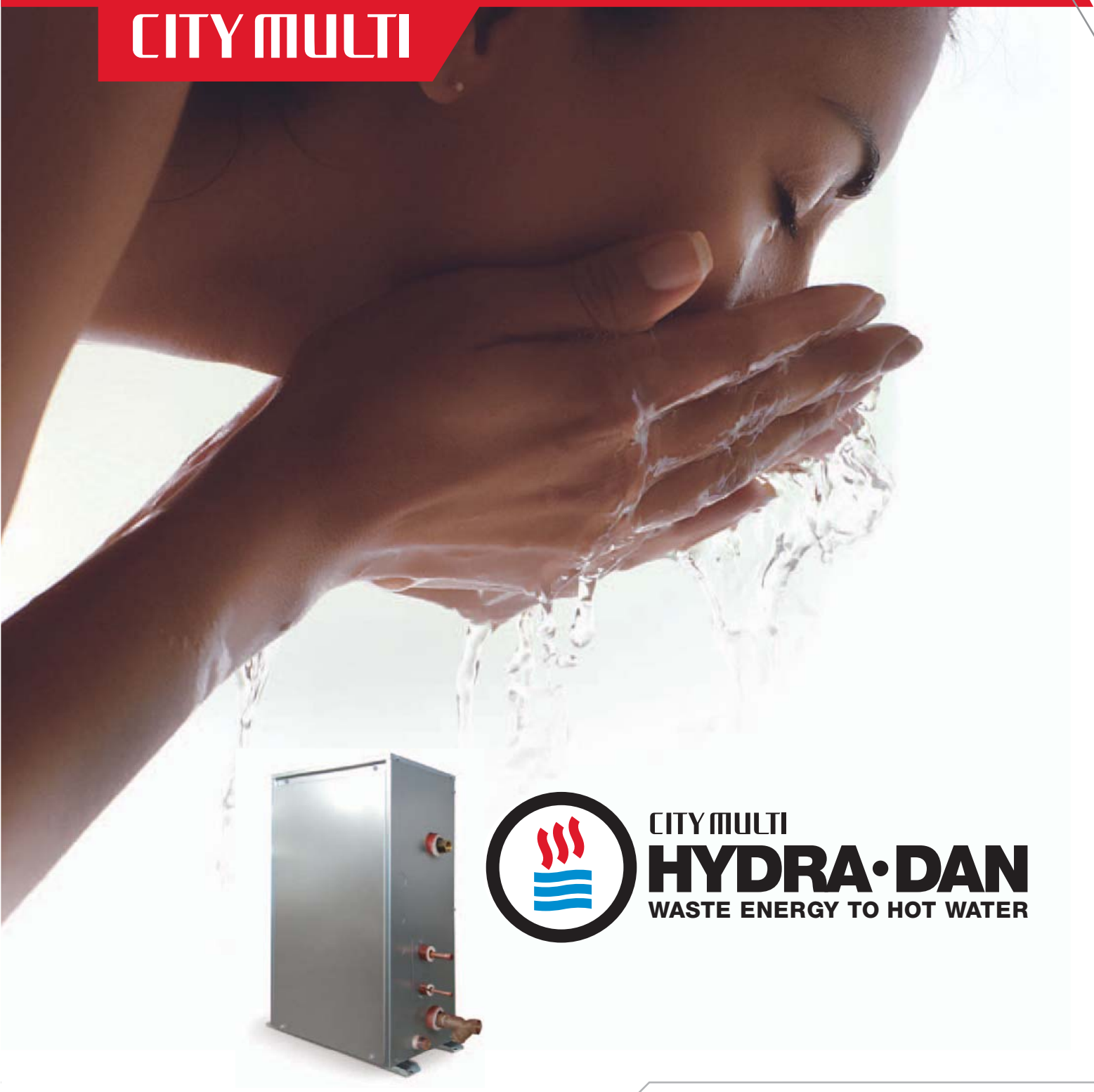
CITY MULTI



CITY MULTI

HYDRA•DAN

WASTE ENERGY TO HOT WATER

TECHNICAL GUIDE

MITSUBISHI ELECTRIC

Changes for the Better

CITY MULTI
HYDRA·DAN
WASTE ENERGY TO HOT WATER

New Technology

With many people spending much of their time indoors at home or work, it is not surprising that buildings account for a large percentage of all energy use through better-designed buildings and more efficient heating, cooling and hot-water systems.

Moving Forward

We need to ensure that we heat and cool by the most efficient means possible. That means reducing CO_2 emissions and improving energy performance, which is exactly what City Multi Hydra-Dan is meant to do.

As a leading manufacturer of energy-efficient heat pump systems, we constantly strive to meet and exceed the increasing demands placed on our industry. The drive to reduce energy consumption and the impact its use has on the environment is crucial and increasingly important to us all. The need to be more energy conscious and environmentally responsible has long driven Mitsubishi Electric to spend huge amounts of resources on researching and developing the solutions of the future. As market leaders at the forefront of the very latest technology, we pride ourselves in providing high-performance and competitive systems on which you can rely. Among such developments is the advanced heat pump technology used in the Booster unit and HEW unit.

CONTENTS

CITY MULTI HYDRA·DAN WASTE ENERGY TO HOT WATER

WHAT IS A BOOSTER UNIT?

