HEAT SOURCE UNITS

Model			PQRY-P72THMU-A	PQRY-P96THMU-A
Power source			3-phase 3-wire 208-230 ±10% 60Hz	3-phase 3-wire 208-230 ±10% 60Hz
Cooling capacity (Nominal) *1		BTU/h	72,700	96,300
		kW	21.3	28.2
	Power input	kW	3.97	5.77
	Current input	A	12.6-11.4	17.9-16.2
Temp. range of cooling	Indoor	W.B.	59~75°F (15~24°C)	59~75°F (15~24°C)
	Circulating water	°C	50~113°F (10~45°C)	50~113°F (10~45°C)
Heating capacity (Nominal) *2		BTU/h	80000	108000
		kW	23.4	31.7
	Power input	kW	3.83	6.18
	Current input	A	11.8-10.7	19.1-17.2
Temp. range of heating	Indoor	D.B.	59~81°F (15~27°C)	59~81°F (15~27°C)
	Circulating water	°C	50~113°F (10~45°C)	50~113°F (10~45°C)
Indoor unit connectable	Total capacity		50~150% of heatsource unit capacity	50~150% of heatsource unit capacity
	Model / Quantity		P06~P96 / 1~18	P06~P96 / 1~24
Sound pressure level (measured in anechoic room)		dB <A>	47	49
Refrigerant piping diameter	High pressure	in.(mm)	5/8 (15.88) Brazed	3/4 (19.05) Brazed
	Low pressure	in.(mm)	3/4 (19.05) Brazed	7/8 (22.2) Brazed
External finish			Acrylic painted steel plate	Acrylic painted steel plate
External dimension HxWxD		mm	1,100 x 880 x 550	1,100 x 880 x 550
		in.	43-5/16 x 34-11/16 x 21-11/16	43-5/16 x 34-11/16 x 21-11/16
Net weight		lbs(kg)	402 (182)	402 (182)
Heat exchanger			plate type	plate type
	Water volume in plate	G	1.32	1.32
		l	5.0	5.0
	Water pressure Max.	psi	290	290
		MPa	2.0	2.0
Compressor	Type		Inverter scroll hermetic compressor	Inverter scroll hermetic compressor
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	AC&R Works, MITSUBISHI ELECTRIC CORPORATION
	Starting method		Inverter	Inverter
	Motor output	kW	4.5	6.2
	Case heater	kW	0.051 (230V)	0.051 (230V)
	Lubricant		MEL32	MEL32
Circulating water	Water flow rate	G/h	1,522	1,522
		G/min(gpm)	25.4	25.4
		m^3 / h	5.76	5.76
		L/min	96	96
		cfm	3.4	3.4
	Pressure drop	kPa	17	17
		psi	2.47	2.47
	Operating volume range	G/h	1189 - 1902	1189 - 1902
		G/min(gpm)	19.8 - 31.7	19.8 - 31.7
		m^3 / h	4.5 - 7.2	4.5 - 7.2
HIC circuit (HIC: Heat Inter-Changer)			-	-
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	High pressure sensor, High pressure switch at 4.15 MPa (601 psi)
	Inverter circuit(comp)		Over-heat protection, Over-current protection	Over-heat protection, Over-current protection
	Compressor		Over-heat protection	Over-heat protection
Minimum Circuit Ampacity(MCA)		A	16-15	23-21
Maximum Overcurrent Protection(MOCP)		A	29-26	41-37
Refrigerant	Type x original charge		R410A x (11 lbs + 1 oz) (5.0 kg)	R410A x (11 lbs + 1 oz) (5.0 kg)
	Control		Indoor LEV and BC controller	Indoor LEV and BC controller
Drawing	External		KB94T665	KB94T665
	Wiring		KE79B308H01	KE79B308H01
Standard attachment	Document		Installation Manual	Installation Manual
	Accessory		Details refer to External Drw	Details refer to External Drw
Optional parts			joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-Y202S-G2, CMY-R160C-J BC controller : CMB-P104, 105, 106, 108, 1010, 1013, 1016NU-G Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB	joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-Y202S-G2, CMY-R160C-J BC controller : CMB-P104, 105, 106, 108, 1010, 1013, 1016NU-G Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB
Remarks			*Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. *Due to continuing improvement, above specifications may be subject to change without notice. *The ambient temperature of the Heat Source Unit needs to be kept below 104°F DB(40°CDB). *The ambient relative humidity of the Heat Source Unit needs to be kept below 80%. *The Heat Source Unit should not be installed at outdoor. *Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit. *Be sure to provide interlocking for the unit operation and water circuit.	

Notes :

1.Nominal cooling conditions
Indoor:81°FDB/66°FWB (27°CDB/19°CWB), Water temperature:86°F (30°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)
2.Nominal heating conditions
Indoor:68°FDB (20°CDB), Water temperature:68°F (20°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)

Unit converter	
BTU/h	=kW x 3,412
cfm	=m^3/min x 35.31
lbs	=kg / 0.4536

*Above specification data is subject to rounding variation.

WR2

1. SPECIFICATIONS

Model			PQRY-P120THMU-A	
Power source			3-phase 3-wire 208-230 ±10% 60Hz	
Cooling capacity (Nominal) *1		BTU/h	120,000	
		kW	35.2	
	Power input	kW	7.73	
	Current input	A	23.6-21.4	
Temp. range of cooling	Indoor	W.B.	59~75°F (15~24°C)	
	Circulating water	°C	50~113°F (10~45°C)	
Heating capacity (Nominal) *2		BTU/h	135000	
		kW	39.6	
	Power input	kW	7.62	
	Current input	A	23.5-21.3	
Temp. range of heating	Indoor	D.B.	59~81°F (15~27°C)	
	Circulating water	°C	50~113°F (10~45°C)	
Indoor unit connectable	Total capacity		50~150% of heatsource unit capacity	
	Model / Quantity		P06~P96 / 1~30	
Sound pressure level (measured in anechoic room)		dB <A>	51	
Refrigerant piping diameter	High pressure	in.(mm)	3/4 (19.05) Brazed	
	Low pressure	in.(mm)	7/8 (22.2) Brazed	
External finish			Acrylic painted steel plate	
External dimension HxWxD		mm	1,100 x 880 x 550	
		in.	43-5/16 x 34-11/16 x 21-11/16	
Net weight		lbs(kg)	402 (182)	
Heat exchanger			plate type	
	Water volume in plate	G	1.32	
		l	5.0	
	Water pressure Max.	psi	290	
		MPa	2.0	
Compressor	Type		Inverter scroll hermetic compressor	
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	
	Motor output	kW	8.5	
	Case heater	kW	0.051 (230V)	
	Lubricant		MEL32	
Circulating water	Water flow rate	G/h	1,522	
		G/min(gpm)	25.4	
		m^3 / h	5.76	
		L/min	96	
		cfm	3.4	
	Pressure drop	kPa	17	
		psi	2.47	
	Operating volume range	G/h	1189 - 1902	
		G/min(gpm)	19.8 - 31.7	
		m^3 / h	4.5 - 7.2	
HIC circuit (HIC: Heat Inter-Changer)			-	
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	
	Inverter circuit(comp)		Over-heat protection, Over-current protection	
	Compressor		Over-heat protection	
Minimum Circuit Ampacity(MCA)		A	30-27	
Maximum Overcurrent Protection(MOCP)		A	54-49	
Refrigerant	Type x original charge		R410A x (11 lbs + 1 oz) (5.0 kg)	
	Control		Indoor LEV and BC controller	
Drawing	External		KB94T665	
	Wiring		KE79B308H01	
Standard attachment	Document		Installation Manual	
	Accessory		Details refer to External Drw	
Optional parts			joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-R160C-J BC controller : CMB-P104, 105, 106, 108, 1010, 1013, 1016NU-G Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB	
Remarks			*Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. *Due to continuing improvement, above specifications may be subject to change without notice. *The ambient temperature of the Heat Source Unit needs to be kept below 104°F DB(40°CDB). *The ambient relative humidity of the Heat Source Unit needs to be kept below 80%. *The Heat Source Unit should not be installed at outdoor. *Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit. *Be sure to provide interlocking for the unit operation and water circuit.	

Notes :

1.Nominal cooling conditions
Indoor:81°FDB/66°FWB (27°CDB/19°CWB), Water temperature:86°F (30°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)
2.Nominal heating conditions
Indoor:68°FDB (20°CDB), Water temperature:68°F (20°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)

Unit converter	
BTU/h	=kW x 3,412
cfm	=m^3/min x 35.31
lbs	=kg / 0.4536

*Above specification data is subject to rounding variation.

WR2

1. SPECIFICATIONS

Model			PQRY-P144TSHMU-A
Power source			3-phase 3-wire 208-230 ±10% 60Hz
Cooling capacity (Nominal) *1		BTU/h	145,400
		kW	42.6
	Power input	kW	8.18
	Current input	A	25.9-23.4
Temp. range of cooling	Indoor	W.B.	59~75°F (15~24°C)
	Circulating water	°C	50~113°F (10~45°C)
Heating capacity (Nominal) *2		BTU/h	160,000
		kW	46.9
	Power input	kW	7.89
	Current input	A	24.3-22.0
Temp. range of heating	Indoor	D.B.	59~81°F (15~27°C)
	Circulating water	°C	50~113°F (10~45°C)
Indoor unit connectable	Total capacity		50~150% of heat source unit capacity
	Model / Quantity		P06~P96 / 1~36
Sound pressure level (measured in anechoic room)		dB <A>	50
Refrigerant piping diameter	High pressure	in.(mm)	7/8 (22.2) Brazed
	Low pressure	in.(mm)	1-1/8 (28.58) Brazed

Set Model

Model			PQRY-P72THMU-A	PQRY-P72THMU-A
External finish			Acrylic painted steel plate	
External dimension HxWxD		mm	1,100 x 880 x 550	1,100 x 880 x 550
		in.	43-5/16 x 34-11/16 x 21-11/16	43-5/16 x 34-11/16 x 21-11/16
Net weight		lbs(kg)	402 (182)	402 (182)
Heat exchanger			plate type	plate type
	Water volume in plate	G	1.32	1.32
		l	5.0	5.0
	Water pressure Max.	psi	290	290
		MPa	2.0	2.0
Compressor	Type		Inverter scroll hermetic compressor	
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	Inverter
	Motor output	kW	4.5	4.5
	Case heater	kW	0.051 (230V)	0.051 (230V)
	Lubricant		MEL32	MEL32
Circulating water	Water flow rate	G/h	1522 + 1522	
		G/min(gpm)	25.4 + 25.4	
		m^3 / h	5.76 + 5.76	
		L/min	96 + 96	
		cfm	3.4 + 3.4	
	Pressure drop	kPa	17	17
		psi	2.47	2.47
	Operating volume range	G/h	1189 + 1189 ~ 1902 + 1902	
		G/min(gpm)	19.8 + 19.8 ~ 31.7 + 31.7	
		m^3 / h	4.5 + 4.5 ~ 7.2 + 7.2	
HIC circuit (HIC: Heat Inter-Changer)			-	
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	
	Inverter circuit(comp)		Over-heat protection, Over-current protection	
	Compressor		Over-heat protection	
Minimum Circuit Ampacity(MCA)		A	16-15	16-15
Maximum Overcurrent Protection(MOCP)		A	29-26	29-26
Refrigerant	Type x original charge		R410A x (11 lbs + 1 oz) (5 kg)	R410A x (11 lbs + 1 oz) (5 kg)
	Control		Indoor LEV and BC controller	
Pipe between unit and distributor	High pressure	in.(mm)	3/4 (19.05) Brazed	3/4 (19.05) Brazed
	Low pressure	in.(mm)	-	7/8 (22.2) Brazed
Drawing	External		KB94T665	
	Wiring		KE79B308H01	KE79B308H01
Standard attachment	Document		Installation Manual	
	Accessory		Details refer to External Drw	
Optional parts			Heat Source Twinning kit : CMY-Q100CBK joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-Y202S-G2, CMY-R160C-J Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB	
Remarks			*Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. *Due to continuing improvement, above specifications may be subject to change without notice. *The ambient temperature of the Heat Source Unit needs to be kept below 104°F DB(40°CDB). *The ambient relative humidity of the Heat Source Unit needs to be kept below 80%. *The Heat Source Unit should not be installed at outdoor. *Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit. *Be sure to provide interlocking for the unit operation and water circuit. *The Heat Source twinning kit (low pressure) should be connected to the low pressure side of the heat source unit. If the connected units are of different capacities, the Heat Source twinning kit (low pressure) should be installed in the unit with the largest capacity	

Notes :

1.Nominal cooling conditions
Indoor:81°FDB/66°FWB (27°CDB/19°CWB), Water temperature:86°F (30°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)
2.Nominal heating conditions
Indoor:68°FDB (20°CDB), Water temperature:68°F (20°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)

Unit converter

BTU/h =kW x 3,412
cfm =m^3/min x 35.31
lbs =kg / 0.4536

*Above specification data is subject to rounding variation.

WR2

1. SPECIFICATIONS

Model			PQRY-P168TSHMU-A
Power source			3-phase 3-wire 208-230 ±10% 60Hz
Cooling capacity (Nominal)	*1	BTU/h	169,100
		kW	49.6
	Power input	kW	10.02
	Current input	A	31.4-28.4
Temp. range of cooling	Indoor	W.B.	59~75°F (15~24°C)
	Circulating water	°C	50~113°F (10~45°C)
Heating capacity (Nominal)	*2	BTU/h	188,000
		kW	55.1
	Power input	kW	10.32
	Current input	A	31.8-28.8
Temp. range of heating	Indoor	D.B.	59~81°F (15~27°C)
	Circulating water	°C	50~113°F (10~45°C)
Indoor unit connectable	Total capacity		50~150% of heat source unit capacity
	Model / Quantity		P06~P96 / 1~42
Sound pressure level (measured in anechoic room)		dB <A>	51
Refrigerant piping diameter	High pressure	in.(mm)	7/8 (22.2) Brazed
	Low pressure	in.(mm)	1-1/8 (28.58) Brazed

Set Model

Model			PQRY-P96THMU-A	PQRY-P72THMU-A
External finish			Acrylic painted steel plate	
External dimension HxWxD		mm	1,100 x 880 x 550	1,100 x 880 x 550
		in.	43-5/16 x 34-11/16 x 21-11/16	43-5/16 x 34-11/16 x 21-11/16
Net weight		lbs(kg)	402 (182)	402 (182)
Heat exchanger			plate type	plate type
	Water volume in plate	G	1.32	1.32
		l	5.0	5.0
	Water pressure Max.	psi	290	290
		MPa	2.0	2.0
Compressor	Type		Inverter scroll hermetic compressor	
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	Inverter
	Motor output	kW	6.2	4.5
	Case heater	kW	0.051 (230V)	0.051 (230V)
	Lubricant		MEL32	MEL32
Circulating water	Water flow rate	G/h	1522 + 1522	
		G/min(gpm)	25.4 + 25.4	
		m^3 / h	5.76 + 5.76	
		L/min	96 + 96	
		cfm	3.4 + 3.4	
	Pressure drop	kPa	17	17
		psi	2.47	2.47
	Operating volume range	G/h	1189 + 1189 ~ 1902 + 1902	
		G/min(gpm)	19.8 + 19.8 ~ 31.7 + 31.7	
		m^3 / h	4.5 + 4.5 ~ 7.2 + 7.2	
HIC circuit (HIC: Heat Inter-Changer)			-	
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	
	Inverter circuit(comp)		Over-heat protection, Over-current protection	
	Compressor		Over-heat protection	
Minimum Circuit Ampacity(MCA)		A	23-21	16-15
Maximum Overcurrent Protection(MOCP)		A	41-37	29-26
Refrigerant	Type x original charge		R410A x (11 lbs + 1 oz) (5 kg)	R410A x (11 lbs + 1 oz) (5 kg)
	Control		Indoor LEV and BC controller	
Pipe between unit and distributor	High pressure	in.(mm)	3/4 (19.05) Brazed	3/4 (19.05) Brazed
	Low pressure	in.(mm)	-	7/8 (22.2) Brazed
Drawing	External		KB94T666	
	Wiring		KE79B308H01	KE79B308H01
Standard attachment	Document		Installation Manual	
	Accessory		Details refer to External Drw	
Optional parts			Heat Source Twinning kit : CMY-Q100CBK joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-Y202S-G2, CMY-R160C-J Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB	
Remarks			*Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. *Due to continuing improvement, above specifications may be subject to change without notice. *The ambient temperature of the Heat Source Unit needs to be kept below 104°F DB(40°CDB). *The ambient relative humidity of the Heat Source Unit needs to be kept below 80%. *The Heat Source Unit should not be installed at outdoor. *Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit. *Be sure to provide interlocking for the unit operation and water circuit. *The Heat Source twinning kit (low pressure) should be connected to the low pressure side of the heat source unit. If the connected units are of different capacities, the Heat Source twinning kit (low pressure) should be installed in the unit with the largest capacity	

Notes :

1.Nominal cooling conditions
Indoor:81°FDB/66°FWB (27°CDB/19°CWB), Water temperature:86°F (30°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)
2.Nominal heating conditions
Indoor:68°FDB (20°CDB), Water temperature:68°F (20°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)

Unit converter

BTU/h =kW x 3,412
cfm =m^3/min x 35.31
lbs =kg / 0.4536

*Above specification data is subject to rounding variation.

WR2

1. SPECIFICATIONS

Model			PQRY-P192TSHMU-A
Power source			3-phase 3-wire 208-230 ±10% 60Hz
Cooling capacity (Nominal) *1		BTU/h	192,600
		kW	56.4
	Power input	kW	11.89
	Current input	A	37.0-33.4
Temp. range of cooling	Indoor	W.B.	59~75°F (15~24°C)
	Circulating water	°C	50~113°F (10~45°C)
Heating capacity (Nominal) *2		BTU/h	216,000
		kW	63.3
	Power input	kW	12.74
	Current input	A	39.3-35.5
Temp. range of heating	Indoor	D.B.	59~81°F (15~27°C)
	Circulating water	°C	50~113°F (10~45°C)
Indoor unit connectable	Total capacity		50~150% of heat source unit capacity
	Model / Quantity		P06~P96 / 1~48
Sound pressure level (measured in anechoic room)		dB <A>	52
Refrigerant piping diameter	High pressure	in.(mm)	7/8 (22.2) Brazed
	Low pressure	in.(mm)	1-1/8 (28.58) Brazed

Set Model

Model			PQRY-P96THMU-A	PQRY-P96THMU-A
External finish			Acrylic painted steel plate	
External dimension HxWxD		mm	1,100 x 880 x 550	1,100 x 880 x 550
		in.	43-5/16 x 34-11/16 x 21-11/16	43-5/16 x 34-11/16 x 21-11/16
Net weight		lbs(kg)	402 (182)	402 (182)
Heat exchanger			plate type	plate type
	Water volume in plate	G	1.32	1.32
		l	5.0	5.0
	Water pressure Max.	psi	290	290
		MPa	2.0	2.0
Compressor	Type		Inverter scroll hermetic compressor	
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	Inverter
	Motor output	kW	6.2	6.2
	Case heater	kW	0.051 (230V)	0.051 (230V)
	Lubricant		MEL32	MEL32
Circulating water	Water flow rate	G/h	1522 + 1522	
		G/min(gpm)	25.4 + 25.4	
		m^3 / h	5.76 + 5.76	
		L/min	96 + 96	
		cfm	3.4 + 3.4	
	Pressure drop	kPa	17	17
		psi	2.47	2.47
	Operating volume range	G/h	1189 + 1189 ~ 1902 + 1902	
		G/min(gpm)	19.8 + 19.8 ~ 31.7 + 31.7	
		m^3 / h	4.5 + 4.5 ~ 7.2 + 7.2	
HIC circuit (HIC: Heat Inter-Changer)			-	
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	
	Inverter circuit(comp)		Over-heat protection, Over-current protection	
	Compressor		Over-heat protection	
Minimum Circuit Ampacity(MCA)		A	23-21	23-21
Maximum Overcurrent Protection(MOCP)		A	41-37	41-37
Refrigerant	Type x original charge		R410A x (11 lbs + 1 oz) (5 kg)	R410A x (11 lbs + 1 oz) (5 kg)
	Control		Indoor LEV and BC controller	
Pipe between unit and distributor	High pressure	in.(mm)	3/4 (19.05) Brazed	3/4 (19.05) Brazed
	Low pressure	in.(mm)	-	7/8 (22.2) Brazed
Drawing	External		KB94T666	
	Wiring		KE79B308H01	KE79B308H01
Standard attachment	Document		Installation Manual	
	Accessory		Details refer to External Drw	
Optional parts			Heat Source Twinning kit : CMY-Q100CBK joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-Y202S-G2, CMY-R160C-J Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB	
Remarks			*Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. *Due to continuing improvement, above specifications may be subject to change without notice. *The ambient temperature of the Heat Source Unit needs to be kept below 104°F DB(40°CDB). *The ambient relative humidity of the Heat Source Unit needs to be kept below 80%. *The Heat Source Unit should not be installed at outdoor. *Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit. *Be sure to provide interlocking for the unit operation and water circuit. *The Heat Source twinning kit (low pressure) should be connected to the low pressure side of the heat source unit. If the connected units are of different capacities, the Heat Source twinning kit (low pressure) should be installed in the unit with the largest capacity	

Notes :

1.Nominal cooling conditions
Indoor:81°FDB/66°FWB (27°CDB/19°CWB), Water temperature:86°F (30°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)
2.Nominal heating conditions
Indoor:68°FDB (20°CDB), Water temperature:68°F (20°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)

Unit converter	
BTU/h	=kW x 3,412
cfm	=m^3/min x 35.31
lbs	=kg / 0.4536

*Above specification data is subject to rounding variation.

WR2

1. SPECIFICATIONS

Model			PQRY-P216TSHMU-A
Power source			3-phase 3-wire 208-230 ±10% 60Hz
Cooling capacity (Nominal) *1		BTU/h	216,000
		kW	63.3
	Power input	kW	13.90
	Current input	A	42.8-38.7
Temp. range of cooling	Indoor	W.B.	59~75°F (15~24°C)
	Circulating water	°C	50~113°F (10~45°C)
Heating capacity (Nominal) *2		BTU/h	243,000
		kW	71.2
	Power input	kW	14.22
	Current input	A	43.9-39.7
Temp. range of heating	Indoor	D.B.	59~81°F (15~27°C)
	Circulating water	°C	50~113°F (10~45°C)
Indoor unit connectable	Total capacity		50~150% of heat source unit capacity
	Model / Quantity		P06~P96 / 2~50 (Connectable branch pipe number is max 48.)
Sound pressure level (measured in anechoic room)		dB <A>	53
Refrigerant piping diameter	High pressure	in.(mm)	1-1/8 (28.58) Brazed
	Low pressure	in.(mm)	1-1/8 (28.58) Brazed

Set Model

Model			PQRY-P120THMU-A	PQRY-P96THMU-A
External finish			Acrylic painted steel plate	
External dimension HxWxD		mm	1,100 x 880 x 550	1,100 x 880 x 550
		in.	43-5/16 x 34-11/16 x 21-11/16	43-5/16 x 34-11/16 x 21-11/16
Net weight		lbs(kg)	402 (182)	402 (182)
Heat exchanger			plate type	plate type
	Water volume in plate	G	1.32	1.32
		l	5.0	5.0
	Water pressure Max.	psi	290	290
		MPa	2.0	2.0
Compressor	Type		Inverter scroll hermetic compressor	
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	Inverter
	Motor output	kW	8.5	6.3
	Case heater	kW	0.051 (230V)	0.051 (230V)
	Lubricant		MEL32	MEL32
Circulating water	Water flow rate	G/h	1522 + 1522	
		G/min(gpm)	25.4 + 25.4	
		m^3 / h	5.76 + 5.76	
		L/min	96 + 96	
		cfm	3.4 + 3.4	
	Pressure drop	kPa	17	17
		psi	2.47	2.47
	Operating volume range	G/h	1189 + 1189 ~ 1902 + 1902	
		G/min(gpm)	19.8 + 19.8 ~ 31.7 + 31.7	
		m^3 / h	4.5 + 4.5 ~ 7.2 + 7.2	
HIC circuit (HIC: Heat Inter-Changer)			-	
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	
	Inverter circuit(comp)		Over-heat protection, Over-current protection	
	Compressor		Over-heat protection	
Minimum Circuit Ampacity(MCA)		A	30-27	23-21
Maximum Overcurrent Protection(MOCP)		A	54-49	41-37
Refrigerant	Type x original charge		R410A x (11 lbs + 1 oz) (5 kg)	R410A x (11 lbs + 1 oz) (5 kg)
	Control		Indoor LEV and BC controller	
Pipe between unit and distributor	High pressure	in.(mm)	3/4 (19.05) Brazed	3/4 (19.05) Brazed
	Low pressure	in.(mm)	-	7/8 (22.2) Brazed
Drawing	External		KB94T666	
	Wiring		KE79B308H01	KE79B308H01
Standard attachment	Document		Installation Manual	
	Accessory		Details refer to External Drw	
Optional parts			Heat Source Twinning kit : CMY-Q100CBK joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-Y202S-G2, CMY-R160C-J Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB	
Remarks			*Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. *Due to continuing improvement, above specifications may be subject to change without notice. *The ambient temperature of the Heat Source Unit needs to be kept below 104°F DB(40°CDB). *The ambient relative humidity of the Heat Source Unit needs to be kept below 80%. *The Heat Source Unit should not be installed at outdoor. *Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit. *Be sure to provide interlocking for the unit operation and water circuit. *The Heat Source twinning kit (low pressure) should be connected to the low pressure side of the heat source unit. If the connected units are of different capacities, the Heat Source twinning kit (low pressure) should be installed in the unit with the largest capacity	

Notes :

1.Nominal cooling conditions
Indoor:81°FDB/66°FWB (27°CDB/19°CWB), Water temperature:86°F (30°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)
2.Nominal heating conditions
Indoor:68°FDB (20°CDB), Water temperature:68°F (20°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)

Unit converter

BTU/h =kW x 3,412
cfm =m^3/min x 35.31
lbs =kg / 0.4536

*Above specification data is subject to rounding variation.

WR2

1. SPECIFICATIONS

Model			PQRY-P240TSHMU-A
Power source			3-phase 3-wire 208-230 ±10% 60Hz
Cooling capacity (Nominal) *1		BTU/h	240,000
		kW	70.3
	Power input	kW	15.93
	Current input	A	48.7-44.0
Temp. range of cooling	Indoor	W.B.	59~75°F (15~24°C)
	Circulating water	°C	50~113°F (10~45°C)
Heating capacity (Nominal) *2		BTU/h	270,000
		kW	79.1
	Power input	kW	15.70
	Current input	A	48.4-43.8
Temp. range of heating	Indoor	D.B.	59~81°F (15~27°C)
	Circulating water	°C	50~113°F (10~45°C)
Indoor unit connectable	Total capacity		50~150% of heat source unit capacity
	Model / Quantity		P06~P96 / 2~50 (Connectable branch pipe number is max 48.)
Sound pressure level (measured in anechoic room)		dB <A>	54
Refrigerant piping diameter	High pressure	in.(mm)	1-1/8 (28.58) Brazed
	Low pressure	in.(mm)	1-1/8 (28.58) Brazed

Set Model

Model			PQRY-P120THMU-A	PQRY-P120THMU-A
External finish			Acrylic painted steel plate	
External dimension HxWxD		mm	1,100 x 880 x 550	1,100 x 880 x 550
		in.	43-5/16 x 34-11/16 x 21-11/16	43-5/16 x 34-11/16 x 21-11/16
Net weight		lbs(kg)	402 (182)	402 (182)
Heat exchanger			plate type	plate type
	Water volume in plate	G	1.32	1.32
		l	5.0	5.0
	Water pressure Max.	psi	290	290
		MPa	2.0	2.0
Compressor	Type		Inverter scroll hermetic compressor	
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	Inverter
	Motor output	kW	8.5	8.5
	Case heater	kW	0.051 (230V)	0.051 (230V)
	Lubricant		MEL32	MEL32
Circulating water	Water flow rate	G/h	1522 + 1522	
		G/min(gpm)	25.4 + 25.4	
		m^3 / h	5.76 + 5.76	
		L/min	96 + 96	
		cfm	3.4 + 3.4	
	Pressure drop	kPa	17	17
		psi	2.47	2.47
	Operating volume range	G/h	1189 + 1189 ~ 1902 + 1902	
		G/min(gpm)	19.8 + 19.8 ~ 31.7 + 31.7	
		m^3 / h	4.5 + 4.5 ~ 7.2 + 7.2	
HIC circuit (HIC: Heat Inter-Changer)			-	
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	
	Inverter circuit(comp)		Over-heat protection, Over-current protection	
	Compressor		Over-heat protection	
Minimum Circuit Ampacity(MCA)		A	30-27	30-27
Maximum Overcurrent Protection(MOCP)		A	54-49	54-49
Refrigerant	Type x original charge		R410A x (11 lbs + 1 oz) (5 kg)	R410A x (11 lbs + 1 oz) (5 kg)
	Control		Indoor LEV and BC controller	
Pipe between unit and distributor	High pressure	in.(mm)	3/4 (19.05) Brazed	3/4 (19.05) Brazed
	Low pressure	in.(mm)	-	7/8 (22.2) Brazed
Drawing	External		KB94T666	
	Wiring		KE79B308H01	KE79B308H01
Standard attachment	Document		Installation Manual	
	Accessory		Details refer to External Drw	
Optional parts			Heat Source Twinning kit : CMY-Q100CBK joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-Y202S-G2, CMY-R160C-J Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB	
Remarks			*Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. *Due to continuing improvement, above specifications may be subject to change without notice. *The ambient temperature of the Heat Source Unit needs to be kept below 104°F DB(40°CDB). *The ambient relative humidity of the Heat Source Unit needs to be kept below 80%. *The Heat Source Unit should not be installed at outdoor. *Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit. *Be sure to provide interlocking for the unit operation and water circuit. *The Heat Source twinning kit (low pressure) should be connected to the low pressure side of the heat source unit. If the connected units are of different capacities, the Heat Source twinning kit (low pressure) should be installed in the unit with the largest capacity	

Notes :

1.Nominal cooling conditions
Indoor:81°FDB/66°FWB (27°CDB/19°CWB), Water temperature:86°F (30°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)
2.Nominal heating conditions
Indoor:68°FDB (20°CDB), Water temperature:68°F (20°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)

Unit converter	
BTU/h	=kW x 3,412
cfm	=m^3/min x 35.31
lbs	=kg / 0.4536

*Above specification data is subject to rounding variation.

1. SPECIFICATIONS

Model			PQRY-P72YHMU-A	PQRY-P96YHMU-A
Power source			3-phase 3-wire 460 ±10% 60Hz	3-phase 3-wire 460 ±10% 60Hz
Cooling capacity (Nominal)	*1	BTU/h	72,700	96,300
		kW	21.3	28.2
	Power input	kW	3.97	5.77
	Current input	A	5.7	8.1
Temp. range of cooling	Indoor	W.B.	59~75°F (15~24°C)	59~75°F (15~24°C)
	Circulating water	°C	50~113°F (10~45°C)	50~113°F (10~45°C)
Heating capacity (Nominal)	*2	BTU/h	80000	108000
		kW	23.4	31.7
	Power input	kW	3.83	6.18
	Current input	A	5.3	8.6
Temp. range of heating	Indoor	D.B.	59~81°F (15~27°C)	59~81°F (15~27°C)
	Circulating water	°C	50~113°F (10~45°C)	50~113°F (10~45°C)
Indoor unit connectable	Total capacity		50~150% of heatsource unit capacity	50~150% of heatsource unit capacity
	Model / Quantity		P06~P96 / 1~18	P06~P96 / 1~24
Sound pressure level (measured in anechoic room)		dB <A>	47	49
Refrigerant piping diameter	High pressure	in.(mm)	5/8 (15.88) Brazed	3/4 (19.05) Brazed
	Low pressure	in.(mm)	3/4 (19.05) Brazed	7/8 (22.2) Brazed
External finish			Acrylic painted steel plate	Acrylic painted steel plate
External dimension HxWxD		mm	1,100 x 880 x 550	1,100 x 880 x 550
		in.	43-5/16 x 34-11/16 x 21-11/16	43-5/16 x 34-11/16 x 21-11/16
Net weight		lbs(kg)	428 (194)	428 (194)
Heat exchanger			plate type	plate type
	Water volume in plate	G	1.32	1.32
		l	5.0	5.0
	Water pressure Max.	psi	290	290
		MPa	2.0	2.0
Compressor	Type		Inverter scroll hermetic compressor	Inverter scroll hermetic compressor
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	AC&R Works, MITSUBISHI ELECTRIC CORPORATION
	Starting method		Inverter	Inverter
	Motor output	kW	4.6	6.3
	Case heater	kW	0.051 (230V)	0.051 (230V)
	Lubricant		MEL32	MEL32
Circulating water	Water flow rate	G/h	1,522	1,522
		G/min(gpm)	25.4	25.4
		m^3 / h	5.76	5.76
		L/min	96	96
		cfm	3.4	3.4
	Pressure drop	kPa	17	17
		psi	2.47	2.47
	Operating volume range	G/h	1189 - 1902	1189 - 1902
		G/min(gpm)	19.8 - 31.7	19.8 - 31.7
		m^3 / h	4.5 - 7.2	4.5 - 7.2
HIC circuit (HIC: Heat Inter-Changer)			-	-
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	High pressure sensor, High pressure switch at 4.15 MPa (601 psi)
	Inverter circuit(comp)		Over-heat protection, Over-current protection	Over-heat protection, Over-current protection
	Compressor		Over-heat protection	Over-heat protection
Minimum Circuit Ampacity(MCA)		A	8	11
Maximum Overcurrent Protection(MOCP)		A	13	19
Refrigerant	Type x original charge		R410A x (11 lbs + 1 oz) (5.0 kg)	R410A x (11 lbs + 1 oz) (5.0 kg)
	Control		Indoor LEV and BC controller	Indoor LEV and BC controller
Drawing	External		KB94T571	KB94T571
	Wiring		KE79B310H01	KE79B310H01
Standard attachment	Document		Installation Manual	Installation Manual
	Accessory		Details refer to External Drw	Details refer to External Drw
Optional parts			joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-Y202S-G2, CMY-R160C-J BC controller : CMB-P104, 105, 106, 108, 1010, 1013, 1016NU-G Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB	joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-Y202S-G2, CMY-R160C-J BC controller : CMB-P104, 105, 106, 108, 1010, 1013, 1016NU-G Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB
Remarks			*Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. *Due to continuing improvement, above specifications may be subject to change without notice. *The ambient temperature of the Heat Source Unit needs to be kept below 104°F DB(40°CDB). *The ambient relative humidity of the Heat Source Unit needs to be kept below 80%. *The Heat Source Unit should not be installed at outdoor. *Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit. *Be sure to provide interlocking for the unit operation and water circuit.	

Notes :

1.Nominal cooling conditions
Indoor:81°FDB/66°FWB (27°CDB/19°CWB), Water temperature:86°F (30°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)
2.Nominal heating conditions
Indoor:68°FDB (20°CDB), Water temperature:68°F (20°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)

Unit converter

BTU/h =kW x 3,412
cfm =m^3/min x 35.31
lbs =kg / 0.4536

*Above specification data is subject to rounding variation.

WR2

1. SPECIFICATIONS

Model			PQRY-P120YHMU-A	
Power source			3-phase 3-wire 460 ±10% 60Hz	
Cooling capacity (Nominal) *1		BTU/h	120,000	
		kW	35.2	
	Power input	kW	7.73	
	Current input	A	10.6	
Temp. range of cooling	Indoor	W.B.	59~75°F (15~24°C)	
	Circulating water	°C	50~113°F (10~45°C)	
Heating capacity (Nominal) *2		BTU/h	135000	
		kW	39.6	
	Power input	kW	7.62	
	Current input	A	10.6	
Temp. range of heating	Indoor	D.B.	59~81°F (15~27°C)	
	Circulating water	°C	50~113°F (10~45°C)	
Indoor unit connectable	Total capacity		50~150% of heatsource unit capacity	
	Model / Quantity		P06~P96 / 1~30	
Sound pressure level (measured in anechoic room)		dB <A>	51	
Refrigerant piping diameter	High pressure	in.(mm)	3/4 (19.05) Brazed	
	Low pressure	in.(mm)	7/8 (22.2) Brazed	
External finish			Acrylic painted steel plate	
External dimension HxWxD		mm	1,100 x 880 x 550	
		in.	43-5/16 x 34-11/16 x 21-11/16	
Net weight		lbs(kg)	428 (194)	
Heat exchanger			plate type	
	Water volume in plate	G	1.32	
		l	5.0	
	Water pressure Max.	psi	290	
		MPa	2.0	
Compressor	Type		Inverter scroll hermetic compressor	
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	
	Motor output	kW	8.5	
	Case heater	kW	0.051 (230V)	
	Lubricant		MEL32	
Circulating water	Water flow rate	G/h	1,522	
		G/min(gpm)	25.4	
		m^3 / h	5.76	
		L/min	96	
		cfm	3.4	
	Pressure drop	kPa	17	
		psi	2.47	
	Operating volume range	G/h	1189 - 1902	
		G/min(gpm)	19.8 - 31.7	
		m^3 / h	4.5 - 7.2	
HIC circuit (HIC: Heat Inter-Changer)			-	
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	
	Inverter circuit(comp)		Over-heat protection, Over-current protection	
	Compressor		Over-heat protection	
Minimum Circuit Ampacity(MCA)		A	14	
Maximum Overcurrent Protection(MOCP)		A	25	
Refrigerant	Type x original charge		R410A x (11 lbs + 1 oz) (5.0 kg)	
	Control		Indoor LEV and BC controller	
Drawing	External		KB94T571	
	Wiring		KE79B310H01	
Standard attachment	Document		Installation Manual	
	Accessory		Details refer to External Drw	
Optional parts			joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-R160C-J BC controller : CMB-P104, 105, 106, 108, 1010, 1013, 1016NU-G Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB	
Remarks			*Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. *Due to continuing improvement, above specifications may be subject to change without notice. *The ambient temperature of the Heat Source Unit needs to be kept below 104°F DB(40°CDB). *The ambient relative humidity of the Heat Source Unit needs to be kept below 80%. *The Heat Source Unit should not be installed at outdoor. *Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit. *Be sure to provide interlocking for the unit operation and water circuit.	

Notes :

1.Nominal cooling conditions
Indoor:81°FDB/66°FWB (27°CDB/19°CWB), Water temperature:86°F (30°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)
2.Nominal heating conditions
Indoor:68°FDB (20°CDB), Water temperature:68°F (20°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)

Unit converter	
BTU/h	=kW x 3,412
cfm	=m^3/min x 35.31
lbs	=kg / 0.4536

*Above specification data is subject to rounding variation.

1. SPECIFICATIONS

Model			PQRY-P144YSHMU-A	
Power source			3-phase 3-wire 460 ±10% 60Hz	
Cooling capacity (Nominal) *1		BTU/h	145,400	
		kW	42.6	
	Power input	kW	8.18	
	Current input	A	11.7	
Temp. range of cooling	Indoor	W.B.	59~75°F (15~24°C)	
	Circulating water	°C	50~113°F (10~45°C)	
Heating capacity (Nominal) *2		BTU/h	160,000	
		kW	46.9	
	Power input	kW	7.89	
	Current input	A	11.0	
Temp. range of heating	Indoor	D.B.	59~81°F (15~27°C)	
	Circulating water	°C	50~113°F (10~45°C)	
Indoor unit connectable	Total capacity		50~150% of heat source unit capacity	
	Model / Quantity		P06~P96 / 1~36	
Sound pressure level (measured in anechoic room)		dB <A>	50	
Refrigerant piping diameter	High pressure	in.(mm)	7/8 (22.2) Brazed	
	Low pressure	in.(mm)	1-1/8 (28.58) Brazed	

Set Model

Model			PQRY-P72YHMU-A	PQRY-P72YHMU-A
External finish			Acrylic painted steel plate	
External dimension HxWxD		mm	1,100 x 880 x 550	1,100 x 880 x 550
		in.	43-5/16 x 34-11/16 x 21-11/16	43-5/16 x 34-11/16 x 21-11/16
Net weight		lbs(kg)	428 (194)	428 (194)
Heat exchanger			plate type	plate type
	Water volume in plate	G	1.32	1.32
		l	5.0	5.0
	Water pressure Max.	psi	290	290
		MPa	2.0	2.0
Compressor	Type		Inverter scroll hermetic compressor	
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	Inverter
	Motor output	kW	4.6	4.6
	Case heater	kW	0.051 (230V)	0.051 (230V)
	Lubricant		MEL32	MEL32
Circulating water	Water flow rate	G/h	1522 + 1522	
		G/min(gpm)	25.4 + 25.4	
		m^3 / h	5.76 + 5.76	
		L/min	96 + 96	
		cfm	3.4 + 3.4	
	Pressure drop	kPa	17	17
		psi	2.47	2.47
	Operating volume range	G/h	1189 + 1189 ~ 1902 + 1902	
		G/min(gpm)	19.8 + 19.8 ~ 31.7 + 31.7	
		m^3 / h	4.5 + 4.5 ~ 7.2 + 7.2	
HIC circuit (HIC: Heat Inter-Changer)			-	
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	
	Inverter circuit(comp)		Over-heat protection, Over-current protection	
	Compressor		Over-heat protection	
Minimum Circuit Ampacity(MCA)		A	8	8
Maximum Overcurrent Protection(MOCP)		A	13	13
Refrigerant	Type x original charge		R410A x (11 lbs + 1 oz) (5 kg)	R410A x (11 lbs + 1 oz) (5 kg)
	Control		Indoor LEV and BC controller	
Pipe between unit and distributor	High pressure	in.(mm)	3/4 (19.05) Brazed	3/4 (19.05) Brazed
	Low pressure	in.(mm)	-	7/8 (22.2) Brazed
Drawing	External		KB94T572	
	Wiring		KE79B310H01	KE79B310H01
Standard attachment	Document		Installation Manual	
	Accessory		Details refer to External Drw	
Optional parts			Heat Source Twinning kit : CMY-Q100CBK joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-Y202S-G2, CMY-R160C-J Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB	
Remarks			*Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. *Due to continuing improvement, above specifications may be subject to change without notice. *The ambient temperature of the Heat Source Unit needs to be kept below 104°F DB(40°CDB). *The ambient relative humidity of the Heat Source Unit needs to be kept below 80%. *The Heat Source Unit should not be installed at outdoor. *Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit. *Be sure to provide interlocking for the unit operation and water circuit. *The Heat Source twinning kit (low pressure) should be connected to the low pressure side of the heat source unit. If the connected units are of different capacities, the Heat Source twinning kit (low pressure) should be installed in the unit with the largest capacity	

Notes :

1.Nominal cooling conditions
Indoor:81°FDB/66°FWB (27°CDB/19°CWB), Water temperature:86°F (30°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)
2.Nominal heating conditions
Indoor:68°FDB (20°CDB), Water temperature:68°F (20°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)

Unit converter

BTU/h =kW x 3,412
cfm =m^3/min x 35.31
lbs =kg / 0.4536

*Above specification data is subject to rounding variation.

