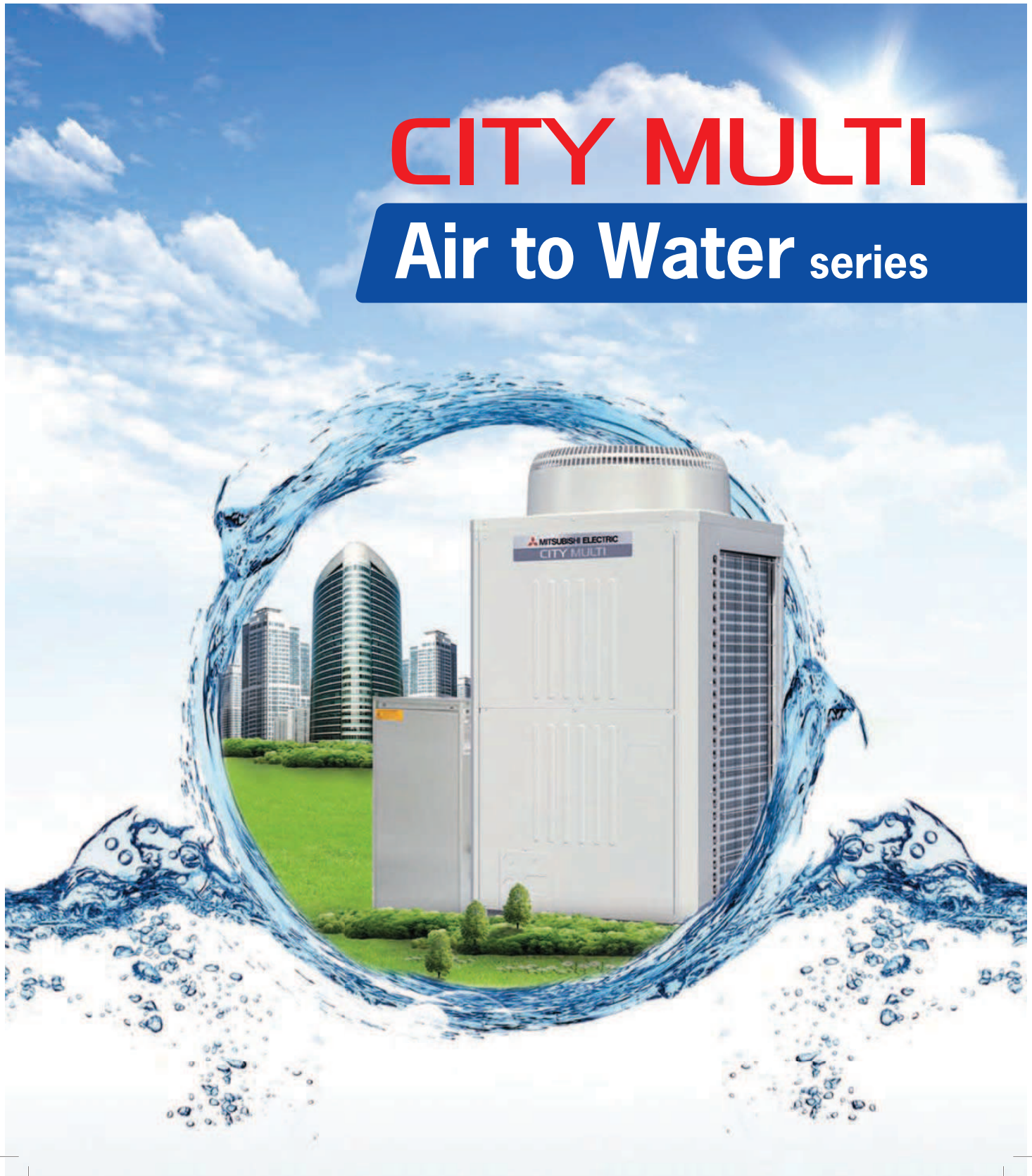
MITSUBISHI ELECTRIC
Changes for the Better

Mitsubishi Electric Quality

CITY MULTI

Air to Water series



Air to Water Series

The solution to COOLING, HEATING & HOT WATER SUPPLY

■ Accelerating Global Warming

Increasing carbon dioxide (CO^2) concentration has contributed to a rise of Earth's average temperature to more than 0.8(0 C) over the last century.

It is estimated that the global temperature would rise by 1.1-6.4 (0C) by the year 2100.

