technical data

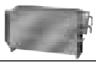
VRV II Systems

Introduction

I Introduction
Table of contents

1

1 Possible indoor units using R-410A

Description	Indoor unit	Size										
		20	25	32	40	50	63	80	100	125	200	250
4-way blow ceiling mounted cassette (600 mm x 600 mm)	FXZQ-MVE 	x	x	x	x	x						
4-way blow ceiling mounted cassette	FXFQ-M7V1B 	x	x	x	x	x	x	x	x	x		
2-way blow ceiling mounted cassette	FXCQ-M7V1B 	x	x	x	x	x	x	x		x		
Ceiling mounted corner cassette	FXKQ-MVE 		x	x	x		x					
Concealed ceiling unit	FXSQ-M7V1B 	x	x	x	x	x	x	x	x	x		
Concealed ceiling unit (large)	FXMQ-MVE 				x	x	x	x	x	x	x	x
Concealed ceiling unit (small)	FXDQ-M7V1B 	x	x									
Wall mounted unit	FXAQ-MVE 	x	x	x	x	x	x					
Ceiling suspended unit	FXHQ-MVE 			x			x		x			
Floor standing unit	FXLQ-MVE 	x	x	x	x	x	x					
Concealed floor standing unit	FXNQ-MVE 	x	x	x	x	x	x					

2 Possible outdoor units using R-410A

VRV II heat pump	Fixed combinations	Nr. of outdoors	Nr. of compressors	Nr. of connectable indoor units	Minimum capacity index	Maximum capacity index
RXYQ5M	RXYQ5M	1	1	8	63	163
RXYQ8M	RXYQ8M	1	2	13	100	260
RXYQ10M	RXYQ10M	1	2	16	125	325
RXYQ12M	RXYQ12M	1	2	20	150	390
RXYQ14M	RXYQ14M	1	3	20	175	455
RXYQ16M	RXYQ16M	1	3	20	200	520
RXYQ18M	RXYQ8M + RXYQ10M	2	4	20	225	585
RXYQ20M	RXYQ10M x 2	2	4	20	250	650
RXYQ22M	RXYQ10M + RXYQ12M	2	4	22	275	715
RXYQ24M	RXYQ10M + RXYQ14M	2	5	32	300	780
RXYQ26M	RXYQ10M + RXYQ16M	2	5	32	325	845
RXYQ28M	RXYQ12M + RXYQ16M	2	5	32	350	910
RXYQ30M	RXYQ14M + RXYQ16M	2	6	32	375	975
RXYQ32M	RXYQ16M x 2	2	6	32	400	1,040
RXYQ34M	RXYQ10M x 2 + RXYQ14M	3	7	34	425	1,105
RXYQ36M	RXYQ10M x 2 + RXYQ16M	3	7	36	450	1,170
RXYQ38M	RXYQ10M + RXYQ12M + RXYQ16M	3	7	38	475	1,235
RXYQ40M	RXYQ10M + RXYQ14M + RXYQ16M	3	8	40	500	1,300
RXYQ42M	RXYQ10M + RXYQ16M x 2	3	8	40	525	1,365
RXYQ44M	RXYQ12M + RXYQ16M x 2	3	8	40	550	1,430
RXYQ46M	RXYQ14M + RXYQ16M x 2	3	9	40	575	1,495
RXYQ48M	RXYQ16M x 3	3	9	40	600	1,560

2-1 Indoor unit capacity index

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

NOTE

1 e.g. Selected indoor units: FXCQ25 + FXFQ100 + FXMQ200 + FXSQ40
Connection ratio: 25 + 100 + 200 + 40 = 365
→ Possible outdoor unit: RXYQ12M

3 Nomenclature

3-1 Indoor units

FX | S | Q | 40 | M | V1 | B

B: Special series for Europe (CE approved)*

V1: Power supply symbol

V1:	1~, 230V, 50Hz
VE:	1~, 220-240V, 50Hz

M:

M:	Indicates major design category
M7:	Indicates 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

Q: Indicates use with ozone friendly refrigerant R-410A

S: Model name

Z:	4-way blow ceiling mounted cassette (600x600mm)
F:	4-way blow ceiling mounted cassette
C:	2-way blow ceiling mounted cassette
K:	Ceiling mounted corner cassette
S:	Concealed ceiling unit
D:	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

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

* B is not mandatory for indoor units

3 Nomenclature

3-2 Outdoor units

- VRVII heat pump

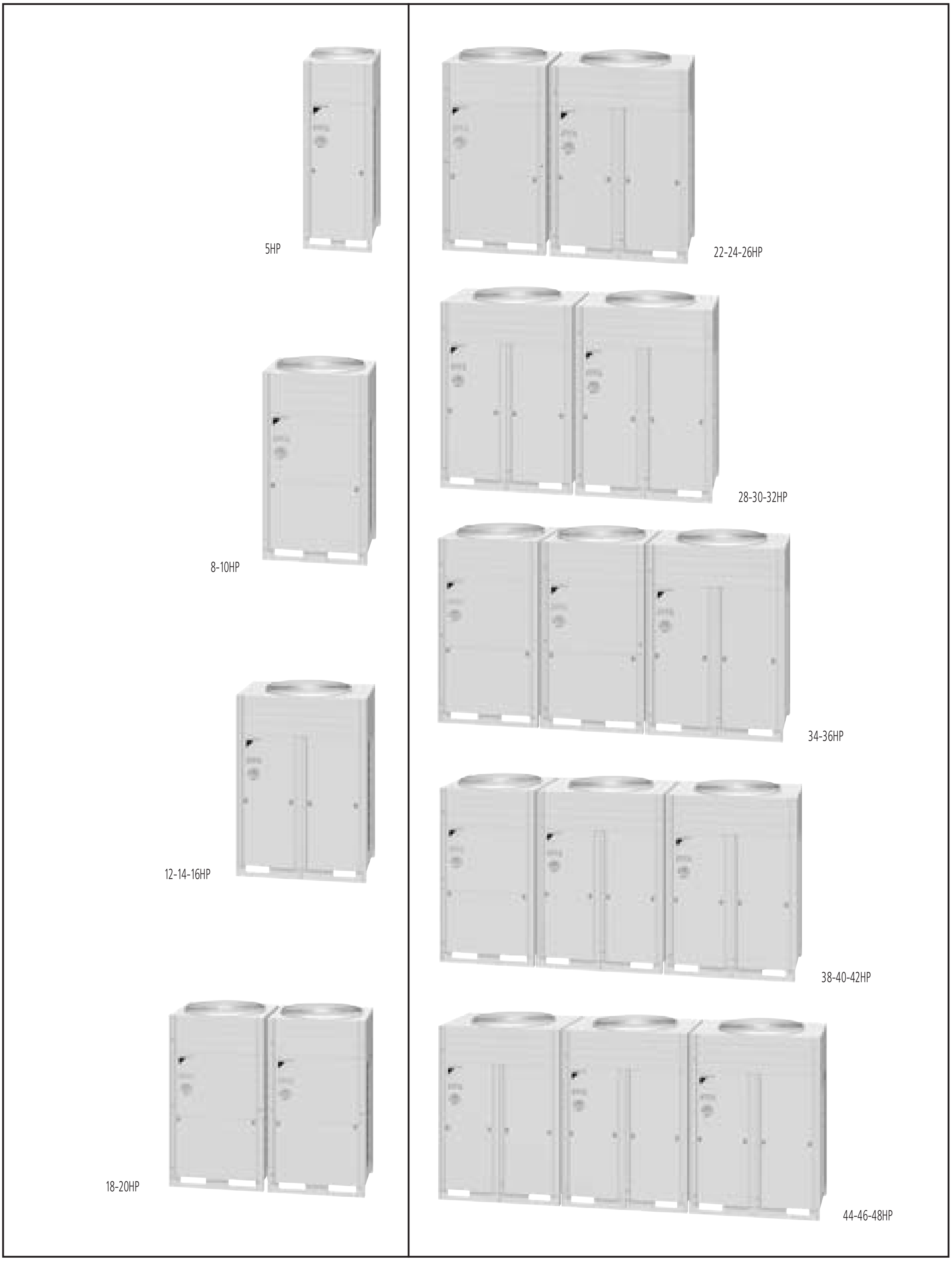
RX | Y | Q | 8 | M7 | W1 | B

- B: Special series for Europe (CE approved)
- W1: Power supply symbol:
  W1: 3N~, 400V, 50Hz
- M7: M7, M: indicates major design category (internal company symbol)
- 8:

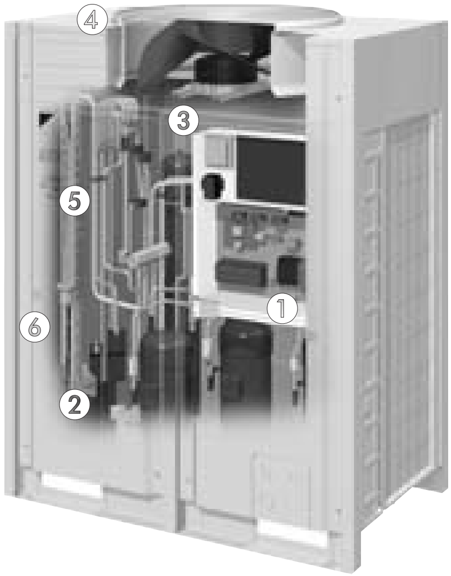
5: 5HP	12:12HP
8: 8HP	14:14HP
10: 10HP	16:16HP

- Q: Indicates the use of ozone friendly refrigerant R-410A
- Y: Indicates heat pump (year around)
- RX: RX: indicates that this is an INVERTER outdoor unit

4 VRV II line-up



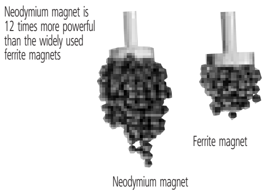
5 VRV II technology

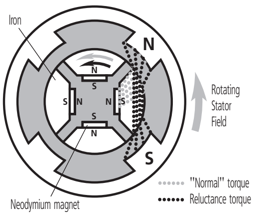


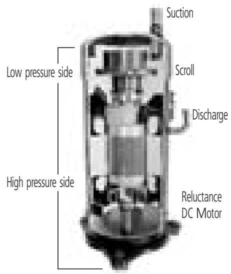
① Reluctance brushless DC Compressor

The reluctance brushless DC motor provides significant increases in efficiency compared to conventional AC inverter motors, simultaneously using 2 different forms of torque (normal and reluctance torque) to produce extra power from small electric currents.
The motor comprises powerful neodymium magnets, that create the reluctance torque. These magnets ar approximately 12 times stronger than ferrite magnets and make a major contribution to its energy saving characteristics.

