

PWFY-P-NMU-E-BU, -NMU-E-AU

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1. GENERAL DESCRIPTION

Unit Configuration

Model	PWFY-P36NMU-E-BU	PWFY-P36NMU-E-AU	PWFY-P72NMU-E-AU
	R2, H2i R2, WR2 series	Y, H2i Y, WY series R2, H2i R2, WR2 series	
BC Controllers	BC Controllers: CMB-P104,105,106,108,1010,1016NU-G		
	Main BC Controllers: CMB-P108,1010,1013, 1016-GA / CMB-P1016NU-HA		
	Sub BC Controllers: CMB-P104,108NU-GB / CMB-P1016NU-HB		

Operation Temperature Range

PWFY-P36NMU-E-BU

		Only PWFY	PWFY with standard indoor unit	Only standard indoor units
		Heating (WB)		
Inlet water temperature	R2/WR2 series	50 to 160° F (10 to 71° C)	50 to 160° F (10 to 71° C)	—
Outdoor temperature	R2 series	-4 to 90° F (-20 to 32° C)	-4 to 90° F (-20 to 32° C)	-4 to 60° F (-20 to 15.5° C)
	H2i R2 series	-13 to 90° F (-25 to 32° C)	-13 to 90° F (-25 to 32° C)	-13 to 60° F (-25 to 15.5° C)
Circulating Water temperature	WR2 series	50 to 113° F (10 to 45° C)	50 to 113° F (10 to 45° C)	50 to 113° F (10 to 45° C)

PWFY-P36, 72NMU-E-AU

		Only PWFY		PWFY with standard indoor unit	
		Cooling	Heating	Cooling	Heating
Inlet water temperature	R2/WR2 series	50 to 95° F (10 to 35° C)	50 to 105° F (10 to 41° C)	50 to 95° F (10 to 35° C)	50 to 105° F (10 to 41° C)
	Y/H2i Y/WY series	50 to 95° F (10 to 35° C)	50 to 105° F (10 to 41° C)	50 to 95° F (10 to 35° C)	50 to 105° F (10 to 41° C)
Outdoor temperature	R2 series	23 to 115° F (-5 to 46° C)	-4 to 90° F (-20 to 32° C)	23 to 115° F (-5 to 46° C)	-4 to 90° F (-20 to 32° C)
	H2i R2 series	23 to 115° F (-5 to 46° C)	-13 to 90° F (-25 to 32° C)	23 to 115° F (-5 to 46° C)	-13 to 90° F (-25 to 32° C)
	Y series	23 to 115° F (-5 to 46° C)	-4 to 60° F (-20 to 15.5° C)	23 to 115° F (-5 to 46° C)	-4 to 60° F (-20 to 15.5° C)
	H2i Y series	23 to 109° F (-5 to 43° C)	-13 to 60° F (-25 to 15.5° C)	23 to 109° F (-5 to 43° C)	-13 to 60° F (-25 to 15.5° C)
Circulating Water temperature	WR2 series	50 to 113° F (10 to 45° C)	50 to 113° F (10 to 45° C)	50 to 113° F (10 to 45° C)	50 to 113° F (10 to 45° C)
	WY series	50 to 113° F (10 to 45° C)	50 to 113° F (10 to 45° C)	50 to 113° F (10 to 45° C)	50 to 113° F (10 to 45° C)

Connectable outdoor unit capacity range

PWFY-P36NMU-E-BU

	Only PWFY	PWFY with standard indoor unit	Only standard indoor units
R2/H2i R2/WR2 series	50 to 100%	50 to 150%	50 to 150%

PWFY-P36, 72NMU-E-AU

	Only PWFY	PWFY with standard indoor unit	Only standard indoor units
R2/H2i R2/WR2 series	50 to 100%	50 to 150%	50 to 150%
Y/H2i Y/WY series	50 to 100%	50 to 130%	50 to 130%

2. SPECIFICATIONS

Model			PWFY-P36NMU-E-BU	
Power source			1-phase 208-230V 60Hz	
Heating capacity (Nominal)	*1	kW	11.7	
	*1	kcal / h	10,100	
	*1	Btu / h	39,900	
		Power input	kW	2.48
		Current input	A	12.30 - 11.12
Temp. range of heating	Outdoor temp.	W.B	-4~90°F (-20~32°C)	
	Inlet Water temp.	-	50~160°F (10~71°C)	
Connectable outdoor unit	Total capacity	50~100% of outdoor unit capacity		
	Model / Quantity	PURY-P•T(S)KMU-A(-BS) PURY-P•Y(S)KMU-A(-BS) PURY-HP•T(S)KMU-A(-BS) PURY-HP•Y(S)KMU-A(-BS) PQRY-P•T(S)HMU-A PQRY-P•Y(S)HMU-A		
Sound pressure level (measured in anechoic room)		dB<A>	44	
Diameter of refrigerant pipe	Liquid	in.(mm)	Φ3/8 (Φ9.52) Brazed	
	Gas	in.(mm)	Φ5/8 (Φ15.88) Brazed	
Diameter of water pipe	Inlet	in.(mm)	PT3/4 (27.2) Screw	
	Outlet	in.(mm)	PT3/4 (27.2) Screw	
Field drain pipe size		in.(mm)	Φ1-1/4 (Φ32)	

External finish			NO	
External dimension H × W × D		mm	800 (785 without legs) × 450 × 300	
		in.	31-1/2" (30-15/16" without legs) × 17-3/4" × 11-13/16"	
Net weight		lbs(kg)	133 (60)	
Compressor	Type	Inverter rotary hermetic compressor		
	Maker	MITSUBISHI ELECTRIC CORPORATION		
	Starting method	Inverter		
	Motor output	kW	1.0	
	Lubricant	NEO22		
Circulating water	Operation volume Range	m³/h	0.6~2.15	
		G/h	158~568	
		gpm	2.6~9.4	
		L/min	10~36	
Protection on Internal circuit (R134a)	High pressure protection		High pressure sensor, High pressure switch at 3.60 MPa (522 psi)	
	Inverter circuit (COMP)		Over-heat protection, Over-current protection	
	Compressor		Discharge thermo protection, Over-current protection	
Refrigerant	Type × original charge		R134a x (2lbs + 7oz) (1.1kg)	
	Control		LEV	
Design pressure	R410A	psi	601	
		MPa	4.15	
	R134a	psi	522	
		MPa	3.60	
	Water	psi	145	
		MPa	1.00	
Drawing	External		WKB94T460	
	Wiring		KE94C344	
Standard attachment	Document		Installation Manual, Instruction Book	
	Accessory		Strainer, Heat insulation material, 2 × Connector sets, 2 × Washer, wire	
Optional parts			NONE	

Remark		Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual.	
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Note:	*1 Nominal heating conditions (PWFY conditions are indicated in the parentheses.)	Unit converter
<R2/H2i R2-series>		<WR2-series>
Outdoor Temp. : 47°FDB / 43°FWB (8.3°CDB/6.1°CWB)		Circulating water Temp.: 70°F (21.1°C)
Pipe length : 25 ft (7.6 m)		Pipe length : 25 ft (7.6 m)
Level difference : 0 ft (0 m)		Level difference : 0 ft (0 m)
(Inlet water Temp.: 149°F (65°C) Water flow rate: 9.2 gpm (2.15 m³/h))		(Inlet water Temp.: 149°F (65°C) Water flow rate 9.2 gpm (2.15 m³/h))
* Due to continuing improvement, the above specifications may be subject to change without notice.		* Install the unit in an environment where the wet bulb Temp. will not exceed 90°F (32°C).
* The unit is not designed for outside installations.		* The water circuit must use the closed circuit.
* Please don't use the steel material for the water piping material.		* Please do not use it as a drinking water.
* Please always make water circulate or add the brine to the circulation water when the ambient temperature becomes 32°F (0°C) or less.		* The specification data is subject to rounding variation.
* Please always make water circulate or pull out the circulation water completely when not using it.		
* Please do not use groundwater and well water.		

2. SPECIFICATIONS

Model			PWFY-P36NMU-E-AU
Power source			1-phase 208 - 230 V 60Hz
Heating capacity (Nominal)	*1	kW	11.7
	*1	kcal / h	10,100
	*1	Btu / h	39,900
	Power input	kW	0.015
	Current input	A	0.072 - 0.065
Temp. range of heating	Outdoor temp.	W.B	-4~90°F (-20~32°C) R2-series
		W.B	-4~60°F (-20~15.5°C) Y-series
		W.B	-13~60°F (-25~15.5°C) H2I-series
	Inlet Water temp.	-	50~105°F (10~41°C)
Cooling capacity (Nominal)	*2	kW	10.6
	*2	kcal / h	9,100
	*2	Btu / h	36,200
	Power input	kW	0.015
	Current input	A	0.072 - 0.065
Temp. range of cooling	Outdoor temp.	D.B	23~115°F (-5~46°C) R2-series
		D.B	23~115°F (-5~46°C) Y-series
		D.B	23~109°F (-5~43°C) H2I-series
	Inlet Water temp.	-	50~95°F (10~35°C)
Connectable outdoor unit	Total capacity		50~100% of outdoor unit capacity
	Model / Quantity		PUHY-P•T(S)KMU-A(-BS) PUHY-P•Y(S)KMU-A(-BS) PUHY-HP•T(S)KMU-A(-BS) PURY-P•T(S)KMU-A(-BS) PURY-P•Y(S)KMU-A(-BS) PURY-HP•T(S)KMU-A(-BS) PURY-HP•Y(S)KMU-A(-BS) PQHY-P•T(S)HMU-A PQHY-P•Y(S)HMU-A PQRY-P•T(S)HMU-A PQRY-P•Y(S)HMU-A
Sound pressure level (measured in anechoic room)		dB<A>	29
Diameter of refrigerant pipe	Liquid	in.(mm)	Φ3/8 (Φ9.52) Brazed
	Gas	in.(mm)	Φ5/8 (Φ15.88) Brazed
Diameter of water pipe	Inlet	in.(mm)	PT3/4 (27.2) Screw
	Outlet	in.(mm)	PT3/4 (27.2) Screw
Field drain pipe size		in.(mm)	Φ1-1/4 (Φ32)

External finish			NO	
External dimension H × W × D		mm	800 (785 without legs) × 450 × 300	
		in.	31-1/2" (30-15/16" without legs) × 17-3/4" × 11-13/16"	
Net weight		lbs(kg)	78 (35)	
Circulating water	Operation Volume Range	m³/h	1.1~2.15	
		G/h	290~568	
		gpm	4.8~9.4	
		L/min	18~36	
Design pressure	R410A	psi	601	
		MPa	4.15	
	Water	psi	145	
		MPa	1.00	
Drawing	External	WKB94T461		
	Wiring	KE94C345		
Standard attachment	Document	Installation Manual, Instruction Book		
	Accessory	Strainer, Heat insulation material, 2 × Connector sets , 2 × Washer, wire, Flow switch × 1set		
Optional parts		NONE		
Remark		Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual.		

Note:		Unit converter
*1 Nominal heating conditions (PWFY conditions are indicated in the parentheses.) <Y/H2I Y/R2/H2I R2-series> Outdoor Temp. : 47°FDB/43°FWB (8.3°CDB/6.1°CWB) Pipe length : 25 ft (7.6 m) Level difference : 0 ft (0 m) (Inlet water Temp.: 86°F (30°C)) (Water flow rate: 9.2 gpm (2.15 m³/h))	<WY/WR2-series> Circulating water Temp.: 70°F (21.1°C) Pipe length : 25 ft (7.6 m) Level difference : 0 ft (0 m) (Inlet water Temp.: 86°F (30°C)) (Water flow rate: 9.2 gpm (2.15 m³/h))	kcal = kW x 860 BTU/h = kW x 3,412 cfm = m³/min x 35.31 G(us) = L x 0.2642 lbs = kg / 0.4536 psi = MPa x 145.038
*2 Nominal cooling conditions (PWFY conditions are indicated in the parentheses.) <Y/H2I Y/R2/H2I R2-series> Outdoor Temp. : 95°FDB (35°CDB) Pipe length : 25 ft (7.6 m) Level difference : 0 ft (0 m) (Inlet water Temp.: 149°F (23°C)) (Water flow rate: 8.3 gpm (1.93 m³/h))	<WY/WR2-series> Circulating water Temp.: 70°F (21.1°C) Pipe length : 25 ft (7.6 m) Level difference : 0 ft (0 m) (Inlet water Temp.: 149°F (23°C)) (Water flow rate: 8.3 gpm (1.93 m³/h))	* The specification data is subject to rounding variation.
* Due to continuing improvement, the above specifications may be subject to change without notice. * Install the unit in an environment where the wet bulb Temp. will not exceed 92°F (32°C)		
* The unit is not designed for outside installations. * The water circuit must use the closed circuit.		
* Please don't use the steel material for the water piping material. * Please always make water circulate or add the brine to the circulation water when the ambient temperature becomes 32°F (0°C) or less.		
* Please always make water circulate or pull out the circulation water completely when not using it. * Please do not use it as a drinking water.		
* Please do not use groundwater and well water.		

2. SPECIFICATIONS

Model			PWFY-P72NMU-E-AU
Power source			1-phase 208 - 230 V 60Hz
Heating capacity (Nominal)	*1	kW	23.4
	*1	kcal / h	20,100
	*1	Btu / h	79,800
	Power input	kW	0.015
	Current input	A	0.072 - 0.065
Temp. range of heating	Outdoor temp.	W.B	-4~90°F (-20~32°C) R2-series
		W.B	-4~60°F (-20~15.5°C) Y-series
		W.B	-13~60°F (-25~15.5°C) H2i-series
	Inlet Water temp.	-	50~105°F (10~41°C)
Cooling capacity (Nominal)	*2	kW	21.1
	*2	kcal / h	18,100
	*2	Btu / h	72,000
	Power input	kW	0.015
	Current input	A	0.072 - 0.065
Temp. range of cooling	Outdoor temp.	D.B	23~115°F (-5~46°C) R2-series
		D.B	23~115°F (-5~46°C) Y-series
		D.B	23~109°F (-5~43°C) H2i-series
	Inlet Water temp.	-	50~95°F (10~35°C)
Connectable outdoor unit	Total capacity	50~100% of outdoor unit capacity	
	Model / Quantity	PUHY-P•T(S)KMU-A(-BS) PUHY-P•Y(S)KMU-A(-BS) PUHY-HP•T(S)KMU-A(-BS) PURY-P•T(S)KMU-A(-BS) PURY-P•Y(S)KMU-A(-BS) PURY-HP•T(S)KMU-A(-BS) PURY-HP•Y(S)KMU-A(-BS) PQHY-P•T(S)HMU-A PQHY-P•Y(S)HMU-A PQRY-P•T(S)HMU-A PQRY-P•Y(S)HMU-A	
Sound pressure level (measured in anechoic room)		dB<A>	29
Diameter of refrigerant pipe	Liquid	in.(mm)	Φ3/8 (Φ9.52) Brazed
	Gas	in.(mm)	Φ3/4 (Φ19.05) Brazed
Diameter of water pipe	Inlet	in.(mm)	PT 1 (34) Screw
	Outlet	in.(mm)	PT 1 (34) Screw
Field drain pipe size		in.(mm)	Φ1-1/4 (Φ32)

External finish		NO	
External dimension H × W × D	mm	800 (785 without legs) × 450 × 300	
		31-1/2" (30-15/16" without legs) × 17-3/4" × 11-13/16"	
Net weight	lbs(kg)	84 (38)	
Circulating water	Operation Volume Range	m³/h	1.8~4.30
		G/h	475~1136
		gpm	7.9~18.9
		L/min	30~72
Design pressure	R410A	psi	601
		MPa	4.15
	Water	psi	145
		MPa	1.00
Drawing	External	WKB94T461	
	Wiring	KE94C345	
Standard attachment	Document	Installation Manual, Instruction Book	
	Accessory	Strainer , Connector , Heat insulation material, 2 × Connector sets , Expansion joint , 2 × Washer, wire, Flow switch × 1set	
Optional parts		NONE	
Remark		Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual.	

Note:	*1 Nominal heating conditions (PWFY conditions are indicated in the parentheses.)		Unit converter	
	<Y/H2i Y/R2/H2i R2-series> Outdoor Temp. : 47°FDB/43°FWB (8.3°CDB/6.1°CWB) Pipe length : 25 ft (7.6 m) Level difference : 0 ft (0 m) (Inlet water Temp.: 86°F (30°C)) (Water flow rate: 18.5 gpm (4.30 m³/h))	<WY/WR2-series> Circulating water Temp.: 70°F (21.1°C) Pipe length : 25 ft (7.6 m) Level difference : 0 ft (0 m) (Inlet water Temp.: 86°F (30°C)) (Water flow rate: 18.5 gpm (4.30 m³/h))	kcal = kW x 860 BTU/h = kW x 3,412 cfm = m³/min x 35.31 G(us) = L x 0.2642 lbs = kg / 0.4536 psi = MPa x 145.038	* The specification data is subject to rounding variation.
	*2 Nominal cooling conditions (PWFY conditions are indicated in the parentheses.)			
	<Y/H2i Y/R2/H2i R2-series> Outdoor Temp. : 95°FDB (35°CDB) Pipe length : 25 ft (7.6 m) Level difference : 0 ft (0 m) (Inlet water Temp.: 149°F (23°C)) (Water flow rate: 16.6 gpm (3.86 m³/h))	<WY/WR2-series> Circulating water Temp.: 70°F (21.1°C) Pipe length : 25 ft (7.6 m) Level difference : 0 ft (0 m) (Inlet water Temp.: 149°F (23°C)) (Water flow rate: 16.6 gpm (3.86 m³/h))		
* Due to continuing improvement, the above specifications may be subject to change without notice.				
* The unit is not designed for outside installations.				
* Please don't use the steel material for the water piping material.				
* The water circuit must use the closed circuit.				
* Please always make water circulate or add the brine to the circulation water when the ambient temperature becomes 32°F (0°C) or less.				
* Please always make water circulate or pull out the circulation water completely when not using it.				
* Please do not use it as a drinking water.				
* Please do not use groundwater and well water.				

3. EXTERNAL DIMENSIONS

PWFY-P36NMU-E-BU

- <Accessories>
- Y-type strainer (RC3/4) 1pc.
 - Heat insulation material 1pc.
 - Connector set 2set
 - Washer 2pcs.

Note 1. Ensure no water or debris can enter the unit through any gaps around wiring or piping.

2. Ensure adequate service space is right around the unit, according to Fig A.
3. Please always make water circulate or add the brine to the circulation water when the ambient temperature becomes 0degC(32°F) or less.

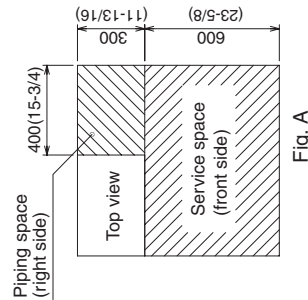
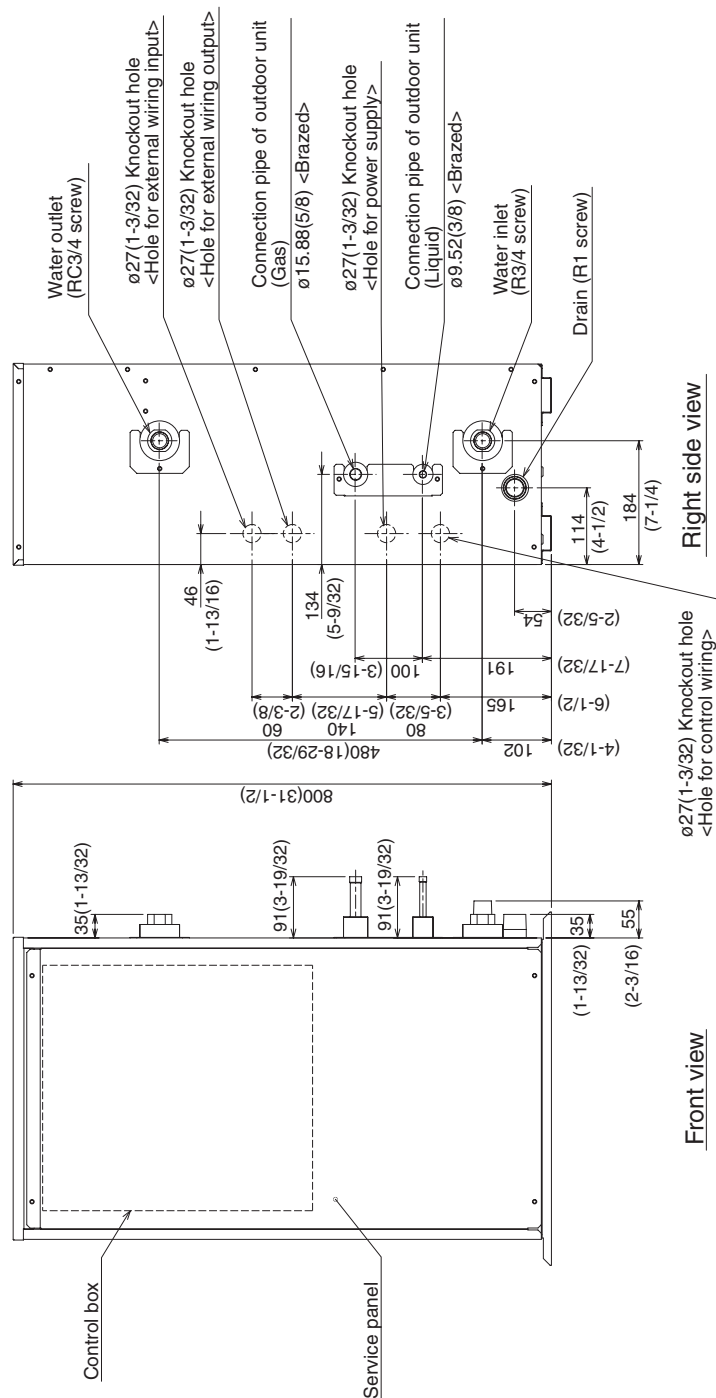
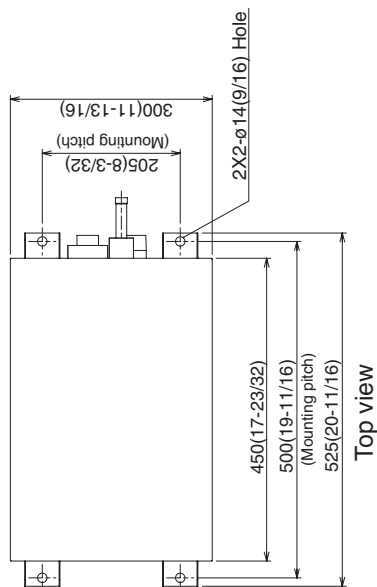
4. The unit is not designed for outside installations.

