Hisense

Hi-Flexi R Series Technical and Service Handbook

TC1 2017007A

Hisense

Inverter-Driven Multi-Split Central Air Conditioning System
Hi-Efficiency R Series Outdoor Units

Technical and Service Handbook

-Design-

-Installation-

-Service-

Models:

AVWT-76~96FESRA
AVWT-114~154FESSA
AVWT-170~454FESZA

TC1 2017007A

Hisense

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Specifications in this catalogue are subject to change without notice,in order that Hisense may bring the latest innovations to their customers.

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IMPORTANT NOTICE AND SAFETY PRECAUTIONS

- Hisense pursues a policy of continuing improvement in design and performance of products. The right is therefore reserved to vary specifications without notice
- Hisense cannot anticipate every possible circumstance that might involve a potential hazard.
- This heat pump air conditioner is designed for standard air conditioning only. Do not use this heat pump air conditioner for other purpose such as drying clothes, refrigerating foods or for any other cooling or heating process.
- Do not install the unit in the following places. It may cause a fire, deformation, corrosion or failure
  * Places where oil (including machinery oil).
  * Places where a lot of sulfide gas drifts such as in hot spring
  *Places where inflammable as may generate or flow.
  * Places where strong salty wind blows such as coast regions.
  * Places with an atmosphere of acidity or alkalinity.
- Do not install the unit in the place where silicon gas drifts. If the silicon gas attaches to the surface of heat exchanger, the fin surface repels wate . As a result, drain water splashes outside of the drain pan and splashed water runs inside of electrical box. In the end, water leakage or electrical devices failure may occur.
- Pay attention to the following points when the unit is installed in a hospital or other facilities where electromagnetic wave generates from medical equipment.
  * Do not install the unit in the place where the electromagnetic wave is directly radiated to the electrical box, remote control cable or remote control switch.
  * Install the unit at least 3 meters away from electromagnetic wave such as a radio.
- Do not install the unit in the place where the breeze directly catches the animals and plants. It could adversely affect the animals and plants.
- The installer and system specialist shall secure against leakage according to local regulations or standards. The following standards may be applicable, if local regulations are not available. International Organization for Standardization, ISO5149 or European Standard, EN378 or Japan Standard, KHKS0010.
- No part of this manual may be reproduced without written permission.
- It is assumed that this heat pump air conditioner will be operated and serviced by English speaking people. If this is not the case, the customer should be add safety, caution and operating signs in the native language.
- If you have any questions, contact your distributor or dealer of Hisense.
- This manual gives a common description and information for this heat pump air conditioner which you operate as well for other models.
- This air conditioner has been designed for operating within a specific range mentioned in section 1.6.

SAFETY SUMMARY

< Signal Words >

- Signal words are used to identify levels of hazard seriousness.
  Definitions for identifying hazard levels are provided below with their respective signal words

⚠ DANGER : DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠WARNING : WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION : CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE : NOTICE is used to address practices not related to personal injury.

NOTE : NOTE is useful information for operation and/or maintenance.

SAFETY SUMMARY

⚠ DANGER

- Do not perform installation work, refrigerant piping work, drain pump, drain piping and electrical wiring connection without referring to our installation manual. If the instructions are not followed, it may result in a water leakage, electric shock or a fire.
- Use the specified non-flammable refrigerant (R410A) to the outdoor unit in the refrigerant cycle. Do not charge material other than R410A into the unit such as hydrocarbon refrigerants (propane or etc.), oxygen, flammable gases (acetylene or etc.) or poisonous gases when installing, maintaining and moving. These flammables are extremely dangerous and may cause an explosion, a fire, and injury.
- Do not pour water into the indoor or outdoor unit. These products are equipped with electrical parts. If poured, it will cause a serious electrical shock.
- Do not open the service cover or access panel for the indoor or outdoor units without turning OFF the main power supply.
- Do not touch or adjust safety devices inside the indoor unit or outdoor units. If these devices are touched or readjusted, it may cause a serious accident.
- Refrigerant leakage can cause difficulty with breathing due to insufficient air. Turn OFF the main switch, extinguish any naked flames and contact your service contractor, if refrigerant leakage occurs.
- Make sure that the refrigerant leakage test should be performed. Refrigerant (Fluorocarbon) for this unit is incombustible, non-toxic and odorless. However if the refrigerant is leaked and is contacted with fire, toxic gas will generate. Also because the fluorocarbon is heavier than air, the floor surface will be filled with it, which could cause suffocation.
- The installer and system specialist shall secure safety against refrigerant leakage according to local regulations or standards.
- Use an ELB (Earth Leakage Breaker). In the event of fault, there is danger of an electric shock or a fire if it is not used.
- Do not install the outdoor unit where there is high level of oil mist, flammable gases, salty air or harmful gases such as sulfur.
- For installation, firmly connect the refrigerant pipe before the compressor starts operating. For maintenance, relocation and disposal, remove the refrigerant pipe after the compressor stops.
- Do not perform a short-circuit of the protection device such as a pressure switch when operating. It may cause a fire and explosion.

SAFETY SUMMARY

⚠WARNING

- Do not use any sprays such as insecticide, lacquer, hair spray or other flammable gases within approximately one (1) meter from the system.
- If circuit breaker or fuse is often activated, stop the system and contact your service contractor.
- Check that the ground wire is securely connected. If the unit is not correctly grounded, it lead electric shock. Do not connect the ground wiring to gas piping, water piping, lighting conductor or ground wiring for telephone.
- Connect a fuse of specified capacity.
- Before performing any brazing work, check to ensure that there is no flammable material around. When using refrigerant be sure to wear leather gloves to prevent cold injuries.
- Protect the wires, electrical parts, etc. from rats or other small animals.
  If not protected, rats may gnaw at unprotected parts and which may lead to a fire.
- Fix the cables securely. External forces on the terminals could lead to a fire.
- Provide a sufficiently strong foundation. If not, the unit may fall down and it may lead to injuries.
- Do not install the unit in a place where oil, vapor, organic solvent and corrosive gas (ammonia, sulfur compound and acid) may be present in quantities.
  It may cause refrigerant leakage due to corrosion, electrical shock, deteriorated performance and breakage.
- Perform electrical work according to Installation Manual and all the relevant regulation and standards.
  If the instructions are not followed, an electrical shock and fire may occur due to insufficient capacity and inadequate performance.
- Use specified cables between units and choose the cables correctly. If not, an electrical shock or fire may occur.
- Ensure that the wiring terminals are tightened securely with the specified torques. If not, generating fire or electrical shock at the terminal connection part may occur.

⚠CAUTION

- Do not step or put any material on the product.
- Do not put any foreign material on the unit or inside the unit.
- Provide a strong and correct foundation so that;
  a. The outdoor unit is not on an incline.
  b. Abnormal sound dose not occur.
  c. The outdoor unit will not fall down due to a strong wind or earthquake.

NOTICE

- Do not install the indoor unit, outdoor unit, remote control switch and cable within approximately 3 meters from strong electromagnetic wave radiators such as medical equipment.
- Supply electrical power to the system to energize the oil heater for 12 hours before startup after a long shutdown.
- Make sure that the outdoor unit is not covered with snow or ice, before operation.
- In some cases, the packaged air conditioner may not be operated normally under the following cases.
  * In case that electrical power for the packaged air conditioner is supplied from the same power transformer as the device*.
  * In case that the power source wires for the device* and the packaged air conditioner are located close to each other.

  Device*: (Ex) Lift, container crane, rectifier for electric railway, inverter power device, arc furnace, electric furnace, large-sized induction motor and large-sized switch.
  It consumes a large quantity of electrical power.

  Regarding the cases mentioned above, surge voltage may be inducted in the power supply wiring for the packaged air conditioner due to a rapid change in power consumption of the device and an activation of switch.
  Therefore, check the field regulations and standards before performing electrical work in order to protect the power supply for the packaged air conditioner.

NOTE

- It is recommended that the room will be ventilated every 3 to 4 hours.
- The heating capacity of the heat pump unit is decreased according to the outdoor air temperature. Therefore, it is recommended that auxiliary heating equipment be used in the field when the units is installed in a low temperature region.
- Regarding transport / storage temperature within -25~55°C.
- All the operation method of remote control switch mention in this handbook is base on HYXE-J01H. Turn to the operation manul accompanied with the remote control switch for detailed information of other types.
- Correct Disposal of this product.

  This marking indicates that this product should not be disposed with other household wastes.
  To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

– CONTENTS –

1. Connectable Outdoor Units and Working Range

1.1 Models of Outdoor Unit

Base Unit

Capacity (HP)	Model 76 (8)	Model 96 (10)	Model 114 (12)	Model 136 (14)	Model 154 (16)
Models	AVWT-76FESRA	AVWT-96FESRA	AVWT-114FESSA	AVWT-136FESSA	AVWT-154FESSA

Model 76~96

Model 114 ~154

[Combined module]

Capacity (HP)	Model 170 (18)	Model 190(20)	Model 212 (22)	Model 232 (24)	Model 250 (26)
Model	AVWT-170FESZA	AVWT-190FESZA	AVWT-212FESZA	AVWT-232FESZA	AVWT-250FESZA
Comination unit	AVWT-96*	AVWT-114*	AVWT-136*	AVWT-114*	AVWT-136*
	AVWT-76*	AVWT-76*	AVWT-76*	AVWT-114*	AVWT-114*
	-	-	-	-	-

Capacity (HP)	Model 272 (28)	Model 290(30)	Model 308 (32)	Model 324 (34)	Model 340 (36)
Model	AVWT-272FESZA	AVWT-290FESZA	AVWT-308FESZA	AVWT-324FESZA	AVWT-340FESZA
Comination unit	AVWT-136*	AVWT-154*	AVWT-154*	AVWT-136*	AVWT-154*
	AVWT-136*	AVWT-136*	AVWT-154*	AVWT-96*	AVWT-96*
	-	-	-	AVWT-96*	AVWT-96*

Capacity (HP)	Model 364 (38)	Model 382 (40)	Model 398 (42)	Model 420 (44)	Model 438 (46)
Model	AVWT-364FESZA	AVWT-382FESZA	AVWT-398FESZA	AVWT-420FESZA	AVWT-438FESZA
Comination unit	AVWT-154*	AVWT-154*	AVWT-154*	AVWT-154*	AVWT-154*
	AVWT-114*	AVWT-136*	AVWT-154*	AVWT-154*	AVWT-154*
	AVWT-96*	AVWT-96*	AVWT-96*	AVWT-154*	AVWT-136*
	-	-	-	-	-

Capacity (HP)	Model 454 (48)
Model	AVWT-454FESZA
Comination unit	AVWT-154*
	AVWT-154*
	AVWT-154*

(Note) Outdoor unit of Models 170~454 consists of 2~3 base units in the combination pattern as given in the table above, and any combination pattern other than specified in the table is unacceptable.

Model 170

Model 190~212

Model 232~308

Model 324~340

Model 364~398

Model 420~454

1.2 Various Indoor Units and Combinations

The line-up of new Hi-Flexi R series indoor units has been extended up to 104 indoor units in 12 types to meet various building requirements.

Indoor Unit Type	Nominal Capacity (kBtu/h)														
	07	09	12	14	17	18	22	24	27	30	38	48	54	76	96
Ceiling Ducted Type (Low Static Pressure)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Ceiling Ducted Type (High Static Pressure)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Low-Height Ceiling Ducted Type	○	○	○	○	○	○	○	○							
Low-Height Ceiling Ducted Type (DC)	○	○	○	○	○	○	○	○							
Slim Ceiling Ducted Type	○	○	○	○											
1-Way Cassette Type	○	○	○	○	○		○								
2-Way Cassette Type	○	○	○	○		○		○							
4-Way Cassette Type		○	○	○	○	○	○	○	○	○	○	○	○		
Compact 4-Way Cassette Type	○	○	○	○	○										
Wall-Mounted Type	○	○	○	○	○	○	○	○							
Ceiling and Floor Type					○	○	○	○	○	○	○	○			
Floor-Concealed Type		○		○		○		○							

○ : Available

1.3 Combination(Standard Type)

Able to Connect a Set of Outdoor Unit with up to 64 Indoor Units

Utilizing an inverter control, a wide range of operation capacity control is also available. A maximum total combination horsepower of 140% and a minimum total combination horsepower of 50% can be chosen by combination of the indoor units when compared with the nominal outdoor unit capacity. Therefore, the new system can meet individual air conditioning requirements in most office buildings

Model (kBtu/h)	Min. Capacity at Individual Operation (kBtu/h)	Max. Number of Connectable I.U.	Recommended Number of Connectable I.U.	Range of Combination Capacity
AVWT-76*	07	13	8	50~140%
AVWT-96*		16	10	
AVWT-114*		19	10	
AVWT-136*		23	16	
AVWT-154*		26	16	
AVWT-170*		26	16	
AVWT-190*		33	18	
AVWT-212*		36	20	
AVWT-232*		40	26	
AVWT-250*		43	26	
AVWT-268*		47	32	
AVWT-287*		50	32	
AVWT-306*		53	32	
AVWT-324*		56	32	
AVWT-340*		59	32	
AVWT-364*		64	38	
AVWT-382*		64	38	
AVWT-398*		64	38	
AVWT-420*		64	38	
AVWT-438*		64	38	
AVWT-454*		64	38	

IMPORTANT:

1. In a system where all indoor units operate at the same time, total of these indoor units should not be larger than combined capacity of the outdoor units, or otherwise overload may occur under severe working condition or within narrow operating range.
2. In a system where not all indoor units operate at the same time, total capacity of these indoor units can be up to 140% of total capacity of the outdoor units.
3. If the system is applied in cold area (with ambient temperature below -10°C) or high heat load environment, the total capacity of indoor units should be less than combined capacity of outdoor units and total length of pipeline shall be less than 300m.
4. Compared to indoor unit of 12kBtu/h, those of 07kBtu/h and 09kBtu/h, if set to high-velocity airflow, may deliver airflow in too low temperature, so prior to installation, check the operation environment and installation location with much care. Where the equipment is installed at a location which may be subject to the circumstance as stated above, number of indoor units connected may be smaller than the number recommended in the table above.

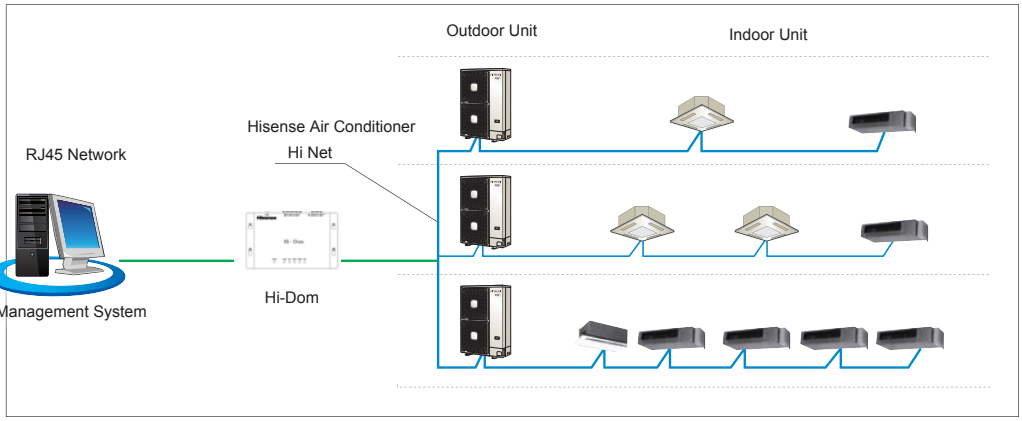
1.4 Communication System

Hisense Centralized Control System

Hisense centralized control system can realize centralized monitoring and control of all air conditioners through the computer, the system has powerful functions and is simple to operate, a maximum of 2048 outdoor units and 4096 indoor units can be monitored and controlled by the system.

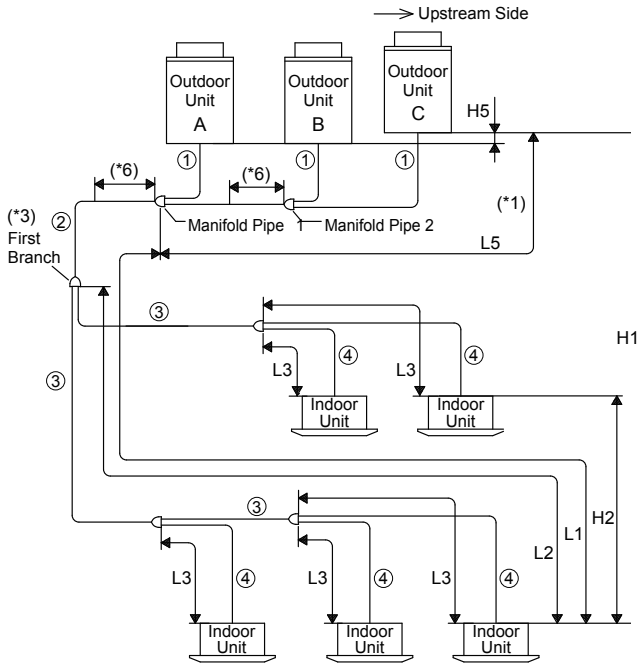
Hisense Smart Home Management System

Connection and normal communication can be realized between the air conditioning system and the smart home system through the air conditioning network converter, by incorporating household central air-conditioning system and hot water system into the smart home system, application management that is more humanized and more convenient can be realized.



1.5 Piping System

1.5.1 Selection of Piping System



※1. Manifold pipe #1 is the one close to indoor unit side

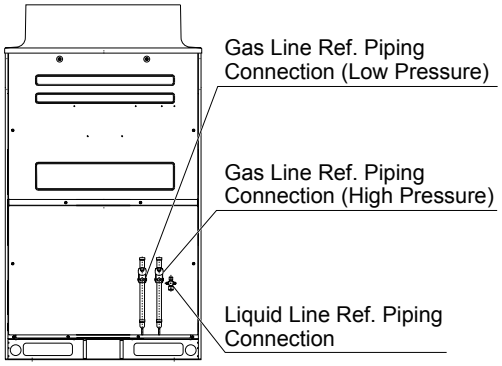
※2. Straight-line distance before main piping of manifold pipe should be more than 500mm.

※3. When manifold pipe following the First Branch is larger than the first branch pipe, re-size it to the same as the first branch pipe. When pipe following the first branch pipe is larger than main pipe (2), re-size it to the same as the main pipe (2).

※4 If equivalent pipe length from manifold pipe #1 of outdoor unit to the nearest indoor unit is more than 100mm, gas and liquid pipes of main pipe (2) (from manifold pipe #1 of outdoor unit to 1st branch pipe) must be larger by one number, and the 1st branch pipe should be re-sized correspondingly.

(1) Manifold pipe of outdoor unit

- Tube Specifications for AVWT-76*~AVWT-154* (basic modules)



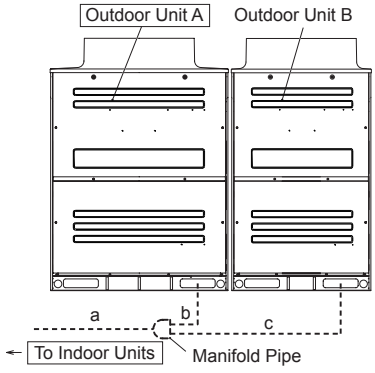
(Φmm)

Model			76	96	114	136	154
Piping Size	a	Low Pressure Gas	19.05	22 2	25.4	25.4	28.6
		High Pressure Gas	15.88	19.05	22.2	22 2	22.2
		Liquid	9.53	9.53	12.7	12.7	12.7

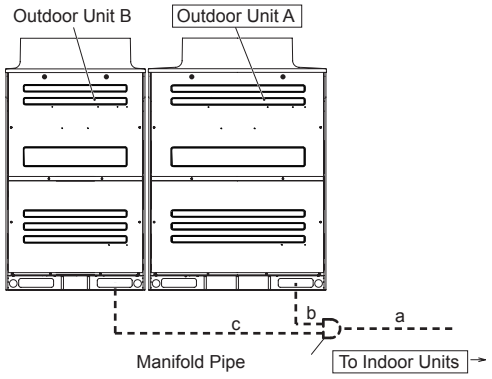
- Piping Size for AVWT-170FESZA to AVWT-308FESZA (2 Units Combination)

< Figure for AVWT-232FESZA >

(Indoor Unit on Left Side)



(Indoor Unit on Right Side)



(ϕmm)

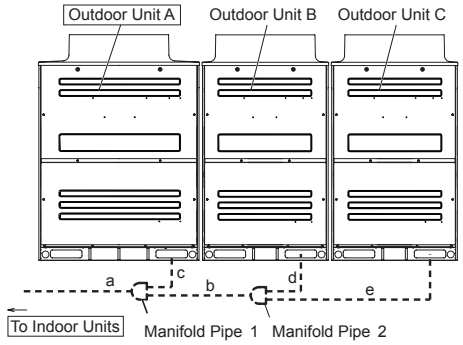
Model			AVWT-170FESZA	AVWT-190FESZA	AVWT-212FESZA	AVWT-232FESZA	AVWT-250FESZA	AVWT-272FESZA	AVWT-290FESZA	AVWT-308FESZA
Combination Unit		Outdoor Unit A	AVWT-96FESRA	AVWT-114FESSA	AVWT-136FESSA	AVWT-114FESSA	AVWT-136FESSA	AVWT-136FESSA	AVWT-154FESSA	AVWT-154FESSA
		Outdoor Unit B	AVWT-76FESRA	AVWT-76ESRA	AVWT-76FESRA	AVWT-114FESSA	AVWT-114FESSA	AVWT-136FESSA	AVWT-136FESSA	AVWT-154FESSA
Piping Connection Kit			HFQ-M202F				HFQ-M212F			
Piping Size	a	Low Pressure Gas	28.6	28.6	28.6	28.6	31.75	31.75	31.75	31.75
		High Pressure Gas	22.2	22.2	25.4	25.4	25.4	28.6	28.6	28.6
		Liquid	15.88	15.88	15.88	15.88	19.05	19.05	19.05	19.05
	b	Low Pressure Gas	22.2	25.4	25.4	25.4	25.4	25.4	28.6	28.6
		High Pressure Gas	19.05	22.2	22.2	22.2	22.2	22.2	22.2	22.2
		Liquid	9.53	12.7	12.7	12.7	12.7	12.7	12.7	12.7
	c	Low Pressure Gas	19.05	19.05	19.05	25.4	25.4	25.4	25.4	28.6
		High Pressure Gas	15.88	15.88	15.88	22 2	22.2	22.2	22.2	22.2
		Liquid	9.53	9.53	9.53	12.7	12.7	12.7	12.7	12.7

* Perform the installation of the outdoor unit and piping connection according to the figure.
Refer to the table for the outdoor unit model, the manifold pipe model and the piping diameter.

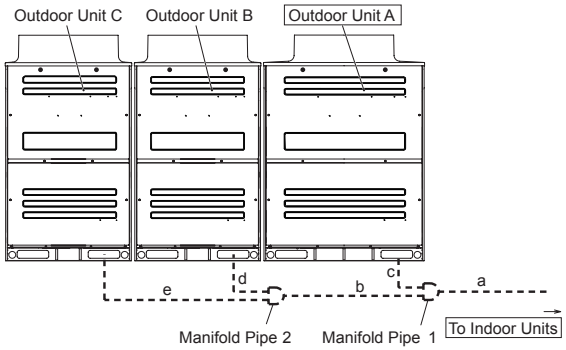
- Piping Size for AVWT-324FESZA to AVWT-454FESZA (Triple Units Combination)

< Figure for AVWT-364FESZA >

(Indoor Unit on Left Side)



(Indoor Unit on Right Side)



(ϕmm)

Model			AVWT-324FESZA	AVWT-340FESZA	AVWT-364FESZA	AVWT-382FESZA	AVWT-398FESZA	AVWT-420FESZA	AVWT-438FESZA	AVWT-454FESZA
Combination Unit		Outdoor Unit A	AVWT-136FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA
		Outdoor Unit B	AVWT-96FESRA	AVWT-96FESRA	AVWT-114FESSA	AVWT-136FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA
		Outdoor Unit C	AVWT-96FESRA	AVWT-96FESRA	AVWT-96FESRA	AVWT-96FESRA	AVWT-96FESRA	AVWT-114FESSA	AVWT-136FESSA	AVWT-154FESSA
Piping Connection Kit			HFQ-M212F		HFQ-M302F					
Piping Size	a	Low Pressure Gas	31.75	31.75	38.1	38.1	38.1	38.1	38.1	38.1
		High Pressure Gas	28.6	28.6	31.75	31.75	31.75	31.75	31.75	31.75
		Liquid	19.05	19.05	19.05	19.05	19.05	19.05	19.05	19.05
	b	Low Pressure Gas	28.6	28.6	28.6	28.6	31.75	31.75	31.75	31.75
		High Pressure Gas	22.2	22.2	25.4	25.4	25.4	28.6	28.6	28.6
		Liquid	15.88	15.88	15.88	15.88	19.05	19.05	19.05	19.05
	c	Low Pressure Gas	25.4	28.6	28.6	28.6	28.6	28.6	28.6	28.6
		High Pressure Gas	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2
		Liquid	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
	d	Low Pressure Gas	22.2	22.2	25.4	25.4	28.6	28.6	28.6	28.6
		High Pressure Gas	19.05	19.05	22.2	22.2	22.2	22.2	22.2	22.2
		Liquid	9.53	9.53	12.7	12.7	12.7	12.7	12.7	12.7
	e	Low Pressure Gas	22.2	22.2	22.2	22.2	22.2	25.4	25.4	28.6
		High Pressure Gas	19.05	19.05	19.05	19.05	19.05	22.2	22.2	22.2
		Liquid	9.53	9.53	9.53	9.53	9.53	12.7	12.7	12.7

* Perform the installation of the outdoor unit and piping connection according to the figure.
Refer to the table for the outdoor unit model, the manifold pipe model and the piping diameter.

① Branch pipe after First Branch

- Branch Pipe (Optional Parts)

  < Line Branch >

First Branch

Outdoor Unit (kBtu/h)	Model
76 to 96	HFQ-M282F
114 to 154	HFQ-M452F
170 to 232	HFQ-M562F
250 to 340	HFQ-M692F
264 to 510	HFQ-M902F

Pipe Diameter and Branch Pipe after First Branch ∗

Total Indoor Unit (kBtu/h)	Low Pressure Gas (ϕmm)	High Pressure Gas (ϕmm)	Liquid (ϕmm)	Model
Lower than 57	15.88	12.7	9.53	HFQ-M142F
57 to 86	19.05	15.88	9.53	HFQ-M282F
86 to 114	22.2	19.05	9.53	
114 to 154	25.4	22.2	12.7	HFQ-M452F
154 to 170	28.6	22.2	12.7	HFQ-M562F
170 to 212	28.6	22.2	15.88	
212 to 250	28.6	25.4	15.88	HFQ-M692F
250 to 340	31.75	28.6	19.05	
Over 340	38.1	31.75	19.05	HFQ-M902F

∗: If the piping branch at 2 pipes portion is necessary, use branch pipe of
HFQ-102F, HFQ-162F, HFQ-242Ffor heat pump type.

② Termind Indoor Unit※5

Indoor Capacity(KW)	Longest equivalent piping length<100m	
	Air pipe（mm）	Liquid pipe（mm）
07–14	12.7	6.35※5
17–18	15.88	6.35※5
22–54	15.88	9.53
76	19.05	9.53
96	22.2	9.53

※5 From 05~19 kBtu/h In door unit and wall mounted type 22 KBtu/h,longer the liquid pipe size from 6.35 to 9.35,If the pipe lenghth longer than 15m。

For Heat Recovery System

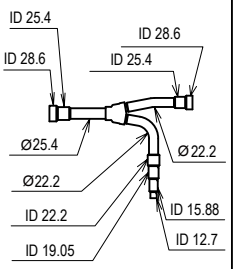
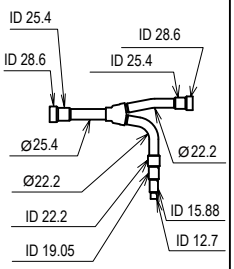
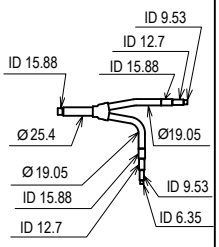
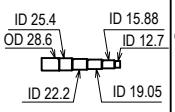
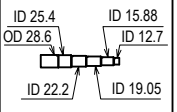
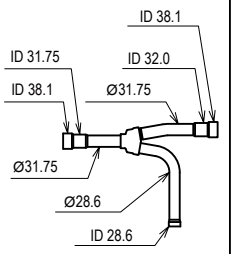
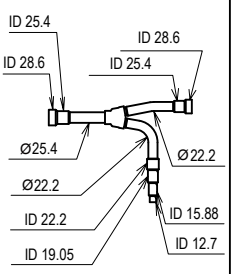
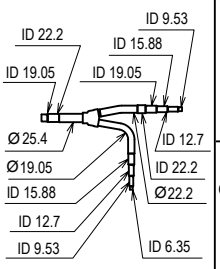
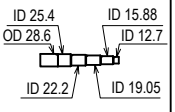
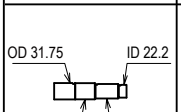
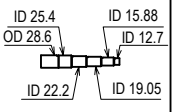
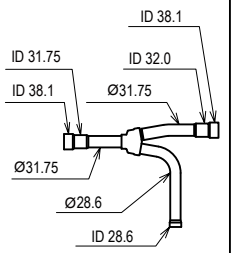
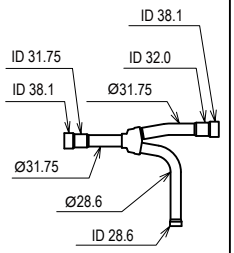
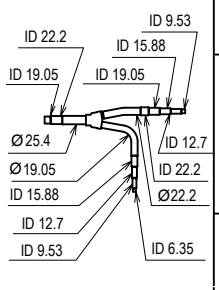
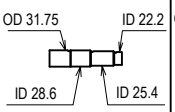
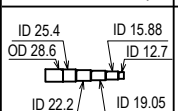
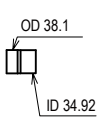
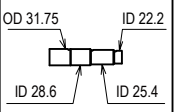
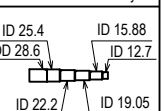
< Manifold Pipe (Models: HFQ-M202F, HFQ-M212F, HFQ-M302F) > [Installation Work]

■ Piping Connection Size

The ends of the branch pipes are finished as shown in the following figures. Cut the end of the pipe to meet with the pipe size.

⚠CAUTION

Piping shall be supported with adequate space. Bent pipes and bypass piping (horizontal loop) shall also be installed in order to absorb piping elasticity caused by temperature changes.

Model	Low Pressure Gas Line	High Pressure Gas Line	Liquid Line	Reducer for Low Pressure Gas Line	Reducer for High Pressure Gas Line	Reducer for Liquid Line
HFQ-M202F				 Q'ty: 1	 Q'ty: 2	—
HFQ-M212F				 Q'ty: 1  Q'ty: 1	 Q'ty: 1 —	—
HFQ-M302F				 Q'ty: 1  Q'ty: 1  Q'ty: 1	 Q'ty: 1  Q'ty: 1 —	—

Unit: mm, ID: Inner Diameter, OD: Outer Diameter

< Line Branch (Models: HFQ-M142F, HFQ-M282F, HFQ-M452F, HFQ-M562F, HFQ-M692F, HFQ-M902F >

[Installation Work]

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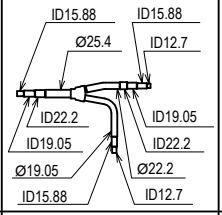
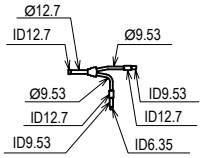
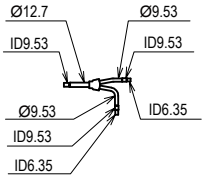
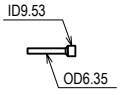
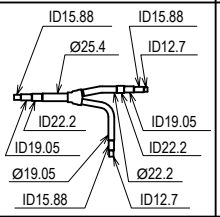
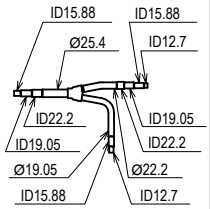
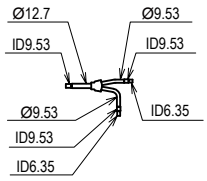
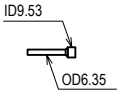
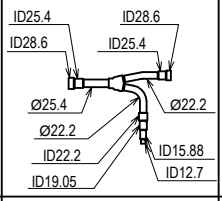
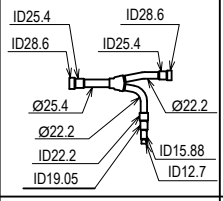
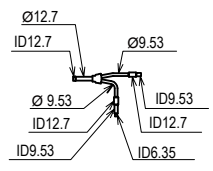
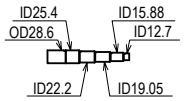
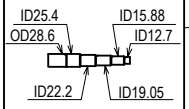
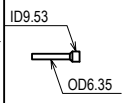
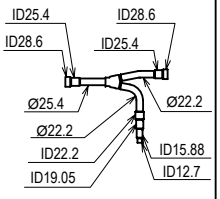
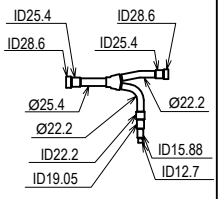
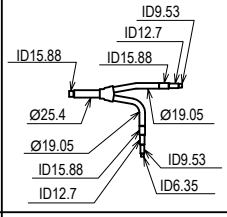
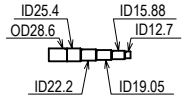
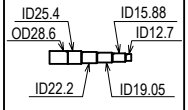
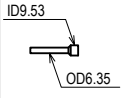
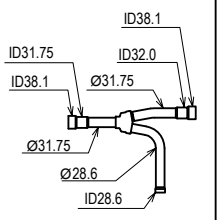
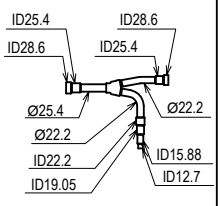
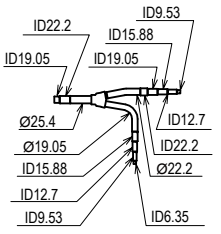
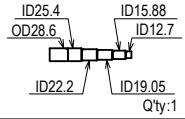
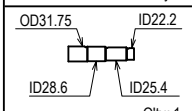
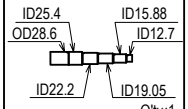
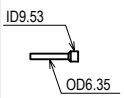
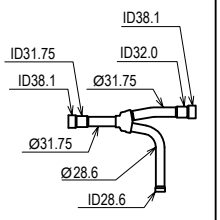
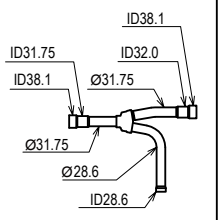
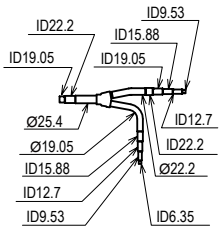
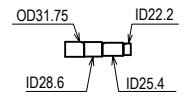
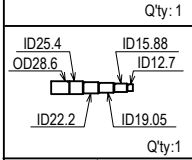
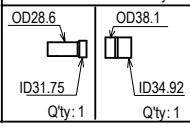
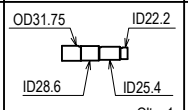
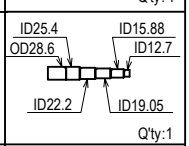
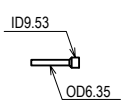
HFQ-M142F				—	—	 Q'ty: 2
HFQ-M282F				—	—	 Q'ty: 2
HFQ-M452F				 Q'ty:1	 Q'ty: 2	 Q'ty:1
HFQ-M562F				 Q'ty:1	 Q'ty: 2	 Q'ty:1
HFQ-M692F				 Q'ty:1  Q'ty: 1	 Q'ty:1	 Q'ty:1
HFQ-M902F				 Q'ty: 1  Q'ty:1  Q'ty: 1 Q'ty: 1	 Q'ty: 1  Q'ty:1	 Q'ty: 1

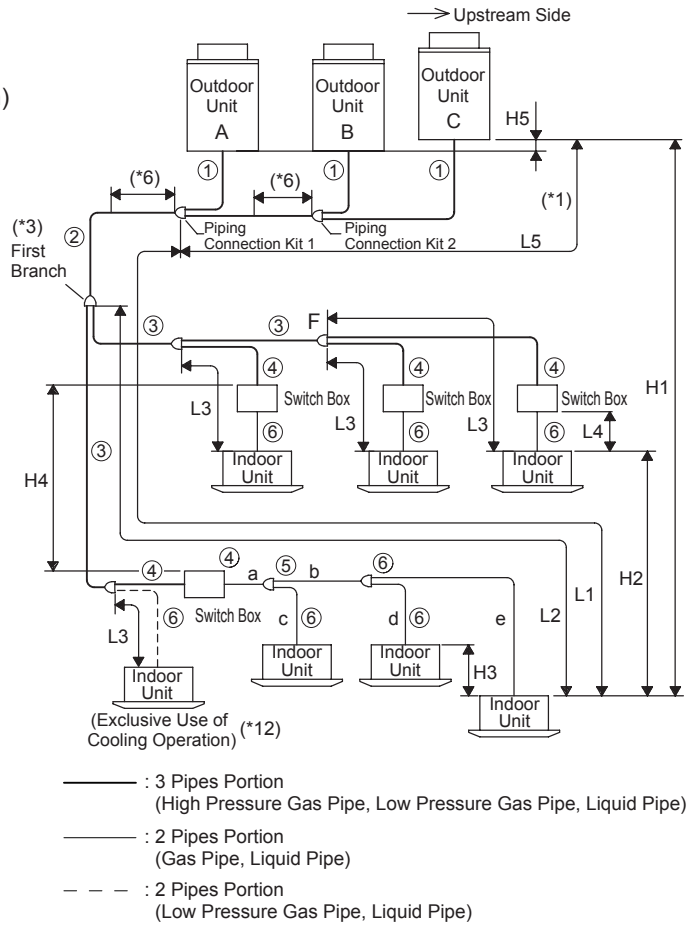
Unit: mm, ID: Inner Diameter, OD: Outer Diameter

- Piping Size (ϕmm)

① Pipe Diameter for Outdoor Unit

② Main Pipe Diameter
(Base Unit or Piping Connection Kit 1 to First Branch)
[Branch pipe of First Branch] (3 Pipes) (*2)

Outdoor Unit kBtu/h	Low Pressure Gas	High Pressure Gas	Liquid
76	19.05	15.88	9.53
96	22.2	19.05	9.53
114 and 136	25.4	22.2	12.7
154	28.6	22.2	12.7
170 and 190	28.6	22.2	15.88
212 and 232	28.6	25.4	15.88
250	31.75	25.4	19.05
272 to 340	31.75	28.6	19.05
364 to 454	38.1	31.75	19.05



③ [Pipe Diameter after First Branch] (3 Pipes) (*3)(*7)

Total Indoor Unit kBtu/h	Low Pressure Gas	High Pressure Gas	Liquid
Lower than 57	15.88	12.7	9.53
57 to 86	19.05	15.88	9.53
86 to 114	22.2	19.05	9.53
114 to 154	25.4	22.2	12.7
154 to 170	28.6	22.2	12.7
170 to 212	28.6	22.2	15.88
212 to 250	28.6	25.4	15.88
250 to 340	31.75	28.6	19.05
Over 340	38.1	31.75	19.05

④ [Pipe Diameter between Switch Box to Branch pipe] (3 Pipes and 2 Pipes) (*9)

Switch Box Model	Max. Combination of Indoor Unit (*8)	Available Combination of Indoor Unit Capacity (kBtu/h) (*10), (*11)	3 Pipes		2 Pipes	
			Low Pressure Gas	High Pressure Gas	Gas	Liquid
HCH-160D	7	07 to 14	15.88	12.7	12.7 (*15)	9.53
		15 to 38	15.88	12.7	15.88	9.53
		39 to 57	19.05	15.88	15.88	9.53
HCH-280D	8	58 to 76	19.05	15.88	19.05	9.53
		77 to 96	22.2	19.05	22.2	9.53

⑤ [Pipe Diameter for 2 Pipes and Branch pipe]

Total Indoor Unit kBtu/h	Gas	Liquid
Lower than 57	15.88	9.53
57 to 86	19.05	9.53
86 to 114	22.2	9.53
114 to 154	25.4	12.7
154 to 170	28.6	12.7
170 to 250	28.6	15.88

⑥ [Pipe Diameter between Branch pipe and Indoor Unit] (2 Pipes) (*4)

Indoor Unit kBtu/h	Gas	Liquid
07 to 14	12.7	6.35 (*5)
17 to 18	15.88	6.35 (*5)
22 to 54	15.88	9.53
76	19.05	9.53
96	22.2	9.53

● Piping Work Conditions (Refer to the figure of previous age.)

Item		Mark	Allowable Piping Length (*13)	
			≤ the recommended connectable number of Indoor Unit	≥ the recommended connectable number of Indoor Unit
Total Piping Length		Total Liquid Piping Actual Length	≤ 1,000m (*14)	≤ 300m
Maximum Piping Length	Actual Length	L1	≤ 165m	≤ 165m
	Equivalent Length		≤ 190m	≤ 190m
Maximum Piping Length between Branch pipe of 1st Branch and Each Indoor Unit		L2	≤ 90m	≤ 40m
Maximum Piping Length between Each Branch pipe and Each Indoor Unit		L3	≤ 40m	≤ 30m
Total Piping Length between Switch Box and Each Indoor Unit		* L4 * a+b+c+d+e	HCH-160D: ≤ 30m	HCH-160D: ≤ 30m
			HCH-280D: ≤ 10m	HCH-280D: ≤ 10m
Piping Length between Piping Connection Kit 1 and Each Outdoor Unit		L5	≤ 10m	≤ 10m
Height Difference between Outdoor Units and Indoor Units	O.U. is Higher	H1	≤ 50m	≤ 50m
	O.U. is Lower		≤ 40m	≤ 40m
Height Difference between Indoor Units		H2	≤ 15m	≤ 15m
Height Difference between Indoor Units using the Same Switch Box		H3	≤ 4m	≤ 4m
Height Difference between Switch Box		H4	≤ 15m	≤ 15m
Height Difference between Outdoor Units		H5	≤ 0.1m	≤ 0.1m

(*1): The piping connection kit is counted from the indoor unit side (as Piping Connection Kit 1).

(*2): When the maximum length of the equivalent refrigerant pipe (L1) from the outdoor unit/piping connection kit 1 to the indoor unit is over 100m, the pipe size of gas/liquid line from the outdoor unit/piping connection kit 1 to first branch should be increased with the reducer (field-supplied)

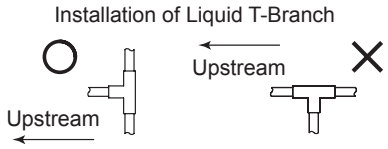
(*3): If the refrigerant piping length is more than 100m, no need to increase the pipe size after first branch.
If the branch pipe size is larger than the first branch, adjust the branch pipe size to the first branch. In case that the selected pipe size after the first branch is larger than the pipe size before the first branch, use the same pipe size as before the branch.

(*4): The pipe diameter ⑥ should be the same as the indoor unit piping connection size.

(*5): When the liquid piping length is longer than 15m, use ϕ9.53 pipe and reducer (field-supplied)

(*6): Keep the direct distance of 500mm or more after the piping connection kit.

(*7): In case of the line branch, if the length of the pipe between the terminal branch of 3 pipes (specified in the figure of mark F) and the farthes indoor unit exceeds 5m, use a T-branch to the applicable liquid pipe of 3 branches. (Corresponding to the Same Diameter as JIS B8607)



(*8): In case that the number of connectable indoor unit exceeds four, the high/low pressure gas pipe, gas pipe and liquid pipe (Fig. ④⑤⑥) need to increase one size respectively.

(*9): The liquid pipe is not required to connect to the Switch Box. Refer to Table ⑥ for the liquid pipe diameter between multi-kit and indoor unit.

(*10): In case that the combination of indoor unit capacity is 96kBtu/h for HCH-280D, the performance may decrease approximate 5% in cooling and 10% in heating.

(*11): The excess of the total capacity may cause insufficient p rformance and abnormal sound. Be sure to connect within the allowable total capacity.

(*12): For the exclusive cooling operation, connect indoor units with low pressure gas pipe and liquid pipe (without Switch Box). The total capacity of the exclusive cooling operation should be smaller than 50% of the total indoor unit capacity.

(*13): The condition of refrigerant piping installation is different depending on the connected indoor unit quantities.

(*14): Allowable total piping length may become shorter than 1,000m due to the limitation of maximum additional refrigerant amount.

(*15): In case that a branch is located downstream of the Switch Box and also the connected indoor unit capacity is 7~14kBtu/h use ϕ15.88 for the gas pipe.

NOTES:

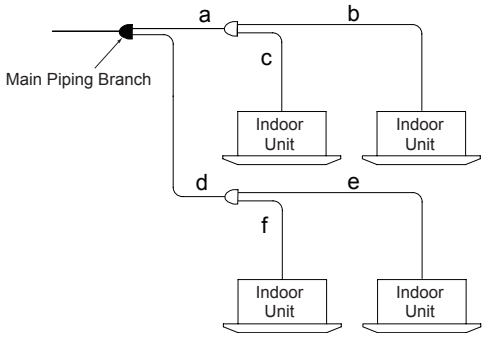
1. Check the gas pipe and liquid pipe are equivalent in terms of the piping length and piping system.
2. Use a branch pipe (system components) for the branch pipe of indoor unit and Switch Box.
3. Install the outdoor unit, branch pipe and Switch Box according to each “Installation & Maintenance Manual”.
4. If the piping length (L3) between each branch pipe and each indoor unit is considerably longer than other indoor unit, refrigerant may not flow well and also performance may be deteriorated compared to other models (Recommended Piping Length: within 15m)

- Piping Branch Restriction

  Follow the table below when performing the field-supplied piping work.

Piping Length between Branch pipe(First Branch) and Each Indoor Unit (L2)	Main Piping Branch *		Indoor Unit Capacity Ratio After Main Branch
	Piping Length After Branch	Number of Main Piping Branch	
≤ 40m	a+b+c ≤ 30m or d+e+f ≤ 30m	without Limit	-
	a+b+c > 30m and d+e+f > 30m	within 2	
within 41m to 90m	-	within 1 (Fig.1)	≥ 40% (Fig.2)

NOTE:
* Main Piping Branch: Distribution from One (1) Branch pipe to Two (2) Branch pipes
The number of main piping branch depends on the piping length after branch (a to f).



Main piping branches are 2 portions.

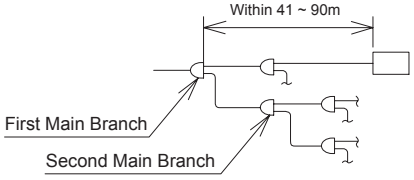


Fig. 1

Indoor unit capacity ratio is less than 40%.

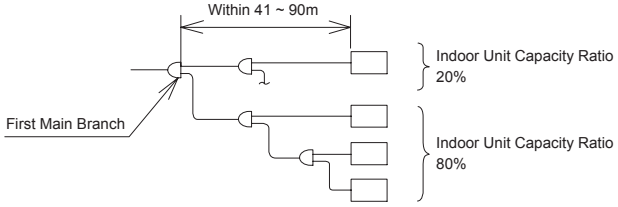


Fig. 2

1.6 Operating Range

Power Supply

Working Voltage: 90% to 110% of the Rated Voltage Working Frequency: ±1% of the Rated Frequency Voltage
Imbalance: Within a 3% Deviation from Each Voltage at the Main Terminal of Outdoor Unit
Starting Voltage: Higher than 85% of the Rated Voltage

Operation temperature range Follow the table below.

		Cooling Operation	Heating Operation
Indoor Temperature	Minimum	21°C DB / 15°C WB	15°C DB
	Maximum	32°C DB / 23°C WB	27°C DB
Outdoor Temperature	Minimum	-5°C DB (*)	-20°C WB (**)
	Maximum	43°C DB	15°C WB

DB: Dry Bulb, WB: Wet Bulb

NOTES:
(*) 10°C DB ~ -5°C DB, Operation Control Range
(**) -12°C WB ~ -20°C WB, Operation Control Range

2. General Data

Capacity（HP）			76Model(8)	96Model(10)	114Model(12)	136Model(14)
Model	Outdoor Model		AVWT-76FESRA	AVWT-96FESRA	AVWT-114FESSA	AVWT-136FESSA
	Conbination		AVWT-76FESRA	AVWT-96FESRA	AVWT-114FESSA	AVWT-136FESSA
Power Supply		–	AC 3 ϕ 380V~415V/50Hz			
Performance						
Cooling Operating Range		℃	-5~43			
Nominal Cooling Capacity※1)		kW	22.4	28.0	33.5	40.0
		Btu/h	76,500	95,600	114,300	136,500
Nominal Cooling Capacity※2)		kW	22.7	28.4	34.0	40.6
		Btu/h	77,500	96,900	116,000	138,600
Power Consumption		kW	5.32	6.97	9.18	10.81
EER		–	4.21	4.02	3.65	3.70
Heating Operating Range		℃	-20~15			
Nominal Heating Capacity		kW	25.0	31.5	37.5	45.0
		Btu/h	85,300	107,500	128,000	153,500
Power Consumption		kW	5.40	7.19	8.60	10.20
COP		–	4.63	4.38	4.36	4.41
Sound Pressure Level※3		dB(A)	60/55	60/55	62/57	62/57
Cabinet Color		–	Ivory White			
Outer Dimensions (Hx W x D)		mm	1,720×950× 750		1,720 × 1,210× 750	
Packing Dimensions(H x W x D)		mm	1,882 ×1,018×828		1,882×1,278×828	
Net Weight（Gross Weight）		kg	245（255）	246（255）	311（325）	312（325）
Refrigerating Installation						
Compressor		–	Scroll Comp			
Crankcase Heater Capacity		kW	0.08	0.08	0.16	0.16
Refrigeration Oil	Type	–	FVC68D			
	Brand	–	Idemitsu Kosan			
	Charge(Unit/Comp.)	L	4.9/1.1	4.9/1.1	6.3/1.1+0..5	6.3/1.1+0.5
Refrigerant	Type	–	R410A			
	Charge Amount	L	9.9	9.9	10.5	10.5
Max Refrigerant Charge Amount※4		kg	42.9	42.9	49	49
Chargeless Length		m	0			
Max.Piping Length		m	1000			
Connections Refrigerant Piping		–	Brazing			
Refrigerant Flow Control		–	Micro-computer Control Expansion Valve			
Heat Exchanger Type		–	Multi-Pass Cross-Finned Tube			
Low Gas Pipe		mm	19.05	22.2	25.4	25.4
High Gas Pipe		mm	15.85	19.05	22.2	22.2
Liquid Pipe		mm	9.53	9.53	12.7	12.7
Design pressure (High/ Low)		MPa	4.15/2.21	4.15/2.21	4.15/2.21	4.15/2.21
Fan						
Condenser Fan Quantity		—	1	1	1	1
Air Flow Rate		m^3/min	170	175	195	195
Defrosting Condition						
Mininum Defrosting time		min	45	45	45	45
Max.Defrosting time		min	9	9	9	9
Defrosting Start Temp		℃	With Air Temperature Ta Calculate			
Defrosting end Temp(Tube)		℃	With Air Temperature Ta Calculate			
Hole for Power Supply Wiring		mm	46	46	46	46
Hole for Control Line Wiring		mm	20	20	20	20

The above cooling and heating capacities show the capacities when the outdoor unit is operated with the 100% rating of indoor units,

Cooling Operation Conditions

Indoor Air Inlet Temperature: 27℃ DB (80°F DB)

※1 19℃ WB (66.2°F WB)

※2 19.5℃ WB (66°F WB)

Heating Operation Conditions

Indoor Air Inlet Temperature: 20°C DB (68°F DB)

Outdoor Air Inlet Temperature: 7°C DB (45°F DB)

6°C WB (43°F WB)

Outdoor Air Inlet Temperature: 35°C DB (95°F DB)

Piping Length: 7.5 Meters, Piping Lift: 0 Meter

※ 3: The sound pressure is tested according to the appendix B of GB/T18836-2002. The above parameters were measured in an anechoic chamber with no echo, so the echo should be considered in the field. When return air grille is on bottom plate of the duct or external static pressure is higher, the sound pressure will increase according to the installation method and building structure.

※ 4: Max. additional refrigerant charge quantity has included the outdoor unit refrigerant charge Before Shipment

Capacity（HP）			154Model (16)	170Model (18)	190Model (20)	212Model (22)
Model	Outdoor Model		AVWT–154FESSA	AVWT–170FESZA	AVWT–190FESZA	AVWT–212FESZA
	Conbination		AVWT–154FESSA	AVWT–96FESRA	AVWT–114FESSA	AVWT–136FESSA
			–	AVWT–76FESRA	AVWT–76FESRA	AVWT–76FESRA
Power Supply		—	AC 3 ϕ 380V~415V/50Hz			
Performance						
Cooling Operating Range		℃	–5~43			
Nominal Cooling Capacity※1)		kW	45.0	50.0	56.0	61.5
		Btu/h	153,500	170,600	191,100	209,900
Nominal Cooling Capacity※2)		kW	45.6	50.7	56.8	62.4
		Btu/h	155,600	173,000	193,800	213.000
Power Consumption		kW	13.16	12.29	14.50	16.13
EER		–	3.42	4.07	3.86	3.81
Heating Operating Range		℃	–20~15			
Nominal Heating Capacity		kW	50.0	56.0	63.0	69.0
		Btu/h	170,600	191,100	213,300	235,500
Power Consumption		kW	12.50	12.59	14.00	15.60
COP		–	4.00	4.45	4.50	4.42
Sound Pressure Level※3		dB(A)	63/58	62/57	63/58	63/58
Cabinet Color		–	Ivory White			
Outer Dimensions (Hx W x D)		mm	1,720×950 × 750	1,720×(950+950)×750	1,720×（950+1,210）×750	
Packing Dimensions(H x W x D)		mm	1,882×1 ,278 ×828	1,882×(1 ,018+1018)×828	1,882×（1,278+1018）×828	
Net Weight（Gross Weight）		kg	318(330)	491(510)	394(415)	395(416)
Refrigerating Installation						
Compressor		–	Scroll Comp			
Oil Crankcase Heater Capacity		kW	0.16	0.16	0.16	0.16
Refrigeration Oil	Type	–	FVC68D			
	Brand	–	Idemitsu Kosan			
	Charge(Unit/Comp.)	L	5.7/2.2	9.8/2.2	11.2/2.7	11.2/2.7
Refrigerant	Type	–	R410A			
	Charge Amount	L	10.5	19.8	20.4	20.4
Max Refrigerant Charge Amount※ 4		kg	52.5	42.5	45.7	46.2
Chargeless Length		m	0			
Max.Piping Length		m	1000			
Connections Refrigerant Piping		–	Brazing			
Refrigerant Flow Control		–	Micro–computer Control Expansion Valve			
Heat Exchanger Type		–	Multi–Pass Cross–Finned Tube			
Low Gas Pipe		mm	28.6	28.6	28.6	28.6
High Gas Pipe		mm	22.2	22.2	22.2	25.4
Liquid Pipe		mm	12.7	15.88	15.88	15.88
Pressure(High/Low Pressure)		MPa	4.15/2.21	4.15/2.21	4.15/2.21	4.15/2.21
Fan						
Condenser Fan Quantity		—	1	2	2	2
Air Flow Rate		m^3/min	195	345	365	365
Defrosting Condition						
Mininum Defrosting time		min	45	45	45	45
Max.Defrosting time		min	9	9	9	9
Defrosting Start Temp		℃	With Air Temperature Ta Calculate			
Defrosting end Temp(Tube)		℃	With Air Temperature Ta Calculate			
Hole for Power Supply Wiring		mm	46	46	46	46
Hole for Control Line Wiring		mm	20	20	20	20

The above cooling and heating capacities show the capacities when the outdoor unit is operated with the 100% rating of indoor units,

Cooling Operation Conditions

Indoor Air Inlet Temperature: 27℃ DB (80°F DB)
※1 19℃ WB (66.2°F WB)
※2 19.5℃ WB (66°F WB)

Heating Operation Conditions

Indoor Air Inlet Temperature: 20°C DB (68°F DB)
Outdoor Air Inlet Temperature: 7°C DB (45°F DB)
6°C WB (43°F WB)

Outdoor Air Inlet Temperature: 35°C DB (95°F DB)

Piping Length: 7.5 Meters, Piping Lift: 0 Meter

※ 3: The sound pressure is tested according to the appendix B of GB/T18836-2002. The above parameters were measured in an anechoic chamber with no echo, so the echo should be considered in the field. When return air grille is on bottom plate of the duct or external static pressure is higher, the sound pressure will increase according to the installation method and building structure.

※ 4: Max. additional refrigerant charge quantity has included the outdoor unit refrigerant charge Before Shipment

Capacity (HP)			232Model (24)	250Model (26)	272*Model (28)	290*Model (30)
Model	Outdoor Model		AVWT–232FESZA	AVWT–250FESZA	AVWT–272FESZA	AVWT–290FESZA
	Conbination		AVWT–114FESSA	AVWT–136FESSA	AVWT–136FESSA	AVWT–154FESSA
			AVWT–114FESSA	AVWT–114FESSA	AVWT–136FESSA	AVWT–136FESSA
Power Supply		–	AC 3 ϕ 380V~415V/50Hz			
Performance						
Cooling Operating Range		℃	–5~43			
Nominal Cooling Capacity※1)		kW	69.0	73.0	80.0	85.0
		Btu/h	235,500	249,100	273,000	290,100
Nominal Cooling Capacity※2)		kW	70.0	74.0	81.1	86.2
		Btu/h	238,840	252,488	276,713	294,114
Power Consumption		kW	18.36	19.99	21.62	23.97
Heating Operating Range		℃	–20~15			
Nominal Heating Capacity		kW	77.5	82.5	90.0	95.0
		Btu/h	264,5	281,600	307,200	324.2
Power Consumption		kW	17.20	18.80	20.40	22.70
Sound Pressure Level※3		dB(A)	64/59	64/59	64/59	65/60
Cabinet Color		–	Ivory White			
Outer Dimensions (Hx W x D)		mm	1720×(1210+1210)×750	1720×(1210+1210)×750		
Packing Dimensions(H x W x D)		mm	1882×(1278+1278)×828	1882×(1278+1278)×828		
Net Weight (Gross Weight)		kg	622 (650)	623 (650)	593 (636)	634 (667)
Refrigerating Installation						
Compressor		–	Scroll Comp			
Crankcase Heater Capacity		kW	0.16	0.24	0.32	0.32
Refrigeration Oil	Type	–	FVC68D			
	Brand	–	Idemitsu Kosan			
	Charge(Unit/Comp.)	L	12.6/3.2	12.6/3.2	12.6/3.2	12/3.8
Refrigerant	Type	–	R410A			
	Charge Amount	L	21	21	21	21
Max Refrigerant Charge Amount※ 4		kg	57.4	57.4	57.4	60.6
Chargeless Length		m	0			
Max.Piping Length		m	1000			
Connections Refrigerant Piping		–	Brazing			
Refrigerant Flow Control		–	Micro–computer Control Expansion Valve			
Heat Exchanger Type		–	Multi–Pass Cross–Finned Tube			
Low Gas Pipe		mm	28.6	31.75	31.75	31.75
High Gas Pipe		mm	25.4	25.4	28.6	28.6
Liquid Pipe		mm	15.88	19.05	19.05	19.05
Pressure(High/Low Pressure)		MPa	4.15/2.21	4.15/2.21	4.15/2.21	4.15/2.21
Fan						
Condenser Fan Quantity		—	2	2	2	3
Air Flow Rate		m^3/min	390	390	390	390
Defrosting Condition						
Mininum Defrosting time		min	45	45	45	45
Max.Defrosting time		min	9	9	9	9
Defrosting Start Temp		℃	With Air Temperature Ta Calculate			
Defrosting end Temp(Tube)		℃	With Air Temperature Ta Calculate			
Hole for Power Supply Wiring		mm	46	46	46	46
Hole for Control Line Wiring		mm	20	20	20	20

The above cooling and heating capacities show the capacities when the outdoor unit is operated with the 100% rating of indoor units,

Cooling Operation Conditions

Indoor Air Inlet Temperature: 27℃ DB (80°F DB)
※1 19℃ WB (66.2°F WB)
※2 19.5℃ WB (66°F WB)

Outdoor Air Inlet Temperature: 35°C DB (95°F DB)

Heating Operation Conditions

Indoor Air Inlet Temperature: 20°C DB (68°F DB)
Outdoor Air Inlet Temperature: 7°C DB (45°F DB)
6°C WB (43°F WB)

Piping Length: 7.5 Meters, Piping Lift: 0 Meter

※ 3: The sound pressure is tested according to the appendix B of GB/T18836-2002. The above parameters were measured in an anechoic chamber with no echo, so the echo should be considered in the field. When return air grille is on bottom plate of the duct or external static pressure is higher, the sound pressure will increase according to the installation method and building structure.

※ 4: Max. additional refrigerant charge quantity has included the outdoor unit refrigerant charge Before Shipment

Capacity (HP)			308Model (32)	324Model (34)	340Model (36)	364*Model (38)
Model	Outdoor Model		AVWT-308FESZA	AVWT-324FESZA	AVWT-340FESZA	AVWT-364FESZA
	Conbination		AVWT-154FESSA	AVWT-136FESZA	AVWT-154FESSA	AVWT-154FESSA
			AVWT-154FESSA	AVWT-96FESRA	AVWT-96FESRA	AVWT-114FESRA
			-	AVWT-96FESRA	AVWT-96FESRA	AVWT-96FESSA
Power Supply		-	AC 3 ϕ 380V~415V/50Hz			
Performance						
Cooling Operating Range		℃	-5~43			
Nominal Cooling Capacity※1)		kW	90	95.0	100.0	109
		Btu/h	307,200	324,200	341,300	372,000
Nominal Cooling Capacity※2)		kW	91.3	97.3	102.9	110.0
		Btu/h	311,516	332,100	351,200	377,026
Power Consumption		kW	26.32	24.75	27.10	29.31
Heating Operating Range		℃	-20~15			
Nominal Heating Capacity		kW	100.0	106.0	112.0	118.0
		Btu/h	341,300	361,800	382,300	402,700
Power Consumption		kW	25.00	24.58	26.88	28.29
Sound Pressure Level※3		dB(A)	65/60	66/61	66/61	67/62
Cabinet Color		-	Ivory White			
Outer Dimensions (Hx W x D)		mm	1720×(1210+1210)×750	1720×(950+950+1210)×750		1720×(950+1210+1210)×750
Packing Dimensions(H x W x D)		mm	1882×(1278+1278)×828	1882×(1278+1278+1018)×828		1882×(1278+1278+1018)×828
Net Weight (Gross Weight)		kg	636 (660)	804 (835)	810 (840)	875 (910)
Refrigerating Installation						
Compressor		-	Scroll Comp			
Crankcase Heater Capacity		kW	0.32	0.32	0.32	0.32
Refrigeration Oil	Type	-	FVC68D			
	Brand	-	Idemitsu Kosan			
	Charge(Unit/Comp.)	L	11.4/4.4	16.1/3.8	15.5/4.4	16.9/4.9
Refrigerant	Type	-	R410A			
	Charge Amount	L	21	30.3	30.3	30.9
Max Refrigerant Charge Amount※ 4		kg	60.6	65.0	65.0	68.7
Chargeless Length		m	0			
Max.Piping Length		m	1000			
Connections Refrigerant Piping		-	Brazing			
Refrigerant Flow Control		-	Micro-computer Control Expansion Valve			
Heat Exchanger Type		-	Multi-Pass Cross-Finned Tube			
Low Gas Pipe		mm	31.75	31.75	31.75	38.1
High Gas Pipe		mm	28.6	28.6	28.6	31.75
Liquid Pipe		mm	19.05	19.05	19.05	19.05
Pressure(High/Low Pressure)		MPa	4.15/2.21	4.15/2.21	4.15/2.21	4.15/2.21
Fan						
Condenser Fan Quantity		—	3	3	3	3
Air Flow Rate		m^3/min	545	545	565	565
Defrosting Condition						
Mininum Defrosting time		min	45	45	45	45
Max.Defrosting time		min	9	9	9	9
Defrosting Start Temp		℃	With Air Temperature Ta Calculate			
Defrosting end Temp(Tube)		℃	With Air Temperature Ta Calculate			
Hole for Power Supply Wiring		mm	46	46	46	46
Hole for Control Line Wiring		mm	20	20	20	20

The above cooling and heating capacities show the capacities when the outdoor unit is operated with the 100% rating of indoor units,

Cooling Operation Conditions

Indoor Air Inlet Temperature: 27℃ DB (80°F DB)

※1 19℃ WB (66.2°F WB)

※2 19.5℃ WB (66°F WB)

Heating Operation Conditions

Indoor Air Inlet Temperature: 20°C DB (68°F DB)

Outdoor Air Inlet Temperature: 7°C DB (45°F DB)

6°C WB (43°F WB)

Outdoor Air Inlet Temperature: 35°C DB (95°F DB)

Piping Length: 7.5 Meters, Piping Lift: 0 Meter

※ 3: The sound pressure is tested according to the appendix B of GB/T18836-2002. The above parameters were measured in an anechoic chamber with no echo, so the echo should be considered in the field. When return air grille is on bottom plate of the duct or external static pressure is higher, the sound pressure will increase according to the installation method and building structure.

※ 4: Max. additional refrigerant charge quantity has included the outdoor unit refrigerant charge Before Shipment

Capacity (HP)			382Model (40)	398Model (42)	420Model (44)	438Model (46)
Model	Outdoor Model		AVWT-382FESZA	AVWT-398FESZA	AVWT-420FESZA	AVWT-438FESZA
	Conbination		AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA
			AVWT-136FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA
			AVWT-96FESRA	AVWT-96FESRA	AVWT-114FESSA	AVWT-136FESSA
Power Supply		–	AC 3 ϕ 380V~415V/50Hz			
Performance						
Cooling Operating Range		℃	–5~43			
Nominal Cooling Capacity※1)		kW	112.0	118	125.0	132
		Btu/h	382,300	402,700	426,0	450,500
Nominal Cooling Capacity※2)		kW	113.6	119.6	126.7	135.3
		Btu/h	387,700	408,075	432,300	461,644
Power Consumption		kW	30.94	33.29	35.50	37.13
Heating Operating Range		℃	–20~15			
Nominal Heating Capacity		kW	125.0	132.0	140.0	145.0
		Btu/h	426,600	450,5	477,8	494,9
Power Consumption		kW	29.89	35.5	33.60	35.20
Sound Pressure Level(380/208V/Night-Shift)※3		dB(A)	67/62	67/62	67/62	67/62
Cabinet Color		–	Ivory White			
Outer Dimensions (Hx W x D)		mm	1720×(950+1210+1210)×750		1720×(1210+1210+1210)×750	
Packing Dimensions(H x W x D)		mm	1882×(1278+1278+1018)×828		1882×(1278+1278+1278)×828	
Net Weight (Gross Weight)		kg	876 (910)	882 (915)	947 (985)	948 (985)
Refrigerating Installation						
Compressor		–	Scroll Comp			
Crankcase Heater Capacity		kW	0.4	0.4	0.4	0.48
Refrigeration Oil	Type	–	FVC68D			
	Brand	–	Idemitsu Kosan			
	Charge(Unit/Comp.)	L	16.9/4.9	16.3/5.5	17.7/6	17.7/6
Refrigerant	Type	–	R410A			
	Charge Amount	L	30.9	30.9	31.5	31.5
Max Refrigerant Charge Amount※ 4		kg	71.4	71.9	72.4	86.9
Chargeless Length		m	0			
Max.Piping Length		m	1000			
Connections Refrigerant Piping		–	Brazing			
Refrigerant Flow Control		–	Micro-computer Control Expansion Valve			
Heat Exchanger Type		–	Multi-Pass Cross-Finned Tube			
Low Gas Pipe		mm	38.1	38.1	38.1	38.1
High Gas Pipe		mm	31.75	31.75	31.75	31.75
Liquid Pipe		mm	19.05	19.05	19.05	19.05
Pressure(High/Low Pressure)		MPa	4.15/2.21	4.15/2.21	4.15/2.21	4.15/2.21
Fan						
Condenser Fan Quantity		—	4	4	4	4
Air Flow Rate		m^3/min	565	565	585	585
Defrosting Condition						
Mininum Defrosting time		min	45	45	45	45
Max.Defrosting time		min	9	9	9	9
Defrosting Start Temp		℃	With Air Temperature Ta Calculate			
Defrosting end Temp(Tube)		℃	With Air Temperature Ta Calculate			
Hole for Power Supply Wiring		mm	46	46	46	46
Hole for Control Line Wiring		mm	20	20	20	20

The above cooling and heating capacities show the capacities when the outdoor unit is operated with the 100% rating of indoor units,

Cooling Operation Conditions

Indoor Air Inlet Temperature: 27℃ DB (80°F DB)

※1 19℃ WB (66.2°F WB)

※2 19.5℃ WB (66°F WB)

Outdoor Air Inlet Temperature: 35°C DB (95°F DB)

Heating Operation Conditions

Indoor Air Inlet Temperature: 20°C DB (68°F DB)

Outdoor Air Inlet Temperature: 7°C DB (45°F DB)

6°C WB (43°F WB)

Piping Length: 7.5 Meters, Piping Lift: 0 Meter

※ 3: The sound pressure is tested according to the appendix B of GB/T18836-2002. The above parameters were measured in an anechoic chamber with no echo, so the echo should be considered in the field. When return air grille is on bottom plate of the duct or external static pressure is higher, the sound pressure will increase according to the installation method and building structure.

※ 4: Max. additional refrigerant charge quantity has included the outdoor unit refrigerant charge Before Shipment

Capacity（HP）			454Model (48)
Model	Outdoor Model		AVWT-454FESZA
	Conbination		AVWT-154FESSA
			AVWT-154FESSA
			AVWT-154FESSA
Power Supply		–	AC 3 ϕ 380V~415V/50Hz
Performance			
Cooling Operating Range		℃	-5~43
Nominal Cooling Capacity※1)		kW	133.5
		Btu/h	464,200
Nominal Cooling Capacity※2)		kW	140.4
		Btu/h	479,045
Power Consumption		kW	39.48
Heating Operating Range		℃	-20~15
Nominal Heating Capacity		kW	150.0
		Btu/h	511,900
Power Consumption		kW	37.50
Sound Pressure Level(380/208V/Night-Shift)※3		dB(A)	68/63
Cabinet Color		–	Ivory White
Outer Dimensions (Hx W x D)		mm	1720×(1210+1210+1210)×750
Packing Dimensions(H x W x D)		mm	1882×(1278+1278+1278)×828
Net Weight（Gross Weight）		kg	954（990）
Refrigerating Installation			
Compressor		–	Scroll Comp
Crankcase Heater Capacity		kW	0.48
Refrigeration Oil	Type	–	FVC68D
	Brand	–	Idemitsu Kosan
	Charge(Unit/Comp.)	L	17.1/6.6
Refrigerant	Type	–	R410A
	Charge Amount	L	31.5
Max Refrigerant Charge Amount※ 4		kg	86.9
Chargeless Length		m	0
Max.Piping Length		m	1000
Connections Refrigerant Piping		–	Brazing
Refrigerant Flow Control		–	Micro-computer Control Expansion Valve
Heat Exchanger Type		–	Multi-Pass Cross-Finned Tube
Low Gas Pipe		mm	38.1
High Gas Pipe		mm	31.75
Liquid Pipe		mm	19.05
Pressure(High/Low Pressure)		MPa	4.15/2.21
Fan			
Condenser Fan Quantity		—	4
Air Flow Rate		m^3/min	585
Defrosting Condition			
Mininum Defrosting time		min	45
Max.Defrosting time		min	9
Defrosting Start Temp		℃	With Air Temperature Ta Calculate
Defrosting end Temp(Tube)		℃	With Air Temperature Ta Calculate
Hole for Power Supply Wiring		mm	46
Hole for Control Line Wiring		mm	20

The above cooling and heating capacities show the capacities when the outdoor unit is operated with the 100% rating of indoor units,

Cooling Operation Conditions

Indoor Air Inlet Temperature: 27℃ DB (80°F DB)
※1 19℃ WB (66.2°F WB)
※2 19.5℃ WB (66°F WB)

Heating Operation Conditions

Indoor Air Inlet Temperature: 20°C DB (68°F DB)
Outdoor Air Inlet Temperature: 7°C DB (45°F DB)
6°C WB (43°F WB)

Outdoor Air Inlet Temperature: 35°C DB (95°F DB)

Piping Length: 7.5 Meters, Piping Lift: 0 Meter

※ 3: The sound pressure is tested according to the appendix B of GB/T18836-2002. The above parameters were measured in an anechoic chamber with no echo, so the echo should be considered in the field. When return air grille is on bottom plate of the duct or external static pressure is higher, the sound pressure will increase according to the installation method and building structure.

※ 4: Max. additional refrigerant charge quantity has included the outdoor unit refrigerant charge Before Shipment

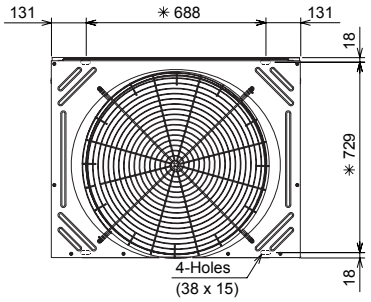
3. Dimensional Data

3.1 Dimensional Data of Outdoor Unit

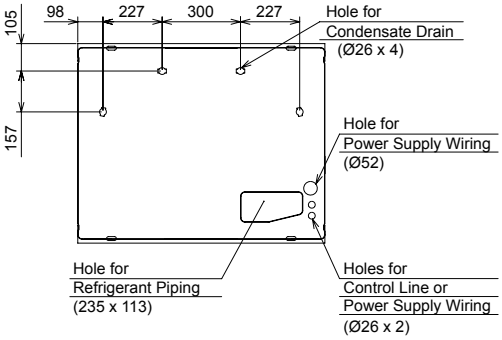
■Outdoor Unit

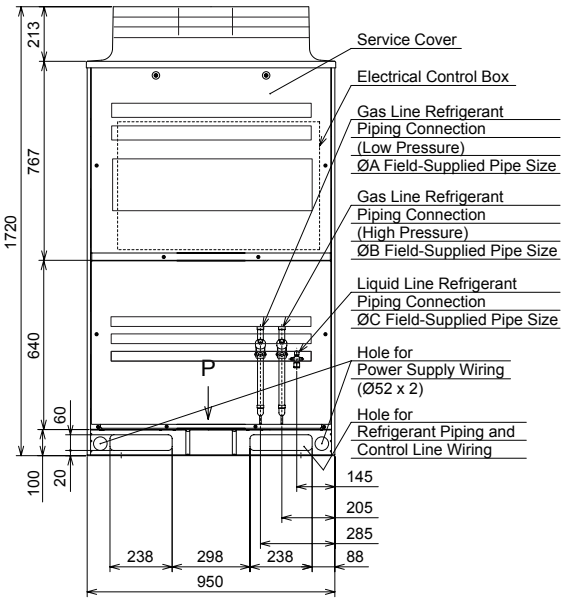
Model: AVWT-76*,AVWT-96*

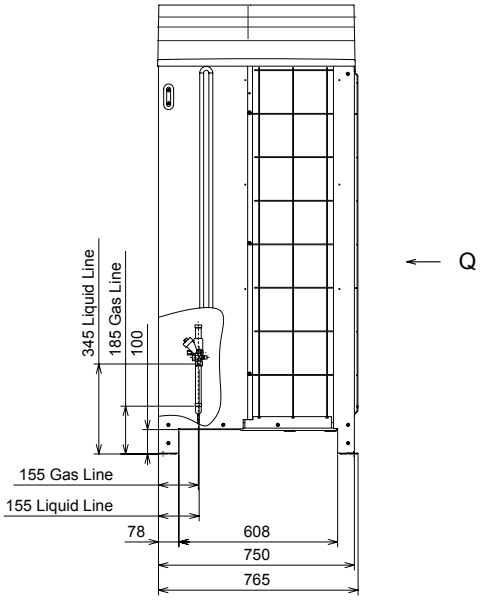
Unit: mm



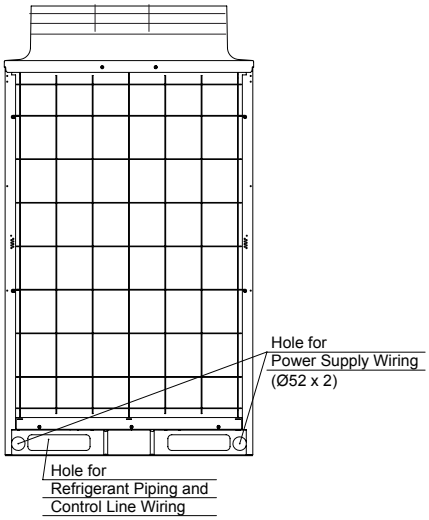
Viewed from P



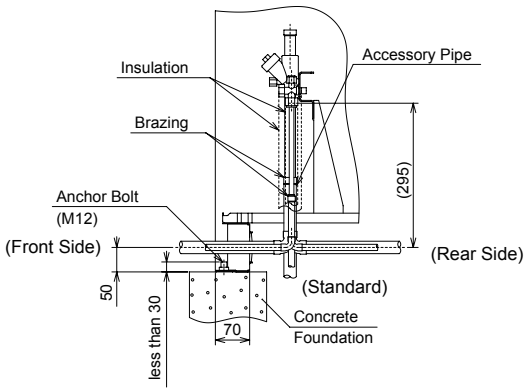




Viewed from Q



Field Installation (Example)



NOTES:

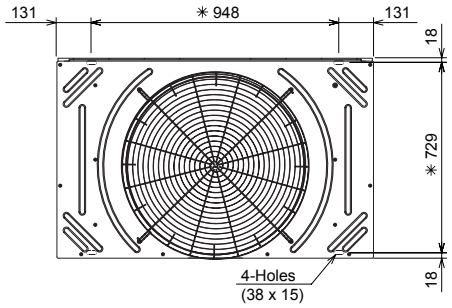
1. Drain water is discharged from the unit during the operation.
   a. Choose a place where well drainage is available. Provide a groove for drain.
   b. Do not provide an upward slope from the unit to avoid reverse flow of the drain.
      Provide a second drain pan under the outdoor unit, to collect drain water securely.
   c. Do not use the drain boss (optional) in a cold area. (Drain water in the drain pipe may be frozen and the drain pipe may crack.)
2. The dimensions marked with ✳ indicates the mounting pitch dimension for anchor bolts.

Heat Recovery System (3 Pipes)

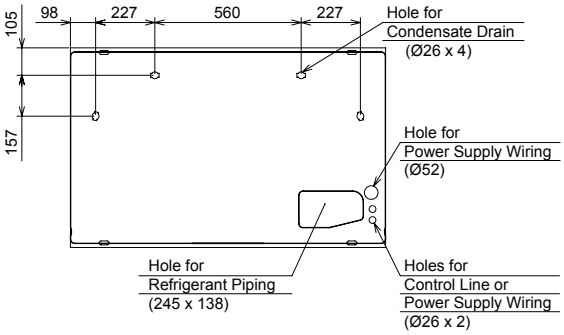
Model \ Dimension	A	B	C
AVWT-76*	19.05	15.88	9.53
AVWT-96*	22.2	19.05	9.53

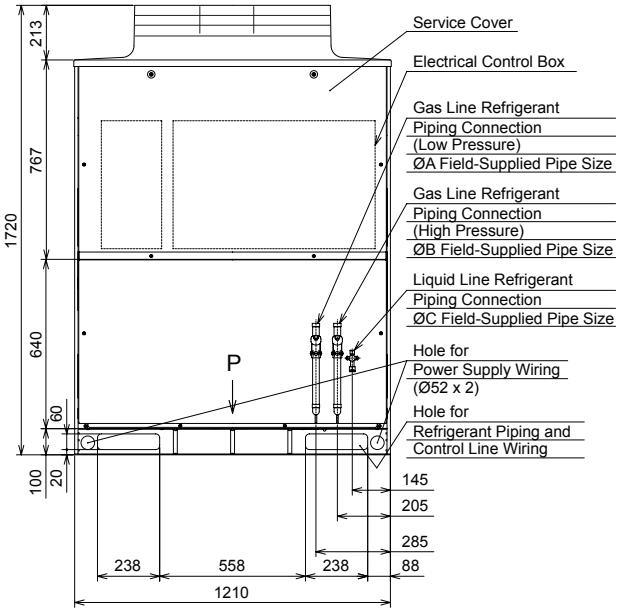
Model: AVWT-114*,AVWT-136*,AVWT-154*

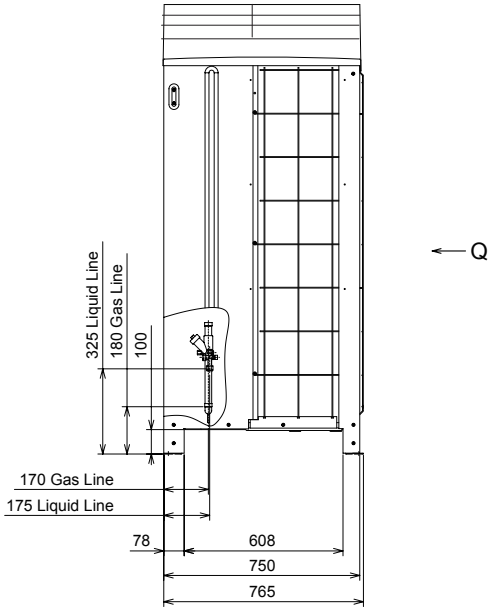
Unit: mm



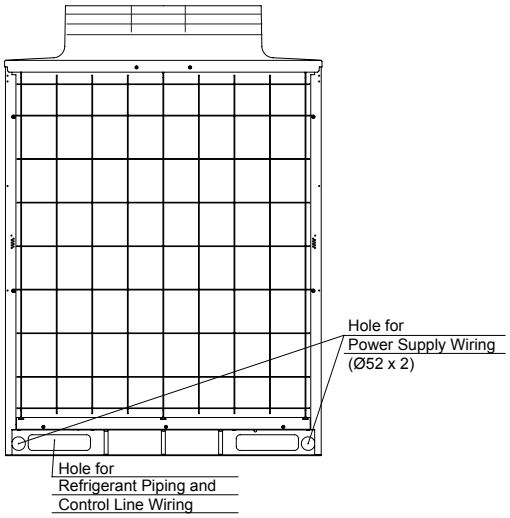
Viewed from P



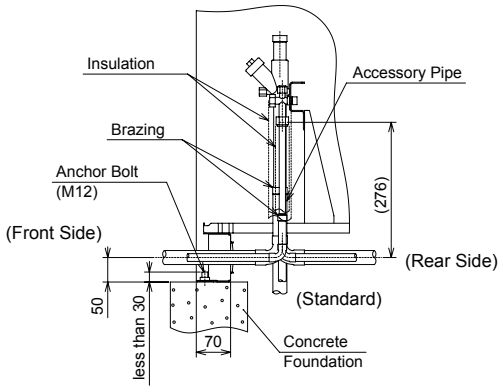




Viewed from Q



Field Installation (Example)



NOTES:

1. Drain water is discharged from the unit during the operation.
   a. Choose a place where well drainage is available. Provide a groove for drain.
   b. Do not provide an upward slope from the unit to avoid reverse flow of the drain.
      Provide a second drain pan under the outdoor unit, to collect drain water securely.
   c. Do not use the drain boss (optional) in a cold area. (Drain water in the drain pipe may be frozen and the drain pipe may crack.)
2. The dimensions marked with ✳ indicates the mounting pitch dimension for anchor bolts.

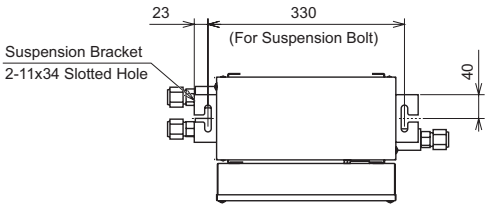
Heat Recovery System (3 Pipes)

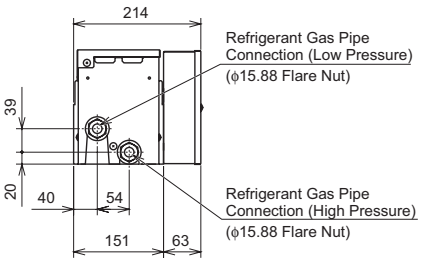
Model \ Dimension	A	B	C
AVWT-114*	25.4	22.2	12.7
AVWT-136*	28.6	22.2	12.7
AVWT-154*	28.6	22.2	15.88

3.2 Switch Box

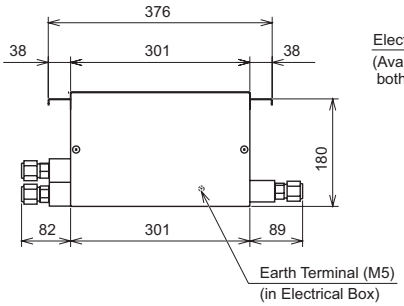
Model: HCH-160D

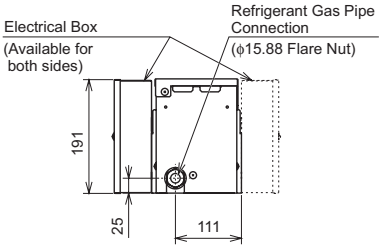
Unit: mm



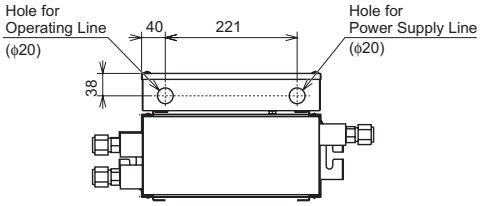


Outdoor Unit Connecting Side





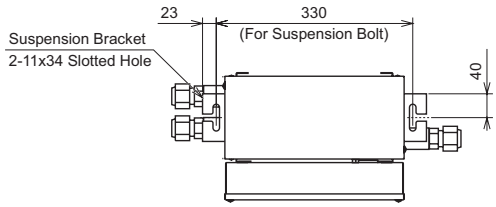
Indoor Unit Connecting Side

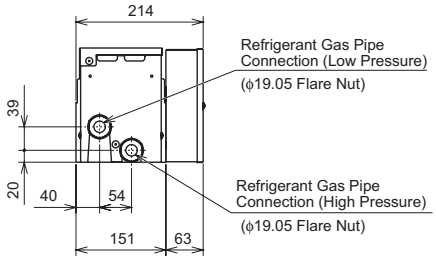


Specification

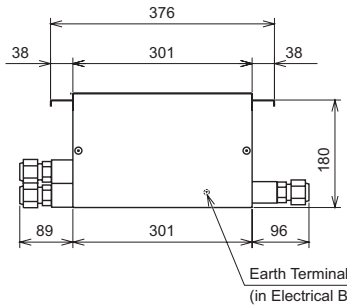
Model	HCH-160D	HCH-280D
Power Supply	AC 1ϕ 220-240V 50/60Hz	
Refrigerant	R410A	
Input (W)	20	
Connectable Indoor Unit Total Capacity	less than 54kBtu/h	55 to 96kBtu/h
Number of Connectable Indoor Unit	1 to 7	1 to 8
Net Weight (kg)	7	

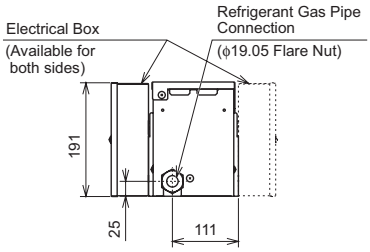
Model: HCH-280D



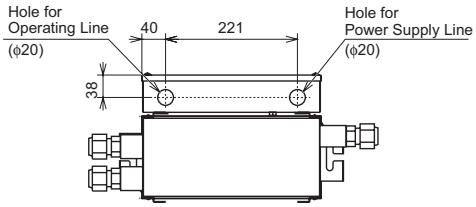


Outdoor Unit Connecting Side

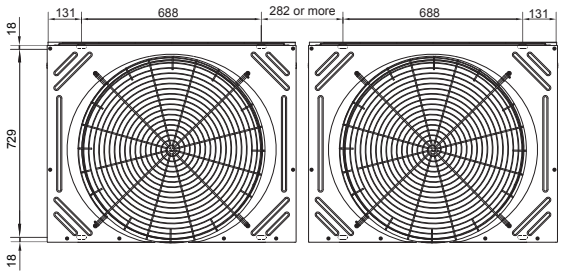




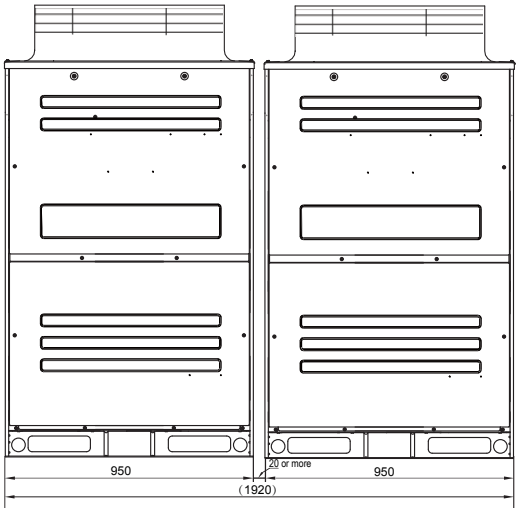
Indoor Unit Connecting Side

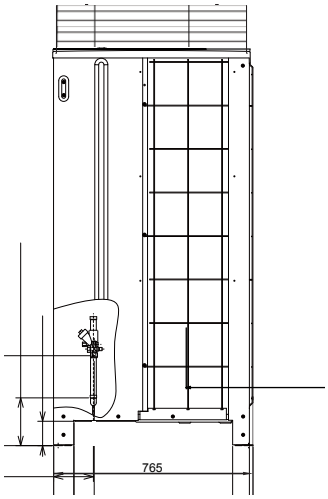


Model: AVWT-170*



Outdoor Unit A Outdoor Unit B



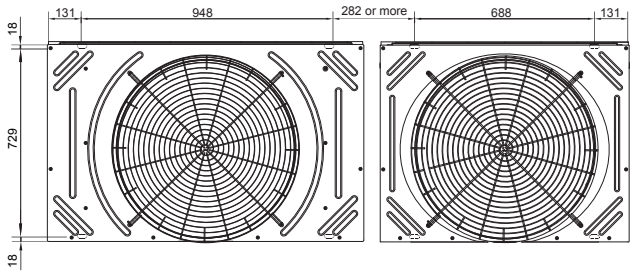


(Note) Spacing between outdoor units in this drawing is 20mm.

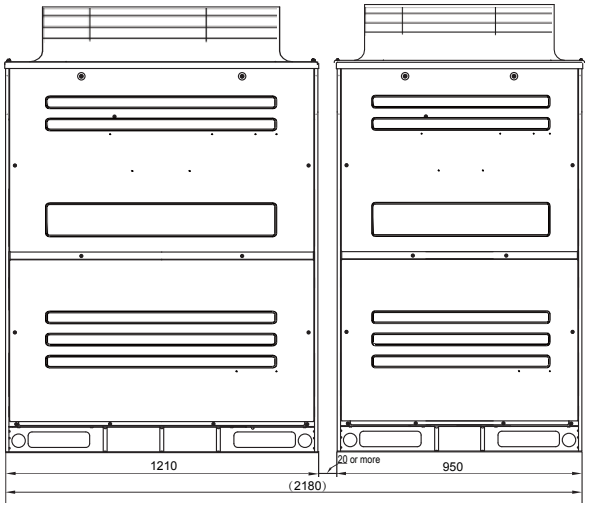
	Model	Outdoor Unit A	Outdoor Unit B
Standard Combination	AVWT-170*	AVWT-96*	AVWT-76*

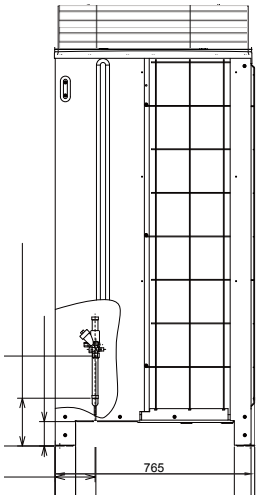
Two-Module Combination

Model: AVWT-190*/212*



Outdoor Unit A Outdoor Unit B

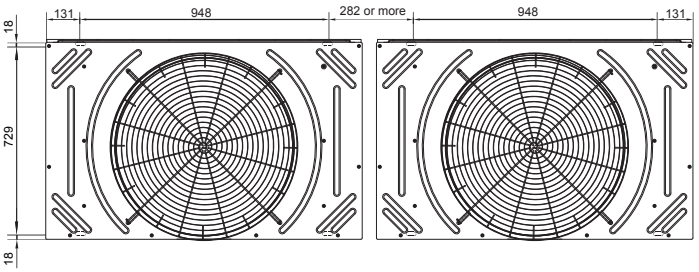




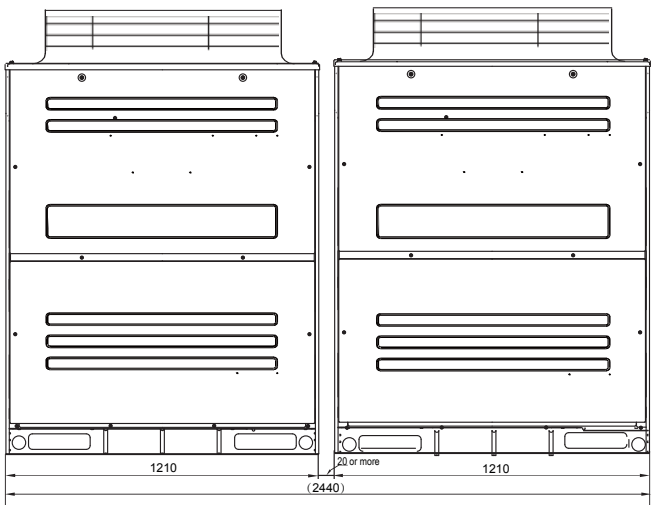
(Note) Spacing between outdoor units in this drawing is 20mm.

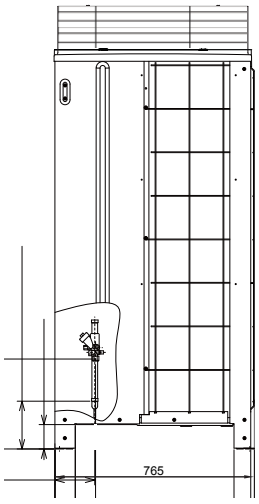
	Model	Outdoor Unit A	Outdoor Unit B
Standard Combination	AVWT-190*	AVWT-114*	AVWT-76*
	AVWT-212*	AVWT-136*	AVWT-76*

Model: AVWT-232*~308*



Outdoor Unit A Outdoor Unit B



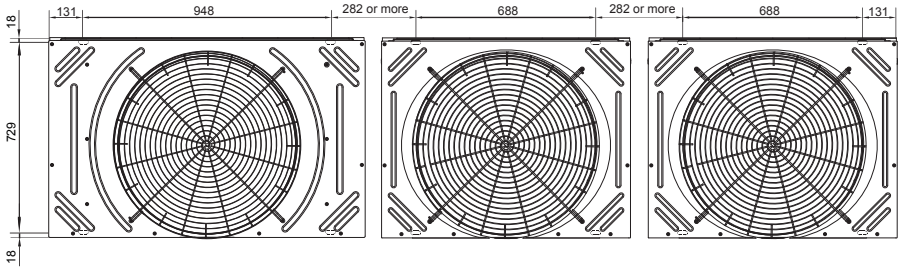


(Note) Spacing between outdoor units in this drawing is 20mm.

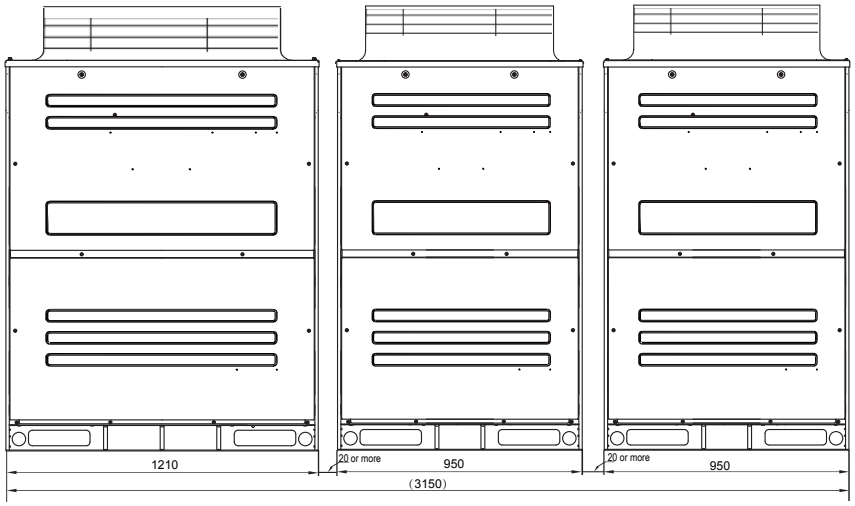
	Model	Outdoor Unit A	Outdoor Unit B
Standard Combination	AVWT-232*	AVWT-114*	AVWT-114*
	AVWT-250*	AVWT-136*	AVWT-114*
	AVWT-272*	AVWT-136*	AVWT-136*
	AVWT-290*	AVWT-154*	AVWT-136*
	AVWT-308*	AVWT-154*	AVWT-154*

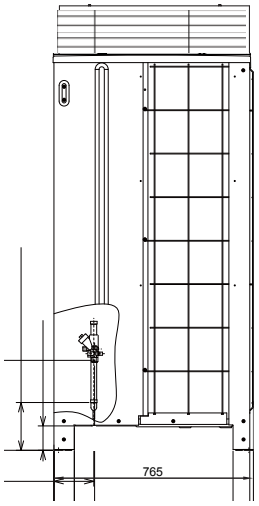
Three-Module Combination

Model: AVWT-324*~340*



Outdoor Unit A Outdoor Unit B Outdoor Unit C

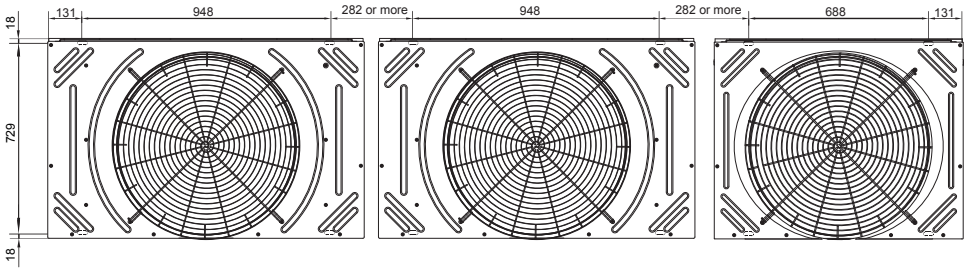


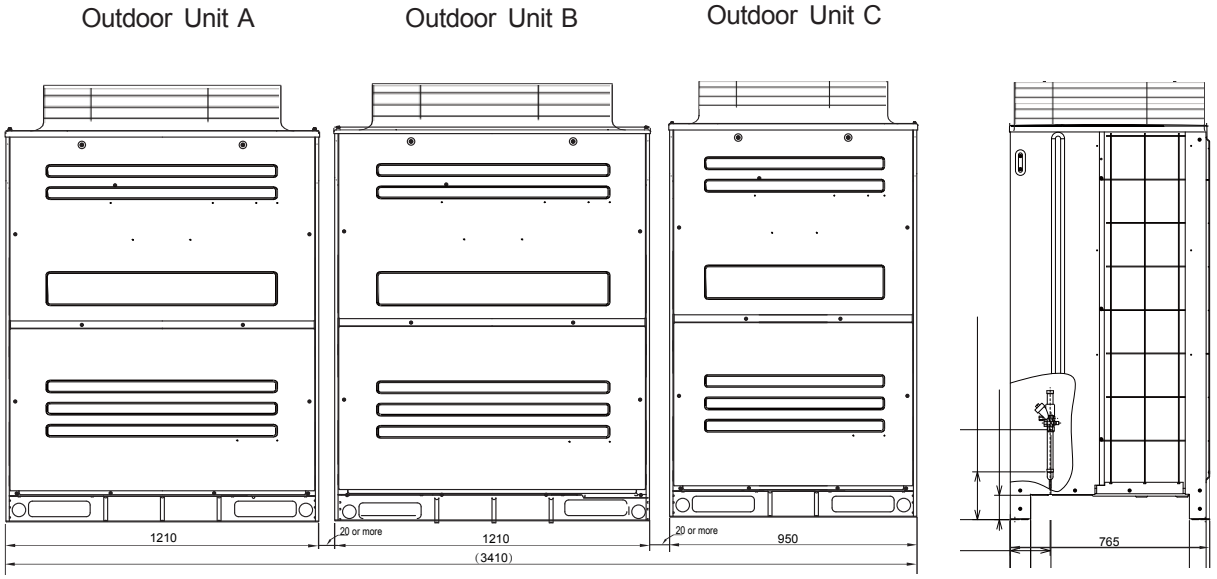


(Note) Spacing between outdoor units in this drawing is 20mm.

	Model	Outdoor unit A	Outdoor unit B	Outdoor unit C
Standard Combination	AVWT-324*	AVWT-136*	AVWT-96*	AVWT-96*
	AVWT-340*	AVWT-154*	AVWT-96*	AVWT-96*

Model: AVWT-364*~398*

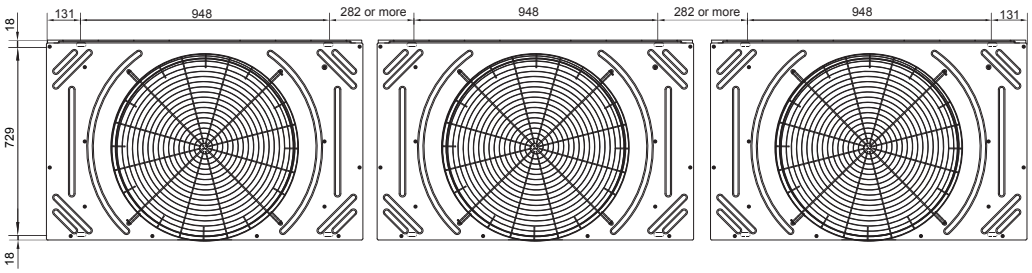


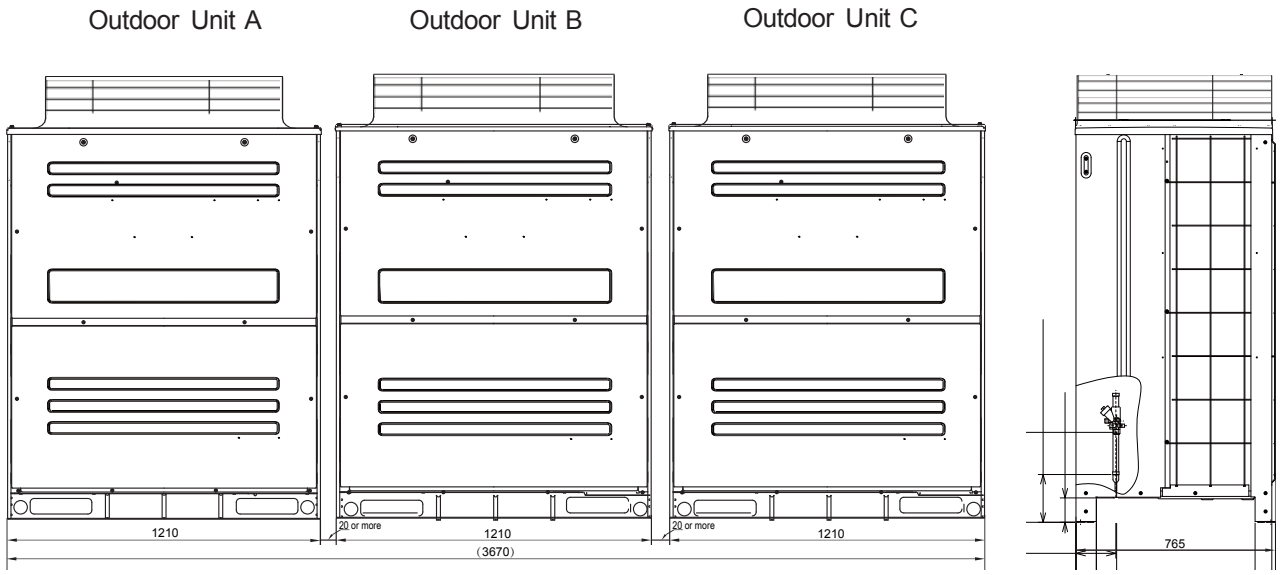


(Note) Spacing between outdoor units in this drawing is 20mm.

	Model	Outdoor unit A	Outdoor unit B	Outdoor unit C
Standard Combination	AVWT-364*	AVWT-154*	AVWT-114*	AVWT-96*
	AVWT-382*	AVWT-154*	AVWT-136*	AVWT-96*
	AVWT-398*	AVWT-154*	AVWT-154*	AVWT-96*

Model: AVWT-420*~454*



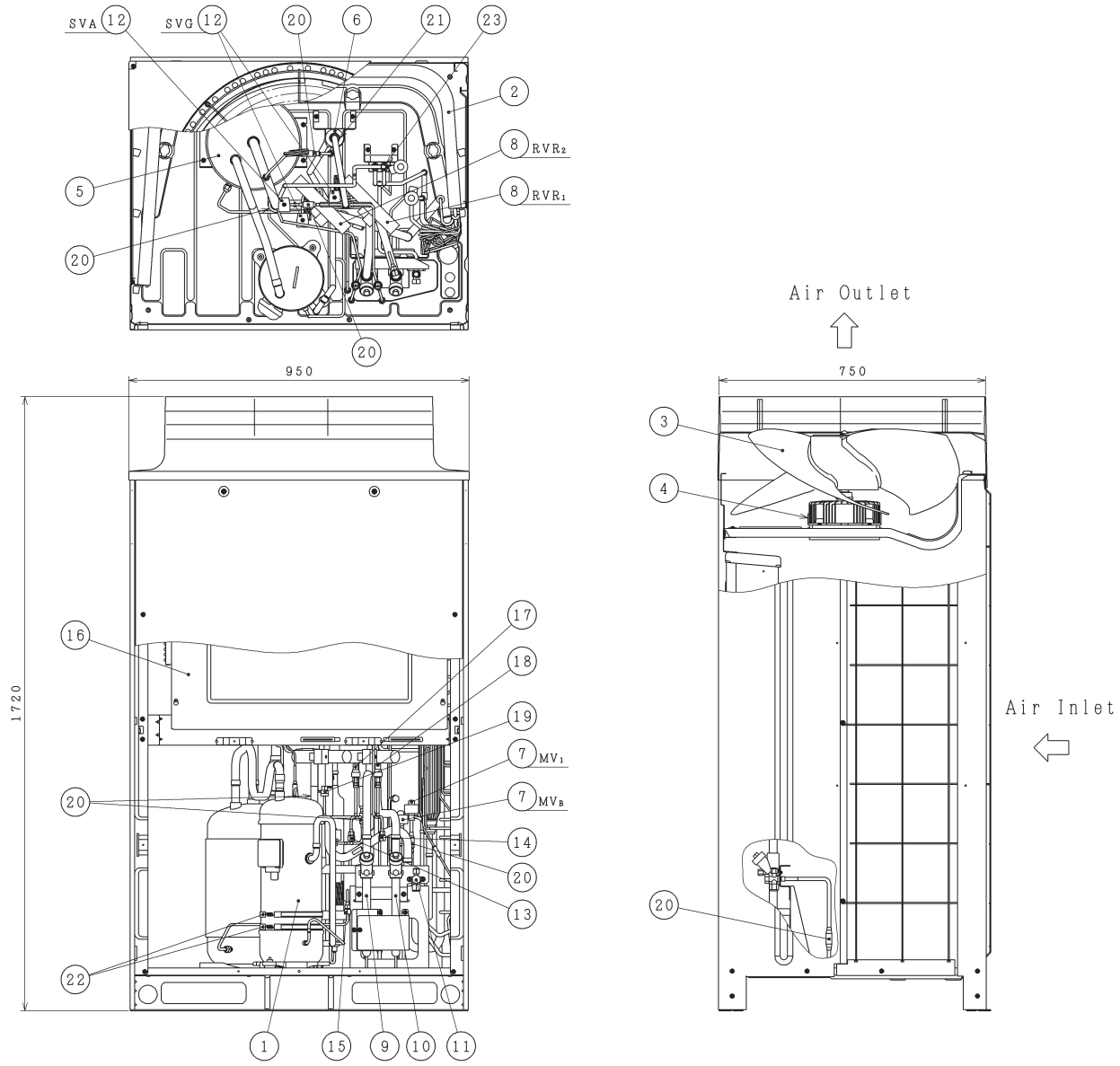


(Note) Spacing between outdoor units in this drawing is 20mm.

