technical data

VRV™ Systems

Introduction

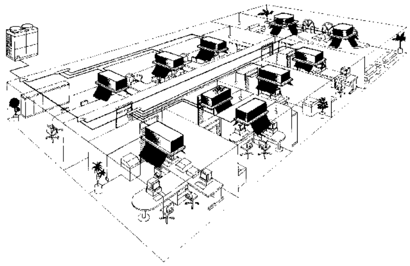
I Introduction
Table of contents

1

1 Survey of different VRV systems

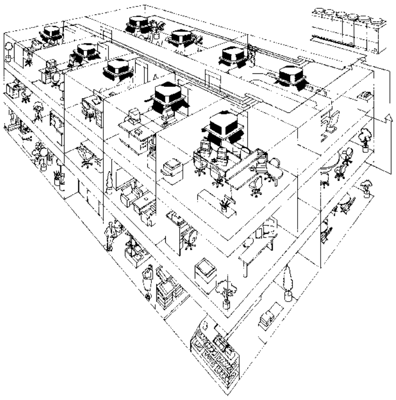
VRV INVERTER COOLING ONLY / HEAT PUMP SERIES

- For EITHER cooling OR heating operation from one system
- Up to 16 indoor units can be operated from a single outdoor unit without the need for an additional adapter PCB. A line-up of 5,8,10 HP models precisely supports applications in small facilities and minor expansions and renovations.



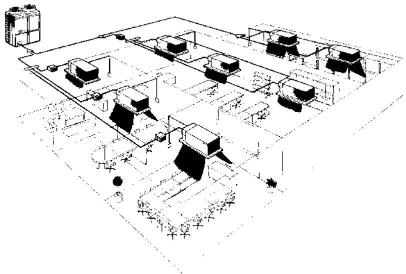
VRV PLUS SERIES

- This line-up from 16HP to 30HP consists of 2 outdoor components, main and sub unit. Up to 32 indoor units can be connected to 1 single refrigerant circuit.
- Available in both heat recovery and heat pump format.



VRV HEAT RECOVERY SERIES

- For SIMULTANEOUS cooling AND heating operation from one system
- Heat recovery is achieved by diverting exhaust heat from indoor units in cooling mode to areas requiring heating.
- The BS unit switches the system between cooling and heating modes.
- Up to 16 indoor units can be operated from a single outdoor unit in heat recovery format.



2 Indoor units using R-407C

Description	Indoor unit	Size											
		20	25	32	40	50	63	71	80	100	125	200	250
2-way blow ceiling mounted cassette	FXYCP-K7V19	x	x	x	x	x	x		x		x		
4-way blow ceiling mounted cassette	FXYFP-KB7V19	x	x	x	x	x	x		x	x	x		
Ceiling mounted corner cassette	FXK-LVE		x	x	x		x						
Concealed ceiling unit	FXYSP-KA7V19	x	x	x	x	x	x		x	x	x		
Concealed ceiling unit (small)	FXYBP-KC7V19	x	x										
Concealed ceiling unit (large)	FXM-LVE				x	x	x		x	x	x	x	x
4-way blow ceiling suspended unit	FUYP-BV17							x		x	x		
Ceiling suspended unit	FXH-LVE			x			x			x			
Wall mounted unit	FXA-LVE	x	x	x									
	FXYAP-KV19				x	x	x						
Floor standing unit	FXL-LVE	x	x	x	x	x	x						
Concealed floor standing unit	FXN-LVE	x	x	x	x	x	x						

3 Outdoor units using R-407C

Description	Outdoor unit	Maximum number of connectable indoor units					Total capacity index range	Capacity steps
		8	13	16	20	32		
VRV™ Inverter cooling only	RSXP5L7	x					62.5 - 162.5	20
	RSXP8L7		x				100 - 260	31
	RSXP10L7			x			125 - 325	31
VRV™ Inverter cooling only	RSXP5K7	x					62.5 - 162.5	13
	RSXP8K7		x				100 - 260	20
	RSXP10K7			x			125 - 325	20
VRV™ Inverter heat pump	RSXYP5L7	x					62.5 - 162.5	20
	RSXYP8L7		x				100 - 260	31
	RSXYP10L7			x			125 - 325	31
VRV™ Inverter heat pump	RSXYP5K7	x					62.5 - 162.5	13
	RSXYP8K7		x				100 - 260	20
	RSXYP10K7			x			125 - 325	20
VRV™ PLUS Inverter heat pump	RSXYP16KJ				x		200 - 520	26
	RSXYP18KJ				x		225 - 585	26
	RSXYP20KJ				x		250 - 650	26
	RSXYP24KJ					x	300 - 780	29
	RSXYP26KJ					x	325 - 845	29
	RSXYP28KJ					x	350 - 910	29
	RSXYP30KJ					x	375 - 975	29
VRV™ Heat recovery	RSEYP8K7		x				100 - 260	20
	RSEYP10K7			x			125 - 325	20
VRV™ PLUS Heat recovery	RSEYP16KJ				x		200 - 520	26
	RSEYP18KJ				x		225 - 585	26
	RSEYP20KJ				x		250 - 650	26
	RSEYP24KJ					x	300 - 780	29
	RSEYP26KJ					x	325 - 845	29
	RSEYP28KJ					x	350 - 910	29
	RSEYP30KJ					x	375 - 975	29

3-1 Indoor unit capacity index

Model	20	25	32	40	50	63	71	80	100	125	200	250
Capacity index	20	25	31.25	40	50	62.5	71	80	100	125	200	250

NOTE

1 e.g. Selected indoor units: FXYCP25 + FXYCP100 + FXYMP200 + FXYSP40
Connection ratio: 25 + 100 + 200 + 40 = 365
→ Possible outdoor unit: RSXYP24KJ

4 Nomenclature

4-1 Indoor units

FXY | S | P | 40 | KA7 | V1 | 9

9: Indoor units can be connected to both R-22 and R-407C outdoor units

V1: Power supply symbol
V1: 1 ~, 230V, 50Hz
VE: 1 ~, 230V, 50Hz

KA7:
K: Indicates major design category
A: Indicates minor design category
K7: Indicates DENV production
KJ: Indicates non-DENV production

40: Capacity Indication
Conversion to horsepower:

20: 0.8HP
25: 1HP
32: 1.25HP
40: 1.6HP
50: 2.0HP
63: 2.5HP
80: 3.2HP
100: 4HP
125: 5HP
200: 8HP
250: 10HP

S: Model name
C: 2-way blow ceiling mounted cassette
F: 4-way blow ceiling mounted cassette
K: Ceiling mounted corner cassette
S: Concealed ceiling unit
B: Concealed ceiling unit (small)
M: Concealed ceiling unit (large)
H: Ceiling suspended unit
A: Wall mounted unit
L: Floor standing unit
LM: Concealed floor standing unit

FXY: Indicates that this is an INVERTER HEAT PUMP/COOLING ONLY or a HEAT RECOVERY indoor unit

4 Nomenclature

4-2 Outdoor units

- VRV Inverter heat pump series

RSX | Y | P | 8 | K7 | W1

- W1: Power supply symbol:
  W1: 3N~, 400V, 50Hz
- K7: K7, KL, KJ: indicates major design category (internal company symbol)
- 8:
  5: 5HP
  8: 8HP
  10: 10HP
- P: Indicates the use of ozone friendly refrigerant R-407C
- Y: Indicates heat pump (year around)
- RSX:
  RSX: indicates that this is an INVERTER outdoor unit
  RSEY: indicates that this is a HEAT RECOVERY outdoor unit

- VRV Plus inverter heat pump series using R-407C

RSX | Y | P | 16 | KJ | Y1

- Y1: Power supply symbol:
  Y1: 3~, 400V, 50Hz
- KJ: Major design category
- 16:
  16: 16HP
  18: 18HP
  20: 20HP
  24: 24HP
  26: 26HP
  28: 28HP
  30: 30HP
- P: Indicates the use of ozone friendly refrigerant R-407C
- Y: Indicates heat pump (year around)
- RSX:
  RSX: indicates that this is an INVERTER outdoor unit
  RSEY: indicates that this is a HEAT RECOVERY outdoor unit

- BS unit

BSV | P | 100 | K | V1

- V1: Power supply symbol:
  V1: 1~, 230V, 50Hz
- K: Major design category
- 100: Capacity indication (Connectable total indoor unit capacity)
  100: Total indoor unit capacity less than 100
  160: Total indoor unit capacity 100 or more but less than 160
  250: Total indoor unit capacity 160 or more but less than 250
- P: Indicates the use of ozone friendly refrigerant R-407C
- BSV: Indicates that this is a BS unit

5 Explanation of different VRV™ Systems

5-1 πVRV™ features

- To indicate clearly that we introduce a next generation of VRV, Daikin decided to link a new name and logo the high COP VRV, i.e.

πVRV™

- The logo is linked in 4 ways to the major features of the high COP VRV:
  1. π is equal to 3.14, the new high COP level.
  2. π (PI) where
     - **P** stands for Performance: linked to the highest COP level available based on the latest and newest VRV technology
     - **I** stands for Intelligence: the most advanced intelligent technology is used
  3. π is a technical symbol linked to the highest technical VRV unit in the market
  4. π is a perfect, universal and never ending number. This is linked with the continuous improvements of Daikin.
- The above arguments explain the name πVRV. It is an easy name to remember and it includes all the new features of the next generation of VRV.

Energy Saving

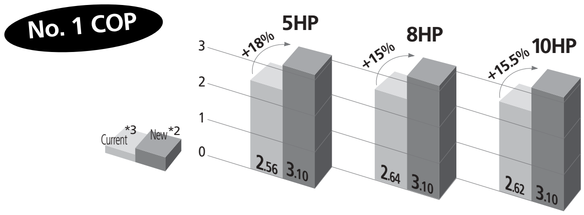
- Highest COP in both Cooling and Heating operation
- High partial load performance

NOTES

1 Average cooling-heating COP is obtained by adding the COP of cooling to the COP of heating and then dividing the sum by 2.
2 COP's figures are reference value
3 COP – comparison with the current K Series

Average cooling-heating COP*1

Value represents that to be achieved by a single outdoor unit.



Environmental Friendly

- Ozone friendly refrigerant : R-407C
- Dramatic reduction in refrigerant charge compared to the current range

RSXYP-L7W1	5	8	10
Reduction of	11 %	10.5 %	14 %

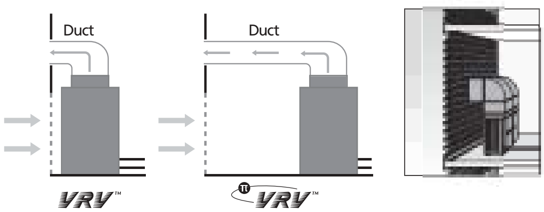
- Refrigerant recovery function :
  this service mode enables all expansion valves of the VRV system to be opened. In this way the refrigerant can be drained from the VRV piping system and stored in a separate recovery tank.

Control Systems

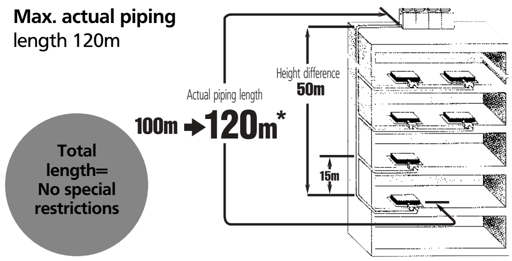
- intelligent touch Controller
- intelligent Manager
- BACnet Gateway

Flexible Design

- **Increased installation flexibility**
  Design flexibility on a veranda is improved.
  Outdoor units can be installed far back from former location.



- **External Static Pressure** (as standard by field setting)
  3mm H_2O → 6mm H_2O
- **Max. actual piping** length 120m



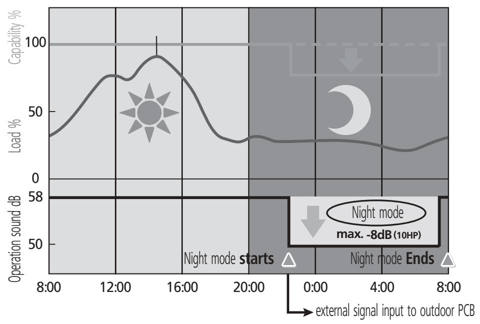
* Equivalent piping length 140m

5 Features

5-1 VRV™ features

Extremely quiet in operation

- **Night quiet function**
  Starting time and ending time can be put in

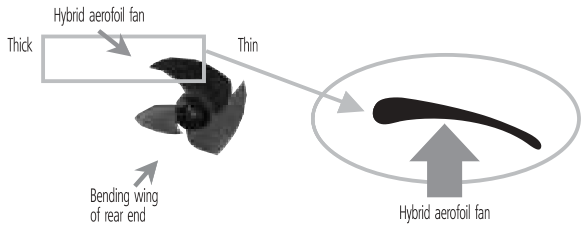


NOTES

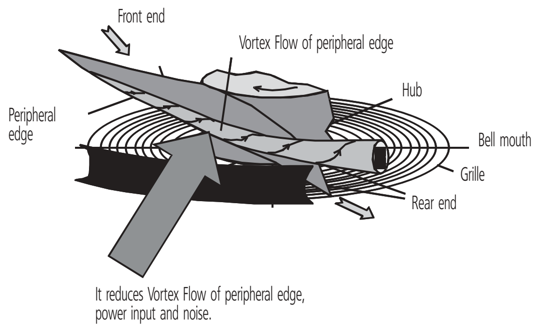
1 This function is available in setting at site.

2 The relationship of outdoor temperature (load) and time shown in the graph is just an example.

- **Hybrid aerofoil fan**
  The newly developed fan ensures low sound level performance at the thick part of the aerofoil and power saving at the thin part of the foil (wide inlet fan)



- **High flared bell mouth**
  Improves low sound level characteristics by applying air flow analyses techniques developed by NASA to create smooth air flow at the edge of foil.



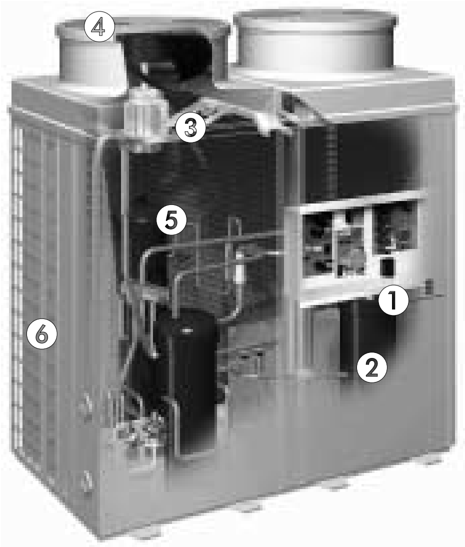
- **Super aero grille**
  The spiral shaped ribs are aligned with the direction of discharge flow in order to minimise turbulence and reduce noise.

5 Features

5-1 VRV™ features

5

An energy efficiency increase of approximately 20% achieved by the adoption of diverse new technologies :



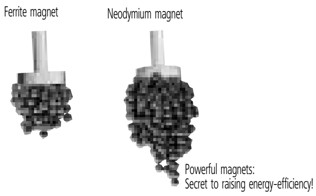
① Reluctance DC Compressor

Energy Saving UP 11%

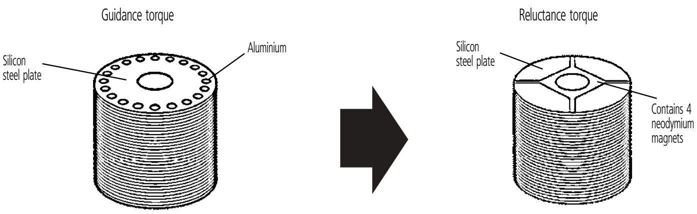
The reluctance DC motor provides significant increases in efficiency compared to conventional AC inverter motors, simultaneously using 2 different forms of torque to produce extra power from small electric currents.

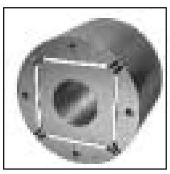
The scroll compressor is driven by the newly developed motor enabling better performance, higher energy efficiency resulting in high energy cost savings:

- Using 4 neodymium magnets. These magnets are more powerful than the widely used ferrite types.



- The new rotor structure allows the highest reluctance torque





5 Features

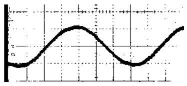
5-1 VRV™ features

② Sine Wave DC inverter

Optimizing the sine wave curve, results in smoother motor rotation and improved motor efficiency.

Rectangular wave

Sine wave PWM*



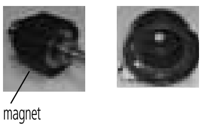
* Pulse Width Modulation

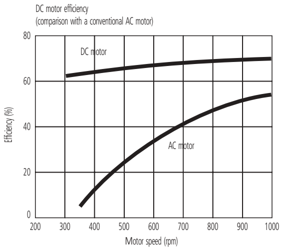
③ DC fan motor

Energy Saving UP 2%

The use of a DC fan motor offers substantial improvements in operating efficiency compared to conventional AC motors, especially during low speed rotation.

DC fan motor structure





First
in the Industry

④ Super aero grill & powerful fan

Energy Saving UP 4%

Improved aerodynamic shape of the grille in combination with a newly developed fan results in a 10 % increase in air flow rate.

⑤ e-Bridge circuit

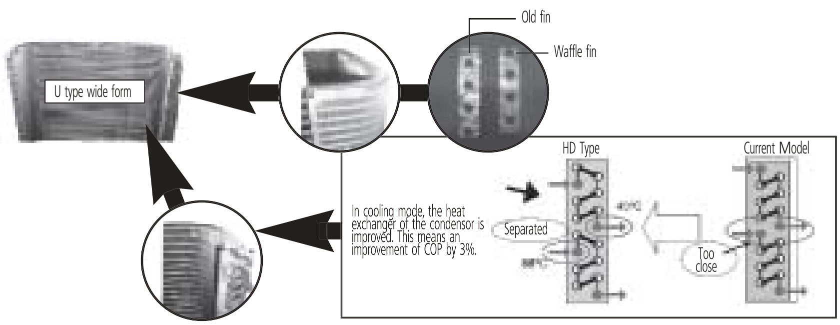
Energy Saving UP 1%

Prevents accumulation of liquid refrigerant in the condenser. This results in more efficient use of the condenser surface under any circumstance and leads in turn to better energy efficiency.

⑥ e-Pass heat exchanger

Energy Saving UP 2%

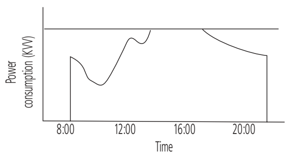
Optimization of the path layout of the heat exchanger prevents heat transferring from the overheated gas section towards the sub cooled liquid section - a more efficient use of the heat exchanger.
Also heat exchange capability is improved by the use of U type wide form and waffle fins, resulting in an improved COP.



⑦ i-demand function

Energy Saving UP 2%

The newly introduced current sensor minimizes the difference between the actual power consumption and the predefined power consumption.



5 Features

5-2 VRV™ Inverter cooling only / heat pump systems

5

- **Survey**

Description	Outdoor unit	Maximum number of connectable indoor units			Total capacity index range	Capacity steps
		8	13	16		
VRV™ Inverter cooling only	RSXP5L7	x			62.5 - 162.5	20
	RSXP8L7		x		100 - 260	31
	RSXP10L7			x	125 - 325	31
VRV™ Inverter cooling only	RSXP5K7	x			62.5 - 162.5	13
	RSXP8K7		x		100 - 260	20
	RSXP10K7			x	125 - 325	20
VRV™ Inverter heat pump	RSXYP5L7	x			62.5 - 162.5	20
	RSXYP8L7		x		100 - 260	31
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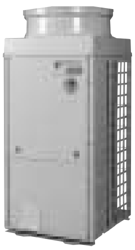
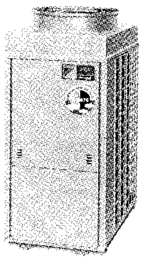
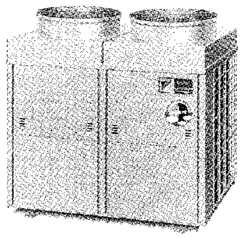
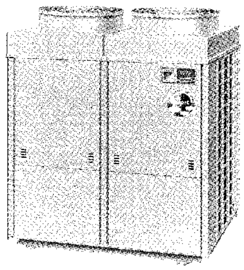
VRV™ Inverter heat pump	RSXYP5K7	x			62.5 - 162.5	13
	RSXYP8K7		x		100 - 260	20
	RSXYP10K7			x	125 - 325	20

- **Outdoor units**

RSXP5L7 	**RSXP8L7** 	**RSXP10L7** 
RSXP5K7 	**RSXP8K7** 	**RSXP10K7** 

- **INTRODUCTION**

A high-grade, high-quality, advanced individual air conditioning system is able to cover more sophisticated building environment needs.

