

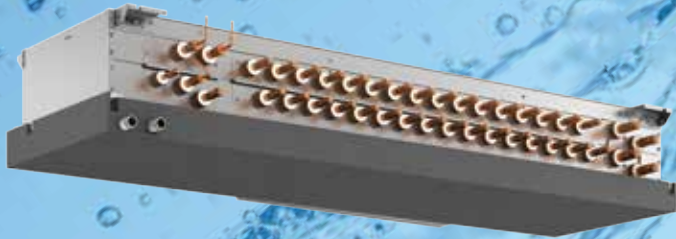


Heating and Cooling

HYBRID

CITY MULTI

R2-Series R410A



Refrigerant
and
Water

Sustainable
**Heat
Pump**





The industry's first and only Hybrid VRF technology

As a leading company in the industry, Mitsubishi Electric has developed the HYBRID VRF CITY MULTI as a top-of-the-line CITY MULTI system by using the industry's first and only hybrid VRF technology.

The HYBRID VRF CITY MULTI is the industry's first system to use refrigerant between the outdoor unit and the Hybrid Branch Circuit Controller (HBC controller) and water between the HBC controller and the indoor units. The HBC controller is the most unique part of this system that allows heat exchange between refrigerant and water.

The HYBRID VRF CITY MULTI System uses Mitsubishi Electric's original VRF technology and is suitable for a wide variety of installations by allowing centralized control, individual operation, and simultaneous heating and cooling with heat recovery.



HYBRID
CITY MULTI

R2-Series



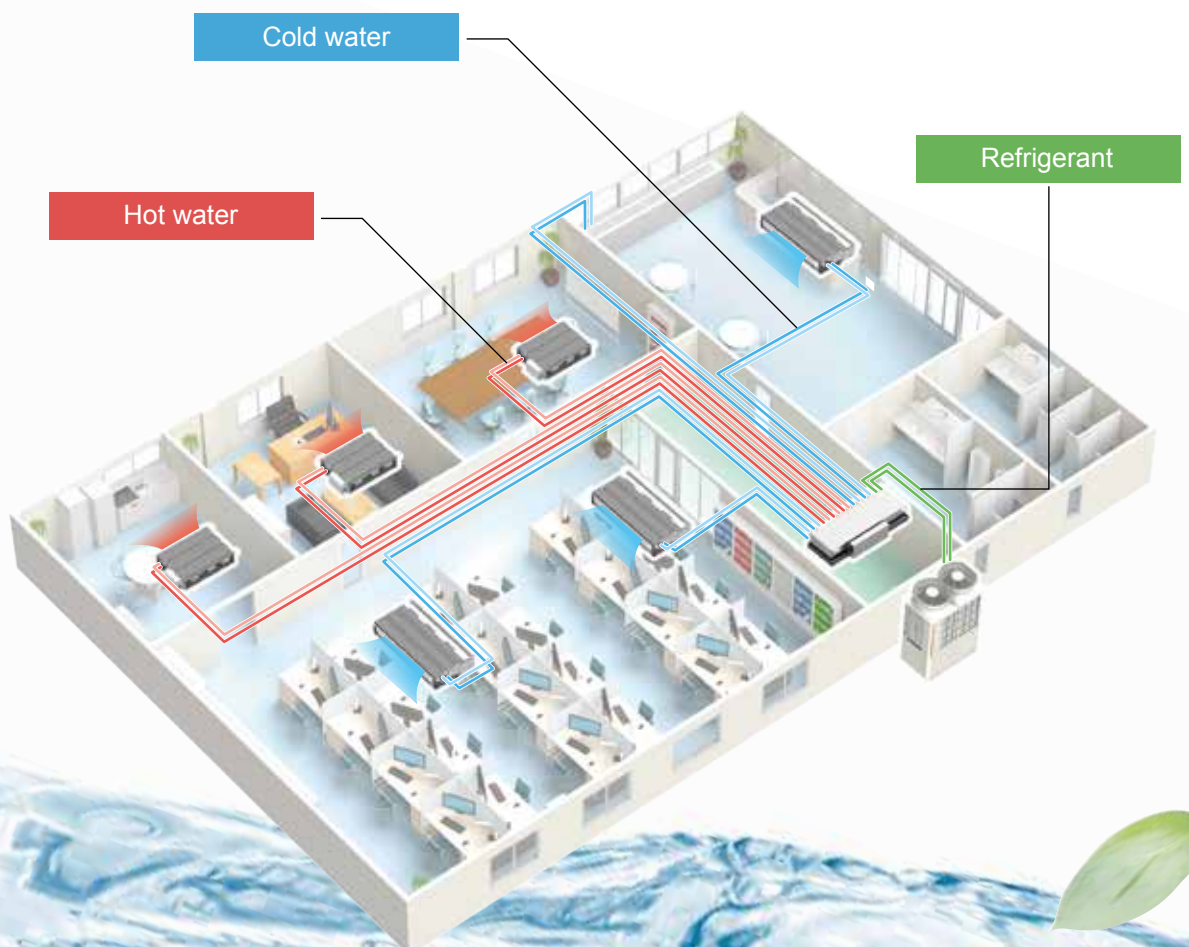
Hybrid System using water and refrigerant

