MITSUBISHI ELECTRIC

Changes for the Better

for a greener tomorrow

AIR CONDITIONING SYSTEMS

MODEL

PWFY-P36NMU-E-BU
PWFY-P36NMU-E-AU
PWFY-P72NMU-E-AU

DATA BOOK

4th edition

Safety Precautions

• Before installing the unit, thoroughly read the following safety precautions.
• Observe these safety precautions for your safety.

⚠ WARNING

This symbol is intended to alert the user to the presence of important instructions that must be followed to avoid the risk of serious injury or death.

⚠ CAUTION

This symbol is intended to alert the user to the presence of important instructions that must be followed to avoid the risk of serious injury or damage to the unit.

• After reading this manual, give it to the user to retain for future reference.
• Keep this manual for easy reference. When the unit is moved or repaired, give this manual to those who provide these services.
When the user changes, make sure that the new user receives this manual.

⚠ WARNING

- **Do not use refrigerant other than the type indicated in the manuals provided with the unit and on the nameplate.**
  - Doing so may cause the unit or pipes to burst, or result in explosion or fire during use, during repair, or at the time of disposal of the unit.
  - It may also be in violation of applicable laws.
  - MITSUBISHI ELECTRIC CORPORATION cannot be held responsible for malfunctions or accidents resulting from the use of the wrong type of refrigerant.
- **Do not use steel pipes as water pipes.**
  - Copper pipes are recommended.
- **The water circuit should be a closed circuit.**
- **Ask the dealer or an authorized technician to install the air conditioner.**
  - Improper installation by the user may result in water leakage, electric shock, or fire.
- **Install the unit in a place that can withstand its weight.**
  - Inadequate strength may cause the unit to fall down, resulting in injuries.
- **Do not touch the unit. The unit surface can be hot.**
- **Do not install the unit where corrosive gas is generated.**
- **Use the specified cables for wiring. Make the connections securely so that the outside force of the cable is not applied to the terminals.**
  - Inadequate connection and fastening may generate heat and cause a fire.
- **Prepare for rain and other moisture and earthquakes and install the unit at the specified place.**
  - Improper installation may cause the unit to topple and result in injury.
- **Always use an strainer and other accessories specified by Mitsubishi Electric.**
  - Ask an authorized technician to install the accessories. Improper installation by the user may result in water leakage, electric shock, or fire.
- **Never repair the unit. If the air conditioner must be repaired, consult the dealer.**
  - If the unit is repaired improperly, water leakage, electric shock, or fire may result.
- **Do not touch the refrigerant pipes and Water pipes.**
  - Improper handling may result in injury.
- **When handling this product, always wear protective equipment.**

  EG: Gloves, full arm protection namely boiler suit, and safety glasses.
  - Improper handling may result in injury.
- **If refrigerant gas leaks during installation work, ventilate the room.**
  - If the refrigerant gas comes into contact with a flame, poisonous gases will be released.
- **Install the unit according to this manual.**
  - If the unit is installed improperly, water leakage, electric shock, or fire may result.
- **Have all electric work done by a licensed electrician according to "Electric Facility Engineering Standard" and "Interior Wire Regulations"and the instructions given in this manual and always use a special circuit.**
  - If the power source capacity is inadequate or electric work is performed improperly, electric shock and fire may result.
- **Keep the electric parts away from water (washing water etc.).**
  - It might result in electric shock, catching fire or smoke.
- **Securely install the heat source unit terminal cover (panel).**
  - If the terminal cover (panel) is not installed properly, dust or water may enter the heat source unit and fire or electric shock may result.
- **When installing and moving the air conditioner to another site, do not charge it with a refrigerant different from the refrigerant (R410A) specified on the unit.**
  - If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.

- **If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration from exceeding the safety limit even if the refrigerant should leak.**
  - Consult the dealer regarding the appropriate measures to prevent the safety limit from being exceeded. Should the refrigerant leak and cause the safety limit to be exceeded, hazards due to lack of oxygen in the room could result.
- **When moving and reinstalling the air conditioner, consult the dealer or an authorized technician.**
  - If the air conditioner is installed improperly, water leakage, electric shock, or fire may result.
- **After completing installation work, make sure that refrigerant gas is not leaking.**
  - If the refrigerant gas leaks and is exposed to a fan heater, stove, oven, or other heat source, it may generate noxious gases.
- **Do not reconstruct or change the settings of the protection devices.**
  - If the pressure switch, thermal switch, or other protection device is shorted and operated forcibly, or parts other than those specified by Mitsubishi Electric are used, fire or explosion may result.
- **To dispose of this product, consult your dealer.**
- **The installer and system specialist shall secure safety against leakage according to local regulation or standards.**
  - Following standards may be applicable if local regulation are not available.
- **Pay a special attention to the place, such as a basement, etc. where refrigeration gas can stay, since refrigeration is heavier than the air.**

Precautions for handling units for use with R410A

⚠ CAUTION

- **Do not use the existing refrigerant piping.**
  - The old refrigerant and refrigerant oil in the existing piping contains a large amount of chlorine which may cause the refrigerant oil of the new unit to deteriorate.
  - R410A is a high-pressure refrigerant and can cause the existing piping to burst.
- **Use refrigerant piping made of C1220 (CU-DHP) phosphorus deoxidized copper as specified in the JIS H3300 “Copper and copper alloy seamless pipes and tubes”. In addition, be sure that the inner and outer surfaces of the pipes are clean and free of hazardous sulphur, oxides, dust/dirt, shaving particles, oils, moisture, or any other contaminant.**
  - Contaminants on the inside of the refrigerant piping may cause the refrigerant residual oil to deteriorate.
- **Store the piping to be used during installation indoors and keep both ends of the piping sealed until just before brazing. (Store elbows and other joints in a plastic bag.)**
  - If dust, dirt, or water enters the refrigerant cycle, deterioration of the oil and compressor trouble may result.
- **Apply a small amount of ester oil, ether oil, or alkyl benzene to flares. (for indoor unit)**
  - Infiltration of a large amount of mineral oil may cause the refrigerant oil to deteriorate.
- **Use liquid refrigerant to fill the system.**
  - If gas refrigerant is used to seal the system, the composition of the refrigerant in the cylinder will change and performance may drop.
- **Do not use a refrigerant other than R410A.**
  - If another refrigerant (R22, etc.) is mixed with R410A, the chlorine in the refrigerant may cause the refrigerant oil to deteriorate.
- **Use a vacuum pump with a reverse flow check valve.**
  - The vacuum pump oil may flow back into the refrigerant cycle and cause the refrigerant oil to deteriorate.
- **Do not use the following tools that are used with conventional refrigerants.**

  (Gauge manifold, charge hose, gas leak detector, reverse flow check valve, refrigerant charge base, refrigerant recovery equipment)
  - If the conventional refrigerant and refrigerant oil are mixed in the R410A, the refrigerant may deteriorated.
  - If water is mixed in the R410A, the refrigerant oil may deteriorate.
  - Since R410A does not contain any chlorine, gas leak detectors for conventional refrigerants will not react to it.
- **Do not use a charging cylinder.**
  - Using a charging cylinder may cause the refrigerant to deteriorate.
- **Do not use antioxidant or leak-detection additive.**
- **Be especially careful when managing the tools.**
  - If dust, dirt, or water gets in the refrigerant cycle, the refrigerant may deteriorate.

Before installing the unit

⚠ WARNING

- **Do not install the unit where combustible gas may leak.**
  - If the gas leaks and accumulates around the unit, an explosion may result.
- **Do not use the air conditioner where food, pets, plants, precision instruments, or artwork are kept.**
  - The quality of the food, etc. may deteriorate.
- **Do not use the air conditioner in special environments.**
  - Oil, steam, sulfuric smoke, etc. can significantly reduce the performance of the air conditioner or damage its parts.
- **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.

Before installing the unit (moving and reinstalling the unit) and performing electrical work

⚠ CAUTION

- **Ground the unit.**
  - Do not connect the ground wire to gas or water pipes, lightning rods, or telephone ground lines. Improper grounding may result in electric shock.
- **Install the power cable so that tension is not applied to the cable.**
  - Tension may cause the cable to break and generate heat and cause a fire.
- **Install a leak circuit breaker, as required.**
  - If a leak circuit breaker is not installed, electric shock may result.
- **Use power line cables of sufficient current carrying capacity and rating.**
  - Cables that are too small may leak, generate heat, and cause a fire.
- **Use only a circuit breaker and fuse of the specified capacity.**
  - A fuse or circuit breaker of a larger capacity or a steel or copper wire may result in a general unit failure or fire.
- **Do not wash the air conditioner units.**
  - Washing them may cause an electric shock.
- **Be careful that the installation base is not damaged by long use.**
  - If the damage is left uncorrected, the unit may fall and cause personal injury or property damage.
- **Install the drain piping according to this manual to ensure proper drainage. Wrap thermal insulation around the pipes to prevent condensation.**
  - Improper drain piping may cause water leakage and damage to furniture and other possessions.
- **Be very careful about product transportation.**
  - Only one person should not carry the product if it weighs more than 45 lbs (20 kg).
  - Some products use PP bands for packaging. Do not use any PP bands for a means of transportation. It is dangerous.
  - When transporting the unit, support it at the specified positions on the unit base. Also support the unit at four points so that it cannot slip side ways.
- **Safely dispose of the packing materials.**
  - Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.
  - Tear apart and throw away plastic packaging bags so that children will not play with them. If children play with a plastic bag which was not torn apart, they face the risk of suffocation.

Before the test run

⚠ CAUTION

- **Turn on the power at least 12 hours before starting operation.**
  - Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.
- **Do not touch the switches with wet fingers.**
  - Touching a switch with wet fingers can cause electric shock.
- **Do not touch the refrigerant pipes during and immediately after operation.**
  - During and immediately after operation, the refrigerant pipes are may be hot and may be cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor, and other refrigerant cycle parts. Your hands may suffer burns or frostbite if you touch the refrigerant pipes.
- **Do not operate the air conditioner with the panels and guards removed.**
  - Rotating, hot, or high-voltage parts can cause injuries.
- **Do not turn off the power immediately after stopping operation.**
  - Always wait at least five minutes before turning off the power. Otherwise, water leakage and trouble may occur.
- **Do not touch the surface of the compressor during servicing.**
  - If unit is connected to the supply and not running, crank case heater at compressor is operating.
- **Do not touch the panels near the fan exhaust outlet with bare hands: they can get hot while the unit is in operation (even if it is stopped) or immediately after operation and poses a risk of burns. Wear gloves to protect your hands when it is necessary to touch the panels.**
- **While the unit is in operation or immediately after operation, high-temperature exhaust air may blow out of the fan exhaust outlet. Do not hold your hands over the outlet or touch the panels near the outlet.**
- **Be sure to provide a pathway for the exhaust air from the fan.**
- **Water pipes can get very hot, depending on the preset temperature. Wrap the water pipes with insulating materials to prevent burns.**

Contents

I General Equipment Descriptions

1. Unit configuration table

Model	PWFY-P36NMU-E-BU		PWFY-P36NMU-E-AU	PWFY-P72NMU-E-AU
Outdoor unit	R2, WR2 series only		Y, H2i series, WY series, R2, WR2 series	
Connection	BC controller	BC controller: CMB-P105,106,108,1010,1013,1016NU-G Main BC controller: CMB-P108,1010,1013,1016NU-GA / CMB-P1016NU-HA Sub BC controller: CMB-P108NU-GB / CMB-P1016NU-HB		

2. Operable 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)
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-E-AU>

		Only PWFY		PWFY with standard indoor units	
		Cooling (DB)	Heating (WB)	Cooling (DB)	Heating (WB)
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/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)
	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 series	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)
	Y series	23 to 115°F (-5~46°C)	-4 to 60°F (-20 to 15.5°C)
	H2i series	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)

3. Connectable outdoor unit capacity range

<PWFY-P36NMU-E-BU>

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

<PWFY-P36, P72NMU-E-AU>

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

<BC controller>

	Connectable unit
CMB-P105,106,108,1010,1013,1016NU-G	PURY-P72,96,120TKMU-A(-BS) PURY-P72,96,120YKMU-A(-BS) PQRY-P72,96,120THMU-A PQRY-P72,96,120YHMU-A
CMB-P108,1010,1013,1016NU-GA	PURY-P72,96,120,144,168,192,216,240T(S)KMU-A(-BS) PURY-P72,96,120,144,168,192,216,240Y(S)KMU-A(-BS) PQRY-P72,96,120,144,168,192,216,240T(S)HMU-A PQRY-P72,96,120,144,168,192,216,240Y(S)HMU-A
CMB-P1016NU-HA	PURY-P72,96,120,144,168,192,216,240,264,288T(S)KMU-A(-BS) PURY-P72,96,120,144,168,192,216,240,264,288Y(S)KMU-A(-BS) PQRY-P72,96,120,144,168,192,216,240T(S)HMU-A(-BS) PQRY-P72,96,120,144,168,192,216,240Y(S)HMU-A(-BS)
CMB-P108NU-GB / CMB-P1016NU-HB	CMB-P108/1010/1013/1016NU-GA / CMB-P1016NU-HA

II Product Specifications

1. Specifications

(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	-4~90°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) 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	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 × 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.

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

<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 = 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) PWFY-P36NMU-E-AU

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)JMU-A(-BS) PURY-P•T(S)KMU-A(-BS) PURY-P•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	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		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			Solenoid valve kit: PAC-SV02PW-E
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/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/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.
* 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.
* 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 = 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.

(3) PWFY-P72NMU-E-AU

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)JMU-A(-BS) PURY-P•T(S)KMU-A(-BS) PURY-P•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
		in.	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	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		WKB94T461
	Wiring		KE94C345
Standard attachment	Document		Installation Manual, Instruction Book
	Accessory		Strainer , Connecter , Heat insulation material, 2 × Connector sets , Expansion joint , 2 × Washer, wire, Flow switch × 1set
Optional parts			Solenoid valve kit: PAC-SV02PW-E
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/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/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 = 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.

(4) CMB-P105NU-G

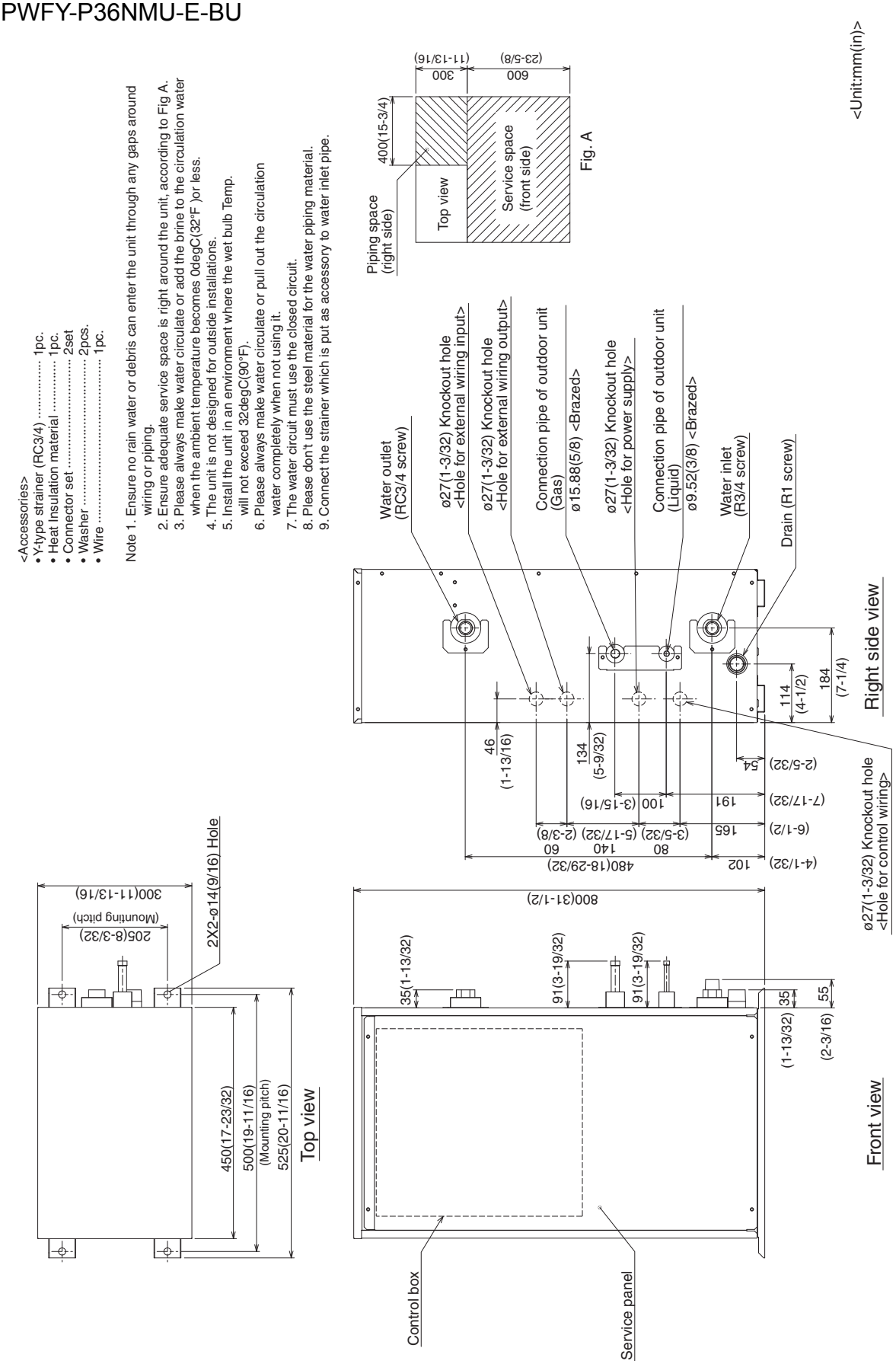
*Other models of BC controller are available. For unit information, refer to the Data Book.

Model name			**CMB-P105NU-G**	
Number of branch			5	
Power source			1-phase 208/230V	
			60Hz	-
Power input (208/230)	Cooling	kW	0.073	-
	Heating		0.033	-
Current (208/230)	Cooling	A	0.35/0.32	-
	Heating		0.16/0.14	-
External finish			Galvanized steel plate (Lower part drain pan :Pre-coated galvanized sheets + powder coating)	
Connectable outdoor unit			PURY-P72/96/120TKMU-A(-BS), PURY-P72/96/120YKMU-A(-BS), PQRY-P72/96/120THMU-A, PQRY-P72/96/120YHMU-A	
Indoor unit capacity connectable to 1 branch			Model P54 or smaller (Use optional joint pipe combing 2 branches when the total unit capacity exceeds P55.) (Use the reducer (standard accessory) when the indoor unit Model 18 or smaller is connected.)	
External dimension H x W x D		in. (mm)	11-3/16 x 25-17/32 x 17-1/32 (284 x 648 x 432)	
Refrigerant piping diameter	Connectable outdoor unit capacity		To outdoor unit	
			High press. pipe	**Low press. pipe**
		to P72 in. (mm) O.D.	5/8 (15.88) Brazed	3/4 (19.05) Brazed
		P73 to P108 in. (mm) O.D.	3/4 (19.05) Brazed	7/8 (22.2) Brazed
		P109 to P126 in. (mm) O.D.	3/4 (19.05) Brazed	1-1/8 (28.58) Brazed
			To indoor unit	
			Liquid pipe	**Gas pipe**
		in. (mm) O.D.	3/8 (9.52) Flare (1/4 (6.35) with attached reducer used.)	5/8 (15.88) Flare (1/2 (12.7) with attached reducer used, 3/4 (19.05) and 7/8 (22.2) with optional joiant pipe used.)
Field drain pipe size		in. (mm) O.D.	1-1/4 (32)	1-1/4 (32)
Net weight		lbs (kg)	64 (29)	72 (32)
Accessories			Drain Connection pipe(with flexible hose and insulation) Reducer	
Remark				

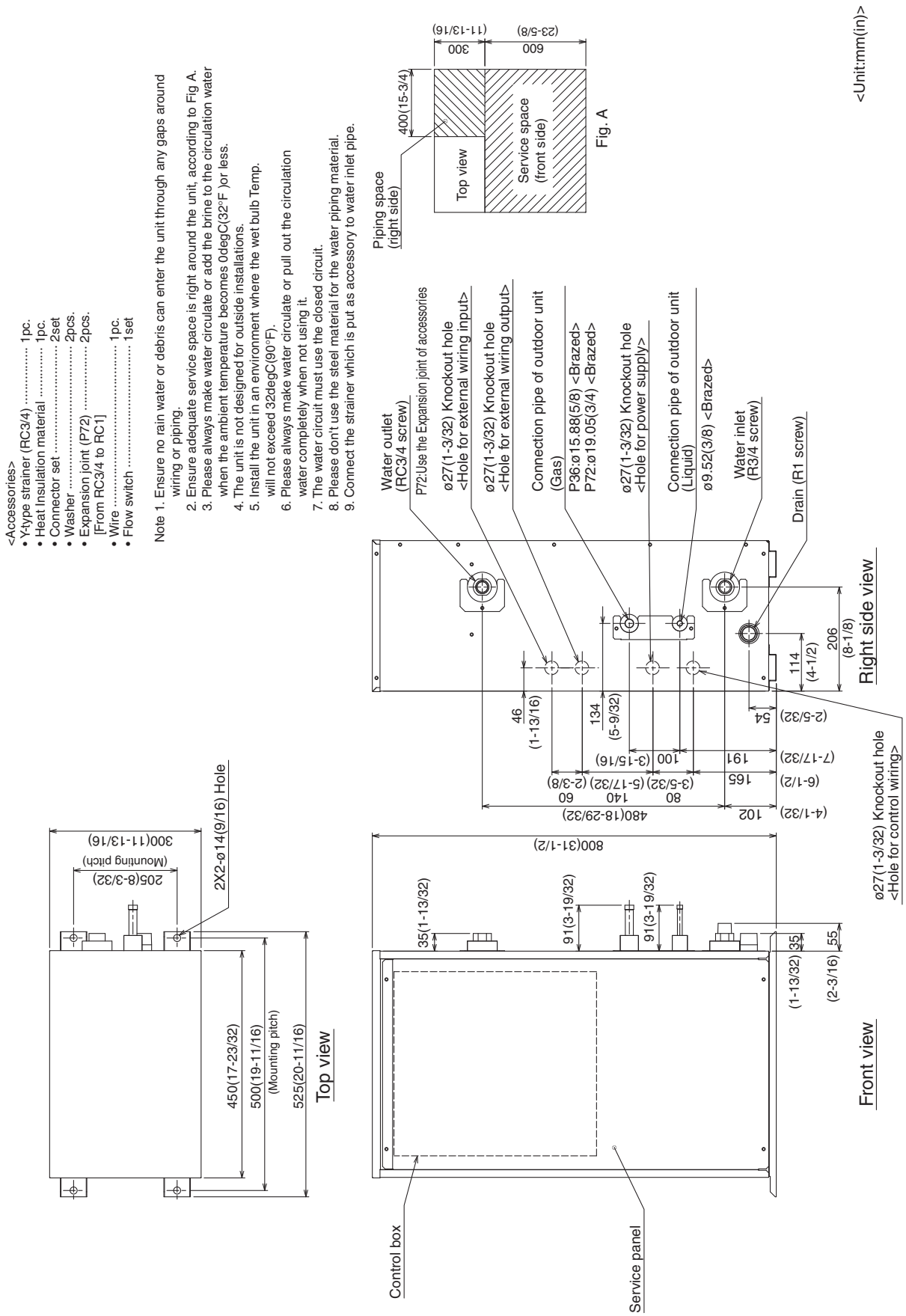
Note:
1. Works not included :
   Installation/foundation work, electrical connection work, duct work, insulation work, power source switch, and other items are not specified in this specifications.
2. The equipment is for R410A refrigerant.
3. Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors. (For use in quiet environments with low background noise,position the BC CONTROLLER at least 5m away from any indoor units.)
4. The data presented is based on a specific combination.