5. Install the unit in an environment where the wet bulb Temp. will not exceed 32degC(90°F).

6. The water circuit must use the closed circuit.

7. Please don't use the steel material for the water piping material.

8. Connect the strainer which is put as accessory to water inlet pipe.



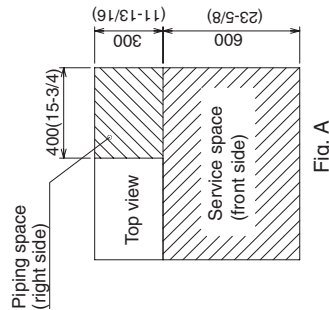
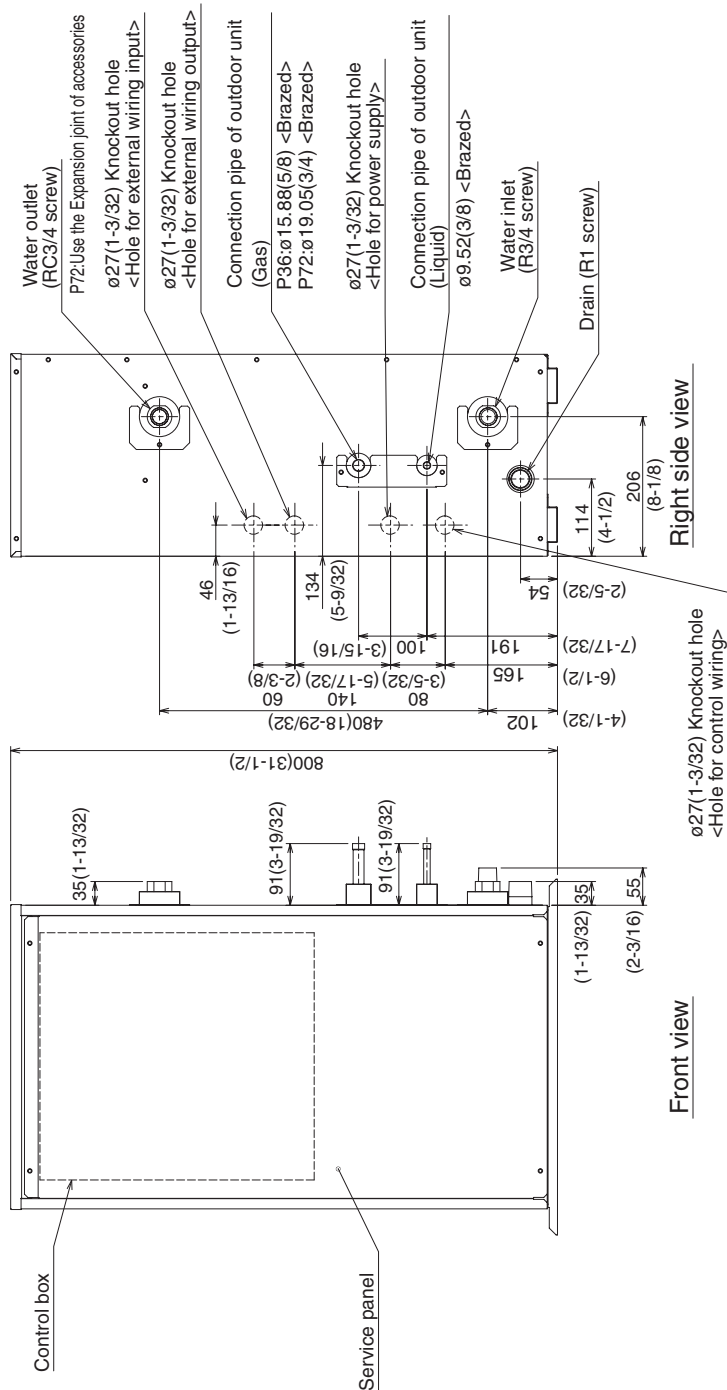
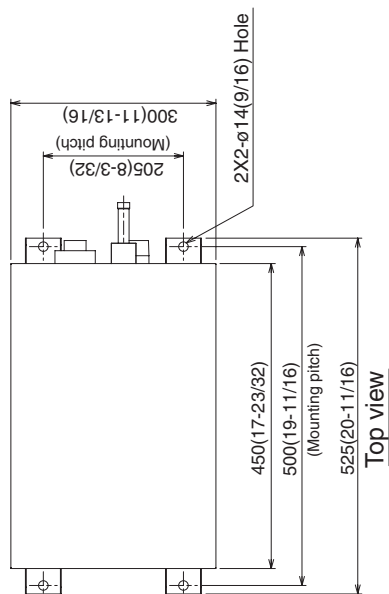
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3. EXTERNAL DIMENSIONS

PWFY-P36,72NMU-E-AU

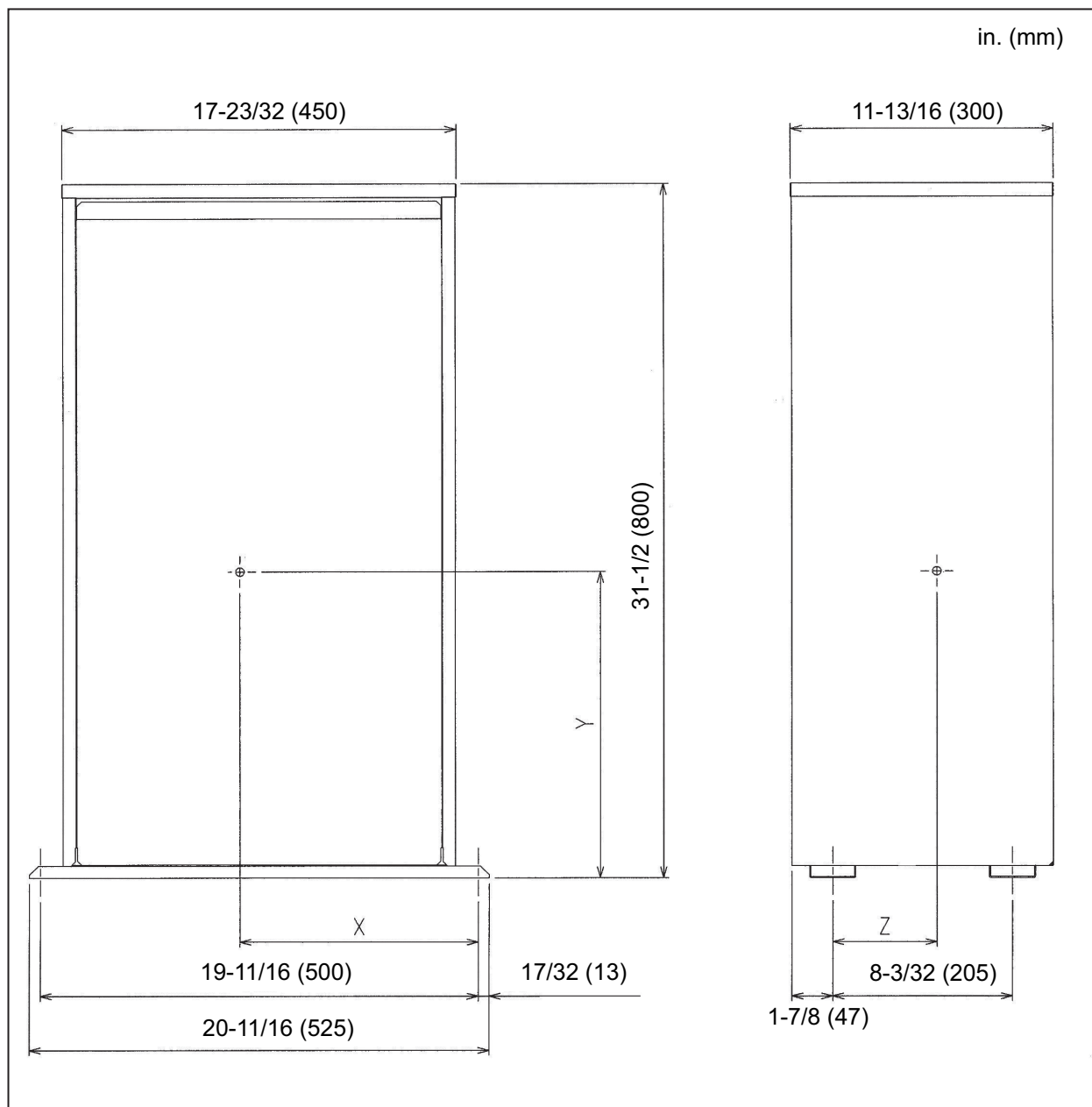
- <Accessories>
- Y-type strainer (RC3/4) 1pc.
 - Heat insulation material 1pc.
 - Connector set 2set
 - Washer 2pcs.
 - Expansion joint(P72) 2pcs.
- [From RC3/4 to RC1]

- Note 1. Ensure no water or debris can enter the unit through any gaps around wiring or piping.
2. Ensure adequate service space is right around the unit, according to Fig A.
3. Please always make water circulate or add the brine to the circulation water when the ambient temperature becomes 0degC(32°F) or less.
4. The unit is not designed for outside installations.
5. Install the unit in an environment where the wet bulb Temp. will not exceed 32degC(90°F).
6. The water circuit must use the closed circuit.
7. Please don't use the steel material for the water piping material.
8. Connect the strainer which is put as accessory to water inlet pipe.



<Unit:mm(in)>

4. CENTER OF GRAVITY



PWFY-P36NMU-E-BU

<HIGH VOLTAGE WARNING>

- 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 CNG31 on Control Board has dropped to DC20V or less.

<CAUTION FOR INSTALLATION>

- Prior to installation, read the Installation Manual carefully.
- *1. Single-dotted lines indicate wiring not supplied with the unit.
- *2. Dot-dash lines indicate the control box boundaries.
- *3. Faston terminals have a locking function.

Make sure the terminals are securely locked in place after insertion. Press the tab on the terminals to removed them.

*4 TB141A(output)

Symbol	Function
OUT1	Operation ON/OFF
OUT2	Defrost
OUT3	Compressor
OUT4	Error signal

*5 TB142A(input)

Symbol	Function
INT1	Pump interlock

*6 TB142B(input)

Symbol	Function
INS1	Connection demand
INA	Operation ON/OFF

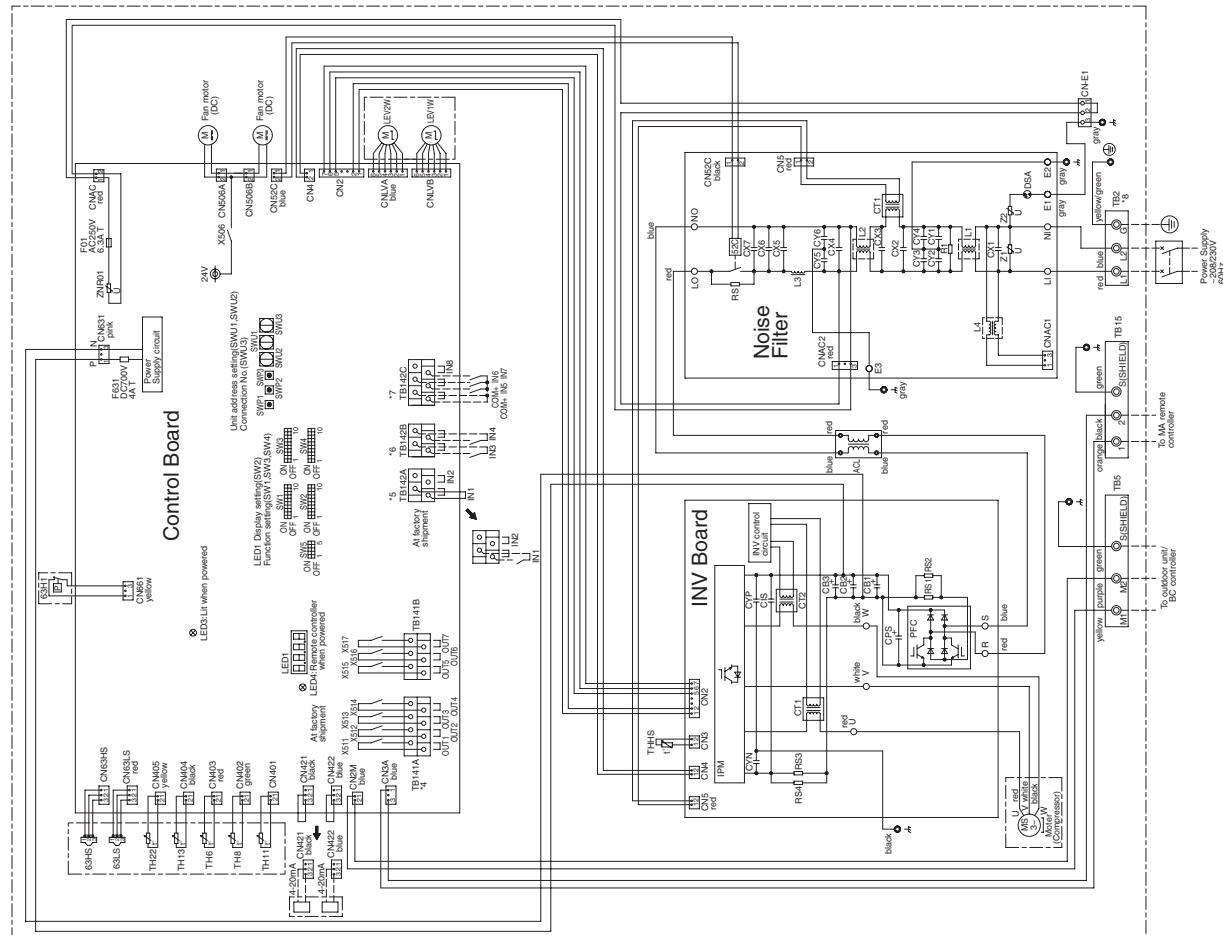
*7 TB142C(input)

Symbol	Function
COM+	Common
INS	Hot water/Heating
INS	Heating ECO
INT	Anti-freeze

*8. Use copper supply wires.

<Symbol explanation>

Symbol	Explanation
63H1	High pressure switch
63H2	High pressure protection for the booster unit
63LS	Pressure sensor
63S	Low pressure
52C	Magnetic relay(main circuit)
ACL	AC reactor
CT1,CT2	Current sensor(AC)
LEVW	Linear expansion valve
LEVW	Expansion valve
TE5	Terminal block
TE5	Outdoor unit/BC controller
TE5	MA remote controller
TH11	Thermistor
TH13	Compressor discharge temp
TH22	Evaporator outlet temp
TH6	Liquid pipe temp
TH6	Water inlet temp
TH6	Water outlet temp
THHS	IGBT temp



5. ELECTRICAL WIRING DIAGRAMS

PWFY-P36,72NMU-E-AU

<CAUTION FOR INSTALLATION>

- Prior to installation, read the Installation Manual carefully.
- *1. Single-dotted lines indicate wiring not supplied with the unit.
- *2. Dot-dash lines indicate the control box boundaries.
- *3. Difference of appliance

Model name	Appliance
P36	*3 do not exist
P72	*3 exist

*4 TB141A(output)

Symbol	Function
OUT1	Operation ON/OFF
OUT2	Pressure
OUT4	Error signal

*5 TB142A(input)

Symbol	Function
IN1	Pump interlock

*6 TB142B(input)

Symbol	Function
IN3	Connection demand
IN4	Operation ON/OFF

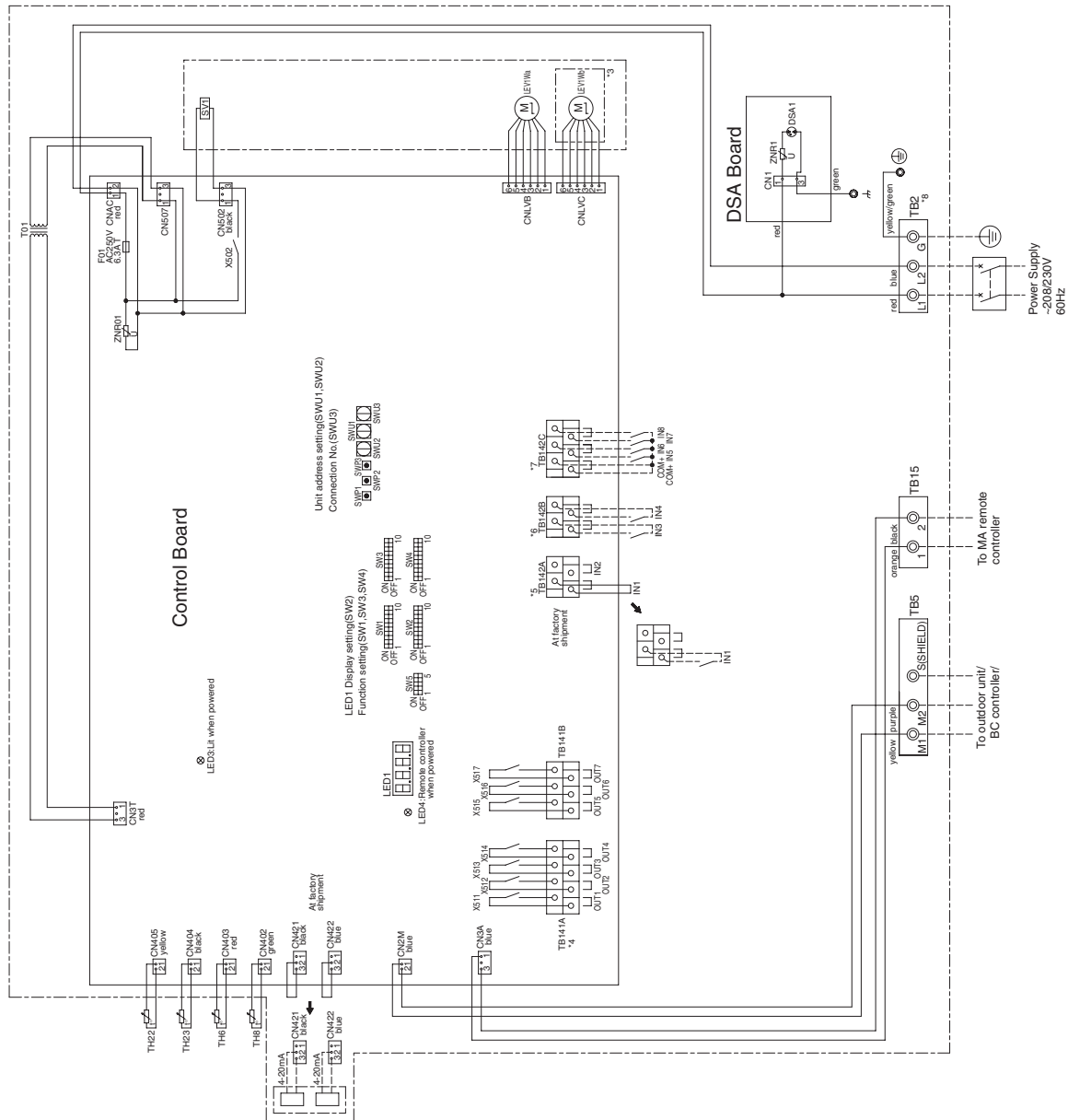
*7 TB142C(input)

Symbol	Function
COM+	Common
IN5	Heating
IN6	Heating ECO
IN7	Anti-freeze
IN8	Cooling

- *8. Use copper supply wires.

<Symbol explanation>

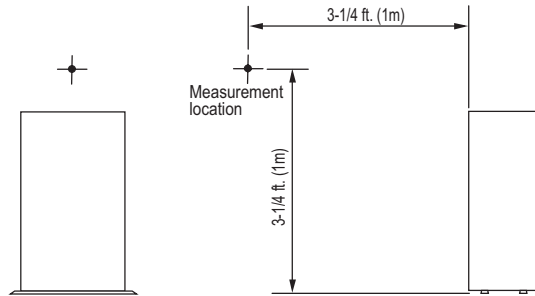
Symbol	Explanation
SV1	Solenoid valve
LEV1Wa	Linear
LEV1Wb	expansion valve
TB2	Terminal
TB5	Block
TH2	Thermistor
TH22	Thermistor
TH23	Thermistor
TH6	gas pipe temp
TH6	water inlet temp
TH8	water outlet temp



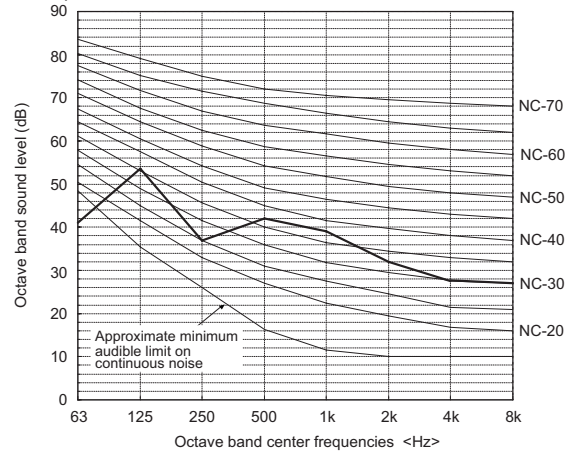
7. SOUND PRESSURE LEVELS

7-1. Sound Pressure Levels and NC Curves

Measurement condition
PWFY-P36NMU-E-BU

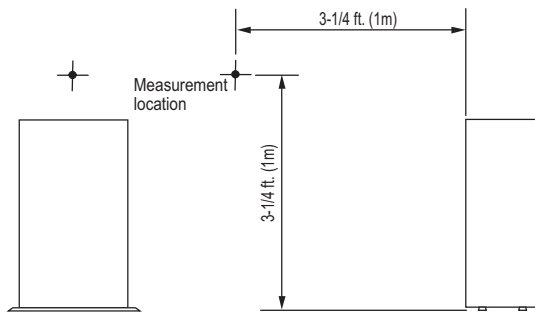


Sound pressure level of PWFY-P36NMU-E-BU

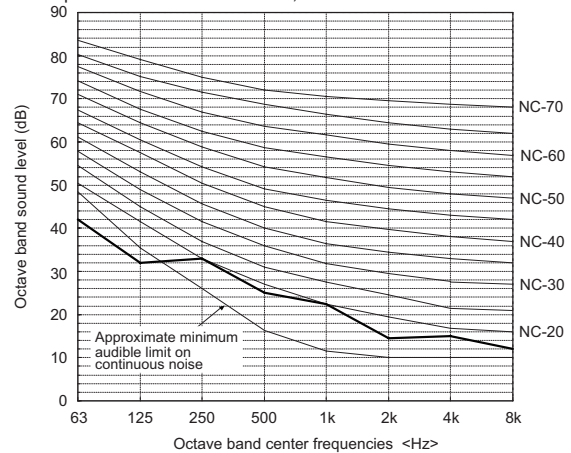


	63	125	250	500	1k	2k	4k	8k	dB(A)
60Hz	41.0	53.5	37.0	42.0	39.0	32.0	27.5	27.0	44.0

Measurement condition
PWFY-P36, 72NMU-E-AU



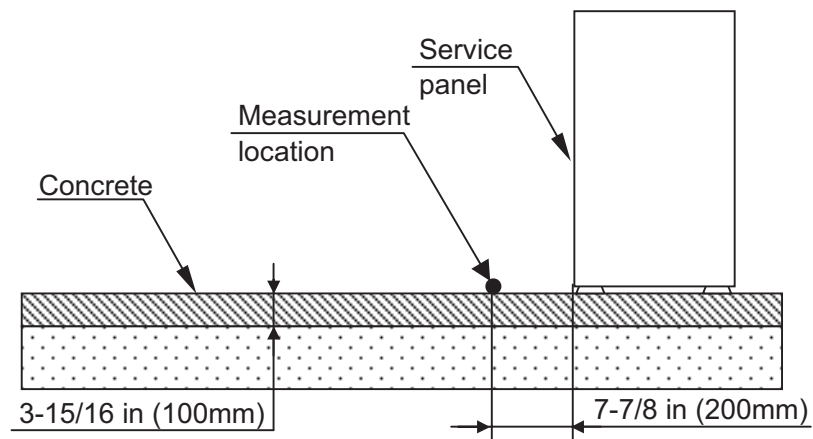
Sound pressure level of PWFY-P36, 72NMU-E-AU



	63	125	250	500	1k	2k	4k	8k	dB(A)
60Hz	42.0	32.0	33.0	25.0	22.5	14.5	15.0	12.0	29.0

8. VIBRATION LEVELS

PWFY-P36NMU-E-BU



Model	Vibration Levels[dBA]
PWFY-P36NMU-E-BU	34

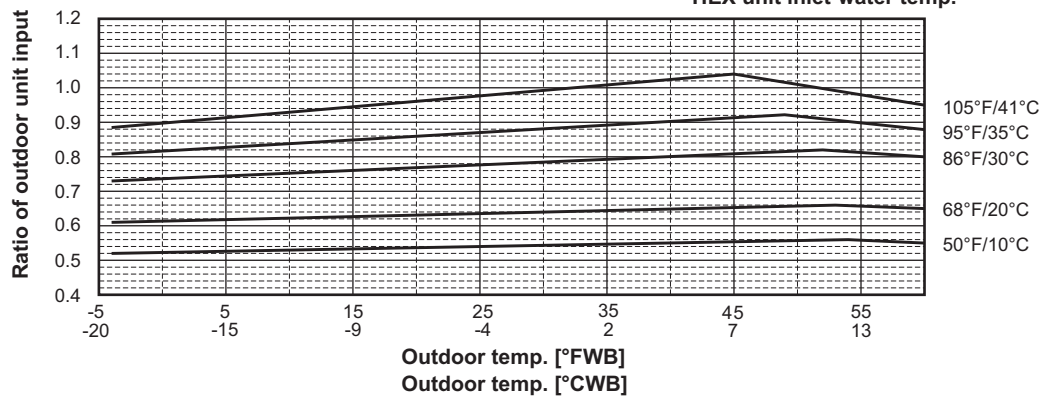
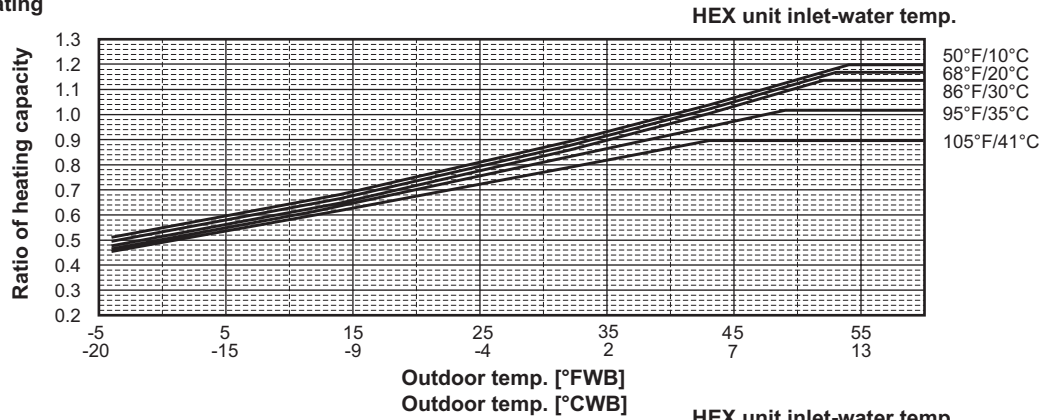
9. CAPACITY TABLES

9-1. Correction by Temperature

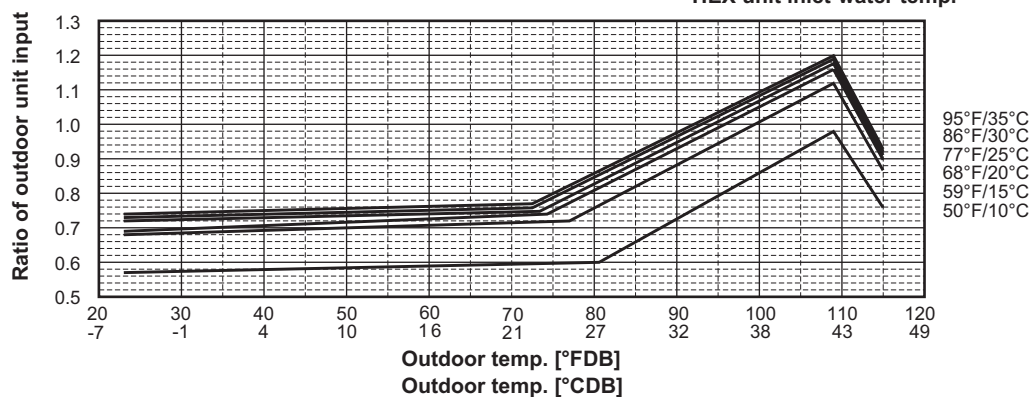
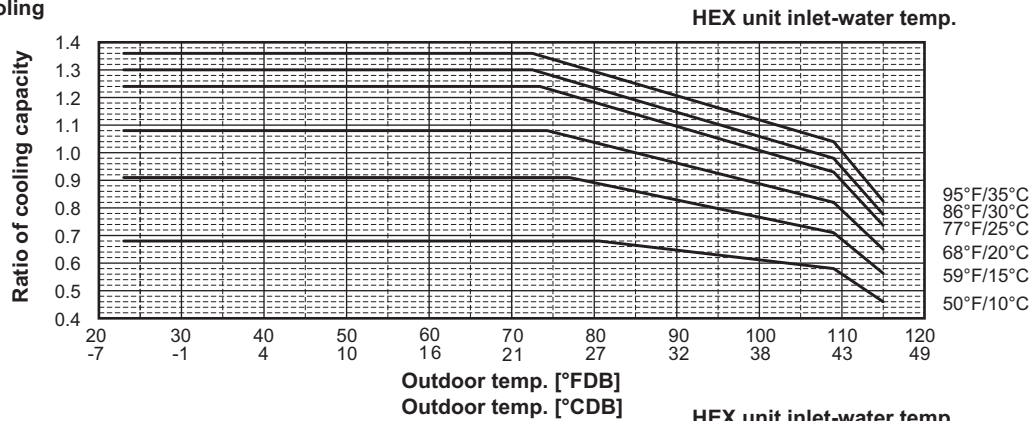
Y-Series + PWFY-P36/72NMU-E-AU

