

WATER:

ENVISION VRF IN SPACES
YOU NEVER COULD BEFORE.



INTRODUCING  HYBRID VRF™



**MITSUBISHI
ELECTRIC**

Heating and Cooling

CITY MULTI®

THE INDUSTRY'S FIRST AND ONLY HYBRID VRF TECHNOLOGY

Mitsubishi Electric, renowned for its world-class innovation in developing sustainable technology, presents Hybrid VRF (HVRF) – the world's first all-electric 2-pipe hydronic heat recovery system that replaces refrigerant with water in occupied zones.

DESIGN WITH EASE OF MIND, WITHOUT LIMITATIONS.

Mitsubishi Electric's HVRF is the industry's first system to use refrigerant between the outdoor unit and the Hybrid Branch Controller (HBC) and water between the HBC Controller and the indoor units. This makes it ideal for buildings with small-occupied spaces as the technology does not use refrigerant between the HBC and Indoor Fan Coil Units, which allows for designing without concern for refrigerant concentration limits and contributes to reducing carbon emissions as it runs on electricity. The 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.

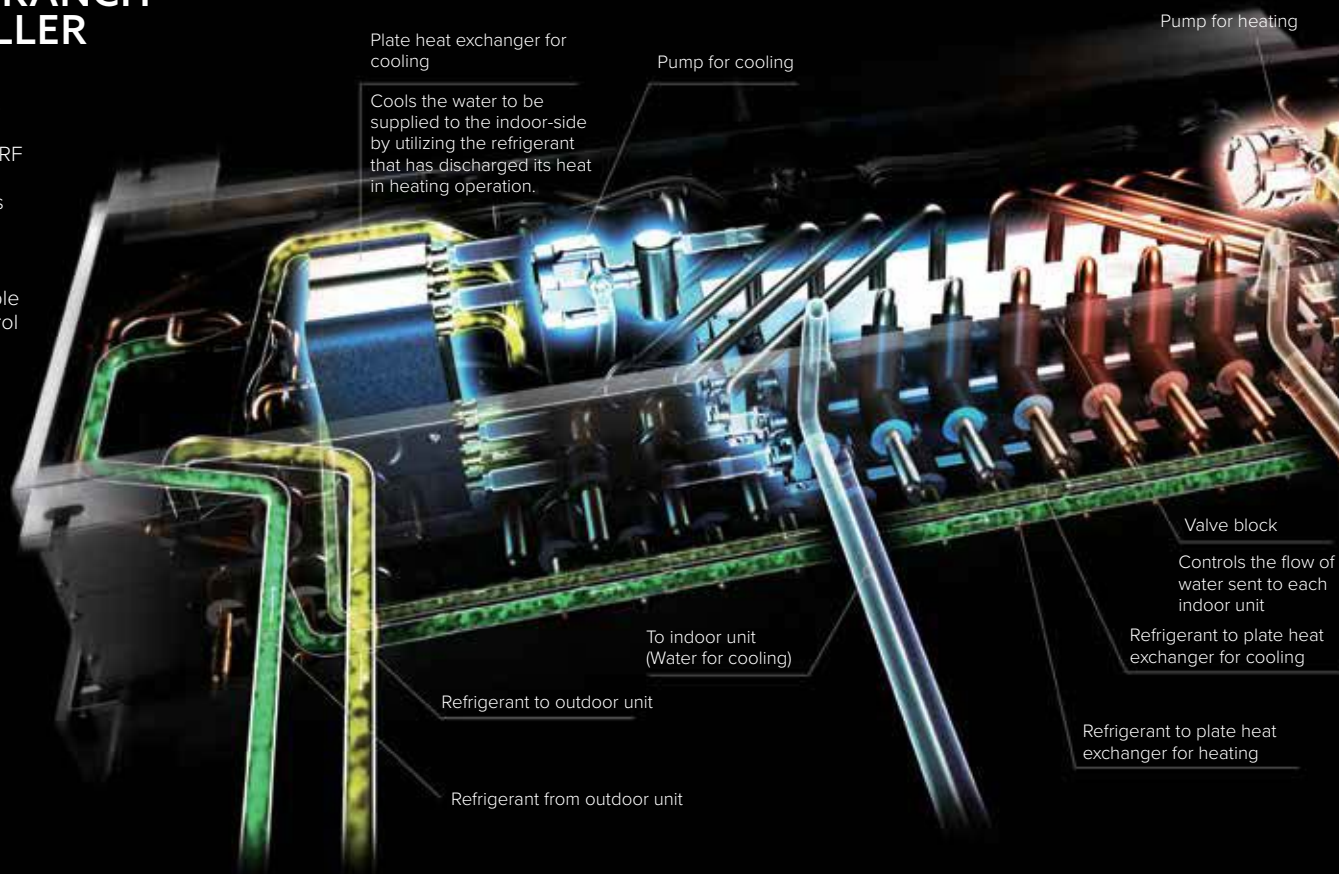
HYBRID VRF SYSTEM

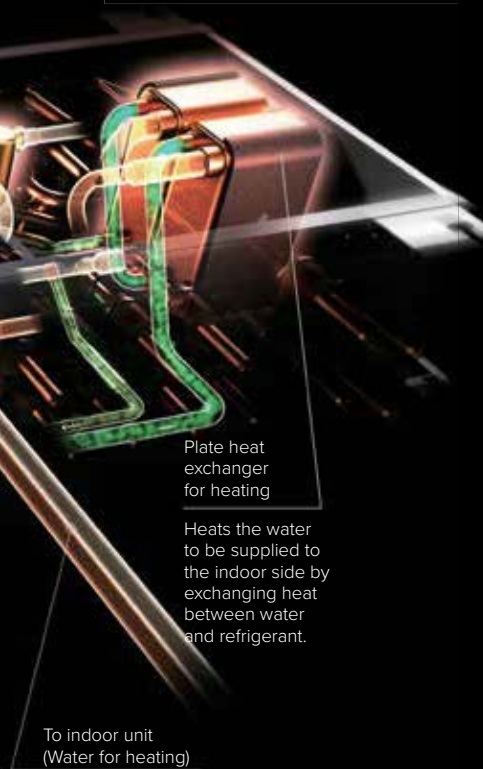
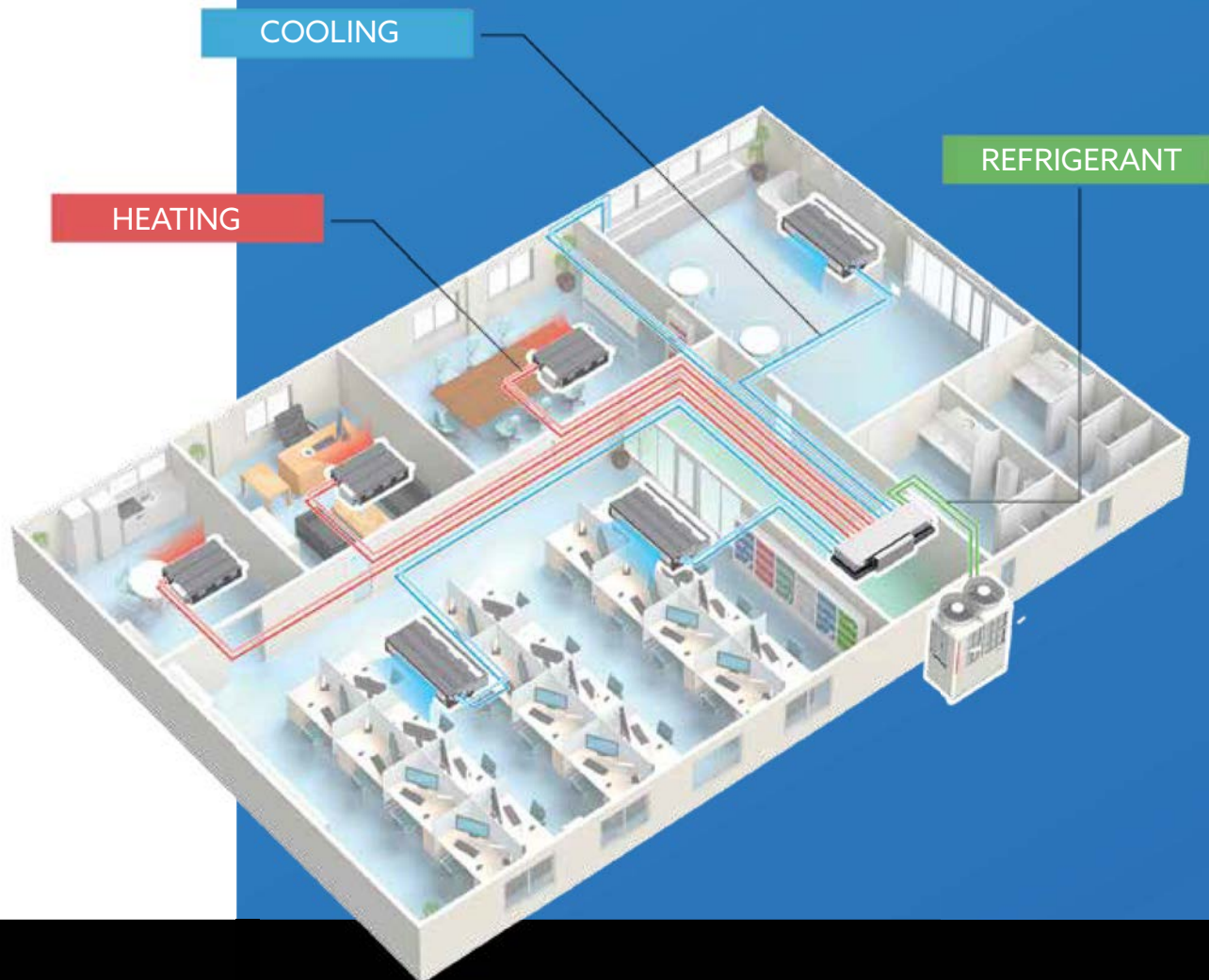
1. No refrigerant in occupied zones
2. Smaller system refrigerant volume
3. Simultaneous heating and cooling operation with a 2-pipe system
4. High energy efficiency through heat recovery
5. Easy control through M-NET