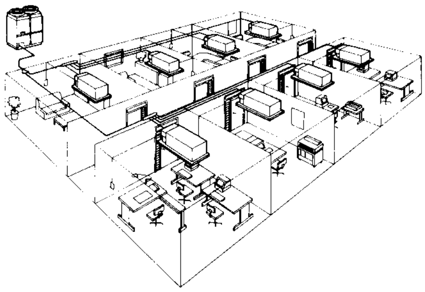
Making buildings more "intelligent" and improving office environment have to be pursued vigorously, in order to create a space referred to as the "new office". Therefore, there is a demand for further upgrading air conditioning systems.

Comfort on the individual level as well as work efficiency and creativity are linked to the performance of air conditioning.

5 Explanation of different VRV™ Systems

5-2 VRV™ Inverter cooling only / heat pump systems

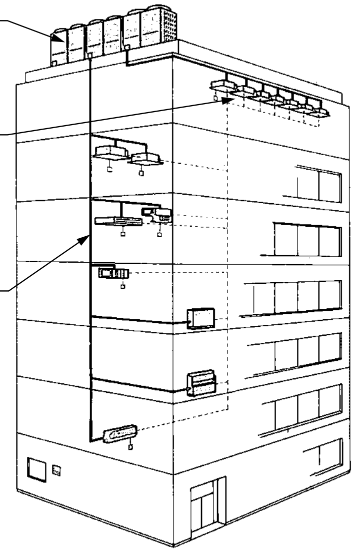
The VRV system of advanced individual air conditioning is a sophisticated, flexible expansion system proper to handle diverse expanding needs.



Outdoor unit
- Outdoor units can be grouped together in a row
- 3 types: **5H$_P$**, **8H$_P$**, **10H$_P$**: cooling only or heat pump

Indoor unit
- Up to **16** units can be connected in one system
- Minimum capacity: 0.8H$_P$

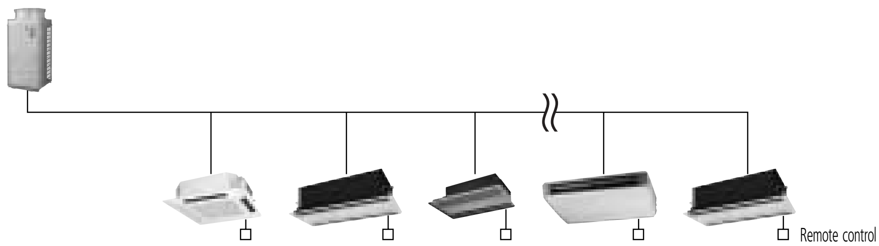
REFNET pipe system
- Actual length of refrigerant piping **100m**
- Level difference of **50m** makes this system suitable for buildings up to 15 to 16 stories



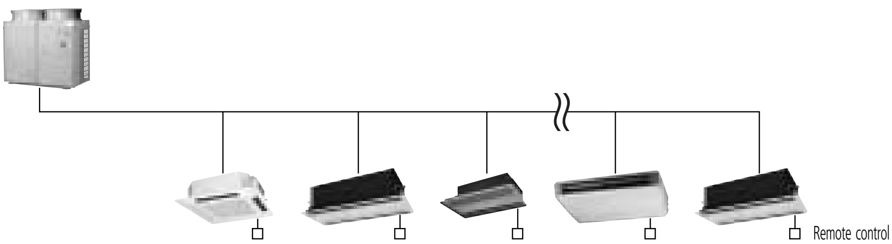
- **EXAMPLES OF DIFFERENT ASSEMBLY PATTERNS**

A single refrigerant pipe system can be connected up to max. 16 indoor units each with a different capacity (0.8 to 5 H$_P$) and of different types with an outdoor unit capacity ratio of up to 130%.

RSX(Y)P5K: maximum 8 indoor units can be connected



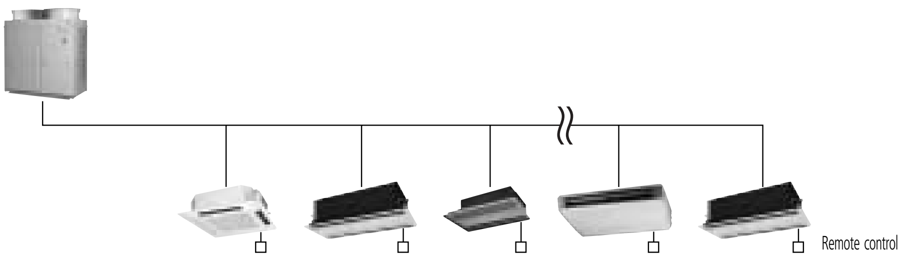
RSX(Y)P8K: maximum 13 indoor units can be connected



5 Explanation of different VRV™ Systems

5-2 VRV™ Inverter cooling only / heat pump systems

RSX(Y)P10K: maximum 16 indoor units can be connected



- **MAIN FEATURES**

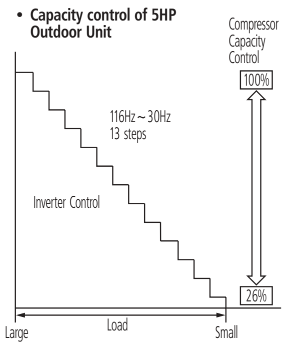
HIDECS Circuit with Inverter Control and Original Electronic Control

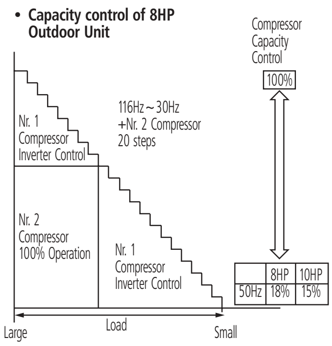
1. **New Linear VRV System with Inverter control**
   Abbreviates inverter control frequency steps and expands capacity control range.
2. **Outdoor Unit Heat Exchanger Capacity Control**
   Includes capacity control of outdoor unit heat exchangers for multi-variable PI control for executing optimal load control.
3. **Oil Control System**
   Controls volume of refrigerant oil to prevent oil from rising or refrigerant liquid back in lengthy pipes.
4. **Refrigerant Flow Stabilization Mechanism**
   Prevents refrigerant drift in lengthy pipes.
5. **PID control with Automatic Capacity Balancing Circuit**
   Controls refrigerant flow through addition of techniques (3) and (4).

- **INVERTER TECHNOLOGY**

Daikin VRV air conditioning offers end users substantial savings in energy costs, the application of innovative inverter technology ensures efficient performance throughout the system's operating cycle.

- **INVERTER DRIVEN CAPACITY CONTROL**





Refnet joint

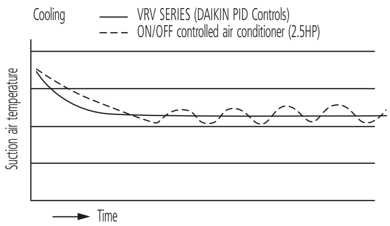
Attached insulators for Refnet joint

5 Explanation of different VRV™ Systems

5-2 VRV™ Inverter cooling only / heat pump systems

- **SMART CONTROL BRINGS COMFORT**

An electronic expansion valve, using PID control, continuously adjusts the refrigerant volume in respond to load variations of the indoor units. The VRV system thus maintains comfortable room temperatures at a virtually constant level, without the temperature variations typical of conventional ON/OFF control systems.
The thermostat can control stable room temperature at ± 0.5°C from set point.

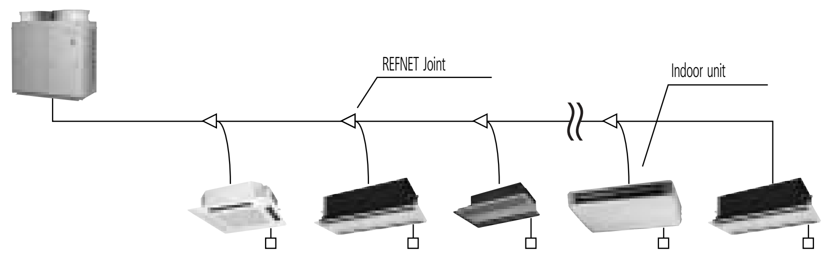


NOTE

1 The graph shows the data, measured in a test room assuming actual heating load.

- **INVERTER CONTROLLED LINEAR VRV SYSTEM**

The "Linear system" makes use of a multi-variable PI (Proportional Integral) control system which uses refrigerant pressure sensors to give added control over inverter and ON/OFF control compressors in order to abbreviate control steps into smaller units to provide precise control in both small and larger areas.
This in turn enables individual control of up to 16 indoor units of different capacity and type at a ratio of 50~130% in comparison with outdoor unit capacity. (5HP outdoor units use inverter control compressors only.)



Daikin's original new multi-variable PI control system automatically controls operation using various sensors that detect refrigerant pressure and room temperature in a certain sequence.
The system is further enhanced by the addition of a capacity control function for outdoor unit heat exchangers, and is able to execute individual control of indoor units ranging from a minimum of 0.8HP to a maximum of 10HP. Because it is able to operate within a wide range of outdoor temperatures including a minimum steady temperature of -5 °C (cooling), it is also able to handle tough air-conditioning conditions throughout the year.

NOTE

1 If you plan to do cooling operation in outdoor temperatures of 15°C or less, be sure to carry out thermal insulation of the refrigerant liquid and gas piping

5 Explanation of different VRV™ Systems

5-2 VRV™ Inverter cooling only / heat pump systems

5

• PID CONTROL

Proportional Integral Derivative control with an automatic capacity balancing circuit:

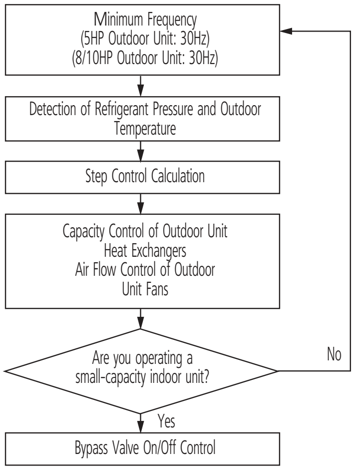
– enables the use of lengthy piping up to 100 meters (actual length)

– consists of two control systems:

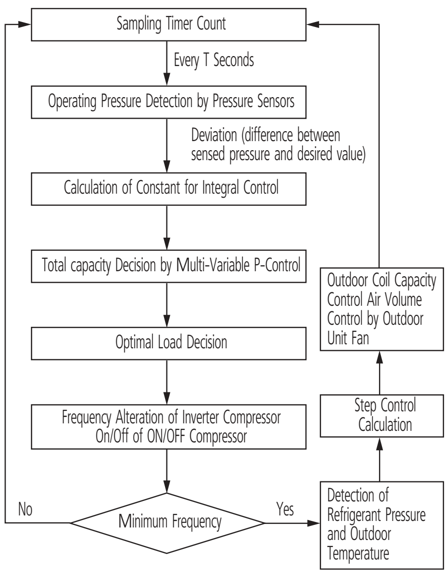
1. Oil control system that controls the refrigerant oil volume to prevent it from raising or backing up in the pipes
2. Refrigerant flow stabilization mechanism: prevents refrigerant drift, caused by level difference of indoor units in the same system.

• OPERATION CONTROL OF SMALL CAPACITY INDOOR UNITS

If the operating frequency is minimal, the refrigerant pressure and outdoor temperature are detected, the number of control steps are calculated, and capacity of outdoor unit heat exchanger (refrigerant accumulates in coils) and air flow of outdoor unit fans (controls pole change of the two fans) are controlled.
If operating a small-capacity indoor unit, the bypass valve is controlled (ON/OFF), with capacity control being executed at a minimum of 14% for a 5HP outdoor unit (when operating one 20-class indoor unit), or a minimum of 8% for 8 and 10HP outdoor units (when operating one 20-class indoor unit.



• CONTROL FLOW



5 Explanation of different VRV™ Systems

5-2 VRV™ Inverter cooling only / heat pump systems

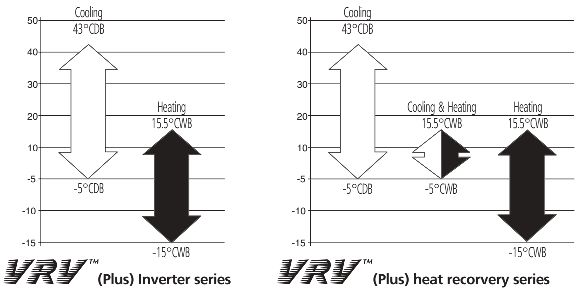
- **LOW OPERATION SOUND LEVEL**

Continuous research by Daikin into reducing operation sound levels has resulted in the development of a purpose designed inverter scroll compressor and fan.

- **OPERATION RANGE**

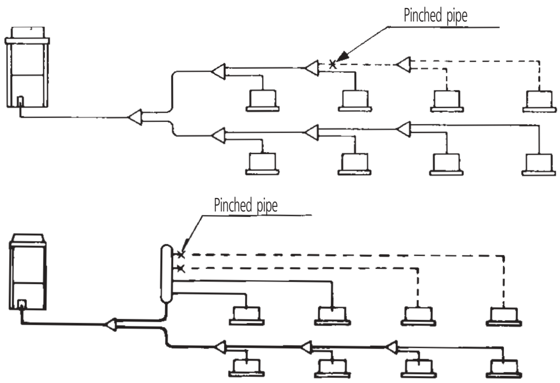
Standard operation down to -15°C outdoor ambient temperature

Advanced PI control of the outdoor unit enables VRV (Plus) heat recovery and Inverter series to operate at outdoor ambients down to -5°C in cooling mode and down to -15°C in heating mode.



- **POSSIBILITY TO ADD EXTRA INDOOR UNITS**

VRV systems are easily adaptable to changes in room layout: extra indoor units can be added to a VRV outdoor unit up to a capacity level of 130%.



Additional units must always be added below the REFNET header.

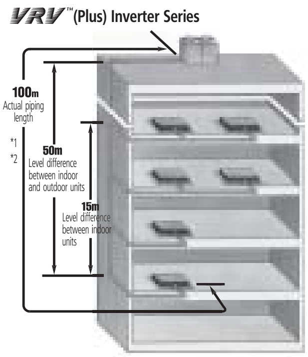
5

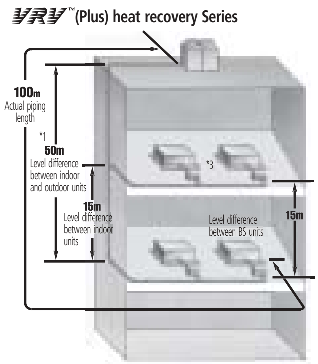
5 Explanation of different VRV™ Systems

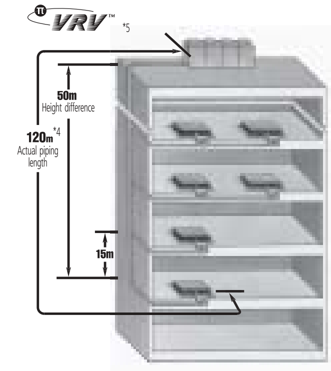
5-2 VRV™ Inverter cooling only / heat pump systems

- **EXTENDED REFRIGERANT PIPING**

The ability to sustain refrigerant piping in lengths up to 100m (120m equivalent) for K series, 120m for L series, allows systems to be designed with level differences of 50m between indoor and outdoor units and 15m between individual indoor units. Thus, even with installations in 15 storey buildings, all outdoor units can be located at rooftop level.





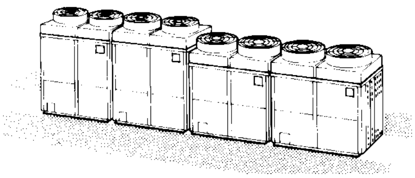


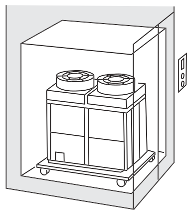
NOTES

1 This value is based on the case where the outdoor unit is located above the indoor unit. If the outdoor unit is located underneath the indoor unit the level difference is a maximum of 40m.
2 The maximum actual piping length between the indoor unit and the first branch is 40m.
3 The BS unit can be located anywhere between the indoor unit and outdoor unit, if installing after the first branch (REFNET JOINT or HEADER), the piping limit is less than 40m. This value is based on the case where the outdoor unit is located above the indoor unit.
4 Equivalent piping length 140m
5 Total length = no special restrictions

- **MODULAR & LIGHTWEIGHT**

Modular design enables units to be joined together in rows with an outstanding degree of uniformity.



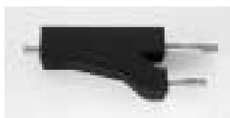


The design of the outdoor units (from 5HP to 10HP) is sufficiently compact to allow them to be taken up to the top of a building in a commercial elevator, overcoming site transportation problem, particularly when outdoor units need to be installed on each floor.

- **UNIFIED REFNET PIPING**

The unified Daikin REFNET piping system is especially designed for simple installation and for use with both R-407C and R-22 refrigerants. Only 2 or 3 main refrigerant pipes are necessary per system and unlike conventional water based schemes, VRV systems do not require strainers, stop valves, 2 and 3 way valves, oil traps, anti freeze treatment or air purging.
The use of REFNET piping in combination with electronic expansion valves, results in a dramatic reduction in imbalance in refrigerant flowing between indoor units, despite the small diameter of the piping. REFNET joints and headers (both accessories) can cut down on installation work and increase system reliability.

Refnet header



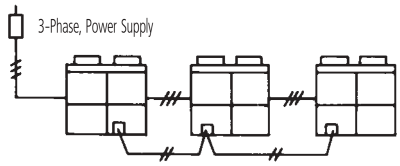
Attached insulators for Refnet header

5 Explanation of different VRV™ Systems

5-2 VRV™ Inverter cooling only / heat pump systems

- **SEQUENTIAL START**

Facilitates electrical work because up to 3 outdoor units can be hooked up to the power supply simultaneously. If using a combination of 8 and 10HP units and start-up must be executed in sequence, please purchase an optional adapter for sequential start separately.

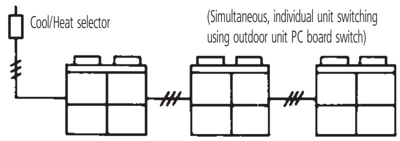


- **OPERATION MODE POSSIBILITIES**

You can simultaneouly switch several outdoor units using Cool/Heat selector.

NOTE

1 Not operative unless power is turned on for all outdoor units.

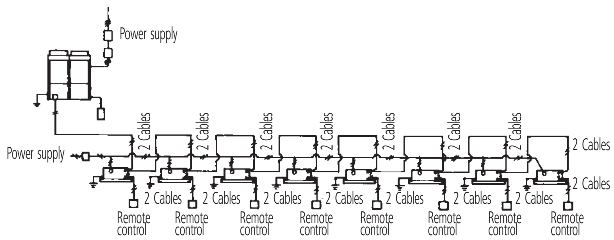


- **SIMPLIFIED WIRING**

A simple 2-wire multiplex transmission system links each outdoor unit to mulyiple indoor units using one 2-core wire, thus simplifying the wiring operation.

- **AUTO ADDRESS SETTING FUNCTION**

Allows wiring between indoor and outdoor units, as well as group control wiring of multiple indoor units, to be performed without the bothersome task of manually setting each address.



- **AUTO CHECK FUNCTION**

The auto check facility available on the VRV (Plus) inverter and heat recovery series is the first of its type in the industry to warn operatives of connection errors in interunit wiring and piping. This function identifies and alerts system errors by means of on/off LEDs on the outdoor unit's PC boards.

- **OUTDOOR UNIT COMBINATIONS**

Total HP	Total Nr. of Units	System Structure RSX(Y)
5	1	5
8	1	8
10	1	10
	2	5+5
13	2	5+8
15	2	5+10
	3	5+5+5
16	2	8+8
18	2	8+10
	3	5+5+8
20	2	10+10
	3	5+5+10
21	3	5+8+8
23	3	5+8+10
24	3	8+8+8
25	3	5+10+10
26	3	8+8+10
28	3	8+10+10
30	3	10+10+10

By using a combination of 5, 8 and 10HP units, you can easily develop a system that can handle even smaller areas.
You can use up to three outdoor units of 10HP or less in any combination. For units of more than 10HP, you develop a system of the exact desired capacity, graduating in units as small as approx. 1HP each. (For power supply cabling, run cable in sequence starting from the larger outdoor unit in terms of horsepower.)

