

***VRV* System**

Design, Installation & Testing Instruction

R407C PLUS Series

Heat Recovery System



RSEYP16KJY1
RSEYP18KJY1
RSEYP20KJY1
RSEYP24KJY1
RSEYP26KJY1
RSEYP28KJY1
RSEYP30KJY1

Part 1

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1. Product Outline

1.1 Year 2001 Models Using New Refrigerant

Outdoor Unit Series

● New model

Series name	Equivalent horsepower (HP)	16	18	20	24	26	28	30
R407C VRV PLUS series Heat Recovery System		●	●	●	●	●	●	●

Indoor Unit Series

● New model ◎ Model change ○ Continued model

		Type P20	Type P25	Type P32	Type P40	Type P50	Type P63	Type P80	Type P100	Type P125	Type P200	Type P250
Ceiling mounted cassette type	Multi-flow type	—	—	○	○	○	○	○	○	○	—	—
	Double-flow type	○	○	○	○	○	○	○	—	○	—	—
	Corner type	—	○	○	○	—	○	—	—	—	—	—
Ceiling mounted built-in type		○	○	○	○	○	○	○	○	○	—	—
Ceiling mounted duct type		—	—	—	○	○	○	○	○	○	○	○
Ceiling suspended type		—	—	○	—	—	○	—	○	—	—	—
Wall mounted type		○	○	○	○	○	○	—	—	—	—	—
Floor standing type		○	○	○	○	○	○	—	—	—	—	—
Concealed floor standing type		○	○	○	○	○	○	—	—	—	—	—

BS unit

	Type P100	Type P160	Type P250
R407C Heat Recovery	○	○	●

System Layout

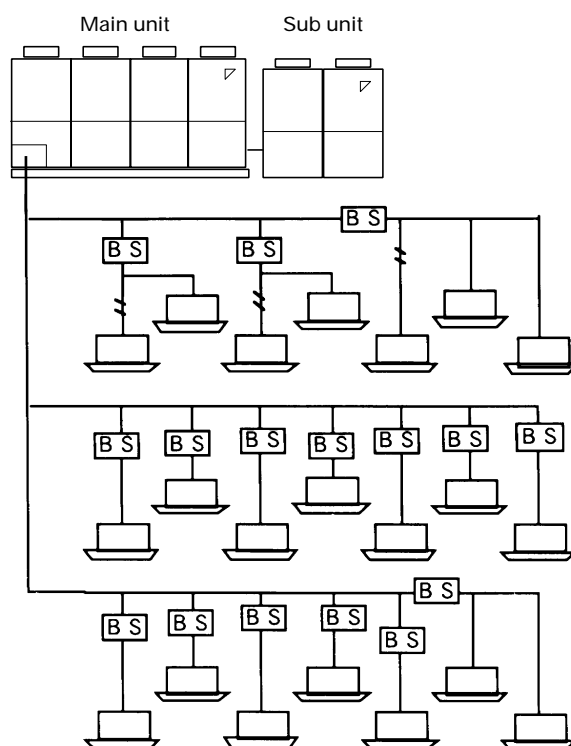
RSEYP-K

Main unit REYP-KJ
Sub unit RXEP-KJ

Connectable indoor unit capacity
20type

Indoor unit connection capacity
50 - 130% of outdoor unit total capacity

No. of connectable indoor units
RSEYP16 ~ 20K Max. 20 units
RSEYP24 ~ 30K Max. 32 units

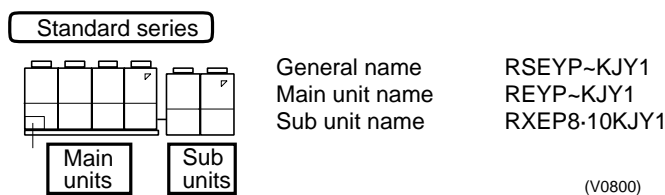


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1.2 Outline of New Series Products

In addition to the use of a new refrigerant (R407C), the new series products incorporate a function-unit-less structure for significantly improved flexibility and ease of installation.

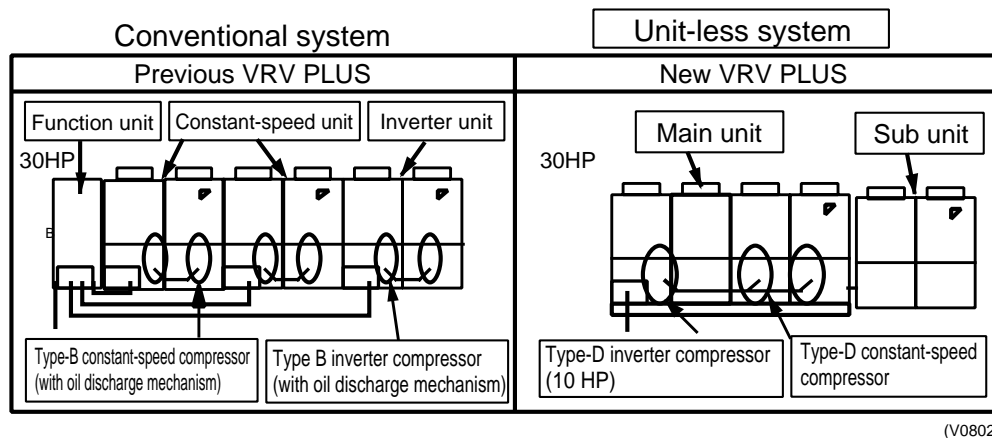
System outline



- No function unit
All models combine master units and slave units or master units, slave units and Plus units.
- All models use a new refrigerant with low ozone destruction potential and global warming potential to minimize environmental loads.

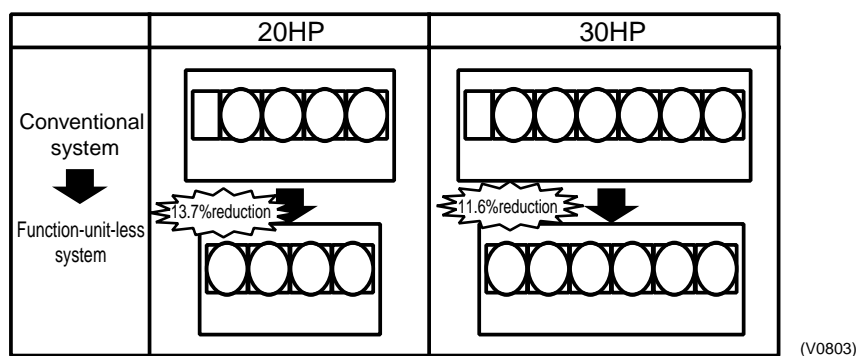
Feature (1)

- Dramatically improved flexibility and ease of field installation by function-unit-less structure
 - Simpler piping work at installation sites
 - Reduced unit installation area (13.7%: 20HP, 11.6%: 30HP)



Feature (2)

- Reduction of installation area

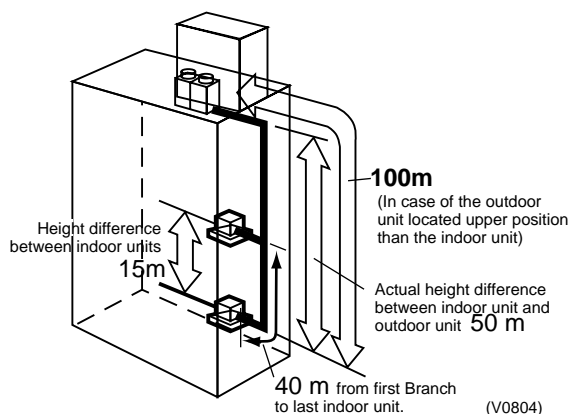


- Simpler piping work at installation sites

	20HP	30HP
Pipe connecting locations	15 joints → 7 joints	21 joints → 7 joints

Other versatile functions are provided

- Long refrigerant piping : equivalent length of 125, actual length of 100 m and height difference of 50 m.
- Connection of indoor unit of varying capacities and types totaling 130% (max.) of outdoor unit by capacity.



- Individual control of up to 20 indoor units with one 20HP class outdoor unit and 32 indoor units with one 30HP outdoor unit.
- For VRV PLUS

Outdoor unit name	No. of indoor units connectable
RSEYP16~20K	20 units
RSEYP24~30K	32 units

- Others
- Refrigerant volume will be reduced by simplify the refrigerant circuit (4kg~9kg)
- COP: Power input decreased 5% for cooling, although 5% increase for heating because of R407C
- Cooling operation with outdoor air temperature as low as -5°C
- Heating operation with outdoor air temperature as low as -15°C
- Simple REFNET piping system
- Super wiring system
- Automatic address setting function
- Built-in wiring error check function
- Equipped with sequential start function
- Nighttime low-noise mode for reduced operating sound

1.3 Model Configuration and Combination

1.3.1 Number of units and capacity of connectable indoor units

Standard series	Equivalent output		16HP	18HP	20HP	24HP
	R407C VRV PLUS series system model		RSEYP16KJ	RSEYP18KJ	RSEYP20KJ	RSEYP24KJ
	Outdoor unit combination	Main unit	REYP8KJ	REYP10KJ	REYP10KJ	REYP16KJ
		Sub unit	RXEP8KJ	RXEP8KJ	RXEP10KJ	RXEP8KJ
	Total number of connectable indoor units		Up to 20 units			Up to 32 units
	Total capacity of connectable indoor units		200~520	225~585	250~650	300~780

Standard series	Equivalent output		26HP	28HP	30HP
	R407C VRV PLUS series system model		RSEYP26KJ	RSEYP28KJ	RSEYP30KJ
	Outdoor unit combination	Main unit	REYP16KJ	REYP20KJ	REYP20KJ
		Sub unit	RXEP10KJ	RXEP8KJ	RXEP10KJ
	Total number of connectable indoor units		Up to 32 units		
	Total capacity of connectable indoor units		325~845	350~910	375~975

1.3.2 Connectable indoor unit

Indoor unit		Model name
Ceiling mounted cassette type	Multi-flow type	FXYFP32KVE·40KVE·50KVE·63KVE·80KVE·100KVE·125KVE
	Double flow type	FXYCP20KV1·25KV1·32KV1·40KV1·50KV1·63KV1·80KV1·125KV1
	Corner type	FXYKP25KV1·32KV1·40KV1·63KV1
Ceiling mounted built-in type		FXYSP20KV1·25KV1·32KV1·40KV1·50KV1·63KV1·80KV1·100KV1·125KV1
Ceiling mounted duct type		FXYMP40KV1·50KV1·63KV1·80KV1·100KV1·125KV1·200KV1·250KV1
Ceiling suspended type		FXYHP32KV1·63KV1·100KV1
Wall mounted type		FXYAP20KV1·25KV1·32KV1·40KV1·50KV1·63KV1
Floor standing type		FXYLP20KV1·25KV1·32KV1·40KV1·50KV1·63KV1
Concealed floor standing type		FXYLMP20KV1·25KV1·32KV1·40KV1·50KV1·63KV1

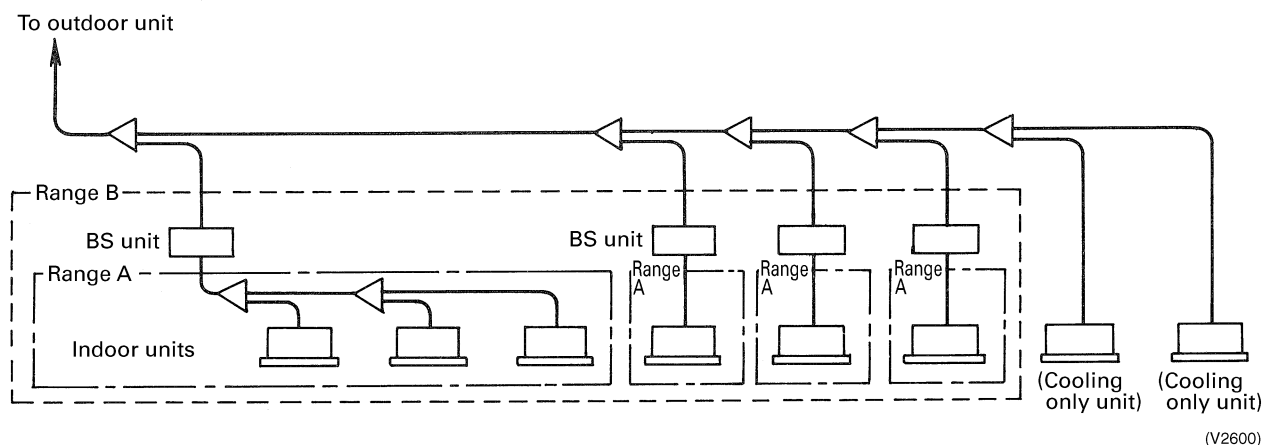
Indoor unit capacity

New refrigerant model code	P20 type	P25 type	P32 type	P40 type	P50 type	P63 type	P80 type	P100 type	P125 type	P200 type	P250 type
Selecting model capacity	2.2kW	2.8kW	3.5kW	4.5kW	5.6kW	7.0kW	9.0kW	11.2kW	14.0kW	22.4kW	28.0kW
Equivalent output	0.8HP	1HP	1.25HP	1.6HP	2.0HP	2.5HP	3.2HP	4HP	5HP	8HP	10HP

Use the above tables to determine the capacities of indoor units to be connected. Make sure the total capacity of indoor units connected to each outdoor unit is within the specified value (kW).

- The total capacity of connected indoor units must be within a range of 50 to 130% of the rated capacity of the outdoor unit.
- In some models, it is not possible to connect the maximum number of connectable indoor units. Select models so the total capacity of connected indoor units conforms to the specification.

1.3.3 BS unit connection range and total indoor unit capacity allowed for simultaneous cooling/heating operations



		Model	Total capacity of connectable indoor units	Maximum number of connectable indoor units
Range A	Total indoor unit capacity allowed for connection to BS unit	BSVP100KJV1	Less than 11.2kW	3 units or less
		BSVP160KJV1	11.2kW or more and less than 18.0kW	6 units or less
		BSVP250KJV1	From 18.0kW to 28.0kW	8 units or less
Range B	Total indoor unit capacity allowed for simultaneous cooling/heating operations	RSEYP16KJY1	22.4kW or more	20 units or less
		RSEYP18KJY1	25.2kW or more	
		RSEYP20KJY1	28.0kW or more	
		RSEYP24KJY1	33.6kW or more	
		RSEYP26KJY1	36.4kW or more	32 units or less
		RSEYP28KJY1	39.2kW or more	
		RSEYP30KJY1	42.0kW or more	

2. Points to Bear in Mind at the System Design

2.1 Points Relating to the Performance of the Air Conditioning Units

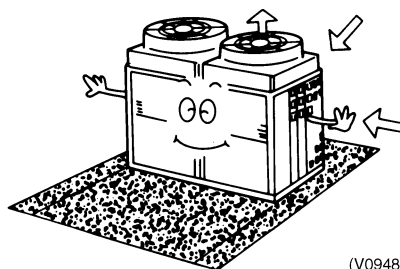
A number of points need to be borne in mind at the system design stage in order to ensure the mechanical efficiency of the air conditioning units.

1. Path of refrigerant piping between outdoor and indoor units, height difference and pipe length.

- Path of refrigerant piping should be determined such that length of piping is kept to a minimum.
- Piping should be kept within permissible limits in terms of length and height difference.

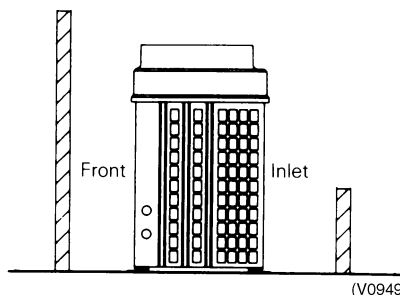
2. Positioning of outdoor unit

- Position such that maintenance and repairs can be carried out. (leave room for servicing)
- Avoid reduction of airflow and short circuiting



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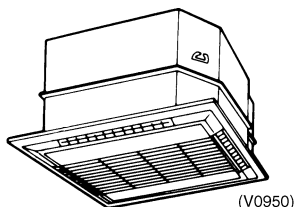
- Avoid reduction of airflow and short circuiting



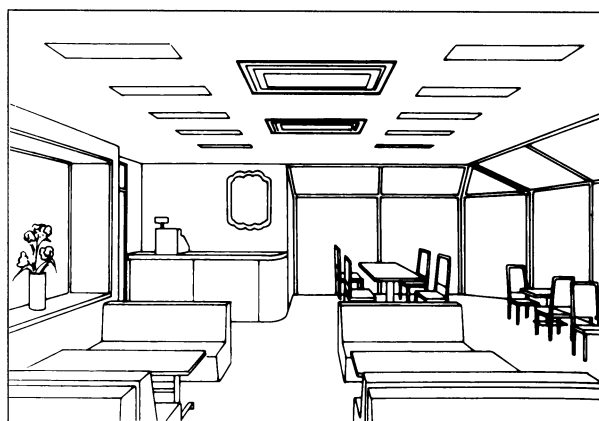
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3. Positioning of indoor unit

- Position such that maintenance and repairs can be carried out. (inspection port positions and size check)
- Avoid short circuiting
- Ensure sufficient drain pipe gradient (need for drain-up kit etc.)
- In the case of a ceiling mounted type make sure ceiling depth is sufficient (need for high performance filter, etc).



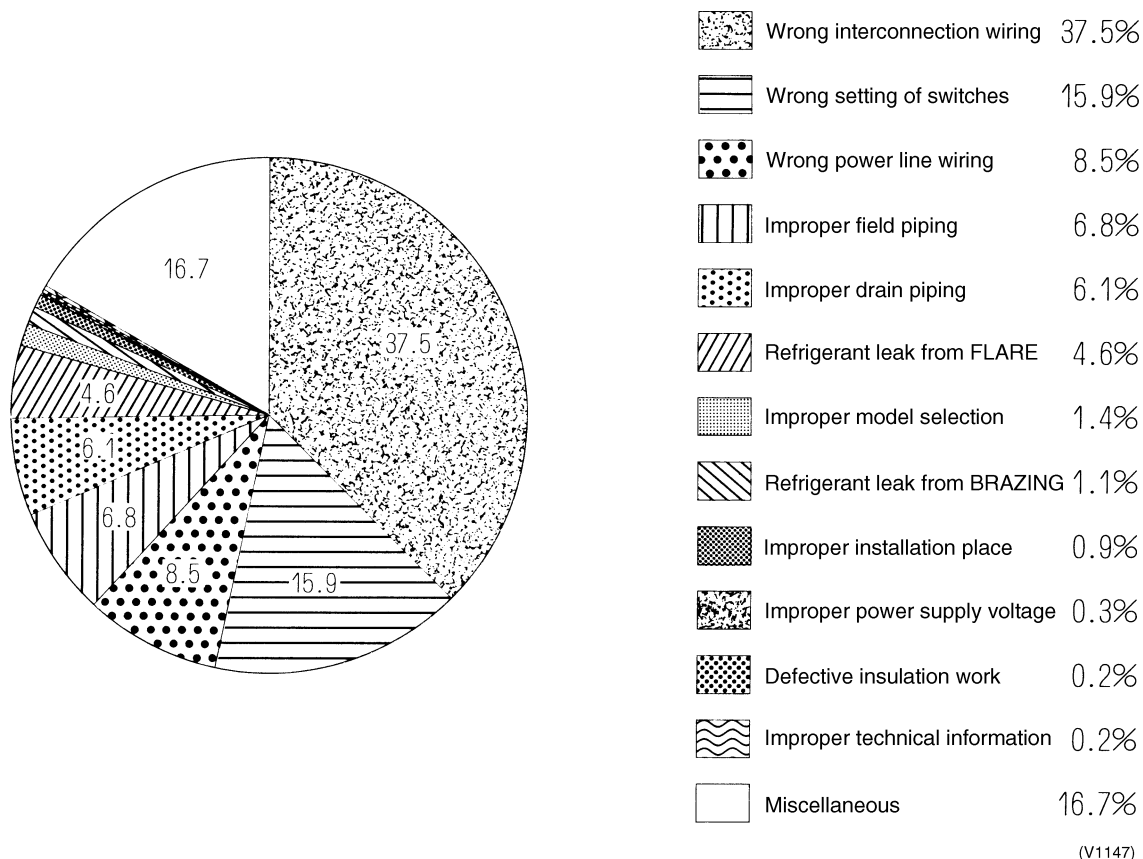
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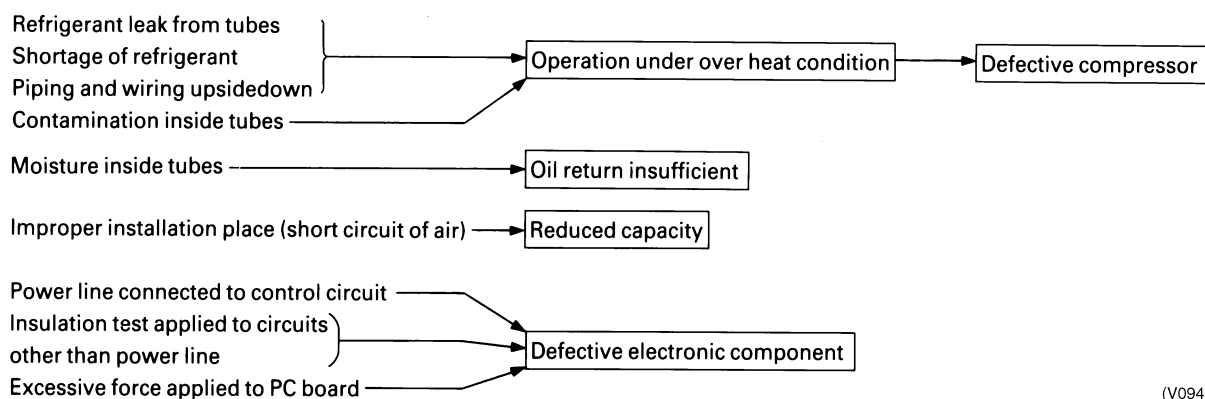
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2.2 The Installation is of Vital Importance

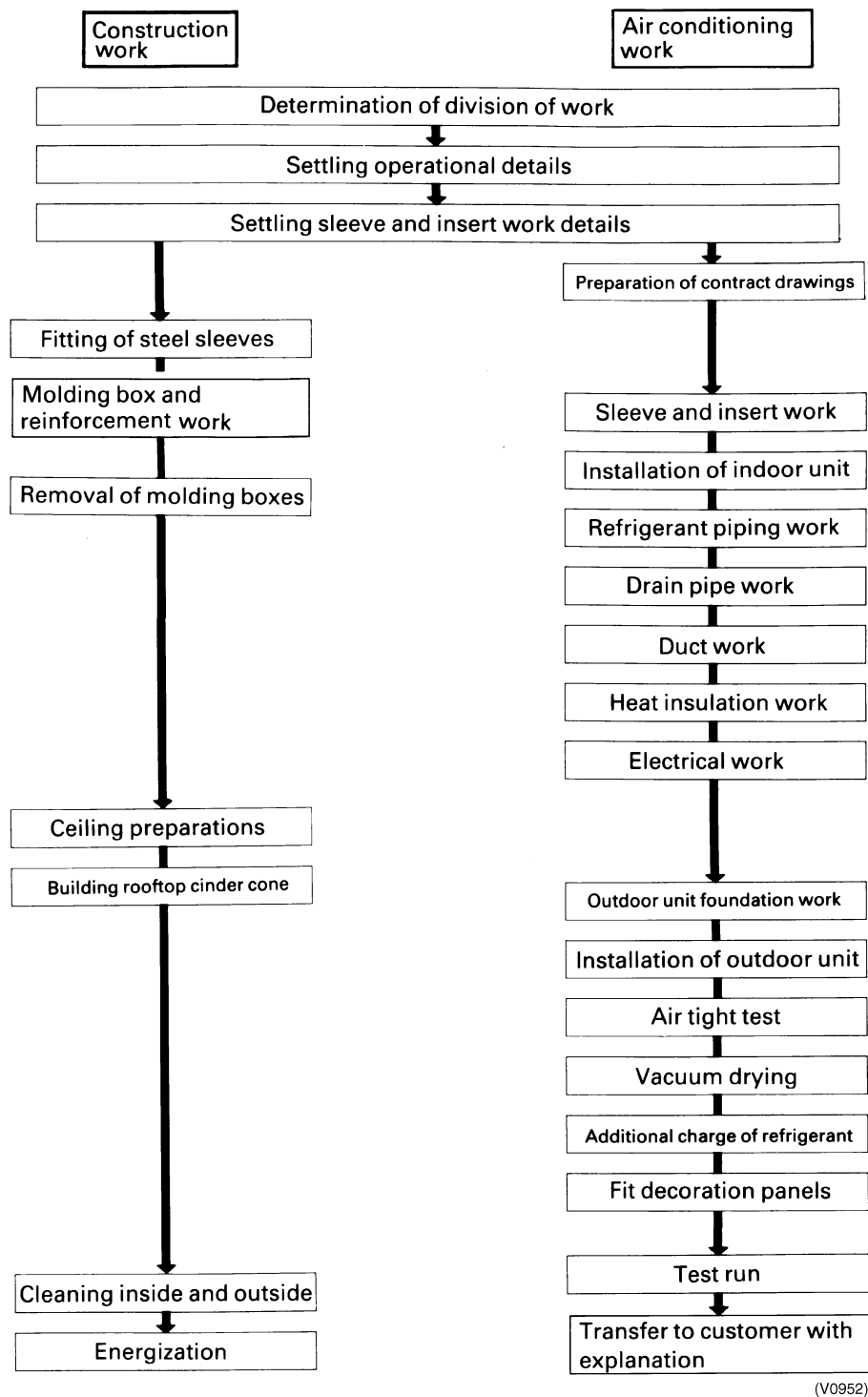
The analysis of major installation problems experienced during the year of 1988 is shown below;



How these installation problems affect an equipment are shown below:



2.3 Striking a Balance between System Installation and General Construction Work (Comprehensive Flow Chart)



(V0952)



- Note:**
1. The division of the work should be thoroughly clarified. (This applies particularly to work relating to the connection of control wiring, fitting of remote controller and central control panel, boundary work on areas such as connection of drain piping and humidification supply piping, inspection and foundation)
 2. Keep a constant check on the progress of the construction work to avoid deviations from the air conditioning work schedule.
 3. For sleeve and insert work the positions of ceiling girders should be confirmed and sleeve and insert requirement, hole diameters, positioning and numbers decided. This is particularly important in the case of sleeves for drain piping.

2.4 Points to Bear in Mind when Preparing the Contract Drawings

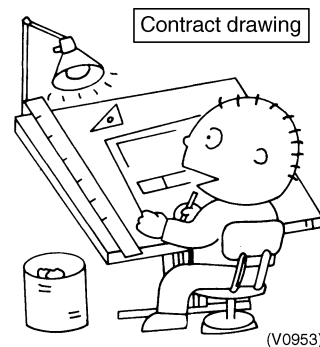
The following points should be borne in mind when preparing the contract drawings from the original drawings and the execution drawings.

The contract drawings for the air conditioning system are blueprints for the performance of the necessary work which are drawn up on the basis of the original drawings in such a way that a working balance is achieved between the specific requirements of each individual aspect of the work.

Contract Drawing

Objectives include:

- The drawings should be easily comprehensible to those carrying out the work.
- The contents of the drawings should not be subject to subsequent alteration.



The following is a list of the main points to be considered when preparing contract drawings for the **VRV** System and should be used as a reference during this stage of the work:

2.4.1 At the Contract Drawing Stage the Following Points are Critical!!

	Check points	
Arrangement of units	<ol style="list-style-type: none"> 1. Have you left the access passages clear and allowed sufficient room for servicing? 2. Have you taken full account of the possibility of short circuits? (Both indoor and outdoor units) 3. Can the air filters be replaced easily? 4. Have you indicated the size and location of the ceiling inspection ports? (Make sure there no other installations in the area above) 5. Have you taken into account the depth of the installation area? (In case of ceiling built-in type) 6. Have you specified the position of the indoor unit clearly? (Have you taken full account of relevant features of the local ventilation, humidity and lighting?) 	
Refrigerant piping	<ol style="list-style-type: none"> 1. Is the piping system correctly connected? 2. Are the rise and fall pipes correctly connected? 3. Are the lengths and height differences of the pipes within the recommended limits? 	<p>(Example of a contract drawing)</p>
Operational control	<ol style="list-style-type: none"> 1. Are the interconnections between the piping and wiring of the indoor and outdoor units clearly shown? 2. Are the numbers of the local setting switches clearly shown? (Group No. and Unit No.) 3. Are the wiring connections between the remote controller and the centralized and remote controls clearly shown? Refer to the notes relating to the preparation of the control wiring system diagrams (see next page) 4. Are the different types of wires clearly marked? 5. Are the any problems with the way the power supply cables and control wiring have been separated or bound together? 6. Are the inter-floor connections of the control wiring correct? 7. Is the position of the remote controller clearly marked? 	
Miscellaneous	<ol style="list-style-type: none"> 1. Have you checked the gradient of the drain piping? (Must be at least 1/100) 	

2.4.2 Main Considerations in Preparation of Control Circuit Diagrams

In addition to the design of the appropriate this system configuration it is also essential that the control system be made amply clear. If the system is designed and installed without a clear, comprehensive plan then problems are inevitably going to occur during the test run.

Servicing too will become much more time consuming than necessary. However, if control circuit diagrams are prepared along with the contract drawings in order to make the total system clearly visible then the essential points relating to the electrical connections will be easily understood, the test run will go off without a hitch and the whole system will be rendered fully effective.

Step 1: Compiling a System List (example using Inverter K Series)

1. Mark each outdoor unit with a code.
2. Add field settings and data for outdoor units, and outdoor unit No. if using sequential start.
3. Add the model number of each indoor unit connected to each refrigerant circuit.
4. Assign each indoor unit a code.
5. Fill in the location of each indoor unit.
6. Group indoor units controlled by one or two remote controllers. (group or individual control).
7. Assign central group No.s if using centralized control.
8. Add field settings and optional equipment for indoor units.
9. Add unit No. if making separate field settings for each indoor unit under group control.



Note: With the R407C PLUS Series, unit No. is determined through automatic addressing, therefore readout unit Nos. after activating the power.

Example: System list

Outdoor Unit		Indoor Unit						
Model Name (code)	Field Settings	Model Name	System Name	Location	Remote Controller Group	Centralized Control Group No.	Unit No.	Optional equipment, field settings, etc.
RSEYP16K (PAC1)	Cool/Heat selector: Indoor unit Low noise operation (L.N.O.P): Individual control Sequential start: ON Defrost: Earlier Sequential start No.	FXYCP32 K	2F01	2nd floor office	A	1-00		
		FXYCP63 K	2F02	2nd floor office	A	(1-00)		
		FXYCP40 K	2F03	2nd floor office	A	(1-00)		
		FXYCP63 K	2F04	2nd floor office	B	1-01		
		FXYCP50 K	2F05	2nd floor office	B	(1-01)		
RSEYP18K (PAC2)	Cool/Heat selector: Indoor unit Low noise operation (L.N.O.P): Individual control Sequential start: ON Defrost: Earlier	FXYCP32 K	3F01	3rd floor office	C	1-02		
		FXYCP40 K	3F02	3rd floor office	C	(1-02)		
		FXYCP50 K	3F03	3rd floor office	C	(1-02)		
		FXYCP50 K	3F04	3rd floor office	D	1-03		

For details on field settings and centralized control group No., refer to the installation manual and system reference materials.

Step 2: Preparation of the Control Circuit Diagrams

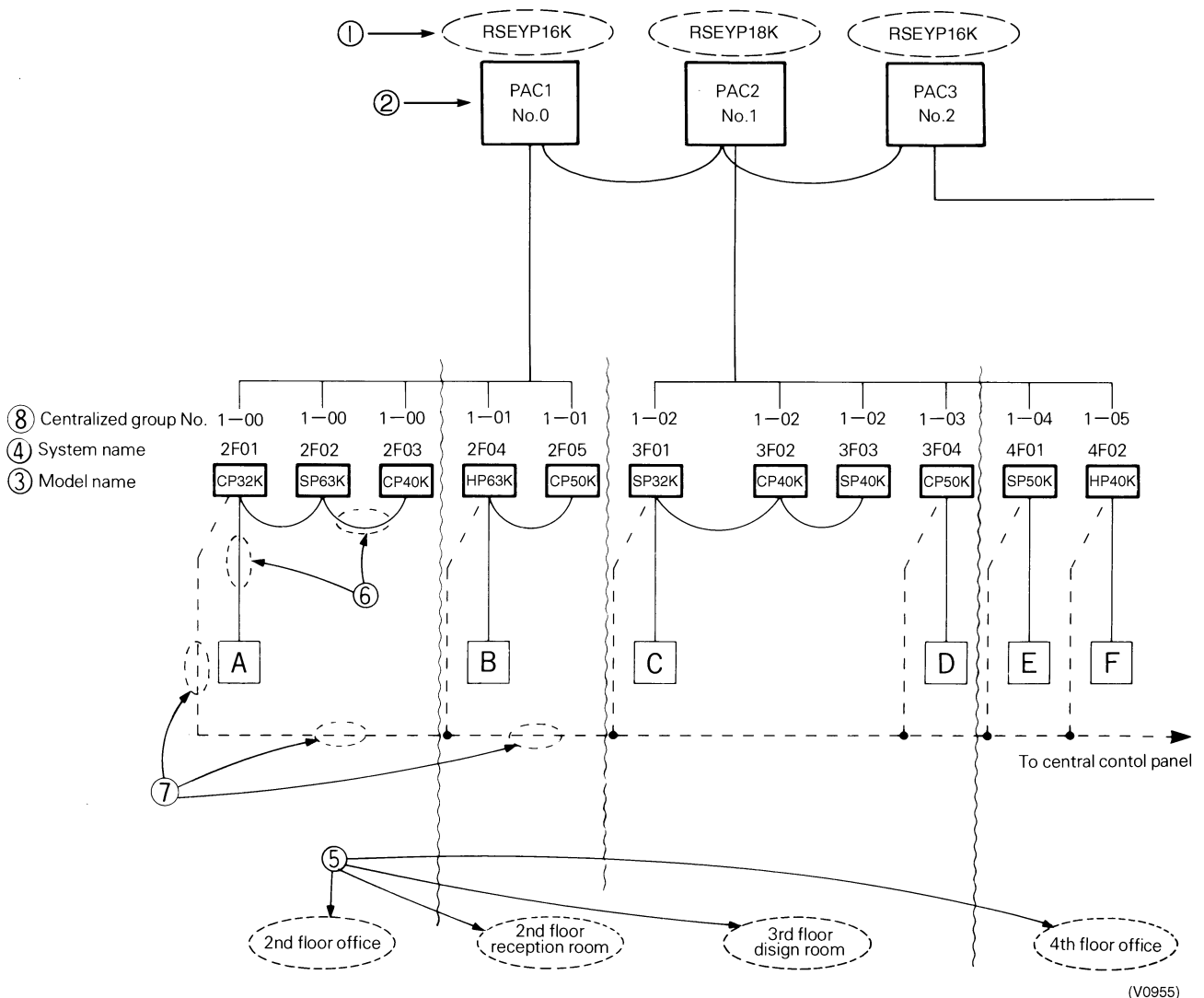
The following sequence should be followed in order to prepare control circuit diagrams in accordance with the system list which has already been completed:

- ① Diagrams should be prepared for each individual outdoor unit. The outdoor unit model number should be inserted into the diagram. (RSEYP16K)
- ② Insert name of refrigerant system. (PAC1, PAC2)
- ③ Insert name of indoor unit. (FXYCP32K→C32K)
- ④ Insert system name of indoor unit.
- ⑤ Insert installation position. (Do this when demarcation is possible)
- ⑥ Insert remote controller control wiring. (Group) Indicated by solid line.Solid line.
- ⑦ Insert centralized control wiring.Dotted line
- ⑧ Insert Group No. (G No. for each indoor unit with U No. 0)

The control circuit diagrams are now complete.

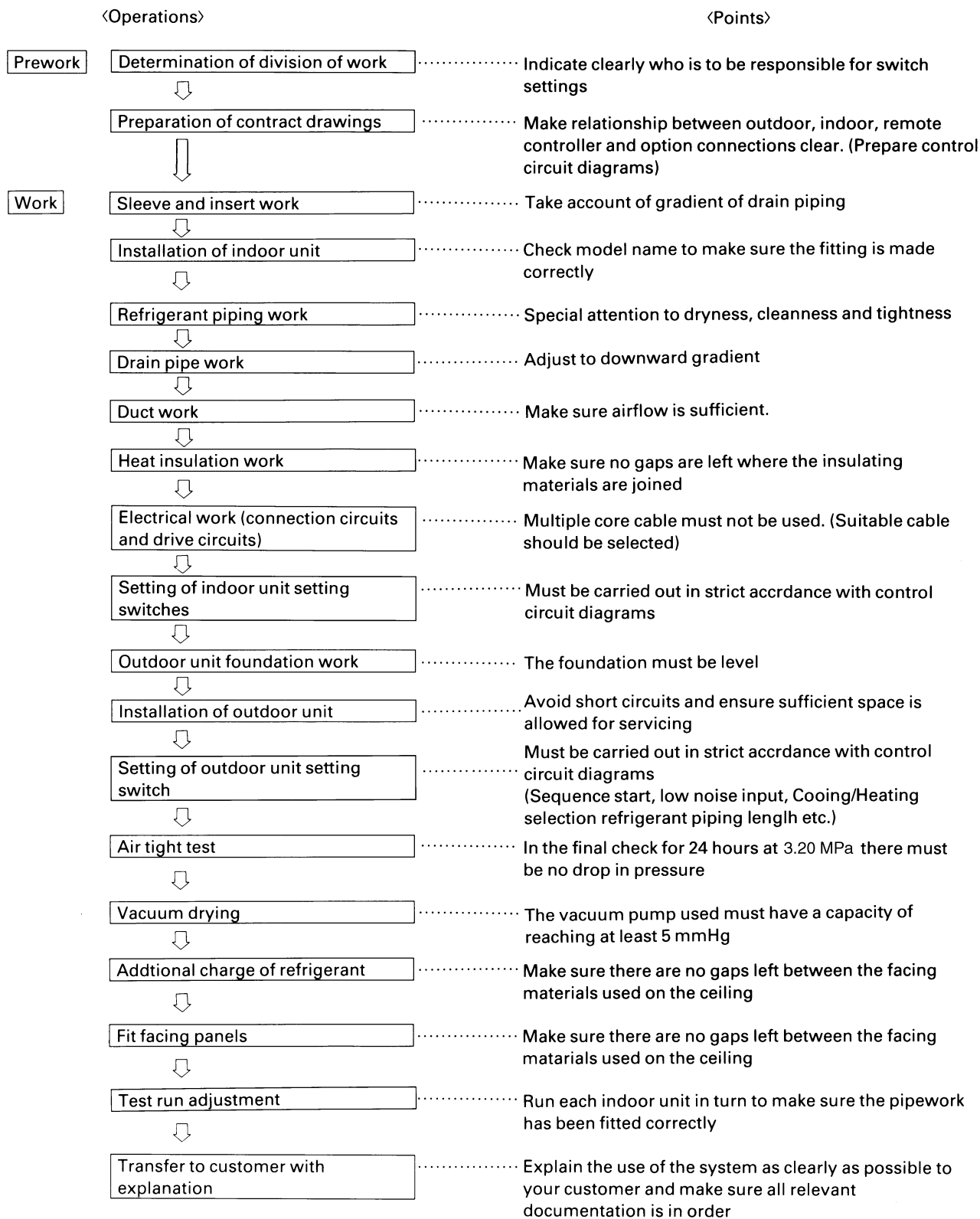
Example: Control circuit diagram

Example: Control circuit diagram



3. Installation

3.1 Step by Step Installation Procedure



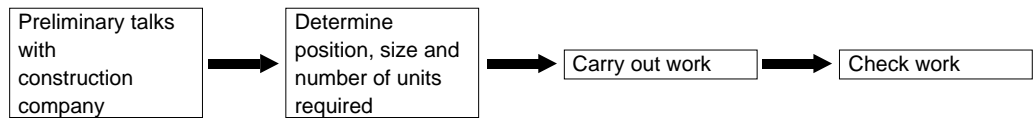
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The above list indicates the order in which the individual work operations are normally carried out but this order may be varied where local conditions warrant such a change

3.2 Work Involved in Individual Operations and Points to be Borne in Mind

3.2.1 Sleeve and Insert Work

■ Operational steps

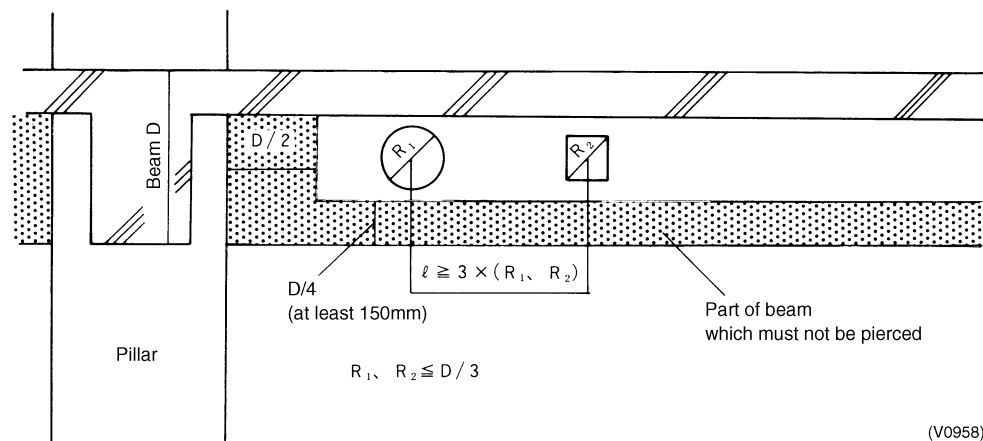


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Positioning of the Pipe Holes

- The through holes for the drain piping should be positioned such that the pipes have a downward gradient. (The gradient must be at least 1/100. The thickness of the insulating materials must also be taken into consideration.)
- The diameter of the through holes for the refrigerant piping should include an allowance for the thickness of the heat insulation materials. (It is a good idea to think of the liquid and gas pipes as pairs.)
- Attention should be paid to the construction of the beam themselves since there are sometimes parts of the beam which cannot be used to accommodate through holes.

Example: Through holes in a reinforced concrete beam

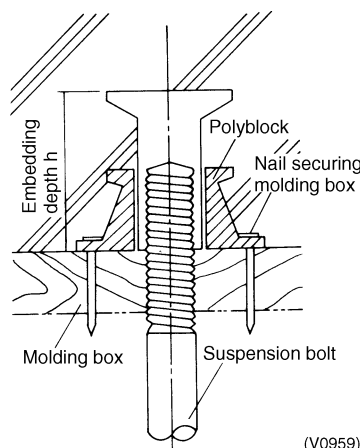


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Positioning the Insert

- An insert is a metal tool which is inserted into a floor or a beam before the concrete is set such that fittings such as ducts, pipes or suspension bolts for hanging units can be fitted into place later. **The positions of the inserts must be decided early.**

Example: Steel insert



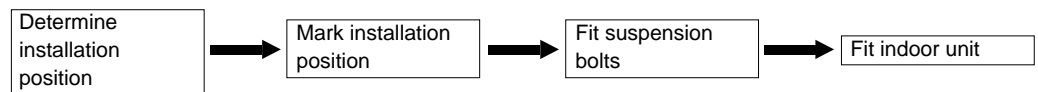
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Important point:

- The weight of the fitting to be suspended must be taken into account when choosing the insert.

3.2.2 Installation of Indoor Unit

■ Operational steps

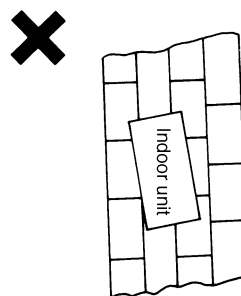
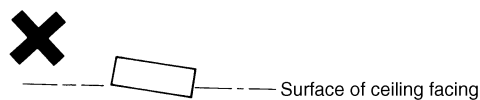
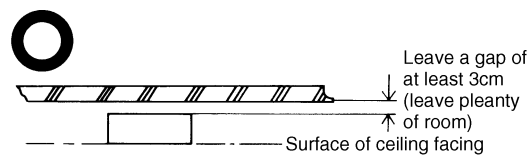


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Positioning

3 essential points when installing an indoor unit

1. Height: Take care to account for final ceiling facing surface level
2. Level: Level fitting is essential. (within ± 1 degree of horizontal)
3. Direction: The unit must be fitted in line with the ultimately visible ceiling joints

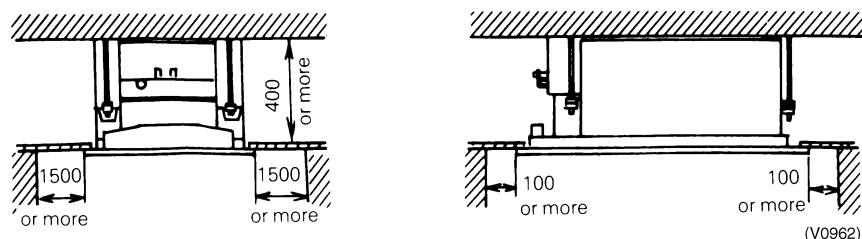


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Important points

1. The suspension bolts must be strong enough to support the weight of the indoor unit.
2. Optional features must be added to the indoor unit prior to installation.
3. The model name should be checked prior to installation.
4. Take care to align the main unit correctly. (Bearing in mind piping layout and direction of blow out)
5. Leave sufficient space for servicing to be carried out.
6. Make inspection holes for model which need them.
7. Fit the unit to ensure proper drainage.