WR2

1. SPECIFICATIONS

Model			PQRY-P168YSHMU-A
Power source			3-phase 3-wire 460 ±10% 60Hz
Cooling capacity (Nominal) *1		BTU/h	169,100
		kW	49.6
	Power input	kW	10.02
	Current input	A	14.2
Temp. range of cooling	Indoor	W.B.	59~75°F (15~24°C)
	Circulating water	°C	50~113°F (10~45°C)
Heating capacity (Nominal) *2		BTU/h	188,000
		kW	55.1
	Power input	kW	10.32
	Current input	A	14.3
Temp. range of heating	Indoor	D.B.	59~81°F (15~27C°)
	Circulating water	°C	50~113°F (10~45°C)
Indoor unit connectable	Total capacity		50~150% of heat source unit capacity
	Model / Quantity		P06~P96 / 1~42
Sound pressure level (measured in anechoic room)		dB <A>	51
Refrigerant piping diameter	High pressure	in.(mm)	7/8 (22.2) Brazed
	Low pressure	in.(mm)	1-1/8 (28.58) Brazed

Set Model

Model			PQRY-P96YHMU-A	PQRY-P72YHMU-A
External finish			Acrylic painted steel plate	
External dimension HxWxD		mm	1,100 x 880 x 550	1,100 x 880 x 550
		in.	43-5/16 x 34-11/16 x 21-11/16	43-5/16 x 34-11/16 x 21-11/16
Net weight		lbs(kg)	428 (194)	428 (194)
Heat exchanger			plate type	plate type
	Water volume in plate	G	1.32	1.32
		l	5.0	5.0
	Water pressure Max.	psi	290	290
		MPa	2.0	2.0
Compressor	Type		Inverter scroll hermetic compressor	
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	Inverter
	Motor output	kW	6.3	4.6
	Case heater	kW	0.051 (230V)	0.051 (230V)
	Lubricant		MEL32	MEL32
Circulating water	Water flow rate	G/h	1522 + 1522	
		G/min(gpm)	25.4 + 25.4	
		m^3 / h	5.76 + 5.76	
		L/min	96 + 96	
		cfm	3.4 + 3.4	
	Pressure drop	kPa	17	17
		psi	2.47	2.47
	Operating volume range	G/h	1189 + 1189 ~ 1902 + 1902	
		G/min(gpm)	19.8 + 19.8 ~ 31.7 + 31.7	
		m^3 / h	4.5 + 4.5 ~ 7.2 + 7.2	
HIC circuit (HIC: Heat Inter-Changer)			-	
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	
	Inverter circuit(comp)		Over-heat protection, Over-current protection	
	Compressor		Over-heat protection	
Minimum Circuit Ampacity(MCA)		A	11	8
Maximum Overcurrent Protection(MOCP)		A	19	13
Refrigerant	Type x original charge		R410A x (11 lbs + 1 oz) (5 kg)	R410A x (11 lbs + 1 oz) (5 kg)
	Control		Indoor LEV and BC controller	
Pipe between unit and distributor	High pressure	in.(mm)	3/4 (19.05) Brazed	3/4 (19.05) Brazed
	Low pressure	in.(mm)	-	7/8 (22.2) Brazed
Drawing	External		KB94T572	
	Wiring		KE79B310H01	KE79B310H01
Standard attachment	Document		Installation Manual	
	Accessory		Details refer to External Drw	
Optional parts			Heat Source Twinning kit : CMY-Q100CBK joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-Y202S-G2, CMY-R160C-J Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB	
Remarks			*Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. *Due to continuing improvement, above specifications may be subject to change without notice. *The ambient temperature of the Heat Source Unit needs to be kept below 104°F DB(40°CDB). *The ambient relative humidity of the Heat Source Unit needs to be kept below 80%. *The Heat Source Unit should not be installed at outdoor. *Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit. *Be sure to provide interlocking for the unit operation and water circuit. *The Heat Source twinning kit (low pressure) should be connected to the low pressure side of the heat source unit. If the connected units are of different capacities, the Heat Source twinning kit (low pressure) should be installed in the unit with the largest capacity	

Notes :

1.Nominal cooling conditions
Indoor:81°FDB/66°FWB (27°CDB/19°CWB), Water temperature:86°F (30°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)
2.Nominal heating conditions
Indoor:68°FDB (20°CDB), Water temperature:68°F (20°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)

Unit converter

BTU/h =kW x 3,412
cfm =m^3/min x 35.31
lbs =kg / 0.4536

*Above specification data is subject to rounding variation.

1. SPECIFICATIONS

Model			PQRY-P192YSHMU-A
Power source			3-phase 3-wire 460 ±10% 60Hz
Cooling capacity (Nominal) *1		BTU/h	192,600
		kW	56.4
	Power input	kW	11.89
	Current input	A	16.7
Temp. range of cooling	Indoor	W.B.	59~75°F (15~24°C)
	Circulating water	°C	50~113°F (10~45°C)
Heating capacity (Nominal) *2		BTU/h	216,000
		kW	63.3
	Power input	kW	12.74
	Current input	A	17.7
Temp. range of heating	Indoor	D.B.	59~81°F (15~27°C)
	Circulating water	°C	50~113°F (10~45°C)
Indoor unit connectable	Total capacity		50~150% of heat source unit capacity
	Model / Quantity		P06~P96 / 1~48
Sound pressure level (measured in anechoic room)		dB <A>	52
Refrigerant piping diameter	High pressure	in.(mm)	7/8 (22.2) Brazed
	Low pressure	in.(mm)	1-1/8 (28.58) Brazed

Set Model

Model			PQRY-P96YHMU-A	PQRY-P96YHMU-A
External finish			Acrylic painted steel plate	
External dimension HxWxD		mm	1,100 x 880 x 550	1,100 x 880 x 550
		in.	43-5/16 x 34-11/16 x 21-11/16	43-5/16 x 34-11/16 x 21-11/16
Net weight		lbs(kg)	428 (194)	428 (194)
Heat exchanger			plate type	plate type
	Water volume in plate	G	1.32	1.32
		l	5.0	5.0
	Water pressure Max.	psi	290	290
		MPa	2.0	2.0
Compressor	Type		Inverter scroll hermetic compressor	
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	Inverter
	Motor output	kW	6.3	6.3
	Case heater	kW	0.051 (230V)	0.051 (230V)
	Lubricant		MEL32	MEL32
Circulating water	Water flow rate	G/h	1522 + 1522	
		G/min(gpm)	25.4 + 25.4	
		m^3 / h	5.76 + 5.76	
		L/min	96 + 96	
		cfm	3.4 + 3.4	
	Pressure drop	kPa	17	17
		psi	2.47	2.47
	Operating volume range	G/h	1189 + 1189 ~ 1902 + 1902	
		G/min(gpm)	19.8 + 19.8 ~ 31.7 + 31.7	
		m^3 / h	4.5 + 4.5 ~ 7.2 + 7.2	
HIC circuit (HIC: Heat Inter-Changer)			-	
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	
	Inverter circuit(comp)		Over-heat protection, Over-current protection	
	Compressor		Over-heat protection	
Minimum Circuit Ampacity(MCA)		A	11	11
Maximum Overcurrent Protection(MOCP)		A	19	19
Refrigerant	Type x original charge		R410A x (11 lbs + 1 oz) (5 kg)	R410A x (11 lbs + 1 oz) (5 kg)
	Control		Indoor LEV and BC controller	
Pipe between unit and distributor	High pressure	in.(mm)	3/4 (19.05) Brazed	3/4 (19.05) Brazed
	Low pressure	in.(mm)	-	7/8 (22.2) Brazed
Drawing	External		KB94T572	
	Wiring		KE79B310H01	KE79B310H01
Standard attachment	Document		Installation Manual	
	Accessory		Details refer to External Drw	
Optional parts			Heat Source Twinning kit : CMY-Q100CBK joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-Y202S-G2, CMY-R160C-J Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB	
Remarks			*Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. *Due to continuing improvement, above specifications may be subject to change without notice. *The ambient temperature of the Heat Source Unit needs to be kept below 104°F DB(40°CDB). *The ambient relative humidity of the Heat Source Unit needs to be kept below 80%. *The Heat Source Unit should not be installed at outdoor. *Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit. *Be sure to provide interlocking for the unit operation and water circuit. *The Heat Source twinning kit (low pressure) should be connected to the low pressure side of the heat source unit. If the connected units are of different capacities, the Heat Source twinning kit (low pressure) should be installed in the unit with the largest capacity	

Notes :

1.Nominal cooling conditions
Indoor:81°FDB/66°FWB (27°CDB/19°CWB), Water temperature:86°F (30°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)
2.Nominal heating conditions
Indoor:68°FDB (20°CDB), Water temperature:68°F (20°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)

Unit converter

BTU/h =kW x 3,412
cfm =m^3/min x 35.31
lbs =kg / 0.4536

*Above specification data is subject to rounding variation.

WR2

1. SPECIFICATIONS

Model			PQRY-P216YSHMU-A
Power source			3-phase 3-wire 460 ±10% 60Hz
Cooling capacity (Nominal)	*1	BTU/h	216,000
		kW	63.3
	Power input	kW	13.90
	Current input	A	19.3
Temp. range of cooling	Indoor	W.B.	59~75°F (15~24°C)
	Circulating water	°C	50~113°F (10~45°C)
Heating capacity (Nominal)	*2	BTU/h	243,000
		kW	71.2
	Power input	kW	14.22
	Current input	A	19.8
Temp. range of heating	Indoor	D.B.	59~81°F (15~27°C)
	Circulating water	°C	50~113°F (10~45°C)
Indoor unit connectable	Total capacity		50~150% of heat source unit capacity
	Model / Quantity		P06~P96 / 2~50 (Connectable branch pipe number is max 48.)
Sound pressure level (measured in anechoic room)		dB <A>	53
Refrigerant piping diameter	High pressure	in.(mm)	1-1/8 (28.58) Brazed
	Low pressure	in.(mm)	1-1/8 (28.58) Brazed

Set Model

Model			PQRY-P120YHMU-A	PQRY-P96YHMU-A
External finish			Acrylic painted steel plate	
External dimension HxWxD		mm	1,100 x 880 x 550	1,100 x 880 x 550
		in.	43-5/16 x 34-11/16 x 21-11/16	43-5/16 x 34-11/16 x 21-11/16
Net weight		lbs(kg)	428 (194)	428 (194)
Heat exchanger			plate type	plate type
	Water volume in plate	G	1.32	1.32
		l	5.0	5.0
	Water pressure Max.	psi	290	290
		MPa	2.0	2.0
Compressor	Type		Inverter scroll hermetic compressor	
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	Inverter
	Motor output	kW	8.5	6.3
	Case heater	kW	0.051 (230V)	0.051 (230V)
	Lubricant		MEL32	MEL32
Circulating water	Water flow rate	G/h	1522 + 1522	
		G/min(gpm)	25.4 + 25.4	
		m^3 / h	5.76 + 5.76	
		L/min	96 + 96	
		cfm	3.4 + 3.4	
	Pressure drop	kPa	17	17
		psi	2.47	2.47
	Operating volume range	G/h	1189 + 1189 ~ 1902 + 1902	
		G/min(gpm)	19.8 + 19.8 ~ 31.7 + 31.7	
		m^3 / h	4.5 + 4.5 ~ 7.2 + 7.2	
HIC circuit (HIC: Heat Inter-Changer)			-	
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	
	Inverter circuit(comp)		Over-heat protection, Over-current protection	
	Compressor		Over-heat protection	
Minimum Circuit Ampacity(MCA)		A	14	11
Maximum Overcurrent Protection(MOCP)		A	25	19
Refrigerant	Type x original charge		R410A x (11 lbs + 1 oz) (5 kg)	R410A x (11 lbs + 1 oz) (5 kg)
	Control		Indoor LEV and BC controller	
Pipe between unit and distributor	High pressure	in.(mm)	3/4 (19.05) Brazed	3/4 (19.05) Brazed
	Low pressure	in.(mm)	-	7/8 (22.2) Brazed
Drawing	External		KB94T572	
	Wiring		KE79B310H01	KE79B310H01
Standard attachment	Document		Installation Manual	
	Accessory		Details refer to External Drw	
Optional parts			Heat Source Twinning kit : CMY-Q100CBK joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-Y202S-G2, CMY-R160C-J Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB	
Remarks			*Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. *Due to continuing improvement, above specifications may be subject to change without notice. *The ambient temperature of the Heat Source Unit needs to be kept below 104°F DB(40°CDB). *The ambient relative humidity of the Heat Source Unit needs to be kept below 80%. *The Heat Source Unit should not be installed at outdoor. *Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit. *Be sure to provide interlocking for the unit operation and water circuit. *The Heat Source twinning kit (low pressure) should be connected to the low pressure side of the heat source unit. If the connected units are of different capacities, the Heat Source twinning kit (low pressure) should be installed in the unit with the largest capacity	

Notes :

1.Nominal cooling conditions
Indoor:81°FDB/66°FWB (27°CDB/19°CWB), Water temperature:86°F (30°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)
2.Nominal heating conditions
Indoor:68°FDB (20°CDB), Water temperature:68°F (20°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)

Unit converter

BTU/h =kW x 3,412
cfm =m^3/min x 35.31
lbs =kg / 0.4536

*Above specification data is subject to rounding variation.

1. SPECIFICATIONS

Model			PQRY-P240YSHMU-A
Power source			3-phase 3-wire 460 ±10% 60Hz
Cooling capacity (Nominal)	*1	BTU/h	240,000
		kW	70.3
	Power input	kW	15.93
	Current input	A	22.0
Temp. range of cooling	Indoor	W.B.	59~75°F (15~24°C)
	Circulating water	°C	50~113°F (10~45°C)
Heating capacity (Nominal)	*2	BTU/h	270,000
		kW	79.1
	Power input	kW	15.70
	Current input	A	21.8
Temp. range of heating	Indoor	D.B.	59~81°F (15~27°C)
	Circulating water	°C	50~113°F (10~45°C)
Indoor unit connectable	Total capacity		50~150% of heat source unit capacity
	Model / Quantity		P06~P96 / 2~50 (Connectable branch pipe number is max 48.)
Sound pressure level (measured in anechoic room)		dB <A>	54
Refrigerant piping diameter	High pressure	in.(mm)	1-1/8 (28.58) Brazed
	Low pressure	in.(mm)	1-1/8 (28.58) Brazed

Set Model

Model			PQRY-P120YHMU-A	PQRY-P120YHMU-A
External finish			Acrylic painted steel plate	
External dimension HxWxD		mm	1,100 x 880 x 550	1,100 x 880 x 550
		in.	43-5/16 x 34-11/16 x 21-11/16	43-5/16 x 34-11/16 x 21-11/16
Net weight		lbs(kg)	428 (194)	428 (194)
Heat exchanger			plate type	plate type
	Water volume in plate	G	1.32	1.32
		l	5.0	5.0
	Water pressure Max.	psi	290	290
		MPa	2.0	2.0
Compressor	Type		Inverter scroll hermetic compressor	
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	Inverter
	Motor output	kW	8.5	8.5
	Case heater	kW	0.051 (230V)	0.051 (230V)
	Lubricant		MEL32	MEL32
Circulating water	Water flow rate	G/h	1522 + 1522	
		G/min(gpm)	25.4 + 25.4	
		m^3 / h	5.76 + 5.76	
		L/min	96 + 96	
		cfm	3.4 + 3.4	
	Pressure drop	kPa	17	17
		psi	2.47	2.47
	Operating volume range	G/h	1189 + 1189 ~ 1902 + 1902	
		G/min(gpm)	19.8 + 19.8 ~ 31.7 + 31.7	
		m^3 / h	4.5 + 4.5 ~ 7.2 + 7.2	
HIC circuit (HIC: Heat Inter-Changer)			-	
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	
	Inverter circuit(comp)		Over-heat protection, Over-current protection	
	Compressor		Over-heat protection	
Minimum Circuit Ampacity(MCA)		A	14	14
Maximum Overcurrent Protection(MOCP)		A	25	25
Refrigerant	Type x original charge		R410A x (11 lbs + 1 oz) (5 kg)	R410A x (11 lbs + 1 oz) (5 kg)
	Control		Indoor LEV and BC controller	
Pipe between unit and distributor	High pressure	in.(mm)	3/4 (19.05) Brazed	3/4 (19.05) Brazed
	Low pressure	in.(mm)	-	7/8 (22.2) Brazed
Drawing	External		KB94T572	
	Wiring		KE79B310H01	KE79B310H01
Standard attachment	Document		Installation Manual	
	Accessory		Details refer to External Drw	
Optional parts			Heat Source Twinning kit : CMY-Q100CBK joint :CMY-Y102SS-G2, CMY-Y102LS-G2, CMY-Y202S-G2, CMY-R160C-J Main BC controller : CMB-P108, 1010, 1013, 1016NU-GA Sub BC controller : CMB-P104, 108NU-GB, CMB-P1016NU-HB	
Remarks			*Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual. *Due to continuing improvement, above specifications may be subject to change without notice. *The ambient temperature of the Heat Source Unit needs to be kept below 104°F DB(40°CDB). *The ambient relative humidity of the Heat Source Unit needs to be kept below 80%. *The Heat Source Unit should not be installed at outdoor. *Be sure to mount a strainer (more than 50 meshes) at the water inlet piping of the unit. *Be sure to provide interlocking for the unit operation and water circuit. *The Heat Source twinning kit (low pressure) should be connected to the low pressure side of the heat source unit. If the connected units are of different capacities, the Heat Source twinning kit (low pressure) should be installed in the unit with the largest capacity	

Notes :

1.Nominal cooling conditions
Indoor:81°FDB/66°FWB (27°CDB/19°CWB), Water temperature:86°F (30°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)
2.Nominal heating conditions
Indoor:68°FDB (20°CDB), Water temperature:68°F (20°C)
Pipe length:24-9/16ft. (7.5m), Level difference:0ft. (0m)

Unit converter

BTU/h =kW x 3,412
cfm =m^3/min x 35.31
lbs =kg / 0.4536

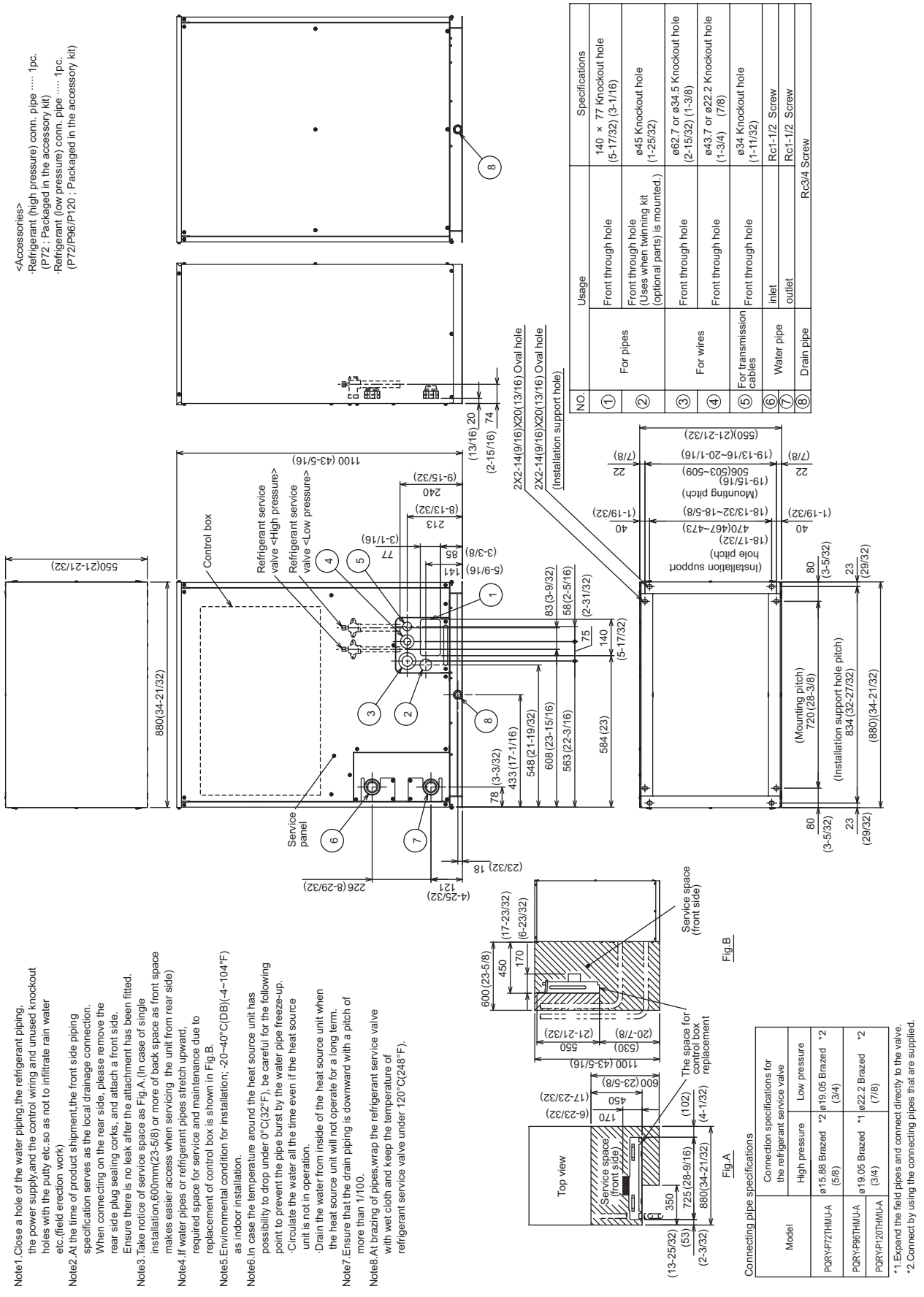
*Above specification data is subject to rounding variation.

WR2

2. EXTERNAL DIMENSIONS

PQRY-P72,96,120THMU-A

Unit : mm(in)



NO.		Usage	Specifications
①	For pipes	Front through hole	140 × 77 Knockout hole (5-17/32) (3-1/16)
②		Front through hole (Uses when twinning kit (optional parts) is mounted.)	ø45 Knockout hole (1-25/32)
③	For wires	Front through hole	ø62.7 or ø34.5 Knockout hole (2-15/32) (1-3/8)
④		Front through hole	ø43.7 or ø22.2 Knockout hole (1-3/4) (7/8)
⑤	For transmission cables	Front through hole	ø34 Knockout hole (1-11/32)
⑥	Water pipe	inlet	Rc1-1/2 Screw
⑦		outlet	Rc1-1/2 Screw
⑧	Drain pipe		Rc3/4 Screw

Note1. Close a hole of the water piping,the refrigerant piping, the power supply,and the control wiring and unused knockout holes with the putty etc.so as not to infiltrate rain water etc.(field erection work)

Note2. At the time of product shipment,the front side piping specification serves as the local drainage connection. When connecting on the rear side, please remove the rear side plug sealing corks, and attach a front side. Ensure there is no leak after the attachment has been fitted.

Note3. Take notice of service space as Fig.A.(In case of single installation,600mm(23-5/8) or more of back space as front space makes easier access when servicing the unit from rear side)

Note4. If water pipes or refrigerant pipes stretch upward, required space for service and maintenance due to replacement of control box is shown in Fig.B.

Note5. Environmental condition for installation; -20~40°C(DB)(-4~104°F) as indoor installation.

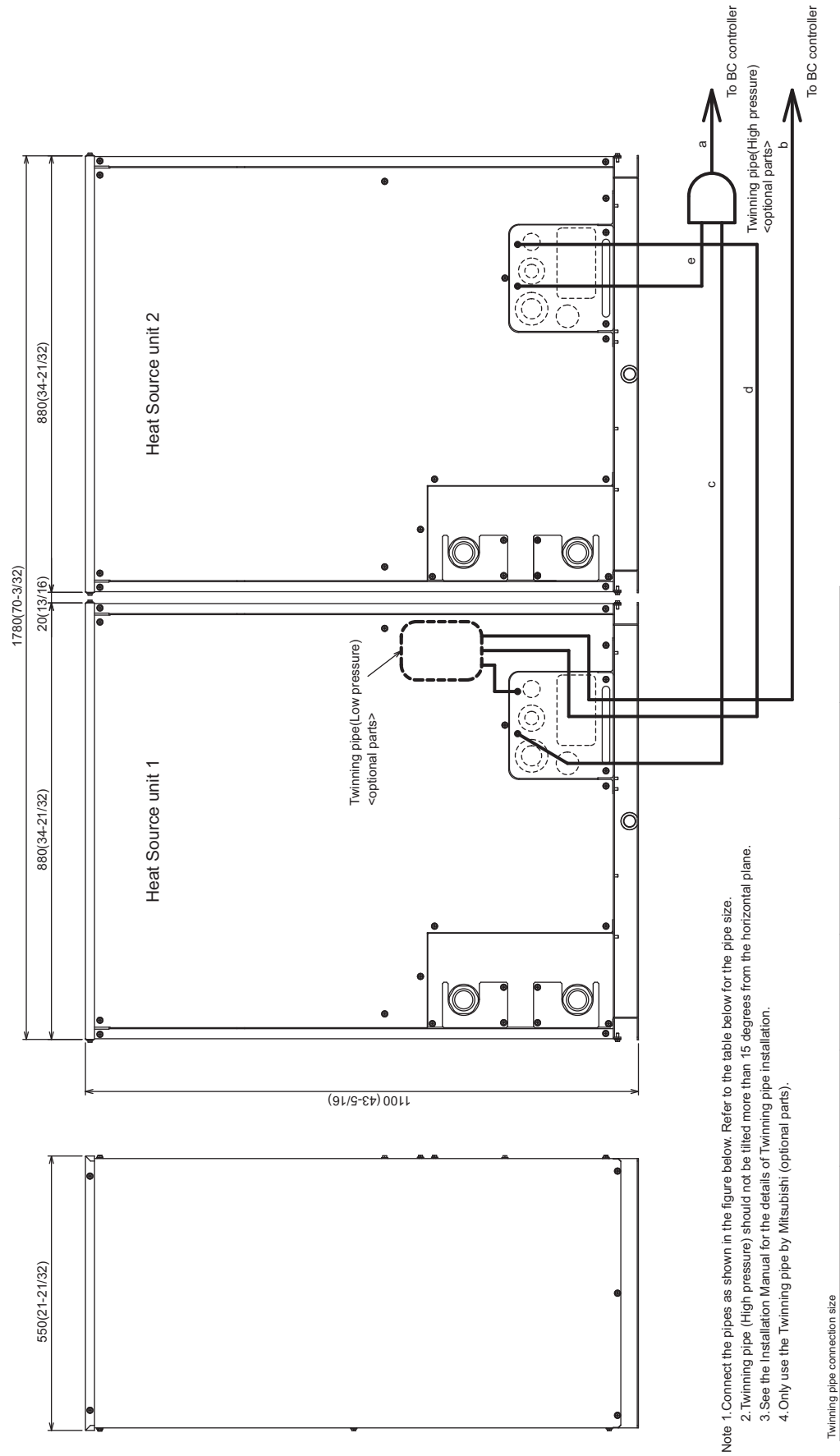
Note6. In case the temperature around the heat source unit has possibility to drop under 0°C(32°F), be careful for the following point to prevent the pipe burst by the water pipe freeze-up.
·Circulate the water all the time even if the heat source unit is not in operation.
·Drain the water from inside of the heat source unit when the heat source unit will not operate for a long term.

Note7. Ensure that the drain piping is downward with a pitch of more than 1/100.

Note8. At brazing of pipes,wrap the refrigerant service valve with wet cloth and keep the temperature of refrigerant service valve under 120°C(248°F).

PQRY-P144,168,192,216,240TSHMU-A

Unit : mm(in)



Note 1.Connect the pipes as shown in the figure below. Refer to the table below for the pipe size.
2.Twinning pipe (High pressure) should not be tilted more than 15 degrees from the horizontal plane.
3.See the Installation Manual for the details of Twinning pipe installation.
4.Only use the Twinning pipe by Mitsubishi (optional parts).

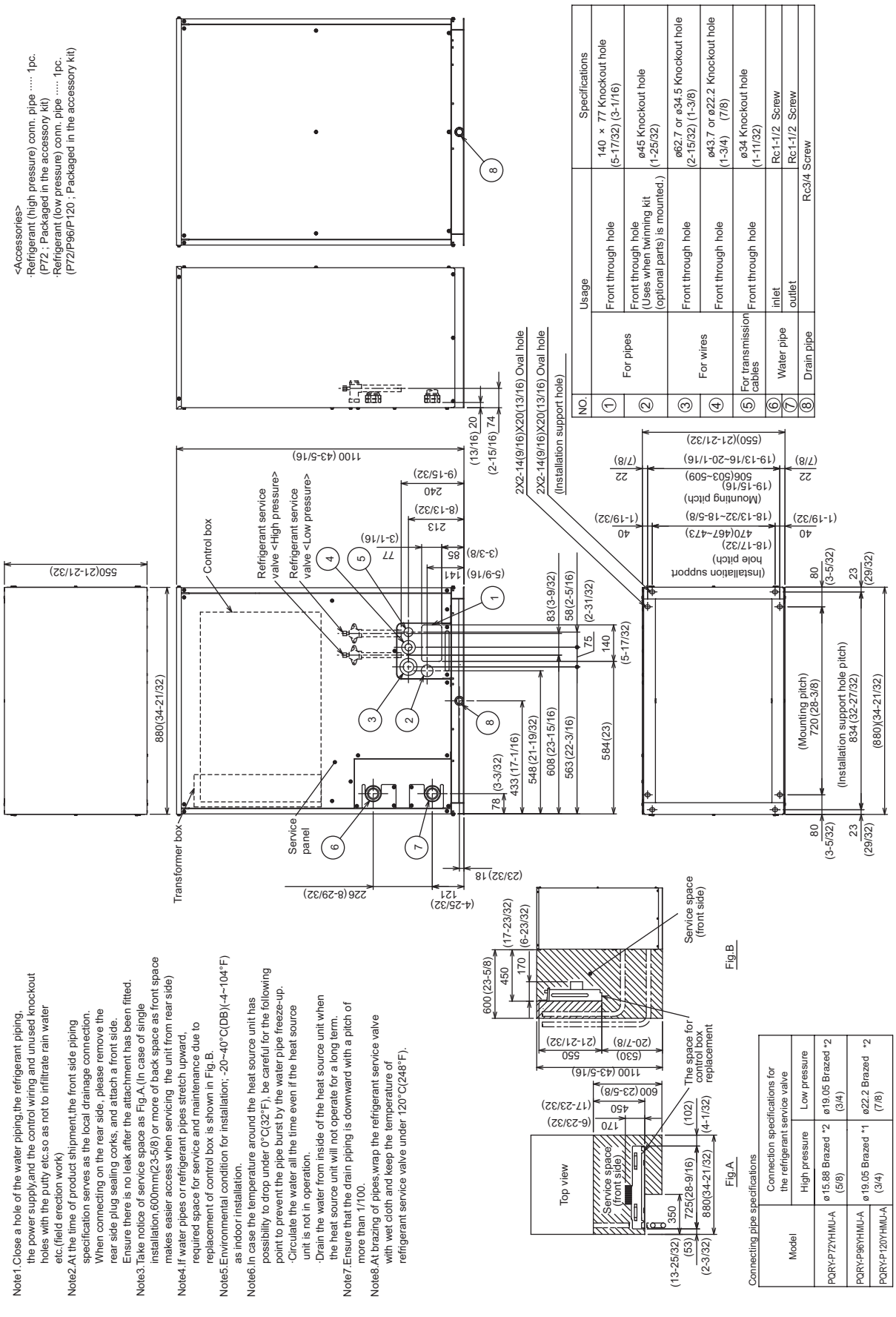
Twinning pipe connection size

Package unit name			PQRY-P144TSHMU-A	PQRY-P168TSHMU-A	PQRY-P192TSHMU-A	PQRY-P216TSHMU-A	PQRY-P240TSHMU-A
Component unit name	Heat Source unit 1		PQRY-P72THMU-A	PQRY-P96THMU-A	PQRY-P96THMU-A	PQRY-P120THMU-A	PQRY-P120THMU-A
	Heat Source unit 2		PQRY-P72THMU-A	PQRY-P72THMU-A	PQRY-P96THMU-A	PQRY-P96THMU-A	PQRY-P120THMU-A
Twinning pipe Kit(optional parts)			CMY-Q100VBK				
BC controller−Twinning pipe	High pressure	a	ø22.2(7/8)			ø28.58(1-1/8)	
	Low pressure	b	ø28.58(1-1/8)				

	Unit model		High pressure	Low pressure
Twinning pipe−Heat source unit	P72		c or e	d
	P96		ø19.05(3/4)	ø22.2(7/8)
	P120			

PQRY-P72,96,120YHMU-A

Unit : mm(in)



Note1. Close a hole of the water piping,the refrigerant piping, the power supply,and the control wiring and unused knockout holes with the putty etc.so as not to infiltrate rain water etc.(field erection work)

Note2. At the time of product shipment,the front side piping specification serves as the local drainage connection. When connecting on the rear side, please remove the rear side plug sealing corks, and attach a front side. Ensure there is no leak after the attachment has been fitted.

Note3. Take notice of service space as Fig.A.(In case of single installation,600mm(23-5/8) or more of back space as front space makes easier access when servicing the unit from rear side)

Note4. If water pipes or refrigerant pipes stretch upward, required space for service and maintenance due to replacement of control box is shown in Fig.B.

Note5. Environmental condition for installation; -20~40°C(DB)(-4~104°F) as indoor installation.

Note6. In case the temperature around the heat source unit has possibility to drop under 0°C(32°F), be careful for the following point to prevent the pipe burst by the water pipe freeze-up.
·Circulate the water all the time even if the heat source unit is not in operation.
·Drain the water from inside of the heat source unit when the heat source unit will not operate for a long term.

Note7. Ensure that the drain piping is downward with a pitch of more than 1/100.

Note8. At brazing of pipes,wrap the refrigerant service valve with wet cloth and keep the temperature of refrigerant service valve under 120°C(248°F).

Connecting pipe specifications

Model	Connection specifications for the refrigerant service valve	
	High pressure	Low pressure
PQRY-P72YHMU-A	ø15.88 Brazed *2 (5/8)	ø19.05 Brazed *2 (3/4)
PQRY-P96YHMU-A	ø19.05 Brazed *1 (3/4)	ø22.2 Brazed *2 (7/8)
PQRY-P120YHMU-A		

*1. Expand the field pipes and connect directly to the valve.
*2. Connect by using the connecting pipes that are supplied.

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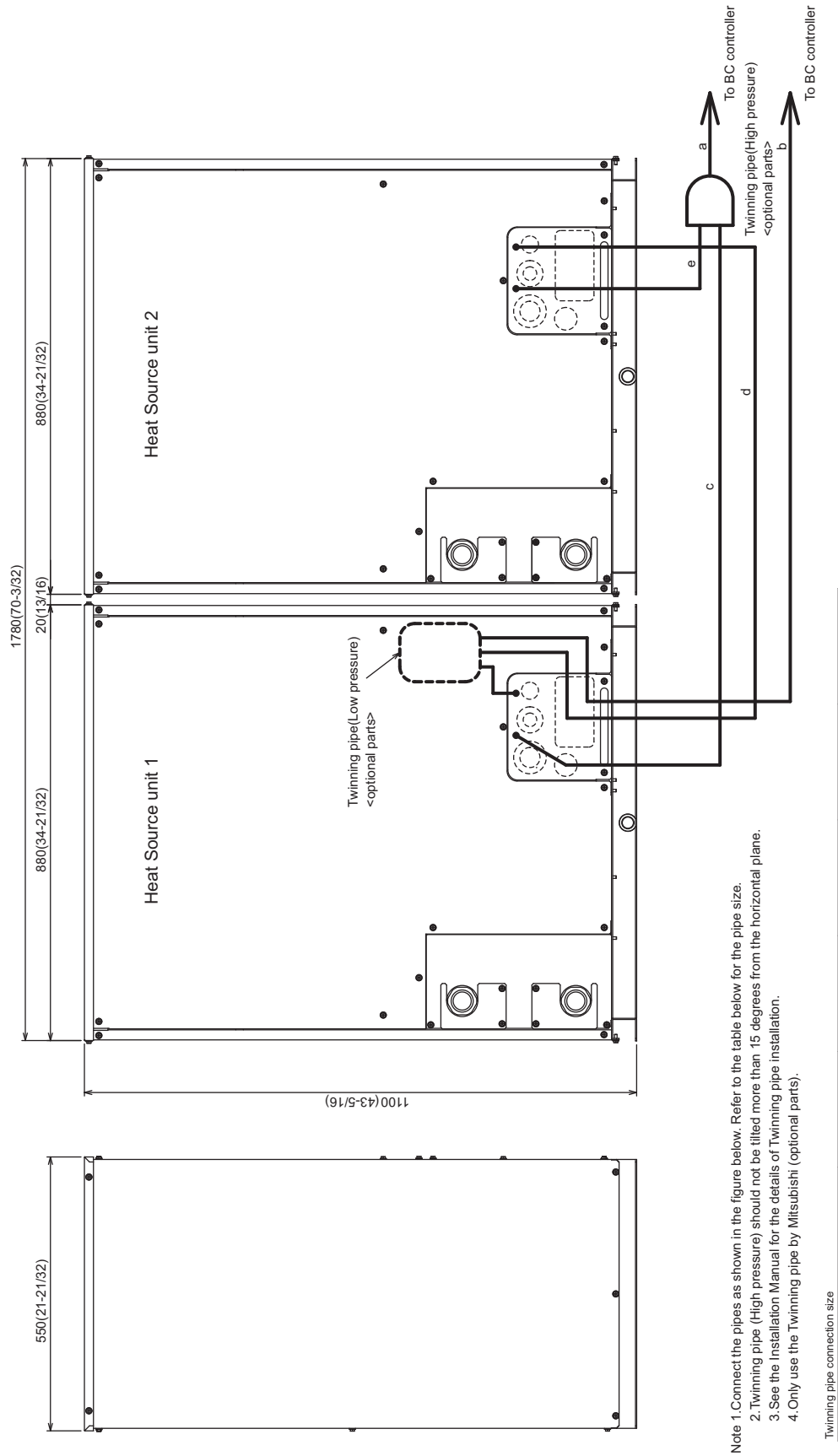
PQRY-P144,168,192,216,240YSHMU-A

Unit : mm(in)



Note 1.Connect the pipes as shown in the figure below. Refer to the table below for the pipe size.
2.Twinning pipe (High pressure) should not be tilted more than 15 degrees from the horizontal plane.
3.See the Installation Manual for the details of Twinning pipe installation.
4.Only use the Twinning pipe by Mitsubishi (optional parts).

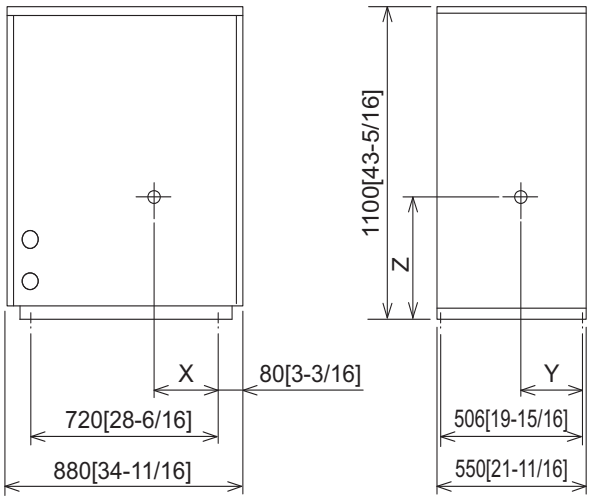
Twinning pipe connection size

Package unit name			PQRY-P144YSHMU-A	PQRY-P168YSHMU-A	PQRY-P192YSHMU-A	PQRY-P216YSHMU-A	PQRY-P240YSHMU-A
Component unit name	Heat Source unit 1		PQRY-P72YHMU-A	PQRY-P96YHMU-A	PQRY-P96YHMU-A	PQRY-P120YHMU-A	PQRY-P120YHMU-A
	Heat Source unit 2		PQRY-P72YHMU-A	PQRY-P72YHMU-A	PQRY-P96YHMU-A	PQRY-P96YHMU-A	PQRY-P120YHMU-A
Twinning pipe Kit(optional parts)			CMY-Q100VBK				
BC controller~Twinning pipe	High pressure	a	ø22.2(7/8)			ø28.58(1-1/8)	
	Low pressure	b	ø28.58(1-1/8)				

	Unit model	High pressure	Low pressure
Twinning pipe~Heat source unit	P72	c or e	d
	P96	ø19.05(3/4)	ø22.2(7/8)
	P120		

PQRY-P72, 96, 120THMU-A

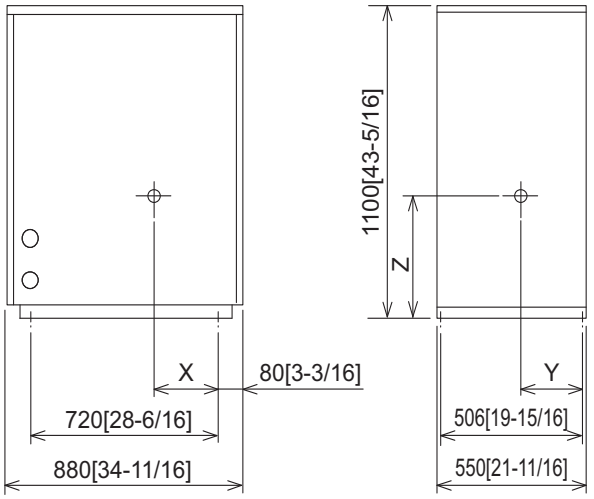
Unit : mm[in.]



Model	X	Y	Z
PQRY-P72THMU-A	423[16-11/16]	253[10]	467[18-7/16]
PQRY-P96THMU-A	423[16-11/16]	253[10]	467[18-7/16]
PQRY-P120THMU-A	423[16-11/16]	253[10]	467[18-7/16]

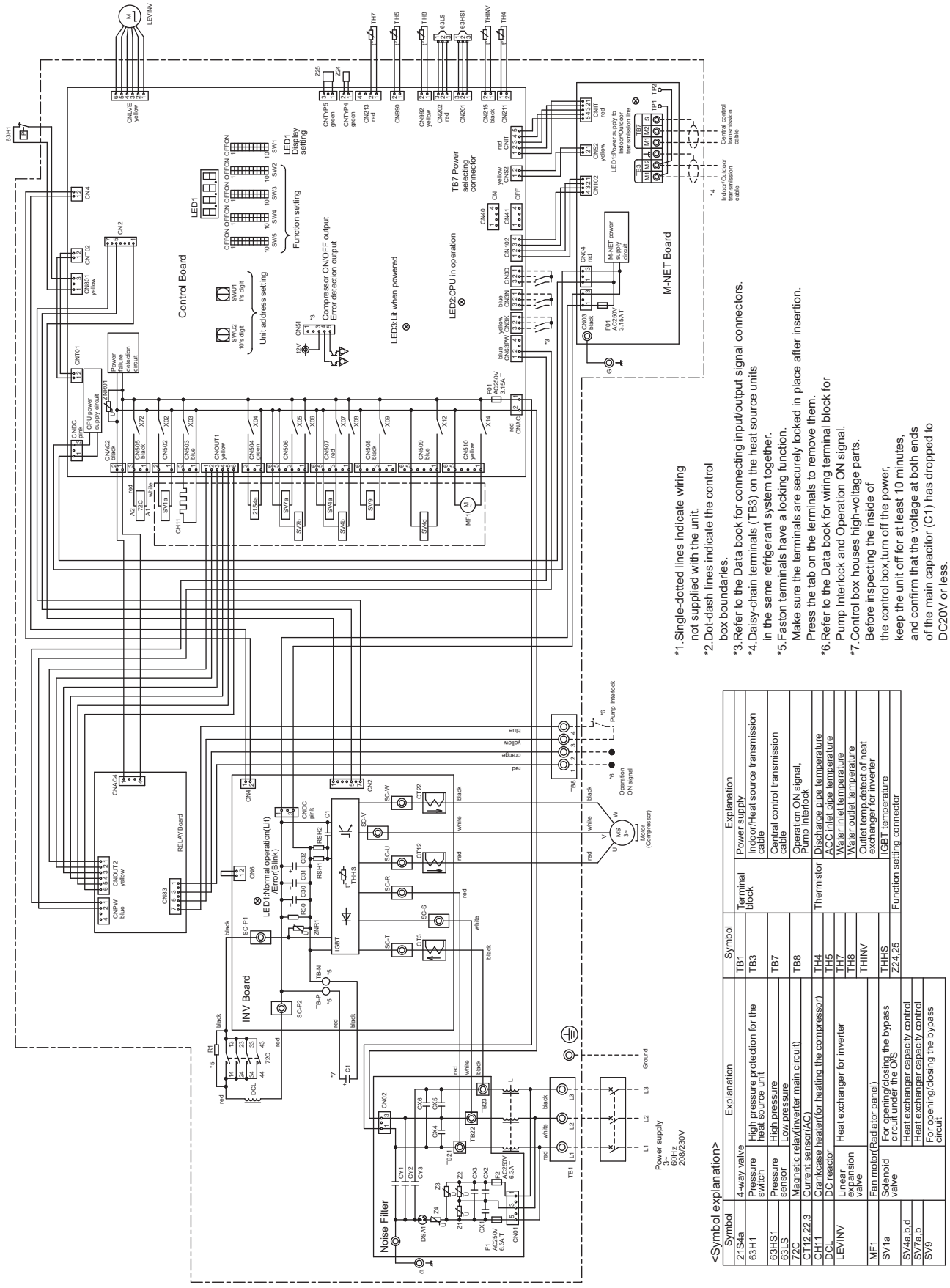
PQRY-P72, 96, 120YHMU-A

Unit : mm[in.]