1. No refrigerant in occupied zones
2. Smaller system refrigerant volume



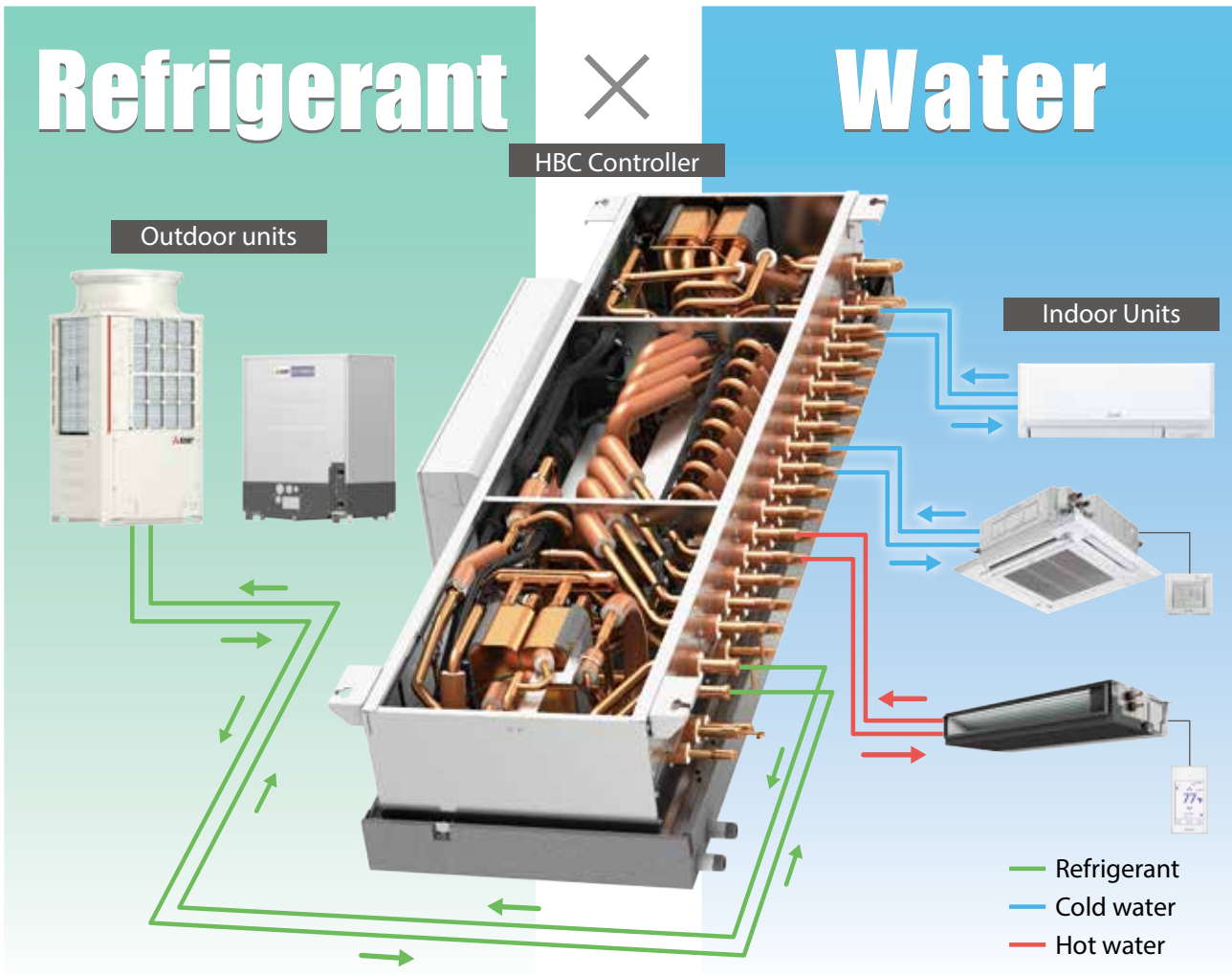
Packaged System with Mitsubishi Electric products

3. Simultaneous heating and cooling operation with a 2-pipe system
4. High energy efficiency through heat recovery
5. Easy control through M-NET



HYBRID

CITY MULTI R2-Series



Outdoor units

Two types of series, air cooled and water cooled, has a line-up of 6 to 14 ton.

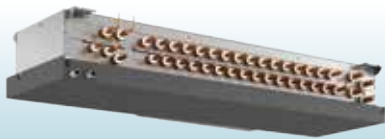


Air Source Unit



Water Source Unit

HBC Controller



The key component HBC controller with 8 and 16 ports of line-up. Additionally sub HBC controller for connection with more indoor units.

Indoor units

Indoor units fit the size of room and its usage.



Ceiling cassette type



Wall-mounted type



Ceiling concealed type

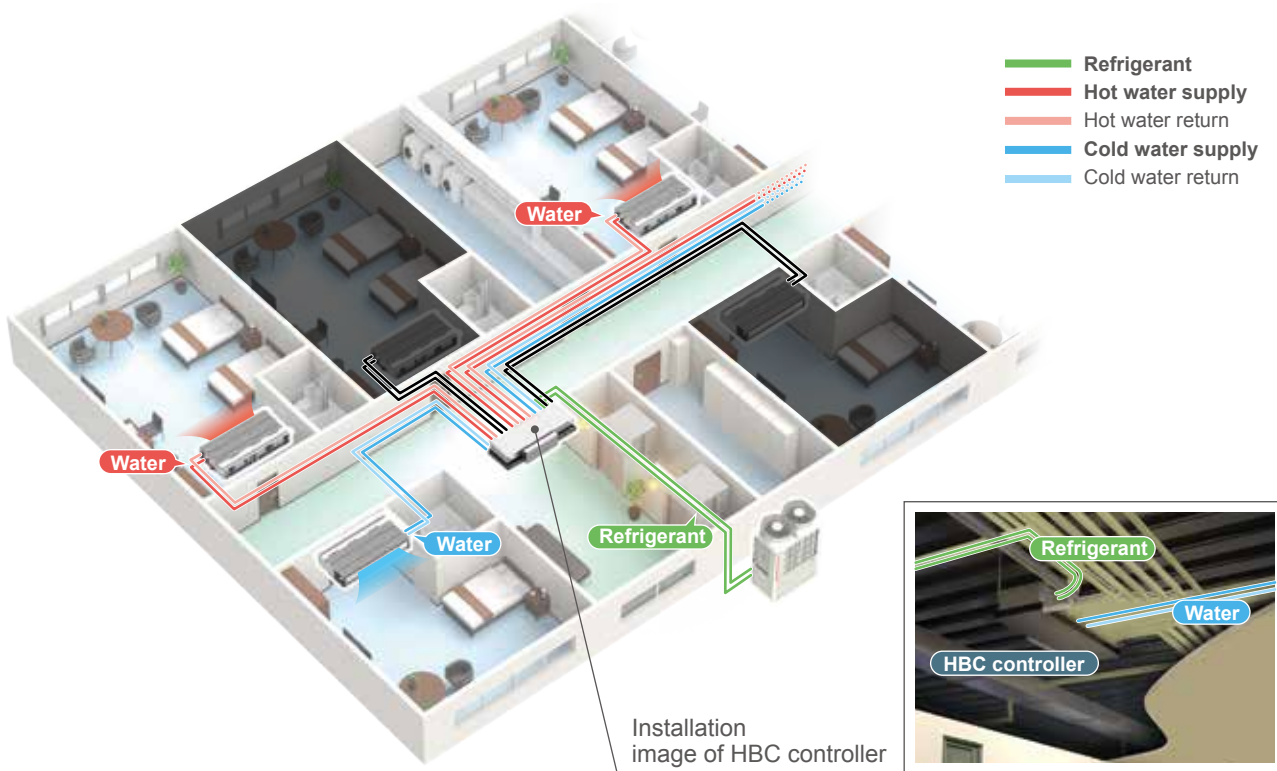
Benefits of HVRF

Hybrid system using water and refrigerant

1. Limits the area of the piping where refrigerant is used

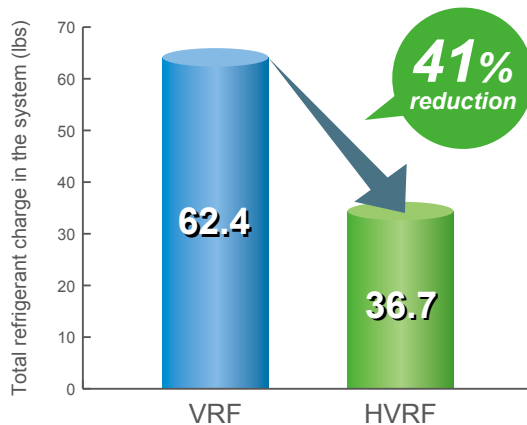
Since the refrigerant does not flow between HBC controller and indoor units, it can limit the use of refrigerant to the outdoor side and keep the piping in the indoor space refrigerant-free.