	Model	Outdoor unit A	Outdoor unit B	Outdoor unit C
Standard Combination	AVWT-420*	AVWT-154*	AVWT-154*	AVWT-114*
	AVWT-438*	AVWT-154*	AVWT-154*	AVWT-136*
	AVWT-454*	AVWT-154*	AVWT-154*	AVWT-154*

3.3 Structure

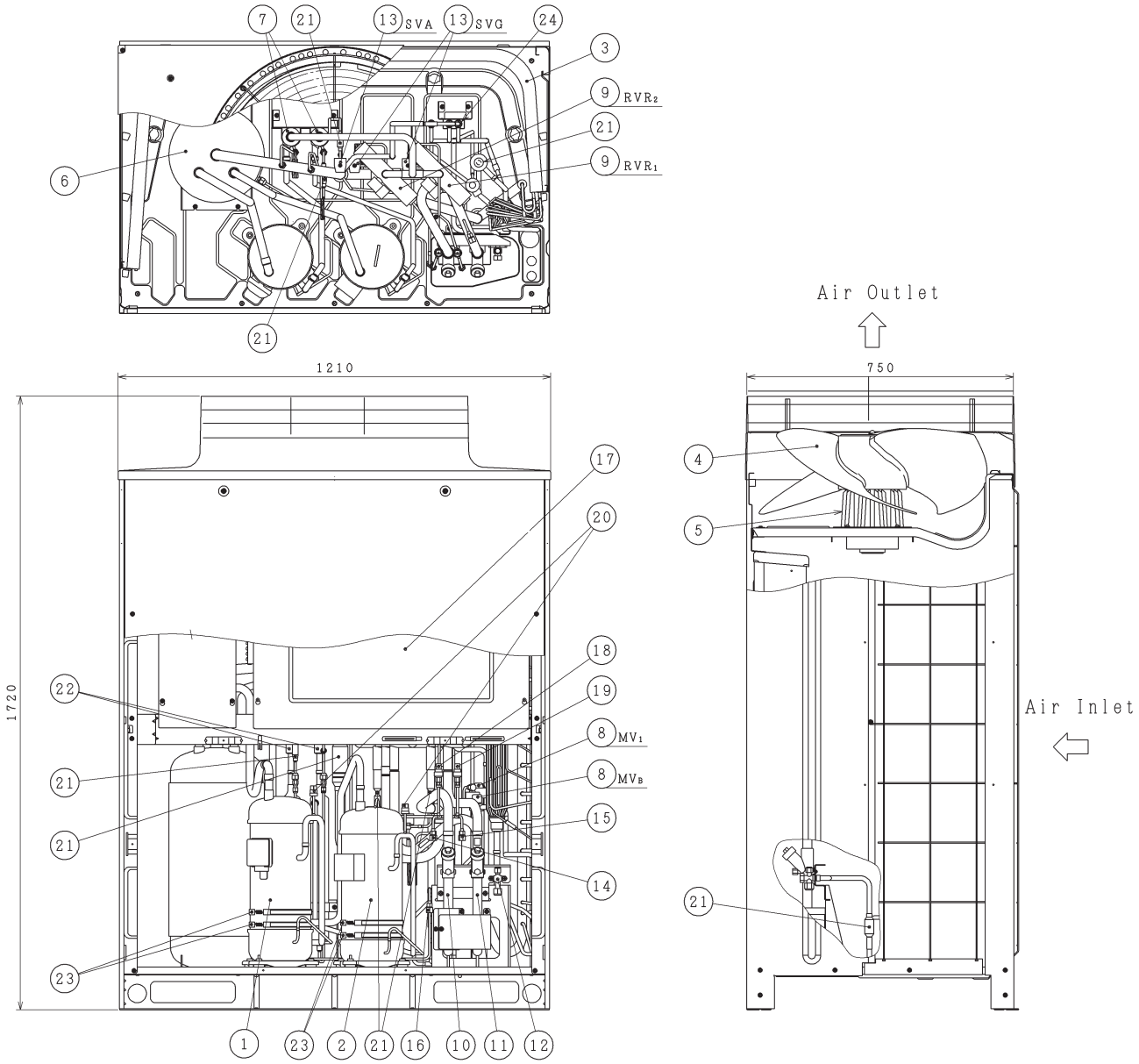
Model: AVWT-76/96*



No.	Part Name
1	Compressor (Inverter)
2	Heat Exchanger
3	Propeller Fan
4	Fan Motor
5	Accumulator
6	Oil Separator
7	Micro-Computer Control Expansion Valve (2pcs.)
8	Reversing Valve (2pcs.)
9	Stop Valve (Low Pressure Gas)
10	Stop Valve (High Pressure Gas)
11	Stop Valve (Liquid)
12	Solenoid Valve (3pcs.)

No.	Part Name
13	Check Joint (Low)
14	Check Joint (High)
15	Check Joint (for Oil)
16	Electrical Box
17	Low Pressure Sensor
18	High Pressure Sensor
19	High Pressure Switch for Protection
20	Strainer (7pcs.)
21	Check Valve
22	Crankcase Heater (2pcs.)
23	Double Tube Type Heat Exchanger

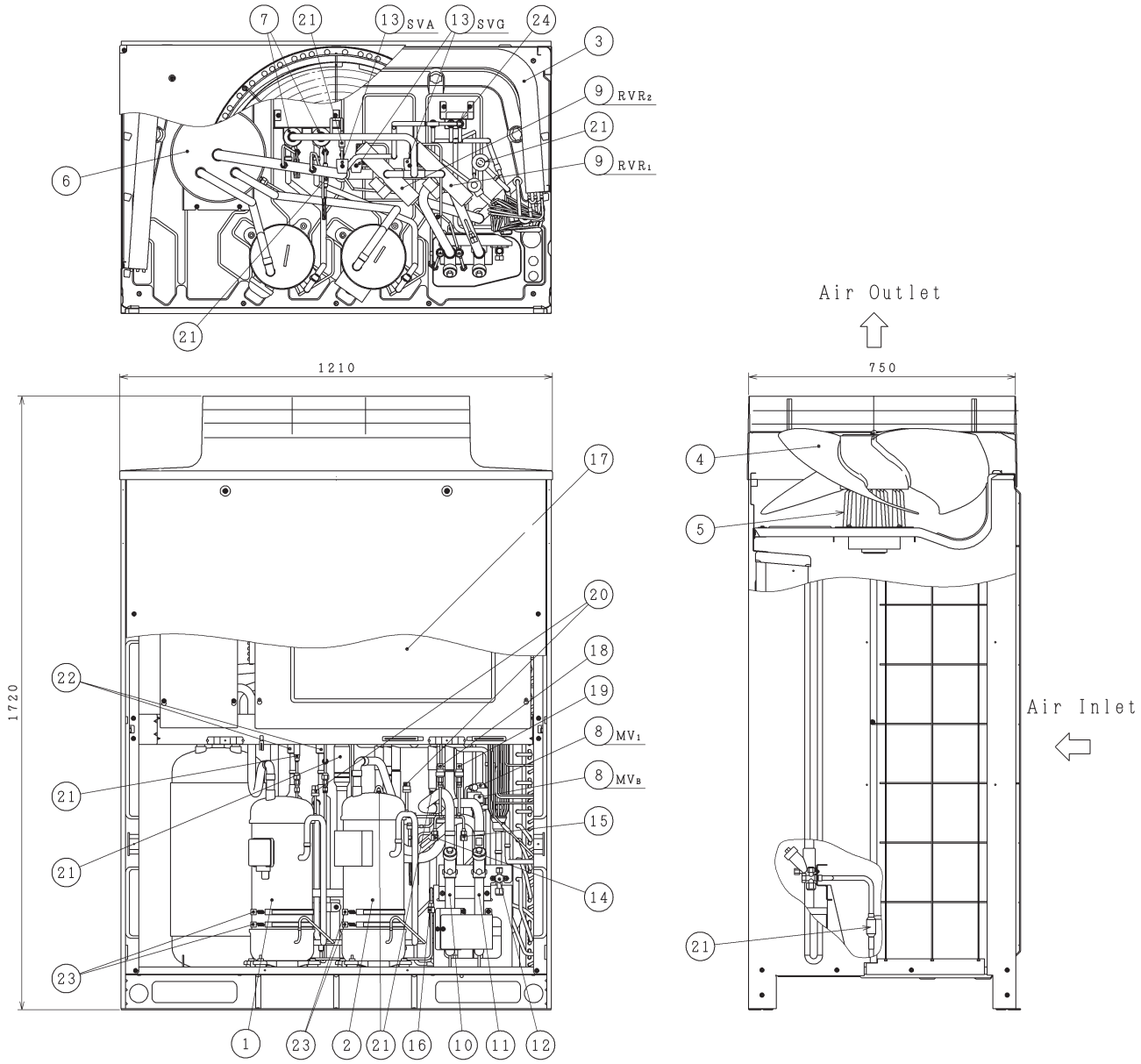
Model: AVWT-114/136*



No.	Part Name
1	Compressor (Inverter)
2	Compressor (Constant Speed)
3	Heat Exchanger
4	Propeller Fan
5	Fan Motor
6	Accumulator
7	Oil Separator
8	Micro-Computer Control Expansion Valve (2pcs.)
9	Reversing Valve (2pcs.)
10	Stop Valve (Low Pressure Gas)
11	Stop Valve (High Pressure Gas)
12	Stop Valve (Liquid)

No.	Part Name
13	Solenoid Valve (3pcs.)
14	Check Joint (Low)
15	Check Joint (High)
16	Check Joint (for Oil)
17	Electrical Box
18	Low Pressure Sensor
19	High Pressure Sensor
20	High Pressure Switch for Protection (2pcs.)
21	Strainer (8pcs.)
22	Check Valve (2pcs.)
23	Crankcase Heater (4pcs.)
24	Double Tube Type Heat Exchanger

Model: AVWT-154*



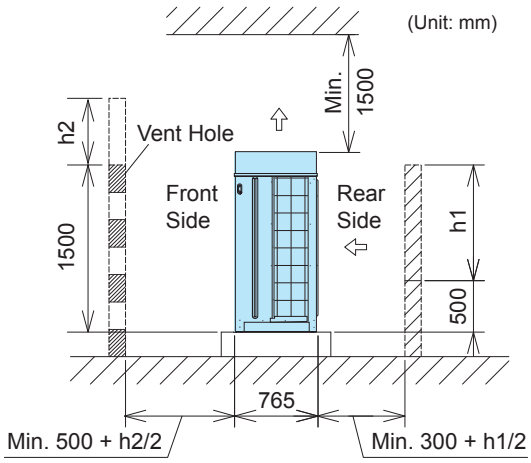
No.	Part Name
1	Compressor (Inverter)
2	Compressor (Constant Speed)
3	Heat Exchanger
4	Propeller Fan
5	Fan Motor
6	Accumulator
7	Oil Separator
8	Micro-Computer Control Expansion Valve (2pcs.)
9	Reversing Valve (2pcs.)
10	Stop Valve (Low Pressure Gas)
11	Stop Valve (High Pressure Gas)
12	Stop Valve (Liquid)

No.	Part Name
13	Solenoid Valve (3pcs.)
14	Check Joint (Low)
15	Check Joint (High)
16	Check Joint (for Oil)
17	Electrical Box
18	Low Pressure Sensor
19	High Pressure Sensor
20	High Pressure Switch for Protection (2pcs.)
21	Strainer (8pcs.)
22	Check Valve (2pcs.)
23	Crankcase Heater (4pcs.)
24	Double Tube Type Heat Exchanger

4. Selection Data

4.1 Service Space

Make the service space when outdoor unit is installed as follows.

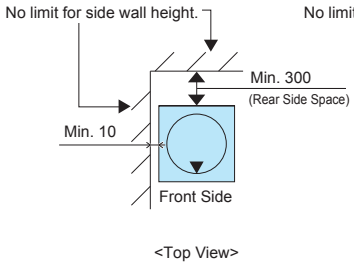


< Side View >

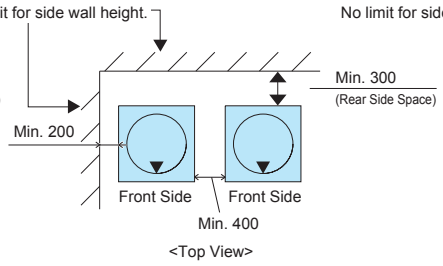
- In case of no walls at the front and the rear side of the unit, the space of 500mm for the front side and 300mm for the rear side is required.
- When the wall of front side is higher than 1,500mm, the space of (500 + h2/2) mm for the front side is required.
- When the wall of rear side is higher than 500mm, the space of (300 + h1/2) mm for the rear side is required.
- When install the wall in front of the unit, make the vent hole on the wall.
- When the space to the obstacle above the unit is less than 1,500mm or the space above the unit is closed, set up the duct at the air outlet side in order to prevent short circuit.
- When there are obstacles above the unit, the four (front, rear, right and left) sides of the unit shall be open in principle.

1) Walls on 2 Directions

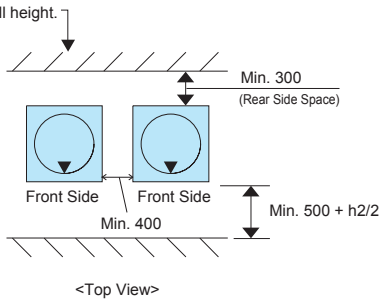
In case that the units are installed adjacent to tall buildings and there are no walls in 2 directions, the minimum rear side space is 300mm.



<Top View>



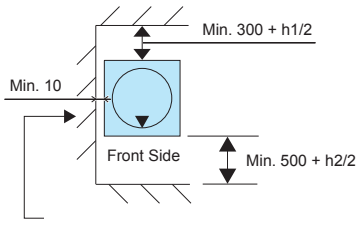
<Top View>



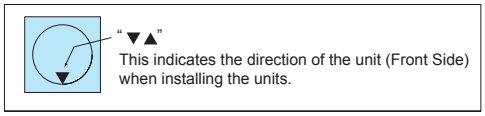
<Top View>

2) Walls on 3 Directions

• Single Installation

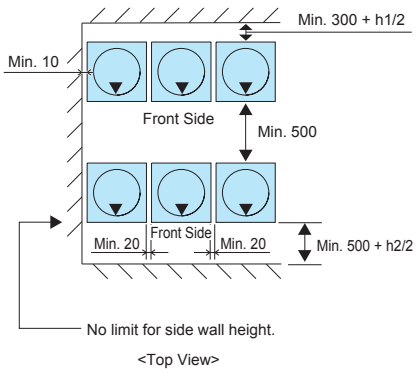


<Top View>



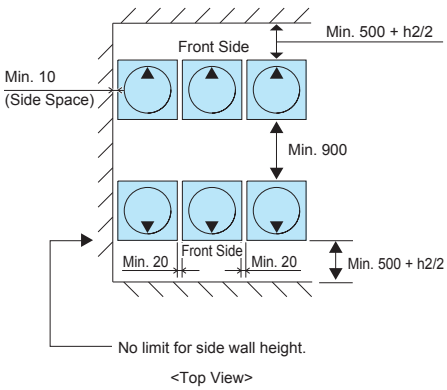
• Multiple / Serial Installation

< Installation in the Same Direction>



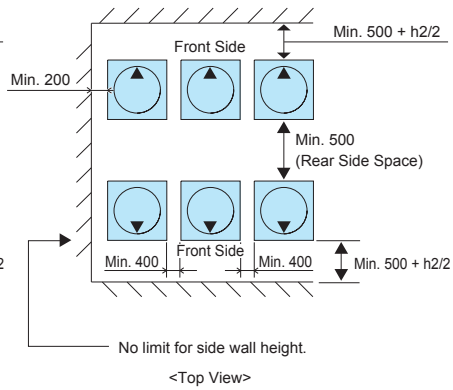
<Top View>

< Rear to Rear Installation 1 >



<Top View>

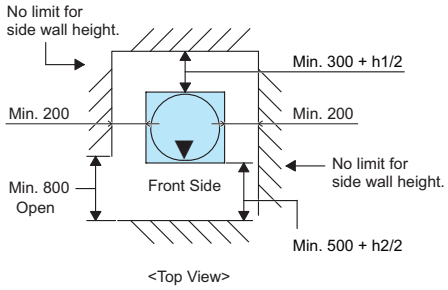
< Rear to Rear Installation 2 >



<Top View>

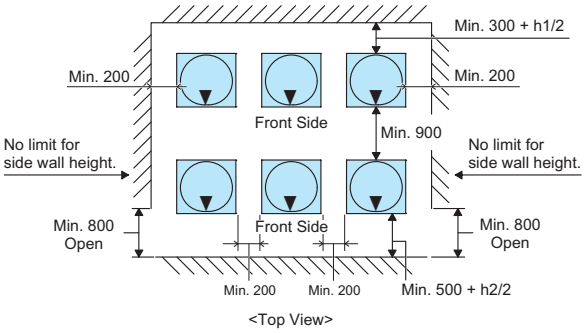
3) Walls on 4 Directions

• Single Installation

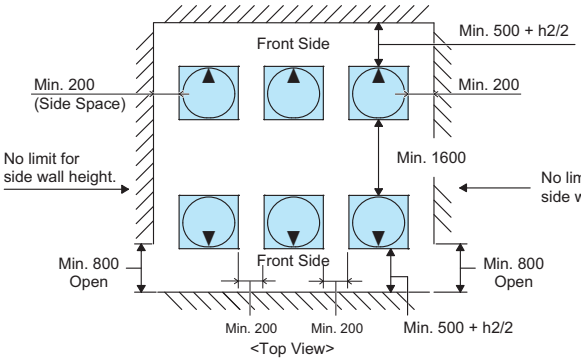


• Multiple / Serial Installation

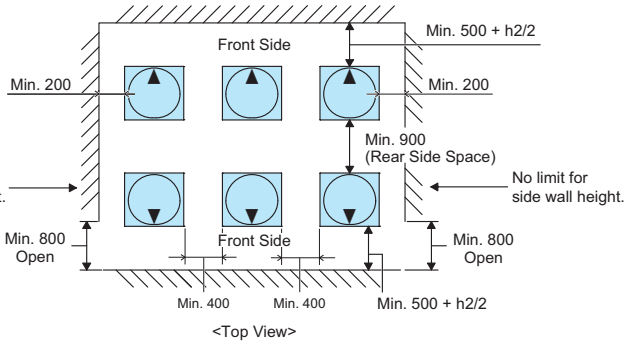
< Installation in the Same Direction>



< Rear to Rear Installation 1 >

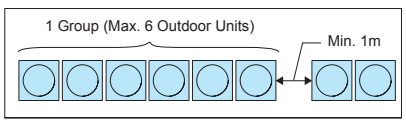


< Rear to Rear Installation 2 >



NOTE

1. Keep the upper side open to prevent mutual interference of inlet and outlet air of each outdoor unit.
2. The figure dimensions are sufficient spaces around outdoor units for operation and maintenance at typical installing conditions as follows. [Operation Mode: Cooling Operation, Outside Temp.: 35°C]
   In case that the outdoor unit ambient temperature is higher and also the short circuit is likely to occur compared to the installation condition, find an appropriate dimension by calculating air flow current.
3. For the multiple installation, 1 group allows 6 outdoor units (max.).
   The space of 1m between each group is required.

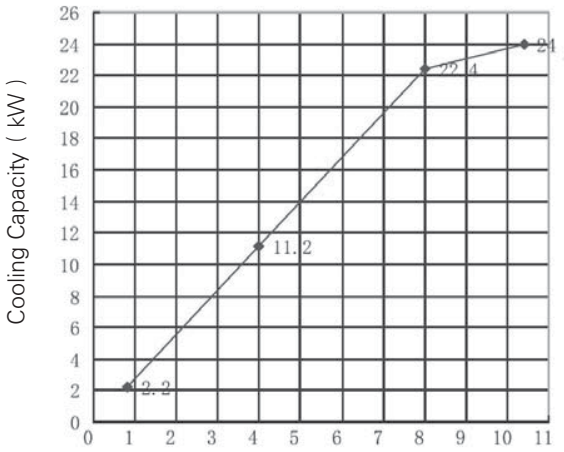


4. Partly open a wall if the unit is surrounded by walls in four directions.

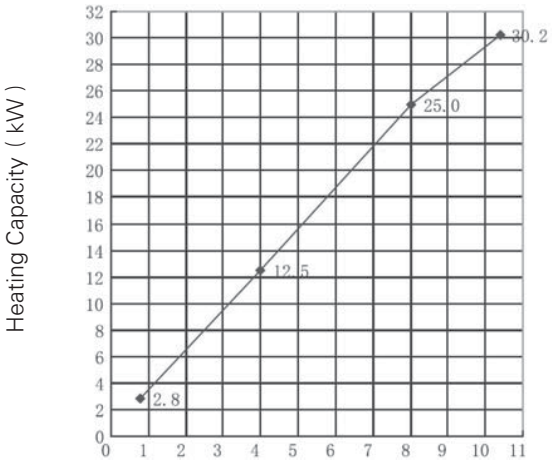
4.2 **Capacity Characteristic Curve**

The following charts show the characteristics of outdoor unit capacity which corresponds with total capacity of combined indoor unit, on standard condition with refrigerant piping of horizontal and 7.5m at length.

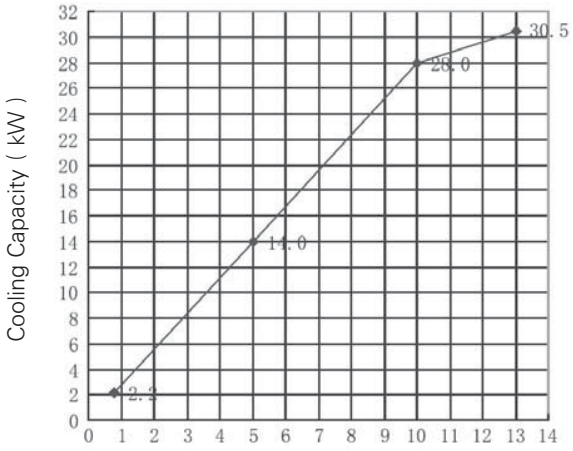
Cooling Capacity Graph for AVWT–76*



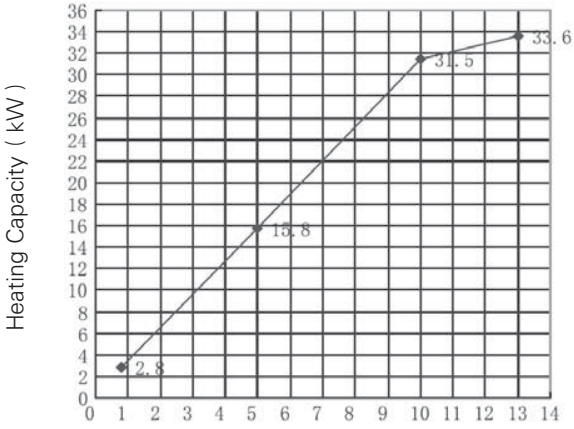
Heating Capacity Graph for AVWT–76*



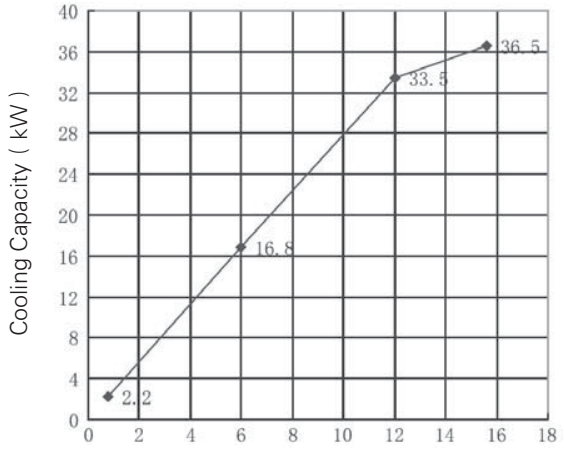
Cooling Capacity Graph for AVWT–96*



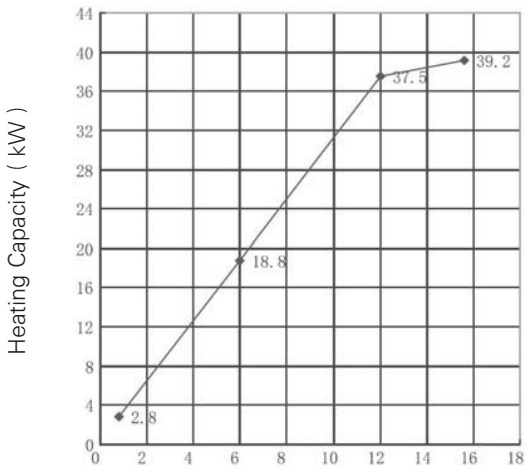
Heating Capacity Graph for AVWT–96*



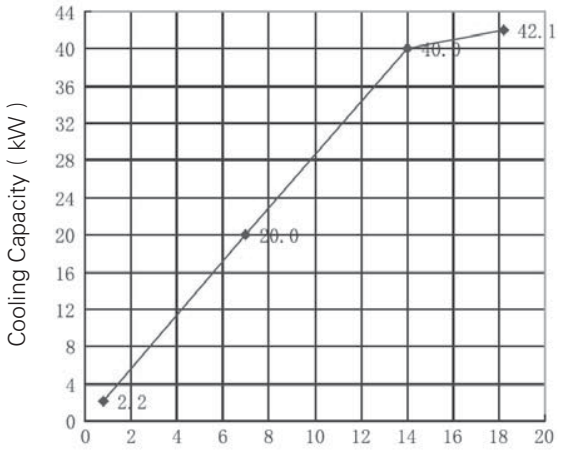
Cooling Capacity Graph for AVWT–114*



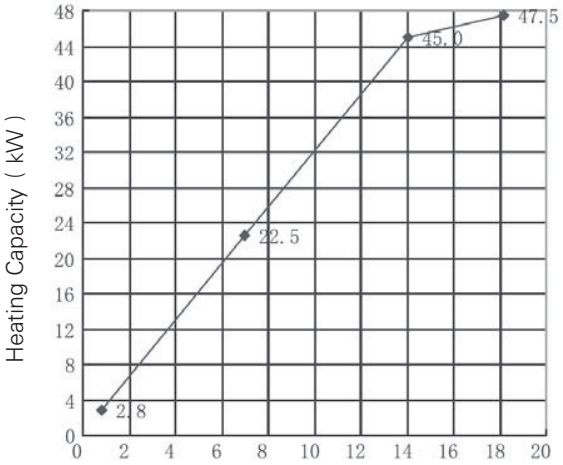
Heating Capacity Graph for AVWT–114*



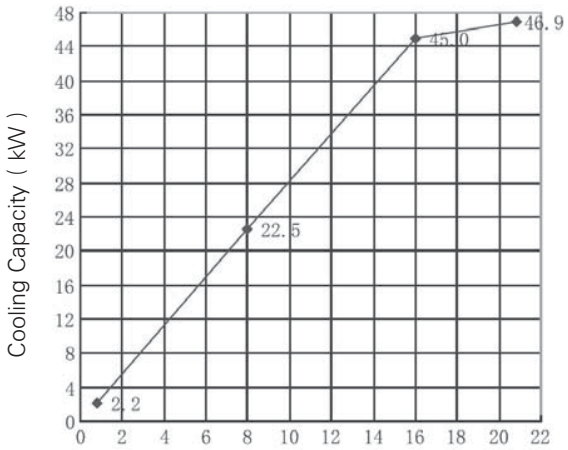
Cooling Capacity Graph for AVWT–136*



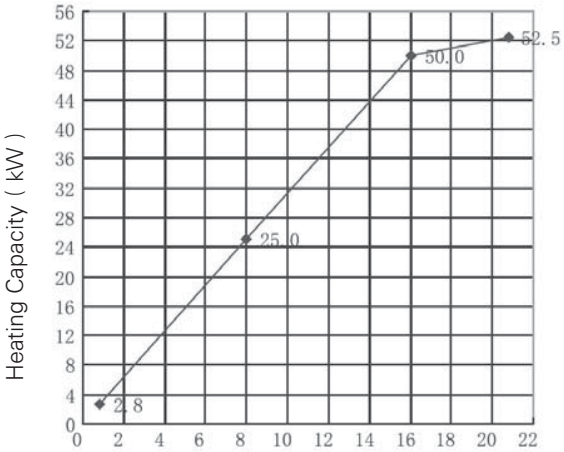
Heating Capacity Graph for AVWT–136*



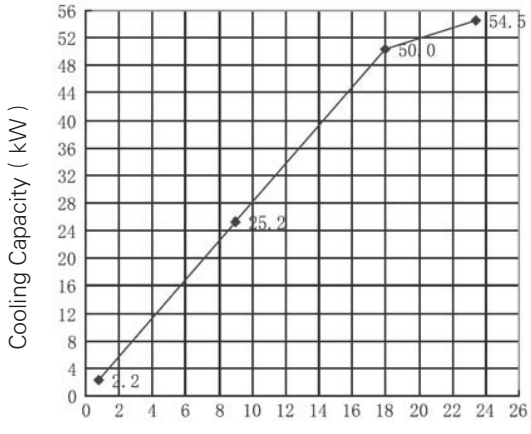
Cooling Capacity Graph for AVWT–154*



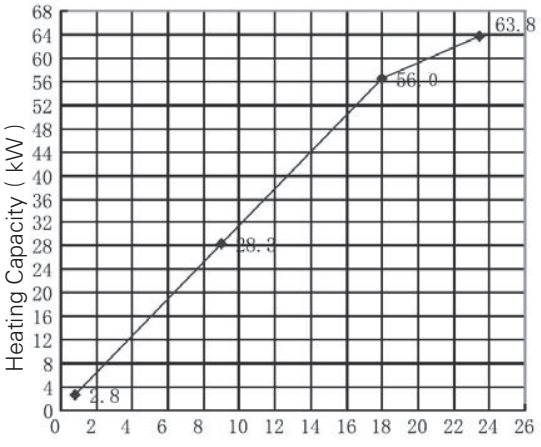
Heating Capacity Graph for AVWT–154*



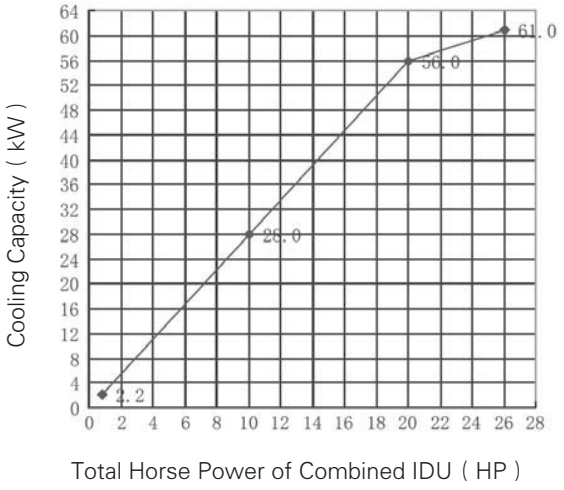
Cooling Capacity Graph for AVWT–170*



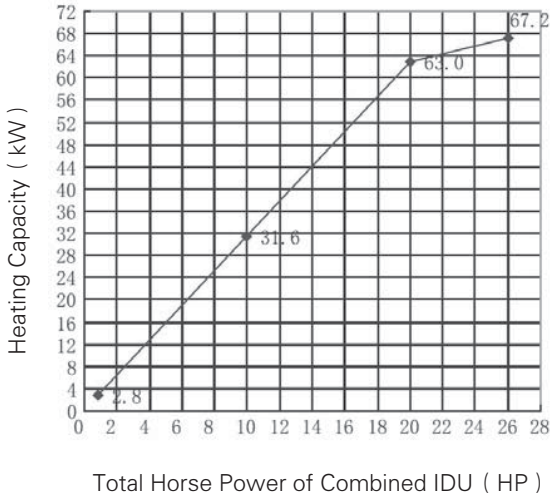
Heating Capacity Graph for AVWT–170*



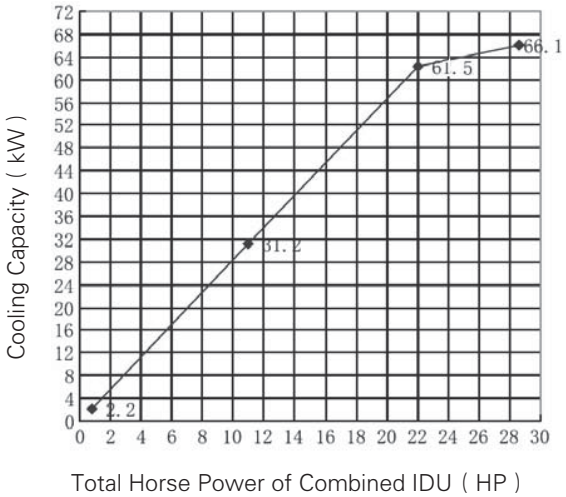
Cooling Capacity Graph for AVWT–190*



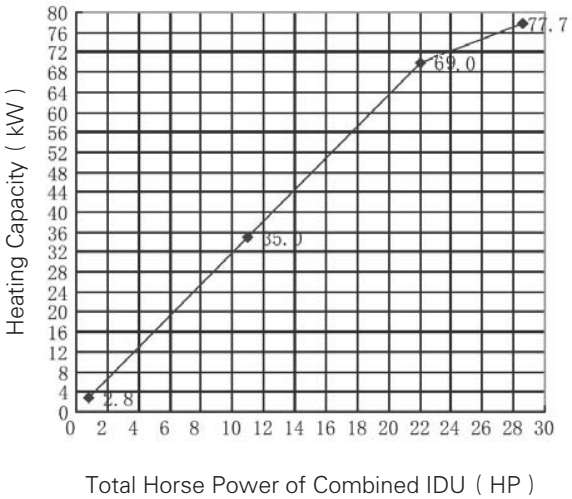
Heating Capacity Graph for AVWT–190*



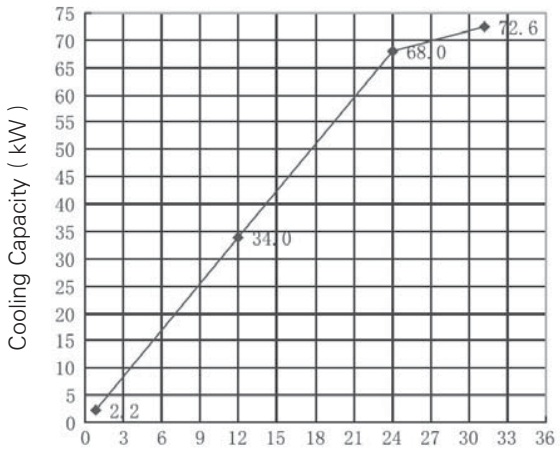
Cooling Capacity Graph for AVWT–212*



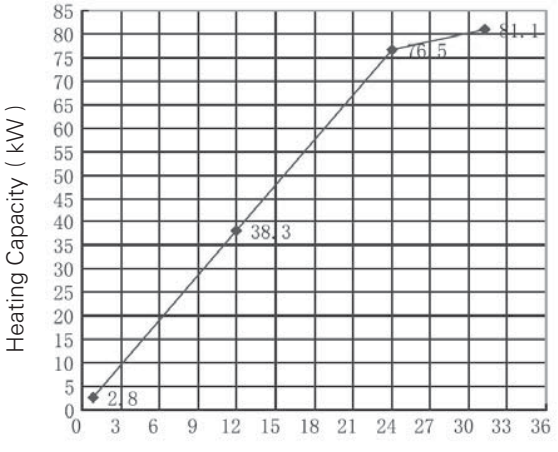
Heating Capacity Graph for AVWT–212*



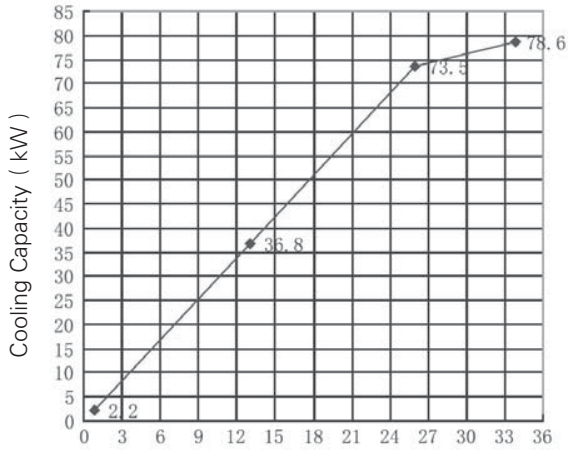
Cooling Capacity Graph for AVWT–232*



Heating Capacity Graph for AVWT–232*

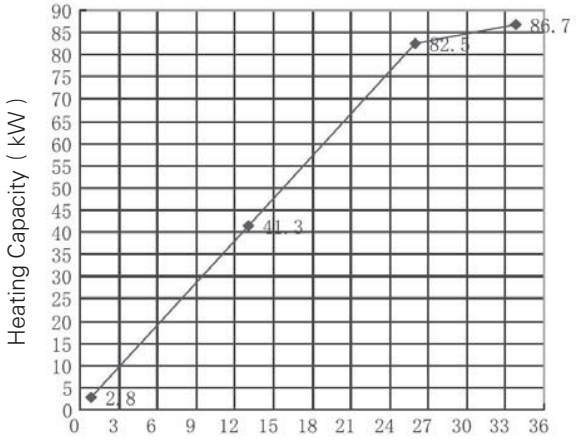


Cooling Capacity Graph for AVWT–250*



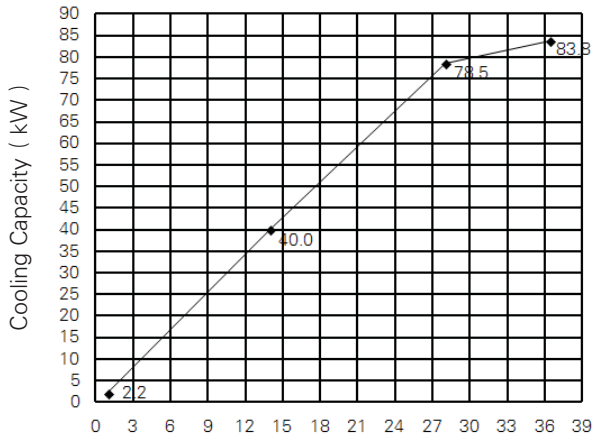
Total Horse Power of Combined IDU (HP)

Heating Capacity Graph for AVWT–250*



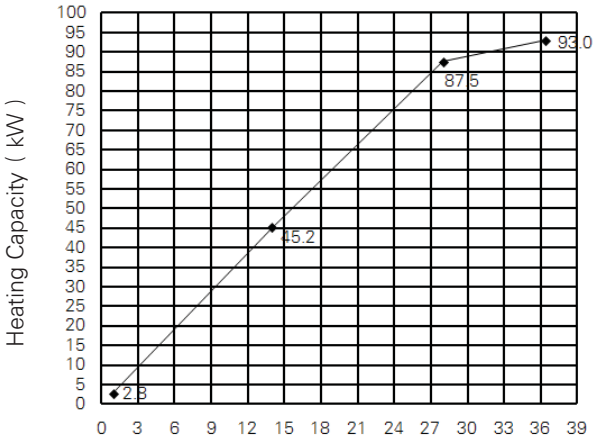
Total Horse Power of Combined IDU (HP)

Cooling Capacity Graph for AVWT–268*



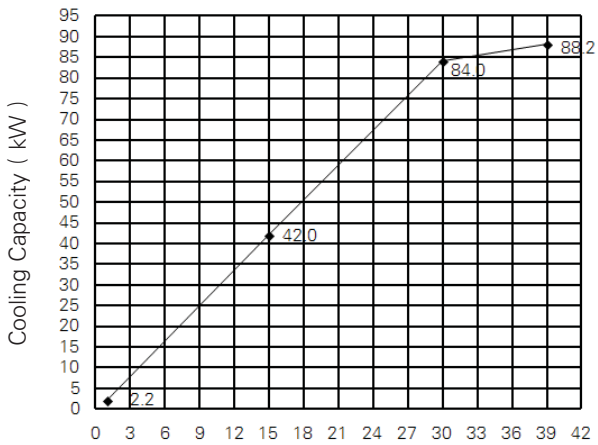
Total Horse Power of Combined IDU (HP)

Heating Capacity Graph for AVWT–268*



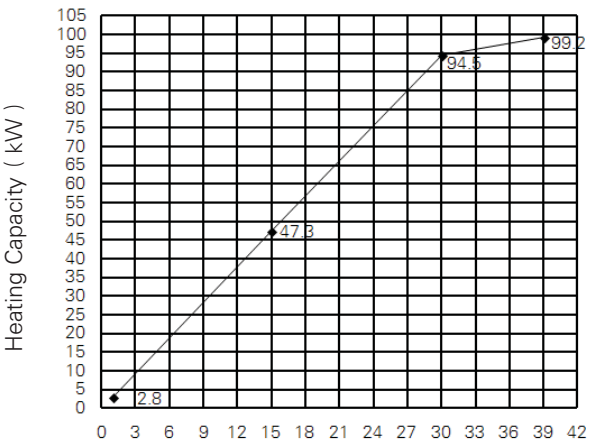
Total Horse Power of Combined IDU (HP)

Cooling Capacity Graph for AVWT–287*



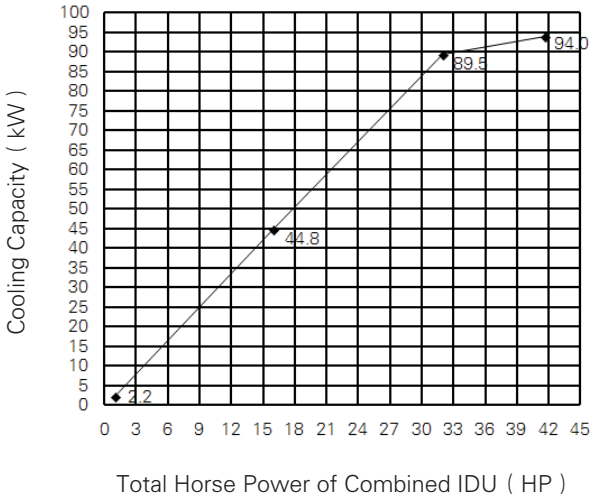
Total Horse Power of Combined IDU (HP)

Heating Capacity Graph for AVWT–287*



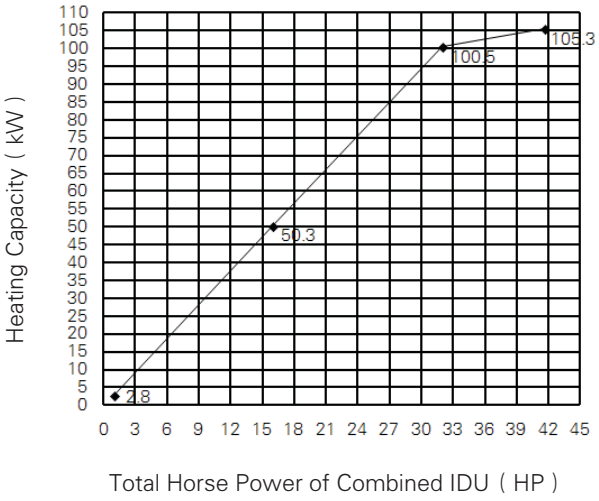
Total Horse Power of Combined IDU (HP)

Cooling Capacity Graph for AVWT–306*



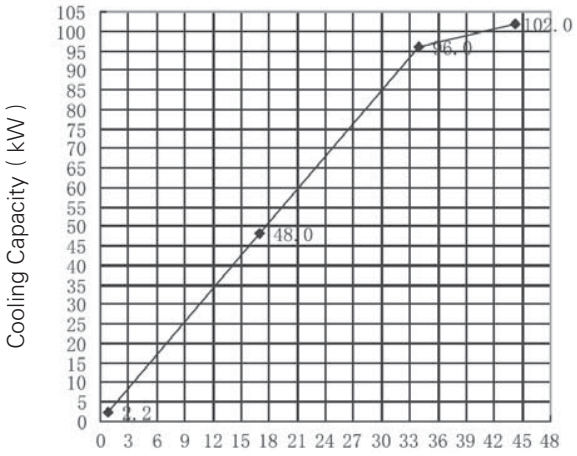
Total Horse Power of Combined IDU (HP)

Heating Capacity Graph for AVWT–306*



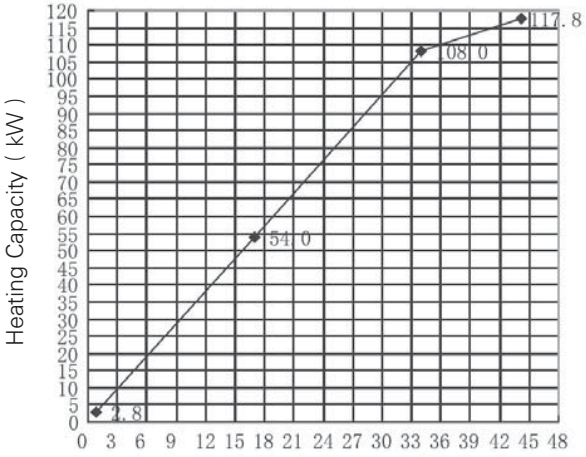
Total Horse Power of Combined IDU (HP)

Cooling Capacity Graph for AVWT–324*



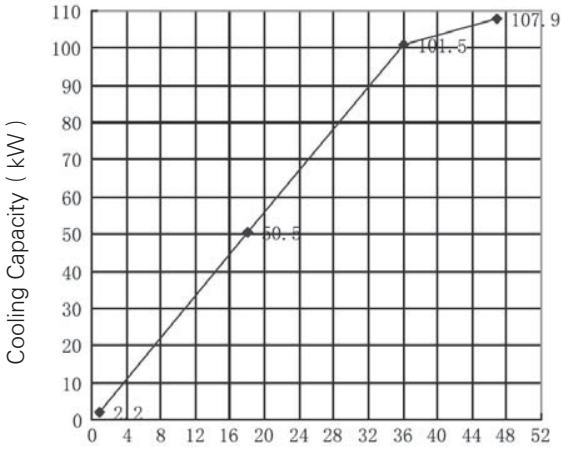
Total Horse Power of Combined IDU (HP)

Heating Capacity Graph for AVWT–324*



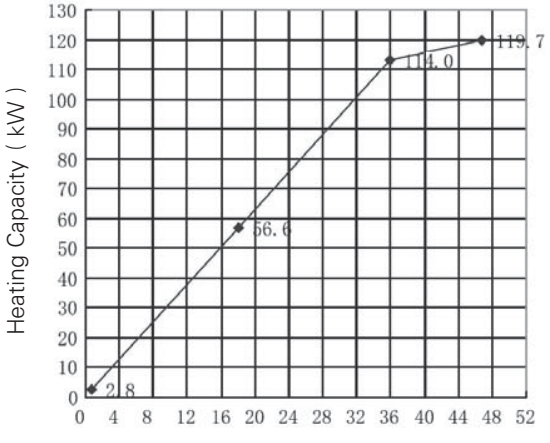
Total Horse Power of Combined IDU (HP)

Cooling Capacity Graph for AVWT–340*



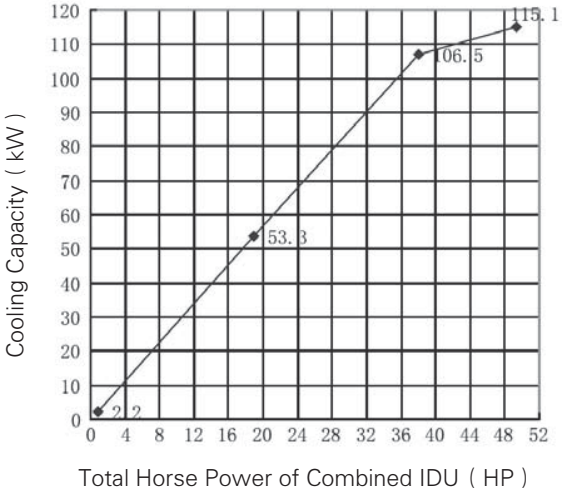
Total Horse Power of Combined IDU (HP)

Heating Capacity Graph for AVWT–340*

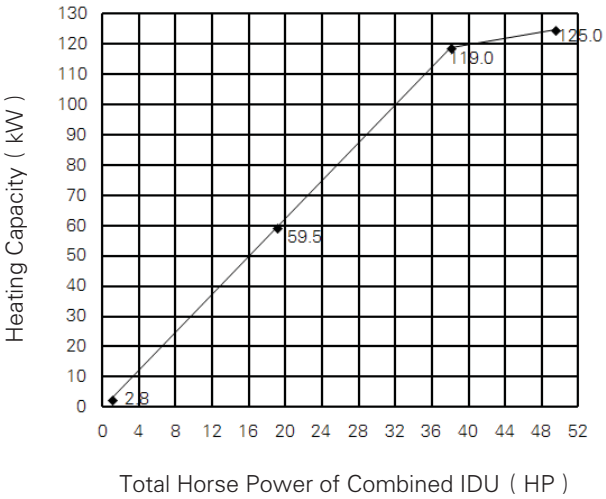


Total Horse Power of Combined IDU (HP)

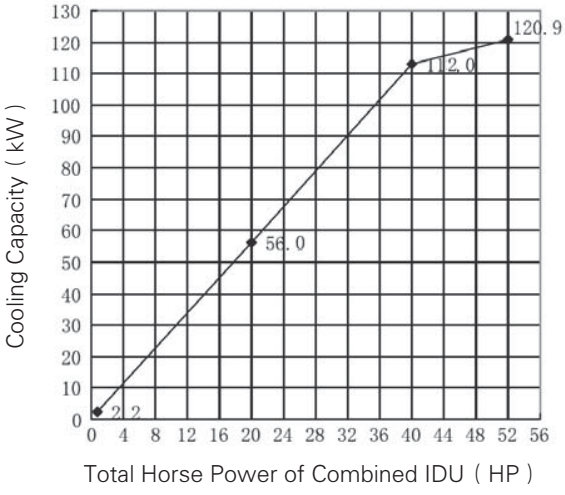
Cooling Capacity Graph for AVWT–364*



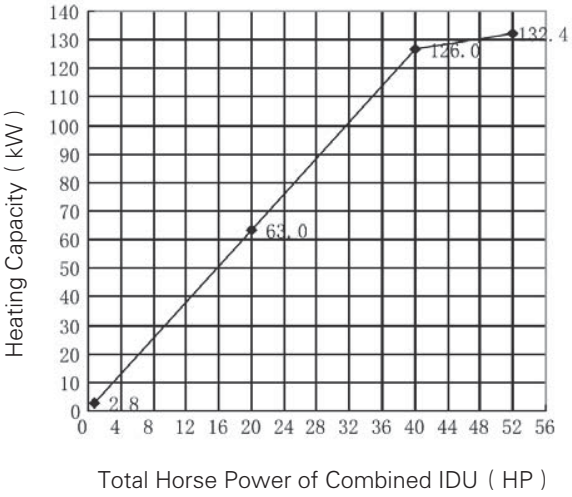
Heating Capacity Graph for AVWT–364*



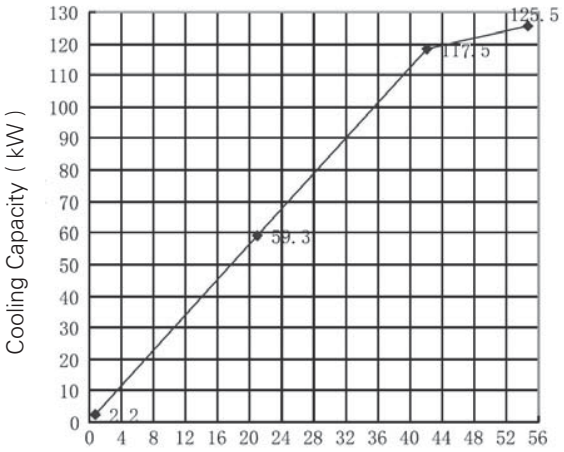
Cooling Capacity Graph for AVWT–382*



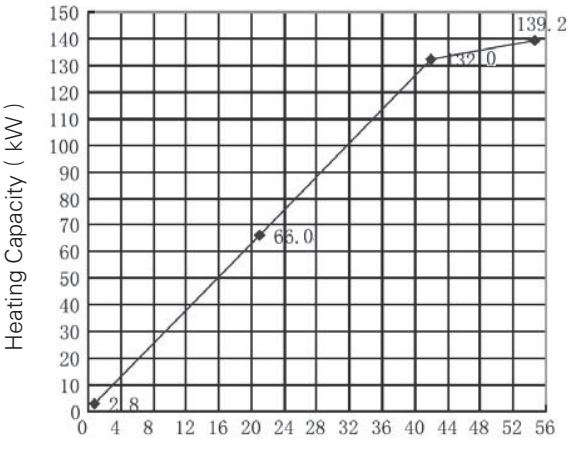
Heating Capacity Graph for AVWT–382*



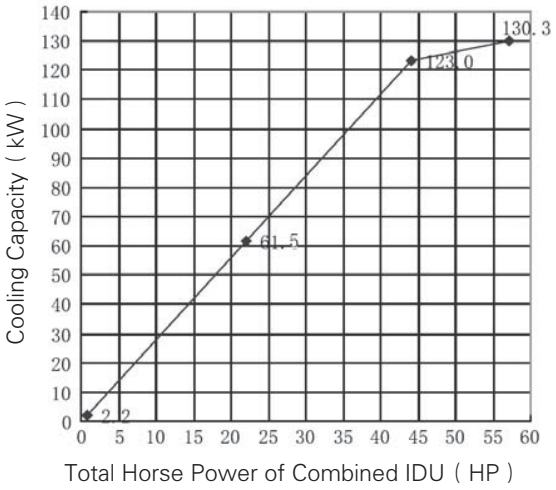
Cooling Capacity Graph for AVWT–398*



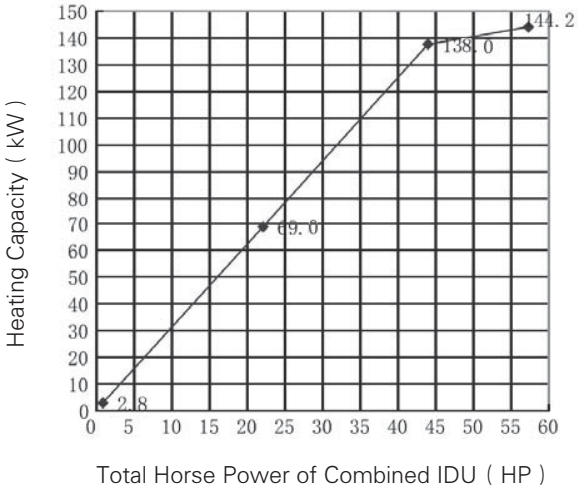
Heating Capacity Graph for AVWT–398*



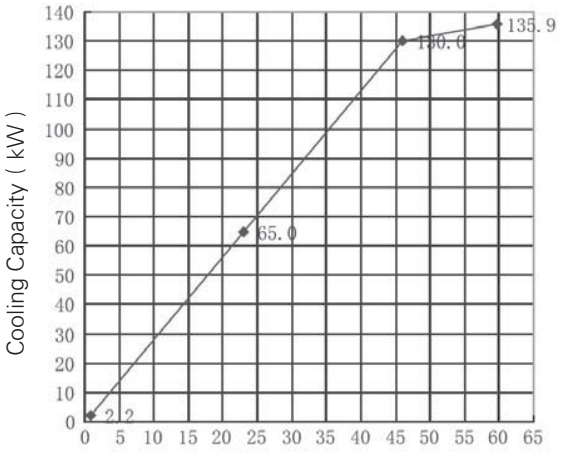
Cooling Capacity Graph for AVWT–420*



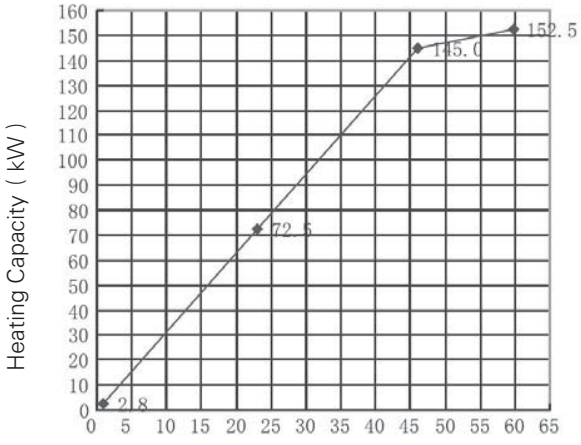
Heating Capacity Graph for AVWT–420*



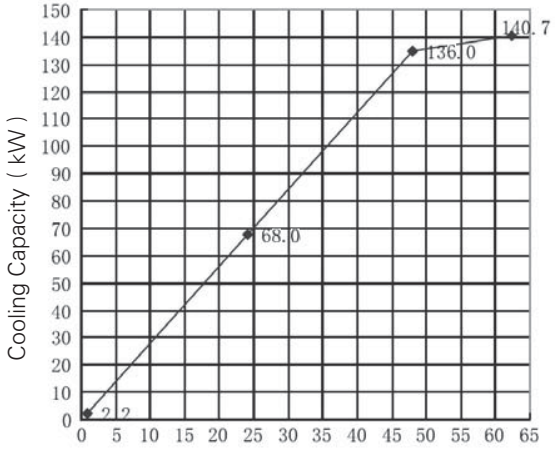
Cooling Capacity Graph for AVWT–438*



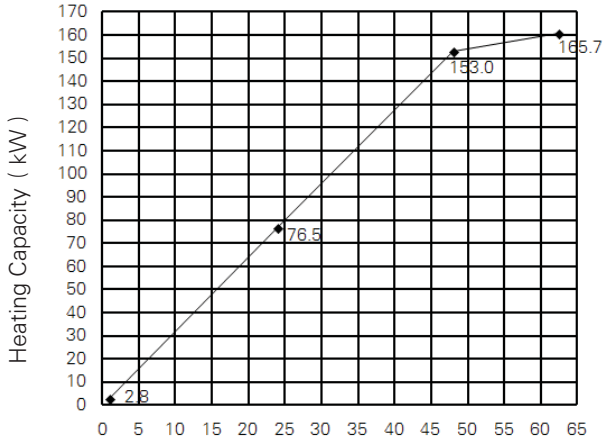
Heating Capacity Graph for AVWT–438*



Cooling Capacity Graph for AVWT–454*



Heating Capacity Graph for AVWT–454*



4.3 Capacity Table Under Different Temperature(KW)

Table 1. Cooling Capacity Table for AVWT-76*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	20.0	21.3	22.7	23.2	24.4	26.1	28.1
28	19.8	21.1	22.4	22.9	23.8	25.6	27.3
32	19.5	20.8	22.2	22.7	23.4	24.9	26.4
35	19.2	20.5	21.9	22.4	23.1	24.3	25.6
40	18.8	20.1	21.4	21.9	22.4	23.2	23.9

Table 2. Cooling Capacity Table for AVWT-96*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	24.8	26.5	28.2	29.0	30.2	32.5	34.9
28	24.6	26.3	27.9	28.6	29.7	31.9	33.9
32	24.2	25.9	27.6	28.4	29.2	31.0	32.8
35	23.8	25.5	27.2	28.0	28.8	30.3	31.8
40	23.3	25.0	26.6	27.4	27.9	28.9	29.8

Table 3. Cooling Capacity Table for AVWT-114*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	29.5	31.6	33.6	34.7	36.0	38.7	41.6
28	29.2	31.3	33.2	34.2	35.4	38.0	40.4
32	28.7	30.8	32.9	33.9	34.8	36.9	39.0
35	28.3	30.4	32.5	33.5	34.4	36.0	37.8
40	27.7	29.8	31.7	32.8	33.4	34.4	35.4

Table 4. Cooling Capacity Table for AVWT-136*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	35.2	37.7	40.2	41.4	43.0	46.3	49.6
28	34.8	37.3	39.6	40.9	42.3	45.4	48.2
32	34.3	36.8	39.3	40.5	41.6	44.1	46.6
35	33.8	36.3	38.8	40.0	41.1	43.0	45.2
40	33.0	35.5	37.9	39.1	39.8	41.1	42.3

Table 5. Cooling Capacity Table for AVWT-154*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	39.6	42.4	45.2	46.6	48.4	52.0	55.8
28	39.2	42.0	44.6	46.0	47.6	51.0	54.2
32	38.6	41.4	44.2	45.6	46.8	49.6	52.4
35	38.0	40.8	43.6	45.0	46.2	48.4	50.8
40	37.2	40.0	42.6	44.0	44.8	46.2	47.6

Table6. Cooling Capacity Table for AVWT–170*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	43.5	46.8	50.1	51.8	53.7	57.5	61.5
28	43.1	46.4	49.4	51.1	52.8	56.4	59.7
32	42.4	45.7	49.0	50.7	51.9	54.8	57.7
35	41.8	45.1	48.3	50.0	51.3	53.5	56.0
40	40.9	44.2	47.2	48.9	49.7	51.1	52.4

Table 7. Cooling Capacity Table for AVWT–190*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	49.6	53.0	56.5	58.0	60.4	65.0	69.8
28	49.1	52.5	55.7	57.3	59.4	63.8	67.8
32	48.3	51.8	55.2	56.8	58.4	62.0	65.6
35	47.6	51.0	54.5	56.0	57.6	60.5	63.6
40	46.6	50.0	53.2	54.8	55.9	57.8	59.5

Table 8. Cooling Capacity Table for AVWT–212*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	54.2	58.0	61.9	63.6	66.3	71.4	76.7
28	53.6	57.5	61.0	62.8	65.1	70.0	74.5
32	52.8	56.6	60.5	62.2	64.0	68.0	72.0
35	51.9	55.8	59.6	61.5	63.2	66.4	69.7
40	50.8	54.7	58.2	60.0	61.2	63.3	65.3

Table 9. Cooling Capacity Table for AVWT–232*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	60.0	64.2	68.4	70.4	73.2	78.8	84.5
28	59.4	63.6	67.5	69.5	72.0	77.3	82.1
32	58.5	62.7	66.9	68.9	70.8	75.1	79.4
35	57.6	61.8	66.0	68.0	69.9	73.3	77.0
40	56.3	60.5	64.5	66.5	67.7	70.0	72.1

Table 10. Cooling Capacity Table for AVWT–250*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	64.7	69.3	73.8	76.1	79.0	85.0	91.2
28	64.0	68.6	72.8	75.1	77.7	83.4	88.6
32	63.0	67.6	72.2	74.4	76.4	81.0	85.6
35	62.1	66.7	71.3	73.5	75.5	79.0	83.0
40	60.7	65.3	69.6	71.9	73.2	75.5	77.7

Table 11. Cooling Capacity Table for：AVWT–268*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	69.1	74.0	78.8	81.3	84.4	90.7	97.4
28	68.4	73.3	77.8	80.2	83.0	89.0	94.6
32	67.3	72.2	77.1	79.5	81.6	86.5	91.4
35	66.3	71.2	76.1	78.5	80.6	84.4	88.6
40	64.9	69.8	74.3	76.8	78.2	80.6	83.0

Table 12. Cooling Capacity Table for AVWT–287*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	74.4	79.5	84.7	87.0	90.6	97.5	104.7
28	73.7	78.8	83.6	85.9	89.1	95.7	101.7
32	72.5	77.7	82.8	85.2	87.6	93.0	98.4
35	71.4	76.5	81.7	84.0	86.4	90.8	95.4
40	69.9	75.0	79.8	82.2	83.8	86.7	89.3

Table 13. Cooling Capacity Table for AVWT–306*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	79.1	84.6	90.1	92.7	96.4	103.7	111.4
28	78.3	83.8	88.9	91.5	94.8	101.8	108.2
32	77.0	82.6	88.1	90.7	93.2	98.9	104.6
35	75.9	81.4	87.0	89.5	92.0	96.5	101.4
40	74.3	79.8	84.9	87.6	89.3	92.2	94.9

Table 14. Cooling Capacity Table for AVWT–324*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	84.8	90.7	96.7	99.4	103.4	111.3	119.4
28	83.9	89.8	95.3	98.2	101.7	109.2	116.0
32	82.6	88.6	94.5	97.3	100.0	106.1	112.2
35	81.4	87.3	93.3	96.0	98.7	103.5	108.8
40	79.6	85.5	91.1	93.9	95.7	98.9	101.8

Table 15. Cooling Capacity Table for AVWT–340*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	89.4	95.7	102.1	105.0	109.3	117.7	126.3
28	88.4	94.8	100.6	103.7	107.4	115.4	122.7
32	87.1	93.4	99.8	102.7	105.6	112.1	118.6
35	85.7	92.1	98.4	101.5	104.3	109.4	114.9
40	83.8	90.2	96.1	99.1	101.0	104.4	107.6

Table 16. Cooling Capacity Table for AVWT–364*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	93.8	100.4	107.1	110.2	114.7	123.4	132.5
28	92.8	99.5	105.6	108.8	112.7	121.0	128.7
32	91.4	98.0	104.7	107.8	110.8	117.6	124.4
35	89.9	96.6	103.2	106.5	109.4	114.8	120.5
40	88.0	94.7	100.8	104.0	106.0	109.5	112.9

Table 17. Cooling Capacity Table for AVWT–382*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	99.2	106.0	113.0	116.0	120.8	130.0	139.6
28	98.2	105.0	111.4	114.6	118.8	127.6	135.6
32	96.6	103.6	110.4	113.6	116.8	124.0	131.2
35	95.2	102.0	109.0	112.0	115.2	121.0	127.2
40	93.2	100.0	106.4	109.6	111.8	115.6	119.0

Table 18. Cooling Capacity Table for AVWT–398*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	103.8	111.0	118.4	121.6	126.7	136.4	146.5
28	102.7	110.0	116.7	120.1	124.5	133.8	142.3
32	101.1	108.4	115.7	119.0	122.4	130.0	137.6
35	99.5	106.8	114.1	117.5	120.8	126.9	133.3
40	97.4	104.7	111.4	114.8	117.1	121.1	124.8

Table 19. Cooling Capacity Table for AVWT–420*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	108.4	116.0	123.8	127.2	132.6	142.8	153.4
28	107.2	115.0	122.0	125.6	130.2	140.0	149.0
32	105.6	113.2	121.0	124.4	128.0	136.0	144.0
35	103.8	111.6	119.2	123.0	126.4	132.8	139.4
40	101.6	109.4	116.4	120.0	122.4	126.6	130.6

Table 20. Cooling Capacity Table for AVWT–438*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	113.9	122.2	130.5	134.6	139.7	150.1	160.7
28	112.7	121.0	128.6	132.9	137.4	147.2	156.1
32	111.0	119.3	127.6	131.7	135.1	143.0	150.9
35	109.4	117.7	125.9	130.0	133.5	139.5	146.4
40	106.9	115.2	123.0	127.1	129.3	133.3	137.0

Table 21. Cooling Capacity Table for AVWT–454*

Outdoor Air Inlet Dry Bulb (℃)	Indoor Air Inlet Wet Bulb (℃)						
	14	16	18	19	20	22	24
24	120.0	128.4	136.9	140.8	146.4	157.6	169.0
28	118.7	127.1	134.9	139.1	144.0	154.6	164.2
32	116.9	125.4	133.8	137.8	141.6	150.2	158.8
35	115.2	123.6	132.1	136.0	139.8	146.5	154.0
40	112.6	121.0	129.0	133.0	135.5	140.0	144.1

NOTE:

1. The table shows the normal value of cooling operation.
   In some cases, the value may change due to the compressor protection control.

2. The value on the table shows when the system is operating under the following conditions.
   The indoor unit total capacity: 100% of outdoor unit capacity, The total piping length: 7.5m, The height difference: 0m

4.4 **Capacity Table Under Different Temperature**（kW）

Table 1. Heating Capacity Table for AVWT–76*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	16.0	16.0	16.0	16.0	16.0
–15	18.1	18.1	18.0	17.9	17.8
–10	20.2	20.1	20.1	20.0	19.8
–5	22.4	22.3	22.3	22.2	22.1
0	24.1	24.0	23.9	23.7	23.5
5	27.5	26.1	24.7	24.5	24.4
6	28.3	26.6	25.0	24.9	24.9
10	28.8	28.6	28.3	28.3	28.3
15	32.8	32.6	32.6	32.5	32.5

Table 2. Heating Capacity Table for AVWT–96*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	20.3	20.3	20.2	20.1	20.1
–15	22.4	22.3	22.2	22.1	22.0
–10	25.0	24.9	24.8	24.7	24.7
–5	28.2	28.1	28.0	27.9	27.8
0	30.5	30.3	30.1	29.9	29.6
5	34.7	32.9	31.1	30.9	30.7
6	35.7	33.5	31.5	31.4	31.4
10	36.3	36.0	35.7	35.7	35.7
15	41.3	41.1	41.1	41.0	41.0

Table 3. Heating Capacity Table for AVWT–114*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	23.4	23.4	23.3	23.2	23.2
–15	26.8	26.4	26.6	26.5	26.3
–10	29.9	29.4	29.7	29.6	29.4
–5	33.6	33.4	33.3	33.2	33.1
0	36.1	36.0	35.9	35.6	35.3
5	41.3	39.2	37.1	36.8	36.6
6	42.5	39.9	37.5	37.4	37.4
10	43.2	42.9	42.5	42.5	42.5
15	49.2	48.9	48.9	48.8	48.8

Table 4. Heating Capacity Table for AVWT–136*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	28.1	28.1	28.0	27.8	27.8
–15	32.2	32.1	32.0	31.8	31.6
–10	35.9	35.8	35.6	35.5	35.2
–5	40.3	40.1	40.0	39.9	39.7
0	43.3	43.2	43.1	42.7	42.3
5	49.5	47.0	44.5	44.1	43.9
6	50.9	47.9	45.0	44.8	44.8
10	51.8	51.5	50.9	50.9	50.9
15	59.0	58.7	58.7	58.5	58.5

Table 5. Heating Capacity Table for AVWT–154*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	30.2	30.2	30.1	29.9	29.9
–15	35.3	35.2	35.0	34.8	34.6
–10	39.4	39.3	39.1	39.0	38.7
–5	44.8	44.5	44.4	44.2	44.0
0	48.0	48.0	47.8	47.4	47.0
5	55.0	52.2	49.4	49.0	48.8
6	56.6	53.2	50.0	49.8	49.8
10	57.6	57.2	56.6	56.6	56.6
15	65.6	65.2	65.2	65.0	65.0

Table 6. Heating Capacity Table for AVWT–170*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	32.4	32.4	32.4	32.4	32.4
–15	38.9	38.8	38.6	38.4	38.2
–10	43.5	43.4	43.2	43.1	42.7
–5	50.1	49.8	49.6	49.5	49.2
0	53.8	53.8	53.6	53.1	52.7
5	61.6	58.5	55.3	54.9	54.7
6	63.4	59.6	56.0	55.8	55.8
10	64.5	64.1	63.4	63.4	63.4
15	73.5	73.0	73.0	72.8	72.8

Table 7. Heating Capacity Table for AVWT–190*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	40.6	40.6	40.4	40.2	40.2
–15	44.8	44.6	44.4	44.2	44.0
–10	50.0	49.8	49.6	49.4	49.4
–5	56.4	56.2	56.1	55.9	55.6
0	61.0	60.5	60.3	59.8	59.3
5	69.3	65.8	62.2	61.7	61.5
6	71.3	67.0	63.0	62.7	62.7
10	72.6	72.1	71.3	71.3	71.3
15	82.7	82.2	82.2	81.9	81.9

Table 8. Heating Capacity Table for AVWT–212*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	43.1	43.1	43.0	42.8	42.8
–15	49.3	48.7	49.0	48.7	48.4
–10	55.1	54.9	54.7	54.5	54.1
–5	61.7	61.4	61.2	61.0	60.8
0	66.4	66.3	66.0	65.4	64.9
5	76.0	72.1	68.2	67.6	67.3
6	78.2	73.5	69.0	68.7	68.7
10	79.6	79.1	78.2	78.2	78.2
15	90.8	90.3	90.3	90.0	90.0

Table 9. Heating Capacity Table for AVWT–232*

Outdoor Air Inlet Web Bulb (°C)	Indoor Air Inlet Dry Bulb (°C)				
	16	18	20	22	24
–20	48.4	48.4	48.2	47.9	47.9
–15	54.6	54.4	54.2	53.9	53.6
–10	60.9	60.7	60.4	60.2	59.9
–5	68.5	68.2	68.0	67.8	67.5
0	73.8	73.5	73.2	72.6	71.9
5	84.2	79.9	75.6	75.0	74.6
6	86.6	81.4	76.5	76.2	76.2
10	88.1	87.5	86.6	86.6	86.6
15	100.3	99.8	99.8	99.5	99.5

Table 10. Heating Capacity Table for AVWT–250*

Outdoor Air Inlet Web Bulb (°C)	Indoor Air Inlet Dry Bulb (°C)				
	16	18	20	22	24
–20	51.5	51.5	51.3	51.0	51.0
–15	59.0	58.5	58.6	58.3	57.9
–10	65.8	65.2	65.3	65.1	64.6
–5	73.9	73.5	73.3	73.1	72.8
0	79.4	79.2	79.0	78.3	77.6
5	90.8	86.2	81.6	80.9	80.5
6	93.4	87.8	82.5	82.2	82.2
10	95.0	94.4	93.4	93.4	93.4
15	108.2	107.6	107.6	107.3	107.3

Table 11. Heating Capacity Table for AVWT–268*

Outdoor Air Inlet Web Bulb (°C)	Indoor Air Inlet Dry Bulb (°C)				
	16	18	20	22	24
–20	53.6	53.6	53.4	53.1	53.1
–15	62.1	61.6	61.6	61.3	60.9
–10	69.3	68.7	68.8	68.6	68.1
–5	78.4	77.9	77.7	77.4	77.1
0	84.1	84.0	83.7	83.0	82.3
5	96.3	91.4	86.5	85.8	85.4
6	99.1	93.1	87.5	87.2	87.2
10	100.8	100.1	99.1	99.1	99.1
15	114.8	114.1	114.1	113.8	113.8

Table 12. Heating Capacity Table for AVWT–287*

Outdoor Air Inlet Web Bulb (°C)	Indoor Air Inlet Dry Bulb (°C)				
	16	18	20	22	24
–20	60.9	60.9	60.6	60.3	60.3
–15	67.2	66.9	66.6	66.3	66.0
–10	75.0	74.7	74.4	74.1	74.1
–5	84.6	84.3	84.1	83.8	83.4
0	91.5	90.8	90.4	89.7	88.9
5	104.0	98.7	93.3	92.6	92.2
6	107.0	100.5	94.5	94.1	94.1
10	108.9	108.1	107.0	107.0	107.0
15	124.0	123.3	123.3	122.9	122.9

Table 13. Heating Capacity Table for AVWT–306*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	64.0	64.0	63.7	63.4	63.4
–15	71.6	71.0	71.0	70.7	70.3
–10	79.9	79.2	79.3	79.0	78.8
–5	90.0	89.6	89.4	89.1	88.7
0	97.1	96.5	96.2	95.4	94.6
5	110.6	105.0	99.3	98.5	98.1
6	113.8	106.9	100.5	100.1	100.1
10	115.8	115.0	113.8	113.8	113.8
15	131.9	131.1	131.1	130.7	130.7

Table 14. Heating Capacity Table for AVWT–324*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	68.7	68.7	68.4	68.0	68.0
–15	77.0	76.7	76.4	76.0	75.6
–10	85.9	85.6	85.2	84.9	84.6
–5	96.7	96.3	96.1	95.8	95.3
0	104.3	103.7	103.4	102.5	101.6
5	118.8	112.8	106.7	105.8	105.4
6	122.2	114.9	108.0	107.5	107.5
10	124.4	123.6	122.2	122.2	122.2
15	141.7	140.9	140.9	140.4	140.4

Table 15. Heating Capacity Table for AVWT–340*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	71.2	71.2	71.0	70.6	70.6
–15	81.5	80.8	81.0	80.5	80.0
–10	91.0	90.7	90.3	90.0	89.3
–5	102.0	101.5	101.2	100.9	100.5
0	109.7	109.5	109.1	108.1	107.2
5	125.5	119.1	112.7	111.7	111.2
6	129.1	121.4	114.0	113.5	113.5
10	131.4	130.6	129.1	129.1	129.1
15	149.8	149.0	149.0	148.5	148.5

Table 16. Heating Capacity Table for AVWT–364*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	73.3	73.3	73.1	72.7	72.7
–15	84.6	83.9	84.0	83.5	83.0
–10	94.5	94.2	93.8	93.5	92.8
–5	106.5	105.9	105.6	105.2	104.8
0	114.4	114.3	113.8	112.8	111.9
5	131.0	124.3	117.6	116.6	116.1
6	134.8	126.7	119.0	118.5	118.5
10	137.2	136.3	134.8	134.8	134.8
15	156.4	155.5	155.5	155.0	155.0

Table 17. Heating Capacity Table for AVWT–382*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	81.2	81.2	80.8	80.4	80.4
–15	89.6	89.2	88.8	88.4	88.0
–10	100.0	99.6	99.2	98.8	98.8
–5	112.8	112.4	112.2	111.8	111.2
0	122.0	121.0	120.6	119.6	118.6
5	138.6	131.6	124.4	123.4	123.0
6	142.6	134.0	126.0	125.4	125.4
10	145.2	144.2	142.6	142.6	142.6
15	165.4	164.4	164.4	163.8	163.8

Table 18. Heating Capacity Table for AVWT–398*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	83.7	83.7	83.4	83.0	83.0
–15	94.1	93.3	93.4	92.9	92.4
–10	105.1	104.7	104.3	103.9	103.5
–5	118.1	117.6	117.3	116.9	116.4
0	127.4	126.8	126.3	125.2	124.2
5	145.3	137.9	130.4	129.3	128.8
6	149.5	140.5	132.0	131.4	131.4
10	152.2	151.2	149.5	149.5	149.5
15	173.5	172.5	172.5	171.9	171.9

Table 19. Heating Capacity Table for AVWT–420*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	86.2	86.2	86.0	85.6	85.6
–15	98.6	97.4	98.0	97.4	96.8
–10	110.2	109.8	109.4	109.0	108.2
–5	123.4	122.8	122.4	122.0	121.6
0	132.8	132.6	132.0	130.8	129.8
5	152.0	144.2	136.4	135.2	134.6
6	156.4	147.0	138.0	137.4	137.4
10	159.2	158.2	156.4	156.4	156.4
15	181.6	180.6	180.6	180.0	180.0

Table 20. Heating Capacity Table for AVWT–438*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	88.6	88.6	88.4	88.0	88.0
–15	103.3	103.0	102.6	102.0	101.4
–10	115.3	115.0	114.4	114.1	113.1
–5	130.7	130.0	129.6	129.3	128.6
0	140.4	140.2	139.8	138.5	137.3
5	160.6	152.5	144.3	143.1	142.5
6	165.2	155.4	146.0	145.4	145.4
10	168.1	167.1	165.2	165.2	165.2
15	191.5	190.4	190.4	189.8	189.8

Table 21. Heating Capacity Table for AVWT–454*

Outdoor Air Inlet Web Bulb (℃)	Indoor Air Inlet Dry Bulb (℃)				
	16	18	20	22	24
–20	96.8	96.8	96.4	95.8	95.8
–15	109.2	108.8	108.4	107.8	107.2
–10	121.8	121.4	120.8	120.4	119.8
–5	137.0	136.4	136.1	135.7	135.0
0	147.6	146.9	146.5	145.2	143.9
5	168.3	159.8	151.2	149.9	149.3
6	173.1	162.8	153.0	152.3	152.3
10	176.2	175.1	173.1	173.1	173.1
15	200.7	199.6	199.6	198.9	198.9

NOTE:
1. The table shows the normal value of heating operation.
   In some cases, the value may change due to the compressor protection control.

2. The value on the table shows when the system is operated under the following conditions.
   The indoor unit total capacity: 100% of outdoor unit capacity, The total piping length: 7.5m, The height difference: 0m

4.5 Capacity Correction Based On Refrigerant Piping Length

< Cooling Capacity >

Correction Factor for Cooling Capacity According to Piping Length

The cooling capacity should be corrected according to the following formula:

CCA=CC × F

CCA: Actual Corrected Cooling Capacity

CC: Cooling Capacity in the Performance Table

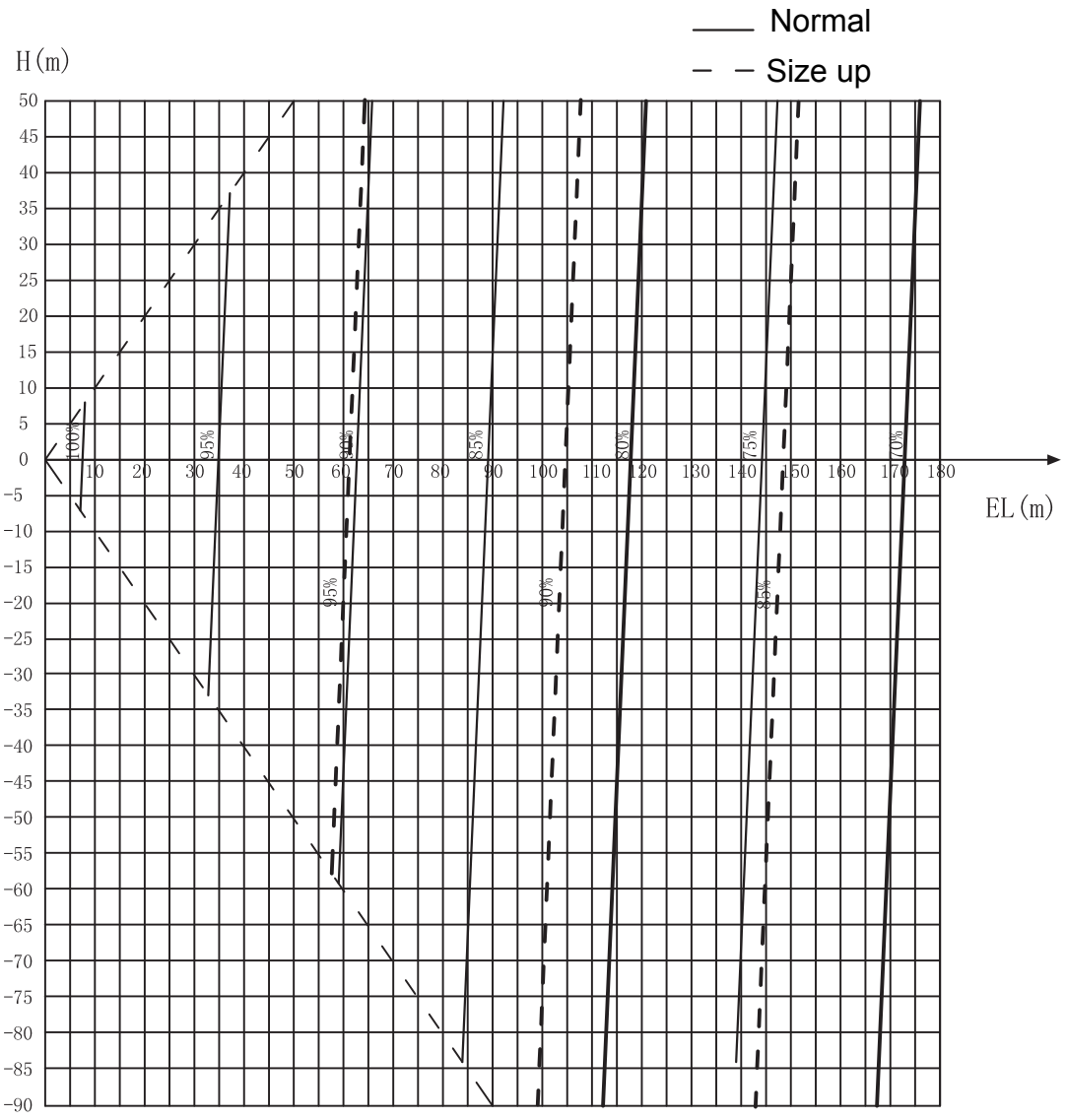
F: Correction Factor Based on the Equivalent Piping Length

The correction factors are shown in the following figure

Equivalent Piping Length for

- One 90° Elbow is 0.5m.
- One 180° Bend is 1.5m.
- One Branch Pipe is 0.5m.

AVWT-76*~454*



<Heating Capacity >

Correction Factor for Cooling Capacity According to Piping Length

The heating capacity should be corrected according to the following formula:

CCA=CC × F

CCA: Actual Corrected Cooling Capacity

CC: Cooling Capacity in the Performance Table

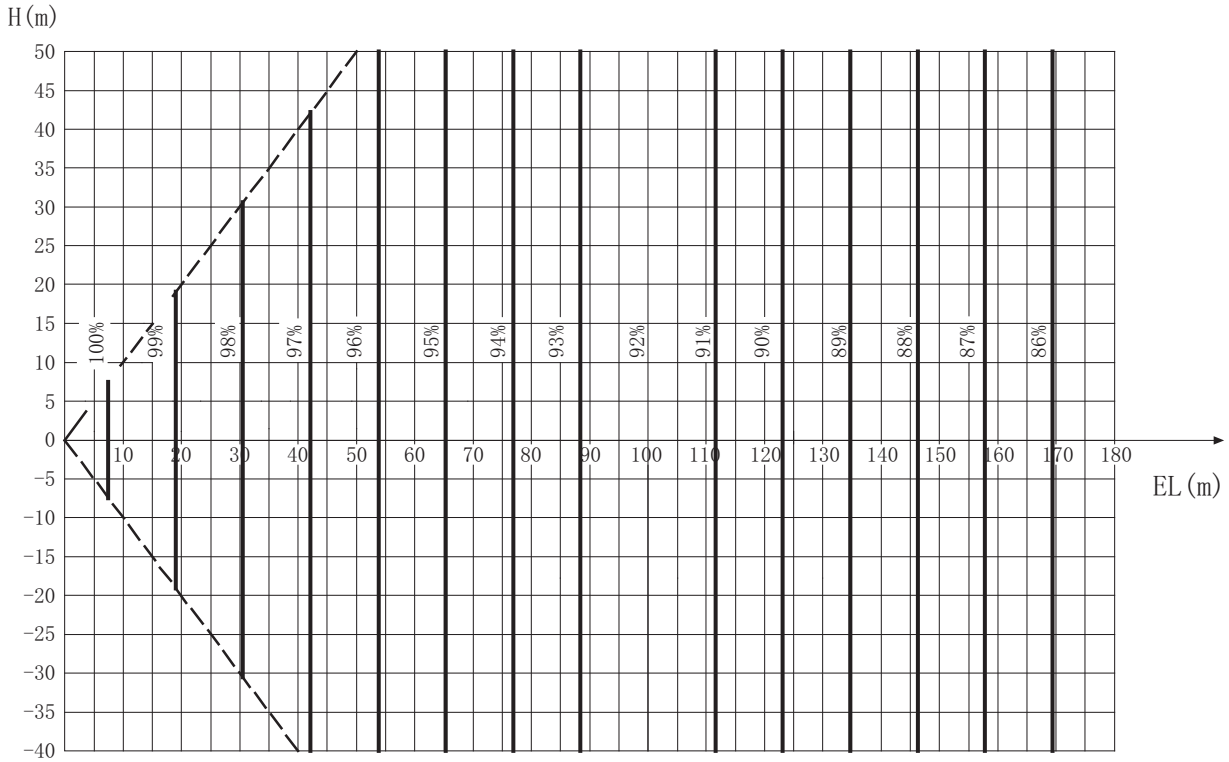
F: Correction Factor Based on the Equivalent Piping Length

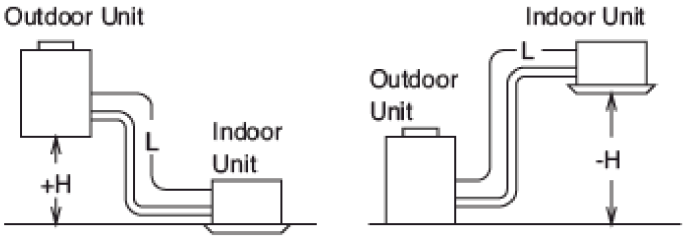
The correction factors are shown in the following figure

Equivalent Piping Length for

- One 90° Elbow is 0.5m.
- One 180° Bend is 1.5m.
- One Branch Pipe is 0.5m.

AVWT–76*~454*





H: Vertical Distance Between Indoor Unit and Outdoor Unit in Meters

EL: Equivalent Total Distance Between Indoor Unit and Outdoor Unit in Meters (Equivalent One–Way Piping Length)

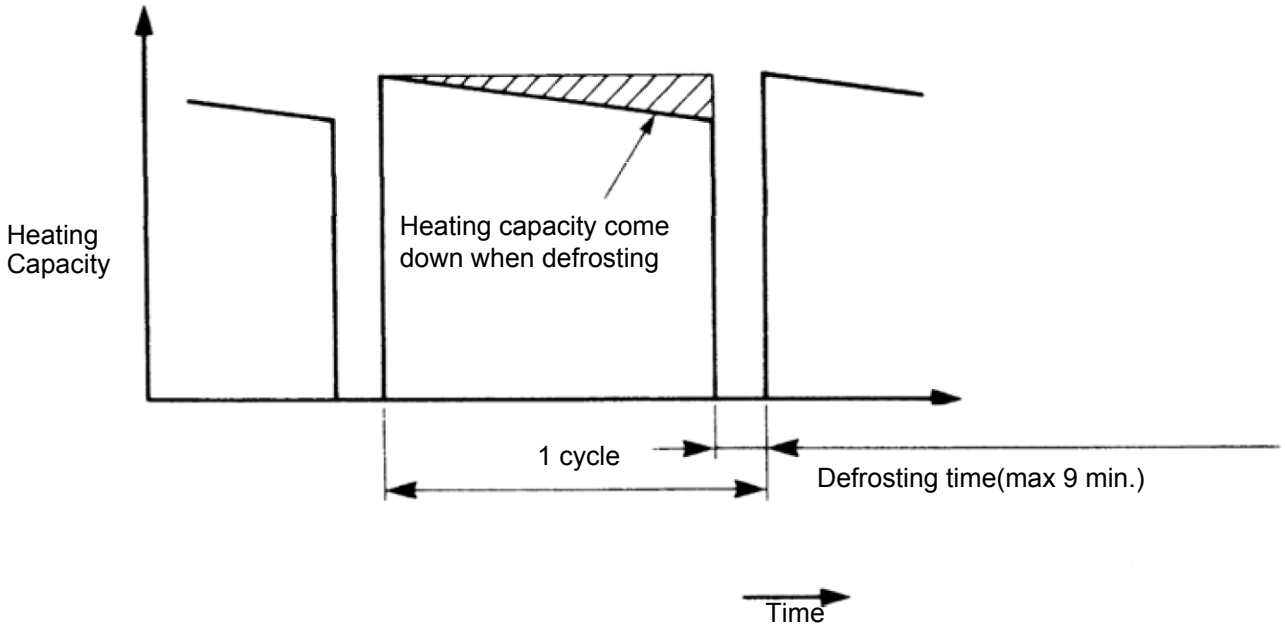
H>0: Position of Outdoor Unit Higher Than Position of Indoor Unit

L:Actual One–Way Piping Length Between Indoor Unit and Outdoor Unit in Meters

4.6 Correction Factor According to Defrosting Operation

The heating capacity in the preceding paragraph, excludes the condition of the frost or the defrosting operation period.
In consideration of the frost or the defrosting operation, the heating capacity is corrected by the equation below.
Corrected Heating Capacity = Correction Factor Heating Capacity

Outdoor Inlet Air Temp. (℃ DB) (Humidity=85% RH)	−7	−5	−3	0	3	5	7
Correction Factor	0.95	0.93	0.88	0.85	0.87	0.90	1.0

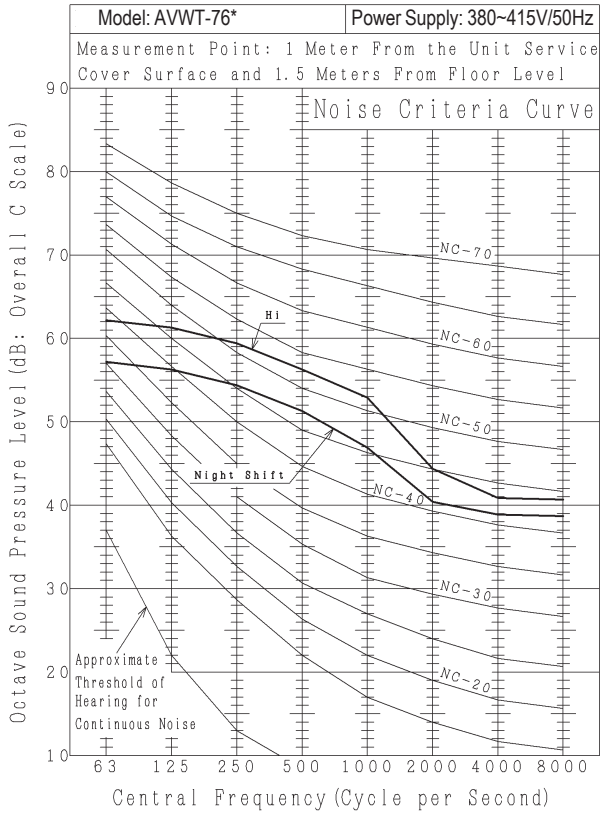


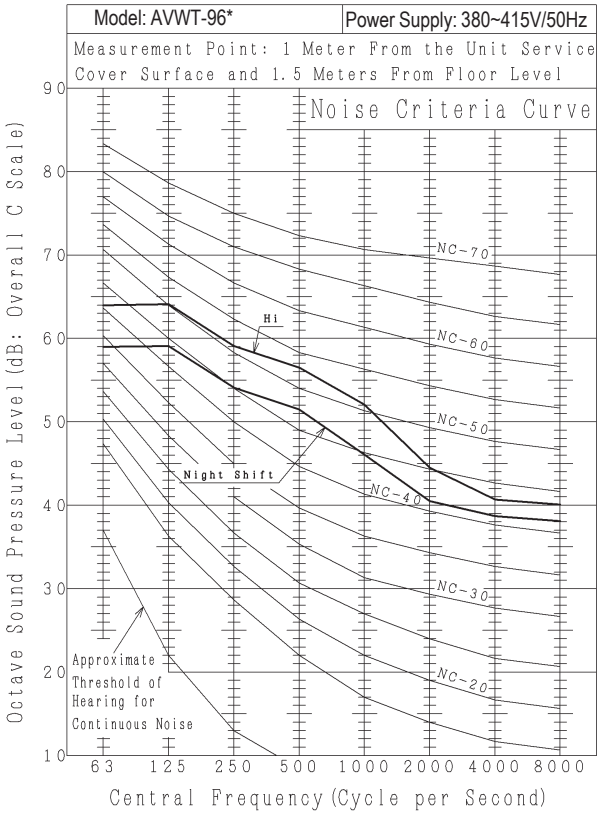
NOTE:
The correction factor is not available for the special condition like a snowfall or a operation in a transitional period.

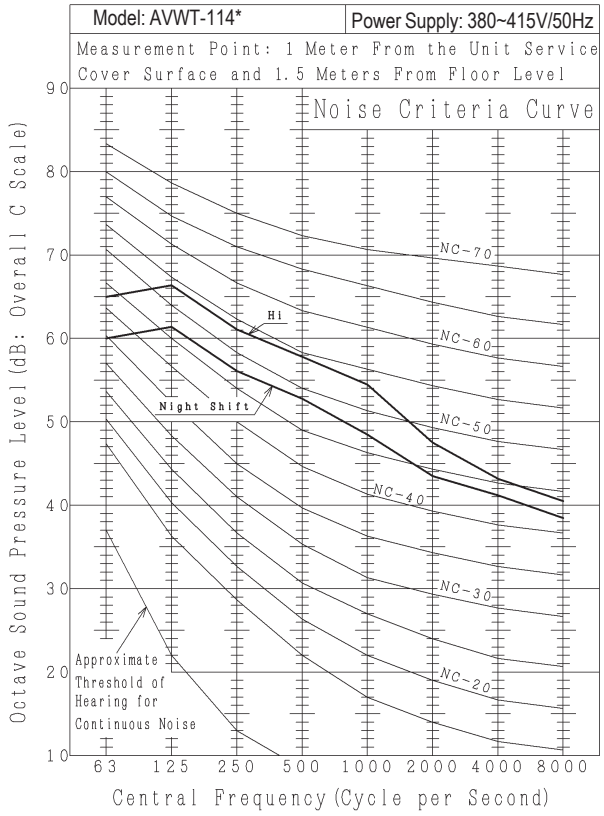
4.7 **Electrical Data**

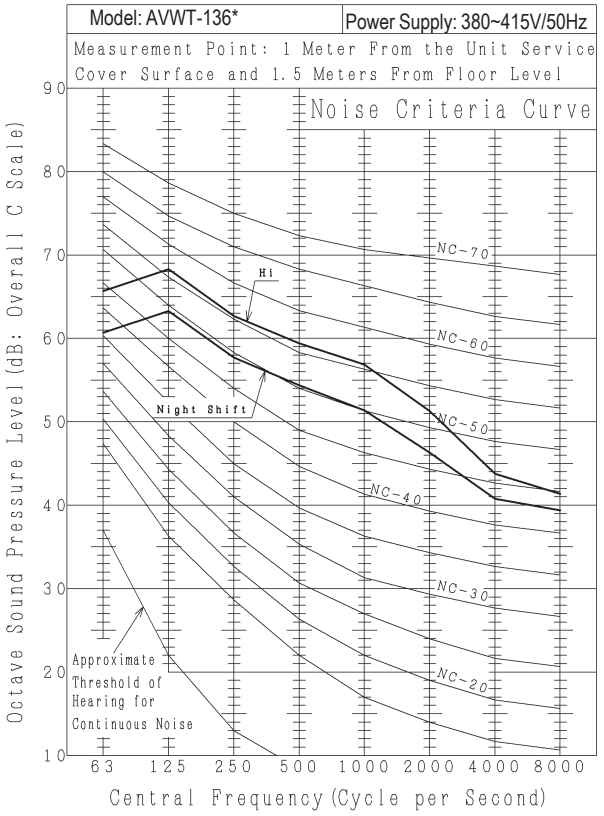
Model	Unit Main Power	Applicable Voltage	ELB		Fuse (A)	Maximum Fuse Current (A)	MCA (A)
			Nominal Current (A)	Nominal Sensitive Current (mA)			
AVWT–76*	AC 3 ϕ 380~415V/50Hz	342V~457V	20	30	25	25	16.5
AVWT–96*	AC 3 ϕ 380~415V/50Hz	342V~457V	25	30	25	25	20
AVWT–114*	AC 3 ϕ 380~415V/50Hz	342V~457V	32	30	32	27	25
AVWT–136*	AC 3 ϕ 380~415V/50Hz	342V~457V	40	30	40	34	30
AVWT–154*	AC 3 ϕ 380~415V/50Hz	342V~457V	40	30	40	35	33
AVWT–170*	AC 3 ϕ 380~415V/50Hz	342V~457V	50	30	50	50	40
AVWT–190*	AC 3 ϕ 380~415V/50Hz	342V~457V	63	30	63	52	48
AVWT–212*	AC 3 ϕ 380~415V/50Hz	342V~457V	63	30	63	52	51
AVWT–232*	AC 3 ϕ 380~415V/50Hz	342V~457V	63	30	63	52	52
AVWT–250*	AC 3 ϕ 380~415V/50Hz	342V~457V	63	30	63	55	55
AVWT–268*	AC 3 ϕ 380~415V/50Hz	342V~457V	80	30	80	65	58
AVWT–287*	AC 3 ϕ 380~415V/50Hz	342V~457V	80	30	80	65	67
AVWT–306*	AC 3 ϕ 380~415V/50Hz	342V~457V	80	30	80	65	72
AVWT–324*	AC 3 ϕ 380~415V/50Hz	342V~457V	100	30	100	85	78
AVWT–340*	AC 3 ϕ 380~415V/50Hz	342V~457V	100	30	100	85	80
AVWT–364*	AC 3 ϕ 380~415V/50Hz	342V~457V	100	30	100	85	83
AVWT–382*	AC 3 ϕ 380~415V/50Hz	342V~457V	125	30	125	105	96
AVWT–398*	AC 3 ϕ 380~415V/50Hz	342V~457V	125	30	125	105	98
AVWT–420*	AC 3 ϕ 380~415V/50Hz	342V~457V	125	30	125	105	100
AVWT–438*	AC 3 ϕ 380~415V/50Hz	342V~457V	125	30	125	105	101
AVWT–454*	AC 3 ϕ 380~415V/50Hz	342V~457V	125	30	125	105	109

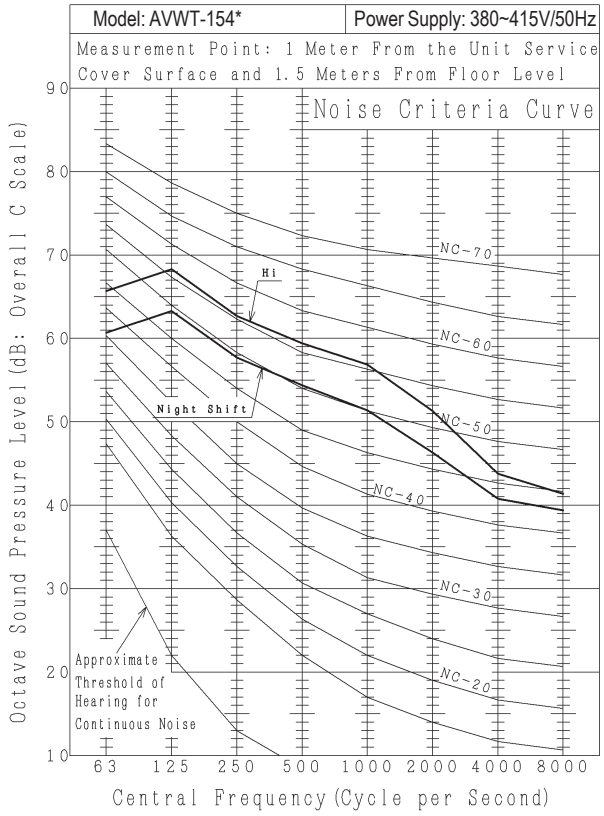
4.8 Sound Data

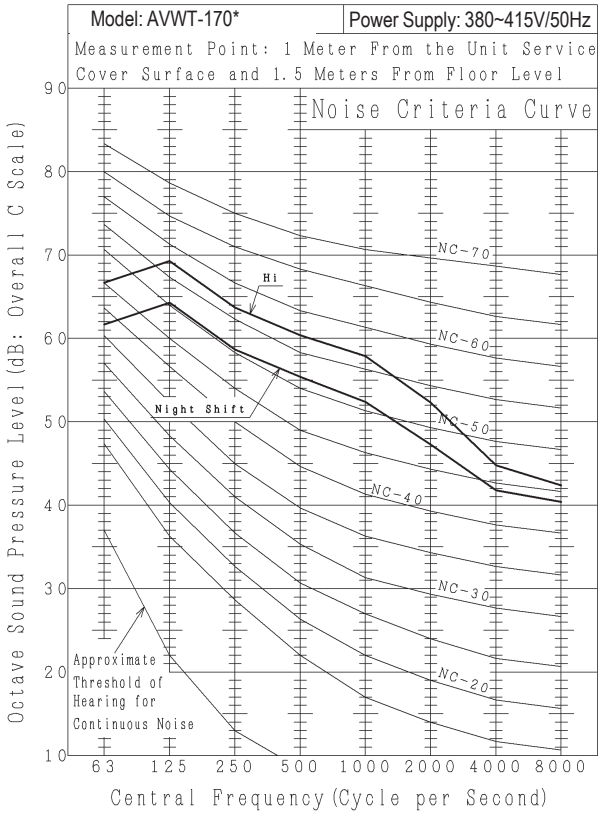


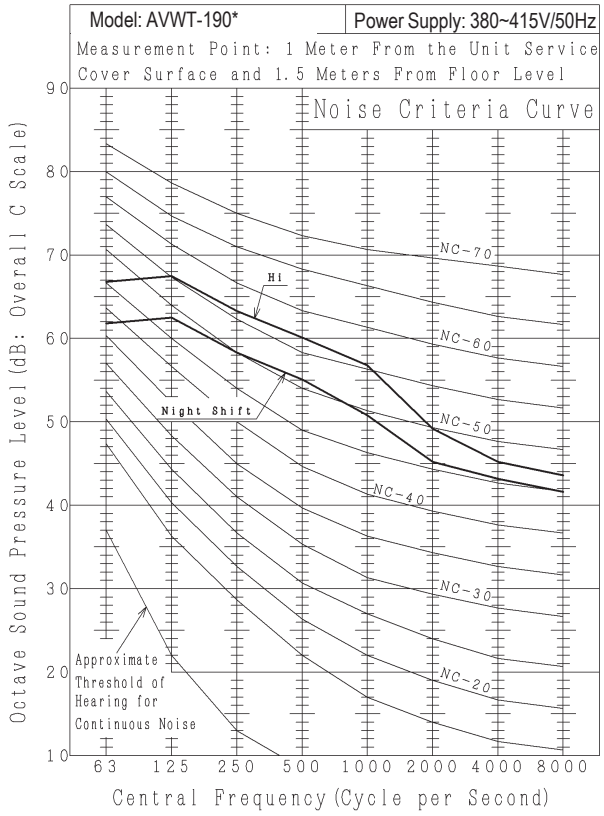


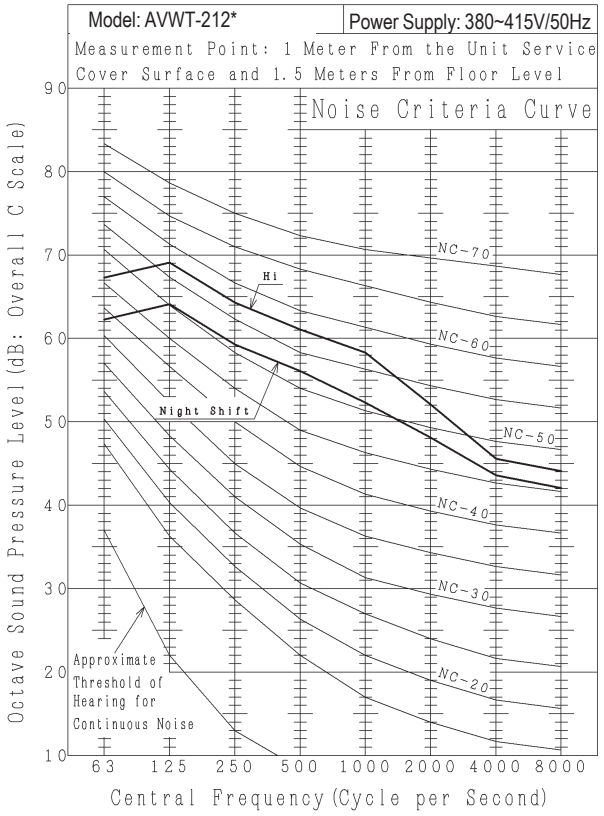


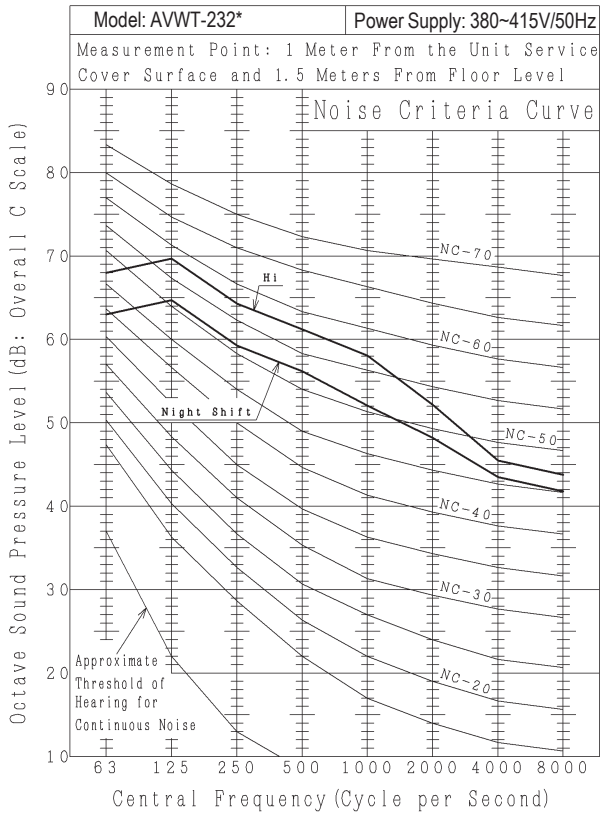


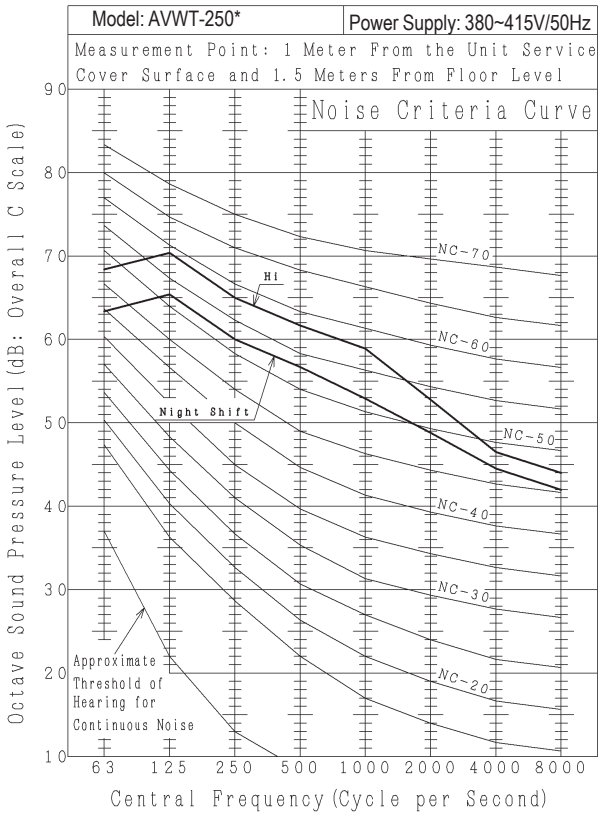

Model: AVWT-154*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Octave Sound Pressure Level (dB: Overall C Scale)
Central Frequency (Cycle per Second)
63 125 250 500 1000 2000 4000 8000
90 80 70 60 50 40 30 20 10
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Hi
Night Shift
Approximate Threshold of Hearing for Continuous Noise

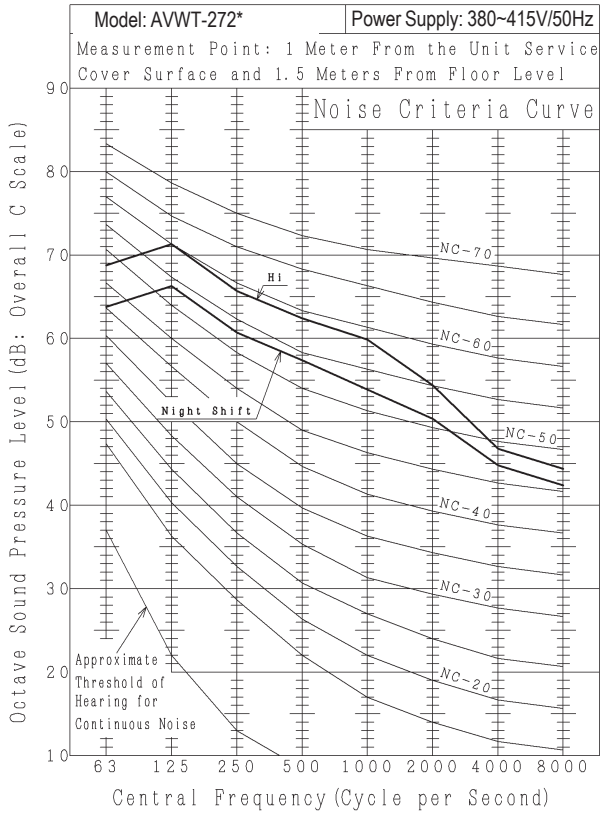

Model: AVWT-170*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Octave Sound Pressure Level (dB: Overall C Scale)
Central Frequency (Cycle per Second)
63 125 250 500 1000 2000 4000 8000
90 80 70 60 50 40 30 20 10
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Hi
Night Shift
Approximate Threshold of Hearing for Continuous Noise