Model	X	Y	Z
PQRY-P72YHMU-A	441[17-6/16]	257[10-2/16]	481[18-15/16]
PQRY-P96YHMU-A	441[17-6/16]	257[10-2/16]	481[18-15/16]
PQRY-P120YHMU-A	441[17-6/16]	257[10-2/16]	481[18-15/16]

PQRY-P72,96,120THMU-A

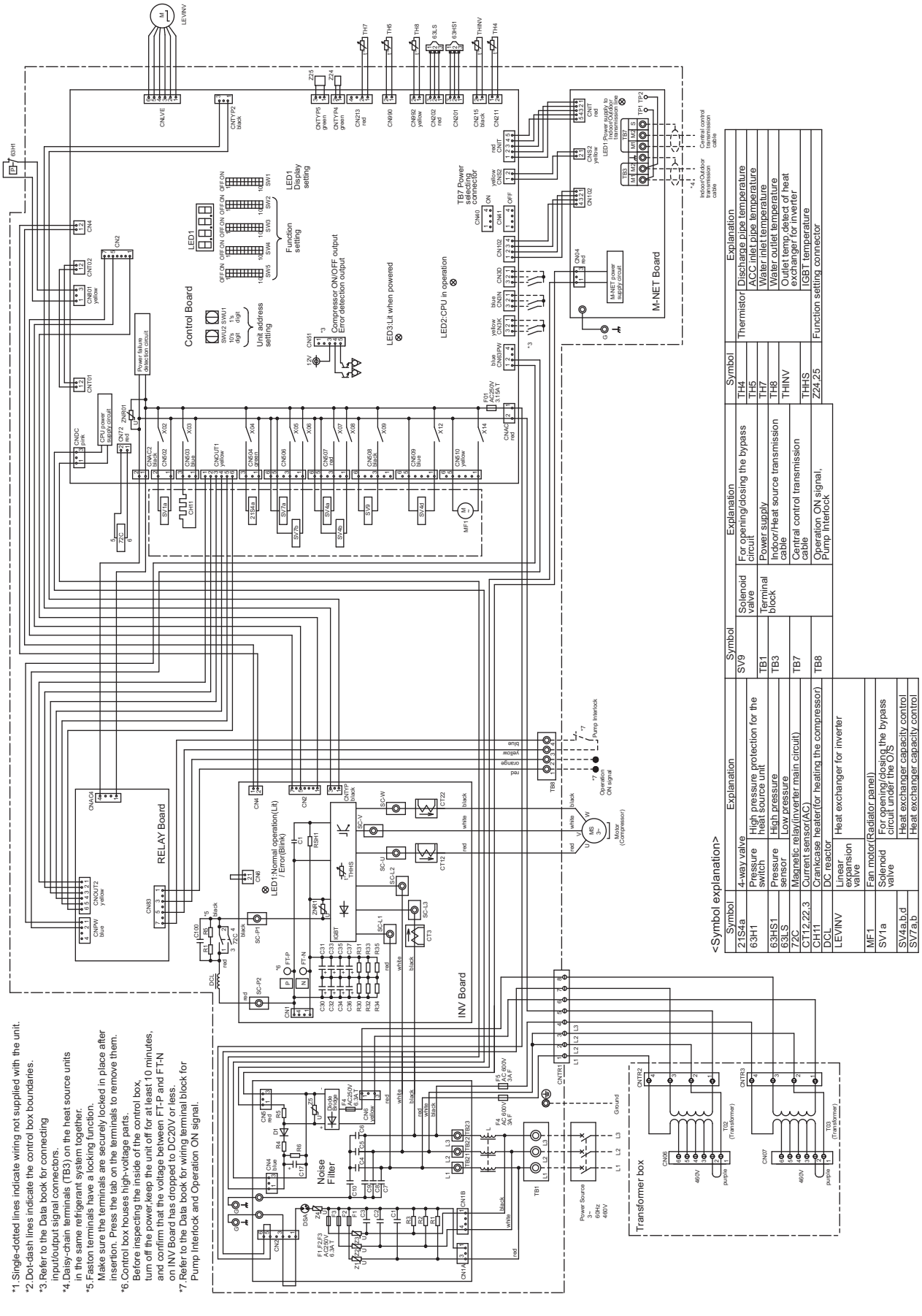


*1.Single-dotted lines indicate wiring not supplied with the unit.
*2.Dot-dash lines indicate the control box boundaries.
*3.Refer to the Data book for connecting input/output signal connectors.
*4.Daisy-chain terminals (TB3) on the heat source units in the same refrigerant system together.
*5.Faston terminals have a locking function. Make sure the terminals are securely locked in place after insertion. Press the tab on the terminals to remove them.
*6.Refer to the Data book for wiring terminal block for Pump Interlock and Operation ON signal.
*7.Control box houses high-voltage parts. Before inspecting the inside of the control box,turn off the power, keep the unit off for at least 10 minutes, and confirm that the voltage at both ends of the main capacitor (C1) has dropped to DC20V or less.

<Symbol explanation>

Symbol	Explanation	Symbol		Explanation
21S4a	4-way valve	TB1		Power supply
63H1	Pressure switch	TB3	Terminal block	Indoor/Heat source transmission cable
63HS1	Pressure sensor	TB7		Central control transmission cable
63LS	Low pressure	TB8		Operation ON signal, Pump Interlock
72C	Magnetic relay(inverter main circuit)	TH4	Thermistor	Discharge pipe temperature
CT12,22,3	Current sensor(AC)	TH5		ACC inlet pipe temperature
CH11	Crankcase heater(for heating the compressor)	TH7		Water inlet temperature
DCL	DC reactor	TH8		Water outlet temperature
LEVINV	Linear expansion valve / Heat exchanger for inverter	THINV		Outlet temp.detect of heat exchanger for inverter
MF1	Fan motor(Radiator panel)	THHS		IGBT temperature
SV1a	Solenoid valve / For opening/closing the bypass circuit under the OS	Z24,25		Function setting connector
SV4a,b,d	Heat exchanger capacity control			
SV7a,b	Heat exchanger capacity control			
SV9	For opening/closing the bypass circuit			

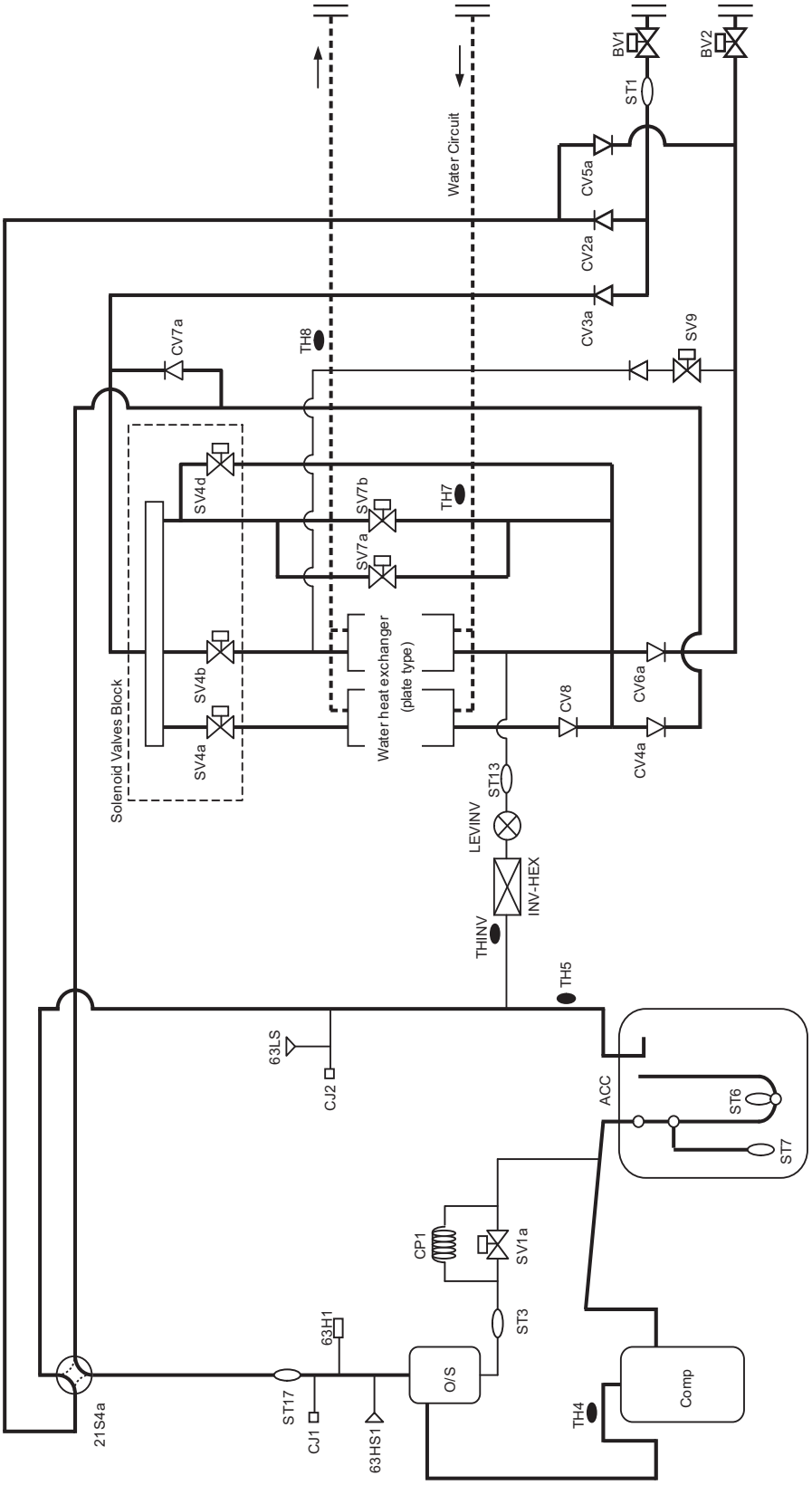
PQRY-P72,96,120YHMU-A



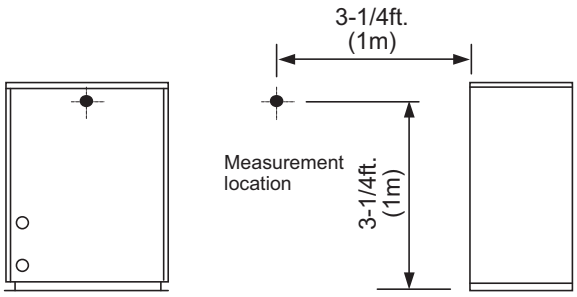
<Symbol explanation>

Symbol	Explanation	Symbol	Explanation	Symbol	Explanation
21S4a	4-way valve	SV9	Solenoid valve	TH4	Thermistor Discharge pipe temperature
63H1	Pressure switch	TB1	Terminal block	TH5	ACC inlet pipe temperature
	High pressure protection for the heat source unit			TH7	Water inlet temperature
63HS1	Pressure sensor	TB3		TH8	Water outlet temperature
63LS	Low pressure			THINV	Outlet temp.detect of heat exchanger for inverter
72C	Magnetic relay(inverter main circuit)	TB7			
CT12,22,3	Current sensor(AC)			THHS	IGBT temperature
CH11	Crankcase heater(for heating the compressor)	TB8		Z24,25	Function setting connector
DCL	DC reactor				
LEV/INV	Linear expansion valve	Heat exchanger for inverter			
MF1	Fan motor(Radiator panel)				
SV1a	Solenoid valve	For opening/closing the bypass circuit under the O/S			
SV4a,b,d		Heat exchanger capacity control			
SV7a,b		Heat exchanger capacity control			

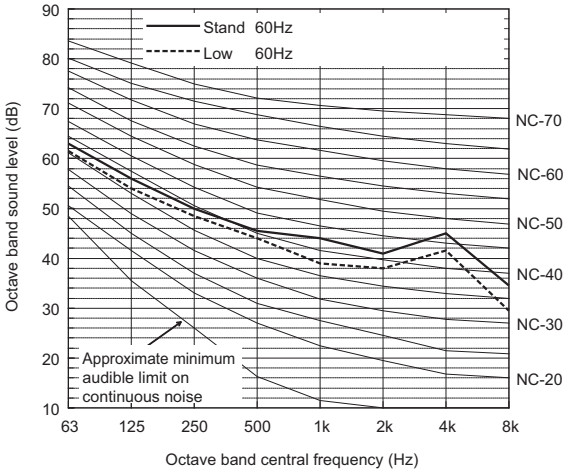
(1) PQRY-P72, P96, 120 THMU-A/YHMU-A



Measurement condition
PQRY-P72,96,120THMU-A/YHMU-A



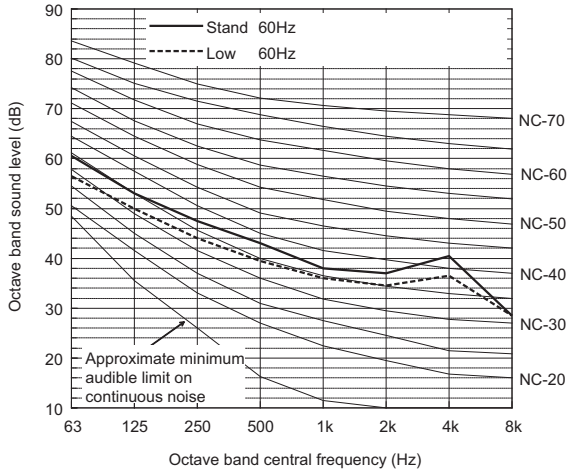
Sound level of PQRY-P120THMU-A/YHMU-A



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard	60Hz	63.0	56.0	50.0	45.5	44.0	41.0	45.0	34.5	51.0
Low noise mode	60Hz	61.5	54.0	48.5	44.0	39.0	38.0	41.5	29.5	48.0

When Low noise mode is set,the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

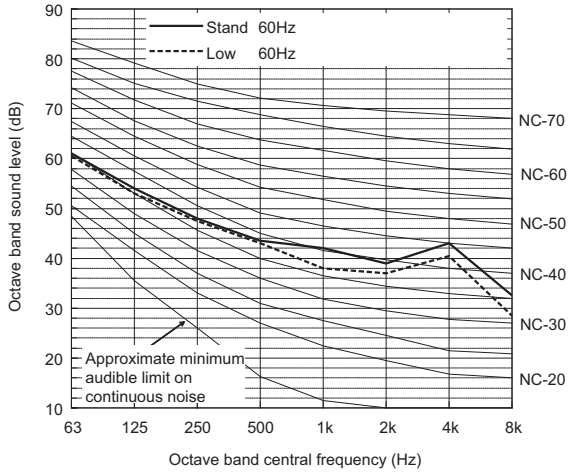
Sound level of PQRY-P72THMU-A/YHMU-A



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard	60Hz	60.5	53.0	47.5	43.0	38.0	37.0	40.5	28.5	47.0
Low noise mode	60Hz	56.5	50.0	44.0	39.5	36.0	34.5	36.5	28.5	44.0

When Low noise mode is set,the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

Sound level of PQRY-P96THMU-A/YHMU-A



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard	60Hz	61.0	54.0	48.0	43.5	42.0	39.0	43.0	32.5	49.0
Low noise mode	60Hz	60.5	53.0	47.5	43.0	38.0	37.0	40.5	28.5	47.0

When Low noise mode is set,the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

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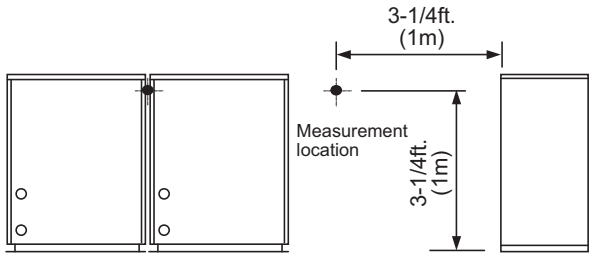
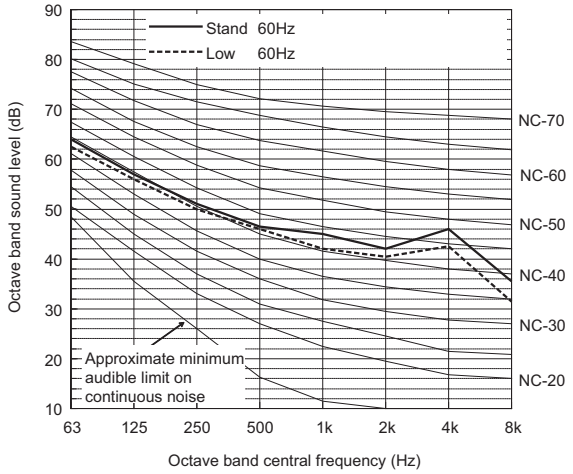
6. SOUND LEVELS

Measurement condition
PQRY-P144,168,192,216,240TSHMU-A/YSHMU-A



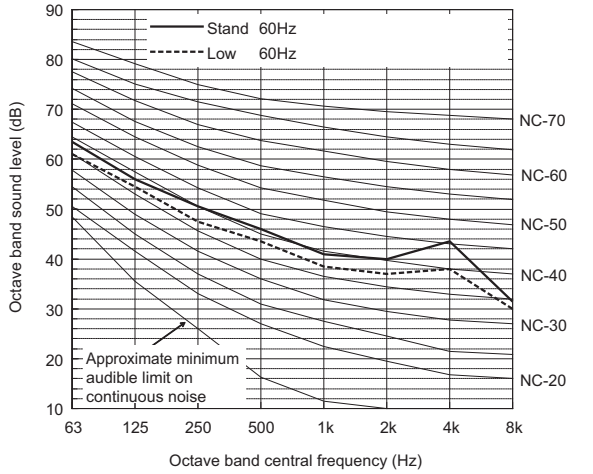
Sound level of PQRY-P192TSHMU-A/YSHMU-A



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard	60Hz	64.0	57.0	51.0	46.5	45.0	42.0	46.0	35.5	52.0
Low noise mode	60Hz	62.5	56.0	50.0	46.0	42.0	40.5	42.5	31.5	50.0

When Low noise mode is set,the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

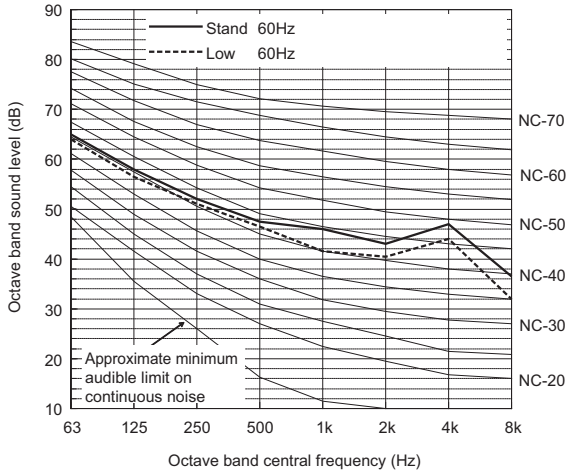
Sound level of PQRY-P144TSHMU-A/YSHMU-A



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard	60Hz	63.5	56.0	50.5	46.0	41.0	40.0	43.5	31.5	50.0
Low noise mode	60Hz	61.0	54.5	47.5	43.5	38.5	37.0	38.0	30.0	47.0

When Low noise mode is set,the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

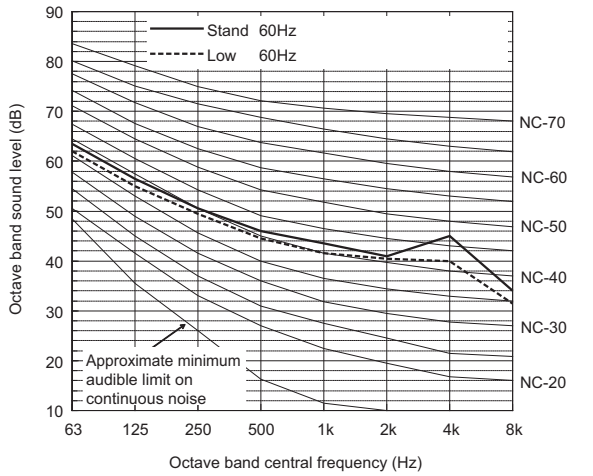
Sound level of PQRY-P216TSHMU-A/YSHMU-A



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard	60Hz	65.0	58.0	52.0	47.5	46.0	43.0	47.0	36.5	53.0
Low noise mode	60Hz	64.0	56.5	51.0	46.5	41.5	40.5	44.0	32.0	50.5

When Low noise mode is set,the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

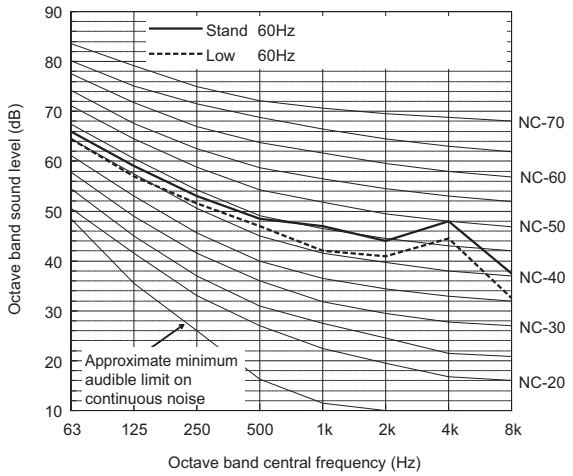
Sound level of PQRY-P168TSHMU-A/YSHMU-A



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard	60Hz	63.5	56.5	50.5	46.0	43.5	41.0	45.0	34.0	51.0
Low noise mode	60Hz	62.0	55.0	49.5	44.5	41.5	40.5	40.0	31.5	49.0

When Low noise mode is set,the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

Sound level of PQRY-P240TSHMU-A/YSHMU-A



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard	60Hz	66.0	59.0	53.0	48.5	47.0	44.0	48.0	37.5	54.0
Low noise mode	60Hz	64.5	57.0	51.5	47.0	42.0	41.0	44.5	32.5	51.0

When Low noise mode is set,the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

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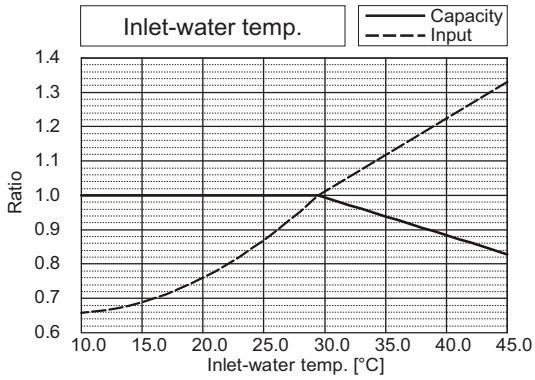
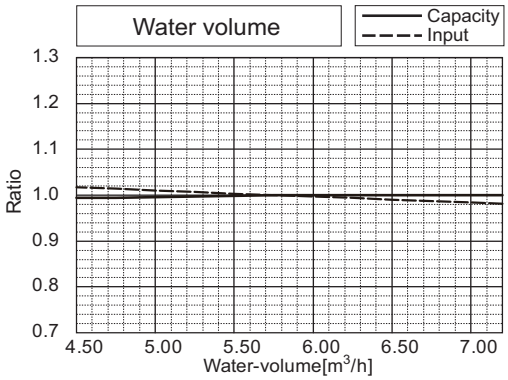
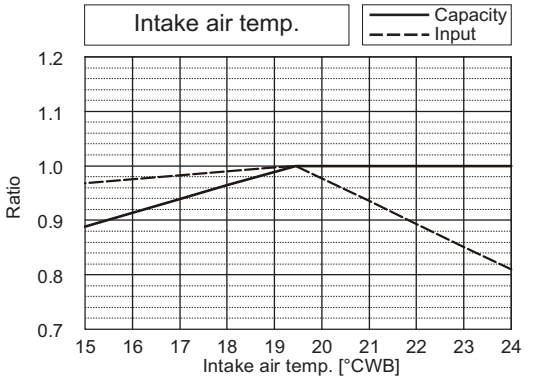
7-1. Correction by temperature

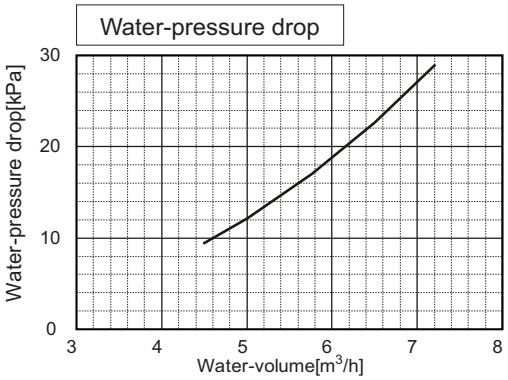
CITY MULTI could have various capacities at different designing temperatures. Using the nominal cooling/heating capacity values and the ratios below, the capacity can be found for various temperatures.

PQRY-		P72THMU	P72YHMU
Nominal Cooling Capacity	kW	21.3	21.3
	BTU/h	72,700	72,700
Input	kW	3.97	3.97

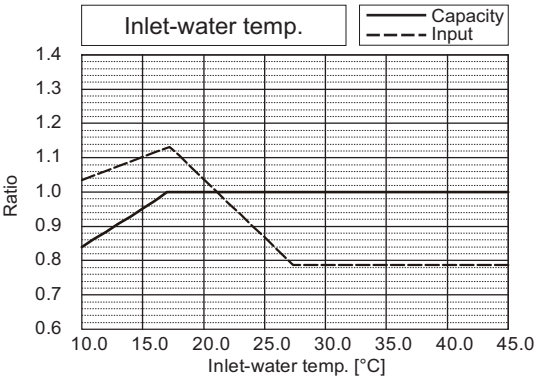


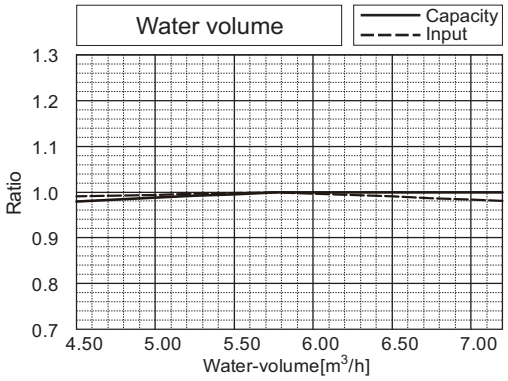


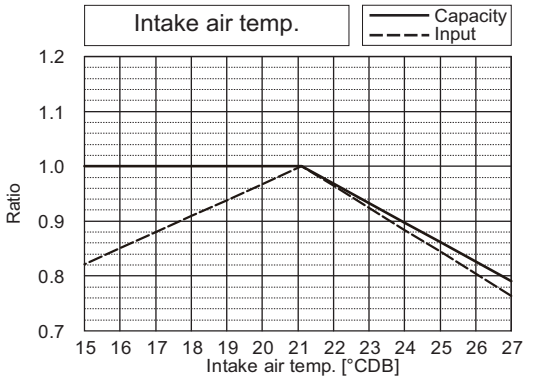


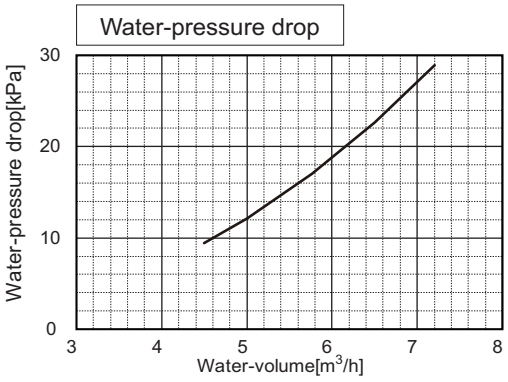


PQRY-		P72THMU	P72YHMU
Nominal Heating Capacity	kW	23.4	23.4
	BTU/h	80,000	80,000
Input	kW	3.83	3.83





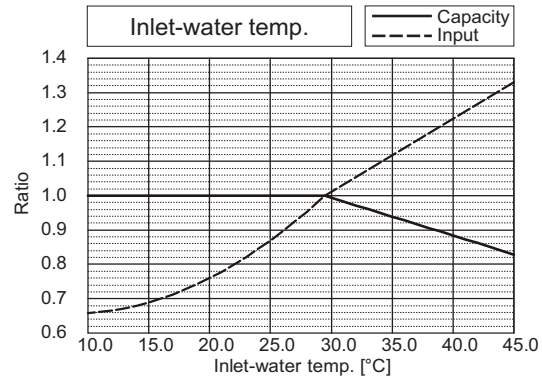


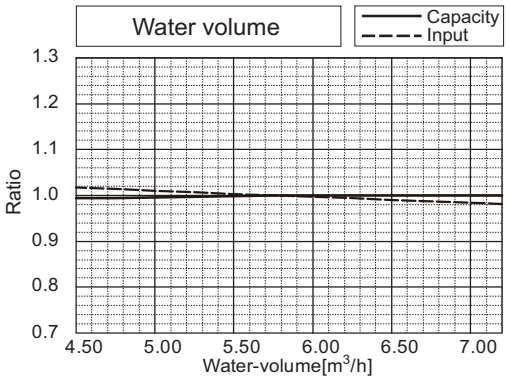


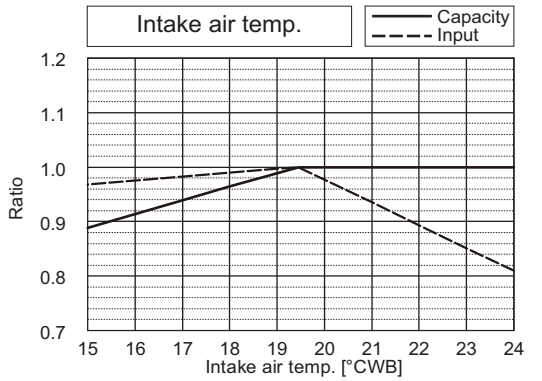
WR2

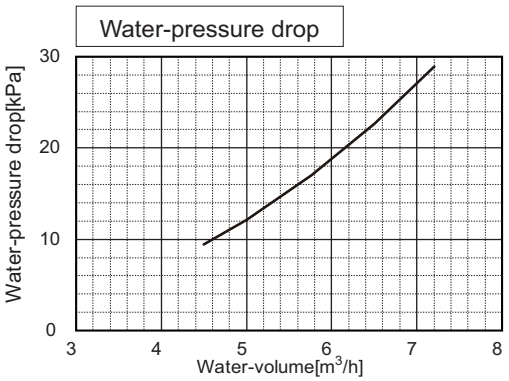
7. CAPACITY TABLES

PQRY-		P96THMU	P96YHMU
Nominal Cooling Capacity	kW	28.2	28.2
	BTU/h	96,300	96,300
Input	kW	5.77	5.77

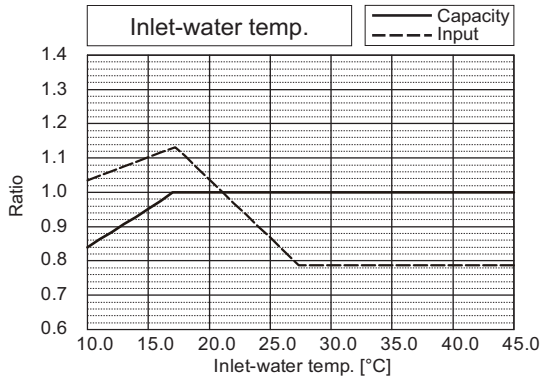


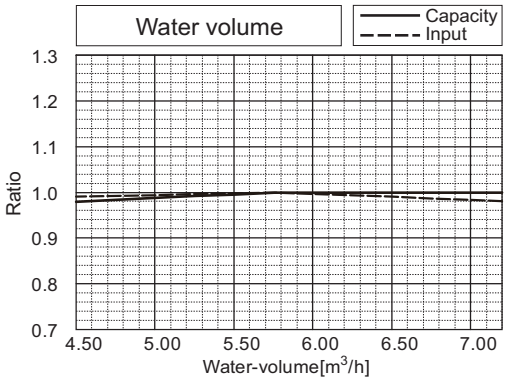


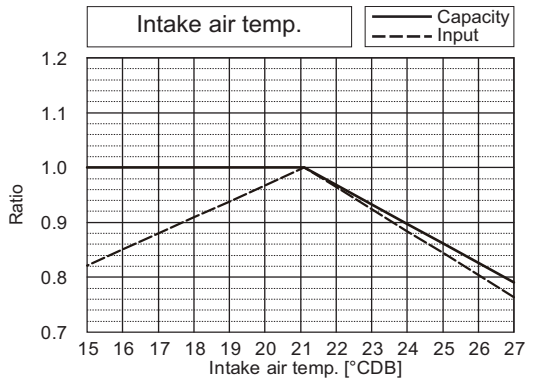


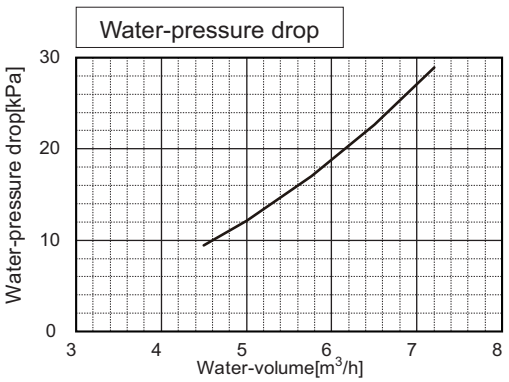


PQRY-		P96THMU	P96YHMU
Nominal Heating Capacity	kW	31.7	31.7
	BTU/h	108,000	108,000
Input	kW	6.18	6.18





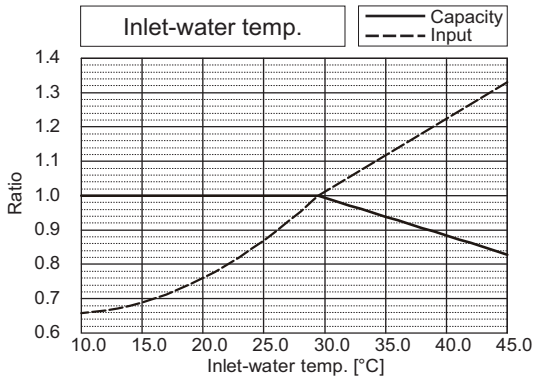


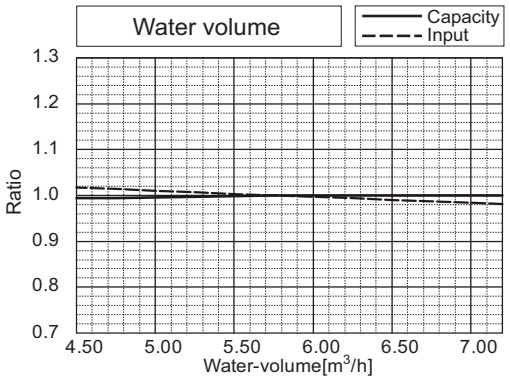


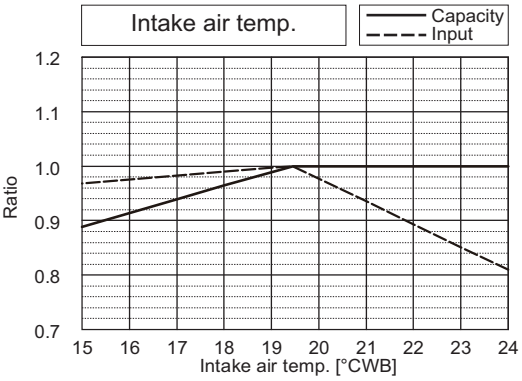
WR2

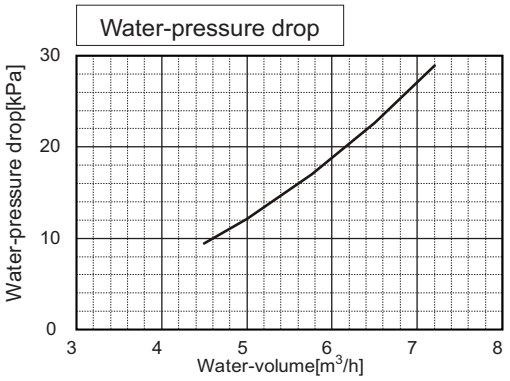
7. CAPACITY TABLES

PQRY-		P120THMU	P120YHMU
Nominal Cooling Capacity	kW	35.2	35.2
	BTU/h	120,000	120,000
Input	kW	7.73	7.73

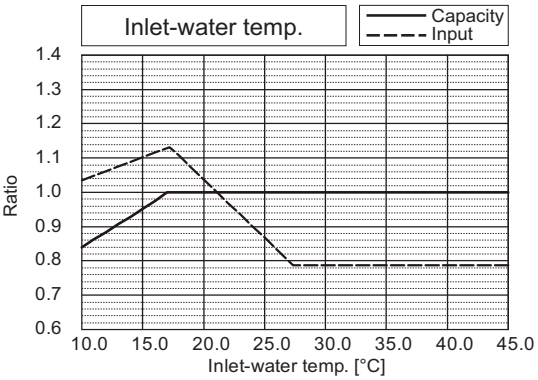


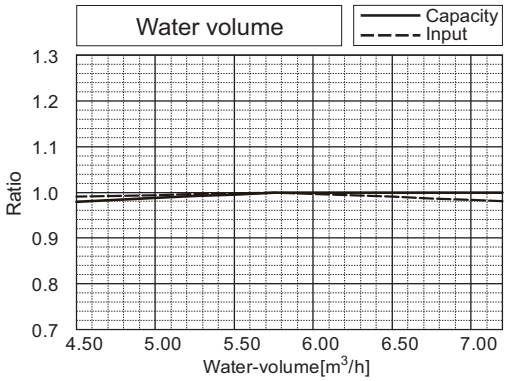


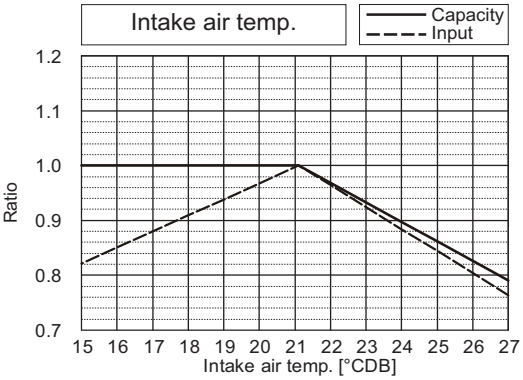


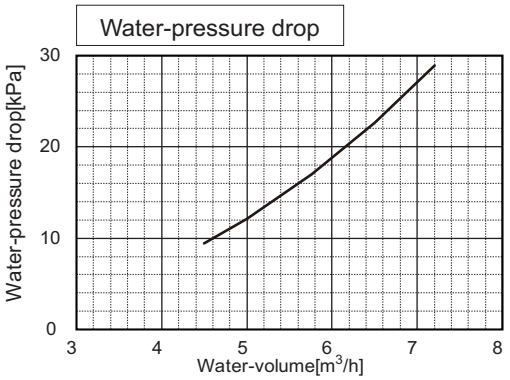


PQRY-		P120THMU	P120YHMU
Nominal Heating Capacity	kW	39.6	39.6
	BTU/h	135,000	135,000
Input	kW	7.62	7.62

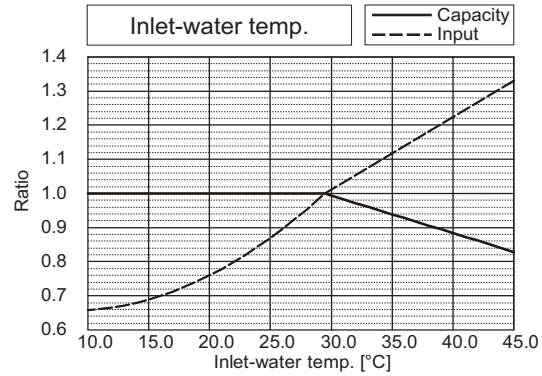


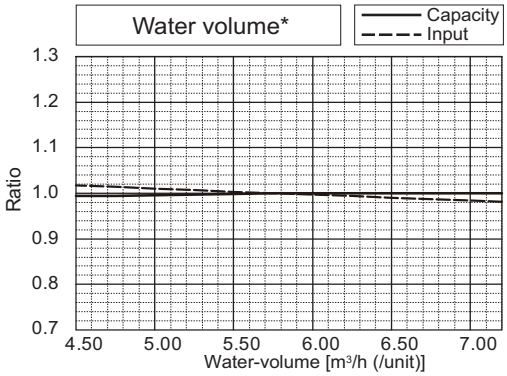


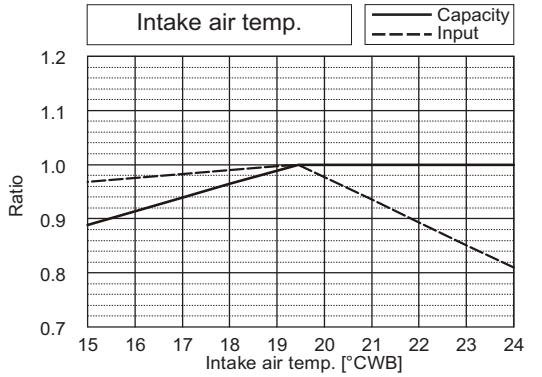


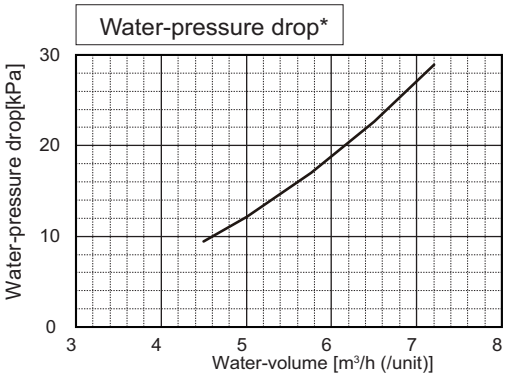


PQRY-		P144TSHMU	P144YSHMU
Nominal Cooling Capacity	kW	42.6	42.6
	BTU/h	145,400	145,400
Input	kW	8.18	8.18



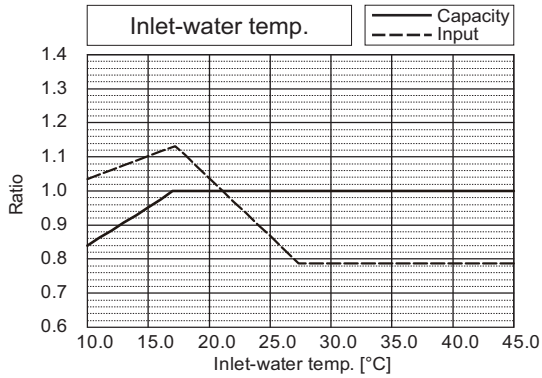


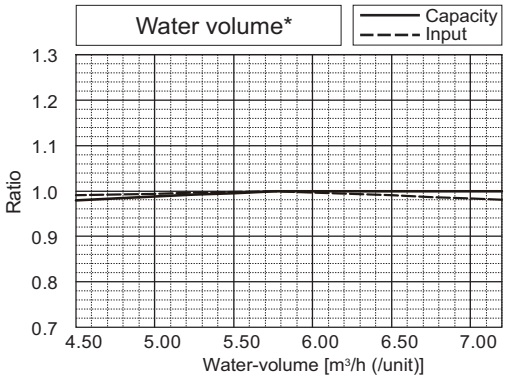


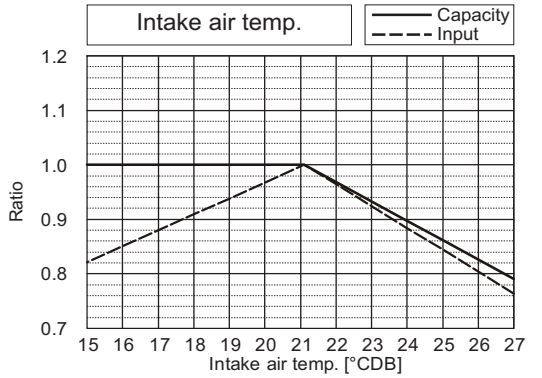


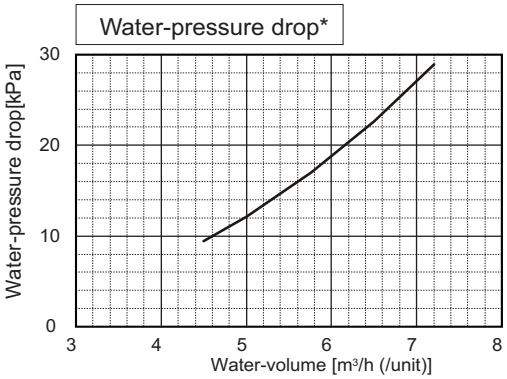
*The drawing indicates characteristic per unit.

