PWFY-P-NMU-E-BU, -NMU-E2-AU

1.1. Unit configuration

Model	PWFY-P36NMU-E-BU		PWFY-P36NMU-E2-AU	PWFY-P72NMU-E2-AU
Outdoor unit	R2, H2i R2, WR2 series only		Y, H2i Y, WY series, R2, H2i R2, WR2 series	
Connection	BC controller	BC controller: CMB-P105,106,108,1010,1013,1016NU-G1 Main BC controller: CMB-P108,1010,1013,1016NU-GA1/CMB-P108,1010,1016NU-HA1 Sub BC controller: CMB-P108NU-GB1/CMB-P1016NU-HB1		

1- 2. Operation temperature range

PWFY-P36NMU-E-BU

		Only PWFY	PWFY with standard indoor units	Only standard indoor units
		Heating (WB)		
Inlet water temperature	R2/H2i 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 90ºF (-25 to 32ºC)	-13 to 90ºF (-25 to 32ºC)	-13 to 60ºF (-25 to 15.5°C)
Circulating water temperature	WR2 series	50 to 113°F (10~45°C)	50 to 113°F (10~45°C)	50 to 113°F (10~45°C)

PWFY-P36, P72NMU-E2-AU

		Only PWFY		PWFY with standard indoor units	
		Cooling (DB)	Heating (WB)	Cooling (DB)	Heating (WB)
Inlet water temperature	R2/H2i 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 (-5~46°C)	-4 to 90°F (-20 to 32°C)	23 to 115°F (-5~46°C)	-4 to 90°F (-20 to 32°C)
	H2i R2 series	23 to 115ºF (-5 to 46ºC)	-13 to 90ºF (-25 to 32ºC)	23 to 115ºF (-5 to 46ºC)	-13 to 90ºF (-25 to 32ºC)
	Y series	23 to 115°F (-5~46°C)	-4 to 60°F (-20 to 15.5°C)	23 to 115°F (-5~46°C)	-4 to 60°F (-20 to 15.5°C)
	H2i Yseries	23 to 109°F (-5~43°C)	-13 to 60°F (-25~15.5°C)	23 to 109°F (-5~43°C)	-13 to 60°F (-25~15.5°C)
Circulating water temperature	WR2 series	50 to 113°F (10~45°C)	50 to 113°F (10~45°C)	50 to 113°F (10~45°C)	50 to 113°F (10~45°C)
	WYseries	50 to 113°F (10~45°C)	50 to 113°F (10~45°C)	50 to 113°F (10~45°C)	50 to 113°F (10~45°C)

		Only standard indoor units	
		Cooling (DB)	Heating (WB)
Outdoor temperature	R2 series	23 to 115°F (-5~46°C)	-4 to 60°F (-20 to 15.5°C)
	H2i R2 series	23 to 115ºF (-5 to 46ºC)	-13 to 60ºF (-25 to 15.5°C)
	Y series	23 to 115°F (-5~46°C)	-4 to 60°F (-20 to 15.5°C)
	H2i Yseries	23 to 109°F (-5~43°C)	-13 to 60°F (-25~15.5°C)
Circulating water temperature	WR2 series	50 to 113°F (10~45°C)	50 to 113°F (10~45°C)
	WYseries	50 to 113°F (10~45°C)	50 to 113°F (10~45°C)

1-3. 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, P72NMU-E2-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

2-1. PWFY-P36NMU-E-BU

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	-4~90ºF (-20~32ºC) R2 series
		W.B	-13~90ºF (-25~32ºC) H2i R2 series
	Inlet Water temp.	-	50~160°F (10~71°C)
Connectable outdoor unit	Total capacity		50~100% of outdoor/heat source unit capacity
	Model / Quantity		PURY-P•T(S)KMU-A(-BS), PURY-P•Y(S)KMU-A(-BS) PURY-P•T(S)LMU-A(-BS), PURY-P•Y(S)LMU-A(-BS) PURY-HP•T(S)KMU-A-H(-BS), PURY-HP•Y(S)KMU-A-H(-BS) PQRY-P•T(S)LMU-A, PQRY-P•Y(S)LMU-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)	131 (59)
Compressor	Type		Inverter rotary hermetic compressor
	Maker		MITSUBISHI ELECTRIC CORPORATION
	Starting method		Inverter
	Motor output	kW	1.0
	Lubricant		NEO22
Circulating water	Operation volume Range	m^3/h	0.6~2.15
		G/h	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 × 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.

Note: *1 Nominal heating conditions (PWFY conditions are indicated in the parentheses.)

<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.: 149°F (65°C) Water flow rate: 9.4 gpm (2.15 m^3/h))

<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 (65°C) Water flow rate 9.4 gpm (2.15 m^3/h))

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

Unit converter

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

* The specification data is subject to rounding variation.

2. SPECIFICATIONS

2-2. PWFY-P36NMU-E2-AU

Model			PWFY-P36NMU-E2-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	0.025 - 0.028
	Current input	A	0.145 - 0.150
Temp. range of heating	Outdoor temp.	W.B	-4～90°F (-20~32°C) R2 series
		W.B	-13～90°F (-25~32°C) H2i R2 series
		W.B	-4～60°F (-20~15.5°C) Y series
		W.B	-13～60°F (-25~15.5°C) H2i Y 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	0.025 - 0.028
	Current input	A	0.145 - 0.150
Temp. range of cooling	Outdoor temp.	D.B	23～115°F (-5~46°C) R2 series
		D.B	23～115°F (-5~46°C) H2i R2 series
		D.B	23～115°F (-5~46°C) Y series
		D.B	23～109°F (-5~43°C) H2i Y series
	Inlet Water temp.	-	50~95°F (10~35°C)
Connectable outdoor unit	Total capacity		50~100% of outdoor/heat source unit capacity
	Model / Quantity		PURY-P•T(S)KMU-A(-BS), PURY-P•Y(S)KMU-A(-BS) PURY-P•T(S)LMU-A(-BS), PURY-P•Y(S)LMU-A(-BS) PURY-HP•T(S)KMU-A-H(-BS), PURY-HP•Y(S)KMU-A-H(-BS) PQRY-P•T(S)LMU-A, PQRY-P•Y(S)LMU-A PUHY-P•T(S)KMU-A(-BS), PUHY-P•Y(S)KMU-A(-BS) PUHY-P•T(S)LMU-A(-BS), PUHY-P•Y(S)LMU-A(-BS) PUHY-HP•T(S)JMU-A(-BS) PQHY-P•T(S)LMU-A; PQHY-P•Y(S)LMU-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)	73 (33)
Circulating water	Operation Volume Range	m^3/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		WKS79C728
	Wiring		KE94G154
Standard attachment	Document		Installation Manual, Instruction Book
	Accessory		Strainer, Heat insulation material, 2 × Washer, Flow switch × 1set, Buffer material
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.)

<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: 9.4 gpm (2.15 m^3/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: 9.4 gpm (2.15 m^3/h))

*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: 8.4 gpm (1.93 m^3/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: 8.4 gpm (1.93 m^3/h))

* Due to continuing improvement, the above specifications may be subject to change without notice.
* The unit is not designed for outside installations.
* Please don't use the steel material for the water piping material.
* Please always make water circulate or add the brine to the circulation water when the ambient temperature becomes 32°F (0°C) or less.
* Please always make water circulate or pull out the circulation water completely when not using it.
* Please do not use groundwater and well water.
* Install the unit in an environment where the wet bulb Temp. will not exceed 92°F (32°C)
* The water circuit must use the closed circuit.
* Please do not use it as a drinking water.

Unit converter

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

* The specification data is subject to rounding variation.

2. SPECIFICATIONS

2-3. PWFY-P72NMU-E2-AU

Model			PWFY-P72NMU-E2-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	0.025 - 0.028
	Current input	A	0.145 - 0.150
Temp. range of heating	Outdoor temp.	W.B	-4~90°F (-20~32°C) R2 series
		W.B	-13~90°F (-25~32°C) H2i R2 series
		W.B	-4~60°F (-20~15.5°C) Y series
		W.B	-13~60°F (-25~15.5°C) H2i Y 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	0.025 - 0.028
	Current input	A	0.145 - 0.150
Temp. range of cooling	Outdoor temp.	D.B	23~115°F (-5~46°C) R2 series
		D.B	23~115°F (-5~46°C) H2i R2 series
		D.B	23~115°F (-5~46°C) Y series
	Inlet Water temp.	-	23~109°F (-5~43°C) H2i Y series
Connectable outdoor unit	Total capacity		50~100% of outdoor/heat source unit capacity
	Model / Quantity		PURY-P•T(S)KMU-A(-BS), PURY-P•Y(S)KMU-A(-BS) PURY-P•T(S)LMU-A(-BS), PURY-P•Y(S)LMU-A(-BS) PURY-HP•T(S)KMU-A-H(-BS), PURY-HP•Y(S)KMU-A-H(-BS) PQRY-P•T(S)LMU-A, PQRY-P•Y(S)LMU-A PUHY-P•T(S)KMU-A(-BS), PUHY-P•Y(S)KMU-A(-BS) PUHY-P•T(S)LMU-A(-BS), PUHY-P•Y(S)LMU-A(-BS) PUHY-HP•T(S)JMU-A(-BS) PQHY-P•T(S)LMU-A, PQHY-P•Y(S)LMU-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 (PT 3/4 Screw without expansion joint)
	Outlet	in.(mm)	PT 1 (34) Screw (PT 3/4 Screw without expansion joint)
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)	80 (36)
Circulating water	Operation Volume Range	m^3/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		WKS79C728
	Wiring		KE94G154
Standard attachment	Document		Installation Manual, Instruction Book
	Accessory		Strainer, Heat insulation material, Expansion joint , 2 × Washer, Flow switch × 1set, Buffer material
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.)

<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: 18.9 gpm (4.30 m^3/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: 18.9 gpm (4.30 m^3/h))

*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: 16.9 gpm (3.86 m^3/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: 16.9 gpm (3.86 m^3/h))

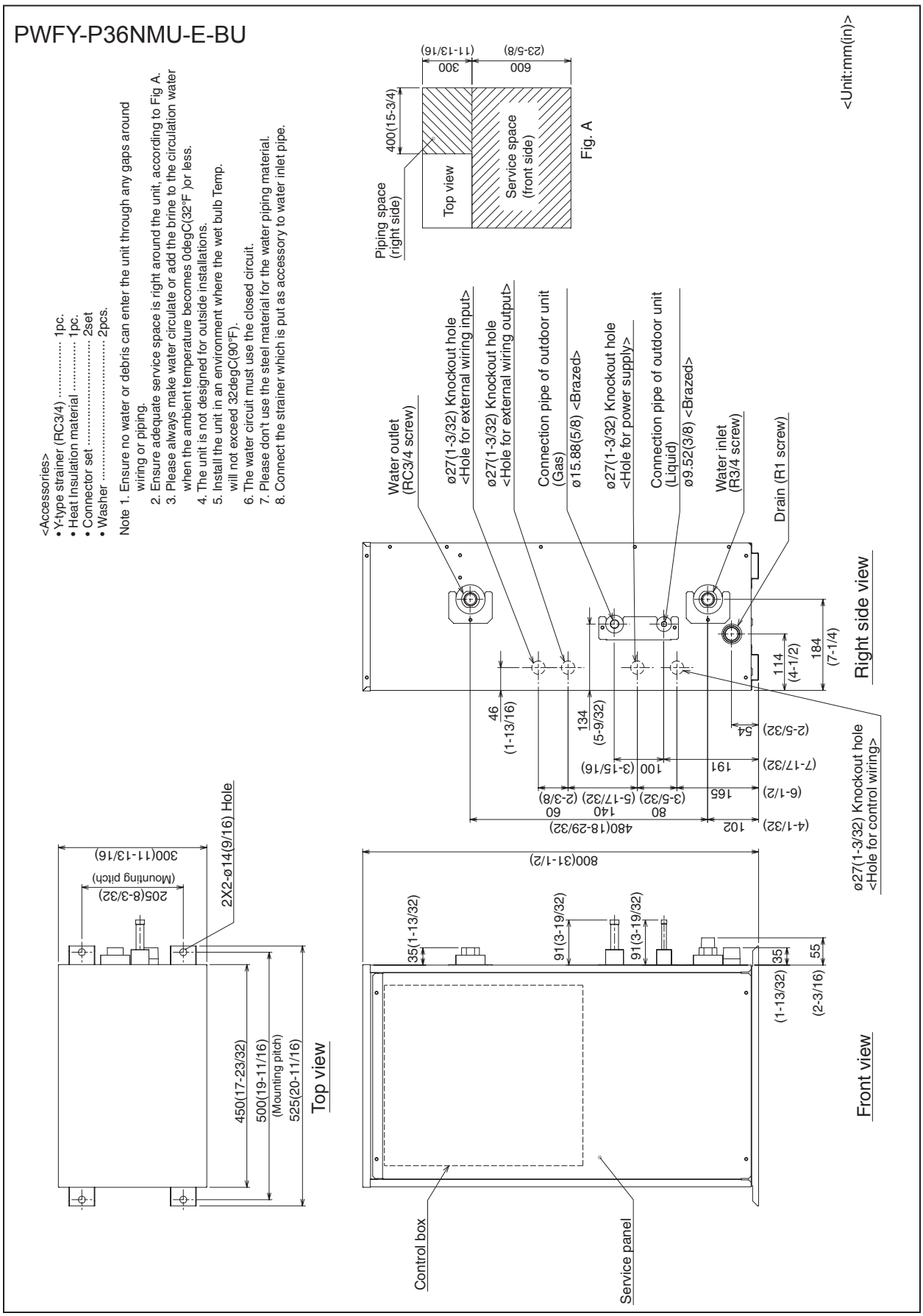
* Due to continuing improvement, the above specifications may be subject to change without notice.
* The unit is not designed for outside installations.
* Install the unit in an environment where the wet bulb Temp. will not exceed 92°F (32°C)
* Please don't use the steel material for the water piping 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.

Unit converter

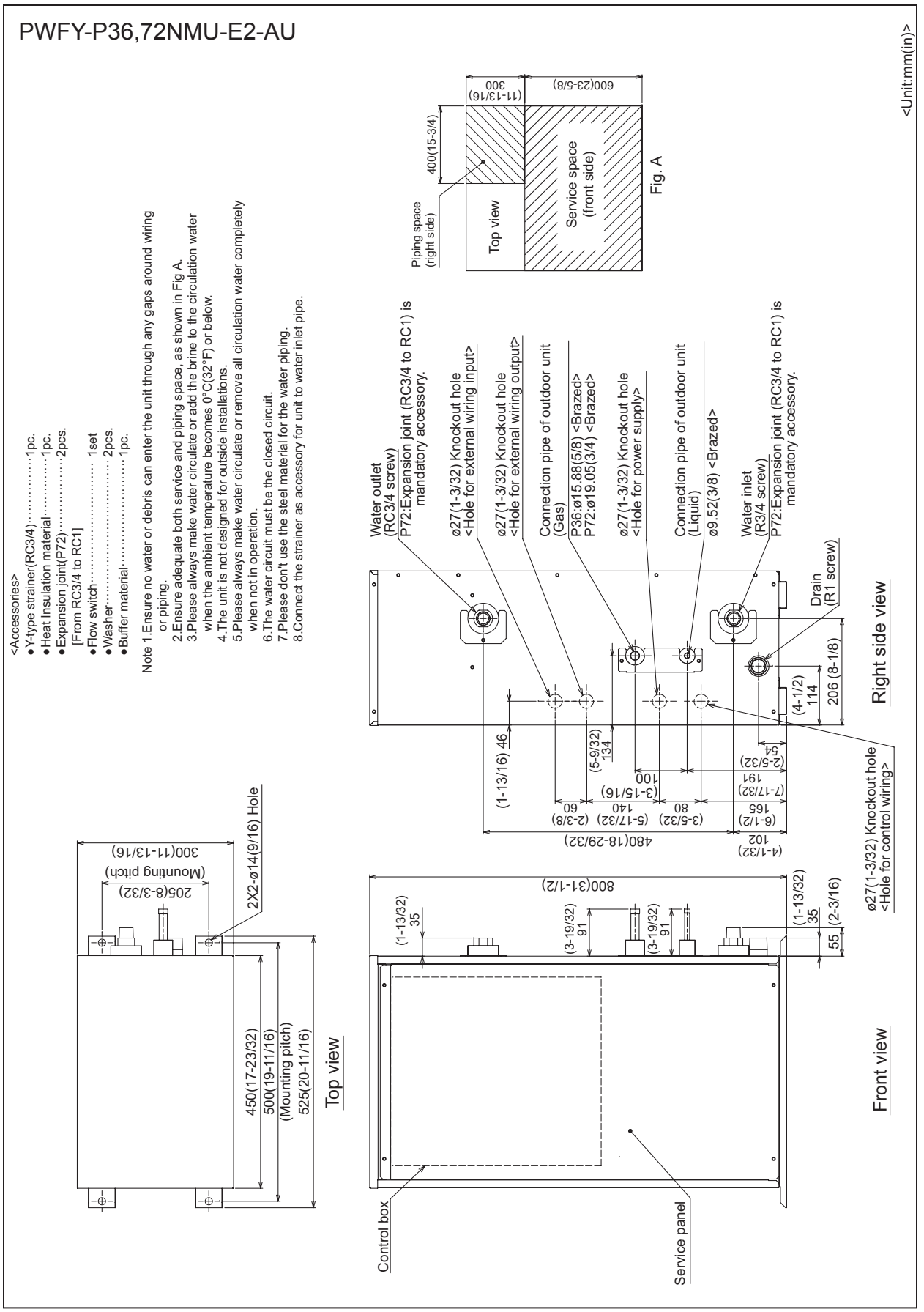
kcal/h = kW x 860
BTU/h = kW x 3,412
cfm = m^3/min x 35.31
G(us) = L × 0.2642
lbs = kg / 0.4536
psi = MPa×145.038

* The specification data is subject to rounding variation.

PWFY-P36NMU-E-BU



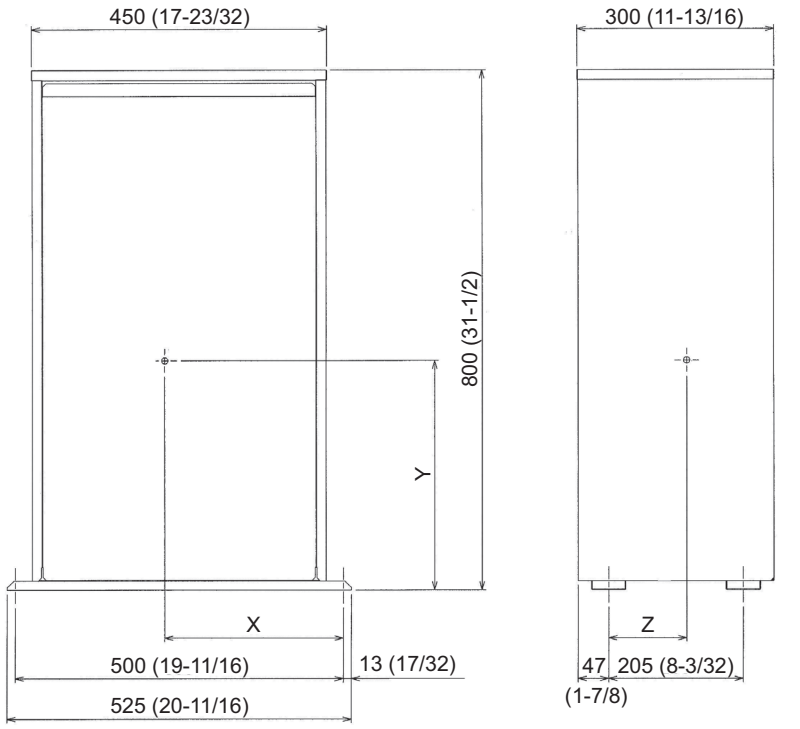
PWFY-P36,72NMU-E2-AU



4. CENTER OF GRAVITY

PWFY-P36NMU-E-BU

unit : mm (in)



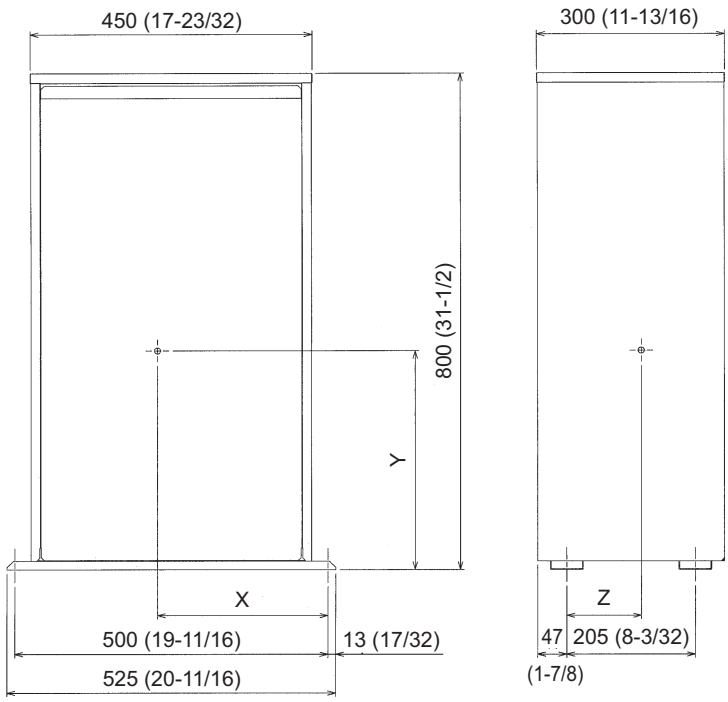
unit : mm (in)

Model	X	Y	Z
PWFY-P36NMU-E-BU	272 (10-23/32)	355 (13)	119 (4-11/16)

4. CENTER OF GRAVITY

PWFY-P36, P72NMU-E2-AU

unit : mm (in)



unit : mm (in)

Model	X	Y	Z
PWFY-P36NMU-E2-AU	257 (10-1/8)	355 (14)	100 (3-15/16)
PWFY-P72NMU-E2-AU	267 (10-17/32)	368 (14-1/2)	103 (4-1/16)

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 CN631 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
IN1	Pump interlock

*6 TB142B(input)

Symbol	Function
IN3	Connection demand
IN4	Operation ON/OFF

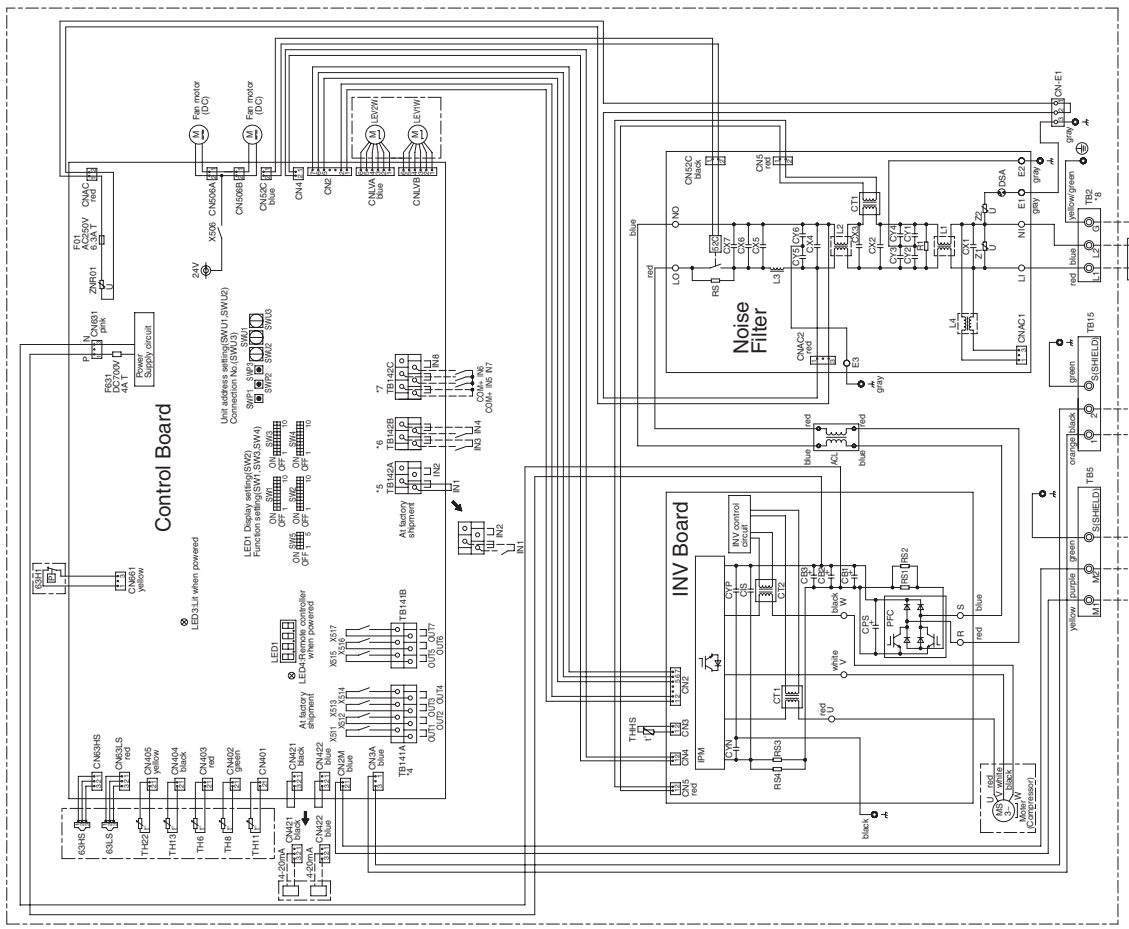
*7 TB142C(input)

Symbol	Function
COM-	Common
IN5	Hot water/Heating
IN6	Heating ECO
IN7	Anti-freeze

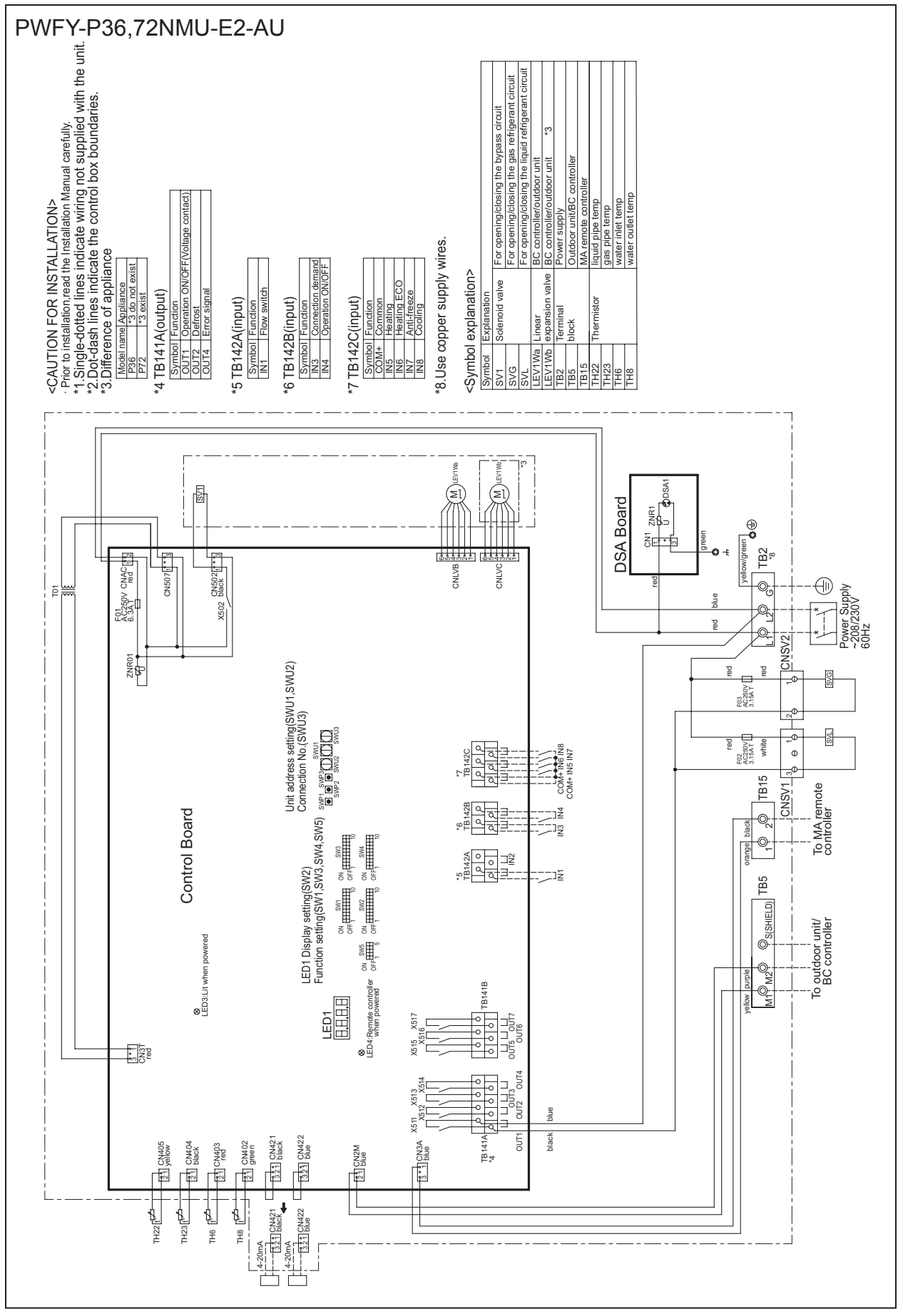
*8. Use copper supply wires.