Secret to raising energy-efficiency! Powerful neodymium magnets

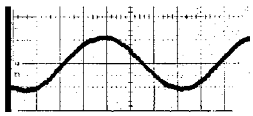






② Sine Wave DC inverter

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



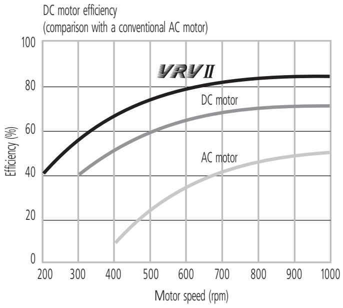
5 VRV II technology

③ DC fan motor

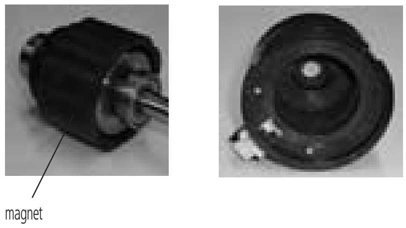
First in the industry

5

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



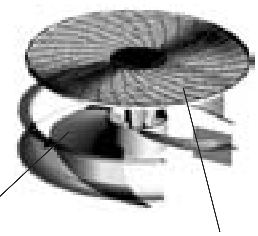
DC fan motor structure



④ Aero fitting grill & aero spiral fan

NEW

These new features achieve a low noise fan with a large airflow, and realize a compact casing together with the compressor linking technology.



Aero spiral fan

Bending the fan blade edge reduces turbulence, resulting in less pressure loss.

Aero fitting grille

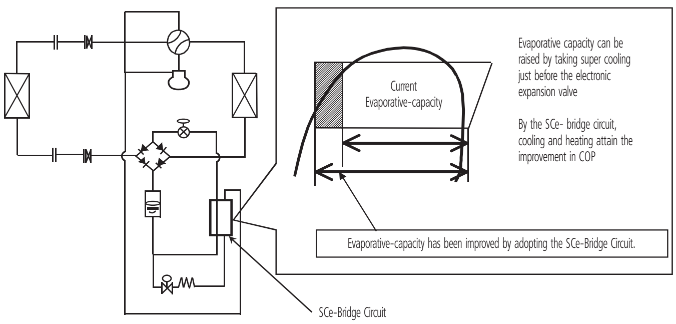
New shape promotes a spiral discharge airflow, resulting in reduced pressure loss.

⑤ e-Bridge circuit

First in the industry

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.

An increase in evaporative capacity systems from the newly developed refrigeration circuit, known as the SCe-bridge circuit, which adds super cooling prior to the expansion cycle. By adopting this circuit, the COPs in both cooling and heating have been drastically improved.

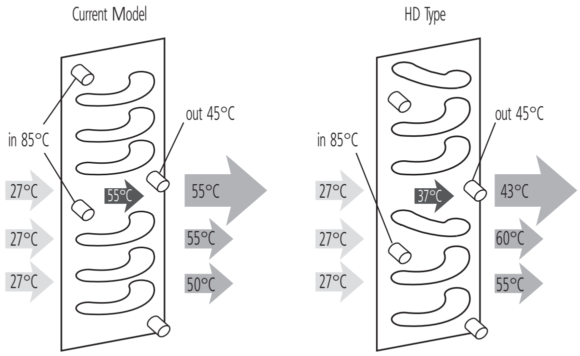


5 VRV II technology

⑥ e-Pass heat exchanger

First in the industry

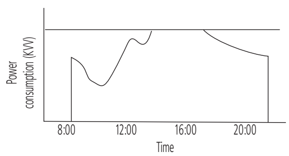
Optimization of the path layout of the heat exchanger prevents heat transferring from the overheated gas section towards the sub cooled liquid section - a more efficient use of the heat exchanger.



In cooling mode, the heat exchanger of the condensor is improved. This means an improvement of COP by 3%.

⑦ i-Demand function

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



⑧ Compact aero box

NEW

Lower noise and savings in input power are achieved by stacking the inverter and control PCBs within a new and more compact 'aero' box.

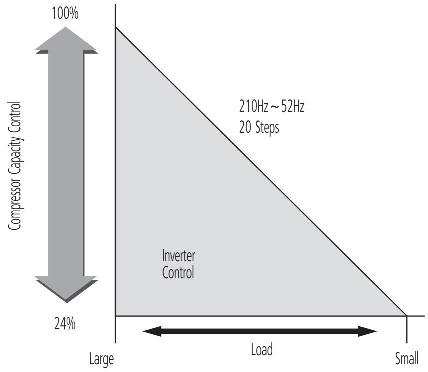
6 Main features

6-1 Creating maximum comfort

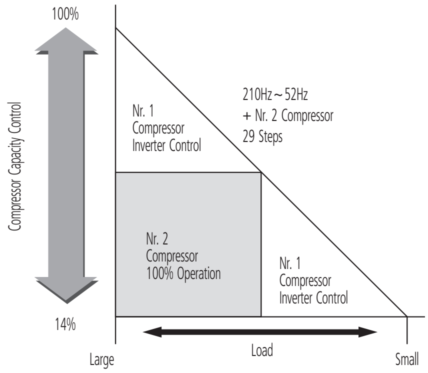
6-1-1 Inverter technology

The linear VRV system makes use of a variable Proportional Integral (PI) 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 40 indoor units of different capacity and type at a ratio of 50~130 % in comparison with outdoor units capacity. 5 HP outdoor units use inverter control compressors only.

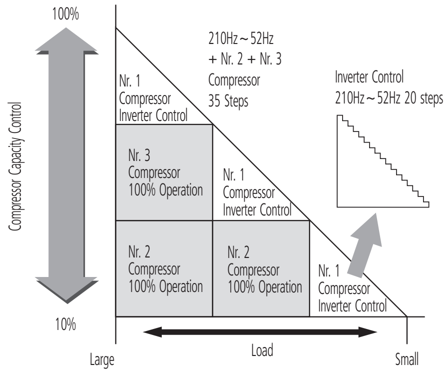
5HP Outdoor Unit



8,10,12HP Outdoor Unit



14,16HP Outdoor Unit

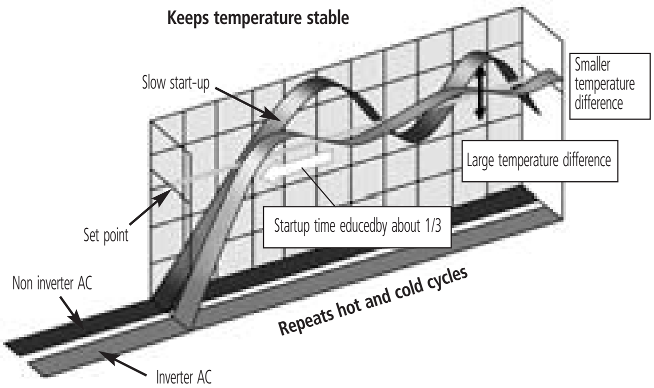


6 Main features

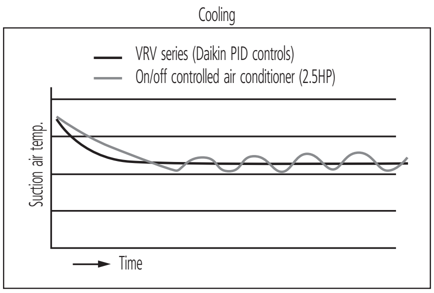
6-1 Creating maximum comfort

6-1-2 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.

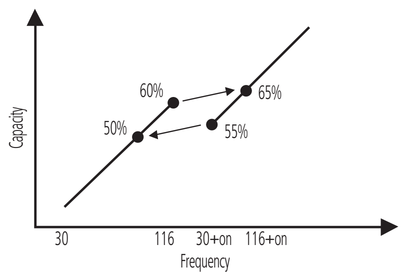


NOTE

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

6-1-3 Less frequent start/stop cycle

- The technique adopted by Daikin, of regulating the capacity using multiple compressors clearly results in minimum switching losses and power surges because of the overlap in capacity and frequency
- Since Daikin utilises small 5HP inverter compressors, the influence of harmonics is less than that generated by a single large compressor
- The use of multiple compressors by Daikin also ensures a 50 % standby facility
- Smaller compressors are cheaper and faster to replace



6 Main features

6-1 Creating maximum comfort

6

6-1-4 PID control

Proportional Integral Derivative control with an automatic capacity balancing circuit:

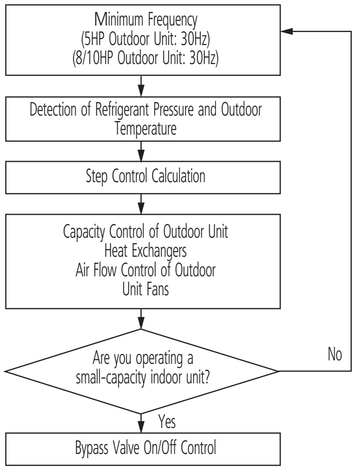
– enables the use of lengthy piping up to 100 meters (actual length)

– consists of two control systems:

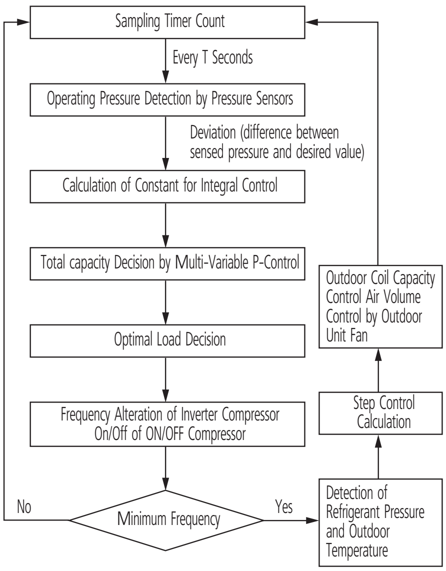
1. Oil control system that controls the refrigerant oil volume to prevent it from raising or backing up in the pipes
2. Refrigerant flow stabilization mechanism: prevents refrigerant drift, caused by level difference of indoor units in the same system.

6-1-5 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.



6-1-6 Control flow



6 Main features

6-2 Energy efficient solution

6-2-1 Low running costs

- VRV systems have low running costs because it permits each zone to be controlled individually. That is, only those rooms that require air conditioning will be heated or cooled, while the system can be shut down completely in rooms where no air conditioning is required.

- VRV units have the highest COP/EER in the market in the most common operating area First in the industry

6-2-2 Most advanced reluctance brushless DC compressor technology First in the industry

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

6-2-3 HRV - Heat Recovery Ventilation System

- Heat and humidity are exchanged between supply and exhaust air, which
  - brings outdoor air close to indoor air conditions
  - recovers energy loss
  - realises considerable reduction of air conditioning capacity
- The VAM heat exchanger modulates the humidity and temperature of incoming fresh air to match indoor conditions.
- The balance achieved between indoor and outdoor ambients, enables the cooling/heating load placed on the air conditioning system to be reduced. (heat and humidity are exchanged)
- Most energy saving solution as smaller indoor units can be selected:
  - size down of indoor units down to 40 %
  - payback total VAM system: ±2.5 years*

  *conditions: outside cooling conditions: 30°C / outside heating conditions: - 8°C
  inside cooling conditions: 24°C / inside heating conditions: 22°C
  ventilation per room: 150m3/h
- Ideal modular concept to cope with the fresh air requirements

6-2-4 Auto restart capability

Even after exceptionally long power failures, the built-in auto restart capability ensures automatic system start up. Since the preset memory is not erased by interruptions in power supply, no programme resetting is necessary.