PUHY-	P72, 96TKMU-A(-BS)	P72, 96YKMU-A(-BS)
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Heating



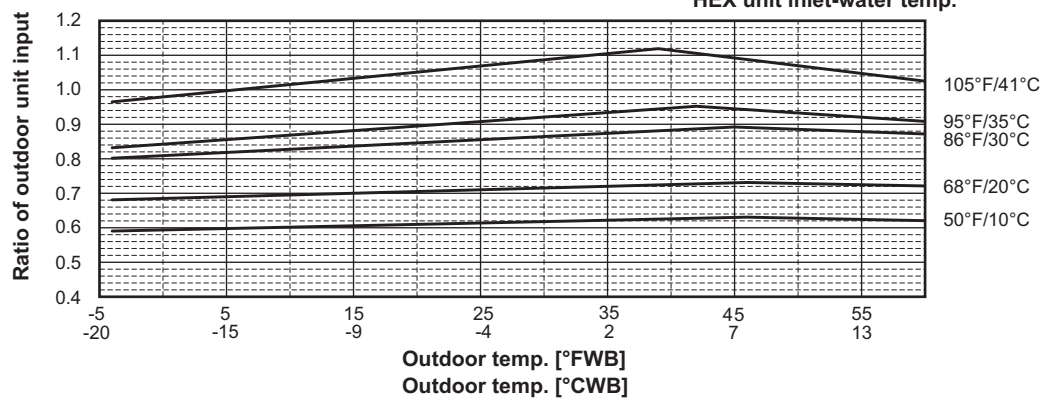
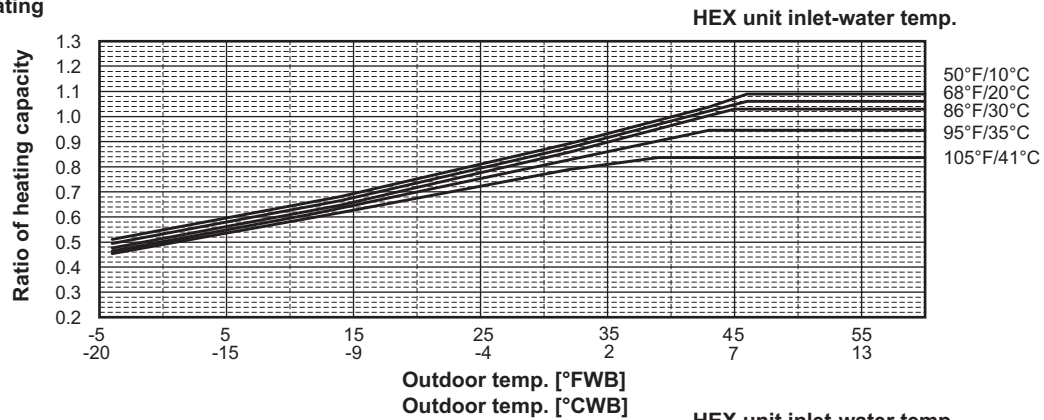
Cooling



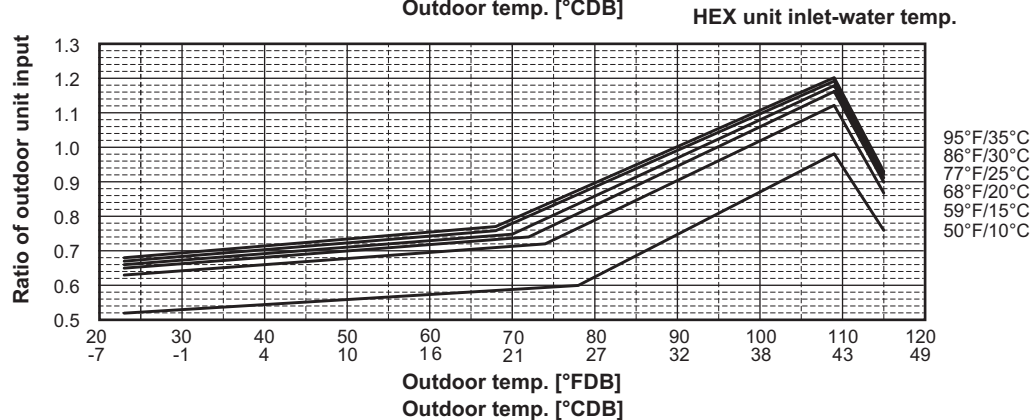
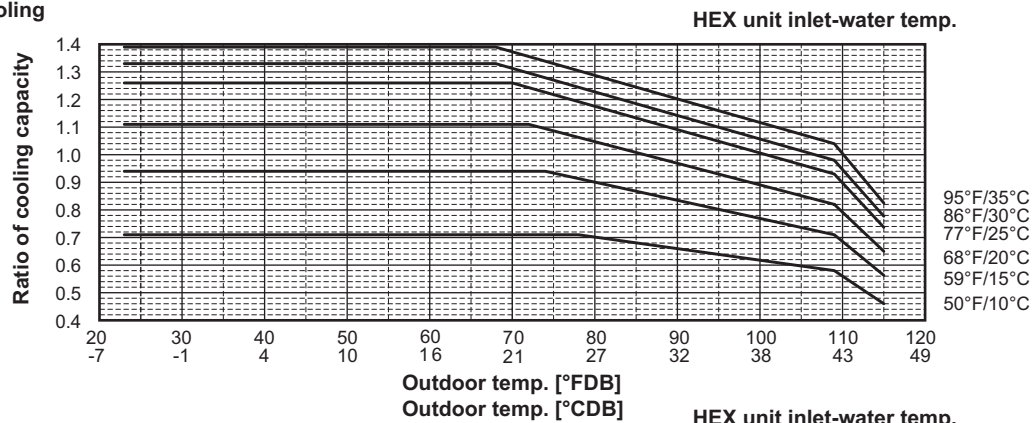
9. CAPACITY TABLES

PUHY-	P120, 144TKMU-A(-BS)	P120, 144YKMU-A(-BS)
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Heating



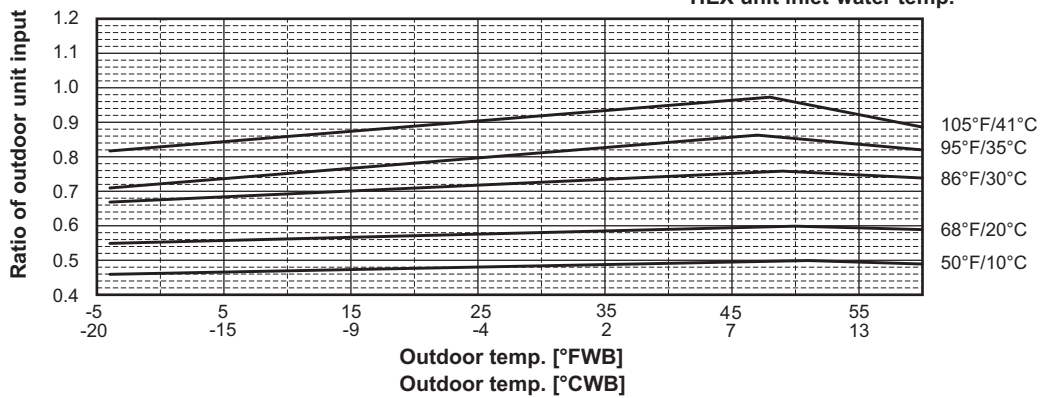
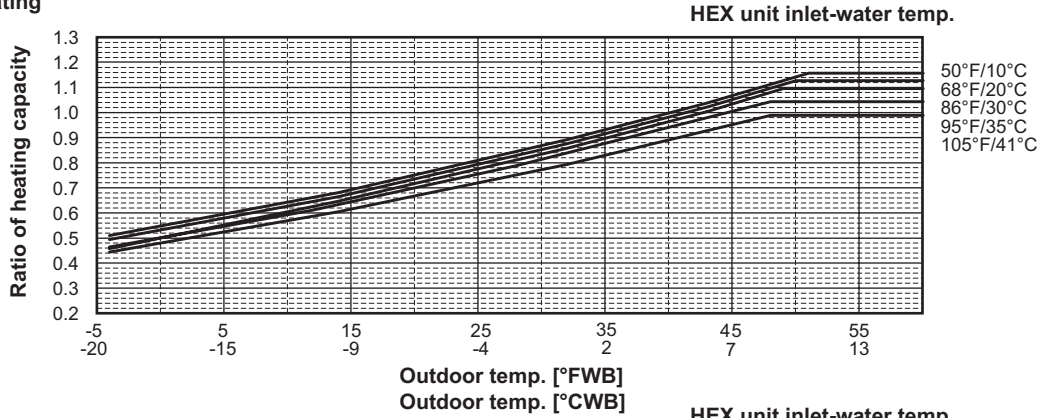
Cooling



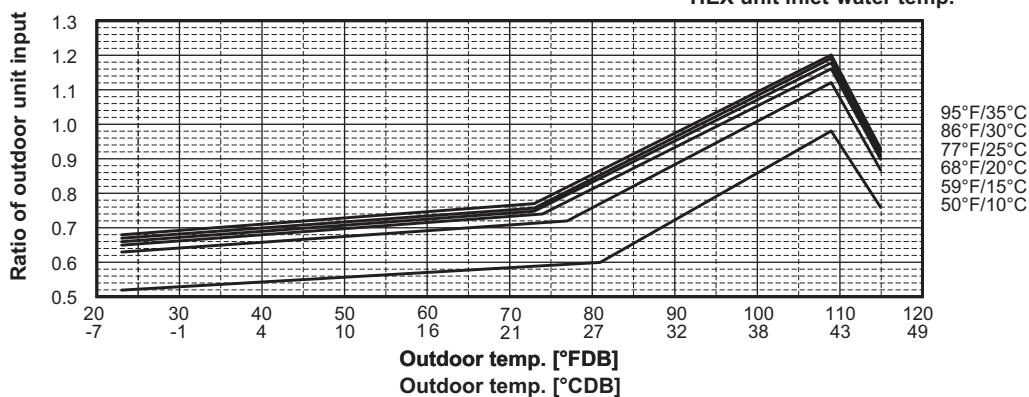
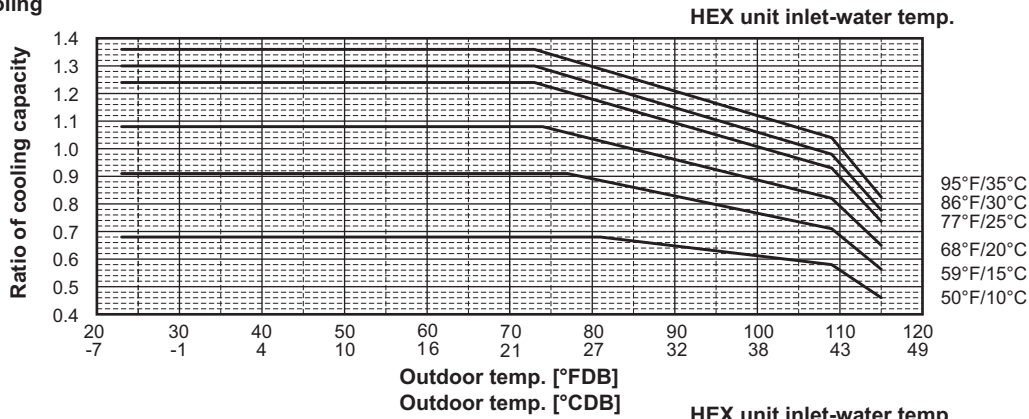
9. CAPACITY TABLES

PUHY- P168, 192, 216, 240TSKMU-A(-BS) P168, 192, 216, 240YSKMU-A(-BS)

Heating



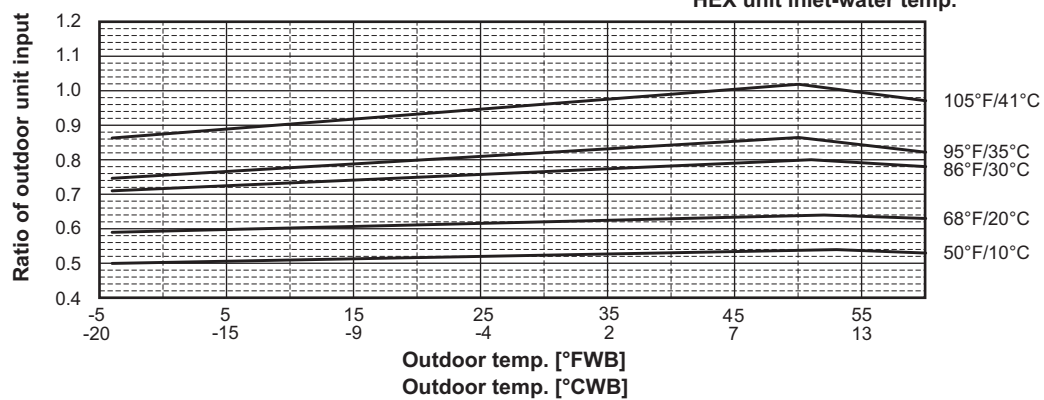
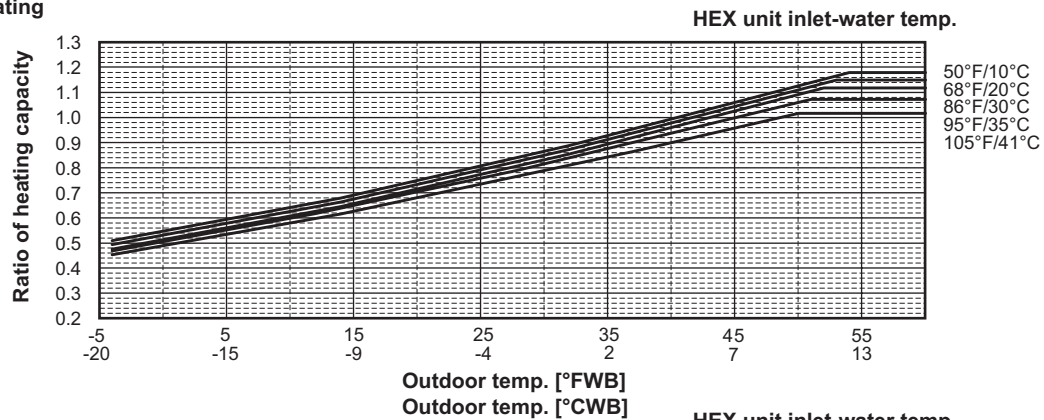
Cooling



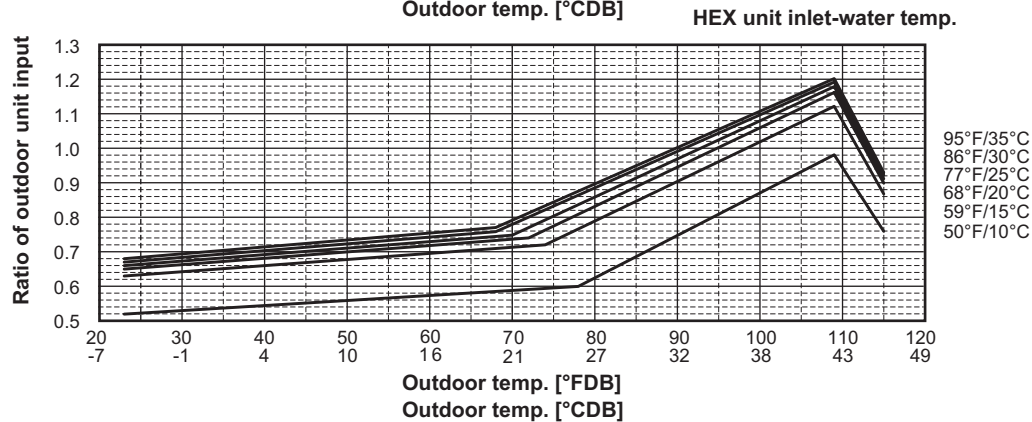
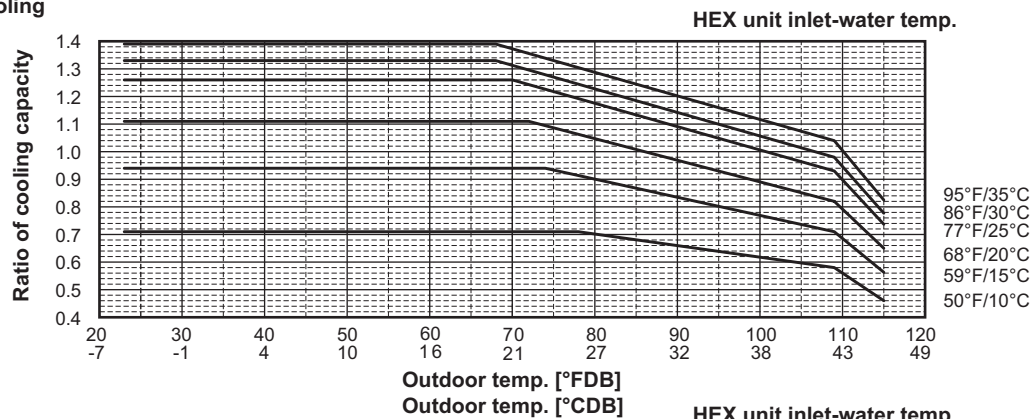
9. CAPACITY TABLES

PUHY- P264, 288TSKMU-A(-BS) P264, 288YSKMU-A(-BS)

Heating



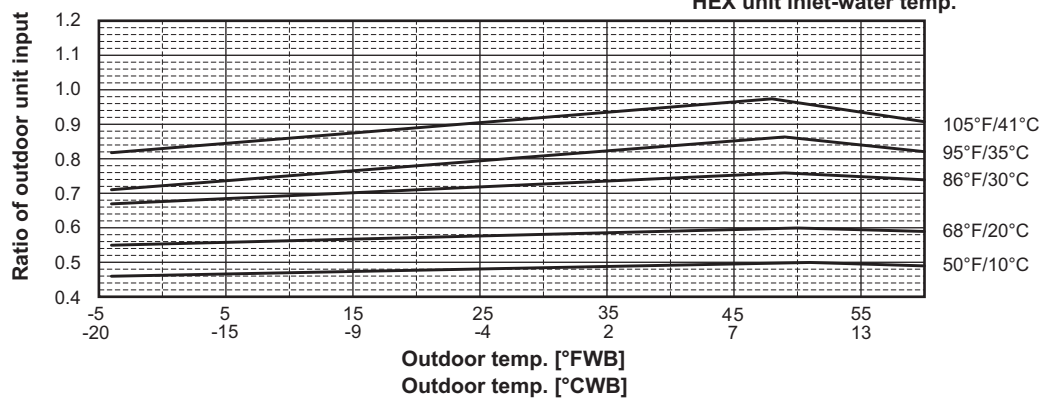
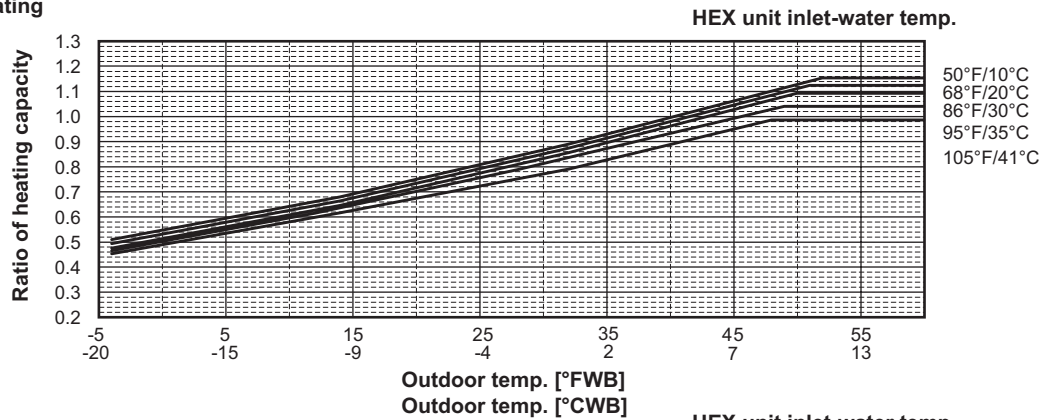
Cooling



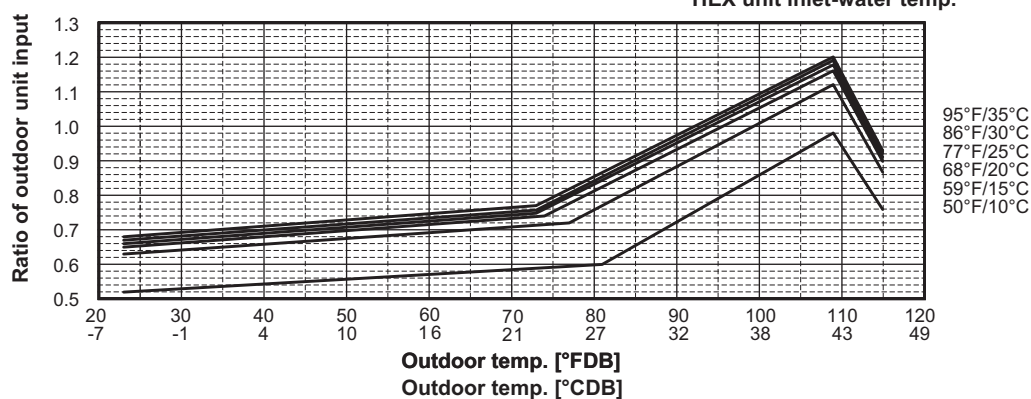
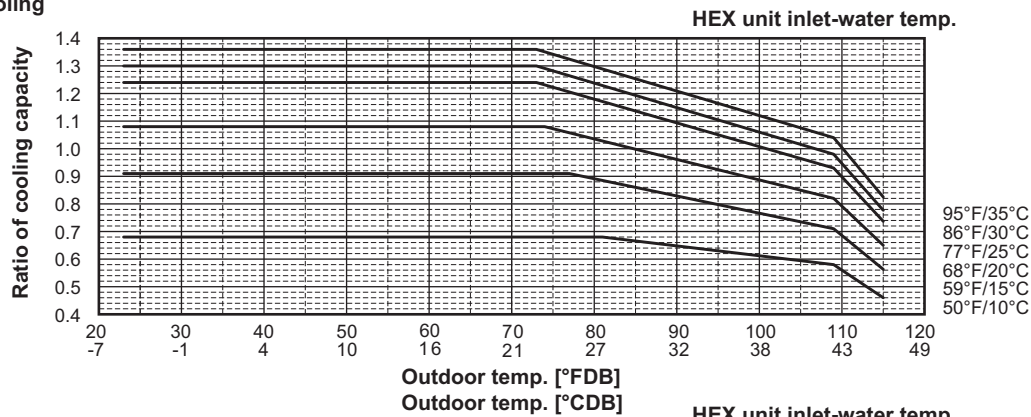
9. CAPACITY TABLES

PUHY- P312, 336, 360TSKMU-A(-BS) P312, 336, 360YSKMU-A(-BS)

Heating



Cooling

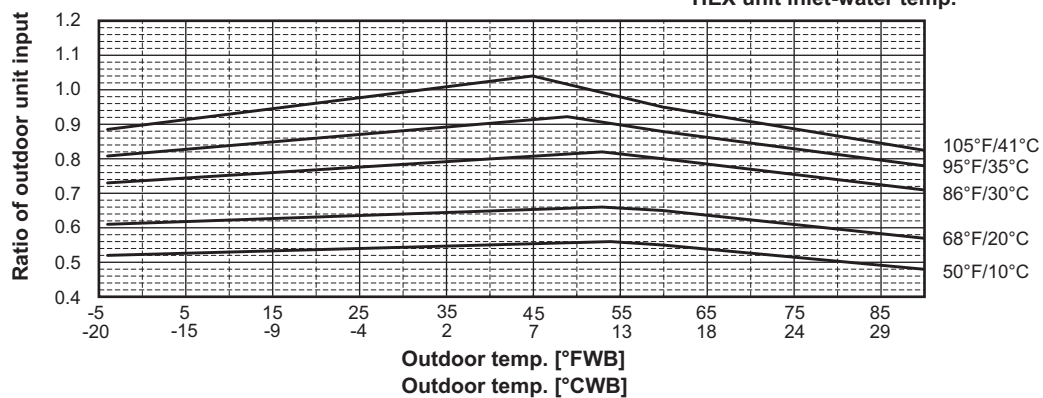
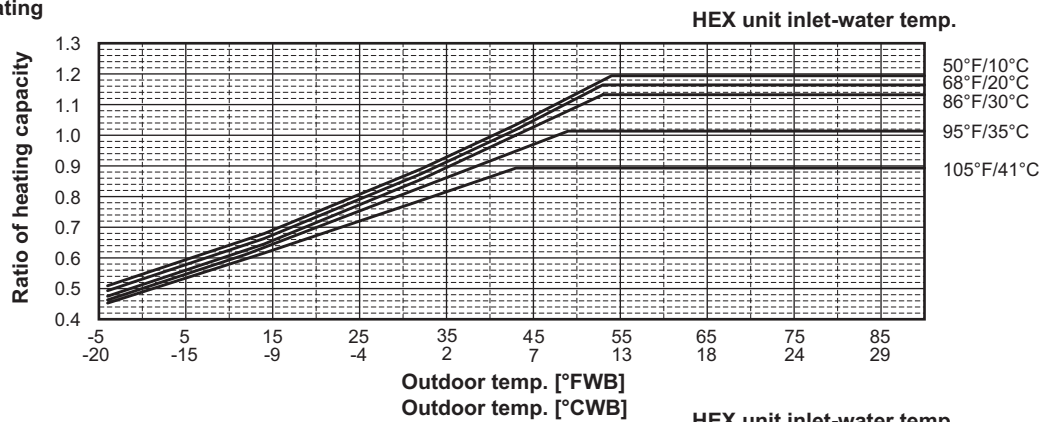