<Symbol explanation>

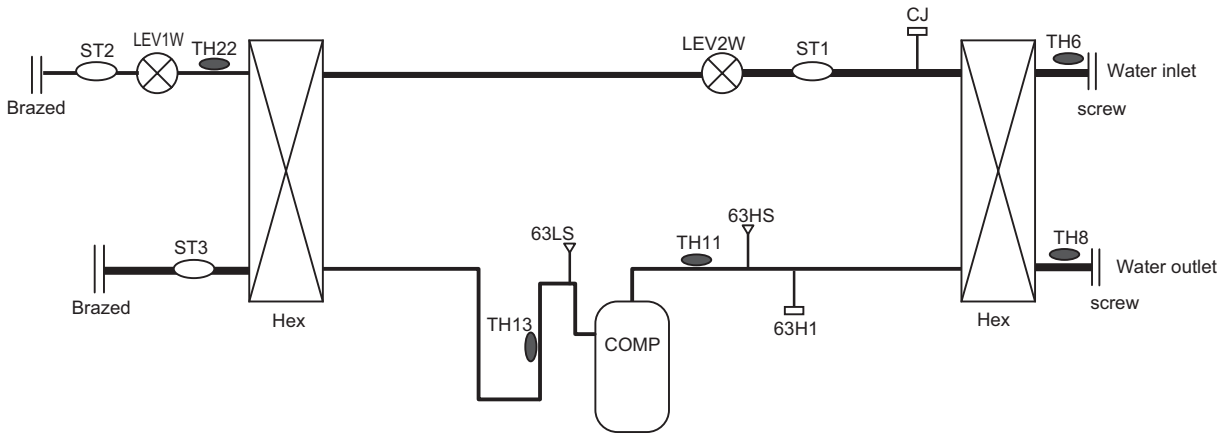
Symbol	Explanation	
63H1	Pressure switch	High pressure switch (High pressure protection for the booster unit)
63HS	Pressure sensor	Discharge pressure
63LS	Pressure sensor	Low pressure
52C	Magnetic relay(main circuit)	
ACL	AC reactor	
CT1,CT2	Current sensor(AC)	
LEV1W	Linear expansion valve	BC controller/outdoor unit
LEV2W		Booster unit
TB2	Terminal block	Power supply
TB5		Outdoor unit/BC controller
TB15		MA remote controller
TH11	Thermistor	Compressor discharge temp
TH13		Liquid pipe temp
TH22		water inlet temp
TH6		water outlet temp
TH8		IGBT temp
THHS		



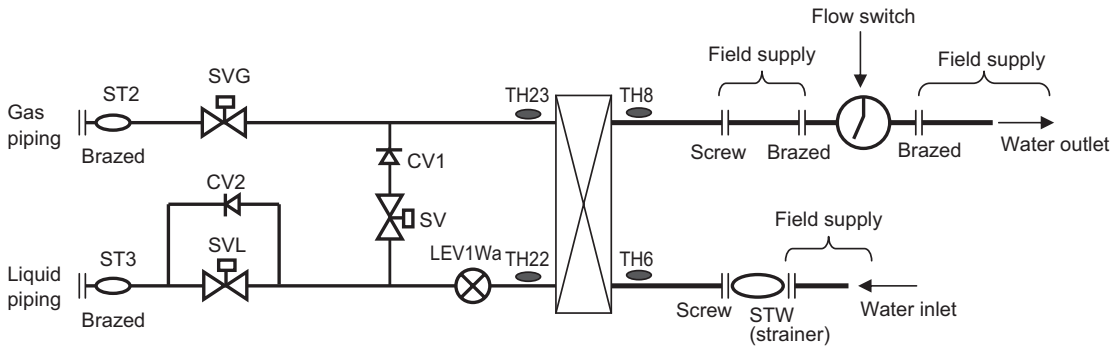
PWFY-P36,72NMU-E2-AU



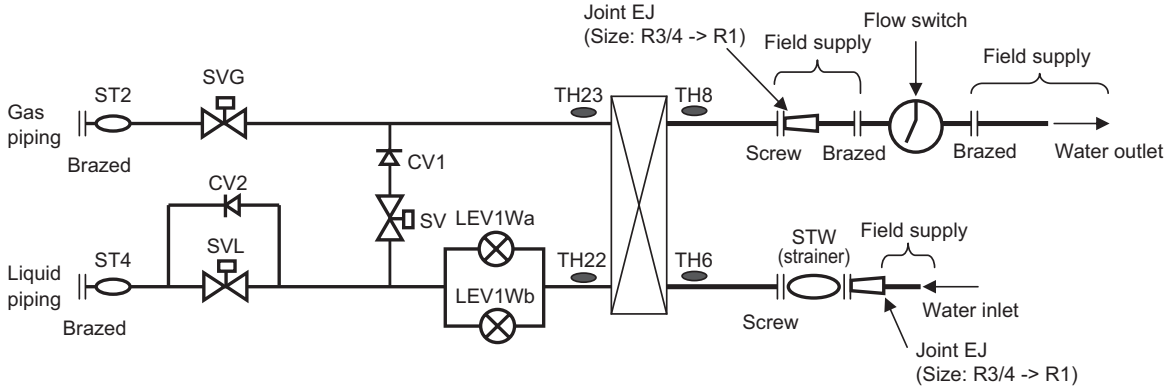
PWFY-P36NMU-E-BU



PWFY-P36NMU-E2-AU



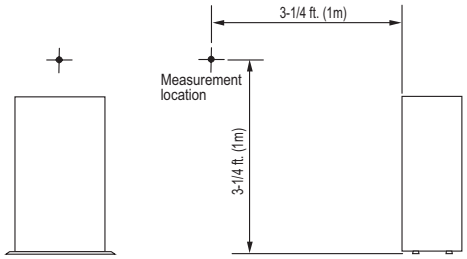
PWFY-P72NMU-E2-AU



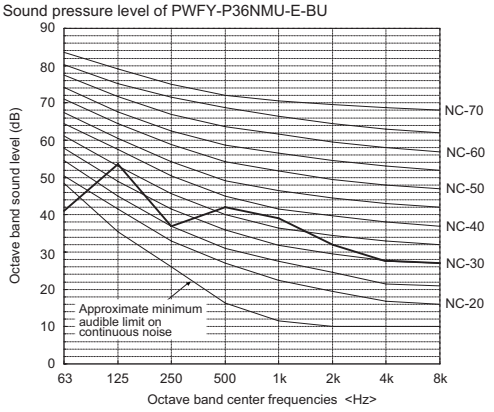
7. SOUND PRESSURE LEVELS

(1) PWFY-P36NMU-E-BU

Measurement condition
PWFY-P36NMU-E-BU



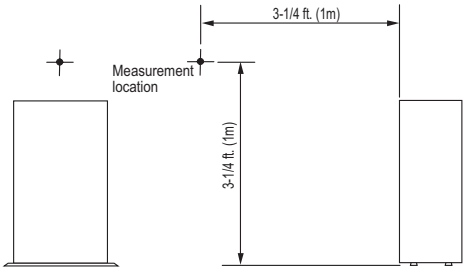
Sound pressure level of PWFY-P36NMU-E-BU



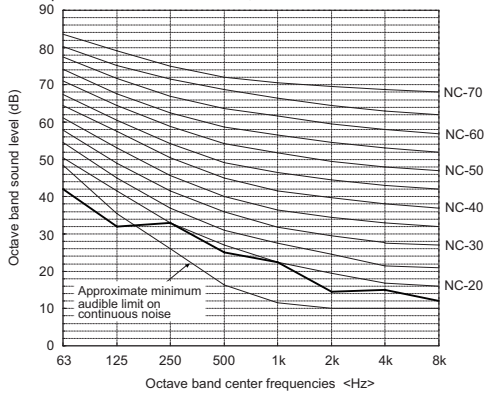
	63	125	250	500	1k	2k	4k	8k	dB(A)
60Hz	41.0	53.5	37.0	42.0	39.0	32.0	27.5	27.0	44.0

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

(2) PWFY-P36, P72NMU-E2-AU



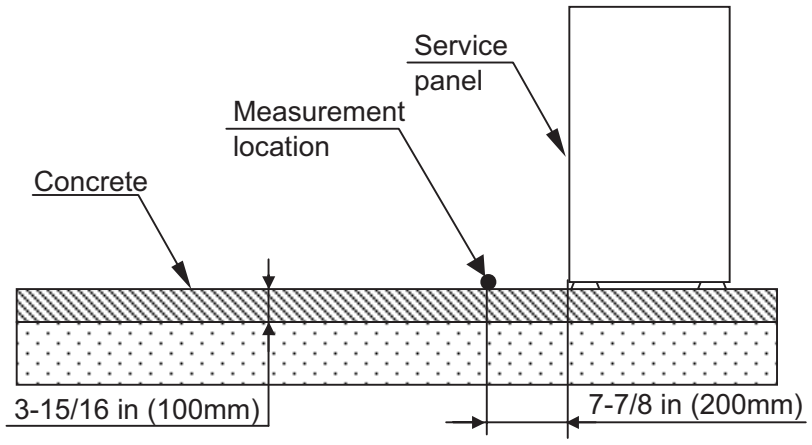
Sound pressure level of PWFY-P36, 72NMU-E-AU



	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

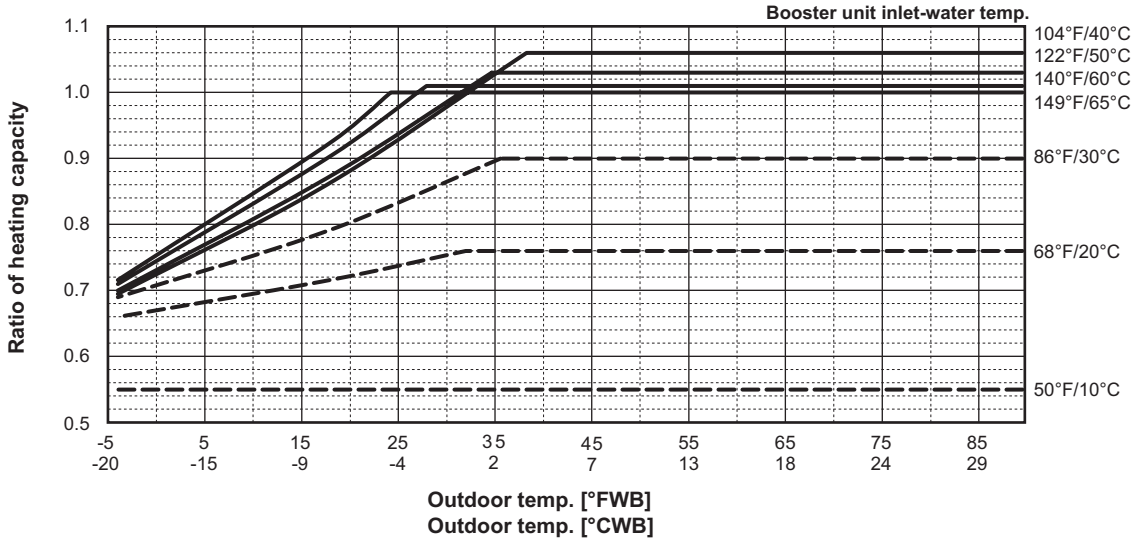


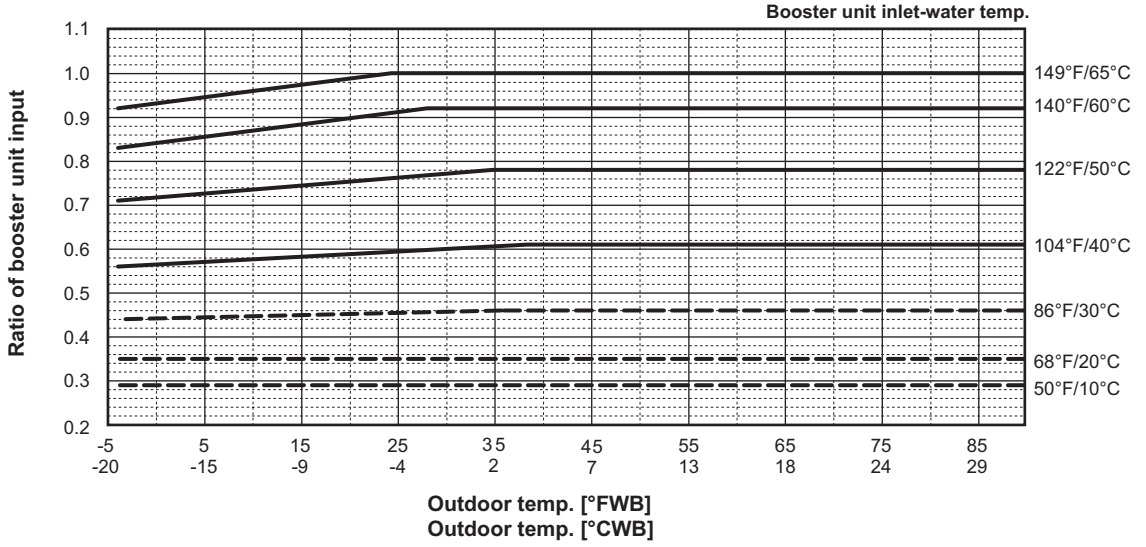
Model	Vibration Levels[dBA]
PWFY-P36NMU-E-BU	34

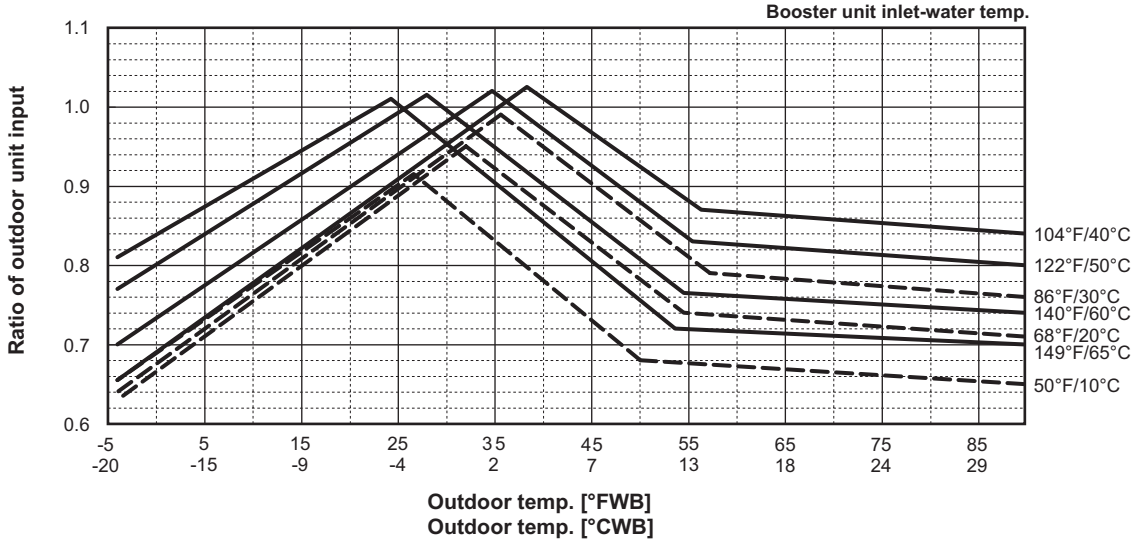
9-1. Correction by Temperature

9-1-1. R2-Series + PWFY-P36NMU-E-BU

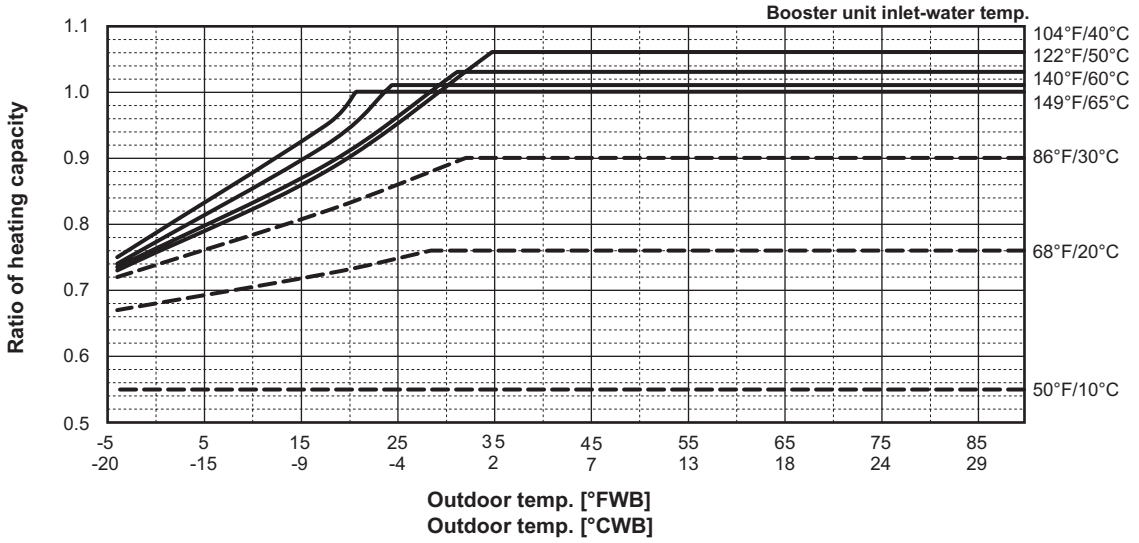
PURY-	P72, 96TKMU-A(-BS)	P72, 96YKMU-A(-BS)
	P72, 96TLMU-A(-BS)	P72, 96YLMU-A(-BS)

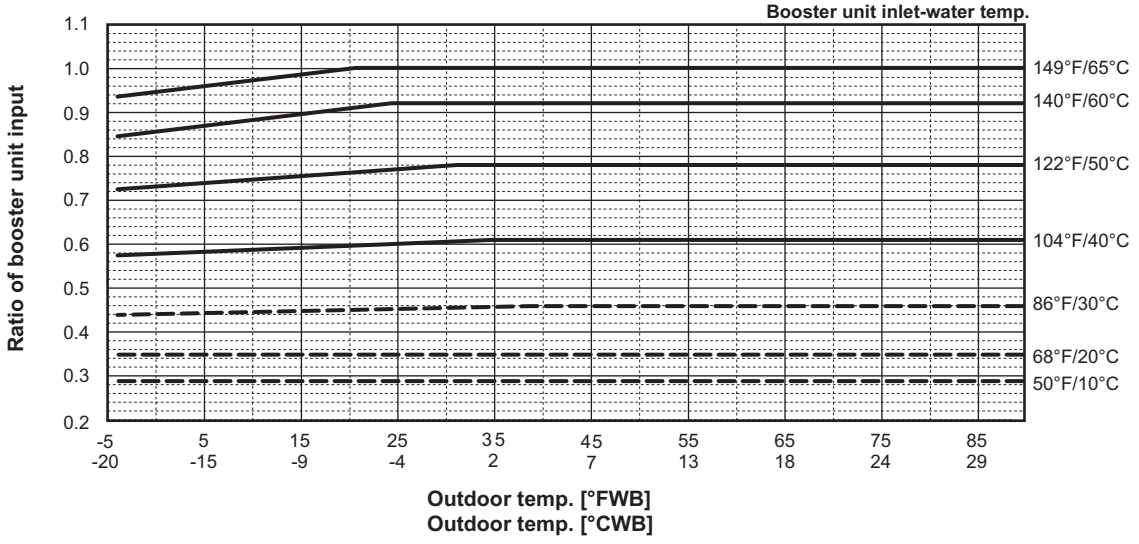


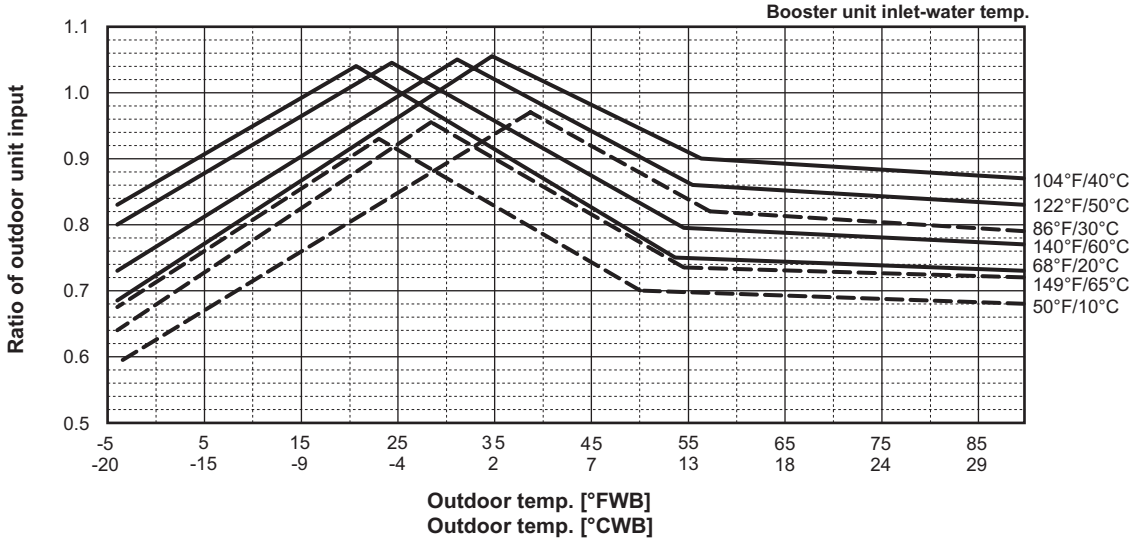




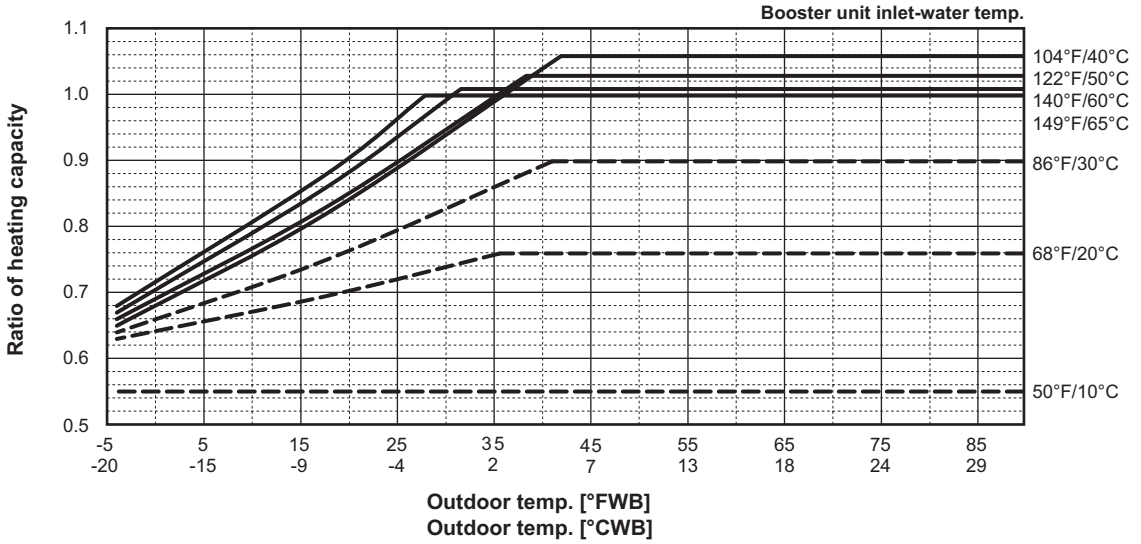
PURY-	P120, 144TKMU-A(-BS)	P120, 144YKMU-A(-BS)
	P120, 144TLMU-A(-BS)	P120, 144YLMU-A(-BS)

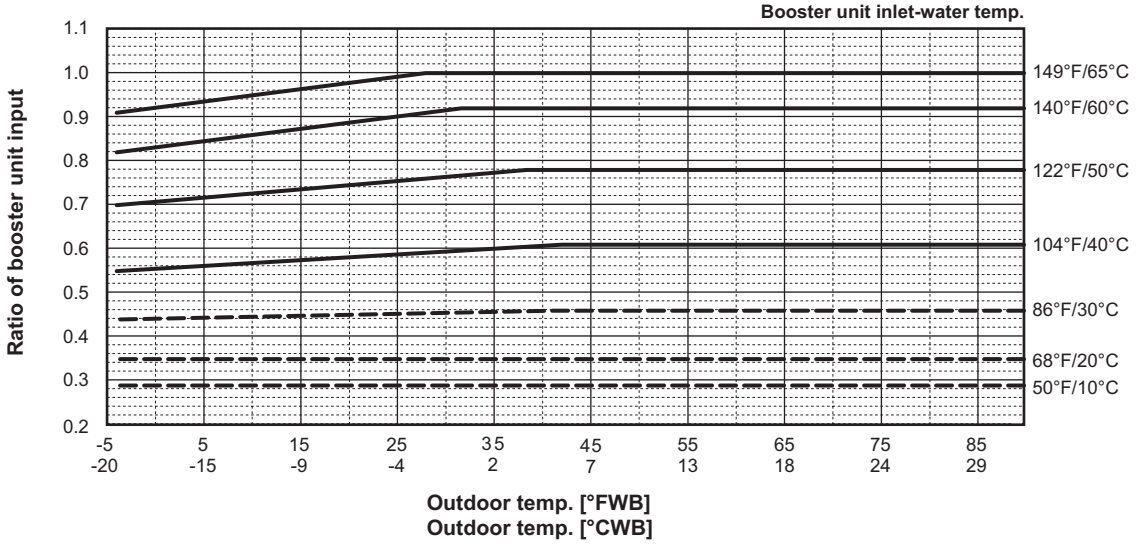


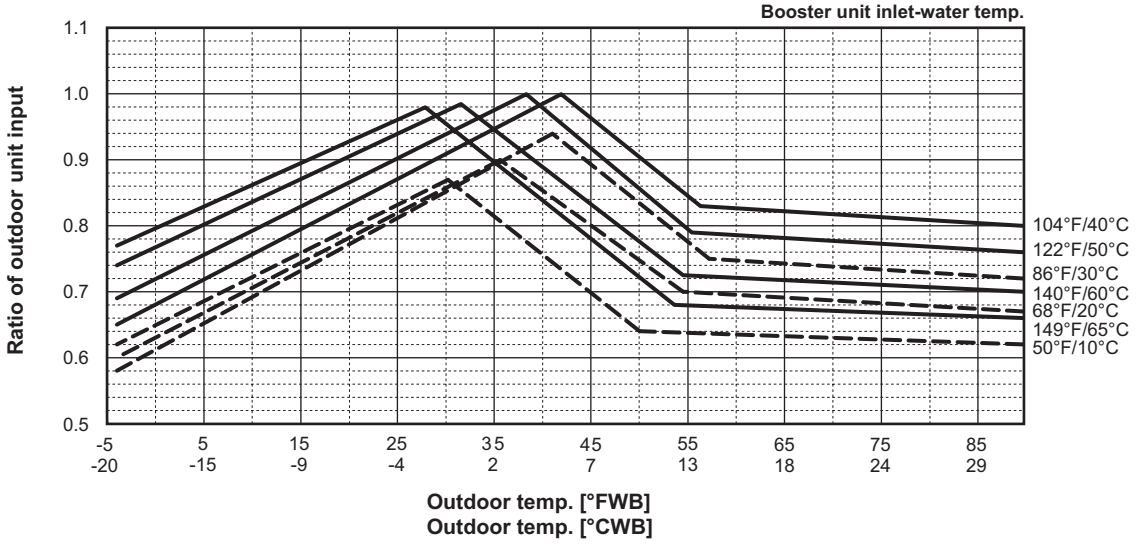




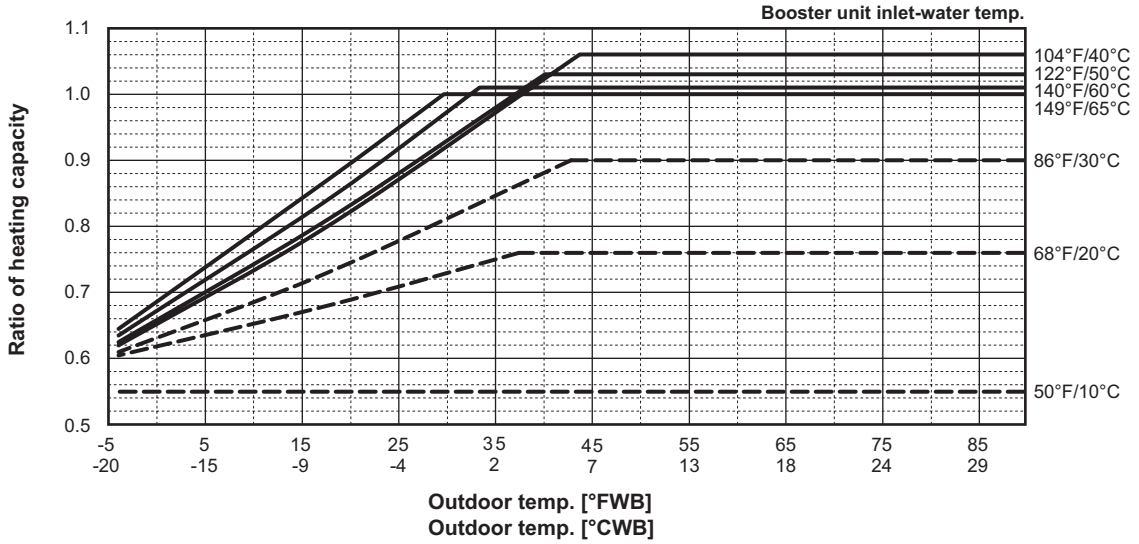
PURY-	P168, 192, 216, 240TSKMU-A(-BS) P168, 192, 216, 240TSLMU-A(-BS)	P168, 192, 216, 240YSKMU-A(-BS) P168, 192, 216, 240YSLMU-A(-BS)