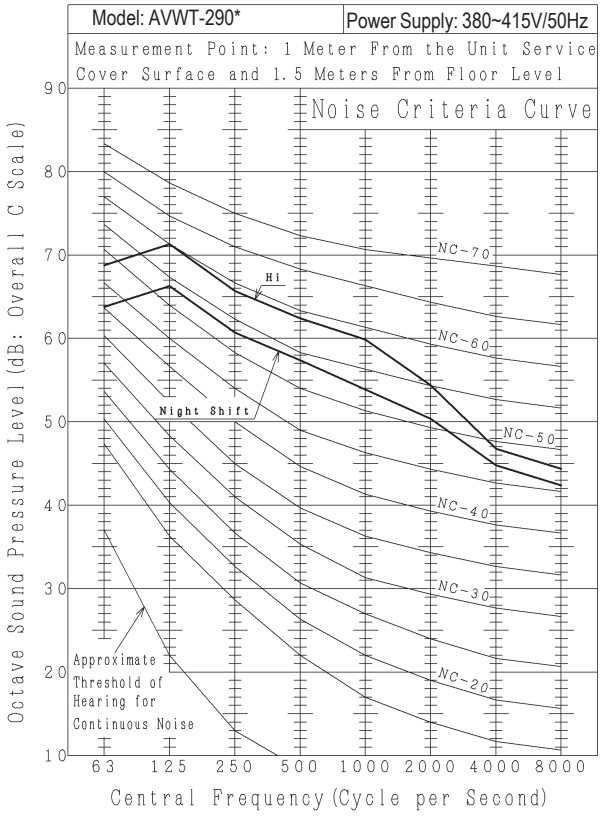

Model: AVWT-190*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Octave Sound Pressure Level (dB: Overall C Scale)
Central Frequency (Cycle per Second)
63 125 250 500 1000 2000 4000 8000
90 80 70 60 50 40 30 20 10
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Hi
Night Shift
Approximate Threshold of Hearing for Continuous Noise

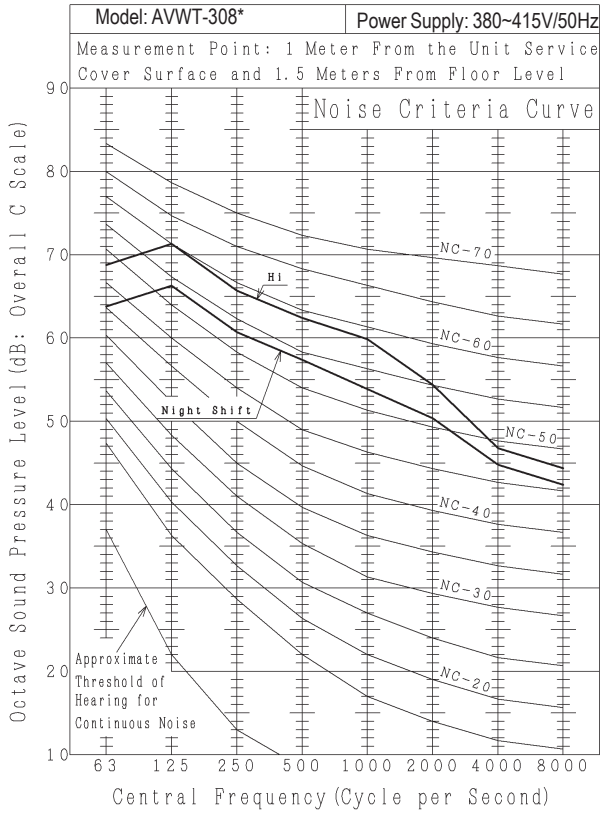

Model: AVWT-212*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Octave Sound Pressure Level (dB: Overall C Scale)
Central Frequency (Cycle per Second)
63 125 250 500 1000 2000 4000 8000
90 80 70 60 50 40 30 20 10
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Hi
Night Shift
Approximate Threshold of Hearing for Continuous Noise

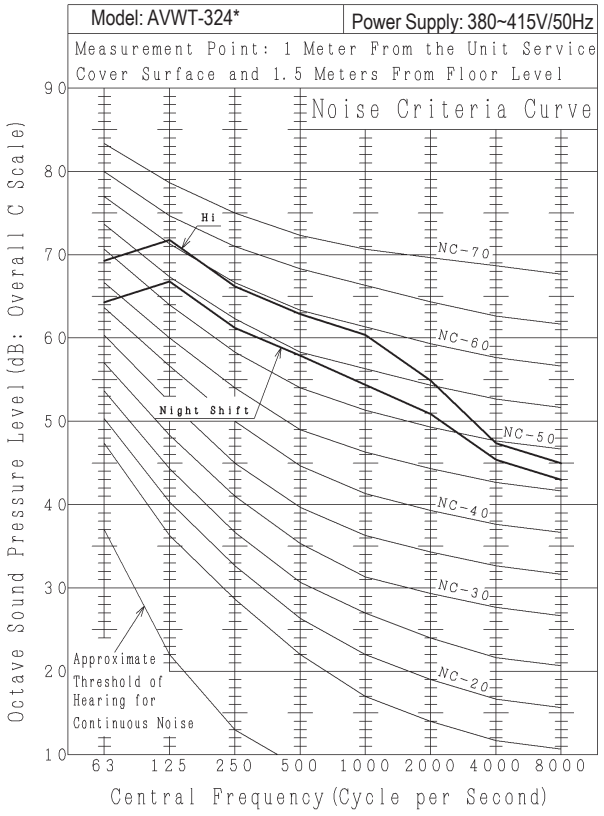

Model: AVWT-232*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Octave Sound Pressure Level (dB: Overall C Scale)
Central Frequency (Cycle per Second)
63 125 250 500 1000 2000 4000 8000
90 80 70 60 50 40 30 20 10
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Hi
Night Shift
Approximate Threshold of Hearing for Continuous Noise

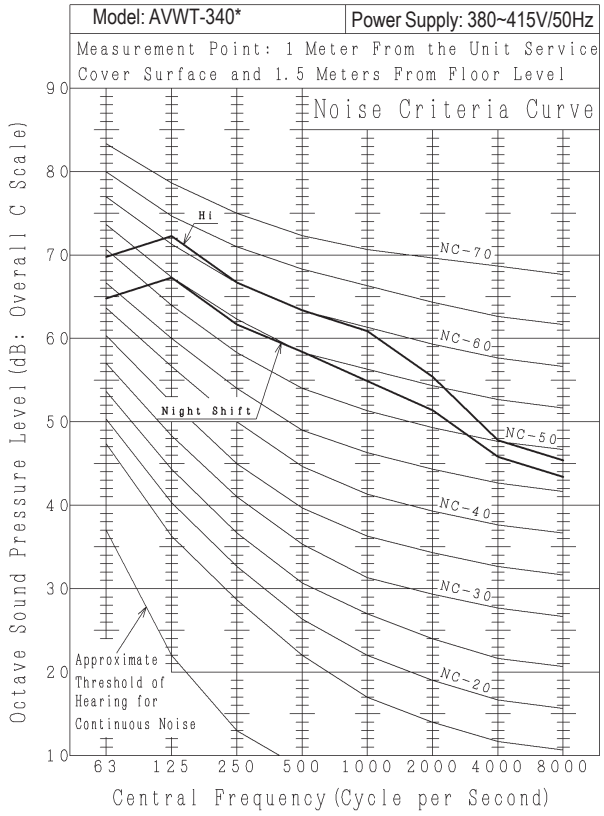

Model: AVWT-250*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Octave Sound Pressure Level (dB: Overall C Scale)
Central Frequency (Cycle per Second)
63 125 250 500 1000 2000 4000 8000
90 80 70 60 50 40 30 20 10
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Hi
Night Shift
Approximate Threshold of Hearing for Continuous Noise

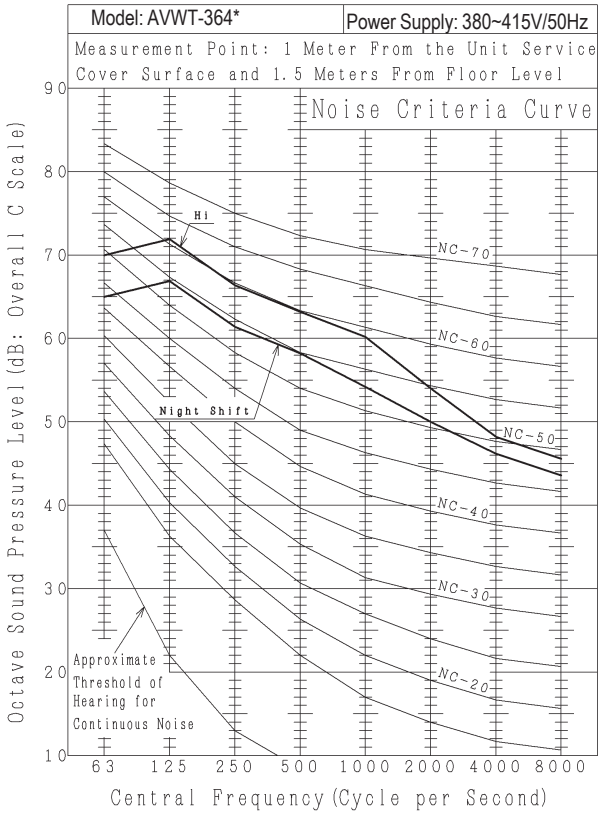

Model: AVWT-272*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Octave Sound Pressure Level (dB: Overall C Scale)
Central Frequency (Cycle per Second)
63 125 250 500 1000 2000 4000 8000
90 80 70 60 50 40 30 20 10
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Hi
Night Shift
Approximate Threshold of Hearing for Continuous Noise

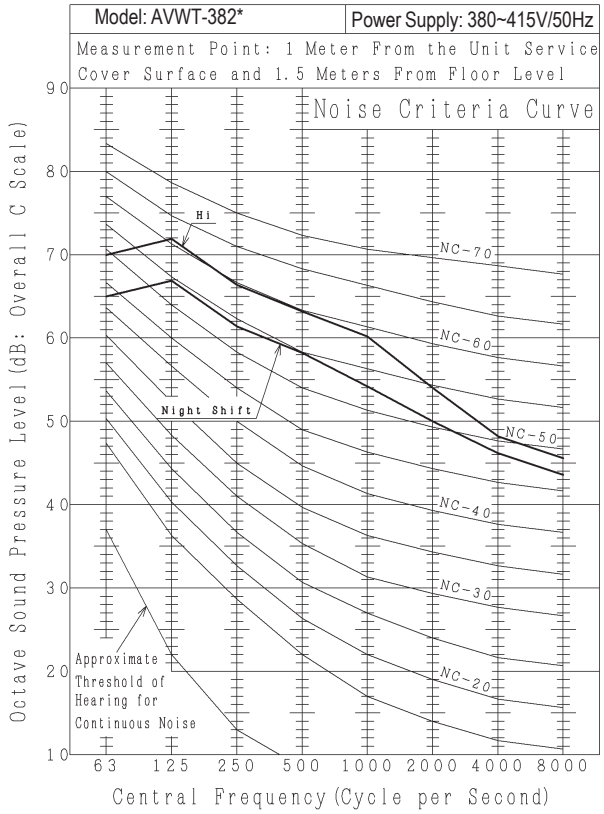

Model: AVWT-290*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Octave Sound Pressure Level (dB: Overall C Scale)
Central Frequency (Cycle per Second)
63 125 250 500 1000 2000 4000 8000
90 80 70 60 50 40 30 20 10
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Hi
Night Shift
Approximate Threshold of Hearing for Continuous Noise

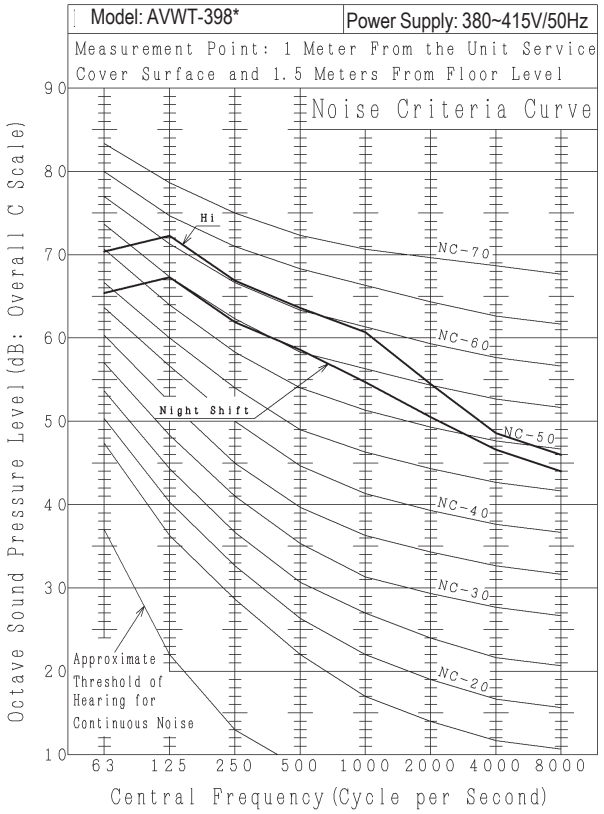

Model: AVWT-308*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Octave Sound Pressure Level (dB: Overall C Scale)
Central Frequency (Cycle per Second)
63 125 250 500 1000 2000 4000 8000
90 80 70 60 50 40 30 20 10
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Hi
Night Shift
Approximate Threshold of Hearing for Continuous Noise

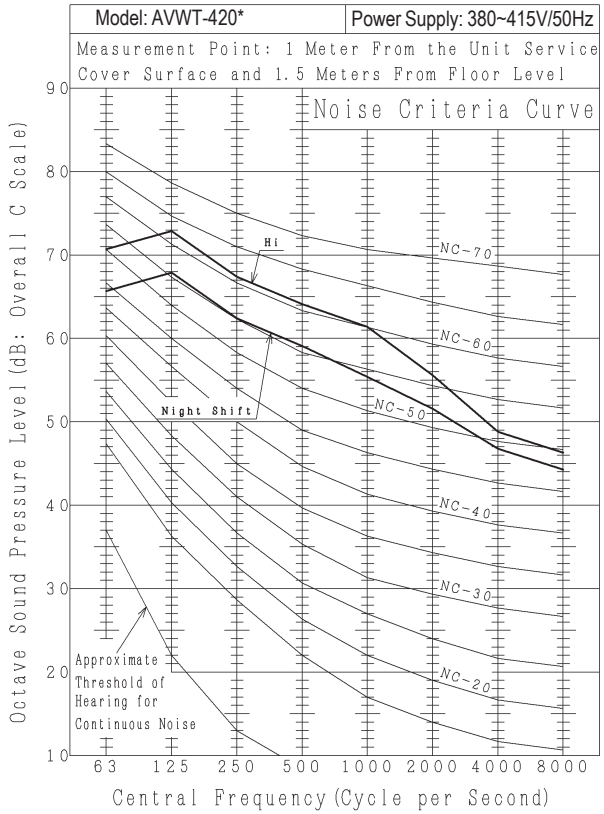

Model: AVWT-324*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Octave Sound Pressure Level (dB: Overall C Scale)
Central Frequency (Cycle per Second)
63 125 250 500 1000 2000 4000 8000
90 80 70 60 50 40 30 20 10
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Hi
Night Shift
Approximate Threshold of Hearing for Continuous Noise

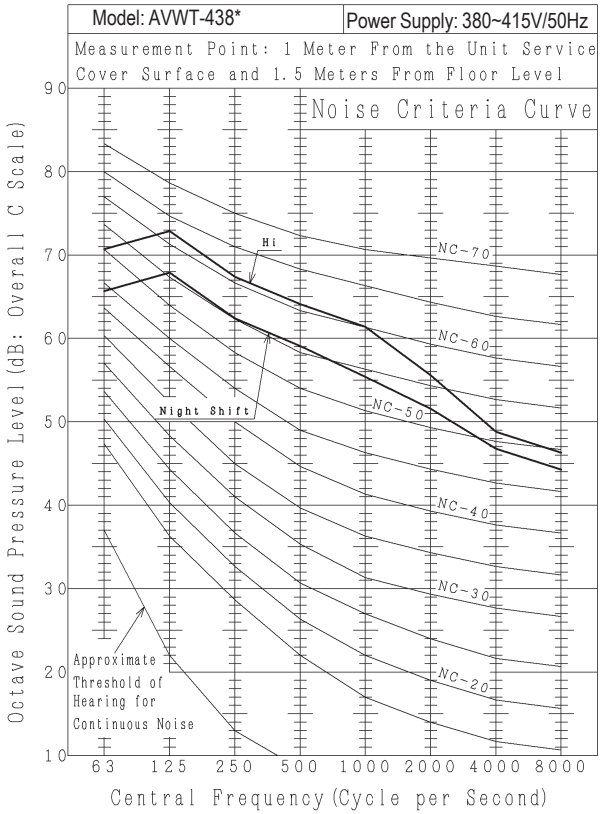

Model: AVWT-340*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Octave Sound Pressure Level (dB: Overall C Scale)
Central Frequency (Cycle per Second)
63 125 250 500 1000 2000 4000 8000
90 80 70 60 50 40 30 20 10
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Hi
Night Shift
Approximate Threshold of Hearing for Continuous Noise

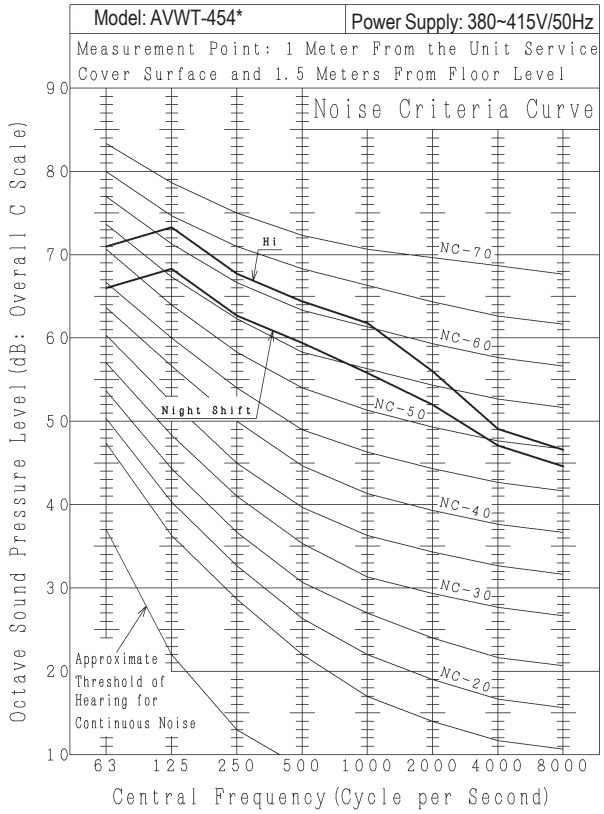

Model: AVWT-364*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Octave Sound Pressure Level (dB: Overall C Scale)
Central Frequency (Cycle per Second)
63 125 250 500 1000 2000 4000 8000
90 80 70 60 50 40 30 20 10
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Hi
Night Shift
Approximate Threshold of Hearing for Continuous Noise


Model: AVWT-382*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Hi
Night Shift
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Approximate Threshold of Hearing for Continuous Noise
Octave Sound Pressure Level (dB: Overall C Scale)
90 80 70 60 50 40 30 20 10
63 125 250 500 1000 2000 4000 8000
Central Frequency (Cycle per Second)


Model: AVWT-398*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Hi
Night Shift
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Approximate Threshold of Hearing for Continuous Noise
Octave Sound Pressure Level (dB: Overall C Scale)
90 80 70 60 50 40 30 20 10
63 125 250 500 1000 2000 4000 8000
Central Frequency (Cycle per Second)


Model: AVWT-420*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Hi
Night Shift
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Approximate Threshold of Hearing for Continuous Noise
Octave Sound Pressure Level (dB: Overall C Scale)
90 80 70 60 50 40 30 20 10
63 125 250 500 1000 2000 4000 8000
Central Frequency (Cycle per Second)


Model: AVWT-438*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Hi
Night Shift
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Approximate Threshold of Hearing for Continuous Noise
Octave Sound Pressure Level (dB: Overall C Scale)
90 80 70 60 50 40 30 20 10
63 125 250 500 1000 2000 4000 8000
Central Frequency (Cycle per Second)


Model: AVWT-454*
Power Supply: 380~415V/50Hz
Measurement Point: 1 Meter From the Unit Service Cover Surface and 1.5 Meters From Floor Level
Noise Criteria Curve
Octave Sound Pressure Level (dB: Overall C Scale)
Central Frequency (Cycle per Second)
63
125
250
500
1000
2000
4000
8000
10
20
30
40
50
60
70
80
90
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
Hi
Night Shift
Approximate Threshold of Hearing for Continuous Noise

5. Component Data

Outdoor Heat Exchanger, Fan and Fan Motor

Model				AVWT– 76*	AVWT–96*	AVWT–114*	AVWT–136*
Heat Exchanger	Heat exchanger type		-	Multi-way cross-flow finned tube type			
	Pipeline	Material	-	Copper			
		Outer diameter	φmm	7	7	7	7
		Rows	-	3	3	3	3
	Fin	Material	-	Aluminum			
		Spacing	mm	1.7	1.7	1.7	1.7
	Max. operating pressure		MPa	4.15			
	Max. frontal area		m^2	2.44	2.44	2.80	2.80
	Quantity		-	1	1	1	1
Fan Part	Fan	Type	-	Axial-flow Fan			
		Quantity	-	1	1	1	1
		Outside diameter	φmm	644	644	644	644
		Rotating speed	rpm	850	850	930	930
		Nominal blast volume	m^3/min	175	175	195	195
	Fan motor	Type	-	Waterproof enclosure			
		Start-up mode	-	Soft driving			
		Nominal output power	W	490	490	660	660
		Quantity	-	1	1	1	1
		Insulation grade	-	E	E	E	E

Model				AVWT–154*	AVWT–170*	AVWT–190*	AVWT–212*
Heat Exchanger	Heat exchanger type		-	Multi-way cross-flow finned tube type			
	Pipeline	Material	-	Copper			
		Outer diameter	φmm	7	7	7	7
		Rows	-	3	3+3	3+3	3+3
	Fin	Material	-	Aluminum			
		Spacing	mm	1.7	1.7	1.7	1.7
	Max. operating pressure		MPa	4.15			
	Max. frontal area		m^2	2.80	2.44+2.44	2.44+2.80	2.44+2.80
	Quantity		-	1	1+1	1+1	1+1
Fan Part	Fan	Type	-	Axial-flow Fan			
		Quantity	-	1	1+1	1+1	1+1
		Outside diameter	φmm	644	644+644	644+644	644+644
		Rotating speed	rpm	930	850+850	850+930	850+930
		Nominal blast volume	m^3/min	195	175+175	175+195	175+195
	Fan motor	Type	-	Waterproof enclosure			
		Start-up mode	-	Soft driving			
		Nominal output power	W	660	490+490	490+660	490+660
		Quantity	-	1	1+1	1+1	1+1
		Insulation grade	-	E	E+E	E+E	E+E

Outdoor Heat Exchanger, Fan and Fan Motor

Model				AVWT–232*	AVWT–250*	AVWT–272*	AVWT–290*
Heat Exchanger	Heat exchanger type		-	Multi-way cross-flow finned tube type			
	Pipeline	Material	-	Copper			
		Outer diameter	φmm	7	7	7	7
		Rows	-	3+3	3+3	3+3	3+3
	Fin	Material	-	Aluminum			
		Spacing	mm	1.7	1.7	1.7	1.7
	Max. operating pressure		MPa	4.15			
	Max. frontal area		m^2	2.80+2.80	2.80+2.80	2.80+2.80	2.80+2.80
	Quantity		-	1+1	1+1	1+1	1+1
Fan Part	Fan	Type	-	Axial-flow Fan			
		Quantity	-	1+1	1+1	1+1	1+1
		Outside diameter	φmm	644+644	644+644	644+644	644+644
		Rotating speed	rpm	930+930	930+930	930+930	930+930
		Nominal blast volume	m^3/min	195+195	195+195	195+195	195+195
	Fan motor	Type	-	Waterproof enclosure			
		Start-up mode	-	Soft driving			
		Nominal output power	W	660+660	660+660	660+660	660+660
		Quantity	-	1+1	1+1	1+1	1+1
		Insulation grade	-	E+E	E+E	E+E	E+E

Model				AVWT–308*	AVWT–324*	AVWT–340*	AVWT–364*
Heat Exchanger	Heat exchanger type		-	Multi-way cross-flow finned tube type			
	Pipeline	Material	-	Copper			
		Outer diameter	φmm	7	7	7	7
		Rows	-	3+3	3+3+3	3+3+3	3+3+3
	Fin	Material	-	Aluminum			
		Spacing	mm	1.7	1.7	1.7	1.7
	Max. operating pressure		MPa	4.15			
	Max. frontal area		m^2	2.80+2.80	2.44+2.44+2.80	2.44+2.44+2.80	2.44+2.80+2.80
	Quantity		-	1+1	1+1+1	1+1+1	1+1+1
Fan Part	Fan	Type	-	Axial-flow Fan			
		Quantity	-	1+1	1+1+1	1+1+1	1+1+1
		Outside diameter	φmm	644+644	644+644+644	644+644+644	644+644+644
		Rotating speed	rpm	930+930	850+850+930	850+850+930	850+930+930
		Nominal blast volume	m^3/min	195+195	175+175+195	175+175+195	175+195+195
	Fan motor	Type	-	Waterproof enclosure			
		Start-up mode	-	Soft driving			
		Nominal output power	W	660+660	490+490+660	490+490+660	490+660+660
		Quantity	-	1+1	1+1+1	1+1+1	1+1+1
		Insulation grade	-	E+E	E+E+E	E+E+E	E+E+E

Outdoor Heat Exchanger, Fan and Fan Motor

Model				AVWT-382*	AVWT-398*	AVWT-420*	AVWT-438*
Heat Exchanger	Heat exchanger type		-	Multi-way cross-flow finned tube type			
	Pipeline	Material	-	Copper			
		Outer diameter	φmm	7	7	7	7
		Rows	-	3+3+3	3+3+3	3+3+3	3+3+3
	Fin	Material	-	Aluminum			
		Spacing	mm	1.7	1.7	1.7	1.7
	Max. operating pressure		MPa	4.15			
	Max. frontal area		m^2	2.44+2.80+2.80	2.44+2.80+2.80	2.80+2.80+2.80	2.80+2.80+2.80
	Quantity		-	1+1+1	1+1+1	1+1+1	1+1+1
Fan Part	Fan	Type	-	Axial-flow Fan			
		Quantity	-	1+1+1	1+1+1	1+1+1	1+1+1
		Outside diameter	φmm	644+644+644	644+644+644	644+644+644	644+644+644
		Rotating speed	rpm	850+930+930	850+930+930	930+930+930	930+930+930
		Nominal blast volume	m^3/min	175+195+195	175+195+195	195+195+195	195+195+195
	Fan motor	Type	-	Waterproof enclosure			
		Start-up mode	-	Soft driving			
		Nominal output power	W	490+660+660	490+660+660	660+660+660	660+660+660
		Quantity	-	1+1+1	1+1+1	1+1+1	1+1+1
		Insulation grade	-	E+E+E	E+E+E	E+E+E	E+E+E

Model				AVWT-454*
Heat Exchanger	Heat exchanger type		-	Multi-way cross-flow finned tube type
	Pipeline	Material	-	Copper
		Outer diameter	φmm	7
		Rows	-	3+3+3
	Fin	Material	-	Aluminum
		Spacing	mm	1.7
	Max. operating pressure		MPa	4.15
	Max. frontal area		m^2	2.80+2.80+2.80
	Quantity		-	1+1+1
Fan Part	Fan	Type	-	Axial-flow Fan
		Quantity	-	1+1+1
		Outside diameter	φmm	644+644+644
		Rotating speed	rpm	930+930+930
		Nominal blast volume	m^3/min	195+195+195
	Fan motor	Type	-	Waterproof enclosure
		Start-up mode	-	Soft driving
		Nominal output power	W	660+660+660
		Quantity	-	1+1+1
		Insulation grade	-	E+E+E

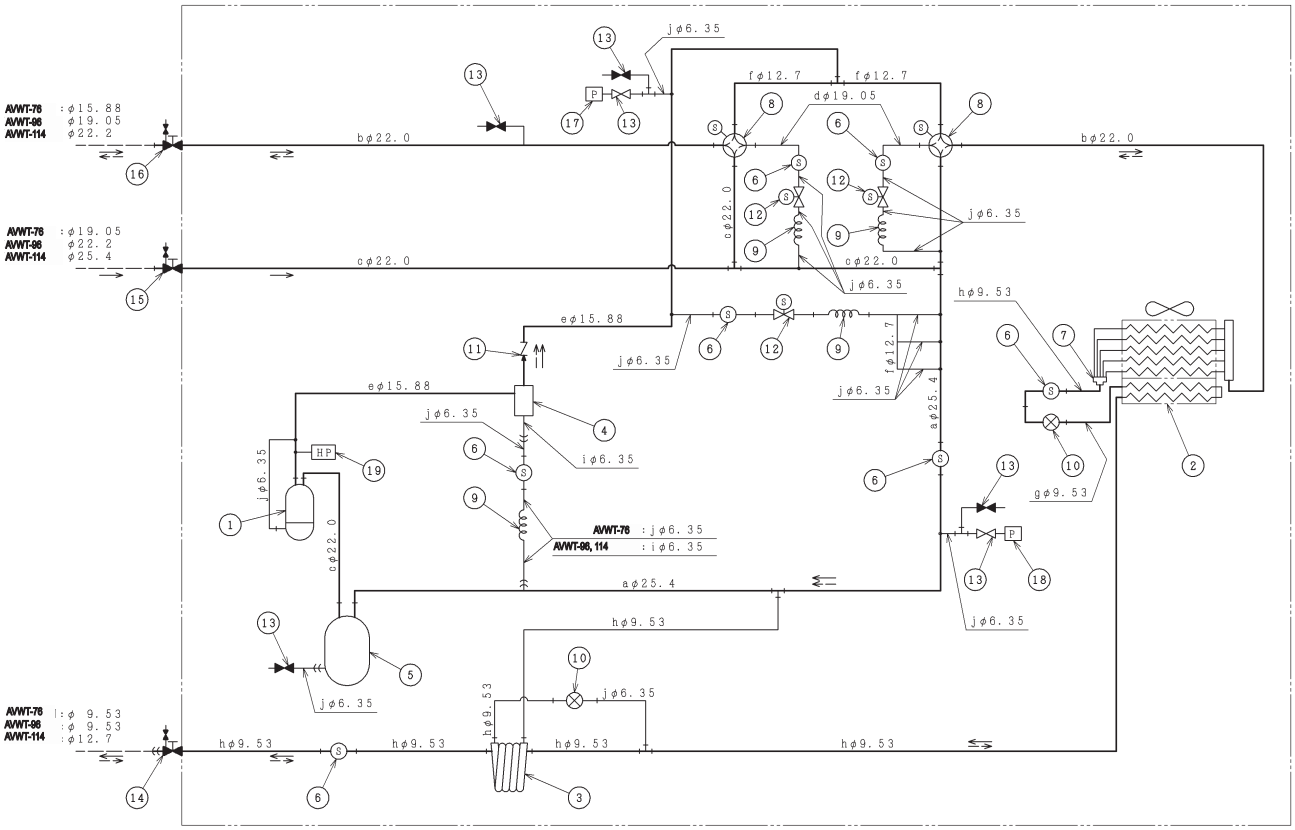
Parameters of Compressor

Compressor Model			E656DHD-65D2Y	E655DH-65D2YG	E855DH-80D2Y(CH)
Leakage pressure	Exhaust pressure	MPa	4.15	4.15	4.15
	Intake pressure	MPa	2.21	2.21	2.21
Compressor motor	Model	-	Three-phase sync motor	Three-phase induction motor	Three-phase induction motor
	Start-up mode	-	VFD	VFD	VFD
	Polarities	-	6	2	2
	Insulation grade	-	E	E	E
Refrigerator oil	Brand	-	FVC68D	FVC68D	FVC68D
	Injected quantity	L	1.1	0.5	1.1

6. Control System

6.1 Refrigerantion Cycle

6.1.1 Outdoor Units AVWT–76*~96*

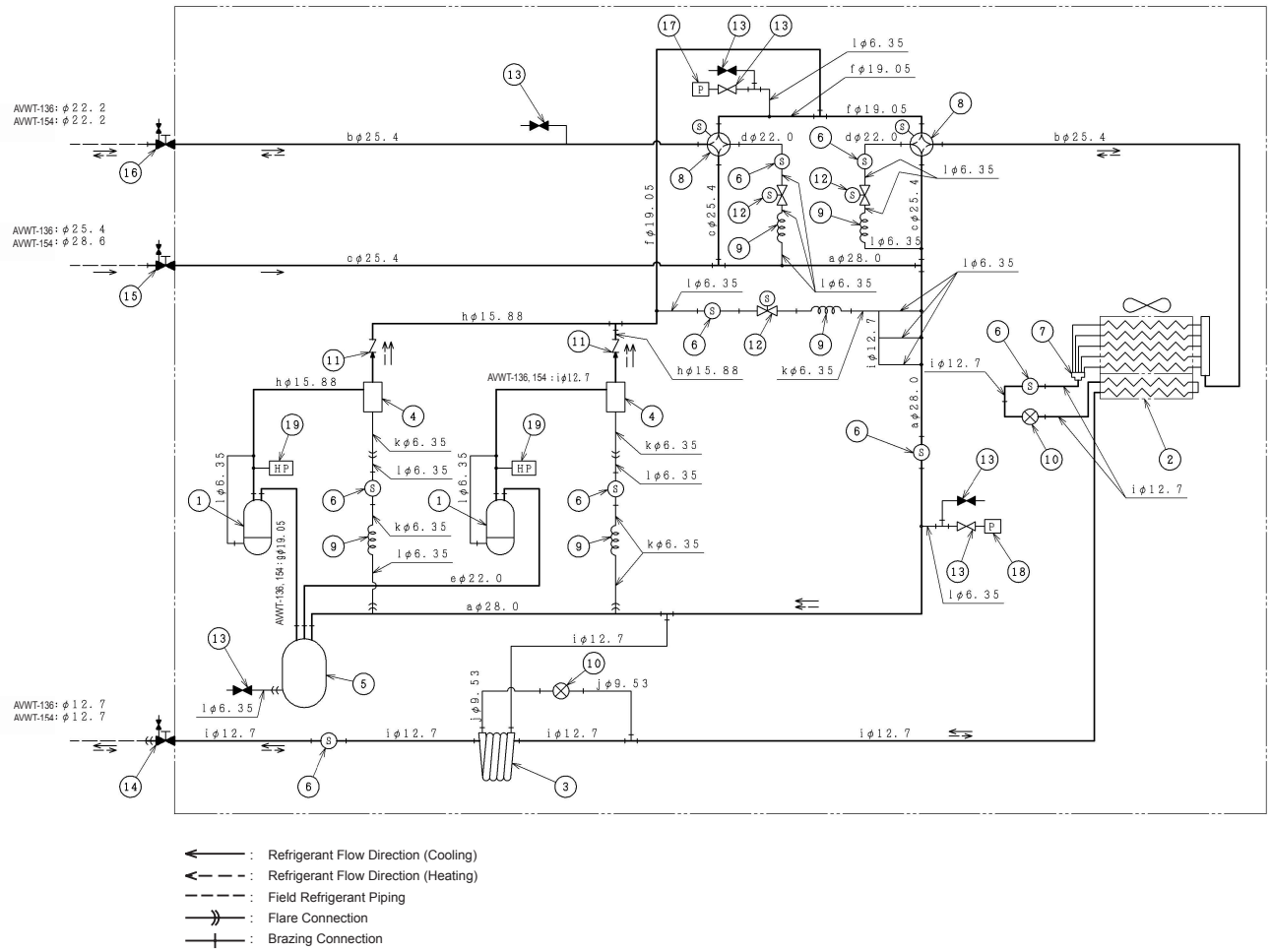


: Refrigerant Flow Direction (Cooling)
: Refrigerant Flow Direction (Heating)
: Field Refrigerant Piping
: Flare Connection
: Brazing Connection

Mark	Part Name
1	Compressor
2	Heat Exchanger
3	Double Tube Type Heat Exchanger
4	Oil Separator
5	Accumulator
6	Strainer
7	Distributor
8	Reversing Valve
9	Capillary Tube
10	Micro-Computer Control Expansion Valve
11	Check Valve
12	Solenoid Valve
13	Check Joint
14	Stop Valve for Liquid Line
15	Stop Valve for Gas (Low) Line
16	Stop Valve for Gas (High) Line
17	Sensor for Refrigerant Pressure (High Pressure Sensor)
18	Sensor for Refrigerant Pressure (Low Pressure Sensor)
19	High Pressure Switch for Protection

Mark	OD x T	Material
a	25.4 x 1.2	C1220T-O
b	22.0 x 1.5	
c	22.0 x 1.2	
d	19.05 x 1.42	
e	15.88 x 1.2	
f	12.7 x 1.0	
g	9.53 x 1.0	
h	9.53 x 0.8	
i	6.35 x 1.07	
j	6.35 x 0.7	

AVWT–114*~154*

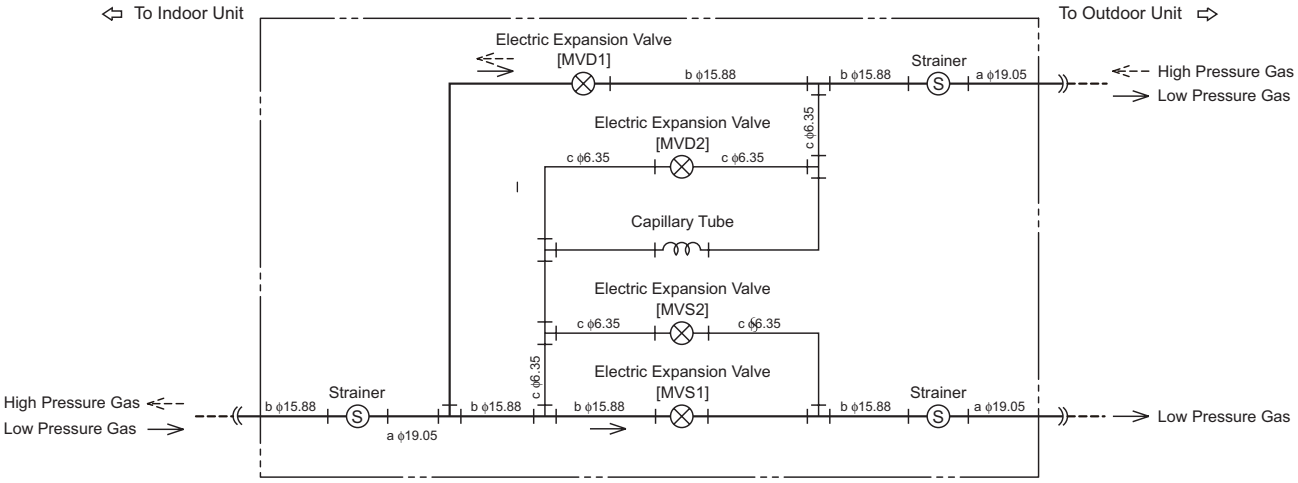


Mark	Part Name
1	Compressor
2	Heat Exchanger
3	Double Tube Type Heat Exchanger
4	Oil Separator
5	Accumulator
6	Strainer
7	Distributor
8	Reversing Valve
9	Capillary Tube
10	Micro-Computer Control Expansion Valve
11	Check Valve
12	Solenoid Valve
13	Check Joint
14	Stop Valve for Liquid Line
15	Stop Valve for Gas (Low) Line
16	Stop Valve for Gas (High) Line
17	Sensor for Refrigerant Pressure (High Pressure Sensor)
18	Sensor for Refrigerant Pressure (Low Pressure Sensor)
19	High Pressure Switch for Protection

Mark	OD x T	Material
a	28.0 x 1.6	C1220T-O
b	25.4 x 1.8	
c	25.4 x 1.2	
d	22.0 x 1.5	
e	22.0 x 1.2	
f	19.05 x 1.42	
g	19.05 x 1.2	
h	15.88 x 1.2	
i	12.7 x 1.0	
j	9.53 x 0.8	
k	6.35 x 1.07	
l	6.35 x 0.7	

6.1.2 Switch Box

Model: HCH-160D and HCH-280D



: Refrigerant Flow Direction (Cooling)
: Refrigerant Flow Direction (Heating)
: Field Refrigerant Piping
: Flare Connection
: Brazing Connection

Mark	OD x T	Material
a	19.05 x 1.65	Copper Tube C1220T-O
b	15.88 x 1.2	
c	6.35 x 0.7	

NOTE:
The mark of inside "[ ]" is shown in the electrical wiring diagram.

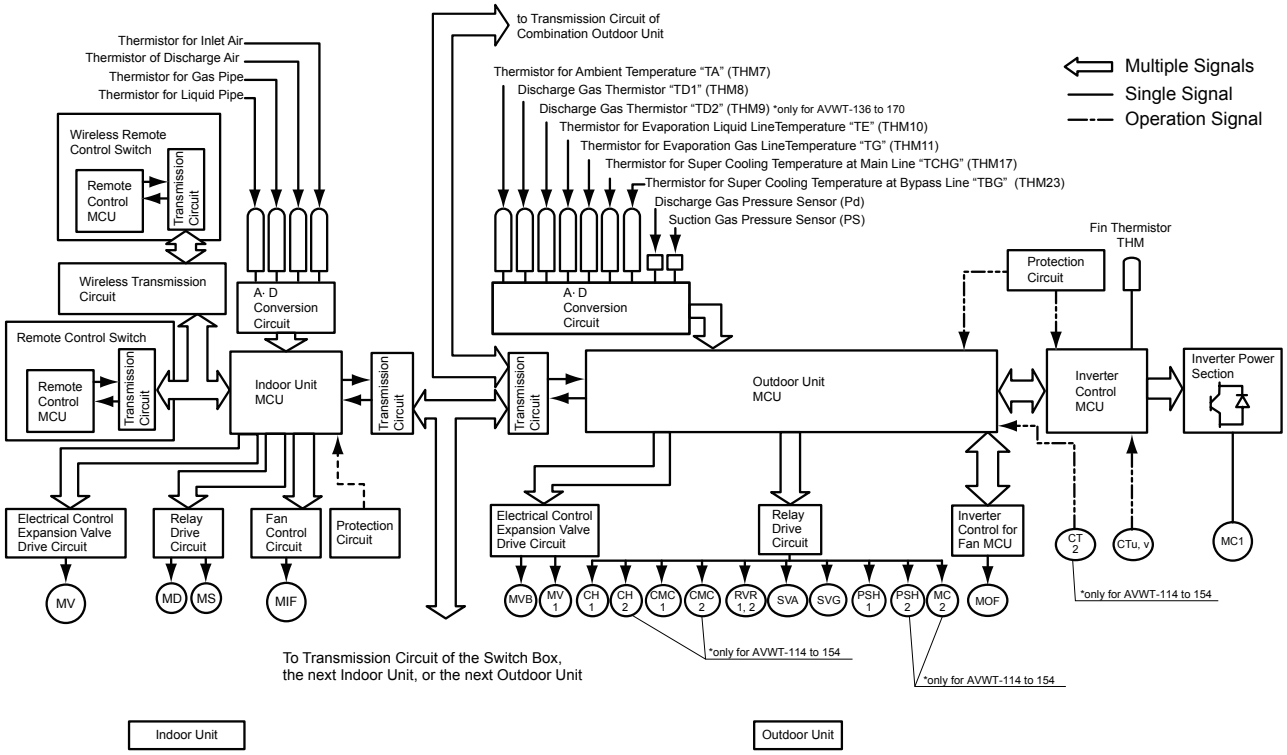
6.2 Function Control Unit

<table>
<tr><td rowspan="3">Control Device</td><td colspan="5">Control</td></tr>
<tr><td colspan="2">Cooling Operation</td><td colspan="2">Heating Operation,
Heat Recovery System</td><td>Defrosting</td></tr>
<tr><td>Purpose of Control</td><td>Contents</td><td>Purpose of Control</td><td>Contents</td><td>Contents</td></tr>
<tr><td>Inverter Freqency of Compressor</td><td>Total I.U.
Operating Capacity</td><td>Capacity control is carried out to achieve the targeted value of evaporating temperature.</td><td>Total I.U.
Operating Capacity</td><td>PI control is carried out to achieve the targeted value of Pd.</td><td>All of the compressors: ON</td></tr>
<tr><td rowspan="2">Electronic Expansion Valve for O.U. Heat Exchanger</td><td rowspan="2">Capacity Control</td><td rowspan="2">Fully open
(Electronic expansion valve opening is depending on the refrigerant cycle condition.)</td><td>Condenser <COND>
Capacity Control</td><td>Condenser <COND>
Fully Open
(Electronic expansion valve opening is depending on the refrigerant cycle condition.)</td><td rowspan="2">Fully open</td></tr>
<tr><td>Evaporator <EVAP>
O.U. Heat Exchanger SH</td><td>Evaporator <EVAP>
PI control is carried out to achieve the targeted value of O.U. heat exchanger SH.</td></tr>
<tr><td>Electronic Expansion Valve for Super Cooling Heat Exchanger</td><td>TdSH Control</td><td>Control Td SH of compressor to achieve the targeted value.</td><td>TdSH Control</td><td>Control Td SH of compressor to achieve the targeted value.</td><td>TdSH Control</td></tr>
<tr><td rowspan="2">Electronic Expansion Valve for I.U. Heat Exchanger</td><td rowspan="2">I.U. Heat Exchanger SH</td><td rowspan="2">PI control is carried out to achieve the targeted value of I.U. heat exchanger SH.</td><td><Cooling Setting>
I.U. Heat Exchanger SH</td><td><Cooling Setting>
PI control is carried out to achieve the targeted value of I.U. heat exchanger SH.</td><td rowspan="2">I.U. Heat Exchanger SH Control</td></tr>
<tr><td><Heating Setting>
I.U. Heat Exchanger SC</td><td><Heating Setting>
Control super cooling of I.U. liquid thermistor to achieve the targeted value.</td></tr>
<tr><td rowspan="2">Outdoor Fan</td><td rowspan="2">Pd Control</td><td rowspan="2">PI control is carried out to achieve the targeted value of Pd.</td><td>Condenser <COND>
Pd Control</td><td>Condenser <COND>
PI control is carried out to achieve the targeted value of Pd.</td><td rowspan="2">Stop</td></tr>
<tr><td>Evaporator <EVAP>
Fixing by Ambient Temperature and Operating Capacity</td><td>Evaporator <EVAP>
Fan rotation is controlled by ambient temperature and I.U. operating capacity.</td></tr>
<tr><td>Gas Bypass Valve (SVA)</td><td>1. Pd Increase Protection
2. Ps Decrease Protection</td><td>1. Pd>3.6MPa: ON
2. Ps<0.15MPa: ON</td><td>1. Pd Increase Protection
2. Ps Decrease Protection</td><td>1. Pd>3.6MPa: ON
2. Ps<0.15MPa: ON</td><td>Closed</td></tr>
<tr><td>High and Low Pressure Shut-off Valve (SVG)</td><td>Shut-off of High and Low Pressure Inside Cycle during Stoppage</td><td>Compressor Run: ON
Compressor Stop: OFF</td><td>Shut-off of High and Low Pressure inside Cycle during Stoppage</td><td>Compressor Run: ON
Compressor Stop: OFF</td><td>Open</td></tr>
</table>

Pd: Discharge Pressure
Ps: Suction Pressure
SH: Superheat
SC: Supercooling
TdSH: Superheat of Discharge Gas Temperature
I.U.: Indoor Unit
O.U.: Outdoor Unit

Figure below shows the outline of the control system.

(Example: Combination of Base Units, AVWT-190* to AVWT-454* + Indoor Unit)



Symbol	Name
MC_1	DC Motor (for Inverter Compressor)
MC_2	AC Motor (for Constant Speed Compressor)
MOF	DC Motor (for Outdoor Fan)
MIF	Motor (for Indoor Fan)
MS	Motor (for Auto-Louver)
MD	Motor (for Drain Pump)
MV	Electronic Expansion Valve (for Indoor Unit)
MV_1	Electronic Expansion Valve (for Outdoor Unit)
MVB	Electronic Expansion Valve for Plate Heat Exchanger
$CMC_{1, 2}$	Magnetic Contactor for Compressor
SVA	Solenoid Valve
SVG	Solenoid Valve
$RVR_{1, 2}$	Reversing Valve
$PSH_{1, 2}$	High Pressure Switch
$CH_{1, 2}$	Crankcase Heater
$CT_{u, v}$	Current Sensor

6.3 Function Selection, Input & Output, Safety and Protective Devices

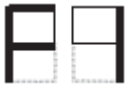
6.3.1 Function Selection

Access outdoor unit settings by pressing PSW1 button on base board of outdoor unit.
In case of combined outdoor unit, set Outdoor unit A to active, and set Outdoor units B and C to inactive.

(1) Press and hold PSW1 for three seconds to access spot inspection mode "CHEC".
(2) Press PSW4 two times to access function selection setting mode "Func".
(3) Press PSW1 one time to access function selection options, and the seven-segment digital tube will be displayed as below.
(4) Press PSW4 or PSW2 to choose function setting options.
(5) Choose the function setting options to change, and then press PSW3 or PSW5 to change these options.
(6) Upon finishing changing settings, press PSW1 for three seconds to exit.

No	Setting Item	Seven-segment digital display		Setting Options
1	Fan operates intermittently when heating temperature control is off		00	Initial setting
			01	On for 2 minutes/off for 6 minutes
			02	On for 2 minutes/off for 13 minutes
			03	On for 2 minutes/off for 28 minutes
			04	Fan stops
2	Night mode		00	Initial setting
			01	Mute at night
3	Restriction on outdoor environment temperature is removed		00	Initial setting
			01	Restriction on external air for heating is removed
			02	Restriction on external air for cooling is removed
			03	Restriction on external air is removed completely
4	Defrosting condition setting		00	Initial setting
			01	Defrosting in cold area
			02	Defrosting suspension condition becomes more stringent
5	Breeze-defrosting setting		00	Initial setting
			01	Indoor fan supplies gentle breeze during defrosting
			02	Indoor fan operates when heating operation is started
			03	Indoor fan operates when heating operation and defrosting is started
6	Preheating of outdoor unit is restricted		00	Initial setting
			01	Preheating restriction is removed
			02	Preheating restriction duration gets longer
7	Capacity priority mode		00	Initial setting
			01	Capacity-based priority (compressor frequency elevates)
			02	Capacity-based priority (compressor frequency and current elevate)
			03	Capacity-based priority (compressor frequency, current rise and fan speed elevate)
			04	Outdoor temperature for heating operation range rises to 50℃
8	Control on target value of cooling compressor frequency		00	Initial setting (target evaporating temperature Pso=7)
			01	Pso=2
			02	Pso=3
			03	Pso=4
			04	Pso=5
			05	Pso=9
			06	Pso=10
			07	Pso=11
9	Heating compressor frequency- target value control		00	Initial setting
			01	Target condensing pressure-0.15MPa
			02	Target condensing pressure-0.10MPa
			03	Target condensing pressure-0.05MPa
			04	Target condensing pressure-0.03MPa
			05	Target condensing pressure+0.03MPa
			06	Target condensing pressure+0.05MPa
			07	Target condensing pressure+0.10MPa

No	Setting Item	Seven-segment digital display	Setting Options	
10	Control on target value of superheat degree of heat exchanger of cooling indoor unit		00	Initial setting
			01	Target value+2℃
			02	Target value+1℃
			03	Target value-1℃
			04	Target value-2℃
11	Control on target value of supercooling degree of the exchanger of heating indoor unit		00	Initial setting
			01	Target value+6℃
			02	Target value+3℃
			03	Target value-3℃
			04	Target value-6℃
12	Change of EVI max. aperture of indoor unit heating OFF		00	Initial setting
			01	EVI Max. aperture reduction mode 1
			02	EVI Max. aperture reduction mode 2
			03	EVI Max. aperture reduction mode 3
			04	EVI Max. aperture reduction mode 4
			05	EVI Max. aperture reduction mode 5
13	Change of EVI max. aperture of indoor unit heating OFF		00	Initial setting
			01	EVI Max. aperture reduction mode 1
			02	EVI Max. aperture reduction mode 2
14	Control on heating start-up and general supercooling degree of indoor unit		00	Initial setting
			01	EVI aperture gets larger in general
			02	On-startup EVI aperture getting larger mode 1
			03	On-startup EVI aperture getting larger mode 2
			04	On-startup EVI aperture getting larger mode 3
15	Change of EVI initial aperture in cooling operation		00	Initial setting
			01	Original set aperture ×0.95
			02	Original set aperture ×1.03
			03	Original set aperture ×1.05
			04	Original set aperture ×1.10
16	Change of EVI initial aperture in heating operation		00	Initial setting
			01	Original set aperture ×0.95
			02	Original set aperture ×1.03
			03	Original set aperture ×1.05
			04	Original set aperture ×1.10
17	Low noise mode		00	Initial setting
			01	Fan speed reduction 1
			02	Fan speed reduction 2
			03	Fan speed reduction 3
			04	Compressor frequency reduction 1
			05	Compressor frequency reduction 2
			06	Compressor frequency reduction 3
			07	Fan speed + compressor frequency reduction 1
			08	Fan speed + compressor frequency reduction 2
			09	Fan speed + compressor frequency reduction 3
18	DEMAND control		00	Initial setting
			01	40% of set value
			02	60% of set value
			03	70% of set value
			04	80% of set value
			05	100% of set value

No	Setting Item	Seven-segment digital display	Settings	
19	WAVE control		00	Initial setting
			01	40% of set value
			02	60% of set value
			03	70% of set value
			04	80% of set value
20	Low cooling blast temperature protection		00	Initial setting
			01	Control started at blast temperature of 10℃
			02	Control started at blast temperature of 12℃
			03	Control started at blast temperature of 14℃
21	When Externa air processing unit is connected		00	Initial setting
			01	Capacity suppression mode
			02	Blast temperature control mode
22	Fan speed adjustment		00	Initial setting
			01	Target rotating speed -15rpm
			02	Target rotating speed -30rpm
23	No function is available		00	
24	Change of EVI min. aperture of indoor unit heating OFF		01	Initial setting
			02	Min. aperture reduction mode 1
			03	Min. aperture reduction mode 2
			04	Min. aperture reduction mode 3
			05	Min. aperture reduction mode 4
			06	EVI off
25	No function is available		00	
26	No function is available		00	
27	Setting of operation of outdoor unit fan upon setting of Snow sensor		00	Fan operates continuously upon setting of Snow sensor
			01	Fan operates intermittently (off for 570s/on for 30s)
			02	Fan operates intermittently (off for 540s/on for 60s)
			03	Fan operates intermittently (off for 480s/on for 120s)
			04	Fan operates intermittently (off for 300s/on for 300s)
28	VIP function in indoor unit (up to 5 units)	u 1	FF	Initial setting
		u 2	00	Indoor units with address 00 are set as VIP
		u 3	01	Indoor units with address 01 are set as VIP
		u 4	**	Indoor units with address ** are set as VIP
		u 5	63	Indoor units with address 63 are set as VIP
29	Automatic in-night mute mode		00	Initial setting
			01	In-night mute ni setting takes effect, and exit in 8 hours
			02	In-night mute ni setting takes effect, and exit in 9 hours
			03	In-night mute ni setting takes effect, and exit in 10 hours
30	High head drop setting		00	Initial setting
			01	High indoor unit head drop setting

6.3.2 Input & Output Settings

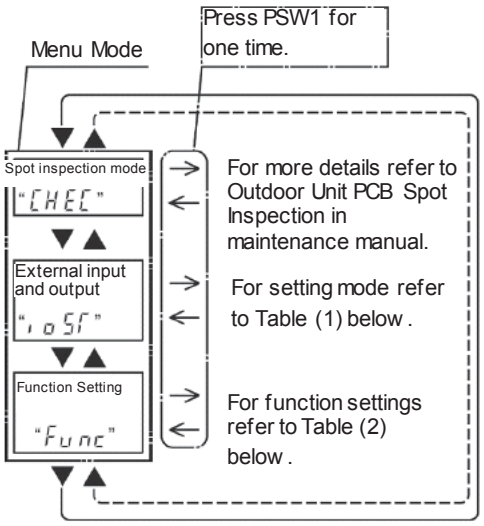
Access outdoor unit settings by pressing PSW1 button on base board of outdoor unit. In case of combined outdoor unit, set Outdoor unit A to active, and set Outdoor units B and C to inactive.

■Start setting

Press down and hold PSW1 for more than three seconds to access menu mode. Press PSW2 and PSW4 to toggle between "check", ".oST" and Func".

■Setting finished

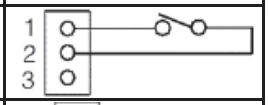
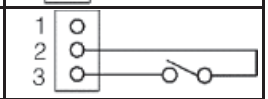
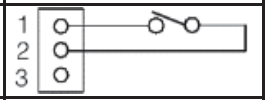
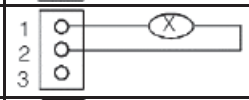
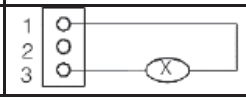
Press and hold PSW1 for three seconds to exit from menu mode when seven-segment code displays "check".



External input and output settings

On base board of outdoor unit, external input terminal are CN17 and CN18, while external output terminal is CN16.

■Outdoor Unit circuit board port setting and indication

	Seven-segment digital display	Port Setting	Remark
Signal Input	.1	#1 and #2 of CN17	
	.2	#2 and #3 of CN17	
	.3	#1 and #2 of CN18	
Signal Output	o1	#1 and #2 of CN16	
	o2	#1 and #3 of CN16	

■External input and output function setting

Function	Input Signal	Output Signal
1	Fixed heating mode	Operation signals
2	Fixed cooling mode	Alarm signal
3	Instructions	Compressor operation signals
4	Snow sensor	Defrosting signals
5	Demand Stoppage	--
6	60% current control	--
7	70% current control	--
8	80% current control	--
9	100% current control	--

The default input and output setting upon factory delivery are given below:

■Factory setting

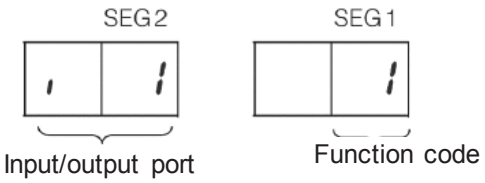
	Connector	Guide Corner	Function	Factory Setting
Signal Input	CN17	#1-#2		Fixed heating mode
		#2-#3		Fixed cooling mode
	CN18	#1-#2		Instructions
Signal Output	CN16	#1-#2		Operating
		#1-#3		Alarm signals

Change input and output settings in the following procedure.

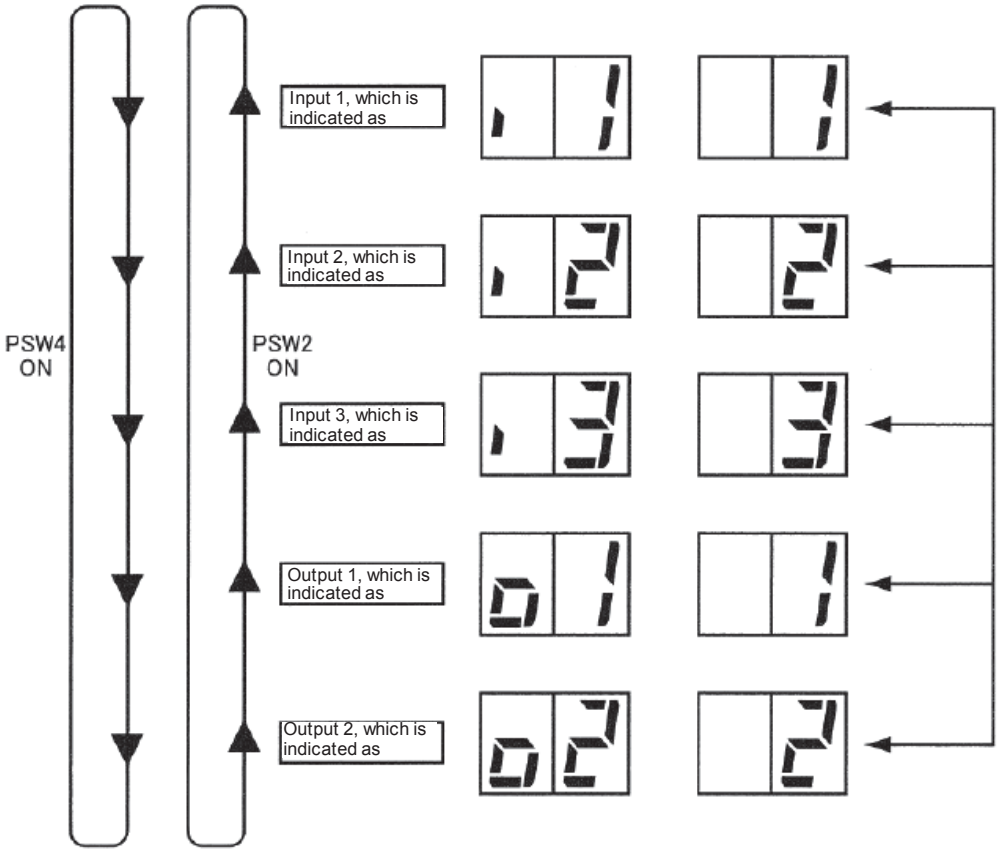
a) Press and hold PSW1 for three seconds to access spot inspection mode "CHEC"

b) Press PSW4 one time to access external input and output setting mode "ioST"

c)Press PSW1 one time to access external input and output setting options, and the seven-segment digital tube will be displayed as



d) Press PSW4 or PSW2 to choose input/output setting options



e) Choose the input/output setting options to change, and then press PSW3 or PSW5 to change these options

By pressing PSW3, the number increases by 1.
By pressing PSW5, the number decreases by 1.
(Control Function No.13 → Press PSW3 → return to 0)

f) Upon finishing changing settings, press PSW1 for three seconds to exit.

.Description of Input Settings

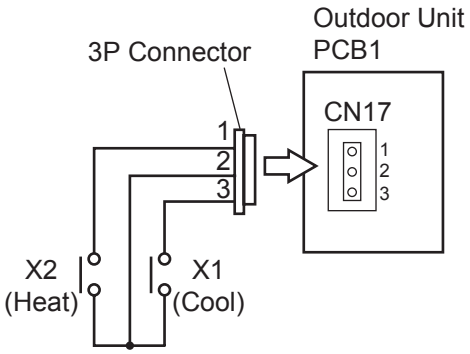
(1) Input fixed operation mode (fixed cooling 2/fixed heating 1)

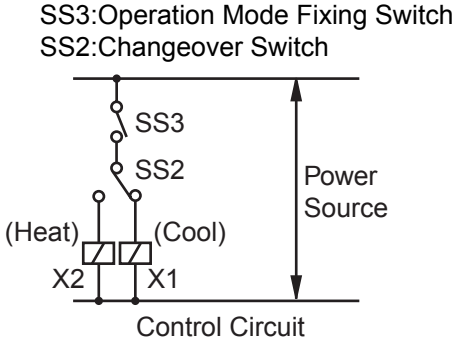
When pin of fixed operation mode on PCB of outdoor unit is short-circuited, the system operation mode is specified as fixed cooling or heating.

Short circuiting of Pins 1 and 2 on CN17: Fixed heating mode

Short circuiting of Pins 2 and 3 on CN17: Fixed cooling mode

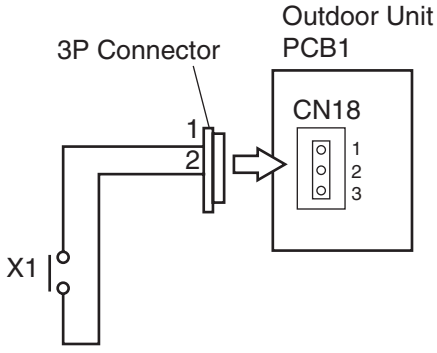
In fixed heating/cooling mode, cooling/heating operation is unavailable. If indoor unit is currently in cooling, dehumidifying or heating mode, "temperature control OFF" will be activated and alarm code "20" will be displayed at the same time.

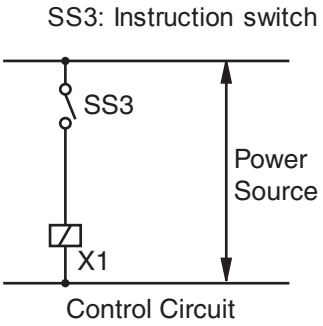




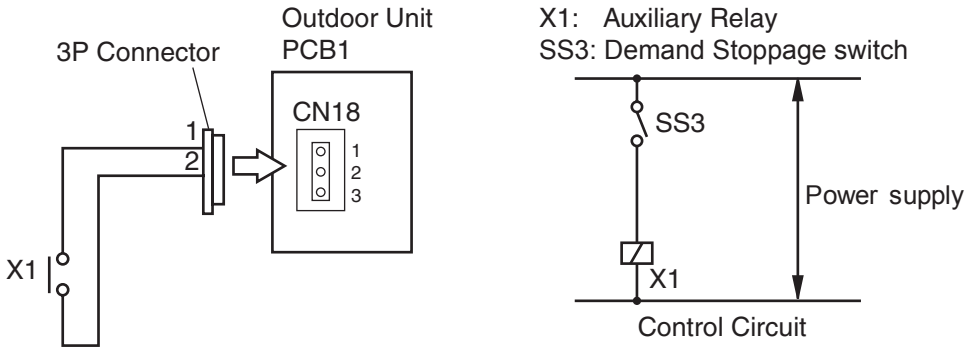
(2) Input on-instruction shutdown (3) and Demand Stoppage (5): Pins #1 and #2 on CN18

When instruction function pins on PCB of outdoor unit is short circuited, compressor will be shut down (in such case, indoor unit will be in "temperature control OFF"). Shutdown code "10" will be displayed. When these instruction function pins are reset, compressor will be restarted. An example of defining instruction function to Input 3 (Pins #1 and #2 on CN18) is given below.



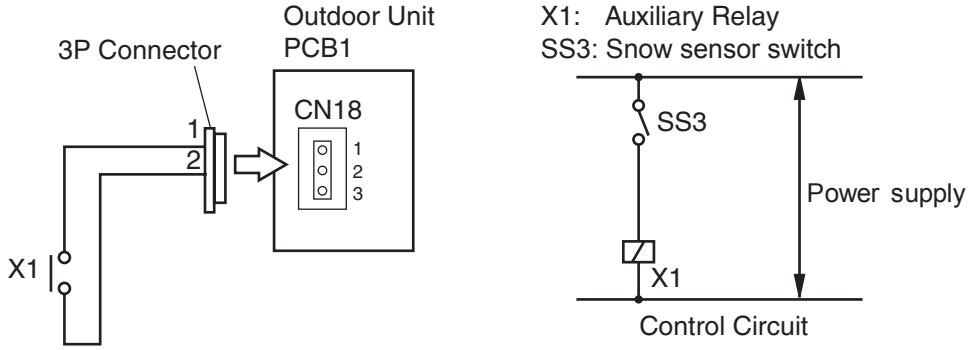


If Demand Stoppage pins (Pins #1 and #2 on CN18) is short circuited when outdoor unit is operating, the compressor and indoor fan motor of will be shut down, while the wire controller will stay in its original mode and shutdown code "10" will be displayed at the same time. In such case, if these pins are reset, the previous operation will be resumed.



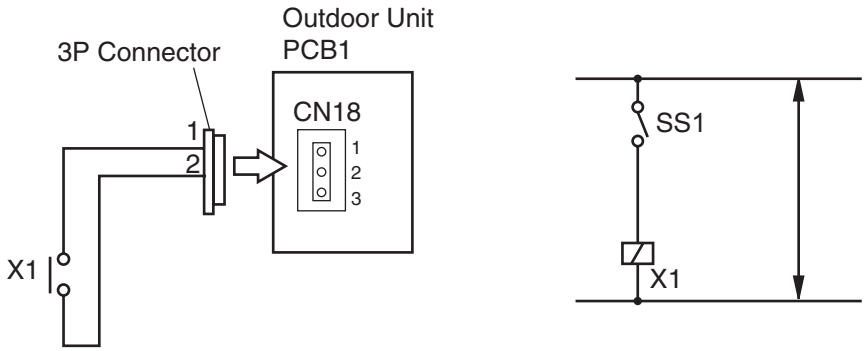
(3) Input outdoor unit fan start-up/shutdown (4) : (Snow sensor)

During shutdown of compressor, when Snow sensor pins are PCB of outdoor unit is short circuited, all outdoor fan motors will operate in full speed. If compressor operates, these fans will operate in normal speed. If these pins are opened, these fans will stop operation. This function can prevent outdoor unit from being covered by snow.



(4) Input demand current control by 60%, 70%, 80%, and 100% (6, 7, 8, and 9)

If current limit inputs are PCB of outdoor unit are short circuited, compressor frequency will be controlled, and the maximum operating current of outdoor unit can be set to 60%, 70%, 80%, or 100% of the rated value. When outdoor unit operating current is higher than the limit as set, indoor unit will be "temperature control OFF" and shutdown code "10" will be displayed. During control on input current, the equipment will be reset if the inputs are opened.



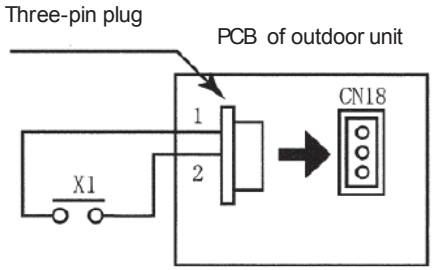
Wiring Diagram Example of Demand Current Control

(5) Low noise setting 1, 2, 3 (11, 12, 13)

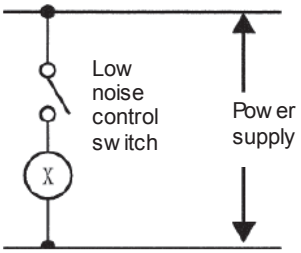
When low noise inputs on PCB of outdoor unit is short circuited, outdoor unit will operate at the Sound Pressure Level as given in the table below.

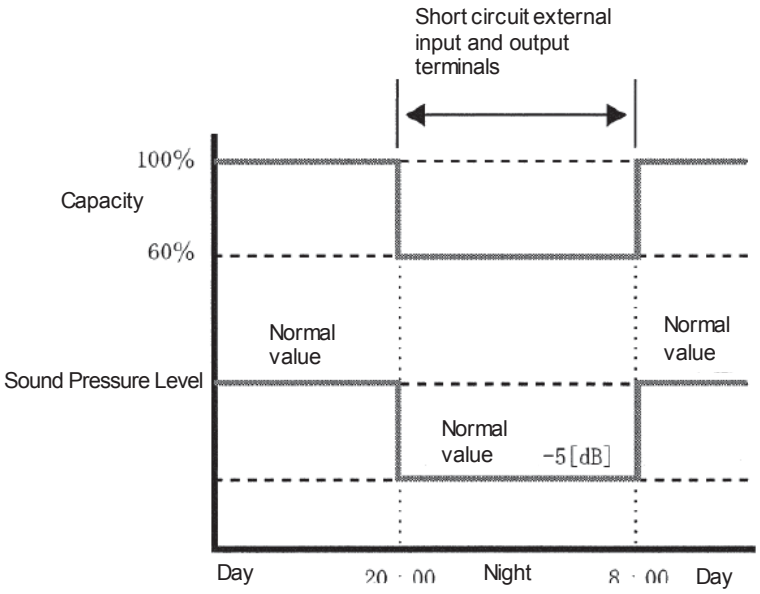
Input Function No.	Sound Pressure Level	Capacity of Outdoor Unit
Not Set	Normal value	100%
11 (Low noise setting 1)	Normal value - 2dB	80%
12 (Low noise setting 2)	Normal value - 5dB	60%
13 (Low noise setting 3)	Normal value - 7dB	40%

An example of defining Low noise setting 2 (Function No.12) to Input 3 (Pins #1 and #2 on CN18) is given below.



Circuit Diagram

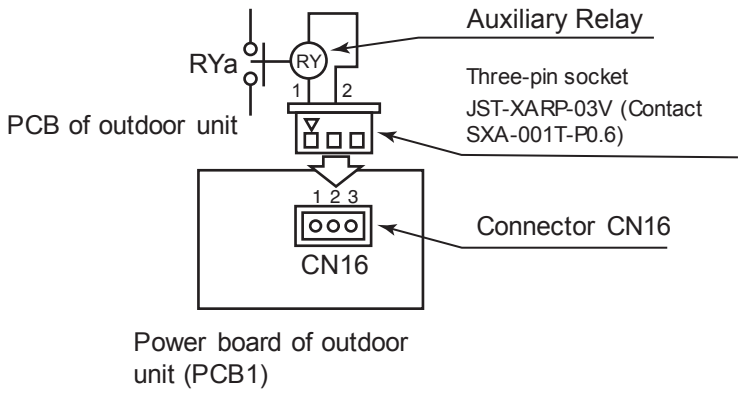




.Description of Output Settings

(1) Input Operation Signals Acquisition (1)

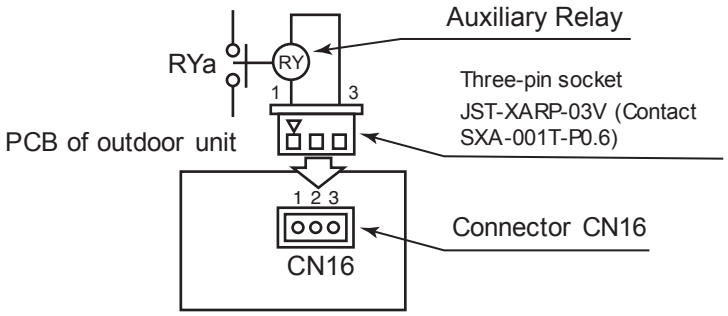
This function is used for acquisition of cooling or heating signals, as shown below. During cooling or heating operation, the relay is close. These signals are applied to control a circulation circuit or humidifier.



Power board of outdoor unit (PCB1)

(2) Output Alarm Signals Acquisition (2)

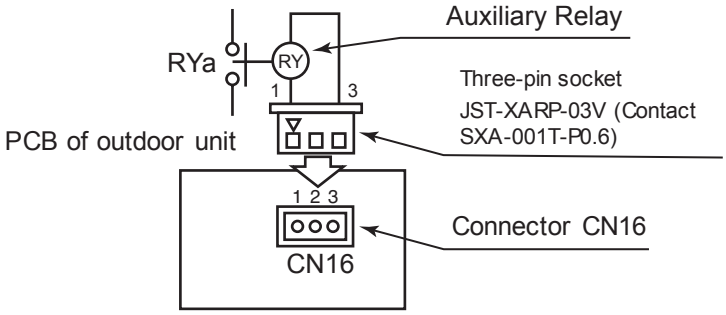
This function is used for acquisition of alarm signals on outdoor unit. When outdoor unit fails, the relay is close. This function is used for linkage control in case of alarm.



Power board of outdoor unit (PCB1)

(3) Output Compressor ON Signals Acquisition (3)

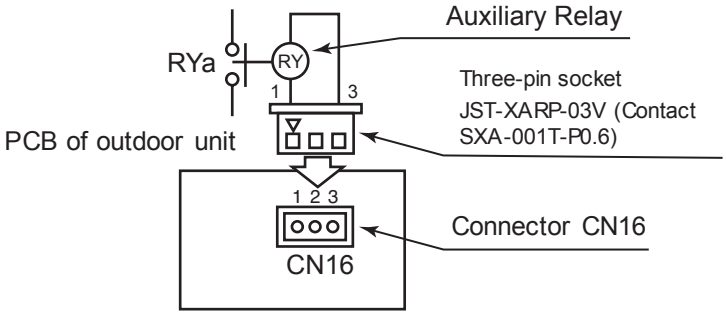
This function is used for acquisition of compressor ON signals on outdoor unit. When compressor in outdoor unit fails, the relay is close. This function is used for linkage control when relay controls action of relay.



Power board of outdoor unit (PCB1)

(4) Output Defrosting Signals Acquisition (4)

This function is used for acquisition of defrosting signals on outdoor unit. When outdoor unit defrosts, the relay is close. This function is used for linkage control when outdoor unit defrosts.



Power board of outdoor unit (PCB1)

6.3.3 Safety and Control Device Setting

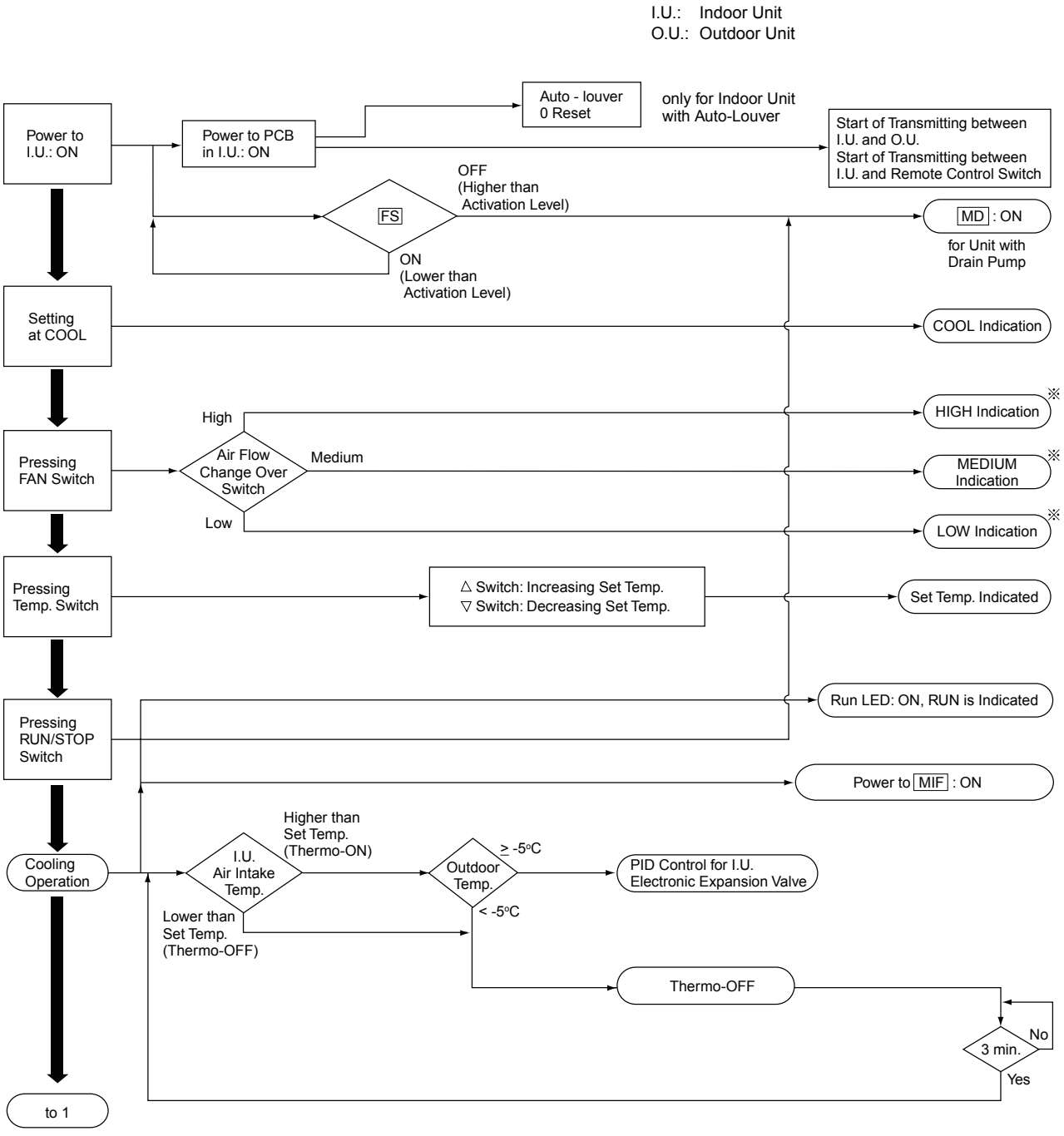
- Compressor Protection
  The compressor is protected by the following devices and their combinations.
  (1) High Pressure Switch: This switch cuts out the operation of the compressor when the discharge pressure exceeds the setting.
  (2) Oil Heater: This band type heater protects against oil foaming during cold starting, as it is energized while the compressor is stopped.

Model			76	96	114
For Compressor Pressure Switches			Automatic Reset, Non-Adjustable (each one for each compressor)		
High	Cut-Out	MPa	$4.15^{-0.05}_{-0.20}$	$4.15^{-0.05}_{-0.20}$	$4.15^{-0.05}_{-0.20}$
	Cut-In	MPa	$3.20^{+0.15}_{-0.20}$	$3.20^{+0.15}_{-0.20}$	$3.20^{+0.15}_{-0.20}$
Fuse Capacity 3ϕ, 380-415V, 50Hz		A	40 x 2	40 x 2	40 x 2 + 32 x 2
Oil Heater Capacity		W	40 x 2	40 x 2	40 x 2
CCP Timer Setting Time		min.	Non-Adjustable 3	3	3
For DC Fan Module Fuse Capacity 3ϕ, 380-415V, 50Hz		A	20 x 1	20 x 1	20 x 1

Model			136	154
For Compressor Pressure Switches			Automatic Reset, Non-Adjustable (each one for each compressor)	
High	Cut-Out	MPa	$4.15^{-0.05}_{-0.20}$	$4.15^{-0.05}_{-0.20}$
	Cut-In	MPa	$3.20^{+0.15}_{-0.20}$	$3.20^{+0.15}_{-0.20}$
Fuse Capacity 3ϕ, 380-415V, 50Hz		A	40 x 2 + 32 x 2	40 x 2 + 32 x 2
Oil Heater Capacity		W	40 x 4	40 x 4
CCP Timer Setting Time		min.	Non-Adjustable 3	3
For DC Fan Module Fuse Capacity 3ϕ, 380-415V, 50Hz		A	20 x 1	20 x 1

6.4 Standard Operating Procedure Chart

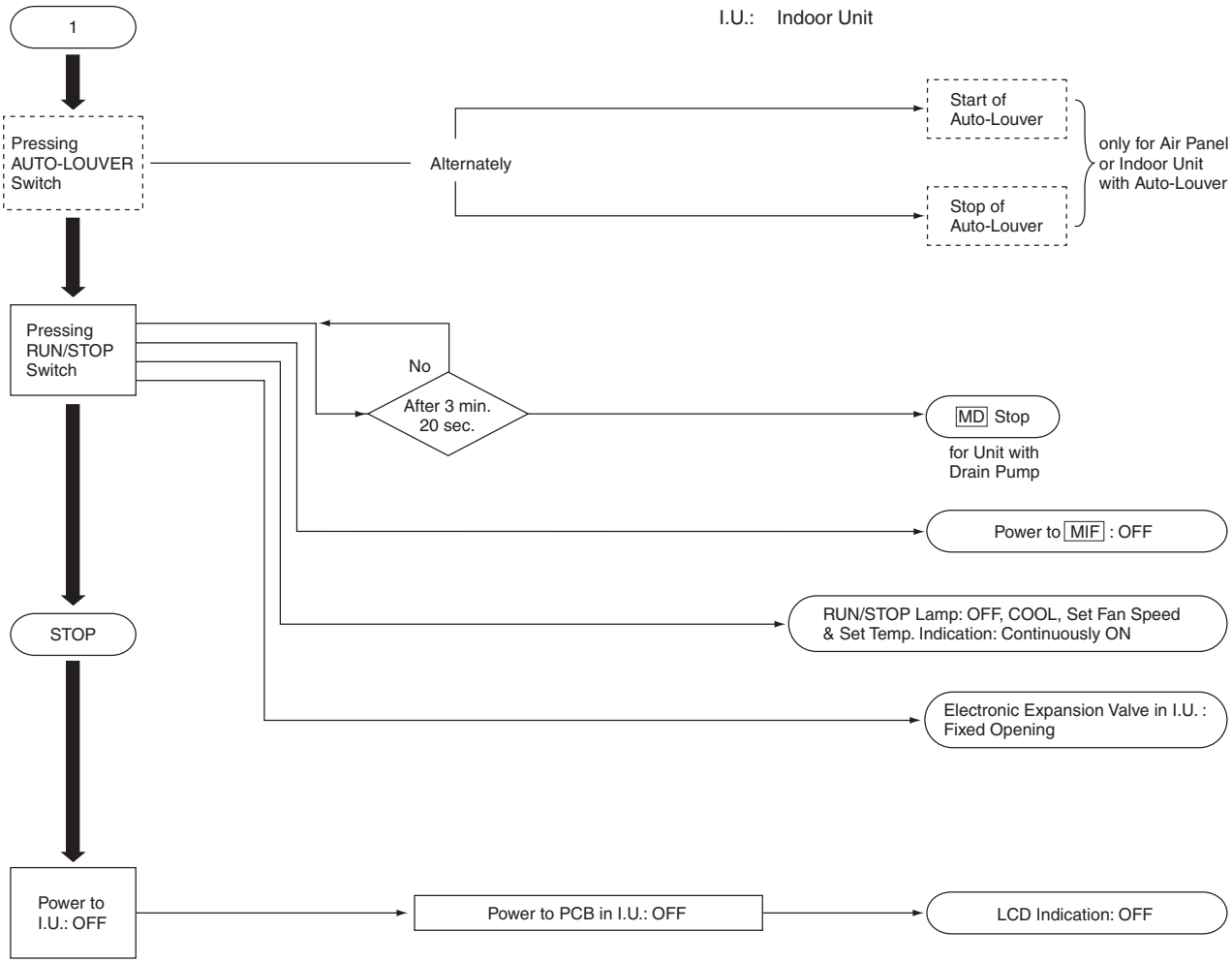
Cooling operation



Note

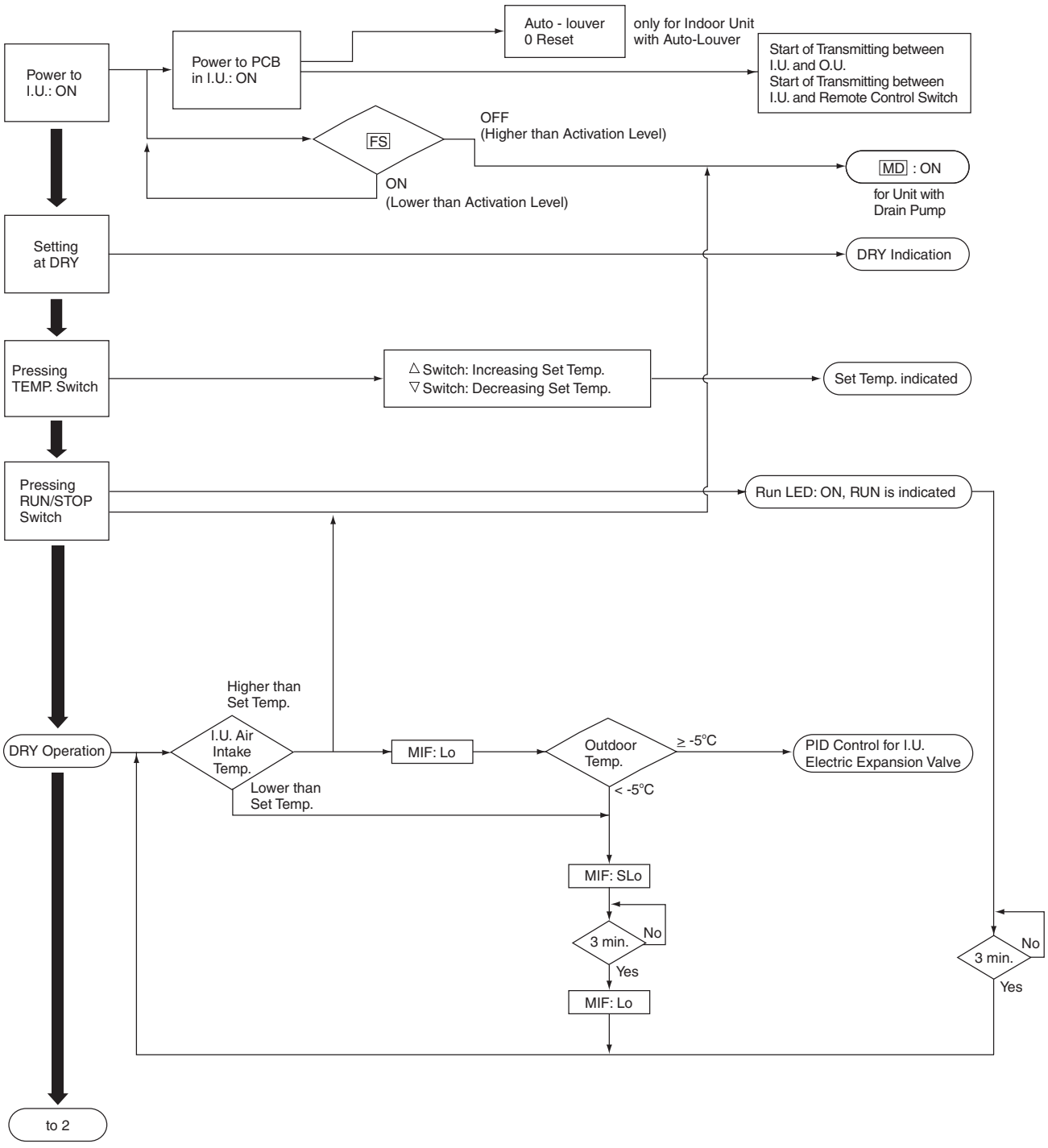
※: In case of AVD-76 and 96, Fan Speed is “High”only .
By pressing the FAN SPEED SWITCH of Remote Control Switch, indication of LCD is change as ┌→Hi→Me→Lo┐, but actual fan speed is “High” only.

Cooling operation

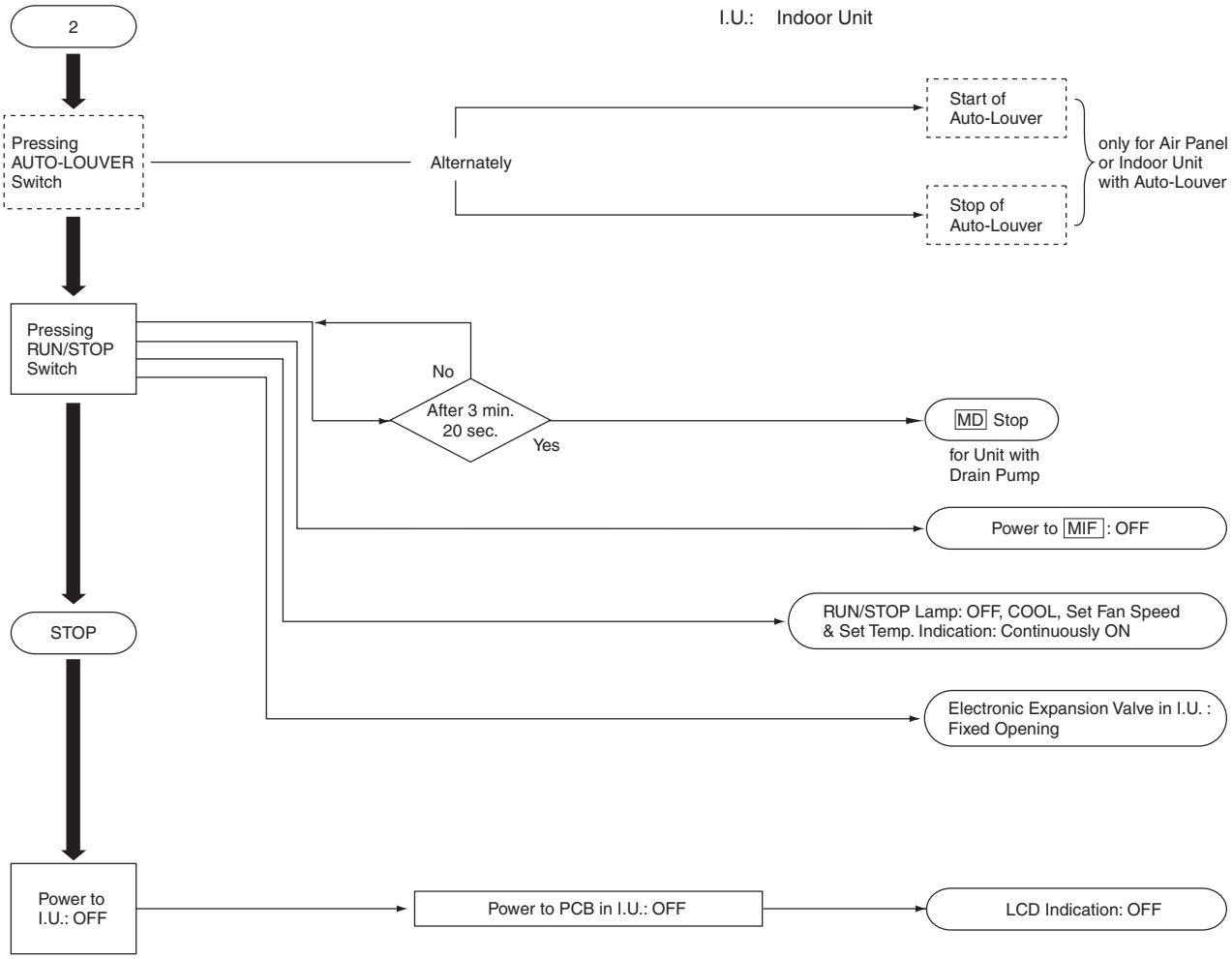


Dry run

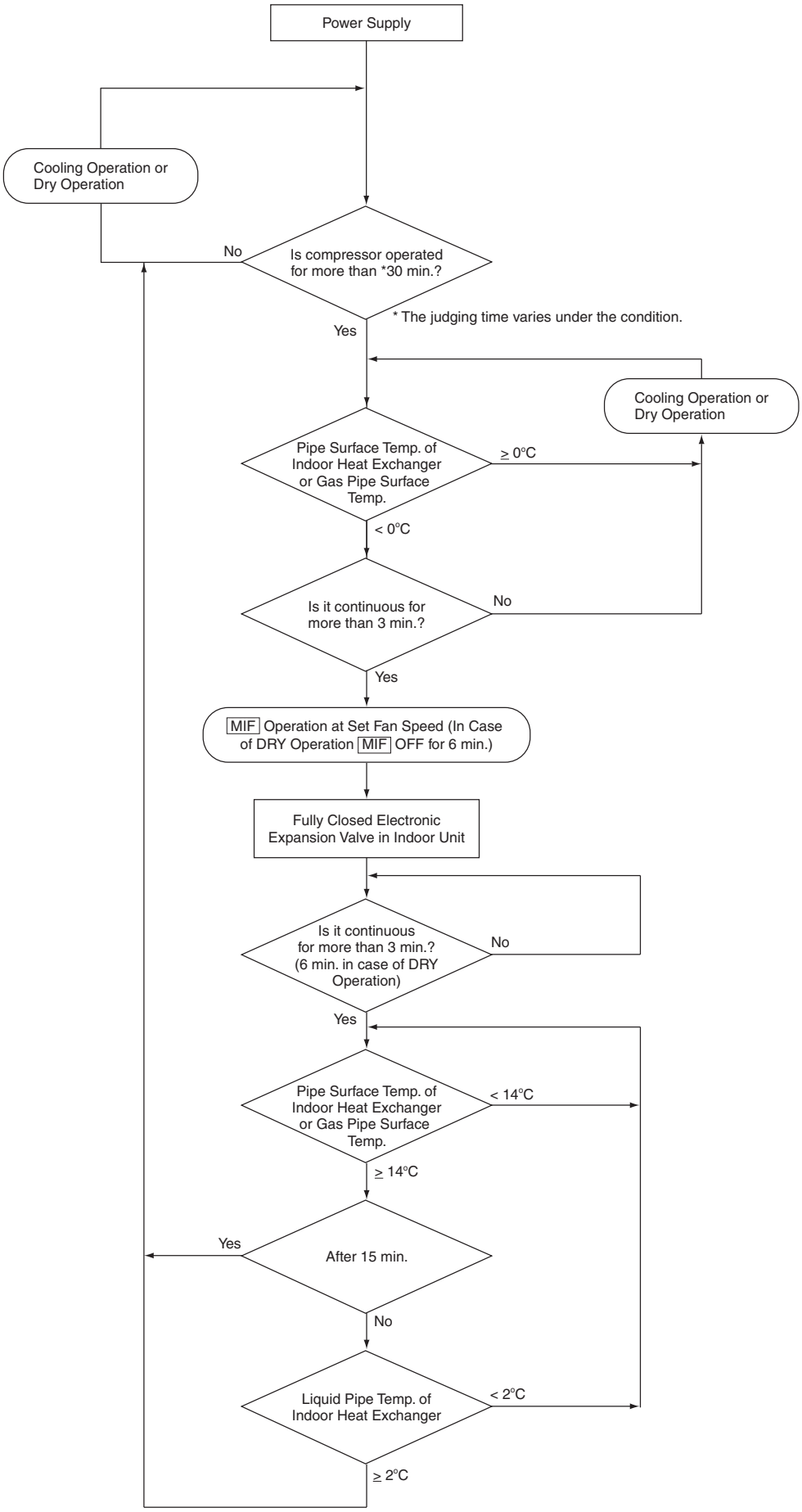
I.U.: Indoor Unit
O.U.: Outdoor Unit



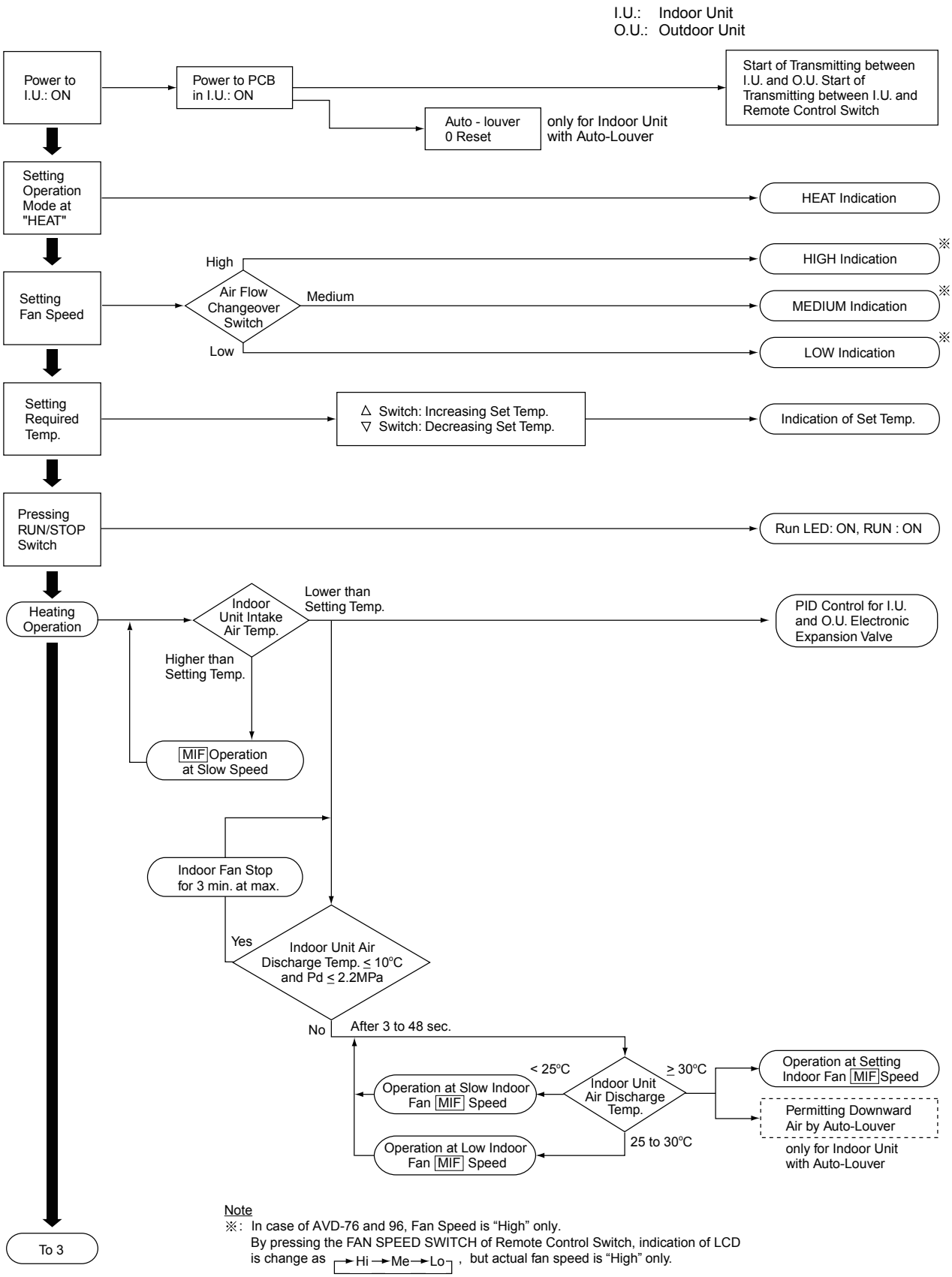
Dry run


I.U.: Indoor Unit
2
Pressing AUTO-LOUVER Switch
Alternately
Start of Auto-Louver
Stop of Auto-Louver
only for Air Panel or Indoor Unit with Auto-Louver
Pressing RUN/STOP Switch
No
After 3 min. 20 sec.
Yes
MD Stop
for Unit with Drain Pump
Power to MIF : OFF
RUN/STOP Lamp: OFF, COOL, Set Fan Speed & Set Temp. Indication: Continuously ON
STOP
Electronic Expansion Valve in I.U. : Fixed Opening
Power to I.U.: OFF
Power to PCB in I.U.: OFF
LCD Indication: OFF

Freeze protection control during the cool or dry run



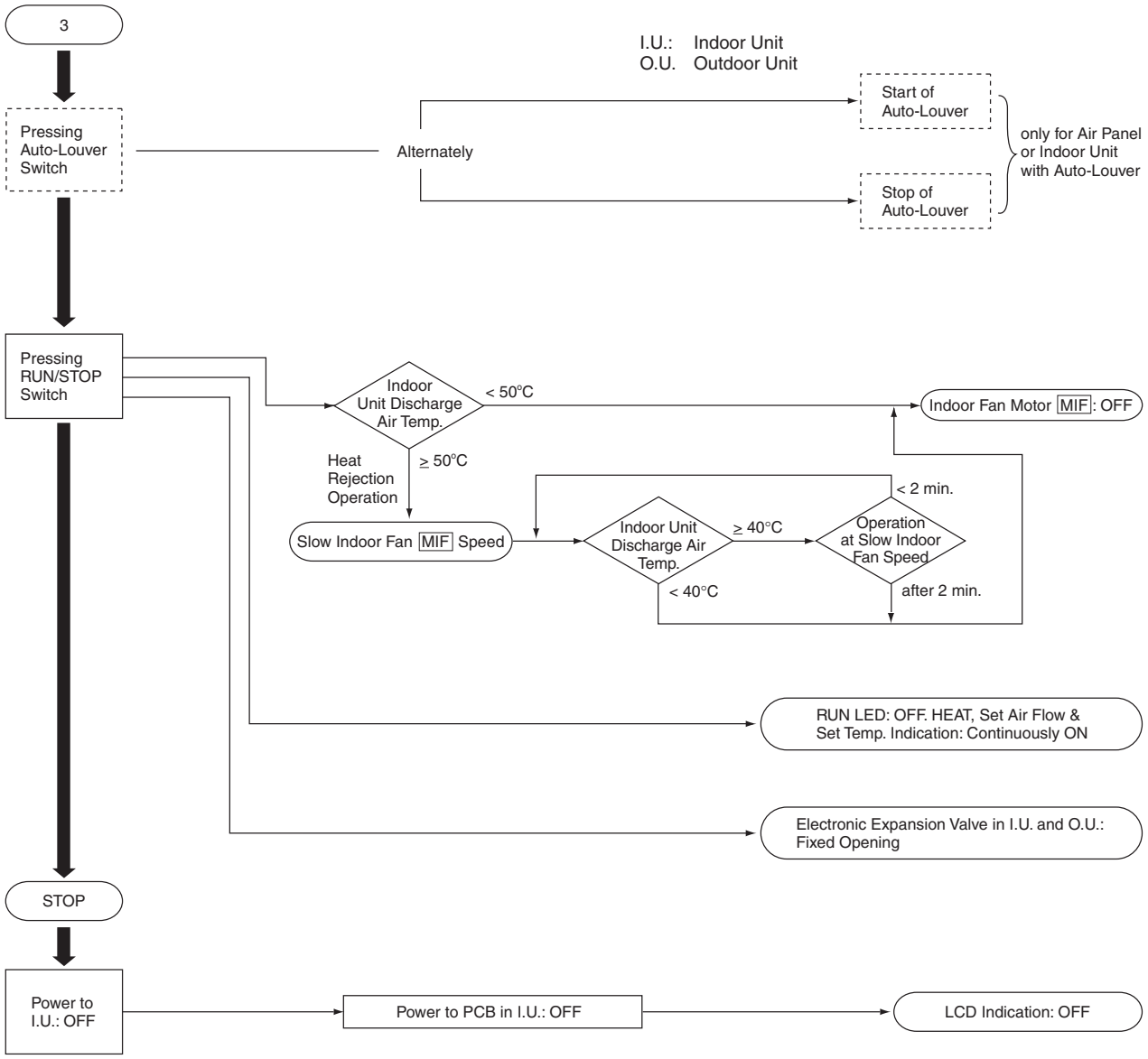
Heating operation



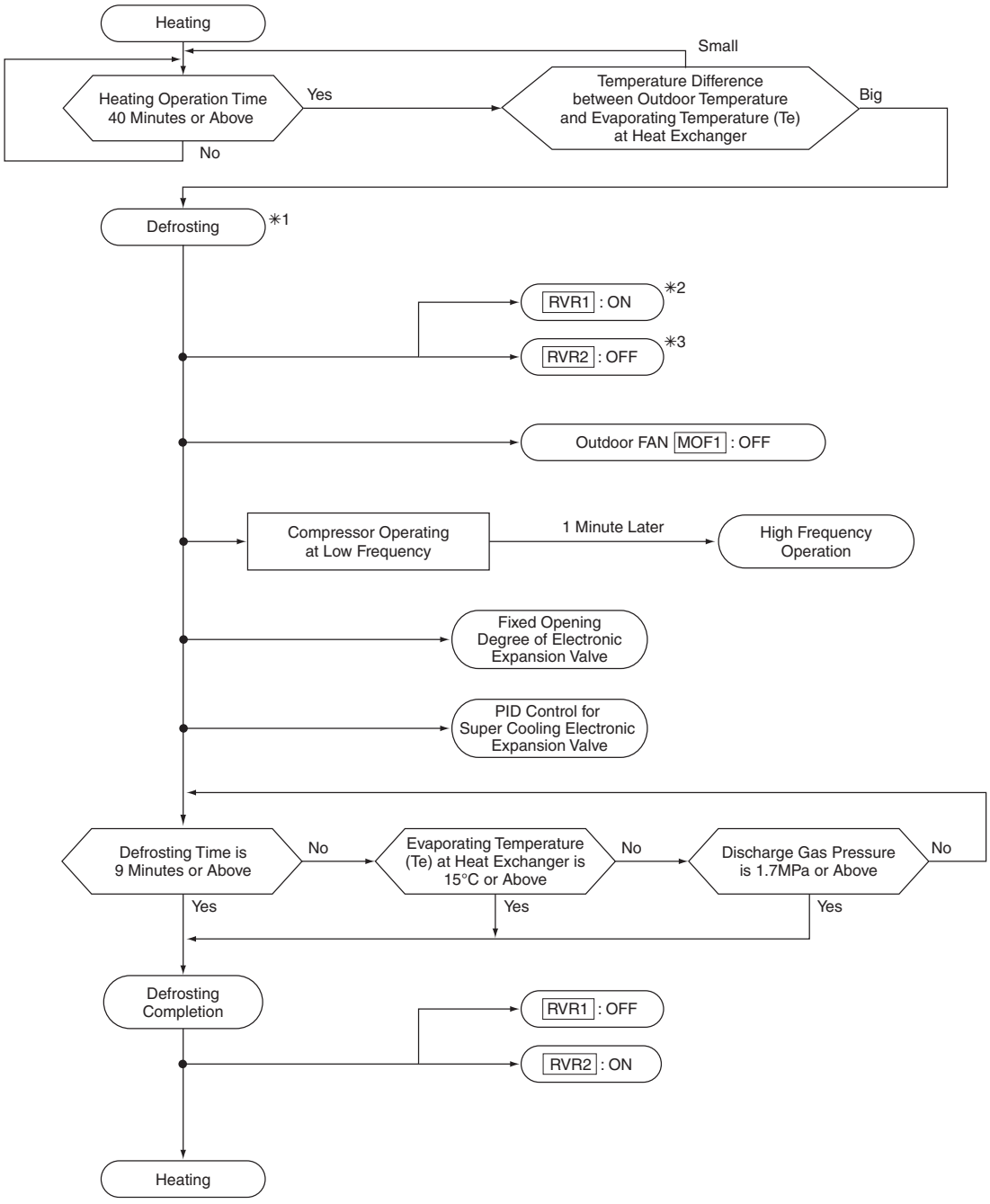
Note

※: In case of AVD-76 and 96, Fan Speed is "High" only.
By pressing the FAN SPEED SWITCH of Remote Control Switch, indication of LCD is change as Hi → Me → Lo , but actual fan speed is "High" only.

Heating operation



Defrosting operation

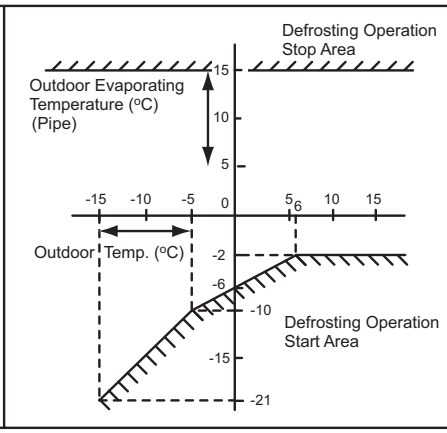


✳1: Defrost operation signal is transmitted to the indoor unit during the defrost operation. After the signal is received, “DEFROST” will be indicated on LCD of remote control switch and the indoor fan will be stopped.

