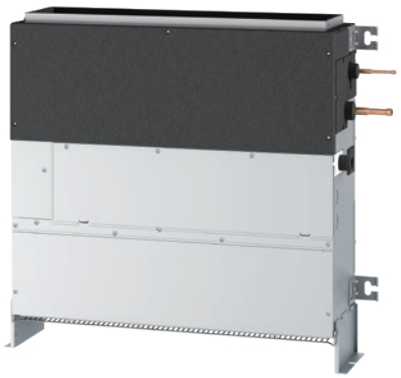
PFFY-P VCM-E

INDOOR UNITS - Floor standing concealed



CITY MULTI

Ideal for...

Built-in floor units: simplified installation for effective air **conditioning performance**.

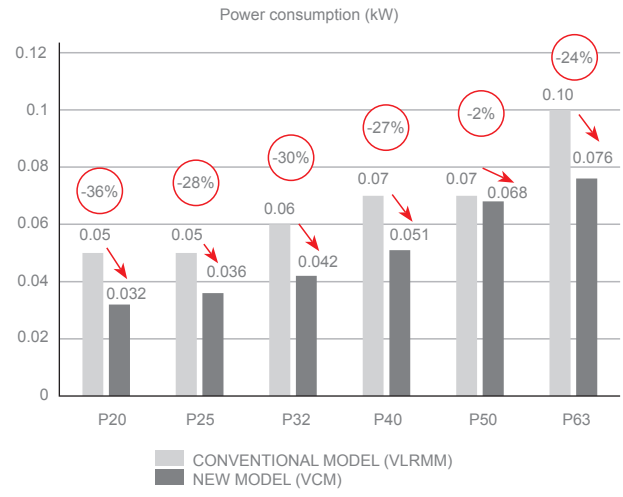
Flexible air-flow and external static pressure setting

The VCM series may be configured with a choice of four different static external pressure settings: 0, 10, 40 and 60 Pa. Besides airflow rate can be selected from 3 patterns (Low-Mid-High).

Reduced power consumption and noise

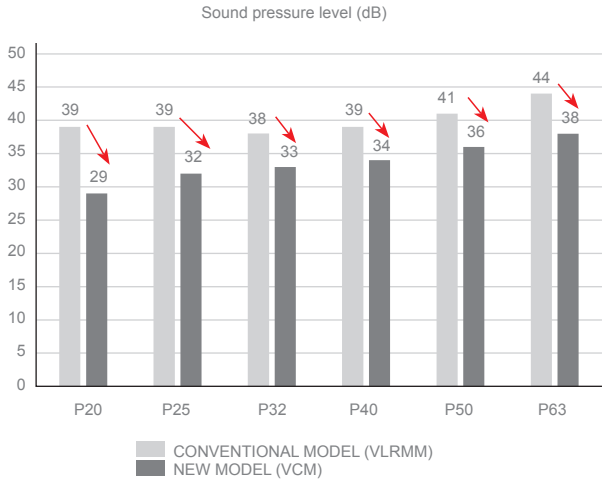
New structure realizes smoother airflow to reduce pressure loss in air pathway. The combination of an improved air pathway structure and components contributes to reduce power consumption and operation noise.

REDUCTION IN POWER CONSUMPTION



*Measurement condition (External static pressure: 40Pa Fan speed: High)
*The unit consumes the same power in both cooling and heating modes.

REDUCTION IN NOISE



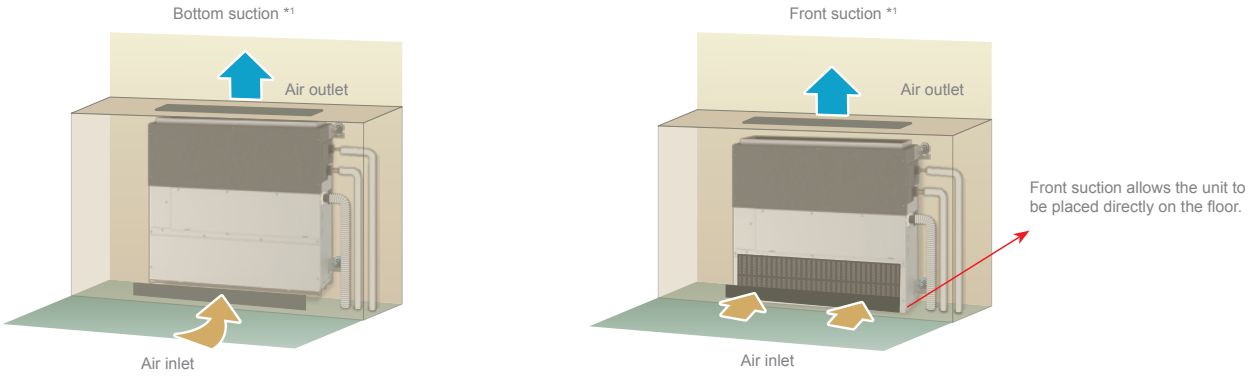
* The sound pressure level in operation is measured at 1.5 m apart from the front side and bottom side of the unit in anechoic room.

Key Technologies VCM

	ACO		Check!			Self Diagnosis	Auto Restart	Low Temp Cooling	

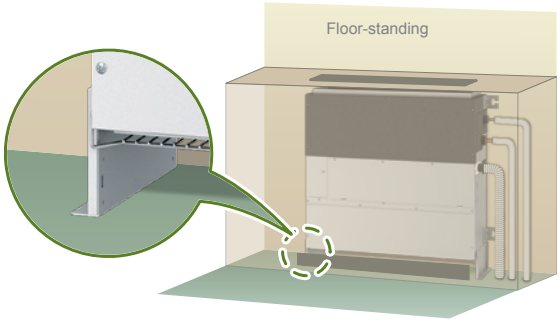
FLEXIBLE INSTALLATION

Selectable air inlet pattern
It is selectable bottom suction or front suction by changing panel, fan guard and filter.



*1 Select a site where the flow of supply and air is not blocked. This unit cannot be placed directly on the floor with bottom suction.
*2 Unit with front suction makes noise than that with bottom suction. It is recommended that the bottom suction to be selected when installing the units in rooms that should be quiet, such as bedrooms.

Floor-standing with legs
The unit can be placed on the floor with the supplied legs.



*Height of unit (with legs) is 690 mm.

Technical specifications

MODEL			PFFY-P20VCM-E	PFFY-P25VCM-E	PFFY-P32VCM-E	PFFY-P40VCM-E	PFFY-P50VCM-E	PFFY-P63VCM-E
Power			A single-phase, 220-240V, 50Hz / a single-phase, 208-230V, 60Hz					
Capacity in cooling mode*1		kW	2.2	2.8	3.6	4.5	5.6	7.1
		Btu/h	7,500	9,600	12,300	15,400	19,100	24,200
Capacity in heating mode*1		kW	2.5	3.2	4.0	5.0	6.3	8.0
		Btu/h	8,500	10,900	13,600	17,100	21,500	27,300
Power consumption*2	Cooling	kW	0.022	0.026	0.031	0.038	0.052	0.058
	Heating	kW	0.022	0.026	0.031	0.038	0.052	0.058
Current*2	Cooling	A	0.25	0.30	0.34	0.38	0.50	0.49
	Heating	A	0.25	0.30	0.34	0.38	0.50	0.49
External finish			Galvanized steel plate					
Dimensions HxLxW*3		mm	615(690)x700x200	615(690)x700x200	615(690)x700x200	615(690)x900x200	615(690)x900x200	615(690)x1,100x200
Net weight		kg	18	18	18.5	22.5	22.5	25.5
Heat exchanger			Cross fin (aluminium fin and copper piping)					
Fan	Type x Quantity		Sirocco x 2	Sirocco x 2	Sirocco x 2	Sirocco x 3	Sirocco x 3	Sirocco x 4
	Air flow		(Low-Mid-High)					
		m^3/min	5.5-6.0-7.0	5.5-6.5-8.0	5.5-7.0-8.5	8.0-9.5-11.0	10.0-11.5-13.5	12.0-14.0-16.5
		l/s	83-100-117	92-108-133	92-117-142	133-158-183	167-192-225	200-233-275
		cfm	177-212-247	194-230-282	194-247-300	282-335-388	353-406-477	424-494-583
	Static external pres.	Pa	<0> - 10 - <40> - <60>	<0> - 10 - <40> - <60>	<0> - 10 - <40> - <60>	<0> - 10 - <40> - <60>	<0> - 10 - <40> - <60>	<0> - 10 - <40> - <60>
Motor	Type		DC motor					
	Power output	kW	0.096	0.096	0.096	0.096	0.096	0.096
Air filter			Polypropylene honeycomb fabric (washable)					
Refrigerant pipe diameter	Gas (brazed)	mm	ø12.7	ø12.7	ø12.7	ø12.7	ø12.7	ø15.88
	Liquid (brazed)	mm	ø6.35	ø6.35	ø6.35	ø6.35	ø6.35	ø9.52
Field drainpipe diameter			O.D. 32 (1-1/4)					
Sound pressure*2		dB(A)	21-23-26	22-25-29	23-26-30	25-27-30	28-31-34	28-32-35

*1 For heating/cooling capacity, the maximum value with the unit operating in the following conditions is given.
Cooling: indoor 27°C (81°F) DB/19°C (66°F) WB, outdoor 35°C (95°F) DB. Heating: indoor 20°C (68°F) DB, outdoor 7°C (45°F) DB/6°C (43°F) WB.
*2 The values are measured at the factory setting of external static pressure (10 Pa).
*3 The values in ( ) show the height of unit with leg.

HVRF hydronic systems

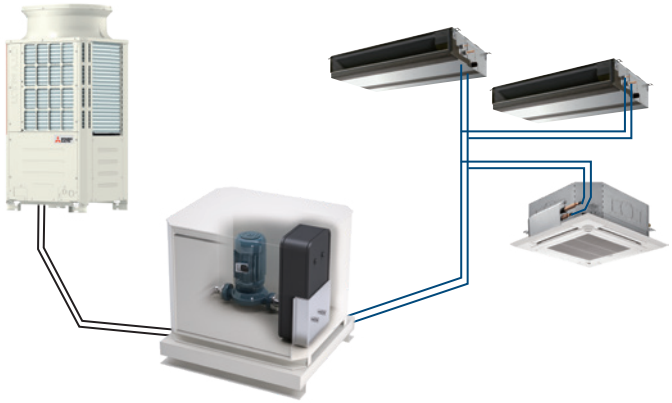
Y Line

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

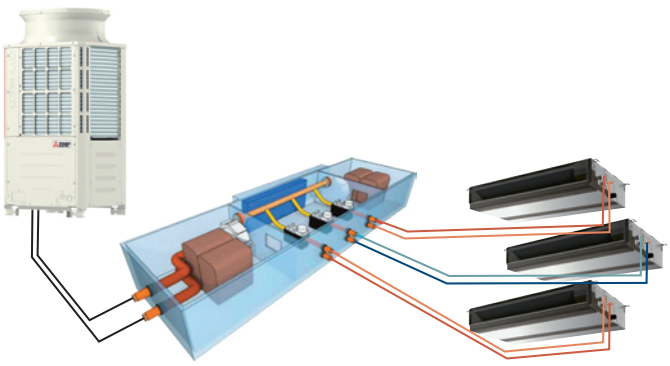
R410A

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.

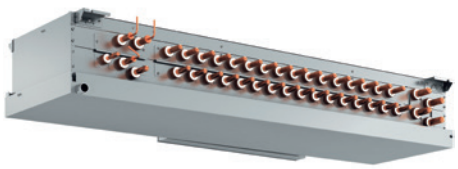
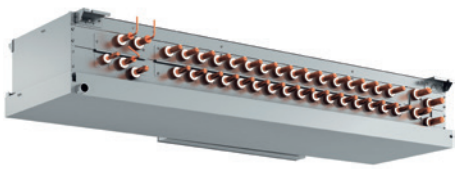
HVRF R2 LINE

HYDRONIC HBC CONTROLLER



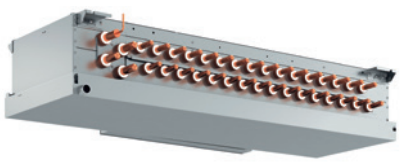
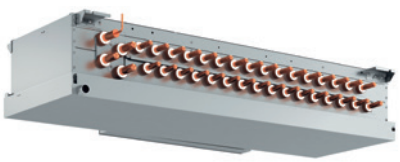
Y Next Stage LINE	**CITY MULTI Y SYSTEMS**	Heat pump systems with continuous heating
R2 Next Stage LINE	**CITY MULTI R2 SYSTEMS**	Simultaneous two-pipe cooling/heating systems with heat recovery and continuous heating.
WR2 LINE	**CITY MULTI WR2 SYSTEMS**	Heat recovery systems with water condensation/evaporation.

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

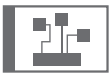
Thanks to HYDRONIC VRF technology it is possibile to design systems with typical VRF simplicity and higher confort thanks to the use of water as heat carrier. Mitsubishi Electric water-fed indoor units grant a really stable temperature control, with higher Sensible Heat Factor (SHF) than traditional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

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 thanks to the pumps and valves 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 Pumps and valve blocks, 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

M-NET POWER

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:

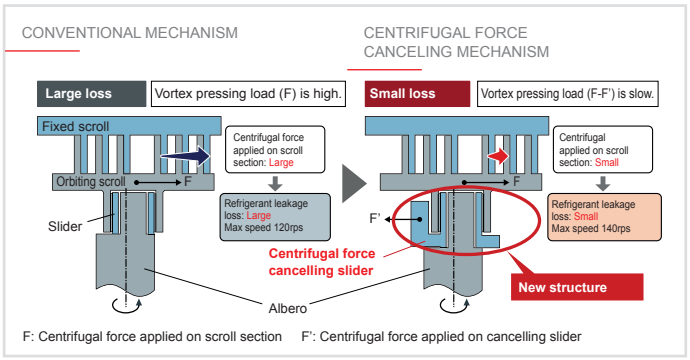
- 20 mm diameter copper or multilayer piping
- Expansion vessel to be connected directly to the HBC Controller
- Supply line (water load) equipped with shut-off valve, safety valve, filter, pressure reducer
- Condensate drain line
- 220V power supply line

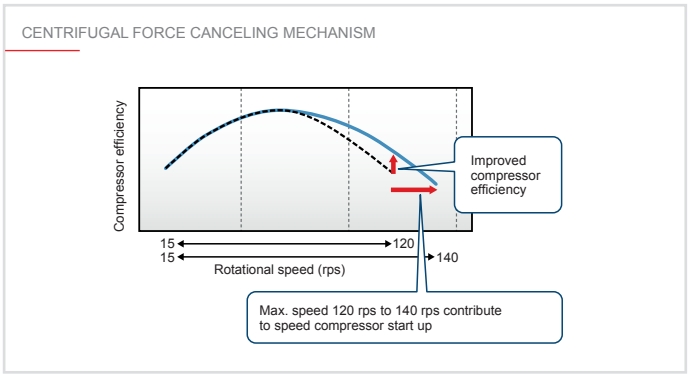
NEXT STAGE generation Compressor NEXT STAGE GENERATION

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.



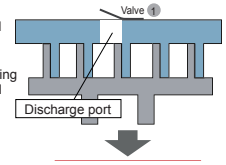


Multi-port mechanism

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.

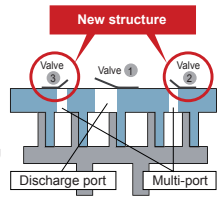
CONVENTIONAL STRUCTURE

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



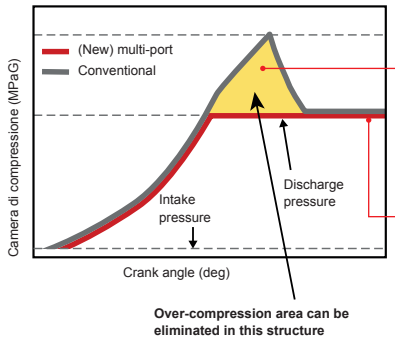
NEW STRUCTURE WITH MULTI-PORT DESIGN

		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)



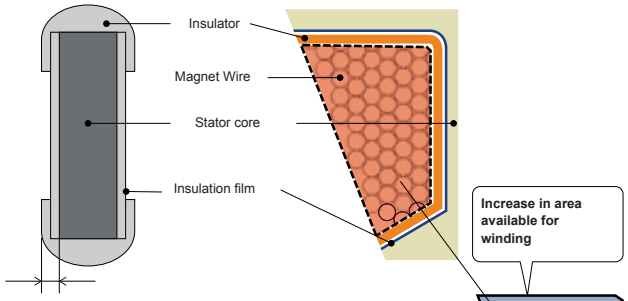
Conventional model
Conventionally, gas refrigerant is compressed to a set pressure, and then lowered to the target discharge pressure at which it is discharged. This causes drive losses from over-compression.

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

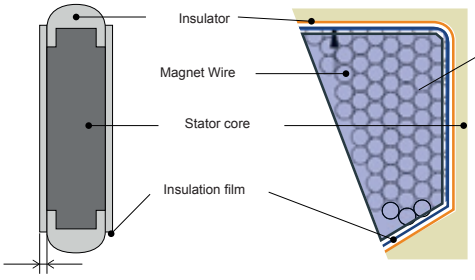
The insulator section that traditionally created a dead space is eliminated by insulating the motor's stator film. Since winding can be set in that section, the winding area can be increased by approx. 9%. The wire diameter has also been increased by two ranks, so the resistance between terminals is 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.

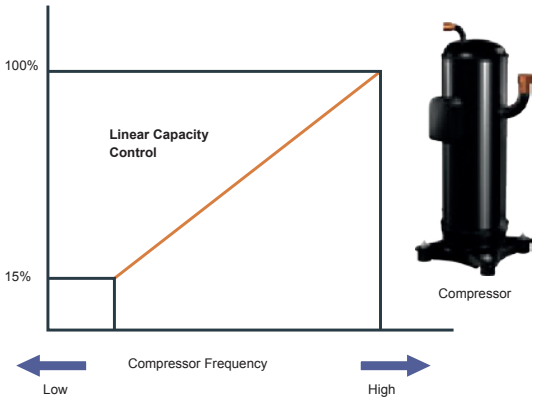
Inverter-driven compressor technology

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

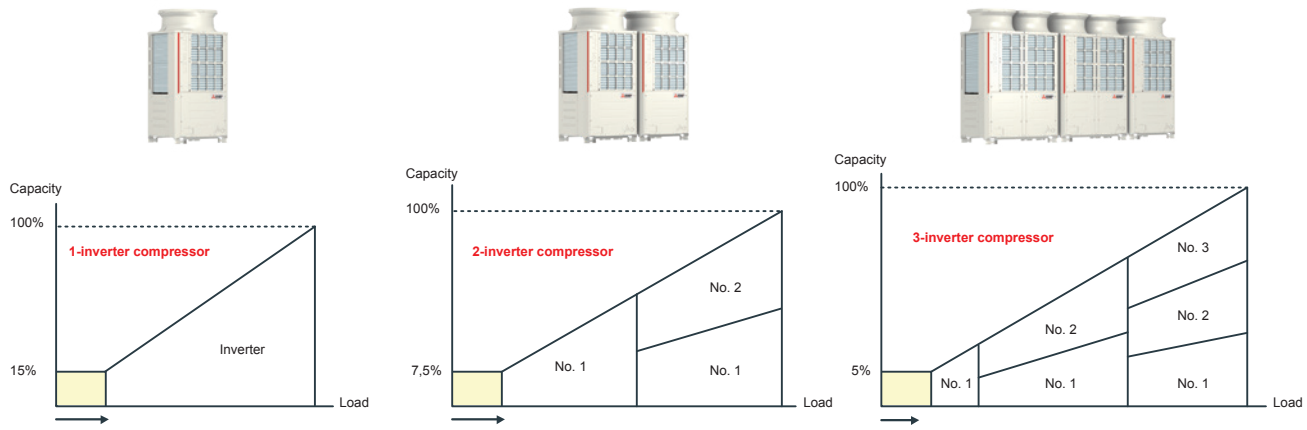
The compressor varies its speed to match the indoor cooling or heating demand and therefore only consumes the energy that is required. When an inverter driven system is operating at partial load, the energy efficiency of the system is significantly higher than that of a standard fixed speed, non-inverter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

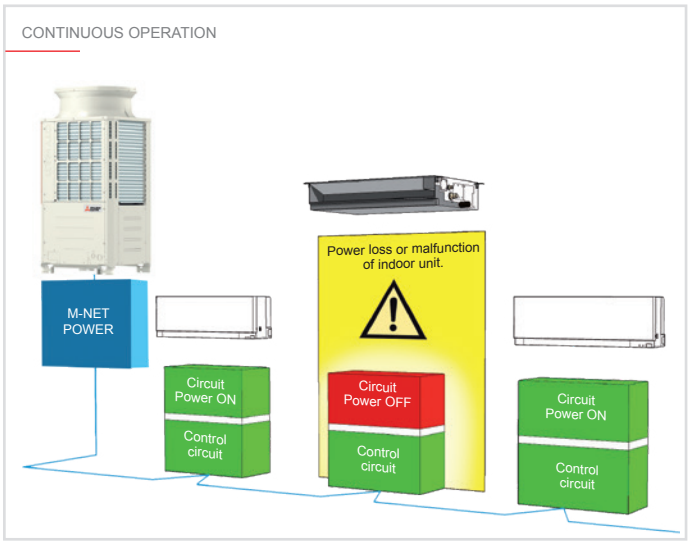
With the M-Net transmission line and the use of separate power and control circuits for indoor units, the following states can be identified automatically:

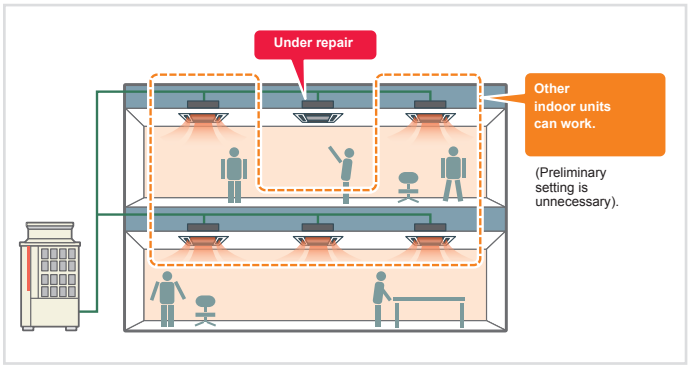
- indoor unit malfunction
- power loss to indoor unit

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

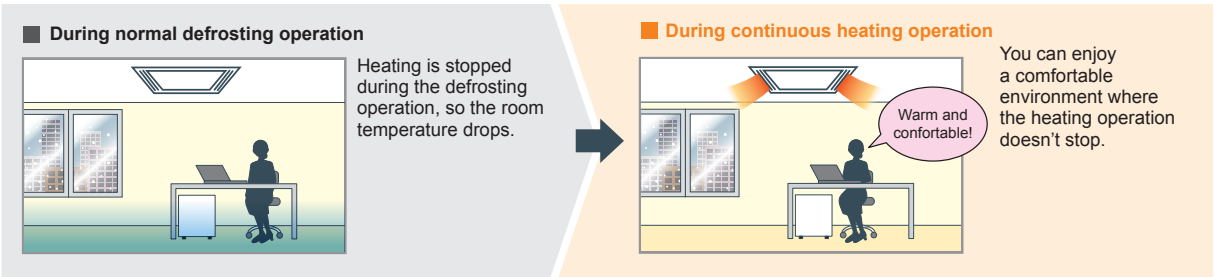
In the event of power loss or partial malfunction of one or more indoor units, the system continues to function uninterruptedly and without requiring any action from a technician and/or system administrator.





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.



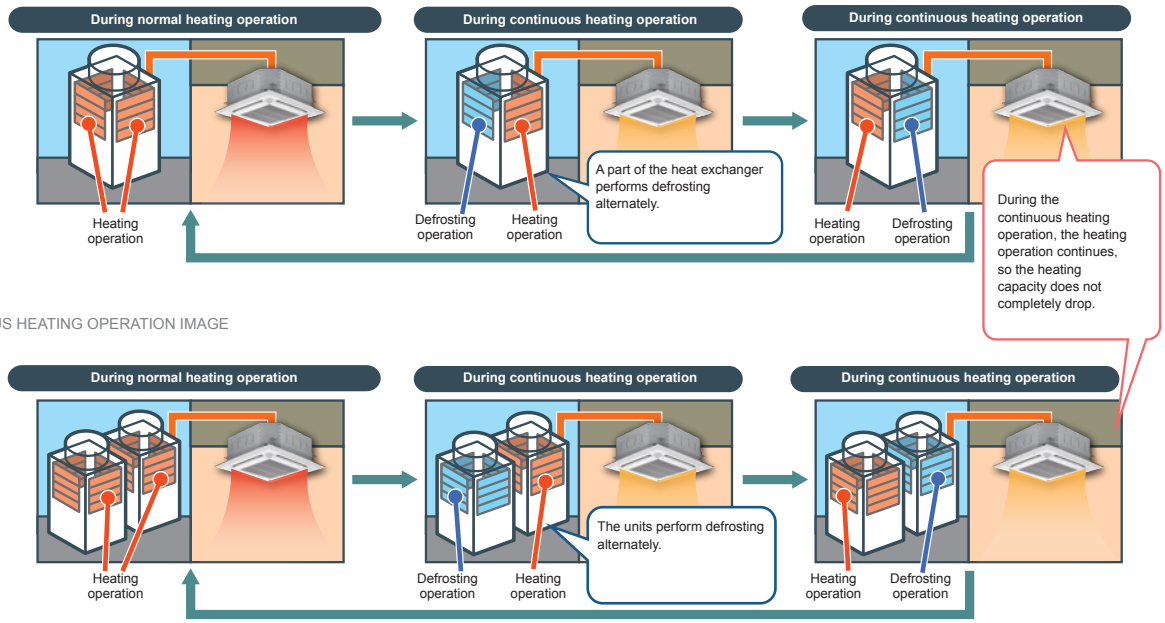
Continuous heating operation image (single unit)

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

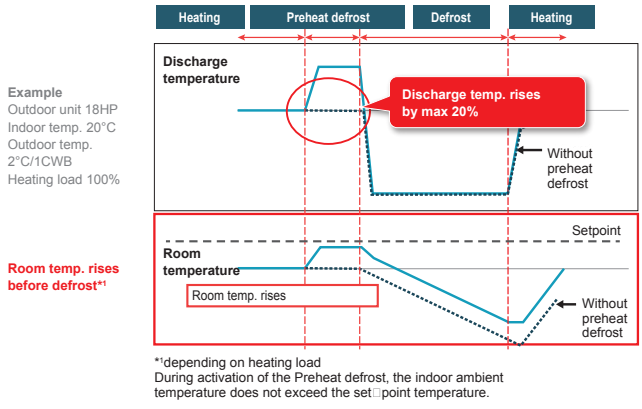


NEW

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.

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.

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.

FLEXIBLE NOISE SETTING

Settings function

1) 50%
2) **60%**
3) **70%**
4) **85%**

3 new settings available

5) 100% nominal speed))

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.

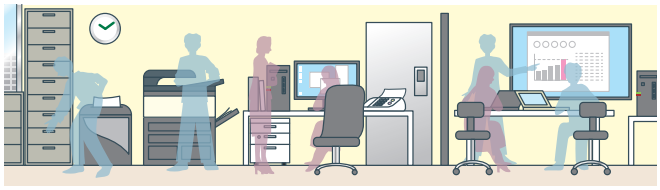
EVAPORATING TEMPERATURE CONTROL (DURING COOLING) NORMAL MODE

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.

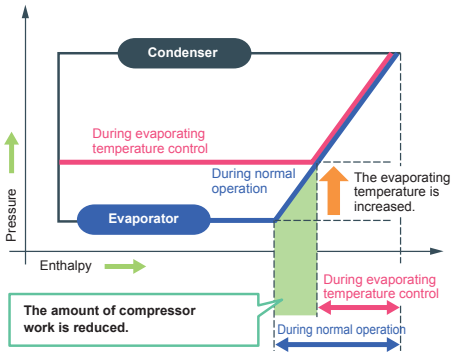
SUITABLE SITUATIONS



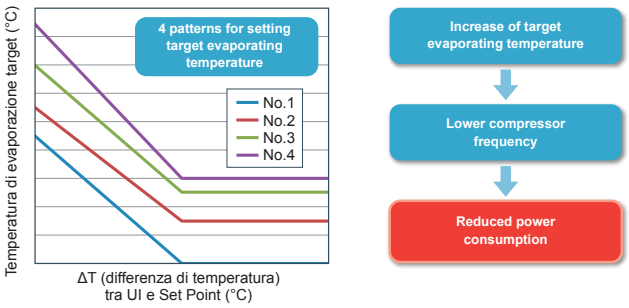
- Spaces with constant high temperatures from heat sources such as OA equipment
- When the load is low during periods when air conditioners are used for cooling (such as during the morning).

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.

Compressor: new induction heating technology

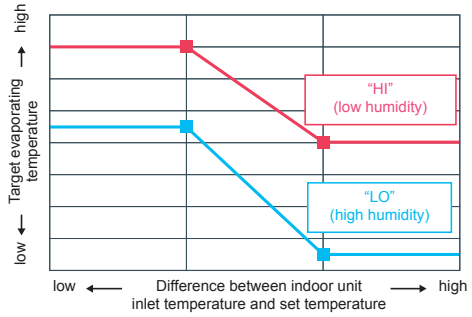
The Y Line and R2 Line outdoor units employ a pre-heating system for the scroll compressor based on induction technology. This solution is used to warm the compressor housing to minimise energy absorption in stand-by state. Yet another solution contributing to reducing energy consumption.

NEW

High sensible heat

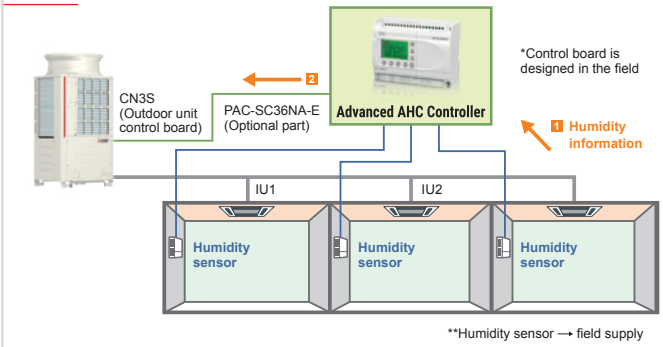
High sensible heat operation

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



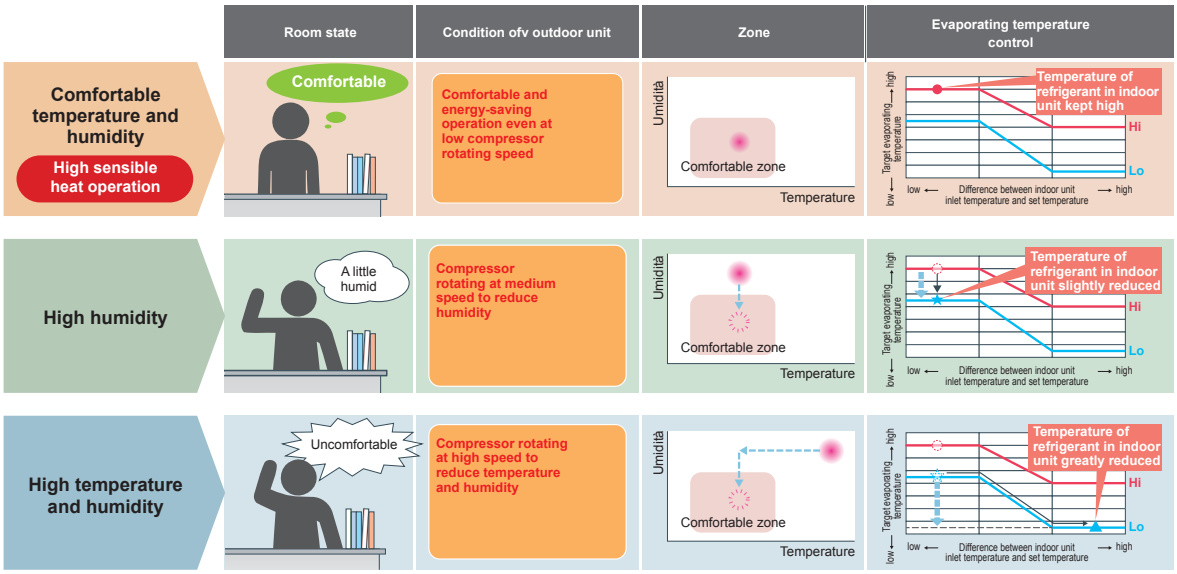
With high sensible heat operation mode activated, air conditioners consume less energy, thereby realizing cost savings. If a locally-procured humidity sensor is installed, the evaporating temperature of the outdoor unit can be controlled optimally as shown below according to the difference between the 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

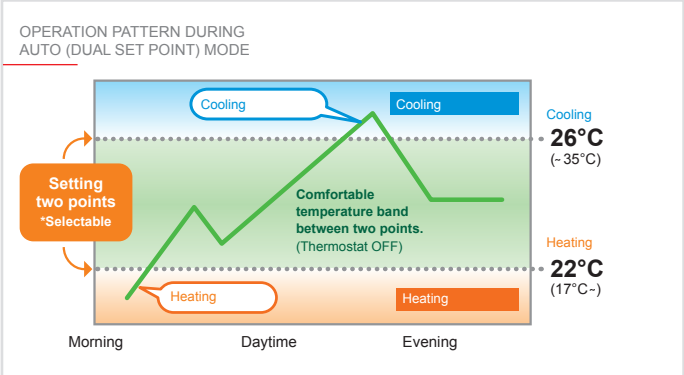


Dual Set Point

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.

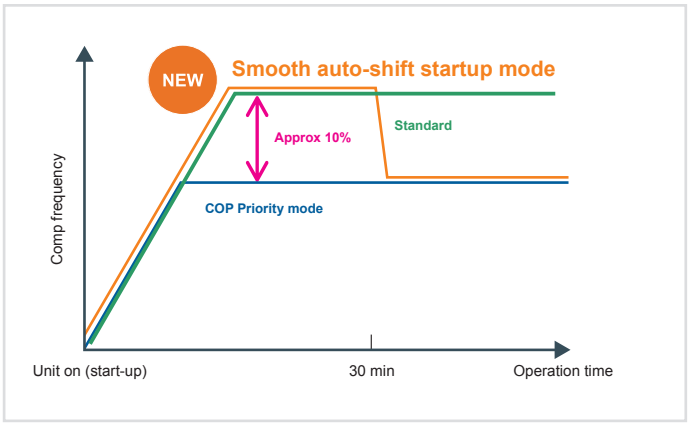
Setting dual set points for the Auto mode on R2 and WR2 helps improve energy efficiency, compared to setting a single set point.

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.



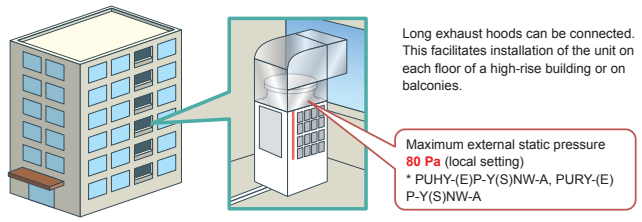
Installation and maintenance

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.

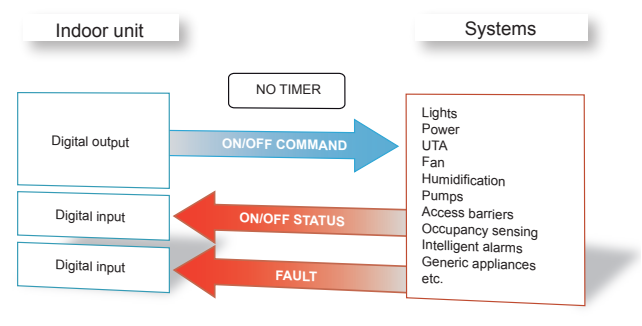
NEW 80Pa Selectable external static pressure of the outdoor unit

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.



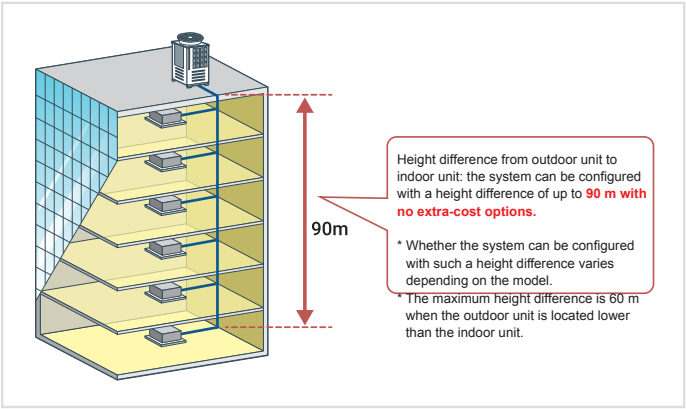
Intelligent Terminal Boards

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:



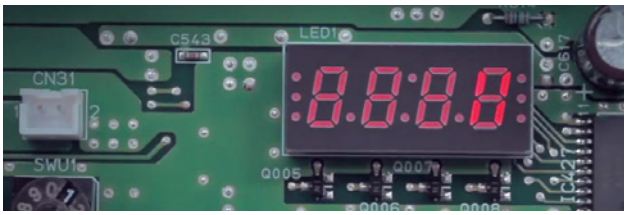
NEW 90m Usable in an application with a large vertical separation of up to 90 meters

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

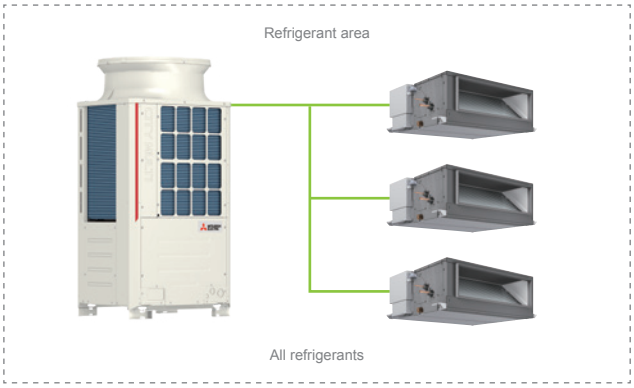
HVRF Y systems are based on a modular concept and a complete solution of Mitsubishi Electric branded products.
All system components: Outdoor Units, Hydronic Units, Indoor Units, Control Systems are native to Mitsubishi Electric and communicate with each other through the “M-Net” communication system.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

Less refrigerant required

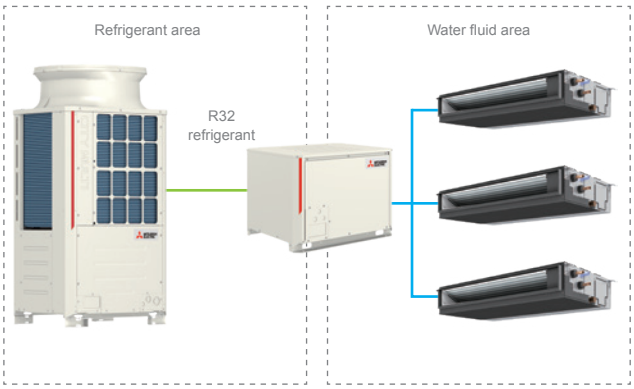
The hydronic unit creates a separation between the area delimited by the refrigerant and the area delimited by the water fluid, limiting the amount of refrigerant that was measured to be around 61%.

LESS REFRIGERANT REQUIRED

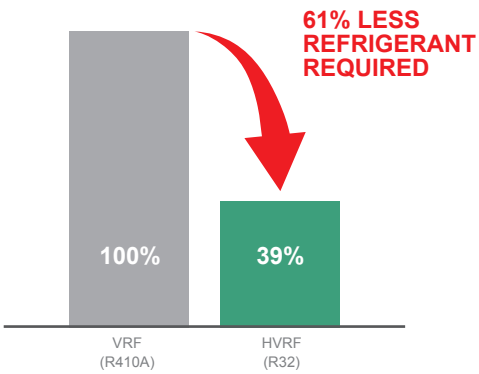
VRF SYSTEMS



HVRF SYSTEMS



LESS REFRIGERANT QUANTITY

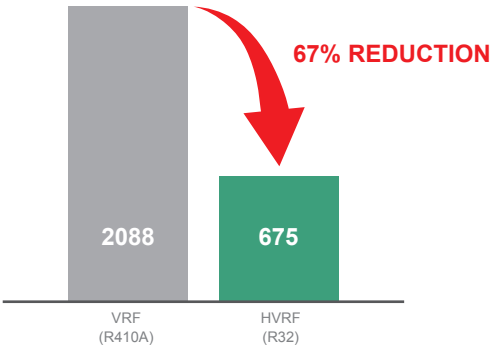


Example carried out with two equivalent VRF and HVRF systems:
Outdoor unit (VRF): 12HP (PUHY-P300YNW-A) x 1, Indoor Units: P20-40 x 19 Outdoor unit (HVRF): 12HP (PUHY-M300YNW-A1) x 1, Indoor Units: W20-40 x 19 Total length of refrigerant piping: 820m (VRF), 60m (HVRF)
Total length from the Outdoor Unit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

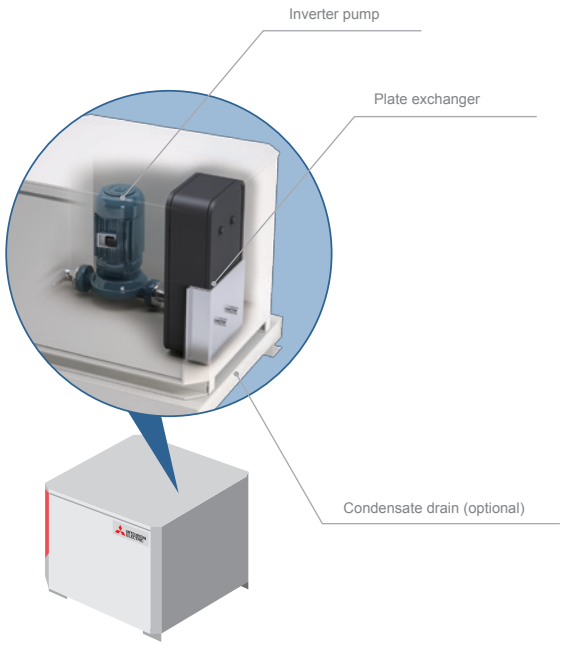
Hydronic unit

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

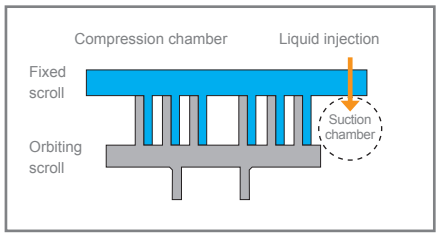


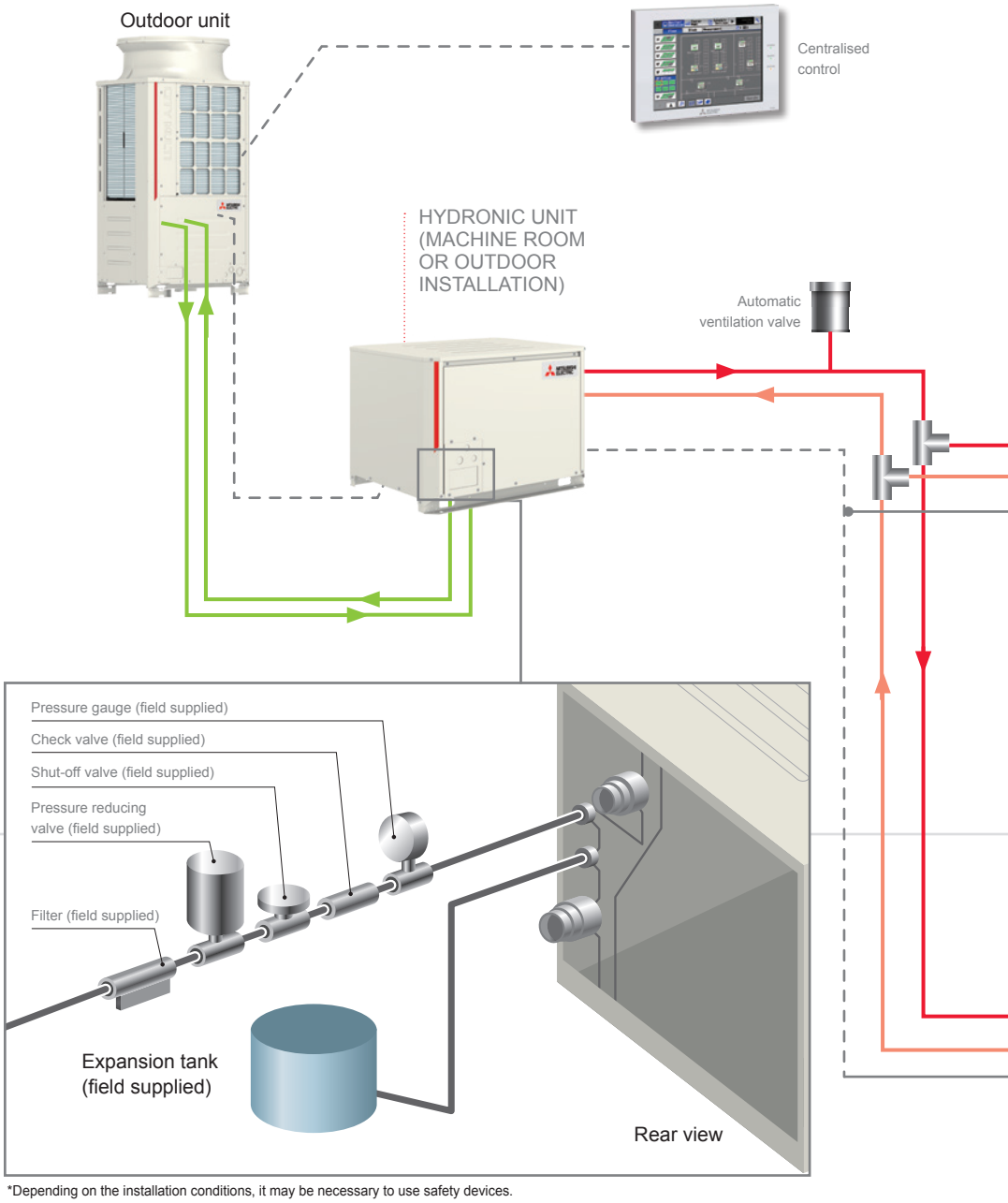
HVRF Y
System architecture

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

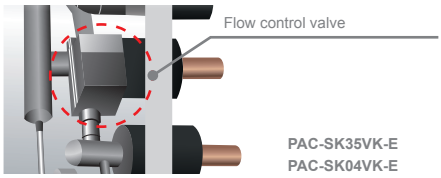
System control through M-NET

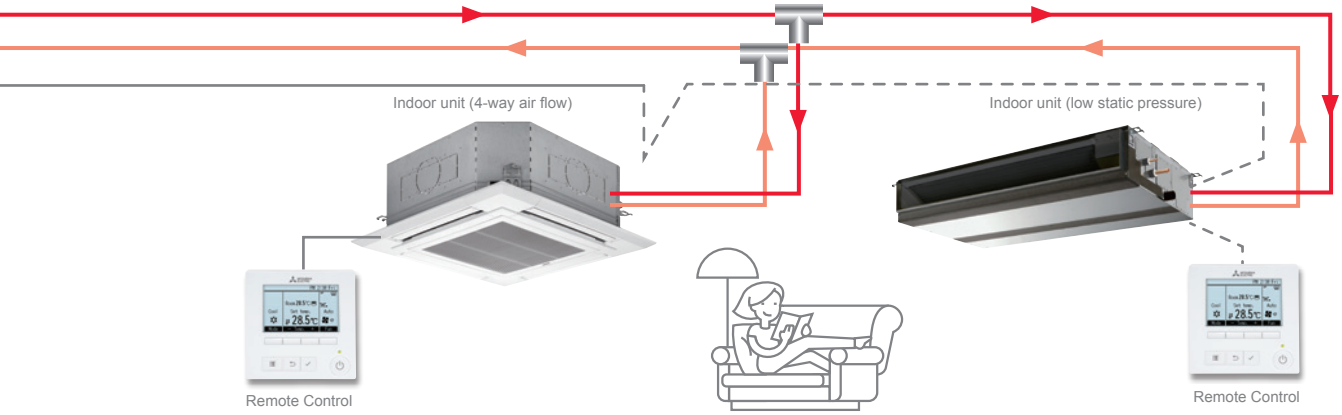
Mitsubishi Electric outdoor unit, indoor units, hydronic unit and individual and centralised control systems communicate through the M-Net communication system for optimal control of the entire system.

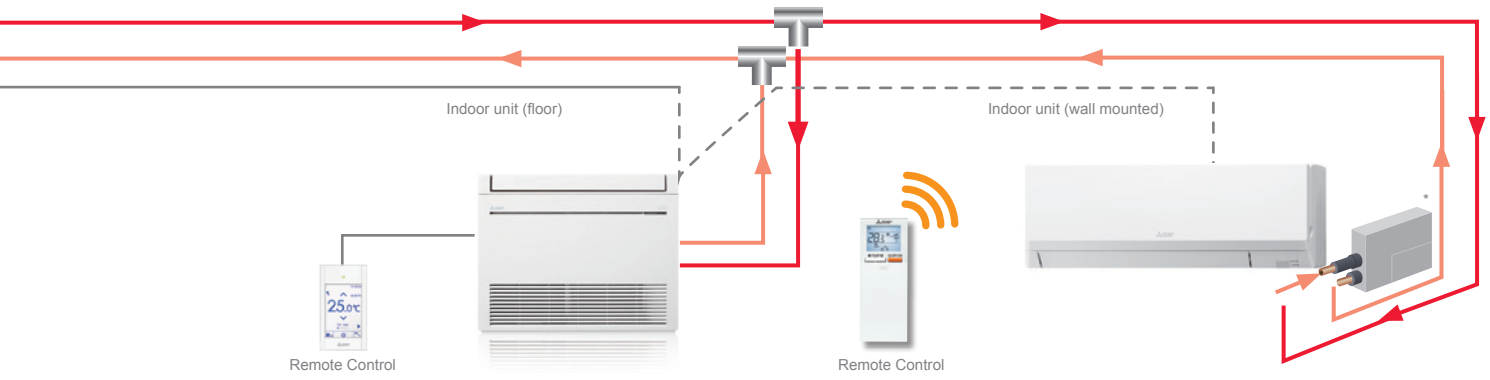
Indoor unit

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. (subject to JIS B8615-2)
*2 Rated heating conditions: Indoor 20°C BS. External 7°C BS / 6°C BU. Pipe length 7.5 m, level difference 0 m. (subject to JIS B8615-2)
*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

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. (subject to JIS B8615-2)
*2 Rated heating conditions: Indoor 20°C BS. External 7°C BS / 6°C BU. Pipe length 7.5 m, level difference 0 m. (subject to JIS B8615-2)
*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	

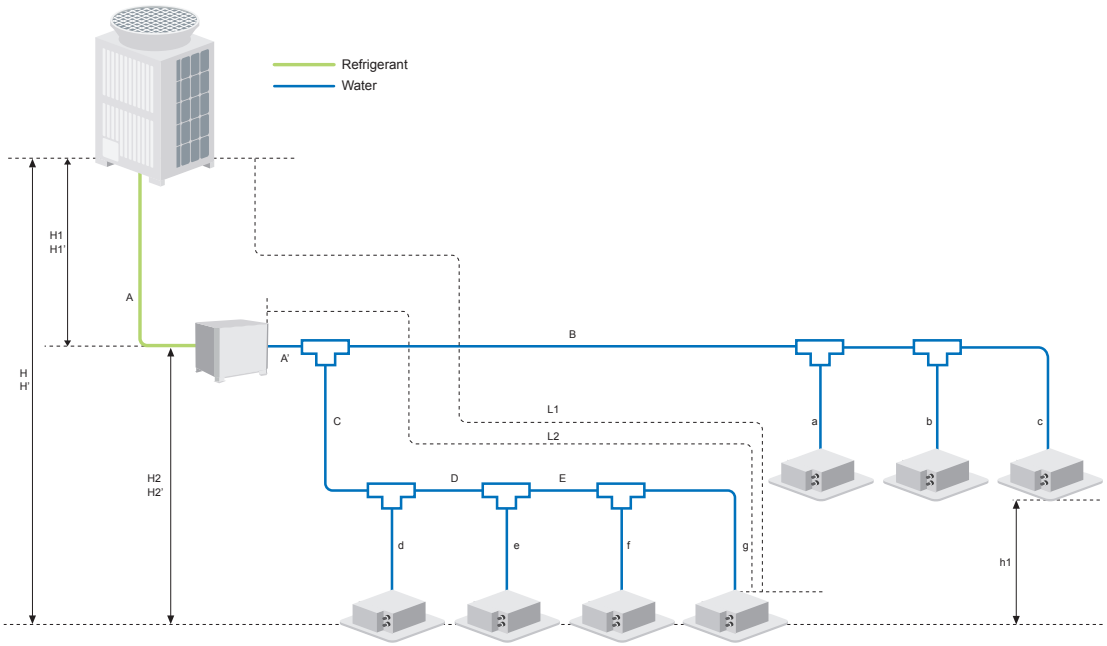
*The equipment is for R32 refrigerant.
*Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors.
(For use in quiet environments with low background noise, position the Hydro unit at least 5 m away from any indoor units.)
*Please install the 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.

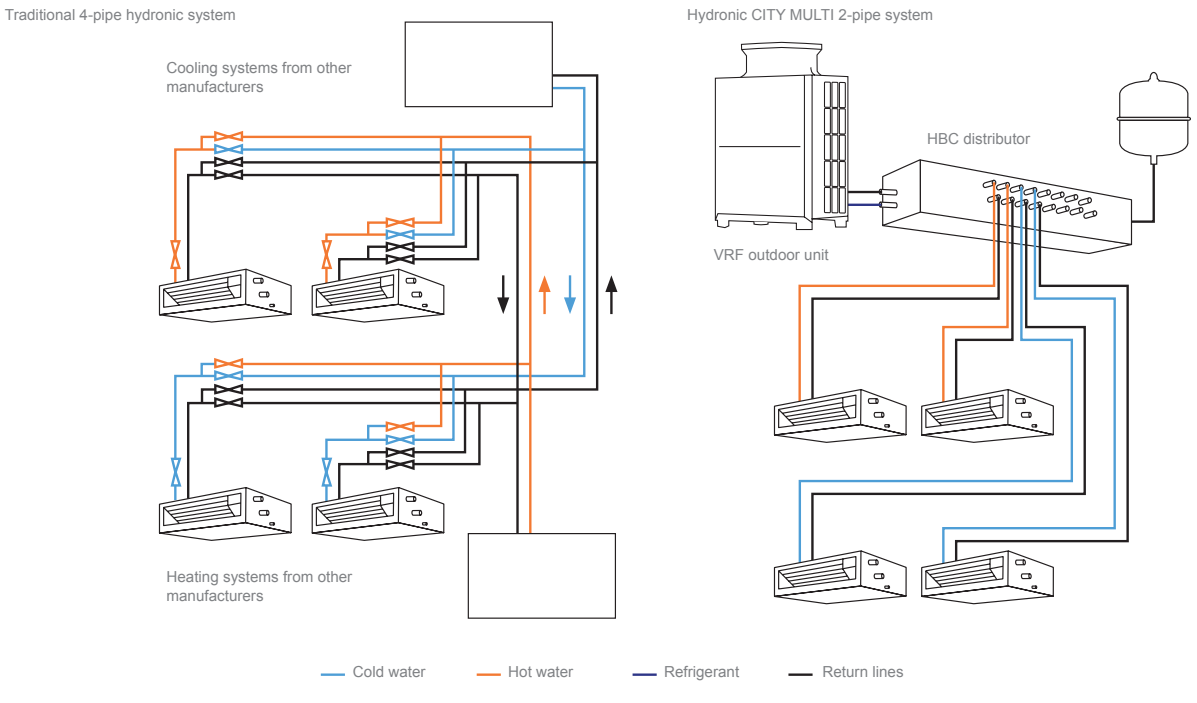
Lower concentration of R410 GAS

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



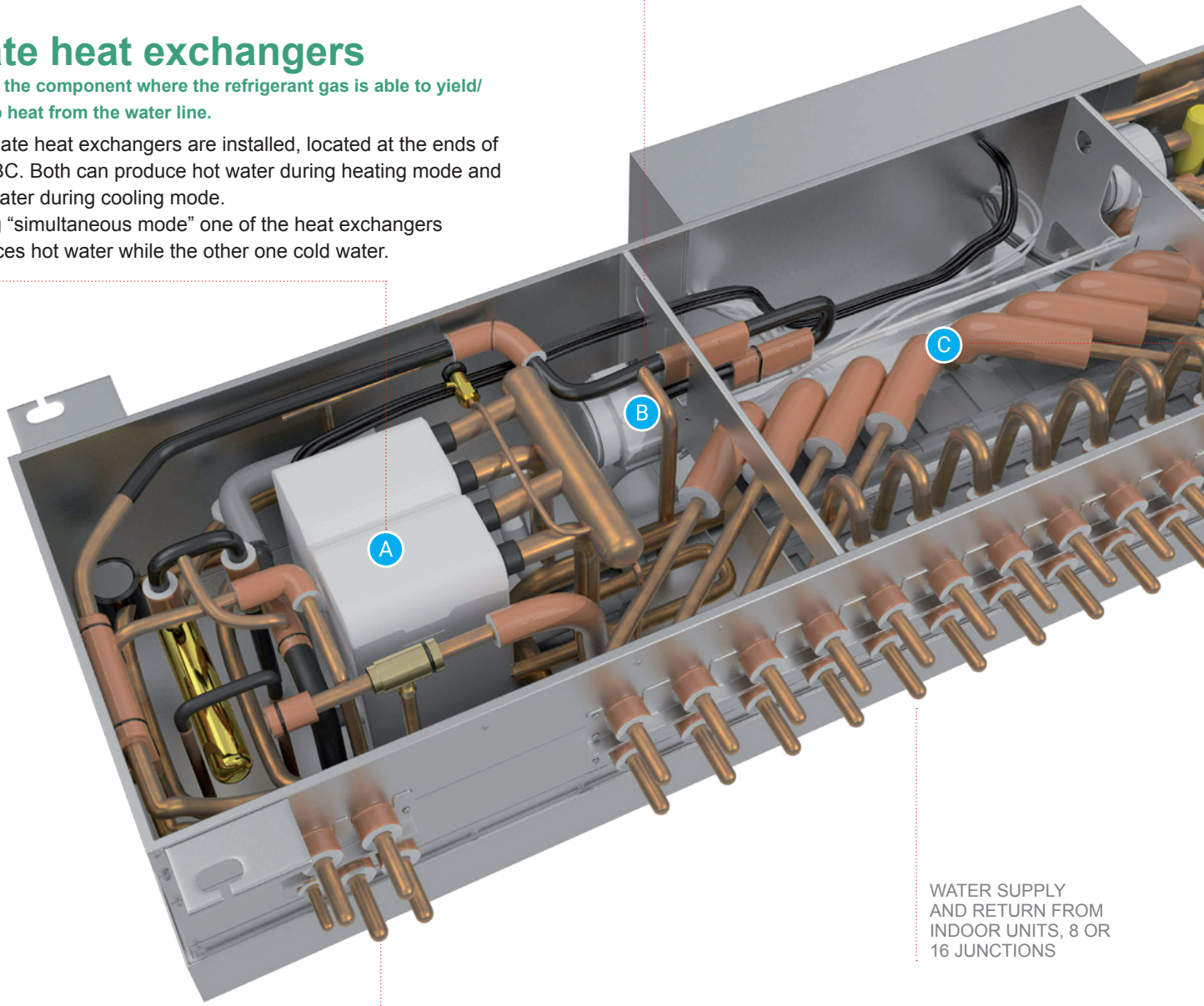
Hydronic Branch Controller (HBC)

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)

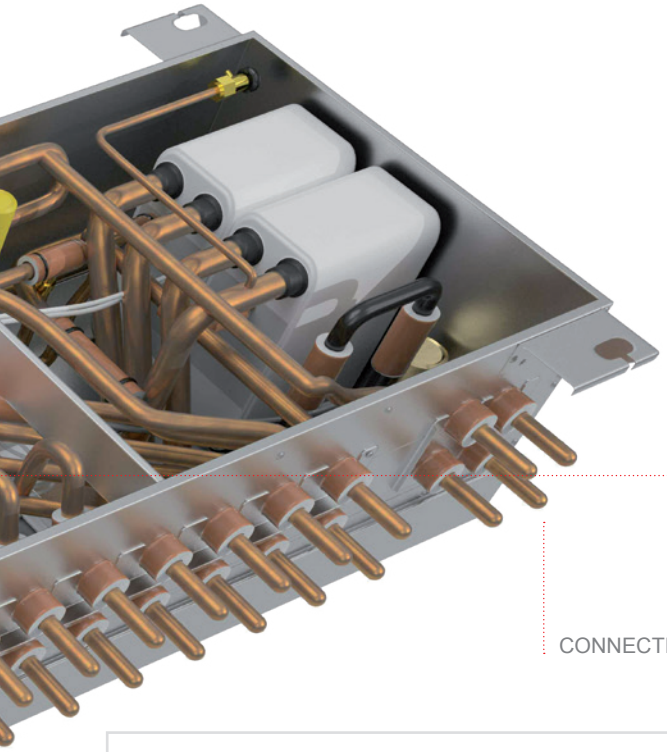
HYDRONICVRF

R410A

Pumps

Both plate heat exchangers are equipped with pumps.

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



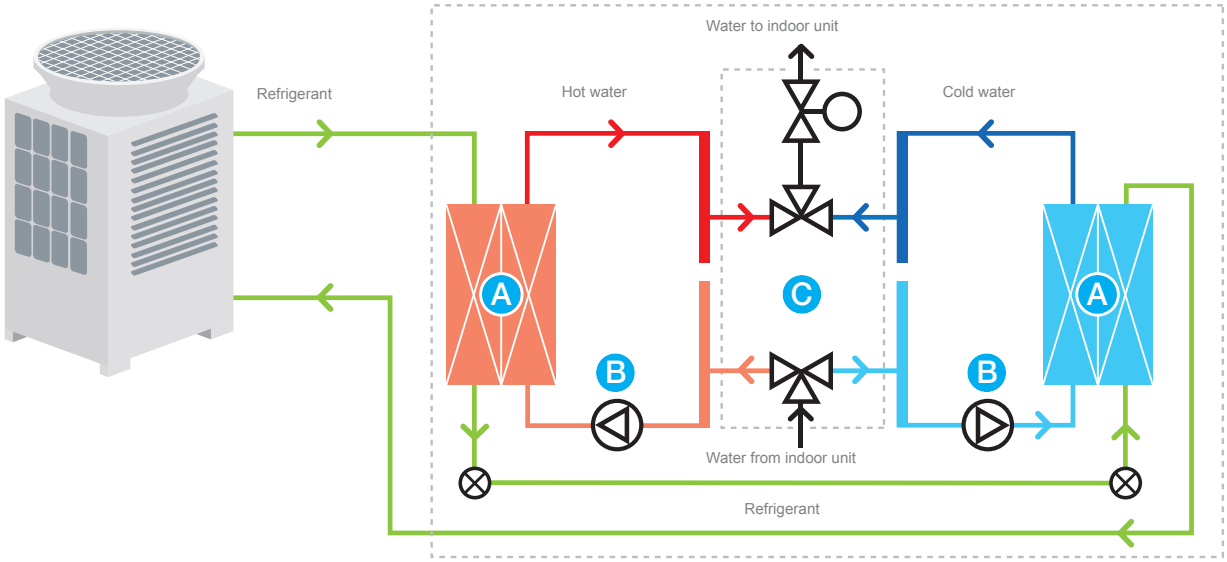
Valves Block

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

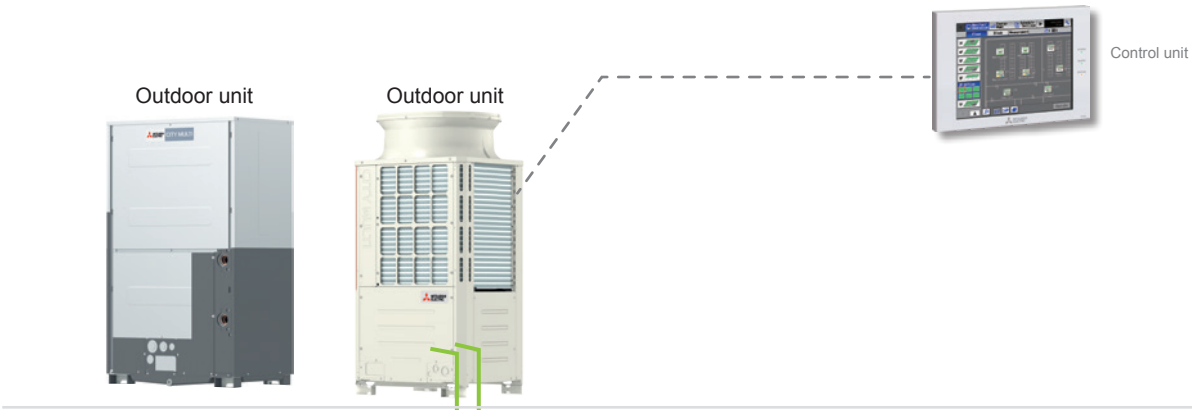
This valves block has two tasks: firstly it selects the hot or cold water header and then it regulates the flow fed to the indoor units based on the thermal power required.

