HVRF hydronic systems

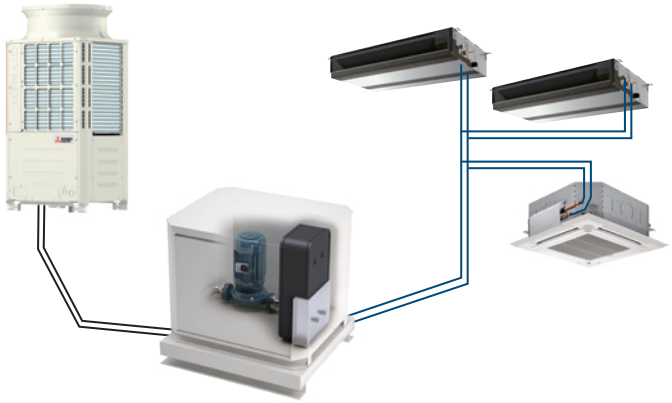
Y Line

R32 HVRF Packaged Hydronic systems Heat Pump

The HVRF Y packaged hydronic system is a new hydronic solution on heat pump version that consists of a water production section composed of a VRF technology Outdoor Unit Y CITY MULTI and a hydronic unit for water distribution.
The system is completed by different types and sizes of hydronic terminals, that can be regulated locally. All components of the hydronic system are branded Mitsubishi Electric.
HVRF hydronic systems are derived from VRF and as such bring with them the advantages of a simplified design and sizing defined by Mitsubishi Electric rules.
HVRF Y systems are environmentally friendly with an important reduction of CO_2 equivalent, thanks to the use of R32 refrigerant gas, with low GWP.

HVRF Y LINE

HYDRONIC UNIT



R2/WR2 Line

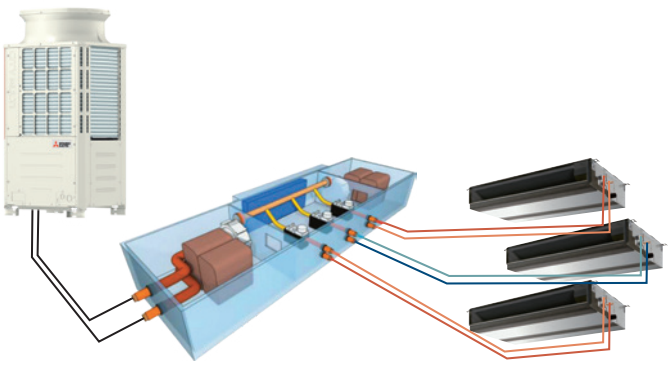
R410A

HVRF packaged hydronic heat pump systems

The HVRF R2 packaged hydronic heat recovery system is a technology based on Mitsubishi Electric's CITY MULTI R2 two-pipe system for simultaneous cooling and heating with heat recovery.
It consists of an R2 (or WR2) outdoor unit of the CITY MULTI series, the innovative Hydronic BC (HBC) distributor which allows the use of refrigerant gas and water as refrigerator fluids, as well as indoor units specially equipped with a water coil.
HVRF hydronic systems are derived from VRF and as such bring with them the advantages of a simplified and guided design in the sizing of all components.
The use of hydronic distribution allows for an up to 45% reduction in refrigerant compared to a traditional VRF system.
HVRF R2 systems have a low environmental impact with an important reduction in CO_2 equivalent.

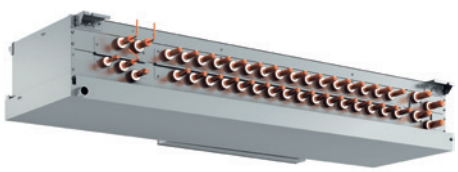
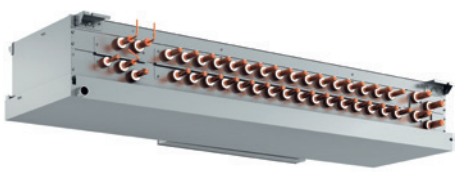
HVRF R2 LINE

HYDRONIC HBC CONTROLLER



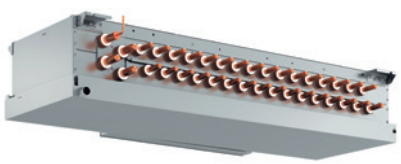
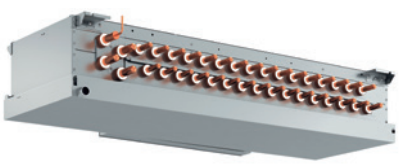
Y Next Stage LINE	**CITY MULTI Y SYSTEMS**	Heat pump systems with continuous heating
R2 Next Stage LINE	**CITY MULTI R2 SYSTEMS**	Simultaneous two-pipe cooling/heating systems with heat recovery and continuous heating.
WR2 LINE	**CITY MULTI WR2 SYSTEMS**	Heat recovery systems with water condensation/evaporation.

Outdoor units	**8**	**10**
	M200	**M250**
Model	**WM250**	
HYDRONIC UNIT **CMH-WM V-A**		
	same external dimensions/different internal structures depending on capacity	

Type of HBC	**Main**	
Model	**CMB-WM108V-AA**	**CMB-WM1016V-AA**
Number of connections	**8**	**16**
HYDRONIC BC CONTROLLER **HBC**		

	**SINGLE Y** PUHY-M YNW-A1 (-BS) - HP 8~20
	**SINGLE R2** PURY-P YNW-A2(-BS) - HP 8~20
	**SINGLE WR2** PQRY-P YLM-A1 - HP 8~20

	12	14	16	18	20
	M300	M350	M400	M450	M500
	WM350		WM500		
					
	same external dimensions/different internal structures depending on capacity				

	Sub	
	CMB-WM108V-BB	CMB-WM1016V-BB
	8	16
		

Sistem					HP	4,5	
					Model	P112	
Air-cooled	HVRF Heat pump	Y Line Heat Pump	PUHY-M YNW-A1 (-BS)		SINGLE		
					DOUBLE		
					TRIPLE		
	HVRF Heat recovery	R2 Line Heat Pump	PURY-P YNW-A2(-BS)		SINGLE		
					DOUBLE		
Water-cooled	HVRF Heat recovery	WR2 Line Heat recovery	PQRY-P YLM-A1		SINGLE		
					DOUBLE		

	5	6	8	10	12	14	16	18	20
	P125	P140	P200	P250	P300	P350	P400	P450	P500
			8	10	12	14	16	18	20
			8	10	12	14	16	18	20
			8	10	12	14	16	18	20

Key Technologies

Mitsubishi Electric: state of the art technology and continuous pursuit of improvement. Quality, innovation and performance of HYDRONIC VRF CITY MULTI systems.

Technology

Lower concentration of GAS

Lower concentration of refrigerant in the building and confined only in the section between the Outdoor Unit and the Hydronic Unit/Hydronic Branch Controller.

High SHF (Sensible Heat Factor) cooling

Thanks to HYDRONIC VRF technology it is possibile to design systems with typical VRF simplicity and higher confort thanks to the use of water as heat carrier. Mitsubishi Electric water-fed indoor units grant a really stable temperature control, with higher Sensible Heat Factor (SHF) than traditional direct expantion systems. re rispetto ad un sistema ad espansione diretta tradizionale.

Reduced defrost and transitory time

Using water as heat carrier also gives an additional advantage during heating periods, reducing defrost time. Thanks to water thermal inertia it is possible to resume releasing heat to the environment just after a defrost cycle, minimizing the system turn-off periods.

Silent functioning with water cooled units

Indoor units of the HYDRONIC VRF are equipped with water-fed heat exchangers. The lack of LEV valve in the units grants a very silet functioning regime, particularly suited for “sensible” environments such as libraries, schools, bedrooms.

Modular system for fractionate and progressive installation

HYDRONIC VRF system is particularly suited for designs which require partial installation or applications catatterized by fractionated realization schedule. This often occurs in real-estate of commercial/residential buildings intended for different type of users, which are often sold/realized separately.

Modulating regulation of the pump based on the load and capacity required

The new HYDRONIC VRF system contains all the components necessary for the distribution and regulation typical of a hydronic system. Thanks to the presence of two variable speed circulators (inverters), the HVRF system is able, in total autonomy, to regulate the flow of water destined for the individual hydronic units (indoor units) according to the thermal load required by the individual rooms.

M-NET control system

Being part of the CITY MULTI family, even the HYDRONIC VRF system can use the control and communication systems (M-Net) of the VRF systems and consequently can benefit from the M-NET Power function which allows the system to continue to operate normally even in the event of a power failure of one or more indoor units. This function is particularly advantageous and effective in all those cases in which the air conditioning system is shared between several users (shopping centre, condominium, etc.).

Valves, pumps, exchangers and integrated control and regulation systems

The innovative HYDRONIC VRF distributor is the only device in the world that uses refrigerant gas and water as carrier fluids thanks to special plate heat exchangers. Inside it there are all the components necessary for the distribution and regulation of the water flow to the individual indoor units. The presence of two plate heat exchangers allows the system to always be ready to produce hot and cold water at the same time; supply and return manifolds, water flow regulation valves and two variable flow pumps allow the system to independently manage the hydronic distribution to the individual indoor units based on a complex series of parameters acquired by the same system.

Accessories and safety devices

When installing the HYDRONIC VRF system, it will be sufficient to provide for

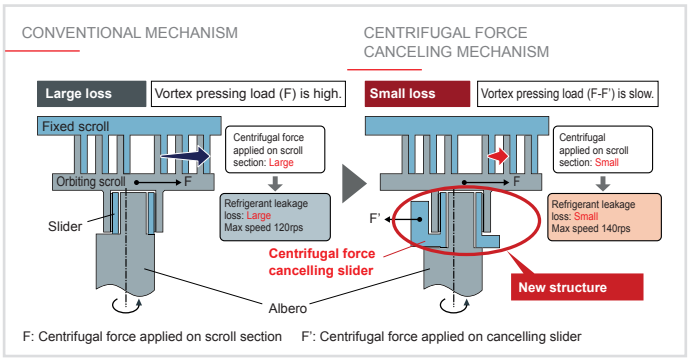
- 20 mm diameter copper or multilayer piping
- Expansion vessel to be connected directly to the HBC Controller
- Supply line (water load) equipped with shut-off valve, safety valve, filter, pressure reducer
- Condensate drain line
- 220V power supply line

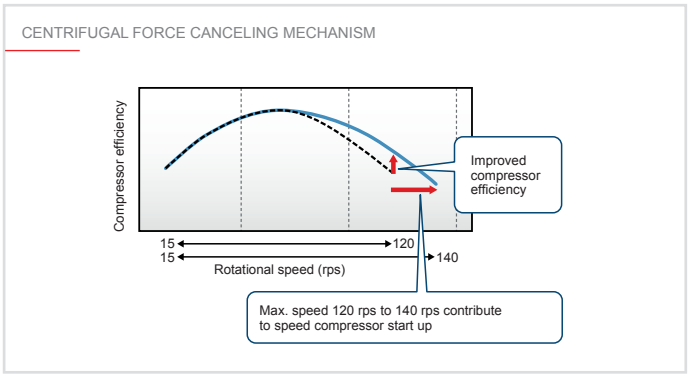
NEXT STAGE generation Compressor NEXT STAGE GENERATION

The compressor, known as the heart of the air conditioner, has been newly developed. A new centrifugal force canceling mechanism and a new multi-port mechanism have been developed. In addition, we have mounted a high-efficiency motor. The synergetic effect of these new technologies increases the compressor performance and efficiency, and also helps to improve the performance of the outdoor unit.

Centrifugal force canceling mechanism (8 to 14HP)

The structure of the scroll compressor causes a centrifugal force during operation. Conventionally, that centrifugal force is applied onto the scroll section. This causes refrigerant to leak, and restricts the increase in rotational speed to a maximum of 120rps. With the new compressor, a new structure (centrifugal force canceling mechanism) has been mounted to suppress the centrifugal force. This mechanism successfully suppresses the centrifugal force generated at the scroll section, reduces refrigerant leakage losses, and increases the compressor efficiency. The maximum rotational speed has been increased from the conventional 120rps to 140rps.
This new mechanism also speeds up the start of operation, and enables operations such as preheat defrost operation and the smooth auto-shift startup mode.



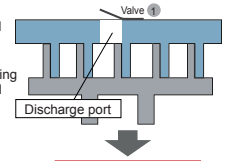


Multi-port mechanism

Efficient partial load operation is realised by avoiding overcompression. With the scroll compressor, the distance of the compression process in the scroll is usually fixed, so over-compression occurs during low loads and low rotation. The new compressor is equipped two sub-ports in addition to the conventional discharge port to reduce this over-compression loss during low loads. In operation conditions having a low compression rate, the distance in the compression process is kept short by that successfully avoiding unnecessary compression, and contributing to efficient partial load operation.

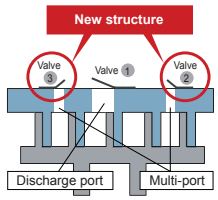
CONVENTIONAL STRUCTURE

		Operation pattern	
		Partial load	Rating, high, pressure difference
Main port	Valve ①	Open	Open



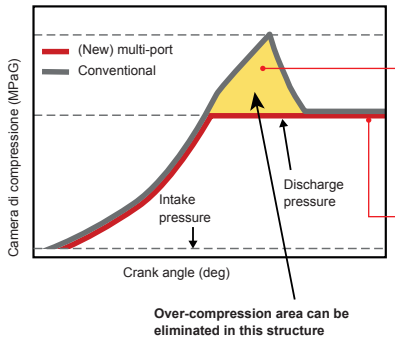
NEW STRUCTURE WITH MULTI-PORT DESIGN

		Operazione	
		Carico parziale	Carico nominale
Main port	Valve ①	Open*	Open
Sub port	Valve ②	Open	Closed
	Valve ③	Open	Closed



*The sub-port is opened during partial load operation to discharge the over-compressed gas.

REDUCED OVER-COMPRESSION LOSS (MULTI-PORT)



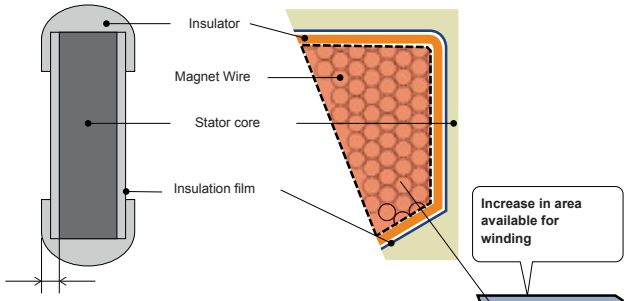
Conventional model
Conventionally, gas refrigerant is compressed to a set pressure, and then lowered to the target discharge pressure at which it is discharged. This causes drive losses from over-compression.

Multi-port
When the target discharge pressure is reached, the multiport opens, and the gas refrigerant is discharged. This reduces drive losses caused by over-compression.

Improved high-efficiency motor

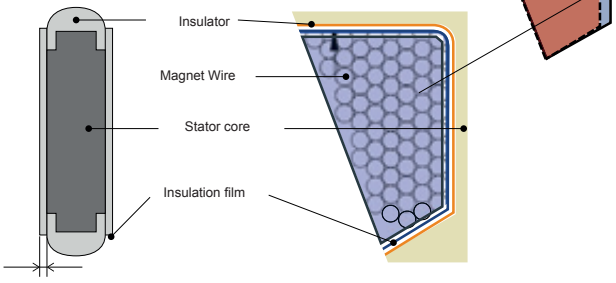
The insulator section that traditionally created a dead space is eliminated by insulating the motor's stator film. Since winding can be set in that section, the winding area can be increased by approx. 9%. The wire diameter has also been increased by two ranks, so the resistance between terminals is reduced, and the insulation distance is shorter. This improves the motor's operation performance and contributes to high-efficiency operation of the compressor.

CONVENTIONAL MODEL (YLM)



The insulator section is large, and the area where the copper wire can be wound is small.

NEW MODEL (YNW)



The motor can be wound in the section where the insulator was, and a larger wire diameter can be used.

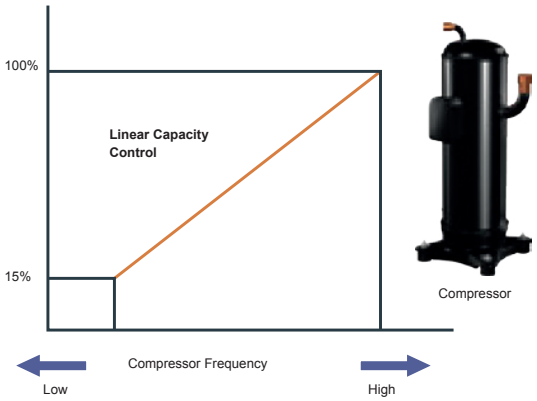
Inverter-driven compressor technology

All CITY MULTI compressors are of the inverter-driven type, capable of precisely matching a building's cooling and heating demands.

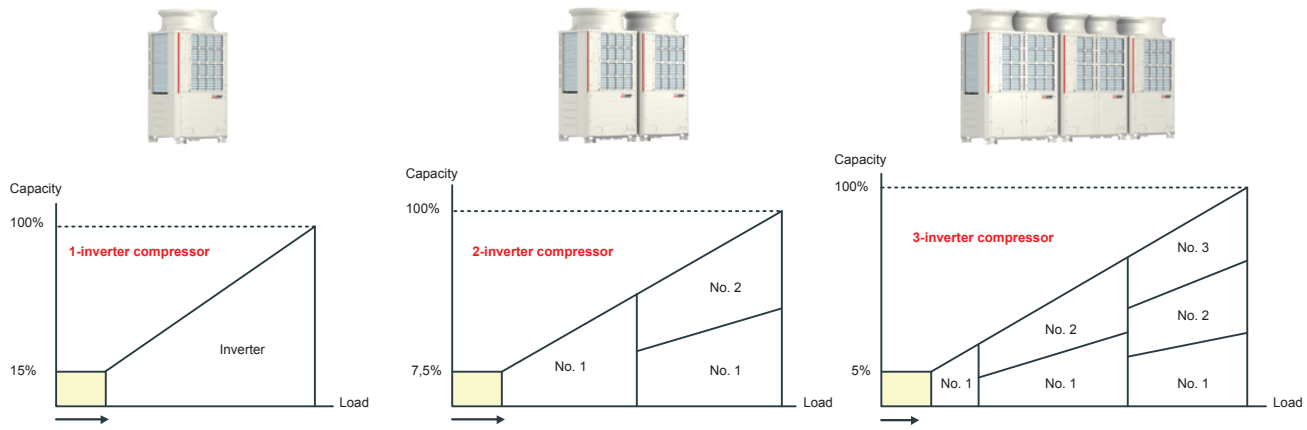
The compressor varies its speed to match the indoor cooling or heating demand and therefore only consumes the energy that is required. When an inverter driven system is operating at partial load, the energy efficiency of the system is significantly higher than that of a standard fixed speed, non-inverter system.