*Please refer to installation manual according to HBC controller installation.



2. Smaller system refrigerant volume

The hybrid system requires less refrigerant compared to the VRF system.



► CASE STUDY

	VRF R410A <TNU>	HVRF R410A <TNU>
Total refrigerant piping length (feet)	850	131
Refrigerant volume	Total (lbs)	36.7

*Simulation condition

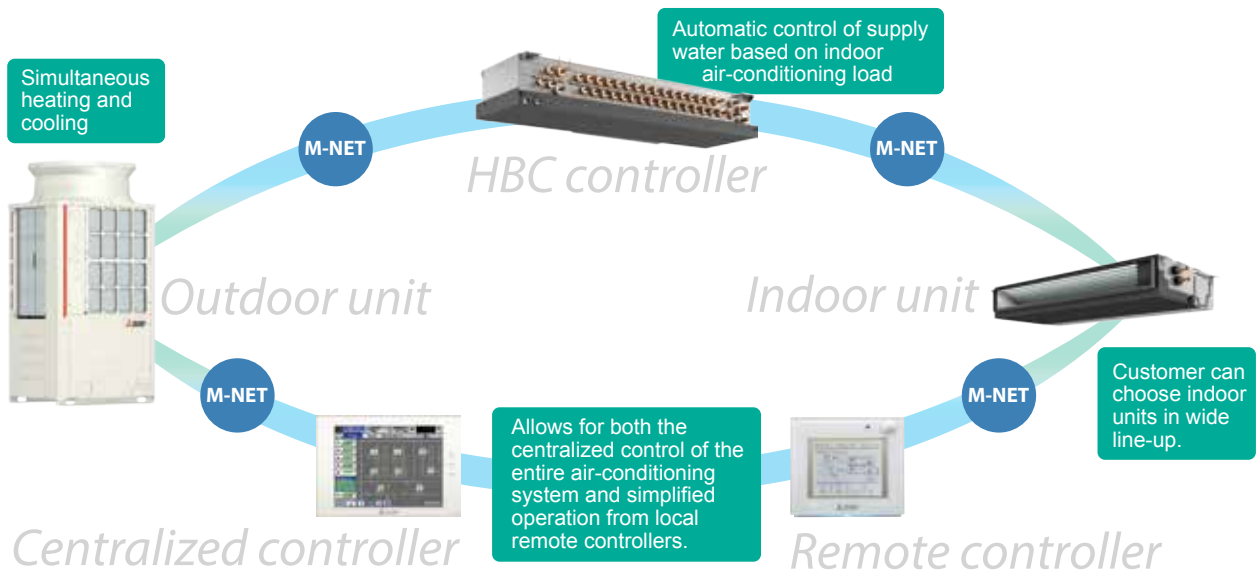
Application image: Hotel (20 rooms/same size)
 Outdoor unit: 10 ton x 1, Indoor unit: P08 (2.3 kW) x 20
 VRF: BC controller 16 ports + 8 ports sub
 HVRF: HBC controller 16 ports + 8 ports sub
 Total refrigerant piping length: 850 ft (VRF), 131 ft (HVRF)
 Piping length from outdoor unit to BC controller: 131 ft (VRF/HVRF)

41% reduction

Benefits of HVRF

Packaged system with Mitsubishi Electric products

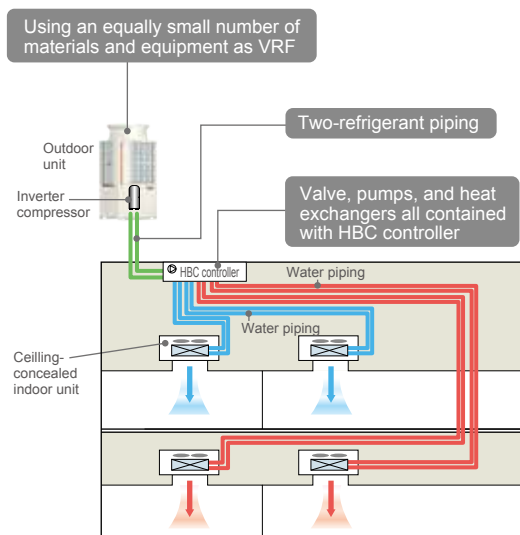
Outdoor units, HBC controller, indoor units, and remote controllers are offered as a package which facilitates design work. Furthermore, connecting M-NET wiring to each other allows optimum control of the whole system to satisfy the zones load precisely.



3. Simultaneous heating and cooling operation with a 2-pipe system

HVRF is a 2-pipe system requiring less piping compared to a 4-pipe system. It needs fewer key components to be installed because components such as the pumps, heat exchanger, and valves are incorporated into the HBC controller.

2-pipe heat recovery system





4. High energy efficiency through heat recovery

The system efficiency is at peak when the ratio of heating and cooling is 50:50 because of dynamic heat recovery.

5. Easy control through M-NET

HVRF can provide individual control by indoor unit or by zone with the integration of Mitsubishi Electric's MELANS control system. Whether by local controller or centralized controller, heating and cooling can be monitored and operated remotely.

Individual control of indoor units

A suitable remote controller can be selected according to zone application.

Centralized control of the entire system

System controller can be connected to multiple indoor units for centralized monitoring and management.

Application example

Our unique HVRF system is compatible with a wide range of applications just like the standard VRF systems are. Since its release in European countries in 2012, it has received great reviews by many customers and has won several awards. The adoption of HVRF, which is packed with our unique technology, is increasing year by year.



01 Hotels & Residences

COMFORT

In hotels, offering a comfortable environment throughout the building is imperative to the guests' hotel experience. The HYBRID VRF CITY MULTI system provides comfort with a gradual rate of change of temperature within the air conditioned space delivering a comfortable and stable environment. It also features individual control while delivering heating and cooling simultaneously.

LESS REFRIGERANT

Whats more, with the HYBRID VRF CITY MULTI system, refrigerant is only used in the outdoor unit, and occupant spaces are free of refrigerant. This helps hotels comply with refrigerant regulations.