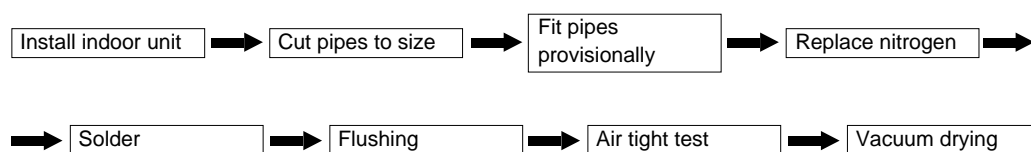
Example: Ceiling mounted cassette type (FXYCP63K)



(V0962)

3.2.3 Refrigerant Pipe Work

■ Operational steps



(V0963)

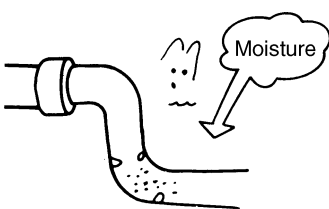
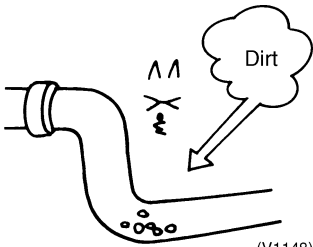

The 3 Principles of Refrigerant Piping

The “3 principles of refrigerant piping” must be strictly observed

	Cause of problem	Actoin to avoid problem
Dry	<ul style="list-style-type: none"> ● Rainwater, work water, etc. gets into pipes from outside ● Moisture generated inside pipes due to condensation 	Pipe covering → Flushing → Vacuum drying
Clean	<ul style="list-style-type: none"> ● Formation of oxides inside pipes during soldering ● Dirt, dust or other extraneous material gets into pipes from outside 	Replace nitrogen → Flushing Pipe covering → Flushing
Air tight	<ul style="list-style-type: none"> ● Leak from soldered area ● Leak from flared area ● Leak from flange area 	Use the proper materials (copper pipe, solder, etc.) Adhere strictly to standard soldering work practice Adhere strictly to standard flaring work practice Adhere strictly to standard flange connection work parctice → Air tight test

(V0964)

The 3 principles of refrigerant piping

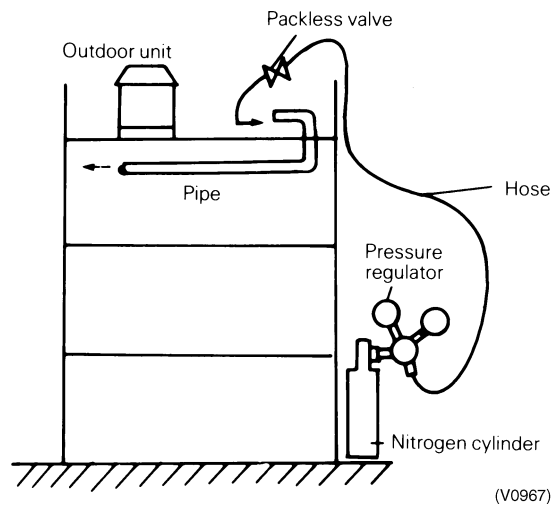
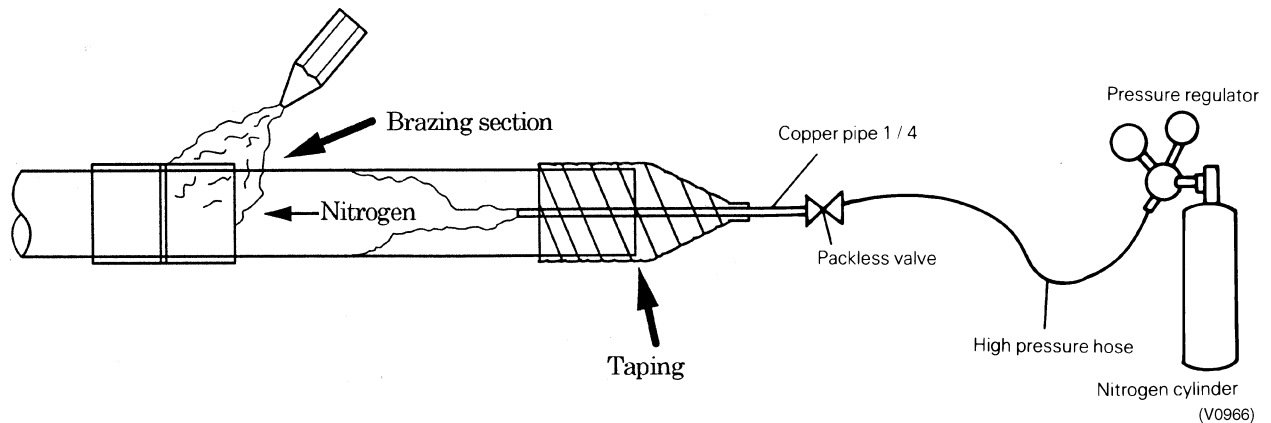
Dry	Clean	Air tight
Make sure there is no moisture inside the pipes	Make sure there is no dirt inside the pipe	Make sure the refrigerant does not leak out
 (V0965)	 (V1148)	 (V1149)

Method for Replacing Nitrogen (Brazing)

If brazing work is carried out without passing nitrogen gas through the pipes which are being brazed then this allows the formation of oxidation bubbles on the inside surface of the pipes. These oxidation bubbles are then carried along inside the pipes to cause damage to various members of the system such as valves or compressors and the system ceases to function properly.

In order to avoid this problem **nitrogen is passed through the pipes while the soldering work is being carried out**. This operation is known as nitrogen replacement. (Air is replaced by nitrogen)

This is **standard work practice for all brazing work**.



Important points:

1. The gas used must be nitrogen (oxygen, carbon dioxide and flon should not be used.)
2. A pressure regulator must be used.

Covering of Refrigerant Pipes

Covering is an extremely important operation as it prevents water, dirt or dust from getting inside the pipes. Moisture inside the pipes was a constant source of trouble in the past. The utmost care is required to nip this problem in the bud.

The end of each pieces of pipe must be covered. "Pinching" is the most effective method but "taping" is an simple alternative which may be used according to the work area and term of work.

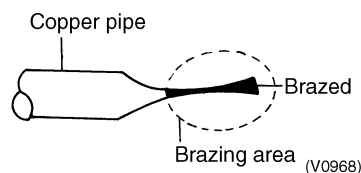
Location	Term of Work	Covering Method
Outdoors	1 months or more	Pinching
	Less than 1 months	Pinching or taping
Indoors	Irrelevant	Pinching or taping

1. Pinching method

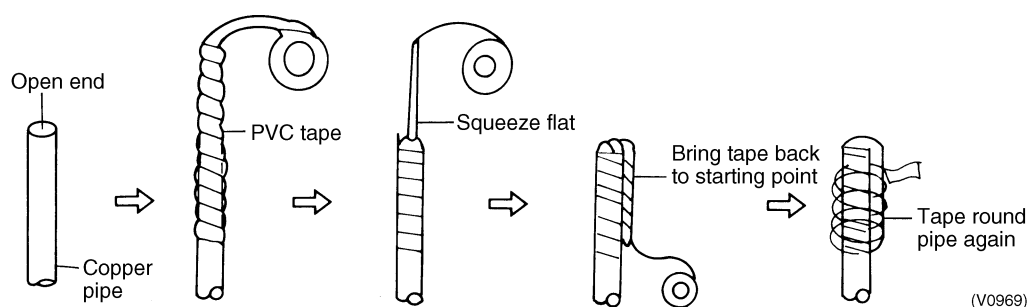
The end of the copper pipe is squeezed together and the gap brazed.

2. Taping method

The end of the copper pipe is covered with PVC tape (vinyl tape).

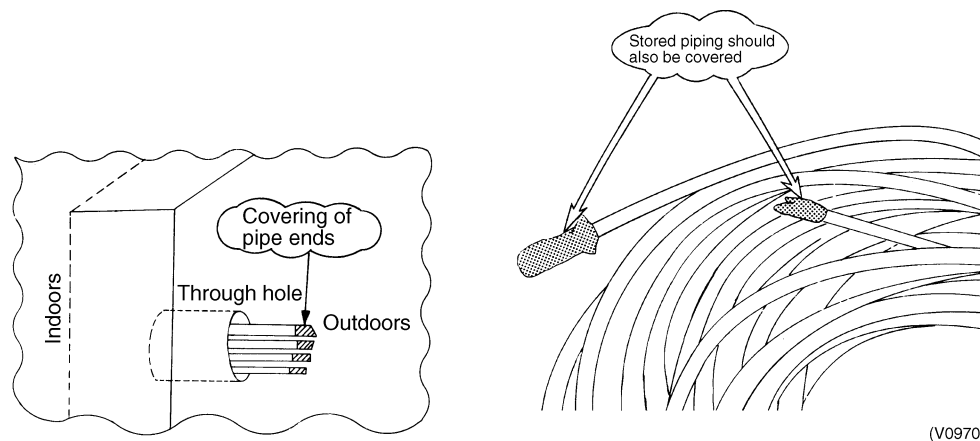


<Taping method>



Particular care should be taken during the following operations:

- When passing copper pipe through a penetration hole (Dirt easily gets into the pipe).
- When copper pipe is located outside (Rainwater gets in)
(Special care is needed when the pipes are standing vertically outside)



Refrigerant Pipe Flushing

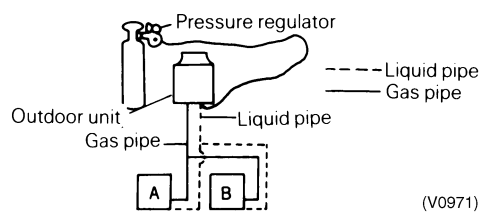
Flushing is a method of cleaning extraneous matter out of pipes using pressurized gas.

[3 major effects]

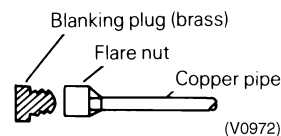
1. Removal of oxidation bubbles formed inside copper pipes when "nitrogen replacement is insufficient" during soldering work
2. Removal of extraneous material and moisture from pipes when covering has been insufficient
3. Checks connections in pipes linking outdoor and indoor units (Both liquid and gas pipes)

[Example of procedure]

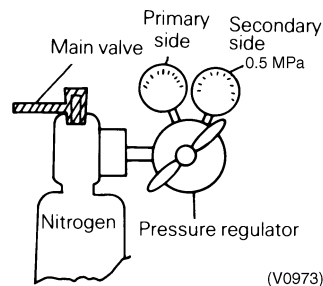
1. Set pressure regulator on nitrogen cylinder.
 *The gas used must be nitrogen.
 (There is a danger of condensation if fluorine or carbon dioxide are used and oxygen carries the risk of explosions.)



2. Connect the charge hose from the pressure regulator to the service port on the liquid pipe side of the outdoor unit.
3. Fit blanking plugs to all indoor units (B) other than unit A.

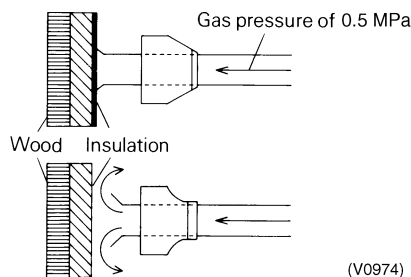


4. Open the main valve on the nitrogen cylinder and set the pressure regulator to 0.5MPa.



5. Check that the nitrogen is passing through the unit A liquid pipe.
6. Flushing.
 - Block the end of the pipe with the insulation of your hand.
 - ↓
 - When the gas pressure becomes too great to contain remove insulation quickly. (First flush)
 - ↓
 - Block the end of the pipe with insulation again.
 - ↓

(Carry out second flushing)



(The nature and amount of the extraneous material inside the pipe can be checked during flushing by placing a rag lightly over the end of the pipe. In the unlikely case that even a small quantity of moisture is found then the inside of the pipe should be dried out thoroughly.)

Action:

1. Flush the inside of the pipe with nitrogen gas. (Until such time as the moisture disappears.)
2. Carry out a thorough vacuum drying operation. (See page 31)
 - ① Close the main valve on the nitrogen cylinder.
 - ② Repeat the above operation for unit B.
 - ③ When the liquid pipe operations have been completed then do the same with the gas pipes.

Choice of Materials for Refrigerant Piping

- a) Refrigerant piping
 - The piping used must meet the requirements of the JIS standard or equivalent. (Size, material, thickness, etc.)
Specification: **Oxidized phosphorous seamless copper pipe**
 - Long pipe lengths or coiled pipe (copper pipe with heat insulation coating) should be used to avoid the necessity for frequent brazing.
 - The whole job is made easier if rolled copper pipe with a heat insulation coating is used.

Size of Refrigerant Piping

Outside Diameter (mm)	Wall Thickness (mm)
6.4	0.8
9.5	0.8
12.7	0.8
15.9	1.0
19.1	1.0
22.2	1.2
25.4	1.2
28.6	1.2
31.8	1.2
34.9	1.3

- b) Brazed joints and special branches
 1. General use (L bend joint, socket joint, T joint, etc.)
 - Joints must meet the requirements of the relevant JIS standard. (Size, materials, thickness, etc.)
 2. Special branches
 - The Daikin REFNET joint or REFNET header should be used.

Example: R407C PLUS Series

	REFNET joint	REFNET header		
		4 branches	6 branches	8 branches
Liquid pipe (with heat insulation coating)				
Gas pipe (with heat insulation coating)				

(V0975)



Refer detail of DAIKIN REFNET joint and REFNET header on page 100.

c) Brazing

The Multi-System requires only copper/copper jointing and the jointing method is explained below.








































- The use of “hard solder” is essential.

Type	Solder: JIS mark	Soldering temperature (°C)	Breaking strength (kg/mm ²)	Soldering method	Jointing distance (mm)	Example for reference (product name)	Flux (example for reference)	Remarks
Hard solder	BCup-2 (Phosphor copper solder)	735 / 840	Approx. 25	0.05 / 0.2	Gas	NEiS # 2BD	Not required	BCup reacts easily with sulfur to form a fragile water-soluble compound and should not therefore be used where the environment is not suitable.
	BAG-2 (Silver solder)	700 / 845	Approx. 20	0.05 / 0.2	Gas	NEiS # 107	NEiS # 103	Suitable for environments with a high sulfur content

This is used under
normal conditions.
(V0976)

The R407C Plus Series uses a wide range of piping sizes. You should therefore be careful when selecting the nozzle tip. If a small nozzle tip is used for brazing piping of large diameters such as $\phi 38.1$ and $\phi 44.5$, brazing flow becomes poor.

Table 1: Correlation of nozzle tip and size of refrigeration piping

		Nozzle tip No.							Brazing filler diameter φ		
		# 200	# 225	# 250	# 315	# 400	# 450	# 500	1.6	2.4	3.2
Piping size	6.35										
	9.53										
	12.7										
	15.9										
	19.1										
	22.2										
	25.4										
	31.8										
	38.1										
	44.5										

(V0977)

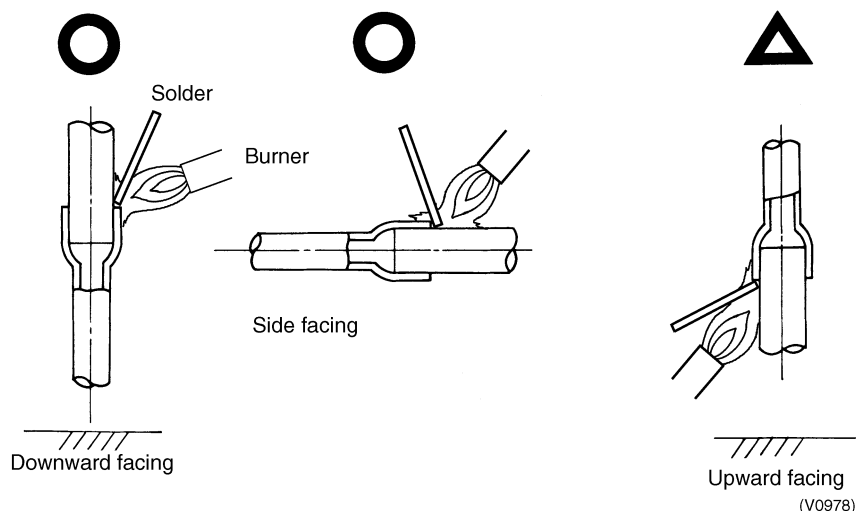


Note: The values in the table above are for type B torch (French).

Brazing

- a) Brazing work should be carried out such that the final result is directed either downwards or sideways. An upward direction should be avoided wherever possible. (to prevent leakage)

<Recommended method>



- b) Liquid and gas pipe branches should always be dealt with in the specified way with attention being paid to the direction of the fitting and its angle. (to prevent oil return or drift) For example see page 125.
- c) It is standard working practice to use the nitrogen replacement method when brazing.

Important points

1. Every effort must be made to avoid fire. (Clean area where brazing is to be performed and make sure that fire fighting equipment and water are ready to hand.)
 2. Be careful of burns.
 3. Make sure that the gap between the pipe and the joint is correct. (To prevent leaks)
 4. Is the pipe adequately supported?
- As a rule the gaps between supports for horizontal piping (copper pipe) are as follows:

Copper pipe support
spacing

(From HASS 107-1977)

Nominal diameter	20 or less	25~40	50
Maximum gap (m)	1.0	1.5	2.0

- The copper pipe should not be secured directly by metal brackets.

CAUTION TO BE TAKEN WHEN BRAZING REFRIGERANT PIPING

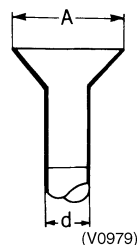
“Do not use flux when brazing copper-to-copper refrigerant piping. (Particularly for the HFC refrigerant piping) Therefore, use the phosphor copper brazing filler metal (BCuP) which does not require flux.”

(Flux has extremely harmful influence on refrigerant piping systems. For instance, if the chlorine based flux is used, it will cause pipe corrosion or, in particular, if the flux contains fluorine, it will damage the refrigerant oil. The use of flux is strictly forbidden since the cleaning on site is impossible.

(Caution) Keep in mind that if the phosphor copper brazing filler metal is used and the brazing temperature and the heating time exceed a certain point, the phosphor changes into the gaseous state (e.g. BCuP -1 to 5 : between 700 and 800C) which causes pin holes and results in refrigerant leakage.

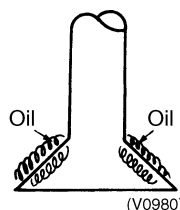
Flare Connection

- Stiffened pipe must always be annealed at least once prior to the flaring work.
- A pipe cutter must be used to cut the pipe. (A large pipe cutter must be used where the pipe has a large diameter. When cutting a pipe which is too big for the pipe cutter a metal saw may be used but care must be taken to ensure that the debris from sawing does not get into the pipe.)
- Set the flaring tool to make sure the flare size remains within the prescribed limits.



Nominal diameter	External diameter of pipe d	Pipe widening dimensions A
3/8B	9.53	12.2~12.8
1/2B	12.7	15.6~16.2
5/8B	15.88	18.8~19.4
3/4B	19.05	23.1~23.7

- Coat the inner and outer surface of the flare with refrigerator oil (Ester or ether oil). (this ensures that the flare nut passes smoothly, preventing the pipe from twisting.)
Do not use SUNISO-4GS oil.



Important points

- Burrs should be carefully removed.
- 2 spanners should be used to grip the pipe.
- The flare nut must be inserted before starting the flaring operation.
- The appropriate amount of torque should be used to tighten the flare nut.

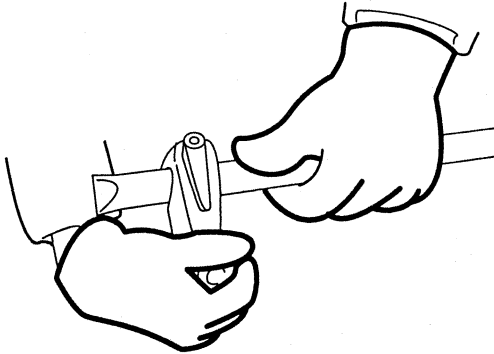
Standard torques for tightening flare nut $\pm 10\%$

Size	Torque	
	(kgf-cm)	(N-cm)
1/4(6.4φ)	144~176	1420~1720
3/8(9.5φ)	333~407	3270~3990
1/2(12.7φ)	504~616	4950~6030
5/8(15.9φ)	630~770	6180~7540
3/4(19.1φ)	990~1210	9270~11860

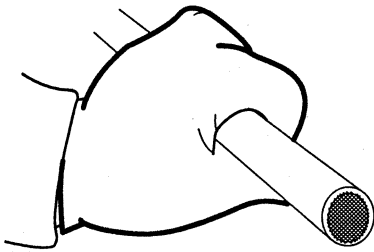
- Check that there is no superficial damage to the surface of the flare.

Flaring Procedure

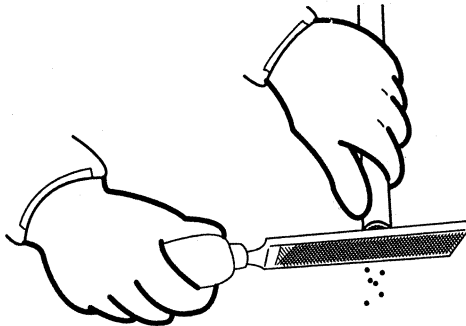
- ① Cut the pipe using a pipe cutter.



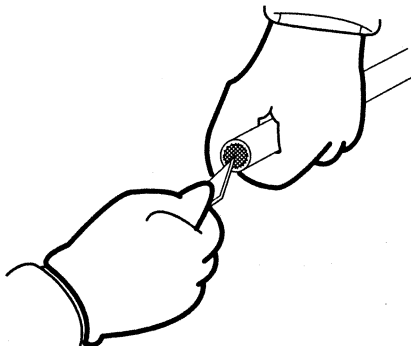
- ② The cut edge has burrs.
(The amount of burrs becomes larger when the pipe wall is thick.)



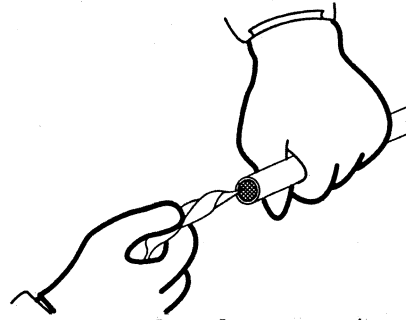
- ③ Remove the burrs using a file.
(Be careful not to let particles enter the pipe. Point the pipe end downward during filing.)



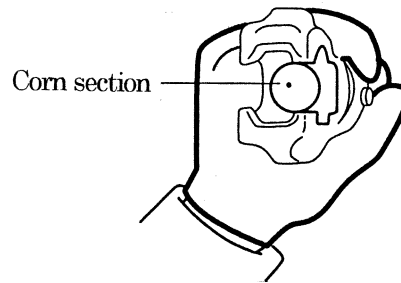
- ④ Remove the burrs using a knife.
(Be careful not to let particles enter the pipe. Point the pipe end downward during cutting.)



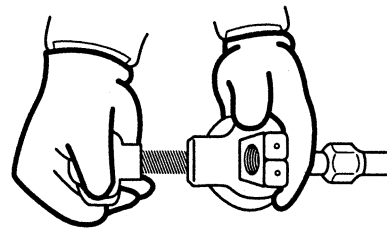
- ⑤ Clean the inside of the pipe.
(Use a thin stick with a cloth wrapped around it.)



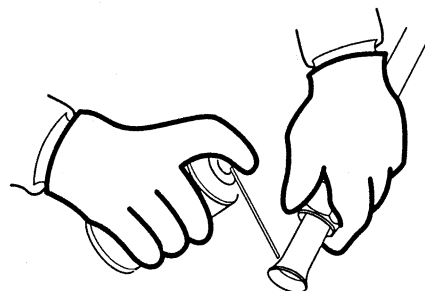
- ⑥ Before flaring, clean the cone section of the flaring tool.



- ⑦ Flare the pipe.
Rotate the flaring tool 3 or 4 turns after a clicking sound is produced. This results in a clean flared surface.

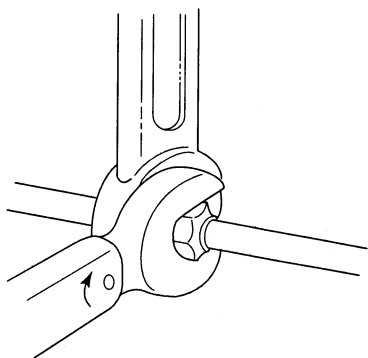


- ⑧ Apply refrigerant oil (Ester or ether oil) on the inside and outside of the flared section. (Do not apply SUNISO oil.)
(Be careful to keep dust away.)

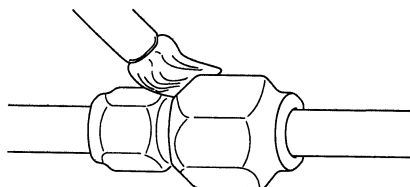


(V1352)

- ⑨ Tighten the flare nut.
(Use a torque wrench to apply the proper tightening force.)

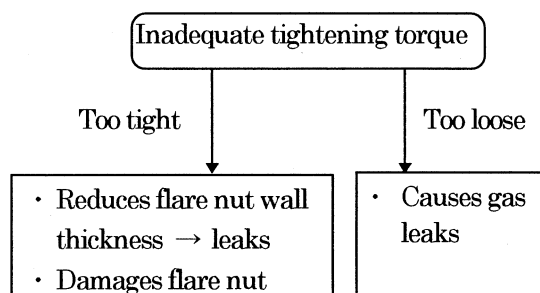


- ⑩ Check for gas leaks.
(Check at the threaded section of the flare nut for gas leaks.)
Spray-type gas leak detecting products are available on the market. Soap water may be used to check for leaks, but use only neutral soap to prevent corrosion of the flare nut.
Be sure to wipe the nut area clean after the gas leak check.



Tighten the flare nut with proper torque.

It takes a lot of experience to tighten the flare nut properly without the use of a torque wrench.



(V0984)

Not recommendable but in case of emergency

You must use a torque wrench but if you are obliged to install the unit without a torque wrench, you may follow the installation method mentioned below.

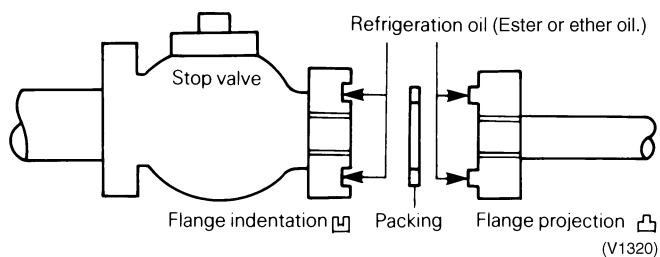
After the work is finished, make sure to check that is no gas leak.

When you keep on tightening the flare nut with a spanner, there is a point where the tightening torque suddenly increases. From that position, further tighten the flare nut the angle shown below:

Pipe size	Further tightening angle	Recommended arm length of tool
6.4 (1/4")	60 to 90 degrees	Approx. 150mm
9.5 (3/8")	60 to 90 degrees	Approx. 200mm
12.7 (1/2")	30 to 60 degrees	Approx. 250mm
15.9 (5/8")	30 to 60 degrees	Approx. 300mm
19.1 (3/4")	20 to 35 degrees	Approx. 450mm

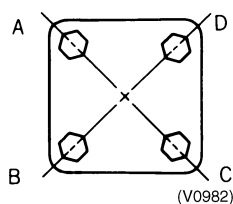
Flange Connection

- The flange sheet surface should be clean and undamaged. (Clean any dirt away with a cloth and check that there has been no damage.)
- Coat the flange sheet surface with refrigeration oil (Ester or ether oil) and then insert the packing. (Do not use SUNISO oil.)



- Tighten the bolts in opposite corners first to ensure that the connection is true.

[Example]



Order: A → C → B → D
The bolts should be tightened little by little in the above order such that the same degree of torque is applied evenly to each corner.

Important points

- Only clean refrigeration/oil should be used to coat the flange. (i.e. free from dirt or water)
- The correct amount of torque should be applied when tightening the flange bolts.

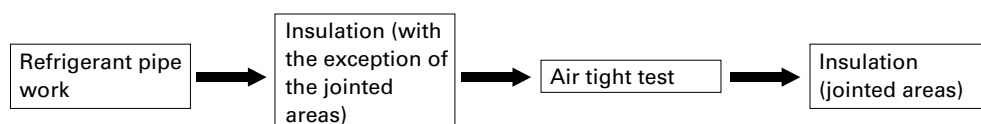
Standard torques for tightening screws and bolts

ISO hexagonal bolt

Size	Class	5.8(5T)		10.9(10T)	
		kgf-cm ±15%	N-m ±15%	kgf-cm ±15%	N-m ±15%
M8		125	1230	302	2960
M10		257	2520	620	6080
M12		436	4280	1,050	10,300
M16		1,030	10,100	2,480	24,300
M20		2,050	20,100	4,950	48,500

3.2.4 Thermal Insulation Work (Refrigerant Piping)

■ Operational steps



(V0985)

Materials

The thermal insulation materials which are used must be well able to withstand the heat from the pipes.

Example:

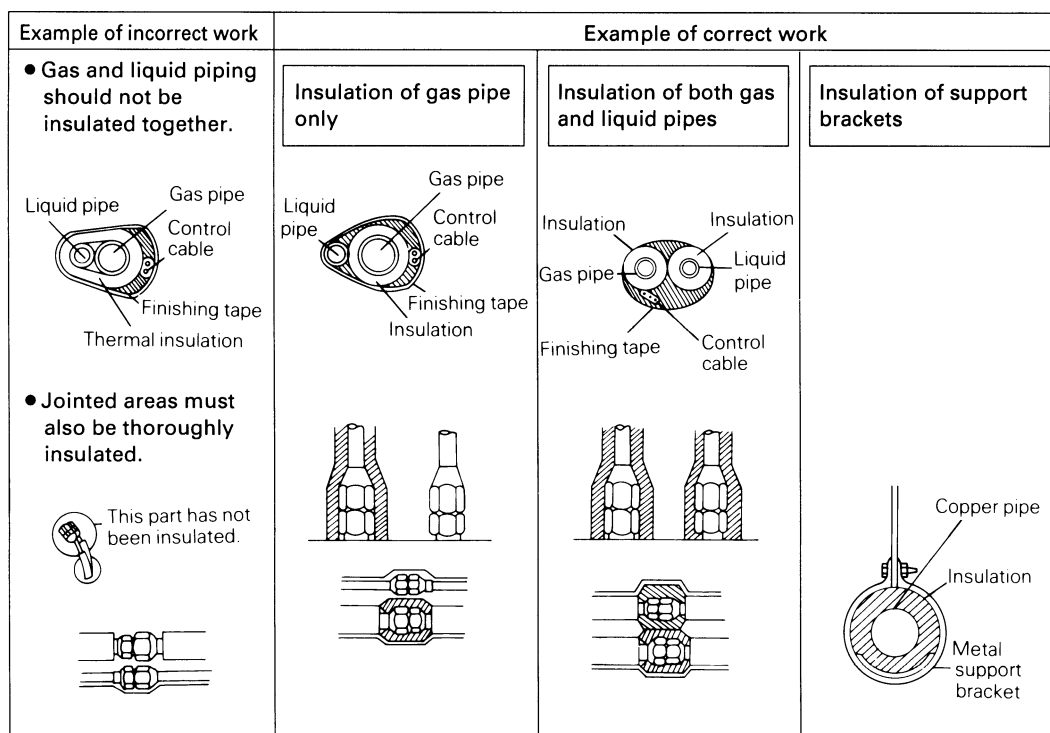
Heat pump type: Heat resistant polyethylene foam (heat resistance of at least 120°C)

Cooling only: Polyethylene foam (heat resistance of 100°C or more)

Essential Points of Thermal Insulation

The insulation of jointed areas such as the soldered, flared or flanged sections should only be carried out after the successful completion of the air tight test.

Attention should be paid to the unit model and its operating conditions since there are occasions when the gas and liquid pipes also need to be thermally insulated.



(V0986)

■ Important points

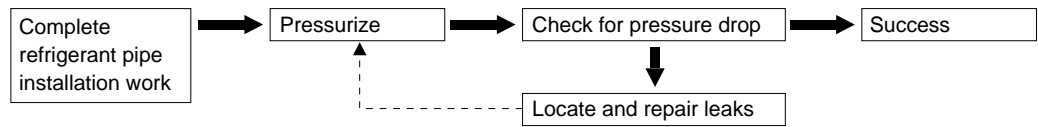
1. The thickness of the thermal insulation material must be determined in the light of the pipe sizes.

Pipe size	Thickness of insulation material
6.4mm~25.4mm	10mm or more
28.6mm~38.1mm	15mm or more

2. It will be necessary to increase the values in the above table for top floors or where conditions are hot and humid.
3. Where a customer supplies his own specifications then these must be adhered to.
4. Where it is anticipated that the air conditioning unit will be operated at external air temperatures of 10°C or less then thermal insulation will also be required for the liquid pipes.

3.2.5 Air Tight Test

■ Operational steps



(V0987)

Essential Points of Testing (Maintaining Pressure Over a Period)

The key to successful testing is strict adherence to the following procedure:

a) The liquid and gas piping in each refrigerant system should be pressurized in turn in accordance with the following steps. (Nitrogen gas must be used.)

- **Step 1: increase pressure to 0.3MPa for 3 minutes or more**
 - **Step 2: increase pressure to 1.5MPa for 3 minutes or more**
 - **Step 3: increase pressure to 3.20MPa for approx. 24 hours**
- } Indicates existence of major leaks
- } Indicates existence of minor leaks

*Increasing the system pressure to 3.20MPa does not guarantee the identification of minor leaks if pressure is maintained for only a short time. It is therefore recommended that the system remain pressurized in accordance with Step 3 above for at least 24 hours.



Note: The pressure must on no account be increased beyond 3.20MPa.

b) Check for pressure drop

If there is no drop in pressure then the test is deemed a success.

If the pressure drops then the leak must be located. See following page.

However, if there is a change in the ambient temperature between the pressurizing stage and the time when you check for a drop in pressure then you will have to adjust your calculations accordingly since a change of 1°C can account for a pressure change of approximately 0.01MPa.

Compensating adjustment value:

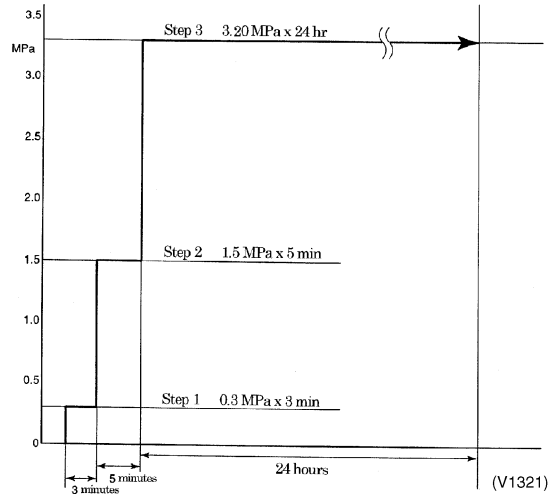
(temperature at time of pressurizing – temperature at time of checking) × 0.1

Example:

Time of pressurizing: 3.20MPa 25°C

24 hours later: 3.15MPa 20°C

The pressure drop in such a case is deemed to be zero (successful test).



Checking for Leaks



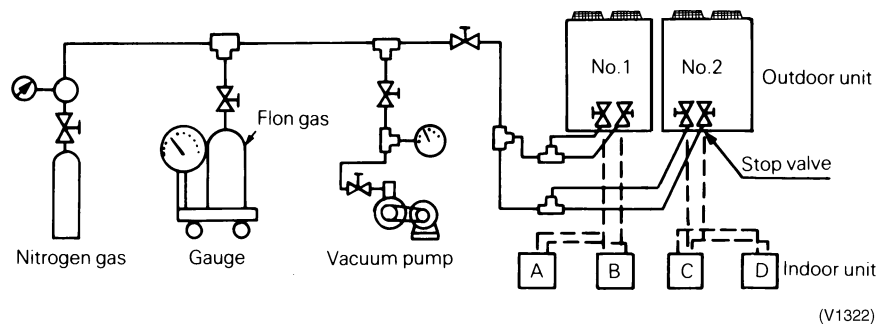
Refer p.148 for “Leak Test and Vacuum Drying” detail of RSEYP16~30KJY1.

[Check 1] (Where pressure falls while carrying out Steps 1 to 3 described on previous page)

- Check by ear.....Listen for the sound of a major leak.
- Check by hand.....Check for leak by feeling around jointed sections with hand.
- Soap and water check (*Snoop).....Bubbles will reveal the presence of a leak.

[Check 2] (When searching for a minor leak or when there has been a fall in pressure while the system has been fully pressurized but the source of the leak cannot be traced.)

1. Release the nitrogen until the pressure reaches 0.3MPa.
2. Increase pressure to 1.5MPa using gaseous flon gas (R407C). (Nitrogen and flon gas mixed)
3. Search for the source of the leak using a detector such as a halide torch or a propane or electric detector.
4. If the source of the leak still cannot be traced then repressurize with nitrogen up to 3.20MPa and check again. (The pressure must not be increased to more than 3.20MPa.)

**Important points**

1. Where the lengths of piping involved are particularly long then the air tight test should be carried out block by block.

Example:

1. Indoor side
2. Indoor side + vertical pipes
3. Indoor side + vertical pipes + outdoor side

3.2.6 Vacuum Drying



Refer p.148 for "Leak Test and Vacuum Drying" detail of RSEYP16~30KJY1.

What is vacuum drying?

Vacuum drying is:

"The use of a vacuum pump to vaporize (gasify) the moisture (liquid) inside the pipes and expel it leaving the pipes completely dry inside."

At 1 atm (760 mmHg) the boiling point (evaporating temperature) of water is 100°C but if a vacuum is created inside the pipes using a vacuum pump then the boiling point is rapidly reduced as the degree of the vacuum is increased. If the boiling point is reduced to a level below that of the ambient temperature then the moisture in the pipes will evaporate

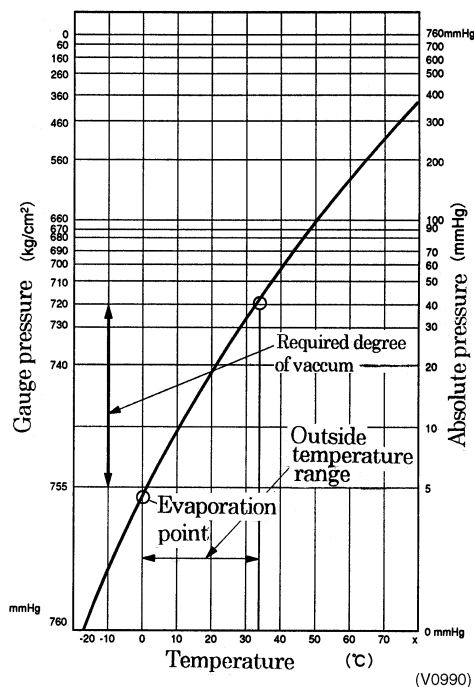
Boiling point of water (°C)	Pressure		
	*cmHg	Pa	Torr
40	-70.5	7333	55
30	-72.4	4800	36
26.7	-73.5	3333	25
24.4	-73.8	3066	22
22.2	-74.0	2666	20
20.6	-74.2	2400	18
17.8	-74.5	2000	15
15.0	-74.7	1733	13
11.7	-75.0	1333	10
7.2	-75.2	1066	8
0	-75.5	667	5

<Example>

When outside temperature is 72°C
As shown in the table on the right, the degree of vacuum must be lowered below -75.2cmHg.

→

Above figures (cmHg) are gauge pressure readings.



The evacuation of air conditioner piping provides the following effects.

1. Vacuum drying
2. Removes air and nitrogen (used in air-tightness test) from the inside of pipes.

Therefore, it is necessary to ensure that the both purposes have been achieved in the vacuum drying operation.

Key points

Lower the degree of vacuum to below -755mmHg

(V1216)

Choosing a Vacuum Pump

General

Refrigerant piping content volume of the Plus Series is larger than the VRV Inverter Series, and consequently takes more time for vacuum drying. If you have time to spare, you may use the same vacuum pump, but if you want to save time, you will have to use a pump with higher exhaust velocity (exhaust volume).

1. Vacuum pump performance

The 2 most important things for determining vacuum pump performance are as follows:

(1) Exhaust velocity

(2) Degree of vacuum

(1) Exhaust velocity

Exhaust volume is usually expressed as l/min or m³/h. The larger the number, the faster vacuum is achieved.

Generally speaking, the faster the exhaust velocity, the larger and heavier the vacuum pump itself is.

Commercially available vacuum pumps (exhaust velocity of 20 - 30 l/min) usually take an extremely long time to achieve vacuum. (We recommend a vacuum pump of approx. 60 - 100 l/min.)

(2) Degree of vacuum

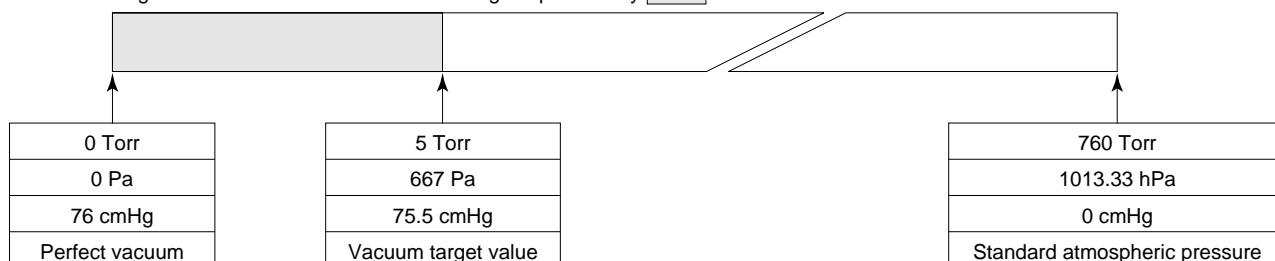
Ultimate vacuum varies largely according to use of the vacuum pump. Vacuum pumps used for vacuum forming cannot be used for vacuum drying. (A vacuum pump with a high degree of vacuum is required.)

When selecting a vacuum, you should select one which is capable of achieving 0.2 Torr of ultimate vacuum.

Degree of vacuum is expressed in Torr, micron, mmHg, and Pascal (Pa). The units correlate as follows:

	Unit	Standard atmospheric pressure	Perfect vacuum
Gauge Pressure	kg/cm ²	0	-1.033
Absolute Pressure	kg/cm ² abs	1.033	0
Torr	Torr	760	0
Micron	Micron	760000	0
*cmHg	cmHg	0	76
Pa	hPa	1013.33	0

Degree of vacuum must be within the range expressed by



(V0992)

2. Vacuum pump maintenance

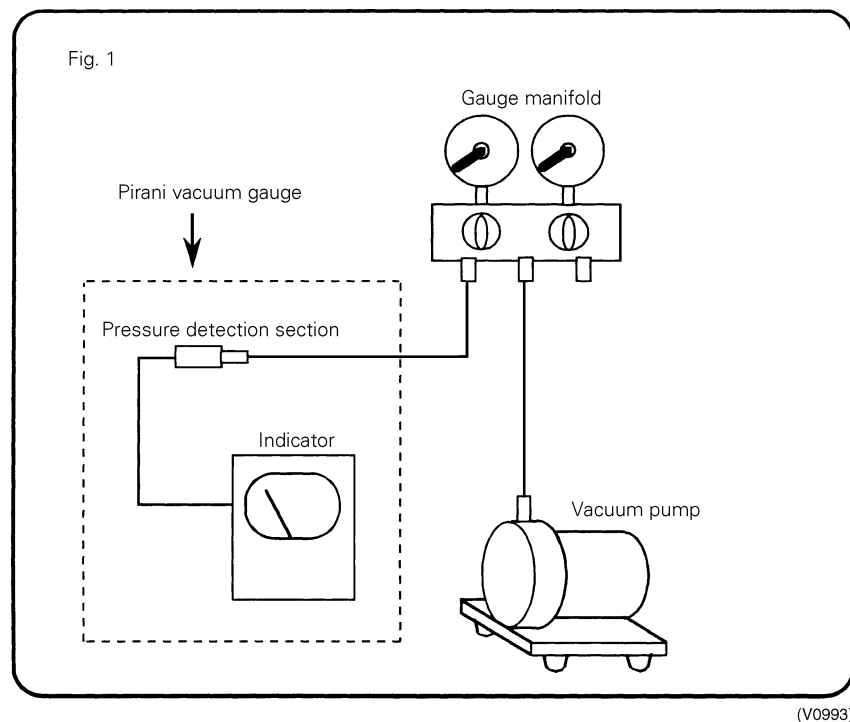
Because of their nature, most vacuum pumps contain large amounts of oil which lubricates bearings, etc., and functions to enhance airtightness of pistons. When using a vacuum pump to discharge air from refrigerant piping, moisture in the air tends to get mixed in with the oil. You must therefore change oil periodically and make sure the proper oil level is maintained. (Perform periodic inspections in accordance with the operating instructions.)