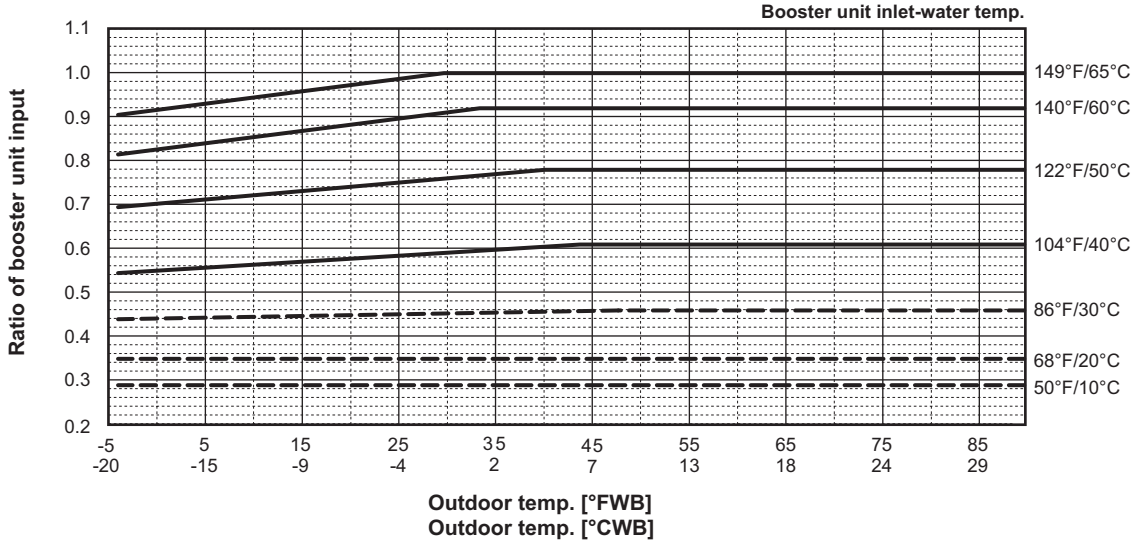


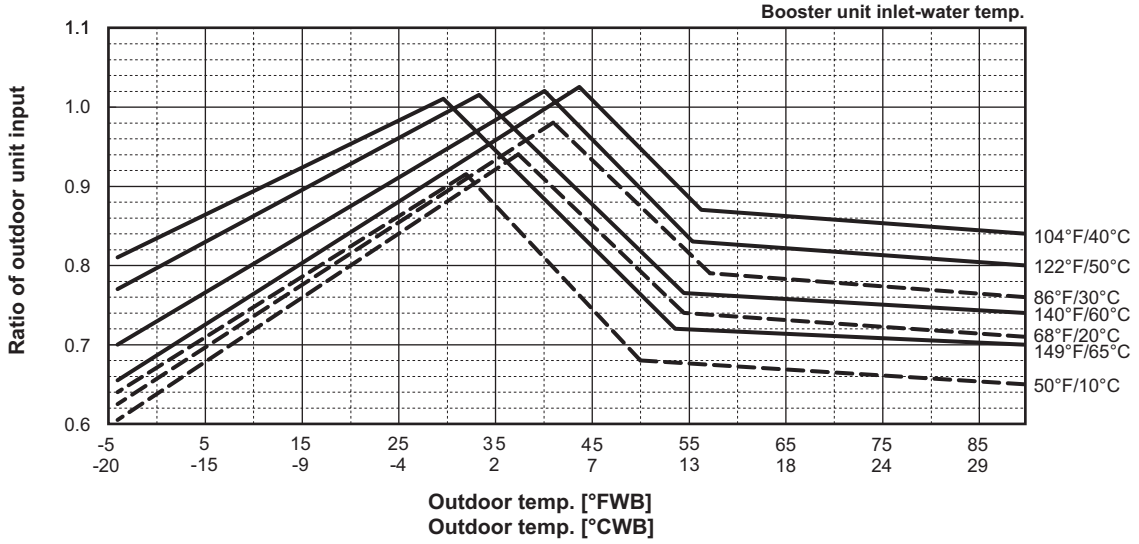




PURY-	P264, 288TSKMU-A(-BS)	P264, 288YSKMU-A(-BS)
	P264, 288, 312, 336TSLMU-A(-BS)	P264, 288, 312, 336YSLMU-A(-BS)

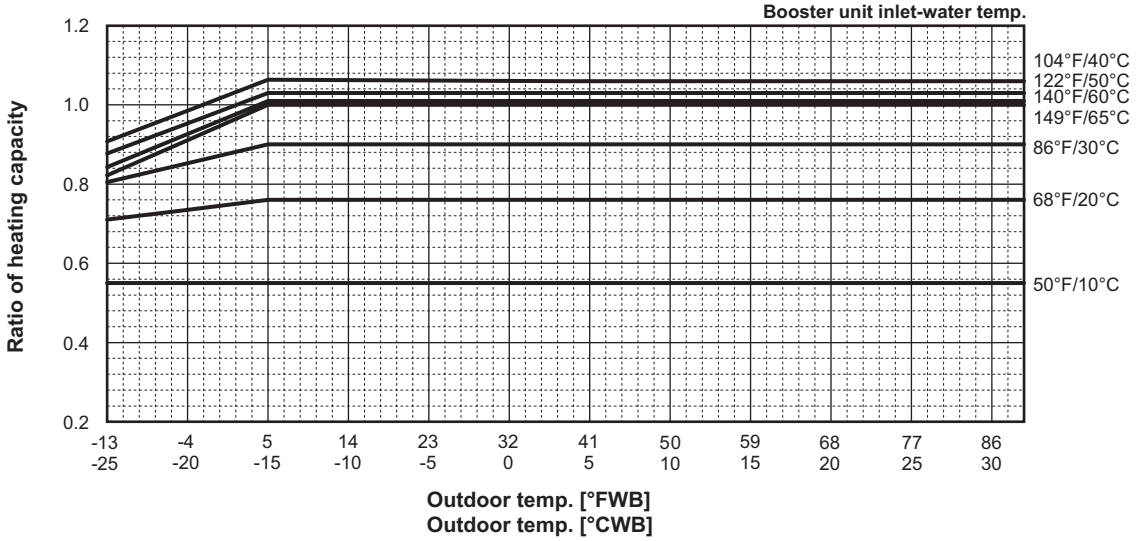


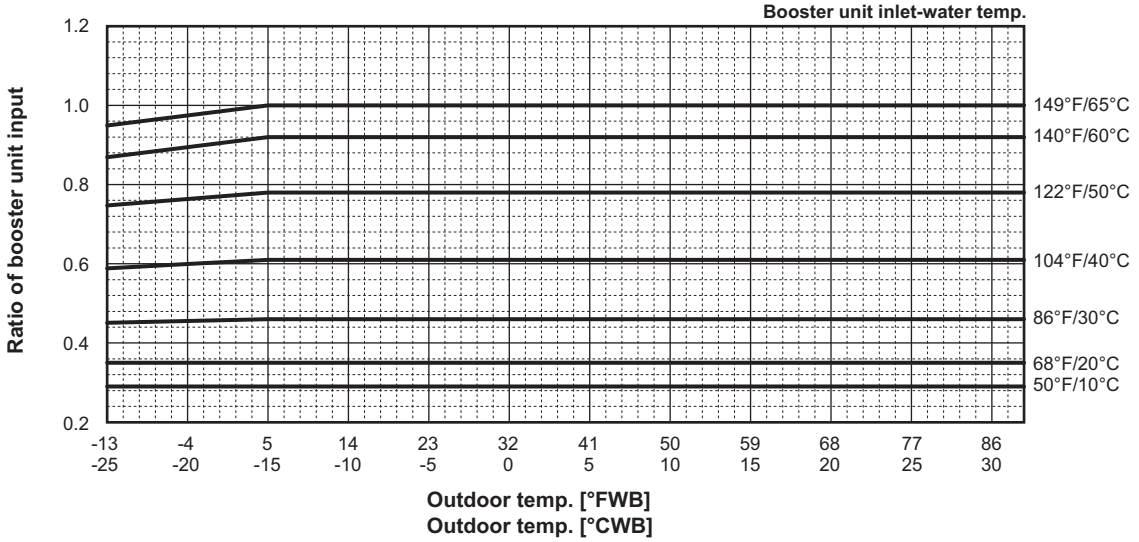


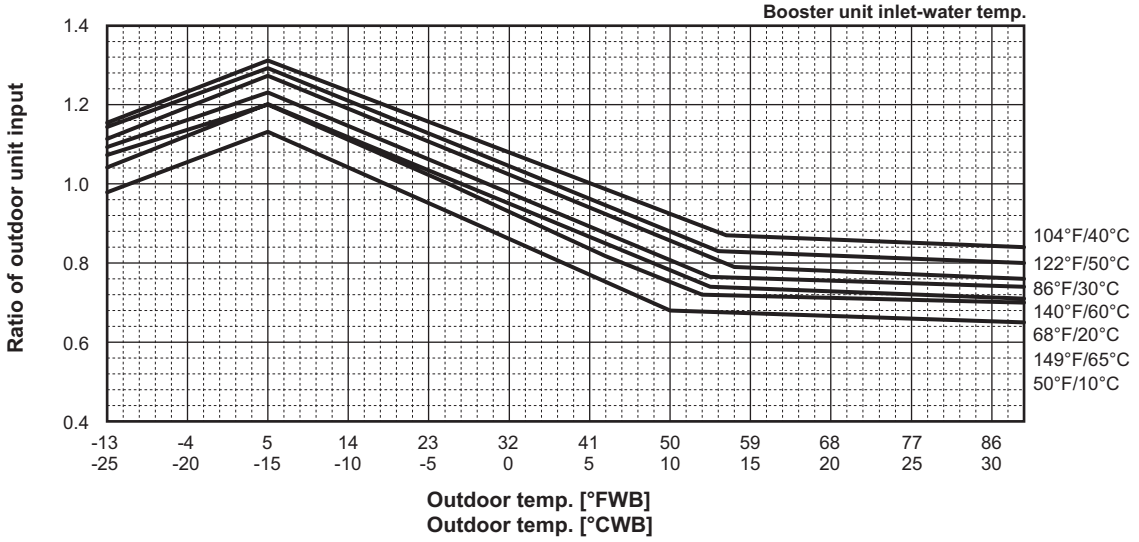


9-1-2. H2i R2-Series + PWFY-P36NMU-E-BU

PURY-	HP72, 96, 144, 192T(S)KMU-A-H(-BS) HP72, 96, 144, 192Y(S)KMU-A-H(-BS)

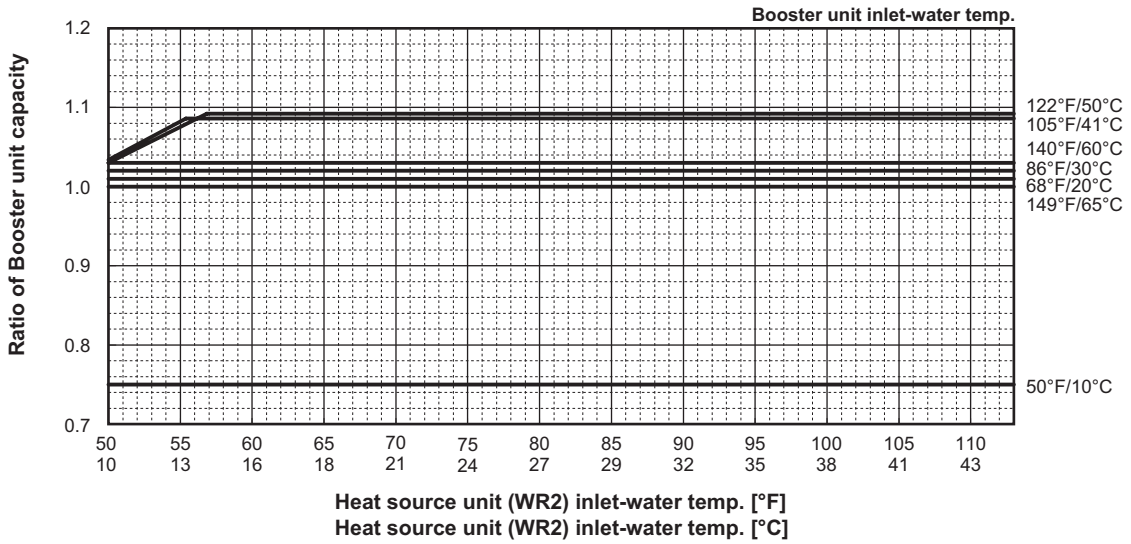


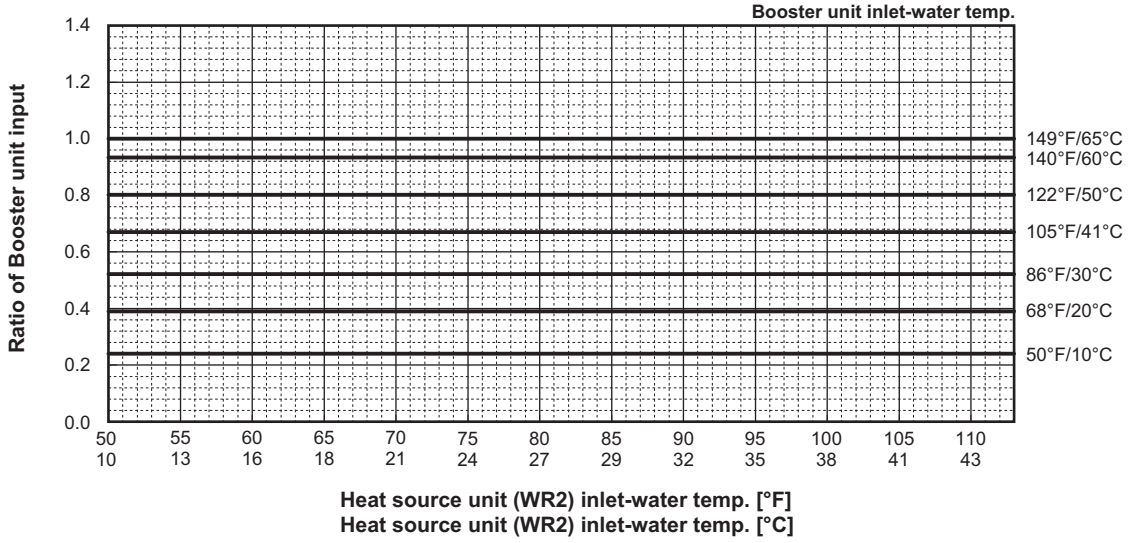


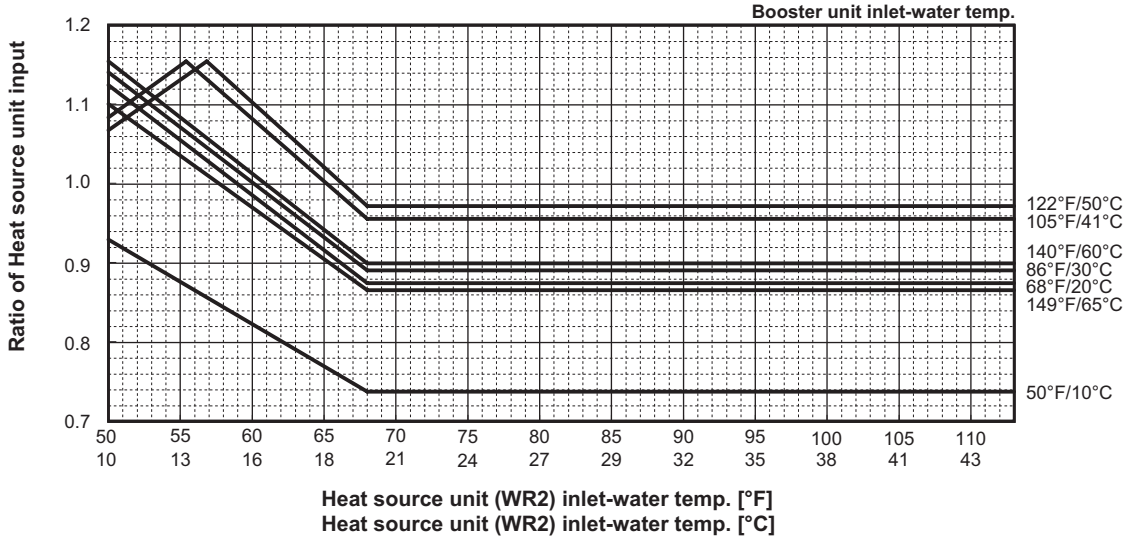


9-1-3 WR2 series + PWFY-P36NMU-E-BU

PQRY-	P72, 96, 120, 144, 168, 192, 216, 240Z(S)KMU-A P72, 96, 120, 144, 168, 192, 216, 240, 264, 288, 312, 336T(S)LMU-A/Y(S)LMU-A



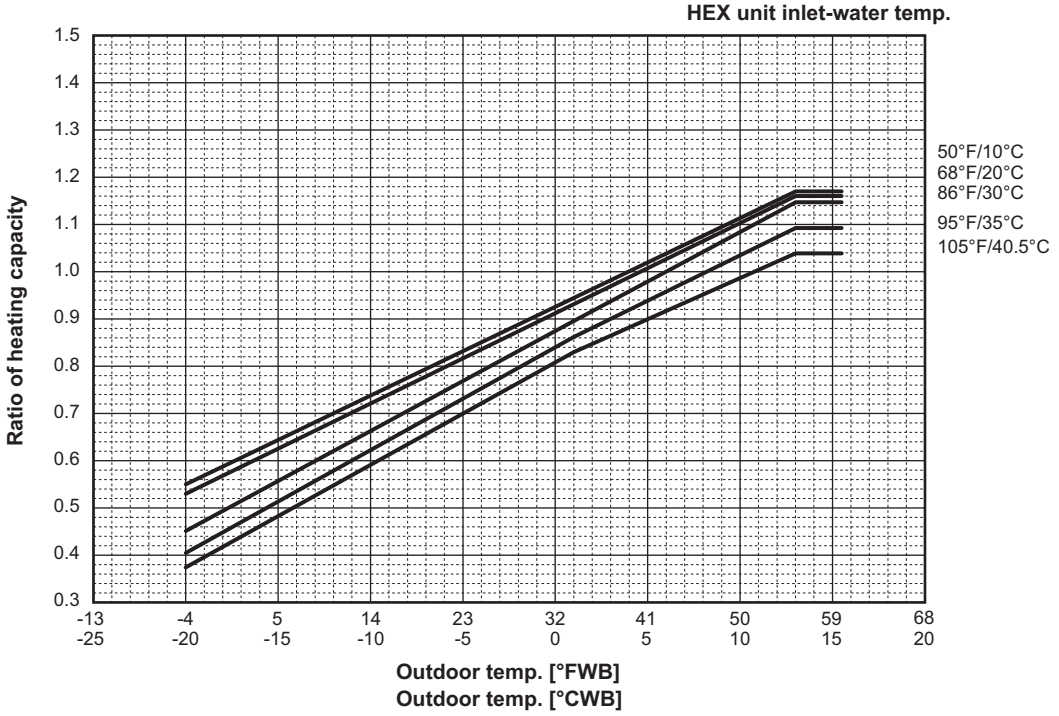


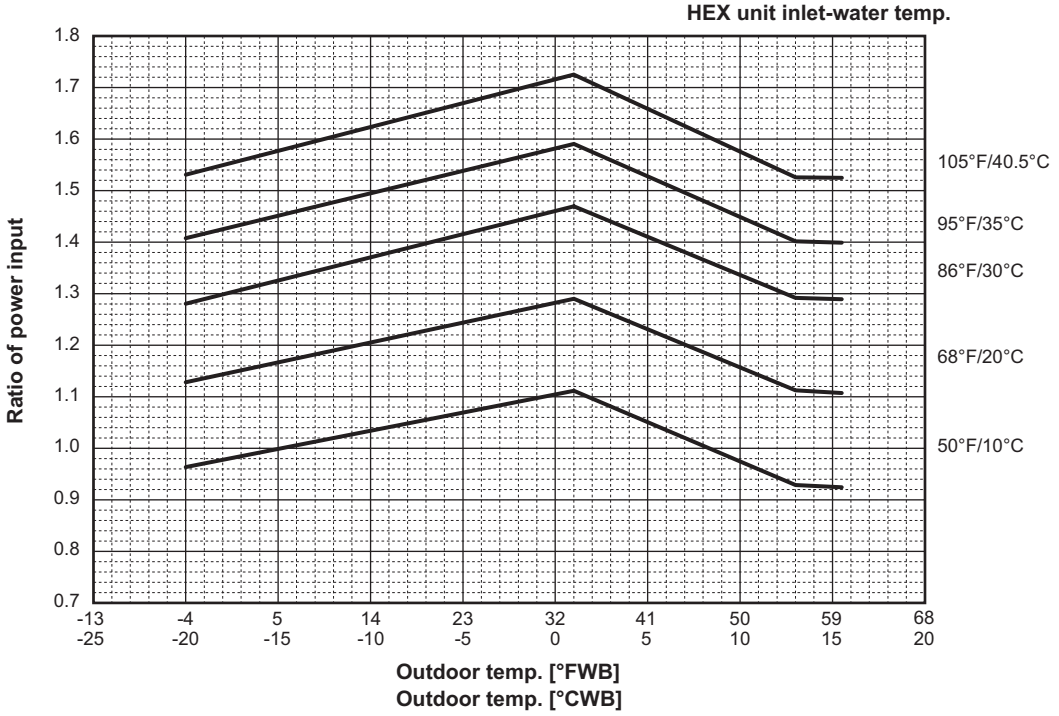


9-1-4 Y series + PWFY-P36, P72NMU-E2-AU

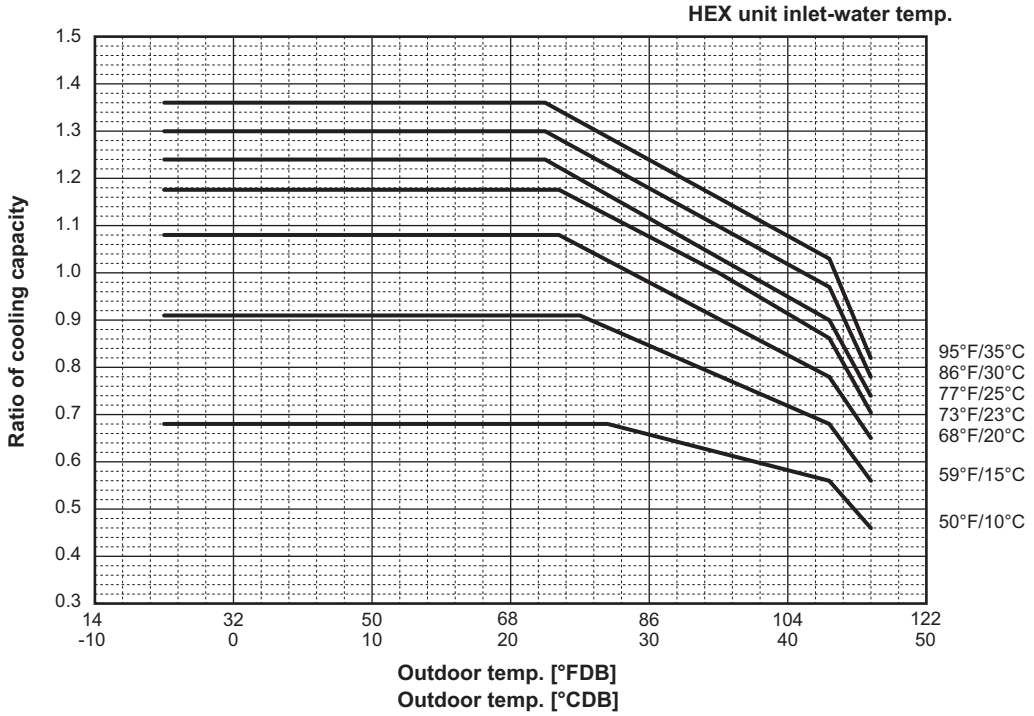
PUHY-	P72, 96, 120, 144, 168, 192, 216, 240, 264, 288, 312, 336, 360T(S)KMU-A(-BS) P72, 96, 120, 144, 168, 192, 216, 240, 264, 288, 312, 336, 360Y(S)KMU-A(-BS)