9. CAPACITY TABLES

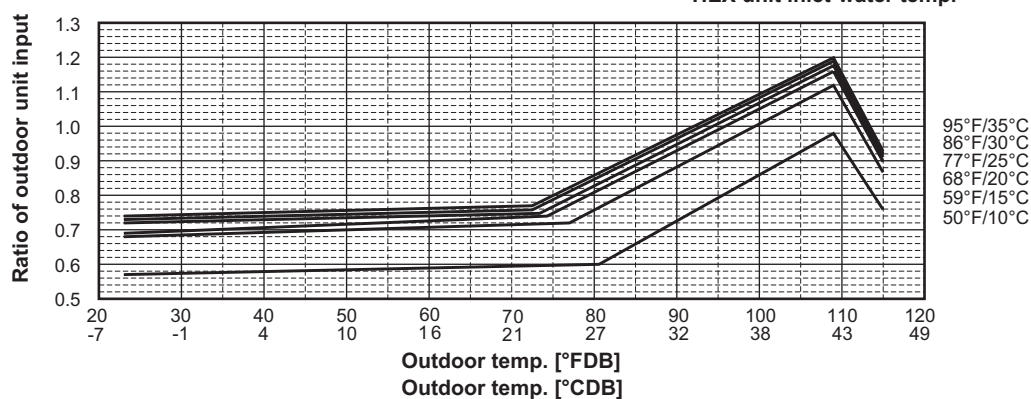
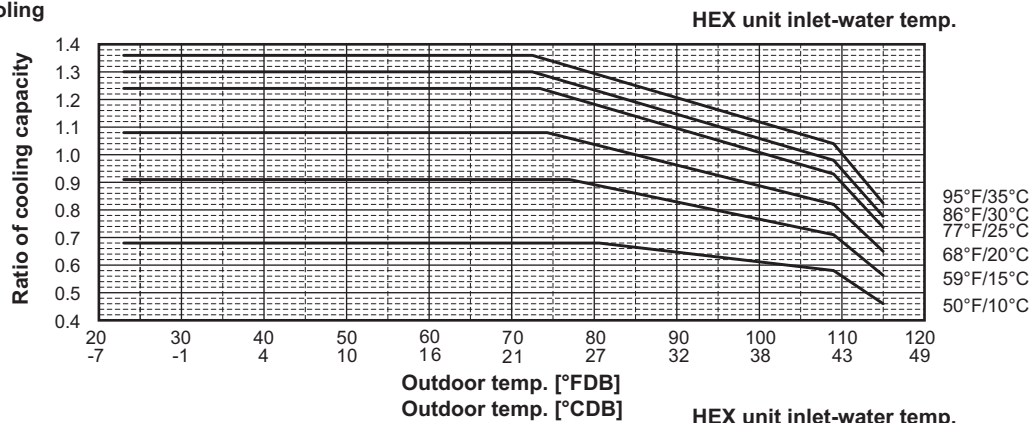
R2-Series + PWFY-P36/72NMU-E-AU

PURY-	P72, 96TKMU-A(-BS)	P72, 96YKMU-A(-BS)
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Heating



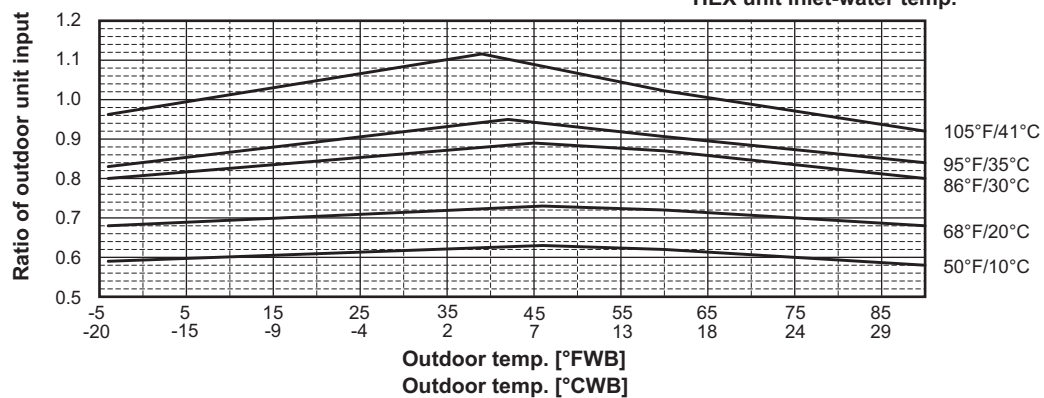
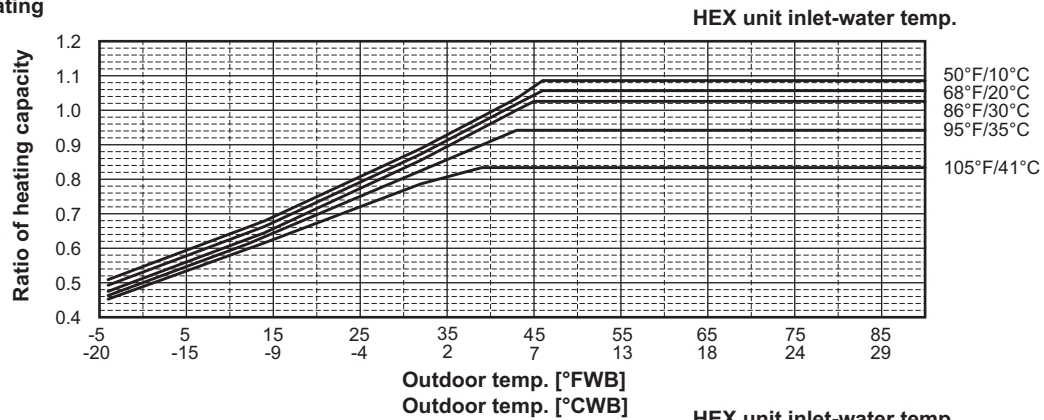
Cooling



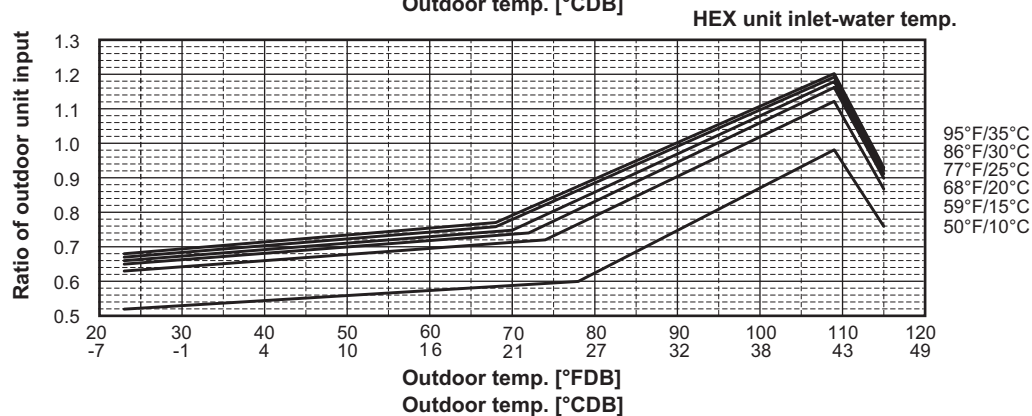
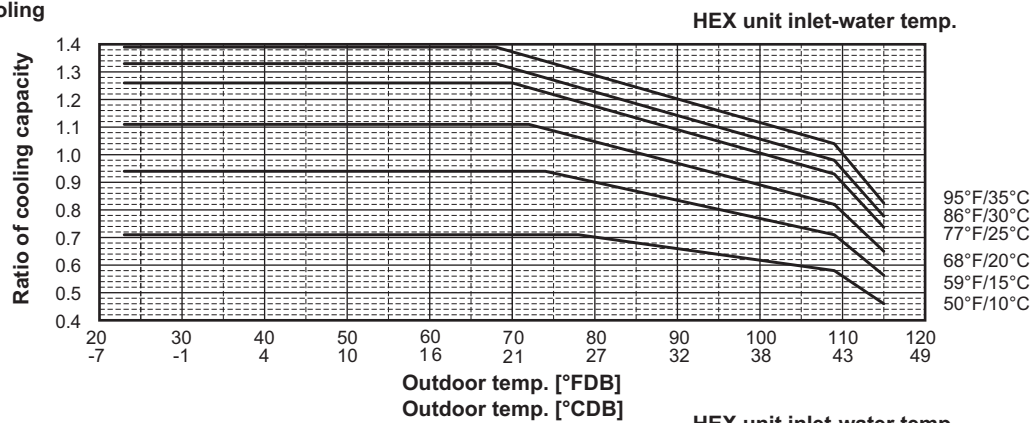
9. CAPACITY TABLES

PURY- P120, 144TKMU-A(-BS) P120, 144YKMU-A(-BS)

Heating



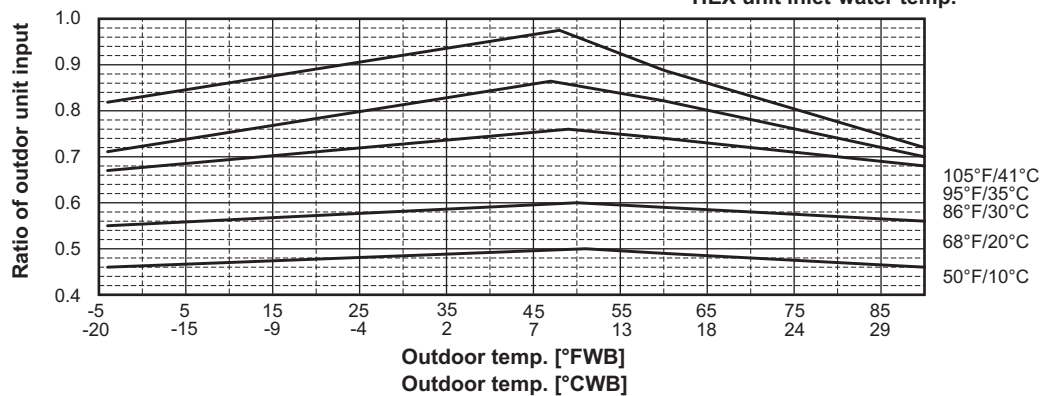
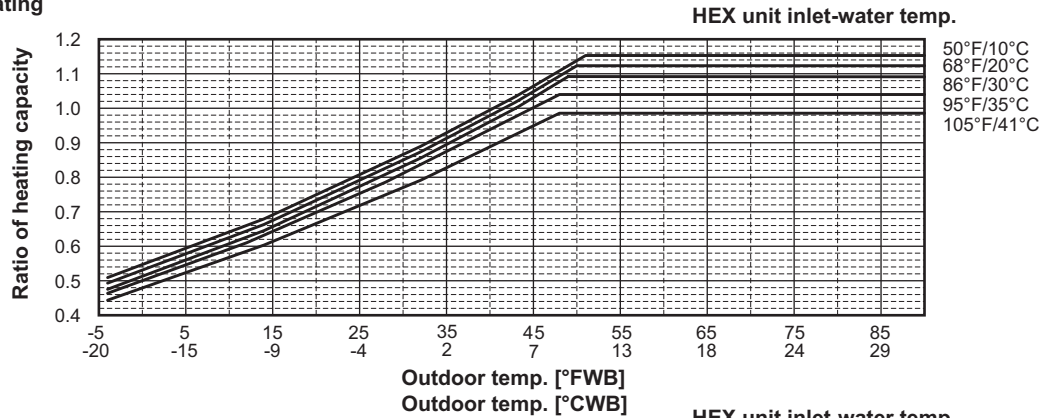
Cooling



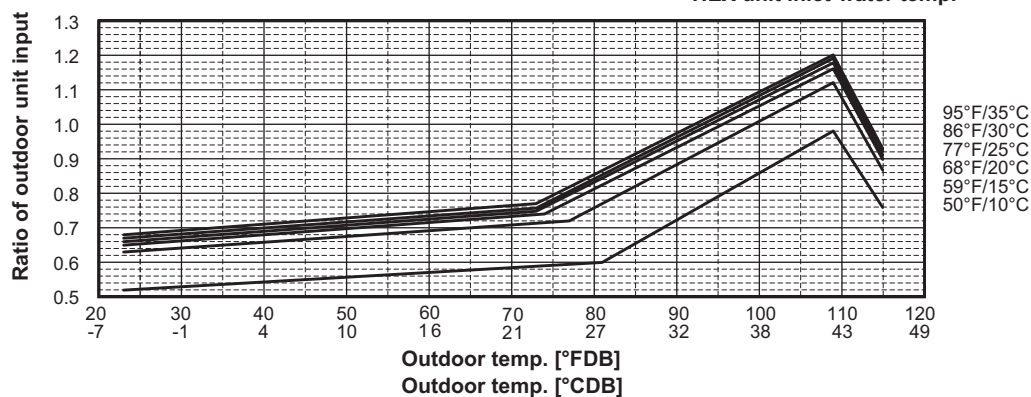
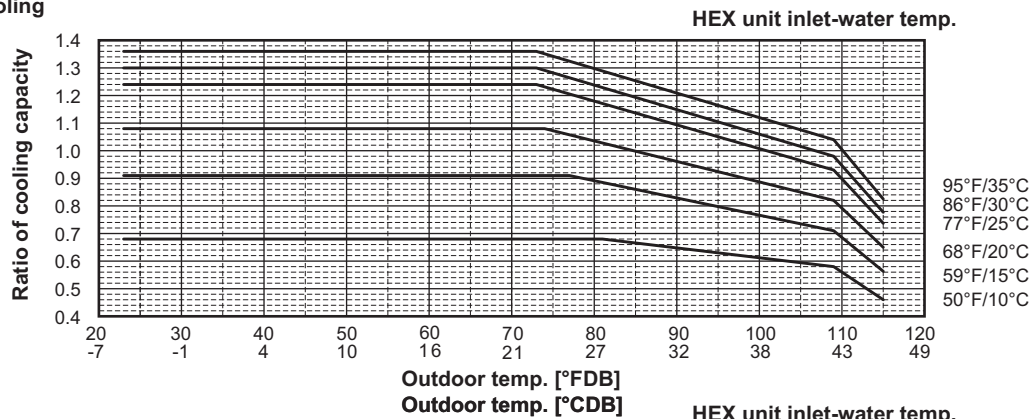
9. CAPACITY TABLES

PURY- P168, 192, 216, 240TSKMU-A(-BS) P168, 192, 216, 240YSKMU-A(-BS)

Heating



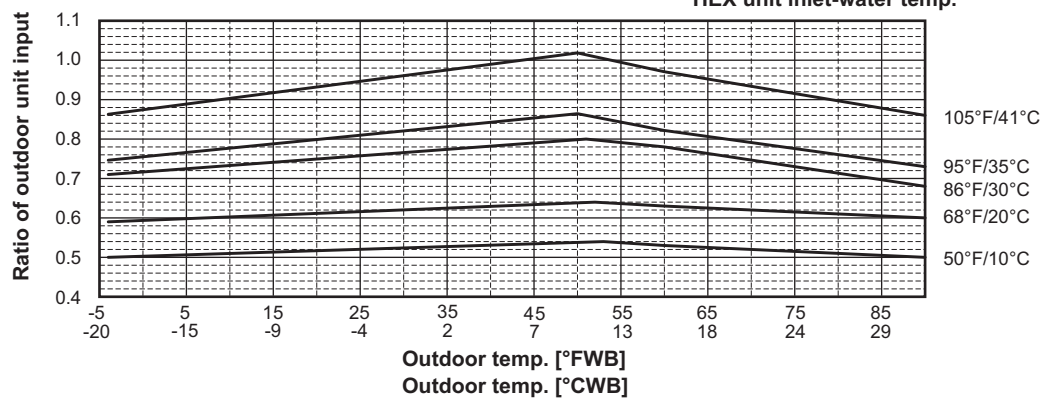
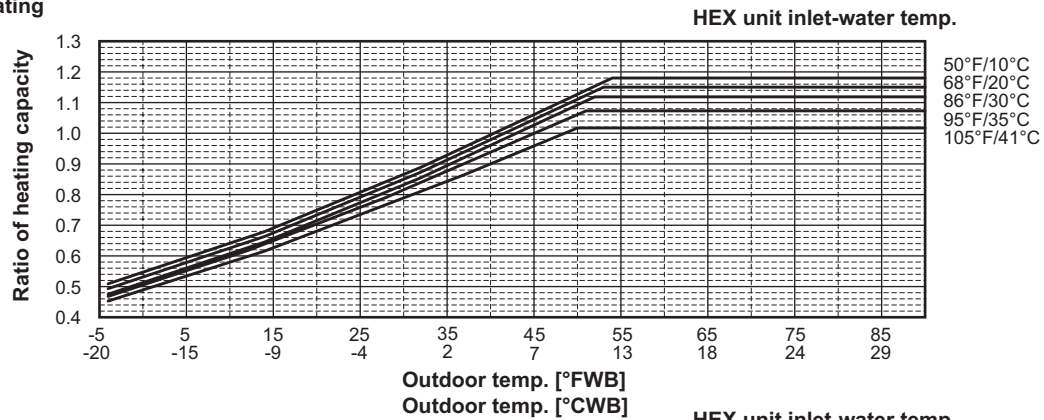
Cooling



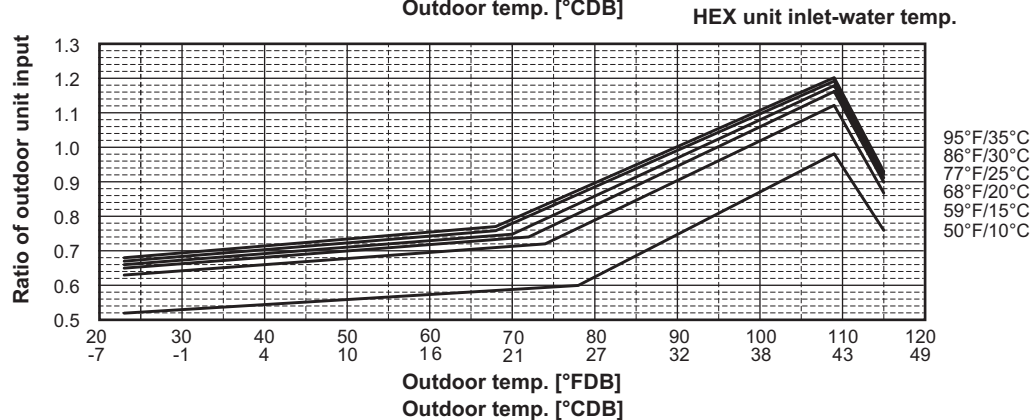
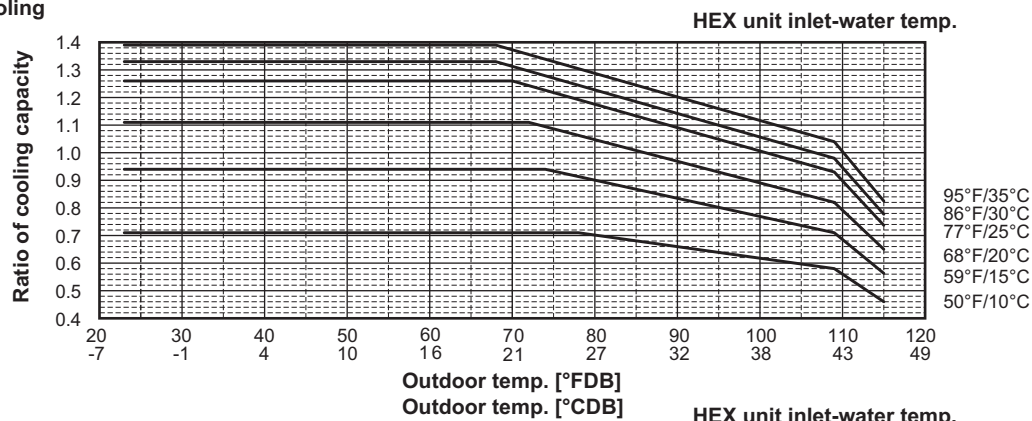
9. CAPACITY TABLES

PURY- P264, 288TSKMU-A(-BS) P264, 288YSKMU-A(-BS)

Heating



Cooling

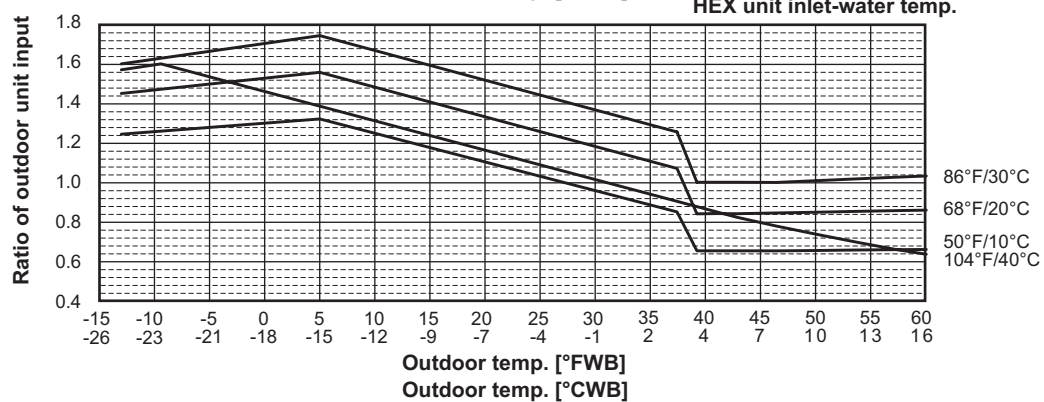
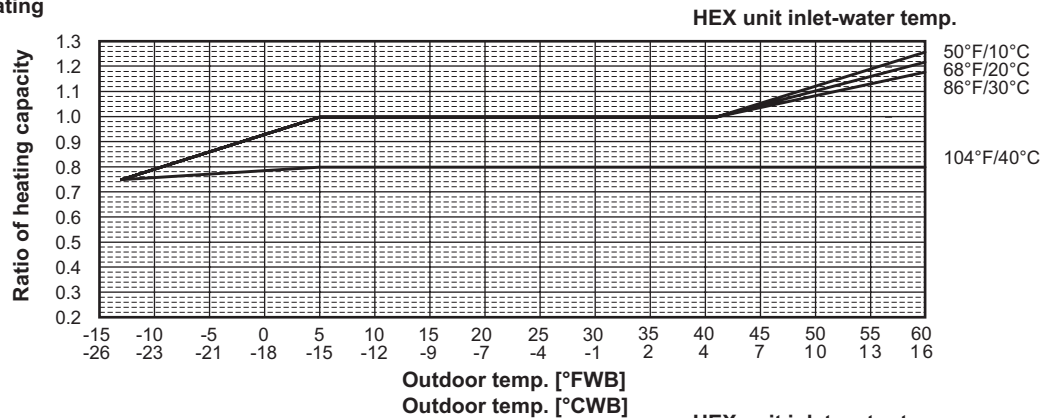


9. CAPACITY TABLES

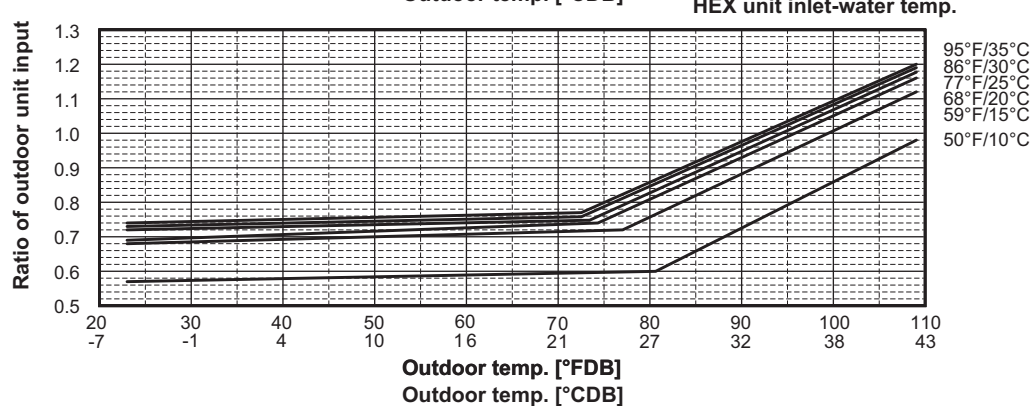
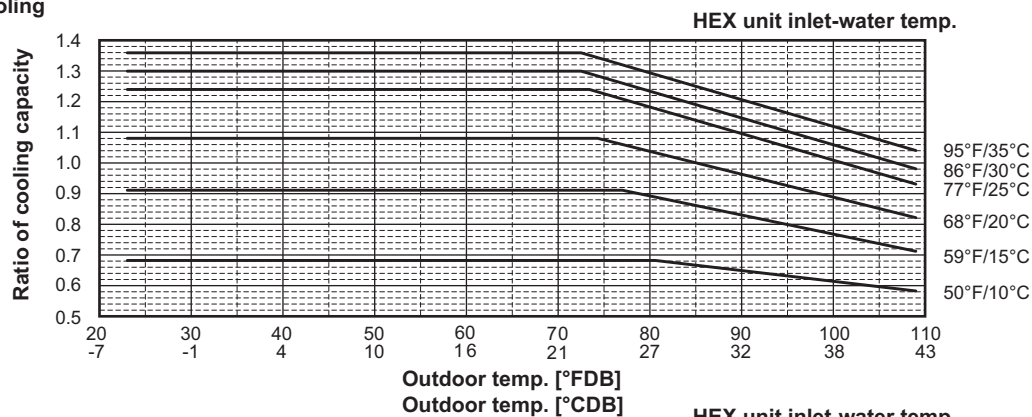
H2I Y-Series + PWFY-P36/72NMU-E-AU

PUHY-	HP72, 96, 144, 192T(S)JMU-A(-BS)
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Heating