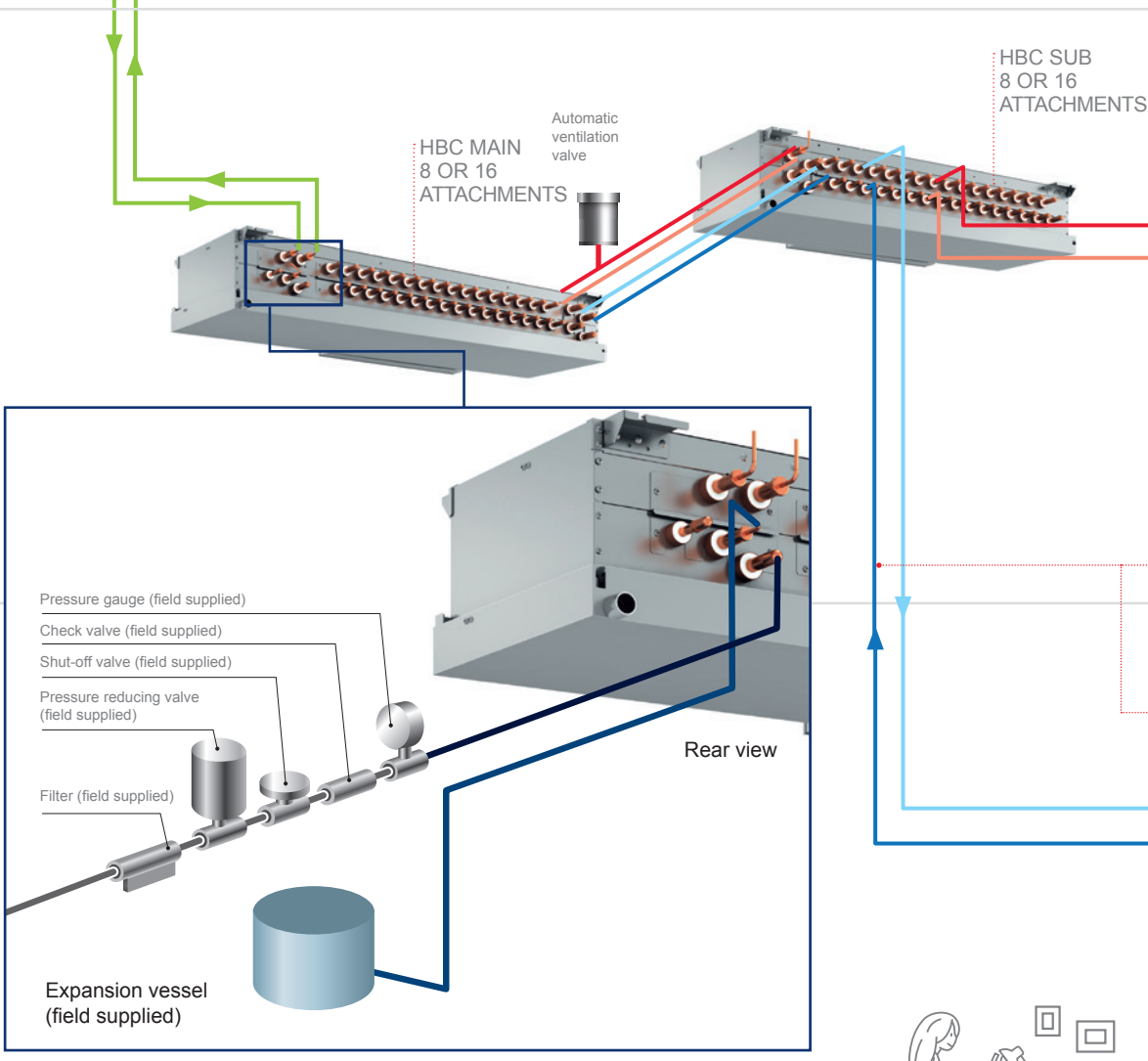
CONNECTION TO SUB HBC

HBC SIMULTANEOUS HEATING/COOLING MODE



HVRF R2/WR2
System architecture

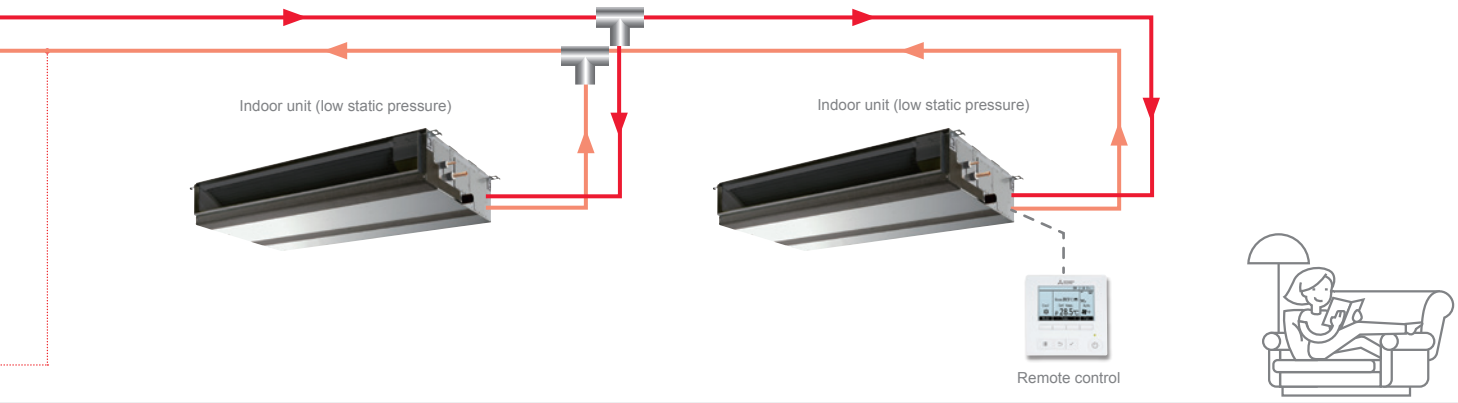




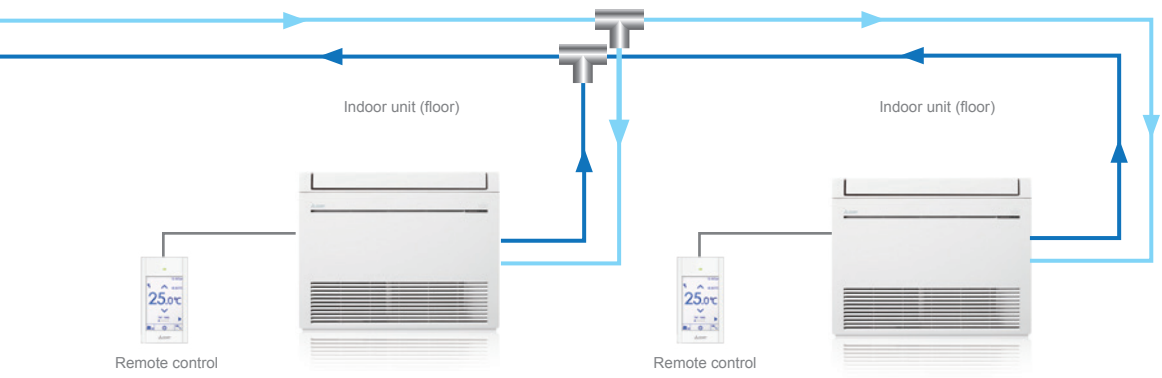
Refrigerant
Hot water supply
Hot water return
Cold water supply
Cold water return

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

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. (subject to JIS B8615-2)
*2 Rated heating conditions: Indoor 20°C BS. External 7°C BS / 6°C BU. Pipe length 7.5 m, level difference 0 m. (subject to JIS B8615-2)
*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. (subject to JIS B8615-2)
*2 Rated heating conditions: Indoor 20°C BS. External 7°C BS / 6°C BU. Pipe length 7.5 m, level difference 0 m. (subject to JIS B8615-2)
*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

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*4/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. (subject to JIS B8615-2)
*2 Rated heating conditions: Indoor 20°C BS. External 7°C BS / 6°C BU. Pipe length 7.5 m, level difference 0 m. (subject to JIS B8615-2)
*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

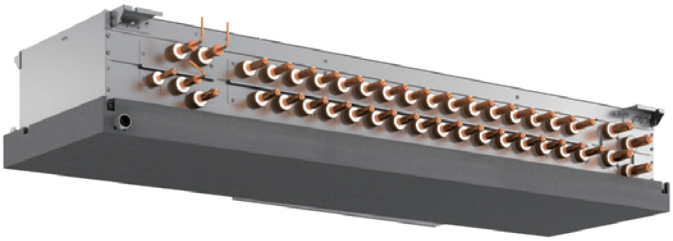
MODEL				PQRY-P350YLM-A1	PQRY-P350YLM-A1 X2 HBC	PQRY-P400YLM-A1	PQRY-P450YLM-A1	PQRY-P500YLM-A1
HP				14	14	16	18	20
Power Supply	Tens/Freq./Phases		V/Hz/n°	3 fasi 380-400-415V 50Hz				
Cooling	Nominal capacity*1		kW	40,0	40,0	45,0	50,0	56,0
	Power input		kW	9,98	8,72	10,05	12,05	14,58
	EER*		kW	4,00	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*2/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. (subject to JIS B8615-2)
*2 Rated heating conditions: Indoor 20°C BS. External 7°C BS / 6°C BU. Pipe length 7.5 m, level difference 0 m. (subject to JIS B8615-2)
*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



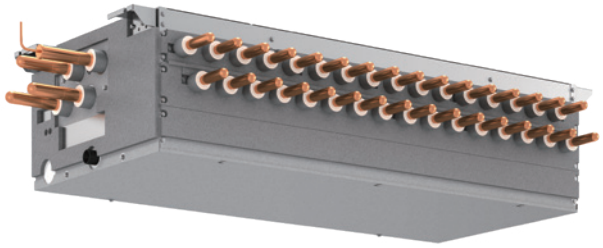
R410A

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

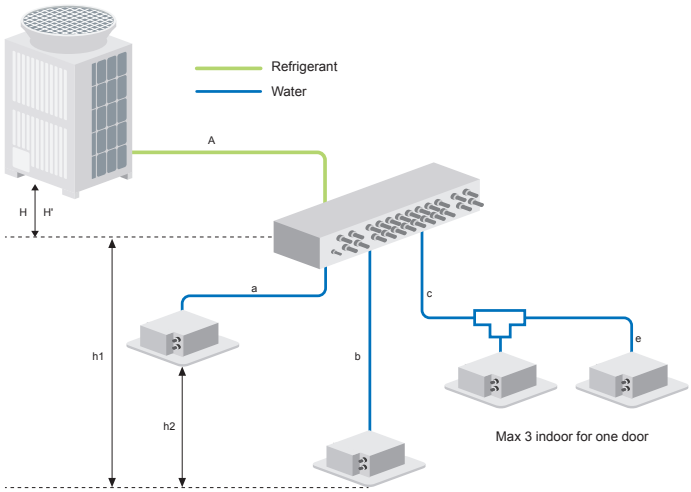
CMB-WM-V-AA e CMB-WM-V-BB units are to be used exclusively with outdoor units PURY-P200-500YNW-A1(2), PQRY-P200-500YLM-A1 and HVRF indoor units (W/WL/WP)

Design guide

HVRF Hydronic Heat Recovery systems

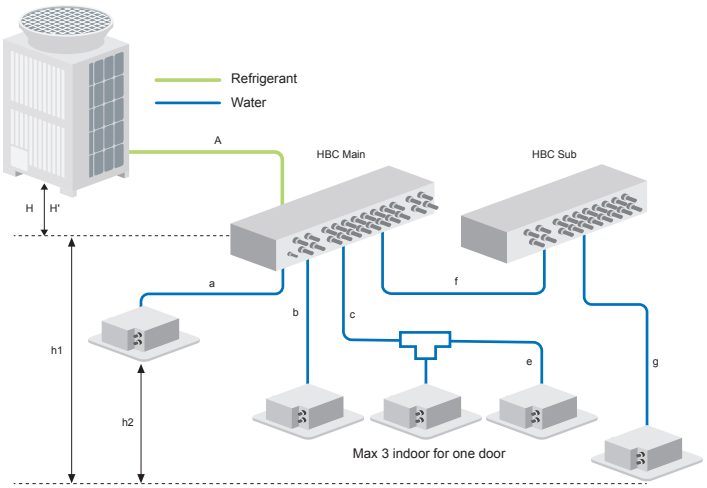
1 HBC Main

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



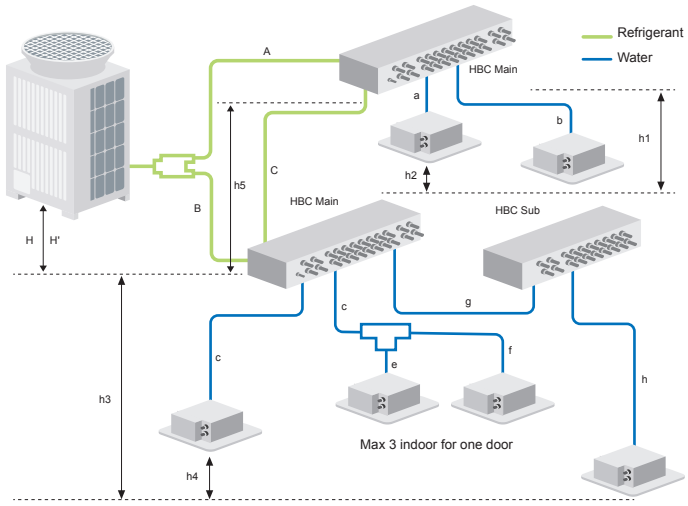
1 HBC Main e 1 HBC Sub

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

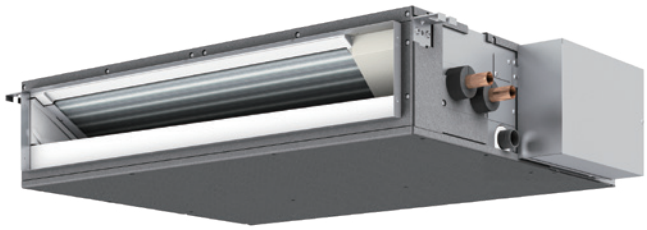
Floor standing indoor units

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

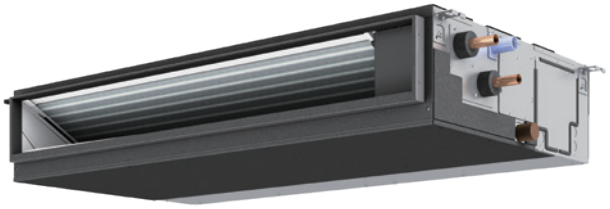
HVRF-R2 outdoor unit	Indoor unit			Connectivity
	A	B	C	
	WLV	W	-	Connectible
	WLV	WL	W	Not connectible
	WLV	W	WP	Not connectible
	WL	W	-	Not connectible
	WL	WP	W	Not connectible
	W	WP	-	Not connectible

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 = Indoor Unit Type WL with optional valve kit
WL = Indoor 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 = Indoor Unit Type WL with optional valve kit
WL = Indoor 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

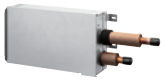
*PAC-SK04VK-E phase-out after stock end

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 = Indoor Unit Type WL with optional valve kit
WL = Indoor 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

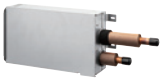
*PAC-SK04VK-E phase-out after stock end

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

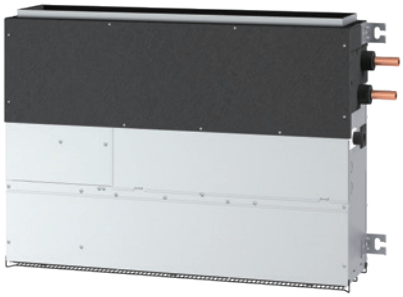
In an HVRF-R2 system, if a valve kit is connected to any of the WL indoor units, all other indoor units must also have a valve.
The valve kit is required to use the HVRF-Y system.

WLV = Indoor Unit Type WL with optional valve kit
WL = Indoor 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 = Indoor Unit Type WL with optional valve kit
WL = Indoor 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

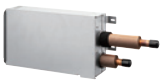
*PAC-SK04VK-E phase-out after stock end

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 = Indoor Unit Type WL with optional valve kit
WL = Indoor 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)

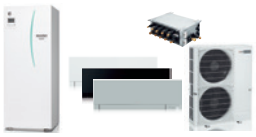


Heating

Hydronic heat pumps

Hybrid systems

Packaged systems

			Capacity				
			Heating kW	Cooling kW	Domestic hot water	Hot water heating	
Hybrid systems							
ecodan Renewable Heating Technology MULTI	PUMY-P		12.5 12.5 12.5	12.5 14.0 15.5	•	•	
HWS	VRF HWS (Hot Water Supply)		12.5	-	•	•	
ATW	VRF ATW (Air To Water)		12.5	11.2		•	
Packaged systems							
CAHV	HWHP (Hot Water Heat Pump)		40.0	-	•	•	
CRHV	HWHP (Hot Water Heat Pump)		60.0	-	•	•	

Supply				Functions		Applications and solutions
	Water cooling	Air heating	Air cooling	Heat recovery	Cascade systems automatic control	
		•	•			**AUTONOMOUS SOLUTIONS** • Residential (villas, appartments) • Offices • Shops/Bars SPA/GYMS
		•	•	•		**CENTRALIZED SOLUTIONS** • Residential (villas, appartments) • Offices • Hotel **INDUSTRY** **SHOPPING CENTER** **SPA/GYM**
	•	•	•	•		
					•	**CENTRALIZED SOLUTIONS** • Residential (condons) • Offices • Hotel **INDUSTRY** **SHOPPING CENTER** **SPA/GYM**
					•	

VRF HWS & ATW

HYBRID SYSTEM - Heating/Cooling/Domestic hot water

CITY MULTI

WATER HEATING | DOMESTIC HOT WATER | ENERGY RECOVERY | AIR COOLING | AIR HEATING

The scalability, flexibility and modularity of the Ecodan® – VRF HWS & ATW system represents the state of the art in Mitsubishi Electric technology. This solution makes it possible to use a single producer – the VRF outdoor unit – to deliver heating water, cooling water and domestic hot water simultaneously.

Hydronic modules for VRF CITY MULTI systems.

Ecodan® heat pump technology has been used in conjunction with hydronic modules to create systems for the production of domestic hot water (HWS) and heating water for radiator panels (ATW) which are perfectly compatible with the inclusion of both thermal and photovoltaic solar panels in the installation. Systems with electric heat pumps may be used all year round, as their use is not restricted by legislation.
The added comfort of being able to use the air conditioning system in spring and autumn is yet another advantage of these VRF systems. The indoor units of the VRF CITY MULTI system gently cool and dehumidify the interior space in spring, cool and dehumidify in summer, transferring the extracted heat to both the HWS and ATW hydronic modules, and heat the interior gently at cooler times of day in autumns.
HWS hydronic modules are ideal for the production of domestic hot water all year round. They make use of the energy drawn from indoor spaces by the VRF indoor units, as well as supplementary energy provided by solar panels in summer and spring.
ATW hydronic modules provide hot water for radiant panel heating in winter and deliver warm water to heat a pool in summer, contributing to maintaining comfortable temperature conditions and making use of the energy drawn from the indoor space by the VRF indoor units supplemented by heat supplied by thermal solar panels.
In systems with this capability, ATW hydronic modules may also be used to deliver refrigerated water to radiant panels in summer.

TYPICAL APPLICATIONS: HOTEL (ROOMS)

TYPICAL APPLICATIONS: CENTRALIZED RESIDENTIAL SYSTEMS

SOLUTION FOR CLIMATIZATION, HEATING AND DOMESTIC HOT WATER PRODUCTION

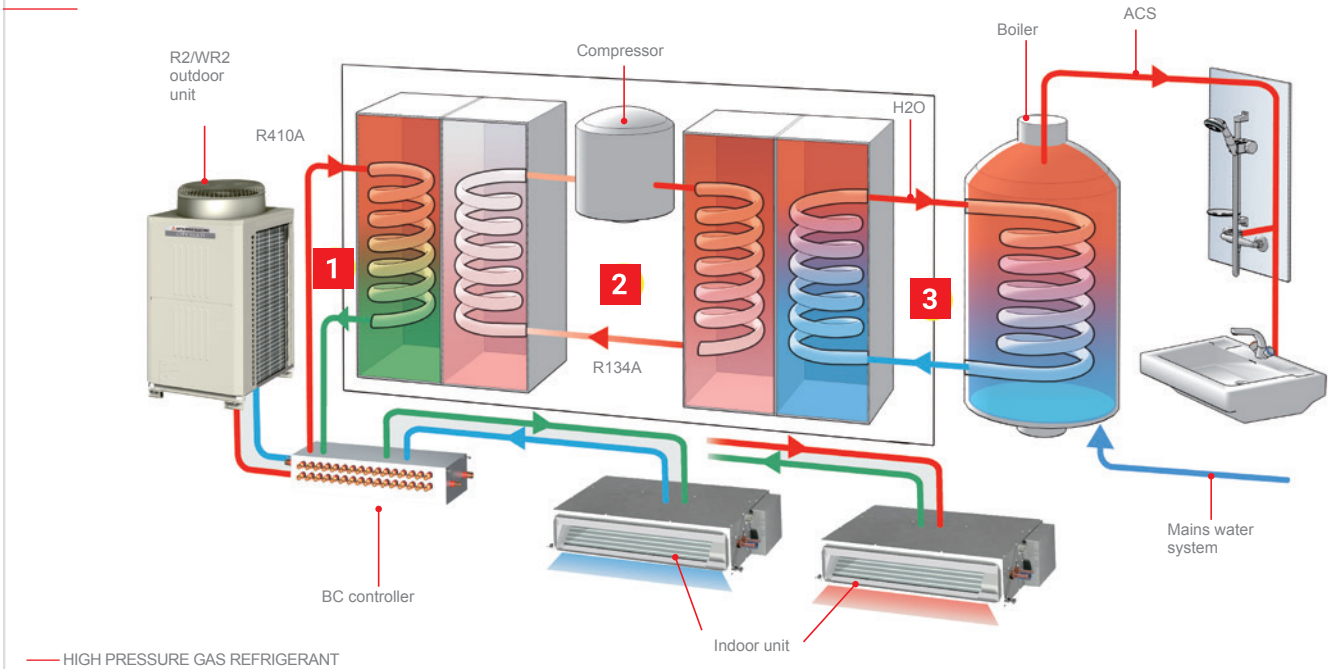
1 R2 Outdoor Units
2 Photovoltaic solar panels
3 BC controller
4 HWS Hydronic Module
5 ATW Hydronic Module
6 Domestic hot water accumulator tank fed from HWS
7 Hot water inertial accumulator tank fed by ATW

GREEN REFRIGERANT CIRCUIT
RED DOMESTIC HOT WATER CIRCUIT
ORANGE HEATING HOT WATER CIRCUIT
BLACK POWER CIRCUIT

HWS hydronic module – Hot water supply

Mitsubishi Electric was the first to introduce VRF systems for the production of high temperature hot water (up to 70°C), usable for domestic hot water production. The HWS hydronic module represents a significant, innovative technological breakthrough that uses the most advanced refrigeration technology, and has been conceived to be easily integrable with R2/WR2 series VRF CITY MULTI simultaneous cooling / heating systems.
Heat recovery plays a crucial role in these systems, as the HWS hydronic module may be used to extract heat from rooms where cooling is required, which would otherwise be vented into the outdoor atmosphere, and then use this heat to contribute to hot water production, adding only the supplementary heat necessary to reach the desired temperature.
The HWS hydronic module can produce hot water at temperatures up to 70°C in the return line, with a heating capacity of up to 12.5 kW per module which, however, is scalable in relation to internal demand.

HWS HYDRONIC MODULE – HOT WATER SUPPLY



HIGH PRESSURE GAS REFRIGERANT
HIGH PRESSURE FLUID REFRIGERANT TWO-PHASE
HIGH PRESSURE LIQUID REFRIGERANT
LOW PRESSURE GAS REFRIGERANT

Operating principle of two-stage technology

The HWS hydronic module employs a variant of the two-stage compression principle – a principle that has been known and used for many years, but which, until now, has only been applied in refrigeration systems to reach very low temperatures (as low as -60°C). Mitsubishi Electric has redesigned the two-stage circuit to achieve the opposite effect, for units intended to produce heating power at medium to high temperatures, from 30°C to 70°C. This solution combines superior energy efficiency with high hot water temperatures that are not attainable with the conventional heat pumps currently on the market. As illustrated previously, the HWS hydronic module uses the "free" heat extracted from the air conditioned interior by the heat recovery circuit of the CITY MULTI R2 outdoor units and raises the temperature to the desired value to deliver usable hot water. This double process recovers energy from the system, increasing its overall efficiency, and raises the temperature of the water with minimal energy expenditure.

Advantages of two-stage technology

The two-stage technology employed in the HWS hydronic module offers a number of significant advantages:

- R134a refrigerant in high temperature stage. R134a is a pure HFC refrigerant which is harmless for the stratospheric ozone layer and contributes only marginally to the greenhouse effect. This refrigerant is particularly suitable for high temperature applications.
- R410A refrigerant in low temperature stage. This is also an HFC refrigerant that is harmless to stratospheric ozone, which offers extraordinary efficiency in air conditioning applications.
- Minimal external energy demand, even when the system is operating in air conditioning mode. The heat drawn from the air is used to heat water.
- When the system functions predominantly in air conditioning mode – in summer, for example – hot water is produced with extremely low energy consumption. This makes it possible for the system to attain very high COP values.
- Continuously variable heating power in relation to demand, made possible by the inverter motor scroll compressor, which reduces energy consumption proportionally.
- Compact dimensions and very light weight. These modules may be mounted on walls, even in intermediate positions. Practically zero floor space usage.
- Individual thermal energy consumption billing with field devices.

TWO-STAGE TECHNOLOGY

Hybrid systems

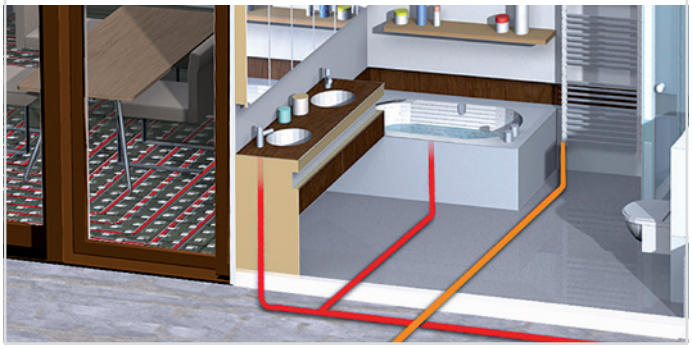
The HWS hydronic module may be used to create hybrid systems, with both hydronic modules and VRF direct expansion units. For instance, this makes it possible for the system to produce domestic hot water and heat or cool the air in the indoor space using the most suitable indoor units of the Mitsubishi Electric range (cassette units, ceiling-suspended units, ducted units etc.).
As well as superior energy efficiency, a hybrid system also offers the extraordinary flexibility needed to cater for very diverse situations, which a conventional air conditioner system simply does not.

Control and adjustment system

The HWS hydronic module can be configured for the following operating modes and hot water temperatures:

OPERATING MODE	TEMPERATURE RANGE
Hot water	30 - 70°C
Heating	30 - 50°C
ECO heating	30 - 45°C
Antifreeze	10 - 45°C

HWS HYDRONIC MODULE



Technical specifications HWS HYDRONIC MODULE

MODEL			PWFY-P100VM-E-BU
Power			Single-phase, 220-230-240V, 50 Hz/60Hz
Heating power output (nominal)		kW *1	12,5
		kcal/h *1	10,800
		Btu/h *1	42,700
	Power absorption	kW	2,48
	Current consumption	A	11,63 - 11,12 - 10,66
Temp. range in heating mode	PURY Series	Outdoor temp. DB	-20~32°C
	PQRY Series	Water temp. in circuit	10~45°C
	PQRY Series	Temp. in water/glycol circuit (for geothermal applications)	-5~45°C
	PWFY-P VM-E1-BU	Return line water temp.	10~70°C
Connectable outdoor units	Total capacity		50-100% of external unit capacity
	Series		R2 (E)P, WR2
Sound pressure in anechoic chamber	dB <A>		44
Refrigerant circuit piping diameter	Liquid	mm (inches)	ø 9,52 (ø 3/8") brazed
	Gas	mm (inches)	ø 15,88 (ø 5/8") brazed
Water piping diameter	Inlet	mm (inches)	ø 19,05 (R 3/4") screw-on connection
	Delivery	mm (inches)	ø 19,05 (R 3/4") screw-on connection
Drain pipe diameter		mm (inches)	ø 32 (1-1/4")
External finish			Galvanised sheet steel
External dimensions HxLxW		mm	800 (785 without feet) x 450 x 300
Dry weight		kg	60
Compressor	Type		Hermetic scroll compressor with inverter
	Manufacturer		MITSUBISHI ELECTRIC CORPORATION
	Starter method		Inverter
	Power	kW	1
	Lubricant		NEO22
Water in circuit	Nominal	m^3/h	0,6 ~ 2,15
	(entire operating volume)		
Internal circuit protection (R134a)	Overpressure protection		Overpressure sensor, pressure switch calibrated to 3.60 Mpa (601 psi)
	Inverter circuit (COMP)		Overcurrent protection, overheat protection
	Compressor		Outlet temperature protection, overheat protection
Refrigerant	Type / original charge		R134a x1.1kg (0,50lb)
	Controller		LEV
Rated pressure	R410a	MPa	4,15
	R134A	MPa	3,60
	Water	MPa	1
Standard equipment	Manuals		Installation manual, Instruction manuals
	Accessory		Water filter, insulating material

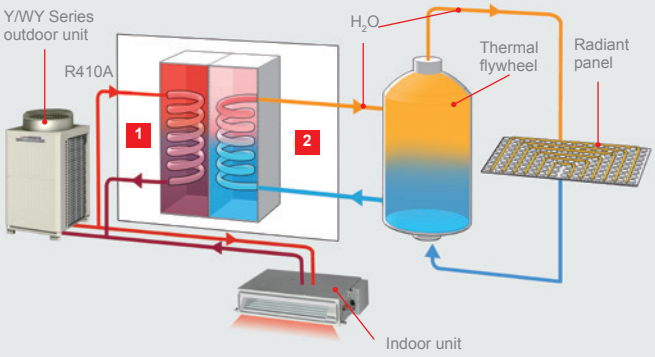
Note:
*Nominal conditions *1 are subject to EN14511-2:2004(E)
*Install the module in an environment with a wet bulb temperature not exceeding 32°C
*Due to continuous improvements made to these products, the specifications given above are subject to modification without prior notification.

*The module is not designed to be installed outdoors.
*1Nominal heating conditions Outdoor temp.: 7°C DB/6°C WB
Nominal heating conditions Outdoor temp.: 7°C DB/6°C WB (45°F DB/43°F WB)
Pipe Length 7.5 m (24-9/16 feet) – Vertical difference: 0 m (0 feet)

ATW hydronic module – Air to water

Mitsubishi Electric has developed the ATW reversible air-water heat pump hydronic module specifically for hydronic heating and air conditioning systems. The refrigeration side of the module may be connected to VRF CITY MULTI SMALL Y and Y Series outdoor heat pump units, or to R2 heat recovery units. The hydronic side of the module may feed heated underfloor systems or other similar utilities, to provide heating in winter in heat pump mode, or cooling in summer in conditioning mode.
Connecting these modules to R2 Series VRF CITY MULTI heat recovery outdoor units offers extraordinarily levels of efficiency, especially in spring and autumn, with extremely high COP values. The HWS hydronic module can produce hot water at temperatures up to 40°C in the return line (45°C in delivery line), with a heating capacity of up to 12.5 kW per module which, however, is scalable in relation to internal demand.

ATW HYDRONIC MODULE – AIR TO WATER



TYPICAL APPLICATIONS: HOTEL (COMMON AREAS)

TYPICAL APPLICATIONS: CENTRALIZED RESIDENTIAL SYSTEMS (RADIANT PANEL HEATING)

Hybrid systems

Like the HWS module, the ATW hydronic module may be used to create hybrid systems, with both hydronic modules and VRF direct expansion units. For instance, this makes it possible to create a system that can heat certain rooms with radiant panels (a heating solution that is now very popular, as it offers uniform temperatures and quietness) and heat other rooms using appropriate Mitsubishi Electric indoor units (cassette units, wall-mounted units, ducted units etc.). Similarly, conditioning in summer may be performed with a heated underfloor system in rooms where this is installed, and with cooled air in other rooms, via standard VRF indoor units.
This makes it possible to use the most effective treatment solution possible for each interior space, catering for both the requisites of the specific application and the preferences of the user. As well as superior energy efficiency, a hybrid system also offers the extraordinary flexibility needed to cater for very diverse situations, which a conventional conditioning system simply does not.

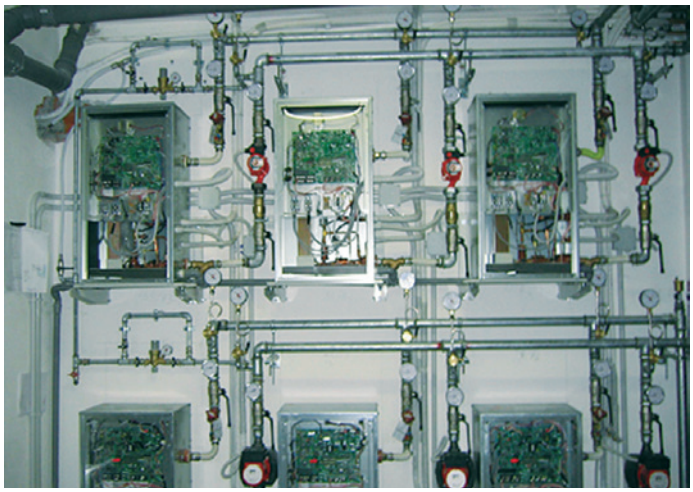
Main features

The functional characteristics of the ATW hydronic module cater for the needs of a very wide variety of different installations:

- nominal heating capacity: 12.5 kW;
- nominal cooling capacity: 11.2 kW;
- outdoor operating temperature range, heating mode: -20°C to +32°C (R2 heat recovery series); -20 to +15.5°C (Y heat pump series);
- outdoor operating temperature range, conditioning mode: -5°C to +46°C (R2 and Y series);
- return hot water temperature range: 10°C to 40°C;
- mains power: single-phase, 230V AC;
- individual thermal energy consumption billing with field devices.

Operating principle

The ATW reversible heat pump hydronic module consists essentially of a brazed plate stainless steel refrigerant-water heat exchanger connected to the VRF CITY MULTI outdoor unit on the refrigeration side, and to the hydronic circuit of the system (radiant panels, radiator units etc.) on the water side. The module is equipped with an electronic expansion valve which modulates the flow of refrigerant in the heat exchanger in response to heating or cooling demand and the demand required by the electronic management and control circuit. The entire system is encased in a housing with compact dimensions and very limited weight comparable to a wall-mounted boiler. The high COP value attained by the ATW hydronic module means that it delivers superior comfort with minimal operating costs, contributing to reducing the CO2 emissions produced for energy production at the power plant. This offers a two-sided advantage as emissions are not only reduced, but also delocalised away from populated areas.



Control and adjustment system

Like the HWS module, the ATW hydronic module is equipped with a sophisticated control system offering a wide choice of functions, selectable in relation to the needs of the installation and the preferences of the user.
The ATW module may be associated with its own independent remote controller (PAR-W21MAA), allowing the user to configure all operating settings, including water temperature, which may be displayed either for the delivery circuit or for the return circuit.
The water temperature reading displayed depends on the type of installation and on the auxiliary controller devices used. The return circuit reading configuration is the most widely used of the two, and allows precise control over the water temperature in the inertial accumulator tank (which is recommended) as a means to balance flows. Once the set temperature is reached, the ATW continues to operate to maintain a constant value.
Note that with this configuration, the delivery temperature is normally higher (max. 45°C) than the set temperature until the set temperature itself is reached.
In installations operating in summer, the ATW produces cold water at a temperature regulated with the same method, based on the primary delivery circuit reading or the return circuit reading.
As the cooling action of the radiant panels only reduces the sensible heat of the interior space, suitable dehumidification systems may also be included in the installation.
The ATW hydronic module can be configured for the following operating modes and hot water temperatures:

MODE	TEMPERATURE RANGE
Heating	30 - 45°C
ECO heating	30 - 45°C
Antifreeze	10 - 45°C
Cooling	10 - 30°C

Technical specifications HWS HYDRONIC MODULE

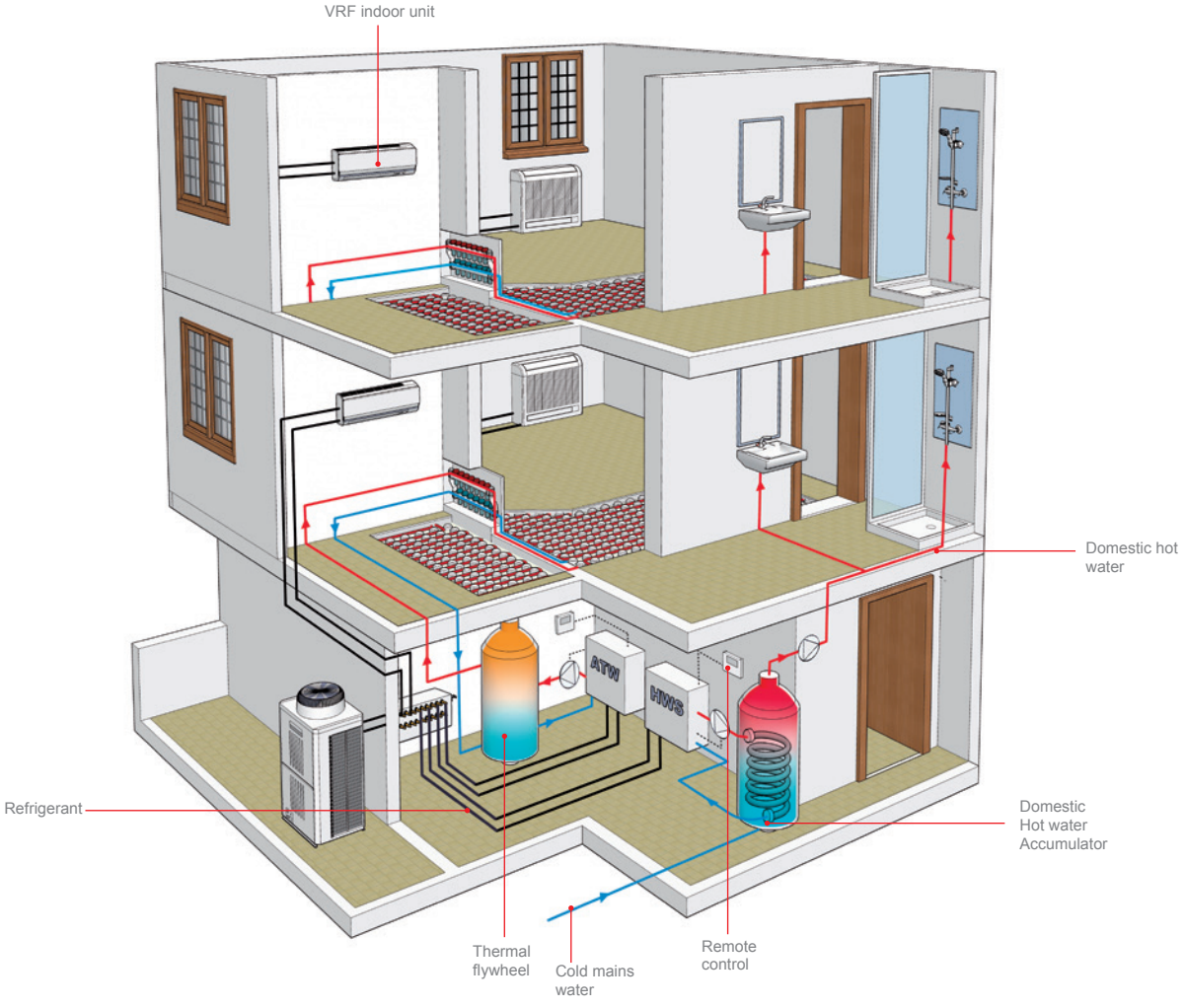
MODEL			PWFY-EP100VM-E2-AU
Power			Single-phase, 220-230-240V 50/60Hz
Heating power output (nominal)		kW *1	12,5
		kcal/h *1	10,800
		Btu/h *1	42,700
	Power absorption	kW	0,025
	Current consumption	A	0,138
Temp. range in heating mode	Serie PUMY	Outdoor temp. DB	-
	Serie PUHY	Outdoor temp. DB	-20~15,5°C
	Serie PURY	Outdoor temp. DB	-20~32°C
	Serie PQHY - PQRY	Water temp. in circuit	10~45°C
	Serie PQHY - PQRY	Temp. in water/glycol circuit	-5~45°C
		(for geothermal applications)	
		Return line water temp	10~40°C
Cooling output (nominal)		kW *2	11,2
		kcal/h *2	9,600
		Btu/h *2	38,200
	Power absorption	kW	0,025
	Current consumption	A	0,138
Temp. range in cooling mode	PUMY Series	Outdoor temp. B.S.	-
	PUHY Series	Outdoor temp. B.S.	-5~46°C
	PURY Series	Outdoor temp. B.S.	-5~46°C
	PQHY - PQRY Series	Water temp. in circuit	10~45°C
	PQHY - PQRY Series	Temp. in water/glycol circuit	-5~45°C
		(for geothermal applications)	
		Return line water temp	10~35°C
Connectable outdoor units	Total capacity		50-100% of capacity of OU
	Series		Y (Ecostandard (P), Standard Efficiencyl (P),High Efficiency (EP)), Zubadan Y, WY, R2 (Standard Efficency (P), High Efficiency (EP)), WR2
			29
			ø 9,52 (ø 3/8") brazed
Sound pressure in anechoic chamber	dB <A>		ø 15,88 (ø 5/8") brazed
Refrigerant circuit piping diameter	Liquid	mm (inches)	ø 19,05 (R 3/4") screw-on connection
	Gas	mm (inches)	ø 19,05 (R 3/4") screw-on connection
Water piping diameter	Inlet	mm (inches)	ø 32 (1-1/4")
	Delivery	mm (inches)	Galvanised sheet steel
Drain pipe diameter		mm (inches)	800 (785 without feet) x 450 x 300
External finish			36
External dimensions HxLxW		mm	1,8-4,30
Dry weight		kg	
Water in circuit	Nominal	m^3/h	4,15
	(entire operating volume)		1
Rated pressure	R410A	MPa	Installation manual, Instruction manuals
	Water	MPa	
Standard equipment	Manuals		Water filter, insulating material, 2x external signal connectors, plumbing fittings for filter, flow regulator
	Accessory		

Note:
*Nominal conditions *1 and 2* are subject to EN14511-2:2004(E)
*Install the module in an environment with a wet bulb temperature not exceeding 32°C
*Due to continuous improvements made to these products, the specifications given above are subject to modification without prior notification.
*The module is not designed to be installed outdoors.

*1Nominal heating conditions
Outdoor temp.: 7°C DB/6°C WB (45°F DB/43°F WB)
Pipe length: 7.5 m (24-9/16 feet)
Vertical difference: 0 m (0 feet)
Intake water temp.: 30°C
Water flow rate: 2.15 m^3/h (P100)
4.30 m^3/h (P200)

*2Nominal cooling conditions:
External temp: 35°C DB/(95°F DB)
Pipe length 7.5 m (24-9/16 feet)
Vertical difference: 0 m (0 feet)
Intake water temp.: 23°C
Water flow rate: 1.93 m^3/h (P100)
3.86 m^3/h (P200)

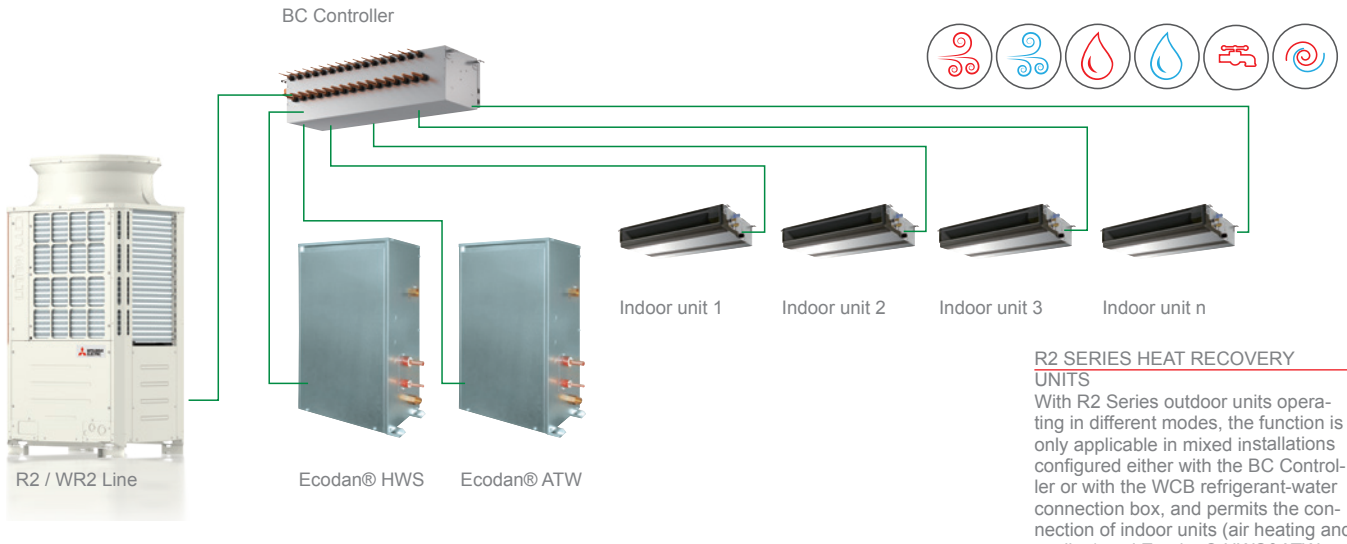
SCHEMATIC: ECODAN® VRF HWS & ATW (SIMULTANEOUS HEATING, COOLING AND DOMESTIC HOT WATER PRODUCTION)



200% EXTENDED CONNECTIVITY FUNCTION

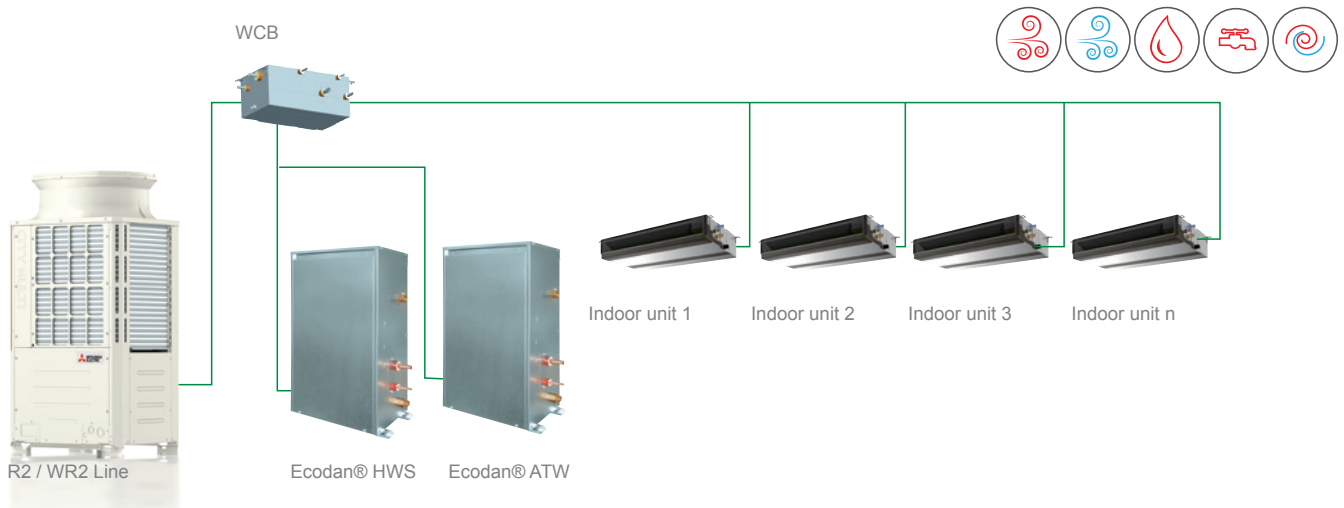
Y SERIES HEAT PUMP UNITS

With Y Series outdoor units, this function is only applicable in mixed installations and allows the connection of indoor units (air heating or cooling) and an Ecodan® ATW hydronic module (water heating) with a total capacity index up to 200% of the capacity of the outdoor unit.*



R2 SERIES HEAT RECOVERY UNITS

With R2 Series outdoor units operating in different modes, the function is only applicable in mixed installations configured either with the BC Controller or with the WCB refrigerant-water connection box, and permits the connection of indoor units (air heating and cooling) and Ecodan® HWS&ATW hydronic modules (DHW production and water heating) with a total capacity index up to 200% of the capacity of the outdoor unit.*



*For detailed informations, please contact your representative


EXIT

ECODAN MULTI

SPLIT - AIR/WATER - AIR/AIR - Heating/Cooling/Domestic hot water

SG Ready

ErP A+++ FOR LOW TEMPERATURE APPLICATIONS

WATER HEATING

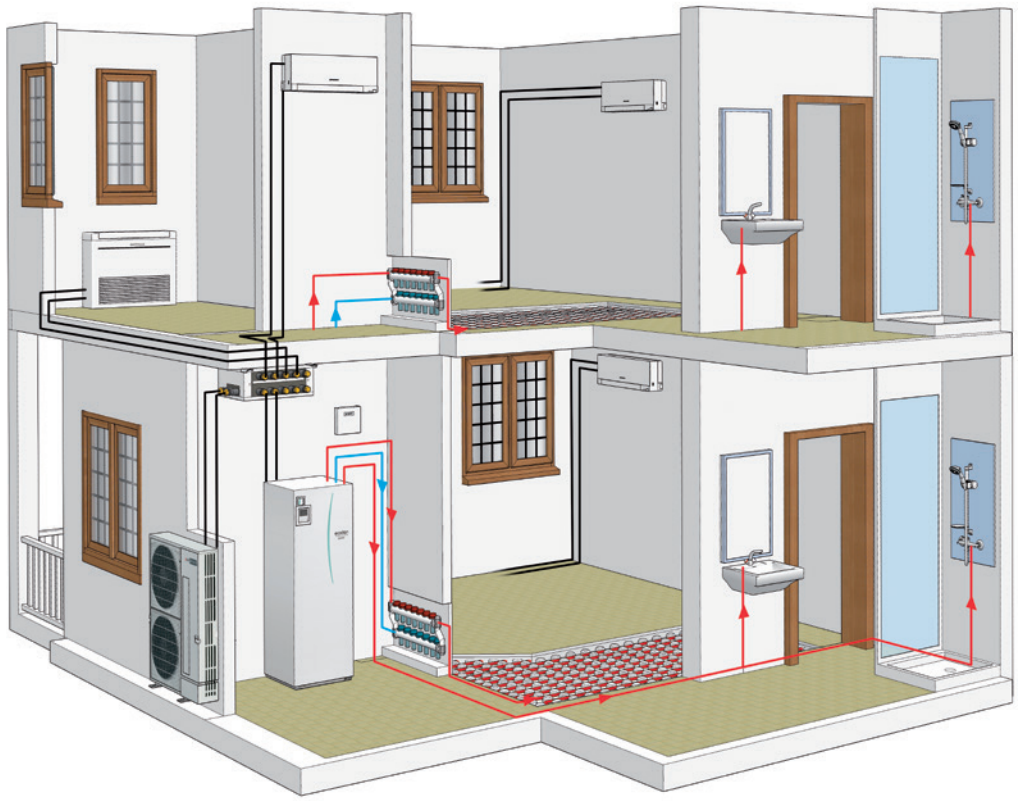
DOMESTIC HOT WATER

AIR COOLING

AIR HEATING

Ecodan® Multi is a hybrid Air/Air, Air/Water system that combines the flexibility of a multisplit system with the convenience of a hydronic heat pump that can produce hot water for heating and domestic use.

SMALL Y LAYOUT WITH ECODAN



Indoor unit				Outdoor units
 EHSC	 EHST20C		 PAC-MK54BC PAC-MK34BC	 PUMY-P112VKM5 PUMY-P112YKM4 PUMY-P125VKM5 PUMY-P125YKM4 PUMY-P140VKM5 PUMY-P140YKM4
HYDROBOX	200-litre HYDROTANK	SERIES M/S/P/CITY MULTI	BRANCH BOX	SMALL Y

Key Technologies

* Optional

Technical specifications HEATING/COOLING/DOMESTIC HOT WATER

OUTDOOR UNIT				PUMY-P112VKM6 PUMY-P112YKM5	PUMY-P125VKM6 PUMY-P125YKM5	PUMY-P140VKM6 PUMY-P140YKM5
	Compatible hydronic modules	Size		MEDIUM		
		Hydrobox		EHSC-VM2D	EHSC-VM2D	EHSC-VM2D
		"hot only" model				
		200-litre hydrotank		EHST20C-VM2D	EHST20C-VM2D	EHST20C-VM2D
		"hot" model only				
	Power Supply	Voltage/Freq./Phases	V/Hz/no.	230 / 50 / 1 400 / 50 / 3+N	230 / 50 / 1 400 / 50 / 3+N	230 / 50 / 1 400 / 50 / 3+N
Air/Air	Cooling	Nominal capacity	kW	12,5	14,0	15,5
		Absorbed power	kW	2,79	3,46	4,52
		EER		4,48	4,05	3,43
		Annual energy consumption	kWh	1395	1730	2260
	Heating	Nominal capacity	kW	14,0	16,0	18,0
		Absorbed power	kW	3,04	3,74	4,47
		COP		4,61	4,28	4,03
Air / Water Heating[1]	Air 7° / Water 35°	Nominal capacity	kW	12,5	12,5	12,5
		Absorbed power	kW	3,06	3,06	3,06
		COP		4,083	4,083	4,083
	Water temperature	max.		55	55	55
	Low water temperature 35°C (Spring/Autumn)	RANK		A++	A++	A++
		SCOP		4,20	4,20	4,20
		ηs	%	168	168	168
	Medium water temperature 55°C (Spring/Autumn)	RANK		A+	A+	A+
		SCOP		3,02	3,02	3,02
		ηs	%	121	121	121
	Production of DHW[2]	RANK (DHW load profile)		A (L)	A (L)	A (L)
		ηwh	%	106	106	106
	Outdoor units	Magnetothermic switch recommended	A	32/16	32/16	32/16
		Dimensions HxWxD	mm	1338x1050x330(+25)	1338x1050x330(+25)	1338x1050x330(+25)
		Weight	Kg	122/125	122/125	122/125
		Sound pressure	dB(A)	49	50	51
		Sound power max	dB(A)	69	70	71
	Refrigeration lines	Diameters (gas/liquid)	mm	15,88/9,52	15,88/9,52	15,88/9,52
		Length max (min)	m	n.d.	n.d.	n.d.
		Respective height elevation max.	m	n.d.	n.d.	n.d.
Guaranteed operating range	Air/Air	Cooling	min/max	-5 / +46	-5 / +46	-5 / +46
		Heating	min/max	-20 /21	-20 / 21	-20 / 21
Guaranteed operating range	Air/Water	Heating	min/max	-20 /21	-20 / 21	-20 / 21
		DHW	min/max	-20 /35	-20 /35	-20 /35
	Refrigerant	Type / Preload	Kg	R410A / 4,80	R410A / 4,80	R410A / 4,80
		GWP[3] / Tons CO_2 Eq.		2088 / 10,02	2088 / 10,02	2088 / 10,02

[1] In combination with 'hot only' hydronic modules.
[2] In combination with 200-litre Ecodan Hydrotank.
[3] IIn combination with the hydronic module only.
[4] Reference notes see last page.

Table of indoor unit combinations

NO. OF CONNECTABLE UNITS	Min/max connectable capacity (kW) x 10	MODEL	Wall Mounted																				
			Kirigamine Style			Kirigamine Zen						Plus line											
			MSZ-LN-VG(2)			MSZ-EF VG(K)/VE2/3						MSZ-SF VE3						MSZ-AP VG(K)					
			25	35	50	18	22	25	35	42	50	15	20	25	35	42	50	15	20	25	35	42	50
8	30/162	**PUMY-P112**	•	•	•	•	•	•	•	•	•	•*1	•*1	•	•	•	•	•*2	•*2	•	•	•	•
	30/182	**PUMY-P125**	•	•	•	•	•	•	•	•	•	•*1	•*1	•	•	•	•	•	•	•	•	•	•
	30/202	**PUMY-P140**	•	•	•	•	•	•	•	•	•	•*1	•*1	•	•	•	•	•	•	•	•	•	•

NO. OF CONNECTABLE UNITS	Min/max connectable capacity (kW) x 10	MODEL	Wall Mounted		Floor Standing						1 way cassette			4 way cassette									Ceiling Concealed									Ceiling Suspeded				
			Plus line											60x60 (Compact)				90x90 (Standard)					Low static pressure					Middle static pressure								
			MSZ-GF VE		MFZ-KJ VE (2)			MFZ-KT VG			MLZ-KP VF			SLZ-M FA				PLA-M- EA PLA -RP-EA					SEZ-M DA (L)					PEAD-M JA PEAD-RP JAQ				PCA-M KA PCA-RP KAQ				
			60	71	25	35	50	25	35	50	25	35	50	15	25	35	50	35	50	60	71	100	25	35	50	60	71	50	60	71	100	35	50	60	71	100
8	30/162	**PUMY-P112**	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	30/182	**PUMY-P125**	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	30/202	**PUMY-P140**	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

* [kW]x10, **COMPATIBILITY TABLE FOR MODELS PUMY P VKM5; PUMY P112-140 Y(V) KM4 R1(2);**
*1 ONLY MSZ-SF 15/20 VA
*2 ONLY MSZ-AP 15/20 VF
ONLY for R2 model : MSZ-LN VG2 ; MSZ-EF·VGK, MSZ-AP·VGK; MFZ -KT VG

HWHP - CAHV NEW

PACKAGED - AIR/WATER SYSTEM - Heating/Domestic Hot Water

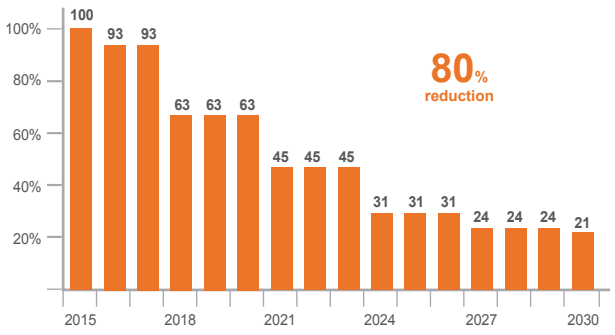
WATER HEATING | DOMESTIC HOT WATER

Low-GWP refrigerant R454C

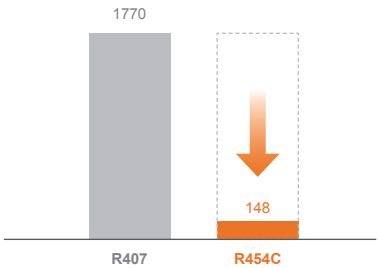
In Europe, the F-gas Regulation is implemented to prevent global warming and unwanted climate changes. The current target is to reduce the total amount of F-gases (CO_2 equivalent) by about 80% across Europe by 2030 compared to 2015. Mitsubishi Electric offers more environmentally friendly hot water heat pumps that use the low Global Warming Potential (GWP) refrigerant R454C.

STEPPED F-GAS REDUCTION SCHEDULE (CO_2 EQUIVALENT)

Reference value (100%) – average value from 2009 to 2012



COMPARISON OF CO_2 EQUIVALENT (GWP)



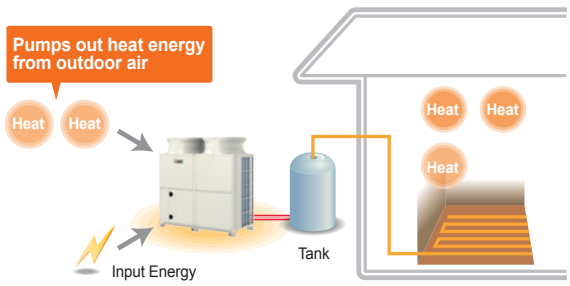
The GWP of R454C refrigerant is 148. It is approximately 91% lower than the R407C refrigerant which is used in the conventional model (CAHV-P500YB-HPB)*.

Extention of low operating temperature range

Hot water heat pumps absorb energy from the surrounding outdoor air and transfer it into refrigerant. Heat energy absorbed from air heats up the incoming water via the heat exchanger. The Seasonal Coefficient of Performance (SCOP) of the new CAHV is 3.57 (low temperature conditions) / 3.24 (medium temperature conditions)*, which means it can extract more than three times the input electric energy.

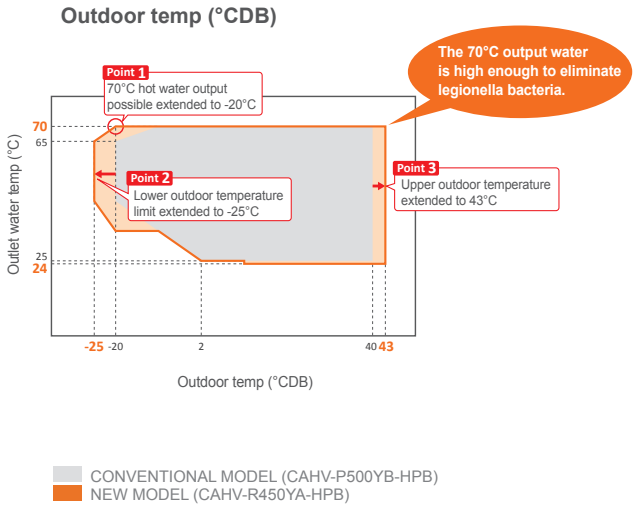
*Above values are based on Regulation (EU) No.811/2013.

HOT WATER HEAT PUMP SYSTEM



The lower outdoor temperature limit for 70°C hot water output has been extended from -10°C in the conventional model to -20°C in the new model. The operating temperature range has also been improved from "-20°C to 40°C" to "-25°C to 43°C". It is suitable for heating and heat-retention operations.

RANGE OF OPERATION TEMPERATURE AND OUTLET WATER TEMPERATURE



Low maintenance & design flexibility

Clean and safe
The hot water heat pump system runs on electricity only.
It does not require the safety measures and periodic inspections required for gas and other combustion appliance-mounted systems, and does not generate toxic substance such as NOx.

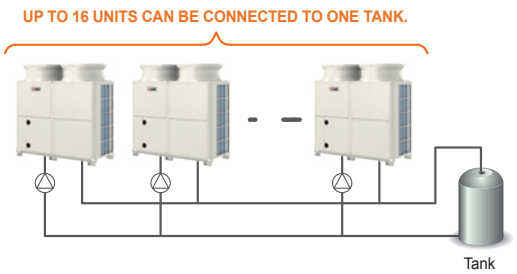
Rotation function
When two or more units are in the system, the unit runs alternately, ensuring an optimum product lifecycle for both component units.

Multi-unit installation
The number of outdoor units can be adjusted from 1 to 16 according to the tank storage capacity.

Wide variety of external input / output
Various system configurations are available:
• Two external output for backup heater
• Analog input to control capacity
• Defrost signal
*Refer to the Data Book for other functions.

ROTATION FUNCTION

MULTI-UNIT INSTALLATION

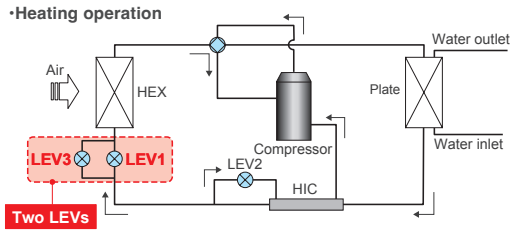


Refrigerant circulation and pressure control with two LEVs

The R454C refrigerant is a lower pressure refrigerant than R407C, which is used in the conventional model, and R410A, which is commonly used in air conditioners. Because low-pressure refrigerants have a low refrigerant density, securing circulation volume can be challenging especially when the refrigerant circuit pressure drops due to low outdoor temperatures or other conditions.

Linear expansion valves (LEVs) before heat exchanger (HEX) were increased from one to two and placed in parallel. The opening of LEV1, which focuses on securing the refrigerant circulation volume, and LEV3, which focuses on controlling the refrigerant pressure, are controlled respectively to control the refrigerant circulation.

HEATING OPERATION



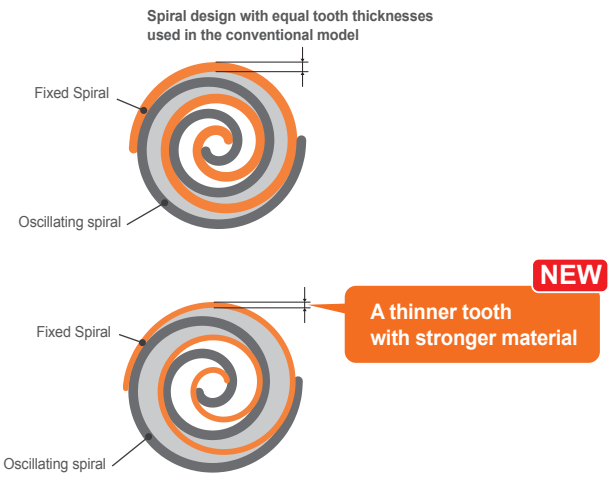
NEW COMPRESSOR

- NEW SPIRAL STRUCTURE
- FLASH INJECTION CIRCUIT
- EXPANDED INVERTER FREQUENCY CONTROL LOWER LIMIT

New spiral structure

The low density of R454C refrigerant requires an increased amount of refrigerant to be discharged from the discharge section.
The new compressor uses a new material for the fixed spiral section, which enables the tooth to be thinner while maintaining their strength. The height of the teeth has also been lengthened. This synergistic effect has resulted in a 15% increase in the extrusion volume from the discharge section compared to the conventional model (assuming the scroll section of the old and new compressors has the same volume).

NEW SPIRAL STRUCTURE

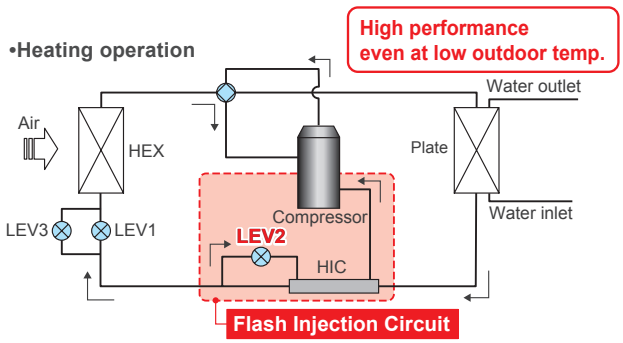


Flash injection circuit

The flash injection circuit is a Mitsubishi Electric technology used in air conditioner for cold climates. The CAHV also adopts this circuit to help units produce high-temperature water even at low outdoor temperatures.

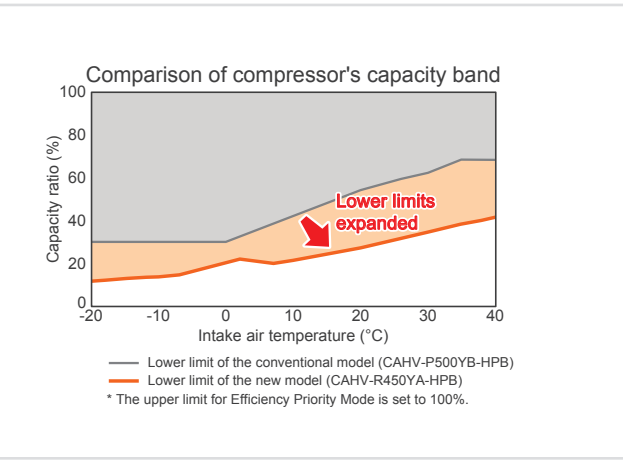
Liquid refrigerant, whose pressure is reduced by the LEV2, exchanges heat in the HIC circuit and becomes gas-liquid two-phase refrigerant. This two-phase refrigerant flows into the injection port in the compressor for controlling the increase of the discharge temperature. Therefore the optimal amount of refrigerant can be provided to the system via the compressor.

FLASH INJECTION CIRCUIT



Expanded inverter frequency control lower limit

The new compressor has an expanded lower limit of the frequency control range compared to the conventional model. This expanded lower-limit control helps minimize thermo ON/OFF frequency during low-load operations, such as in intermediate seasons, and improves energy efficiency.



PAR-W31MAA - Individual remote controller

PAR-W31MAA offers an easy-to-see full-dot and backlit LCD display. Basic operations, such as ON/OFF, mode switching, water temperature setting and schedule setting, can be performed. Up to 16 units can be controlled with one remote controller.

INDIVIDUAL REMOTE CONTROLLER

MAJOR FUNCTIONS	
Operation/ setting	ON/OFF
	Hot water/Heating/HeatingECO/Anti-freeze
	Snow/regular
	Demand
	Scheduled operation (daily/weekly)
Display	Operation mode
	Current water temperature
	Error code

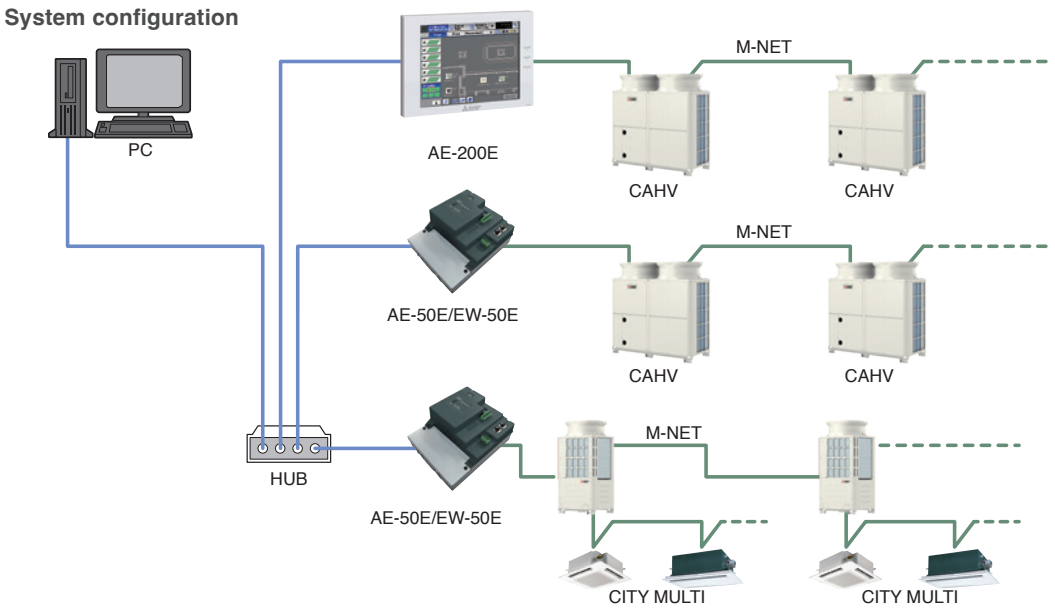
AE-200E / AE-50E / EW-50E Centralized remote controller

The CAHV-R450YA-HPB(-BS) is connectable to the AE-200E that centrally controls up to 50 units or 50 systems connected via M-NET.

OPTIONAL PART	
Description	Model
Representative water temperature sensor	TW-TH16-E

MAJOR FUNCTIONS	
Operation/ setting	ON/OFF
	Hot water/Heating/HeatingECO/Anti-freeze
	Snow/regular
	Scheduled operation (daily/weekly)
Display	Operation mode
	Current water temperature
	Error code

CENTRALIZED REMOTE CONTROLLER



MODEL			CAHV-R450YA-HPB (-BS)
Power source			3-phase 4-wire 380-400-415V 50/60Hz
Capacity (EN14511) *1		kW	40.0
		kcal/h	34,400
		BTU/h	136,480
	Power input	kW	14.03
	Current input	A	23.7-22.5-21.7
	COP	kW/kW	2.85
	SCOP Low/Medium		3.57/3.24
Capacity (EN14511) *2		kW	35.0
		kcal/h	30,100
		BTU/h	119,420
	Power input	kW	20.13
	Current input	A	34.0-32.3-31.1
	COP	kW/kW	1.74
Maximum current input		A	44.0-41.8-40.3
Water pressure drop *1			10.2kPa (1.47 psi)
Temperature range *5	Outlet water temperature		24-70ºC 75.2-158ºF
	Outdoor temperature	D.B.	-25-43ºC -13-109.4ºF
Circulating water volume range *6			1.5m³/h-15.0m³/h
Sound pressure level (measured 1 m below the unit in an anechoic room) *1 *4		dB (A)	64
Sound pressure level (measured 1 m below the unit in an anechoic room) *3 *4		dB (A)	72
Water pipe diameter and type	Inlet	mm (in)	38.1(Rc1 1/2"),housing type joint
	Outlet	mm (in)	38.1(Rc1 1/2"),housing type joint
Extemal finish			Acrylic painted steel sheet <Munsell 5Y 8/1 or similar>
Extemal dimensions H × W × D		mm	1710 x 1750 x 740
Net weight		kg (lb)	359 (791)
Design pressure	R454C	MPa	3.85
	Water	MPa	1.0
Drawing number	Wiring		KW94C870
	External appearance		KW94C397
Heat exchanger	Water-side		Copper brazed stainless steel sheet
	Air-side		Plate fins and copper tubes
Compressor	Type		Inverter scroll hermetic compressor
	Manufacturer		MITSUBISHI ELECTRIC CORPORATION
	Starting method		Inverter
	Motor output	kW	12.1
	Lubricant		FVC32EA
Fan	Air flow rate m³/min	m³/min	150 × 2
		L/s	2500 × 2
		cfm	5297 × 2
	External static pressure		10 Pa (1 mm H2O)
	Type and quantity		Propeller fan x 2
	Control and driving mechanism		Inverter control, direct driven by motor
	Motor output kW	kW	0.92 x 2
HIC (Heat inter-changer) circuit			Copper pipe
Protection devices	High pressure		High-pressure sensor and switch set at 3.85 MPa (643 psi)
	Inverter circuit		Overheat and overcurrent protection
	Compressor		Overheat protection
	Fan motor		Thermal switch
Defrosting method			Auto-defrost mode (Reversed refrigerant cycle)
Refrigerant	Type and factory charge	kg	R454C, 9.0 kg
	Flow and temperature control		LEV and HIC circuit

Note:

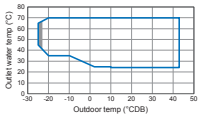
*1 Under normal heating conditions at the outdoor temperature of 7°CDB/6°CWB (44.6°FDB/42.8°FWB), the outlet water temperature of 45°C (113°F), and the inlet water temperature of 40°C (104°F)

*2 Under normal heating conditions at the outdoor temperature of 7°CDB/6°CWB (44.6°FDB/42.8°FWB) and the outlet water temperature of 70°C (158°F)

*3 Under normal heating conditions at the outdoor temperature of 7°CDB/6°CWB (44.6°FDB/42.8°FWB) when the unit is set to the "Capacity Priority" mode through the dry NC-contact

*4 The sound pressure level is a value measured in an anechoic room in accordance with the conventional method in JRA 4060.

*5



Outdoor temp. -25°CDB/Outlet water temp. 45 to 65°C
(Outdoor temp. -13°FDB/Outlet water temp. 113 to 149°F)
Outdoor temp. -20°CDB/Outlet water temp. 35 to 70°C
(Outdoor temp. -4°FDB/Outlet water temp. 95 to 158°F)
Outdoor temp. 43°CDB/Outlet water temp. 24 to 70°C
(Outdoor temp. -109°FDB/Outlet water temp. 75.2 to 158°F)
*Do not start up the unit at or below the outdoor temperature of -23°C

*6 4.0-15.0m³/h under the following conditions.

a. When the outdoor temperature is below 0°C.

b. When the outlet water temperature is 30°C or below AND the outdoor temperature is 6°C or below.

Fluorinated Greenhouse Gases Information

Model Name	Refrigerant		Model	
	type	GWP	Weight [kg]	CO_2 equivalent [t]*
CAHV-R450YA-HPB (-BS)	R454C	148	9.0	1332

HWHP - CRHV

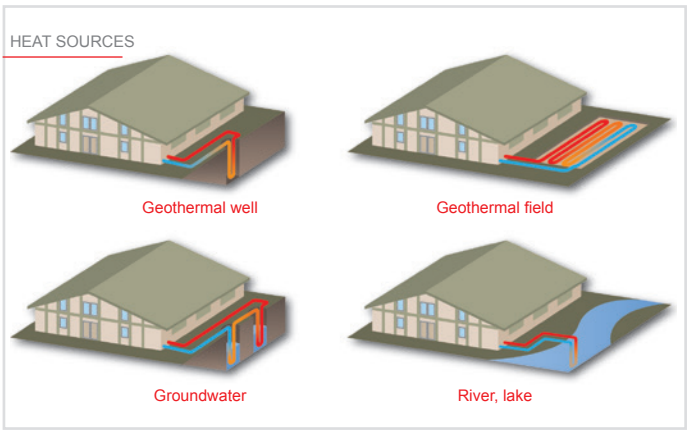
PACKAGED - WATER/WATER SYSTEM - Heating/Domestic Hot Water

ErP A++ FOR MEDIUM TEMPERATURE APPLICATIONS | WATER HEATING | DOMESTIC HOT WATER

The Ecodan® - Packaged HWHP (Hot Water Heat Pump) system consists of an outdoor monoblock air condensing unit which produces very high volumes of high-temperature hot water.