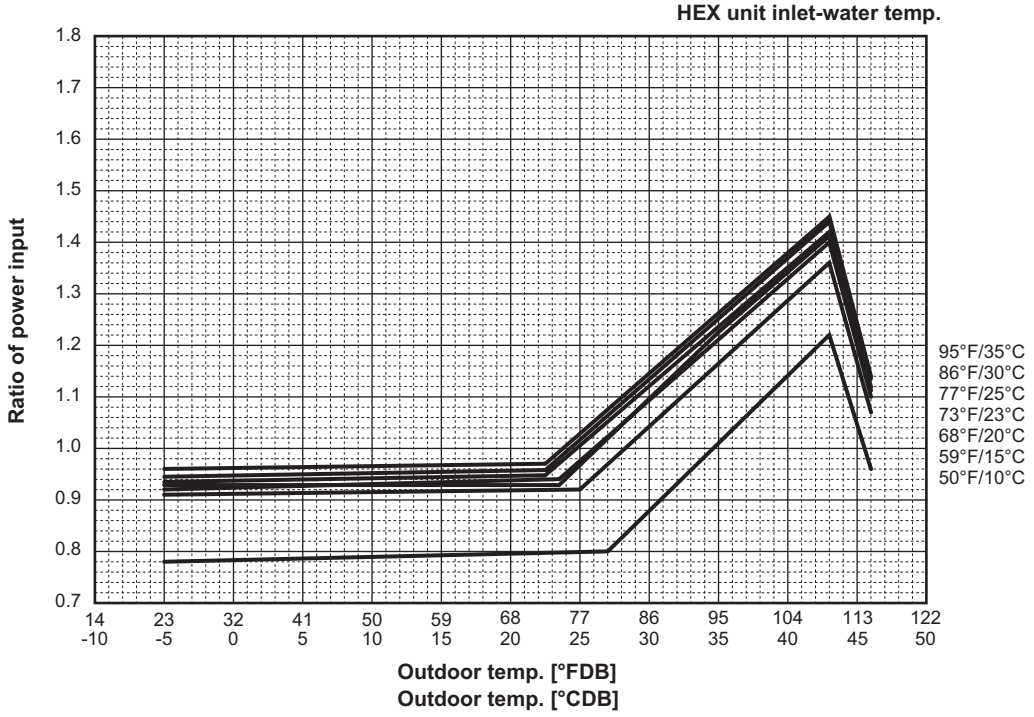
Heating





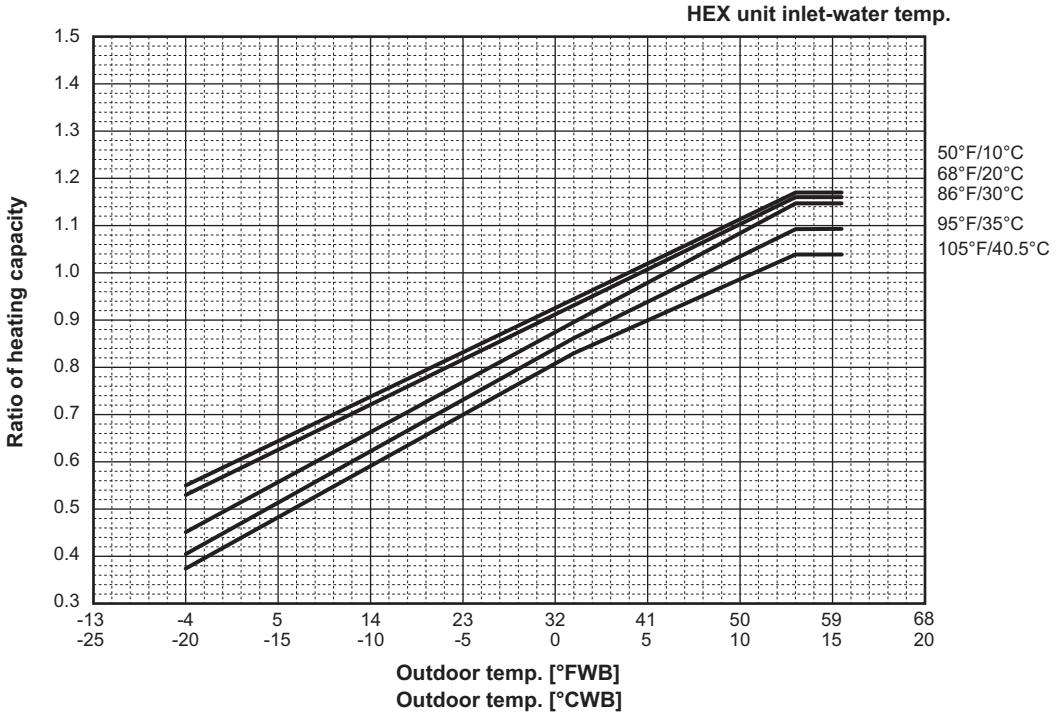
Cooling

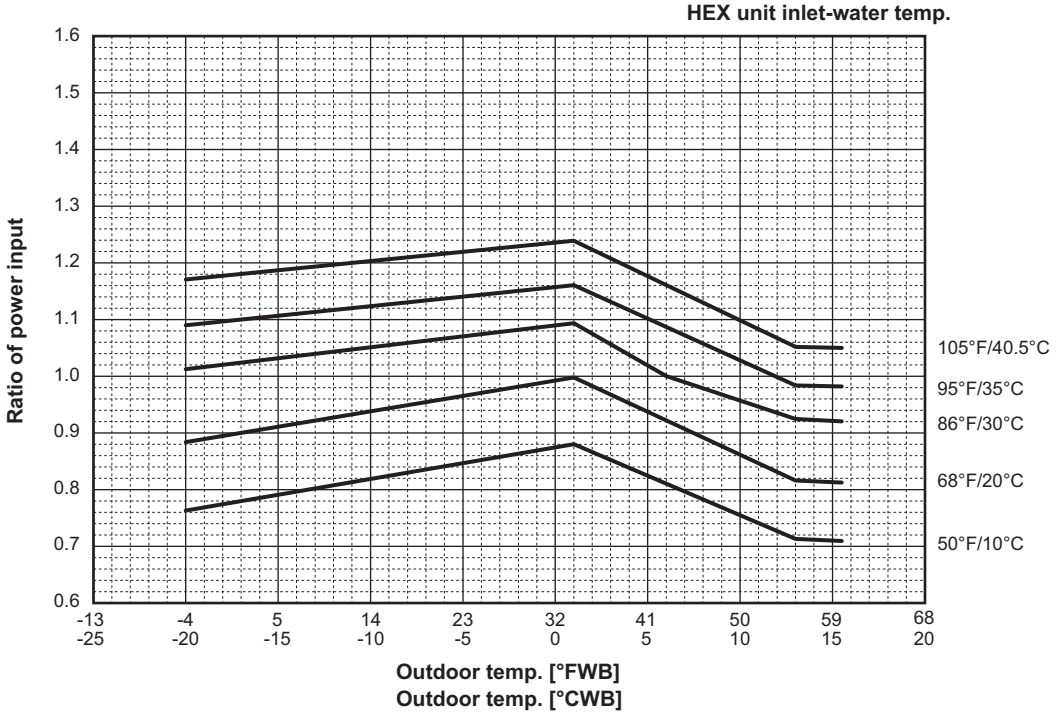




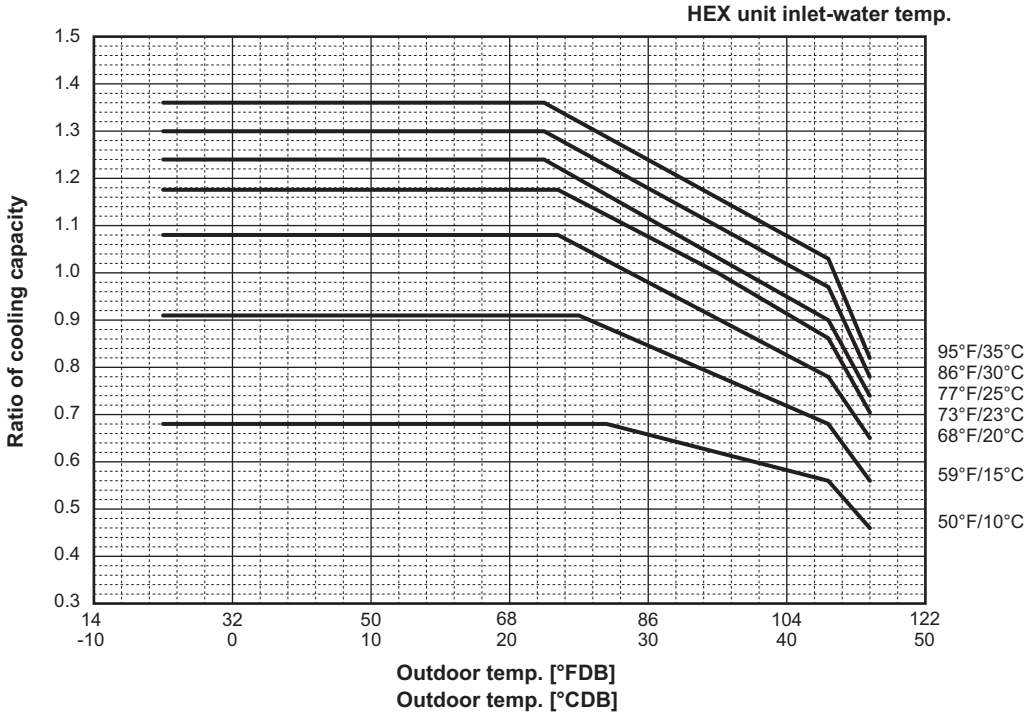
PUHY-	P72, 96, 120, 144, 168, 192, 216, 240, 264, 288, 312, 336, 360T(S)LMU-A(-BS) P72, 96, 120, 144, 168, 192, 216, 240, 264, 288, 312, 336, 360Y(S)LMU-A(-BS)

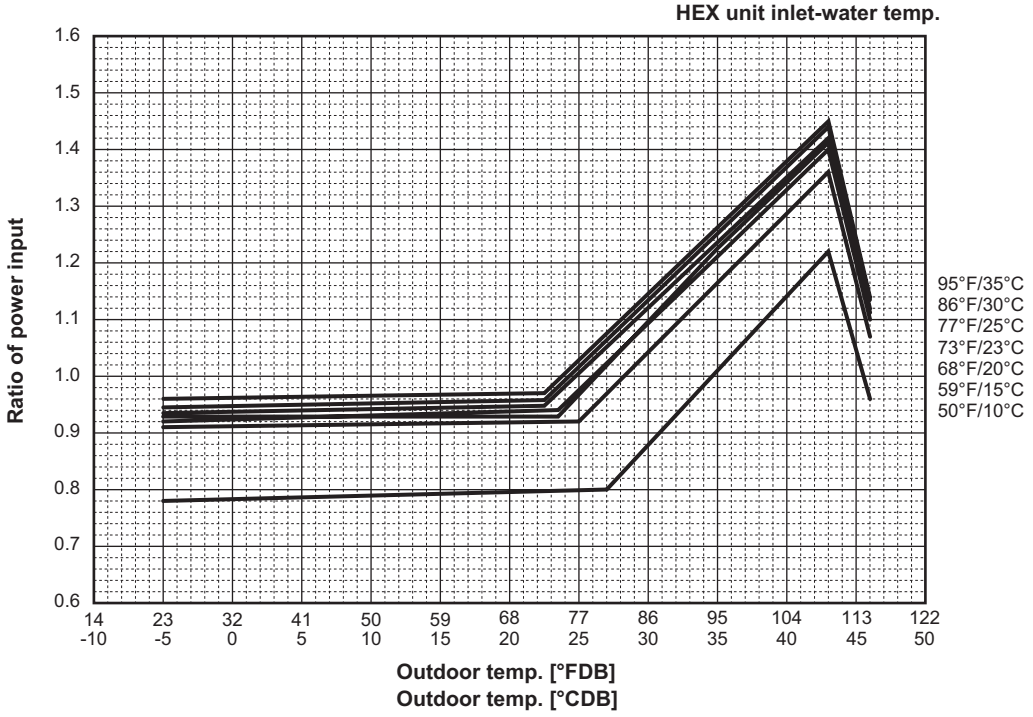
Heating





Cooling

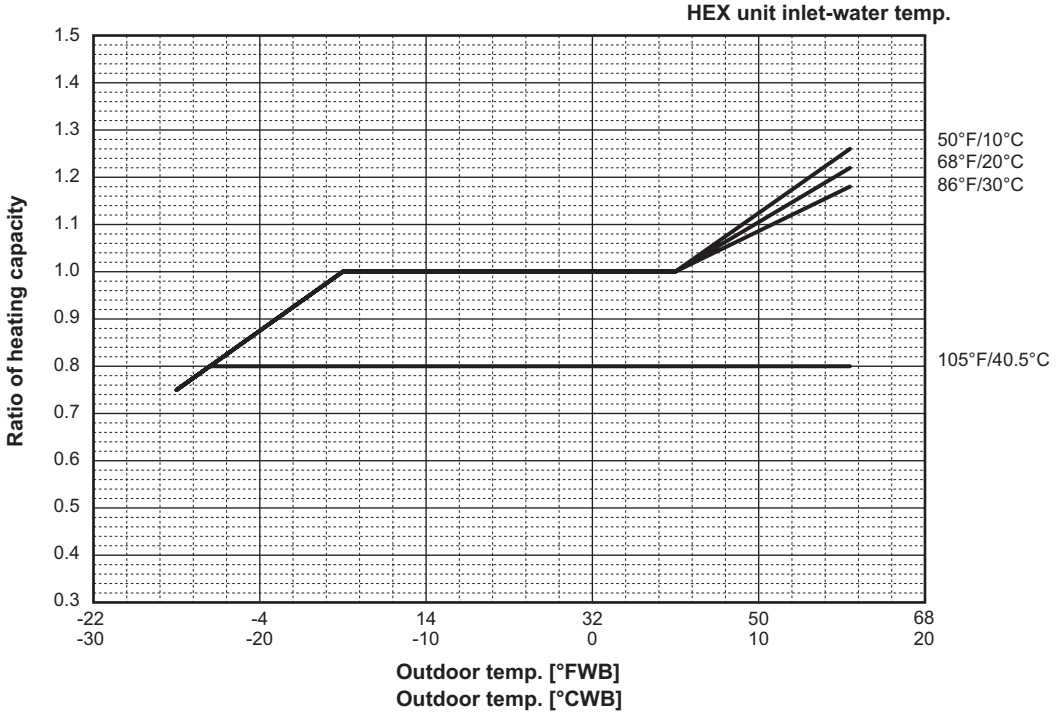


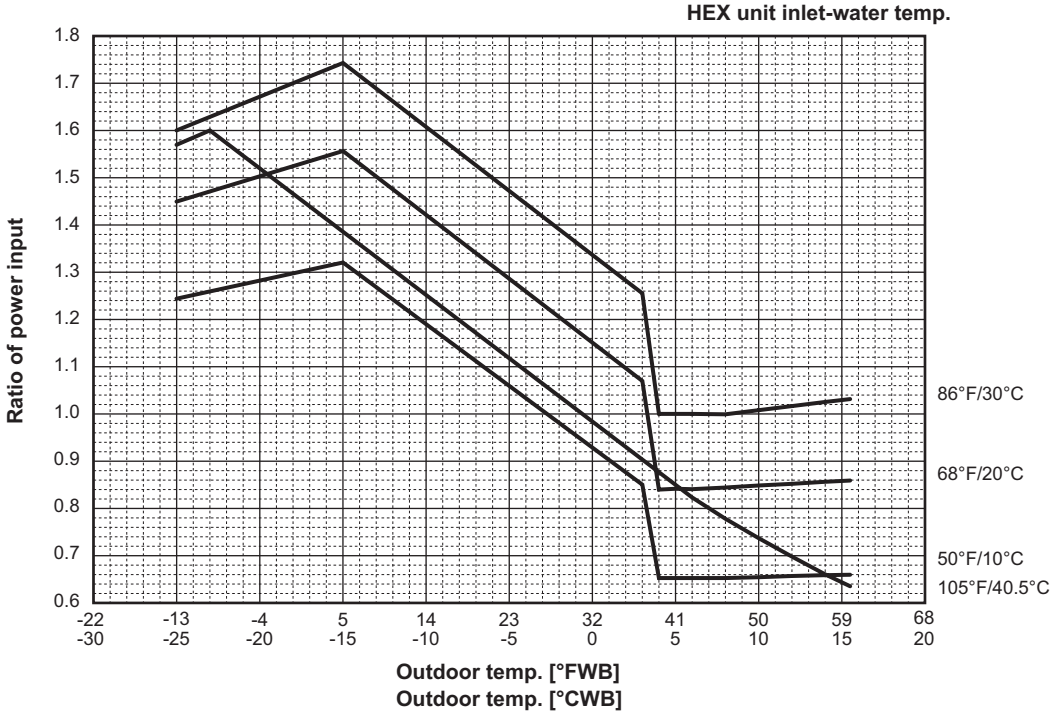


9-1-5. H2i Y series + PWFY-P36, P72NMU-E2-AU

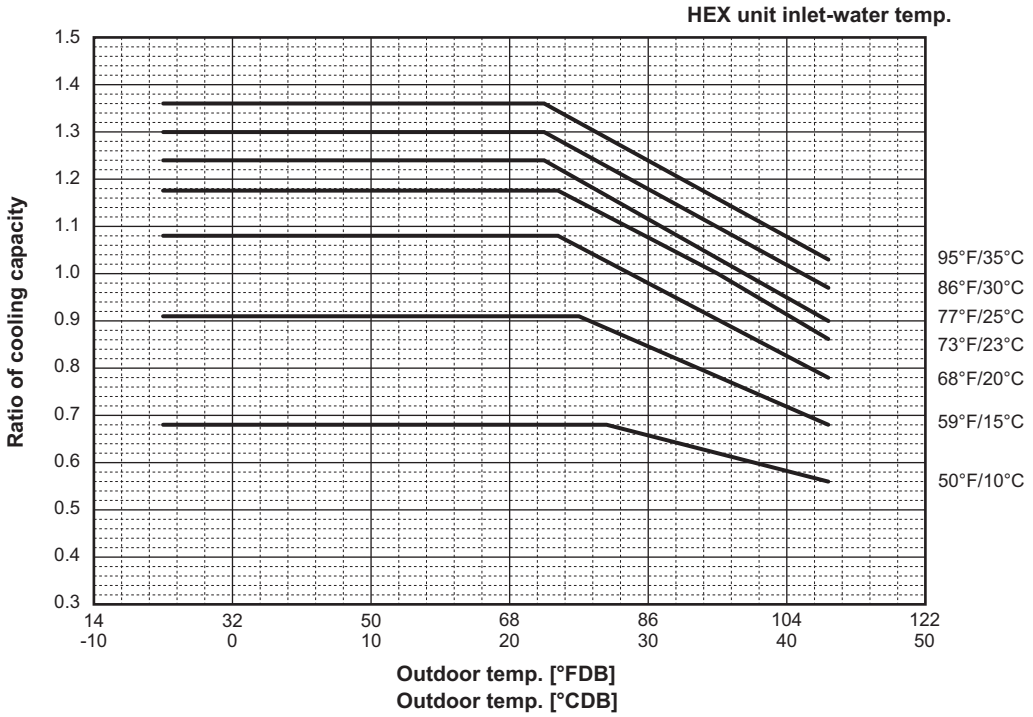
PUHY-	HP72, 96, 144, 192T(S)JMU-A(-BS)

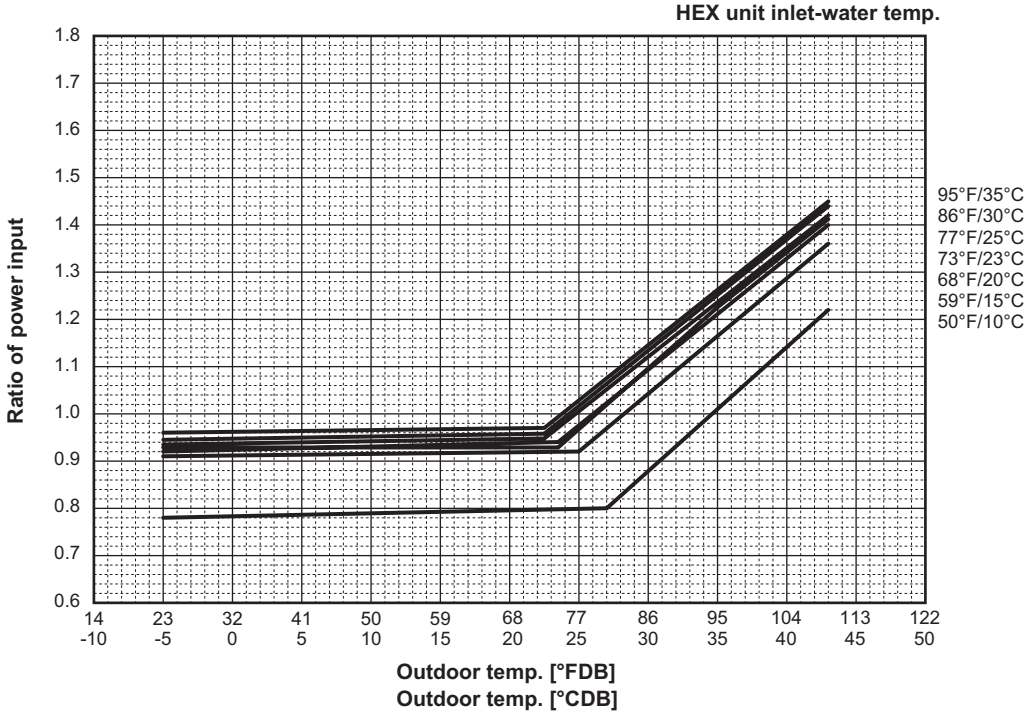
Heating





Cooling

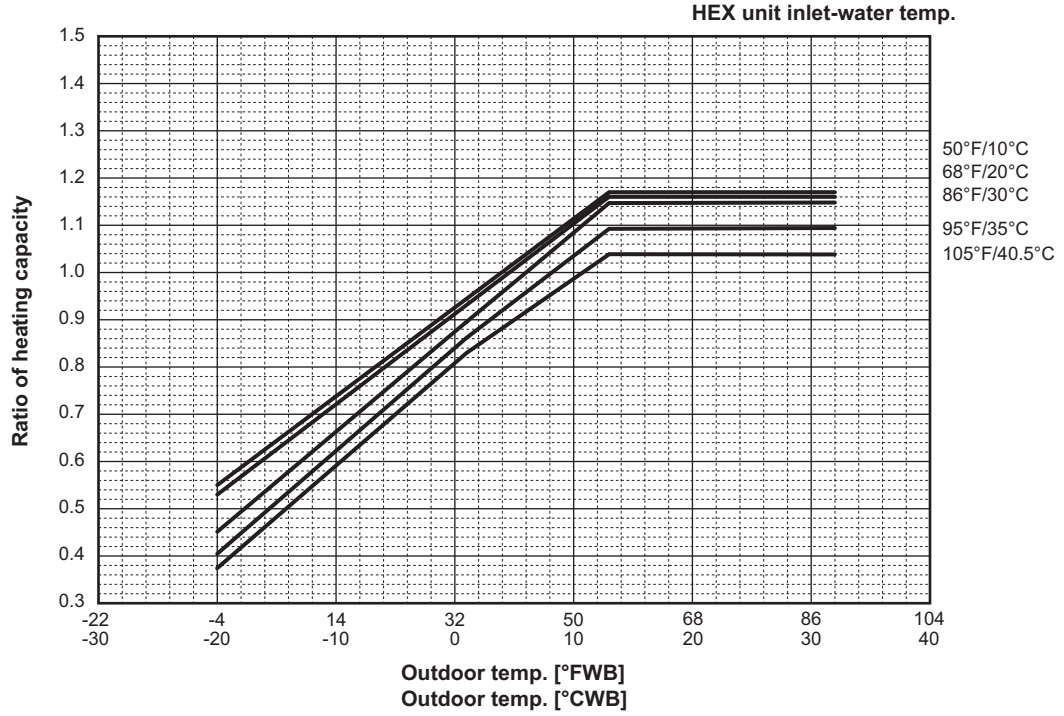


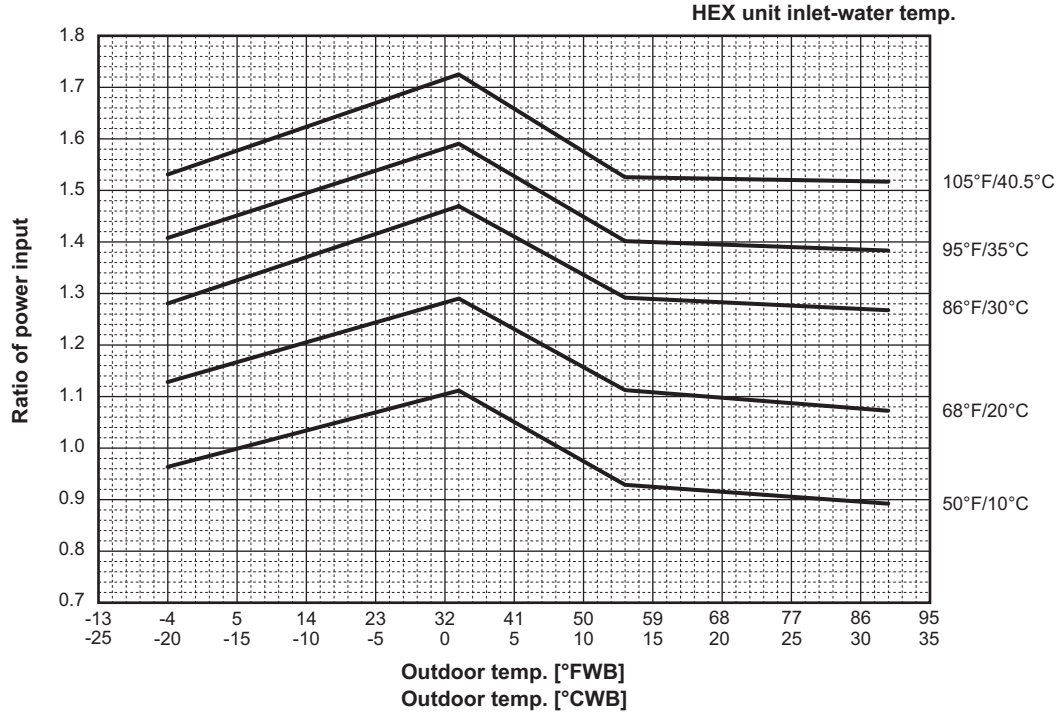


9-1-6. R2 series + PWFY-P36, P72NMU-E2-AU

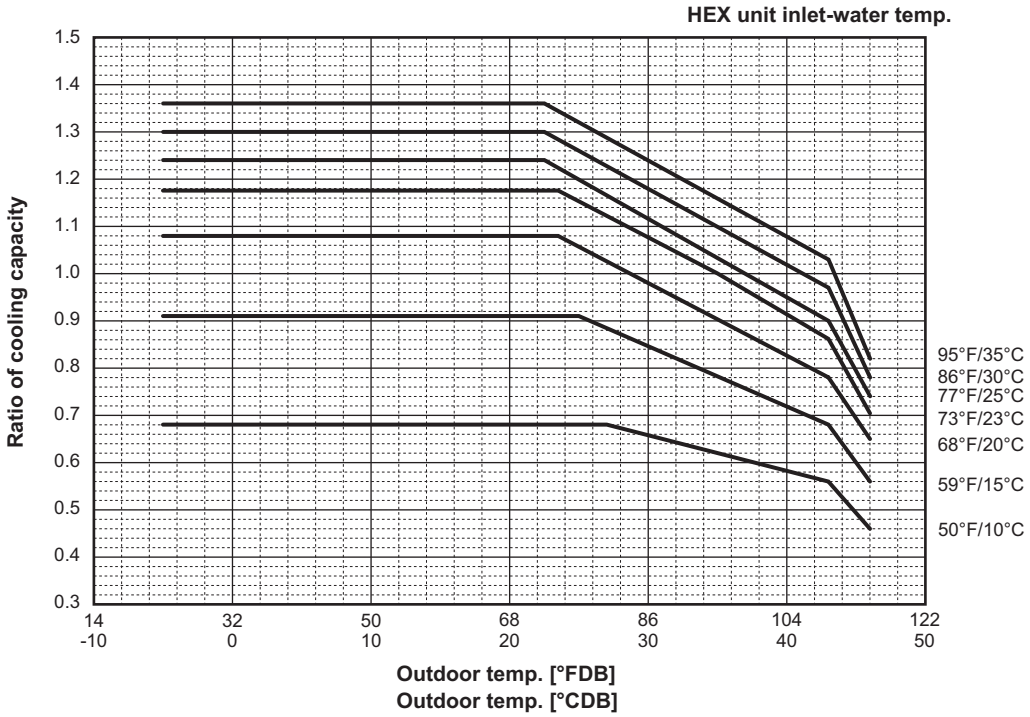
PURY-	P72, 96, 120, 144, 168, 192, 216, 240, 264, 288T(S)KMU-A(-BS) P72, 96, 120, 144, 168, 192, 216, 240, 264, 288Y(S)KMU-A(-BS)