Cooling

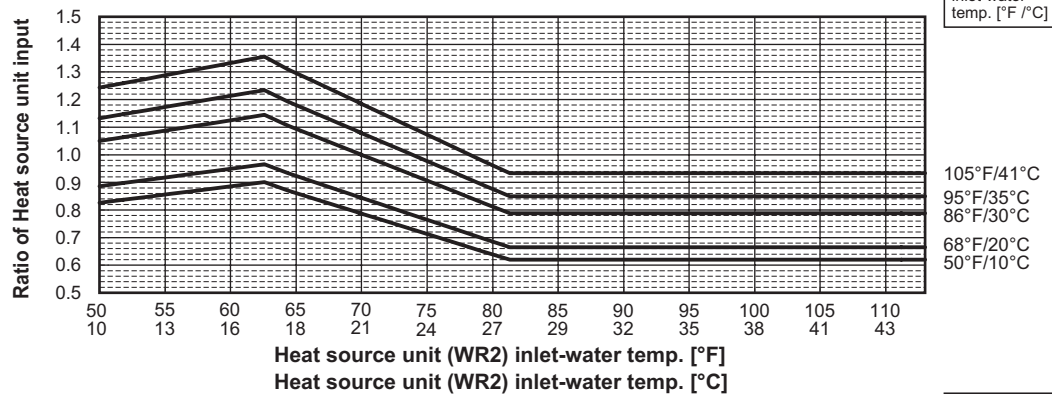
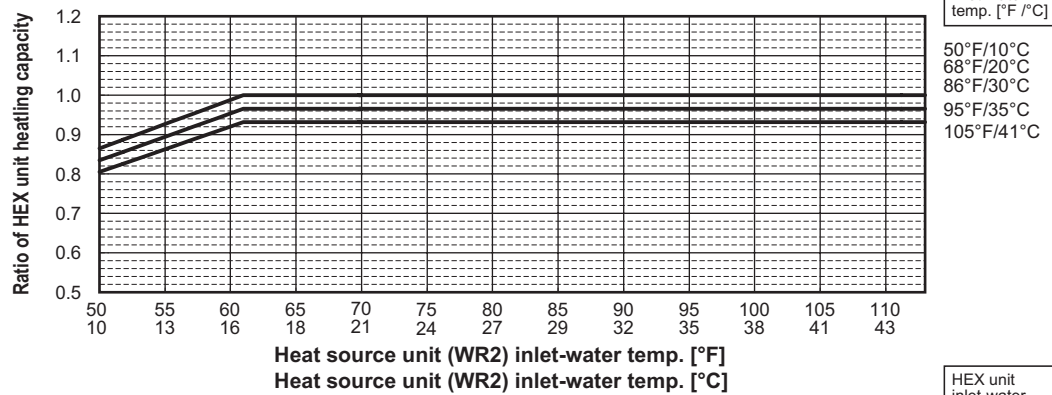


9. CAPACITY TABLES

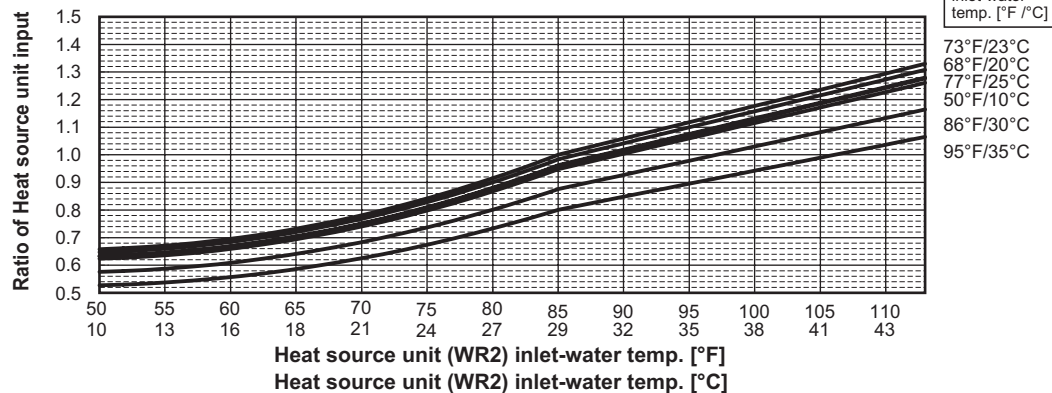
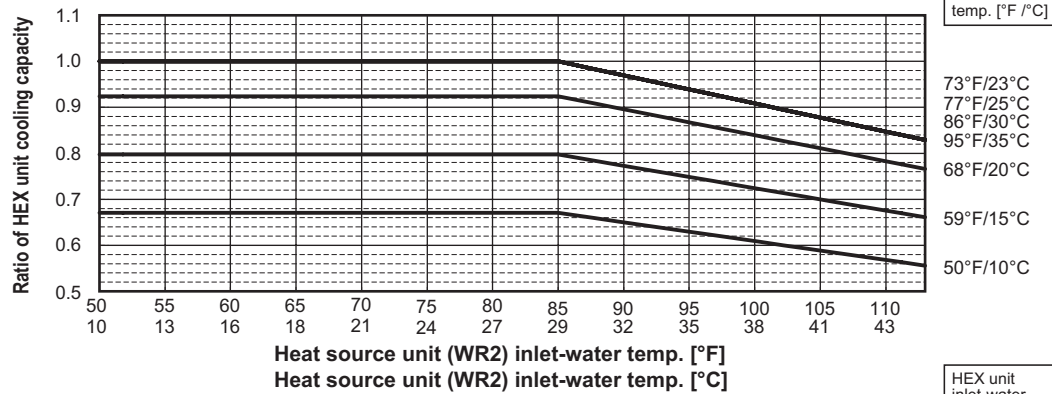
WR2-Series + PWFY-P36/72NMU-E-AU

PQRY- P72, 96, 120, 144, 168, 192, 216, 240T(S)HMU-A/Y(S)HMU-A

Heating



Cooling

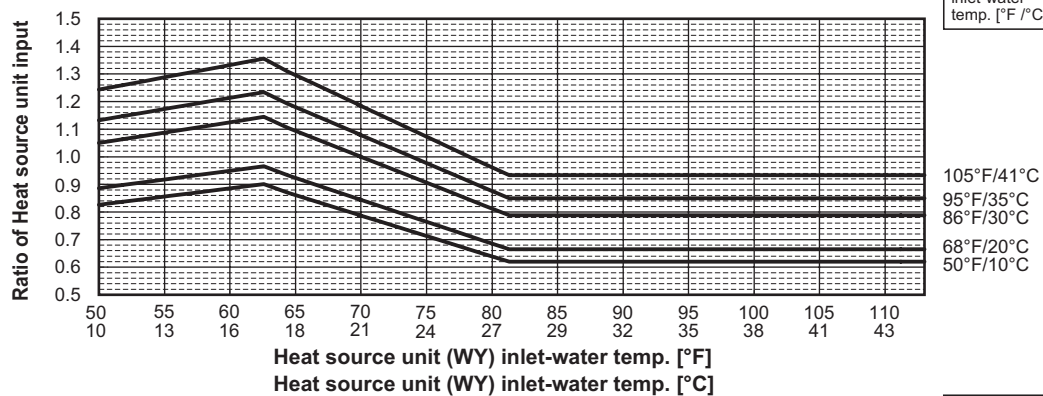
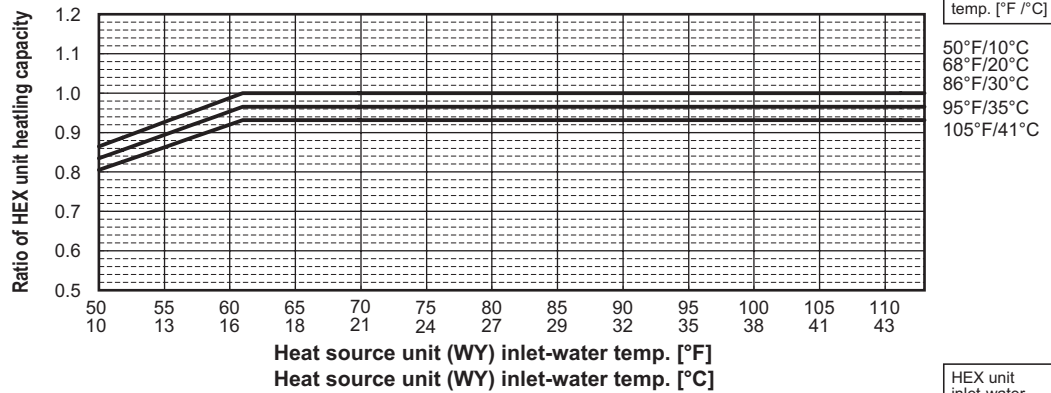


9. CAPACITY TABLES

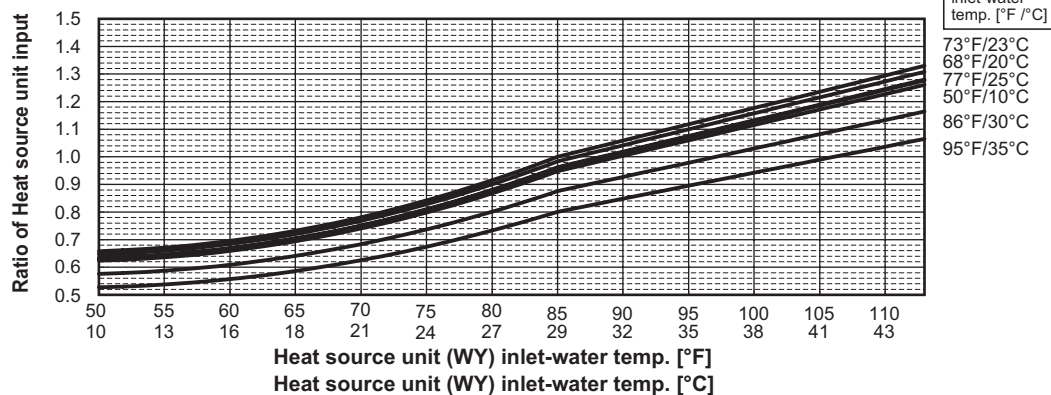
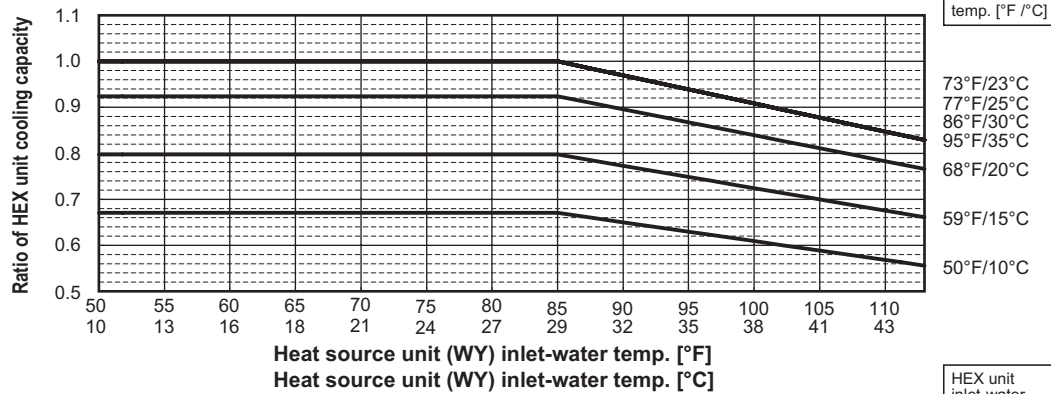
WY-Series + PWFY-P36/72NMU-E-AU