Packaged WtW heat pumps for hot water

With the latest Hot Water Heat Pump Packaged Water to Water CRHV system, Mitsubishi Electric has added to its range of heat pumps for hot water production and established the company as a leader in the manufacture of these systems. The CRHV packaged system is equipped with two compressors using R410A refrigerant, delivering a nominal capacity up to 60kW and drawing energy from the ground. It is the ideal solution for geothermal applications and applications using groundwater, river or lake water as a heat source to produce hot water for heating or domestic use up to 65°C. The Hot Water Heat Pump CRHV system offers class-beating innovation and efficiency.

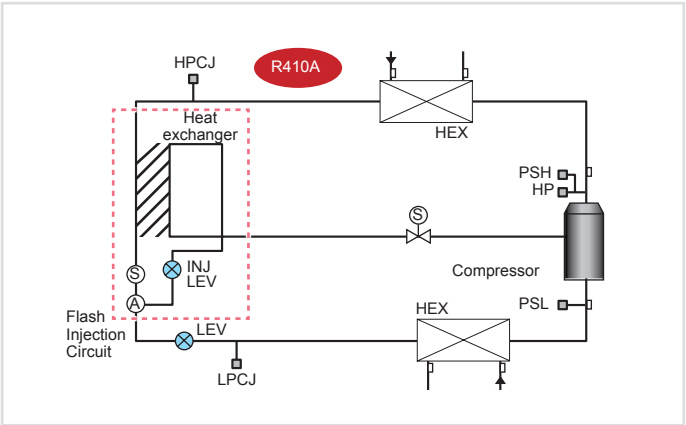


Technology

SCOP Over 4*

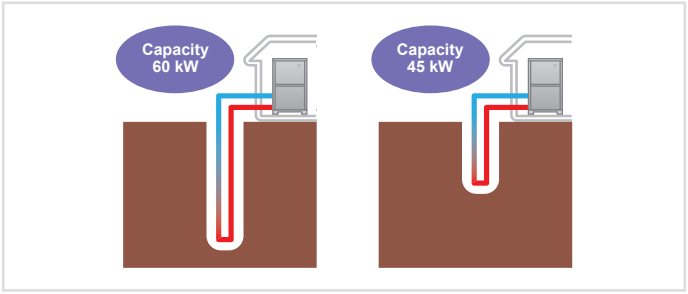
The new CRHV packaged system is also equipped with a flash-injection circuit designed for the VRF CITY MULTI ZUBADAN Y system (heat pump system for very cold climates). By using this advanced injection system and a highly efficient compressor, the CRHV packaged system can deliver high-temperature hot water up to 65°C, and ensures fewer losses in terms of performance and capacity at very low outdoor temperatures.

* SCOP 4.33 - Outlet water/glycol temperature -3°C. Outlet water temperature 35°C.



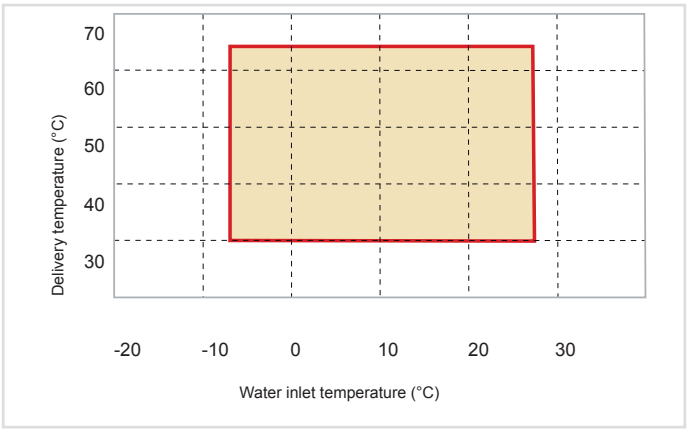
Upgrading existing systems

The latest CRHV packaged system can reuse existing geothermal probes or wells, adapting to their actual thermal capacity.
The inverter-driven CRHV packaged system is capable of adjusting its thermal capacity to between 45kW and 60kW in relation to the actual amount of heat deliverable by the existing geothermal well.



Operating temperatures

The new CRHV packaged system is capable of operating at incoming source water temperatures of between -8°C and 27°C with a counterflow configuration (the incoming source water temperature range can be extended up to 45°C using a parallel flow configuration). The water delivery temperature range is from 30°C to 65°C (in parallel flow configuration, the maximum water delivery temperature is 60°C at incoming water temperatures above 27°C).
The CRHV packaged system is suited to indoor installation.



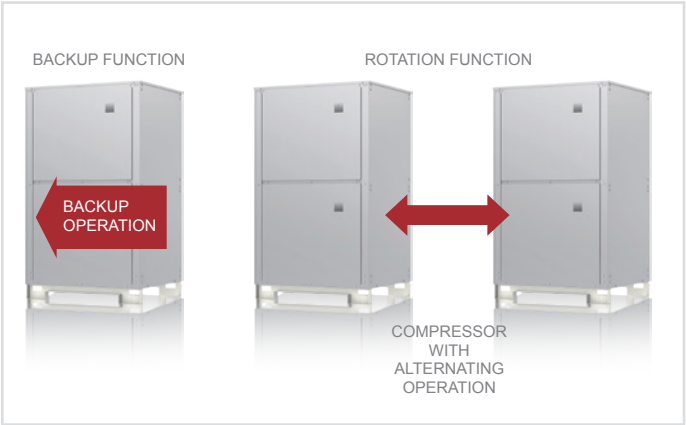
Finishing treatment

The module can also be ordered with a special protective finish on request, for installation in particularly harsh or corrosive environments.

Backup and rotation functions

Backup Function
Rotation Function

he CRHV packaged system is highly reliable thanks to its Backup function, which ensures that if one of the compressors in an individual system fails, the other will continue operating to avoid the inconvenience of the system shutting down completely. Obviously heat capacity is halved under these conditions.
Another key function for ensuring uniform operation and optimal compressor lifetime in compressors in CRHV packaged systems in multiple configurations is the Rotation function. This ensures that when an installation has two or more systems, the individual systems will operate in turn if thermal demand does not require simultaneous operation.



Cascade systems

When the demand for large volumes of hot water production is high, a flexible, modular thermal power installation can be created with up to 16 CRHV packaged systems, for a maximum output of up to 960 kW, with integrated cascade control.
This solution offers a high level of modularity thanks to the 2 DC scroll inverter compressors installed in an individual system, ensuring that thermal power is adjusted progressively and with extreme precision in relation to actual hot water demands. This optimises the operation of the entire installation, with only part of the CRHV packaged system operating under medium-load conditions during typical spring and autumn temperatures.
A malfunction in one or several CRHV packaged systems will not compromise the operation of the other systems in the installation, ensuring safety and continuous operation.

External remote control

Wide variety of external input/output

A wide choice of analogue and digital inputs and digital outputs available with the system's electronics enables remote control operation (via a BMS, timer or external contacts). The following are just some of the available input signals:

- Option of selecting operating mode and hot water production temperature setpoint, choosing Heating Mode or ECO Heating Mode. The latter mode is particularly advanced, as it uses the outdoor air compensation curve to automatically determine the water delivery setpoint.
- Option of selecting operating mode and hot water production temperature setpoint, choosing Domestic Hot Water Mode or Heating Mode. This makes it possible to configure two different water temperature setpoints, a higher value for domestic hot water production and a lower value for heating. This improves performance at partial loads, as DHW is only produced when required.
- Selecting Efficiency Mode (COP) or Capacity Mode for unit operation. This means system operation can be optimised in relation to demand, increasing power or performance depending on requirements.
- Selecting ON/OFF on the basis of the signals received from the flow regulator switch and the circulation pump, for increased protection of the hydronic circuit and satisfactory system operation.

The following are just some of the available output signals:

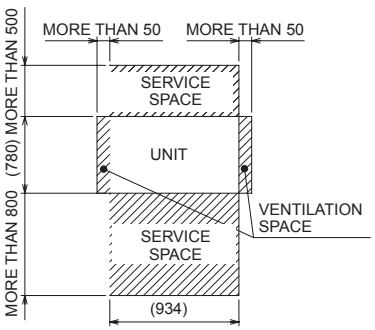
- A digital output can be enabled at a selectable minimum water temperature to start an alternative heat generator (boiler, solar panel etc.) to substitute the system if it is OFF.
- 3-way valve control in relation to hot water or heating demands.
- Pump control on circuit hot water side and heat source side (ON/OFF).

The result is maximum control flexibility, either locally using the dedicated PAR-W21MAA remote controller, or remotely using external contacts.

Compact dimensions

The unit has a compact footprint thanks to the latest, highly-efficient heat exchanger with low pressure losses. Installation footprint 0.73 m²*

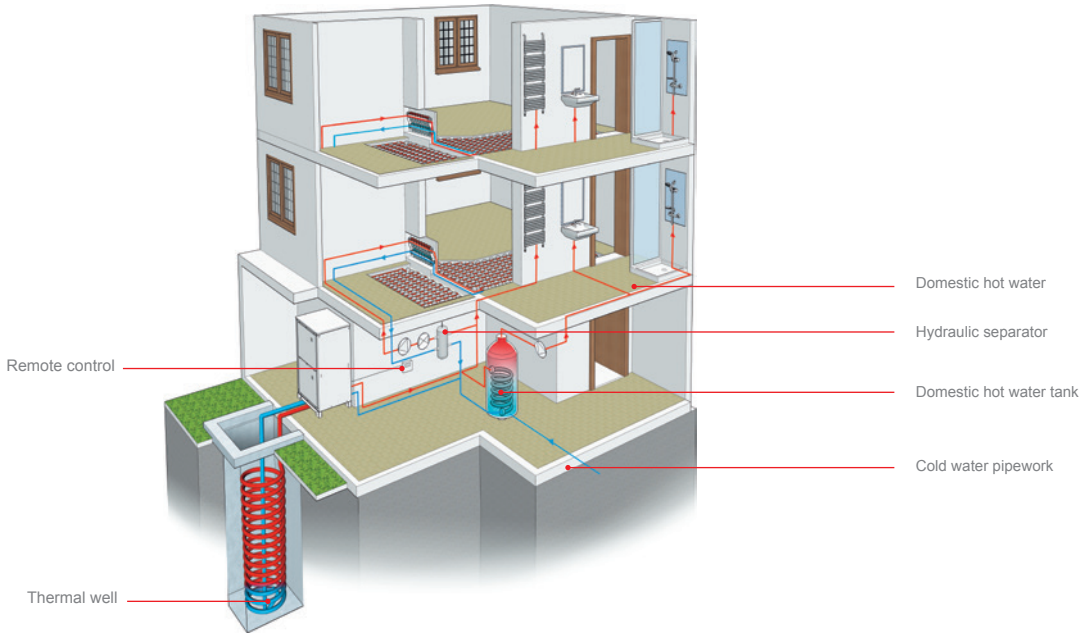
*Dimensions of a unit excluding service space.



Control and monitoring functionality with centralized WEB Server controllers

With the M-Net data transmission bus, the CRHV packaged system can interface with the centralised **WEB Server 3D Touch** and **3D Blind Controllers** of the VRF CITY MULTI control system range. Depending on the application, the CRHV packaged system can therefore interface with a VRF CITY MULTI system to optimise operation when catering for hot water, heating and air conditioning demands, or to manage, monitor and supervise the system in a standalone configuration for applications solely requiring the production of large volumes of hot water. In both cases, the system can be controlled via a 10.4" backlit, colour touchscreen display on the 3DT controller, or via the Internet using the web pages for either centralised controller.

LAYOUT: ECODAN® PACKAGED HWHP CRHV (LOW AND HIGH TEMPERATURE HEATING + DHW)



Technical specifications HEATING/COOLING/DOMESTIC HOT WATER

MODEL				CRHV-P600YA-HPB
Spring/Autumn heating	Power Supply	Voltage/Freq./Phases	V/Hz/no.	3 phases 380-400-415V; 50/60 Hz
	SCOP (power 60 kW) EN14825 Avg. clim. cond.	Heat source water/glycol 0°C/-3°C, Hot water 30°C/35°C		4,33
		Heat source water/glycol 0°C/-3°C, Hot water 47°C/55°C		2,89
	Nominal heating capacity[1]		kW	60
		Absorbed power	kW	14,2
		Absorbed current	A	24,0 - 22,8 - 22,0
		COP		4,23
		Flow rate of water in circuit	m³/h	10,3
		Flow rate of heat source water/glycol	m³/h	14,7
	Nominal heating capacity[2]		kW	45
		Absorbed power	kW	10,2
		Absorbed current	A	17,2 / 16,4 / 15,8
		COP		4,41
		Flow rate of hot water in circuit	m³/h	7,7
		Flow rate of heat source water/glycol	m³/h	11,2
	Heat source liquid			Ethylene Glycol 35 WT
	Temperature range[4]	Hot water side	°C	30 - 65
		Heat source water/glycol side	°C	-8 - 27
	Low water temperature 35°	Rank		A++
		ηS	%	153
	Medium water temperature 55°	Rank		A++
		ηS	%	127
	Water pressure drop	Hot water side[3]	kPa	14
		Heat source water/glycol side[3]		38
	Water pipe diameters	Return	mm	50,8 (Rc 2") threaded
		Delivery	mm	50,8 (Rc 2") threaded
	Flow rate of water in circuit	Hot water side	m³/h	3,2 - 15,0
		Heat source water/glycol side	m³/h	4,5 - 16,0
	Sound level at 1 m		dBA	50
	External dimensions HxWxD	HxWxD	mm	1561 x 934 x 780
	Net weight		kg	395
	Ref. refill R410A[4]/CO_2 Eq		kg/Tons	9/18.79

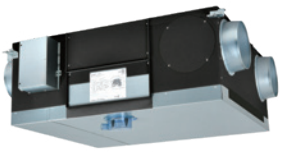
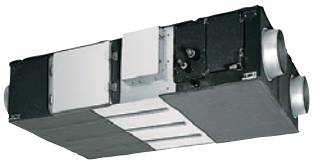
Note:
[1] Nominal heating conditions: hot water delivery temperature 35°C; water/glycol outlet temperature -3°C; hot water return temperature 30°C; water/glycol inlet temperature 0°C.
[2] Includes the power absorbed by the pump in accordance with EN14511
[3] Nominal heating conditions:hot water delivery temperature 35°C; water/glycol outlet temperature -3°C; hot water return temperature 30°C; water/glycol inlet temperature 0°C. Power 60 kW, hot water flow rate 10.3 m3; water/glycol flow rate 14.7 m³
[4] GWP of HFC R410A equivalent to 2088 in line with regulation 517 / 2014.

Ventilation

All fresh air (AFA)

Lossnay enthalpy heat recovery (LGH)

Outdoor air treatment indoor units

TYPE	MODEL NAME	MODEL
All fresh air (AFA)	**PEFY-P125VMHS-E-F** **PEFY-P200VMHS-E-F** **PEFY-P250VMHS-E-F**	
Lossnay Enthalpy heat recovery (LGH)	**LGH-RVS-E**	
	LGH-RVX3-E	
	LGH-150RVXT-E **LGH-200RVXT-E** **LGH-250RVXT-E**	
Outdoor air treatment indoor units (GUF)	**GUF-50RD(H)4** **GUF-100RD(H)4**	
	s-AIRME	ME-series 

	Air flow (mc/h)						
	500	600	800	1000	1600	2000	2500
				•	•	•	
	•		•	•			
					•	•	•
	•			•			

PEFY-P VMHS-E-F

OUTDOOR FRESH AIR INTAKE UNIT (AFA)

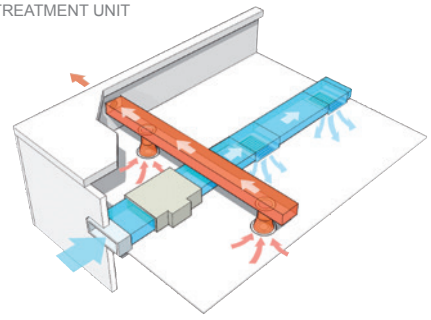
Ideal for...

...feeding temperature-controlled fresh outdoor air into building. The ideal solution for offices, large stores and restaurants.

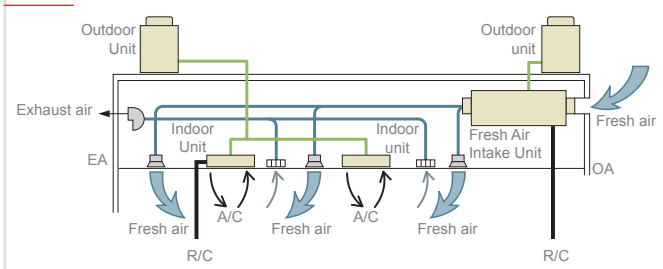
Enables intake of outside air

The indoor purified air delivery unit may be installed anywhere. The purified air delivery unit may be used to feed fresh, purified outdoor air into any building, in any place and at any time.

INSTALLATION OF INDOOR FRESH OUTDOOR AIR TREATMENT UNIT



OPERATING SCHEME - EXAMPLE



Controllable outlet air temperature

With new PEFY-P VMHS-E-F is possible to operate **Supply Air** temperature control.

OPERATION MODE	TEMPERATURE RANGE SETTABLE
COOL mode	14°C - 30°C
HEAT mode	17°C - 28°C
AUTO mode (single set point)	17°C - 28°C
FAN	Not settable

*In some cases the temperature of the air introduced into the ambient may be subject to fluctuations due to the conditions of the external air and to the operating conditions of the system.

Equipped with new DC fan motor

Fan motor has been changed to higher efficiency DC motor. Power source has been changed from three-phase power supply to **single-phase** power supply for all sizes.

Maximum connectable indoor units capacity to outdoor unit

Max. 110% of outdoor unit capacity (100% in case of heating below -5°C).

Flexible air-flow setting

4 levels of external static pressure to choose. External static pressure can be set also by remote controller (PAR-33/40MAA, PAR-U02MEDA and PAR-CT01MA).

MODEL	P125	P200	P250
External Static Pressure (Pa)	<100>-<150>-200-<250>		

*The factory setting of external static pressure is shown without chevrons "< >;".

Two types of air-flow modes are available, each of which has three air-flow rates to choose from:
- Normal Airflow rate
- High Airflow rate

Air-flow rates are accesible from the remote controller (PAR-33/40MAA, PAR-U02MEDA and PAR-CT01MA).

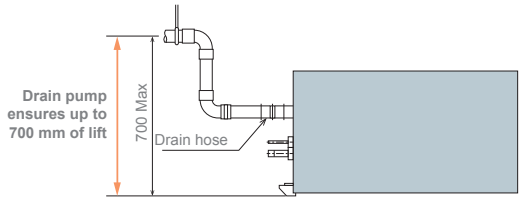
Mode	Normal-airflow rate	High-airflow rate
Air-flow rate	Low-Medium-High	Low-Medium-High

Drain pump (optional)

Greater design flexibility made possible by the increased head height (700 mm max).

UNIT MODEL	DRAIN PUMP MODEL
PEFY-P125 VMHS-E-F	PAC-DRP10DP-E2
PEFY-P200 VMHS-E-F	PAC-KE06DM-F
PEFY-P250 VMHS-E-F	PAC-KE06DM-F

DRAIN PUMP (OPTIONAL)



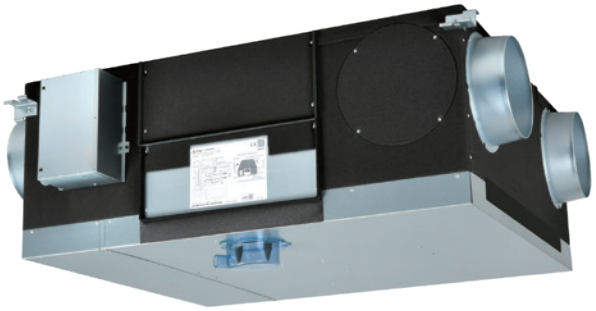
Specifications

MODEL			PEFY-P125VMHS-E-F	PEFY-P200VMHS-E-F	PEFY-P250VMHS-E-F
Power source	V/phase/Hz		1 phase, 220-230-240V 50/60 Hz		
Cooling capacity *1		kW	14.0	22.4	28.0
		Btu/h	47,800	76,400	95,500
Heating capacity *2		kW	8.9	13.9	17.4
		Btu/h	30,400	47,400	59,400
Temperature range	Cooling		17°C D.B./15.5°C W.B. ÷ 43°C D.B./35°C W.B. Thermo-off (FAN-mode) automatically starts if the outdoor temperature is lower than 17°CD.B.		
	Heating		'-10°C D.B. ÷ 20°C D.B. Thermo-off (FAN-mode) automatically starts if the outdoor temperature is higher than 20°CD.B.		
Power input *3	Cooling	kW	0.220	0.260	0.350
	Heating	kW	0.230	0.270	0.360
Current input *3	Cooling	A	1.43	1.66	2.16
	Heating	A	1.52	1.85	2.38
External finish			Galvanized		
External dimension HxWxD		mm	380x1195x900	470x1250x1120	470x1250x1120
Net weight		kg	49	78	81
Heat exchanger			Cross fin (aluminum fin and copper tube)		
Motor	Type		DC Motor		
	Output	kW	0.244	0.375	0.375
Refrigerant piping diameter	Gas (brazed)	mm	15.88	19.05	22.22
	Liquid (brazed)	mm	9.52	9.52	9.52
Field drain pipe size		mm	O.D. 32	O.D. 32	O.D. 32
Fan	Type x Quantity		Sirocco fan x 1	Sirocco fan x 2	Sirocco fan x 2
	External static press. *4	Pa	<100> - <150> - 200 - <250>		
	Air flow rate *5		Normal Airflow rate mode / High Airflow	Normal Airflow / High Airflow	Normal Airflow / High Airflow
		m^3/min	14.0 - 15.5 - 18.0 / 15.5 - 18.0 - 20.0	22.5 - 25.0 - 28.0 / 25.0 - 28.0 - 32.0	28.0 - 31.0 - 35.0 / 31.0 - 35.0 - 40.0
		L/s	233 - 258 - 300 / 258 - 300 - 333	375 - 417 - 467 / 417 - 467 - 533	467 - 517 - 583 / 517 - 583 - 667
		cfm	494 - 547 - 636 / 547 - 636 - 706	794 - 883 - 898 / 883 - 989 - 1,130	989 - 1,095 - 1,236 / 1,095 - 1,236 - 1,412
Sound pressure level *2 (Low-Mid-High)			Normal Airflow / High Airflow	Normal Airflow / High Airflow	Normal Airflow / High Airflow
		dB(A)	34-37-41 / 36-40-42	35-38-41 / 36-39-42	38-40-44 / 38-41-45

*1Cooling capacity indicates the maximum value at operation under the following condition. Cooling: Indoor 33°CDB/28°CWB, Outdoor 33°CDB. The set temperature of the remote controller is 18°C.
*2Heating capacity indicates the maximum value at operation under the following condition. Heating: Indoor 0°CDB/-2.9°CWB, Outdoor 0°CDB/-2.9°CWB. The set temperature of the remote controller is 25°C.
*3The value are measured at the factory setting of airflow mode and external static pressure.
*4The factory setting of airflow mode and external static pressure mode is shown without < >. Refer to "Fan characteristics curves", according to the external static pressure, in DATA BOOK for the usable range of air flow rate.
*5If the airflow rate is over the usable range, dew drop can be caused from the air outlet and the air flow rate is changed automatically because of the output down by the fan motor control. If the air flow rate is less than the usable range, condensation from the unit surface can be caused.
- The combination of fresh air intake type indoor units with other types of indoor units to handle internal thermal load which may cause the conflict of operation mode. It is not recommended when fresh air intake type indoor unit is connected to the Y or WY series.
- Depending on the air conditioning load, outside temperature, and due to the activation of protection functions, the desired preset temperature may not always be achieved and the discharge temperature may swing. Note that untreated outside air may be delivered directly into the room upon the activation of protection functions.
- Fresh air intake type indoor units cannot be connected to PUMY and cannot be connected to an outdoor unit together with PWFY series.
- The maximum connectable indoor units to 1 outdoor unit are 110% (100% in case of heating below -5°C).
- When fresh air intake type indoor units connect to an outdoor unit together with other types of indoor unit, the total capacity of fresh air intake type indoor units needs to be 30% or less of the connected outdoor unit capacity.
- The AUTO mode on the local remote controller is available only when fresh air intake type indoor unit is connected to the R2 or WR2 series of outdoor unit.
- The system changeover function is available only when all the connected indoor units are fresh air intake type indoor units.
- The fan temporary stops during defrost.
- The cooling and heating capacities are the maximum capacities that were obtained by operating in the above air conditions and with a refrigerant pipe of about 7.5 m and a level difference of 0 m.
- The actual capacity characteristics vary with the combination of indoor and outdoor units. See the technical information in DATA BOOK for the details.
- Thermo off (Fan) operation automatically starts either when temperature is lower than 17°CDB in cooling mode or when the temperature exceeds 20°CDB in heating mode.
- Dry mode is not available.
- When this unit is used as sole A/C system, be careful about the dew in air outlet grilles in cooling mode.
- Un-conditioned outdoor air such as humid air or cold air blows to the indoor during thermo off operation. Please be careful when positioning indoor unit air outlet grilles, ie take the necessary precautions for cold air, and also insulate rooms for dew condensation prevention as required.
- Air filter must be installed in the air intake side. The filter should be attached where easy maintenance is possible in case of usage of field supply filters.

LGH-RVS

DUCTED SENSIBLE HEAT RECOVERY UNIT



SIZES	
LGH-50RVS	500 mc/h @ 150 Pa
LGH-80RVS	800 mc/h @ 170 Pa
LGH-1000RVS	1000 mc/h @ 190 Pa

Standard filter (provided with the unit)	Optional filter
G3 (Coarse 50%)	F8 (ePM1 65%)

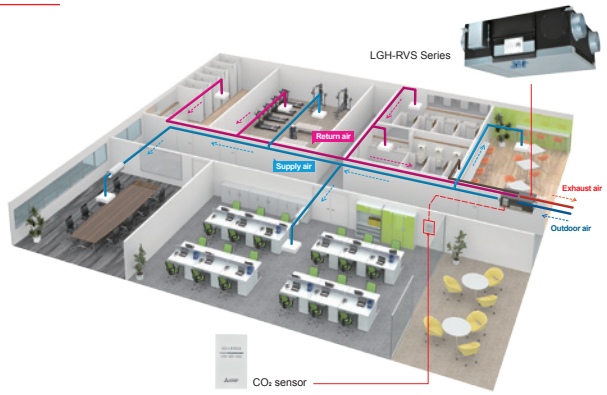
Ideal for...

Ducted indoor unit equipped with fresh air intake fan, exhaust fan, filtering system, Lossnay sensitive heat recovery system and bypass damper.

Sensible heat recovery unit

The new Lossnay LGH-RVS sensible heat recovery unit caters to different needs thanks to its features and accessories.
Ease of installation, ultra-quiet operation and recovery efficiency are the three key features of this model.

DUCTABLE SENSIBLE HEAT RECOVERY UNIT



CO_2 sensor (optional)

A CO_2 sensor connected directly to the unit means that the airflow rate can be optimised according to the level of carbon dioxide detected in the room, improving heat exchange efficiency and contributing to energy saving.

AIRFLOW MODULATION WITH CO_2 SENSOR

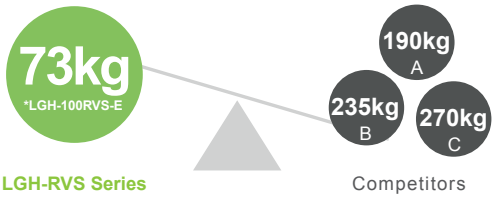
OPTIONAL CO_2 SENSOR

PZ-70CSW-E (sensor for wall-mounted installation). The CO2 levels are indicated by the LEDs on the sensor.

PZ-70CSB-E (sensor built into the unit)

Easy installation

Lighter weight
Being lightweight is one of the most important factors in installation. The lightweight frame of the LGH-RVS series can provide a huge advantage in terms of installation cost and safety.

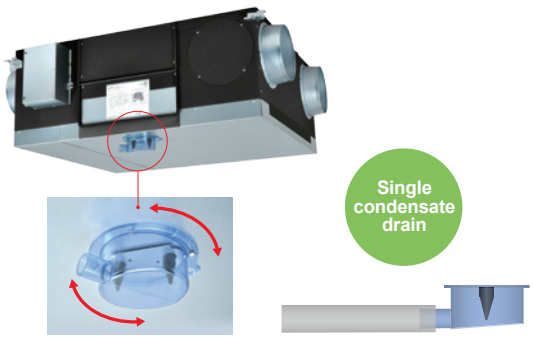


Silent and efficient operation

The new LGH-RVS recovery unit has extremely low noise emissions thanks to the special sirocco fan produced by Mitsubishi Electric coupled with a high-efficiency motor.

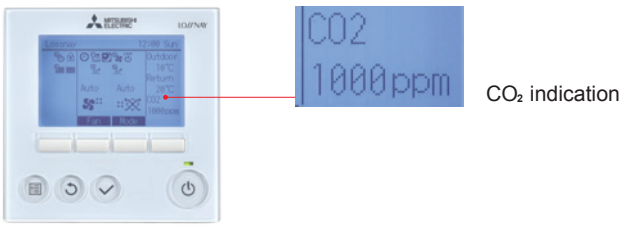
Single condensate drain

The LGH-RVS unit is equipped with a special condensate drain that allows the connection of a single condensate evacuation pipe. Connection to the pipeline is made easy thanks to the rotating connection system. Furthermore, thanks to the special design of the new drainage system, there is no need for an external siphon.



Dedicated PZ-62DR-EB wired controller

The new PZ-62DR-EB controller can be used to control all the functions of the LGH-RVS unit.
If the PZ-70CSW-E (optional) or PZ-70CSB-E (optional) CO_2 sensor is used, the carbon dioxide concentration in the room can be displayed on the control unit's display.



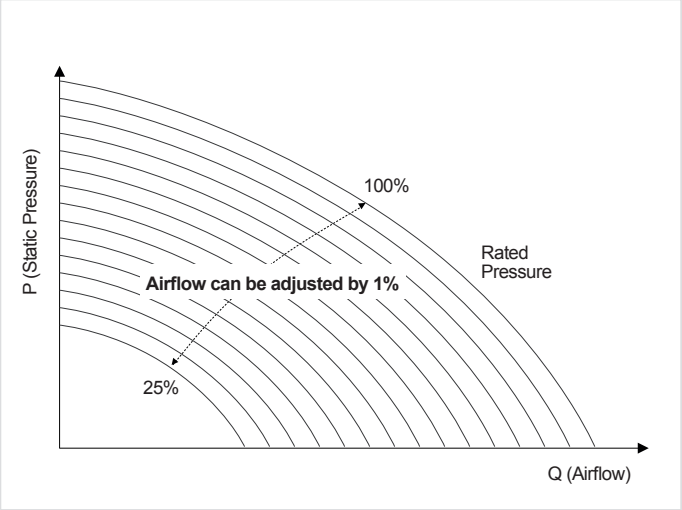
Customisable filtration level

The new LGH-RVS is fitted with G3 filters (Coarse 50%) as standard. F8 filters can be used for higher performance filtration.

Filter Model	Class. EN779:2012	Class. ISO16890:2016	No. filters per set	Compatible VL model	Filter position	Maintenance	Filter life*
PZ-S50RF-E	**G3**	**Coarse 55%**	2	LGH-50RVS-E	**RA, OA**	Clean the air filter once a year	Approx. 5 years with periodic cleaning/maintenance
PZ-S80RF-E				LGH-80RVS-E			
PZ-S100RF-E				LGH-100RVS-E			
PZ-S50RFH-E	**F8**	**ePM1 65%**	2	LGH-50RVS-E	**SA**	Disposable filter. No cleaning/washing	Approximately one year or when blocked
PZ-S80RFH-E				LGH-80RVS-E			
PZ-S100RFH-E				LGH-100RVS-E			

Airflow modulation

The fan inverter motor, designed and manufactured directly by Mitsubishi Electric, guarantees maximum performance with minimum energy consumption and allows **inlet and outlet ventilation speed modulation from 25% to 100%** (+/- 5% increments/decrements).



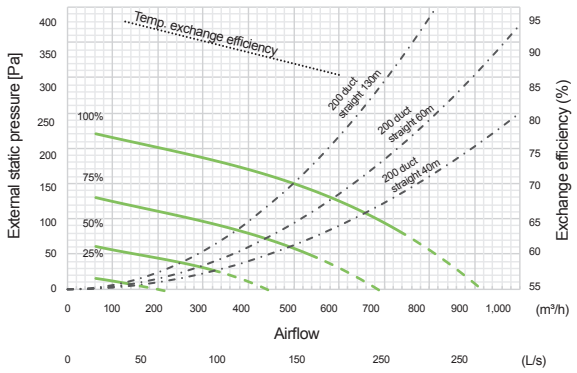
MELCloud connection (optional)

The unit can be controlled and monitored remotely via the **MelCloud** platform. This requires the installation of the optional **MAC-587IF-E** interface card.

Technical data LGH-50RVS-E

MODEL			LGH-50RVS-E			
Electrical power supply	V/Phase/Hz		220-240/MONOFASE /50			
Fan speed			100%	75%	50%	25%
Input power		W	190	110	60	25
Air volume		m³/h	500	375	250	125
		L/s	139	104	69	35
External static pressure		Pa	150	84	38	9
Sensible heat exchange efficiency		%	87	89	91	93
Standard filter	EN 779 (ISO 16890)		G3 (Coarse 35%)			
Noise		dB(A)	33	27	22	18
Weight		kg	55			
Dimensions	HxLxD	mm	529 x 974 x 946			
Guaranteed field of operation (continuous operation)*	Outdoor temp.	°C	0 ~ +40			
	Max. indoor temp.	%	40			
	Max. indoor RU	°C	90			
	Max. indoor AH	%	0.0139			

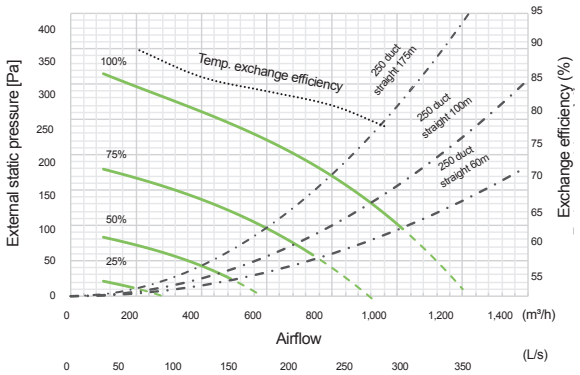
DIAGRAM LGH-50RVS-E



Technical data LGH-80RVS-E

MODEL			LGH-80RVS-E			
Electrical power supply	V/Phase/Hz		220-240/MONOFASE /50			
Fan speed			100%	75%	50%	25%
Input power		W	325	175	85	32
Air volume		m³/h	800	600	400	200
		L/s	222	167	111	56
External static pressure		Pa	170	96	43	11
Sensible heat exchange efficiency		%	82	84	86	90
Standard filter	EN 779 (ISO 16890)		G3 (Coarse 35%)			
Noise		dB(A)	36	30	25	18
Weight		kg	63			
Dimensions	HxLxD	mm	529 x 1185 x 997			
Guaranteed field of operation (continuous operation)*	Outdoor temp.	°C	0 ~ +40			
	Max. indoor temp.	%	40			
	Max. indoor RU	°C	90			
	Max. indoor AH	%	0.0139			

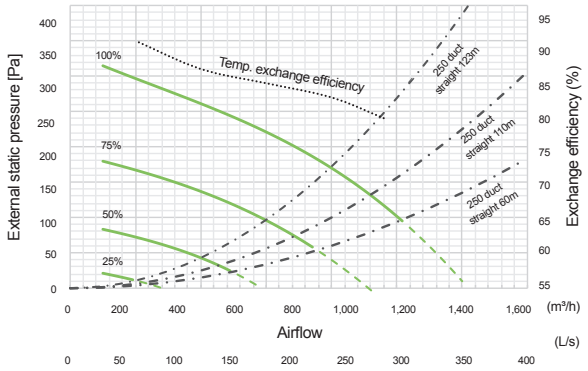
DIAGRAM LGH-80RVS-E



Technical data LGH-100RVS-E

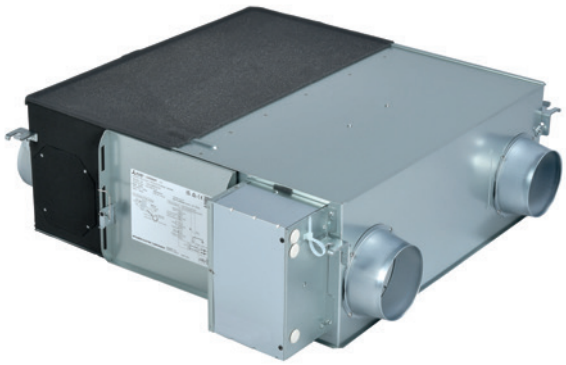
MODEL			LGH-100RVS-E			
Electrical power supply	V/Phase/Hz		220-240/MONOFASE /50			
Fan speed			100%	75%	50%	25%
Input power		W	445	225	100	35
Air volume		m³/h	1000	750	500	250
		L/s	278	208	139	69
External static pressure		Pa	190	107	48	12
Sensible heat exchange efficiency		%	82	84	86	90
Standard filter	EN 779 (ISO 16890)		G3 (Coarse 35%)			
Noise		dB(A)	37	32	24	18
Weight		kg	73			
Dimensions	HxLxD	mm	529 x 1185 x 1224			
Guaranteed field of operation (continuous operation)*	Outdoor temp.	°C	0 ~ +40			
	Max. indoor temp.	%	40			
	Max. indoor RU	°C	90			
	Max. indoor AH	%	0.0139			

DIAGRAM LGH-100RVS-E



LGH-RVX3 NEW

HEAT RECOVERY UNIT FOR DUCTED INSTALLATIONS



BMS connectivity	Accessories
Modbus	**Procon A1M**
MELCloud connectivity	
YES with **MAC-587IF-E** interface	

Standard filter (included with unit)	Optional filter
Coarse 60% (equivalent to G4)	**ePM1** 75% (equivalent to F8)

M-NET connection | Lossnay | A classe | PRESTAZIONI CERTIFICATE

SIZE	
LGH-65RVX3-E	150 Pa @ 650 m³/h
LGH-80RVX3-E	170 Pa @ 800 m³/h
LGH-100RVX3-E	190 Pa @ 1000 m³/h
LGH-160RVX3-E	170 Pa @ 1600 m³/h
LGH-200RVX3-E	170 Pa @ 2000 m³/h

Ideal for...

Ducted indoor unit for **horizontal or vertical** (with optional accessory) installation, with inlet and exhaust fans equipped with **EC motor** with broad speed modulation range (**25-100%**), integrated filtration system, Lossnay enthalpic heat recovery module and bypass damper.

LOSSNAY – Heat recovery ventilation units

The importance of adequate air exchange

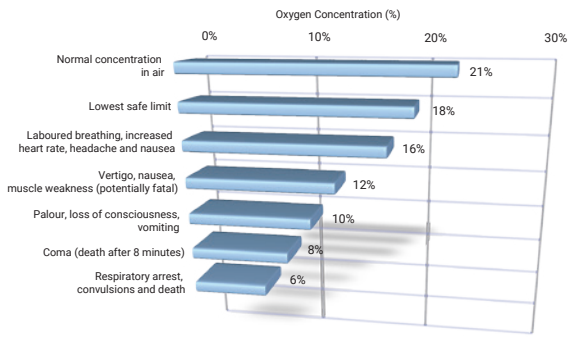
Air quality is a primary parameter for comfort.

Poor air quality in the office or at home has been proven to have a significantly detrimental influence on productivity and on the healthiness of the environment, and contribute to fatigue.

This is due to increasing concentrations of CO2 caused by inadequate air exchange. To live comfortably, every individual needs 40Ol of fresh air per hour.

Ensuring adequate ventilation in residential and commercial buildings is necessary to offer a healthy, comfortable environment for all occupants.

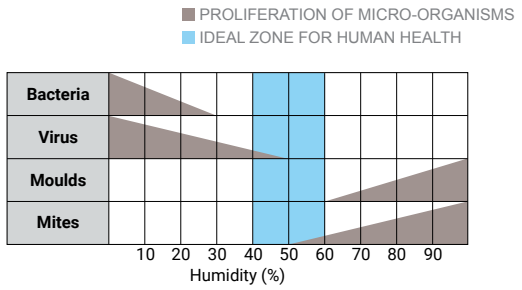
OXYGEN CONCENTRATIONS AND THE EFFECTS OF INADEQUATE OXYGEN LEVELS



The importance of correctly controlled humidity

A dry environment offers the ideal conditions for the proliferation of bacteria and viruses, and the survival rate of these micro-organisms drops rapidly at relative humidity levels above 50%. Excessively humid environments, on the other hand, encourage the proliferation of mould and mites. Precise humidity control is therefore an important factor in maintaining the ideal, healthy conditions.

ACTIVITY OF MICRO-ORGANISMS IN RELATION TO HUMIDITY



Source: ASHRAE Trans. 91 - 1B (1985)

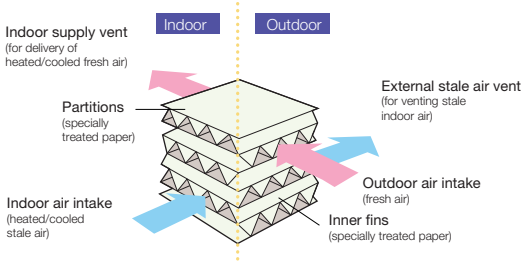
Low noise

Precise control over the flow of treated air significantly reduces the sound pressure values of the LOSSNAY unit by up to 17 dB(A). All LGH-RVX3 units ensure ideal acoustic comfort, even for residential applications, libraries, offices etc.

Simple construction

As shown in the figure, the Lossnay exchanger consists of a structure in special treated paper allowing two different air flows to cross one another and exchange thermal energy. Partitions separating the inlet and outlet channels prevent incoming fresh air from ever mixing with outgoing air.

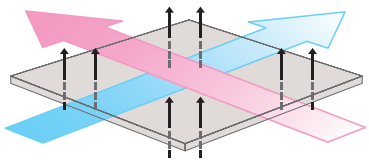
LOSSNAY EXCHANGER



Operating principle

The Lossnay exchanger performs a highly effective total exchange action for both temperature (sensible heat) and humidity (latent heat) – the system uses moisture-permeable partitions in specially treated paper to allow stale air to be vented externally and fresh outdoor air to be fed to the indoor space with absolutely no mixing between the two air flows.

WORKING PRINCIPLE



New PZ-62DR-EB dedicated remote control

NEW

The new wired remote control unit specifically for LGH-RVX3, LGH-RVS and LGH-RVXT heat recovery units boasts a fresh new look and new features:

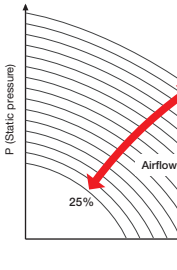
- Manage a group of up to 15 units
- Simple and intuitive.
- Backlit LCD screen
- "Lossnay" logo
- New "Pure White" colour
- Internal weekly timer
- Custom ventilation strategies for mode switching (Auto/recovery/bypass)
- Night purge function for active night-time ventilation in summer..

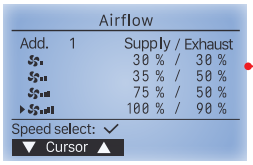
REMOTE CONTROL

Flow rate control

NEW

Both the fans of the new LGH-RVX3 can operate at 4 different pre-set ventilation speeds.
The desired speed setting can be selected independently for each of the two fans from the dedicated PZ-62DR-EB controller. Moreover, the new EC motors also allow each of the 4 set speeds to be increased or decreased within a range from 25% to 100%, letting the user fine-tune the performance of the air distribution system to perfection and reduce energy consumption.





PZ-62DR-EB

New CO_2 sensor

NEW

The optional CO2 sensor lets the controller of the unit modulate the recirculated air flow in relation to the concentration of carbon dioxide detected by the sensor itself. This also increases heat exchange efficiency and contributes to saving energy.

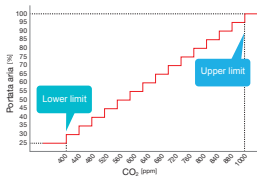
NEW CO_2 SENSOR

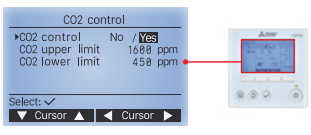
CO_2 sensor for wall-mounted installation (PZ-70CSW-E)

or

CO_2 sensor for ducted installation (PZ-70CSD-E)

Two different CO_2 sensor versions are available, one for wall-mounted installations and the other for ducted installations. The sensors receive electrical power from the board of the LGH unit. Fan speed is modulated in 16 steps within a range from 25% al 100% in relation to the CO_2 levels measured in the ambient air





The upper and lower CO2 limits are user-settable.
Upper limit: from 600 to 2,000 ppm.
Lower limit: from 300 to (upper limit -300) ppm.
50 ppm steps.

AUTOMATIC OPERATION WITH CO_2 SENSOR

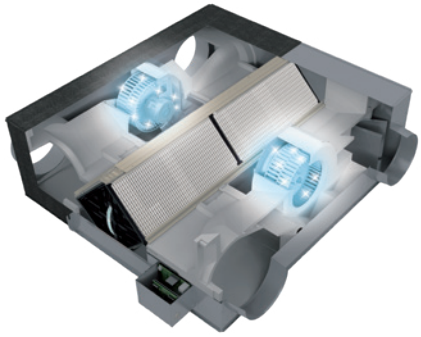
Fan speed is adjusted automatically in relation to the CO_2 concentration measured by the sensor

Dual Barrier Coating protective surface treatment

NEW

The new LGH-RVX3 heat recovery module uses Dual Barrier Coating technology. During operation, dust and contaminants carried by the air accumulate on the internal components of the unit, and especially on the fans, increasing energy consumption. The Dual Barrier Coating applied to both of the fans of the unit forms an additional protective layer which impedes the accumulation of dust and contaminants, even after prolonged usage, and eliminates the need for maintenance to address this problem.

Dual Barrier Coating



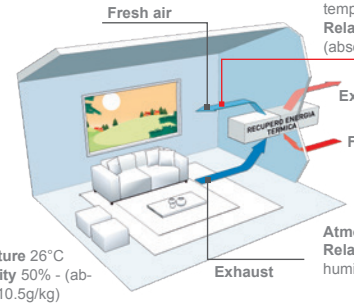
*The Dual Barrier Coating treatment is applied to both the inlet and exhaust fans

Comfortable air renewal action in either cold or hot outdoor conditions

Summer - Difference in temperature between new fresh air and air already in room of only 1.7°C.
• Incoming fresh air is brought to the same conditions as the cooled (and dehumidified) air in the room.

Winter - 4 kg/h humidity recovered.
• Incoming fresh air is brought to the same conditions as the warmed (and humidified) air in the room.

AIR RENEWAL IN SUMMER

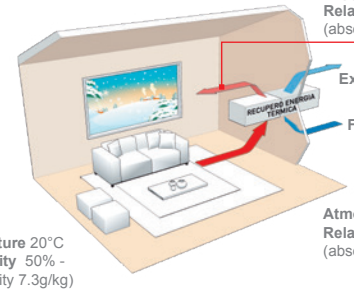


Supply air temperature 27.7°C
The incoming air lowers the temperature by approximately 6°C
Relative humidity 58% (absolute humidity 13.4 g/kg)

Atmospheric temperature 33°C
Relative humidity 63% (absolute humidity 20.1g/kg)

Room temperature 26°C
Relative humidity 50% - (absolute humidity 10.5g/kg)

AIR RENEWAL IN WINTER



Supply air temperature 16°C
Relative humidity 46% (absolute humidity 5.2g/kg)

Atmospheric temperature 0°C
Relative humidity 50% (absolute humidity 1.9g/kg)

Room temperature 20°C
Relative humidity 50% - (absolute humidity 7.3g/kg)

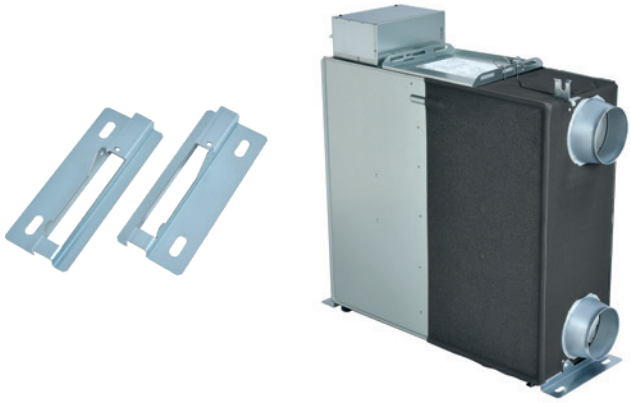
Horizontal or vertical installation

NEW

The LGH-RVX3 offers even more flexibility for installation.
The optional new dedicated mounts allow the unit to also be installed in a vertical position, so it can be installed not only in false ceilings but also in spaces such as alcoves, wall cavities and utility rooms.

MODEL CODE FOR VERTICAL INSTALLATION	LOSSNAY
PZ-1VS-E	LGH-50RVX3-E
PZ-2VS-E	LGH-65RVX3-E
	LGH-80RVX3-E
	LGH-100RVX3-E

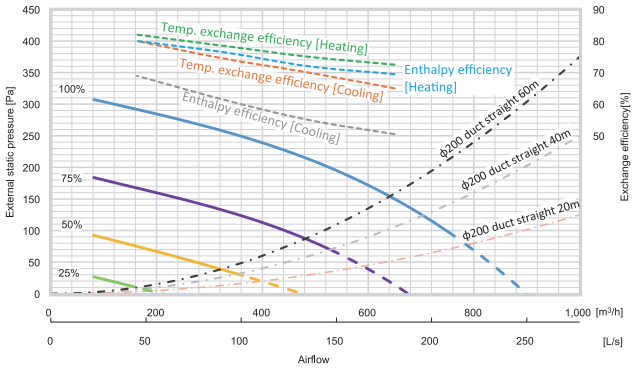
VERTICAL INSTALLATION



Technical specifications

MODEL			LGH-65RVX3-E			
Power supply	V/Phases/Hz		220-240 / SINGLE PHASE /50; 220-240 / SINGLE PHASE / 60			
Specific energy consumption class [1] (SEC)						
ErP data[1]	Max. air flow	m³/h	650			
Fan speed			SP4	SP3	SP2	SP1
Factory flow rate setting (modifiable)			100%	75%	50%	25%
Power consumption		W	245	120	51	20
Treated air volume		m3/h	650	488	325	163
Static external pressure		Pa	150	85	38	10
Sensible heat exchange efficiency	Cooling	%	65	70	74,5	80
	Heating	%	72,5	75	78,5	82
Enthalpic exchange efficiency	Cooling	%	50,5	55	61,5	69
	Heating	%	69,5	72	76,5	80
Standard filter	ISO 16890		Coarse 60%			
Sound pressure		dB(A)	37,5	31,5	24	17,5
No. and diameter of channels		mm	4 x 200			
Weight		kg	41			
Dimensions	HxLxW	mm	404 x 954 x 908			
Continuous operation range*	Outd. Temp.	°C	-10 ~ +40			
	Max. outd. RH	%	80			
	Max. ind. Temp.	°C	40			
	Max. ind. RH	%	80			

DIAGRAM LGH-65RVX3-E



*The dotted ventilation curves are for reference values which cannot be measured

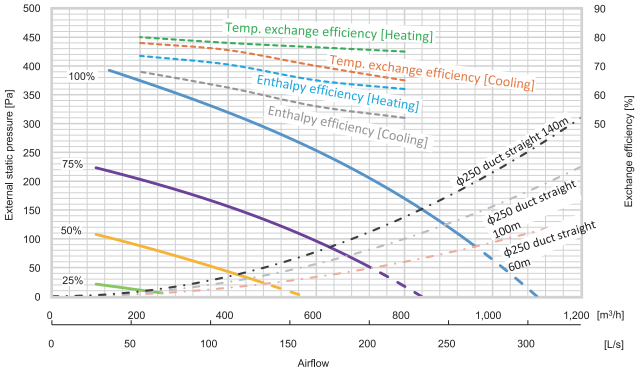
For LGH-RVX3 series
The values for power consumption, efficiency and noise are determined for the reference conditions specified with a mains power supply of 230V/50Hz and with the unit in a horizontal installation configuration.

Technical specifications

MODEL			LGH-80RVX3-E			
Power supply	V/Phases/Hz		220-240 / MONOFASE /50; 220-240 / MONOFASE / 60			
Specific energy consumption class [1] (SEC)						
ErP data[1]	Max. air flow	m³/h	800			
Fan speed			SP4	SP3	SP2	SP1
Factory flow rate setting (modifiable)			100%	75%	50%	25%
Power consumption		W	343	160	64	23
Treated air volume		m3/h	800	600	400	200
Static external pressure		Pa	170	96	43	11
Sensible heat exchange efficiency	Cooling	%	65	70	75,5	78
	Heating	%	75	76,5	78	80
Enthalpic exchange efficiency	Cooling	%	52	56	62,5	68
	Heating	%	62	65	70,5	73,5
Standard filter	ISO 16890		Coarse 60%			
Sound pressure		dB(A)	39	33,5	25	18
No. and diameter of channels		mm	4 x 250			
Weight		kg	47			
Dimensions	HxLxW	mm	404 x 1004 x 1144			
Continuous operation range*	Outd. Temp.	°C	-10 ~ +40			
	Max. outd. RH	%	80			
	Max. ind. Temp.	°C	40			
	Max. ind. RH	%	80			

[1]According to EU Regulation 1254/2014
*At temperatures <-10°C, the fan functions intermittently. In these conditions, we recommend using a heater unit that may be controlled by the LOSSNAY unit

DIAGRAM LGH-80RVX3-E



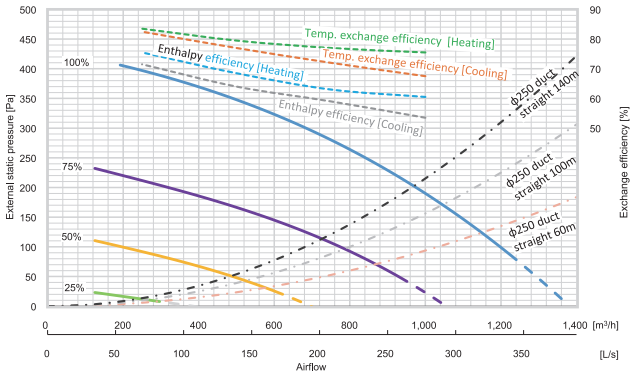
*The dotted ventilation curves are for reference values which cannot be measured

For LGH-RVX3 series
The values for power consumption, efficiency and noise are determined for the reference conditions specified with a mains power supply of 230V/50Hz and with the unit in a horizontal installation configuration.

Technical specifications

MODEL			LGH-100RVX3-E			
Power supply	V/Phases/Hz		220-240 / MONOFASE /50; 220-240 / MONOFASE / 60			
Specific energy consumption class [1] (SEC)			A (Average: -39.7 kWh/(m2.a))			
ErP data[1]	Max. air flow	m³/h	1000			
Fan speed			SP4	SP3	SP2	SP1
Factory flow rate setting (modifiable)			100%	75%	50%	25%
Power consumption		W	438	210	83	27
Treated air volume		m3/h	1000	750	500	250
Static external pressure		Pa	190	107	48	12
Sensible heat exchange efficiency	Cooling	%	67,5	72	77	82,5
	Heating	%	75,5	77	79,5	83,5
Enthalpic exchange efficiency	Cooling	%	53,5	59	64	71,5
	Heating	%	60,5	63	68,5	75,5
Standard filter	ISO 16890		Coarse 60%			
Sound pressure		dB(A)	40	35	27	18,5
No. and diameter of channels		mm	4 x 250			
Weight		kg	53			
Dimensions	HxLxW	mm	404 x 1231 x 1144			
Continuous operation range*	Outd. Temp.	°C	-10 ~ +40			
	Max. outd. RH	%	80			
	Max. ind. Temp.	°C	40			
	Max. ind. RH	%	80			

DIAGRAM LGH-100RVX3-E



*The dotted ventilation curves are for reference values which cannot be measured

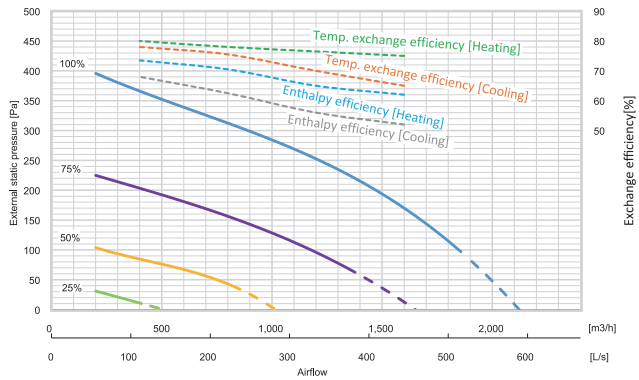
For LGH-RVX3 series
The values for power consumption, efficiency and noise are determined for the reference conditions specified with a mains power supply of 230V/50Hz and with the unit in a horizontal installation configuration.

Technical specifications

MODEL			LGH-160RVX3-E			
Power supply	V/Phases/Hz		220-240 / MONOFASE /50; 220-240 / MONOFASE / 60			
Specific energy consumption class [1] (SEC)			A (Average: -39.0 kWh/(m2.a))			
ErP data[1]	Max. air flow	m³/h	1600			
Fan speed			SP4	SP3	SP2	SP1
Factory flow rate setting (modifiable)			100%	75%	50%	25%
Power consumption		W	687	324	128	45
Treated air volume		m3/h	1600	1200	800	400
Static external pressure		Pa	170	96	43	11
Sensible heat exchange efficiency	Cooling	%	65	70	75,5	78
	Heating	%	75	76,5	78	80
Enthalpic exchange efficiency	Cooling	%	52	56	62,5	68
	Heating	%	62	65	70,5	73,5
Standard filter	ISO 16890		Coarse 60%			
Sound pressure		dB(A)	41	35	26	18
No. and diameter of channels		mm	4 x 250			
Weight		kg	98			
Dimensions	HxLxW	mm	690 x 690 x 1004			
Continuous operation range*	Outd. Temp.	°C	-10 ~ +40			
	Max. outd. RH	%	80			
	Max. ind. Temp.	°C	40			
	Max. ind. RH	%	80			

[1]According to EU Regulation 1254/2014
*At temperatures <-10°C, the fan functions intermittently. In these conditions, we recommend using a heater unit that may be controlled by the LOSSNAY unit

DIAGRAM LGH-160RVX3-E



*The dotted ventilation curves are for reference values which cannot be measured

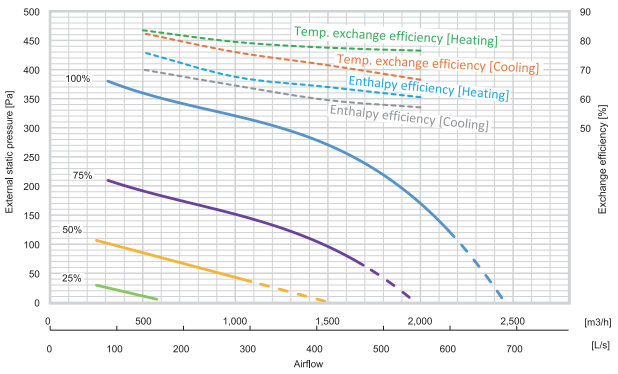
For LGH-RVX3 series
The values for power consumption, efficiency and noise are determined for the reference conditions specified with a mains power supply of 230V/50Hz and with the unit in a horizontal installation configuration.

Technical specifications

MODEL			LGH-200RVX3-E			
Power supply	V/Phases/Hz		220-240 / MONOFASE /50; 220-240 / MONOFASE / 60			
Specific energy consumption class [1] (SEC)			A (Average: -39.7 kWh/(m2.a))			
ErP data[1]	Max. air flow	m^3/h	2000			
Fan speed			SP4	SP3	SP2	SP1
Factory flow rate setting (modifiable)			100%	75%	50%	25%
Power consumption		W	855	416	163	57
Treated air volume		m3/h	2000	1500	1000	500
Static external pressure		Pa	170	96	43	11
Sensible heat exchange efficiency	Cooling	%	66,5	71,5	76	82,5
	Heating	%	76,5	77,5	79,5	83,5
Enthalpic exchange efficiency	Cooling	%	57	59,5	64,5	70
	Heating	%	60,5	64	67,5	76
Standard filter	ISO 16890		Coarse 60%			
Sound pressure		dB(A)	41,5	36	27,5	18
No. and diameter of channels		mm	4 x 250			
Weight		kg	110			
Dimensions	HxLxW	mm	917 x 917 x 1231			
Continuous operation range*	Outd. Temp.	°C	-10 ~ +40			
	Max. outd. RH	%	80			
	Max. ind. Temp.	°C	40			
	Max. ind. RH	%	80			

[1]According to EU Regulation 1254/2014
*At temperatures <-10°C, the fan functions intermittently. In these conditions, we recommend using a heater unit that may be controlled by the LOSSNAY unit

DIAGRAM LGH-200RVX3-E



*The dotted ventilation curves are for reference values which cannot be measured

For LGH-RVX3 series
The values for power consumption, efficiency and noise are determined for the reference conditions specified with a mains power supply of 230V/50Hz and with the unit in a horizontal installation configuration.

LGH-RVXT

LOSSNAY - Heat recovery ventilation unit

PRESTAZIONI CERTIFICATE

Standard filter (provided with the unit)	Optional filter
Standard filter G3 - Coarse 35%	High efficiency filter M6 - ePM10 75%
	High efficiency filter ePM1 75% (equivalent to F8)

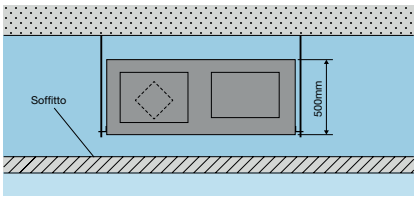
Ideale per....

Unità interna canalizzata compatta per elevate portate d'aria munita di ventilatore di immissione e di rinnovo, ventilatore di espulsione dell'aria viziata, sistema filtrante, recuperatore di calore totale Lossnay e serranda di by-pass.

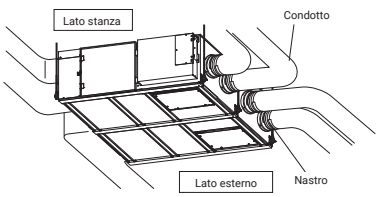
Elevati volumi di aria e altezza ridotta

La Linea di recuperatori entalpici LGH si arricchisce con l'introduzione di un nuovo modello dalle importanti novità.
Il modello **RVXT** è caratterizzato da elevati volumi di aria trattata (fino a 250 m3/h) e da altezze estremamente contenute **(solo 500mm)**, caratteristica che lo rende estremamente flessibile in fase di installazione soprattutto dove l'altezza del controsoffitto non permette l'utilizzo del modello RVX. Anche il modello RVXT è dotato di pacco di scambio entalpico in carta trattata ed è equipaggiato, di serie, di filtri ISO COARSE 50% (G3 secondo EN779:2012).

ELEVATI VOLUMI DI ARIA E ALTEZZA RIDOTTA



FLANGE DEI CONDOTTI CON Ø250

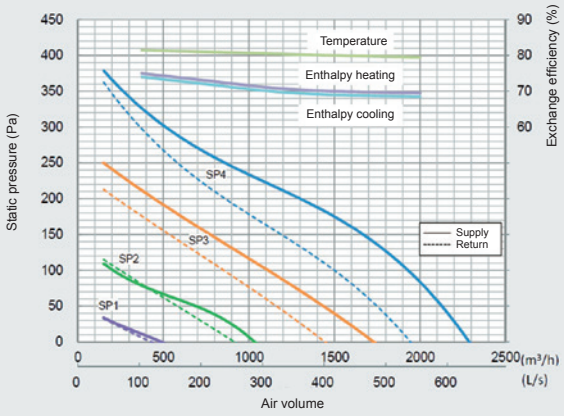


Vantaggi

- Nuovo Design Thin
- Tre taglie disponibili (150, 200 e 250)
- Riduzione dei consumi energetici.
- Riduzione della potenza termica necessaria per il trattamento dell'aria esterna e quindi minore potenza installata.
- Salubrità dell'ambiente.
- Miglior comfort ambientale dovuto ad un miglior controllo dell'umidità relativa.
- Maggior silenziosità (barriera acustica contro i rumori in entrata ed in uscita).
- Facilità di installazione con possibilità di installazione orizzontale e collegamento da due direzioni dei canali che vanno verso l'esterno.
- Possibilità di installazione su impianti esistenti.
- Manutenzione semplificata.
- Sistema a tutta aria esterna (Free Cooling).
- Dimensioni contenute.
- Installabili in controsoffitti ad altezza ridotta.

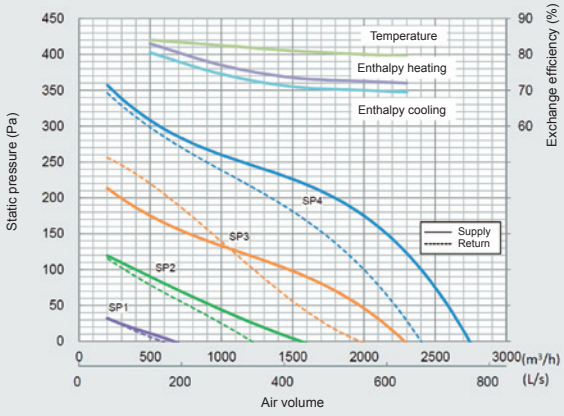
Technical specifications

MODEL			LGH-150RVXT-E			
Power supply		V/Phase/Hz	220-240 / 1-phase /50			
Speed			SP4	SP3	SP2	SP1
Current		A	4.30 - 3.40	2.40 - 1.80	1.10 - 0.77	0.36 - 0.31
Power input		W	792 - 625	421 - 334	176 - 134	48 - 37
Air volume		m³/h	1500	1125	750	375
		L/s	417	313	208	104
External static pressure		mmH_2O	175	98	44	11
		Pa	100	56	25	6
Temp. heat exch. Efficiency		%	80.0	80.5	81.0	81.5
Total heat exch. Efficiency	Cooling	%	69.0	70.0	72.0	74.0
	Heating	%	70.0	71.0	73.0	75.0
Sound pressure level		dB(A)	39.5	35.5	29.5	22.0
Duct qty x diameter		mm	4 x 250 / 2 x (250x750)	4 x 250 / 2 x (250x750)	4 x 250 / 2 x (250x750)	4 x 250 / 2 x (250x750)
Wheight		kg	156	156	156	156
Dimensions	HxLxD	mm	500 x 1980 x 1500	500 x 1980 x 1500	500 x 1980 x 1500	500 x 1980 x 1500
Operating field*	Outdoor temp.	°C	-10 ~ +40	-10 ~ +40	-10 ~ +40	-10 ~ +40
	Max outdoor RH	%	80	80	80	80
	Max indoor temp	°C	40	40	40	40
	Max indoor RH	%	80	80	80	80



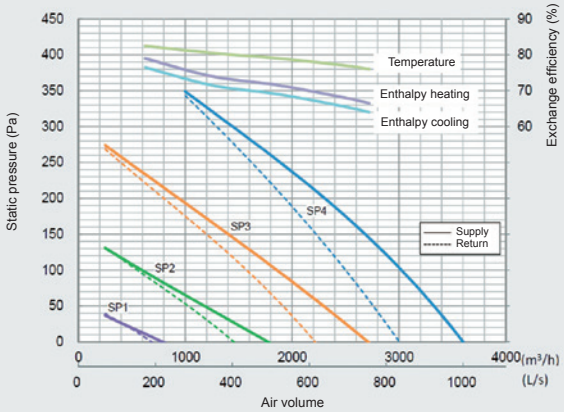
Technical specifications

MODEL			LGH-200RVXT-E			
Power supply		V/Phase/Hz	220-240 / 1-phase /50			
Speed			SP4	SP3	SP2	SP1
Current		A	5.40 - 5.00	2.70 - 2.20	1.10 - 0.85	0.39 - 0.34
Power input		W	1000 - 916	494 - 407	197 - 150	56 - 45
Air volume		m³/h	2000	1500	1000	500
		L/s	556	417	278	139
External static pressure		mmH_2O	175	98	44	11
		Pa	100	56	25	6
Temp. heat exch. Efficiency		%	80.0	81.0	82.5	84.0
Total heat exch. Efficiency	Cooling	%	70.0	71.0	74.5	80.5
	Heating	%	72.5	73.5	77.0	83.0
Sound pressure level		dB(A)	39.5	35.5	28.0	22.0
Duct qty x diameter		mm	4 x 250 / 2 x (250x750)	4 x 250 / 2 x (250x750)	4 x 250 / 2 x (250x750)	4 x 250 / 2 x (250x750)
Wheight		kg	159	159	159	159
Dimensions	HxLxD	mm	500 x 1980 x 1500	500 x 1980 x 1500	500 x 1980 x 1500	500 x 1980 x 1500
Operating field*	Outdoor temp.	°C	-10 ~ +40	-10 ~ +40	-10 ~ +40	-10 ~ +40
	Max outdoor RH	%	80	80	80	80
	Max indoor temp	°C	40	40	40	40
	Max indoor RH	%	80	80	80	80



Technical specifications

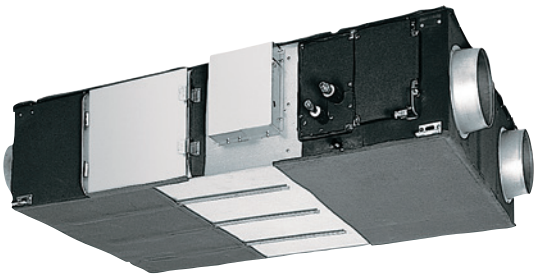
MODEL			LGH-250RVXT-E			
Power supply		V/Phase/Hz	220-240 / 1-phase /50			
Speed			SP4	SP3	SP2	SP1
Current		A	7.60 - 6.90	3.60 - 3.10	1.40 - 1.30	0.57 - 0.49
Power input		W	1446 - 1298	687 - 587	244 - 212	82 - 69
Air volume		m³/h	2500	1875	1250	625
		L/s	694	521	347	174
External static pressure		mmH_2O	175	98	44	11
		Pa	100	56	25	6
Temp. heat exch. Efficiency		%	77.0	79.0	80.5	82.5
Total heat exch. Efficiency	Cooling	%	65.5	69.0	71.5	76.5
	Heating	%	68.0	71.5	74.0	79.0
Sound pressure level		dB(A)	43.0	39.0	32.0	24.0
Duct qty x diameter		mm	4 x 250 / 2 x (250x750)	4 x 250 / 2 x (250x750)	4 x 250 / 2 x (250x750)	4 x 250 / 2 x (250x750)
Wheight		kg	198	198	198	198
Dimensions	HxLxD	mm	500 x 1980 x 1500	500 x 1980 x 1500	500 x 1980 x 1500	500 x 1980 x 1500
Operating field*	Outdoor temp.	°C	-10 ~ +40	-10 ~ +40	-10 ~ +40	-10 ~ +40
	Max outdoor RH	%	80	80	80	80
	Max indoor temp	°C	40	40	40	40
	Max indoor RH	%	80	80	80	80



*In case of temperature < -10°C fan will work discontinuously. Lossnay controlled heat generator is recommanded in this condition.