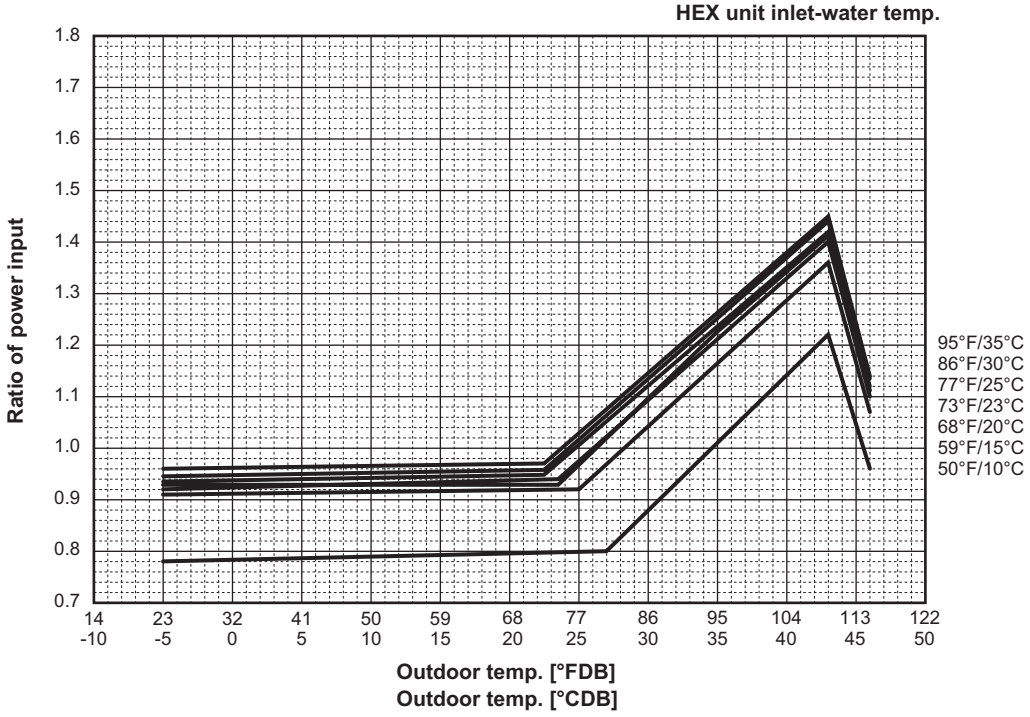
Heating





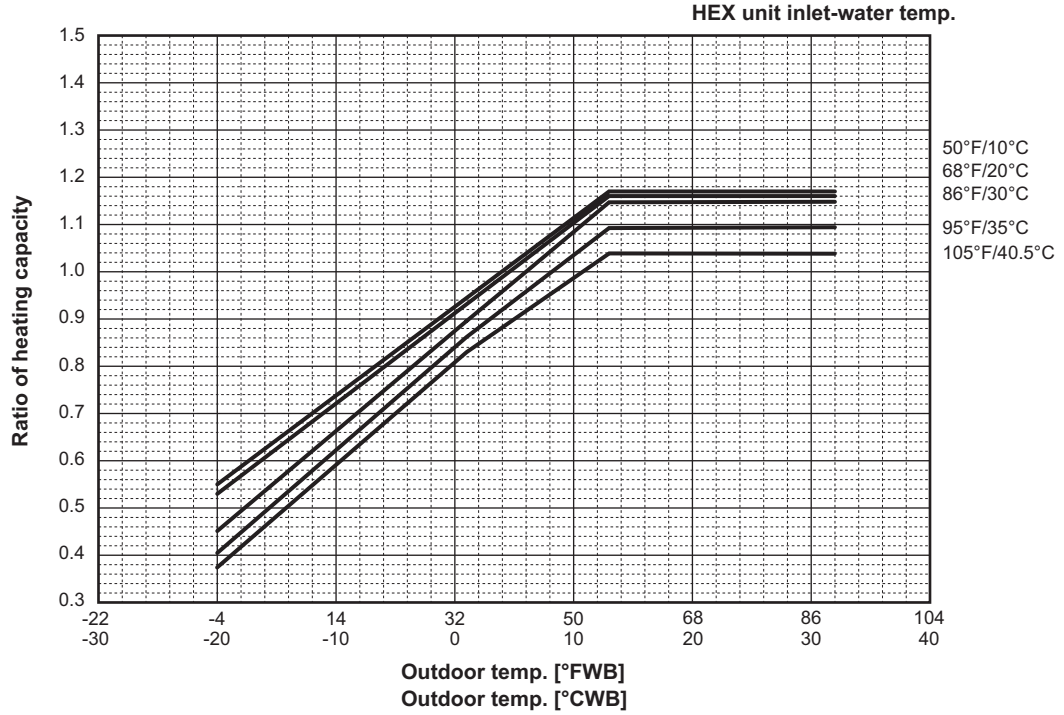
Cooling

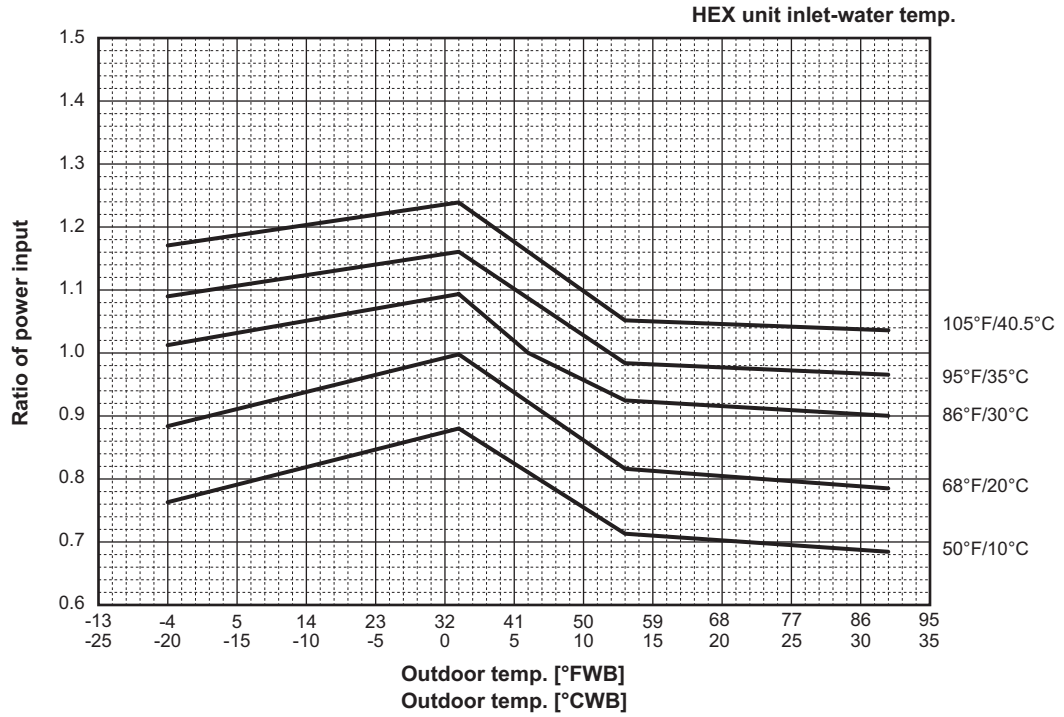




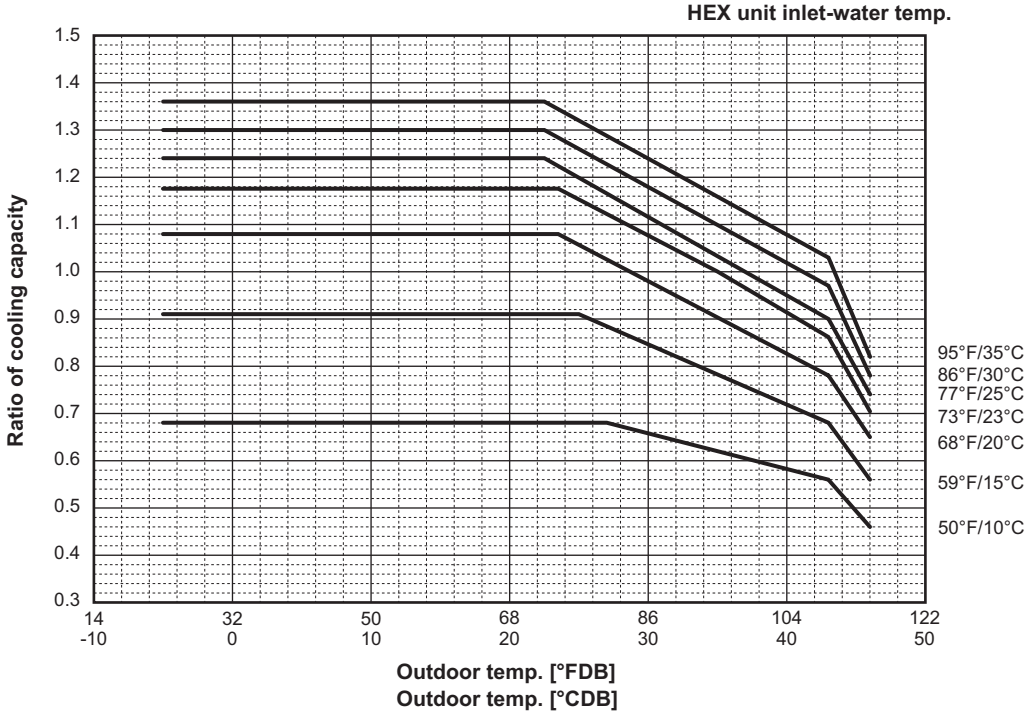
PURY-	P72, 96, 120, 144, 168, 192, 216, 240, 264, 288, 312, 336T(S)LMU-A(-BS) P72, 96, 120, 144, 168, 192, 216, 240, 264, 288, 312, 336Y(S)LMU-A(-BS)

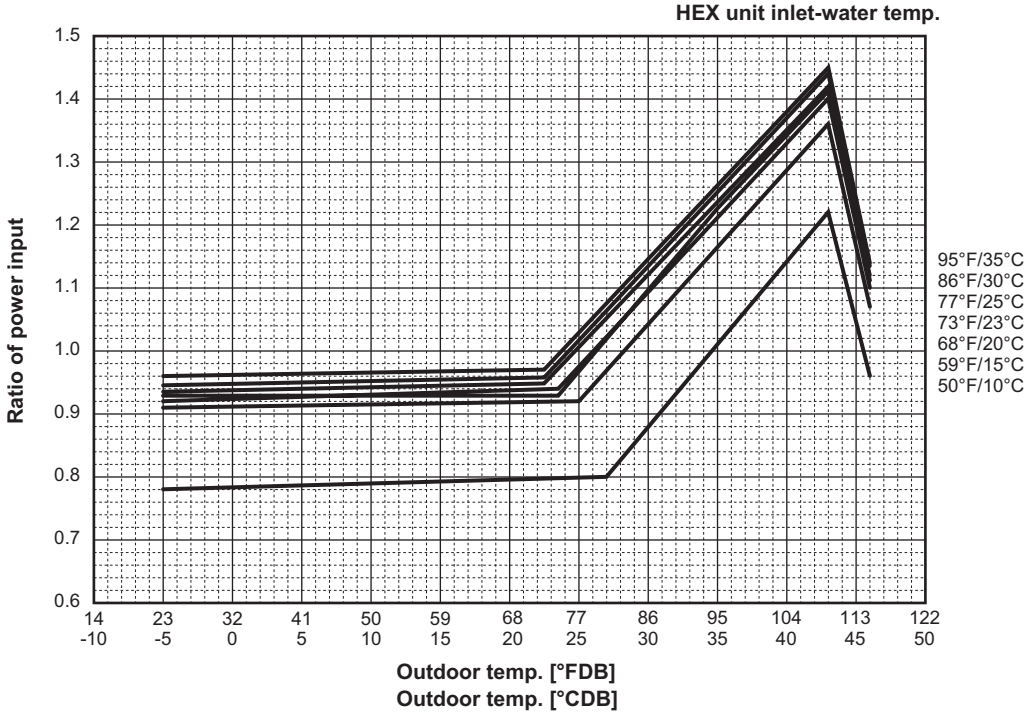
Heating





Cooling

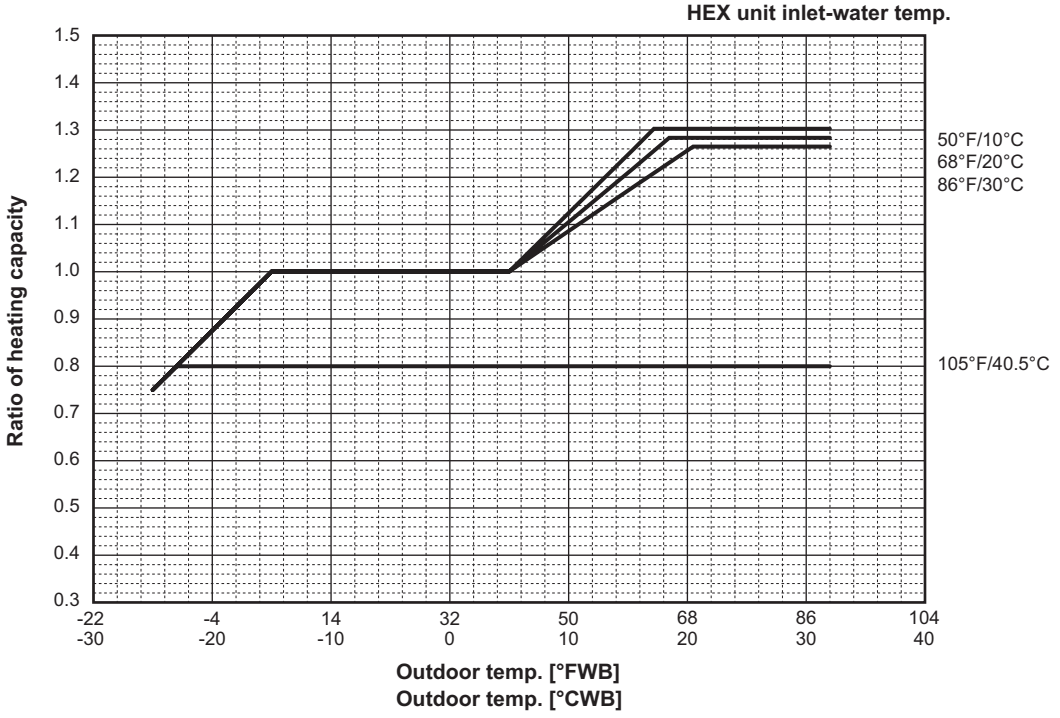


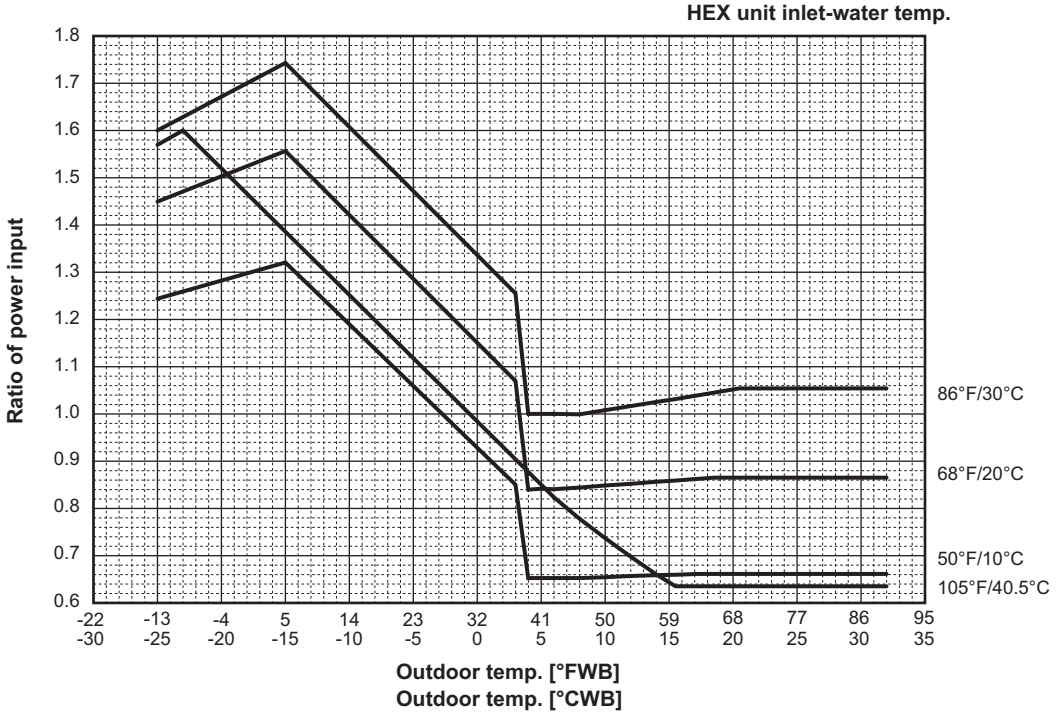


9-1-7. H2i R2 series + PWFY-P36, P72NMU-E2-AU

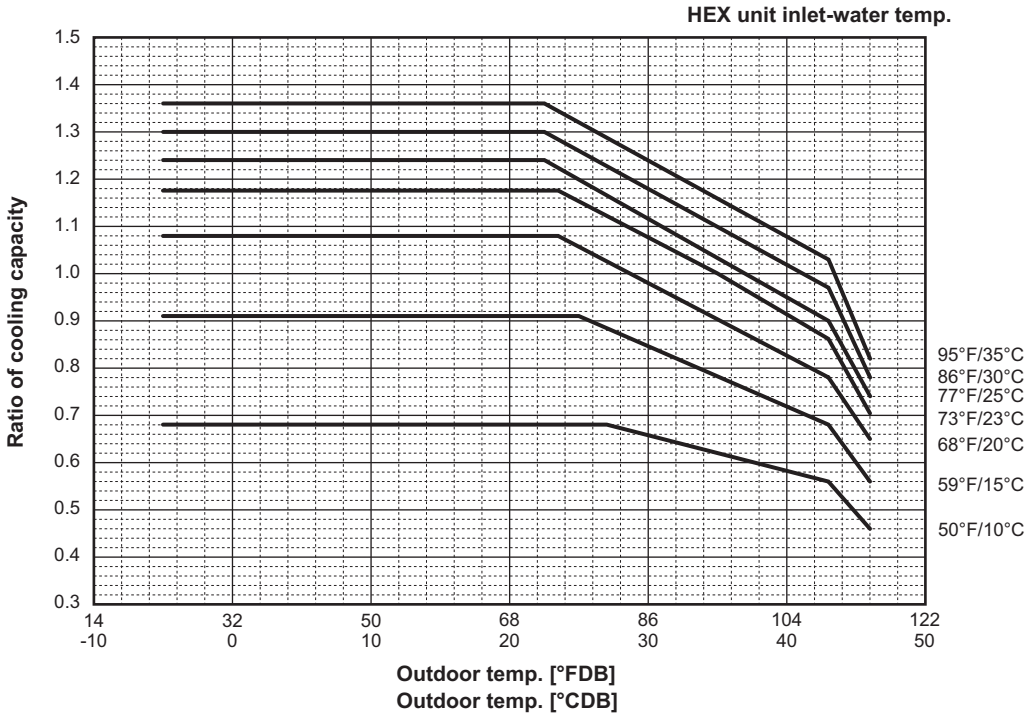
PURY-	HP72, 96, 144, 192T(S)KMU-A-H(-BS) HP72, 96, 144, 192Y(S)KMU-A-H(-BS)

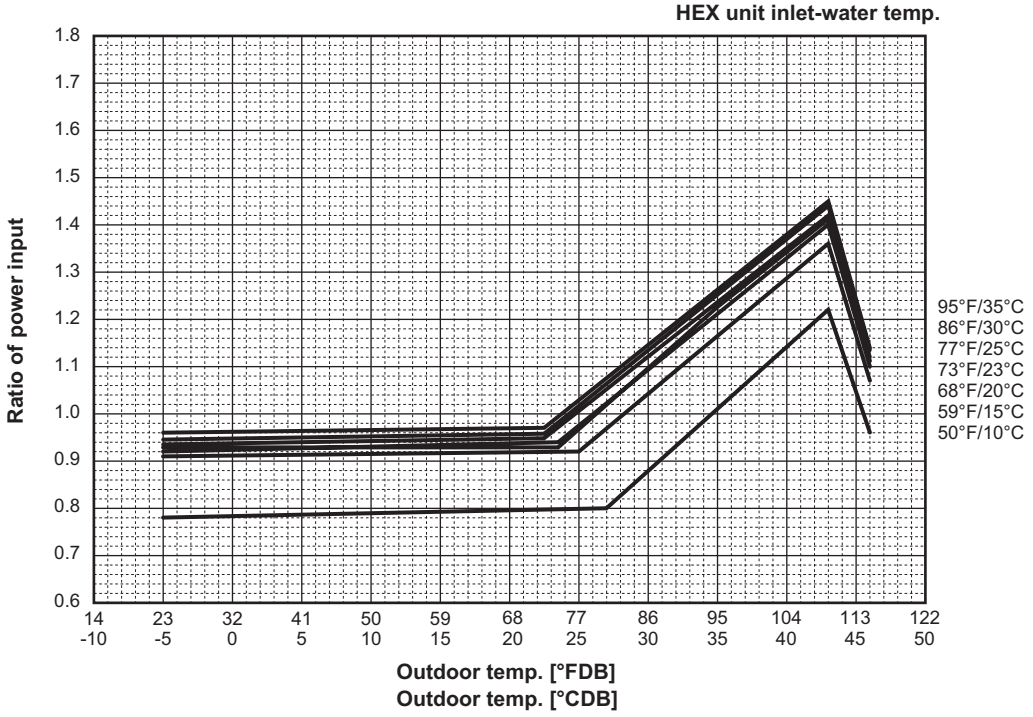
Heating





Cooling

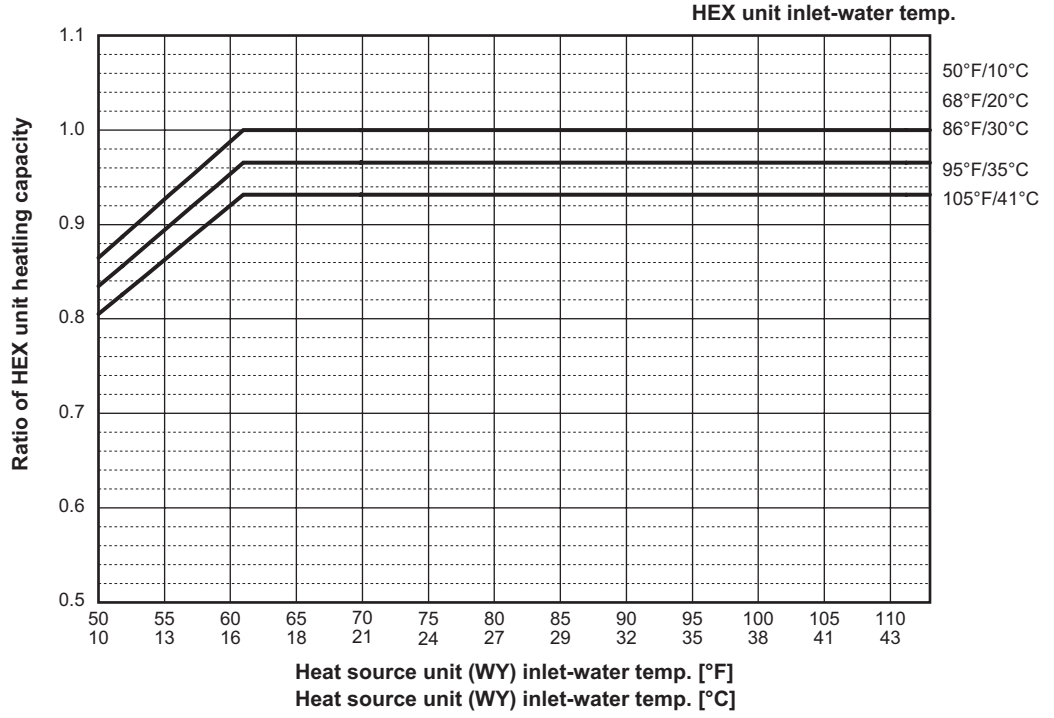


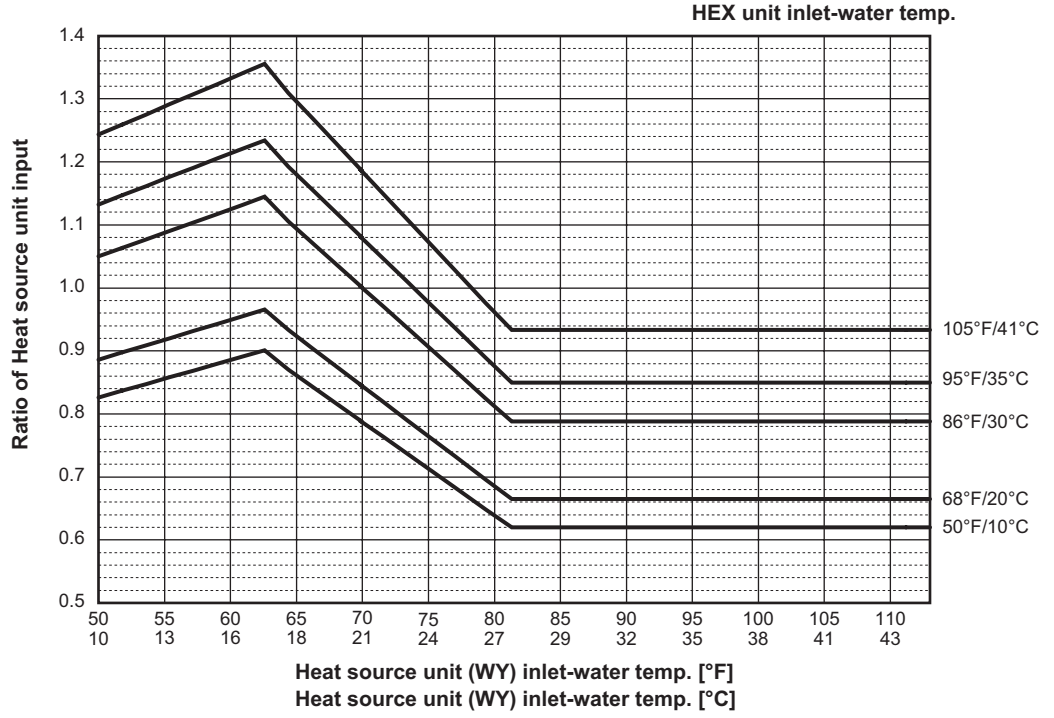


9-1-8. WY + PWFY-P36, P72NMU-E2-AU

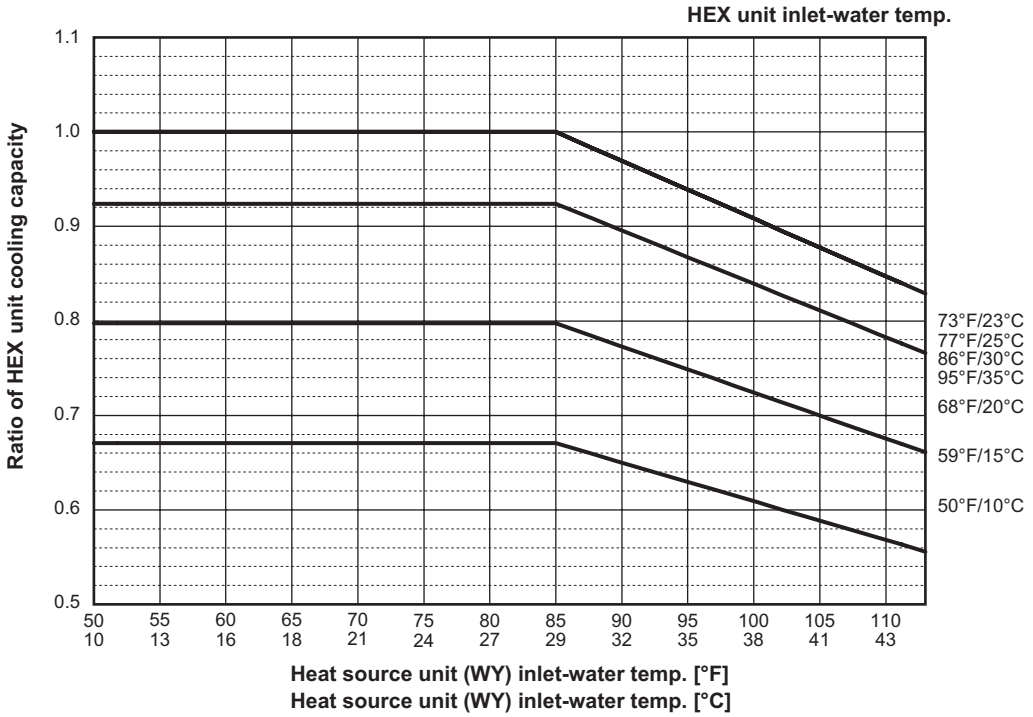
PQHY-	P72, 96, 120, 144, 168, 192, 216, 240, 264, 288, 312, 336, 360T(S)LMU-A/Y(S)LMU-A