The fixed speed system can only operate at 100%, however, partial load conditions prevail for the majority of the time. Therefore, fixed speed systems cannot match the annual efficiencies of inverter driven systems. Using proven single inverter driven compressor technology, the CITY MULTI range is favored by the industry for low starting currents (just 8 amps for a 20HP outdoor unit) and smooth transition across the range of compressor frequencies.

HEATING / COOLING CAPACITY



STABLE AND SMOOTH OPERATION



Functions

M-Net Power

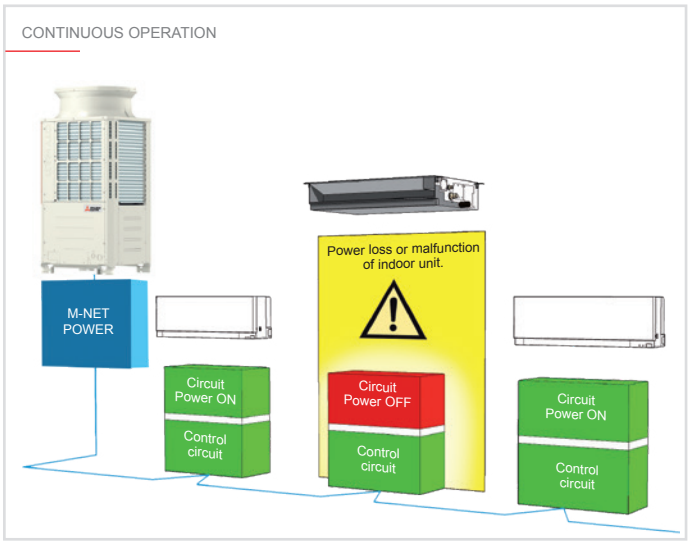
With the M-Net transmission line and the use of separate power and control circuits for indoor units, the following states can be identified automatically:

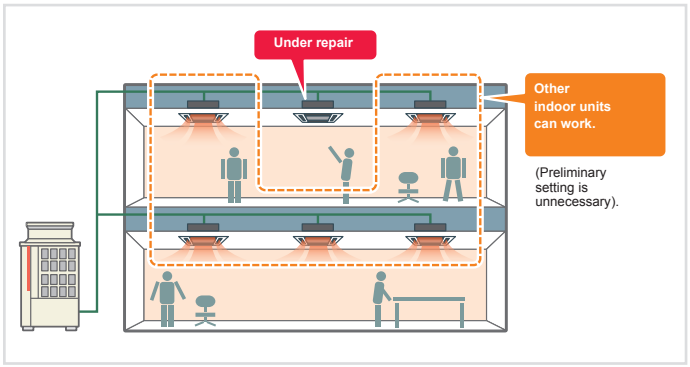
- indoor unit malfunction
- power loss to indoor unit.

In the event of one of these conditions, the outdoor unit isolates the malfunctioning indoor unit or indoor unit receiving no power to ensure the continued electrical and refrigeration functionality of the system with no action required from a technician and/or a system administrator. This allows total flexibility in planning and laying out 220V AC power circuits, without the need for shared main lines and without requiring any additional devices to attain compliance with legislation for electrical systems. This circuit configuration is essential for situations where the system itself is shared by multiple owners or tenants, and where each must be able to electrically isolate their respective indoor terminal sections when required.

Continuous operation

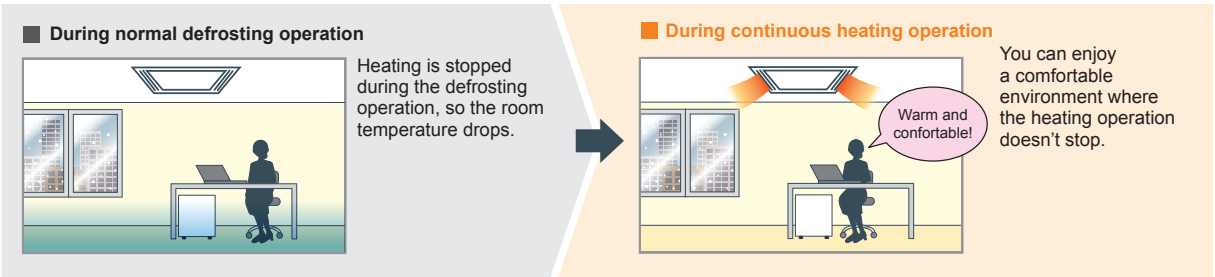
In the event of power loss or partial malfunction of one or more indoor units, the system continues to function uninterruptedly and without requiring any action from a technician and/or system administrator.





Continuous heating operation

Normally, it is necessary to stop the heating operation during defrosting. However, the continuous heating operation method makes it possible to perform defrosting while the heating operation continues.
Reduction in the stoppage time of the heating operation prevents drops in room temperature.
Use a dip switch on the outdoor unit to switch between the continuous heating operation method and the conventional defrosting method.



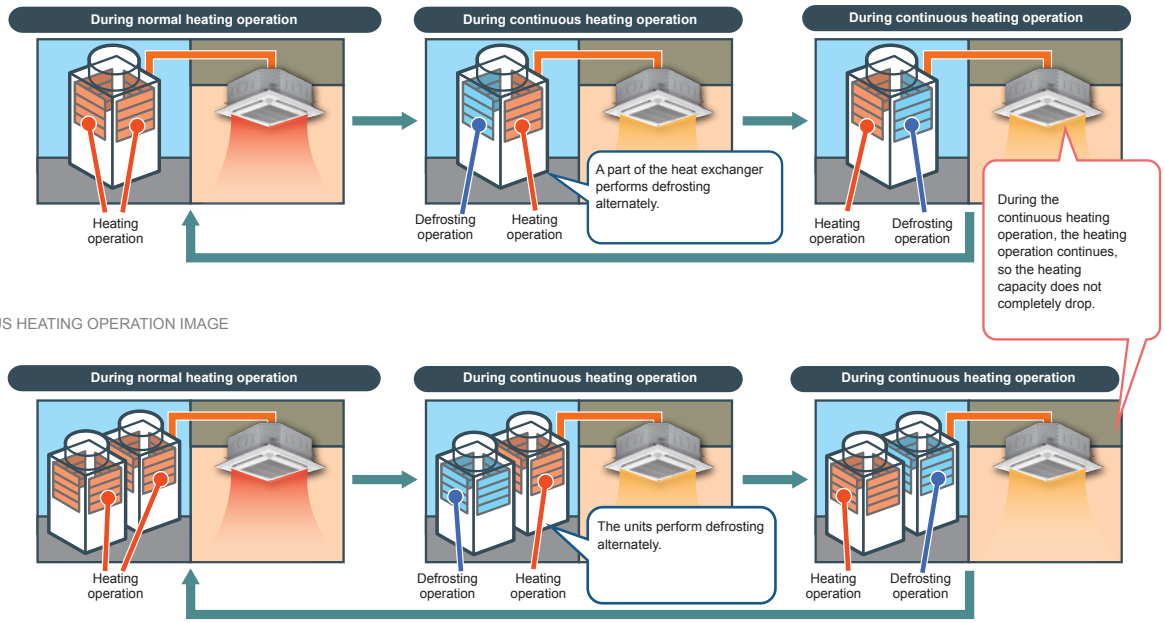
Continuous heating operation image (single unit)

The heat exchanger of the outdoor unit is split into parts. Even when defrosting is necessary, the heating operation is continued with a part of the heat exchangers.

Continuous heating operation image (combination)

With the combination model, units perform defrosting alternately. While one unit is performing defrosting, the other continues heating.

CONTINUOUS HEATING OPERATION IMAGE



NEW

Preheat defrost operation

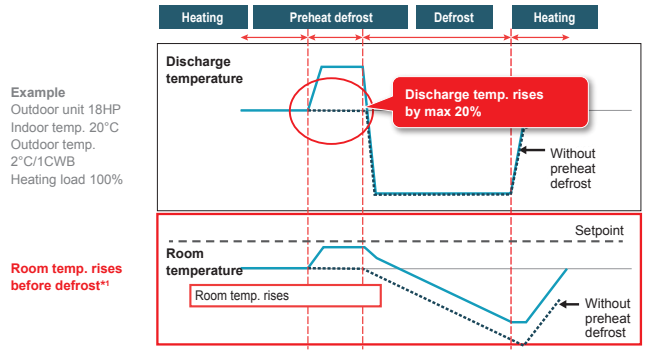
The new outdoor unit is equipped with a preheat defrost operation that raises the discharge temperature of the air before beginning defrost operation. This contributes to raising the room temperature before the start of defrost operation and prevents room occupants experiencing a chilling sensation.

NEW

Flexible Noise Setting

The “Low Noise” mode, which conventionally only had one pattern, has been increased to four patterns so that a mode can be selected from a total of five patterns, including the rated pattern. The low-noise mode has four patterns 85%, 70%, 60% and 50% in respect to the fan speed. This can be set with the outdoor unit’s DIP switch. The pattern can be selected according to the customer’s requests when low-noise operation is required.

PREHEAT DEFROST ON/OFF



*1depending on heating load
During activation of the Preheat defrost, the indoor ambient temperature does not exceed the set□point temperature.

FLEXIBLE NOISE SETTING

Settings function

1) 50%
2) **60%**
3) **70%**
4) **85%**
5) 100% nominal speed))

3 new settings available

Energy efficiency control

Evaporating temperature control (during cooling)

In a traditional system, the evaporation temperature is kept constant regardless of the system load conditions. In low load conditions (when thermal loads to be dealt with are limited) increasing the evaporation temperature of the system decreases the compressor's workload and consequently limits the electrical absorption of the outdoor unit without affecting the environmental comfort level.

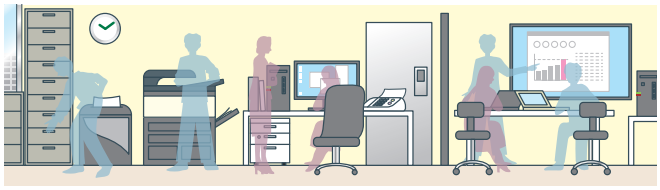
EVAPORATING TEMPERATURE CONTROL (DURING COOLING) NORMAL MODE

The evaporating temperature is kept constant regardless of the load. Even at low loads, the normal evaporating temperature does not change, which leads to energy losses during partial load operation.

SMART EVAPORATING TEMPERATURE CONTROL MODE

The evaporating temperature is increased and the compressor input is decreased according to the load, resulting in increased operating efficiency.
There are two patterns to control the evaporating temperature as follows.
1) The evaporating temperature is controlled to be constant, regardless of the ΔT. The evaporating temperature is set to a value that is higher than the normal evaporating temperature.
2) The evaporating temperature is controlled by shifting it according to the ΔT. The user can select from 4 control patterns.
* The availability of 1 and 2 varies depending on the model. Refer to the function table.
* Changing the evaporating temperature reduces latent heat capacity. Select an appropriate pattern according to the installation conditions.

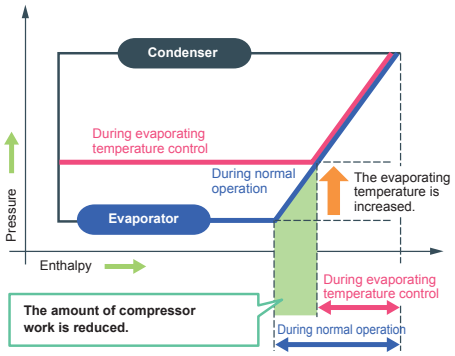
SUITABLE SITUATIONS



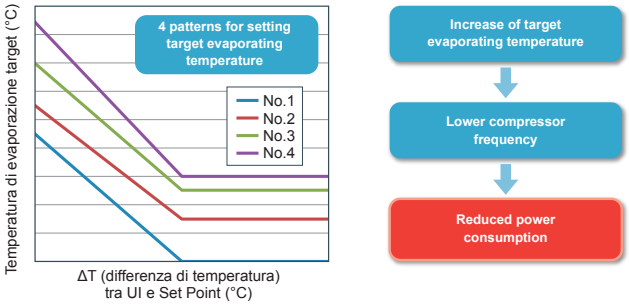
- Spaces with constant high temperatures from heat sources such as OA equipment
- When the load is low during periods when air conditioners are used for cooling (such as during the morning).

The new outdoor units are equipped with an evaporation temperature selection function, which automatically takes the system load conditions into account.

1) EVAPORATING TEMPERATURE CONTROL IMAGE



2) EVAPORATING TEMPERATURE CONTROL IMAGE (WITH 4 PATTERNS)



*1) To change the evaporating temperature setting, it is necessary to change the setting of the dip switch on the outdoor unit.
*2) When the difference between the indoor unit air-intake temperature and the actual temperature setting exceeds 1°C, the evaporating temperature based on this difference is constant. int) è maggiore di 1 C° la temperatura di evaporazione di evaporazione rimane costante.

Compressor: new induction heating technology

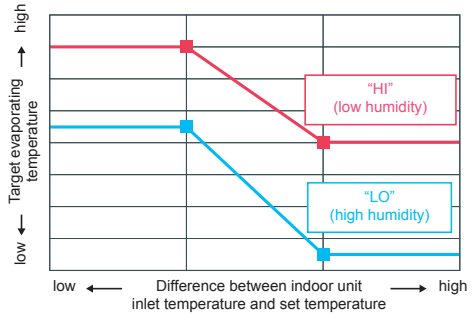
The Y Line and R2 Line outdoor units employ a pre-heating system for the scroll compressor based on induction technology. This solution is used to warm the compressor housing to minimise energy absorption in stand-by state. Yet another solution contributing to reducing energy consumption.

NEW

High sensible heat

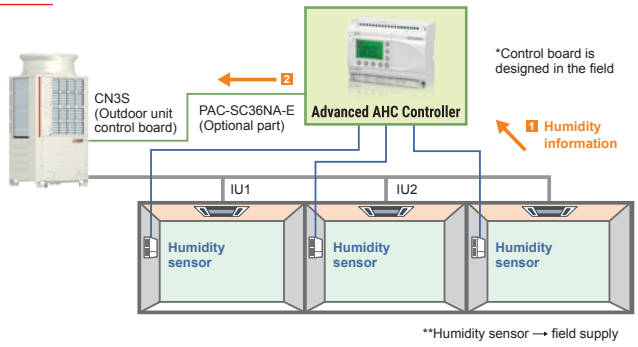
High sensible heat operation

The evaporating temperature is controlled according to room temperature and humidity, and refrigerant pressure.



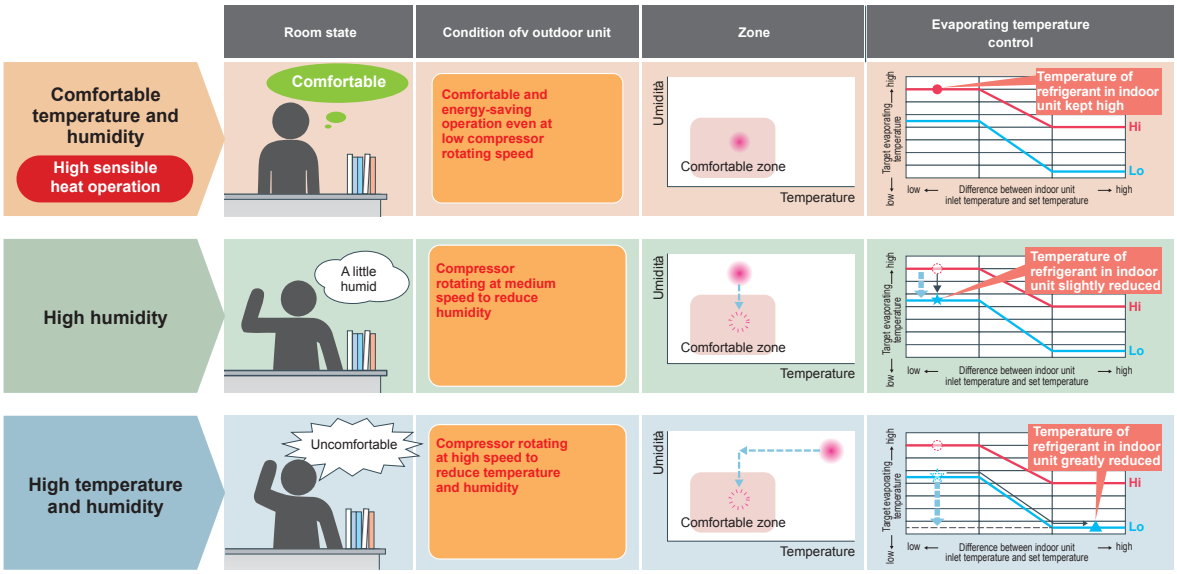
With high sensible heat operation mode activated, air conditioners consume less energy, thereby realizing cost savings. If a locally-procured humidity sensor is installed, the evaporating temperature of the outdoor unit can be controlled optimally as shown below according to the difference between the indoor unit inlet temperature and set temperature. A wide range of temperature settings are available, from a low evaporating temperature close to the temperature for normal operation to a high evaporating temperature to realize energy savings.

LOCALLY-PROCURED HUMIDITY SENSOR INSTALLATION IMAGE



1 Humidity information is sent to the control board.
2 The control board judges the humidity information, and sends a HIGH/LOW signal to the outdoor unit through CN3S. The outdoor unit shifts the evaporating temperature depending on the information from the control board.

TEMPERATURE AND HUMIDITY CONDITIONS

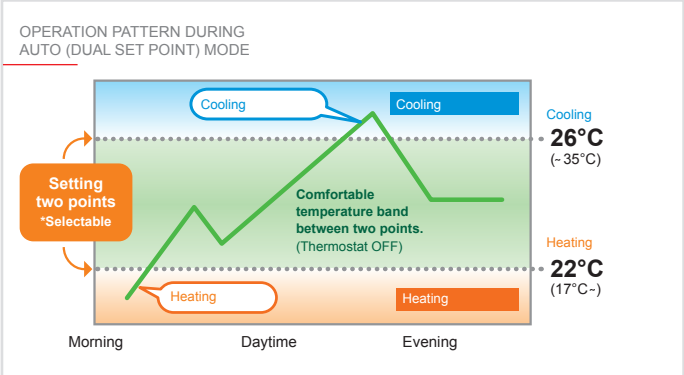


Dual Set Point

Normally, the desired room temperature is set to the same value for cooling and heating. However, the dual set point function makes it possible to set different temperatures for cooling and heating. When operation switches from cooling to heating or vice versa, the preset temperature changes accordingly.