GUF-RD(H)4

MONOBLOCK INDOOR UNIT WITH FRESH AIR INTAKE FAN



Standard filter (provided with the unit)	Optional filter
Standard filter G3 - Coarse 35%	High efficiency filter M6 - ePM10 75%
	High efficiency filter ePM1 75% (equivalent to F8)

Monoblock indoor unit with fresh air intake fan, stale air exhaust fan, filtration system, Lossnay total heat recovery module, bypass shutter, permeable film humidifier (only for RDH4 version) and direct expansion coil.

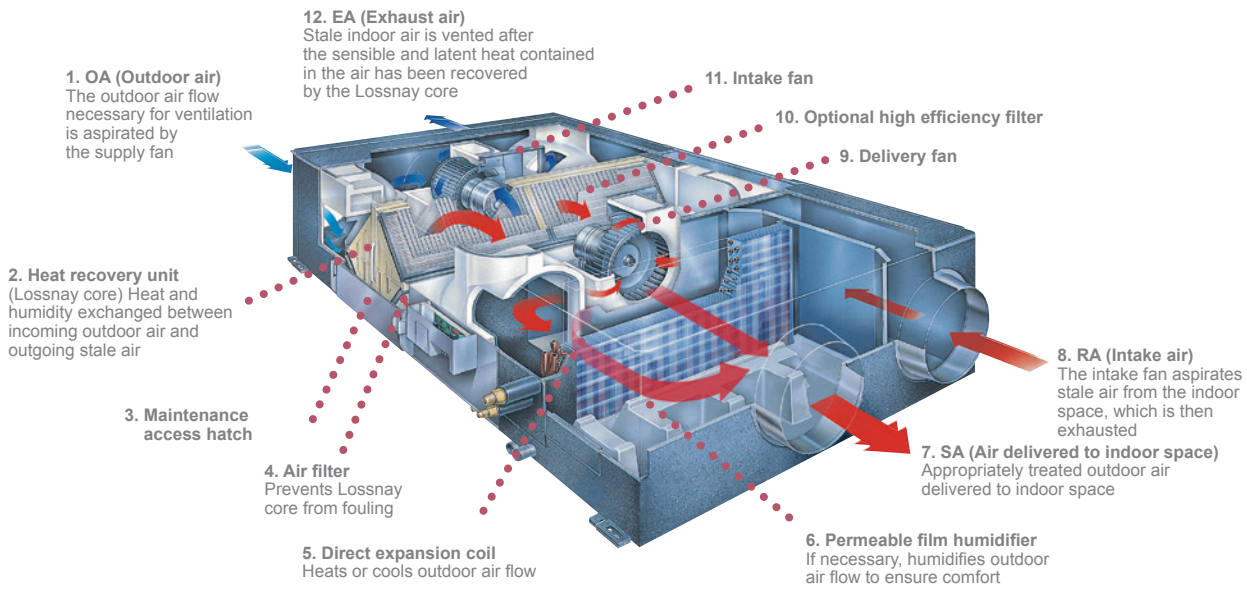
Serie RD(H)4

GUF-50RD(H)4

Cooling capacity 5.57 (DX coil: 3.63, Lossnay core: 1.94) kW Heating capacity 6.18 (DX coil: 6.21, Lossnay core: 2.04) kW 500 m³/h 220-240V 50Hz single-phase

GUF-100RD(H)4

Cooling capacity 11.44 (DX coil: 3.63, Lossnay core: 3.85) kW Heating capacity 12.56 (DX coil: 8.30, Lossnay core: 4.26) kW 500 m³/h 220-240V 50Hz single-phase

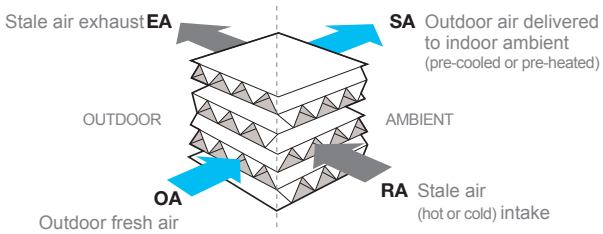


Lossnay technology

The Lossnay total heat recovery module has a cross-flow plate fin structure and heat transfer diaphragms in special treated paper. The excellent thermal transfer properties and permeability to moisture of this special paper ensure the highly efficient exchange of both sensible and latent heat between the two air flows passing through the recovery core. The result is a ventilation system with outstanding characteristics ensuring extremely high levels of comfort and wellbeing in the environment treated, which can also cut operating costs substantially.

The incoming fresh air and outgoing stale air cannot mix within the core. The diaphragm pores, which were already microscopic in previous generations, have been further reduced in size to reduce the possibility of the passage of waterborne soluble gases such as ammonia and hydrogen. To increase heat and moisture exchange, a special treatment is applied to the paper used for the diaphragms. These improvements have increased moisture permeability while reducing permeability to harmful gases, resulting in an overall increase in recovery efficiency and a more effective barrier action against the transfer of these gases.

CONSTRUCTION AND OPERATING PRINCIPLE OF LOSSNAY UNIT



IN GENERAL
GUF – For optimum indoor air quality
GUF = (Lossnay) + (heating & cooling)

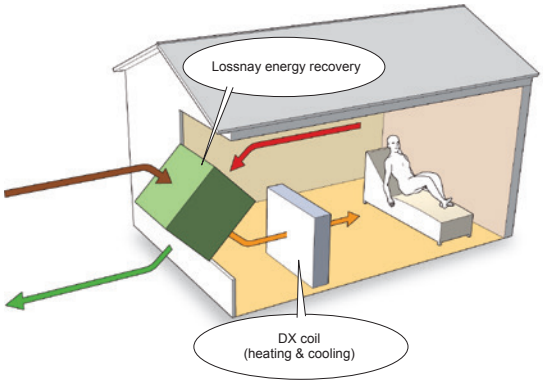


IMAGE OF GUF MODEL

Heat exchanger

A direct expansion coil incorporated in the unit makes it possible to cover approximately 25% of the load of the system with the GUF unit. This also means that the terminal units installed in the indoor space can be smaller. Moreover, as the GUF unit covers the entire thermal load attributable to ventilation, this means that this load and the ambient load can be managed completely separately, simplifying the design process of the installation. The treated air heats the humidifier as it passes through it, further increasing humidification efficiency.

Total comfort

Maintaining the correct humidity levels in an indoor space ensures the ideal conditions for comfort and prevents the unpleasant side-effects typical of an environment with insufficient humidity such as dry eyes and throat.

The evaporation surface area is approximately 8.5 times larger than in a comparably sized natural evaporation humidifier, while performance is 6 times greater.

Humidification - RDH4 version

The innovative permeable film humidification system, which uses a natural evaporation process, is a particularly intelligent solution.

The efficiency with which the air is humidified has been significantly increased by reducing the resistance of the material used. A three-layer film ensures that only the necessary moisture is transferred to the air without any limescale dust release – a problem of certain conventional humidifiers.

Maintaining the correct humidity levels in an indoor space ensures the ideal conditions for comfort and prevents the unpleasant side-effects typical of an environment with insufficient humidity such as dry eyes and throat.

The evaporation surface area is approximately 8.5 times larger than in a comparably sized natural evaporation humidifier, while performance is 6 times greater.

Note: Use a demineraliser if residual total salt levels exceed 100 mg/l.

Increased efficiency of humidification process - RDH4 version

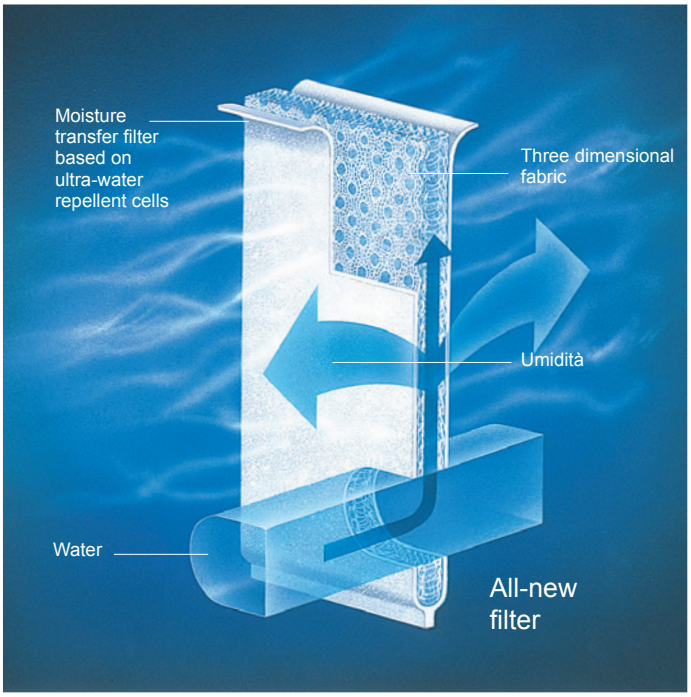
Optimised air flows within the unit together with a water injection system have significantly increased the efficiency of the humidification process. The system also controls the humidity in the outgoing stale air to effectively improve the air quality of the outdoor environment as well. This solution prevents limescale and silica dust from being carried in the air, so purer, less dusty air is vented into the outdoor environment.

Automatic free cooling

When the air conditioning is operating in cooling mode and the outdoor temperature is lower than the indoor ambient temperature (as normally occurs at night-time in summer), the GUF indoor unit recognises this condition and automatically bypasses the recovery core. The cooler outdoor air fed into the indoor space contributes to reducing the cooling demand sustained by the system.

Dust suppression

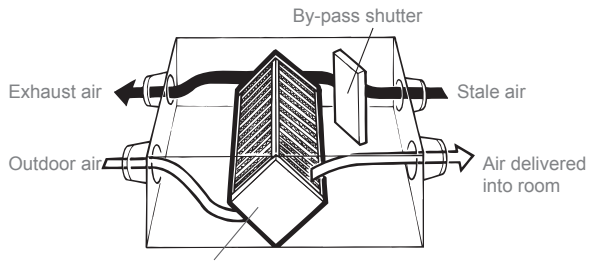
An optional high efficiency filter may be used for up to 3,000 hours while maintaining a filtration efficiency (evaluated with colorimetric testing) of over 65%. The filter may also be fitted in the GUF unit after initial installation and takes up no additional precious space.



Automatic regulation

GUF ventilation and recovery units may be integrated into a Melans control and regulation system for Mitsubishi Electric air conditioner installations, as they use the same bus used for connecting indoor units.

BY-PASS

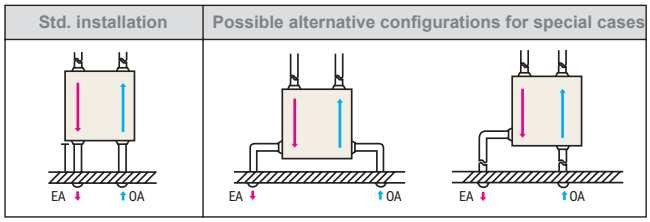


Advantages

- Reduced energy consumption
- Reduced thermal power necessary to treat outdoor air, equating to lower rated power
- Healthier environment
- Quieter operation (noise baffles in inlet and outlet)
- Free Cooling function using exclusively external air
- Humidification with film permeable to water vapour only
- Total air treatment (neutral air returned to outdoor environment)
- Custom temperature and humidity control
- Compact dimensions
- Installable in double ceilings with limited vertical space.

Flexible installation

The positions of air duct connections may be changed as needed to cater for different installation requirements.



*Changing the installation configuration causes no any additional pressure loss.

Technical specifications

MODEL			GUF-50RDH4	GUF-100RDH4	GUF-50RD4	GUF-100RD4
Power supply			1-phase 220-240V 50Hz			
Comunication system			In serie tramite rete M-NET: Mitsubishi Electric Air Conditioners Network System			
Lossnay	Mode		Air to Air Total heat recovery system			
	Material		Partition, Cross-flow structure, Special preserved paper-plate.			
Cooling capacity*1		kW	5,57 (1,94)	11,4 (4,12)	5,57 (1,94)	11,44 (4,12)
	Power input	W	235-265	480-505	235-265	480-505
	Curren	A	1,15	2,2	1,15	2,2
Heating capacity*1		kW	6,21 (2,04)	12,56 (4,26)	6,21 (2,04)	12,56 (4,26)
	Power input	W	235-265	480-505	235-265	480-505
	Current	A	1,15	2,2	1,15	2,2
Temperature heat recovery efficiency		%	77,5/80	79,5/81,5	77,5/80	79,5/81,5
Total heat recovery efficiency*2	Heating	%	68/71	71/74	68/71	71/74
	Cooling	%	65/67	69/71	65/67	69/71
Capacity index			P32	P63	P32	P63
Humidifier capacity		kg/h	2,7	5,4	-	-
Fan	Type x qty		SA: Centrifugal fan (Sirocco FAN) x 1 - EA: Centrifugal fan (Sirocco FAN) x 1			
	Static pressure	Pa	125	135	140	140
		mmH_2	12,7	13,8	14,3	14,3
	Motor		Totally enclosed capacitor permanent split-phase induction motor, 4 poles, 2 units			
	Flow rate (High speed)	m^3/h	500	1000	500	1000
		L/s	139	278	139	278
SPL (Low-High)		dB(A)	33,5-34,5	38-39	33,5-34,5	38-39
Ref. Piping diameter	Liquid	mm(in.)	Ø6,35(Ø1/4)	Ø9,52(Ø3/8)	Ø6,35(Ø1/4)	Ø9,52(Ø3/8)
	Gas	mm(in.)	Ø12,7(Ø1/2)	Ø15,88(Ø5/8)	Ø12,7(Ø1/2)	Ø15,88(Ø5/8)

*1 () value from Lossnay heat recovery.
*2 High/Low speed values.

s-AIRME NEW

OUTDOOR AIR HANDLING UNITS

ME-series

Connettività BMS	Accessory
Modbus	**Contact sales network**
Bacnet	**Contact sales network**
Wi-Fi connectivity	
KIPLink	
Supervisor System	
B.EYELink	

Standard filter (included with unit)	Optional filter
SUPPLY: **G4+F7** (Coarse 55% + ePM1 50%) RETURN: **G4** (Coarse 55%)	**F8** (ePM1 70%) **F9** (ePM1 85%) **Electronic filter** **Active photocatalytic filter** **Active carbon filter** **H14 absolute filter**

R32 | R410A

SIZE	
s-AIRME 3000	3000 m³/h @ 300 Pa (optional 500 Pa)
s-AIRME 5000	5000 m³/h @ 300 Pa (optional 500 Pa)
s-AIRME 7500	7500 m³/h @ 300 Pa (optional 500 Pa)
s-AIRME 10000	10000 m³/h @ 300 Pa (optional 500 Pa)
s-AIRME 12500	12500 m³/h @ 300 Pa (optional 500 Pa)
s-AIRME 15000	15000 m³/h @ 300 Pa (optional 500 Pa)
s-AIRME 20000	20000 m³/h @ 300 Pa (optional 500 Pa)

Ideal for...

s-AIRME units are reversible, preconfigured and modular air handling units produced by **Mitsubishi Electric**. These units are designed and built for the complete treatment of outdoor fresh air for air renewal, recirculated air, or a combination of the two, to serve medium volume indoor spaces such as stores, small supermarkets, cinemas, theatres, logistics centres and expo centres.
Suitable for both **indoor** and **outdoor** installation, in compliance with the requirements of the standard UNI EN 378.
All s-AIRME models are fully compatible for installation in conjunction with Mitsubishi Electric Mr. Slim direct expansion outdoor units, and are **equipped with a direct expansion coil** with one or more interconnected gas circuits operating with R32 or R410A refrigerant gas, and EC plug-fans.
s-AIRME units are available in 7 sizes covering a range of delivery rates from **1,000 to 20,000 m³/h**. These machines are available in a choice of 3 configurations to cater for specific project needs (**AR** All Recirculation, **MF** Mixing and Free Cooling, and **HR/P** Plate Heat Exchanger), and 3 different basic power variants (**C** Basic, **I** Intermediate and **B** Boosted).

Perfectly compatible with direct expansion systems

s-AIRME units are fully compatible for installation together with both R32 and R410A variants of the Mitsubishi Electric Mr. Slim range of outdoor direct expansion units, for the seamless and efficient management of even the most complex installations with multiple outdoor units.
This range of air handling units is usable in conjunction with both Mr. Slim Standard Inverter and - for even greater efficiency and a broader range of operation - Mr. Slim Power Inverter units.

A WIDE RANGE OF POWER RATINGS

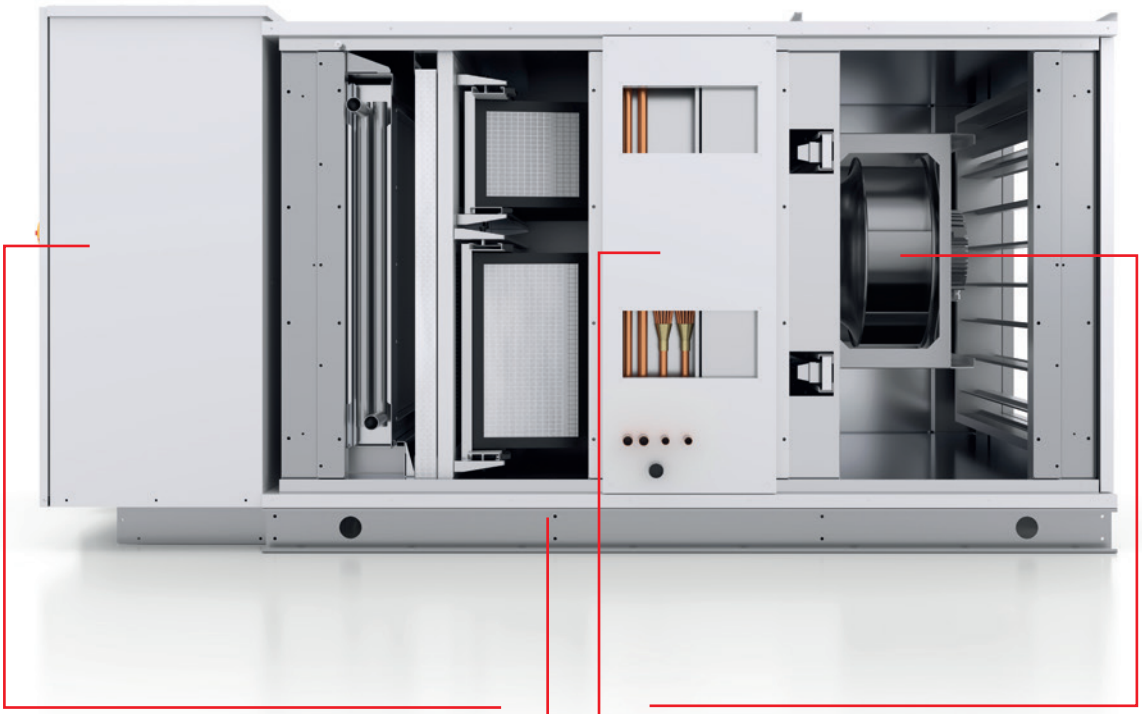
Partial or full air treatment
7 sizes and 3 power variants: **Basic (C), Intermediate (I) and Boosted (B)**
2 refrigerant gases: **R32 and R410A**

s-AIRME AR
All recirculation
Air flow rate from 1,000 to 20,000 m³/h
Cooling capacity from 10 to 125 kW

s-AIRME MF
Mixing & Free Cooling
Air flow rate from 1,000 to 20,000 m³/h
Cooling capacity from 10 to 125 kW

s-AIRME HR/P
Plate heat exchanger
Air flow rate from 2,000 to 15,000 m³/h
Cooling capacity from 20 to 150 kW

s-AIRME UNIT



CONTROL PANEL

The s-AIRME unit is a **Plug&Play** solution equipped with the **AIR 3000+ controller system**, which takes advantage of the potential of the full inverter technology of Mr. Slim units to offer complete control over both ventilation and heating-cooling functions.
The integrated ventilation system for the electrical panel ensures effective protection against overheating, the risk of pooling refrigerant gas and condensation forming on electrical components.

STRUCTURE

Load-bearing **monobloc structure** with no pressed aluminium chassis elements, constructed from sandwich panels:
- thickness **60 mm**
- built-in thermal break
- outer panels with factory-applied paint finish for complete weather protection
- galvanised steel inner panel.
- thermal and acoustic insulation in expanded polyurethane foam (or optional mineral wool)
- polypropylene seal beading ensures continuous Class L1 seat tightness in accordance with EN 1886

This solution completely **eliminates all thermal bridges** forming across the aluminium profiles of a conventional structure with pressed chassis profile elements and panels, offering a drastically lower thermal bridging factor and improving the overall performance of the unit.
The brackets and subframes supporting the internal components, and the load-bearing base of the unit, are fabricated in galvanised steel.

DIRECT EXPANSION COIL

The expansion coil is designed with the optimal geometry defined by Mitsubishi Electric to ensure the ideal balance between rated thermal power and treated air flow rate, and complete compatibility with the outdoor units of the Mr. Slim range. The coil is also designed to be compatible with both R32 and R410A refrigerant gas types.

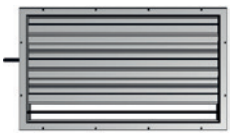
VENTILATION SECTION OF HANDLING UNIT

Plug-fan supply fan unit with **EC brushless** IP54 direct drive motor:
- continuous, precise air flow rate control without using an external inverter.
- available as two variants: standard, with 300Pa overpressure, and optional high output version with effective static overpressure of 500Pa. Both variants are optimised for superlative efficiency and low noise.
- The fan units installed are rated safe for operation in applications with A2L refrigerant gas.

SAFETY DEVICE FOR OPERATION WITH A2L GAS

As R32 refrigerant gas is classified as an A2L refrigerant (mildly flammable) by the standard ISO 817, all s-AIRME units intended for use with this gas **are equipped with a gas detector sensor safety device**, which prevents the possibility of potentially dangerous concentrations of refrigerant gas accumulating in the space served or inside the unit itself in the event of leakage.
For complete safety, R32 versions of s-AIRME units can also be equipped with optional safety dampers. Rated Class 4 devices according to the standard EN 751, and installed on both the air supply outlet and return inlet of the unit, these dampers isolate the space served from the unit if any escaping refrigerant gas is detected.
For more effective evacuation of refrigerant gas, the supply damper is equipped with a rotating louvre vane which opens outwards when the unit is not operating, while the remaining vanes remain in the closed position. By shutting the last rotating vane in the array, this accessory ensures that the supply flow of the unit is ducted into the atmosphere.

UNIT ON = OPEN DAMPER



UNIT ON = CLOSER DAMPER

Control and Supervision Functions

Precise, efficient control

AIR 3000 + is a dedicated controller software system for both ventilation and temperature control, with advanced functions and proprietary adjustment features.

This controller can be used to manage the following functions and settings:
- unit power **on/off**
- **set manual or automatic operating mode** (heat or cool)
- ventilation, temperature and humidity set points
- **force 100% fresh outdoor air mode** (not for basic AR function)
- **force all recirculation mode**
- **automatic free-cooling and enthalpic free-cooling mode management** (not for basic AR function)
- set ventilation section mode to **constant flow** (standard), **constant pressure** (optional) or **variable flow** rate dependent on signal received from a CO_2 sensor (optional). Two different variable flow rate modes are available: modulated, or stepped with 2 levels (max. flow rate or min. flow rate)
- **automatic management of optional thermal modules** (hot water coil, electric heating element)
- **automatic modulation of proportion of fresh air for renewal** in relation to ppm CO2 detected by dedicated sensor installed in the recirculation inlet duct of the unit or directly in the served zone (optional).

There are a number of options for setting up the architecture of the supervisor system: using either proprietary devices, or using BACnet, BACnet over-IP, Modbus, Modbus over-IP and Echelon protocols to integrate it into a third party system.

IMOUC: Intelligent Multiple Outdoor Units Control

s-AIRME can use the IMOUC (Intelligent Multiple Outdoor Units Control) protocol developed internally by Mitsubishi Electric, which offers the following capabilities and advantages:
- simultaneously connect and **manage up to 6 Mr. Slim** units, even with different power ratings;
- **maximise efficiency** by distributing thermal load over the individual Mr. Slim units, prioritising the units operating in the most favourable conditions;
- **modulate the thermal power of the system to as low as 20% of the overall rated thermal power**, which would not be possible if each Mr. Slim unit were to operate independently;
- **redistribute operating hours** uniformly and more efficiently between the outdoor units connected to the system;
- optimise **defrost** cycles, staggering start and stop times between the different Mr. Slim units connected (never allowing all units to execute defrost cycles simultaneously);
- automatic **backup** management in case of malfunction of a Mr. Slim unit;
- **NIGHT PURGE** function, which forces units into Free Cooling mode at night, when permitted by external air conditions, to offer significant energy savings.

BMS connectivity

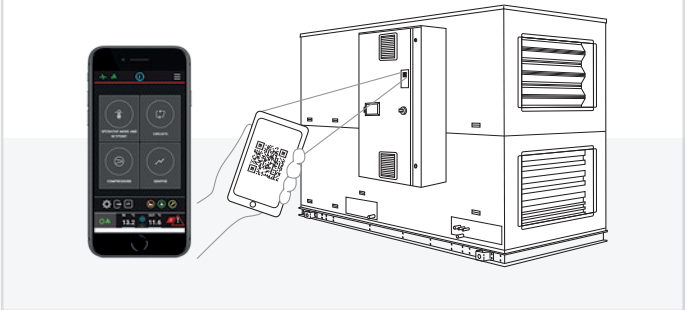
There are a number of options for setting up the architecture of the supervisor system: using either proprietary devices, or integrating it into a third party system with the following protocols:
- BACnet/BACnet over-IP
- Modbus/Modbus over-IP
- Echelon.

KIPlink: the Keyboard in your Pocket

AIR 3000 + can also be configured with the innovative **KIPlink** optional user interface. Based on Wi-Fi technology, which also allows access to the unit from a LAN connection, this interface lets the user monitor and manage the settings of the unit directly from a smartphone or tablet by simply scanning the QR code on the unit itself.
KIPlink lets the user:
- switch the unit on and off;
- modify set points;
- monitor the status of the unit and the individual components of the system in detail;
- view/reset active alarms;
- view and download the data log

Wi-Fi CONNECTIVITY

no internet connection is needed



B.EYELink

B.EYELink is the new **supervisor system** for HVAC installations developed by Mitsubishi Electric. As the name itself implies ('B' for Building and 'EYE' for an overall vision of the system), this system offers total control over all the thermal management functions of Mitsubishi Electric, Climaveneta, RC and branded products.
The functions managed include:
- **Air conditioning** (air cooling and heating) and/or hot water production with VRF CITY MULTI systems;
- **Medium and high temperature water production** (for heating and DHW domestic hot water production) using heat pumps;
- **Ventilation and air renewal** with s-AIRME units and Rooftop systems.

BEYELINK

Models and versions available

A solution which simplifies your installation while maximising versatility

s-AIRME units are extremely compact and ready to use, with all control, setting and safety components already factory-tested and installed in the respective sections.
Each application has its own specific needs and requires exactly the right solution. This is why the units of the s-AIRME range offer a wide choice of **configurations** to cater for the individual needs of each project and different thermal power requirements. Additionally, each machine configuration can be personalised even further with an extensive **selection of accessories**.

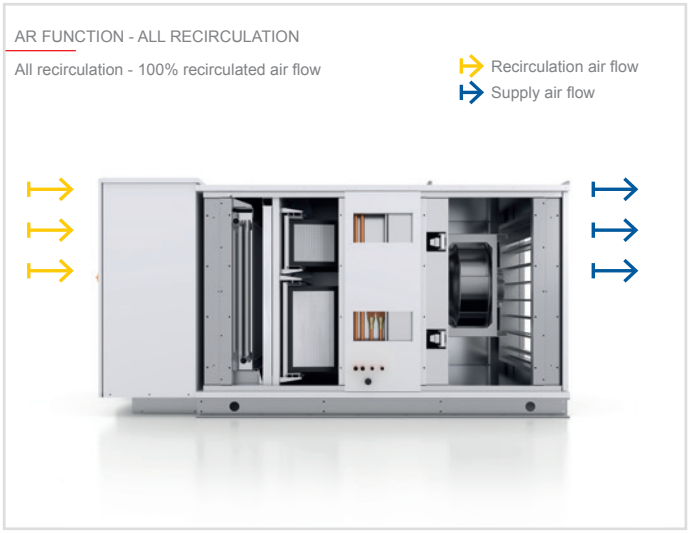
Versions

s-AIRME units are available in 7 sizes covering a range of delivery rates from 1,000 to 20,000 m3/h. Each size variant is available in a choice of 3 different thermal power versions:

- **Basic C version**, suitable for neutral air treatment. The performance and size characteristics of the direct expansion coil and the respective connection with a Mr. Slim unit are not intended to provide complete air conditioning treatment, but only to offer air recirculation and/or renewal capability.
- **Intermediate I version**, for air conditioning without dehumidification. The performance and size characteristics of the direct expansion coil and the respective connection with a Mr. Slim unit are adequate for providing an intermediate air conditioning treatment, but cannot sustain the additional latent heat load of a complete treatment inclusive of dehumidification;
- **Boosted B version**, for both conditioning and dehumidifying the treated air. The performance and size characteristics of the direct expansion coil and the respective connection with a Mr. Slim unit are sufficient for providing a complete air conditioning treatment, sustaining both the sensible heat and latent heat loads of a treatment inclusive of dehumidification.

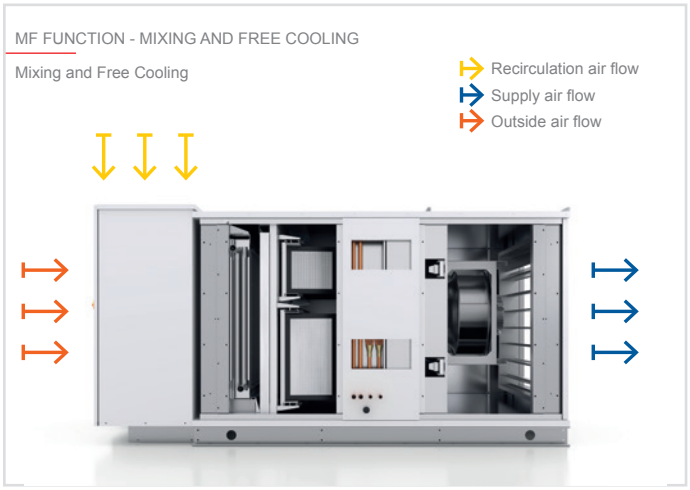
AR configuration - All Recirculation

This is the basic unit configuration of the s-AIRME range. This unit is intended for operation in **all recirculation mode only**, in which air is drawn from the space served (yellow arrow) and then returned to the space after treatment by the direct expansion coil (blue arrow).
Other independent systems must be used to exhaust stale air from the space and renew the air with fresh outdoor air.
This is the ideal configuration for replacing obsolete units in an existing installation which already includes a dedicated unit for air renewal.



MF configuration - Mixing and Free Cooling

The main difference between this configuration and the basic unit is the addition of 2 opposed motorised dampers managed by the on-board controller for **switching between all-recirculation, mixed and free cooling operating modes.**
This configuration makes it possible to mix recirculated air drawn from the space served (yellow arrow) with a quantity of fresh outdoor air (red arrow). The proportion of fresh air used may either be a fixed value set by the controller, or variable in relation to the signal received from an optional air quality CO2 sensor.
Free cooling mode is managed by the controller, which controls the aperture of the two dampers to obtain the most advantageous mixture of fresh air and recirculated air in relation to outdoor temperature, indoor temperature and set point. The thermal utilities connected to the unit are progressively disabled when in free cooling mode, and are disabled completely in case of total free cooling.
The supply fans ensure the rated inlet air flow of the system, while **other independent systems** must be used to **exhaust stale air**.
This mode is recommended where only small quantities of fresh air will be used for renewal, and for cases with limited loss of overpressure in the recirculation ducts and where the seal tightness of the building is poor (old buildings).

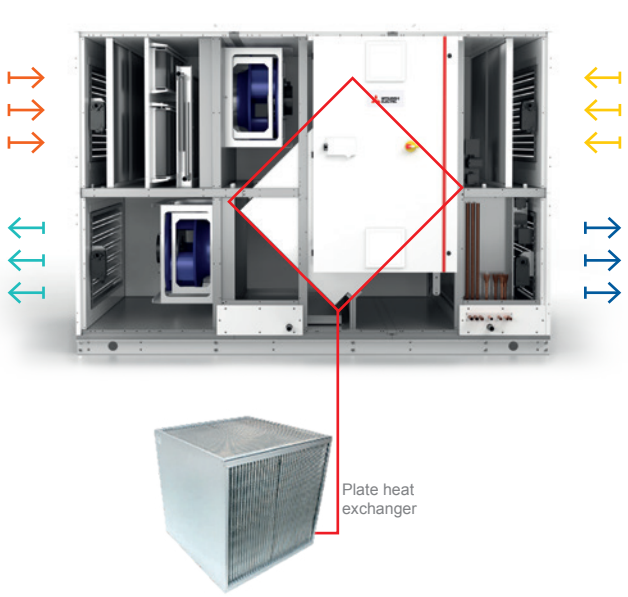


HR-P - Heat Recovery Plate configuration (return fan unit and plate heat exchanger recovery system)

The HR-P configuration uses a **plate heat exchanger to recover thermal energy** by transferring it as necessary between the outside air and recirculated air flows. The recovery unit is housed within the structure of the unit, together with the supply and return EC plug-fans, and situated ahead of the treatment coil.
This function **is suitable for new buildings with high air renewal rates** (such as cinemas, theatres, auditoriums, trade fair centres and shopping centres).
The thermodynamic principle of the function is as follows: the flow of fresh outside air (red arrow) passes through the plate heat exchanger, where it is heated or cooled (depending on the case) by the return air flow (yellow arrow). Seals between the aluminium plates keep the two air flows completely separate, and heat is transferred as a result of the temperature difference between them. As recovery efficiency increases with larger differences in temperature between the two air flows, this solution is particularly suitable for extreme climates.

HR-P FUNCTION - HEAT RECOVERY PLATE

Heat recovery – Plate heat exchanger complete air renewal, free cooling



Advantages of the static heat recovery unit

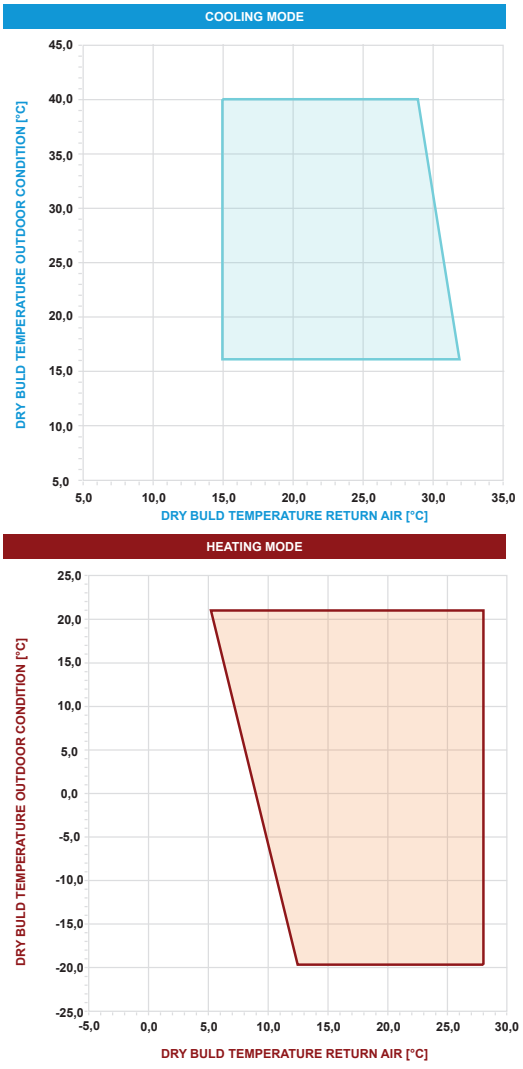
- The exhaust and outside air flows are kept completely separate, with no risk of cross-contamination.
- Extremely reliable and safe operation;
- Easy to clean, and minimal maintenance;
- Excellent performance in extreme climates;
- Extends the operating range of the unit;
- Suitable for applications with high outside air flow rates;
- Aluminium heat exchanger plates for improved thermal exchange performance;
- Generous thermal exchange surface areas for minimised overpressure losses;
- In free-cooling mode, the bypass damper makes the return air bypass the heat recovery unit, reducing the power consumption of the return fan.

The operating principle of the unit in **free cooling** function is exactly the same as for the s-AIRME MF version. To implement this mode, **the unit is equipped with bypass dampers incorporated in the return air section of the plate heat recovery unit**, which prevent thermal exchange occurring within the heat exchanger between the return and fresh air flows when this is not advantageous.

Extended operating range

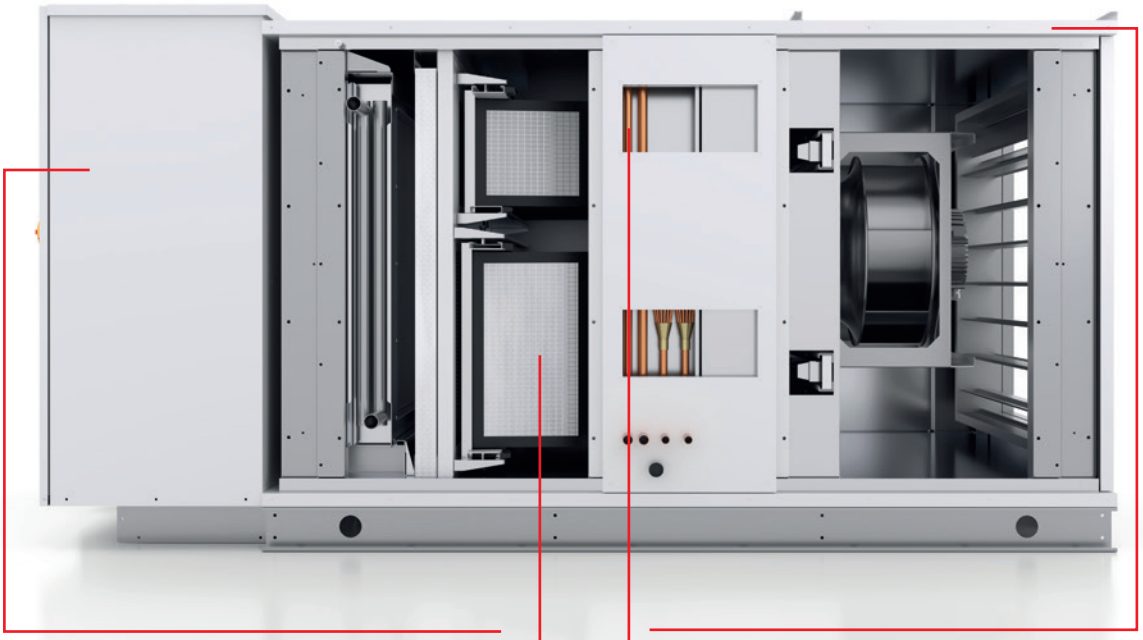
The extended temperature range made possible by operating at partial load allows the s-AIRME to function with outdoor air temperatures as low as -20 °C. The use of the optional electrical pre-heat coil is recommended for operation of the unit in heating mode at external temperatures below 5 °C.

EXTENDED OPERATING RANGE



Construction Options

s-AIRME UNIT



ELECTRICAL PANEL INCLUDED WITH UNIT/BMS

The 15,000 and 20,000 m^3/h sizes of the AR and MF configurations, and the 12,500 and 15,000 m^3/h sizes of the HR-P configuration, are shipped with the electrical panel dismantled from the unit to permit greater freedom for configuration, and to facilitate handling and installing the unit on site. Optional protocol boards: MODBUS / BACNET MS / TP RS485 / BACNET OVER IP / MOD-BUS TCP/IP

FILTER SECTION

The unit comes complete with filters mounted on sliding steel rails allowing easy access for regular maintenance and replacement. In the standard configuration, the filter section consists of the following:

- supply outlet with ISO COARSE 55% + ePM01 50% prefilter (**G4+F7** according to EN 779:2012)
- return inlet with ISO COARSE 55% prefilter (**G4** according to EN 779:2012).

A wide choice of solutions related to IAQ (Indoor Air Quality) are available, and these units can also be equipped with optional filters offering higher filtration performance (see table below)

MONOBLOC UNIT WEATHER PROTECTION ROOF

In case of outdoor installations, the unit may be equipped with the optional aluminium roof offering protection against the weather.

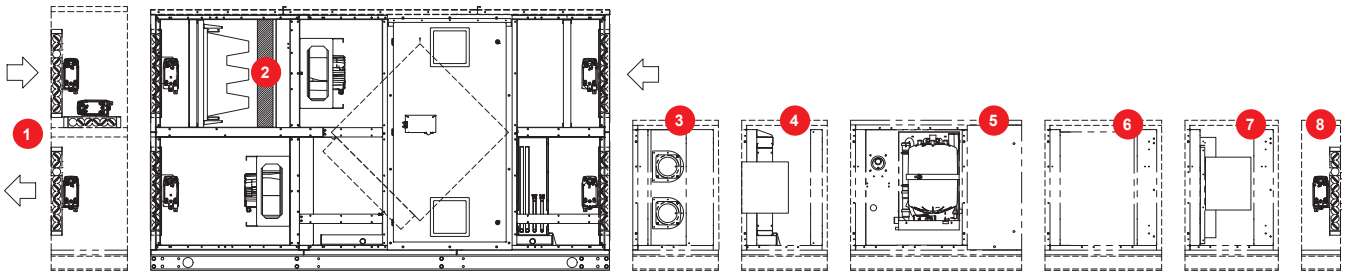
PROTECTIVE TREATMENTS FOR COIL

The unit is equipped with a copper-aluminium coil as standard.
However, the following alternatives are available as options:

- Copper-copper coil, with better corrosion resistance than the standard coil. Not susceptible to galvanic corrosion.
- FIN GUARD SILVER coil: excellent corrosion resistance in very harsh environments or coastal applications with exposure to salt.
- Coil with pre-painted fins: offers improved corrosion resistance in environments with moderate air pollution.
- Battery with Electrofin treatment: Excellent corrosion resistance in very harsh environments or coastal applications with exposure to salt.

Indoor Air Quality	INDOOR AIR QUALITY - Optional solutions	
	DESCRIPTION	**FUNCTION**
PCO AIR PURIFICATION SYSTEM	Active purification system with photocatalytic oxidation. The combined action of a special UV light source and a honeycomb catalytic matrix generates a photocatalytic oxidation process.	This process releases hydroxyl radicals (-OH) and hydrogen peroxide (H2O2), which are carried by the treated air flow and exert a continuous active sanitising effect on the surfaces in the space treated. This system is very effective in abating microbial load (bacteria, mould) and other contaminants such as allergens, unpleasant odours, organic and volatile compounds and ultra-fine particulate.
UVC LIGHT SOURCE	A purification system consisting of a UVC light source installed near the direct expansion coil, where condensate may promote the formation of a bacterial film.	The light source disinfects the irradiated surface, ensuring superior hygiene inside the machine.
ELECTRONIC FILTERS	These filters are an alternative to high efficiency mechanical pocket filters. This type of filter is based on the working principle of electrostatic precipitation.	It is suitable for applications where high filtration efficiency is required to eliminate pathogens and dust particles with diameters in the order of micrometers. The very limited overpressure loss of these filters reduces energy consumption for ventilation. The extended operating life and minimal maintenance needs of these filters allow the initial cost of installing them to be recouped over time.
ACTIVE CARBON FILTERS	Rigid active carbon pocket filters with a filtration efficiency of ePM01 50% (ISO 16890, F7 according to EN 779) with a deodorising action for use in conjunction with the standard pre-filters.	These offer finer filtration of the air delivered to the space served, combined with a complete deodorising action.
ABSOLUTE FILTERS	The standard high efficiency pocket filters can be supplemented with an add-on Class H14 HEPA polyhedral mini-pleat filtration module, consisting of a galvanised steel frame and glass fibre filter paper.	Installed after the air handling section, these filters exert an extremely fine filtration action on the air delivered to the space served. Suitable for healthcare sector applications.

UNITÀ s-AIRME



1 MIXING SECTION

For applications requiring the ability to recirculate a portion of the air extracted from the space served, the unit may be equipped with an additional accessory section with a motorised recirculation damper.
A number of different methods may be used **to control** the recirculation damper:
• **Using a CO2 sensor, also available as an accessory.** If the CO_2 concentration in the extracted air exceeds the threshold set on the controller for the s-AIRME unit, the outdoor air inlet damper opens and the recirculation damper closes. When CO2 concentration is below the set threshold, the recirculation damper is opened proportionally in relation to the level detected to reduce energy consumption.
• **Unit start in all recirculation mode.** The unit starts with the outdoor air inlet damper closed and the recirculation damper completely open. Once the set point conditions are met, the unit switches to all outdoor air operating mode.
• **Periodical air renewal:** the unit is forced to 100% outdoor air mode at **precise intervals set on the controller.**

2 PREHEAT COIL

Water or electric preheat coils may be installed ahead of the air handling coil. During winter operation, the preheat coil protects the heat recovery unit against exposure to excessively low temperatures. The unit controller system automatically activates the preheat coil if the outdoor air temperature drops below -10 °C to increase the air temperature by up to 5 °C. With an electric preheat coil, heating power is modulated by activating the three different stages of the coil itself. With a hot water coil, heating power is controlled by modulating the aperture of the 3-way valve feeding the coil.

These coils can also be used as supplementary heating during winter operation of the unit.

3 ACTIVE AIR PURIFICATION SYSTEM

s-AIRME units can equipped with an active photocatalytic oxidation purification system. This system may be used to actively purify large volumes of air, eliminating a wide variety of contaminants that cannot always be captured by conventional static filters.

4 POST-HEAT COIL

Available as either water or electric versions, a post-heat coil may be used to supplement the direct expansion coil with additional heating power during winter operation of the unit, or to post-heat air after dehumidification during summer operation.
Electric coils feature three stage operation to allow finer temperature control, while the heating power of a hot water coil is controlled by modulating the aperture of a 3-way valve.
This coil can also be activated during the defrost cycle.

5 STEAM HUMIDIFIER SECTION

For applications requiring additional humidification of the air delivered to the space served, the unit may be equipped with a specific add-on humidifier accessory. The additional moisture is provided by **an immersion electrode steam generator** connected to a steam distributor manifold situated in the supply outlet. The quantity of steam generated and electrical power consumption of the steam generator are determined in relation to the specific size variant of the s-AIRME unit. Sensors measuring air humidity allow the controller of the s-AIRME to regulate the output of the steam generator via a 0-10V signal. Humidity control may be linked to the humidity measured in either the supply flow or the return flow. The section is designed and constructed to ensure **quick and simple mechanical and electrical** connection to the unit. When equipped with this accessory, the electrical panel of the s-AIRME is supplied complete with all the additional power and protection components needed for operation of the steam generator. The electrical power feed for the accessory is taken directly from the electrical panel of the s-AIRME unit.
The section includes a condensate collector tray which collects and drains the water condensing from the steam.
Alternatively, a digital ON/OFF signal provided by the unit may be used to control an external humidifier in relation to the reading of the humidity sensor situated in the return inlet.

6 SILENCERS

An add-on silencer module, with internal baffles and sound-absorbing mineral wool, may be installed to reduce the noise emissions of ventilation systems.

7 H14 ABSOLUTE FILTERS

The standard high efficiency pocket filters can be supplemented with an add-on Class H14 HEPA polyhedral mini-pleat filtration module, consisting of a galvanised steel frame and glass fibre filter paper.
These filters exert an extremely fine filtration action on the air delivered to the space served, making them suitable for healthcare sector applications.

8 OUTDOOR AIR, SUPPLY AIR, RETURN AIR AND EXHAUST AIR DAMPERS

For air distribution duct installations which require the air flow to be shut off when the unit is not running, dampers may be installed on the outdoor air inlet, the supply outlet to the space served, the return air inlet and the exhaust outlet venting into the external atmosphere as optional accessories. These dampers are supplied ready-installed on the unit, complete with servo-control mechanisms for aperture and closure. The supervisor and controller system of the unit controls the servo-mechanisms to open and close the dampers when requested by the management logic.

CO_2 SENSOR

The controller system of the s-AIRME may be supplemented with a CO2 sensor. When a threshold for CO2 concentration in the return air is set, the controller of the s-AIRME applies the following control strategies:
• **Two-step (min./max.) fan speed air flow modulation** (requires installation of accessory dual fan speed controller board): if the CO2 concentration is below the threshold, the flow rate of the fans is set to the minimum value, whereas if the threshold is exceeded, the flow rate is automatically set to the maximum value.
• **Air flow modulation with accessory recirculation damper:** in this case, the fans always operate at a fixed flow rate, and the aperture or closure of the recirculation damper is modulated as described in the paragraph relative to the accessory MIXING SECTION.

WATER CONNECTION LOCATIONS

For greater configuration freedom and to facilitate on-site installation, s-AIRME units may be configured with direct expansion coil and hydronic coil connections and inspection hatches situated on different sides of the unit itself.

SMOKE DETECTOR

For greater safety, the unit may be equipped with an optional smoke detector which, if smoke is detected, forces the unit to shut down and stops the delivery of air to the indoor space served to reduce the potential risk of fire.

RAIN COWL AND MESH ON OUTDOOR AIR INLET

s-AIRME units may be equipped with a rain cowl complete with bird protection mesh installed on the outdoor air inlet, which prevents small objects or rain drops from being aspirated into the unit from outside by the incoming air flow.

Technical specifications AR CONFIGURATION

R410A

SIZE VARIANT			3000	5000	7500	10000	12500	15000	20000
VERSION C									
Cooling (indoor + outdoor unit)	Cooling capacity	kW	10,40	20,10	25,10	40,70	45,10	50,20	75,10
	Sensible heat power	kW	8,39	15,30	21,60	30,30	36,80	42,50	61,70
	Total power consumption	kW	3,79	6,88	6,48	12,10	12,50	13,50	21,00
	EER	-	2,75	2,93	3,87	3,36	3,61	3,72	3,58
Heating (indoor + outdoor unit)	Thermal power	kW	11,30	22,50	27,10	44,90	49,40	54,20	81,10
	Total power consumption	kW	3,77	7,07	6,43	11,80	12,00	13,10	18,40
	COP	-	2,99	3,18	4,21	3,81	4,11	4,13	4,40
VERSION I									
Cooling (indoor + outdoor unit)	Cooling capacity	kW	14,10	25,10	40,40	50,10	60,40	75,30	100,00
	Sensible heat power	kW	10,50	18,60	29,90	39,00	45,90	55,10	78,20
	Total power consumption	kW	3,73	6,93	10,70	12,30	17,80	20,10	26,30
	EER	-	3,79	3,63	3,79	4,07	3,40	3,75	3,80
Heating (indoor + outdoor unit)	Thermal power	kW	16,00	27,00	44,80	54,40	67,20	81,20	108,00
	Total power consumption	kW	3,93	6,90	11,30	12,10	17,20	23,50	25,60
	COP	-	4,08	3,92	3,98	4,49	3,92	3,46	4,23
VERSION B									
Cooling (indoor + outdoor unit)	Cooling capacity	kW	20,10	34,00	50,30	60,30	80,00	100,00	125,00
	Sensible heat power	kW	13,80	23,20	34,50	45,00	56,40	68,70	88,70
	Total power consumption	kW	6,67	10,80	11,80	18,20	23,20	31,70	39,20
	EER	-	3,01	3,16	4,27	3,32	3,45	3,15	3,19
Heating (indoor + outdoor unit)	Thermal power	kW	22,4	38,4	54,2	67,2	89,6	108	135
	Total power consumption	kW	7,6	10,1	13	16,8	23,9	26,4	33,2
	COP	-	2,95	3,8	4,18	4	3,76	4,1	4,08

All values given for unit in following state:
- Nominal operating conditions (SUMMER: 35°C/50% Outdoor air, 27°C/47% Ambient air; WINTER: 7°C/87% Outdoor air, 20°C/50% Ambient air)
- Unit with no accessories and with clean filters

Technical specifications MF CONFIGURATION

R410A

SIZE VARIANT			3000	5000	7500	10000	12500	15000	20000
VERSION C									
Cooling (indoor + outdoor unit)	Cooling capacity	kW	12,30	24,30	29,50	49,00	53,30	59,00	88,10
	Sensible heat power	kW	9,44	17,30	24,50	34,30	41,60	48,40	70,10
	Total power consumption	kW	3,92	7,07	6,70	12,50	13,00	14,00	21,70
	EER	-	3,15	3,44	4,40	3,92	4,11	4,22	4,06
Heating (indoor + outdoor unit)	Thermal power	kW	12,10	23,80	28,60	47,50	51,90	57,20	85,60
	Total power consumption	kW	3,25	6,10	5,42	10,00	10,20	11,10	15,50
	COP	-	3,72	3,90	5,28	4,75	5,08	5,15	5,53
VERSION I									
Cooling (indoor + outdoor unit)	Cooling capacity	kW	16,60	30,00	49,00	59,40	72,90	89,90	119,00
	Sensible heat power	kW	11,80	21,00	33,60	44,00	51,80	62,20	88,40
	Total power consumption	kW	3,88	7,18	11,00	12,80	18,30	20,90	27,40
	EER	-	4,29	4,18	4,44	4,64	3,98	4,30	4,33
Heating (indoor + outdoor unit)	Thermal power	kW	17,20	28,50	47,40	57,50	71,20	85,60	114,00
	Total power consumption	kW	3,35	5,87	9,53	10,00	14,60	19,40	21,20
	COP	-	5,12	4,86	4,98	5,73	4,89	4,41	5,39
VERSION B									
Cooling (indoor + outdoor unit)	Cooling capacity	kW	24,10	41,20	60,60	73,10	97,40	121,00	150,00
	Sensible heat power	kW	15,20	25,80	38,50	48,80	62,90	76,70	99,30
	Total power consumption	kW	6,93	11,20	12,30	18,80	24,00	33,20	41,00
	EER	-	3,48	3,68	4,93	3,89	4,05	3,63	3,67
Heating (indoor + outdoor unit)	Thermal power	kW	23,90	40,70	57,10	71,20	94,80	114,00	143,00
	Total power consumption	kW	6,33	8,59	10,70	14,20	20,10	21,90	27,40
	COP	-	3,78	4,74	5,33	5,02	4,73	5,21	5,22

All values given for unit in following state:
- Nominal operating conditions (SUMMER: 35°C/50% Outdoor air, 27°C/47% Ambient air; WINTER: 7°C/87% Outdoor air, 20°C/50% Ambient air)
- Unit with no accessories and with clean filters

Technical specifications HR-P CONFIGURATION

R410A

SIZE VARIANT			3000	5000	7500	10000	12500	15000
VERSION C								
Cooling (indoor + outdoor unit)	Cooling capacity	kW	25,90	42,10	59,80	84,60	105,00	119,00
	Sensible heat power	kW	16,40	27,30	38,70	52,80	67,20	74,20
	Total power consumption	kW	6,61	11,70	13,50	19,30	25,20	26,70
	EER	-	3,92	3,61	4,44	4,38	4,16	4,46
Heating (indoor + outdoor unit)	Thermal power	kW	32,00	52,60	74,00	104,00	130,00	150,00
	Total power consumption	kW	6,71	12,10	13,70	19,70	26,70	26,60
	COP	-	4,77	4,36	5,39	5,27	4,86	5,65
VERSION I								
Cooling (indoor + outdoor unit)	Cooling capacity	kW	31,00	49,60	74,70	99,50	124,00	148,00
	Sensible heat power	kW	17,10	29,90	44,80	59,90	70,10	89,30
	Total power consumption	kW	6,69	14,00	18,30	25,00	25,90	37,50
	EER	-	4,63	3,55	4,08	3,98	4,78	3,96
Heating (indoor + outdoor unit)	Thermal power	kW	37,00	60,60	91,60	122,00	149,00	186,00
	Total power consumption	kW	6,31	14,80	19,30	26,50	26,20	38,30
	COP	-	5,86	4,09	4,76	4,61	5,68	4,85
VERSION B								
Cooling (indoor + outdoor unit)	Cooling capacity	kW	33,80	59,40	84,20	119,00	148,00	178,00
	Sensible heat power	kW	19,20	32,60	48,20	62,60	77,90	93,80
	Total power consumption	kW	7,71	13,90	19,10	25,10	31,50	38,40
	EER	-	4,39	4,26	4,42	4,75	4,71	4,64
Heating (indoor + outdoor unit)	Thermal power	kW	41,70	70,20	101,00	140,00	175,00	213,00
	Total power consumption	kW	8,00	14,10	18,90	24,30	31,20	36,80
	COP	-	5,22	4,99	5,35	5,76	5,61	5,78

All values given for unit in following state:
- Nominal operating conditions (SUMMER: 35°C/50% Outdoor air, 27°C/47% Ambient air; WINTER: 7°C/87% Outdoor air, 20°C/50% Ambient air)
- Unit with no accessories and with clean filters

Technical specifications AR CONFIGURATION

R32

SIZE VARIANT			3000	5000	7500	10000	12500	15000	20000
VERSION C									
Cooling (indoor + outdoor unit)	Cooling capacity	kW	10,00	20,10	25,00	40,70	45,00	50,00	75,20
	Sensible heat power	kW	8,76	15,10	18,10	30,40	32,70	35,50	55,80
	Total power consumption	kW	3,72	6,73	6,47	11,90	12,50	13,30	18,90
	EER	-	2,70	2,98	3,86	3,42	3,62	3,77	3,97
Heating (indoor + outdoor unit)	Thermal power	kW	11,20	22,40	26,90	44,80	49,40	53,80	81,00
	Total power consumption	kW	3,74	6,48	6,07	11,50	11,60	12,20	17,50
	COP	-	3,00	3,46	4,42	3,89	4,27	4,40	4,62
VERSION I									
Cooling (indoor + outdoor unit)	Cooling capacity	kW	14,00	25,10	40,30	50,20	60,10	75,10	100,00
	Sensible heat power	kW	9,66	16,00	27,30	33,60	43,50	48,60	66,50
	Total power consumption	kW	3,60	6,75	10,60	12,00	17,60	18,40	24,20
	EER	-	3,90	3,72	3,79	4,16	3,41	4,08	4,13
Heating (indoor + outdoor unit)	Thermal power	kW	16,10	27,00	44,80	54,00	67,20	80,80	108,00
	Total power consumption	kW	3,66	6,18	11,20	11,50	16,40	21,80	25,30
	COP	-	4,41	4,38	4,02	4,69	4,09	3,71	4,27
VERSION B									
Cooling (indoor + outdoor unit)	Cooling capacity	kW	20,10	34,00	50,10	60,10	80,10	100,00	125,00
	Sensible heat power	kW	14,10	21,60	29,40	40,50	53,70	58,60	75,20
	Total power consumption	kW	6,64	9,72	11,60	17,10	22,70	28,30	35,60
	EER	-	3,03	3,50	4,30	3,51	3,52	3,54	3,51
Heating (indoor + outdoor unit)	Thermal power	kW	22,40	38,40	54,10	67,20	89,60	108,00	135,00
	Total power consumption	kW	7,48	9,75	12,40	16,40	22,30	26,10	32,20
	COP	-	3,00	3,94	4,37	4,10	4,03	4,14	4,19

All values given for unit in following state:
- Nominal operating conditions (SUMMER: 35°C/50% Outdoor air, 27°C/47% Ambient air; WINTER: 7°C/87% Outdoor air, 20°C/50% Ambient air)
- Unit with no accessories and with clean filters

Technical specifications MF CONFIGURATION

R32

SIZE VARIANT			3000	5000	7500	10000	12500	15000	20000
VERSIONE C									
Cooling (indoor + outdoor unit)	Cooling capacity	kW	12,10	24,00	29,50	48,50	53,50	59,00	87,70
	Sensible heat power	kW	9,93	17,20	20,90	34,60	37,50	41,10	64,60
	Total power consumption	kW	3,77	6,76	6,49	12,00	12,50	13,30	19,00
	EER	-	3,21	3,55	4,54	4,05	4,27	4,43	4,62
Heating (indoor + outdoor unit)	Thermal power	kW	11,50	23,00	27,60	45,90	50,60	55,30	83,30
	Total power consumption	kW	3,09	5,37	4,92	9,28	9,40	9,95	14,10
	COP	-	3,71	4,27	5,61	4,94	5,38	5,56	5,92
VERSIONE I									
Cooling (indoor + outdoor unit)	Cooling capacity	kW	16,80	29,90	48,90	59,30	72,40	89,00	118,00
	Sensible heat power	kW	11,00	18,30	31,00	38,50	49,40	55,50	76,10
	Total power consumption	kW	3,62	6,77	10,70	12,10	17,70	18,40	24,30
	EER	-	4,64	4,42	4,57	4,91	4,09	4,83	4,87
Heating (indoor + outdoor unit)	Thermal power	kW	16,50	27,70	45,90	55,50	68,90	82,90	111,00
	Total power consumption	kW	2,99	5,10	8,93	9,11	13,10	17,30	19,90
	COP	-	5,53	5,44	5,13	6,09	5,24	4,8	5,56
VERSIONE B									
Cooling (indoor + outdoor unit)	Cooling capacity	kW	24,60	41,40	60,30	73,10	97,50	120,00	150,00
	Sensible heat power	kW	15,50	24,30	33,40	45,80	60,60	66,60	85,60
	Total power consumption	kW	6,69	9,76	11,70	17,20	22,90	28,40	35,80
	EER	-	3,68	4,24	5,16	4,25	4,26	4,24	4,20
Heating (indoor + outdoor unit)	Thermal power	kW	22,80	39,30	55,40	68,80	91,70	111,00	139,00
	Total power consumption	kW	6,10	7,97	9,76	13,10	17,80	20,60	25,30
	COP	-	3,75	4,93	5,68	5,27	5,16	5,37	5,48

All values given for unit in following state:
- Nominal operating conditions (SUMMER: 35°C/50% Outdoor air, 27°C/47% Ambient air; WINTER: 7°C/87% Outdoor air, 20°C/50% Ambient air)
- Unit with no accessories and with clean filters

Technical specifications HR-P CONFIGURATION

R32

SIZE VARIANT			3000	5000	7500	10000	12500	15000
VERSION C								
Cooling (indoor + outdoor unit)	Cooling capacity	kW	25,90	42,00	59,70	84,90	105,00	119,00
	Sensible heat power	kW	15,80	26,30	35,90	50,20	64,70	71,60
	Total power consumption	kW	6,62	11,60	13,60	19,20	25,70	26,30
	EER	-	3,90	3,61	4,39	4,42	4,07	4,53
Heating (indoor + outdoor unit)	Thermal power	kW	31,90	52,40	73,80	104,00	130,00	150,00
	Total power consumption	kW	6,78	11,90	13,00	19,10	26,40	25,70
	COP	-	4,71	4,39	5,68	5,46	4,91	5,85
VERSION I								
Cooling (indoor + outdoor unit)	Cooling capacity	kW	30,80	49,50	75,00	99,50	124,00	148,00
	Sensible heat power	kW	16,10	29,20	44,10	58,40	65,40	87,50
	Total power consumption	kW	6,64	13,80	18,70	24,40	25,80	36,50
	EER	-	4,64	3,59	4,01	4,08	4,81	4,07
Heating (indoor + outdoor unit)	Thermal power	kW	36,80	60,70	91,90	122,00	148,00	186,00
	Total power consumption	kW	6,17	14,30	19,10	25,50	24,80	38,00
	COP	-	5,97	4,24	4,82	4,78	5,97	4,89
VERSION B								
Cooling (indoor + outdoor unit)	Cooling capacity	kW	33,70	60,10	84,50	119,00	149,00	178,00
	Sensible heat power	kW	18,20	29,60	43,80	58,80	73,90	88,50
	Total power consumption	kW	7,57	13,90	18,70	24,40	31,00	36,70
	EER	-	4,45	4,33	4,51	4,89	4,80	4,85
Heating (indoor + outdoor unit)	Thermal power	kW	42,10	70,00	101,00	141,00	175,00	214,00
	Total power consumption	kW	7,75	13,40	18,50	24,00	30,30	36,40
	COP	-	5,44	5,22	5,45	5,87	5,77	5,87

All values given for unit in following state:
- Nominal operating conditions (SUMMER: 35°C/50% Outdoor air, 27°C/47% Ambient air; WINTER: 7°C/87% Outdoor air, 20°C/50% Ambient air)
- Unit with no accessories and with clean filters

Control Systems

Remote control

Wireless remote control

Remote control

Centralized control

Interface for hotel simplified application

Remote monitoring and control system

External signal integration

Control Systems

PAC-YT52CRA

DESIGN REMOTE CONTROL

PAR-FL32MA
PAR-SL101A-E

WIRELESS REMOTE CONTROL

PAR-41MAA

DELUXE REMOTE CONTROL

PZ-62DR-EB

LOSSNAY REMOTE CONTROL

PAR-CT01MA

PRISMA REMOTE CONTROL

PAR-W21MAA
PAR-W31MAA

ECODAN REMOTE CONTROL

PAR-U02MEDA

ADVANCED REMOTE CONTROL

AT-50B

SYSTEM CENTRALIZED CONTROL

AE-200E

3D TOUCH Controller
WEB SERVER CENTRALIZED CONTROL

EW-50

3D BLIND Controller
WEB SERVER CENTRALIZED CONTROL

3D TABLET CONTROLLER

WI-FI REMOTE MANAGEMENT SYSTEM

MELCloud® CITY MULTI

MELCloud CITY MULTI

CLOUD REMOTE MANAGEMENT SYSTEM

MELCOTEL

INTERFACE FOR HOTEL SIMPLIFIED APPLICATION

RMI REMOTE MONITORING INTERFACE
Available on the App Store
ANDROID APP ON Google play

RMI

Remote Monitoring Interface
CLOUD REMOTE MANAGEMENT SYSTEM

M-NET-AHC-24VDC

INTEGRATION OF EXTERNAL SIGNALS

B.M.S. INTERFACE

B.M.S. INTEGRATION

PAC-YT52CRA

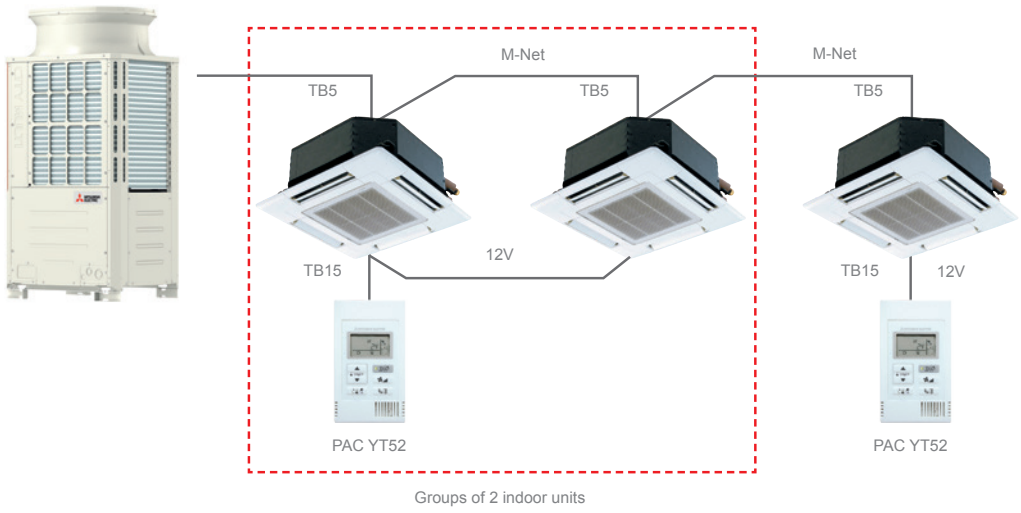
DESIGN REMOTE CONTROL

PAC-YT52CRA Design remote control

- Display with white backlighting.
- Simple wall-mounted installation.
- Easy and intuitive with icon-based interface.
- Operating mode selection function.
- Vane position selection function (for compatible indoor units).
- Usable to manage 1 group of up to 16 indoor units.
- Simple connection with single non-polarised two-core wire.
- **MA** self-addressing technology.
- Suitable for all types of indoor unit.
- Recommended for hotels and public spaces, as ambient air temperature display can be disabled.
- Integrated temperature sensor usable instead of indoor unit sensor.
- Configurable temperature range settable from local keypad.

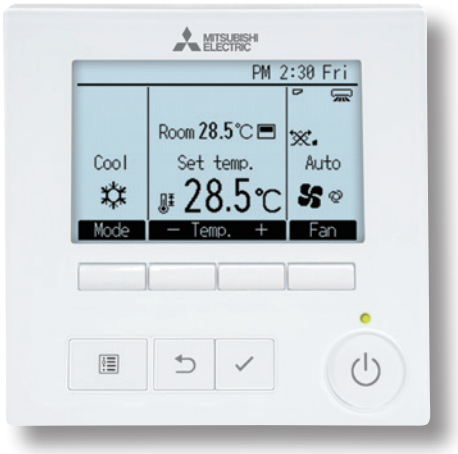
Key Technologies

dual Setpoint				



PAR-41MAA

DELUXE REMOTE CONTROL UNIT

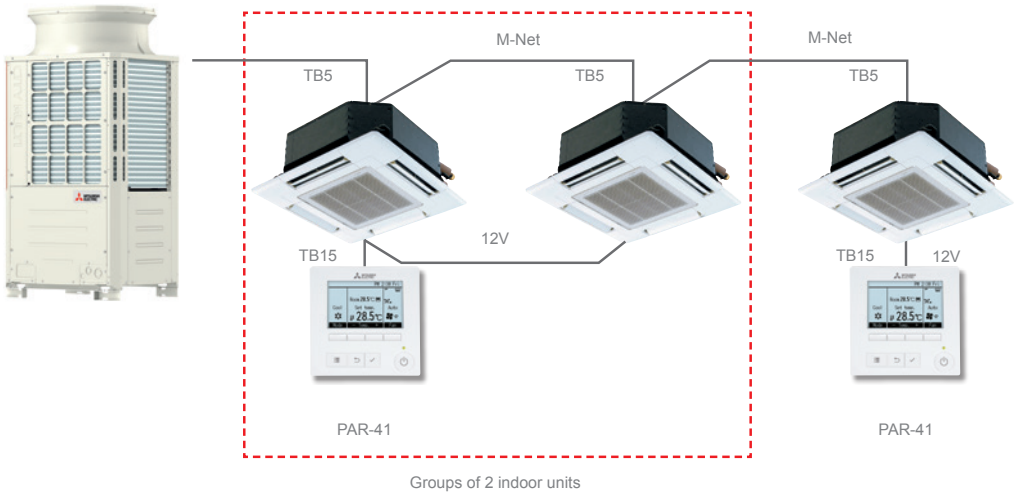


PAR-41MAA Deluxe remote control unit

- Display with white (factory setting) or black backlighting and adjustable contrast.
- Simple wall-mounted installation.
- Night Set-back function for setting minimum winter temperature or maximum summer temperature in temperature maintenance mode.
- Effective static overpressure selection function for ducted indoor units (PEFY-P VMHS only).
- Internal weekly timer function and simplified internal timers (Auto-off, etc.).
- Usable to manage 1 group of up to 16 indoor units.
- Easy and intuitive, with icon based graphic interface, direct control buttons and function buttons.
- Simple connection with single non-polarised two-core wire.
- **MA** self-addressing technology.
- Suitable for all types of indoor unit, including GUF.
- Integrated temperature sensor usable instead of indoor unit sensor.
- Configurable temperature range settable from local keypad.
- **View and set setpoint temperatures in 0.5°C increments.**
- Supports 3D i-see sensor functions
- **14 languages available** (English, French, Spanish, German, Italian, Dutch, Portuguese, Greek, Russian, Czech, Turkish, Polish, Hungarian, Swedish).
- Draft reduction *
  "Close" has been added to the manual vane angle selection.
  The air outlet can be closed to reduce drafts from the air conditioner.