■ Major Cause Of CO^2 Emission

Residential and commercial sectors account for more than 30% of all energy use. In buildings, especially energy used for air conditioning (cooling and heating) and hot water accounts for large percentage of all energy use.

Mitsubishi Electric can contribute to the environment by helping to reduce energy use through better-designed buildings and more efficient heating, cooling and hot water systems.

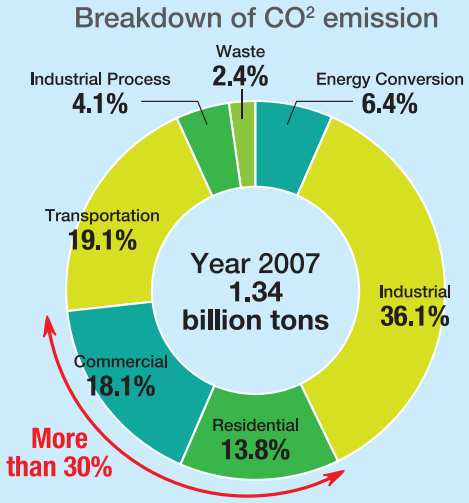


Fig2 Percentage of energy consumed by each economic sector in Japan
Source: "Emissions of Greenhouse Gases in Japan in 2007" published by Green house Gas Inventory Office of Japan from website of Japan Center of Climate Change Actions (http://www.jccca.org/)

Key Technologies of Air to Water Series

Making the most out of Heat Pump & Heat Recovery Technology

Mitsubishi Electric has designed Air to Water (ATW) series that utilizes the heat pump and heat recovery technologies to provide hot water. In Heat Recovery Technology, it involves in a simultaneous operation of heating and cooling.

■ Key Benefits



Incredible design flexibility



Excellent use of energy and reduces CO^2 emissions

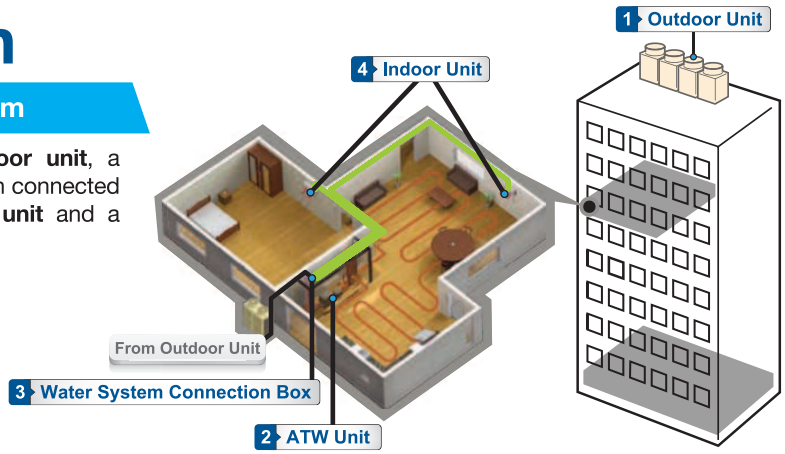


Effective use of water heater

The Solution

Air to Water Advanced System

ATW system consists of an **Outdoor unit**, a **Water system connection box** when connected with R2 series, **ATW unit**, **Indoor unit** and a controller.



*Installation image with air-cooled outdoor unit

1 Outdoor Unit

City Multi Outdoor Units, both air-cooled heat pump/heat recovery can be connected to ATW system depending on the system structure.

AIR COOLED Outdoor unit



▶ Lineup

CITY MULTI

Heat recovery
R2 series

▶ Features

CITY MULTI units are designed to be an efficient, fully customizable solution for providing comfort environment inside a building. Broader model line up is prepared from standard Y/R2 series, high COP series and ZUBADAN series to diverse requirements.



▶ R410A Refrigerants

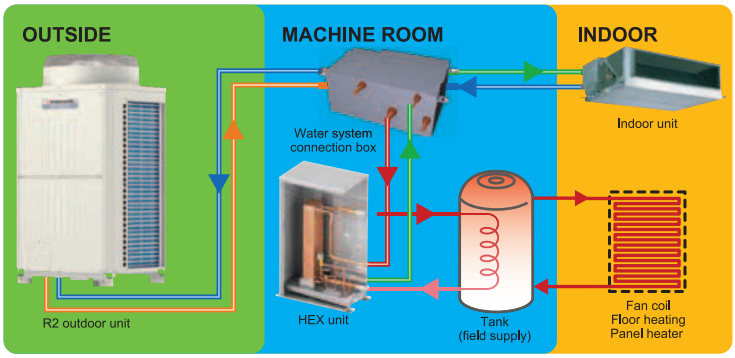
R410A refrigerants are safe with zero ODP (Ozone Depletion Potential). Accordingly, our systems require less energy to run, and have a significantly lower indirect global warming potential.