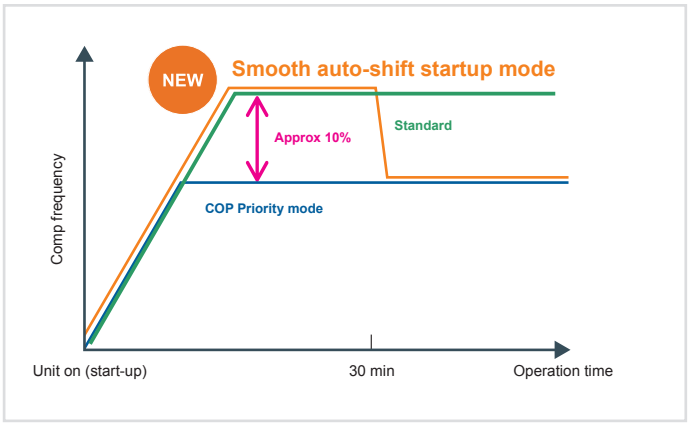
Setting dual set points for the Auto mode on R2 and WR2 helps improve energy efficiency, compared to setting a single set point.

When the operation mode is set to the Auto (dual set point) mode, two preset temperatures (one each for cooling and heating) can be set. Depending on the room temperature, the indoor unit will automatically operate in either the Cool or Heat mode and keep the room temperature within the preset range. The outdoor unit does not operate in the dead band defined by two temperature points where the thermostat is off. This cuts down on unnecessary operation of the air conditioning system.



Smooth auto-shift startup mode

Smooth auto-shift startup mode, a new operation mode on the outdoor unit, can now be selected in addition to the conventional COP Priority and Capacity Priority modes. In order to heat the room faster, Capacity Priority mode runs for 30 minutes when heating operation starts. The unit then switches to COP Priority mode to increase energy-saving efficiency. This enables both improved comfort and energy savings.



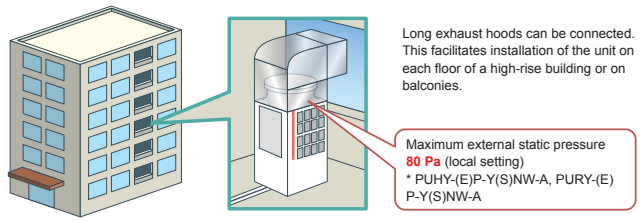
Installation and maintenance

R410A R407C Multi-refrigerant

The indoor units of VRF CITY MULTI systems are the first and only products on the market with multi-refrigerant capability. These units can operate with R22, R407C and R410A systems with no loss in performance, irrespective of the different pipe sizes.This allows unparalleled freedom for installation, as well as offering total reverse compatibility in the event of replacing indoor units with an R22 or R407C VRF CITY MULTI system.

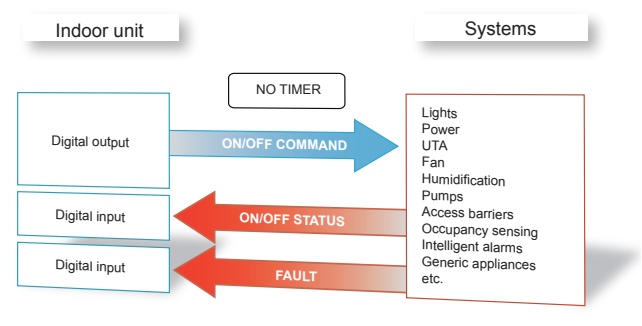
NEW 80Pa Selectable external static pressure of the outdoor unit

The static pressure specification of the outdoor unit can be selected (0, 30, 60, or 80 Pa). This facilitates installation of the unit on each floor of a high-rise building or on balconies.
* The static pressure that can be set varies depending on the model.



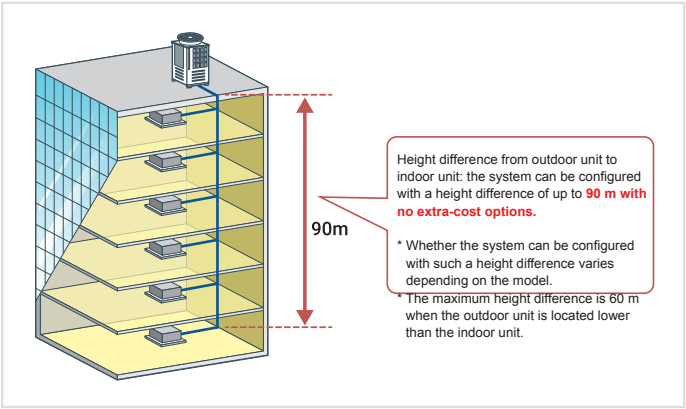
Intelligent Terminal Boards

Intelligent indoor unit terminal boards are a unique feature of Mitsubishi Electric VRF systems.
These intelligent terminal boards make it possible to use the air conditioning system and the M-NET communication network, via the indoor units, as a vehicle for collecting, transferring and monitoring field signals from generic appliances such as lighting, power, access management, intelligent alarm systems etc.
Using the intelligent terminal boards of the indoor units together with the existing infrastructure drastically reduces the number of cables needed to collect these field signals and the amount of labour required to route the cables to the centralized units.
Typically, each indoor unit supports the following signals and functions:



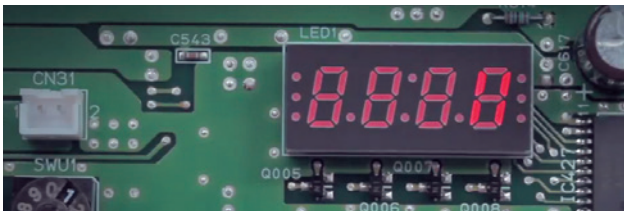
NEW 90m Usable in an application with a large vertical separation of up to 90 meters

A height difference of up to 90 m from the outdoor unit to the indoor unit can be supported with no extra-cost options.
This increases design flexibility and facilitates installation of these units even in high-rise buildings.



Self-diagnosis of VRF CITY MULTI system

For even simpler maintenance, CITY MULTI systems have a self-diagnostic function which is capable of communicating malfunctions on different levels using fault codes. With the special Maintenance Tool software developed by Mitsubishi Electric, the user can connect to any point in the transmission line to acquire all technical operating information interactively.



NEW USB Downloading operating data via USB

Operation data was retrieved from conventional models using the maintenance tool. On the new model, the data can be retrieved
quickly via USB*1. It is unnecessary to carry the personal computer in which the maintenance tool has been installed, reducing field operation time and improving convenience.
Software can be rewritten via USB, while data for up to 4 days and the 5 minutes after an error has occurred can be stored in the the USB memory device*2.

*1 In the case of OC-IC maximum configuration
*2 USB memory devices conforming to USB2.0 can be used.

HVRF System Line

Heat pump systems

HVRF Y Systems

Hydronic unit

HVRF Y System architecture

System Components

Design guide

HYDRONICVRF

HVRF Hydronic Systems

Heat Pump

HYDRONICVRF

R32

Complete system

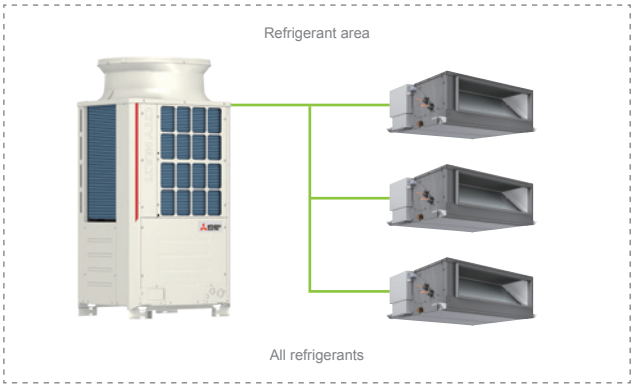
HVRF Y systems are based on a modular concept and a complete solution of Mitsubishi Electric branded products.
All system components: Outdoor Units, Hydronic Units, Indoor Units, Control Systems are native to Mitsubishi Electric and communicate with each other through the “M-Net” communication system.
The regulation of HVRF systems is also Mitsubishi Electric unlike traditional Hydronic systems.

Less refrigerant required

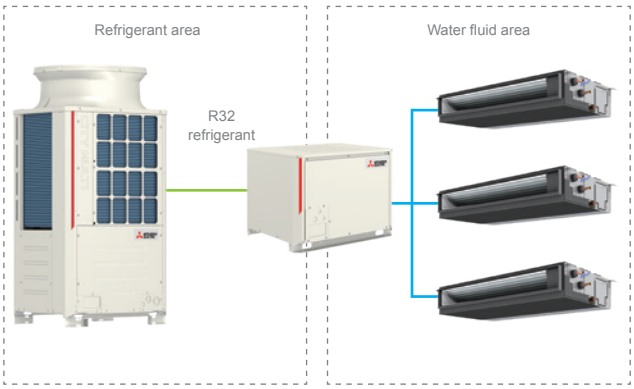
The hydronic unit creates a separation between the area delimited by the refrigerant and the area delimited by the water fluid, limiting the amount of refrigerant that was measured to be around 61%.

LESS REFRIGERANT REQUIRED

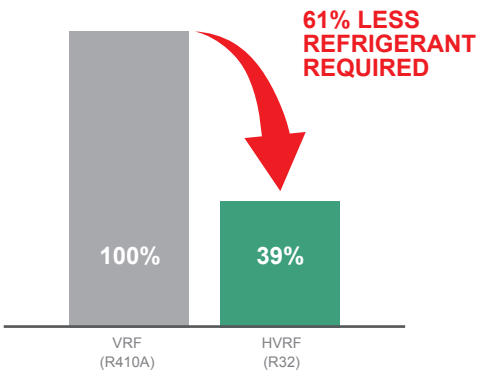
VRF SYSTEMS



HVRF SYSTEMS



LESS REFRIGERANT QUANTITY

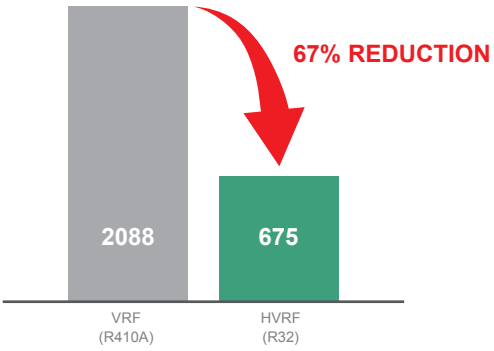


Example carried out with two equivalent VRF and HVRF systems:
Outdoor unit (VRF): 12HP (PUHY-P300YNW-A) x 1, Indoor Units: P20-40 x 19 Outdoor unit (HVRF): 12HP (PUHY-M300YNW-A1) x 1, Indoor Units: W20-40 x 19 Total length of refrigerant piping: 820m (VRF), 60m (HVRF)
Total length from the Outdoor Unit to the Hydronic Unit: 60 m (HVRF) Total length of water pipes: 760m (HVRF)

R32 refrigerant with low environmental impact

Starting from the HVRF Y range, Mitsubishi Electric chooses R32 gas with low GWP (“global warming potential”) 675, approximately 67% less than the 2088 value of R410A gas.
The advantage is in terms of a net reduction in the amount of CO2 equivalent in the environment. Adding the benefits of 61% less refrigerant and 67% less GWP, the reduction amounts to 87% for the CO2 released in the environment.

R32 REFRIGERANT WITH LOW ENVIRONMENTAL



Hydronic unit

HYDRONICVRF

R32

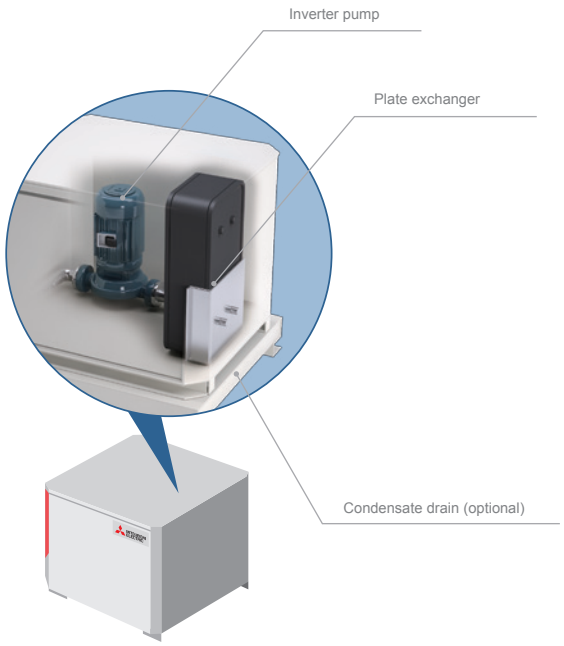
Hydronic unit

The hydronic unit is the fundamental element of the HVRF Y heat pump system, it connects the CITY MULTI outdoor unit to the indoor units via the hydronic system.
The integrated plate exchanger exchanges heat between refrigerant and water.
The integrated pump regulated by an inverter allows the water to reach the indoor units according to the actual cooling and heating needs, allowing efficient operation.
The R32 refrigerant pipes are limited in the section between the Outdoor Unit and the Hydronic Unit, helping to reduce the amount of refrigerant compared to VFR CITY MULTI systems.
The HVRF Y system's hydronic unit can be installed in the building, making the use of antifreeze unnecessary. This reduces energy consumption compared to traditional chillers.

Optimal control

The Hydronic unit automatically calculates the water flow rate required for all indoor units by adapting the flow according to the required load. The pump is controlled with the inverter to determine the amount of water according to the internal load.
The optimal temperature of the supply water is automatically calculated and the corresponding command is communicated to the outdoor unit to define the evaporation and condensation target for the refrigerant gas production.

HYDRONIC UNIT

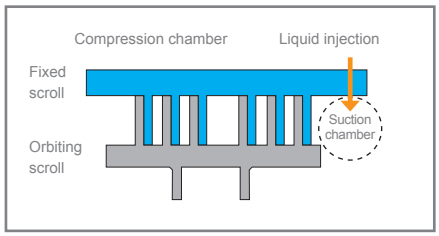


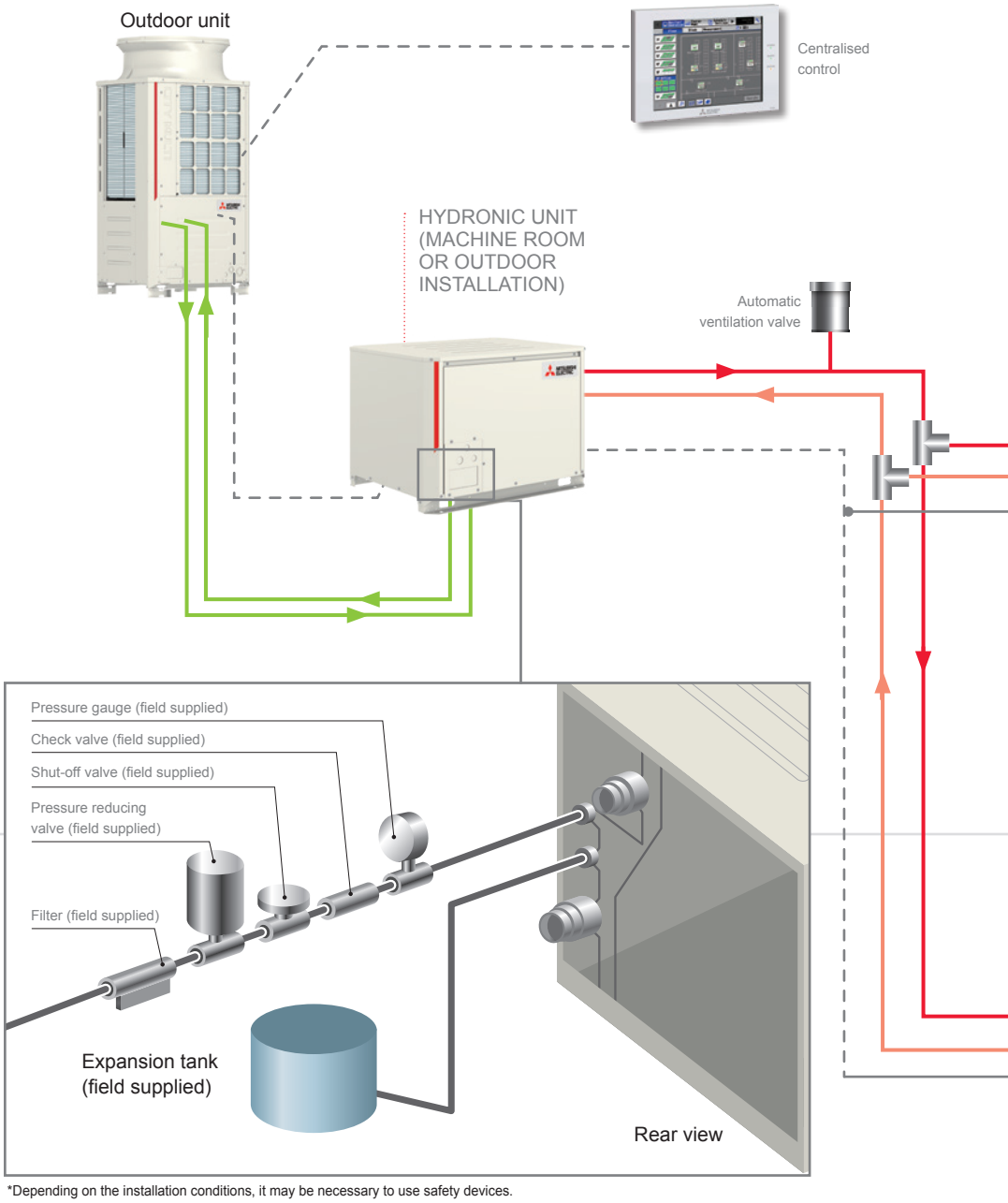
HVRF Y
System architecture

Outdoor unit

Development of the compressor for the adoption of R32 refrigerant

R32 gas has a higher discharge temperature than R410A gas.
To better manage the increase in the discharge temperature, Mitsubishi Electric has redesigned the compressor by equipping it with a liquid injection mechanism in the suction chamber.