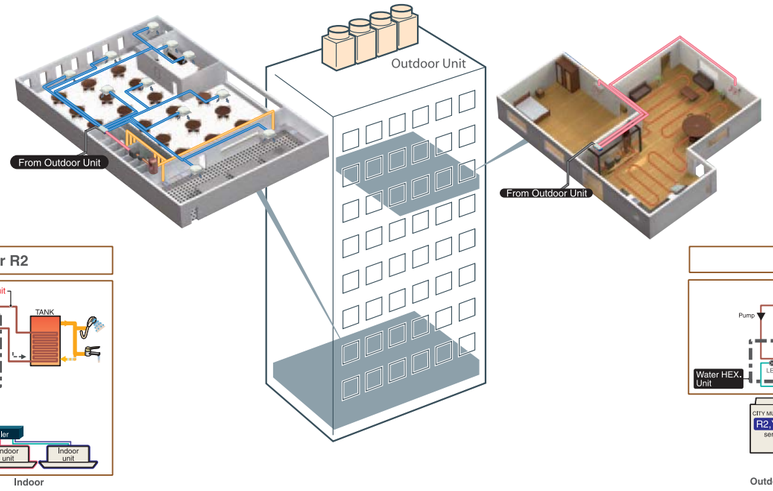
The efficient and technologically advanced Booster unit takes advantage of a proven heat recovery technology to provide hot water for sanitary use and is one of the most advanced, efficient hot water systems available today.

Technology

Benefiting from the heat recovery operation of the CITY MULTI R2 system, the Booster unit converts energy from the air to higher temperatures suitable for heating water and results in virtually no energy waste.

High Efficiency

Capable to air condition and supply hot water in a single system, the Booster unit is ideal for use in a variety of applications. From hotels and restaurants to gyms, it works perfectly in providing an optimum air environment and hot water to a maximum of 160˚F(71˚C).



WHAT IS A HEX UNIT?

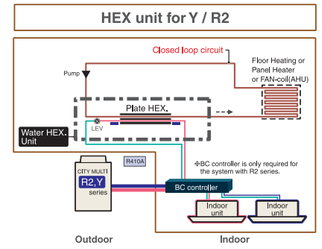
With a high COP output achieved, the MITSUBISHI ELECTRIC HEX unit provides a greater level of comfort, lower CO_2 emissions and reduced running costs.

Technology

The HEX unit works perfectly to provide heating and cooling to fan coil units, panel heaters, or under-floor heating systems. Its advantages come from the high-efficient operation of our CITY MULTI and heat recovery operation when used with the R2 system.

Features

The HEX unit offers hot water of 115˚F(46˚C) in heating down to 50˚F(10˚C) in cooling, suitable for residence, offices or hotels, providing an optimal environment while benefiting from reduced running costs and lessening the impact on our environment.



Model			PWFY-P36NMU-E-BU
Power source			1-phase 208-230V 60Hz
Heating capacity (Nominal)	*1	kW	11.7
	*1	kcal / h	10,100
	*1	Btu / h	39,900
	Power input	kW	2.48
	Current input	A	12.30 - 11.12
Temp. range of heating	Outdoor temp.	W.B.	59 ~ 90˚F (-20 ~ 32˚C)
	Inlet Water temp.	-	50 ~ 160˚F (10 ~ 71˚C)
Connectable outdoor unit	Total capacity		50 ~ 100% of outdoor unit capacity
	Model / Quantity		PURY-P Y(S)HMU-A(-BS) PURY-P T(S)HMU-A(-BS)
Sound pressure level (measured in anechoic room)		dB<A>	44
Diameter of refrigerant pipe	Liquid	in.(mm)	ø3/8 (ø9.52) Brazed
	Gas	in.(mm)	ø5/8 ø15.88) Brazed
Diameter of water pipe	Inlet	in.(mm)	PT3/4 (27.2) Screw
	Outlet	in.(mm)	PT3/4 (27.2) Screw
Field drain pipe size		in.(mm)	ø1-1/4 (ø32)
External finish			NO
External dimension H × W × D		mm	800 (785 without legs) × 450 × 300
		in.	31-1/2" (30-15/16" without legs) × 17-3/4" × 11-13/16"
Net weight		lbs(kg)	133 (60)
Compressor	Type		Inverter rotary hermetic compressor
	Maker		MITSUBISHI ELECTRIC CORPORATION
	Starting method		Inverter
	Motor output	kW	1.0
	Lubricant		NEO22
Circulating water	Operation volume range	m^3/h	0.6 ~ 2.15
		G/h	156 ~ 555
		G/min	2.6 ~ 9.2
		L/min	10 ~35
Protection on Internal circuit (R134a)	High pressure protection		High pressure sensor, High pressure switch at 3.60MPa (522 psi)
	Inverter circuit (Comp.)		Over-heat protection, Over-current protection
	Compressor		Discharge thermo protection, Over-current protection
Refrigerant	Type × original charge		R134a × (2lbs + 7oz) (1.1kg)
	Control		LEV
Design pressure	R410A	psi	601
		MPa	4.15
	R134a	psi	522
		MPa	3.60
	Water	psi	145
		MPa	1.00
Drawing	External		WKB94T460
	Wiring		KE94C344
Standard attachment	Document		Installation Manual, Instruction Book
	Accessory		Strainer, Heat insulation material, 2 × Connector sets, 2 × Washer
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: *1 Nominal heating conditions
Outdoor Temp. : 47˚FDB / 43˚FWB (8.3˚CDB/6.1˚CWB)
Pipe length : 7.6 m (25 ft)
Level difference : 0m (0ft)
Inlet water Temp 149˚F (65˚C) Water flow rate 2.15m^3/h (555G/h)

*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 32˚F (0˚C) 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 90˚F (32˚C).
* 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
G(us)=L × 0.2642
lb=kg / 0.4536
psi=MPa × 145.038

* The specification data is subject to rounding variation.