2. External Dimensions

(1) PWFY-P36NMU-E-BU

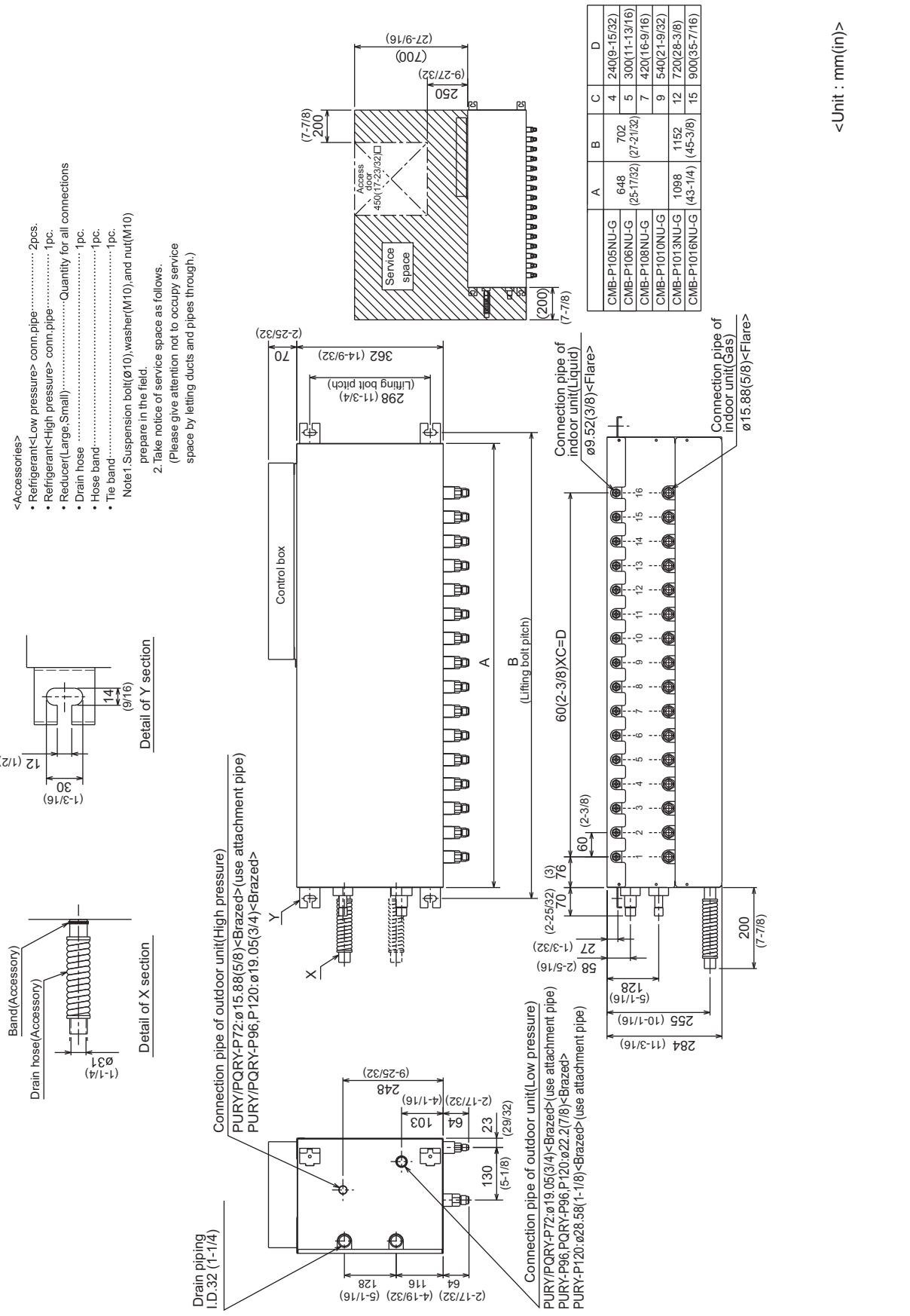


(2) PWFY-P36, P72NMU-E-AU



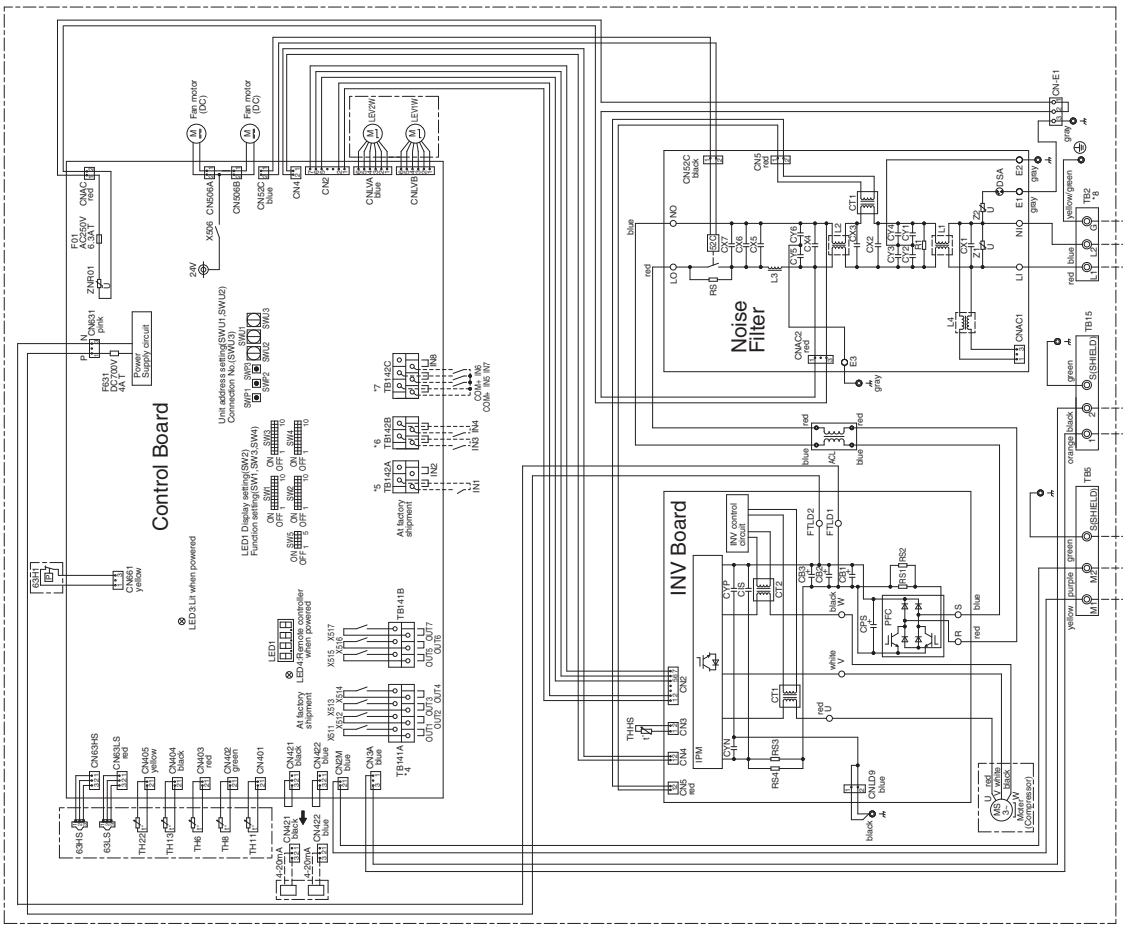
(3) CMB-P105, 106, 108, 1010, 1013, 1016NU-G

*Other models of BC controller are available. For unit information, refer to the Data Book.



3. Electrical Wiring Diagrams

(1) 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 remove 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)

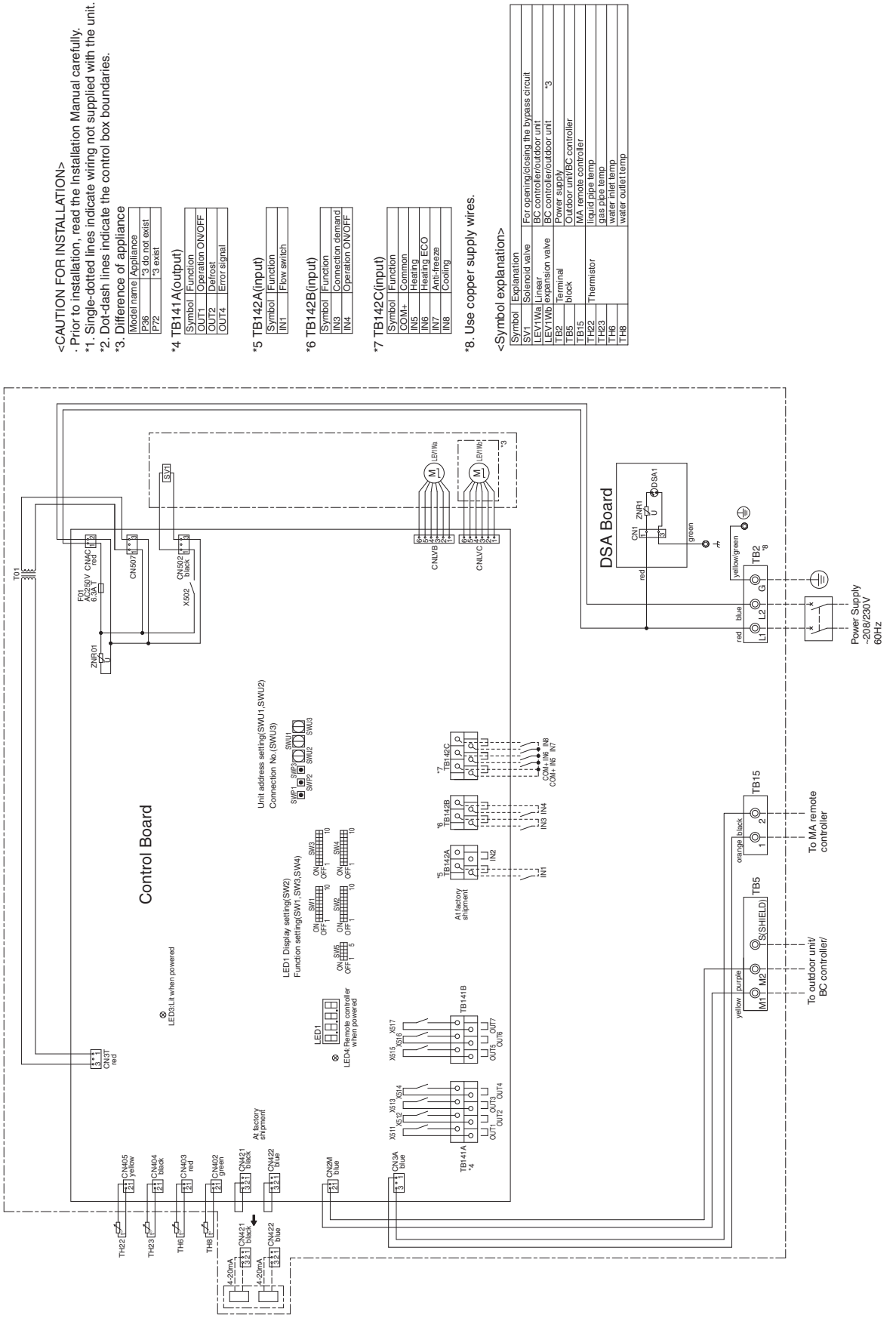
Symbol	Function
COM+	Common
IN5	Hot water/Heating
IN6	Heating ECO
IN7	Anti-freeze

*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 senscr(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		Evaporator outlet temp
TH22		liquid pipe temp
TH6		water inlet temp
TH8		water outlet temp
THHS		IGBT temp

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



*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	Defrost
OUT4	Error signal

*5 TB142A(input)

Symbol	Function
IN1	Flow switch

*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

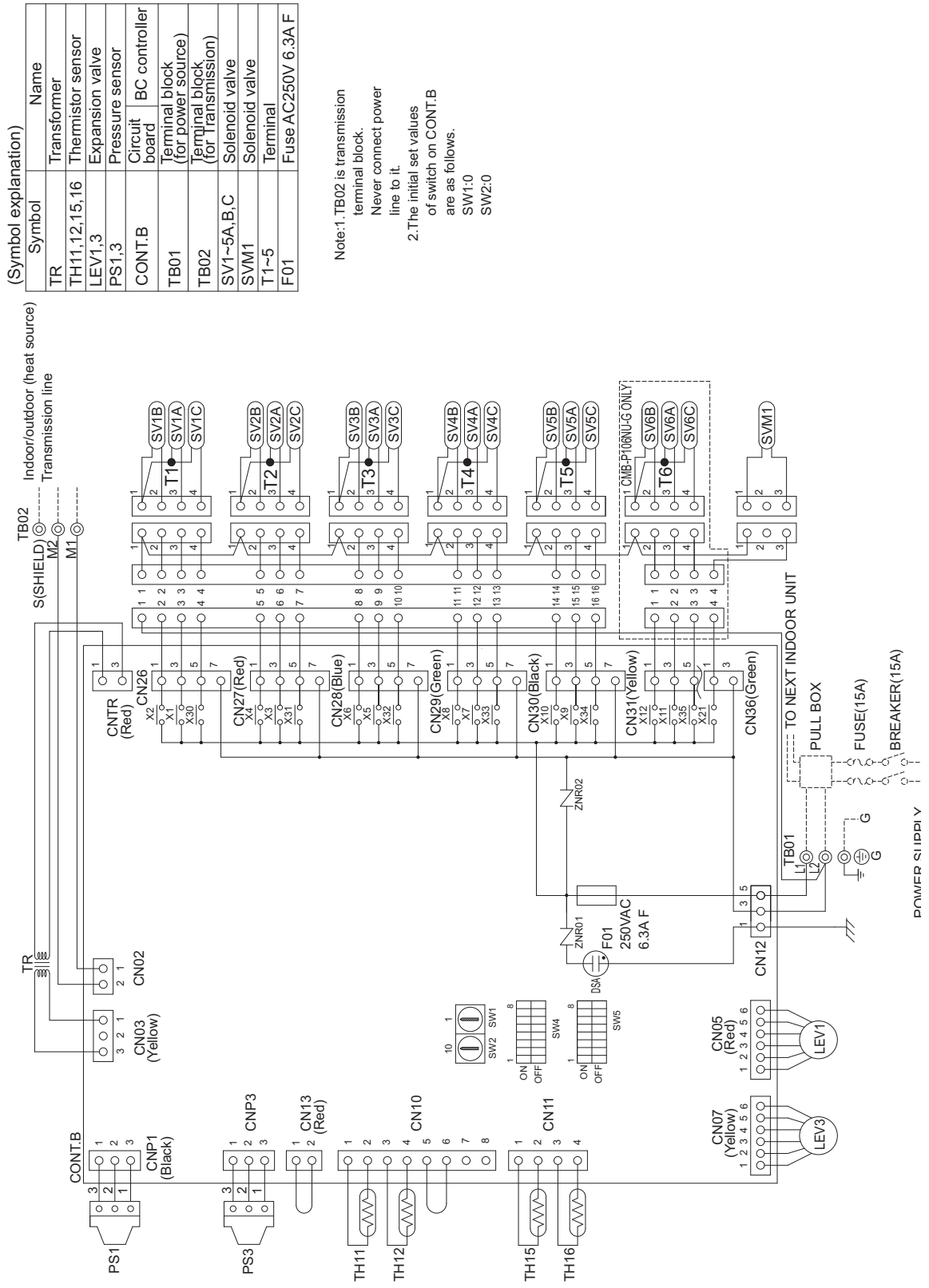
*8. Use copper supply wires.

<Symbol explanation>

Symbol	Explanation	
SV1	Solenoid valve	For opening/closing the bypass circuit
LEV1Wa	Linear expansion valve	BC controller/outdoor unit
LEV1Wb		BC controller/outdoor unit *3
TB2	Terminal block	Power supply
TB5		Outdoor unit/BC controller
TB15		MA remote controller
TH22	Thermistor	liquid pipe temp
TH23		gas pipe temp
TH6		water inlet temp
TH8		water outlet temp

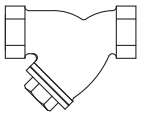
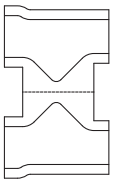
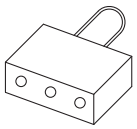
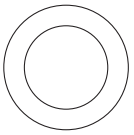
(3) CMB-P105NU-G

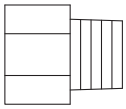
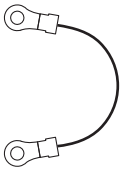
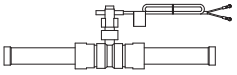
*Other models of BC controller are available. For unit information, refer to the Data Book.



4. Accessories

(1) PWFY

(A) Strainer	(B) Heat insulation material	(C) Connecter 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) Supplied only with the PWFY-P72NMU-E-AU. Install them at the strainer inlet. Refer to P.52 for details.
(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.