*Depending on the installation conditions, it may be necessary to use safety devices.

Refrigerant
Hot water supply
Hot water return
M-NET

Control systems

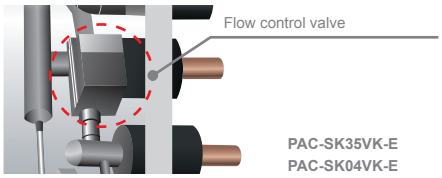
System control through M-NET

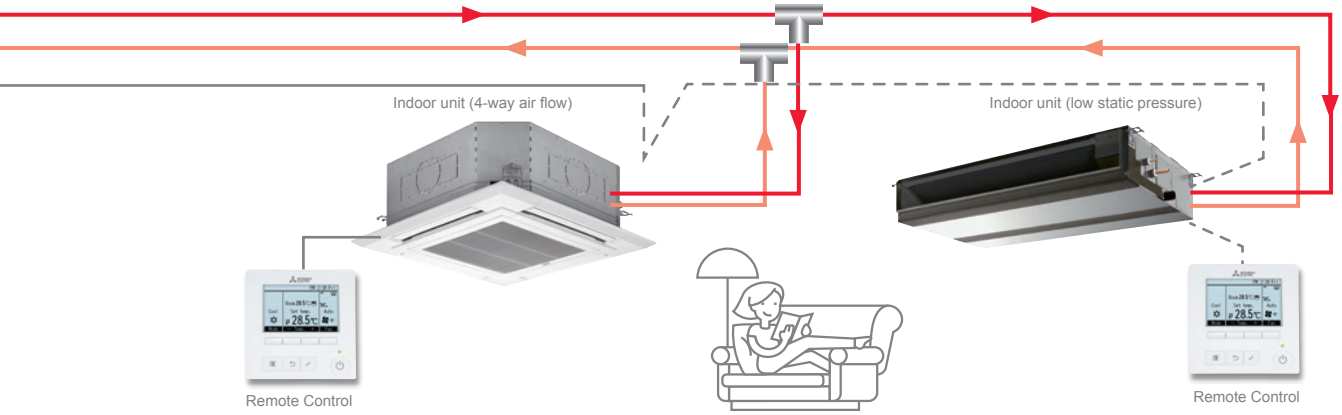
Mitsubishi Electric outdoor unit, indoor units, hydronic unit and individual and centralised control systems communicate through the M-Net communication system for optimal control of the entire system.

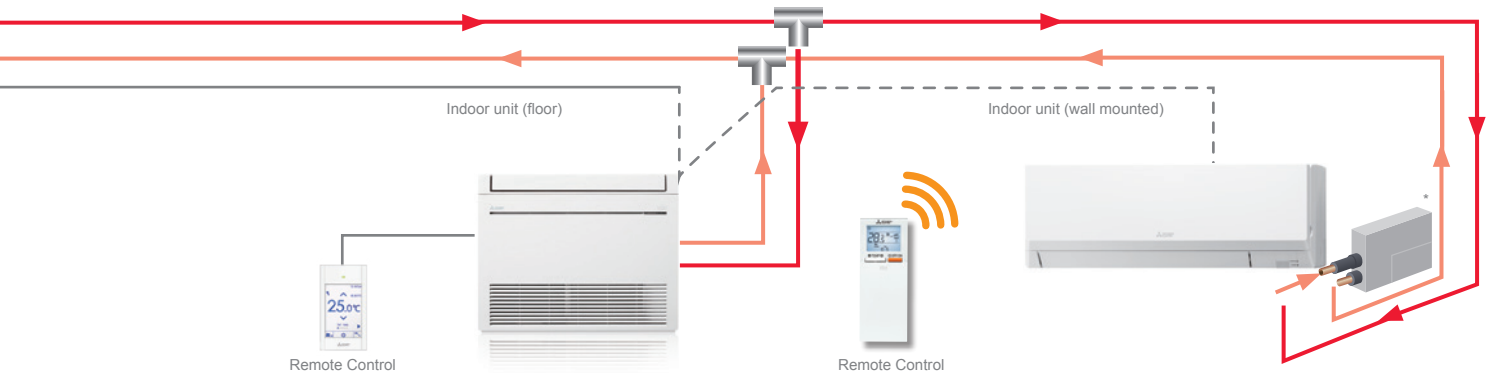
Indoor unit

Optimal control with the flow control valve

HVRF Y system indoor units are fitted with a flow control valve. Based on the internal load of each room, opening the valve automatically allows the correct supply of water to the indoor units serving each room.







Specifications

Y Line

OUTDOOR UNITS - HEAT PUMPS

Technical specifications

MODEL				PUHY-M200YNW-A1(-BS)	PUHY-M250YNW-A1(-BS)	PUHY-M300YNW-A1(-BS)	PUHY-M350YNW-A1(-BS)
HP				8	10	12	14
Power Supply	Tens./Freq./Phases		V/Hz/n°	3-phase 4-wire 380-400-415 V 50/60 Hz			
Cooling	Nominal capacity*1		kW	22,4	28,0	33,5	40
	Power input		kW	5.53	8.38	9.85	12,15
	EER*		kW	4.05	3.34	3.40	3,29
	Temperature operating fields	Indoor BU	°C	15,0~24,0	15,0~24,0	15,0~24,0	15,0~24,0
		Outdoor BS	°C	-5,0~52,0	-5,0~52,0	-5,0~52,0	-5,0~52,0
Heating	Nominal capacity*2		kW	25.0	31.5	37.5	45
	Power input		kW	5.70	8.18	9.66	12,16
	COP*		kW	4.38	3.85	3.88	3,70
	Temperature operating fields	Indoor BU	°C	15,0~27,0	15,0~27,0	15,0~27,0	15,0~27,0
		Outdoor BS	°C	-20,0~15,5	-20,0~15,5	-20,0~15,5	-20,0~15,5
Sound pressure*3			dB(A)	58.0 / 59.0 75.0 / 78.0	60.0 / 61.0 78.0 / 80.0	61.0 / 64.5 80.0 / 83.5	62.0 / 64.0 80.5 / 83.0
Connectable int. units.	Model/Quantity			W10~125,WL10~50/1~26	W10~125, WL10~50/1~32	W10~125, WL10~50/2~39	W10~125, WL10~50/2~45
Ø refrigerant pipe	Liquid/Gas		mm	9,52/22,2	9,52/22,2	9,52/22,2	12,7/28,58
External dimensions **	(HxLxD)		mm	1858 x 920 x 740	1858 x 920 x 740	1858 x 920 x 740	1858 x 1240 x 740
Net weight			kg	222	222	223	270
Refr. charge R32/CO_2 Eq			kg/Tons	6,5/4,39	6,5/4,39	6,5/4,39	9,8/6,62

*1 Rated cooling conditions: Indoor 27°C BS / 19°C BU. Outdoor 35°C BS. Pipe length 7.5 m, level difference 0 m.
*2 Rated heating conditions: Indoor 20°C BS. External 7°C BS / 6°C BU. Pipe length 7.5 m, level difference 0 m.
*3 Values measured in anechoic chamber. Cooling / Heating
*4 GWP of HFC R32 equal to 675 saccording to regulation 517 / 2014

* The COP and EER coefficients are system performances and as such do not refer just to the outdoor unit but include both the water production coefficients (Outdoor Unit + Hydronic Unit) and the water distribution coefficients (Hydronic Unit + Indoor units).
** Without removable support feet, A = 1798 mm

R32 | ErP 2021 COMPLIANT

Technical specifications

MODEL				PUHY-M400YNW-A1(-BS)	PUHY-M450YNW-A1(-BS)	PUHY-M500YNW-A1(-BS)
HP				16	18	20
Power Supply	Tens./Freq./Phases		V/Hz/n°	3-phase 4-wire 380-400-415 V 50/60 Hz		
Cooling	Nominal capacity*1		kW	45	50	56
	Power input		kW	14,65	14,70	17,72
	EER*		kW	3,07	3,40	3,16
	Temperature operating fields	Indoor BU	°C	15,0~24,0	15,0~24,0	15,0~24,0
		Outdoor BS	°C	-5,0~52,0	-5,0~52,0	-5,0~52,0
Heating	Nominal capacity*2		kW	50	56	63
	Power input		kW	13,69	16	17.07
	COP*		kW	3,65	3,50	3,69
	Temperature operating fields	Indoor BU	°C	15,0~27,0	15,0~27,0	15,0~27,0
		Outdoor BS	°C	-20,0~15,5	-20,0~15,5	-20,0~15,5
Sound pressure*3			dB(A)	65.0 /67.0 82.5 / 86.0	65.5 / 69.5 83.5 / 88.5	63.5 / 66.5 82 / 85.5
Connectable int. units.	Model/Quantity			W10~125,WL10~50/2~50	W10~125, WL10~50/2~50	W10~125, WL10~50/2~50
Ø refrigerant pipe	Liquid/Gas		mm	12,7/28,58	15,88/28,58	15,88/28,58
External dimensions **	(HxLxD)		mm	1858 x 1240 x 740	1858 x 1240 x 740	1858 x 1750 x 740
Net weight			kg	273	290	329
Refr. charge R32/CO_2 Eq			kg/Tons	9,8/6,62	10,8/7,29	10,8/7,29

*1 Rated cooling conditions: Indoor 27°C BS / 19°C BU. Outdoor 35°C BS. Pipe length 7.5 m, level difference 0 m.
*2 Rated heating conditions: Indoor 20°C BS. External 7°C BS / 6°C BU. Pipe length 7.5 m, level difference 0 m.
*3 Values measured in anechoic chamber. Cooling / Heating
*4 GWP of HFC R32 equal to 675 saccording to regulation 517 / 2014

* The COP and EER coefficients are system performances and as such do not refer just to the outdoor unit but include both the water production coefficients (Outdoor Unit + Hydronic Unit) and the water distribution coefficients (Hydronic Unit + Indoor units).
** Without removable support feet, A = 1798 mm

Hydronic unit

R32

Technical specifications

MODEL			CMH-WM250V-A		CMH-WM350V-A		CMH-WM500V-A	
Power source	Phases/ Tens.		1-phase 220-230-240 V					
	Frequence		50 Hz					
Power input	Cooling	kW	0.74		0.90		1.06	
	Heating	kW	0.74		0.90		1.06	
Sound pressure level (measured in anechoice room)		dB <A>	60		60		60	
Applicable temperature range of installation site		°C (D.B.)	-5~52		-5~52		-5~52	
Connectable outdoor/heat source unit capacity			M200~250		M300~350		M400~500	
External dimension	HxWxD	mm	660 x 920 x 740		660 x 920 x 740		660 x 920 x 740	
Refrigerant piping diameter	To outdoor/ heat source unit		Connectable outdoor/heat source unit capacity		Connectable outdoor/heat source unit capacity		Connectable outdoor/heat source unit capacity	
			M200	M250	M300	M350	M400	M450/500
	Liquid pipe	mm O.D.	9.52	9.52	9.52	12.7	12.7	15.88
	Gas pipe	mm O.D.	22.2	22.2	22.2	28.58	28.58	28.58
Water piping diameter	To Indoor unit							
	Inlet Pipe	mm I.D.	40 (1-1/2) housing joint		40 (1-1/2) housing joint		50 (2) housing joint	
	Outlet Pipe	mm I.D.	40 (1-1/2) housing joint		40 (1-1/2) housing joint		50 (2) housing joint	
Net weight		kg	112		117		143	

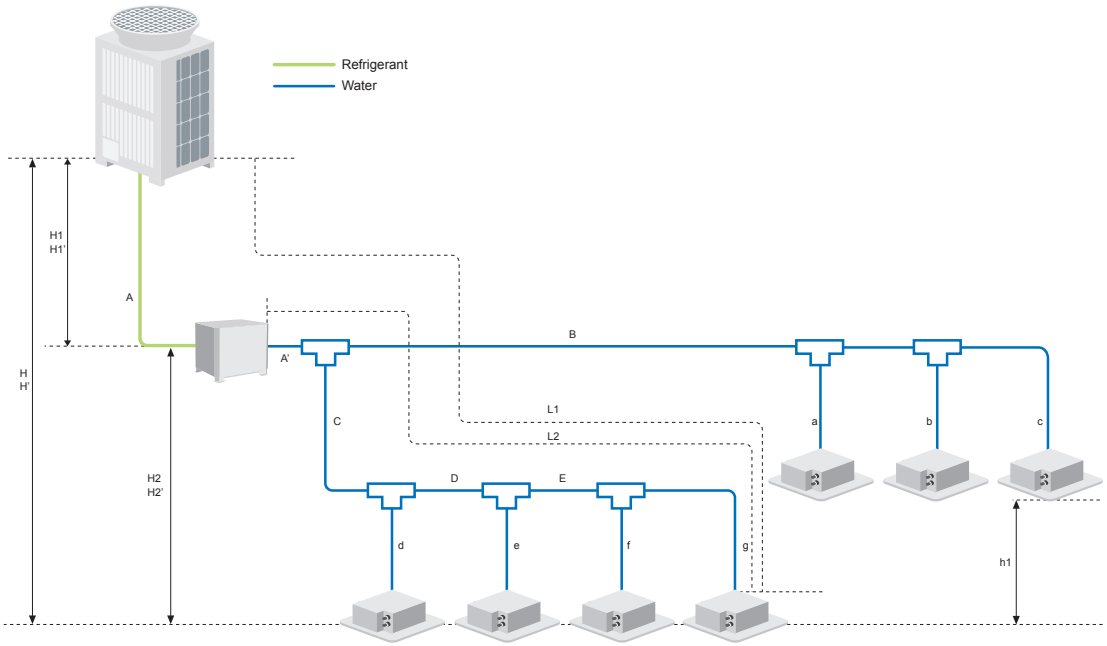
*The equipment is for R32 refrigerant.
*Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors.
(For use in quiet environments with low background noise, position the Hydro unit at least 5 m away from any indoor units.)
*Please install the Hydro unit in a place where noise will not be an issue.
*Please attach an expansion vessel (field supply).
*Use copper, plastic, steel, or stainless steel pipes for the water circuit.
Furthermore, when using copper pipe-work use a non-oxidative brazing method.
Oxidation of the pipe-work will reduce the pump life.
*When blazing the pipes, be sure to blaze, after covering a wet cloth to the insulation pipes of the units in order to prevent it from burning and shrinking by heat.
*Please install an air purge valve where air will gather in the water circuit.
*Please install a pressure reducing valve and a strainer on the water supply to the Hydro unit.
*Please refer to the databook or the installation manual for the specified water quality.
*Please always make water circulate or pull out the circulation water complentely when not using it.
(Please do not use it as a drinking water.)
*Please do not use ground water and well water.
*When installing the Hydro unit in an environment which may drop below 0 °C, please add antifreeze to the circulating water.(Refer to the data-book and the installation manual).
*R32 is flammable, and certain restrictions apply to the installation of units.
When installing new units, moving the existing units, or changing the layout of the room, ensure that installation restrictions are observed.
For detail, refer to the section in the Databook on installation restrictions.
*Drain or condensation water will be discharged from hydro units during test run.
If this will be a problem, install a separately sold drain pan.
*Do not install the unit where it could be salt-damaged.

Design guide

HVRF Hydronic Heat Pump Systems

Item	Circuit section	Maximum length (m)
Effective length between outdoor unit and hydronic unit		
(Refrigerant piping)	A	110
Effective length between Outdoor Unit and furthest indoor unit (L1)	A+A'+C+D+E+g/A+B+c	165
Effective length between Hydronic Unit and furthest indoor unit (L2)	A'+C+D+E+g/A'+B+c	60
Difference in height between outdoor unit and indoor unit		
(Outdoor unit above/below the indoor unit)	H/H'	90/60
Difference in height between outdoor unit and hydronic unit		
(Outdoor unit above/below the hydronic unit)	H1/H1'	50[1] / 40[2]
Difference in height between hydronic unit and indoor unit		
(Hydronic unit above/below the indoor unit	H2/ H2'	50/40
Difference in height between indoor units	h1	30

*1 90 m is available depending on the model and installation conditions. For more detailed information, please contact your local distributor.
*2 60 m is available depending on the model and installation conditions. For more detailed information, please contact your local distributor.



HVRF Systems Line

Heat recovery systems

HVRF R2/WR2 systems

Hydronic Branch Controller (HBC)

HVRF R2/WR2 System architecture

System Components

Design guide

HYDRONICVRF

HVRF R2/WR2 systems

Heat Recovery

HYDRONICVRF

R410A

Hydronic CITY MULTI

Hydronic CITY MULTI is the first and only system in the world derived from the R2 system to guarantee a high degree of air comfort with the advantages of direct expansion with variable refrigerant flow.

Why Hydronic VRF

Hydronic CITY MULTI is a heat recovery system (simultaneous heating and cooling) which becomes part of the CITY MULTI family and which adopts water for the first time to distribute the heating and cooling power in the room.

Hydronic BC Distributor

Simultaneous cooling/heating with heat recovery.
The new Hydronic CITY MULTI is the first and only two-pipe system in the world for simultaneous cooling and heating with heat recovery that combines the advantages of the direct expansion system with those of the traditional hydronic system. The technology is based on Mitsubishi Electric's CITY MULTI R2 heat recovery system and consists of an R2 (or WR2) outdoor unit of the CITY MULTI series, the innovative Hydronic BC (HBC) distributor which allows the use of refrigerant gas and water as heat carrier fluids, as well as indoor units specially equipped with a.water coil.