PQHY- P72, 96, 120, 144, 168, 192, 216, 240T(S)HMU-A/Y(S)HMU-A

Heating

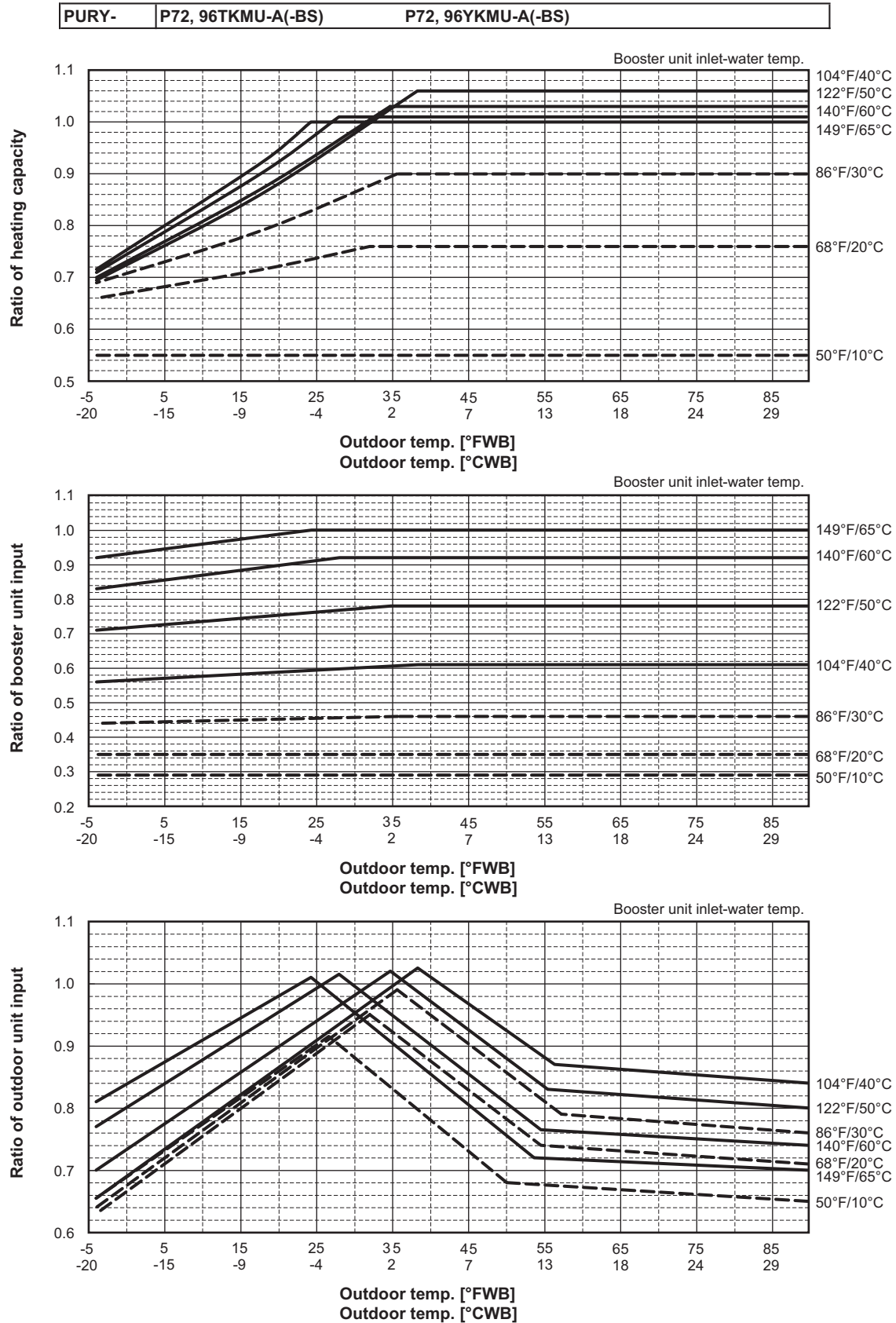


Cooling



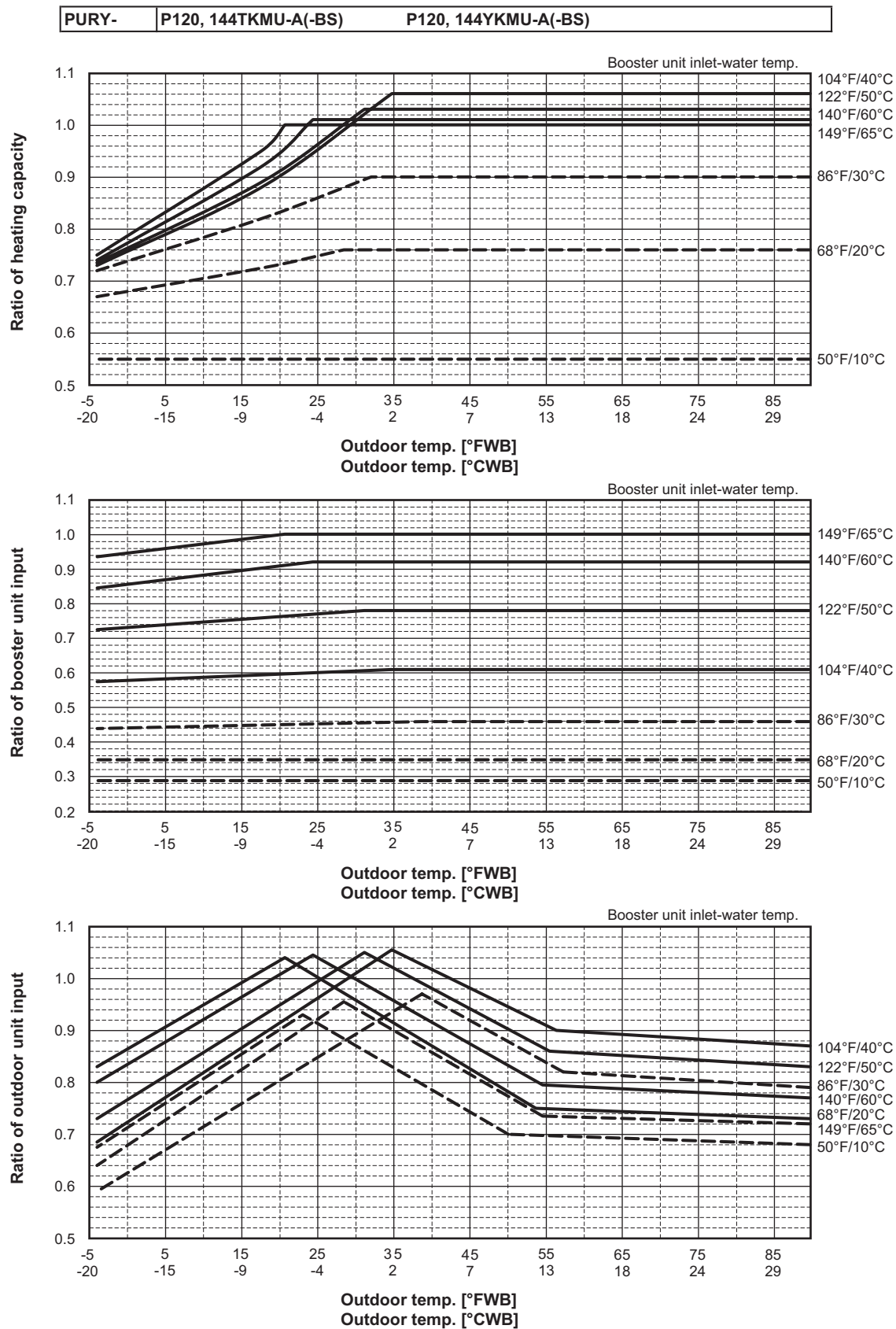
9. CAPACITY TABLES

R2-Series + PWFY-P36NMU-E-BU



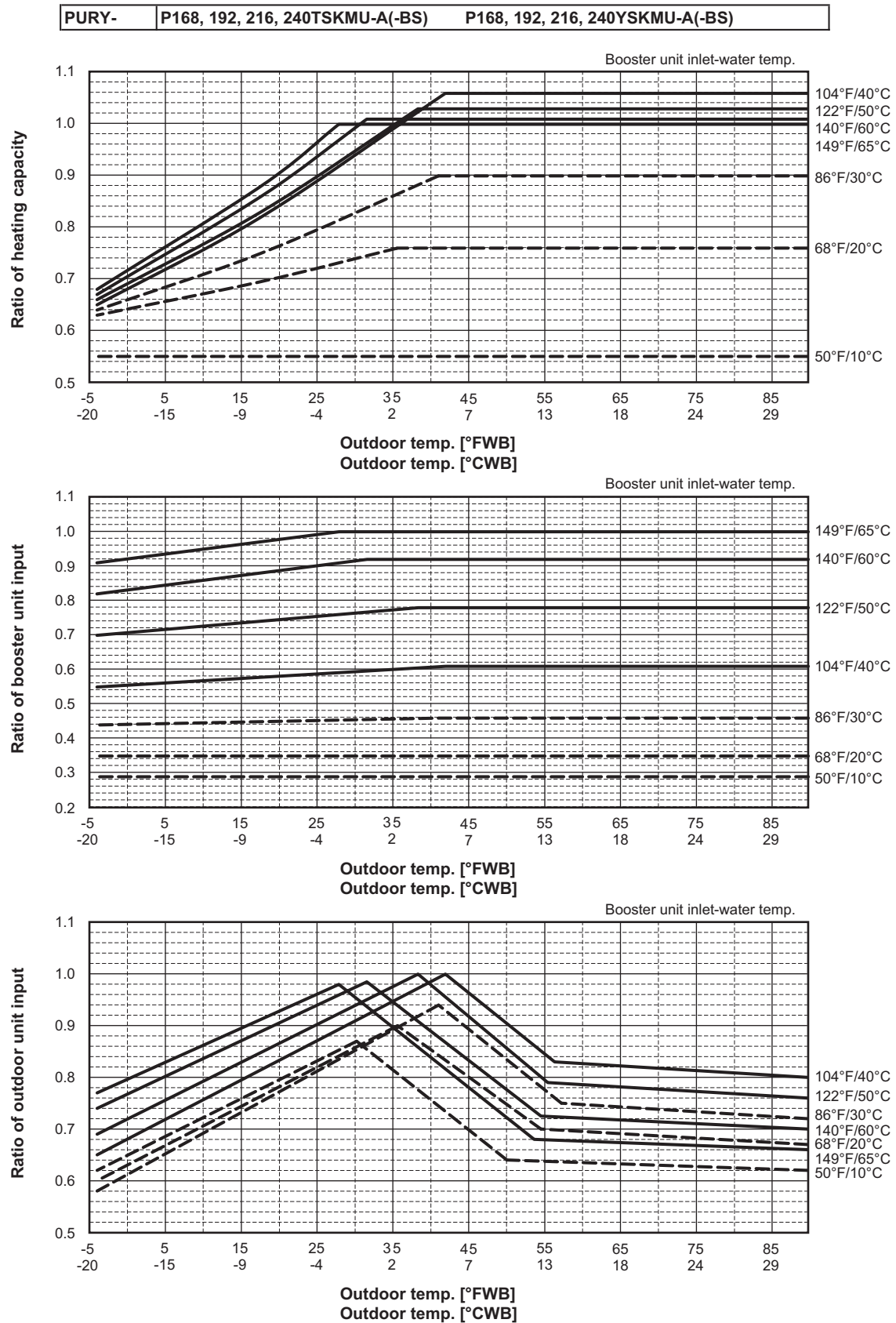
9. CAPACITY TABLES

R2-Series + PWFY-P36NMU-E-BU



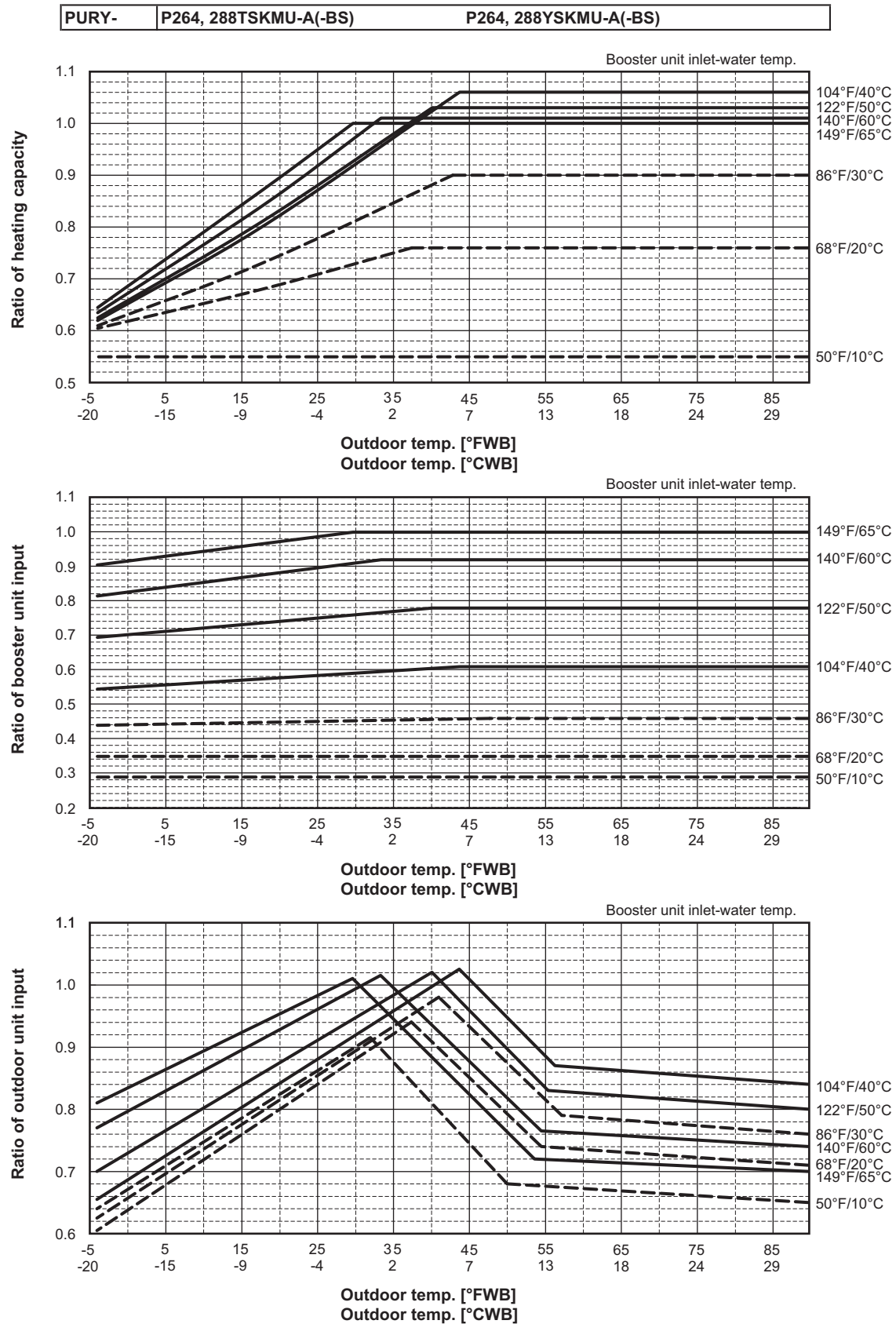
9. CAPACITY TABLES

R2-Series + PWFY-P36NMU-E-BU



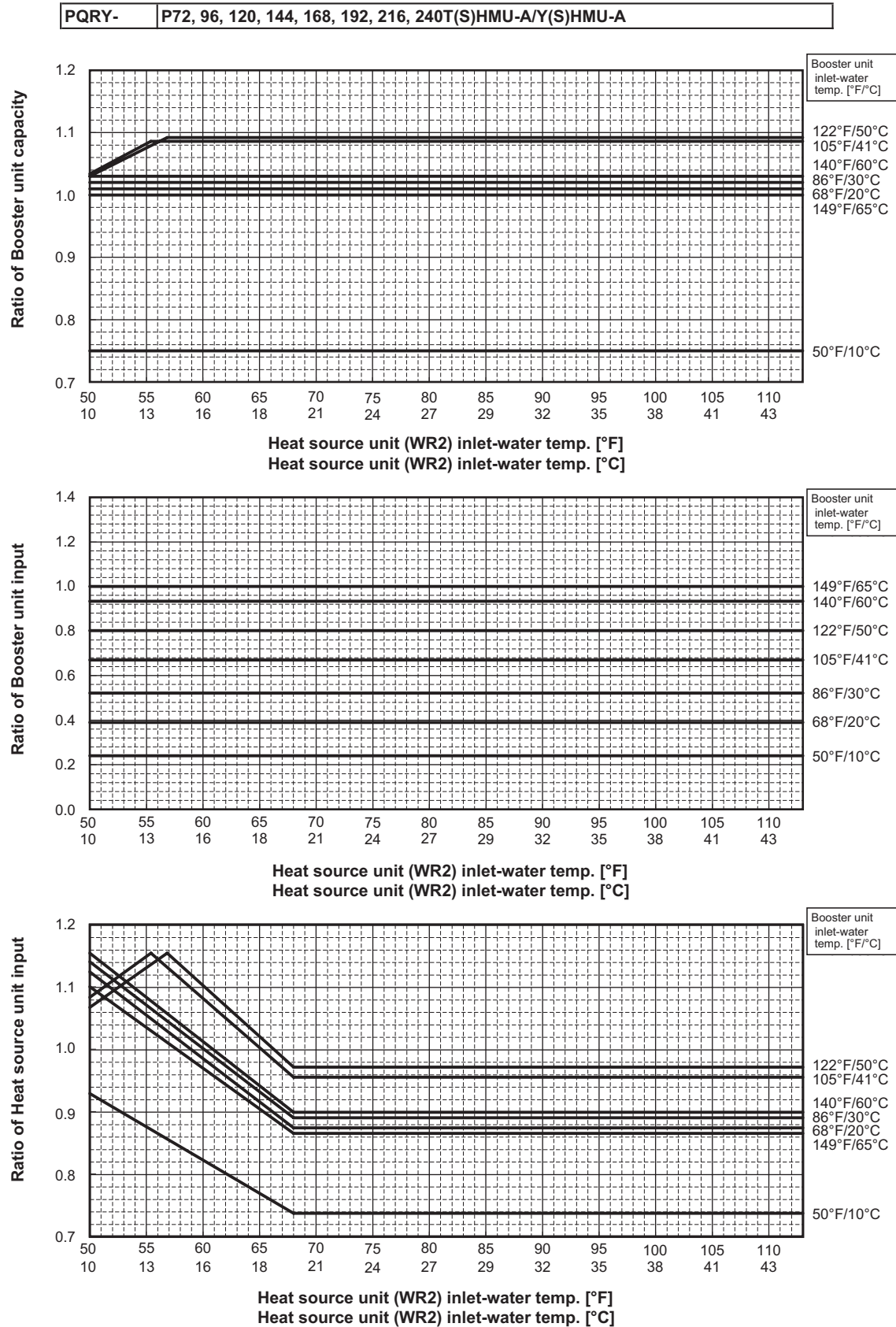
9. CAPACITY TABLES

R2-Series + PWFY-P36NMU-E-BU



9. CAPACITY TABLES

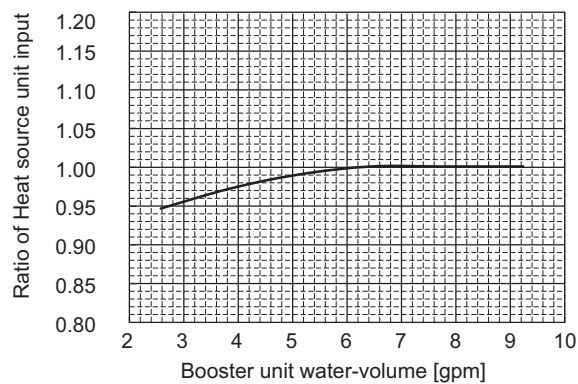
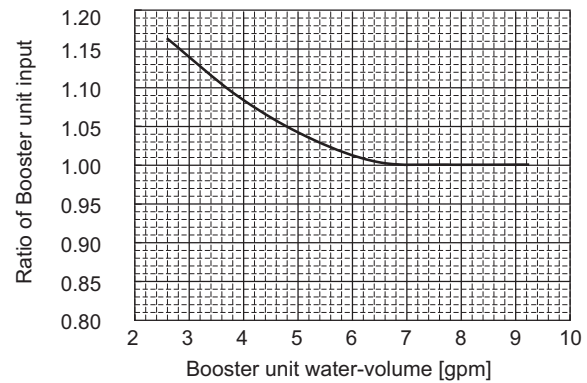
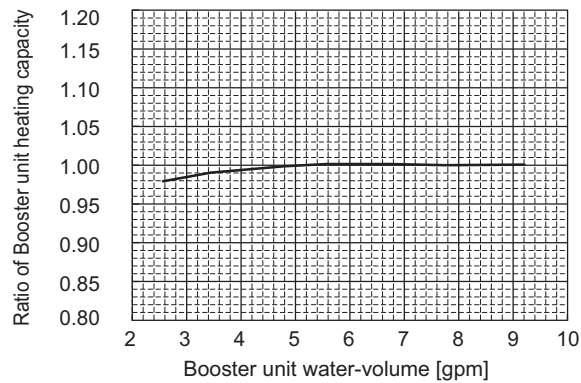
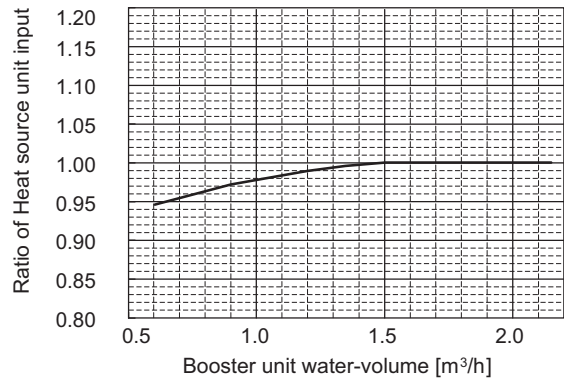
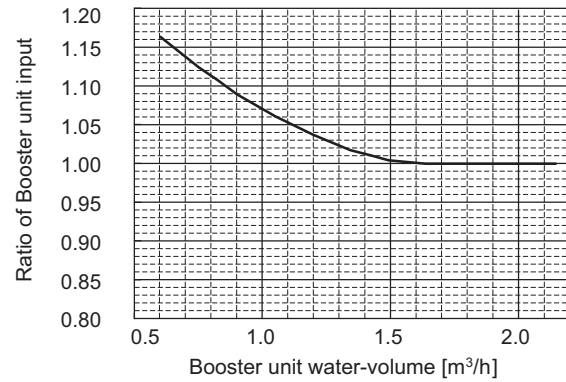
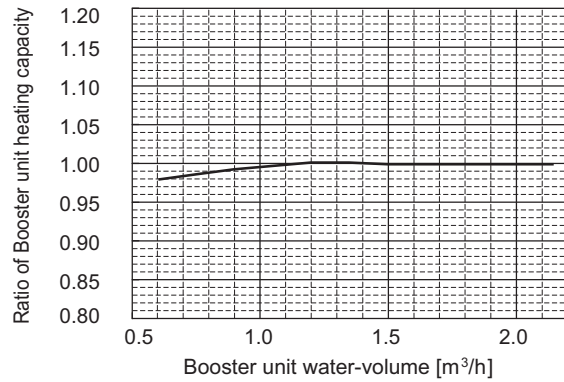
WR2-Series + PWFY-P36NMU-E-BU



9. CAPACITY TABLES

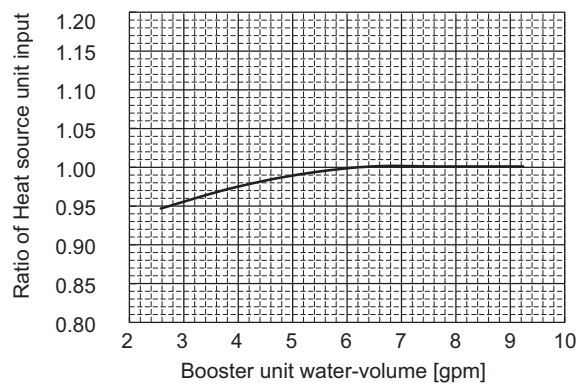
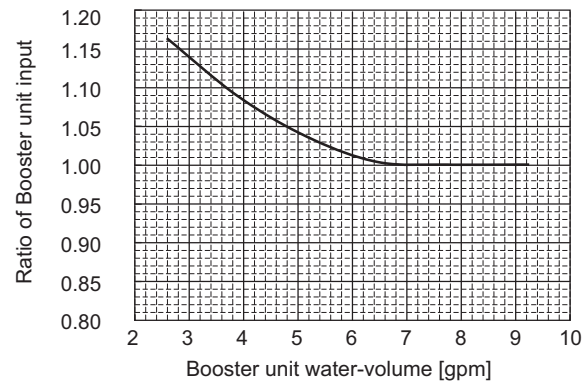
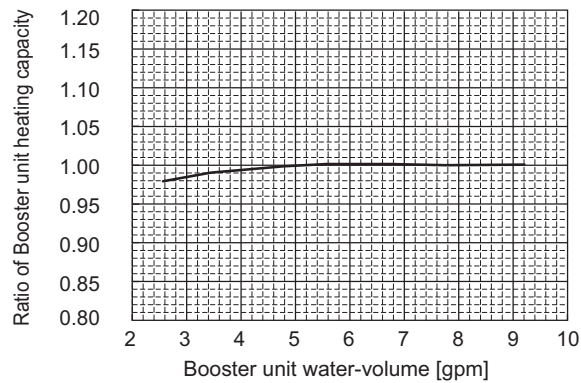
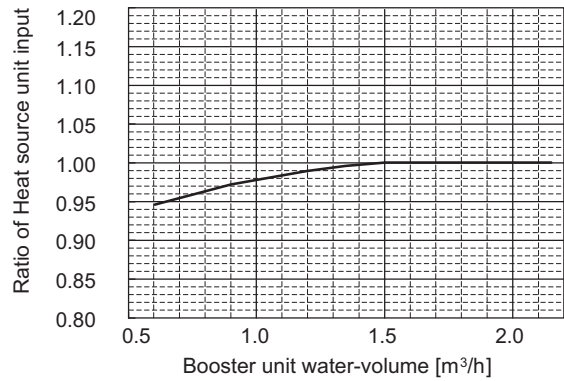
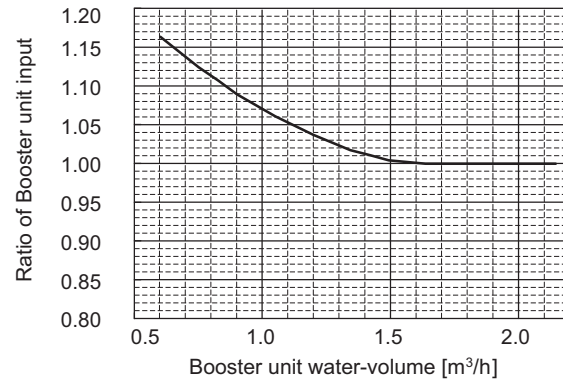
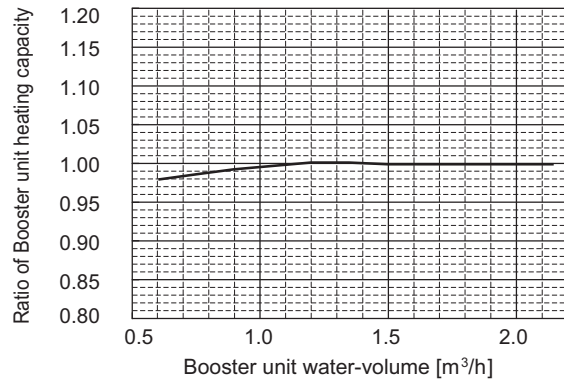
9-2. Correction by Water Volume

PWFY-P36NMU-E-BU



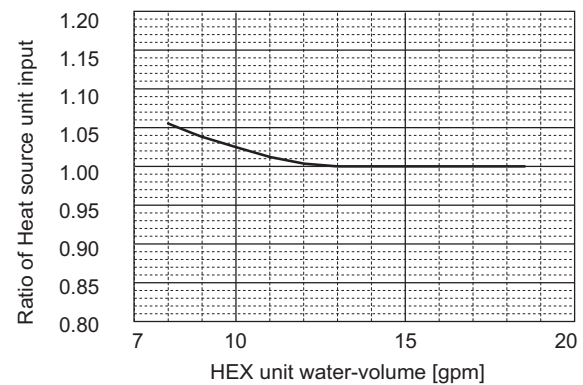
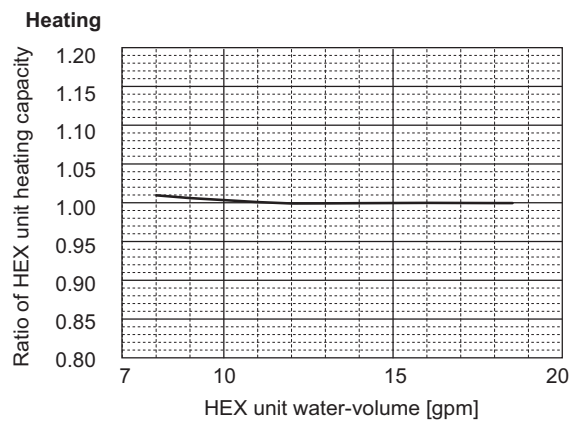
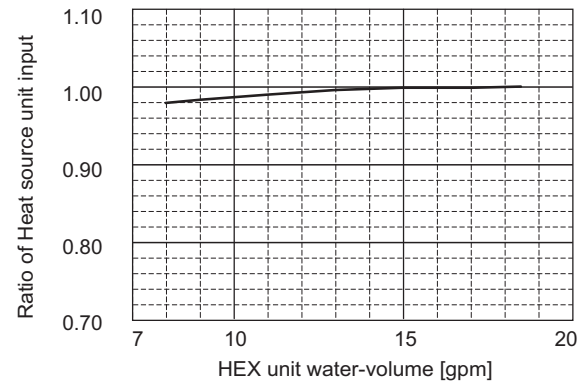
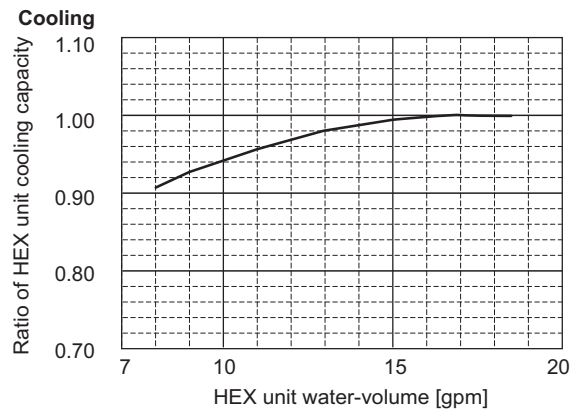
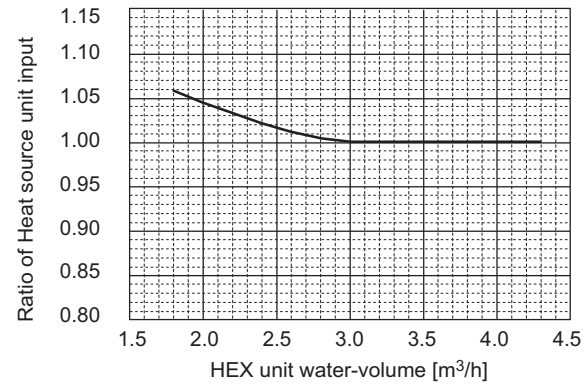
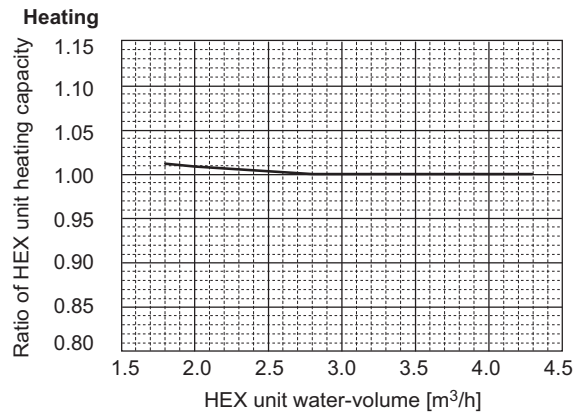
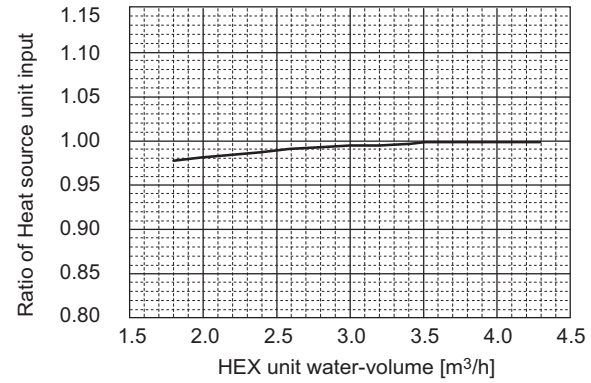
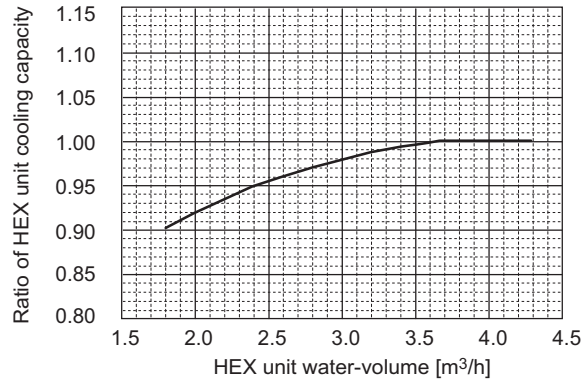
9. CAPACITY TABLES

PWFY-P36NMU-E-BU



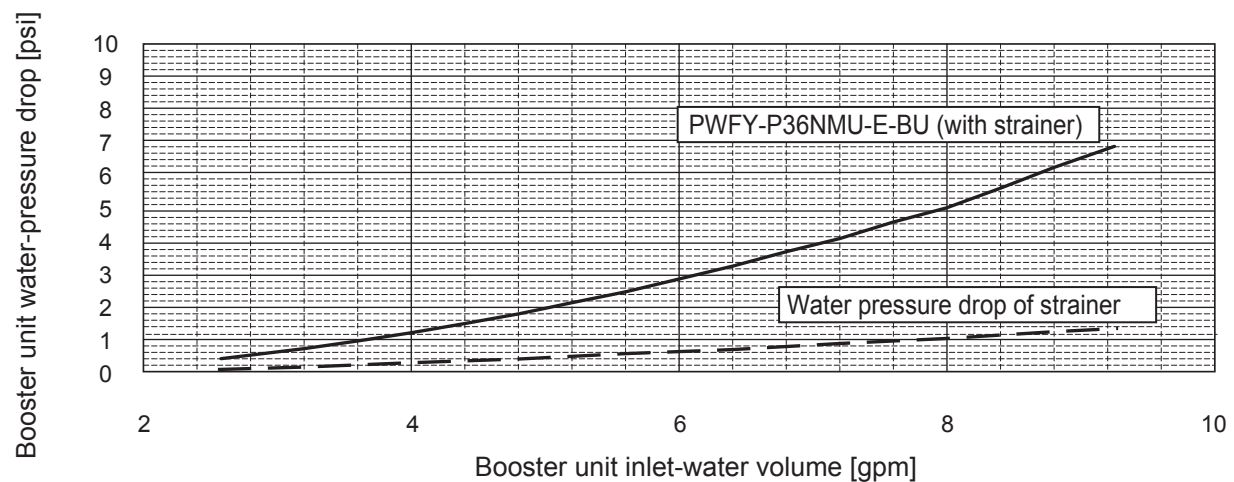
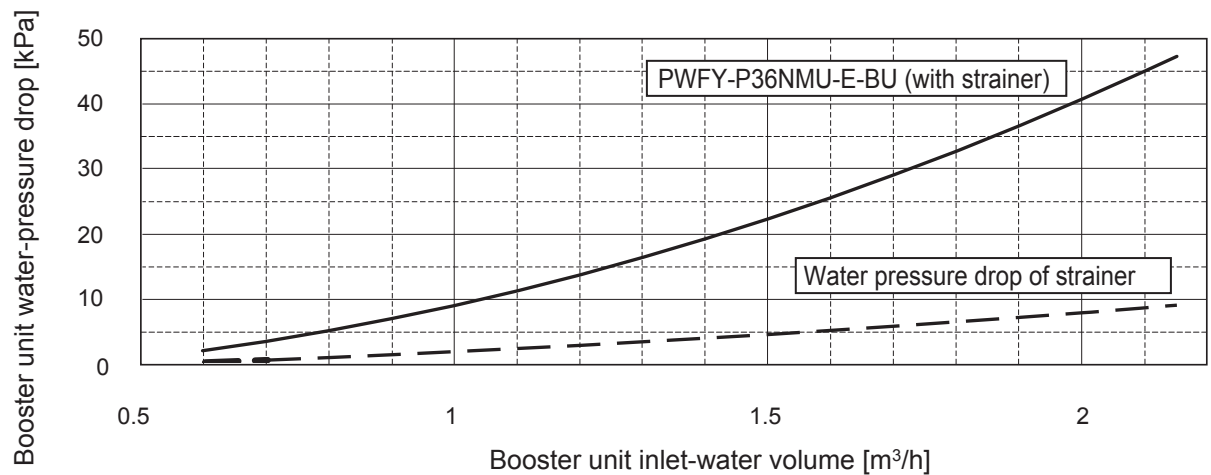
9. CAPACITY TABLES

PWFY-P72NMU-E-AU



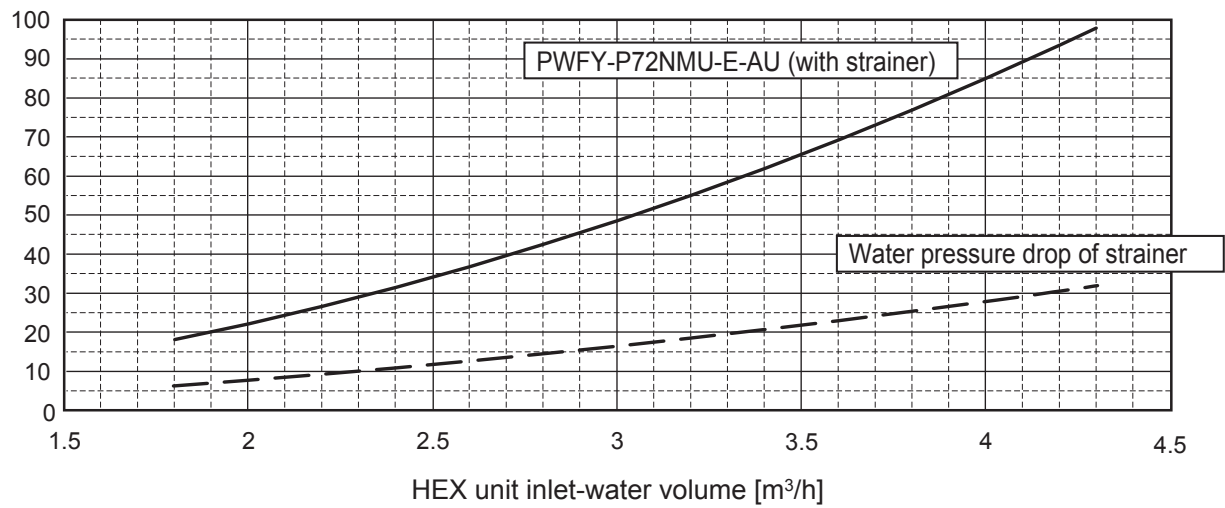
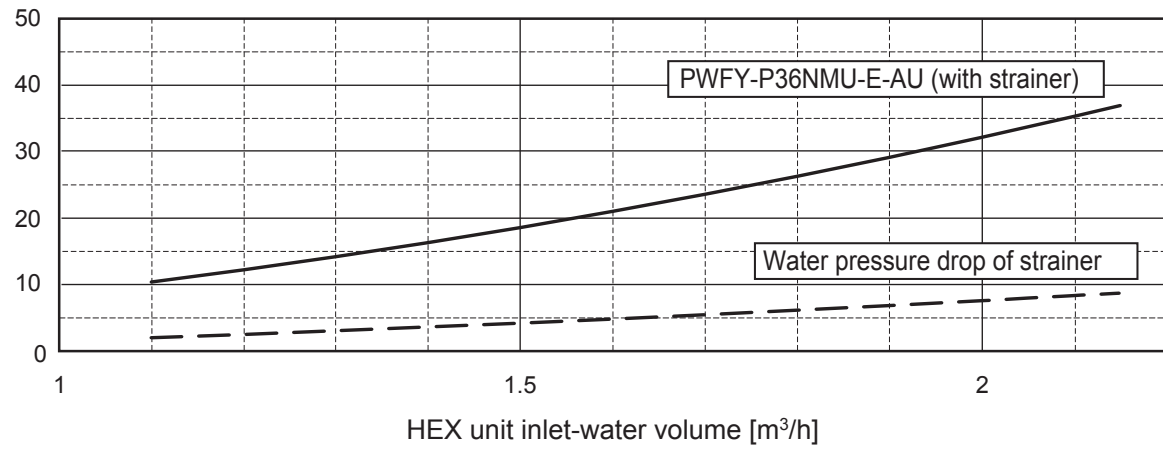
9. CAPACITY TABLES