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

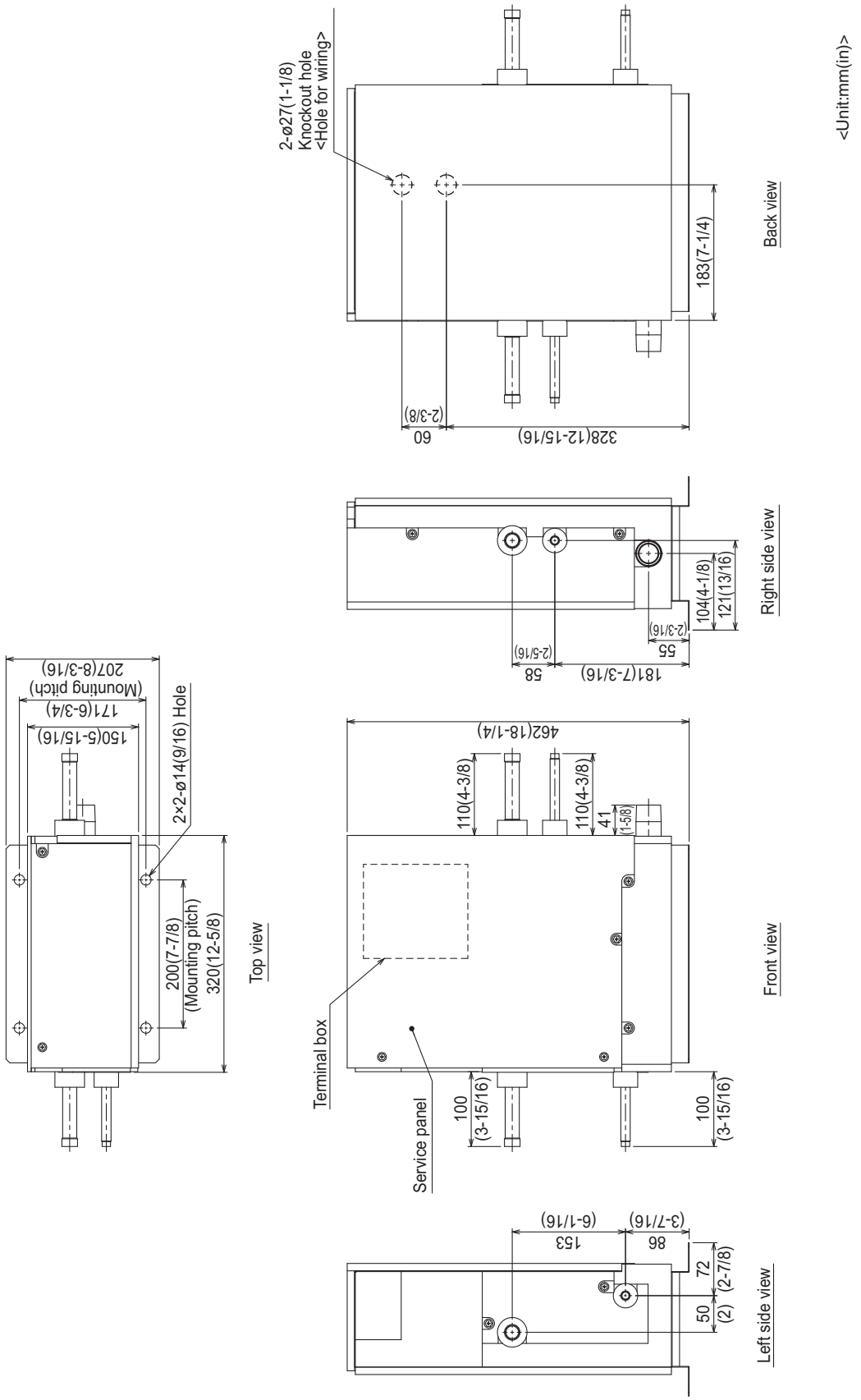
Item	Qty
Drain hose	1
Tie band	1
Hose band	1
Reducer (large & small)	Same number as branch holes
Refrigerant connection pipe	3

5. Optional parts

(1) Solenoid valve kit

PAC-SV02PW-E

TENTATIVE

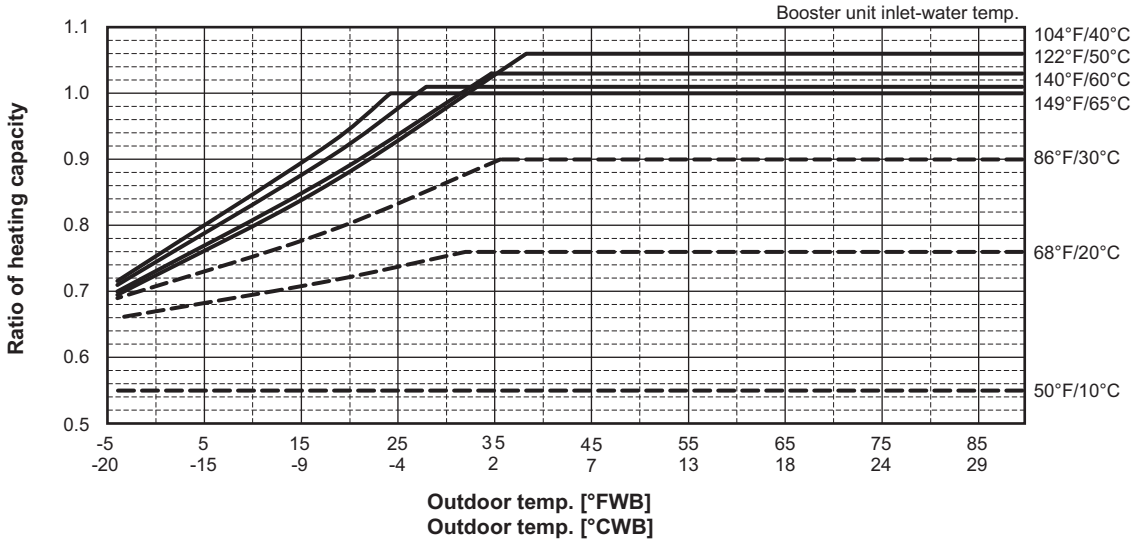


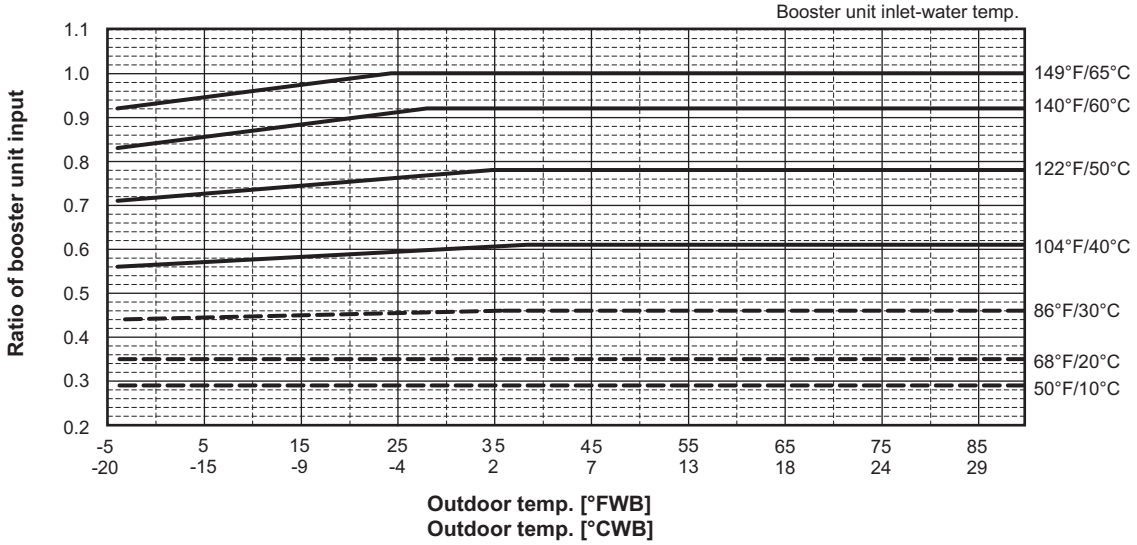
1. Capacity tables

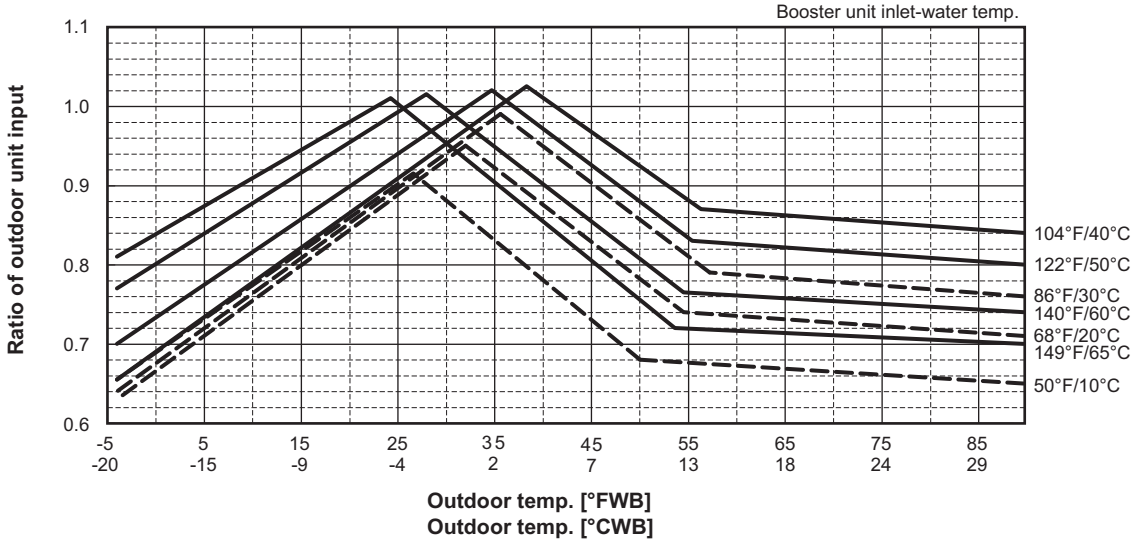
(1) Correction by temperature (Estimated performance without defrost)

(1)-1 R2 series + PWFY-P36NMU-E-BU

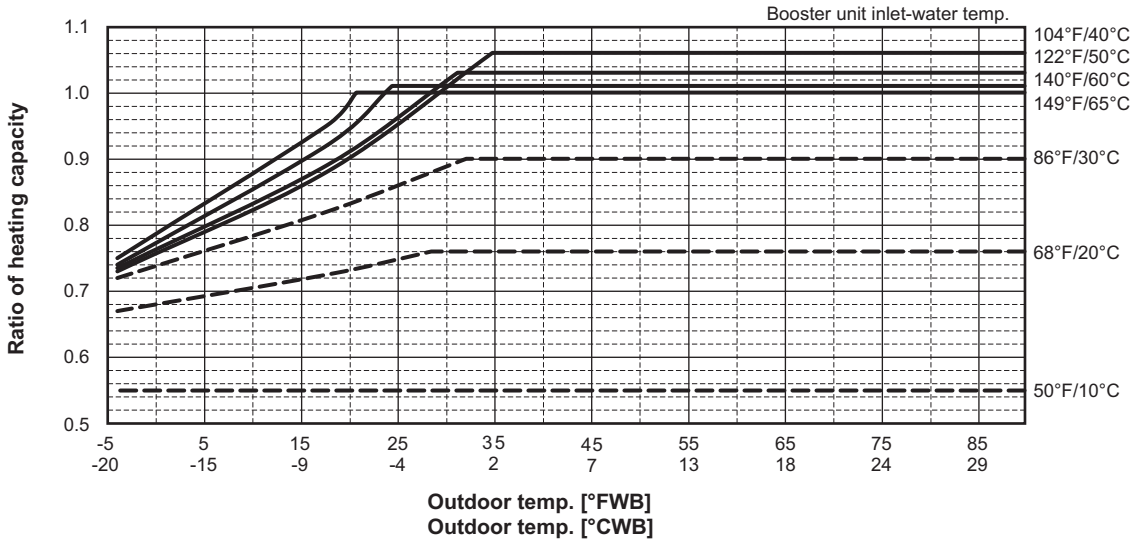
PURY-	P72, 96TKMU-A(-BS)	P72, 96YKMU-A(-BS)

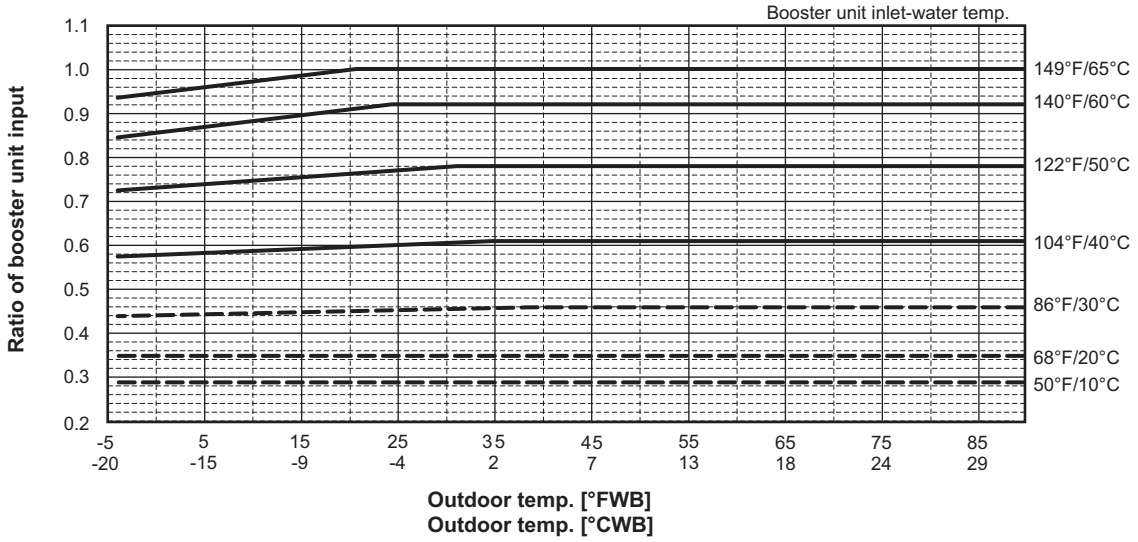


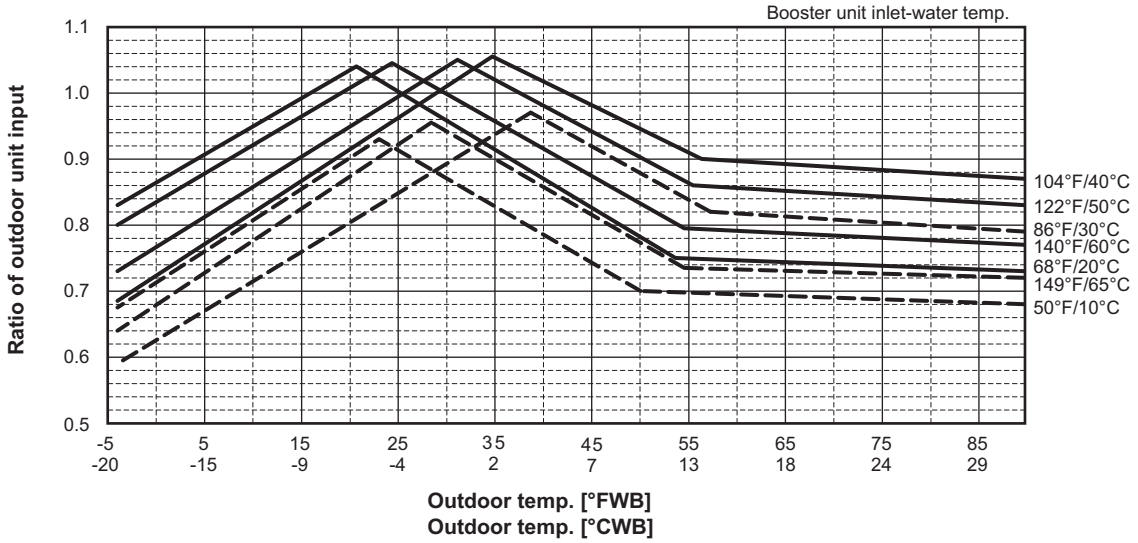




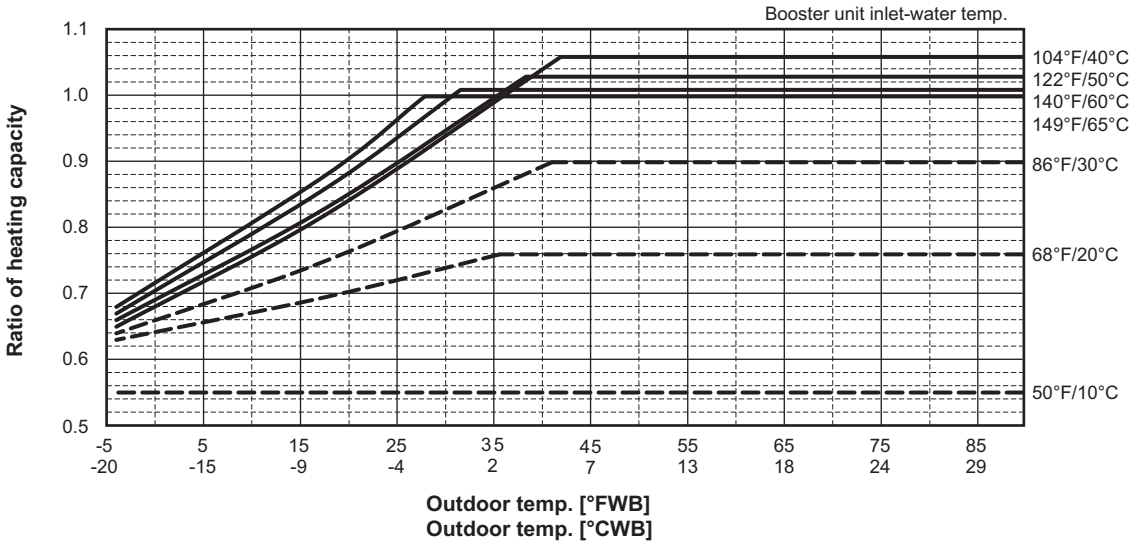
PURY-	P120, 144TKMU-A(-BS)	P120, 144YKMU-A(-BS)

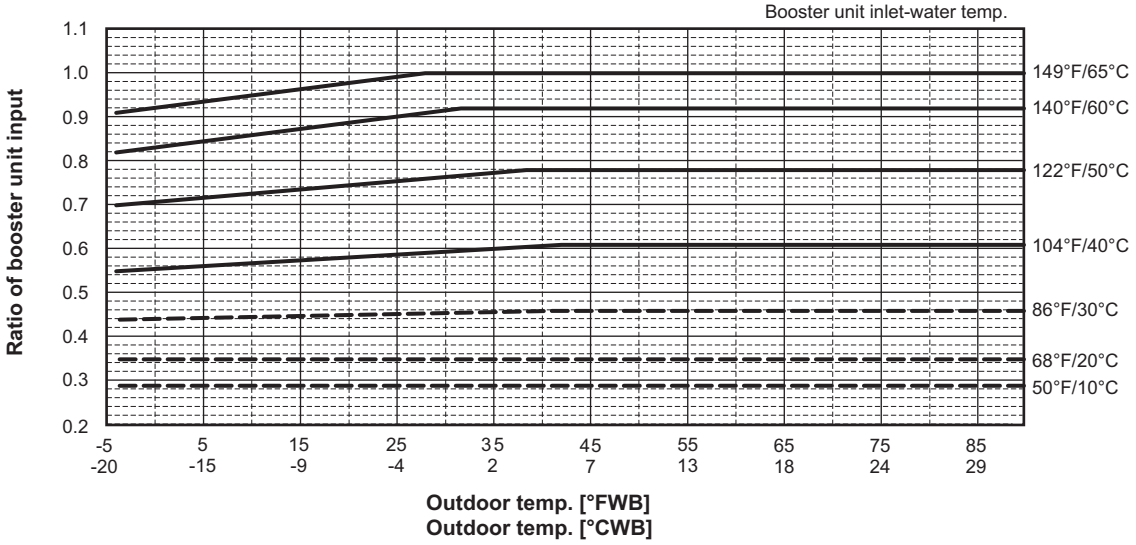


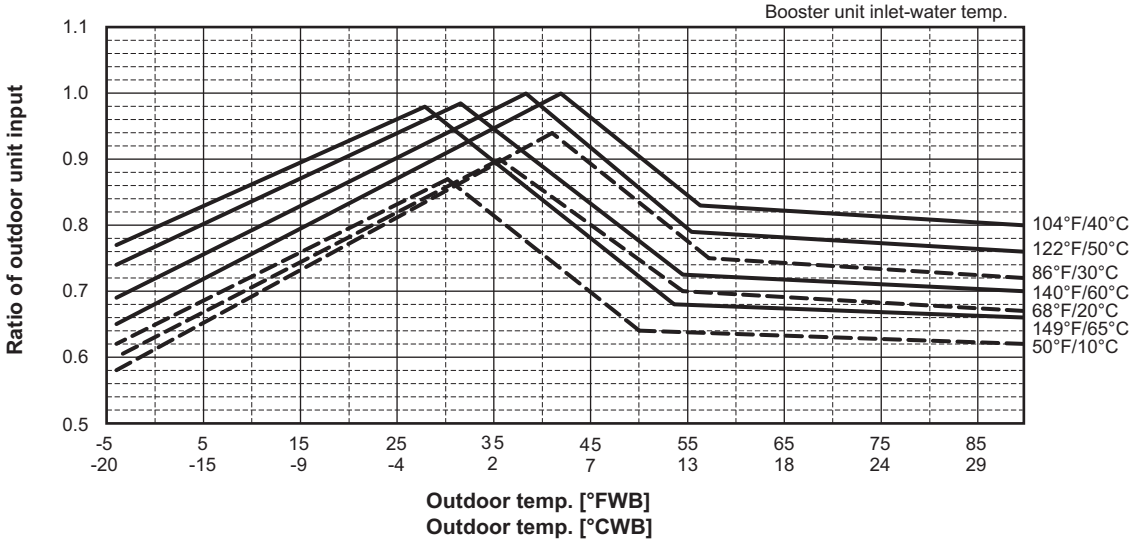




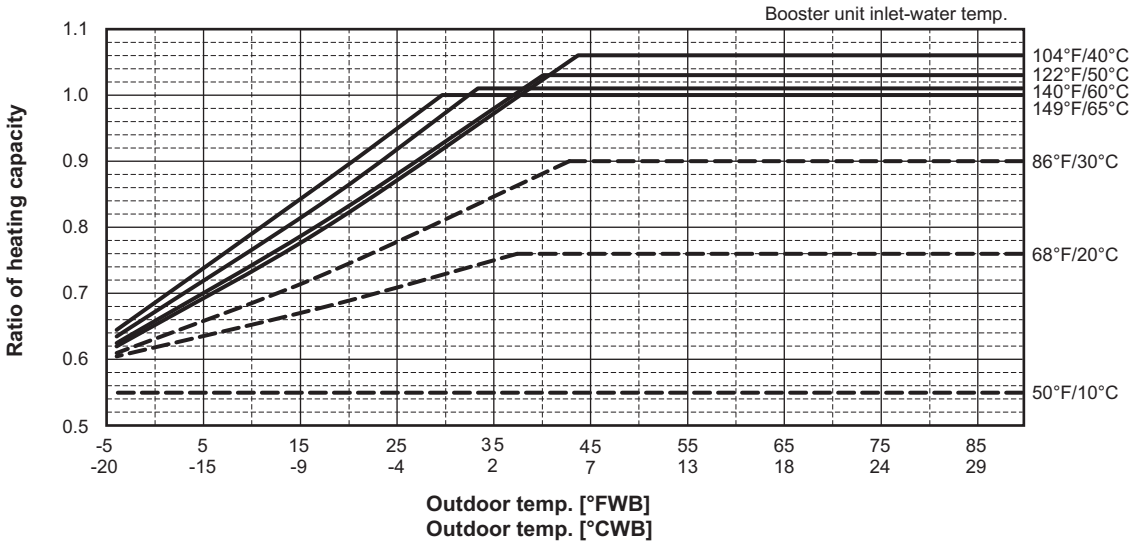
PURY-	P168, 192, 216, 240TSKMU-A(-BS)	P168, 192, 216, 240YSKMU-A(-BS)