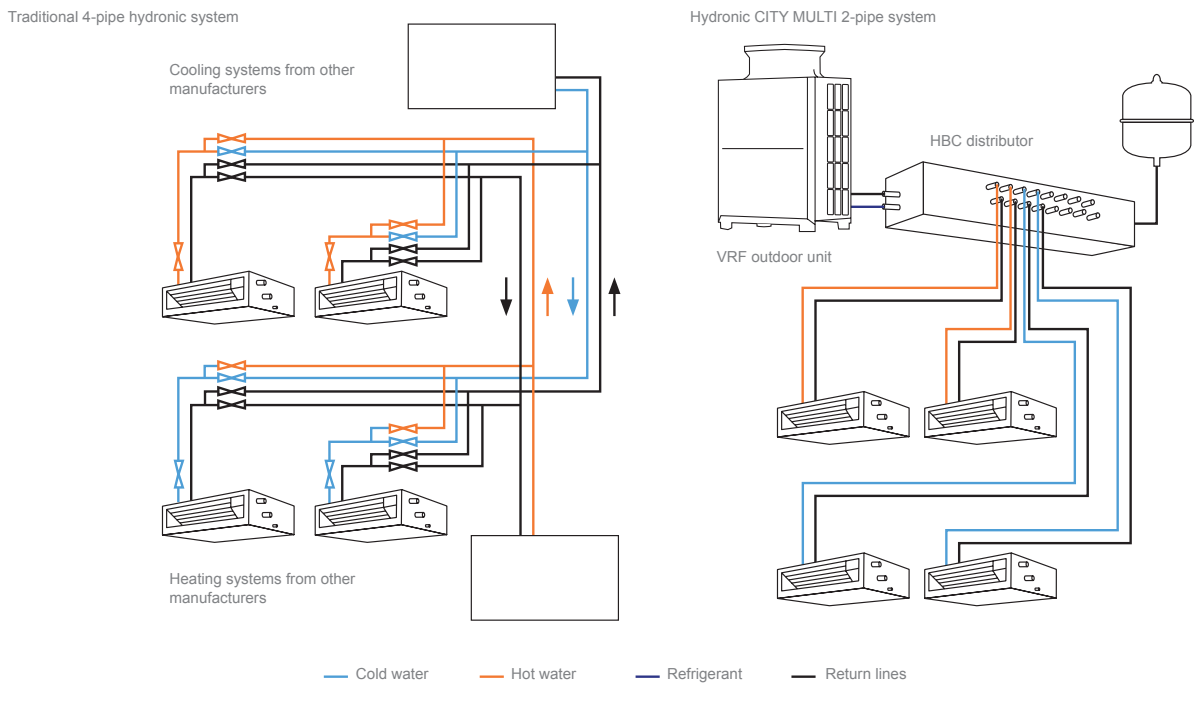
Lower concentration of R410 GAS

The use of hydronic distribution allows the limits linked to the stringent legislation
(UNI EN 378) on the concentration of refrigerant gases to be overcome: this is possible thanks to the fact that the only portion of the system that contains refrigerant gas is the one that connects the outdoor unit to the Hydronic BC Controller distributor. In this way it is possible to obtain up to 45% reduction of the refrigerant charge compared to a traditional VRF system.

2-Pipe systems

Compared to a traditional 4-pipe hydronic system, the design and installation of the 2-pipe system is very flexible and simplified.
For example, the Hydronic CITY MULTI system does not need additional pumps, tanks or switching valves. The significantly smaller number of connection points in the two-pipe system limits its potential for leakage, makes it safer and reduces the need for maintenance.

COMPARISON OF THE CONNECTION POINTS TO BE MADE IN THE SYSTEM



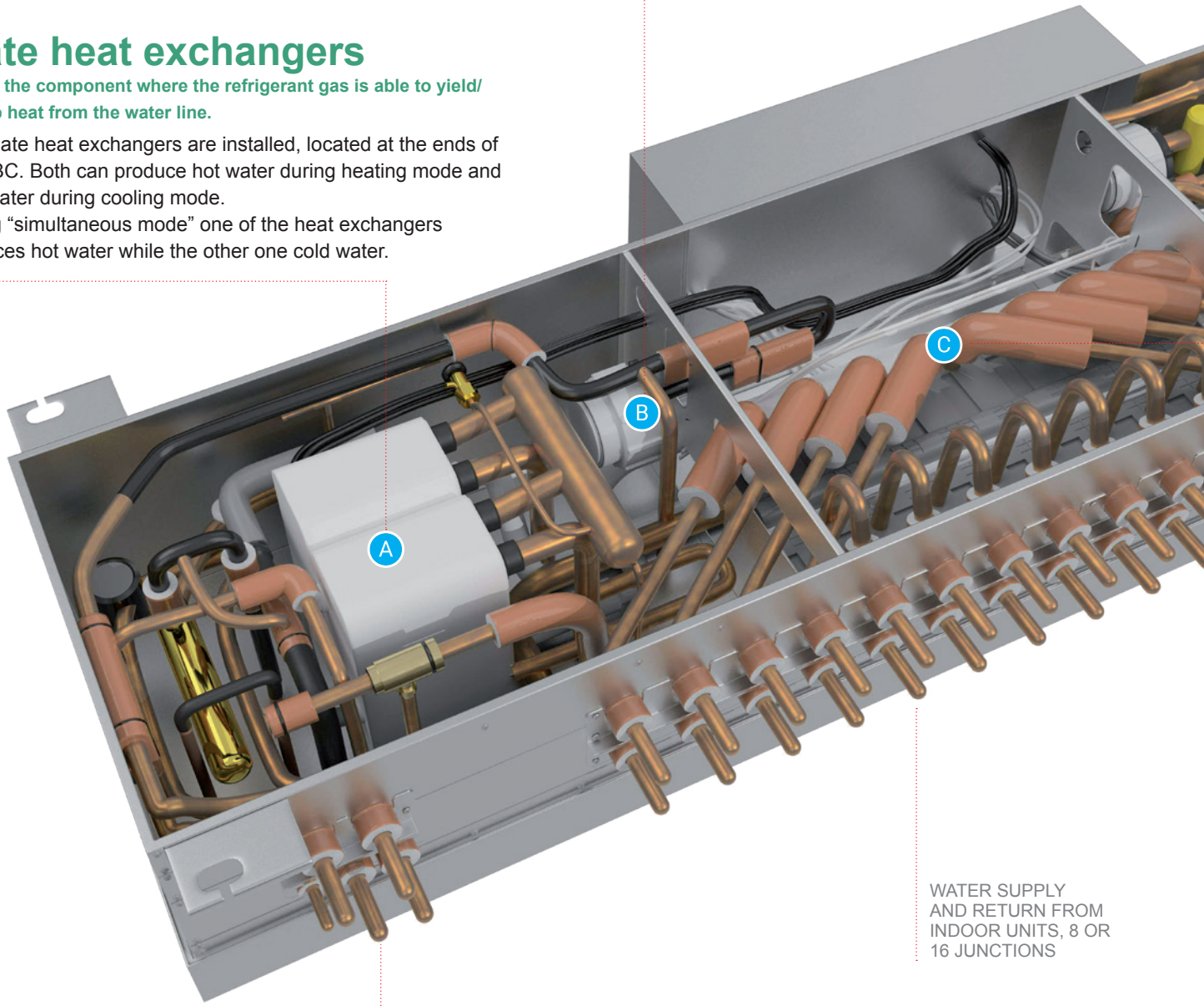
Hydronic Branch Controller (HBC)

The heart of Hybrid VRF

Plate heat exchangers

This is the component where the refrigerant gas is able to yield/ absorb heat from the water line.

Two plate heat exchangers are installed, located at the ends of the HBC. Both can produce hot water during heating mode and cold water during cooling mode.
During “simultaneous mode” one of the heat exchangers produces hot water while the other one cold water.



WATER SUPPLY AND RETURN FROM INDOOR UNITS, 8 OR 16 JUNCTIONS

REFRIGERANT PIPES TO OUTDOOR UNIT, EXPANTION VESSEL (FIELD SUPPLIED) AND WATER FEEDING LINE (FIELD SUPPLIED)

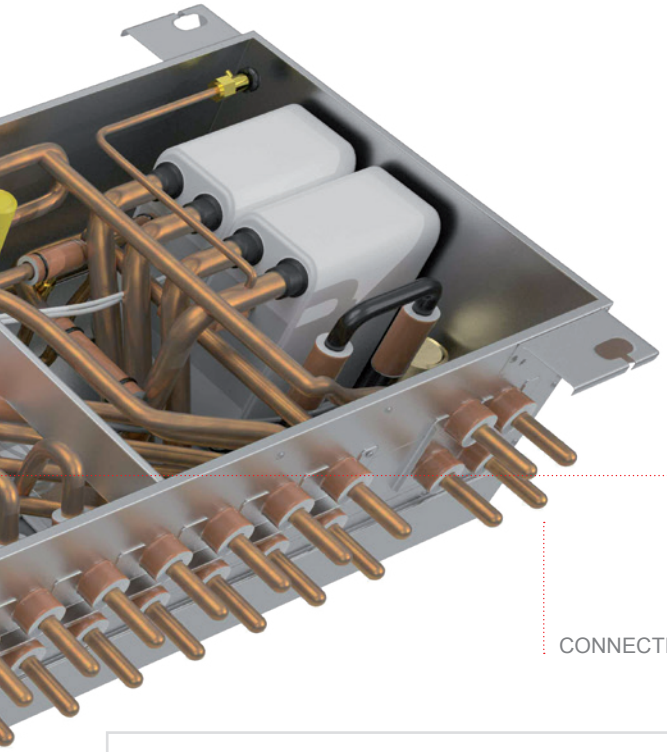
HYDRONICVRF

R410A

Pumps

Both plate heat exchangers are equipped with inverter DC pumps.

The pumps allow circulation of water between HBC and the indoor units. The flow rate is controlled by a valves block.



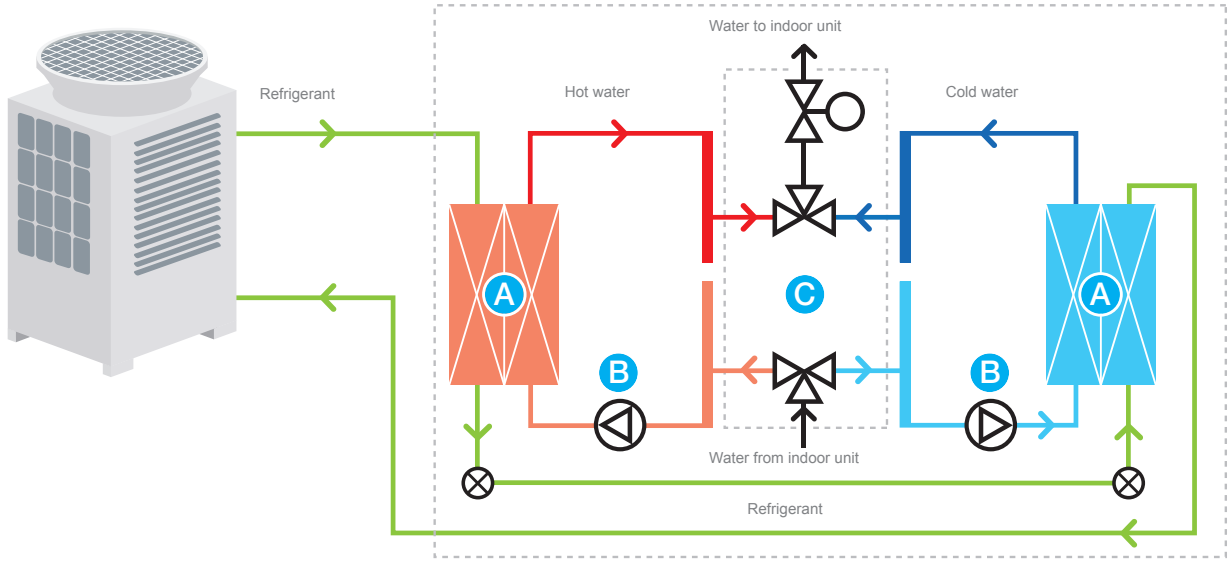
Valves Block

A set of valves is connected to supply and return pipes of each indoor unit.

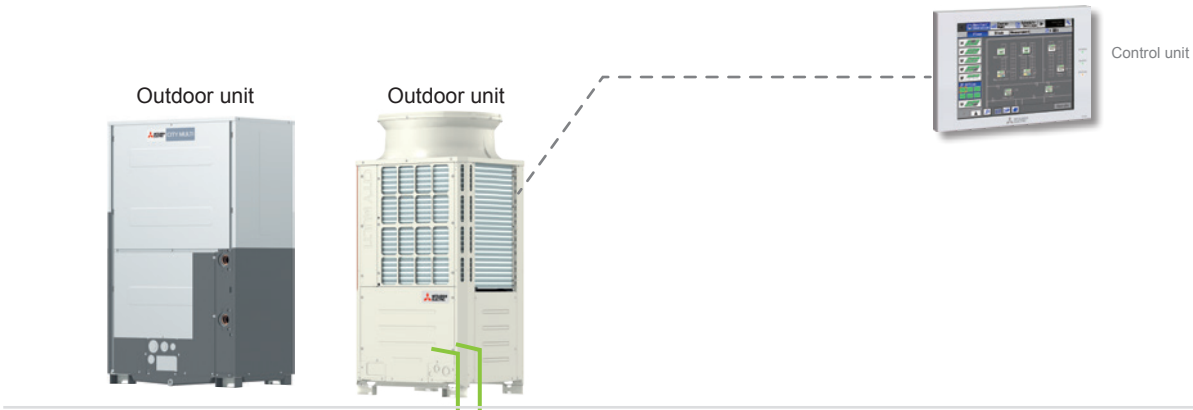
This valves block has two tasks: firstly it selects the hot or cold water header and then it regulates the flow fed to the indoor units based on the thermal power required.

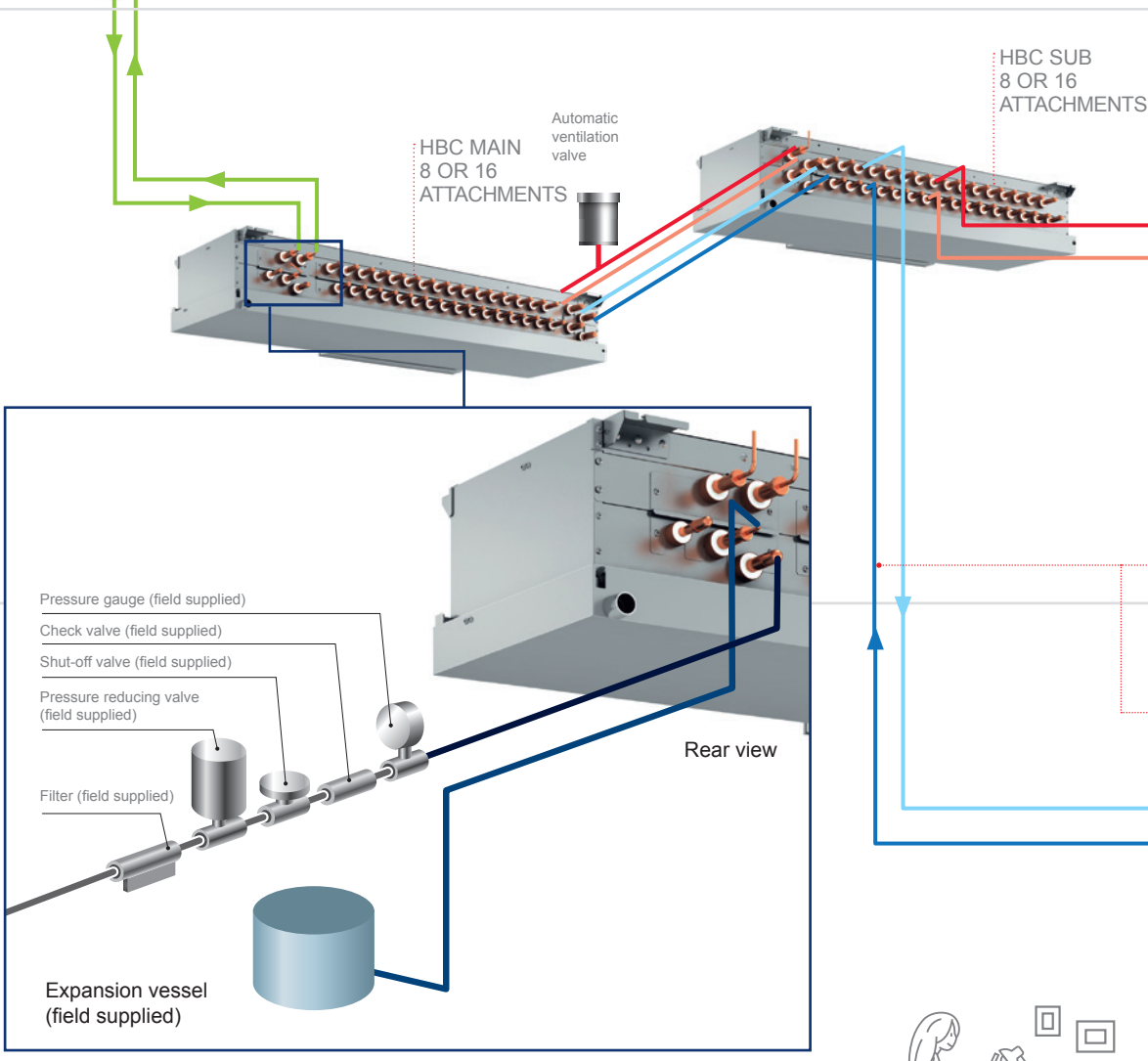
CONNECTION TO SUB HBC

HBC SIMULTANEOUS HEATING/COOLING MODE



HVRF R2/WR2
System architecture

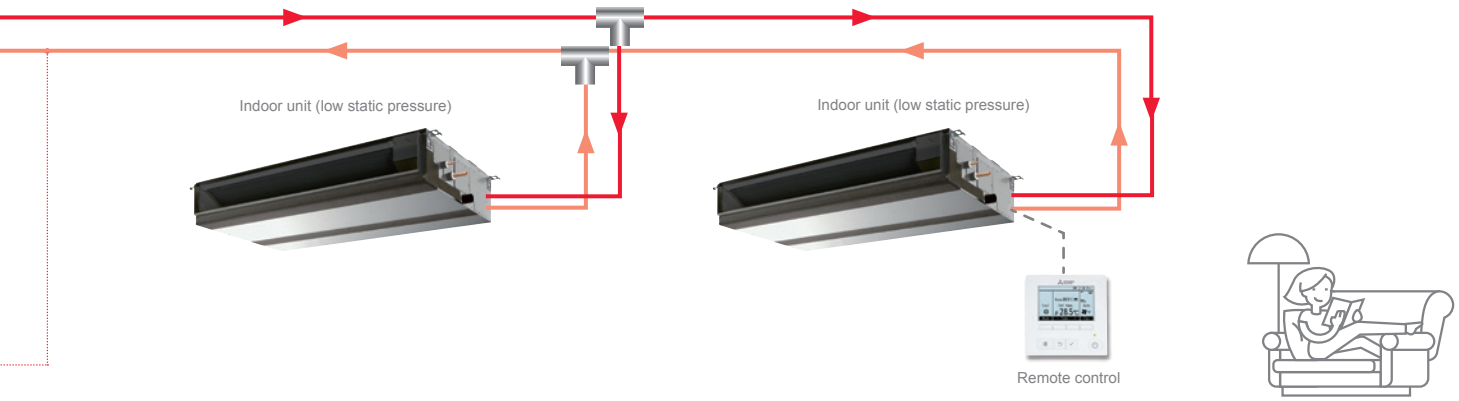




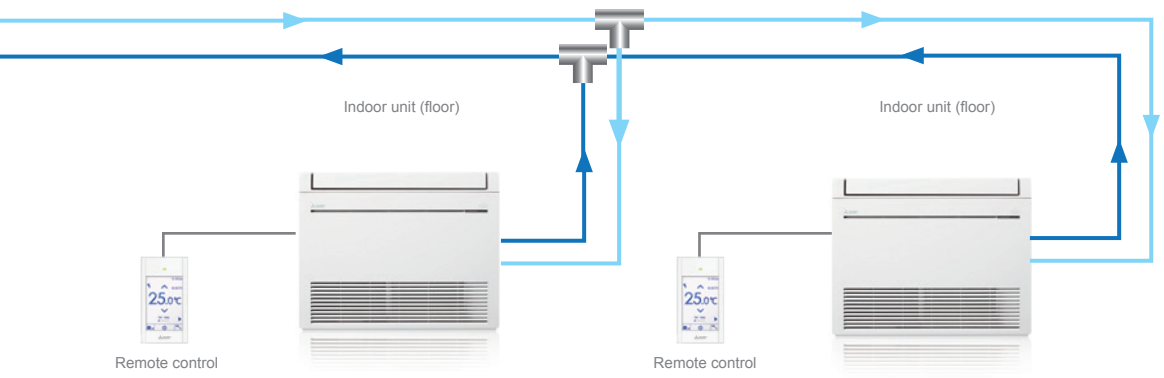
Refrigerant
Hot water supply
Hot water return
Cold water supply
Cold water return

