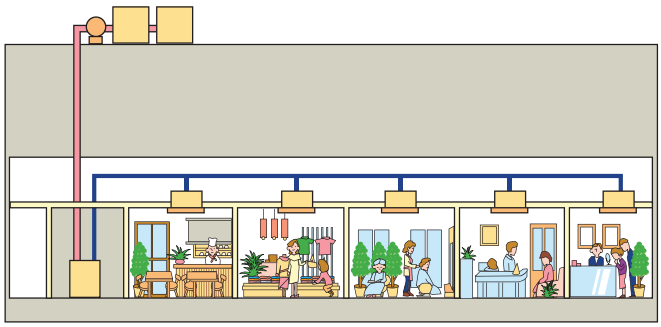
Water Cooled CITY MULTI Benefits

Water cooled systems are ideally suited for use in temperate and cooler climates since heat exchange with the outside air is not required.



Water cooled systems can be used even in buildings that are taller than 50m by running a main water pipe through each floor.

Any heat source system that can supply heat source water between 10°C~45°C can be used.

Simultaneous heating and cooling operation is available. (WR2 series)

It is suggested that Water-Cooled systems are used in the buildings in which there are heating and cooling needs as follows.

■ **Buildings that require all year cooling**
Example,
- Tenant buildings in which kitchens and offices exist together
- Buildings in which equipment rooms and offices exist together

■ **Buildings in which there are large room temperature differences between sunny and unsunny rooms**
■ **Hotels in which there are a lot of individual operation needs**

Energy Saving Technology

What is Water-Cooled?

>A unique offering from Mitsubishi Electric

It is possible now to combine the features of VRF with a water circuit using CITY MULTI WR2/WY. In this case the heat is rejected to a water source rather than to the outside air.

The advantages of water cooled systems are that the water can be delivered at optimised temperatures and volumes, which allows even greater flexibility and increased COP.

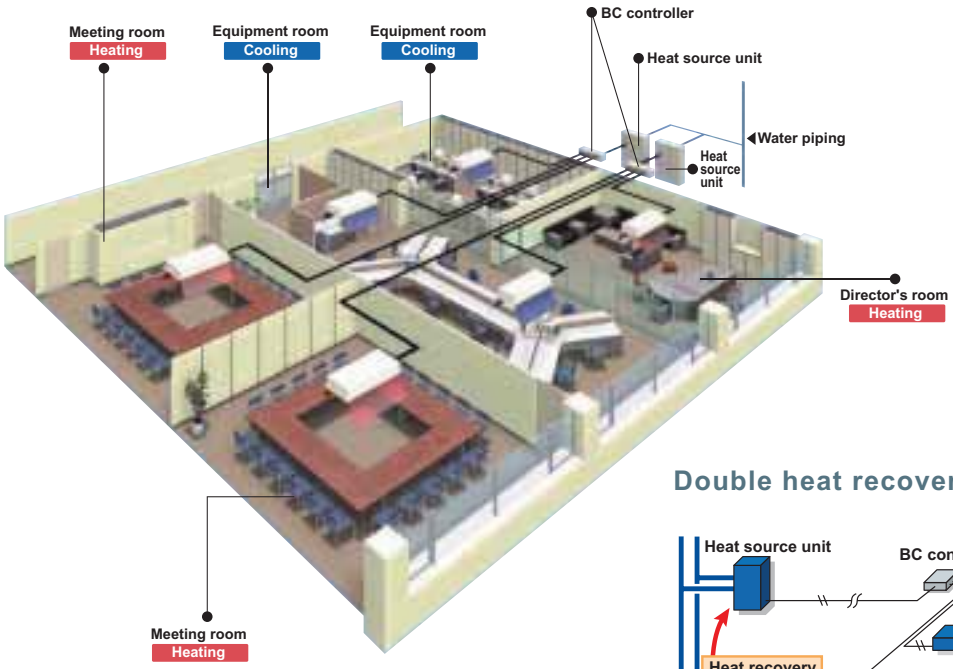
WR2(Heat recovery type)

Mitsubishi Electric now offers double heat recovery operation.