HYBRID BRANCH CONTROLLER

LEAVE LIMITATIONS OUT IN THE COLD

The unique Hybrid VRF system with the HBC Controller exchanges heat between water and refrigerant. This allows it to provide comfortable and stable air temperature control with no refrigerant in occupied spaces.





TWO SERIES OF OUTDOOR UNITS UP TO 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.



AIR SOURCE UNIT

PURY-(E)P-T/YNU-A
PURY-P-ZKMU-A
(6-14 TON)



WATER SOURCE UNIT

PQRY-P-T/YLMU-A1
PQRY-P-ZLMU-A1
(6-14 TON)

THE HYBRID ADVANTAGE: HVRF BENEFITS

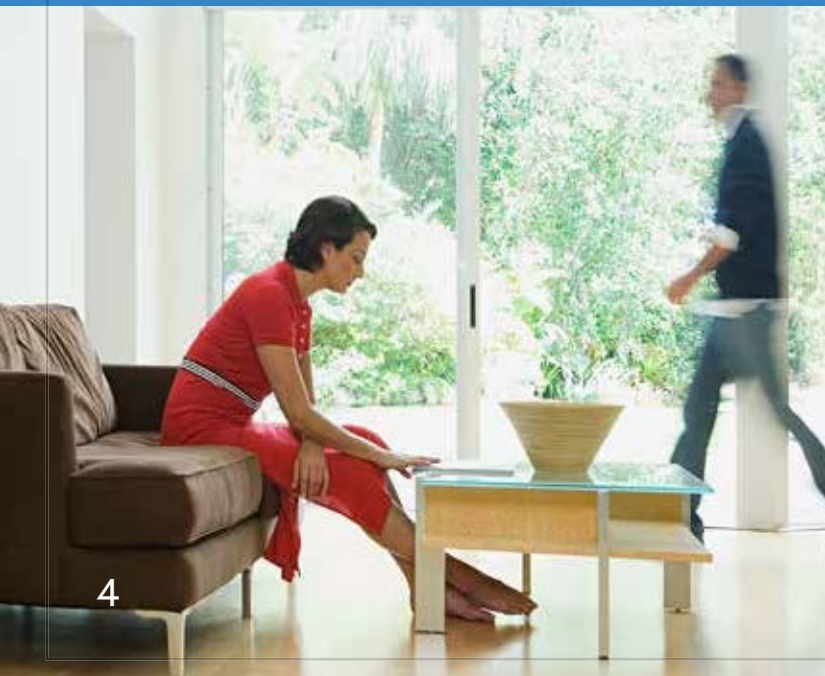
Hybrid VRF (HVRF) is the world's first 2-pipe VRF heat recovery system, which replaces refrigerant with water in occupied zones. It's another world-class innovation in sustainable technology from Mitsubishi Electric.

REDUCTION OF REFRIGERANT AND ASSOCIATED PIPING

Since refrigerant does not flow between the HBC Controller and indoor units, this significantly reduces the volume of refrigerant in the system so the occupied zones are free of refrigerant.

SMALLER SYSTEM REFRIGERANT VOLUME

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





HYBRID VRF WORKS SEAMLESSLY IN A PACKAGED MITSUBISHI ELECTRIC SYSTEM

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



SIMULTANEOUS HEATING AND COOLING OPERATION WITH A 2-PIPE SYSTEM

HVRF is a 2-pipe system requiring less piping compared to a hydronic 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.



HIGH ENERGY EFFICIENCY THROUGH HEAT RECOVERY

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



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, and can be integrated into Central BAS Systems using BACnet.



MANAGEABLE PHASED INSTALLATION

The decentralized system of HVRF means phased installation is possible.



SMALL FOOTPRINT. LOW WEIGHT.

HVRF is modular, has a small footprint and light weight outdoor units, and is available in a flexible range of VRF options.