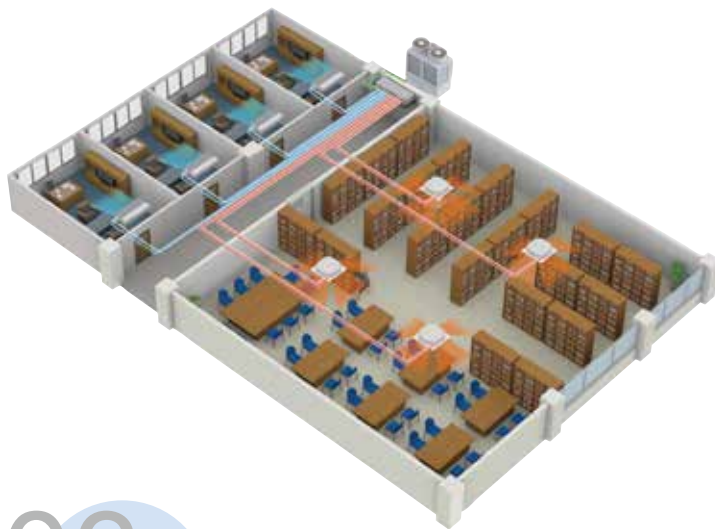
02 Offices

COMFORT

Offices can be a comfortable place with independently controlled zones. The HYBRID VRF CITY MULTI system provides a gradual change of temperature for greater comfort, minimizes drafts and operates at a low sound level.

EASE of INSTALLATION and MAINTENANCE

The HYBRID VRF CITY MULTI system installation is as easy as the standard VRF system, and adaptable with flexible layouts and system integration of the MELANS control. Compared to a conventional 4-pipe system, it requires less space, and maintenance is easier with less piping and fewer key components.



03 Education Facilities

COMFORT

Having an optimal environment is mandatory for concentration and learning. The HYBRID VRF CITY MULTI system provides a gradual rate of change of temperature within the air conditioned space delivering a comfortable and stable environment for greater comfort with fewer drafts and a low sound level.

LESS REFRIGERANT

Educational facilities contain many smaller spaces. HYBRID VRF CITY MULTI provides a solution that complies with refrigerant regulations by not using refrigerant in occupant spaces and eliminating the need for leak detection.



04 Hospital & Healthcare Facilities

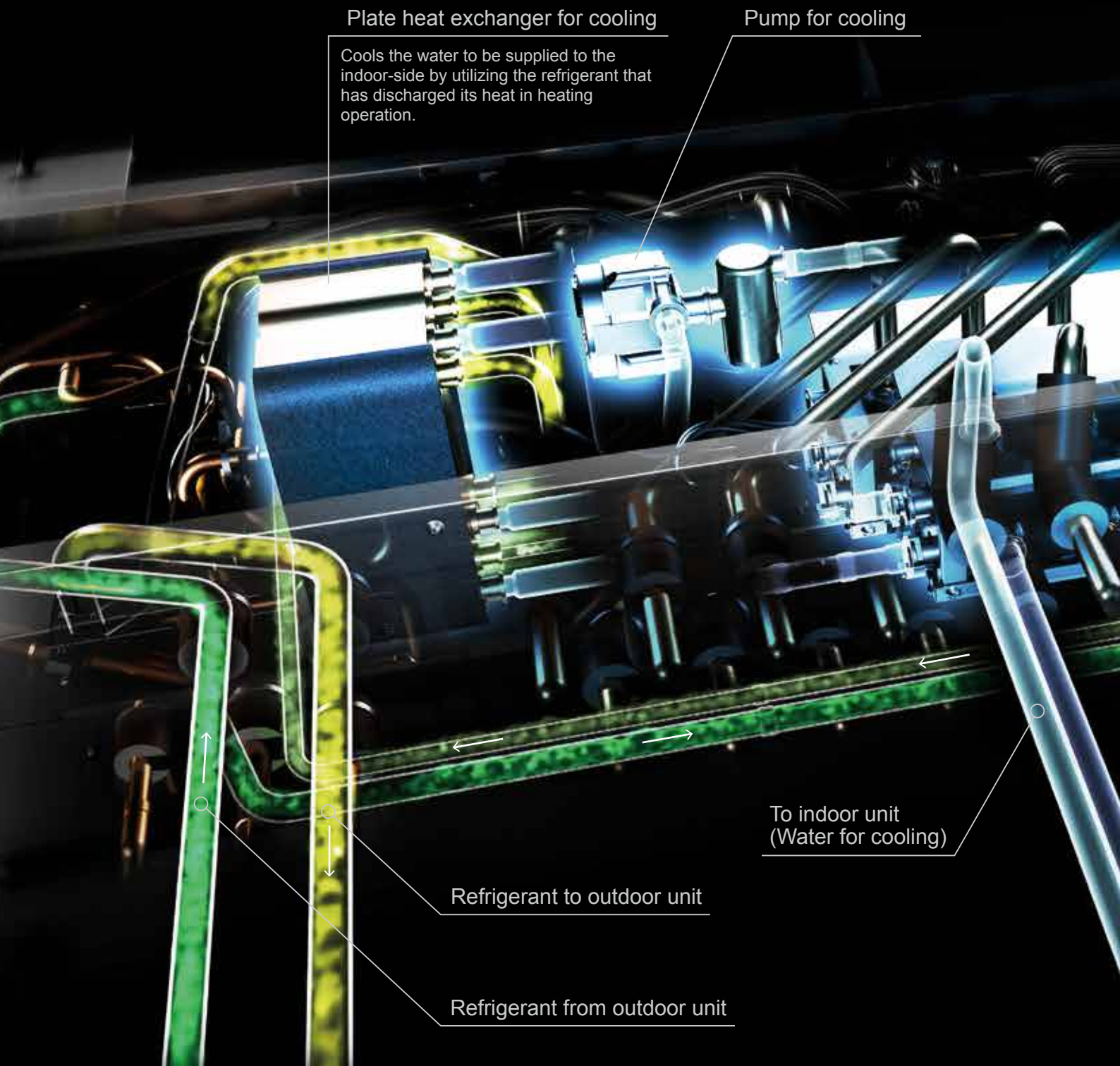
COMFORT

Having individual comfort control is important in order for patients and residents in a hospital or healthcare facility to experience optimal comfort, whether over a short or long term period.