Key Technologies

dual Setpoint				



PAR-CT01MA

PRISMA REMOTE CONTROL

PAR-CT01MAA-SB

PAR-CT01MAA-PB

PAR-CT01MA prisma remote control

- Full color touch panel display
- 180 color patterns can be selected for control parameters or background on the display
- Easy wall mounted installation
- Night Set-back function for setting minimum winter temperature or maximum summer temperature in temperature maintenance mode.
- Effective static overpressure selection function for ducted indoor units (PEFY-P VMHS only).
- Internal weekly timer function and simplified internal timers (Auto-off, etc.).
- Usable to manage 1 group of up to 16 indoor units.
- Easy and intuitive, with icon based graphic interface, direct control buttons and function buttons.
- Simple connection with single non-polarised two-core wire.
- MA self-addressing technology.
- Suitable for all types of indoor unit, including GUF.
- Recommended for groups with only one indoor unit.
- Integrated temperature sensor usable instead of indoor unit sensor.
- Configurable temperature range settable from local keypad.
- **View and set setpoint temperatures in 0.5°C increments.**
- **Supports 3D i-see sensor functions for 60 x 60 PLFY-P VFM-E1 cassette and 90 x 90 PLFY-P(M) VEM-E cassette**

Key Technologies

dual Setpoint				

Multiple color pattern

180 MULTIPLE COLOR PATTERNS

Multilingual support

The smartphone app can be displayed in the language that the guest's smartphone is set to.

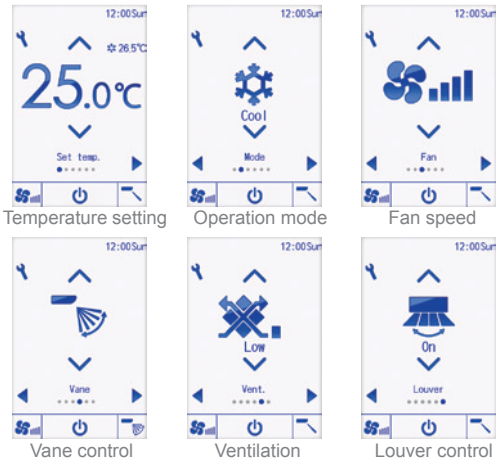
Large color backlit touch display

New PRISMA remote control is equipped by 3.5 inch/HVGA Full Color LCD Touch screen,

TOUCH PANEL

3,5 Inch/HVGA Full Color LCD

OPERATION PANEL



Temperature setting | Operation mode | Fan speed

Vane control | Ventilation | Louver control

Display customization

Customized display, color on parameter and background, editable parameter, logo image on the initial display.

Hotel setting

Simple operation panel is liked by users, especially in hotels. It is available to display only ON/OFF, set temp., fan speed.

Bluetooth connection

PAR-CT01MA remote control is equipped with Low Energy Bluetooth connection. Thanks to two dedicated Apps (one for installers and one for users) it is possible to connect your smartphone or tablet the the remote control. User App allows to control the air conditioning system connected to PAR-CT, with a simple and intuitive interface.
Installer App allows to easily configure the remote control during maintenance and commissioning. Thanks to this App it is possible to save a settings pattern on mobile device and easily transfer it to the remote control, shortening service and commissioning timing.

APP SCREEN IMAGE

* The Bluetooth® word mark is tra-demark of Bluetooth SIG, Inc, USA.
* Contact the sales company for information on "Bluetooth function.

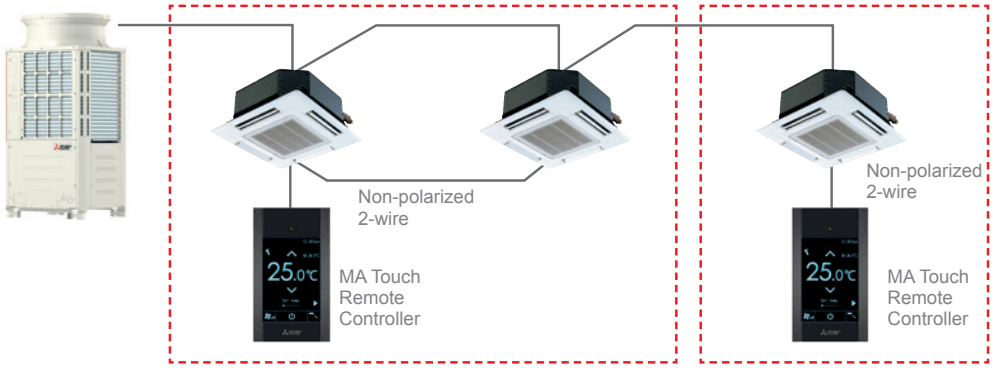
Setting App | User App

Logo image customization

Logo image can be displayed on the initial screen.

LOGO IMAGE CUSTOMIZATION

SYSTEM EXAMPLE



*When a PAR-CT01MAA is connected to a group, no other MA remote controllers can be connected to the same group.

PAR-U02MEDA

ADVANCED REMOTE CONTROL

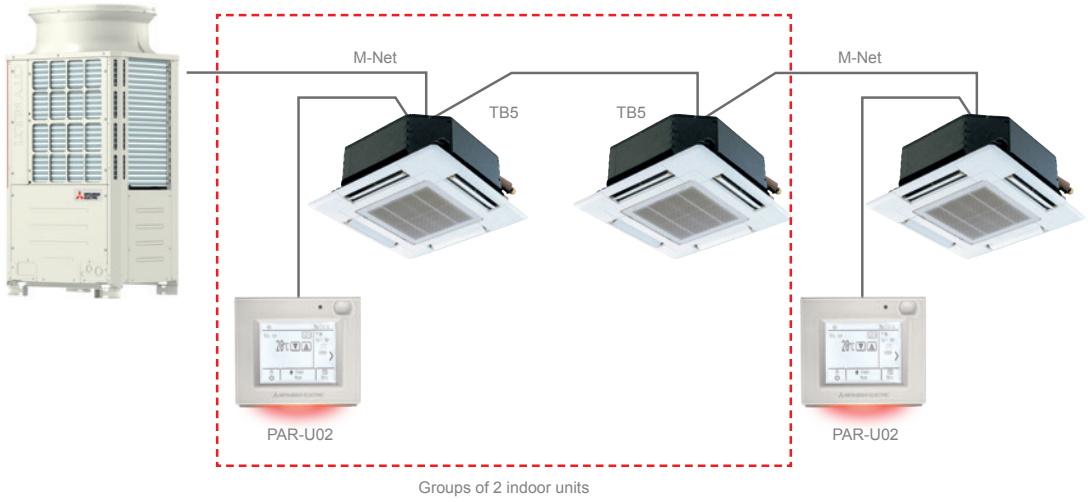
PAR-U02MEDA advanced remote control

The Mitsubishi Electric Advanced remote control may be used to control up to 16 indoor units. While advanced, this controller also offers basic functions such as monitoring and controlling the status of the units in the system, and a weekly hour timer. Four integrated sensors (temperature, humidity, occupancy and light) allow a series of advanced adjustment and control functions. For example, the occupancy sensor can be used to save energy by configuring different modes based on the occupied/ vacant status of each room.

- Large monochrome LCD touch screen display with white backlighting.
- Usable to manage 1 group of up to 16 indoor units.
- **Integrated temperature, humidity, occupancy and light sensors.**
- SMART energy saving and comfort functions.
- Contextual colour LED indicating operating status of indoor units.
- **View and set setpoint temperatures in 0.5°C increments**
- **Dual Setpoint** function.
- Internal weekly timer.
- **ME M-Net** addressing technology.
- Extended setting ranges for setpoints (Cool: 19-35°C; Heat: 5-28°C).
- New functions for use in conjunction with AHC Programmable Controller (PLC M-Net), for creating operating strategies with generic devices.

Key Technologies

dual Setpoint				

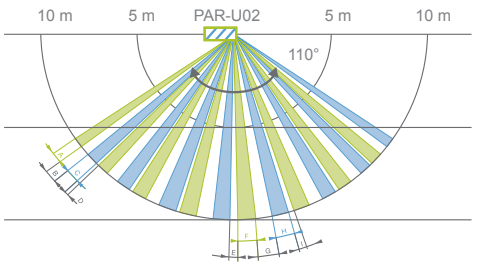


Occupancy sensor

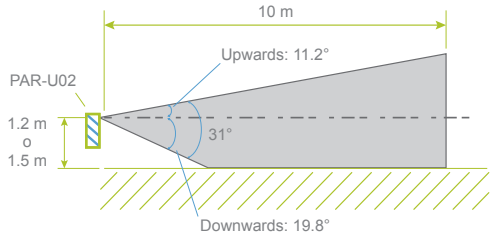
The occupancy sensor detects if a room is vacant and enables automatic control of the indoor units to implement energy saving strategies based on the effective occupancy of each room. The occupancy sensor enables the following energy saving functions:

- Switch indoor units ON/OFF based on occupied/vacant state of room;
- Fan speed control;
- Switch indoor unit from Thermo ON to Thermo OFF state;
- Configure temperature deviation based on occupied/vacant status.

RADIAL MEASUREMENT UP TO 10 M



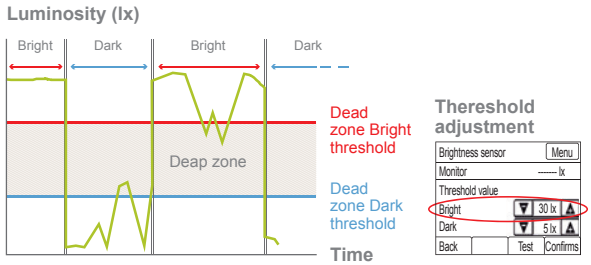
EXTENDED SPATIAL MEASUREMENT



Light sensor

The light sensor measures the light levels in the conditioned room and adjusts the brightness of the remote control display accordingly.
Bright/dark thresholds may be set directly from the remote control over an extended luminosity range (1 to 65535 lx).
The light sensor is also used in low light conditions to confirm the occupied/vacant status of the room.

LIGHT SENSOR



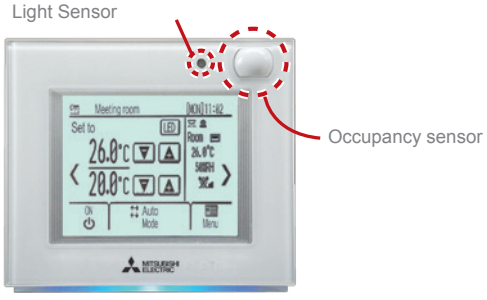
Temperature and humidity sensor

The integrated temperature and humidity sensor may be used to increase perceived comfort levels, while the ability to adjust the temperature with a precision of 0.5°C gives the user an even greater sense of control. The relative humidity sensor, combined with the ability to interlock the remote control with a programmable AHC controller, makes it possible to control humidity with external devices connected to the system via the AHC.

LED status indicator

The LED status indicator indicates the status of active functions on the remote control. Each colour is associated with a status or function:
e.g. Red=Heating, Blue=Cooling etc.
The LED indicator may be temporarily or permanently disabled.

LED STATUS INDICATOR



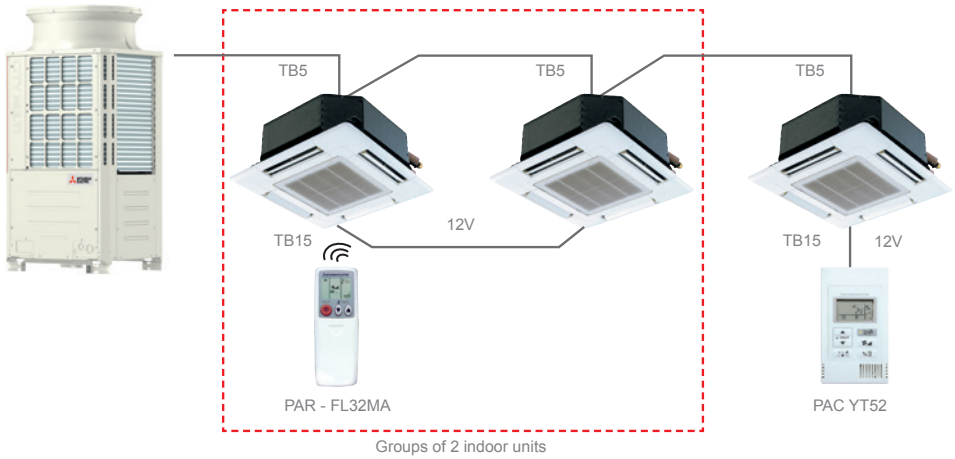
PAR-FL32MA

WIRELESS REMOTE CONTROL

PAR-FL32MA PAR-FA32MA PAR-SE9FA

PAR-FL32MA wireless remote control

- Usable to manage 1 group of up to 16 indoor units.
- Easy and intuitive with icon-based interface.
- Receiver connected simply with single non-polarised two-core wire.
- MA self-addressing technology.
- Suitable for all types of indoor unit.
- Recommended for groups with only one indoor unit.
- Generic receiver for all indoor unit types: PAR-FA32MA.
- Specific corner receiver for 4-way PLFY-P(M) VEM-E cassette units: PAR-SE9FA.



Groups of 2 indoor units

Compatibility table		
	Wireless signal receiver	Wireless remote control
PMFY-P VBM PLFY-P VLMD PEFY-P VMR/VMH PEFY-P VMS1 PEFY-M VMA PEFY-P VMA3 PEFY-P VMHS PFFY-P VLEM/VKM/VCM PCFY-P*VKM	**PAR-FA32MA**	**PAR-FL32MA**
PLFY-P/M VEM PLFY-P VFM-E1	**PAR-FA32MA**	**PAR-FL32MA**

Compatibility table		
	Wireless signal receiver	Wireless remote control
PKFY-P VLM PKFY-P VKM	**Built in**	**PAR-FL32MA**

PAR-SL101A-E

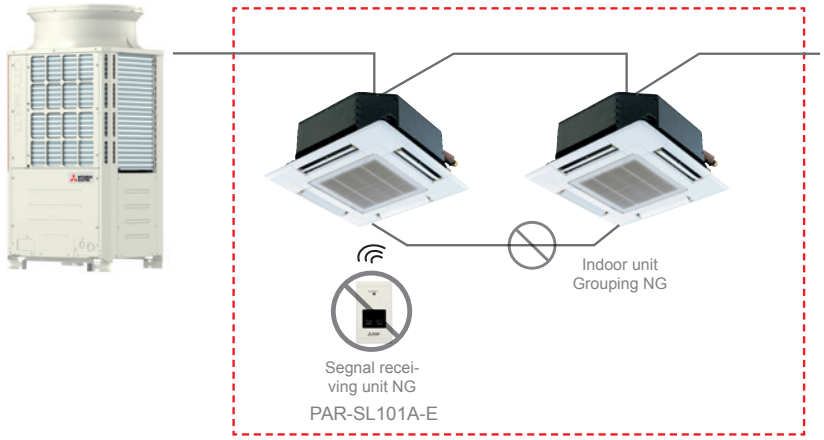
WIRELESS REMOTE CONTROL

Wireless remote control PAR-SL101A-E

- Compatible with PLFY-VFM and PLFY-VEM
- **Backlighting**
- Group with up to 16 units
- **Direct/Indirect function** with corner PAC-SF1ME-E (3D i-see sensor)
- **Single vane control**
- Temperature view and setting 0,5°C
- **3D i-see sensor compatible**

Key Technologies

dual Setpoint				



Compatibility table		
	Wireless signal receiver	Wireless remote control
PLFY-P/M VEM-E	**PAR-SE9FA-E**	**PAR-SL101A-E**
PLFY-P*VFM-E1	**SLP-2FAL**	

PZ-62DR-EB

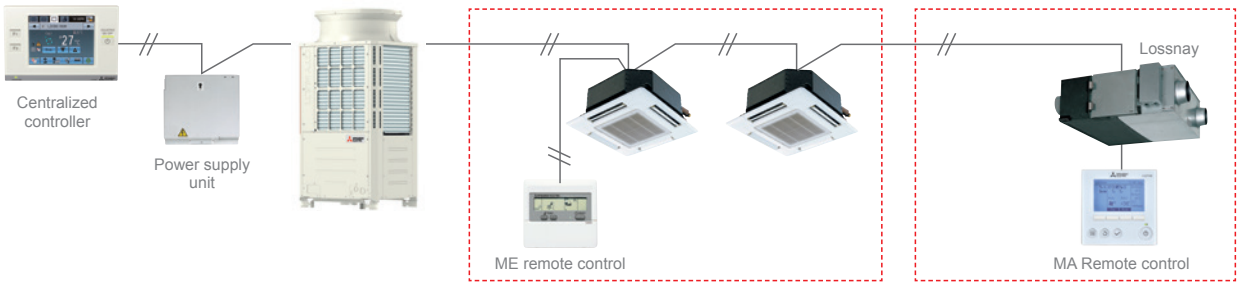
LOSSNAY REMOTE CONTROL

PZ-62DR-EB remote control for Lossnay

- Specific remote control for Lossnay heat recovery units.
- Usable to manage one group of up to 15 Lossnay units.
- Easy and intuitive with icon-based interface.
- Simple connection with single non-polarised two-core wire.
- Internal weekly timer.
- Custom ventilation strategies for mode switching (Auto/recovery/bypass).
- Night purge function for active night-time ventilation in summer.
- On-display service messages.
- Backlit LCD screen.
- Energy managemen

3 Languages are added
Greek,Slovenian, Denmark

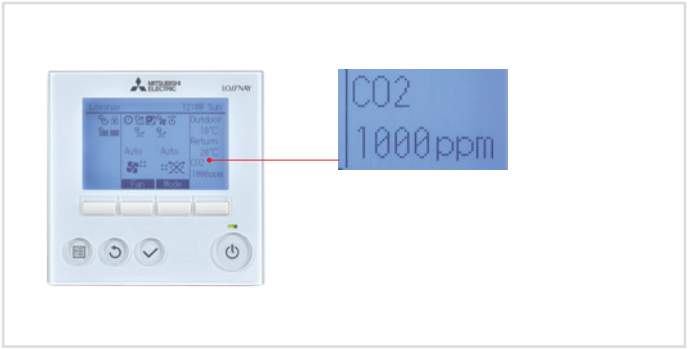
Compatibility
PZ-62DR-EB are compatible with both RVX and RVS.



*Not compatible with LGF

Dedicated PZ-62DR-EB wired controller

The new PZ-62DR-EB controller can be used to control all the functions of the LGH-RVS unit.
If the PZ-70CSW-E (optional) or PZ-70CSB-E (optional) CO_2 sensor is used, the carbon dioxide concentration in the room can be displayed on the control unit's display.

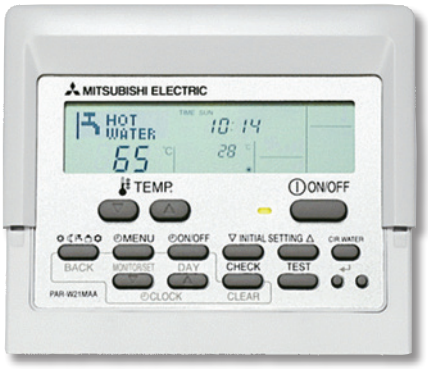


Function	PZ-62DR-E
Fan speed selection	4 fan speeds and Auto (Auto is available when using a CO2 sensor)
Control with a CO2 sensor	Yes (Fan speed automatically changes from 25% to 100% depending on the CO2 concentration*)
Ventilation mode selection	Energy recovery/Bypass/Auto
Night-purge	Yes
Function setting from remote controller	Yes
Bypass temp. free setting	Yes
Multi-stage air ow control	Yes (Both supply and exhaust fan speeds can be set separately from 25% to 100% in 5% pitches)
ON/OFF timer	Yes
Auto-off timer	Yes
Weekly timer	Yes
Fan speed timer	Yes
Operation restrictions (ON/OFF, ventilation mode, fan speed)	Yes
Operation restrictions (fan speed skip setting)	Yes
Screen contrast adjustment	Yes
Language selection	Yes
CO2 concentration indication	Yes (available when using a CO2 sensor)
Filter cleaning sign	Yes (maintenance interval can be changed)
Error indication	Yes (displays model name, serial number, contact information if they are input)
Error history	Yes
OA/RA/SA temp. display	Yes

*When using a CO_2 sensor. Upper and lower limits may be changed.

PAR-W21MAA / PAR-W31MAA

ECODAN REMOTE CONTROL



PAR-W21MAA / PAR-W31MAA remote control for hydronic modules and HWHP units / E-SERIES

- (PAR-W21MAA) Remote control for hydronic modules, HWS and ATW units and Hot Water Heat Pump package systems (HWHP) CAHV&CRHV.
- Usable to manage 1 group of up to 16 indoor units.
- Easy and intuitive with icon-based interface.
- Simple connection with single non-polarised two-core wire.
- MA self-addressing technology.
- Operating mode selection (Heating, Heating ECO, Hot water, etc.).
- Internal weekly timer.
- Customisable water temperature ranges for switching operating mode from local keypad.
- On-display service messages.
- PAR-W31MAA specific for E-SERIES

AT-50B

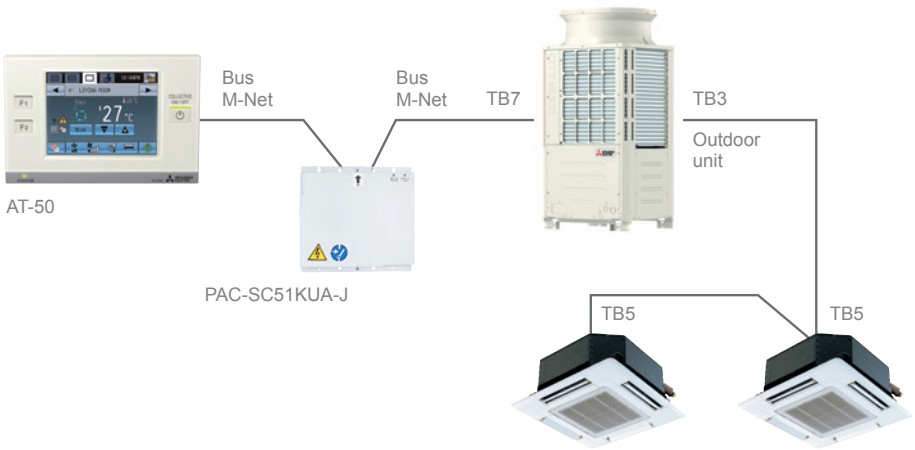
SYSTEM CONTROLLER

AT-50B system controller

- **5”** backlit **LCD touch screen.**
- Usable to manage 50 groups of up to 50 indoor units.
- Individual or collective group control, with groups displayed in grid, list or group format.
- **Dual-Setpoint** function.
- **View and set setpoint temperatures in 0.5°C increments.**
- Two weekly timers (for seasonal switching) and one daily timer.
- Simple connection with single non-polarised two-core wire.
- ME M-Net addressing technology.
- Two function buttons programmable to access any of a choice of functions (Night Set-back, weekly hour timer setting, switch operating mode, adjustable temperature range restriction, local restrictions).
- Recommended for controlling a single system.

Key Technologies

dual Setpoint				



AE-200E

WEB SERVER CENTRALIZED CONTROLLER

3D TOUCH controller

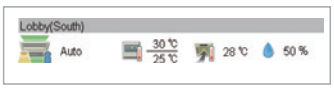
- Generously sized backlit 10.4” SVGA touch screen with graphic layout display function.
- Built-in 240 V AC 50 / 60 Hz power supply.
- Standalone configuration: management of up to 50 indoor units.
- Extended configuration: management of up to 200 indoor units (with 3 expansion controllers EW-50).
- Individual or collective control of groups, blocks or zones.
- Ethernet interface for connection to BMS supervisor systems.
- Integrated WEB server software for management using Internet Explorer®.
- Integrated 2 GB SD memory card for storing system data.
- Direct management of 4 impulse meters with no external interface.
- Power consumption data for billing downloadable via internet connection.
- Complete support for all advanced RMI platform functions for energy consumption monitoring and for multi-installation and multi-user management.
- Temperature setpoints settable and viewable with a precision of 0.5°C.
- Energy saving functions: Maintenance temperature, Sliding temperature, Optimised start, Dual Setpoint.
- M-Net interfacing with Ecodan package Hot Water Heat Pump systems (CAHV and CRHV).
- **Allows direct connection to BMS BACnet NEW**

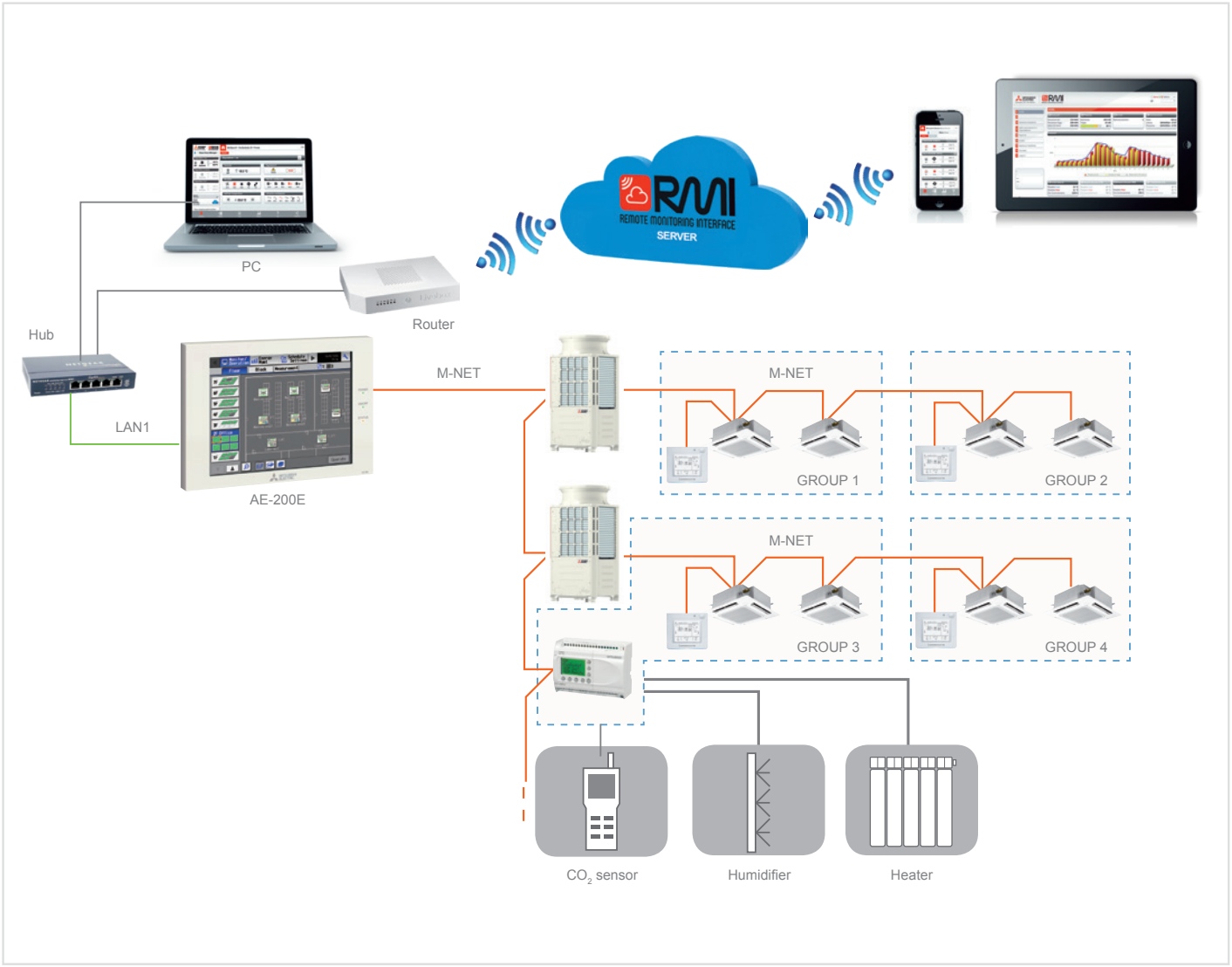
Key Technologies

Superior management, functional and monitoring capabilities with new Mitsubishi Electric controller systems

The 3D TOUCH Controller supports the management, operational and monitoring capabilities of all the new functions offered by the new **ADVANCED remote control.**

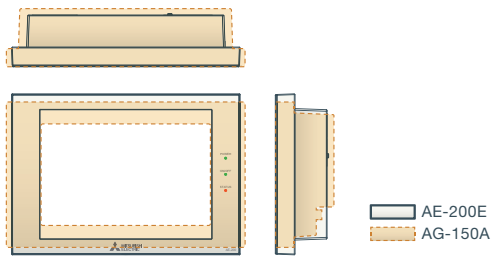
Information concerning **occupancy, light levels**, relative humidity in the **indoor space and dual setpoints** is accessible directly from the display and via the WEB.





Power and flexibility in a compact device

While measuring practically the same as the previous AG-150, the new 3D TOUCH Controller WEB Server centralized controller offers a larger screen area, greater processing power and expandable flexibility for future applications.



RMI Ready

The **3D TOUCH Controller** WEB Server centralized controller performs the crucial role of acquiring and monitoring data via the M-Net data transmission bus linking all the components of the VRF CITY MULTI, Mr. Slim or Residential system.

A router (available as wired ADSL or 3G Mobile versions) creates a secure, protected communication channel with the RMI Server. The modular flexibility of the RMI Server makes it possible to store enormous volumes of data, which is acquired, processed and archived for access from portable devices.

This infrastructural complexity, combined with superior processing, management and security capabilities, is encapsulated in an extremely user friendly concept, to help users optimise the energy usage of their systems.

EW-50

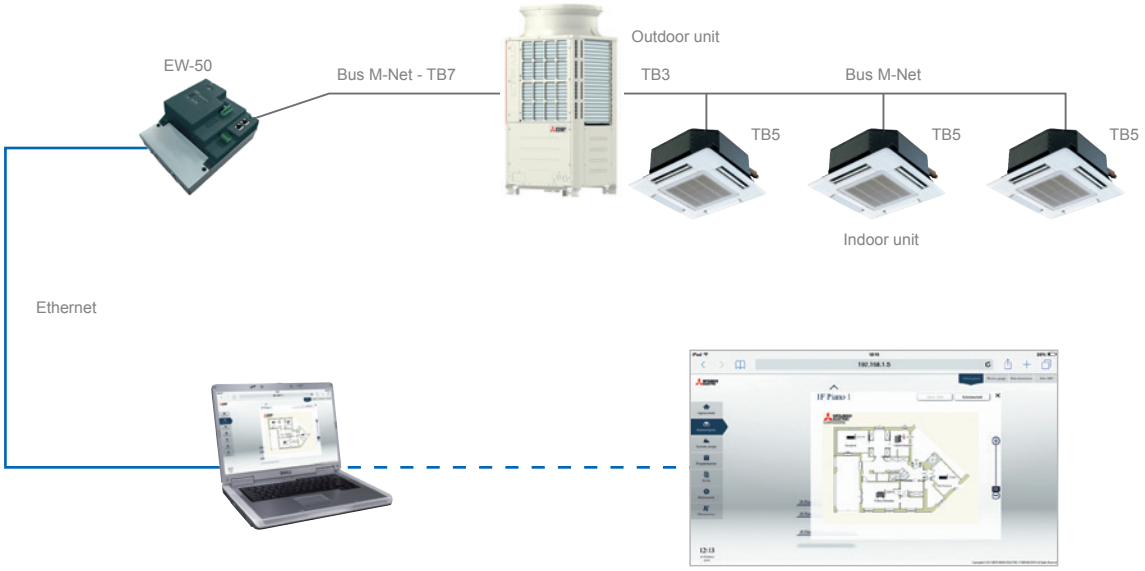
WEB SERVER CENTRALIZED CONTROLLER

3D blind controller

- “Black Box” version (no display).
- Compact dimensions (external 230V AC power supply).
- Usable to manage 50 groups for a total of up to 50 indoor units.
- Individual or collective group control.
- Ethernet interface for connection to supervisor systems.
- Integrated WEB server software for management using Internet Explorer®.
- Simplified connection, with single non-polarised two-core wire, using ME technology.
- Integrated 2 GB SD memory card for storing system data.
- Direct management of 4 impulse meters with no external interface.
- Status indicator LED indicating data transmission status and/or errors.
- Consumption data for billing downloadable via internet connection.
- A wide choice of energy saving functions offered as standard, with additional optional functions accessible with PIN code licenses.
- Complete support for all advanced RMI platform functions for energy consumption monitoring and for multi-installation and multi-user management.
- **Expansion controller for AE-200.**
- Allows direct connection to BMS BACnet NEW

Key Technologies

dual Setpoint				



CHARGE

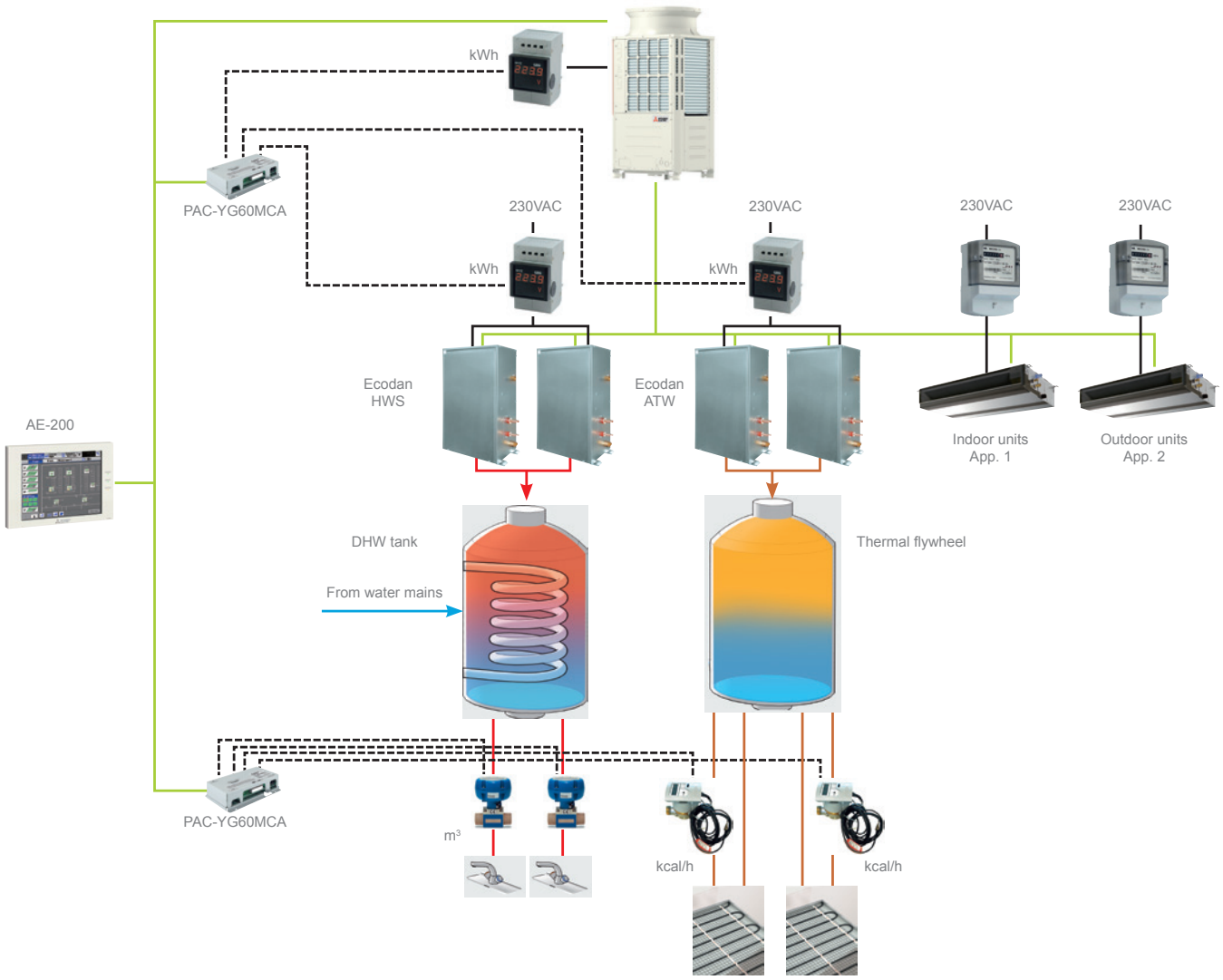
"CHARGE" SYSTEM FOR CENTRALIZED WEB SERVER CONTROLS

Apportioning system by web server centralized controllers

The Charge consumption monitoring and apportioning system may be used to meter the consumption of electric power, thermal power and water for air conditioning, air and/or water heating and domestic hot water production with a Mitsubishi Electric VRF CITY MULTI system, and calculate individual usage values.

The AE-200 and EW-50 CHARGE systems use proprietary Mitsubishi Electric calculation and apportioning methods. This consumption apportioning method indicates the consumption parameters of each user as percentages of the total consumption of the system. Consumption values, as percentages and kWh, may be calculated separately for:

- Outdoor Units
- Indoor Units
- Ecodan HWS Hydronic Modules
- Ecodan ATW Hydronic Modules



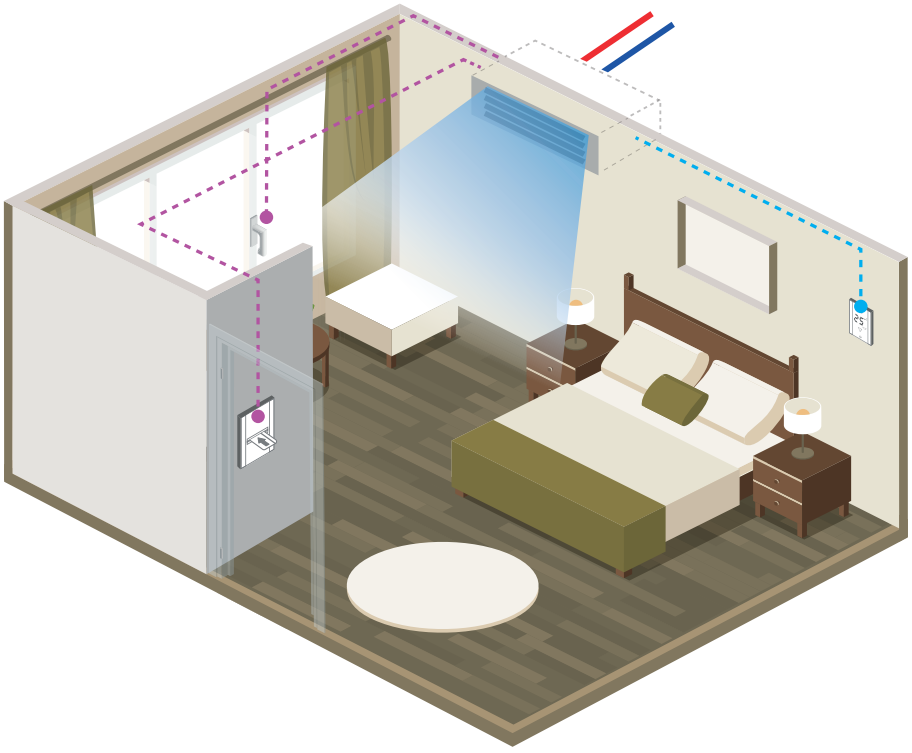
MELCOTEL

INTERFACE FOR HOTEL SIMPLIFIED APPLICATION

MELCOTEL

- Integrated solution interface for small-medium hotels;
- Centralized solution;
- Higher level of control and therefore greater energy saving and a substantial reduction in running costs;
- Key Card contact and Window contact management (1 PAC-SE55RA for each indoor unit is required)
- It works in combination with 1 AE-200 and up to 3 more Web Server Centralized Controllers AE-200/EW-50 (up to 200 Indoor Units).

HOTEL ROOM MANAGEMENT

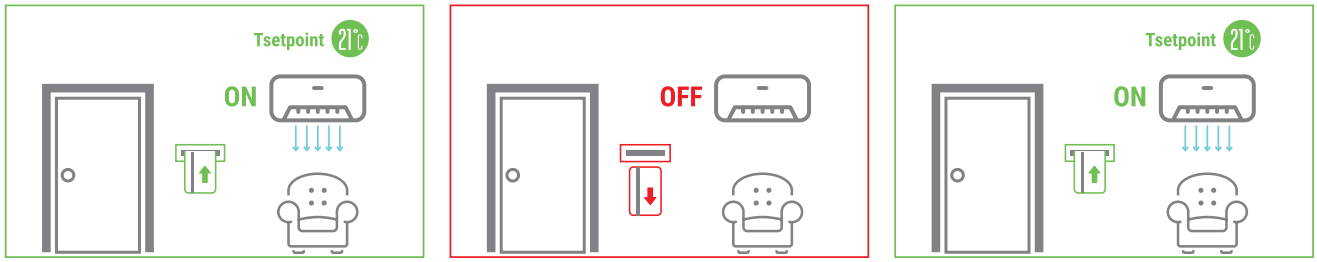


Key card contact and window contact management

The Melcotel Interface allows a hotel to have more accurate control over its air conditioning and can be used to control and monitor up to 200 bedrooms.

KEY CARD CONTACT MANAGEMENT

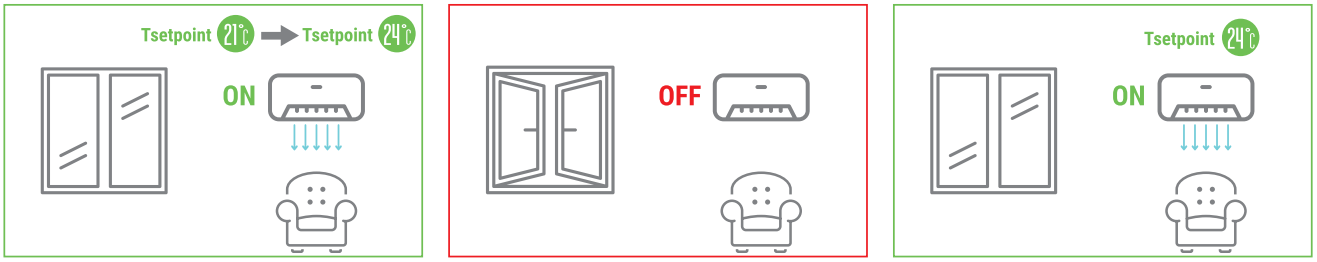
It allows the resetting of the status (Setpoint Temperature) set by Melcotel when key card is reinserted



Application example:
When key card is inserted, the indoor unit switches on with the setpoint temperature set by MELCOTEL, for example 21°C. The chamber customer changes the setpoint to 24°C. When key card is removed the indoor unit switches off and remote control is disabled. When key card is reinserted, the indoor unit switches to ON with the setpoint of 21 °C, the one set by MELCOTEL, in order to guarantee energy savings.

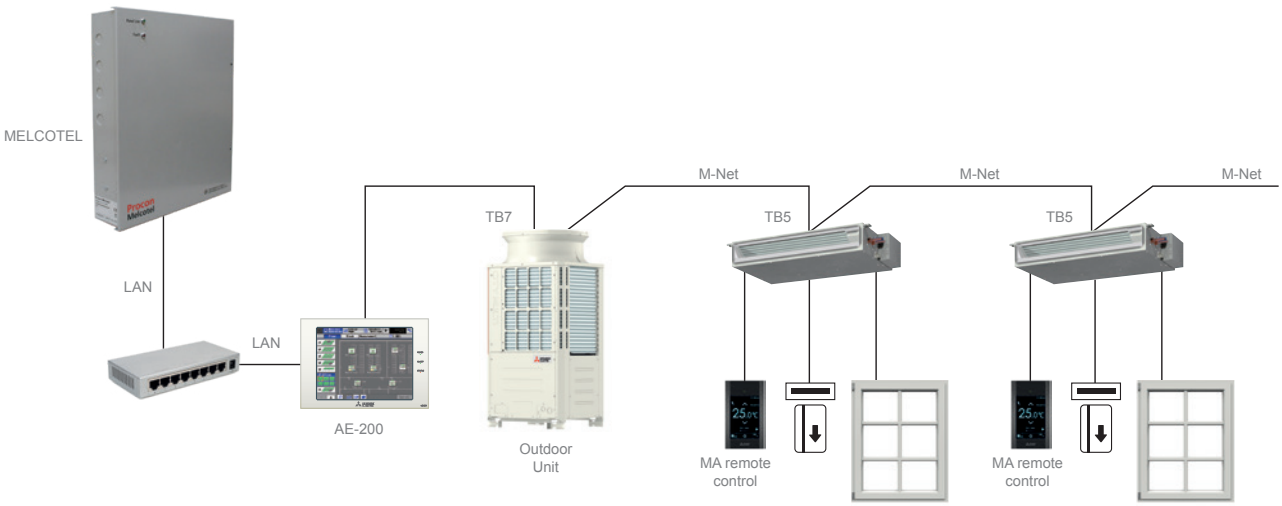
WINDOW CONTACT MANAGEMENT

It allows restoring the previous state (ON / OFF status, Setpoint Temperature) when the window is reclosed;



Application Example:
The indoor unit is on and with a setpoint temperature equal to that set by MELCOTEL, for example 21°C. The chamber customer changes the setpoint to 24°C. When the window is opened, the indoor unit switches off and remote control is disabled in order to avoid energy waste. When the window is reclosed, the state prior to opening is restored, i.e. the indoor unit returns to ON and to the setpoint previously set by the customer chamber, i.e. 24 ° C.

ARCHITECTURE



First Centralized Controller HAVE to be necessarily AE-200;
In order to implement the window and/or key card contact system it is necessary to provide one PAC-SE55RA for each indoor unit.

Remote monitoring and control system

3D Tablet Controller

3D Tablet Controller is the new solution by Mitsubishi Electric
allowing portable system management from Smartphone and Tablet **inside the building**. User configuration, with restrictions and privileges, makes it the ideal solution in those application serving different environments, such as offices or appartments. Thanks to its simple and intuitive interface the user is able to control and monitor **air conditioning** and **hot water production** units on **mobile device**, just as easily as he would on a traditional remote control.
This is possible thanks to WEB Server 3D centralized control installed on site, connected to the building Wi-Fi router*1.

*1 Not supplied by Mitsubishi Electric.

INSIDE THE BUILDING

MELCloud

- Cloud remote **monitoring and control** system.
- Born for residential aplications, it's now being expanded to VRF CITY MULTI.
- **Complete and intuitive** solution with all main control and monitoring functions.
- Does not require WEB Server 3D centralized control (AE-200, EW-50).

RMI

- Cloud remote monitoring and control system **for professional use.**
- Allows all main remote control and monitoring functions.
- **Advanced energy monitoring** features are available, such as hourly cunsumption view, custom charts and data collection and display.
- Geo-localized **multi-site** management.
- **Multi-user** management for centralized systems.
- Energy **consumption apportioning**[*2].

	3D TABLET CONTROLLER	MELCloud CITY MULTI	RMI REMOTE MONITORING INTERFACE
Group/Individual simplified management[*2]	•	•	•
Available for Smartphone and Tablet	•	•	•
Dedicated App		•	•
User restrictions	•	•	•
Outside the building (Cloud)		•	•
Internet connection needed		•	•
WEB Server centralized control needed	•		•
Advanced energy monitoring			•
Monthly/Custom charts and reports			•
Multi-site management			•
Energy consumption apportioning			•

[*2] For compatible product lines please refer to catalogues or contact headoffice

OUTSIDE THE BUILDING

3D TABLET CONTROLLER

WI-FI REMOTE MANAGEMENT SYSTEM

New Wi-Fi management system by Mitsubishi Electric

3D Tablet Controller allows system management and control through Smartphone and Tablet under LAN Wi-Fi coverage.

Access and components

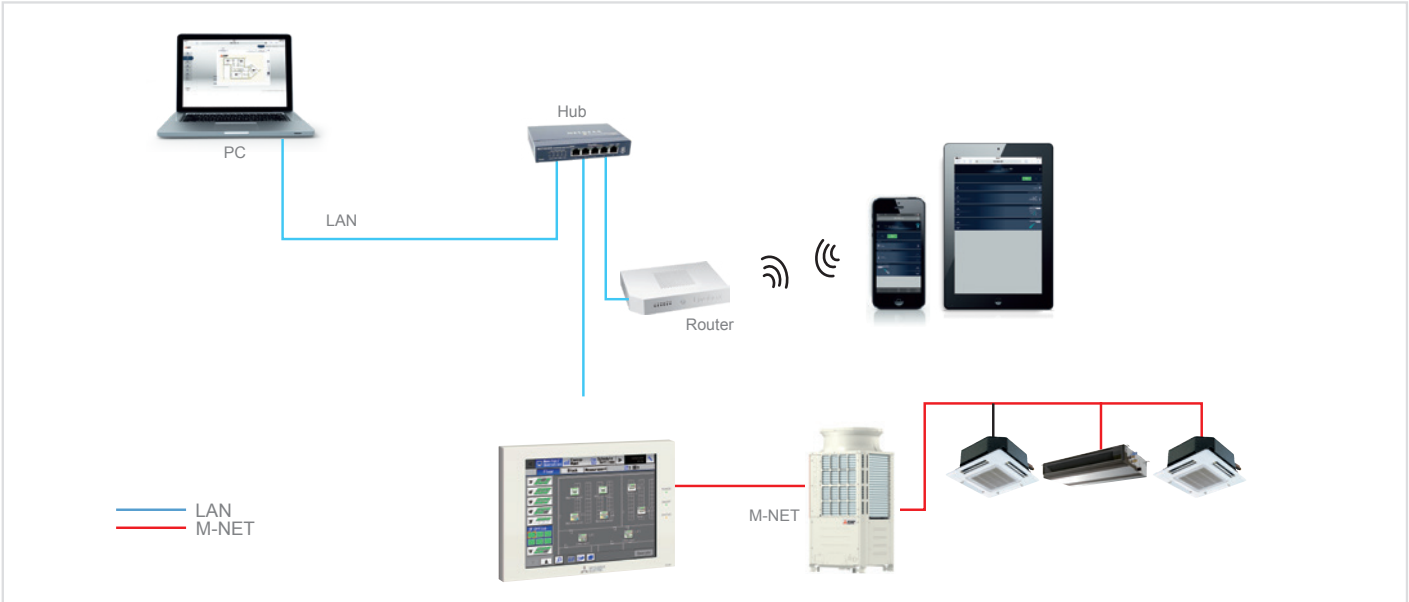
WEB Server centralized control connected to Wi-Fi router is needed.
3D Tablet Controller is compatible with all Smartphone and Tablets, thank to access through internet browser.

The user can login at the address:

http://[AE-200/EW-50 IP address]/mobile

Simple and intuitive interface

Thanks to its simple and intuitive interface the user is able to freely control air conditioning and water production units from mobile device, inside the building.
This interface has been designed to have the look&feel of a typical App for Smartphone, with immediate feedback from units and fast setting of operating parameters.



Mobile interface

The web interface has been designed following the modern style of App for Smartphone and Tablet, maximizing easy of use and intuitiveness for mobile use.

Advantages

- Compatible with all Smartphone and Tablet mobile devices, regardless of the brand and operating system.
- No need for internet connection, communication is direct between device, router and centralized controller.
- Possibility to replace the wired remote controls
- Possibility of configuring different users with privileges/restrictions on the available functions

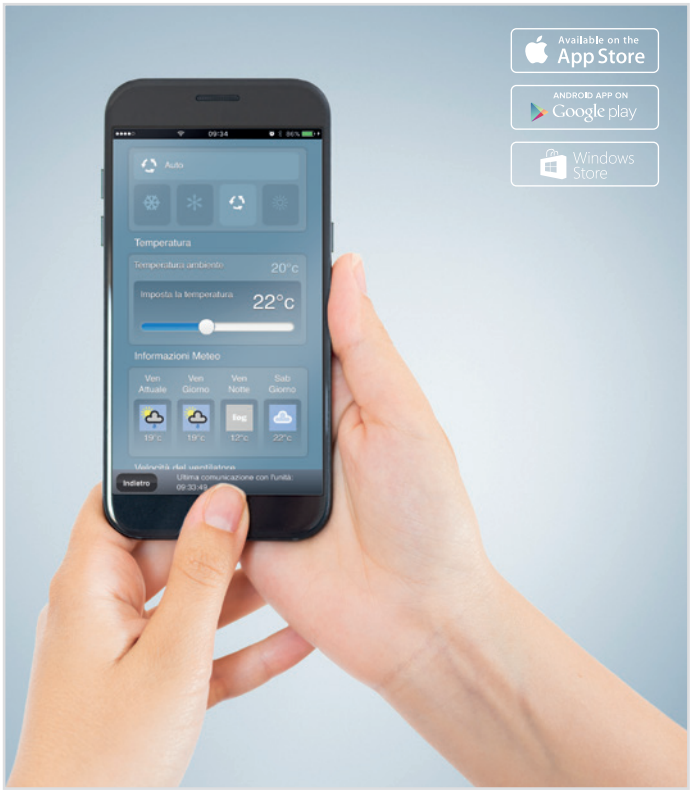
MELCLOUD CITY MULTI

CLOUD-BASED REMOTE MANAGEMENT AND SUPERVISOR SYSTEM

MELCloud, the Wi-Fi controller for VRF CITY MULTI systems.

MELCloud, the new Wi-Fi controller for your Mitsubishi Electric VRF system. By using the cloud for sending and receiving information and the dedicated Wi-Fi interface (MAC-567IF-E), you can now control your VRF system easily wherever you are from any PC, tablet or smartphone with an internet connection.
The MELCloud service has been designed to ensure complete compatibility with PCs, tablets and smartphones via dedicated apps or via a web browser

Registering the system
The system must be registered to activate the MELCloud service.
Once the interface is connected to the indoor unit and paired with the router, the system itself may be registered. To activate Wi-Fi control capability, simply access the website www.melcloud.com, sign up as a user and register the interface used. After registering, you will be able to take full advantage of the potential offered by the MELCloud service and manage your VRF system from any location over the internet.



Control functions for CITY MULTI indoor units

Main functions:

- On / Off
- Mode (Auto/Heat./Cool./Ventilation)
- Fan speed
- Programmable weekly timer
- Louvre angle setting
- View and set ambient temperature
- Local weather information

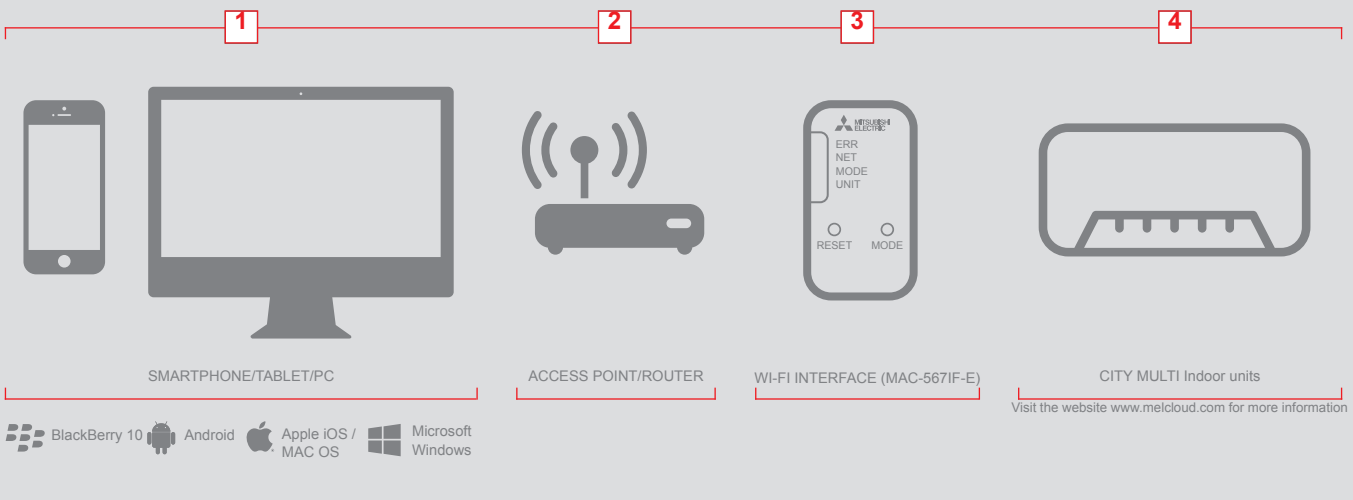
(availability of functions depends on the model of indoor unit connected to the controller)

Control functions for Lossnay ventilation systems

Main functions:

- On / Off
- Ventilation mode
- Fan speed
- Timer

MELCloud® CITY MULTI - SYSTEM ELEMENTS WWW.MELCLOUD.COM



REMOTE MONITORING INTERFACE

CLOUD REMOTE MANAGEMENT SYSTEM

The Cloud system by Mitsubishi Electric for large installations

The RMI system lets you control your air conditioning, heating and domestic hot water production system remotely from a smartphone, tablet or PC. The system may be used to monitor the performance of your appliances, programme functions, check consumption and view operating states to optimise the efficiency of the system.

Your perfect climate in an App!

Control your air conditioner, adjust temperature and air flow settings, view and manage hot and cold water production status and check for system faults.

ALL FROM AN APP ON YOUR SMARTPHONE OR TABLET.

Simplified control for all of your systems

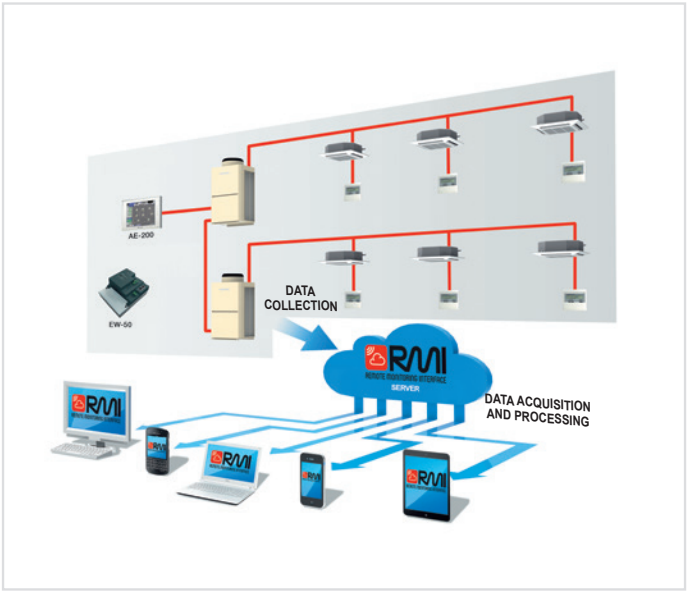
Set weekly programmes and special events, and view and analyse the operating parameters of your system remotely from a mobile device with a graphic interface that lets you change settings instantaneously when needed.

Manage your systems with detailed information and analytical functions

Manage multiple installations with different sizes and architectures conveniently from the application on your PC, view function parameters in a summarised dashboard interface, and analyse specifically created reports to make your installation work even more efficiently.
RMI is also the ideal solution for the centralized management and supervision of multiple installations in different locations.

System architecture

The 3D TOUCH Controller WEB Server centralized controller performs the crucial role of acquiring and monitoring data via the M-Net data transmission bus linking all the components of the VRF CITY MULTI, Mr. Slim or Residential system.
A router (available as wired ADSL or 3G Mobile versions) creates a secure, protected communication channel with the RMI Server. The modular flexibility of the RMI Server makes it possible to store enormous volumes of data, which is acquired, processed and archived for access from portable devices. This infrastructural complexity, combined with superior processing, management and security capabilities, is encapsulated in an extremely user friendly concept, to help users optimise the energy usage of their systems.



The project

The RMI project is the result of a forward thinking idea by Mitsubishi Electric to offer its customers the capability of managing their installations from portable devices, adding a significant new advantage offered by these systems. The all-new **RMI** system is the FIRST system of its kind based on **Cloud Computing** technology, which lets you interface with your system via a simple yet secure internet connection. RMI makes it possible to manage Mitsubishi Electric air conditioning solutions, with **energy consumption monitoring and maintenance functions**, from **smartphone** and **tablet** apps for the iOS and **Android** operating systems, and via a private **WEB Client** area **from a PC**. The RMI system is based on a dedicated infrastructure (RMI Server), which may be described as a container for installation data that is collected and made accessible **simply and intuitively**, and filtered and represented appropriately for the type of user analysing and using the data.
The project was designed from the start with security in mind, to protect the installation and the client against unauthorised access with a secure VPN connection (Virtual Private Network).

Who can use RMI?

Because of its many different functions, the RMI system is suitable for all types of installation, from centralized residential systems to commercial applications and large scale installations.
The remote management and monitoring functions are intended for end users (e.g. tenants), owners, administrators, energy/building managers, global service providers and installing and maintenance technicians.

RMI Service packages

RMI can also be applied to an existing VRF CITY MULTI system, by interfacing through the installation's existing WEB Server centralized controllers. Contact head office to check compatibility between hardware and available functions.

See DEMO RMI at:

http://demo-it.rmi.cloud

RMI IS AVAILABLE IN THE FOLLOWING PACKAGES

RMI SMART
REMOTE MONITORING INTERFACE

RMI ADVANCED
REMOTE MONITORING INTERFACE

RMI MULTI-TENANT
REMOTE MONITORING INTERFACE

RMI PLAN
REMOTE MONITORING INTERFACE

RMI CHARGE
REMOTE MONITORING INTERFACE

ADVANCED HVAC CONTROLLER

EXTERNAL SIGNAL INTEGRATION

AHC – Advanced HVAC controller

- Solution consists of an ALPHA2 PLC and an M-Net interface, both by Mitsubishi Electric.
- Intuitive object-based graphic programming function.
- Create control strategies using either physical signals (inputs and outputs) or logical signals (via M-Net data transmission bus).
- Receive signals from 2 Groups for a total of up to 32 indoor units for each PLC.
- Programme synchronised energy saving strategies between power consuming utilities (such as lighting) and the air conditioning system.
- 15 inputs and 9 outputs.
- Number of physical inputs and outputs may be increased with dedicated expansion modules.
- Large backlit LCD display for programming functions and viewing graphics, text and values.
- Direct programming with 8 function keys on front control panel without using auxiliary devices.
- Superior installation flexibility with integrated DIN rail adapter.
- System may be password-protected.
- Possibilità di proteggere il sistema mediante password.

Total integration

The AHC programmable controller uses Mitsubishi Electric know-how acquired in industrial automation applications to integrate air conditioning, heating and domestic hot water production systems with third party systems, such as access control, security, lighting control systems etc., allowing communication between the systems via the M-Net data communication bus.
This makes it possible, for example, to use data acquired via the M-Net communication bus to control external devices instead of interlocking the operation of air conditioner units and external systems connected to the AHC Programmable Controller, or using other similar measures.

Flexible programming…

Up to 200 function blocks can be used in a single application (Set/Reset, Timer, Service messages etc.), offering extraordinary scope for controlling the entire installation.

… and safe data!

The application is stored permanently in an EEPROM memory module. This means that active data (such as meter counts) are backed up without requiring power.

Extensive operating temperature range

Designed to operate in a temperature range from 25°C to 55°C and with an IP20 protection rating, these devices are ideal for both indoor and outdoor installation.

Digital and analogue expansion modules

Dedicated expansion modules offer the possibility of increasing the number of both analogue and digital inputs and outputs.

Digital

AL2-4EX:

offers 4 digital inputs

AL2-4EYT:

offers 4 digital outputs

Analogue

AL2-2PT-ADP:

offers 2 analogue inputs

AL2-2DA:

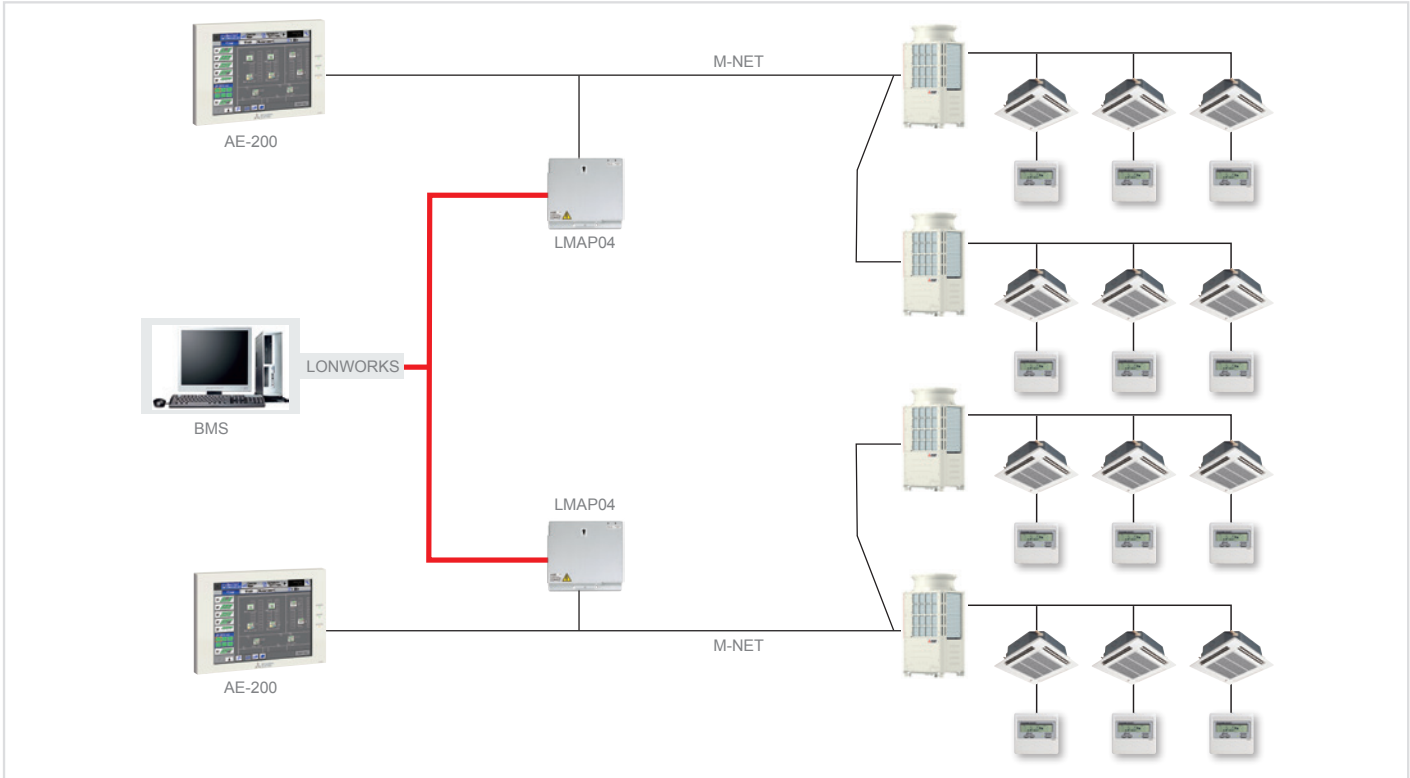
offers 2 analogue outputs

LMAP04

BMS INTERFACE FOR LONWORKS® NETWORKS

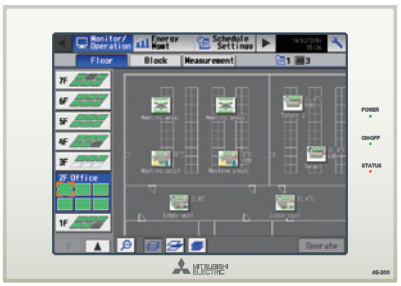
LMAP04 BMS interface for LonWorks® networks

The LMAP04 interface allows Mitsubishi Electric air conditioners to communicate with third party BMS supervisor and management systems through the LonWorks® network system. The hardware of the interface consists of an electronic board with software integrated in the board itself which needs no configuration.
The LMAP04 interface may be installed with any remote control or centralized controller of the Mitsubishi Electric range. The LMAP04 interface can also be used in a mixed system, which also includes the TG-2000A supervisor. Each LMAP04 interface can control up to 50 indoor units, each with its own unique address. In installations with AE-200E or EW-50 WEB Server centralized controllers, the LMAP04 interface offers the same modularity as the controllers themselves. In these cases, a separate interface must be installed for each centralized controller.



XML

BMS INTERFACE FOR ETHERNET NETWORKS

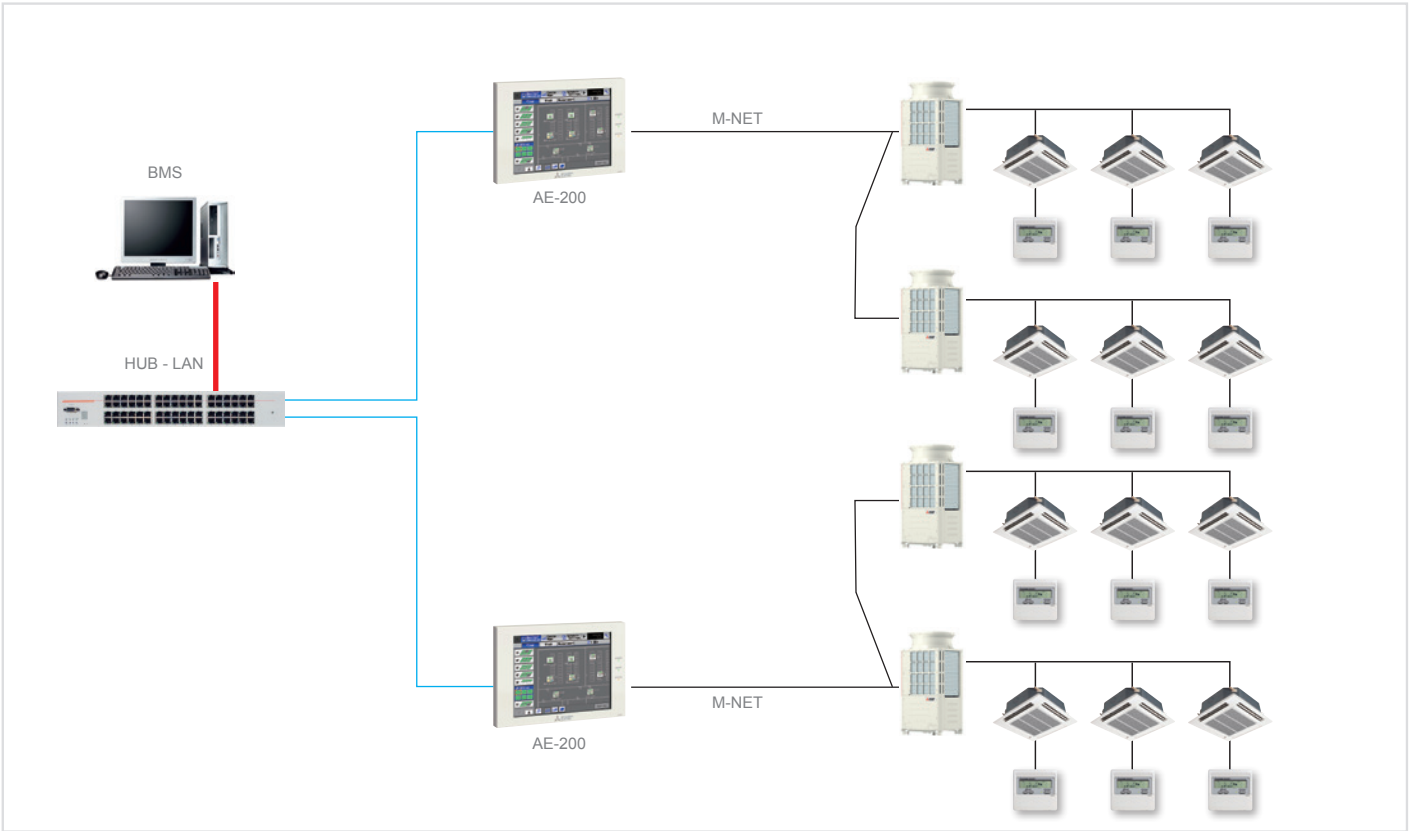


AE-200

EW-50

XML BMS interface for ethernet networks

XML is an innovative new communication system developed specifically for exchanging data over the web. XML makes it possible to create custom software extremely simply, which can even be used with a standard internet browser. The XML protocol makes it possible to integrate with a BMS system using the AE-200E or EW-50 WEB Server centralized controllers, with no additional dedicated hardware interfaces. As all the information necessary for the BMS system is available in XML format directly over the Ethernet communication port of the AE-200E / EW-50 controller, all that needs to be done is to connect both the AE-200E / EW-50 WEB Server centralized controllers and the BMS computer system to the same network. Connecting to a BMS system with the XML protocol is extremely simple, as the Ethernet network platform is used. No dedicated conversion or interface hardware is needed, as shown in the typical layout schematic.