3. Degree of vacuum measurement

An extremely accurate vacuum gauge is required to test degree of vacuum. You cannot accurately measure degree of vacuum with the compound gauge on the gauge manifold. A Pirani vacuum gauge is required to measure degree of vacuum accurately. Because Pirani gauges are very sensitive and require extreme care when using, they are not very suitable for use in the field. You should therefore use the Pirani gauge to calibrate the attached vacuum gauge on the gauge manifold and the degree of vacuum of the vacuum pump.

4. Calibration method

1. Connect a Pirani vacuum gauge and the gauge manifold vacuum gauge (0 - 76 cmHg) to the vacuum pump at the same time, and run the pump for about 3 minutes.
2. Make sure the reading of the Pirani vacuum gauge is 5 Torr (667 Pa) or less. The reading of conventional vacuum pumps lowers to about 0.2 Torr.
If the reading is not 5 Torr or less, check the vacuum pump oil. (Oil is low in many cases.)
3. Check the attached gauge on the gauge manifold. Adjust the gauge if the reading is not exactly correct.
4. Adjust the gauge manifold valve so that the Pirani vacuum gauge reads 5 Torr.
5. Mark the position indicated by the gauge manifold gauge with an oil based ink pen.
6. Use the mark of the gauge manifold as a target when vacuuming in the field.



(Reference) Types of vacuum pump with respective maximum degree of vacuum

Type	Maximum Degree of Vacuum	Use	
	Expulsion Capacity	Vacuum Drying	Air Expulsion
Oil Rotary (Oil Using)	0.02 mmHg 100 l/min	Suitable	Suitable

Oilless Rotary (No Need of Oil)	10 mmHg	50 l/min	Unsuitable	Suitable
	0.02 mmHg	40 l/min	Suitable	Suitable

← Many handy pumps fall into this category

Vacuum Drying Procedure

There are two vacuum drying methods and the appropriate one should always be chosen to conform with individual local conditions.

[Normal vacuum drying].....The standard method

[Operational steps]

1. Vacuum drying (1st time): Connect a manifold gauge to the service port of the liquid or gas pipe and operate the vacuum pump for at least 2 hours.

(The degree of vacuum produced should be in excess of 5 mmHg)

If after 2 hours the vacuum produced has not exceeded 5 mmHg then either there is moisture in the pipe or there is a leak. Operate the vacuum pump for a further hour.

If, even after 3 hours, the vacuum has not reached 5 mmHg then check the system for a leak.

2. Carry out maintained vacuum test.

Produce a vacuum in excess of -755 mmHg and do not release it for an hour or more.

Check the vacuum gauge to make sure that it has not risen. (If the gauge does rise then there is still moisture in the pipe or there is a leak somewhere.)

3. Additional charge of refrigerant.

Connect the charging cylinder to the liquid pipe service port and charge with the required amount of refrigerant.

4. Open stop valve to the full.

Open the stop valves on the liquid and the gas pipes to the full.

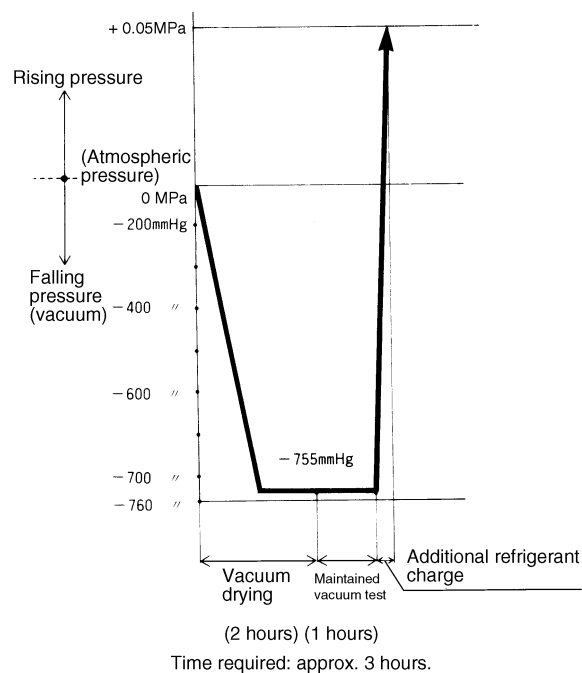


Note:

Vacuums should be produced in both the liquid and the gas pipes.

(Because there are a large number of functional components in the indoor unit which cut off the vacuum mid-way through)

[Standard vacuum drying time chart]



(V0991)

Special vacuum drying

This vacuum drying method is selected when there is a suspicion that there may be moisture in the pipes.

For example:

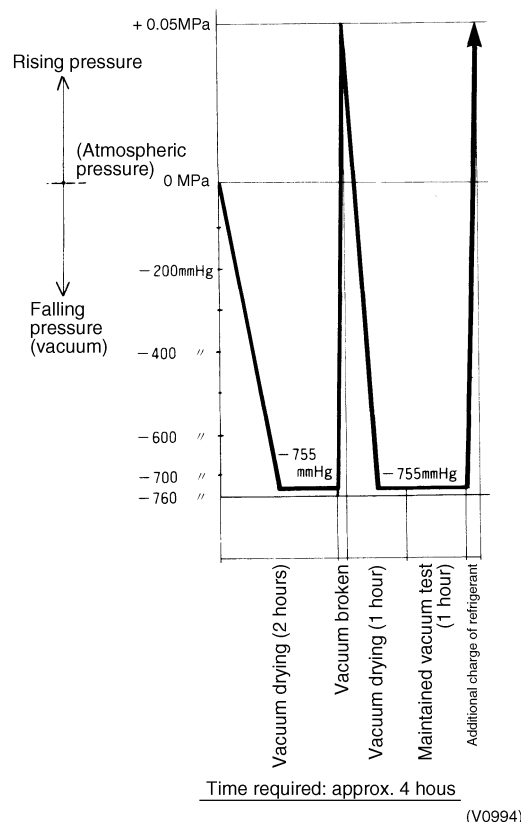
- When moisture was discovered during the refrigerant pipe flushing operation
- When there is a risk of condensation forming inside the pipes during periods of heavy rainfall
- When there is a risk of condensation forming inside the pipes due to a long term of works
- When there is a risk that rainwater may have entered the pipes during installation

The special vacuum drying method is the same as the standard method except that nitrogen is introduced into the pipes to break the vacuum on one or more occasions during the course of the operation.

[Operational steps]

1. Vacuum drying (1st time): 2 hours
 2. Vacuum breaking (1st time): Use nitrogen to raise pressure to +0.05MPa.
(Since the nitrogen gas used to break the vacuum is dry nitrogen this process serves only to enhance the overall drying effect of the vacuum drying operation itself.
However, since the effectiveness of this process is severely impaired by a high moisture level inside the pipes, the utmost care is required during installation to see that water does not enter or form inside the refrigerant pipes.)
 3. Vacuum drying (2nd time): Operate the vacuum pump for at least 1 hour.
(Observations: Degree of vacuum has reached 5 mmHg. If the degree of vacuum has not reached 5 mmHg after 2 hours or more then repeat the operations at 2 (vacuum breaking) and 3 (vacuum drying) above.)
 4. Carry out maintained vacuum test: 1 hour
 5. Additional charge of refrigerant
 6. Open stop valve to the full
- * The gas used for the vacuum breaking operation must be nitrogen.
(The use of oxygen brings a serious risk of explosions)

[Special vacuum drying time chart]



3.2.7 Additional Charge of Refrigerant



Refer p.151 for “Additional Refrigerant Charge” detail of RSEYP16~30KJY1.

■ Operational steps

Use the length of the piping to calculate the amount of refrigerant required



Additional charge of refrigerant

(V0995)

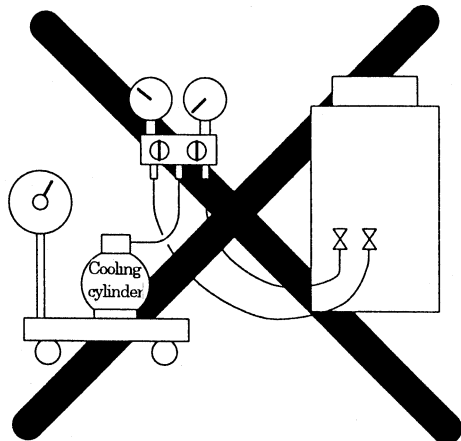
Important points

1. The results of all calculations must be recorded. (Make a list.)
2. The refrigerant will need to be additionally charged whenever the distance between the outdoor unit and the most distant indoor unit is more than 10m.
3. The additional charging operation should be carried out by input of liquid into the liquid pipes from a charging cylinder following completion of the vacuum drying operation.
4. When the additional charging operation cannot be satisfactorily completed use the action of the compressor to complete the additional charging during the test run.

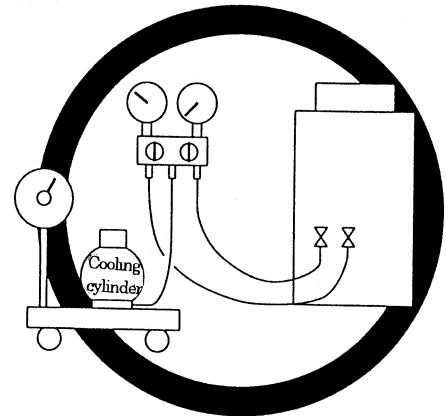
Refrigerant Charging Instructions

HFC407C are non-azeotropic* refrigerants. Therefore, these refrigerants must be charged in the liquid state. When charging the refrigerant into equipment from the cylinder, turn the refrigerant cylinder upside down.

Important: Make sure that the refrigerant (liquid) is taken out from the bottom part of the cooling cylinder. Do not take out the refrigerant (gas) at the upper part of the cooling cylinder for charging.



(V0996)



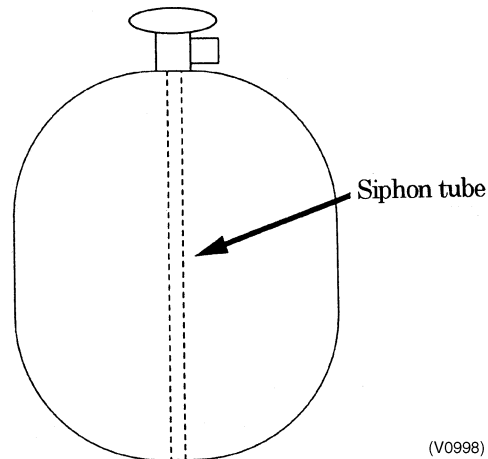
(V0997)



Caution

Since some cooling cylinders differ in the internal mechanism, it is necessary to examine the cylinder carefully. (Some cylinders have a siphon tube to eliminate the need for turning it upside down.)

Siphon tube



(V0998)

<*Non-azeotropic refrigerants>

When a refrigerant is a mixture of two or more types with different evaporation temperature, it is called a non-azeotropic refrigerant. If all refrigerant components evaporate at the same temperature, the mixture is called an azeotropic refrigerant.

If a non-azeotropic refrigerant is charged into equipment in the gaseous state, the refrigerant components that evaporate sooner than others enter the equipment, and the refrigerant that evaporate after others remain in the refrigerant cylinder.

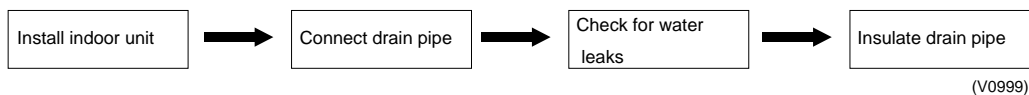
Caution items

The following devices designed for R22 cannot be used to charge the new refrigerants. Be sure to use the devices specifically designed for the new refrigerants.

1. Charging cylinder...(Pressure resisting specification is different.)
2. Gauge manifold (including hose)...(same as above)

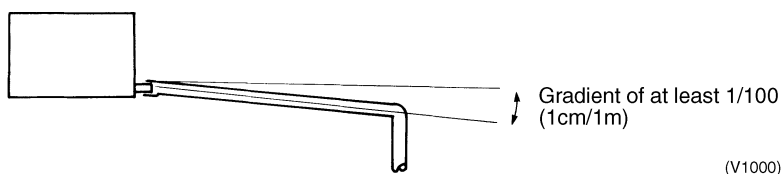
3.2.8 Drain Pipe Work (Indoor)

■ Operational steps



Drain Pipe Gradient and Support

- a) The drain pipe must be fitted at a gradient of at least 1/100.
The drain pipe should be as short as possible and free from airlocks.



- b) Suspension bolts should be used to support long stretches of drain pipe in order to ensure that a gradient of 1/100 is maintained. (PVC pipes should not be bent)

Spacing of supports for horizontal piping

Class	Nominal diameter	Spacing
Rigid PVC pipe	25~40mm	1~1.5m

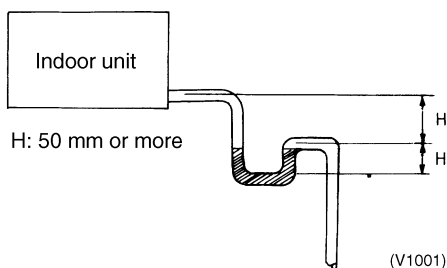
- c) The length of pipe laid horizontally should be kept to a minimum.

Drain Trap

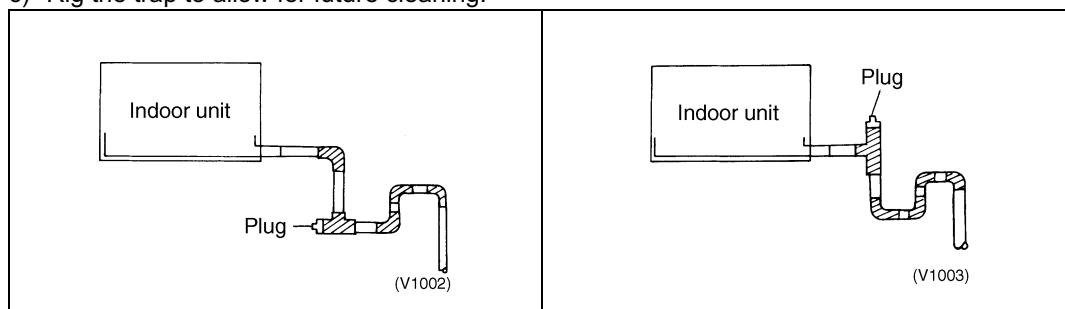
Fit any indoor unit whose drain pipe connection is subjected to negative pressure, with a drain trap.

(FXYMP40~125 only)

- a) Rig the drain trap as shown in the drawing bellow.



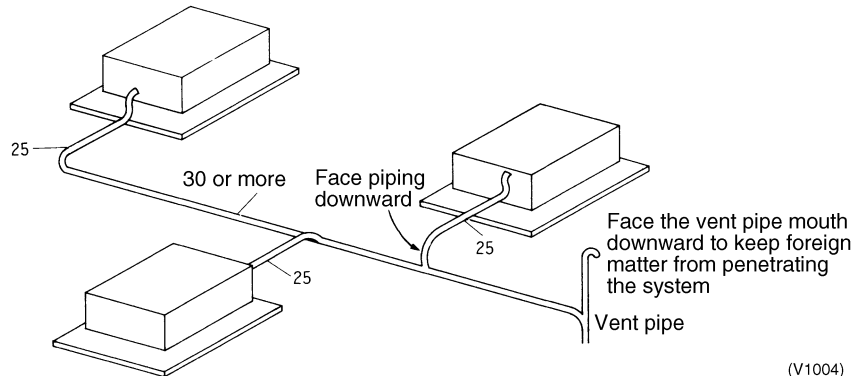
- b) Provide one trap per unit. A single trap for converging units will prove ineffective.
- c) Rig the trap to allow for future cleaning.



Grouped Drain Piping

1. It is standard work practice to make connections to the main pipe from above. The pipe down from the combination should be as large as possible.

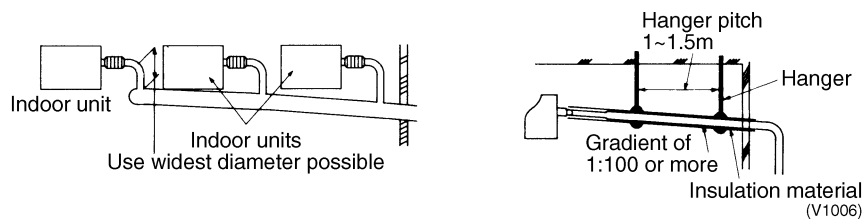
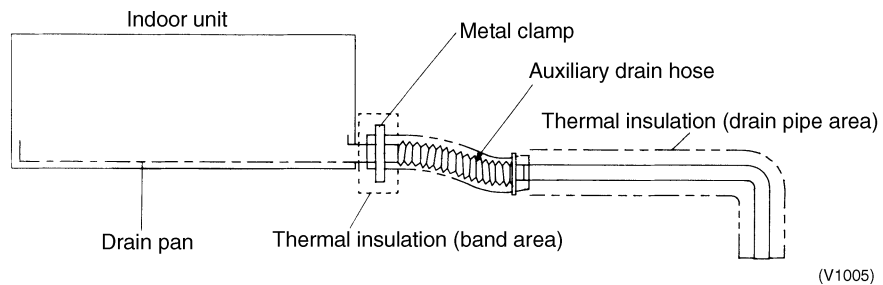
Grouped drain pipes from multiple units



2. The pipework should be kept as short as possible and the number of indoor units per group kept to a minimum.

Use of an Auxiliary Drain Hose (Flexible)

If a drain pan made of polystyrene foam is used then an auxiliary drain hose (flexible) is also essential. A flexible drain hose permits the drain socket and drain pipe to be connected without difficulty and prevents any undue strain being placed on the drain pan.



Important points

1. The drain pipe should be at least equal in size to that of the indoor unit.
2. The drain pipe is thermally insulated to prevent the formation of condensation inside the pipe.
3. The drain up mechanism should be fitted before the indoor unit is installed and when the electricity has been connected some water should be added to the drain pan and the drain pump checked to see that it is functioning correctly.
4. All connections should be secure. (Special care is needed with PVC pipe)
The use of a colored adhesive with PVC pipes will help you to remember to connect them up.)

Piping Diameter for Grouped Drain Pipes

- Select piping diameter from the below table in accordance with the amount of condensation drained by all units with a common drain pipe.
- Consider 2 l/hr of drainage for every 1 HP. For example, drainage from 3 units running at 2 HP and 2 units running at 3 HP is calculated as follows.
 $2 \text{ (l/hr)} \times 2 \text{ (HP)} \times 3 \text{ (units)} + \{ 2 \text{ (l/hr)} \times 3 \text{ (HP)} \times 2 \text{ (units)} = 24 \text{ l/hr}$

1. Relationship between horizontal pipe diameter and allowable drainage (for extended ventilation system)

JIS nominal	Vinyl chloride pipe diameter (mm)	Allowable flow rate (l/hr)		Remarks
		Piping gradient 1:50	Piping gradient 1:100	
VP20	20	39	27	(Reference value) Cannot be used in grouped piping.
VP25	25	70	50	
VP30	31	125	88	Can be used in grouped piping.
VP40	40	247	175	
VP50	51	473	334	



Notes:

- Calculations have been made with water area inside the pipe as 10%.
- Allowable flow rate figures below the decimal have been discarded.
- Use VP30 or larger pipe after the convergence point.

2. Relationship between riser diameter and allowable drainage (for extended ventilation system)

JIS nominal	Vinyl chloride pipe diameter (mm)	Allowable flow rate (l/hr)	Remarks
VP20	20	220	(Reference value) Cannot be used in grouped piping.
VP25	25	410	
VP30	31	730	Can be used in grouped piping.
VP40	40	1440	
VP50	51	2760	
VP65	67	5710	
VP75	77	8280	



Notes:

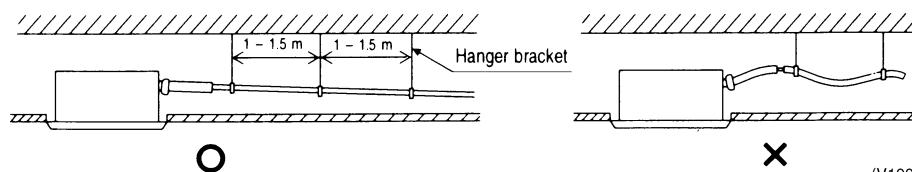
- Allowed flow rate figures below the decimal have been discarded.
- Use VP30 or larger pipe in risers.
- Use the same drain pipe for the humidifier as the indoor unit.

3.2.9 Drain Piping for Each Model

Ceiling Mounted Cassette Type (FXYCP Double flow)

1. Rig drain piping

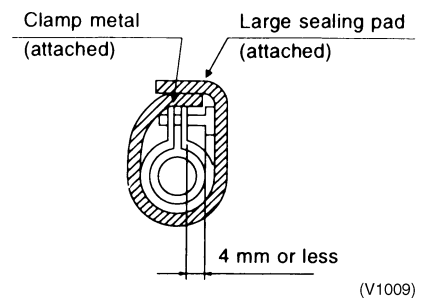
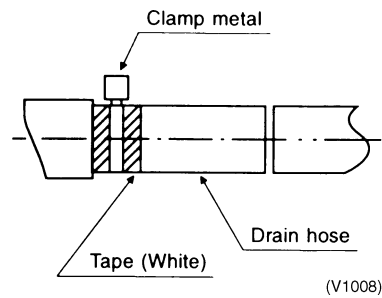
- The diameter of the drain pipe should be greater than or equal to the diameter of the connecting pipe (vinyl tube; pipe size: 25mm; outer dimension: 32mm).
- Keep the drain pipe short and sloping downwards at a gradient of at least 1/100 to prevent air pockets from forming.
- If the drain hose cannot be sufficiently set on a slope, execute the drain raising piping.
- To keep the drain hose from sagging, space hanging wires every 1 to 1.5 m.



(V1007)

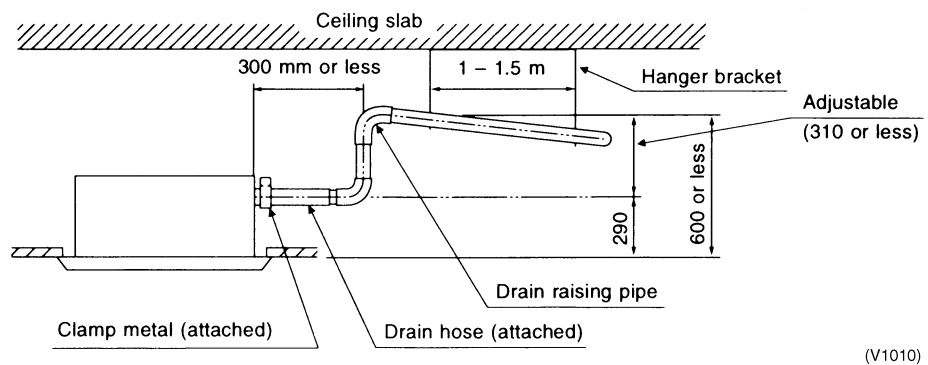
- Use the attached drain hose and clamp metal.
Insert the drain hose into the drain socket, up to the white tape. Tighten the clamp until the screw head is less than 4 mm from the hose.
- Wrap the attached sealing pad over the clamp and drain hose to insulate.

- Insulate the drain hose inside the building.

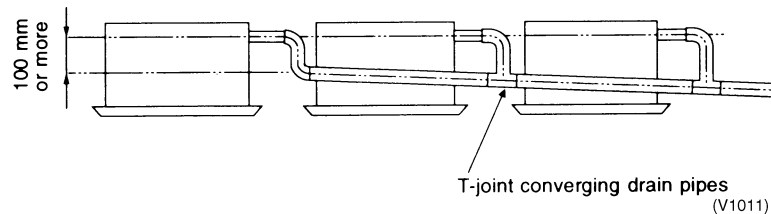


(PRECAUTIONS FOR DRAIN RAISING PIPING)

- Install the drain raising pipes at a height of less than 310 mm.
- Install the drain raising pipes at a right angle to the indoor unit and no more than 300 mm from the unit.

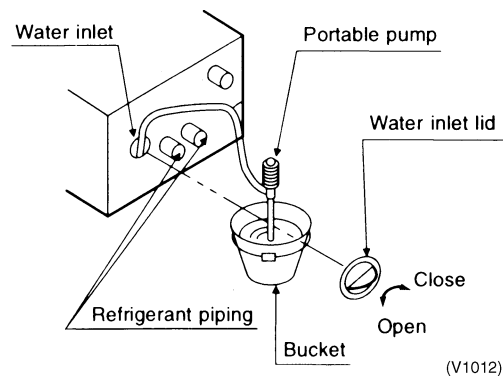


- If converging multiple drain pipes, install according to the procedure shown below.



Select converging drain pipes whose gauge is suitable for the operating capacity of the unit.

2. After piping work is finished, check drainage flows smoothly.
- Open the water inlet lid, add approximately 2500 cc of water gradually and check drainage flow.








WHEN ELECTRIC WIRING WORK IS FINISHED

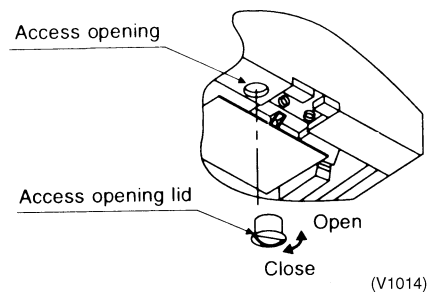
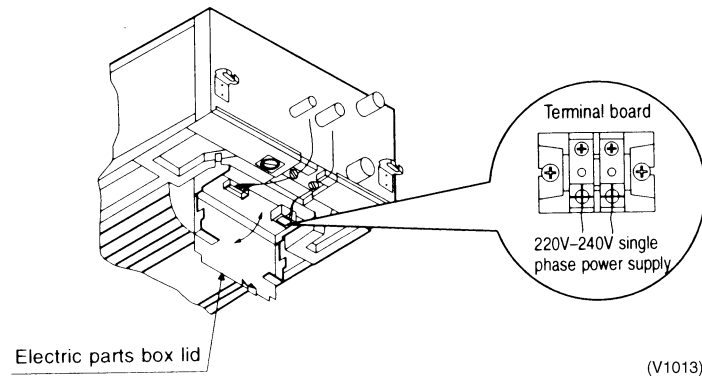
- Check drainage flow during COOL running, explained under "TEST OPERATION"

WHEN ELECTRIC WIRING WORK IS NOT FINISHED

- Remove the electric parts box lid, connect a power supply and remote controller to the terminals.

Next, press the inspection/test operation button “” on the remote controller. The unit will engage the test operation mode. Press the operation mode selector button “” until selecting FAN OPERATION “”. Then, press the ON/OFF button “”. The indoor unit fan and drain pump will start up. Check that the water has drained from the unit. Press “” to go back to the first mode.

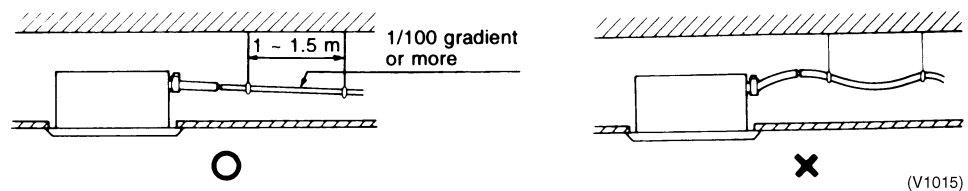
- You can check whether drainage is satisfactory or not by removing the access opening lid and checking the water level of the drain pan through the access opening.
- **Be careful when doing so because the fan is turning at the same time.**



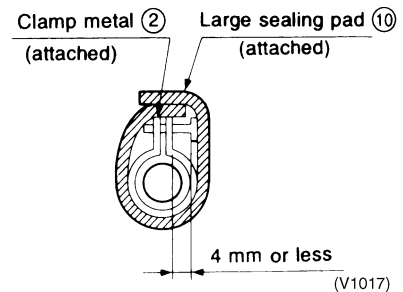
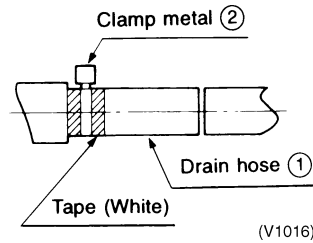
Ceiling Mounted Cassette Type (FXYFP Multi- flow)

1. Rig drain piping

- The diameter of the drain pipe should be greater than or equal to the diameter of the connecting pipe (vinyl tube; pipe size: 25mm; outer dimension: 32mm).
- Keep the drain pipe short and sloping downwards at a gradient of at least 1/100 to prevent air pockets from forming.
- If the drain hose cannot be sufficiently set on a slope, execute the drain raising piping.
- To keep the drain hose from sagging, space hanging wires every 1 to 1.5 m.

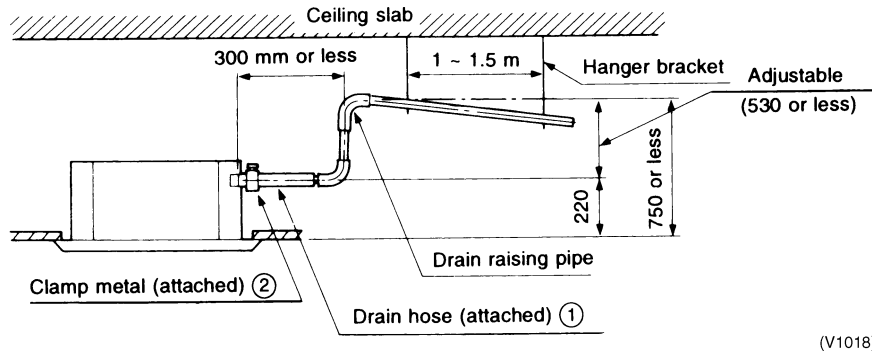


- Use the attached drain hose ① and clamp metal ②.
Insert the drain hose into the drain socket, up to the white tape. Tighten the clamp until the screw head is less than 4 mm from the hose.
- Wrap the attached sealing pad over the clamp and drain hose to insulate.
- Insulate the drain hose inside the building.

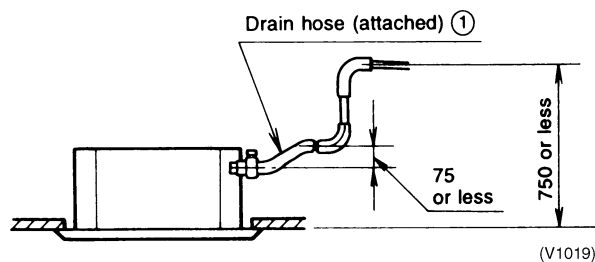


(PRECAUTIONS FOR DRAIN RAISING PIPING)

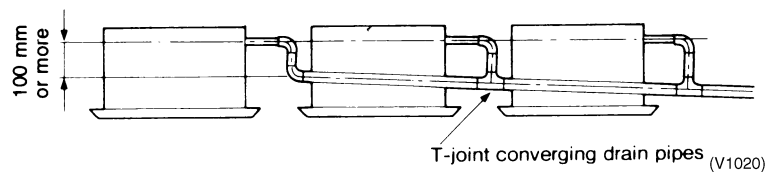
- Install the drain raising pipes at a height of less than 530 mm.
- Install the drain raising pipes at a right angle to the indoor unit and no more than 300 mm from the unit.



- Note:**
- The incline of attached drain hose ① should be 75 mm or less so that the drain socket dose not have to stand additional force.



- If converging multiple drain pipes, install according to the procedure shown below.



Select converging drain pipes whose gauge is suitable for the operating capacity of the unit.






2. After piping work is finished, check drainage flows smoothly.
- Open the water inlet lid, add approximately 600 cc of water slowly and check drainage flow.

WHEN ELECTRIC WIRING WORK IS FINISHED

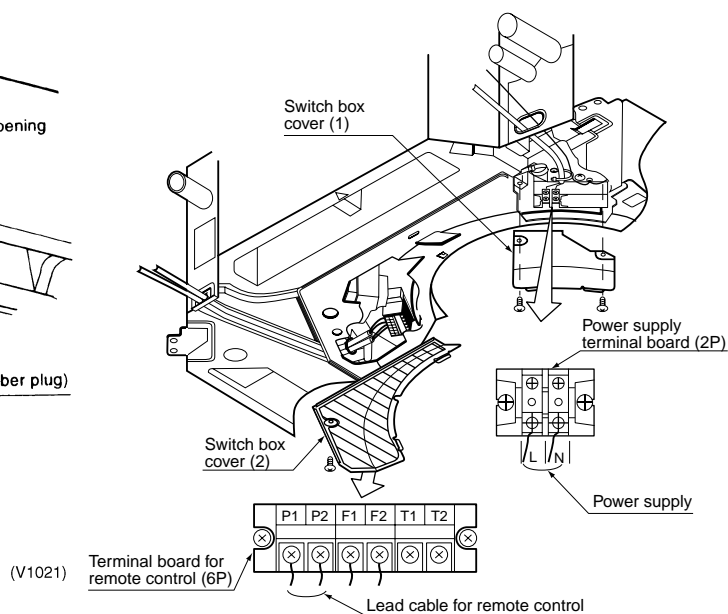
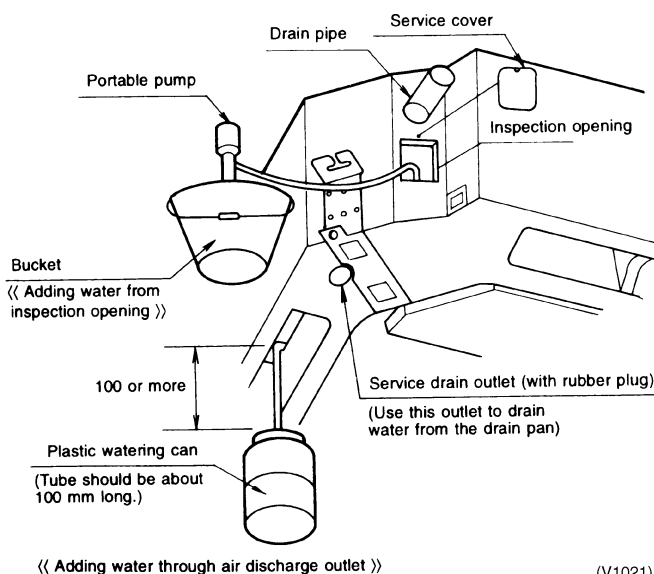
Check drainage flow during COOL running, explained under “TEST OPERATION”.

WHEN ELECTRIC WIRING WORK IS NOT FINISHED

Remove the electric parts box lid, connect a power supply and remote controller to the terminals.

Next, press the inspection/test operation button “” on the remote controller. The unit will engage the test operation mode. Press the operation mode selector button “” until selecting FAN OPERATION “”. Then, press the ON/OFF button “”. The indoor unit fan and drain pump will start up. Check that the water has drained from the unit. Press “” to go back to the first mode.

■ Note that the fan also starts rotating.

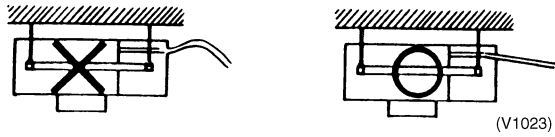


3PA60996-10L

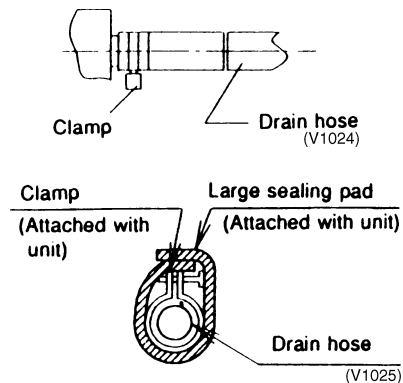
[Method of adding water]

Ceiling Mounted Cassette Corner Type (FXYKP)

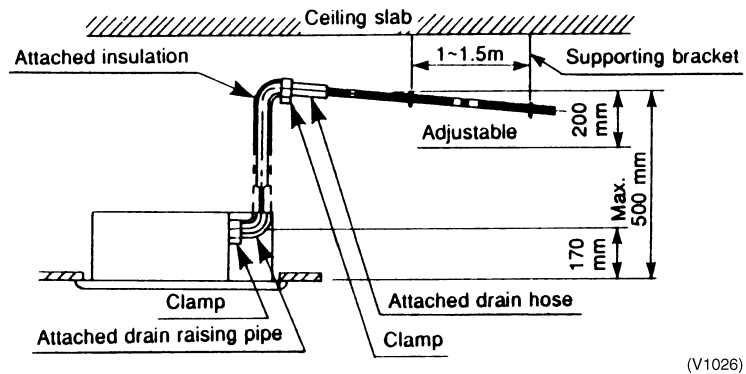
1. Install the drain pipes.
 - Keep piping as short as possible and slope it downwards so that air may not remained trapped inside the pipe.



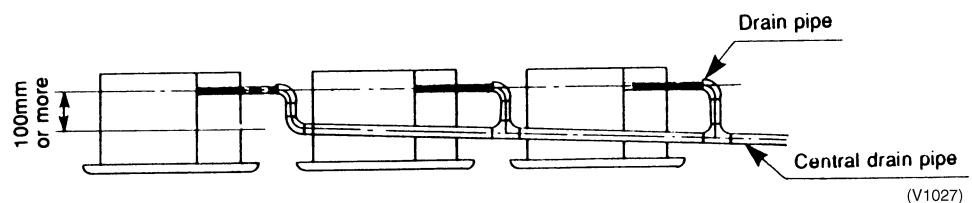
- Keep pie size equal to or greater than that of the connecting pipe (Vinyl pipe of 25 mm nominal diam. and 32 mm outer diam.).
- Use the attached drain hose and clamp. Tighten the clamp firmly.
- Insulate the clamp with the attached sealing pad.
- Insulate the drain hose inside the building.



- If the drain hose cannot be sufficiently set on a slope, fit the hose with drain raising piping as shown in the drawing.
Be sure to use the attached drain hose, drain raising pipe, clamp and drain pipe insulation
- Secure a downward gradient of 1/100 or more for the drain pipe. To accomplish this, mount supporting brackets at an interval of 1 - 1.5 m.



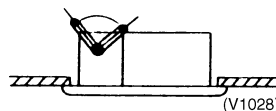
- Use the following outline if laying central drain piping.



(Drain raising pipe laying procedure)

- (1) Connect the drain raising pipe and drain hose and fasten with a clamp.
- (2) Mount the drain pipe insulation and wrap with vinyl tape.
- (3) After completing steps (1) and (2), attach the drain raising pipe to the drain pipe connection port of the indoor unit and fasten with a clamp. (Do not connect any other pipes between the drain raising pipe and the indoor unit.)

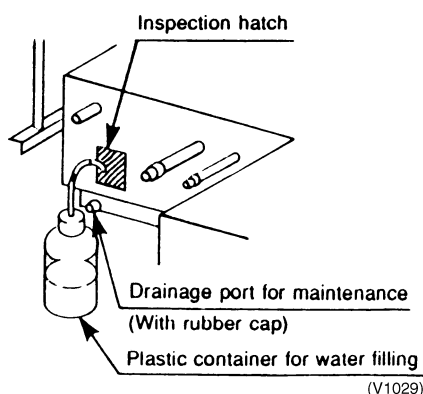
- Adjust the drain raising height by turning the drain raising pipe as shown in the figure.



2. After piping, check to make sure draining flows smoothly.

If construction work for interconnecting piping is complete:

Using a plastic container for water filling, etc., gradually inject about 1,000 cc of water into the drain pan through the inspection hatch.








Note: To drain water from the drain pan, use the drainage port for maintenance.

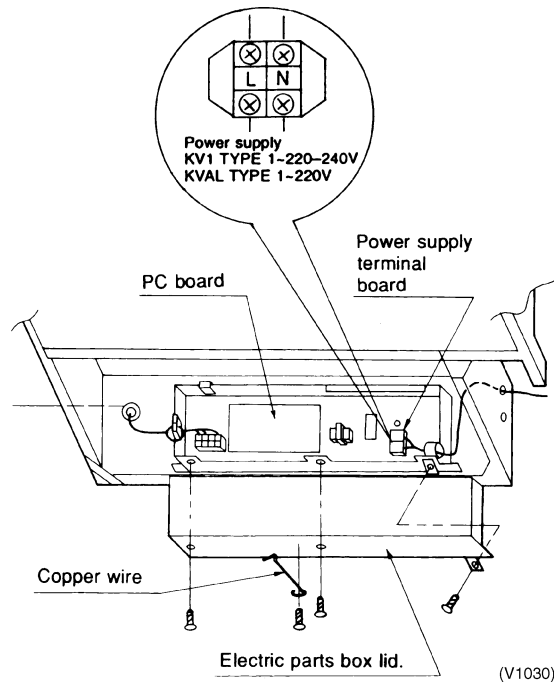
WHEN ELECTRIC WIRING WORK IS FINISHED

Check drainage flow during COOL running, explained under “TEST OPERATION”.

WHEN ELECTRIC WIRING WORK IS NOT FINISHED

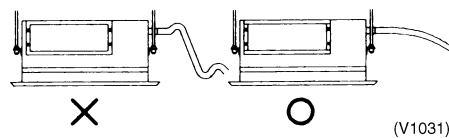
Remove the electric parts box lid, connect a power supply and remote controller to the terminals.

Next, press the inspection/test operation button “” on the remote controller. The unit will engage the test operation mode. Press the operation mode selector button “” until selecting FAN OPERATION “”. Then, press the ON/OFF button “”. The indoor unit fan and drain pump will start up. Check that the water has drained from the unit. Press “” to go back to the first mode.

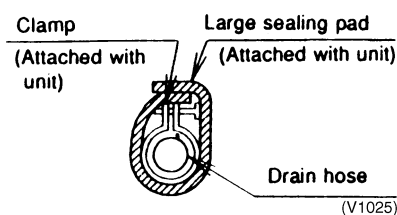
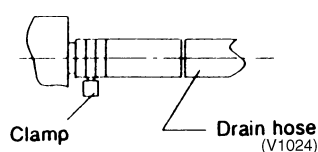


Ceiling Mounted Built-in Type (FXYP)

1. Install the drain pipes.
 - Keep piping as short as possible and slope it downwards so that air may not remain trapped inside the pipe.

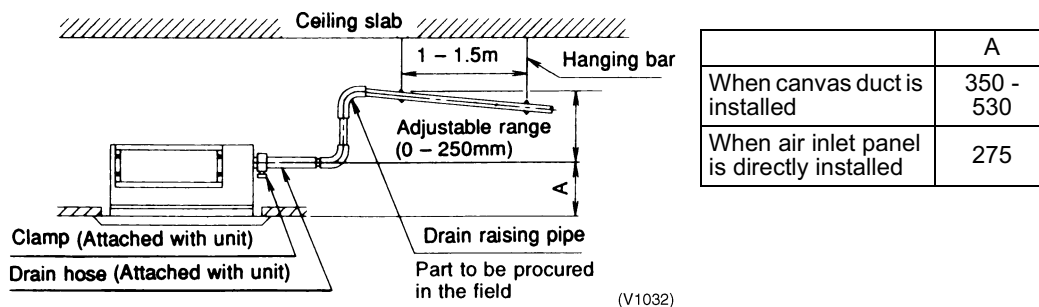


- Keep pipe size equal to or greater than that of the connecting pipe (Vinyl pipe of 25 mm nominal diam. and 32 mm outer diam.).
- Use the attached drain hose and clamp. Tighten the clamp firmly.
- Insulate the clamp with the attached sealing pad.
- Insulate the drain hose inside the building.
- If the drain hose cannot be sufficiently set on a slope, fit the hose with drain raising piping as shown in the drawing.