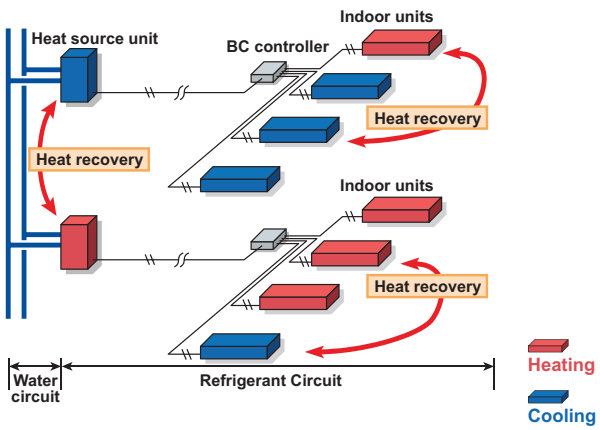
The first heat recovery is within the refrigerant system. Simultaneous cooling and heating operation is available with heat recovery performed between indoor units.

The second heat recovery is within the water loop, where heat recovery is performed between the PQRY units.

This double heat recovery operation substantially improves energy efficiency and makes the system the ideal solution to the requirements of modern office buldings, where some areas require cooling even in winter.



Double heat recovery (WR2)



Cooling or Heating

WY series — PQHY-P YHM-A
PQHY-P YSHM-A

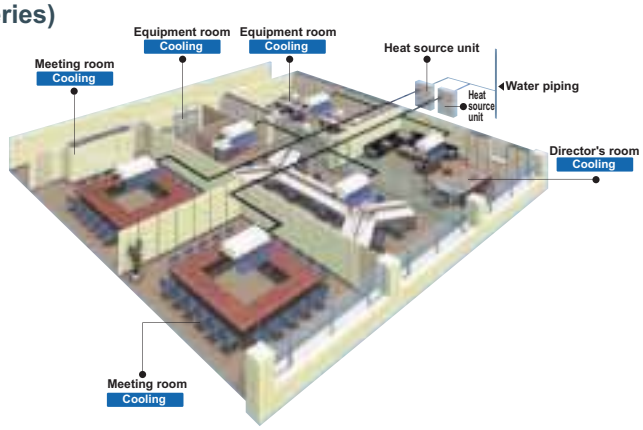
WR2 series — PQRY-P YHM-A
PQRY-P YSHM-A

[WY(Heat Pump) series]

Water energy source system allows switching between cooling and heating.

The WY-Series has all the benefits of the Y-Series using water source condensing units.
Condensing units can be situated indoors allowing greater design flexibility and no limitation on building size. Depending on capacity, up to 17 to 50 indoor units can be connected to a single condensing unit with individualized and/or centralized control. The two-pipe system allows all CITY MULTI solutions to switch between cooling and heating while maintaining a constant indoor temperature.

Installation image (WY series)

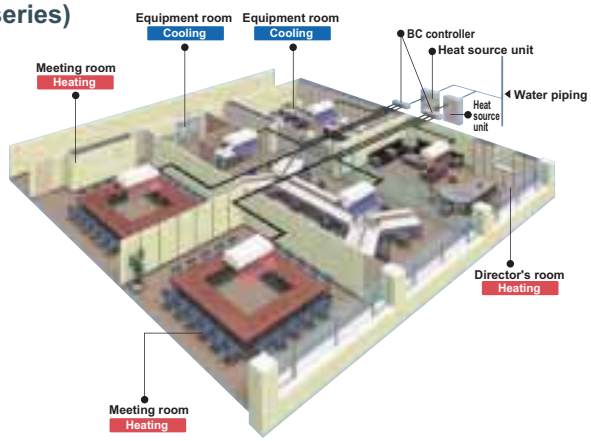


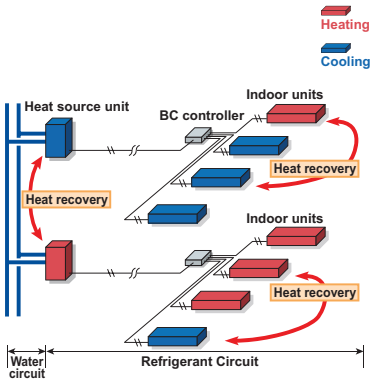
[WR2(Heat Recovery) series]