6 Main features

6-2 Energy efficient solution

6-2-5 Low operation sound level

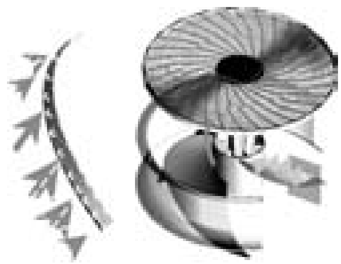
- Continuous research by Daikin into reducing operation sound levels has resulted in the development of a purpose designed inverter scroll compressor and fan.
- The new grille and fan offer low noise, high volume airflow and are housed in a compact casing together with the associated compressor components. The use of this new technology assembly enables a 16hp unit to be housed in a single casing.

NEW **Aero spiral fan:**

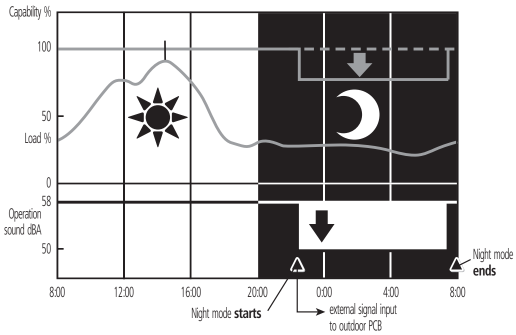
Bending the fan blade edge reduces turbulence, resulting in less pressure loss

NEW **Aero fitting grille:**

New shape promotes spiral discharge airflow, resulting in reduced pressure loss



- Night quiet function (max. -8dBA)
  During night time, sound level of the outdoor unit can be reduced for a certain period : starting time and ending time can be input



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.

- Daikin indoor units have very low sound operation levels, down to 25 dBA.

dB(A)	Perceived loudness	Sound
0	Treshold of hearing	-
20	Extremely soft	Rustling leaves
40	Very soft	Quiet room
60	Moderately loud	Normal conversation
80	Very loud	City traffic noise
100	Extremely loud	Symphonic orchestra
120	Threshold of feeling	Jet taking off

Daikin indoor units

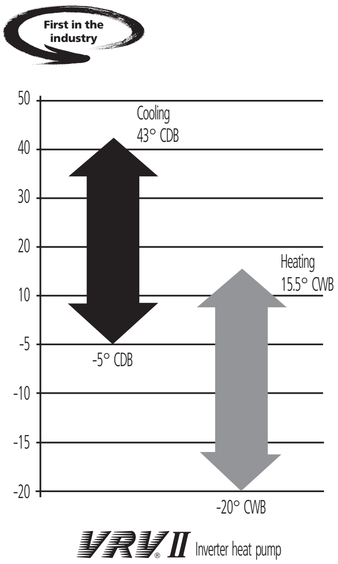
6 Main features

6-2 Energy efficient solution

6-2-6 Operation range of outdoor temperature

Standard operation down to -20°C outdoor ambient temperature

Advanced PI control of the outdoor unit enables VRV II heat recovery and Inverter cooling only/heat pump series to operate at outdoor ambients down to -5°C in cooling mode and down to -20°C in heating mode.



6 Main features

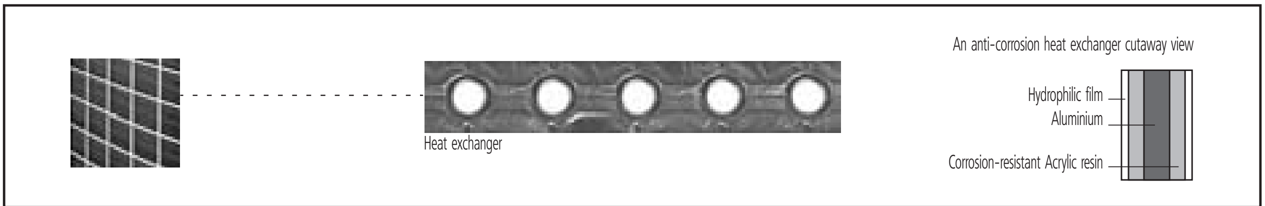
6-3 High reliability

6-3-1 Nr. 1 anti-corrosion treatment

- Special anti corrosion treatment of the heat exchanger provides 5 to 6 times greater resistance against acid rain and salt corrosion. The provision of rust proof steel sheet on the underside of the unit gives additional protection.

Improvement in corrosion resistance

Corrosion resistance rating		
	Non-treated	Anti-corrosion treated
Salt corrosion	1	5 to 6
Acid rain	1	5 to 6

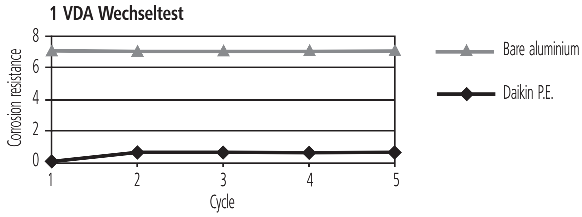


Performed tests

contents of 1 cycle (7 days):

- 24 hours salt spray test SS DIN 50021
- 96 hours humidity cycle test KFW DIN 50017
- 48 hours room temperature & room humidity

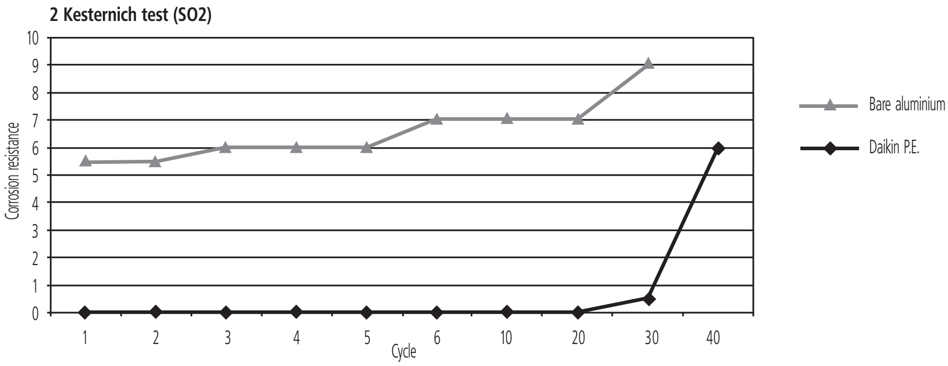
testing period : 5 cycles



contents of 1 cycle (48 hours):

according to DIN50018 (0.21)

testing period : 40 cycles



6-3-2 Double back-up function

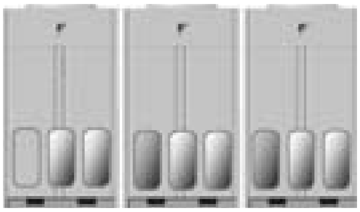
In the event of a compressor malfunction, the remotely controlled or field set back-up function in the outdoor unit in question (and also between different outdoor units) will allow emergency operation of another compressor in order to maintain 8 hour maximum interim capacity

6 Main features

6-3 High reliability

6-3-3 Duty cycling

The cyclical start-up sequence of multiple outdoor unit systems equalises compressor duty and extends operating life.



6-3-4 Special oil equalising technology

The incorporation of this technology ensures that the optimum quantity of oil is contained in each outdoor unit module in order to maintain compressor reliability. Automatic checks are carried out every 6 minutes on the number of compressors in operation and also to ascertain that there is enough oil to keep them running. In the event of a shortage being indicated, oil can be piped from other outdoor units in the system via the oil balancing pipe linking multiple systems.

Each compressor in a VRV II outdoor unit is equipped with an internal oil equalising circuit, comprising an oil separator and oil return circuit. This ensures that the maximum quantity of oil is returned to the compressor case before entering the REFNET piping network. The oil equalising circuit of each outdoor unit is linked to those of the other outdoor units, allowing additional reliability and oil circulation during partial load operations.

6-3-5 No standby equipment required

Conventional VAV (Variable Air Volume) systems and chiller/fan coil systems require expensive and bulky standby units in case of breakdown. Since most outdoor units of the VRV system comprise a number of independent compressors, the system as a whole will continue to function in the event of a unit breakdown.

6 Main features

6-4 Eco friendly

6-4-1 Lowest refrigerant amount in the total system

18 HP	VRV II	Comparable VRF system
Total refrigerant amount in the system*	100 %	160 %

NOTE

* based on average installation

6-4-2 Dramatic reduction in initial refrigerant charge

16 HP	R-22 VRV-K series	R-407C VRV-K series	R-410A VRV II series
Refrigerant charge	100 %	85.6 %	79.5 %

6-4-3 Optimised R-410A design

Daikin Europe has achieved a quantum leap forward in commercial air conditioning technology by the introduction of its VRV II, the world's first R-410A operated variable refrigerant flow system. Available in cooling only, heat pump and heat recovery versions, the new system, which represents a considerable advance over earlier VRV systems, demonstrates Daikin's innovative application of new technology and the latest HFC refrigerants to its VRV product programmes.

6-4-4 Less waste and improved re-cycling

The lead free, soldered PCB obviates environmental contamination, whilst the re-cyclable galbarium steel bottom plate is designed to last around 6 times longer than the traditional galvanised base.

6-4-5 Refrigerant recovery function

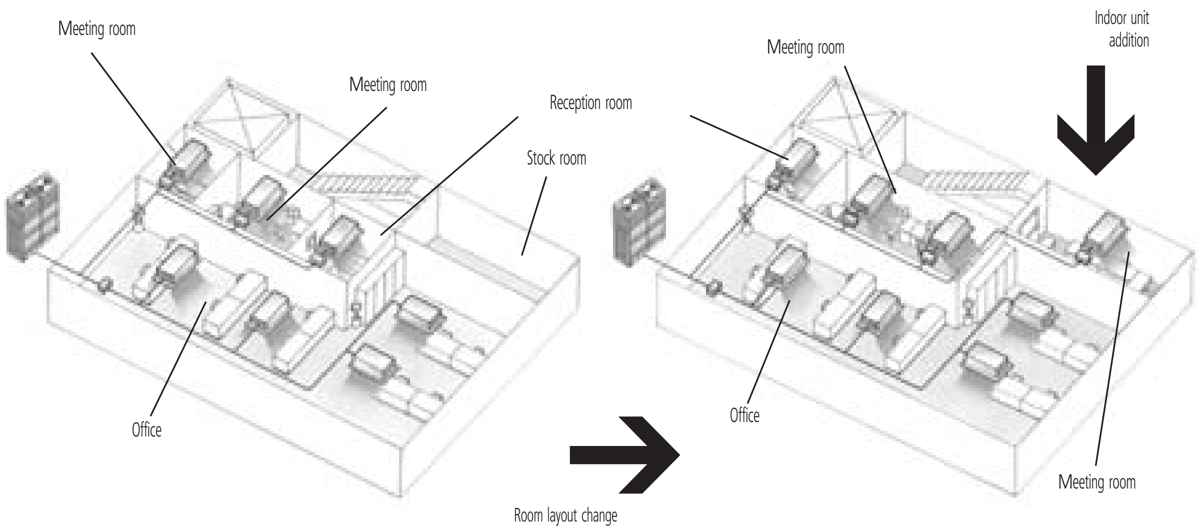
The refrigerant recovery function enables all expansion valves to be opened. In this way the refrigerant can be drained from the piping system and stored in the receiver and the condenser.

6 Main features

6-5 Easy and flexible design

6-5-1 Total room layout flexibility

- VRV II 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 II 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.