2 ATW Unit

HEX Unit

By utilizing waste heat from the R2 outdoor unit for heating operation in HEX unit, it is possible to supply hot water with high efficiency. Also, even when connected with the Y series, it provides efficient operation compared to a conventional system.

HEX unit with R2 series



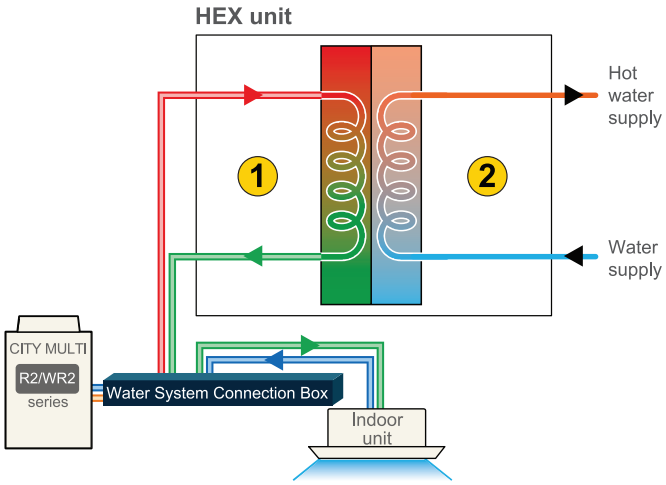
OPERATION
Hot water up to 45°C Cold water down to 8°C

Red	High pressure gas refrigerant
Orange	High pressure 2-phase refrigerant
Green	High pressure liquid refrigerant
Blue	Low pressure gas refrigerant

*The image is a system example in case of heating mode
*The necessity of the tank depends on the system configuration

What makes HEX unit unique with R2/WR2 series?

Hot Water Supply



Red	High pressure gas refrigerant
Orange	High pressure 2-phase refrigerant
Green	High pressure liquid refrigerant
Blue	Low pressure gas refrigerant

Refrigerant flow

1 From the water system connection box, high pressure R410A gas refrigerant is delivered to the HEX unit and returns to the unit as high pressure liquid refrigerant.

Water supply

2 Water entering the HEX unit exchanges heat with the R410A refrigerant and water circulates to heat the water inside the tank.

3 Water Connection Box

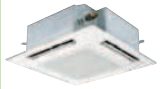
To connect R2/WR2 series outdoor units and ATW indoor units or WCB.

		Water System Connection Box
Connectable ATW System		HEX
Outdoor unit	Connectable series	R2
	Connectable capacity	P350
ATW/ Indoor unit	Connectable qty	1~28 + PWFY
	Connection method	By Branch Pipe
	Operation mode	Cooling OR Heating
Product Image		

4 Indoor Unit

In an ATW system, standard **CITY MULTI** indoor units can also be connected. **CITY MULTI** selection of indoor units provide a wide range of indoor units to meet the requirements of all room types. Units are available in Ceiling Cassette, Ceiling Concealed Ducted, Ceiling Suspended, and Wall Mounted & Floor mounted versions.

Ceiling Cassette 4-Way Airflow



PLFY-VBM,VCM

Ceiling Cassette 2-Way Airflow



PLFY-VLMD

Ceiling Cassette 1-Way Airflow



PMFY

Ceiling Concealed Middle Static Pressure



PEFY-VMA(L)

Ceiling Concealed High Static Pressure



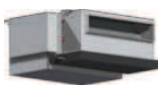
PEFY-VMH

Ceiling Suspended

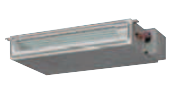


PCFY

Ceiling Concealed Low Static Pressure



PEFY-VMR



PEFY-VMS1(L)

Wall Mounted



PKFY

Floor Standing Exposed



PFFY-VKM

Floor Standing Concealed



PFFY-VLRM
PFFY-VLRMM

5 Control

Remote Controller

The PAR-W21MAA remote controller is specially designed for Air to Water system.

BASIC FUNCTIONS

- Operation mode setting
- Water temperature setting
- Temperature range setting
- Local operation setting
- Weekly schedule setting
- Error code display



PAR-W21MAA

Centralized Controller

With a new designed color liquid crystal display and touch panel, AG-150A can centrally control up to 150 units via an expansion controller.