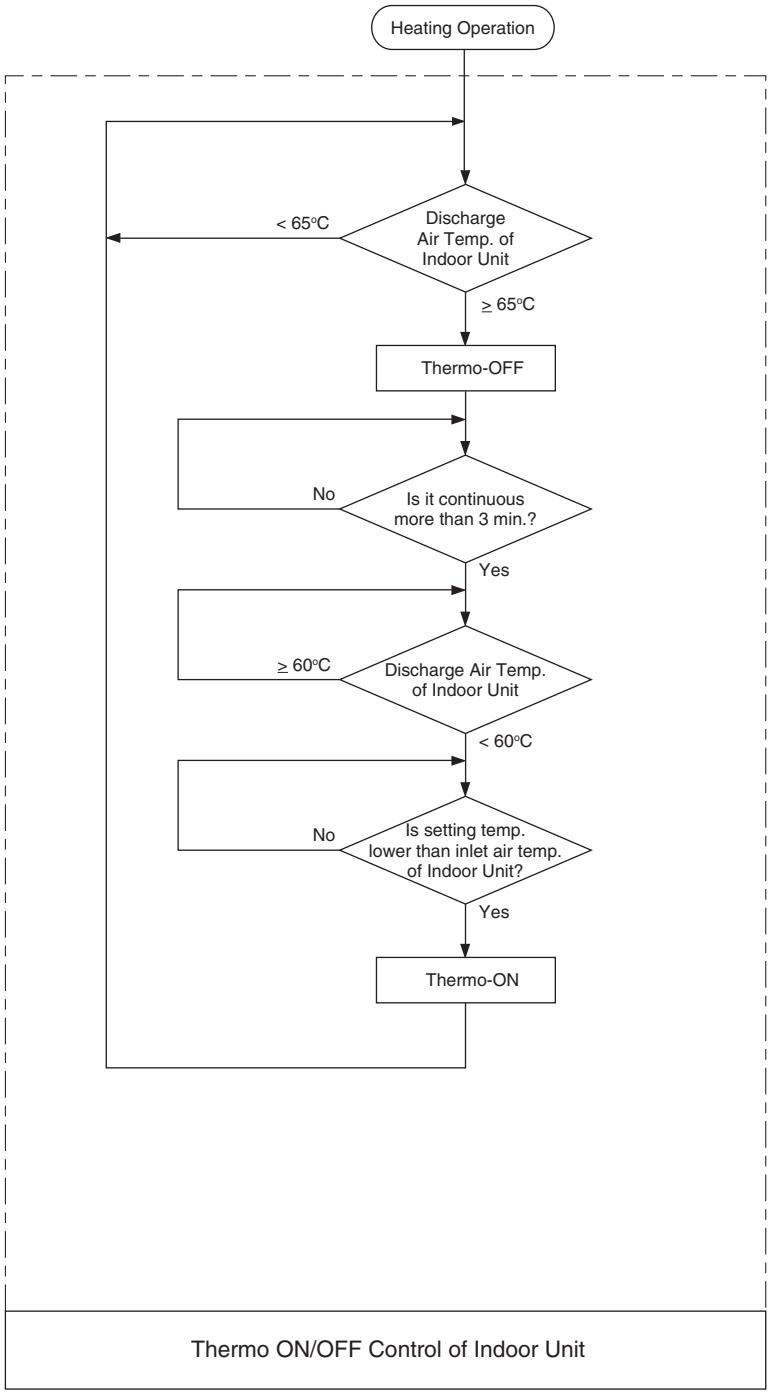
✳2: For the heat recovery system of 190kBtu/h or over, RVR1 will not operate.

✳3: For the heat recovery system of 20HP or over, switching power ON/OFF of RVR2 will be performed in each outdoor unit.

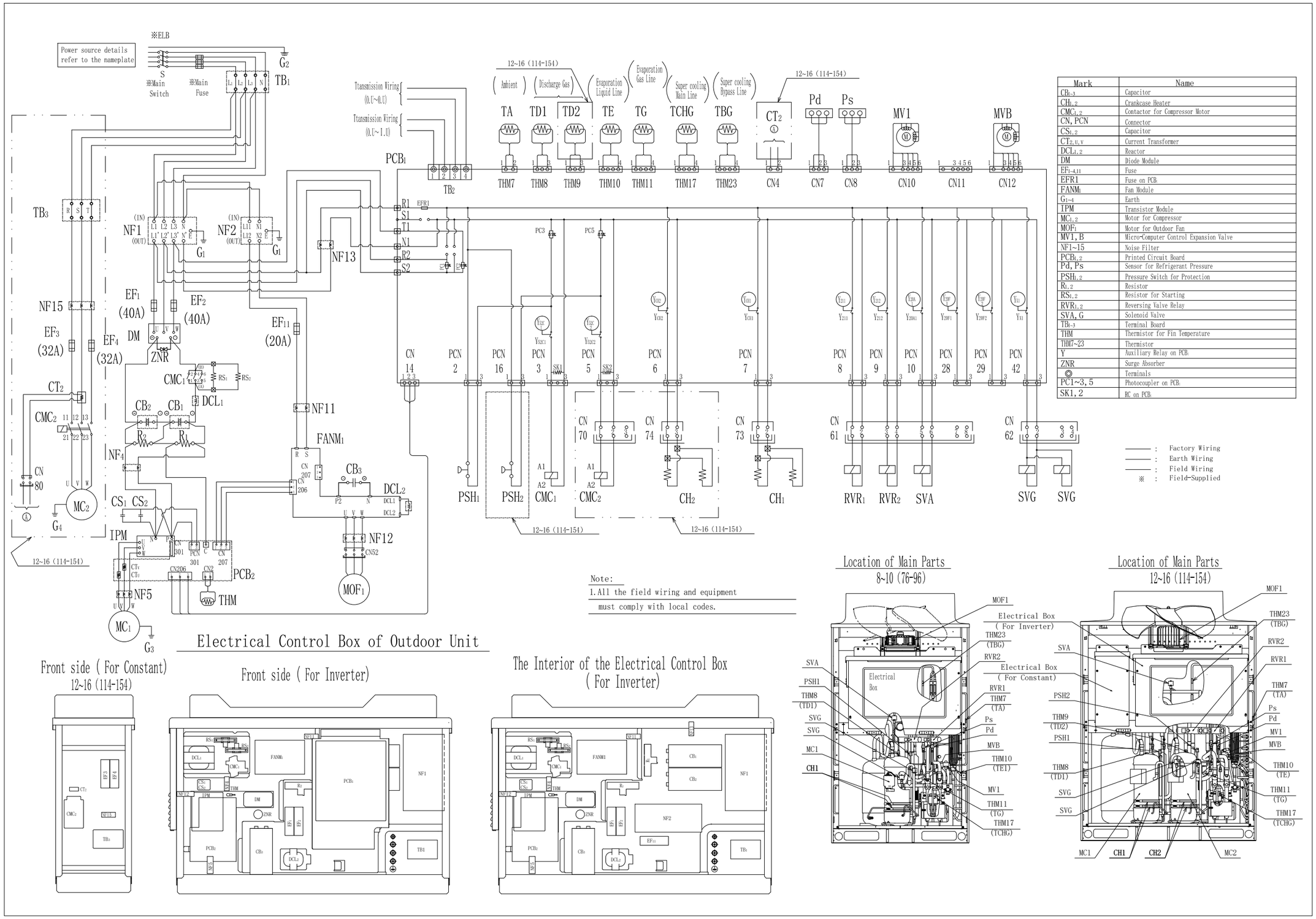
Temperature Conditions under Defrosting Operation



Supply air temperature overheat protection



ELECTRICAL WIRING DIAGRAM (FOR MODEL: AVWT-76~96 AVWT-114*~154*; 380-415V/50HZ*



Mark	Name
CB_{1-3}	Capacitor
$CH_{1,2}$	Crankcase Heater
$CMC_{1,2}$	Contactor for Compressor Motor
CN, PCN	Connector
$CS_{1,2}$	Capacitor
$CT_{2,U,V}$	Current Transformer
$DCL_{1,2}$	Reactor
DM	Diode Module
$EF_{1-4,11}$	Fuse
EFR1	Fuse on PCB
$FANM_1$	Fan Module
G_{1-4}	Earth
IPM	Transistor Module
$MC_{1,2}$	Motor for Compressor
MOF_1	Motor for Outdoor Fan
MV1, B	Micro-Computer Control Expansion Valve
NF1~15	Noise Filter
$PCB_{1,2}$	Printed Circuit Board
Pd, Ps	Sensor for Refrigerant Pressure
$PSH_{1,2}$	Pressure Switch for Protection
$R_{1,2}$	Resistor
$RS_{1,2}$	Resistor for Starting
$RVR_{1,2}$	Reversing Valve Relay
SVA, G	Solenoid Valve
TB_{1-3}	Terminal Board
THM	Thermistor for Fin Temperature
THM7~23	Thermistor
Y	Auxiliary Relay on PCB
ZNR	Surge Absorber
◎	Terminals
PC1~3, 5	Photocoupler on PCB
SK1, 2	RC on PCB

Note:
1. All the field wiring and equipment must comply with local codes.

Electrical Control Box of Outdoor Unit

Front side (For Constant)
12~16 (114-154)

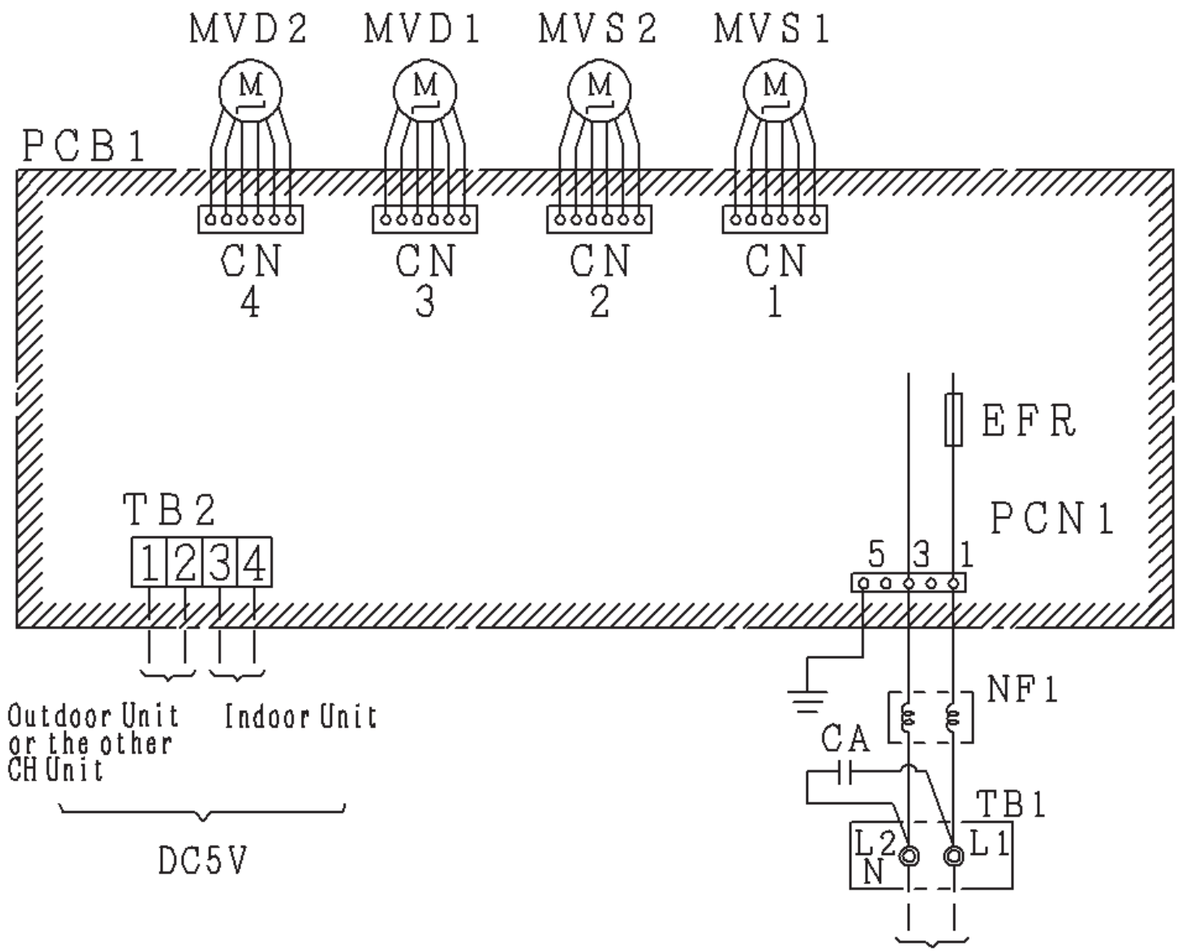
Front side (For Inverter)

The Interior of the Electrical Control Box (For Inverter)

Location of Main Parts
8~10 (76-96)

Location of Main Parts
12~16 (114-154)

ELECTRICAL WIRING DIAGRAM (FOR MODEL: HCH-160D AND HCH-280D; 220-240V/50HZ)

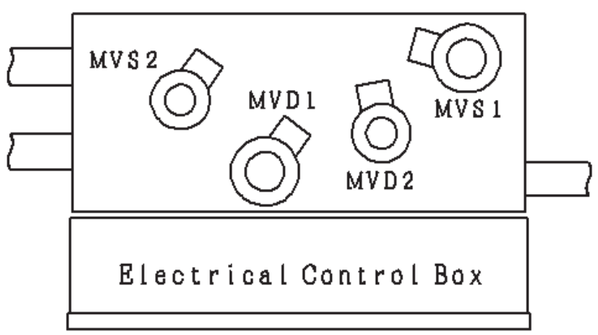


Mark	Name	Remark
PCB1	Printed Circuit Board	
TB1	Terminal Board	Main Power
TB2	Terminal Board	Operating Line
MVD_1、MVS_1 MVD_2、MVS_2	Micro-Computer Control Expansion Valve	
NF1	Noise Filter	
EFR	Fuse	
CA	Capacitor	

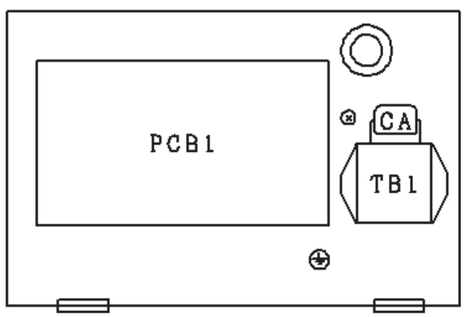
Mark	Torque to tighten the terminal
TB1	1.0~1.3 (N·m)
TB2	1.0~1.3 (N·m)

———: Factory Wiring

— —: Field Wiring



Arrangement of Micro-Computer Control Expansion Valve (View of the Top)



Electrical Control Box

Note:

1. All the field wiring and equipment must comply with local codes.

7. Structure

7.1 Outdoor Unit & Refrigerant Cycle

Regarding structure drawing and refrigerant cycle diagram,please refer to Technical Catalogue.

7.2 Necessary Tools and Instrument List for Installation

No.	Tool	No.	Tool	No.	Tool	No.	Tool
1	Handsaw	6	Copper Pipe Bender	11	Spanner	16	Leveller
2	Phillips Screwdriver	7	Plier	12	Charging Cylinder	17	Clamper for Solderless Terminals
3	Vacuum Pump	8	Pipe Cutter	13	Gauge Manifold	18	Hoist (for Indoor Unit)
4	Refrigerant Gas Hose	9	Brazing Kit	14	Cutter for Wires	19	Ammeter
5	Megohmmeter	10	Hexagon Wrench	15	Gas Leak Detector	20	Voltage Meter

Use tools and measuring instruments only for the new refrigerant R410A which is directly touch to refrigerant.

⚠ DANGER

The pressure of refrigerant R410A is 1.4 times higher than that of conventional refrigerant, impurities such as moisture, oxide film, and grease affect easily R410A. Be sure to remove any moisture, dust, different refrigerant or refrigerant oil from the refrigerant cycle.
Therefore, if the specified materials are not used, it may cause explosion, injury, leakage, electrical shock or fire.

NOTICE

Check the design pressure for this product is 4.15MPa.
To avoid accidental mixing of the different refrigerant or different refrigerant oil, the sizes of the charging connections have been changed.
It is necessary to prepare the following tools before performing the installation work.

✧: Interchangeability is available with current R22
×: Prohibited
●: only for Refrigerant R410A (No Interchangeability with R22)
✦: only for Refrigerant R407C (No Interchangeability with R22)

Measuring Instrument and Tool		Interchangeability with R22		Reason of Non-Interchangeability and Attention (★: Strictly Required)	Use
		R410A	R407C		
Refrigerant Pipe	Pipe Cutter Chamfering Reamer	✧	✧	-	Cutting Pipe Removing Burrs
	Flaring Tool	✧ ●	✧	* The flaring tools for R407C are applicable to R22. * If using flaring tube, make dimension of tube larger for R410A. * In case of material 1/2H, flaring is not available.	Flaring for Tubes
	Extrusion Adjustment Gauge	●	-		Dimensional Control for Extruded Portion of Tube after Flaring
	Pipe Bender	✧	✧	* In case of material 1/2H, bending is not available. Use elbow for bend and braze.	Bending
	Expanding Tool	✧	✧	* In case of material 1/2H, expanding of tube is not available. Use socket for connecting tube.	Expanding Tubes
	Torque Wrench	●	✧	* For ϕ12.7, ϕ15.88, spanner size is up 2mm.	Connection of Flare Nut
		✧	✧	* For ϕ6.35, ϕ9.53, ϕ19.05, spanner size is the same.	
	Brazing Tool	✧	✧	* Perform correct brazing work.	Brazing for Tubes
	Nitrogen Gas	✧	✧	* Strict Control against Contamin (Blow nitrogen during brazing.)	Prevention from Oxidation during Brazing
	Lubrication Oil (for Flare Surface)	●	✦	* Use a synthetic oil which is equivalent to the oil used in the refrigeration cycle. * Synthetic oil absorbs moisture quickly.	Applying Oil to the Flared Surface
Vacuum Drying · Refrigerant Charge	Refrigerant Cylinder	●	✦	* Check refrigerant cylinder color. ★ Liquid refrigerant charging is required regarding zeotoropic refrigerant.	Refrigerant Charging
	Vacuum Pump	✧	✧	★ The current ones are applicable. However, it is required to mount a vacuum pump adapter which can prevent from reverse flow when a vacuum pump stops, resulting in no reverse oil flow.	Vacuum Pumping
	Adapter for Vacuum Pump	✳ ●	✦		
	Manifold Valve	●	✦	* No interchangeability is available due to higher pressures when compared with R22. ★ Do not use current ones to the different refrigerant. If used, mineral oil will flow into the cycle and cause sludges, resulting in clogging or compressor failure. Connection diameter is different; R410A: UNF1/2, R407C: UNF7/16.	Vacuum Pumping, Vacuum Holding, Refrigerant Charging and Check of Pressures
	Charging Hose	●	✦		
	Charging Cylinder	×	×	* Use the weight scale.	-
	Weight Scale	✧	✧	-	Measuring Instrument for Refrigerant Charging
	Refrigerant Gas Leakage Detector	✳ ●	✦	* The current gas leakage detector (R22) is not applicable due to different detecting method.	Gas Leakage Check

✳: Interchangeability with R407C.

8. Unit Transportation and Handing

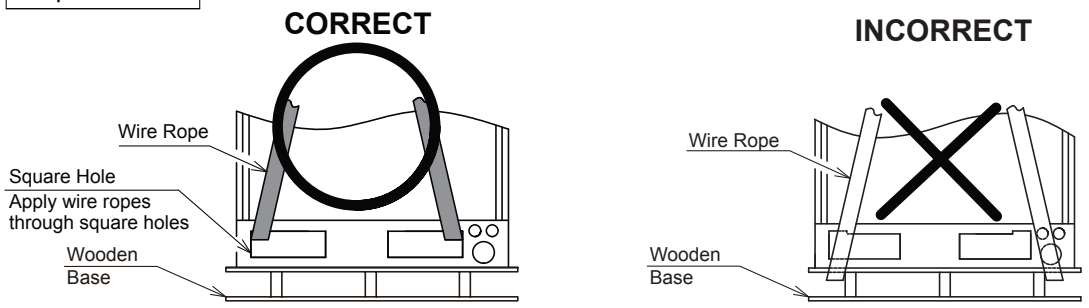
8.1 Transportation

Transport the product as close to the installation location as practical before unpacking.
When using a crane, hang the unit according to the description of the label attached to the outdoor unit.

⚠ DANGER

Do not hang the unit by the ropes at the wooden base.

Rope Position



⚠ CAUTION

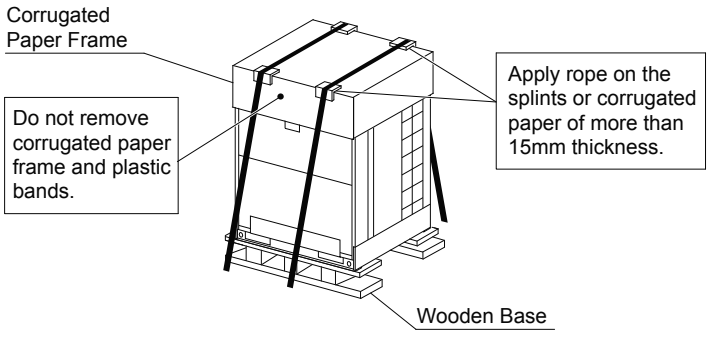
(1.) Transportation and Storage

The corrugated paper frame is not sufficiently strong, therefore pay attention to the followings in order to prevent the unit deformation.

- **Do not step or put any material on the product.**
- **Apply two lifting wires onto the outdoor unit, when lifting it by crane.**
- **Do not stack the product when storing.**

(2.) Transportation and Wire Rope

- **To protect the unit, do not remove any packing.**
- **Do not stack or put any material on the product.**
- **Apply wire ropes on the both side of the unit as shown in the figure.**

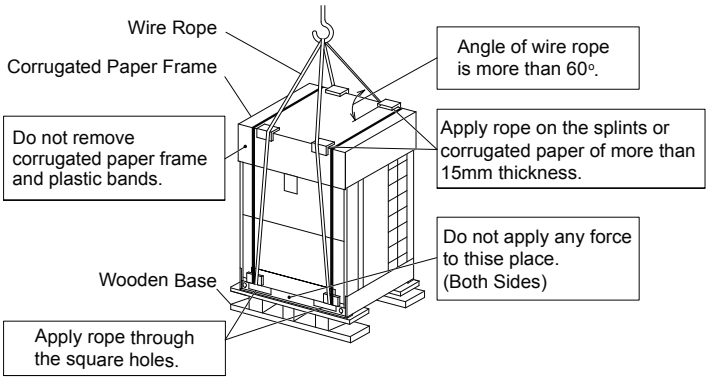


8.2 Hanging Method

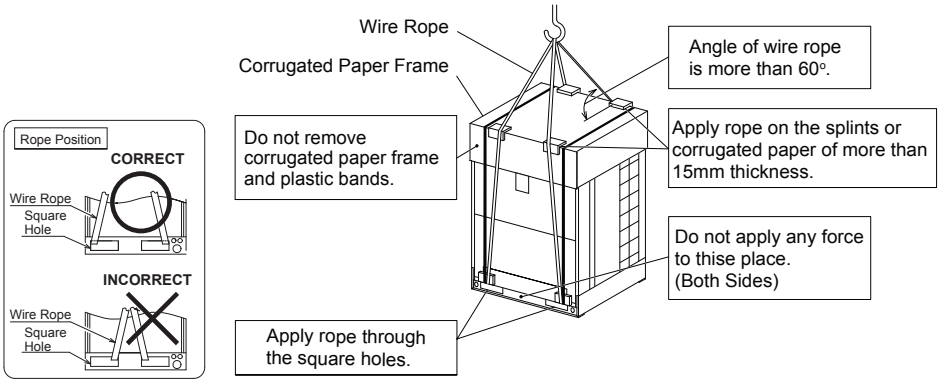
When hanging the unit, ensure a balance of the unit, check safety and lift up smoothly.

(1) Do not remove any packing materials.

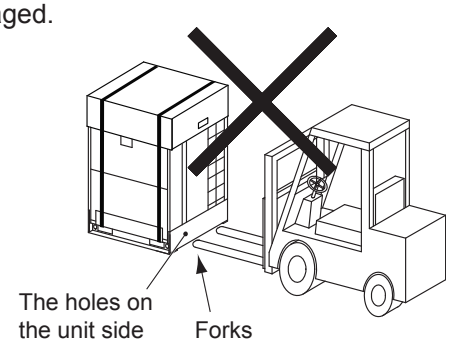
(2) Hang the unit under packing condition with two (2) wire ropes, as shown in the following figure.



(3) Hang the unit without wooden base with two (2) wire ropes, as shown in the following figure.

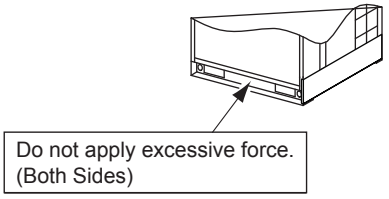


When using forklift, do not insert forks into the holes on the unit side. The unit may be damaged.



Do not apply excessive force to the square holes with forks or other materials. The bottom of the unit may be deformed.

* Do not push the bottom base by fork.
* Do not use roller.



NOTE

In case of transportation after unpacking, protect the unit with the splints or cloth.

- Handling of Outdoor Unit

⚠WARNING

Do not put any foreign material into the outdoor unit and check to ensure that none exists in the outdoor unit before the installation and test run. Otherwise, a fire or failure, etc. may occur.

9. Outdoor Installation

9.1 Factory-Supplied Accessories

Check to ensure that the following accessories are packed with the outdoor unit.

Table Factory-Supplied Accessories

Accessory			76	96	114	136	154
Accessory Pipe	(A)	Connection for Refrigerant Gas (Low) Pipe	 ϕ22.2→ϕ15.88	 ϕ22.2→ϕ19.05	 ϕ25.4→ϕ22.2	 ϕ25.4→ϕ22.2	 ϕ25.4→ϕ22.2
	(B)	Connection for Refrigerant Gas (High/Low) Pipe	 ϕ22.2→ϕ19.05	-	-	-	 ϕ25.4→ϕ28.6
	(C)	Connection for Refrigerant Liquid Pipe	-	-	-	-	-
Rubber Bush	For Connection Hole of Power Supply Wire		 ×1	 ×1	 ×1	 ×1	 ×1
Screw (Spare)			 ×3	 ×3	 ×3	 ×3	 ×3
Combination Unit Model Label							

Note:

If any accessory is not provided along with the equipment, please contact your dealer。

9.2 Installation

(1) Install the outdoor unit in a dry well ventilated environment.

(2) Install the outdoor unit where it is in the shade or it will not be exposed to direct sunshine or direct radiation from high temperature heat source.

(3) Install the outdoor unit where the sound or the discharge air from the outdoor unit does not affect neighbors or surrounding ventilation. The operating sound at the rear or right/left sides is 3 to 6dB(A) higher than the value in the catalog at the front side.

(4) Install the outdoor unit in a space with limited access to general public.

(5) Check to ensure that the foundation is flat, level and sufficiently strong.

(6) Do not install the outdoor unit where dust or other contamination could block the outdoor heat exchanger.

(7) When installing the outdoor unit in snow-covered areas, mount the field-supplied hoods on the top of the outdoor unit and the inlet side of the heat exchanger.

(8) While heating or defrosting operation, drain water is discharged. Provide adequate drainage around the foundation. If installing the unit on a roof or a veranda, avoid draining in or over walkways to prevent water dripping on people or the formation of ice in winter. In case of installing such a place, provide the additional drainage around the foundation.

(9) Do not install the outdoor unit in a space where a seasonal wind directly blows to the outdoor heat exchanger or a wind from a building space directly blows to the outdoor fan.

NOTES:

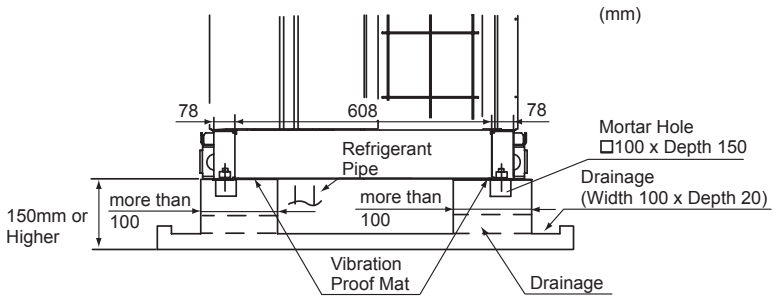
1. Do not install the outdoor unit where there is a high level of oil mist, flammable gases, salty air or harmful gases such as sulphur and an acid or alkaline environment.
2. Do not install the outdoor unit where the electromagnetic wave is directly radiated to the electrical control box.
3. Install the outdoor unit as far as possible, being at least 3 meters from the electromagnetic wave radiator.

9.3 Maintenance Space

For more details see 4.1 Operation Space.

9.4 Foundation

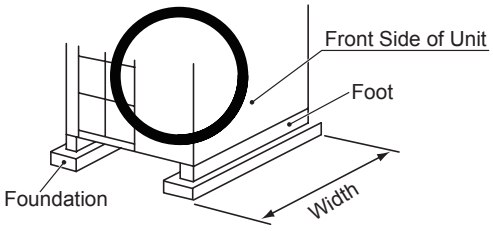
- Concrete Foundations
  (1) The height of the foundation should be 150mm higher than the ground level.
  (2) Install a drainage around foundation for smooth drain.



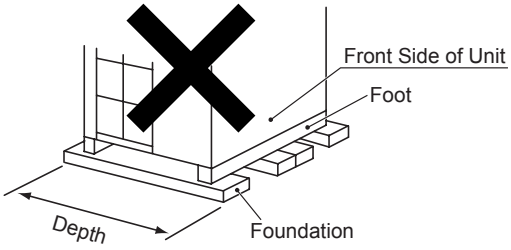
* Provide concrete foundation as shown in the figure

* Do not provide concrete foundation as shown below. The foot of the outdoor unit may be deformed.

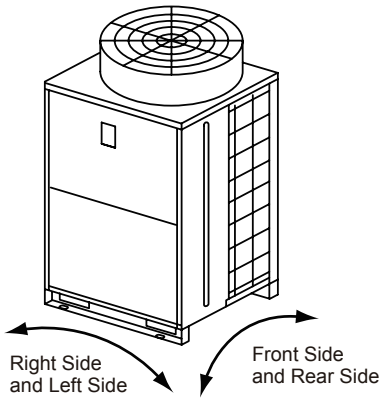
CORRECT



INCORRECT



(3) Install the outdoor unit in the front-rear and right-left direction horizontally. (Use a level gauge.) Check to ensure that the gradient in four directions (front, rear, right and left) is within 10mm.

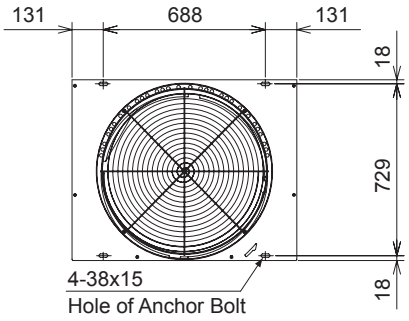


(4) Provide a strong and correct foundation so that;
  a. The outdoor unit is not on an incline.
  b. Abnormal sound does not occur.
  c. The outdoor unit will not fall down due to a strong wind or earthquake.

(5) When installing the outdoor unit, fix the unit by ancho bolts (field-supplied)
Refer to below Fig. regarding the location of fixing holes

Unit: mm

<76 kBtu/h to 96 kBtu/h>



<114 kBtu/h to 154kBtu/h>

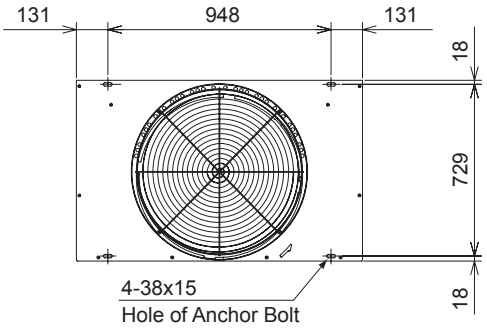
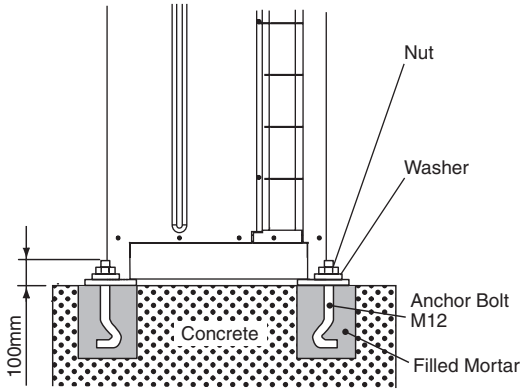


Fig. Position of Anchor Bolts

Secure the outdoor unit with the anchor bolts.



(6) When installing the unit on a roof or a veranda, drain water sometimes turns to ice on a cold morning. Therefore, avoid draining into an area where people often use because it is slippery.

(7) When drain piping is necessary for the outdoor unit, use the drain boss set (Optional).
Do not use drain boss and drain pan kit in the cold area. The drain water in the drain pipe may be frozen and then the drain pipe may crack.

9.5 Treatment of Condensed Water

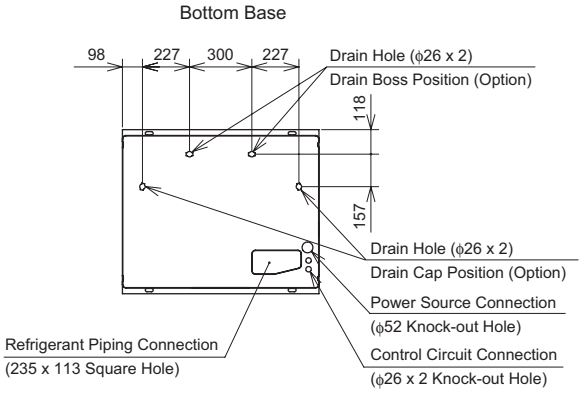
Condensed water will be discharged from outdoor unit during heating and defrosting operation (rain water also to be discharged from here). Special attention shall be paid to the following considerations:

(1) Select a proper location to construct drain pipe or trench.

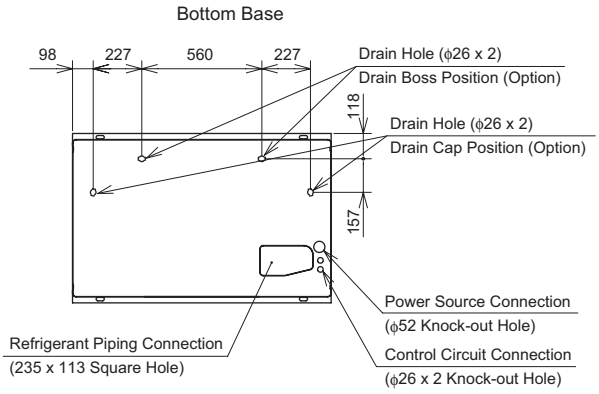
(2) Do not install outdoor unit above any access for personal traffic, as condensed water may fall onto pedestrians. If outdoor unit has to be installed above such access, additional drain pan shall be provided.

(3) Where drain pipe has to be used for outdoor unit, use drain pipe connector device (Model DC-01Q, optional). In cold area, do not use drain pipe connector to drip tray, or otherwise the condensed water may be frozen in drain pipe and thereby cause the drain pipe to crack.

AVWT-76~96* Unit mm



AVWT-114*~154* Unit: mm



- Drain pipe connector

  Drain Pipe connector is a connecting device for connection of drip tray.

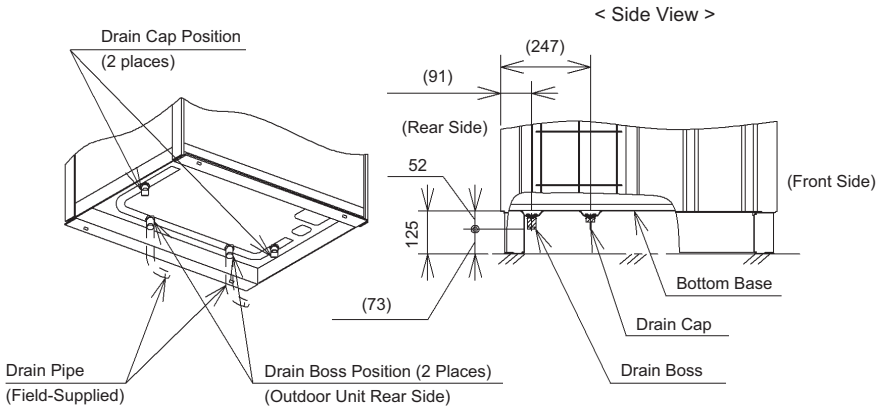
  Construction of drain pipe connector component

Name	Model
Drain pipe connector	DC-01Q

Model	Part Name	Quantity	Application
DC-01Q	Drain nozzle	1	Used along with rubber gasket as a component for drain pipe
	Rubber gasket	1	
	Rubber ring	4	For sealing of drain pipe opening

Installation position

Example :AVWT-96*



10. Refrigerant Piping Work

⚠ DANGER

- **Use refrigerant R410A in the refrigerant cycle.**
  Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed air, nitrogen or refrigerant be used for these types of tests.
- **Check to ensure that no pressure exists inside the stop valve before removing the flange.**

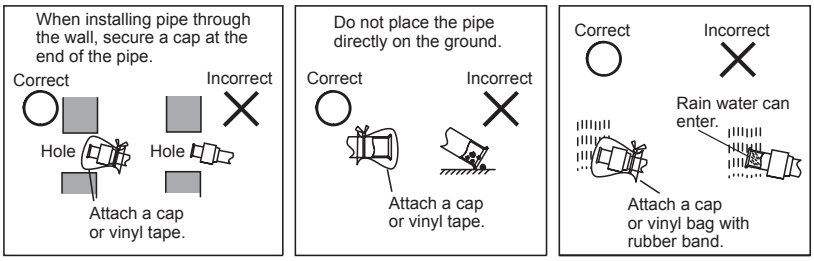
⚠ CAUTION

Ensure to connect the piping among the units in the same refrigerant cycle.

10.1 Piping Materials

(1) Prepare locally-supplied copper pipes.
(2) Select the piping size from the Table 6.1 and Table 6.2.
(3) Select clean copper pipes. Make sure there is no dust and moisture inside of the pipes. Blow the inside of the pipes with nitrogen or dry air, to remove any dust or foreign materials before connecting pipes. Do not use any tools which produce a lot of swarf such as a saw or a grinder.

- Cautions for Refrigerant Pipe Ends

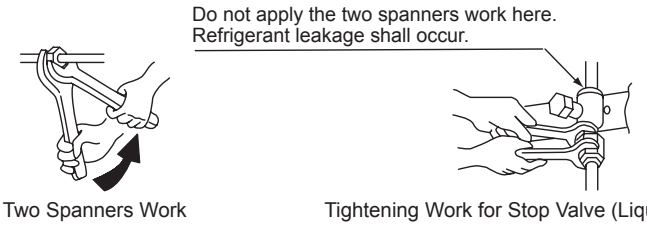


$ Cautions for Piping Connection Work

(1) Connect the indoor/outdoor units with refrigerant pipes. Fix the pipes and pay attention not to contact with weak materials such as ceiling. (Otherwise, abnormal sound may be heard due to the vibration of the piping.)
(2) Apply refrigerant oil slightly on the sheet surface of the pipe and f are nut before the flaring work. And then tighten the flare nut with the specified tightenin torque using two spanners. Perform the flaring work on the liquid piping side before the gas piping side. Check the gas leakage after the flaring work
NOTE:
Refrigerant oil is field-supplied
[Ethereal Oil FVC68D]

(3) In case that temperature and humidity inside the ceiling exceed 27°C/RH80%, apply additional insulation (approx. 10mm thickness) to the accessory insulation. It prevents dew condensation on the surface of the insulation (refrigerant pipe only).
(4) Perform the air-tight test (4.15MPa for the test pressure).
(5) Perform cold insulation work by insulating and taping the flare connection and reducer connection. Also insulate all the refrigerant pipes.

$ When tightening the flare nut, use two spanners



⚠ CAUTION

Do not apply excessive force to the flare nut when tightening. If applied, the flare nut may crack due to aged deterioration and refrigerant leakage may occur. Use the specified tightening torque.

Table 10.1 Piping Size of Outdoor Unit

(mm)

Model	Gas		Liquid
76	ϕ19.05	ϕ15.88	ϕ9.53
96	ϕ 22.2	ϕ19.05	ϕ9.53
114	ϕ25.4	ϕ22.2	ϕ12.7
136			
154	ϕ28.6	ϕ22.2	ϕ12.7
170	ϕ28.6	ϕ22.2	ϕ15.88
190			
212	ϕ28.6	ϕ25.4	ϕ15.88
232			
250	ϕ31.75	ϕ25.4	ϕ19.05
272	ϕ31.75	ϕ28.6	ϕ19.05
290			
308			
324			
340			
364	ϕ38.1	ϕ31.75	ϕ19.05
382			
398			
420			
438			
454			

Table 10.2 Piping Size of Indoor Unit

(mm)

Indoor Unit(KBtu/h)	Gas	Liquid
07 to 14	ϕ12.7	ϕ6.35
17 to 18	ϕ15.88	ϕ6.35
22 to 54	ϕ15.88	ϕ9.53
76	ϕ19.05	ϕ9.53
96	ϕ22.2	ϕ9.53

- Piping Thickness and Material
  Use the pipe as below.

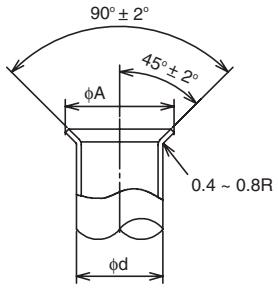
(mm)

Diameter	R410A	
	Thickness	Material
ϕ6.35	0.8	O material
ϕ9.53	0.8	O material
ϕ12.7	0.8	O material
ϕ15.88	1.0	O material
ϕ19.05	1.0	1/2H material
ϕ22.2	1.0	1/2H material
ϕ25.4	1.0	1/2H material
ϕ28.6	1.0	1/2H material
ϕ31.75	1.1	1/2H material
ϕ38.1	1.35	1/2H material
ϕ41.3	1.45	1/2H material
ϕ44.45	1.55	1/2H material

10.2 Flare and Connector

- Flaring Dimension

  Perform the flaring work as shown below.



(mm)

Diameter (ϕd)	A +0 -0.4
	R410A
6.35	9.1
9.53	13.2
12.7	16.6
15.88	19.7
19.05	(✳)

(✳) It is impossible to perform the flaring work with 1/2H material. In this case, use an accessory pipe (with a flare)

- Joint Selection

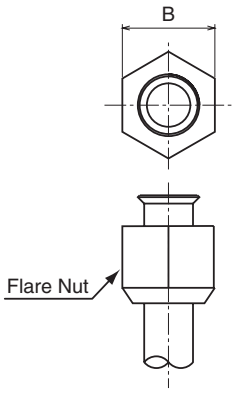
  If you use 1/2H material, you can not perform the flaring work. In this case, use a joint selected from the chart below.

< Minimum Thickness of Joint (mm) >

Diameter	R410A
ϕ6.35	0.5
ϕ9.53	0.6
ϕ12.7	0.7
ϕ15.88	0.8
ϕ19.05	0.8
ϕ22.2	0.9
ϕ25.4	0.95
ϕ28.6	1.0
ϕ31.75	1.1
ϕ38.1	1.35
ϕ41.3	1.45
ϕ44.5	1.55

< Flare Nut Dimension B (mm) >

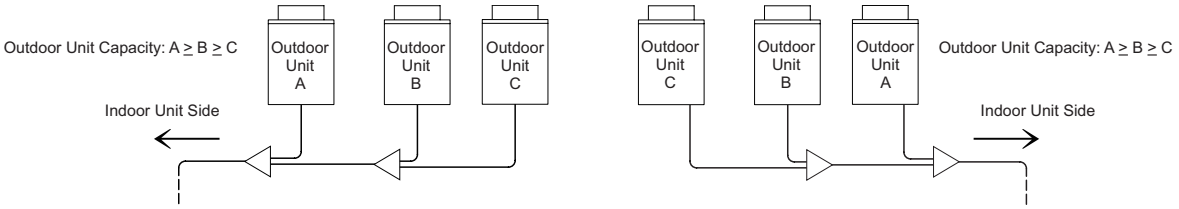
Diameter	R410A
ϕ6.35	17
ϕ9.53	22
ϕ12.7	26
ϕ15.88	29
ϕ19.05	36



10.3 Caution about outdoor unit Installation

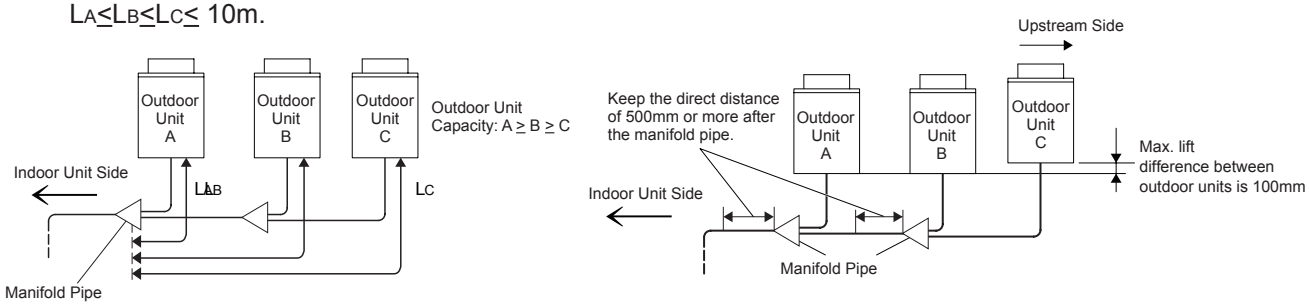
＜Outdoor Unit Alignment＞

Align the outdoor unit from large capacity as A ≥ B ≥ C and outdoor Unit “A” should be located at the indoor unit side.

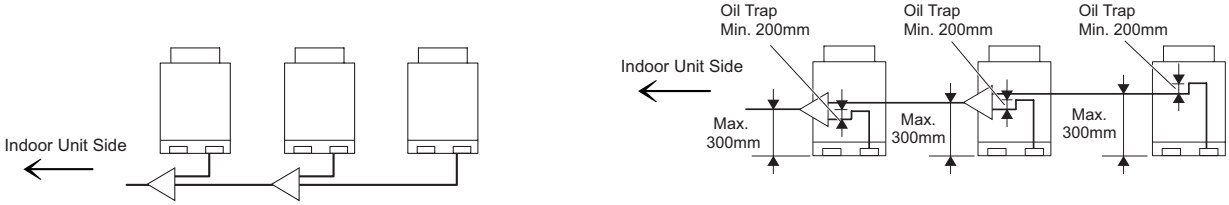


< Piping Work between Outdoor Units >

(1) Piping length between manifold pipe (at outdoor unit side) and outdoor unit should be $L_A \leq L_B \leq L_C \leq$ 10m.

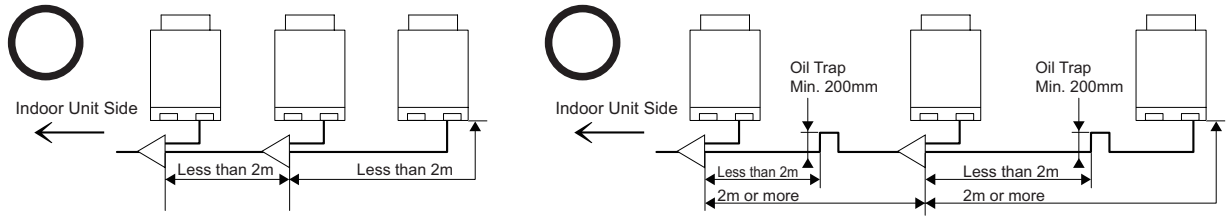


(2) Place the manifold pipe lower than the outdoor unit piping connection.
In case that the manifold pipe is placed higher than the outdoor unit piping connection, keep 300mm (max.) between the manifold pipe and the bottom of the outdoor unit. Also, provide the oil trap (min. 200mm) between the manifold pipe and the outdoor unit.

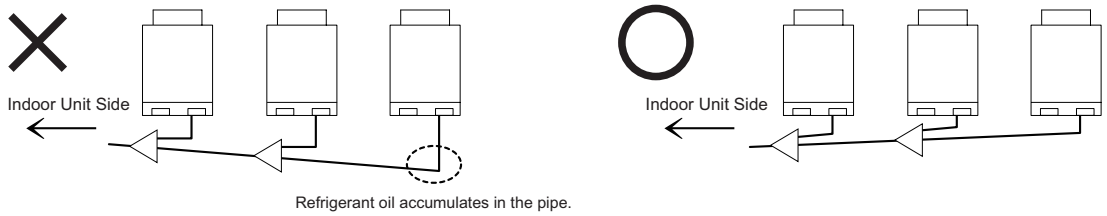


(3) In case that the piping length between outdoor units is 2m or more, the oil trap should be provided for the gas pipe so that accumulation of refrigerant oil may not occur.

* Less than 2m　　* 2m or More

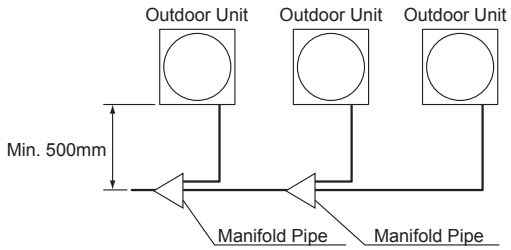


(4) Place the outdoor unit pipe horizontally or with downward gradient towards the indoor unit side, or refrigerant oil may accumulate in the pipe.

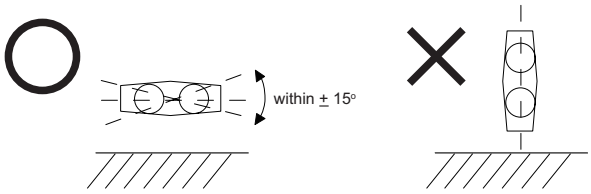


Refrigerant oil accumulates in the pipe.

(5) For servicing, in case that the pipe is placed frontward of the outdoor unit, secure min. 500mm between the outdoor unit and manifold pipe. (When the compressor is replaced, a space of min. 500mm is required.)



(6) Direction of manifold pipe
Place the manifold pipe vertically towards the ground (within $\pm 15^{o}$) as shown in the figure.



10.4 Piping Connection

Perform the piping connection work for each outdoor unit.

NOTE:
Ensure that the refrigerant pipe should be connected to the same refrigerant cycle unit.

- Prepare the refrigerant pipe in the field for the piping work.
  Refer to Fig 10.1 for the position of piping connection.

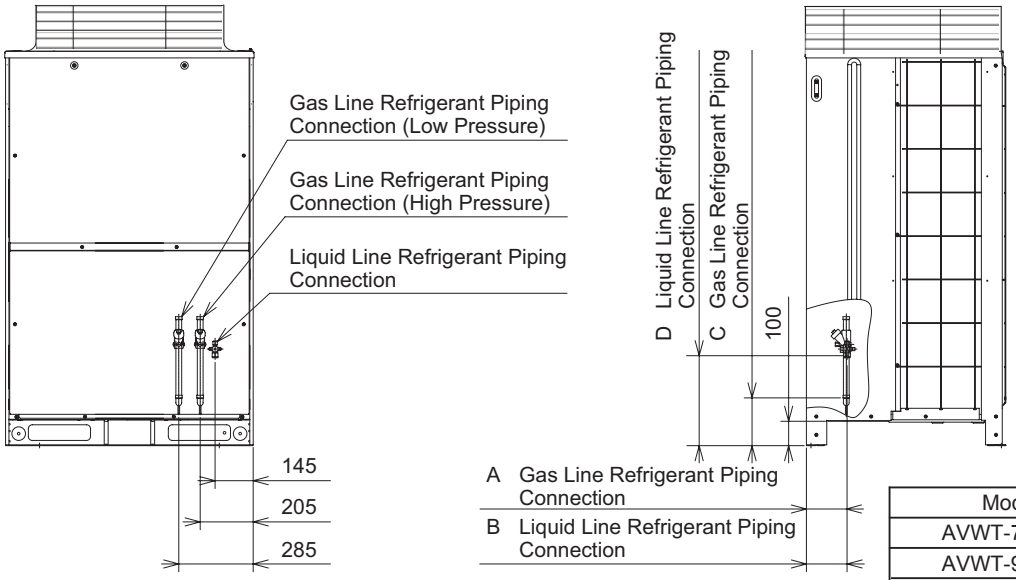


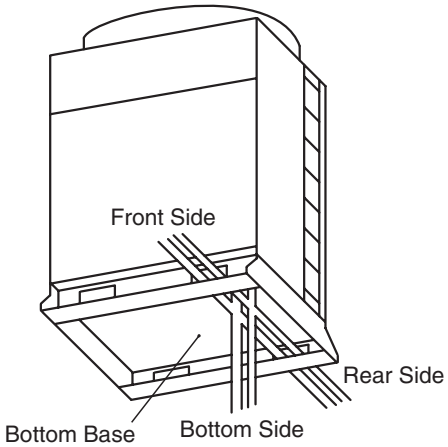
Fig.10.1 Refrigerant Piping Connection

(mm)

Model	A	B	C	D
AVWT-76*	155	155	185	345
AVWT-96*				
AVWT-114*	170	175	180	325
AVWT-136*				
AVWT-154*				

- Piping Direction
  Fix the pipes adequately in order to avoid vibration and excessive force to the valve.

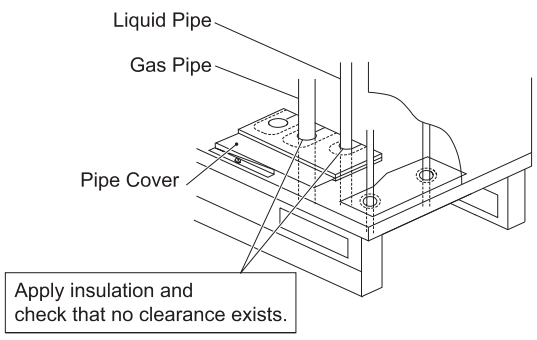
(1) The pipes are available to connect in three directions (front, rear or bottom side) from the bottom base. For the vibration protection, properly fix the piping connection and check that no excessive force applied to the stop valve.



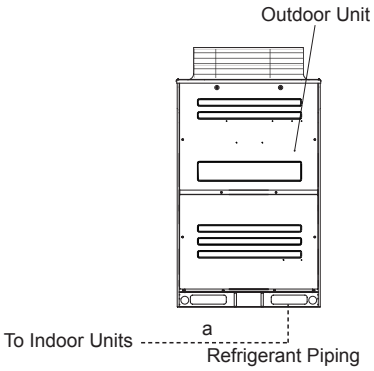
(2) Operation of the stop valve should be performed according to Item 10.2.

(3) Connectthe pipes according to Table 9.1 and this "Installation & Maintenance Manual".

(4) Completely seal the penetration part of the bottom pipe with insulation in order to prevent rain water entering into the conduit.



10.4.1 Piping Size for AVWT-76* to AVWT-96* (Base Unit)



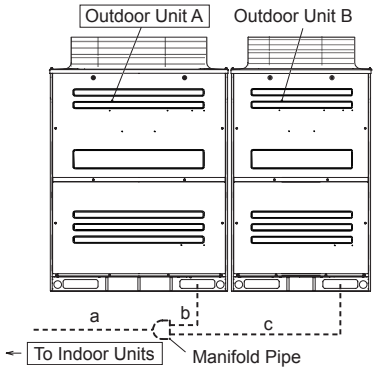
(ϕmm)

Model			AVWT-76*	AVWT-96*	AVWT-114*	AVWT-136*	AVWT-154*
Piping Size	a	Low Pressure Gas	19.05	22.2	25.4	25.4	28.6
		High Pressure Gas	15.85	19.05	22.2	22.2	22.2
		Liquid	9.53	9.53	12.7	12.7	12.7

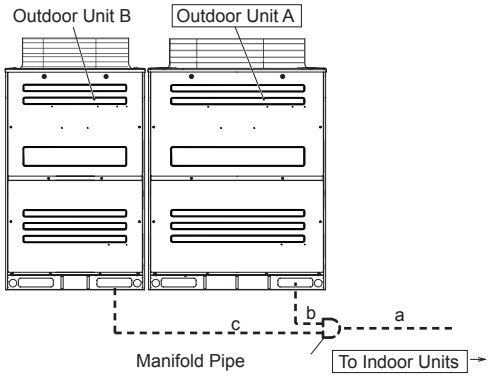
10.4.2 Piping Size for AVWT-170* to AVWT-308* (2 Units Combination)

< Figure for AVWT-232FE(7)(9)SZ >

(Indoor Unit on Left Side)



(Indoor Unit on Right Side)



(ϕmm)

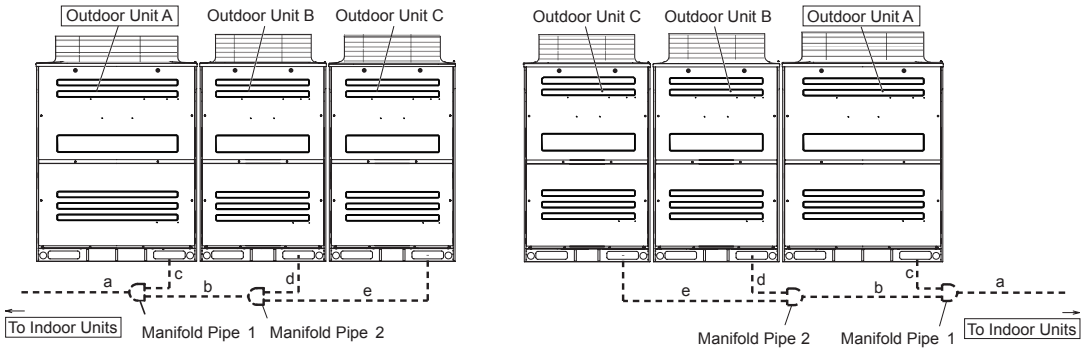
Model			AVWT-170FESZA	AVWT-190FESZA	AVWT-212FESZA	AVWT-232FESZA	AVWT-250FESZA	AVWT-272FESZA	AVWT-290FESZA	AVWT-308FESZA
Combination Unit		Outdoor Unit A	AVWT-96FESRA	AVWT-114FESSA	AVWT-136FESSA	AVWT-114FESSA	AVWT-136FESSA	AVWT-136FESSA	AVWT-154FESSA	AVWT-154FESSA
		Outdoor Unit B	AVWT-76FESRA	AVWT-76ESRA	AVWT-76FESRA	AVWT-114FESSA	AVWT-114FESSA	AVWT-136FESSA	AVWT-136FESSA	AVWT-154FESSA
Piping Connection Kit			HFQ-M202F				HFQ-M212F			
Piping Size	a	Low Pressure Gas	28.6	28.6	28.6	28.6	31.75	31.75	31.75	31.75
		High Pressure Gas	22.2	22.2	25.4	25.4	25.4	28.6	28.6	28.6
		Liquid	15.88	15.88	15.88	15.88	19.05	19.05	19.05	19.05
	b	Low Pressure Gas	22.2	25.4	25.4	25.4	25.4	25.4	28.6	28.6
		High Pressure Gas	19.05	22.2	22.2	22.2	22.2	22.2	22.2	22.2
		Liquid	9.53	12.7	12.7	12.7	12.7	12.7	12.7	12.7
	c	Low Pressure Gas	19.05	19.05	19.05	25.4	25.4	25.4	25.4	28.6
		High Pressure Gas	15.88	15.88	15.88	22 2	22.2	22.2	22.2	22.2
		Liquid	9.53	9.53	9.53	12.7	12.7	12.7	12.7	12.7

* Perform the installation of the outdoor unit and piping connection according to the figure.
Refer to the table for the outdoor unit model, the piping connection kit model and the piping diameter.

10.4.3 Piping Size for AVWT-324* to AVWT-454* (Triple Units Combination)

< Figure for AVWT-364FE(7)(9)SZ >

(Indoor Unit on Left Side) (Indoor Unit on Right Side)



(ϕmm)

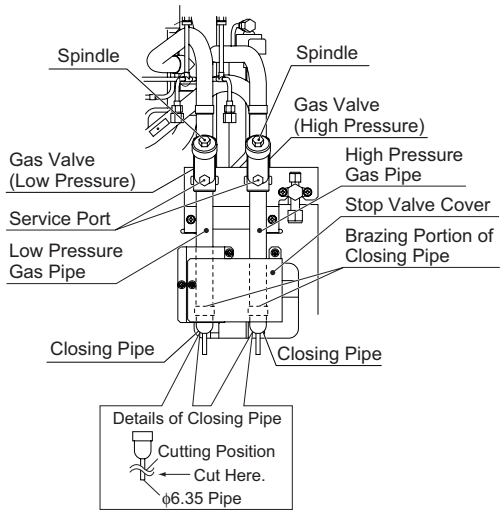
Model			AVWT-324FESZA	AVWT-340FESZA	AVWT-364FESZA	AVWT-382FESZA	AVWT-398FESZA	AVWT-420FESZA	AVWT-438FESZA	AVWT-454FESZA
Combination Unit		Outdoor Unit A	AVWT-136FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA
		Outdoor Unit B	AVWT-96FESRA	AVWT-96FESRA	AVWT-114FESSA	AVWT-136FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA	AVWT-154FESSA
		Outdoor Unit C	AVWT-96FESRA	AVWT-96FESRA	AVWT-96FESRA	AVWT-96FESRA	AVWT-96FESRA	AVWT-114FESSA	AVWT-136FESSA	AVWT-154FESSA
Piping Connection Kit			HFQ-M212F		HFQ-M302F					
Piping Size	a	Low Pressure Gas	31.75	31.75	38.1	38.1	38.1	38.1	38.1	38.1
		High Pressure Gas	28.6	28.6	31.75	31.75	31.75	31.75	31.75	31.75
		Liquid	19.05	19.05	19.05	19.05	19.05	19.05	19.05	19.05
	b	Low Pressure Gas	28.6	28.6	28.6	28.6	31.75	31.75	31.75	31.75
		High Pressure Gas	22.2	22.2	25.4	25.4	25.4	28.6	28.6	28.6
		Liquid	15.88	15.88	15.88	15.88	19.05	19.05	19.05	19.05
	c	Low Pressure Gas	25.4	28.6	28.6	28.6	28.6	28.6	28.6	28.6
		High Pressure Gas	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2
		Liquid	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
	d	Low Pressure Gas	22.2	22.2	25.4	25.4	28.6	28.6	28.6	28.6
		High Pressure Gas	19.05	19.05	22.2	22.2	22.2	22.2	22.2	22.2
		Liquid	9.53	9.53	12.7	12.7	12.7	12.7	12.7	12.7
	e	Low Pressure Gas	22.2	22.2	22.2	22.2	22.2	25.4	25.4	28.6
		High Pressure Gas	19.05	19.05	19.05	19.05	19.05	22.2	22.2	22.2
		Liquid	9.53	9.53	9.53	9.53	9.53	12.7	12.7	12.7

* Perform the installation of the outdoor unit and piping connection according to the figure
Refer to the table for the outdoor unit model, the piping connection kit model and the piping diameter.

10.4.4 Stop Valve

< Gas Valve >

(1) Make sure that the all the spindles are closed completely.
(2) Connect the charging hose to the service port and release gas from the gas pipe.
(3) Cut the end of the closing pipe (ϕ6.35) and check that no gas exists inside the gas pipe .
(4) Remove the stop valve cover.
(5) Remove the closing pipe from the brazing portion by using a burner.
Pay attention to the flame from the burner not to burn the stop valve body.



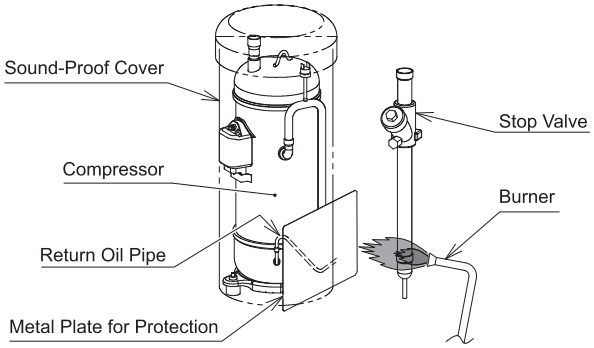


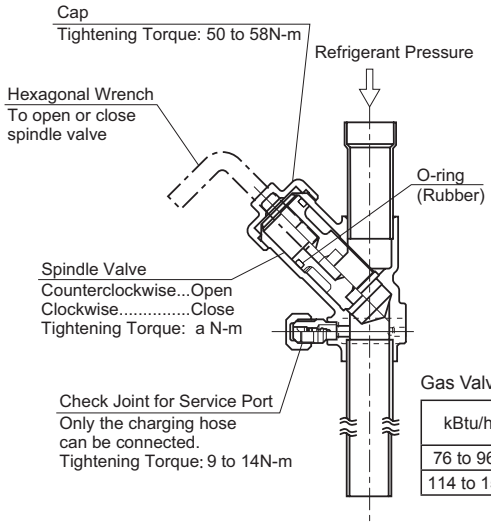
Fig.10.2

⚠CAUTION

- **Ensure that there is no gas inside the pipe when removing the closing pipe. Otherwise, the pipe may be blown out and it may lead to injury.**
- **Protect the return oil pipe and vibration proof of the compressor with the metal plate when using a burner.**

- The details of stop valves are as follows.

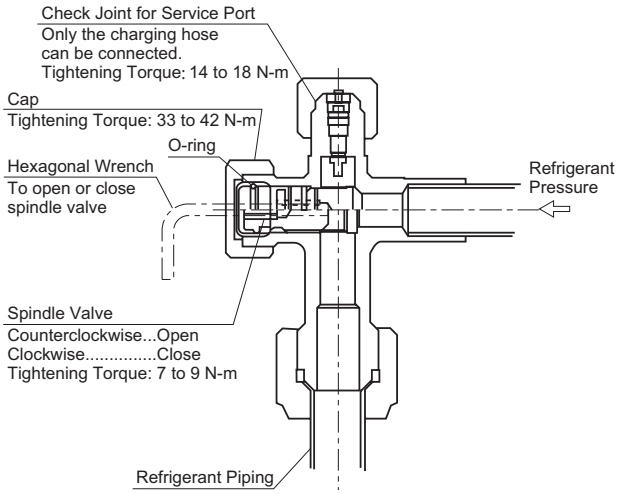
< Gas Valves >



Gas Valve

kBtu/h	Tightening Torque a (N-m)
76 to 96	18 to 22
114 to 154	20 to 25

< Liquid Valve >



⚠CAUTION

- **Do not apply an abnormal big force to the spindle valve at the end of opening. The back seat construction is not provided.**
- **At the test run, fully open the spindle. If not fully opened, the devices will be damaged.**

● Tube Connection

(1) Make sure that stop valve is completely close.

(2) When welding air-side tube as shown in Figure 10.2, use a metal sheet to protect compressor and its acoustical e nclosure, and take care not to make flame of welding torch burn valve body,

(3) Connect indoor unit to outdoor unit with Refrigerant tube; keep Refrigerant tube off any fragile building structure (e.g. wall, c eiling), or otherwise abnormal noise may be generated due to vibration of the pipeline.

(4) Tighten nut on flare opening by using the torque specified in Table 10.1.During welding, feed nitrogen into tube for protection.

(5) In assembly, gas and Liquid pipes should be subject to thermal isolation treatment.

(6) After connecting tube, mount baffle onto the equipment. If the baffle is not mounted, snow or rain may enter the equipment and thereby cause damage to it.

Table 10.1 Tightening Nut on Flare Opening

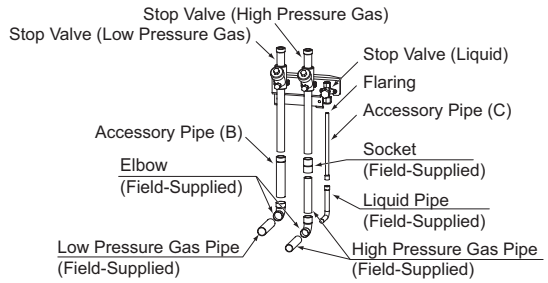
Required tightening torque (JIS B8607)

Pipe Size	Tightening Torque
ϕ6.35 (1/4)	14~18 (N-m)
ϕ9.53 (3/8)	34~42 (N-m)
ϕ12.7 (1/2)	49~61 (N-m)
ϕ15.88 (5/8)	68~82 (N-m)
ϕ19.05 (3/4)	100~120 (N.m)

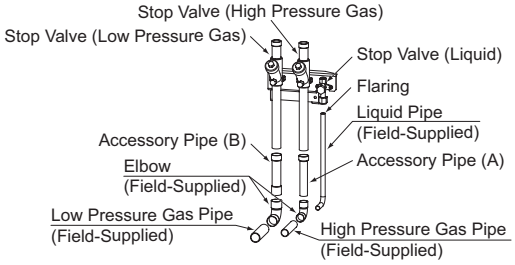
●Detail drawing of connecting stop valve pipe

● Details of Stop Valve Piping Connection

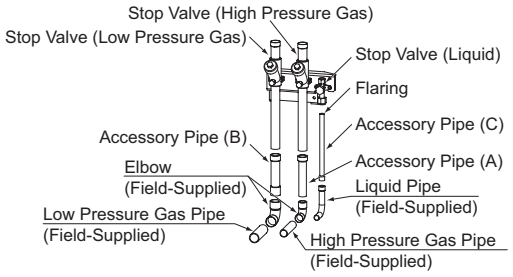
AVWT-76/96*



AVWT-114/136*



AVWT-154*



NOTES:

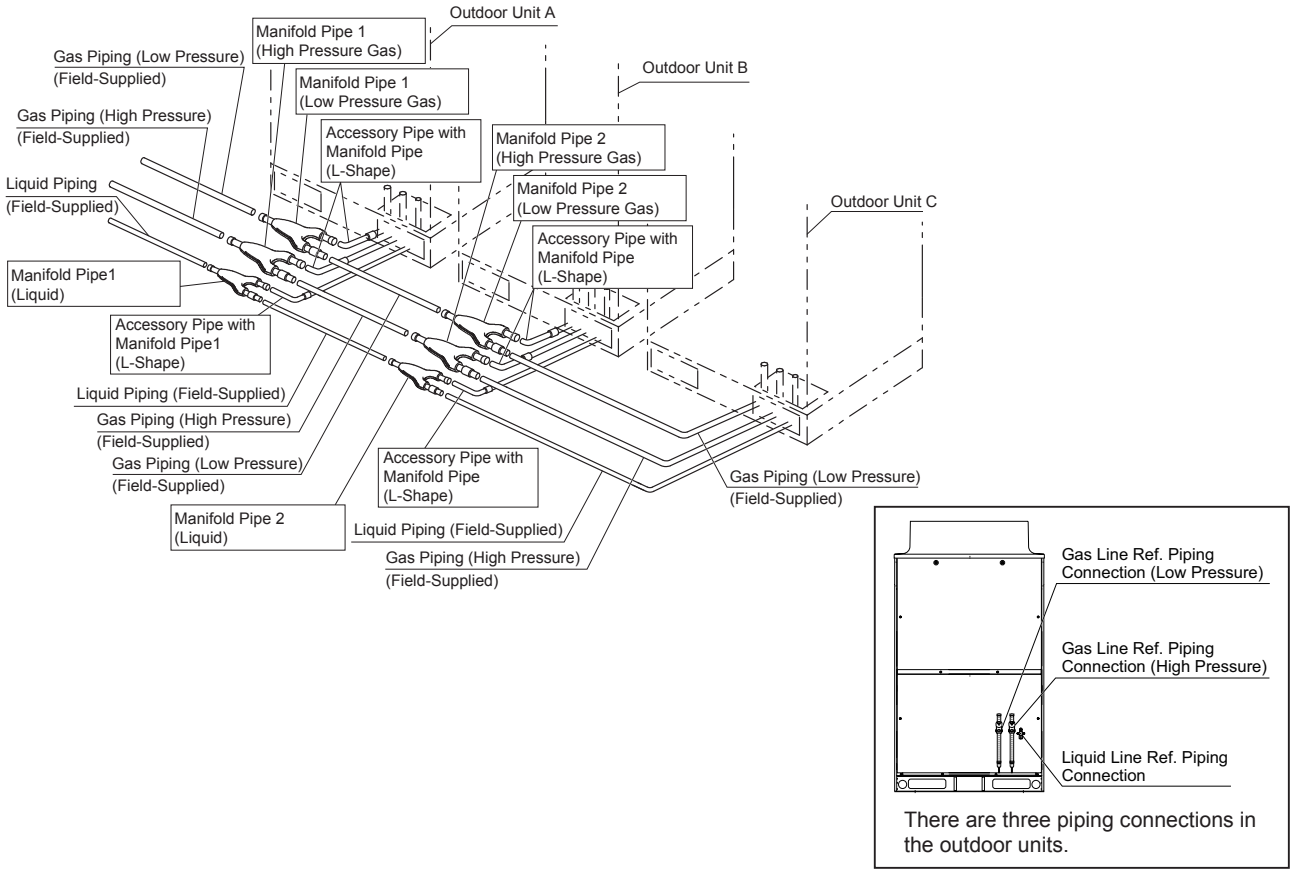
1. Ensure that the closing pipe of the high and low pressure gas stop valves (2 places) is removed firstly.
2. Refer to the item 10.2 for the flaring work.

- Manifold Pipe (Optional parts)

Item	Operation Type	Applicable Outdoor Unit		Model	Remarks
		Outdoor Unit kBtu/h	Outdoor Unit Number		
Piping Connection Kit	for Cooling/Heating Simultaneous Operation	170 to 232	2	HFQ-M202F	3 Pipes Type * for High Pressure Gas: 1 set * for Low Pressure Gas: 1 set * for Liquid: 1 set
		250 to 308	2	HFQ-M212F	
		324 to 454	3	HFQ-M302F	

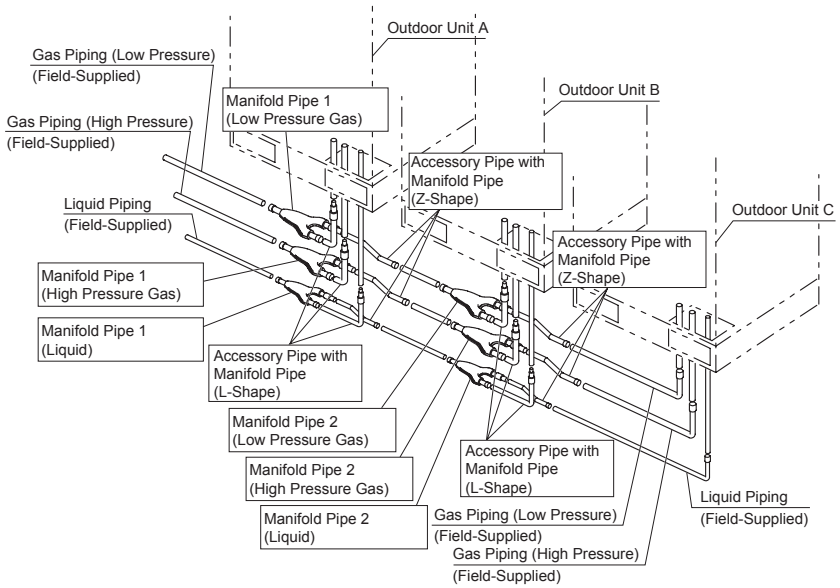
- Construction Example (In Case of 340kBtu/h: 3 Pipes Type)
  Regarding the piping work for 190kBtu/h and over, refer to the item 1.5 “For Heat Recovery System”.

< Front Side or Rear Side Piping Connection >



There are three piping connections in the outdoor units.

< Downward Piping Connection >



- Branch Pipe (Optional Parts)

  < Line Branch >

First Branch

Outdoor Unit (kBtu/h)	Model
76 to 96	HFQ-M282F
114 to 154	HFQ-M452F
170 to 232	HFQ-M562F
250 to 340	HFQ-M692F
264 to 510	HFQ-M902F

Pipe Diameter and Branch Pipe after First Branch ∗

Total Indoor Unit (kBtu/h)	Low Pressure Gas (ϕmm)	High Pressure Gas (ϕmm)	Liquid (ϕmm)	Model
Lower than 57	15.88	12.7	9.53	HFQ-M142F
57 to 86	19.05	15.88	9.53	HFQ-M282F
86 to 114	22.2	19.05	9.53	
114 to 154	25.4	22.2	12.7	HFQ-M452F
154 to 170	28.6	22.2	12.7	HFQ-M562F
170 to 212	28.6	22.2	15.88	
212 to 250	28.6	25.4	15.88	HFQ-M692F
250 to 340	31.75	28.6	19.05	
Over 340	38.1	31.75	19.05	HFQ-M902F

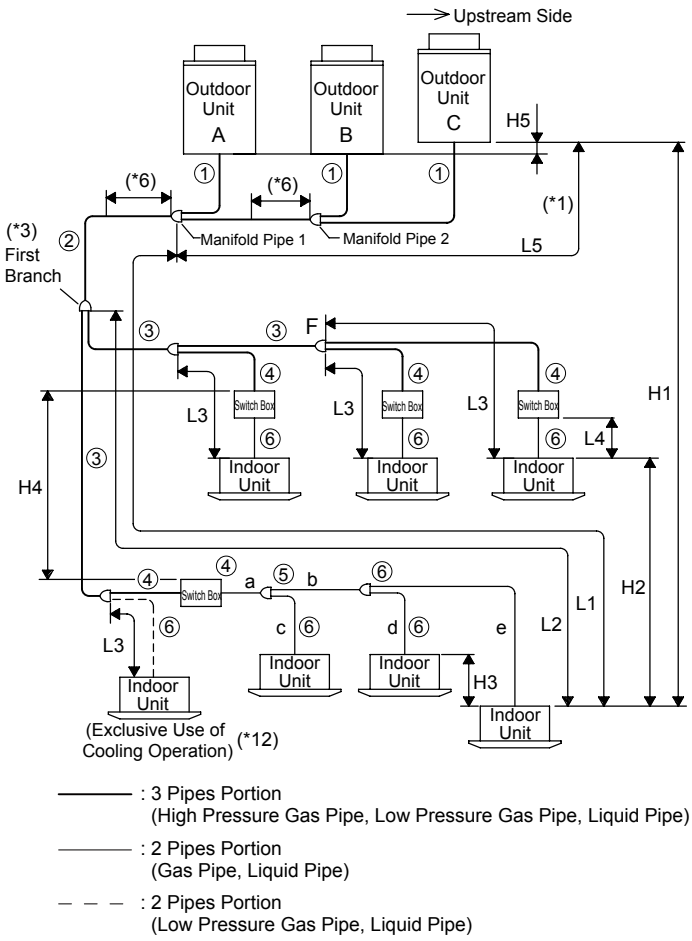
∗: If the piping branch at 2 pipes portion is necessary, use branch pipe of HFQ-102F, HFQ-162F, HFQ-242Ffor heat pump type.

- Piping Size (ϕmm)

① Pipe Diameter for Outdoor Unit

② Main Pipe Diameter
(Base Unit or Manifold Pipe 1 to First Branch)
[Branch pipe of First Branch] (3 Pipes) (*2)

Outdoor Unit (kBtu/h)	Low Pressure Gas	High Pressure Gas	Liquid
76	19.05	15.88	9.53
96	22.2	19.05	9.53
114 and 136	25.4	22.2	12.7
154	28.6	22.2	12.7
170 to 190	28.6	22.2	15.88
212 to 232	28.6	25.4	15.88
250	31.75	25.4	19.05
272 to 340	31.75	28.6	19.05
364 to 510	38.1	31.75	19.05



③ [Pipe Diameter after First Branch] (3 Pipes) (*3)(*7)

Total Indoor Unit kBtu/h	Low Pressure Gas	High Pressure Gas	Liquid
Lower than 57	15.88	12.7	9.53
57 to 86	19.05	15.88	9.53
86 to 114	22.2	19.05	9.53
114 to 154	25.4	22.2	12.7
154 to 170	28.6	22.2	12.7
170 to 212	28.6	22.2	15.88
212 to 250	28.6	25.4	15.88
250 to240	31.75	28.6	19.05
Over 340	38.1	31.75	19.05

④ [Pipe Diameter between Switch Box to Branch Pipe] (3 Pipes and 2 Pipes) (*9)

Switch Box Model	Max. Combination of Indoor Unit (*8)	Available Combination of Indoor Unit Capacity (kBtu/h) (*10), (*11)	3 Pipes		2 Pipes	
			Low Pressure Gas	High Pressure Gas	Gas	Liquid
HCH-160D	7	07 to 14	15.88	12.7	12.7 (*15)	9.53
		15 to 38	15.88	12.7	15.88	9.53
		39 to 57	19.05	15.88	15.88	9.53
HCH-280D	8	58 to 76	19.05	15.88	19.05	9.53
		77 to 96	22.2	19.05	22.2	9.53

⑤ [Pipe Diameter for 2 Pipes and Branch Pipe]

Total Indoor Unit kBtu/h	Gas	Liquid
Lower than 57	15.88	9.53
57 to 86	19.05	9.53
86 to 114	22.2	9.53
114 to 154	25.4	12.7
154 to 170	28.6	12.7
170 to 250	28.6	15.88

⑥ [Pipe Diameter between Branch Pipe and Indoor Unit](2 Pipes) (*4)

Indoor Unit kBtu/h	Gas	Liquid
07 to 14	12.7	6.35 (*5)
17 and 18	15.88	6.35 (*5)
22 to 54	15.88	9.53
76	19.05	9.53
96	22.2	9.53

● Piping Work Conditions (Refer to the figure of previous page.)

Item		Mark	Allowable Piping Length (*13)	
			≤ the recommended connectable number of Indoor Unit	≥ the recommended connectable number of Indoor Unit
Total Piping Length		Total Liquid Piping Actual Length	≤ 1,000m (*14)	≤ 300m
Maximum Piping Length	Actual Length	L1	≤ 165m	≤ 165m
	Equivalent Length		≤ 190m	≤ 190m
Maximum Piping Length between Branch Pipe of 1st Branch and Each Indoor Unit		L2	≤ 90m	≤ 40m
Maximum Piping Length between Each Branch Pipe and Each Indoor Unit		L3	≤ 40m	≤ 30m
Total Piping Length between Switch Box and Each Indoor Unit		* L4 * a+b+c+d+e	HCH-160D: ≤ 30m	HCH-160D: ≤ 30m
			HCH-280D: ≤ 10m	HCH-280D: ≤ 10m
Piping Length between Manifold Pipe1 and Each Outdoor Unit		L5	≤ 10m	≤ 10m
Height Difference between Outdoor Units and Indoor Units	O.U. is Higher	H1	≤ 50m	≤ 50m
	O.U. is Lower		≤ 40m	≤ 40m
Height Difference between Indoor Units		H2	≤ 15m	≤ 15m
Height Difference between Indoor Units using the Same Switch Box		H3	≤ 4m	≤ 4m
Height Difference between Switch Box		H4	≤ 15m	≤ 15m
Height Difference between Outdoor Units		H5	≤ 0.1m	≤ 0.1m

(*1): The manifold pipe is counted from the indoor unit side (as Manifold Pipe 1).

(*2): When the maximum length of the equivalent refrigerant pipe (L1) from the outdoor unit/manifold pipe1 to the indoor unit is over 100m, the pipe size of liquid line from the outdoor unit/manifold pipe1 to first branch should be increased one size with the reducer (field-supplied).

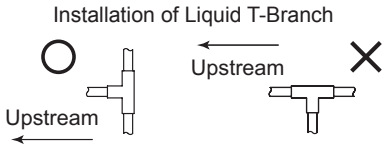
(*3): Even if the equivalent refrigerant piping length is more than 100m, no need to increase the pipe size after first branch. If the branch pipe size is larger than the first branch, adjust the branch pipe size to the first branch. In case that the selected pipe size after the first branch is larger than the pipe size before the first branch, use the same pipe size as before the branch.

(*4): The pipe diameter ⑥ should be the same as the indoor unit piping connection size.

(*5): When the liquid piping length is longer than 15m, use ϕ9.53 pipe and reducer (field-supplied).

(*6): Keep the straight line distance of 500mm or more after the manifold pipe.

(*7): In case of the line branch, if the length of the pipe between the terminal branch of 3 pipes (specified in the figure of mark F) and the farthest indoor unit exceeds 5m, use a T-branch to the applicable liquid pipe of 3 branches.



(*8): In case that the number of connectable indoor unit exceeds four, the high/low pressure gas pipe, gas pipe and liquid pipe ④⑤⑥ need to increase one size respectively.

(*9): The liquid pipe is not required to connect to the Switch Box. Refer to Table ⑥ for the liquid pipe diameter between branch pipe and indoor unit.

(*10): In case that the combination of indoor unit capacity is 96kBtu/h for HCH-280D, the performance may decrease approximate 5% in cooling and 10% in heating.

(*11): The excess of the total capacity may cause insufficient performance and abnormal sound. Be sure to connect within the allowable total capacity.

(*12): For the exclusive cooling operation, connect indoor units with low pressure gas pipe and liquid pipe (without Switch Box). The total capacity of the exclusive cooling operation should be smaller than 50% of the total indoor unit capacity.

(*13): The condition of refrigerant piping installation is different depending on the connected indoor unit quantities.

(*14): Allowable total piping length may become shorter than 1,000m due to the limitation of maximum additional refrigerant amount as following table.

kBtu/h	76 and 96	114	126 and 154	170	190 to 232	250 to 510
Max. Additional Refrigerant Charge (kg)	28	33	38.5	42	46	52

(*15): In case that a branch is located downstream of the Switch Box and also the connected indoor unit capacity is 7~14kBtu/h, use ϕ15.88 for the gas pipe.

NOTES:

1. Check the gas pipe and liquid pipe are equivalent in terms of the piping length and piping system.
2. Use a branch pipe (system components) for the branch pipe of indoor unit and Switch Box.
3. Install the indoor unit, Branch Pipe and Switch Box according to each “Installation & Maintenance Manual”.
4. If the piping length (L3) between each branch pipe and each indoor unit is considerably longer than other indoor unit, refrigerant may not flow well and also performance may be deteriorated compared to other models. (Recommended Piping Length: within 15m)

- Piping Branch Restriction

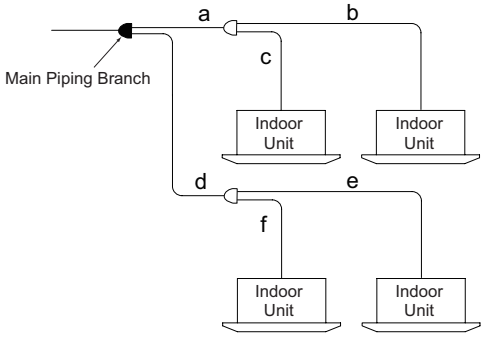
  Follow the table below when performing the field-supplied piping work.

Piping Length between Branch Pipe (First Branch) and Each Indoor Unit (L2)	Main Piping Branch *		Indoor Unit Capacity Ratio After Main Branch
	Piping Length After Branch	Number of Main Piping Branch	
≤ 40m	a+b+c ≤ 30m or d+e+f ≤ 30m	without Limit	-
	a+b+c > 30m and d+e+f > 30m	within 2	
within 41m to 90m	-	within 1 (Fig.1)	≥ 40% (Fig.2)

NOTE:

* Main Piping Branch: Distribution from One (1) Branch pipe to Two (2) Branch Ppies

The number of main piping branch depends on the piping length after branch (a to f).



✕ Main piping branches are 2 portions.

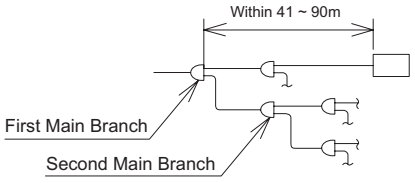


Fig. 1

✕ Indoor unit capacity ratio is less than 40%.

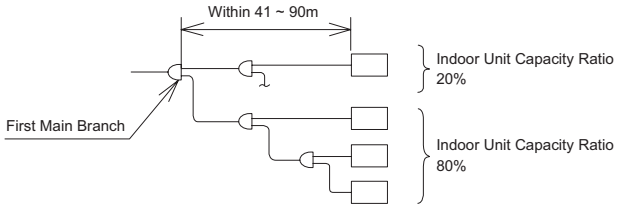


Fig. 2

11. Electrical wiring

⚠ Warning

- Prior to electrical wiring or regular inspection, shut off the main supply to indoor and outdoor units and wait for least three minutes
- Prior to electrical wiring or regular inspection, make sure that indoor and outdoor fans have been shut down.
- Protect wires and electrical parts from damage by mouse or other insect. Any unprotected part may be damaged by mouse or other insect, which may even cause fire.
- Avoid any wire from contacting with Refrigerant tube, edge of metal plate and electrical part in the equipment, or otherwise the wire may bedamaged or even thereby cause fire.
- ELB with intermediate induction rate (with shorter than 0.1 second or fewer) shall be used, or otherwise electric shock or fire may be caused
- Wire shall be fixed securely, since external force imposed to the connecting terminal may make it loose and thereby cause fire.
- Tighten screws by using the following torque.
  M4: 1.0~1.3 N•m
  M5: 2.0~2.4 N•m
  M6: 4.0~5.0 N•m
  M8: 9.0~11.0 N•m
  M10: 18.0~23.0 N•m
- DSW7 on PGB1 should be set based on power supply specifications as shown in the table below.

DSW7	Power Supply Setting
Setting is required.	
380-415V Unit: 380-415V Setting Before Shipment	
	380-415V

11.1 General Inspection

(1) Make sure that any electrical component (mains switch, CB, conductor, cable tray connection and connecting terminal) connected on the site have been selected in accordance with the specifications set forth in the technical manual and meet related national standards.

- Power each outdoor unit on. Earth leakage breaker, fuse and knife switch should be provided for each outdoor unit, or otherwise electric shock or fire may be caused.
- Indoor and outdoor units should be provided with separate power supply.
  A power cable should be connected to each indoor unit (which is connected to the same outdoor unit).

(2) Check whether supply voltage is within rated voltage±10%.
Too low supply voltage may cause system start-up failure.

(3) Check specifications of electrical wire.

(4) Air conditioner mayfail to operate in any of the following cases:

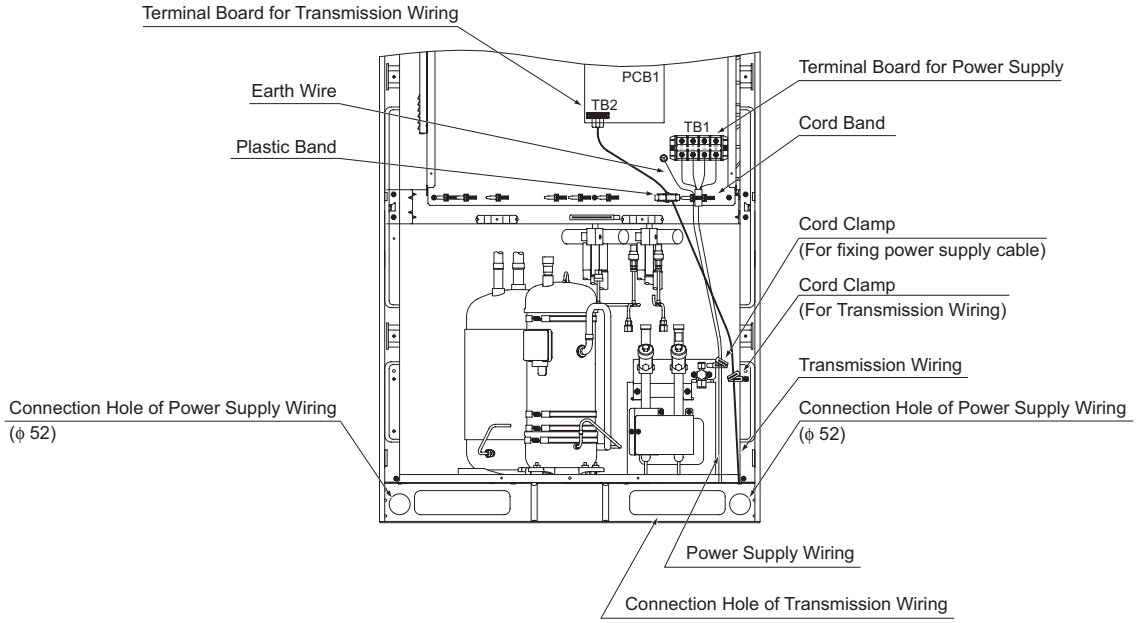
- Air conditioner shares one power transformer with some high-consumption equipment*.
- Power cables of any other equipment* and the air conditioner are located too close to each other.

*(For example, elevator, container crane, electrical railway rectifier, inverter, electric arc furnace, electrical furnace, large-sized induction motor and large-capacity switch.

In the cases above, due to abrupt change in power consumption and action of electrical equipment, exc essive inductive surging voltage will be generated in power cable of the air conditioner.

Therefore, for protection of the power cable, installation site must be inspected in accordance with related rules and standards prior to electrical wiring activity.

(5) Check to ensure that out and indoor units have been earthed properly.



11.2 Wiring

Warning

Earth leakage breaker (ELB), fuse and main switch should be provided for power supply to each outdoor unit, or otherwise electric shock or fire may be caused.

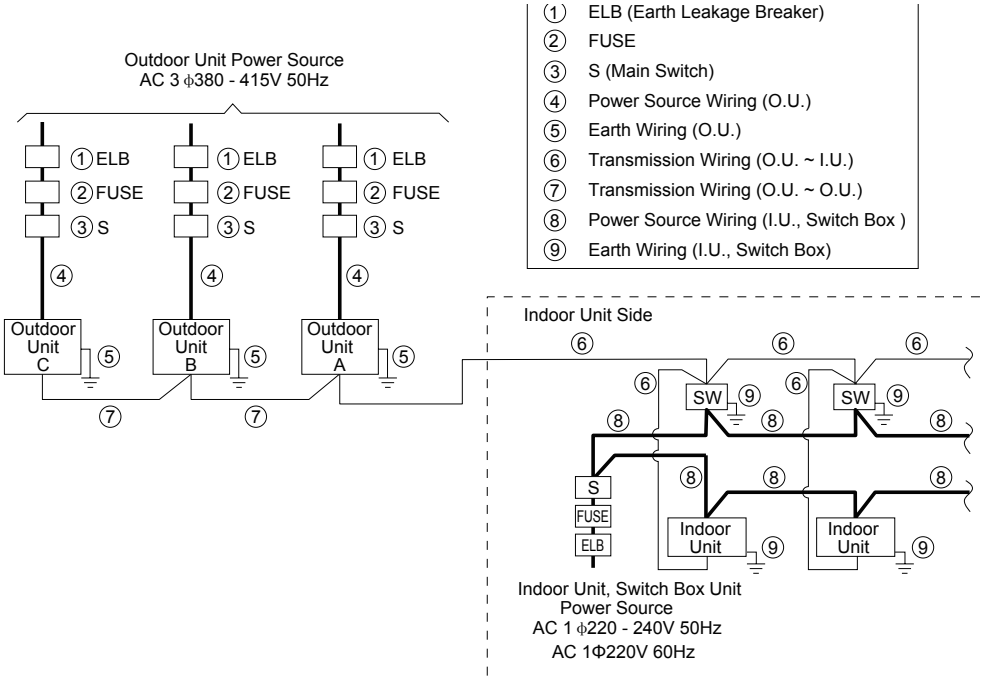
Remark:

Outdoor and indoor units shall be provided with separate power supply.

(1) Power cable

Each outdoorunit shall be provided with separate power supply.

< Heat Recovery System >



(2) See Chapter 4.7 for the power distribution parameters.

ELB: Earth Leakage Circuit

Breaker Remarks:

(1) The field wiring shall be conducted according to local laws.

(2) The sizes of above power lines shall comply with relevant standards.

(3) The shielded wire shall be used for the control system and be grounded.

(4) The sheathed lines shall be used for power lines and shall be copper conductors.

(5) In case of tandem connection of power lines, the current values shall be added up to select the electric wire.

Selection According to EN60 335-1

Current i (A)	Wire Size (mm^2)
$i \leq 3$	1.0~2.5
$3 < i \leq 6$	1.0~2.5
$6 < i \leq 10$	1.0~2.5
$10 < i \leq 16$	1.5~4.0
$16 < i \leq 25$	2.5~6.0
$25 < i \leq 32$	4.0~10.0
$32 < i \leq 50$	6.0~16.0
$50 < i \leq 63$	10.0~25.0
$63 < i$	*2

*2: In the case that current exceeds 63A, do not connect cables in series.

⚠ Note

A multiple-pole master switch shall be installed between phases, with the distance of 3.5mm or larger.

Remarks:

1) When the power line is long, the electric wire of minimum size shall be selected to ensue its voltage drop is within 2%.

2) The power voltage must meet the following requirements:

Power voltage: the voltage fluctuation is within + / - 10%
Starting voltage: the voltage fluctuation is within -15%
Operating voltage: the voltage fluctuation is within + / - 10%
Interphase unbalance rate: within 3%

3) Do not connect the earth wire with the gas pipe, water pipe or lightning rod.

Gas pipe: gas leakage can cause explosion and fire.
Water pipe: the earth wire is ineffective when the hard vinyl pipe is used.
Lightning rod: the ground potential will abnormally increase when the lightning rod is used.

11.3 Electrical Wiring for Outdoor Unit

Connect the electrical wirings according to the following figure.

(1) Connect the power supply wires to L1, L2, L3, and N (for 380-415V) for the three phase power source on the terminal board TB1 and earth wire to the terminal in the electrical control box.

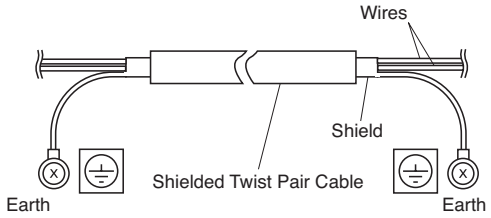
(2) Connect the transmission wires between the outdoor and indoor units to the TB2 terminals 1 and 2 on the PCB1. As for the transmission wires between outdoor units in the same refrigerant cycle, connect them to the TB2 terminals 3 and 4 on the PCB1.

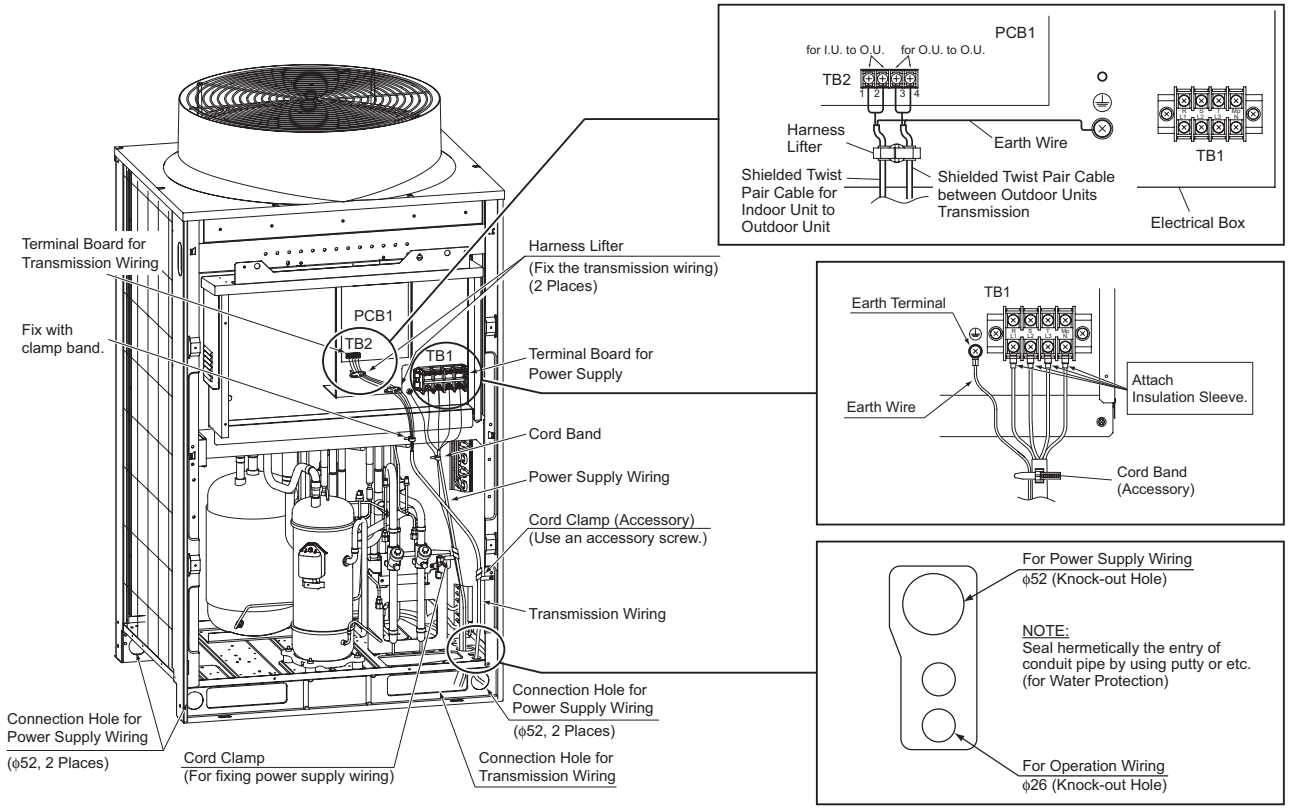
(3) Tighten screws for the terminal board according to the following table.

< Required Tightening Torque >

Size	Tightening Torque
M4	1.0 to 1.3 N-m
M5	2.0 to 2.4 N-m
M6	4.0 to 5.0 N-m
M8	9.0 to 11.0 N-m
M10	18.0 to 23.0 N-m

(4) When installing the unit in Australia, connect the both ends of shielded twist pair cable (remote control switch cable and transmission cable) to the earth as shown bellow.



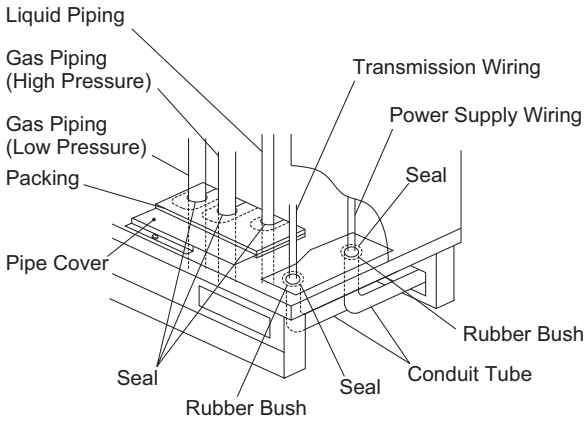


⚠CAUTION

Pay attention to the followings to run through the cables under the unit using conduit tube.
(The pipe cover is required to remove before performing piping and wiring works.)

NOTES:

1. Do not lead the power supply wiring and transmission wiring through the same conduit tube. Moreover, keep at least 5cm between the power supply wiring and transmission wiring.
2. Cut cross line at rubber bush (accessory) and securely attach it to the knock-out hole for cable protecting.
3. Attach the pipe cover to avoid entering rats or other small animals into the unit.
4. Avoid the wirings from touching the refrigerant pipes, plate edges and electrical parts inside the unit.
5. Completely seal the end of conduit tube with sealing materials to avoid entering rain into the conduit tube.
6. Make a drain hole at the lowest part of the conduit tube.



⚠CAUTION

Tightly secure the power source wiring using the cord clamp inside the unit.

NOTE

Fix the rubber bushes with adhesive when conduit tubes to the outdoor unit are not used.

11.4 Electrical Wiring Connection of Indoor Unit, Outdoor Unit and Switch Box

(1) Connect a power supply wiring to each outdoor unit. Connect an ELB, fuse and main switch (S) to each outdoor unit.

(2) Connect a power supply wiring to each indoor unit group to be connected to the same outdoor unit. (Max. capacity of one indoor unit group is 250kBtu/h.)
Connect an ELB, fuse and main switch (S) to each indoor unit group.

(3) Connect the transmission wiring between indoor units, Switch Box and outdoor units, as show below.

(4) Connect the transmission wiring in the same refrigerant cycle unit. (In case that the refrigerant pipe of indoor unit is connected to the outdoor unit, connect the transmission wiring to the same indoor unit.) Connecting the refrigerant pipe and transmission wiring to the different refrigerant cycle systems may lead to malfunction.

(5) Use 2-Core lead wires such as shielded twist pair cable for the transmission wiring. (Do not use 3-Core or over.)

(6) Use the same kind of cables for the Hi-NET system of the same refrigerant cycle.

(7) The transmission wiring is required to be separated from the power supply wiring. Keep at least 5cm between the transmission wiring and the power supply wiring, and also min. 1.5m between the transmission wiring and power supply wiring for other electrical device. If the above is not secured, put the power supply wiring into the metal conduit tube to separate from other wirings.

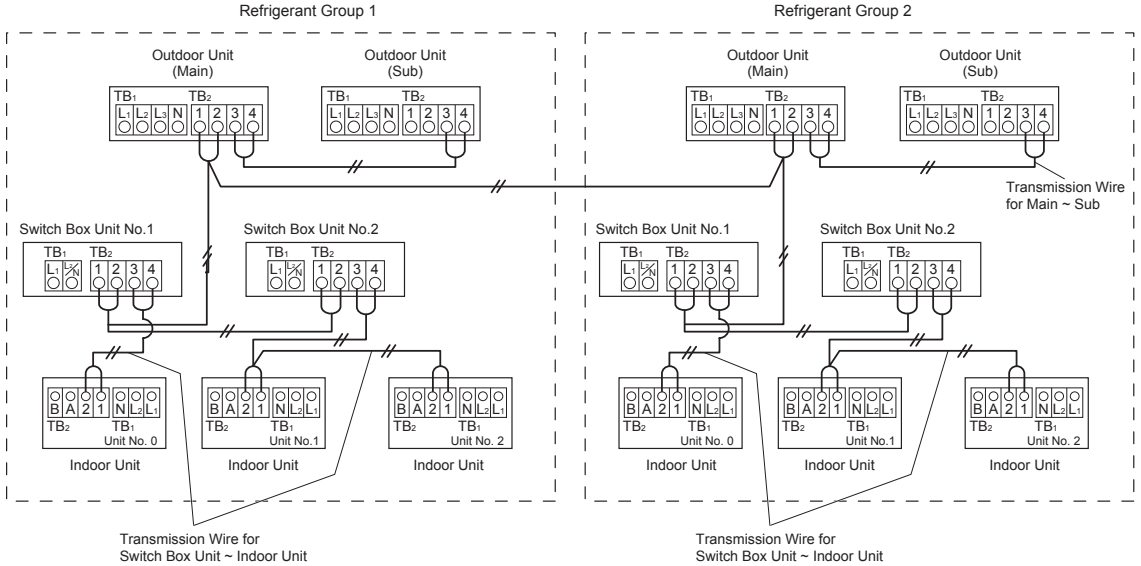
(8) Connect the following transmission wiring to the terminals 1 and 2 of TB2 in the outdoor unit A (main unit).
- between outdoor unit and indoor unit
- between outdoor unit and Switch Box
- between outdoor unit and indoor unit in other refrigerant cycles

(9) Do not connect the power supply wiring to the terminal board for transmission wiring (TB2). Printed circuit board may be damaged.

(10) For Heat Recovery System, connect the transmission wiring from indoor unit (exclusively used for cooling) to the terminals 1 and 2 of TB2 in the Switch Box .

(11) Connect the earth wire for the outdoor/indoor units and Switch Box. The earth wiring work under the condition of 100Ω (max.) ground resistance should be performed by the qualified person.

- Transmission Wiring



NOTES:

1. For the combination units (170~454kBtu/h), DSW settings of Main and Sub are required.
2. Alarm occurs if the transmission wires between outdoor units are connected to the terminals 1 and 2 for Hi-NET.
3. In case that alarm is indicated on the LCD of Main outdoor unit, follow the "7-segment" indication of the Main outdoor unit for checking.
4. Perform function setting from Main outdoor unit.
5. Maximum refrigerant groups with one central controller are 64.
   Maximum indoor units to be connected are 160.

< 380-415V/50Hz >

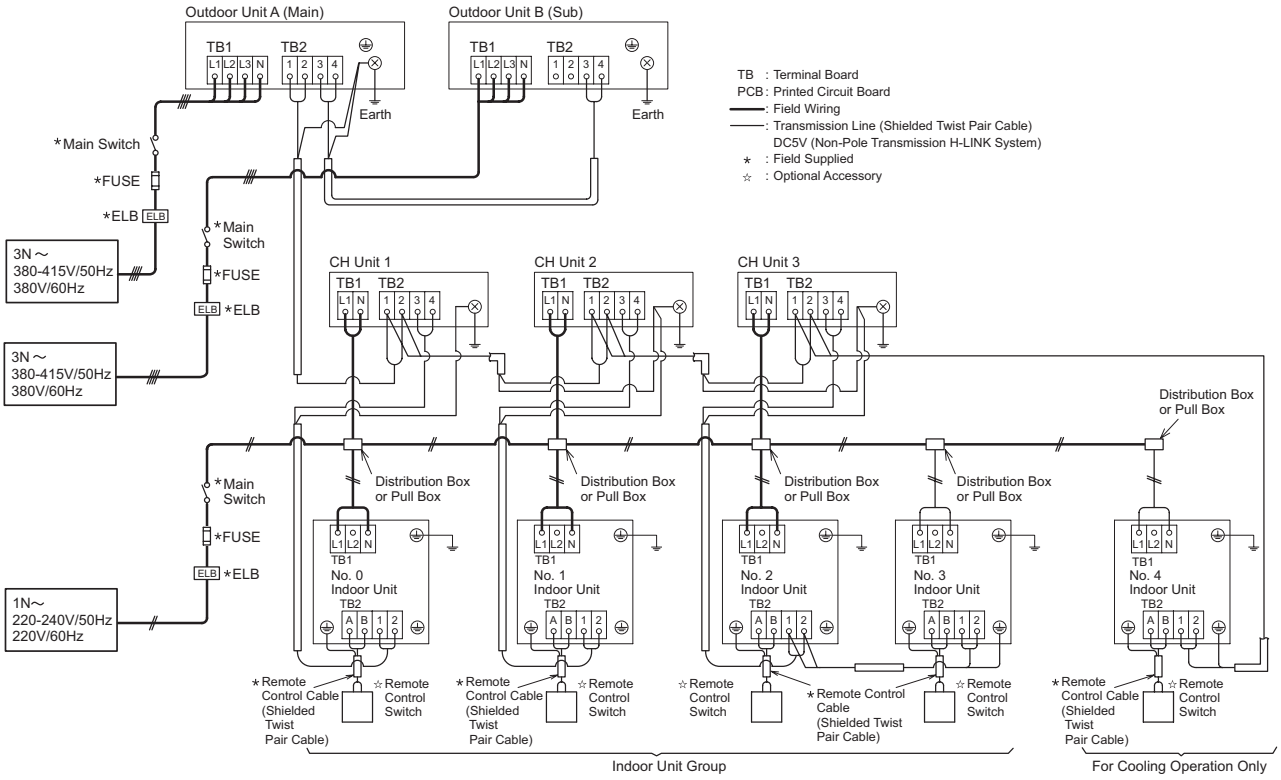


Fig Electrical Wiring Description

12. Additional Refrigerant Charge

12.1 Air-Tight Test

(1) Check to ensure that the stop valves are closed completely before air-tight test.

< Tightening Check of Stop Valves >

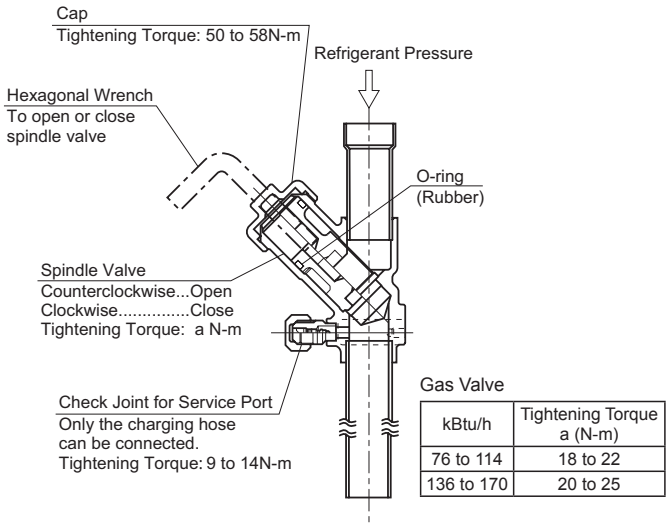
a) After connecting the pipe, remove the cap of stop valve for high pressure gas, low pressure gas (heat recovery system only) and liquid gas.
Tighten the open-close spindle in the close direction with a torque *1).