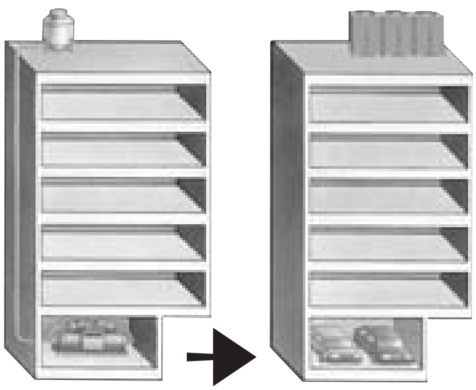


6-5-2 Complete flexibility

- The VRV II system enables different floors or even rooms to be rented to different customers, because each room has independent control of its air conditioning.
- Thanks to inverter technology, as many as 40 indoor units with different types and capacities can be installed in one system. This system automatically and effectively controls each unit to provide individual rooms of different sizes with a comfortable working or living environment.

6-5-3 Efficient use of space

The VRV II system allows you to use the available space more efficiently. Instead of having to incorporate a machine room in to your building plans, you can use this space for other purposes, such as a garage.



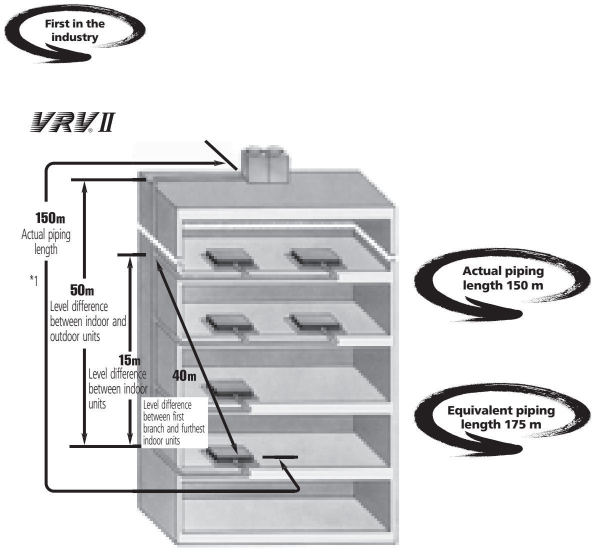
6 Main features

6-5 Easy and flexible design

6

6-5-4 Longest refrigerant piping run

The ability to sustain refrigerant piping in lengths up to 150m (175m equivalent), 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 In this case 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.

6-5-5 Short planning and design time

In conventional water systems, the size of the pipes and all auxiliary equipment must be calculated in accordance with the water flow rate. However, using a Daikin VRV system, with innovative compressor technology, time-consuming calculations are not necessary, offering considerable reductions in design time.

6 Main features

6-5 Easy and flexible design

6-5-6 Hi-VRV selection programme

A simple to use, Daikin Hi-VRV air conditioning computerised selection programme, designed for use with Windows 95®, Windows 98® and WindowsNT® systems, enables consulting engineers, design and build contractors, property developers and architects etc. to plan a Daikin air conditioning project on a step by step basis, complete with detailed drawings, bills of quantities and costs.

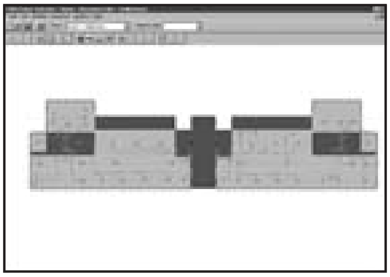
The programme thus enables VRV air conditioning systems to be engineered precisely and economically (without over-sizing units), thereby ensuring optimum operating cycles and maximum energy efficiency.

Features

- The Hi-VRV selection programme offers 3 separate modes to accommodate different design formats according to customer requirements:

  1. **Expert mode**

     Once the cooling and heating loads in the different rooms have been calculated, the software will select the most appropriate system plus an estimate of the power consumption



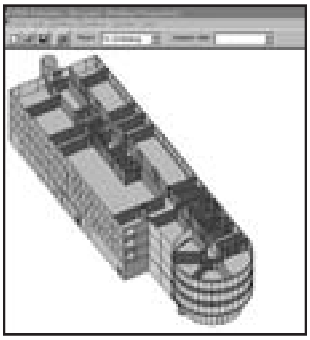
  2. **Quick mode**

     Based on calculated system loads, the software will select the most appropriate system

  3. **Drawing mode**

     NEW

     Selecting the indoor and outdoor units from a list enables the user to design a system in no time at all



  - AutoCAD and scanned drawings can be used to help draw up a floor plan
  - Piping diameters can be automatically calculated
  - Indoor and outdoor units, headers and joints etc can be automatically selected

Windows95®, Windows98® and WindowsNT® are registered trademarks of Microsoft corporation.

6

6 Main features

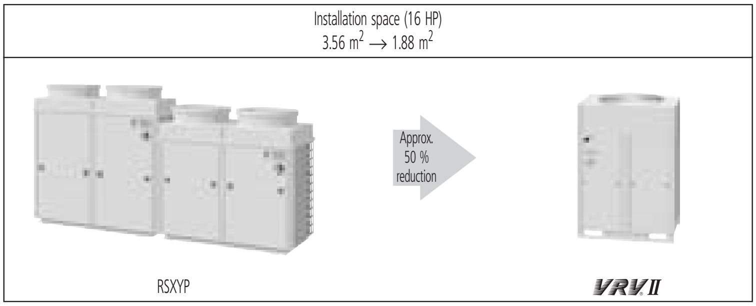
6-6 Simple and rapid installation

6-6-1 Short installation time

- Thanks to small bore refrigerant pipes and REFNET piping options, the VRV II piping system can be installed very easily and quickly.
- Installation of the VRV II system can also be implemented floor by floor, so that sections of the building can be put into use very quickly, or enabling the air conditioning system to be commissioned and operated in stages, rather than on final completion of the project.

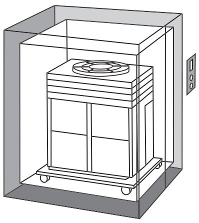
6-6-2 Dramatic reduction in installation space

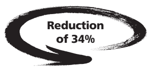
VRV II features a dramatic reduction in installation space - for example, the 16hp outdoor unit is housed in a single casing outdoor unit, providing a 50 % reduction in required installation space.



6-6-3 Modular & lightweight

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

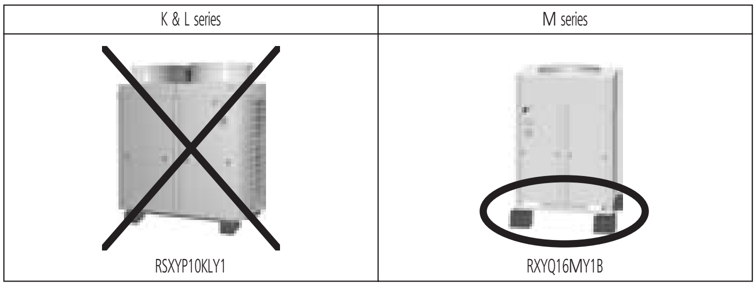




16HP	VRV K series	VRV L series	VRV II series
WEIGHT REDUCTION	100 %	99.70 %	66 %

6-6-4 No structural reinforcement necessary

- The galbarium steel allows the use of corner block foundations - earlier K and L series VRV systems required full beam foundations.
- Thanks to the lightweight and vibration-free construction of the outdoor units, floors do not need to be reinforced, reducing the overall cost of the building.

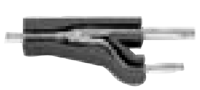
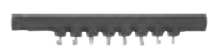
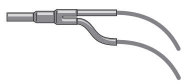
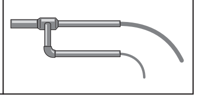


6 Main features

6-6 Simple and rapid installation

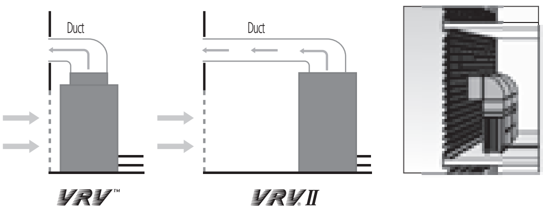
6-6-5 Unified REFNET piping

- The unified Daikin REFNET piping system is especially designed for simple installation
- Only 2 or 3 main refrigerant pipes are necessary per system and unlike conventional water based schemes, VRV II 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.
- Compared to regular T-joints, where refrigerant distribution is far from optimal, the Daikin REFNET joints have specifically been designed to optimise refrigerant flow.

REFNET joint	Attached insulators for REFNET joint	REFNET header	Attached insulators for REFNET header	REFNET joint	T-joint
					

6-6-6 Increased installation flexibility

Outdoor units can be installed far back from former location.

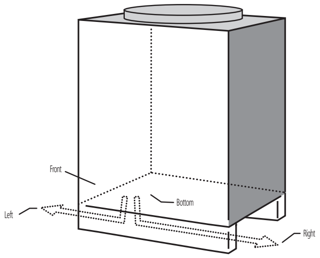


6-6-7 High external static pressure : 6mm H_2O

Daikin now offers high external static pressure as standard to meet requirements of indoor installation.

6-6-8 4-way piping connection

VRV II series not only offer the possibility to run piping from the front, but also from the left, right or bottom, thus providing greater freedom of layout.



6

6 Main features

6-6 Simple and rapid installation

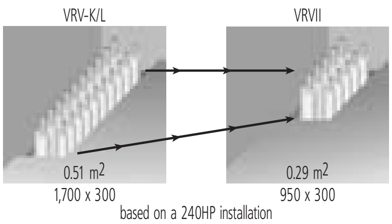
6-6-9 Downsizing refrigerant piping

- **Reduced piping diameters**

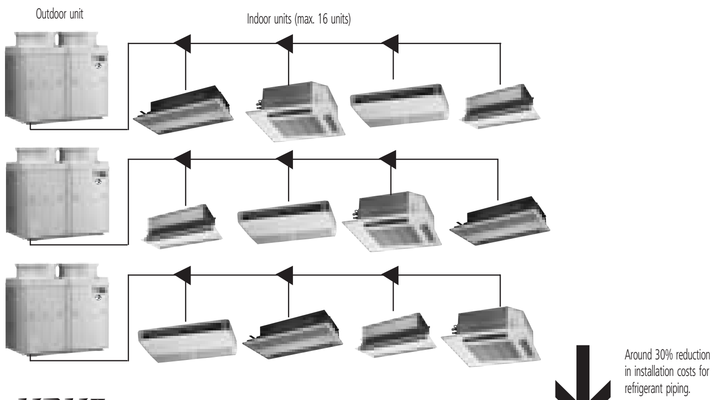
Use of high efficiency R-410A enables the VRV II to operate on a smaller refrigerant charge to be used, leading to a reduction in liquid and gas pipe diameters.

- **Reduced piping costs thanks to modular design**

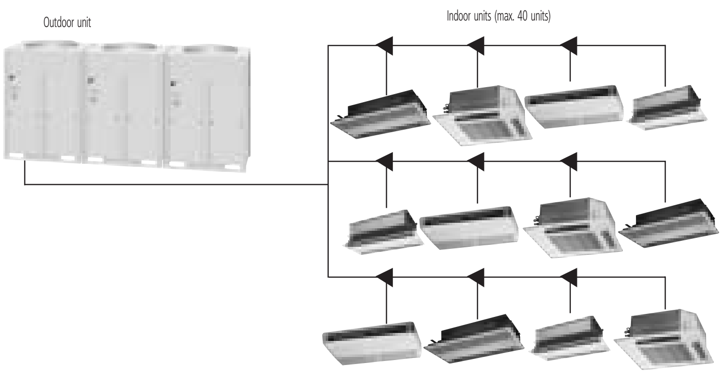
Smaller diameter liquid and gas piping contributes to a reduction in installation space and installation costs.