BASIC FUNCTIONS

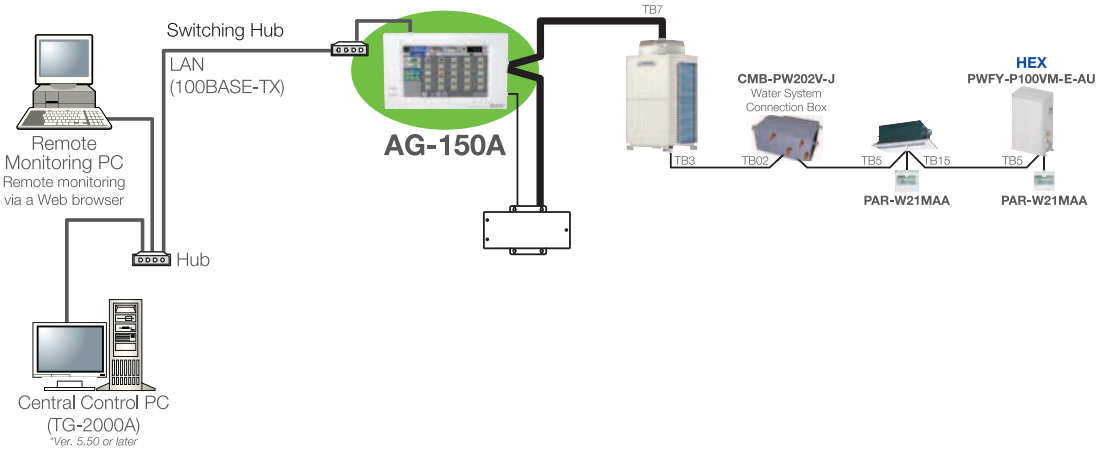
- Operation setting
- Temperature setting
- Fan speed setting
- Local operation setting
- Error code display
- Interlock

Booster / HEX unit icon shown on AG-150A screen



AG-150A

System Structure (Remote Controller + Centralised Controller)



Application Example



Restaurant



Health Clubs
(swimming pool and show rooms)



Office



HEX Unit

Model			PWFY-P100VM-E-AU
Power source			1 - phase 220 - 230 - 240V 50 Hz
Cooling capacity (Nominal)	*2	kW	11.2
	*2	kcal / h	9,600
	*2	BTU / h	38,200
	Power input	kW	0.015
	Current input	A	0.068 - 0.065 - 0.063
Temp. range of cooling	Outdoor unit/Heat source unit condition	D.B.	-5 ~ 43°C (23 ~ 110°F) PURY - series
	HEX unit inlet water temp	-	10 ~ 35°C (50 ~ 95°F)
Temp. range of heating	Outdoor unit/Heat source unit condition	W.B.	-20 ~ 32°C (-4 ~ 90°F) PURY - series
	HEX unit inlet water temp	-	10 ~ 40°C (50 ~ 104°F)
Connectable outdoor unit / heat source unit	Total capacity		50~100% of outdoor unit/heat source unit capacity
	Model / Quantity		ZUBADAN series R2(Standard, Hi-COP), Replace R2
Sound pressure level (measured in anechoic room)		dB <A>	29
Diameter of refrigerant pipe	Liquid	mm (in.)	ø9.52 (ø3/8") Brazed
	Gas	mm (in.)	ø15.88 (ø5/8") Brazed
Diameter of water pipe	Inlet	mm (in.)	PT3/4 Screw
	Outlet	mm (in.)	PT3/4 Screw
Field drain pipe size		mm (in.)	ø32 (1-1/4")
External finish			NO
External dimension H × W × D		mm (in.)	800 (785 without legs) × 450 × 300
		in.	31-1/2" (30-15/16" without legs) × 17-3/4" × 11-13/16"
Net weight		kg (lb)	35 (78)
Circulating water	Operation Volume Range	m^3 / h	0.9 ~ 2.15
Design pressure	R410A	MPa	4.15
	Water	MPa	1.00
Standard attachment	Document		Installation Manual, Instruction Book
	Accessory		Strainer, Heat insulation material, 2 × Connector sets
Optional parts			NONE
Remark			Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual.