NOW YOU CAN TAKE VRF ANYWHERE.

COMFORT

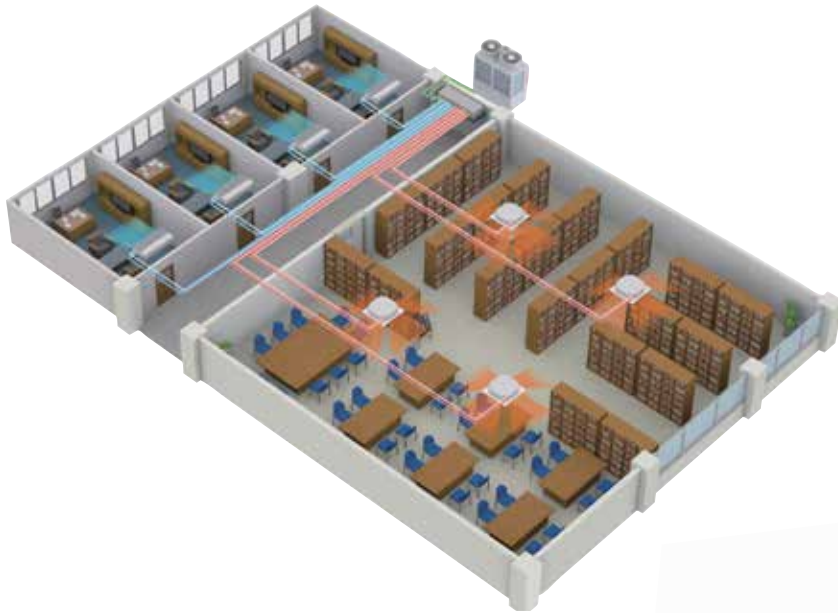
No matter the application, offering a comfortable environment throughout the building is imperative to the occupant experience. The HYBRID VRF CITY MULTI system provides comfort with a gradual rate of change of temperature within the air-conditioned space delivering a comfortable and stable environment. It also features individual control while delivering heating and cooling simultaneously.



OFFICES



HOTELS & RESIDENCES



EDUCATIONAL FACILITIES



HOSPITALS & HEALTHCARE FACILITIES

LESS REFRIGERANT

What's more, with the Hybrid VRF system, refrigerant is only used between the outdoor unit and HBC, and occupied spaces are free of refrigerant. As a result, the concerns regarding refrigerant concentration limits in the occupied spaces are alleviated.

INNOVATION FLOWS LIKE WATER

THE HBC CONTROLLER: THE ENGINE OF HVRF

The HBC Controller plays a key role in heat exchange between water and refrigerant. 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. The number of connectable indoor units can be increased by connecting a Sub HBC Controller.

REVOLUTIONARY TECHNOLOGY BEHIND THE HVRF-SERIES PRODUCTS

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.