5 Explanation of different VRV™ Systems

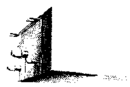
5-3 VRV™ Inverter heat recovery systems

5

- **SURVEY**

Description	Outdoor unit	Maximum number of connectable indoor units	Total capacity index range
VRV™ Heat recovery	RSEYP8K7	13	100 - 260
	RSEYP10K7	16	125 - 325

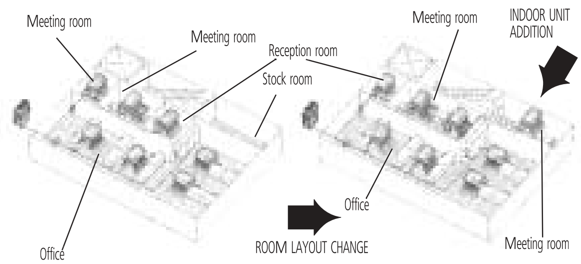
- **OUTDOOR UNITS**

RSEYP8	RSEYP10	BSV(P)100,160
		

- **INTRODUCTION**

Total room layout flexibility

VRV systems are easily adaptable to changes in room layout: extra indoor units can be added to a VRV outdoor unit up to a capacity level of 130%. Also, since VRV heat recovery systems offer simultaneous cooling and heating, existing indoor and outdoor units can continue to provide year round air conditioning from their existing locations, even if office layouts are altered or extended.



Year round cooling and/or heating

Designed to provide simultaneous year round cooling and/or heating, VRV heat recovery systems are modular in concept and are therefore, ideal for use in rooms or zones that generate varying thermal loads according to building orientation or local hot or cold spots.
It is possible for the same meeting room to give rise to differing thermal loads depending on the time of day, number of occupants present, location and usage pattern of lighting and electronic office equipment. Until the advent of the VRV, a complex 4-pipe fan coil was needed to meet this requirement. The VRV however, is easier to design and install and in its heat recovery format, can conserve energy in two or more rooms at the same time.

5 Explanation of different VRV™ Systems

5-3 VRV™ Inverter heat recovery systems

Simultaneous cooling and heating operation with 1 system

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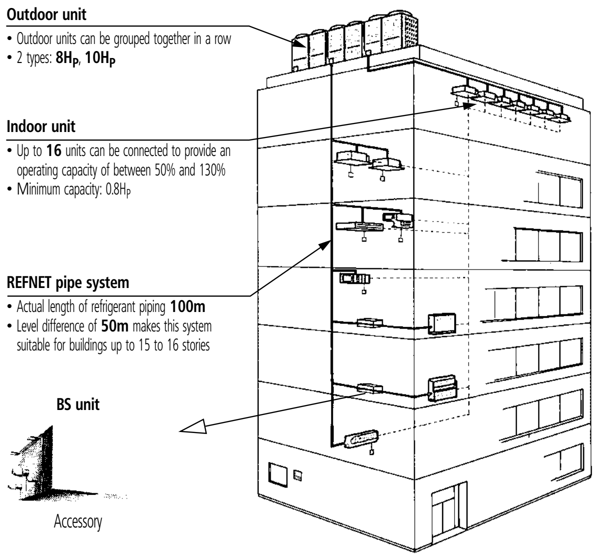
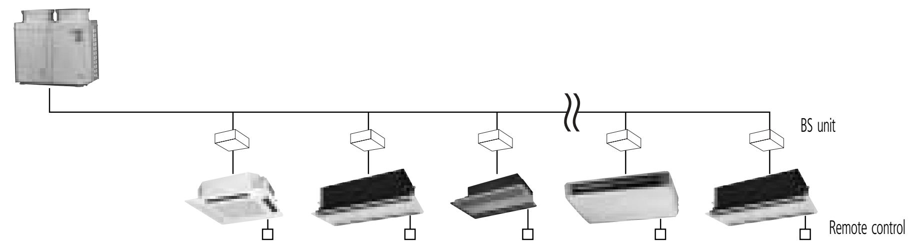
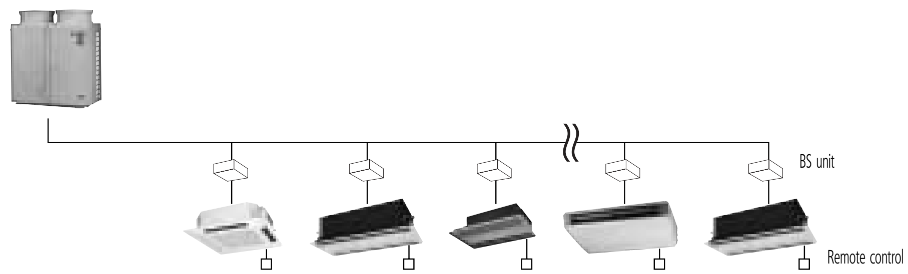


- **EXAMPLES OF DIFFERENT ASSEMBLY PATTERN**

RSEYP8K: maximum 13 indoor units can be connected



RSEYP10K: maximum 16 indoor units can be connected



5 Explanation of different VRV™ Systems

5-3 VRV™ Inverter heat recovery systems

5

- **LOAD DISTRIBUTION**

A totally individual energy saving air conditioning system that uses a highly efficient load heating and cooling free heat recovery method making use of differences in the load.
A highly energy efficient, wholly modular air conditioning system has been achieved through the use of a heating and cooling free heat recovery method whereby efficiency is enhanced by selective load distribution.

The use of "R-HIDECS circuit" inverter (*2) control together with independent multi-variable PI control (*1) for the precise monitoring of status and more effective control of each part of the system, enables the highly particularized use of the system's capacity to meet the varying air conditioning load requirements (heating and cooling requirements and load size) of different rooms.
This is nothing less than a completely revolutionary modular air conditioning system which offers the user an entirely free choice of cooling or heating mode for each and every indoor unit in the system.

NOTES

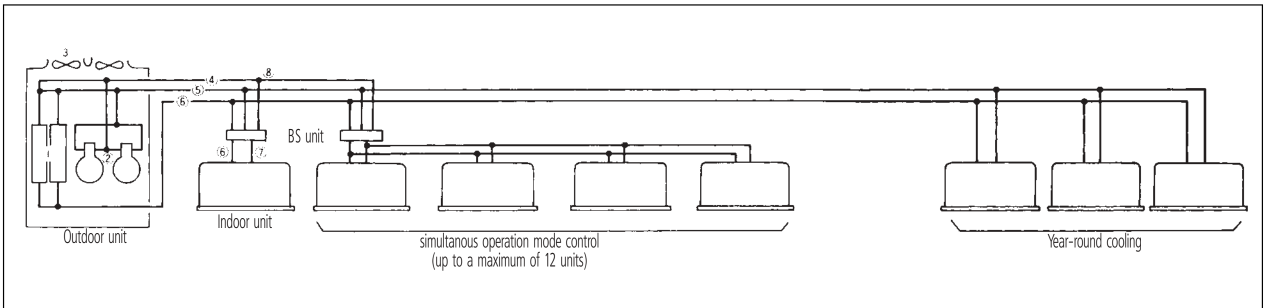
*1: Proportional integrated control.

*2: Recovery-Hi-Inverter Drive and Electronic Control System.

- **EFFECTIVE SIMULTANEOUS COOLING AND HEATING FROM 1 SYSTEM**

Effective simultaneous cooling and heating from 1 outdoor unit is achieved by the addition of a gas suction pipe to the existing liquid and gas discharge piping of the refrigerant system. The availability of both cooling and heating functions is then achieved through the selection of either the gas discharge or the gas suction pipe in accordance with the ambient temperature and temperature settings.
At this point the "R-HIDECS circuit" is used for capacity control of the indoor unit heat exchanger and the outdoor unit compressor and heat exchanger in order to achieve perfect performance through the collection and delivery of the precise amount of refrigerant required.
Moreover, perfect control of the thermal balance is achieved by the use of inverter and fan speed adjustment control which in turn permits stable and efficient control in response to independent selection of cooling or heating mode for each indoor unit.

- **SYSTEM OUTLINE**



① Twin heat exchangers
② Twin compressor (inverter + unloader)
③ Fan
④ Gas discharge pipe
⑤ Gas suction pipe
⑥ Liquid pipe
⑦ Gas pipe
⑧ REFNET joint

- **ENERGY SAVING SYSTEM USING HEAT RECOVERY**

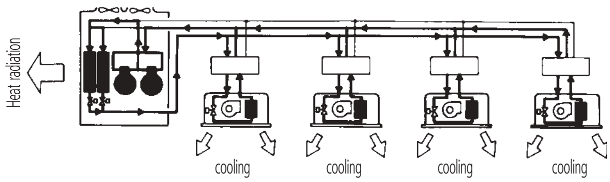
This complete heat recovery system operates by selecting the mode with the smaller load during the course of simultaneous heating and cooling operations and then using the refrigerant to transmit heat from the mode which is bearing the lower load to the mode which is bearing the higher load. In this way it is possible in winter, for example, to use the waste heat from the OA room cooling operation to heat the remaining office space … a highly effective use of energy is thus achieved.

5 Explanation of different VRV™ Systems

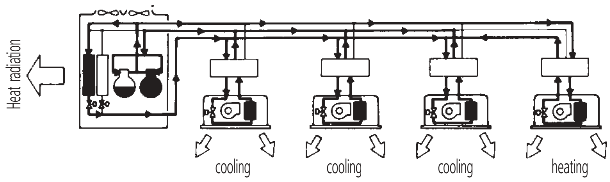
5-3 VRV™ Inverter heat recovery systems

- **COOLING AND HEATING DEVIATION**

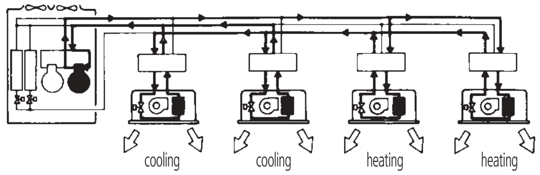
① Heat radiation mode (all cooling operation)



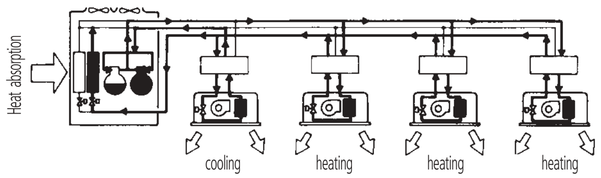
② Heat radiation tendency heat recovery operation (mainly cooling, partly heating operation



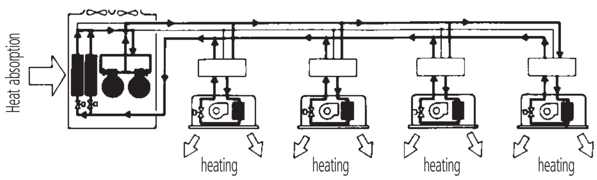
③ Heat recovery operation (cooling ≒ heating operation)



④ Heat absorption tendency heat recovery operation (mainly heating, partly cooling operation)



⑤ Heat absorption operation (all heating operation)



5 Explanation of different VRV™ Systems

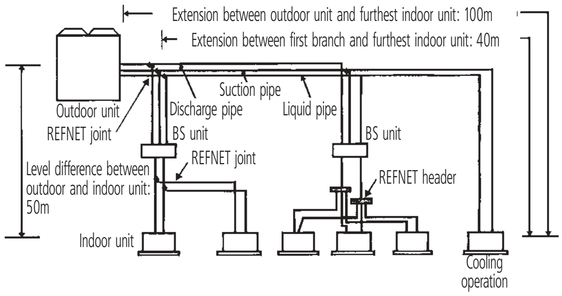
5-3 VRV™ Inverter heat recovery systems

5

- **FREER DESIGN AND EASIER OPERATION VIA A SINGLE HEAT RECOVERY SYSTEM**

Compared to other outdoor units that have a separate heating and cooling system and a separate year-round cooling outdoor unit, this single heat recovery system saves on installation space, makes refrigerant piping simpler and increases the overall simplicity of the system.

- Fewer outdoor units, hence less installation space is needed
- Installation can be simplified and greater reliability is achieved
- Greater savings on facilities and installation costs and time
- Simple refrigerant piping system and small pipe shaft space
- Wiring has been made even easier with a power outlet now fitted to the front of the unit to add to the one on the side
- It is not necessary to take designs for room usage, conditions and air conditioning loads into account
- New refrigerant control technology has enabled an actual refrigerant piping length of 100m and a level difference of 15-16 floors



- Heat recovery operation allows you to save approx. 15-20% of annual demand compared with conventional individual air-conditioning systems (Trial by this company)
- Lets you reduce total outdoor unit capacity by approx. 15-20% (Trial by this company)

- **SIMPLE OPERATION CONTROL**

- Easy control because operation mode selection for outdoor units is unnecessary.
- Equipped with an automatic operation function that can automatically changeover cool/heat according to temperature setting and room temperature.

5 Explanation of different VRV™ Systems

5-4 VRV™ PLUS Inverter heat pump / heat recovery systems

- **SURVEY**

Conditions of heat pump system connection:

Model name	Horsepower	Total capacity index	Max. nr. of connectable indoor units	Capacity steps	Outdoor unit combinations
RSXYP16KJY1	16 HP	200~520	20	26	RXYP8KJ + RXEP8K7
RSXYP18KJY1	18 HP	225~585	20	26	RXYP10KJ + RXEP8K7
RSXYP20KJY1	20 HP	250~650	20	26	RXYP10KJ + RXEP10K7
RSXYP24KJY1	24 HP	300~780	32	29	RXYP16KJ + RXEP8K7
RSXYP26KJY1	26 HP	325~845	32	29	RXYP16KJ + RXEP10K7
RSXYP28KJY1	28 HP	350~910	32	29	RXYP20KJ + RXEP8K7
RSXYP30KJY1	30 HP	375~975	32	29	RXYP20KJ + RXEP10K7

Conditions of heat pump system connection:

Model name	Horsepower	Total capacity index	Max. nr. of connectable indoor units	Capacity steps	Outdoor unit combinations
RSEYP16KJY1	16 HP	200~520	20	26	REYP8KJ + RXEP8K7
RSEYP18KJY1	18 HP	225~585	20	26	REYP10KJ + RXEP8K7
RSEYP20KJY1	20 HP	250~650	20	26	REYP10KJ + RXEP10K7
RSEYP24KJY1	24 HP	300~780	32	29	REYP16KJ + RXEP8K7
RSEYP26KJY1	26 HP	325~845	32	29	REYP16KJ + RXEP10K7
RSEYP28KJY1	28 HP	350~910	32	29	REYP20KJ + RXEP8K7
RSEYP30KJY1	30 HP	375~975	32	29	REYP20KJ + RXEP10K7

Conditions of BS unit connection:

Model name	Horsepower	Connectable ratio	Max. nr. of connectable indoor units
BSVP100K	4 HP	less than 11.2 kW	5
BSVP160K	6 HP	11.2 kW~less than 18.0 kW	8
BSVP250K	10 HP	18.0 kW~less than 28.0 kW	12

- **OUTDOOR UNITS + BS BOXES**

VRV Plus heat pump / heat recovery systems

RSXYP/RSEYP16,18KJY1

RSXYP/RSEYP20KJY1

RSXYP/RSEYP24,28KJY1

RSXYP/RSEYP26,30KJY1

Main units

RXYP/REYP8KJY1

RXYP/REYP10KJY1

RXYP/REYP16KJY1

RXYP/REYP20KJY1

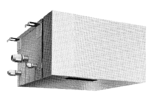
Sub units

RXEP8KJY1

RXEP10KJY1

BS unit

BSVP-K



5 Explanation of different VRV™ Systems

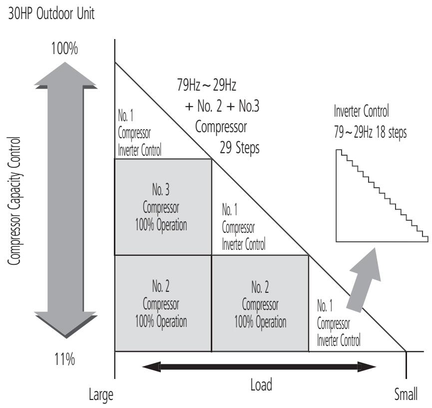
5-4 VRV™ PLUS Inverter heat pump / heat recovery systems

5

- **INTRODUCTION**

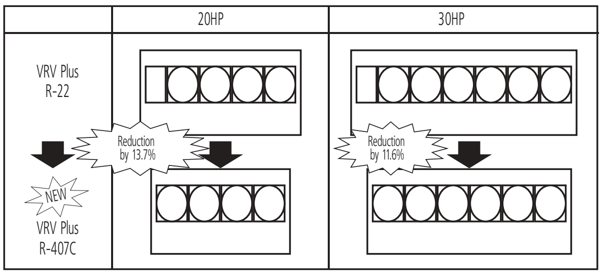
VRV Plus series using R-407C are designed for outdoor installation and used for cooling and heat pump applications. The RSXYP units are available in 7 standard sizes with nominal cooling capacities ranging from 43.8 to 82.1 kW and nominal heating capacities ranging from 43.8 to 82.1 kW.

- **COMPRESSOR CAPACITY CONTROL**

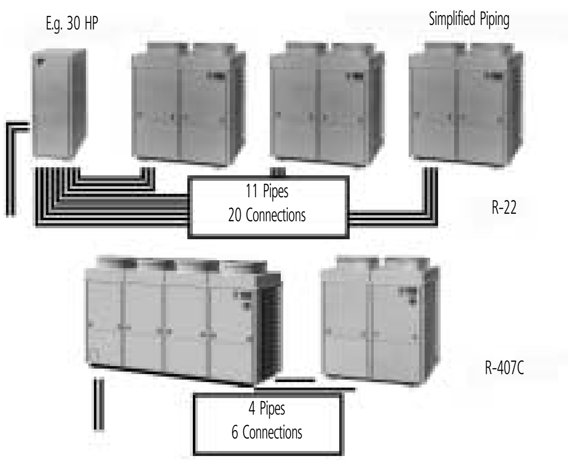


- **REDUCTION IN INSTALLATION SPACE**

R-407C VRV Plus units - without function unit - consist out of 2 components only, namely main unit & sub unit, whereby the common piping system is integrated in the main unit. This significantly reduces the necessary installation space. A reduction of 13.7% for the 20HP unit and a reduction of 11.6% for the 30HP unit.



- **SIMPLIFIED PIPING SYSTEM**

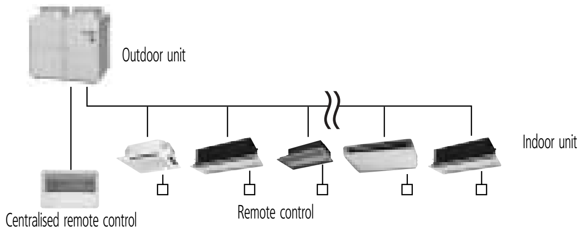


5 Explanation of different VRV™ Systems

5-4 VRV™ PLUS Inverter heat pump / heat recovery systems

- **SUPER WIRING SYSTEM**

A Super wiring system is used to enable the shared use of the wiring between the indoor and outdoor units and the centralised remote control. A high-level central control system can be achieved via a relatively simple wiring operation. Even when retrofitting with a central control system, you only need to connect the centralised remote control to the outdoor units.



- **BACK-UP FUNCTION**

Conventional VAV systems or water systems require expensive, bulky standby systems to prevent air conditioning from being shut down when a problem has occurred. The VRV system conditions the air in each room individually, allowing any possible problems to affect only the immediate system and not the complete VRV system. If one compressor in the outdoor units of the Plus series should malfunction, the back-up function by means of remote control will allow emergency operation of another compressor

- **REDUCTION IN REFRIGERANT VOLUME COMPARED TO VRV PLUS R-22 UNITS**

Unit	Horsepower	Reduction (kg)	Reduction (%)
RSXYP16KJ	16 HP	4.6 kg	77%
RSXYP18KJ	18 HP	5.5 kg	75%
RSXYP20KJ	20 HP	6.7 kg	72%
RSXYP24KJ	24 HP	5.2 kg	82%
RSXYP26KJ	26 HP	6.6 kg	78%
RSXYP28KJ	28 HP	7.2 kg	78%
RSXYP30KJ	30 HP	8.8 kg	74%

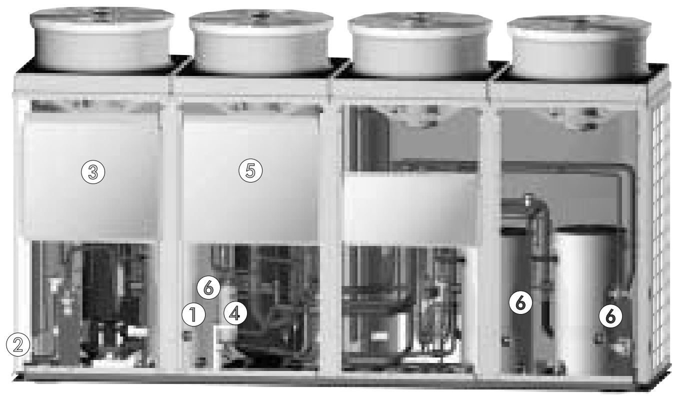
- **REFRIGERANT PIPES** with diameter 25.4 mm are changed to diameter 28.6 mm to match European standards.