Advanced water heat source unit enjoying the benefits of R2 series

The CITY MULTI WR2 series provides all of the advantages of the R2 series with the added advantages of a water heat source system, making it suitable for wider range of applications in high rises, frigid climates, coastal areas, etc.
Not only does it produce heat recovery from the indoor units on the same 2-pipe refrigerant circuit, it also produces heat recovery via the water circuit between heat source units, making it a very economical system.

Installation image (WR2 series)



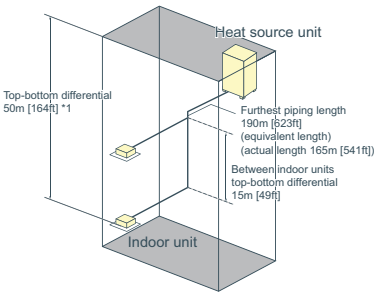


Double heat recovery (WR2)

System Pipe Lengths

[8-36HP (WY series)]

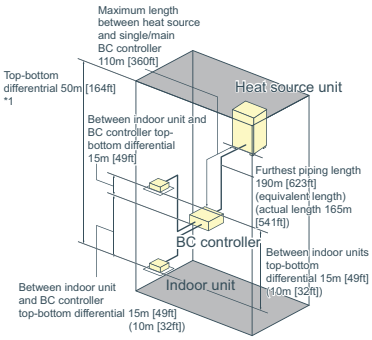
Refrigerant Piping Lengths	Maximum meters [Feet]
Total length (8-12HP)	300 [984]
Total length (16-36HP)	500 [1,640]
Maximum allowable length	165 (190equivalent) [541 (623)]
Farthest indoor from first branch	40 [131]
Vertical differentials between units	**Maximum meters [Feet]**
Indoor/heat source (heat source higher)	50 [164]
Indoor/heat source (heat source lower)	40 [131]
Indoor/indoor	15 [49]



*1 When the outdoor unit is installed below the indoor unit, top-bottom differential is 40m [131ft].

[8-24HP (WR2 series)]

Refrigerant Piping Lengths	Maximum meters [Feet]
Total length (8-12HP)	300-550 [984-1,804]
Total length (16-24HP)	500-750 [1,640-2,460]
Maximum allowable length	165 (190equivalent) [541 (623)]
Maximum length between heat source and single/main BC controller	110 [360]
*Maximum total length is dependent upon the distance between the outdoor unit and the single/main BC Controller.	
Maximum length between single/main BC controller and indoor	40-60 [131-196]
Vertical differentials between units	**Maximum meters [Feet]**
Indoor/ heat source (heat source higher)	50 [164]
Indoor/ heat source (heat source lower)	40 [131]
Indoor/BC controller (single/main)	15 [49]
Indoor/indoor	15 (10) [49 (32)]
Main BC Controller/Sub BC Controller	15 (10) [49 (32)]



*1 When the outdoor unit is installed below the indoor unit, top-bottom differential is 40m [131ft].

COP comparison (energy efficiency)

The new water cooled outoor unit offers a greater efficiency with a higher COP compared to our YGM conventional model.