Model			PWFY-P36NMU-E-AU	PWFY-P72NMU-E-AU
Power source			1-phase 208 - 230 V 60Hz	1-phase 208 - 230 V 60Hz
Heating capacity (Nominal)	*1	kW	11.7	23.4
	*1	kcal / h	10,100	20,100
	*1	Btu / h	39,900	79,800
	Power input	kW	0.015	0.015
	Current input	A	0.072 - 0.065	0.072 - 0.065
Temp. range of heating	Outdoor temp.	W.B.	-4~90˚F (-20~32˚C) PURY - series	-4~90˚F (-20~32˚C) PURY - series
		W.B.	-4~60˚F (-20~15.5˚C) PUHY - series	-4~60˚F (-20~15.5˚C) PUHY - series
	Inlet Water temp.	-	50~105˚F (10~41˚C)	50~105˚F (10~41˚C)
Cooling capacity (Nominal)	*2	kW	10.6	21.1
	*2	kcal / h	9,100	18,100
	*2	Btu / h	36,200	72,000
	Power input	kW	0.015	0.015
	Current input	A	0.072 - 0.065	0.072 - 0.065
Temp. range of cooling	Outdoor temp.	D.B.	23~109˚F (-5~43˚C) PURY - series	23~109˚F (-5~43˚C) PURY - series
		D.B.	23~109˚F (-5~43˚C) PUHY - series	23~109˚F (-5~43˚C) PUHY - series
	Inlet Water temp.	-	50~95˚F (10~35˚C)	50~95˚F (10~35˚C)
Connectable outdoor unit	Total capacity		50~100% of outdoor unit capacity	50~100% of outdoor unit capacity
	Model / Quantity		PURY-P Y(S)HMU-A(-BS) PURY-P T(S)HMU-A(-BS) PUHY-P Y(S)HMU-A(-BS) PUHY-P T(S)HMU-A(-BS)	
Sound pressure level (measured in anechoic room)		dB<A>	29	29
Diameter of refrigerant pipe	Liquid	in.(mm)	ø3/8 (ø9.52) Brazed	ø3/8 (ø9.52) Brazed
	Gas	in.(mm)	ø5/8 (ø15.88) Brazed	ø3/4 (ø19.05) Brazed
Diameter of water pipe	Inlet	in.(mm)	PT3/4 (27.2) Screw	PT 1 (34) Screw
	Outlet	in.(mm)	PT3/4 (27.2) Screw	PT 1 (34) Screw
Field drain pipe size		in.(mm)	ø1-1/4(ø32)	ø1-1/4 (ø32)
External finish			NO	NO
External dimension H × W × D		mm	800 (785 without legs) × 450 x 300	800 (785 without legs) × 450 × 300
		in.	31-1/2" (30-15/16" without legs) × 17-3/4" × 11-13/16"	31-1/2" (30-15/16" without legs) × 17-3/4" × 11-13/16"
Net weight		lbs(kg)	78 (35)	84 (38)
Circulating water	Operation volume range	m^3/h	0.6 ~ 2.15	1.2 ~ 4.30
		G/h	156 ~ 555	312 ~ 1110
		G/min	2.6 ~ 9.2	5.2 ~ 18.4
		L/min	10 ~35	20 ~72
Design pressure	R410A	psi	601	601
		MPa	4.15	4.15
	Water	psi	145	145
		MPa	1.00	1.00
Drawing	External		WKB94T461	WKB94L763
	Wiring		KE94C345	E94C228X01
Standard attachment	Document		Installation Manual, Instruction Book	Installation Manual, Instruction Book
	Accessory		Strainer, Heat insulation material, 2 × Connector sets, 2 × Washer	Strainer, Connecter, Heat insulation material, 2 X Connector sets, Expansion joint, 2 X Washer
Optional parts			NONE	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: * 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 32˚F (0˚C) 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 92˚F (32˚C).
*The water circuit must use the closed circuit.
*Please do not use it as a drinking water.

*1 Nominal heating conditions
Outdoor Temp.: 47˚FDB / 43˚FWB (8.3˚CDB/6.1˚CWB)
Pipe length : 7.6 m (25 ft)
Level difference : 0m (0ft)
Inlet water Temp 86˚F (30˚C)
Water flow rate 2.15m^3/h (555G/h)
*2 Nominal cooling conditions
Outdoor Temp. : 95˚FDB (35˚CDB)
Pipe length : 7.6m (25ft)
Level difference : 0m (0ft)
Inlet water Temp 149˚F (23˚C)
Water flow rate 1.93m^3/h (498G/h)

Unit converter

kcal=kW × 860
Btu/h=kW × 3,412
cfm=m^3/min × 35.31
G(us)=L × 0.2642
lb=kg / 0.4536
psi=MPa × 145.038

* The specification data is subject to rounding variation.

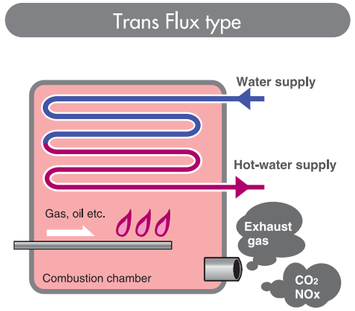
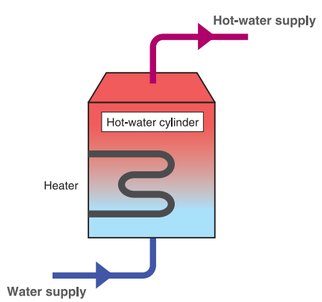
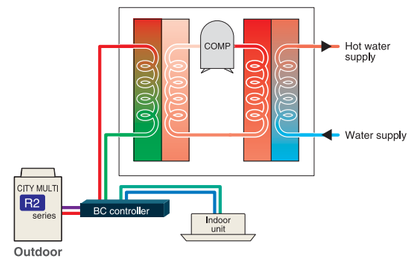
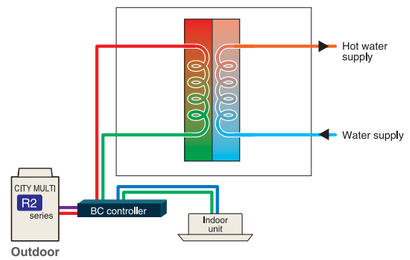
*1 Nominal heating conditions
Outdoor Temp.: 47˚FDB / 43˚FWB (8.3˚CDB/6.1˚CWB)
Pipe length : 7.6m (25ft)
Level difference : 0m (0ft)
Inlet water Temp 86˚F (30˚C)
Water flow rate 4.30m^3/h (1110G/h)
*2 Nominal cooling conditions
Outdoor Temp. : 95˚FDB (35˚CDB)
Pipe length : 7.6m (25ft)
Level difference : 0m (0ft)
Inlet water Temp 149˚F (23˚C)
Water flow rate 3.86m^3/h (996G/h)