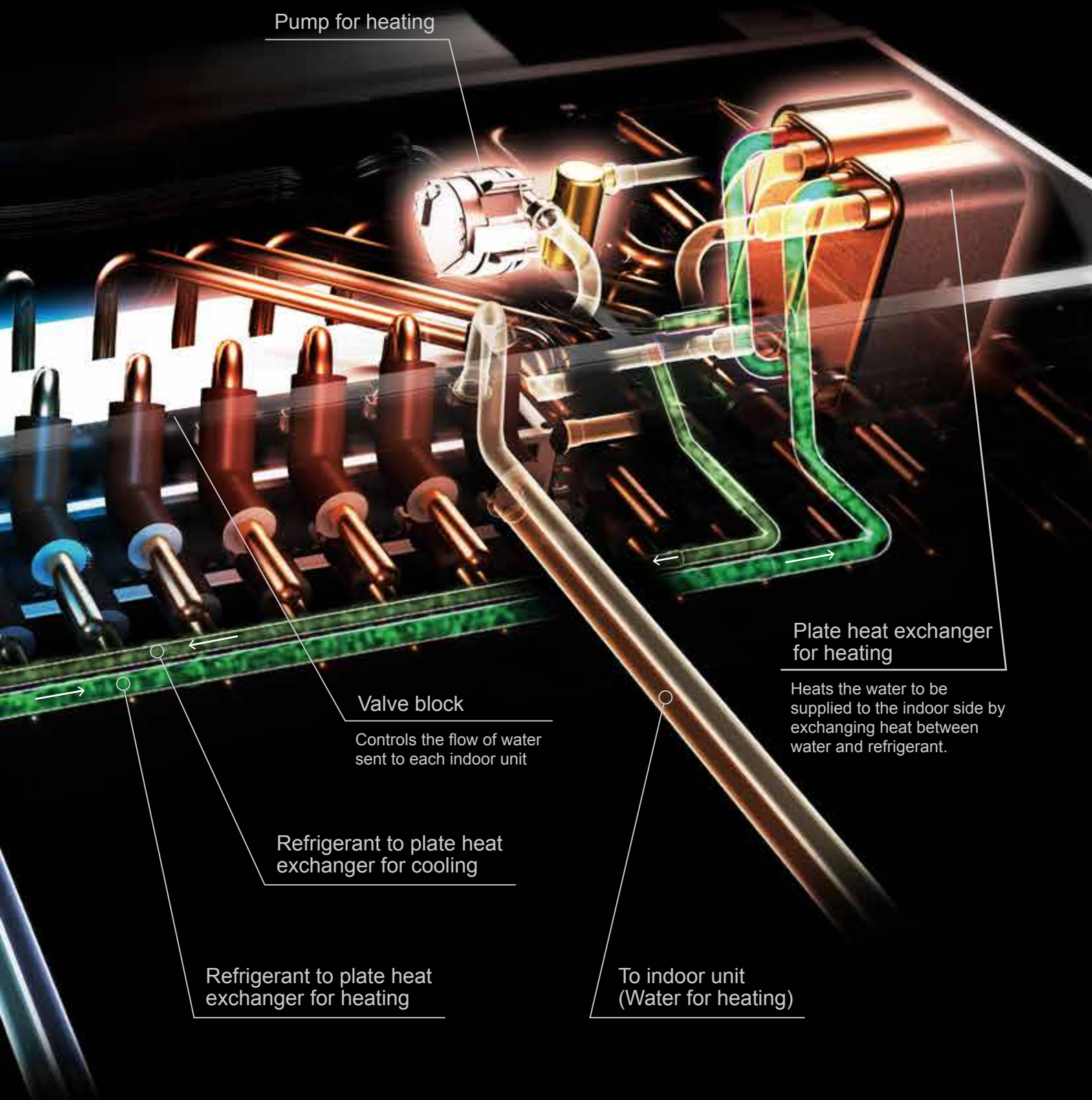
LESS REFRIGERANT

Consultation rooms are often small in size and airtight which require the use of door grilles or other means to mitigate the danger of a possible VRF refrigerant leak exposure. With the HYBRID VRF CITY MULTI system, refrigerant is not used in the occupied space. The concerns of refrigerant concentration are relieved and the need of a leak detection is negated.

Hydro Branch Circuit Controller (During simultaneous heating and cooling operation)



Our unique Hybrid VRF system with HBC controller that exchanges heat between water and refrigerant



Two series of outdoor units up to 14 ton



Air Source Unit

PURY-(E)P-TYNU-A
PURY-P-ZKMU-A
(6-14 ton)



Water Source Unit

PQRY-P-TYLMU-A1
PQRY-P-ZLMU-A1
(6-14 ton)

R410A-compatible outdoor units are available in two line-ups: The air-cooled PURY-Series and the water-cooled PQRY-Series. Each series has a line-up of between 6 and 14 ton.

Revolutionary technology

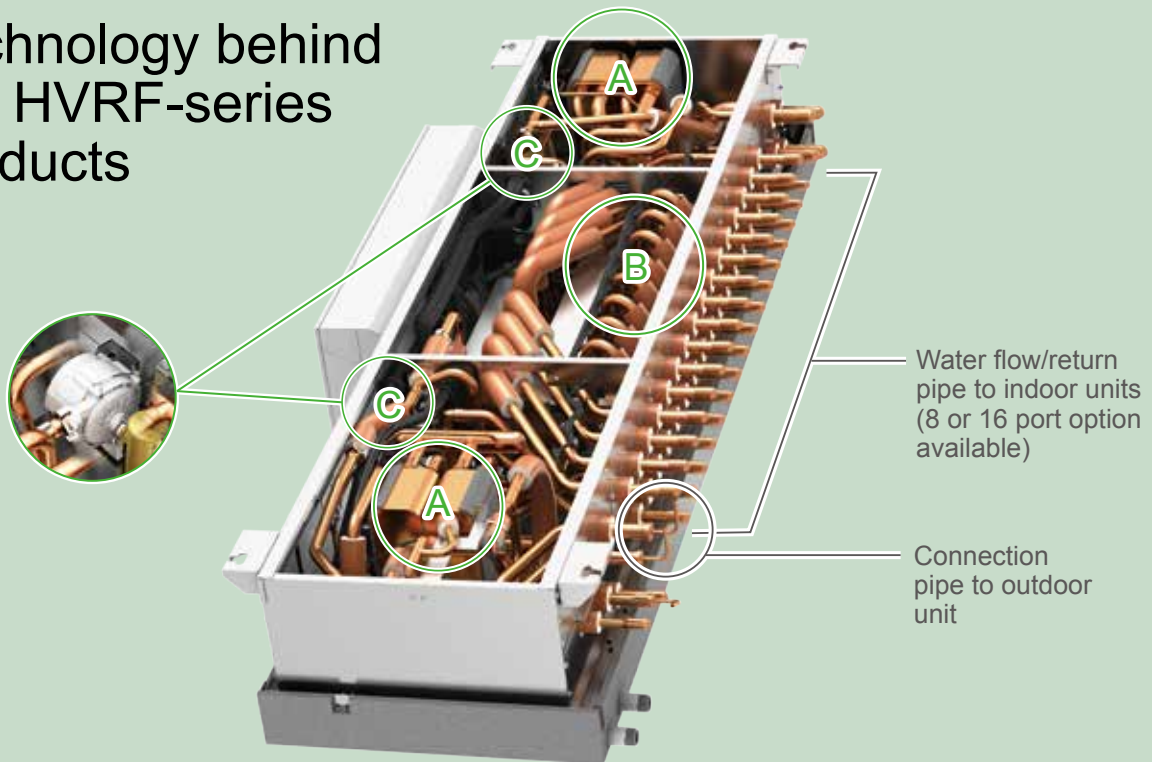
The HBC Controller plays a key part in HVRF

The HBC controller plays a key role in heat exchange between water and refrigerant. We have a line-up of 8-branch and 16-branch HBC Controllers. By connecting the Sub HBC controller, the number of connectable indoor units can be increased.