COP comparison

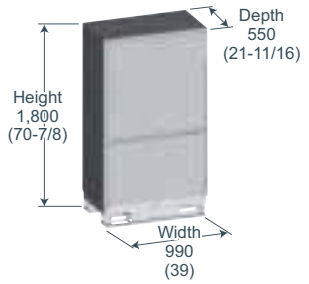
		HP	8	10	12	16	18	20	22	24	26	28	30	32	34	36
PQHY	YGM	Cooling	4.68	4.71	-	3.96	-	3.72	-	-	-	-	-	-	-	-
		Heating	4.68	4.71	-	3.96	-	3.72	-	-	-	-	-	-	-	-
	YHM	Cooling	5.71	5.13	4.55	5.45	5.08	4.89	4.68	4.45	5.22	5.13	4.94	4.69	4.52	4.34
		Heating	6.06	5.43	4.60	5.78	5.37	5.22	4.70	4.46	5.52	5.33	5.19	4.82	4.65	4.40
PQRY	YGM	Cooling	4.68	4.71	-	3.96	-	3.72	-	-	-	-	-	-	-	-
		Heating	5.33	5.43	-	4.54	-	4.63	-	-	-	-	-	-	-	-
	YHM	Cooling	5.65	5.08	4.50	5.40	5.03	4.84	4.63	4.41	-	-	-	-	-	-
		Heating	6.06	5.43	4.60	5.78	5.37	5.22	4.70	4.46	-	-	-	-	-	-

Compact design

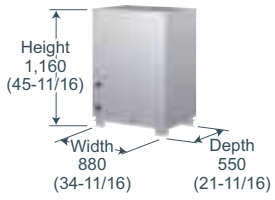
Downsized by approximately 57%*, the new models enable an effective use of space.

*8/10/12HP

mm (in.)



■ P200, P250YGM (WY/WR2 series)



■ P200, P250, P300YHM (WY/WR2 series)

Weight saving

The reduction in weight leads to easy transportaion and installation.

Weight comparison unit : kg

	HP	8	10	12	16	18	20	22	24	26	28	30	32	34	36
PQHY	YGM	272	275	-	452	-	456	-	-	-	-	-	-	-	-
	YHM	195	195	195	390	390	390	390	390	585	585	585	585	585	585
PQRY	YGM	263	266	-	440	-	444	-	-	-	-	-	-	-	-
	YHM	181	181	181	362	362	362	362	362	-	-	-	-	-	-