PQRY-		P144TSHMU	P144YSHMU
Nominal Heating Capacity	kW	46.9	46.9
	BTU/h	160,000	160,000
Input	kW	7.89	7.89





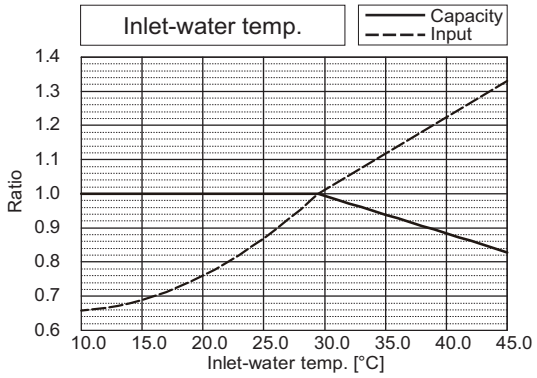


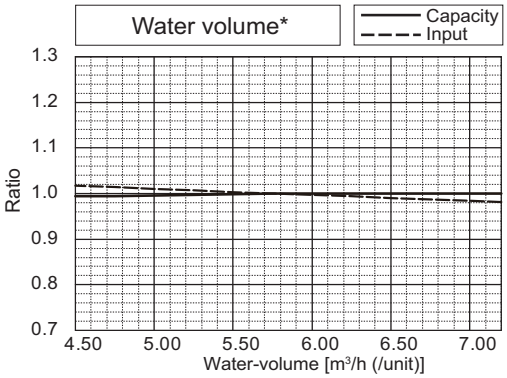


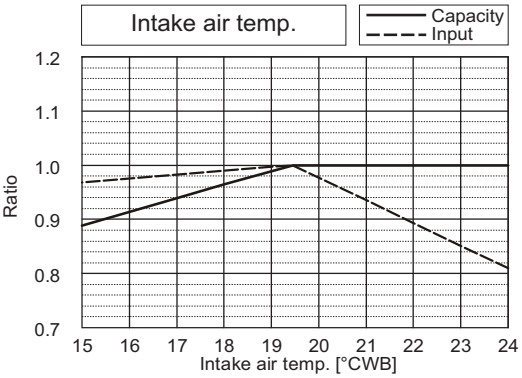
*The drawing indicates characteristic per unit.

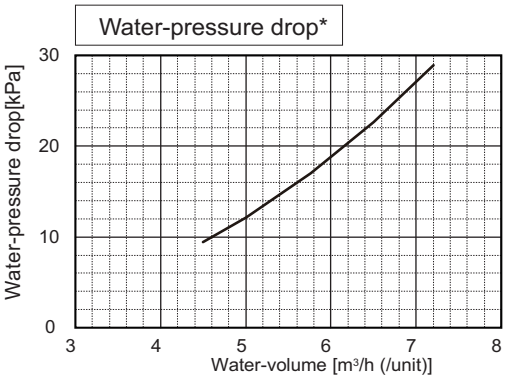
WR2

PQRY-		P168TSHMU	P168YSHMU
Nominal Cooling Capacity	kW	49.6	49.6
	BTU/h	169,100	169,100
Input	kW	10.02	10.02



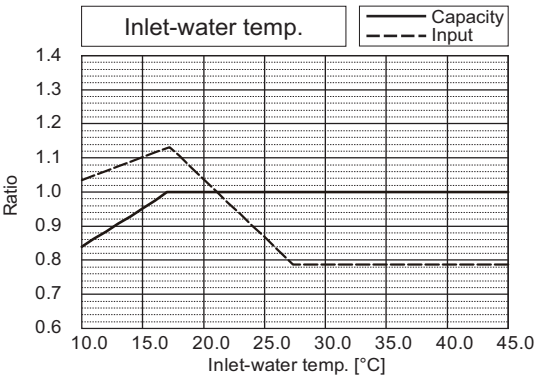


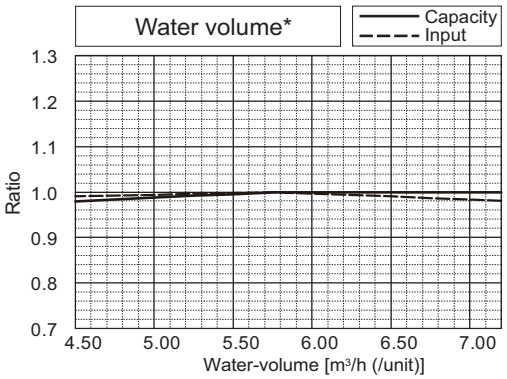


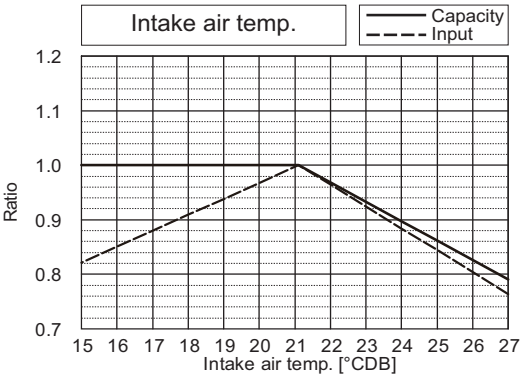


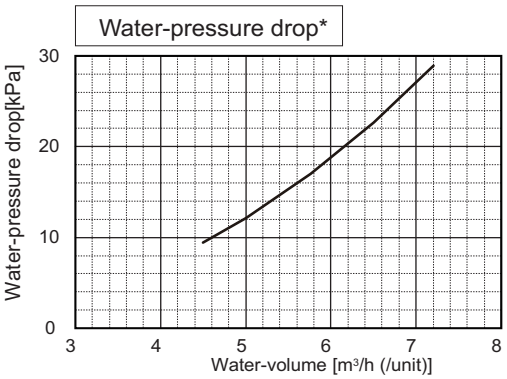
*The drawing indicates characteristic per unit.

PQRY-		P168TSHMU	P168YSHMU
Nominal Heating Capacity	kW	55.1	55.1
	BTU/h	188,000	188,000
Input	kW	10.32	10.32





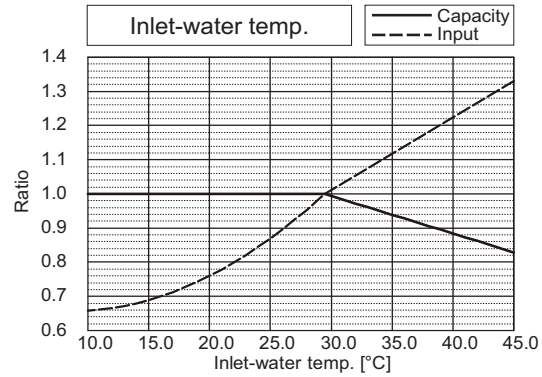


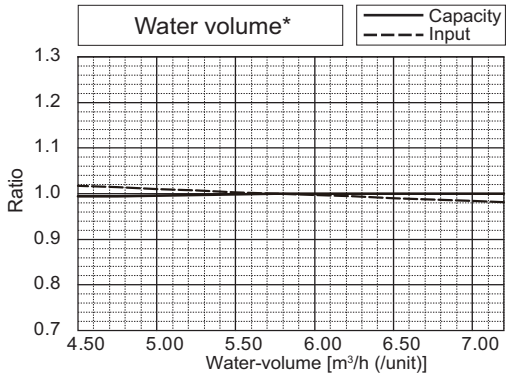


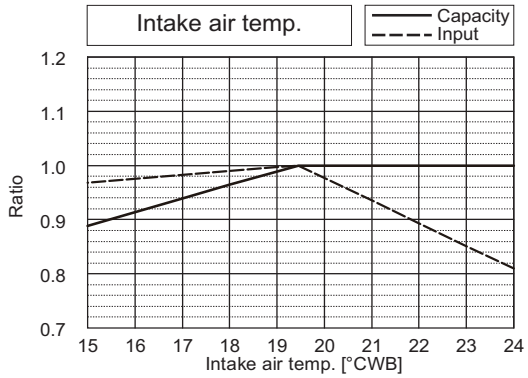
*The drawing indicates characteristic per unit.

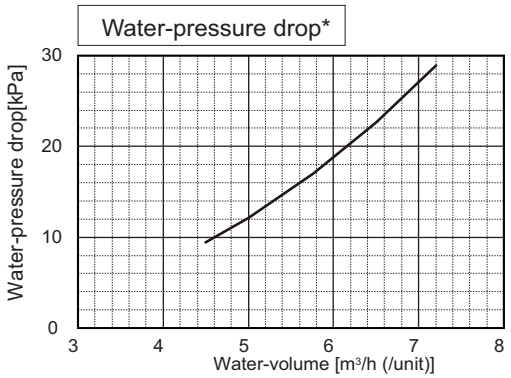
7. CAPACITY TABLES

PQRY-		P192TSHMU	P192YSHMU
Nominal Cooling Capacity	kW	56.4	56.4
	BTU/h	192,600	192,600
Input	kW	11.89	11.89



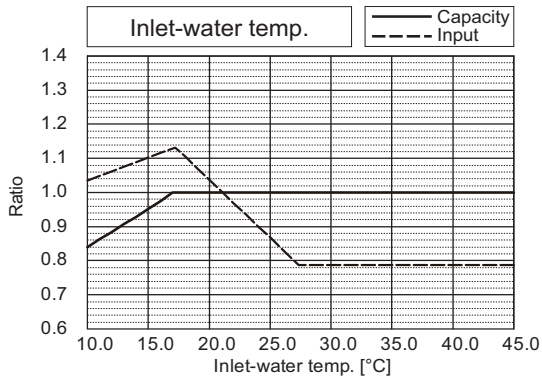


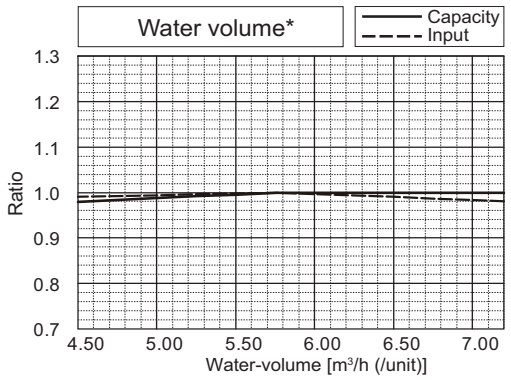


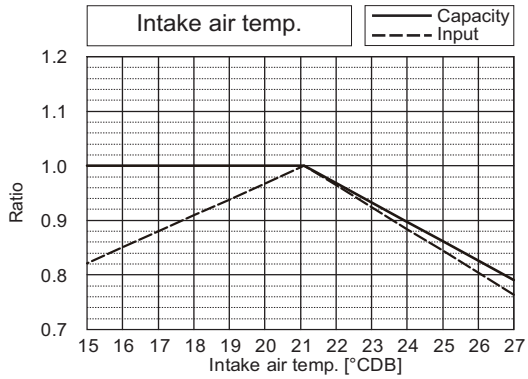


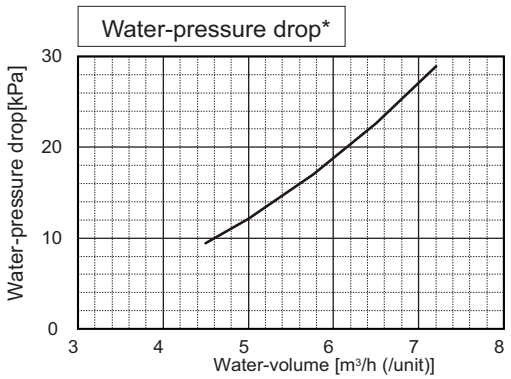
*The drawing indicates characteristic per unit.

PQRY-		P192TSHMU	P192YSHMU
Nominal Heating Capacity	kW	63.3	63.3
	BTU/h	216,000	216,000
Input	kW	12.74	12.74





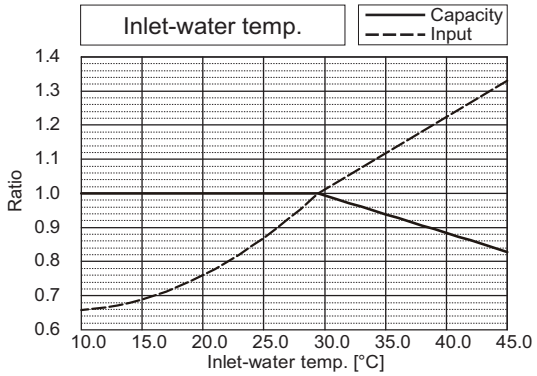


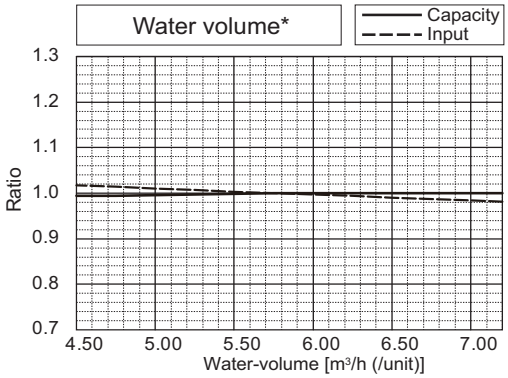


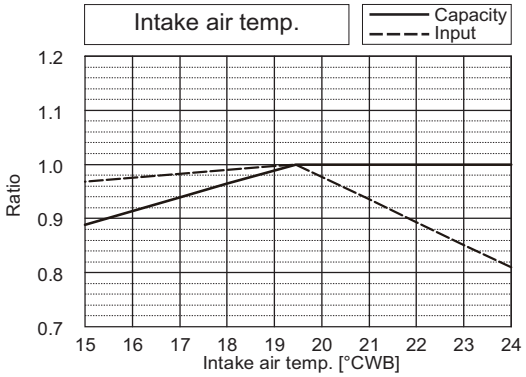
*The drawing indicates characteristic per unit.

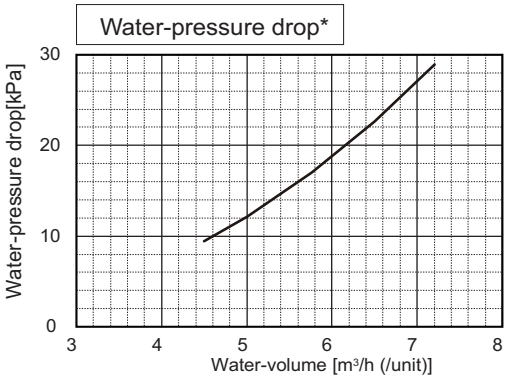
WR2

PQRY-		P216TSHMU	P216YSHMU
Nominal Cooling Capacity	kW	63.3	63.3
	BTU/h	216,000	216,000
Input	kW	13.90	13.90



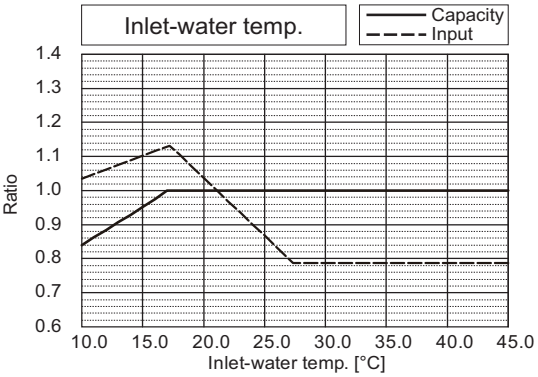


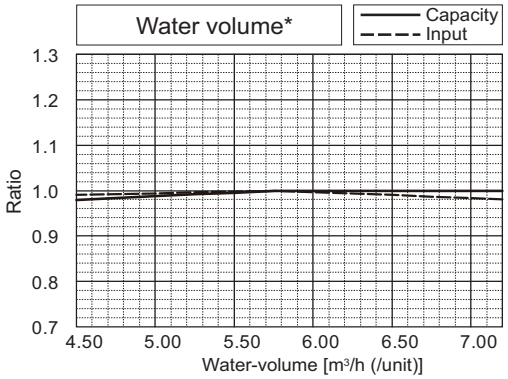


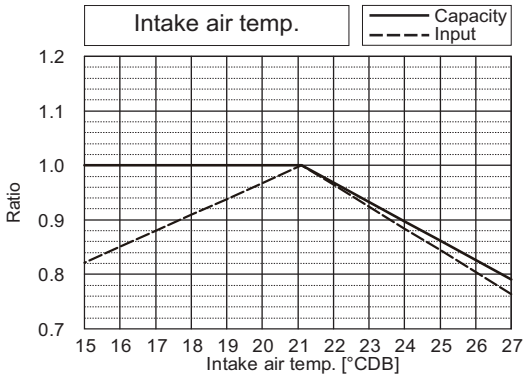


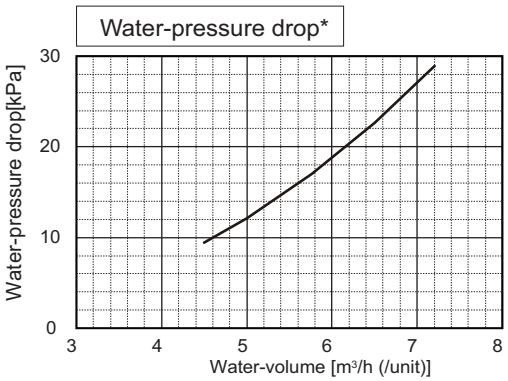
*The drawing indicates characteristic per unit.

PQRY-		P216TSHMU	P216YSHMU
Nominal Heating Capacity	kW	71.2	71.2
	BTU/h	243,000	243,000
Input	kW	14.22	14.22





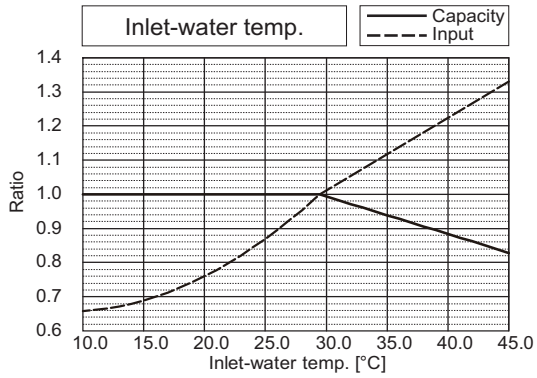


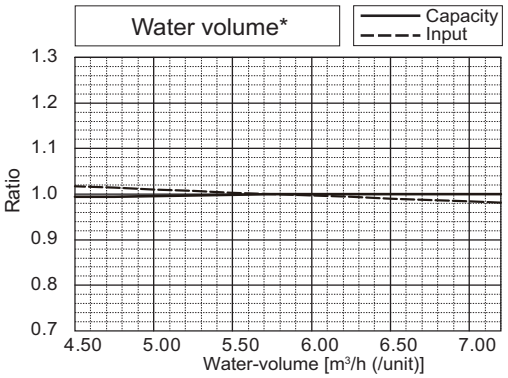


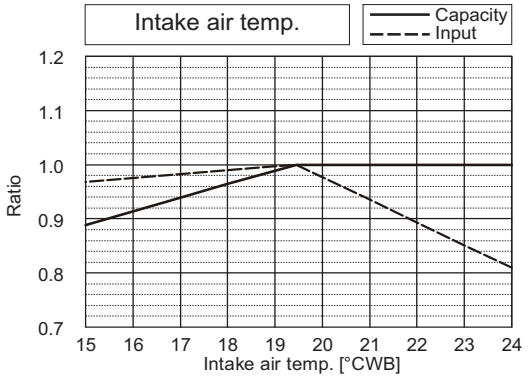
*The drawing indicates characteristic per unit.

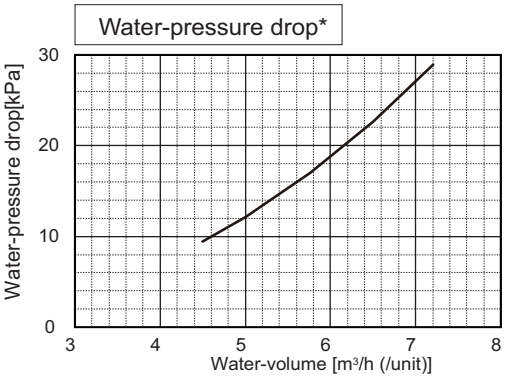
7. CAPACITY TABLES

PQRY-		P240TSHMU	P240YSHMU
Nominal Cooling Capacity	kW	70.3	70.3
	BTU/h	240,000	240,000
Input	kW	15.93	15.93



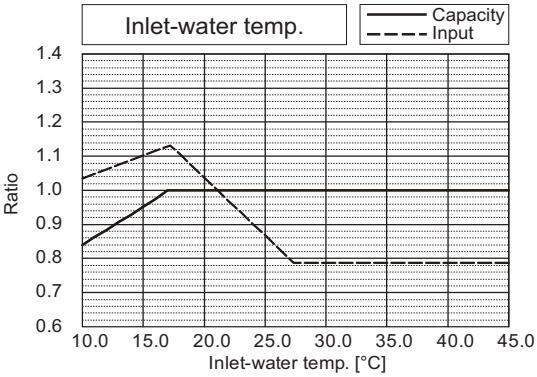


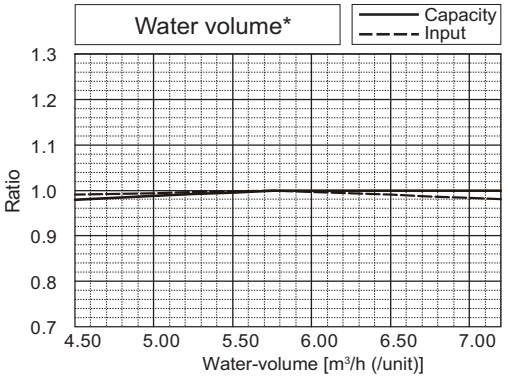


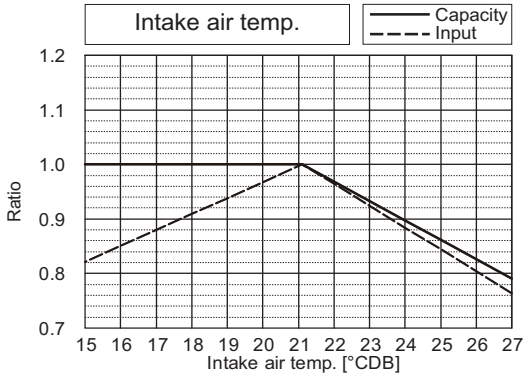


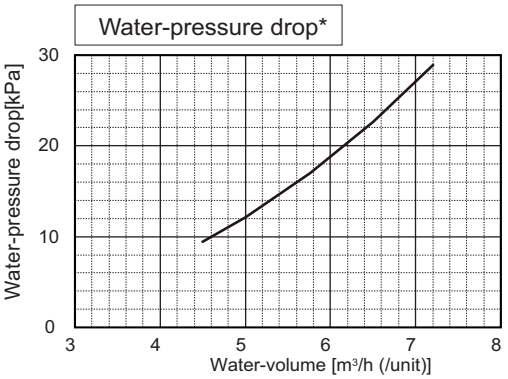
*The drawing indicates characteristic per unit.

PQRY-		P240TSHMU	P240YSHMU
Nominal Heating Capacity	kW	79.1	79.1
	BTU/h	270,000	270,000
Input	kW	15.70	15.70





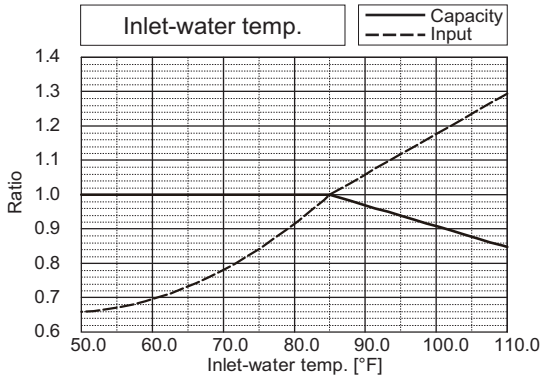


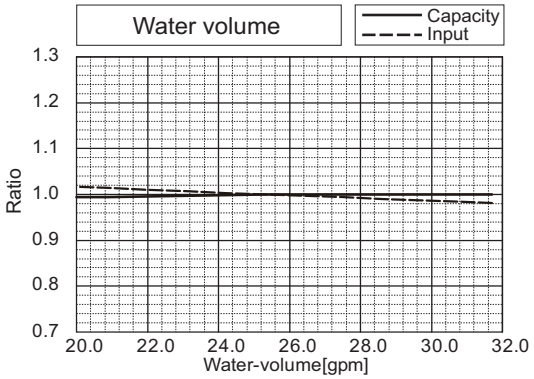


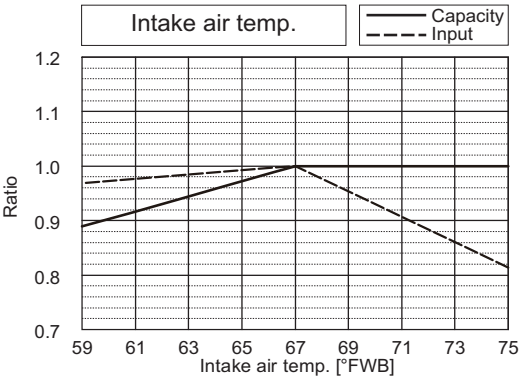
*The drawing indicates characteristic per unit.

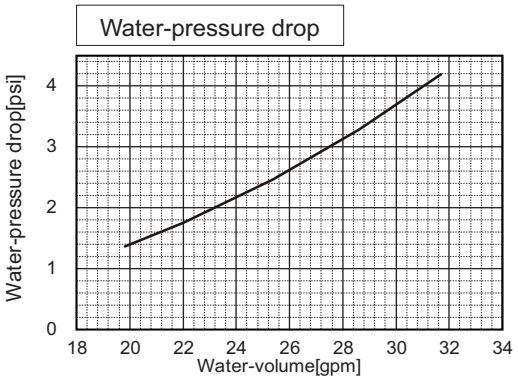
WR2

PQRY-		P72THMU	P72YHMU
Nominal Cooling Capacity	kW	21.3	21.3
	BTU/h	72,700	72,700
Input	kW	3.97	3.97

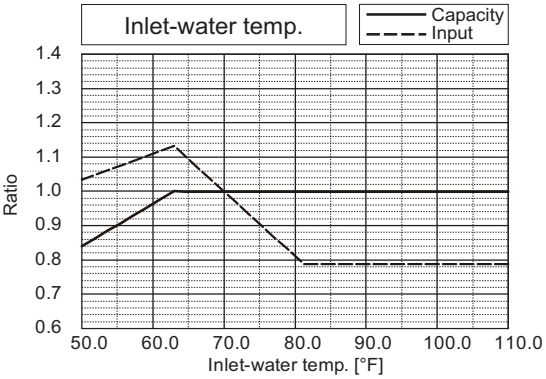


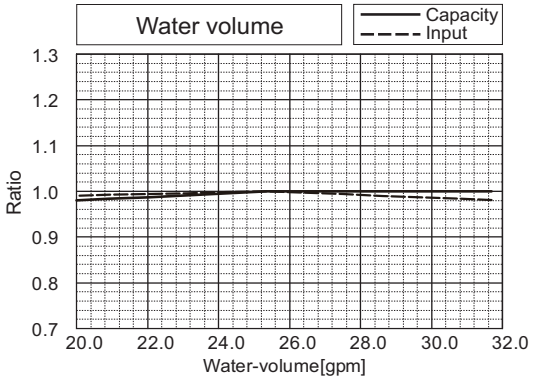


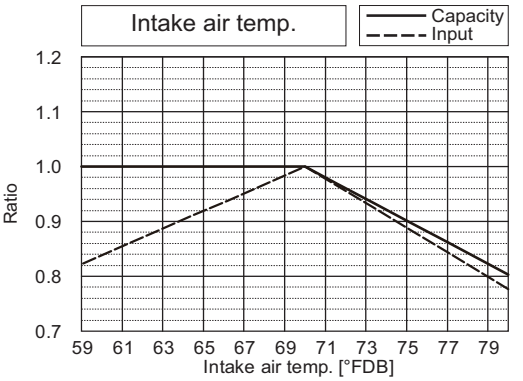


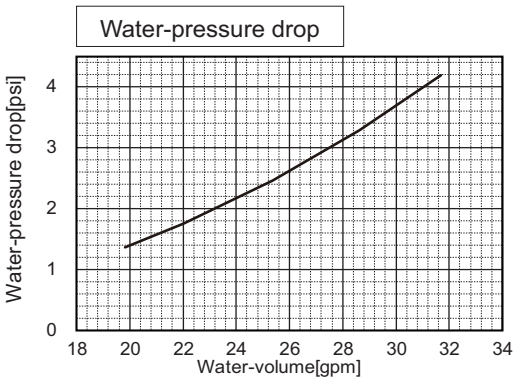


PQRY-		P72THMU	P72YHMU
Nominal Heating Capacity	kW	23.4	23.4
	BTU/h	80,000	80,000
Input	kW	3.83	3.83



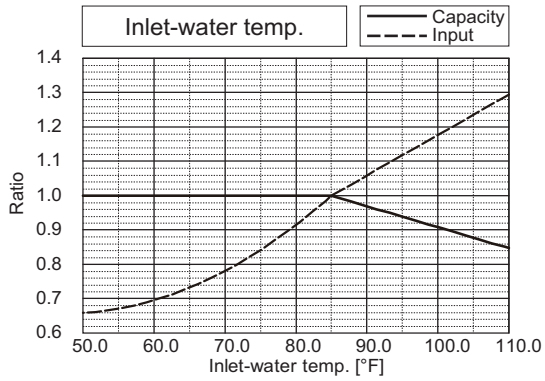


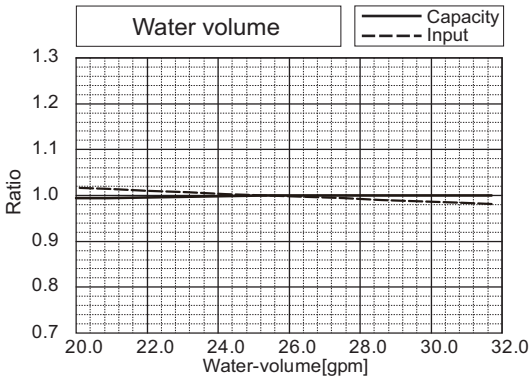


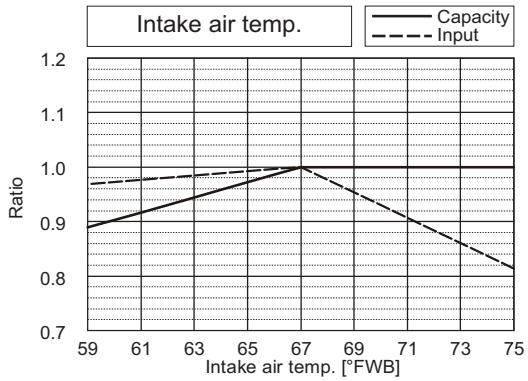


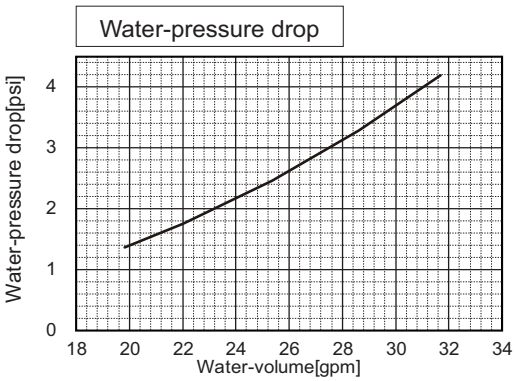
7. CAPACITY TABLES

PQRY-		P96THMU	P96YHMU
Nominal Cooling Capacity	kW	28.2	28.2
	BTU/h	96,300	96,300
Input	kW	5.77	5.77

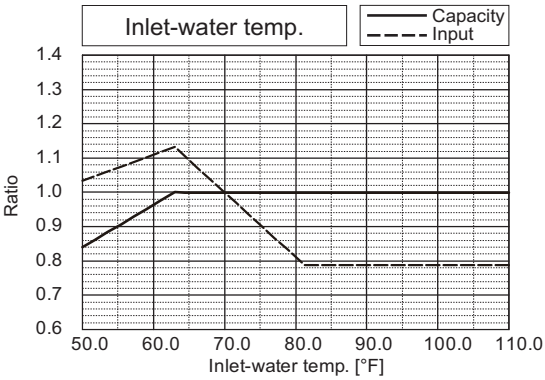


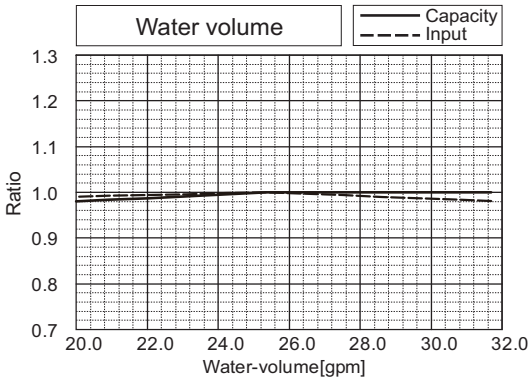


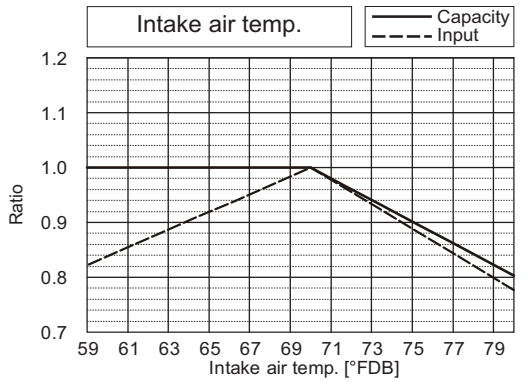


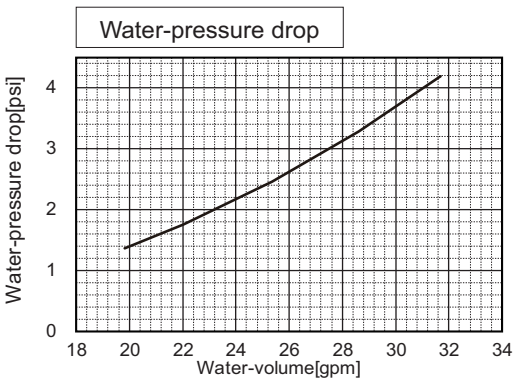


PQRY-		P96THMU	P96YHMU
Nominal Heating Capacity	kW	31.7	31.7
	BTU/h	108,000	108,000
Input	kW	6.18	6.18





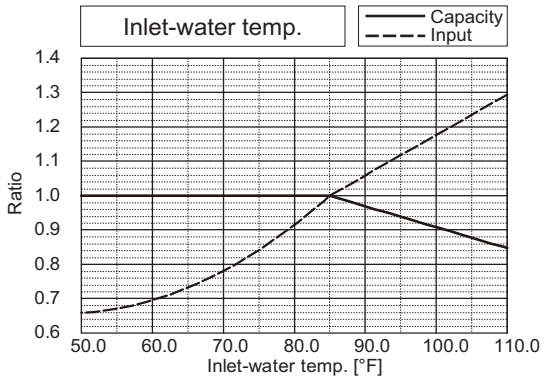


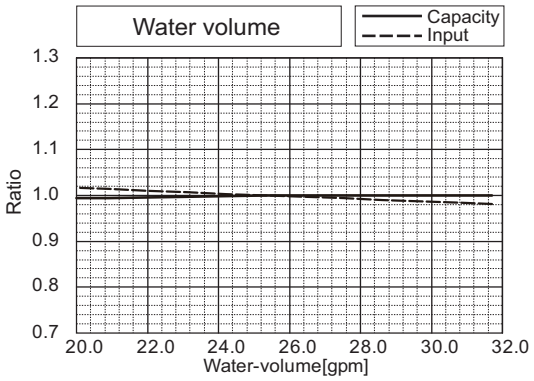


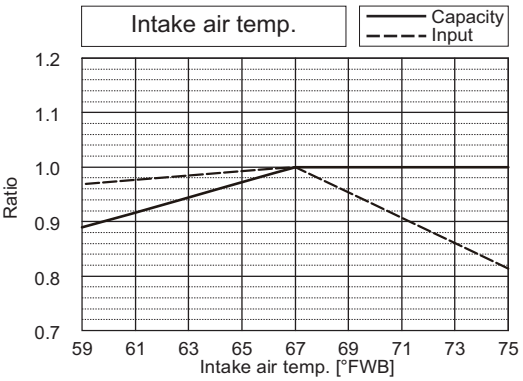
WR2

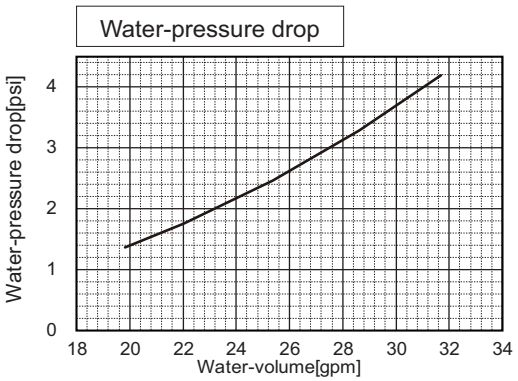
7. CAPACITY TABLES

PQRY-		P120THMU	P120YHMU
Nominal Cooling Capacity	kW	35.2	35.2
	BTU/h	120,000	120,000
Input	kW	7.73	7.73

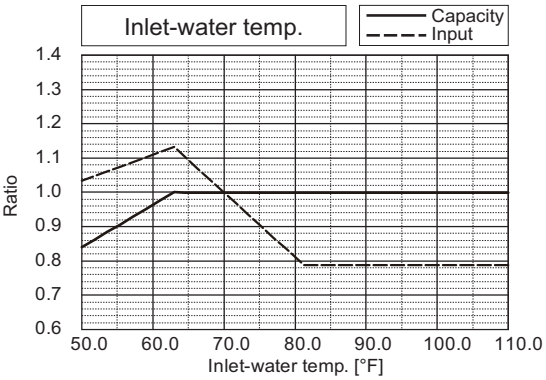


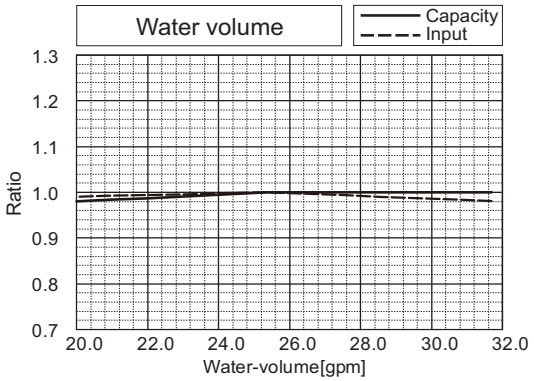


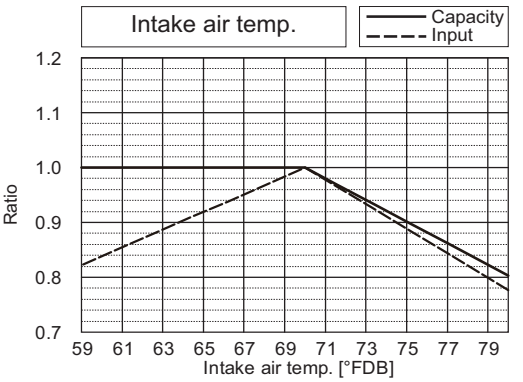


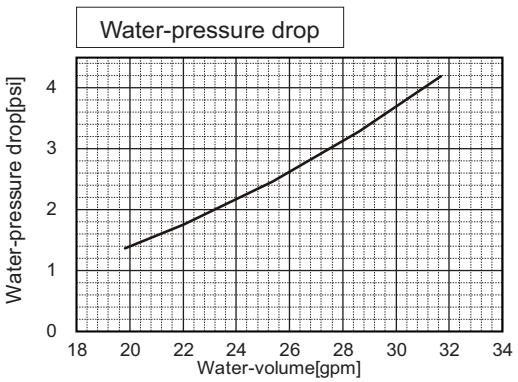


PQRY-		P120THMU	P120YHMU
Nominal Heating Capacity	kW	39.6	39.6
	BTU/h	135,000	135,000
Input	kW	7.62	7.62

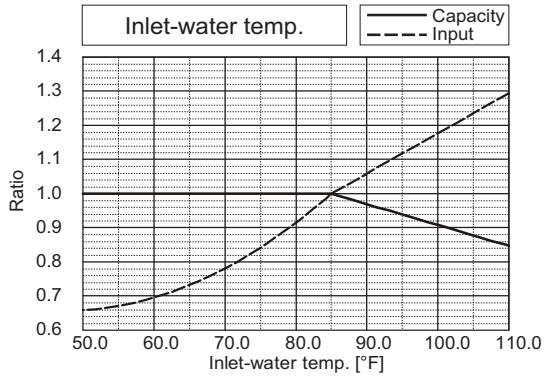


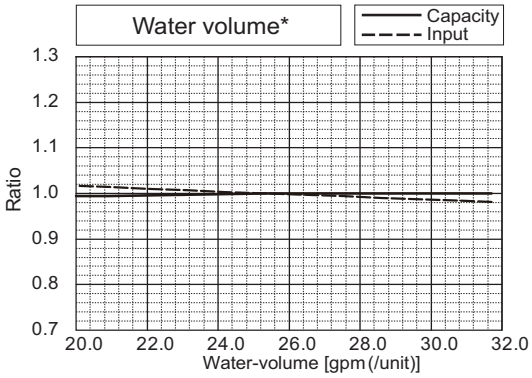


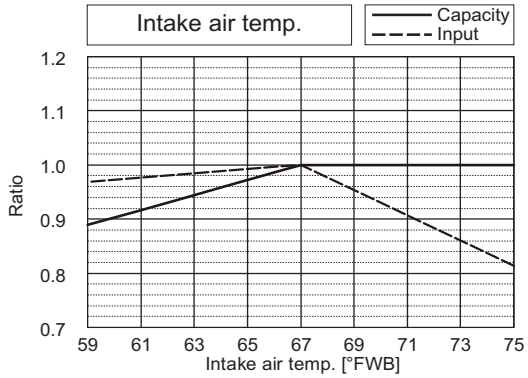


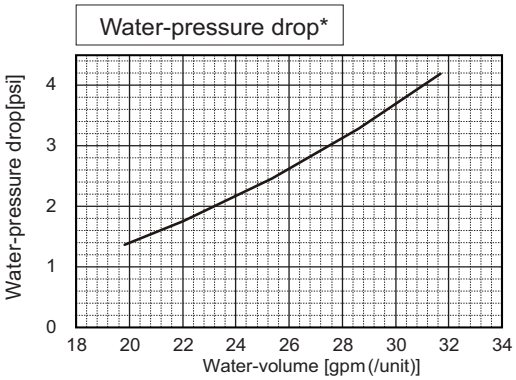


PQRY-		P144TSHMU	P144YSHMU
Nominal Cooling Capacity	kW	42.6	42.6
	BTU/h	145,400	145,400
Input	kW	8.18	8.18



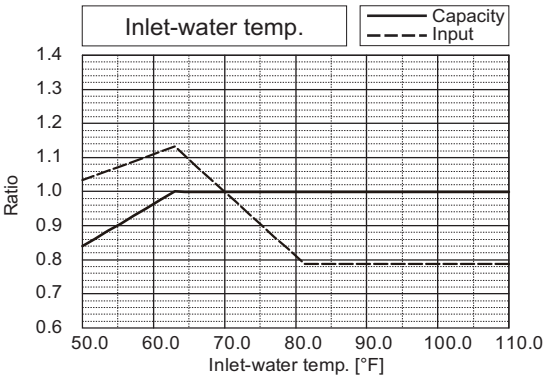


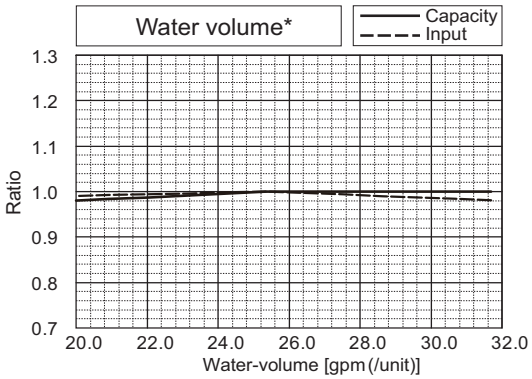


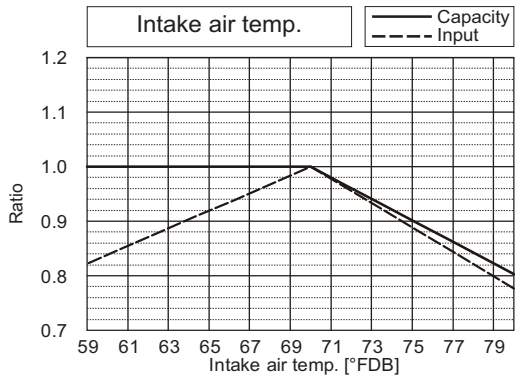


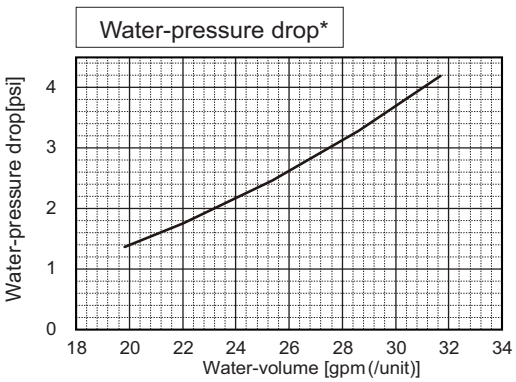
*The drawing indicates characteristic per unit.