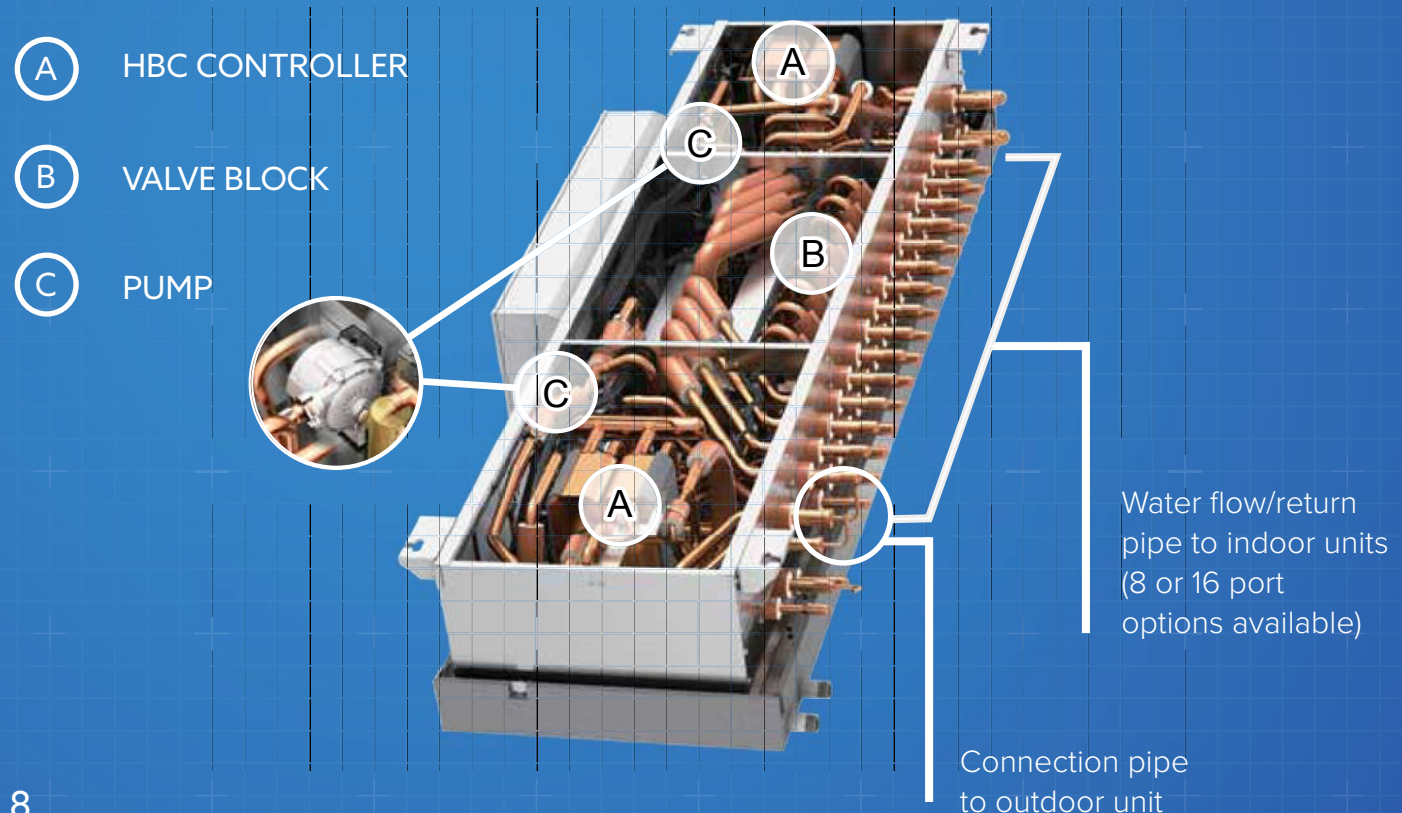
PUMP

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.

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.