Unit converter

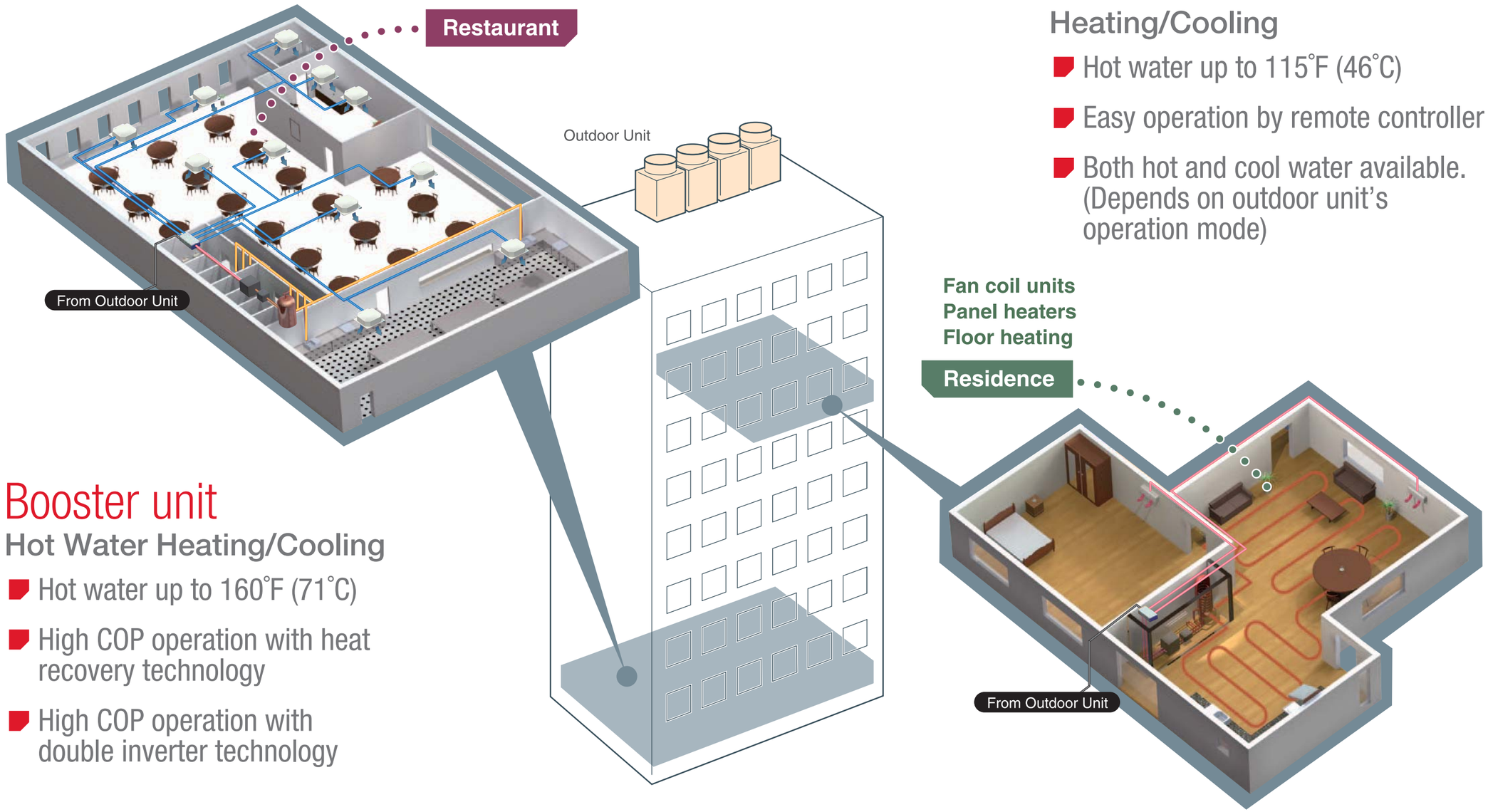
kcal=kW × 860
Btu/h=kW × 3,412
cfm=m^3/min × 35.31
G(us)=L × 0.2642
lb=kg / 0.4536
psi=MPa × 145.038

* The specification data is subject to rounding variation.