PQRY-		P144TSHMU	P144YSHMU
Nominal Heating Capacity	kW	46.9	46.9
	BTU/h	160,000	160,000
Input	kW	7.89	7.89







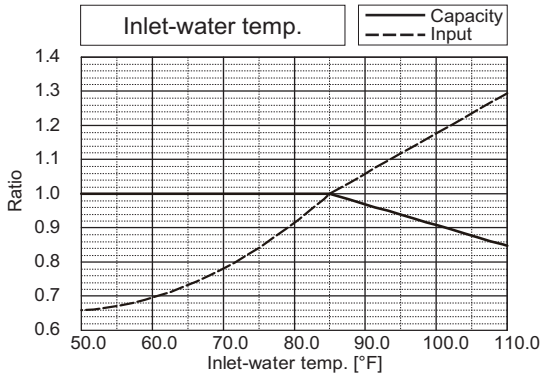


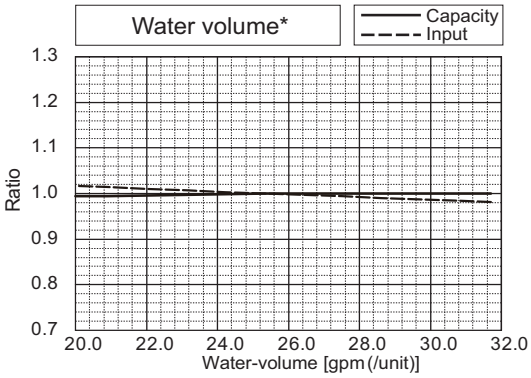
*The drawing indicates characteristic per unit.

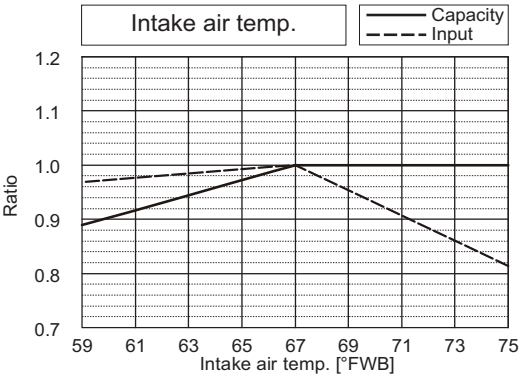
WR2

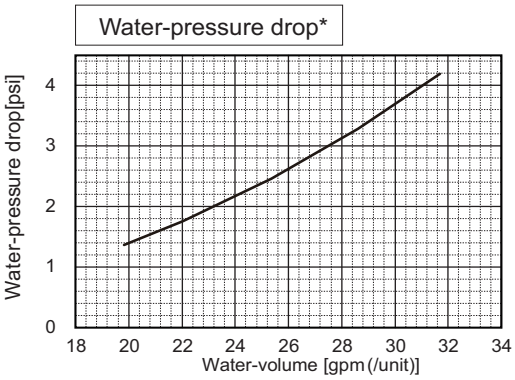
7. CAPACITY TABLES

PQRY-		P168TSHMU	P168YSHMU
Nominal Cooling Capacity	kW	49.6	49.6
	BTU/h	169,100	169,100
Input	kW	10.02	10.02



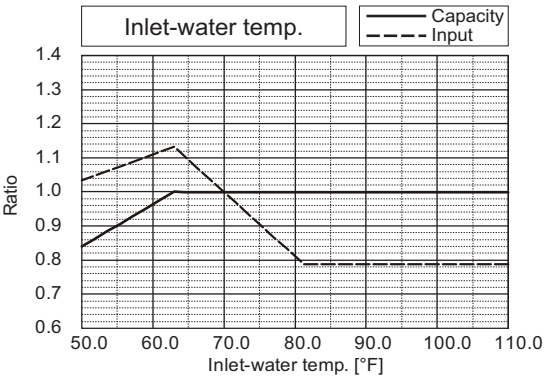


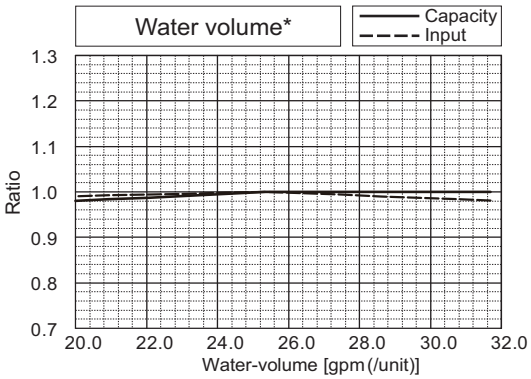


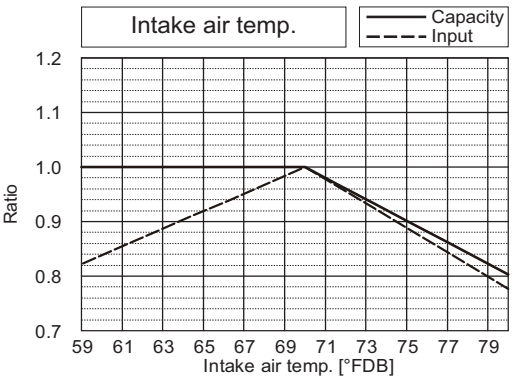


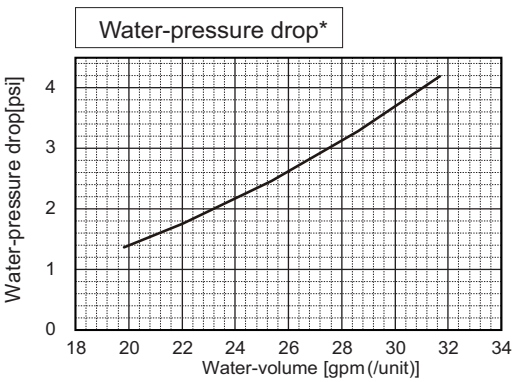
*The drawing indicates characteristic per unit.

PQRY-		P168TSHMU	P168YSHMU
Nominal Heating Capacity	kW	55.1	55.1
	BTU/h	188,000	188,000
Input	kW	10.32	10.32



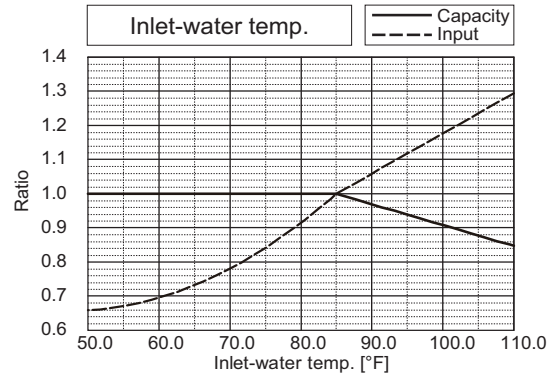


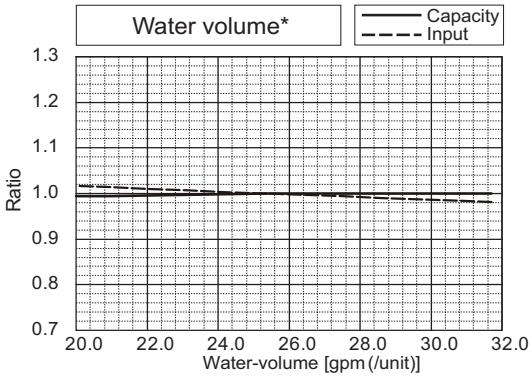


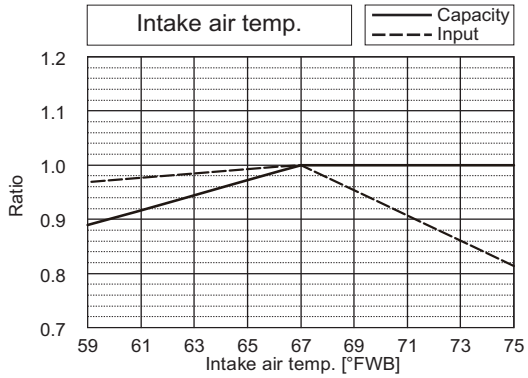


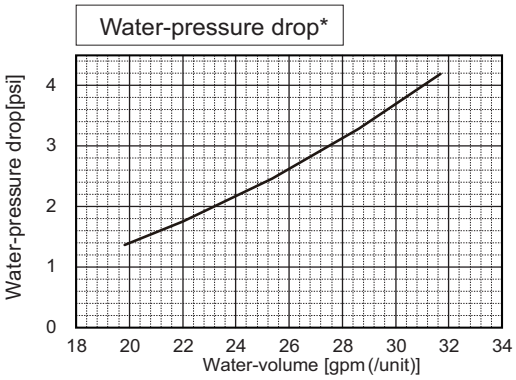
*The drawing indicates characteristic per unit.

PQRY-		P192TSHMU	P192YSHMU
Nominal Cooling Capacity	kW	56.4	56.4
	BTU/h	192,600	192,600
Input	kW	11.89	11.89



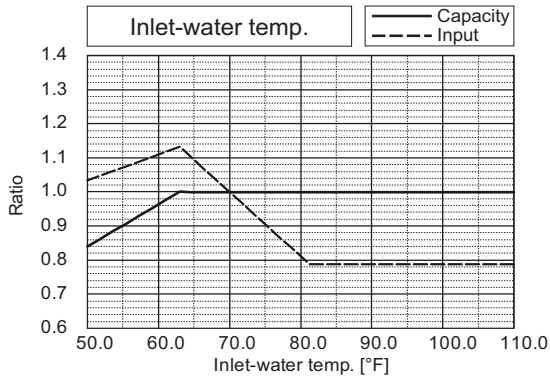


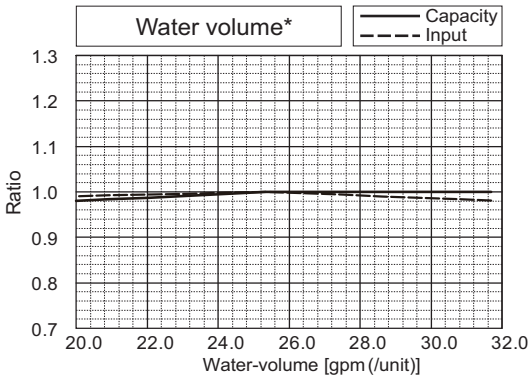


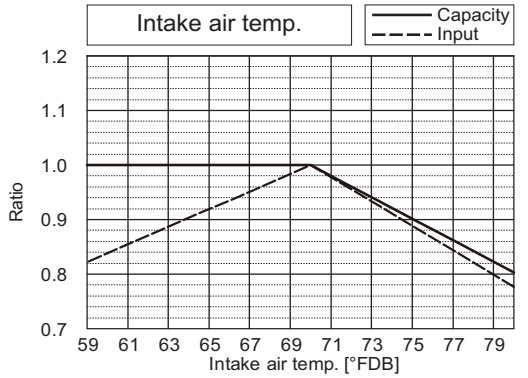


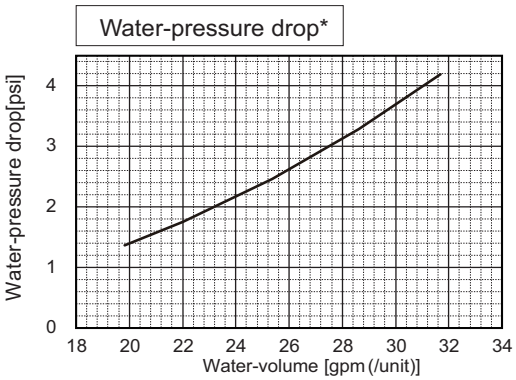
*The drawing indicates characteristic per unit.

PQRY-		P192TSHMU	P192YSHMU
Nominal Heating Capacity	kW	63.3	63.3
	BTU/h	216,000	216,000
Input	kW	12.74	12.74





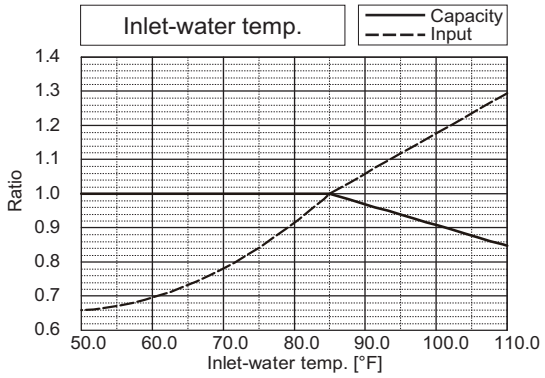


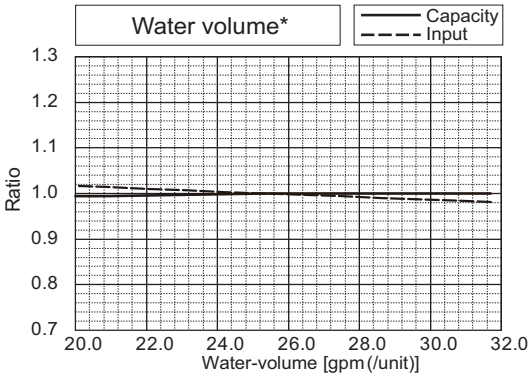


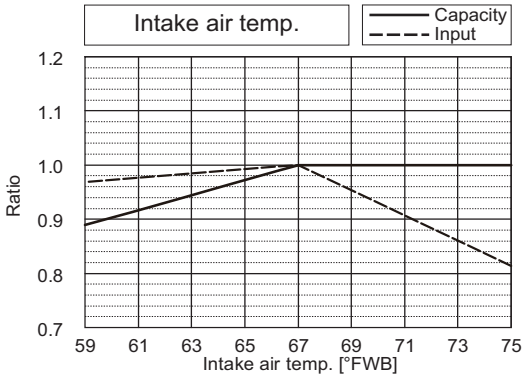
*The drawing indicates characteristic per unit.

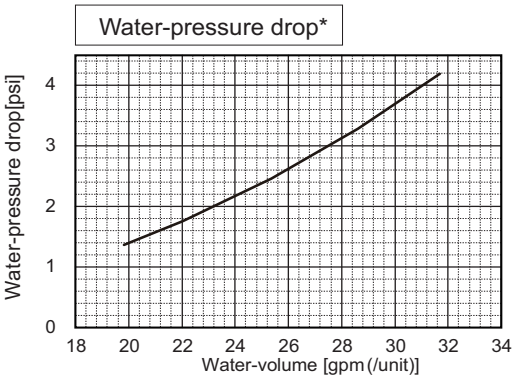
WR2

PQRY-		P216TSHMU	P216YSHMU
Nominal Cooling Capacity	kW	63.3	63.3
	BTU/h	216,000	216,000
Input	kW	13.90	13.90



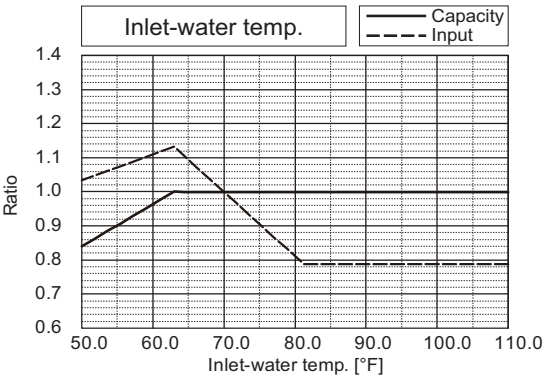


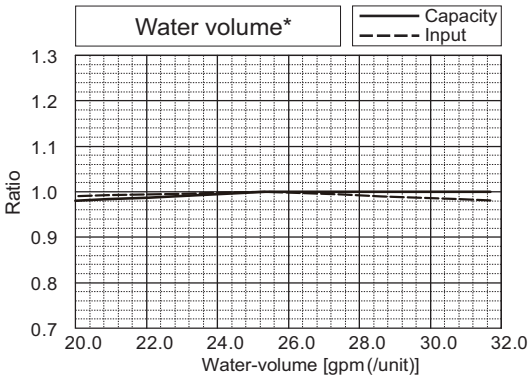


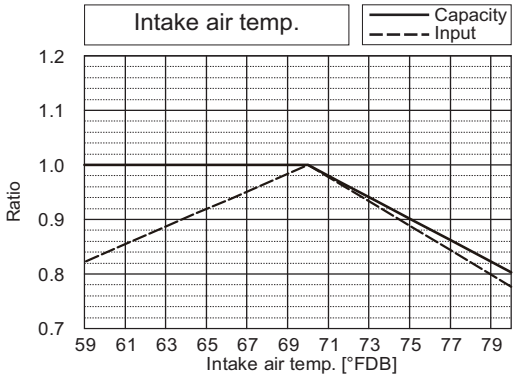


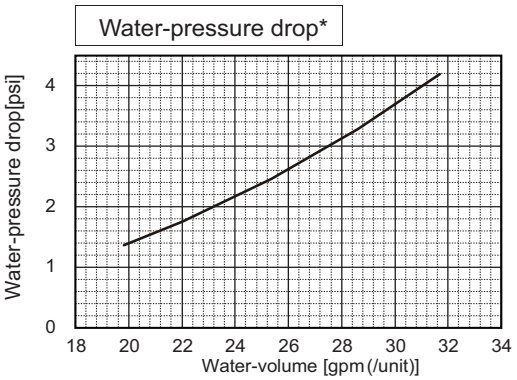
*The drawing indicates characteristic per unit.

PQRY-		P216TSHMU	P216YSHMU
Nominal Heating Capacity	kW	71.2	71.2
	BTU/h	243,000	243,000
Input	kW	14.22	14.22



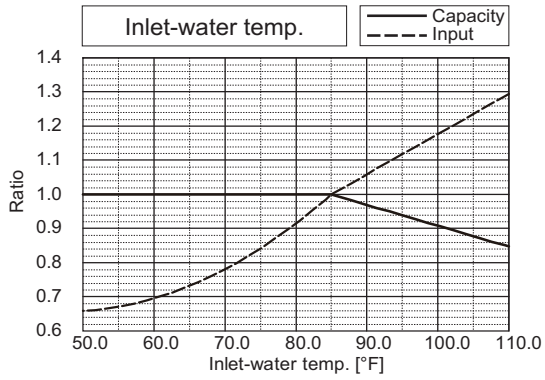


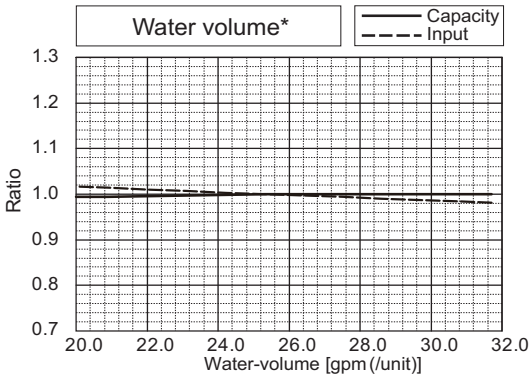


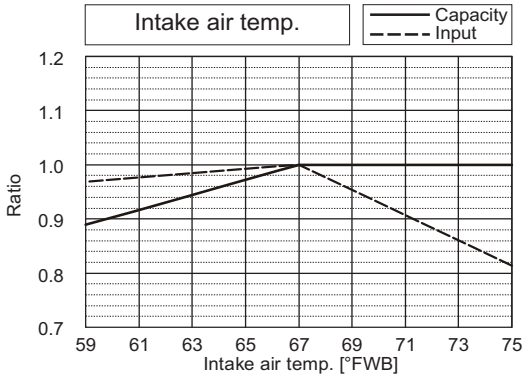


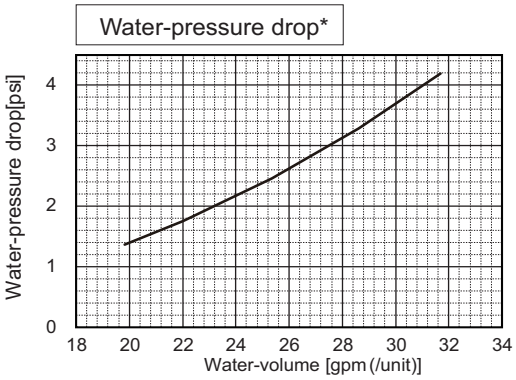
*The drawing indicates characteristic per unit.

PQRY-		P240TSHMU	P240YSHMU
Nominal Cooling Capacity	kW	70.3	70.3
	BTU/h	240,000	240,000
Input	kW	15.93	15.93



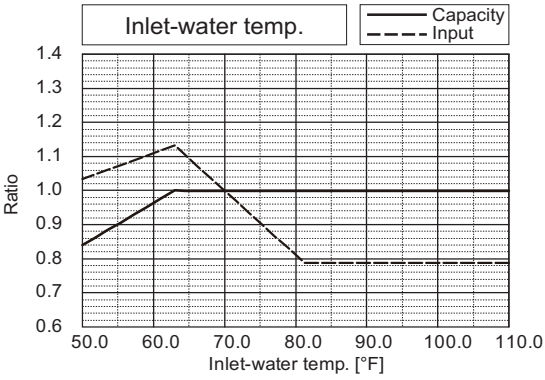


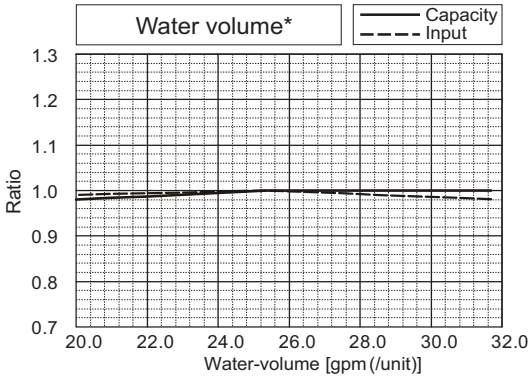


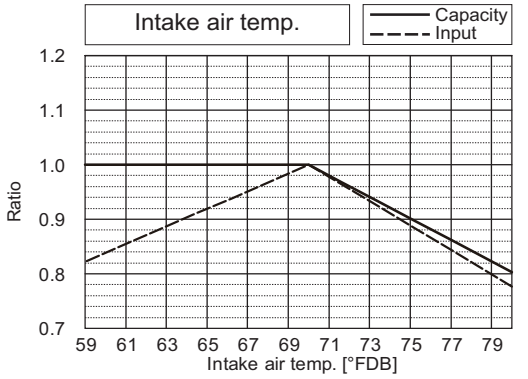


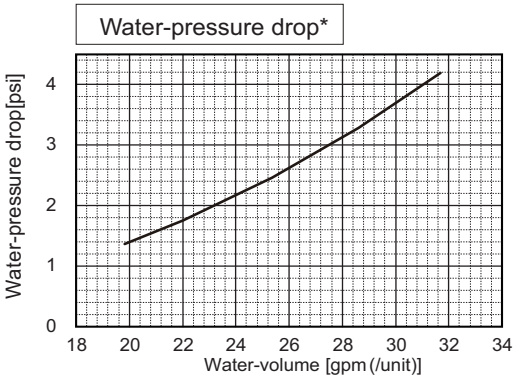
*The drawing indicates characteristic per unit.

PQRY-		P240TSHMU	P240YSHMU
Nominal Heating Capacity	kW	79.1	79.1
	BTU/h	270,000	270,000
Input	kW	15.70	15.70









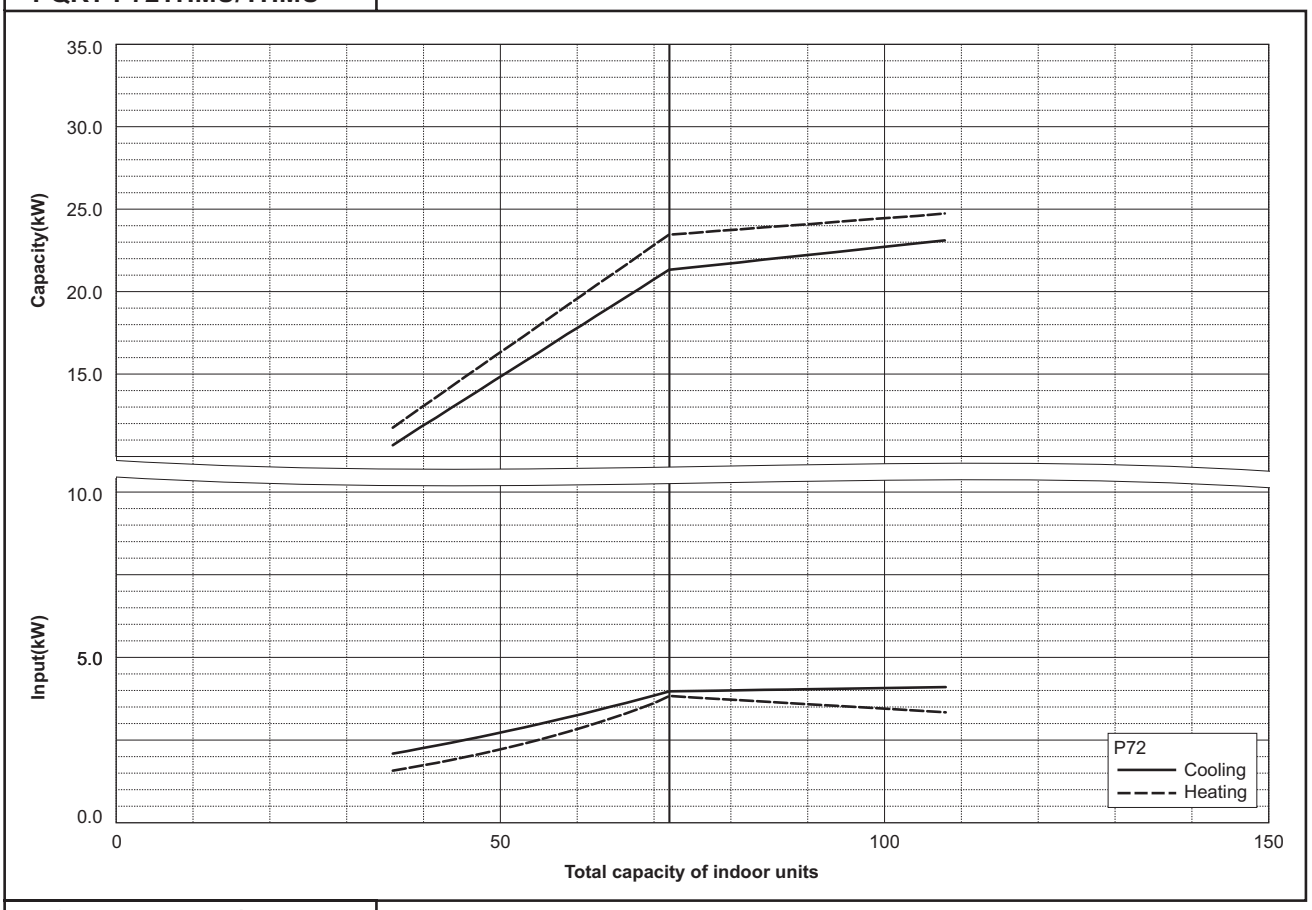
*The drawing indicates characteristic per unit.

WR2

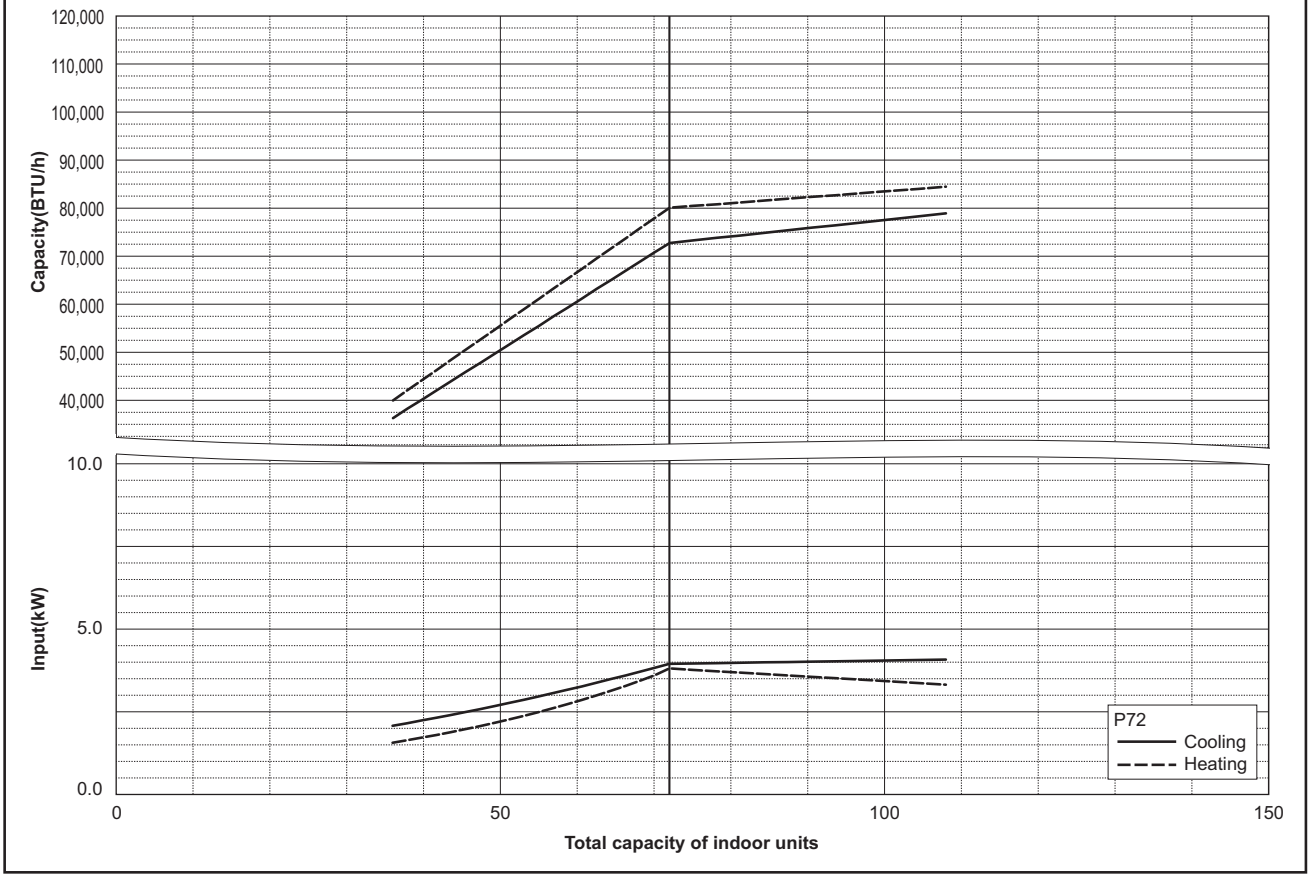
7-2. Correction by total indoor

CITY MULTI system have different capacities and inputs when many combinations of indoor units with different total capacities are connected. Using following tables, the maximum capacity can be found to ensure the system is installed with enough capacity for a particular application.