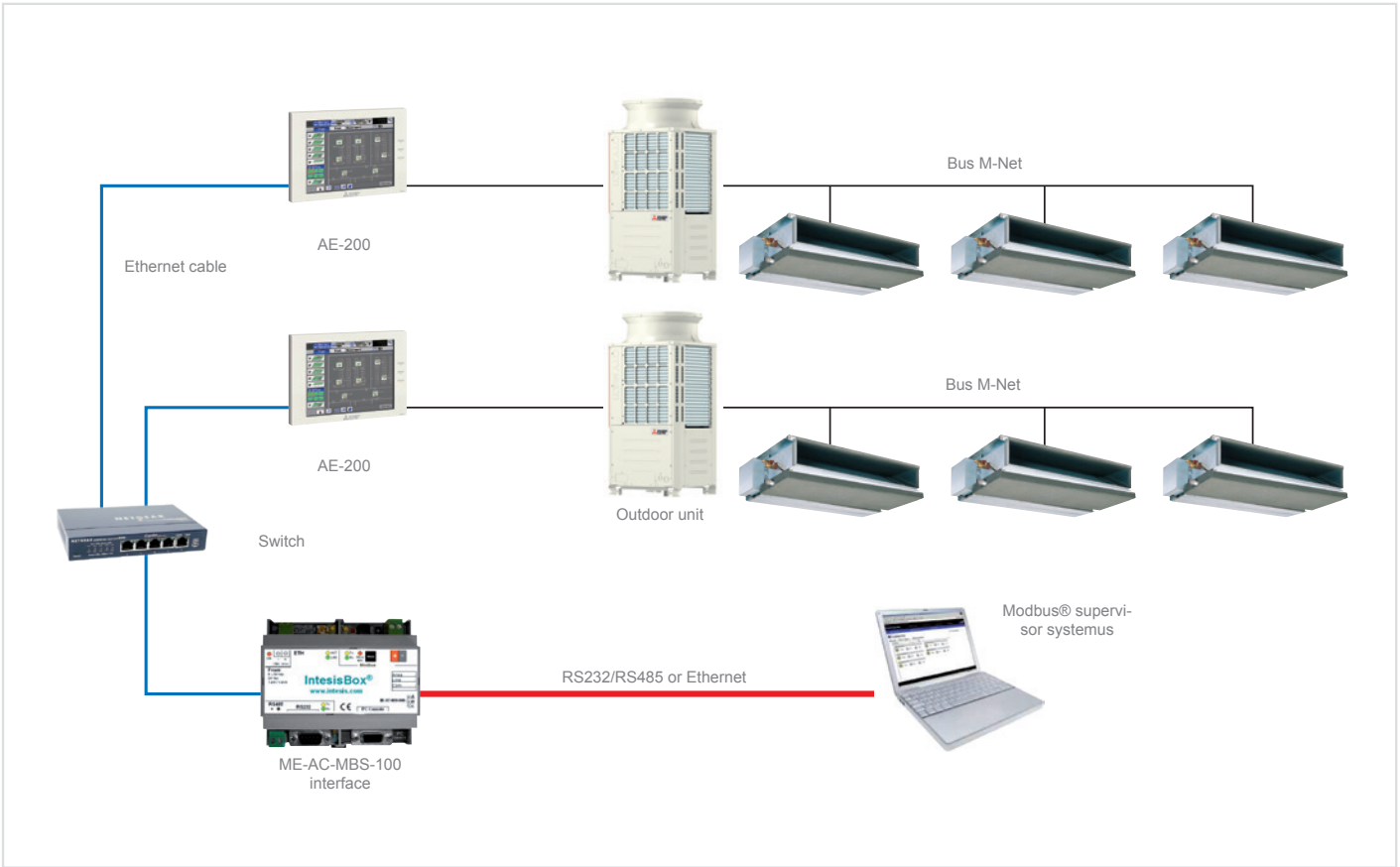
ME-AC-MBS-100

BMS INTERFACE FOR MODBUS® NETWORKS

ME-AC-MBS-100 – BMS interface for Modbus® networks

The Modbus communication protocol was initially used for PLC networks. Mitsubishi Electric offers an interface capable of controlling up to 100 indoor units (ME-AC-MBS-100) for managing a VRF CITY MULTI installation with a BMS system.

The interface is connected to the Modbus supervisor system either by an RS232/RS485 serial connection or a TCP/IP over Ethernet connection, and is connected to the Mitsubishi Electric VRF CITY MULTI installation by Ethernet.

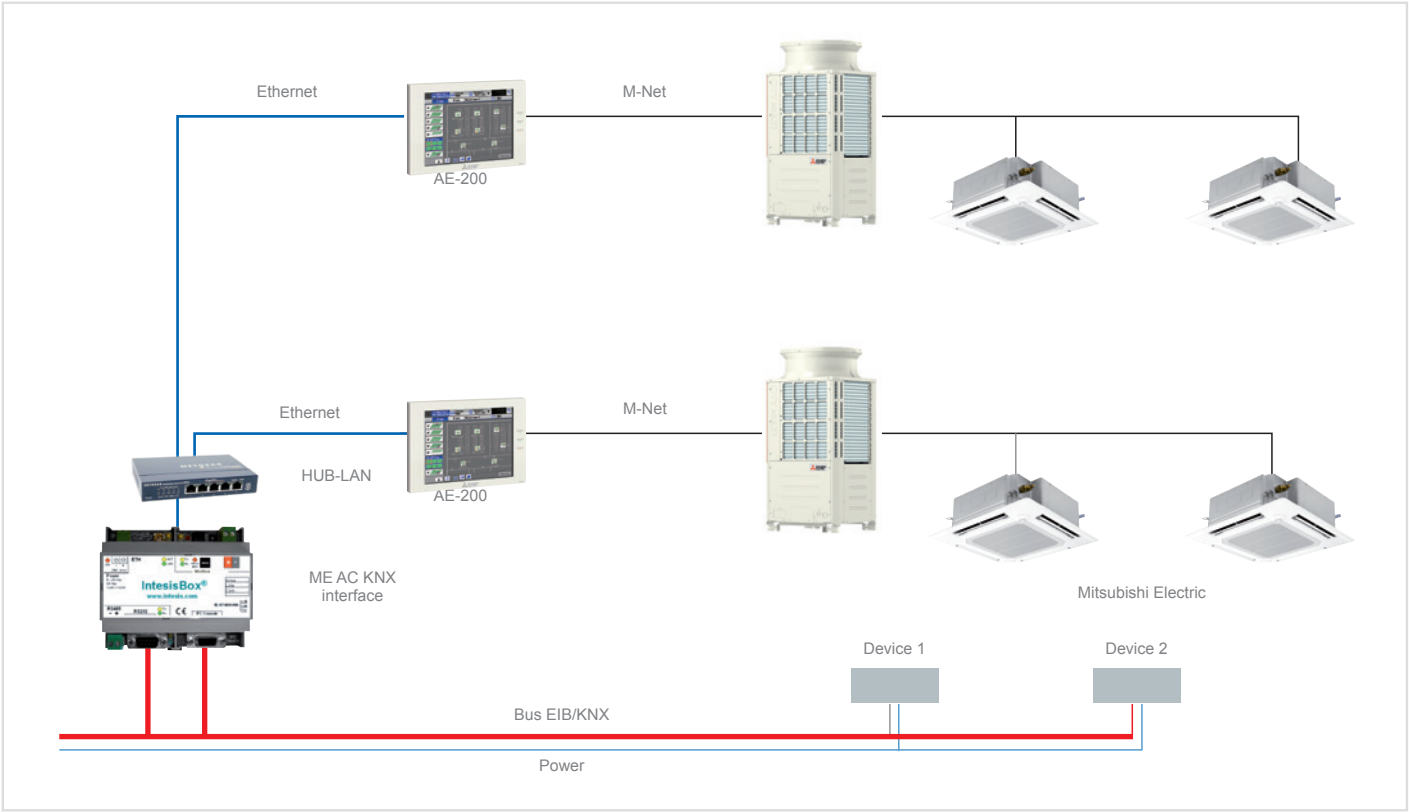


ME-AC-KNX-100

BMS INTERFACE FOR KNX® NETWORKS

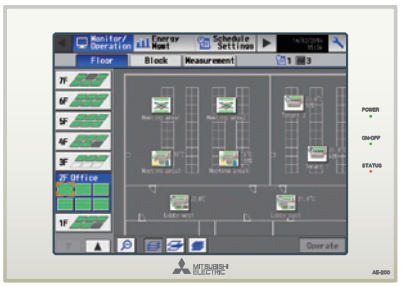
ME-AC-KNX-100 – BMS interface for KNX® networks

KNX is one of the global standards for automated household and building control. This open protocol ensures cross-compatibility between products from different manufacturers. Mitsubishi Electric offers an interface capable of controlling up to 100 indoor units (ME AC KNX – 100) for managing a VRF CITY MULTI installation with a BMS system.
The interface is connected directly to the EIB bus linked to the KNX network, and to the Mitsubishi Electric VRF CITY MULTI installation by Ethernet.



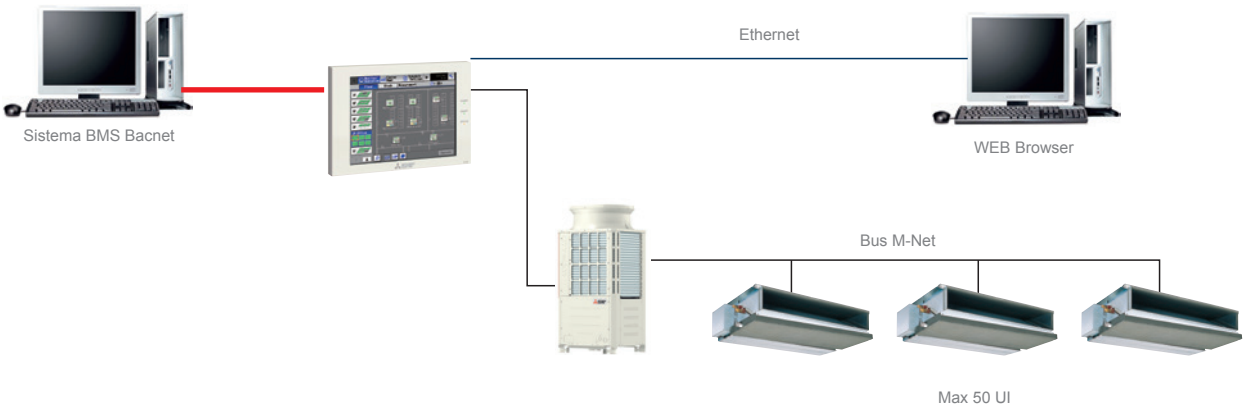
BACnet® PIN CODE

BMS INTERFACE FOR BACNET® NETWORKS



BACnet® PIN code

The BACnet® protocol was originally developed by ASHRAE in North America specifically for HVAC applications (Heat, Ventilation, Air Conditioning). It was subsequently also adopted in Europe as one of the standard communication solutions for air conditioning systems, together with LonWorks® and other protocols. One of the greatest advantages of this protocol is the extraordinary degree of cross-compatibility it offers, allowing systems from different manufacturers to be integrated with each other. New BACnet PIN code allows communication between Mitsubishi Electric system and BACnet BMS network with the same monitoring information and settings which were available with BAC-HD150. **BACnet PIN code is available only for WEB Server 3D centralized controls** (AE-200, EW-50). Physical connection is via Ethernet cable through a dedicated port on centralized control. Thanks to new BACnet PIN code it is possible to remove one hardware component (BAC-HD150) from the system, simplifying its structure and removing one potential source of malfunction. Each centralized control equipped with BACnet PIN code is able to handle up to 50 indoor units and 50 groups.



Applied Hydronic systems

ME-series
Modular Chillers and heat pumps

Formidable.
In every aspect.

ME-series R32

Air source chillers and reversible heat pumps with Mitsubishi Electric variable speed scroll compressors and R32 low GWP refrigerant.
From 50 to 220 kW.

MECH-iS-G07 | MEHP-iS-G07

1 2 3 4 5 | 1 2 3 4 5

Brand	1	**ME** - Mitsubishi Electric
Unit type	2	**CH** - Chiller unit **HP** - Heat pump unit
Technology	3	**i** - Inverter driven
Compressor type	4	**S** - Scroll
Refrigerant	5	

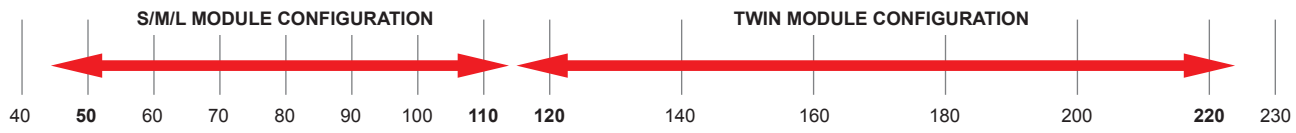
NEW

MECH-iS-G07 and MEHP-iS-G07 are the new Mitsubishi Electric chiller and heat pump ranges designed with the utmost care in terms of quality and details. Dedicated to different applications, from comfort to industrial or IT cooling processes, MECH-iS-G07 and MEHP-iS-G07 achieve top-level energy efficiencies, in the most compact footprints in their category.

Extended range

7 new sizes developed in 3 compact modules to fit any thermal load request up to 110 kW, extendable up to 220 kW through the optional twin module configuration, the connection of two modules of the same size.

CAPACITY RANGE



Cooling capacity [kW]

S MODULE
50 / 60 / 70 kW

M MODULE
80 / 90 kW

L MODULE
100 / 110 kW

Key technologies

Electrical Control Box

W3000+ control software, available with standard keyboard or touch screen, features proprietary settings, to perfectly manage each single product dynamic.

Compact keyboard (STD)

7 inch touch screen
(opt.)

KIPLink (opt.)
Full access by simply scanning the QR code

Complete Hydronic Kit Options

Factory-installed several pumps (with VPF options) and buffer tank (opt.)

Slingle-head
in-line pump

Twin-head
in-line pump

Source side heat exchanger

V-shape micro-channel coils for chillers and Cu/Al coils for heat pumps with several optional coil types and treatments available.

Complete Fan assembly

with high-efficiency EC fans as std

Inverter scroll compressors

with acoustical enclosure as std

Fans & Compressors' drivers

EMI filters and DC reactors included

Mitsubishi Electric quality

MECH-iS-G07 and MEHP-iS-G07 ranges have been perfectly designed to achieve the highest quality standards, adopting the Japanese Poka Yoka technique.

Poka-yoke

The 'Zero Defects' idea

Poka Yoke is a Japanese term that means "mistake-proofing" approach applied on the equipment manufacturing processes. This implies activities that help an equipment operator avoid (yokeru) mistakes (poka) and defects, and the selection of technological choices that make maintenance activities as easy as possible.

Scroll compressor

- Proprietary Mitsubishi Electric compressor
- VSD compressor with BLDC motor for outstanding seasonal efficiencies
- Motor's shape designed to reduce vibrations and to assure the lowest sound power emissions
- Injection gas refrigerant into compressor with medium temperature for increased capacity and efficiency
- All rotating parts are designed to guarantee absolute reliability in every operating condition
- Unrivalled operating map to suit every kind of application: Comfort, Process or IT Cooling without any limitation

SCROLL COMPRESSOR

COMPRESSOR CONFIGURATIONS

i = inverter

S MODULE

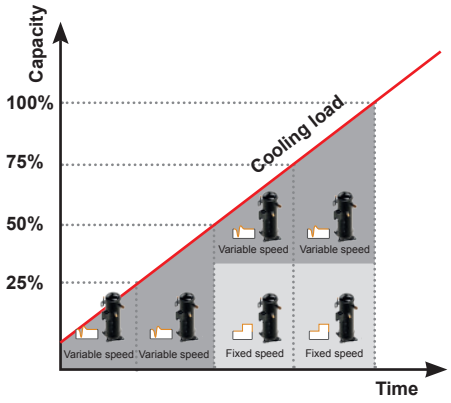
1+i = 1 x inverter
1 x on/off

M MODULE

1+i = 1 x inverter
1 x on/off

L MODULE

VSD single-compressor or **VSD solution (1+i) tandem configuration,** Mitsubishi Electric proprietary technology

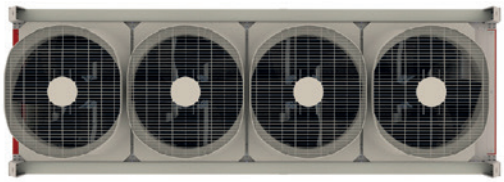


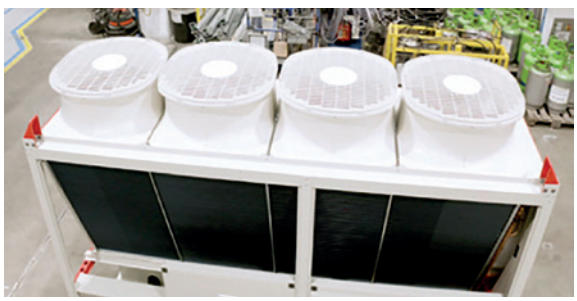
- High seasonal efficiency
- Stable leaving water temperature
- Continuous capacity modulation
- Perfect and accurate load delivery in all working conditions

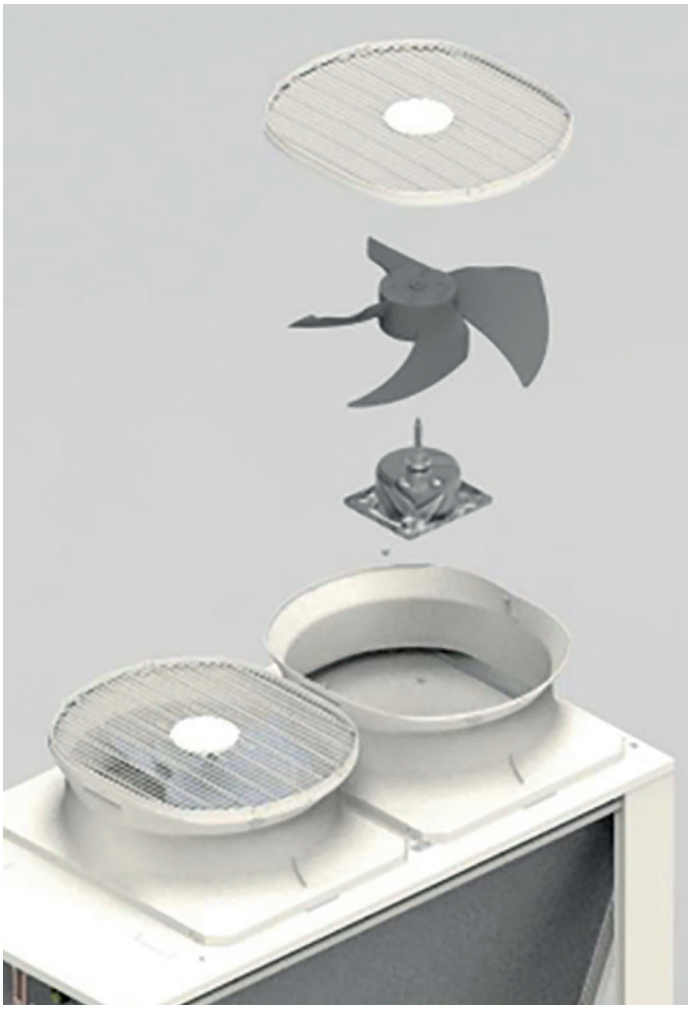
Axial fan

High performing, 700mm-diameter variable speed axial fans (with inverter driven BLDC motor).
Fan, fan motor, inverter and the layout of the external bell mouth are Mitsubishi proprietary technologies, for the highest efficiency and very low sound power levels.
High-end-components designed to achieve very high efficiencies, minimizing the sound level of the unit.
POKA-YOKE Philosophy: smart design in order to avoid mistakes during assembly operations and to simplify maintenance operations. Quick couplers for fans for an easier and quick connection.

AXIAL FAN







Why R32?

MECH-iS-G07 and MEHP-iS-G07 with R32 refrigerant are key in the company's path towards the creation of a greener future

The reduced GWP level of this refrigerant gas tackles both direct and indirect global warming, offering customers a concrete forward-looking solution for your building and a concrete alternative to traditional refrigerants.

R32

Low GWP
-66% GWP vs R410A

Safety Class A2L

Reduced Environmental Impact

- ODP - Ozone Depletion Potential
- One-third GWP that R410A
- F-Gasphasedown compliant

Performance & Envelope

- Ideal for the next generation of equipment
- Requires less refrigerant volume per kW
- High refrigeration and thermal conductivity
- Low pressure drops
- Affordable and readily available

Reliability

- Easy to handle, reuse, and recycle
- Low toxicity, low flammability
- A single component refrigerant

Designed down to a fine art

Groundbreaking performance. Especially in partial load

A

MECH-iS-G07 and MEHP-iS-G07 bring brilliant performance, particularly in partial load conditions, thus helping individuals and business reduce the energy bill of their HVAC system.

MECH-iS-G07			
up to	**EER:** 3.3	**SEER:** 5.6	**SEPR HT:** 6.5

EER – conditions: evap. 12/7 C, air 35 C – NET values [EN14511 – EN14825]
SEER – Regulation (EU) N.2281/2016
SEPR-HT – Regulation (EU) N.2281/2016

MEHP-iS-G07				
up to	**COP:** 3.4	**SEER:** 4.6	**SCOP LT:** 4.6	**SCOP MT:** 3.5

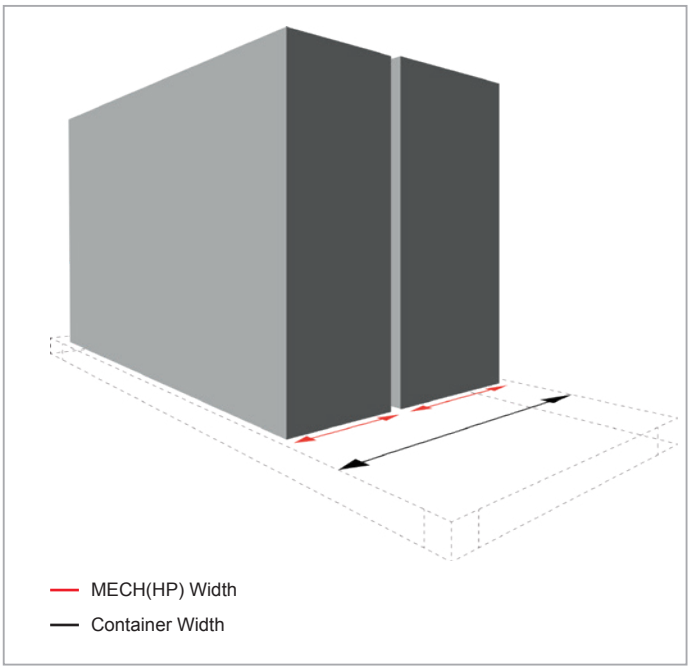
COP – conditions: cond. 40/45 C, air 7(6) C – NET values [EN14511 – EN14825]
SCOP LT – Regulation (EU) N.813/2013
SCOP MT – Regulation (EU) N.813/2013

Supreme class quietness

Best-in-class sound levels without additional accessories. MECH-iS-G07 and MEHP-iS-G07 units are equipped as standard with the acoustical enclosure for compressors and hydronic kits.

Best-in-class footprint

Extremely compact footprint, among the best in the category. The reduced width of the units is ideal for multi-unit transportation, optimizing the shipping spaces and shipment via container.

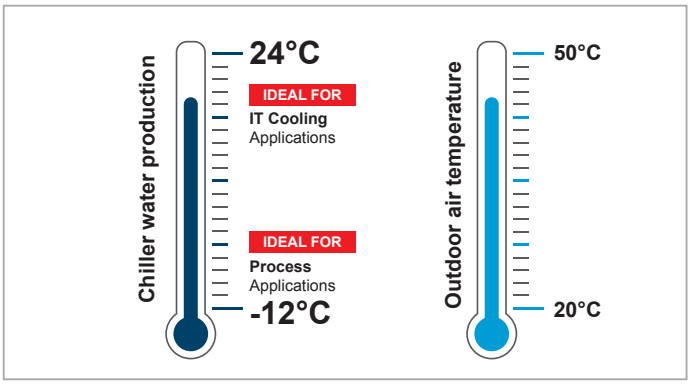


Wide operating range

Going beyond ordinary limits of standard heat pumps and chillers, MECH-iS-G07 and MEHP-iS-G07 ranges achieve extreme water temperatures, making these units ideal for many uses from Comfort to Process and IT Cooling applications.

Matching mission critical applications requirements

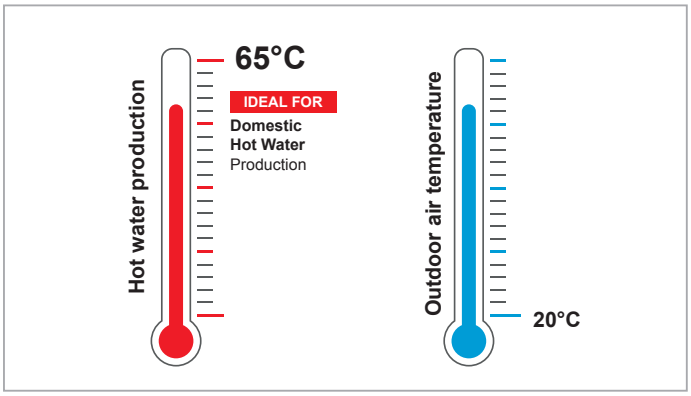
MECH-iS-G07 can operate with outdoor temperatures up to **+50 C** and chilled water temperatures from **-12 C** to **+24 C**, significant values which make these units ideal for Process and IT Cooling applications.



One unique unit for heating, cooling and producing hot water

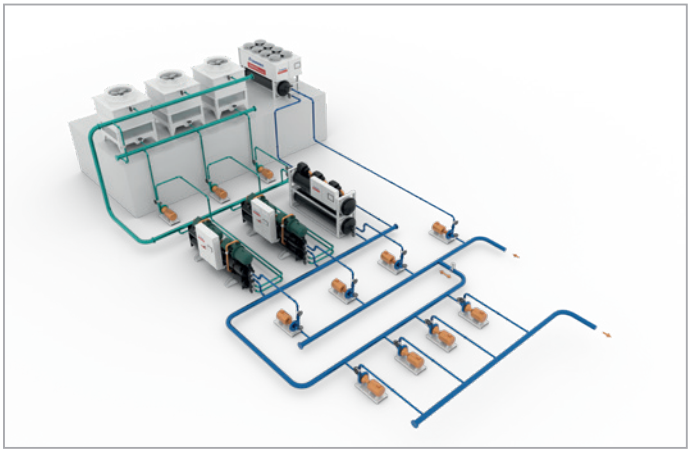
MEHP-iS-G07 can produce, alone and without any auxiliary accessory, both medium temperature water for space heating and cooling, and hot water for domestic use up to 65 C. These key features make MEHP-iS-G07 an interesting alternative for classic gas or fuel oil heating systems.

- Use of renewables sources
- Considerable energy savings
- Green footprint



Group control systems integrated solutions

LAN MULTI MANAGER



Architecture	Exploits proprietary LAN technology to connect a group of chillers and heat pumps.
Interfacing	Completely integrated in the units.
Applications	**• Multi Manager** Comfort, Process and IT Cooling applications. Chillers and heat pumps. **• HPC** **IT cooling** applications. Chillers and CRAHs (Computer Room Air Handlers)
Function	Smart management of the group of units with dynamic master logic, stand-by management, load and resource management.

Smart coordinated defrost

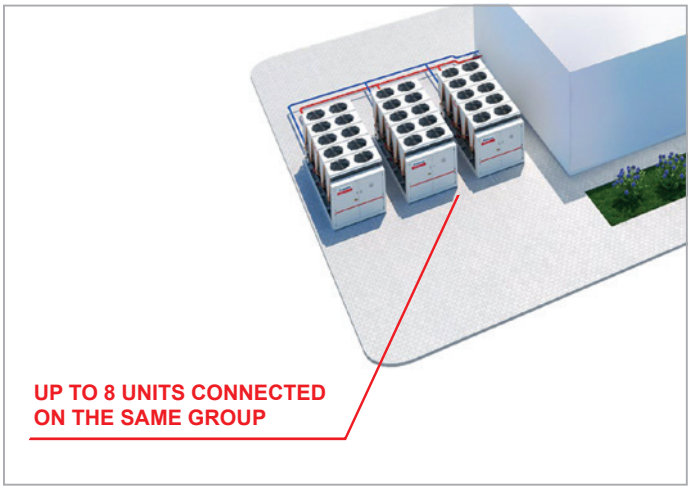
Smart control logic for coordinating the non-simultaneous start of defrosting cycles of a group of heat pumps:

- Minimization of the energy required for defrost
- Increase of the maximum heat output of the system which can be constantly supplied
- Increased system efficiency
- Minimum impact on leaving water temperature

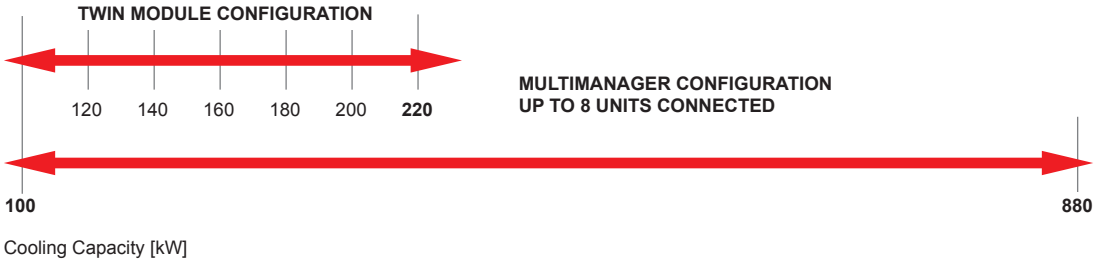
Multimanager

With opt. 1541 and 1542 – MULTI MANAGER, MECH-iS and MEHP-iS ranges feature **embedded LAN logics for an easy connection between group of units.** The entire cooling equipment works as one, with **one master unit that coordinate and optimize the operation of the unit group**:

- **Up to 8 units connected on the same group**
- **Load sharing and Sequencing logics f**or the smart distribution of thermal loads among the units
- **No simultaneous start-ups of different unit's compressors,** to prevent dangerous current peaks, but a selectable units' start-up sequence
- **Stand by unit management with automatic unit rotation.**
- **Dynamic master with succession priority:** one master unit is elected to coordinate the equipment group and once it becomes disconnected, the candidate unit takes full control.
- **Resource prioritymanagement:** In case of a varying group of units, with different technologies, it is possible to set the usage priority of each unit, making the most of the available thermal resources.

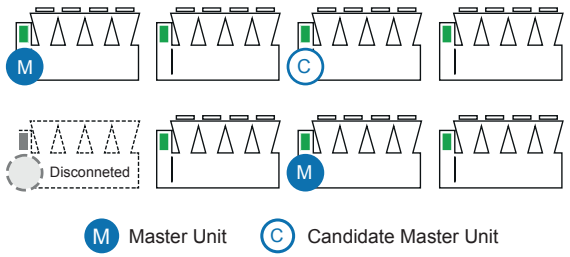


RANGE EXTENSION UP TO 880KW.MAXIMUM EFFICIENCY ON PARTIAL LOADS CONDITIONS.



Dynamic master with succession priority

One master unit is elected to coordinate the equipment group and once it becomes disconnected, the candidate unit takes full control.



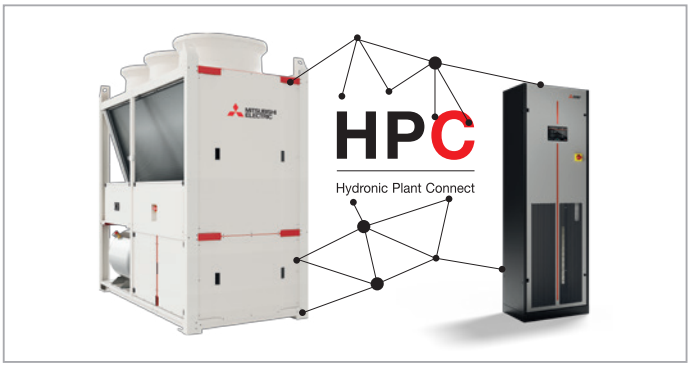
Resource priority management

In case of a varying group of units, with different technologies, it is possible to set the usage priority of each unit, making the most of the available thermal resources.

HPC (Hydronic Plant Connect)

System approach: Chillers + CRAHS

A complete Mitsubishi Electric cooling package dedicated to your high efficiency data center.**Up to 20 groups of CRAHs are connected to the group of chillers.**
Proprietary LAN network for the optimization of the entire cooling system: CRAHs, chillers, FC availability, fans, pumps, and valves.



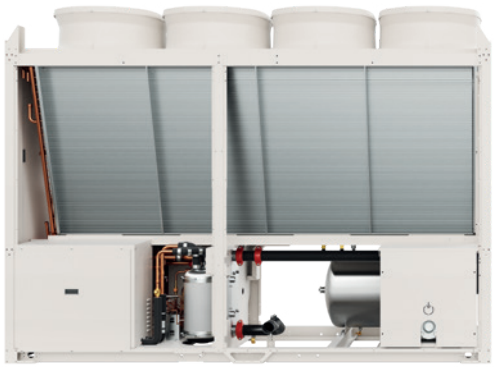
Main options

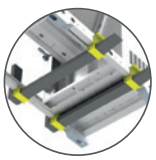
Energy Meter for BMS Energy Meter for W3000+	Acquires the electrical data and the power absorbed by the unit. Data is sent to the BMS or directly readable on the unit keyboard.
Thermal Energy Meter	Evaluates the cooling/heating capacity delivered by the unit.
External Capacity Cap	This option controls the maximum capacity output of the unit and it's ideal for full inverter or hybrid units.
Hydrophilic Treatment	Source side heat exchanger treatment that allows water droplets to flow off the surface (MEHP-iS-G07 only).
Hydronic Kits	Low or high head, fixed or variable speed, single or twin pumps and buffer tank always integrated in the unit.
Auxiliary Source and DHW Management	Functions for plants requiring the production of DHW in a storage tank. (MEHP-iS-G07 only).
Multifunction Card	Night mode, hydraulic decoupler probe for pump activation and User Limit Control Function.
Modular Installation Kit	Two modules of the same size can be connected thanks to a dedicated kit: • structural and mechanical connection for reinforcement and safety • hydraulic connections • a software connection through multi-unit multi manager control

Simplified operations during installation, commissioning and service of the units

Thanks to an accurate design it was possible to include with meticulous detail every mechanical and electrical component for an easier and more effective maintenance.

EASY AND EFFECTIVE MAINTENANCE OPERATIONS





Forklift brackets for lateral handling of the units

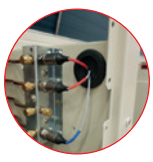
Extremely easy power cable connection thanks to the precise design of the structure with the front entrance or from the basement of the unit and a convenient direct connection to the electrical connectors

In and out hydraulic connections label directly printed on the metal frame

The electrical power panel is separated from the electrical control panel and from the compressor and fans drivers box

EASY AND EFFECTIVE MAINTENANCE OPERATIONS

Hinged speed drivers boxes for an easier access to each internal component



Easy access to the service points

Quick electrical couplings for fans

Huge benefits for every kind of application

Comfort applications

- Top-level performance at partial loads
- Extremely silent and compact unit
- Large operating map down to -20 C of outdoor air temperature; up to 65 C of hot water pr oduction in heat pump mode
- Plug & Play solution, thanks to integrated pumps kit + buffer tank
- Domestic Hot Water production (for MEHP-iS-G07)
- Optimized for heating mode (MEHP-iS-G07)

Process Applications

- Large operating map down to -12 C of evaporator leaving water temperature and down to -20 C of outdoor air temperature
- Extremely high reliability components
- Fully accessible service points for an easier maintenance
- Refrigerant leak detection options available
- Several coil solutions including e-coated microchannel, Cu/Al, pre-painted fins, fin guard silver and hydrophilic treatments (for MEHP-iS-G07)

IT Cooling applications

- MECH-iS-G07 combined with w-MEXT creates a complete Mitsubishi Electric System ideal for small and medium data centers
- High leaving water temperature up to 24 C
- LAN functions with up to 8 units
- HPC software for optimizing the entire chillers

+ CRAHs systems

- Wide option availability ideal for this kind of application (demand limit, external capacity cap, thermal energy meter)

Factory acceptance

Factory acceptance test experience

Test your heat pump before installation and make sure its performance is totally reliable.

Factory acceptance test

Factory Acceptance Test is available as additional service in order to test the unit under specific conditions.
Carried out within modern and sophisticated facilities, this service gives the customer the possibility to choose among different test options in order to:

- Verify unit operation under severe conditions
- Check performance, both at full and partial loads
- Test the unit with low outdoor air temperature operation
- Detect sound emissions
- Time the fast restart

GENERAL TECHNICAL DATA

MECH-iS-G07			0051	0061	0071	0082	0092	0102	0112
Power supply	(1)	V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
PERFORMANCE									
COOLING ONLY (GROSS VALUE)									
Cooling capacity	(1)	kW	50,09	60,11	70,14	80,14	90,23	100,2	110,2
Total power input	(1)	kW	15,16	19,13	26,89	26,24	32,57	31,43	37,90
EER	(1)	kW/ kW	3,296	3,147	2,606	3,057	2,767	3,191	2,908
COOLING ONLY (EN14511 VALUE)									
Cooling capacity	(1)(4)	kW	50,00	60,00	70,00	80,00	90,00	100,00	110,00
EER	(1)(4)	kW/ kW	3,280	3,110	2,580	3,020	2,740	3,150	2,870
COOLING WITH PARTIAL RECOVERY									
Cooling capacity	(5)	kW	51,97	62,36	72,77	83,15	93,61	104,00	114,30
Total power input	(5)	kW	14,66	18,50	25,99	25,37	31,48	30,39	36,64
Desuperheater heating capacity	(5)	kW	12,68	16,19	23,11	22,16	27,82	26,37	32,15
EXCHANGERS									
HEAT EXCHANGER USER SIDE IN COOLING									
Water flow	(1)	l/s	2,395	2,874	3,354	3,833	4,315	4,792	5,270
Pressure drop at the heat exchanger	(1)(4)	kPa	15,6	22,5	30,6	23,6	29,9	28,3	34,2
PARTIAL RECOVERY USER SIDE IN REFRIGERATION									
Water flow	(1)	l/s	0,612	0,781	1,116	1,070	1,343	1,273	1,552
Pressure drop at the heat exchanger	(1)	kPa	8,57	14,0	28,5	12,9	20,4	12,9	19,1
PERFORMANCE									
COOLING ONLY (GROSS VALUE)									
16°C/10°C									
Cooling capacity	(2)	kW	54,69	65,32	75,82	87,60	98,20	109,4	120,1
Total power input	(2)	kW	15,47	19,61	27,69	26,82	33,41	32,06	38,73
EER	(2)	kW/ kW	3,529	3,332	2,736	3,269	2,940	3,408	3,103
23°C/15°C									
Cooling capacity	(3)	kW	62,37	73,93	85,00	100,1	111,5	124,7	136,4
Total power input	(3)	kW	15,86	20,25	28,85	27,55	34,52	32,81	39,78
EER	(3)	kW/ kW	3,925	3,640	2,941	3,640	3,232	3,802	3,427
EXCHANGERS									
16°C/10°C									
Water flow	(2)	l/s	2,181	2,605	3,024	3,494	3,917	4,362	4,788
Pressure drop at the heat exchanger	(2)	kPa	12,9	18,5	24,9	19,6	24,7	23,4	28,2
23°C/15°C									
Water flow	(3)	l/s	1,868	2,215	2,546	2,999	3,339	3,735	4,086
Pressure drop at the heat exchanger	(3)	kPa	9,50	13,3	17,6	14,5	17,9	17,2	20,6
REFRIGERANT CIRCUIT									
Compressors nr.		N°	1	1	1	2	2	2	2
Number of capacity steps		N°	0	0	0	0	0	0	0
No. Circuits		N°	1	1	1	1	1	1	1
Regulation			Stepless	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless
Min. capacity step		%	27	27	27	22	22	20	20
Refrigerant			R32	R32	R32	R32	R32	R32	R32
Theoretical refrigerant charge		kg	8,00	8,00	8,00	11,0	11,0	13,0	13,0
Oil charge		kg	3,50	3,50	3,50	7,00	7,00	7,00	7,00
Rc (ASHRAE)	(6)	kg/kW	0,16	0,13	0,12	0,14	0,12	0,13	0,12
FANS									
Quantity		N°	2	2	2	3	3	4	4
Air flow		m^3/s	6,86	7,01	7,01	9,84	9,84	12,97	12,97
Total fans power input		kW	0,96	1,00	1,00	1,41	1,41	1,88	1,88
NOISE LEVEL									
Total sound Pressure	(7)	dB(A)	45	46	48	48	49	50	50
Total sound power level in cooling	(8)(9)	dB(A)	77	78	80	80	81	82	82
SIZE AND WEIGHT									
A	(10)	mm	2085	2085	2085	2600	2600	3225	3225
B	(10)	mm	1100	1100	1100	1100	1100	1100	1100
H	(10)	mm	2400	2400	2400	2400	2400	2400	2400
Operating weight	(10)	kg	630	630	630	830	830	940	940

Notes:
1 Plant (side) cooling exchanger water (in/out) 12,00°C/7,00°C; Source (side) heat exchanger air (in) 35,0°C.
2 Plant (side) cooling exchanger water (in/out) 16,00°C/10,00°C; Source (side) heat exchanger air (in) 35,0°C.
3 Plant (side) cooling exchanger water (in/out) 23,00°C/15,00°C; Source (side) heat exchanger air (in) 35,0°C.
4 Values in compliance with EN14511
5 Plant (side) cooling exchanger water (in/out) 12,00°C/7,00°C; Source (side) heat exchanger air (in) 35,0°C; Plant (side) heat exchanger recovery water (in/out) 40,00°C/45,00°C.
6 Rated in accordance with AHRI Standard 550/590
7 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
8 Sound power on the basis of measurements taken in compliance with ISO 9614.
9 Sound power level in cooling, outdoors.
10 Unit in standard configuration, without optional accessories.

TECHNICAL DATA SEASONAL EFFICIENCY IN COOLING (EN14825 VALUE)									
MECH-iS-G07			**0051**	**0061**	**0071**	**0082**	**0092**	**0102**	**0112**
SEASONAL EFFICIENCY IN COOLING (REG. EU 2016/2281) AMBIENT REFRIGERATION									
Prated,c	(1)	kW	50,0	60,	70,0	80,0	90,0	100,0	110,0
SEER	(1)(2)	-	5,29	5,28	4,98	5,15	5,12	5,32	5,29
Performance ηs	(1)(3)	%	209,0	208,0	196,0	203,0	202,0	210,0	209,0

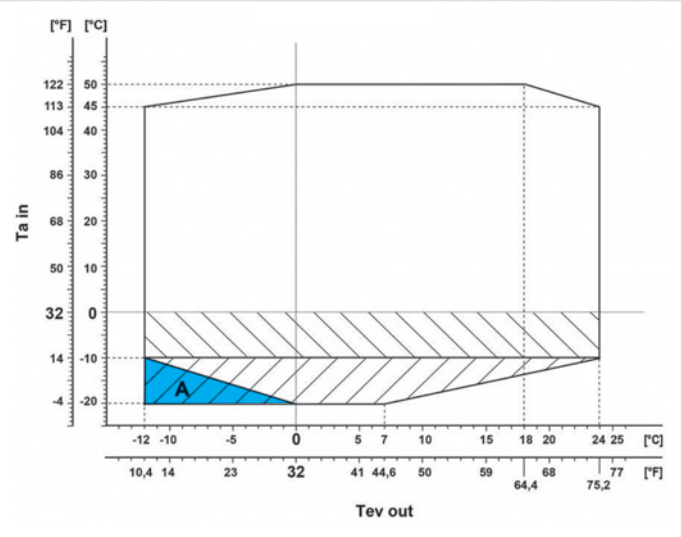
Notes:
(1) Parameter calculated according to [REGULATION (EU) N. 2016/2281]
(2) Seasonal energy efficiency ratio
(3) Seasonal space cooling energy efficiency
The units highlighted in this publication contain R32 [GWP100 677] fluorinated greenhouse gases.

TECHNICAL DATA SEASONAL EFFICIENCY IN COOLING (EN14825 VALUE)									
MECH-iS-G07			**0051**	**0061**	**0071**	**0082**	**0092**	**0102**	**0112**
SEASONAL EFFICIENCY IN COOLING (REG. EU 2016/2281) HIGH TEMPERATURE PROCESS COOLING									
Prated,c	(1)	kW	50,0	60,0	70,0	80,0	90,0	100,0	110,0
SEPR HT	(1)(3)	-	6,29	5,96	5,18	6,27	6,04	5,98	5,89

Notes:
1 Seasonal energy efficiency of high temperature process cooling [REGULATION (EU) N. 813/2013]
3 Seasonal space cooling energy efficency

OPERATING LIMITS - GRAPHS

COOLING MODE



Ta in Outdoor air temperature
Tev out Evaporator leaving water temperature

Required: Antifreeze heaters on pipes (opt. 2431)
Antifreeze heaters on pipes, pumps*, and buffer tank* (opt. 2432 or 2433) *if present.

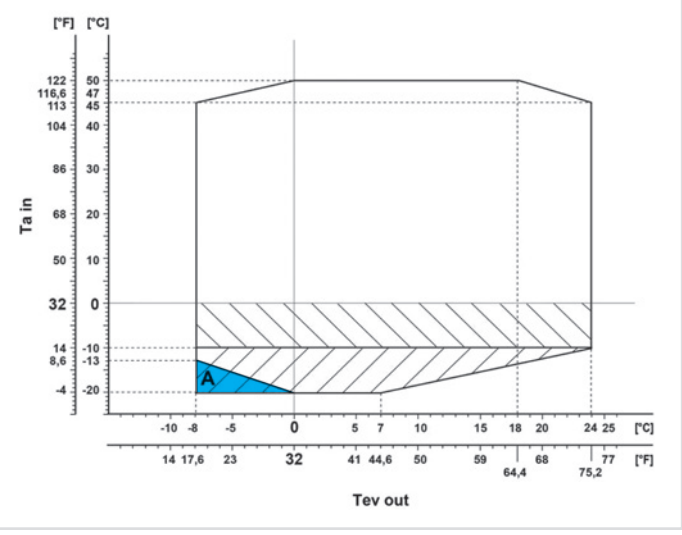
Required: Antifreeze heaters on pipes (opt. 2431)
Antifreeze heaters on pipes, pumps*, and buffer tank* (opt. 2432 or 2433) *if present.
Extra insulation on heat exchangers (opt. 2641)

A — Operation betwen -10 °C / 14 °F and -20 °C / -4 °F of outdoor air temperature is allowed for wind protected installations (wind speed lower than 2 m/s - 6,56 ft/s)

In particular operating conditions the unit can work with forced ventilation, at partial loads or with derating compressors. For any specific information please referto the ElcaWorld software selection.

For the specific temperature limits of each model please refer to the selection software ElcaWorld.

COOLING MODE /D VERSION



Ta in Outdoor air temperature
Tev out Evaporator leaving water temperature

Required: Antifreeze heaters on pipes (opt. 2431)
Antifreeze heaters on pipes, pumps*, and buffer tank* (opt. 2432 or 2433) *if present.

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In particular operating conditions the unit can work with forced ventilation, at partial loads or with derating compressors. For any specific information please referto the ElcaWorld software selection.

For the specific temperature limits of each model please refer to the selection software ElcaWorld.

GENERAL TECHNICAL DATA

MEHP-iS-G07			0051	0061	0071	0082	0092	0102	0112
Power supply	(1)	V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
PERFORMANCE									
COOLING ONLY (GROSS VALUE)									
Cooling capacity	(1)	kW	48,10	53,11	60,09	68,39	74,18	85,99	93,98
Total power input	(1)	kW	17,00	19,95	25,48	24,91	30,10	31,86	37,61
EER	(1)	kW/kW	2,829	2,668	2,357	2,747	2,465	2,696	2,500
COOLING ONLY (EN14511 VALUE)									
Cooling capacity	(1)(2)	kW	48,00	53,00	60,00	68,30	74,10	85,90	93,80
EER	(1)(2)	kW/kW	2,810	2,640	2,340	2,730	2,450	2,680	2,480
HEATING ONLY (GROSS VALUE)									
Total heating capacity	(3)	kW	49,92	59,86	69,87	79,89	89,85	100,1	110,0
Total power input	(3)	kW	14,39	17,65	21,98	23,95	28,53	29,65	34,19
COP	(3)	kW/kW	3,465	3,403	3,177	3,343	3,151	3,382	3,216
HEATING ONLY (EN14511 VALUE)									
Total heating capacity	(3)(2)	kW	50,00	60,00	70,00	80,00	90,00	100,3	110,3
COP	(3)(2)	kW/kW	3,440	3,380	3,150	3,320	3,120	3,350	3,180
COOLING WITH PARTIAL RECOVERY									
Cooling capacity	(4)	kW	49,90	55,10	62,34	70,95	76,96	89,22	97,50
Total power input	(4)	kW	16,44	19,28	24,62	24,09	29,10	30,81	36,36
Desuperheater heating capacity	(4)	kW	14,39	17,02	21,96	20,98	25,61	26,76	31,89
EXCHANGERS									
HEAT EXCHANGER USER SIDE IN COOLING									
Water flow	(1)	l/s	2,300	2,540	2,874	3,270	3,547	4,112	4,494
Pressure drop at the heat exchanger	(1)	kPa	14,4	17,6	22,5	17,2	20,2	20,8	24,9
HEAT EXCHANGER USER SIDE IN HEATING									
Water flow	(3)	l/s	2,410	2,889	3,373	3,856	4,337	4,832	5,311
Pressure drop at the heat exchanger	(3)	kPa	15,8	22,7	31,0	23,9	30,2	28,7	34,7
PARTIAL RECOVERY USER SIDE IN REFRIGERATION									
Water flow	(4)	l/s	0,695	0,822	1,060	1,012	1,236	1,292	1,539
Pressure drop at the heat exchanger	(4)	kPa	11,1	15,5	25,7	11,6	17,3	13,3	18,8
REFRIGERANT CIRCUIT									
Compressors nr.		N°	1	1	1	2	2	2	2
Number of capacity steps		N°	0	0	0	0	0	0	0
No. Circuits		N°	1	1	1	1	1	1	1
Regulation			Stepless	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless
Min. capacity step		%	27	27	27	22	22	20	20
Refrigerant			R32	R32	R32	R32	R32	R32	R32
Theoretical refrigerant charge		kg	12,0	12,0	12,0	18,0	18,0	25,0	25,0
Oil charge		kg	3,50	3,50	3,50	7,00	7,00	7,00	7,00
Rc (ASHRAE)	(5)	kg/kW	0,25	0,23	0,20	0,27	0,24	0,29	0,27
FANS									
Quantity		N°	2	2	2	3	3	4	4
Air flow		m³/s	5,89	5,89	5,89	8,89	8,89	11,77	11,77
Total fans power input		kW	0,88	0,88	0,88	1,41	1,41	1,88	1,88
NOISE LEVEL									
Total sound Pressure	(6)	dB(A)	59	60	62	62	63	63	63
Total sound power level in cooling	(7)(8)	dB(A)	77	78	80	80	81	82	82
Total sound power level in heating	(7)(9)	dB(A)	77	78	80	80	81	82	82
SIZE AND WEIGHT									
A	(10)	mm	2085	2085	2085	2600	2600	3225	3225
B	(10)	mm	1100	1100	1100	1100	1100	1100	1100
H	(10)	mm	2400	2400	2400	2400	2400	2400	2400
Operating weight	(10)	kg	710	710	710	960	960	1085	1085

Notes:
1 Plant (side) cooling exchanger water (in/out) 12,00°C/7,00°C; Source (side) heat exchanger air (in) 35,0°C.
2 Values in compliance with EN14511
3 Plant (side) heat exchanger water (in/out) 40,00°C/45,00°C; Source (side) heat exchanger air (in) 7,0°C - 87% R.H.
4 Plant (side) cooling exchanger water (in/out) 12,00°C/7,00°C; Source (side) heat exchanger air (in) 35,0°C; Plant (side) heat exchanger recovery water (in/out) 40,00°C/45,00°C.
5 Rated in accordance with AHRI Standard 550/590
6 Average sound pressure level at 1m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
7 Sound power on the basis of measurements taken in compliance with ISO 9614.
8 Sound power level in cooling, outdoors.
9 Sound power level in heating, outdoors.
10 Unit in standard configuration, without optional accessories.

TECHNICAL DATA SEASONAL EFFICIENCY IN HEATING (EN14825 VALUE) - LOW TEMPERATURE APPLICATION

MEHP-iS-G07			0051	0061	0071	0082	0092	0102	0112
Power supply	(1)	V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
WEATHER CONDITIONS - AVERAGE									
Rated heat output at Tdesignh	(1)(2)	kW	40	48	55	64	72	80	89
Bivalent temperature	(1)(2)	°C	-7	-7	-7	-7	-7	-7	-7
SCOP	(1)(2)		4,39	4,33	4,34	4,35	4,12	4,30	4,32
Seasonal space heating energy efficiency	(1)(2)	%	172	170	171	171	162	169	170
Seasonal space heating energy efficiency class	(1)(2)		A++	A++	A++	A++	A++	-	-

Notes:
1 Seasonal space heating energy efficiency class MEDIUM TEMPERATURE [REGULATION (EU) N. 813/2013]
2 Type of calculation with variable flow and variable temperature.

TECHNICAL DATA SEASONAL EFFICIENCY IN HEATING (EN14825 VALUE) - MEDIUM TEMPERATURE APPLICATION

MEHP-iS-G07			0051	0061	0071	0082	0092	0102	0112
Power supply	(1)	V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
WEATHER CONDITIONS - AVERAGE									
Rated heat output at Tdesignh	(1)(2)	kW	40	48	48	64	64	82	82
Bivalent temperature	(1)(2)	°C	-7	-7	-7	-7	-7	-7	-7
SCOP	(1)(2)		3,43	3,37	3,37	3,37	3,23	3,39	3,43
Seasonal space heating energy efficiency	(1)(2)	%	134	132	132	132	126	133	134
Seasonal space heating energy efficiency class	(1)(2)		A++	A++	A++	A++	A++	-	-

Notes:
1 Seasonal space heating energy efficiency class LOW TEMPERATURE [REGULATION (EU) N. 813/2013]
2 Type of calculation with variable flow and variable temperature.

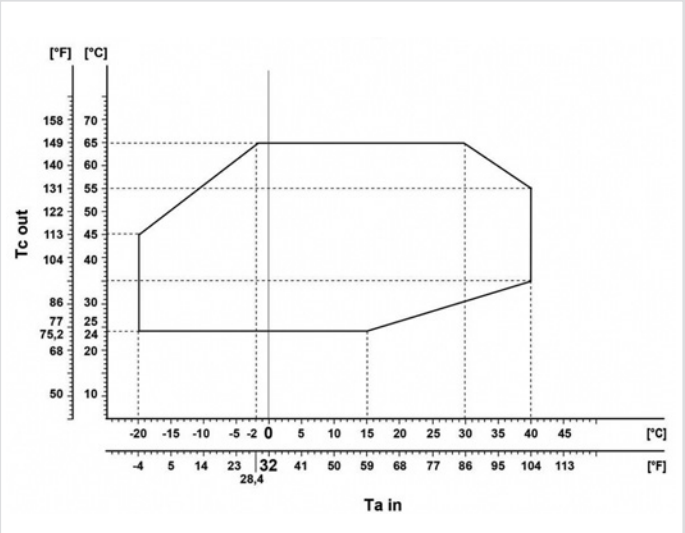
TECHNICAL DATA SEASONAL EFFICIENCY IN COOLING (EN14825 VALUE)

MEHP-iS-G07			0051	0061	0071	0082	0092	0102	0112
Prated,c	(1)	kW	48,0	53,0	60,0	68,3	74,1	85,9	93,8
SEER	(1)(2)	-	4,63	4,58	4,46	4,49	4,46	4,81	4,75
Performance ηs	(1)(3)	%	182,0	180,0	175,0	177,0	175,0	189,0	187,0

Notes:
1 Seasonal space heating energy efficiency class LOW TEMPERATURE [REGULATION (EU) N. 813/2013]
2 Type of calculation with variable flow and variable temperature.

OPERATING LIMITS - GRAPHS

HEATING MODE

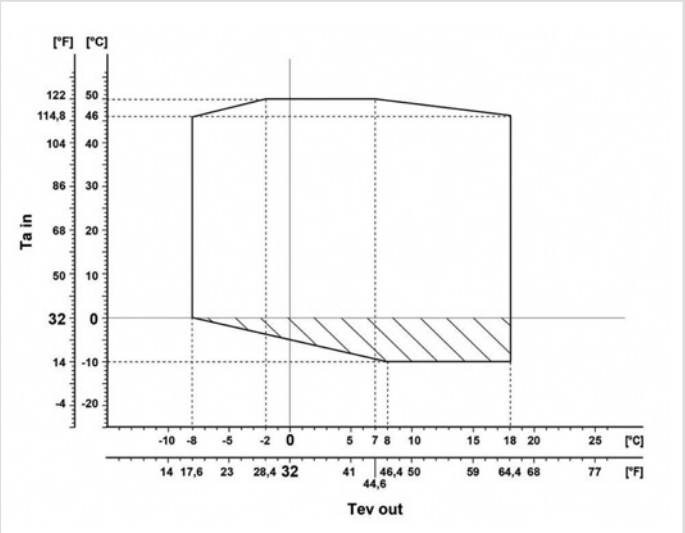


Ta in Outdoor air temperature
Tev out Condenser leaving water temperature

In particular operating conditions the unit can work with forced ventilation, at partial loads or with derating compressors. For any specific information please referto the ElcaWorld software selection.

For the specific temperature limits of each model please refer to the selection software ElcaWorld.

COOLING MODE



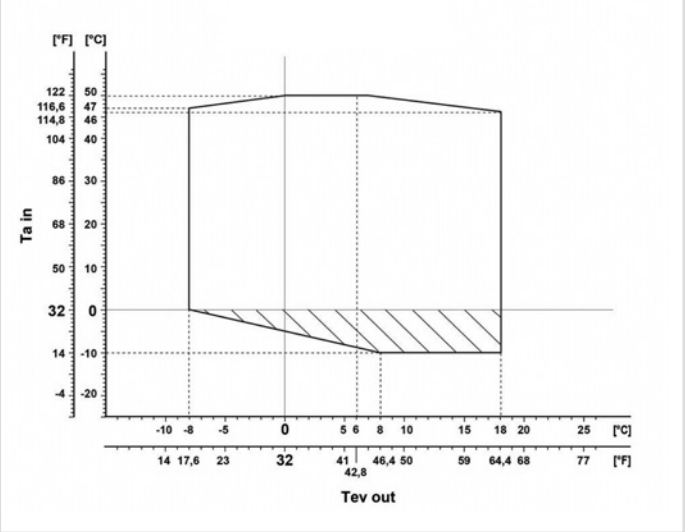
Ta in Outdoor air temperature
Tev out Evaporator leaving water temperature

Required: Antifreeze heaters on pipes (opt. 2431)
Antifreeze heaters on pipes, pumps*, and buffer tank* (opt. 2432 or 2433) *if present.

In particular operating conditions the unit can work with forced ventilation, at partial loads or with derating compressors. For any specific information please referto the ElcaWorld software selection.

For the specific temperature limits of each model please refer to the selection software ElcaWorld.

COOLING MODE /ID VERSION



Ta in Outdoor air temperature
Tev out Evaporator leaving water temperature

Required: Antifreeze heaters on pipes (opt. 2431)
Antifreeze heaters on pipes, pumps*, and buffer tank* (opt. 2432 or 2433) *if present.

In particular operating conditions the unit can work with forced ventilation, at partial loads or with derating compressors. For any specific information please referto the ElcaWorld software selection.

For the specific temperature limits of each model please refer to the selection software ElcaWorld.

EAC(H)V Line

ME-series R32

The EAC(H)V Line allows for up to six individual units to be connected together. Available as a cooling only or heat pump version, the EAC(H)V Line is suitable for both comfort, process an IT cooling applications.

Mitsubishi Electric's modular chiller line-up contributes to realizing high functionality, reliability and energy saving with its own control.
Three capacity modules with the side flow type of 90 kW, the top flow type of 150, 180 kW.

The 90kW model is equipped with R410A refrigerant, whereas the 150 and 180 kW models come with the R32 low GWP refrigerant.

A new generation of chiller technology

Mitsubishi Electric is the first name for comfort and effciency.

Founded in 1921, Mitsubishi Electric is now a global, market leading environmental technologies manufacturer. In the worldwide market, the Living Environment Systems Division provides pioneering solutions that heat, cool, ventilate and control our buildings in some of the most energy efficient ways possible.
Through our technical expertise, long experience and innovative product range, we enable building operators everywhere to significantly improve energy efficiency, reduce running costs and adhere to increasingly tough legislation. We believe that global climate challenges need local solutions.
There are number of challenges facing building owners and managers today, they must tackle ongoing requirements to reduce energy used in their buildings and their running costs, and our aim is to help them in achieving these goals.

At Mitsubishi Electric, we have evolved and today we offer advanced technology that really can make a world of difference.

Why chillers?

Today's building owners and managers face the challenge of providing a comfortable, productive space that is also energy efficient.

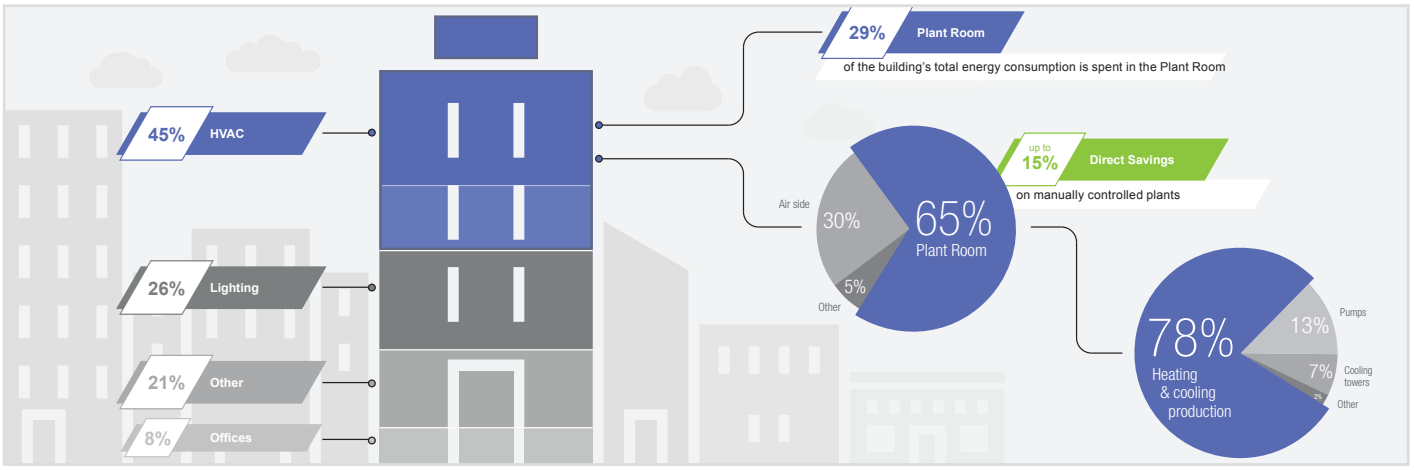
As the drive to reduce energy waste continues with further legislation, building services are being scrutinised to find more ways to optimise performance. Air conditioning is acknowledged as a significant energy user in buildings, therefore chillers can make a significant impact on the energy performance and running cost for many buildings. As manufacturers, we are being tasked with producing more efficient equipment and with enabling specifiers to compare products easily with regard to efficiency and performance.

In Commercial buildings HVAC accounts for 45% of total energy consumption

In commercial buildings, HVAC is by far the most energy intensive system, accounting for close to half of the total energy consumption. For this reason every efficiency improvement in HVAC performance can significantly reduce the energy profile of the building, turning HVAC optimisation into a value generating opportunity.

ErP Directive - Lot 21

The main impact of the ErP (Energy Related Products) Lot 21 will be on the way that chiller efficiency is measured. Ratings will be based on higher requirements for seasonal efficiency, and many older existing chillers will not comply. The ErP uses different performance parameters for different types of product to set the Minimum Energy Performance Standards (MEPS).



Source	Cooling Capacity	Minimum Efficency	
		Jan 2018	Jan 2021
Air Cooled	<400kW	149%	**161%**
Air Cooled	≥400kW	161%	**179%**
Water Cooled	<400kW	196%	**200%**
Water Cooled	≥400kW ≤1500kW	227%	**252%**
Water Cooled	≥1500kW	245%	**272%**

The latest chiller technologies help to address the ERP Directive by ensuring that they operate to meet the precise cooling demand of the building, conserving energy usage within the building. The main components of water and air cooled chillers are very similar.
The way we use buildings today is changing, and the energy demands are changing with them. So now is a good time to consider the benefits of upgrading chiller plant.
With legislation pushing buildings towards greater energy efficiency and reducing carbon, and new regulations bringing even more efficient chiller options, such as heat recovery, to the market, specifiers have every reason to take a look at the benefits of a modern chiller for both new construction and retrofit scenarios.

The impact of a chiller on the comfort of occupants should also be considered. With a modern, robust technology in place, building owners can be assured that they are providing a comfortable and healthy environment, as well as saving themselves energy costs in the long-term.

Best in class efficiency for energy saving performance by the use of inverter compressors

- Inverter compressor is automatically controlled according the load.
- Optimal control of fans by using inverters contributes to save energy.

High functionality of modular chiller

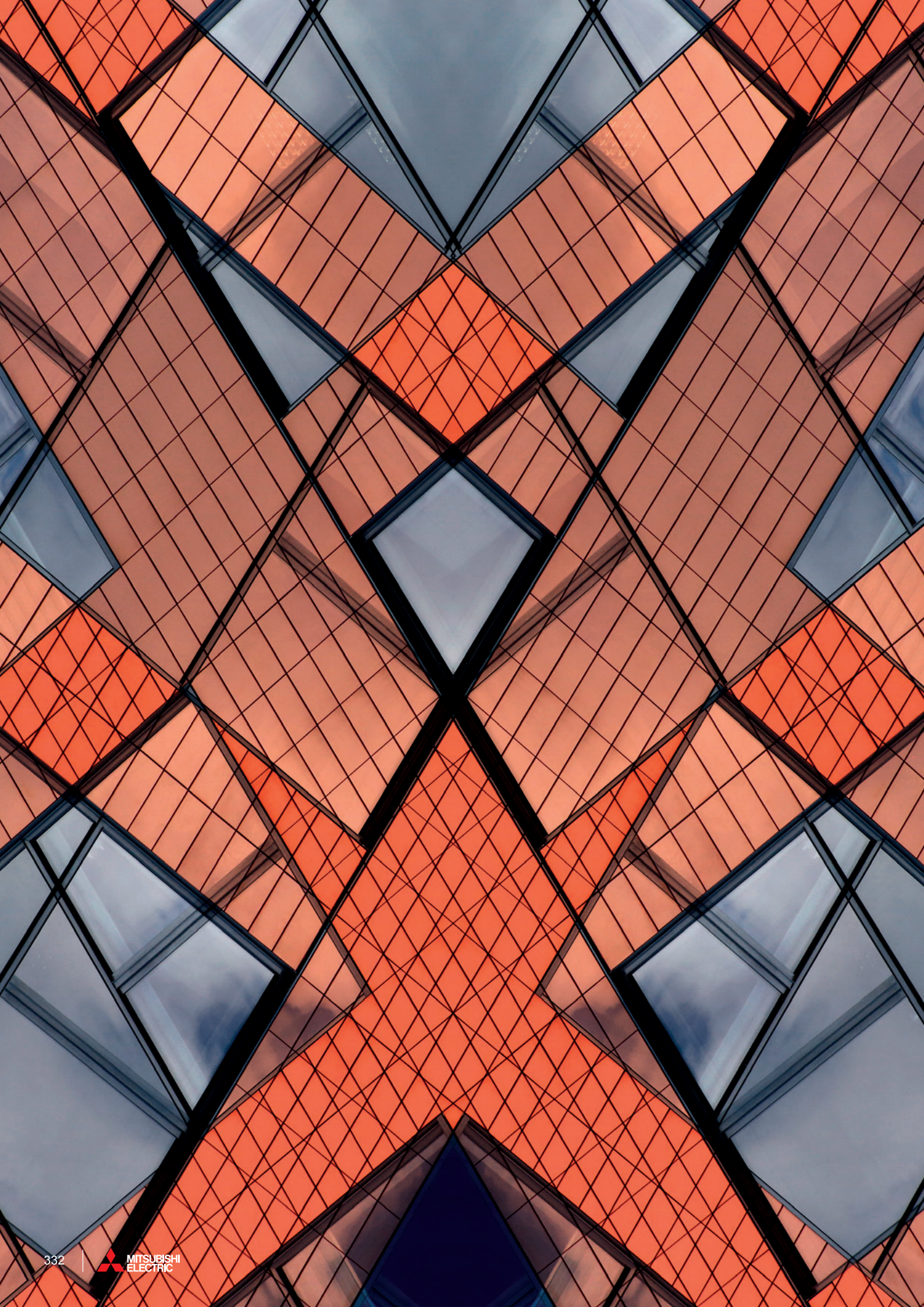
- Up to 6 modules can be connected.
- The combination control of modules helps to continue operation even when one module has stopped due to maintenance.

Saving space and installation work

- Small footprint installation helps to save space.
- Built-in header type is optional, external piping space can be reduced.