HEAT SOURCE UNIT
WR2 (Heat Recovery) Series
PQRY-P YHM-A

▸Specifications

Model			PQRY-P200YHM-A	PQRY-P250YHM-A	PQRY-P300YHM-A
Power source			3-phase 4-wire 380-400-415V 50/60Hz	3-phase 4-wire 380-400-415V 50/60Hz	3-phase 4-wire 380-400-415V 50/60Hz
Cooling capacity (Nominal)	*1	kW	22.4	28.0	33.5
	*1	BTU / h	76,400	95,500	114,300
	Power input	kW	3.96	5.51	7.44
	Current input	A	6.6-6.3-6.1	9.3-8.8-8.5	12.5-11.9-11.5
	EER	kW / kW	5.65	5.08	4.50
Temp. range of cooling	Indoor	W.B.	15.0~24.0°C(59~75°F)	15.0~24.0°C(59~75°F)	15.0~24.0°C(59~75°F)
	Circulating water	°C	10.0~45.0°C(50~113°F)	10.0~45.0°C(50~113°F)	10.0~45.0°C(50~113°F)
Heating capacity (Nominal)	*2	kW	25.0	31.5	37.5
	*2	BTU / h	85,300	107,500	128,000
	Power input	kW	4.12	5.80	8.15
	Current input	A	6.9-6.6-6.3	9.7-9.3-8.9	13.7-13.0-12.5
	COP	kW / kW	6.06	5.43	4.60
Temp. range of heating	Indoor	D.B.	15.0~27.0°C(59~81°F)	15.0~27.0°C(59~81°F)	15.0~27.0°C(59~81°F)
	Circulating water	°C	10.0~45.0°C(50~113°F)	10.0~45.0°C(50~113°F)	10.0~45.0°C(50~113°F)
Indoor unit connectable	Total capacity		50~150 % of heat source unit capacity	50~150 % of heat source unit capacity	50~150 % of heat source unit capacity
	Model / Quantity		P15~P250 / 1~20	P15~P250 / 1~25	P15~P250 / 1~30
Sound pressure level (measured in anechoic room)		dB <A>	47	49	50
Refrigerant piping diameter [O.D.]	High pressure	mm (in.)	15.88(5/8) Brazed	19.05(3/4) Brazed	19.05(3/4) Brazed
	Low pressure	mm (in.)	19.05(3/4) Brazed	22.2(7/8) Brazed	22.2(7/8) Brazed
Circulating water	Water flow rate	m^3 / h	5.76	5.76	5.76
		L/min	96	96	96
		cfm	3.4	3.4	3.4
	Pressure drop	kPa	17	17	17
	Operating volume range	m^3 / h	4.5 ~ 7.2	4.5 ~ 7.2	4.5 ~ 7.2
Compressor	Type x Quantity		Inverter scroll hermetic compressor	Inverter scroll hermetic compressor	Inverter scroll hermetic compressor
	Starting method		Inverter	Inverter	Inverter
	Motor output	kW	4.6	6.3	7.4
	Case heater	kW	0.035(240 V)	0.035(240 V)	0.035(240 V)
External finish			Acrylic painted steel plate	Acrylic painted steel plate	Acrylic painted steel plate
External dimension HxWxD		mm	1,160(1,100 without legs) x 880 x 550	1,160(1,100 without legs) x 880 x 550	1,160(1,100 without legs) x 880 x 550
		in.	45-11/16(43-5/16 without legs) x 34-11/16 x 21-11/16	45-11/16(43-5/16 without legs) x 34-11/16 x 21-11/16	45-11/16(43-5/16 without legs) x 34-11/16 x 21-11/16
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15MPa (601 psi)	High pressure sensor, High pressure switch at 4.15MPa (601 psi)	High pressure sensor, High pressure switch at 4.15MPa (601 psi)
	Inverter circuit (COMP.)		Over-heat protection, Over-current protection	Over-heat protection, Over-current protection	Over-heat protection, Over-current protection
	Compressor		Over-heat protection	Over-heat protection	Over-heat protection
Refrigerant	Type x original charge		R410A x 5.0kg (12lbs)	R410A x 5.0kg (12lbs)	R410A x 5.0kg (12lbs)
Net weight		kg (lbs)	181(400)	181(400)	181(400)
Heat exchanger			plate type	plate type	plate type
	Water volume in plate	L	5.0	5.0	5.0
	Water pressure Max.	MPa	2.0	2.0	2.0
Optional parts			Joint: CMY-Y102SS-G2,CMY-Y102LS-G2,CMY-Y202S-G2,CMY-R160-J1	Joint: CMY-Y102SS-G2,CMY-Y102LS-G2,CMY-Y202S-G2,CMY-R160-J1	Joint: CMY-Y102SS-G2,CMY-Y102LS-G2,CMY-Y202S-G2,CMY-R160-J1

Notes:

*1,*2 Nominal conditions

	Indoor	Water temperature	Pipe length	Level difference
Cooling	27ºCD.B./19ºCW.B. (81ºFD.B./66ºFW.B.)	30ºC (86ºF)	7.5m (24-9/16ft.)	0m (0ft.)
Heating	20ºCD.B. (68ºFD.B.)	20ºC (68ºF)		

*3 The ambient temperature of the heat source unit needs to be kept below 40ºCD.B.
*4 The ambient relative humidity of the heat source unit needs to be kept below 80%.
*5 The heat source Unit should not be installed at outdoor.
*6 Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit.
*7 Be sure to provide interlocking for the unit operation and water circuit.
*Nominal condition *1,*2 are subject to JIS B8615-1.
*Due to continuing improvement, above specification may be subject to change without notice.