PURY/PQRY Outdoor unit	FIRST HBC MAIN	FIRST HBC SUB	SECOND HBC MAIN	SECOND HBC SUB
P200	•	•*	X	X
P250	•	•*	X	X
P300	•	•*	•*	•*
P350	•	•*	•*	•*
P400	•	•*	•	•*
P450	•	•*	•	•*
P500	•	•*	•	•*

* Optional



The water pipes (20 mm) provide heating and cooling simultaneously



Specifications

R2 Line

HEAT RECOVERY OUTDOOR UNIT

R410A | ErP 2021 COMPLIANT | EUROVENT CERTIFIED PERFORMANCE

Technical specifications

MODEL				PURY-P200YNW-A2 (-BS)	PURY-P250YNW-A2(-BS)	PURY-P300YNW-A2 (-BS)
HP				8	10	12
Power Supply	Tens./Freq./Phases		V/Hz/n°	3-phase 4-wire 380-400-415 V 50/60 Hz		
Cooling	Nominal capacity*1		kW	22,4	28,0	33,5
	Power input		kW	6,54	9,92	13,13
	EER*		kW	3,42	2,82	2,55
	Temperature operating fields	Indoor WB	°C	15.0~24.0°C (59~75°F)	15.0~24.0°C (59~75°F)	15.0~24.0°C (59~75°F)
		Outdoor DB	°C	-5.0~52.0°C (23~126°F)	-5.0~52.0°C (23~126°F)	-5.0~52.0°C (23~126°F)
Heating	Nominal capacity*2		kW	25,0	31,5	33,5
	Power input		kW	6,49	10,06	11,35
	COP*		kW	3,85	3,13	2,95
	Temperature operating fields	Indoor DB	°C	15.0~27.0°C (59~81°F)	15.0~27.0°C (59~81°F)	15.0~27.0°C (59~81°F)
		Outdoor WB	°C	-20.0~15.5°C (-4~60°F)	-20.0~15.5°C (-4~60°F)	-20.0~15.5°C (-4~60°F)
Sound pressure*3			dB(A)	59,0/59,0 (76/76)	60,5/64,0 (78/83)	61,0/67,0 (80/86)
Connectable int. units.	Model/Quantity			W/WP/WL 10~125/1~30	W/WP/WL 10~125/1~37	W/WP/WL 10~125/2~45
Ø refrigerant pipe	Liquid/Gas		mm	15,88/19,05	19,05/22,2	19,05/22,2
External dimensions	(HxLxD)		mm	1,858 (1,798) x 920 x 740	1,858 (1,798) x 920 x 740	1,858 (1,798) x 920 x 740
Net weight			kg	214	223	225
Refr. charge R410A/CO_2 Eq			kg/Tons	5,2/10,86	5,2/10,86	5,2/10,86

*1 Rated cooling conditions: Indoor 27°C BS / 19°C BU. Outdoor 35°C BS. Pipe length 7.5 m, level difference 0 m.
*2 Rated heating conditions: Indoor 20°C BS. External 7°C BS / 6°C BU. Pipe length 7.5 m, level difference 0 m.
*3 Values measured in anechoic chamber. Cooling / Heating
*4 GWP of HFC R410A equal to 2088 according to regulation 517 / 2014

* The COP and EER coefficients are system performances and as such do not refer just to the outdoor unit but include both the water production coefficients (Outdoor Unit + Hydronic Unit) and the water distribution coefficients (Hydronic Unit + Indoor units).

Technical specifications

MODEL				PURY-P350YNW-A2 (-BS)	PURY-P400YNW-A2 (-BS)	PURY-P450YNW-A2 (-BS)	PURY-P500YNW-A2 (-BS)
HP				14	16	18	20
Power Supply	Tens./Freq./Phases		V/Hz/n°	3-phase 4-wire 380-400-415 V 50/60 Hz			
Cooling	Nominal capacity*1		kW	40,0	45	50,0	56,0
	Power input		kW	16,26	16,65	17,92	24,03
	EER*		kW	2,46	2,70	2,79	2,33
	Temperature operating fields	Indoor BU	°C	15.0~24.0°C (59~75°F)	15.0~24.0°C (59~75°F)	15.0~24.0°C (59~75°F)	15.0~24.0°C (59~75°F)
		Outdoor BS	°C	-5.0~52.0°C (23~126°F)	-5.0~52.0°C (23~126°F)	-5.0~52.0°C (23~126°F)	-5.0~52.0°C (23~126°F)
Heating	Nominal capacity*2		kW	45,0	50,0	56,0	63,0
	Power input		kW	13,88	14,88	17,39	19,09
	COP*		kW	3,24	3,36	3,22	3,30
	Temperature operating fields	Indoor BU	°C	15.0~27.0°C (59~81°F)	15.0~27.0°C (59~81°F)	15.0~27.0°C (59~81°F)	15.0~27.0°C (59~81°F)
		Outdoor BS	°C	-20.0~15.5°C (-4~60°F)	-20.0~15.5°C (-4~60°F)	-20.0~15.5°C (-4~60°F)	-20.0~15.5°C (-4~60°F)
Sound pressure*3			dB(A)	62,5/64,0(81/83)	65,0/69,0 (83/88)	65,5/70,0 (83/89)	63,5/64,5(82/84)
Connectable int. units.	Model/Quantity			W/WP/WL 10~125/2~50	W/WP/WL 10~125/2~50	W/WP/WL 10~125/2~50	W/WP/WL 10~125/2~50
Ø refrigerant pipe	Liquid/Gas		mm	19,05/28,58	22,2/28,58	22,2/28,58	22,2/28,58
External dimensions	(HxLxD)		mm	1,858 (1,798) x 1240 x 740	1,858 (1,798) x 1240 x 740	1,858 (1,798) x 1240 x 740	1,858 (1,798) x 1750 x 740
Net weight			kg	269	269	289	335
Refr. charge R410A/CO_2 Eq			kg/Tons	8/16,70	8/16,70	10,8/22,55	10,8/22,55

*1 Rated cooling conditions: Indoor 27°C BS / 19°C BU. Outdoor 35°C BS. Pipe length 7.5 m, level difference 0 m.
*2 Rated heating conditions: Indoor 20°C BS. External 7°C BS / 6°C BU. Pipe length 7.5 m, level difference 0 m.
*3 Values measured in anechoic chamber. Cooling / Heating
*4 GWP of HFC R410A equal to 2088 according to regulation 517 / 2014

* The COP and EER coefficients are system performances and as such do not refer just to the outdoor unit but include both the water production coefficients (Outdoor Unit + Hydronic Unit) and the water distribution coefficients (Hydronic Unit + Indoor units).

WR2 Line

WATER CONDENSED HEAT RECOVERY OUTDOOR UNIT

R410A | ErP 2021 COMPLIANT | EUROVENT CERTIFIED PERFORMANCE

Technical specifications

MODEL				PQRY-P200YLM-A1	PQRY-P250YLM-A1	PQRY-P300YLM-A1	PQRY-P300YLM-A1 X2 HBC
HP				8	10	12	12
Power Supply	Tens/Freq./Phases		V/Hz/n°	3 phase 380-400-415V 50Hz			
Cooling	Nominal capacity*1		kW	22,4	28,0	33,5	33,5
	Power input		kW	3,97	5,44	7,55	6,71
	EER*		kW	5,64	5,14	4,43	4,99
	Temperature operating fields	Indoor BU	°C	15,0~24,0	15,0~24,0	15,0~24,0	15,0~24,0
		Outdoor BS	°C	10,0~45,0	10,0~45,0	10,0~45,0	10,0~45,0
Heating	Nominal capacity*2		kW	25,0	31,5	37,5	37,5
	Power input		kW	4,04	5,41	7,13	6,79
	COP*		kW	6,18	5,82	5,25	5,52
	Temperature operating fields	Indoor BS	°C	15,0~27,0	15,0~27,0	15,0~27,0	15,0~27,0
		Outdoor BU	°C	10,0~45,0	10,0~45,0	10,0~45,0	10,0~45,0
Sound pressure*3			dB(A)	46 (60)	48 (62)	54(68)	54(68)
Connectable int. units.				50~150% of outdoor unit capacity	50~150% of outdoor unit capacity	50~150% of outdoor unit capacity	50~150% of outdoor unit capacity
	Connectable int. units			1~30	1~37	3~45	2~45
Ø refrigerant pipe	Liquid/Gas		mm	15,88/19,05	19,05/22,2	19,05/22,2	19,05/22,2
Water circuit	Norm flow rate		m^3/h	5,76	5,76	5,76	5,76
	Water flow rate range		m^3/h	3,0-7,2	3,0-7,2	3,0-7,2	3,0-7,2
	Pressure drop		kPa	24	24	24	24
	Heat exch. volume		l	5	5	5	5
External dimensions (HxLxD)			mm	1100 x 880 x 550	1100 x 880 x 550	1100 x 880 x 550	1100 x 880 x 550
Net weight			kg	173	173	172	173
Refr. charge R410A*2/CO_2 Eq			kg/Tons	5/10,44	5/10,44	5/10,44	5/10,44

*1 Rated cooling conditions: Indoor 27°C BS / 19°C BU. Outdoor 35°C BS. Pipe length 7.5 m, level difference 0 m.
*2 Rated heating conditions: Indoor 20°C BS. External 7°C BS / 6°C BU. Pipe length 7.5 m, level difference 0 m.
*3 Values measured in anechoic chamber. Cooling / Heating
*4 GWP of HFC R410A equal to 2088 according to regulation 517 / 2014

* The COP and EER coefficients are system performances and as such do not refer just to the outdoor unit but include both the water production coefficients (Outdoor Unit + Hydronic Unit) and the water distribution coefficients (Hydronic Unit + Indoor units).

** Without removable support feet, A = 1798 mm

Technical specifications

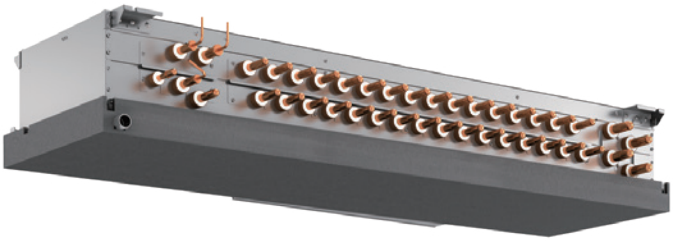
MODEL				PQRY-P350YLM-A1	PQRY-P350YLM-A1 X2 HBC	PQRY-P400YLM-A1	PQRY-P450YLM-A1	PQRY-P500YLM-A1
HP				14	14	16	18	20
Power Supply	Tens/Freq./Phases		V/Hz/n°	3 fasi 380-400-415V 50Hz				
Cooling	Nominal capacity*1		kW	40,0	40,0	45,0	50,0	56,0
	Power input		kW	9,98	8,72	10,05	12,05	14,58
	EER*		kW	4,00	4,58	4,47	4,14	3,84
	Temperature operating fields	Indoor BU	°C	15,0~24,0	15,0~24,0	15,0~24,0	15,0~24,0	15,0~24,0
		Outdoor BS	°C	10,0~45,0	10,0~45,0	10,0~45,0	10,0~45,0	10,0~45,0
Heating	Nominal capacity*2		kW	45,0	45,0	50,0	56,0	63,0
	Power input		kW	8,87	8,25	9,45	11,11	13,07
	COP*		kW	5,07	5,45	5,29	5,04	4,82
	Temperature operating fields	Indoor BS	°C	15,0~27,0	15,0~27,0	15,0~27,0	15,0~27,0	15,0~27,0
		Outdoor BU	°C	10,0~45,0	10,0~45,0	10,0~45,0	10,0~45,0	10,0~45,0
Sound pressure*3			dB(A)	52(66)	52(66)	52(66)	54(70)	54(70,5)
Connectable int. units.				50~150% of outdoor unit capacity	50~150% of outdoor unit capacity	50~150% of outdoor unit capacity	50~150% of outdoor unit capacity	50~150% of outdoor unit capacity
	Connectable int. units			2~50	2~50	2~50	2~50	5~50
Ø refrigerant pipe	Liquid/Gas		mm	22,2/28,58	22,2/28,58	22,2/28,58	22,2/28,58	22,2/28,58
Water circuit	Norm flow rate		m^3/h	7,20	7,20	7,20	7,20	7,20
	Water flow rate range		m^3/h	4,5-11,6	4,5-11,6	4,5-11,6	4,5-11,6	4,5-11,6
	Pressure drop		kPa	44	44	44	44	44
	Heat exch. volume		l	5	5	5	5	5
External dimensions (HxLxD)			mm	1450 x 880 x 550	1450 x 880 x 550	1450 x 880 x 550	1450 x 880 x 550	1450 x 880 x 550
Net weight			kg	217	217	217	217	217
Refr. charge R410A*4/CO_2 Eq			kg/Tons	6/12,53	6/12,53	6/12,53	6/12,53	6/12,53

*1 Rated cooling conditions: Indoor 27°C BS / 19°C BU. Outdoor 35°C BS. Pipe length 7.5 m, level difference 0 m.
*2 Rated heating conditions: Indoor 20°C BS. External 7°C BS / 6°C BU. Pipe length 7.5 m, level difference 0 m.
*3 Values measured in anechoic chamber. Cooling / Heating
*4 GWP of HFC R410A equal to 2088 according to regulation 517 / 2014

* The COP and EER coefficients are system performances and as such do not refer just to the outdoor unit but include both the water production coefficients (Outdoor Unit + Hydronic Unit) and the water distribution coefficients (Hydronic Unit + Indoor units).

** Without removable support feet, A = 1798 mm

Main HBC Controller



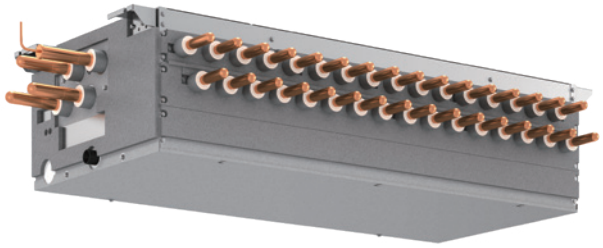
R410A

Technical specifications

MODEL			CMB-WM108V-AA	CMB-WM1016V-AA
Number of branches			8 (22mm OD pipe)	16 (22mm OD pipe)
Net weight		kg	86	98
Weight with water		kg	96	111
Dimensions	Width	mm	1520	1800
	Depth	mm	630	630
	Height	mm	300	300
Power supply			220-240V, 50Hz	220-240V, 50Hz
Phase			1	1
Power input		kW	0.46	0.46
Current		A	2.83	2.83

CMB-WM-V-AA e CMB-WM-V-BB units are to be used exclusively with outdoor units PURY-P200-500YNW-A1(2), PQRY-P200-500YLM-A1 and HVRF indoor units (W/WL/WP)
One HBC Main can be used with PURY-P200-350YNW-A, PQRY-P200-350YLM-A.
Two HBC Main can be used with PURY-P300-350YNW-A, PQRY-P300-350YLM-A.
Two HBC Main must be used withPURY-P400-500YNW-A, PQRY-P400-500YLM-A.