Easy system control

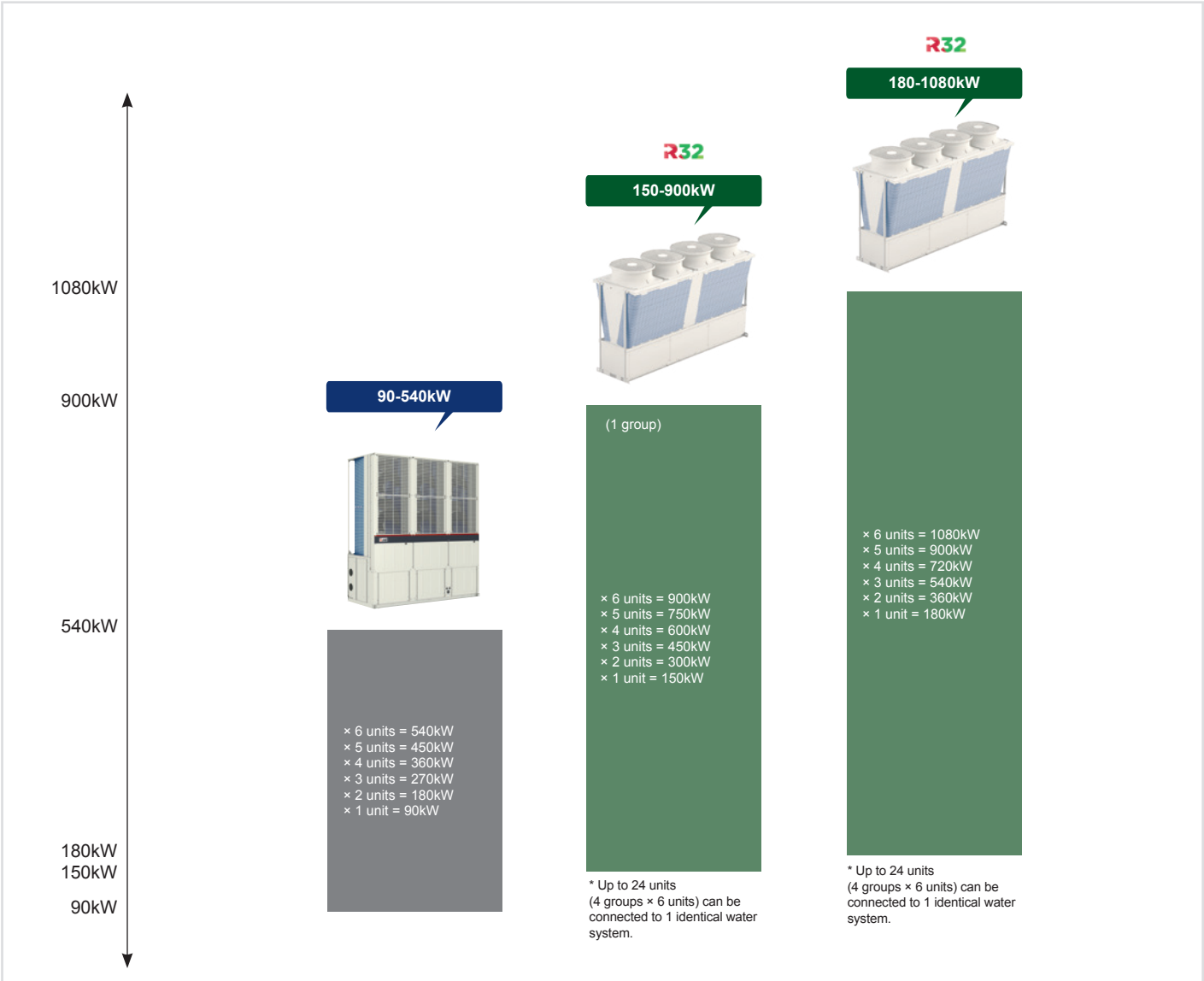
- Water temperature can be controlled remotely by using local remote controllers.
- By installing an AE-200E/A, it is possible to centrally control e-series and CITY MULTI at the same time.



Module line-up

	90kW module*1	150kW module	180kW module
			
Heat Pump	EAHV-P900YAL(-N)(-BS) EAHV-P900YAF(-N)(-BS)	EAHV-M1500YCL(-N)(-BS) R32	EAHV-M1800YCL(-N)(-BS) R32
Heating Only	EAHV-P900YAL-H(-N)(-BS) EAHV-P900YAF-H(-N)(-BS)		
Cooling Only	EACV-P900YAL(-N)(-BS) EACV-P900YAF(-N)(-BS)	EACV-M1500YCL(-N)(-BS) R32	EACV-M1800YCL(-N)(-BS) R32

*(-N) indicates model with built-in header.
*1The amount of pre-charged refrigerant differs among models. YAF indicates full refrigerant charging model.



P900

R410A | ME-series

HIGH ENERGY SAVING PERFORMANCE BY THE USE OF INVERTER COMPRESSORS

BEST IN CLASS EFFICIENCY FOR ENERGY SAVING PERFORMANCE

ENERGY-SAVING TECHNOLOGY

UP TO 6 MODULES CAN BE CONNECTED

COMBINATION CONTROL FUNCTION

*LAST AVAILABILITY: DECEMBER 2024

High energy saving performance by the use of inverter compressors

Each module is provided with two high-efficiency inverter scroll compressors developed by Mitsubishi Electric and can operate optimally according to the load. This improves the high energy saving performance.

Best in class efficiency for energy saving performance

High EER, High COP

- The air suction area is expanded to maximize the performance of the air heat exchanger.
- Two independent refrigerant circuits are provided in the module to cool and heat water in two stages in series to improve EER and COP.

EER 3.30	COP 3.50

*EER shows the value at an outdoor air temperature of 35°C and cool waterinlet/outlet temperatures of 12°C/7°C, respectively. COP shows the value at an outdoor air temperature of 7°C and hot water inlet/outlet temperatures of 40°C/45°C, respectively. Pump input is not included.

High SEER

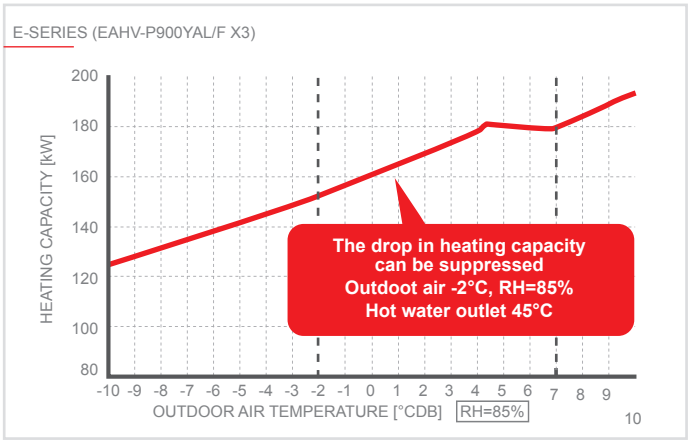
- Achieved the same SEER from 30 to 180 HP.

SEER 4.48

* SEER shows the value at an outdoor air temperature of 35°C and cool water inlet/outlet temperatures of 12°C/7°C, respectively. Pump input is included based on EN14511.

Suppression of heating capacity drop at low outside temperatures

- A heat pump technology captures heat from the outdoor air. The heating performance decrease which occurs with a decrease in outdoor air temperature has been made up for by installing a larger number of units. This disadvantage has been eliminated with the e-series by increasing the heating performance in the low outdoor air temperature range. This allows the user to reduce the required number of units.



Energy-saving technology

High Efficiency Inverter Compressor

DC inverter scroll compressor is incorporated. Two compressors each are incorporated to increase efficiency.

Two refrigerating cycles

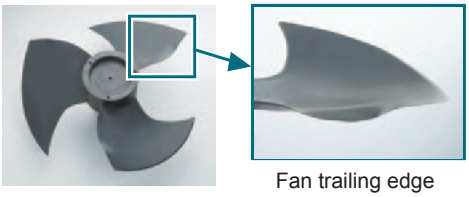
A configuration of two independent refrigerant circuits and the series connection of water-side heat exchangers increase the performance (two-stage cooling).

U-shaped High Performance Compact Air Heat Exchanger

U-shaped air heat exchangers are used. Installing them in a row makes the system thinner.
Weather resistant coating is provided for the heat transfer plate fin as standard.

Inflexed Fan

Adoption of a fan with improved ventilation characteristics and a newly designed trailing edge that suppresses wind turbulence raises fan operation efficiency.

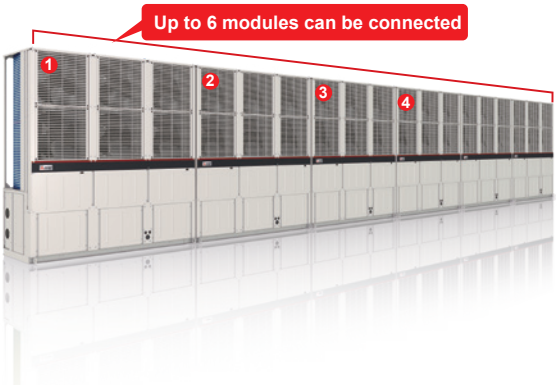


Fan Inverter Control

Air blower fans are also equipped with an inverter to save energy.

Up to 6 modules can be connected

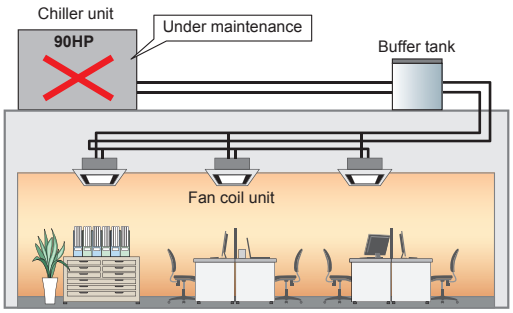
The total capacity can be increased to up to 30HP × 6 modules = 180HP. Because modules can be installed horizontally in a row. Installation in narrow places such as along building walls is possible.



Combination control function

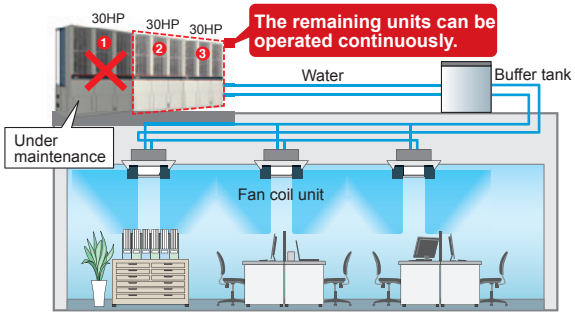
The flexible backup operation among the combined modules enables the continuous operation, even when one module is stopped due to maintenance.

Non-modular chiller



Since the chiller unit can not operate during maintenance, the timing of maintenance is limited.

Mitsubishi Electric modular chiller



With our module chiller system, even if one module is stopped, the remaining modules back the continuous operation up.

* When performing maintenance, please confirm that the remaining modules

Small footprint installation

Since this module has a compact and thin body, it is suitable for installation along the exterior walls of buildings or in narrow spaces, and it is possible to install the modules on each floor.

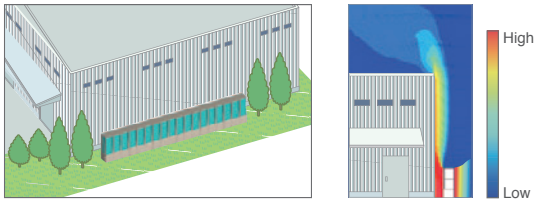
Installation example

Installable in limited space, such as along the outer wall or in the corner of a factory, or in a narrow space of a building. The compact and thin design allows for the consideration of installation on each floor of a building, as is the case with industrial air conditioners. (If the inside header specification is selected).

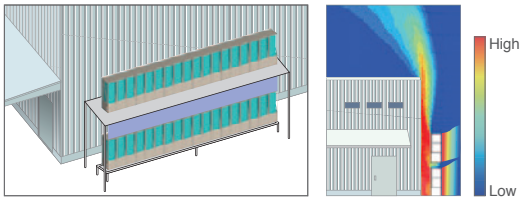
The figure shows the air blowing surface directed toward the wall (a diagonal blowing air guide is equipped as standard). Directing the air blowing surface toward the wall is effective in preventing short cycling.

The modules can be installed in two rows or in one row on each of two stages using a frame. They can be installed flexibly according to the installation space.

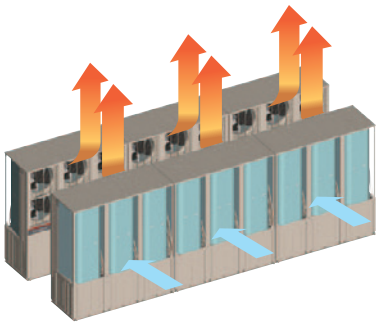
EXAMPLE OF INSTALLATION ALONG THE OUTER WALL OF A FACTORY

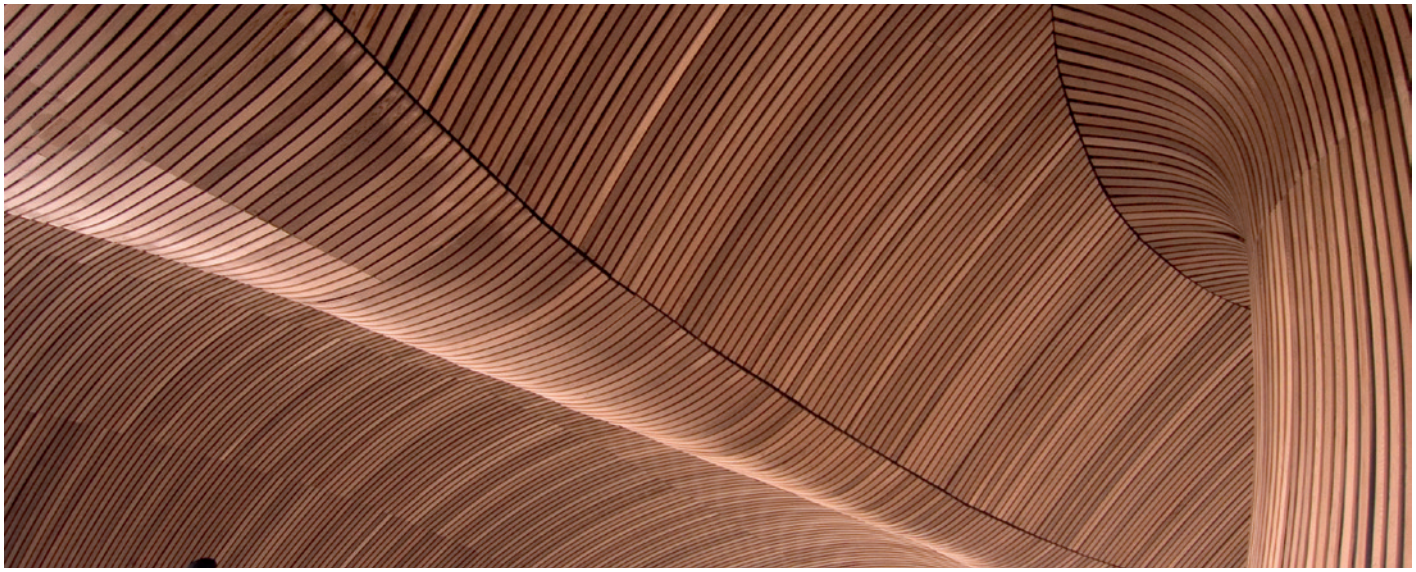


FRONT SURFACE-FACING DOUBLE-ROW INSTALLATION EXAMPLE



SINGLE-ROW DOUBLE-STACK INSTALLATION EXAMPLE





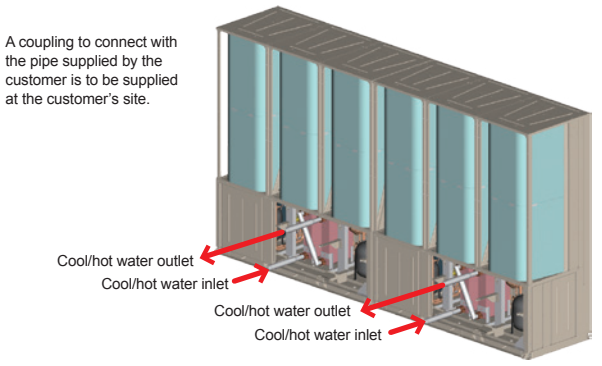
Inside Header

Mitsubishi Electric's Unique Inside Header Incorporates Field Water Pipe Header into Module

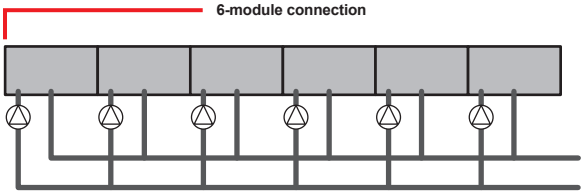
- The field water pipe header section that is usually required to connect the module to the field water pipe is now available as a manufacturer option (hereinafter referred to as the "inside header") which can be incorporated into the module at the factory before shipment (a supplied connection kit is used for the connection work at the customer's site).
- This allows for incorporating the field water pipe header section into the module.
- In addition, the field connection work of the inside header is very simple. Significant simplification of the water pipe connection compared to the previous one has reduced the installation time.

Standard Pipe Specification

THE FIGURE SHOWS A 60 HP UNIT IN WHICH TWO 30 HP MODULES ARE CONNECTED



FIELD WATER PIPE HEADER CONNECTION IMAGE *1
(in the case of installing one pump for each module)



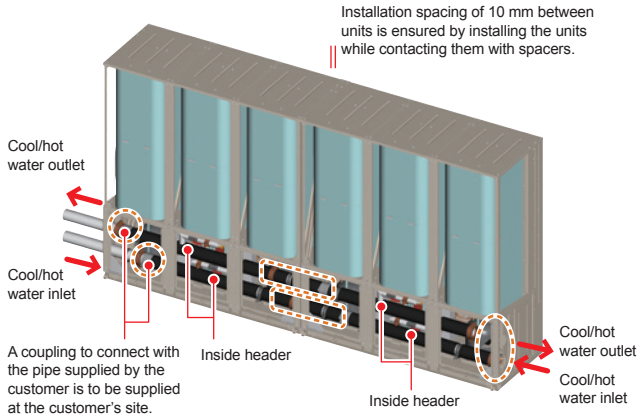
- Number of pumps: 6
- Pipes connected at the site: 12 points

*1 Be sure to install a strainer (optional parts: YS-50A) near the chiller on the inlet side of the cool/hot water pipe to prevent the entry of foreign substances such as dirt and sand particles to the plate heat exchanger

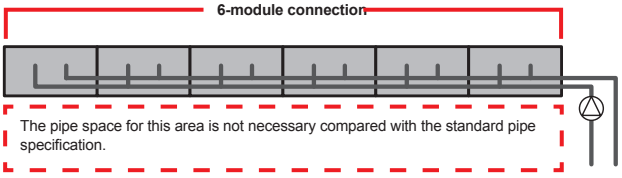
Inside Header Specification

(Left or right connection can be selected for the water pipes)

THE FIGURE SHOWS A 60 HP UNIT IN WHICH TWO 30 HP MODULES ARE CONNECTED



FIELD WATER PIPE HEADER CONNECTION IMAGE *1
(in the case of installing one pump for the system)

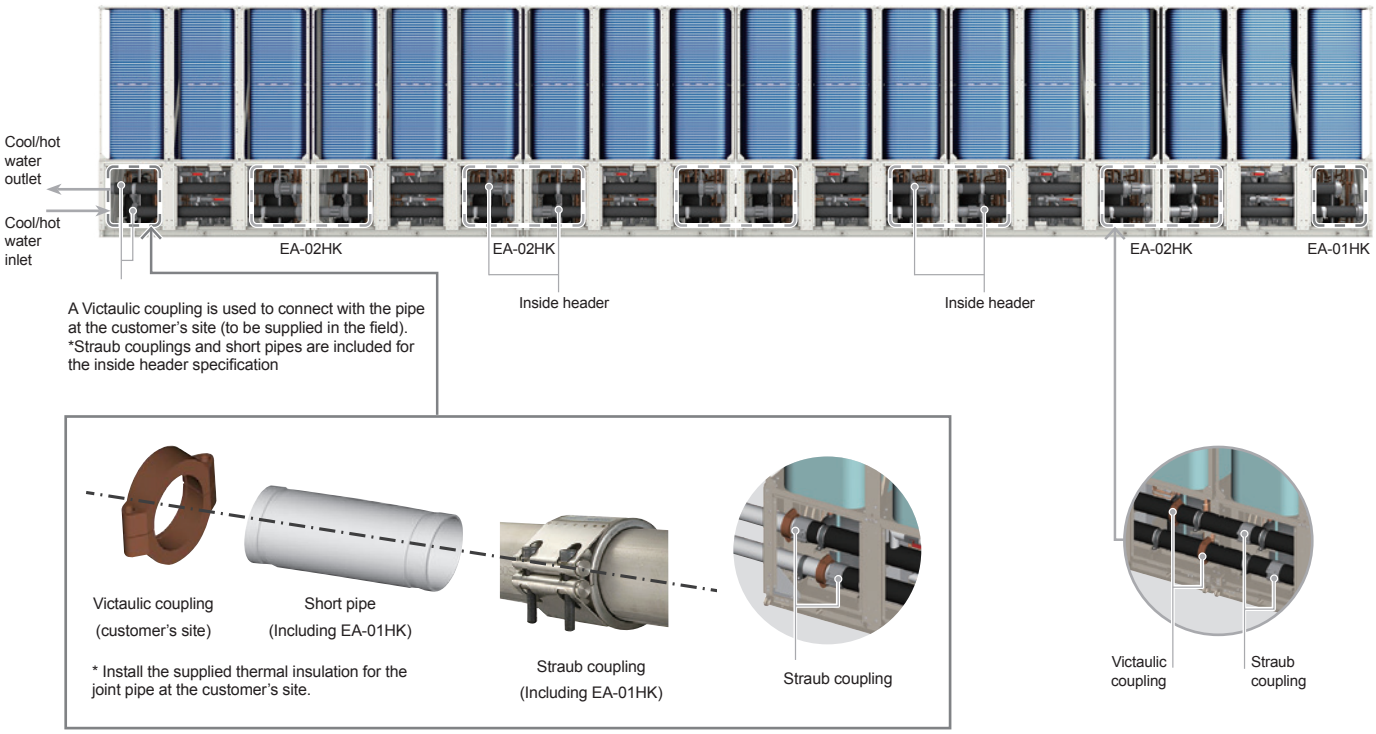


- Number of pumps: 1
- Pipes connected at the site: 2 points (10 internal connection points)

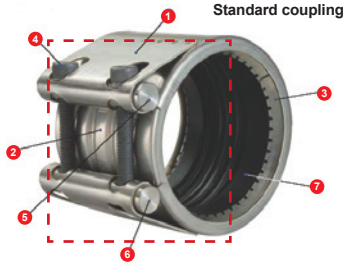
*1 Be sure to install a strainer near the chiller on the inlet side of the cool/hot water pipe to prevent the entry of foreign substances such as dirt and sand particles to the plate heat exchanger.

About Pipe Connection Kit

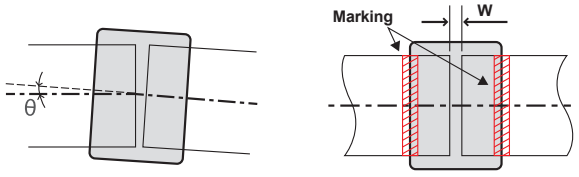
THIS FIGURE SHOWS 540 HP (EAHV-P900YAL/F-N×6) AS AN EXAMPLE.



STRUCTURE



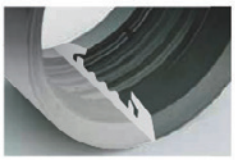
No.	Part name	Material
1	Casing	SUS 304
2	Sliding plate	SUS 301 or 304
3	Grip ring	SUS 301
4	Tightening bolt	SUS XM7
5	Rod washer	SUS 304
6	Rod nut	SUS 304
7	Rubber sleeve	EPDM



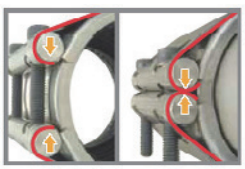
Allowable clearance and tilt range

Allowable pipe clearance value [W]=0 to 25 mm

Allowable pipe tilt angle [θ]=±2°

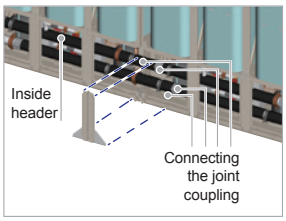


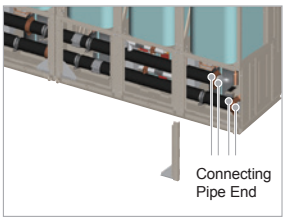
The sealed rubber has a lip structure to improve the water-stopping performance. Adjust the position of the Straub coupling so the marking on both sides can be seen.



Just tighten the bolt until the casing fits against (comes into contact with) the metal. Anyone can connect the pipes evenly and securely, regardless of their skills and the type of the pipe used.

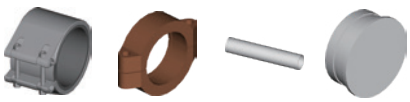
CONNECTING PIPE END
(Connection at Customer's Site)





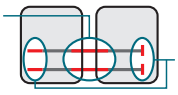
Capacity	Module (Inside header)	Optional parts -1- EA-01HK (model)	Optional parts -2- EA-02HK (model)
30 HP	1	1	0
60 HP (30 HP×2)	2	1	1
90 HP (30 HP×3)	3	1	2
120 HP (30 HP×4)	4	1	3
150 HP (30 HP×5)	5	1	4
180 HP (30 HP×6)	6	1	5

Optional parts -1- (Piping Kit) EA-01HK



Optional parts -2- (Connection Piping Kit) EA-02HK

Optional parts -2-



Optional parts -1-

The Victaulic coupling and Straub coupling mentioned in the explanation are product names.

Control technology

- Up to 6 modules and one unit can be connected for each remote control.
- Simultaneous control

Unit Remote Control

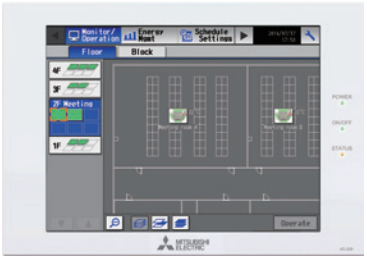
	 PAR-W31MAA
Control	Simultaneous control
Number of modules that can be connected	6
Number of units that can be connected	1
Number of supported water lines	1
ON/OFF	●
Cooling/heating switch	●
FAN operation switch for snowfall	●
Target outlet temperature setting	●
Scheduled operation	●
Individual error display	●
Outlet water temperature setting of 5°C or below (Brine)	●

Centralized controller*

When connected to the AE-200E/A centralized controller or the EW-50A/E expansion controller, up to 6 e-series modules can be connected to 1 group for centralized monitoring and management.
Combined management of CITY MULTI is also possible.

* Centralized monitoring and management are possible only for M-NET-connected e-series units.

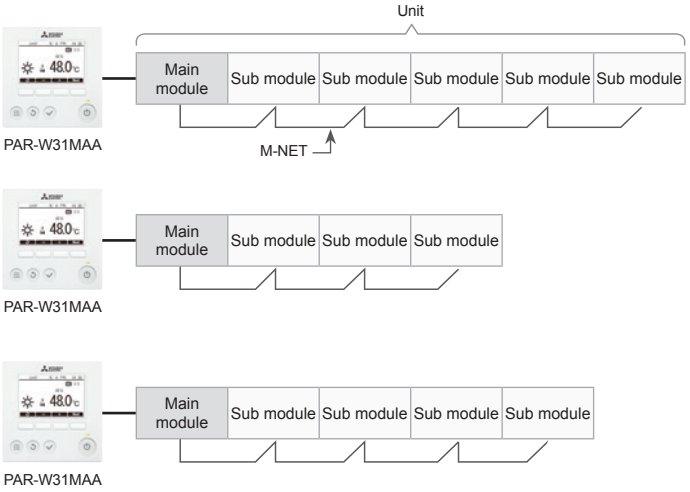
AE-200E/A



Monitoring on LCD touch panel and web browser

Monitoring of the operating condition—including the water temperature—of e-series units are possible from the LCD screen of the AE-200E/A or from a Web browser. Combined management of CITY MULTI is also possible.

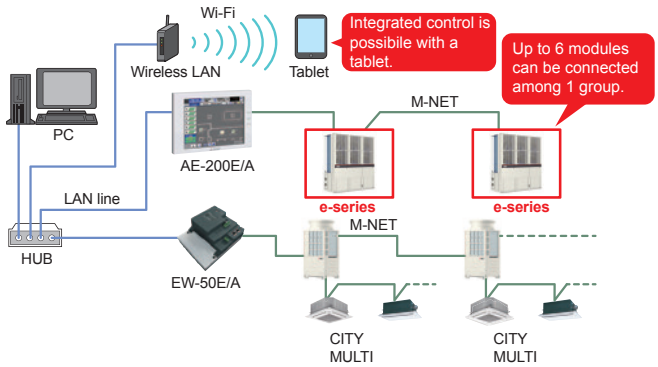
System configuration



Demand control

Forced capacity control up to the demand upper limit by an external input to the unit (non-voltage normal open). Heating demand is possible in addition to the cooling demand.

SYSTEM CONFIGURATION AE-200E/A



Technical specifications COOLING ONLY MODEL

MODEL			SET	EACV-P900YAL(-N)(-BS) EACV-P900YAF(-N)(-BS)	
Power source				3-phase 4-wire 380-400-415V 50/60Hz	
Capacity change mode				Capacity priority	COP priority
Cooling capacity *1 Water			kW	90.00	63.00
			kcal/h	77,400	54,180
			BTU/h	307,080	214,956
	Power input *2		kW	27.27	16.27
	Current input 380-400-415V		A	46.0 - 43.7 - 42.2	27.5 - 26.1 - 25.2
	Pump input is not included	EER		3.30	3.87
		ESEER		5.66	-
	Certified value by EUROVENT	EER *3		3.08	3.76
		ESEER *3 *4		4.71	-
	ESEER (Includes pump input based on EN14511) *3 *5			5.46	-
	SEER (Includes pump input based on EN14511) *3			4.88	-
	IPLV *6		kW/kW	6.34	-
	Water flow rate		m^3/h	15.5	10.8
Cooling capacity *7 *8 Brine(ethylene glycol 35wt%)			kW	56.73	39.34
			kcal/h	48,788	33,832
			BTU/h	193,563	134,228
	Power input *2		kW	25.98	15.78
	Current input 380-400-415V		A	43.9 - 41.7 - 40.2	26.7 - 25.4 - 24.4
	EER(Pump input is not included)			2.18	2.49
	EER(Includes pump input based on EN14511) *3			2.10	2.42
	Brine flow rate		m^3/h	11.5	8.0
Maximum current input			A	61	
Water pressure drop	Water *9		kPa	135	65
	Brine(ethylene glycol 35wt%) *8 *10		kPa	106	50
Temp range	Cooling		°C	Outlet water 5~25 *11	
	Water		°F	Outlet water 41~77 *11	
	Cooling		°C	Outlet brine -10~25 *8 *12	
	Brine(ethylene glycol 35wt%)		°F	Outlet brine 14~77 *8 *12	
	Outdoor		°C	-15~43 *11 *12	
			°F	5~109.4 *11 *12	
Circulating water volume range			m^3/h	7.7~25.8	
Sound pressure level (measured in anechoic room) at 1m *1			dB (A)	65	63
Sound power level (measured in anechoic room) *1			dB (A)	77	75
Diameter of water pipe (Standard piping)	Inlet		mm (in)	50A (2B) housing type joint	
	Outlet		mm (in)	50A (2B) housing type joint	
Diameter of water pipe (Inside header piping)	Inlet		mm (in)	100A (4B) housing type joint	
	Outlet		mm (in)	100A (4B) housing type joint	
External finish				Polyester powder coating steel plate	
External dimension HxWxD			mm	2450 x 2250 x 900	
Net weight	Standard piping		kg (lbs)	957 (2110)	
	Inside header piping		kg (lbs)	992 (2187)	
Design pressure	R410A		MPa	4.15	
	Water		MPa	1.0	
Heat exchanger	Water side			Stainless steel plate and copper brazing	
	Air side			Plate fin and copper tube	
Compressor	Type			Inverter scroll hermetic compressor	
	Maker			MITSUBISHI ELECTRIC CORPORATION	
	Starting method			Inverter	
	Quantity			2	
	Motor output		kW	11.7 x 2	
	Case heater		kW	0.045 x 2	
	Lubricant			MEL32	
Fan	Air flow rate		m^3/min	77 x 6	
			L/s	1283 x 6	
			cfm	2719 x 6	
	Type, Quantity			Propeller fan x 6	
	Starting method			Inverter	
	Motor output		kW	0.19 x 6	
Protection	High pressure protection			High pres.Sensor & High pres.Switch at 4.15MPa (601psi)	
	Inverter circuit			Over-heat protection, Over current protection	
	Compressor			Over-heat protection	

*1 Under normal cooling conditions at outdoor temp 35°CDB/24°CWB (95°FDB/75.2°FWB) outlet water temp 7°C (44.6°F) inlet water temp 12°C (53.6°F).
*2 Pump input is not included.
*3 Pump is not included in e-series.
*4 EN14511 standard (2013) formula is applied to figure out this value in case of fixed flow rate operation (flow rate is fixed at any heat load)
Pump input is included in cooling capacity for EER calculation. Condition of water inlet and outlet is fixed at inlet 12°C and outlet 7°C.
*5 EN14511 standard (2013) formula is applied to figure out this value in case of variable flow rate operation (flow rate varies per heat load).
Pump input is included in cooling capacity for EER calculation. Condition of water temperature : inlet water temperature varies due to fixed water flow rate and outlet is fixed at outlet 7°C.
*6 Calculations according to standard performances (in accordance with AHRI 550-590).
*7 Under normal cooling conditions at outdoor temp 35°CDB/24°CWB (95°FDB/75.2°FWB) outlet brine temp -5°C (23.0°F) inlet brine temp 0°C (32.0°F).
*8 Set the dipswitch SW3-6 on both main and sub modules to ON.
*9 Under normal cooling conditions capacity 90kW, water flow rate 15.5m3/h
*10 Under normal cooling conditions capacity 56.73kW, brine flow rate 11.5m3/h
*Please don't use the steel material for the water piping.
*Please always make water circulate, or pull the circulation water out completely when not in use.
*Please do not use groundwater or well water in direct.
*The water circuit must be closed circuit.
*Due to continuous improvement, the above specifications may be subject to change without notice.

Technical specifications HEATPUMP MODEL

MODEL		SET	EAHV-P900YAL(-N)(-BS) EAHV-P900YAF(-N)(-BS)	
Power source			3-phase 4-wire 380-400-415V 50/60Hz	
Capacity change mode			Capacity priority	COP priority
Cooling capacity *1		kW	90.00	63.00
		kcal/h	77,400	54,180
		BTU/h	307,080	214,956
	Power input *3	kW	27.27	16.27
	Current input 380-400-415V	A	46.0 - 43.7 - 42.2	27.5 - 26.1 - 25.2
	Pump input is not included	EER	3.30	3.87
	Certified value by EUROVENT	EER *4	3.08	3.76
	SEER (Includes pump input based on EN14511) *4		4.88	-
	IPLV *8	kW/kW	6.34	-
	Water flow rate	m^3/h	15.5	10.8
Heating capacity *2		kW	90.00	63.00
		kcal/h	77,400	54,180
		BTU/h	307,080	214,956
	Power input *3	kW	25.71	16.96
	Current input 380-400-415V	A	43.4 - 41.2 - 39.7	28.6 - 27.2 - 26.2
	COP (Pump input is not included)		3.50	3.71
	COP (Includes pump input based on EN14511) *4		3.25	3.61
	SCOP (Reversible) Low/Medium (Includes pump input based on EN14511) *4		3.66/2.89	-
	Seasonal space heating energy efficiency class for medium-temperature application		A+	-
	Seasonal space heating energy efficiency class for low-temperature application		A+	-
	Water flow rate	m^3/h	15.5	10.8
Maximum current input		A	61	
Water pressure drop *5		kPa	135	65
Temp range	Cooling	°C	Outlet water 5~25 *9	
		°F	Outlet water 41~77 *9	
	Heating	°C	Outlet water 30~55 *9	
		°F	Outlet water 86~131 *9	
	Outdoor	°C	-15~43 *9	
		°F	5~109.4 *9	
Circulating water volume range		m^3/h	7.7~25.8	
Sound pressure level (measured in anechoic room) at 1m *1		dB (A)	65	63
Sound power level (measured in anechoic room) *1		dB (A)	77	75
Diameter of water pipe (Standard piping)	Inlet	mm (in)	50A (2B) housing type joint	
	Outlet	mm (in)	50A (2B) housing type joint	
Diameter of water pipe (Inside header piping)	Inlet	mm (in)	100A (4B) housing type joint	
	Outlet	mm (in)	100A (4B) housing type joint	
External finish			Polyester powder coating steel plate	
External dimension HxWxD		mm	2450 x 2250 x 900	
Net weight	Standard piping	kg (lbs)	987 (2176)	
	Inside header piping	kg (lbs)	1022 (2253)	
Design pressure	Refrigerant	MPa	4.15	
	Water	MPa	1.0	
Heat exchanger	Water side		Stainless steel plate and copper brazing	
	Air side		Plate fin and copper tube	
Compressor	Type		Inverter scroll hermetic compressor	
	Maker		MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	
	Quantity		2	
	Motor output	kW	11.7 x 2	
	Case heater	kW	0.045 x 2	
	Lubricant		MEL32	
Fan	Air flow rate	m^3/min	77 x 6	
		L/s	1283 x 6	
		cfm	2719 x 6	
	Type, Quantity		Propeller fan x 6	
	Starting method		Inverter	
	Motor output	kW	0.19 x 6	
Protection	High pressure protection		High pres.Sensor & High pres.Switch at 4.15MPa (601psi)	
	Inverter circuit		Over-heat protection, Over current protection	
	Compressor		Over-heat protection	

*1 Under normal cooling conditions at outdoor temp 35°CDB/24°CWB (95°FDB/75.2°FWB) outlet water temp 7°C (44.6°F) inlet water temp 12°C (53.6°F).
*2 Under normal heating conditions at outdoor temp 7°CDB/6°CWB (44.6°FDB/42.8°FWB) outlet water temp 45°C (113°F) inlet water temp 40°C (104°F).
*3 Pump input is not included.
*4 Pump is not included in e-series.
*5 Under normal cooling or heating conditions capacity 90kW, water flow rate 15.5m3/h
*6 EN14511 standard (2013) formula is applied to figure out this value in case of fixed flow rate operation (flow rate is fixed at any heat load)
Pump input is included in cooling capacity for EER calculation. Condition of water inlet and outlet is fixed at inlet 12°C and outlet 7°C.
*7 EN14511 standard (2013) formula is applied to figure out this value in case of variable flow rate operation (flow rate varies per heat load). Pump input is included in cooling capacity for EER calculation.
Condition of water temperature : inlet water temperature varies due to fixed water flow rate and outlet is fixed at outlet 7°C.
*8 Calculations according to standard performances (in accordance with AHRI 550-590).
*Please don't use the steel material for the water piping.
*Please always make water circulate, or pull the circulation water out completely when not in use.
*Please do not use groundwater or well water in direct.
*The water circuit must be closed circuit.
*Due to continuous improvement, the above specifications may be subject to change without notice.

Technical specifications HEATING ONLY MODEL

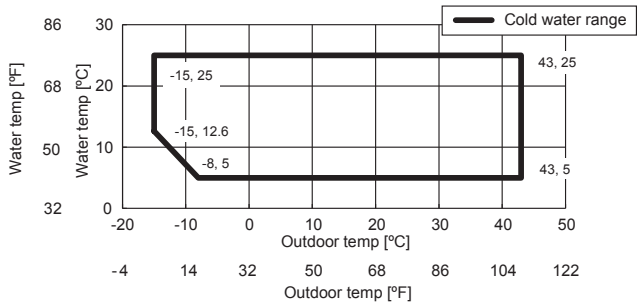
MODEL		SET	EAHV-P900YAL-H(-N)(-BS) EAHV-P900YAF-H(-N)(-BS)	
Power source			3-phase 4-wire 380-400-415V 50/60Hz	
Capacity change mode			Capacity priority	COP priority
Heating capacity *1		kW	90.00	63.00
		kcal/h	77,400	54,180
		BTU/h	307,080	214,956
	Power input *2	kW	25.71	16.96
	Current input 380-400-415V	A	43.4 - 41.2 - 39.7	28.6 - 27.2 - 26.2
	COP (Pump input is not included)		3.50	3.71
	COP (Includes pump input based on EN14511) *3		3.25	3.61
	SCOP (Reversible) Low/Medium (Includes pump input based on EN14511) *4		3.56/2.83	-
	Seasonal space heating energy efficiency class for medium-temperature application		A+	-
	Seasonal space heating energy efficiency class for low-temperature application		A+	-
	Water flow rate	m^3/h	15.5	10.8
Maximum current input		A	61	
Water pressure drop *5		kPa	135	65
Temp range	Heating	°C	Outlet water 30~55 *6	
		°F	Outlet water 86~131 *6	
	Outdoor	°C	-15~43 *6	
		°F	5~109.4 *6	
Circulating water volume range		m^3/h	7.7~25.8	
Sound pressure level (measured in anechoic room) at 1m *4		dB (A)	65	63
Sound power level (measured in anechoic room) *4		dB (A)	77	75
Diameter of water pipe (Standard piping)	Inlet	mm (in)	50A (2B) housing type joint	
	Outlet	mm (in)	50A (2B) housing type joint	
Diameter of water pipe (Inside header piping)	Inlet	mm (in)	100A (4B) housing type joint	
	Outlet	mm (in)	100A (4B) housing type joint	
External finish			Polyester powder coating steel plate	
External dimension HxWxD		mm	2450 x 2250 x 900	
Net weight	Standard piping	kg (lbs)	987 (2176)	
	Inside header piping	kg (lbs)	1022 (2253)	
Design pressure	Refrigerant	MPa	4.15	
	Water	MPa	1.0	
Heat exchanger	Water side		Stainless steel plate and copper brazing	
	Air side		Plate fin and copper tube	
Compressor	Type		Inverter scroll hermetic compressor	
	Maker		MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	
	Quantity		2	
	Motor output	kW	11.7 x 2	
	Case heater	kW	0.045 x 2	
	Lubricant		MEL32	
Fan	Air flow rate	m^3/min	77 x 6	
		L/s	1283 x 6	
		cfm	2719 x 6	
	Type, Quantity		Propeller fan x 6	
	Starting method		Inverter	
	Motor output	kW	0.19 x 6	
Protection	High pressure protection		High pres.Sensor & High pres.Switch at 4.15MPa (601psi)	
	Inverter circuit		Over-heat protection, Over current protection	
	Compressor		Over-heat protection	

*1 Under normal heating conditions at outdoor temp 7°CDB/6°CWB (44.6°FDB/42.8°FWB) outlet water temp 45°C (113°F) inlet water temp 40°C (104°F).
*2 Pump input is not included.
*3 Pump is not included in e-series.
*4 Under normal heating conditions at outdoor temp 7°CDB/6°CWB (44.6°FDB/42.8°FWB) outlet water temp 45°C (113°F) inlet water temp 40°C (104°F).
*5 Under normal heating conditions capacity 90kW, water flow rate 15.5m3/h
*Please don't use the steel material for the water piping material.
*Please always make water circulate, or pull the circulation water out completely when not in use.
*Please do not use groundwater or well water in direct.
*The water circuit must be closed circuit.
*Due to continuous improvement, the above specifications may be subject to change without notice.

Operating limits

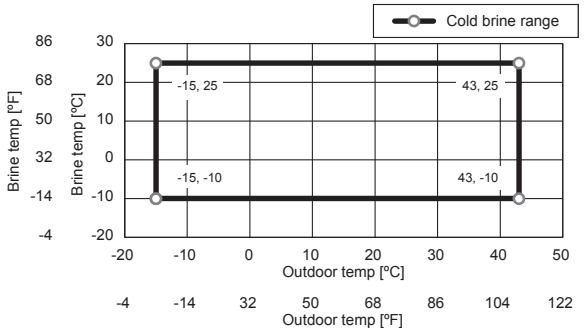
COOLING ONLY

*11

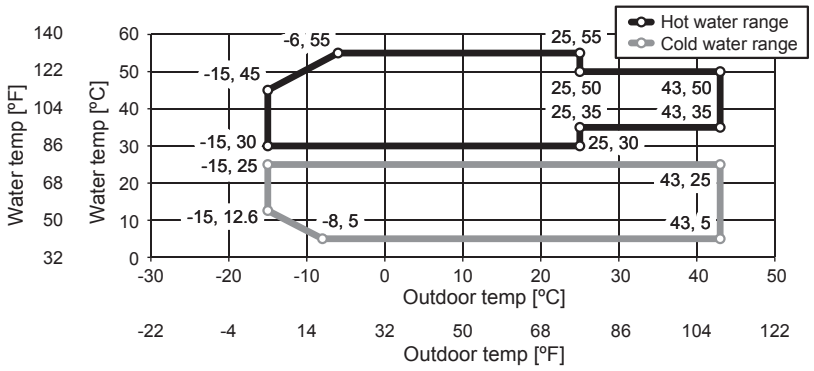


COOLING ONLY - BRINE MODE

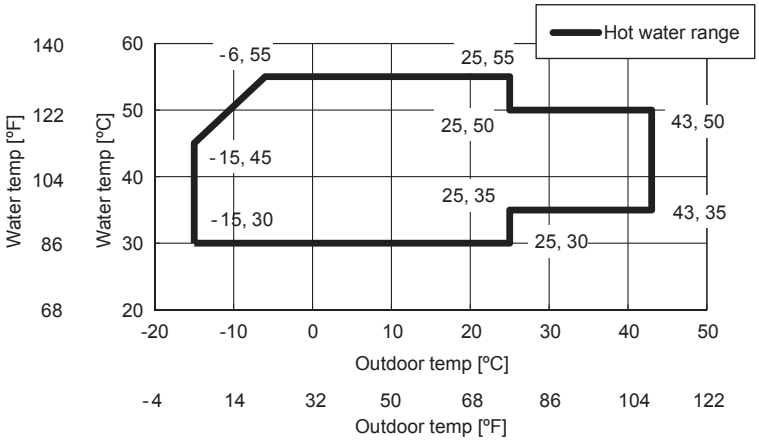
*12



REVERSIBLE HEAT PUMP



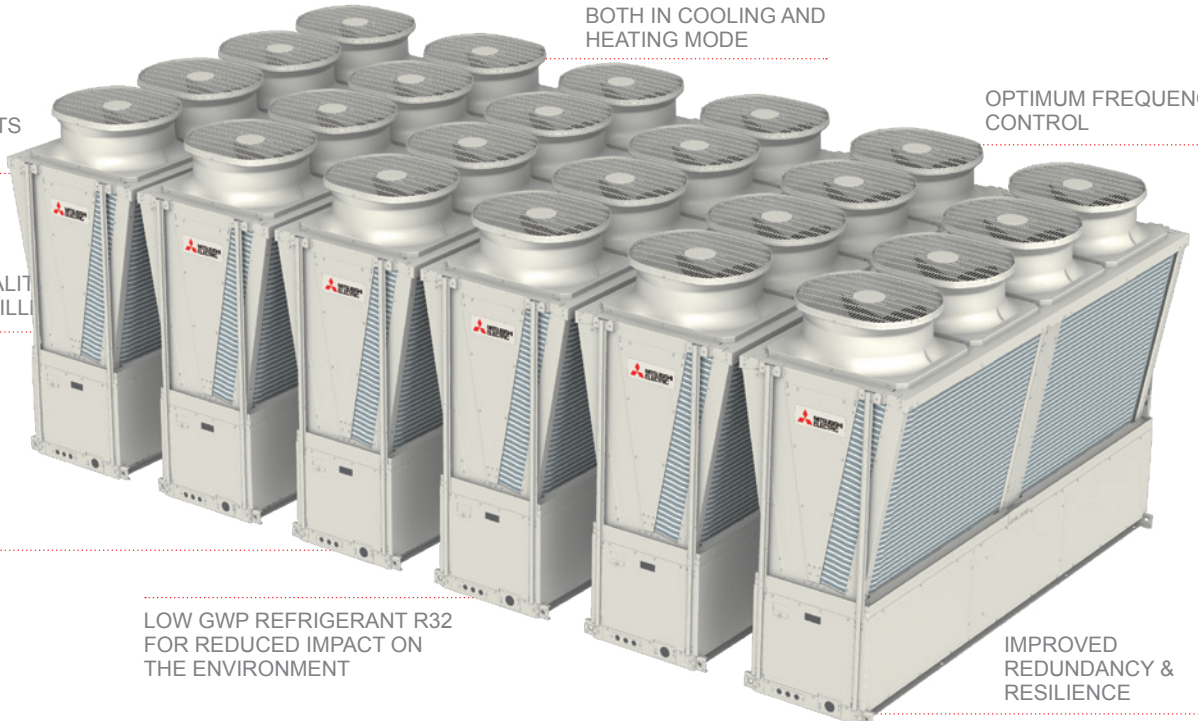
HEATING ONLY



Unit converter
kcal/h = kW x 860
BTU/h = kW x 3,412
lbs = kg/0.4536
cfm = m³/min x 35.31

M1500/M1800

R32 | ME-series



High energy-saving performance thanks to high-performance inverter compressor and proprietary Y-shaped construction.

Best in class efficiency for energy saving performance

The rated and seasonal energy efficiency ratios have been increased to achieve high energy saving performance.

Rated efficiency

The use of the high-efficiency inverter compressors achieves high energy saving performance. The 50 HP model has cooling EER and heating COP rating corresponding to energy saving class A.

Model **M1500**	Model **M1500**
EER 3.28[*1]	**COP 3.47**[*2]

[*1]Under normal cooling conditions at outdoor temp 35°DB/24°WB(95°FDB/75.2°FWB) outlet water temp 7°C(44.6°F) inlet water temp 12°C(53.6°F). Pump input is included in cooling capacity and power input based on EN14511.
[*2]Under normal heating conditions at outdoor temp 7°DB/6°WB(44.6°FDB/42.8°FWB) outlet water temp 45°C(113°F) inlet water temp 40°C(104°F). Pump input is included in heating capacity and power input based on EN14511.

Seasonal efficiency

The use of the high-efficiency inverter compressors ensures optimum operation according to the operation load. The compressors can operate efficiently even during nighttime and intermediate seasons with low load, thereby saving energy throughout the year.

Model **M1500**		Model **M1800**
SEER 5.52[*1]	SEERavg. +18% vs R410 version	**SEER 5.36**[*1]
SCOP 3.31[*1]		**SCOP 3.31**[*1]

[*1]Compliant with EN14511

Key Components and Technologies

The high-grade functionality, energy efficiency, and endurance of the e-series are achieved by Mitsubishi Electric's technology.

Compressor

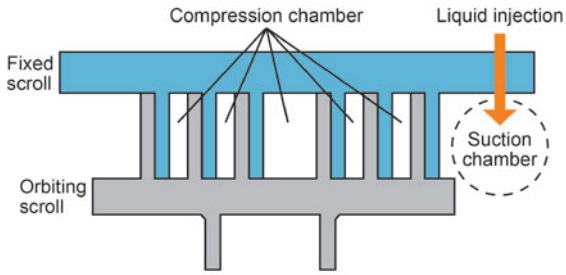
R32-compatible high-efficiency inverter compressor

Each unit has four high-efficiency R32-compatible inverter compressors. Compared to R410A, R32 has low pressure loss, contributing to better operation efficiency. The inverter compressor automatically controls the compressor frequencies based on various air-conditioning conditions such as outside air temperature and changes in load, helping to achieve higher seasonal efficiency.

Stable operation with a suction chamber injection mechanism

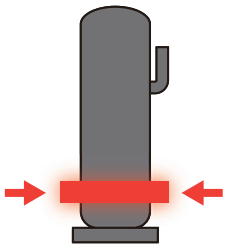
Returning the liquid refrigerant to the suction chamber suppresses a rise in the discharge temperature of R32 while the units are operated at low outside temperatures. The amount of injected refrigerant is adjusted according to the refrigerant state, allowing the units to operate in heating mode at an intake temperature as low as -20°C.

IH (induction heating) warmer



The e-series adopts an IH (induction heating) warmer to prevent refrigerant stagnation while the unit is stopped. The IH warmer suppresses standby power more than the belt case heater, which is wrapped around the compressor shell surface to constantly heat the compressor.

CASE HEATER



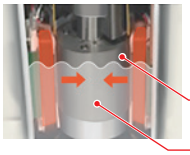
Heated from the outside with a heater

IH WARMER

The magnetic property of the iron motor core inside the compressor is used to heat the compressor shell and prevent refrigerant stagnation while the unit is stopped. In addition, compressor heating remains on for 30 minutes after operation is stopped, and subsequently is switched on and off every 30 minutes. Standby power consumption therefore is lower than a case heater.

Heated by energizing the motor

*Low voltage at a level that will not start up the compressor



Operation while the air conditioner is stopped

On/off is repeated every 30 minutes

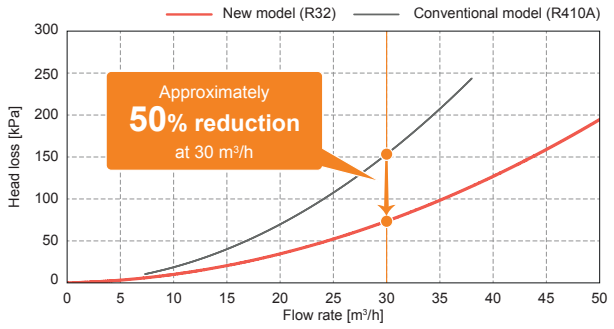
*Normally the compressor is heated while the unit is stopped to prevent liquid refrigerant from remaining in the compressor and to evaporate the liquid refrigerant in the compressor.

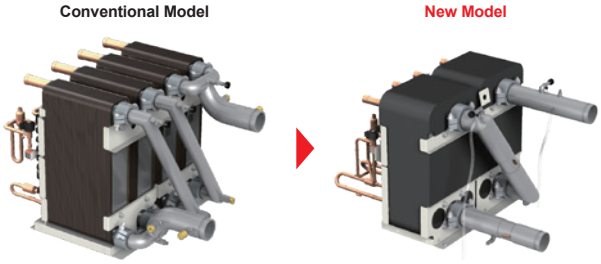
Water heat exchanger

Reduction in head loss

Head loss in the water pipe is reduced by the use of a different water heat exchanger and by reducing the number of water piping routes in the unit.

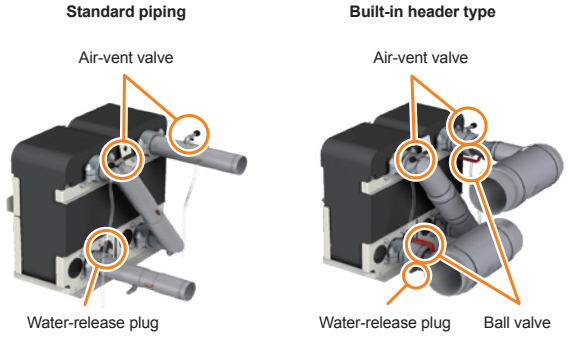
WATER HEAT EXCHANGER HEAD LOSS





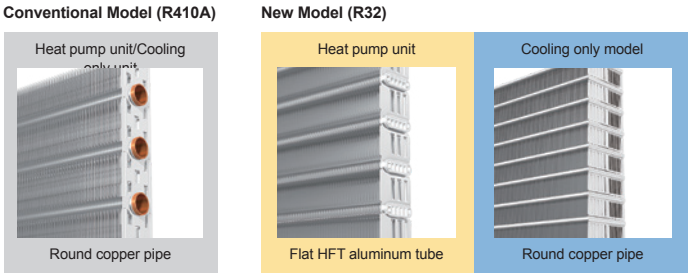
Water piping in the unit

• A water-release plug prevents water splashing when bleeding air.
• Separate air-vent valves are installed at both the inlet and outlet of the water pipes, allowing for easy water drainage just by plugging in and out the plugs.



Flat tube heat exchanger

Flat tubes are sub-divided into smaller fins to increase the contact area with the refrigerant, resulting in greater heat-exchanging efficiency. The cooling only models and the heat pump models have fins that are shaped differently to increase the overall heat-exchange efficiency of each model, resulting in reduced refrigerant volume, greater operating range, and higher operation efficiency.



Parallel flow condenser

The heat pump and cooling only models adopt different fins in consideration of the influence of drain water clogging during heating. The heat pump model uses a horizontal flat tube and the cooling only model uses a parallel flow condenser.
The shape of the corrugated fin used in the cooling only model increases the contact area with air and the amount of heat exchange in cooling operation.

FIN IMAGE

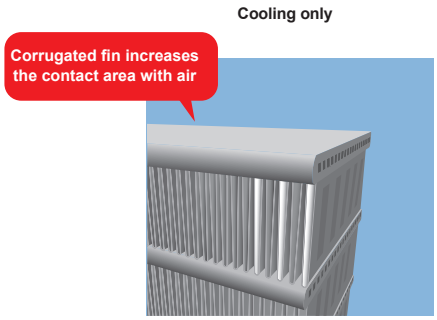
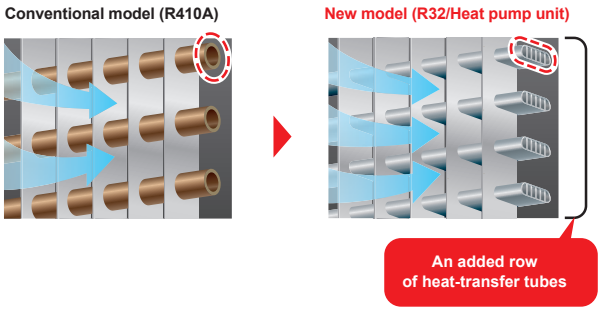
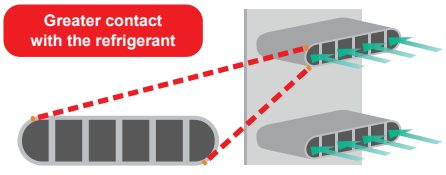


IMAGE OF THE FLAT TUBE



CROSS SECTION OF THE FLAT TUBE



The fins inside the flat tube divide the flow of refrigerant into multiple paths and improve heat-exchanger effectiveness. Flat tubes reduce wind resistance and increase the number of piping stages, resulting in an overall improvement in heat exchange efficiency.

Use of Y-shape structure for effective operation

When the modules are connected, the intake air passages can be ensured on the floor and sides. This structure contributes to effective operation.

High functionality of modular chiller

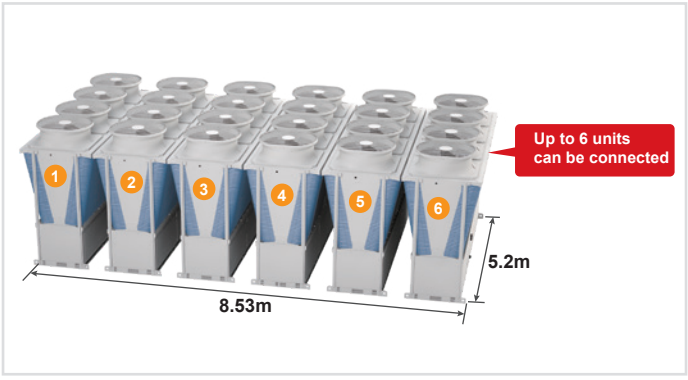
The capacity among 1 group can be increased to up to 360 HP by combining units.

Large-capacity 50 HP and 60 HP units are available. Even a 360 HP system using six 60 HP units can be installed in a floor area of 8.53 m × 5.2 m including the service space

* Only modules with the same capacity can be combined.

Heat Pump	EAHV-M1500YCL(-N)
Cooling Only	EACV-M1500YCL(-N)

Heat Pump	EAHV-M1800YCL(-N)
Cooling Only	EACV-M1800YCL(-N)

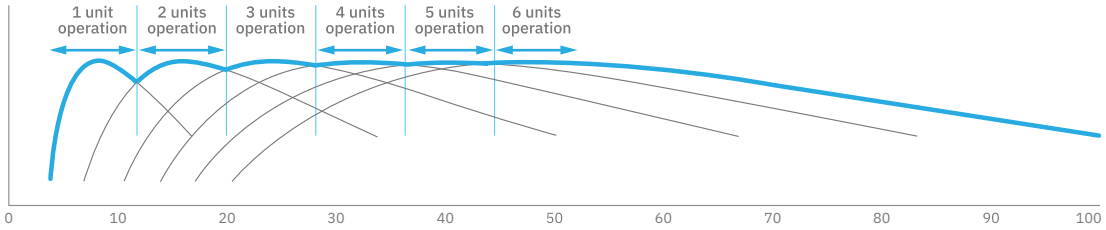


Optimum frequency control

When multiple modules are connected, the frequency of each inverter compressor is controlled during operation to increase the efficiency of each module, achieving a high energy saving performance.

This control can be implemented by simply using our unique M-NET control, without the need for any other on-site design.

HIGH EFFICIENCY IS MAINTAINED

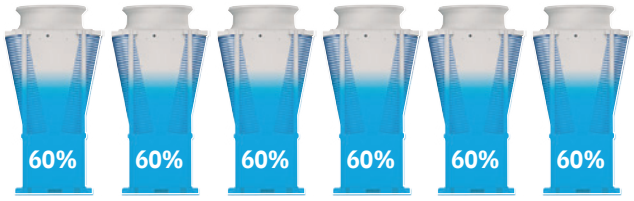


WHEN THE OVERALL SYSTEM LOAD IS 60%

Without optimum frequency control

With non-inverter compressors, it is only possible to turn the unit on or off, and the compressor frequency cannot be adjusted according to the required capacity.

With optimum frequency control



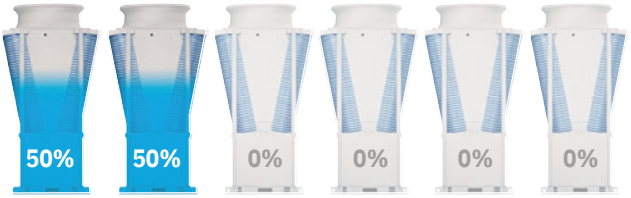
Our modules are equipped with inverter compressors, so the system can be operated in frequency ranges in which the efficiency of each module is at its peak. Optimum frequency control of each unit increases the efficiency of the whole system.

WHEN THE OVERALL SYSTEM LOAD IS 20%

Without optimum frequency control

Since the compressors are running at inefficient frequencies, the efficiency of the whole system is lower.

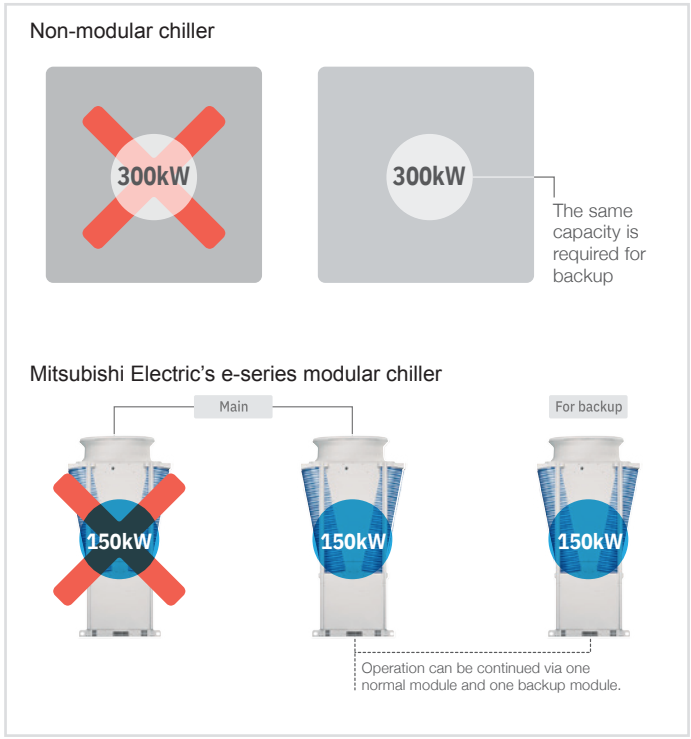
With optimum frequency control

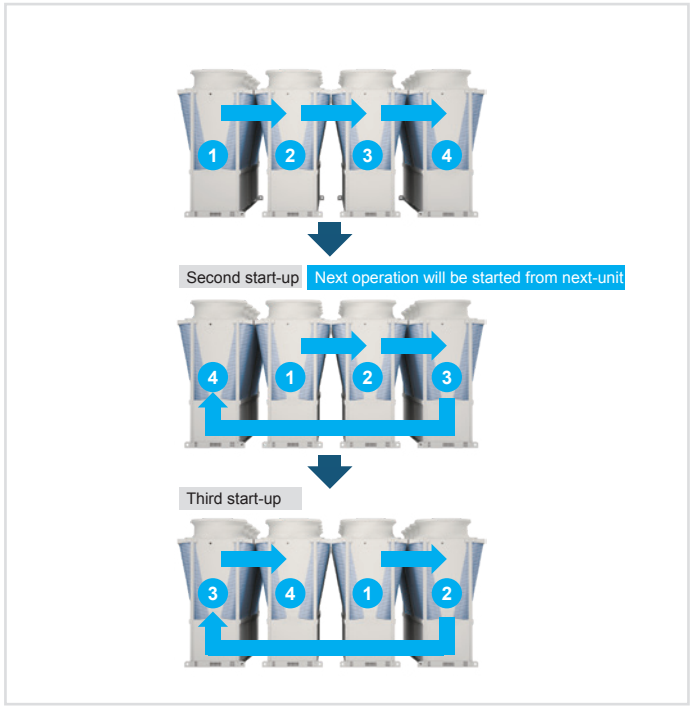


Peak efficiency is between 40 and 60%. In low load conditions, modules can be switched off to **keep remaining modules at optimum efficiency.**
The output of the pumps connected to the remaining group can be decreased, and the efficiency of the whole system is then increased. This control is achieved by connecting to M-NET. There is no need to prepare sensors, and the instrumentation is simple.

Improved redundancy & resilience

When a non-modular chiller is used as the main 300kW unit, as in this example, the same capacity would also be required as a backup. However, when a Mitsubishi Electric e-series modular chiller is used, two modules can still operate even if one module goes down, continuing normal operation. This reduces the backup capacity requirement.

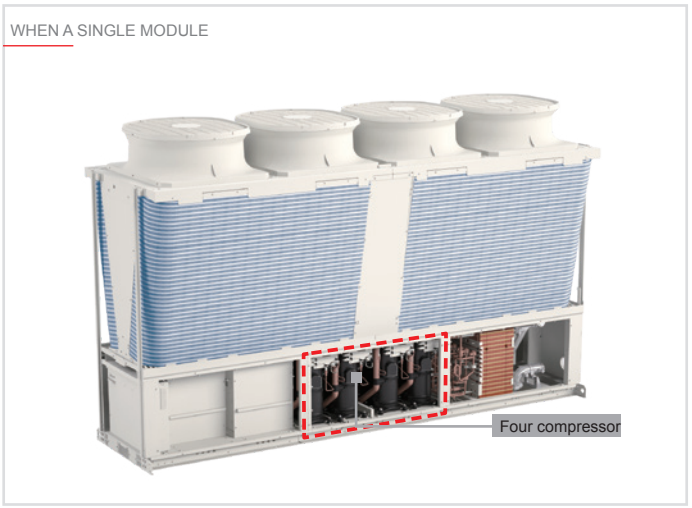




Emergency operation mode

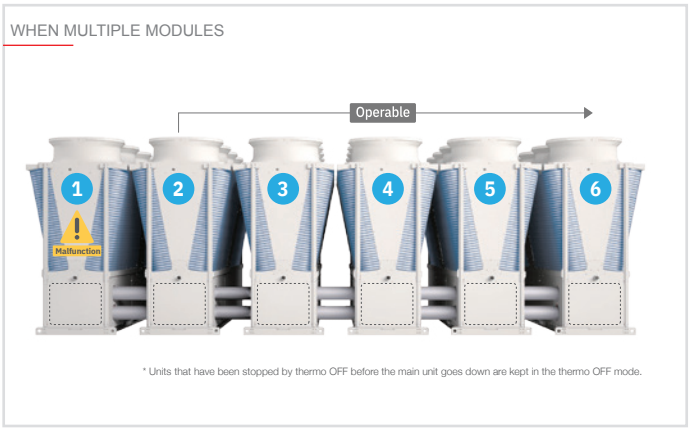
When a single module

The e-series module contains four compressors (two for the 90kW module) developed by Mitsubishi Electric. The four compressors operate as two pairs. If something is wrong with one of the two pairs, the other pair can temporarily continue to operate. The 90kW module achieves this by operating its two compressors independently.



When multiple modules

If one of the e-series modules goes down, the remaining modules can continue to operate. Each module can independently control the outlet water temperature. Even if the main module goes down, operation can be continued.



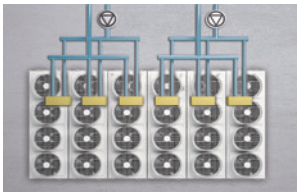
Procedure for installing the connection kit

Selectable piping system

Standard piping and built-in header types are available. The optimum type can be selected according to the design and construction needs of the building.

STANDARD PIPING TYPE

Type without built-in pump or header



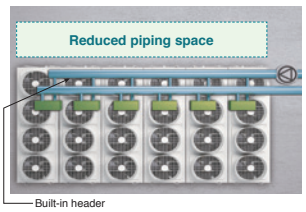
Advantages

The flexibility of design is high, and it is possible to select the most suitable number of pumps and water circuit for the on-site system.

BUILT-IN HEADER TYPE

(models with "-N" in the name only)

Type of built-in header piping for connection between modules



Advantages

The piping space and number of connections are reduced, allowing simple construction and short construction times.
Advantages

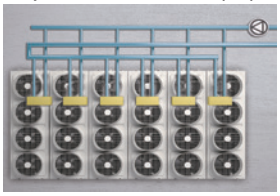
* It is not possible to build both the pump and the header in each unit.

Standard piping type

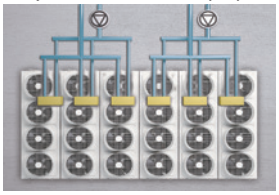
The flexibility of design is high, and the system can be designed according to the on-site system and load pattern. Up to 24 units (4 groups × 6 units) can be connected to one system. The number of pumps and the piping structure can be designed according to the on-site.

STANDARD PIPING TYPE

<System with 6 chillers and one pump>



<System with 6 chillers and 2 pumps>

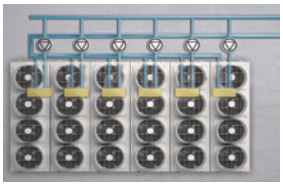


Built-in header type

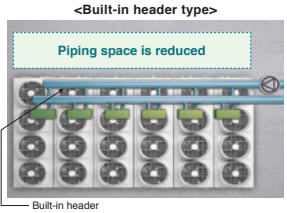
The piping to connect to other units is built into each unit. The number of piping connections is reduced (saving construction work and reducing the construction time), and the installation space can be also reduced.

BUILT-IN HEADER TYPE

<Standard piping construction>



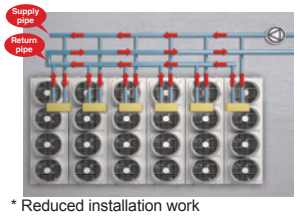
<Built-in header type>



* Less space and equipment cost

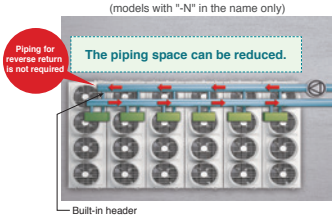
SPACE FOR RETURN PIPING IS NOT REQUIRED

<Standard piping construction>



<Built-in header type>

(models with "-N" in the name only)



* Reduced installation work

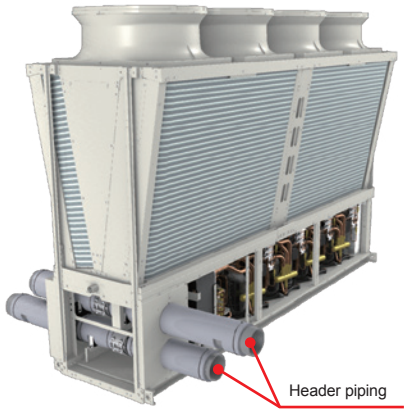
Details of built-in header type modules

Up to six units with built-in headers can be connected. (Piping size: 150A)
When 6 units or a less are connected, flow adjustment and reverse return piping for each unit are unnecessary.