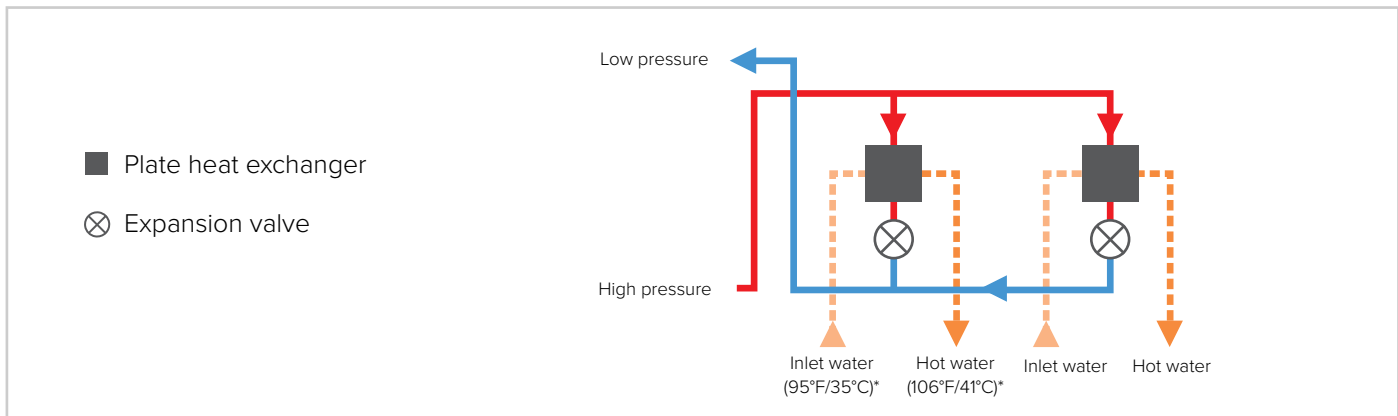
TECHNOLOGY BEHIND OUR HVRF-SERIES PRODUCTS



VISUALIZING OPERATION

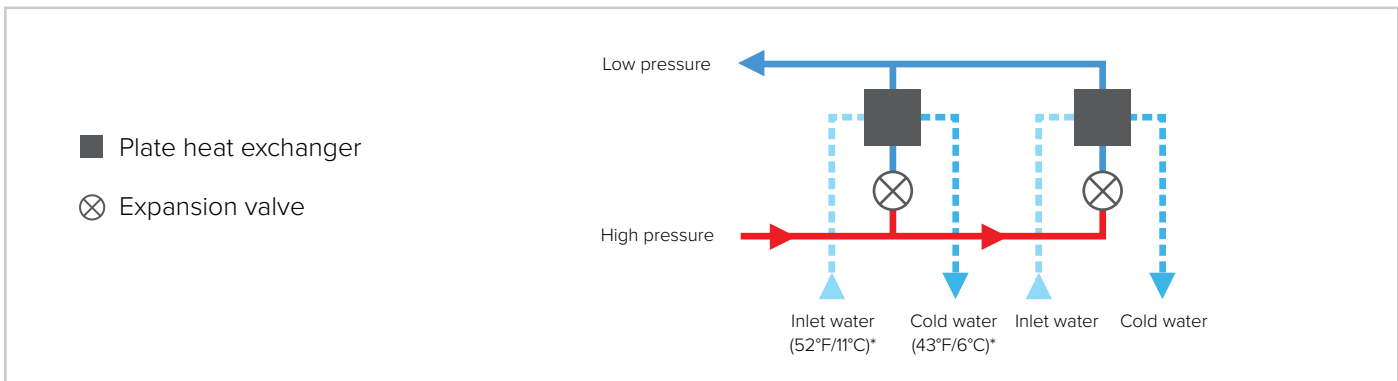
HEATING OPERATION

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



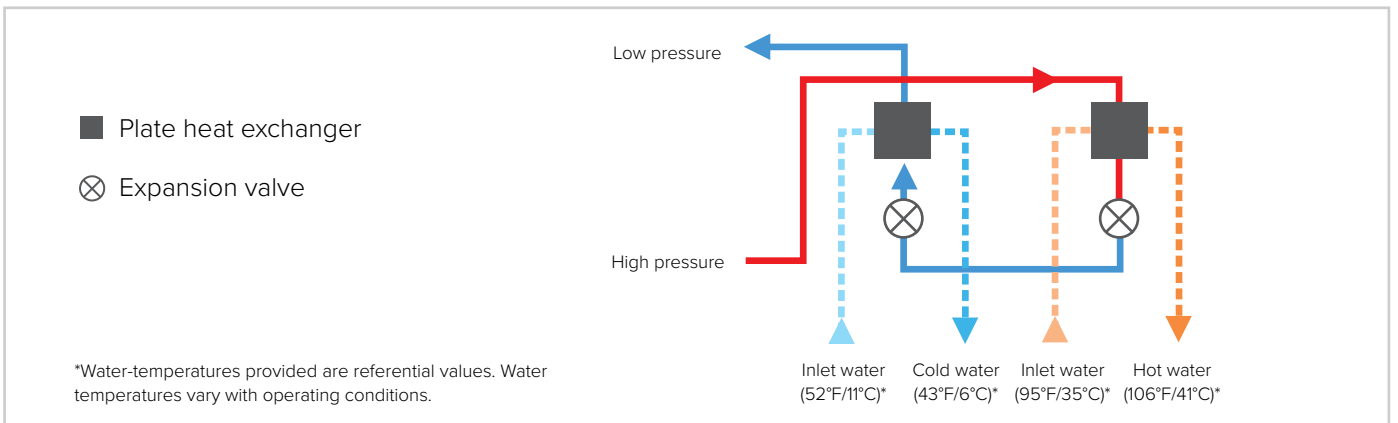
COOLING OPERATION

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.



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.