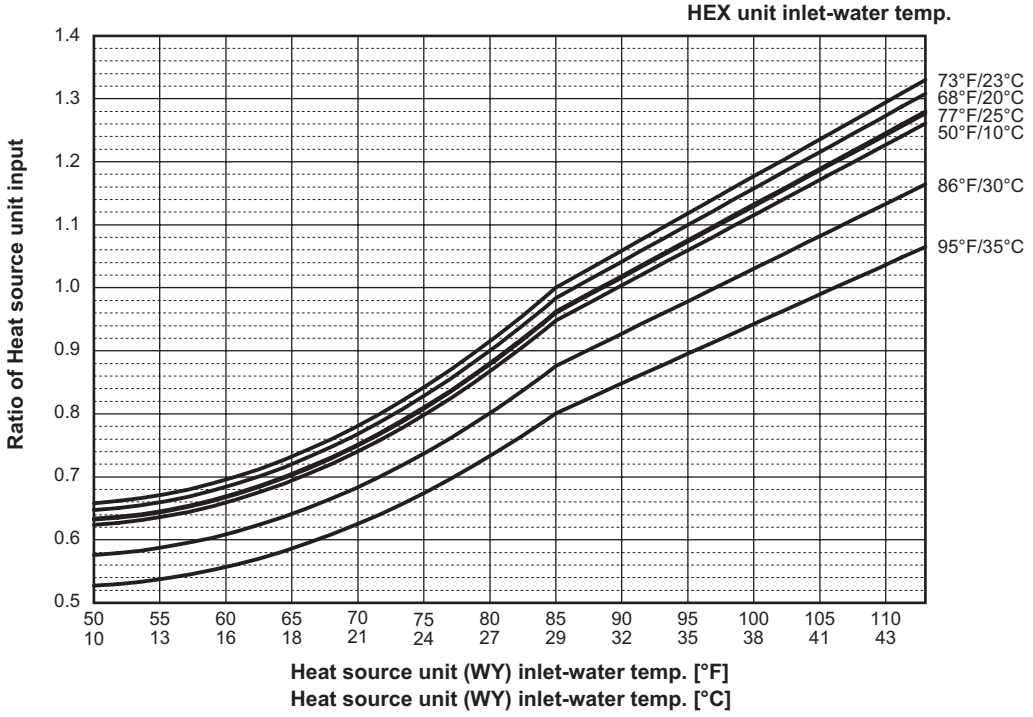
Heating





Cooling

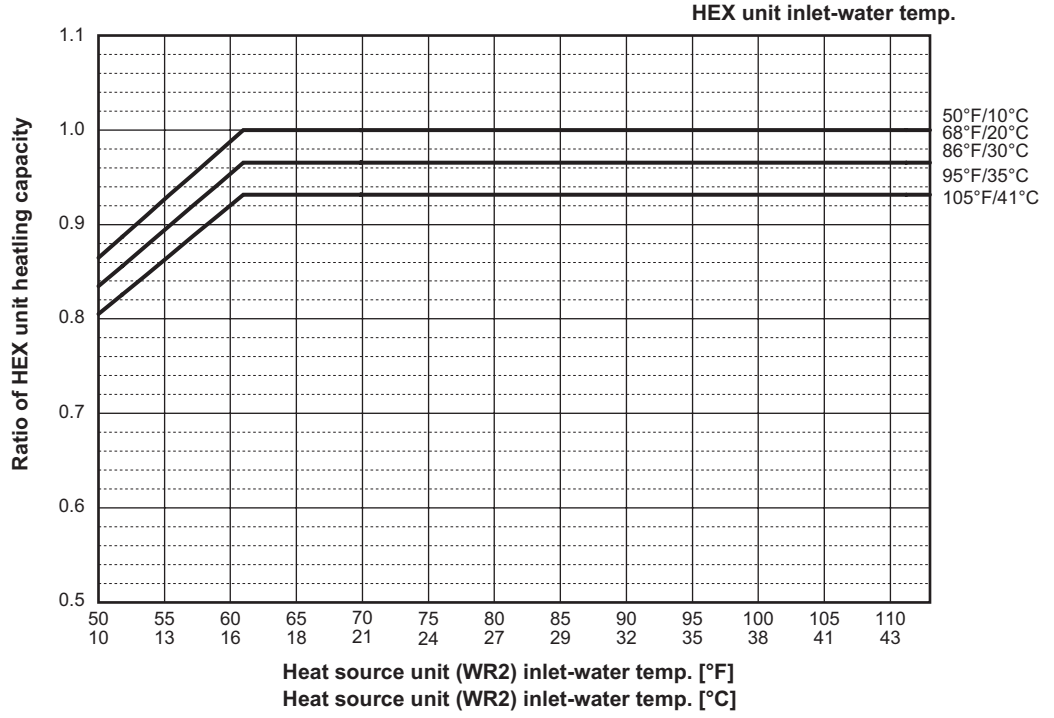


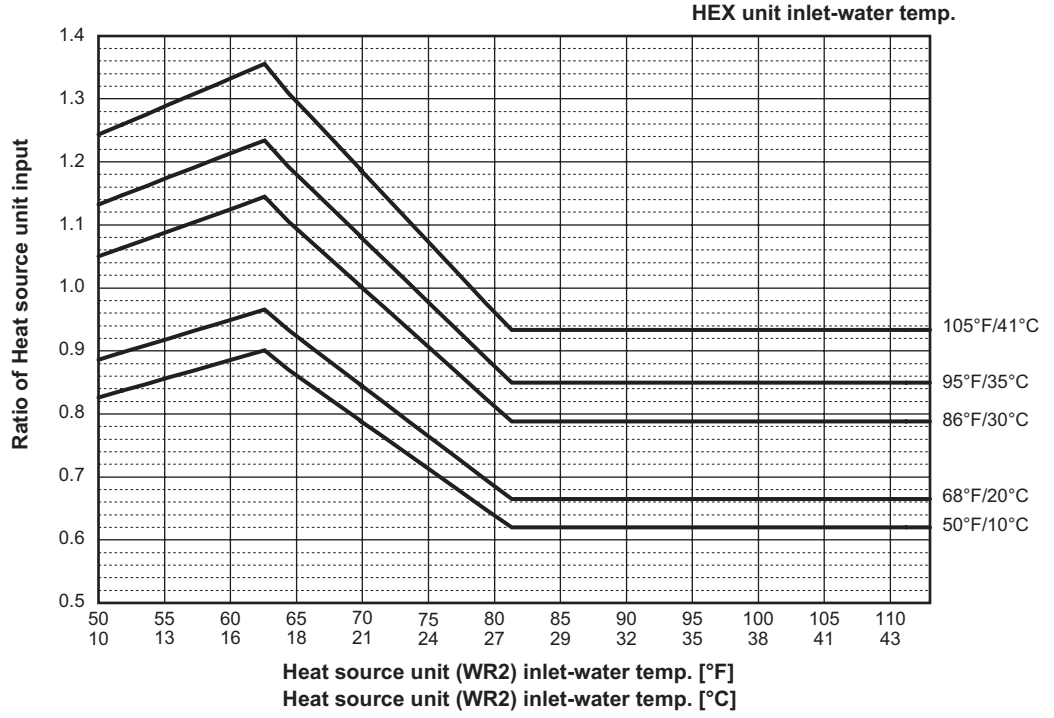


9-1-9. WR2 + PWFY-P36, P72NMU-E2-AU

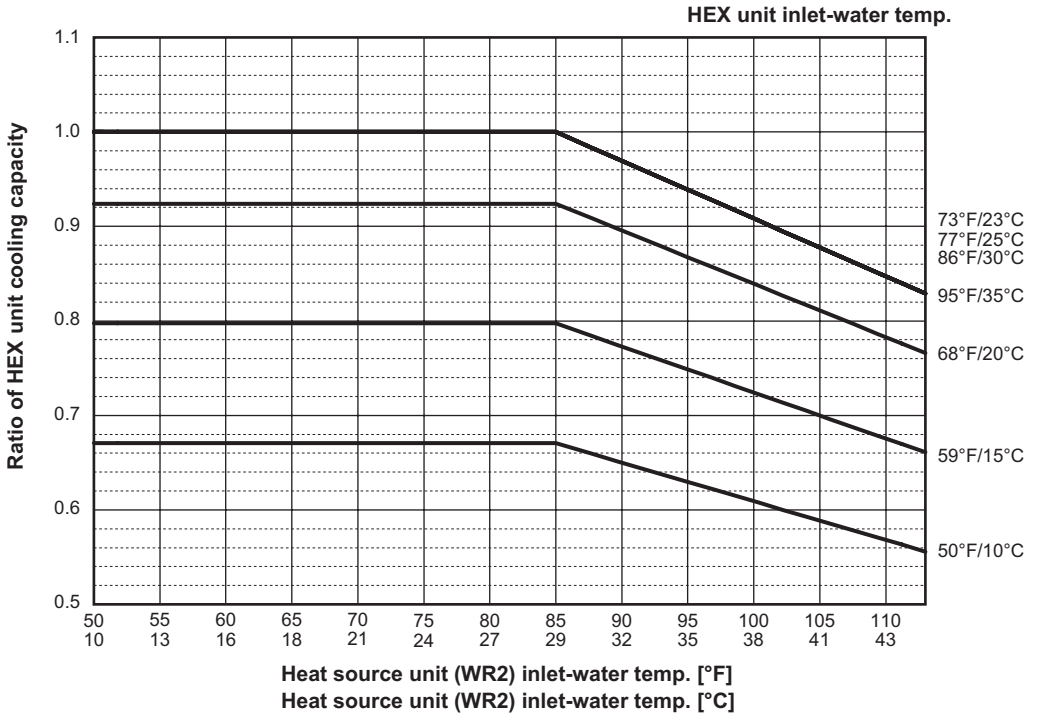
PQRY-	P72, 96, 120, 144, 168, 192, 216, 240Z(S)KMU-A P72, 96, 120, 144, 168, 192, 216, 240, 264, 288, 312, 336T(S)LMU-A/Y(S)LMU-A

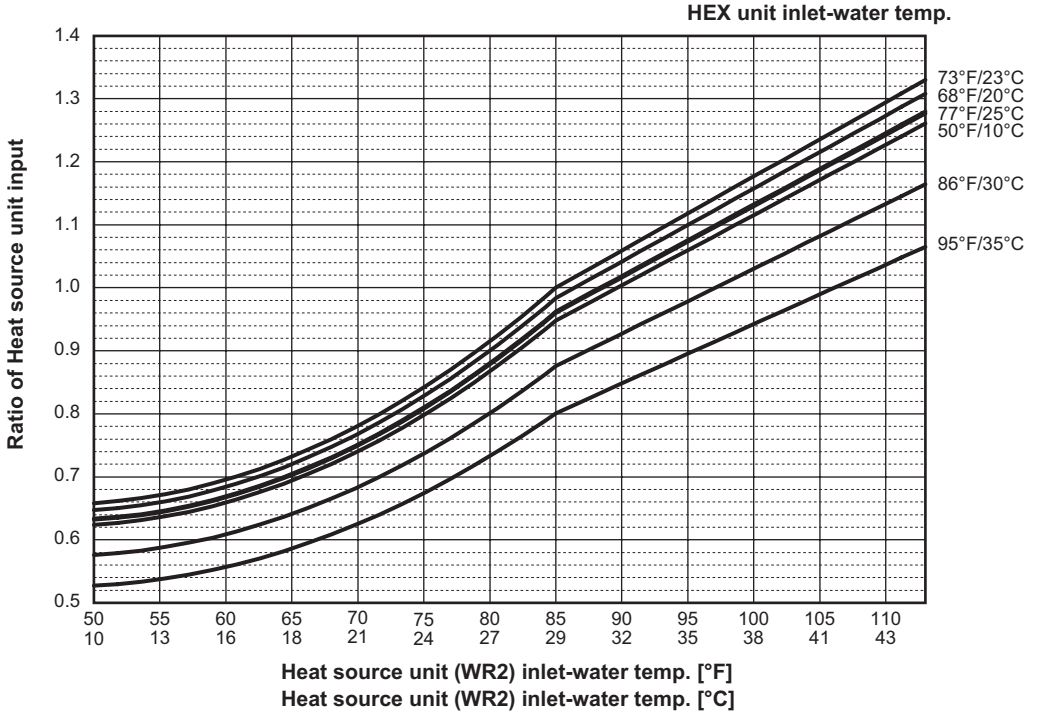
Heating





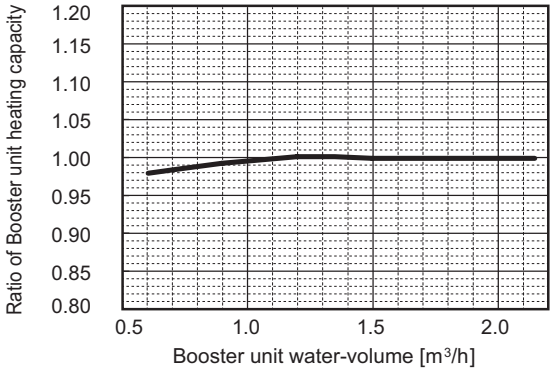
Cooling

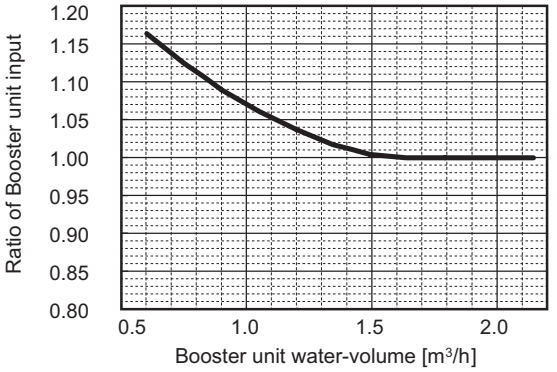


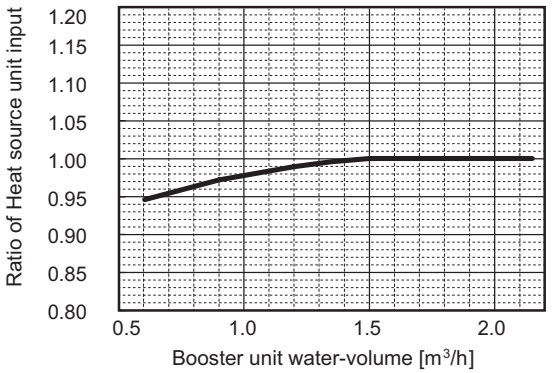


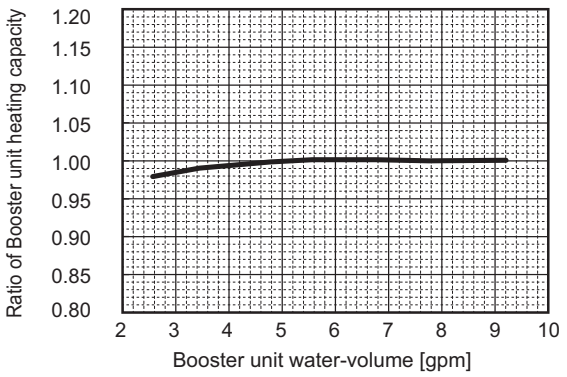
9-2. Correction by Water Volume

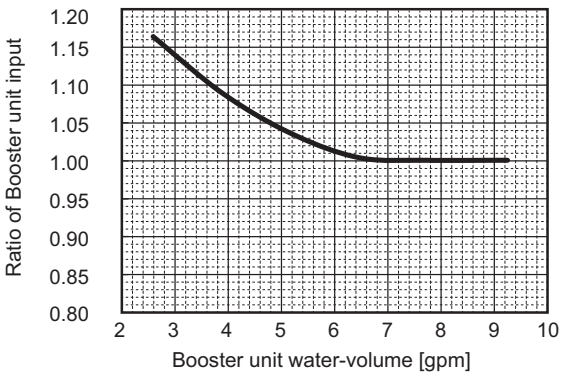
9-2-1. PWFY-P36NMU-E-BU

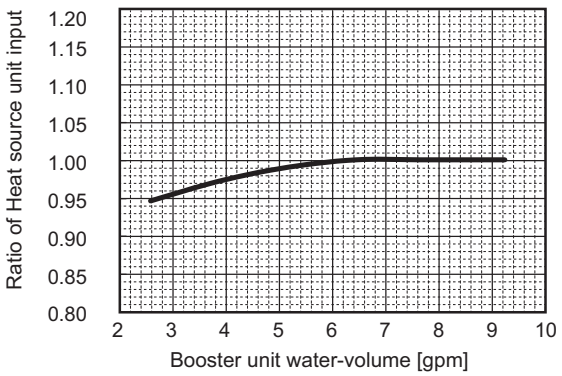






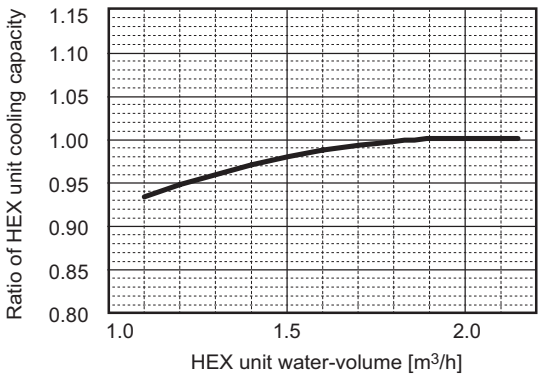


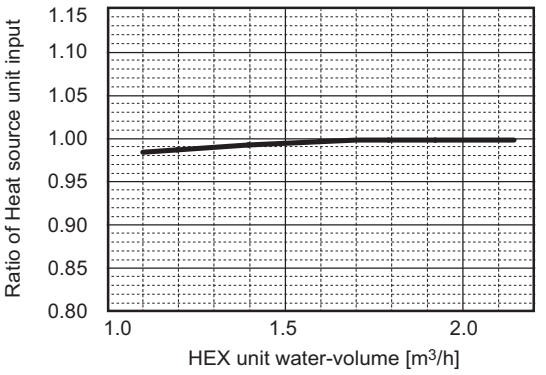




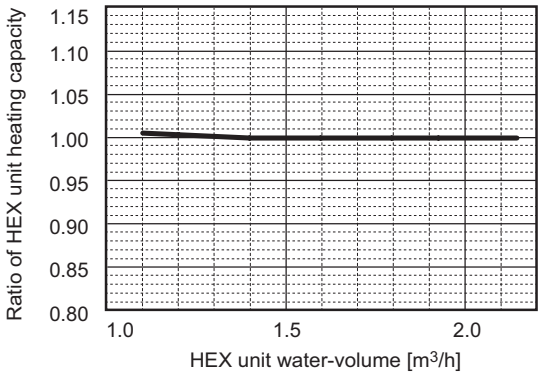
9-2-2. PWFY-P36NMU-E2-AU

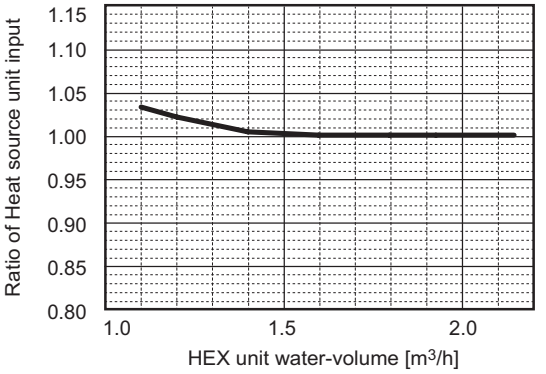
Cooling



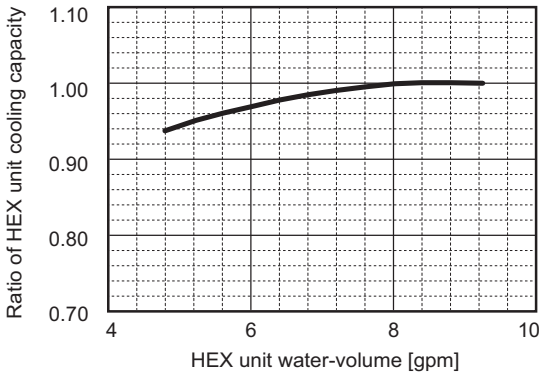


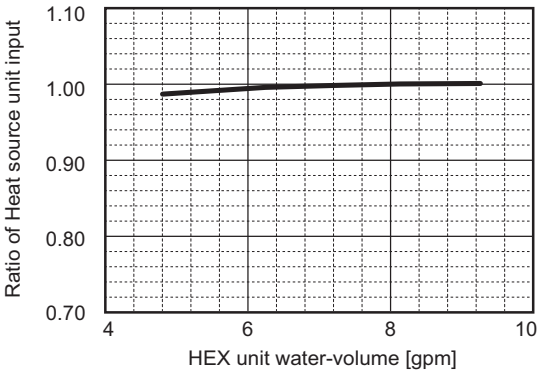
Heating



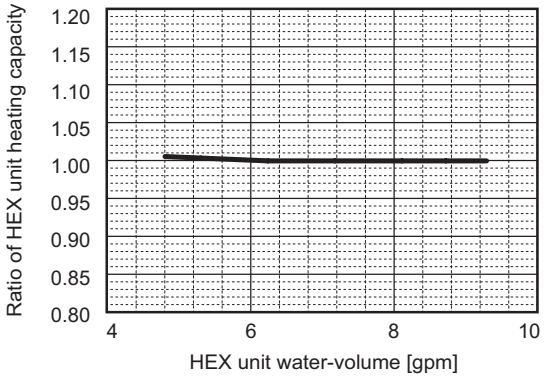


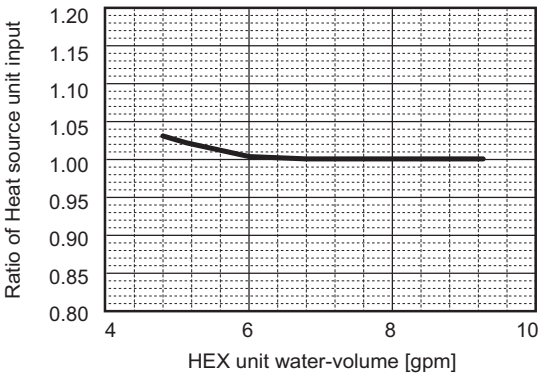
Cooling





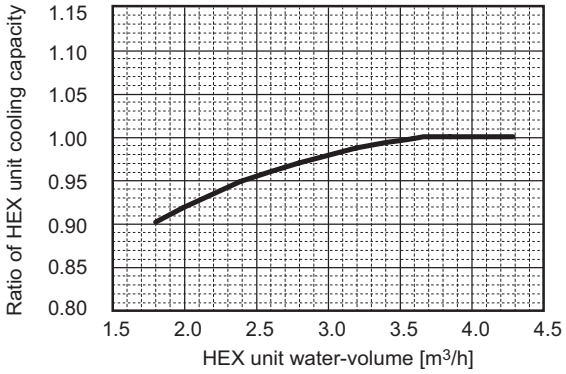
Heating

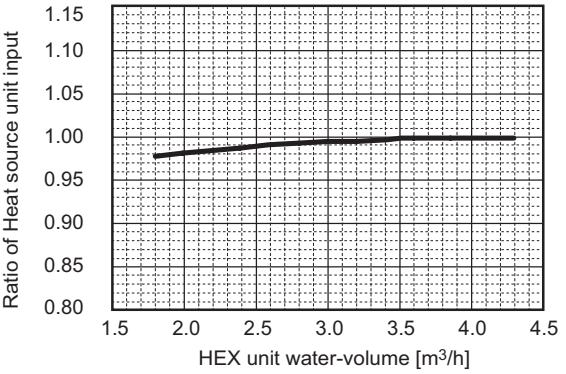




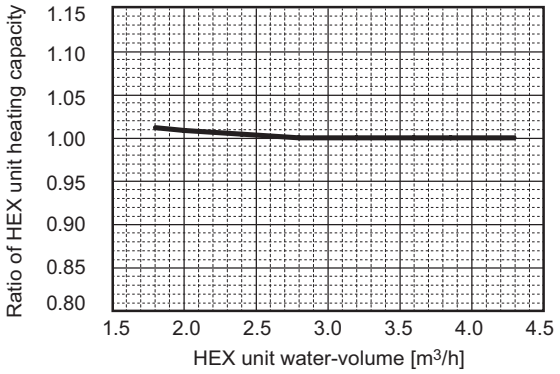
9-2-3. PWFY-P72NMU-E2-AU

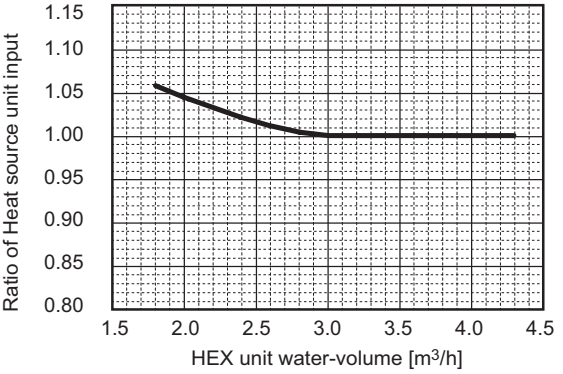
Cooling



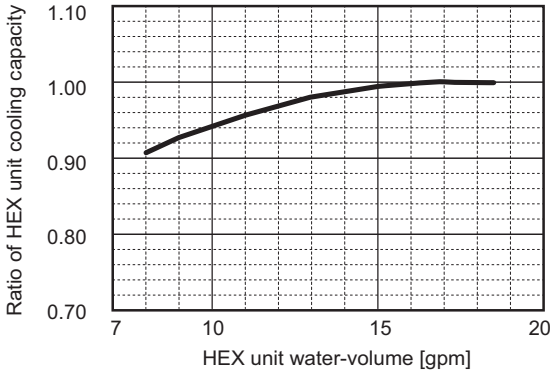


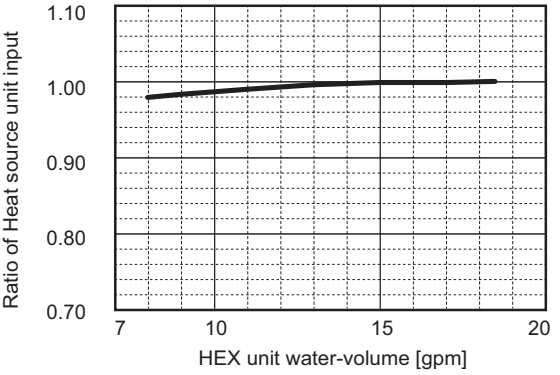
Heating



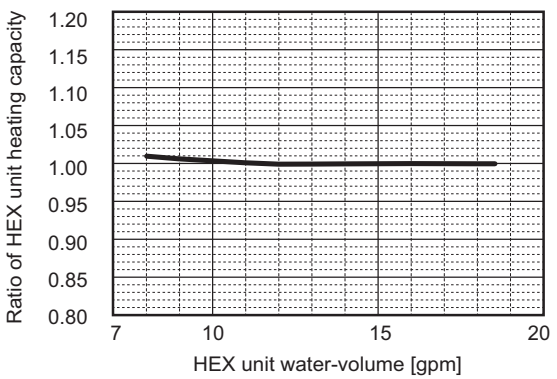


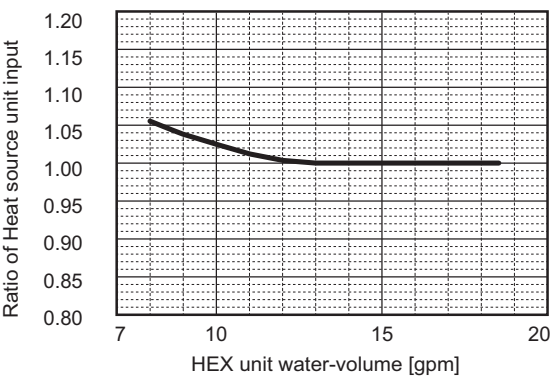
Cooling





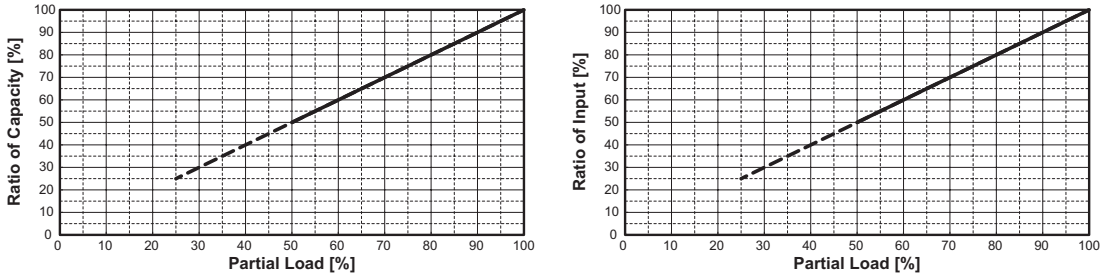
Heating





9-3. Correction by total indoor

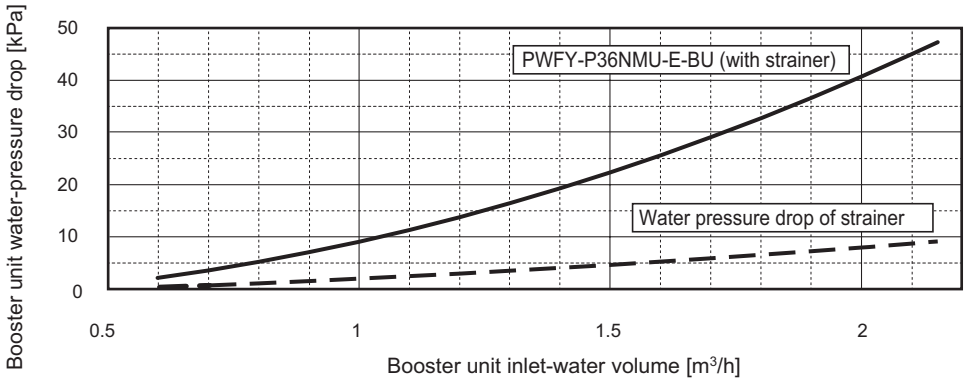
Partial Load of PWFY-P36NMU-E-BU/ P36, 72NMU-E2-AU

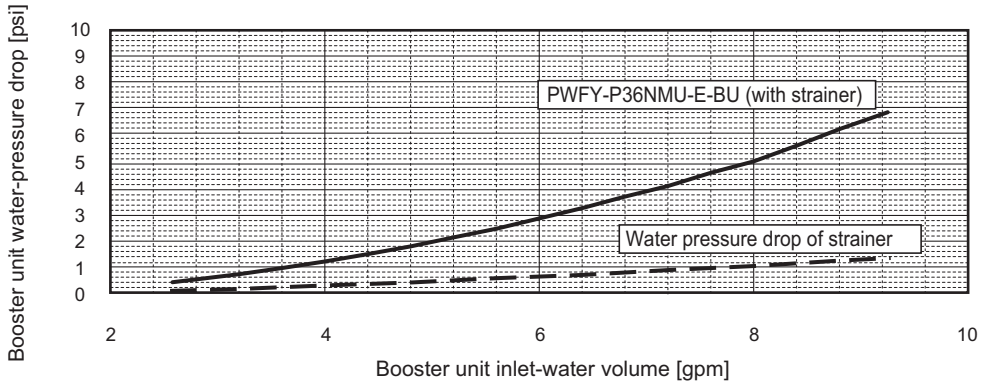


Note Out of warranty at 50% or less due to unit's turn on-off.