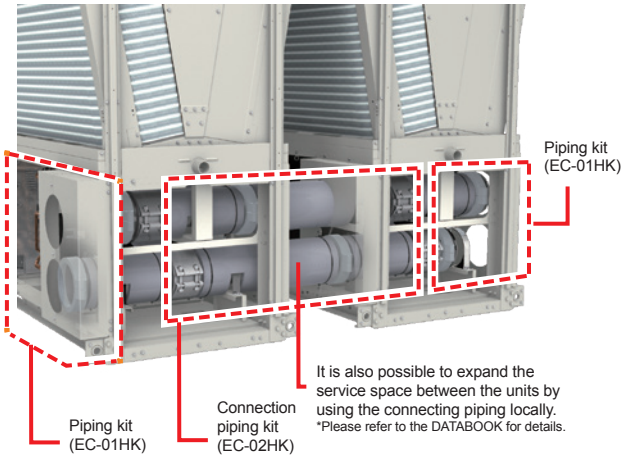
Built-in header type

Header pipings, which are normally required for connecting the unit to local water pipes, are built into the unit. Multiple units are easily connectable by using optional parts. This eliminates the need to procure water pipes for connecting the units, and reduces installation work.

BUILT-IN HEADER TYPE

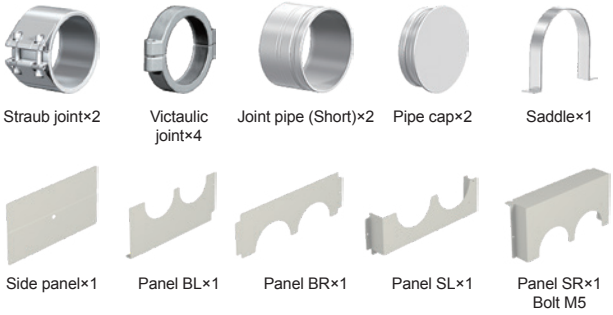


* This photo shows the angle from the piping side.



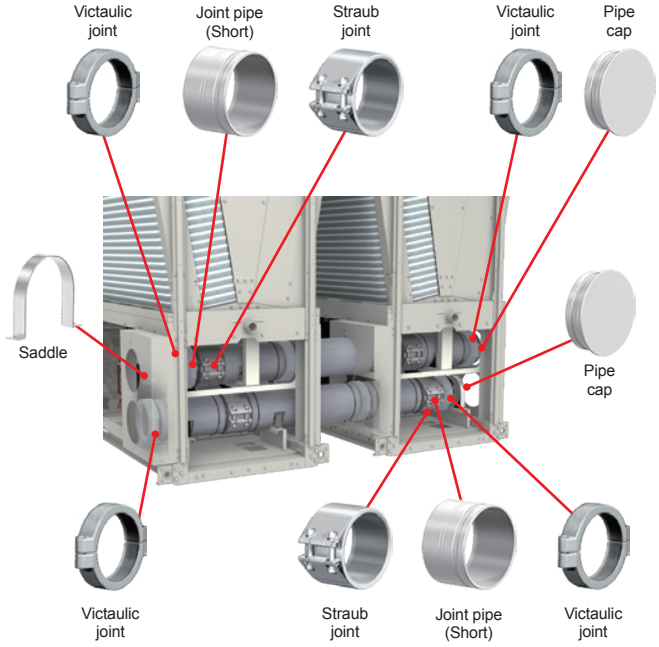
PARTS LIST

EC-01HK
Optional parts
(Piping kit)



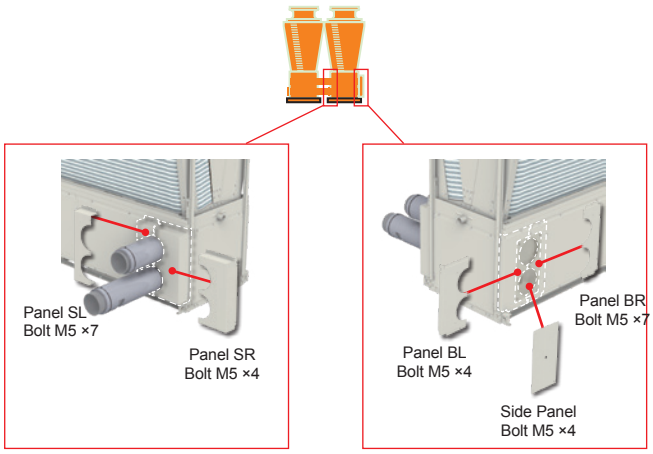
INSTALLING THE PIPING KIT (EC-01HK)

Header piping



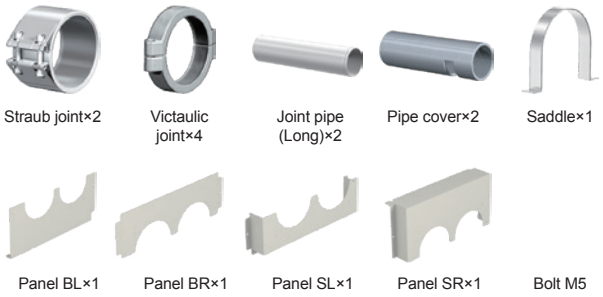
INSTALLING THE PIPING KIT (EC-01HK)

Panel



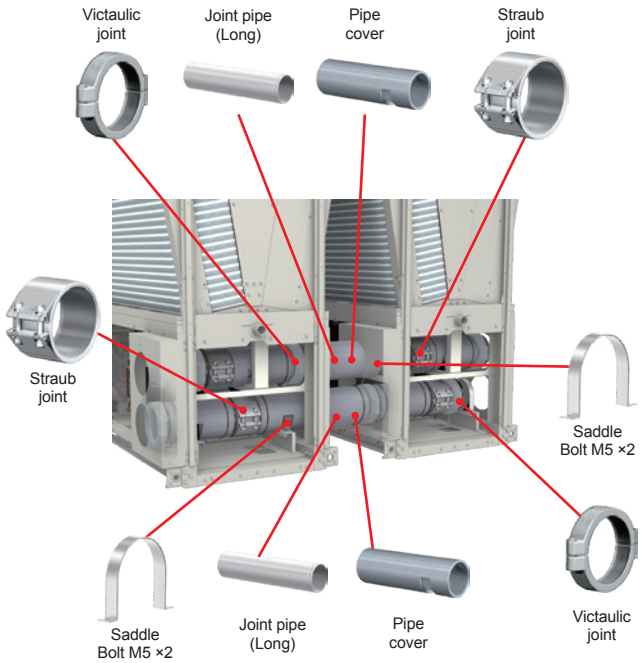
PARTS LIST

EC-02HK
(Connection piping kit)



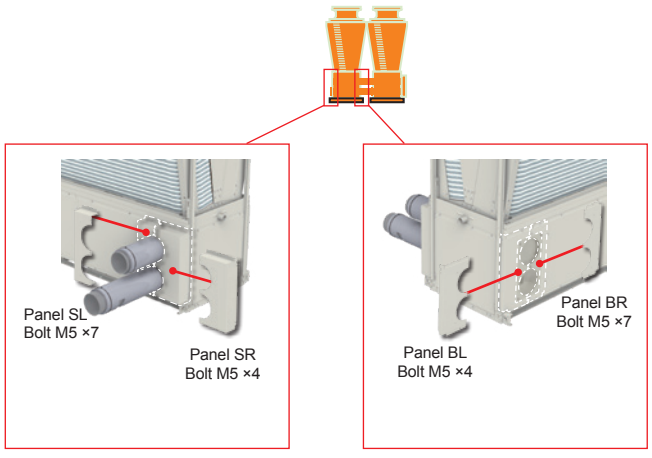
INSTALLING THE PIPING KIT (EC-02HK)

Header piping



INSTALLING THE PIPING KIT (EC-02HK)

Panel



Easy control

The water temperature in each module can be controlled by using local remote controller PAR-W31MAA or by using centralized controller AE-200E. The control method can be selected at the request of each customer.

Remote controller
PAR-W31MAA

Centralized controller
AE-200E

External signal input

Basic operations, such as operation command, mode switching and water temperature setting, can be performed by inputting external signals directly to the unit.

*Optional products, such as remote controllers, are not always required.

Input	ON/OFF
	Cooling/Heating
	Snow/regular
	Demand
	Target water temperature
Output	Operation command
	Operation mode
	vError
Control function (function of chiller)	Control of number of units Control to prevent simultaneous defrosting

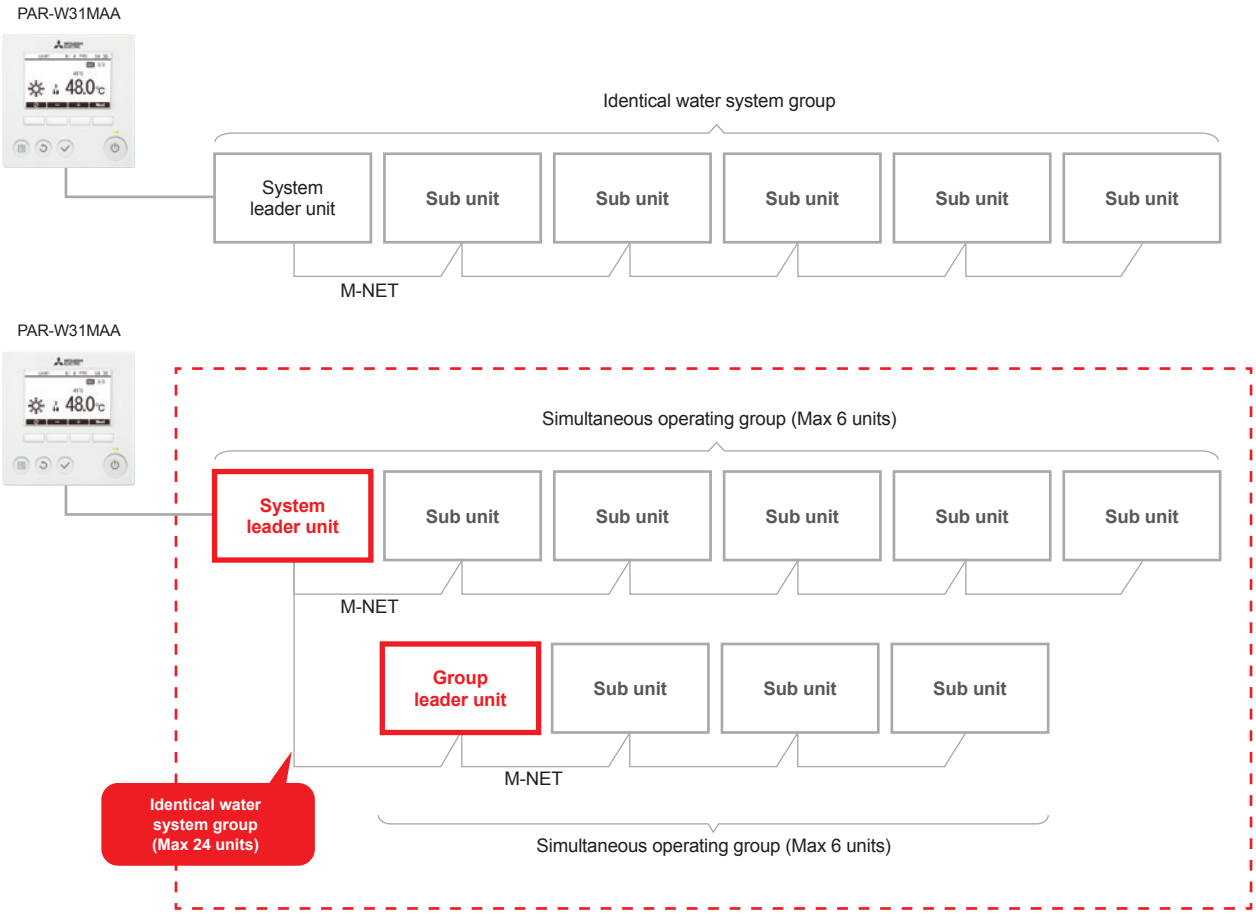
Remote controller

Basic operations, such as ON/OFF, mode switching, water temperature setting and schedule setting, can be performed by connecting a remote controller.

Operation/setting	ON/OFF
	Cooling/Heating/HeatingECO/Anti-freeze
	Snow/Normal
	Demand
	Scheduled operation (daily/weekly)
	Target temperature
Display	Operation mode
	Current water temperature
	Target temperature
	Error code
Control function (function of chiller body)	Control of number of units Control to prevent simultaneous defrosting

PAR-W31MAA

SYSTEM CONFIGURATION



Centralized controller*

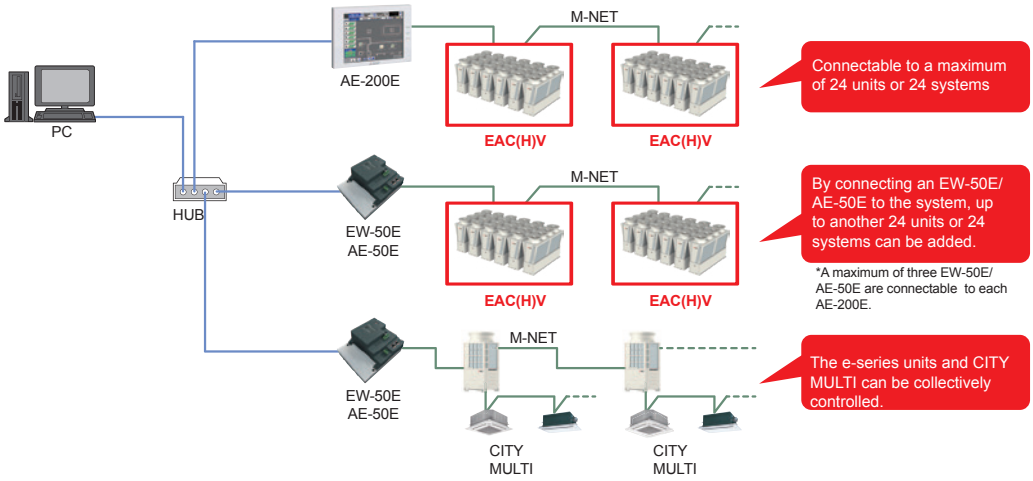
The e-series units are connectable to the AE-200E that centrally controls up to 24 units or 24 systems connected via M-NET.
By using EW-50E or AE-50E, the maximum number of connectable units can be further increased.
The use of AE-200E enables various operation settings and integrated control of the e-series and CITY MULTI.

*AE-200E with software Ver.7.80 or later can be connected.

Operation/setting	ON/OFF
	Cooling/Heating/HeatingECO/Anti-freeze
	Snow/Normal
	Scheduled operation (daily/weekly/annual)
	Target temperature
	Local control disabled (ON/OFF, operation mode, target temperature)
Display	WEB browser connected
	Operation mode
	Current water temperature
	Error code
	Outdoor temperature
Control function (function of chiller body)	Control of number of units Control to prevent simultaneous defrosting

Centralized controller
AE-200E

SYSTEM CONFIGURATION



BACnet® connection function

Connectable to a central monitoring device via AE-200E using BACnet®

*BACnet® is a registered trademark of ASHRAE in the United States of America.
*BACnet® can be connected to AE-200E with software Ver.7.90 or later.

Operation/setting	ON/OFF
	Cooling/Heating/Heating ECO/Anti-freeze
	Snow/Normal
	Target water temperature
	Local control disabled (ON/OFF, operation mode, target temperature)
Display	ON/OFF
	Cooling/Heating/Heating ECO/Anti-freeze
	Snow/Normal
	Local control disabled (ON/OFF, operation mode, target temperature)
	Inlet/outlet water temperature
	Collective error
	Communication error
	Individual unit error

Technical specifications COOLING ONLY MODEL

MODEL		SET	EACV-M1500YCL(-N)(-BS)	EACV-M1800YCL(-N)(-BS)
Power source			3-phase 4-wire 380-400-415V 50/60Hz	
Cooling capacity *1		kW	150.00	180.00
		kcal/h	129,000	154,800
		BTU/h	511,800	614,160
	Power input	kW	44.73	57.02
	EER		3.35	3.16
	IPLV *4		6.42	6.31
	Water flow rate	m^3/h	25.8	31.0
Cooling capacity(EN14511) *2		kW	149.18	178.80
		kcal/h	128,295	153,768
		BTU/h	509,002	610,066
	Power input	kW	45.55	58.22
	EER (EUROVENT certified)		3.28	3.07
	SEER		5.52	5.36
	Water flow rate	m^3/h	25.8	31.0
Current input	Cooling current 380-400-415V *1	A	76 - 72 - 69	96 - 91 - 88
	Maximum current	A	120	
Water pressure drop *1	Standard piping	kPa	56	79
	Inside header piping	kPa	134	190
Temp range	Cooling	°C	Outlet water 5~30 *5	
		°F	Outlet water 41~86 *5	
	Outdoor	°C	-15~52 *5	
		°F	5~125.6 *5	
Circulating water volume range		m^3/h	12.9~34.0	
Sound pressure level (measured in anechoic room) at 1m *1		dB (A)	65	67
Sound power level (measured in anechoic room) *1		dB (A)	83	85
Diameter of water pipe (Standard piping)	Inlet	mm (in)	65A (2 1/2B) housing type joint	
	Outlet	mm (in)	65A (2 1/2B) housing type joint	
Diameter of water pipe (Inside header piping)	Inlet	mm (in)	150A (6B) housing type joint	
	Outlet	mm (in)	150A (6B) housing type joint	
External finish			Polyester powder coating steel plate	
External dimension HxWxD		mm	2350 x 3400 x 1080	
Net weight	Standard piping	kg (lbs)	1039 (2291)	
	Inside header piping	kg (lbs)	1067 (2352)	
Design pressure	Refrigerant	MPa	4.15	
	Water	MPa	1.0	
Heat exchanger	Water side		Stainless steel plate and copper brazing	
	Air side		Salt-resistant corrugated fin & aluminium micro channel	
Compressor	Type		Inverter scroll hermetic compressor	
	Maker		MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	
	Quantity		4	
	Motor output	kW	11.5 x 4	
	Lubricant		MEL46EH	
Fan	Air flow rate	m^3/min	270 x 4	
		L/s	4500 x 4	
		cfm	9534 x 4	
	Type, Quantity		Propeller fan x 4	
	Starting method		Inverter	
	Motor output	kW	0.92 x 4	
	External static press.	Pa	20	
Protection	High pressure protection		High pres.Sensor & High pres.Switch at 4.15MPa (601psi)	
	Inverter circuit		Over-heat protection, Over current protection	
	Compressor		Over-heat protection	
Refrigerant *3	Type x charge		R32 x 4.7 (kg) x 4 *3	
	Control		LEV	

*1 Under normal cooling conditions at outdoor temp 35°C DB / 24°C WB (95°F DB / 75.2°F WB) outlet water temp 7°C (44.6°F) inlet water temp 12°C (53.6°F). Pump input is not included in cooling capacity and power input.
*2 Under normal cooling conditions at outdoor temp 35°C DB / 24°C WB (95°F DB / 75.2°F WB) outlet water temp 7°C (44.6°F) inlet water temp 12°C (53.6°F). Pump input is included in cooling capacity and power input based on EN14511.
*3 Amount of factory-charged refrigerant is 3 (kg) x 4. Please add the refrigerant at the field.
*4 IPLV is calculated in accordance with AHRI 550-590.
*Please don't use the steel material for the water piping.
*Please always make water circulate, or pull the circulation water out completely when not in use.
*Please do not use groundwater or well water directly.
*The water circuit must be closed circuit.
*Due to continuous improvement, the above specifications may be subject to change without notice.
*This model is not equipped with a pump.

Technical specifications HEATPUMP MODEL

MODEL		SET	EAHV-M1500YCL(-N)(-BS)	EAHV-M1800YCL(-N)(-BS)
Power source			3-phase 4-wire 380-400-415V 50/60Hz	
Cooling capacity *1		kW	150.00	180.00
		kcal/h	129,000	154,800
		BTU/h	511,800	614,160
	Power input	kW	44.73	57.02
	EER		3.35	3.16
	IPLV *6		6.42	6.31
	Water flow rate	m^3/h	25.8	31.0
Cooling capacity(EN14511) *2		kW	149.18	178.80
		kcal/h	128,295	153,768
		BTU/h	509,002	610,066
	Power input	kW	45.55	58.22
	EER (EUROVENT certified)		3.28	3.07
	SEER		5.52	5.36
	Water flow rate	m^3/h	25.8	31.0
Heating capacity *3		kW	150.00	180.00
		kcal/h	129,000	154,800
		BTU/h	511,800	614,160
	Power input	kW	42.61	53.09
	COP		3.52	3.39
	Water flow rate	m^3/h	25.8	31.0
Heating capacity(EN14511) *4		kW	150.82	181.20
		kcal/h	129,705	155,832
		BTU/h	514,598	618,254
	Power input	kW	43.43	54.29
	COP		3.47	3.34
	SCOP Low temp. application/Medium temp. applic.		3.31 / 2.88	
	Water flow rate	m^3/h	25.8	31.0
Current input	Cooling current 380-400-415V *1	A	76 - 72 - 69	96 - 91 - 88
	Heating current 380-400-415V *3	A	72 - 68 - 66	90 - 85 - 82
	Maximum current	A	120	
Water pressure drop *1	Standard piping	kPa	56	79
	Inside header piping	kPa	134	190
Temp range	Cooling	°C	Outlet water 4~30 *7	
		°F	Outlet water 39.2~86 *7	
	Heating	°C	Outlet water 25~55 *7	
		°F	Outlet water 77~131 *7	
	Outdoor (Cooling)	°C	-15~52 *7	
		°F	5~125.6 *7	
	Outdoor (Heating)	°C	-20~43 *7	
		°F	-4~109.4 *7	
Circulating water volume range		m^3/h	12.9~43.0	
Sound pressure level (measured in anechoic room) at 1m *1		dB (A)	65	67
Sound power level (measured in anechoic room) *1		dB (A)	83	85
Diameter of water pipe (Standard piping)	Inlet	mm (in)	65A (2 1/2B) housing type joint	
	Outlet	mm (in)	65A (2 1/2B) housing type joint	
Diameter of water pipe (Inside header piping)	Inlet	mm (in)	150A (6B) housing type joint	
	Outlet	mm (in)	150A (6B) housing type joint	
External finish			Polyester powder coating steel plate	
External dimension HxWxD		mm	2350 x 3400 x 1080	
Net weight	Standard piping	kg (lbs)	1280 (2822)	
	Inside header piping	kg (lbs)	1307 (2881)	
Design pressure	Refrigerant	MPa	4.15	
	Water	MPa	1.0	
Heat exchanger	Water side		Stainless steel plate and copper brazing	
	Air side		Salt-resistant cross fin & aluminium tube	
Compressor	Type		Inverter scroll hermetic compressor	
	Maker		MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	
	Quantity		4	
	Motor output	kW	11.5 x 4	
	Lubricant		MEL46EH	
Fan	Air flow rate	m^3/min	270 x 4	
		L/s	4500 x 4	
		cfm	9534 x 4	
	Type, Quantity		Propeller fan x 4	
	Starting method		Inverter	
	Motor output	kW	0.92 x 4	
	External static press.	Pa	20	
Protection	High pressure protection		High pres.Sensor & High pres.Switch at 4.15MPa (601psi)	
	Inverter circuit		Over-heat protection, Over current protection	
	Compressor		Over-heat protection	
Refrigerant *5	Type x charge		R32 x 11.5 (kg) x 4 *5	
	Control		LEV	

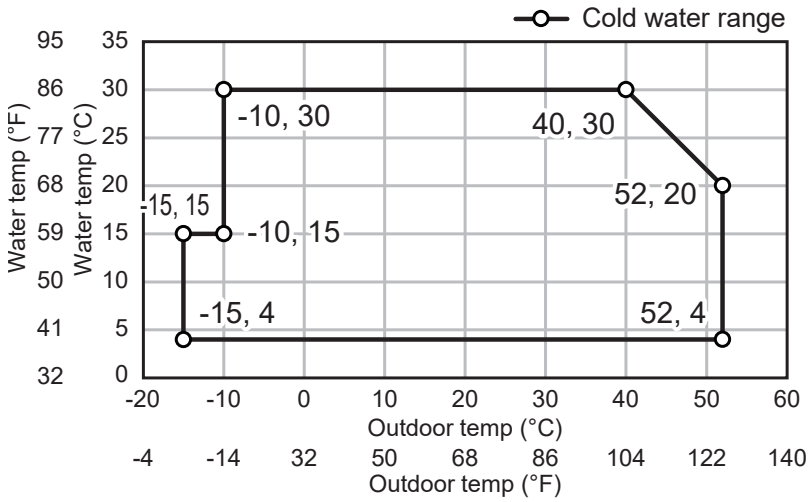
*1 Under normal cooling conditions at outdoor temp 35°C DB / 24°C WB (95°F DB / 75.2°F WB) outlet water temp 7°C (44.6°F) inlet water temp 12°C (53.6°F). Pump input is not included in cooling capacity and power input.
*2 Under normal cooling conditions at outdoor temp 35°C DB / 24°C WB (95°F DB / 75.2°F WB) outlet water temp 7°C (44.6°F) inlet water temp 12°C (53.6°F). Pump input is included in cooling capacity and power input based on EN14511.
*3 Under normal heating conditions at outdoor temp 7°C DB / 6°C WB (44.6°F DB / 42.8°F WB) outlet water temp 45°C (113°F) inlet water temp 40°C (104°F). Pump input is not included in heating capacity and power input.
*4 Under normal heating conditions at outdoor temp 7°C DB / 6°C WB (44.6°F DB / 42.8°F WB) outlet water temp 45°C (113°F) inlet water temp 40°C (104°F). Pump input is included in heating capacity and power input based on EN14511.
*5 Amount of factory-charged refrigerant is 3 (kg) x 4. Please add the refrigerant at the field.
*6 IPLV is calculated in accordance with AHRI 550-590.
*Please don't use the steel material for the water piping.
*Please always make water circulate, or pull the circulation water out completely when not in use.
*Please do not use groundwater or well water directly.
*The water circuit must be closed circuit.
*Due to continuous improvement, the above specifications may be subject to change without notice.
*This model is not equipped with a pump.

Operating limits

COOLING ONLY

Operable in cooling mode at an intake air temperature of up to 52°C.

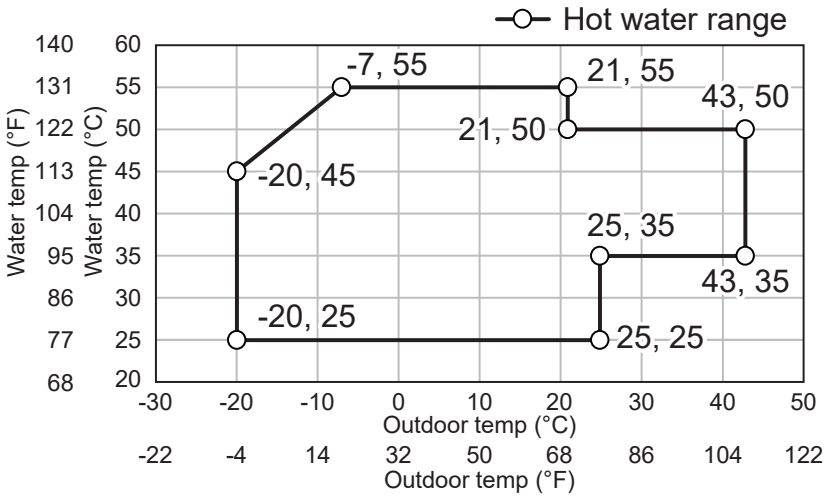
The use of the flat tube heat exchanger has made it possible to increase the maximum intake air temperature from 43°C to 52°C in cooling mode, extending the cooling performance of the units in intense heat and in collective installation.

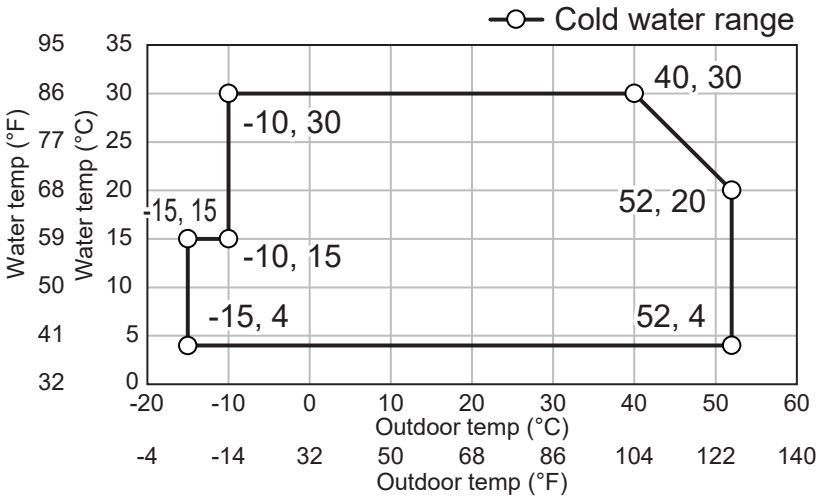


REVERSIBLE HEAT PUMP

Operable in heating mode at an intake air temperature of down to -20°C.

The new model has a greater heating capacity range due to the flat tube heat exchanger and the suction chamber injection mechanism of the compressor. It is operable at the minimum intake air temperature of -20°C and the minimum outlet water temperature of 25°C.
The new model is suitable for use in manufacturing lines requiring heating throughout the year.



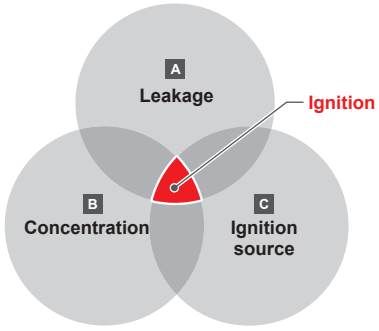


R32 refrigerant properties

Under the conditions shown below, there is a possibility that R32 could burn.

	R32	R410	R22
Chemical formula	CH_2F_2	CH_2F_2/CHF_2CF_3	$CHClF_2$
Composition (blend ratio wt. %)	Single composition	R32/R125 (50/50 wt %)	Single composition
Ozone depletion potential (ODP)	0	0	0.055
Global warming potential (GWP) *1	675	2088	1810
LFL(vol.%) *2	13.3	-	-
UFL(vol.%) *3	29.3	-	-
Flammability *4	Lower flammability (2L)	No flame propagation (1)	No flame propagation (1)

*1 IPCC 4th assessment report
*2 LFL: Lower flammable limit
*3 UFL: Upper flammable limit
*4 ISO 817:2014
*5 R32 consistency is higher than LFL*2 and lower than UFL*3.

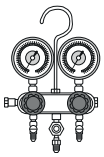
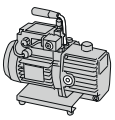
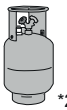


A **Do not leak refrigerant.**
<Installation> • Vacuum drying should be done.
Do not release refrigerant into the atmosphere unnecessarily.
• Follow "Installation points of charging refrigerant."
<Repair/Removal> • Refrigerant should be recovered.

B **Prevent concentration.**
• Follow "Installation restrictions".

C **Keep ignition sources away from the unit.**
• Do not braze pipes that contain refrigerant. Before brazing, refrigerant should be recovered.
• Do not install the unit while electricity is on. Turn off electricity and check using a tester.
• Do not smoke during work and transportation.

Note: Both R32 / R410A emit toxic gas when exposed to naked flame.

TOOLS	Gauge manifold	Charge hose	Electronic weight scales	Charge valve	Electric leak tester (Gas leak detector)	Vacuum pump	Vacuum pump adapter	Refrigerant recovery equipment	Refrigerant recovery cylinder
								 *1	 *2
R32	Shareable *3	Shareable *3	Shareable *3	Shareable *3	Shareable *3	Shareable *3	Shareable *3	Shareable *3	EXCLUSIVE
R410									EXCLUSIVE

NOTE: Be sure to confirm with the manufacturers that the electric leak tester, vacuum pump and refrigerant recovery equipment are compliant with R32.
*1 Refer to catalogs provided by the manufacturers of the tools above to ensure that the tools are usable with R32.
*2 Do not use R32 and R410A in combination in the same refrigerant recovery cylinder.
*3 The types of tools required for R32 units and R410A units are the same. Each tool must be used only with either R32 units or R410A units.

PROCEDURE FOR CHARGING REFRIGERANT

Before work	Confirmation of refrigerant type	Confirm the spec label.
Work	Confirmation of installation restrictions	Be sure to follow "Installation restrictions".
	Charging of additional refrigerant	Use a gauge manifold, charge hose and charge valve compliant with R32.
	Gas leak inspection	Use a leak tester compliant with R32.

Installation restrictions

Do not install the unit where combustible gas may leak
- If combustible gas accumulates around the unit, fire or explosion may result.

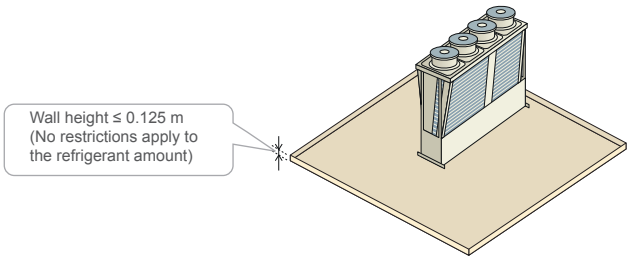
- Provide sufficient space around the unit for effective operation, efficient air movement, and ease of access for maintenance
- All restrictions mentioned in this manual apply not only to new installations but also to relocations and layout changes
- Refer to the Installation manual for other precautions on installation

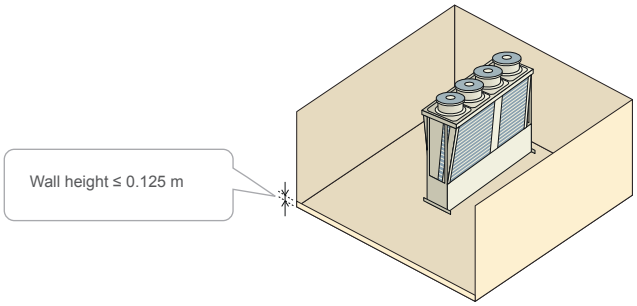
Installation space requirement
- Do not install the unit inside a building such as the basement or machine room, where the refrigerant may stagnate
- Install the unit in a place where at least one of four sides is open

CORRECT INSTALLATION

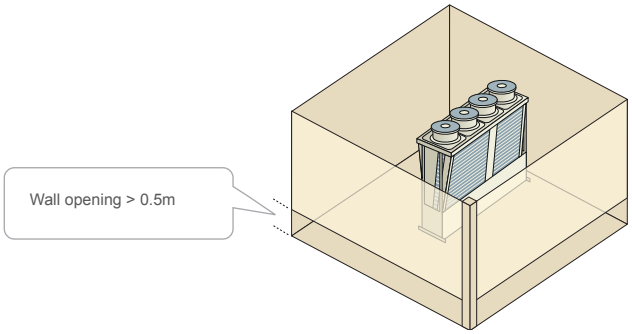
If the unit needs to be installed in a space where all four sides are blocked, confirm that one of the following situations (A or B) is satisfied.

A Install the unit in a space with a wall height of ≤ 0.125 m.

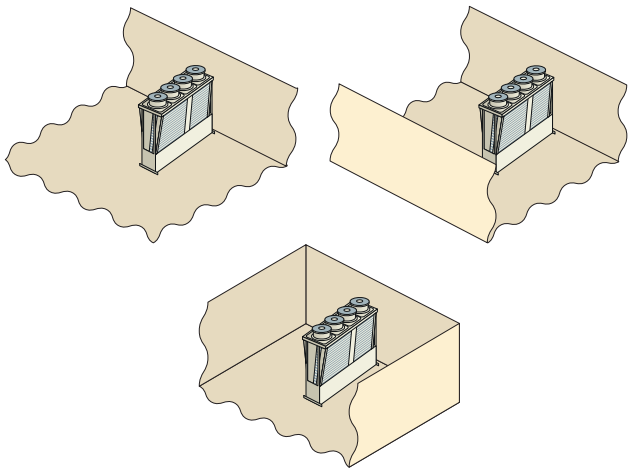




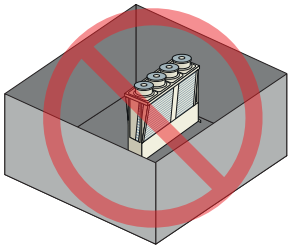
B Create an appropriate ventilation opening.



CORRECT INSTALLATION



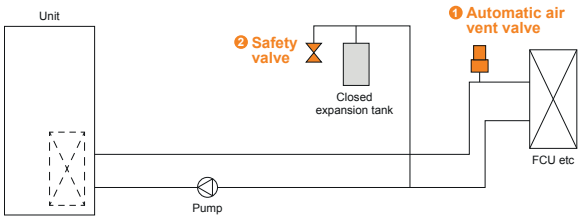
INCORRECT INSTALLATION



Regulatory requirements for safety

See below for information on installing a safety device on the air cooled chilling unit system

*Safety devices shall be regularly inspected, maintained, and replaced in accordance with relevant laws, regulations, and the instructions of the manufacturers.
*The requirements listed below were established based on IEC60 335-2-40 (Edition 5.0) G.G.6. See the original standards for fu rther information on selecting a safety device.



Required items	Note
Automatic air vent valve	* In the event of a failure of the waterside heat exchanger in the unit, the refrigerant may leak from the automatic air vent valve, so install it in a place where the refrigerant will not accumulate, such as outdoors.
Safety valve	* In the event of a failure of the waterside heat exchanger in the unit, the refrigerant may leak from the safety valve, so install it in a place where the refrigerant will not accumulate, such as outdoors.

IT Cooling

s-MEXT split system

MULTIDENSITY modular system


MEMORY
STATUS ONLINE
BACKUP
TIME 19:52
POWER
HDD1 FAN1 HIGH
HDD2 FAN2 MID
HDD3 FAN3 LOW
LAN1 ONLINE
LAN2 ONLINE
LAN3 ONLINE
LAN4 ONLINE

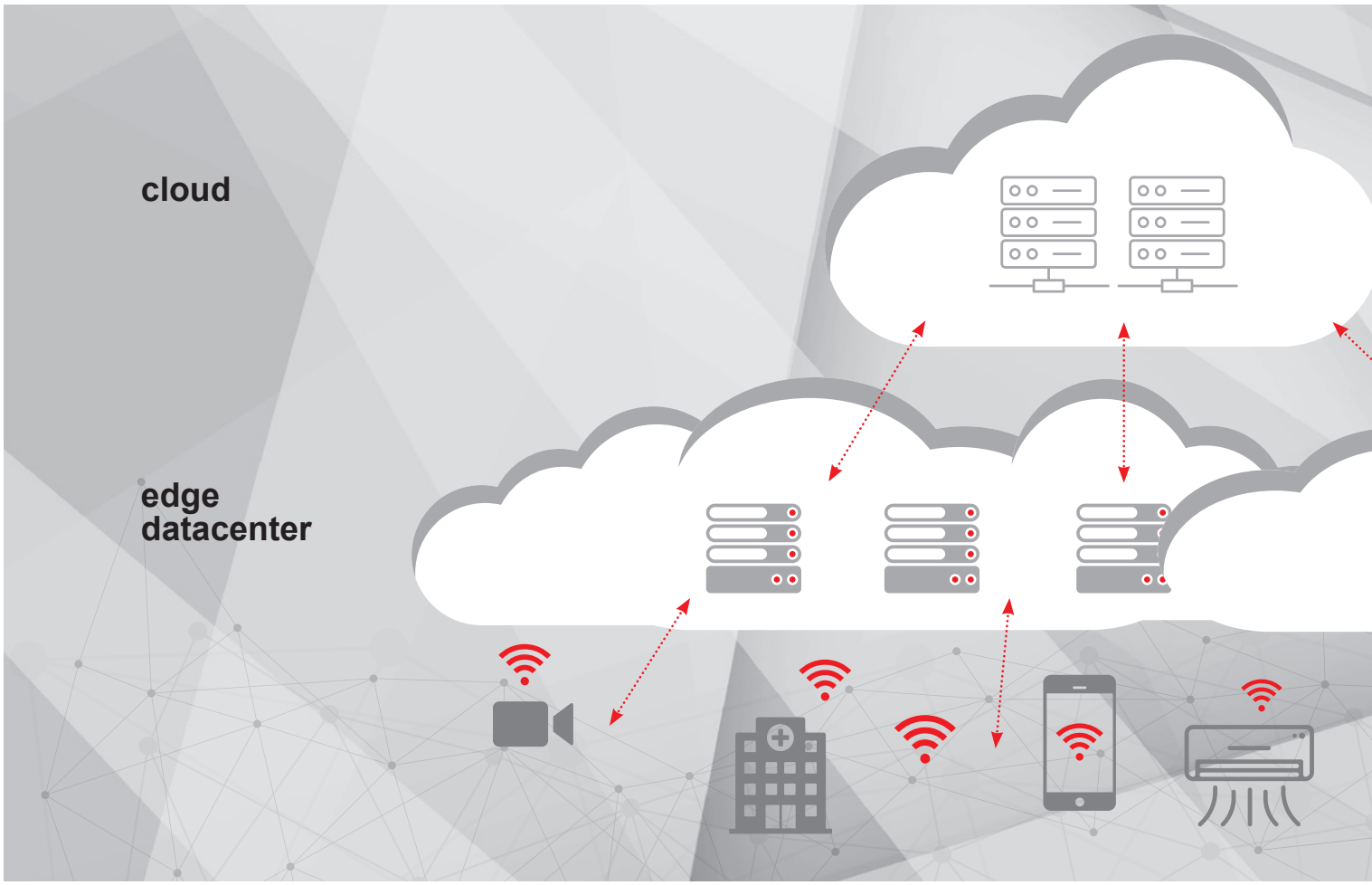
s-MEXT split system

Close Control Unit for IT Cooling applications.
Direct expansion system, full inverter for Edge Data Center.

Edge computing: the new trend for cloud decentralization

A new concept that places it self side by side to cloud computing is appearing on the market, thanks to the unstoppable digital transformation we are experiencing. It's the Edge computing.
In 2018, into the top ten strategic technological trends for companies and organizations, Gartner, a leading company in research and consulting, reported the "Cloud to the Edge" trend in fifth position.
This technology imposes the cloud decentralization, which translate into a new reference model for designing data centers. Concepts like IoT, 5G will inevitably lead a resources fragmentation in data centers management. In fact, we speak of granularity, investments in smaller and widespread data centers, developed to respond to the growing demand for web connections with low latency and high performances.
As result, data processing times will have to be faster, and the only way to comply with both the connections' growing number and consumers' needs in terms of performances will have to be, according to the experts, to data processing closer to the users themselves.
Then we start to talk about Edge Data Centers, little data centers or server rooms, scattered on territory and used to host cloud services and local data processing.


cloud
users


cloud
edge
datacenter

Cloud Computing

Traditional cloud model

The traditional model is facing some latency problems, limited brandwidth, dependability that cause traffic congestions, not suitable for future IoT implementations.
Advantages: large data processing capacity for complex analysis.
Products and applications: chillers, precision conditioners, infrastructures, control systems and accessories with RC brand.

Edge Computing

Distributed intellingence model

Edge computing, by distributing intelligence, will bring down the reduction of the amount of datas to be processed, prioritizing management of critical datas, latency sensitive, next to the users, filtering and passing to the cloud less impacting datas. It will manage big data processing.
Advantages: low latency, high elaboration performances with less investments in infrastructures.
Products and applications: precision air conditioners, infrastructures, control systems and accesories branded Mitsubishi Electric an RC.

s-MEXT G00 system

R32

HIGH EFFICIENCY LEVEL,
REDUCED OCCUPATION

S-MEXT COMBINES MORE THAN 50 YEARS OF EXPERIENCE OF RC BRAND IN THE IT COOLING MARKET, WITH THE MITSUBISHI ELECTRIC EXCELLENCE QUALITY.

S-MEXT AND MR. SLIM
PERFECT SYNERGY

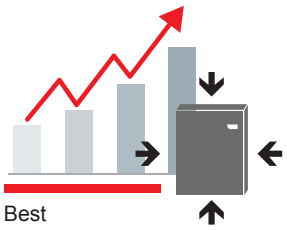
MITSUBISHI ELECTRIC QUALITY
READY TO SERVE YOUR EDGE
DATA CENTER

Mitsubishi Electric present s-MEXT, developed with the RC experience and notoriety in the IT Cooling market: the brand new combined system that combines all the experience of a specialized brand in precision air conditioning with the tecnological excellence and reliability of Mitsubishi Electric.

The innovative system dedicated to Edge Data Center combines a precision air conditioner (indoor unit) with the commercial outdoor unit of Mr.Slim series.

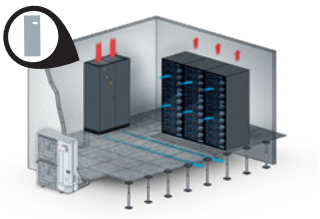
Best kW/m² Ratio

Thanks to the innovative system, s-MEXT guarantees high level performances while occupying very small floor space.
It's compact layout allows to easily integrate the unit in existing data centers, without sacrificing any kW per square meter.



Beyond the traditional Operational limits

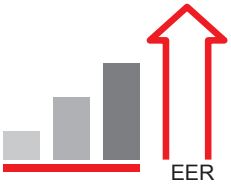
The continuous increase of the thermal load in the IT environments has led to an increasing temperature inside the server rooms (up to 27°C) s-MEXT system has been developed to operate with return air temperature up to 35°C.



Efficiency beyond expectations

A data center's air conditioning system accounts for over 40% of total data center energy consumption. An efficient approach to air conditioning can generate an enormous advantage in efficiency and reduction of operating costs.
s-MEXT system is characterized by high quality components and control logics aimed at managing the system in the most efficiency mode.

- DC inverter scroll for linear and continuous modulation of cooling capacity based on the load.
- DC fans for best modulation of the air flow.



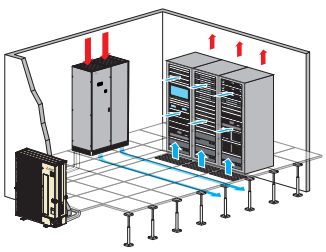
Flexibility in the air flows' choice

Flexible installation of the unit, thanks to the possibility of choosing between two air requirements: Under and Over.

UNDER

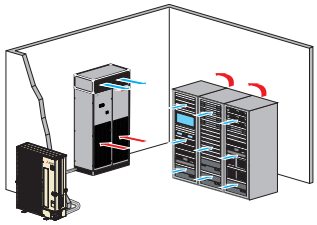
With air delivery down, and air intake on the top.

Ideal for environments with raised floor.



OVER

With air delivery from the top and fron air intake.
Ideal for environments with standard floors.



s-MEXT G00 Indoor Unit

R32

PRECISION CONDITIONER (INDOOR UNIT)

ABLE TO MANAGE TEMPERATURE AND HUMIDITY VARIABLES, WITH EXTREME PRECISION, EVEN IN THE EVENTS OF LARGE LOADS VARIATIONS

DESIGNED TO PERFECT COMBINE EFFICIENCY AND RELIABILITY IN ALL OPERATIONG CONDITIONS, THESE INDOOR UNIT USES ONLY CERTIFIED AND HIGH QUALITY COMPONENTS: EC FAN, DX COIL WITH HYDROLYSIS TREATMENT AND ADVANCED CONTROL SYSTEM.

A WIDE RANGE OF ACCESORIES COMPLETES THE SERIE AND MAKES S-MEXT SUITABLE FOR THE MOST CRITICAL ENVIRONMENTAL'S CONDITIONS

Quick and easy installation

The construction features and the unit layout have been designed to ensure quick installation and facilitate front access for easy maintenance activity.

New EC inverter fan

High performance EC fan ensures a perfect modulation of air flow for partial loads. Made of ultra-light polymeric material, this fan is distinguished by:
- Sound level reduction by 4-5 dB(A);
- Reduction of 25% of power consumption, compared to traditional solutions.

Advanced Control System

Control System is the heart of the unit. Designed for monitoring and to operate the fuctional and environmetnal single unit's parameters. The Control System allows:
- Automatic reset after power failures;
- Serial interconnection with most modern BMS systems;
- up to 100 events recording;
- "Non-volatile" data storage for saving files;

Via simple and intuitive graphic display.

R32 INVERTER EEV EC FAN

Technical specifications

MODEL			006	009	013	022	028	038	044
	Outdoor unit	n°	1	1	1	1	1	2	2
	Model	PUZ-ZM	60 VHA	100 VKA	125 VKA/125 YKA	250 YKA	250 YKA	200 YKA	250 YKA
Cooling (1)	Cooling capacity	kW	6,82	10,1	11,9	22,6	28	39	42,5
	Sensible	kW	6,18	8,91	10,2	19,3	26,2	33,6	35,3
	SHR (2)		0,91	0,88	0,86	0,85	0,94	0,86	0,83
	System EER (nominal) 27°C - 47% RH		4,67	4,3	3,49	3,18	2,68	3,58	2,88
Supply Fan	Supply Fan	n°	1	1	1	2	1	1	1
	Air flow	m³/h	2000	2500	2800	5000	7600	8800	10000
	Nominal external static pressure	Pa	20	20	20	20	20	20	20
	Maximum external static pressure	Pa	208	22	110	21	305	129	20
	Power input (3)	kW	0,21	0,35	0,47	0,7	0,64	1,43	1,96
Indoor unit electrical data	Absorbed current (3)	A	1,5	2,1	2,7	3	2,1	2,1	2,8
	Starting current	A	2	2	2,8	3,3	3,8	3,8	3,8
	Maximum absorbed current	A	2,3	2,3	2,8	3,9	3,8	3,8	3,8
	Electrical panel Power input	kW	0,14	0,14	0,14	0,14	0,14	0,14	0,14
Sound level (ISO 3744) (4)	Pressure level	dB(A)	53	57	61	60	60	63	37
	Power level	dB(A)	69	73	77	76	76	79	83
Air Filters	Air Filters	n°	1	1	1	2	4	4	4
	Extended filtering surface	m²	0,68	0,68	0,68	1,05	1,76	1,76	1,76
	Efficiency (ISO EN 16890)	COARSE	60%	60%	60%	60%	60%	60%	60%
Refrigerant circuits		n°	1	1	1	1	1	2	2
Power supply		V/Ph/Hz	230/1/50	230/1/50	230/1/50	230/1/50	400/3+N/50	400/3+N/50	400/3+N/50
Dimensions	Length	mm	600	600	600	1000	1000	1000	1000
	Depth	mm	500	500	500	500	500	890	890
	Height	mm	1980	1980	1980	1980	1980	1980	1980
Net Weight	Over	kg	103	106	110	165	237	237	237
	Under	kg	110	115	120	175	247	247	247
Connections	Refrigerant pipes: Gas - Liquid	Ø Inch	5/8" - 3/8"	5/8" - 3/8"	5/8" - 3/8"	1" - 1/2"	1" - 1/2	1" - 3/8	1" - 1/2
	Condensate (5)	Ø mm	19	19	19	19	19	19	19
	Power supply wiring cable (6)	n° x mm²	3G1.5	3G1.5	3G1.5	3G1.5	5G1.5	5G1.5	5G1.5

Notes:
THE COOLINC CAPACITY DOES NOT CONSIDER THE SUPPLY FAN MOTOR THERMAL LOAD
(1) Gross value. Characteristics referred to entering air at 27°C-47% RH; Ambient temperature 35°C; ESP=20Pa; Connection pipes length 5m;
(2) SHR= Sensible cooling capacity / Total cooling capacity.
(3) Corresponding to the nominal ESP=20Pa.
(4) Sound pressure level on air return at 1m .
(5) Rubber pipe-referred to internal diameter.
(6) Minimum section.
These units contain <HFC R32 [GWP100 675]> fluorinated greenhouse gas.

Mr. SLIM

OUTDOOR UNIT

OUTDOOR UNIT EQUIPPED WITH DC SCROLL INVERTER COMPRESSOR AND AXIAL FANS WITH DC ELECTRIC MOTOR

THE HEAT EXCHANGER IS THUS EXPLOITED ENTIRELY IN ITS EXCHANGE SURFACE.

OUTDOOR UNIT THAT BENEFIT FROM SCROLL COMPRESSOR, IS ALSO EQUIPPED WITH A DEVICE CALLED "POWER RECEIVER", A REFRIGERANT ACCUMULATOR ACCOMPAINED BY A PAIR OF LEV VALVES, WITH THE DUAL FUNCTION (SUBCOOLING/OVERHEATING THE REFRIGERANT).

Technologies and Functions

Mr.Slim presents excellent performances in all loading conditions thanks to the sophisticated power inverter technology with advanced features:
- "Rotation and Backup" function for automatic switching on a second unit in case of first unit block
- "Easy and fast maintenance" function and authomatic monitoring of the refrigerant status

Linear Expansion Valve (LEV)

The Mr.Slim linear expansion valve (LEV) allows precise regulation of the refrigerant flow, optimizing the compressor's performances:
- Fast achievement of system stability
- Quick adaptation to load fluctuations

Scroll Inverter compressor

Full inverter technology applied to the compressor allows continuous modulation of the cooling capacity according to the real needs of the servers.
In this way the rotation speed is continuously modulated helping to significantly increase the efficiency for partial loads:
- Elimination of inrush currents
- Energy consumption reduction for 25%, compared to traditional ON/OFF technology
- Maximum reliability thanks to continuous modulation without annoying ON/OFF cycles

Technical specifications

OUTDOOR UNIT			PUZ-ZM 60 VHA	PUZ-ZM 100 VKA	PUZ-ZM 125 YKA	PUZ-ZM 200 YKA	PUZ-ZM 250 YKA
Power supply		V/Ph/Hz	230/1/50	230/1/50	400/3+N/50	400/3+N/50	400/3+N/50
Compressor	Compressor	n°	1	1	1	1	1
	Power input(1)	kW	1,19	1,88	2,82	4,33	6,01
	Refrigerant charge (2)	kg	2,8	4	4	7,1	7,7
Condenser fan	Condenser fan	n°	1	2	2	2	2
	Air flow	m³/h	3300	6600	7200	8400	8400
	Power input (1)	kW	0,06	0,06	0,06	0,2	0,2
Dimensions	Length	mm	950	1050	1050	1050	1050
	Depth	mm	355	370	370	370	370
	Height	mm	943	1338	1338	1338	1338
	Weight	kg	70	116	125	135	135

Notes:
(1) Characteristics referred to ambient temperature 35°C – indoor air condition 27°C-47% UR - Connection pipes length 5m;
(2) Standard refrigerent charge.
(+) for additional refrigerant charge please refer to Mr Slim O&M Manual.
These units contain <HFC R32 [GWP100 675]> fluorinated greenhouse gas.

MULTIDENSITY modular system

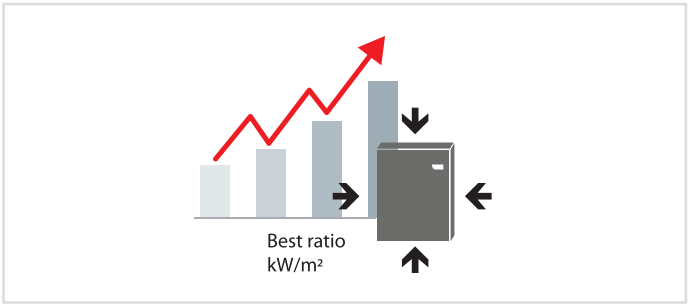
Efficient, rational, plug & play solution for high density data rooms.
Full inverter VRF system for small & medium size it environments
with hot spots up to 50 kW.

Up to 8 indoor units connected to one OUTDOOR unit

High density hot spots are managed by indoor units connected to condensing units working together as a unique system.

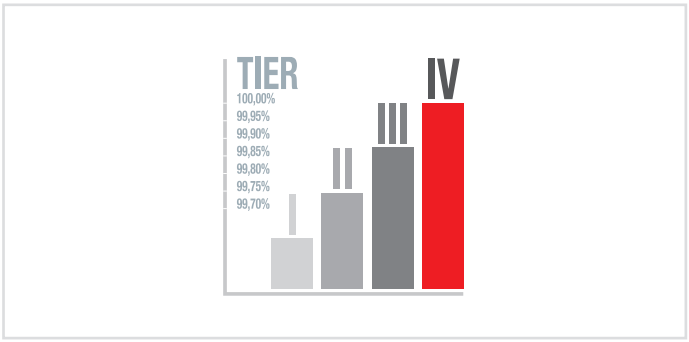
Highest capacity per footprint

Thanks to the possibility to minimise the number of outdoor units, the overall footprint of the whole system is drastically reduced.



Choose your system's reliability

A multitude of configurations are available to provide customers with their desired level of reliability (configuration N, N+1, 2N). The Multidensity system is in line with TIER III and IV design topologies, based on the configuration chosen.

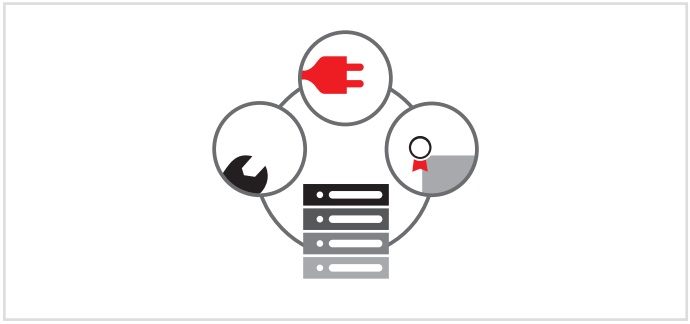


Adaptable flexibility

Match any kind of cooling requirement, from localised cooling to hot and cold aisle cooling management.

Rational design for optimised CAPEX

The rational design of the VRF system is combined with the experience and reliability of the Mitsubishi Electric brand, which guarantees the best quality for your IT infrastructure.



Plug and Play Installation

No additional elements such as pumps, tanks, and valves are required. This installation simplicity results in a quicker start-up and more reliable maintenance, which are key factors for reducing installation and maintance costs.

Active Redundancy

Advanced load sharing logics of the Active Redundancy function ensure that the heat loads are balanced among the units (including those units that usually remain in stand-by) according to the actual requirements of the IT infrastructure, leveraging on the multi-unit configuration of redundant systems.

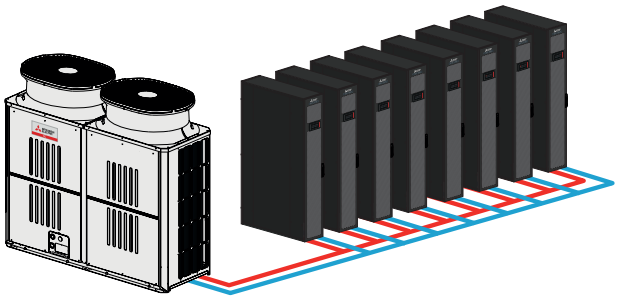
The modular approach of MULTIDENSITY SYSTEM

Indoor units are connected in master-slave configuration, if the master unit fails for any reason, the Dynamic Master logic automatically elects a new master from the other units.

Thanks to the flexible and modular approach of the MULTIDENSITY SYSTEM, it represents a tailored solution for any data center layout.

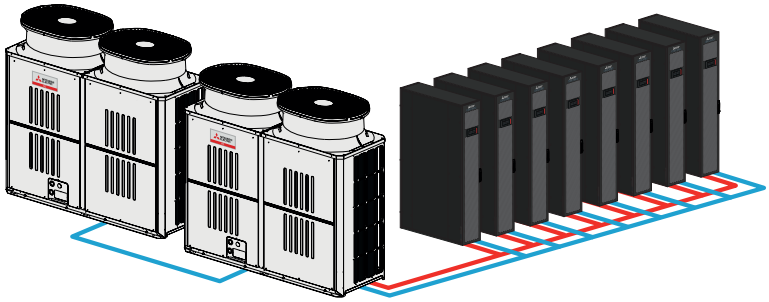
CONFIGURATION WITHOUT REDUNDANCY (N)

Ideal for small to medium IT rooms
- 1 external unit paired with up to 8 indoor units
- Average system EER is around 3.00
- Cooling capacity up to 50 kW



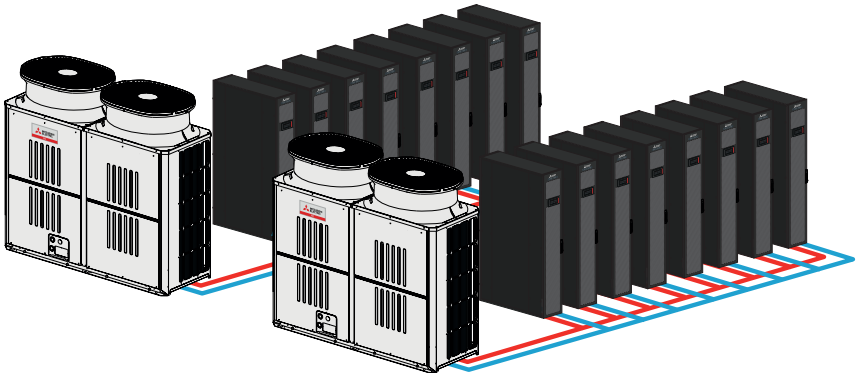
CONFIGURATION WITH REDUNDANCY (N+1)

Ideal for TIER II IT rooms
- 2 external units paired with up to 8 indoor units
- The external units operate in load sharing at partial loads for higher efficiency
- In case of failure of one of the condensing units, the second one operates at full load
- Average system EER is around 3.25
- Cooling capacity up to 50 kW



CONFIGURATION (2N)

Ideal for TIER III and TIER IV data centers
In accordance with the Uptime's Institute's classification, this configuration offers:
- A fully redundant and mirrored system with two independent distribution systems
- 1+1 external units paired with up to 8+8 indoor units

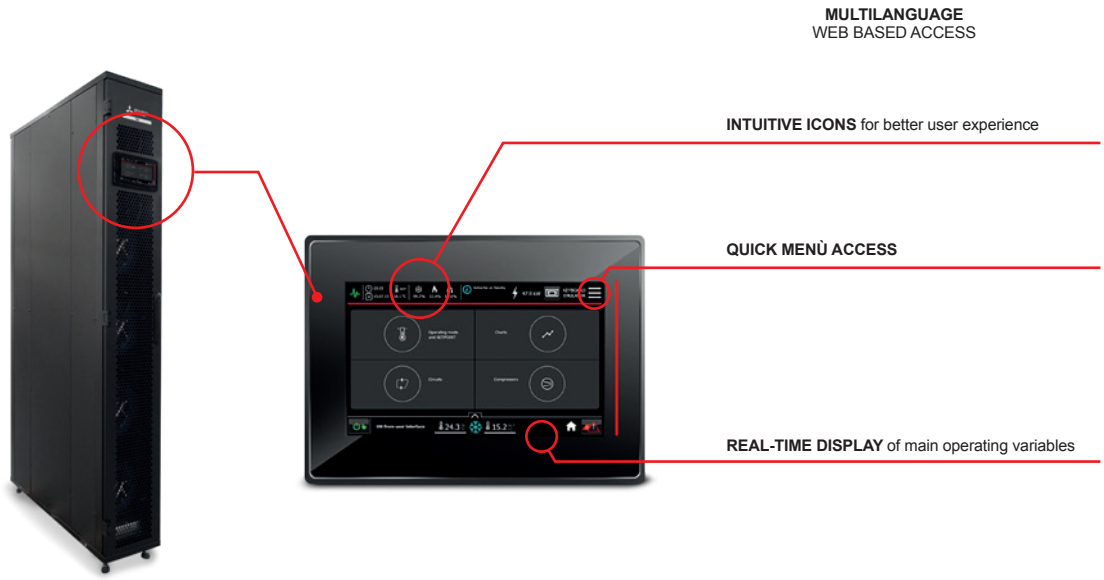


New evolution touch display

The evolution touch display is available for the room units m-MROW and m-MRAC.
Through simple, easy-to-read colour graphics, the innovative touch screen display (available as an option) shows the real performance of key components.

A completely redesigned interface improves the user experience.
The 7" touch screen display ensures the immediate visualization of the indoor units' status thanks to dedicated screens for main operating parameter control: temperature, humidity, ventilation and then, alarms and event management.

NEW EVOLUTION TOUCH DISPLAY



KIPlink innovative interface

Multidensity system is also available, as option, with KIPlink interface.
Based on WI-FI technology, KIPlink gets rid of the standard keyboard and allows one to operate on the unit directly from a mobile devices (smartphone, tablet, notebook).

KIPLINK INNOVATIVE INTERFACE

Dimensioning and design

Thanks to the sizing and design tool typical of Mitsubishi Electric direct expansion systems - New Design Tool – it's possible to simplify the design phases by minimizing the learning curve.

KIPLINK INNOVATIVE INTERFACE

Easier on-site operation
View and change all parameters with easy-to-understand screenshot and dedicated tooltips.
Get devoted "help" messages for alarm reset and trouble shooting.

Real-time graphs and trends
Monitor the immediate labour status of main components.
View the real-time graphs of the key operating variable trends.

Data logger function
View history of events and use the filter for a simple search.
Enhance diagnostics with data and graphs of 10 minutes before and after each alarm.
Download all the data for detailed analysis.

m-MOCU

AIR-COOLED OUTDOOR UNIT FOR OUTDOOR INSTALLATION
TO BE COUPLED WITH IT COOLING INDOOR UNITS

MITSUBISHI ELECTRIC'S EXPERIENCE IN VRF APPLIED TO IT COOLING INFRASTRACTURES

BLDC SCROLL COMPRESSORS WITH INVERTER TECHNOLOGY TO PRODUCE THE EXACT OUTPUT NEEDED BY THE SYSTEM

INCREASED PERFORMANCE

SUITABLE FOR LONG REFRIGERANT PIPE DISTANCE

BELL-MOUTH SHAPE DESIGNED PROPELLER FANS WITH INVERTER CONTROL BRUSHLESS DC MOTORS

MODULAR DESIGN AND REDUCED FOOTPRINT FOR ANY INSTALLATION REQUIREMENT

EXTREME RELIABILITY

LOW NOISE OPERATION

Technical specifications CONDENSING UNITS

Outdoor Unit			1x m-MOCU-G02-050	2x m-MOCU-G02-050
Cooling Capacity	Total (1)	kW	50	50
	System EER (1)	kW/kW	2.96	3.24
Unit Electrical Data	Power input (1)	kW	15.2	13.7
Compressor		Nr.	1	2x 1
	Power input (1)	kW	14.3	2x 14.3
Condenser Fans		Nr.	2	2x 2
	Total air flow	m3/h	19.200	2x 19.200
	Power input	kW	2x 0.92	4x 0.92
	External static pressure	Pa	0	0
Sound Level Iso 3744	Pressure level (2)	dB(A)	65	68
Refrigerant Circuits		Nr.	**1**	**2x 1**
	Refrigerant type		R410A	R410A
	Pre-charged refrigerant	kg	11.8	2x 11.8
	F-GAS - CO_2 equivalent	t	24.63	2x 24.63
Refrigerant Piping	Max pipe length (from the outdoor unit to the farthest indoor unit)	m	165	165
	Max height difference (outdoor unit higher than indoor units)	m	50	50
	Max height difference (outdoor unit lower than indoor units)	m	40	40
Power Supply		V/Ph/Hz	**380-400-415 / 3+N / 50-60**	**380-400-415 / 3+N / 50-60**
Dimensions	Length	mm	1750	2x 1750
	Depth	mm	740	2x 740
	Height	mm	1650	2x 1650
Net Weight		kg	**304**	**2x 304**

1. Gross Value. Characteristics referred to room air temperature 35°C with 27%RH and external ambient air temperature 35°C. ESP=20Pa.
2. Gross Value. Characteristics referred to room air temperature 46°C with 16%RH and external ambient air temperature 35°C. ESP=20Pa.
3. Sound pressure level on air return at 1m.

m-MROW
m-MRAC

**THESE INDOOR RACK COOLING UNITS, FROM 10 TO 28 KW,
ARE DESIGNED TO BE CLOSE-COUPLED TO BLADE SERVERS AND MANAGE HOT SPOTS**

OPTIMIZED FOR MULTIDENSITY SYSTEM

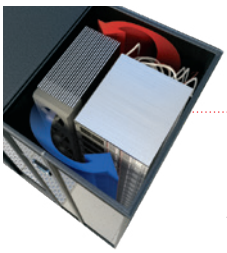
REDUCED SPACE OCCUPANCY (UP TO 0,36 M²)

COOLING ONLY WHERE NEEDED

EC PLUG FANS FOR REDUCING ENERGY CONSUMPTION AND NOISE LEVELS

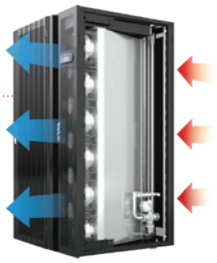
ELECTRONIC EXPANSION VALVE TO ACHIEVE A MUCH WIDER MODULATION CAPACITY

BOTH IN-ROW AND ENCLOSURE VERSIONS AVAILABLE



ENCLOSURE
IDEAL FOR REMOVING HOT SPOTS IN STAND ALONE SYSTEMS

IN ROW
IDEAL FOR HOT/COLD AISLE CONFIGURATIONS



Technical specifications INDOOR UNITS

Indoor unit			m-MROW-G02-009 m-MRAC-G02-009	m-MROW-G02-015 m-MRAC-G02-015	m-MROW-G02-025 m-MRAC-G02-025
Unit size			9	15	25
Cooling capacity m-MROW	Total (1)	kW	10.6	16.6	28.6
	Sensible (1)	kW	9.6	15.7	27.4
	SHR (1)		0.91	0.94	0.96
	Indoor unit EER (1)	kW/kW	58.9	50.3	32.5
Cooling capacity m-MROW	Total (2)	kW	10.9	22.9	32.8
	Sensible (2)	kW	10.9	22.9	32.8
	SHR (2)		1	1	1
	Indoor unit EER (2)	kW/kW	60.5	69.3	37.2
Supply fan		Nr.	2	4	5
	Air flow	m³/h	1500	2700	4200
	Power input	kW	0.18	0.34	0.85
	Nominal external static pressure	Pa	20	20	20
	Maximum external static pressure	Pa	60	60	60
Sound level ISO 3744	Pressure level (3)	dB(A)	63.5	64.5	70.5
	Power level	dB(A)	79.0	80.0	86.0
Air filters		Nr.	2	2	2
	Extended filtering surface	m2	0.35	0.35	0.35
	Efficiency (ISO EN 16890)	COARSE	40%	40%	40%
Refrigerant circuits		Nr.	1	1	1
	POWER SUPPLY	V/Ph/Hz	230/1/50-60	230/1/50-60	230/1/50-60
Dimensions	Width	mm	300	300	300
	Length	mm	1000 / 1200	1000 / 1200	1000 / 1200
	Height	mm	2085	2085	2085
Net weight	m-MROW	kg	175	190	193
	m-MRAC	kg	185	200	203


MITSUBISHI
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The equipment described in this catalogue contain fluorinated gasses such as HFC-32 (GWP 675), HFC-410A (GWP 2088). Installation of those equipment must be executed by professional installer based on EU reg. 303/2008 and 517/2014

COMFORT & IT COOLING SYSTEMS FULL PRODUCT
CATALOGUE 2024
E-2404250

Specifications are subject to change without notice

E-2404250

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