PQRY-P72THMU/YHMU

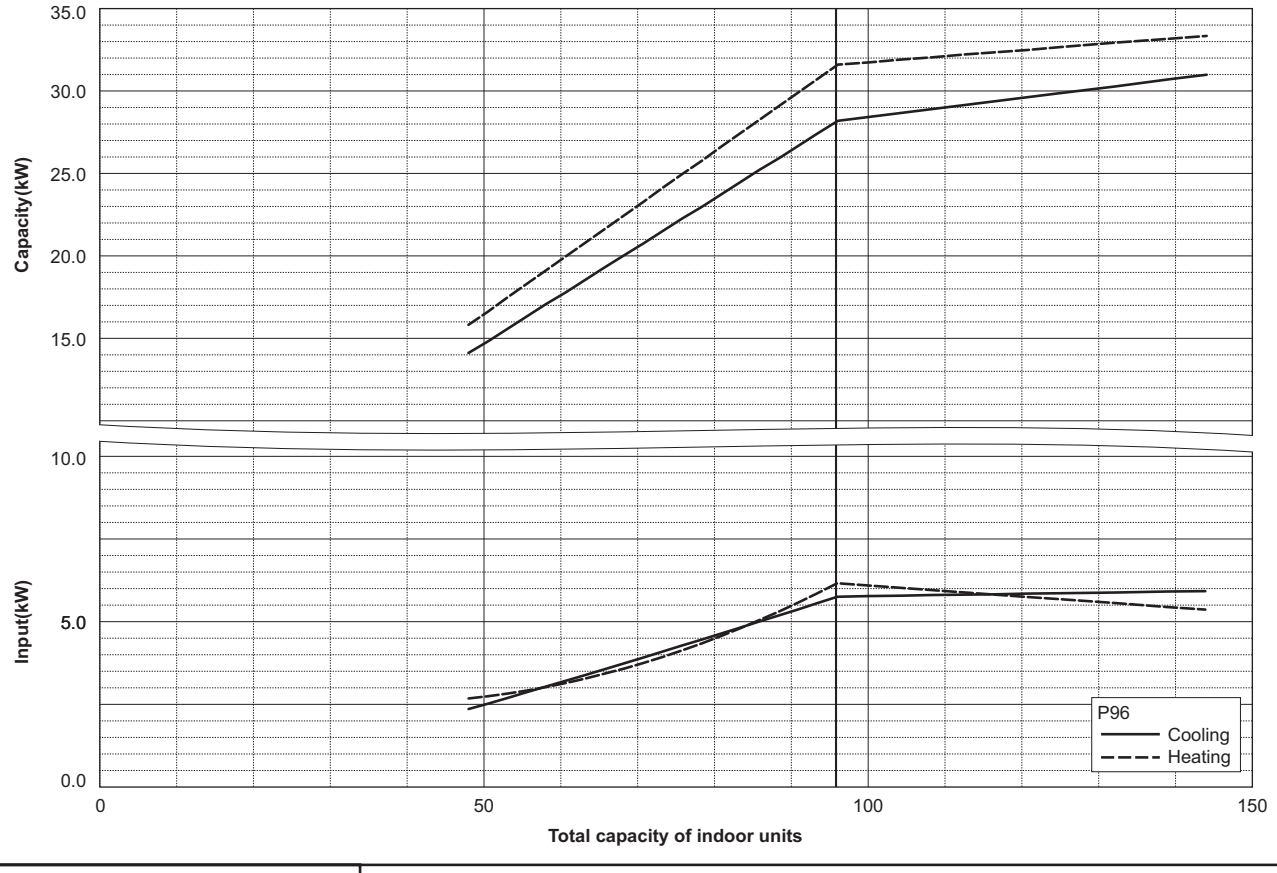


PQRY-P72THMU/YHMU

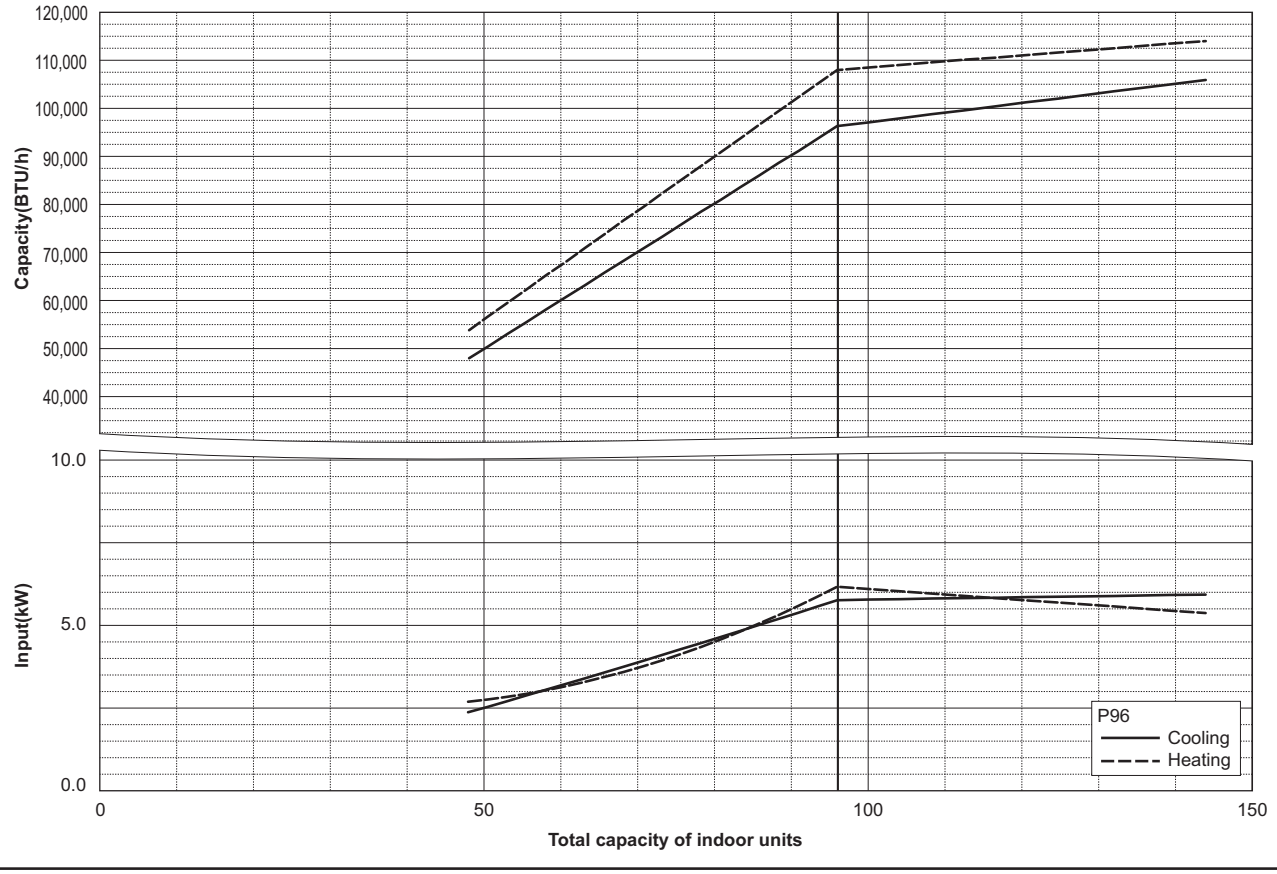


WR2

PQRY-P96THMU/YHMU

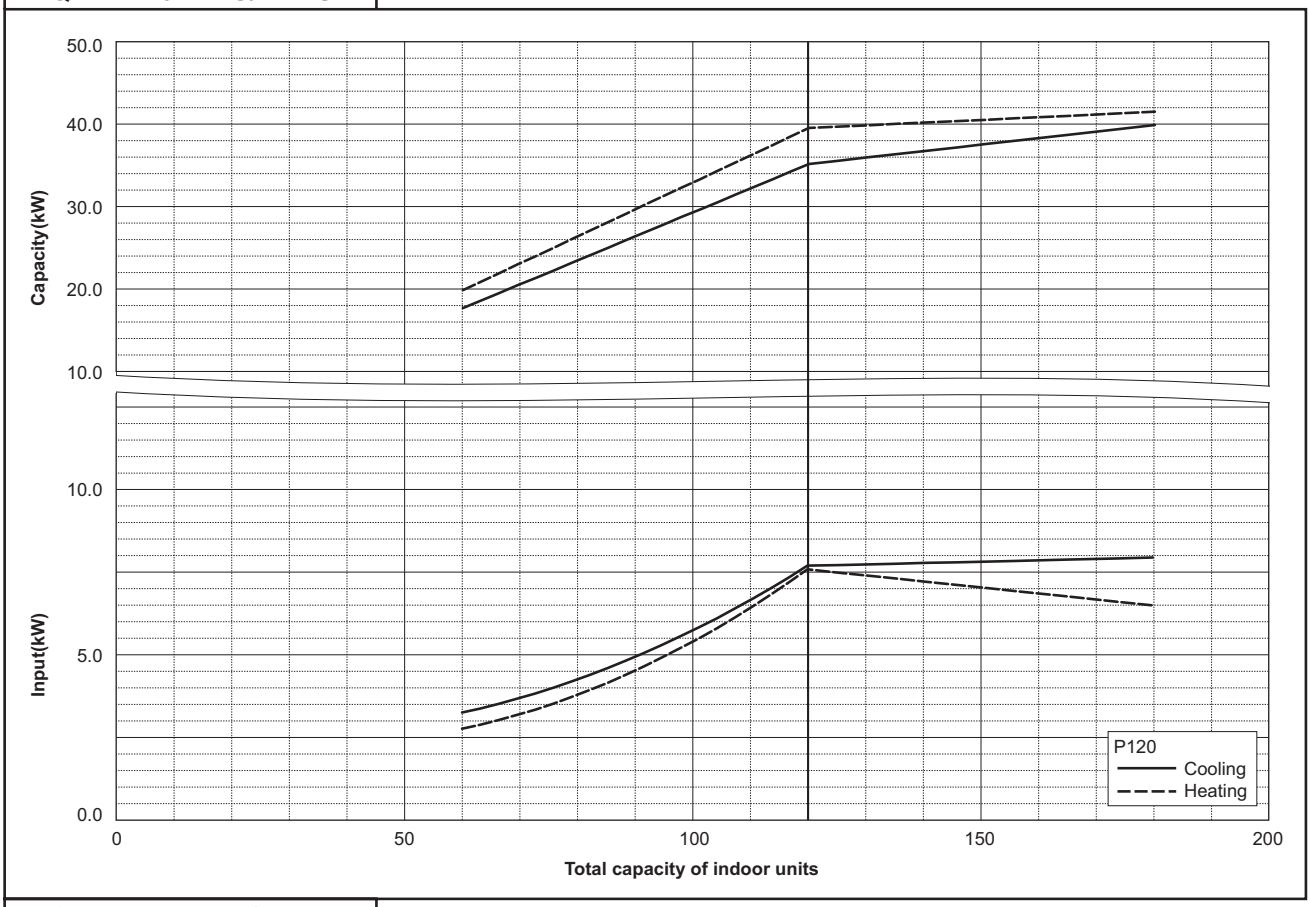


PQRY-P96THMU/YHMU

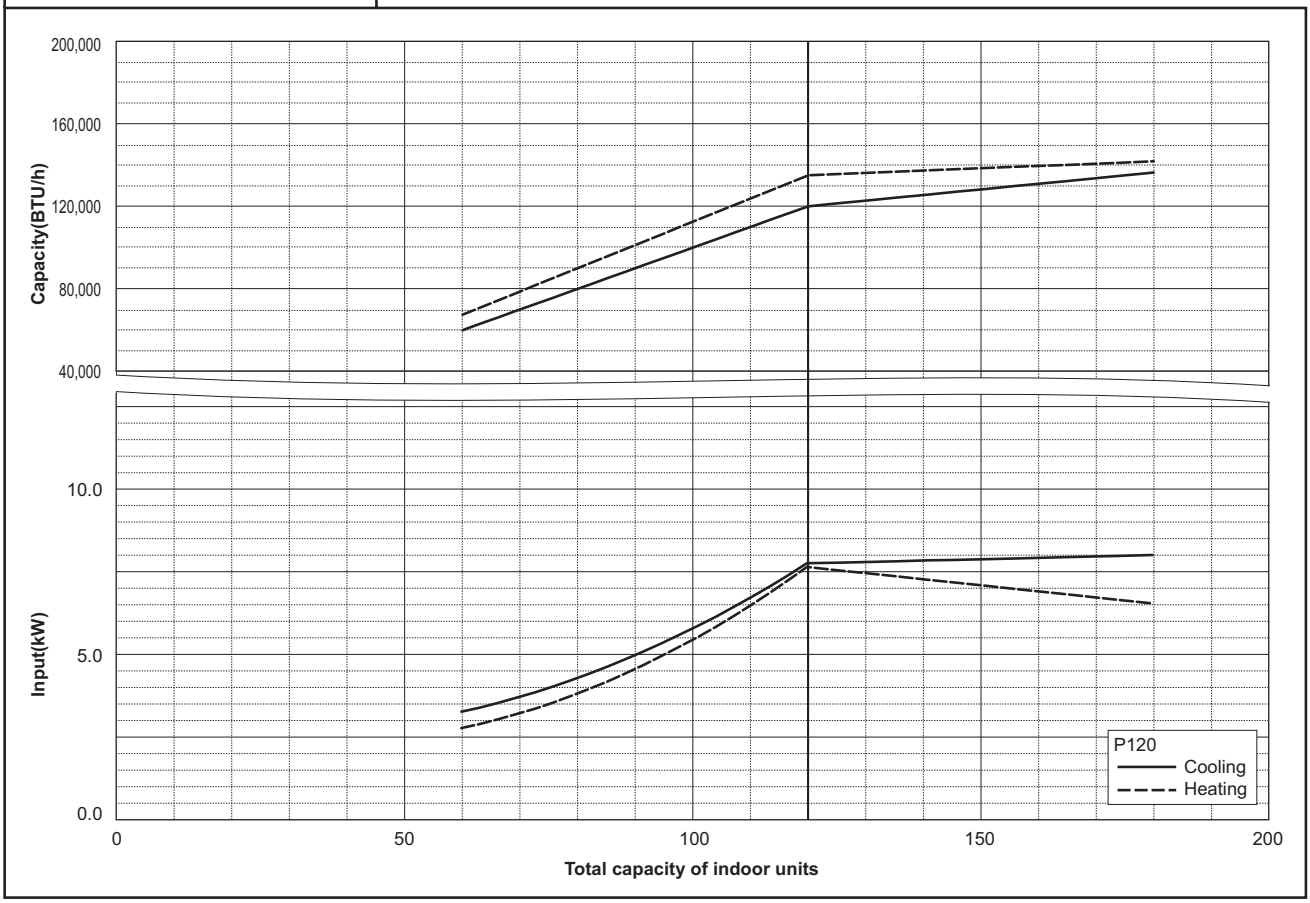


WR2

PQRY-P120THMU/YHMU

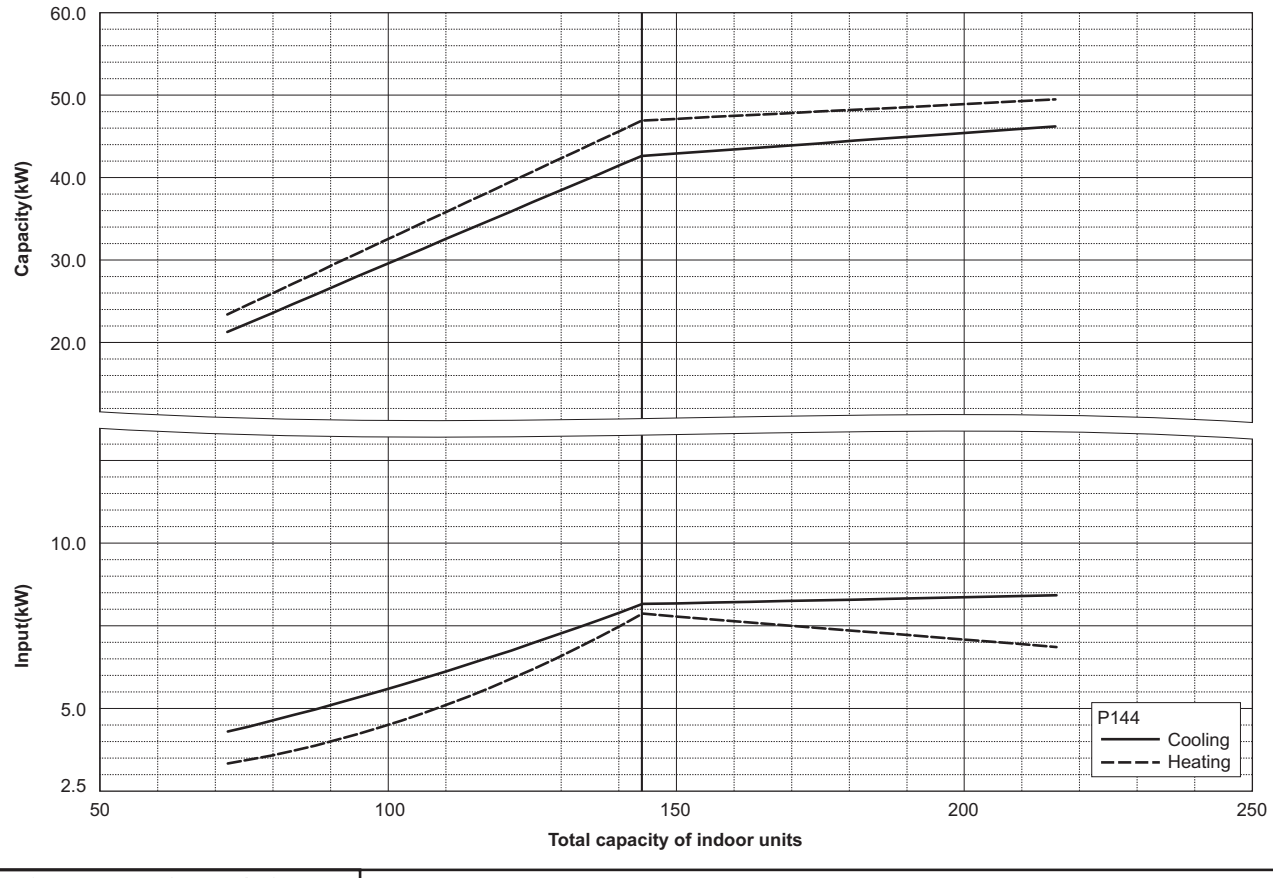


PQRY-P120THMU/YHMU

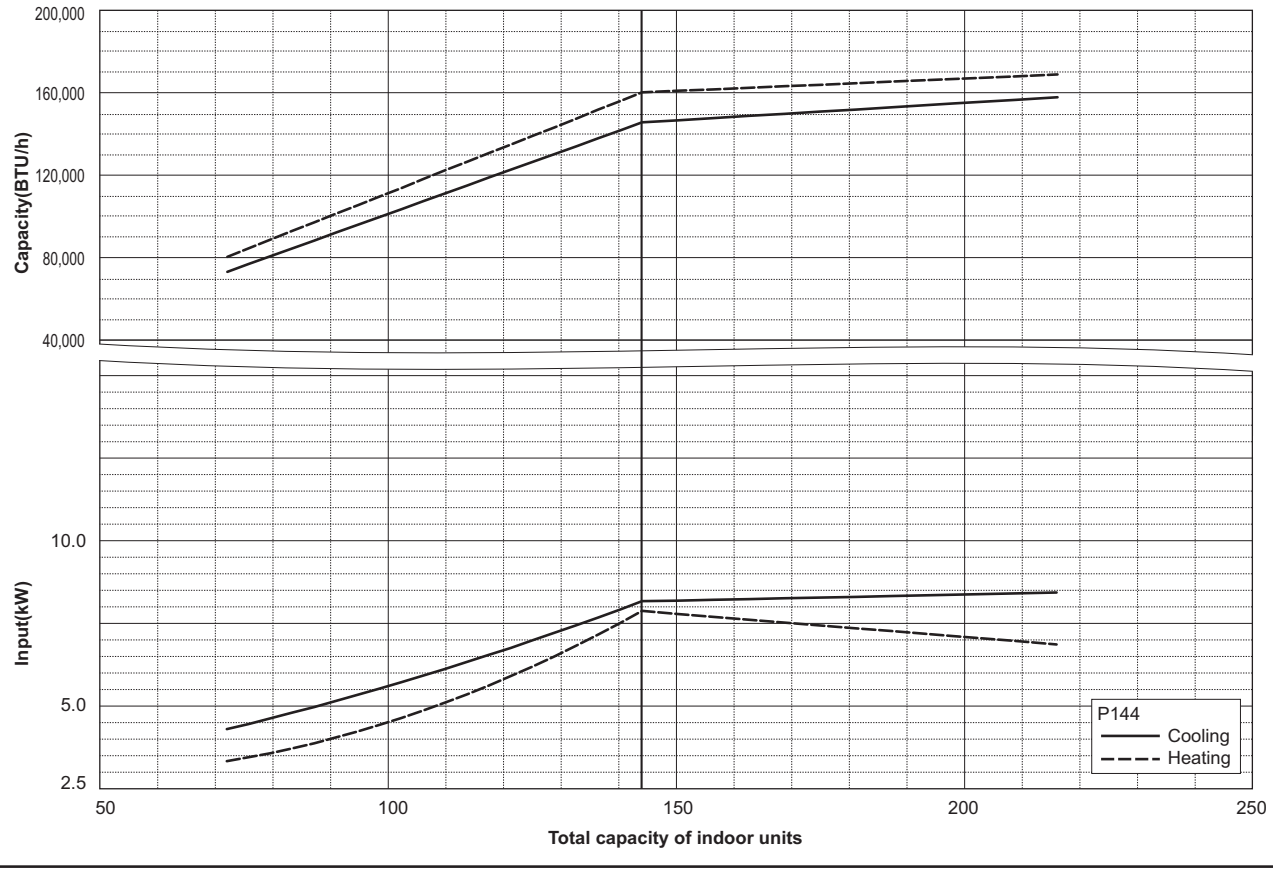


WR2

PQRY-P144TSHMU/YSHMU

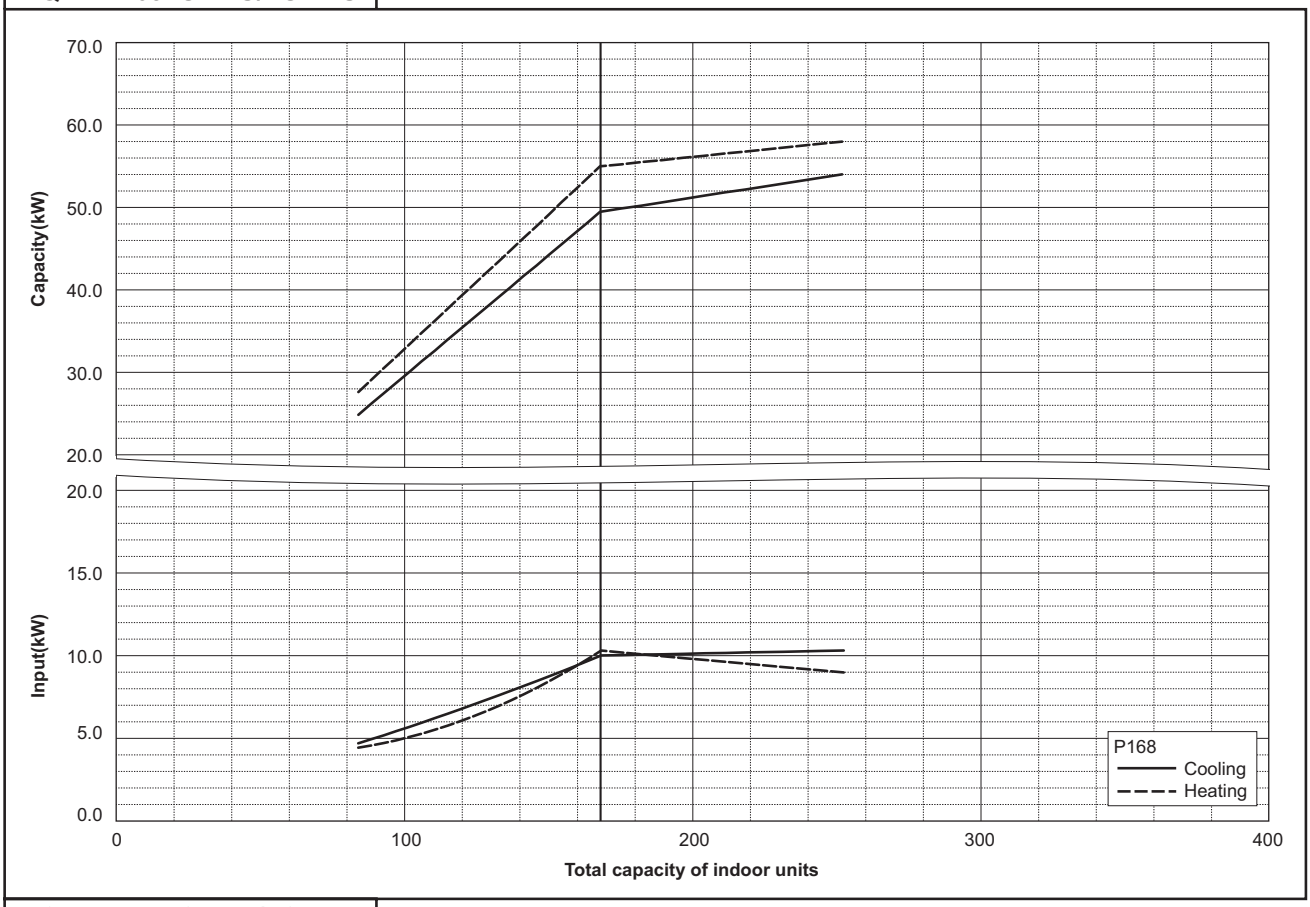


PQRY-P144TSHMU/YSHMU



WR2

PQRY-P168TSHMU/YSHMU



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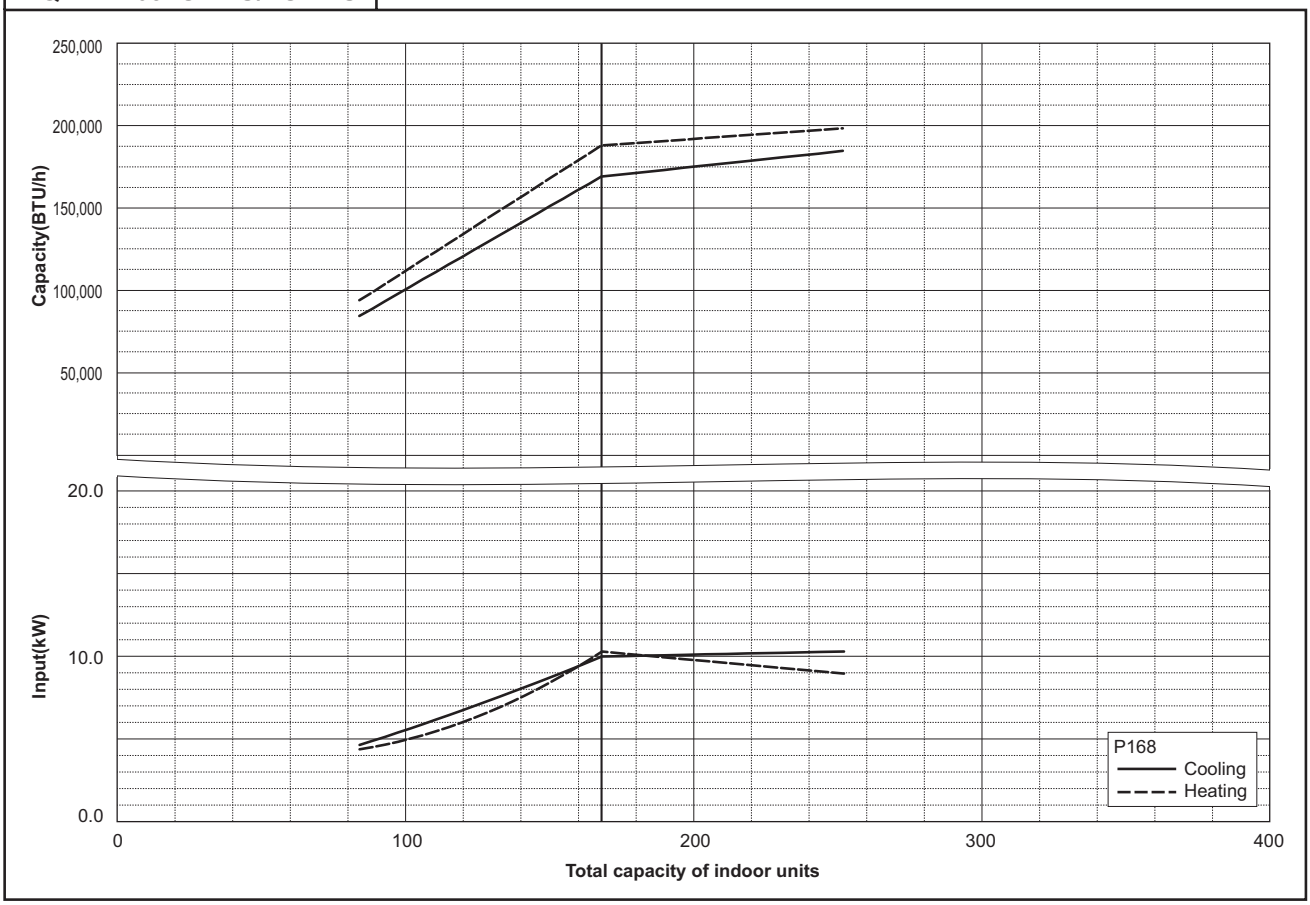
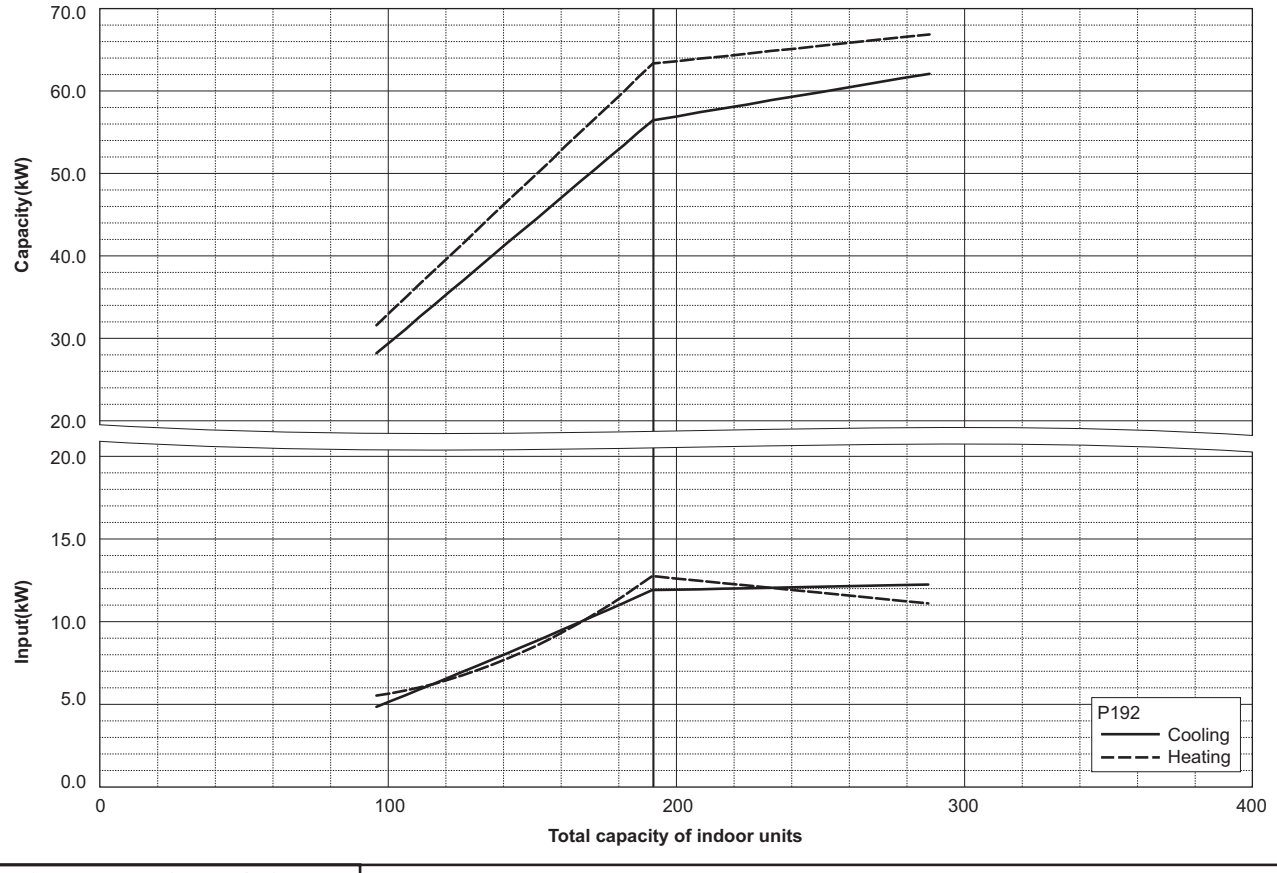
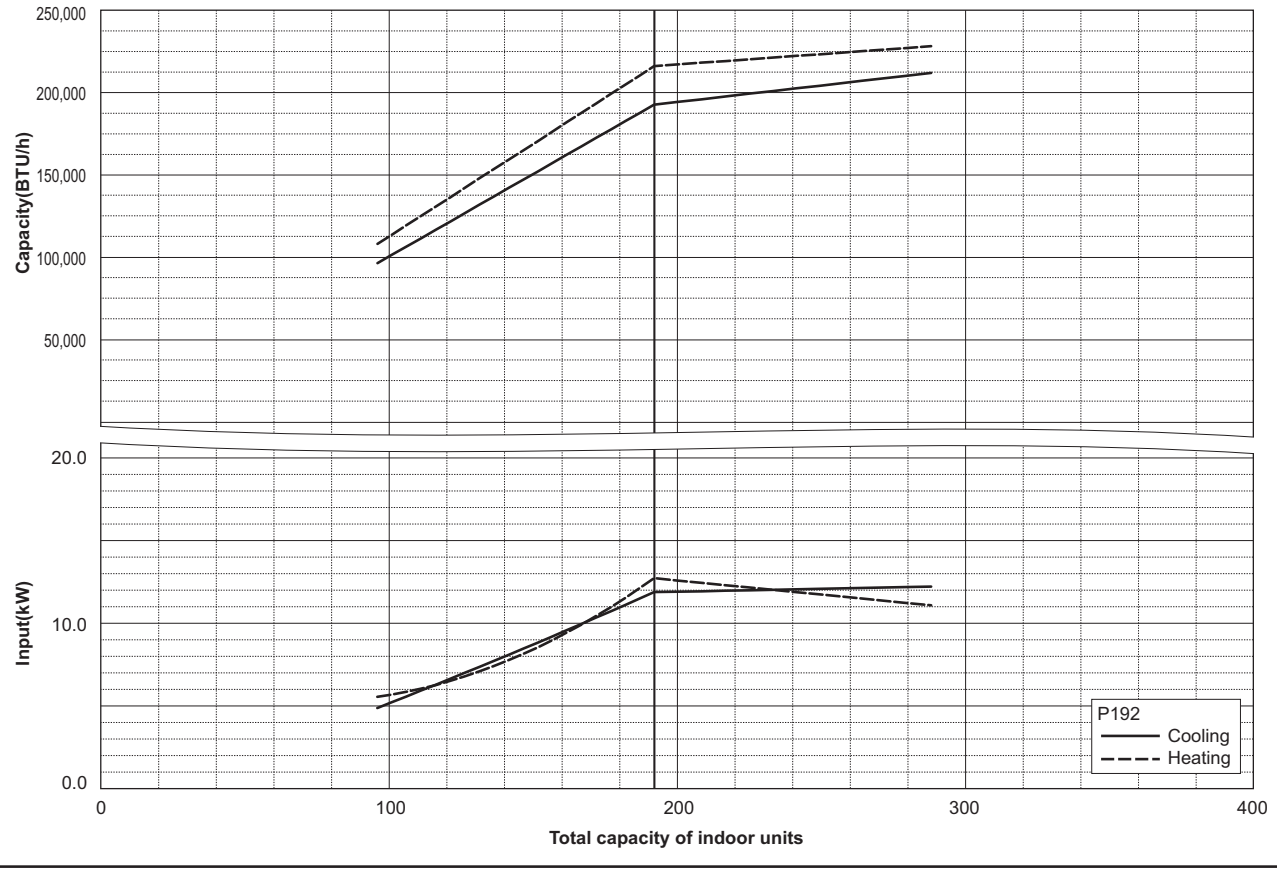


WR2

PQRY-P192TSHMU/YSHMU

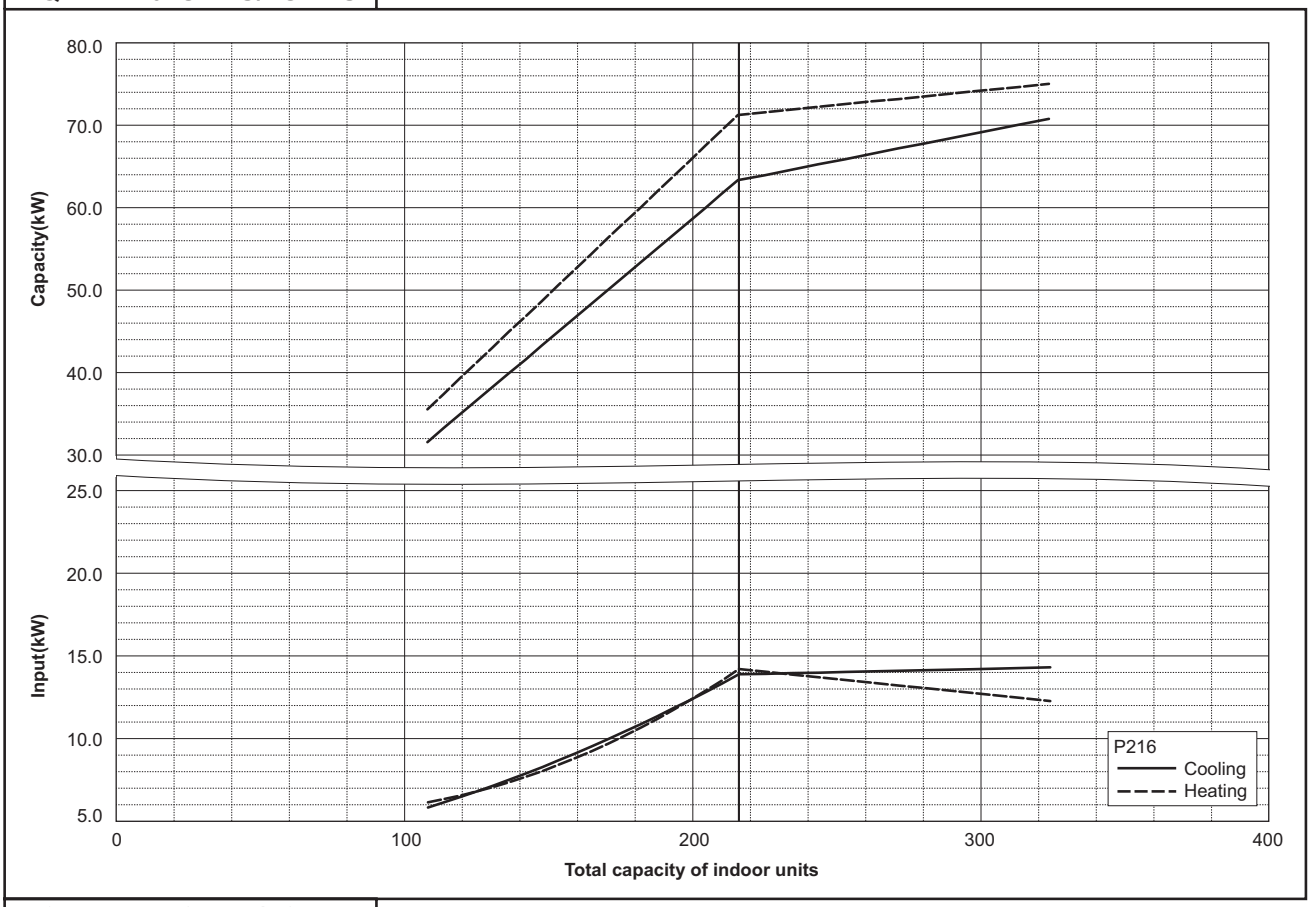


PQRY-P192TSHMU/YSHMU

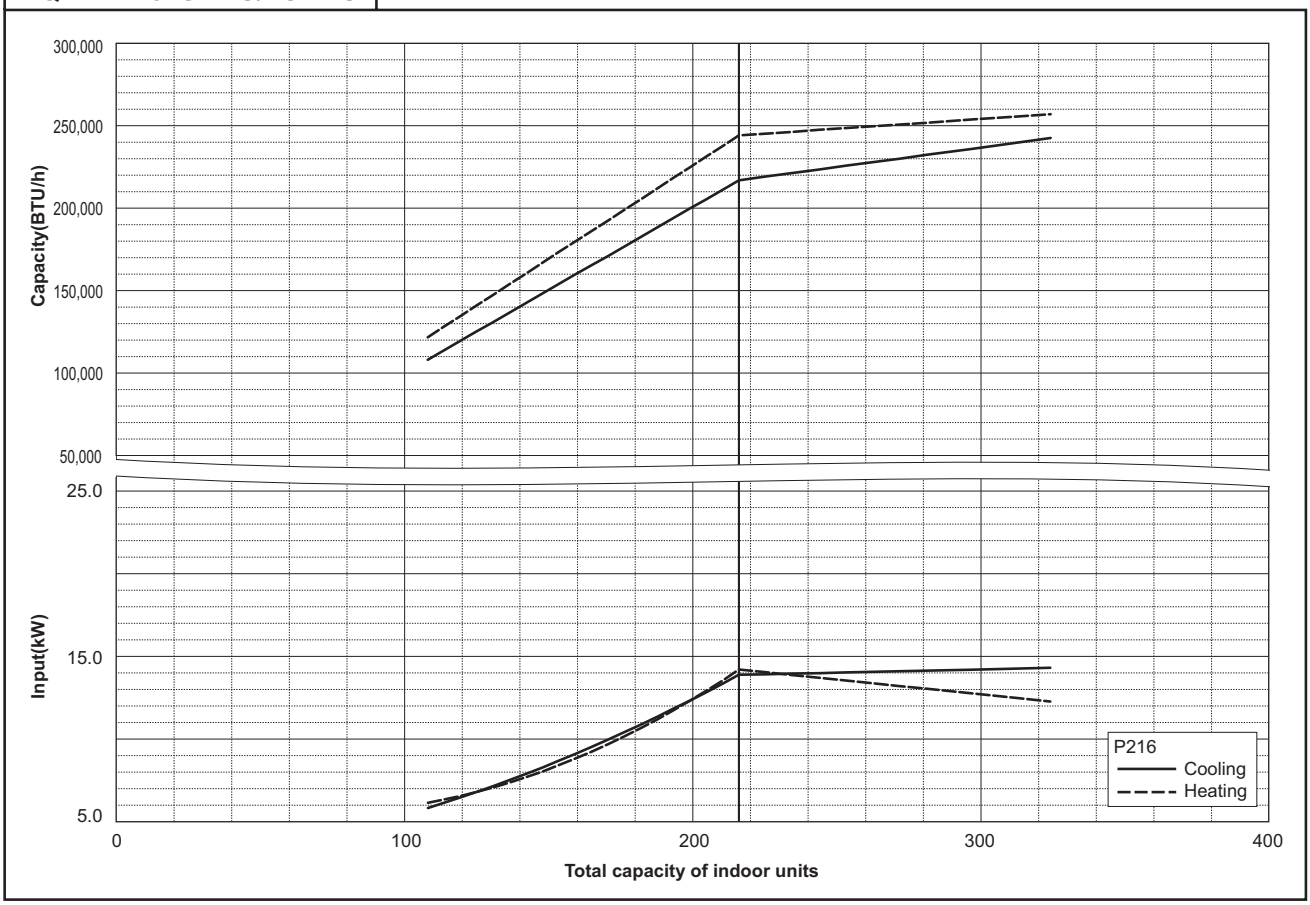


WR2

PQRY-P216TSHMU/YSHMU

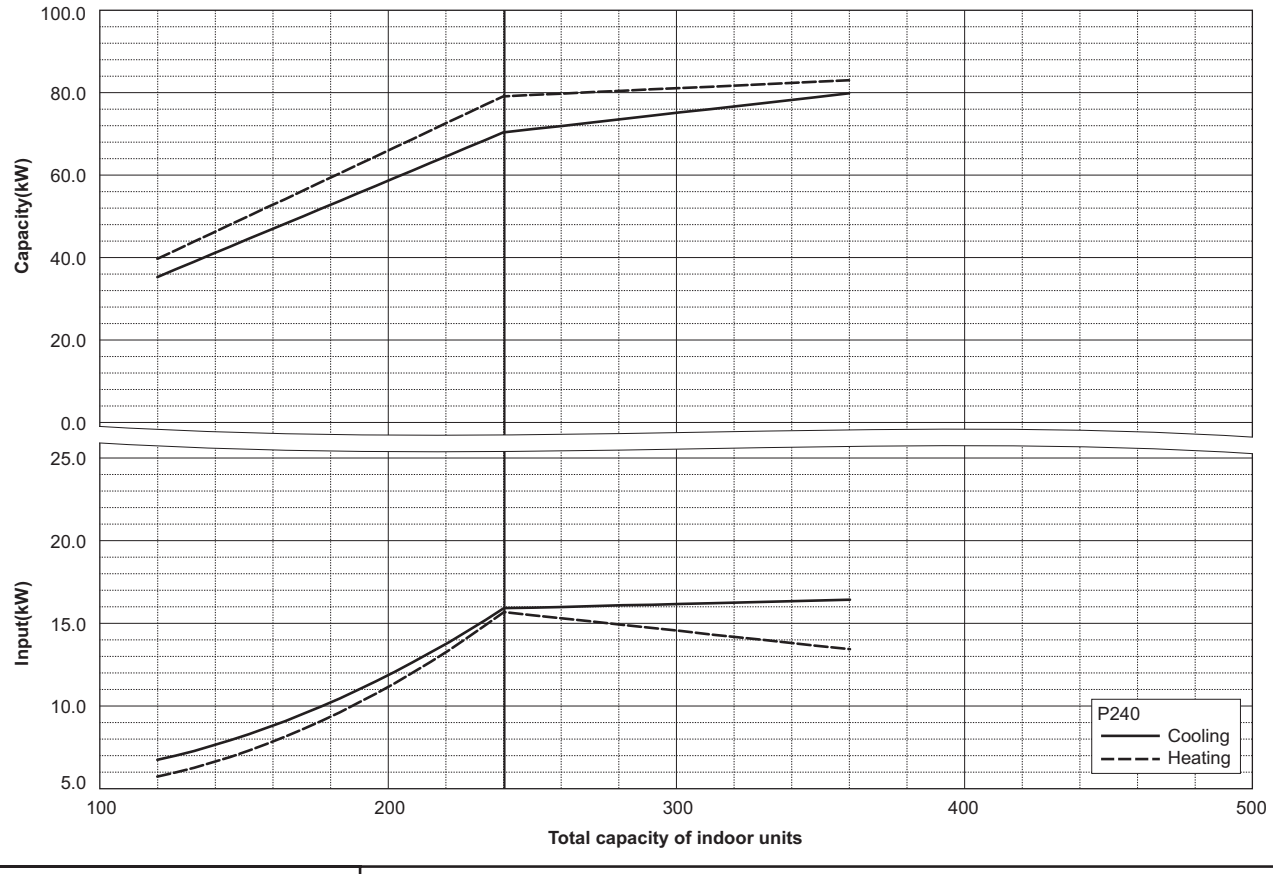


PQRY-P216TSHMU/YSHMU

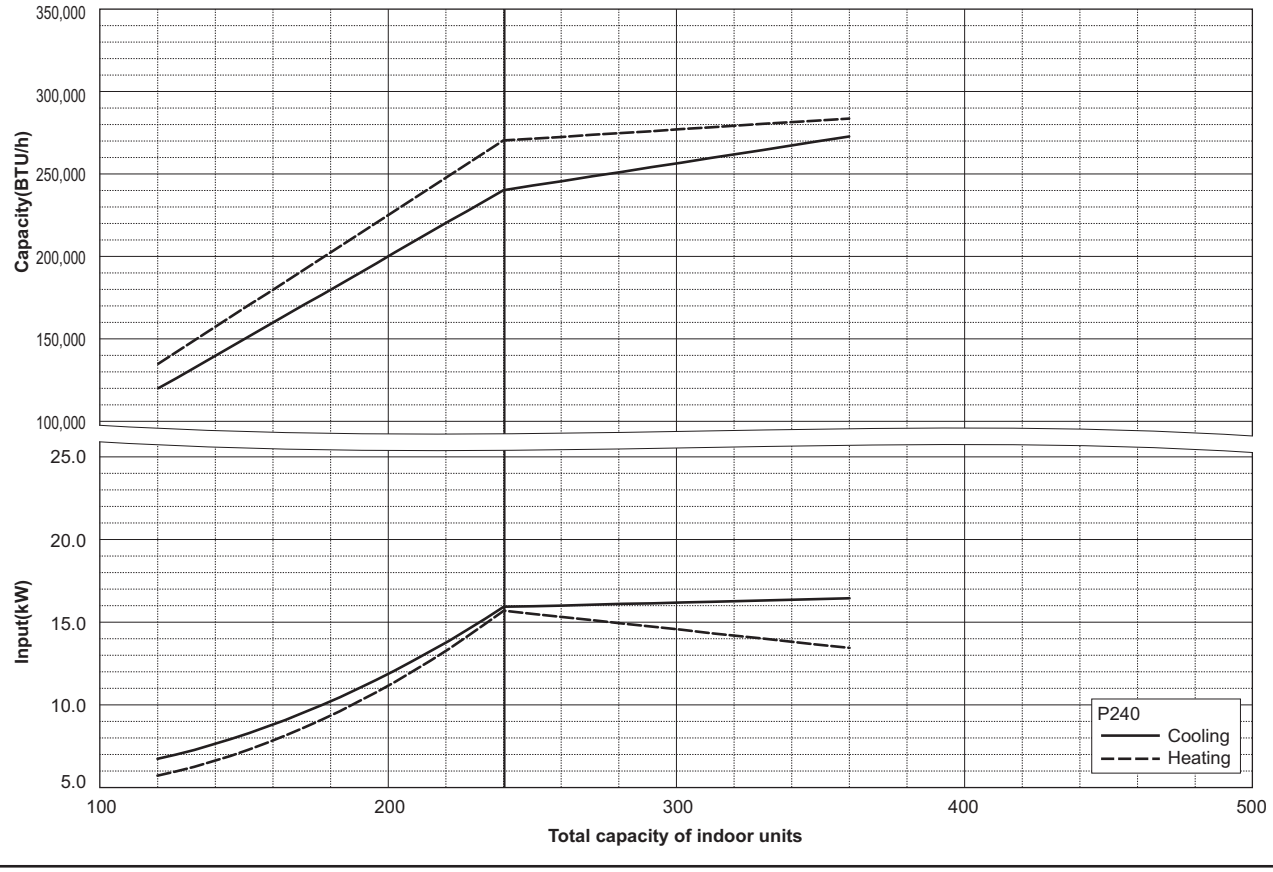


WR2

PQRY-P240TSHMU/YSHMU



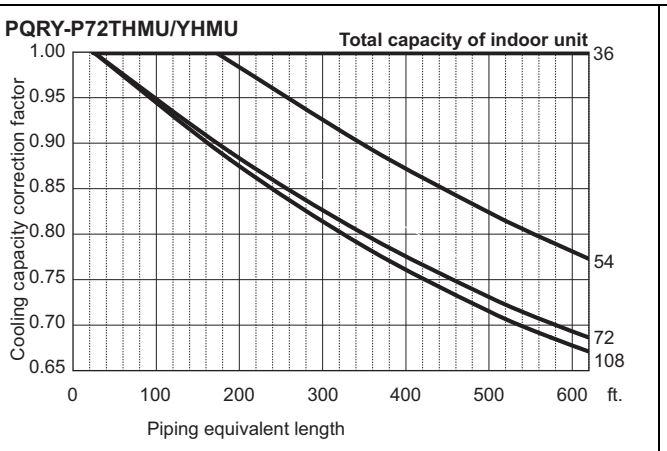
PQRY-P240TSHMU/YSHMU

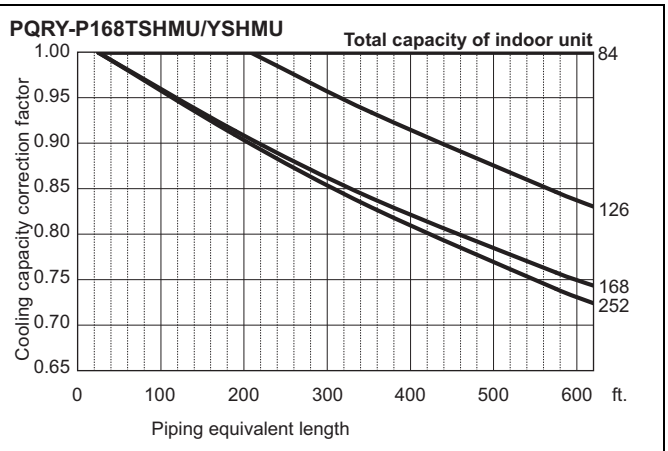


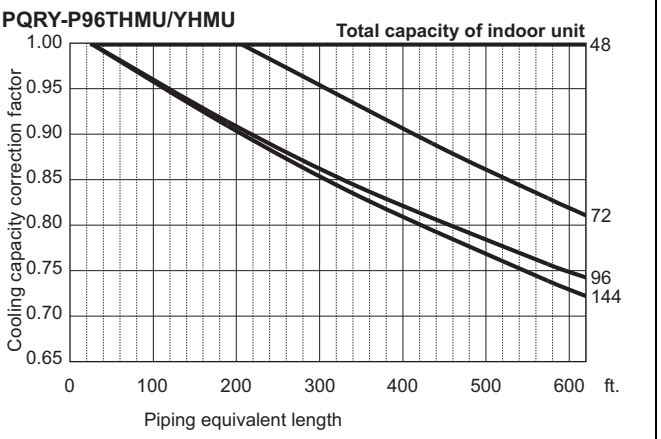
7-3. Correction by refrigerant piping length

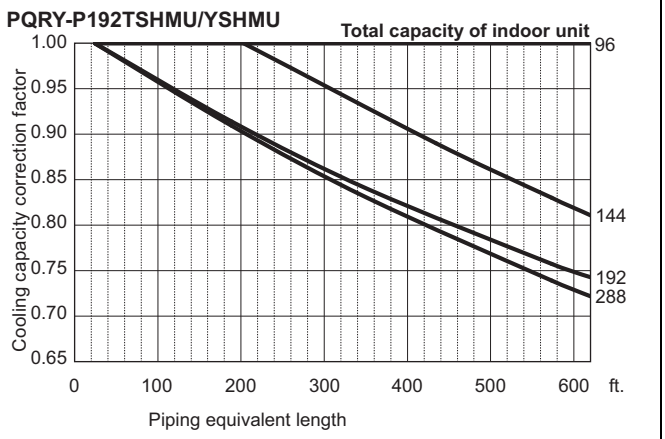
CITY MULTI systems can have extended piping lengths if certain limitations are followed, but cooling/heating capacity could be reduced. Using following correction factor by equivalent piping length shown at 7-3-1 and 7-3-2, capacity can be found. 7-3-3 shows how to obtain the equivalent piping length.