Note: *2 Nominal cooling conditions
<PURY-series>
Outdoor Temp. : 35°CB (95°FDB)
Pipe length : 7.5 m (24-9/16 ft)
Level difference : 0m (0ft)
Inlet water Temp 23°C
Water flow rate 1.93m^3/h(P100)

* Due to continuing improvement, the above specifications may be subject to change without notice.
* The unit is not designed for outside installations.
* Please don't use the steel material for the water piping material.
* Please always make water circulate or add the brine to the circulation water when the ambient temperature becomes 0°C (32°F) or less.
* Please always make water circulate or pull out the circulation water completely when not using it.
* Please do not use groundwater and well water.
* Install the unit in an environment where the wet bulb Temp. will not exceed 32°C (90°F).
* The water circuit must use the closed circuit.
* Please do not use it as a drinking water.

Unit converter

kcal=kW × 860 • BTU / h =kW × 3,412 • cfm=m^3 / min × 35.31 • lb=kg / 0.4536

** The specification data is subject to rounding variation.*



Outdoor Unit

Model			PURY-P350YHM-A(-BS)
Power source			3-phase 4-wire 380-400-415V 50Hz
Cooling capacity (Nominal)	*1	kW	40
	*1	BTU / h	136,500
	Power input	kW	12.47
	Current input	A	21.0-19.9-19.2
	COP (kW/kW)		3.20
Temp. range of cooling *2	Indoor	W.B.	15 ~ 24°C (59 ~ 75°F)
	Outdoor	D.B.	- 5 ~ 43°C (23 ~ 109°F)
Indoor Connectable	Total Capacity		50 ~ 150% of outdoor unit capacity
	Model / Quantity		P15 ~ P250 / 1~35
Sound pressure level (measured in anechoic room)		dB <A>	60
Diameter of refrigerant pipe	High Pressure	mm (in.)	ø19.05 (ø3/4) Brazed
	Low Pressure	mm (in.)	ø28.58 (ø1-1/8) Brazed
External finish			Pre-coated galvanized steel sheet (+powder coating for -BS type) <MUNSELL 5Y 8/1>
External dimension H × W × D		mm (in.)	1,710 (1,650 without legs) X 1,220 X 760
		in.	67-3/8 (65 without legs) X 48-1/16 X 29-15/16
Net weight		kg (lb)	265 (584)
Heat exchanger			Salt-resistant cross fin & copper tube
Compressor	Type		Inverter scroll hermetic compressor
	Starting method		Inverter
	Motor output	kW	10.3
FAN	Air flow rate	m^3 / min	225
		L/s	3,750
		cfm	7,945
	Type X Quantity		Propeller fan X 1
	Motor output	kW	0.92
Protection	High pressure protection		High pressure sensor, High pressure switch 4.15 MPa (601 psi)
	Inverter circuit (COMP./FAN)		Over-heat protection, Over-current protection
	Compressor		Over-heat protection
Refrigerant	Type X Original Charge		R410A X 11.8kg (26 lbs)
Optional parts			Joint : CMY-Y102S-G2, CMY-Y102L-G2, CMY-Y202-G2, CMY-R160-J BC controller : CMB-PW202V-J

Note: *1 Nominal cooling conditions
Indoor 27°C (81°F) DB/19°C (66°F) WB, Outdoor 35°C (95°F) DB
Pipe length 7.5 m (24-9/16 ft), Level difference 0 m (0 ft)

*2 -5°C (23°F) DB/-6°C (21°F) WB~21°C (70°F) DB/15.5°C (60°F) WB with cooling/heating mixed operation.