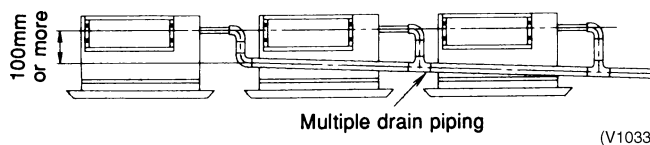


<HOW TO INSTALL PIPING>

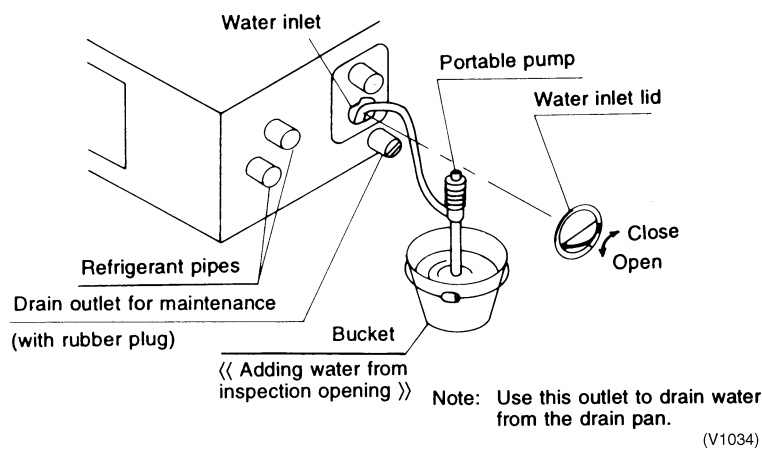
- (1) Connect the drain hose to the drain raising pipes, and insulate them.
- (2) Connect the drain hose to the drain outlet on the indoor unit, and tighten it with the clamp.
- (3) Insulate both metal clamp and drain hose with the attached sealing pad.



- To ensure a down ward slope of 1:100, install hanging bars every 1 to 1.5 m.
- If unifying multiple drain pipes, install pipes shown right.



2. After piping, check to make sure draining flows smoothly.
- Open the water inlet lid, add approximately 1000 cc of water gradually and check drainage flow.








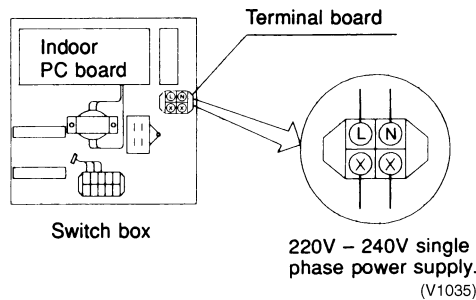
WHEN ELECTRIC WIRING WORK IS FINISHED

Check drainage flow during COOL running, explained under “TEST OPERATION”.

WHEN ELECTRIC WIRING WORK IS NOT FINISHED

Remove the electric parts box lid, connect a power supply and remote controller to the terminals.

Next, press the inspection/test operation button “” on the remote controller. The unit will engage the test operation mode. Press the operation mode selector button “” until selecting FAN OPERATION “”. Then, press the ON/OFF button “”. The indoor unit fan and drain pump will start up. Check that the water has drained from the unit. Press “” to go back to the first mode.



3.2.10 Electrical Work

Control Wiring

1. Compatible types of wire

Wiring Specifications

Wiring Type	Shield Wire (2 wire) (See NOTE 1, 2)
Size	0.75~1.25 mm ²



Notes:

1. Sheathed wire may be used for transmission wirings, but they do not comply with EMI (Electromagnetic Interference) (EN55014). When using sheathed wire, EMI must conform to Japanese standards stipulated in the Electric Appliance Regulatory Act. (If using a sheathed wire, the grounding shown in the figure on the left is unnecessary.)
2. For FXYAP indoor unit, use sheathed wire.

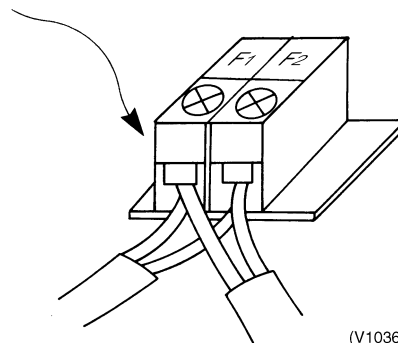
2. Problems arising from the use of unsuitable cable

a) When cable less than 0.75 mm² is used

Where the control wiring is particularly long the transmission signals may, for example, become unstable and the terminal relay cease to function. (Reduced voltage) The control system may become unduly subject to noise interference.

b) When cable more than 1.25 mm² is used

When wiring indoor units together, the terminal block will not be able to accommodate 2 cables simultaneously if the cables are larger than 1.25 mm².

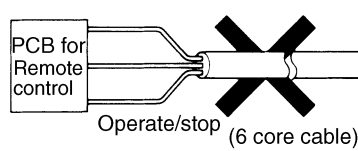


c) For multi-core cable

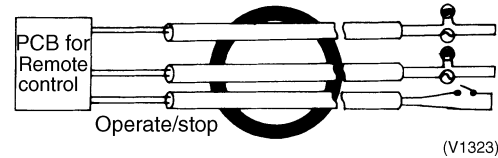
The greater play between wires, the more the transmitted wave is distorted and transmission destabilized.

- d) In the case of a remote controller with a three way selector for cooling, heating and ventilation, twin core cable should be used when the ventilation mode is not required and three core cable should be used when three way selection is required.
- e) Since there is a considerable risk of mixing high (220 to 240V) and low voltages in the case of, for example, a PCB for remote control, multiple core cable must not be used. (Internal wiring regulations and dielectric strengths of cables are relevant here.)

[Example of incorrect method]



[Example of correct method]



(V1323)

- f) Other important points
1. The refrigerant circuit and the indoor/outdoor connecting cables must correspond exactly.
 2. A suitable gap must be left between the control cables and the power supply cables where these are laid alongside each other. (See "Separation of control and power supply cables" on page 51)

Power Supply (Cabling of Main Power Supply)

1. Choosing a circuit breaker

The power supply work must conform to local regulations. In Japan, the relevant regulations are the MITI ordinance determining technical standards for electrical equipment, and the Internal Wiring Provisions.

a) The indoor unit circuit breakers

- In accordance with the provisions for internal wiring (JEAC8001-1986), power may be supplied by means of crossover lines between the indoor units in a single system branch circuit.

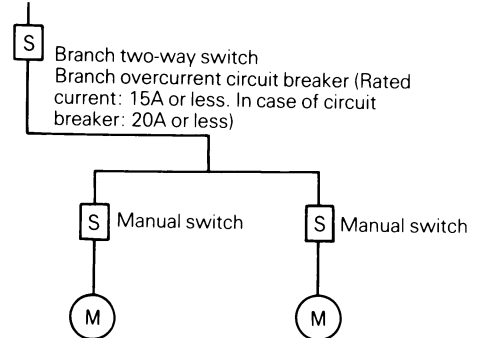
Branch circuit facility (Internal wiring provisions 305-2)

The motors must be set up with a dedicated branch circuit for each unit. However, where they correspond to any of the following situations, this limitation does not apply.

- ① When used in a 15A branch circuit of a 20A circuit breaker branch circuit

Note: It is recommended that the total rated capacity of the motors set up in a 15A branch circuit or a 20A circuit breaker branch circuit should be no more than 2.2kW.

Example of 15A branch circuit or 20A circuit breaker branch circuit



(V1038)

When using high static pressure indoor units the fan motors must have a large capacity. Single phase 220~240V branch circuits are therefore required for each indoor unit.

Example: Up to 10 × 2.5HP indoor units or 5 × 5HP indoor units can be wired together.

b) The outdoor unit circuit breaker

- A separate circuit breaker must be fitted for each unit.
- The motors incorporated into air conditioning system compressors are treated as special motors under the internal wiring provisions. The values which apply to normal motors are thus somewhat variance with those which apply to such compressor motors. You are recommended to adhere strictly to the procedures laid down in the technical materials included in, for example, the system design manuals.

Calculation of load (Refer to local regulation.)

With respect to the calculation of load for motors with special applications such as elevator, air conditioner and refrigerator motors, not only must the rated current be shown on the name plate of the said motor or piece of apparatus but it must also included all special characteristics or applications.



Note: The rated current for package air conditioners which use special purpose built-in compressor motors in their compressors in 1.2 times the operating current shown on the name plate.

2. Cable size

The thickness of the cables in the circuits (branch circuits) providing the main power supply to each item of apparatus must satisfy the following conditions:

1. To have a current tolerance of 40% or more of the rated current of the overcurrent circuit breaker (wiring circuit breaker, etc.).
2. To have a current tolerance of 125% or more of the rated current in cases where the rated current of the apparatus is 50A or less.
3. To have a current tolerance of 110% or more of the rated current in cases where the rated current of the apparatus is more than 50A.
4. To satisfy voltage drop standards.

3. Separation of control and power supply cables

- **If control and power cables are run alongside each other** then there is a strong likelihood of operational faults developing due to interference in the signal wiring caused by electrostatic and electromagnetic coupling.

The table below indicates our recommendations as to the appropriate spacing of control and power cables **where these are to be run side by side**.

Current capacity of power cable		Spacing (d)
100V or more	10A or less	300mm
	50A	500mm
	100A	1000mm
	100A or more	1500mm



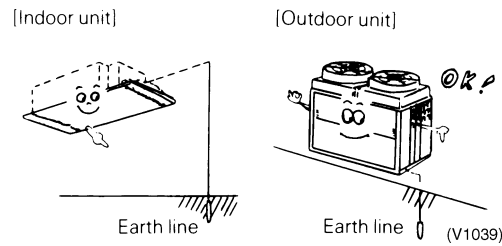
- Notes:**
1. The figures are based on an assumed length of parallel cabling up to 100m. For lengths in excess of 100m the figures will have to be recalculated in direct proportion to the additional length of cable involved.
 2. If the power supply waveform continues to exhibit some distortion the recommended spacing in the table should be increased.

If the cables are laid inside conduits then the following points must also be taken into account when grouping various cables together for introduction into the conduits.

1. Power cables (including power supply to the air conditioner) and signal cables must not be laid inside the same conduit. (Power cables and signal cables must each have their own individual conduits.)
2. In the same way, when grouping the cables, power and signal cables should not be bunched together.

■ Important points

1. Earthing

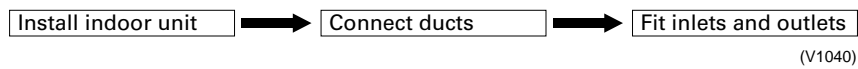


■ Have the indoor and outdoor units both been earthed?

- * If the apparatus is not properly earthed then there is always a risk of electric shocks. The earthing of the apparatus must be carried out by a qualified person.

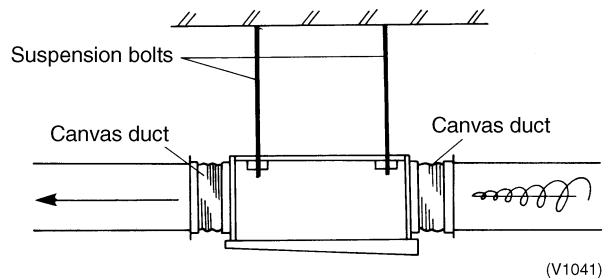
3.2.11 Duct Work (Indoor)

■ Operational steps



Taking Account of Noise and Vibration

- a) Canvas joints must be used between the main unit and the air suction and discharge ducts. These fittings are designed to inhibit secondary noise resulting from the transmission of vibrations and operating noise from the main unit to the ducts or to the rest of the building.



- b) The speed of the airflow should be taken into account when choosing air suction and distribution grills in order to keep wind noise to minimum.

■ Important points

1. The air discharge duct must be thermally insulated.
2. The canvas duct on the inlet side must be set in a metal framework.
3. The air suction and distribution grills should be positioned to take into account the possibility of short circuits.
4. Static pressure should be checked to ensure that the airflow is within the specified range.
5. The air filter must be easily detachable.

3.2.12 Installation of Outdoor Unit

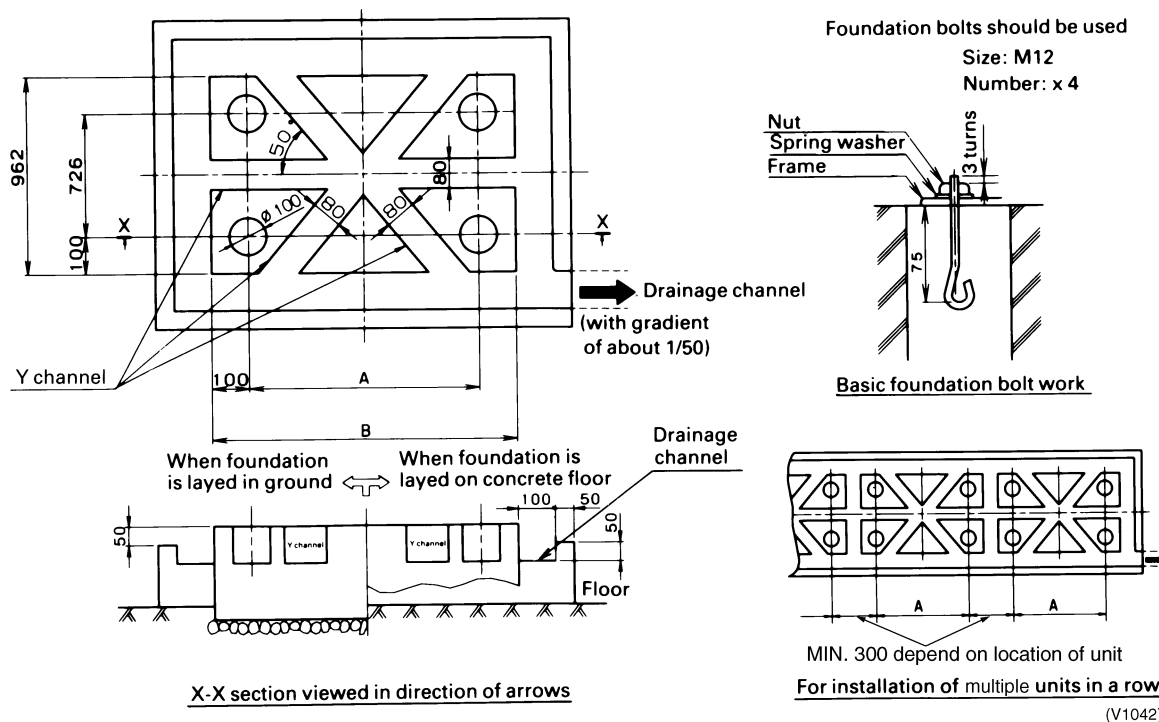
■ Operational steps

Prepare foundation

Install outdoor unit

(V1150)

Foundation of Units



Model	A	B
REYP8 REYP10 RXEP8 RXEP10	1000	1200
REYP16 REYP20	2290	2490

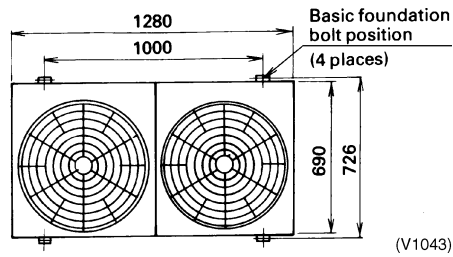


Notes:

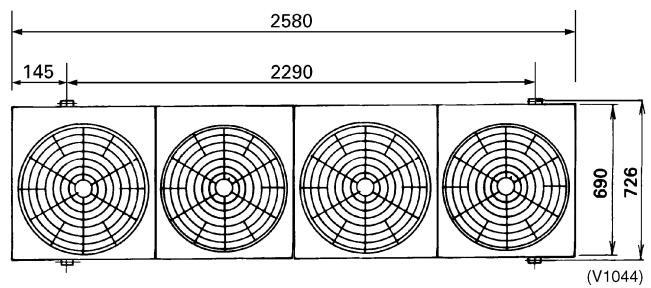
1. Standard concrete mix: 1 cement / 2 sand / 4 gravel with 10 reinforcing rods (approx. 300mm intervals).
2. Mortar should be used to level the surface. The edge of the concrete surface should be bevelled.
3. When setting the foundation on a concrete floor macadam is not required but the surface of the concrete should be broken up to make it uneven.
4. A drainage channel should be made around the foundation to cater for waste water around the machinery.
5. When installing a unit on the roof be sure to check the strength of the roof and pay special attention to waterproofing requirements.
6. If the unit is to be installed on a frame, install the waterproofing board within a distance of 150mm under the unit in order to prevent infiltration of water coming from under the unit.

■ Bolt pitch

REYP8/10K, RXEP8/10K



REYP16/20K



■ Caution in installation

1. Execute the installation work by checking the foundation strength and levelness to avoid any occurrence of vibration and noise.
Fix the unit tightly with foundation bolts. (Prepare 4 sets of M12 foundation bolts with proper nuts and washers.)
The proper length of the foundation bolts from the surface of the base is 20mm.
The foundation must support the unit in the range above the shaped portion in the figure 1.
2. Remove the fitting (yellow color) for loading as shown in the figure 2.
Tighten the installation bolt of compressor firmly again.
2 fittings are attached to the front side of a single compressor.





Caution

Install the unit securely in case of earthquake an typhoon, cyclone, hurricane or other strong wind. The unit may topple or cause another accident if improperly set up.

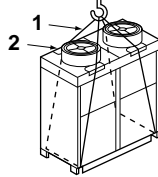
Inspecting and Handling the Unit

At delivery, the package should be checked and any damage should be reported immediately to the carrier claims agent.

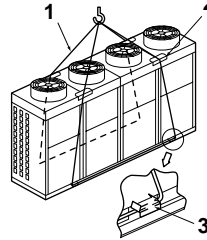
When handling the unit, take into account the following:

1.  Fragile, handle the unit with care.
2.  Keep the unit upright in order to avoid compressor damage.
2. Lift the unit preferably with a crane and 2 belts(1) of at least 8m or 10m (REYP16,20) long.
3. When lifting the unit with a crane, always use protectors(2) to prevent belt damage and pay attention to the position of the unit's centre of gravity.

REYP8,10
RXEP8,10



REYP16,20



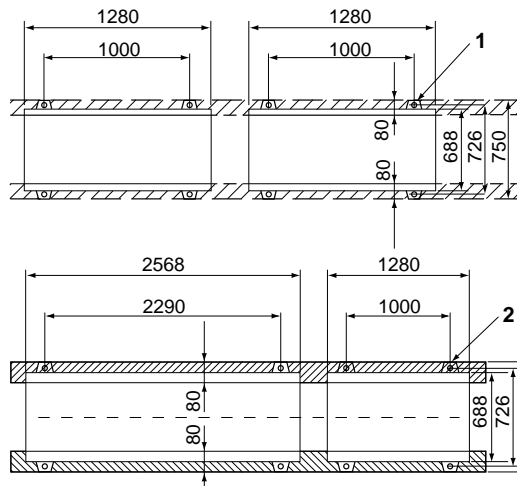
1. Rope
2. Sequencer
3. Hanger metal

Fig. 3
(V2476)

4. Bring the unit as close to its final installation position in its original package to prevent damage during transport.

Unpacking and Placing the Unit

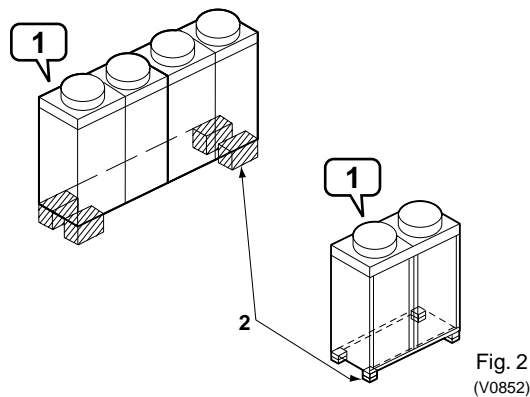
1. Remove the wooden craft from the unit.
2. Remove the four screws fixing the unit to the pallet.
3. The unit must be installed on a solid longitudinal foundation (steelbeam frame or concrete) as indicated in figure 1.



1. Fundamental bolt position ($\phi 15$ holes ... 8 places)

Fig. 1
(V0853)

Bad Example



1. ✗ No!
2. Do not use stands to support the corners.



Note: Maximum height of the foundation is 150mm.

4. Lift the unit from the pallet and place it on its installation position.
5. Fasten the unit in place using four anchor bolts M12.
6. Remove the upper and lower service plate.
7. When closing the service panels take care that the tightening torque does not exceed 4.1 Nm.
8. Remove the yellow shipping stays from the compressor support as shown in the figure (2 stays per single compressor). Tighten the installation bolts firmly again afterwards.

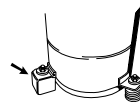


Fig. 3
(V0898)

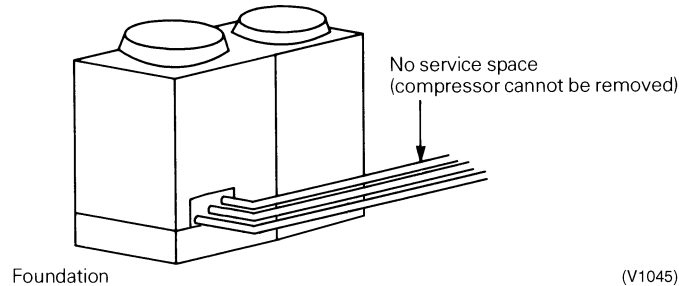
9. Once installed in place, detach the hangers. There are 2 lifting lugs per compressor. (Refer to the previous page.)

**Caution**

1. Prepare a water drainage channel around the foundation to drain waste water from around the unit.
2. If the unit is to be installed on a roof, check the strength of the roof and its drainage facilities first.
3. If the unit is to be installed on a frame, install the waterproofing board within a distance of 150mm under the unit in order to prevent infiltration of water coming from under the unit.

Service Space

It is extremely important that enough space is left when installing the equipment to allow routine servicing and maintenance to be carried out without undue hindrance. It is particularly important to bear in mind the work which will be required if the compressor needs to be replaced. (The layout of the pipework can sometimes cause considerable difficulties if the compressor needs to be changed.)



(V1045)

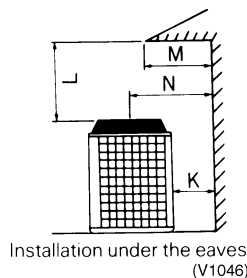
Prevention of Short Circuits

The unit must be installed in a well ventilated area, otherwise short circuiting will occur. Special care should be taken in situations such as that illustrated in the diagram below since additional fittings such as air discharge ducts may also be required. (Attention should be paid to the duct's resistance)

Conditions for installation under the eaves

- When $L \geq 1\text{m}$ then N must be $\geq M$.
- When $L < 1\text{m}$ then K must be $\geq M$.

Where K is the required dimension for a single unit installation.

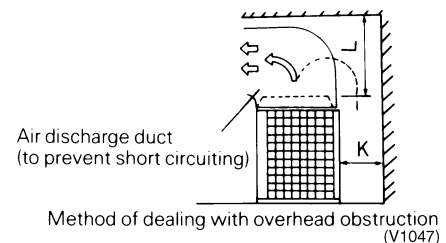


(V1046)

Conditions for installation where there is a horizontal obstruction above the unit

- When $L \geq 3\text{m}$ then no special action is required.
- When $L < 3\text{m}$ then an air discharge duct with resistance within $3\text{mmH}_2\text{O}$ is required.

Where K measures a little more than the required K dimension for a single unit installation.



(V1047)

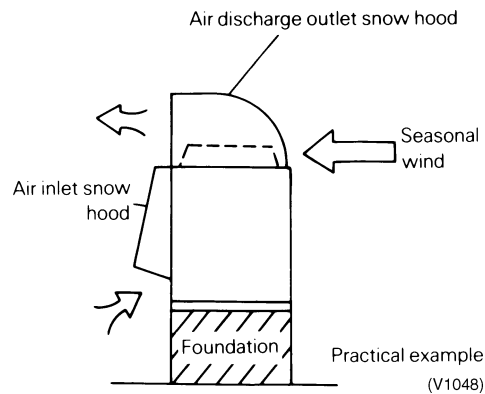
Techniques for Prevention of Snow Accumulation in Areas of High Snowfall

1. Snow must be prevented from accumulating around the outdoor unit's air inlet and air discharge outlet and one possible answer would be to fit a snow hood.

[Points relating to design of snow hood]

- In order to ensure the required outdoor unit airflow the duct resistance must be less than the permissible external static pressure of 3 mmH₂O.
- The structure must be robust enough to withstand the weight snow building up on it and strong winds or typhoons.
- The construction of the unit should be such as to avoid short circuiting between suction air and discharge air.

A snow hood is available from Daikin as an optional accessories so please make use of it where necessary.



2. The unit should be oriented in such a way as to prevent the air heat exchanger from facing into driving snow.
3. The outdoor unit should be set at a higher level in relation to the surface on which it is mounted than the anticipated depth of snow accumulation in order to prevent it from being buried.
4. Measures to combat lightning and burying by drifting snow.
The proposed installation spot should be thoroughly investigated and on no account should the unit be placed beneath eaves or trees where snow is likely to drift.

When units are located on different floors

Special care must be taken with respect to short circuits when units are installed on each floors.

Selection of Location

This unit, both indoor and outdoor, is suitable for installation in a commercial and light industrial environment. If installed as a household appliance it could cause electromagnetic interference.

The VRV plus outdoor units should be installed in a location that meets the following requirements:

1. The foundation is strong enough to support the weight of the unit and the floor is flat to prevent vibration and noise generation.
2. The space around the unit is adequate for servicing and the minimum space for air inlet and air outlet is available. (Refer to figure 1 and choose one of both possibilities.)

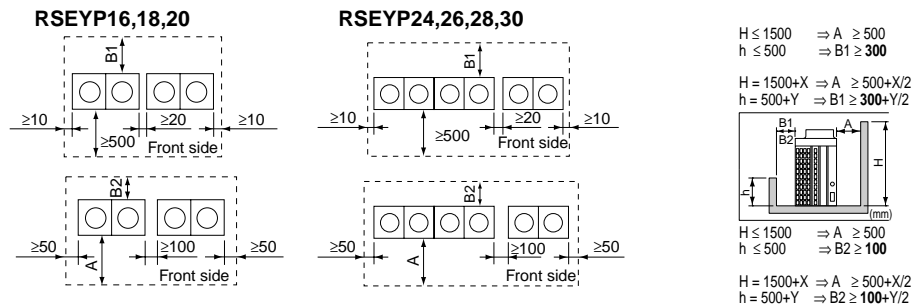


Fig. 1
(V2475)

3. There is no danger of fire due to leakage of inflammable gas.
4. Ensure that water cannot cause any damage to the location in case it drips out the unit (e.g. in case of a blocked drain pipe).
5. The piping length between the outdoor unit and the indoor unit may not exceed the allowable piping length. (See "Example of Connection" on page 171.)
6. Select the location of the unit in such a way that neither the discharged air nor the sound generated by the unit disturb anyone.
7. Make sure that the air inlet and outlet of the unit are not positioned towards the main wind direction. Frontal wind will disturb the operation of the unit. If necessary, use a windscreen to block the wind.
8. Locations where there is mineral oil or kitchens and other locations where oil may splatter or there may be a lot of steam in the air. Deterioration of resin parts may cause parts to fall or leak.
9. Locations where corrosive gases are present, such as sulfuric gas. This may cause corrosion of copper pipes and brazed parts, causing the refrigerant to leak.
10. Locations with machinery which gives off electromagnetic waves. Such waves may cause the control system to malfunction and prevent normal operation.



Caution

1. An inverter air conditioner may cause electronic noise generated from AM broadcasting. Examine where to install the main air conditioner and electric wires, keeping proper distances away from stereo equipment, personal computers, etc.

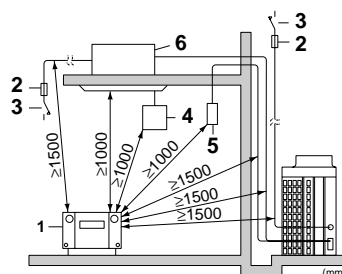


Fig. 2
(V0850)

1. Personal Computer or Radio
2. Fuse
3. Earth Leak Detector
4. Remote Controller
5. Cool/Heat Selector
6. Indoor Unit

If the electric wave of AM broadcasting is particularly weak, keep distances of 3m or more and use conduit tubes for power and transmission lines.

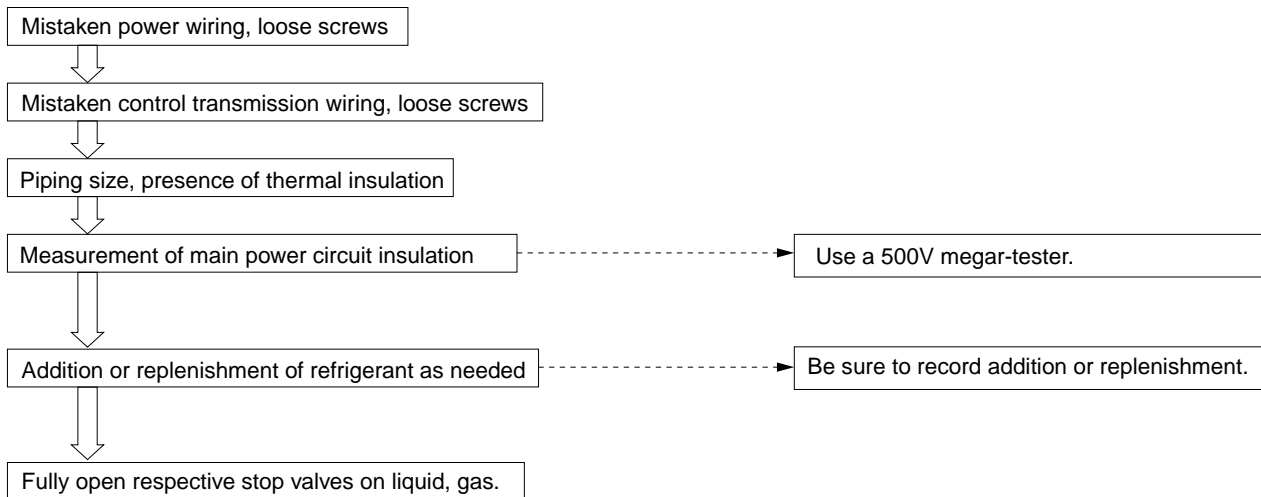
2. In heavy snowfall areas, select an installation site where snow will not affect operation of the unit.
3. The refrigerant R407C itself is nontoxic, nonflammable and is safe. If the refrigerant should leak however, its concentration may exceed the allowable limit depending on room size. Due to this it could be necessary to take measures against leakage. Refer to the chapter 'Caution for refrigerant leaks'.

4. Test Operation

4.1 Procedure and Outline

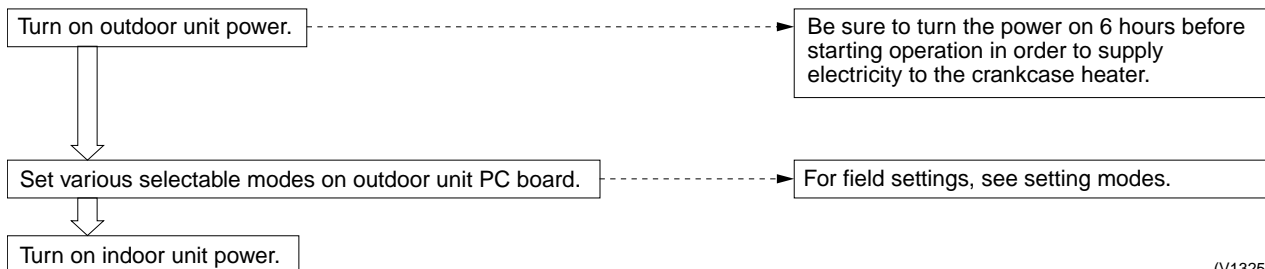
The operation sequence is the most important thing for test operation. Follow the following outline.

4.1.1 Check the Following Before Turning Power On



(V1324)

4.1.2 Turn Power On

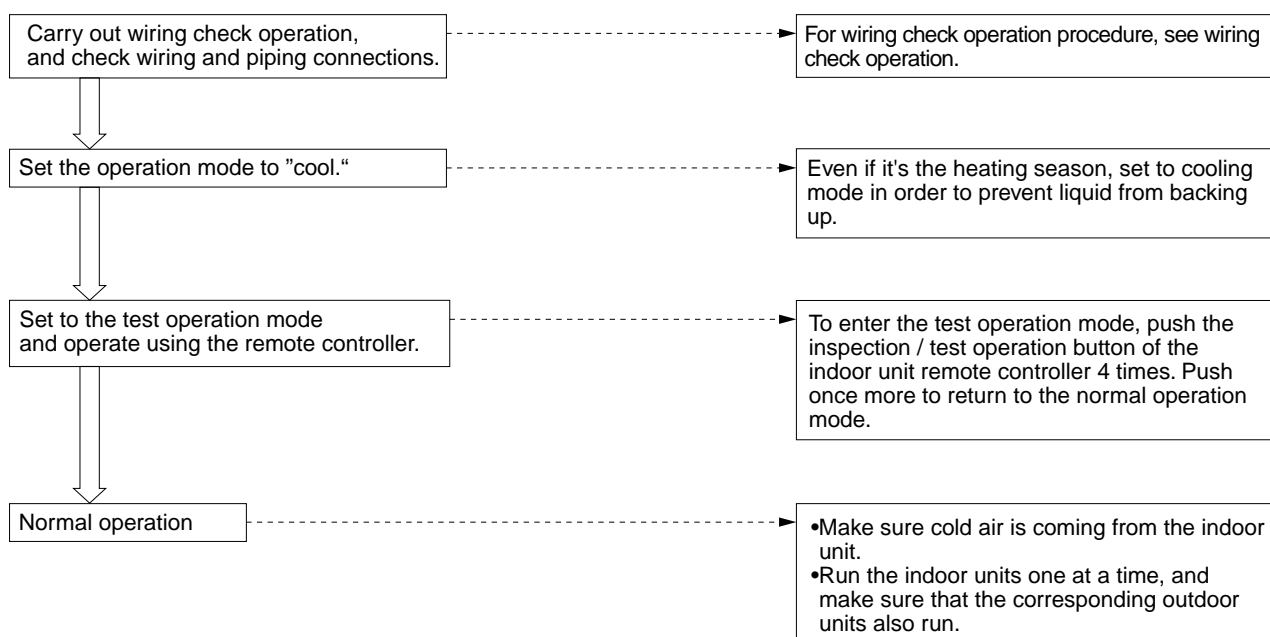


(V1325)



Refer to Setting Modes on P65

4.1.3 Check Operation



(V1326)



Refer to Wiring Check Operation on P77



Caution

When the 400 volt power supply is applied to "N" phase by mistake, replace Inverter P.C.B (A2P) and control transformer (T1R, T2R) in switch box together.

(V0847)

4.2 Operation When Power is Turned On

4.2.1 When Turning On Power for First Time

The unit cannot be run for up to 12 minutes to automatically set the master power and address (indoor-outdoor address, etc.).

- ◆ Outdoor unit ... Warning lamp (H2P) lights
Test lamp (H2P) blinks
Can also be set during operation described above.
- ◆ Indoor unit ... If ON button is pushed during operation described above, the “UH” malfunction indicator blinks. (Returns to normal when automatic setting is complete.)

4.2.2 When Turning On Power The Second Time and Subsequent

Tap the RESET button (BS5) on the outdoor unit PC board. Operation becomes possible after setting up for about 2 minutes. If you do not push the RESET button, the unit cannot be run for up to 10 minutes to automatically set master power.

- ◆ Outdoor unit ... Warning lamp (H2P) lights
Test lamp (H2P) blinks
Can also be set during operation described above.
- ◆ Indoor unit ... If ON button is pushed during operation described above, the operation lamp lights but the compressor does not operate. (Returns to normal when automatic setting is complete.)

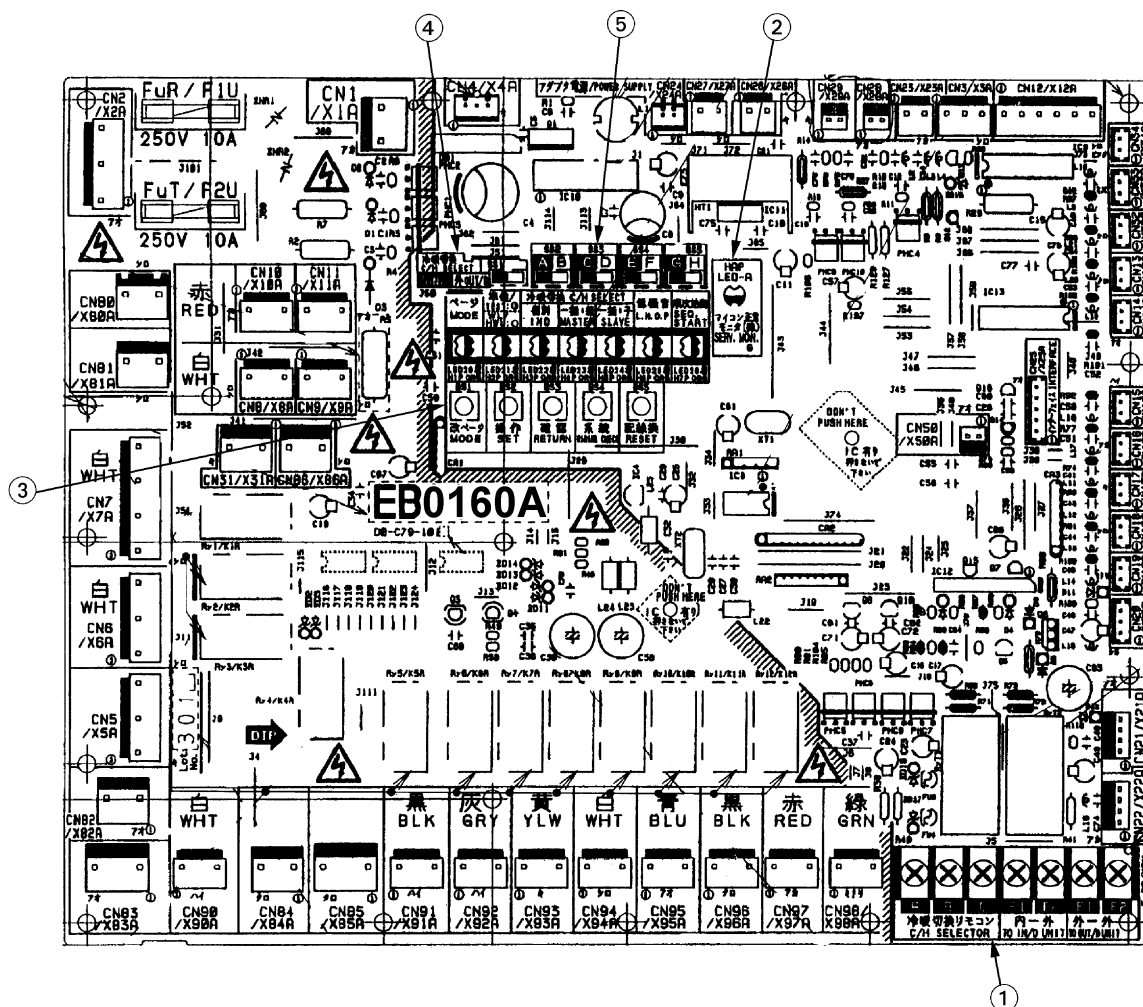
4.2.3 When an Outdoor Unit or Indoor Unit Has Been Added, or Indoor / Outdoor Units PC Board Has Been Changed

Be sure to push and hold the wiring change button for 5 seconds or longer. If not, the addition cannot be recognized. In this case, the unit cannot be run for up to 12 minutes to automatically set the address (indoor-outdoor address, etc.).

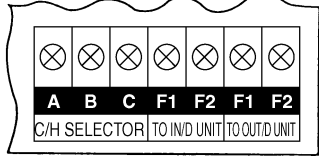

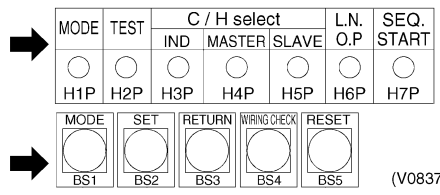
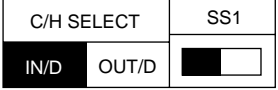
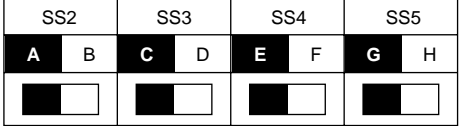
- ◆ Outdoor unit ... Warning lamp (H2P) lights
Test lamp (H2P) goes off
Can also be set during operation described above.
- ◆ Indoor unit ... If ON button is pushed during operation described above, the “UH” or “U4” malfunction indicator blinks. (Returns to normal when automatic setting is complete.)

4.3 Outdoor Unit PC Board Ass'y

Outdoor Unit



(V0834)

1	Transmission terminal Indoor unit, Cool/Heat selector Outdoor - Outdoor	 (V0835)
2	Service monitor LED (Green).	 (V0836)
3	Function setting mode switch and LED	<p>LED</p> <p>○ : ON ● : Flash ● : OFF</p> <p>Push Button switch</p>  (V0837)
4	Function of setting between cooling and heating	 (V0838)
5	Outdoor unit Capacity setting switch	<p>Switches for capacity setting when the outdoor unit PC board is replaced to spare parts PC board.</p>  (V0848)

Refer table below.

	SS2		SS3		SS4		SS5	
	A	B	C	D	E	F	G	H
RSEYP16K J		■		■	■			■
RSEYP18K J		■	■			■		■
RSEYP20K J		■	■			■		■
RSEYP24K J		■	■		■		■	
RSEYP26K J		■	■		■		■	
RSEYP28K J	■			■		■	■	
RSEYP30K J	■			■		■	■	

Capacity setting table

↑
Position of
dipswitch



Note: Resetting of power supply switch is necessary after capacity setting.

4.4 Setting Modes

There are the following three setting modes.

◆ Setting mode 1 (H1P off)

Used to select the cool/heat setting, low-noise run and sequential start.

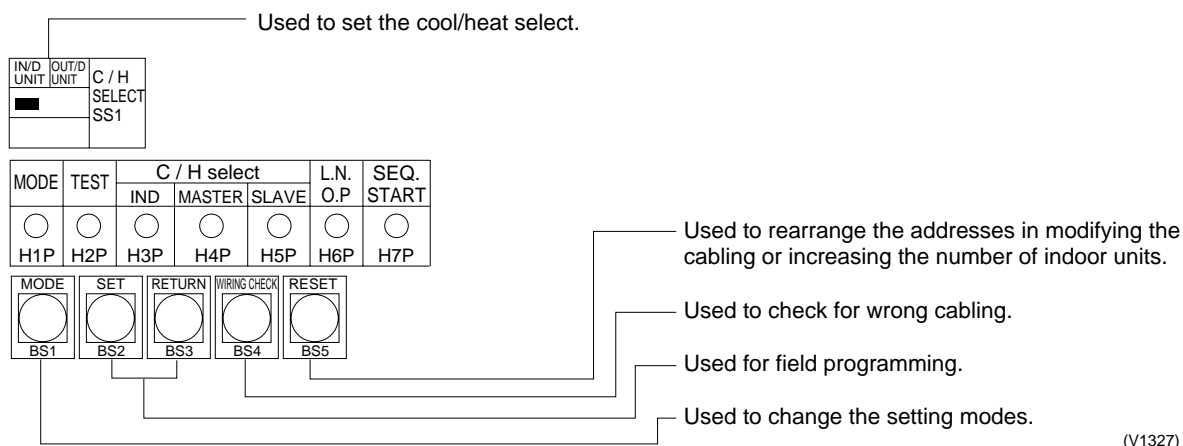
◆ Setting mode 2 (H1P on)

Used to modify the running status and to program addresses, etc. Usually used in servicing the system.

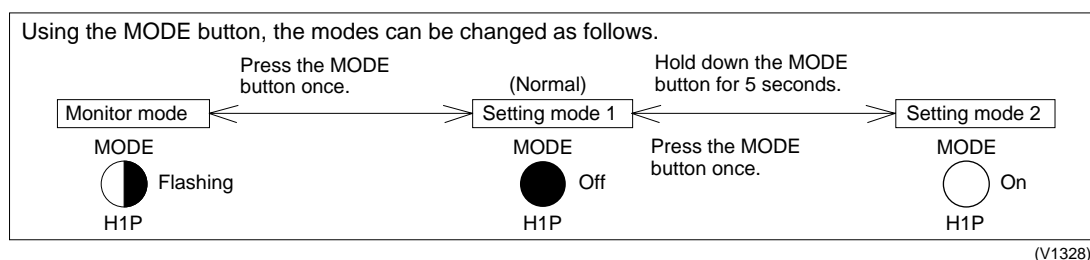
◆ Monitor mode (H1P flashing)

Used to check the programs made in the setting mode 2, the number of units being connected, and other entries.