HEAT SOURCE UNIT
WR2 (Heat Recovery) Series
PQRY-P YSHM-A

▸Specifications

Model			PQRY-P400YSHM-A	PQRY-P450YSHM-A	PQRY-P500YSHM-A
Power source			3-phase 4-wire 380-400-415V 50/60Hz	3-phase 4-wire 380-400-415V 50/60Hz	3-phase 4-wire 380-400-415V 50/60Hz
Cooling capacity (Nominal)	*1	kW	45.0	50.0	56.0
	*1	BTU / h	153,500	170,600	191,100
	Power input	kW	8.32	9.94	11.57
	Current input	A	14.0-13.3-12.8	16.7-15.9-15.3	19.5-18.5-17.8
	EER	kW / kW	5.40	5.03	4.84
Temp. range of cooling	Indoor	W.B.	15.0~24.0°C(59~75°F)	15.0~24.0°C(59~75°F)	15.0~24.0°C(59~75°F)
	Circulating water	°C	10.0~45.0°C(50~113°F)	10.0~45.0°C(50~113°F)	10.0~45.0°C(50~113°F)
Heating capacity (Nominal)	*2	kW	50.0	56.0	63.0
	*2	BTU / h	170,600	191,100	215,000
	Power input	kW	8.65	10.42	12.06
	Current input	A	14.6-13.8-13.3	17.5-16.7-16.1	20.3-19.3-18.6
	COP	kW / kW	5.78	5.37	5.22
Temp. range of heating	Indoor	D.B.	15.0~27.0°C(59~81°F)	15.0~27.0°C(59~81°F)	15.0~27.0°C(59~81°F)
	Circulating water	°C	10.0~45.0°C(50~113°F)	10.0~45.0°C(50~113°F)	10.0~45.0°C(50~113°F)
Indoor unit connectable	Total capacity		50~150 % of heat source unit capacity	50~150 % of heat source unit capacity	50~150 % of heat source unit capacity
	Model / Quantity		P15~P250 / 1~40	P15~P250 / 1~45	P15~P250 / 1~50 (Connectable branch pipe number is max. 48.)
Sound pressure level (measured in anechoic room)		dB <A>	50	51	52
Refrigerant piping diameter [O.D.]	High pressure	mm (in.)	22.2(7/8) Brazed	22.2(7/8) Brazed	22.2(7/8) Brazed
	Low pressure	mm (in.)	28.58(1-1/8) Brazed	28.58(1-1/8) Brazed	28.58(1-1/8) Brazed

Set Model

Model			PQRY-P200YHM-A	PQRY-P200YHM-A	PQRY-P250YHM-A	PQRY-P200YHM-A	PQRY-P250YHM-A	PQRY-P250YHM-A
Circulating water	Water flow rate	m^3 / h	5.76 + 5.76		5.76 + 5.76		5.76 + 5.76	
		L/min	96 + 96		96 + 96		96 + 96	
		cfm	3.4 + 3.4		3.4 + 3.4		3.4 + 3.4	
	Pressure drop	kPa	17	17	17	17	17	17
	Operating volume range	m^3 / h	4.5 + 4.5 ~ 7.2 + 7.2		4.5 + 4.5 ~ 7.2 + 7.2		4.5 + 4.5 ~ 7.2 + 7.2	
Compressor	Type x Quantity		Inverter scroll hermetic compressor		Inverter scroll hermetic compressor		Inverter scroll hermetic compressor	
	Starting method		Inverter	Inverter	Inverter	Inverter	Inverter	Inverter
	Motor output	kW	4.6	4.6	6.3	4.6	6.3	6.3
	Case heater	kW	0.035(240 V)	0.035(240 V)	0.035(240 V)	0.035(240 V)	0.035(240 V)	0.035(240 V)
External finish			Acrylic painted steel plate		Acrylic painted steel plate		Acrylic painted steel plate	
External dimension HxWxD		mm	1,160(1,100 without legs) x 880 x 550	1,160(1,100 without legs) x 880 x 550	1,160(1,100 without legs) x 880 x 550	1,160(1,100 without legs) x 880 x 550	1,160(1,100 without legs) x 880 x 550	1,160(1,100 without legs) x 880 x 550
		in.	45-11/16(43-5/16 without legs) x 34-11/16 x 21-11/16	45-11/16(43-5/16 without legs) x 34-11/16 x 21-11/16	45-11/16(43-5/16 without legs) x 34-11/16 x 21-11/16	45-11/16(43-5/16 without legs) x 34-11/16 x 21-11/16	45-11/16(43-5/16 without legs) x 34-11/16 x 21-11/16	45-11/16(43-5/16 without legs) x 34-11/16 x 21-11/16
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15MPa (601 psi)		High pressure sensor, High pressure switch at 4.15MPa (601 psi)		High pressure sensor, High pressure switch at 4.15MPa (601 psi)	
	Inverter circuit (COMP.)		Over-heat protection, Over-current protection		Over-heat protection, Over-current protection		Over-heat protection, Over-current protection	
	Compressor		Over-heat protection		Over-heat protection		Over-heat protection	
Refrigerant	Type x original charge		R410A x 5.0kg (12lbs)	R410A x 5.0kg (12lbs)	R410A x 5.0kg (12lbs)	R410A x 5.0kg (12lbs)	R410A x 5.0kg (12lbs)	R410A x 5.0kg (12lbs)
Net weight		kg (lbs)	181(400)	181(400)	181(400)	181(400)	181(400)	181(400)
Heat exchanger			plate type	plate type	plate type	plate type	plate type	plate type
	Water volume in plate	L	5.0	5.0	5.0	5.0	5.0	5.0
	Water pressure Max.	MPa	2.0	2.0	2.0	2.0	2.0	2.0
Optional parts			Heat Source Twinning kit: CMY-Q100VBK Joint: CMY-Y102SS-G2,CMY-Y102LS-G2,CMY-Y202S-G2,CMY-R160-J1		Heat Source Twinning kit: CMY-Q100VBK Joint: CMY-Y102SS-G2,CMY-Y102LS-G2,CMY-Y202S-G2,CMY-R160-J1		Heat Source Twinning kit: CMY-Q100VBK Joint: CMY-Y102SS-G2,CMY-Y102LS-G2,CMY-Y202S-G2,CMY-R160-J1	