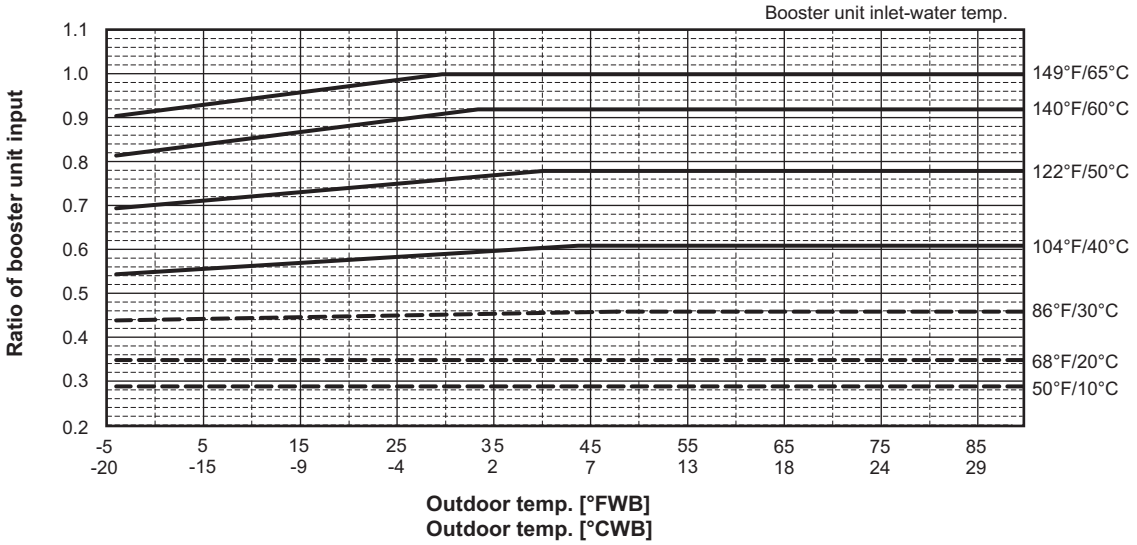


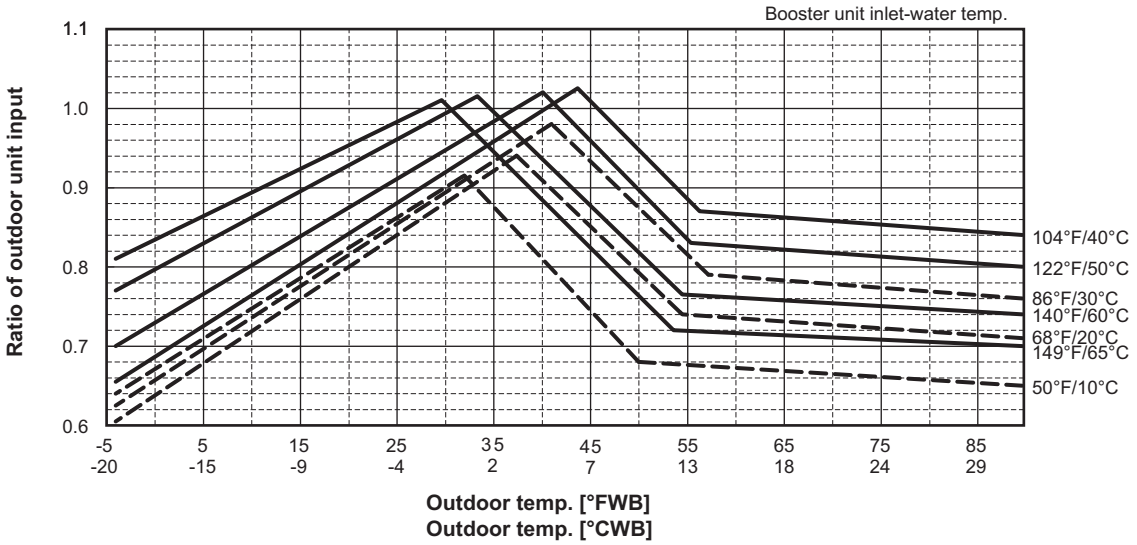




PURY-	P264, 288TSKMU-A(-BS)	P264, 288YSKMU-A(-BS)

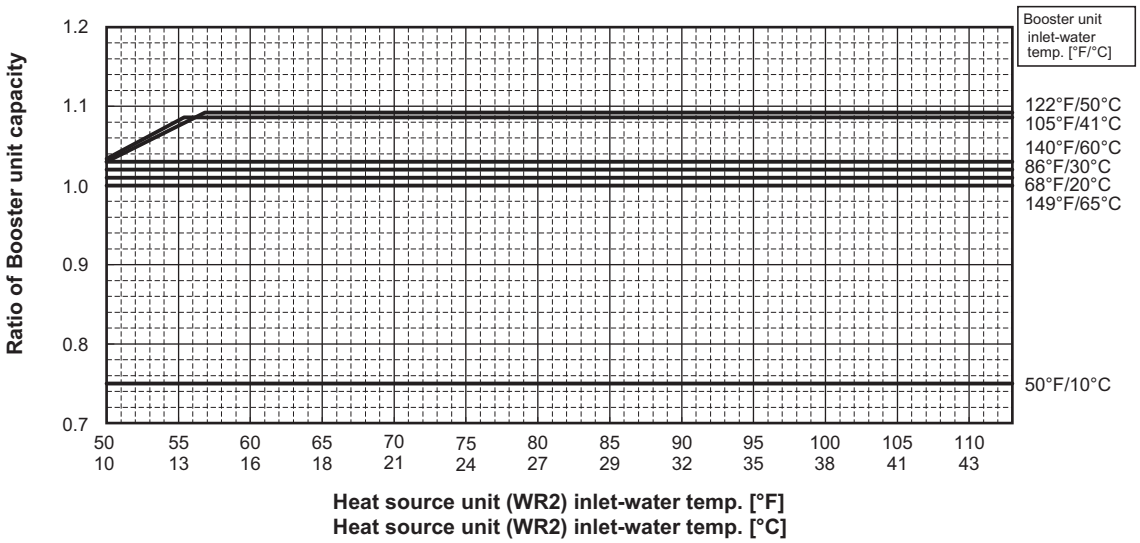


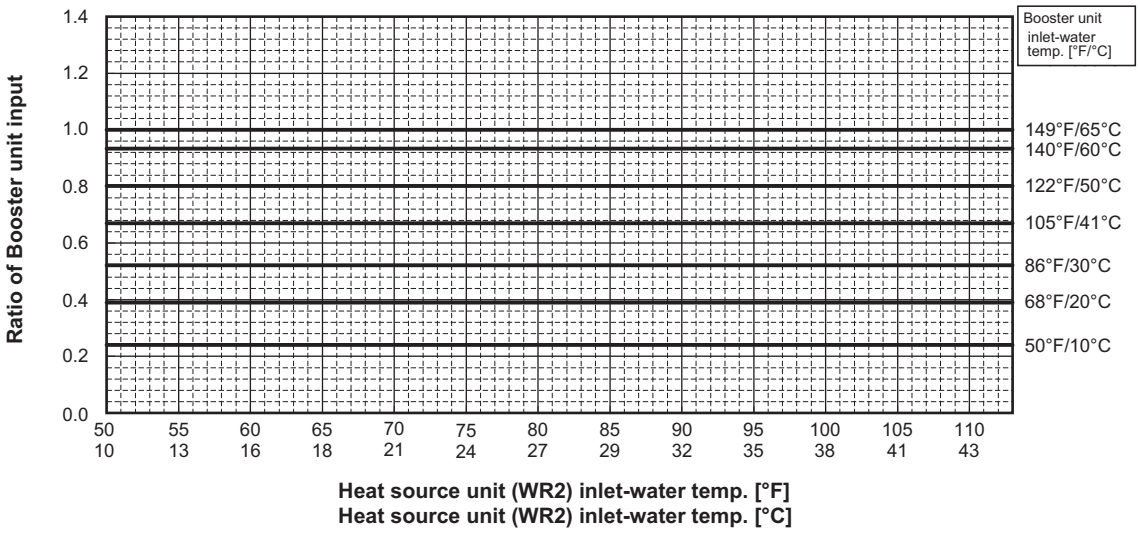


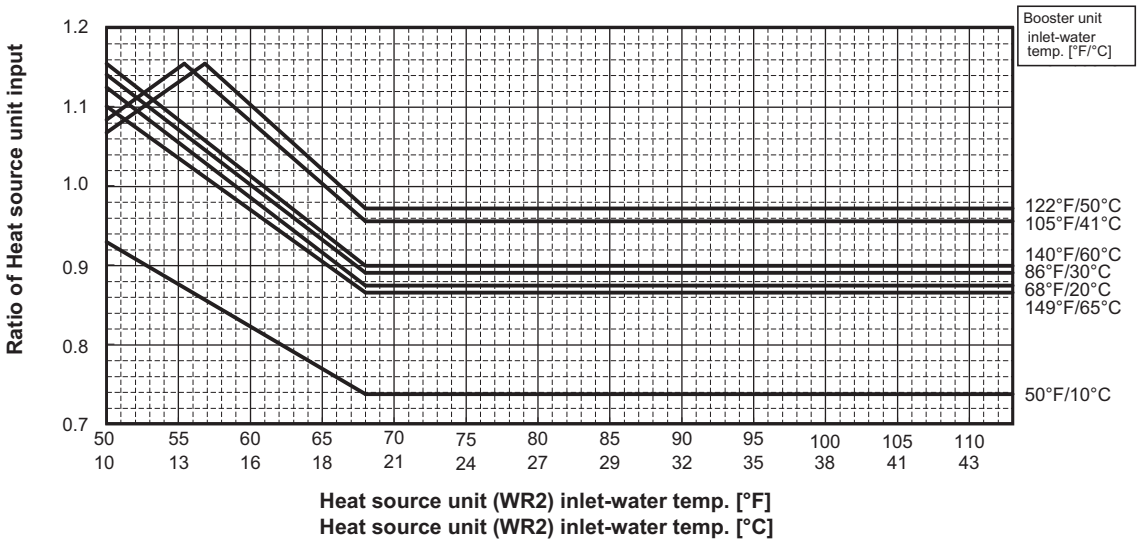


(1)-2 WR2 series + PWFY-P36NMU-E-BU

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



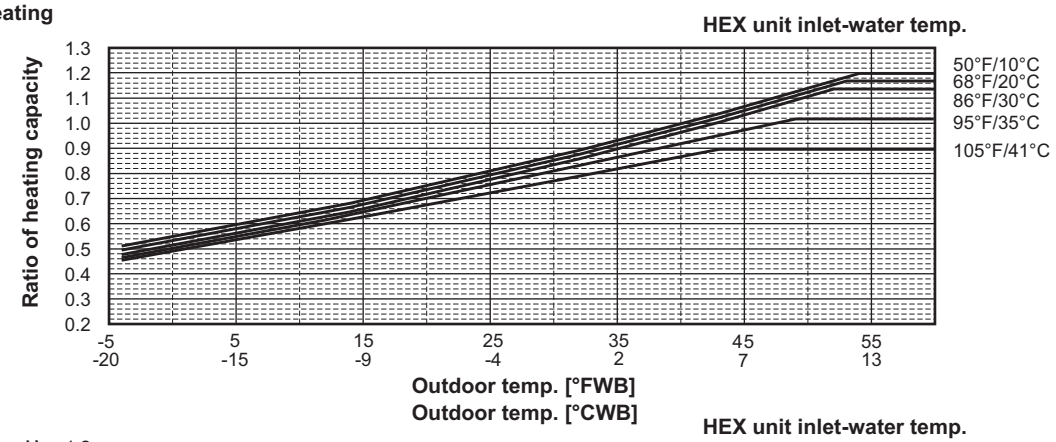


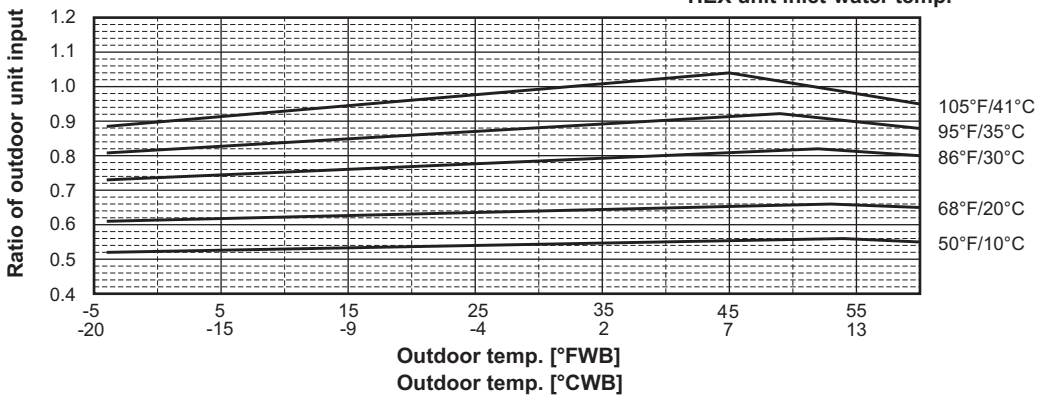


(1)-3 Y series + PWFY-P36, P72NMU-E-AU

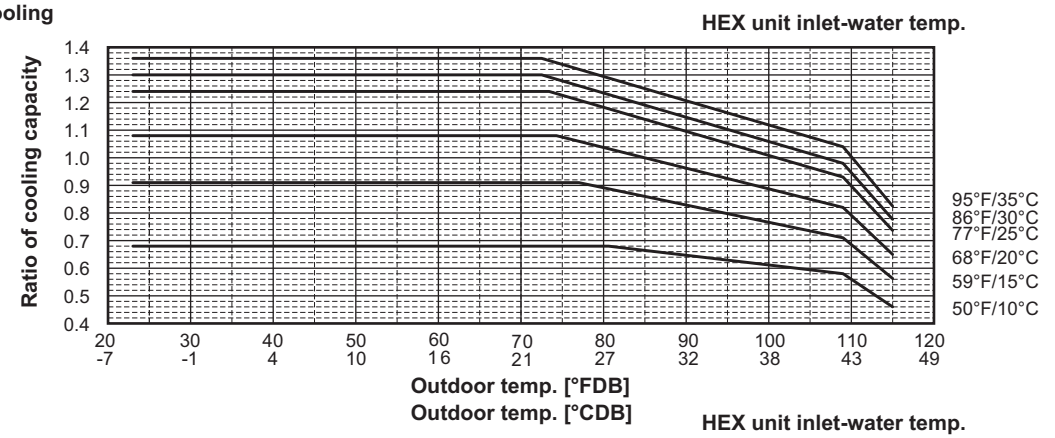
PUHY-	P72, 96TKMU-A(-BS)	P72, 96YKMU-A(-BS)

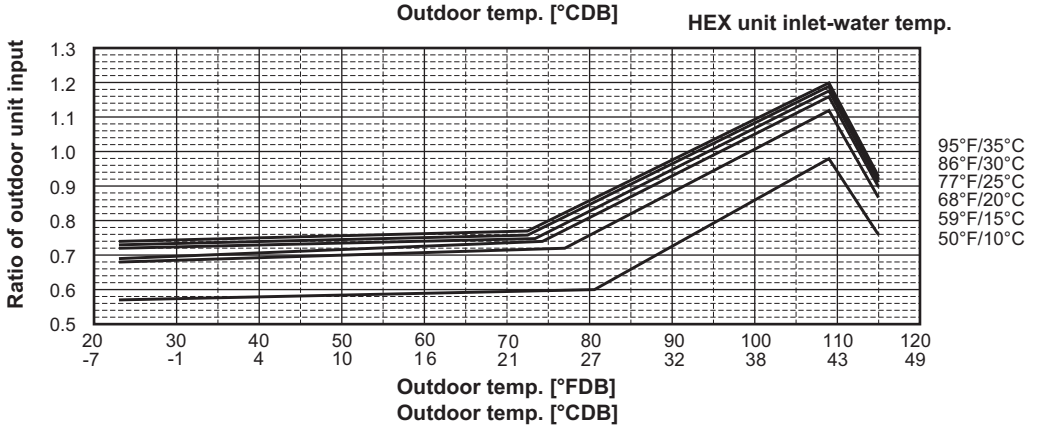
Heating





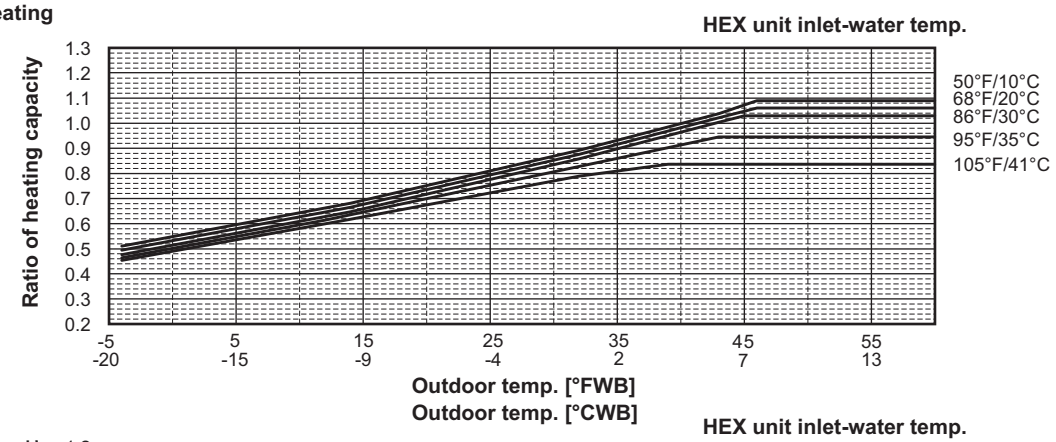
Cooling

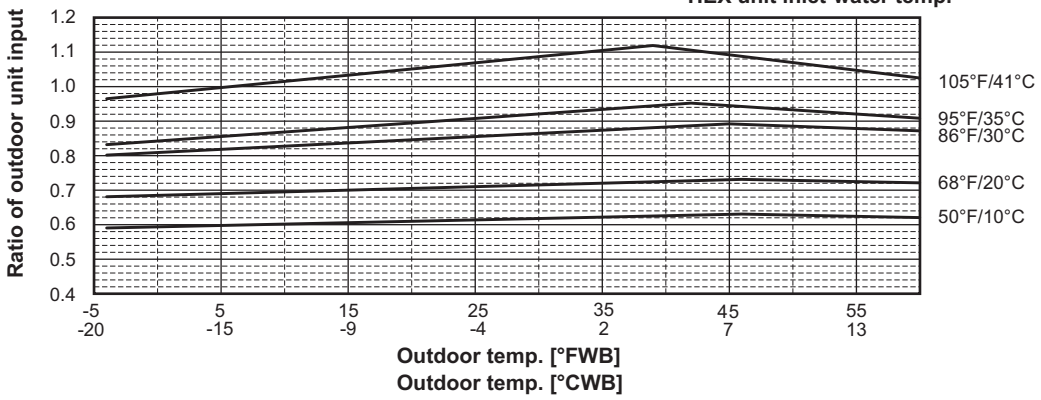




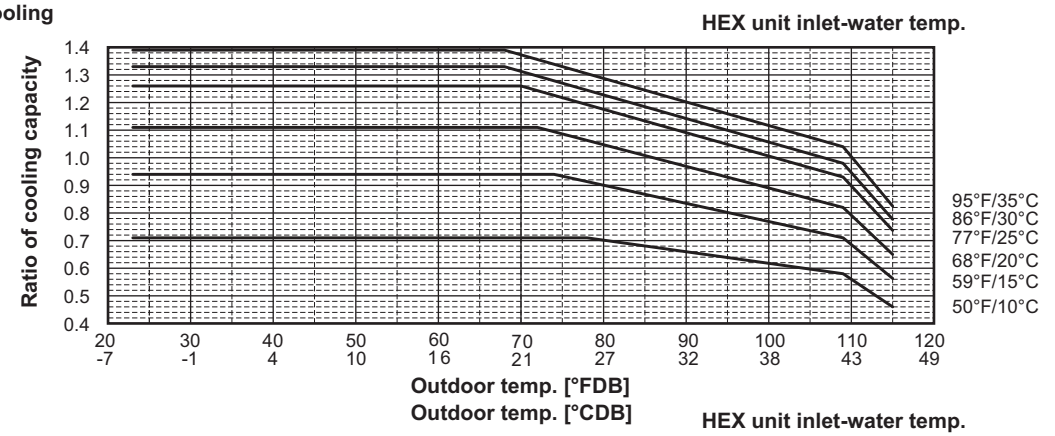
PUHY-	P120, 144TKMU-A(-BS)	P120, 144YKMU-A(-BS)