- **FIELD PIPING CONNECTION** has been simplified: 6 spots for piping connection instead of 14 for 20HP outdoor unit and 26 for 30HP outdoor unit.

5 Explanation of different VRV™ Systems

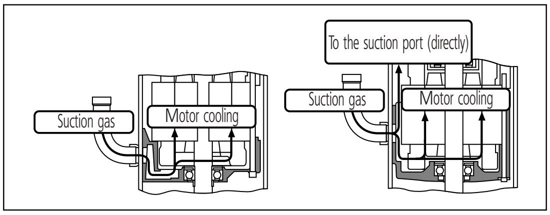
5-4 VRV™ PLUS Inverter heat pump / heat recovery systems

- **FIELD PIPING CONNECTION**

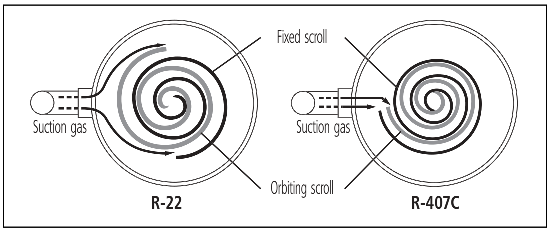


① **High-efficiency scroll compressor**

Conventional compressors were designed to cool a motor with all incoming refrigerant gas and send it to the compression process. Daikin's new scroll compressor separates incoming refrigerant: a gas which is fed to compressing process through motor in order to cool the motor and a gas which is fed to compressing process directly. This minimizes loss in motor section



The refrigerant gas inlet to the compression process is located near the suction inlet to minimize loss.



② **New intelligent defrost control**

Detection of frosting conditions of a multiple number of heat exchangers to achieve timely activation of defrost operation.

③ **Newly developed inverter unit**

Detailed capacity control in accordance with high-efficiency scroll compressor operation.

④ **New-type oil separator**

Ensures high reliability even with extended piping.

⑤ **New oil-return operation control**

Daikin's original sensor technology for accurate return of lubrication oil to compressors.

⑥ **Twin/triple compressor control**

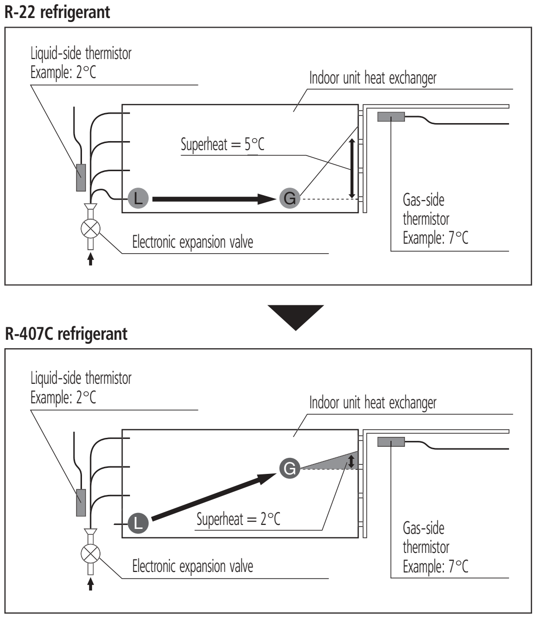
Optimum capacity control of two or three compressors in accordance with load.

(16~20 HP: twin, 24~30 HP: triple)

⑦ **Superheat optimization control (indoor unit)**

In an indoor unit, liquid refrigerant is heated by a heat exchanger, and it boils and evaporates, thus changing to a gas state. The refrigerant temperature is controlled by an electronic expansion valve and thermistor so the temperature difference between the inlet and outlet stays 5°C. R-22, a single-component refrigerant remains at a constant temperature until it changes completely to a gas; therefore, the gas must be superheated to increase the temperature by 5°C. By contrast, R-407C, a mixture of three different refrigerants, increases in temperature before it becomes 7a gas, thus requiring the superheating process to bring up the temperature by only 2°C. This means more efficient operation of the heat exchanger.

R-22 refrigerant



L: liquid refrigerant, G: gas refrigerant

6 Selection procedure

6-1 Selection procedure standard VRV™ System based on cooling load

6-1-1 Indoor unit selection

Enter indoor unit capacity tables at given indoor and outdoor temperature.

Select the unit that the capacity is the nearest to and higher than the given load.

NOTE

1 Individual indoor unit capacity is subject to change by the combination. Actual capacity has to be calculated according to the combination by using outdoor units capacity table.

6-1-2 Outdoor unit selection

Allowable combinations are indicated in indoor unit combination total capacity index table.

In general, oudoor units can be selected as follows though the location of the unit, zoning and usage of the rooms should be considered.

The indoor and outdoor unit combination is determined that the sum of indoor unit capacity index is nearest to and smaller than the capacity index at 100 % combination ratio of each outdoor unit. Up to 16 indoor units can be connected to one outdoor unit. It is recommended to choose a larger outdoor unit if the installation space is large enough.

If the combination ratio is higher than 100 %, the indoor unit selection will have to be reviewed by using actual capacity of each indoor unit.

Indoor unit combination total capacity index table

Outdoor unit	Indoor unit combination ratio								
	130 %	120 %	110 %	100 %	90 %	80 %	70%	60 %	50 %
RSX(Y)P5K/L	162.5	150	137.5	125	112.5	100	87.5	75	62.5
RSX(Y)P8K/L / RSEYP8K	260	240	220	200	180	160	140	120	100
RSX(Y)10K/L RSEY10K	325	300	275	250	225	200	175	150	125

Indoor unit capacity index

Model	20	25	32	40	50	63	71	80	100	125	200	250
Capacity index	20	25	31.25	40	50	62.5	71	80	100	125	200	250

6-1-3 Actual performance data

Use outdoor unit capacity tables

Determine the correct table according to the outdoor unit model and combination ratio.

Enter the table at given indoor and outdoor temperature and find the outdoor capacity and power input. The individual indoor unit capacity (power input) can be calculated as follows :

$$ICA = \frac{OCA \times INX}{TNX}$$

ICA : Individual indoor unit capacity (power input)
OCA : Outdoor unit capacity (power input)
INX : Individual indoor unit capacity index
TNX : Total capacity index

Then, correct the indoor unit capacity according to the piping length.
If the corrected capacity is smaller than the load, the size of indoor unit has to be increased. Repeat the same selection procedure.

6

6 Selection procedure

6-1 Selection procedure standard VRV™ System based on cooling load

6-1-4 Selection example based on cooling load

1 Given

- Design condition
  Cooling : indoor 20°CWB, outdoor 33°CDB
- Cooling load

Room	A	B	C	D	E	F	G	H
Load (kW)	2.9	2.7	2.5	4.3	4.0	4.0	3.9	4.2

- Power supply : 3-phase 380V/50Hz

2 Indoor unit selection

Enter indoor unit capacity table at:
20°CWB indoor temperature
33°CDB outdoor air temperature.

Selection results are as follows:

Room	A	B	C	D	E	F	G	H
Load (kW)	2.9	2.7	2.5	4.3	4.0	4.0	3.9	4.2
Unit size	25	25	25	40	40	40	40	40
Capacity	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8

3 Outdoor unit selection

- Assume that the indoor and outdoor unit combination is as follows.
  Outdoor unit : RSEYP10K
  Indoor unit : FXYCP25K7 x 3 , FXYCP40K7 x 5
- Indoor unit combination total capacity index
  25 x 3 + 40 x 5 = 275 (110 %)

4 Actual performance data (50Hz)

- Outdoor unit cooling capacity : 31.7kW (RSEYP10K, 110 %)
- Individual capacity
  Capacity of FXYCP25K $= 31.7 \times \frac{25}{275} = 2.88$kW

  Capacity of FXYCP40K7 $= 31.7 \times \frac{40}{275} = 4.61$ kW

Actual combination capacity

Room	A	B	C	D	E	F	G	H
Load (kW)	2.9	2.7	2.5	4.3	4.0	4.0	3.9	4.2
Unit size	25	25	25	40	40	40	40	40
Capacity	2.88	2.88	2.88	4.61	4.61	4.61	4.61	4.61

The unit size for room A has to be increased from 25 to 32 because the capacity is less than the load. For new combination, actual capacity is calculated as follows.

- Indoor unit combination total capacity index
  25 x 2 +31.25 + 40 x5 = 281.25 (112.5 %)
- Outdoor unit cooling capacity:
  27,610 kcal/h (direct interpolation between 110 % and 120 % in the table)
- Individual capacity
  Capacity of FXYCP25K $= 31.9 \times \frac{25}{281.25} = 2.84$kW

  Capacity of FXYCP32K $= 31.9 \times \frac{32}{281.25} = 3.63$kW

  Capacity of FXYCP40K $= 31.9 \times \frac{40}{281.25} = 4.54$kW

Actual capacity of new combination

Room	A	B	C	D	E	F	G	H
Load (kW)	2.9	2.7	2.5	4.3	4.0	4.0	3.9	4.2
Unit size	32	25	25	40	40	40	40	40
Capacity	3.63	2.84	2.84	4.54	4.54	4.54	4.54	4.54

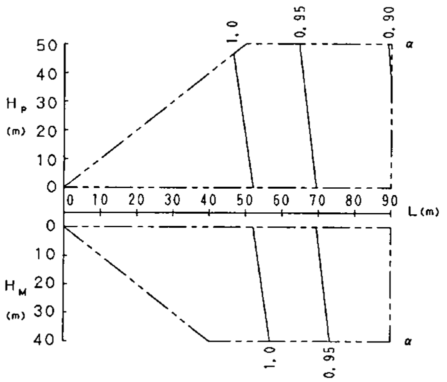
Then, the capacities have to be corrected for actual piping length according to the location of indoor and outdoor units and the distance between them.

6 Selection procedure

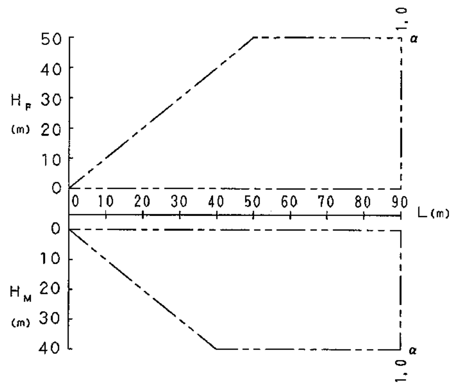
6-2 VRV Capacity correction ratio

6-2-1 RSX(Y)P5L7W1

- Rate of change in cooling capacity



- Rate of change in heating capacity

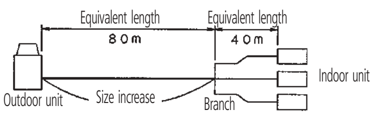


6

NOTES

1. These figures illustrate the rate of change in capacity of a standard indoor unit system at maximum load (with the thermostat set to maximum) under standard conditions.
   Moreover, under partial load conditions there is only a minor deviation from the rate of change in capacity shown in the above figures.
2. With this outdoor unit, evaporating pressure constant control when cooling, and condensing pressure constant control when heating is carried out.
3. Method of calculating cooling / heating capacity (max. capacity for combination with standard indoor unit)
   cooling / heating capacity = cooling / heating capacity obtained from performance characteristics table x each capacity rate of change
   When piping length differs depending on the indoor unit, maximum capacity of each unit during simultaneous operation is:
   cooling / heating capacity = cooling / heating capacity of each unit x capacity rate of change for each piping length
4. When overall equivalent pipe length is 90m or more the size of the main gas pipes must be increased (outdoor unit-branch sections).
   [Increase in gas pipe diameters (main pipes)]
   RSX(Y)P5~ø 22.2
5. When the main sections of the interunit gas pipe sizes are increased the overall equivalent length should be calculated as follows.
   Overall equivalent length = Equivalent length to main pipe x 0.5 + Equivalent length after branching

   Example:



   In the above case (Cooling)
   Overall equivalent length = 80m x 0.5 + 40m = 80m
   The correction factor in capacity when H_P = 0m is thus approximately 0.75.

EXPLANATION OF SYMBOLS

H_P : level difference (m) between indoor and outdoor units with indoor unit in inferior position

H_M : level difference (m) between indoor and outdoor units with indoor unit in superior position

L : Equivalent pipe length (m)

α : Capacity correction factor

Diameters of gas pipe

RSX(Y)P5~ø 19.1

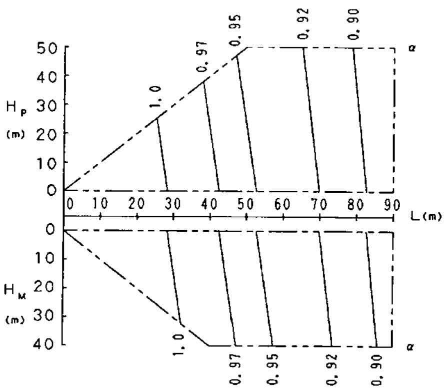
3TW24772-3A

6 Selection procedure

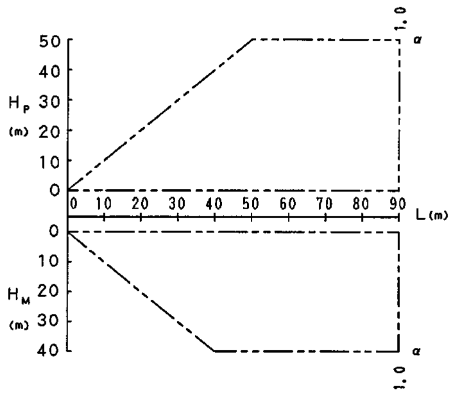
6-2 VRV Capacity correction ratio

6-2-2 RSX(Y)P8L7W1

- Rate of change in cooling capacity



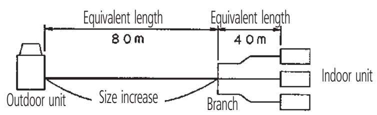
- Rate of change in heating capacity



NOTES

1. These figures illustrate the rate of change in capacity of a standard indoor unit system at maximum load (with the thermostat set to maximum) under standard conditions.
   Moreover, under partial load conditions there is only a minor deviation from the rate of change in capacity shown in the above figures.
2. With this outdoor unit, evaporating pressure constant control when cooling, and condensing pressure constant control when heating is carried out.
3. Method of calculating cooling / heating capacity (max. capacity for combination with standard indoor unit)
   cooling / heating capacity = cooling / heating capacity obtained from performance characteristics table x each capacity rate of change
   When piping length differs depending on the indoor unit, maximum capacity of each unit during simultaneous operation is:
   cooling / heating capacity = cooling / heating capacity of each unit x capacity rate of change for each piping length
4. When overall equivalent pipe length is 90m or more the size of the main gas pipes must be increased (outdoor unit-branch sections).
   [Increase in gas pipe diameters (main pipes)]
   RSX(Y)P8~ø 28.6
5. When the main sections of the interunit gas pipe sizes are increased the overall equivalent length should be calculated as follows.
   Overall equivalent length = Equivalent length to main pipe x 0.5 + Equivalent length after branching

   Example:



   In the above case (Cooling)
   Overall equivalent length = 80m x 0.5 + 40m = 80m
   The correction factor in capacity when H_P = 0m is thus approximately 0.87.

EXPLANATION OF SYMBOLS

H_P : level difference (m) between indoor and outdoor units with indoor unit in inferior position

H_M : level difference (m) between indoor and outdoor units with indoor unit in superior position

L : Equivalent pipe length (m)

α : Capacity correction factor

Diameters of gas pipe

RSX(Y)P8~ø 25.4

3TW24782-3

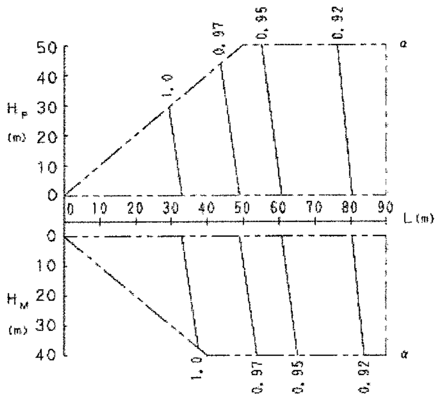
6 Selection procedure

6-2 VRV Capacity correction ratio

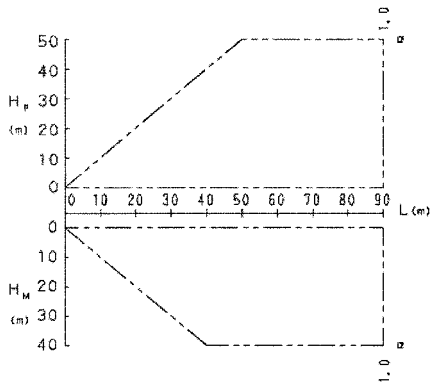
6-2-3 RSX(Y)P10L7W1

6

- Rate of change in cooling capacity



- Rate of change in heating capacity



NOTES

1 These figures illustrate the rate of change in capacity of a standard indoor unit system at maximum load (with the thermostat set to maximum) under standard conditions.
Moreover, under partial load conditions there is only a minor deviation from the rate of change in capacity shown in the above figures.

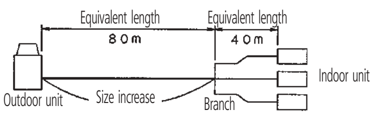
2 With this outdoor unit, evaporating pressure constant control when cooling, and condensing pressure constant control when heating is carried out.

3 Method of calculating cooling / heating capacity (max. capacity for combination with standard indoor unit)
cooling / heating capacity = cooling / heating capacity obtained from performance characteristics table x each capacity rate of change
When piping length differs depending on the indoor unit, maximum capacity of each unit during simultaneous operation is:
cooling / heating capacity = cooling / heating capacity of each unit x capacity rate of change for each piping length

4 When overall equivalent pipe length is 90m or more the size of the main gas pipes must be increased (outdoor unit-branch sections).
[Increase in gas pipe diameters (main pipes)]
RSX(Y)P10~ø 31.8

5 When the main sections of the interunit gas pipe sizes are increased the overall equivalent length should be calculated as follows.
Overall equivalent length = Equivalent length to main pipe x 0.5 + Equivalent length after branching

Example:



In the above case (Cooling)
Overall equivalent length = 80m x 0.5 + 40m = 80m
The correction factor in capacity when H_P = 0m is thus approximately 0.84.

EXPLANATION OF SYMBOLS

H_P : level difference (m) between indoor and outdoor units with indoor unit in inferior position

H_M : level difference (m) between indoor and outdoor units with indoor unit in superior position

L : Equivalent pipe length (m)

α : Capacity correction factor

Diameters of gas pipe

RSX(Y)P10~ø 28.6

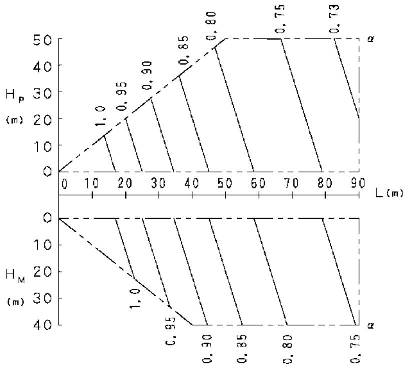
3TW24792-3

6 Selection procedure

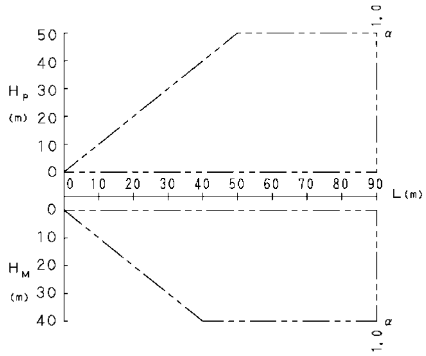
6-2 VRV Capacity correction ratio

6-2-4 RSX(Y)P5K7W1

- Rate of change in cooling capacity



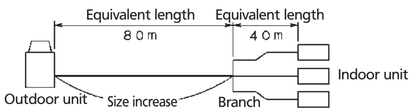
- Rate of change in heating capacity



NOTES

1. These figures illustrate the rate of change in capacity of a standard indoor unit system at maximum load (with the thermostat set to maximum) under standard conditions.
   Moreover, under partial load conditions there is only a minor deviation from the rate of change in capacity shown in the above figures.
2. With this outdoor unit, evaporating pressure constant control when cooling, and condensing pressure constant control when heating is carried out.
3. Method of calculating cooling / heating capacity (max. capacity for combination with standard indoor unit)
   cooling / heating capacity = cooling / heating capacity obtained from performance characteristics table x each capacity rate of change
   When piping length differs depending on the indoor unit, maximum capacity of each unit during simultaneous operation is:
   cooling / heating capacity = cooling / heating capacity of each unit x capacity rate of change for each piping length
4. When overall equivalent pipe length is 90 m or more the size of the main gas pipes must be increased (outdoor unit-branch sections).
   [Increase in gas pipe diameters (main pipes)]
   RSXYP5~ø 22.2
5. When the main sections of the interunit gas pipe sizes are increased the overall equivalent length should be calculated as follows
   Overall equivalent length = equivalent length to main pipe x 0.5 + Equivalent length after branching

   Example



In the above case (Cooling)
Overall equivalent length = 80m x 0.5 + 40m = 80m
The correction factor in capacity when Hp = 0m is thus approximately 0.75.