*1)

Stop Valve for High Pressure Gas and Low Pressure Gas	76 to 96	18 to 22 N-m
	114 to 154	20 to 25 N-m
Stop Valve for Liquid Gas		7 to 9 N-m

b) Perform the air-tight test after the above check.

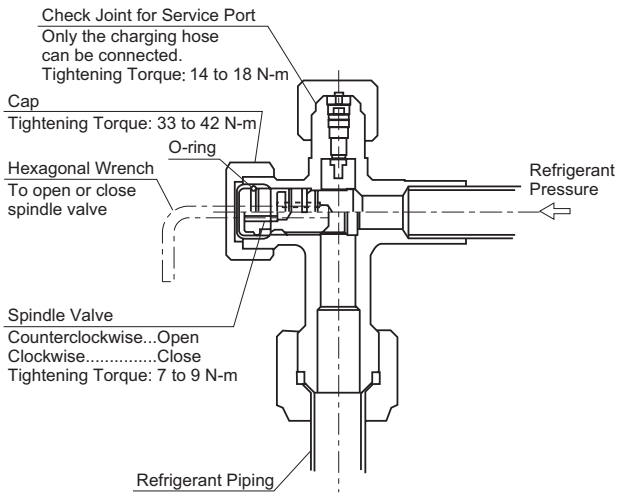
< Gas Valve >



Gas Valve

kBtu/h	Tightening Torque a (N-m)
76 to 114	18 to 22
136 to 170	20 to 25

< Liquid Valve >



(2) Connect the indoor unit and the outdoor unit with field-supplied refrigerant piping.
Suspend the refrigerant piping at specified points and prevent the refrigerant piping from touching weak parts of the building such as wall, ceiling, etc.
(Abnormal sound may occur due to the vibration of the piping. Pay special attention in case of short piping length.)

(3) Connect the gauge manifold using charging hoses with a vacuum pump or a nitrogen cylinder to the check joints of the liquid line and the gas line stop valves.
Perform the air-tight test.

Connect a manifold gauge to the check joints of the liquid and gas stop valves in the outdoor unit.
Do not open the stop valves. Apply nitrogen gas pressure of **4.15MPa** .

⚠ DANGER

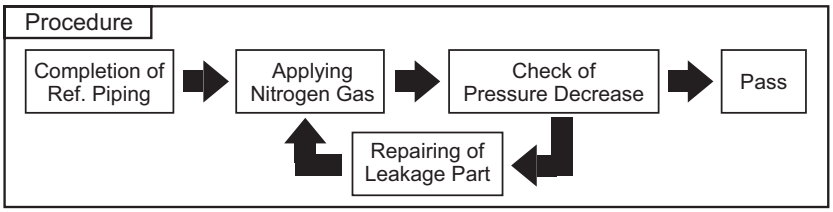
Be sure to use Nitrogen Gas for air-tight test. If other gases such as oxygen gas, acetylene gas or fluorocarbon gas are accidentally used, it may cause explosion or gas intoxication.

(4) Check for any gas leakage at the flare nut connections, or brazed parts by gas leakage tester or by use of a foaming agent or gas leak detector.

Recommended Forming Agent	Manufacturer
Güproflex	Yokogawa & CO.,Ltd

(5) Insulate high pressure and low pressure (heat recovery system only) gas piping side and liquid piping side.

(6) Mount the piping cover equipped with the outdoor unit after connecting the pipe.



< Heat Recovery System >

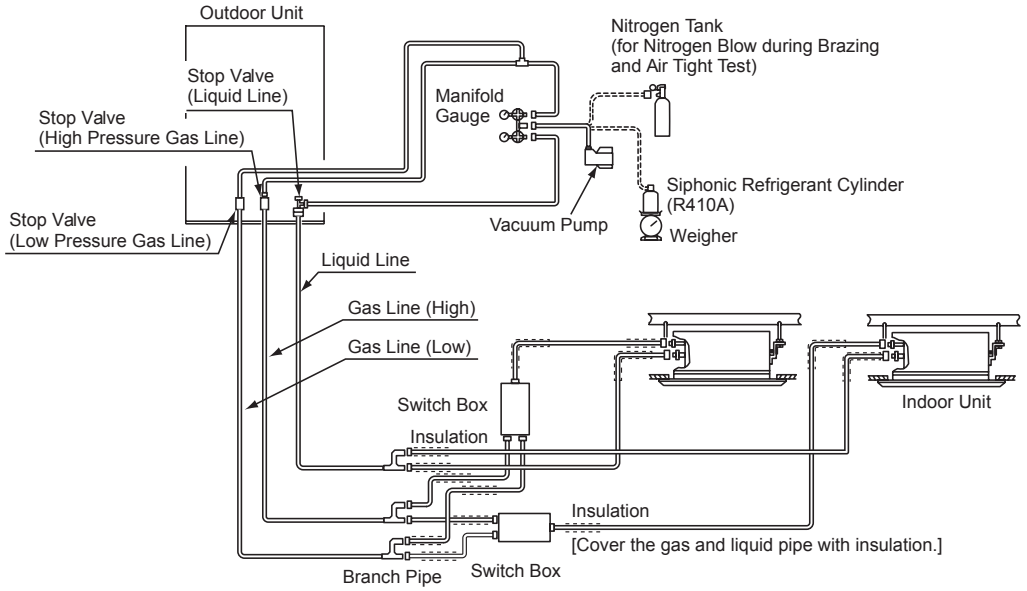


Fig. Vacuum Pumping and Refrigerant Charge

12.2 Vacuuming

(1) Connect a manifold gauge and vacuum pump to the check joints*.

*

Heat Pump System	High Pressure Gas Stop Valve Liquid Stop Valve
Heat Recovery System	High Pressure Gas Stop Valve Low Pressure Gas Stop Valve Liquid Stop Valve

(2) Continue vacuum pumping work until the pressure reaches -0.1MPa (-756mmHg) or lower for one to two hours.
After vacuum pumping work, stop the manifold valve's valve, stop the vacuum pump and leave it for one hour. Check to ensure that the pressure in the manifold gauge does not increase.

(3) Tighten the cap of check joint (9 to 14N-m for high/low pressure gas valve, 14 to 18N-m for liquid valve) after the vacuum pumping work.

NOTES:

1. If tools or measuring instruments come into contact with the refrigerant, use the tools or the measuring instruments exclusive for R410A.
2. If vacuum degree of -0.1MPa (-756mmHg) is not available, it is considered that there is a gas leakage. Check for any gas leakage once again. If no leakage exists, operate the vacuum pump for one to two hours.

NOTICE

- Insulate the refrigerant pipes as shown in Fig. below.
  After connecting the refrigerant piping, seal the refrigerant pipes by using the field-supplied insulation material. Insulate the unions and flare nuts at the piping connections completely. Insulate the liquid piping and gas piping completely to avoid decreasing of performance and dewing on the surface of the pipe.

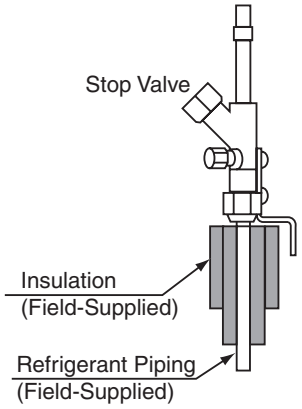


Fig. Insulation on Pipes

12.3 Additional Refrigerant Charge Calculation

Table 12.1 Additional Refrigerant Charge Calculation

Although refrigerant has been charged into this unit, additional refrigerant charge is required according to piping length.
Determine the additional refrigerant quantity according to the following procedure, and charge it into the system.
Record the additional refrigerant quantity to facilitate maintenance and servicing activities thereafter.

1. Calculating Method of Additional Refrigerant Charge (W kg)

<table>
<tr><th>No.</th><th>Symbol</th><th>Contents</th><th>Additional Charge (kg)</th></tr>
<tr><td>1</td><td>W1</td><td>Additional Refrigerant Charge Calculation for Liquid Piping (W1 kg)
<table>
<tr><th>Pipe Diameter</th><th>Total Piping Length (m)</th><th>Refrigerant Amount for 1m Pipe</th><th>Additional Charge (kg)</th></tr>
<tr><td>ϕ22.2</td><td>m</td><td>×0.39 =</td><td></td></tr>
<tr><td>ϕ19.05</td><td>m</td><td>×0.28 =</td><td></td></tr>
<tr><td>ϕ15.88</td><td>m</td><td>×0.19 =</td><td></td></tr>
<tr><td>ϕ12.7</td><td>m</td><td>×0.12 =</td><td></td></tr>
<tr><td>ϕ9.53</td><td>m</td><td>×0.06 =</td><td></td></tr>
<tr><td>ϕ6.35</td><td>m</td><td>×0.03 =</td><td></td></tr>
<tr><td colspan="3">Total Additional Charge For Liquid Piping =</td><td></td></tr>
</table></td><td>kg</td></tr>
<tr><td>2</td><td>W2</td><td>Additional Refrigerant Charge Calculation for Indoor Unit (W2 kg)
Additional refrigerant charge is 1kg/unit of 76kBtu/h and 96kBtu/h indoor unit.
Additional refrigerant charge of less than 76kBtu/h indoor units is not needed.
76 and 96 Total Indoor Unit Numbers Additional Charge
☐ × 1.0kg/unit = ☐</td><td>kg</td></tr>
<tr><td>3</td><td>W3</td><td>The Ratio of Indoor Unit Connection Capacity (Indoor Unit Total Capacity/ Outdoor Unit Capacity) Additional Charge
Determine the ratio of indoor unit connection capacity.
Condition Refrigerant Amount
• I.U.Capacity Ratio is less than 100% : 0.0kg
• I.U.Capacity Ratio is 100~115% : 0.5kg
• I.U.Capacity Ratio is 116~130% : 1.0kg</td><td>kg</td></tr>
<tr><td>4</td><td>W</td><td>Calculation of Additional Charge (W kg) = W1 + W2 +W3</td><td>kg</td></tr>
</table>

Note:
Ensure that the total additional charge should not be exceeded the max. additional refrigerant charge quantity as shown in the table below.

< Max. Additional Refrigerant Charge Quantity >

Outdoor Unit (kBtu/h)	76/96	114	136	154	170~212	232~454
Max. Additional Ref. Charge Quantity (kg)	33.0	38.5	38.5	42.0	46.0	52.0

2. Charging Work
   Charge refrigerant (R410A) into the system according to Item 12.4.

3. Record of Additional Charge
   Total refrigerant charge of this system is calculated in the following formula.

Total Ref. Charge = W + Wo
This System = ☐ + ☐ = ☐ kg

Total Additional Charge: W ☐ kg
Total Ref. Charge: ☐ kg
Date of Ref. Charge Work: ☐ / ☐ / ☐

Ref. Charge Amount of O.U. Before Shipment (W0) kg

Outdoor Unit (kBtu/h)	W0 Outdoor Unit Ref. Charge (kg)
76	9.9
96	9.9
114	10.5
136	10.5
154	10.5

Note:
• W0 is outdoor unit ref. charge before shipment.
• In case of the combination of the base unit, calculate the total ref. charge before shipment of the outdoor units to be combined.

12.4 Charging Work

After vacuum pumping work, check that the high pressure gas valve, low pressure gas valve (low pressure gas valve is for heat recovery system only) and liquid stop valve are fully closed.
Charge the additional refrigerant (refer to Table 8.1) from the check joint of liquid stop valve (Charging Refrigerant Amount Tolerance: 0.5kg).
If the specified refrigerant quantity can not be charged, follow the procedure below.

(1) Fully open the stop valve for high pressure gas*.
(* In case of heat recovery system, fully open the stop valve for high pressure and low pressure gas.)
(2) Operate the compressor at the cooling mode and add the refrigerant from the check joint of the liquid stop valve. At this time, the liquid stop valve is slightly opened (Charging Refrigerant Amount Tolerance: 0.5kg).
(3) After refrigerant is charged, fully open the liquid stop valve and gas stop valve (high pressure and low pressure (heat recovery system only)).

Charge the correct refrigerant quantity according to Table 12.1. If not, a compressor may be damaged due to an excess or insufficient refrigerant charge.

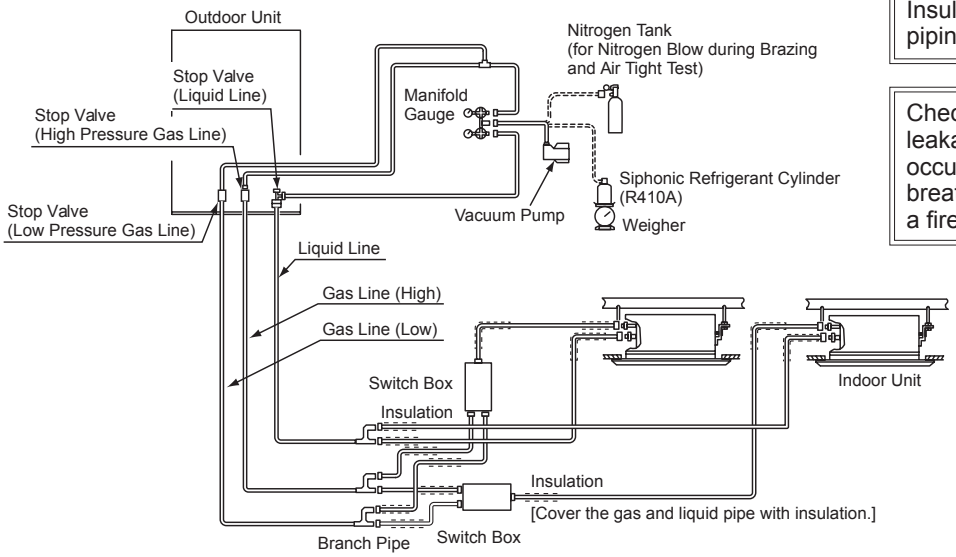
Refrigerant charge from check joint of gas stop valve may lead to compressor failure. Be sure to charge refrigerant from the check joint of liquid stop valve.

Insulate the liquid piping and gas piping completely to avoid decreasing of performance and dewing on the surface of the pipe.

Insulate the flare nut and union of the piping connection with insulation.

Check to ensure that there is no gas leakage. If a large refrigerant leakage occurs, it will cause difficulty with breathing or harmful gases would occur if a fire was being used in the room.

< Heat Recovery System >



12.5 Automatic Simple Judgement System for Refrigerant Amount

NOTE

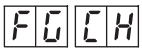
1. This function is applicable when outdoor air temperature is 0 to 43°C DB and indoor air temperature is 10 to 32°C DB.
2. For 190 to 510kBtu/h, the operation and 7-segment indication check should be performed at outdoor unit A (main). Close all the covers of outdoor unit B and C (sub).

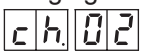
Perform the refrigerant amount check operation according to the automatic judgement function after the refrigerant charging work.
When the judgement result is excessive refrigerant, insufficient refrigerant or abnormal termination, find out the cause of abnormality and perform the refrigerant amount check operation again.

< Procedure of Refrigerant Amount Check Operation >

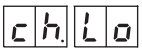
(1) Reassemble all the cover except for the electrical control box cover and service cover of No.1 unit.

(2) Turn ON the power supply of indoor unit and outdoor unit in the refrigerant cycle to be performed the refrigerant amount check operation. (Supply electrical power to the system 12 hours before starting this check operation to warm the compressor oil.)

(3) Turn No.4 of DSW5 (PCB1) ON.
7-segment Display


(4) Check the 7-segment display and press PSW1.
The outdoor fan and compressor will be activated and the 7-segment display will be indicated the following figure.

The judgement takes 30 to 40 minutes. Refer to the table below for the result indication.
When the judgement result is excessive refrigerant, insufficient refrigerant or abnormal termination, find out the cause of abnormality and perform the refrigerant amount check operation again.

Judgement Result Indication

7-segment Indication	Result	Remarks
	Sufficient Refrigerant	The refrigerant amount is sufficient. * Turn No.4 of DSW5 OFF and perform Test Run.
	Excessive Refrigerant	The refrigerant amount is excessive. * Calculate the additional refrigerant amount according to the piping length. Collect the refrigerant using a collector and charge the correct refrigerant amount.
	Insufficient Refrigerant	The refrigerant amount is insufficient. * Check if the additional refrigerant has been charged. * Calculate the additional refrigerant amount according to the piping length and charge the refrigerant.
	Abnormal Termination	Find out the cause of abnormal termination as shown below. After resolved the cause of abnormal termination, restart the check operation. (1) Is No.4 pin of DSW5 ON before turning on the power supply? (2) Are all indoor units ready and waiting, before turned ON No.4 pin of DSW5? (3) Is the outdoor ambient temperature within the applicable range (0 to 43oC)? (In some cases, when the connected indoor unit number exceeds the recommended number and the outdoor ambient temperature exceeds 35oC, this check operation cannot be performed.) (4) Is the total indoor units operation capacity 30% (indoor units capacity ratio) or less?(5) Is No.4 of DSW4 (compressor forced stoppage) OFF?

(5) Turn No.4 of DSW5 OFF when the refrigerant amount is sufficient.
Wait 3 minutes (at least) after turning No.4 of DSW5 OFF and then the outdoor unit is ready to operate.

NOTE:
The 7-segment indication during the check operation may be changed to the protection control code by the activation of protection control, however it is normal. As for the protection control code, refer to the sheet attached to the inside of the outdoor unit service cover.

NOTE:
1. Emissions of the fluorocarbons are prohibited.
2. In case of disposal and maintenance of this product, collection of fluorocarbons is required.
3. Regarding the fluorocarbon, the specification label or refrigerant label attached to the product should be followed. After the additional refrigerant charge, record the total refrigerant (= refrigerant before shipment + additional refrigerant in the field) in the refrigerant label.

12.6 Consideration

- Special Attention Regarding Refrigerant Gas Leakage

Pay attention to the critical gas concentration to avoid accidental refrigerant gas leakage before installing air conditioning systems.

$$\frac{\text{Totally Charged Refrigerant Quantity in System (kg)}}{\text{Room Space for each Indoor Unit (m}^3\text{)}} \leq \text{Critical Concentration (kg/m}^3\text{)}$$

Critical Concentration: 0.3 kg/m^3 *

* In case of KHK S 0010, this value should be decided according to the each country's regulation such as ISO5149 and EN378.

In the case that the calculated critical concentration is higher than 0.3kg/m^3, take the following actions.

1) Provide a gas leakage detector and exhaust fan(s) controlled by its gas leakage detector.
2) Provide each effective opening at the wall or door for ventilation to next door so that the critical gas concentration can be maintained lower than the above value.
   (Provide an opening more than 0.15% of floor surface at the lower part of a door.)

⚠CAUTION

1. Maximum Permissible Concentration of HFC GAS R410A
   The refrigerant R410A is an incombustible and non-toxic gas.
   However, if leakage occurs and gas fills a room, it may cause suffocation. The maximum permissible concentration of HFC gas, R410A in air is 0.3kg/m^3, according to the refrigeration and air conditioning facility standard (KHK S 0010) by the KHK (High Pressure Gas Protection Association) Japan. Therefore, some effective measure must be taken to lower the R410A concentration in air below 0.3kg/m^3, in case of leakage.
   As for R410A, this consideration is applied similarly.
2. Calculation of Refrigerant Concentration
   (1) Calculate the total quantity of refrigerant R (kg) charged in the system connecting all the indoor units of objective rooms.
   (2) Calculate the room space where this unit is to be installed V (m^3) of each objective room.
   (3) Calculate the refrigerant concentration C (kg/m^3) of the room according to the following equation.

$$\frac{\text{R: Total Quantity of Charged Refrigerant (kg)}}{\text{V: Room Space Where This Unit Is to Be Installed (m}^3\text{)}} = \text{C: Refrigerant Concentration} \leq 0.3\ (\text{kg/m}^3)\ *$$

   If local codes or regulations are specified, follow them.

   <Example>
   Japanese Standard KHK S 0010 C=0.3 (kg/m^3)

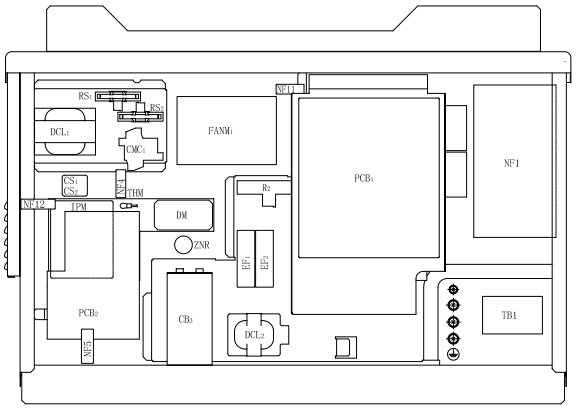
13.Setting of DIP Switches

13.1 Function of RSW, DSWs and LEDs

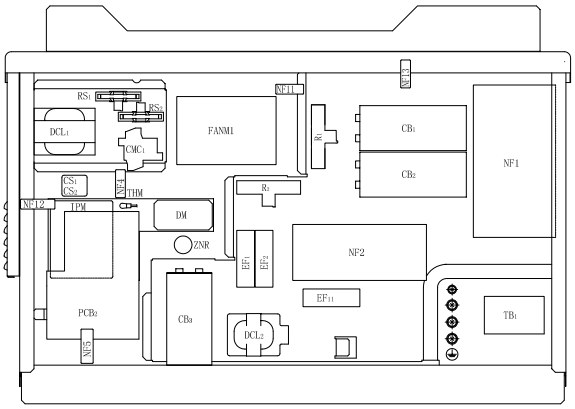
(Arrangement Inside of Electrical Box for AVWT-76~154* < 380-415V/50Hz>

AVWT-76FESRA to AVWT-96FESRA

Front side (For Inverter)

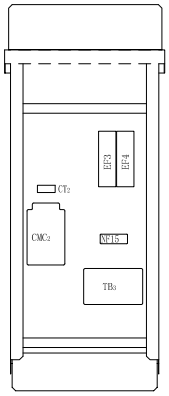


The Interior of the Electrical Control Box
(For Inverter)

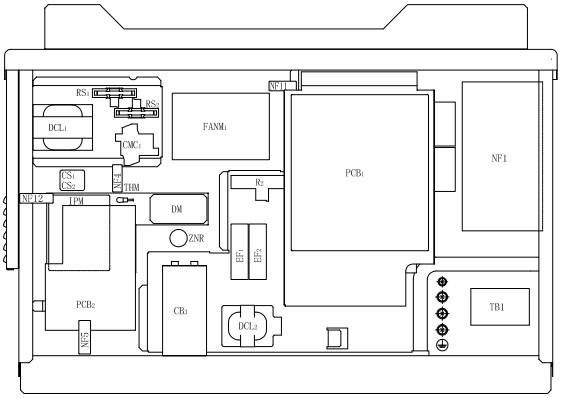


AVWT-114FESSA to AVWT-154FESSA

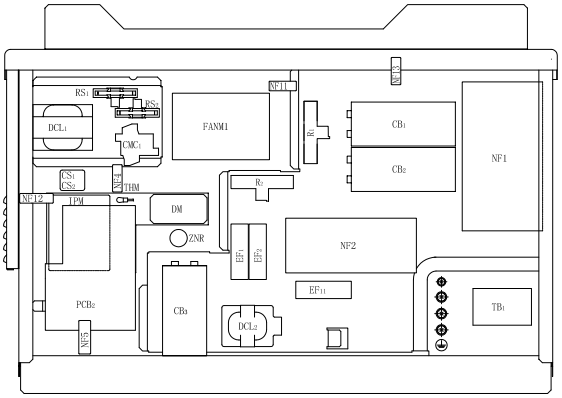
Front side (For Constant)



Front side (For Inverter)



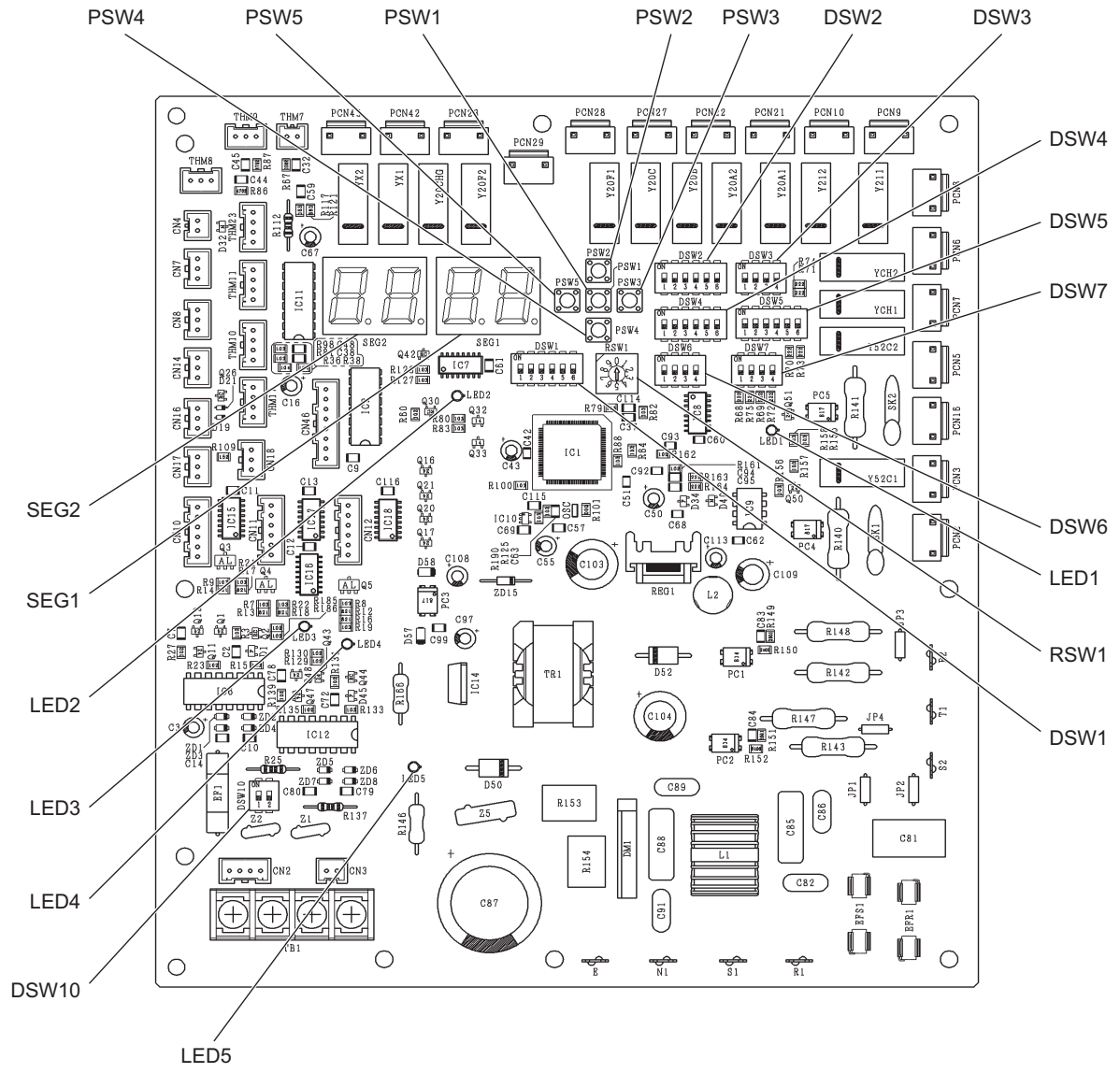
The Interior of the Electrical Control Box
(For Inverter)



■ Purpose

Symbol	PCB	Purpose
PCB1	for Control	1. Transmitting between Indoor Unit and Outdoor Unit 2. Processing for Sensor Input 3. Processing for Dip Switch Input 4. Operation Control for Above Items 1 to 3. Compressor Operation Control, Bypass Valve Control, Fan Control and Overcurrent Control 5. 7-Segment Indication 6. Processing of Safety Device Input 7. Processing of Relay Output 8. Reverse Phase Detection for Power Source
PCB2	for Inverter	1. Inverter power part is driven by instruction of PCB1 and compressor is driven. 2. Overcurrent Control 3. Protection Control for Inverter Part
FANM	for Fan	1. DC Fan Motor Speed Control 2. Overcurrent Control

a. Control Printed Circuit Board: PCB1



13.2 Function of RSW、DSW、LED

TURN OFF all power sources before setting.
Without turning OFF, the switches do not work and the contents of the setting are invalid.
(However, DSW4-No.1, 2, 4 can be operated during power source is ON.)

The mark of "■" indicates the position of dip switches. Set the dip switches according to the below Fig.

NOTE

- **By using switch DSW4, the unit is started or stopped after 10 to 20 seconds after the switch is operated.**
- **Number this outdoor unit to distinguish from other outdoor units for service and maintenance.**
  And write the number in the space right.

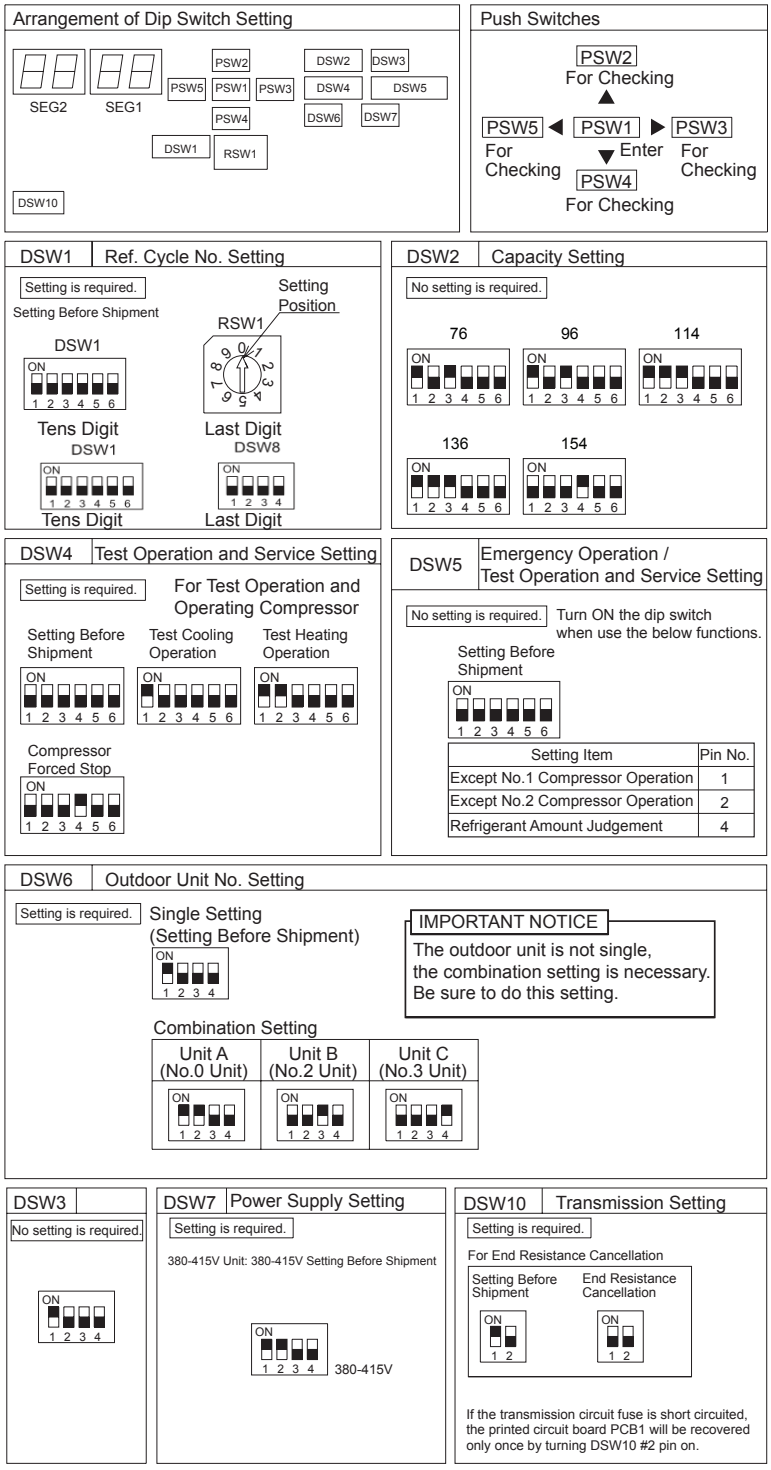
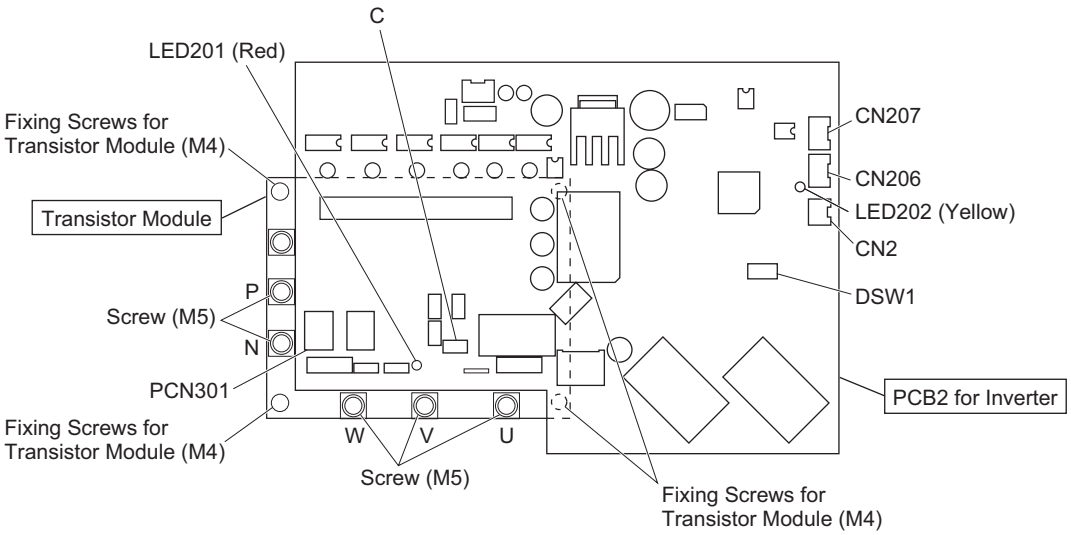


Fig. DSW Setting

Part Name		Contents of Functions
LEDs	LED1 (Red)	Power Source Indication for PCB1 (Low Voltage) Normal Condition: Activated Abnormal Condition: Deactivated
	LED2 (Green)	This LED2 indicates the transmission state between the PCB1 and PCB2. Normal Condition: Flashing Abnormal Condition: Activated or Deactivated
	LED3 (Yellow)	This LED3 indicates the transmission state between the indoor unit and outdoor unit. Normal Condition: Flashing Abnormal Condition: Activated or Deactivated
	LED4 (Orange)	This LED4 indicates the transmission state between the outdoor units. Normal Condition: Flashing Abnormal Condition: Activated or Deactivated
	LED5 (Red)	Power Source Indication for PCB1 (High Voltage) Normal Condition: Activated Abnormal Condition: Deactivated
SEGs	SEG1, SEG2	These indicate the following “Alarm”, “Protective Safety Device has Tripped” or “Checking Items”.

b. Inverter Printed Circuit Board: PCB2 (and Transistor Module)



Part Name	Contents of Functions
LED201 (Red)	Power Source Indication for PCB2 Normal Condition: Activated Abnormal Condition: Deactivated
LED202 (Yellow)	This indicates the state of microcomputer. Normal Condition: Activated Abnormal Condition: Deactivated

• DSW1

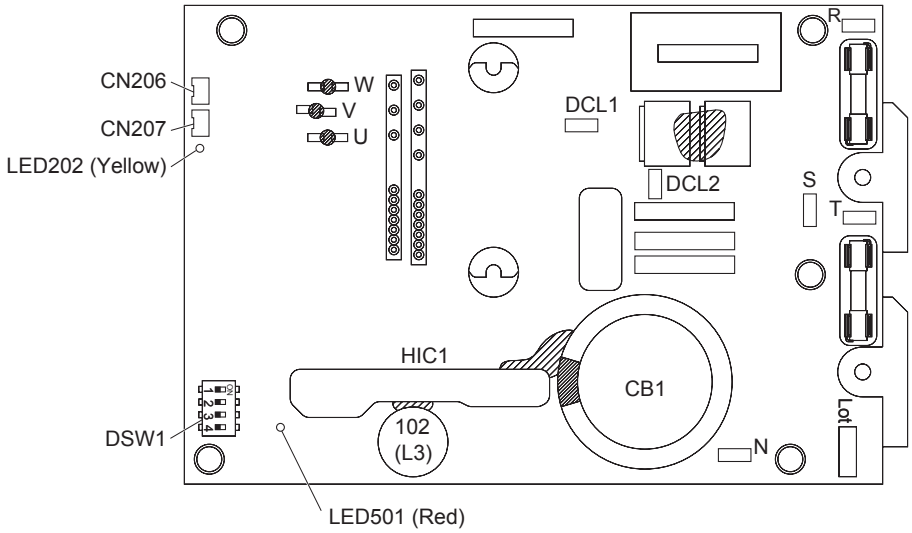
No setting is required.

When set No.1 pin to ON, the electric current detection is canceled.

No.1 pin should be set back to OFF after electrical work.

c. Fan Controller

380-415V/50Hz



Part Name	Contents of Functions
LED501 (Red)	Power Source Indication for Fan Controller Normal Condition: Activated Abnormal Condition: Deactivated
LED202 (Yellow)	This indicates the state of microcomputer. Normal Condition: Activated Abnormal Condition: Deactivated

• DSW1

No setting is required.

13.3 Procedure of Checking Each Main Parts

13.3.1 Self-Checking of PCBs using Remote Control Switch

The following troubleshooting procedure is utilized for function test of PCBs in the indoor unit and outdoor unit.

Each “Check Menu” item and its function are explained in the following table.

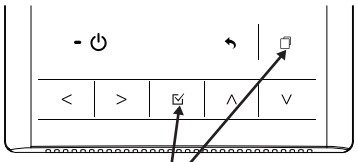
Check menu item	Function
Check 1	Sensor condition of air conditioner will be monitored and indicated.
Check 2	Sensor data of air conditioner prior to alarm occurrence will be indicated.
Alarm Record	Previous alarm record (date, time, alarm code) will be indicated. ※
Species	Model name and manufacturing number will be indicated.
IDU/ODU Diagnosis	The result of PCB check will indicated.
Self Diagnosis	Checking of remote control switch will be carried out.

※ To Erase Alarm Record

Press “ ☑ ” when the abnormality record is indicated. After that, the confirmation screen will be displayed.

Select “Yes” and press “ ☑ ” so that the alarm record will be deleted.

Indication of Check Menu



Press and hold “❐” (menu) and “ ☑ ” simultaneously for at least 3 seconds during the normal mode . The check menu will be displayed.

Indi-cation	Contents	
00	Normal	
	Abnormality (Open-circuit, Short-circuit, etc.) in circuit for	
01	Intake Air Temp. Thermistor	Indoor Unit PCB
02	Discharge Air Temp. Thermistor	
03	Liquid Pipe Temp. Thermistor	
04	Remote Thermistor Abnormality	
05	Gas Pipe Temp. Thermistor	
06	Remote Sensor	
08	Transmission of Central Station	
0A	EEPROM	
0b	Zero Cross Input Failure	
EE	Transmission of Indoor Unit during This Checking Operation	
07	Transmission of Outdoor Unit	Outdoor Unit PCB
F4	ITO Input Failure	
F5	PSH Input Failure	
F6	Protection Signal Detection Circuit	
F7	Phase Detection	
F8	Transmission of Inverter	
FA	High Pressure Sensor	
Fb	Comp. Discharge Gas Temp. Thermistor	
FC	Low Pressure Sensor	
Fd	Heat Exchanger Evaporation Temp. Thermistor	
FF	Ambient Air Temp. Thermistor	

13.4 Procedure of Checking Other Main Parts

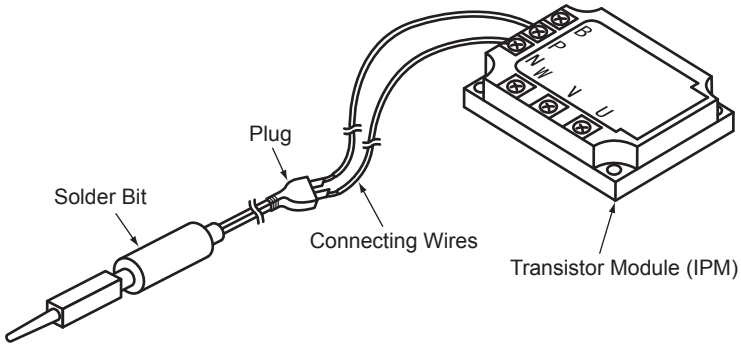
(1) High Voltage Discharge Work for Replacing Parts

⚠CAUTION

Perform this high voltage discharge work to avoid an electric shock.

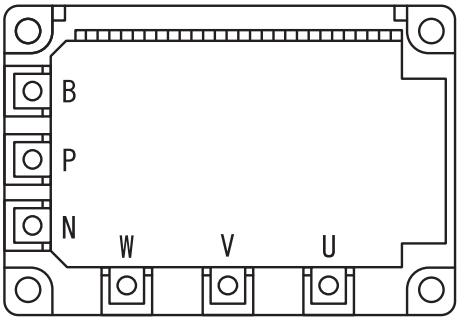
<Procedure >

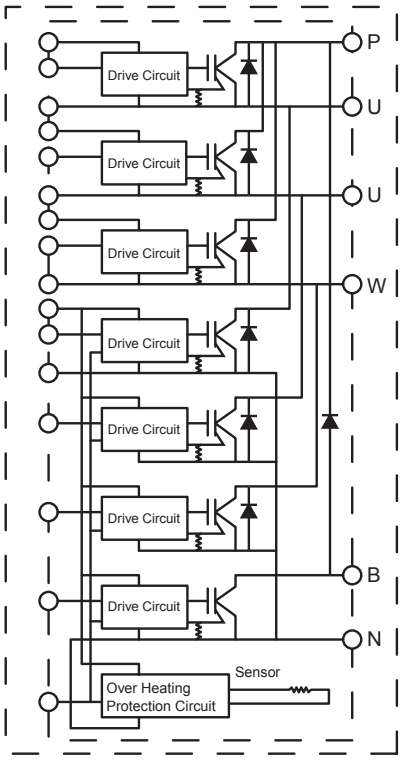
(a) Turn OFF the main switches and wait for three minutes. Check to ensure that no high voltage exists. If LED201 is ON after start-up and LED201 is OFF after turning OFF power source, the voltage will decrease lower than DC50V.
(b) Connect connecting wires to an electrical solder bit
(c) Connect the wires to terminals, P and N on IPM. => Discharging is started, resulting in hot solder bit. Pay attention not to short-circuit between terminal P and N.
(d) Wait for 2 or 3 minutes and measure the voltage once again. Check to ensure that no voltage is charged.



(2) Checking Method of Transistor Module (IPM)

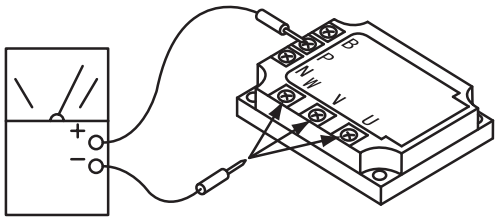
Outer Appearance and Internal Circuit of Transistor Module



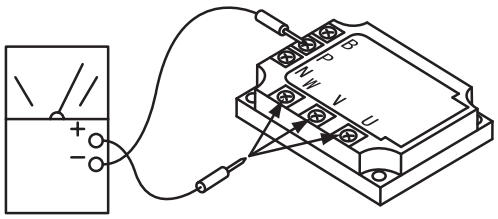


Remove all the terminals of the transistor module before check. If items (a) to (d) are performing and the results are satisfactory, the transistor module is normal. Measure it under 1kΩ range of a tester. Do not use a digital tester.

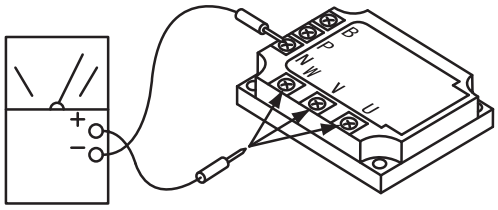
(a) By touching the + side of the tester to the P terminal of transistor module and the - side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are from 1 to 5kΩ, it is normal.



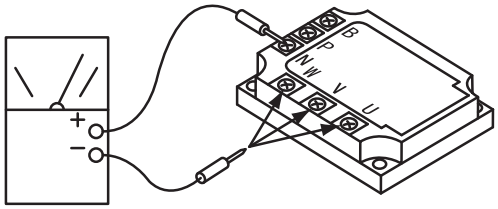
(b) By touching the - side of the tester to the P terminal of transistor module and the + side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are greater than 100kΩ, it is normal.



(c) By touching the - side of the tester to the N terminal of transistor module and the + side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are from 1 to 5kΩ, it is normal.

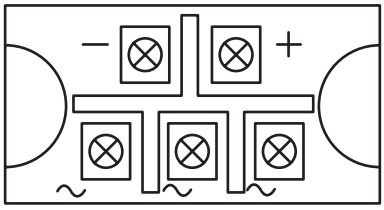


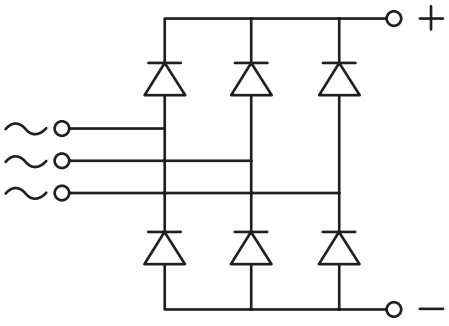
(d) By touching the + side of the tester to the N terminal of transistor module and the - side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are greater than 100kΩ, it is normal.



(3) Checking Method of Diode Module (DM)

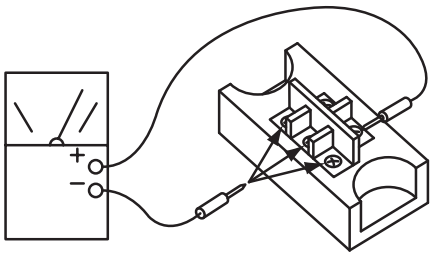
Outer Appearance and Internal Circuit of Diode Module



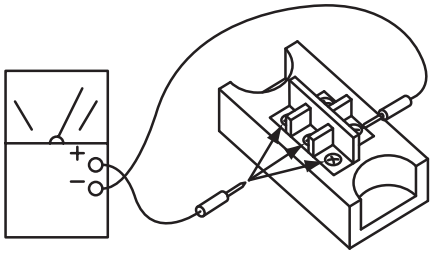


If items (a) to (d) are performing and the results are satisfactory, the diode module is normal. Measure it under 1kΩ range of a tester. Do not use a digital tester.

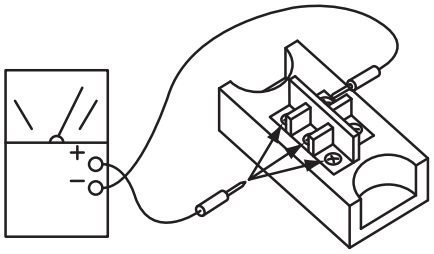
(a) By touching the + side of the tester to the + terminal of diode module and the - side of tester to the ~ terminals (3 NOs.) of the diode module, measure the resistance. If all the resistances are from 5 to 50kΩ, it is normal.



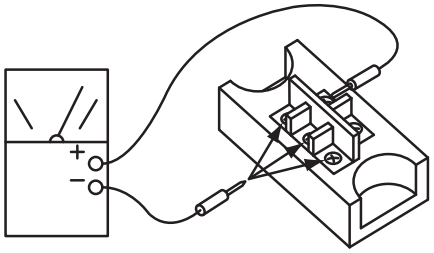
(b) By touching the - side of the tester to the + terminal of diode module and the + side of tester to the ~ terminals (3 NOs.) of the diode module, measure the resistance. If all the resistances are greater than 500kΩ, it is normal.



(c) By touching the - side of the tester to the - terminal of diode module and the + side of tester to the ~ terminals (3 NOs.) of the diode module, measure the resistance. If all the resistances are from 5 to 50kΩ, it is normal.



(d) By touching the + side of the tester to the - terminal of diode module and the - side of tester to the ~ terminals (3 NOs.) of the diode module, measure the resistance. If all the resistances are greater than 500kΩ, it is normal.

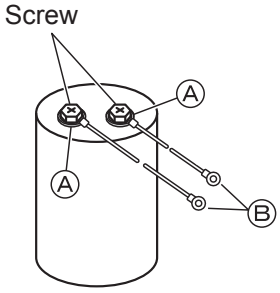


(4) Checking Method of Capacitor

(a) Check that the screws are connected tightly.
(b) Check that the capacitor is not tarnished or expanded.

* When checking the capacitor, disconnect the terminals Ⓑ. Do not disconnect the terminals Ⓐ.

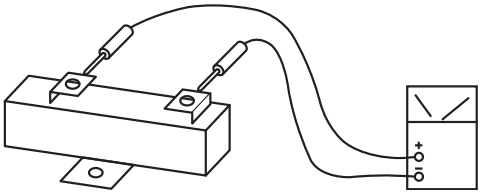
Capacitance	380-415V
For Inverter	4700μF
For Fan Controller	2700μF



(5) Checking Method of Resistor

Measure the both ends of resistor as shown in the figure.
If the resistance is ∞Ω, it is abnormal.

Resistance		380-415V
For Inverter	RS	-
	RS1	0.5kΩ
	RS2	0.5kΩ
	R1	6.3kΩ
	R2	10.5kΩ

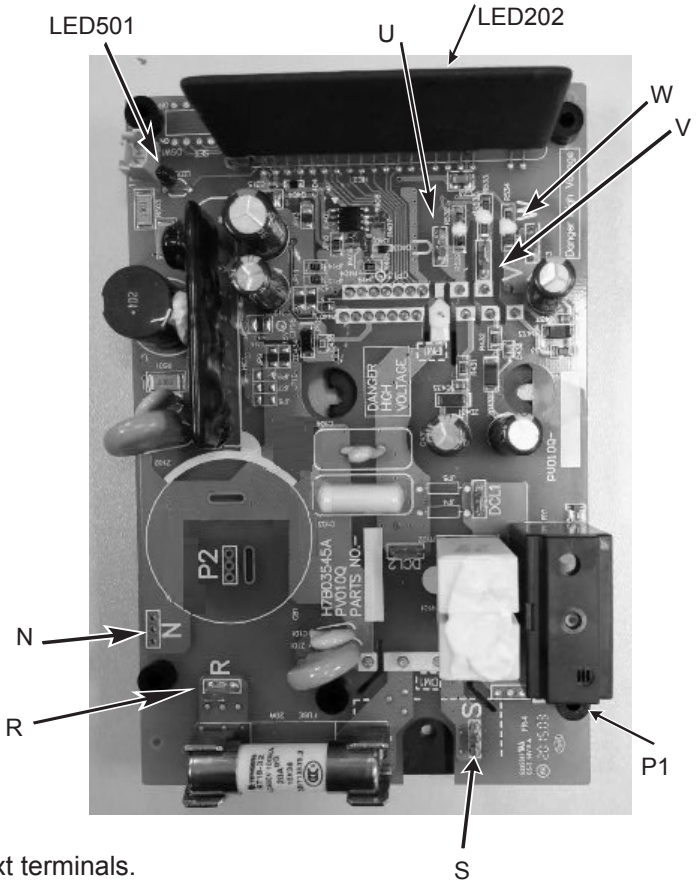


(6) Checking of Fan Controller

(a) Turn OFF the power source switches before this work.
Also ensure that LED501 (Red) on the fan controller is turned OFF. If LED501 is ON, electrical shock may occur.

(b) Disconnect all the wirings connected to the fan controller.
Measure the resistance between terminals using the tester. (Do not use a digital tester.)
When measuring, check the color of tester probe and the terminals to be measured as shown in the table below.

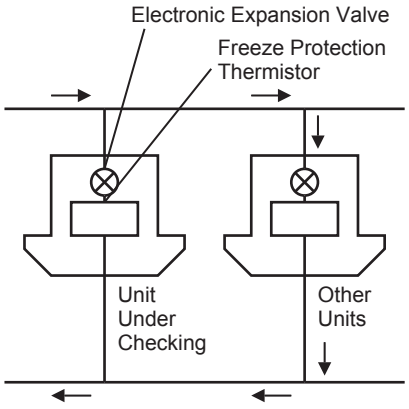
Tester Probe Red (+) - Black (-)	Resistance Range
P1 - R P1 - S P1 - T R - N S - N T - N P1 - U P1 - V P1 - W U - N V - N W - N	1 kΩ and over
R - P1 S - P1 T - P1 N - R N - S N - T U - P1 V - P1 W - P1 N - U N - V N - W	Resistance will gradually increase once after it is between 1700 kΩ to 1900 kΩ. (✳)



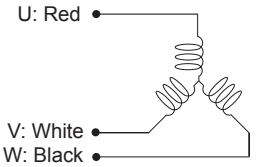
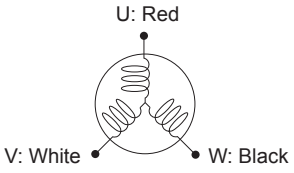
(✳) Leave at least 30 seconds when measuring the next terminals.

Regarding DSW setting, do not change from the original setting. Abnormal transmitting and fan controller failure may occur if the setting is changed.

(7) Checking Method of Electronic Expansion Valve

	Indoor Unit Electronic Expansion Valve	Outdoor Unit Electronic Expansion Valve
Locked with Fully Closed	Check for the liquid pipe temperature during heating operation. It is abnormal if the temperature does not increase.	It is abnormal if the liquid pipe pressure does not increase during cooling operation
Locked with Slightly Open	It is abnormal under the following conditions; The temperature of freeze protection thermistor becomes lower than the suction air temperature when the unit under checking is stopped and other units are under cooling operation.	It is abnormal if the liquid pipe pressure does not increase and the outlet temperature of the expansion valve decreases after the cooling operation is started.
Locked with Fully Open		It is abnormal under the following conditions; After heating operation for more than 30 min., the discharge gas temperature of compressor is not 10°C higher than the condensing temperature and there is no other faults such as excessive charge of refrigerant, etc.

(8) Checking of Electrical Coil Parts

Name of Parts	Model	Electrical Wiring Diagram	Wiring No.	Resistance (Ω)
DC Fan Motor for Outdoor Unit (AVWT-76* to AVWT-96*)	DMSBA8PQH 750W		White-Black Black-Red Red-White	2.58±0.3 at 20°C
DC Fan Motor for Outdoor Unit (AVWT-114* to AVWT-154*)	ECW8802AHS 1200W		White-Black Black-Red Red-White	1.63±5 at 20°C

Name of Parts	Model	Resistance (Ω)
Solenoid Valve for Gas Bypass	SR10PA	1,250 at 20°C
Reversing Valve	Coil: STF-01AJ502D1 (50Hz) STF-01AI511A1 (60Hz) + Body: STF-0401G (8-12HP) STF-0712G (14-18HP)	1,130 (220V/60Hz) at 20°C
Compressor Motor (for Inverter Compressor)	E656DHD-65D2Y	0.839 (380-415V/50Hz) at 75°C
Compressor Motor (for constant Compressor)	E655DH-65D2YG	3.262 (380-415V/50Hz) at 75°C

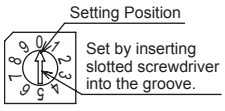
13.5 Communication Settings

- **Setting for Transmitting**
  It is required to set the outdoor unit Nos., refrigerant cycle Nos. and end terminal resistance for this Hi-NET system.

- **Setting of Outdoor Unit No.**
  In case of the combination of base unit, set DSW6 as shown below.

Base Unit (Before Shipment)	Combination of Base Unit		
	Unit A (No.0) (Main)	Unit B (No.2)	Unit C (No.3)
			

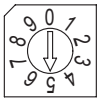
- **Setting of Refrigerant Cycle No.**
  In the same refrigerant cycle, set the same refrigerant cycle No. for the outdoor unit and the indoor units as shown below.
  As for setting indoor unit refrigerant cycle No., set the RSW2 and DSW5 on the indoor unit PCB.

	Setting Switch	
	10 digit	1 digit
RSW1		
Outdoor Unit	DSW1	RSW1
Indoor Unit (Hi-NET)	DSW5	RSW2

	Setting Switch	
	10 digit	1 digit
DSW8		
Outdoor Unit	DSW1	DSW8
Indoor Unit (Hi-NET)	DSW5	RSW2

Ex.: In Case of Setting Refrigerant Cycle No. 25

Turn ON No. 2 pin.



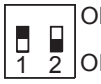
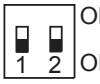
Set Dial No.5.

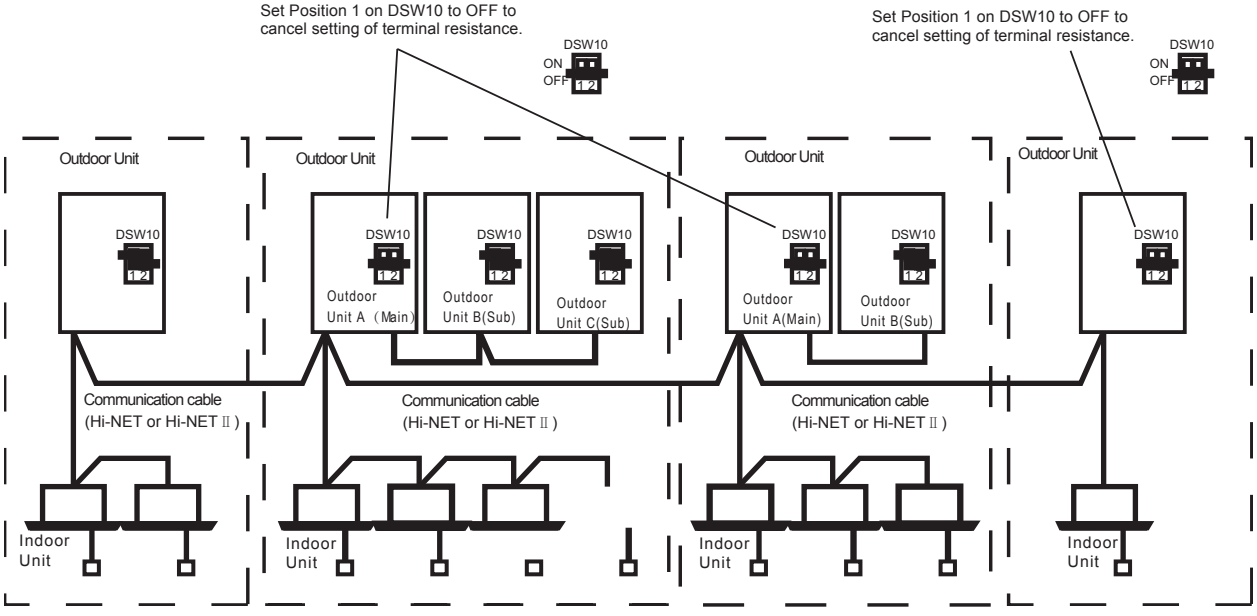
DSW and RSW setting before shipment is 0.
Maximum in setting refrigerant cycle No. is 63.

- **Setting of End Terminal Resistance**

Before shipment, No. 1 pin of DSW10 is set at the “ON” side. In the case that the outdoor units quantity in the same Hi-NETis 2 or more, set No. 1 pin of DSW10 at the “OFF” side from the 2nd refrigerant group outdoor unit. If only one outdoor unit is used, no setting is required.

Setting of End Terminal Resistance
DSW10

Before Shipment	Cancellation
	



14. Test Run

⚠ WARNING

- **Do not operate the system until all the check points have been cleared.**
  As for the test run of indoor unit, check "Installation & Maintenance Manual" attached to the indoor unit and Switch Box.

14.1 Before Test Run

(1) Check to ensure that the refrigerant piping and transmission between outdoor unit and indoor units are connected to the same refrigerant cycle. If not, it will cause an abnormal operation and a serious accident.
Check that the dip switch setting of the refrigerant cycle No. (DSW1 & RSW1 [O.U.], DSW5 & RSW2 [I.U.]) and the unit number (RSW) for the indoor units apply to the system.
Confirm that the dip switch setting on the printed circuit board of the indoor units and the outdoor units are correct. Especially, pay attention to the setting of outdoor unit No., the refrigerant cycle No. and the end terminal resistance. Refer to the chapter "7. Electrical Wiring".

(2) Check to ensure that the electrical resistance is more than 1 megohm, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is found and repaired (Refer to "Caution for Insulation Resistance" for details.).
Do not impress the voltage on the terminals for transmission (Outdoor Unit: TB2 1, 2, 3, 4 / Indoor Unit: TB2 1, 2, A, B / Switch Box: TB2 1, 2, 3, 4).

(3) Check to ensure that each wire, L1, L2, L3 and N is correctly connected at the power source.
If incorrectly connected, the unit will not operate and the remote control switch will indicate the alarm code "05". In this case, check and change the phase of the power source according to the attached sheet on the reverse side of the service cover.

(4) **Check to ensure that the switch on the main power source has been ON for more than 12 hours, to warm the compressor oil by the oil heater.**
R series outdoor units does not operate within 4 hours after power supply (Stoppage Code d1-22).
In case of operating within 4 hours, release the protection control as follows:

1. Supply power to the outdoor unit.
2. Wait for 30 seconds.
3. Push PSW5 on the outdoor PCB more than 3 seconds in order to release the d1-22.
   In case of using remote control switch for release, push "Air Flow" and "Auto Louver" switch simultaneously for 3 seconds.

(5) Main Unit Label
In case of the combination of base units, **attach the main unit label on a visible spot of the main unit (outdoor unit A)**, so that the outdoor unit A can be identified easily. Do not attach the main label on the sub unit (outdoor unit B and C).

⚠CAUTION

Caution for Insulation Resistance

If total unit insulation resistance is lower than 1 megohm, the compressor insulation resistance may be low due to retained refrigerant in the compressor. This may occur if the unit has not been used for long periods.

1. **Disconnect the cables to the compressor and measure the insulation resistance of the compressor itself. If the resistance value is over 1 megohm, then insulation failure has occurred of other electrical parts.**
2. **If the insulation resistance is less than 1 megohm, disconnect the compressor cable from the inverter PCB. Then, turn on the main power to apply current to the crankcase heater. After applying current for more than 3 hours, measure insulation resistance again. (Depending on the air conditions, pipe length or refrigerant conditions, it may be necessary to apply the current for a longer period of time.) Check the insulation resistance and reconnect the compressor.**

If the leakage breaker is activated, check the recommended size shown in Section 4.7.

NOTICE

1. Confirm that field-supplied electrical components (main switch fuse, fuse-free breaker, earth leakage breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data shown in Section 4.7.
2. Use shielded wires ($\geq$0.75mm^2) for field wiring to protect electrically noise obstacle. (Total length of shielded wire shall be less then 1000m, and size of shielded wire shall comply with local codes.)
3. Check to ensure that the terminal for power source wiring (terminals “L1” to “L1” and “N” to “N” of each terminal board: AC 380-415V).
   If not, some component will be damaged.

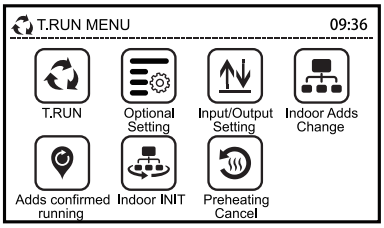
14.2 Test Run By Wired Controller

(1) Turn ON the power supply for all the indoor units.

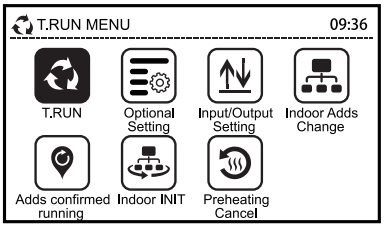
(2) For the models with the auto-address function, wait for 3 minutes approximately. The addressing is automatically performed. (There is a case that 5 minutes is required according to the setting condition.) After that, select using language from “Menu”. Refer to the operation manual for details.

(3) Press and hold “▯” (menu) and “↩” (return) simultaneously for at least 3 seconds.

a. The test run menu will be displayed.

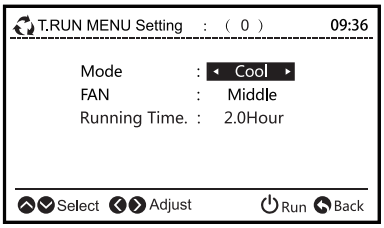


b. Select “ ” and press “ ☑”. The test run settings will be displayed.

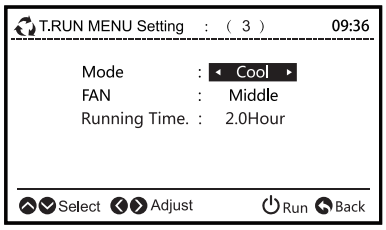


NOTE

When “ 0 ” is indicated, the auto-address function may be performing. Cancel “Test Run” mode and set it again.



(4) The total number of the indoor units connected is indicated on the LCD (liquid crystal display). The case of the twin combination (one (1) set with two (2) indoor units) is indicated " 2 " , and the triple combination (one (1) set with three (3) indoor units) is indicated " 3 ".



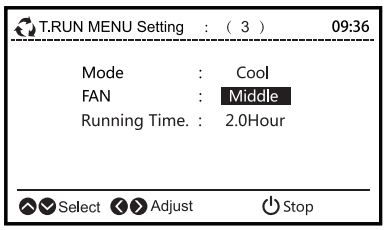
a. If the indicated number is not equal to the actual connected number of indoor unit, the auto-address function is not performed correctly due to incorrect wiring, the electric noise or etc. Turn OFF the power supply and correct the wiring after checking the following points; (Do not repeat turning ON and OFF within 10 seconds.)

- Power supply for indoor unit is not turned ON or incorrect wiring.
- Incorrect connection of connecting cable between indoor units or incorrect connection of controller cable.
- Incorrect setting of rotary switch and dip switch (the setting is overlapped) on the indoor units PCB.

b. Press "⏻" (run/stop) to start the test run.

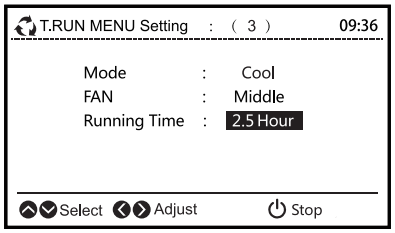
c. Press " < > ∧ ∨ " and set each item.

(5) Press "⏻" (run/stop). At this time, 2-hour OFF timer will be set automatically.

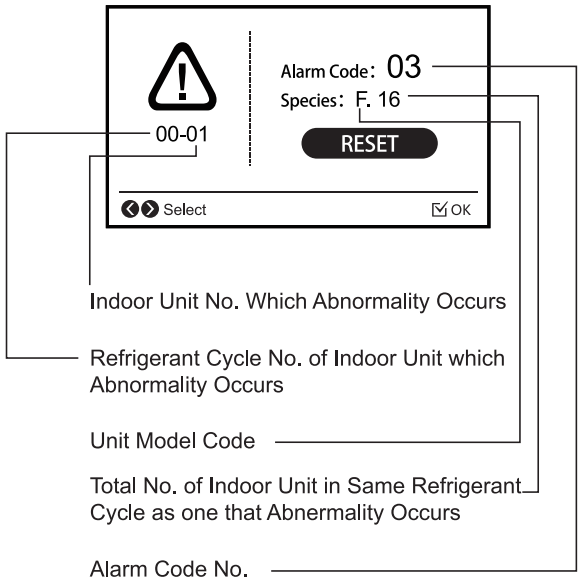


(6) The temperature detections by the thermistors are invalid though the protection devices are valid during the test run.

(7) To finish the test run, press "⏻" (run/stop) again or pass over the set test run time. When changing the test run time, press "∧" or "∨" to select "Running Time". Then, set the test run time (30 to 600 minutes) by pressing "<" or ">".



- The RUN indicator on the remote control switch flashes when some abnormalities such as protection devices activated occur during the test run as well as the RUN indicator (red) on the indoor unit flashes (0.5 second ON/ 0.5 second OFF). Additionally, the alarm code, the unit model code and connected number of indoor units will be displayed on the LCD as shown in the figure below. If the RUN indicator on HYXE-J01H flashes , it may be a failure in the transmission between the indoor unit and the remote control switch (loosening of connector, disconnecting wiring or breaking wire, etc.). Consult to authorized service engineers if abnormality can not be recovered.

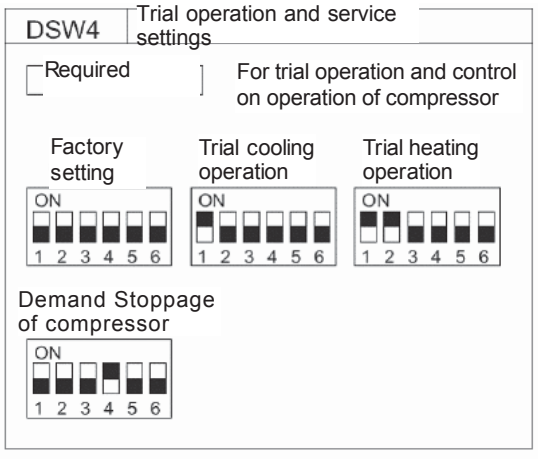


1	Settings of trial operation mode and blast volume: Press Operation Toggling to set operation mode (cooling or heating) and press Blast Volume to set volume to High.
2	Press Start/Stop to start trial operation
3	Stop trial operation after 2 hours, or press Start/Stop to cease trial operation.

Abnormal	Displayed number is inconsistent with actual connected number.

Wire controller display	Phenomena	Trouble	Inspection after Power Down
Operation indicator lamp keeps flashing (once per second) and equipment number and error code "03" is displayed.	Air conditioner fails to be started	Power supply to outdoor unit is not started, or communication cable is connected incorrectly or gets loose.	1. Wiring sequence on terminal strip. 2. Whether connections on terminal strip are made securely. Note: In case that power cable is connected to control circuit, protective fuses both on indoor and outdoor units will be blown. In such case, communication circuit can be recovered by resetting the DIP switch on PCB, as shown below. Indoor unit Outdoor unit  *Set the switch to the position as shown above to recover communication circuit.
Operating indicator lamp keeps flashing (once/2 seconds)	Air conditioner fails to be started	Wire controller is disconnected. Connector is in poor contact.	Refer to Items 1, 2 and 3 above.
Any phenomena other than described above	Air conditioner fails to be started or operates abnormally.	Temperature sensor or other connector is connected improperly. Any protective device acts or any other malfunction occurs.	Perform inspection by referring to the troubleshooting table on Technical Manual II. (which shall be carried out by service personnel)
Operation indicator lamp keeps flashing (once per second) and equipment number "00", error code "dd" and unit code "E.00" are displayed.	Air conditioner fails to be started	Wire controller between indoor units is not connected properly.	Perform inspection by referring to the troubleshooting table on Technical Manual II. (which shall be carried out by service personnel)

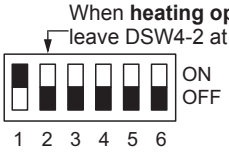
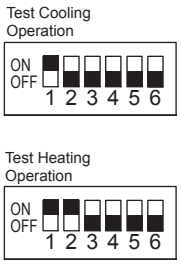
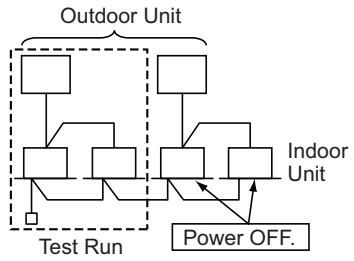
14.3 Trial Operation via Outdoor Unit

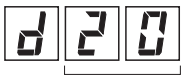


Caution	·Settings are available when DIP switch for trial operation is powered on. ·Recover DSW4 DIP switch to normal status upon end of trial operation. ·In case of any malfunction during trial operation, set #4 key on DSW4 to ON.

⚠ WARNING

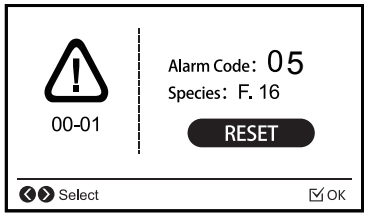
- **Do not touch any other electrical parts when operating switches on the PCB.**
- **Do not attach or detach service cover when the power source for the outdoor unit is ON and the outdoor unit is operated.**
- **Turn all the dip switches of DSW4 OFF when the test run operation is completed.**

	Dip Switch Setting	Operation	Remarks
Test Run	1. Starting Test Run Set DSW4-1 ON and the operation is started after a few ~ 20 seconds.  2. Setting of Operation Mode 	1. The indoor unit automatically start to operate when the test run of the outdoor unit is set. 2. The ON/OFF operation can be performed from the remote control switch or DSW4-1 of the outdoor unit. 3. Continuous operation during 2 hours is performed without Thermo-OFF.	* Take care that the indoor units operate in accordance with the test run operation of the outdoor unit. * The test run is started from the outdoor unit and stopped from the remote control switch, the test run function of the remote control switch is cancelled. However, the test run function of the outdoor unit is not cancelled. Check to ensure that the DSW4-1 of the outdoor unit PCB is turned OFF. * In case that the plural indoor units are connected with one remote control switch, perform the test run operation at each refrigerant system one by one. Then, make sure to turn the power source OFF for the indoor units at other refrigerant system not to operate test run.  * The setting of DSW4 is not required for the test run from the remote control switch.

	Dip Switch Setting	Operation	Remarks
Manual OFF of Comp.	1. Setting *Compressor Manual OFF: Set DSW4-4 ON.  2. Reset *Compressor ON: Set DSW4-4 OFF.  	1. When DSW4-4 is ON during compressor operation, the compressor stops to operate immediately and the indoor unit is under the condition of Thermo-OFF. 2. When DSW4-4 is OFF, the compressor starts to operate after the cancellation of 3-minutes guard.	* Do not repeat compressor ON/OFF frequently.
Manual Defrost	1. Manual Defrost Operation Press PSW5 for more than 3 seconds during heating operation, the defrost operation is started after 2 minutes. This function is not available within 5 minutes after starting heating operation. 2. Manual Defrost Operation Completion Defrost operation is automatically ended and the heating operation is restarted.	1. Defrost operation is available regardless of frosting condition and total time of heating operation. 2. Defrost operation is not performed when the temperature of outdoor heat exchanger is higher than 10°C, high pressure is higher than 3.3MPa or Thermo-OFF.	* Do not repeat defrost operation frequently. * When manual defrost operation is accepted by PSW5, the time left before starting defrost operation is indicated at the 7-segment indicator on the PCB.  Time Left (Every 4 Seconds)

When the test run operation is completed, turn all switches of DSW4 OFF.

(1) During the test run mode, the following default indication will appear.



(2) If the remote control switch is set to a different mode, the test run function will not start. In this case, perform the following actions before the test run.
Remote Control Switch: STOP
Central Station: STOP and Remote Control Switch is available mode.
COOL/HEAT Changeover Switch: Connector (CN17) of Outdoor PCB is opened.
During the test run mode, do not change the remote control switch setting, the central station setting and cool/heat changeover switch setting.

(3) If an alarm code is indicated during the test run, reset the system by turning the main power supply off then back on. The system should then operate.

The following phenomena can not be regarded to indicate that the unit is abnormal. Instead, they are designed to achieve better comfort, and serve for protecting the unit.

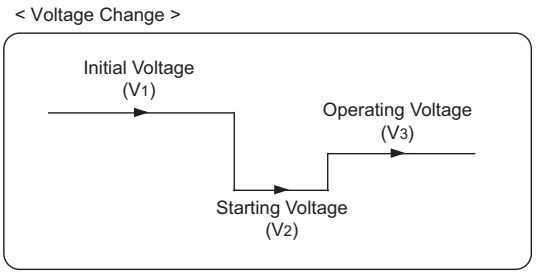
SN.	Normal phenomenon	Remark
1	The unit continues to blow after the heating system is turned off.	This design intends to blow out the waste heat. As the temperature of coil is high when the unit is shut down, the shutdown of fan is delayed to blow out the waste heat to protect the unit.
2	After the machine is started, the air is not blown out immediately or the blowing rate is significantly lower than the set rate.	Heating system: to control and prevent the cold air. As the temperature of coil is low when the machine is started, the outlet air temperature will be low and the comfort will be poor if the air is blown out immediately or the unit operates at high blowing rate. Refrigerating system: to wait for the air deflector to open.
3	When the refrigerating system is turned off, the shutdown of water pump is delayed	To prevent the condensate water from failing to drain immediately.
4	The outlet air temperature becomes high slightly during refrigeration.	To control and prevent the freeze. As the temperature of coil is too low during refrigeration, this design can prevent the freeze caused by excessive tow temperature of the compressor.
5	The operating blowing rate is lower than the set value during dehumidification.	This design serves to improve the dehumidifying effect as the dehumidifying effect is better at low blowing rate.
6	The fan does not blow out air when the heating system is operating.	The unit is being defrosted. In order to prevent the fan blowing out low-temperature air and thus affecting the comfort, the fan stops operating.
7	The machine does not stop after the set temperature is achieved.	The machine does not stop after the set temperature (excluding appropriate temperature) is achieved.
8	After the machine is stopped, it can’t be restarted after restarting.	Three-minute protection control of the compressor. It is designed to avoid frequent startup and shutdown of the compressor. After three minutes, the unit will be restarted.
9	The unit does not operate and displays “Limited Operation” when the machine is started.	The unit fails to be electrified and preheated in advance as required. The temperatures of compressor and viscosity of temperature of refrigerator oil will become low when the air temperature is low. Therefore, the compressor will wear if it is forced to operate.

15.Check and troubleshooting

15.1 Overview of Inspection

(1) Indoor and Outdoor Fan
Inspect that the indoor fan and outdoor fan rotate correctly and the air flow is smooth.

(2) Power Supply Voltage
Check the power supply.
If the power supply is abnormal, contact with electric power company.
Usually, voltage drop will occur when starting as shown in the figure (V_2).
In order to protect device, comply with the following normal range of the power supply voltage.



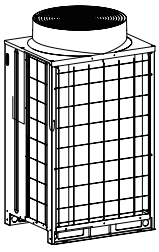
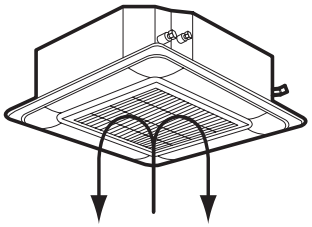
<Normal Range of Power Supply Voltage>
• Supply Voltage: Rated Voltage ≤ ±10%
• Starting Voltage (V_2): Rated Voltage ≥ -15%
Operating Voltage (V_3): Rated Voltage ≤ ±10%
Voltage Imbalance between Phase: ≤ 3%

(3) Normal Operating Pressure
Normal operating suction pressure is 0.2 to 1.1MPa and normal operating discharge pressure is 1.0 to 3.5MPa when the refrigerant charge is correct. Check the operation pressure by the test run mode.

(4) High Pressure Switch
Check the operation pressure of the high pressure switch in the table below.

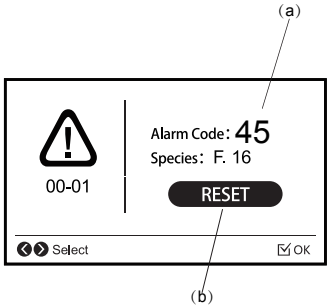
Refrigerant	Operation Pressure
R410A	4.15MPa

(5) High Pressure Increase Retry (Protection Control)
(a) The high pressure will be increased when the following procedure is performed.

Cover the air inlet of outdoor unit during cooling operation.	Cover the air inlet of indoor unit during heating operation.
	

2-130

When High pressure retry control is activated, "P13" will be displayed on PCB of outdoor unit.
If "P13" is displayed for more than 3 times within 1 hour, error code "45" will be displayed. The following will occur on HYXE-J01H:
. Error code "45" is displayed.



(Note) Depending on temperature and other conditions, high pressure will not rise till High pressure breaker operates in some cases.

Checking List for Refrigerant Cycle

CHECK LIST ON TEST OPERATION

CLIENT: _____ INSTALLER: _____ DATE: _____

O.U. MODEL: _____ O.U. SERIAL NO.: _____ CHECKER: _____

I.U. Model							
I.U. Serial No.							

I.U.: Indoor Unit, O.U.: Outdoor Unit

Piping Length: _____ m Additional Refrigerant Charge: _____ kg

(1) General

No.	Check Item	Result
1	<Combination of Base Units> Is DSW6 setting for outdoor unit No. correct?	
2	Are the power source wire and the transmitting wire apart from refrigerant pipings?	
3	Is an earth wire connected?	
4	Is there any short circuit?	
5	Is there any voltage abnormality among each phase? (R-S, S-T, T-R)	

(2) Refrigerant Cycle

a. Operation (Cooling/Heating)

No.	Check Item	Result
1	Operate all the units (“TEST RUN” mode).	
2	Operate all the indoor units at “HIGH” speed.	
3	In case that the constant compressor is turned ON and OFF repeatedly, switch off an indoor unit (small capacity one).	

b. Sampling Data (Cooling/Heating, Indoor Temperature 21~30°C)

No.	Check Item	Result
1	Check the operating data after the 20 minutes operation.	
2	Check Pd and Td. Is Td-SH 15 to 45 deg.?	
3	Is Ps 0.2 to 1.1 MPa?	
4	Is Pd 1.0 to 3.5 MPa? (If the outdoor temperature is high, Pd becomes high.)	

NOTE:
The symbol with an underline ___ indicates checking item.

Heating Operation (It is applicable when outdoor temperature is higher than 0°C.)

No.	Check Item	Standard	Causes	Result
1	Are oE1 and oE2 (O.U. Ex. Valves Opening) abnormally low or high when TdSH is 15 to 45 deg.?	-	• Low → Excessive Refrigerant • High → Insufficient Refrigerant	
2	Is Pd "1.6" to "3.5"? (Pd is high when the indoor temperature is high.)	-	• Low → Solenoid Valve SVA Leakage • High → Excessive Gas Pipe Pressure Loss	
3	Is Ps "0.2" to "1.1"?	-	• Low → O.U. Short-circuit • Low/High → O.U. Fan Motor Failure, Fan Module Failure or Outdoor Ambient Thermistor Failure	
4	Is the temperature difference between I.U.* more than 10 deg. when iE (I.U. Ex. Valve) is "100"? * The temperature difference between I.U. means the following; b3 (Discharge Air Temp.) - b2 (Intake Air Temp.) indicated on the remote control switch by check mode. However, this is applicable only when b2 (Intake Air Temp.) - b1 (Setting Temp.) is higher than 3 deg.	-	• Failure such as PCB, Wiring, I.U. Ex. Valve and Coil • Excessive Pipe Pressure Loss • Thermistor Failure for Discharge Air	

NOTE:

The symbol with an underline ⎯ indicates checking item and the mark " " indicates checking data.

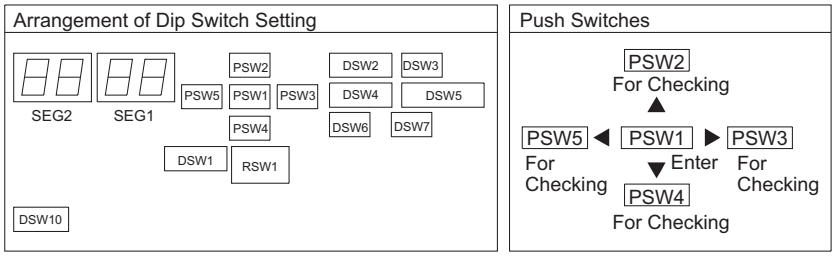
(3) Check Item after Sampling Data

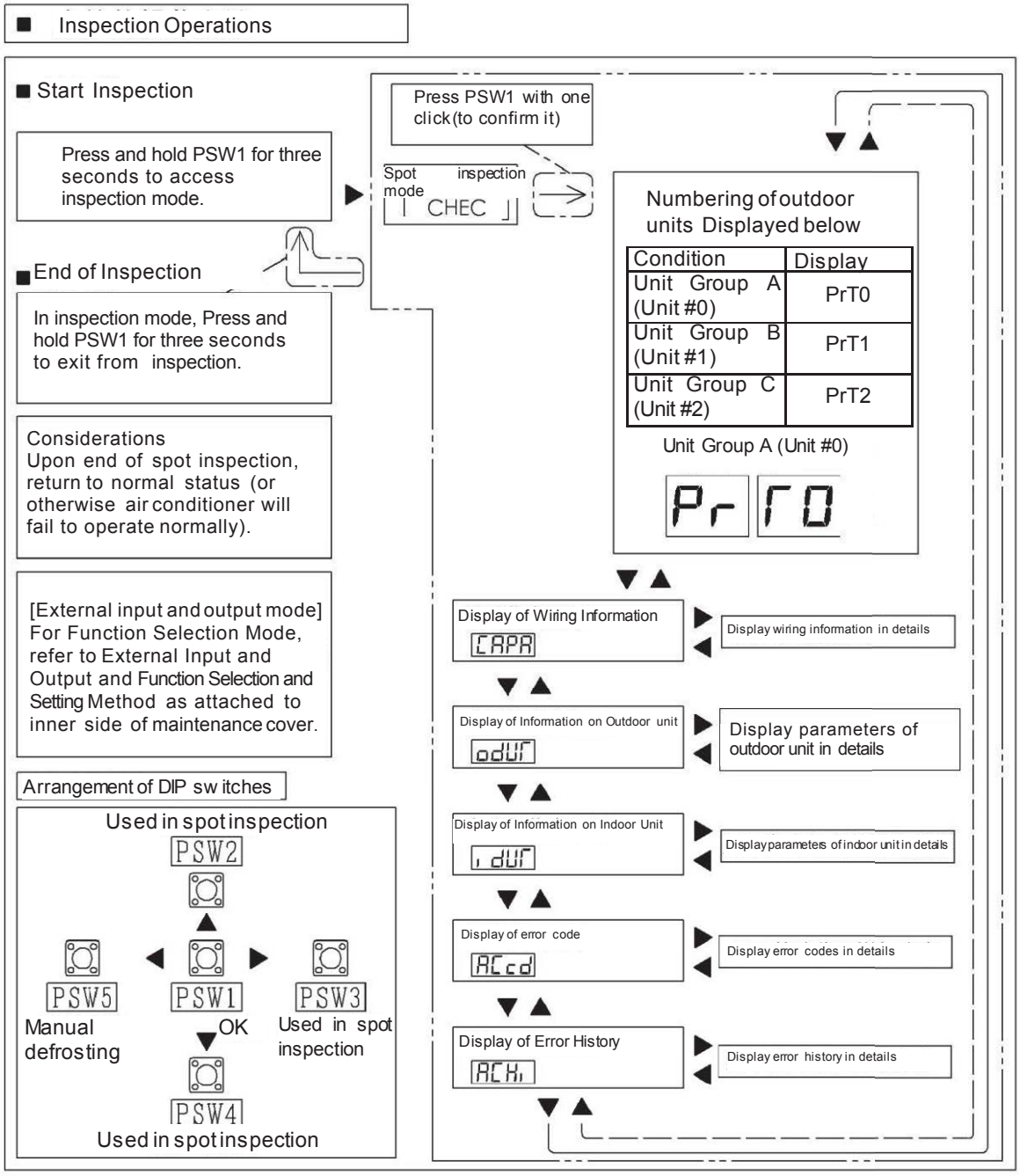
a. Cooling Operation (It is applicable when outdoor temperature is higher than 15°C.)

No.	Check Item	Standard	Causes	Result
1	Is fan actually running when Fo (Air Flow Rate of O.U. Fan) is not "0"?	-	• Fan Motor Failure • PCB1 Failure • Condenser Failure	
2	Is the total of iE (I.U. Ex. Valves Opening) abnormally low or high?	-	• Low → Excessive Refrigerant • High → Insufficient Refrigerant or Excessive Pipe Pressure Loss	
3	Is TL (Liquid Pipe Temp. of I.U. Heat Exchanger) lower than Ti (Intake Air Temp. of I.U.)?	It is normal when TL-Ti < -5 deg.	• TL Thermistor Failure • I.U. Ex. Valve; Fully Closed • Short-Circuit	
4	Is TG (Gas Pipe Temp. of I.U. Heat Exchanger) lower than Ti (Intake Air Temp. of I.U.)? (It is applicable when Intake Air Temp. is 3 deg. higher than Setting Temp.)	It is normal when TG-Ti < -5 deg.	• TG Thermistor Failure • I.U. Ex. Valve; Fully Closed or Slightly Open • Short-Circuit	
5	Is there any excessive difference among I.U. at SH (TG-TL) of I.U. heat exchanger? (It is applicable when Intake Air Temp. is 3 deg. higher than Setting Temp.)	It is normal if the difference among units is within 7 deg.	• TL/TG Thermistor Failure • I.U. Ex. Valve; Fully Open, Slightly Open or Fully Closed	
6	Is there any I.U. with the I.U. heat exchanger SH (TG-TL) excessively different from other units' value and is iE (I.U. Ex. Valves Opening) lower than "7"?	It is normal if SH is within - 3 deg. lower than other units.	• I.U. Ex. Valve; Locked with Fully Open • Mismatched Wiring and Piping	
7	Is there any I.U. with the I.U. heat exchanger SH (TG-TL) excessively different from other units' value and is iE (I.U. Ex. Valves Opening) lower than "100"?	It is normal if SH is within + 3 deg. higher than other units.	• I.U. Ex. Valve; Locked with Slightly Open or Closed • Mismatched between Wiring and Piping	
8	Is the temperature difference between I.U.* more than 7 deg.? * The temperature difference between I.U. means the following; b3 (Discharge Air Temp.) - b2 (Intake Air Temp.) indicated on the remote control switch by check mode.	-	-	

15.2 Inspection Operations

(1) Start inspection: Press and hold PSW1 for three seconds to access Inspection mode "CHEC".





15.3 Spot Inspection and Troubleshooting

■ Spot inspection description

a) Wiring information display

Item		7SEG Display		Description
		SEG2	SEG1	
1	Total capacity of outdoor units			For Total capacity of modules constituting outdoor unit, see table Capacity of Outdoor Unit.
2	Total of outdoor units			Number of modules constituting outdoor unit
3	Capacity of Indoor Unit			Total of indoor units connected
4	Number of indoor units connected			Total of indoor units connected
5	Refrigeraion system number			Number of Refrigeration system for outdoor unit
6	Capacity of Indoor Unit			Capacity of Indoor Unit
7	Total frequency of compressors			Sum of operating frequency Unit: Hz
8	Compressor duration operation			Unit: hours (×10 = actual operation duration)

b) Outdoor unit parameter display

Choose outdoor unit number by pressing PSW4 (▼) and PSW2 (▲)

Unit number	Display
Module A (Unit #0)	
Module B (Unit #1)	
Module C (Unit #2)	

View parameter detail by pressing PSW3(◆)

Press PSW4 (▼)/PSW2 (▲) to page down/up.

Press PSW5 (●) to return

Item		7SEG Display		Description
		SEG2	SEG1	
1	Capacity of outdoor unit module			Capacity of module of outdoor unit Refer to Outdoor Unit Capacity Codes
2	Outdoor unit output status			Output status of outdoor unit See Outdoor Unit 7SEG Spot Inspection Diagram
3	Frequency of compressor			Operating frequency of compressor Unit: Hz
4	Number of compressors			Number of compressors operating
5	Outdoor unit fan level			Capacity level of fan of outdoor unit (0~27) A lager number means a higher blast volume.
6	Aperture of expansion valve (MV1)			Aperture unit:% A lager number means a larger aperture
7	Aperture of expansion valve of super-cooling heat exchanger			Aperture unit:% A lager number means a larger aperture
8	Exhaust pressure			Unit: MPa Display of "562" means open circuit; display of "-062" means short circuit.
9	Intake pressure			Unit: Close Display of "225" means open circuit; display of "-025" means short circuit.
10	Return air temperature of outdoor unit (Ta)			Unit: ℃ Display of "-127" means open circuit; display of "127" means short circuit.
11	Compressor (MC1) exhaust temperature			Unit:℃ Display of "0" means open circuit; display of "255" means short circuit.
12	Compressor (MC2) exhaust temperature			Unit:℃ (available only for outdoor units of Models 136~154) Display of "0" means open circuit; display of "255" means short circuit.
13	Liquid-side temperature in heat exchanger			Unit:℃ Display of "-127" means open circuit; display of "127" means short circuit.
14	Gas-side temperature in heat exchanger			Unit:℃ Display of "-127" means open circuit; display of "127" means short circuit.
15	Super-cooler bypass-side temperature			Unit:℃ Display of "-127" means open circuit; display of "127" means short circuit.
16	Super-cooler outlet-side temperature			Unit:℃ Display of "-127" means open circuit; display of "127" means short circuit.
17	Frequency converter module temperature			Unit:℃
18	Fan control module temperature			Unit:℃

Item		7SEG Display		Content
		SEG2	SEG1	
19	Compressor (MC1) current			Unit: A
20	Compressor (MC2) current			Unit: A Available only for outdoor units of Models 400~450
21	Outdoor unit fan motor (MFC1) current			Unit: A
				Unit: A
22	Compressor (MC1) operation duration			Unit: hours (×10 = actual operation duration)
23	Compressor(MC2) operation duration			Unit: hours (× 10 = actual operation duration) Available only for outdoor units of Models 136~154
24	Compressor (MC1) operation duration			Unit: hours (×10 = actual operation duration)
25	Compressor(MC2) operation duration			Unit: hours (×10 = actual operation duration) Available only for outdoor units of Models 400~ 450
26	Cause for failure of frequency converter module			Cause for failure of frequency converter module See Cause Codes for Failure of Frequency Converter Module
27	Cause for failure of fan module			Cause for failure of fan module See Cause Codes for Failure of Fan Module

c) Indoor unit parameter display

Choose outdoor unit number by pressing PSW4 (▼) and PSW2 (▲)

Indoor unit address number	Display
Unit #0	
Unit #1	
↓	↓
Unit #63	

View parameter detail by pressing PSW3 (►)

Press PSW4 (▼)/PSW2 (▲) to page down/up.

Press PSW5 (◄) to return

Item		7SEG Display		Content
		SEG2	SEG1	
1	Capacity of Indoor Unit			For capacity of indoor unit, see Indoor Unit Capacity Codes
2	Aperture of electronic expansion valve			Unit: %
3	Heat exchanger liquid pipe temperature			Unit: ℃
4	Heat exchanger gas pipe temperature			Unit: ℃
5	Inlet air temperature			Unit: ℃
6	Outlet air temperature			Unit: ℃
7	Cause for shutdown of indoor unit			For shutdown of indoor unit, see Cause Codes for Shutdown of Indoor Unit

d) Displayof error code
Press PSW4 (▼)/PSW2 (▲) to page down/up.

Item		7SEG Display		Content
		SEG2	SEG1	
1	Error Codes for Outdoor Unit			The latest error code or outdoor unit. See Error Codes for more details.
2	Retreat control for low pressure ratio protection			0: Retreat control is not started 1: Retreat control is acting
3	Retreat control for high pressure protection			0:Retreat control is not started 1:Retreat control is acting
4	Retreat control for frequency converter module temperature rise protection			0:Retreat control is not started 1:Retreat control is acting
5	Retreat control for high exhaust pressure protection			0:Retreat control is not started 1:Retreat control is acting
6	Retreat control for high exhaustsuperheat degree protection			0:Retreat control is not started 1:Retreat control is acting
7	Retreat control over-for current protection			0:Retreat control is not started 1:Retreat control is acting

e) Displayof Error History

Record recent 15 error codes displayed

Choose error SN by pressing PSW4 (▼) and PSW2 (▲)

SN	7SEG Display	
	SEG2	SEG1
1		
↓	↓	
15		

View parameter detail by pressing PSW3 (►)

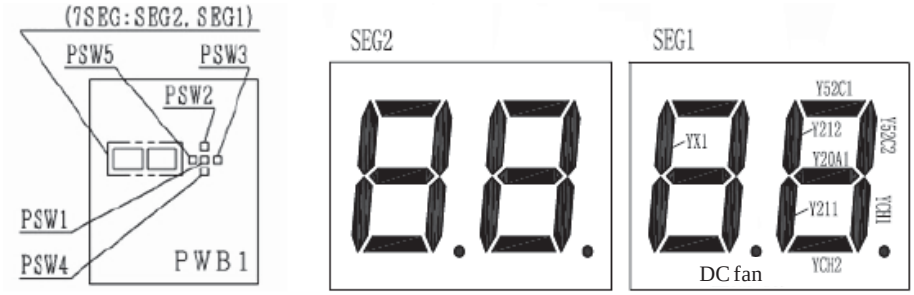
Press PSW4 (▼)/PSW2 (▲) to page down/up.

Press PSW5 (◄) to return

Item		7SEG Display		Content
		SEG2	SEG1	
1	Operation duration			Display operation duration upon occurrence of failure Unit: hours (×10 = actual duration)
2	Cause for failure			Cause for shutdown of outdoor unit
				Cause for shutdown of indoor unit
				Control information
3	Failure/shutdown code			Tens digit of SEG2 means number of outdoor unit, while the single digit means serial number of compressor. SEG1 means error code/cause for failure
4	Error display			Where IT code is available, display cause codes for shutdown of frequency converter
				Where FT code is available, display cause codes for shutdown of fan control
				Constant compressor current error: in case of OA shutdown
				Constant compressor current error: over-current shutdown
		--	--	Others

Annex

●7SEG Display Part Diagram



●Cause Codes for Failure send to Indoor Unit

Shutdown code	Cause	Shutdown code	Cause
00	Operation is ceased and power supply is shut off	14	Retry caused by over-current in Constant compressor
01	Shutdown for temperature control	15	Retry caused by low intake pressure and exhaust temperature rise
02	Shutdown for alarm	16	Retry caused by low exhaust superheat degree
03	Freezing protection/overheating protection	17	Retry caused by trip-out of frequency converter
05	Instantaneous power failure in outdoor unit	18	Retry caused by low supply voltage
06	Instantaneous power failure in indoor unit	19	Electronic expansion valve aperture variation protection
07	Cooling suspension for low ambient temperature Heating suspension for high ambient temperature	21	Demand Stoppage
09	Failure for four-way valve change-over control	22	Compressor preheating protection
10	Demand Stoppage on demand	26	Retry caused by low High pressure
11	Retry caused by pressure ratio fall	28	Low cooling air temperature protection control
12	Retry caused by LP pressure rise	30	Shutdown of compressor (except or failure of temperature control)
13	Retry caused by high pressure rise	32	Retry caused by communication error in outdoor unit
36	Retry caused by shutdown of outdoor unit after defrosting	39	Shutdown caused by energy conservation control

●Cause Codes for Failure of INV Module

Shutdown code	Cause
1	INV Module controlled shutdown
2	Instantaneous over-current
3	Module temperature rise
4	Heating protection action
5	Excessively low voltage
6	excessive voltage
7	Communication error
8	Current sensor operates improperly
9	Instantaneous power failure
11	Frequency converter module micro-computer reset
12	Compressor earthing error
13	Power supply phase sequence is incorrect
16	Frequency converter module retry
21	Compressor error

●Cause Codes for Failure of Fan Control Module

Shutdown code	Cause
1	Fan module controlled shutdown
2	Instantaneous over-current
3	Module temperature rise
4	Heating protection action
5	Excessively low voltage
6	Excessive voltage
7	Communication error
8	Current sensor operates improperly
9	Instantaneous power failure
11	Fan module micro-computer reset
12	Earthing error
15	Reverse rotation
16	Fan control module retry
17	Control error
21	Motor error

● Capacity of Outdoor Units

Display code	Capacity of outdoor unit	HP
64	76	8
80	96	10
96	114	12
112	136	14
128	154	16
144	170	18
160	190	20
176	212	22

● Capacity of Indoor Units

Display Code	Capacity of Indoor Units	HP
5	05	0.6
6	07	0.8
8	09	1.0
10	12	1.3
13	14	1.8
14	17	2.0
16	18	2.3
18	22	2.5
20	24	2.8
22	27	3.0
26	30	3.3
32	38	4.0
40	48	5.0
48	54	6.0
64	76	8.0
80	96	10.0
128	154	16.0
160	190	20.0

● Protection Code

Protection Code	Protection Control	Protection Code	Protection Control
P01	Pressure ratio protection control	P11	Retry caused by excessively low pressure ratio
P02	High pressure rise protection control	P12	Retry caused by LP pressure rise
P03	Frequency converter current protection control	P13	Retry caused by High pressure rise
P04	Frequency converter temperature rise protection control	P14	Retry caused by over-current in Constant compressor
P05	Exhaust temperature rise protection control	P15	Retry caused by low intake pressure and exhaust temperature rise
P06	LP pressure low protection control	P16	Retry caused by low exhaust superheat degree
P09	High pressure low protection control	P17	Retry caused by trip-out of frequency converter module
P0A	Specified current protection control	P18	Retry caused by frequency converter module over-voltage/under-voltage
P0d	LP pressure rise protection control	P26	Retry caused by low High pressure

Note: When retreat control is started: P01~05 is displayed as: PC1～5.

● Error Codes

Error Codes	Error Description	Cause
01	Protective device of indoor unit acts (float switch)	Float switch acts (high water level, drain pipe error, float switch error, drain pump error)
02	Protective device of outdoor unit acts (High pressure switch)	High pressure switch acts (excessive Refrigerant, tube blockage, entry of non-condensable gas)
03	Communication between outdoor unit and indoor unit is improper	communication cable between outdoor and indoor units is connected incorrectly or disconnected, shared power supply to outdoor unit is off, or communication fuse of outdoor unit is blown
04	Communication between PCB1 of outdoor unit and frequency converter module of compressor is improper	Connection wire gets loose, is connected improperly or module fails
04	Communication between PCB1 of outdoor unit and fan control module is improper	Connection wire gets loose, is connected improperly or module fails
05	Power supply phase sequence is incorrect	Reverse phase, default phase, or power supply fails
06	Frequency converter module voltage in compressor is improper	Supply voltage to outdoor unit is too low, or compressor frequency converter module control board fails
06	Fan control module voltage is improper	Supply voltage to outdoor unit is too low, or fan module fails
07	Exhaust air superheat degree is too low	Refrigerant is overloaded, temperature sensor/ electronic expansion valve fails, or tube is connected improperly
08	Exhaust air temperature is too high	Refrigerant is under-loaded, temperature sensor/electronic expansion valve fails, pipeline system is blocked or tube is connected improperly
0A	Communication between outdoor unit modules is improper	Wire is connected improperly; connecting terminal gets loose
0B	Sub-module of outdoor units is set incorrectly	Address of sub-unit in one outdoor unit system is set incorrectly
0C	Main module of outdoor units is set incorrectly	Two masters are set in one outdoor unit system

11	Return air temperature sensor of indoor unit operates improperly	Temperature sensor is in short circuit or open circuit Connection wire is improper PCB fails
12	Outlet air temperature sensor of indoor unit operates improperly	
13	Liquid pipe humidity sensor of heat exchanger of indoor unit operates improperly	
14 16	Gas pipe temperature sensor of heat exchanger of indoor unit operates improperly Ambient temperature sensor of fresh air processor operates improperly	
19	Protective device in fan motor for indoor unit acts	Fan motor is blocked or overheats, or motor protection circuit is open
21	High pressure sensor operates improperly (outdoor unit)	Sensor is in short circuit or open circuit Connection wire is improper PCB fails
22	Ambient temperature sensor operates improperly (outdoor unit)	
23	Exhaust air temperature sensor operates improperly(outdoor unit)	
24	Liquid-side temperature in heat exchanger operates improperly(outdoor unit)	
25	Gas-side temperature in heat exchanger operates improperly(outdoor unit)	
29	LP pressure sensor operates improperly (outdoor unit)	
31	Capacity combination of indoor and outdoor units is incorrect	Capacity matching/connection between indoor and outdoor units is Incorrect, capacity DIP switch is set incorrectly, system numbering in Hi-NET Ⅱ system is incorrect
35	System number of outdoor unit or address number of indoor unit is set incorrectly	Duplicate system number is allocated in outdoor units in one Hi-NET Ⅱ system Duplicate address number is allocated in indoor units in one system
38	Outdoor protective circuit is improper	Protective circuit of outdoor unit acts, or PCB is connected incorrectly
3a	Capacity of outdoor unit is improper	Combined capacity of outdoor units is larger than 54HP
3b	Outdoor units are combined incorrectly	Master/slave combination or supply voltage setting of outdoor unit is incorrect
3d	Communication between master and slaves of outdoor unit is improper	Wire is connected improperly; connecting terminal gets loose
43	Pressure ratio low protection acts	Poor compression (compressor/frequency converter fails; power supply is improper)
44	LP pressure rise protection acts	Indoor unit overloads in cooling operation; outdoor temperature is too high in heating operation; expansion valve fails
45	High pressure rise protection acts	Overloaded operation, system pipeline is blocked, airflow is in short circuit, Refrigerant is overloaded; non-condensable gas is mixed in
47	LP pressure low protection acts	Refrigerant is under-loaded, pipeline is blocked, or expansion valve fails
48	Frequency converter over-current protection acts	Overload operation; compressor fails

51	Frequency converter current sensor operates improperly	Current sensor fails
53	Frequency converter control signals are improper	Frequency converter control is improper (over-current/low voltage/short circuiting protection) Instantaneous over-current
54	Frequency converter temperature rise protection acts	Temperature sensor operates improperly, heat exchanger is blocked, or fan motor fails
55	Frequency converter fails	Frequency converter PCB fails
57	Fan control PCB protection acts	Fan control PCB is improper (over-current/ low voltage/short circuiting protection) Instantaneous over-current
5a	Fan control PCB temperature rise protection acts	Temperature sensor operates improperly, heat exchanger is blocked, or fan motor fails
5b	Fan control PCB over-current protection acts	Fan motor fails
5c	Current sens or on fan control PCB operates improperly	Current sensor fails
EE	Compressor protection alarm	The following failure occurs for 3 times within 6 hours in compressor: 02, 07, 08, 39, 43, 44, 45, 47
B1	System number of outdoor units is set incorrectly	Refrigeration system number of outdoor unit should be set to 64-69
B5	Incorrect number of indoor units are connected	Number of indoor units other than Hi-NET Ⅱ connected in one system ≥17

● Normal operation status

Pd	below 3.0MPa
Ps	0.15~1.3Mpa
Compressor temperature	below 110℃
Temperature of heat exchanger (Heating)	-25~15℃

● Rest of accumulated compressor operation time

Accumulated compressor operation time includes: general accumulated operation time (UJ) and post-maintenance accumulated operation time (CUJ). The latter can be reset each time after maintenance is finished.

● Object

Accumulated operation time (CUJ1~CUJ2) of Compressor #1 and #2

● Reset of accumulated compressor operation time (CJU)

To reset accumulated compressor operation time (CJU), press and hold <PSW1+PSW3> for more than 5 seconds.

● Example: Reset of accumulated operation time (CUJ1) of Compressor #1

15.4 Troubleshooting

15.4.1 Initial Troubleshooting

● Checking of Electrical Wiring and Power Source

Inspect the following items when abnormality is found during the system activation.

No.	Check Item	Check Method
1	Is power source breaker or fuse blown out?	Check the voltage (secondary side) of the breaker and also check the conductivity of fuse by a tester.
2	Is voltage at secondary side of transformer correct?	Disconnect connection at the secondary side of the transformer and measure voltage by a tester.
3	Is wiring firmly fixed or correctly connected?	• Check to ensure that the terminal for power source wiring (terminals "L1" to "L1" and "N" to "N" of each terminal board: AC380-415V, terminals "R" to "L1" and "S" to "L2" of each terminal board: AC220-240V) and intermediate wiring (Operating Line: terminals "1" to "1" and "2" to "2" of each terminal board: DC5V) between the indoor unit and the outdoor unit coincide correctly, as figure on the next page. If not, som component will be damaged. • Check the wiring connection to the PCB and especially ensure that the following connections are NOT loosened. (a) thermistor connector plug (each) (b) remote control cable connector plug (c) transformer connector plug (d) each connector plug of main power source circuit • Check to ensure that the twist pair cable with shield (≥0.75mm^2) are used for intermediate wiring to protect noise obstacle at total length of less than 1000m and size complied with local code. • Check to ensure that the wirings and the breakers are chosen correctly, as shown in Table 15.4. • All the field wiring and equipment must comply with local code.

Example for Electrical Wiring Connection

< 380-415V/50Hz >

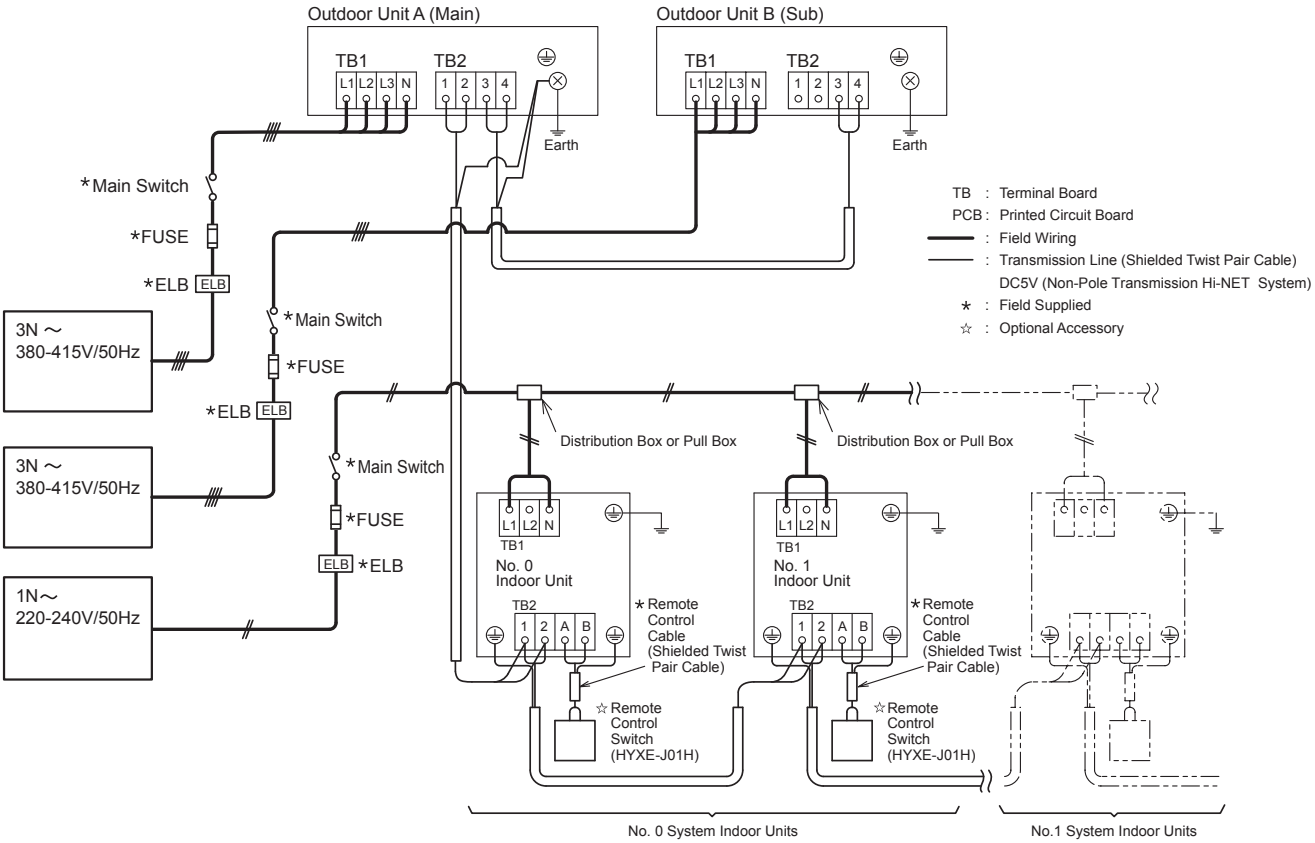


Table 15.4 Electrical Data and Recommended Wiring, Breaker Size/1 Outdoor Unit

■ Field Minimum Wire Sizes for Power Source

Outdoor Unit (KBtu/h)	Power Supply	Maximum Running Current (A)	Power Source Cable Size EN60335-1 *1 (mm^2)	Transmitting Cable Size EN60335-1 *1 (mm^2)	Earth Wire Size (mm^2)	ELB Nominal Current (A)	ELB Nominal Sensitive Current (mA)	Fuse (A)
76	AC 3Φ 380~415/50Hz	23	6	0.75	6	40	30	40
96		23	6	0.75	6	40	30	40
114		31	6	0.75	6	50	30	50
136		31	10	0.75	10	50	30	50
154		33	10	0.75	10	50	30	50

*1 Refer to the NOTES for selection of the power source cable size.
ELB: Earthleakage Breaker.