Standard VRV System



VRVII System



6-6-10 Sequential start

Up to 3 outdoor units can be connected to 1 power supply and can be turned on sequentially. This allows the number of breakers and their capacities to remain small and simplifies wiring (for models of 10Hp or less).

6-6-11 Self diagnosis

Detects malfunctions in major locations of the system and displays the type of malfunction and location, which in turn allows servicing and maintenance to be performed more efficiently.

6 Main features

6-6 Simple and rapid installation

6-6-12 Crosswiring check

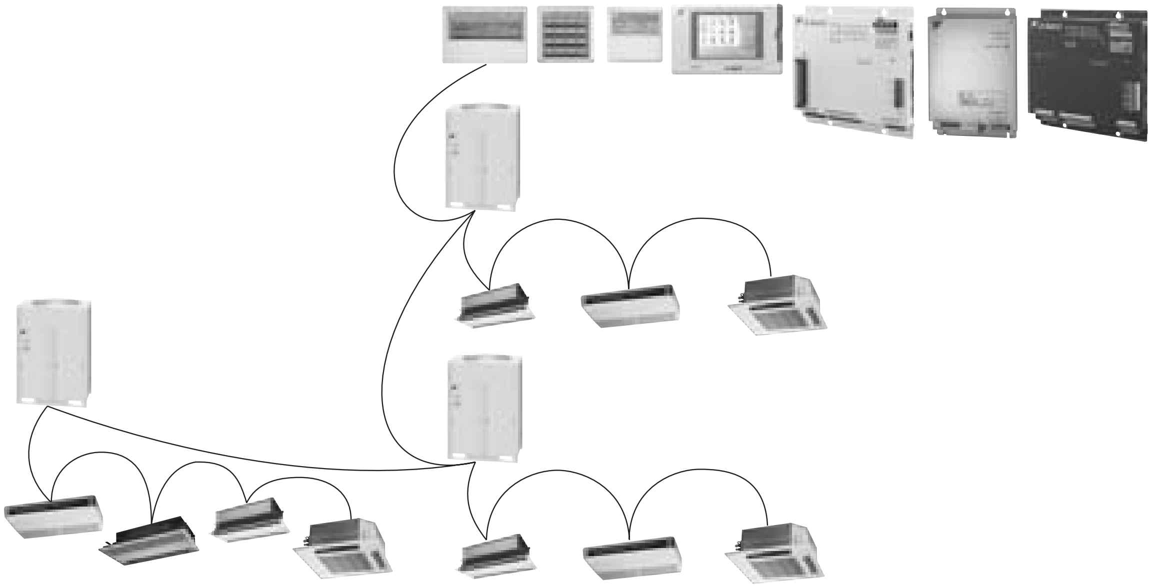
The cross wiring check facility available on the VRVII is the first of its type in the industy to warn operatives of connection errors in interunit wiring and piping. This function identifies and alerts system errors by means of on/off LEDs on the outdoor unit's PC boards.

6-6-13 Simplified wiring

- A simple 2-wire non-shielded multiplex transmission system links each outdoor unit to multiple indoor units using one 2-core wire, thus simplifying the wiring operation.
- Furthermore, outdoor units have power connection outlets on side and front, resulting in easier installation and maintenance and saving space when rows of units are connected together.

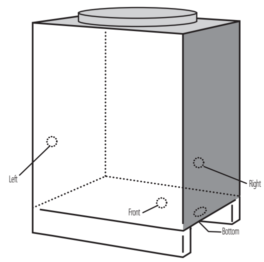
6-6-14 "Super Wiring" system

- A Super Wiring system is used to enable the shared use of wiring between indoor units, outdoor units and the centralised remote control.
- This system makes it easy for the user to retrofit the existing system with a centralised remote control, simply by connecting it to the outdoor units.
- Thanks to a non polarity wiring system, incorrect connections become impossible and installation time is reduced.



6-6-15 4-way wiring connection

Wiring can be fed from the front panel, both left and right side panels or bottom panel of the outdoor unit.



6-6-16 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.

7 Selection procedure

7-1 Selection procedure VRV II System based on cooling load

7-1-1 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.

7-1-2 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 %
RXYQ5M	162.5	150	137.5	125	112.5	100	87.5	75	62.5
RXYQ8M	260	240	220	200	180	160	140	120	100
RXYQ10M	325	300	275	250	225	200	175	150	125
RXYQ12M	390	360	330	300	270	240	210	180	150
RXYQ14M	455	420	385	350	315	280	245	210	175
RXYQ16M	520	480	440	400	360	320	280	240	200
RXYQ18M	585	540	495	450	405	360	315	270	225
RXYQ20M	650	600	550	500	450	400	350	300	250
RXYQ22M	715	660	605	550	495	440	385	330	275
RXYQ24M	780	720	660	600	540	480	420	360	300
RXYQ26M	845	780	715	650	585	520	455	390	325
RXYQ28M	910	840	770	700	630	560	490	420	350
RXYQ30M	975	900	825	750	675	600	525	450	375
RXYQ32M	1,040	960	880	800	720	640	560	480	400
RXYQ34M	1,105	1,020	935	850	765	680	595	510	425
RXYQ36M	1,170	1,080	990	900	810	720	630	540	450
RXYQ38M	1,235	1,140	1,045	950	855	760	665	570	475
RXYQ40M	1,300	1,200	1,100	1,000	900	800	700	600	500
RXYQ42M	1,365	1,260	1,155	1,050	945	840	735	630	525
RXYQ44M	1,430	1,320	1,210	1,100	990	880	770	660	550
RXYQ46M	1,495	1,380	1,265	1,150	1,035	920	805	690	575
RXYQ48M	1,560	1,440	1,320	1,200	1,080	960	840	720	600

Indoor unit capacity index

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

7 Selection procedure

7-1 Selection procedure VRV II System based on cooling load

7-1-3 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:

$$ICA = \frac{OCA \text{ x } INX}{TNX}$$

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.

7-1-4 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: RXYQ10M
  Indoor unit: FXCQ25M7 x 3, FXCQ40M7 x 5
- Indoor unit combination total capacity index
  25 x 3 + 40 x 5 = 275 (110 %)

7

7 Selection procedure

7-1 Selection procedure VRV II System based on cooling load

7-1-4 Selection example based on cooling load

4 Actual performance data (50Hz)

- Outdoor unit cooling capacity: 30.5kW (RXYQ10M, 110 %)
- Individual capacity
  Capacity of FXYCP25K $= 30.5 \times \frac{25}{275} = 2.77$kW

  Capacity of FXYCP40K7 $= 30.5 \times \frac{40}{275} = 4.44$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	2.77	2.77	2.77	4.44	4.44	4.44	4.44	4.44

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 FXCQ25M $= 30.0 \times \frac{25}{281.25} = 2.7$kW

  Capacity of FXCQ32M $= 30.0 \times \frac{32}{281.25} = 3.4$kW

  Capacity of FXCQ40M $= 30.0 \times \frac{40}{281.25} = 4.3$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	3.4	2.7	2.7	4.3	4.3	4.3	4.3	4.3

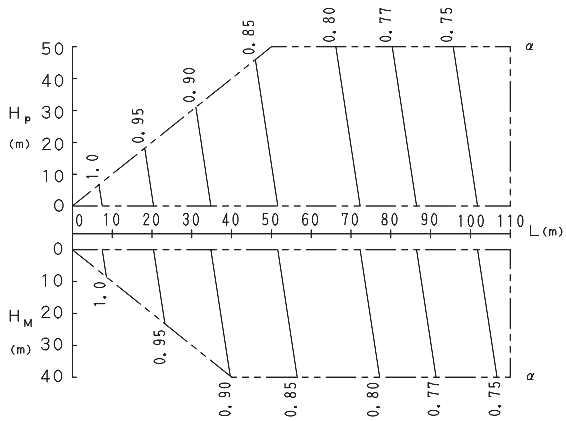
Then, the capacities have to be corrected for actual piping length according to the location of indoor and outdoor units and the distance between them.

7 Selection procedure

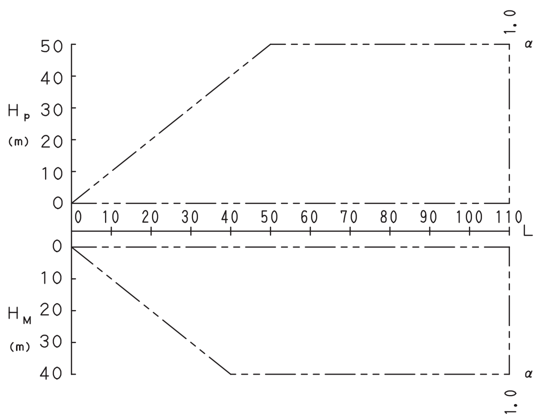
7-2 Capacity correction ratio

7-2-1 RXYQ5MY1B

- Rate of change in cooling capacity



- Rate of change in heating capacity



3D040052

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.

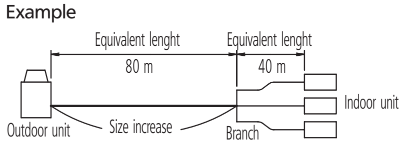
2 With this outdoor unit, evaporating pressure constant control when cooling, and condensing pressure constant control when heating is carried out.

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 diameter of the main gas pipes (outdoor unit-branch sections) must be increased.
Diameter of above case

Model	gas
RXYQ5MY1B	ø 19.1

5 When the main sections of the interunit gas pipe diameters 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 0.78

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

Diameter of gas pipes

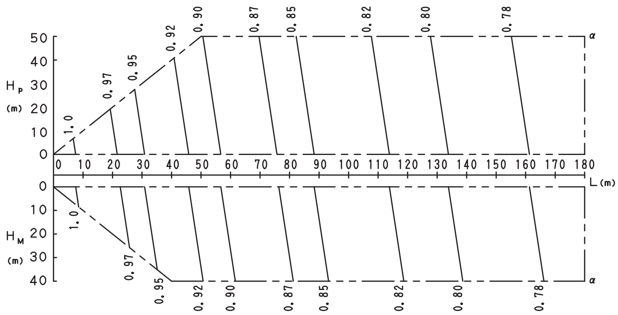
Model	gas
RXYQ5MY1B	ø 15.9

7 Selection procedure

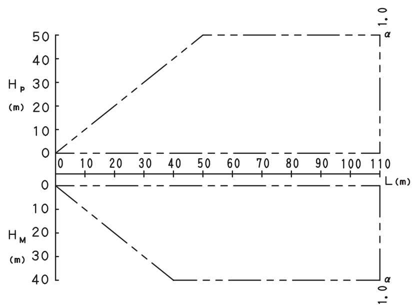
7-2 Capacity correction ratio

7-2-2 RXYQ8,22MY1B

- Rate of change in cooling capacity



- Rate of change in heating capacity



3D040059

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.

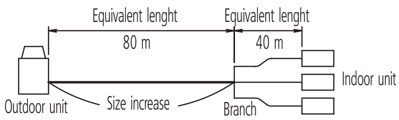
2 With this outdoor unit, evaporating pressure constant control when cooling, and condensing pressure constant control when heating is carried out.