Notes:

*1,*2 Nominal conditions

	Indoor	Water temperature	Pipe length	Level difference
Cooling	27ºCD.B./19ºCW.B. (81ºFD.B./66ºFW.B.)	30ºC (86ºF)	7.5m (24-9/16ft.)	0m (0ft.)
Heating	20ºCD.B. (68ºFD.B.)	20ºC (68ºF)		

*3 The ambient temperature of the heat source unit needs to be kept below 40ºCD.B.
*4 The ambient relative humidity of the heat source unit needs to be kept below 80%.
*5 The heat source Unit should not be installed at outdoor.
*6 Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit.
*7 Be sure to provide interlocking for the unit operation and water circuit.
*Nominal condition *1,*2 are subject to JIS B8615-1.
*Due to continuing improvement, above specification may be subject to change without notice.

HEAT SOURCE UNIT
WR2 (Heat Recovery) Series
PQRY-P YSHM-A

▸Specifications

Model			PQRY-P550YSHM-A	PQRY-P600YSHM-A
Power source			3-phase 4-wire 380-400-415V 50/60Hz	3-phase 4-wire 380-400-415V 50/60Hz
Cooling capacity (Nominal)	*1	kW	63.0	69.0
	*1	BTU / h	215,000	235,400
	Power input	kW	13.60	15.62
	Current input	A	22.9-21.8-21.0	26.3-25.0-24.1
	EER	kW / kW	4.63	4.41
Temp. range of cooling	Indoor	W.B.	15.0~24.0°C(59~75°F)	15.0~24.0°C(59~75°F)
	Circulating water	°C	10.0~45.0°C(50~113°F)	10.0~45.0°C(50~113°F)
Heating capacity (Nominal)	*2	kW	69.0	76.5
	*2	BTU / h	235,400	261,000
	Power input	kW	14.65	17.12
	Current input	A	24.7-23.4-22.6	28.9-27.4-26.4
	COP	kW / kW	4.70	4.46
Temp. range of heating	Indoor	D.B.	15.0~27.0°C(59~81°F)	15.0~27.0°C(59~81°F)
	Circulating water	°C	10.0~45.0°C(50~113°F)	10.0~45.0°C(50~113°F)
Indoor unit connectable	Total capacity		50~150 % of heat source unit capacity	50~150 % of heat source unit capacity
	Model / Quantity		P15~P250 / 2~50 (Connectable branch pipe number is max. 48.)	P15~P250 / 2~50 (Connectable branch pipe number is max. 48.)
Sound pressure level (measured in anechoic room)		dB <A>	52.5	53
Refrigerant piping diameter [O.D.]	High pressure	mm (in.)	28.58(1-1/8) Brazed	28.58(1-1/8) Brazed
	Low pressure	mm (in.)	28.58(1-1/8) Brazed	28.58(1-1/8) Brazed