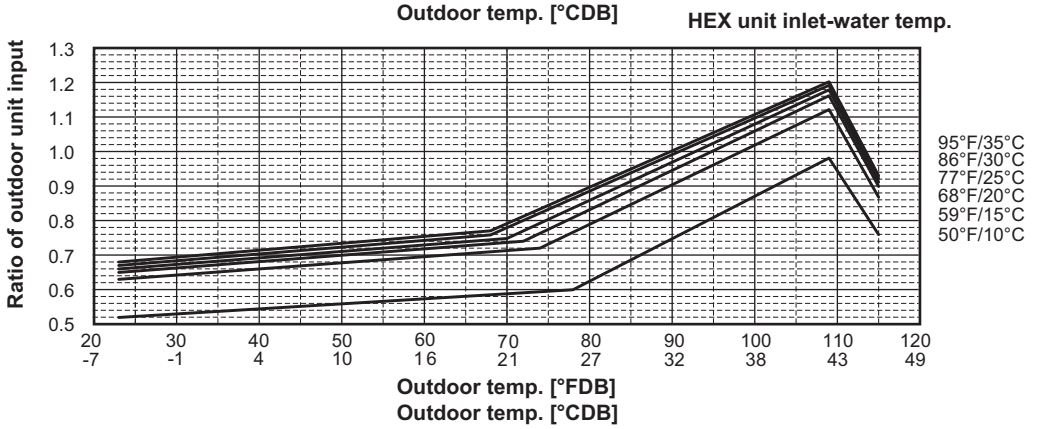
Heating





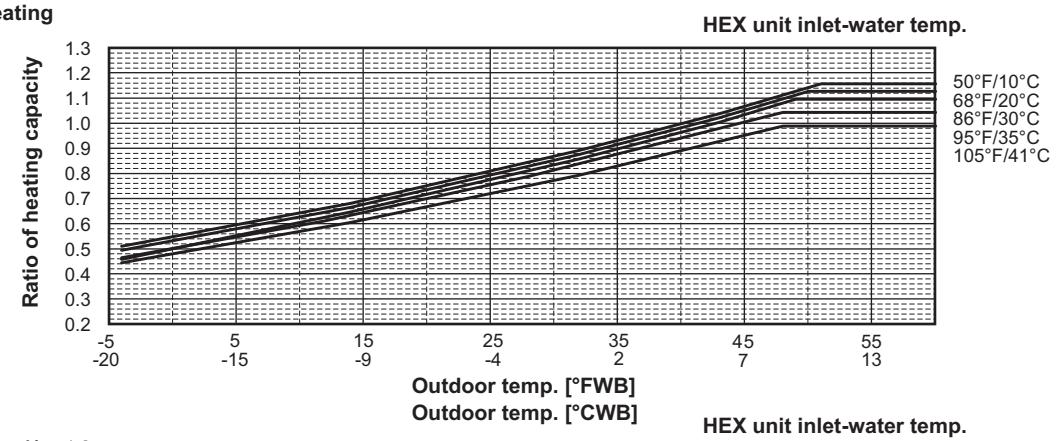
Cooling

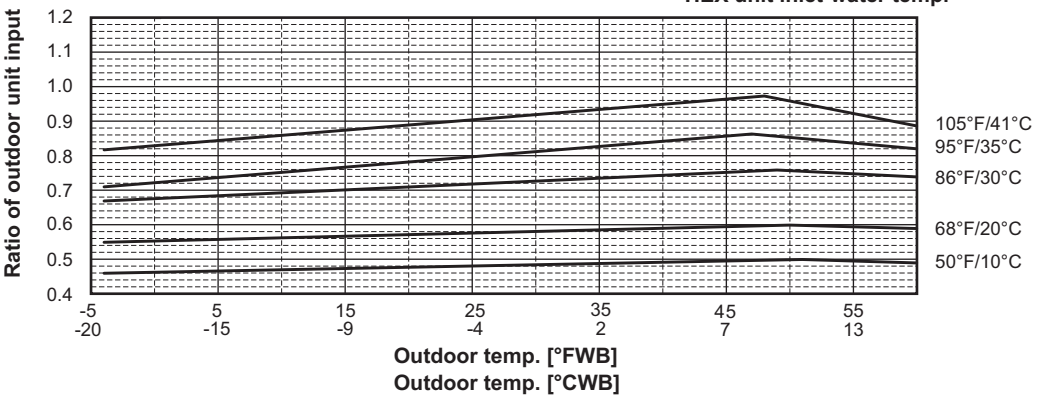




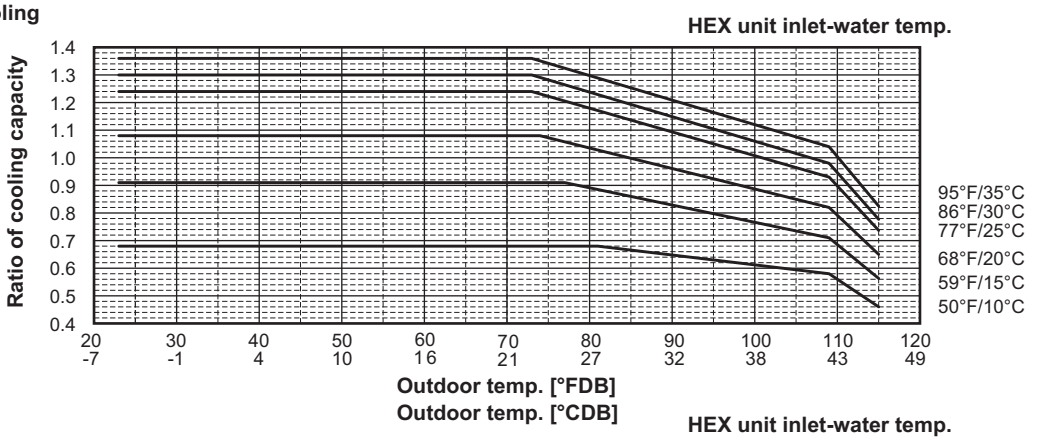
PUHY-	P168, 192, 216, 240TSKMU-A(-BS) P168, 192, 216, 240YSKMU-A(-BS)

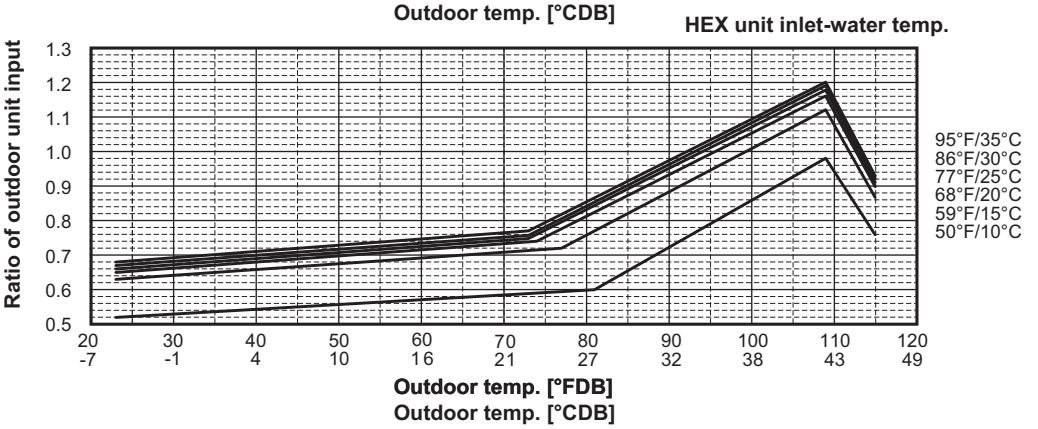
Heating





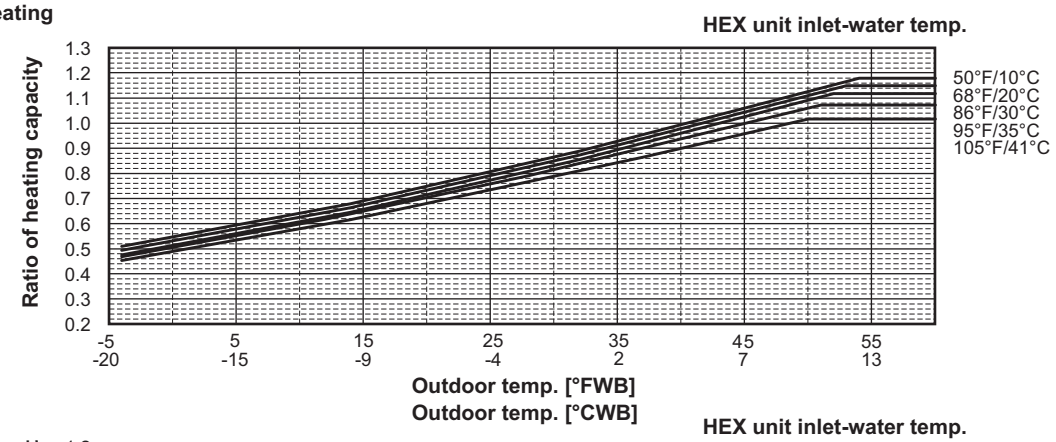
Cooling

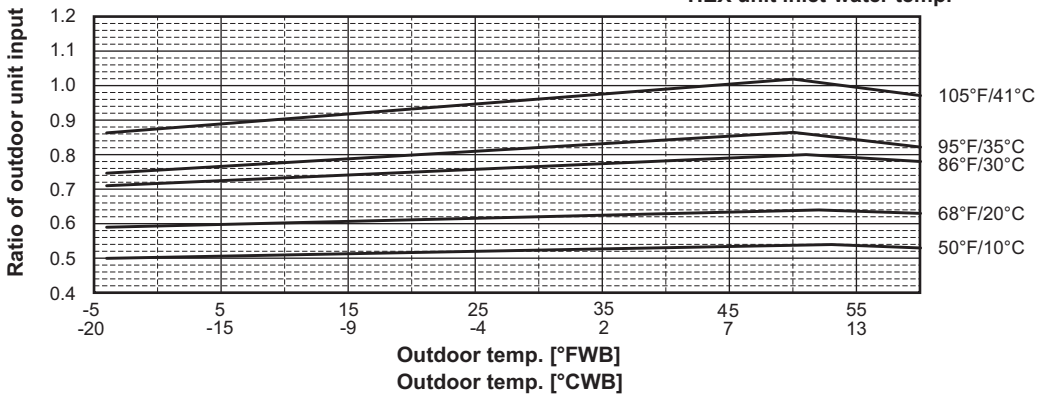




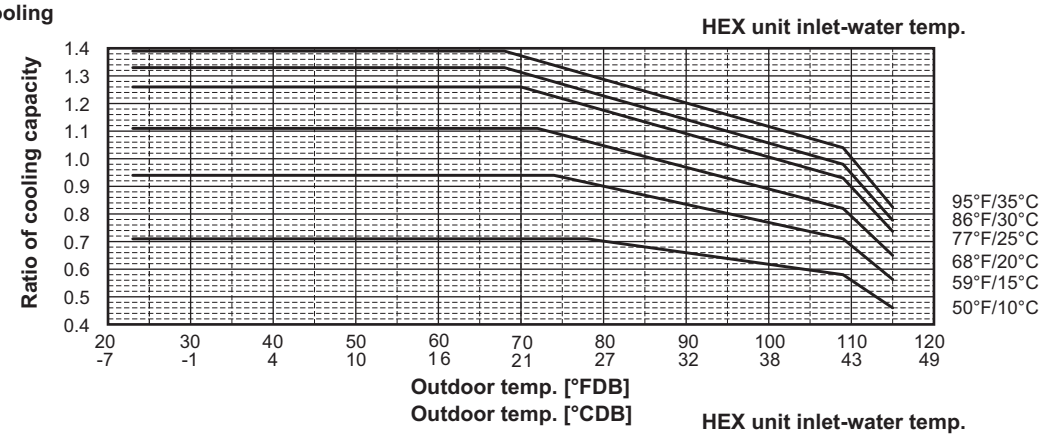
PUHY-	P264, 288TSKMU-A(-BS) P264, 288YSKMU-A(-BS)

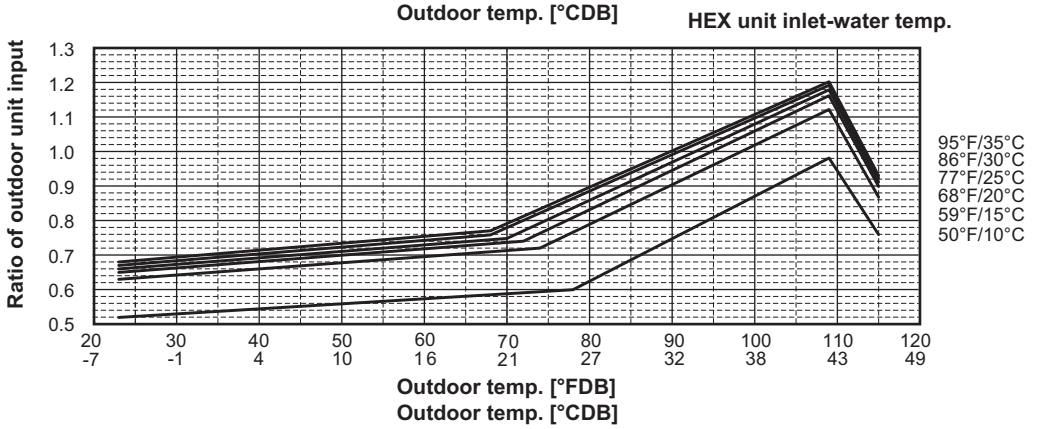
Heating





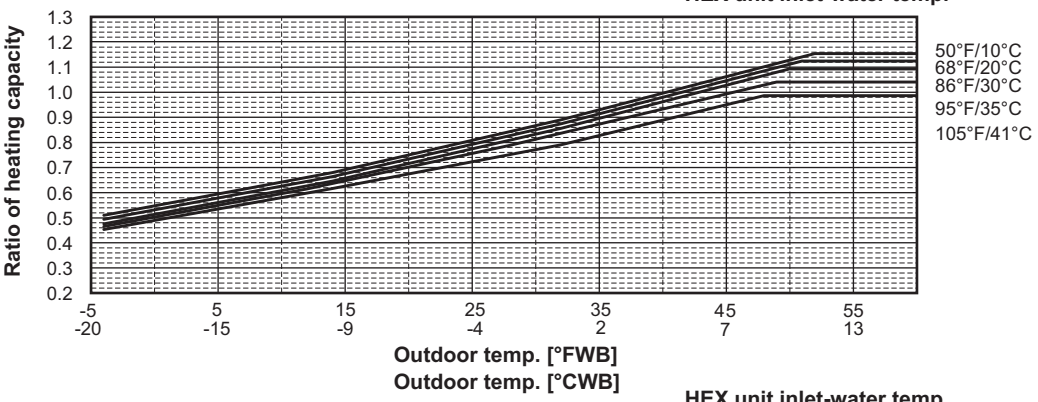
Cooling

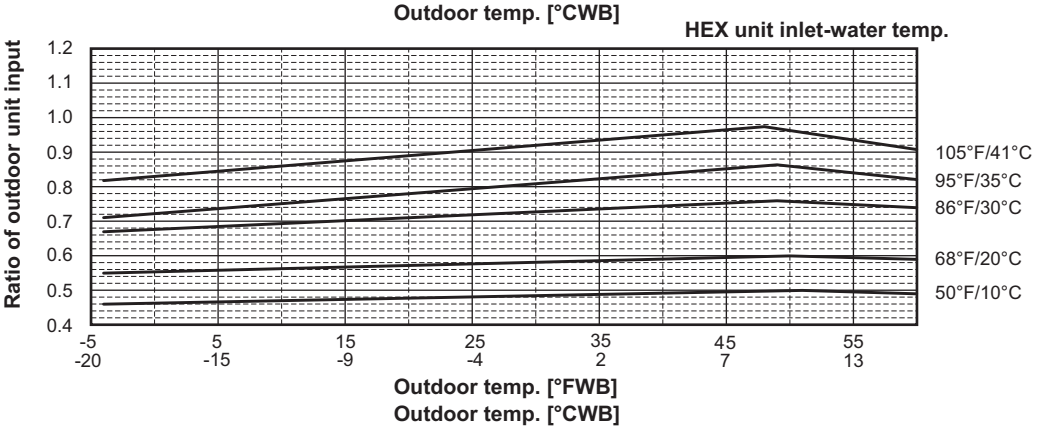




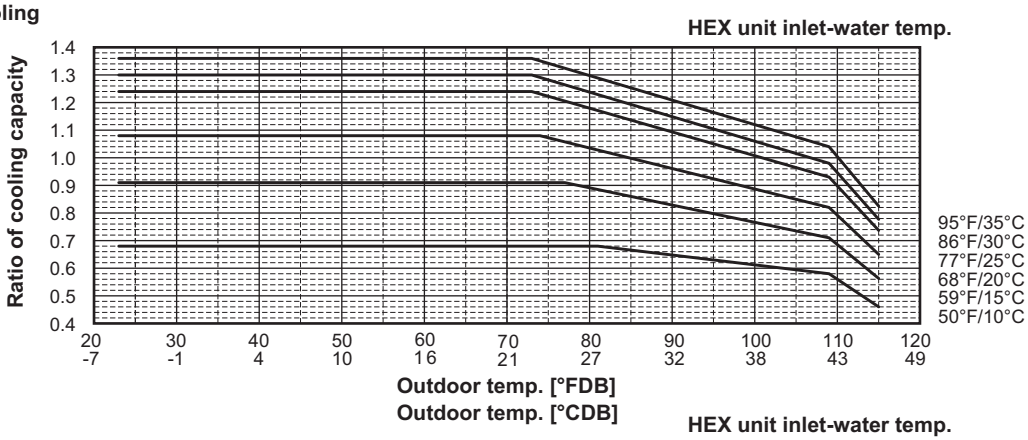
PUHY-	P312, 336, 360TSKMU-A(-BS)	P312, 336, 360YSKMU-A(-BS)

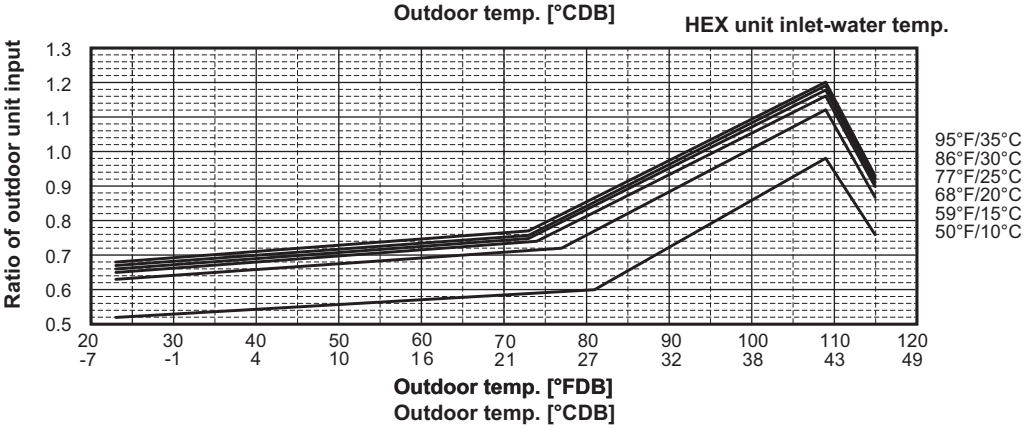
Heating





Cooling

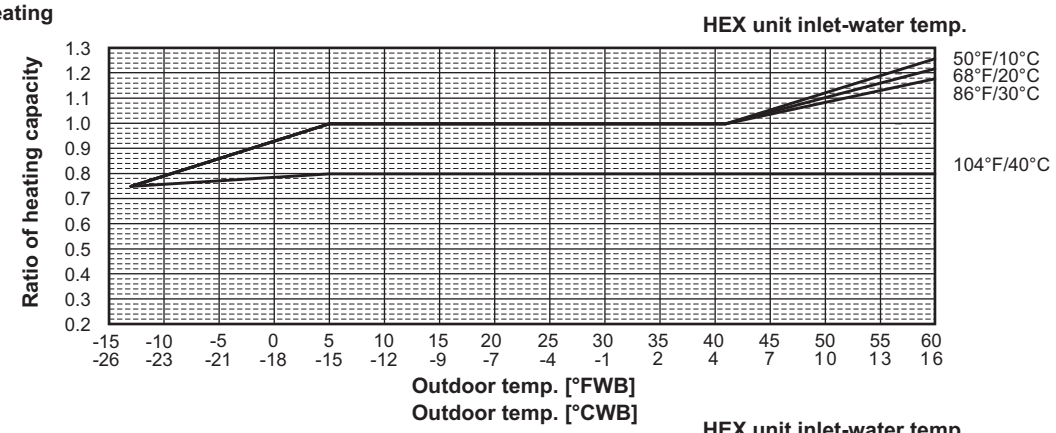


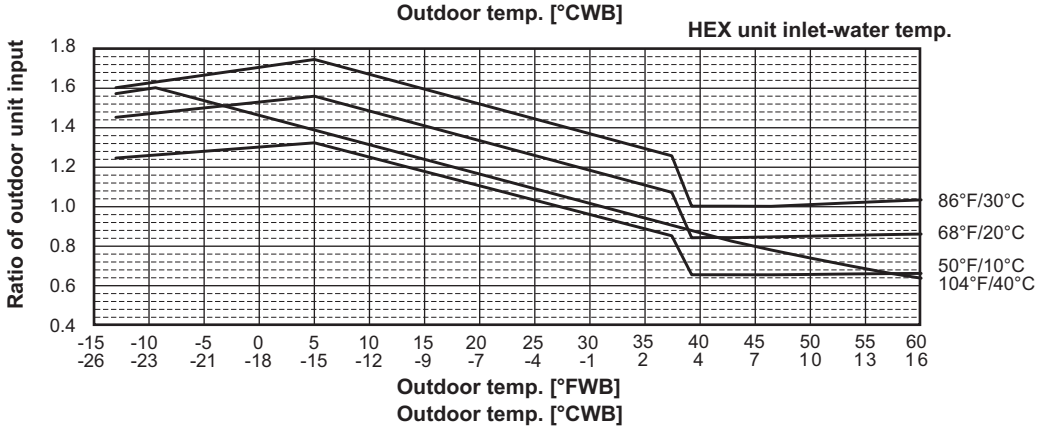


(1)-4 H2i series + PWFY-P36, P72NMU-E-AU

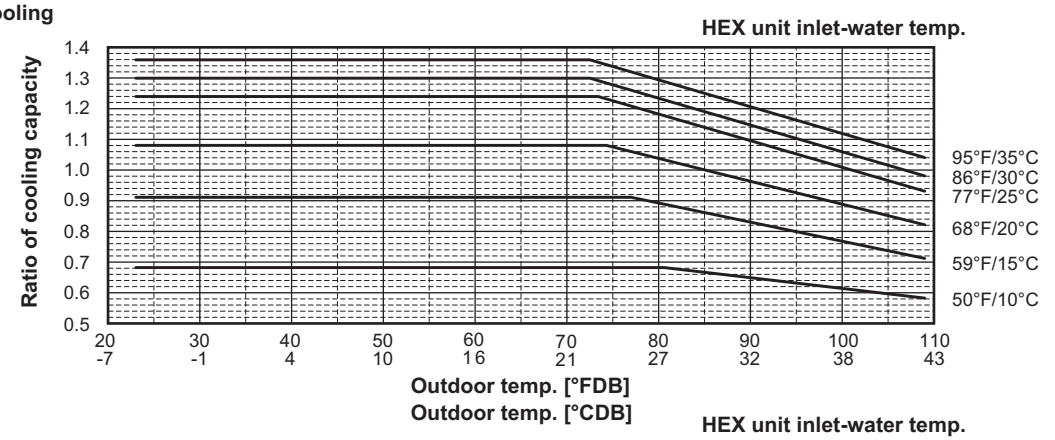
PUHY-	HP72, 96, 144, 192T(S)JMU-A(-BS)