Sub HBC Controller



R410A

Technical specifications

MODEL			CMB-WM108V-BB	CMB-WM1016V-BB
Number of branches			8 (22mm OD pipe)	16 (22mm OD pipe)
Net weight		kg	40	53
Weight with water		kg	45	62
Dimensions	Width	mm	930	1210
	Depth	mm	630	630
	Height	mm	310	310
Power supply			220-240V 50Hz	220-240V, 50Hz
Phase			1	1
Power input		kW	0.01	0.01
Current		A	0.14	0.14

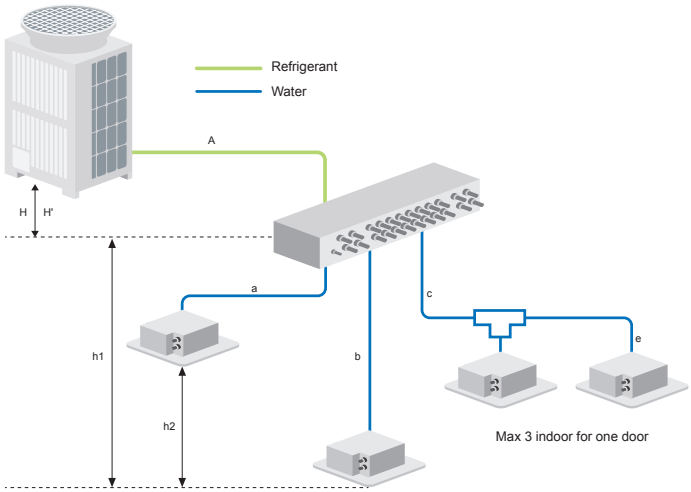
CMB-WM-V-AA e CMB-WM-V-BB units are to be used exclusively with outdoor units PURY-P200-500YNW-A1(2), PQRY-P200-500YLM-A1 and HVRF indoor units (W/WL/WP)

Design guide

HVRF Hydronic Heat Recovery systems

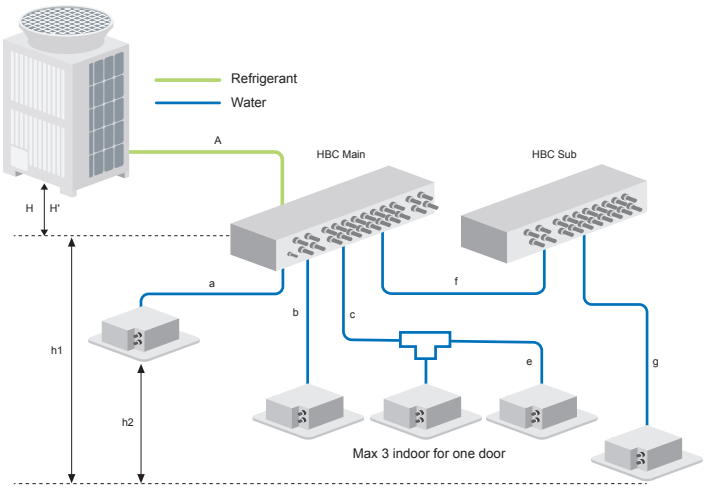
1 HBC Main

Item	Circuit section	Maximum length (m)
Effective length between outdoor unit and HBC Main distributor	A	110
Effective length between HBC distributor and indoor unit	b	60
Height difference between OU and HBC Main (OU above HBC Main)	H	50
Height difference between OU and HBC Main (OU below HBC Main)	H'	40
Difference in height between Indoor unit and HBC distributor	h1	15
Difference in height between indoor units	h2	15



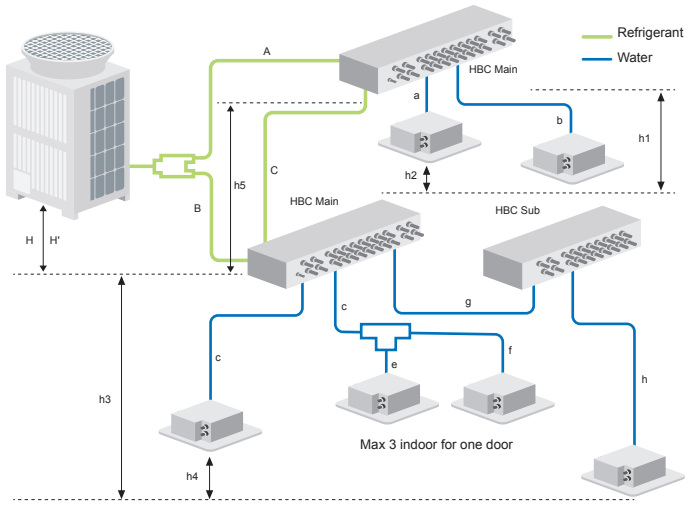
1 HBC Main e 1 HBC Sub

Item	Circuit section	Maximum length (m)
Effective length between outdoor unit and HBC Main distributor	A	110
Effective length between HBC distributor and indoor unit	f+g	60
Height difference between OU and HBC Main (OU above HBC Main)	H	50
Height difference between OU and HBC Main (OU below HBC Main)	H'	40
Difference in height between indoor unit and HBC distributor	h1	15
Difference in height between indoor units	h2	15



2 HBC Main e 1 HBC Sub

Item	Circuit section	Maximum length (m)
Effective length between outdoor unit and HBC Main distributor	A+B	110
Effective length between HBC distributor and indoor unit	b e (g + h)	60
Height difference between OU and HBC Main (OU above HBC Main)	H	50
Height difference between OU and HBC Main (OU below HBC Main)	H'	40
Difference in height between indoor unit and HBC distributor	h1	15
Difference in height between indoor units	h2	15
Difference in height between HBC Main and HBC Main	h3	15
Length between HBC Main and HBC Main	C	40



HVRF Systems Line

Indoor units

Ceiling concealed indoor units

Ceiling cassette indoor units

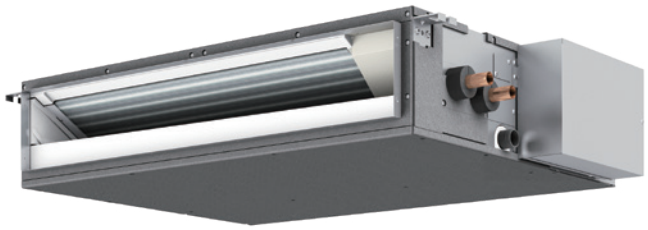
Floor standing indoor units

Wall mounted indoor units

HYDRONICVRF

PEFY-W VMS-A

INDOOR UNITS - Ceiling concealed medium to low static pressure



VALVE **INCLUDED**

Technical specifications

MODEL			PEFY-W10VMS-A	PEFY-W15VMS-A	PEFY-W20VMS-A	PEFY-W25VMS-A
Power source			1-phase 220-240 V 50 Hz	1-phase 220-240 V 50 Hz	1-phase 220-240 V 50Hz	1-phase 220-240 V 50Hz
Cooling capacity*1		kW	1.2	1.7	2.2	2.8
		BTU/h	4,100	5,800	7,500	9,600
Heating capacity*1		kW	1.4	1.9	2.5	3.2
		kcal/h	1,200	1,600	2,200	2,800
		BTU/h	4,800	6,500	8,500	10,900
Power input	Cooling	kW	0.020	0.025	0.030	0.035
	Heating	kW	0.020	0.025	0.030	0.035
External finish			Galvanized steel plate	Galvanized steel plate	Galvanized steel plate	Galvanized steel plate
External dimension		HxWxD	200 x 790 x 700	200 x 790 x 700	200 x 790 x 700	200 x 790 x 700
Net weight		kg	19 (42)	19 (42)	19 (42)	19 (42)
Heat exchanger			Cross fin (Aluminum fin and copper tube)			
FAN	Type x Quantity		Sirocco fan x 2	Sirocco fan x 2	Sirocco fan x 2	Sirocco fan x 2
	External static press.*2	Pa	<5> - 15 - <35> - <50>	<5> - 15 - <35> - <50>	<5> - 15 - <35> - <50>	<5> - 15 - <35> - <50>
	Air flow rate		(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Bassa –Media- Alta)
		m3/min	4.0 - 4.5 - 5.0	5.0 - 5.5 - 7.0	5.5 - 6.5 - 7.5	5.5 - 6.5 - 8.5
Motor	Type		Motore DC	Motor DC	Motor DC	Motor DC
	Output	kW	0.096	0.096	0.096	0.096
Sound pressure level			(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		dB <A>	20-22-23	22-24-25	23-24-26	23-24-28
Air filter			PP honeycomb fabric	PP honeycomb fabric	PP honeycomb fabric	PP honeycomb fabric
Water piping diameter	Inlet	mm I.D.	20	20	20	20
	Outlet	mm I.D.	20	20	20	20
Field drain pipe size		mm	O.D.32 (1-1/4)	O.D.32 (1-1/4)	O.D.32 (1-1/4)	O.D.32 (1-1/4)

*1 The heating/cooling capacity indicates the maximum value during operation under the following conditions:
Cooling: indoor 27°C DB / 19°C WBT, outdoor 35°C DB. Heating: indoor 20°C DB, outdoor 7°C DB. Length of pipes: 7.5 m. Height difference: 0 m.

*2 The external static pressure is factory set to 15 Pa for the PEFY-W VMS-A model
The HVRF **W** indoor units can be connected to both **HVRF Y** and **R2** systems.

Technical specifications

MODEL			PEFY-W32VMS-A	PEFY-W40VMS-A	PEFY-W50VMS-A
Power source			1-phase 220-240 V 50 Hz	1-phase 220-240 V 50 Hz	1-phase 220-240 V 50Hz
Cooling capacity*1		kW	3.6	4.5	5.6
		BTU/h	12,300	15,400	19,100
Heating capacity*1		kW	4.0	5.0	6.3
		kcal/h	3,400	4,300	5,400
		BTU/h	13,600	17,100	21,500
Power input	Cooling	kW	0.040	0.045	0.070
	Heating	kW	0.040	0.045	0.070
External finish			Galvanized steel plate	Galvanized steel plate	Galvanized steel plate
External dimension		HxWxD	200 x 790 x 700	200 x 990 x 700	200 x 990 x 700
Net weight		kg	19.5 (45)	23.5 (53)	23.5 (53)
Heat exchanger			Cross fin (Aluminum fin and copper tube)		
FAN	Type x Quantity		Sirocco fan x 2	Sirocco fan x 3	Sirocco fan x 3
	External static press.*2	Pa	<5> - 15 - <35> - <50>	<5> - 15 - <35> - <50>	<5> - 15 - <35> - <50>
	Air flow rate		(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		m3/min	5.5 - 6.5 - 9.0	8.0 - 9.5 - 11.0	9.5 - 12.0 - 14.5
Motor	Type		Motor DC	Motor DC	Motor DC
	Output	kW	0.096	0.096	0.096
Sound pressure level			(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		dB <A>	24-25-31	24-25-28	25-29-33
Air filter			PP honeycomb fabric	PP honeycomb fabric	PP honeycomb fabric
Water piping diameter	Inlet	mm I.D.	20	20	20
	Outlet	mm I.D.	20	20	20
Field drain pipe size		mm	O.D.32 (1-1/4)	O.D.32 (1-1/4)	O.D.32 (1-1/4)

*1 The heating/cooling capacity indicates the maximum value during operation under the following conditions:
Cooling: indoor 27°C DB / 19°C WBT, outdoor 35°C DB. Heating: indoor 20°C DB, outdoor 7°C DB. Length of pipes: 7.5 m. Height difference: 0 m.
*2 The external static pressure is factory set to 15 Pa for the PEFY-W VMS-A model
The HVRF **W** indoor units can be connected to both **HVRF Y** and **R2** systems.

Indoor unit	Connectivity with outdoor unit
W Model	R2 + HBC Series Y Series + Idronic Unit

The table below summarizes the connectivity between different combinations of indoor units for HVRF - R2 systems

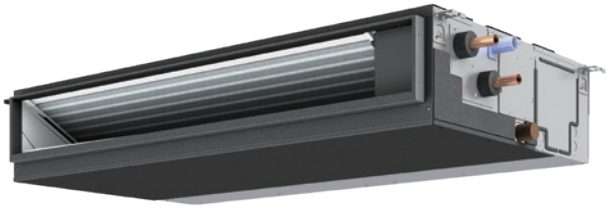
HVRF-R2 outdoor unit	Indoor unit			Connectivity
	A	B	C	
	WLV	W	-	Connectible
	WLV	WL	W	Not connectible
	WLV	W	WP	Not connectible
	WL	W	-	Not connectible
	WL	WP	W	Not connectible
	W	WP	-	Not connectible

In an HVRF-R2 system, if a valve kit is connected to any of the WL indoor units, all other indoor units must also have a valve.
The valve kit is required to use the HVRF-Y system.

WLV =Indor Unit Type WL with optional valve kit
WL = Indor Unit Type WL without optional valve kit
WP = Indoor Unit Type WP (without integrated valve and not compatible with the optional valve kit)
W = Indoor Unit Type W (With integrated valve)

PEFY-W VMA-A

INDOOR UNITS - Ceiling concealed medium to high static pressure



VALVE **INCLUDED**

Technical specifications

MODEL			PEFY-W20VMA-A	PEFY-W25VMA-A	PEFY-W32VMA-A	PEFY-W40VMA-A	PEFY-W50VMA-A
Power source			1-phase 220-240 V 50 Hz	1-phase 220-240 V 50 Hz	1-phase 220-240 V 50Hz	1-phase 220-240 V 50Hz	1-phase 220-240 V 50Hz
Cooling capacity*1		kW	2.2	2.8	3.6	4.5	5.6
		BTU/h	7,500	9,600	12,300	15,400	19,100
Heating capacity*1		kW	2.5	3.2	4.0	5.0	6.3
		kcal/h					
		BTU/h	8,500	10,900	13,600	17,100	21,500
Power input	Cooling	kW	0.032	0.032	0.044	0.047	0.093
	Heating	kW	0.030	0.030	0.042	0.045	0.091
External finish			Galvanized steel plate	Galvanized steel plate	Galvanized steel plate	Galvanized steel plate	Galvanized steel plate
External dimension		HxWxD	250 x 700 x 732			250 x 900 x 732	250 x 1,100 x 732
Net weight		kg	22 (49)	22 (49)	22 (49)	26 (58)	30 (67)
Heat exchanger			Cross fin (Aluminum fin and copper tube)				
FAN	Type x Quantity		Sirocco fan x 1	Sirocco fan x 1	Sirocco fan x 2	Sirocco fan x 2	Sirocco fan x 2
	External static press.*2	Pa	35 - <50> - <70> - <100> - <150>				40 - <50> - <70> - <100> - <150>
	Air flow rate		(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		m3/min	6.0 - 7.5 - 8.5	6.0 - 7.5 - 8.5	7.5 - 9.0 - 10.5	10.0 - 12.0 - 14.0	14.5 - 18.0 - 21.0
Motor	Type		Motor DC	Motor DC	Motor DC	Motor DC	Motor DC
	Output	kW	0.085	0.085	0.085	0.121	0.121
Sound pressure level			(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		dB <A>	21-25-27	21-25-27	23-27-30	23-28-31	26-31-35
Air filter			PP honeycomb fabric				
Water piping diameter	Inlet	mm I.D.	20	20	20	20	20
	Outlet	mm I.D.	20	20	20	20	20
Field drain pipe size		mm	O.D.32(1-1/4)	O.D.32(1-1/4)	O.D.32(1-1/4)	O.D.32(1-1/4)	O.D.32(1-1/4)

*1 The heating/cooling capacity indicates the maximum value during operation under the following conditions:
Cooling: indoor 27°C DB / 19°C WBT, outdoor 35°C DB. Heating: indoor 20°C DB, outdoor 7°C DB. Length of pipes: 7.5 m. Height difference: 0 m.

*2 The external static pressure is factory set to 15 Pa for the PEFY-W VMA-A model.
The HVRF **W** indoor units can be connected to both **HVRF Y** and **R2** systems.

Technical specifications

MODEL			PEFY-W63VMA-A	PEFY-W71VMA-A	PEFY-W80VMA-A	PEFY-W100VMA-A	PEFY-W125VMA-A
Power source			1-phase 220-240 V 50 Hz	1-phase 220-240 V 50 Hz	1-phase 220-240 V 50Hz	1-phase 220-240 V 50Hz	1-phase 220-240 V 50Hz
Cooling capacity*1		kW		8.0	9.0	11.2	14.0
		BTU/h	24,200	27,300	30,700	38,200	47,800
Heating capacity*1		kW	8.0	9.0	10.0	12.5	16.0
		kcal/h					
		BTU/h	27,300	30,700	34,100	42,700	54,600
Power input	Cooling	kW	0.093	0.093	0.093	0.142	0.199
	Heating	kW	0.091	0.091	0.091	0.140	0.197
External finish			Galvanized steel plate	Galvanized steel plate	Galvanized steel plate	Galvanized steel plate	Lamiera in acciaio galvanizzato
External dimension		HxWxD	250 x 1,100 x 732			250 x 1,400 x 732	
Net weight		kg	30 (67)	30 (67)	30 (67)	37 (82)	38 (84)
Heat exchanger			Cross fin (Aluminum fin and copper tube)				
FAN	Type x Quantity		Sirocco fan x 2	Sirocco fan x 2	Sirocco fan x 3	Sirocco fan x 3	Sirocco fan x 3
	External static press.*2	Pa	40 - <50> - <70> - <100> - <150>				<40> - 50 - <70> - <100> - <150>
	Air flow rate		(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		m3/min	14.5 - 18.0 - 21.0	14.5 - 18.0 - 21.0	14.5 - 18.0 - 21.0	23.0 - 28.0 - 32.0	28.0 - 34.0 - 37.0
Motor	Type		Motore DC	Motore DC	Motore DC	Motore DC	Motore DC
	Output	kW	0.121	0.121	0.121	0.300	0.300
Sound pressure level			(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		dB <A>	26-31-35	26-31-35	26-31-35	30-35-38	34-38-40
Air filter			PP honeycomb fabric				
Water piping diameter	Inlet	mm I.D.	30	30	30	30	30
	Outlet	mm I.D.	30	30	30	30	30
Field drain pipe size		mm	O.D.32(1-1/4)	O.D.32(1-1/4)	O.D.32(1-1/4)	O.D.32(1-1/4)	O.D.32(1-1/4)

*1 The heating/cooling capacity indicates the maximum value during operation under the following conditions:
Cooling: indoor 27°C DB / 19°C WBT, outdoor 35°C DB. Heating: indoor 20°C DB, outdoor 7°C DB. Length of pipes: 7.5 m. Height difference: 0 m.
*2 The external static pressure is factory set to 15 Pa for the PEFY-W VMA-A model.
The HVRF **W** indoor units can be connected to both **HVRF Y** and **R2** systems.

Indoor unit	Connectivity with outdoor unit
W Model	R2 + HBC Series Y Series + Idronic Unit

The table below summarizes the connectivity between different combinations of indoor units for HVRF - R2 systems

HVRF-R2 outdoor unit	Indoor unit			Connectivity
	A	B	C	
	WLV	W	-	Connectible
	WLV	WL	W	Not connectible
	WLV	W	WP	Not connectible
	WL	W	-	Not connectible
	WL	WP	W	Not connectible
	W	WP	-	Not connectible

In an HVRF-R2 system, if a valve kit is connected to any of the WL indoor units, all other indoor units must also have a valve.
The valve kit is required to use the HVRF-Y system.