Set Model

Model			PQRY-P300YHM-A	PQRY-P250YHM-A	PQRY-P300YHM-A	PQRY-P300YHM-A
Circulating water	Water flow rate	m^3 / h	5.76 + 5.76		5.76 + 5.76	
		L/min	96 + 96		96 + 96	
		cfm	3.4 + 3.4		3.4 + 3.4	
	Pressure drop	kPa	17	17	17	17
	Operating volume range	m^3 / h	4.5 + 4.5 ~ 7.2 + 7.2		4.5 + 4.5 ~ 7.2 + 7.2	
Compressor	Type x Quantity		Inverter scroll hermetic compressor		Inverter scroll hermetic compressor	
	Starting method		Inverter	Inverter	Inverter	Inverter
	Motor output	kW	7.4	6.3	7.4	7.4
	Case heater	kW	0.035(240 V)	0.035(240 V)	0.035(240 V)	0.035(240 V)
External finish			Acrylic painted steel plate		Acrylic painted steel plate	
External dimension HxWxD		mm	1,160(1,100 without legs) x 880 x 550	1,160(1,100 without legs) x 880 x 550	1,160(1,100 without legs) x 880 x 550	1,160(1,100 without legs) x 880 x 550
		in.	45-11/16(43-5/16 without legs) x 34-11/16 x 21-11/16	45-11/16(43-5/16 without legs) x 34-11/16 x 21-11/16	45-11/16(43-5/16 without legs) x 34-11/16 x 21-11/16	45-11/16(43-5/16 without legs) x 34-11/16 x 21-11/16
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15MPa (601 psi)		High pressure sensor, High pressure switch at 4.15MPa (601 psi)	
	Inverter circuit (COMP.)		Over-heat protection, Over-current protection		Over-heat protection, Over-current protection	
	Compressor		Over-heat protection	Over-heat protection	Over-heat protection	Over-heat protection
Refrigerant	Type x original charge		R410A x 5.0kg (12lbs)	R410A x 5.0kg (12lbs)	R410A x 5.0kg (12lbs)	R410A x 5.0kg (12lbs)
Net weight		kg (lbs)	181(400)	181(400)	181(400)	181(400)
Heat exchanger			plate type	plate type	plate type	plate type
	Water volume in plate	L	5.0	5.0	5.0	5.0
	Water pressure Max.	MPa	2.0	2.0	2.0	2.0
Optional parts			Heat Source Twinning kit: CMY-Q100VBK Joint: CMY-Y102SS-G2,CMY-Y102LS-G2,CMY-Y202S-G2,CMY-R160-J1		Heat Source Twinning kit: CMY-Q100VBK Joint: CMY-Y102SS-G2,CMY-Y102LS-G2,CMY-Y202S-G2,CMY-R160-J1	

Notes:

*1,*2 Nominal conditions

	Indoor	Water temperature	Pipe length	Level difference
Cooling	27ºCD.B./19ºCW.B. (81ºFD.B./66ºFW.B.)	30ºC (86ºF)	7.5m (24-9/16ft.)	0m (0ft.)
Heating	20ºCD.B. (68ºFD.B.)	20ºC (68ºF)		

*3 The ambient temperature of the heat source unit needs to be kept below 40ºCD.B.
*4 The ambient relative humidity of the heat source unit needs to be kept below 80%.
*5 The heat source Unit should not be installed at outdoor.
*6 Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit.
*7 Be sure to provide interlocking for the unit operation and water circuit.
*Nominal condition *1,*2 are subject to JIS B8615-1.
*Due to continuing improvement, above specification may be subject to change without notice.