EXPLANATION OF SYMBOLS

H_P level difference (m) between indoor and outdoor units with indoor unit in inferior position
H_M level difference (m) between indoor and outdoor units with indoor unit in superior position
L Equivalent pipe length (m)
α Capacity correction factor

[Diameters of gas pipe]
RSXYP5~ø19.1

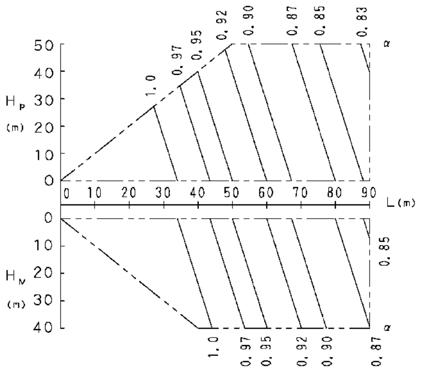
3D006065

6 Selection procedure

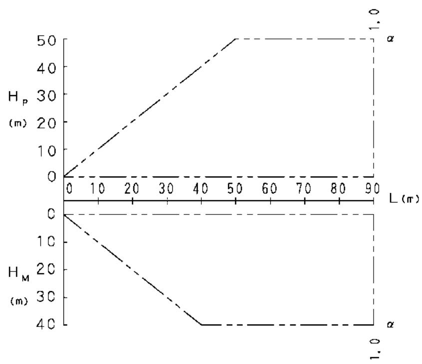
6-2 VRV Capacity correction ratio

6-2-5 RSX(Y)P8K7W1

- Rate of change in cooling capacity



- Rate of change in heating capacity



NOTES

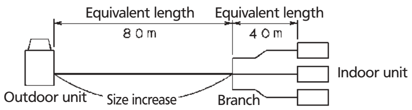
1 These figures illustrate the rate of change in capacity of a standard indoor unit system at maximum load (with the thermostat set to maximum) under standard conditions.
Moreover, under partial load conditions there is only a minor deviation from the rate of change in capacity shown in the above figures.

2 With this outdoor unit, evaporating pressure constant control when cooling, and condensing pressure constant control when heating is carried out.

3 Method of calculating cooling / heating capacity (max. capacity for combination with standard indoor unit)
cooling / heating capacity = cooling / heating capacity obtained from performance characteristics table x each capacity rate of change
When piping length differs depending on the indoor unit, maximum capacity of each unit during simultaneous operation is:
cooling / heating capacity = cooling / heating capacity of each unit x capacity rate of change for each piping length

4 When overall equivalent pipe length is 90 m or more the size of the main gas pipes must be increased (outdoor unit-branch sections).
[Increase in gas pipe diameters (main pipes)]
RSXYP8~ø 28.6

5 When the main sections of the interunit gas pipe sizes are increased the overall equivalent length should be calculated as follows
Overall equivalent length = equivalent length to main pipe x 0.5 + Equivalent length after branching
Example



In the above case (Cooling)
Overall equivalent length = 80m x 0.5 + 40m = 80m
The correction factor in capacity when Hp = 0m is thus approximately 0.87.

EXPLANATION OF SYMBOLS

H_P level difference (m) between indoor and outdoor units with indoor unit in inferior position
H_M level difference (m) between indoor and outdoor units with indoor unit in superior position
L Equivalent pipe length (m)
α Capacity correction factor

[Diameters of gas pipe]
RSXYP8~ø 25.4

3D006063

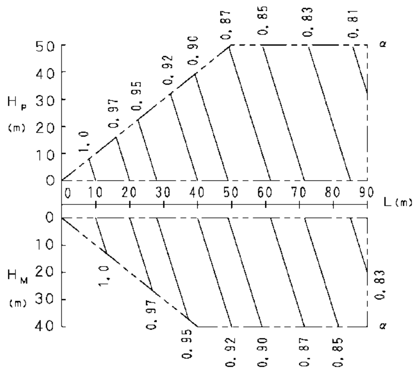
6

6 Selection procedure

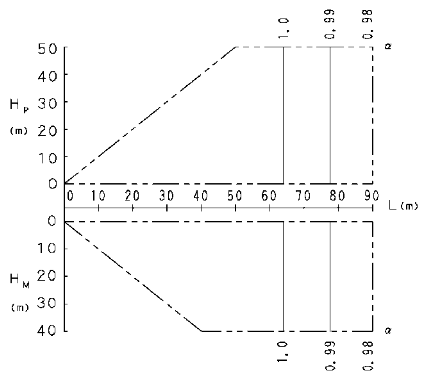
6-2 VRV Capacity correction ratio

6-2-6 RSX(Y)P10K7W1

- Rate of change in cooling capacity

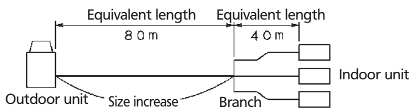


- Rate of change in heating capacity



NOTES

1. These figures illustrate the rate of change in capacity of a standard indoor unit system at maximum load (with the thermostat set to maximum) under standard conditions.
   Moreover, under partial load conditions there is only a minor deviation from the rate of change in capacity shown in the above figures.
2. With this outdoor unit, evaporating pressure constant control when cooling, and condensing pressure constant control when heating is carried out.
3. Method of calculating cooling / heating capacity (max. capacity for combination with standard indoor unit)
   cooling / heating capacity = cooling / heating capacity obtained from performance characteristics table x each capacity rate of change
   When piping length differs depending on the indoor unit, maximum capacity of each unit during simultaneous operation is:
   cooling / heating capacity = cooling / heating capacity of each unit x capacity rate of change for each piping length
4. When overall equivalent pipe length is 90 m or more the size of the main gas pipes must be increased (outdoor unit-branch sections).
   [Increase in gas pipe diameters (main pipes)]
   RSXYP10~ø 31.8
5. When the main sections of the interunit gas pipe sizes are increased the overall equivalent length should be calculated as follows
   Overall equivalent length = equivalent length to main pipe x 0.5 + Equivalent length after branching
   Example



In the above case (Cooling)
Overall equivalent length = 80m x 0.5 + 40m = 80m
The correction factor in capacity when Hp = 0m is thus approximately 0.84.

EXPLANATION OF SYMBOLS

H_P level difference (m) between indoor and outdoor units with indoor unit in inferior position
H_M level difference (m) between indoor and outdoor units with indoor unit in superior position
L Equivalent pipe length (m)
α Capacity correction factor

[Diameters of gas pipe]
RSXYP10~ø 28.6

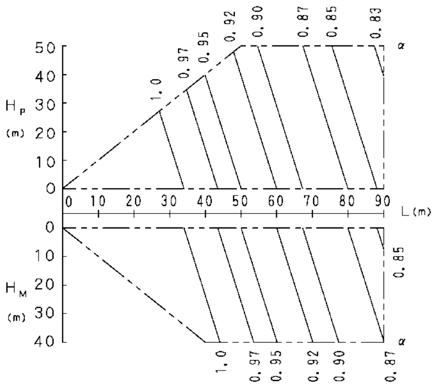
3D006064

6 Selection procedure

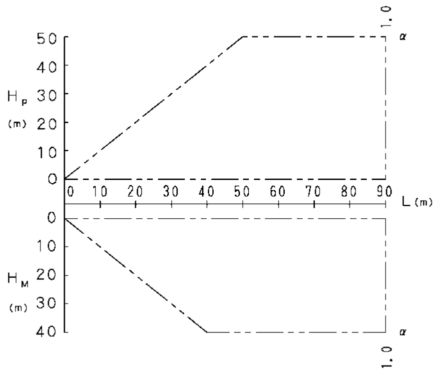
6-2 VRV Capacity correction ratio

6-2-7 RSEYP8K

- Rate of change in cooling capacity



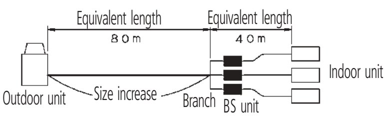
- Rate of change in heating capacity



NOTES

1. These figures illustrate the rate of change in capacity of a standard indoor unit system at maximum load (with the thermostat set to maximum) under standard conditions.
   Moreover, under partial load conditions there is only a minor deviation from the rate of change in capacity shown in the above figures.
2. With this outdoor unit, evaporating pressure constant control when cooling, and condensing pressure constant control when heating is carried out.
3. Method of calculating cooling / heating capacity (max. capacity for combination with standard indoor unit)
   cooling / heating capacity = cooling / heating capacity obtained from performance characteristics table x each capacity rate of change
   When piping length differs depending on the indoor unit, maximum capacity of each unit during simultaneous operation is:
   cooling / heating capacity = cooling / heating capacity of each unit x capacity rate of change for each piping length
4. In the combination which does not include cooling indoor unit. Calculate the equivalent length pipe by the following when you calculate cooling capacity.
   Overall equivalent length = equivalent length to main pipe x 0.5 + Equivalent length after branching

   (Example)



In the above case (Cooling)
Overall equivalent length = 80m x 0.5 + 40m = 80m
The correction factor in capacity when Hp = 0m is thus approximately 0.87.

EXPLANATION OF SYMBOLS

H_P level difference (m) between indoor and outdoor units with indoor unit in inferior position
H_M level difference (m) between indoor and outdoor units with indoor unit in superior position
L Equivalent pipe length (m)
α Capacity correction factor

[Diameters of suction gas pipe]
RSEYP8~ø25.4

3D018350

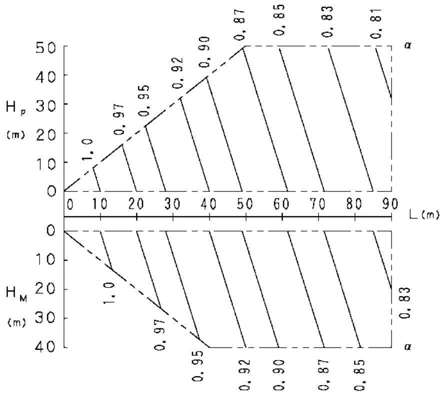
6 Selection procedure

6-2 VRV Capacity correction ratio

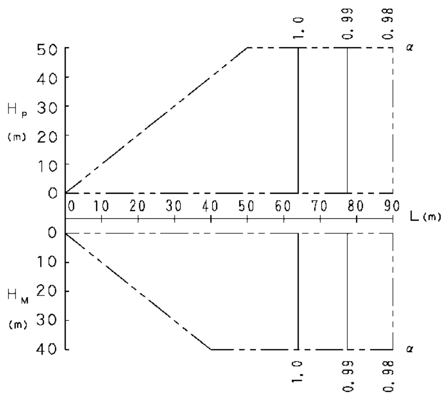
6-2-8 RSEYP10K

6

- Rate of change in cooling capacity



- Rate of change in heating capacity



NOTES

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Moreover, under partial load conditions there is only a minor deviation from the rate of change in capacity shown in the above figures.

2 With this outdoor unit, evaporating pressure constant control when cooling, and condensing pressure constant control when heating is carried out.

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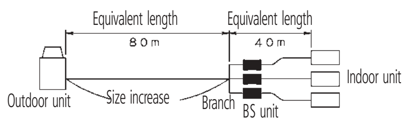
cooling / heating capacity = cooling / heating capacity obtained from performance characteristics table x each capacity rate of change
When piping length differs depending on the indoor unit, maximum capacity of each unit during simultaneous operation is:
cooling / heating capacity = cooling / heating capacity of each unit x capacity rate of change for each piping length

4 In the combination which does not include cooling indoor unit. Calculate the equivalent length pipe by the following when you calculate cooling capacity.
Overall equivalent length = equivalent length to main pipe x 0.5 + Equivalent length after branching
(Example)



In the above case (Cooling)
Overall equivalent length = 80m x 0.5 + 40m = 80m
The correction factor in capacity when Hp = 0m is thus approximately 0.84.

EXPLANATION OF SYMBOLS

H_P level difference (m) between indoor and outdoor units with indoor unit in inferior position
H_M level difference (m) between indoor and outdoor units with indoor unit in superior position
L Equivalent pipe length (m)
α Capacity correction factor

[Diameters of suction gas pipe]
RSEYP10~ø 28.6

3D0118351

6 Selection procedure

6-3 Selection procedure VRV PLUS System based on cooling load

6-3-1 Indoor unit selection

Enter indoor unit capacity tables at given indoor and outdoor temperature.
Select the unit that the capacity is the nearest to and higher than the given load.

NOTE

1 Individual indoor unit capacity is subject to change by the combination. Actual capacity has to be calculated according to the combination by using outdoor units capacity table.

6-3-2 Outdoor unit selection

Allowable combinations are indicated in indoor unit combination total capacity index table.
In general, oudoor units can be selected as follows though the location of the unit, zoning and usage of the rooms should be considered.
The indoor and outdoor unit combination is determined that the sum of indoor unit capacity index is nearest to and smaller than the capacity index at 100 % combination ratio of each outdoor unit. Up to 32 indoor units can be connected to one outdoor system. It is recommended to choose a larger outdoor unit if the installation space is large enough.
If the combination ratio is higher than 100 %, the indoor unit selection will have to be reviewed by using actual capacity of each indoor unit.

Indoor unit combination total capacity index table

Outdoor unit	Indoor unit combination ratio								
	130 %	120 %	110 %	100 %	90 %	80 %	70%	60 %	50 %
RSXYP/RSEYP16K	520	480	440	400	360	320	280	240	200
RSXYP/RSEYP18K	585	540	495	450	405	360	315	270	225
RSXYP/RSEYP20K	650	600	550	500	450	400	350	300	250
RSXYP/RSEYP24K	780	720	660	600	540	480	420	360	300
RSXYP/RSEYP26K	845	780	715	650	585	520	455	390	325
RSXYP/RSEYP28K	910	840	770	700	630	560	490	420	350
RSXYP/RSEYP30K	975	900	825	750	675	600	525	450	375

Indoor unit capacity index

Model	20	25	32	40	50	63	71	80	100	125	200	250
Capacity index	20	25	31.25	40	50	62.5	71	80	100	125	200	250

6-3-3 Actual performance data

Use outdoor unit capacity tables
Determine the correct table according to the outdoor unit model and combination ratio.
Enter the table at given indoor and outdoor temperature and find the outdoor capacity and power input. The individual indoor unit capacity (power input) can be calculated as follows :

$$ICA = \frac{OCA \times INX}{TNX}$$

ICA : Individual indoor unit capacity (power input)
OCA : Outdoor unit capacity (power input)
INX : Individual indoor unit capacity index
TNX : Total capacity index

Then, correct the indoor unit capacity according to the piping length.
If the corrected capacity is smaller than the load, the size of indoor unit has to be increased. Repeat the same selection procedure.

6

6 Selection procedure

6-3 Selection procedure VRV™ PLUS System based on cooling load

6-3-4 Selection example based on cooling load

1 Given

- Design condition
  Cooling : indoor 20°CWB, outdoor 33°CDB
- Cooling load

Room	A	B	C	D	E	F	G	H
Load (kW)	2.9	2.7	2.5	4.3	4.0	4.0	3.9	4.2

- Power supply : 3-phase 380V/50Hz

2 Indoor unit selection

Enter indoor unit capacity table at:
20°CWB indoor temperature
33°CDB outdoor air temperature.

Selection results are as follows:

Room	A	B	C	D	E	F	G	H	I	J	K	L	M
Load (kW)	2.9	2.7	2.5	4.3	4.0	4.0	3.9	4.2	5.4	5.8	8.7	10.9	10.8
Unit size	25	25	25	40	40	40	40	40	50	50	80	100	100
Capacity	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	5.9	5.9	9.5	11.9	11.9

3 Outdoor unit selection

- Assume that the indoor and outdoor unit combination is as follows.
  Outdoor unit : RSXYP26K
  Indoor unit : FXYCP25K x 3 , FXYCP40K x 5, FXYSP50K x 2, FXYFP80K x 1, FXYMP100K x 2
- Indoor unit combination total capacity index
  25 x 3 + 40 x 5 + 50 x 2 + 80 x 1 + 100 x 2 = 655 (100.77 %)

4 Actual performance data (50Hz)

- Outdoor unit cooling capacity : 75.78kW (RSXYP26K, 100.77 %)
  →direct interpolation between 100 and 110 %
- Individual capacity

Capacity of FXYCP25K $= 75.78 \times \frac{25}{655} = 2.89$kW

Capacity of FXYCP40K7 $= 75.78 \times \frac{40}{655} = 4.63$kW

Capacity of FXYSP50K $= 75.78 \times \frac{50}{655} = 5.78$kW

Capacity of FXYFP80K $= 75.78 \times \frac{80}{655} = 9.25$kW

Capacity of FXYMP100K $= 75.78 \times \frac{100}{655} = 11.57$kW

Actual combination capacity

Room	A	B	C	D	E	F	G	H	I	J	K	L	M
Load (kW)	2.9	2.7	2.5	4.3	4.0	4.0	3.9	4.2	5.4	5.8	8.7	10.9	10.8
Unit size	25	25	25	40	40	40	40	40	50	50	80	100	100
Capacity	2.89	2.89	2.89	4.63	4.63	4.63	4.63	4.63	5.78	5.78	9.25	11.57	11.57

6 Selection procedure

6-3 Selection procedure VRV PLUS System based on cooling load

6-3-4 Selection example based on cooling load

The unit size for room A has to be increased from 25 to 32 because the capacity is less than the load. For new combination, actual capacity is calculated as follows.

- Indoor unit combination total capacity index
  25x2 + 31.25 + 40x5 + 50 + 62.5 + 80 + 100x2 = 673.75 (103.65 %)
- Outdoor unit cooling capacity:
  76.44kW (direct interpolation between 100 % and 110 % in the table)
- Individual capacity
  Capacity of FXYCP25K $= 76.44 \times \frac{25}{673.75} = 2.84$kW

  Capacity of FXYCP32K $= 76.44 \times \frac{32}{673.75} = 3.63$kW

  Capacity of FXYCP40K $= 76.44 \times \frac{40}{673.75} = 4.54$kW

  Capacity of FXYSP50K $= 76.44 \times \frac{50}{673.75} = 5.67$kW

  Capacity of FXYSP63K $= 76.44 \times \frac{63}{673.75} = 7.15$kW

  Capacity of FXYMP80K $= 76.44 \times \frac{80}{673.75} = 9.08$kW

  Capacity of FXYFP100K $= 76.44 \times \frac{100}{673.75} = 11.35$kW

Actual capacity of new combination

Room	A	B	C	D	E	F	G	H	I	J	K	L	M
Load (Kw)	2.9	2.7	2.5	4.3	4.0	4.0	3.9	4.2	5.4	5.8	8.7	10.9	10.8
Unit size	32	25	25	40	40	40	40	40	50	63	80	100	100
Capacity	3.63	2.84	2.84	4.54	4.54	4.54	4.54	4.54	5.67	7.15	9.08	11.35	11.35

Then, the capacities have to be corrected for actual piping length according to the location of indoor and outdoor units and the distance between them.

NOTE

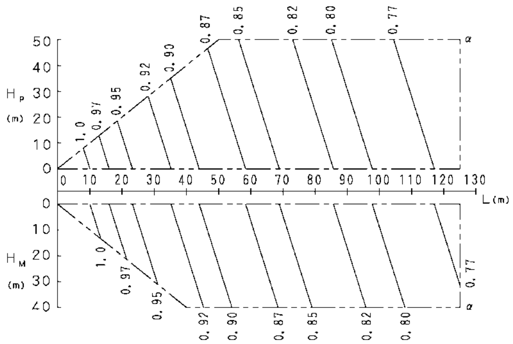
Select the optimum size of units and take care no to select the oversized units.