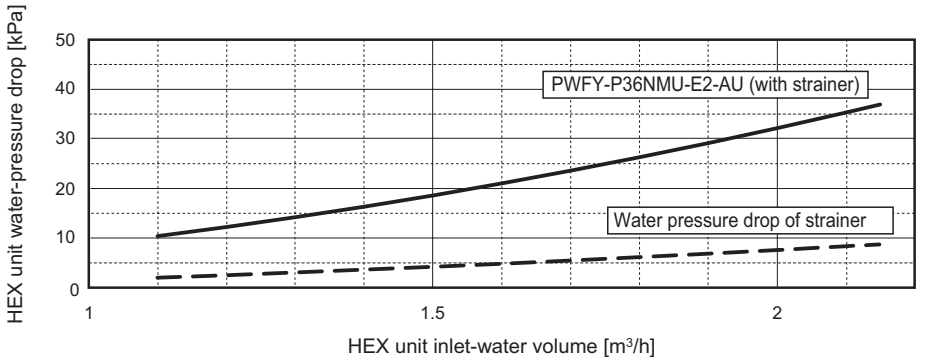
9-4. Water pressure drop

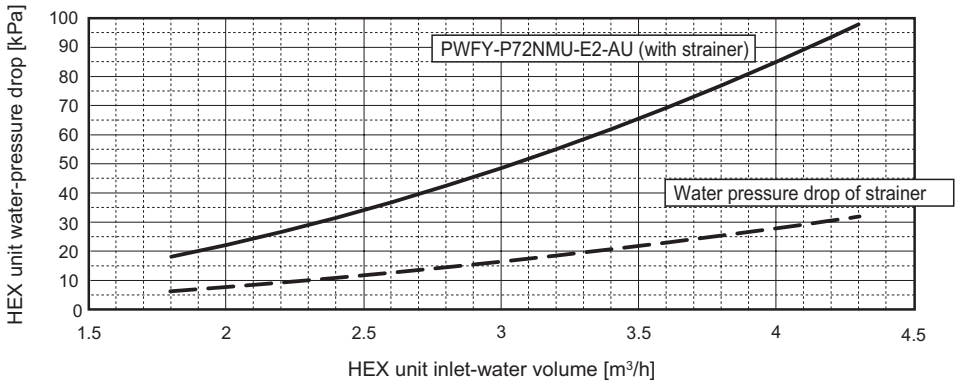
9-4-1. PWFY-P36NMU-E-BU

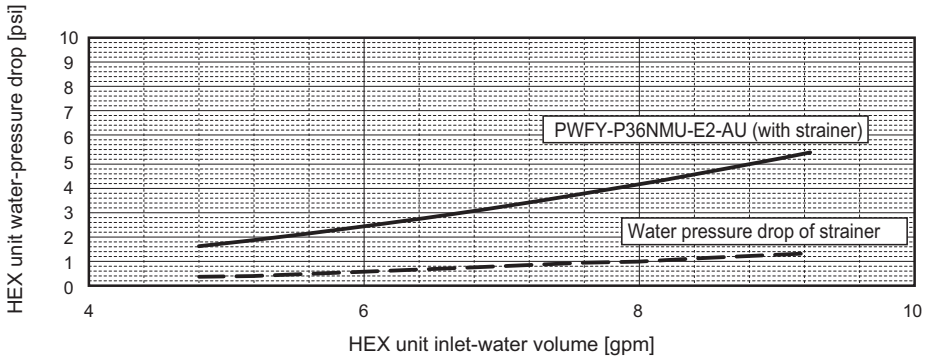


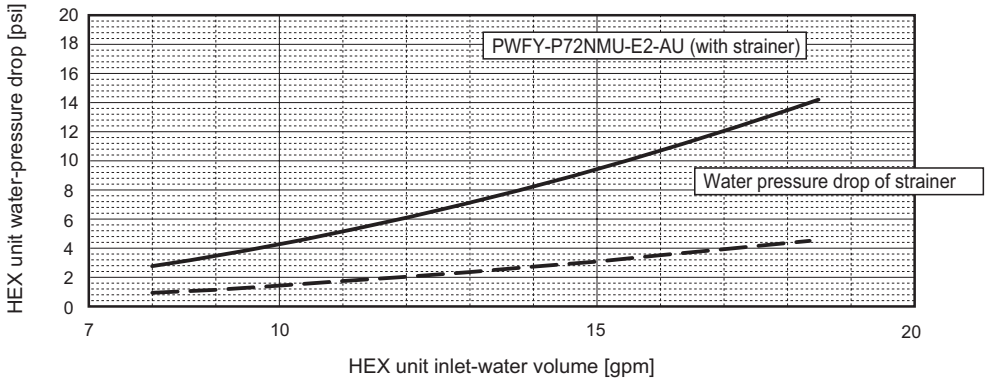


9-4-2. PWFY-P36, P72NMU-E2-AU

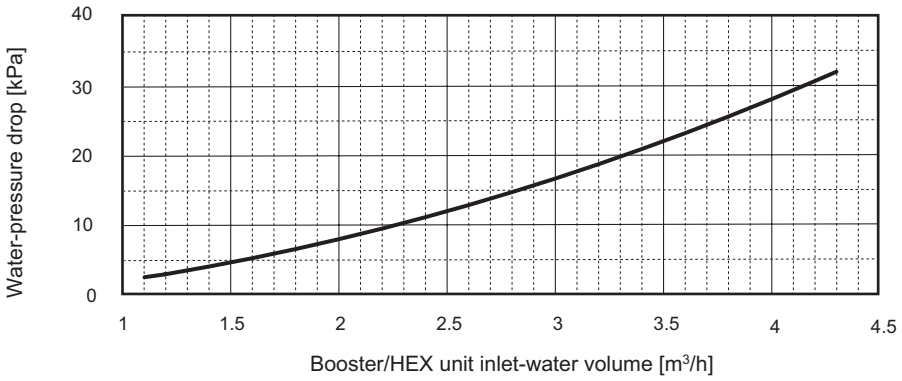


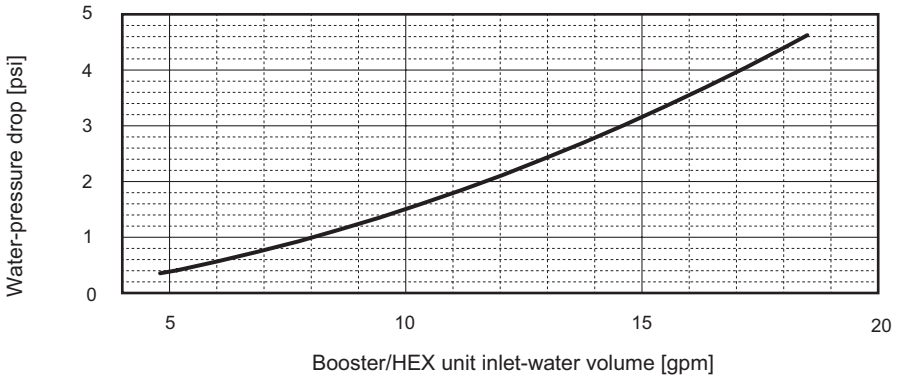






9-4-3. Water pressure drop of strainer only (accessory for PWFY-P36NMU-E-BU and PWFY-P36/72NMU-E2-AU)





9-5. Cooling operation in cold climates

Need to add text which is contained in the original PWFY manual for this section: Please refer to previous manual for exact description.

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 -4o 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.

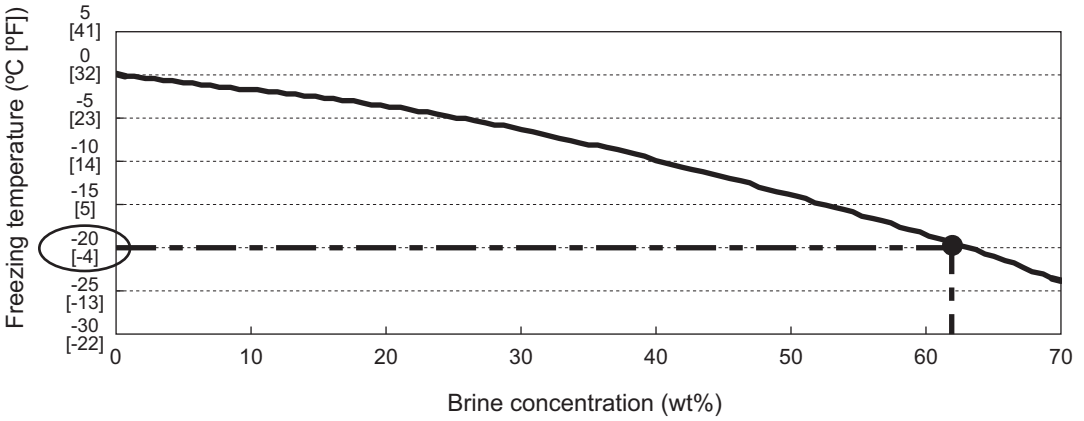
During ambient temperatures below 32o F if the PWFY unit is not being utilized, especially when connected on an R2-series air cooled system that running in heating main mode, it is important to also maintain water circulation through the HEX unit even when not thermally active.

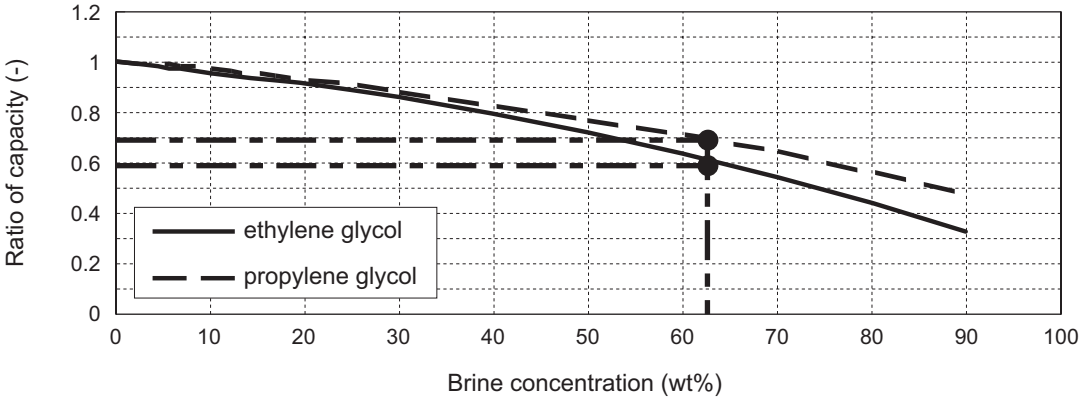
Alternately, if the PWFY is not being used during winter months, glycol has not been added to the water, and continuous pump circulation is not provided, the unit should be shut down and water drained from the heat exchanger as a preventative measure. Brine is required to add.

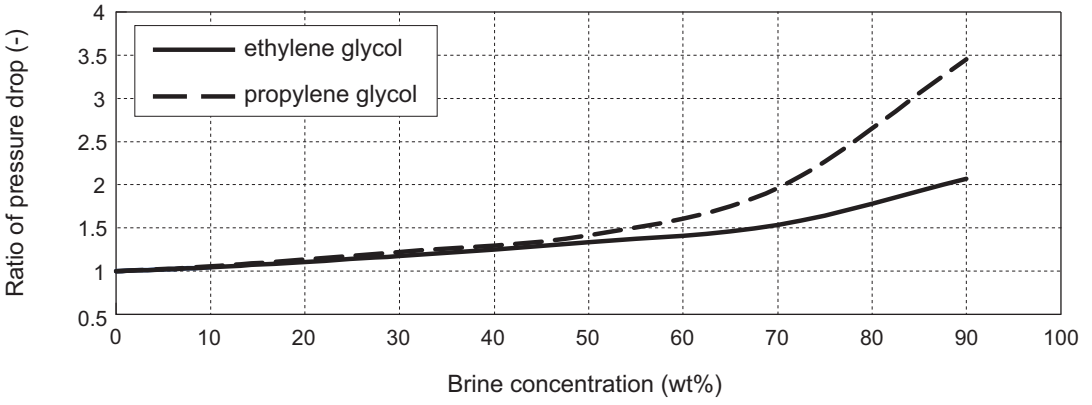
Brine

When (a) PWFY-AU is used for cooling purpose, or (b) PWFY-AU is installed in the temperature condition below freezing temperature, Brine is required to add.

Set Dip SW 1-10 (on ATW unit) to ON if brine is added.

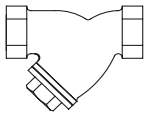
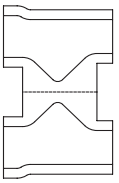
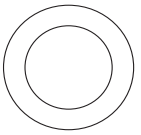
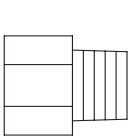


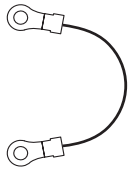
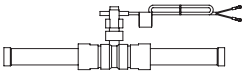
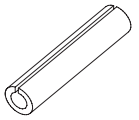




10. OPTIONAL PARTS

(1) PWFY

(A) Strainer	(B) Heat insulation material	(C) Washer × 2	(D) Expansion joint × 2
			 *1

(E) Wire	(F) Flow switch	(G) Buffer material
 *2		

*1. PWFY-P72NMU-E2-AU only
*2. PWFY-P36NMU-E-BU 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) 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.
(D) Supplied only with the PWFY-P72NMU-E2-AU. Install them at the strainer inlet. Refer to P.57 for details.
(E) To perform test run before the pump interlock circuit is completed, short circuit the terminal block TB142A (IN1),
and then perform test run.
(F) 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.
(G) If allowing wires inside the unit to hang loosely so as to prevent water from collecting and running down into electrical components, be careful not to let the wires hang so loosely as to come into contact with nearby piping (solenoid valves).
If there is any risk of contact being made, use the included buffer material to protect other components.

(2) CMB-P105, 106, 108, 1010, 1013, 1016NU-G1

Item	Qty
Drain hose	1
Tie band	1
Hose band	1
Reducer (large & small)	Same number as branch holes
Refrigerant connection pipe	3

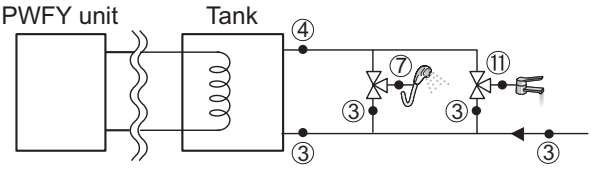
11-1. Heating capacity calculation (Unit: ° F/BTU/G)

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

Required total heating capacity [①] BTU

Safety factor; [②] %

B. For Sanitary use such as Shower and Bathrooms



Conditions

Tank inlet water Temp.; [③] °F

Tank outlet water Temp.; [④] °F

(Set Temp 23 °F)

Safety factor for Heat Loss; [⑤] %

Operating time; [⑥] Hours

For Shower; [⑦] G/Person x [⑧] Person = [⑨] G (Water Temp. Condition [⑩] °F)

For Bathrooms; [⑪] G/Person x [⑫] Person = [⑬] G (Water Temp. Condition [⑭] °F)

The conversion of water volume to [④] °F

[⑨] x ([⑩] - [③]) / ([④] - [③])

+ [⑬] x ([⑭] - [③]) / ([④] - [③])

= [⑮] G/day

Heating Capacity Calculation for sanitary usage

[⑮] /1,000 x ([④] - [③]) / 2 = [⑯] M BTU / day

The conversion of M BTU to BTU

[⑯] x 1,000 / [⑥] = [⑰] BTU

C. Total (A+B)

Total Heating Capacity

[①] x (100% + [②] %) + [⑰] x (100% + [⑤] %) = [⑱] BTU

D. No. of units required

Safety factor; [⑲] %

[⑱] x (100% + [⑲] %) / 39900BTU = [⑳] units

11-2. A calculation example (Unit: ° F/BTU/G)

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

Required total heating capacity [68240] BTU

Safety factor; [10] %

B. For Sanitary use such as Shower and Bathrooms

Conditions

Tank inlet water Temp.; [50] °F

Tank outlet water Temp.; [140] °F

(Set Temp 23 °F)

Safety factor for Heat Loss; [15] %

Operating time; [8] Hours

For Shower; [16] G/Person x [20] Person = [317] G (Water Temp. Condition [104] °F)

For Bathrooms; [2.1] G/Person x [30] Person = [63.4] G (Water Temp. Condition [113] °F)

The conversion of water volume to [④] °F

[317] x ([104] - [50]) / ([140] - [50])

+ [63.4] x ([113] - [50]) / ([140] - [50])

= [234.6] G/day

Heating Capacity Calculation for sanitary usage

[234.6] /1,000 x ([140] - [50]) / 2 = [11.2] M BTU / day

The conversion of M BTU to BTU

[11.2] x 1,000 / [8] = [1400] BTU

C. Total (A+B)

Total Heating Capacity

[68240] x (100% + [10] %) + [1400] x (100% + [15] %) = [76674] BTU

D. No. of units required

Safety factor; [20] %

[76674] x (100% + [20] %) / 39900BTU = [2.31] units

⇩

[3] units are required

11-3. Heating capacity calculation (Unit: ° C/kW/ℓ)

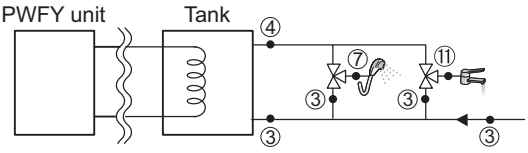
A. For Air conditioning using such as Panel Heaters, Floor Heating and Fan coil units

Required total heating capacity ① kW

Safety factor; ② %

B. For Sanitary use such as Shower and Bathrooms

Conditions



Tank inlet water Temp.; ③ °C

Tank outlet water Temp.; ④ °C

(Set Temp -5 °C)

Safety factor for Heat Loss; ⑤ %

Operating time; ⑥ Hours

For Shower; ⑦ ℓ/Person x ⑧ Person = ⑨ ℓ (Water Temp. Condition ⑩ °C)

For Bathrooms; ⑪ ℓ/Person x ⑫ Person = ⑬ ℓ (Water Temp. Condition ⑭ °C)

The conversion of water volume to ④ °C

⑨ x (⑩ - ③) / (④ - ③)

+ ⑬ x (⑭ - ③) / (④ - ③)

= ⑮ ℓ/day

Heating Capacity Calculation for sanitary usage

⑮ /1,000 x (④ - ③) = ⑯ M cal / day

The conversion of M cal to kW

⑯ / 860 x 1,000 / ⑥ = ⑰ kW

C. Total (A+B)

Total Heating Capacity

① x (100% + ② %) + ⑰ x (100% + ⑤ %) = ⑱ kW

D. No. of units required

Safety factor; ⑲ %

⑱ x (100% + ⑲ %) / 11.7 kW = ⑳ units

⇩

⑳ units are required

11-4. A calculation example (Unit: ° C/kW/ℓ)

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

Required total heating capacity 20 kW

Safety factor; 10 %

B. For Sanitary use such as Shower and Bathrooms

Conditions

Tank inlet water Temp.; 10 °C

Tank outlet water Temp.; 60 °C

(Set Temp -5 °C)

Safety factor for Heat Loss; 15 %

Operating time; 8 Hours

For Shower; 60 ℓ/Person x 20 Person = 1,200 ℓ (Water Temp. Condition 40 °C)

For Bathrooms; 8 ℓ/Person x 30 Person = 240 ℓ (Water Temp. Condition 45 °C)

The conversion of water volume to ④ °C

1,200 x (40 - 10) / (60 - 10)

+ 240 x (45 - 10) / (60 - 10)

= 888 ℓ/day

Heating Capacity Calculation for sanitary usage

888 /1,000 x (60 - 10) = 44.4 M cal / day

The conversion of M cal to kW

44.4 / 860 x 1,000 / 8 = 6.45 kW

C. Total (A+B)

Total Heating Capacity

20 x (100% + 10 %) + 6.45 x (100% + 15 %) = 29.42 kW

D. No. of units required

Safety factor; 20 %

29.42 x (100% + 20 %) / 11.7 kW = 2.82 units

⇩

3 units are required

12-1. 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.**

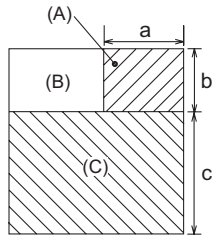
- The inverter equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the air conditioner to operate erroneously, or fail to operate. On the other hand, the air conditioner may affect such equipment by creating noise that disturbs medical treatment 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.

12-1-1. 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. IV. 2. (1). 1]
  •PWFY unit



(A) Piping space (right side)
(B) Top view
(C) Service space (front side)

Unit : in (mm)

Model	PWFY-P36NMU-E-BU	PWFY-P36NMU-E2-AU	PWFY-P72NMU-E2-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.

11-2-1-2. Combining indoor units with BC controllers and outdoor units
For combining indoor units with BC controllers and outdoor units, refer to V System Design and outdoor units installation manual.

12-2. Installing the unit

12-2-1. Lifting method

⚠ **Caution:**

Be very careful when carrying the product.

- Do not have only one person to carry product if it is more than 45 lbs (20 kg).
- Do not tilt the unit while transporting.
- PP bands are used to pack some products. Do not use them as a mean for transportation because they are dangerous.
- Tear plastic packaging bag and scrap it so that children cannot play with it. Otherwise plastic packaging bag may suffocate children to death.

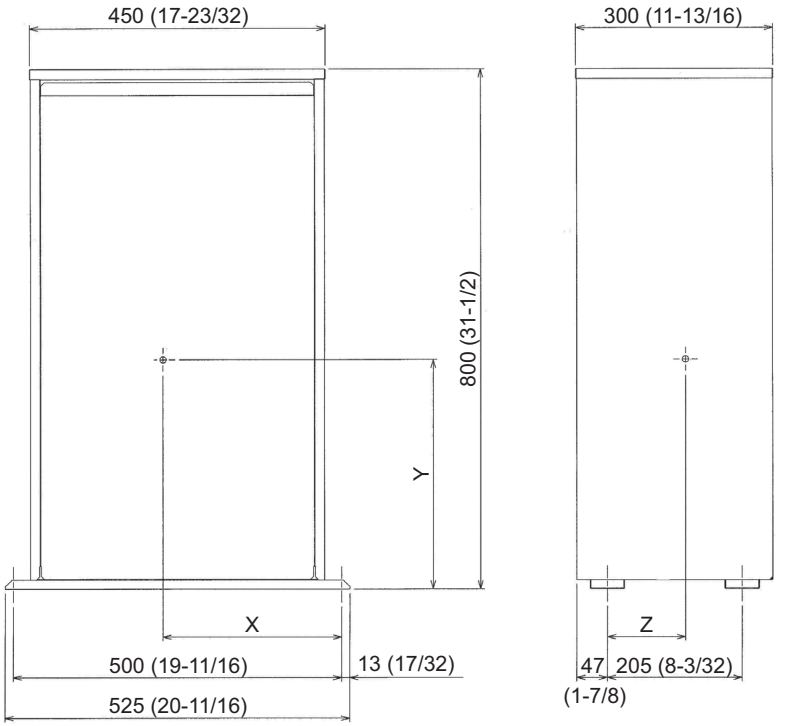
12-2-2. Product net weight

Model	PWFY-P36NMU-E-BU	PWFY-P36NMU-E2-AU	PWFY-P72NMU-E2-AU
Net weight	131 lbs (59 kg)	73 lbs (33 kg)	80 lbs (36 kg)

12-2-3. Center of gravity

PWFY-P36NMU-E-BU

unit : mm (in)

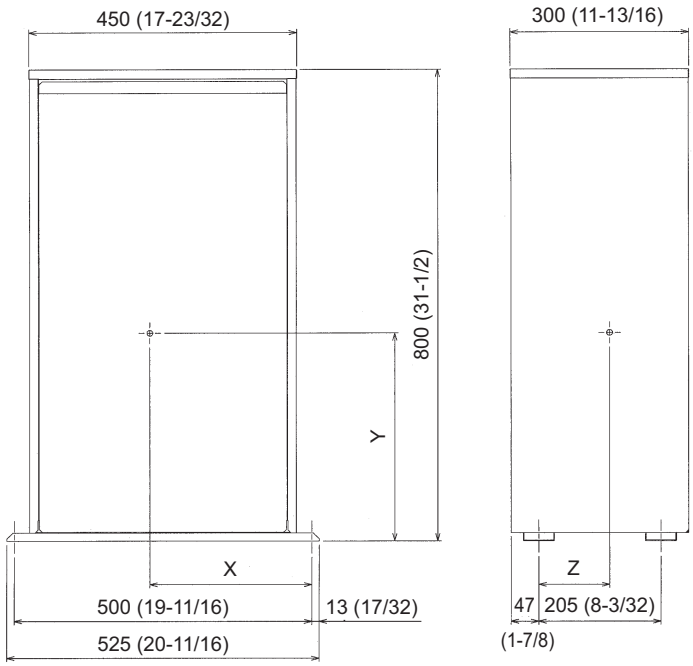


unit : mm (in)

Model	X	Y	Z
PWFY-P36NMU-E-BU	272 (10-23/32)	355 (13)	119 (4-11/16)

PWFY-P36, P72NMU-E2-AU

unit : mm (in)



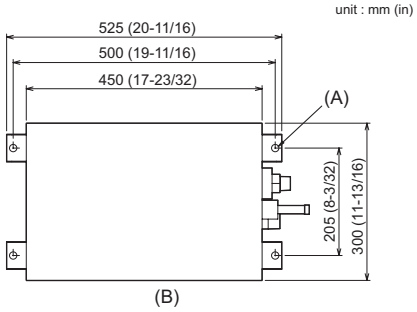
unit : mm (in)

Model	X	Y	Z
PWFY-P36NMU-E2-AU	257 (10-1/8)	355 (14)	100 (3-15/16)
PWFY-P72NMU-E2-AU	267 (10-17/32)	368 (14-1/2)	103 (4-1/16)

12-2-4. Installation method

- Using the anchoring holes shown below, firmly bolt the unit to the base.
  [Fig. IV. 2. (2). 1]
  •PWFY unit

unit : mm (in)



(A) 2 x 2-ø14 (9/16) (Anchoring hole)
(B) (Top view)

Bases

- Be sure to install unit in a place strong enough to withstand its weight. If the base is unstable, reinforce with a concrete base.
- The unit must be anchored on a level surface. Use a level to check after installation.
- If the unit is installed near a room where noise is a problem, using an anti-vibration stand on the base of the unit is recommended.

12-2-3. Refrigerant pipe and drain pipe specifications

12-2-3-1. Refrigerant pipe and drain pipe specifications

To avoid dew drops, provide sufficient antisweating and insulating work to the refrigerant and drain pipes.
When using commercially available refrigerant pipes, be sure to wind commercially available insulating material (with a heat-resisting temperature of more than 212 °F (100 °C) and thickness given below) onto both liquid and gas pipes.
Be also sure to wind commercially available insulating material (with a form polyethylene's specific gravity of 0.03 and thickness given below) onto all pipes which pass through rooms.

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

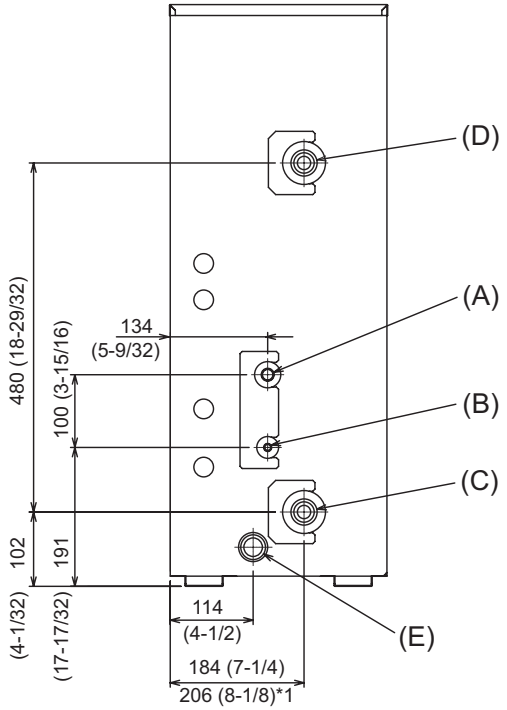
Unit : mm (in)

Model	PWFY-P36NMU-E-BU	PWFY-P36NMU-E2-AU	PWFY-P72NMU-E2-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)		
Insulating material's thickness	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) If there are customer's specifications, simply follow them.

11-2-3-2. Refrigerant pipe, drain pipe and filling port

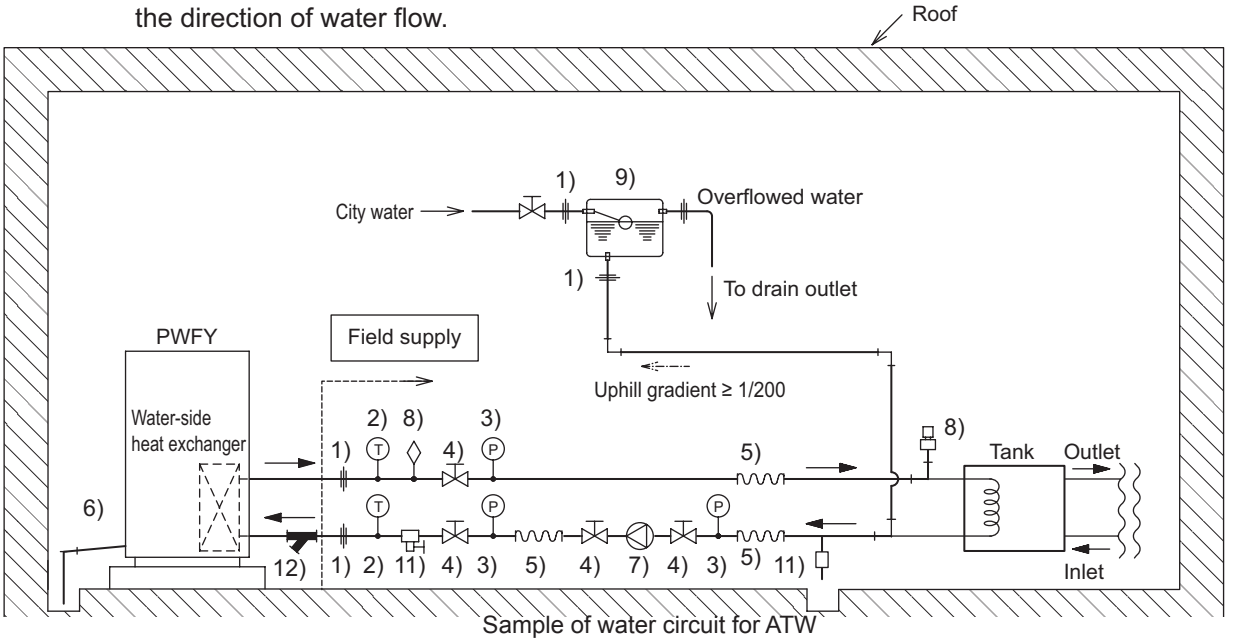
• PWFY unit



12-3. Water Pipe Installation

12-3-1. 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)-(14) 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.
13) Flow switch
   Install the supplied flow switch on the outlet pipe.
14) Tank
   Minimum tank capacity: 100 L (Refer to Fig. IV. 3. (8). 1)

12-3-1-1 Caution for water pipe installation

Consider the following when designing and installing a water piping system.

- Do not use steel pipes as water pipes.
- Copper pipes or stainless steel pipes are recommended.If iron pipes are used in the existing system, do not connect a new circuit to the old one. Keep the existing and new circuits separate.
- Light pipes are similar to other air-conditioning pipes, however, please observe the following precautions during installation.
- Before a long period of non use, purge the water out of the pipes and thoroughly let them dry.
- Use a closed water circuit.
- When operating the unit, add brine to the circulating water to prevent it from freezing. To use brine in the system, DipSW 1-10 must be set to ON.
- When installed in a low-ambient temperature environment, keep the water circulating at all times. If that is not possible, purge the water out of the pipes completely.
- Do not use the water used for this unit for drinking or food manufacturing.
- When the ambient temperature is 0 ˚C (32 ˚F) or lower during stop operation, keep the water circulating at all times, or purge the water out of the pipes completely.

Model	Water inlet	Water outlet
PWFY-P36NMU-E-BU	PT 3/4 Screw	PT 3/4 Screw
PWFY-P36NMU-E2-AU	PT 3/4 Screw	PT 3/4 Screw
PWFY-P72NMU-E2-AU *1 When the attached expansion joints are installed.	PT 1 Screw*1	PT 1 Screw*1

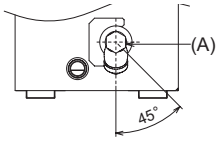
12-3-1-2. Selecting a water pump

Use a pump that is large enough to compensate for the total water pressure loss and to supply sufficient water to the unit.

12-3-1-3. Installing the strainer

- Install the strainer at the angle of 45˚ or less as shown in [Fig. IV 3.(3).1].
- Install the supplied strainer at the water inlet.