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 diameter of the main gas and liquid pipes (outdoor unit-branch sections) must be increased.
Diameter of above case

Model	gas	liquid
RXYQ8MY1B	ø 22.2	ø 12.7
RXYQ22MY1B	ø 31.8	ø 19.1

5 When the main sections of the interunit pipe diameters 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
When the gas pipe diameter is increased: correct cooling capacity.
When the liquid pipe diameter is increased: correct heating capacity.
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 0.86

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

Diameter of gas pipes

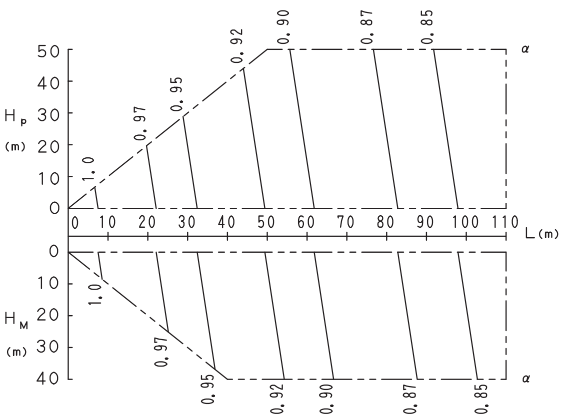
Model	gas	liquid
RXYQ8MY1B	ø 19.1	ø 9.5
RXYQ22MY1B	ø 28.6	ø 15.9

7 Selection procedure

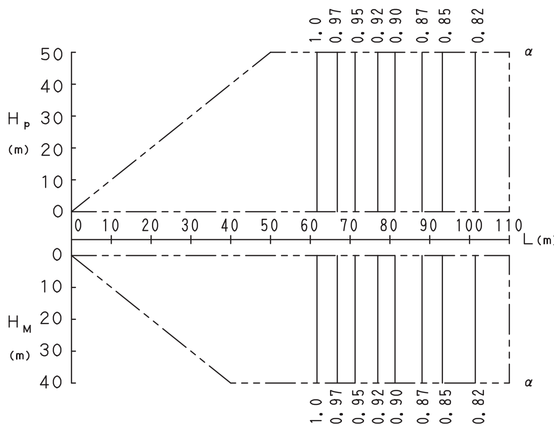
7-2 Capacity correction ratio

7-2-3 RXYQ10MY1B

- Rate of change in cooling capacity



- Rate of change in heating capacity



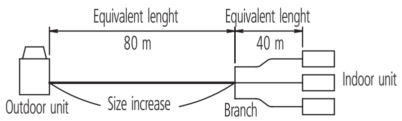
3D040054

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)
   <u>cooling / heating capacity</u> = <u>cooling / heating capacity obtained from performance characteristics table</u> x <u>each capacity rate of change</u>
   When piping length differs depending on the indoor unit, maximum capacity of each unit during simultaneous operation is:
   <u>cooling / heating capacity</u> = <u>cooling / heating capacity of each unit</u> x <u>capacity rate of change for each piping length</u>
4. When overall equivalent pipe length is 90m or more, the diameter of the main gas and liquid pipes (outdoor unit-branch sections) must be increased.
   Diameter of above case

Model	gas	liquid
RXYQ10MY1B	ø 25.4	ø 12.7

5. When the main sections of the interunit gas pipe diameters are increased the overall equivalent length should be calculated as follows.
   <u>Overall equivalent length</u> = <u>Equivalent length to main pipe</u> x <u>0.5</u> + <u>Equivalent length after branching</u>
   When the gas pipe diameter is increased: correct cooling capacity.
   When the liquid pipe diameter is increased: correct heating capacity.
   Example



In the above case (Cooling)
<u>Overall equivalent length</u> = <u>80m</u> x <u>0.5</u> + <u>40m</u> = 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

Diameter of gas pipes

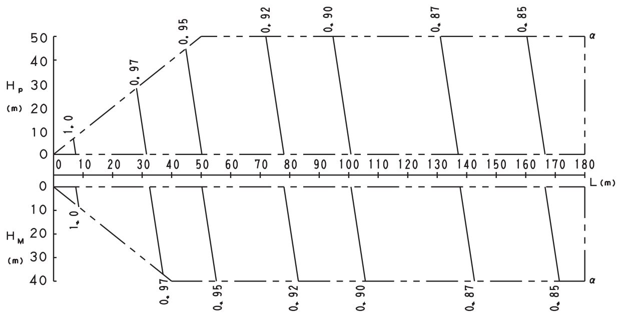
Model	gas	liquid
RXYQ10MY1B	ø 22.2	ø 9.5

7 Selection procedure

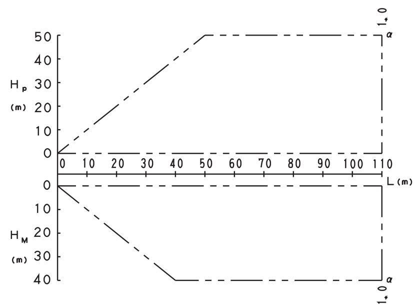
7-2 Capacity correction ratio

7-2-4 RXYQ12,14,24,36MY1B

- Rate of change in cooling capacity



- Rate of change in heating capacity



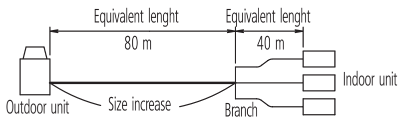
3D040055

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 diameter of the main liquid pipes (outdoor unit-branch sections) must be increased.
   Diameter of above case

Model	gas	liquid
RXYQ12,14MY1B	Not Increased	ø 15.9
RXYQ24MY1B		ø 19.1
RXYQ36MY1B		ø 22.2

5. When the main sections of the interunit liquid pipe diameters are increased the overall equivalent length should be calculated as follows. (Heating only)
   Overall equivalent length = Equivalent length to main pipe x 0.5 + Equivalent length after branching
   Example



In the above case (Heating)
Overall equivalent length = 80m x 0.5 + 40m = 80m
The correction factor in capacity when H_p = 0m is thus approximately 1.0

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

Diameter of gas pipes

Model	gas	liquid
RXYQ12,14MY1B	ø 28.6	ø 12.7
RXYQ24MY1B	ø 34.9	ø 15.9
RXYQ36MY1B	ø 41.3	ø 19.1

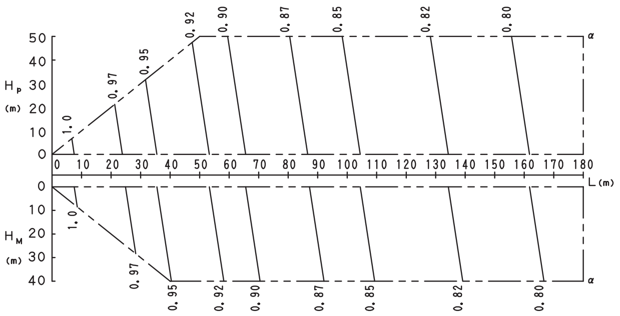
7 Selection procedure

7-2 Capacity correction ratio

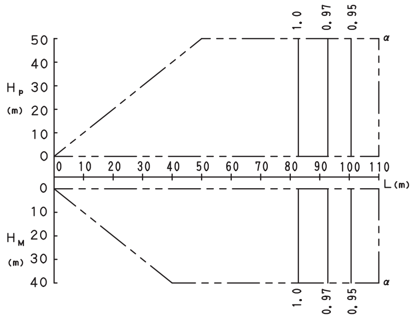
7-2-5 RXYQ16MY1B

7

- Rate of change in cooling capacity



- Rate of change in heating capacity



3D040056

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.

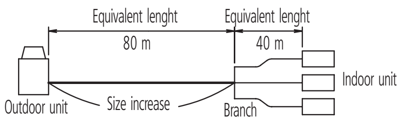
2 With this outdoor unit, evaporating pressure constant control when cooling, and condensing pressure constant control when heating is carried out.

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

4 When overall equivalent pipe length is 90m or more, the diameter of the main gas and liquid pipes (outdoor unit-branch sections) must be increased.
Diameter of above case

Model	gas	liquid
RXYQ16MY1B	ø 31.8	ø 15.9

5 When the main sections of the interunit pipe diameters are increased the overall equivalent length should be calculated as follows.
<u>Overall equivalent length</u> = <u>Equivalent length to main pipe</u> x <u>0.5</u> + <u>Equivalent length after branching</u>
When the gas pipe diameter is increased: correct cooling capacity.
When the liquid pipe diameter is increased: correct heating capacity.
Example



In the above case (Cooling)
<u>Overall equivalent length</u> = <u>80m</u> x <u>0.5</u> + <u>40m</u> = 80m
The correction factor in capacity when H_p = 0m is thus approximately 0.88

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

Diameter of pipes

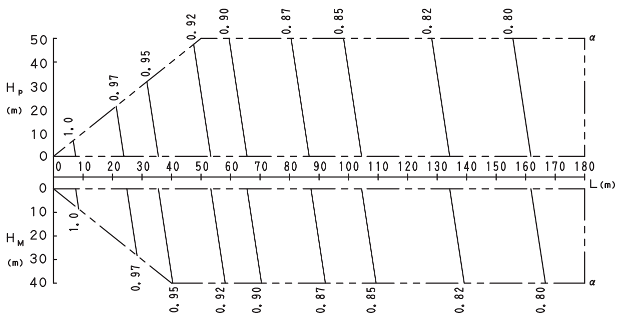
Model	gas	liquid
RXYQ16MY1B	ø 28.6	ø 12.7

7 Selection procedure

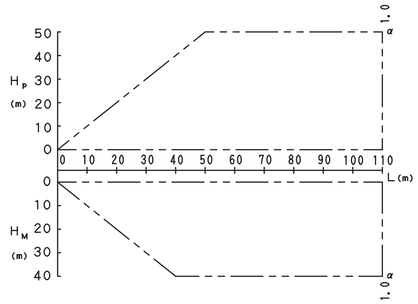
7-2 Capacity correction ratio

7-2-6 RXYQ18,26,28,30,38,40,42,44MY1B

- Rate of change in cooling capacity



- Rate of change in heating capacity



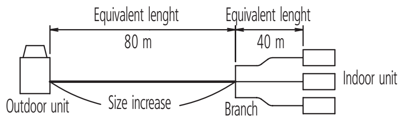
3D040057

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 diameter of the main gas and liquid pipes (outdoor unit-branch sections) must be increased except for the gas pipe of RXYQ38,40,42,44MY1B.
   Diameter of above case

Model	gas	liquid
RXYQ18MY1B	ø 31.8	ø 19.1
RXYQ26,28,30MY1B	ø 38.1	ø 22.2
RXYQ40,42,44MY1B	Not Increased	ø 22.2

5. When the main sections of the interunit pipe diameters 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
   When the gas pipe diameter is increased: correct cooling capacity.
   When the liquid pipe diameter is increased: correct heating capacity.
   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 0.88