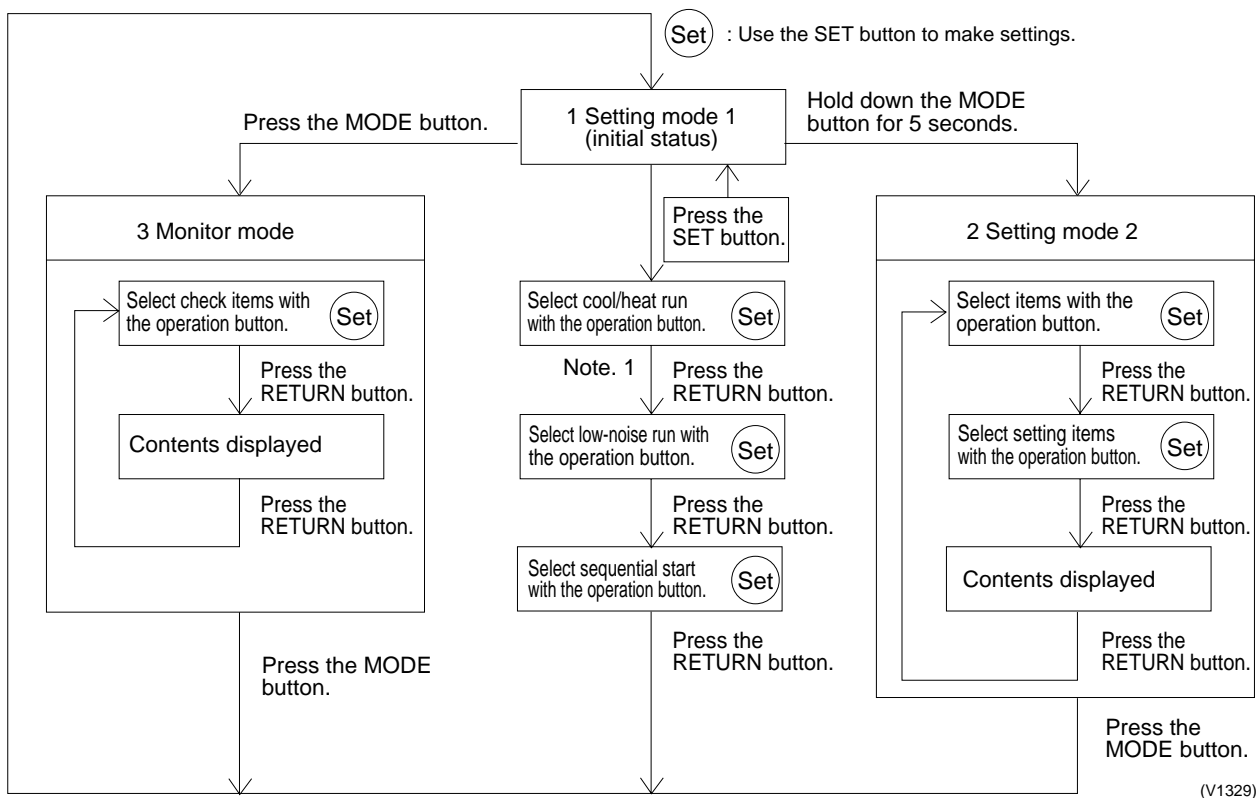
Functions of Pushbutton Switches



Mode Change

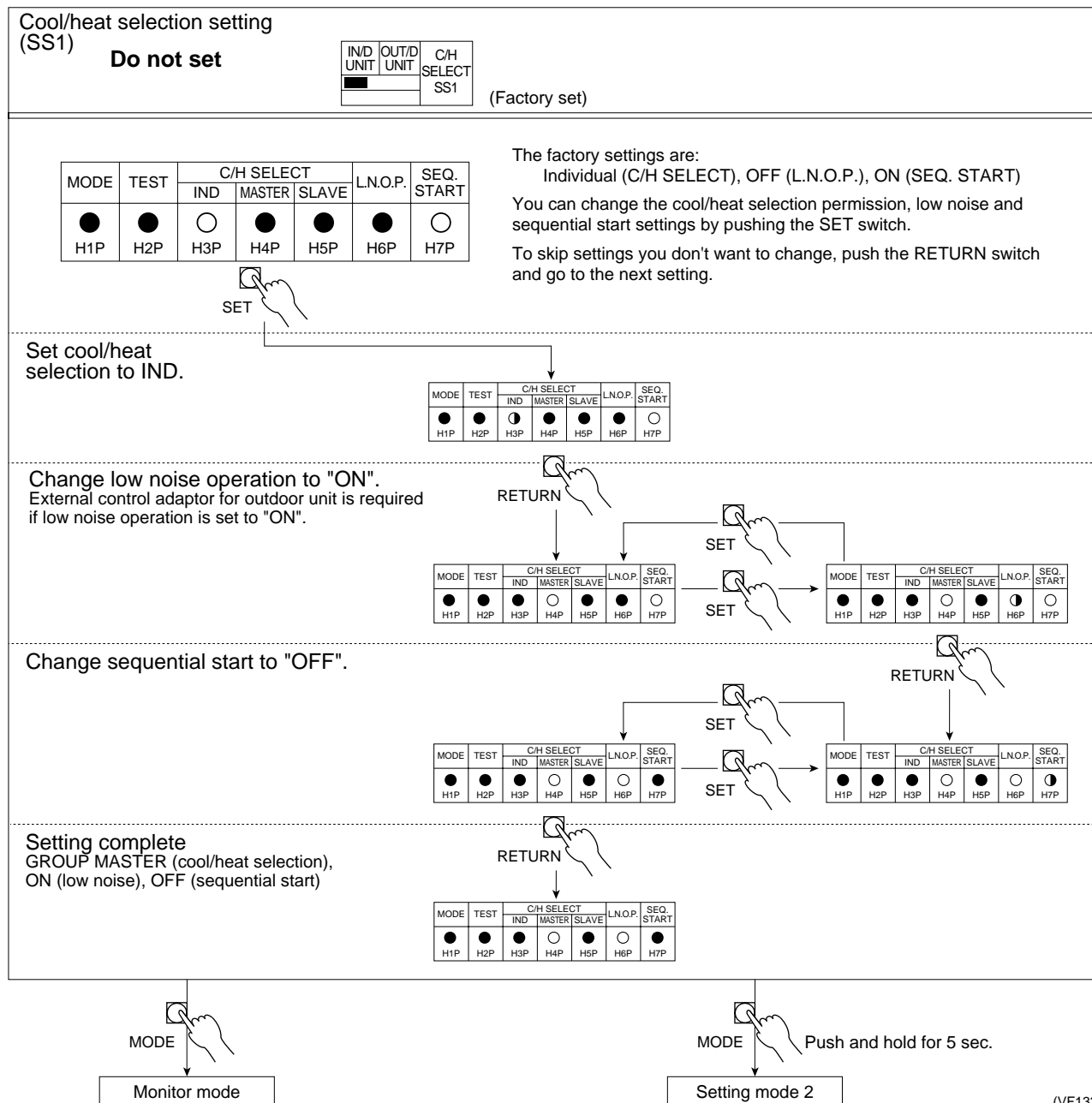


Mode Changing Procedure



- Note:**
1. If you become unsure of how to proceed, push the MODE button (BS1) and return to setting mode 1.
 2. Power reset is not necessary after setting of setting mode 1 (including C/H select SS1) and setting mode 2.

4.4.1 Setting Mode 1



(VF133)



Note: External control adaptor for outdoor unit is required if cool/heat selection set to MASTER or SLAVE, or if low noise operation is set to ON.

4.4.2 Setting Mode 2

To switch from setting mode 1 (normal) to setting mode 2, you must push and hold the next page button (BS1) for 5 seconds. (You cannot enter setting mode 2 while setting mode 1 is set.)

Setting Procedure

1. Push the SET button and match with the setting item (LED display). (All 10 settings)
↓
2. Push the RETURN button (BS3) and the present settings flicker (LED display).
↓
3. Push the SET button (BS2) and match with each setting (LED flicker display).
↓
4. Push the RETURN button (BS3) and enter the settings.
↓
5. Push the RETURN button (BS3) and return to the initial status.



- Note:**
1. If you become unsure of how to proceed, push the MODE button (BS1) and return to setting mode 1.
 2. The initial status of setting mode 2 is the status of setting item No. 1 in mode 2.

Setting Items

No	Setting item	Description	LED display H1P H2P H3P H4P H5P H6P H7P	LED display H1P H2P H3P H4P H5P H6P H7P
0	EMG (Emergency operation 1)	Emergency operation when inverter type outdoor unit malfunctions.	○ ● ● ● ● ● ●	Emergency operation (Operates by constant speed outdoor unit only.) Normal operation ○ ● ● ● ● ● ●
1	Cool/heat unified address Do not set.	Address for cool/heat unified operation.	○ ● ● ● ● ● ○	Address 0 ○ ● ● ● ● ● ● Binary number 1 ○ ● ● ● ● ● ○ (5 digits) 2 ○ ● ● ● ● ● ● 31 ○ ● ● ● ● ● ○
2	Low noise / demand address	Address for low noise / demand operation.	○ ● ● ● ● ● ○	Address 0 ○ ● ● ● ● ● ● Binary number 1 ○ ● ● ● ● ● ○ (5 digits) 2 ○ ● ● ● ● ● ● 31 ○ ● ● ● ● ● ○
3	Sequential start system address	Address for sequential start system.	○ ● ● ● ● ● ○	Address 0 ○ ● ● ● ● ● ● Binary number 1 ○ ● ● ● ● ● ○ (5 digits) 2 ○ ● ● ● ● ● ● 31 ○ ● ● ● ● ● ○
4	Number of unit for sequential start	Outdoor unit for sequential start.	○ ● ● ● ● ● ○	3 units ○ ● ● ● ● ● ● 2 units ○ ● ● ● ● ● ○ 1 unit ○ ● ● ● ● ● ○
5	Forced fan switch	Indoor unit fan turns while unit is stopped.	○ ● ● ● ● ● ○	Forced fan operation (H tap) ○ ● ● ● ● ● ● Normal operation ○ ● ● ● ● ● ○
6	Indoor unit forced operation	Allows operation of indoor unit from outdoor unit.	○ ● ● ● ● ● ○	Indoor unit forced operation ○ ● ● ● ● ● ● Normal operation ○ ● ● ● ● ● ○
7	Frequency fix	Fixes compressor frequency. INV:(60Hz+OFF) STD1:(ON+OFF) STD2:(ON+OFF)	○ ● ● ● ● ● ○	Frequency fix ○ ● ● ● ● ● ● Normal operation ○ ● ● ● ● ● ○
8	TE setting	Low pressure setting for cooling.	○ ● ● ● ● ● ●	High ○ ● ● ● ● ● ●
9	TC setting Note 1	High pressure setting for heating.	○ ● ● ● ● ● ○	Normal (factory set) ○ ● ● ● ● ● ● Low ○ ● ● ● ● ● ○
10	Defrost setting Note 1	Temperature setting for defrost.	○ ● ● ● ● ● ○	Quick defrost ○ ● ● ● ● ● ● Normal (factory set) ○ ● ● ● ● ● ● Slow defrost ○ ● ● ● ● ● ○

(V2730)

No	Setting item	Description	LED display	LED display						
			H1P H2P H3P H4P H5P H6P H7P	H1P H2P H3P H4P H5P H6P H7P						
13	Air Net address	Address for Air 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(V2731)

No	Setting item	Description	LED display H1P H2P H3P H4P H5P H6P H7P	LED display H1P H2P H3P H4P H5P H6P H7P	LED display H1P H2P H3P H4P H5P H6P H7P
0	EMG (Emergency operation 1)	Emergency operation when inverter type outdoor unit malfunctions.		Emergency operation Normal operation	
1	Cool/heat unified address Do not set !!	Address for cool/heat unified operation.		Address 0 Binary number 1 (5 digits) 2 31	
2	Low noise / demand address	Address for low noise / demand operation.		Address 0 Binary number 1 (5 digits) 2 31	
3	Sequential start system	Address for sequential start system.		Address 0 Binary number 1 (5 digits) 2 31	
4	Number of unit for sequential start Note 1	Outdoor unit for sequential start.		3 units 2 units 1 unit	
5	Forced fan switch	Indoor unit fan turns while unit is stopped.		Forced fan operation (H tap) Normal operation	
6	Indoor unit forced operation	Allows operation of indoor unit from outdoor unit.		Forced fan operation (H tap) Normal operation	
7	Frequency fix	Fixes compressor frequency. INV:(60Hz+OFF) STD1:(ON+OFF) STD2:(ON+OFF)		Frequency fix Normal operation	
8	TE setting	Low pressure setting for cooling.		High Normal (factory set) Low	
9	TC setting Note 1	High pressure setting for heating.			
10	Defrost setting Note 1	Temperature setting for defrost.		Quick defrost Normal (factory set) Slow defrost	

Initial setting (EMG)

Push 3 times

(V2732)

No	Setting item	Description	LED display H1P H2P H3P H4P H5P H6P H7P	LED display H1P H2P H3P H4P H5P H6P H7P	LED display H1P H2P H3P H4P H5P H6P H7P
13	Air Net address	Address for Air Net		Address 0 Binary number 1 (6 digits) 2 3 63	
↓S					
14	Pump down 1	Allows operation of pump down 1.		Pump down 1 operation Normal operation	
↓S Push 3 times					
15	Pump down 2	Allows operation of pump down 2.		Pump down 2 operation Normal operation	
↓S Push two times					
17	JIS 1	Allows operation of JIS 1 setting.		JIS 1 operation Normal operation	
↓S					
18	JIS 2	Allows operation of JIS 2 setting.		JIS 2 operation Normal operation	
↓S					
19	Back up operation	Emergency operation when STD compressor malfunctions.		When STD 2 malfunctions When STD 1 malfunctions Normal operation	
↓S					
20	Refrigerant charge operation	Additional refrigerant charge operation.		Refrigerant charge operation Normal operation	
↓S Push 3 times					
21	Refrigerant recovery operation	Allows operation of refrigerant recovery.		Refrigerant recovery operation Normal operation	
↓S Push two times					
23	CT address	Address for CT.		Address 0 Binary number 1 (4 digits) 2 3 10	
↓S Push two times					
25	Accumulator discharge operation time	Setting for accumulator discharge operation time.		14 minutes 9 minutes	
↓S Push 3 times					
26	Soft start	Setting for soft start time.		9 minutes 14 minutes	
↓S					
Initial setting (EMG)			RETURN BUTTON SET BUTTON		

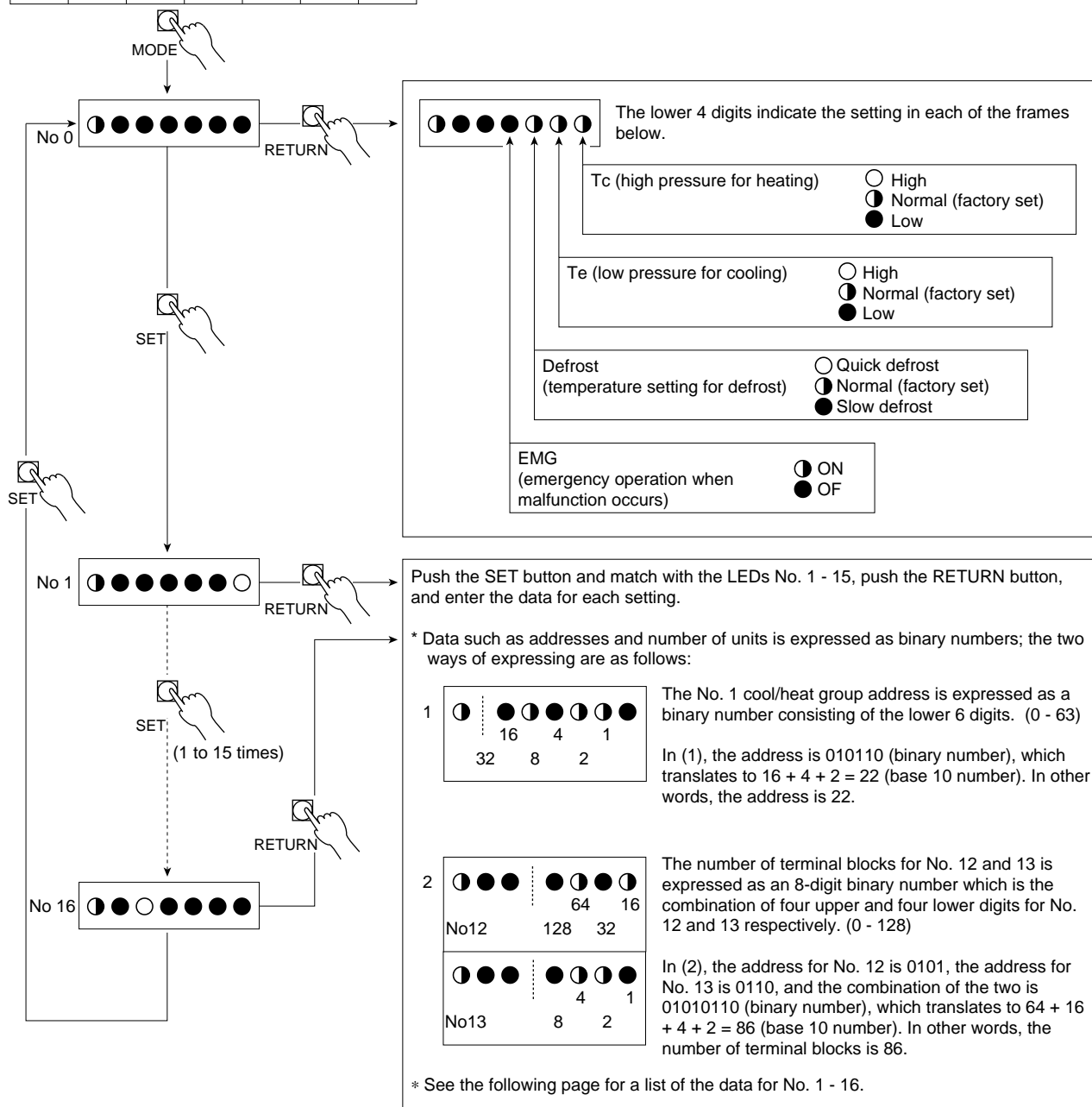
Initial setting (EMG)

(V2733)

4.4.3 Monitor Mode

MODE	TEST	C/H SELECT			L.N.O.P.	SEQ. START
		IND	MASTER	SLAVE		
<input checked="" type="radio"/> H1P	<input checked="" type="radio"/> H2P	<input type="radio"/> H3P	<input checked="" type="radio"/> H4P	<input checked="" type="radio"/> H5P	<input checked="" type="radio"/> H6P	<input type="radio"/> H7P

To enter the monitor mode, push the MODE button when in setting mode 1.



(V1331)

- After making sure the data is correct, push the RETURN button and return to No. 0, or push the MODE button and return to setting mode 1.

Monitor Mode Data

Mode No.	LED	Data	Display method	Size (binary number)
No 1	○ ● ● ● ● ● ○	Cool/heat group address	0 ~ 31	Lower 6 digits
No 2	○ ● ● ● ● ○ ●	Low noise / demand address	0 ~ 31	Lower 6 digits
No 3	○ ● ● ● ● ○ ○	Not used		
No 4	○ ● ● ● ○ ● ●	Not used	0 ~ 63	Lower 6 digits
No 5	○ ● ● ● ○ ● ○	Number of connected Indoor units	0 ~ 63 units	Lower 6 digits
No 6	○ ● ● ● ○ ○ ●	Number of connected BS units	0 ~ 63 units	Lower 6 digits
No 7	○ ● ● ● ○ ○ ○	Number of connected zone units (excluding outdoor and BS units)	0 ~ 63 units	Lower 6 digits
No 8	○ ● ● ○ ● ● ●	Number of outdoor units	0 ~ 63 units	Lower 6 digits
No 9	○ ● ● ○ ● ● ○	Number of BS units	0 ~ 128 units	Lower 4 digits, upper
No 10	○ ● ● ○ ● ○ ●	Number of BS units	0 ~ 128 units	Lower 4 digits, lower
No 11	○ ● ● ○ ● ○ ○	Number of zone units (excluding outdoor and BS units)	0 ~ 63 units	Lower 6 digits
No 12	○ ● ● ○ ○ ● ●	Number of terminal blocks	0 ~ 128 units	Lower 4 digits, upper
No 13	○ ● ● ○ ○ ● ○	Number of terminal blocks	0 ~ 128 units	Lower 4 digits, lower
No 14	○ ● ● ○ ○ ○ ●	Not used		
No 15	○ ● ● ○ ○ ○ ○	Not used		
No 16	○ ● ○ ● ● ● ●	Not used		

4.5 Low Noise Operation

By connecting the external contact input to the low noise input of the outdoor unit external control adaptor for outdoor unit (optional), you can save power and lower operating noise by 2 - 3 dB.

Instructions for Demand Control Operation

1. Outdoor unit field setting

- ◆ Setting mode 1: Set low noise operation to "ON."
- ◆ Setting mode 2: Match low noise operation and demand control address with address of outdoor unit external control adaptor.

2. Outdoor unit external control adaptor setting

- ◆ Function switch (SS1)

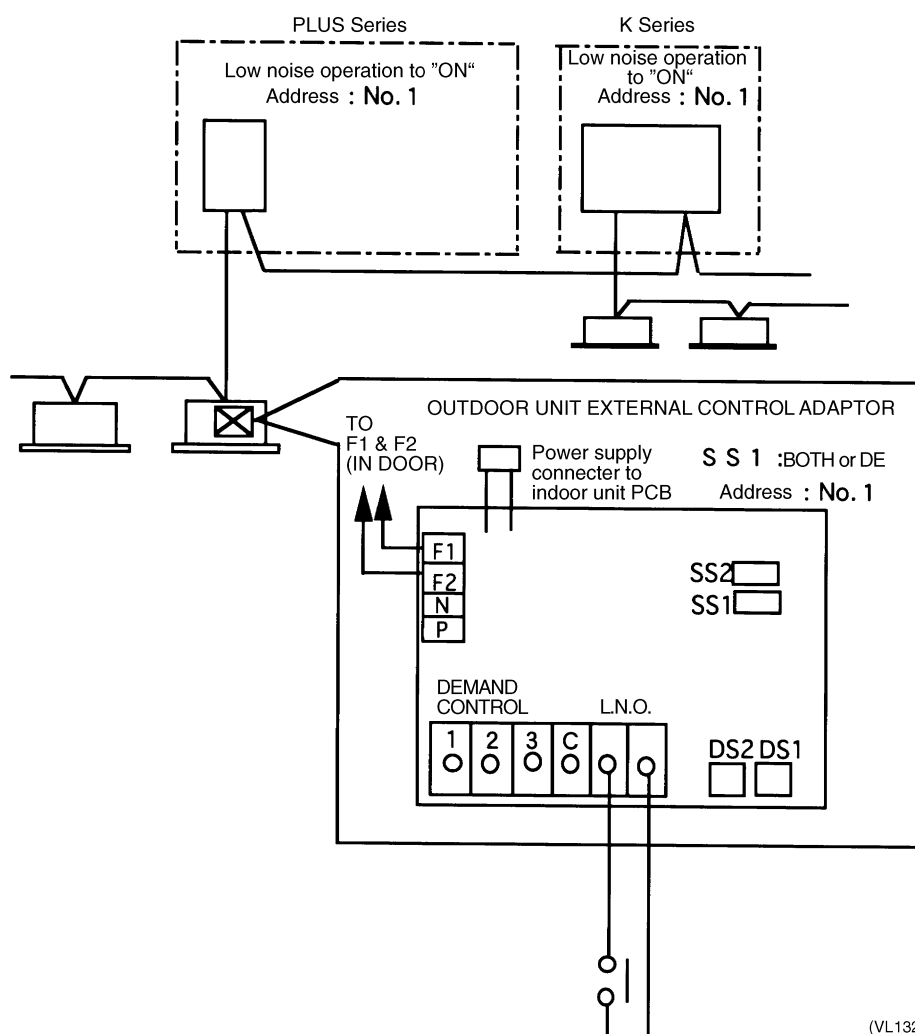
Set to "BOTH" or "DE."

- ◆ Address setting switches (DS1, DS2)

Match with outdoor unit low noise operation and demand control address.

3. Short-circuit the low noise input of outdoor unit external control adaptor for outdoor unit.

Low Noise Control System Example



(VL132)

4.6 Demand Control

By connecting the external contact input to the demand input of the outdoor unit external control adaptor (option), the compressor operating conditions can be controlled for reduced power consumption.

- Demand 1 Approximately 70% level
- Demand 2 Approximately 40% level
- Demand 3 Forced thermostat OFF

Instructions for Demand Control Operation

1. Outdoor unit field setting

- ◆ Setting mode 1: Set low noise operation to "ON."
- ◆ Setting mode 2: Match low noise operation and demand control address with address of outdoor unit external control adaptor.

2. Outdoor unit external control adaptor setting

- ◆ Function switch (SS1)

Set to "BOTH" or "DE."

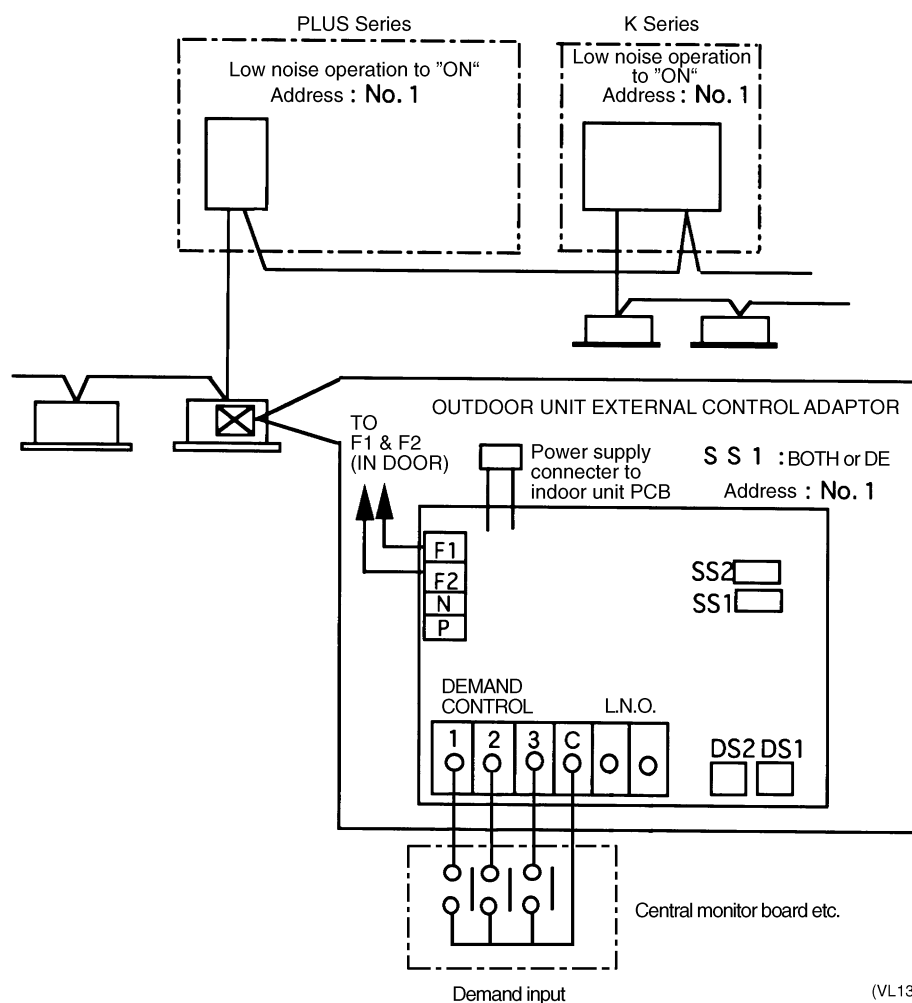
- ◆ Address setting switches (DS1, DS2)

Match with outdoor unit low noise operation and demand control address.

3. Select one from demand input terminals 1 through 3 on the outdoor unit external control adaptor, and short the corresponding terminals.

- Demand 1 Short 1-C.
- Demand 2 Short 2-C.
- Demand 3 Short 3-C.

Demand Control System Example



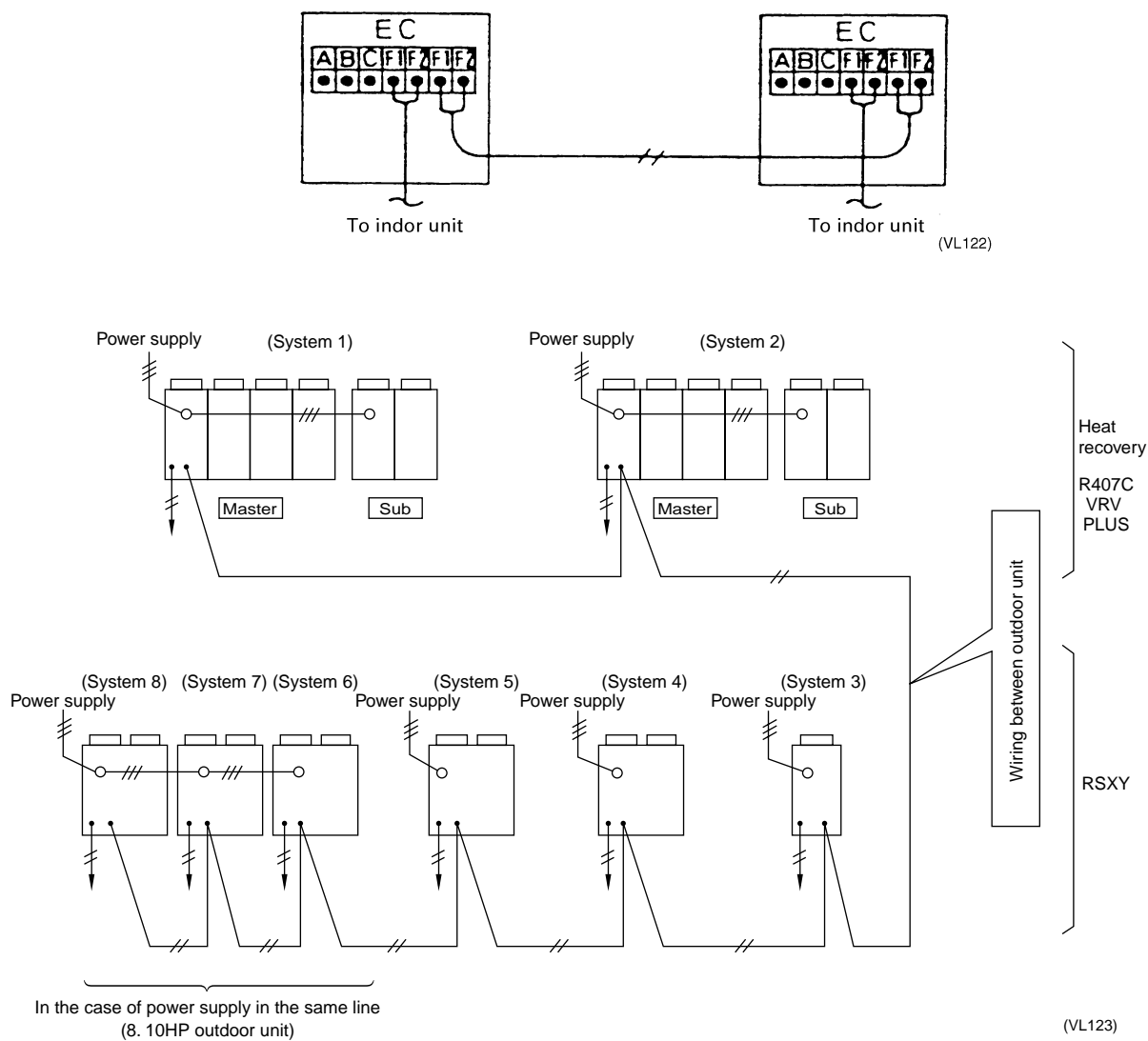
(VL133)

4.7 Sequential Start

- Separates path timing of commercial power supply compressors by 3 seconds each in order to prevent overcurrent when more than 1 compressor are to be started at the same time.
- Improved wiring system enables sequential start of up to 10 outdoor units.

If you want to carry out sequential start, connect outdoor unit - outdoor unit transmission wiring as shown below.

The outdoor unit PC board (EC) is factory set to "sequential start ON."

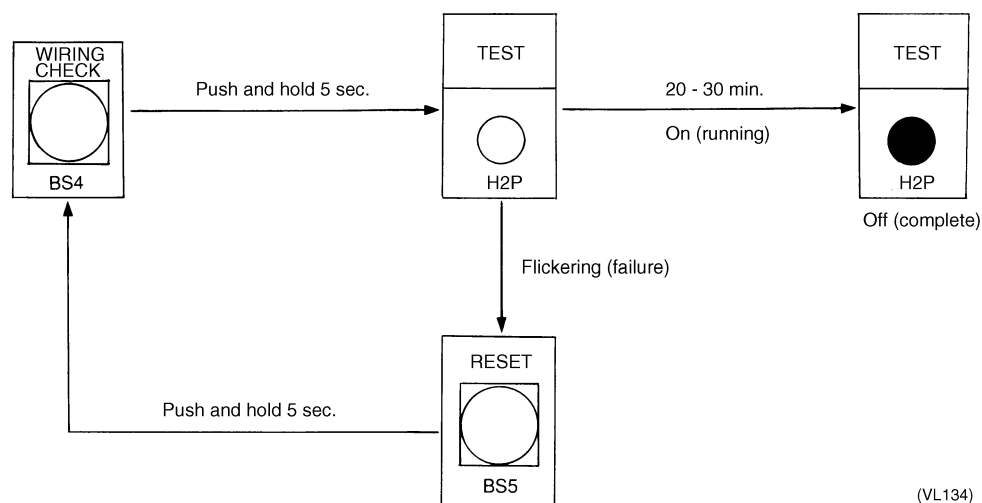


4.8 Wiring Check Operation

If within 12 hours of stopping cooling or heating, be sure to run all indoor units in the system you want to check in the fan mode for about 60 minutes in order to prevent mis-detection.

Operation Method

1. In the monitor mode, check the number of connected indoor units. (See monitor mode.)
2. Push and hold the WIRING CHECK button (BS4) for 5 seconds to perform wiring check operation. While running, TEST (H2P) lights and goes off when finished.
If TEST (H2P) flickers (wiring check operation failure), push and hold the RESET button (BS5) for 5 seconds, and then repeat the procedure from the beginning.
3. About 1 minute after you finish running the system, once again check the number of connected indoor units in the monitor mode and make sure the number agrees with the first time you checked. If not, it indicates that there is a wiring mistake. Fix the wiring of the indoor unit whose remote controller displays "UF" when its ON/OFF switch is turned ON.



Note: Other settings are not accepted during wiring check operation.

4.9 Additional Refrigerant Charge Operation

[Work procedure]

1. Conduct ordinary refrigerant charge.
With the outdoor unit in non-operating condition, charge refrigerant from the liquid-side stop valve service port.
(Keep the stop valves on both liquid and gas sides closed.)
- **Conduct the following operation only when the entire amount of refrigerant could not be charged with the compressor in non-operating condition (otherwise equipment damage can result).**
2. Turn on the power switches of the indoor and outdoor units, and fully open the gas-side stop valve.
(Keep the liquid-side stop valve closed.)

3. Set the service mode.

In service mode 1, press the "MODE" button for 5 seconds to enter service mode 2.		○ ● ● ● ● ● ●
Press the "SET" button to set the LED indicators to the "additional refrigerant charge operation" indication.		○ ● ○ ● ○ ● ●
Press the "RETURN" button.		○ ● ● ● ● ● ①
Press the "SET" button to set the LED indicators as shown at right.		○ ● ● ● ● ① ●
Press the "RETURN" button to end the setting operation.		○ ● ● ● ● ○ ●
Press the "RETURN" button again to start operation.		① ① ● ● ● ● ●
Low pressure level is indicated during operation.	Higher than 3.5k	○ ○ ○ ○ ○ ○ ○
	3.5k or less	○ ○ ● ● ○ ○ ○
	2.5k or less	○ ○ ● ● ● ○ ○
	1.5k or less	○ ○ ● ● ● ● ○
Operation ends (after 30 minutes). (Pressure level immediately before is indicated by flashing LEDs.)		○ ○ ● ● ● ① ① This LED indication shows that the operation stopped with pressure level at [2.5 k or lower].
Push "Mode" button once to complete additional refrigerant charge.		○ ● ● ● ● ○ ●

4. The refrigerant charge is completed when the specified amount of refrigerant is added. If the refrigerant charge operation is not completed in 30 minutes, make the settings again and restart the operation for another 30 minutes.
(When the Confirmation button is pressed during additional refrigerant charge operation, the operation stops.)
5. Disconnect the refrigerant charge hose, then fully open the liquid-side stop valve.

4.10 Refrigerant Recovery Mode

- The electronic expansion valves in the indoor and outdoor units are fixed in the fully open position for refrigerant recovery.

[Work procedure]

1. Stop equipment operation.

2. Set the service mode.

In service mode 1, press the "MODE" button for 5 seconds to enter service mode 2.	○ ● ● ● ● ● ●
Press the "SET" button to set the LED indicators to the "refrigerant recovery mode" indication.	○ ● ○ ● ○ ● ○
Press the "RETURN" button.	○ ● ● ● ● ● ①
Press the "SET" button to set the LED indicators as shown at right.	○ ● ● ● ● ① ●
Press the "RETURN" button to end the setting operation.	○ ● ● ● ● ○ ●

3. Turn off the power switches of the indoor and outdoor units.

(Turn off the power switch for one of indoor or outdoor unit, then turn off the power switch of the other unit within 10 minutes.)

4. Conduct refrigerant recovery.

5.

Press the "RETURN" button again to return to initial status.	○ ● ● ● ● ● ●
--	---------------

- Cancel the setting in the setting mode or cancel the mode by conducting power reset of the outdoor unit.

4.11 Pump Down Operation

Pump down operation is carried out when refrigerant is moved to outdoor unit if the indoor unit is necessary to disconnect or replacing. In this case, outdoor unit operates in the cooling mode and indoor unit's electronic expansion valves open for 30 minutes.

4.11.1 Method

1. Fully shut the liquid side stop valves. (Leave fully open the gas side stop valve)
2. Set to pump down mode in setting mode 2 as per table below and execute pump down operation.
 - Outdoor unit operate for approximately 30 minutes.
3. After unit stopping, shut the stop valve of the gas pipe.

Setting of Pump Down Mode

Setting Method		LED Display						
		H1P	H2P	H3P	H4P	H5P	H6P	H7P
Hold down the Mode button for 5 seconds to change to setting Mode 2.		○	●	●	●	●	●	●
Push SET button and select LED display to "Pump down operation".		○	●	●	○	○	○	●
Push the RETURN button.		○	●	●	●	●	●	①
Push SET button and select LED display as shown right.		○	●	●	●	●	①	●
Push the RETURN button twice to start operation.		○	●	●	●	●	○	●
		①	①	●	●	●	●	●
During pump down operation, low pressure level is displayed as shown right.	Over 0.343MPa	○	○	○	○	○	○	○
	Below 0.343MPa	○	○	●	●	○	○	○
	Below 0.245MPa	○	○	●	●	●	○	○
	Below 0.147MPa	○	○	●	●	●	●	○
Pump down operation completed ■ Final pressure level is shown with blinking or H2P is shown ON.		○	○	①	①	①	①	①
Push MODE button once to complete this procedure.		○	●	●	●	●	○	●

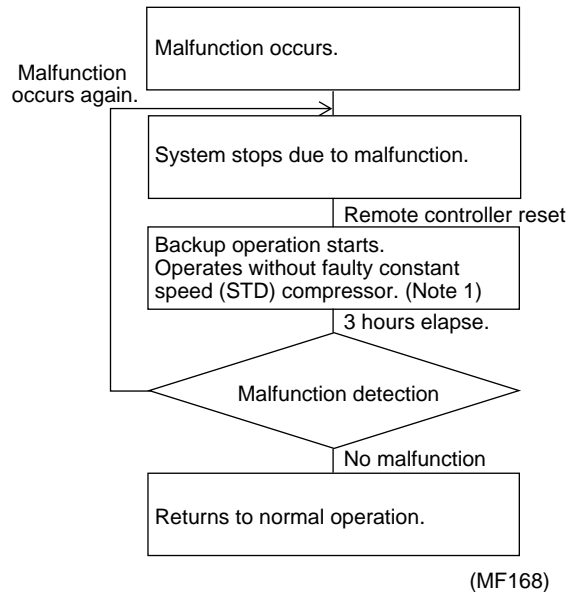
4.12 Backup and Emergency Operation

4.12.1 Backup Operation:

When a constant speed type compressor malfunctions due to OC actuation, if you restart operation by remote controller after the unit stops, you can continue to operate the system without the faulty constant speed type compressor.

The system can run by backup operation for up to 3 hours of total indoor unit operating time. When 3 hours is exceeded and the malfunction still remains, the system once again stops due to malfunction. If the malfunction returns to normal, the system continues to operate as is.

Backup Operation Control Flow



After the system briefly stops due malfunction in order to call attention to the problem, backup operation is started by remote controller.

For the reason described above, after about 3 hours of backup operation, the system again carries out malfunction detection, and the system once again stops due to malfunction if an error is detected.



Note:

1. < For 2-compressor system >

- When the STD compressor OC operates, the operation continues using only the inverter compressor based on remote control reset. (for 3 hours only)

< For 3-compressor system >

- When OC operates again immediately after a backup operation (within 5 minutes after STD compressor startup), STD1 and STD2 are switched and operation is retried.
- If OC activates again, only the inverter compressor is used for the operation.
- (In any case, the backup operation ends after 3 hours.)
- The compressor in which OC is activated is prohibited to operate until power reset is conducted for a restart.

4.12.2 Emergency Operation:

Set in setting mode 2. Operates the system when an outdoor unit malfunctions.

1. When an inverter type outdoor unit malfunctions

When an inverter type compressor malfunctions, you can continue operation using constant speed type compressors only.

Emergency Operation Method

1. Set to "EMG" in setting mode 2.
and
2. All indoor units connected to this outdoor unit are turned on by thermostat.

Emergency operation stops at the following conditions.

1. Emergency operation mode is reset on outdoor unit PC board.
or
2. One or more indoor units connected to this outdoor unit are turned off by thermostat.

Setting of Emergency Mode

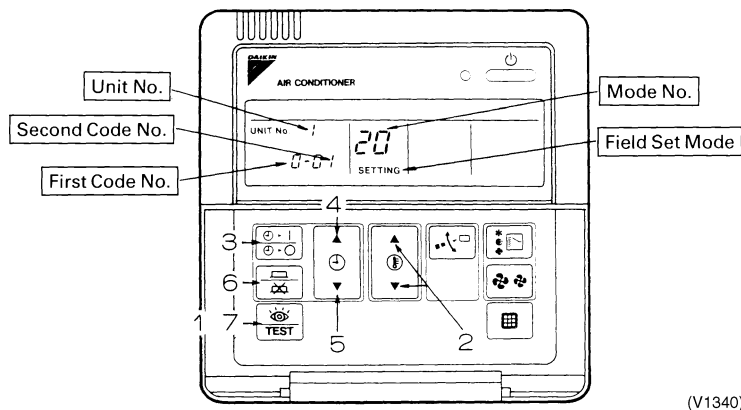
Setting Method	LED Display						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P
Hold down the Mode button for 5 seconds to change to setting Mode 2.	○	●	●	●	●	●	●
Push SET button and select LED display to "Emergency Mode".	○	●	●	●	●	●	●
Push the RETURN button.	○	●	●	●	●	●	①
Push SET button and select LED display as shown right.	○	●	●	●	●	①	●
Push the RETURN button to enter "Emergency Mode". All indoor units must be thermostat ON.	○	●	●	●	●	○	●

4.13 Indoor Field Setting

Making a field setting

Field settings must be made by remote controller if optional accessories have been installed on the indoor unit, or if the indoor unit or HRV unit's individual functions have been modified.

4.13.1 Wired Remote Controller <BRC1A51>



(V1340)

1. When in the normal mode, push the button for 4 seconds or more, and operation then enters the "field set mode."
2. Select the desired "mode No." with the button.
3. During group control and you want to set by each individual indoor unit (when mode No. 20, 21, 22, 23, 25 has been selected), push the time mode button and select the "indoor unit No." to be set.