NOTES:

1) Follow local codes and regulations when selecting field wires.
2) The wire sizes marked with *1 in the table of previous page are selected at the maximum current of the unit according to the European Standard, EN60 335-1. Use the wires which are not lighter than the ordinary tough rubber sheathed flexible cord (code designation H05RN-F) or ordinary polychloroprene sheathed flexible cord (code designation H05RN-F).
3) Use a shielded cable for the transmitting circuit and connect it to ground.
4) In the case that power cables are connected in series, add each unit maximum current and select wires below.

Selection According to EN60 335-1

Current i (A)	Wire Size (mm^2)
$i \leq 3$	1.0~2.5
$3 < i \leq 6$	1.0~2.5
$6 < i \leq 10$	1.0~2.5
$10 < i \leq 16$	1.5~4.0
$16 < i \leq 25$	2.5~6.0
$25 < i \leq 32$	4.0~10.0
$32 < i \leq 50$	6.0~16.0
$50 < i \leq 63$	10.0~25.0
$63 < i$	*2

*2: In the case that current exceeds 63A, do not connect cables in series.

⚠CAUTION

Install a multi-pole main switch with a space of 3.5mm or more between each phase.

- Checking of Rotary Switch and Dip Switch Setting

  The following figures indicate the normal setting (before shipment) of DSW on PCB in the indoor and outdoor unit. When simultaneous operation control of multiple units or room thermo control is operated, DSW setting will be different with the following figures.

  Outdoor Unit (before shipment)

  TURN OFF all power sources before setting. Without turning OFF, the switches do not work and the contents of the setting are invalid. (However, DSW4-No.1, 2, 4 and push switches can be operated during power sources is ON.) Mark of " ▪ " indicates the position of dip switches.

< 380-415V/50Hz

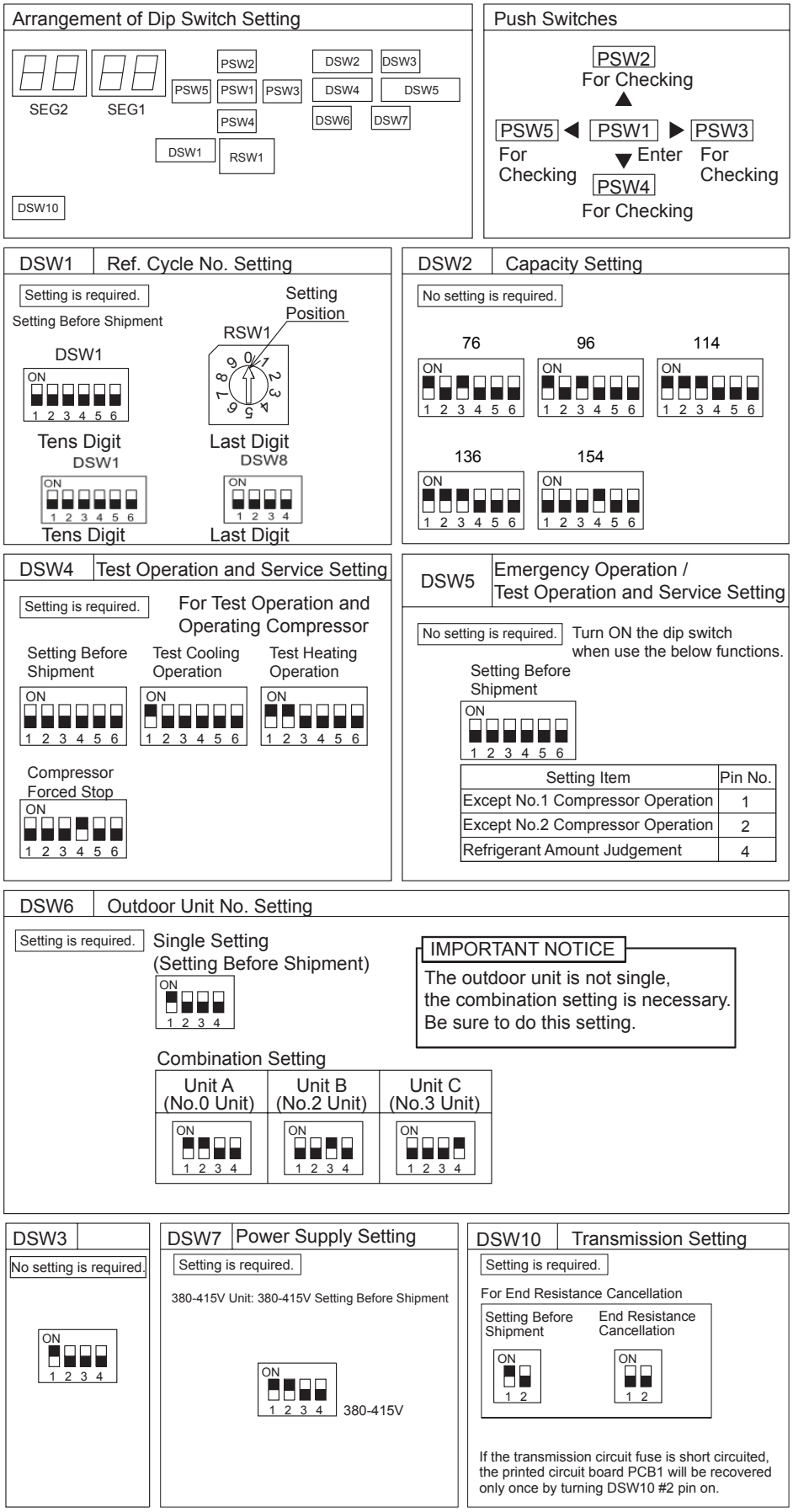


Fig. DSW Setting

● Checking by 7-Segment Display

• Simple Checking by 7-Segment Display

1 ✳ Turn on All Indoor Units

✳ All the Indoor Units Connected to the Outdoor Unit

2 Turn on the Outdoor Unit

3 Auto-addressing Starts

Outdoor Unit Printed Circuit Board PCB1

During auto-addressing, the following items can be checked using the outdoor unit's on-board 7-segment LED display.
(1) Disconnection of power supply to the indoor unit.
(2) Reverse connection of the operating line between the outdoor and indoor units.
In this case, "03" appears after 30 seconds.
(3) Duplication of indoor unit number. See Alarm Code 35.

Normal Case

(1) The outdoor unit's on-board 7-segment LED display is not indicated.

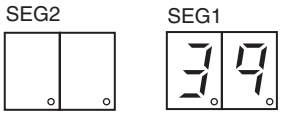
Abnormal Case

(2) The outdoor unit's on-board 7-segment LED display indicates as follows if there is something wrong.

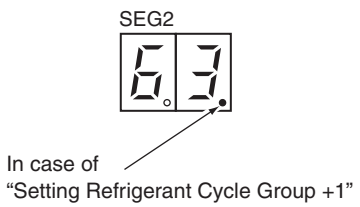
(A) Alarm code will be displayed on the 7-segment when alarm is received from indoor unit in normal mode.
As for the following alarm codes, however, alarm code will be displayed on the 7-segment when alarm is detected by outdoor unit itself.
- Alarm Code “03” (Abnormal Transmission between Indoor Unit and Outdoor Unit)
- Alarm Code “35” (Incorrect Indoor and Outdoor Unit No. Setting)

(B) Alarm code of smaller indoor unit address No. will be displayed when alarm is received from multiple indoor units.

(C) The following 7-segment is displayed and flashed every 0.5 seconds.



(D) SEG1 and SEG2 are as follows.

7-Segment Display	Dotted Indication	Remarks
<In Case of Unit No. 63, Alarm Code “01”> SEG2: Indoor Unit No. (0~63) SEG1: Alarm Code  	 	In case of 2-refrigerant cycle group, indentify from SEG2 dotted indication.

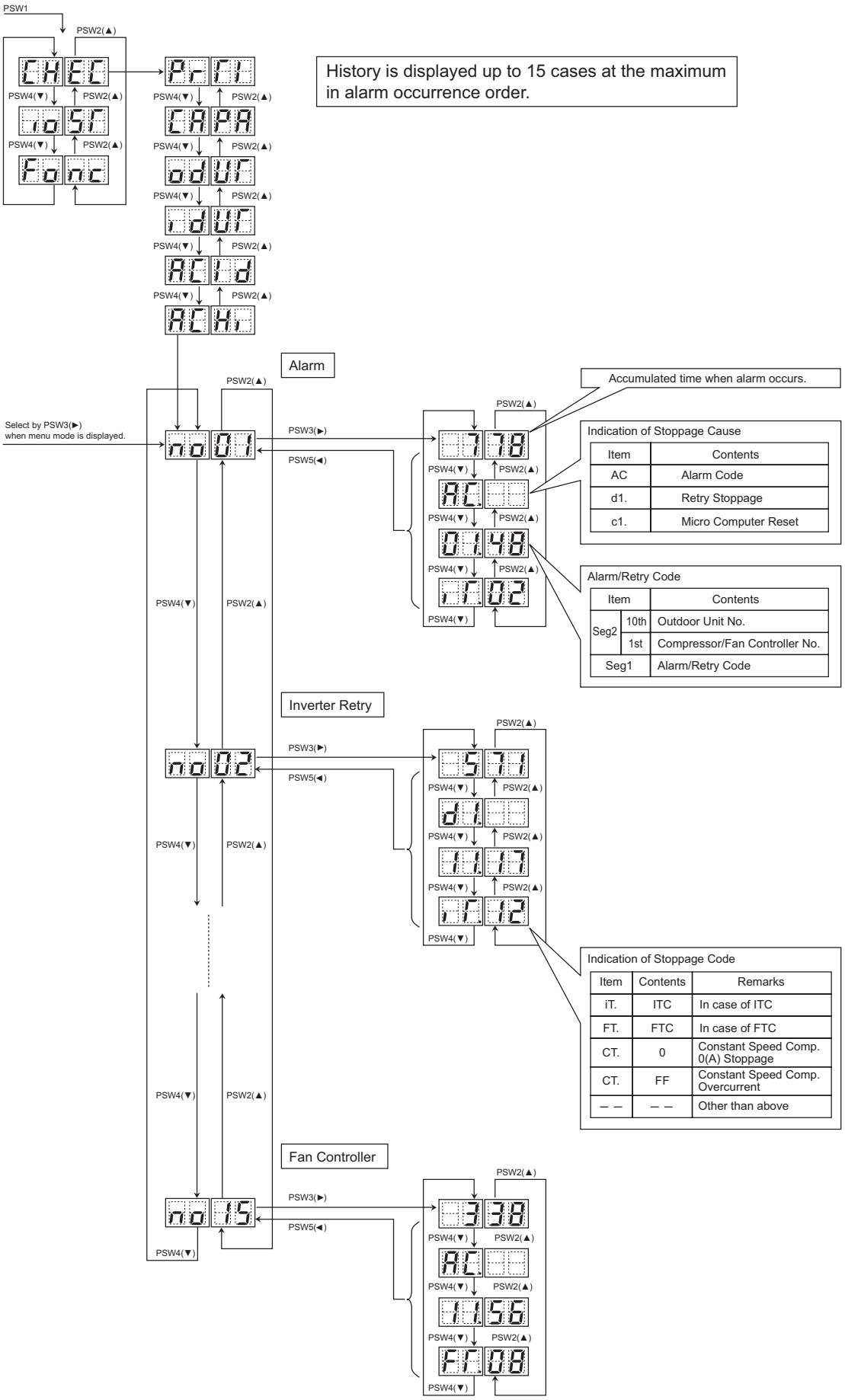
- Function Setting

No.	Setting Item	7-Segment Display		Contents
		SEG2	SEG1	
1	Circular at Heating Function Thermo-off	FA	00	No setting
			01	Indoor fan forced ON and OFF (2 min. ON / 6 min. OFF)
2	Night-Shift	ni	00	No Setting
			01	Setting of night-shift
3	Cancellation of Outdoor Ambient Temperature Limit	GS	00	No setting
			01	For heating
			02	For cooling
			03	For cooling/heating
4	Defrost for Cold Area (Change of Defrost Condition)	Jo	00	No setting
			01	Condition 2 of defrost operation
5	SLo (Fan Speed) Defrost Setting	bJ	00	Indoor fan stop when heating operation is activated/during defrost operation
			01	Indoor fan SLo operation during defrost operation
			02	Indoor fan SLo operation when heating operation is activated
			03	Fan operation when heating operation is activated/ Indoor fan SLo operation during defrost operation
6	Cancellation of Hot Start	HT	00	Hot start control is available
			01	Cancellation of hot start
7	Priority Capacity Mode	nU	00	No setting
			01	Change of frequency maximum limit value
			02	Change of current limit value
			03	Change of frequency maximum limit value and current limit value
8	Compressor Frequency Control Target Value for Cooling	Hc	00	Initial setting (Ps evaporation temperature targeted value 7°C)
			01	Targeted value (2°C)
			02	Targeted value (3°C)
			03	Targeted value (4°C)
			04	Targeted value (5°C)
			05	Targeted value (9°C)
			06	Targeted value (10°C)
			07	Targeted value (11°C)
			08•09	Not prepared (If set, the setting item will be ignored by the control PCB.)
9	Compressor Frequency Control Target Value for Heating	Hh	00	Initial setting (Ps targeted value 2.85MPa)
			01	Targeted value (2.60MPa)
			02	Targeted value (2.75MPa)
			03	Targeted value (2.80MPa)
			04	Targeted value (2.82MPa)
			05	Targeted value (2.88MPa)
			06	Targeted value (2.90MPa)
			07	Targeted value (2.95MPa)
			08•09	Not prepared (If set, the setting item will be ignored by the control PCB.)
10	Indoor Expansion Valve Control Target Value for Cooling	SC	00	Initial setting (SH targeted value +5°C)
			01	SH Targeted value 7
			02	SH Targeted value 6
			03	SH Targeted value 4
			04	SH Targeted value 3
			05~09	Not prepared (If set, the setting item will be ignored by the control PCB.)
11	Indoor Expansion Valve Control Target Value for Heating	SH	00	Initial setting (SC targeted value +5°C)
			01	SC Targeted value 11
			02	SC Targeted value 8
			03	SC Targeted value 2
			04	SC Targeted value -1
			05~09	Not prepared (If set, the setting item will be ignored by the control PCB.)
12	Indoor Expansion Valve Opening Change for Stoppage Indoor Unit in Heating Mode	Si	00	Initial setting (stoppage unit expansion valve opening (150~325 pulse))
			01	Expansion valve opening 07~22: 175 pulse, 24 or over: 300 pulse
			02	Expansion valve opening 07~22: 100 pulse, 24 or over: 150 pulse
			03~09	Not prepared (If set, the setting item will be ignored by the control PCB.)
13	Indoor Expansion Valve Opening Change for Thermo-OFF Indoor Unit in Heating Mode	So	00	Thermo-OFF unit expansion valve opening (150~325 pulse)
			01	Expansion valve opening 07~22: 175 pulse, 24 or over: 300 pulse
			02	Expansion valve opening 07~22: 100 pulse, 24 or over: 150 pulse
			03~09	Not prepared (If set, the setting item will be ignored by the control PCB.)

No.	Setting Item	7-Segment Display		Contents
		SEG2	SEG1	
14	Indoor Expansion Valve Initial Opening of Thermo-ON Indoor Unit in Heating Mode	ci	00	Initial setting (300~650PK)
			01	2000 pulse
			02	1400 pulse
			03	1000 pulse
			04	600 pulse
			05~09	Not prepared (If set, the setting item will be ignored by the control PCB.)
15	Fine Adjustment of Indoor Expansion Valve Initial Opening in Cooling Mode	cb	00	Initial setting
			01	Cooling operation initial opening -2%
			02	Cooling operation initial opening +1%
			03	Cooling operation initial opening +3%
			04	Cooling operation initial opening +5%
			05~09	Not prepared (If set, the setting item will be ignored by the control PCB.)
16	Fine Adjustment of Indoor Expansion Valve Initial Opening in Heating Mode	ch	00	Initial setting
			01	Heating operation initial opening -2%
			02	Heating operation initial opening +1%
			03	Heating operation initial opening +3%
			04	Heating operation initial opening +5%
			05~09	Not prepared (If set, the setting item will be ignored by the control PCB.)
17	Low Noise Setting (In the case of low noise setting, cooling/heating operation range will be restricted.)	db	00	Initial setting
			01	Fan rotation maximum limit 20 steps
			02	Fan rotation maximum limit 18 steps
			03	Fan rotation maximum limit 16 steps
			04	Frequency limit 1
			05	Frequency limit 2
			06	Frequency limit 3
			07	Operation sound value, Catalog value-2dB
			08	Operation sound value, Catalog value-5dB
			09	Operation sound value, Catalog value-8dB
18	Demand Function Setting	dE	00	No demand control
			01	Demand control 40%
			02	Demand control 60%
			03	Demand control 70%
			04	Demand control 80%
			05	Demand control 100%
19	Wave Function Setting	UE	00	No wave function
			01	Minimum limit 40%
			02	Minimum limit 60%
			03	Minimum limit 70%
			04	Minimum limit 80%
20	Cold Draft Protection	Fb	00	Initial setting
			01	Outlet temperature $\geq$ 10°C
			02	Outlet temperature $\geq$ 12°C
			03	Outlet temperature $\geq$ 14°C
21	Not Prepared	FT	00	-
22	Adjustment of Fan Rotation (To avoid a whining sound for the multiple installation.)	Fo	00	Initial setting
			01	Change of fan rotation -15rpm
			02	Change of fan rotation -30rpm
23	Not Prepared	LT	00	-
24	Not Prepared	F1	00	-
25	Not Prepared	F2	00	-
26	Not Prepared	F3	00	-

- Checking of Alarm Code History

Alarm code history is indicated in the following order while the check mode is displayed.
"no01" (latest) ⟷ history data ~ "no15" (oldest) ⟷ history data
Refer to the figure below as an example.



(1) Register of Alarm Code History

Cause of Stoppage (Alarm Code or Stoppage Code)	Contents	Indication of Alarm Code History					
		Time	*Alarm	Alarm Code			Alarm Code or Stoppage Code
				O.U. Unit No.	Comp. No.	Fan No.	
02	Activation of protection device	Accumulated Time	AC.	○	○		--
03	Abnormality transmitting between indoor units and outdoor units	Accumulated Time	AC.				--
04	Abnormality transmitting between inverter PCB and outdoor PCB	Accumulated Time	AC.	○	○		--
04.	Abnormality transmitting between fan controller and outdoor PCB	Accumulated Time	AC.	○		○	--
05	Abnormality of power source phase	Accumulated Time	AC.	○			--
06	Abnormality of inverter voltage	Accumulated Time	AC.	○	○		iTC
d1-18		Accumulated Time	d1.	○	○		iTC
06.	Abnormality of fan controller voltage	Accumulated Time	AC.	○		○	FTC
07	Decrease in discharge gas superheat	Accumulated Time	AC.	○	○		--
d1-16		Accumulated Time	d1.	○	○		--
08	Increase in discharge gas temperature at the top of compressor	Accumulated Time	AC.	○	○		--
d1-15		Accumulated Time	d1.	○	○		--
0A	Abnormality transmitting between outdoor units	Accumulated Time	AC.				--
0b	Incorrect outdoor unit address setting	Accumulated Time	AC.				--
0c	Incorrect outdoor main unit setting	Accumulated Time	AC.				--
21	Abnormality of high pressure sensor	Accumulated Time	AC.	○			--
22	Abnormality of thermistor for outdoor air temperature	Accumulated Time	AC.	○			--
23	Abnormality of thermistor for discharge gas temp. on top of compressor	Accumulated Time	AC.	○	○		--
24	Abnormality of thermistor for outdoor unit heat exchanger liquid pipe (Te/Tchg)	Accumulated Time	AC.	○	Thermistor Signal Te: E Tchg: C		--
25	Abnormality of thermistor for outdoor unit heat exchanger gas pipe (Tg/TbG)	Accumulated Time	AC.	○	Thermistor Signal TG: G TbG: b		--
29	Abnormality of low pressure sensor	Accumulated Time	AC.	○			--
31	Incorrect capacity setting of indoor unit and outdoor unit	Accumulated Time	AC.				--
35	Incorrect indoor unit No. setting	Accumulated Time	AC.				--
36	Incorrect indoor unit combination	Accumulated Time	AC.				--
38	Abnormality of picking up circuit for protection in outdoor unit	Accumulated Time	AC.	○			--
39	Abnormality of running current at constant speed compressor	Accumulated Time	AC.	○			CT Detected Value
d1-14		Accumulated Time	d1.	○			
3A	Abnormality of outdoor unit capacity	Accumulated Time	AC.				--
3b	Incorrect setting of outdoor unit model combination or voltage	Accumulated Time	AC.				--
3d	Abnormality transmitting between main unit and sub unit(s)	Accumulated Time	AC.				--

* (Details of Alarm)

AC.: Alarm
d1.: Retry
Ci.: Control Information

iTC: Inverter Stoppage Code
FTC: Fan Controller Stoppage Code

Cause of Stoppage (Alarm Code or Stoppage Code)	Contents	Indication of Alarm Code History					
		Time	* Alarm	Alarm Code			Alarm Code or Stoppage Code
				O.U. Unit No.	Comp. No.	Fan No.	
43	Abnormality of low compression ratio	Accumulated Time		○			--
d1-11		Accumulated Time	d1.	○			--
44	Abnormality of low-pressure increase	Accumulated Time	AC.	○			--
d1-12		Accumulated Time	d1.	○			--
45	Abnormality of high-pressure increase	Accumulated Time	AC.	○			--
d1-13		Accumulated Time	d1.	○			--
47	Activation of low-pressure decrease protection device (Vacuum operation protection)	Accumulated Time	AC.	○			--
d1-15		Accumulated Time	d1.	○			--
48	Activation of inverter overcurrent protection device	Accumulated Time	AC.	○	○		iTC
d1-17		Accumulated Time	d1.	○	○		iTC
51	Abnormality of inverter current sensor	Accumulated Time	AC.	○	○		iTC
d1-17		Accumulated Time	d1.	○	○		iTC
53	Inverter error signal detection	Accumulated Time	AC.	○	○		iTC
d1-17		Accumulated Time	d1.	○	○		iTC
54	Abnormality of inverter fin temperature	Accumulated Time	AC.	○	○		iTC
d1-17		Accumulated Time	d1.	○	○		iTC
55	Inverter failure	Accumulated Time	AC.	○	○		iTC
d1-17		Accumulated Time	d1.	○	○		iTC
57	Activation of fan controller protection device	Accumulated Time	AC.	○		○	FTC
b5	Incorrect setting of indoor unit connection number	Accumulated Time	AC.				--
EE	Compressor protection alarm	Accumulated Time	AC.				--
d1-05	Instantaneous power failure	Accumulated Time	di.				--
d1-18	Abnormality of inverter and other	Accumulated Time	di.				iTC
d1-26	Abnormality of high pressure decrease	Accumulated Time	di.				--
d1-32	Retry stoppage by indoor unit auto address setting	Accumulated Time	di.				--
Control Information	Micro-computer reset by abnormality of inverter transmission	Accumulated Time	Ci.				1
	Micro-computer reset by abnormality of fan controller transmission	Accumulated Time	Ci.				2
	Micro-computer reset by abnormality of indoor unit transmission	Accumulated Time	Ci.				3
	Micro-computer reset by abnormality transmitting between outdoor unit and outdoor unit	Accumulated Time	Ci.				4
	Micro-computer reset for abnormality of control state	Accumulated Time	Ci.				6

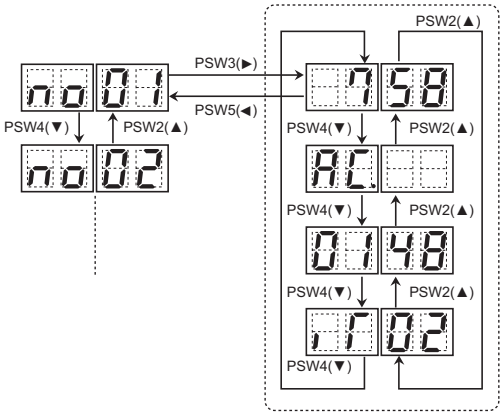
* (Details of Alarm)

AC.: Alarm
d1.: Retry
Ci.: Control Information

iTC: Inverter Stoppage Code
FTC: Fan Controller Stoppage Code

(2) Deletion of Alarm Code History

Press PSW1 and PSW3 for 5 seconds to clear the alarm code history while the history data is displayed. (All history can be deleted.)



In order to delete all the history, press PSW1 and PSW3 (►) for 5 seconds while history is displayed.

- Emergency Operation

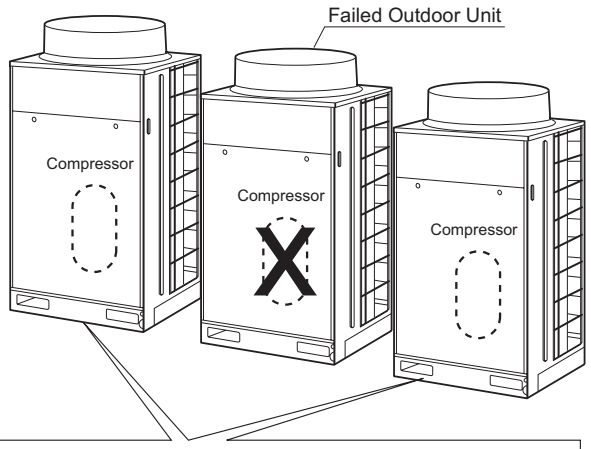
(1) Emergency Mode Operation from Remote Control Switch (AVWT-170FESZA to AVWT-454FESZA Only)

If compressor is failed, emergency operation mode is available by the remote control switch.
Even if the compressor is failed, the air conditioning operation is continuously available until the troubleshooting is performed.

* In case of following alarm code, emergency operation is available.

(1) Inverter Compressor Failure
- 06: Abnormality of Inverter Voltage
- 23: Abnormality of Discharge Gas Thermistor
- 48: Activation of Overcurrent Protection Device
- 51: Abnormality of Inverter Current Sensor
- 53: Inverter Error Signal Detection
- 54: Abnormality of Inverter Fin Temperature

(2) Constant Speed Compressor Failure
- 23: Abnormality of Discharge Gas Thermistor
- 39: Abnormality of Running Current at Constant Speed Compressor

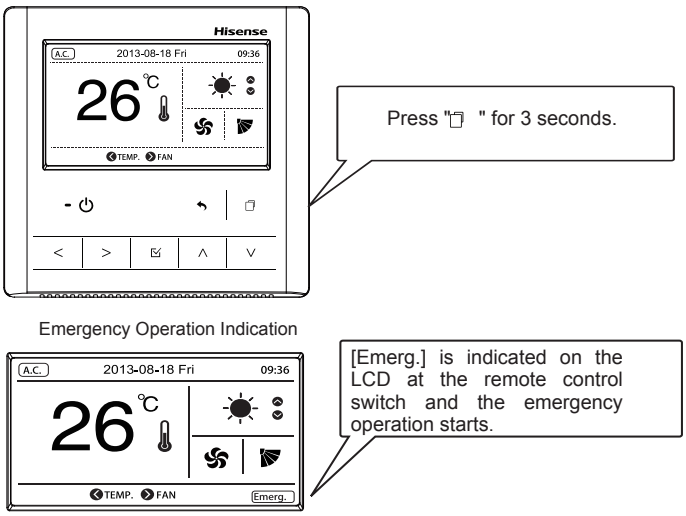


(a) Procedure

<In case of HYXE-J01H>

By pressing " ❐ " for 3 seconds simultaneously, emergency mode operation starts.
"Emerg." can be displayed on the LCD during this operation.

<HYXE-J01H>



(b) Operation Condition

This emergency operation is NOT applicable to all the compressors mounted in the failed outdoor unit.

NOTES:
- Emergency operation is available only when all the indoor unit and remote control to be connected are forHi-NET II.
- Emergency operation is available only for when the alarm codes above (*) are indicated.
- The emergency operation is not available for the failures of inverter PCB or fan controller.
- This emergency operation is not a normal operation but a temporary operation until the service people comes. If the alarm is indicated again during the emergency operation, the alarm cannot be canceled.
- Do not perform emergency operation more than 8 hours. If not, the unit may be damaged.

(2) Emergency Mode Operation from Outdoor Unit PCB for Inverter Compressor Failure (AVWT-114FESS to AVWT-154FESS Only)

This operation is an emergency operation by the constant speed compressor when the inverter compressor is failed.

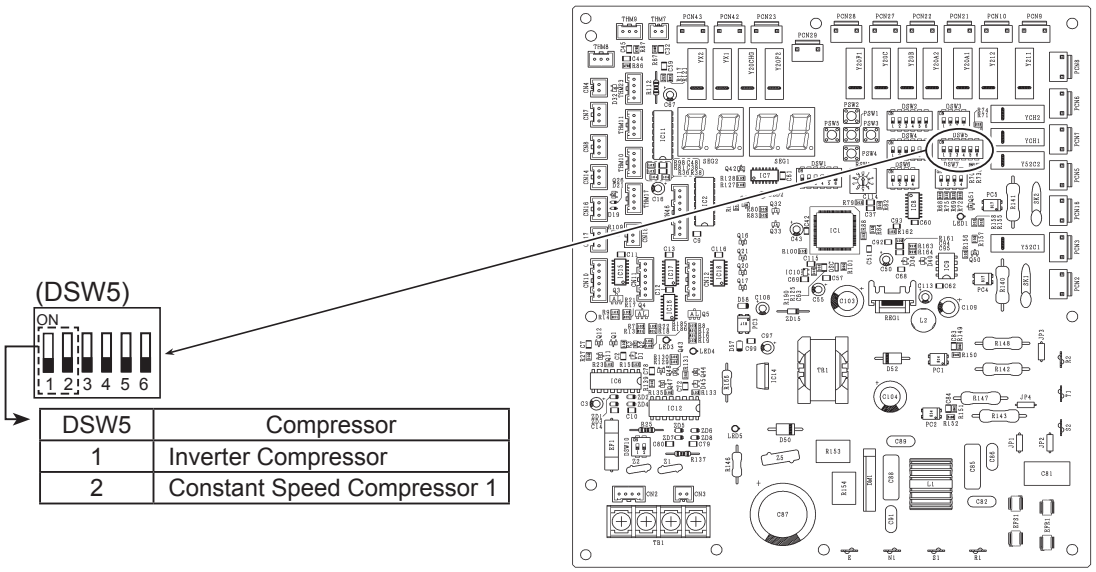
<Alarms Corresponding to Inverter Compressor Failure>

04: Abnormality Transmitting between inverter PCB and Outdoor Unit PCB
06: Abnormality of Inverter Voltage
23: Abnormality of Discharge Gas Thermistor
48: Activation of Overcurrent Protection Device
51: Abnormality of Inverter Current Sensor
53: Inverter Error Signal Detection
54: Abnormality of Inverter Fin Temperature

(a) Procedure

1. Turn OFF all the main switches of outdoor and indoor units.
2. Check the inverter PCB. If inverter PCB is faulty, disconnect the wiring (U, V, W) of diode module.
   (Insulate the disconnected terminals.)
3. Turn ON DSW5-No.1 of outdoor unit PCB1.
4. Turn ON the power supply.
5. Start the operation by remote control switch.

Turn the DSW5-No.1 or No.2 ON to stop the compressor operation.
(When 2 compressors are stopped simultaneously, d1-30 is indicated on 7-segment display.)

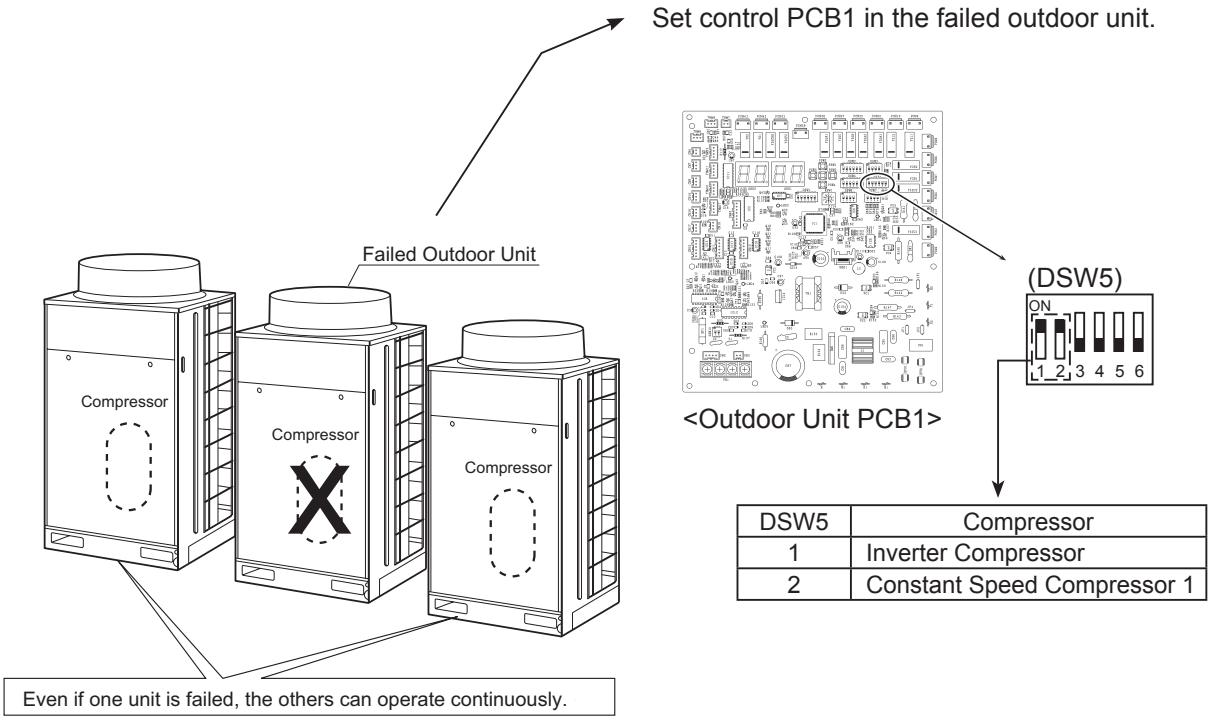


DSW5	Compressor
1	Inverter Compressor
2	Constant Speed Compressor 1

<Outdoor Unit PCB1>

(4) Emergency Mode Operation from Outdoor Unit PCB for Compressor Failure (AVWT-170FESZAto AVWT-454FESZA Only)

Turn DSW5-No.1 or No.2 ON to stop the compressor operation. If set, all the compressors in the failed outdoor unit will NOT be operated.



DSW5	Compressor
1	Inverter Compressor
2	Constant Speed Compressor 1

NOTE:
Fully close the stop valves (gas/liquid) in the failed outdoor unit.

• Operation Condition

< Indoor Unit Operation Capacity >

The compressor is forced to stop for compressor protection under the following condition:

Total Capacity of Thermo ON I.U. < 50% of O.U. Capacity and

Total Capacity of Thermo ON I.U. < 96kBtu/h

(A lack of thermo ON indoor unit may lead a constant speed compressor failure because the compressor is operated and stopped repeatedly.)

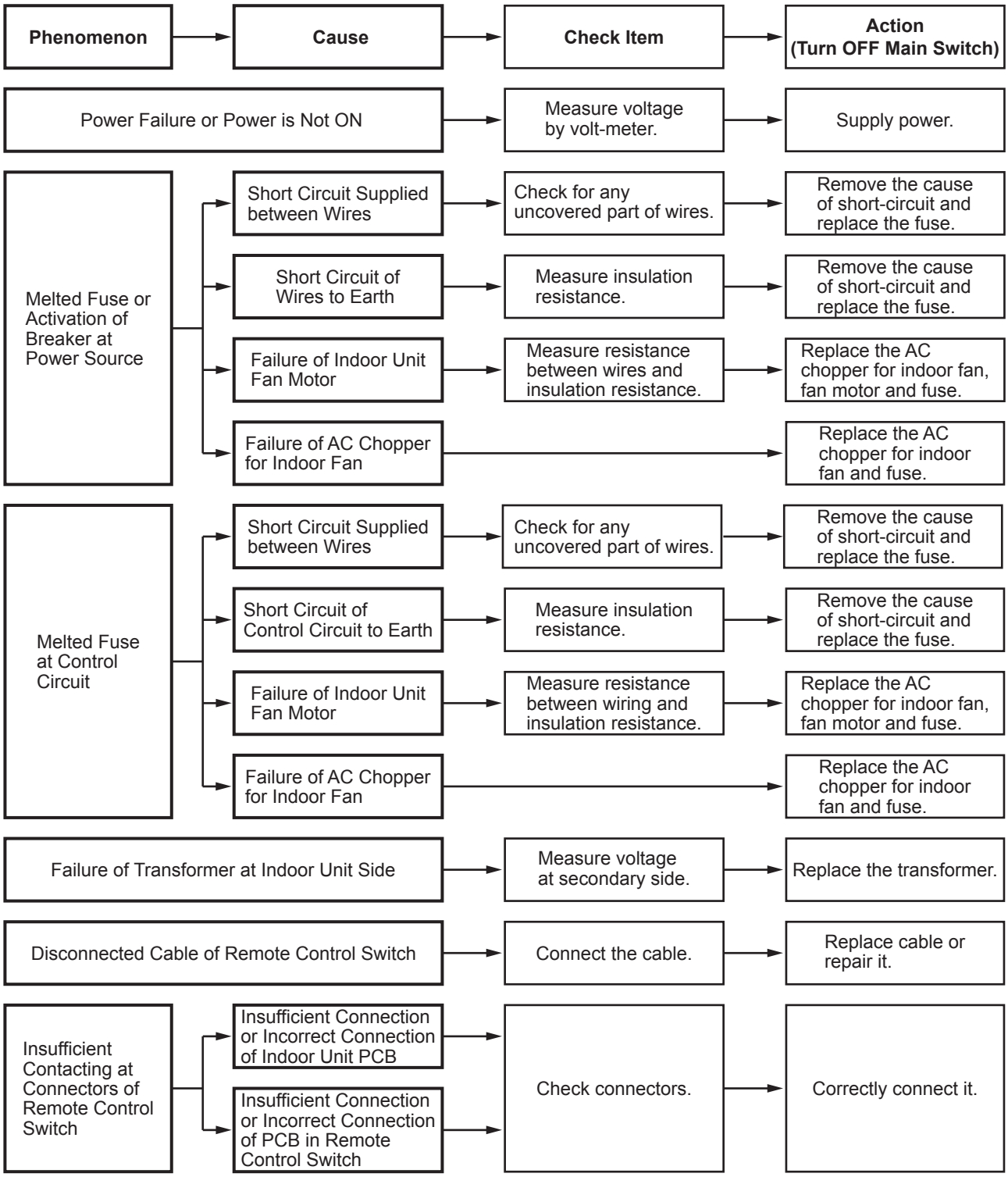
NOTES:

- Measure the insulation resistance of inverter compressor.
  Do not perform the emergency operation when the insulation resistance is 0Ω
  Other compressor may be damaged because there is a possibility that refrigerant oil may be oxidized.
- Total operating capacity of indoor unit should be 96kBtu/h and over.
  (Less than 96kBtu/h: Forced stoppage)
- In this emergency operation, compressor frequency cannot be controlled normally.
  Therefore, alarm code "07", "43", "44", "45" or "47" may be indicated on LCD.
- This emergency operation may not provide sufficient cooling and heating capacity.
- This operation is an emergency but a temporary operation when the inverter compressor is damaged.
  Therefore, change the new one as soon as possible.
- Turn OFF DSW5-No.1 of outdoor PCB1 after replacing the compressor.
  If this setting is not performed, the inverter compressor will be damaged.

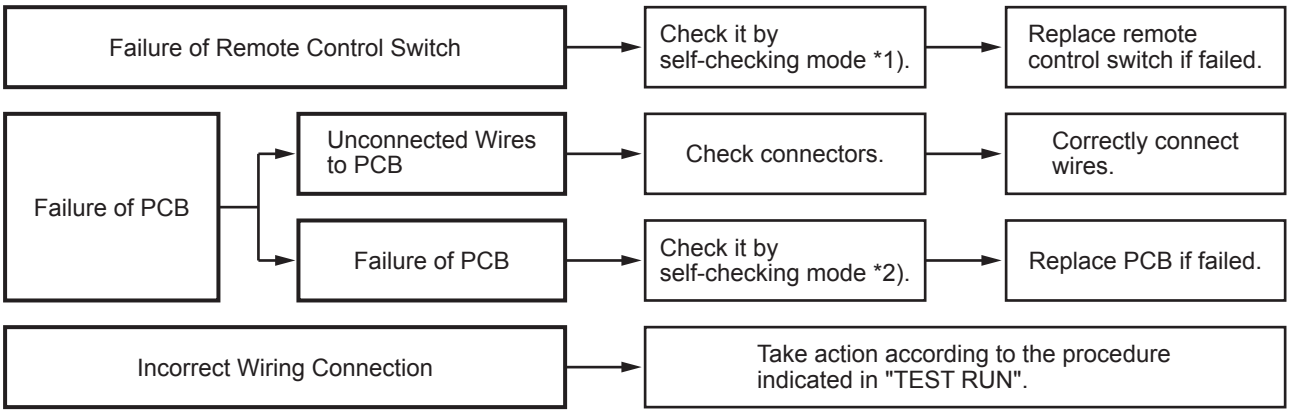
- Failure of Power Supply to Indoor Unit and Remote Control Switch

  - Lights and LCD are not Indicated.

    Not Operated
    If fuses are melted or a breaker is activated, investigate the cause of over current and take necessary action.



(● Failure of Power Supply to Indoor Unit and Remote Control Switch)

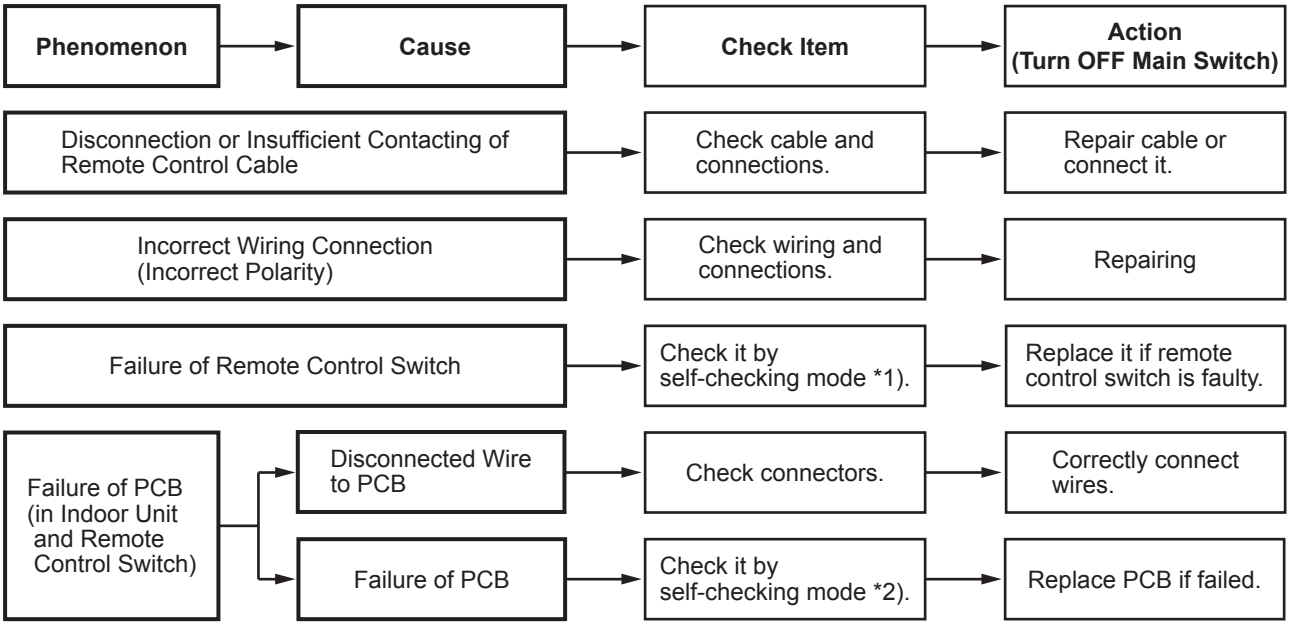


*1): Refer to Item 13.4.
*2): Refer to Item 13.3 .

● Abnormal Transmission between Remote Control Switch and Indoor Unit

• "RUN" Lamp on Remote Control Switch:

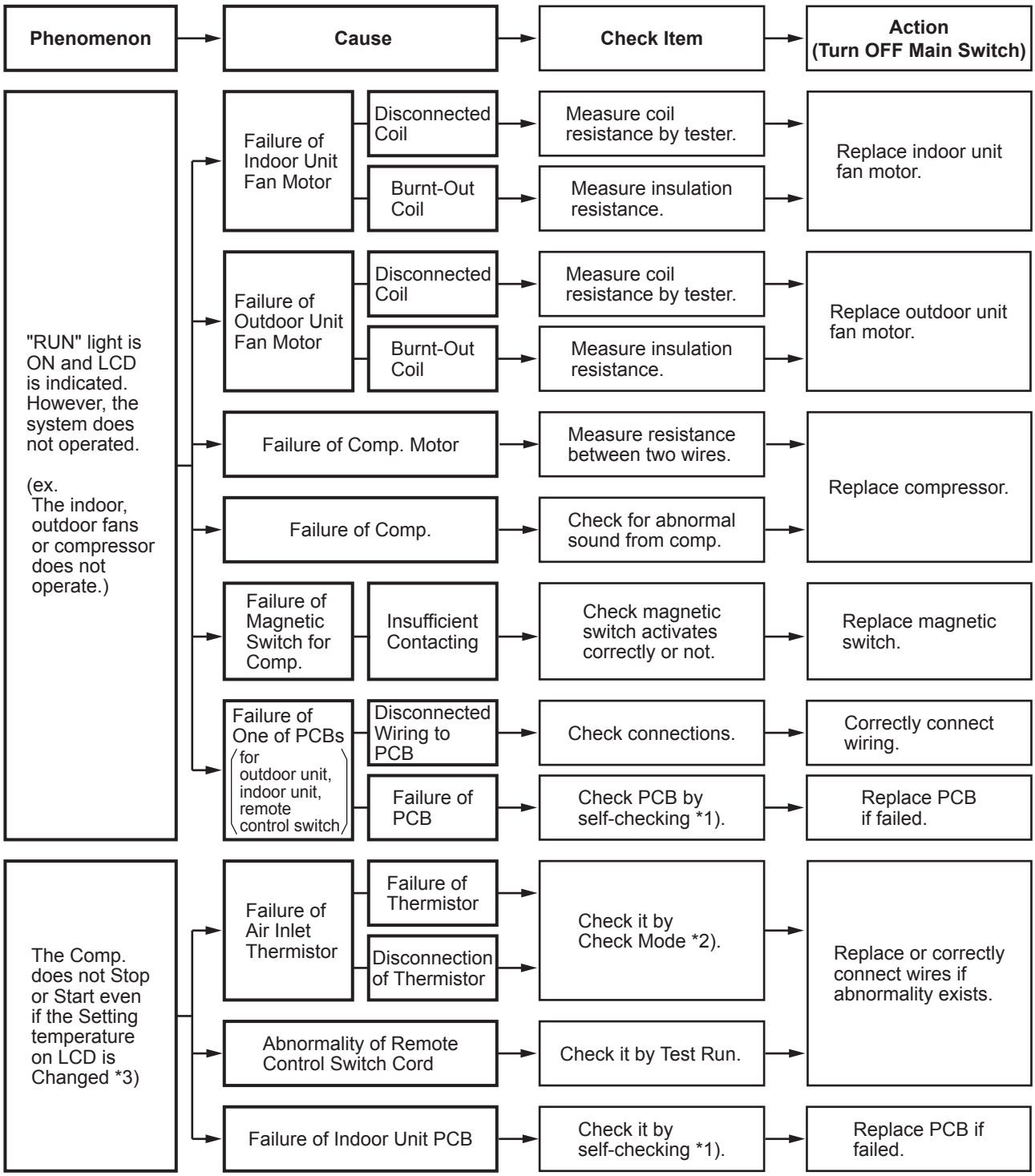
Flashing every 2 seconds



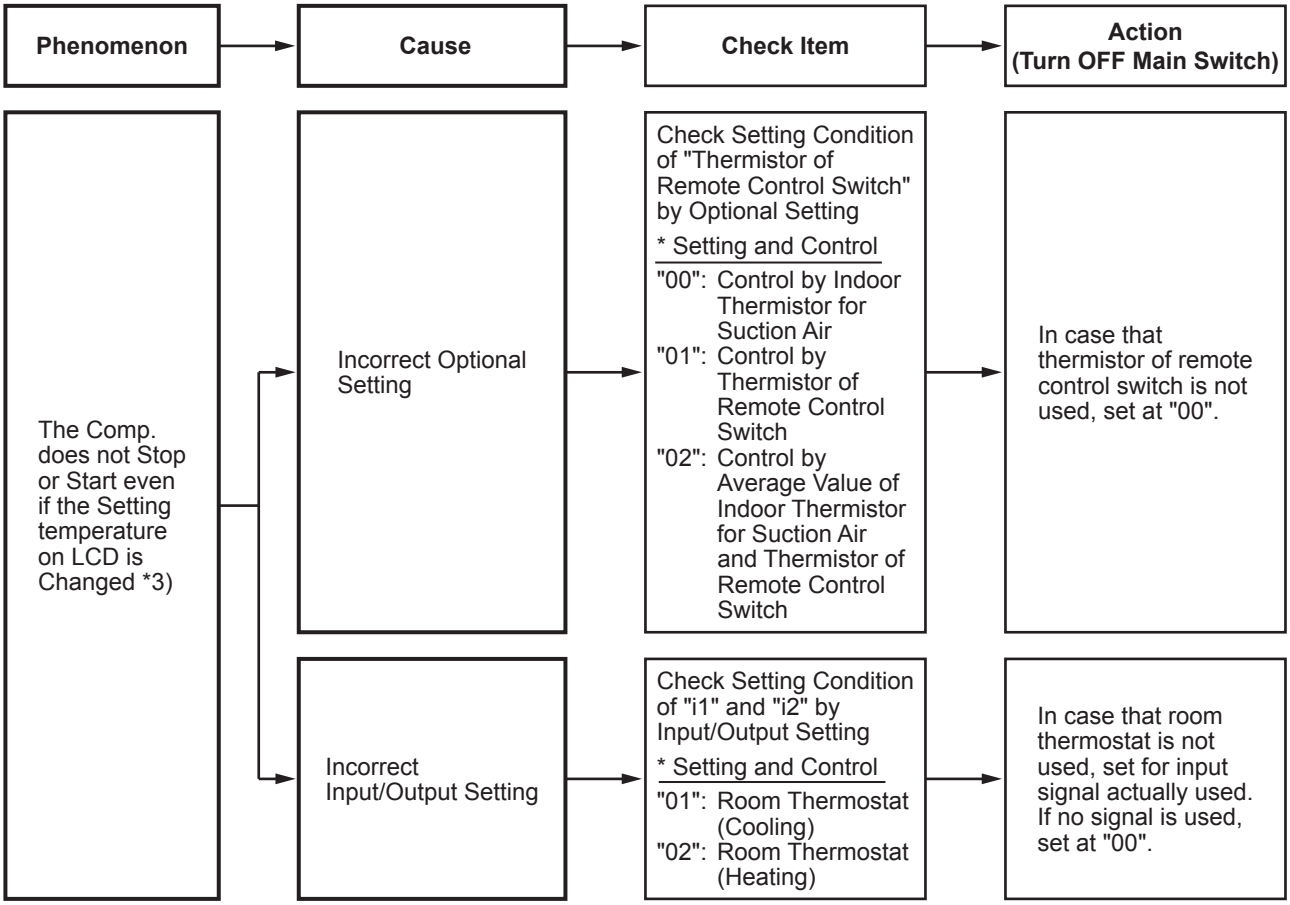
*1): Refer to Item 13.4.
*2): Refer to Item 13.3.

● Abnormalities of Devices

In the case that no abnormality (Alarm Code) is indicated on the remote control switch, and normal operation is not available, take necessary action according to the procedures mentioned below.

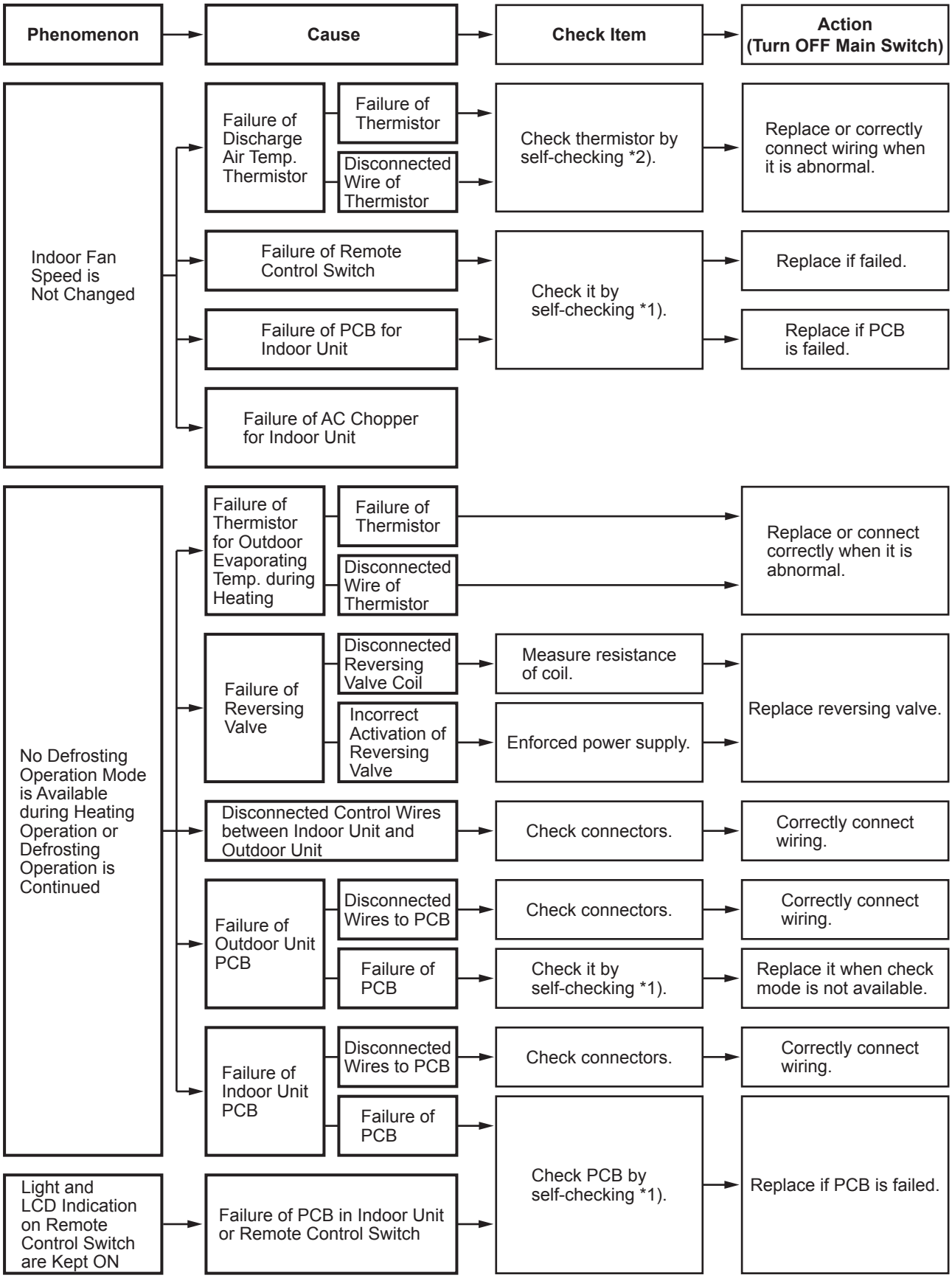


- Abnormalities of Devices)



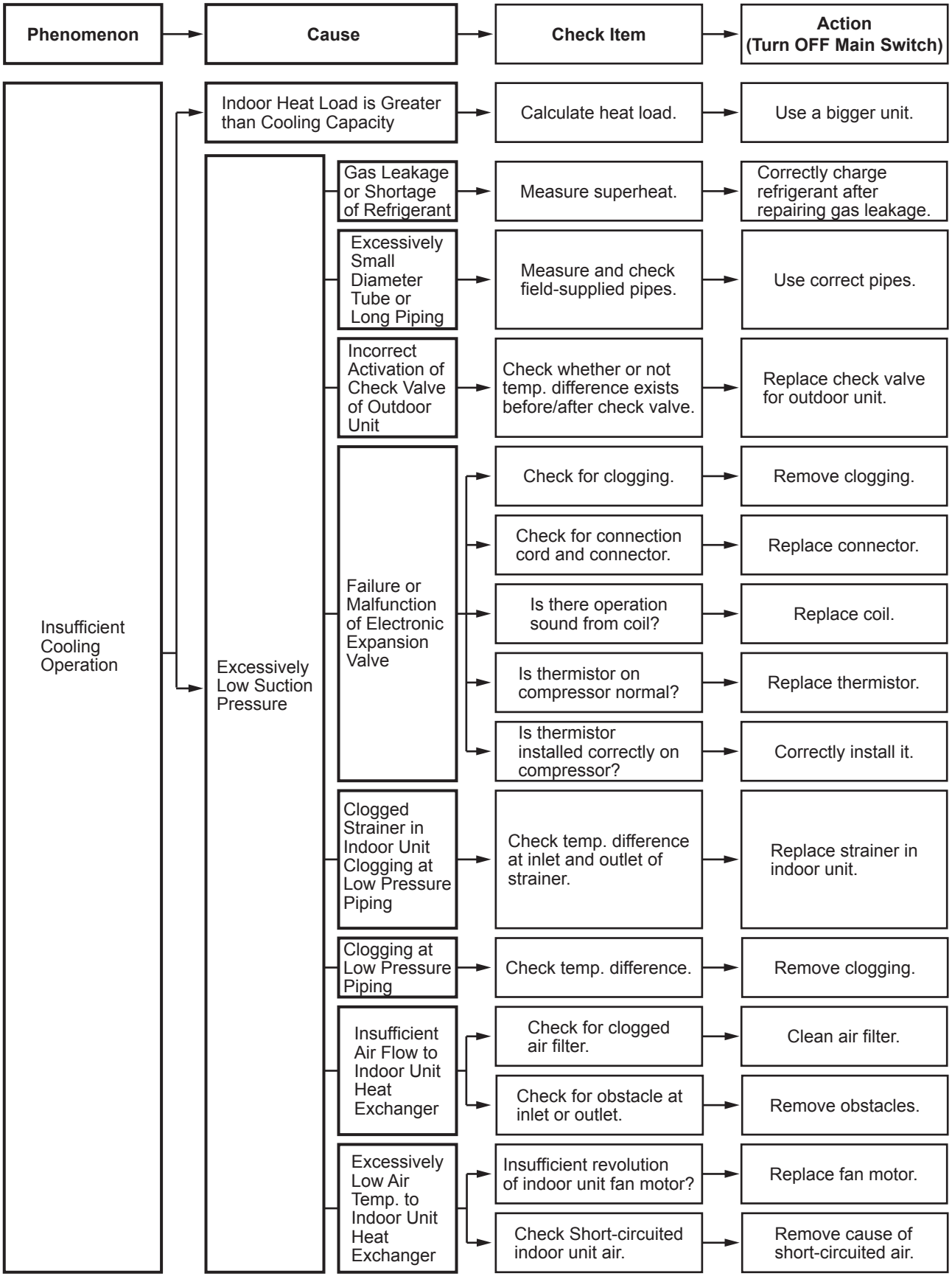
*1): Refer to Item 13.3.
*2): Refer to Item 1.2.3.
*3): Even if controllers are normal, the compressor does not operate under the following conditions.
* Indoor Air Temp. is lower than 19°C or Outdoor Air Temp. is lower than -5°C during cooling operation.
* Indoor Air Temp. is higher than 30°C or Outdoor Air Temp. is higher than 23°C during heating operation.
* When a cooling (or heating) operation signal is given to the outdoor unit and a different mode as heating (or cooling) operation signal is given to indoor units.
* When demand signal or emergency stop signal is given to outdoor unit.

(● Abnormalities of Devices)

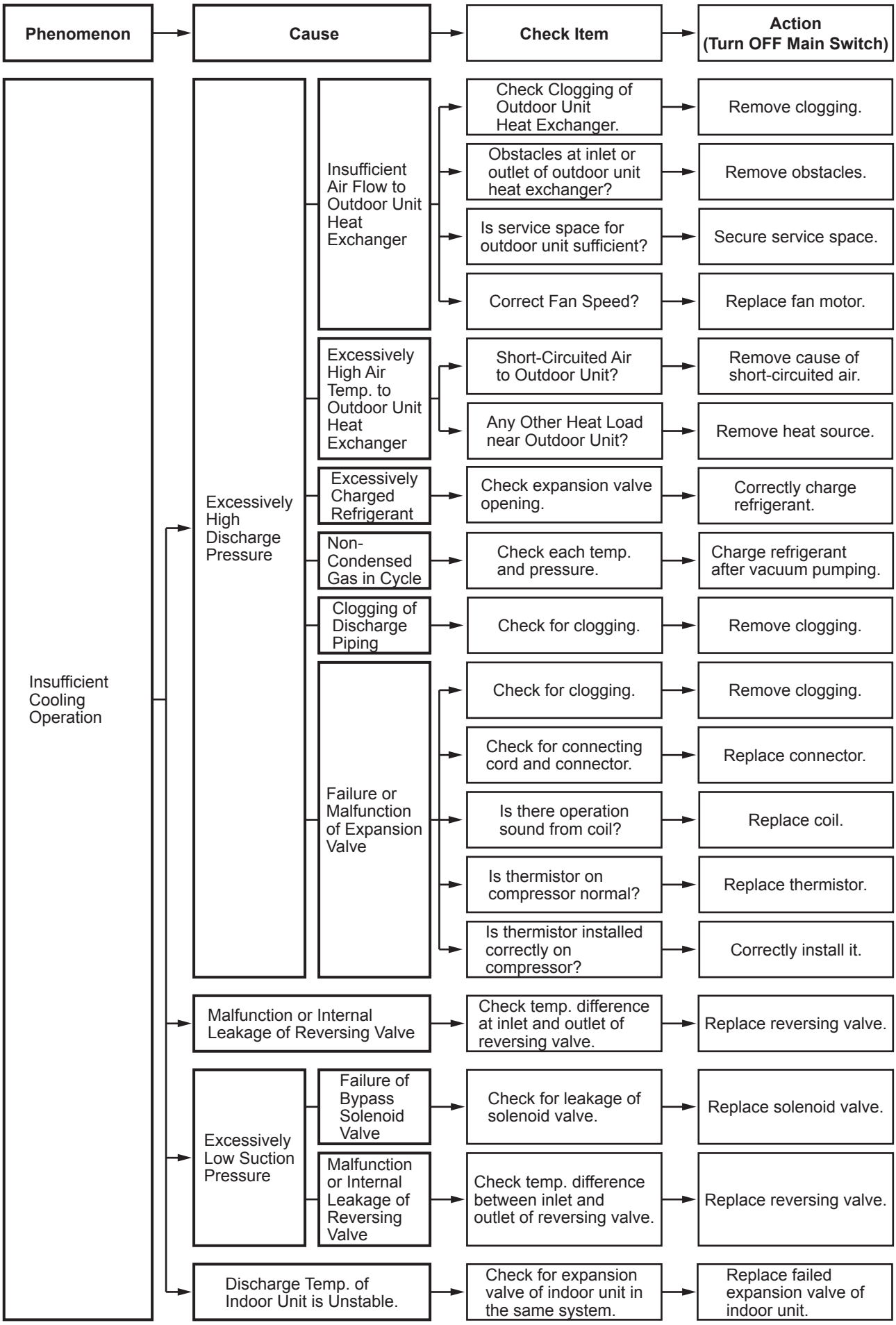


*1): Refer to Item 13.3 to 13.4.
*2): Refer to Item 1.2.3.

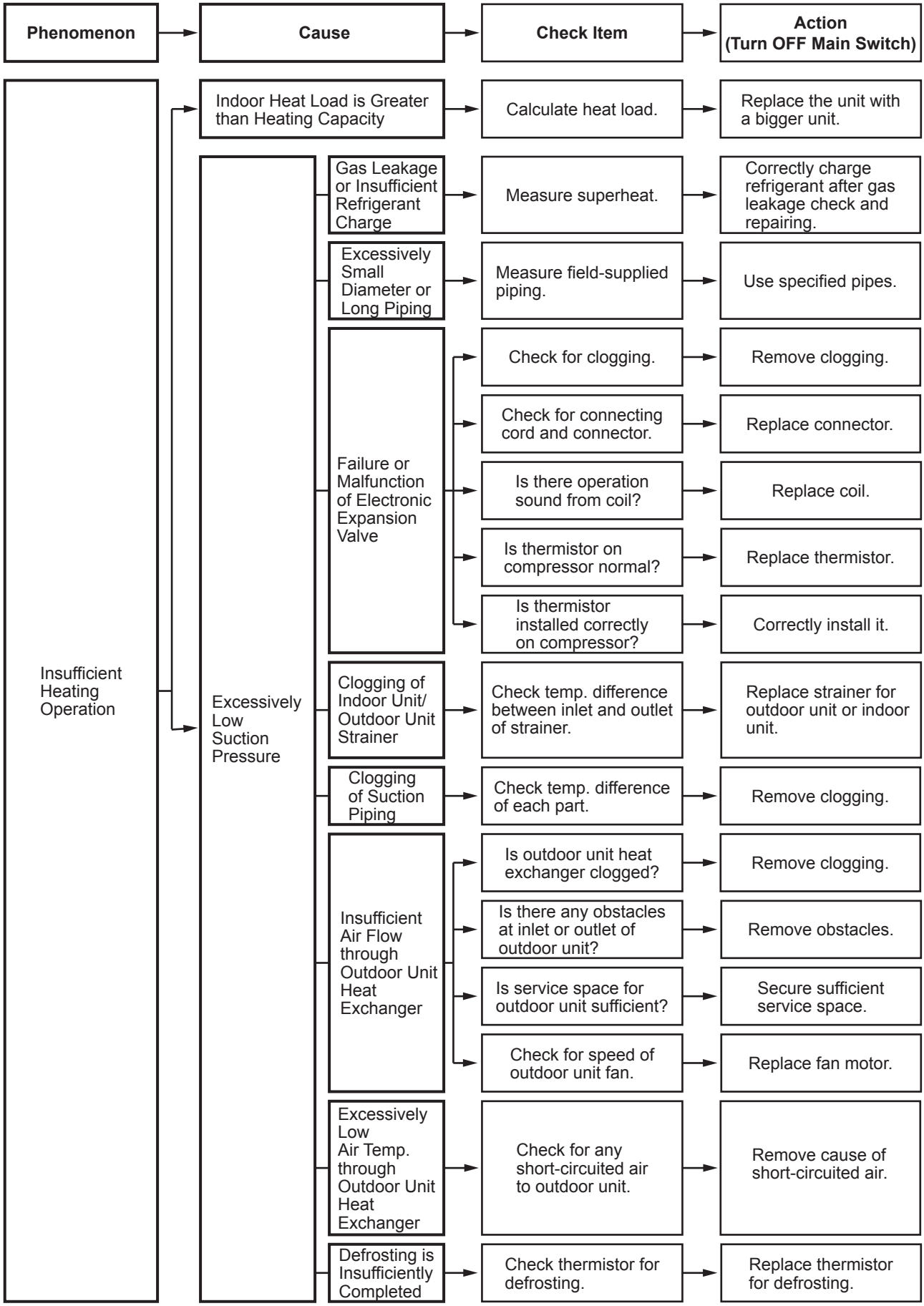
(● Abnormalities of Devices)



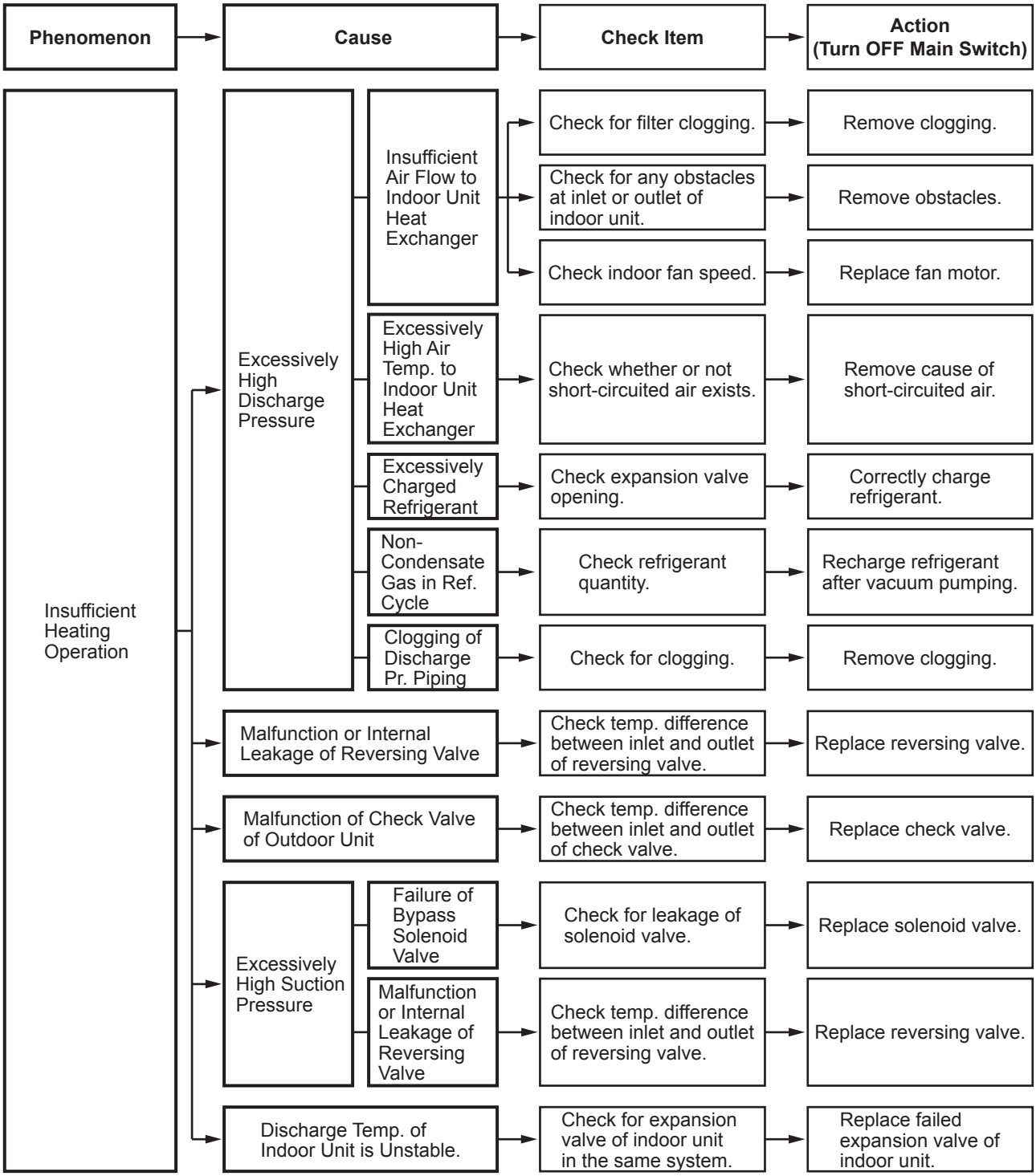
(● Abnormalities of Devices)



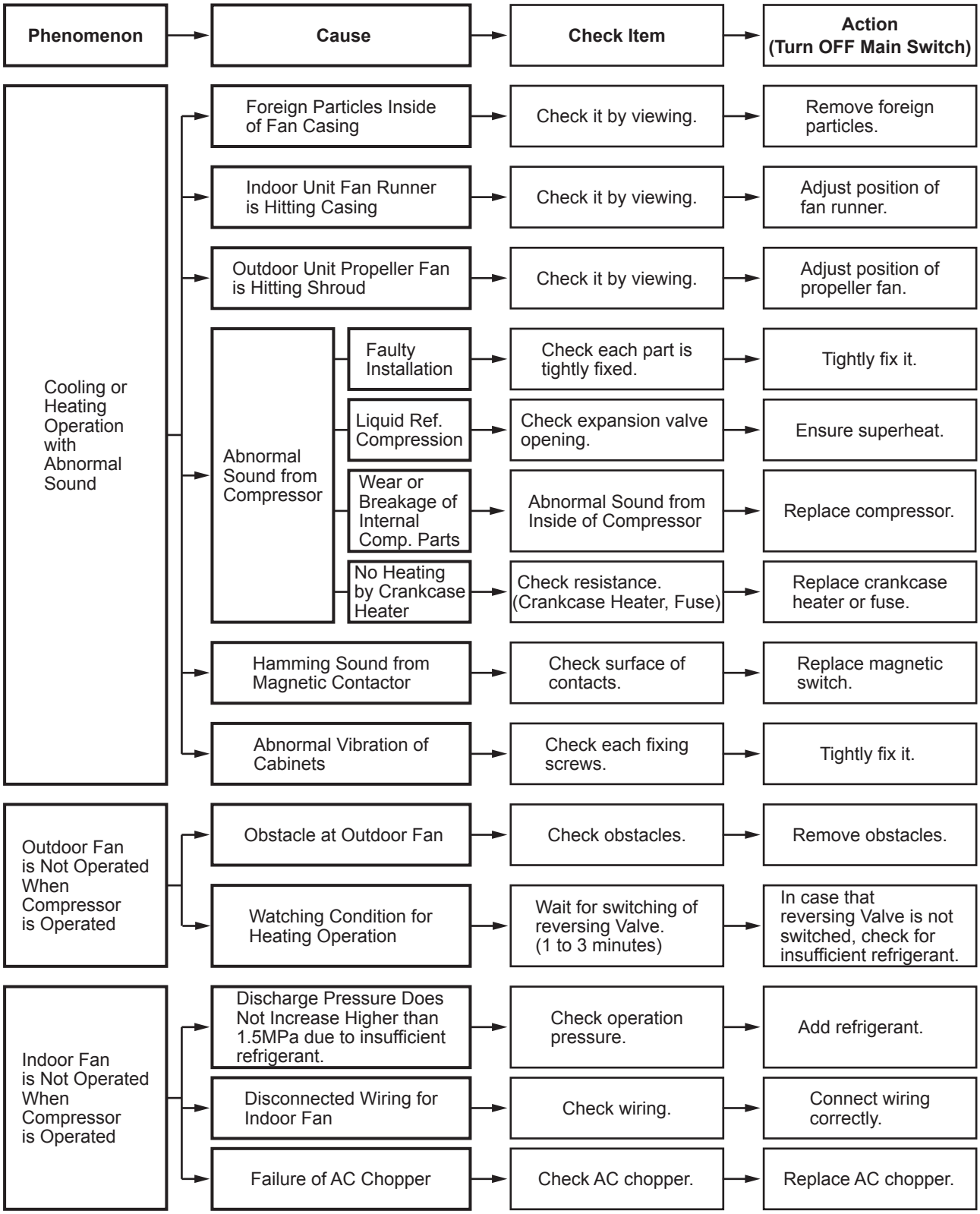
(● Abnormalities of Devices)



(● Abnormalities of Devices)

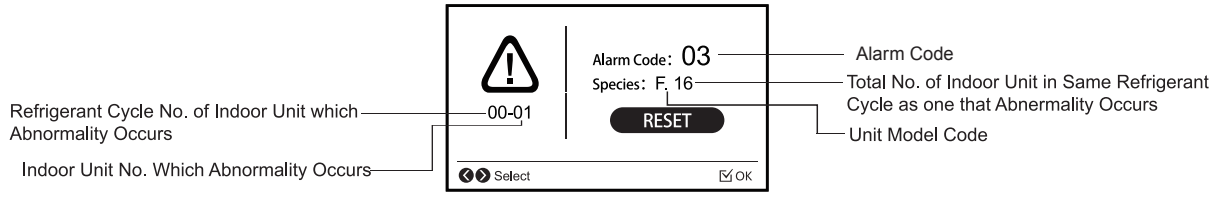


(● Abnormalities of Devices)



15.4.2 Troubleshooting Procedure

- Alarm Code Indication of Remote Control Switch



- Alarm Code Table

Code	Category	Content of Abnormality	Leading Cause
01	Indoor Unit	Activation of Protection Device (Float Switch)	Activation of Float Switch (High Water Level in Drain Pan, Abnormality of Drain Pipe, Float Switch or Drain Pan)
02	Outdoor Unit	Activation of Protection Device (High Pressure Cut)	Activation of PSH (Pipe Clogging, Excessive Refrigerant, Inert Gas Mixing)
03	Transmission	Abnormality between Indoor and Outdoor	Incorrect Wiring, Loose Terminals, Disconnect Wire, Blowout of Fuse, Outdoor Unit Power OFF
04		Abnormality between Inverter PCB and Outdoor PCB	Inverter PCB - Outdoor PCB Transmission Failure (Loose Connector, Wire Breaking, Blowout of Fuse)
04.		Abnormality between Fan Controller and Outdoor PCB	Fan Controller - Outdoor PCB Transmission Failure (Loose Connector, Wire Breaking, Blowout of Fuse)
05	Supply Phase	Abnormality Power Source Phases	Incorrect Power Source, Connection to Reversed Phase, Open-Phase
06	Voltage	Abnormal Inverter Voltage	Outdoor Voltage Drop, Insufficient Power Capacit
06.		Abnormal Fan Controller Voltage	Outdoor Voltage Drop, Insufficient Power Capacit
07	Cycle	Decrease in Discharge Gas Superheat	Excessive Refrigerant Charge, Failure of Thermistor, Incorrect Wiring, Incorrect Piping Connection, Expansion Valve Locking at Opened Position (Disconnect Connector)
08		Increase in Discharge Gas Temperature	Insufficient Refrigerant Charge, Pipe Clogging Failure of Thermistor, Incorrect Wiring, Incorrect Piping Connection, Expansion Valve Locking at Closed Position (Disconnect Connector)
0A	Transmission	Abnormality between Outdoor and Outdoor	Incorrect Wiring, Breaking Wire, Loose Terminals
0b	Outdoor Unit	Incorrect Outdoor Unit Address Setting	Duplication of Address Setting for Outdoor Units (Sub Units) in Same Refrigerant Cycle System
0C		Incorrect Outdoor Unit Main Unit Setting	Two (or more) Outdoor Units Set as “Main Unit” Exist in Same Refrigerant Cycle System
11	Sensor on Indoor Unit	Inlet Air Thermistor	Incorrect Wiring, Disconnecting Wiring Breaking Wire, Short Circuit
12		Outlet Air Thermistor	
13		Freeze Protection Thermistor	
14		Gas Piping Thermistor	
19	Fan Motor	Activation of Protection Device for Indoor Fan	Fan Motor Overheat, Locking
21	Sensor on Outdoor Unit	High Pressure Sensor	Incorrect Wiring, Disconnecting Wiring Breaking Wire, Short Circuit
22		Outdoor Air Thermistor	
23		Discharge Gas Thermistor on Top of Compressor	
24		Heat Exchanger Liquid Pipe Thermistor	
25		Heat Exchanger Gas Pipe Thermistor	
29		Low Pressure Sensor	

Code	Category	Content of Abnormality	Leading Cause
31	System	Incorrect Capacity Setting of Outdoor Unit and Indoor Unit	Incorrect Capacity Code Setting of Combination Excessive or Insufficient Indoor Unit Total Capacity Code
35		Incorrect Setting of Indoor Unit No.	Duplication of Indoor Unit No. in same Ref. Gr.
36		Incorrect of Indoor Unit CombinationI	ndoor Unit is Designed for R22
38		Abnormality of Picking up Circuit for Protection in Outdoor Unit	Failure of Protection Detecting Device (Incorrect Wiring of Outdoor PCB)
39	Compressor	Abnormality Running Current at Constant Speed Compressor	Overcurrent, Blowout Fuse, Current Sensor Failure, Instantaneous Power Failure, Voltage Drop, Abnormal Power Supply
3A	Outdoor Unit	Abnormality of Outdoor Unit Capacity	Outdoor Unit Capacity > 510kBtu/h
3b		Incorrect Setting of Outdoor Unit Models Combination or Voltage	Incorrect Setting of Main and Sub Unit(s) Combination or Voltage
3d		Abnormality Transmission between Main Unit and Sub Unit(s)	Incorrect Wiring, Disconnect Wire, Breaking Wire, PCB Failure
43	Protection Device	Activation of Low Compression Ratio Protection Device	Defective Compression (Failure of Compressor of Inverter, Loose Power Supply Connection)
44		Activation of Low Pressure Increase Protection Device	Overload at Cooling, High Temperature at Heating, Expansion Valve Locking (Loose Connector)
45		Activation of High Pressure Increase Protection Device	Overload Operation (Clogging, Short-Pass), Pipe Clogging, Excessive Refrigerant, Inert Gas Mixing
47		Activation of Low Pressure Decrease Protection Device (Vacuum Operation Protection)	Insufficient Refrigerant, Refrigerant Piping, Clogging, Expansion Valve Locking at Open Position (Loose Connector)
48		Activation of Inverter Overcurrent Protection Device	Overload Operation, Compressor Failure
51	Sensor	Abnormal Inverter Current Sensor	Current Sensor Failure
53	Inverter	Inverter Error Signal Detection	Driver IC Error Signal Detection (Protection for Overcurrent, Low Voltage, Short Circuit)
54		Abnormality of Inverter Fin Temperature	Abnormal Inverter Fin Thermistor, Heat Exchanger Clogging, Fan Motor Failure
55		Inverter Failure	Inverter PCB Failure
57	Fan Controller	Activation of Fan Controller Protection	Driver IC Error Signal Detection (Protection for Overcurrent, Low Voltage, Short Circuit), Instantaneous Overcurrent
5A		Abnormality of Fan Controller Fin Temperature	Fin Thermistor Failure, Heat Exchanger Clogging, Fan Motor Failure
5b		Activation of Overcurrent Protection	Fan Motor Failure
5C		Abnormality of Fan Controller Sensor	Failure of Current Sensor (Instantaneous Overcurrent, Increase of Fin Temperature, Low Voltage, Earth Fault, Step-Out)
EE	Compressor	Compressor Protection Alarm (It is can not be reset from remote Controller)	This alarm code appears when the following alarms* occurs three times within 6 hours. *02, 07, 08, 39, 43 to 45, 47
b1	Outdoor Unit No. Setting	Incorrect Setting of Unit and Refrigerant Cycle No.	Over 64 Number is Set for Address or Refrigerant Cycle.
b5	Indoor Unit No. Setting	Incorrect Indoor Unit Connection Number Setting	More than 17 Non-Corresponding to Hi-NET Units are Connected to One System.
C1	Switch Box	Incorrect Indoor Unit Connection	2 or more Switch Boxes are connected between outdoor unit and indoor unit.
C2		Incorrect Indoor Unit Connection No. Setting	9 or More Indoor Units Connected to Switch Box
C3		Incorrect Indoor Unit Connection	The indoor units of different refrigerant cycle is connected to Switch Box.

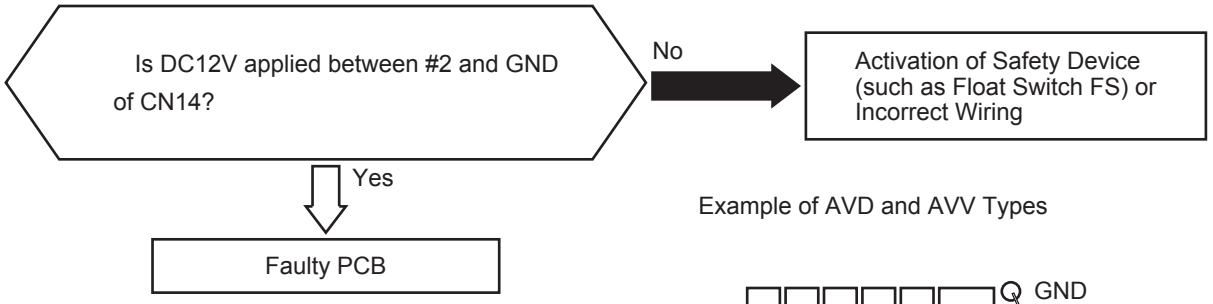
● Troubleshooting by Alarm Code

Alarm Code 01	Activation of Protection Device in Indoor Unit

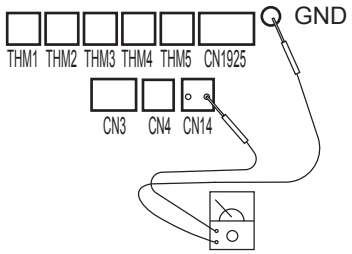
- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when the contact between #1 and #2 of CN14 is not closed over 120 seconds during the cooling, ventilation or heating operation.

PCB1: Control PCB in Outdoor Unit
PCB: Indoor Unit PCB

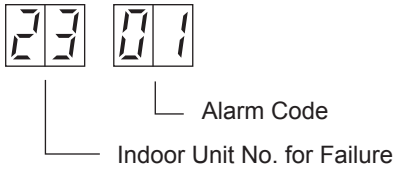


Example of AVD and AVV Types



Phenomenon	Cause		Check Item	Action (Turn OFF Main Switch)
Activation of Float Switch	High Drain Level	Clogging of Drainage	Check drain pan.	Remove clogged foreign particles.
	Faulty Float Switch	Fault	Check continuity when drain level is low.	Replace float switch if faulty.
		Faulty Contacting	Measure resistance by tester.	Repair looseness and replace connector.
		Faulty Connection	Check connections.	Repair connection.
Faulty Indoor Unit PCB			Check PCB by self-checking.	Replace it if faulty.

<Outdoor Unit PCB1 Display Indication>

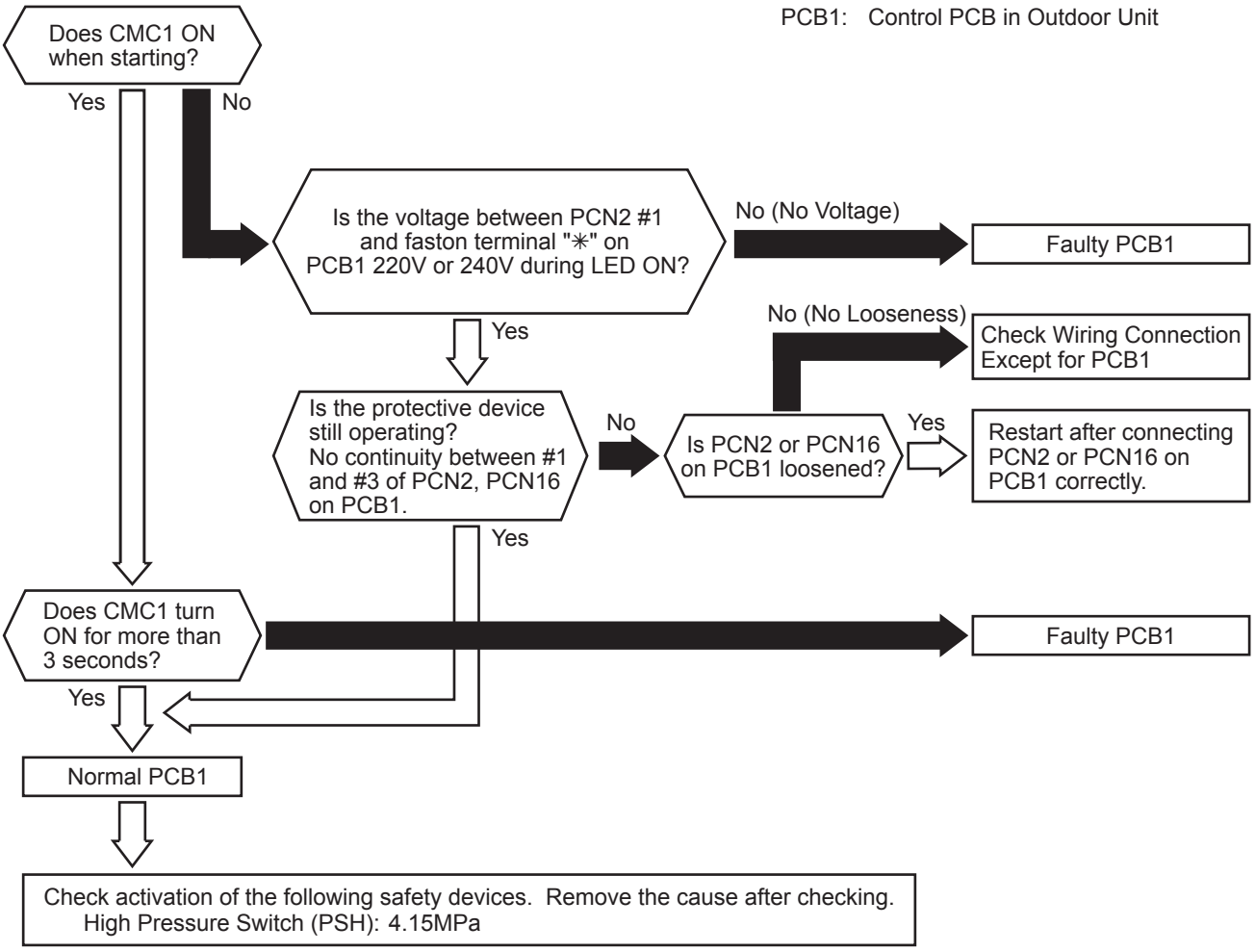


Alarm Code 07	Activation of Protection Device in Outdoor Unit

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
  The unit No., alarm code and the unit code are alternately indicated on the set temperature section and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when one of safety devices is activated during compressor running.

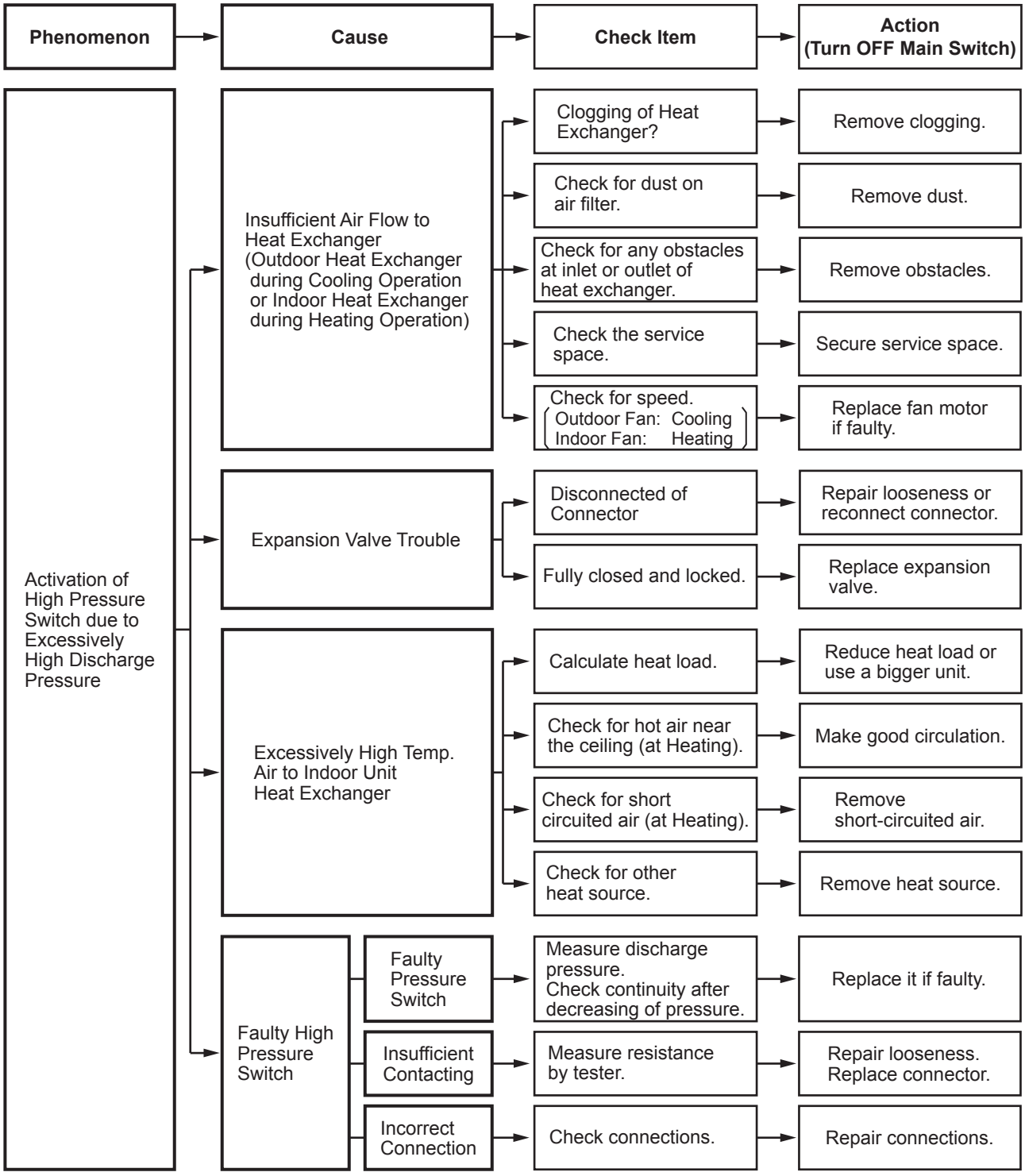
PCB1: Control PCB in Outdoor Unit

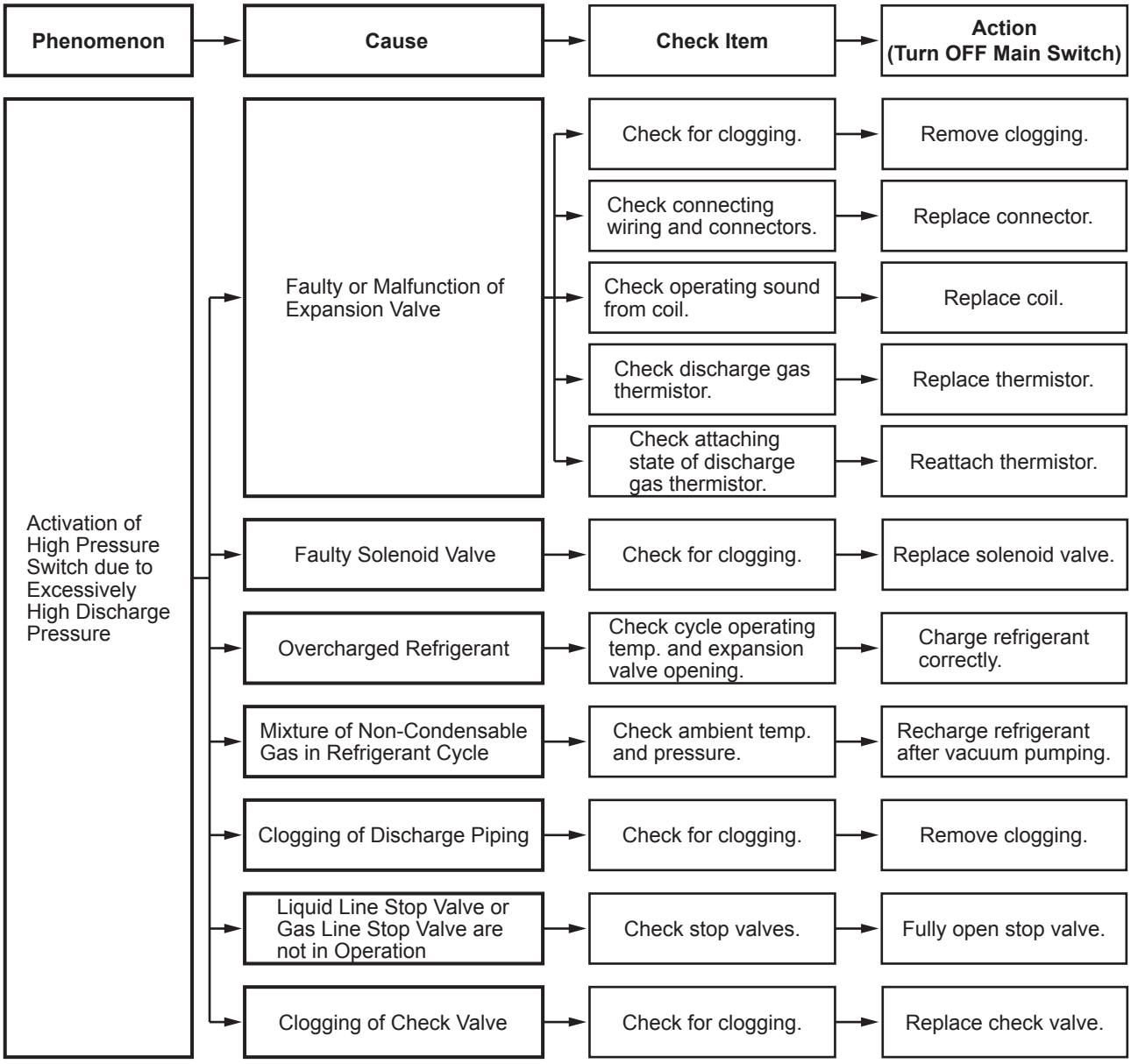


Check Item

Connector for CMC1	Faston Terminal ✳		Connector for Protection Device
PCN3	380-415V/50Hz	N1	PCN2 or PCN16

Model	High Pressure Switch (Connector No.)	
	63H1 (PCN2)	63H2 (PCN16)
AVWT-76 to AVWT-96	○	-
AVWT-114 to AVWT-154	○	○


Phenomenon
Cause
Check Item
Action
(Turn OFF Main Switch)
Activation of High Pressure Switch due to Excessively High Discharge Pressure
Insufficient Air Flow to Heat Exchanger (Outdoor Heat Exchanger during Cooling Operation or Indoor Heat Exchanger during Heating Operation)
Clogging of Heat Exchanger?
Remove clogging.
Check for dust on air filter.
Remove dust.
Check for any obstacles at inlet or outlet of heat exchanger.
Remove obstacles.
Check the service space.
Secure service space.
Check for speed.
Outdoor Fan: Cooling
Indoor Fan: Heating
Replace fan motor if faulty.
Expansion Valve Trouble
Disconnected of Connector
Repair looseness or reconnect connector.
Fully closed and locked.
Replace expansion valve.
Excessively High Temp. Air to Indoor Unit Heat Exchanger
Calculate heat load.
Reduce heat load or use a bigger unit.
Check for hot air near the ceiling (at Heating).
Make good circulation.
Check for short circuited air (at Heating).
Remove short-circuited air.
Check for other heat source.
Remove heat source.
Faulty High Pressure Switch
Faulty Pressure Switch
Measure discharge pressure.
Check continuity after decreasing of pressure.
Replace it if faulty.
Insufficient Contacting
Measure resistance by tester.
Repair looseness.
Replace connector.
Incorrect Connection
Check connections.
Repair connections.



Alarm Code 03	Abnormal Transmitting between Indoor Units and Outdoor Units

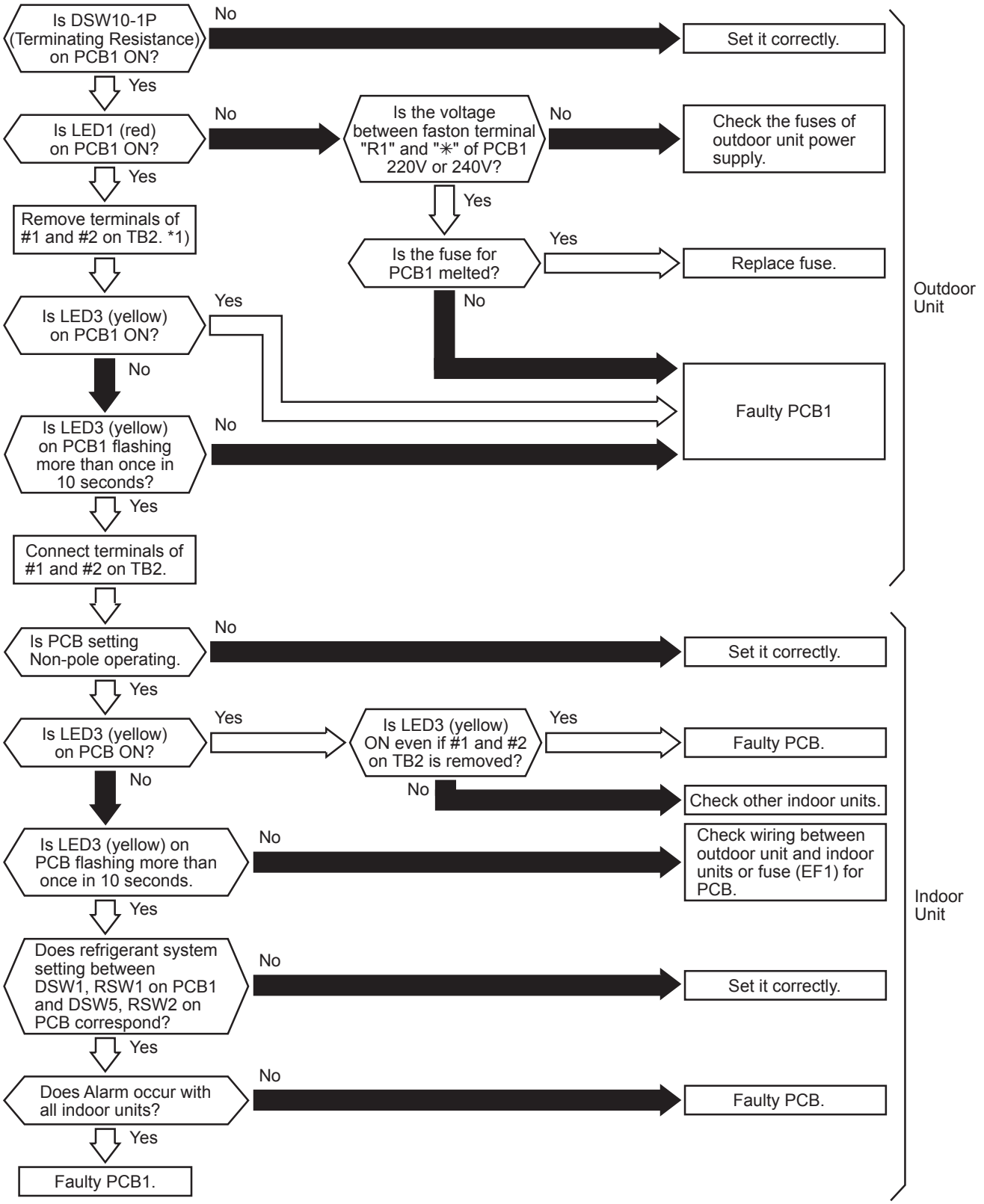
- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.

※ The unit No., alarm code and the unit code are alternately indicated on the set temperature section, or the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

This alarm is indicated when abnormality lasts for 3 minutes after normal transmitting occurs between indoor units and outdoor unit, and also abnormality lasts for 30 seconds after the micro-computer is automatically reset.
The alarm is indicated when the abnormal transmitting lasts for 30 seconds from the starting of the outdoor unit.

Investigate the cause of overcurrent and take necessary action when fuses are melted or the breakers for the outdoor unit are activated.

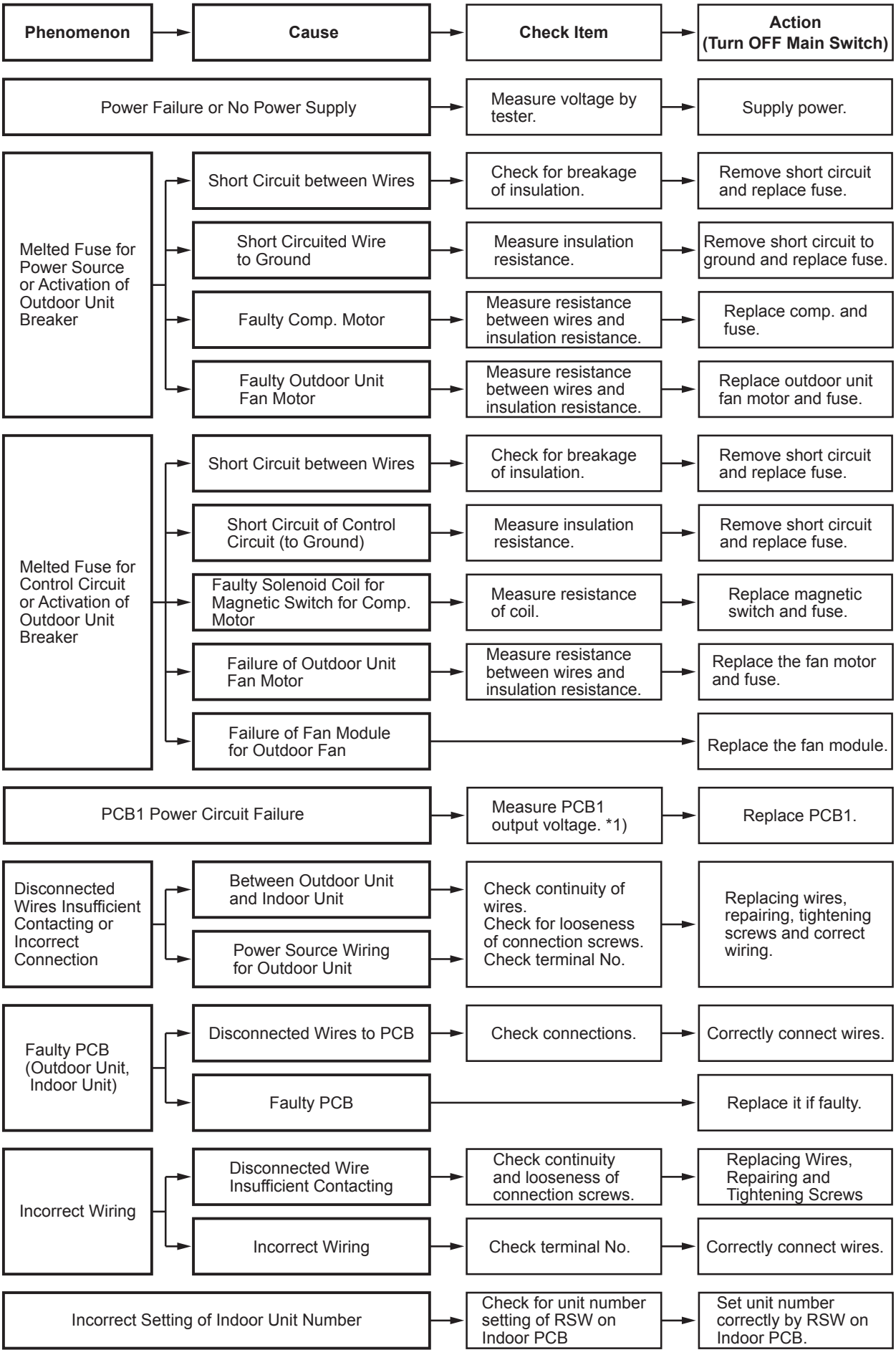
PCB1: Control PCB in Outdoor Unit
PCB: Indoor Unit PCB



*1): In case that terminating resistance (DSW10-1P) is OFF when Hi-NET Connection are performed. Set the terminating resistance to ON when #1 and #2 on TB2 is removed. Set the terminating resistance to OFF when #1 and #2 on TB2 are reconnected.

✳Check Item

Power Supply	Faston Terminal
380-415V/50Hz 380V/60Hz	N1



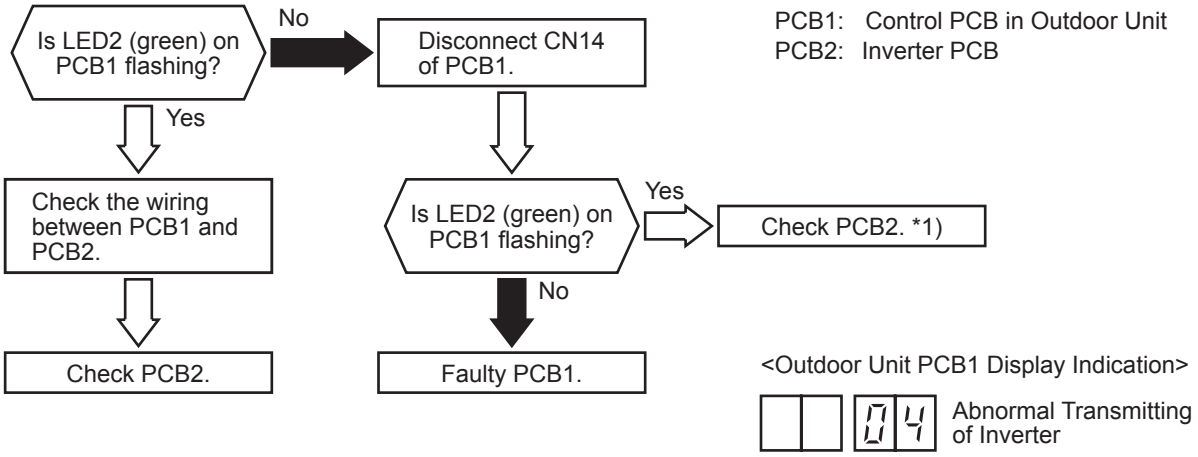
*1): 12VDC between VCC12 and GND2, 5VDC between VCC05 and GND1,
12VDC between VCC12 and GND1, 15VDC between VCC15 and GND1,
24VDC between VCC24 and GND1, 12VDC between VCC12T and GND1

Alarm Code 04	Abnormal Transmitting between Inverter PCB and Outdoor PCB

"RUN" light f ashes and "ALARM" is indicated on the remote control switch.

- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

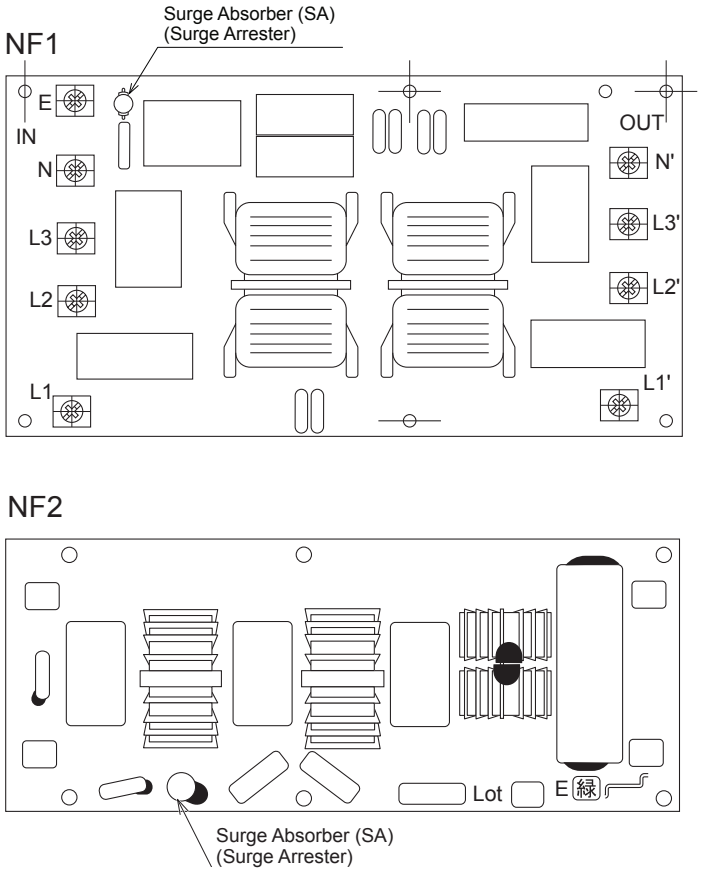
★ This alarm is indicated when abnormality lasts for 30 seconds after normal transmitting occurs between the outdoor unit PCB1 and PCB2, and also abnormality lasts for 30 seconds after the micro-computer is automatically reset. The alarm is indicated when the abnormal transmitting lasts for 30 seconds from the starting of the unit.



Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Disconnected Wires, Insufficient Contacting or Incorrect Connection	Between PCB1 and PCB2	Check continuity of wires. Check for looseness of connection screws. Check connection No.	Replacing wires, repairing, tightening screws and incorrect wiring.
	Power Source Wiring for Outdoor Unit		
Faulty PCB (PCB1 and PCB2)	Disconnected Wires to PCB	Check connections.	Repair wiring connections.
	Faulty PCB		Replace PCB if faulty.
Faulty Electrical Components (Power Fuse, Resistance)	Melted Power Fuse	Check conductivity of power fuse, power transistor, diode module.	Replace power fuse, power transistor, and diode module.
	Disconnected Incoming Current Limit Resistance	Check resistance of incoming current limit resistance.	Replace incoming current limit resistance.
Incorrect Wiring	Disconnected Wires Insufficient Contacting	Check continuity. Check for looseness of connection screws.	Replacing Wires, Repairing and Tightening Screws
	Incorrect Wiring	Check connection No.	Correctly Connect Wires

*1): When the unit is applied with excessive surge current due to lighting or other causes, this alarm code “04” or the inverter stoppage code (IT) “11” will be indicated and the unit can not be operated. In this case, check to ensure the surge absorber/surge arrester (SA) on the noise filte (NF1, NF2). The surge absorber may be damaged if the inner surface of the surge absorber is black. In that case, replace the surge absorber.
If the inside of the surge absorber is normal, turn OFF the power once and wait until PCB2’s LED201 (red) is OFF (approx. 5 min.) and turn ON again.

< Position of Surge Absorber >

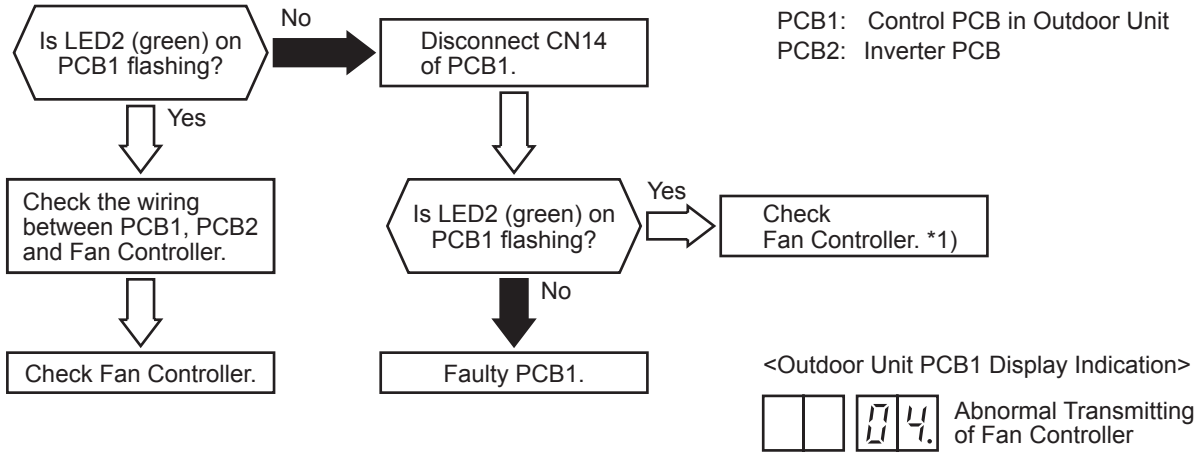


(380-415V)

Alarm Code 04.	Abnormal Transmitting between Fan Controller and Outdoor PCB

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when abnormality lasts for 30 seconds after normal transmitting occurs between the outdoor unit PCB1 and fan controller, and also abnormality lasts for 30 seconds after the micro-computer is automatically reset. The alarm is indicated when the abnormal transmitting lasts for 30 seconds from the starting of the outdoor unit.



Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Disconnected Wires, Insufficient Contacting or Incorrect Connection	Between PCB1, PCB2 and Fan Controller	Check continuity of wires. Check for looseness of connection screws. Check connection No.	Replacing wires, repairing, tightening screws and incorrect wiring.
	Power Source Wiring for Outdoor Unit		
Faulty PCB (PCB1 and PCB2 Fan Controller	Disconnected Wires to PCB	Check connections.	Repair wiring connections.
	Faulty PCB		Replace PCB if faulty.
	Melted Fuse (Fan Controller)	Check conductivity of fuse.	Replace fan controller. *1)
Faulty Electrical Components (Power Fuse, Resistance	Melted Power Fuse	Check conductivity of power fuse, power transistor, diode module.	Replace power fuse, power transistor, and diode module.
	Disconnected Incoming Current Limit Resistance	Check resistance of incoming current limit resistance.	Replace incoming current limit resistance.
Incorrect Wiring	Disconnected Wires Insufficient Contacting	Check continuity. Check for looseness of connection screws.	Replacing Wires, Repairing and Tightening Screws
	Incorrect Wiring	Check connection No.	Correctly Connect Wires

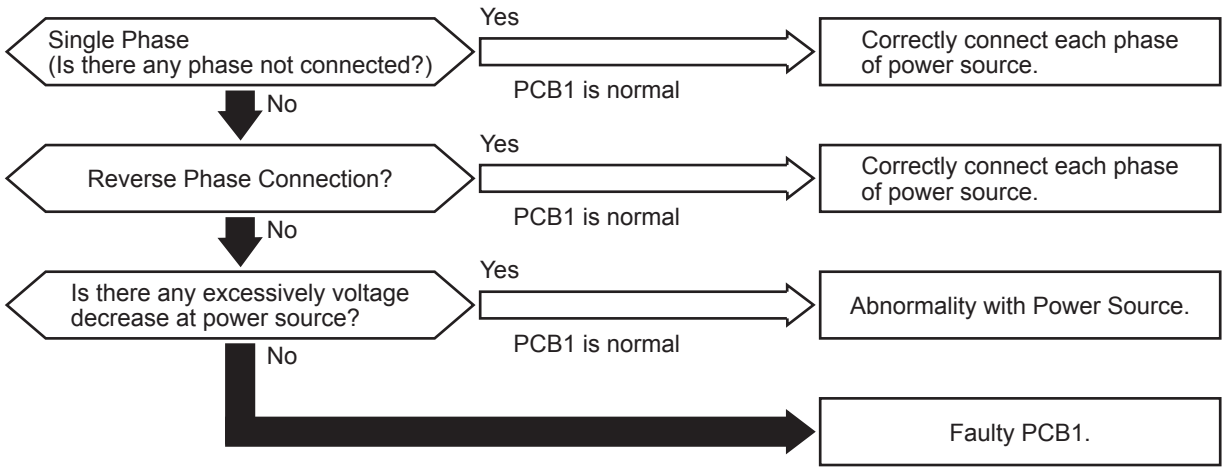
*1): The fan controller may be damaged if the fuse of fan controller is melted. In that case, replace the fan controller.

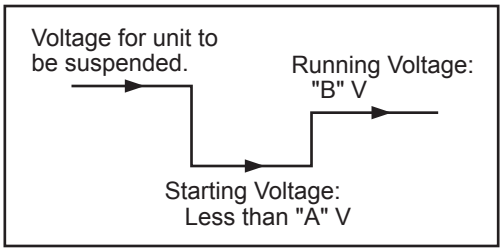
Alarm Code 05	Abnormality Power Source Phase

- “RUN” light is flashing and “ALARM” are indicated on the remote control switch.
  The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when the main power source phase is reversely connected or one phase is not connected.

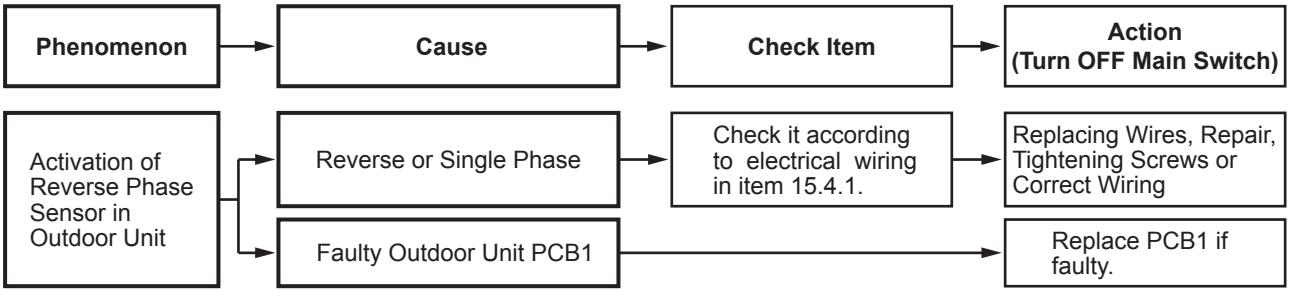
PCB1: Control PCB in Outdoor Unit





Check Item

Power Supply	“A”	“B”
380-415V/50Hz	323	342 to 456
380V/60Hz	323	342 to 418
220V/60Hz	187	198 to 242



Alarm Code 06	Abnormal Inverter Voltage

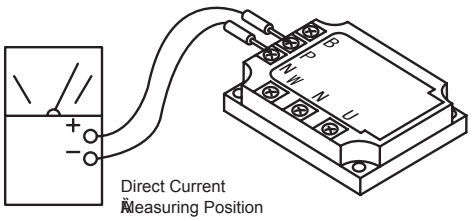
- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the alarm code is indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when voltage between terminal "P" and "N" of transistor module (IPM) is insufficient and its occurrence is three times in 30 minutes. In the case that the occurrence is fewer than 2 times, retry is performed.

<Outdoor Unit PCB1 Display Indication>

Abnormal of Inverter

PCB1: Control PCB in Outdoor Unit
PCB2: Inverter PCB



Direct Current Measuring Position

Measuring Range: DC1000V

Restart operation.

In case of 380-415V/50Hz, 380V/60Hz:
Is the power supply voltage 380V±10% or 415V±10% ?
In case of 220V/60Hz:
Is the power supply voltage 220V±10%?

No → Check wiring and wire sizes.

Yes

In case of 380-415V/50Hz, 380V/60Hz:
Is the power supply voltage more than 323V?
In case of 220V/60Hz:
Is the power supply voltage more than 187V?

No

Yes

Does the voltage fall during operation by operation of other apparatus?

Yes

No

Does LED201 on PCB2 ON after compressor's electromagnetic switches (CMC) turn ON?

Yes → How is compressor operation?

- Frequency can increase higher than 60Hz.
- Compressor stops immediately. (lower than 30Hz)
- Compressor stops when frequency increase. (Approx. 31Hz to 60Hz)

Frequency can increase higher than 60Hz. → Faulty CMC. Replace it.

Compressor stops immediately. (lower than 30Hz) → Check CMC for Compressor.
- Abnormal → Faulty CMC. Replace it.
- Normal → Faulty PCB2. Replace it.

Compressor stops when frequency increase. (Approx. 31Hz to 60Hz) → Faulty PCB2. Replace it.

No

Is connection correctly between PCB2, capacitors A*, DCL and CMC?

No → Connect correctly.

Yes

* Be careful especially because of high voltage.

Is the DC voltage over B* V?

Yes → Check capacitors A*.
- (Loose Wiring, Change of Color) → Replace capacitors. Capacitors have high voltage. Be careful especially. *1)
- Fault → Replace capacitors. Capacitors have high voltage. Be careful especially. *1)
- Normal → Faulty transistor module. Replace it.

No

Check Item

Power Supply	A* Capacitor	B* Voltage (DC)
380-415V/50Hz 380V/60Hz	CB1, CB2	460
220V/60Hz	CB	230

Check the wiring, the transistor module and capacitors A*. *2)
In case the wiring is correct, replace the transistor module.

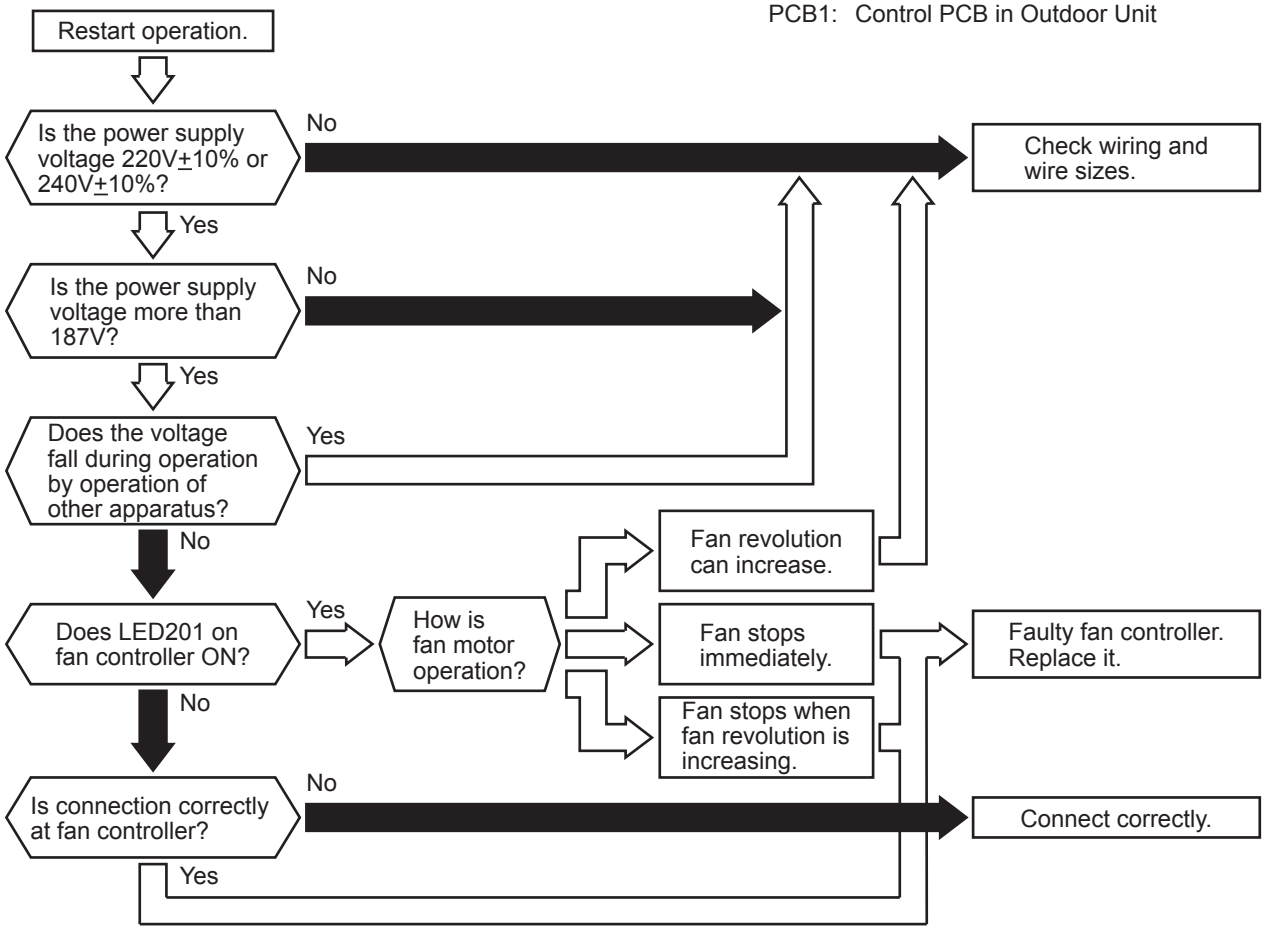
*1): If capacitor has high voltage, perform the high voltage discharge work according to the item 13.4.
*2): Checking procedures of transistor module is indicated in the item 13.4.

Alarm Code 06.	Abnormal Fan Controller Voltage

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the alarm code is indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when voltage between terminal "R" and "S" of Fan Controller is insufficient and its occurrence is three times in 30 minutes. In the case that the occurrence is fewer than 2 times, retry is performed.

PCB1: Control PCB in Outdoor Unit



<Outdoor Unit PCB1 Display Indication>

Abnormal of Fan Controller

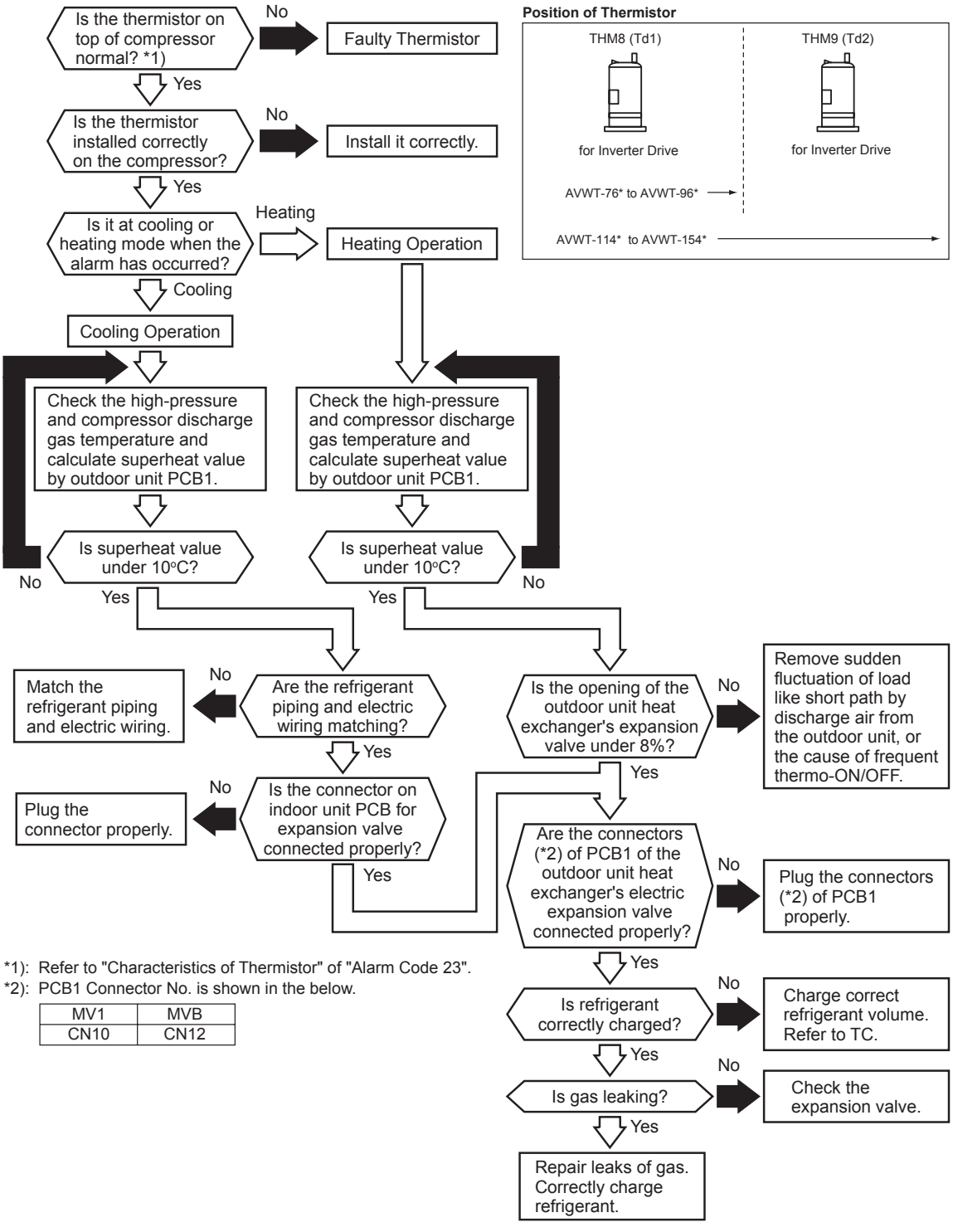
NOTES:
• I f fan controller has high voltage, perform the high voltage discharge work according to the item 13.4.
• Check the wiring connection according to the checking procedure of fan controller indicated in the item 13.4.

Alarm Code 07	Decrease in Discharge Gas Superheat

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
  The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

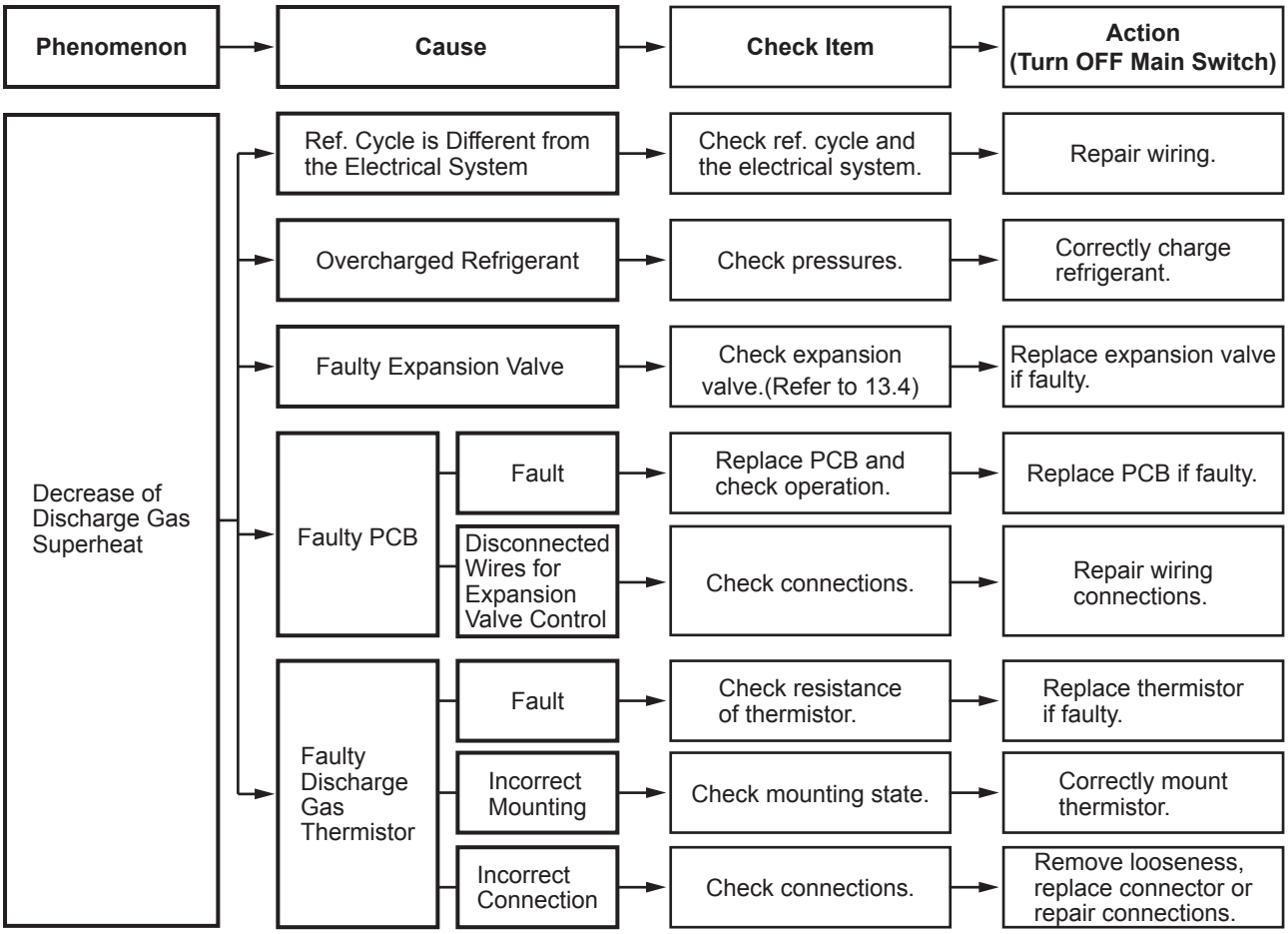
In the case that the discharge gas superheat is less than 10 deg. at the top of the compressor and it lasts for 30 minutes, retry operation is performed. However, when the alarm occurs twice within two hours, this alarm code is indicated.

PCB1: Control PCB in Outdoor Unit



*1): Refer to "Characteristics of Thermistor" of "Alarm Code 23".
*2): PCB1 Connector No. is shown in the below.

MV1	MVB
CN10	CN12

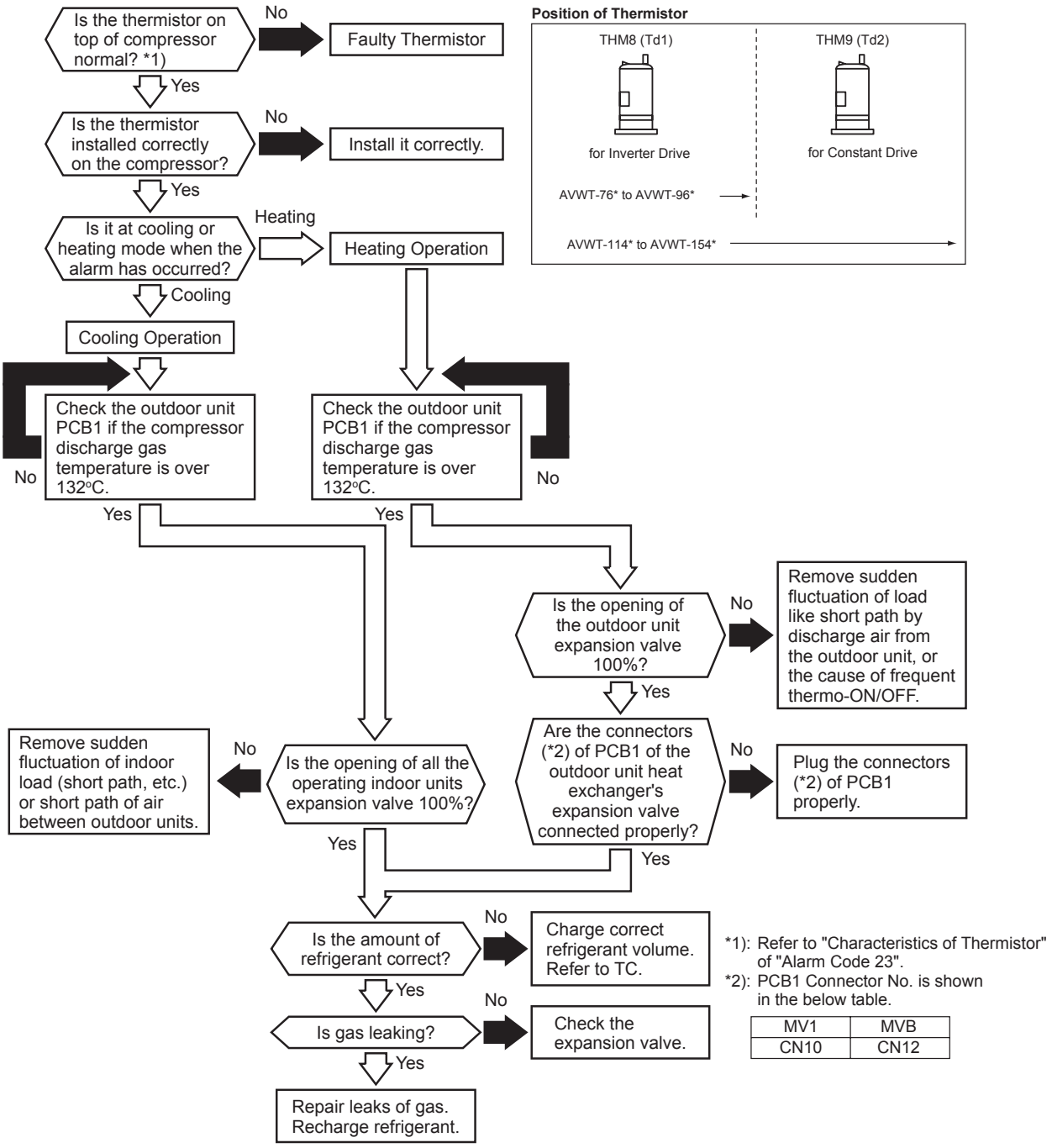

Phenomenon
Cause
Check Item
Action (Turn OFF Main Switch)
Decrease of Discharge Gas Superheat
Ref. Cycle is Different from the Electrical System
Check ref. cycle and the electrical system.
Repair wiring.
Overcharged Refrigerant
Check pressures.
Correctly charge refrigerant.
Faulty Expansion Valve
Check expansion valve.(Refer to 13.4)
Replace expansion valve if faulty.
Faulty PCB
Fault
Replace PCB and check operation.
Replace PCB if faulty.
Disconnected Wires for Expansion Valve Control
Check connections.
Repair wiring connections.
Faulty Discharge Gas Thermistor
Fault
Check resistance of thermistor.
Replace thermistor if faulty.
Incorrect Mounting
Check mounting state.
Correctly mount thermistor.
Incorrect Connection
Check connections.
Remove looseness, replace connector or repair connections.

Alarm Code 08	Increase in Discharge Gas Temperature at the Top of Compressor

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
  The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

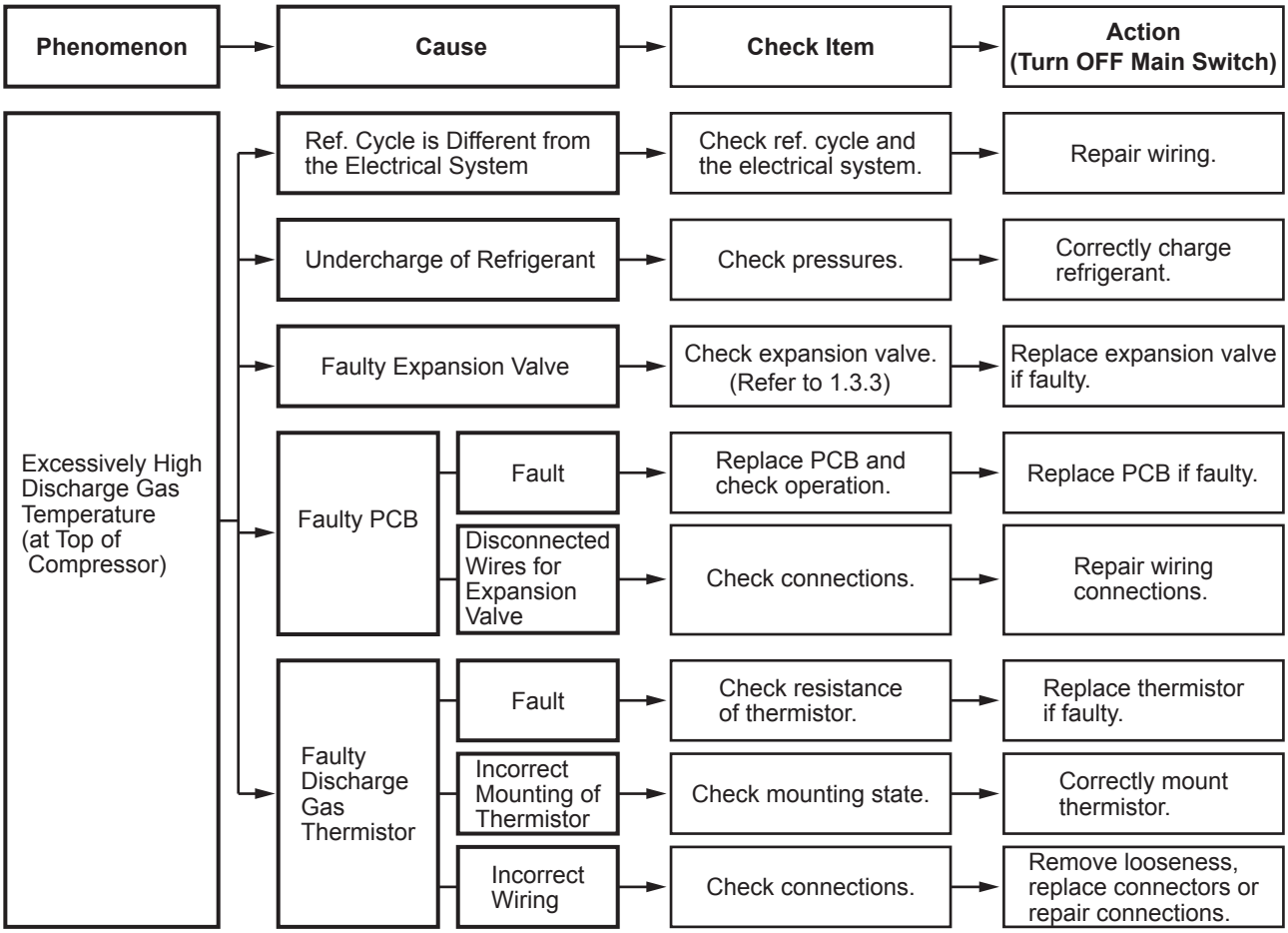
  This alarm is indicated when the following conditions occurs three times within one hour;
  (1) The temperature of the thermistor on the top of the compressor is maintained higher than 132°C for 10 minutes, or (2) The temperature of the thermistor on the top of the compressor is maintained higher than 140°C for 5 seconds.

PCB1: Control PCB in Outdoor Unit



*1): Refer to "Characteristics of Thermistor" of "Alarm Code 23".
*2): PCB1 Connector No. is shown in the below table.

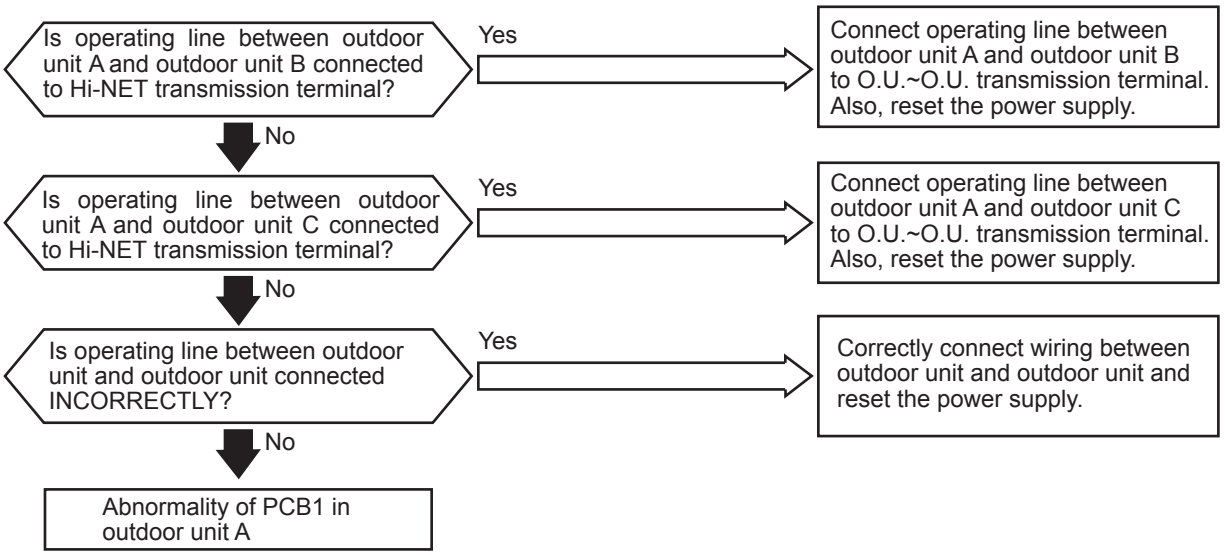
MV1	MVB
CN10	CN12

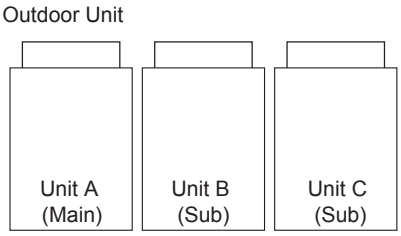

Phenomenon
Cause
Check Item
Action (Turn OFF Main Switch)
Excessively High Discharge Gas Temperature (at Top of Compressor)
Ref. Cycle is Different from the Electrical System
Check ref. cycle and the electrical system.
Repair wiring.
Undercharge of Refrigerant
Check pressures.
Correctly charge refrigerant.
Faulty Expansion Valve
Check expansion valve. (Refer to 1.3.3)
Replace expansion valve if faulty.
Faulty PCB
Fault
Replace PCB and check operation.
Replace PCB if faulty.
Disconnected Wires for Expansion Valve
Check connections.
Repair wiring connections.
Faulty Discharge Gas Thermistor
Fault
Check resistance of thermistor.
Replace thermistor if faulty.
Incorrect Mounting of Thermistor
Check mounting state.
Correctly mount thermistor.
Incorrect Wiring
Check connections.
Remove looseness, replace connectors or repair connections.

Alarm Code	Abnormality Transmitting between Outdoor Units

- “RUN” light is flashing and “ALARM” are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

PCB1: Control PCB in Outdoor Unit
O.U.: Outdoor Unit

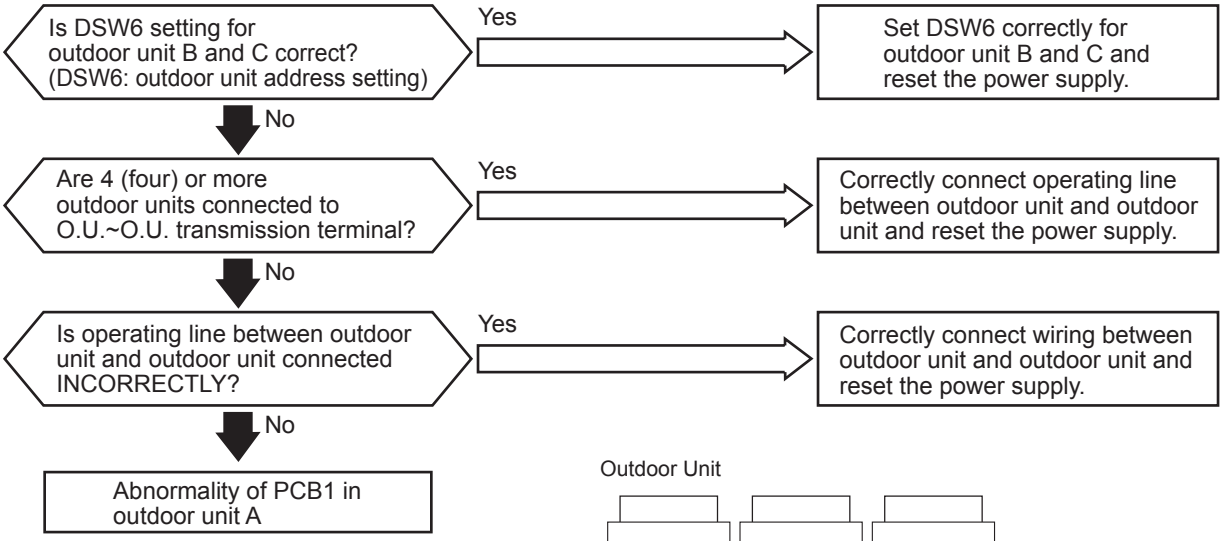




Alarm Code	Incorrect Outdoor Unit Address Setting

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
  The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

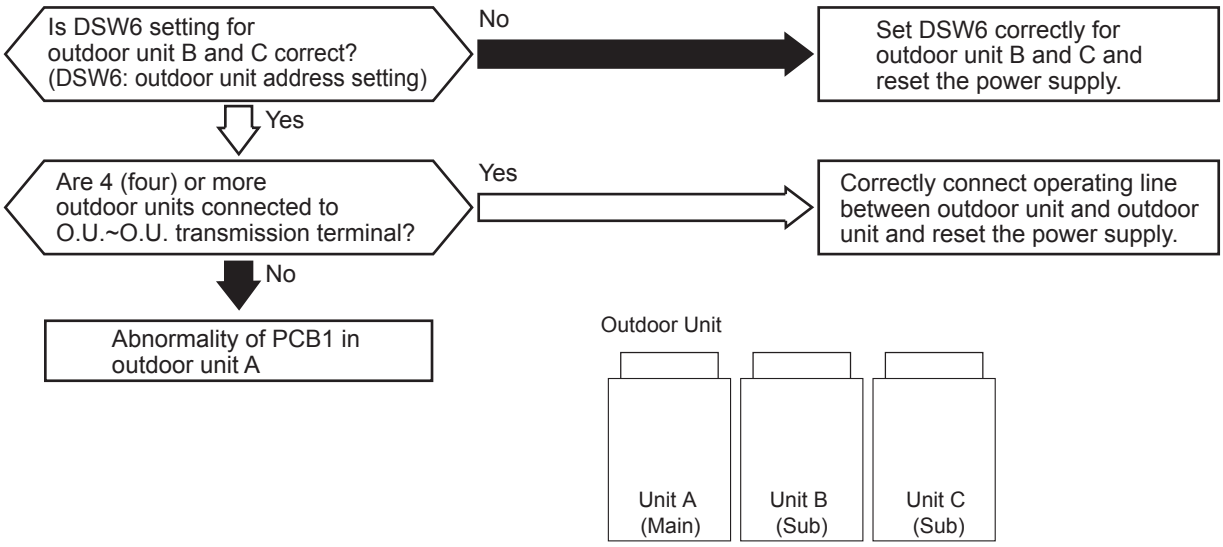
PCB1: Control PCB in Outdoor Unit
O.U.: Outdoor Unit



Alarm Code	Incorrect Outdoor Main Unit Setting

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

PCB1: Control PCB in Outdoor Unit
O.U.: Outdoor Unit

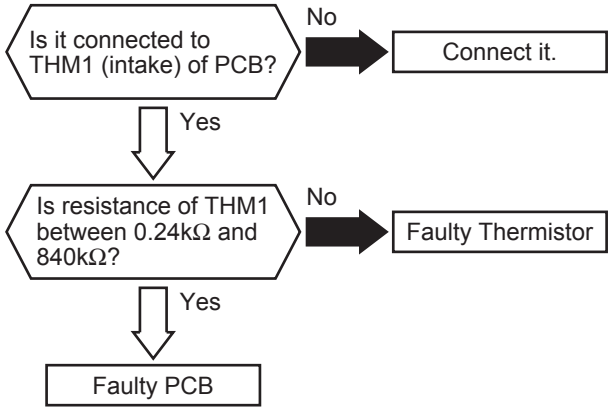


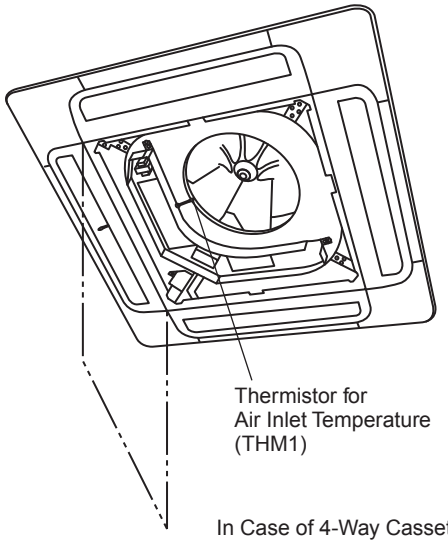
Alarm Code 11	Abnormality of Thermistor for Indoor Unit Inlet Air Temperature (Air Inlet Thermistor)

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
  The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

This alarm is indicated when the thermistor is short-circuited (less than 0.24 kW) or cut (greater than 840 kW) during the cooling or heating operation. The system will automatically restart when the fault is removed.

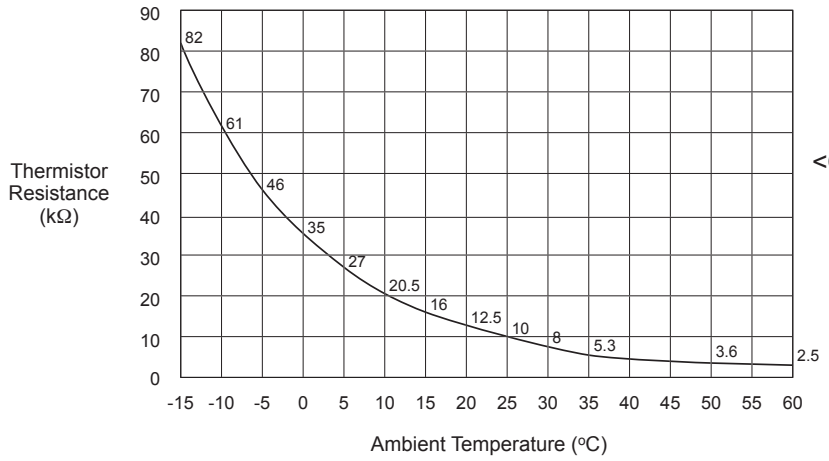
PCB1: Control PCB in Outdoor Unit
PCB: Indoor Unit PCB





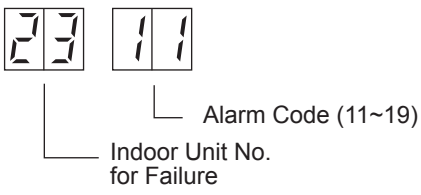
In Case of 4-Way Cassette Type

Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Intake Air Thermistor	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check connection.	Connect wiring correctly.
Faulty PCB		Replace PCB and check operation.	Replace PCB if faulty.



Thermistor Characteristics

<Outdoor Unit PCB1 Display Indication>
(Alarm Code 11~19)



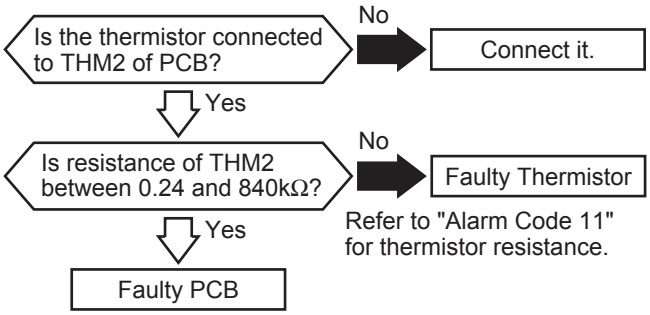
NOTE:
Thess data are applicable to the following thermistors;
1. Indoor Unit Discharge Air Temperature, 2. Indoor Unit Intake Air Temperature, 3. Indoor Unit Liquid Piping Temperature, 4. Indoor Unit Gas Piping Temperature, 5. Outdoor Air Temperature, 6. Outdoor Unit Liquid Piping Temperature, 7. Outdoor Unit Gas Piping Temperature

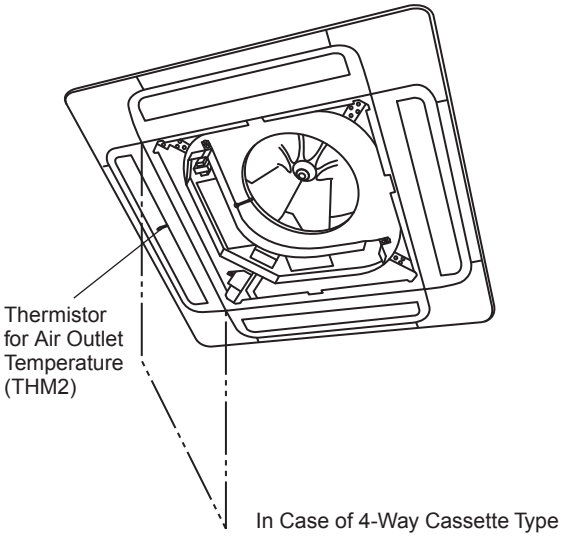
Alarm Code 12	Abnormality of Thermistor for Indoor Unit Discharge Air Temperature (Air Outlet Thermistor)

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when the thermistor is short-circuited (less than 0.24 kW) or cut (greater than 840 kW) during the cooling or heating operation. The system will automatically restart when the fault is removed.

PCB1: Control PCB in Outdoor Unit
PCB: Indoor Unit PCB





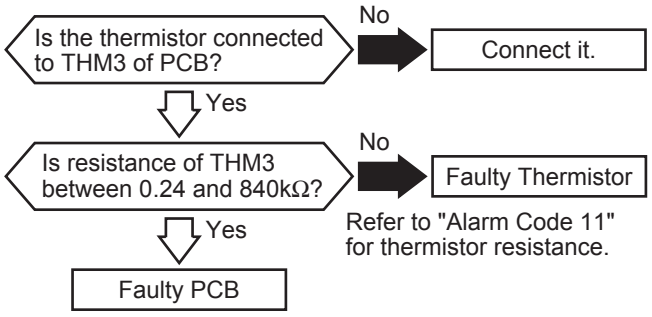
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Air Outlet Thermistor	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check wiring to PCB.	Connect wiring correctly.
Faulty PCB		Replace PCB and check operation.	Replace PCB if faulty.

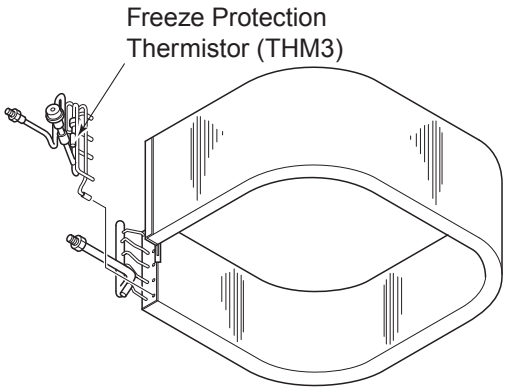
Alarm Code 13	Abnormality of Thermistor for Indoor Unit Heat Exchanger Liquid Refrigerant Pipe Temperature (Freeze Protection Thermistor)

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
  The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when the thermistor is short-circuited (less than 0.24 kW) or cut (greater than 840 kW) during the cooling operation or heating operation. The system will automatically restart when the fault is removed.

PCB1: Control PCB in Outdoor Unit
PCB: Indoor Unit PCB





In Case of 4-Way Cassette Type

Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Freeze Protection Thermistor	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check wiring to PCB.	Connect wiring correctly.
Faulty PCB		Replace PCB and check operation.	Replace PCB if faulty.

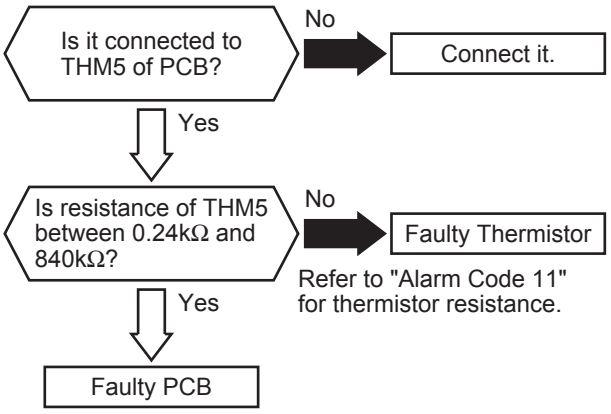
Alarm Code 14	Abnormality of Thermistor for Indoor Unit Heat Exchanger Gas Refrigerant Pipe Temperature (Gas Piping Thermistor)

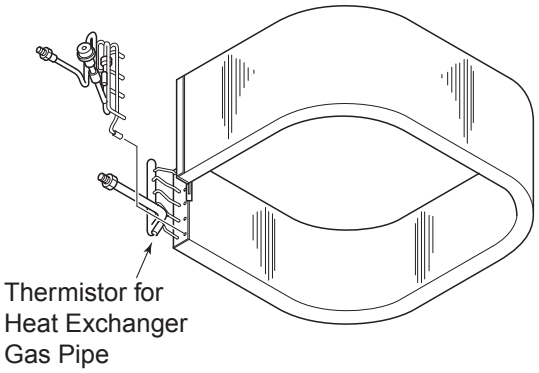
- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.

  The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

  This alarm is indicated when the thermistor is short-circuited (less than 0.24 kW) or cut (greater than 840 kW) during the cooling or heating operation. The system will automatically restart when the fault is removed.

PCB1: Control PCB in Outdoor Unit
PCB: Indoor Unit PCB





In Case of 4-Way Cassette Type

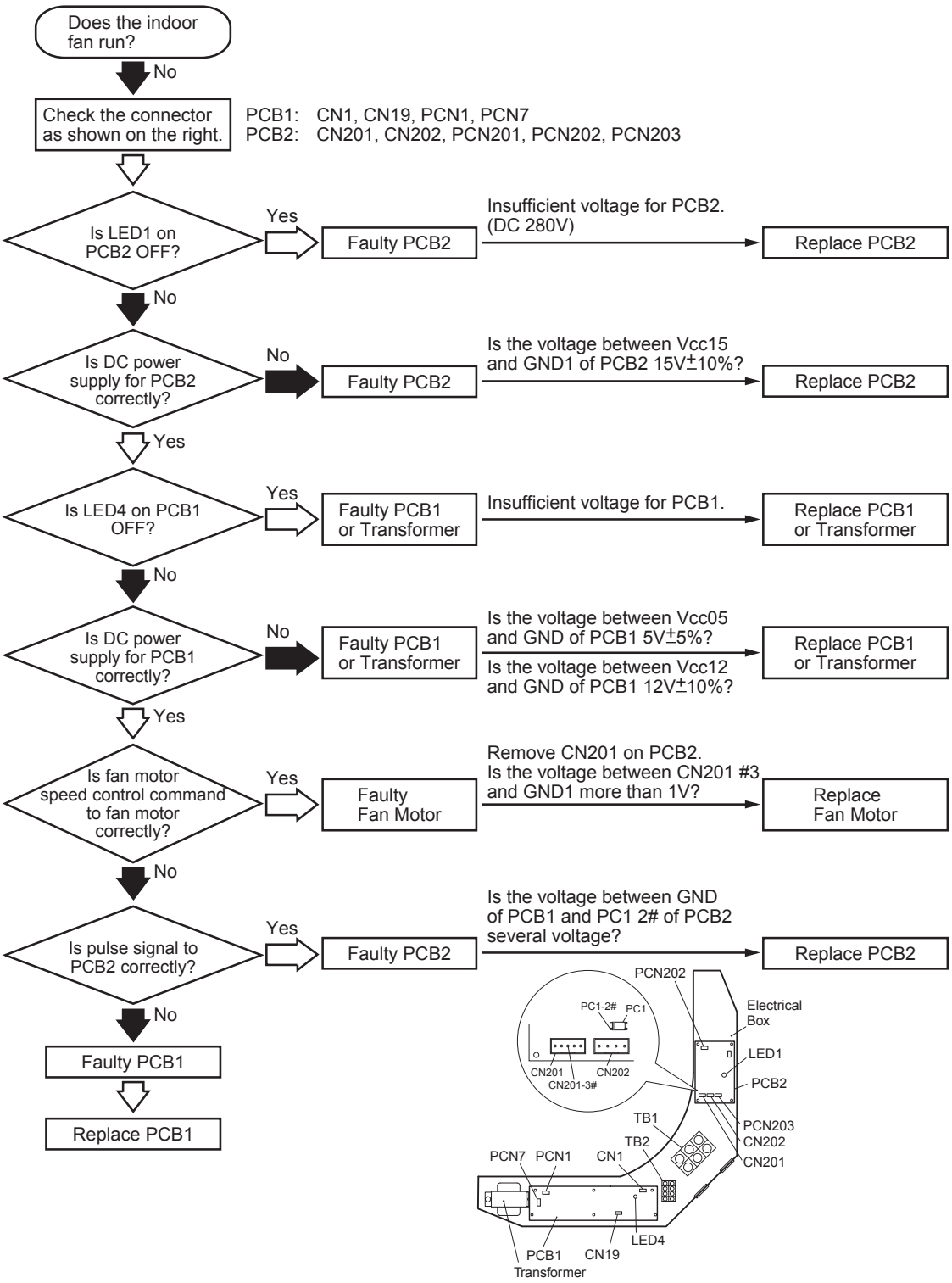
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Gas Pipe Thermistor	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check wiring to PCB.	Connect wiring correctly.
Faulty PCB		Replace PCB and check operation.	Replace PCB if faulty.

Alarm Code 19	Activation of Protection Device for Indoor Fan Motor (AVC-Model)

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the alarm code is indicated on the display of the outdoor unit PCB.

★ This alarm is indicated when the following conditions occurs three times in 30 minutes.
* Indoor fan rotates less than 70rpm for 5 seconds during operation.

★ Check to ensure that power is OFF before checking the connector connections. If not, PCB and fan motor may be damaged.

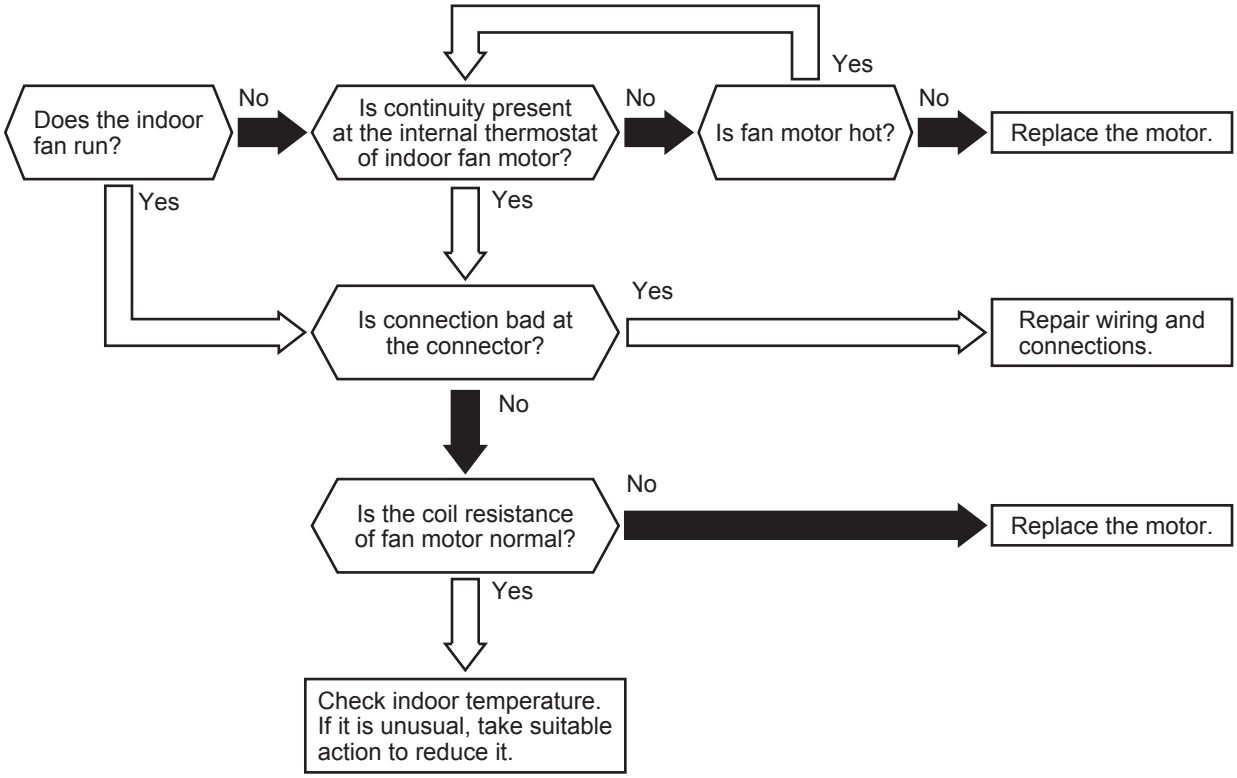


Alarm Code 19	Activation of Protection Device for Indoor Fan Motor (except AVC)

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and alarm code is indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when the temperature of the internal thermostat for the indoor fan motor is higher than 120°C or 135°C. (120°C: AVV, 135°C: AVH)

PCB1: Control PCB in Outdoor Unit



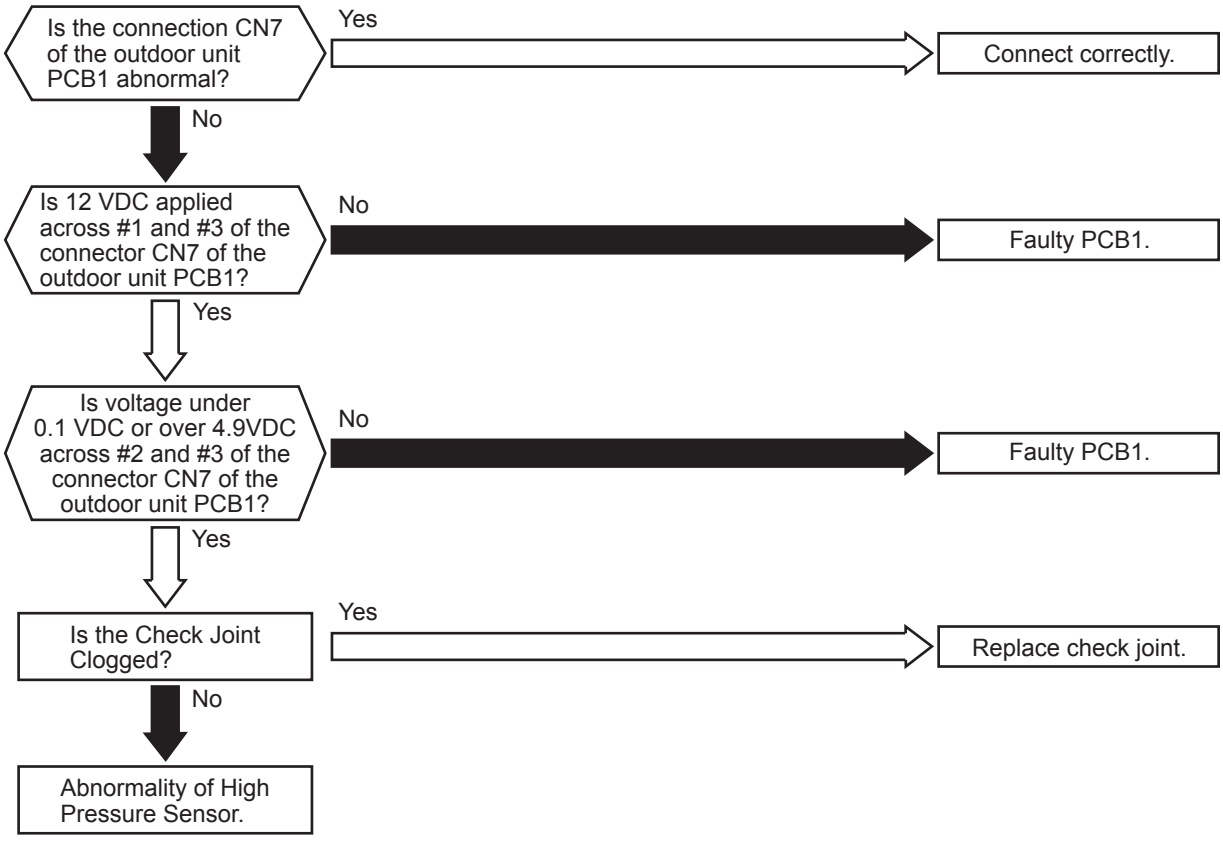
Phenomenon	Cause		Check Item	Action (Turn OFF Main Switch)
Activation of Internal Thermostat for Indoor Unit Fan Motor	Faulty Indoor Unit Fan Motor		Measure coil resistance and insulation resistance.	Replace motor if faulty.
	Faulty Internal Thermostat	Fault	Check continuity after fan motor temperature decreases to room temp.	Replace fan motor if no continuity.
		Insufficient Contacting	Measure resistance by tester.	Correct looseness. Replace connectors.
		Incorrect Connection	Check connections.	Repair connections.

Alarm Code 21	Abnormality of High Pressure Sensor for Outdoor Unit

● “RUN” light is flashing and “ALARM” are indicated on the remote control switch.
The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when the pressure sensor voltage decreases by lower than 0.1V or increases by higher than 4.9V during running.

PCB1: Control PCB in Outdoor Unit



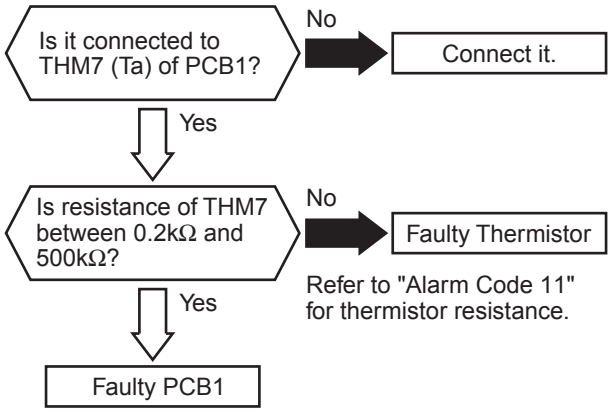
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty High Pressure Sensor	Fault	Check output voltage is correct.	Replace pressure sensor if faulty.
	Incorrect Connection	Check connections.	Repair wiring and connections.
Faulty PCB1		Replace PCB1 and check operation.	Replace PCB1 if faulty.
Indicated Pressure Value is Excessively High or Low	Malfunction of Pressure Sensor due to Faulty Check Joint	Check for clogging of check joint.	Replace check joint.

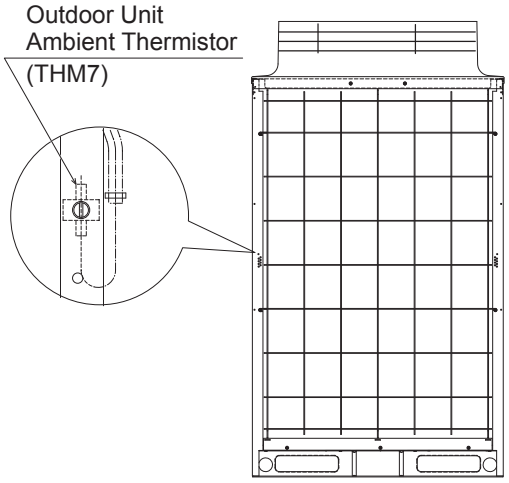
Alarm Code 22	Abnormality of Thermistor for Outdoor Air Temperature (Outdoor Unit Ambient Thermistor)

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when the thermistor is short-circuited (less than 0.2 kW) or cut (greater than 500 kW) during running.

PCB1: Control PCB in Outdoor Unit





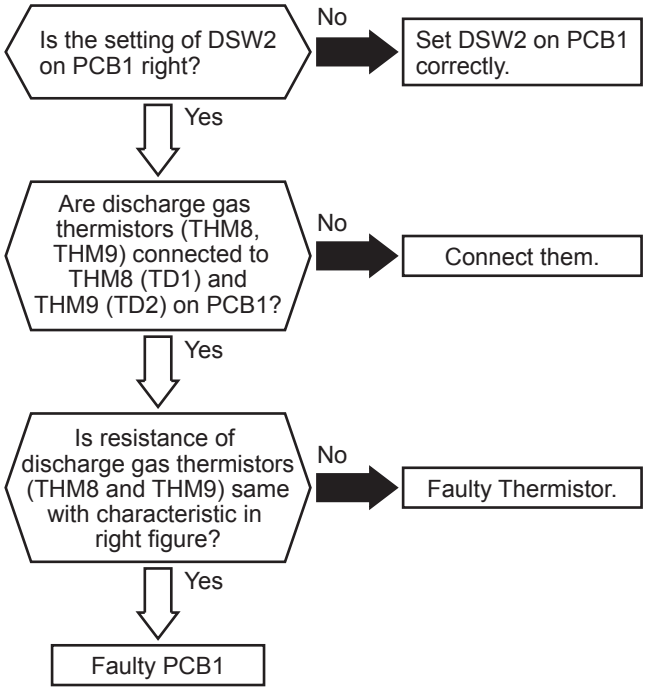
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Outdoor Unit Ambient Thermistor	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check wiring to PCB1.	Repair wiring and connections.
Faulty PCB1		Replace PCB1 and check operation.	Replace PCB1 if faulty.

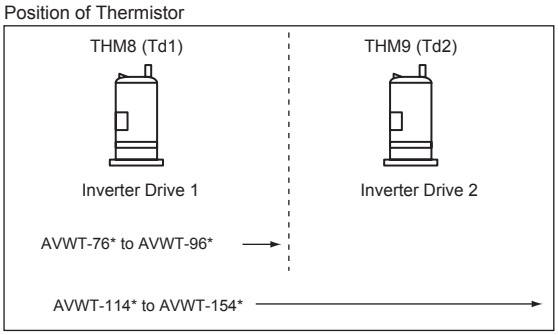
Alarm Code 23	Abnormality of Thermistor for Discharge Gas Temperature on the Top of Compressor

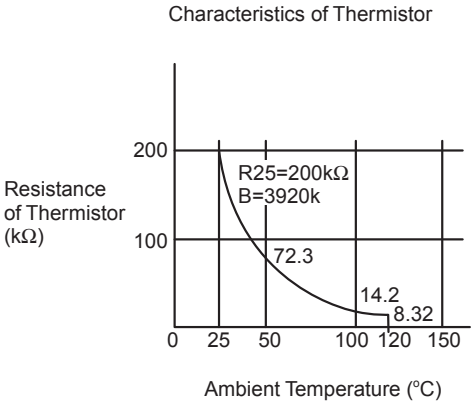
- "RUN" light is flashing and "ALARM" are indicated on the wired remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, or the unit No. and alarm code are indicated on the outdoor unit PCB1. If abnormality with the thermistor is found out, check all the thermistors as shown below.

★ This alarm is indicated when the thermistor is in short-circuited (less than 0.9 kW) or open-circuit(greater than 5,946 kW) during running.

PCB1: Control PCB in Outdoor Unit







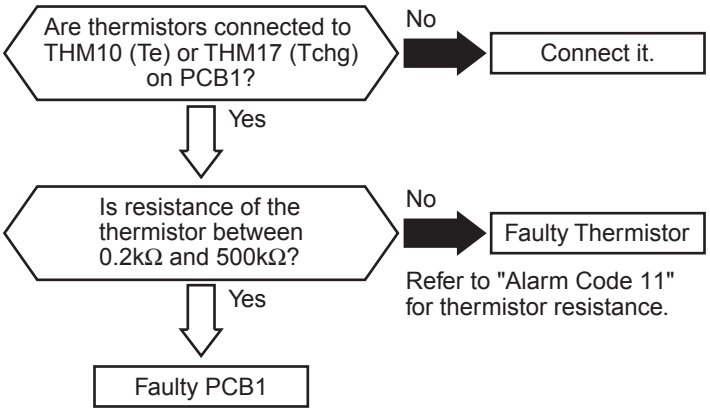
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Discharge Gas Thermistor	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check wiring to PCB1.	Repair wiring and connections.
Faulty PCB1		Replace PCB1 and check operation.	Replace PCB1 if faulty.
Incorrect Setting of DSW2 on PCB1		Check setting of DSW2 on PCB1.	Correctly set DSW2 on PCB1.

Alarm Code 24	Abnormality of Thermistor for Outdoor Unit Heat Exchanger Liquid Pipe (Te/Tchg)

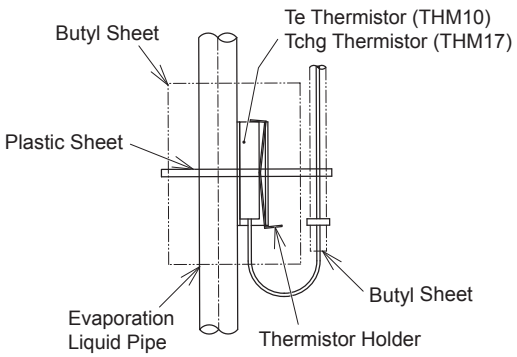
● "RUN" light is flashing and "ALARM" are indicated on the wiredremote control switch.
The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.
If abnormality with the thermistor is found out, check the thermistors as shown below.

★ This alarm is indicated when the thermistor is in short-circuit (less than 0.2 kW) or open-circuit (greater than 840 kW) for 8 minutes during running.

If this thermistor is faulty, this alarm is indicated.



< Details for Thermistor >



Te: Thermistor for Outdoor Liquid Pipe
Tchg: Thermistor for Super Cooling Main Line
PCB1: Control PCB in Outdoor Unit

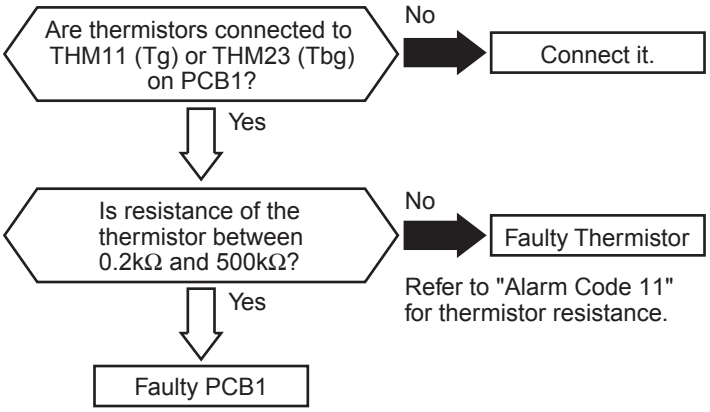
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Outdoor Unit Liquid Pipe Thermistor	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check wiring to PCB1.	Repair wiring and connections.
Faulty PCB1		Replace PCB1 and check operation.	Replace PCB1 if faulty.

Alarm Code 25	Abnormality of Thermistor for Outdoor Unit Heat Exchanger Gas Pipe (Tg/Tbg)

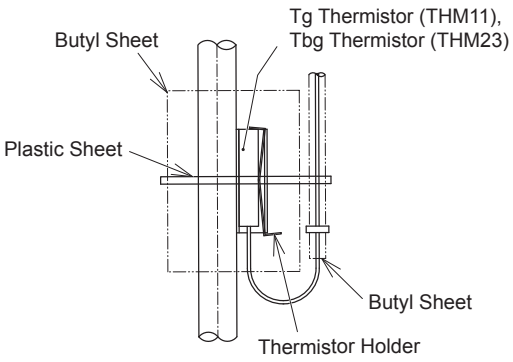
- "RUN" light is flashing and "ALARM" are indicated on the wired remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1. If abnormality with the thermistor is found out, check all the thermistors as shown below.

★ This alarm is indicated when the thermistor is in short-circuit (less than 0.2kW)or open-circuit (greater than 840kW) for 8 minutes during running.

If this thermistor is faulty, this alarm is indicated.



< Details for Thermistor >



Tg: Thermistor for Outdoor Gas Pipe
Tbg: Thermistor for Super Cooling Bypass Line
PCB1: Control PCB in Outdoor Unit

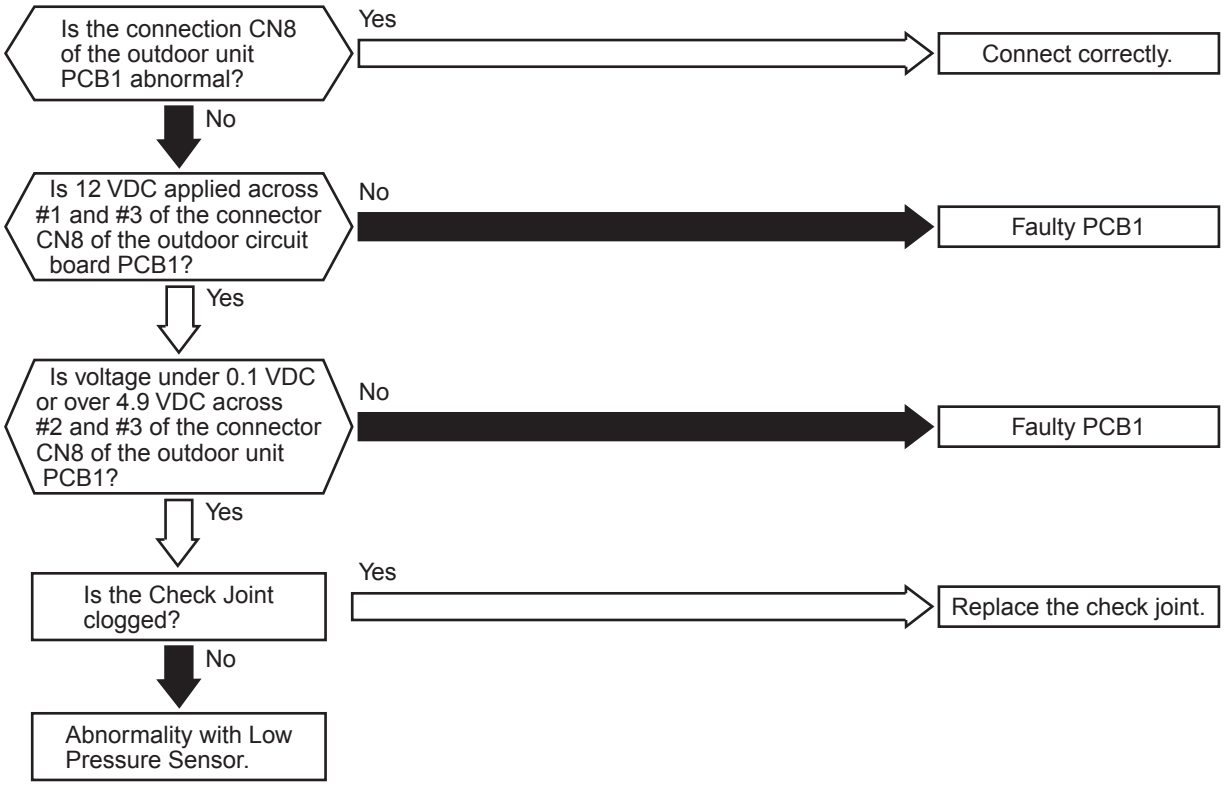
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Outdoor Unit Gas Pipe Thermistor	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check wiring to PCB1.	Repair wiring and connections.
Faulty PCB1		Replace PCB1 and check operation.	Replace PCB1 if faulty.

Alarm Code 29	Abnormality of Low Pressure Sensor for Outdoor Unit

- "RUN" light is flashing and "ALARM" are indicated on the wired remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ This alarm is indicated when the pressure sensor voltage is lower than 0.1V or higher than 4.9V during running.

PCB1: Control PCB in Outdoor Unit



Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Low Pressure Sensor	Fault	Check output voltage is correct.	Replace pressure sensor if faulty.
	Incorrect Connection	Check connections.	Repair wiring and connections.
Faulty PCB1		Replace PCB1 and check operation.	Replace PCB1 if faulty.
Indicated Pressure Value is Excessively High or Low	Malfunction of Pressure Sensor due to Faulty Check Joint	Check for clogging of check joint.	Replace check joint.

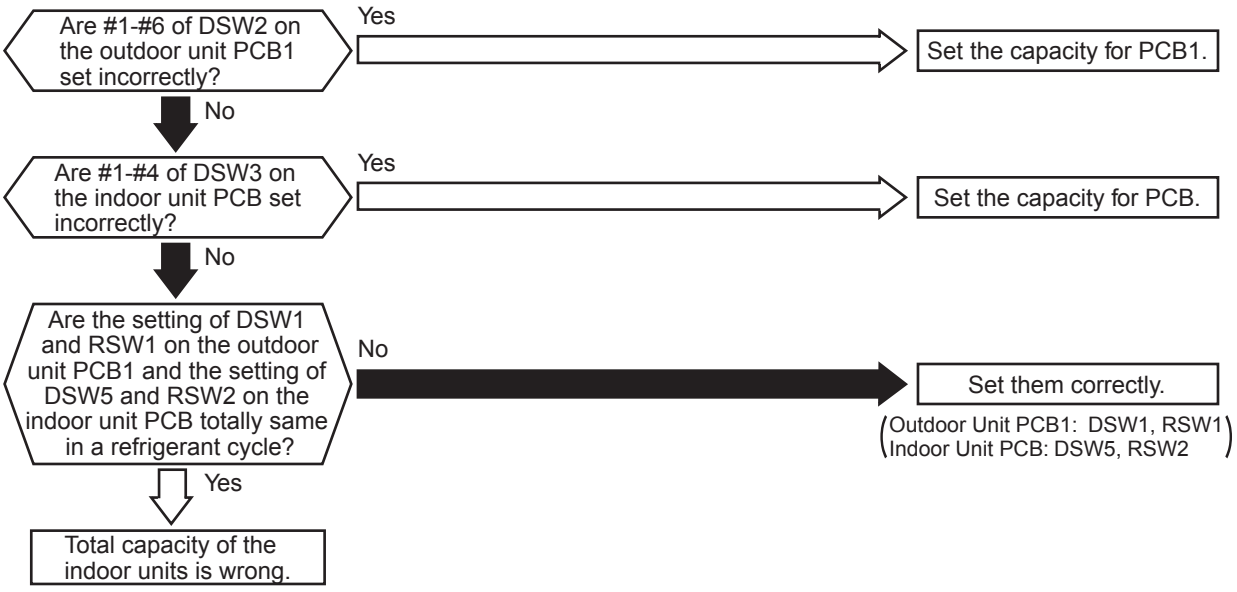
Alarm Code 31	Incorrect Capacity Setting of Indoor Unit and Outdoor Unit

● “RUN” light is flashing and “ALARM” are indicated on the wirde remote control switch.
The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ This alarm is indicated when the capacity setting dip switch, (DSW2) on the outdoor unit PCB1, is not set (all the settings from #1 to #6 are OFF) or mis-setting.

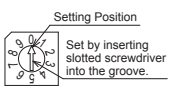
★ This alarm is indicated when the total indoor unit capacity is smaller than 50% or greater than 130% of the combined outdoor unit capacity.

PCB1: Control PCB in Outdoor Unit
PCB: Indoor Unit PCB



Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
	Incorrect Capacity Setting of Indoor Unit	Check combination of indoor units and capacity setting on PCB.	Correctly set dip switch, DSW3.
	Incorrect Capacity Setting of Outdoor Unit	Check capacity setting on outdoor unit PCB1.	Correctly set dip switch, DSW2.
	Total Indoor Unit Capacity Connected to the Outdoor Unit is Beyond Permissible Range	Check outdoor unit model by calculating total indoor units capacity.	Ensure that total indoor unit capacity is from 50% to 130%.
	Refrigeration Cycle Setting of Outdoor Unit and Indoor Unit is Different	Check refrigeration cycle setting on outdoor unit PCB1 and indoor unit PCB.	Set them correctly.

Refrigerant Cycle No. Setting (AVWT-76UE(7)SRG AVWT-96UE(7)SRG AVWT-114UE(7)SRG AVWT-136UE(7)SRG AVWT-154UE(7)SRG AVWT-170UE(7)SRG)

	Setting Switch	
	10 digit	1 digit
		
Outdoor Unit	DSW1	RSW1

	Setting Switch	
	10 digit	1 digit
		
Outdoor Unit	DSW1	RSW1

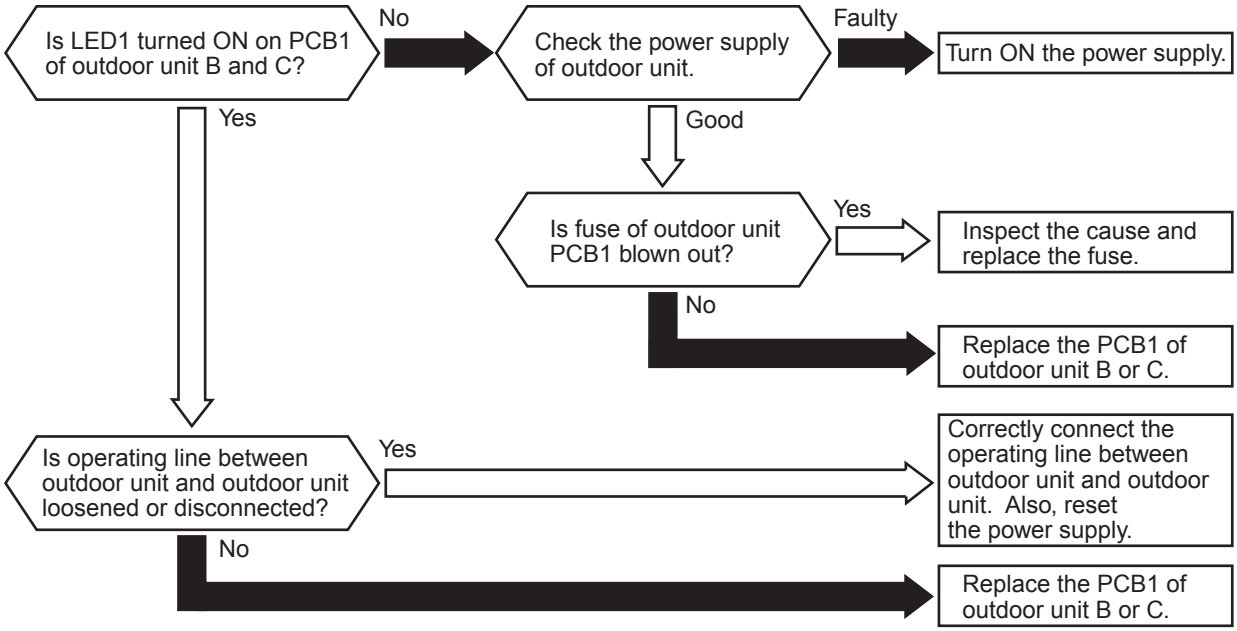
Alarm Code 31	Abnormal Transmitting between Outdoor Units

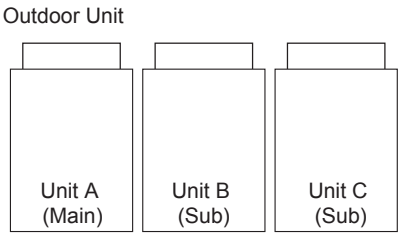
- "RUN" light is flashing and "ALARM" are indicated on the wired remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when the following condition occurs after normal transmitting between outdoor unit and outdoor unit is maintained;

- Abnormality is maintained for 30 seconds.
- Abnormality is maintained for 30 seconds even after micro-computer reset (automatically).

PCB1: Control PCB in Outdoor Unit





Alarm Code 35	Incorrect Indoor Unit No. Setting

- "RUN" light is flashing and "ALARM" are indicated on the wired remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the alarm code is indicated on the outdoor unit PCB1.

★ This alarm code is indicated when indoor units No. are duplicated in one system after power ON for 5 minutes.

NOTE:
In the case of Hi-NET System, this alarm code is indicated when DSW1 and RSW1 of the outdoor unit PCB1 and DSW5 and RSW2 of the indoor unit PCB are incorrectly set.
In this case, set them correctly after turning OFF the main switch, and again turn ON the main switch.
When the refrigerant No. setting of outdoor unit (Hi-NET II) and the one of outdoor unit (Hi-NET) are duplicated, the alarm "35" may go ON and OFF repeatedly.

PCB1: Control PCB in Outdoor Unit

Alarm Code 36	Incorrect Indoor Unit Combination

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the alarm code is indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when the indoor unit connected to outdoor unit is designed for refrigerant R22 type.

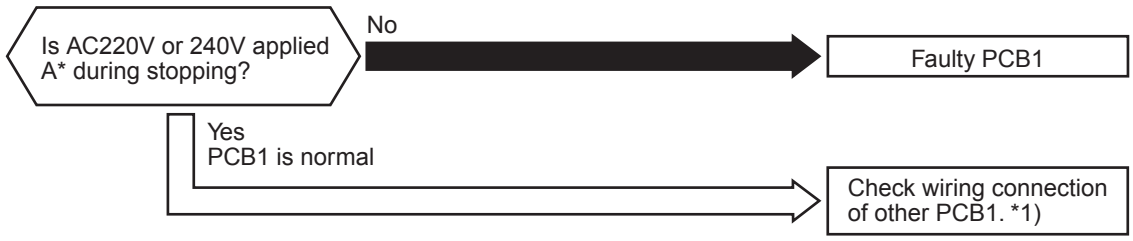
PCB1: Control PCB in Outdoor Unit

Alarm Code 38	Abnormality of Picking up Circuit for Protection in Outdoor Unit

● “RUN” light is flashing and “ALARM” are indicated on the remote control switch.
The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and the alarm code are indicated on the outdoor unit PCB1.

★ This alarm is indicated when AC 220V or 240V is not detected in A* during inverter compressor stoppage.

PCB1: Control PCB in Outdoor Unit



Power Supply	A*
380-415V/50Hz	Between terminal #3 of PCN2, PCN16 and faston terminal “N1” on PCB1

Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Activation of Picking up Circuit for Protection	Starting Outdoor Unit at Activation of Pickig up Circuit for Protection	Alarm Code History: “02” and “09” before “38”.	Refer to Alarm Code “02” and “09”
Abnormality of Picking up Circuit for Protection	Incorrect Connection	Check voltage supplied to connectors.	Repair wiring connections.
Faulty PCB1			Replace PCB1.

*1): Check wiring system connecting to PCN2 and PCN16 on PCB1.

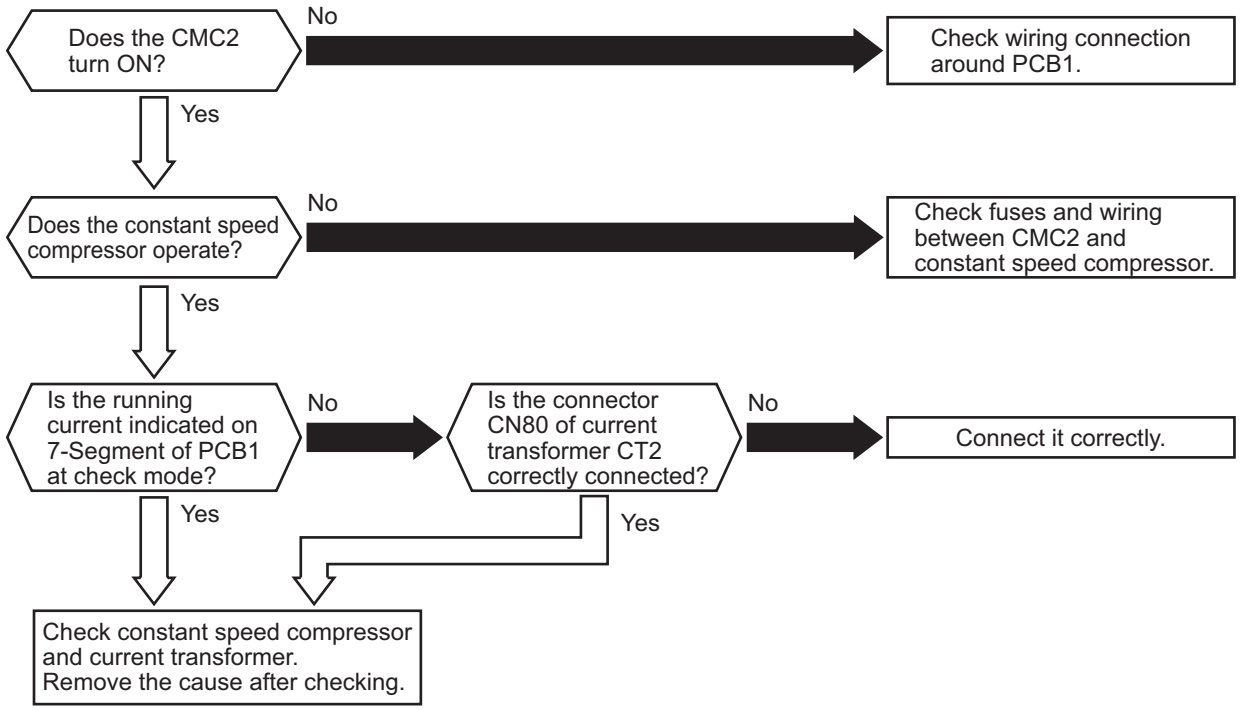
Alarm Code 39	Abnormality of Running Current at Constant Speed Compressor

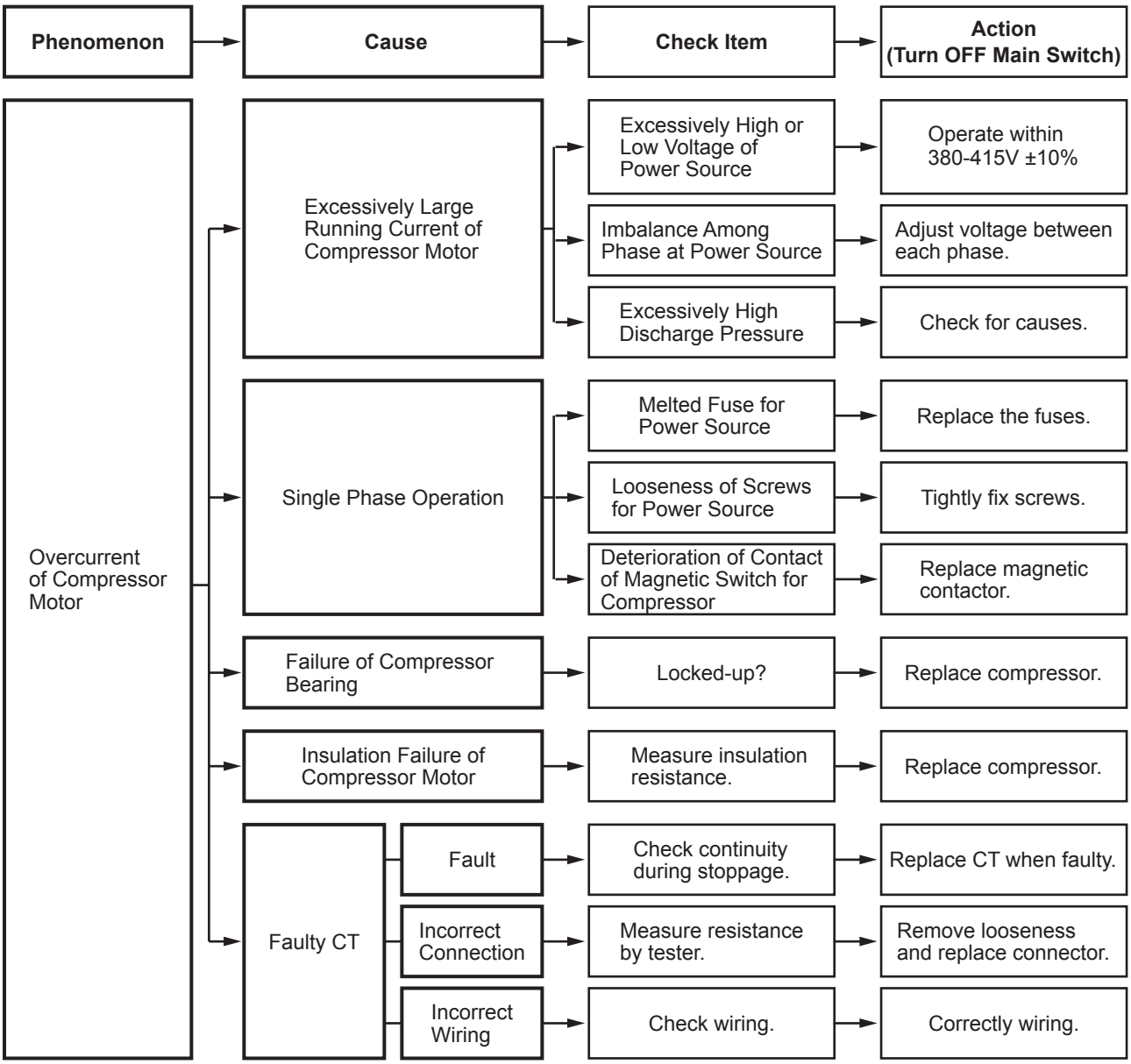
- "RUN" light flashes and "ALARM" is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when the following conditions occurs;

- The running current of the constant speed compressor exceeds the value of overcurrent limitation during operating.
- The running current of the constant speed compressor is detected 0A and retry when 3 minutes are passed after all compressors are stopped, and this phenomenon occurs three times within 30 minutes.

PCB1: Control PCB in Outdoor Unit




Phenomenon
Cause
Check Item
Action
(Turn OFF Main Switch)
Overcurrent of Compressor Motor
Excessively Large Running Current of Compressor Motor
Excessively High or Low Voltage of Power Source
Operate within 380-415V ±10%
Imbalance Among Phase at Power Source
Adjust voltage between each phase.
Excessively High Discharge Pressure
Check for causes.
Single Phase Operation
Melted Fuse for Power Source
Replace the fuses.
Looseness of Screws for Power Source
Tightly fix screws.
Deterioration of Contact of Magnetic Switch for Compressor
Replace magnetic contactor.
Failure of Compressor Bearing
Locked-up?
Replace compressor.
Insulation Failure of Compressor Motor
Measure insulation resistance.
Replace compressor.
Faulty CT
Fault
Check continuity during stoppage.
Replace CT when faulty.
Incorrect Connection
Measure resistance by tester.
Remove looseness and replace connector.
Incorrect Wiring
Check wiring.
Correctly wiring.

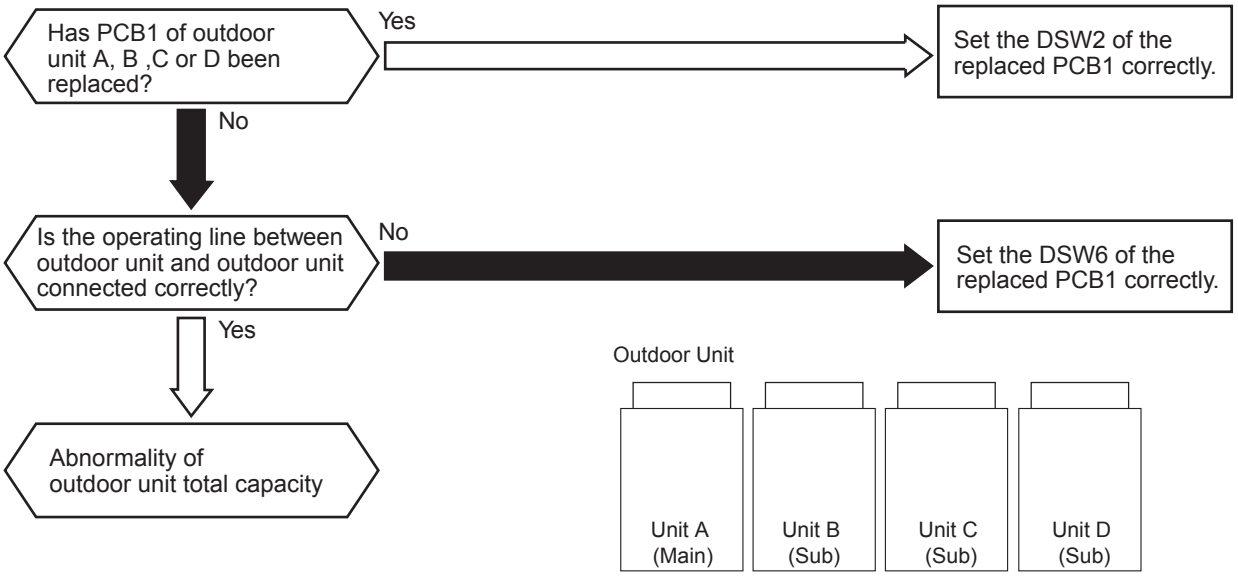
Alarm Code 3A	Abnormality of Outdoor Unit Capacity

● “RUN” light is flashing and “ALARM” are indicated on the remote control switch.

The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ This alarm is indicated when the total capacity of outdoor unit connected to O.U.~O.U. transmission terminal exceeds 88HP.

PCB1: Control PCB in Outdoor Unit
O.U. Outdoor Unit



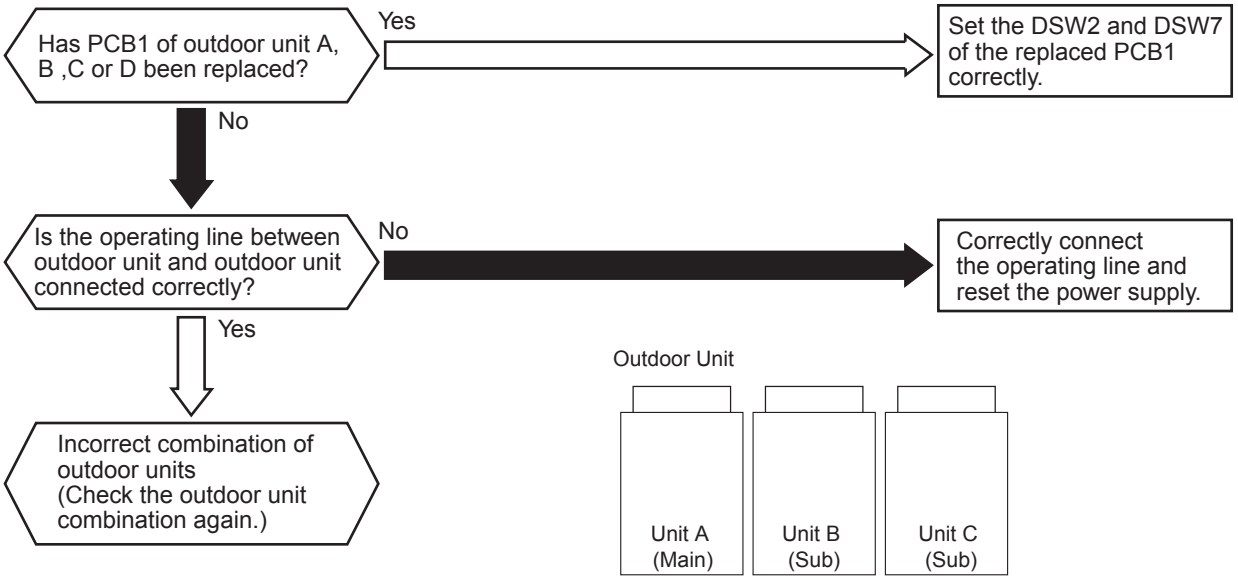
Alarm Code 3b	Incorrect Setting of Outdoor Unit Model Combination or Voltage

“RUN” light is flashing and “ALARM” are indicated on the remote control switch.

The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.

★ This alarm is indicated when the model setting for outdoor unit connected to O.U.~O.U. transmission terminal is incorrect.

PCB1: Control PCB in Outdoor Unit
O.U. Outdoor Unit

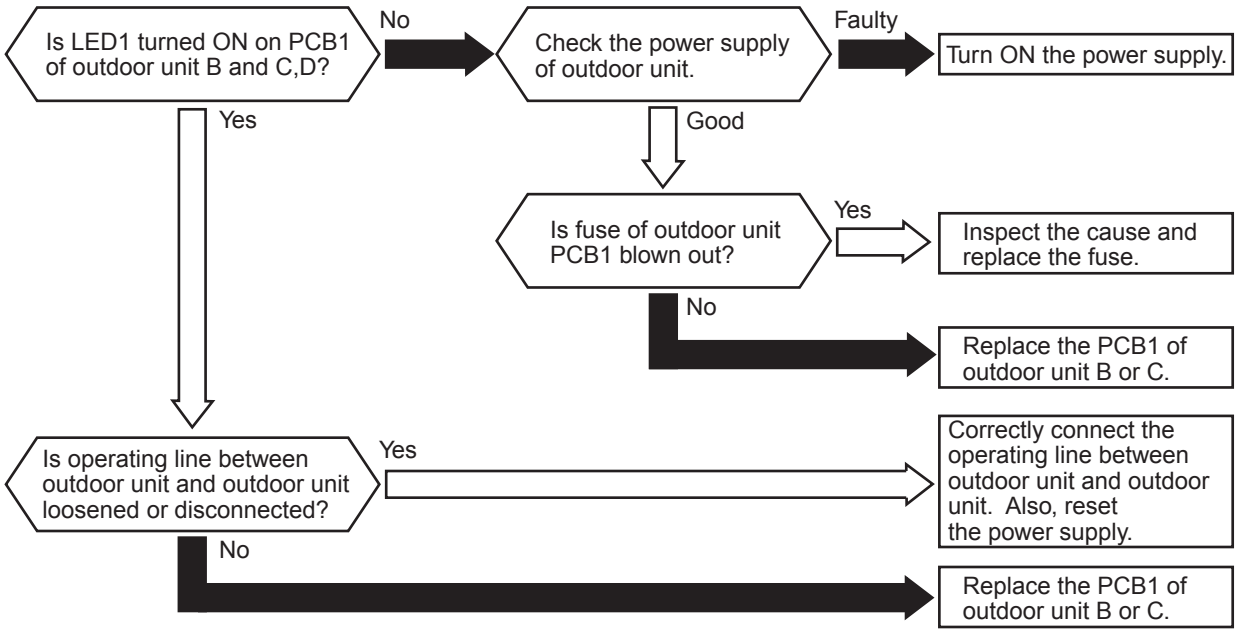


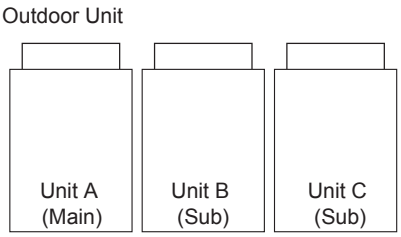
Alarm Code 3d	Abnormality Transmitting between Main Unit and Sub Unit(s)

- "RUN" light is flashing and "ALARM" are indicated on the wired remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ This alarm is indicated when transmission to outdoor unit B or C,D is NOT maintained for 30 seconds. (Alarm code "31" will be indicated when transmission to all the outdoor units connected to O.U.~O.U. transmission terminal is NOT maintained.)

PCB1: Control PCB in Outdoor Unit
O.U.: Outdoor Unit



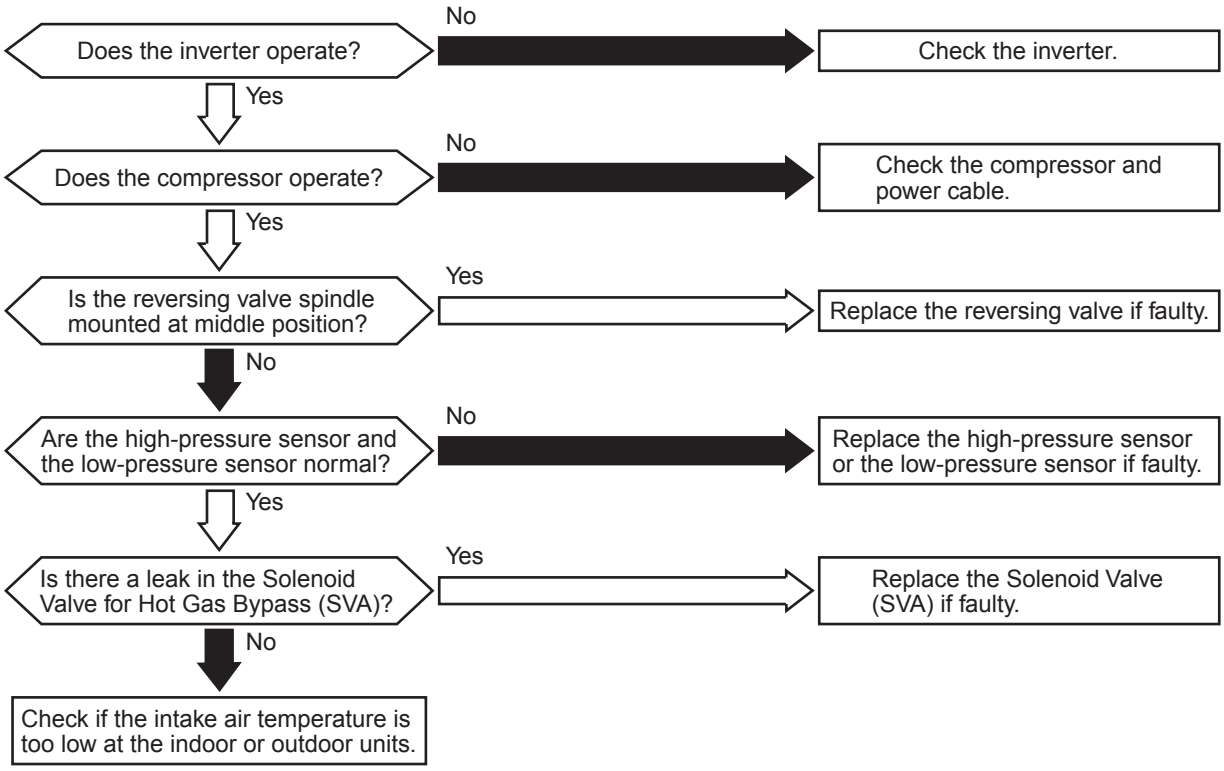


Alarm Code 43	Activation of Low Compression Ratio Protection Device

- "RUN" light is flashing and "ALARM" is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ This alarm is indicated when a compression ratio, $\varepsilon = \{(Pd + 0.1) / (Ps + 0.06)\}$ is calculated from a discharge pressure (Pd MPa) and suction pressure (Ps MPa) and the condition lower than $\varepsilon < 1.8$ occurs more than three times (including three) in one hour.