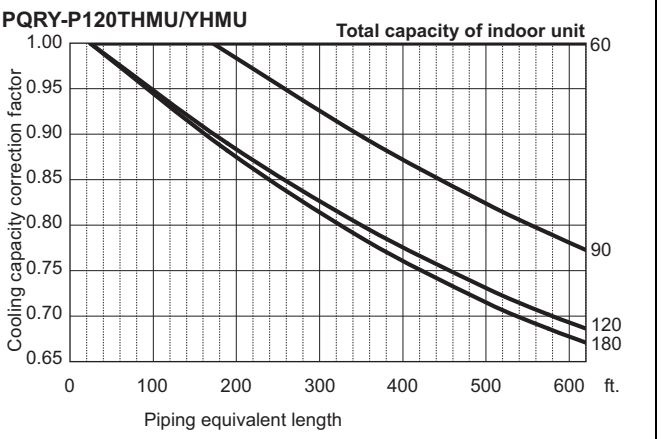
7-3-1. Cooling capacity correction

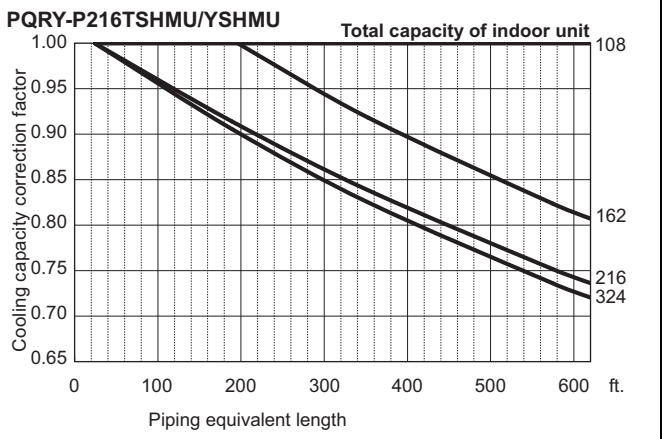


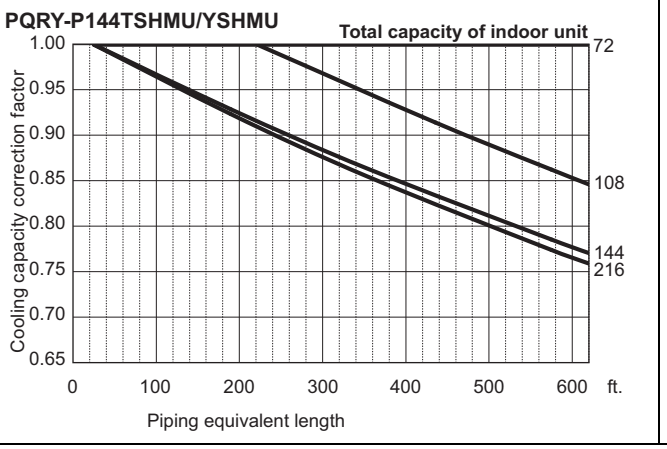


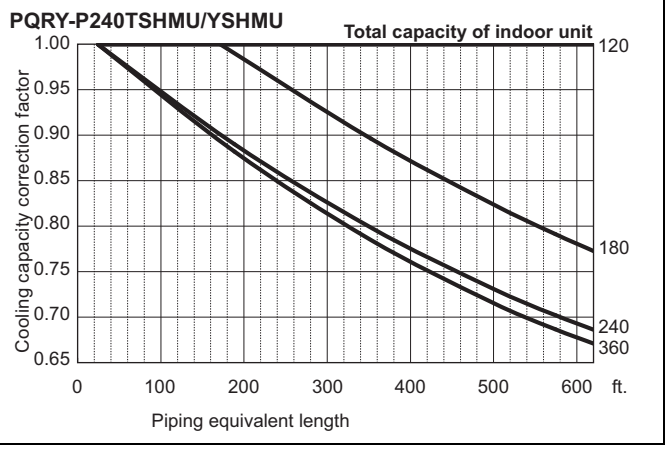








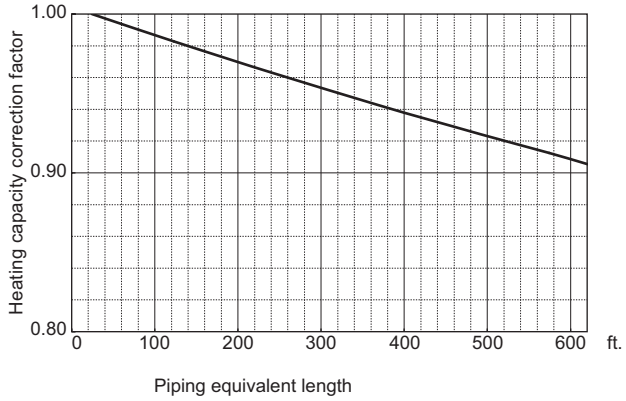




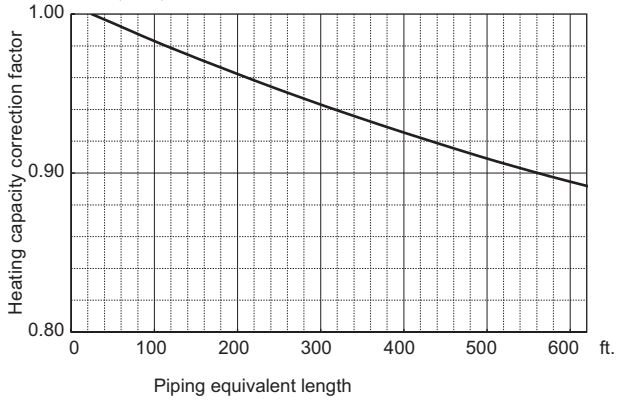
WR2

7-3-2. Heating capacity correction

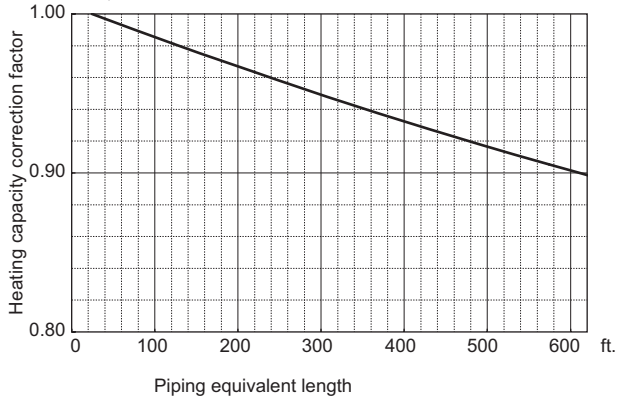
PQRY-P72THMU/YHMU



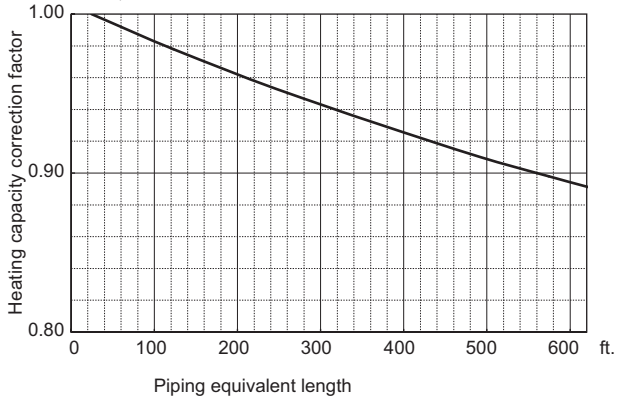
PQRY-P144,168,192TSHMU/YSHMU



PQRY-P96,120THMU/YHMU



PQRY-P216,240TSHMU/YSHMU



WR2

7-3-3. How to obtain the equivalent piping length

1. PQRY-P72THMU/YHMU

Equivalent length = (Actual piping length to the farthest indoor unit) + (1.15 x number of bent on the piping) [ft.]
Equivalent length = (Actual piping length to the farthest indoor unit) + (0.35 x number of bent on the piping) [m]

2. PQRY-P96,120THMU/YHMU

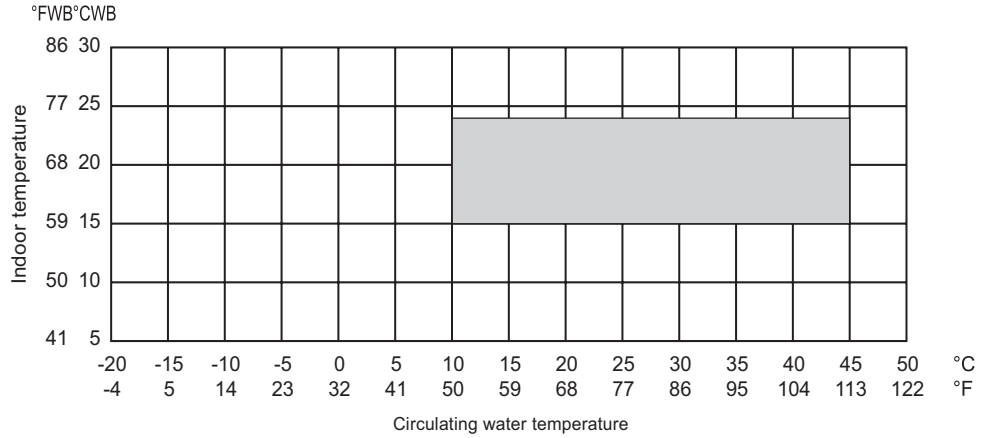
Equivalent length = (Actual piping length to the farthest indoor unit) + (1.38 x number of bent on the piping) [ft.]
Equivalent length = (Actual piping length to the farthest indoor unit) + (0.42 x number of bent on the piping) [m]

3. PQRY-P144,168,192,216,240TSHMU/YSHMU

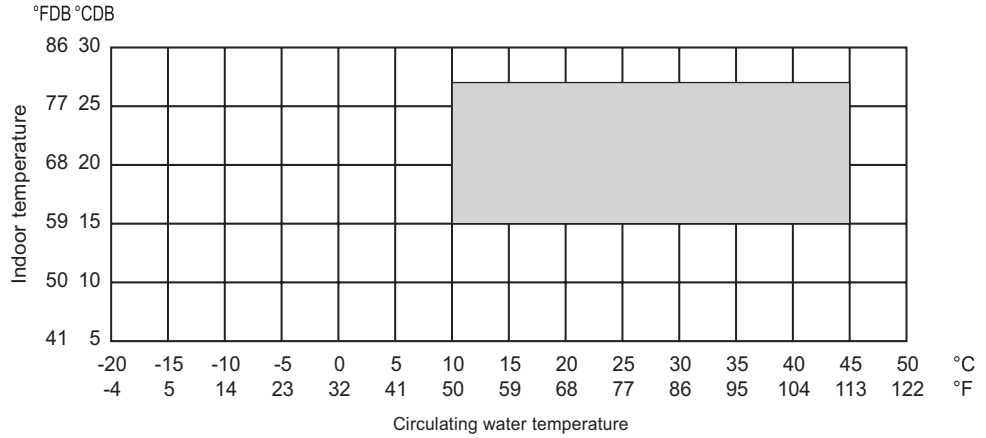
Equivalent length = (Actual piping length to the farthest indoor unit) + (1.64 x number of bent on the piping) [ft.]
Equivalent length = (Actual piping length to the farthest indoor unit) + (0.50 x number of bent on the piping) [m]

7-4. Operation temperature range

• Cooling



• Heating



• Combination of cooling/heating operation (Cooling main or Heating main)

Water temperature	Indoor temperature	
	Cooling	Heating
10 to 45˚C (50 to 113˚F)	15 to 24˚CWB (59 to 75˚FWB)	15 to 27˚CDB (59 to 81˚FDB)

8-1. Designing of water circuit system

1) Example of basic water circuit

The water circuit of the water heat source CITY MULTI connects the heat source unit with the cooling tower/auxiliary heat source/heat storage tank/circulation pump with a single system water piping as shown in the figure below. The selector valve automatically controls to circulate water toward the cooling tower in the cooling season, while toward the heat storage tank in the heating season. If the circulation water temperature is kept in a range of 10~45°C[50~113°F] regardless of the building load, the water heat source CITY MULTI can be operated for either cooling or heating. Therefore in the summer when only cooling load exists, the temperature rise of circulation water will be suppressed by operating the cooling tower. While in the winter when heating load increases, the temperature of circulation water may be dropped below 10°C[50°F]. Under such situation, the circulation water will be heated with the auxiliary heat source if it drops below a certain temperature.

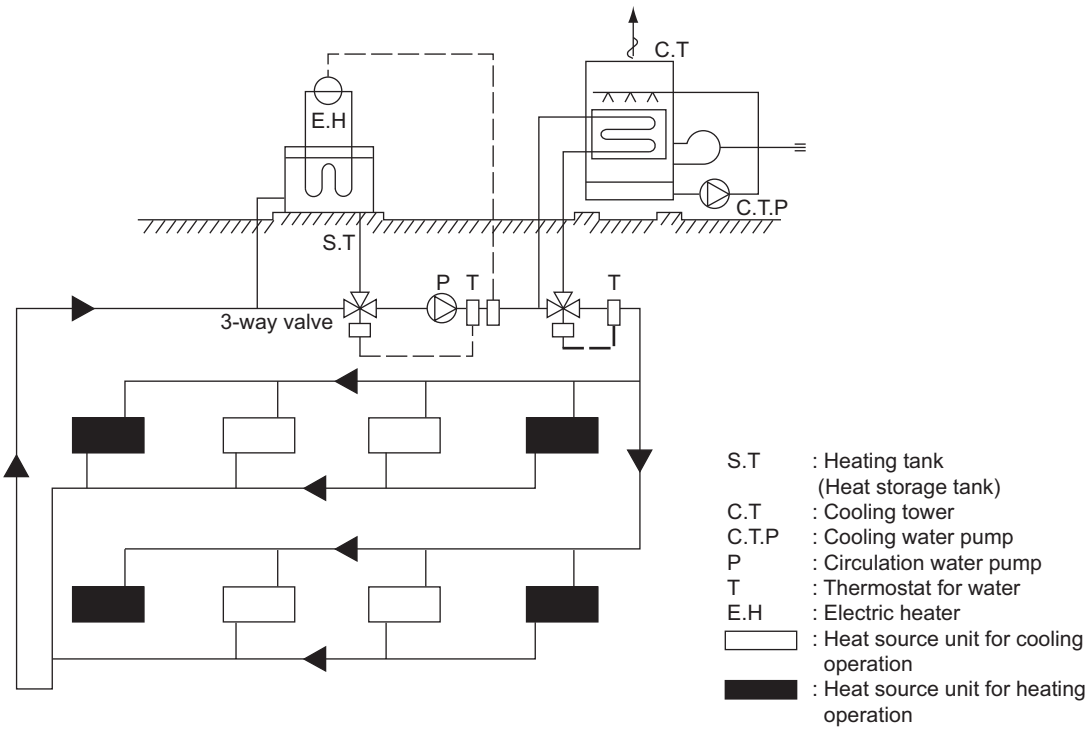
When the thermal balance between cooling and heating operation is in a correct proportion, the operation of the auxiliary heat source and cooling tower is not required.

In order to control the above thermal balance properly and use thermal energy effectively, utilizing of heat storage tanks, and night-time discounted electric power as a auxiliary heat source will be economical.

Meantime as this system uses plural sets of heat source unit equipped with water heat exchangers, water quality control is important. Therefore it is recommended to use closed type cooling towers as much as possible to prevent the circulation water from being contaminated.

When open type cooling towers are used, it is essential to provide proper maintenance control such as that to install water treatment system to prevent troubles caused by contaminated circulation water.

Example of basic water circuit for water heat source CITY MULTI



The indoor unit and refrigerant piping system are excluded in this figure.

WR2

2) Cooling tower

a) Types of cooling tower

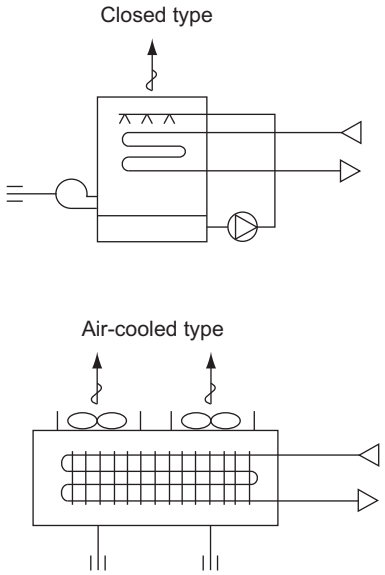
The cooling towers presently used include the open type cooling tower, open type cooling tower + heat exchanger, closed type cooling tower, and air-cooled type cooling tower. However, as the quality control of circulation water is essential when units are installed in decentralized state inside a building, the closed type cooling tower is generally employed in such case.

Although the circulation water will not be contaminated by atmospheric air, it is recommended to periodically blow water inside the system and replenish fresh water instead.

In a district where the coil may be frozen in the winter, it is necessary to apply antifreeze solution to the circulation water, or take freeze protection measures such as to automatically discharge water inside the cooling coil at the stopping of the pump.

When the open type cooling tower is used, be sure to install a water quality control device in addition to the freeze protection measures, as the water may be deteriorated by atmospheric contaminants entered into the cooling tower and dissolved into the circulation water.

Types of cooling towers



b) Calculation method of cooling tower capacity

All units of the water heat source CITY MULTI may possibly be in cooling operation temporarily (at pulling down) in the summer, however, it is not necessary to determine the capacity according to the total cooling capacity of all CITY MULTI units as this system has a wide operating water temperature range.

It is determined in accordance with the value obtained by adding the maximum cooling load of an actual building, the input heat equivalent value of all CITY MULTI units, and the cooling load of the circulating pumps. Please check for the values of the cooling water volume and circulation water volume.

$$\text{Cooling tower capacity} = \frac{Qc + 860 \times (\Sigma Qw + Pw)}{3{,}900} \text{ (Refrigeration ton)}$$

Qc : Maximum cooling load under actual state (kcal/h)
Qw : Total input of water heat source CITY MULTI at simultaneous operation under maximum state (kW)
Pw : Shaft power of circulation pumps (kW)

$$\text{Cooling tower capacity} = \frac{Qc + 3{,}412 \times (\Sigma Qw + Pw)}{15{,}500} \text{ (Refrigeration ton)}$$

Qc : Maximum cooling load under actual state (BTU/h)
Qw : Total input of water heat source CITY MULTI at simultaneous operation under maximum state (kW)
Pw : Shaft power of circulation pumps (kW)

* 1 Refrigerant ton of cooling tower capacity ≈ US refrigerant ton x (1+0.3)
= 3,900 kcal/h = 15,500 BTU/h

3) Auxiliary heat source and heat storage tank

When the heating load is larger than the cooling load, the circulation water temperature lowers in accordance with the heat balance of the system. It should be heated by the auxiliary heat source in order to keep the inlet water temperature within the operating range of the water heat source CITY MULTI.

Further in order to operate the water heat source CITY MULTI effectively, it is recommended to utilize the heat storage tank to cover the warming up load in the morning and the insufficient heat amount.

Effective heat utilization can be expected to cover insufficient heat at the warming up in the next morning or peak load time by storing heat by installing a heat storage tank or operating a low load auxiliary heat source at the stopping of the water heat source CITY MULTI. As it can also be possible to reduce the running cost through the heat storage by using the discounted night-time electric power, using both auxiliary heat source and heat storage tank together is recommended.

The effective temperature difference of an ordinary heat storage tank shows about 5deg. even with the storing temperature at 45°C[113°F].

However with the water heat source CITY MULTI, it can be utilized as heating heat source up to 15°C[59°F] with an effective temperature of a high 30deg°C[54deg°F]. approximately, thus the capacity of the heat storage tank can be minimized.

a) Auxiliary heat source

The following can be used as the auxiliary heat source.

- Boiler (Heavy oil, kerosine, gas, electricity)
- Electric heat (Insertion of electric heater into heat storage tank)
- Outdoor air (Air-heat source heat pump chiller)
- Warm discharge water (Exhaust water heat from machines inside building and hot water supply)
- Utilization of night-time lighting
- Solar heat

Please note that the auxiliary heat source should be selected after studying your operating environment and economical feasibility.

Determining the auxiliary heat source capacity

For the CITY MULTI water heat source system, a heat storage tank is recommended to use. When employment of the heat storage tank is difficult, the warming up operation should be arranged to cover the starting up heating load. Since the holding water inside the piping circuit owns heat capacity and the warming up operation can be assumed for about one hour except that in a cold region, the heat storage tank capacity is required to be that at the maximum daily heating load including the warming up load at the next morning of the holiday. However the auxiliary heat source capacity should be determined by the daily heating load including warming up load on the week day.

For the load at the next morning of the holiday, heat storage is required by operating the auxiliary heat source even outside of the ordinary working hour.

WR2

When heat storage tank is not used

$$QH = HC_T \left(1 - \frac{1}{COP_h}\right) - 1000 \times Vw \times \Delta T - 860 \times Pw$$

QH	: Auxiliary heat source capacity	(kcal/h)
HC_T	: Total heating capacity of each water heat source CITY MULTI	(kcal/h)
COP_H	: COP of water heat source CITY MULTI at heating	
Vw	: Holding water volume inside piping	(m^3)
ΔT	: Allowable water temperature drop = T_{WH} - T_{WL}	(°C)
T_{WH}	: Heat source water temperature at high temperature side	(°C)
T_{WL}	: Heat source water temperature at low temperature side	(°C)
Pw	: Heat source water pump shaft power	(kW)

$$QH = HC_T \left(1 - \frac{1}{COP_h}\right) - 8.343 \times Vw \times \Delta T - 3412 \times Pw$$

QH	: Auxiliary heat source capacity	(BTU/h)
HC_T	: Total heating capacity of each water heat source CITY MULTI	(BTU/h)
COP_H	: COP of water heat source CITY MULTI at heating	
Vw	: Holding water volume inside piping	(G)
ΔT	: Allowable water temperature drop = T_{WH} - T_{WL}	(°F)
T_{WH}	: Heat source water temperature at high temperature side	(°F)
T_{WL}	: Heat source water temperature at low temperature side	(°F)
Pw	: Heat source water pump shaft power	(kW)

When heat storage tank is not used

$$QH = \frac{HQ_{1T} \cdot \left(1 - \frac{1}{COP_h}\right) - 860 \times Pw \times T_2}{T1} \times K \quad \text{(kcal)}$$

QH_{1T}	: Total of heating load on weekday including warming up	(kcal/day)
T_1	: Operating hour of auxiliary heat source	(h)
T_2	: Operating hour of heat source water pump	(h)
K	: Allowance factor (Heat storage tank, piping loss, etc.)	1.05~1.10

HQ_{1T} is calculated from the result of steady state load calculation similarly by using the equation below.

$HQ_{1T} = 1.15 \times (\Sigma Q'a + \Sigma Q'b + \Sigma Q'c + \Sigma Q'd + \Sigma Q'f)\, T_2 - \psi\, (\Sigma Qe_1 + \Sigma Qe_2 + \Sigma Qe_3)\, (T2 - 1)$

Q'a	: Thermal load from external wall/roof in each zone	(kcal/h)
Q'b	: Thermal load from glass window in each zone	(kcal/h)
Q'c	: Thermal load from partition/ceiling/floor in each zone	(kcal/h)
Q'd	: Thermal load by infiltration in each zone	(kcal/h)
Q'f	: Fresh outdoor air load in each zone	(kcal/h)
$Q'e_1$	: Thermal load from human body in each zone	(kcal/h)
$Q'e_2$	: Thermal load from lighting fixture in each zone	(kcal/h)
$Q'e_3$	: Thermal load from equipment in each zone	(kcal/h)
ψ	: Radiation load rate	0.6~0.8
T2	: Air conditioning hour	

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$$QH = \frac{HQ_{1T} \cdot \left(1 - \frac{1}{COP_h}\right) - 3{,}412 \times Pw \times T_2}{T1} \times K \quad \text{(BTU)}$$

QH_{1T}	: Total of heating load on weekday including warming up	(BTU/day)
T_1	: Operating hour of auxiliary heat source	(h)
T_2	: Operating hour of heat source water pump	(h)
K	: Allowance factor (Heat storage tank, piping loss, etc.)	1.05~1.10

HQ_{1T} is calculated from the result of steady state load calculation similarly by using the equation below.

$HQ_{1T} = 1.15 \times (\Sigma Q'a + \Sigma Q'b + \Sigma Q'c + \Sigma Q'd + \Sigma Q'f)\, T_2 - \psi\, (\Sigma Qe_1 + \Sigma Qe_2 + \Sigma Qe_3)\, (T2 - 1)$

Q'a	: Thermal load from external wall/roof in each zone	(BTU/h)
Q'b	: Thermal load from glass window in each zone	(BTU/h)
Q'c	: Thermal load from partition/ceiling/floor in each zone	(BTU/h)
Q'd	: Thermal load by infiltration in each zone	(BTU/h)
Q'f	: Fresh outdoor air load in each zone	(BTU/h)
$Q'e_1$	: Thermal load from human body in each zone	(BTU/h)
$Q'e_2$	: Thermal load from lighting fixture in each zone	(BTU/h)
$Q'e_3$	: Thermal load from equipment in each zone	(BTU/h)
ψ	: Radiation load rate	0.6~0.8
T2	: Air conditioning hour	

b) Heat storage tank

Heat storage tank can be classified by types into the open type heat storage tank exposed to atmosphere, and the closed type heat storage tank with structure separated from atmosphere. Although the size of the tank and its installation place should be taken into account, the closed type tank is being usually employed by considering corrosion problems.
The capacity of heat storage tanks is determined in accordance with the daily maximum heating load that includes warming up load to be applied for the day after the holiday.

When auxiliary heat source is operated during operation and even after stopping of water heat source CITY MULTI unit

$$V = \frac{HQ_{2T}\left(1 - \frac{1}{COP_h}\right) - 860 \times Pw \times T_2 - QH \times T_2}{\Delta T \times 1{,}000 \times \eta V} \quad \text{(ton)}$$

HQ_{2T} : Maximum heating load including load required for the day after the holiday (kcal/day)
ΔT : Temperature difference utilized by heat storage tank (deg°C)
ηV : Heat storage tank efficiency

HQ_{2T} : $1.3 \times (\Sigma Q'a + \Sigma Q'c + \Sigma Q'd + \Sigma Q'f)\, T2 - \psi(\Sigma Qe2 + \Sigma Qe3)\,(T2 - 1)$

$$V = \frac{HQ_{2T}\left(1 - \frac{1}{COP_h}\right) - 3{,}412 \times Pw \times T_2 - QH \times T_2}{\Delta T \times \eta V} \quad \text{(lbs)}$$

HQ_{2T} : Maximum heating load including load required for the day after the holiday (BTU/day)
ΔT : Temperature difference utilized by heat storage tank (deg°F)
ηV : Heat storage tank efficiency

HQ_{2T} : $1.3 \times (\Sigma Q'a + \Sigma Q'c + \Sigma Q'd + \Sigma Q'f)\, T2 - \psi(\Sigma Qe2 + \Sigma Qe3)\,(T2 - 1)$

When auxiliary heat source is operated after stopping of water heat source CITY MULTI unit

$$V = \frac{HQ_{2T}\left(1 - \frac{1}{COP_h}\right) - 860 \times Pw \times T_2}{\Delta T \times 1{,}000 \times \eta V} \quad \text{(ton)}$$

HQ_{2T} : Maximum heating load including load required for the day after the holiday (kcal/day)
ΔT : Temperature difference utilized by heat storage tank (deg°C)
ηV : Heat storage tank efficiency

HQ_{2T} : $1.3 \times (\Sigma Q'a + \Sigma Q'c + \Sigma Q'd + \Sigma Q'f)\, T2 - \psi(\Sigma Qe2 + \Sigma Qe3)\,(T2 - 1)$

$$V = \frac{HQ_{2T}\left(1 - \frac{1}{COP_h}\right) - 3{,}412 \times Pw \times T_2}{\Delta T \times \eta V} \quad \text{(lbs)}$$

HQ_{2T} : Maximum heating load including load required for the day after the holiday (BTU/day)
ΔT : Temperature difference utilized by heat storage tank (deg°F)
ηV : Heat storage tank efficiency

HQ_{2T} : $1.3 \times (\Sigma Q'a + \Sigma Q'c + \Sigma Q'd + \Sigma Q'f)\, T2 - \psi(\Sigma Qe2 + \Sigma Qe3)\,(T2 - 1)$

4) Piping system

The following items should be kept in your mind in planning / designing water circuits.

a) All units should be constituted in a single circuit in principle.

b) When plural numbers of the water heat source CITY MULTI unit are installed, the rated circulating water flow rate should be kept by making the piping resistance to each unit almost same value. As an example, the reverse return system as shown below may be employed.

c) Depending on the structure of a building, the water circuit may be prefabricated by making the layout uniform.

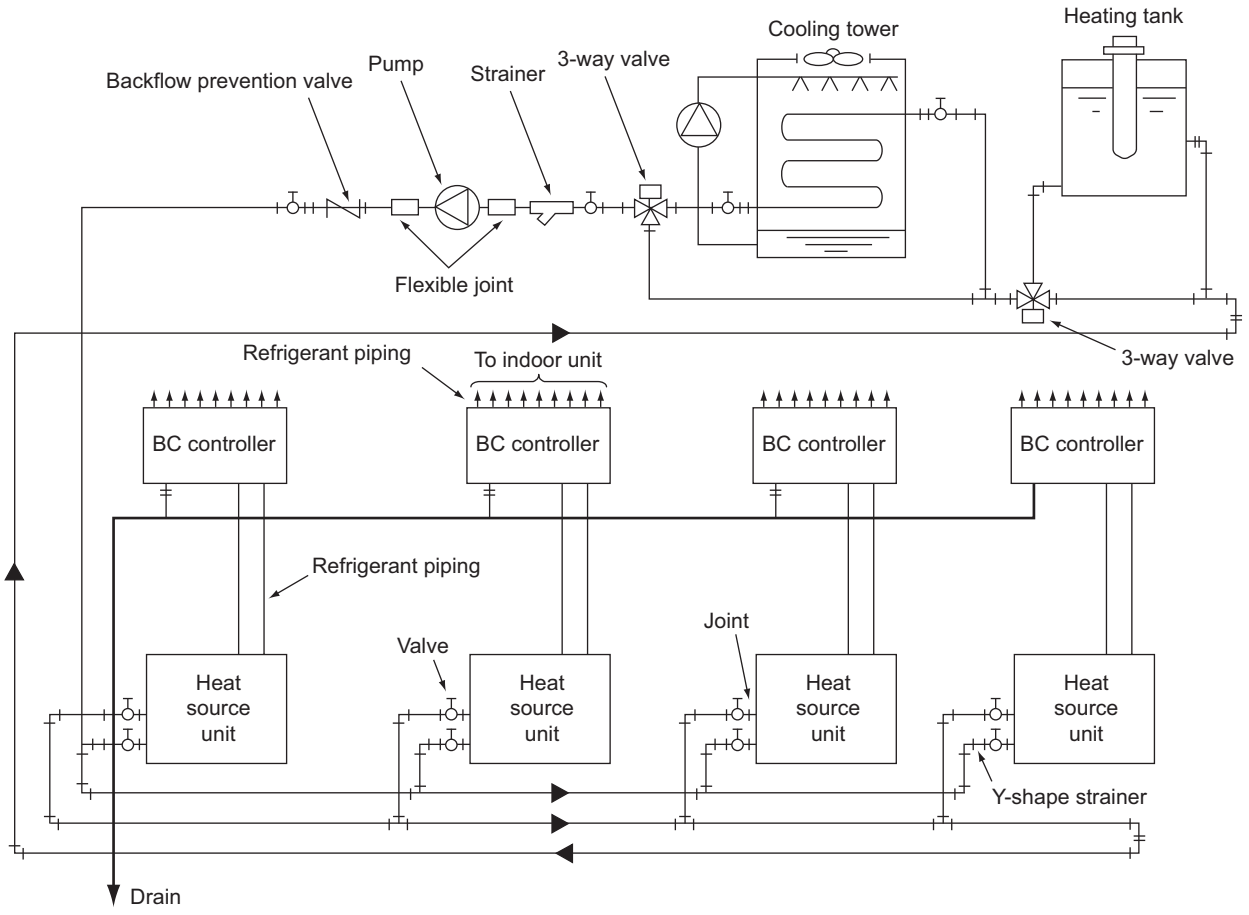
d) When a closed type piping circuit is constructed, install an expansion tank usable commonly for a make-up water tank to absorb the expansion/contraction of water caused by temperature fluctuation.

e) If the operating temperature range of circulation water stays within the temperature near the normal temperature (summer : 29.4°C[85°F], winter : 21.1°C[70°F]), thermal insulation or anti-sweating work is not required for the piping inside buildings.

In case of the conditions below, however, thermal insulation is required.

- When well water is used for heat source water.
- When piped to outdoor or a place where freezing may be caused.
- When vapor condensation may be generated on piping due to an increase in dry bulb temperature caused by the entry of fresh outdoor air.

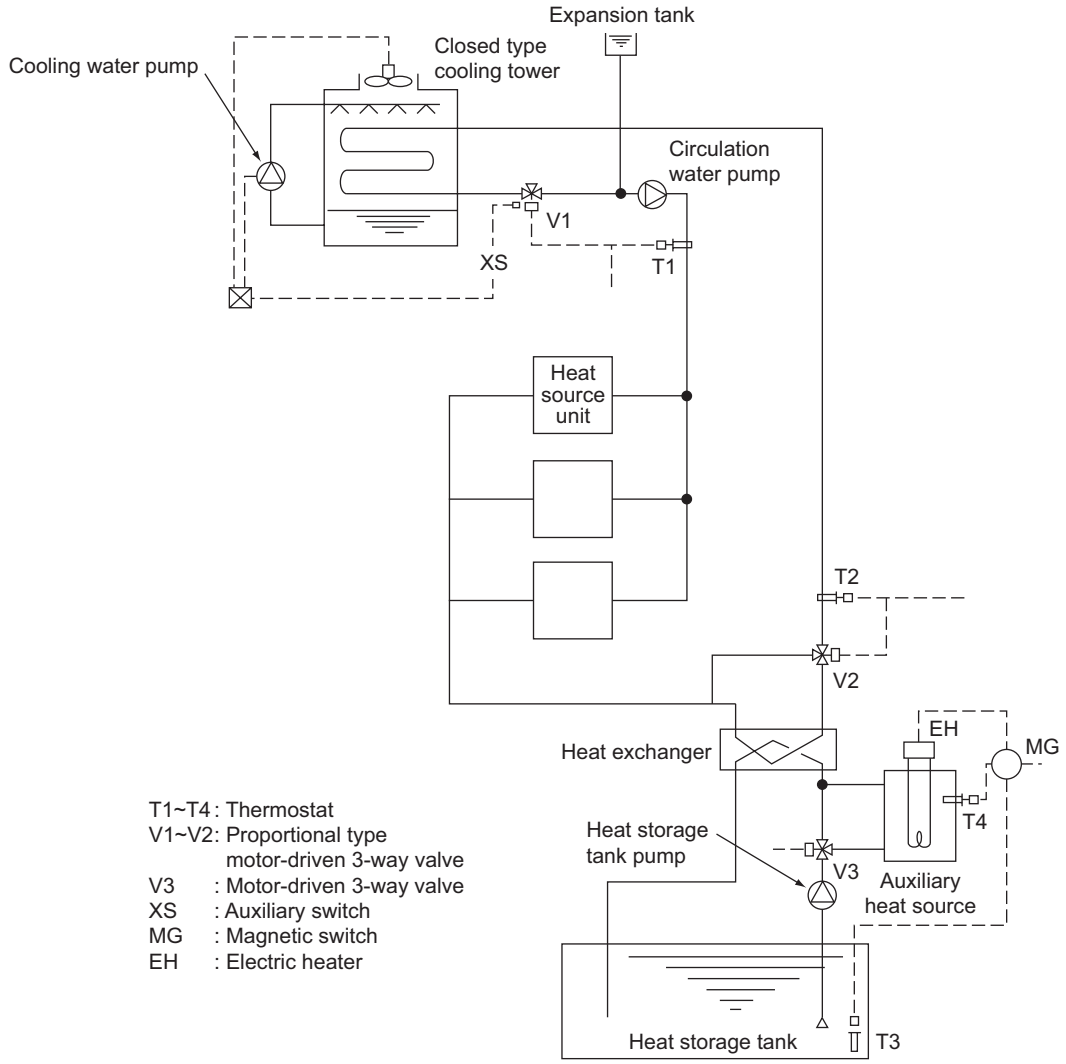
System example of water circuit



5) Practical System Examples and Circulation Water Control

Since the water heat source CITY MULTI is of water heat source system, versatile systems can be constituted by combining it with various heat sources.
The practical system examples are given below.
Either cooling or heating operation can be performed if the circulation water temperature of the water heat source CITY MULTI stays within a range of 15~45°C [59~113°F]. However, the circulation water temperature near 32°C[90°F] for cooling and 20°C[68°F] for heating is recommended by taking the life, power consumption and capacity of the air conditioning units into consideration. The detail of the control is also shown below.

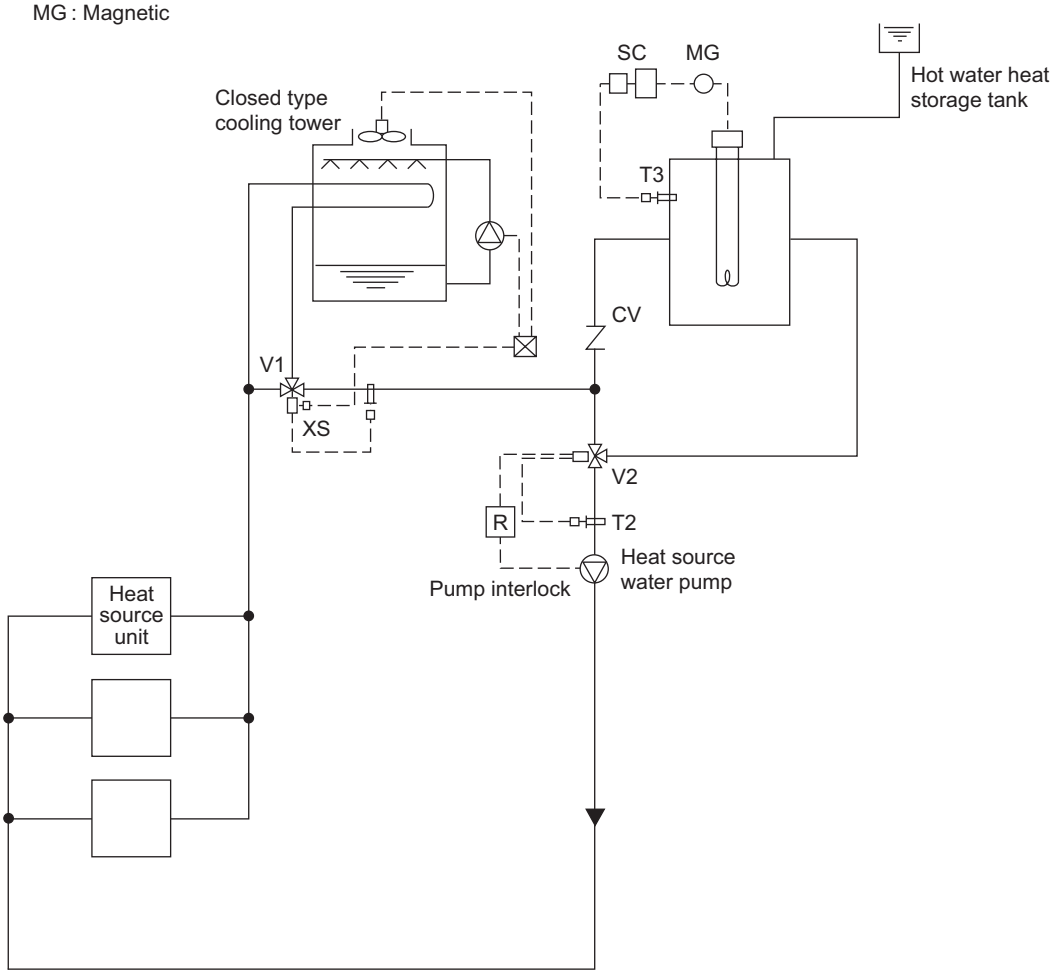
Example-1 Combination of closed type cooling tower and hot water heat storage tank (using underground hollow slab)



By detecting the circulation water temperature of the water heat source CITY MULTI system with T1 (around 32°C[90°F]) and T2 (around 20°C[68°F]), the temperature will be controlled by opening/closing V1 in the summer and V2 in the winter.
In the summer, as the circulation water temperature rises exceeding the set temperature of T1, the bypass port of V1 will open to lower the circulation water temperature. While in the winter, as the circulation water temperature drops, V2 will open following the command of T2 to rise the circulation water temperature.
The water inside the heat storage tank will be heated by the auxiliary heat source by V3 being opened with timer operation in the night-time. The electric heater of the auxiliary heat source will be controlled by T3 and the timer. The start/stop control of the fan and pump of the closed type cooling tower is applied with the step control of the fan and pump following the command of the auxiliary switch XS of V1, that operates only the fan at the light load while the fan and pump at the maximum load thus controlling water temperature and saving motor power.

Example-2 Combination of closed type cooling tower and hot water heat storage tank

T1 : Proportional type, insertion system thermostat
T2 : Proportional type, insertion system thermostat
T3 : Proportional type, insertion system thermostat
V1 : Proportional type, motor-driven 3-way valve
V2 : Proportional type, motor-driven 3-way valve
XS : Auxiliary switch (Duplex switch type)
SC : Step controller
R : Relay
MG : Magnetic



In the summer, as the circulation water temperature rises exceeding the set temperature of T1, the bypass port of V1 will open to lower the circulation water temperature. In the winter, if the circulation water temperature stays below 25°C[77°F], V2 will open/close by the command of T2 to keep the circulation water temperature constant.
The temperature of the hot water inside the heat storage tank will be controlled through the step control of the electric heater by step controller operation following the command of T3.
During the stopping of the heat source water pump, the bypass port of V2 will be closed fully by interlocking thus preventing the high temperature water from entering into the system at the starting of the pump.
The start/stop control of the fan and pump of the closed type cooling tower is applied with the step control of the fan and pump following the command of the auxiliary switch XS of V1, that operates only the fan at the light load while the fan and pump at the maximum load thus controlling water temperature and saving motor power.