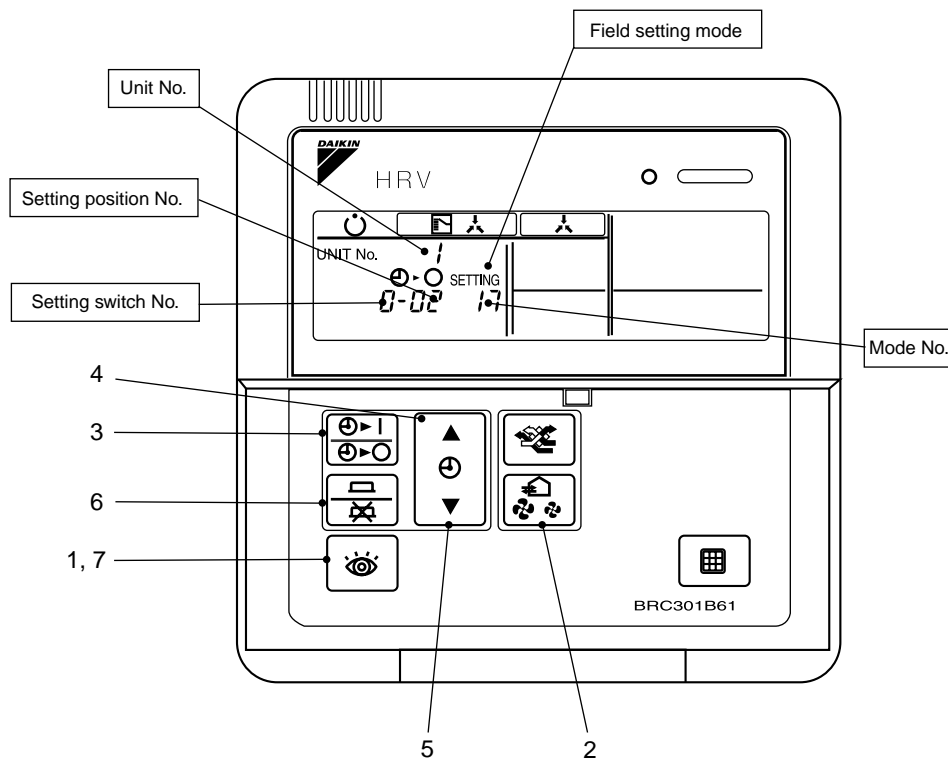
Note: This operation is not required when setting as a group.

4. Push the button and select the first code No.
5. Push the button and select the second code No.
6. Push the timer button one time and "define" the currently set contents.
7. Push the button to return to the normal mode.

(Example)

When setting the filter sign time to "Filter Dirtiness-High" in all group unit setting, set the Mode No. to "10", Mode setting No. to "0" and setting position No. to "02".

4.13.2 Wired Remote Controller – Heat Reclaim Ventilation <BRC301B61>



(V1341)

Setting procedure

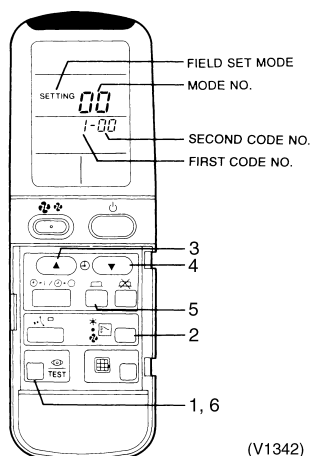
1. In the Normal Mode, press the button for more than 4 seconds to enter the Local Setting mode.
2. Using the (Mode No. UP) and [Ventilation Volume] (Mode No. DOWN) buttons to select a desired Mode No.
3. To set individual Heat Reclaim Ventilation units in group control (select Mode Nos. 27 and 28 (Heat Reclaim Ventilation)), press the button and choose the Unit No. to set. (This step is not necessary in all group unit setting.)
4. Press the UP button to select a Setting Switch No.
5. Press the DOWN button to select a Setting Position No.
6. Press the button once to enter the settings.
7. Depress the button for about 1 second to return to the Normal Mode.







(Example)

When setting the filter sign time to "Filter Dirtiness - High" in all group unit setting, set the Mode No. to "17," Mode Setting No. to "0" and Setting Position No. to "02."

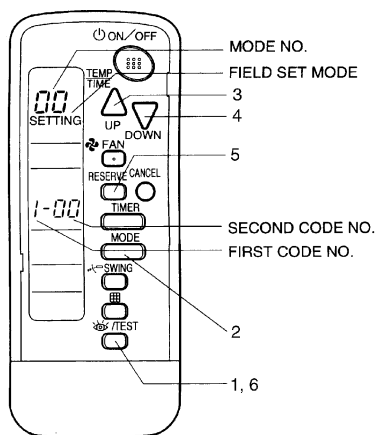
4.13.3 Wireless Remote Controller — Indoor Unit







BRC7A type



1. When in the normal mode, push the  button for 4 seconds or more, and operation then enters the “field set mode.”
2. Select the desired “mode No.” with the  button.
3. Pushing the  button, select the first code No.
4. Pushing the  button, select the second code No.
5. Push the timer  button and check the settings.
6. Push the  button to return to the normal mode.

BRC7C type



1. When in the normal mode, push the  button for 4 seconds or more, and operation then enters the “field set mode.”
2. Select the desired “mode No.” with the  button.
3. Pushing the  button, select the first code No.
4. Pushing the  button, select the second code No.
5. Push the timer  button and check the settings.
6. Push the  button to return to the normal mode.

4.13.4 Setting Contents and Code No. – VRV Unit

VRV system indoor unit settings	Mode No. Note 2	Setting Switch No.	Setting Contents	Second Code No.(Note 3)							
				01		02		03		04	
10(20)	0		Filter contamination heavy/light (Setting for display time to clean air filter) (Sets display time to clean air filter to half when there is heavy filter contamination.)	Light	Approx. 10,000 hrs.	Heavy	Approx. 5,000 hrs.	—		—	
					Approx. 2,500 hrs.		Approx. 1,250 hrs.				
					Approx. 200 hrs.		Approx. 100 hrs.				
	1		Long life filter type (FXYC only, 01 indicates long life)	Long life filter		Super long life filter		—		Soot filter	
	2		Thermostat sensor in remote controller	Use		No use		—			
	3		Display time to clean air filter calculation (Set when filter sign is not to be displayed.)	Display		No display		—			
	12(22)	0	Optional accessories output selection (field selection of output for adaptor for wiring)	Indoor unit turned ON by thermostat				Operation output		Malfunction output	
		1	ON/OFF input from outside (Set when ON/OFF is to be controlled from outside.)	Forced OFF		ON/OFF control		External protection device		—	
		2	Thermostat differential changeover (Set when remote sensor is to be used.) FXYCP, FXYFP, FXYHP only	1°C		0.5°C		—		—	
		3	OFF by thermostat fan speed	LL		Set fan speed		—		—	
		4	Automatic mode differential (automatic temperature differential setting for VRV system heat recovery series cool/heat)	01:0	02:1	03:2	4:03	05:4	6:05	7:06	08:7
		5	Power failure automatic reset	Not equipped		Equipped		—		—	
	13(23)	0	High air outlet velocity (Set when installed in place with ceiling higher than 2.7 m.) FXYF only	N		H		—		—	
		1	Selection of air flow direction (Set when a blocking pad kit has been installed.) FXYF only	F (4 directions)		T (3 directions)		W (2 directions)		—	
		2	Horizontal air discharge	Equipped		Not equipped				—	
		3	Air flow direction adjustment (Set at installation of decoration panel.) FXYK only	Equipped		Not equipped				—	
		4	Field set air flow position setting	Draft prevention		Standard		Ceiling Soiling prevention		—	
		5	Field set fan speed selection (fan speed control by air discharge outlet for phase control)	Standard		Optional accessory 1		Optional accessory 2		—	
15(25)	1		Thermostat OFF excess humidity	Not equipped		Equipped		—		—	
	3		Drain pump humidifier interlock selection	Not equipped		Equipped		—		—	
	4		Sets whether filter sign is to be output by time or by input.	Time addition		Input		—		—	
	5		Field set selection for individual ventilation setting by remote controller	Not equipped		Equipped		—		—	
	6		Field set selection for individual ventilation setting by remote controller	Not equipped		Equipped		—		—	


Notes:

- Settings are made simultaneously for the entire group, however, if you select the mode No. inside parentheses, you can also set by each individual unit. Setting changes however cannot be checked except in the individual mode for those in parentheses.
- The mode numbers inside parentheses cannot be used by wireless remote controllers, so they cannot be set individually. Setting changes also cannot be checked.
- Mode numbers 17 (27) and 19 (29) are HRV functions that can be set from a VRV system remote controller.
- The second code No. is factory set to "01." The field set air flow position setting is however factory set to "02".
- Do not make settings other than those described above. Nothing is displayed for functions the indoor unit is not equipped with.
- "88" may be displayed to indicate the remote controller is resetting when returning to the normal mode.

4.13.5 Field Setting, Service Mode – Heat Reclaim Ventilation (HRV)

1. Field setting
Used for initial setting of heat reclaim ventilation unit.
2. Service mode
Used for confirmation of unit Nos. in the group and reallocation of unit Nos.

List of Field Setting and Service Mode

Heat Reclaim Ventilation (HRV)	Mode No.	Setting switch No.	Setting contents	Setting position					
				01	02	03	04	05	06
	17(27)	0	Filter cleaning time setting	Approx. 2500 hr.	Approx. 1250 hr.	No counting	—	—	—
		2	Pre-cool/pre-heat On/Off setting	Off	On	—	—	—	—
		3	Pre-cool/pre-heat time (min.) setting	30 min.	45 min.	60 min.		—	—
		4	Fan speed initial setting	Normal	Ultra-High	—	—	—	—
		5	Yes / No setting for direct duct Connection with VRV system Setting for cold areas (Fan operation selection for heater thermostat OFF)	No duct (Air flow setting)	With duct (fan off)	—	—	—	—
						No duct		With duct	
						Fan off	Fan L	Fan off	Fan L
		7	Centralized / individual setting	Centralized	Individual	—	—	—	—
		8	Centralized zone interlock setting	No	Yes	Priority on Operation	—	—	—
		9	Pre-heat time extension setting	0	30 min.	60 min.	90 min.	—	—
	18(28)	0	External signal setting JC / J2	Last command	Priority on external input	—	—	—	—
		1	Setting for direct power-on	Off	On	—	—	—	—
		2	Auto restart setting	Off	On	—	—	—	—
		4	Indication of ventilation mode / Not indication	Indication	No Indication	—	—	—	—
		7	Fresh up air supply / exhaust setting	No Indication	No Indication	Indication	Indication	—	—
				Supply	Exhaust	Supply	Exhaust	—	—
		8	External input terminal function selection (between J1 and JC)	Fresh up	Overall alarm	Overall malfunction	Forced off	Fan forced off	Air flow increase
		9	KRP50-2 output switching selection (between 1 and 3)	Humidify	Abnormal	Fan on / off	—	—	—
	19(29)	0	Air flow setting	Low	Low	Low	Low	High	High
		2	Ventilation mode setting	Automatic	Total heat exchange	Normal	—	—	—
		3	Fresh up operation	OFF	ON	—	—	—	—
		8	Electric heater setting	No delay	No delay	ON / OFF Delay	ON / OFF Delay	—	—

**Note:**







1. All the setting can be made by the remote controller for VRV and HRV unit.
The setting of mode No. 19 (29) and 40 can be made only by the remote controller for VRV unit. The mode No. 30 is used for the individual setting such as the calculation of power bill, etc.
2. The mode No. in () is used for making individual setting of each unit.
3. **Group number setting for centralized controller**
 1. Mode no. 00: Group controller
 2. Mode no. 30: Individual controller
 - * Regarding the setting procedure, refer to the section "Group number setting for centralized control" in the operating manual of either the on / off controller or the central controller.

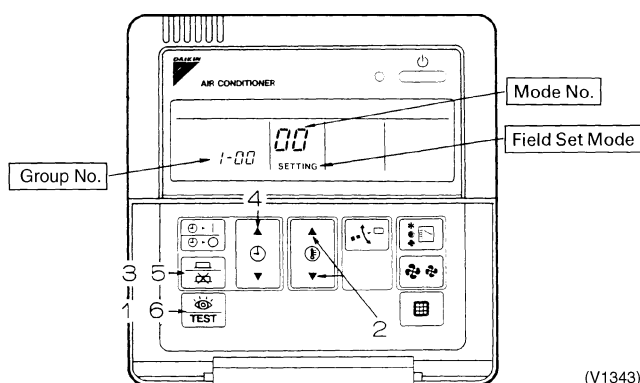
**Caution**

1. The setting positions are set at "01" at the factory.
The ventilation air flow, however, is set at "05" (medium) in the HRV unit. When lower or higher setting is desired, change the setting after installation.

4.14 Centralized Control Group No. Setting

BRC1A51-52






- If carrying out centralized control by central remote controller or unified ON/OFF controller, group No. must be set for each group individually by remote controller.
 - Group No. setting by remote controller for centralized control
1. When in the normal mode, push the  button for 4 seconds or more, and operation then enters the “field setting mode.”
 2. Set mode No. “00” with the  button. *
 3. Push the  button to inspect the group No. display.
 4. Set the group No. for each group with the  button (The group No. increases in the manner of 1-00, 1-01, ..., 1-15, 2-00, ..., 4-15. However, the unified ON/OFF controller displays only the group No. within the range selected by the switch for setting each address.)
 5. Push the timer  button to define the selected group No.
 6. Push the  button to return to the normal mode.



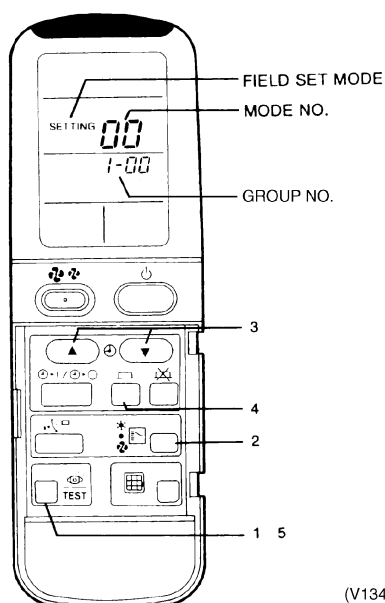
(V1343)

- Even if not using a remote controller, connect the remote controller when setting the group No., set the group No. for centralized control, and disconnect after making the setting.
- Set the group No. after turning on the power supply for the central remote controller, unified ON/OFF controller, and indoor unit.

BRC7A Type

- Group No. setting by wireless remote controller for centralized control
1. When in the normal mode, push  button for 4 seconds or more, and operation then enters the “field set mode.”
 2. Set mode No. “00” with  button.
 3. Set the group No. for each group with  button (advance/backward).
 4. Enter the selected group numbers by pushing  button.
 5. Push  button and return to the normal mode.







BRC7A Type



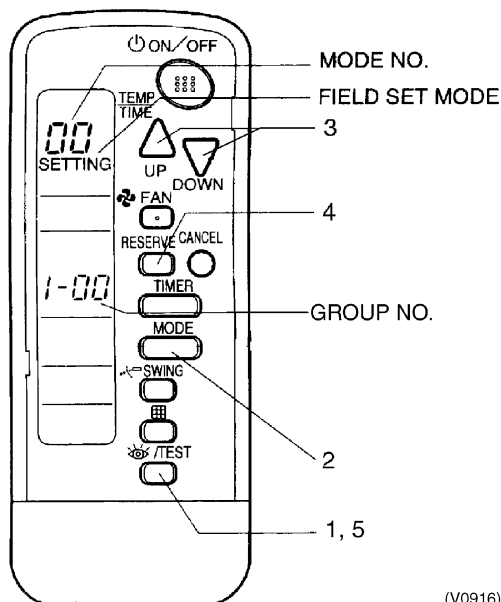
(V1344)

BRC7C Type

■ Group No. setting by wireless remote controller for centralized control

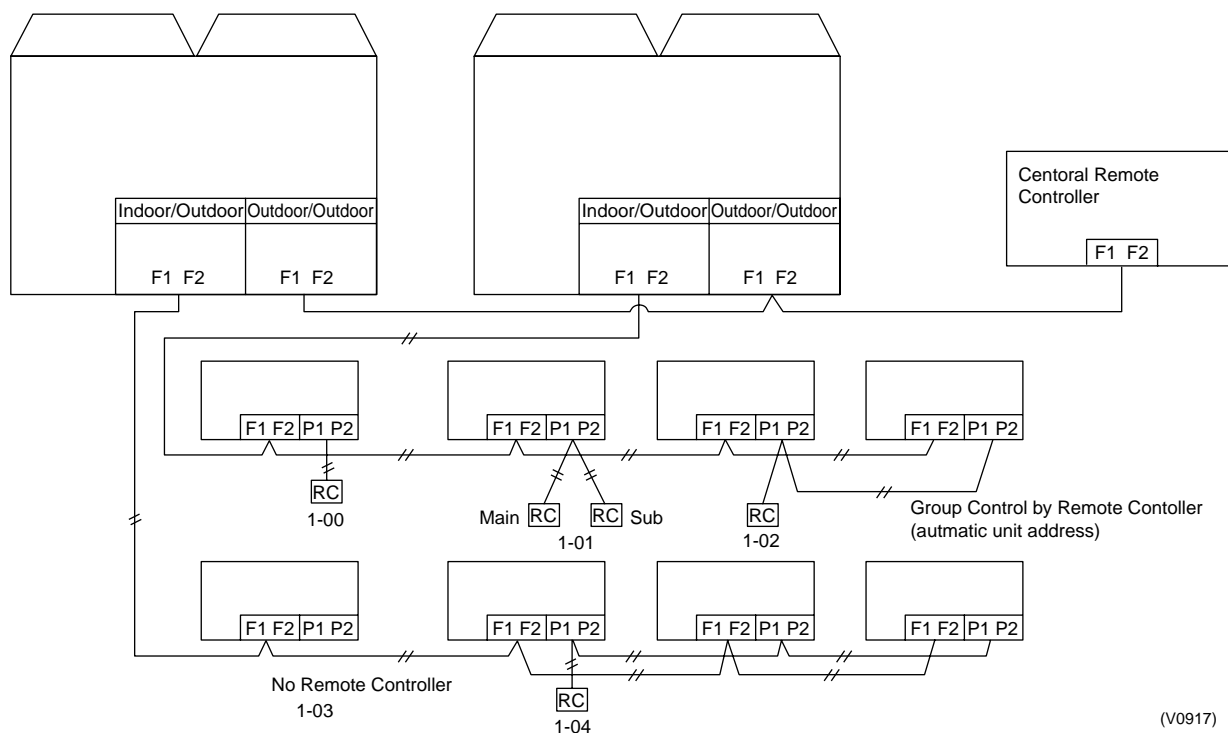
1. When in the normal mode, push  button for 4 seconds or more, and operation then enters the "field set mode."
2. Set mode No. "00" with  button.
3. Set the group No. for each group with   button (advance/backward).
4. Enter the selected group numbers by pushing  button.
5. Push  button and return to the normal mode.

BRC7C Type



(V0916)

Group No. Setting Example



(V0917)

- If you have to set the address for each unit for calculating cost, etc., set the mode No. to "30."

**Caution**

When turning the power supply on, the unit may often not accept any operation while "88" is displaying after all indications were displayed once for about 1 minute on the liquid crystal display.

This is not an operative fault.

4.15 Contents of Control Modes

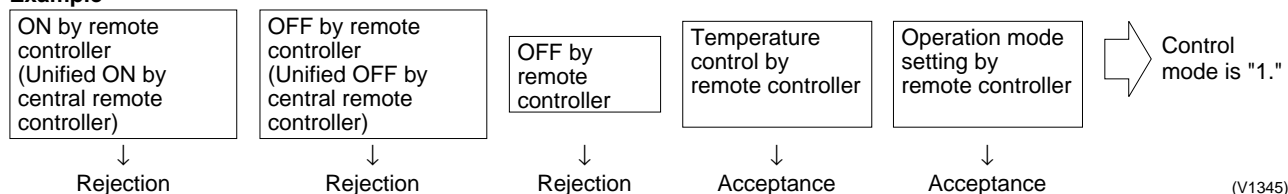
Twenty modes consisting of combinations of the following five operation modes with temperature and operation mode setting by remote controller can be set and displayed by operation modes 0 through 19.

- ◆ ON/OFF control impossible by remote controller
Used when you want to turn on/off by central remote controller only.
(Cannot be turned on/off by remote controller.)
- ◆ OFF control only possible by remote controller
Used when you want to turn on by central remote controller only, and off by remote controller only.
- ◆ Centralized
Used when you want to turn on by central remote controller only, and turn on/off freely by remote controller during set time.
- ◆ Individual
Used when you want to turn on/off by both central remote controller and remote controller.
- ◆ Timer operation possible by remote controller
Used when you want to turn on/off by remote controller during set time and you do not want to start operation by central remote controller when time of system start is programmed.

How to Select Operation Mode

Whether operation by remote controller will be possible or not for turning on/off, controlling temperature or setting operation mode is selected and decided by the operation mode given on the right edge of the table below.

Example

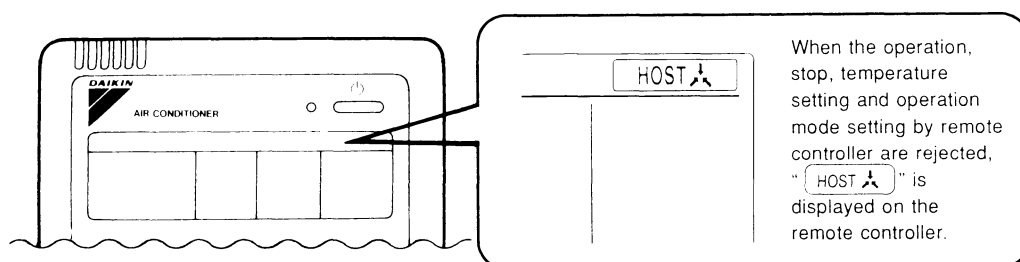


Control mode	Control by remote controller					Control mode
	Operation		OFF	Temperature control	Operation mode setting	
	Unified operation, individual operation by central remote controller, or operation controlled by timer	Unified OFF, individual stop by central remote controller, or timer stop				

ON/OFF control impossible by remote controller	Rejection (Example)	Rejection (Example)	Rejection (Example)	Rejection	Acceptance	0
					Rejection	10
				Acceptance (Example)	Acceptance (Example)	1 (Example)
					Rejection	11
OFF control only possible by remote controller			Acceptance	Rejection	Acceptance	2
					Rejection	12
				Acceptance	Acceptance	3
					Rejection	13
Centralized	Acceptance			Rejection	Acceptance	4
					Rejection	14
				Acceptance	Acceptance	5
					Rejection	15
Individual		Acceptance		Rejection	Acceptance	6
					Rejection	16
				Acceptance	Acceptance	7 *1
					Rejection	17
Timer operation possible by remote controller	Acceptance (During timer at ON position only)	Acceptance (During timer at ON position only)		Rejection	Acceptance	8
					Rejection	18
				Acceptance	Acceptance	9
					Rejection	19

Do not select "timer operation possible by remote controller" if not using a remote controller.
Operation by timer is impossible in this case.

*1. Factory setting



(V1346)

5. Caution for Refrigerant Leaks

5.1 Caution for Refrigerant Leaks

5.1.1 Introduction

(Points to note in connection with refrigerant leaks)

The VRV System, like other air conditioning systems, uses R407C as refrigerant. R407C itself is an entirely safe non-toxic, non-combustible refrigerant. Nevertheless care must be taken to ensure that air conditioning facilities are installed in a room which is sufficiently large. This assures that the maximum concentration level of refrigerant gas is not exceeded, in the unlikely event of major leak in the system and this in accordance to the local applicable regulations and standards.

5.1.2 Maximum Concentration Level

The maximum charge of refrigerant and the calculation of the maximum concentration of refrigerant is directly related to the humanly occupied space in to which it could leak.

The unit of measurement of the concentration is kg/m^3 (the weight in kg of the refrigerant gas in 1m^3 volume of the occupied space).

Compliance to the local applicable regulations and standards for the maximum allowable concentration level is required.

In Japan the maximum allowed concentration level of refrigerant to a humanly space for R407C is limited to 0.3 kg/m^3

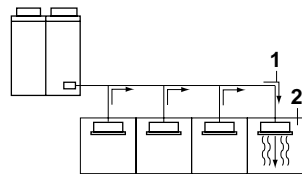


Fig. 32
(V0885)

1. Direction of The Refrigerant Flow
2. Room where refrigerant leak has occurred (outflow of all the refrigerant from the system)

5.1.3 Procedure for Checking Maximum Concentration

Check the maximum concentration level in accordance with steps 1 to 4 below and take whatever action is necessary to comply.

Step 1

Calculate the amount of refrigerant (kg) charged to each system separately.

amount of refrigerant in a single unit system (amount of refrigerant with which the system is charged before leaving the factory)	+	additional charging amount (amount of refrigerant added locally in accordance with the length or diameter of the refrigerant piping)	=	total amount of refrigerant (kg) in the system
---	---	--	---	--



Note:

- Where a single refrigerant facility is divided into 2 entirely independent refrigerant systems then use the amount of refrigerant with which each separate system is charged.

Step 2

Calculate the smallest room volume (m³)

In case like the following, calculate the volume of (A), (B) as a single room or as the smallest room.

A. Where there are no smaller room divisions

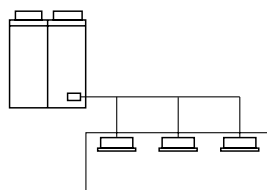
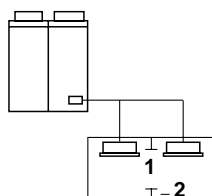


Fig. 33
(V0886)

B. Where there is a room division but there is an opening between the rooms sufficiently large to permit a free flow of air back and forth.



- Opening between rooms
- Partition

Fig. 34
(V0887)

(Where there is an opening without a door or where there are openings above and below the door which are each equivalent in size to 0.15% or more of the floor area.)

Step 3

Calculating the refrigerant density using the results of the calculations in steps 1 and 2 above.

total volume of refrigerant in the refrigerant system	÷	size (m ³) of smallest room in which there is an indoor unit installed	≤	maximum concentration level (kg/m ³)
---	---	--	---	--

If the result of the above calculation exceeds the maximum concentration level then make similar calculations for the second then third smallest room and so until the result falls short of the maximum concentration.

Step 4

Dealing with the situations where the result exceeds the maximum concentration level.

Where the installation of a facility results in a concentration in excess of the maximum concentration level then it will be necessary to revise the system.

Please consult your Daikin supplier.

Step 5**Dealing with situations where the result exceeds the dangerous concentration level.**

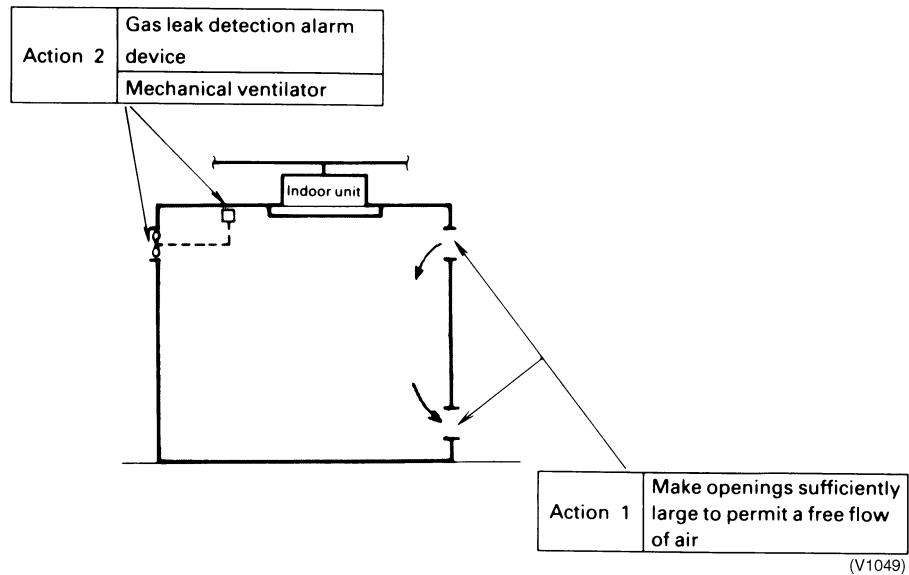
Where the installation of a facility results in a concentration in excess of the dangerous concentration level then it may be necessary to revise the system design to some extent or else take one of the following courses of action.

Action **Making openings which will allow the air to flow freely into the room.**

1: Make openings above and below the door which are each equivalent in size to 0.15% or more of the floor area or make a doorless opening.

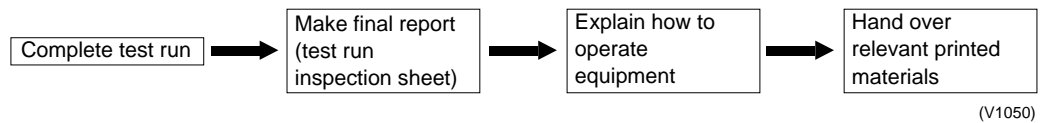
Action **Fit a mechanical ventilator linked to a gas leak detection alarm device.**

2:



6. Hand Over to Customer

6.1 Operational Steps



Important Points

- The measurements taken during the test run should be recorded and kept on a test run inspection sheet.
- Do not forget to record the **length of the refrigerant piping** and the **refrigerant additional charging volume** on the plate on the back of the outdoor unit external notice board, as this information will be required for servicing the system.
- Explain to the customer how to operate the equipment and let him try it.
- Assemble all the relevant diagrams and other printed matter which is required to operate the system and hand it all over to the customer (on the spot) and tell him to keep it.

List of equipment which has been delivered

Contract drawings

It is essential to prepare a control wiring diagram which clarifies the refrigerant system and the control system.

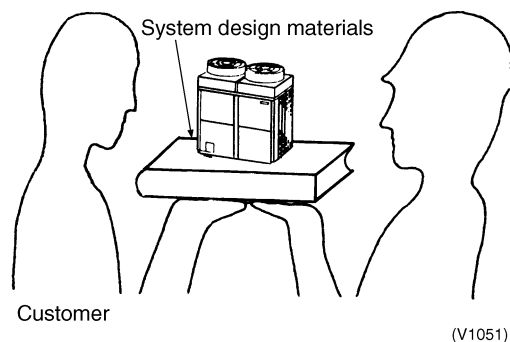
1 set of operation manuals

Names of those responsible for the work (emergency contact address)

Equipment guarantees.

(V1143)

- Make the service contact address clear.



7. Appendix

7.1 Operating Noise of Indoor Units

7.1.1 Difference between Catalogue Data and Actual Noise

Operating noise differs depending on the place of measurement (room) because of the various degrees with which the room reverberates the sound. To determine the amount of reverberation under uniform conditions, the unit has been measured in a dead room with results having been compiled in the below table. The actual sound produced in unit operation can be determined from Table 1.

Sound pressure rise due to room reverberation (Higher than catalogue data)

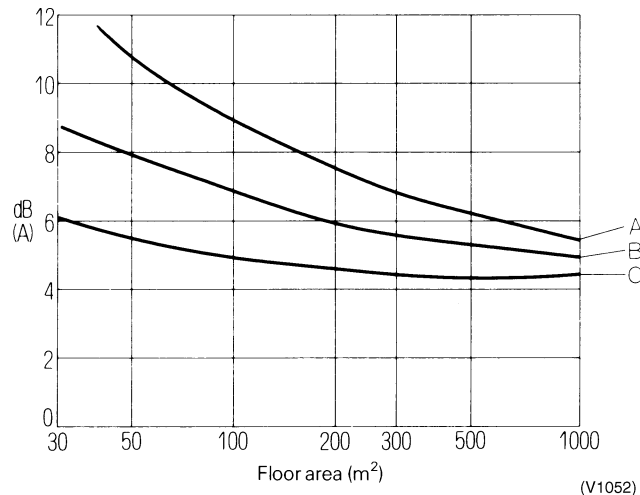


Table 1

		A	B	C
Room Interior Detection	Floor	Mortar	Linoleum tile	Carpet
	Walls	Mortar	Plaster	Fiberglass + Saroncross finish
	Ceiling	Mortar	mineral wool tile	Fiberglass + Saroncross finish
Average Absorbed Sound (Room with Approx. 50 m² Floor Area)		0.05	0.12	0.25
		Typical office		
Estimated value to be added to catalogue value		11~12	8~8.5	5~6

Classifications of indoor unit environments (reference data)

Table 2

Classification	Environment	Example	Faint Noises (NOTE 2)	Recommended Operating Noise on Site
1	Non-active places requiring silence	Reception rooms, libraries, sitting rooms, hospitals (examining rooms) (NOTE 1)	~35	~40
2	Sedate business activities that do not disturb people even over time	Quiet offices, classrooms, small conference rooms, lobbies	~40	~45
3	Somewhat quiet settings that permit soft-spoken conversation, typical activities	Small offices, large conferences rooms, quiet stores, restaurants	~45	~50
4	Somewhat loud settings that permit regular conversation, brisk activity	Large offices, typical stores, cafeterias	~50	~55
5	Loud places that permit conversation in a loud voice, highly active place with many people	Loud large-side offices, large cafeterias, loud stores	~55	~60
6	Rather loud settings	Factories, gymnasiums, recreational places like pachinko parlors	~60	~65



- Notes:**
1. Excluding bedrooms
 2. Reference values of faint noises in the place of usage

7.1.2 Faint Noises and Correcting Operating Noise with Respect to Faint Noises

Faint noises are defined as peripheral sounds existing while the unit is not running, which are picked up when measuring operating noise. If these faint noises are 10 dB or more than the noise produced by the unit, the measured value can be taken as the operating noise of the unit. But, the difference must be corrected if less than 10 dB, because of the effect these noises have on the actual measured value. Also, when the sound meter remains unchanged even while the unit is stopped, we can determine the operational noise to be at least 10 dB less than the faint noises, but we cannot pinpoint the operating noise exactly.

For example, if the faint noises are some 65 dB and the noise produced by the unit in operation is 70 dB, the indicated difference comes to 5 dB. Using Table 3, we recommend you correct the operating noise by about 2 dB to 68 dB.

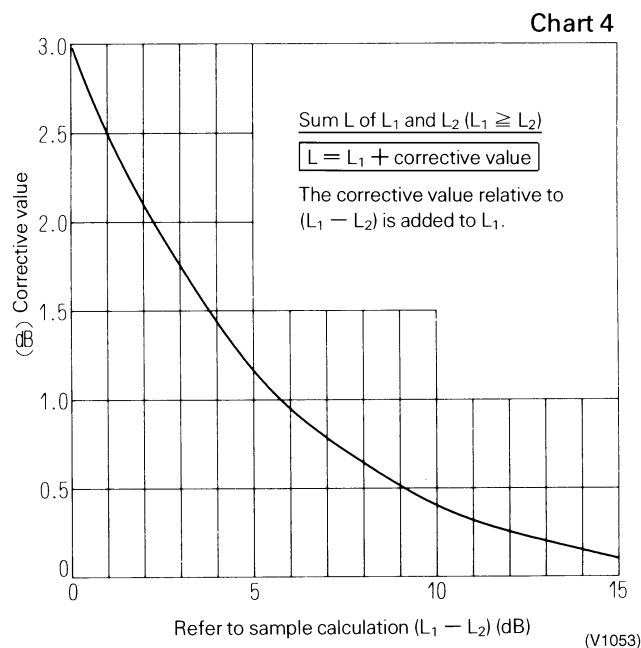
Table 3 Correcting the effect of faint noises

Unit: dB

Difference between when noise is produced and when not	1	2	3	4	5	6	7	8	9	10
Corrective Value	-6.9	-4.4	-3.0	-2.3	-1.7	-1.25	-0.95	-0.75	-0.60	-0.45

7.1.3 Calculating Operating Noise

When two or more units are running at the same time, the amount of operating noise they produce rises. The total amount of noise produced can be obtained ahead of time with Chart 4.



Sample calculation 1

L_1 and L_2 are given as compounded sounds of 50 and 49 dB respectively. Since $L_1 - L_2 = 50 - 49 = 1$, the corrective value is 2.5, therefore $50 + 2.5 = 52.5$ dB.

Sample calculation 2

When sounds of 40 dB, 38 dB, 37 dB and 40 dB are placed in order of magnitude, we obtain the following:

40 dB, 40 dB, 38 dB, 37 dB

To start, the difference between 40 dB and 40 dB is 0, therefore we take a corrective value of 3dB and obtain $40 + 3 = 43$ dB. The compounded sound of 43 dB and 38 dB has a 5.0 dB difference, thus a corrective value of 1.2 dB, which gives us 44.2 dB from $43 + 1.2$. In the same manner, the corrective value for 44.2 dB and 37 dB is approximately 0.7 dB, or in other words, $44.2 + 0.7 = 44.9$ dB.

7.2 Allowable Piping Length, Selection of Refrigerant Pipe Size and Additional change of refrigerant



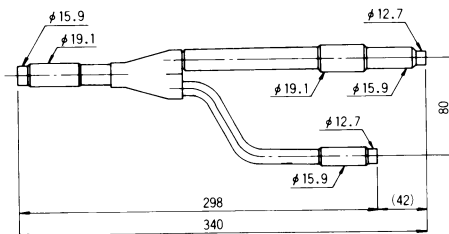
Refer P.171 for “10 Appendix of installation”.

7.3 REFNET Pipe Connections for VRV R407C PLUS Series — Heat Recovery System —

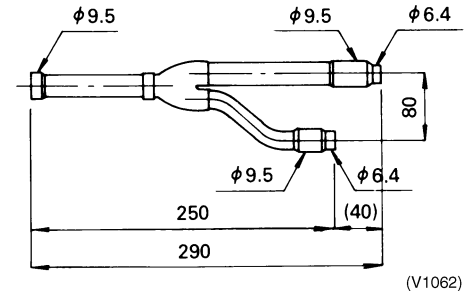
7.3.1 REFNET Joint (for 2 Pipe)

■ KHRP26K18T (100 or more 160)

● Suction gas side



● Liquid side

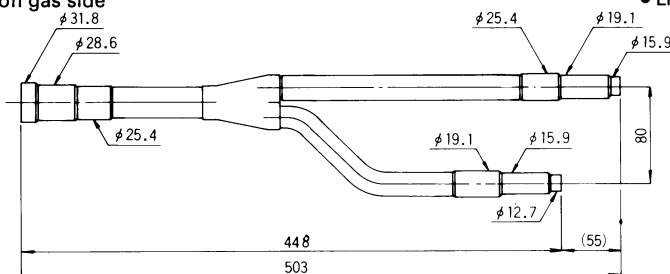


(V1062)

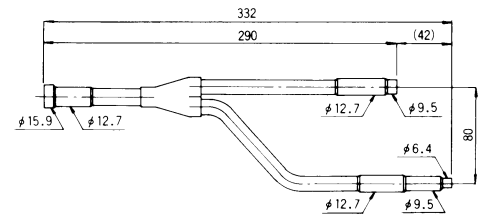
● Including insulator and tape

■ KHRP26K37T (160 or more 330)

● Suction gas side



● Liquid side

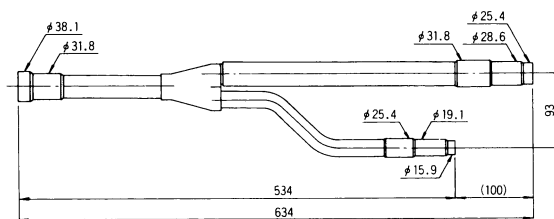


(V1063)

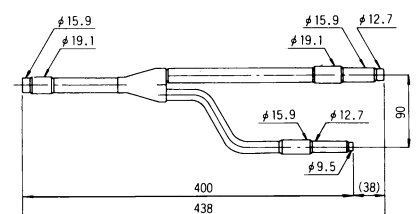
● Including insulator and tape

■ KHRP26K40T (330 or more 640)

● Suction gas side



● Liquid side

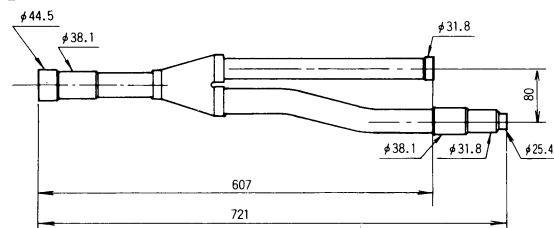


(V1064)

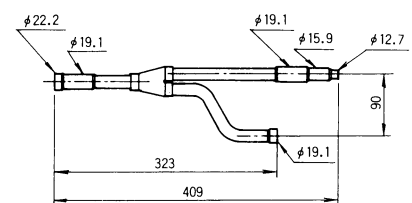
● Including insulator, reducing joint Liquid side $\phi 9.5 \rightarrow \phi 6.4$, $\phi 15.9 \rightarrow \phi 12.7$ gas side $\phi 25.4 \rightarrow \phi 28.6$, $\phi 31.8 \rightarrow \phi 38.1$

■ KHRP26K75T (640 or more)

● Suction gas side



● Liquid side



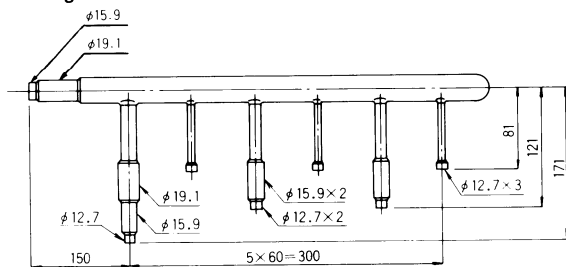
(V1065)

● Including insulator, universal joint Suction gas side $\phi 31.8 \rightarrow \phi 38.1 \rightarrow \phi 44.5$, $\phi 25.4 \rightarrow \phi 19.1 \rightarrow \phi 15.9$
 Liquid side $\phi 19.1 \rightarrow \phi 15.9 \rightarrow \phi 12.7$, $\phi 12.7 \rightarrow \phi 9.5 \rightarrow \phi 6.4$

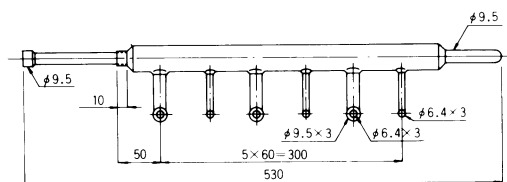
7.3.2 REFNET Header (for 2 Pipe)

■ KHRP26K18H (6 branch fitting) (100 or more 160)

● Suction gas side



● Liquid side

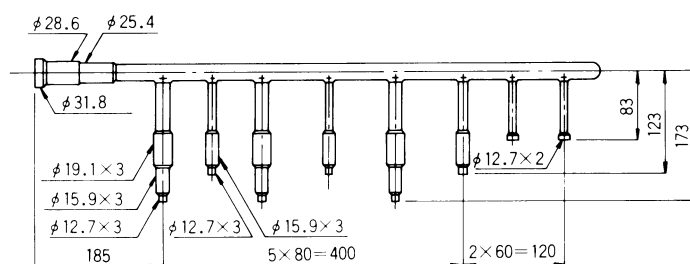


(V1068)

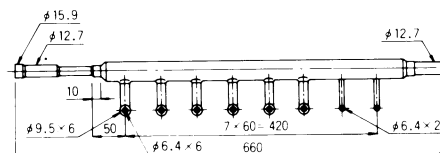
● Including insulator, cap pipes and tapes

■ KHRP26K37H (8 branch fitting) (160 or more 330)

● Suction gas side



● Liquid side

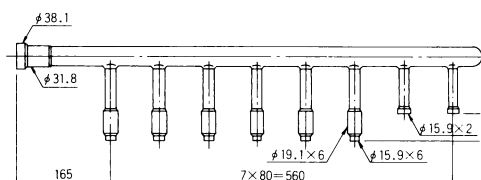


(V1069)

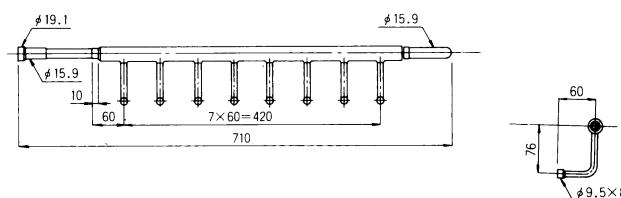
● Including insulator, cap pipes and tapes

■ KHRP26K40H (8 branch fitting) (330 or more 640)

● Suction gas side



● Liquid side

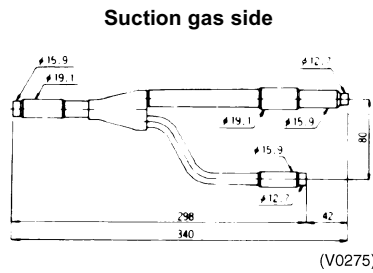


(V1070)

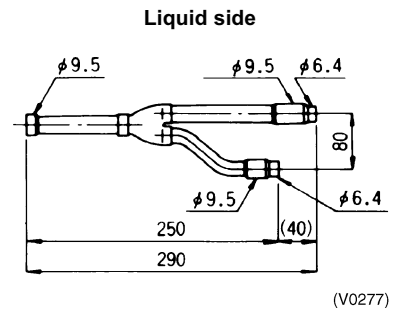
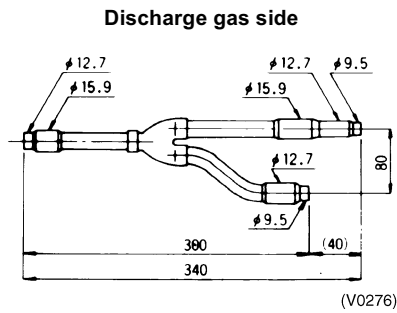
● Including insulator, cap pipes and tapes