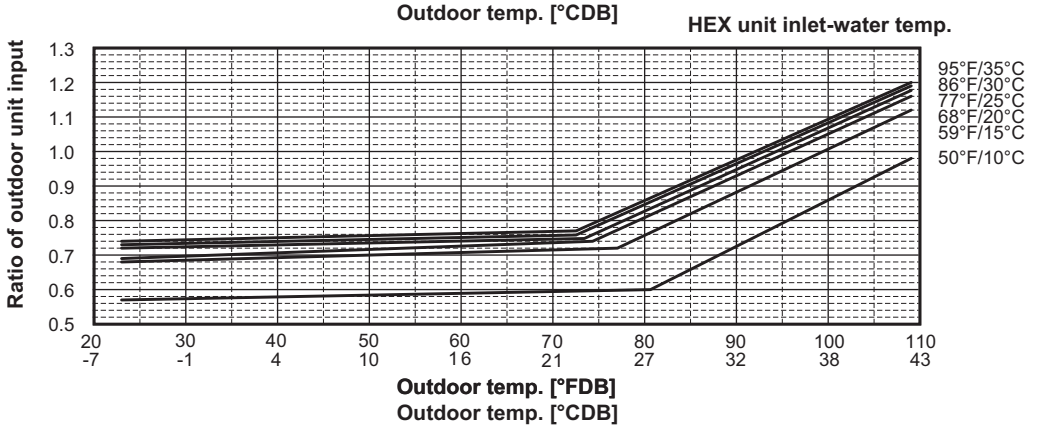
Heating





Cooling

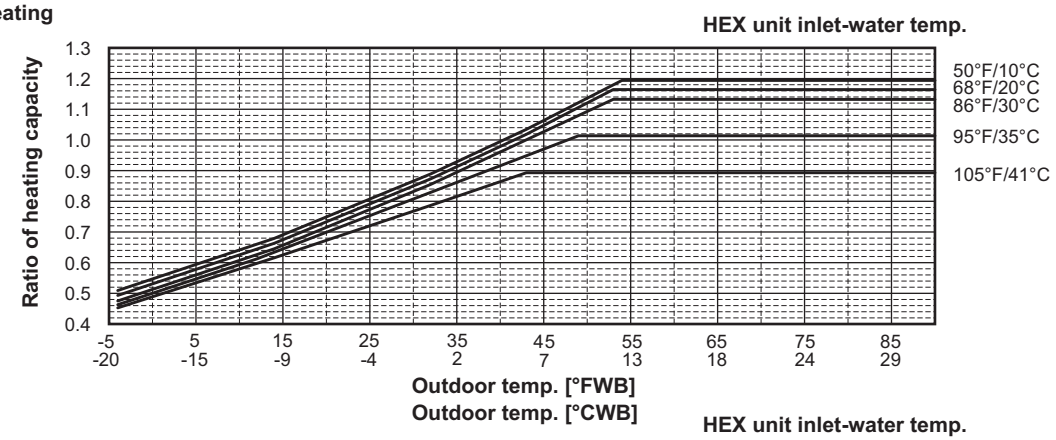


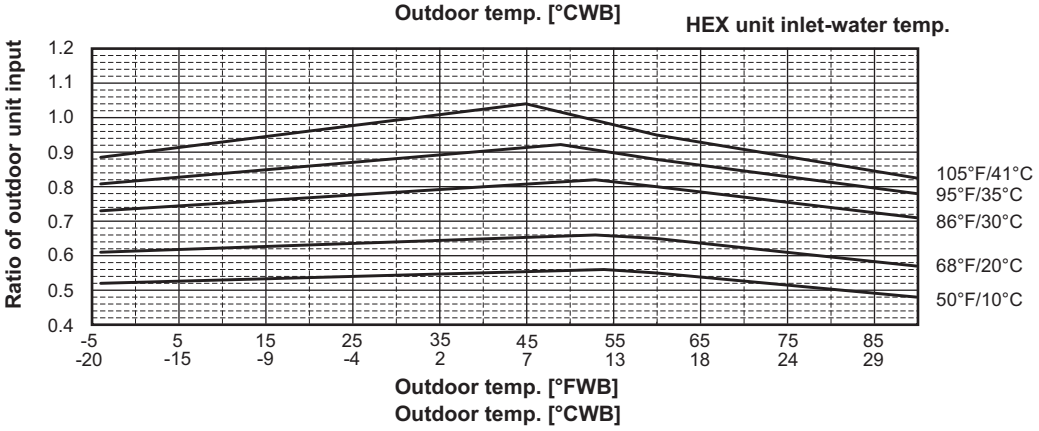


(1)-5 R2 series + PWFY-P36, P72NMU-E-AU

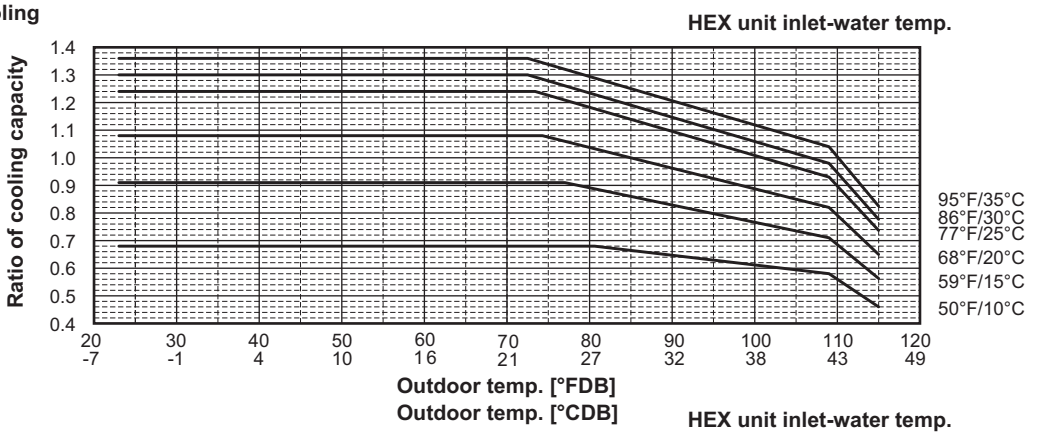
PURY-	P72, 96TKMU-A(-BS)	P72, 96YKMU-A(-BS)

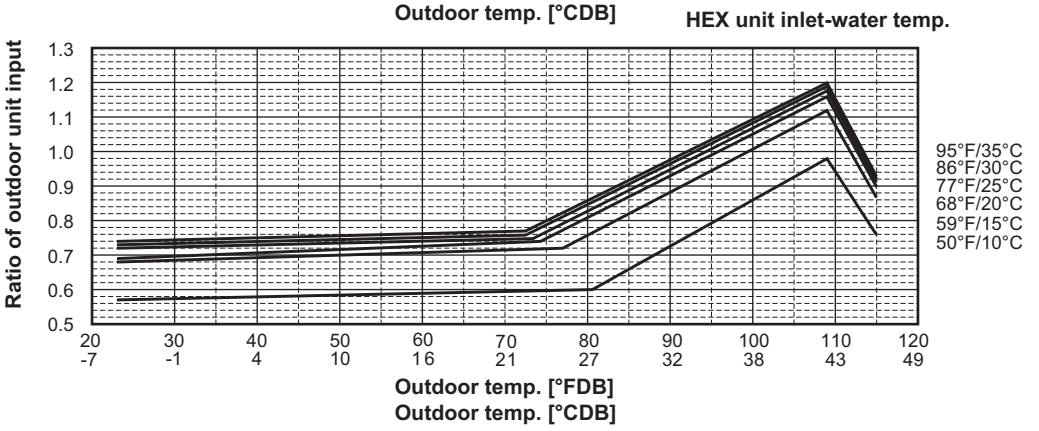
Heating





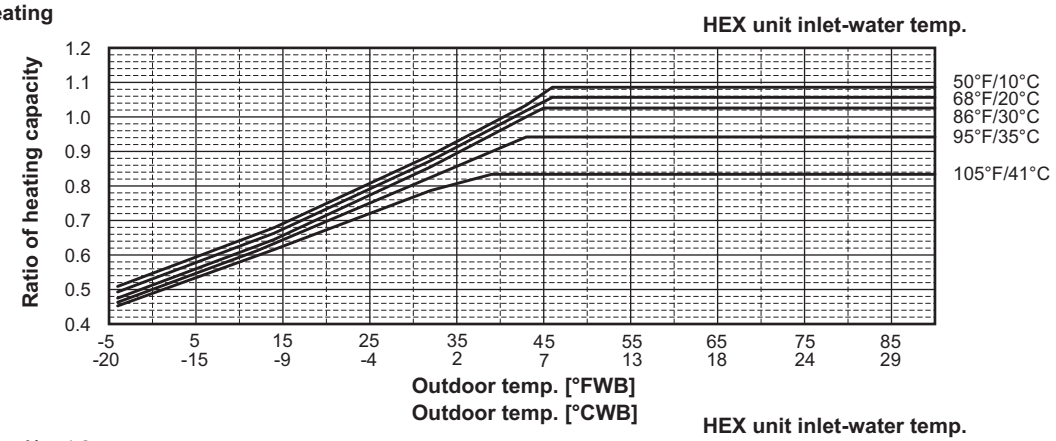
Cooling

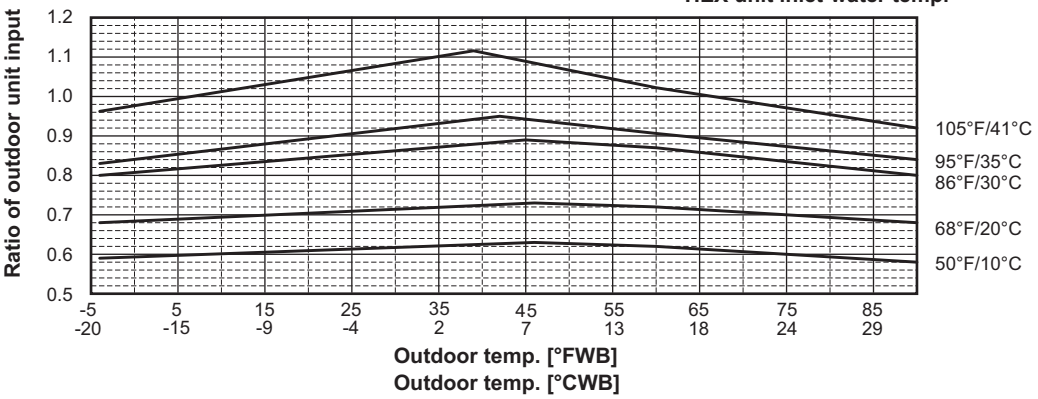




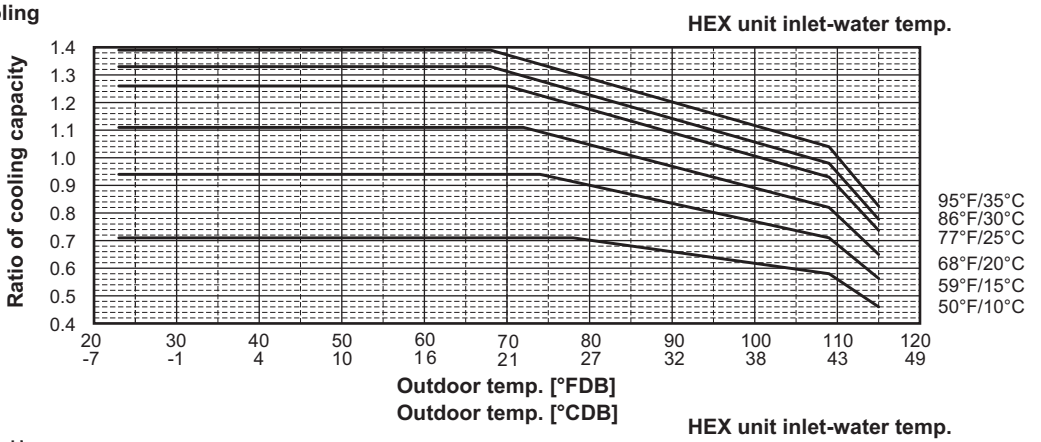
PURY-	P120, 144TKMU-A(-BS)	P120, 144YKMU-A(-BS)

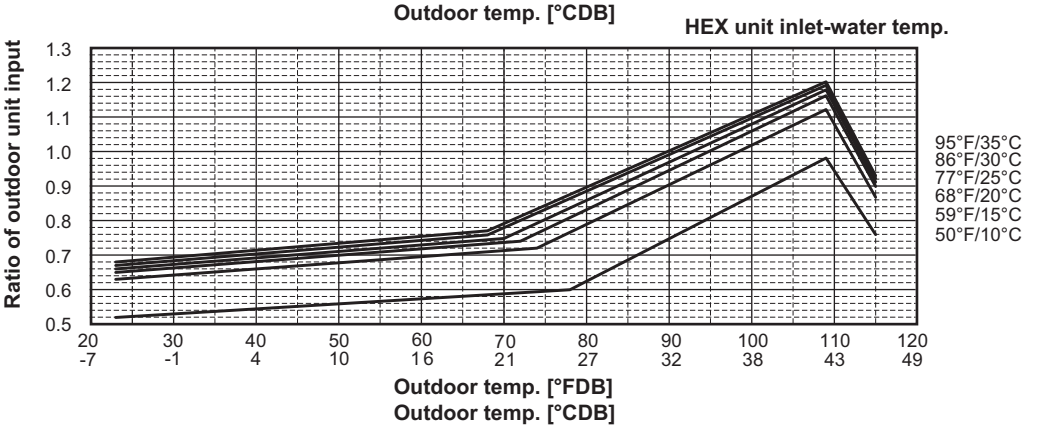
Heating





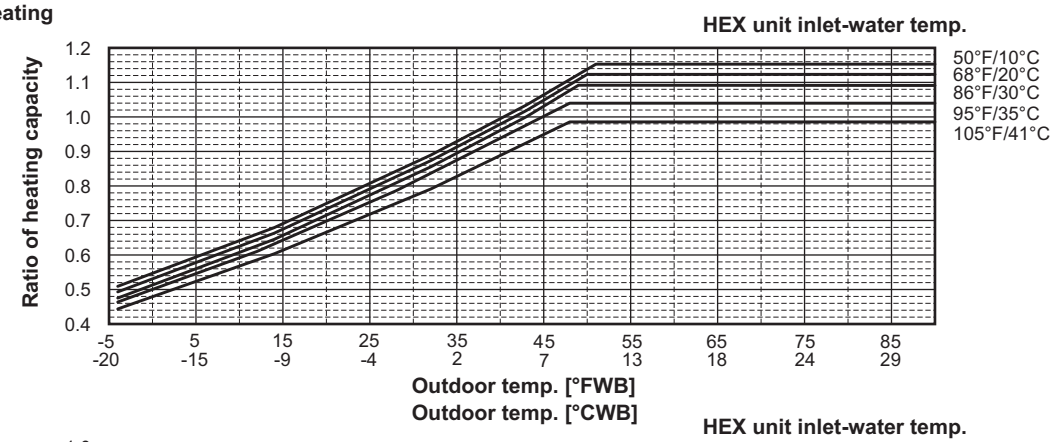
Cooling

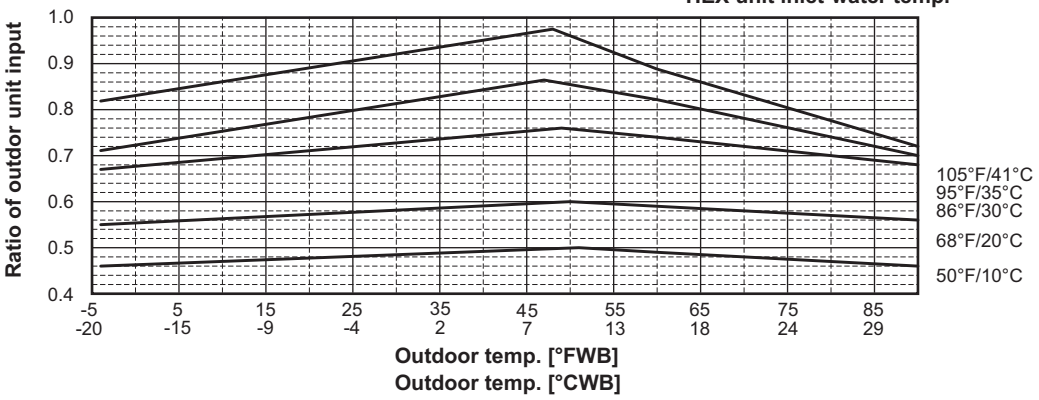




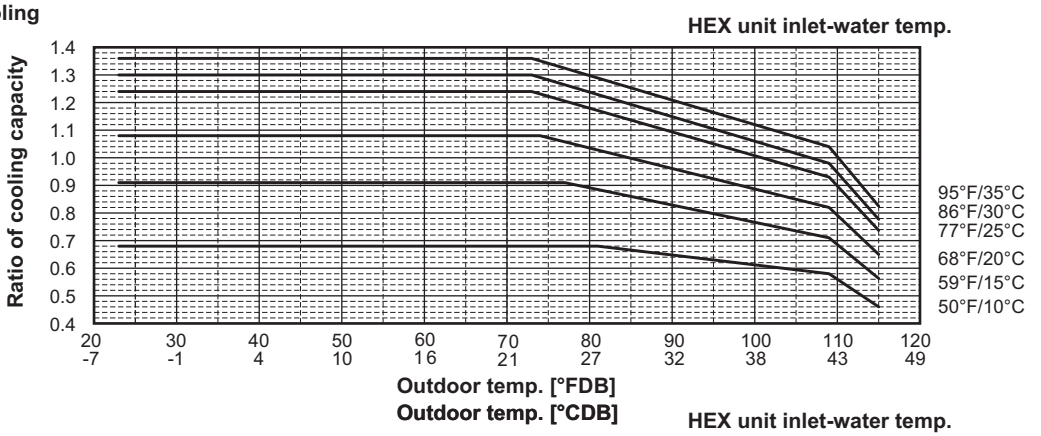
PURY-	P168, 192, 216, 240TSKMU-A(-BS)	P168, 192, 216, 240YSKMU-A(-BS)