WLV =Indor Unit Type WL with optional valve kit
WL = Indor Unit Type WL without optional valve kit
WP = Indoor Unit Type WP (without integrated valve and not compatible with the optional valve kit)
W = Indoor Unit Type W (With integrated valve)

PLFY-WL VEM-E

INDOOR UNITS - 4-way cassette 900x900

VALVE
EXCLUDED

Technical specifications

MODEL			PLFY-WL32VEM-E	PLFY-WL40VEM-E	PLFY-WL50VEM-E
Power source			1-phase 220-240 V 50 Hz, 1-phase 220 V 60 Hz	1-phase 220-240 V 50 Hz, 1-phase 220 V 60 Hz	1-phase 220-240 V 50 Hz, 1-phase 220 V 60 Hz
Cooling capacity*1		kW	3.6	4.5	5.6
		BTU/h	12,300	15,400	19,100
Heating capacity*1		kW	4.0	5.0	6.3
		kcal/h	3,400	4,300	5,400
		BTU/h	13,600	17,100	21,500
Power input	Cooling	kW	0.03	0.03	0.04
	Heating	kW	0.03	0.03	0.04
External finish			Galvanized steel plate	Galvanized steel plate	Galvanized steel plate
External dimension		HxWxD	258 × 840 × 840	258 × 840 × 840	258 × 840 × 840
Net weight		kg	20 (44)	20 (44)	20 (44)
Heat exchanger			Cross fin (Al fin and Cu pipe)		
FAN	Type x Quantity		Turbo fan × 1	Turbo fan × 1	Turbo fan × 1
	External static press.*2	Pa	-	-	-
	Air flow rate		(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		m3/min	14-15-16-17	14-15-16-17	14-16-18-20
Motor	Type		Motor DC		
	Output	kW	0.050	0.050	0.050
Sound pressure level			(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		dB <A>	26-27-29-30	26-28-29-31	27-29-31-33
Air filter			PP honeycomb fabric		
Water piping diameter	Inlet	mm I.D.	20	20	20
	Outlet	mm I.D.	20	20	20
Field drain pipe size		mm	O.D.32 (1-1/4)	O.D.32 (1-1/4)	O.D.32 (1-1/4)

*1 The heating/cooling capacity indicates the maximum value during operation under the following conditions:
Cooling: indoor 27°C DB / 19°C WBT, outdoor 35°C DB. Heating: indoor 20°C DB, outdoor 7°C DB. Length of pipes: 7.5 m. Height difference: 0 m.
The HVRF **WL** indoor units can be connected to both **HVRF Y** and **R2** systems.

Indoor unit	Connectivity with outdoor unit
WL Model	R2 + HBC Series Y Series + Idronic Unit

Valve kit specifications

Model			PAC-SK35VK-E
Dimensions	H × W × D	mm	549 × 201 × 107
Net weight	kg	kg	3.5
Water piping diameter	Inlet	mm I.D.	20
	Outlet	mm I.D.	20

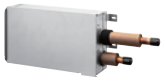
*PAC-SK04VK-E phase-out after stock end

The table below summarizes the connectivity between different combinations of indoor units for HVRF - R2 systems

HVRF-R2 outdoor unit	Indoor unit			Connectivity
	A	B	C	
	WLV	WLV	-	Connectible
	WLV	W	-	Connectible
	WLV	WL	-	Not connectible
	WLV	WP	-	Not connectible
	WLV	WL	W	Not connectible
	WLV	WL	WP	Not connectible
	WLV	W	WP	Not connectible
	WL	WL	-	Connectible
	WL	WP	-	Connectible
	WL	W	-	Not connectible
	WL	WP	W	Not connectible

In an HVRF-R2 system, if a valve kit is connected to any of the WL indoor units, all other indoor units must also have a valve.
The valve kit is required to use the HVRF-Y system.

WLV =Indor Unit Type WL with optional valve kit
WL = Indor Unit Type WL without optional valve kit
WP = Indoor Unit Type WP (without integrated valve and not compatible with the optional valve kit)
W = Indoor Unit Type W (With integrated valve)



PLFY-WL VFM-E

INDOOR UNITS - 4-way cassette 600x600

VALVE
EXCLUDED

Technical specifications

MODEL			PLFY-WL10VFM-E	PLFY-WL15VFM-E	PLFY-WL20VFM-E	PLFY-WL25VFM-E	PLFY-WL32VFM-E
Power source			1-phase 220-240 V 50 Hz, 1-phase 220 V 60 Hz	1-phase 220-240 V 50 Hz, 1-phase 220 V 60 Hz	1-phase 220-240 V 50 Hz, 1-phase 220 V 60 Hz	1-phase 220-240 V 50 Hz, 1-phase 220 V 60 Hz	1-phase 220-240 V 50 Hz, 1-phase 220 V 60 Hz
Cooling capacity*1		kW	1.2	1.7	2.2	2.8	3.6
		BTU/h	4,100	5,800	7,500	9,600	12,300
Heating capacity*1		kW	1.4	1.9	2.5	3.2	4.0
		kcal/h	1,200	1,600	2,200	2,800	3,400
		BTU/h	4,800	6,500	8,500	10,900	13,600
Power input	Cooling	kW	0.02	0.02	0.02	0.03	0.04
	Heating	kW	0.02	0.02	0.02	0.03	0.04
External finish			Galvanized steel plate				
External dimension		HxWxD	208 × 570 × 570				
Net weight		kg	13 (29)	13 (29)	14 (31)	14 (31)	14 (31)
Heat exchanger			Cross fin (Al fin and Cu pipe)				
FAN	Type x Quantity		Turbo fan × 1	Turbo fan × 1	Turbo fan × 1	Turbo fan × 1	Turbo fan × 1
	External static press.*2	Pa	-	-	-	-	-
	Air flow rate		(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		m3/min	6.0-6.5-7.0	6.0-7.0-8.0	6.5-7.0-8.0	6.5-7.5-9.0	6.5-9.0-12.0
Motor	Type		Motore DC	Motore DC	Motore DC	Motore DC	Motore DC
	Output	kW	0.050	0.050	0.050	0.050	0.050
Sound pressure level			(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		dB <A>	25-26-27	25-26-29	27-29-31	27-30-34	27-33-41
Air filter			PP honeycomb fabric				
Water piping diameter	Inlet	mm I.D.	20	20	20	20	20
	Outlet	mm I.D.	20	20	20	20	20
Field drain pipe size		mm	O.D.32 (1-1/4)	O.D.32 (1-1/4)	O.D.32 (1-1/4)	O.D.32 (1-1/4)	O.D.32 (1-1/4)

*1 The heating/cooling capacity indicates the maximum value during operation under the following conditions:
Cooling: indoor 27°C DB / 19°C WBT, outdoor 35°C DB. Heating: indoor 20°C DB, outdoor 7°C DB. Length of pipes: 7.5 m. Height difference: 0 m.
The HVRF **WL** indoor units can be connected to both **HVRF Y** and **R2** systems.

Indoor unit	Connectivity with outdoor unit
WL Model	R2 + HBC Series Y Series + Idronic Unit

Valve kit specifications

Model			PAC-SK35VK-E
Dimensions	H × W × D	mm	549 × 201 × 107
Net weight	kg	kg	3.5
Water piping diameter	Inlet	mm I.D.	20
	Outlet	mm I.D.	20

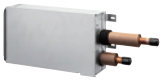
*PAC-SK04VK-E phase-out after stock end

The table below summarizes the connectivity between different combinations of indoor units for HVRF - R2 systems

HVRF-R2 outdoor unit	Indoor unit			Connectivity
	A	B	C	
	WLV	WLV	-	Connectible
	WLV	W	-	Connectible
	WLV	WL	-	Not connectible
	WLV	WP	-	Not connectible
	WLV	WL	W	Not connectible
	WLV	WL	WP	Not connectible
	WLV	W	WP	Not connectible
	WL	WL	-	Connectible
	WL	WP	-	Connectible
	WL	W	-	Not connectible
	WL	WP	W	Not connectible

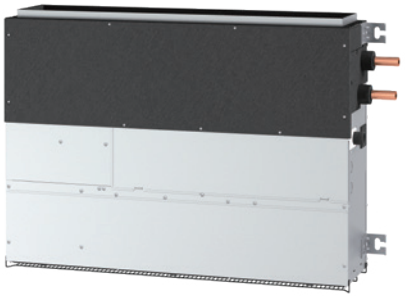
In an HVRF-R2 system, if a valve kit is connected to any of the WL indoor units, all other indoor units must also have a valve.
The valve kit is required to use the HVRF-Y system.

WLV =Indor Unit Type WL with optional valve kit
WL = Indor Unit Type WL without optional valve kit
WP = Indoor Unit Type WP (without integrated valve and not compatible with the optional valve kit)
W = Indoor Unit Type W (With integrated valve)



PFFY-W VCM-A

INDOOR UNITS - Floor standing concealed



VALVE **INCLUDED**

Technical specifications

MODEL			PFFY-W20VCM-A	PFFY-W25VCM-A	PFFY-W32VCM-A	PFFY-W40VCM-A	PFFY-W50VCM-A
Power source			1-phase 220-240 V 50 Hz	1-phase 220-240 V 50 Hz	1-phase 220-240 V 50Hz	1-phase 220-240 V 50 Hz	1-phase 220-240 V 50 Hz
Cooling capacity*1		kW	2.2	2.8	3.6	4.5	5.6
		BTU/h	7,500	9,600	12,300	15,400	19,100
Heating capacity*1		kW	2.5	3.2	4.0	5.0	6.3
		kcal/h	2,200	2,800	3,400	4,300	5,400
		BTU/h	8,500	10,900	13,600	17,100	21,500
Power input	Cooling	kW	0.022	0.029	0.035	0.038	0.062
	Heating	kW	0.022	0.029	0.035	0.038	0.062
External finish			Galvanized steel plate				
External dimension		HxWxD	615 (690) x 700 x 200	615 (690) x 700 x 200	615 (690) x 700 x 200	615 (690) x 900 x 200	615 (690) x 900 x 200
Net weight		kg	18.5 (42)	18.5 (42)	19 (42)	23 (51)	23 (51)
Heat exchanger			Cross fin (Al fin and Cu pipe)				
FAN	Type x Quantity		Sirocco fan x 2	Sirocco fan x 2	Sirocco fan x 2	Sirocco fan x 3	Sirocco fan x 3
	External static press.*2	Pa	<0> - 10 - <40> - <60>	<0> - 10 - <40> - <60>	<0> - 10 - <40> - <60>	<0> - 10 - <40> - <60>	<0> - 10 - <40> - <60>
	Air flow rate		(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		m3/min	5.0 - 6.0 - 7.0	5.5 - 7.0 - 8.5	6.5 - 7.5 - 9.0	8.0 - 9.5 - 11.0	10.5 - 12.5 - 14.5
Motor	Type		Motor DC				
	Output	kW	0.096	0.096	0.096	0.096	0.096
Sound pressure level			(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		dB <A>	21-23-26	22-26-30	25-28-32	25-27-30	28-32-35
Air filter			PP honeycomb fabric				
Water piping diameter	Inlet	mm I.D.	20	20	20	20	20
	Outlet	mm I.D.	20	20	20	20	20
Field drain pipe size		mm	O.D.32 (1-1/4)	O.D.32 (1-1/4)	O.D.32 (1-1/4)	O.D.32 (1-1/4)	O.D.32 (1-1/4)

*1 The heating/cooling capacity indicates the maximum value during operation under the following conditions:
Cooling: indoor 27°C DB / 19°C WBT, outdoor 35°C DB. Heating: indoor 20°C DB, outdoor 7°C DB. Length of pipes: 7.5 m. Height difference: 0 m.

*2 The external static pressure is factory set to 20 Pa for the PFFY-WP VLRMM-E Model.
The HVRF **W** indoor units can be connected to both **HVRF Y** and **R2** systems.
Indoor unit connections 3/4" thread.

Indoor unit	Connectivity with outdoor unit
W Model	R2 + HBC Series Y Series + Idronic Unit

The table below summarizes the connectivity between different combinations of indoor units for HVRF - R2 systems

HVRF-R2 outdoor unit	Indoor unit			Connectivity
	A	B	C	
	WLV	W	-	Connectible
	WLV	WL	W	Not connectible
	WLV	W	WP	Not connectible
	WL	W	-	Not connectible
	WL	WP	W	Not connectible
	W	WP	-	Not connectible

In an HVRF-R2 system, if a valve kit is connected to any of the WL indoor units, all other indoor units must also have a valve.
The valve kit is required to use the HVRF-Y system.

WLV =Indor Unit Type WL with optional valve kit
WL = Indor Unit Type WL without optional valve kit
WP = Indoor Unit Type WP (without integrated valve and not compatible with the optional valve kit)
W = Indoor Unit Type W (With integrated valve)

PKFY-WL VLM-E

INDOOR UNITS - Wall-mounted

VALVE
EXCLUDED

Technical specifications

MODEL			PKFY-WL10VLM-E	PKFY-WL15VLM-E	PKFY-WL20VLM-E
Power source			1-phase 220-240 V 50 Hz, 1-phase 220 V 60 Hz	1-phase 220-240 V 50 Hz, 1-phase 220 V 60 Hz	1-phase 220-240 V 50 Hz, 1-phase 220 V 60 Hz
Cooling capacity*1		kW	1.2	1.7	2.2
		BTU/h	4,100	5,800	7,500
Heating capacity*1		kW	1.4	1.9	2.5
		kcal/h	1,200	1,600	2,200
		BTU/h	4,800	6,500	8,500
Power input	Cooling	kW	0.02	0.02	0.03
	Heating	kW	0.01	0.01	0.02
External finish			Galvanized steel plate		
External dimension		HxWxD	299 × 773 × 237		
Net weight		kg	11(25)	11(25)	11(25)
Heat exchanger			Cross fin (Al fin and Cu pipe)		
FAN	Type x Quantity		Line flow fan x 1	Line flow fan x 1	Line flow fan x 1
	External static press.*2	Pa	-	-	-
	Air flow rate		(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		m3/min	3.3 - 3.8 - 4.1 - 4.5	3.3 - 3.8 - 4.3 - 4.9	4.0 - 5.0 - 6.0 - 7.0
Motor	Type		Motor DC		
	Output	kW	0.030	0.030	0.030
Sound pressure level			(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		dB <A>	22-26-28-30	22-26-29-32	22-28-33-36
Air filter			PP honeycomb fabric		
Water piping diameter	Inlet	mm I.D.	Rc 3/4 screw	Rc 3/4 screw	Rc 3/4 screw
	Outlet	mm I.D.	Rc 3/4 screw	Rc 3/4 screw	Rc 3/4 screw
Field drain pipe size		mm	I.D.16 (5/8)	I.D.16 (5/8)	I.D.16 (5/8)

*1 The heating/cooling capacity indicates the maximum value during operation under the following conditions:
Cooling: indoor 27°C DB / 19°C WBT, outdoor 35°C DB. Heating: indoor 20°C DB, outdoor 7°C DB. Length of pipes: 7.5 m. Height difference: 0 m.
The HVRF **WL** indoor units can be connected to both **HVRF Y** and **R2** systems.

Technical specifications

MODEL			PKFY-WL25VLM-E	PKFY-WL32VLM-E	PKFY-WL40VLM-E
Power source			1-phase 220-240 V 50 Hz, 1-phase 220 V 60 Hz	1-phase 220-240 V 50 Hz, 1-phase 220 V 60 Hz	1-phase 220-240 V 50 Hz, 1-phase 220 V 60 Hz
Cooling capacity*1		kW	2.8	3.6	4.5
		BTU/h	9,600	12,300	15,400
Heating capacity*1		kW	3.2	4.0	5.0
		kcal/h	2,800	3,400	4,300
		BTU/h	10,900	13,600	17,100
Power input	Cooling	kW	0.04	0.04	0.05
	Heating	kW	0.03	0.03	0.04
External finish			Galvanized steel plate		
External dimension		HxWxD	299 × 773 × 237	299 × 898 × 237	
Net weight		kg	11(25)	13(29)	13(29)
Heat exchanger			Cross fin (Al fin and Cu pipe)		
FAN	Type x Quantity		Line flow fan x 1	Line flow fan x 1	Line flow fan x 1
	External static press.*2	Pa	-	-	-
	Air flow rate		(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		m3/min	3.3 - 3.8 - 4.1 - 4.5	6.3 - 7.6 - 9.0 - 10.4	6.4 - 8.2 - 10.0 - 11.9
Motor	Type		Motor DC		
	Output	kW	0.030	0.030	0.030
Sound pressure level			(Low-Mid-High)	(Low-Mid-High)	(Low-Mid-High)
		dB <A>	22-26-28-30	29-34-38-41	30-36-41-45
Air filter			PP honeycomb fabric		
Water piping diameter	Inlet	mm I.D.	Rc 3/4 screw	Rc 3/4 screw	Rc 3/4 screw
	Outlet	mm I.D.	Rc 3/4 screw	Rc 3/4 screw	Rc 3/4 screw
Field drain pipe size		mm	I.D.16 (5/8)	I.D.16 (5/8)	I.D.16 (5/8)

*1 The heating/cooling capacity indicates the maximum value during operation under the following conditions:
Cooling: indoor 27°C DB / 19°C WBT, outdoor 35°C DB. Heating: indoor 20°C DB, outdoor 7°C DB. Length of pipes: 7.5 m. Height difference: 0 m.
The HVRF **WL** indoor units can be connected to both **HVRF Y** and **R2** systems.

Indoor unit	Connectivity with outdoor unit
WL Model	R2 + HBC Series Y Series + Idronic Unit

Valve kit specifications

Model			PAC-SK35VK-E
Dimensions	H × W × D	mm	549 × 201 × 107
Net weight	kg	kg	3.5
Water piping diameter	Inlet	mm I.D.	20
	Outlet	mm I.D.	20

*PAC-SK04VK-E phase-out after stock end

The table below summarizes the connectivity between different combinations of indoor units for HVRF - R2 systems

HVRF-R2 outdoor unit	Indoor unit			Connectivity
	A	B	C	
	WLV	WLV	-	Connectible
	WLV	W	-	Connectible
	WLV	WL	-	Not connectible
	WLV	WP	-	Not connectible
	WLV	WL	W	Not connectible
	WLV	WL	WP	Not connectible
	WLV	W	WP	Not connectible
	WL	WL	-	Connectible
	WL	WP	-	Connectible
	WL	W	-	Not connectible
	WL	WP	W	Not connectible

In an HVRF-R2 system, if a valve kit is connected to any of the WL indoor units, all other indoor units must also have a valve.
The valve kit is required to use the HVRF-Y system.

WLV =Indor Unit Type WL with optional valve kit
WL = Indor Unit Type WL without optional valve kit
WP = Indoor Unit Type WP (without integrated valve and not compatible with the optional valve kit)
W = Indoor Unit Type W (With integrated valve)