INSTALLATION

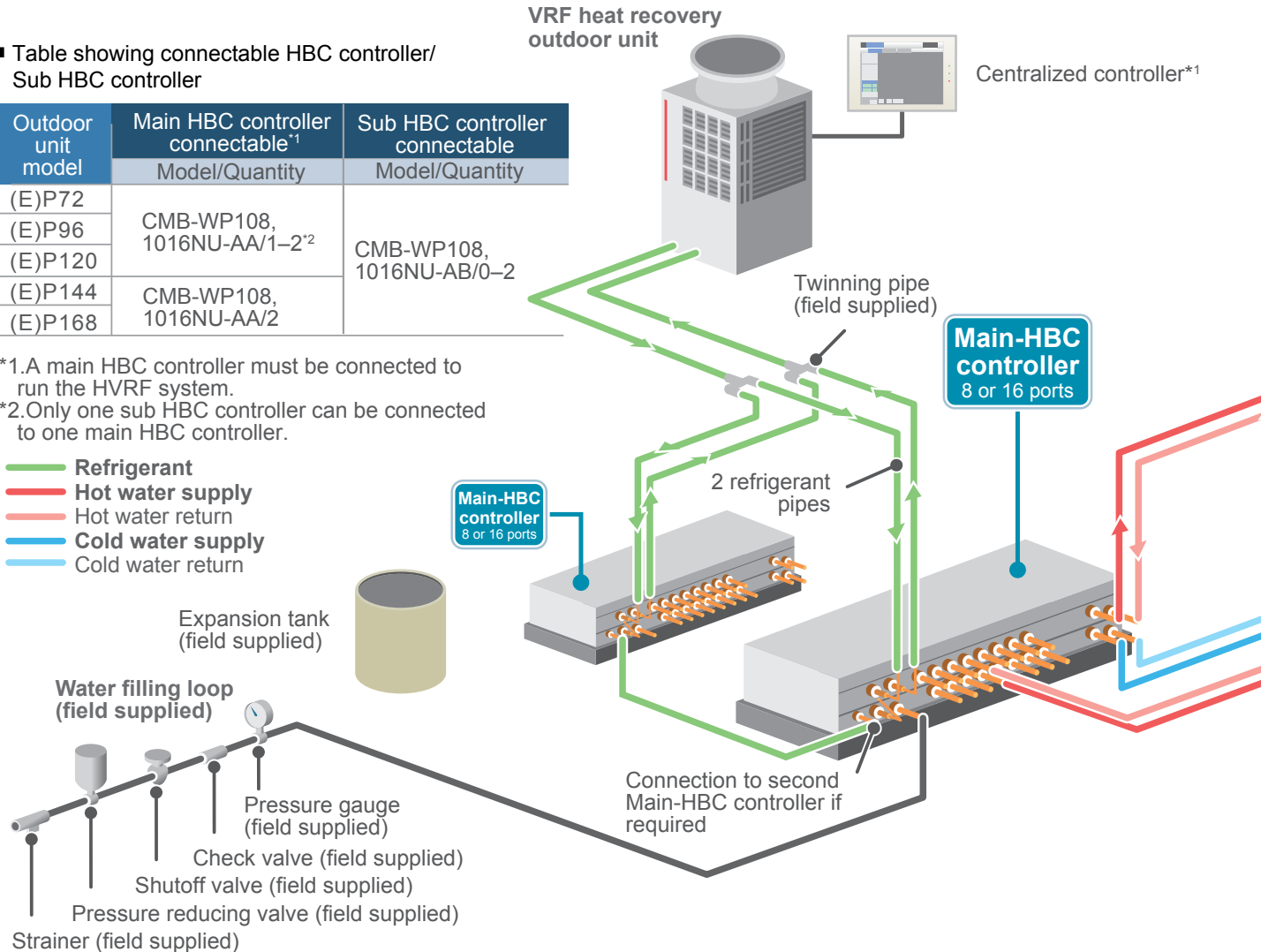
- Table showing connectable HBC controller/
Sub HBC controller

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

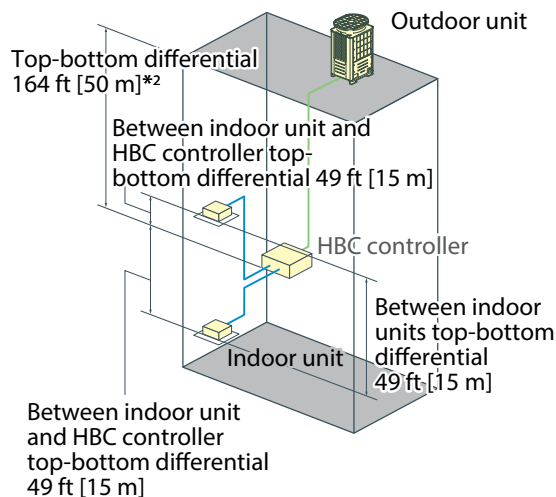
*1. A main HBC controller must be connected to run the HVRF system.