9-3. Water Pressure Drop PWFY-P36NMU-E-BU



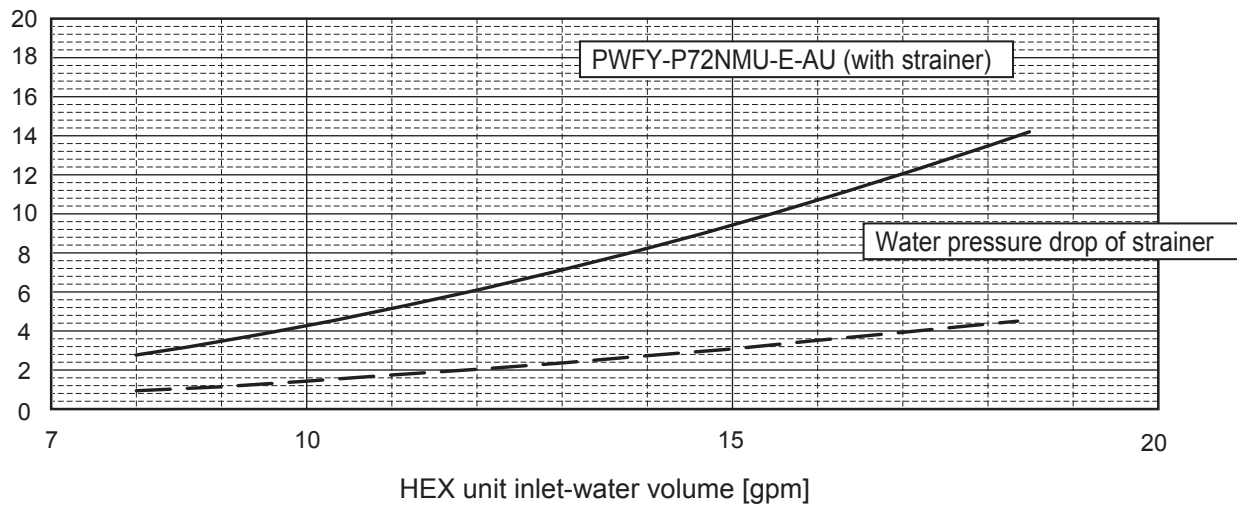
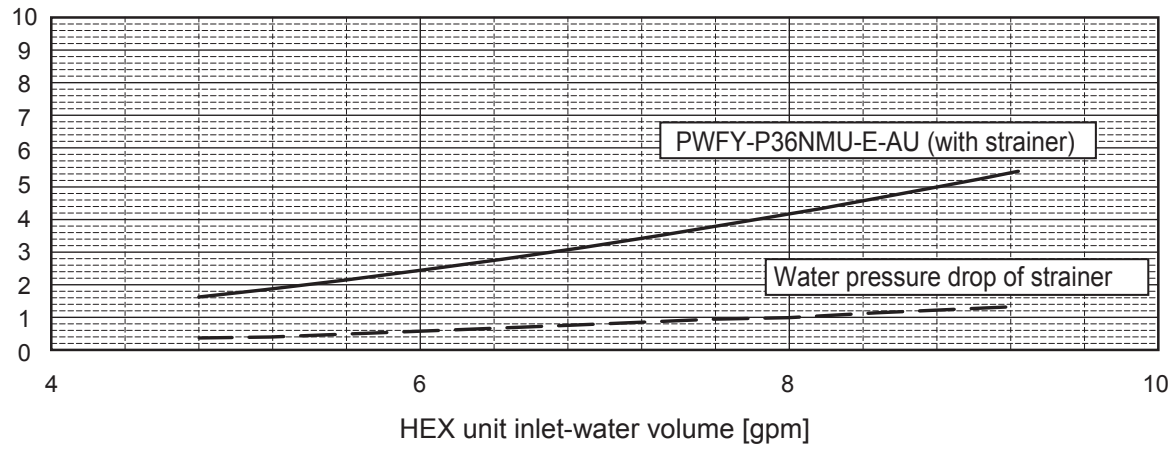
9. CAPACITY TABLES

PWFY-P36/72NMU-E-AU



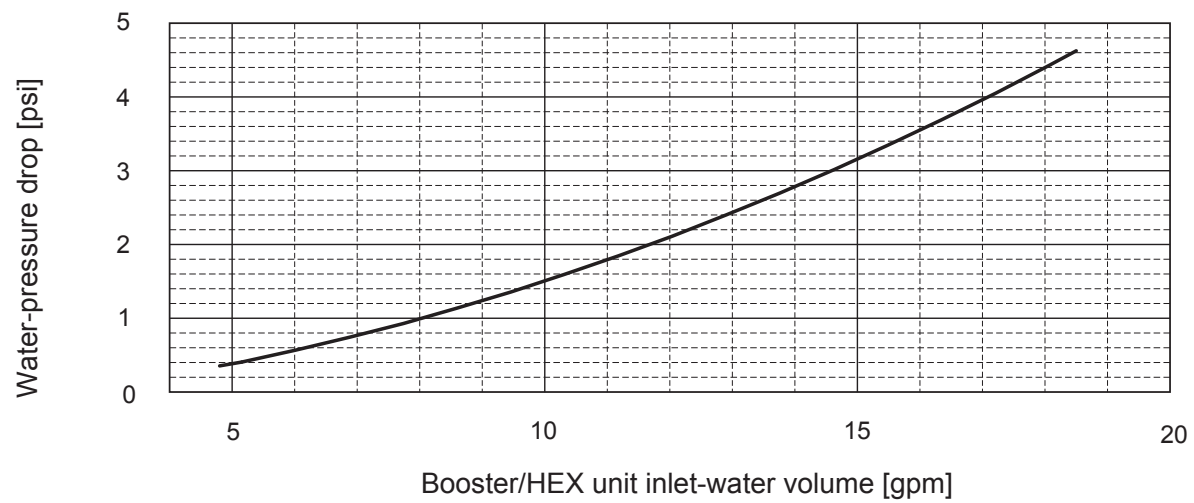
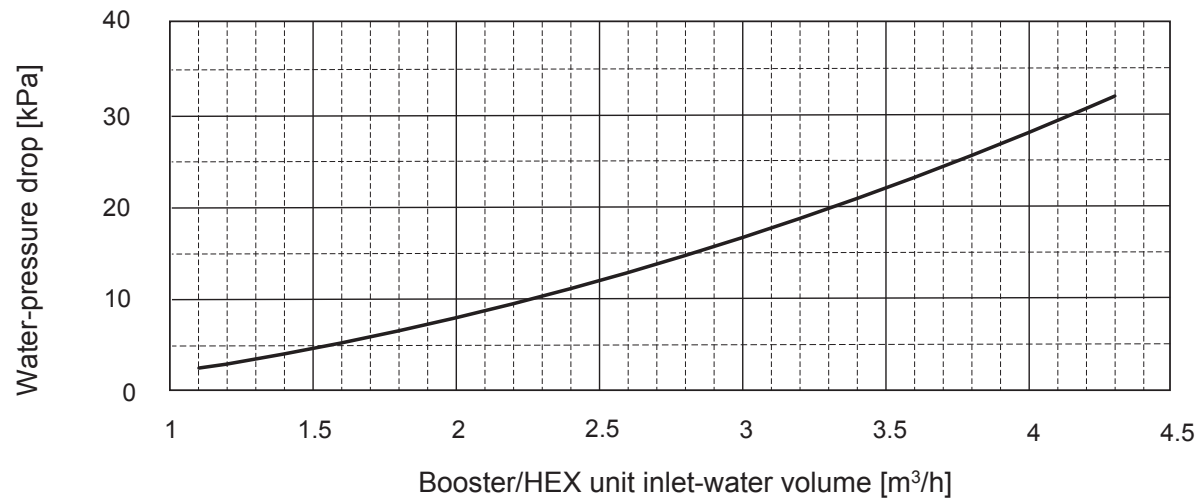
9. CAPACITY TABLES

PWFY-P36/72NMU-E-AU



9. CAPACITY TABLES

Water pressure drop of strainer only
(accessory for PWFY-P36NMU-E-BU and PWFY-P36/72NMU-E-AU)



9. CAPACITY TABLES

9-4. Cooling Operation in Cold Climates

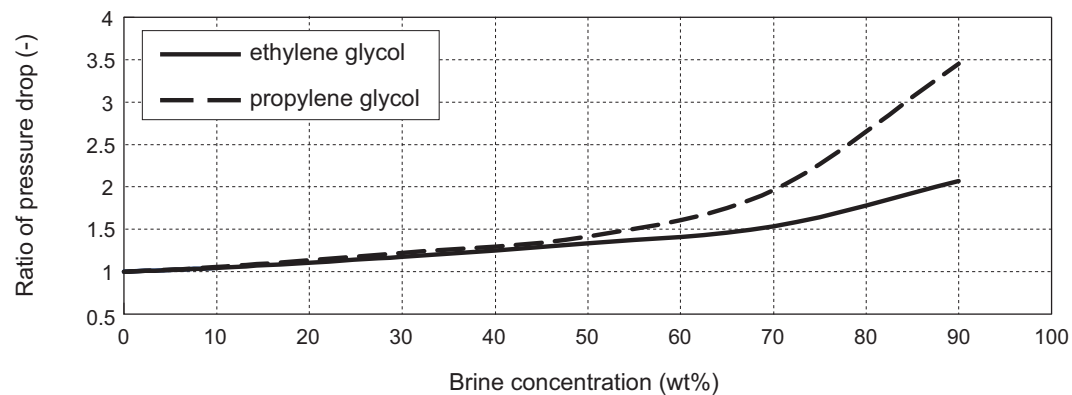
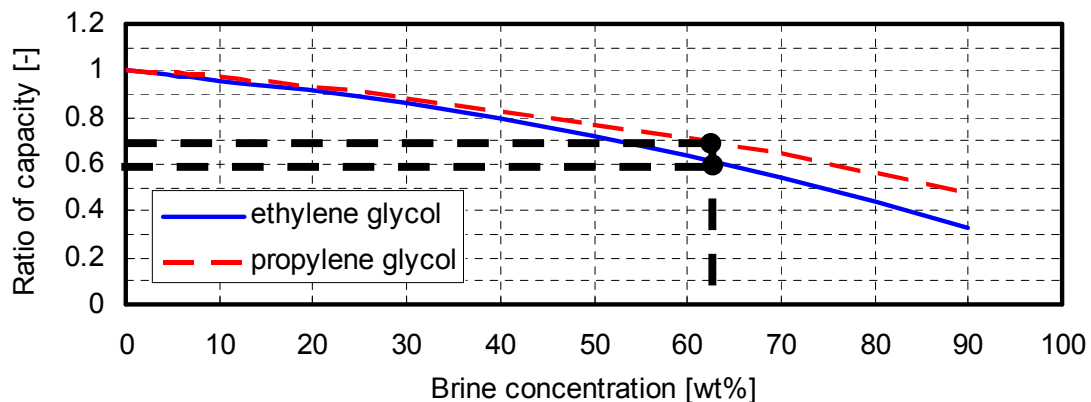
When using the PWFY unit for cooling water applications, especially with air cooled equipment, it is recommended to include glycol for freeze protection in the water circulating through the unit. Refer to glycol manufacturer data to determine level of concentration required; concentration for -4°F water is highly recommended.

The PWFY is equipped with a brazed plate heat exchanger and potential loss or abrupt loss of flow due to pump failure while PWFY is fully loaded during cooling operation poses a potential freezing risk.

During ambient temperatures below 32°F if the PWFY unit is not being utilized, especially when connected on an R2-series air cooled system that running in heating main mode, it is important to also maintain water circulation through the HEX unit even when not thermally active.

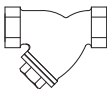
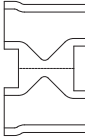
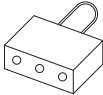
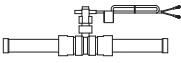
Alternately, if the PWFY is not being used during winter months, glycol has not been added to the water, and continuous pump circulation is not provided, the unit should be shut down and water drained from the heat exchanger as a preventative measure.

Brine



10. OPTIONAL PARTS

Optional Parts Line Up for the Indoor Unit

(A) Strainer	(B) Heat insulation material	(C) Connector sets × 2	(D) Washer × 2
			
(E) Expansion joint × 2	(F) Wire	(G) Flow switch	
 *1			

*1. PWFY-P72NMU-E-AU only

- (A) Install the strainer at the water pipe inlet.
- (B) This insulation is for exclusive use with the strainer. Wrap the strainer with the insulation after water pipes are installed.
- (C) These are analog input connectors. Cut the wire before using.
- (D) Fix power source wiring to terminal bed box by using buffer bushing for tensile force. (Conduit or the like.) Connect transmission wiring to transmission terminal bed through the knockout hole of terminal bed box using ordinary bushing.
- (E) When installing the unit, be sure to install the supplied flow switch on the water outlet side of the unit and connect the wire to IN1 of TB142A on the unit.
- (F) To perform test run before the pump interlock circuit is completed, short circuit the terminal block TB142A (IN1), and then perform test run.
- (G) When installing the unit, be sure to install the supplied flow switch on the water outlet side of the unit and connect the wire to IN1 of TB142A on the unit.

11. SYSTEM DESIGN

11-1. Electrical Work

11-1-1. General Cautions

⚠ Warning:

Electrical work should be performed by qualified electrical engineers in accordance with "Engineering Standards For Electrical Installation" and the supplied installation manuals. Special circuits should also be used. If the power circuit lacks capacity or has an installation failure, it may cause a risk of electric shock or fire.

1. Follow ordinances of your government organization for technical standard related to electrical equipment, wiring regulations, and guidances of each electrical power company.
2. Power should be taken from the special branch circuit.
3. Install a ground breaker to the power.
4. Install the unit so that the control circuit cables (remote controller, transmission cables, or external input/output line) is not in direct contact with the power cable outside the unit.
5. Ensure that there is no slack on all wire connections.
6. Vermin may have access to and damage the power, remote controller, and transmission cables. To prevent damage, insert cables into metal piping.
7. Do not connect the power cables to the transmission cable leads.
8. Connect control cables to the indoor unit, remote controller, and the outdoor unit.
9. Ground the unit.
10. Select control cables following instructions.

⚠ Caution:

Be sure to put the unit to the ground on the outdoor unit side. Do not connect the ground cable to any gas pipe, water pipe, lightning rod, or telephone cable. Improper grounding may cause electric shock.

11-1-2. Electrical characteristics of Indoor unit

- Provide a switch with at least 3 mm (1/8 in) contact separation in each pole when installing the air conditioner.

Symbols: MCA: Min. Circuit Amps (=1.25 x FLA)

Model	Unit						Compressor
	Hz	Volts	Voltage range	RLA(A)	MCA(A)	Max. Fuse(A)	SC(A)
PWFY-P36NMU-E-BU	60Hz	208/230V	188 to 253V	12.30/11.12	25	25	1.25

Model	Unit					
	Hz	Volts	Voltage range	RLA(A)	MCA(A)	Max. Fuse(A)
PWFY-P36NMU-E-AU PWFY-P72NMU-E-AU	60Hz	208/230V	188 to 253V	0.072/0.065	0.09	15

11. SYSTEM DESIGN

11-2. M-NET Control

11-2-1. Transmission Cable Specifications

PWFY-P36NMU-E-BU

	Transmission Cables	MA Remote Controller Cables	External Input	External Output
Type of Cable	Shielding wire (2-core) CVVS, CPEVS or MVVS	Sheathed 2-core cable (shielded) CVVS	Sheathed multi-core cable (shielded) CVVS or MVVS	Sheathed multi-core cable (unshielded) CVV or MVV
Cable Diameter	More than 1.25 mm ² [AWG16]	1.25 mm ² [AWG16] (1.25 mm ² [AWG16])*1	1.25 mm ² [AWG16]	1.25 mm ² [AWG16]
Remarks	-	Max.length: 200 m [656 ft]	Max. length: 100 m [328 ft]	Rated voltage: L1-N: 220~240 V Rated load: 0.6 A

PWFY-P36,72NMU-E-AU

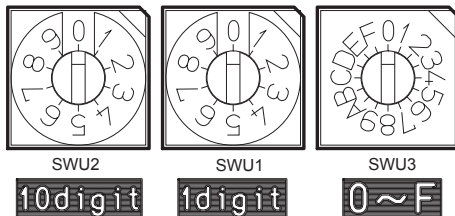
	Transmission Cables	MA Remote Controller Cables	External Input	External Output
Type of Cable	Shielding wire (2-core) CVVS, CPEVS or MVVS	Sheathed 2-core cable CVV (unshielded)	Sheathed multi-core cable CVV or MVV (unshielded)	Sheathed multi-core cable (unshielded) CVV or MVV
Cable Diameter	More than 1.25 mm ² [AWG16]	1.25 mm ² [AWG16] (1.25 mm ² [AWG16])*1	1.25 mm ² [AWG16]	1.25 mm ² [AWG16]
Remarks	-	Max.length: 200 m [656 ft]	Max. length: 100 m [328 ft]	Rated voltage: L1-N: 220~240 V Rated load: 0.6 A

*1 Connected with simple remote controller. CVVS, MVVS: PVC insulated PVC jacketed shielded control cable
CVV, MVV : PVC insulated PVC sheathed control cable
CPEVS : PE insulated PVC jacketed shielded communication cable

11-2-2. Address Setting

Switch Operation

Operate with the main power turned OFF



- There are two types of rotary switch setting available: setting addresses 1 to 9 and over 10, and setting branch numbers.
 - How to set addresses
Example: If Address is "3", remain SWU2 (for over 10) at "0", and match SWU1 (for 1 to 9) with "3".
 - How to set branch numbers SWU3 (Series R2 only)
Match the indoor unit's refrigerant pipe with the BC controller's end connection number. Remain other than R2 at "0".
- The rotary switches are all set to "0" when shipped from the factory. These switches can be used to set unit addresses and branch numbers at will.

11. SYSTEM DESIGN

11-2-3. Setting Addresses

Unit		Address setting	Example	Note
PWFY unit Standard indoor unit		01 ~ 50	 	Use the most recent address within the same group of indoor units. Make the indoor units address connected to the BC controller (Sub) larger than the indoor units address connected to the BC controller (Main). If applicable, set the sub BC controllers in an PURY system in the following order: (1) Indoor unit to be connected to the BC controller (Main) (2) Indoor unit to be connected to the BC controller (No.1 Sub) (3) Indoor unit to be connected to the BC controller (No.2 Sub) Set the address so that (1)<(2)<(3)
Outdoor unit		51 ~ 99, 100 (Note1)	 	The smallest address of indoor unit in same refrigerant system + 50 Assign sequential address numbers to the outdoor units in one refrigerant circuit system. OC and OS are automatically detected. (Note 2) * Please reset one of them to an address between 51 and 99 when two addresses overlap. * The address automatically becomes "100" if it is set as "01~ 50"
BC controller (Main)		52 ~ 99, 100	 	The address of outdoor unit + 1 *Please reset one of them to an address between 52 and 99 when two addresses overlap. *The address automatically becomes "100" if it is set as "01~ 50"
BC controller (Sub)		53 ~ 99, 100	 	Lowest address within the indoor units connected to the BC controller (Sub) plus 50.
Local remote controller	ME, LOSSNAY Remote controller (Main)	101 ~ 150	1 Fixed  	The smallest address of indoor unit in the group + 100 *The place of "100" is fixed to "1"
	ME, LOSSNAY Remote controller (Sub)	151 ~ 199, 200	1 Fixed  	The address of main remote controller + 50 *The address automatically becomes "200" if it is set as "00"
System controller	Group remote controller	201 ~ 250	2 Fixed  	The smallest group No. to be managed + 200
	System remote controller	000, 201 ~ 250	  	
	ON/OFF remote controller	000, 201 ~ 250	  	
	AG-150 GB-50	000, 201 ~ 250	  	
	BAC-HD150	000, 201 ~ 250	  	* Settings are made with setting tool of BM ADAPTER.
	LMAP03U	201 ~ 250	2 Fixed  	

Note1: To set the address to "100", set it to "50"

Note2: Outdoor units OC and OS in one refrigerant circuit system are automatically detected.

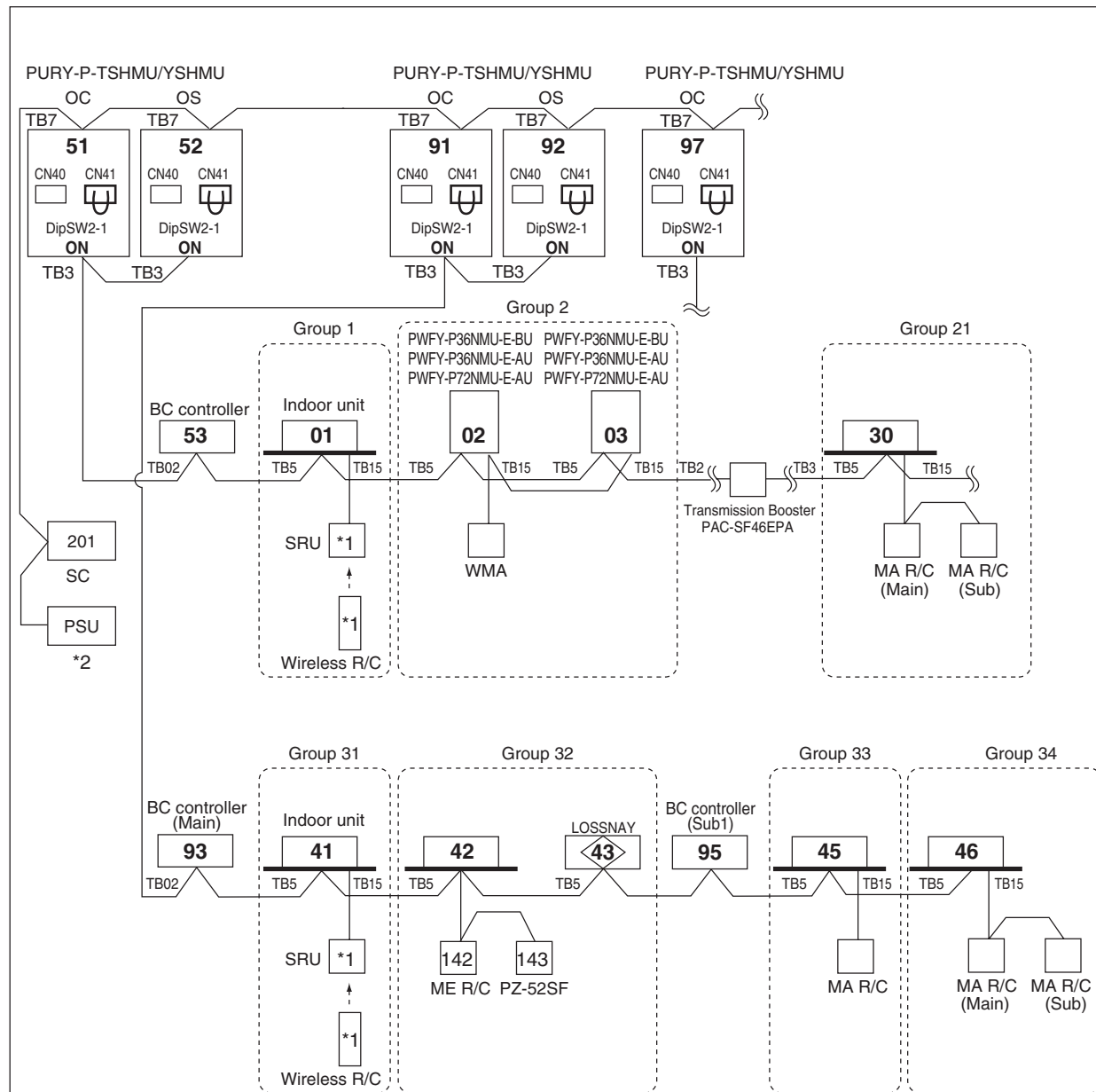
OC and OS are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.

11. SYSTEM DESIGN

11-2-4. System Examples

MA Remote Controller, Multi-refrigerant system, System Controller at TB7 side.

PWFY-P36NMU-E-BU/PWFY-P36,72NMU-E-AU with R2-Series Outdoor Units



*1 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

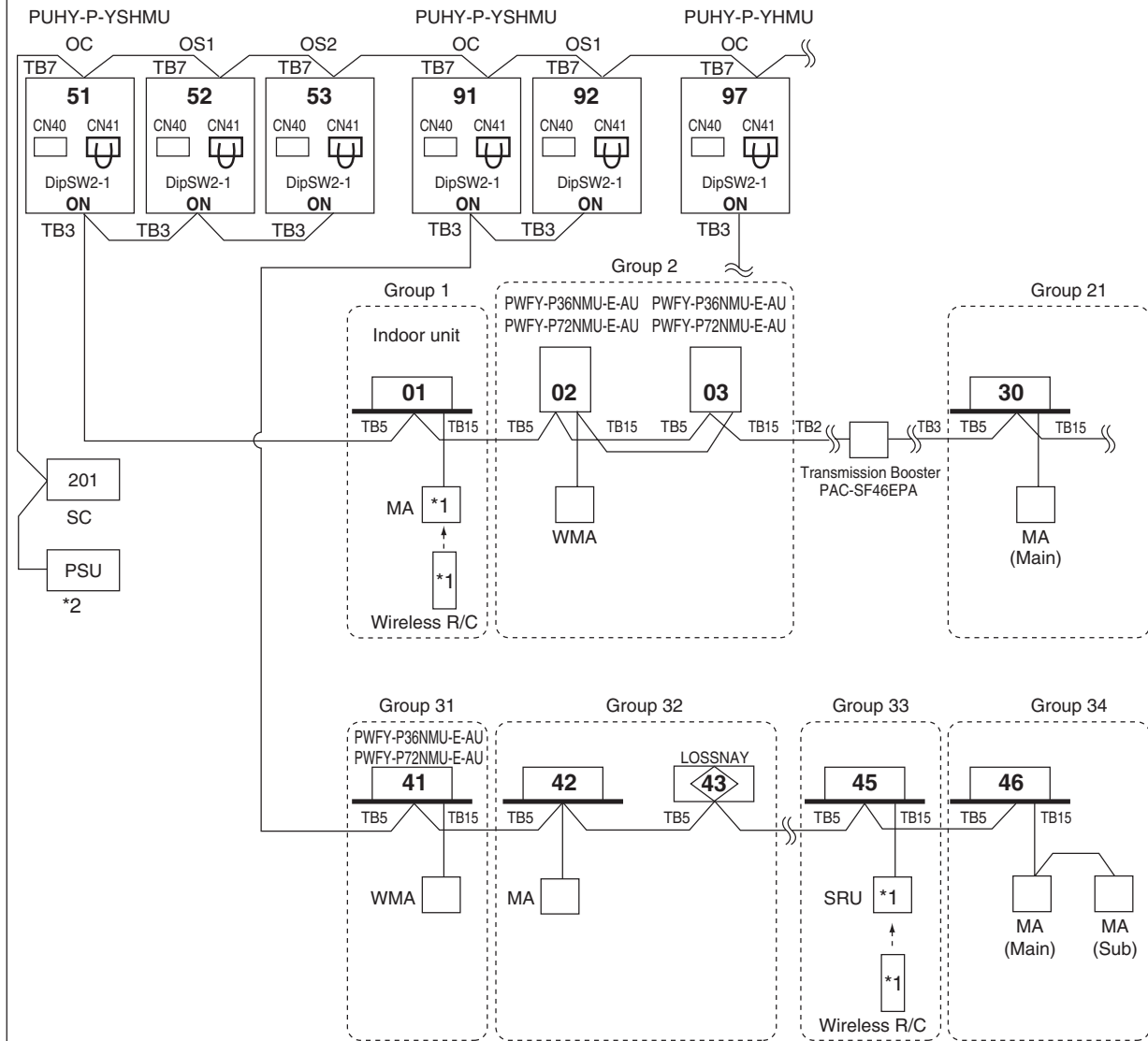
*2 System controller should connect to TB7 at Outdoor and use power supply unit together in Multi-Refrigerant-System.