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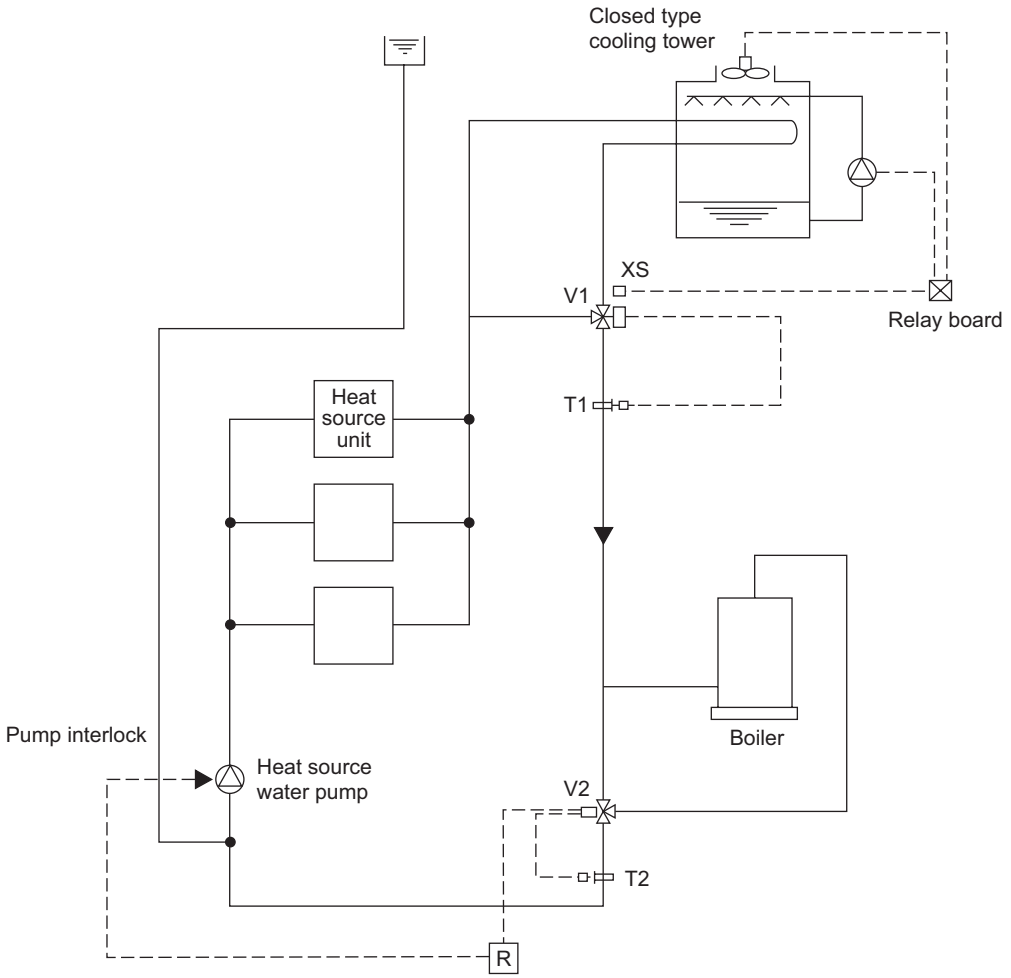
Example-3 Combination of closed type cooling tower and boiler

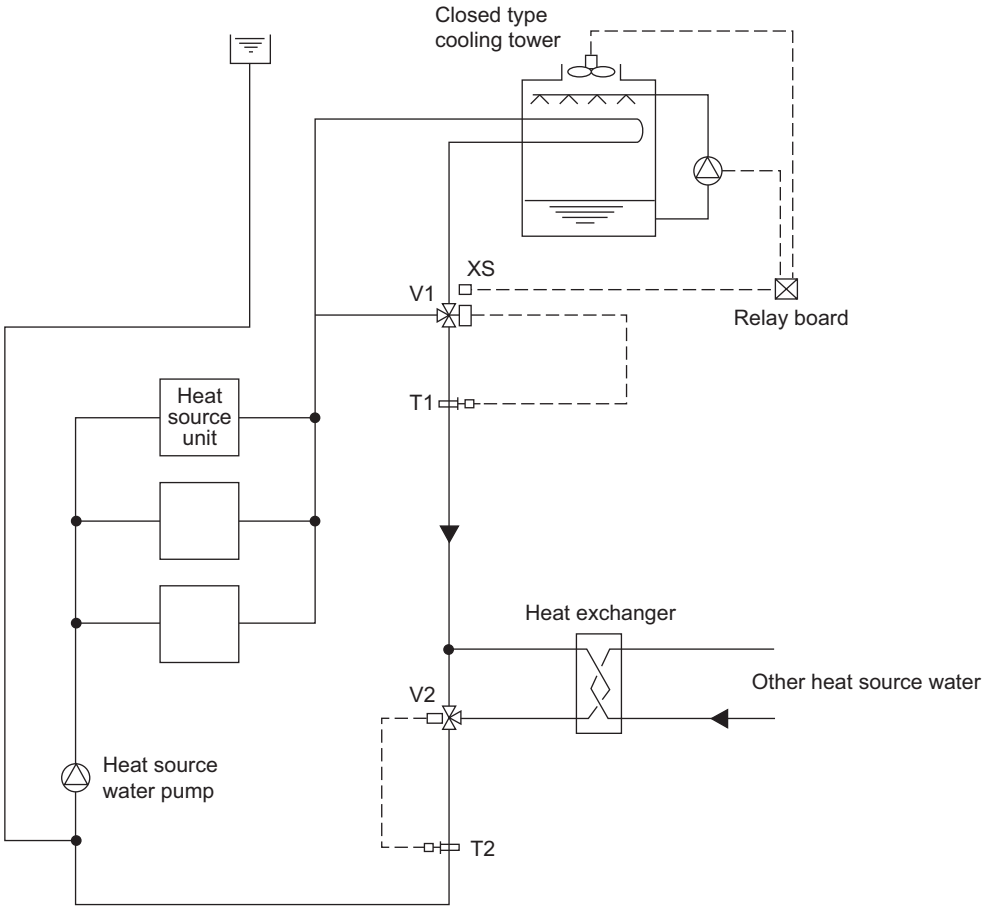
T1 : Proportional type, insertion system thermostat
T2 : Proportional type, insertion system thermostat
T3 : Proportional type, insertion system thermostat
V1 : Proportional type, motor-driven 3-way valve
S : Selector switch
R : Relay
XS : Auxiliary switch (Duplex switch type)



In the summer, as the circulation water temperature rises exceeding the set temperature of T1, the bypass port of V1 will close to lower the circulation water temperature. In the winter, if the circulation water temperature drops below 25°C[77°F], V2 will conduct water temperature control to keep the circulation water temperature constant.
During the stopping of the heat source water pump, the bypass port of V2 will be closed fully by interlocking.
The start/stop control of the fan and pump of the closed type cooling tower is applied with the step control following the command of the auxiliary switch XS of V1, thus controlling water temperature and saving motor power.

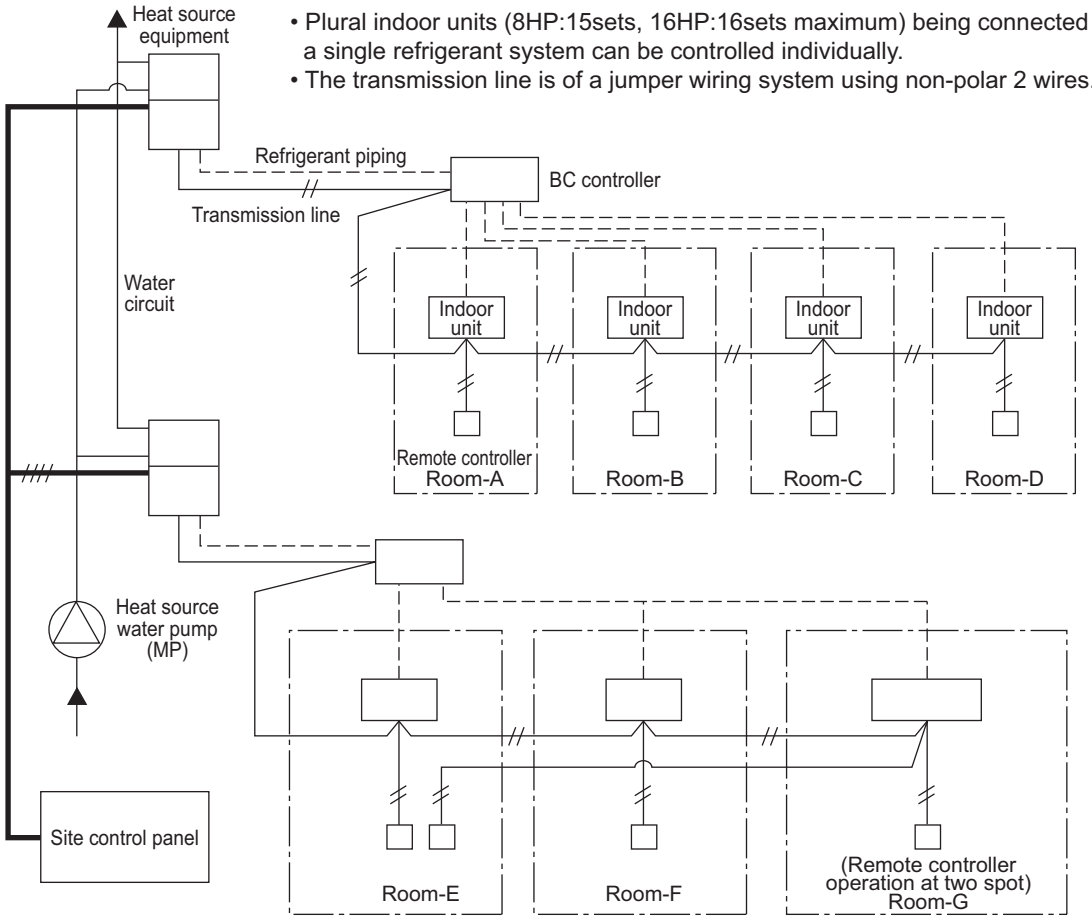
Example-4 Combination of closed type cooling tower and heat exchanger (of other heat source)

T1 : Proportional type, insertion system thermostat
T2 : Proportional type, insertion system thermostat
V1 : Proportional type, motor-driven 3-way valve
V2 : Proportional type, motor-driven 3-way valve
S : Selector switch
R : Relay
XS : Auxiliary switch (Duplex switch type)



In the summer, as the circulation water temperature rises exceeding the set temperature of T1, the bypass port of V1 will close to lower the circulation water temperature. In the winter, if the circulation water temperature drops below 26°C[79°F], V2 will conduct water temperature control to keep the circulation water temperature constant.
During the stopping of the heat source water pump, the bypass port of V2 will be closed fully by interlocking.
The start/stop control of the fan and pump of the closed type cooling tower is applied with the step control following the command of the auxiliary switch XS of V1, thus controlling water temperature and saving motor power.

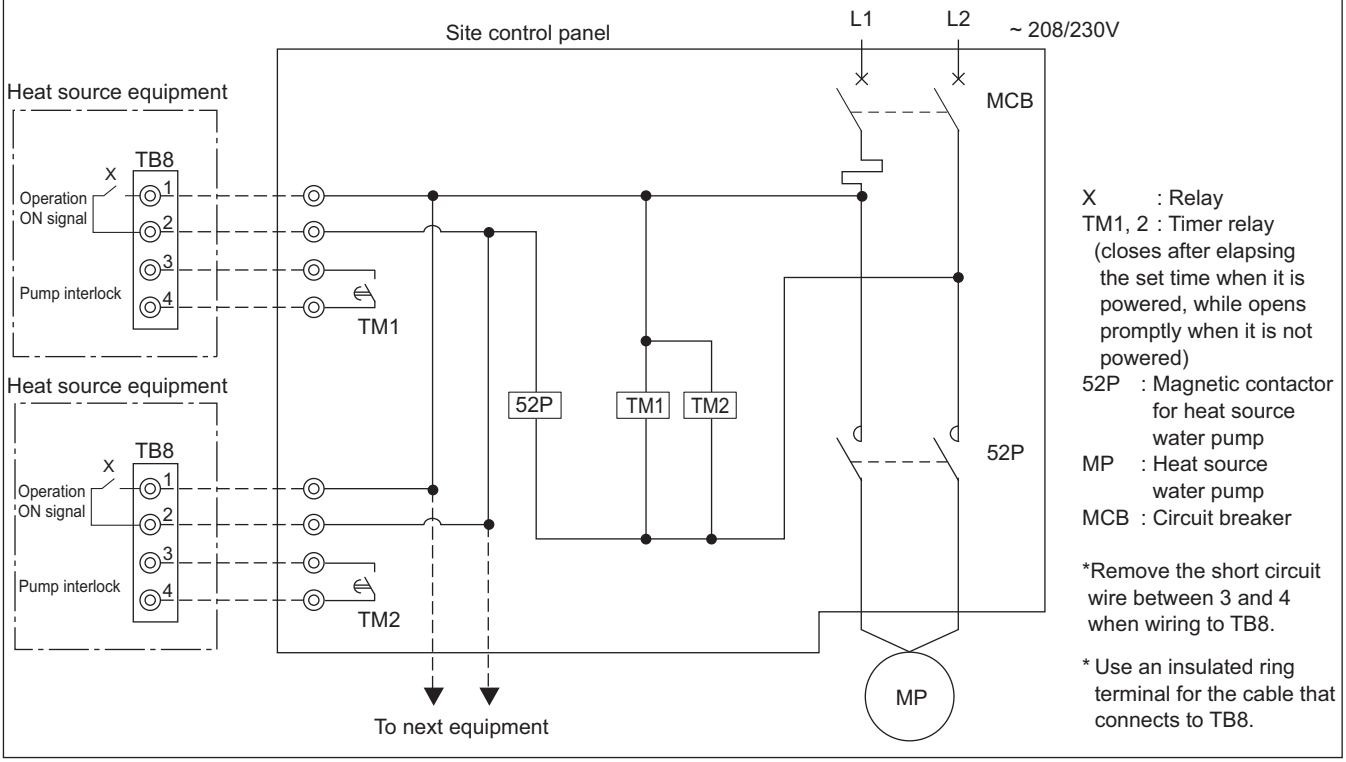
6) Pump interlock circuit



- Plural indoor units (8HP:15sets, 16HP:16sets maximum) being connected to a single refrigerant system can be controlled individually.
- The transmission line is of a jumper wiring system using non-polar 2 wires.

Wiring diagram

This circuit uses the "Terminal block for pump interlock (TB8)" inside the electrical parts box of the heat source equipment. This circuit is for interlocking of the heat source equipment operation and the heat source water pump.



X : Relay
TM1, 2 : Timer relay (closes after elapsing the set time when it is powered, while opens promptly when it is not powered)
52P : Magnetic contactor for heat source water pump
MP : Heat source water pump
MCB : Circuit breaker

*Remove the short circuit wire between 3 and 4 when wiring to TB8.

* Use an insulated ring terminal for the cable that connects to TB8.

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Operation ON signal

Terminal No.	TB8-1, 2
Output	Relay contacts output Rated voltage : 3~ : 208/230V Rated load : 1A
Operation	• When Dip switch 2-7 is OFF The relay closes during compressor operation. • When DIP switch 2-7 is ON. The relay closes during reception of cooling or the heating operation signal from the controller. (Note : It is output even if the thermostat is OFF (when the compressor is stopped).)

Pump Interlock

Terminal No.	TB8-3, 4
Input	Level signal
Operation	If the circuit between TB8-3 and TB8-4 is open, compressor operation is prohibited.

8-2. Water piping work

Although the water piping for the CITY MULTI WR2 system does not differ from that for ordinary air conditioning systems, pay special attention to the items below in conducting the piping work.

1) Items to be observed on installation work

- The water pressure resistance of the water pipes in the heat source unit is 2.0MPa [290psi].
- In order to equalize piping resistance for each unit, adapt the reverse return system.
- Mount a joint and a valve onto the water outlet/inlet of the unit to allow for maintenance, inspection and replacement work. Be sure to mount a strainer at the water inlet piping of the unit. (The strainer is required at the circulation water inlet to protect the heat source unit.)

* The installation example of the heat source unit is shown right.

- Be sure to provide an air relief opening on the water piping properly, and purge air after feeding water to the piping system.
- Condensate will generate at the low temperature part inside the heat source equipment. Connect drain piping to the drain piping connection located at the bottom of the heat source equipment to discharge it outside the equipment.
- Mount a backflow prevention valve and a flexible joint for vibration control onto the pump.
- Provide a sleeve to the penetrating parts of the wall to prevent the piping.
- Fasten the piping with metal fitting, arrange the piping not to expose to cutting or bending force, and pay sufficient care for possible vibration.
- Be careful not to erroneously judge the position of the inlet and outlet of water.
  (Lower position : Inlet, Upper position : Outlet)
- When connecting heat source unit water piping and water piping on site, apply liquid sealing material for water piping over the sealing tape before connection.
- This unit doesn't include a heater to prevent freezing within tubes. If the water flow is stopped on low ambient, drain the water out.
- The unused knockout holes should be closed and the refrigerant pipes, water pipes, power source and transmission wires access holes should be filled with putty.
- The drain plug is installed on the back of the unit at factory for field-connection of the drain pipes on the front of the unit. Move the plug to the front to connect the drain pipes on the back. Verify that there are no leaks from pipe connections.
- For installing two units, install water pipes in parallel to each other so that the water flow rate through both units will be equal.
- Wrap the sealing tape as follows.

① Wrap the joint with sealing tape in the direction of the threads (clockwise), and do not let the tape run over the edge.
② Overlap the sealing tape by two-thirds to three-fourths of its width on each turn. Press the tape with your fingers so that it is pressed firmly against each thread.
③ Leave the 1.5th through 2nd farthest threads away from the pipe end unwrapped.

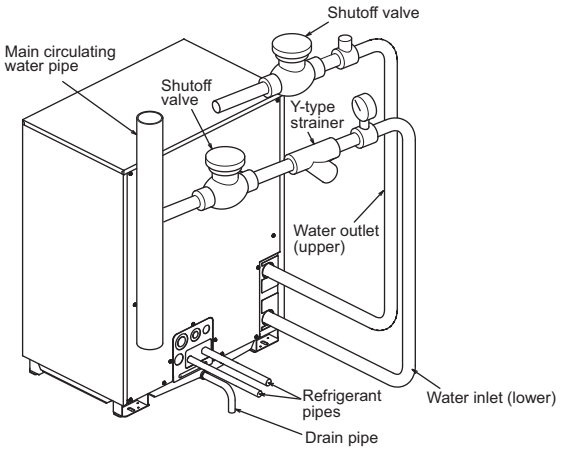
- Hold the pipe on the unit side in place with a spanner when installing the pipes or strainer. Tighten screws to a torque of 150N·m.

2) Thermal insulation work

Thermal insulation or anti sweating work is not required for the piping inside buildings in the case of the CITY MULTI WR2 system if the operating temperature range of circulation water stays within the temperature near the normal (summer : 30°C[86°F], winter : 20°C[68°F]).
In case of the conditions below, however, thermal insulation is required.

- Use of well water for heat source water
- Outdoor piping portions
- Indoor piping portions where freezing may be caused in winter
- A place where vapor condensation may be generated on piping due to an increase in dry bulb temperature inside the ceiling caused by the entry of fresh outdoor air
- Drain piping portions

Installation example of heat source unit



3) Water treatment and water quality control

For the circulation water cooling tower of the CITY MULTI WR2 system, employment of the closed type is recommended to keep water quality. However, in the case that an open type cooling tower is employed or the circulating water quality is inferior, scale will adhere onto the water heat exchanger leading to the decreased heat exchange capacity or the corrosion of the heat exchanger. Be sufficiently careful for water quality control and water treatment at the installation of the circulation water system

- Removal of impurities inside piping
  Be careful not to allow impurities such as welding fragment, remaining sealing material and rust from mixing into the piping during installation work.
- Water treatment
  The water quality standards have been established by the industry (Japan Refrigeration, Air Conditioning Industry Association, in case of Japan) for water treatment to be applied.

Items			Lower mid-range temperature water system		Tendency	
			Recirculating water [20<T<60°C] [68<T<140°F]	Make-up water	Corrosive	Scale-forming
Standard items	pH (25°C[77°F])		7.0 ~ 8.0	7.0 ~ 8.0	○	○
	Electric conductivity	(mS/m) (25°C[77°F])	30 or less	30 or less	○	○
		(μS/cm) (25°C[77°F])	[300 or less]	[300 or less]		
	Chloride ion	(mg Cl⁻/ℓ)	50 or less	50 or less	○	
	Sulfate ion	(mg SO_4^{2-}/ℓ)	50 or less	50 or less	○	
	Acid consumption (pH4.8)	(mg $CaCO_3$/ℓ)	50 or less	50 or less		○
	Total hardness	(mg $CaCO_3$/ℓ)	70 or less	70 or less		○
	Calcium hardness	(mg $CaCO_3$/ℓ)	50 or less	50 or less		○
	Ionic silica	(mg SiO_2/ℓ)	30 or less	30 or less		○
Reference items	Iron	(mg Fe/ℓ)	1.0 or less	0.3 or less	○	○
	Copper	(mg Cu/ℓ)	1.0 or less	0.1 or less	○	
	Sulfide ion	(mg S^{2-}/ℓ)	not to be detected	not to be detected	○	
	Ammonium ion	(mg NH_4^+/ℓ)	0.3 or less	0.1 or less	○	
	Residual chlorine	(mg Cl/ℓ)	0.25 or less	0.3 or less	○	
	Free carbon dioxide	(mg CO_2/ℓ)	0.4 or less	4.0 or less	○	
	Ryzner stability index		–	–	○	○

Reference : Guideline of Water Quality for Refrigeration and Air Conditioning Equipment. (JRA GL02E-1994)

In order to keep the water quality within such standards, you are kindly requested to conduct bleeding-off by overflow and periodical water quality tests, and use inhibitors to suppress condensation or corrosion. Since piping may be corroded by some kinds of inhibitor, consult an appropriate water treatment expert for proper water treatment.

4) Pump interlock

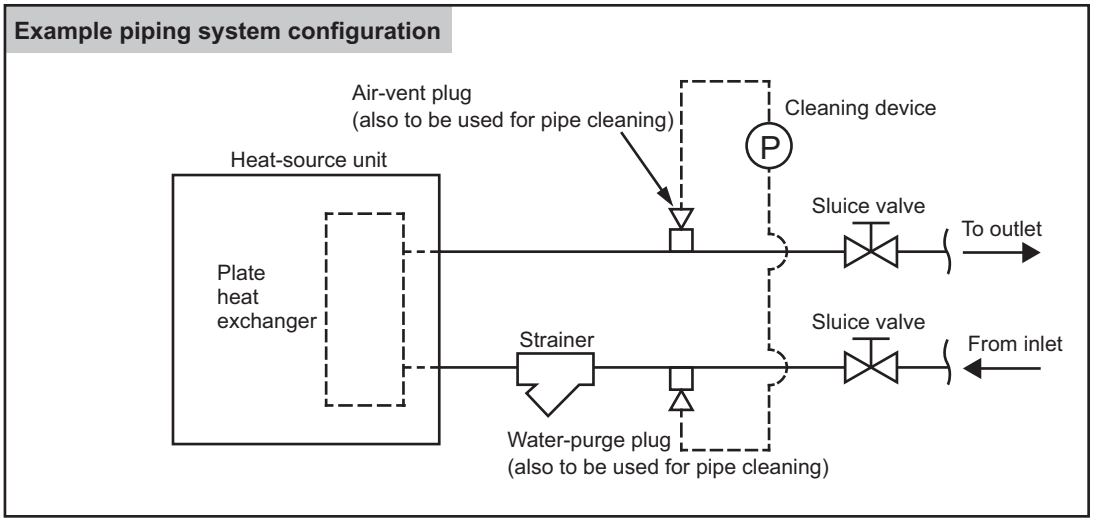
Operating the heat source unit without circulation water inside the water piping can cause a trouble. Be sure to provide interlocking for the unit operation and water circuit. Since the terminal block is being provided inside the unit, use it as required.

5) Handling plate heat exchangers for heat-source units

<Designing the piping system>

- Install a strainer (50 mesh or finer recommended) near the heat-source unit on the inlet side of the hot/cold water pipe and cooling-water pipe (hereafter referred to as water pipes) to prevent an infiltration of foreign materials of solid nature, such as dirt and sand, into the plate heat exchanger.
- Depending on the water quality, scale may form inside plate heat exchangers. Plate heat exchangers must be chemically cleaned regularly to remove scale formation. Install sluice valves on the water pipes, and provide ports for connecting a pipe between the sluice valves and the heat-source unit for chemical cleaning.
- On both the inlet and outlet sides of water pipes, provide a plug to remove trapped air and water (also to be used for cleaning heat-source units and for purging water before a period of nonuse in winter or at the end of an air conditioning season). Also, provide automatic air-vent valves where air is likely to be trapped (such as a pipe that runs vertically).
- In addition to installing the above-mentioned strainers, install a cleanable strainer near the pump pipe inlet.
- Keep the pipes properly insulated and take an appropriate measure against humidity to minimize heat loss and prevent freeze damage in severe cold climate.
- If the system is stopped during winter or at night in subfreezing temperatures, take appropriate measures to protect pipes from freezing (i.e., pipe purging and use of water-circulation pump or heater) and prevent resultant damage to the plate heat exchanger.

Example piping system configuration



<Test run>

- Before performing a test run, check that the piping system is properly installed, especially the strainers, air-vents, automatic water-supply valves, expansion tanks, and systerns.
- After the pipe system is filled with water, first, operate the pump alone to check the system for trapped air and adjust the water flow rate to prevent the plate heat exchanger from freezing. Take into consideration the water pressure loss before and after each heat-source unit, and make sure the water flow rate falls within the design water flow rate range. Stop the test run and correct any problems found, if any.
- At the completion of a test run, check the strainer at the inlet pipe of the heat-source unit and clean it as necessary.

<Daily maintenance>

- Controlling the water quality
  Plate heat exchangers cannot be disassembled for cleaning and have no replaceable parts. Watch the water quality to prevent corrosion and scale formation. The quality of the water to be used for plate heat exchangers must meet the water quality guidelines JRA GL-02-1994 specified by Japan Refrigeration and Air conditioning Industry Association (JRAIA). (Refer to section <3> Water treatment and water quality control.)
- Controlling the circulation water flow rate
  Insufficient water rate will cause freeze damage to plate heat exchangers. Check for insufficient water flow caused by clogged strainer, trapped air in the system, or malfunction of the circulation water pump. Flow rate can also be checked by measuring the temperature or pressure difference between the inlet and outlet of plate heat exchangers.
  If the temperature or pressure difference goes outside of the specified range, stop the operation, remove the cause of the problem, and resume operation.
- What to do when the freeze protection trips
  If the freeze protection trips during operation, be sure to remove its cause before resuming operation. Tripped freeze protection indicates that the system is partially frozen, and resuming operation without removing the cause of the problem will result in freeze damage to plate heat exchangers and/or pipes as well as resultant refrigerant leaks and infiltration of water into the refrigerant circuit.

<Maintaining plate heat exchangers>

Plate heat exchangers must be maintained in a planned and periodical manner to prevent scale formation, which may cause performance loss or decrease water flow rate that result in freeze damage to the plate heat exchanger.

- Check the following items before the operating season.
  1. Check that the water quality meets the specified water quality.
  2. Clean the strainers.
  3. Check that the water flow rate is adequate.
  4. Check for proper operation (e.g., pressure, flow rate, inlet/outlet temperatures).

- Plate heat exchangers cannot be disassembled for cleaning. Clean them in the following way.
  1. Make sure that there is a pipe connection port on the water inlet pipe.
     Use formic acid, citric acid, oxalic acid, acetic acid, or phosphoric acid diluted to 5% to clean plate heat exchangers. Do not use highly corrosive acids, such as hydrochloric acid, sulfuric acid, or nitric acid.
  2. Make sure that valves are installed before the inlet connection port and after the outlet connection port.
  3. Connect a pipe for circulating cleaning solution to the inlet/outlet pipes of the plate heat exchanger, fill the plate heat exchanger with cleaning solution at a temperature between 50 and 60°C, and circulate the cleaning solution with a pump for 2 to 5 hours. The cleaning time will depend on the temperature of the cleaning solution and the degree of scale formation. Use the color of the cleaning solution as a guide to determine how long the system needs to be cleaned.
  4. When done, discharge the cleaning solution out of the plate heat exchanger, fill it with sodium hydrate (NaOH) or sodium bicarbonate ($NaHCO_3$) diluted with water to 1 to 2%, and let the solution be circulated for 15 to 20 minutes until the cleaning solution is neutralized.
  5. After neutralizing the cleaning solution, thoroughly rinse the plate heat exchanger with clean water.
  6. When using a commercially available cleaning solution, make sure to use a solution not corrosive to stainless steel or copper.
  7. Consult the cleaning solution manufacture for details.

- At the completion of cleaning, check the system for proper operation.

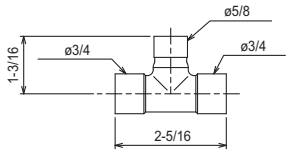
9-1. JOINT

CITY MULTI units can be easily connected by using Joint sets and Header sets provided by Mitsubishi Electric. Four kinds of Joint sets are available for use. Refer to section 3 in "System Design" or the Installation Manual that comes with the Joint set for how to install the Joint set.

CMY-Y102SS-G2

in.

For Gas pipe:



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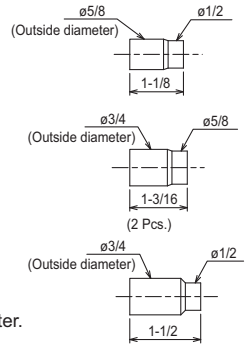
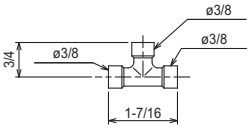


For Liquid pipe:



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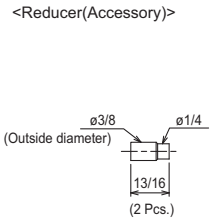
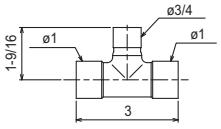


*Pipe diameter is indicated by inside diameter.

CMY-Y102LS-G2

in.

For Gas pipe:



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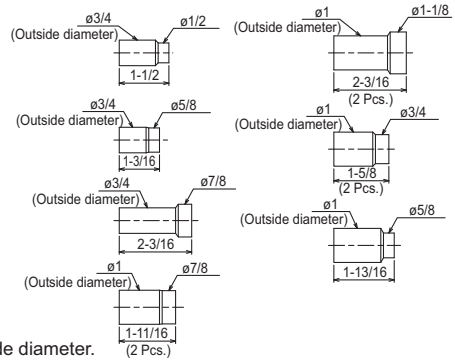
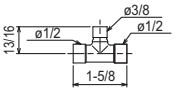


For Liquid pipe:



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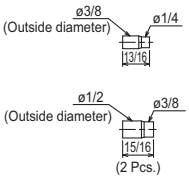
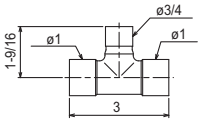


*Pipe diameter is indicated by inside diameter.

CMY-Y202S-G2

in.

For Gas pipe:



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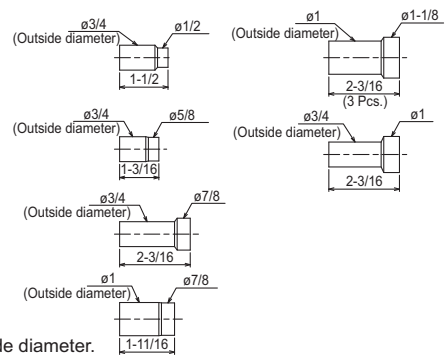
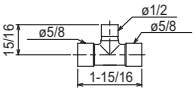


For Liquid pipe:



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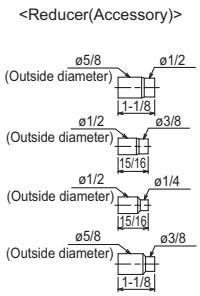
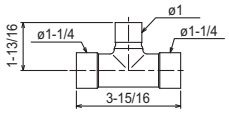


*Pipe diameter is indicated by inside diameter.

CMY-Y302S-G2

in.

For Gas pipe:



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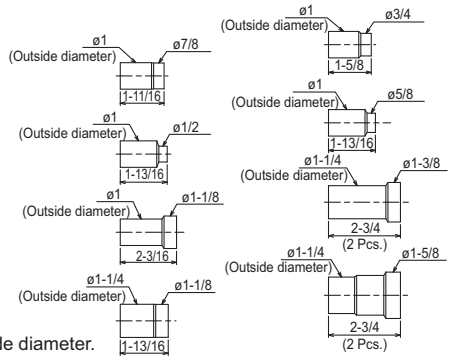
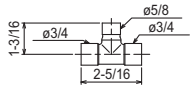


For Liquid pipe:



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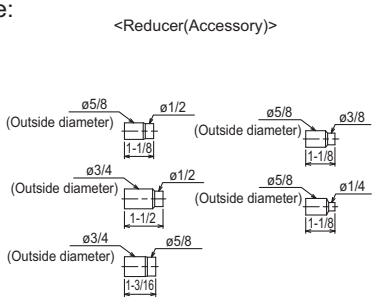


*Pipe diameter is indicated by inside diameter.

WR2

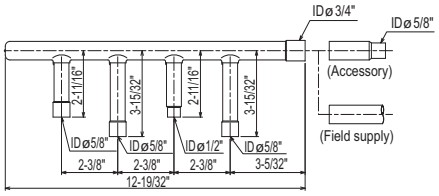
9-2. HEADER

CITY MULTI units can be easily connected by using Joint sets and Header sets provided by Mitsubishi Electric. Three kinds of Header sets are available for use. Refer to section 3 in "System Design" or the Installation Manual that comes with the Header set for how to install the Header set.

CMY-Y104C-G

in.

For gas pipe:



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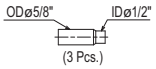
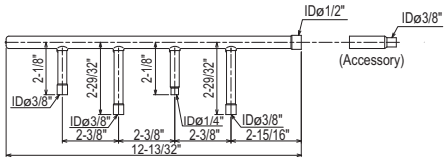


For liquid pipe:



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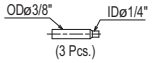
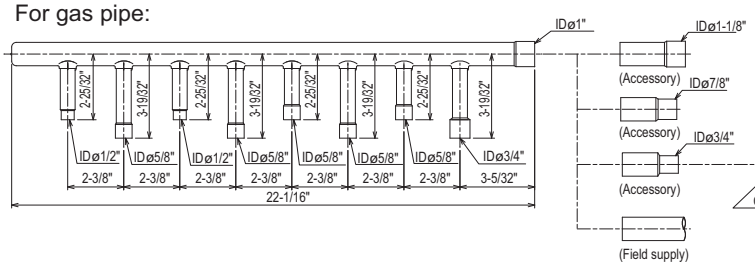


ID: Inner Diameter OD: Outer Diameter
NOTE: Besides above mentioned accessories, caps for ø1/4", ø3/8", ø1/2", ø5/8" pipes (each diameter 1 piece) are included in the Header set.

CMY-Y108C-G

in.

For gas pipe:



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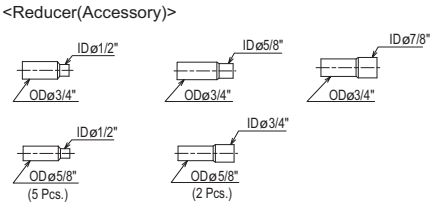
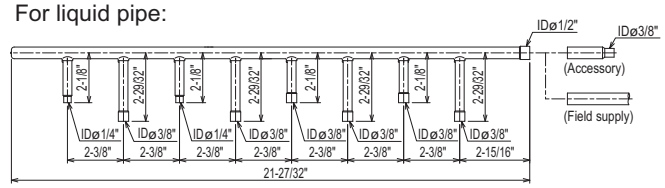


For liquid pipe:



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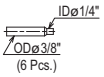
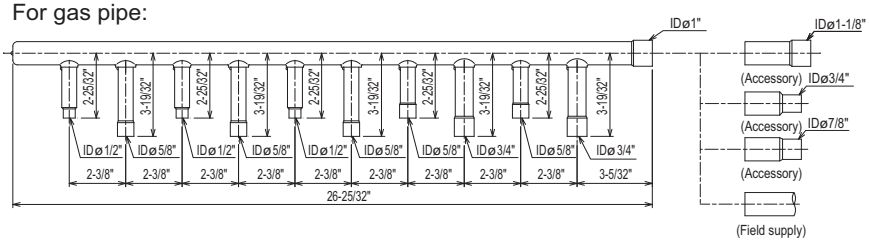


ID: Inner Diameter OD: Outer Diameter
NOTE: Besides above mentioned accessories, caps for ø1/4", ø3/8", ø1/2", ø5/8" pipes (each diameter 2 pieces) and 1 cap for ø3/4" pipe are included in the Header set.

CMY-Y1010C-G

in.

For gas pipe:



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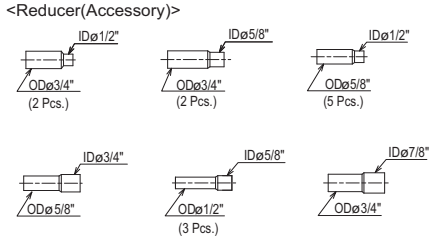
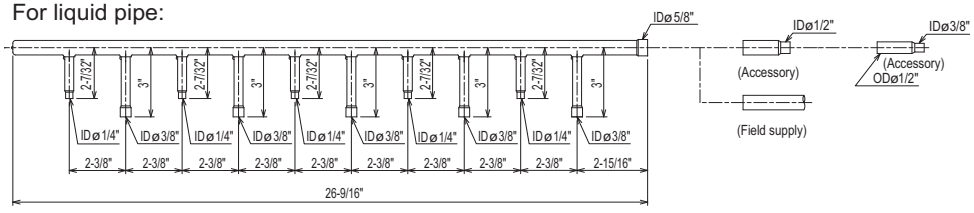


For liquid pipe:



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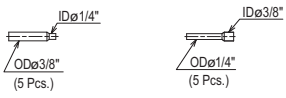


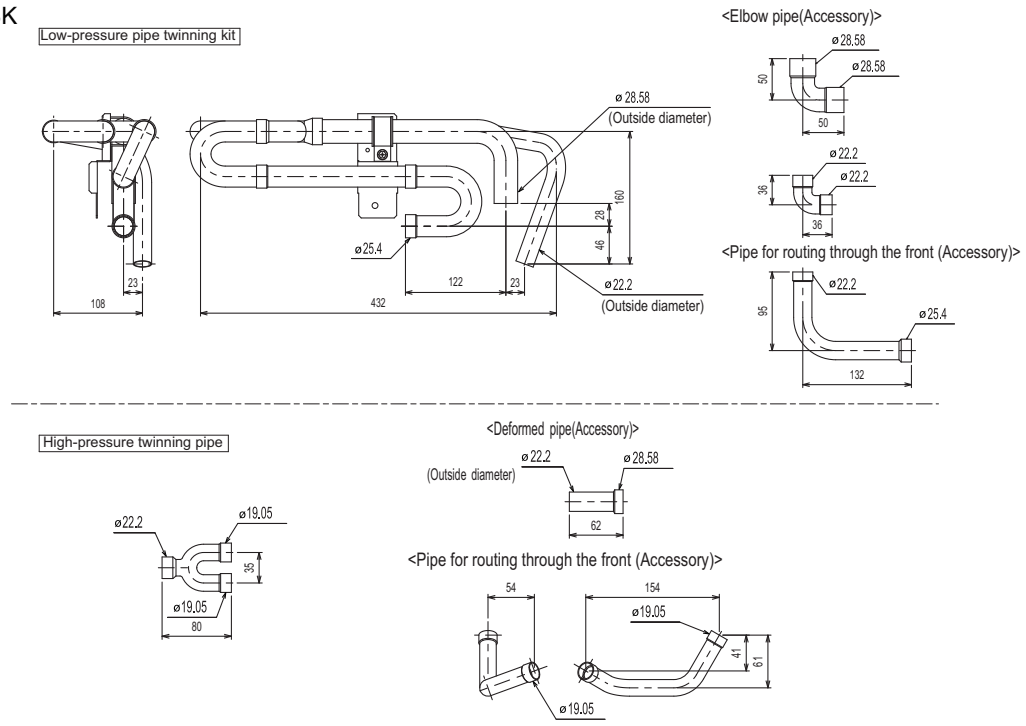
ID: Inner Diameter OD: Outer Diameter
NOTE: Besides above mentioned accessories, caps for ø1/4", ø3/8", ø1/2", ø5/8" pipes (each diameter 2 pieces) and 1 cap for ø3/4" pipe are included in the Header set.

WR2

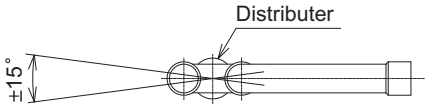
9-3. OUTDOOR TWINNING KIT

The following optional Outdoor Twinning Kit is needed to use to combine multiple refrigerant pipes. Refer to the chapter entitled System Design Section for the details of selecting a proper twinning kit.

CMY-Q100CBK



Note 1. Reference the attitude angle of the branch pipe below the fig.



The angle of the branch pipe for hign pressure is within ±15° against the horizontal plane.

2. Use the attached pipe to braze the port-opening of the distributer.
3. Pipe diameter is indicated by inside diameter.

WR2

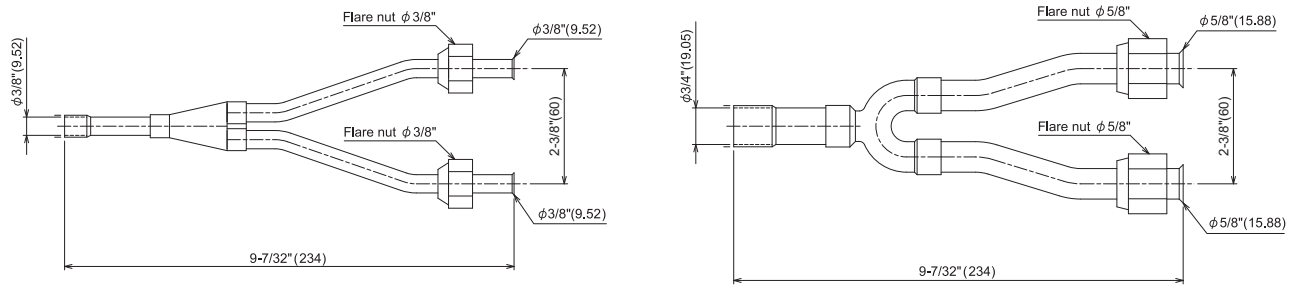
9-4. JOINT KIT "CMY-R160C-J" FOR BC CONTROLLER

Joint kit "CMY-R160C-J" is used to combine two ports of the BC controller for a PQRY-P-T(S)HMU-A/Y(S)HMU-A system to enable Indoor capacity above P55 as shown in Fig. 1.

The Joint kit include following items:

①Instructions	②Joint pipe	③Joint pipe	④Cover 1	⑤Cover 2	⑥Cover 3	⑦Band	⑧Reducer
	(for liquid side)	(for gas side)		(for gas side)	(for liquid side)		
1pc	1pc	1pc	2pcs	1pc	1pc	8pcs	1pc

②Joint pipe (for liquid side) ③Joint pipe (for gas side) in.(mm)



1. Designing CMY-R160C-J to a PQRY-P-T(S)HMU-A/ Y(S)HMU-A system

The maximum of Indoor capacity for one port of BC controller is P54. When the Indoor capacity is above P54, Joint kit CMY-R160C-J is needed to combine two ports of BC controller to enlarge the capacity, like Groups 2 and 3 in Fig. 1.

A maximum of three Indoor units are allowed to connect to one port of BC controller or two combined ports of BC controller using CMY-R160C-J.

When connecting Indoor units to one port of BC controller or two combined ports of BC controller using CMY-R160C-J, CMY-Y102SS-G2 or CMY-Y104C-G is applicable, like Groups 1 and 2 in Fig. 1

Caution: Simultaneous operation of cooling and heating modes for Indoor units connecting to the same BC ports is not available.

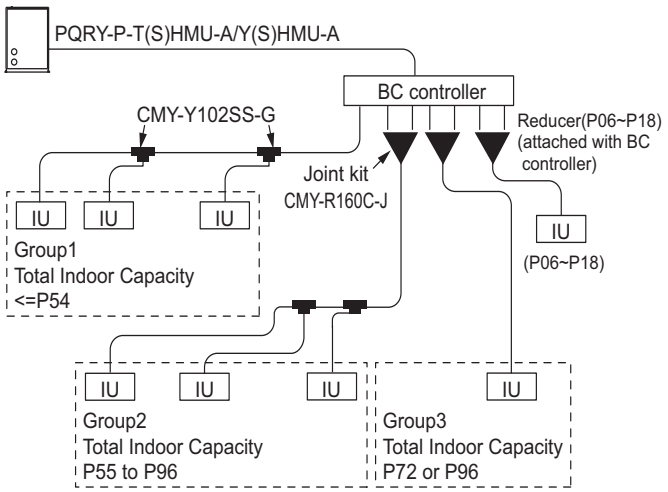


Fig.1. CMY-R160C-J applying scheme

2. Piping at the installation site

Refer to Fig. 2 for connecting the CMY-R160C-J to the BC controller and the pipe leading to the Indoor units. Non-oxidized brazing is necessary. Avoid getting foreign material inside the piping.

After piping and air-tight testing, insulate the joint and pipe. Details are available in the Installation Manual.

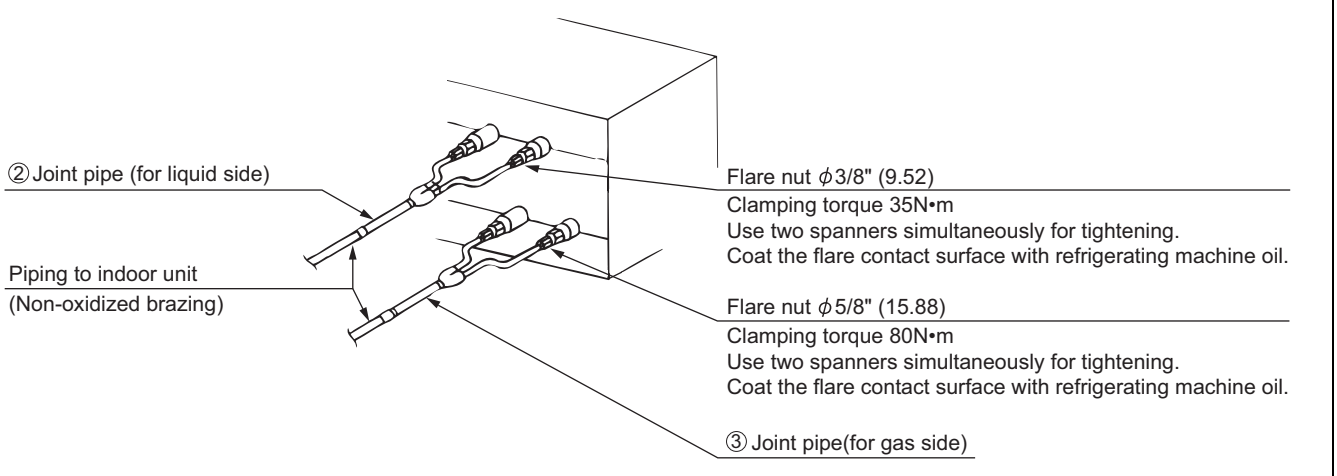


Fig.2. Connecting CMY-R160C-J