HYBRID VRF CITY MULTI uses water in the indoor unit side. Refrigerant is circulated in the limited sections in the outdoor unit side.

Technology behind our HVRF-series products



A

Plate Heat Exchanger

The HBC controller has two plate heat exchangers inside. The heat exchange is performed between the refrigerant from outdoor units and water from indoor units inside the HBC controller. During simultaneous heating/cooling, one is used for heating and the other is used for cooling.

B

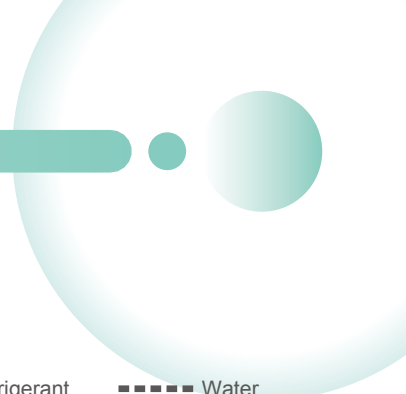
Valve Block

A valve block serves as a pathway that connects indoor units and the HBC controller. It distributes water from the indoor unit side to the plate heat exchanger, and then leads the heat-exchanged water back to the indoor unit side. Two types of HBC controllers are available: One with 8 ports and the other with 16 ports to accommodate a different number of indoor units.

C

Pump

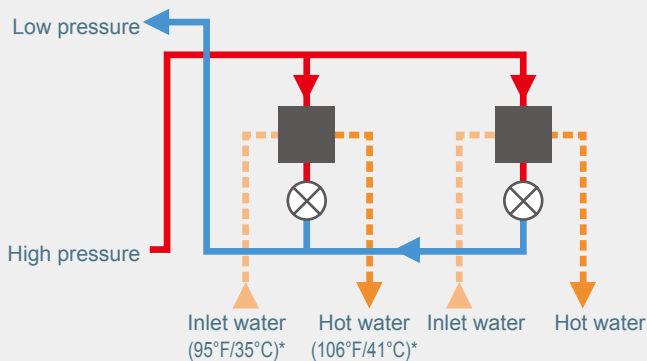
Each heat exchanger has a DC inverter-driven water pump, one of the crucial components for controlling water flow to the indoor units in the system.



— Refrigerant - - - - Water

Heating operation

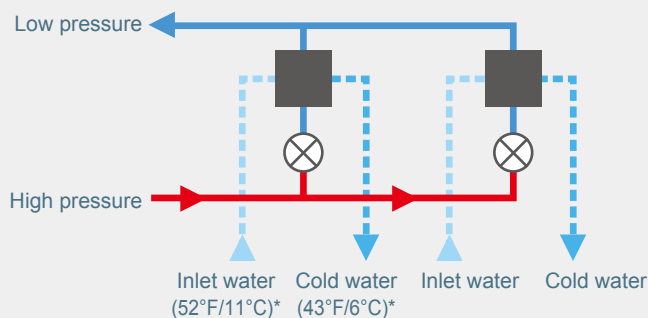
To produce hot water for heating operation, water from indoor unit is heated by heat exchange with high temperature, high-pressure refrigerant gas inside the plate heat exchanger.



■ Plate heat exchanger ⊗ Expansion valve

Cooling operation

To produce cold water for cooling operation, water from the indoor unit is chilled by heat exchange with low-pressure refrigerant inside the plate heat exchanger.

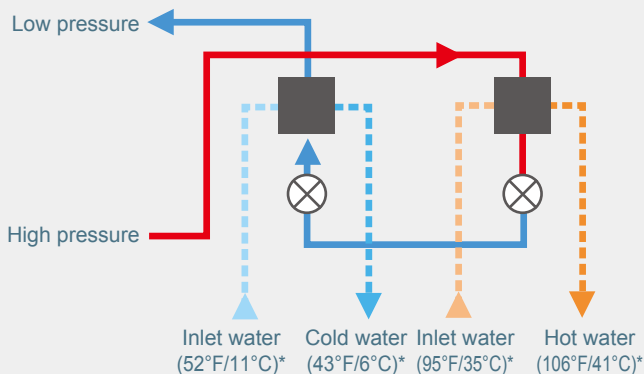


■ Plate heat exchanger ⊗ Expansion valve

Simultaneous heating and cooling operation

First, water from the indoor unit is heated by heat exchange with high-temperature, high-pressure refrigerant gas inside the plate heat exchanger for heating operation.

Refrigerant gas is changed to low-pressure liquid refrigerant after passing through the expansion valve. Then, heat exchange is performed between the refrigerant and water from the indoor unit inside the other plate heat exchanger. Chilled water is used for cooling operation.



■ Plate heat exchanger ⊗ Expansion valve

*Water-temperatures provided are referential values. Water temperatures vary with operating conditions.