6 Selection procedure

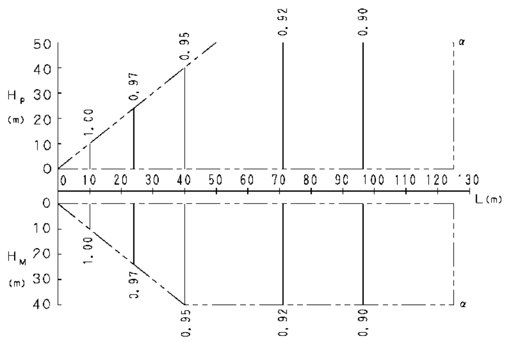
6-4 VRV Plus Capacity correction ratio

6-4-1 RSXYP16,18,26KJY1

- Rate of change in cooling capacity



- Rate of change in heating capacity



NOTES

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3. Method of calculating cooling / heating capacity (max. capacity for combination with standard indoor unit)
   cooling / heating capacity = cooling / heating capacity obtained from performance characteristics table x each capacity rate of change
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EXPLANATION OF SYMBOLS

H_p : level difference (m) between indoor and outdoor units with indoor unit in inferior position
H_M : level difference (m) between indoor and outdoor units with indoor unit in superior position
L : Equivalent pipe length (m)
α : Capacity correction factor

Diameters of suction gas pipe
RSXYP26KJY1 ~ ø 41.3
RSXYP16, 18 KJY1 ~ ø 34.9

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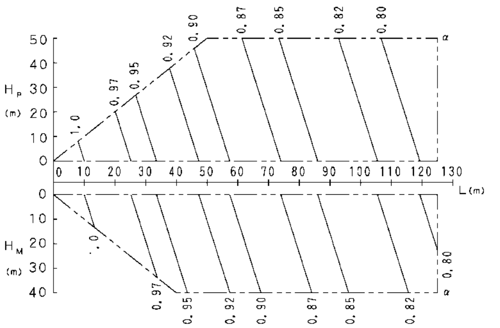
6 Selection procedure

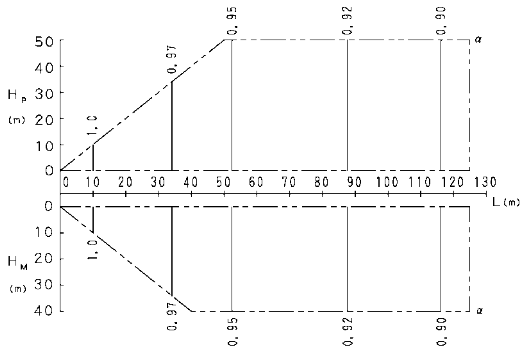
6-4 VRV Plus Capacity correction ratio

6-4-2 RSXYP24KJY1

- Rate of change in cooling capacity



- Rate of change in heating capacity



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L : Equivalent pipe length (m)
α : Capacity correction factor

Diameters of suction gas pipe
RSXYP24KJY1 ~ ø 41.3

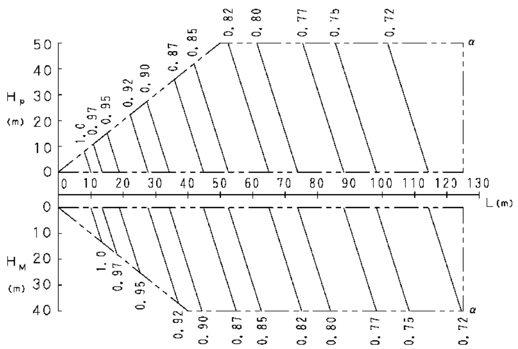
3D027995

6 Selection procedure

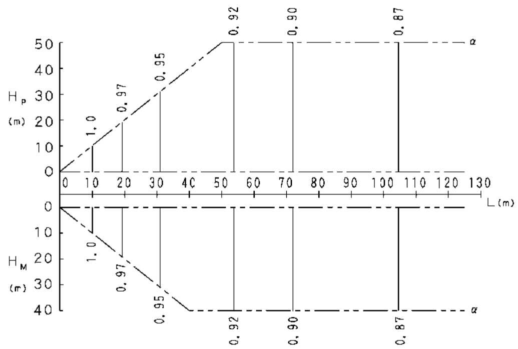
6-4 VRV Plus Capacity correction ratio

6-4-3 RSXYP20,28,30KJY1

- Rate of change in cooling capacity



- Rate of change in heating capacity



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L : Equivalent pipe length (m)
α : Capacity correction factor

Diameters of suction gas pipe
RSXYP28,30KJY1 ~ ø 41.3
RSXYP20KJY1 ~ ø 34.9

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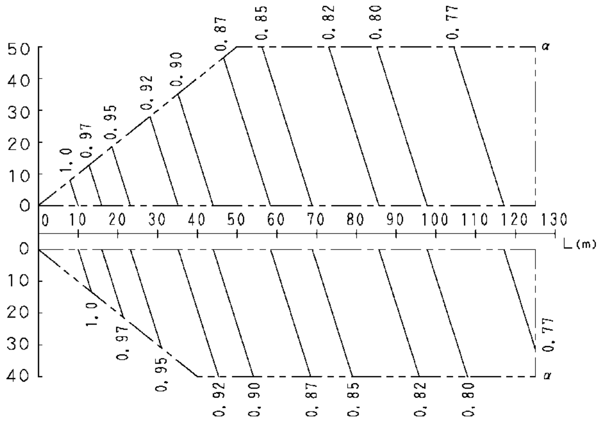
6 Selection procedure

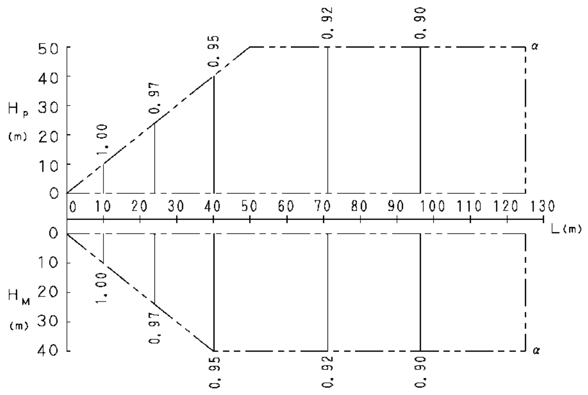
6-4 VRV Plus Capacity correction ratio

6-4-4 RSEYP16,18,26KJY1

- Rate of change in cooling capacity



- Rate of change in heating capacity



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H_M level difference (m) between indoor and outdoor units with indoor unit in superior position
L Equivalent pipe length (m)
α Capacity correction factor

Diameters of suction gas pipe
RSEYP26KJY1 ~ ø 41.3
RSEYP16,18KJY1 ~ ø 34.9

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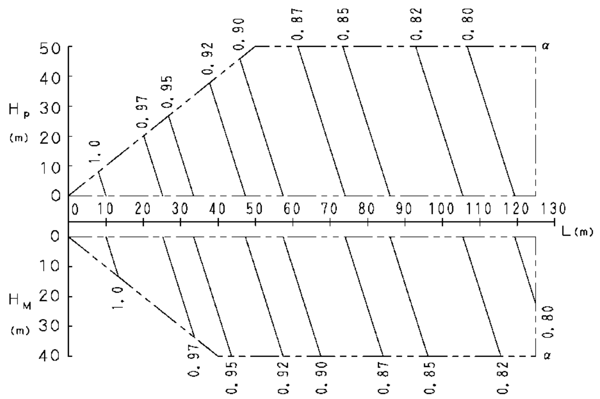
6 Selection procedure

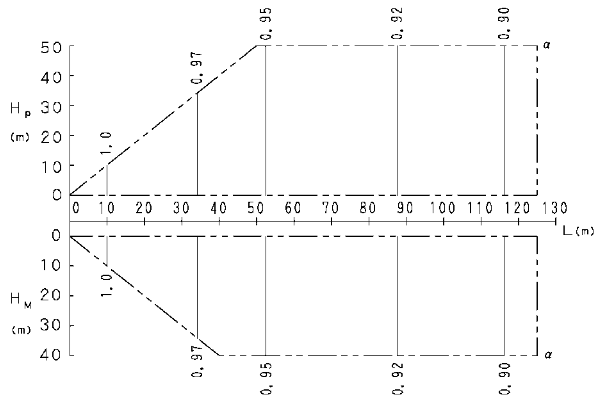
6-4 VRV Plus Capacity correction ratio

6-4-5 RSEYP24KJY1

- Rate of change in cooling capacity



- Rate of change in heating capacity



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H_M level difference (m) between indoor and outdoor units with indoor unit in superior position
L Equivalent pipe length (m)
α Capacity correction factor

Diameters of suction gas pipe
RSEYP24KJY1 ~ ø 41.3

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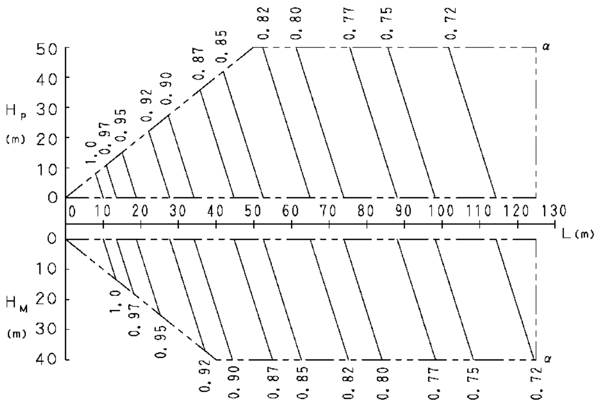
6 Selection procedure

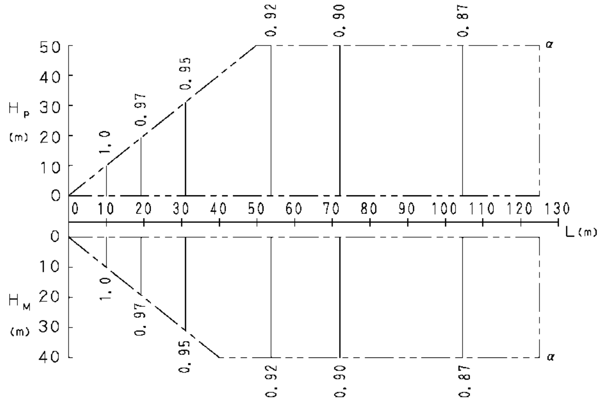
6-4 VRV Plus Capacity correction ratio

6-4-6 RSEYP20,28,30KJY1

- Rate of change in cooling capacity



- Rate of change in heating capacity



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α Capacity correction factor

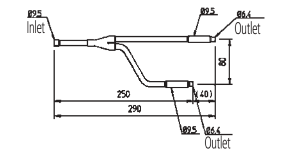
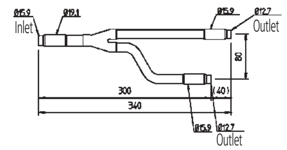
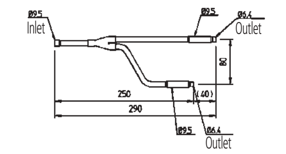
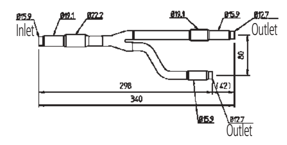
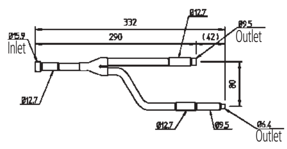
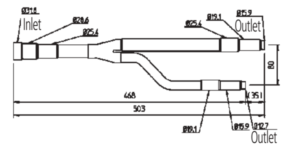
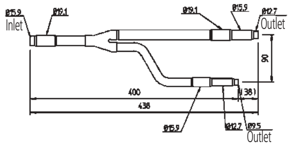
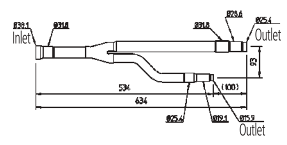
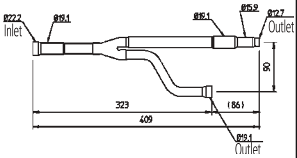
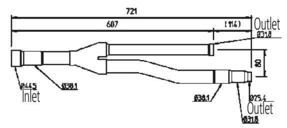
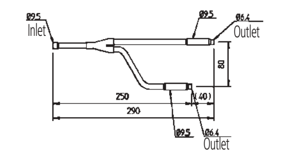
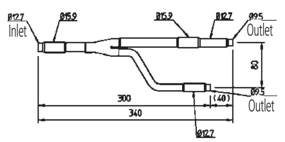
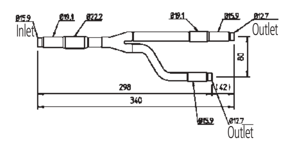
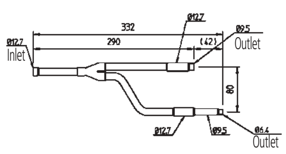
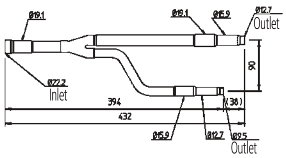
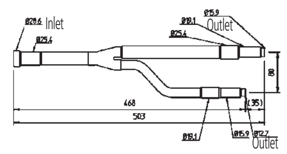
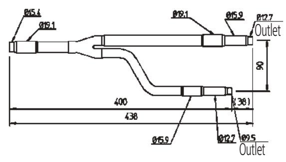
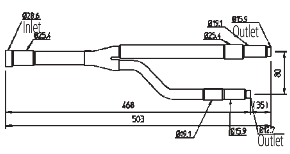
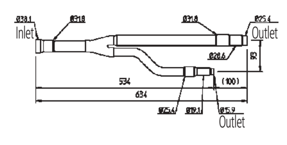
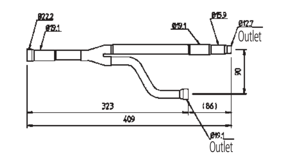
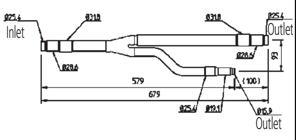
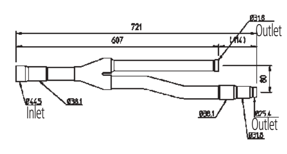
Diameters of suction gas pipe
RSEYP28,30KJY1 ~ ø 41.3
RSEYP20KJY1 ~ ø 34.9

3D031933

6 Selection procedure

6-5 Refnet pipe system

6-5-1 Unified Refnet joints

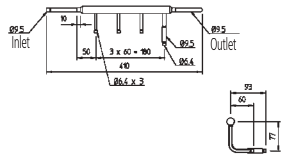
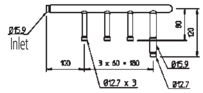
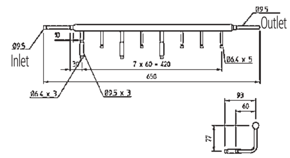
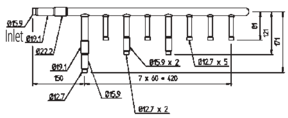
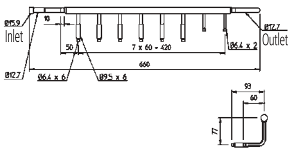
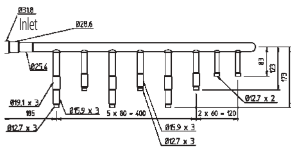
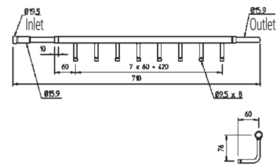
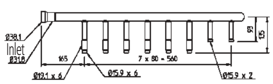
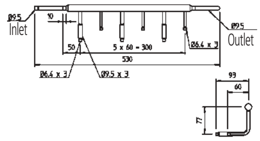
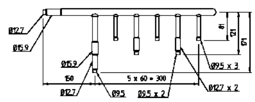
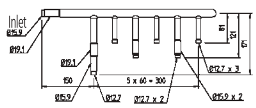
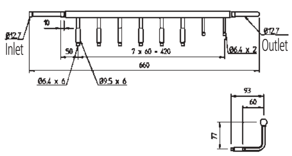
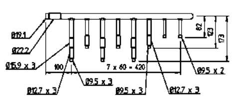
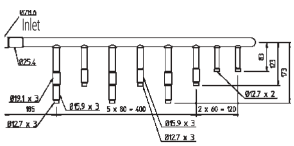
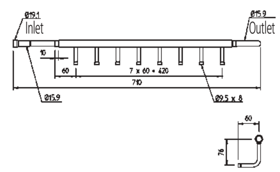
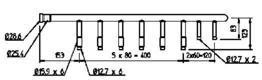
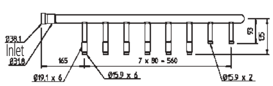
	Liquid side junction	Discharge gas side junction	Suction gas side junction	Others
KHRP26K11T				– Insulator – Installation manual
KHRP26K18T				– Insulator – Installation manual
KHRP26K37T				– Insulator – Pipe reducer (suction) ø25.4-ø19.1 ø28.6-ø25.4 – Installation manual
KHRP26K40T				– Insulator – Pipe reducer (suction) ø15.9-ø12.7 – Pipe reducer (liquid) ø9.5-ø6.4 – Installation manual
KHRP26K75T				– Insulator – Pipe reducers (suction) ø25.4-ø19.1-ø15.9 ø31.8-ø34.9 (3x) ø38.1-ø41.3 ø31.8-ø34.9-ø41.3 – Pipe reducers (liquid) ø19.1-ø15.9-ø12.7 ø12.7-ø9.5-ø6.4 – Installation manual
KHRP25K18T				– Insulator – Installation manual
KHRP25K20T				– Insulator – Pipe reducers (suction) ø25.4-ø19.1 – Pipe reducers (discharge) ø12.7-ø9.5 ø19.1-ø15.9 – Installation manual
KHRP25K40T				– Insulator – Pipe reducers (suction) ø15.9-ø12.7 ø41.3-ø34.9-ø31.8 ø34.9-ø31.8 – Pipe reducers (discharge) ø12.7-ø9.5 – Pipe reducers (liquid) ø9.5-ø6.4 – Installation manual
KHRP25K75T				– Insulator – Pipe reducers (suction) ø15.9-ø12.7 ø25.4-ø19.1-ø15.9-ø12.7 ø31.8-ø34.9 (3x) ø38.1-ø41.3 ø31.8-ø34.9-ø41.3 – Pipe reducers (discharge) ø12.7-ø9.5 ø19.1-ø15.9 ø31.8-ø25.4 – Pipe reducers (liqid) ø19.1-ø15.9-ø12.7 ø12.7-ø9.5-ø6.4 – Installation manual

1TW21559-11C

6 Selection procedure

6-5 Refnet pipe system

6-5-2 Unified Refnet headers

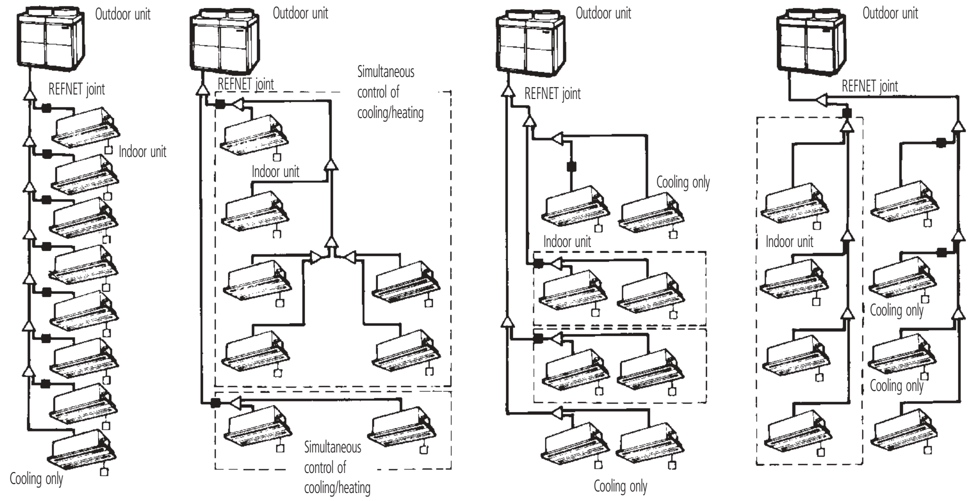
	Liquid side header	Discharge gas side header	Suction gas side header	Others
KHRP26K11H 4 branches				– Insulator – Pinched pipes – Installation manual
KHRP26K18H 8 branches				– Insulator – Pinched pipes – Installation manual
KHRP26K37H 8 branches				– Insulator – Pinched pipes – Installation manual
KHRP26K40H 8 branches				– Insulator – Pinched pipes – Installation manual – Pipe reducer (suction) ø31.8-ø34.9-ø41.3
KHRP25K18H 6 branches				– Insulator – Pinched pipes – Installation manual
KHRP25K37H 8 branches				– Insulator – Pinched pipes – Installation manual
KHRP25K40H 8 branches				– Insulator – Pinched pipes – Installation manual – Pipe reducers (suction) ø15.9-ø12.7 ø31.8-ø34.9-ø41.3 ø25.4-ø19.1-ø15.9-ø12.7 – Pipe reducers (liquid) ø19.1-ø15.9-ø12.7 ø12.7-ø9.5-ø6.4 – Pipe reducers (discharge) ø12.7-ø9.5 ø19.1-ø15.9 ø31.8-ø25.4