Water System Connection Box

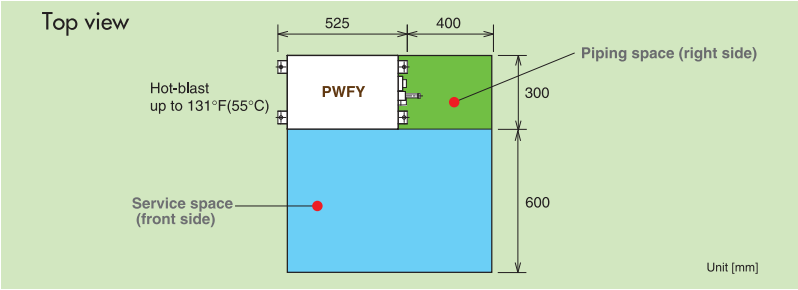
Model				CMB-PW202V-J
Number of branch				2
Power source				1N~220/230/240V
				50HZ
Power input			kW	Cooling : 0.019/0.020/0.021
Current input			A	Cooling : 0.09/0.09/0.09
External Finish				Galvanizes steel plate (Lower part drain pan painting N1.5)
Connectable outdoor unit				PURY-(E)P200/250/300/350YJM-A(-BS)
Connectable unit capacity			Total	50% ~ 130% of outdoor unit
			Indoor / PWFY branch	up to 130% of outdoor unit
			PWFY branch	up to 100% of outdoor unit/heat source unit
External dimension H X W X D			mm (in.)	284 x 648 x 432 (11-3/16" x 25-9/16" x 17-1/16")
Refrigerant piping diameter	To outdoor unit			Connectable outdoor unit capacity
				P350
		High press. pipe	mm (in.)	ø19.05 (ø3/4") Brazed
		Low press. pipe	mm (in.)	ø28.58 (ø1-1/8") Brazed
	To indoor/ PWFY unit			Total down-stream indoor unit capacity
				~P301~P350
		Liquid pipe	mm (in.)	ø12.70 (ø1/2")
				Brazed
		Gas pipe	mm (in.)	ø28.58 (ø1-1/8")
				Brazed
Field drain pipe size				O.D. 32 mm (1-1/4")
Net weight			kh (lb)	20 (45)
Accessories				• Drain Connection pipe (with flexible hose and insulation) • Refrigerant connection pipe

Note: *1. For installation/foundation work, electrical connection work, insulation work, and power source switch etc., refer to the Installation Manual.
*2. The equipment is for R410A refrigerant.
*3. Install this product in a location where noise (refrigerant noise) emmitted by the unit will not disturb the neighbours. (For use in quiet environments with low background noise, position the WSCB at least 5m away from any indoor units).
*4. Install the unit horizontally.
*5. The indoor / PWFY unit branch is for cooling / heating. The indoor / PWFY unit cannot be simultaneously operated in different operation modes.
*6. Seal the unused branch using the optional cover cap (CMY-S202-J).

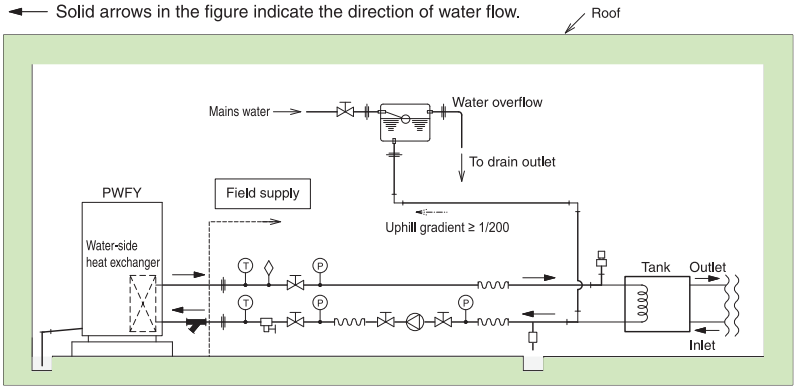
Installation

- **The unit must be installed inside a buidling, the unit is not designed for outdoor installation.**
- **For water pipes, do NOT use steel pipes. Copper pipes are recommended.**
- **Drain pipe**
  Install the drain pipe with an inclination of between 1/100 and 1/200 to provide a downward flow of drain water. For cold climate installation, take an appropriate measures (e.g., drain heater) to prevent the drain water from freezing.
- **Strainer**
  Install a strainer near the PWFY unit to keep foreign materials from entering the water-side heat exchanger.
- **Do not touch the unit, the unit surface can be hot.**
- **Back up system is recommended in case of PWFY unit breakdown.**

Service space



Example of Water pipe installation



Sample of water circuit for Booster/HEX

for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping to contribute to the realization of a sustainable society.



MITSUBISHI ELECTRIC ASIA PTE LTD

307 Alexandra Road, Mitsubishi Electric Building, Singapore 159943.
Tel: (65) 6473 2308 Fax: (65) 6476 0590

Office Hours: Monday - Friday 8.30am - 5.30pm
Show Room Opening Hours: Monday - Friday 8.30am - 5.30pm,
Saturday & Sunday 10:00am - 6.00pm, Closed on Public Holidays
Showroom Tel: (65) 6470 2600
http://www.MitsubishiElectric.com.sg

Mitsubishi Electric Consumer Products and Mitsubishi Electric Shizuoka Works acquired ISO 9001 certification under series 9000 of the International Standard Organization (ISO) based on a review of Quality Warranties for the production of air conditioning equipment. The plant also acquired environmental management system standard ISO 14001 certification.