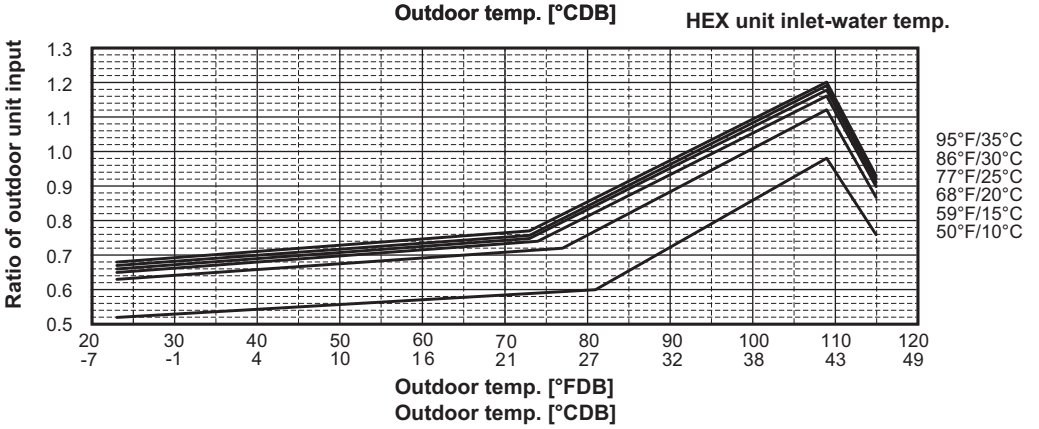
Heating





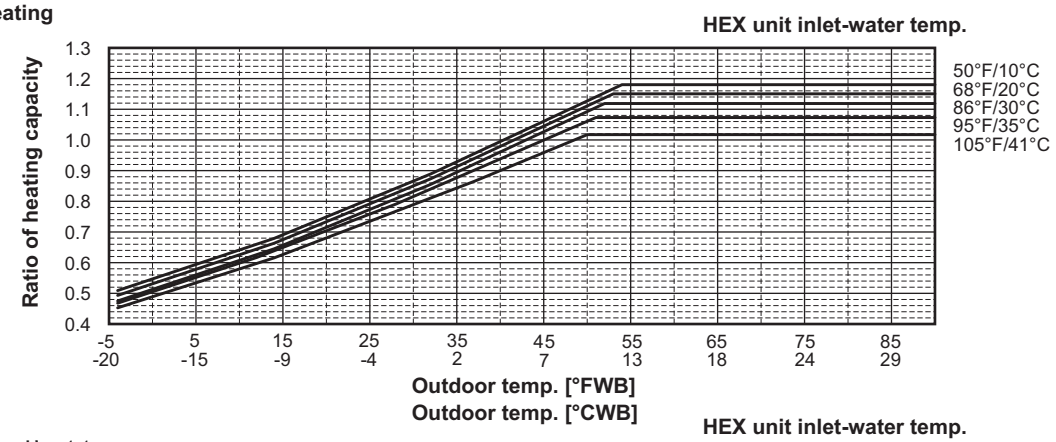
Cooling

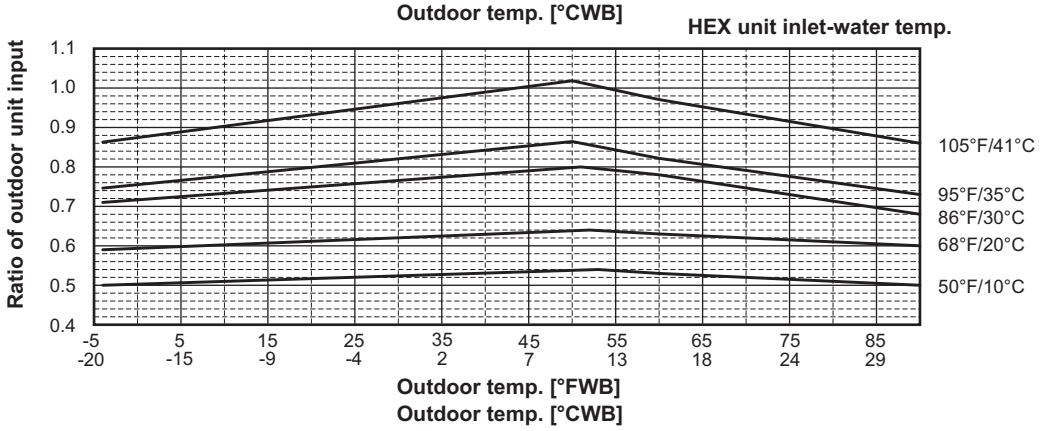




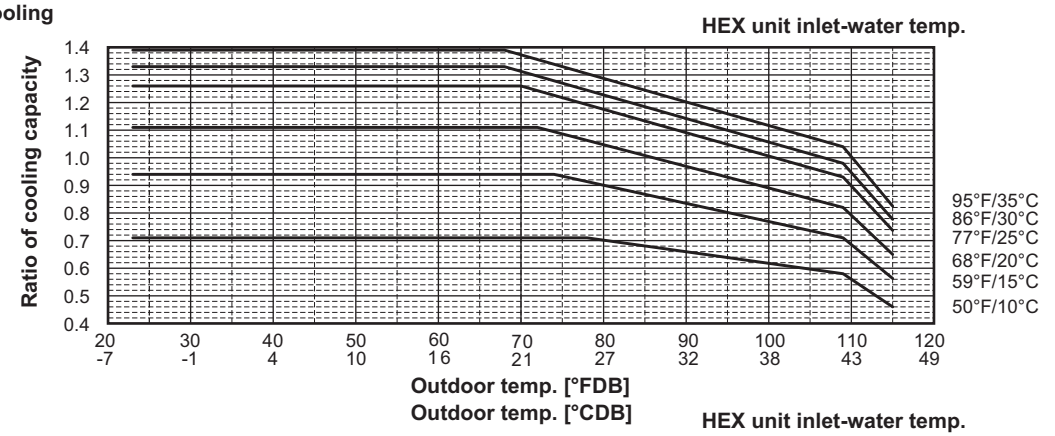
PURY-	P264, 288TSKMU-A(-BS) P264, 288YSKMU-A(-BS)

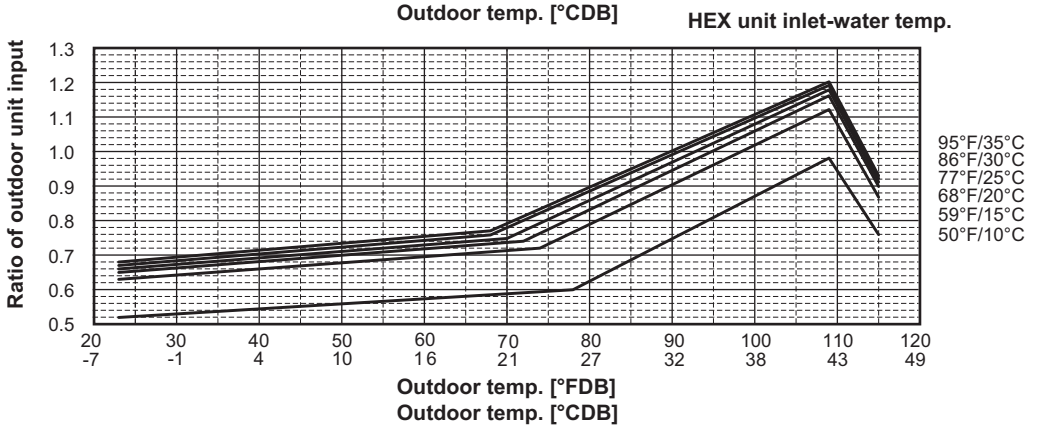
Heating





Cooling

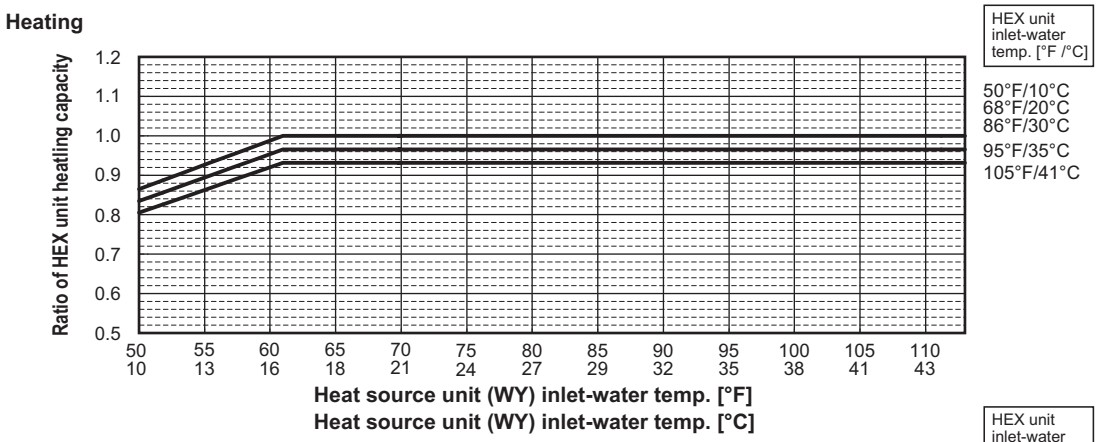


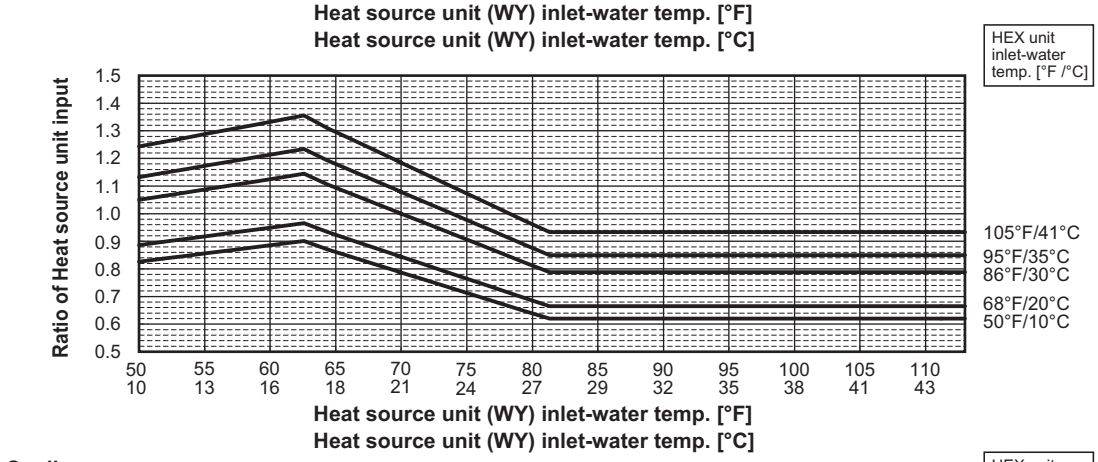


(1)-6 WY + PWFY-P36, P72NMU-E-AU

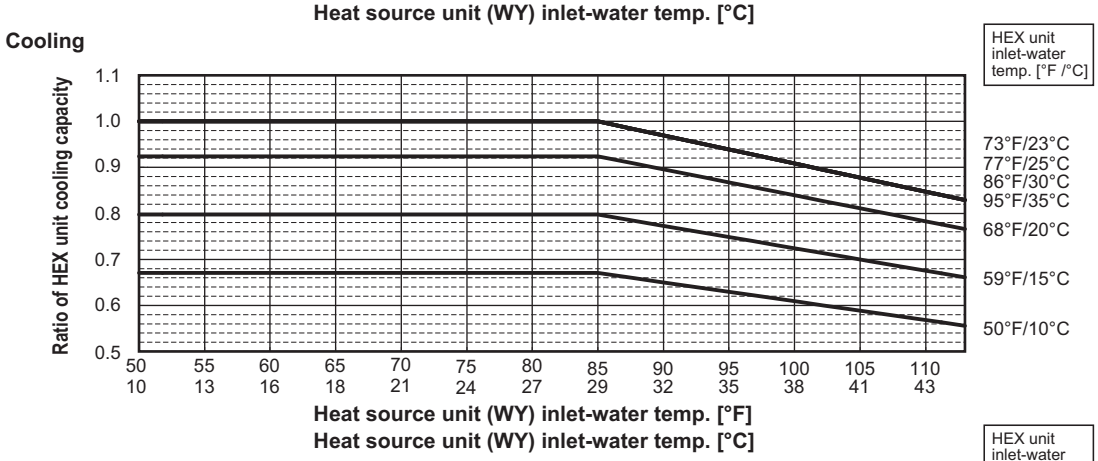
PQHY-	P72, 96, 120, 144, 168, 192, 216, 240T(S)HMU-A/Y(S)HMU-A

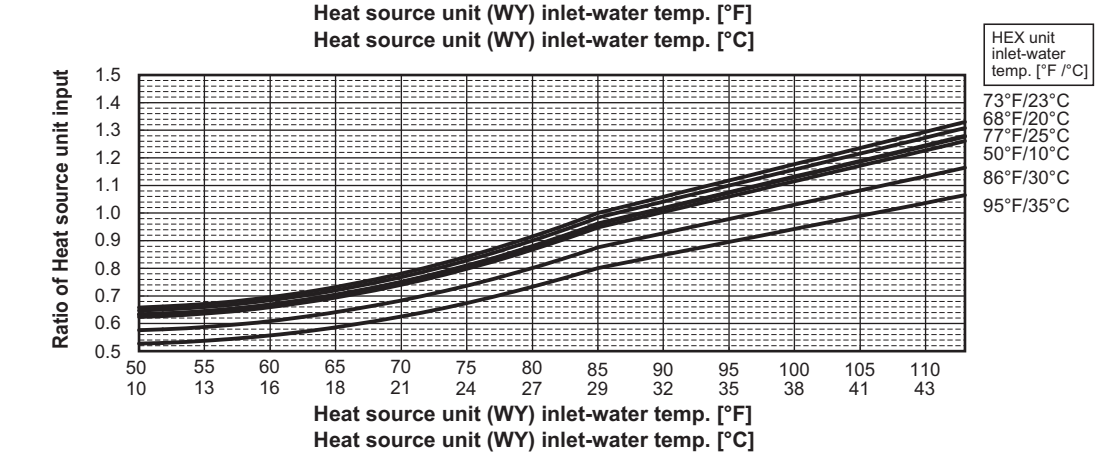
Heating





Cooling

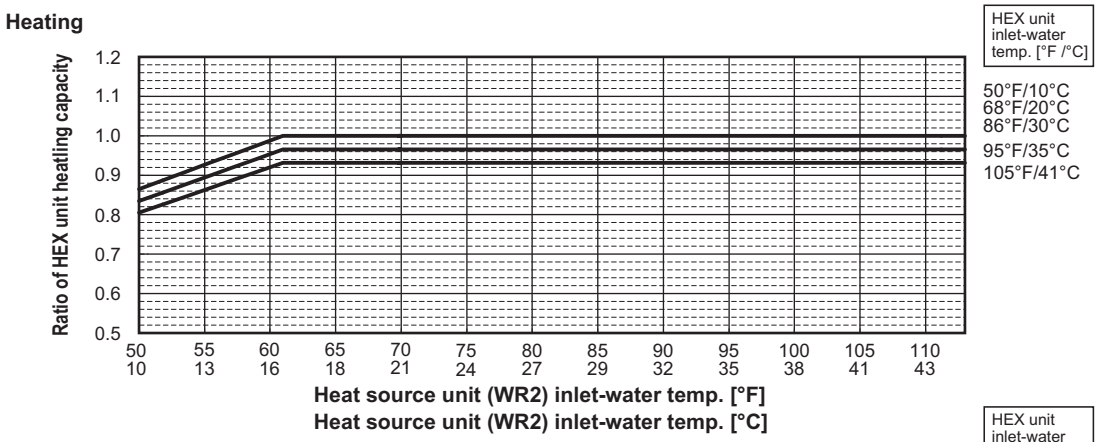


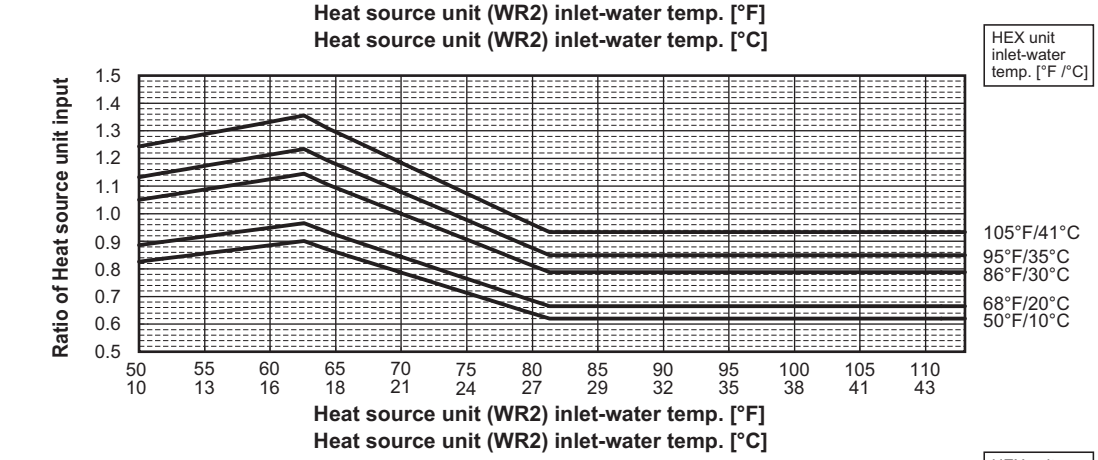


(1)-7 WR2 + PWFY-P36, P72NMU-E-AU

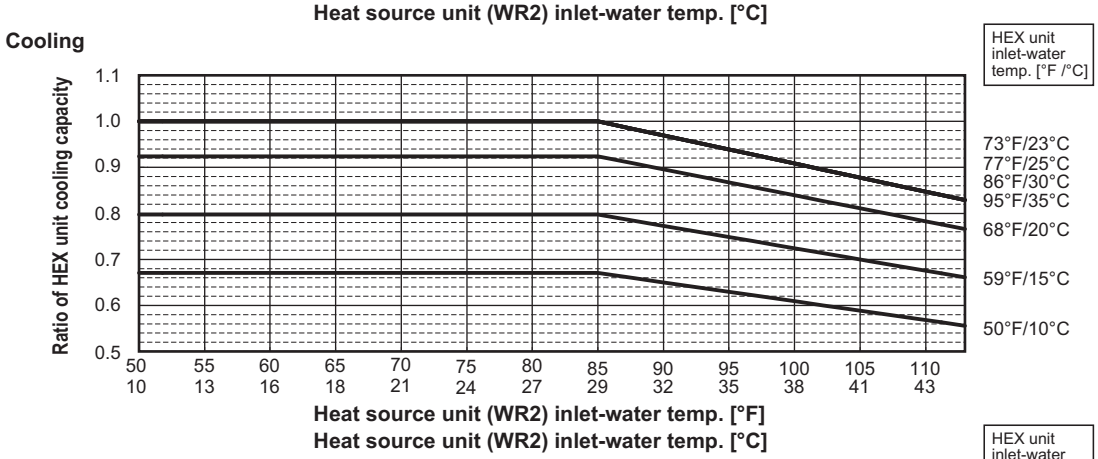
PQRY-	P72, 96, 120, 144, 168, 192, 216, 240T(S)HMU-A/Y(S)HMU-A