1TW21559-11C

6 Selection procedure

6-5 Refnet pipe system

6-5-3 Example of Refnet piping layouts

<table>
<tr><th>Type of fitting</th><th>Sample systems</th></tr>
<tr><td>Distribution by REFNET joints</td><td>
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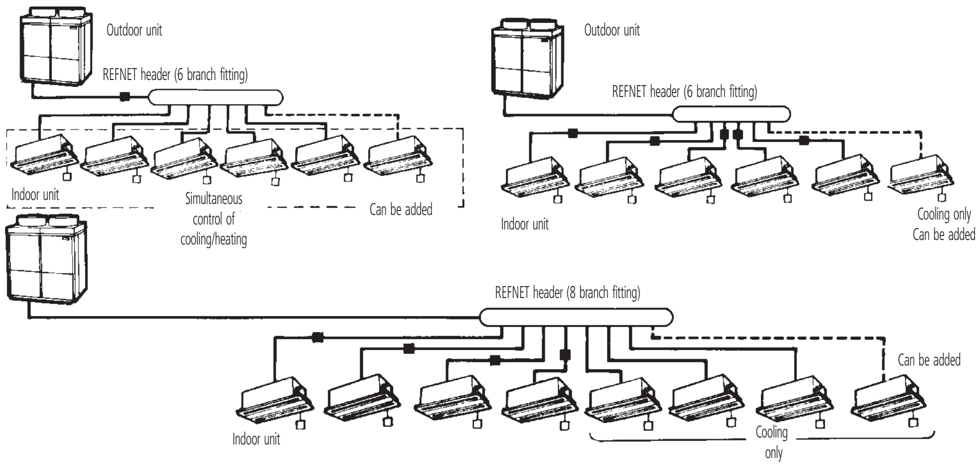
<tr><td>Distribution by REFNET header</td><td>
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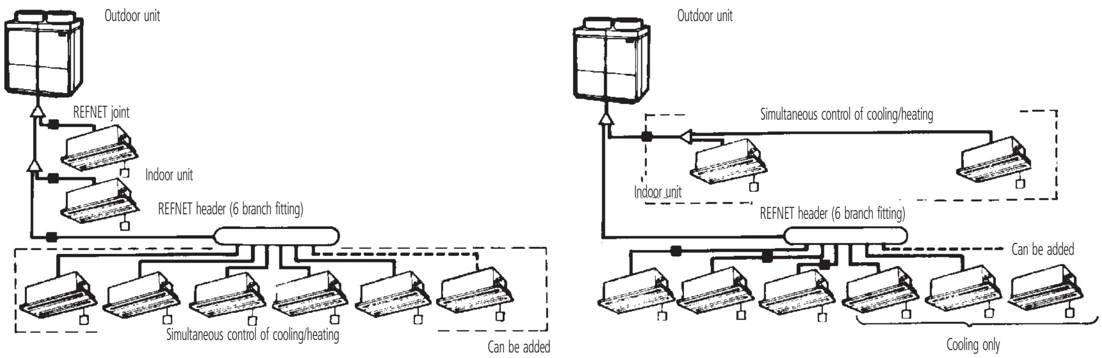
<tr><td>Distribution by REFNET joints and headers</td><td>
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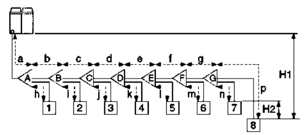
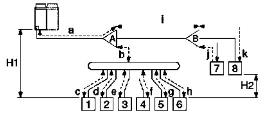
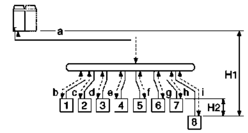
6 Selection procedure

6-6 Refrigerant pipe selection

6-6-1 RSX(Y)P5-10L

Connection example
Use exclusive refrigerant branch kits for R-407C.
Connection of 8 indoor units

- 1 Indoor unit
- ◁ Refnet joint
- ⊂⊃ Refnet header

	Branch with refnet joint	Branch with refnet joint and refnet header	Branch with refnet header
Connection example			

		Branch with refnet joint	Branch with refnet joint and refnet header	Branch with refnet header
Maximum allowable length between outdoor and indoor units	Actual pipe length	Pipe length between outdoor and indoor units ≤ 120m		
		[Example] unit 8: a+b+c+d+e+f+g+p ≤ 120m	[Example] unit 1: a+b+h ≤ 100m, Δ : a+i+j ≤ 120m	[Example] unit 8: a+i ≤ 120m
	Equivalent length	Equivalent pipe length between outdoor and indoor units ≤ 140m (Assume equivalent pipe length of refnet joint to be 0.5m and of the refnet header to be 1.0m (For calculation purposes))		
Allowable height between outdoor and indoor units	Difference in height	Difference in height between outdoor and indoor units (H1) ≤ 50m (≤ 40m if outdoor unit is located in a lower position)		
Allowable height between adjacent indoor units	Difference in height	Difference in height between adjacent indoor units (H2) ≤ 15m		
Allowable length after the branch	Actual pipe length	Pipe length from first refrigerant branch kit (either refnet joint or refnet header) to indoor units ≤ 40m		
		Example unit 8: b+c+d+e+f+g+p ≤ 40m	Example unit 6: b+h ≤ 40m, unit 7: i+k ≤ 40m	Example unit 8: i ≤ 40m

Refrigerant branch kit selection

How to select the refnet joint

- When using a refnet joint at the first branch counted from the outdoor unit side, use KHRP26K17T (RSXYP5L) or KHRP26K37T (RSXYP8/10L). [Example: refnet joint A]
- For refnet joints other than the first branch, select the proper branch kits based on the total capacity index of indoor units installed after the first branch, using the following table.

Total capacity index of indoor units		Branch kit
RSXYP5L	< 100	KHRP26K11T
	≥ 100	KHRP26K18T
RSXYP8/10L	< 160	KHRP26K18T
	≥ 160	KHRP26K37T

How to select the refnet header

- Select the proper branch kit based on the total capacity index of indoor units installed after the header, using the following table.
- Branching is impossible between refnet header and indoor unit

Total capacity index of indoor units		Branch kit
RSXYP5L	< 100	KHRP26K11H (up to 4 branches)
	≥ 100	KHRP26K18H (up to 8 branches)
RSXYP8/10L	< 160	KHRP26K18H (up to 6 branches)
	≥ 160	KHRP26K37H (up to 8 branches)

Example of downstream indoor units

- Branch with refnet joint: [Example] In case of refnet joint C: indoor units 3+4+5+6+7+8
- Branch with refnet joint and refnet header: [Example] In case of refnet joint B: indoor units 7+8; In case of refnet header: indoor units 1+2+3+4+5+6
- Branch with refnet header: [Example] In case of refnet header: indoor units 1+2+3+4+5+6+7+8

Pipe size selection
Pipe size = outer diameter x minimum wall thickness
(unit: mm)

Between the outdoor unit and the uppermost stream refrigerant branch kit

- Match the pipe size to the pipe size of the outdoor unit

Pipe size connected to outdoor unit

	Gas	Liquid
RSXYP5L	ø 19.1 x 1.0	ø 9.5 x 0.8
RSXYP8L	ø 28.6 x 1.2	ø 12.7 x 0.8
RSXYP10L	ø 28.6 x 1.2	ø 12.7 x 0.8

Between two immediately adjacent refrigerant branch kits

- Select the proper pipe size based on the total capacity index of indoor units connected downstream, using the following table.

Total capacity index	Gas	Liquid
< 100	ø 15.9 x 1.0	ø 9.5 x 0.8
100-160	ø 19.1 x 1.0	ø 9.5 x 0.8
≥ 160	ø 25.4 x 1.2	ø 12.7 x 0.8

Between refrigerant branch kit and indoor unit

- Select the proper pipe size based on the total capacity index of indoor units connected downstream, using the following table.
  (Pipe size for direct connection to indoor unit must be the same as the connection size of the indoor unit)

Connection pipe size of indoor unit

Indoor unit capacity index	Gas	Liquid
20 25 32 40	ø 12.7 x 0.8	ø 6.4 x 0.8
50 63 80	ø 15.9 x 1.0	ø 9.5 x 0.8
100 125	ø 19.1 x 1.0	ø 9.5 x 0.8

Additional refrigerant to be charged
Calculation of additional refrigerant to be charged R (kg) is in function of total length of liquid lines L and as follows:

RSXYP5L R=[(Lø9.5) x 0.06] + [(L ø6.4) x 0.023]
RSXYP8/10L R=[(Lø12.7) x 0.12] + [(L ø9.5) x 0.06] + [(L ø6.4) x 0.023]

Example **RSXYP5L**

a : ø9.5 x 30m	e : ø9.5 x 3m	i : ø6.4 x 5m	m : ø6.4 x 5m
b : ø9.5 x 5m	f : ø9.5 x 2m	j : ø6.4 x 5m	n : ø6.4 x 5m
c : ø9.5 x 5m	g : ø9.5 x 5m	k : ø6.4 x 5m	p : ø6.4 x 5m
d : ø9.5 x 5m	h : ø6.4 x 5m	l : ø6.4 x 5m	

R = [55 x 0.66] + [40 x 0.023] = 4.22 ⟶ R = 4.2kg

Example **RSXYP8/10L**

a : ø12.7 x 30m	d : ø6.4 x 10m	g : ø6.4 x 10m	m : ø9.5 x 10m
b : ø12.7 x 10m	e : ø6.4 x 10m	h : ø6.4 x 20m	k : ø6.4 x 9m
c : ø9.5 x 10m	f : ø6.4 x 10m	i : ø9.5 x 10m	

R = [40 x 0.12] + [30 x 0.06] + [69 x 0.023] = 8.187⟶ R = 8.2kg

Example **RSXYP8/10L**

a : ø12.7 x 40m	d : ø6.4 x 10m	g : ø6.4 x 20m
b : ø9.5 x 20m	e : ø6.4 x 20m	h : ø6.4 x 20m
c : ø9.5 x 10m	f : ø6.4 x 23m	i : ø6.4 x 30m

R = [40 x 0.12] + [30 x 0.06] + [123 x 0.023] = 9.429⟶ R = 9.4kg

NOTES

- Round off R to 1 decimal place.
- If R is ≤ 0, keep the unit in operation

(V2891)

6 Selection procedure

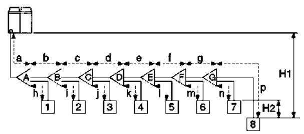
6-6 Refrigerant pipe selection

6-6-2 RSX(Y)P5-10K

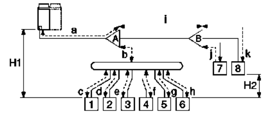
Connection example
Use exclusive refrigerant branch kits for R-407C.
Connection of 8 indoor units

- 1 Indoor unit
- ◁ Refnet joint
- ⊂⊃ Refnet header

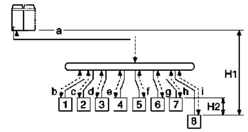
Branch with refnet joint



Branch with refnet joint and refnet header



Branch with refnet header



		Branch with refnet joint	Branch with refnet joint and refnet header	Branch with refnet header
Maximum allowable length between outdoor and indoor units	Actual pipe length	Pipe length between outdoor and indoor units ≤ 100m		
		[Example] unit 8: a+b+c+d+e+f+g+p ≤ 100m	[Example] unit 1: a+b+h ≤ 100m, Δ : a+i+j ≤ 100m	[Example] unit 8: a+i ≤ 100m
	Equivalent length	Equivalent pipe length between outdoor and indoor units ≤ 125m (Assume equivalent pipe length of refnet joint to be 0.5m and of the refnet header to be 1.0m (For calculation purposes))		
Allowable height between outdoor and indoor units	Difference in height	Difference in height between outdoor and indoor units (H1) ≤ 50m (≤ 40m if outdoor unit is located in a lower position)		
Allowable height between adjacent indoor units	Difference in height	Difference in height between adjacent indoor units (H2) ≤ 15m		
Allowable length after the branch	Actual pipe length	Pipe length from first refrigerant branch kit (either refnet joint or refnet header) to indoor units ≤ 40m		
		Example unit 8: b+c+d+e+f+g+p ≤ 40m	Example unit 6: b+h ≤ 40m, unit 7: i+k ≤ 40m	Example unit 8: i ≤ 40m

Refrigerant branch kit selection

How to select the refnet joint

- When using a refnet joint at the first branch counted from the outdoor unit side, use KHRP26K17T (RSX(Y)P5) or KHRP26K37T (RSX(Y)P8/10). [Example: refnet joint A]
- For refnet joints other than the first branch, select the proper branch kits based on the total capacity index of indoor units installed after the first branch, using the following table.

Total capacity index of indoor units		Branch kit
RSX(Y)P5	< 100	KHRP26K11T
	≥ 100	KHRP26K18T
RSX(Y)P8/10	< 160	KHRP26K18T
	≥ 160	KHRP26K37T

How to select the refnet header

- Select the proper branch kit based on the total capacity index of indoor units installed after the header, using the following table.
- Branching is impossible between refnet header and indoor unit

Total capacity index of indoor units		Branch kit
RSX(Y)P5	< 100	KHRP26K11H (up to 4 branches)
	≥ 100	KHRP26K18H (up to 8 branches)
RSX(Y)P8/10	< 160	KHRP26K18H (up to 8 branches)
	≥ 160	KHRP26K37H (up to 8 branches)

	Branch with refnet joint	Branch with refnet joint and refnet header	Branch with refnet header
Example of downstream indoor units	[Example] In case of refnet joint C: indoor units 3+4+5+6+7+8	[Example] In case of refnet joint B: indoor units 7+8 In case of refnet header: indoor units 1+2+3+4+5+6	[Example] In case of refnet header: indoor units 1+2+3+4+5+6+7+8

Pipe size selection
Pipe size = outer diameter x minimum wall thickness
(unit: mm)

Between the outdoor unit and the uppermost stream refrigerant branch kit

- Match the pipe size to the pipe size of the outdoor unit

Pipe size connected to outdoor unit

	Gas	Liquid
RSX(Y)P5	ø 19.1	ø 9.5
RSX(Y)P8	ø 25.4	ø 12.7
RSX(Y)P10	ø 28.6	ø 12.7

Between two immediately adjacent refrigerant branch kits

- Select the proper pipe size based on the total capacity index of indoor units connected downstream, using the following table.

Total capacity index	Gas	Liquid
< 100	ø 15.9	ø 9.5
100-160	ø 19.1	ø 9.5
≥ 160 (RSX(Y)P8/10 only)	ø 25.4	ø 12.7

Between refrigerant branch kit and indoor unit

- Select the proper pipe size based on the total capacity index of indoor units connected downstream, using the following table.
(Pipe size for direct connection to indoor unit must be the same as the connection size of the indoor unit.)

Connection pipe size of indoor unit

Indoor unit capacity index	Gas	Liquid
20 25 32 40	ø 12.7	ø 6.4
50 63 80	ø 15.9	ø 9.5
100 125	ø 19.1	ø 9.5

Additional refrigerant to be charged
Calculation of additional refrigerant to be charged R (kg) is in function of total length of liquid lines L and as follows:
RSX(Y)P5 R=[(Lø9.5) x 0.06] + [(Lø6.4) x 0.023]
RSX(Y)P8/10 R=[(Lø12.7) x 0.12] + [(Lø9.5) x 0.06] + [(L ø6.4) x 0.023]

NOTES

- Round off R to 1 decimal place.
- If R is ≤ 0, keep the unit in operation

Example **RSX(Y)P5**

a : ø9.5 x 30m	e : ø9.5 x 3m	i : ø6.4 x 5m	m : ø6.4 x 5m
b : ø9.5 x 5m	f : ø9.5 x 2m	j : ø6.4 x 5m	n : ø6.4 x 5m
c : ø9.5 x 5m	g : ø9.5 x 5m	k : ø6.4 x 5m	p : ø6.4 x 5m
d : ø9.5 x 5m	h : ø6.4 x 5m	l : ø6.4 x 5m	

R = [55 x 0.66] + [40 x 0.023] = 4.22 ⟶ R = 4.2kg

Example **RSX(Y)P8/10**

a : ø12.7 x 30m	d : ø6.4 x 10m	g : ø6.4 x 10m	m : ø9.5 x 10m
b : ø12.7 x 10m	e : ø6.4 x 10m	h : ø6.4 x 20m	k : ø6.4 x 9m
c : ø9.5 x 10m	f : ø6.4 x 10m	i : ø9.5 x 10m	

R = [40 x 0.12] + [30 x 0.06] + [69 x 0.023] = 8.187⟶ R = 8.2kg

Example **RSX(Y)P8/10**

a : ø12.7 x 40m	d : ø6.4 x 10m	g : ø6.4 x 20m
b : ø9.5 x 20m	e : ø6.4 x 20m	h : ø6.4 x 20m
c : ø9.5 x 10m	f : ø6.4 x 23m	i : ø6.4 x 30m

R = [40 x 0.12] + [30 x 0.06] + [123 x 0.023] = 9.429⟶ R = 9.4kg

(V2891)

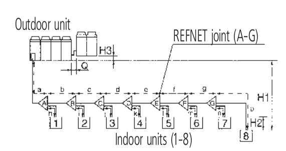
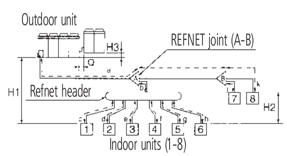
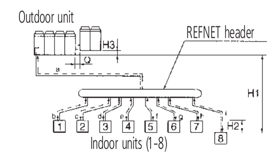
6 Selection procedure

6-6 Refrigerant pipe selection

6-6-3 RSXYP16-30K

Connection example
Heat pump system
Connection of 8 indoor units

- 1 Indoor unit
- ◁ Refnet joint
- ⊂⊃ Refnet header

		Branch with refnet joint	Branch with refnet joint and refnet header	Branch with refnet header
Connection example				

			Branch with refnet joint	Branch with refnet joint and refnet header	Branch with refnet header
Maximum allowable length	Between outdoor and indoor units	Actual pipe length	Pipe length between outdoor and indoor units ≤ 100m		
			[Example] unit 8: a+b+c+d+e+f+g+p ≤ 100m	[Example] unit 6: a+b+h ≤ 100m, unit 8: a+i+k ≤ 100m	[Example] unit 8: i ≤ 40m
		Equivalent length	Equivalent pipe length between outdoor and indoor units ≤ 125m (Assume equivalent pipe length of refnet joint to be 0.5m and of the refnet header to be 1.0m (For calculation purposes))		
	Between outdoor unit (main) and outdoor unit (sub)	Actual pipe length	Pipe length between outdoor unit (main) and outdoor unit (sub) (Q) ≤ 5m		
Allowable height length	Between outdoor and indoor units	Difference in height	Difference in height between outdoor and indoor units (H1) ≤ 50m (≤ 40m if outdoor unit is located in a lower position)		
	Between adjacent indoor units	Difference in height	Difference in height between adjacent indoor units (H2) ≤ 15m		
	Between outdoor unit (main) and outdoor unit (sub)	Difference in height	Difference in height between outdoor unit (main) and outdoor unit (sub) (H3) ≤ 5m		
Allowable length after the branch		Actual pipe length	Pipe length from first refrigerant branch kit (either refnet joint or refnet header) to indoor units ≤ 40m		
			Example unit 8: b+c+d+e+f+g+p ≤ 40m	Example unit 6: b+h ≤ 40m, unit 8: i+k ≤ 40m	Example unit 8: i ≤ 40m

Refrigerant branch kit selection

How to select the refnet joint

- When using refnet joints at the first branch counted from the outdoor unit side. If the system capacity is <500, use KHRP26K40T + pipe size reducer. If the system capacity is ≥500, use KHRP26K75T + pipe size reducer.
- For refnet joints other than the first branch, select the proper branch kits based on the total capacity index of indoor units installed after the first branch, using the following table:

Indoor capacity index	Branch kit
< 100	KHRP26K11T
100≤ x <160	KHRP26K18T
160≤ x <330	KHRP26K37T
330≤ x <640	KHRP26K40T
> 640	KHRP26K75T

How to select the refnet header

- Select the proper branch kit based on the total capacity index of indoor units installed after the header, using the following table.
- Branching is impossible between refnet header and indoor unit
- For systems with a total capacity is ≥640, connect a refnet joint branch.