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

Diameter of gas pipes

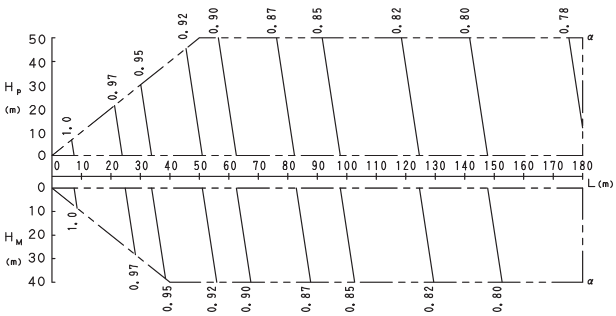
Model	gas	liquid
RXYQ18MY1B	ø 28.6	ø 15.9
RXYQ26,28,30MY1B	ø 34.9	ø 19.1
RXYQ40,42,44MY1B	ø 41.3	ø 19.1

7 Selection procedure

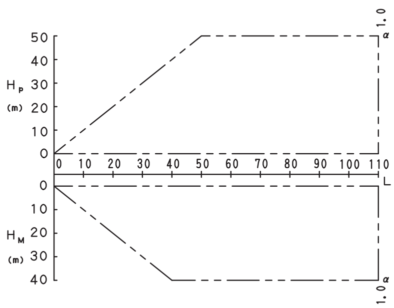
7-2 Capacity correction ratio

7-2-7 RXYQ20,32,34,46MY1B

- Rate of change in cooling capacity



- Rate of change in heating capacity



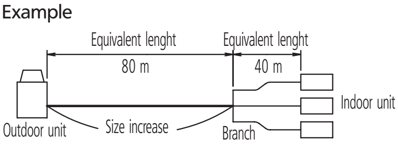
3D040058

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 diameter of the main gas and liquid pipes (outdoor unit-branch sections) must be increased except for the gas pipe of RXYQ46MY1B.
   Diameter of above case

Model	gas	liquid
RXYQ20MY1B	ø 31.8	ø 19.1
RXYQ32,34MY1B	ø 38.1	ø 22.2
RXYQ46MY1B	Not Increased	ø 22.2

5. When the main sections of the interunit pipe diameters 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
   When the gas pipe diameter is increased: correct cooling capacity.
   When the liquid pipe diameter is increased: correct heating capacity.
   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

Diameter of gas pipes

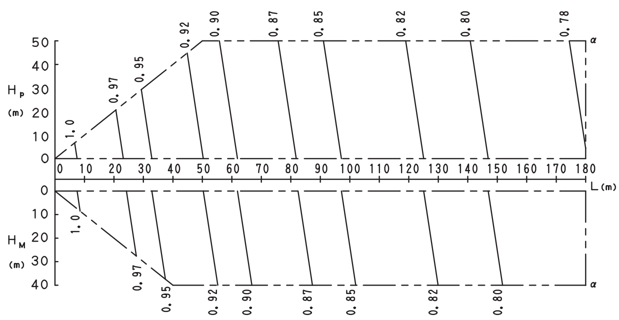
Model	gas	liquid
RXYQ18MY1B	ø 28.6	ø 15.9
RXYQ26,28,30MY1B	ø 34.9	ø 19.1
RXYQ40,42,44MY1B	ø 41.3	ø 19.1

7 Selection procedure

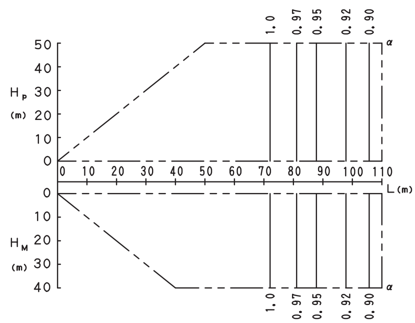
7-2 Capacity correction ratio

7-2-8 RXYQ48MY1B

- Rate of change in cooling capacity



- Rate of change in heating capacity



3D040061

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.

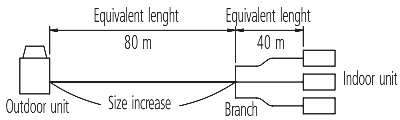
2 With this outdoor unit, evaporating pressure constant control when cooling, and condensing pressure constant control when heating is carried out.

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

4 When overall equivalent pipe length is 90m or more, the diameter of the main liquid pipes (outdoor unit-branch sections) must be increased.
Diameter of above case

Model	liquid
RXYQ48MY1B	ø 22.2

5 When the main sections of the interunit liquid pipe diameters are increased the overall equivalent length should be calculated as follows. (Heating only)
<u>Overall equivalent length</u> = <u>Equivalent length to main pipe</u> x <u>0.5</u> + <u>Equivalent length after branching</u>
Example



In the above case (Heating)
<u>Overall equivalent length</u> = <u>80m</u> x <u>0.5</u> + <u>40m</u> = 80m
The correction factor in capacity when H_p = 0m is thus approximately 0.97

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

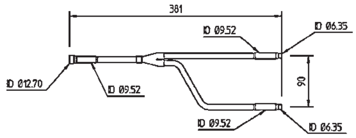
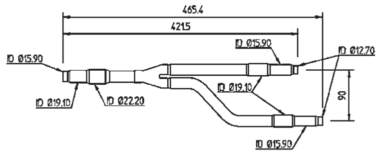
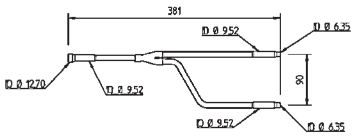
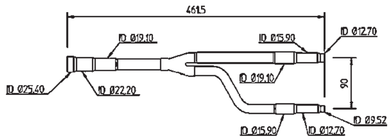
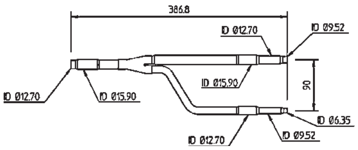
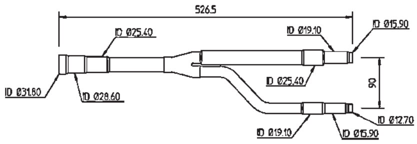
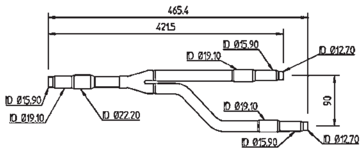
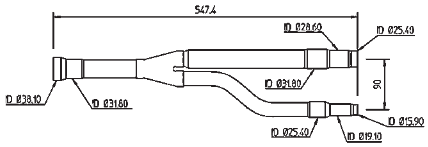
Diameter of pipes

Model	gas	liquid
RXYQ48MY1B	ø 41.3	ø 19.1

7 Selection procedure

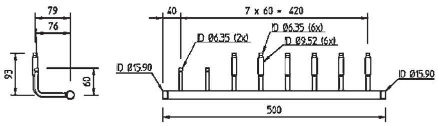
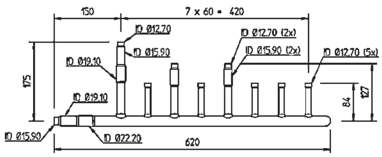
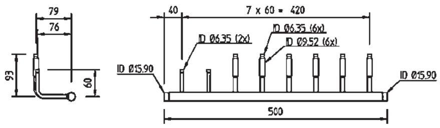
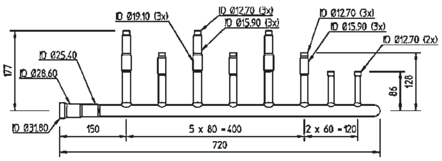
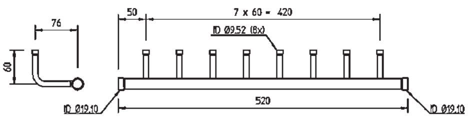
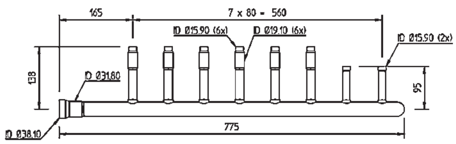
7-3 Refnet pipe system

7-3-1 Refnet joints

	Liquid side junction	Suction gas side junction
KHRQ22M20T7		
KHRQ22M29T7		
KHRQ22M64T7		
KHRQ22M75T7		

1TW25799-1

7-3-2 Refnet headers

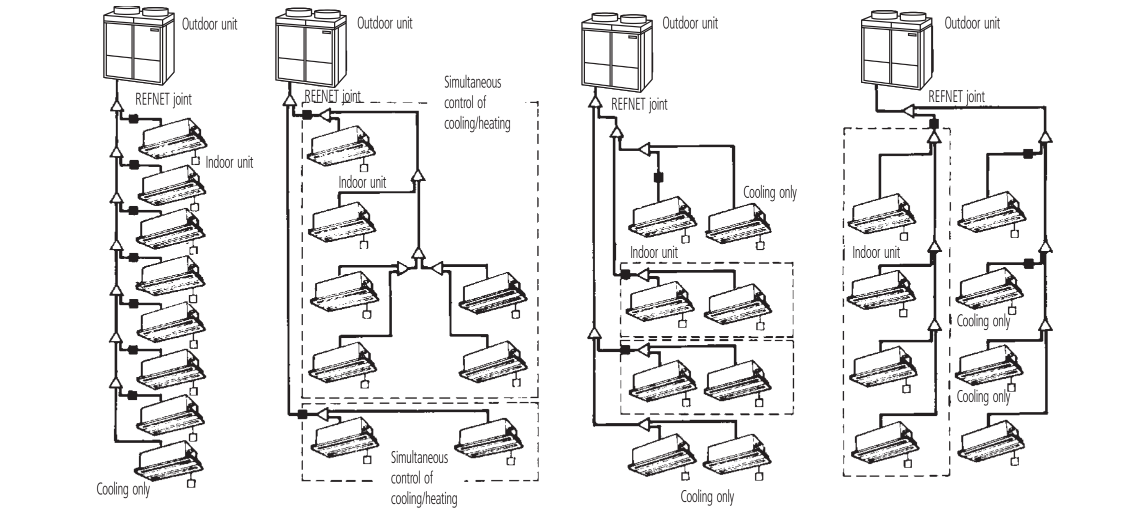
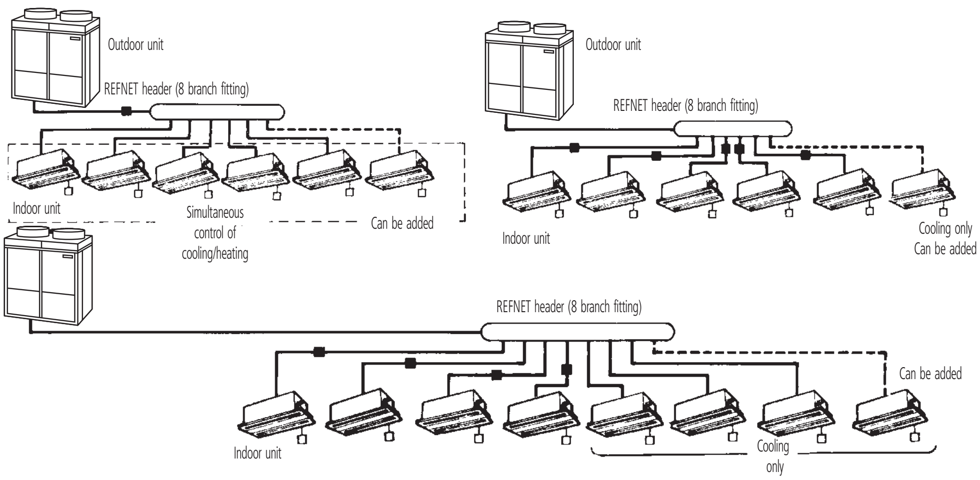
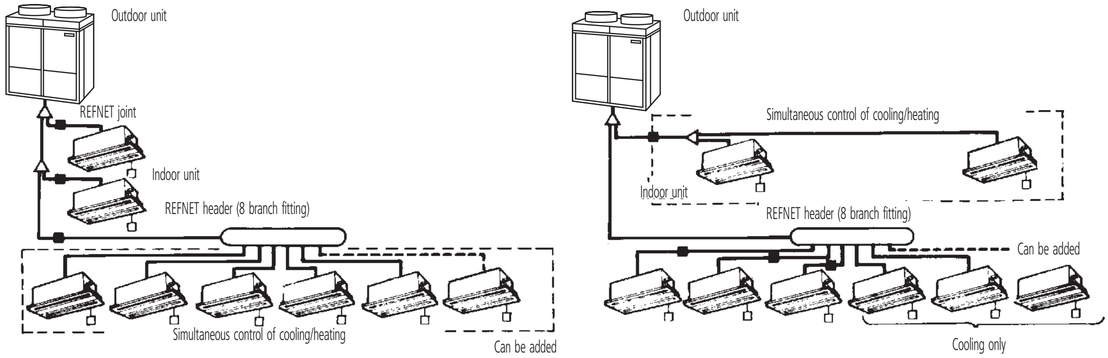
	Liquid side header	Suction gas side header
KHRQ22M29H7		
KHRQ22M64H7		
KHRQ22M75H7		