Installation image

VRF heat recovery outdoor unit

Centralized controller*1

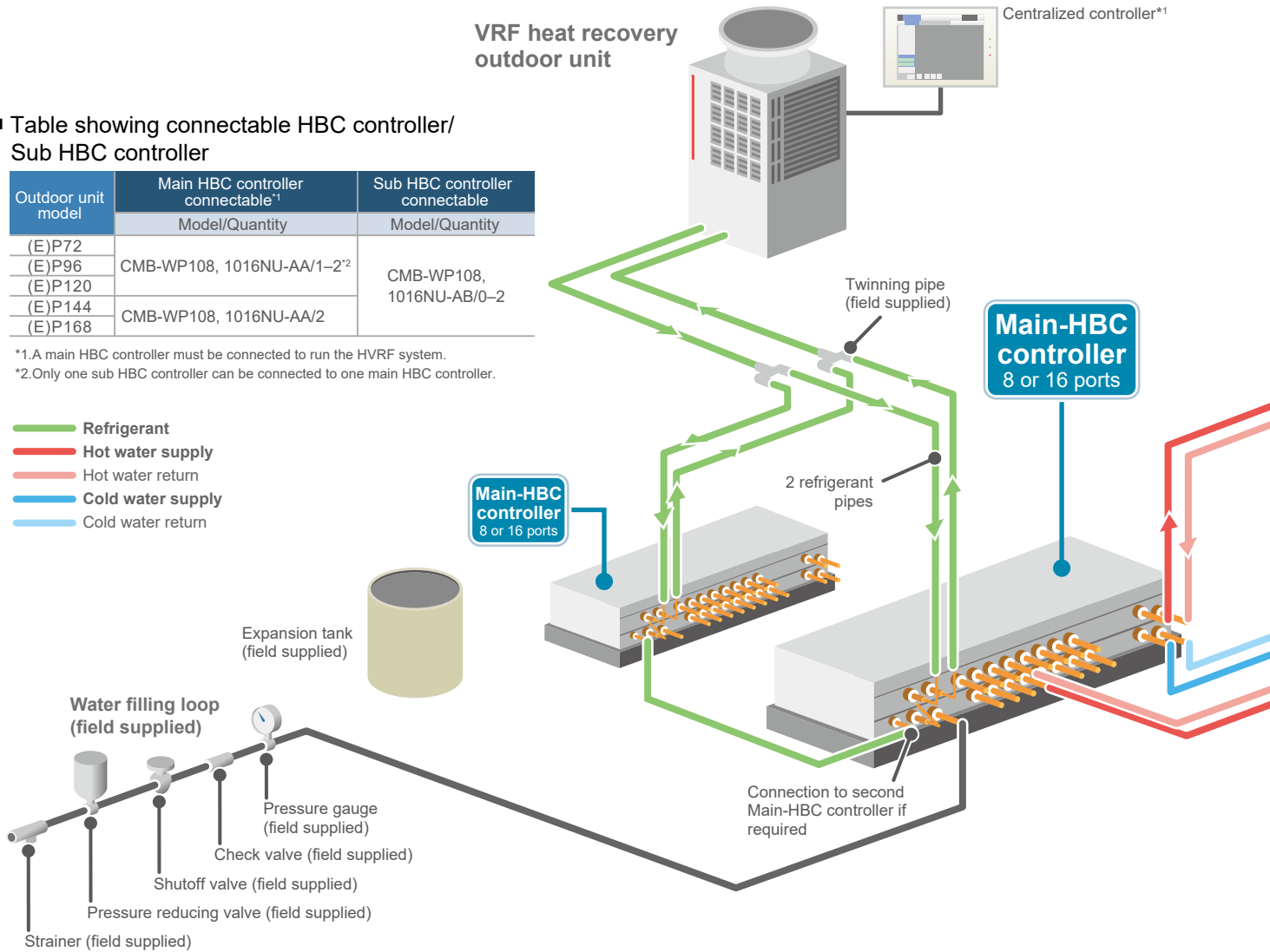
■ Table showing connectable HBC controller/
Sub HBC controller

Outdoor unit model	Main HBC controller connectable*1	Sub HBC controller connectable
	Model/Quantity	Model/Quantity
(E)P72	CMB-WP108, 1016NU-AA/1-2*2	CMB-WP108, 1016NU-AB/0-2
(E)P96		
(E)P120		
(E)P144		
(E)P168		

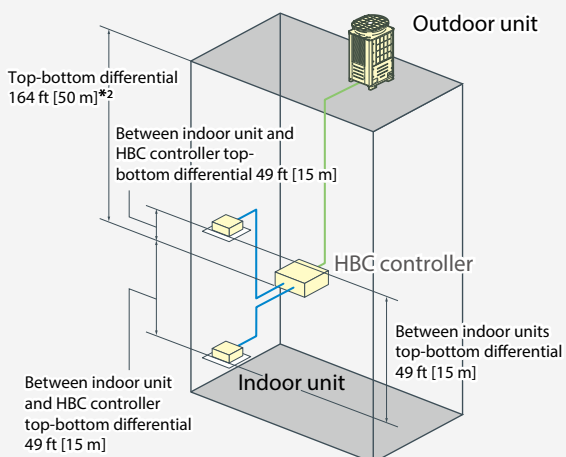
*1. A main HBC controller must be connected to run the HVRF system.

*2. Only one sub HBC controller can be connected to one main HBC controller.

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



• Piping length



R : Refrigerant Pipe W : Water Pipe

Refrigerant Piping Lengths Maximum feet [meters]

- R Distance between outdoor and HBC controller 360 [110]
- W Farthest indoor from HBC controller 196 [60]

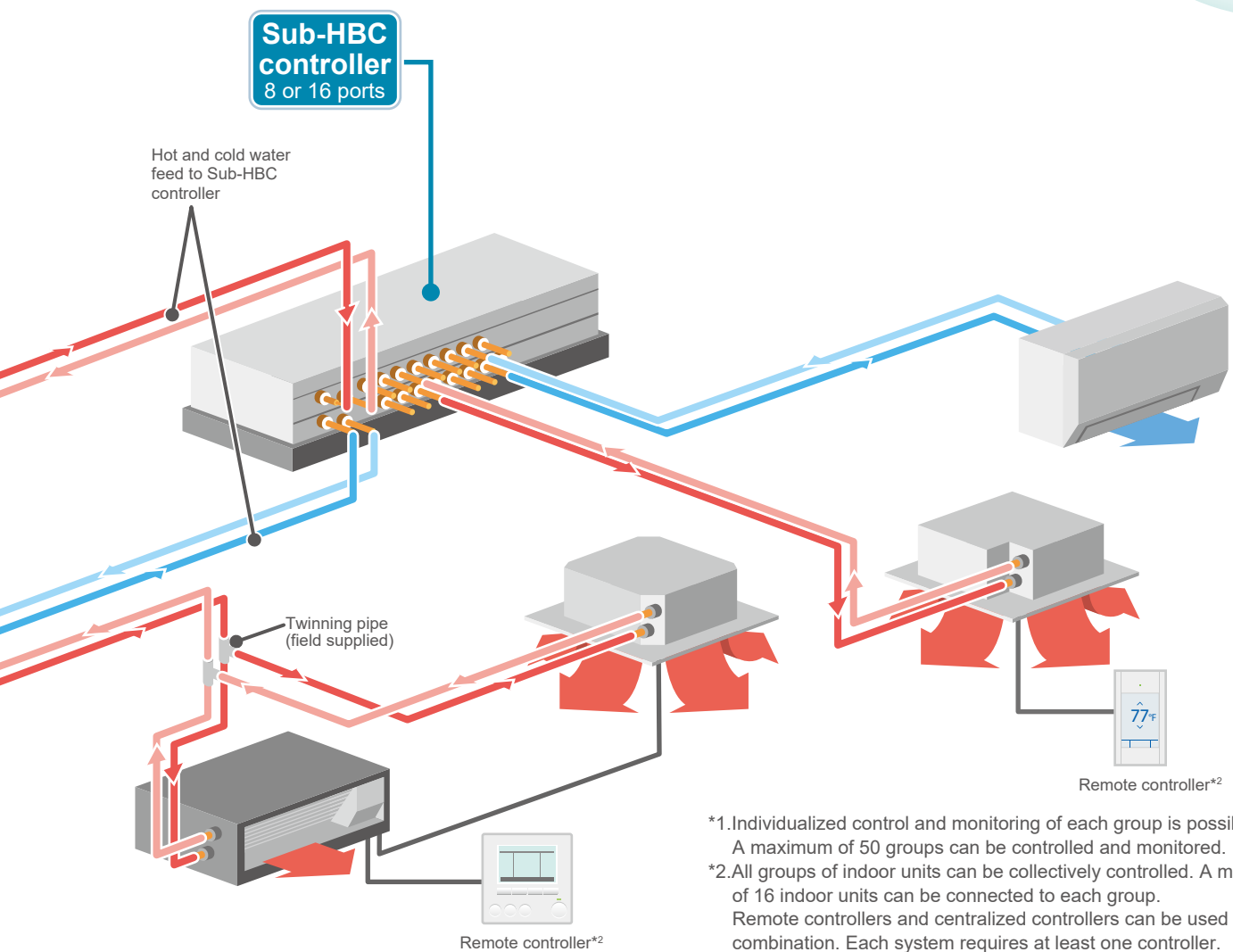
Vertical differentials between units Maximum feet [meters]