*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

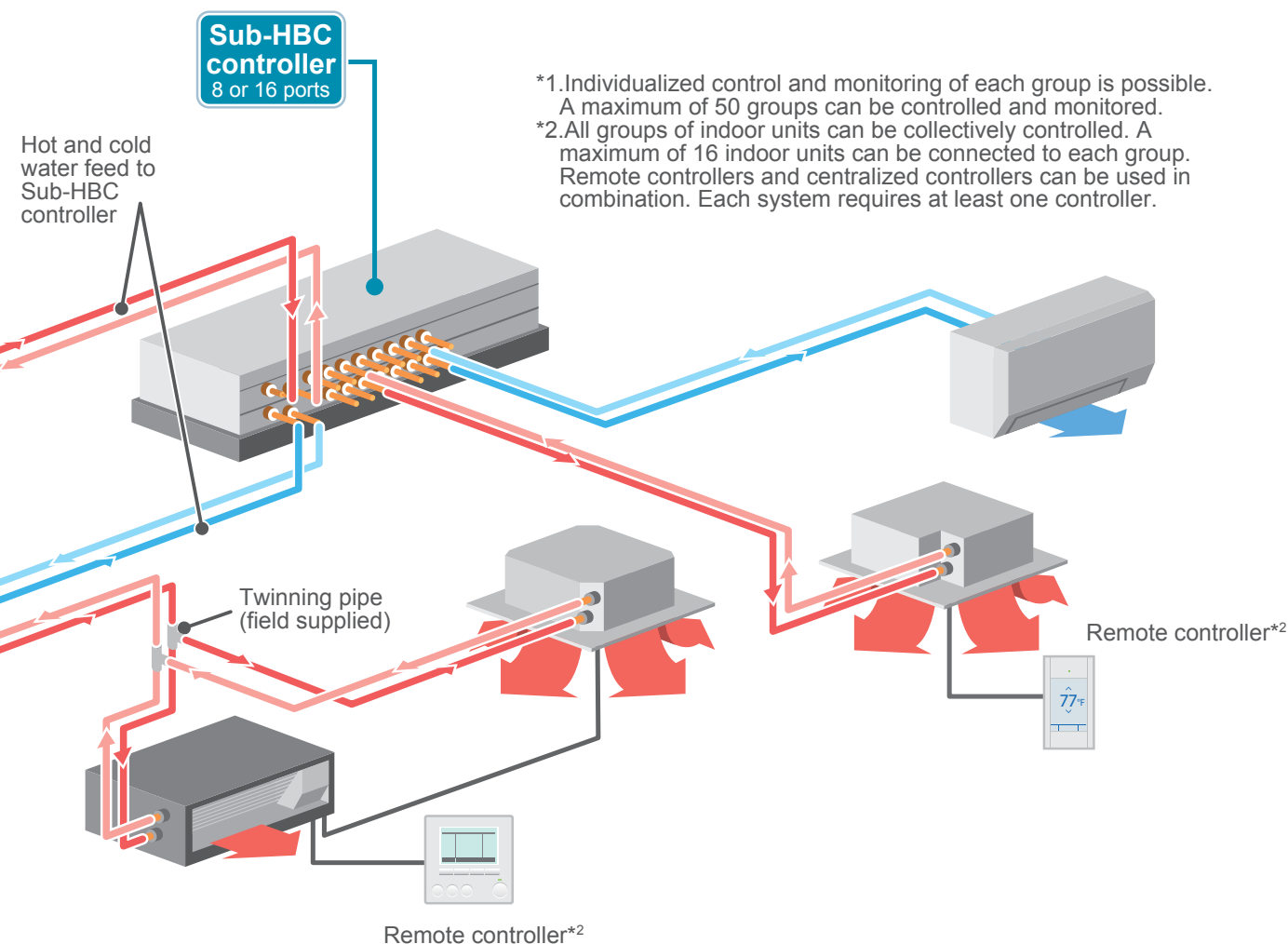


R : Refrigerant Pipe W : Water Pipe

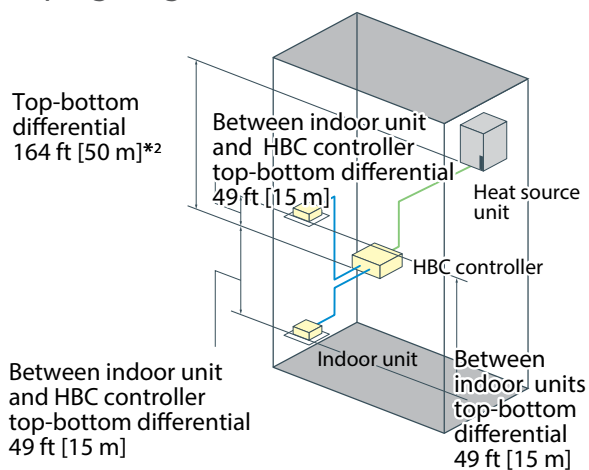
Refrigerant Piping Lengths	Maximum feet [meters]
R Distance between outdoor and HBC controller	360 [110]
W Farthest indoor from HBC controller	196 [60]

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.



• Piping length



Ⓡ: Refrigerant Pipe Ⓜ: Water Pipe

Refrigerant Piping Lengths Maximum feet [meters]

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

Vertical differentials between units Maximum feet [meters]

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

■ OUTDOOR UNITS

*Please refer to the DATA BOOK for specifications.

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

■ 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	●	●	●	●	●						
		PEFY-WL NMAU-A		●	●	●	●	●	●	●	●	●	●
Ceiling concealed medium static pressure													
		PKFY-WL NLMU-E	●	●	●	●	●						
		PKFY-WL NKMU-E						●	●		●		

■ HBC CONTROLLERS

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

A wide range of remote controller options for individual and centralized 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, BACnet integration and individual remote controllers. Users can easily control units according to user needs. Depending on the heating and cooling need in the space, each indoor unit can be controlled individually, increasing efficiency of operation.



SCAN TO DOWNLOAD SPEC SHEET
Learn more at HybridVRF.com



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.