COMPARISON AGAINST TRADITIONAL SYSTEMS

	Gas/oil boiler	Electric heater		Booster unit	HEX unit
System outline	Heats water using the energy released by combustion.	Heats water by immersing an electric heater inside the water tank, which directly heats the water.		By utilizing waste heat from the R2 outdoor unit for the booster unit, it is possible to supply hot water with a high efficiency operation.	By utilizing waste heat from the R2 outdoor unit for heating operation in the HEX unit, it is possible to supply hot water with high efficiency. (No efficiency when in cooling or connected with Y series).
System structure	Trans Flux type 			Booster Unit for R2 	HEX unit for Y/R2 
Safety	Operation involves combustion. Due to special requirements, a boiler room is necessary. Proper installation is required to ensure safe operation, i.e.ventilation. Due to high voltage, careful handling and installation of power lines are required.	Relatively safe. Due to high voltage, careful handling and installation of power lines are required.		Relatively safe. Due to high voltage, careful handling and installation of power lines are required. If refrigerant leaks, there is a possibility of suffocation.	Relatively safe. Due to high voltage, careful handling and installation of power lines are required. If refrigerant leaks, there is a possibility of suffocation.
Energy saving	Only consumes energy at the time and place where it is needed. Continuous running of the system required to keep load of buffer tank. Efficiency is low as COP of 1, as part of the embedded energy is lost through exhaust and emission losses.	Only consumes energy at the time and place where it is needed. Consumed energy is entirely converted into effective heat at the point of use. Efficiency is low as COP of 1, as part of the embedded energy is lost through exhaust and emission losses.		Highly efficient, as it utilizes waste heat from cooling to supply hot water.	Highly efficient, as it utilizes waste heat from cooling to supply hot water.
CO_2 emission	CO_2 and NOx may be generated at the installation site. The volume will be larger than an electric system.	CO_2 and NOx will not be generated at the installation site.		CO_2 and NOx will not be generated at the installation site.	CO_2 and NOx will not be generated at the installation site.
Maintenance	Regular maintenance and chimney sweeping required. Remote operation and monitoring is possible.	Easy maintenance, no chimney sweeping, no purging of the pipes. Remote operation and monitoring is possible. May require regular replacement of electric heater.		Easy maintenance, no need for regular servicing by an expert, no chimney sweeping, no purging of the pipes. Remote operation and monitoring is possible.	Easy maintenance, no need for regular servicing by an expert, no chimney sweeping, no purging of the pipes. Remote operation and monitoring is possible.

APPLICATION EXAMPLES



HEX unit

Heating/Cooling

- Hot water up to 115˚F (46˚C)
- Easy operation by remote controller
- Both hot and cool water available. (Depends on outdoor unit's operation mode)

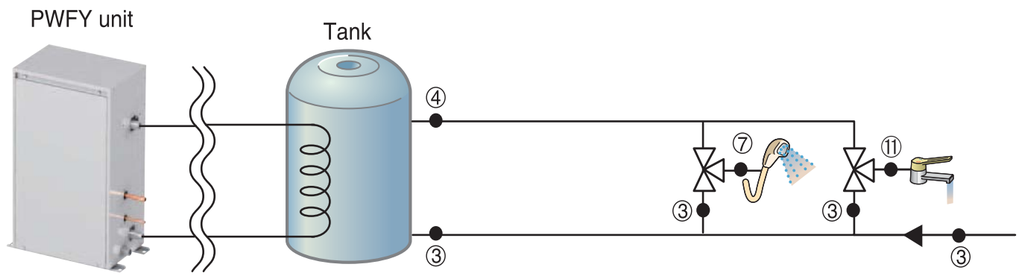
Booster unit

Hot Water Heating/Cooling

- Hot water up to 160˚F (71˚C)
- High COP operation with heat recovery technology
- High COP operation with double inverter technology

☑Healthcare facilities ☑Apartments ☑Hospitals ☑Supermarkets ☑Gyms ☑Factories ☑Hotels ☑Restaurants ☑Offices

SELECTING A MODEL



(1) Model selection calculation

Heating Capacity Calculation

A. For Air conditioning using such as Panel Heaters, Floor Heating and Fan coil units
Required total heating capacity ① BTU / kW
Safety factor; ② %

B. For Sanitary use such as Shower and Bathrooms Conditions
Tank inlet water Temp.; ③ ˚F / ˚C
Tank outlet water Temp.; ④ ˚F / ˚C
(Set Temp 23˚F / -5˚C)
Safety factor for Heat Loss; ⑤ %
Operating time; ⑥ Hours
For Shower; ⑦ G/ℓ Per Person × ⑧ Person = ⑨ G / ℓ (Water Temp. Condition ⑩ ˚F / ˚C)
For Bathrooms; ⑪ G/ℓ Per Person × ⑫ Person = ⑬ G / ℓ (Water Temp. Condition ⑭ ˚F / ˚C)

The conversion of water volume to ④ ˚F / ˚C
⑨ × (⑩ - ③) / (④ - ③)
+ ⑬ × (⑭ - ③) / (④ - ③)
= ⑮ G/ℓ day

Unit : M BTU, BTU
Heating Capacity Calculation for sanitary usage
⑮ /1,000 × (④ - ③) / 2 = ⑯ M BTU / day

The conversion of M BTU to BTU
⑯ × 1,000 / ⑥ = ⑰ BTU

Unit : M cal, kW
Heating Capacity Calculation for sanitary usage
⑮ /1,000 × (④ - ③) = ⑯ M cal / day

The conversion of M BTU to BTU
⑯ / 860 × 1,000 / ⑥ = ⑰ kW

C. Total (A+B)
Total Heating Capacity
① × (100% + ② %) + ⑰ × (100% + ⑤ %) = ⑱ BTU / kW

D. No. of units required
Safety factor; ⑲ %
⑱ × (100% + ⑲ %) / 39,900BTU / 12.5kW = ⑳ units
⇩
⑳ units are required

(2)-1 Model selection calculation example (˚F/BTU/G)

A. For Air conditioning using such as Panel Heaters, Floor Heating and Fan coil units
Required total heating capacity 68,240 BTU
Safety factor; 10 %

B. For Sanitary use such as Shower and Bathrooms Conditions
Tank inlet water Temp.; 50 ˚F
Tank outlet water Temp.; 140 ˚F
(Set Temp 23 ˚F)
Safety factor for Heat Loss; 15 %
Operating time; 8 Hours
For Shower; 16 G/Person x 20 Person = 317 G (Water Temp. Condition 104 ˚F)
For Bathrooms; 2.1 G/Person x 30 Person = 63.4 G (Water Temp. Condition 113 ˚F)