7.3.3 REFNET Joint (for 3 Pipe)

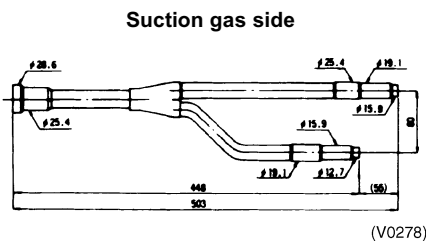
■ KHRP25K18T (less than 160)



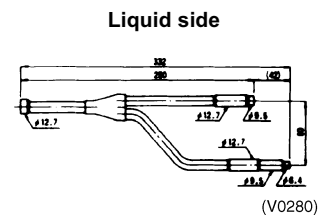
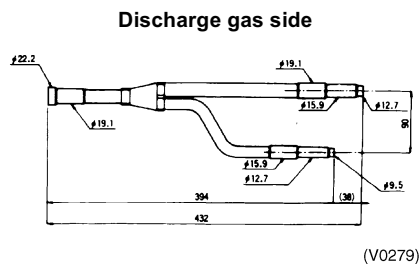
Including 2 sets of insulator



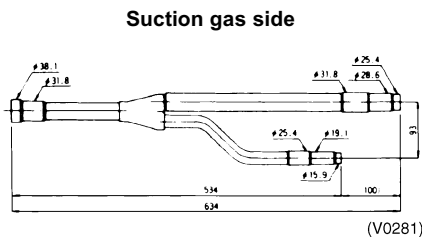
■ KHRP25K37T (160 or more but less than 330)



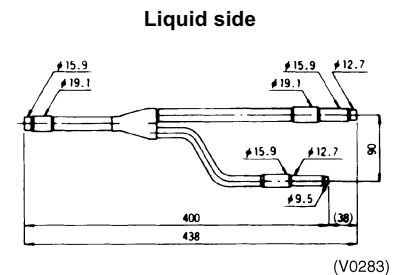
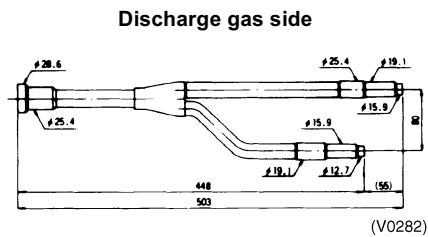
Including insulator



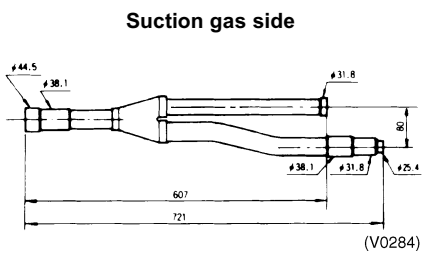
■ KHRP25K40T (330 or more but less than 640)



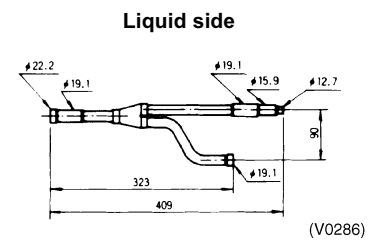
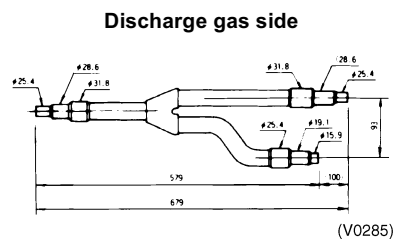
Including insulator, universal joint



■ KHRP25K75T (640 or more)

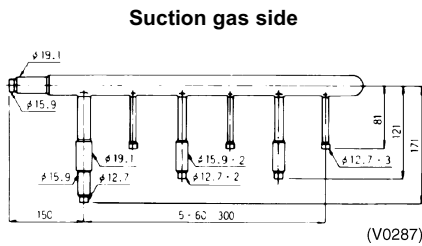


Including insulator, universal joint

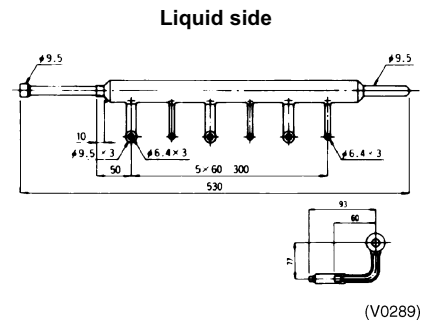
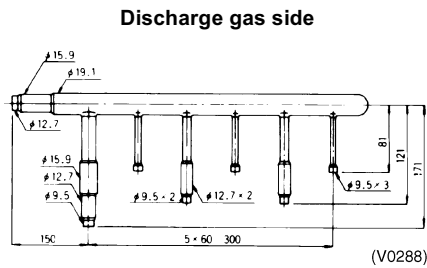


7.3.4 REFNET Header (for 3 Pipe)

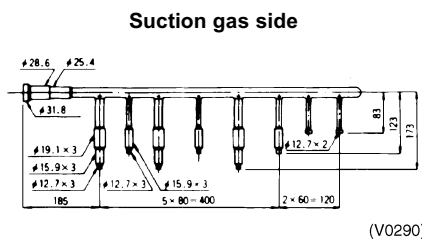
■ KHRP25K18H (6 branch fitting) (less than 160)



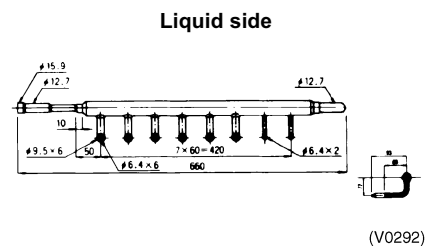
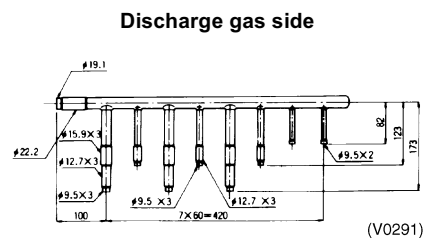
Including insulator, cap pipes and tapes



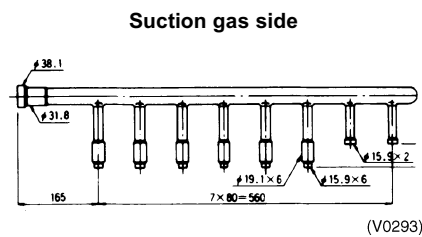
■ KHRP25K37H (8 branch fitting) (160 or more but less than 330)



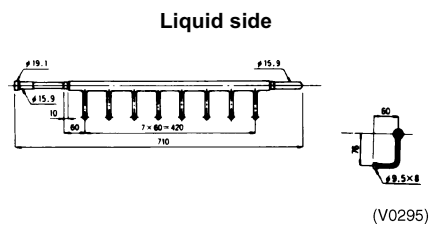
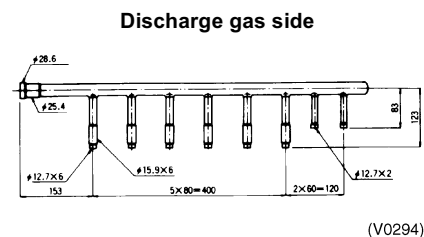
Including insulator, cap pipes



■ KHRP25K40H (8 branch fitting) (330 or more but less than 640)

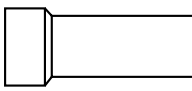

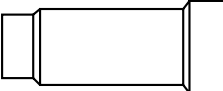


Including insulator, cap pipes



7.3.5 PIPE SIZE REDUCER (For R407C)

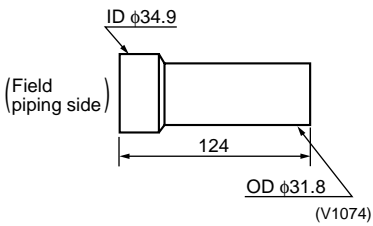
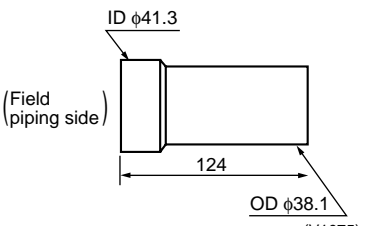
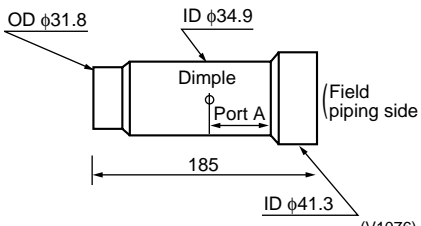
■ This kit including followings;

Name		Pipe size reducer (1)	Pipe size reducer (2)	Pipe size reducer (3)
Figure				
Q'ty	KHRP26K40TP	1	—	1
	KHRP26K40HP	—	—	1
	KHRP26K75TP	1	1	1

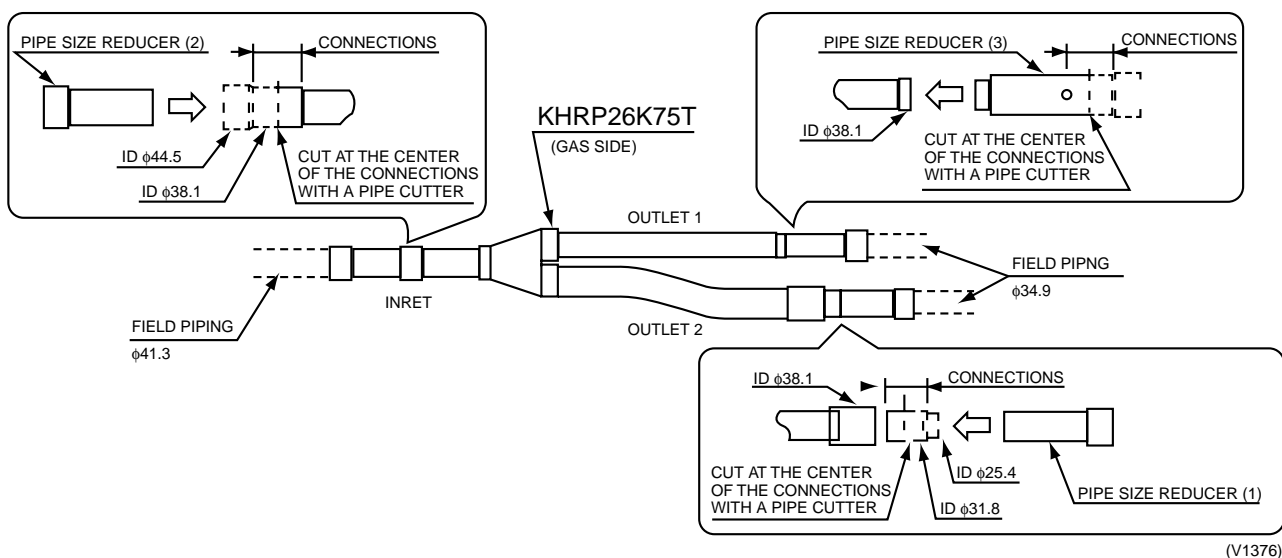
■ This kits are pipe size reducers for REFNET JOINT and HEADER and applicable to following REFNET CONNECTOR.

Kit Name	REFNET CONNECTOR
KHRP26K40TP	KHRP26K40T (Gas pipe)
KHRP26K40HP	KHRP26K40H (Gas pipe)
KHRP26K75TP	KHRP26K75T (Gas pipe)

The figure and size of pipe size reducers are as followings;

Pipe size reducer (1)	Pipe size reducer (2)	Pipe size reducer (3)
		
		★ For φ34.9, cut the center of the part A.

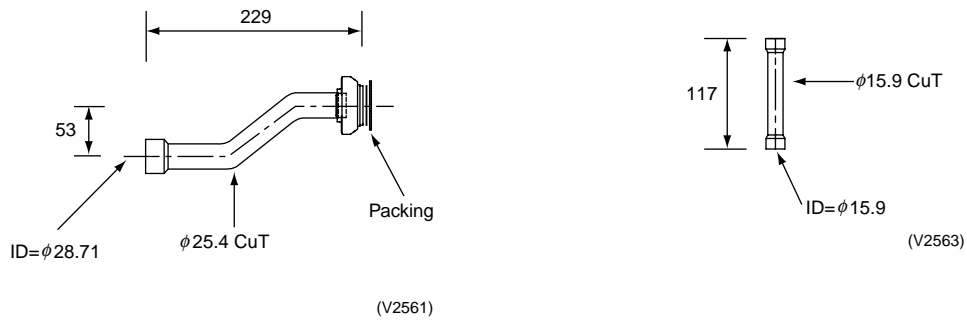
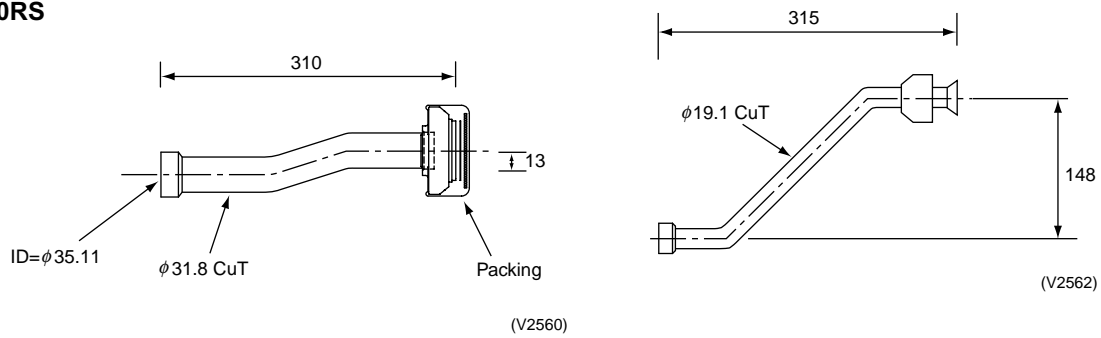
1. Select the field piping size according to the installation manual of the BRANCH PIPING KIT.
2. Connect the PIPE SIZE REDUCER suitable for the field piping size to the branch piping kit.
ex.) Connect the reducers to the branch piping kit, KHRP26K75T. For inlet piping size is φ41.3 and outlet 1-2 piping size are φ34.9.



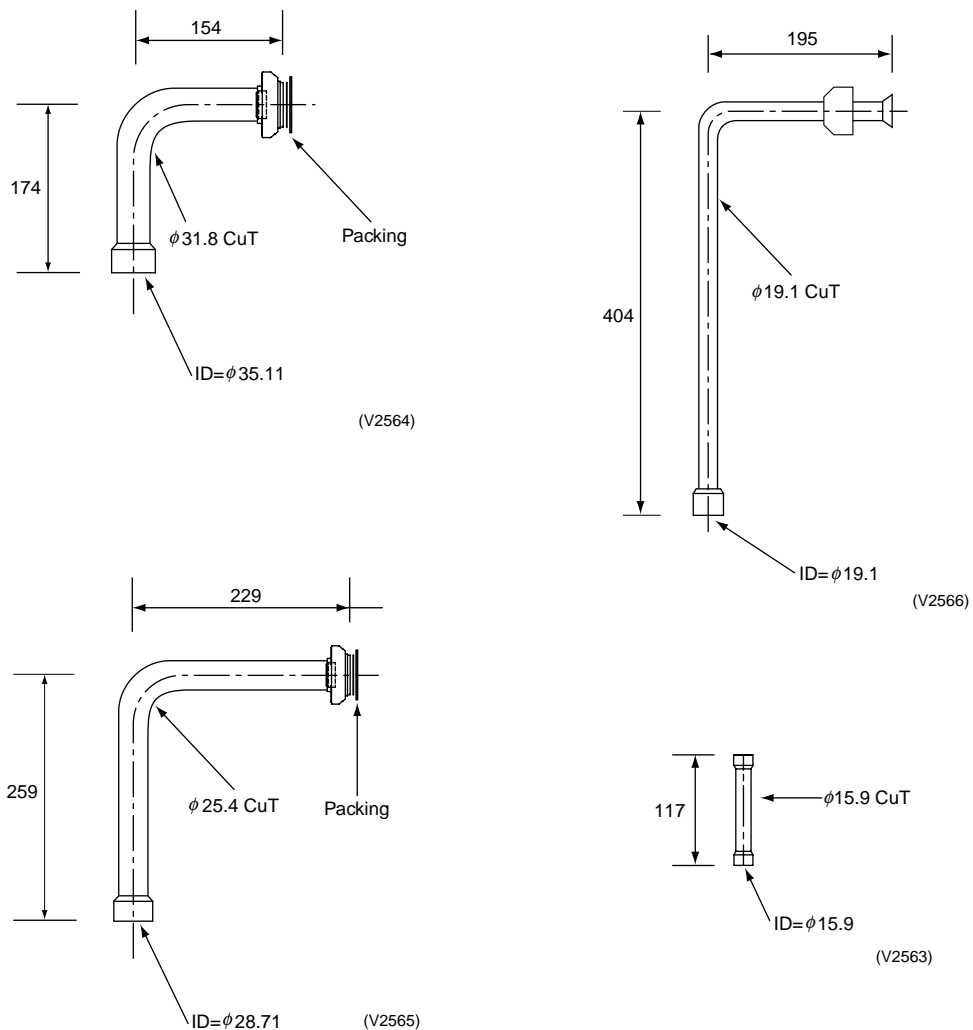
7.3.6 Piping Kits for Side and Bottom Piping – Outdoor Unit (Option)

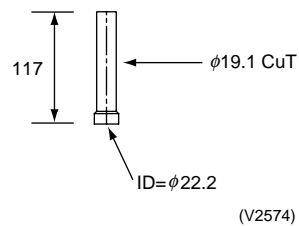
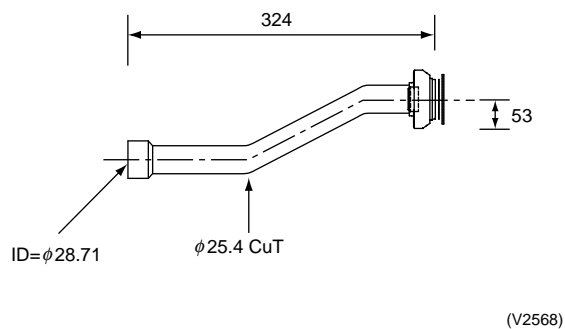
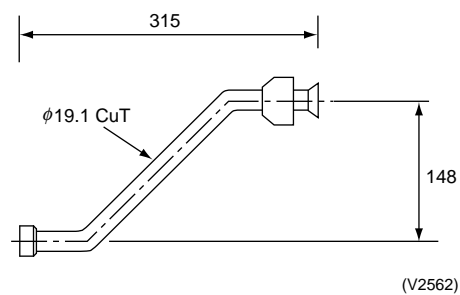
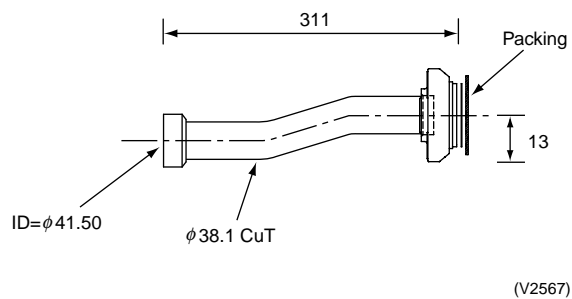
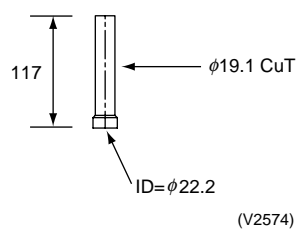
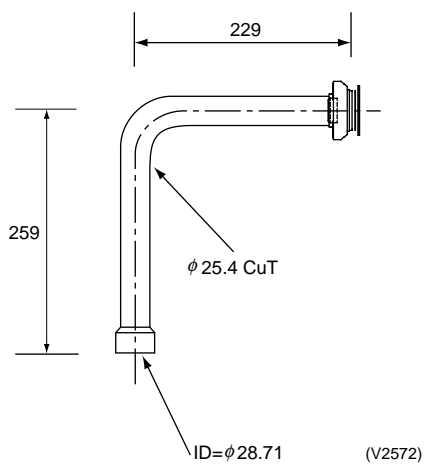
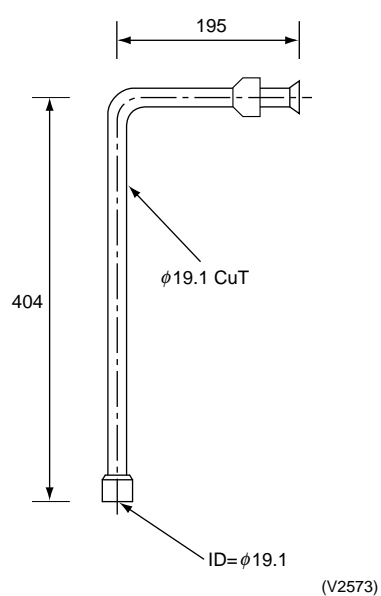
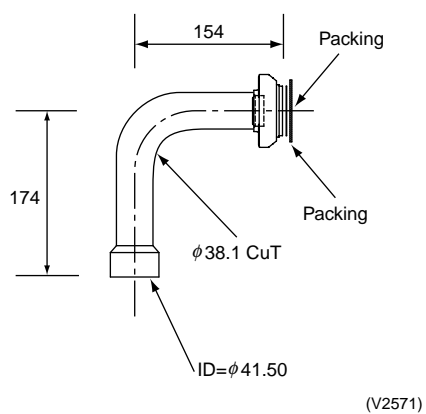
Piping kit for side piping

KHF30A20RS



KHF30A20RB

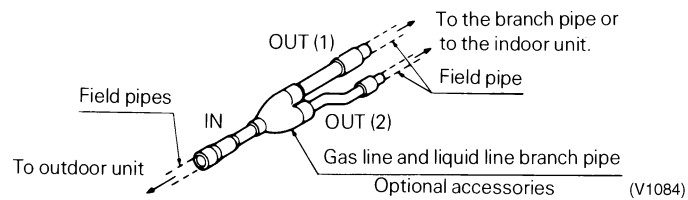


KHF30A30RS**KHF30A30RB**

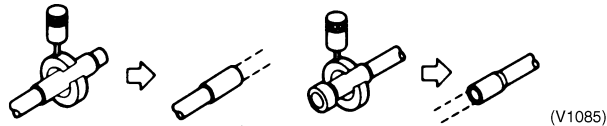
7.3.7 REFNET Joint and Header Installation

1. REFNET joint

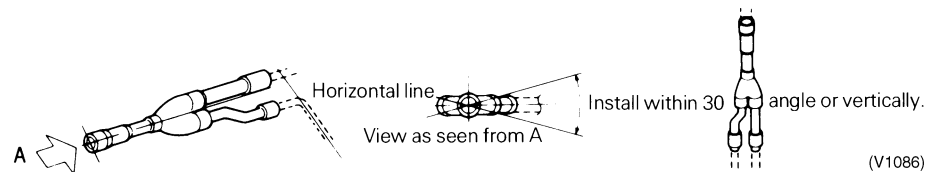
(Gas line and liquid line branch pipe)



- If the selected building pipe differs from the branch pipe in size, cut the connection with a pipe cutter as shown below.

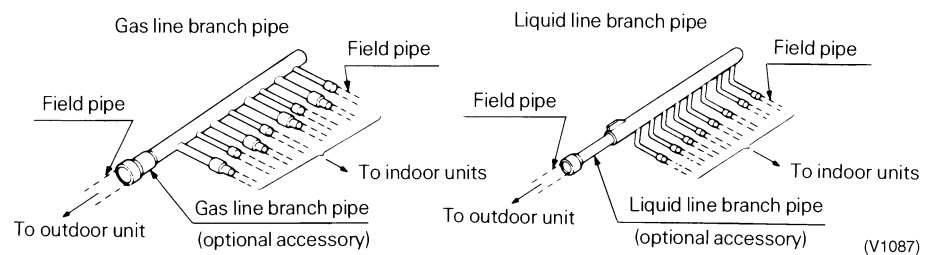


- Install the branch pipe either vertically or horizontally.

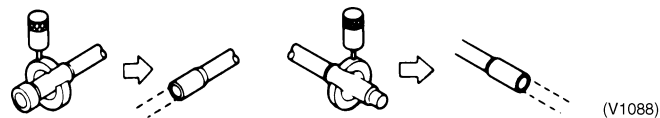


- Insulate the branch pipe as described in the kit installation manual.

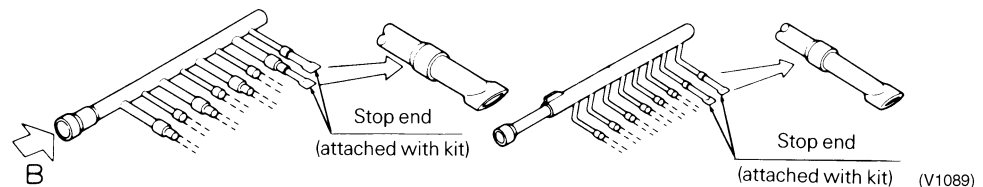
2. REFNET header



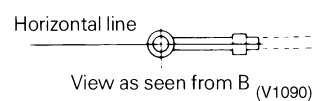
- If the selected field pipe differs from the branch pipe in size, cut the connection with a pipe cutter as shown below.



- Fit a stop end on all open branch pipe connections not in use.



- Install the branch pipe horizontally.



- Insulate the branch pipe as described in the kit installation manual.



Note:

- Install the REFNET joint horizontally or vertically, keeping it within a 30° angle when installed horizontally.
- Install the REFNET header so that it branches horizontally.
- Do not use a T-joint for the branch pipe.

7.4 VRV Inspection Sheet

1/6

Inspection date:

Delivery date:

Transfer date:

Owner		System name	
-------	--	-------------	--

Outdoor units

	Installation location	Model	Unit No.
Outdoor unit			
Main unit			
Sub unit			

BS Unit and Indoor Unit

BS Unit					Indoor Unit				
No.	Installation	Model	Unit No.		No.	Installation	Model	Unit No.	Group No.
					1				
					2				
					3				
					4				
					5				
					6				
					7				
					8				
					9				
					10				
					11				
					12				
					13				
					14				
					15				
					16				

Field settings

C/H SELECT (setting mode 1)			C/H SELECT setting (SS1)			Low noise operation			Sequential start	
IND	MASTER	SLAVE	IN/D		OUT/D	ON		OFF	ON	OFF
Tc			Te			Defrost SETTING			Refrigerant addition/replenishment	
H	M	L	H	M	L	H	M	L	kg	

Company name

Inspector

BS Unit and Indoor Unit

BS Unit					Indoor Unit				
No.	Installation	Model	Unit No.		No.	Installation	Model	Unit No.	Group No.
					17				
					18				
					19				
					20				
					21				
					22				
					23				
					24				
					25				
					26				
					27				
					28				
					29				
					30				
					31				
					32				

(V2575)

Before turning on the power

System name

	Inspection item	Inspection method	Standard (guideline)	Measurement values						Decision						
	Breaker capacity	Visual inspection	Specified capacity	G NG												
Main unit	Refrigerant piping system	Gas detector	No leaks	G NG												
	Heat exchanger	Visual inspection	No clogging or damage	G NG												
	Terminal connection section	Screwdriver, etc.	No looseness	G NG												
	Fan motor electrical insulation	500-V megatester	1 MΩ or more	MΩ												
	Compressor electrical insulation	500-V megatester	1 MΩ or more	INV	MΩ	STD1	MΩ	STD2	MΩ							
	Installation	Visual inspection	Short circuit, etc.	G NG												
Sub unit	Refrigerant piping system	Gas detector	No leaks	G NG												
	Heat exchanger	Visual inspection	No clogging or damage	G NG												
	Terminal connection section	Screwdriver, etc.	No looseness	G NG												
	Fan motor electrical insulation	500-V megatester	1 MΩ or more	MΩ												
	Installation	Visual inspection	Short circuit, etc.	G NG												
BS unit	Refrigerant system	Gas Leak detector or visual inspection	No leaks	BS 1	G	NG	BS 2	G	NG	BS 3	G	NG	BS 4	G	NG	
				BS 5	G	NG	BS 6	G	NG	BS 7	G	NG	BS 8	G	NG	
				BS 9	G	NG	BS 10	G	NG	BS 11	G	NG	BS 12	G	NG	
				BS 13	G	NG	BS 14	G	NG	BS 15	G	NG	BS 16	G	NG	
				BS 17	G	NG	BS 18	G	NG	BS 19	G	NG	BS 20	G	NG	
				BS 21	G	NG	BS 22	G	NG	BS 23	G	NG	BS 24	G	NG	
				BS 25	G	NG	BS 26	G	NG	BS 27	G	NG	BS 28	G	NG	
				BS 29	G	NG	BS 30	G	NG	BS 31	G	NG	BS 32	G	NG	
	Terminal connection section	Screw driver etc.	No looseness	BS 1	G	NG	BS 2	G	NG	BS 3	G	NG	BS 4	G	NG	
				BS 5	G	NG	BS 6	G	NG	BS 7	G	NG	BS 8	G	NG	
				BS 9	G	NG	BS 10	G	NG	BS 11	G	NG	BS 12	G	NG	
				BS 13	G	NG	BS 14	G	NG	BS 15	G	NG	BS 16	G	NG	
				BS 17	G	NG	BS 18	G	NG	BS 19	G	NG	BS 20	G	NG	
				BS 21	G	NG	BS 22	G	NG	BS 23	G	NG	BS 24	G	NG	
				BS 25	G	NG	BS 26	G	NG	BS 27	G	NG	BS 28	G	NG	
				BS 29	G	NG	BS 30	G	NG	BS 31	G	NG	BS 32	G	NG	
	Heat insulation	Visual inspection	No damage	BS 1	G	NG	BS 2	G	NG	BS 3	G	NG	BS 4	G	NG	
				BS 5	G	NG	BS 6	G	NG	BS 7	G	NG	BS 8	G	NG	
				BS 9	G	NG	BS 10	G	NG	BS 11	G	NG	BS 12	G	NG	
				BS 13	G	NG	BS 14	G	NG	BS 15	G	NG	BS 16	G	NG	
				BS 17	G	NG	BS 18	G	NG	BS 19	G	NG	BS 20	G	NG	
				BS 21	G	NG	BS 22	G	NG	BS 23	G	NG	BS 24	G	NG	
				BS 25	G	NG	BS 26	G	NG	BS 27	G	NG	BS 28	G	NG	
				BS 29	G	NG	BS 30	G	NG	BS 31	G	NG	BS 32	G	NG	
	Installation	Visual inspection	Hanging method, etc.	BS 1	G	NG	BS 2	G	NG	BS 3	G	NG	BS 4	G	NG	
				BS 5	G	NG	BS 6	G	NG	BS 7	G	NG	BS 8	G	NG	
				BS 9	G	NG	BS 10	G	NG	BS 11	G	NG	BS 12	G	NG	
				BS 13	G	NG	BS 14	G	NG	BS 15	G	NG	BS 16	G	NG	
				BS 17	G	NG	BS 18	G	NG	BS 19	G	NG	BS 20	G	NG	
				BS 21	G	NG	BS 22	G	NG	BS 23	G	NG	BS 24	G	NG	
				BS 25	G	NG	BS 26	G	NG	BS 27	G	NG	BS 28	G	NG	
				BS 29	G	NG	BS 30	G	NG	BS 31	G	NG	BS 32	G	NG	

Before turning on the power

System name

	Inspection item	Inspection method	Standard (guideline)	Measurement values				Decision
Indoor unit	Refrigerant system	Gas leak detector	No leaks	Room 1 G NG	Room 2 G NG	Room 3 G NG	Room 4 G NG	
				Room 5 G NG	Room 6 G NG	Room 7 G NG	Room 8 G NG	
				Room 9 G NG	Room 10 G NG	Room 11 G NG	Room 12 G NG	
				Room 13 G NG	Room 14 G NG	Room 15 G NG	Room 16 G NG	
				Room 17 G NG	Room 18 G NG	Room 19 G NG	Room 20 G NG	
				Room 21 G NG	Room 22 G NG	Room 23 G NG	Room 24 G NG	
				Room 25 G NG	Room 26 G NG	Room 27 G NG	Room 28 G NG	
				Room 29 G NG	Room 30 G NG	Room 31 G NG	Room 32 G NG	
	Air filter	Visual inspection	No clogging or damage	Room 1 G NG	Room 2 G NG	Room 3 G NG	Room 4 G NG	
				Room 5 G NG	Room 6 G NG	Room 7 G NG	Room 8 G NG	
				Room 9 G NG	Room 10 G NG	Room 11 G NG	Room 12 G NG	
				Room 13 G NG	Room 14 G NG	Room 15 G NG	Room 16 G NG	
				Room 17 G NG	Room 18 G NG	Room 19 G NG	Room 20 G NG	
				Room 21 G NG	Room 22 G NG	Room 23 G NG	Room 24 G NG	
				Room 25 G NG	Room 26 G NG	Room 27 G NG	Room 28 G NG	
				Room 29 G NG	Room 30 G NG	Room 31 G NG	Room 32 G NG	
	Heat exchanger	Visual inspection	No clogging or damage	Room 1 G NG	Room 2 G NG	Room 3 G NG	Room 4 G NG	
				Room 5 G NG	Room 6 G NG	Room 7 G NG	Room 8 G NG	
				Room 9 G NG	Room 10 G NG	Room 11 G NG	Room 12 G NG	
				Room 13 G NG	Room 14 G NG	Room 15 G NG	Room 16 G NG	
				Room 17 G NG	Room 18 G NG	Room 19 G NG	Room 20 G NG	
				Room 21 G NG	Room 22 G NG	Room 23 G NG	Room 24 G NG	
				Room 25 G NG	Room 26 G NG	Room 27 G NG	Room 28 G NG	
				Room 29 G NG	Room 30 G NG	Room 31 G NG	Room 32 G NG	
	Fan motor electrical insulation	500-V megatester	1 MΩ or more	Room 1 MΩ	Room 2 MΩ	Room 3 MΩ	Room 4 MΩ	
				Room 5 MΩ	Room 6 MΩ	Room 7 MΩ	Room 8 MΩ	
				Room 9 MΩ	Room 10 MΩ	Room 11 MΩ	Room 12 MΩ	
				Room 13 MΩ	Room 14 MΩ	Room 15 MΩ	Room 16 MΩ	
				Room 17 MΩ	Room 18 MΩ	Room 19 MΩ	Room 20 MΩ	
				Room 21 MΩ	Room 22 MΩ	Room 23 MΩ	Room 24 MΩ	
				Room 25 MΩ	Room 26 MΩ	Room 27 MΩ	Room 28 MΩ	
				Room 29 MΩ	Room 30 MΩ	Room 31 MΩ	Room 32 MΩ	
	Auxiliary heater electrical insulation	500-V megatester	1 MΩ or more	Room 1 MΩ	Room 2 MΩ	Room 3 MΩ	Room 4 MΩ	
				Room 5 MΩ	Room 6 MΩ	Room 7 MΩ	Room 8 MΩ	
				Room 9 MΩ	Room 10 MΩ	Room 11 MΩ	Room 12 MΩ	
				Room 13 MΩ	Room 14 MΩ	Room 15 MΩ	Room 16 MΩ	
				Room 17 MΩ	Room 18 MΩ	Room 19 MΩ	Room 20 MΩ	
				Room 21 MΩ	Room 22 MΩ	Room 23 MΩ	Room 24 MΩ	
				Room 25 MΩ	Room 26 MΩ	Room 27 MΩ	Room 28 MΩ	
				Room 29 MΩ	Room 30 MΩ	Room 31 MΩ	Room 32 MΩ	
	Installation	Visual inspection	Short circuit, etc.	Room 1 G NG	Room 2 G NG	Room 3 G NG	Room 4 G NG	
				Room 5 G NG	Room 6 G NG	Room 7 G NG	Room 8 G NG	
				Room 9 G NG	Room 10 G NG	Room 11 G NG	Room 12 G NG	
				Room 13 G NG	Room 14 G NG	Room 15 G NG	Room 16 G NG	
				Room 17 G NG	Room 18 G NG	Room 19 G NG	Room 20 G NG	
				Room 21 G NG	Room 22 G NG	Room 23 G NG	Room 24 G NG	
				Room 25 G NG	Room 26 G NG	Room 27 G NG	Room 28 G NG	
				Room 29 G NG	Room 30 G NG	Room 31 G NG	Room 32 G NG	

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During operation

System name

	Inspection item	Inspection method	Standard (guideline)	Measurement values			Decision			
Main unit	Main power supply voltage	Tester	Rated voltage ±10%	R-S	V	S-T	V	R-T	V	
	Operation circuit voltage	Tester	Rated voltage ±10%	V						
	Fan rotation direction	Visual inspection	Forward rotation	G NG						
	Fan noise/vibration	Listening	No noise or vibration							
	Fan operation current	Clamp meter		M1(11)F, M2(12)F,		M21F,	M22F			
				A	A	A	A			
	Suction air temperature	Thermometer	Temperature differential	°C						
	Discharge air temperature	Thermometer	9~11°C when cooling, 2~3.5°C when heating	°C						
	Compressor discharge pressure	Pressure gauge		INV		Mpa				
				STD1		Mpa				
				STD2		Mpa				
	Compressor suction pressure	Pressure gauge		Mpa						
	Compressor operating current	Clamp meter	Phase differential within 1A	INV		A				
				STD1	R()A,	S()A,	T()A			
				STD2	R()A,	S()A,	T()A			
	Compressor operating frequency	Clamp meter		INV		Hz				
	Suction pipe temperature	Thermometer	3~15°C	INV	°C	STD1	°C	STD2	°C	
	Discharge pipe temperature	Thermometer	85~105°C	INV	°C	STD1	°C	STD2	°C	
Clank case heater	Touch	Warm	INV		G·NG					
			STD1		G·NG					
			STD2		G·NG					
Sub unit	Fan rotation direction	Visual inspection	Forward rotation	G NG						
	Fan noise/vibration	Listening	No noise or vibration							
	Fan operating current	Clamp meter		A						
	Suction air temperature	Thermometer	Temperature differential	°C						
	Discharge air temperature	Thermometer	9~11°C when cooling, 2~3.5°C when heating	°C						

(V1093)

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During operation

System name

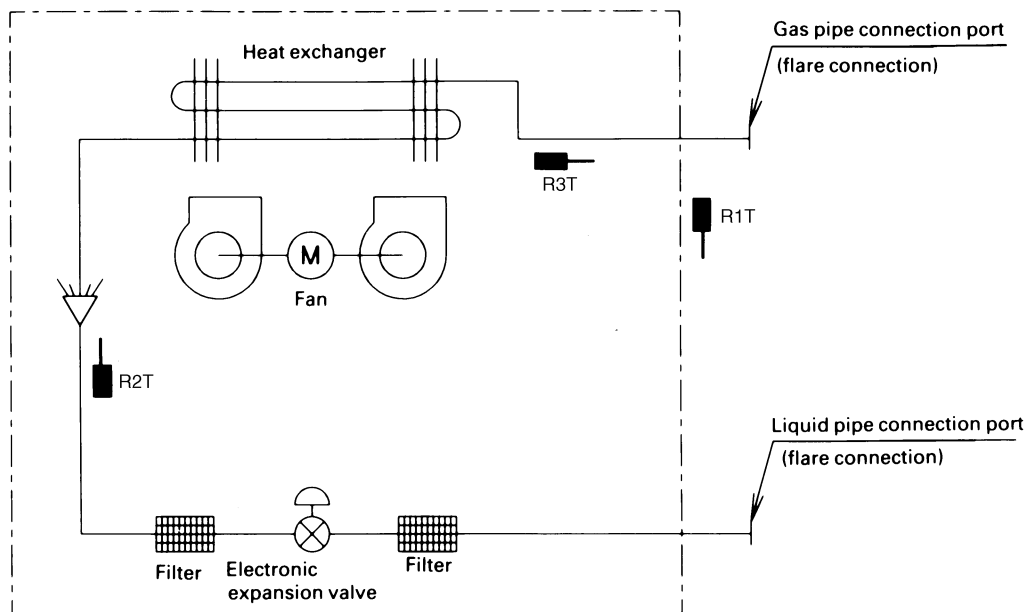
	Inspection item	Inspection method	Standard (guideline)	Measurement values								Decision
Indoor unit	Power supply voltage	Tester	Rated voltage ±10%	Room 1	V	Room 2	V	Room 3	V	Room 4	V	
				Room 5	V	Room 6	V	Room 7	V	Room 8	V	
				Room 9	V	Room10	V	Room11	V	Room12	V	
				Room13	V	Room14	V	Room15	V	Room16	V	
				Room17	V	Room18	V	Room19	V	Room20	V	
				Room21	V	Room22	V	Room23	V	Room24	V	
				Room25	V	Room26	V	Room27	V	Room28	V	
				Room29	V	Room30	V	Room31	V	Room32	V	
	Suction air temperature	Thermometer	Temperature differential 9~13℃ when cooling, 15~20℃ when heating	Room 1	℃	Room 2	℃	Room 3	℃	Room 4	℃	
				Room 5	℃	Room 6	℃	Room 7	℃	Room 8	℃	
				Room 9	℃	Room10	℃	Room11	℃	Room12	℃	
				Room13	℃	Room14	℃	Room15	℃	Room16	℃	
				Room17	℃	Room18	℃	Room19	℃	Room20	℃	
				Room21	℃	Room22	℃	Room23	℃	Room24	℃	
				Room25	℃	Room26	℃	Room27	℃	Room28	℃	
				Room29	℃	Room30	℃	Room31	℃	Room32	℃	
	Discharge air temperature			Room 1	℃	Room 2	℃	Room 3	℃	Room 4	℃	
				Room 5	℃	Room 6	℃	Room 7	℃	Room 8	℃	
				Room 9	℃	Room10	℃	Room11	℃	Room12	℃	
				Room13	℃	Room14	℃	Room15	℃	Room16	℃	
				Room17	℃	Room18	℃	Room19	℃	Room20	℃	
				Room21	℃	Room22	℃	Room23	℃	Room24	℃	
				Room25	℃	Room26	℃	Room27	℃	Room28	℃	
				Room29	℃	Room30	℃	Room31	℃	Room32	℃	
	Fan rotation direction	Visual inspection	Forward rotation	Room 1	G NG	Room 2	G NG	Room 3	G NG	Room 4	G NG	
				Room 5	G NG	Room 6	G NG	Room 7	G NG	Room 8	G NG	
				Room 9	G NG	Room10	G NG	Room11	G NG	Room12	G NG	
				Room13	G NG	Room14	G NG	Room15	G NG	Room16	G NG	
				Room17	G NG	Room18	G NG	Room19	G NG	Room20	G NG	
				Room21	G NG	Room22	G NG	Room23	G NG	Room24	G NG	
				Room25	G NG	Room26	G NG	Room27	G NG	Room28	G NG	
				Room29	G NG	Room30	G NG	Room31	G NG	Room32	G NG	
	Fan noise / vibration	Listening	No noise or vibration	Room 1	G NG	Room 2	G NG	Room 3	G NG	Room 4	G NG	
				Room 5	G NG	Room 6	G NG	Room 7	G NG	Room 8	G NG	
				Room 9	G NG	Room10	G NG	Room11	G NG	Room12	G NG	
				Room13	G NG	Room14	G NG	Room15	G NG	Room16	G NG	
				Room17	G NG	Room18	G NG	Room19	G NG	Room20	G NG	
				Room21	G NG	Room22	G NG	Room23	G NG	Room24	G NG	
				Room25	G NG	Room26	G NG	Room27	G NG	Room28	G NG	
				Room29	G NG	Room30	G NG	Room31	G NG	Room32	G NG	
	Fan operating current	Clamp meter		Room 1	A	Room 2	A	Room 3	A	Room 4	A	
			Room 5	A	Room 6	A	Room 7	A	Room 8	A		
			Room 9	A	Room10	A	Room11	A	Room12	A		
			Room13	A	Room14	A	Room15	A	Room16	A		
			Room17	A	Room18	A	Room19	A	Room20	A		
			Room21	A	Room22	A	Room23	A	Room24	A		
			Room25	A	Room26	A	Room27	A	Room28	A		
			Room29	A	Room30	A	Room31	A	Room32	A		

(V1094)

7.5 Piping System Diagrams

7.5.1 Indoor Unit

FXYCP, FXYFP, FXYKP, FXYSP, FXYMP, FXYHP, FXYAP, FXYLP, FXYLMP



R1T: Thermister for suction air temp.

R2T: Thermister for liquid line temp.

R3T: Thermister for gas line temp.