PCB1: Control PCB in Outdoor Unit



Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Excessively Low Compression Ratio	Inverter is not Functioning	Check inverter.	Repair faulty part.
	Compressor is not Operating	Check compressor.	Replace comp. if faulty.
	Valve Stoppage at Middle Position of Reversing Valve	Measure suction pipe temp. of reversing valve.	Replace reversing valve if faulty.
	Abnormality of High or Low Pressure Sensor	Check connector for PCB1, power source and pressure indication.	Replace sensor if faulty.
	Excessively Low Indoor Intake Air Temperature	Check indoor unit and outdoor unit air temp. thermistor.	Replace thermistor if faulty.
	Leakage from Solenoid Valve (SVA)	Check Solenoid Valve.	Replace SVA if leaking.

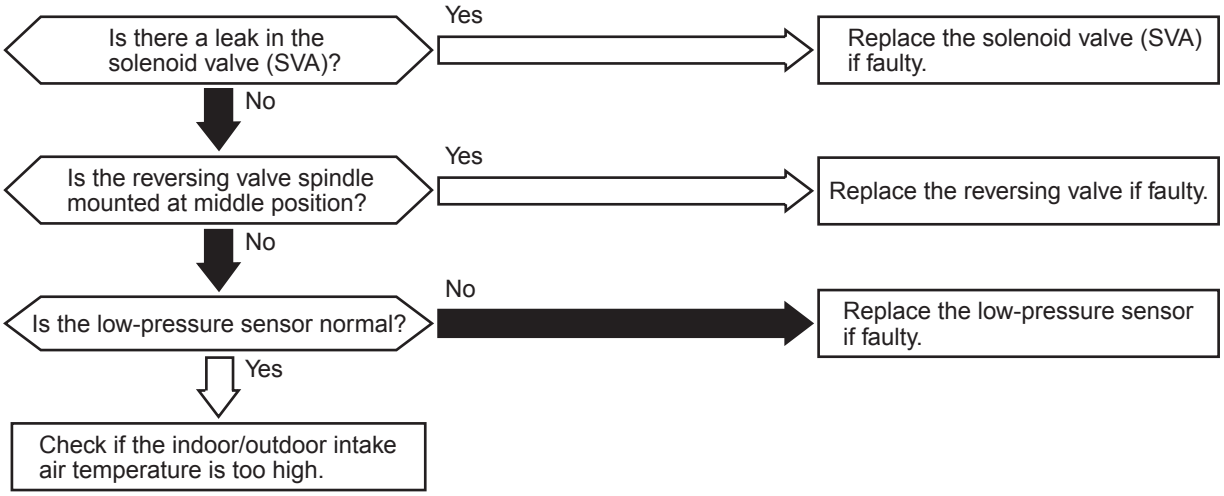
Alarm Code 44	Activation of Low Pressure Increase Protection Device

● “RUN” light is flashing and “ALARM” are indicated on the remote control switch.

The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ In case that compressor is operated under the condition that is higher than 1.4MPa of suction pressure (Ps) for 1 minute, all compressors are stopped and retry operation is started after 3 minutes. However this alarm is indicated when same phenomenon is occurred at two times within the next 30 minutes.

PCB1: Control PCB in Outdoor Unit



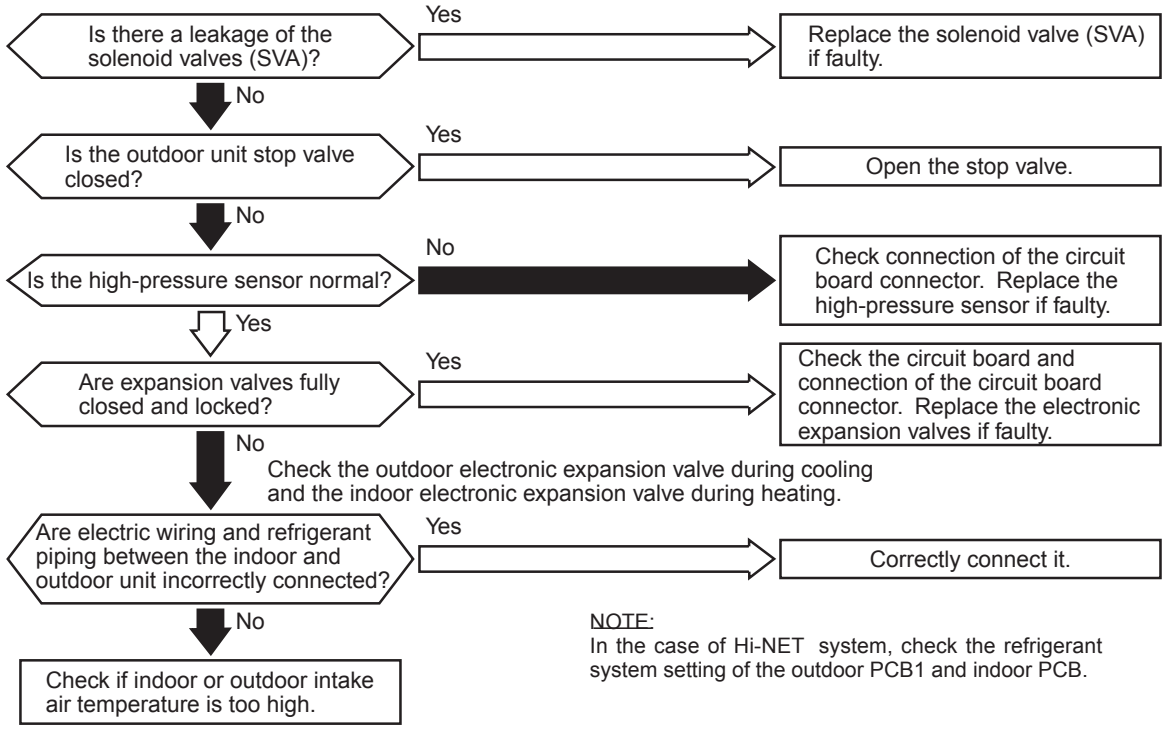
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Excessively Low Suction Pressure	Leakage of Solenoid Valve (SVA)	Check outlet pipe temp. of solenoid valve (SVA).	Check connecting wires. Replace solenoid valve (SVA) if faulty.
	Valve Stoppage at Middle Position of Reversing Valve	Measure suction gas pipe temp. of reversing valve.	Replace reversing valve if faulty.
	Abnormal Suction Pressure Sensor	Check connectors of PCB1 and power source.	Replace sensor if faulty.
	Excessively High Indoor Unit and Outdoor Unit Suction Air Temperature	Check indoor unit and outdoor unit suction air temp. thermistor.	Replace thermistor if faulty.

Alarm Code 45	Activation of High Pressure Increase Protection Device

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ In case that compressor is operated under the condition that is higher than 3.8MPa of discharge pressure (Pd) for 1 minute, all compressors are stopped and retry operation is started after 3 minutes. However this alarm is indicated when same phenomenon is occurred at two times within the next 30 minutes.

PCB1: Control PCB in Outdoor Unit
PCB: Indoor Unit PCB



NOTE:
In the case of Hi-NET system, check the refrigerant system setting of the outdoor PCB1 and indoor PCB.

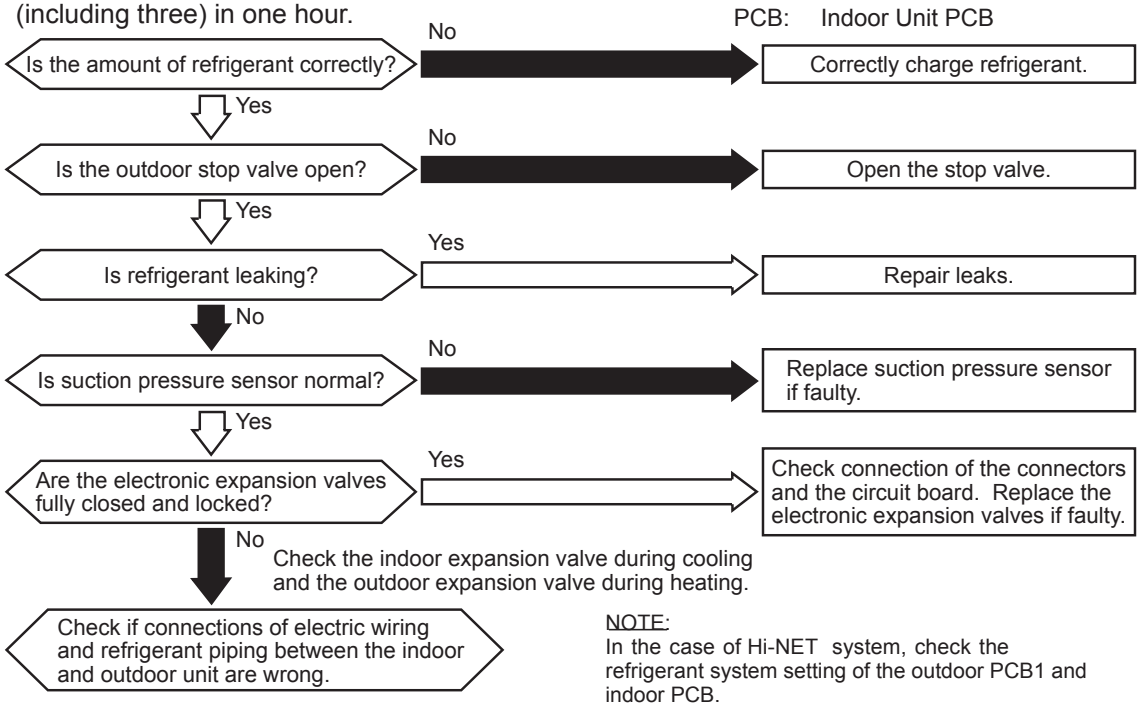
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Excessively High Discharge Pressure	Leakage of Solenoid Valve (SVA)	Check outlet temp. of solenoid valve (SVA).	Check connection. Replace solenoid valve (SVA) if faulty.
	Closed Stop Valve	Check stop valve.	Open stop valve.
	Abnormal High Pressure Sensor	Check connectors for PCB1.	Replace pressure sensor if faulty.
	Excessively High Indoor Unit and Outdoor Unit Inlet Air Temp.	Check thermistor for indoor unit and outdoor unit inlet air temp.	Replace thermistor if faulty.
	Incorrect Connection between Indoor Unit and Outdoor Unit	Check electrical system and ref. cycle.	Correctly connect.
	Locked Expansion Valve with Fully Closed	Check connector for PCB.	Repair connector for PCB or expansion valve. Replace it if faulty.

Alarm Code 47	Activation of Low Pressure Decrease Protection Device (Vacuum Operation Protection)

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ This alarm is indicated when a suction pressure (Ps) is lower than 0.09 MPa over 12 minutes and its state occurs more than three times (including three) in one hour.

PCB1: Control PCB in Outdoor Unit
PCB: Indoor Unit PCB



NOTE:
In the case of Hi-NET system, check the refrigerant system setting of the outdoor PCB1 and indoor PCB.

Phenomenon	Cause		Check Item	Action (Turn OFF Main Switch)
Excessively Low Suction Pressure (in Vacuum)	Shortage of Ref.		Check ref. charged volume or check for leakage.	Repair leakage and correctly charge.
	Closed Stop Valve		Check stop valve.	Open stop valve.
	Abnormal Low or High Pressure Sensor		Check connector for PCB1.	Replace pressure sensor if faulty.
	Incorrect Connection between Indoor Unit and Outdoor Unit		Check electrical system and ref. cycle.	Correctly connect between indoor unit and outdoor unit.
	Locked Expansion Valve with Fully Closed		Check connector for PCB.	Repair connector for PCB or expansion valve. Replace it if faulty.
	Closed Expansion Valve by Disconnecting Td Thermistor		Check Td thermistors for compressors and measure Td thermistor resistance.	Repair or replace Td thermistor.
Internal Thermostat for Outdoor Fan is Activated in Heating Operation	Faulty Outdoor Fan Motor		Measure coil resistance and insulation resistance.	Replace outdoor fan motor if faulty.
	Faulty Internal Thermostat	Fault	Check for conduction after temperature of outdoor fan motor is decreased.	Replace outdoor fan motor.
		Incorrect Contact	Measure resistance by tester.	Remove looseness and replace connector.
		Incorrect Connection	Check connection.	Connect correctly.

Alarm Code 48	Activation of Inverter Overcurrent Protection Device (1)

● “RUN” light is flashing and “ALARM” are indicated on the remote control switch.

The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ This alarm is indicated when inverter electronic thermal protection is activated at six times within 30 minutes. (Retry operation is performed up to the occurrence of five times.)

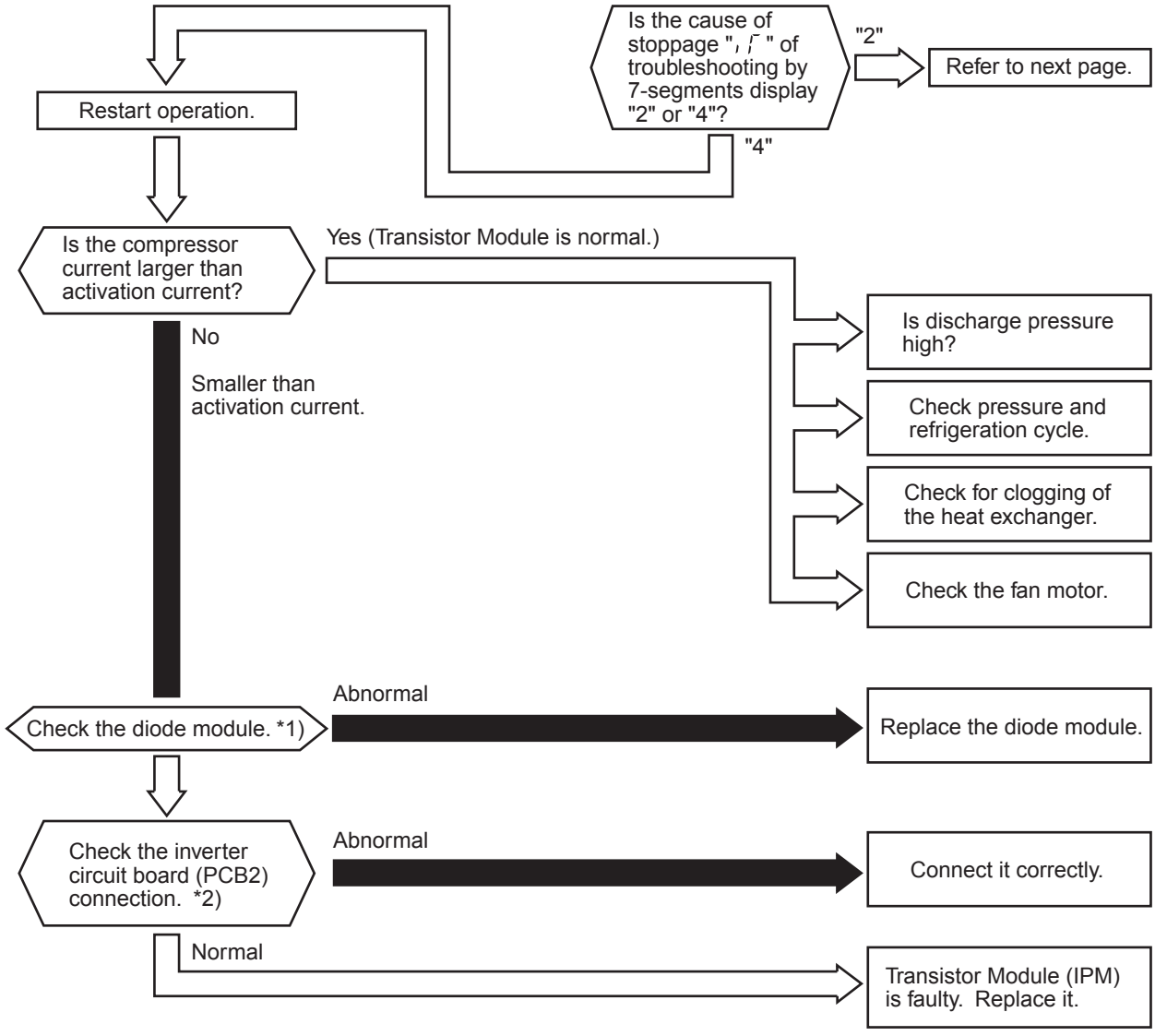
Conditions of Activation:

Inverter current 5% higher than rated current lasts for 30 seconds continuously.

or

Inverter current runs intermittently and the accumulated time reaches up to 3 minutes during with 10 minutes.

PCB1: Control PCB in Outdoor Unit
PCB2: Inverter PCB

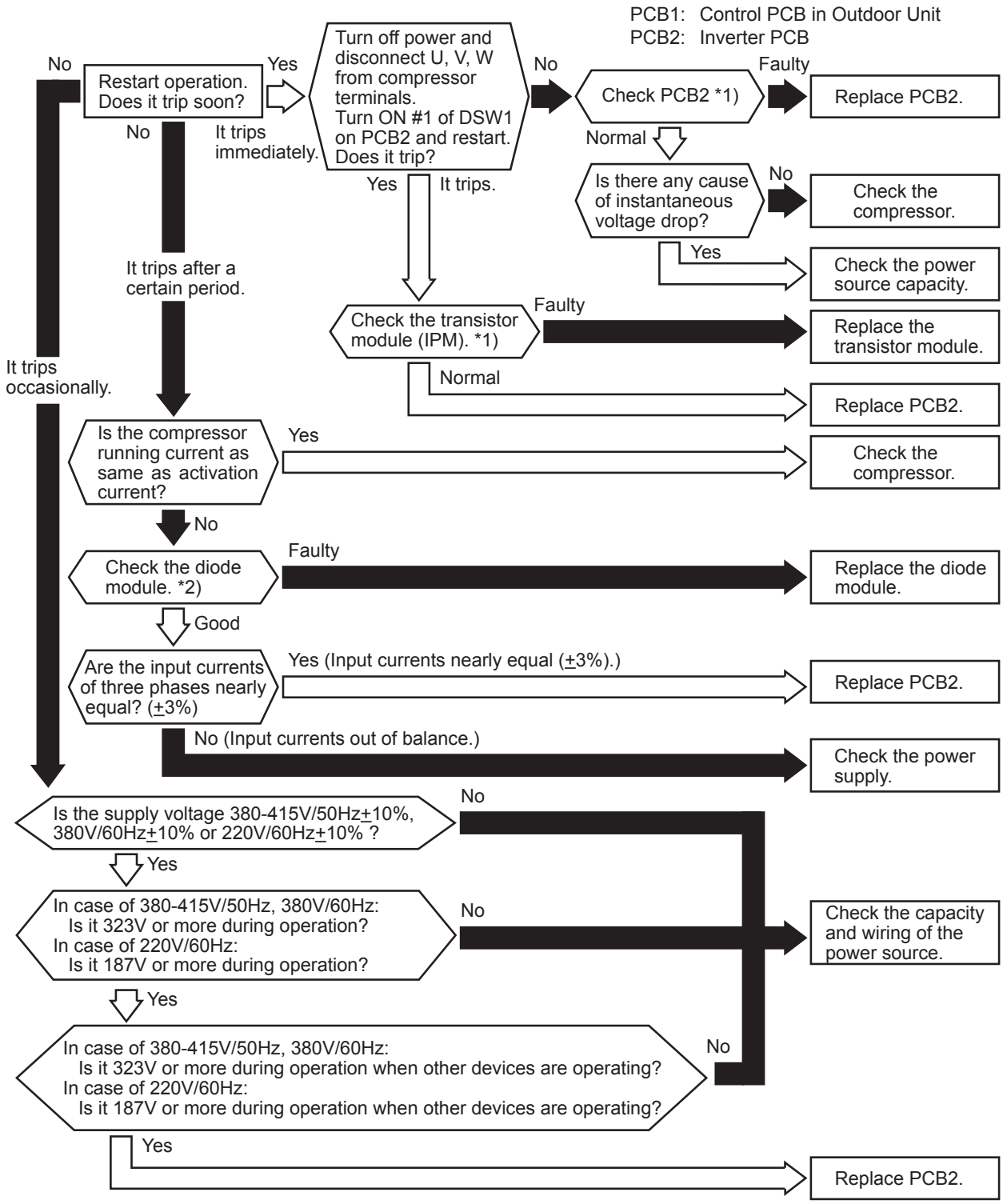


*1): Regarding replacing or the checking diode module, refer to the item 13.4.
*2): Regarding replacing or checking method for inverter parts, refer to the item 13.4.

Alarm Code 48	Activation of Inverter Overcurrent Protection Device (2)

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ This alarm is indicated when instantaneous overcurrent occurs at six times within 30 minutes. (Retry operation is performed up to the occurrence of five times.)
Conditions of Activation: Inverter current with 150% of the rated current



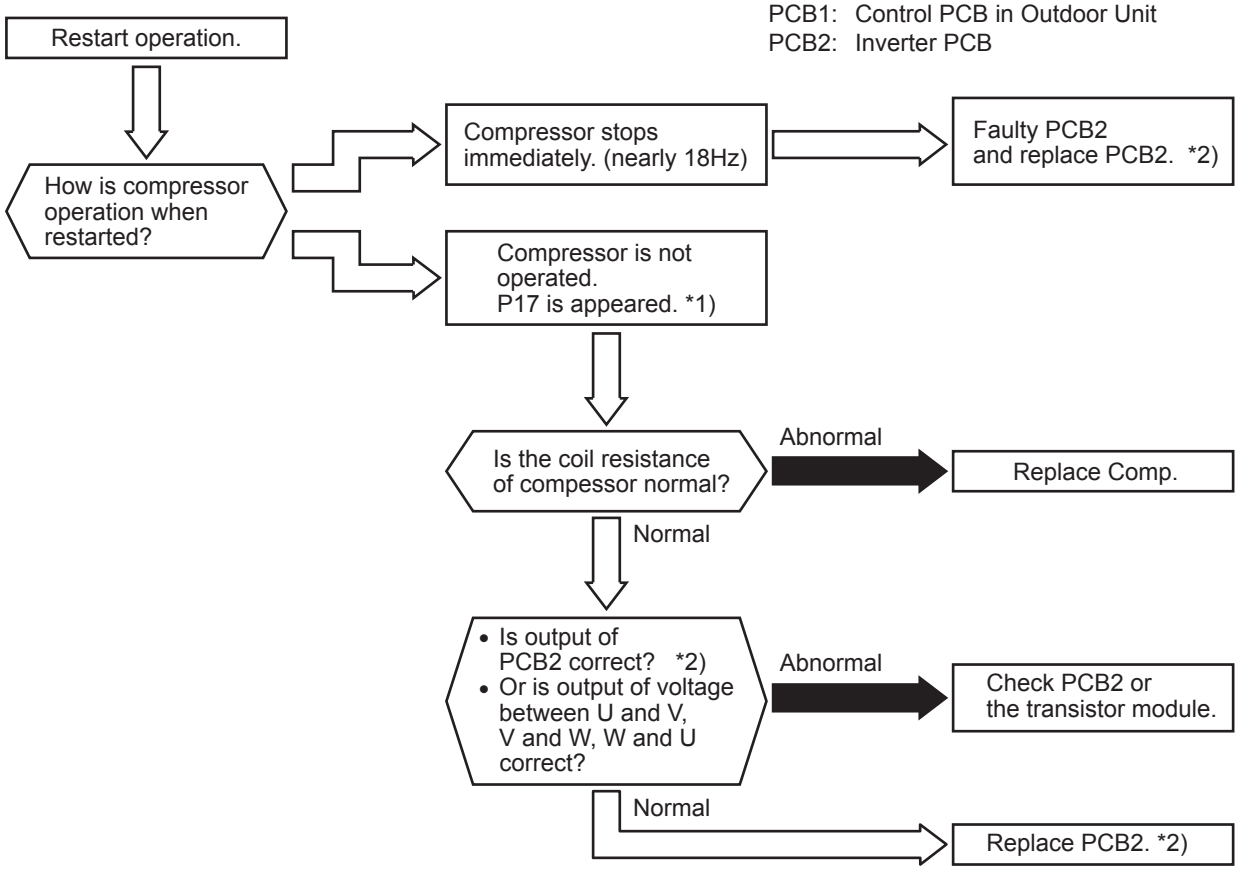
*1): Perform electrical discharge when replacing or the checking for inverter parts by referring to the item 13.4.
**2) Before checking of diode module, refer to the item 13.4.

Alarm Code 51	Abnormality of Inverter Current Sensor

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ In case that the abnormality of current transformer (0A detecting) occurs three times within 30 minutes, this alarm is indicated at the third time.
(Retry operation is performed up to second time of abnormality occurrence.)
Condition of Activation: When the frequency of compressor is maintained at 15 to 18Hz after compressor is started, one of the absolute value of running current detected by the current transformer at each phase U+, U-, V+ and V- is less than 1.5A (including 1.5A).

PCB1: Control PCB in Outdoor Unit
PCB2: Inverter PCB



*1): P17 is shown at 7-segment on the outdoor unit PCB1.
*2): Perform the high voltage discharge work by referring to the item 13.4 before checking and replacing the inverter parts.

Alarm Code 53	Inverter Error Signal Detection

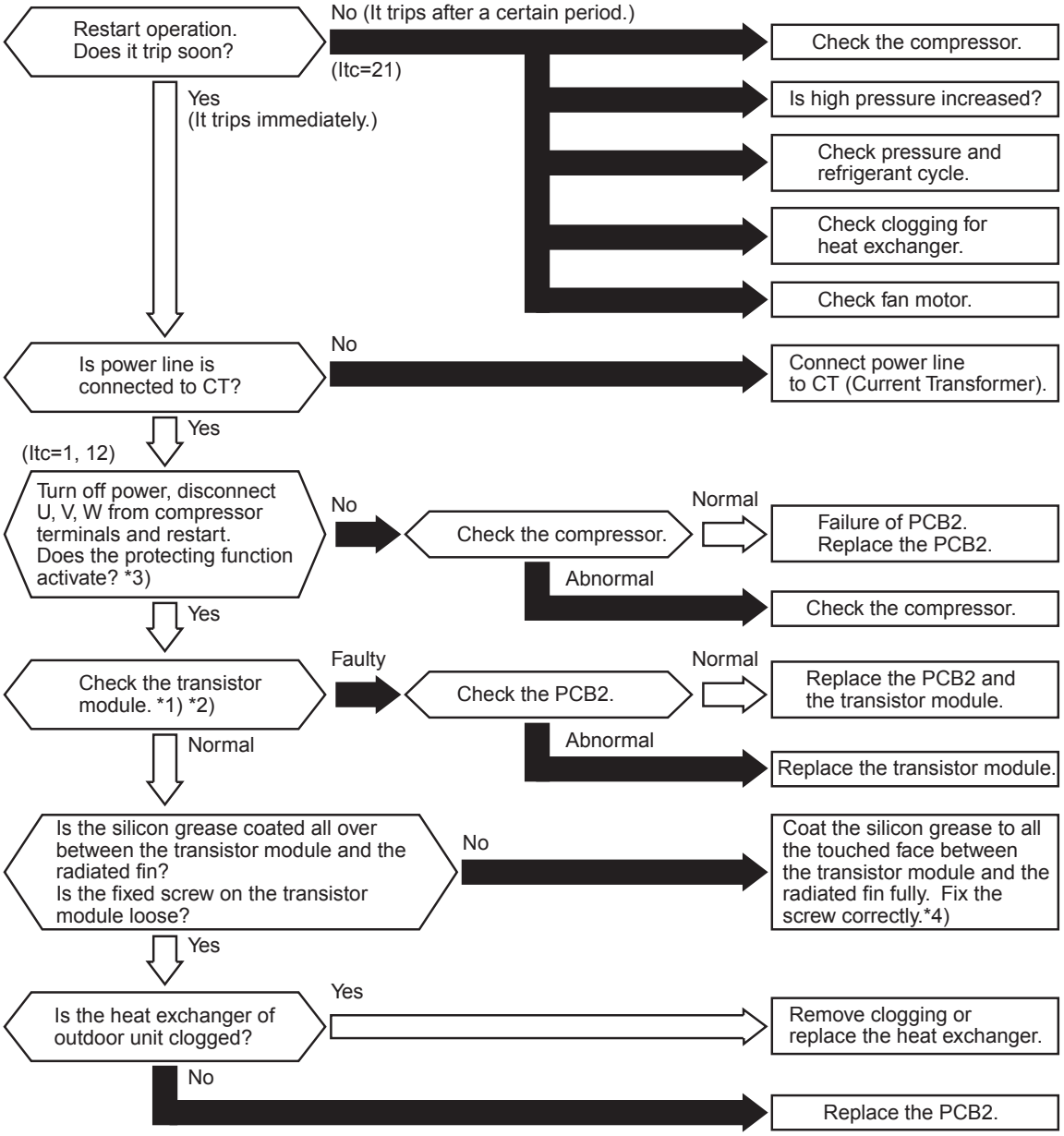
● “RUN” light is flashing and “ALARM” are indicated on the remote control switch.
The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ IPM (Transistor Module) has detected function of abnormality.
This alarm is indicated when the transistor module detects the abnormality seven times in 30 minutes. (Retry operation is performed up to the occurrence of six times.)

Conditions of Activation:

Abnormal Current to the Transistor Module such as Short Circuited or Grounded
Abnormal Temperature of the Transistor Module
Control Voltage Decrease

PCB1: Control PCB in Outdoor Unit
PCB2: Inverter PCB

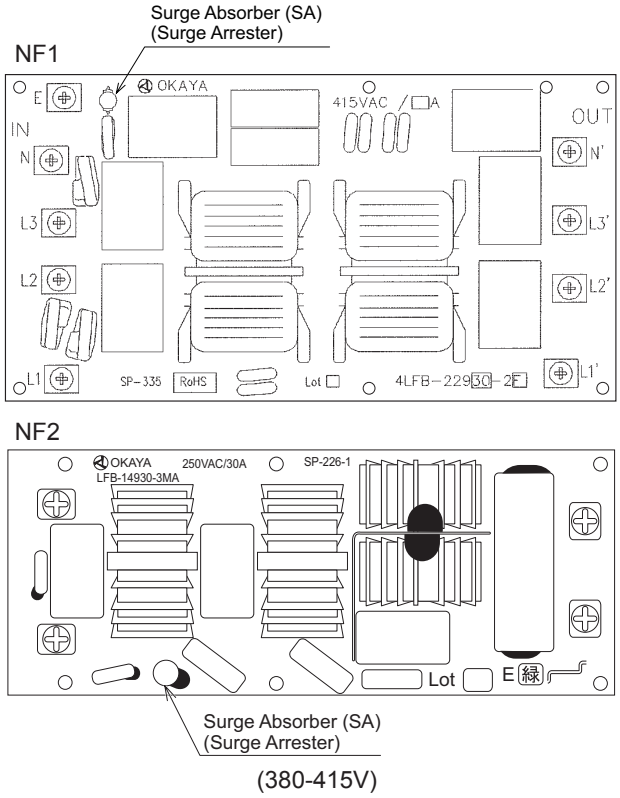


*1): Perform electrical discharge when replacing or checking inverter parts by referring to the item 13.4.
*2): Regarding checking method of transistor module, refer to the item 13.4.
*3): Turn ON the No.1 switch of the dip switch DSW1 on PCB2 when restarting with disconnecting the terminals of the compressor. After troubleshooting, turn OFF the No.1 switch of the dip switch DSW1 on PCB2.
*4): Use the silicon grease provided as accessory.

NOTE:

When the unit is applied the excessive surge current due to lighting or other causes, this alarm code “53” or the inverter stoppage code (IT) “11” will be indicated and the unit can not be operated. In this case, check to ensure the surge absorber/surge arrester (SA) on the noise filte (NF1, NF2). The surge absorber may be damaged if the inner surface of the surge absorber is black. In that case, replace the surge absorber.
If the inside of the surge absorber is normal, turn OFF the power once and wait for PCB2’s LED201 (red) OFF (approx. 5 min.) and turn ON again.

< Position of Surge Absorber >

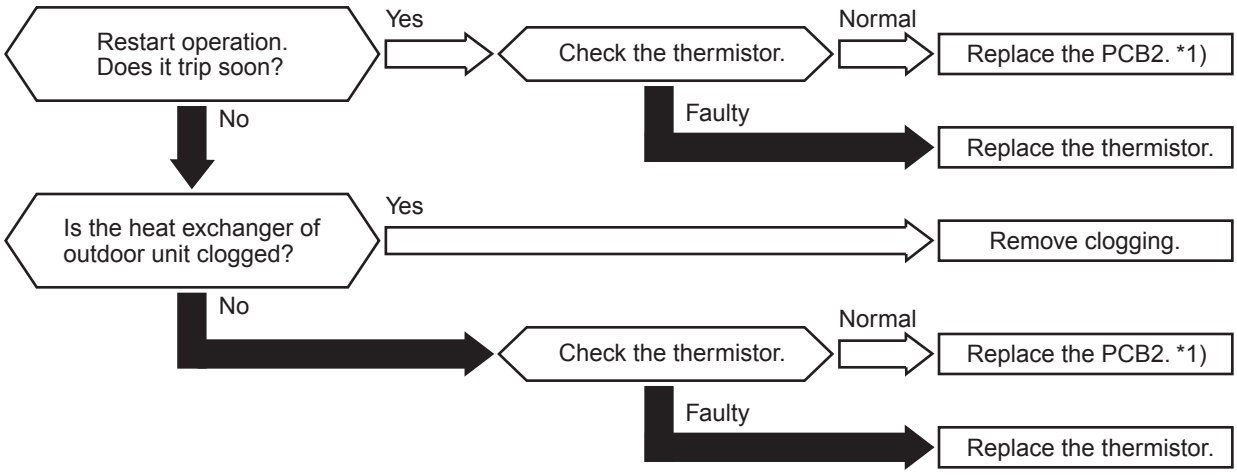


Alarm Code 54	Abnormality of Inverter Fin Temperature

● “RUN” light is flashing and “ALARM” are indicated on the remote control switch.
The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ In case that the abnormality of inverter fin temperature occurs three times within 30 minutes, this alarm is indicated at the third time.
(Retry operation is performed up to second time of abnormality occurrence.)
Conditions of Activation: This alarm is indicated when the temperature of the inverter fin thermistor for Transistor Module is higher than 90°C.

PCB1: Control PCB in Outdoor Unit
PCB2: Inverter PCB



*1): Perform electrical discharge when replacing or checking inverter parts by referring to the item 13.4.

Alarm Code 55	Inverter Failure

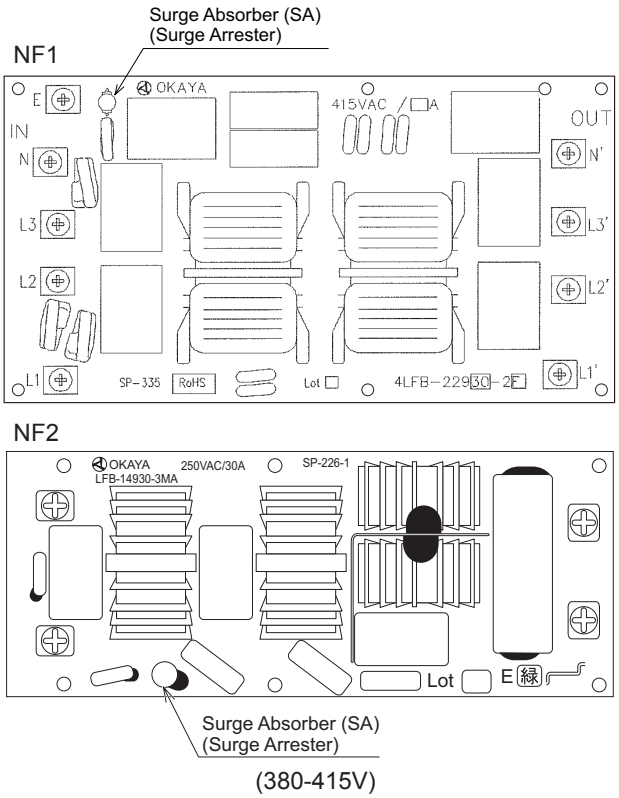
- “RUN” light is flashing and “ALARM” are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ This alarm is indicated when the following phenomenon occurs three times in 30 minutes. (Retry operation is performed up to the occurrence of two times.)
Actual frequency from PCB2 is less than 10Hz (after inverter frequency output from PCB1).
Conditions of Activation: This alarm is indicated when PCB2 is not performed normally.

PCB1: Control PCB in Outdoor Unit
PCB2: Inverter PCB

*1): When the unit is applied the excessive surge current due to lighting or other causes, this alarm code “55” or the inverter stoppage code (IT) “11” will be indicated and the unit can not be operated. In this case, check to ensure the surge absorber/surge arrester (SA) on the noise filter (NF1, NF2). The surge absorber may be damaged if the inner surface of the surge absorber is black. In that case, replace the surge absorber.
If the inside of the surge absorber is normal, turn OFF the power once and wait for PCB2’s LED201 (red) OFF (approx. 5 min.) and turn ON again.

< Position of Surge Absorber >



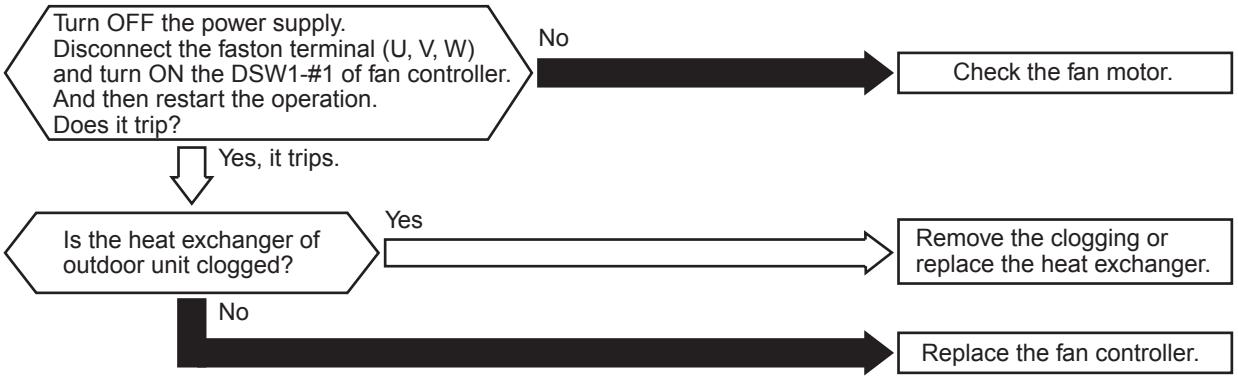
Alarm Code 57	Activation of Fan Controller Protection

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ IPM (Transistor Module) has detected function of abnormality.
This alarm is indicated when the abnormality is detected ten times within 30 minutes.
(Retry operation is performed up to the occurrence of nine times.)

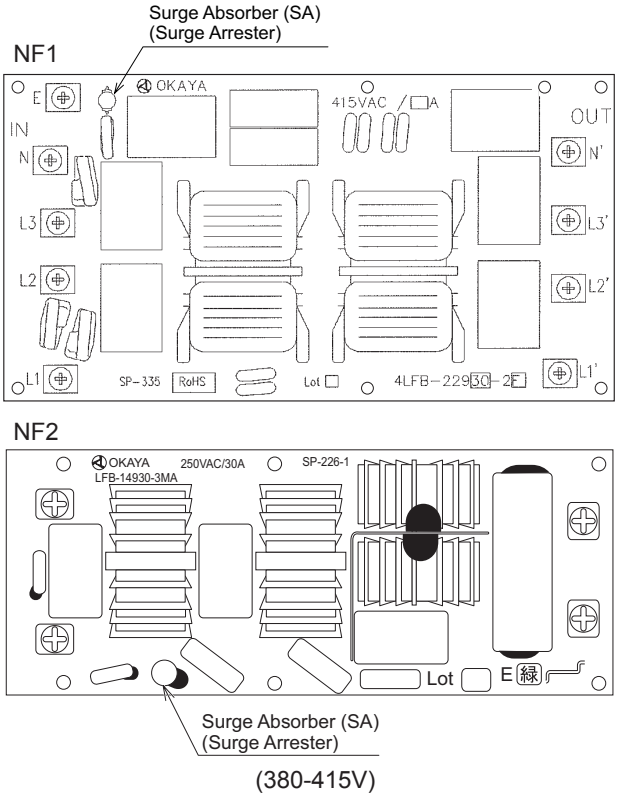
Conditions of Activation:
Abnormal Current to the Transistor Module such as Short Circuited or Grounded
or Overcurrent
or Control Voltage Decrease

PCB1: Control PCB in Outdoor Unit



NOTE:
When the unit is applied the excessive surge current due to lighting or other causes, this alarm code "57" or the inverter stoppage code (IT) "11" will be indicated and the unit can not be operated. In this case, check to ensure the surge absorber/surge arrester (SA) on the noise filter (NF1, NF2). The surge absorber may be damaged if the inner surface of the surge absorber is black. In that case, replace the surge absorber.
If the inside of the surge absorber is normal, turn OFF the power once and wait for PCB2's LED201 (red) OFF (approx. 5 min.) and turn ON again.

< Position of Surge Absorber >

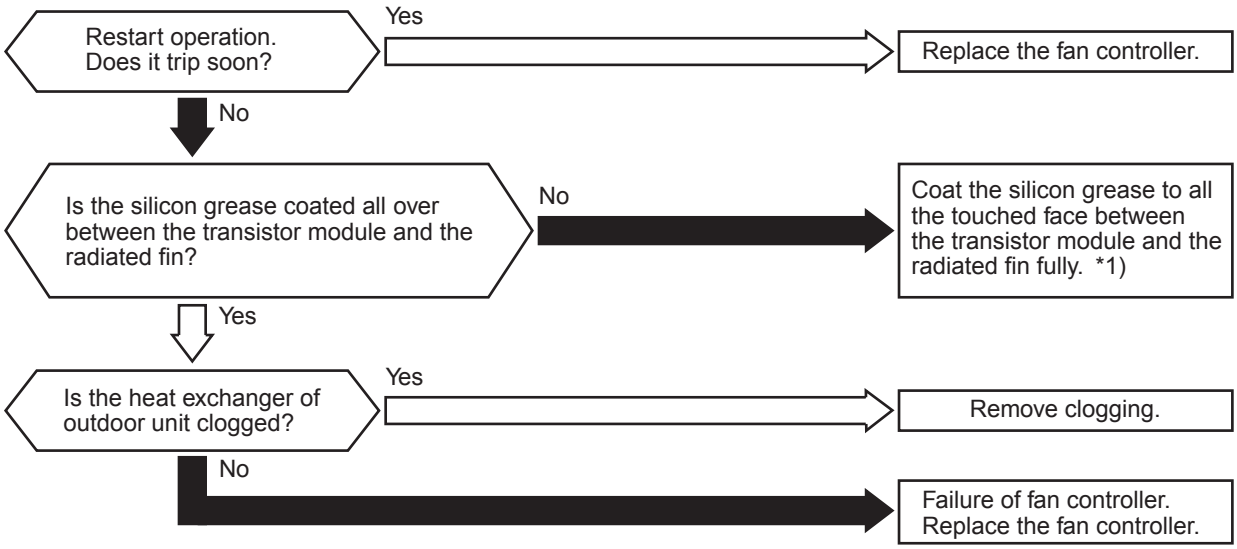


Alarm Code 5A	Abnormality of Fan Controller Fin Temperature

● “RUN” light is flashing and “ALARM” are indicated on the remote control switch.
The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ This alarm is indicated when the abnormality of fin temperature occurs ten times within 30 minutes. (Retry operation is performed up to the occurrence of nine times.)
Conditions of Activation: This alarm is indicated when the thermistor temperature inside the transistor module exceeds 100°C.

PCB1: Control PCB in Outdoor Unit



*1): Use the silicon grease provided as accessory.

Alarm Code 56	Activation of Fan Controller Overcurrent Protection Device (1)

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

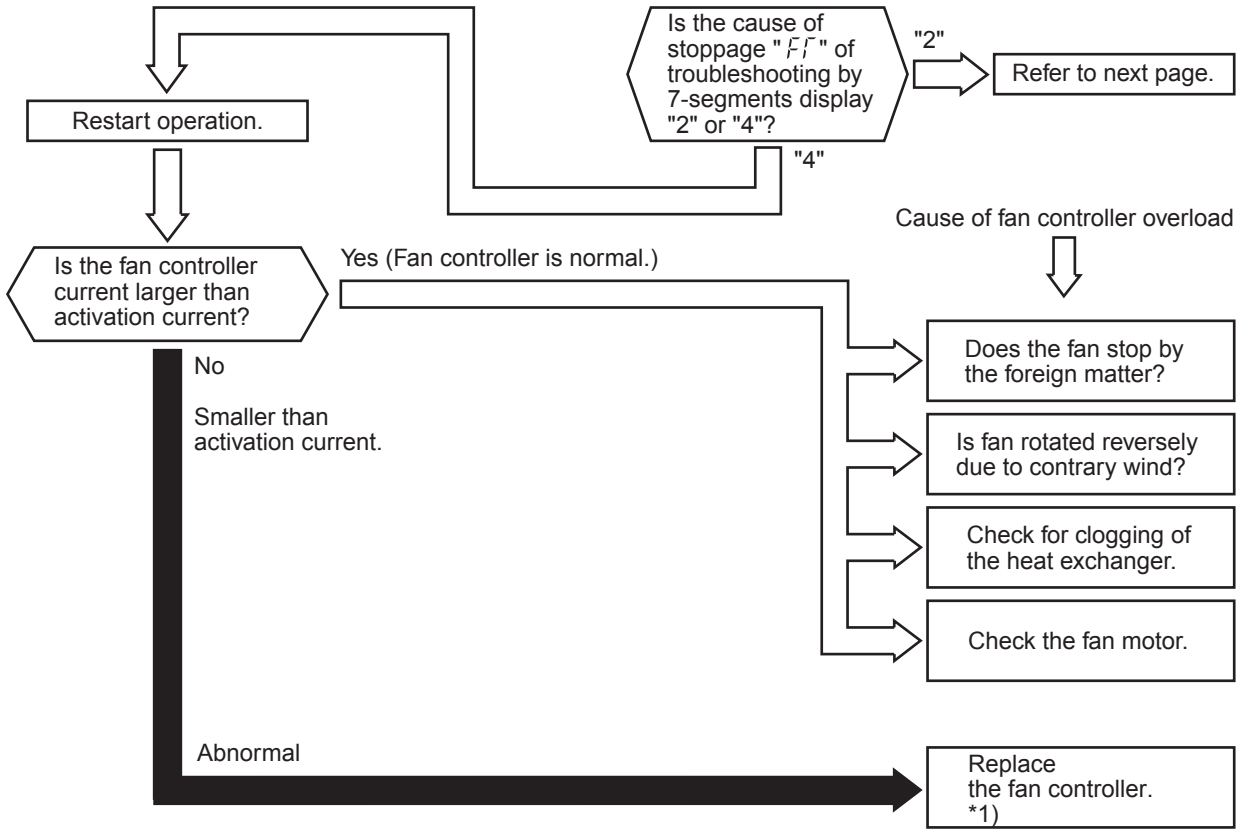
★ This alarm is indicated when fan controller electronic thermal protection is activated at ten times within 30 minutes.
(Retry operation is performed up to the occurrence of nine times.)
Conditions of Activation:

current 5% higher than rated one time lasts for 30 seconds .

or

Electric current runs intermittently and the accumulated time reaches up to 3 minutes, in 10 minutes.

PCB1: Control PCB in Outdoor Unit



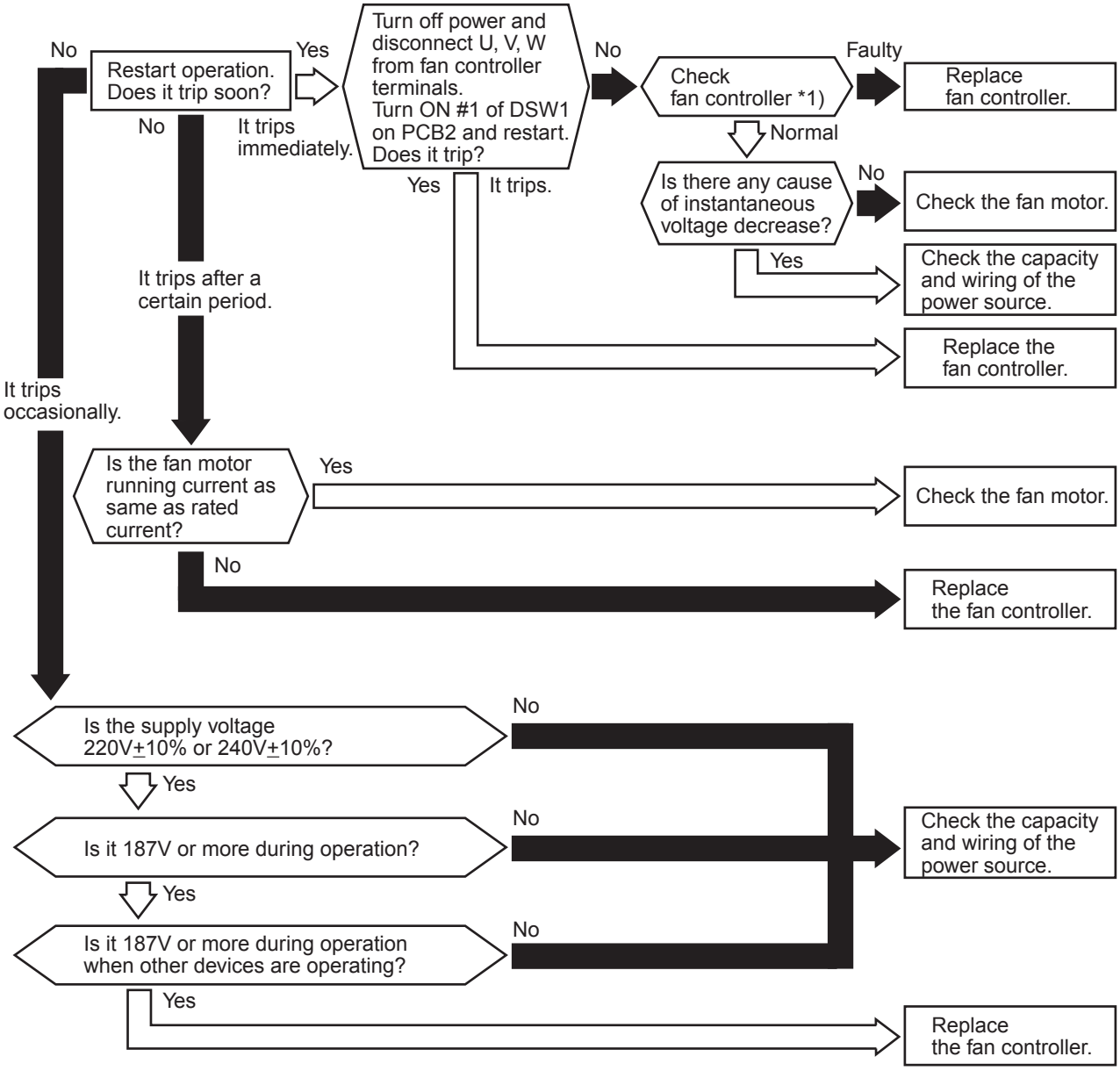
*1): Perform electrical discharge when replacing or checking fan controller by referring to the item 13.4.

Alarm Code 56	Activation of Fan Controller Overcurrent Protection Device (2)

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the outdoor unit PCB1.

★ This alarm is indicated when instantaneous overcurrent occurs at ten times within 30 minutes. (Retry operation is performed up to the occurrence of nine times.)
Conditions of Activation: Fan controller current with 5% higher than the rated current

PCB1: Control PCB in Outdoor Unit
PCB2: Inverter PCB



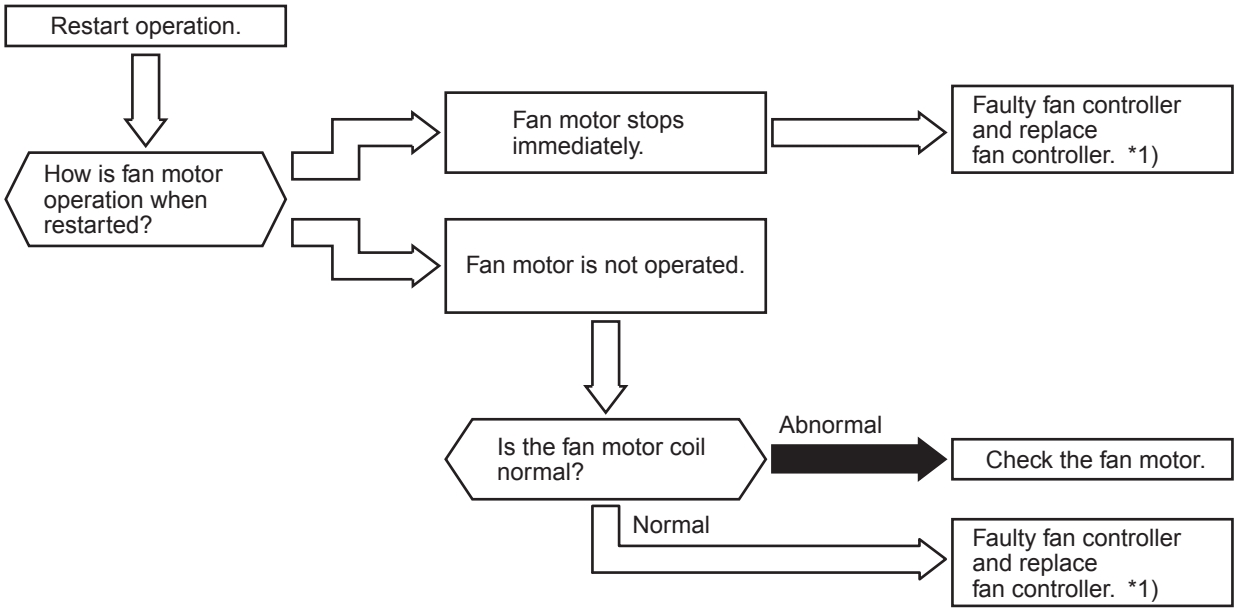
*1): Perform electrical discharge when checking or replacing fan controller by referring to the item 13.4.

Alarm Code 51	Abnormality of Fan Controller Sensor

★ Conditions of Activation:

This alarm is indicated when the following condition occurs.

- After fan motor operation is started, fan controller current does NOT exceed 1.5A.
- Before fan motor operation is started, fan controller peak current does NOT exceed 4A.



*1): Perform electrical discharge when checking or replacing fan controller by referring to the item 13.4.

Alarm Code EE	Compressor Protection Alarm

This alarm code appears when one of the following alarms occurs three times within 6 hours, which may result in serious compressor damages, if the outdoor unit is continuously operated without removing the cause.

Alarm Code:	*Content of Abnormality*
02	*Activation of Protection Device (High Pressure Cut)*
07	*Decrease in Discharge Gas Superheat*
08	*Increase in Discharge Gas Temperature*
43	*Activation of Low Compression Ratio Protection Device*
44	*Activation of Low Pressure Increase Protection Device*
45	*Activation of High Pressure Increase Protection Device*
47	*Activation of Low Pressure Decrease Protection Device*

(Vacuum Operation Protection)

These alarms are able to be checked by the CHECK Mode 1. Follow the action indicated in each alarm chart.
These alarms are cleared only by turning OFF the main power switch to the system. **However, careful attention is required before starting, since there is a possibility which will result in serious damages to the compressors.**

Alarm Code b1	Incorrect Setting of Unit and Refrigerant Cycle No.

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and alarm code is indicated on the display of the outdoor unit PCB.

★ This alarm is indicated under the following conditions. Turn off the power source and check for DSW and RSW settings.

Conditions	Action
Unit No. (DSW6 and RSW1) or Refrigerant Cycle No. (DSW5 and RSW2) are set above "64". Or, more than 2 pins are set at DSW5 and DSW6.	Set Unit No. and Refrigerant Cycle No. below "63".
Unit No. and Refrigerant Cycle No. are set from "16" to "63", AND indoor unit is not corresponding to Hi-NET II.	Set Unit No. and Refrigerant Cycle No. from "0" to "15".

Alarm Code b5	Incorrect Indoor Unit Connection No. Setting

- "RUN" light is flashing and "ALARM" are indicated on the remote control switch.
- The unit No., alarm code and the unit code are alternately indicated on the set temperature section, and the unit No. and alarm code is indicated on the display of the outdoor unit PCB1. ("35" is indicated on the display of the remote control switch.)

★ This alarm is indicated under the following conditions.
Turn OFF the power supply and check the setting of DSW and RSW.

Conditions: More than 17 Indoor Unit (Hi-NET) are connected to one system.
Countermeasure: Indoor Unit (Hi-NET) should be 16 or less.

PCB1: Control PCB in Outdoor Unit

15.5 Trouble shooting in the detection mode

(HYXE-J01H)

Each “Check Menu” item and its function are explained in the following table.

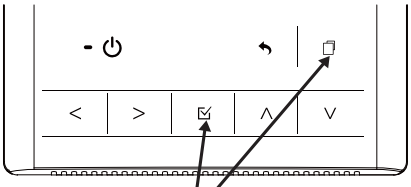
Check menu item	Function
Check 1	Sensor condition of air conditioner will be monitored and indicated.
Check 2	Sensor data of air conditioner prior to alarm occurrence will be indicated.
Alarm Record	Previous alarm record (date, time, alarm code) will be indicated. ※
Species	Model name and manufacturing number will be indicated.
IDU/ODU Diagnosis	The result of PCB check will indicated.
Self Diagnosis	Checking of remote control switch will be carried out.

※ To Erase Alarm Record

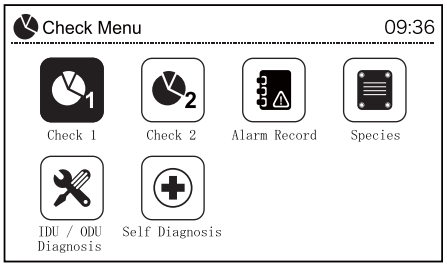
Press “ ☑ ” when the abnormality record is indicated. After that, the confirmation screen will be displayed.

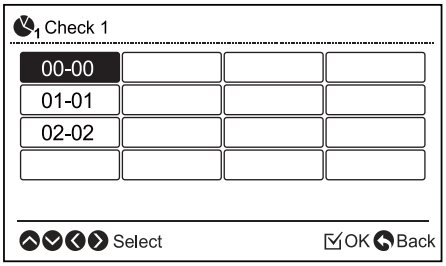
Select “Yes” and press “ ☑ ” so that the alarm record will be deleted.

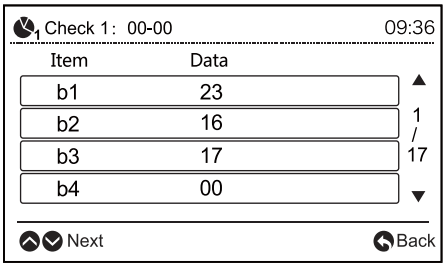
Indication of Check Menu



Press and hold “⧉” (menu) and “ ☑ ” simultaneously for at least 3 seconds during the normal mode. The check menu will be displayed.

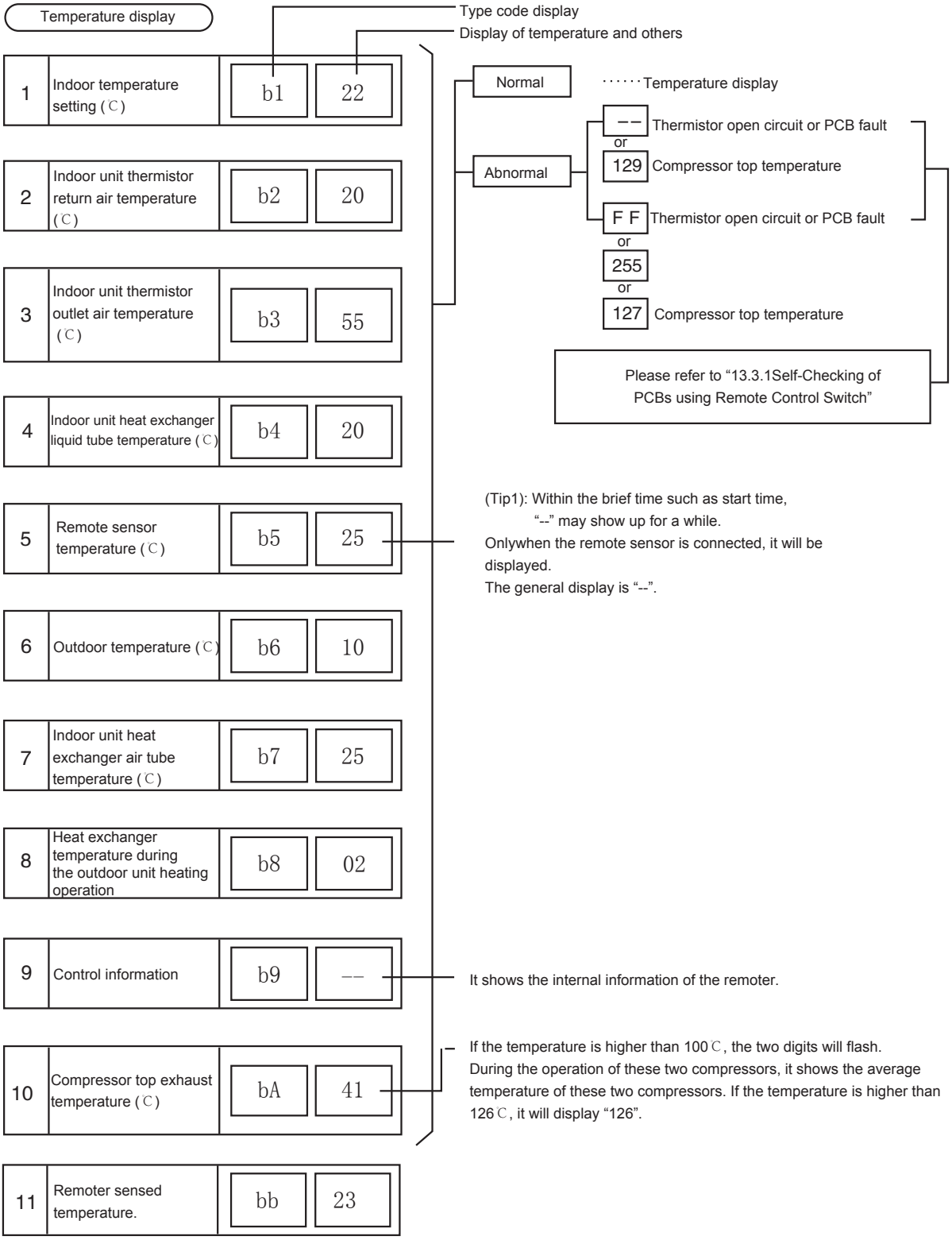






15.5.1 Contents of Detection Mode 1

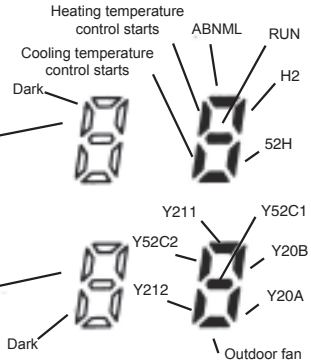
Press check1 button, the next content will be displayed. Press "∧" "∨"the previous content will be displayed.



12	Remoter sensed humidity (optional).	bC	00

Microcomputer output/ input display

13	Indoor unit microcomputer input/ output.	C1	
14	Outdoor unit microcomputer input/ output.	C2	



Symbols with the letter “Y” are PCB relays.

Shutdown cause display

	Cause for shutdown	d1	01

00	Stop the operation and turn off the power
01	Temperature control switch (Tip1)
02	Alarm (Tip2)
03	Freeze protection, overheat protection
05	Outdoor unit momentary power failure, reset (Tip3)
06	Indoor unit momentary power failure, reset (Tip4)
07	Cease of cooling operation due to low outdoor temperature and cease of heating operation due to high outdoor temperature
09	It needs four-way valves to shift to the shutdown
10	It needs forced shutdown.
11	Restart due to the reduced pressure ratio
12	Restart due to the increased low pressure
13	Restart due to the increased high pressure
15	Restart due to the excessively high exhaust temperature and low air inlet pressure.
16	Restart due to the reduced exhaust superheat
17	Restart due to the tripping of the frequency converter
18	Restart due to the reduced voltage
19	Expansion valve opening change protection
20	Indoor unit run mode shift (Tip5)
21	Forced temperature controlled shutdown
22	Forced temperature controlled shutdown (Preheating)
26	Insufficient high pressure, restart

Abnormal occurrences counter

	Abnormal occurrence times	E1	01
	Indoor unit momentary power failure occurrence times.	E2	00
	Remoter and indoor unit transmission error occurrence times	E3	00
	Frequency converter abnormal occurrence times	E4	00

Automatic louver state display

	Louver sensor	F1	00

(Tip1): Term definition
Temperature controlled startup: The indoor unit requires the running of the compressor.
Temperature controlled shutdown: The indoor unit does not require the running of the compressor.
(Tip2): Even if the poweroff is caused by the “AlarmABNML”, “02” will not always be displayed.
(Tip3): If the communication between the frequency converter PCB and control PCB cannot be carried out within 30 seconds, the outdoor unit will be closed down. In this case, the shutdown is the cause for d1-05 and the alarm code “04” may be displayed.
(Tip4): If the communication between the indoor unit and outdoor unit cannot be carried out within 3 minutes, the outdoor unit will be closed down. In this case, the shutdown is the cause for d1-06 and the alarm code “03” may also be displayed.
(Tip5): “20” will be displayed in different modes of the indoor units.
It can be numbered to 99.
If over 99, “99” will always be displayed.
(Tip1): If the communication error lasts for 3 minutes, the occurrence times will be added with 1.
(Tip2): The reserved parameters can be removed with the method indicated in 13.3.1 “Self-Checking of PCBs using Remote Control Switch”.

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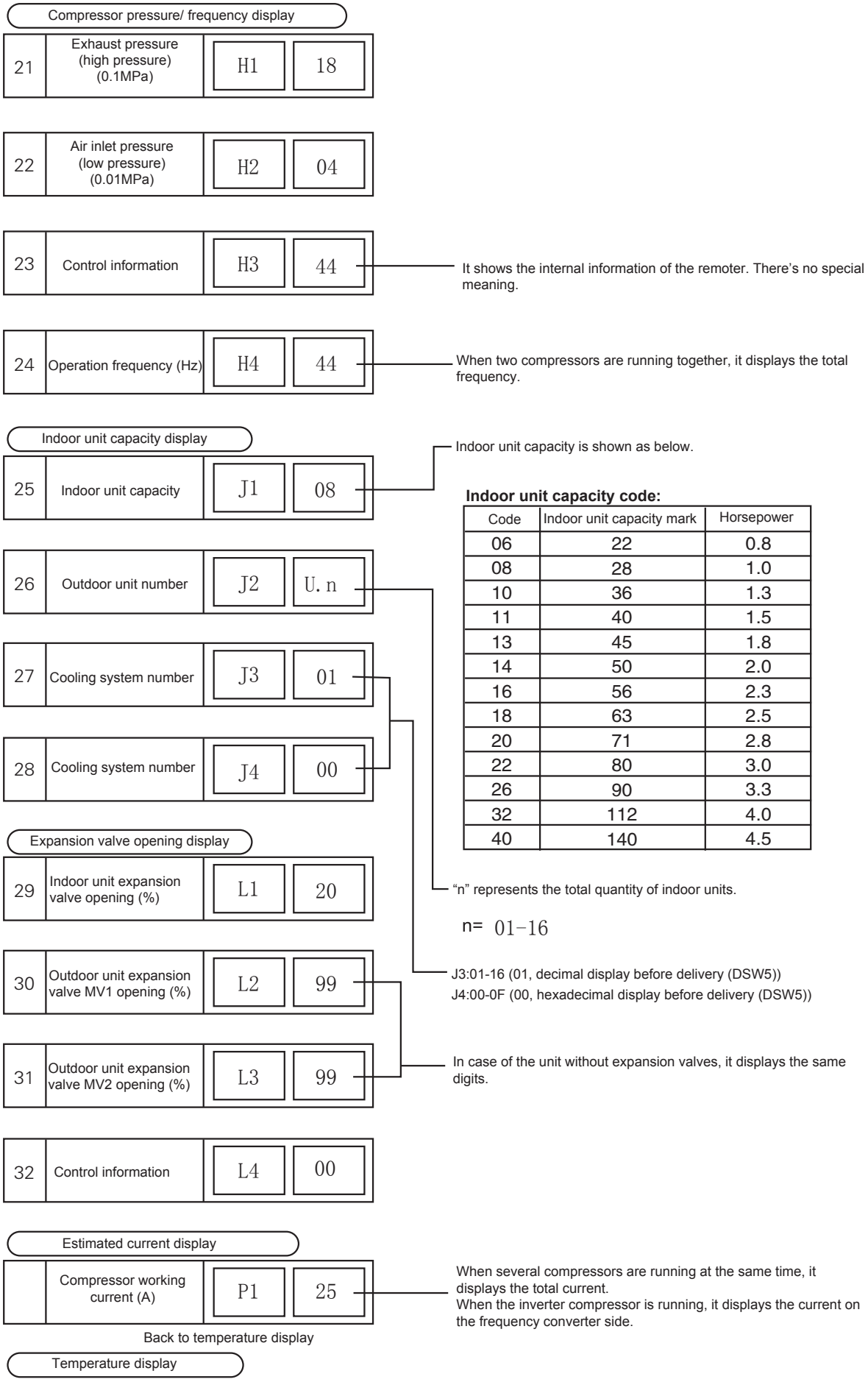
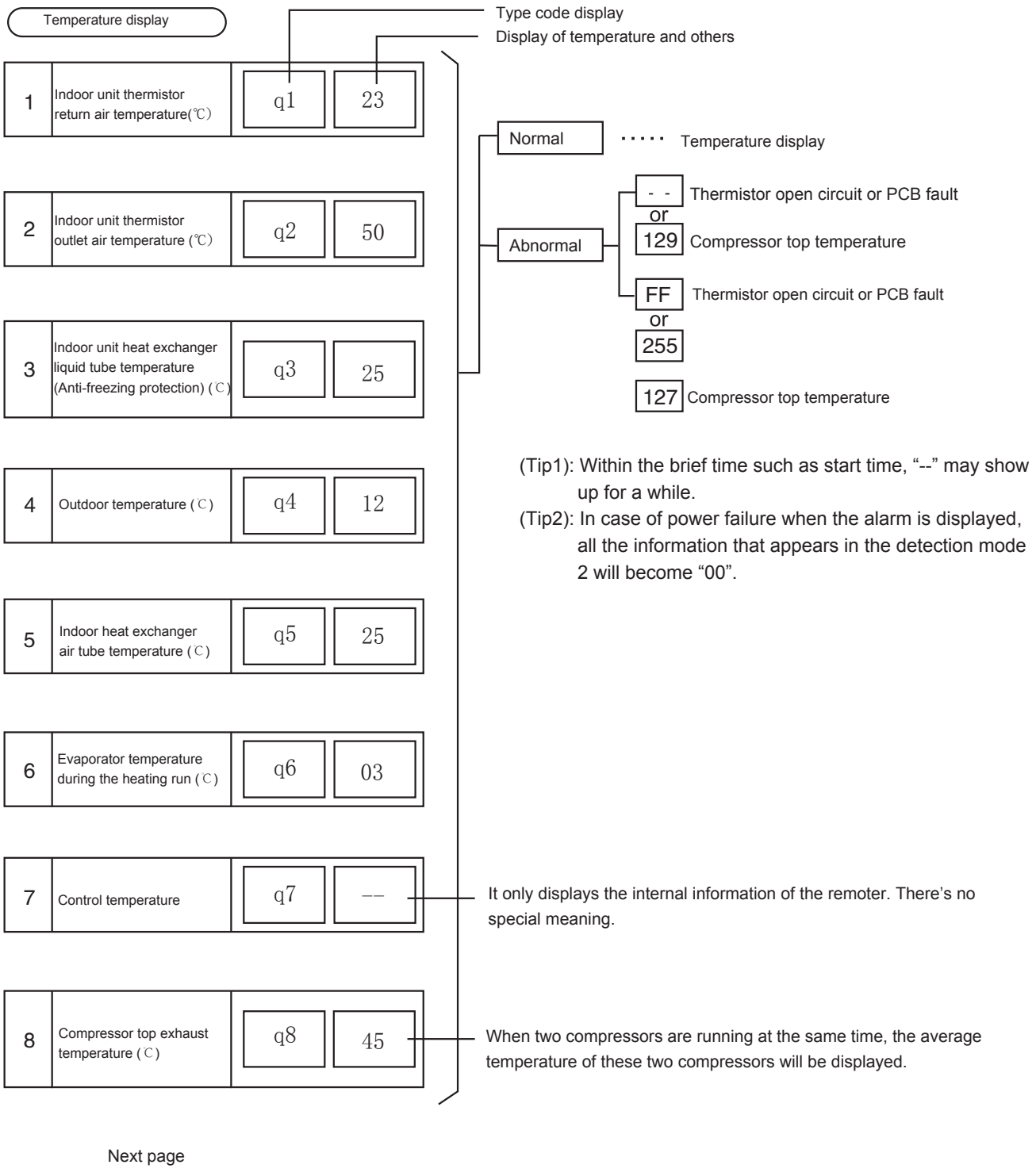


Code	Indoor unit capacity mark	Horsepower
06	22	0.8
08	28	1.0
10	36	1.3
11	40	1.5
13	45	1.8
14	50	2.0
16	56	2.3
18	63	2.5
20	71	2.8
22	80	3.0
26	90	3.3
32	112	4.0
40	140	4.5

15.5.2 Contents of Detection Mode 2

When over three units are connected to one remoter, the updated parameters of the first three indoor units will be displayed.

Press ‘check2” button, the next content will be displayed. Press “V" the previous content will be displayed.



(Tip1): Within the brief time such as start time, “--” may show up for a while.

(Tip2): In case of power failure when the alarm is displayed, all the information that appears in the detection mode 2 will become “00”.

Next page

Compressor pressure/ frequency display

9	Exhaust pressure (high pressure) (0.1MPa)	q9	18
10	Air inlet pressure (low pressure) (0.1MPa)	qA	04
11	Control information	qb	44
12	Operation frequency (Hz)	qC	44

It displays the internal information of the remoter. There's no special meaning.

When two compressors are running at the same time, it'll display the total frequency.

Expansion valve opening display

13	Indoor unit expansion valve opening (%)	qd	20
14	Outdoor unit expansion valve MV1 opening (%)	qE	99

Estimated current display

15	Compressor working current (A)	qF	20

When two compressors are running at the same time, it'll display the total current.

Back to temperature display

Temperature display

- Troubleshooting by 7-Segment Display

Only the authorized person can check with this method. Operating conditions and each part of refrigeration cycle can be checked by 7-segments and push switches on the PCB1 in the outdoor unit.

(1) Before Checking

(a) Turn ON main power source. Wait for more than 20 seconds to start checking.

(b) Checking Items

* Connecting Information
* Outdoor Unit Information
* Indoor Unit Information
* Cause of Alarm Code Information
* Alarm Code History Information

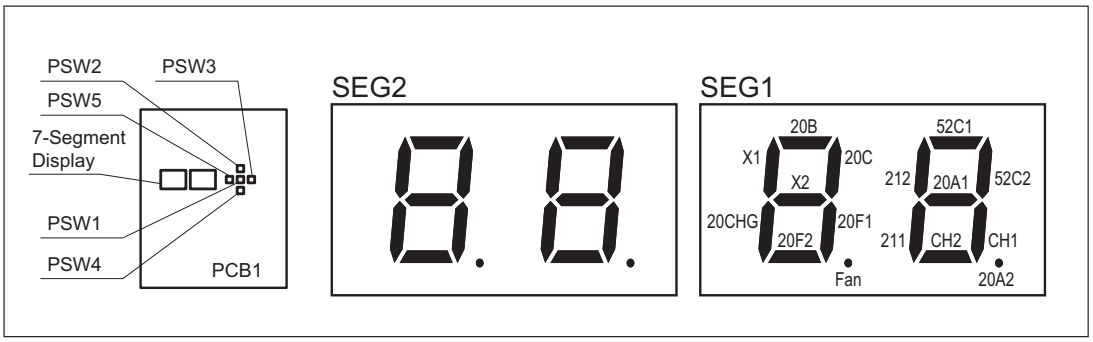
(c) Check the location of 7-segments and push switches.

⚠WARNING

AC220-240V is applied to PCB and electrical parts. Never touch electrical parts and wires when checking.

(2) Location of Push Switches and 7-segments Display

The push switches and 7-segments display are located on the PCB1.



- Protection Control Code on 7-Segment Display

* Protection control code is displayed on 7-segment during operation when a protection control is activated.

* Protection control code is displayed while function is working, and goes out when released.

* When several protection control are activated, code number with higher priority will be indicated (see below for the priority order).

(a) Higher priority is given to protection control related to frequency control than the other.

< Priority Order >

<1> Pressure Ratio Control
<2> High-Pressure Increase Protection
<3> Current Protection
<4> Inverter Fin Temperature Increase Protection
<5> Discharge Gas Temperature Increase Protection
<6> Low-Pressure Decrease Protection
<7> Demand Current Control (Running Current Limit Control)
<8> Low-Pressure Increase Protection
<9> High-Pressure Decrease Protection

(b) In relation to retry control, the latest retry code will be indicated unless a protection control related to frequency control is indicated.

Code	Protection Control	Code during Degeneration Control
	Pressure Ratio Protection Control	
	High-Pressure Increase Protection	
	Inverter Current Protection	
	Inverter Fin Temperature Increase Protection	
	Discharge Gas Temperature on Top of Compressor Increase Protection	
	Low-Pressure Decrease Protection	Without
	High-Pressure Decrease Protection	
	Demand Current Protection Control	
	Low-Pressure Increase Protection	

Code	Retry Control	Code during Degeneration Control
	Pressure Ratio Decrease Retry	Without
	Low-Pressure Increase Retry	
	High-Pressure Increase Retry	
	Overcurrent Retry of Constant Speed Compressor	
	Discharge Gas Temperature Increase Retry/Low-Pressure Decrease Retry	
	Discharge Gas SUPERHEAT Decrease Retry	
	Inverter Abnormality Retry	
	Abnormal Inverter Voltage Retry/Inverter Failure Retry	
	High-Pressure Decrease Retry	

NOTE:

(1) Retry indication continues for 30 minutes unless a protection control is indicated.
(2) Retry indication disappears if the stop signal comes from all rooms.
(3) The protection control code being indicated on 7-segment display is changed to an alarm code when the abnormal operation occurs. Also, the same alarm code is indicated on the remote control switch.
(4) In case that the degeneration control is activated, the indications Pc1 to Pc5 are indicated instead of P01 to P05.

(4) Activating Condition of Protection Retry Control Code
Protection Control or Retry Control is performed to prevent the abnormal operation.
The activating conditions are shown in the table below.

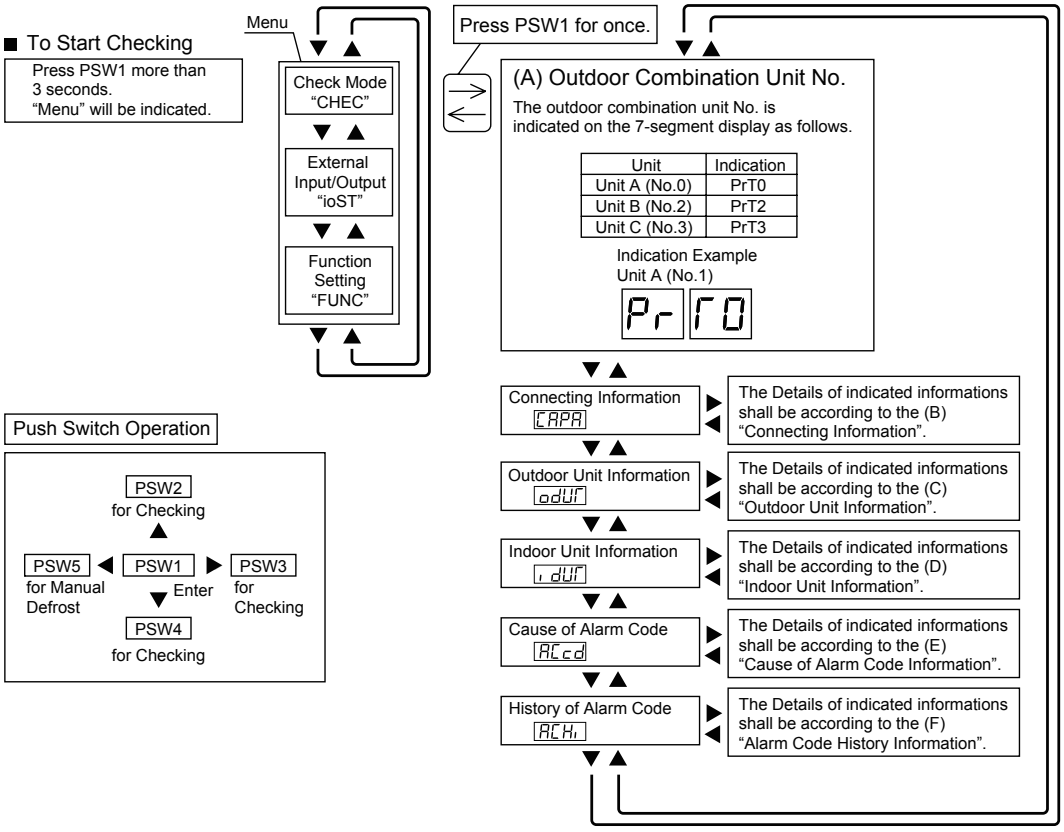
Code	Protection Control	Activating Condition	Remarks
P01	Pressure Ratio Protection Control	Compression Ratio $\varepsilon \geq 8.5$ or Compression Ratio $\varepsilon \leq 2.0$	-
P02	High-Pressure Increase Protection	Discharge Pressure Pd≥3.45 (at Cooling Mode) Pd≥3.35 (at Heating Mode and Heat Recovery Mode)	-
P03	Inverter Current Protection	Inverter Output Current≥(a)A (a) 380-415V: 22.5 220V: 38.5	-
P04	Inverter Fin Temperature Increase Protection	Inverter Fin Temperature≥80°C	-
P05	Discharge Gas Temperature Increase Protection	Temperature at the Top of Compressor Td≥112°C	-
P06	Low-Pressure Decrease Protection	Suction Pressure Ps≤0.1MPa	-
P09	High-Pressure Decrease Protection	Discharge Pressure Pd≤1.0MPa	-
P0A	Demand Current Protection Control	Running Current for Compressor≥Demand Current Setting Value	Demand Current Setting Value: Upper limit of total running current is set 100%, 80%, 70%, 60% and 40% at normal operation.
P0d	Low-Pressure Increase Protection	Suction Pressure≥1.3MPa	-

Code	Retry Control	Activating Condition	Remarks
P11	Pressure Ratio Decrease Retry	Pressure Ratio ε<1.8	When activating 3 times in 30 minutes, "43" alarm is indicated.
P12	Low-Pressure Increase Retry	Ps>1.4MPa	When activating 3 times in 30 minutes, "44" alarm is indicated.
P13	High-Pressure Increase Retry	Pd≥3.8MPa	When activating 3 times in 30 minutes, "45" alarm is indicated.
P14	Overcurrent Retry of Constant Compressor	* ico<2.5A over 50ms * ico≥icomax over 50ms ico: Running Current of Constant Compressor icomax: Maximum Current of Constant Compressor Constant Comp. / icomax 380-415V: E655 15.5A, E855 21.0A	When activating 3 times in 30 minutes, "39" alarm is indicated.
P15	Discharge Gas Temperature Increase Retry	Discharge Gas Temperature≥132°C over 10 minutes or Discharge Gas Temperature≥140°C over 5 seconds	When activating 3 times in 60 minutes, "08" alarm is indicated.
	Low-Pressure Decrease Retry	Ps<0.09MPa over 12 minutes	When activating 3 times in 60 minutes, "47" alarm is indicated.
P16	Discharge Gas SUPERHEAT Decrease Retry	Discharge Gas SUPERHEAT≤Tc+10 deg. over 30 minutes. Tc: Saturation Temperature	When activating 3 times in 120 minutes, "07" alarm is indicated.
P17	Inverter Abnormality Retry	Instantaneous Overcurrent	When activating 6 times in 30 minutes, "48" alarm is indicated.
		Abnormality of Current Sensor	When activating 3 times in 30 minutes, "51" alarm is indicated.
		IPM Error	When activating 7 times in 30 minutes, "53" alarm is indicated.
		Fin Temperature≥100°C	When activating 3 times in 30 minutes, "54" alarm is indicated.
P18	Abnormal Inverter Voltage Retry	Insufficient Voltage at Inverter Circuit	When activating 3 times in 30 minutes, "06" alarm is indicated.
		Excessive Voltage at Inverter Circuit	When activating 3 times in 30 minutes, "06" alarm is indicated.
	Inverter Failure Retry	Actual Inverter Frequency is 0Hz over 3 seconds after Inverter Frequency is outputted.	When activating 3 times in 30 minutes, "55" alarm is indicated.
P26	High-Pressure Decrease Retry	Pd<Ta/130+0.1MPa over 4 minutes or Pd<1.0MPa over 60 minutes Ta: Ambient Temperature	Without Alarm

Ps: Suction Pressure of Compressor, Pd: Discharge Pressure of Compressor

(5) Alarm Code
Refer to the section 15.4.2

(6) Checking Method by Checking Mode



■ To Cancel Checking Method

Press "PSW1" for more than 3 seconds while "Menu Mode" is displayed.
The indication of LCD will be turned off and condition will return to normal.

NOTICE
Make sure to cancel Checking Mode after checking is completed.

(B) Connecting Information

This information is indicated on the unit A (main unit) only.
Press PSW4 (▼) to forward or press PSW2 (▲) to backward.

Select the outdoor unit No. for indication.
Press PSW3 (▶) for details information of selected unit No..
Press PSW4 (▼) to forward or PSW2 (▲) to backward.
The information will be indicated alternately as "Item"→"Details"
Press PSW5 (◀) for return to Outdoor Unit No. Selection.

Unit	Indication
Unit A (No.0)	od00
Unit B (No.2)	od02
Unit C (No.3)	od03

Details of Indication

	Item	7-Segment Display		Details
		SEG2	SEG1	
1	Total Capacity of Connected Outdoor Units	o	CP	Total Capacity of O.U. Combination Refer to "Outdoor Unit Capacity Table".
2	O.U. Constitution Quantities	o	AA	Constitution Quantities of O.U. Combination
3	Total Capacity of Connected Indoor	i	CP	Total Capacity of Connected Indoor Units
4	Connected I.U. Number	i	AA	Connected Indoor Unit Number
5	Refrigerant Group		GA	Refrigerant Group Number (0 to 64)
6	Total Capacity of Operated I.U.		oP	Total Capacity of Operated Indoor Units Refer to "Indoor Unit Capacity Table".
7	Total Comp. Frequency		Hz	Unit: Hz
8	Accumulated Operation Time		UJ	Unit: Hour (Indication x 10 Hours)

(C) Outdoor Unit Information

Select the outdoor combination unit No. for indication.
When the selection is changed, press PSW4 (▼) to forward or PSW2 (▲) to backward.

Unit	Indication
Unit A (No.0)	od00
Unit B (No.2)	od02
Unit C (No.3)	od03

Select the outdoor combination unit No. for indication by pressing PSW4 or PSW2.
Press PSW3 (▶) for details information.
Press PSW4 (▼) to forward or PSW2 (▲) to backward.
The information will be indicated alternately as "Item"→"Details"
Press PSW5 (◀) for return to Outdoor Combination Unit No. Selection.

Details of Indication

	Item	7-Segment Display SEG2	7-Segment Display SEG1	Details
1	Outdoor Unit Capacity	CA	0	Unit Capacity Indication Refer to "Outdoor Unit Capacity Table"
2	Output State of Outdoor Micro-Computer	SC	0	Output State of Outdoor Micro-Computer Indication Refer to "Location of Push Switches and 7-Segment Display"
3	Running Frequency of Inverter Compressor MC1	H1	0	Running Frequency of INV. Compressor Indication (Hz)
4	Total Number of Running Compressor	CC	0	Total Number of Running Compressor Indication
5	Air Flow Rate	Fo	0	Air Flow Rate Indication (0 to 25 Steps)
6	Outdoor Expansion Valve MV1 Opening	E1	0	Outdoor Expansion Valve MV1 Opening Indication (Unit: %)
7	Outdoor Expansion Valve MVB Opening for Bypass	Eb	0	Expansion Valve Opening for Bypass Indication (Unit: %)
8	Discharge Pressure (High)	Pd	0	Unit: MPa Indication of Thermistor Open Circuit: 562 Indication of Thermistor Short Circuit: -062
9	Suction Pressure (Low)	PS	0	Unit: MPa Indication of Thermistor Open Circuit: 225 Indication of Thermistor Short Circuit: -025
10	Ambient Air Temperature (Ta)	To	0	Unit: °C Indication of Thermistor Open Circuit: -127 Indication of Thermistor Short Circuit: 127
11	Discharge Gas Temperature on the Top of Compressor MC1 (TD1)	Td	10	Unit: °C Indication of Thermistor Open Circuit: 0 Indication of Thermistor Short Circuit: 255
12	Discharge Gas Temperature on the Top of Compressor MC2 (TD2)	Td	20	Unit: °C Indication of Thermistor Open Circuit: 0 Indication of Thermistor Short Circuit: 255 AVWT-136 to AVWT-170 only
13	Evaporating Temperature TE at Heating	TE	0	Unit: °C Indication of Thermistor Open Circuit: -127 Indication of Thermistor Short Circuit: 127
14	Outdoor Heat Exchanger Gas Temperature	TG	0	Unit: °C Indication of Thermistor Open Circuit: -127 Indication of Thermistor Short Circuit: 127
15	Supercooling Temperature	TC	H0	Unit: °C Indication of Thermistor Open Circuit: -127 Indication of Thermistor Short Circuit: 127
16	Supercooling Temperature at Bypass	Tb	G0	Unit: °C Indication of Thermistor Open Circuit: -127 Indication of Thermistor Short Circuit: 127
17	Inverter Fin Temperature	TF	,0	Unit: °C
18	Fan Controller Fin Temp.	TF	F0	Unit: °C
19	Compressor MC1 Current *1)	A1	0	Unit: A
20	Compressor MC2 Current *1)	A2	0	Unit: A AVWT-136 to AVWT-170 only
21	Fan Motor (MFO1) Current *1)	AF	0	Unit: A
22	Accumulated Operation Time of Compressor MC1	UJ	10	Unit: Hour (Indication x 10 Hours)
23	Accumulated Operation Time of Compressor MC2	UJ	20	Unit: Hour (Indication x 10 Hours) AVWT-136 to AVWT-170 only
24	Accumulated Operation Time of Compressor MC1	cU	10	Unit: Hour (Indication x 10 Hours) Accumulated operation time can be reset. *2)
25	Accumulated Operation Time of Compressor MC2	cU	20	Unit: Hour (Indication x 10 Hours) AVWT-136 to AVWT-170 only Accumulated operation time can be reset. *2)
26	Cause of Inverter Stoppage	,F	10	Refer to "Inverter Stoppage Cause Table" ,F10 Comp. No. O.U. No.
27	Cause of Fan Controller Stoppage	FF	10	Refer to "Fan Controller Stoppage Cause Table" FF10 Fan Controller No. O.U. No.

*1) The indicated current is reduced value. Use a clamp meter for the accurate current value.

*2) For resetting the accumulated operation time, press "PSW1 + PSW3" for 5 seconds while the accumulated data is displayed.

NOTE: The outdoor unit No. is indicated on the one digit of "SEG1" .

(Example)

● Outdoor Unit Capacity Table

Indication	Capacity (kW)	kBtu/h
64	22.4	76
80	28.0	96
96	33.5	114
112	40.0	136
128	45.0	154
144	50.0	170

NOTE:
In case of combination unit, the indication of outdoor unit capacity is total capacity of constitution units.

(D) Indoor Unit Information

This information is indicated on the unit A (main unit) only.
Select the indoor unit number for the information indication.
Press PSW4 (▼) to forward or press PSW2 (▲) for backward.

Unit No.	Indication
No.0	ı d00
No.1	ı d01
↓	↓
No.63	ı d63

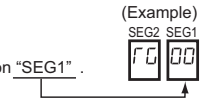
Select the indoor unit No. for indication.
Press PSW3 (▶) for details information of selected unit No..
Press PSW4 (▼) to forward or PSW2 (▲) to backward.
The information will be indicated alternately as "Item"→"Details"
Press PSW5 (◀) for return to Indoor Unit No. Selection.

Details of Indication

Item		7-Segment Display		Details
		SEG2	SEG1	
1	Indoor Unit Capacity	CA	00	Unit Capacity Indication Refer to "Indoor Unit Capacity Table".
2	Expansion Valve Opening	ı E	00	Unit: %
3	Heat Exchanger Liquid Piping Temp.	rL	00	Unit: °C
4	Heat Exchanger Gas Piping Temp.	rG	00	Unit: °C
5	Air Inlet Temp.	r1	00	Unit: °C
6	Air Outlet Temp.	ro	00	Unit: °C
7	Unit Stoppage Cause Code	d1	00	Indoor Unit Stoppage Cause Code Indication Refer to "Cause of Indoor Unit Stoppage Table".

NOTE: The indoor unit No. is indicated on "SEG1" .

(Example)



● Indoor Unit Capacity Table

Indication	Capacity (kW)	kBtu/h	Indication	Capacity (kW)	kBtu/h	Indication	Capacity (kW)	kBtu/h
6	2.2	7	16	5.6	18	40	14.0	48
8	2.8	9	18	6.3	22	48	16.0	54
10	3.6	12	20	7.1	24	64	22.4	76
11	4.0	13	22	8.0	27	80	28.0	96
13	4.5	14	26	9.0	30	128	45.0	154
14	5.0	17	32	11.2	38	160	56.0	190

(E) Cause of Alarm Code Information

This information is indicated on the unit A (main unit) only.
Press PSW4 (▼) to forward or press PSW2 (▲) to backward.
The indication will be indicated alternately as "Item"→"Details".

Details of Indication

Item		7-Segment Display		Details
		SEG2	SEG1	
1	Alarm Cause Code		AC	Latest O.U. Stoppage Alarm Code Indication Refer to "Alarm Code Table".
2	Degeneracy Control for Pressure Ratio Decrease Protection	c	11	0 : Degeneracy Control is not Activated. 1 : Degeneracy Control is Activated.
3	Degeneracy Control for High Pressure Increase Protection	c	13	0 : Degeneracy Control is not Activated. 1 : Degeneracy Control is Activated.
4	Degeneracy Control for Inverter Fin Temp. Increase Protection	c	14	0 : Degeneracy Control is not Activated. 1 : Degeneracy Control is Activated.
5	Degeneracy Control for Discharge Gas Temp. Increase Protection	c	15	0 : Degeneracy Control is not Activated. 1 : Degeneracy Control is Activated.
6	Degeneracy Control for Td SH Decrease Protection	c	16	0 : Degeneracy Control is not Activated. 1 : Degeneracy Control is Activated.
7	Degeneracy Control for Overcurrent Protection	c	17	0 : Degeneracy Control is not Activated. 1 : Degeneracy Control is Activated.

(F) Alarm Code History Information

This information is indicated on the unit A (main unit) only.
If history of abnormality exists, it is indicated maximum 15 case in chronological order.
Press PSW4 (▼) to forward or press PSW2 (▲) for backward.

Select the data No. for indication by pressing PSW4 or PSW2.
Press PSW3 (▶) for details information.
Press PSW4 (▼) to forward or PSW2 (▲) to backward.
Press PSW5 (◀) for return to Combination Unit No. Selection.

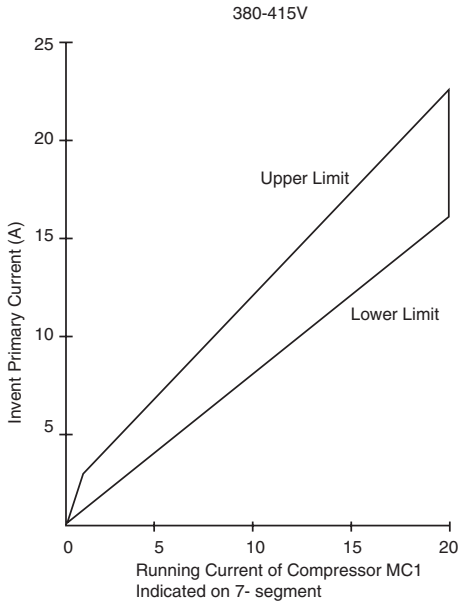
Data No.	7-Segment Display	
	SEG2	SEG1
1 (Latest Data)	no	01
↓	↓	↓
15 (Oldest Data)	no	15

Details of Indication

Item		7-Segment Display		Details
		SEG2	SEG1	
1	Unit Accumulated Operation Time	07	08	O.U. Accumulated Operation Time at Stoppage Unit: Hour (Indication x 10 Hours)
2	Cause of Stoppage	AC		Alarm Stoppage
		d1		Retry Stoppage
		C1		Control Information
3	Alarm/Stoppage Cause Code	01	48	Alarm and Stoppage Cause Code O.U. No. is indicated on 10 digit of SEG2. Compressor and fan controller No. are indicated on one digit of SEG2. Alarm and stoppage code are indicated on SEG1.
4	Abnormal Data Indication	IT	12	Inverter stoppage cause code is indicated when IT code is existing on SEG2.
		FT	12	Fan controller stoppage cause code is indicated when FT code is existing on SEG2.
		CT	0	Stoppage cause of constant speed compressor abnormal current is 0A stoppage.
		CT	FF	Overcurrent Stoppage of Constant Speed Comp.
		--	--	Except for the above.

(7) Running Current of Compressor

- Inverter Primary Current
  The inverter primary current is estimated from the running current of the compressor MC1 indicated on 7-segment, as chart below.



- Indicated Running Current of Compressor MC2
  The running current of the compressor MC2 is detected by current sensor. (CT2)

- Cause of Inverter Stoppage (Check Item " ")

Code	Cause
1	IPM Error (Overcurrent, Decrease Voltage, Short Circuit)
2	Instantaneous Overcurrent
3	Abnormal Inverter Fin Temperature
4	Inverter Overcurrent
5	Inverter Voltage Decrease
6	Inverter Voltage Increase
7	Abnormal Inverter Transmission
8	Abnormal Current Sensor
9	Instantaneous Power Failure Abnormal Power Source Phase
11	Micro Computer Reset
12	Earth Fault Detecting
13	Abnormal Power Source Phase
16	Inverter Failure
21	Abnormal Start-up

- Cause of Fan Controller Stoppage (Check Item " ")

Code	Cause
1	Driver IC Error
2	Instantaneous Overcurrent
3	Abnormal Inverter Fin Temperature
4	Inverter Overcurrent
5	Fan Controller Voltage Decrease
6	Fan Controller Voltage Increase
7	Abnormal Fan Controller Transmission
8	Abnormal Current Sensor
9	Instantaneous Power Failure
11	Micro Computer Reset
12	Earth Fault Detecting
15	Reverse Rotation
16	Fan Controller Retry
17	Abnormal Control
21	Abnormal Start-up

Appendix

Service and Maintenance Record by 7-Segment Display

Customer's Name _____ DATE: - -

Outdoor Unit Model (Serial No.)		AVWT- (Serial No.)								AVWT- (Serial No.)							
(1) Operation Mode																	
(2) Test Run Start Time																	
(3) Data Collect Start Time																	
(4) Read Out Data from 7-Segment in Outdoor Unit																	
Protection Control Code																	
Operating Capacity																	
Outdoor Total Connecting Capacity	oCP																
Outdoor Connecting Quantity	oAA																
Indoor Total Connecting Capacity	iCP																
Indoor Connecting Quantity	iAA																
Refrigerant System Address	GA																
Indoor Operating Capacity	oP																
Total Frequency	Hz																
Accumulated Operation Time of Unit	UJ																
Outdoor Unit Information																	
Outdoor brand	1																
Outdoor Capacity	CA																
Outdoor Microcomputer Output	SC	$52C_1$	$52C_2$	CH_1	CH_2	A_1	A_2	21_1	21_2	$52C_1$	$52C_2$	CH_1	CH_2	A_1	A_2	21_1	21_2
		FAN	20B	20C	$20F_1$	$20F_2$	20CHG	X_1	X_2	FAN	20B	20C	$20F_1$	$20F_2$	20CHG	X_1	X_2
Inverter Frequency	H1																
Compressor Running Quantity	CC																
Outdoor Fan Step	Fo																
Outdoor Expansion Valve Opening	E1																
	Eb																
Discharge Pressure	Pd																
Suction Pressure	Ps																
Outdoor Temperature	To																
Discharge Gas Temperature	Td1																
	Td2																
Heat Exchanger Liquid Temperature	TE																
Heat Exchanger Gas Temperature	TG																
Automatic Refrigerant Charge Temperature	TCH																
Gas Bypass Temperature	TbG																
Inverter Fin Temperature 1	TFi																
Inverter Fin Temperature 2	TFi																
Fan Controller Temperature	TFF																
Compressor Running Current	A1																
	A2																
Fan Running Current 1	AF																
Fan Running Current 2	AF																
Accumulated Operation Time of Compressor	UJ1																
	UJ2																
Accumulated Operation Time of Compressor (Available for Timer Reset)	cU1																
	cU2																
Inverter Stoppage Cause Code	iT																
Fan Controller Stoppage Cause Code	FT																
Indoor Unit Information																	
Indoor Capacity	CA																
Indoor Expansion Valve Opening	iE																
Heat Exchanger Liquid Temperature	TL																
Heat Exchanger Gas Temperature	TG																
Intake Air Temperature	Ti																
Outlet Air Temperature	To																
Indoor Unit Stoppage Cause Code	d1																

Service and Maintenance Record by Remote Control Switch

Data Sheet for Checking by Remote Control Switch

Time				:	:	:	:	:
I.U. Model								
I.U. Serial No.								
I.U. No. / Alarm Code								
		Check Mode 1	Check Mode 2	1 • 2	1 • 2	1 • 2	1 • 2	1 • 2
B	Temp. Indication							
	Set Temp.	b1	- -					
	Inlet Air Temp.	b2	91					
	Discharge Air Temp.	b3	92					
	Liquid Pipe Temp.	b4	93					
	Remote Thermistor Temp.	b5	- -					
	Outdoor Air Temp.	b6	94					
	Gas Pipe Temp.	b7	95					
	Evaporating Temp. at Heating	b8	96					
	Control Information	b9	97					
	Comp. Top Temp.	bA	98					
	Thermo Temp. of Remote Control Switch	bb	- -					
	Humidity	bC	00					
C	Micro-Computer State Indication							
	I.U. Micro-Computer	C1	- -					
	O.U. Micro-Computer	C2	- -					
D	Stopping Cause State Indication							
	Stopping Cause State Indication	d1	- -					
E	Alarm Occurrence							
	Times of Abnormality	E1	- -					
	Times of Power Failure	E2	- -					
	Times of Abnormal Transmitting	E3	- -					
	Times of Inverter Tripping	E4	- -					
F	Automatic Louver State							
	Louver Sensor State	F1	- -					
H	Pressure, Frequency State Indication							
	Discharge Pressure	H1	99					
	Suction Pressure	H2	9A					
	Control Information	H3	9b					
	Operating Frequency	H4	9C					
J	I.U. Capacity Indication							
	I.U. Capacity (X1/8HP)	J1	- -					
	O.U. Code	J2	- -					
	Refrigerant Cycle Number	J3	- -					
	Refrigerant Cycle Number	J4	- -					
L	Opening of Expansion Valve							
	I.U. Expansion Valve	L1	9d					
	O.U. Expansion Valve 1	L2	9E					
	O.U. Expansion Valve 2	L3	- -					
	O.U. Expansion Valve B	L4	- -					
P	Running Current Indication (Reference)							
	Comp. Current	P1	9F					
P	Version No.							
	Version No.	PQ	- -					

Client:	
Installation Date:	
System No.:	
Date Checked:	
Checked by:	

Result	

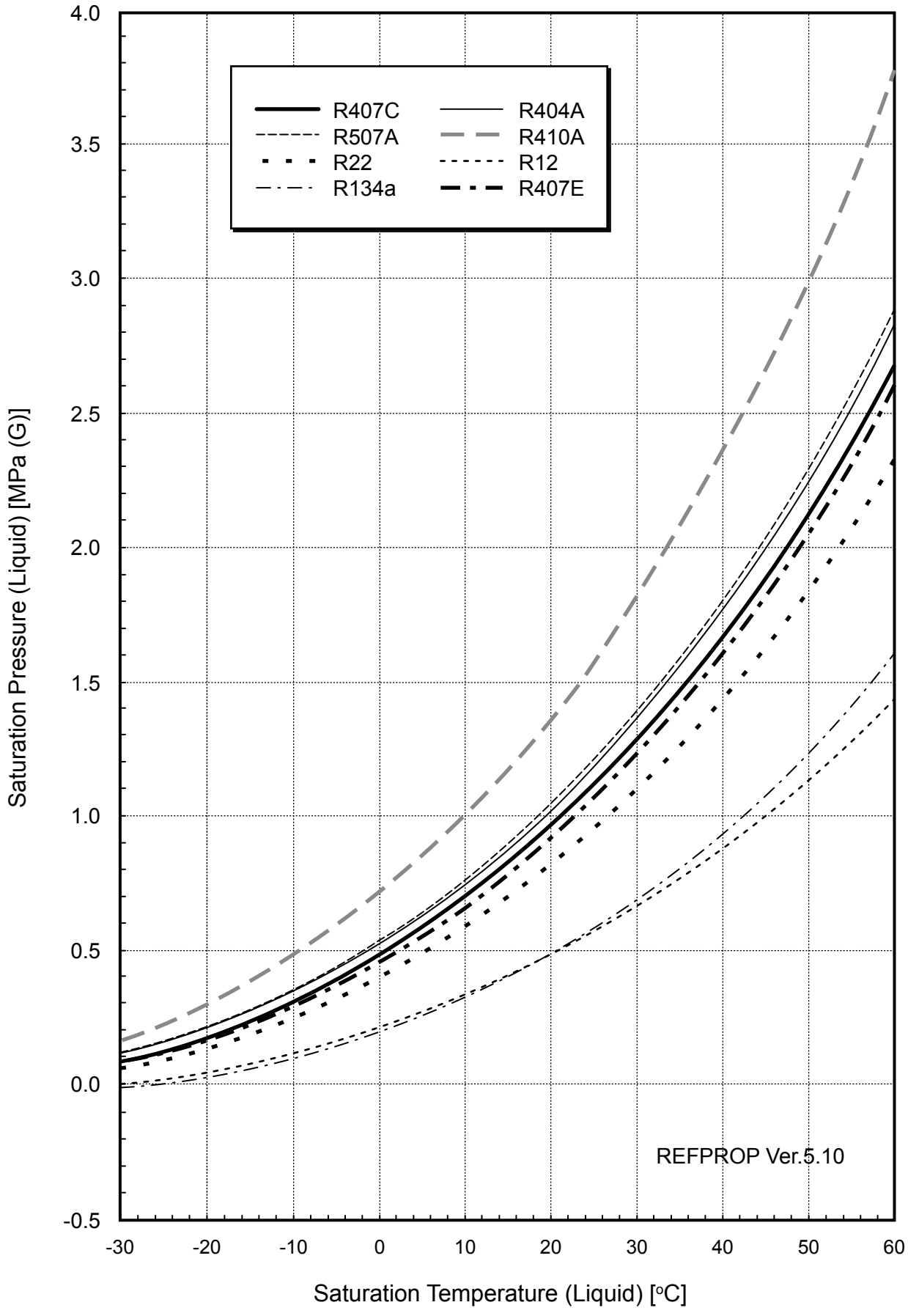
Service & Maintenance Record

Service and Maintenance Record

No.	Check Item	Action	Judgement
1	Is service space sufficient		YES or NO
2	Short Circuit of Discharge Air?		YES or NO
3	Any Heat Influenc		YES or NO
4	Is earth wire connected?		YES or NO
5	Refrigeration Piping		GOOD or NOT GOOD
6	Fixing of Units		GOOD or NOT GOOD
7	Any Damage on Outer or Internal Surface?		YES or NO
8	Checking of Screw and Bolts	Tighten if loosen.	TIGHTENED or NOT TIGHTENED
9	Tightening of Terminal Screws	Tighten all terminal screws by phillips driver.	TIGHTENED or NOT TIGHTENED
10	Are compressor terminals tightly fixed	Push all terminals.	PUSHED or NOT PUSHED
11	Insulation Resistance	Measure insulation resistance by insulation resistance-meter. Comp. and Fan Motor: greater than 3MΩ Others: greater than 3MΩ	GOOD or NOT GOOD
12	Does drain water smoothly flow	Check for smooth flow b pouring water.	GOOD or NOT GOOD
13	Check for leakage at compressor.	Check for any leakage.	GOOD or NOT GOOD
14	Check for leakage at outdoor heat exchanger.	ditto	GOOD or NOT GOOD
15	Check for leakage at indoor heat exchanger.	ditto	GOOD or NOT GOOD
16	Check for leakage at reversing valve.	ditto	GOOD or NOT GOOD
17	Check for leakage at check valve.	ditto	GOOD or NOT GOOD
18	Check for leakage at accumulator.	ditto	GOOD or NOT GOOD
19	Check for leakage at strainer.	ditto	GOOD or NOT GOOD
20	Check for leakage at electronic expansion valve.	ditto	GOOD or NOT GOOD
21	Check for leakage at piping.	ditto	GOOD or NOT GOOD
22	Check direction of fans.	by Viewing or Air Flow Volume	GOOD or NOT GOOD
23	Voltage among each Phase.	higher than 220V	GOOD or NOT GOOD
24	Vibration and Sound	Check fan, compressor, piping, etc.	GOOD or NOT GOOD
25	Activation of Each Operation Mode	Check activation of COOL, HEAT, STOP and TEMP. switches.	GOOD or NOT GOOD
26	High Pressure Cut-out Switch	Check actual activation value.	GOOD or NOT GOOD
27	Check activation of drain mechanism.	Check it during cooling operation.	GOOD or NOT GOOD
28	Indoor Inlet Air Temp. (DB/WB)		°C DB/ °C WB
29	Indoor Outlet Air Temp. (DB/WB)		°C DB/ °C WB
30	Outdoor Inlet Air Temp. (DB/WB)		°C DB/ °C WB
31	Outdoor Outlet Air Temp. (DB/WB)		°C DB/ °C WB
32	High Pressure Switch		MPaG
33	Low Pressure Switch		MPaG
34	Operating Voltage		V
35	Operating Current		A
36	Instruction Cleaning of Air Filter to Client		DONE or NOT YET
37	Instruction for Cleaning Method to Client		DONE or NOT YET
38	Instruction for Operation to Client		DONE or NOT YET

16. Appendix

Saturation Curve for Refrigerant



Mollier Chart for R410A