- R HBC controller/outdoor (outdoor unit above HBC controller) 164 [50]*2
- R HBC controller/outdoor (outdoor unit below HBC controller) 131 [40]*3
- W Indoor/HBC controller 49 (32) [15 (10)]*1
- W Indoor/indoor 49 (32) [15 (10)]*1
- R HBC controller/HBC controller 49 (32) [15 (10)]*1

*1. Values in () are applied when indoor total capacity exceeds 130% of outdoor unit capacity.

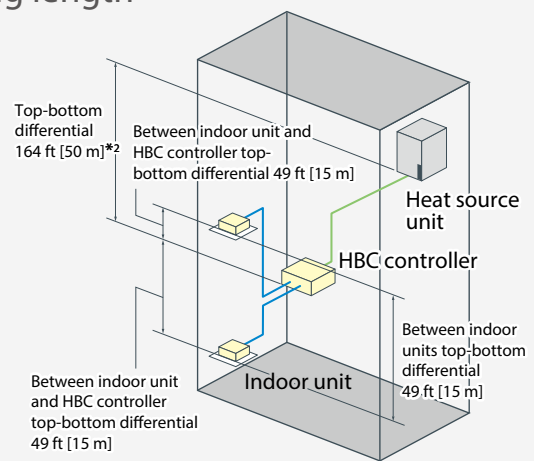
*2. 90 m is available depending on the model and installation conditions. For more detailed information, contact your local distributor.

*3. 60 m is available depending on the model and installation conditions. For more detailed information, contact your local distributor.



- *1. Individualized control and monitoring of each group is possible. A maximum of 50 groups can be controlled and monitored.
- *2. All groups of indoor units can be collectively controlled. A maximum of 16 indoor units can be connected to each group. Remote controllers and centralized controllers can be used in combination. Each system requires at least one controller.

• Piping length



R : Refrigerant Pipe **W** : Water Pipe

Refrigerant Piping Lengths Maximum feet [meters]

R Distance between heat source and HBC controller	360 [110]
W Farthest indoor from HBC controller	196 [60]

Vertical differentials between units Maximum feet [meters]

R HBC controller/heat source (heat source unit above HBC controller)	164 [50]*2
R HBC controller/heat source (heat source unit below HBC controller)	131 [40]*3
W Indoor/HBC controller	49 (32) [15 (10)]*1
W Indoor/indoor	49 (32) [15 (10)]*1
R HBC controller/HBC controller	49 (32) [15 (10)]*1

*1. Values in () are applied when indoor total capacity exceeds 130% of outdoor unit capacity.
 *2. 90 m is available depending on the model and installation conditions. For more detailed information, contact your local distributor.
 *3. 60 m is available depending on the model and installation conditions. For more detailed information, contact your local distributor.

Line-up

*Please refer to the DATA BOOK for specifications.




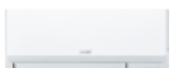

■ Line-up of Outdoor units/Heat source units

System	Model Name		Model	6 ton	8 ton	10 ton	12 ton	14 ton
				P72	P96	P120	P144	P168
Air cooled	Standard	PURY-P T/YNU-A	 size S size L size XL	S	L	L	L	XL
		PURY-P ZKMU-A	 size S size L size XL	S	L	XL	XL	-
	High Efficiency	PURY-EP T/YNU-A	 size S size L size XL	S	L	L	L	XL
Water cooled	Standard	PQRY-P T/YLMU-A1	 size S size L	S	S	S	L	L
		PQRY-P ZLMU-A1	 size S size L	S	S	S	L	L

■ Line-up of HBC controllers

	Model Name	8 ports	16 ports
Main-HBC controller	CMB-WP108/1016NU-AA		
Sub-HBC controller	CMB-WP108/1016NU-AB		

■ Line-up of Indoor units

Type		Model Name	P04	P06	P08	P12	P15	P18	P24	P27	P30	P36	P48
Ceiling cassette	37-13/32in. (950mm) × 37-13/32in. (950mm)	PLFY-WL NEMU-E 		●	●	●	●	●	●		●	●	●
	24-19/32in. (625mm) × 24-19/32in. (625mm)	PLFY-WL NFMU-E 	●	●	●	●	●						
Ceiling concealed medium static pressure		PEFY-WL NMAU-A 		●	●	●	●	●	●	●	●	●	●
Wall-mounted		PKFY-WL NLMU-E 	●	●	●	●	●						
		PKFY-WL NKMU-E 						●	●		●		

A wide range of remote controller options for individual and centralized air-conditioner control

• Centralized Remote Controller



AE-200A/AE-50A



EW-50A



TC-24B



PAC-YT40ANRA

• Individual Remote Controller



PAR-U01MEDU



PAC-YT53CRAU



PAR-CT01MAU



PAR-40MAAU

Mitsubishi Electric also offers centralized controllers and individual remote controllers, customer can easily control units according to user demands.

Depending on the air-conditioning of the space, each indoor unit can be controlled individually, increasing efficiency of operation.

⚠ Warning

- Do not use refrigerant other than the type indicated in the manuals provided with the unit and on the nameplate.
 - Doing so may cause the unit or pipes to burst, or result in explosion or fire during use, repair, or at the time of disposal of the unit.
 - It may also be in violation of applicable laws.
 - MITSUBISHI ELECTRIC CORPORATION cannot be held responsible for malfunctions or accidents resulting from the use of the wrong type of refrigerant.
- Our air conditioning equipment and heat pumps contain a fluorinated greenhouse gas, R410A.