■ Refrigerant pipe connection port diameters

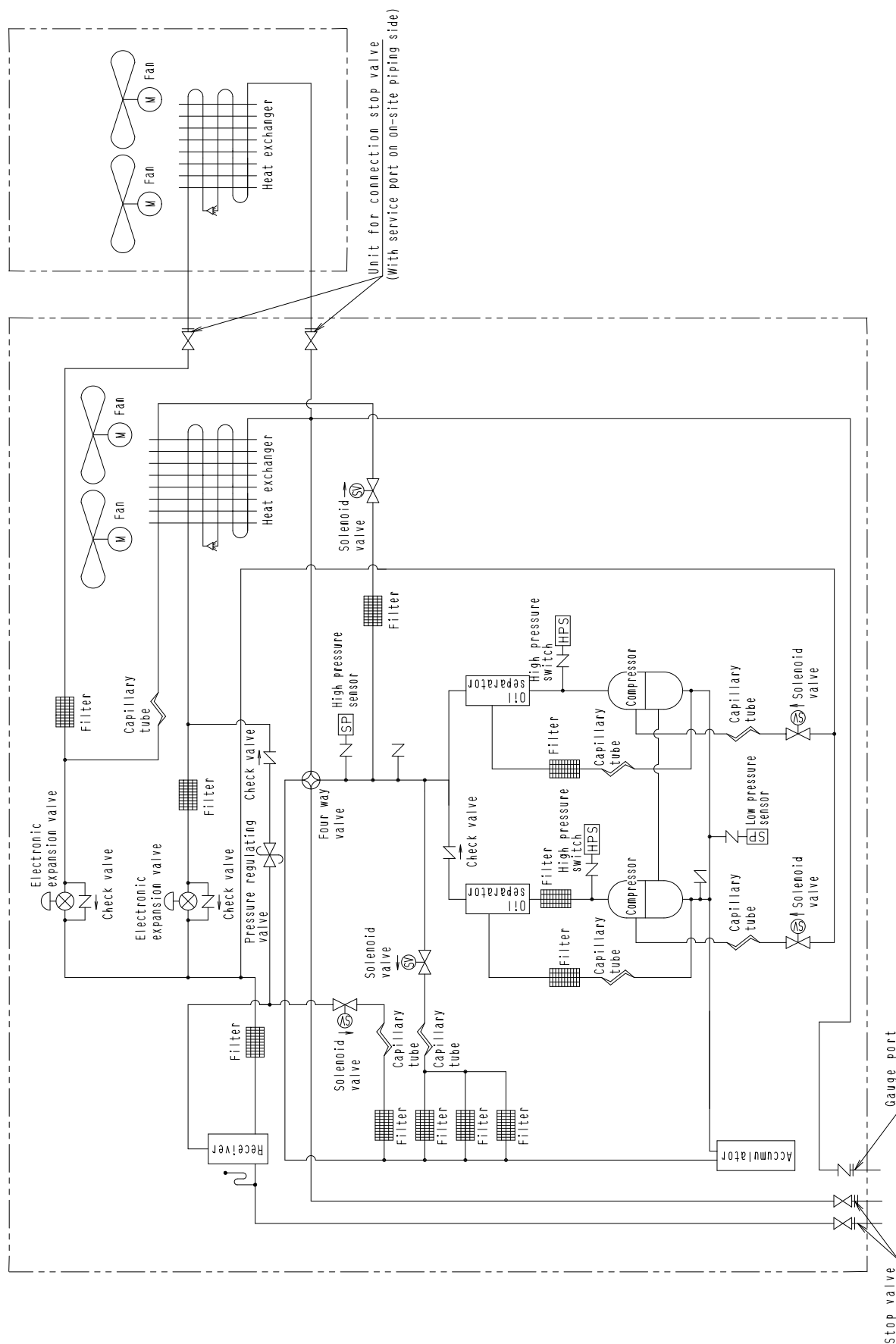
(mm)

Model	Gas	Liquid
FXYCP20K/25K/32K/40K FXYFP32K/40K FXYKP25K/32K/40K FXYSP20K/25K/32K/40K FXYMP40K/50K FXYHP32K FXYAP25K/32K/40K FXYLP25K/40K FXYLMP25K/40K	φ12.7	φ6.4
FXYCP50K/63K/80K FXYFP50K/63K/80K FXYKP63K FXYSP50K/63K/80K FXYMP63K/80K/100K FXYHP63K FXYAP50K/63K FXYLP63K FXYLMP63K	φ15.9	φ9.5
FXYCP125K FXYFP100K/125K FXYSP100K/125K FXYMP125K FXYHP100K	φ19.1	
FXYMP200K	φ25.4	
FXYMP250K	φ28.6	φ12.7

(V1095)

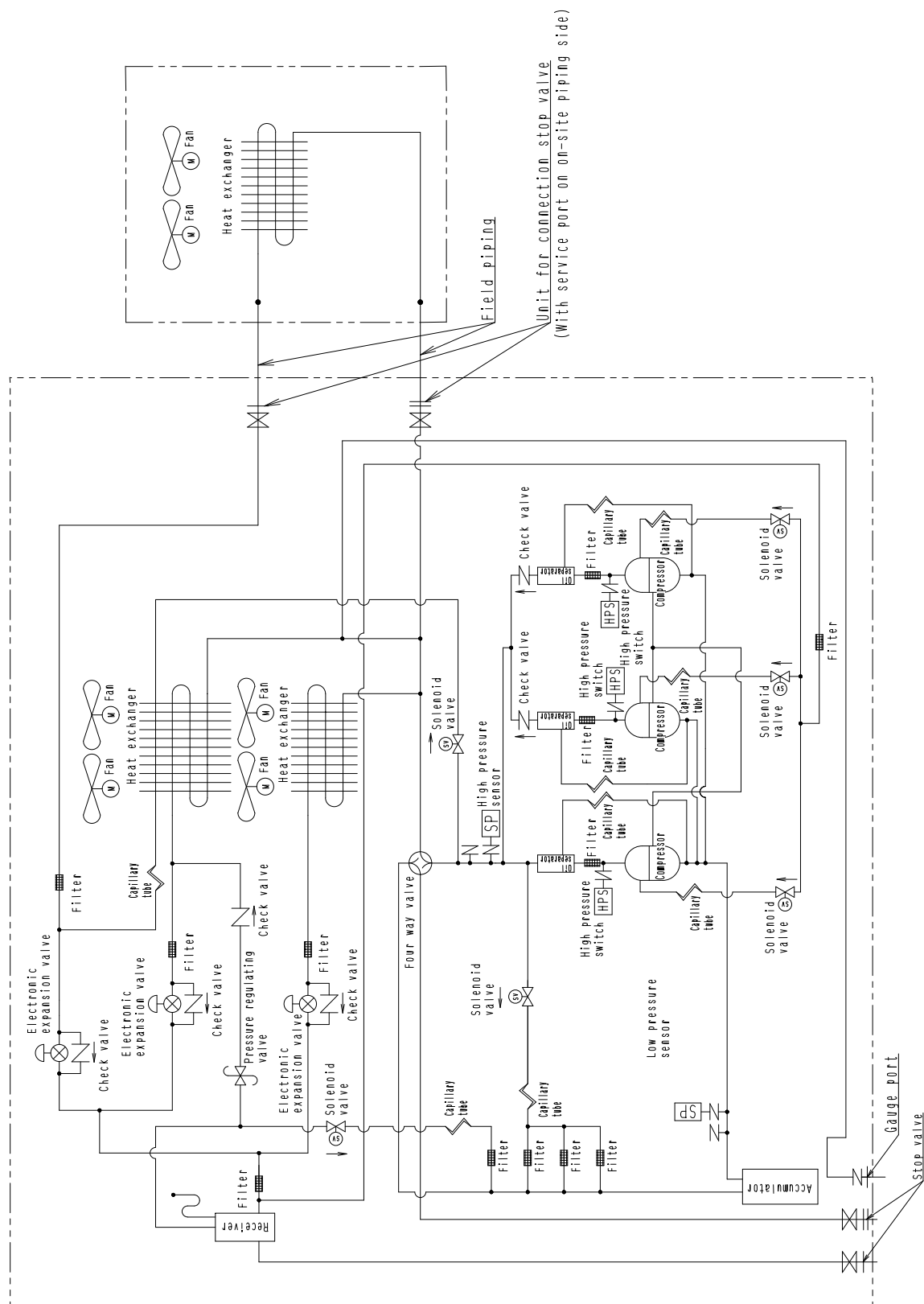
7.5.2 Outdoor Unit

RSEYP16-18-20KJY1



3D024909

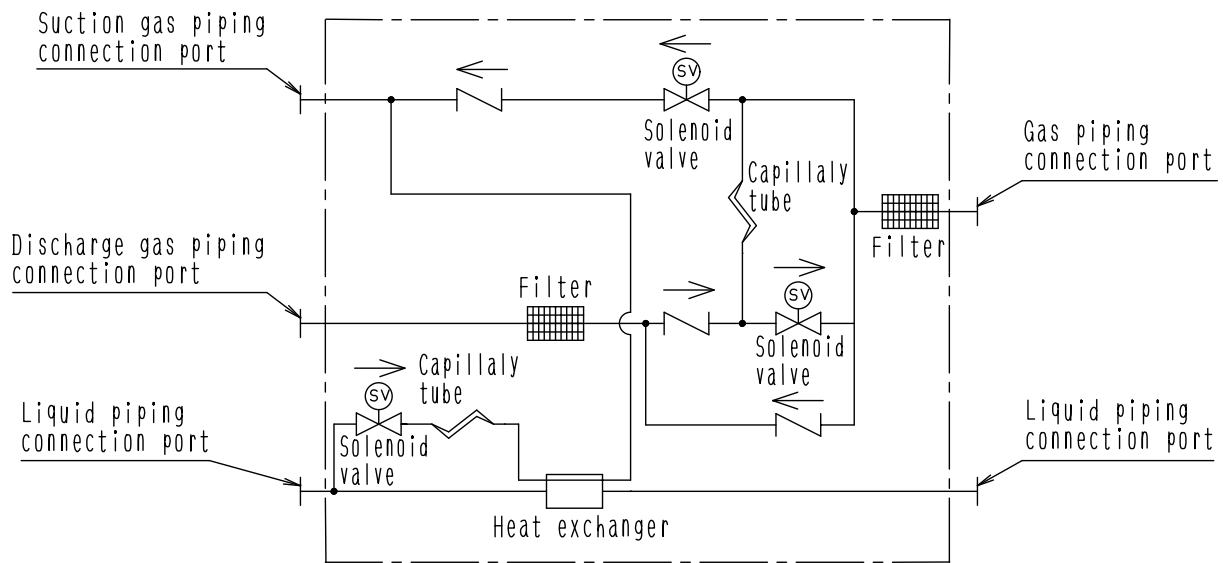
RSEYP24·26·28·30KJY1



3D024910

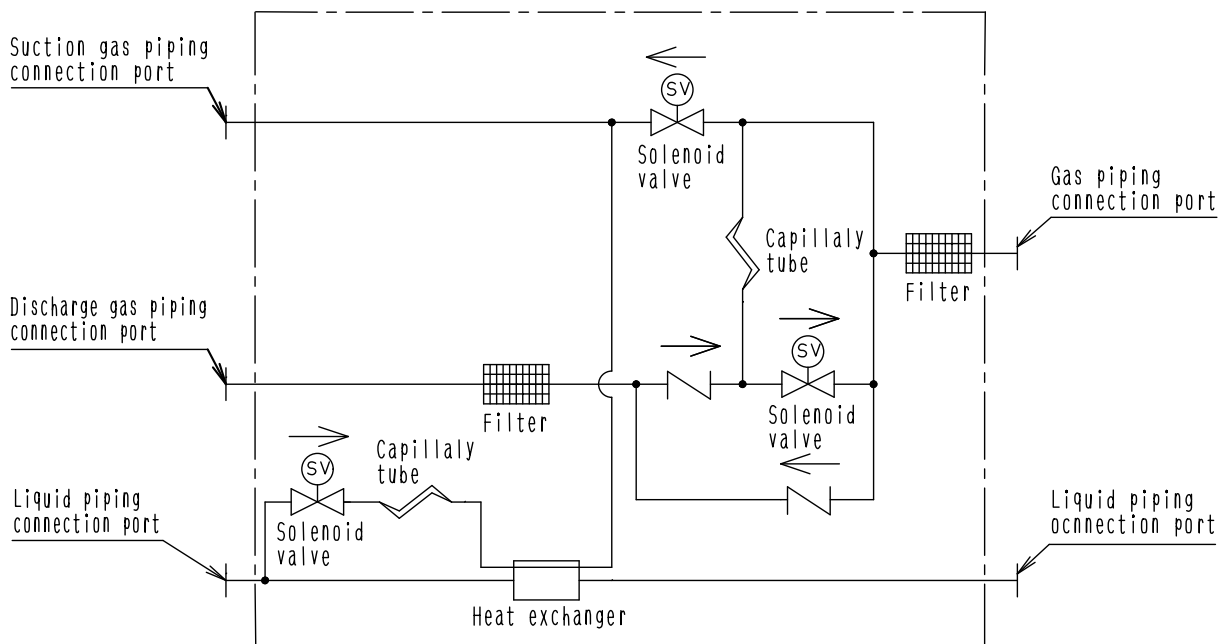
7.6 BS Unit

BSVP100KJV1



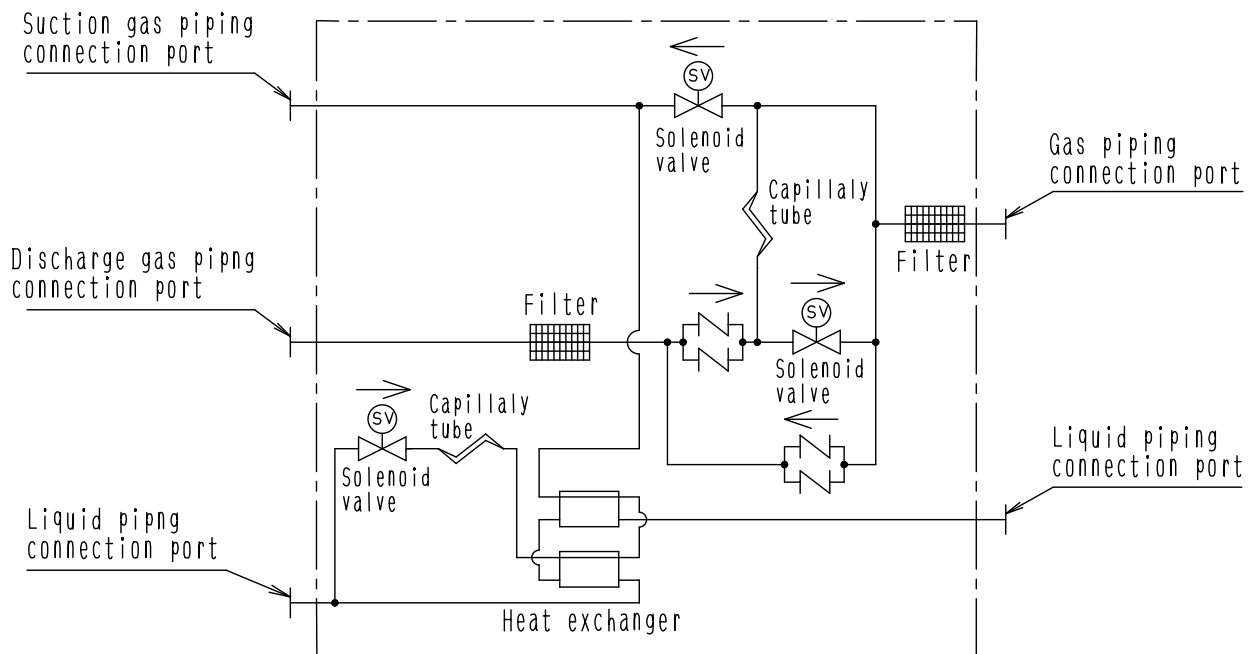
4D014497A

BSVP160KJV1



4D014498A

BSVP250KJV1

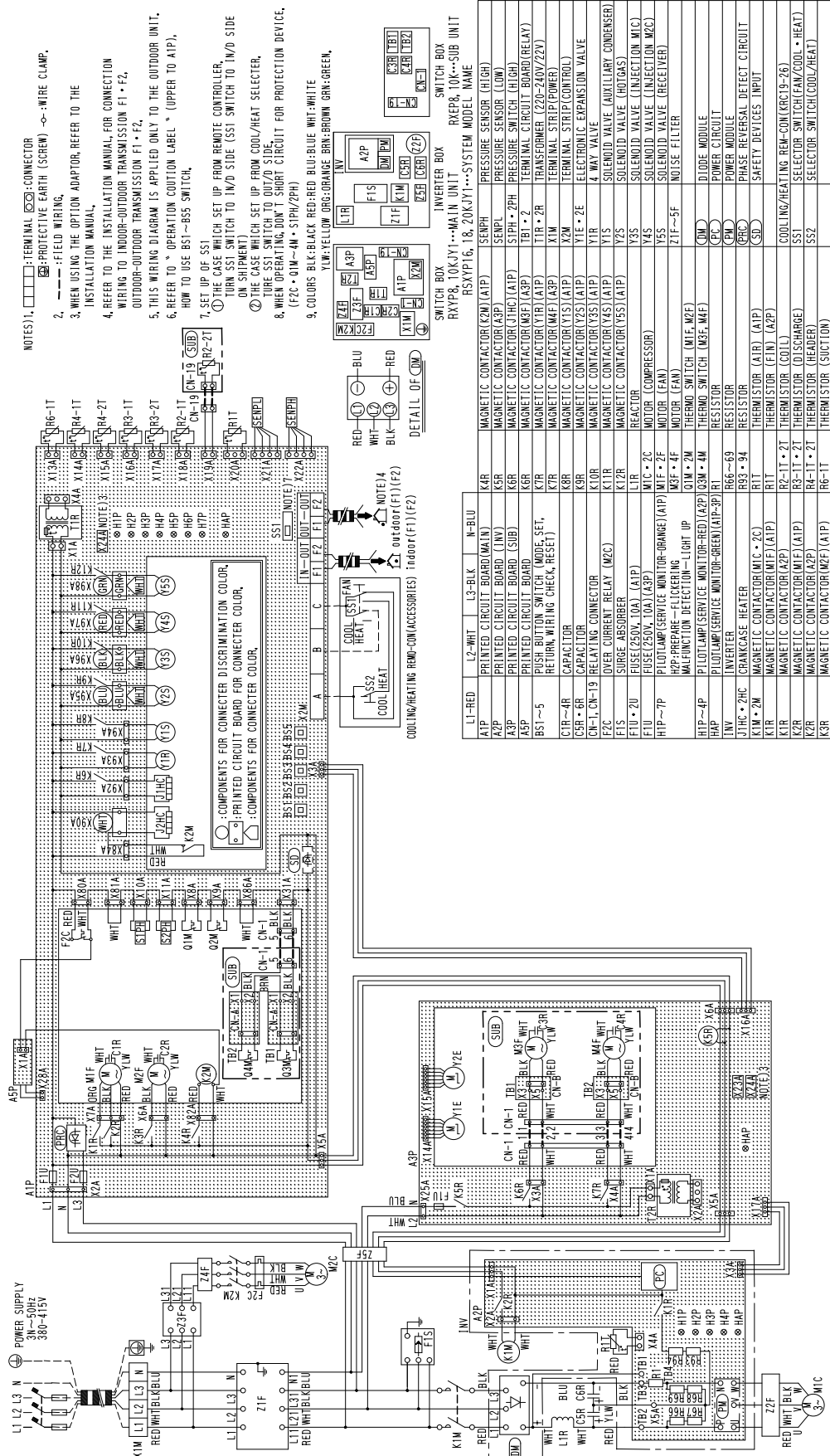


4D014499A

7.7 Wiring Diagram

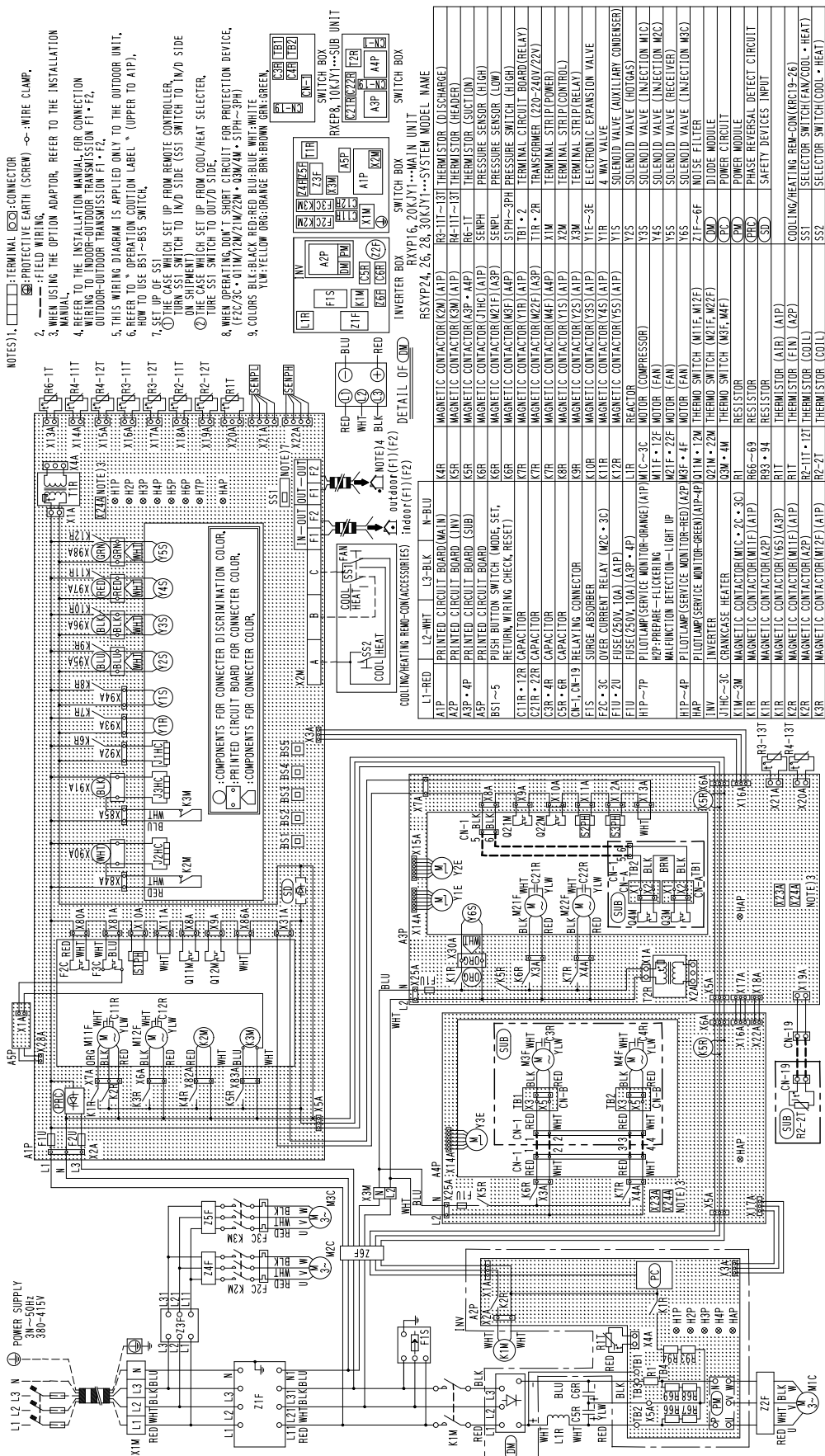
7.7.1 Outdoor Unit

RSEYP16-18-20KJY1



3D024953B

RSEYP24-26-28-30KJY1



3D024954B

7.8 Bad Examples and Good Examples in Installation

7.8.1 Example 1: Signal interference due to use of multiple core cable (all model)

Situation

Although for the purposes of group control there are only 2 units per group there are transmission malfunctions between the indoor units and the remote controller and the remote controller's address display is showing non-existent addresses such as 13 or 15.

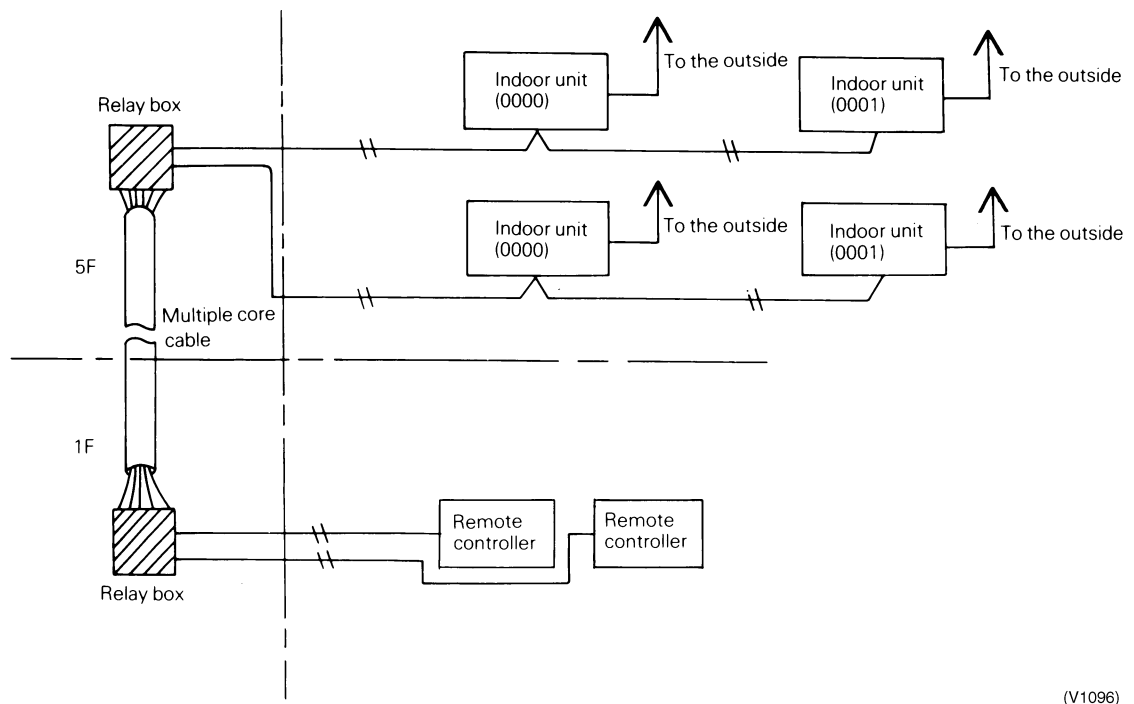
Source of

Problem and

Remedial Action

Multiple core cable has been used for at least part of the interconnecting wiring between the remote controller and the indoor units.

This has resulted in signal interference leading to a transmission malfunction.



The multiple core cable was replaced by twin core cable and the fault disappeared.

Main Points

- Although twin core cable had been run from each unit, multiple core cable was used on the way.
- In schools, etc., because remote controllers are often installed in a single first floor control room, it is easier to use a multi-core cable.
- Signal interference can result in non-existent addresses appearing on the display.

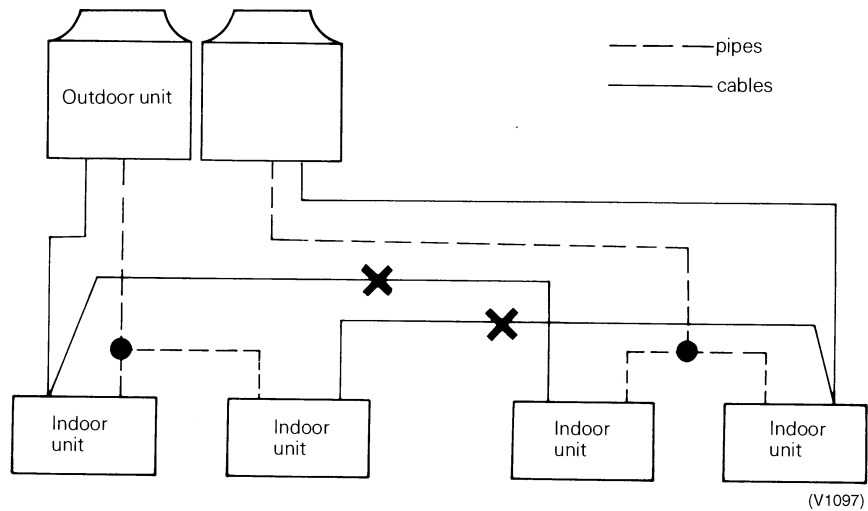
7.8.2 Example 2: Mismatch between cables connecting indoor and outdoor units and corresponding piping. (all model)

Situation

The remote controller is not showing any malfunction and the system is operating but there is no flow of warm air from the indoor unit (in heating mode).

Source of Problem and Remedial Action

The connecting cables and the corresponding piping were not correctly matched.
Recabling was carried out and the fault disappeared.



Main Points

- Special care must be taken when the pipework and cabling are carried out by different people.
- Run each indoor unit in turn to check that the system is correctly matched.

7.8.3 Example 3: Drain pipe trap shape defective

Situation

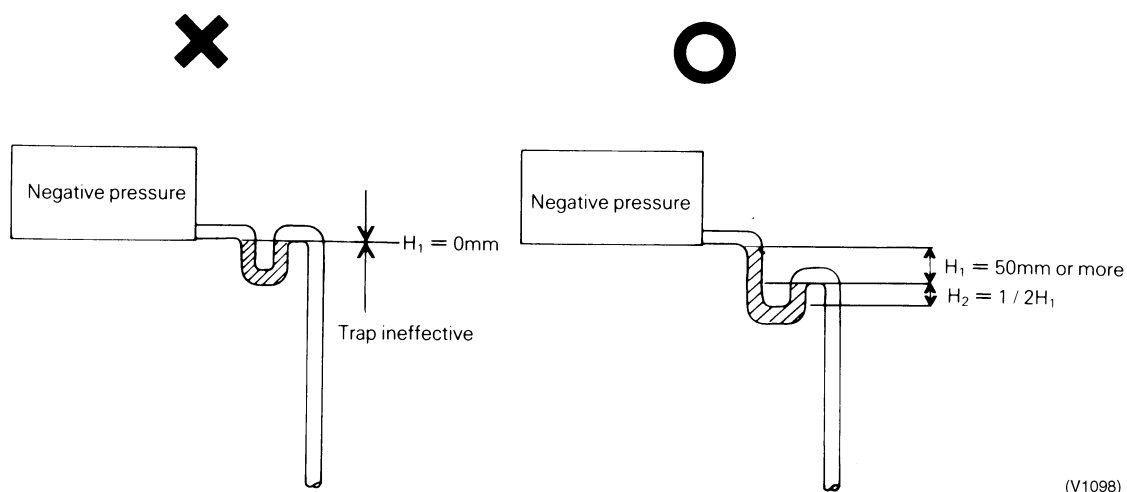
Indoor unit was fitted with a drain trap but a leak occurred during subsequent operation.

Source of

Problem and

Remedial Action

The trap was not properly shaped thus preventing it from functioning effectively as a trap and resulting in drain leakage. The trap was reshaped and the fault disappeared.



Main Points

- Duct types (40~125) require a drain trap.

Reason: There is resistance on the air inlet side caused by the heat exchanger and air filter and this in turn creates negative pressure in relation to the atmospheric pressure on the discharge side. If there is no drain trap then air will be drawn in from the drain pipe and the waste water splashed around giving rise to the risk of water overflowing from the drain pan. To avoid this problem it is therefore necessary to design a trap which takes account of the maximum negative pressure which is likely to be created on the suction side.

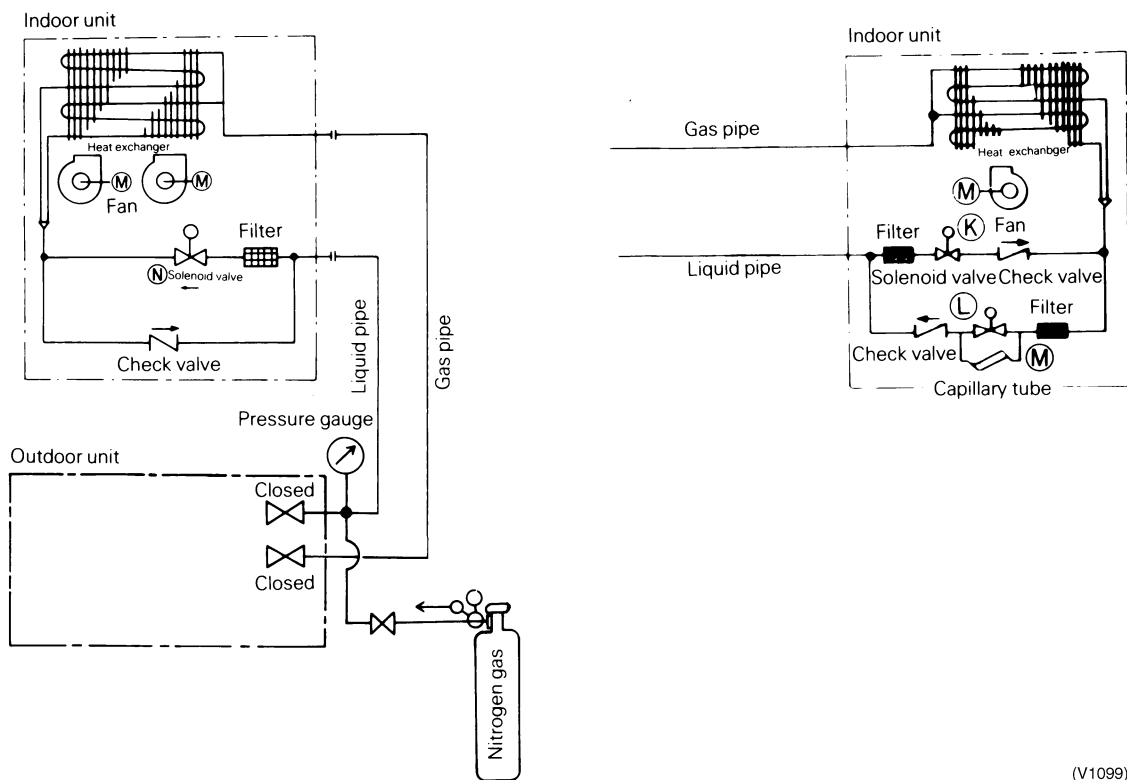
7.8.4 Example 4: Pressure down despite absence of leaks during air tight test (all model)

Situation

In order to carry out local air tight tests on the refrigerant piping the system was pressurized (3.33KPa) via the liquid pipe service port and after 24 hours the pressure was found to have fallen. The local refrigerant piping alone does not lose any pressure. Maybe the gas leak is supposed to be located in the indoor unit itself.

Source of Problem and Remedial Action

The system was pressurized from the liquid pipe side and the gas pipes were therefore not pressurized. The system was then left under pressure for 24 hours but during that time gas leaked through into the gas pipes due to internal leaks within the solenoid and check valves and the gas pressure inside the liquid pipes consequently dropped.



(V1099)

Main Points

When carrying out air tight tests on local pipework it is essential that the system be pressurized via both the liquid pipes and the gas pipes.

7.8.5 Example 5: Excessive noise due to incorrect angling of REFNET joints

Situation

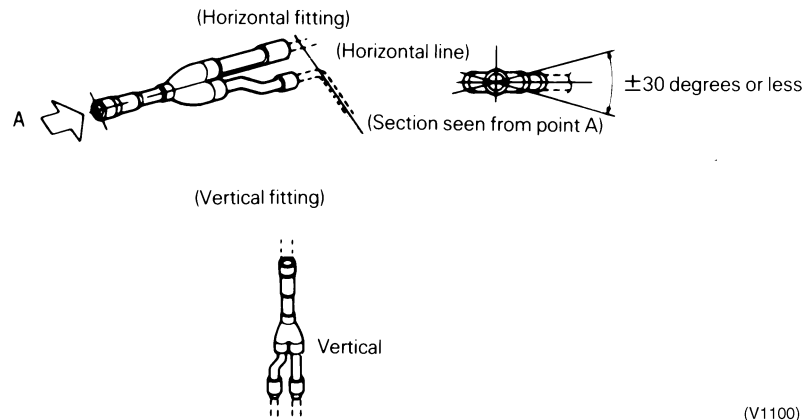
The noise of the refrigerant flow during defrosting is excessive.

Source of Problem and Remedial Action

The angle of the fittings was incorrect and needed to be rectified as shown in the following figure.

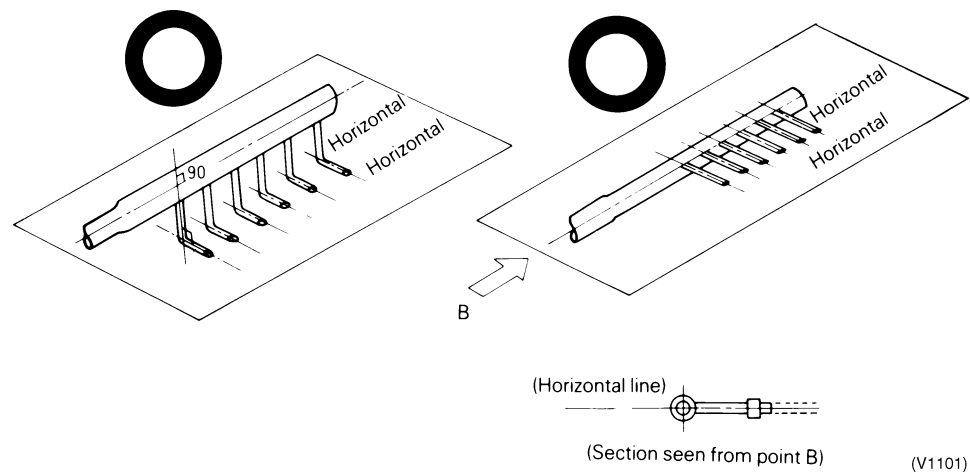
1. REFNET joints

The REFNET joints should be installed such that branches meet the main pipe either horizontally or vertically at an angle of exactly 90 degrees.



2. REFNET header

The REFNET header is a lateral flow pipe and should be fitted so as to allow horizontal branch fittings. (Vertical or sloping fitting is not permissible.)



Main Points

■ Reasons for using refrigerant branch kit

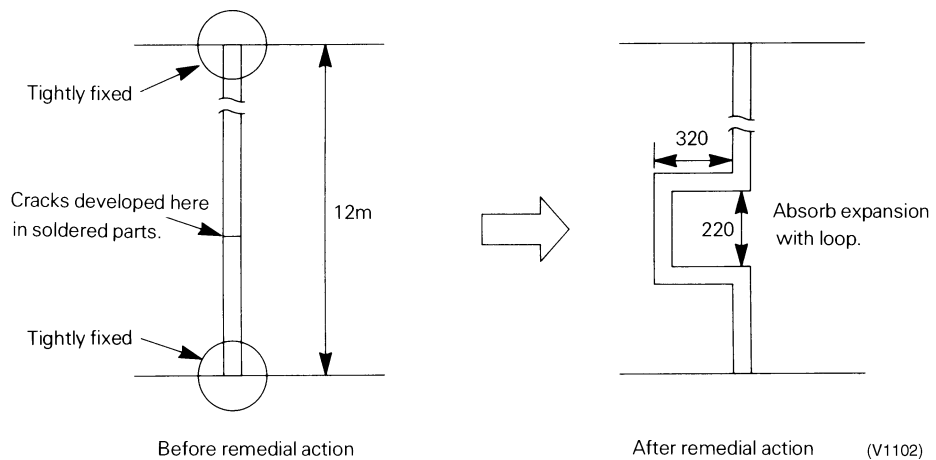
Fittings of REFNET joints or headers which are not carried out in strict accordance with the principles outlined here may result in complaints relating, for example, to “poor performance” of the system or “noisy refrigerant flow”. (To prevent unbalance flow or oil shortage)

7.8.6 Example 6: Cracks develop in field pipes due to thermal expansion and contraction

Situation Refrigerant piping has developed cracks in soldered points and is leaking gas.

Cause Both ends of the pipe have been tightly fixed in place.
 ↓
 Starting and stopping the compressor has caused temperature to vary, thus the pipes have expanded and contracted which places stress on soldered parts.
 ↓
 Cracks have formed because of repeated expansion and contraction.

Remedial Action Fit the pipe with a loop as shown in the below drawing.



Main Points ■ Take thermal expansion and contraction along the spline into consideration when installing pipe supports.

For Your Reference Expansion (m) = Full length × Coefficient of thermal expansion × Rise in temperature
 Coefficient of thermal expansion for copper: 16.5×10^{-6}

Example For a pipe length of 10 m and a rise in temperature of 50°C, expansion reaches 8.2 mm.

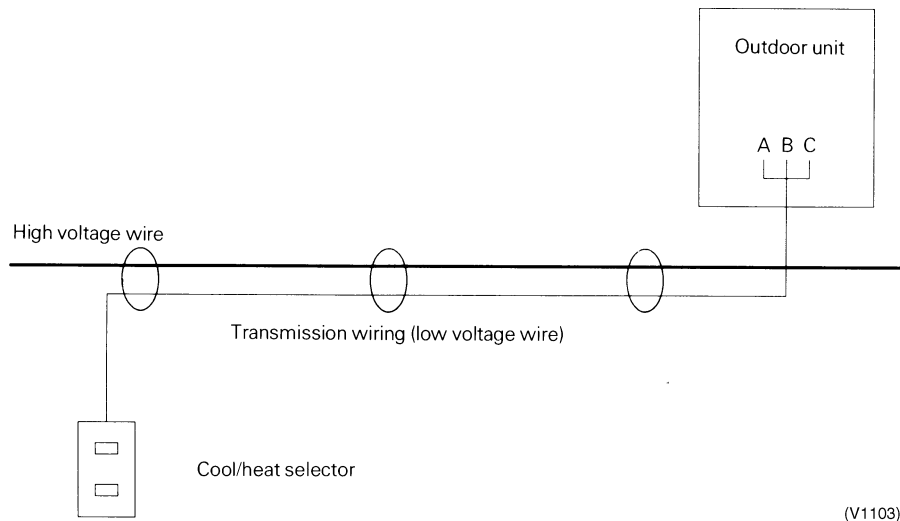
7.8.7 Example 7: Transmission wiring between the cool/heat selector and the outdoor unit is too close to a high voltage wire.

Situation

Heating is indicated despite having selected cooling with the cool/heat selector.

Cause and Remedial Action

The transmission wiring between the cool/heat selector and the outdoor unit is too close to a high voltage wire. An induced voltage is, therefore, being impressed on the transmission wiring which is causing a heating/cooling malfunction in the outdoor unit PC board.



Bypassing the transmission wiring will allow the unit to function normally.

Main Points

- Keep low and high voltage wiring away from each another.

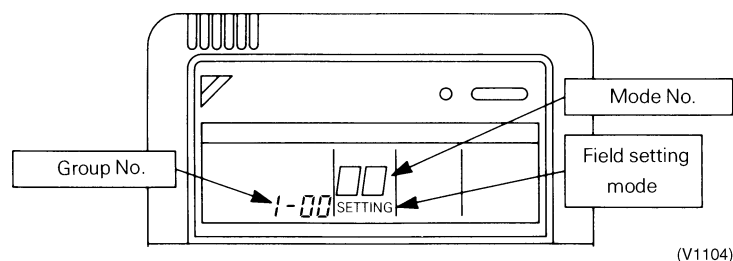
7.8.8 Example 8: The centralized control group number cannot be set (Inverter K Series).

Situation

An attempt was made to set the centralized control group number with the indoor unit remote controller, but "00" cannot be selected in the field setting mode.

Cause

1. The central remote controller or unified ON/OFF controller is OFF.
2. The central remote controller or unified ON/OFF controller, or indoor unit is not wired to the centralized control line (F1 & F2).



Remedial Action

Supply power to either the central remote controller or unified ON/OFF controller.
Wire the central remote controller or unified ON/OFF controller, or indoor unit to the centralized control line.

Main Points

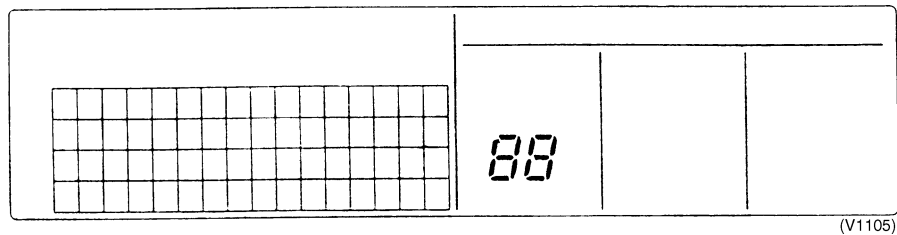
- When communications with the central remote controller are down, "00" cannot be selected in the field setting mode.
- Activate power to the central remote controller, unified ON/OFF controller and indoor unit before setting the centralized control group number.

7.8.9 Example 9: "88" cannot be cleared from the central remote controller.

Situation

The display on the central remote controller does not change from its initial state after turning power ON.

Initial display of the central remote controller

**Cause**

1. None of the indoor units connected to the central remote controller have been given a group No.
2. The connector for setting the master controller inside the central remote controller is disconnected.

Remedial Action

- Set a centralized control group No. for each indoor unit with the respective remote controllers.
- Connect the connector for setting the master controller in one of the central remote controller.

Main Points

- If the setting for master controller has been changed, reset the power to the unit at the ON/OFF switch or the forced reset switch of the controller.
- Activate power to the central remote controller, unified ON/OFF controller and indoor unit before setting the centralized control group No.
- For details on how to set the centralized control group number, refer to the installation manual.