[Fig. IV 3.(3).1]



(A) Y-type strainer

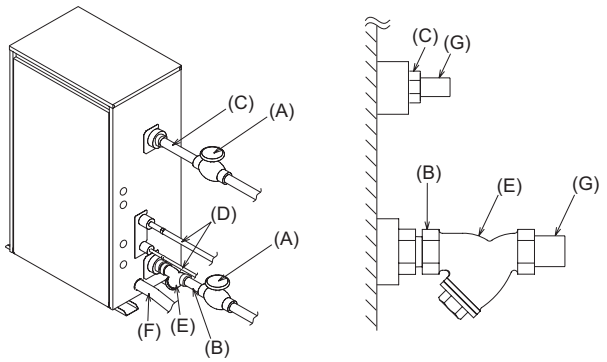
12-3-1-4. Precautions during installation

- Use the reverse-return method to insure proper pipe resistance to each unit.
- To insure easy maintenance, inspection, and replacement of the unit, use a proper joint, valve, etc. on the water intake and outlet port. In addition, be sure to install a strainer on the water intake pipe. (In order to maintain the heat source unit, a strainer on the circulating water inlet is necessary.)
  * An example of the heat source unit installation is shown in the diagram below.
- Install a suitable air vent on the water pipe. After sending water through the pipe, be sure to vent the excess air.
- Compressed water may form in the low-temperature sections of heat source unit. Use a drainage pipe connected to the drain valve at the base of the unit to drain the water.
- Install a back flow-prevention valve on the pump and a flexible joint to prevent excess vibration.
- Use a sleeve to protect the pipes where they go through a wall.
- Use metal fittings to secure the pipes, and install them so that they have maximum protection against breakage and bending.
- Do not confuse the water intake and outlet valves.
- This unit doesn’t have any heater to prevent freezing within tubes. When the water flow is stopped on low ambient, take out the water from tubes.
- The unused knockout holes should be closed and the opening of refrigerant pipes, water pipes, power source and transmission wires should be filled with putty and so on to prevent from rain. (field construction)
- Wrap some sealing tape around the screw part to prevent water leakage.
- Hold the pipe on the unit side in place with a spanner when installing the pipes or strainer. Tighten screws to a torque of 50 N·m.
- Water pipes can get very hot, depending on the preset temperature. Wrap the water pipes with insulating materials to prevent burns.
- On the PWFY-P72NMU-E2-AU model, install the expansion joint (accessory) at the inlet after installing the strainer, and outlet.

12-3-1-5. Example of unit installation

[Fig. IV. 3.(5).1]

PWFY- P72NMU-E2-AU



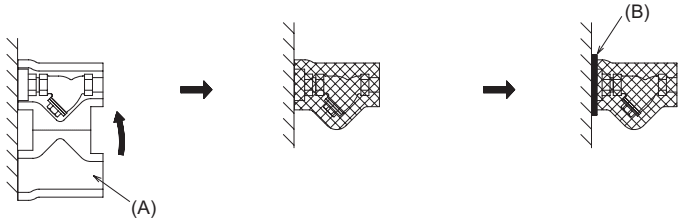
(A) Close valve
(B) Water inlet
(C) Water outlet
(D) Refrigerant piping
(E) Y-type strainer
(F) Drain pipe
(G) Expansion joint

12-3-1-6. Insulation installation

The surface temperature of the water pipe would be very high, depending on the set temperature. Insulate the pipe to prevent burns. When operating PWFY-P36, 72NMU-E2-AU with cold water, insulate the water pipe to prevent condensation.

Wrap insulation material around water pipes as shown in [Fig. IV. 3.(6).1].

- Any heat source piping.
- Indoor piping in cold-weather regions where frozen pipes are a problem.
- When air coming from the outside causes condensation to form on piping.
- Any drainage piping.



(A) Heat insulation material (accessory)
(B) Inject with caulking material

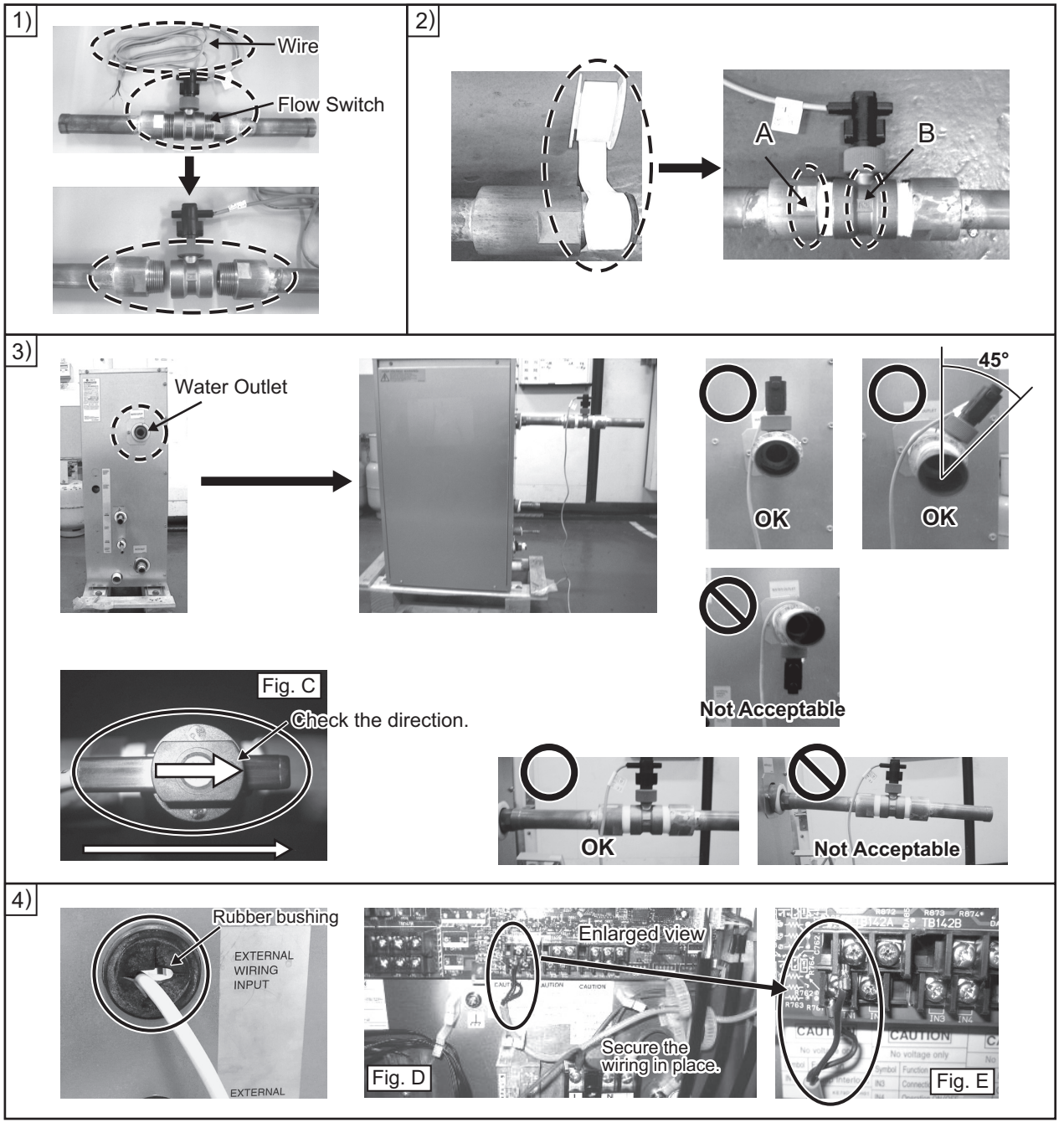
[Fig. IV. 3.(6).1]

12-3-1-7. Flow switch installation

<Caution>
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.
If the flow switch is not installed, the unit will emit the error signal (2100: Interlock error) and not operate.
* A short-circuit wire is supplied, but it is only for test run.

<Installation procedures>

1) Remove the pipes attached to the flow switch.
   Note: The unit is shipped with the pipes loosely tightened.
2) Wrap seal tape around the threads at the end of the pipes, starting at the 1.5th or 2nd thread, and not over the openings. Apply two to three wraps in the direction of the pipe threads (clockwise). Each course of the tape should overlap the one before it by 2/3 to 3/4 the width of the tape. Run your fingers around the threads and tape to press the tape into the threads.
   Then, attach the pipes to the flow switch, holding parts A and B with a spanner. The maximum tightening torque is 60 N•m (611 kgf•cm).
3) Attach the flow switch and pipes to the water outlet in the horizontal position.
   The angle of the axis of the pipe should be less than 45 degrees.
   Check the direction of the flow switch as shown in Fig. C.
4) Connect the flow switch wire to IN1 of TB142A.
   From the External Wiring Input, route the wire as shown in Fig. D and connect it to the terminal as shown in Fig. E. Use a wire protector such as a rubber bushing in the access hole on the unit.



12-4. Water Processing And Water Quality Control

To preserve water quality, use the closed type of cooling tower for 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.

- Removal of foreign objects or impurities within the pipes.

  During installation, be careful that foreign objects, such as welding fragments, sealant particles, or rust, do not enter the pipes.
- Water Quality Processing

  a) 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.

  b) 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	Make-up water	Recirculating water	Make-up water	Corrosive	Scale-forming
Standard items	pH	77 ˚F (25 ˚C)	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	○	○
	Electric conductivity(mS/m)	77 ˚F (25 ˚C)	30 or less	30 or less	30 or less	30 or less	○	○
	(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)	50 or less	50 or less	30 or less	30 or less	○	
	Acid consumption	(pH4.8) (mg $CaCO_3$/liter)	50 or less	50 or less	50 or less	50 or less		○
	Total hardness	(mg $CaCO_3$/liter)	70 or less	70 or less	70 or less	70 or less		○
	Calcium hardness	(mg $CaCO_3$/liter)	50 or less	50 or less	50 or less	50 or less		○
	Ionic silica	(mg SiO_2/liter)	30 or less	30 or less	30 or less	30 or less		○
Reference items	Iron	(mg Fe/liter)	1.0 or less	0.3 or less	1.0 or less	0.3 or less	○	○
	Copper	(mg Cu/liter)	1.0 or less	1.0 or less	1.0 or less	1.0 or less	○	
	Sulfide ion	(mg S^{2-}/liter)	not to be detected	not to be detected	not to be detected	not to be detected	○	
	Ammonium ion	(mg NH_4^+ /liter)	0.3 or less	0.1 or less	0.1 or less	0.1 or less	○	
	Residual chlorine	(mg Cl/liter)	0.25 or less	0.3 or less	0.1 or less	0.3 or less	○	
	Free carbon dioxide	(mg CO_2/liter)	0.4 or less	4.0 or less	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)

c) 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.

d) 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.

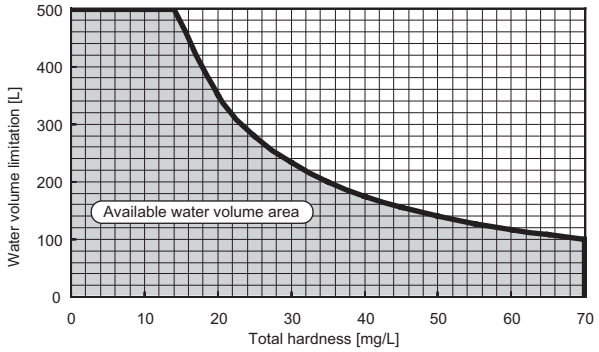
Corrosion can occur in cold-water systems even if there has been no prior signs of corrosion.

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

Refer to the below graph for the maximum amount of circulating water in the water pipe. Make sure that this amount does not exceed.

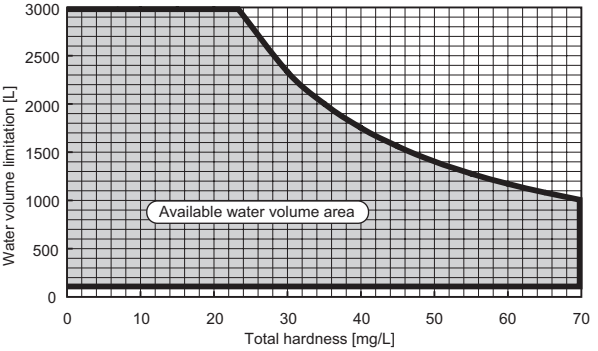
[Fig. IV. 3. (8).1] Maximum circulating water

PWFY-P36NMU-E-BU



Condition: Water outlet temp. 160°F (71°C)

PWFY-P36/72NMU-E2-AU

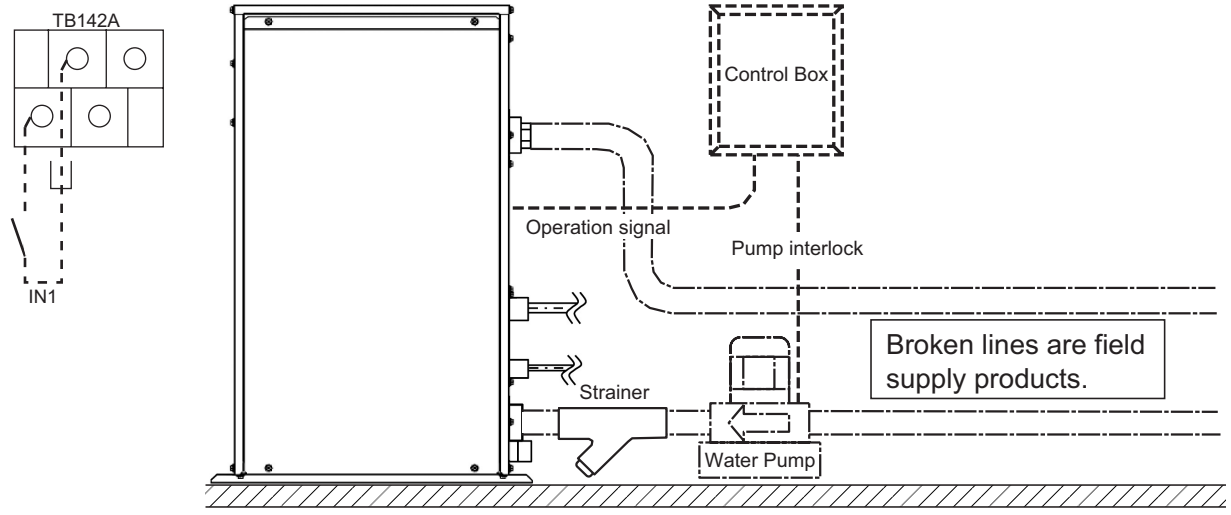


Condition: Water outlet temp. 113°F (45°C)

12-4-1. 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. In the system including PWFY-P36NMU-E-BU, use the terminal blocks for interlocking TB142A (IN1) that can be found on the unit.

[Fig. IV. 3. (10).1]



13-1. General Cautions

⚠ **Warning:**

Electrical work should be done by qualified electrical engineers in accordance with "Engineering Standards For Electrical Installation" and 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. Be sure to take power from the special branch circuit.
2. Be sure to install an earth leakage breaker to the power.
3. Install the unit to prevent that any of the control circuit cables (remote controller, transmission cables, or external input/output line) is brought in direct contact with the power cable outside the unit.
4. Ensure that there is no slack on all wire connections.
5. Some cables (power, remote controller, transmission cables external input/output line) above the ceiling may be bitten by mouses. Use as many metal pipes as possible to insert the cables into them for protection.
6. Never connect the power cable to leads for the transmission cables. Otherwise the cables would be broken.
7. Be sure to connect control cables to the indoor unit, remote controller, and the outdoor unit.
8. Be sure to ground the unit.
9. Select control cables from the conditions given in page **67**.

⚠ **Caution:**

Be sure to put the unit to the ground on the outdoor unit side. Do not connect the earth cable to any gas pipe, water pipe, lightening rod, or telephone earth cable. Incomplete grounding may cause a risk of electric shock.

13-2. Power supply for PWFY unit

13-2-1. Electrical characteristics of PWFY unit

- Power supply cords of appliances shall not be lighter than design 245 IEC 57 or 227 IEC 57.
- A switch with at least 3 mm (1/8 in) contact separation in each pole shall be provided by the Air conditioner installation.

Model	Unit						Compressor	
	Hz	Volts	Voltage range	RLA(A)	MCA(A)	Max.Fuse(A)	Output(kW)	SC(A)
PWFY-P36NMU-E-BU	60Hz	208/230V	188 to 253V	12.30/11.12	25	25	1.00	1.25

Model	Unit					
	Hz	Volts	Voltage range	RLA(A)	MCA(A)	Max.Fuse(A)
PWFY-P36NMU-E2-AU PWFY-P72NMU-E2-AU	60Hz	208/230V	188 to 253V	0.072/0.065	0.09	15

14-1. 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]	0.3 ~ 1.25 mm^2 [AWG22 ~ 16] (0.75 ~ 1.25 mm^2 [AWG18 ~ 16])*1	0.3 ~ 0.5 mm^2 [AWG18 ~ 16]	0.3 ~ 1.25 mm^2 [AWG18 ~ 16]
Remarks	-	Max.length: 200 m [656 ft]	Max.length: 100 m [328 ft]	Rated voltage: L1-L2: 208 ~ 230 V Rated load: 0.6 A

PWFY-P36, 72NMU-E2-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 CVVS (shielded)	Sheathed multi-core cable CVVS or MVVS (shielded)	Sheathed multi-core cable (unshielded) CVV or MVV
Cable diameter	More than 1.25 mm^2 [AWG16]	0.3 ~ 1.25 mm^2 [AWG22 ~ 16] (0.75 ~ 1.25 mm^2 [AWG18 ~ 16])*1	0.3 ~ 0.5 mm^2 [AWG18 ~ 16]	0.3 ~ 1.25 mm^2 [AWG18 ~ 16]
Remarks	-	Max.length: 200 m [656 ft]	Max.length: 100 m [328 ft]	Rated voltage: L1-L2: 208 ~ 230 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

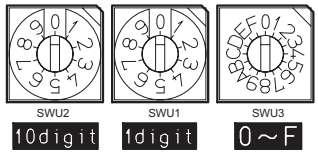
14-2. Address setting

14-2-1. Switch operation

(Be sure to operate with the main power turned OFF.)

[Fig. V. 1.(6).1]

<Address board>



- There are two types of rotary switch setting available: setting addresses 1 to 9 and over 10, and setting branch numbers.

a) How to set addresses

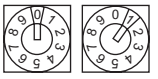
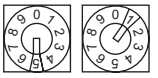
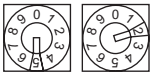
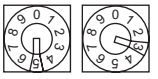
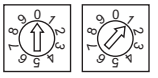
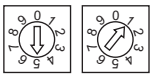
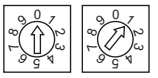
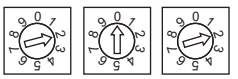
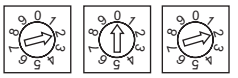
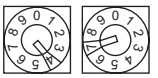
Example: If Address is “3”, remain SWU2 (for over 10) at “0”, and match SWU1 (for 1 to 9) with “3”.

b) 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.

14-2-3. Rule of setting address

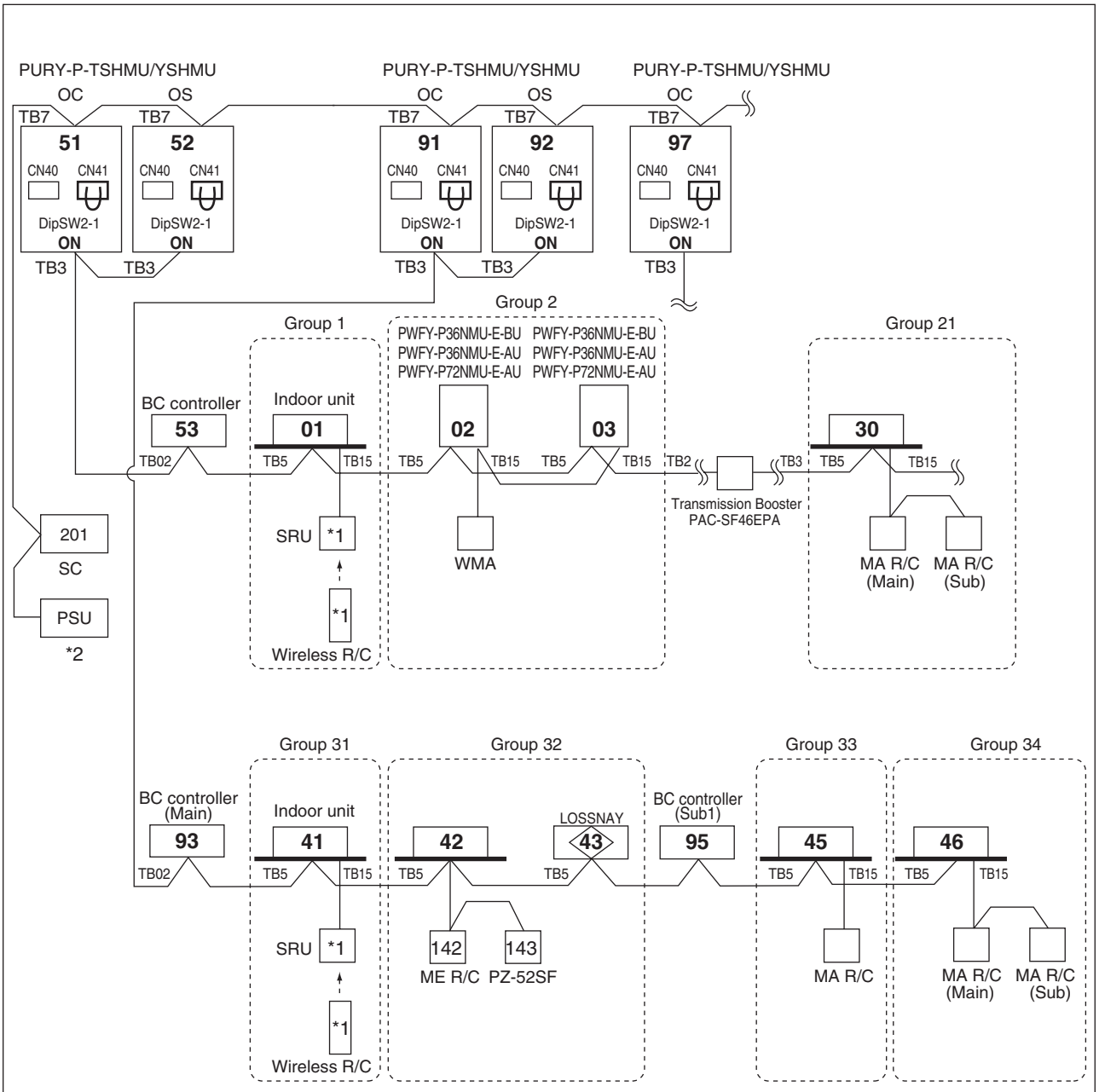
Unit		Address setting	Example	Note
PWFY unit Standard indoor unit		01 ~ 50		Use the most recent address within the same group of indoor units. Make the indoor units address connected to the BC controller (Sub) larger than the indoor units address connected to the BC controller (Main). If applicable, 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	0,2 / 0~5 / 0~9 100 10 1	
	BAC-HD150	000, 201 ~ 250	0,2 / 0~5 / 0~9 100 10 1	* 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.

14-2-4. System examples

14-2-4-1. MA remote controller, Multi-refrigerant-system, System Controller at TB7 side, Booster for long M-NET wiring

PWFY-P36NMU-E-BU/PWFY-P36, 72NMU-E2-AU with R2 series outdoor units



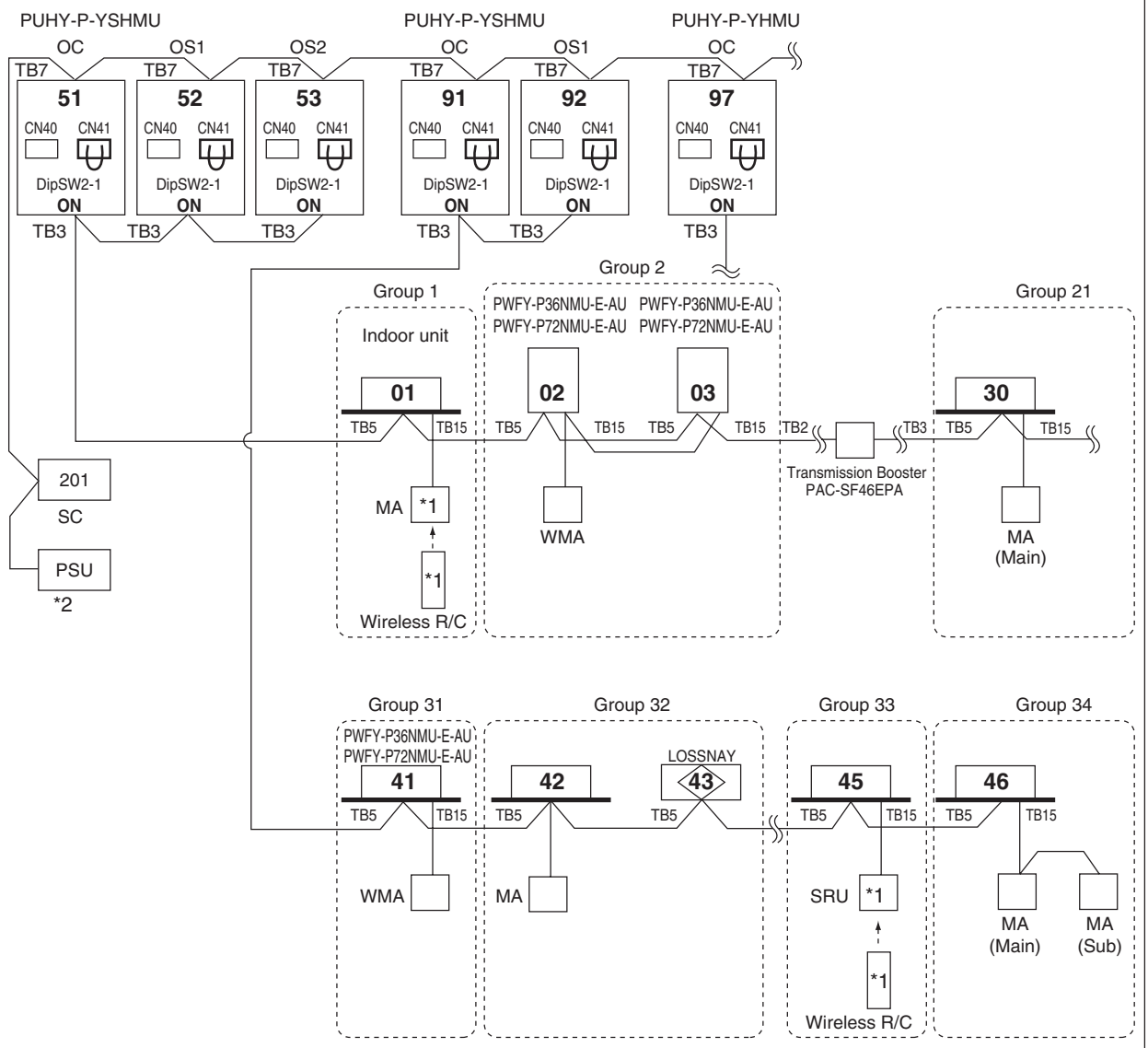
*1 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

*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.

PWFY-P36, 72NMU-E2-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.

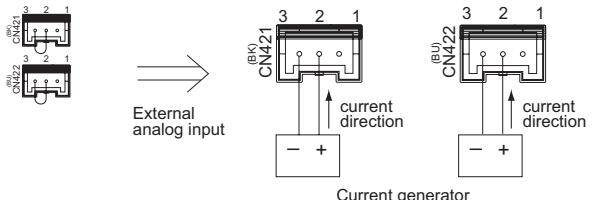
NOTE:

1. 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.
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 consume the M-NET power for transmission use.
   For details, refer to **"System configuration restrictions".**

14-2-5. External input/output function

Preset temperature input (external analog input: 4mA-20mA)
External input is input through CN421, CN422 on the circuit board. (Fig. V. 1.(7).1)

[Fig. V. 1.(7).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)

Note: Use a 4-20mA signal output device with insulation.

External output terminal
External output terminal (refer to Fig. V. 1.(7).3) is ineffective when the circuit is open.
Refer to Table V. 1.(7).1 for information about each contact.
The current and voltage in the circuit to be connected to external output terminal (TB141A OUT1) must meet the following conditions.

External input terminal

The piping length must be within 100 m.
External input terminal (refer to Fig. V. 1.(7).4) is ineffective when the circuit is open.
Refer to Table V. 1.(7).2 through Table V. 1.(7).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. IV. 3.(10).2.
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 V. 1.(7).2] TB142A

IN1	Pump interlock

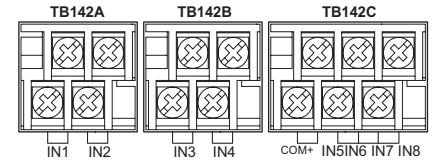
[Table V. 1.(7).3] TB142B

IN3	Connection demand
IN4	Operation ON/OFF

[Table V. 1.(7).4] TB142C

COM+	Common
IN5 *1	Hot Water/Heating
IN6 *2	Heating ECO *5
IN7 *3	Anti-freeze *6
IN8 *4	Cooling operation

[Fig. V. 1.(7).4]



*1 PWFY-P36NMU-E-BU Hot Water
PWFY-P36, 72NMU-E2-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-E2-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.
*7 PWFY-P36NMU-E-BU only
*8 When setting Heating ECO or Anti-freeze mode, reset all power supply of all units (outdoor/indoor units).

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