1TW25799-1

7 Selection procedure

7-3 Refnet pipe system

7-3-3 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>
</td></tr>
<tr><td>Distribution by REFNET header</td><td>
</td></tr>
<tr><td>Distribution by REFNET joints and headers</td><td>
</td></tr>
</table>

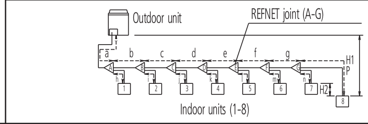
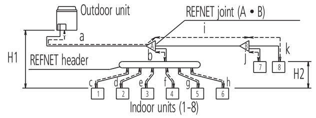
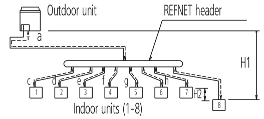
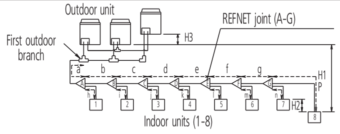
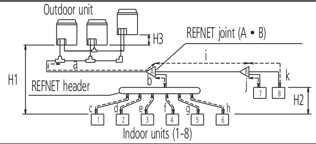
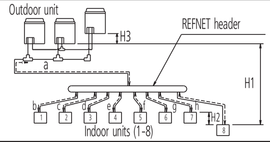
7 Selection procedure

7-4 Refnet pipe selection

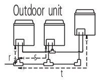
7-4-1 RXYQ5~48

Example of connection
(Connection of 8 indoor units Heat pump system)

* If the system capacity is RXYQ18 or more, re-read to the first outdoor branch as seen from the indoor unit.

	Branch with REFNET joint	Branch with REFNET joint and REFNET header	Branch with REFNET header
One outdoor unit installed (RXYQ5~16)			
When multiple outdoor units are installed (RXYQ18~)			

Maximum allowable length	Between outdoor and indoor units	Actual pipe length	Pipe length between outdoor and indoor units ≤ 150m		
			Example unit 8: a + b + c + d + e + f + g + p ≤ 150m	Example unit 6: a + b + h ≤ 150m, unit 8: a + i + k ≤ 150m	Example unit 8: a + i ≤ 150m
		Equivalent length	Equivalent pipe length between outdoor and indoor units ≤ 175m (assume equivalent pipe length of refnet joint to be 0.5m, that of refnet header to be 1m, calculation purposes)		
		Total extension length	Total piping length from outdoor unit* to all indoor units ≤ 300m		
	Between outdoor branch and indoor unit (Only for RXYQ18 or more)	Actual pipe length	Piping length from outdoor branch to outdoor unit ≤ 10m Approximately length: max 13m		
Allowable height length	Between outdoor and indoor units	Difference in height	Difference in height between outdoor and indoor units (H1) ≤ 50m (Max 40m if the outdoor unit is below)		
	Between indoor and indoor units	Difference in height	Difference in height between adjacent indoor units (H2) ≤ 15m		
	Between outdoor and outdoor units	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 unit ≤ 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



r ≤ 10m (Approximate length: max 13m)
s ≤ 10m (Approximate length: max 13m)
t ≤ 10m (Approximate length: max 13m)

Refrigerant branch kit selection

Refrigerant branch kits can only be used with R-410A.

How to select the REFNET joint
• When using REFNET joints at the first branch counted from the outdoor unit side. Choose from the following table in accordance with the capacity of the outdoor unit.

First branch after the outdoor unit has to be selected from "Outdoor unit capacity type" table. Even if it is contradictory to the "indoor capacity index" table.

Outdoor unit capacity type	REFNET joints
RXYQ5	KHRQ22M20T7
RXYQ8, 10	KHRQ22M29T7
RXYQ12~22	KHRQ22M64T7
RXYQ24~	KHRQ22M75T7

• For refnet joints other than the first branch, select the proper branch kit model based on the total capacity index.

Indoor capacity index	REFNET joints
< 200	KHRQ22M20T7
200 ≤ x < 290	KHRQ22M29T7
290 ≤ x < 640	KHRQ22M64T7
640 <	KHRQ22M75T7

How to select the REFNET header
• Choose from the following table in accordance with the total capacity of all the indoor units connected below the REFNET header.
• Note: 250 type cannot be connected below the REFNET header.

Indoor capacity index	REFNET headers
< 200	KHRQ22M29H7 (Max 8 branches)
< 290	KHRQ22M29H7 (Max 8 branches)
290 ≤ x < 640	KHRQ22M64H7 (Max 8 branches)
640 <	KHRQ22M75H7 (Max 8 branches)

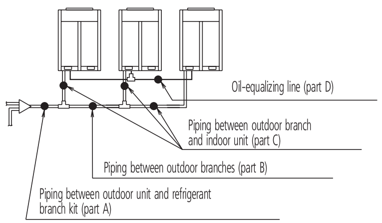
How to choose an outdoor branch kit (needed if the outdoor unit capacity type is RXYQ18 or more)
• Choose from the following table in accordance with the number of outdoor units.

Number of outdoor units	Outdoor unit multi piping connection kit
2 units	BHFQ22M907
3 units	BHFQ22M1357

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, example in case of refnet header; indoor units 1 + 2 + 3 + 4 + 5 + 6
- example in the case of refnet header; indoor units 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8

Pipe size selection

For an outdoor unit multi installation (RXYQ18~48MY1B), make the settings in accordance with the following figure.



Piping between outdoor unit and refrigerant branch kit (part A)
• Match to the size of the connection piping on the outdoor unit.
Outdoor unit connection piping size (Unit: mm)

Outdoor unit capacity type	Piping size (outer diameter x minimum thickness) Gas pipe	Liquid pipe
RXYQ5	ø15.9 x 0.99	ø9.5 x 0.80
RXYQ8	ø19.1 x 0.80	
RXYQ10	ø22.2 x 0.80	
RXYQ12, 14, 16	ø28.6 x 0.99	ø12.7 x 0.80
RXYQ18~22		ø15.9 x 0.99
RXYQ24	ø34.9 x 1.21	
RXYQ26~34		ø19.1 x 0.80
RXYQ36~48	ø41.3 x 1.43	

Piping between refrigerant branch kits
• Choose from the following table in accordance with the total capacity of all the indoor units connected below this.
• Do not let the connection piping exceed the refrigerant piping size chosen by general system model name. (Unit: mm)

indoor capacity index	Piping size (outer diameter x minimum thickness) Gas pipe	Liquid pipe
< 200	ø15.9 x 0.99	ø9.5 x 0.80
200 ≤ x < 290	ø22.2 x 0.80	
290 ≤ x < 420	ø28.6 x 0.99	ø12.7 x 0.80
420 ≤ x < 640		ø15.9 x 0.99
640 ≤ x < 920	ø34.9 x 1.21	ø19.1 x 0.80
920 <	ø41.3 x 1.43	

Piping between outdoor branches (part B)
• Choose from the following table in accordance with the total capacity of all the outdoor units connected above this. (Unit: mm)

outdoor capacity index	Piping size (outer diameter x minimum thickness) Gas pipe	Liquid pipe
< 22HP	ø28.6 x 0.99	ø15.9 x 0.99
24HP	ø34.9 x 1.21	
26HP <		ø19.1 x 0.80

Between refrigerant branch kit and indoor unit
• Pipe size for direct connection to indoor unit must be the same as the connection size of indoor unit. (Unit: mm)

indoor capacity index	Piping size (outer diameter x minimum thickness) Gas pipe	Liquid pipe
20, 25, 32, 40, 50 type	ø12.7 x 0.80	ø6.4 x 0.80
63, 80, 100, 125 type	ø15.9 x 0.99	ø9.5 x 0.80
200 type	ø19.1 x 0.80	
250 type	ø22.2 x 0.80	

Piping between outdoor branch and outdoor unit (part C) (Unit:mm)

outdoor capacity index	Piping size (outer diameter x minimum thickness) Gas pipe	Liquid pipe
RXYQ8 type	ø19.1 x 0.80	ø9.5 x 0.80
RXYQ10 type	ø22.2 x 0.80	
RXYQ12, 14, 16 type	ø28.6 x 0.99	ø12.7 x 0.80

Oil-equalizing line (Only for RXYQ18 or more) (part D)

Piping size (outer diameter x minimum thickness)	ø6.4 x 0.80

(Unit:mm)

How to calculate the additional refrigerant to be charged

Additional refrigerant to be charged R (Kg)
R should be rounded off in units of 0.1Kg.

NOTE
If a negative result is gotten for R from the formula at right, no refrigerant needs to be added.

R = (Total length (m) of liquid piping size at ø22.2) x 0.35 + (Total length (m) of liquid piping size at ø19.1) x 0.25 + (Total length (m) of liquid piping size at ø15.9) x 0.17 + (Total length (m) of liquid piping size at ø12.7) x 0.11 + (Total length (m) of liquid piping size at ø9.5) x 0.054 + (Total length (m) of liquid piping size at ø6.4) x 0.022 −

Model name	Amount of refrigerant
RXYQ5~16MY1B	0 kg
RXYQ18~32MY1B	3 kg
RXYQ34~48MY1B	6 kg

Example for refrigerant branch using refnet joint and refnet header for RXYQ34MY1B

If the outdoor unit is RXYQ34MY1B and the piping lengths are as at right

a: ø19.1 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 0.25 (a) + 10 x 0.17 (b) + 10 x 0.11 (i) + 40 x 0.054 (c+d+e+f) + 49 x 0.022 (g+h+j+k) - 6 = 7.538 ⇩ 7.5

2

VRV II 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.

Specifications are subject to change without prior notice

DAIKIN EUROPE N.V.

Zandvoordestraat 300
B-8400 Ostend - Belgium
Internet: http://www.daikineurope.com

EEDE03-2/3 • 05/2003
Prepared in Belgium by Vanmelle