The conversion of water volume to ④ ˚F
317 x (104 - 50) / (140 - 50)
+ 63.4 x (113 - 50) / (140 - 50)
= 234.6 G/day

Heating Capacity Calculation for sanitary usage
234.6 /1,000 x (140 - 50) / 2 = 11.2 M BTU / day

The conversion of M BTU to BTU
11.2 x 1,000 / 8 = 1400 BTU

C. Total (A+B)
Total Heating Capacity
68240 x (100% + 10 %) + 1400 x (100% + 15 %) = 76674 BTU

D. No. of units required
Safety factor; 20 %
76674 x (100% + 20 %) / 39900BTU = 2.31 units
⇩
3 units are required

(2)-2 Model selection calculation example (˚C/kW/ℓ)

A. For Air conditioning using such as Panel Heaters, Floor Heating and Fan coil units
Required total heating capacity 20 kW
Safety factor; 10 %

B. For Sanitary use such as Shower and Bathrooms Conditions
Tank inlet water Temp.; 10 ˚C
Tank outlet water Temp.; 60 ˚C
(Set Temp -5 ˚C)
Safety factor for Heat Loss; 15 %
Operating time; 8 Hours
For Shower; 60 ℓ/Person x 20 Person = 1,200 ℓ (Water Temp. Condition 40 ˚C)
For Bathrooms; 8 ℓ/Person x 30 Person = 240 ℓ (Water Temp. Condition 45 ˚C)

The conversion of water volume to ④ ˚C
1,200 x (40 - 10) / (60 - 10)
+ 240 x (45 - 10) / (60 - 10)
= 888 ℓ/day

Heating Capacity Calculation for sanitary usage
888 /1,000 x (60 - 10) = 44.4 M cal / day

The conversion of M cal to kW
44.4 / 860 x 1,000 / 8 = 6.45 kW

C. Total (A+B)
Total Heating Capacity
20 x (100% + 10 %) + 6.45 x (100% + 15 %) = 29.42 kW

D. No. of units required
Safety factor; 20 %
29.42 x (100% + 20 %) / 11.7 kW = 2.82 units
⇩
3 units are required

BOOSTER UNIT CONTROL DESIGN

r/Hex unit icon shown on 0A and TG-2000A screen

Booste
AG-15

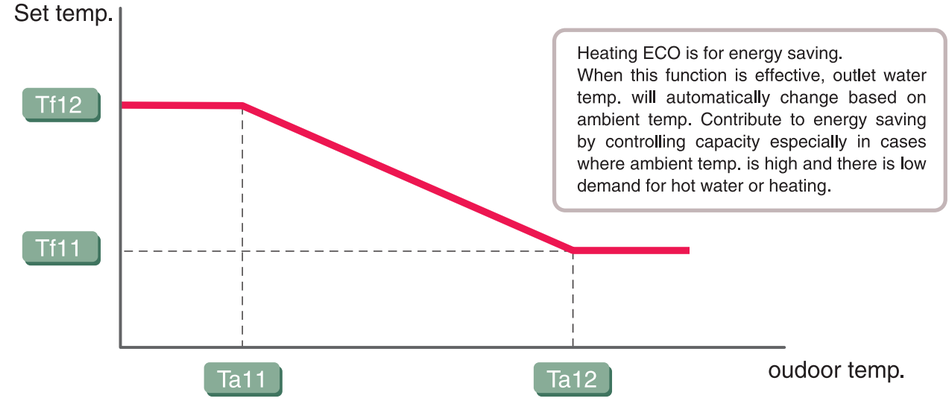
Remote Controller:
PAR-W21MAA

Function

Item	Description	Operations	Display
ON/OFF	Runs and stops the operation of a group of units	○	○
Operation mode switching	Switches between Hot Water / Heating / Heating ECO / Anti-freeze / Cooling ※ Available operation modes vary depending on the unit to be connected. ※ Switching limit setting can be made via a remote controller.	○	○
Water temperature setting	Temperature can be set within the ranges below. (in increments of 1°F or 1°C) Hot Water / Heating } 86°F(30°C) / 95°F(35°C) / 104°F(40°C) / 115°F(46°C) min. ~ 86°F(30°C) ~ 160°F(71°C) (in increments of 2°F or 1°C) Heating ECO Temperature within the following range can be set depending on the outside air temperature. 86°F(30°C) min. ~ 122°F(50°C) max. Anti-freeze 50°F(10°C) min. ~ 115°F(46°C) max. (in increments of 10°F or 5°C) Cooling 41°F(5°C) min. ~ 86°F(30°C) max. (in increments of 10°F or 5°C) ※ The settable range varies depending on the unit to be connected.	○	○
Preset temperature range limit	Preset temperature range setting can be limited via a remote controller.	○	○
Water temperature display	50°F(10°C) min. ~ 194°F(90°C) max. (in increments of 1°F or 1°C) ※ The settable range varies depending on the unit to be connected.	×	○
Permit / Prohibit local operation	Individually prohibits operations of each local remote control function :ON/OFF, Operation modes, water temperature setting, Circulating water replacement warning reset. ※ Upper level controller may not be connected depending on the unit to be connected.	×	○
Weekly scheduler	ON / OFF / Water temperature setting can be done up to 6 times one day in the week. (in increments of a minute)	○	○
Error	When an error is currently occurring on a unit, the afflicted unit and the error code are displayed.	×	○
Self check (Error history)	Searches the latest error history by pressing the CHECK button twice.	○	○
Test run	Enables the Test run mode by pressing the TEST button twice. ※ Test run mode is not available depending on the unit to be connected.	○	○
Circulating water replacement warning	Displays the circulating water replacement warning via the unit message. Clears the display by pressing the CIR.WATER button twice. ※ Circulating water replacement warning is not available depending on the unit to be connected.	○	○
LANGUAGE setting	The language on the dot matrix LCD can be changed. (Seven languages) English/German/Spanish/Russian/Italian/French/Swedish	○	○
Operation locking function	Remote controller operation can be locked or unlocked. ·All-switch locking ·Locking except ON/OFF switch	○	○