NOTE:

1. Outdoor units OC and OS in one refrigerant circuit system are automatically detected. OC and OS are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.
2. Address should be set to Indoor units, LOSSNAY and central controller.
3. M-NET power is supplied by the Outdoor unit at TB3, while Indoor unit and MA RC consume the M-NET power for transmission use. For details, refer **System configuration restrictions**.
4. Indoor units should be set with a branch number.
5. Assign an address to each of the sub BC controllers (SC1 and SC2) which equals the sum of the smallest address of the indoor units that are connected to each sub BC controller and 50.

11. SYSTEM DESIGN

PWFY-P36,72NMU-E-AU with Y-Series Outdoor Units



*1 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

*2 System controller should connect to TB7 at Outdoor and use power supply unit together in Multi-Refrigerant-System.

NOTE:

- Outdoor units OC, OS1 and OS2 in one refrigerant circuit system are automatically detected. OC, OS1 and OS2 are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.
- Address should be set to Indoor units, LOSSNAY and central controller.
- M-NET power is supplied by the Outdoor unit at TB3, while Indoor unit and MA consume the M-NET power for transmission use. For details, refer to "**System configuration restrictions**".

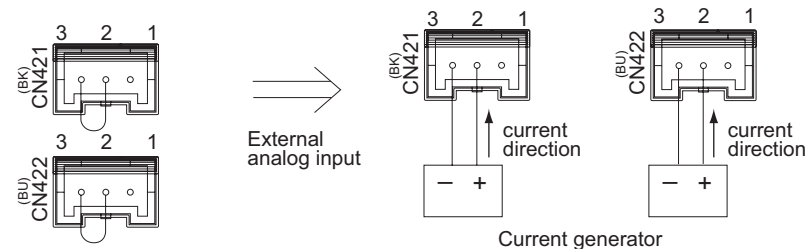
11. SYSTEM DESIGN

11-2-5. External Input/Output Function

Preset temperature input (external analog input: 4mA-20mA)

External input is input through CN421, CN422 on the circuit board. (Fig. 1)

[Fig. 1]



Use the supplied connector.

If no temperature settings are made via the MA remote controller, the temperature changes with the current of generator. Refer to the instructions manual that came with the MA remote controller for how to make the settings.

4 mA → 50 °F (10 °C) 20 mA → 160 °F (71 °C)

External output terminal

External output terminal (refer to Fig. 2) is ineffective when the circuit is open.

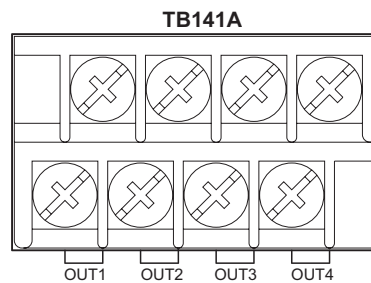
Refer to Table 1 for information about each contact.

The current in the circuit to be connected to the external output terminal must be 0.6A or less.

[Table. 1]

OUT1	Operation ON/OFF
OUT2	Defrost
OUT3	Compressor
OUT4	Error Signal

[Fig. 2]



External input terminal

Wiring length must be within 328 ft. (100 m).

External input terminal (refer to Fig. 2).

Refer to Table 2 through Table 4 for information about each contact.

Only the "pump interlock" function is ineffective when the circuit is short-circuited.

Connect a relay circuit to the external output terminal as shown in Fig. 3.

The specifications of the relay circuit to be connected must meet the following conditions.

Contact rating voltage ≥ DC15V

Contact rating current ≥ 0.1A

Minimum applicable load ≤ 1mA at DC

[Table 2 TB142A]

IN1	Pump Interlock
-----	----------------

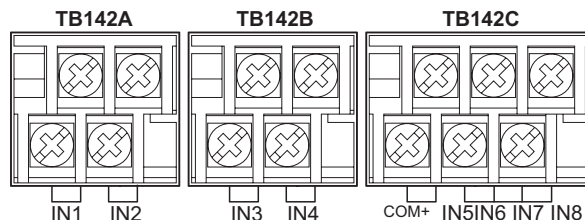
[Table 3 TB142B]

IN3	Connection Demand
IN4	Operation ON/OFF

[Table 4 TB142C]

COM+	Common
IN5 *1	Hot Water/Heating
IN6 *2	Heating ECO *5
IN7 *3	Antifreeze *6
IN8 *4	Cooling Operation

[Fig. 3]



*1 PWFY-P36NMU-E-BU: Hot Water

PWFY-P36, 72NMU-E-AU: Heating

*2 Effective when SW 4-3 is set to ON.

*3 Effective when SW 4-4 is set to ON.

*4 PWFY-P36, 72NMU-E-AU only

*5 When Heating ECO mode is effective, the outlet water temp. will be changed based on ambient temp. automatically.

*6 When Anti-freeze mode is effective, the unit will work for keeping set water temp. automatically.

Note: Dip S/W 1-1 OFF: Water Inlet Temp.

Dip S/W 1-1 ON : Water Outlet Temp.

The factory setting for Dip SW 1-1 is OFF.

Signal priority = External input > centralized controller > remote controller

11. SYSTEM DESIGN

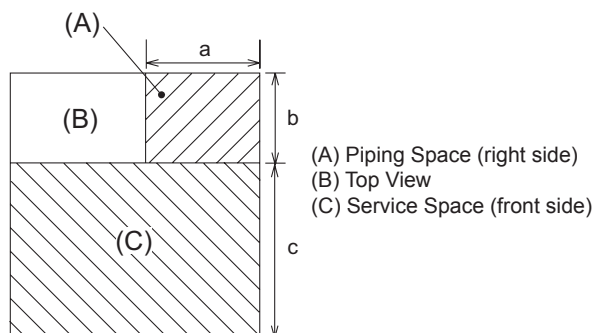
11-3. Installation

Selecting an installation site

- **Do not install outdoors. The unit is not waterproof.**
- **Back up system is recommended in case of PWFY unit breakdown.**
- **The unit will get hot. Do not install in a location where heat gets trapped inside.**
- **Be sure to install unit in a place strong enough to withstand its weight.**
Any lack of strength may cause unit to fall down, resulting in a personal injury.
- **Do not install the unit where corrosive gas is generated.**
- **Have installation work in order to protect against earthquake.**
Any installation deficiency may cause unit to fall down, resulting in a personal injury.
- **Pay a special attention to the place, such as a basement, etc. where refrigeration gas can stay, since refrigeration is heavier than the air.**
- **Do not install the unit where combustible gas may leak.**
 - If the gas leaks and accumulates around the unit, an explosion may result.
- **When installing the unit in a hospital, communication station, or similar place, provide sufficient protection against noise.**
 - The inverter equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the air conditioner to operate erroneously, or fail to operate. Also, the air conditioner may affect such equipment by creating noise that disturbs medical treatment or image broadcasting.
- **Do not install the unit on a structure that may cause leakage.**
 - When the room humidity exceeds 80 % or when the drain pipe is clogged, condensation may drip from the indoor unit. Perform collective drainage work together with the unit, as required.

Securing installation and service space

- Please secure the following service spaces after installation.
(All servicing can be performed from the front of the unit)
[Fig. 4]



Unit : in (mm)

Model	PWFY-P36NMU-E-BU	PWFY-P36NMU-E-AU	PWFY-P72NMU-E-AU
a	15-3/4 (400)	15-3/4 (400)	15-3/4 (400)
b	11-13/16 (300)	11-13/16 (300)	11-13/16 (300)
c	23-5/8 (600)	23-5/8 (600)	23-5/8 (600)

⚠ Warning:

- **Be sure to install the unit in a location which can adequately support its weight.**
 - If there is insufficient strength to support the unit's weight, it could fall and cause injuries.

Combining indoor units with BC controllers and outdoor units

For combining indoor units with BC controllers and outdoor units, refer to section BC controllers and outdoor units installation manual.

11. SYSTEM DESIGN

11-3-1. Calculating the Necessary Heat Capacity

- A. For Air conditioning using such as Panel Heaters, Floor Heating and Fan coil units

Required total heating capacity BTU

Safety factor; %

- B. For Sanitary use such as Shower and Bathrooms

Conditions

Tank inlet water Temp.; °F

Tank outlet water Temp.; °F

(Set Temp 23 °F)

Safety factor for Heat Loss; %

Operating time; Hours

For Shower; G/Person x Person = G (Water Temp. Condition °F)

For Bathrooms; G/Person x Person = G (Water Temp. Condition °F)

The conversion of water volume to °F

$$\begin{aligned} & \frac{\text{⑨}}{\text{⑩}} \times \left(\frac{\text{⑩}}{\text{③}} - \frac{\text{③}}{\text{④}} \right) / \left(\frac{\text{④}}{\text{③}} - \frac{\text{③}}{\text{④}} \right) \\ + & \frac{\text{⑬}}{\text{⑭}} \times \left(\frac{\text{⑭}}{\text{③}} - \frac{\text{③}}{\text{④}} \right) / \left(\frac{\text{④}}{\text{③}} - \frac{\text{③}}{\text{④}} \right) \\ = & \text{⑮} \text{ G/day} \end{aligned}$$

Heating Capacity Calculation for sanitary usage

$$\frac{\text{⑮}}{1,000} \times \left(\frac{\text{④}}{\text{③}} - \frac{\text{③}}{\text{④}} \right) / 2 = \text{⑰} \text{ M BTU / day}$$

The conversion of M BTU to BTU

$$\text{⑰} \times 1,000 / \text{⑥} = \text{⑱} \text{ BTU}$$

- C. Total (A+B)

Total Heating Capacity

$$\text{①} \times (100\% + \text{②}\%) + \text{⑱} \times (100\% + \text{⑤}\%) = \text{⑲} \text{ BTU}$$

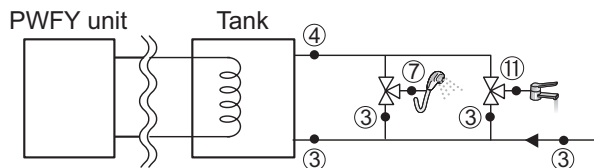
- D. No. of units required

Safety factor; %

$$\text{⑲} \times (100\% + \text{⑲}\%) / 39900 \text{ BTU} = \text{⑳} \text{ units}$$



units are required



11. SYSTEM DESIGN

11-3-2. Refrigerant and Drain Piping Specifications

To avoid condensation, install insulation and antisweating materials on the refrigerant and drain pipes.

When using commercially available refrigerant pipes, be sure to install commercially available insulating material (with a heat-resistant temperature of more than 212°F (100°C) and thickness given below) onto both the liquid and gas pipes.

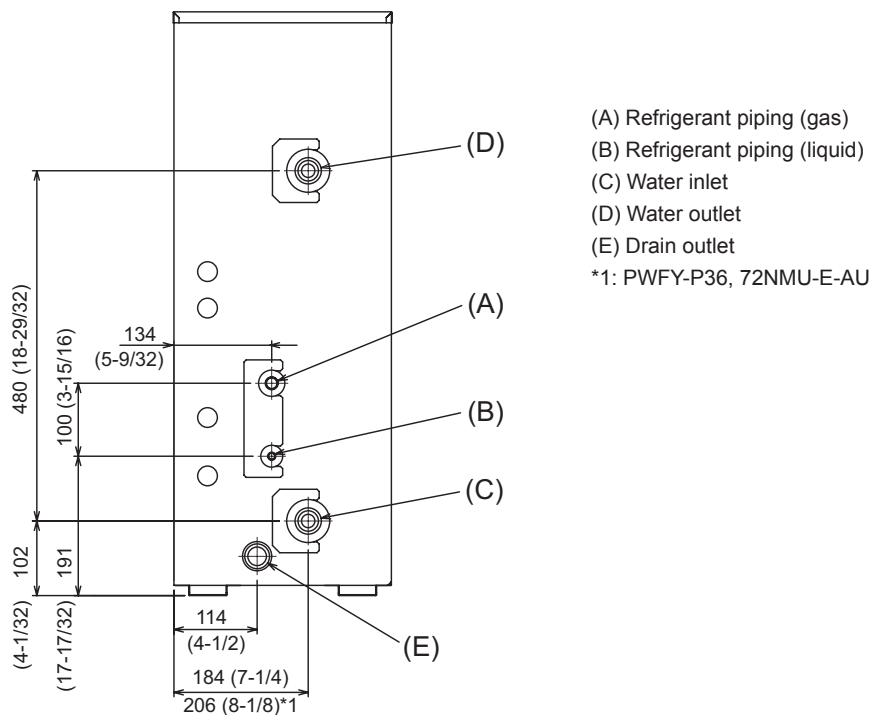
Be also sure to install commercially available insulating material (with a form polyethylene's specific gravity of 0.03 and thickness given below) onto all pipes that pass through rooms.

- 1) Select the thickness of insulating material by pipe size.

Model	PWFY-P36NMU-E-BU	PWFY-P36NMU-E-AU	PWFY-P72NMU-E-AU
Gas	ø15.88 (5/8)	ø15.88 (5/8)	ø19.05 (3/4)
Liquid	ø9.52 (3/8)	ø9.52 (3/8)	ø9.52 (3/8)
Drain	ø32 (1-1/4)		
Thickness of Insulation Material	More than 10 mm (13/32 in.)		

- 2) If the unit is used on the highest story of a building and under conditions of high temperature and humidity, it is necessary to use pipe size and insulating material's thickness more than those given in the table above.
- 3) Follow customer's specifications, if applicable.

Refrigerant Piping, Drain Pipe, and Filling Port

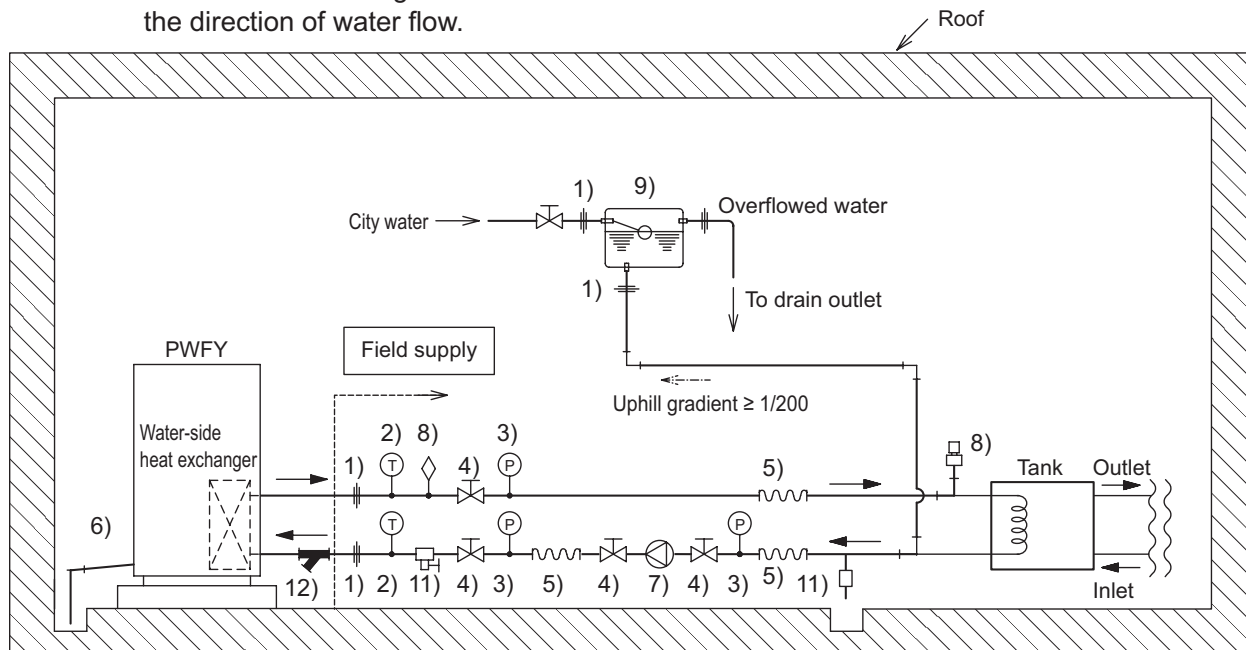


11. SYSTEM DESIGN

11-3-3. Water Piping Installation

Water Circuit Sample

← Solid arrows in the figure indicate the direction of water flow.



Sample of water circuit for ATW

Consider the following when designing and installing a water piping system. (Items (1)-(12) in the figure are explained below.)

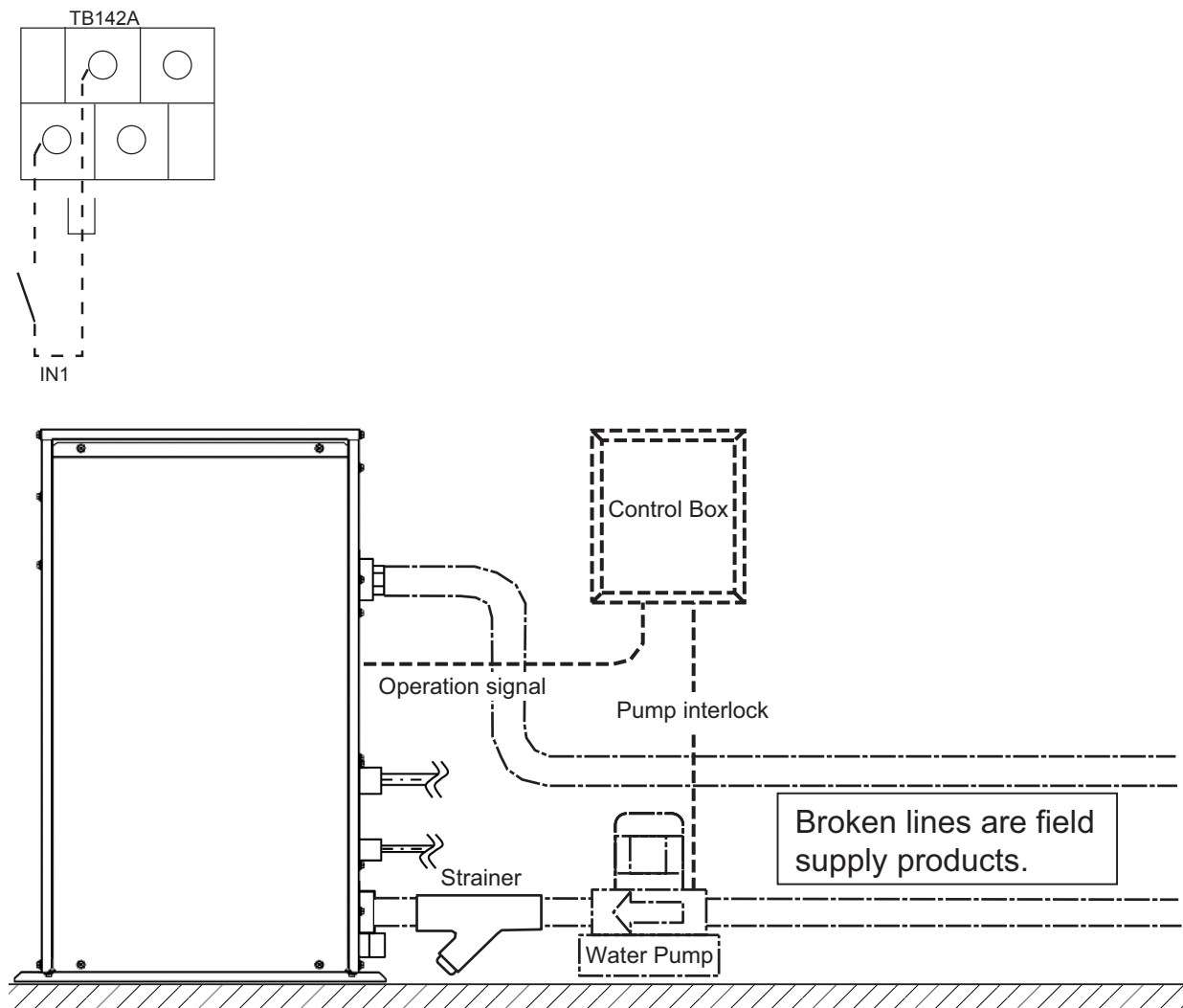
- 1) Union joints/flange joints etc.
Install a flange etc. to allow for easy replacement of connected equipment.
- 2) Thermometer
For checking unit performance and operation monitoring
- 3) Water pressure gauge
For operation status monitoring
- 4) Valve
Install a valve for easy replacement and cleaning of the refrigerant flow control device.
Install a refrigerant flow control valve on the fan coil outlet side.
- 5) Flexible joint
Recommended to prevent the noise and vibration from the pump from being transmitted.
- 6) Drain pipe
Install the drain pipe with an inclination of between 1/100 and 1/200 to provide a downward flow of drain water.
For cold climate installation, take an appropriate measure (e.g., drain heater) to prevent the drain water from freezing.
- 7) Pump
Use a pump that is large enough to compensate for the total water pressure loss and to supply sufficient water to the unit.
- 8) Air vent valve
Provide air vent valves on the pipes.
- 9) Expansion tank
Install an expansion tank to accommodate expanded water and to supply water.
- 10) Cold/Hot water pipe
Use pipes that allow for easy air purging, and provide sufficient insulation.
- 11) Drain valve
Install drain valves so that water can be drained for servicing.
- 12) Strainer
Install a strainer near the PWFY unit to keep foreign materials from entering the water-side heat exchanger.

11. SYSTEM DESIGN

11-3-4. Pump Interlock

The unit may become damaged if it is operated with no water circulating through the pipes.

Be sure to interlock unit operation and the water-circuit pump. Use the terminal blocks for interlocking TB142A (IN1) that can be found on the unit.



Pump Interlock Example Diagram

11. SYSTEM DESIGN

11-3-5. Water Processing and Water Quality Control

To preserve water quality, use closed water loops for the unit. When the circulating water quality is poor, the water heat exchanger can develop scales, leading to a reduction in heat-exchange power and possible corrosion of the heat exchanger. Please pay careful attention to water processing and water quality control when installing the water circulation system.

- Remove of foreign objects or impurities within the pipes.

During installation, take extreme care that foreign objects such as welding fragments, sealant particles, or rust, do not enter the pipes.

- Water Quality Processing

- Depending on the quality of the cold-temperature water used in the air-conditioner, the copper piping of the heat exchanger may become corroded. We recommend regular water quality processing.

Cold water circulation systems using open heat storage tanks are particularly prone to corrosion.

When using an open-type heat storage tank, install a water-to-water heat exchanger, and use a closed-loop circuit on the air conditioner side. If a water supply tank is installed, keep contact with air to a minimum, and keep the level of dissolved oxygen in the water no higher than 1mg/liter.

- Water quality standard

Items		Lower mid-range temperature water system Water Temp. ≤ 140 °F (60 °C)		Higher mid-range temperature water system Water Temp. > 140 °F (60 °C)		Tendency	
		Recirculating water 7.0 ~ 8.0	Make-up water 7.0 ~ 8.0	Recirculating water 7.0 ~ 8.0	Make-up water 7.0 ~ 8.0	Corrosive	Scale-forming
Standard items	pH 77 °F (25 °C)	30 or less	30 or less	30 or less	30 or less	○	○
	Electric conductivity(mS/m) 77 °F (25 °C) (μ s/cm) 77 °F (25 °C)	[300 or less]	[300 or less]	[300 or less]	[300 or less]	○	○
	Chloride ion (mg Cl ⁻ /liter)	50 or less	50 or less	30 or less	30 or less	○	
	Sulfate ion (mg SO ₄ ²⁻ /liter)			30 or less	30 or less	○	
	Acid consumption (pH4.8)	50 or less	50 or less	50 or less	50 or less		○
	(mg CaCO ₃ /liter)	70 or less	70 or less	70 or less	70 or less		○
	Total hardness (mg CaCO ₃ /liter)	50 or less	50 or less	50 or less	50 or less		○
	Calcium hardness (mg CaCO ₃ /liter)	30 or less	30 or less	30 or less	30 or less		○
Reference items	Ionic silica (mg SiO ₂ /liter)	1.0 or less	0.3 or less	1.0 or less	0.3 or less	○	○
	Iron (mg Fe/liter)	1.0 or less	1.0 or less	1.0 or less	1.0 or less	○	
	Copper (mg Cu/liter)	not to be	not to be	not to be	not to be	○	
	Sulfide Ion (mg S ²⁻ /liter)	detected	detected	detected	detected	○	
		0.3 or less	0.1 or less	0.1 or less	0.1 or less	○	
	Ammonium ion (mg NH ₄ ⁺ /liter)	0.25 or less	0.3 or less	0.1 or less	0.3 or less	○	
	Residual chlorine (mg Cl ⁻ /liter)	0.4 or less	4.0 or less	0.4 or less	4.0 or less	○	
	Free carbon dioxide (mg CO ₂ /liter)	—	—	—	—	○	○
Ryzner stability index							

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

- Please consult with a water quality control specialist about water quality control methods and water quality calculations before using anti-corrosive solutions for water quality management.
- When replacing a previously installed air conditioning device (even when only the heat exchanger is being replaced), first conduct a water quality analysis and check for possible corrosion.

Corrosion can occur in cold-water systems even if there has been no prior signs of corrosion.

If the water quality level has dropped, please adjust water quality sufficiently before replacing the unit.

Do not exceed the maximum of 100L circulating water in the water pipe.