Indoor capacity index	Branch kit
< 100	KHRP26K11H
100≤ x <160	KHRP26K18H
160≤ x <330	KHRP26K37H
330≤ x <640	KHRP26K40H

Example of downstream indoor units

Branch with refnet joint	Branch with refnet joint and refnet header	Branch with refnet header
[Example] In case of refnet joint C: indoor units 3+4+5+6+7+8	[Example] In case of refnet joint B: indoor units 7+8 In case of refnet header: indoor units 1+2+3+4+5+6	[Example] In case of refnet header: indoor units 1+2+3+4+5+6+7+8

Pipe size selection
Pipe size = outer diameter x minimum wall thickness
(unit: mm)
Use the included reducing joint which matches the pipe size

Between the outdoor unit and the uppermost stream refrigerant branch kit

- Select pipe size according to outdoor system name

Pipe size connected to outdoor unit

	Gas	Liquid
RXYP16K	ø 19.1 x t1.0	ø 34.9 x t1.3
RXYP18-20K	ø 19.1 x t1.0	ø 34.9 x t1.3
RXYP24K	ø 19.1 x t1.0	ø 41.3 x t1.7
RXYP26-30K	ø 22.2 x t1.2	ø 41.3 x t1.7

Between two immediately adjacent refrigerant branch kits

- Select the proper pipe size based on the total capacity index of indoor units connected downstream, using the following table.
- Select connection pipe size according to the outdoor unit. Do not select a larger pipe size

Total capacity index	Liquid	Gas
< 100	ø 9.5 x t0.8	ø 15.9 x 1.0
100≤ x <160	ø 9.5 x .t08	ø 19.1 x 1.0
160≤ x <330	ø 12.7 x t0.8	ø 25.4 x 1.2
330≤ x <480	ø 15.9 x t1.0	ø 34.9 x 1.3
480≤ x <640	ø 19.1 x t1.0	ø 34.9 x 1.3
≥ 640	ø 19.1 x t1.0	ø 41.3 x 1.7

Between refrigerant branch kit and indoor unit

- Pipe size for direct connection to indoor unit must be the same as the connection size of the indoor unit.

Connection pipe size of indoor unit

Total capacity index	Gas	Liquid
20, 25, 32, 40	ø 6.4 x t0.8	ø 12.7 x t0.8
50, 63, 80	ø 9.5 x t0.8	ø 15.9 x t1.0
100, 125	ø 9.5 x t0.8	ø 19.1 x t1.0
200	ø 12.7 x t0.8	ø 25.4 x t1.2
250	ø 12.7 x t0.8	ø 28.6 x t1.2

Additional refrigerant to be charged
Calculation of additional refrigerant to be charged R (kg) is in function of total length of liquid lines L

R = [(Lø22.2) x 0.39] + [(Lø19.1) x 0.28] + [(Lø15.9) x 0.19] + [(Lø12.7) x 0.12] + [(Lø9.5) x 0.06] + [(ø6.4) x 0.023]

+ 0 : RSXYP16,18,24,28
+ 0.4 : RSXYP30
+ 0.6 : RSXYP26
+ 0.8 : RSXYP20

Example for refrigerant branch using refnet joint and refnet header for RSXYP28

a : ø22.2 x 30m	d : ø9.5 x 10m	g : ø6.4 x 10m	j : ø6.4 x 10m
b : ø15.9 x 10m	e : ø9.5 x 10m	h : ø6.4 x 20m	k : ø6.4 x 9m
c : ø9.5 x 10m	f : ø9.5 x 10m	i : ø12.7 x 10m	

R = [30 x 0.39] + [10 x 0.19] + [10 x 0.12] + [40 x 0.06] + [49 x 0.023] + [0] = 18.32 → 18.3kg
(30 = a; 10 = b; 10 = i; 40 = c+d+e+f; 49 = g+h+j+k)

NOTES

- Round off R to 1 decimal place.

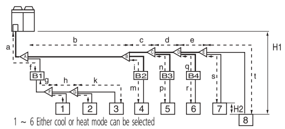
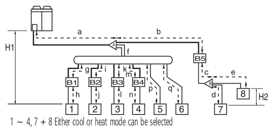
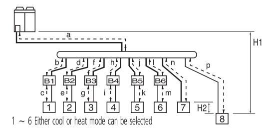
6 Selection procedure

6-6 Refrigerant pipe selection

6-6-4 RSEYP8-10K

Connection example
Connection of 8 indoor units

- 1 Indoor unit
- Refnet joint
- Refnet header
- Three lines
- Two lines
- a~t Connecting-line length

	Branch with refnet joint	Branch with refnet joint and refnet header	Branch with refnet header
	 1 ~ 6 Either cool or heat mode can be selected 7 + 8 Cooling only	 1 ~ 4, 7 + 8 Either cool or heat mode can be selected 5 + 6 Cooling only	 1 ~ 6 Either cool or heat mode can be selected 7 + 8 Cooling only

Maximum allowable length between outdoor and indoor units

- Actual pipe length: Pipe length between outdoor and indoor units ≤ 100m
  - Branch with refnet joint: [Example] unit 8: a+b+c+d+e+t ≤ 100m
  - Branch with refnet joint and refnet header: [Example] unit 1: a+f+g+h ≤ 100m, unit 7: a+b+c+d ≤ 100m
  - Branch with refnet header: [Example] unit 8: a+p ≤ 100m
- Equivalent length: Equivalent pipe length between outdoor and indoor units ≤ 125m (Assume equivalent pipe length of refnet joint to be 0.5m and of the refnet header to be 1.0m (For calculation purposes))

Allowable height between outdoor and indoor units (Difference in height)

Difference in height between outdoor and indoor units (H1) ≤ 50m (≤ 40m if outdoor unit is located in a lower position)

Allowable height between adjacent indoor units (Difference in height)

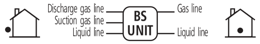
Difference in height between adjacent indoor units (H2) ≤ 15m

Allowable length after the branch (Actual pipe length)

Pipe length from first refrigerant branch kit (either refnet joint or refnet header) to indoor units ≤ 40m

- Branch with refnet joint: [Example] unit 8: b+c+d+e+t ≤ 40m
- Branch with refnet joint and refnet header: [Example] unit 1: f+g+h ≤ 40m, unit 7: b+c+d ≤ 40m
- Branch with refnet header: [Example] unit 8: p ≤ 40m

Connecting line



Piping between outdoor and BS units

- Connect three connecting lines: suction gas line, discharge gas line and liquid line (Thick lines above)
- Select refrigerant branch kit from KHRP25K20T, 18T, 37H and 18H (For how to select, refer to the item below)

Piping between BS unit and indoor unit and between refrigerant branch kit and cool-only indoor unit

- Connect two connecting lines: gas line (suction gas line in the case of cool-only indoor unit) and liquid line (Thin lines above)
- Select refrigerant branch kit from KHRP26K18T, and 18H (For how to select, refer to the item below)

Refrigerant branch kit selection

How to select the refnet joint

- When using a refnet joint at the first branch counted from the outdoor unit side, use KHRP25K20T. [Example: refnet joint A]
- For refnet joints other than the first branch, select the proper branch kits based on the total capacity index of indoor units installed after the first branch, using the following table.

Total capacity index of indoor units		Branch kit
≥ 160		KHRP25K20T
< 160	3 lines	KHRP25K18T
	2 lines	KHRP26K18T

How to select the refnet header

- Select the proper branch kit based on the total capacity index of indoor units installed after the header, using the following table.
- Branching is impossible between refnet header and indoor unit.

Total capacity index of indoor units		Branch kit
≥ 160		KHRP25K37H (up to 8 branches)
< 160	3 lines	KHRP25K18H (up to 6 branches)
	2 lines	KHRP26K18H (up to 8 branches)

Example of downstream indoor units

- Branch with refnet joint: [Example] In case of refnet joint C: indoor units 5+6+7+8
- Branch with refnet joint and refnet header: [Example] In case of refnet joint B: indoor units 7+8; In case of refnet header: indoor units 1+2+3+4+5+6
- Branch with refnet header: [Example] In case of refnet header: indoor units 1+2+3+4+5+6+7+8

Pipe size selection
Pipe size = outer diameter x minimum wall thickness
(unit: mm)

Between the outdoor unit and the uppermost stream refrigerant branch kit

- Match the pipe size to the pipe size of the outdoor unit

Pipe size connected to outdoor unit

	Suction gas line	Discharge gas line	Liquid line
RSEYP8	ø 25.4 x 1.2	ø 19.1 x 1.0	ø 12.7 x 0.8
RSEYP10	ø 28.6 x 1.2	ø 19.1 x 1.0	ø 12.7 x 0.8

- When only one BS unit is connected per refrigerant line of the outdoor unit, discharge gas line does not branch. In this case, use ø15.9 discharge gas line in order to prevent confusion with suction gas line.

Between two immediately adjacent refrigerant branch kits and BS unit

- Select the proper pipe size based on the total capacity index of indoor units connected downstream, using the following table.

Total capacity index	Suction gas line	Discharge gas line	Liquid line
* < 50	ø 12.7 x 0.8	ø 9.5 x 0.8	ø 6.4 x 0.8
≥ 50~≤100	ø 15.9 x 1.0	ø 12.7 x 0.8	ø 9.5 x 0.8
> 100~≤160	ø 19.1 x 1.0	ø 15.9 x 1.0	ø 9.5 x 0.8
> 160	ø 25.4 x 1.2	ø 19.1 x 1.0	ø 12.7 x 0.8

- When two lines are connected between two adjacent refrigerant branch kits, select the proper gas line size based on data mentioned under "Suction gas line" column in the table above.

Between BS unit (refrigerant branch kit) and indoor unit

- Select the proper pipe size based on the total capacity index of indoor units connected downstream, using the following table.
  (Pipe size for direct connection to indoor unit must be the same as the connection size of the indoor unit.)

Connection pipe size of indoor unit

Total capacity index	Gas pipe	Liquid pipe
* < 50	ø 12.7 x 0.8	ø 6.4 x 0.8
≥ 50~≤100	ø 15.9 x 1.0	ø 9.5 x 0.8
> 100~≤160	ø 19.1 x 1.0	ø 9.5 x 0.8

- When the total capacity sum is in the range marker *, the connection size of the BS unit (BSVP100KV1) is different from connecting line size, reduce the connecting line size by using tapered pipe attached to the BS unit.

Additional refrigerant to be charged
Calculation of additional refrigerant to be charged R (kg) is in function of total length of liquid lines L and as follows:
R=[(Lø12.7) x 0.12] + [(Lø9.5) x 0.06] + [(L ø6.4) x 0.023]

NOTES

- Round off R to 1 decimal place.
- If R is ≤ 0, keep the unit in operation

Example (Branch with refnet joint)

a : ø12.7 x 30m	f : ø9.5 x 5m	k : ø6.4 x 5m	p : ø6.4 x 5m
b : ø12.7 x 10m	g : ø9.5 x 5m	l : ø9.5 x 5m	r : ø6.4 x 3m
c : ø12.7 x 5m	h : ø9.5 x 5m	m : ø9.5 x 2m	s : ø6.4 x 5m
d : ø9.5 x 5m	i : ø9.5 x 5m	n : ø9.5 x 5m	t : ø6.4 x 5m
e : ø9.5 x 5m	j : ø6.4 x 5m	o : ø9.5 x 2m	

R = [45 x 0.12] + [44 x 0.06] + [28 x 0.023] = 8.6 ⟶ R = 8.6kg

Example (Branch with refnet joint and refnet header)

a : ø12.7 x 40m	e : ø9.5 x 5m	i : ø6.4 x 5m	m : ø6.4 x 10m
b : ø9.5 x 10m	f : ø9.5 x 10m	j : ø6.4 x 2m	n : ø6.4 x 4m
c : ø9.5 x 5m	g : ø6.4 x 5m	k : ø6.4 x 10m	o : ø6.4 x 10m
d : ø9.5 x 5m	h : ø6.4 x 2m	l : ø6.4 x 2m	p : ø6.4 x 10m

R = [40 x 0.12] + [30 x 0.06] + [69 x 0.023] = 8.18 ⟶ R = 8.18kg

Example (Branch with refnet header)

a : ø12.7 x 40m	e : ø9.5 x 5m	i : ø6.4 x 2m	m : ø6.4 x 2m
b : ø9.5 x 10m	f : ø6.4 x 10m	j : ø6.4 x 20m	n : ø6.4 x 10m
c : ø9.5 x 5m	g : ø6.4 x 2m	k : ø6.4 x 2m	p : ø6.4 x 30m
d : ø9.5 x 20m	h : ø6.4 x 10m	l : ø6.4 x 10m	

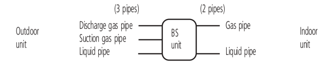
R = [40 x 0.12] + [70 x 0.06] + [68 x 0.023] = 10.56 ⟶ R = 10.56kg

(V2891)

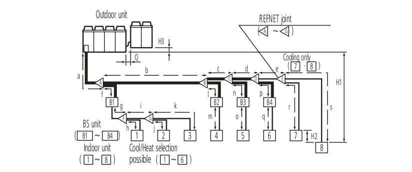
6 Selection procedure

6-6 Refrigerant pipe selection

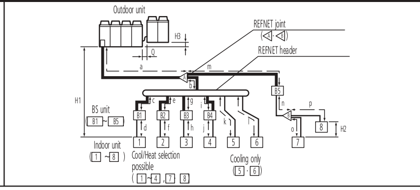
6-6-5 RSEYP16-30K



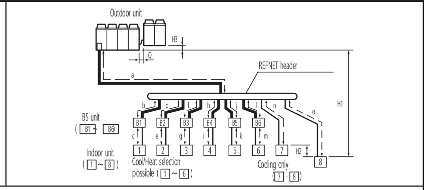
Branch with refnet joint



Branch with refnet joint and refnet header



Branch with refnet header



Maximum allowable length

Between outdoor and indoor unit — Actual pipe length
Pipe length between outdoor and indoor units ≤ 100m
- Branch with refnet joint: Example unit 8 : a + b + c + d + e + s ≤ 100m
- Branch with refnet joint and refnet header: Example unit 6 : a + b + l ≤ 100m
- Branch with refnet header: Example unit 8 : a + o ≤ 100m

Between outdoor and indoor unit — Equivalent length
Equivalent pipe length between outdoor and indoor units ≤ 125m (assume equivalent pipe length of refnet joint to be 0.5m, that of refnet header to be 1m, that of BS unit to be 4m, calculation purposes)

Between outdoor unit (main) and outdoor unit (sub) — Actual pipe length
Pipe length between outdoor unit (main) and outdoor unit (sub)(Q) ≤ 5m

Allowable height length (Difference in height)

- Between outdoor and indoor units: Difference in height between indoor units and outdoor units (H1) ≤ 50m (≤ 40m or less when oudoor unit is located in a lower position)
- Between adjacent indoor units: Difference in height between adjacent indoor units (H2) ≤ 15m
- Between outdoor unit (main) and outdoor unit (sub): Difference in height between outdoor unit (main) and outdoor unit (sub) (H3) ≤ 5m

Allowable length after the branch (Actual pipe length)

Pipe length from first refrigerant branch kit (either refnet joint or refnet header) to indoor unit ≤ 40m
- Branch with refnet joint: Example unit 8 : b + c + d + e + s ≤ 40m
- Branch with refnet joint and refnet header: Example unit 6 : b + l ≤ 40m, Example unit 8 :m + n + p ≤ 40m
- Branch with refnet header: Example unit 8 : o ≤ 40m

Refrigerant branch kit selection

How to select the refnet joint
- When using refnet joints at the first branch counted from the outdoor unit side.
  If the system capacity is < 500, use KHRP25K40T + KHRP26K40TP(Pipe size reducer).
  If the system capacity is ≥ 500, use KHRP25K75T + KHRP25K75TP (Pipe size reducer).
- For refnet joints other than the first branch, select the proper branch kit model based on the total capacity index of the indoor units installed after the first branch using the following table:
- In case of 2 pipes, please select KHRP26K-T series

indoor capacity index	branch kit
< 160	KHRP25K18T
160 ≤ x < 330	KHRP25K20T
330 ≤ x < 640	KHRP25K40T + KHRP26K40T
640 ≤ x	KHRP25K75T + KHRP25K75T

How to select the refnet header
- Select the proper branch kit model based on the total capacity index of indoor units installed after the header using the following table.
- Branching is impossible between refnet header and indoor unit.
- For systems with a total capacity of 640 and over, connect a refnet joint branch.
- In case of 2 pipes, please select KHRP26K-H series.

indoor capacity index	branch kit
< 160	KHRP25K18H (Max. 6 branches)
160 ≤ x < 330	KHRP25K37H (Max. 8 branches)
330 ≤ x < 640	KHRP25K40H (Max. 8 branches) + KHRP26K40HP

Example of downstream indoor units
- Branch with refnet joint: Example in case of refnet joint C: indoor units 5 + 6 + 7 + 8
- Branch with refnet joint and refnet header: Example in case of refnet joint B: indoor units 7 + 8; Example in case of refnet header: indoor units 1 + 2 + 3 + 4 + 5 + 6
- Branch with refnet header: Example in case of refnet header: indoor units 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8

Pipe size selection

Pipe size = outer diameter x minimum wall thickness
(Unit; mm).
Use the included reducing joint which matches the pipe size.

Between outdoor unit and the uppermost stream refrigerant branch kit
- Select pipe size according to outdoor system.

(Unit : mm)

Outdoor system name	Pipe size: Liquid pipe	Gas pipe: Suction	Gas pipe: Discharge
RSEYP16K	ø15.9 x t1.0	ø34.9 x t1.3	ø28.6 x t1.2
RSEYP18~20K	ø19.1 x t1.0	ø34.9 x t1.3	ø28.6 x t1.2
RSEYP24K	ø19.1 x t1.0	ø41.3 x t1.7	ø28.6 x t1.2
RSEYP26K	ø22.2 x t1.2	ø41.3 x t1.7	ø34.9 x t1.3
RSEYP28~30K	ø22.2 x t1.2	ø41.3 x t1.7	ø34.9 x t1.3

Between two immediately adjacent refrigerant branch kits and BS unit
- Select the proper pipe size based on the total capacity index of indoor units connected downstream, using the following table.
- Select connection pipe size according to the outdoor unit (table on the bottom left). Do not select a larger pipe size.

(Unit : mm)

indoor capacity index	Pipe size: Liquid pipe	Gas pipe: Suction	Gas pipe: Discharge
x < 50	ø6.4 x t0.8	ø12.7 x t0.8	ø9.5 x t0.8
50 ≤ x < 100	ø9.5 x t0.8	ø15.9 x t1.0	ø12.7 x t0.8
100 ≤ x < 160	ø9.5 x t0.8	ø19.1 x t1.0	ø15.9 x t1.0
160 ≤ x < 330	ø12.7 x t0.8	ø25.4 x t1.2	ø19.1 x t1.0
330 ≤ x < 480	ø15.9 x t1.0	ø34.9 x t1.3	ø25.4 x t1.2
480 ≤ x < 640	ø19.1 x t1.0	ø34.9 x t1.3	ø25.4 x t1.2
640 ≤ x < 700	ø19.1 x t1.0	ø41.3 x t1.7	ø25.4 x t1.2
x > 700	ø19.1 x t1.0	ø41.3 x t1.7	f34.9 x t1.3

Between BS unit and indoor unit
- Pipe size for direct connection to indoor unit must be the same as the connection size of indoor unit.

indoor capacity index	Pipe size: Liquid pipe	Pipe size: Gas pipe
20 · 25 · 32 · 40	ø6.4 x t0.8	ø12.7 x t0.8
50 · 63 · 80	ø9.5 x t0.8	ø15.9 x t1.0
100 · 125	ø9.5 x t0.8	ø19.1 x t1.0
200	ø12.7 x t0.8	ø25.4 x t1.0
250	ø12.7 x t0.8	ø28.6 x t1.2

Additional refrigerant to be charged

Calculation of additional refrigerant to be charged R (kg) is in function of the total length of liquid lines L

R= (Total length of ø22.2 liquid line) x0.39 + (Total length of ø19.1 liquid line) x0.28 + (Total length of ø15.9 liquid line) x0.19 + (Total length of ø12.7 liquid line) x0.12 + (Total length of ø9.5 liquid line) x0.06 + (Total length of ø6.3 liquid line) x0.023

+ 0:RSEYP16, 18, 24, 26, 28
0.6:RSEYP20
1.0:RSEYP30

Note
- Round off R to 1 decimal place

Example for refrigerant branch using refnet joint and header (RSEYP30K)

a: ø22.2 x 30m	d: ø 9.5 x 5m	g: ø 9.5 x 15m	j: ø 9.5 x 5m	m: ø12.7 x 10m
b: ø19.1 x 10m	e: ø 9.5 x 20m	h: ø 9.5 x 5m	k: ø 9.5 x 20m	n: ø12.7 x 5m
c: ø 9.5 x 20m	f: ø 9.5 x 5m	i: ø 9.5 x 10m	l: ø 9.5 x 5m	o: ø12.7 x 20m
				p: ø 6.4 x 9m

R= 30x0.39 (a) + 10x0.28 (b) + 35x0.12 (m+n+o) + 110x0.06 (c+d+e+f+g+h+i+j+k+l) + 9x0.023 (p) +1.0 = 31.27 ⇨ 31.3

2

VRV™

Systems

ISO14001 assures an effective environmental management system in order to help protect human health and the environment from the potential impact of our activities, products and services and to assist in maintaining and improving the quality of the environment.

Daikin units comply with the European regulations that guarantee the safety of the product.

Daikin Europe N.V. is approved by LRQA for its Quality Management System in accordance with the ISO9001 standard. ISO9001 pertains to quality assurance regarding design, development, manufacturing as well as to services related to the product.

VRV products are not within the scope of the Eurovent certification programme.

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