HEX UNIT CONTROL DESIGN

Heating ECO mode



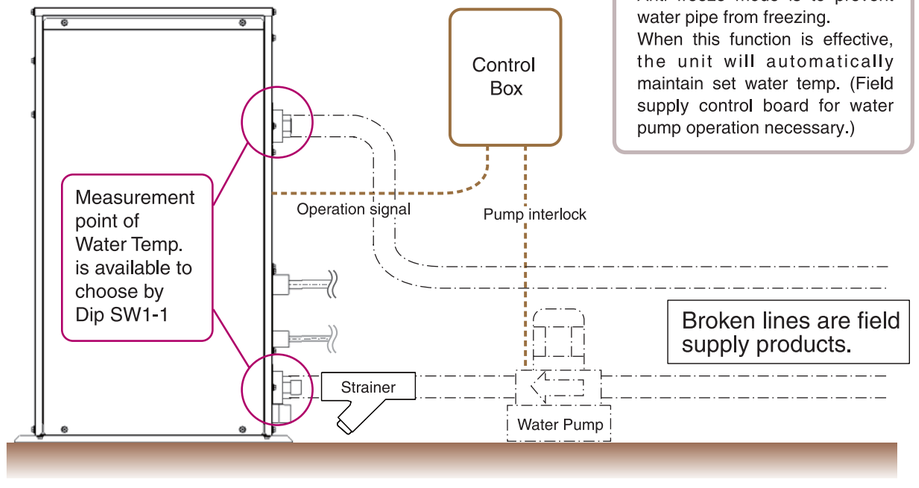
Heating ECO is for energy saving.
When this function is effective, outlet water temp. will automatically change based on ambient temp. Contribute to energy saving by controlling capacity especially in cases where ambient temp. is high and there is low demand for hot water or heating.

Initial setting

Tf11	86˚F (30˚C)
Tf12	104˚F (40˚C)
Ta11	32˚F (0˚C)
Ta12	50˚F (10˚C)

Possible to change by remote controller

Anti freeze mode



Anti freeze mode is to prevent water pipe from freezing.
When this function is effective, the unit will automatically maintain set water temp. (Field supply control board for water pump operation necessary.)

Water temperature is changeable by remote controller

INSTALLATION

The unit must be installed inside a building. The unit is not designed for outdoor installation.

For water pipes, do NOT use steel pipes. Copper pipes are recommended.

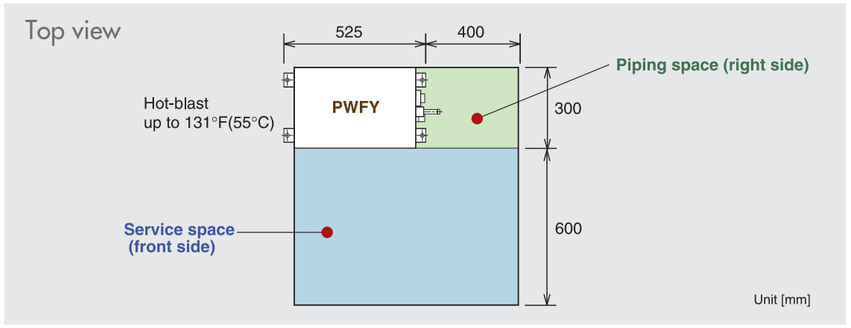
Drain pipe
Install the drain pipe with an inclination of between 1/100 and 1/200 to provide a downward flow of drain water. For cold climate installation, take appropriate measures (e.g., drain heater) to prevent the drain water from freezing.

Strainer
Install a strainer near the PWFY unit to keep foreign materials from entering the water-side heat exchanger.

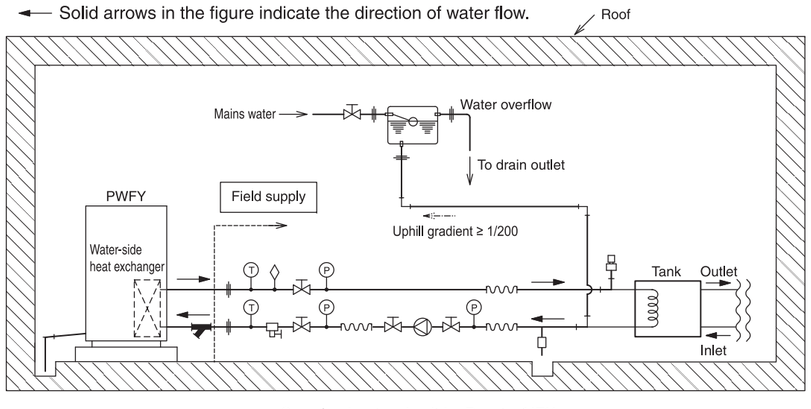
Do not touch the unit, the unit surface can be hot.

Back up system is recommended in case of PWFY unit breakdown.

Service space

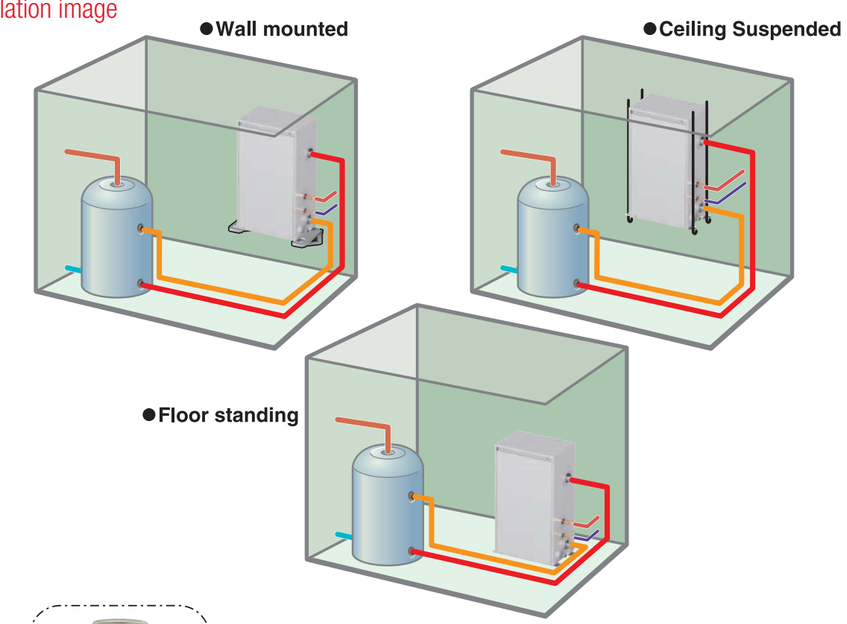


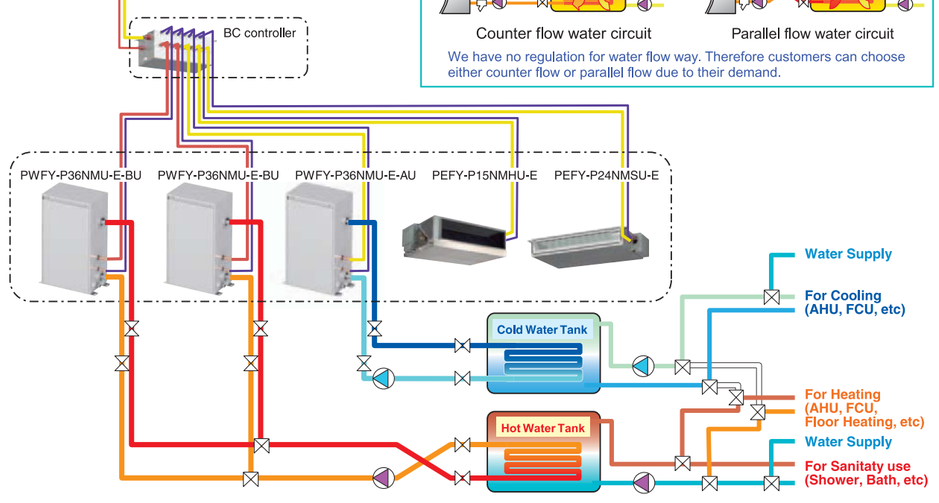
Example of Water pipe installation



Sample of water circuit for Booster/HEX

Installation image





* Note: If any medicinal substance is used for Heating (AHU, FCU, Floor Heating, etc), part the water circuit for sanitary use.

QUESTIONS & ANSWERS

What applications are suitable?

- It is best for facilities that require a large amount of hot water such as healthcare facilities, hotels, hospitals, sports facilities (gyms, golf courses) and restaurants.

How many people can the unit provide hot water for?

- Hotels, healthcare facilities, and hospitals: 10-20 people/unit.

*It varies depending on the purpose. Refer to "2-3 Selecting a model" selection for calculation.

Can it be used for air conditioning and space heating?

- Yes, it can be used for both applications.

Why is the running cost low?

- Because of the high efficiency heat pump and heat recovery technology.

What is the difference between Hydra-Dan Booster unit and HEX unit and electric heaters?

- Booster unit and HEX unit COP is 3.0 or more and therefore the running cost is 1/3 compared to electric heaters.

What is the temperature range on controller for heating?

- Booster unit: 95˚F-160˚F (35˚C ~ 71˚C)
  Hex unit: 86˚F-115˚F (30˚C ~ 46˚C) (Heating)
  Hex unit: 41˚F-86˚F (5˚C ~ 30˚C) (Cooling)

What are the new technologies?

- Booster units and HEX units operate on high COP with recovery function (with R2 system). Booster unit is able to supply high temperature hot water up to 160˚F (71˚C) without electric heater.

What is the water temperature operation range?

- Booster unit: 50˚F-160˚F (10˚C ~ 71˚C)
  Hex unit: 50˚F-105˚F (10˚C ~ 41˚C) (Heating)
  Hex unit: 50˚F-95˚F (10˚C ~ 35˚C) (Cooling)

Will the temperature of the hot water decrease during winter?

- Even when the outdoor temperature is low, water temperature of supplied hot water will not decrease.

Can HEX unit/Booster unit be connected to standard indoor units?

- Yes, it can be connected to the standard indoor models.

Is it possible to use ground water?

- No. Ground water, rain, and sea water cannot be used.

FM 33568 / ISO 9001;2000

The Air Conditioning & Refrigeration Systems Works acquired ISO 9001 certification under Series 9000 of the International Standard Organization (ISO) based on a review of quality, management for the production of refrigeration and air conditioning equipment.

ISO Authorization System
The ISO 9000 series is a plant authorization system relating to quality management as stipulated by the ISO. ISO 9001 certifies quality management based on the "design, development, production, installation and auxiliary services" for products built at an authorized plant.

Certificate Number EC97J1227

The Air Conditioning & Refrigeration Systems Works acquired environmental management system standard ISO 14001 certification.

The ISO 14000 series is a set of standards applying to environmental protection set by the International Standard Organization (ISO).

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