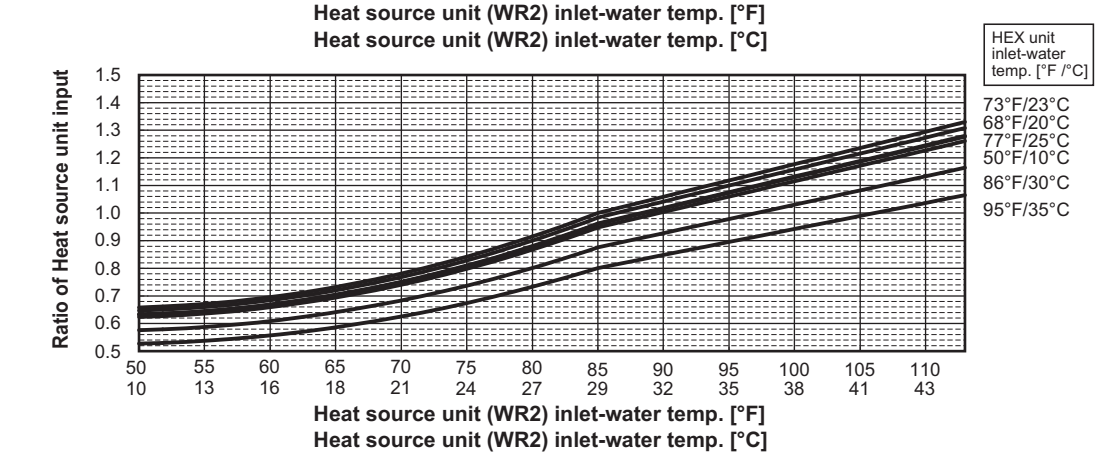
Heating





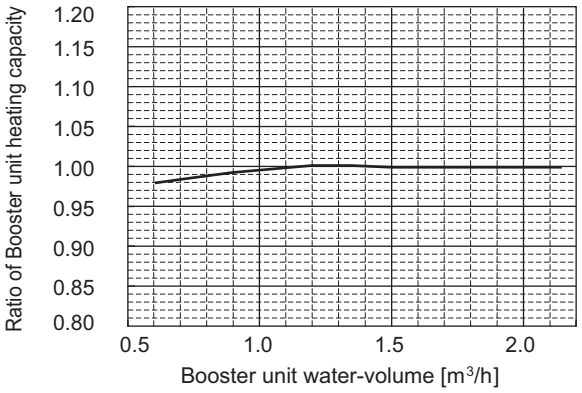
Cooling

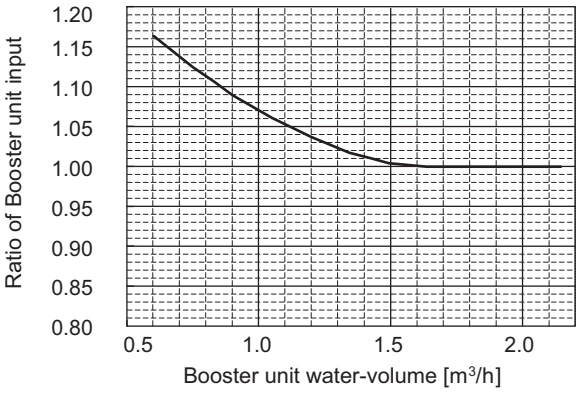


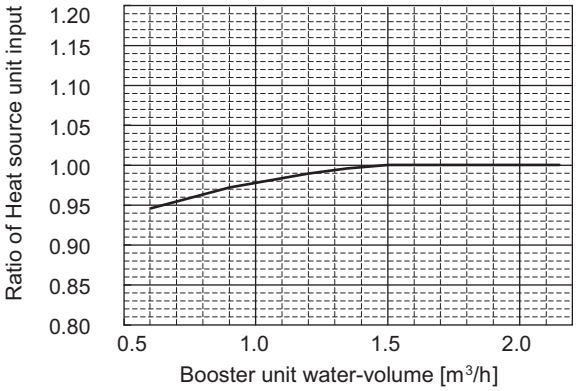


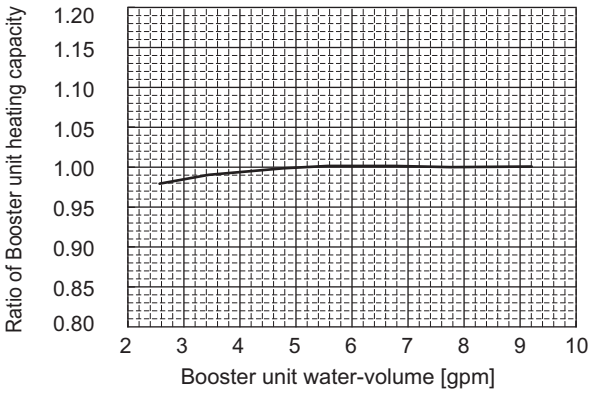
(2) Correction by water volume

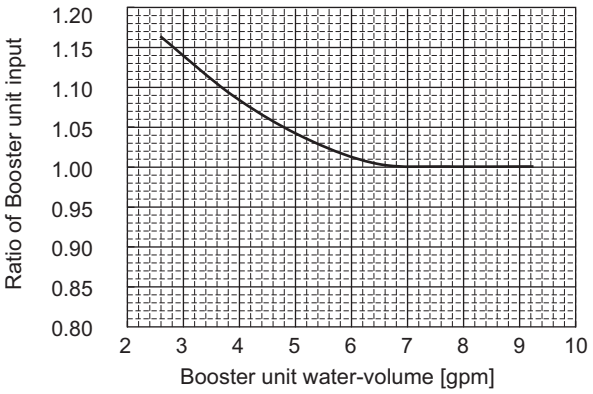
(2)-1 PWFY-P36NMU-E-BU

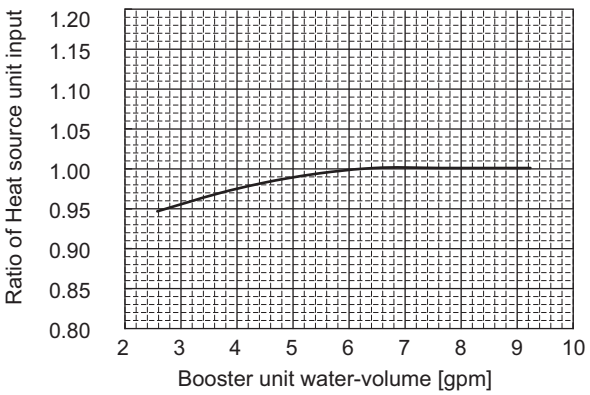






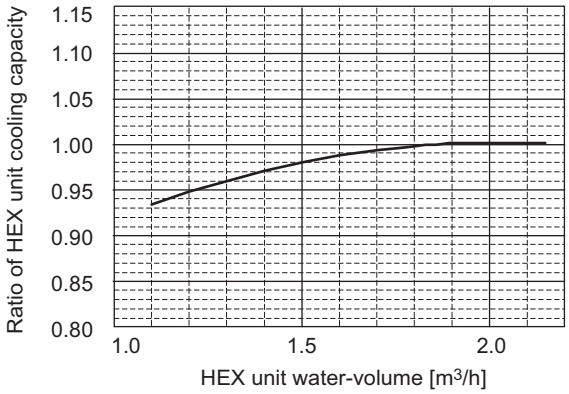


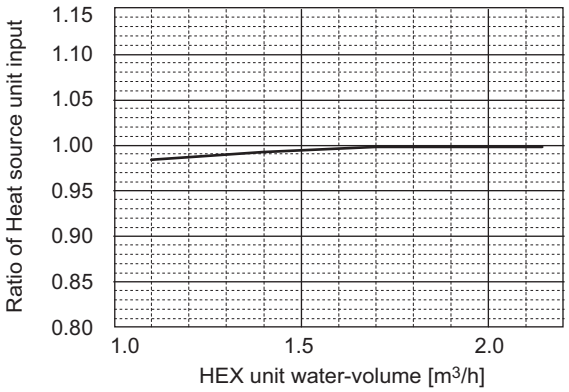




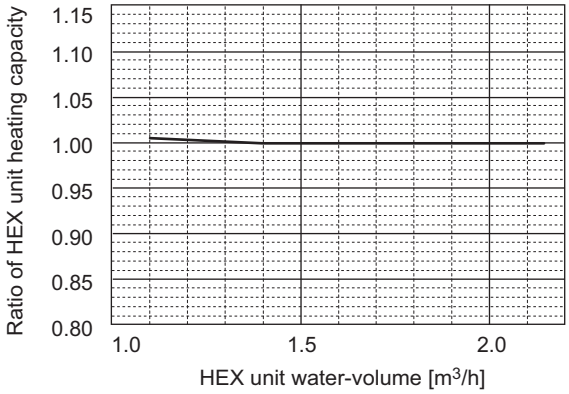
(2)-2 PWFY-P36NMU-E-AU

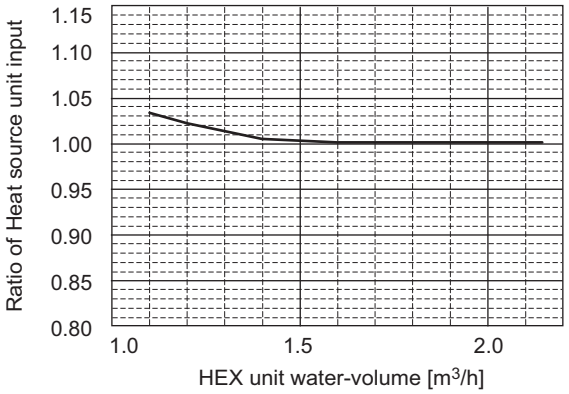
Cooling



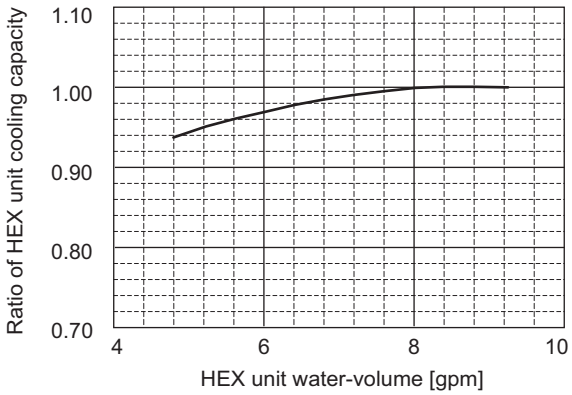


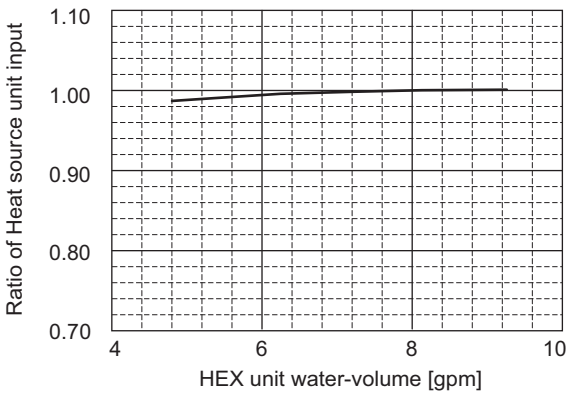
Heating



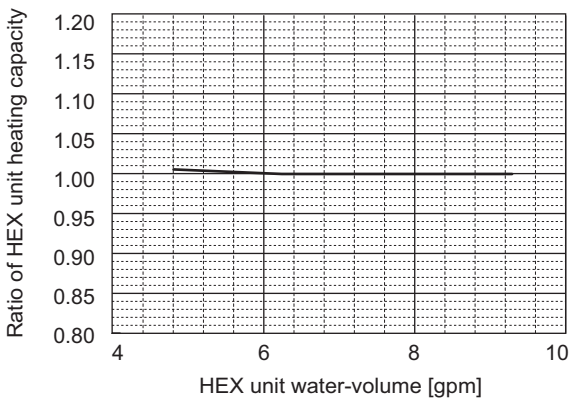


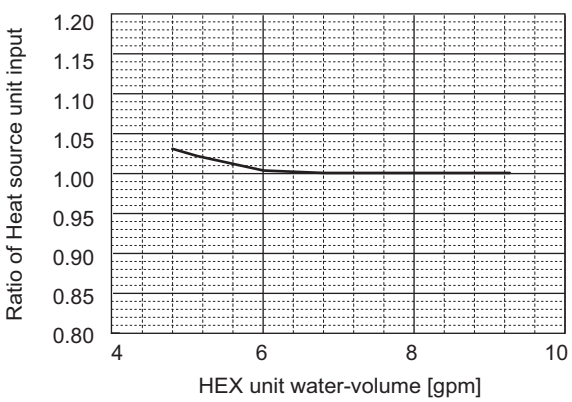
Cooling





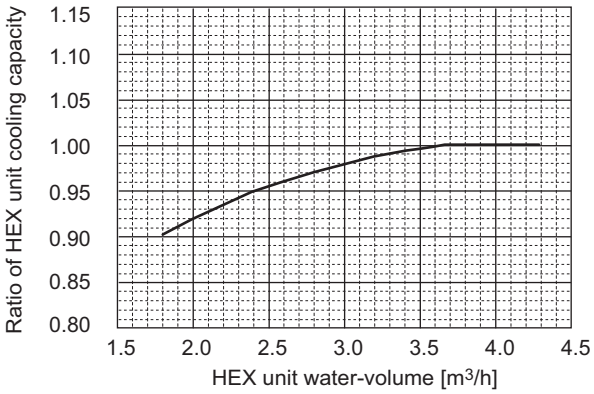
Heating

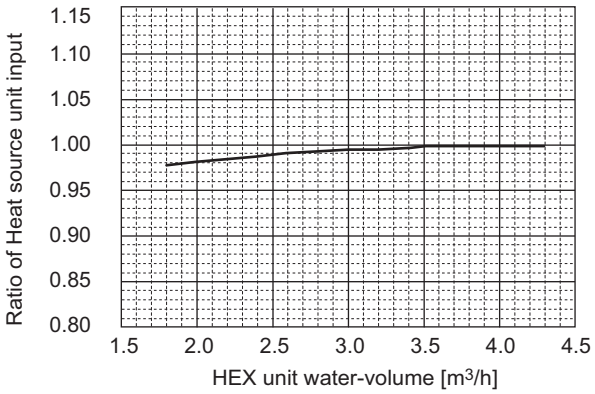




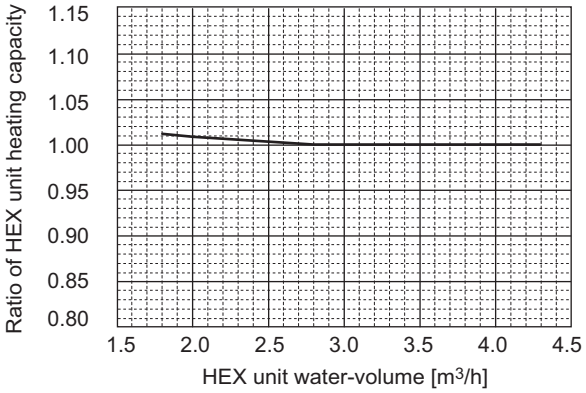
(2)-3 PWFY-P72NMU-E-AU

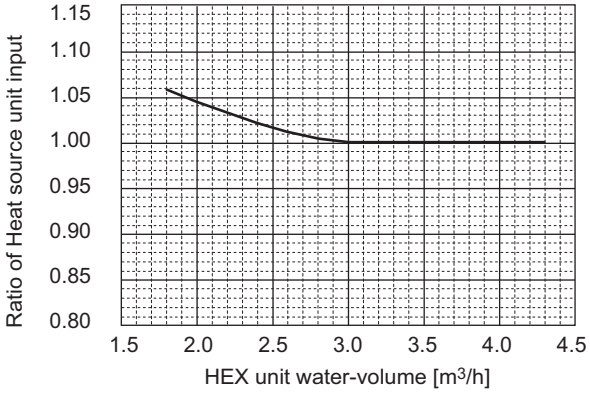
Cooling



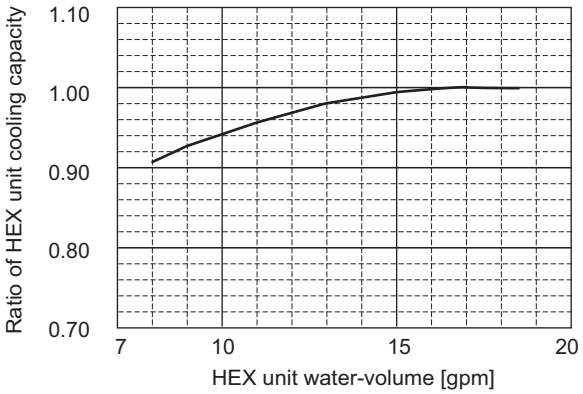


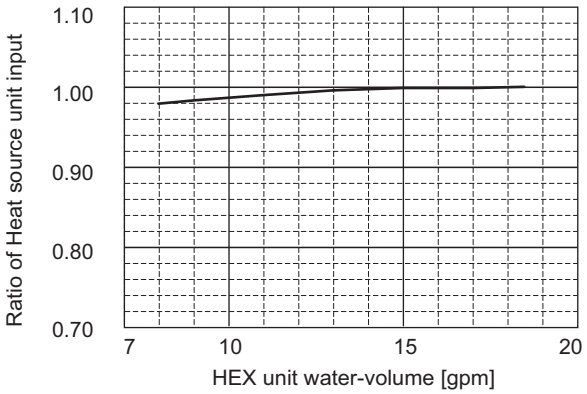
Heating



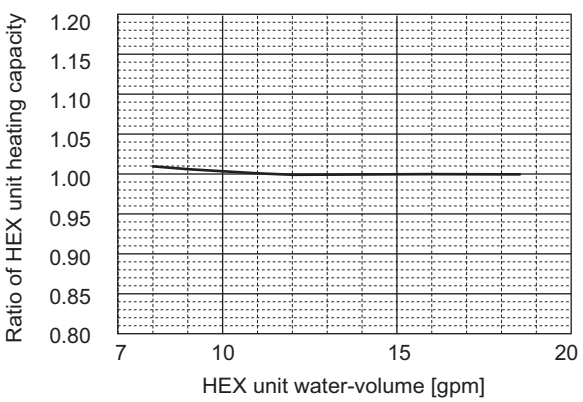


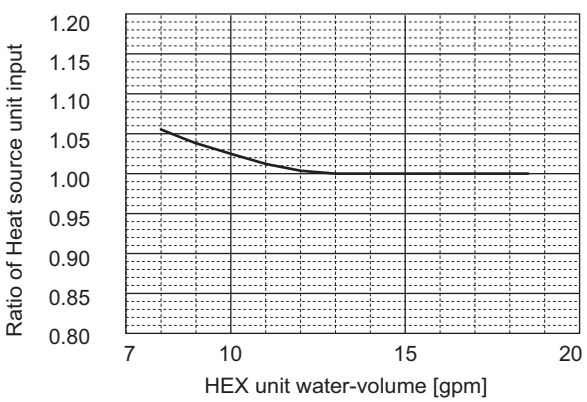
Cooling





Heating





(3) Correction by total indoor

Refer to Chapter VIII.

(4) Correction by refrigerant piping length

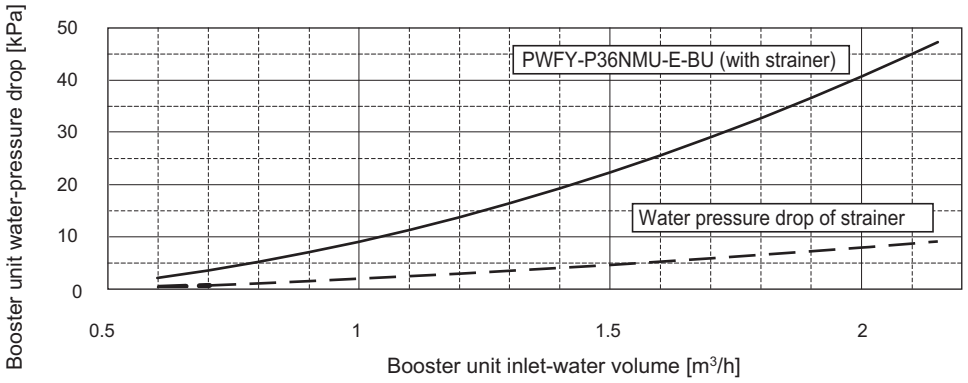
Refer to Chapter VIII.

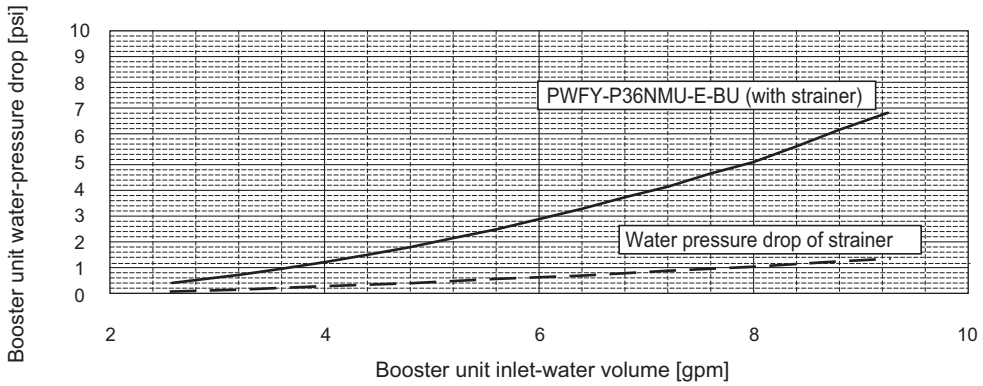
(5) Correction at frosting and defrosting

Refer to Chapter VIII.

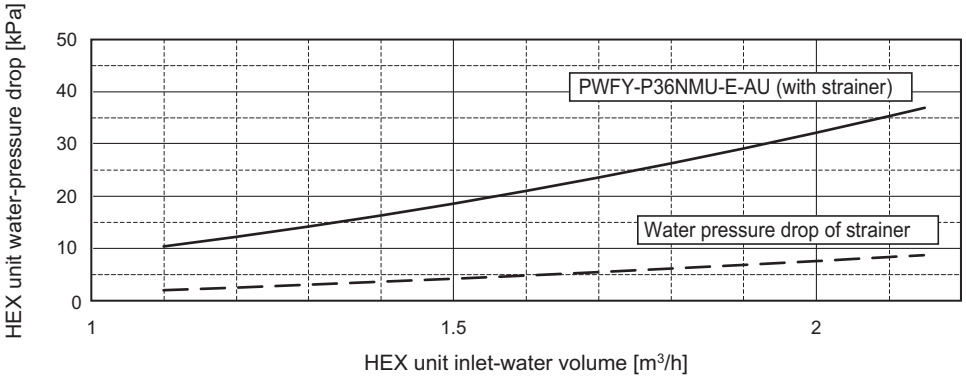
(6) Water pressure drop

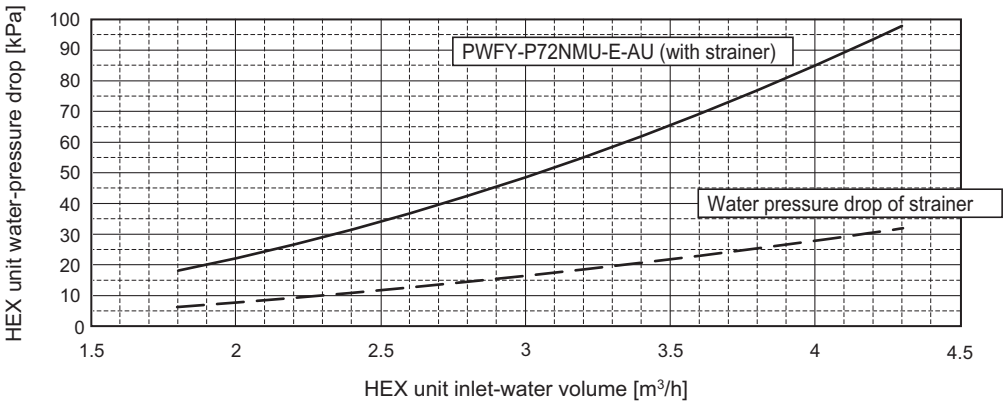
(6)-1 PWFY-P36NMU-E-BU

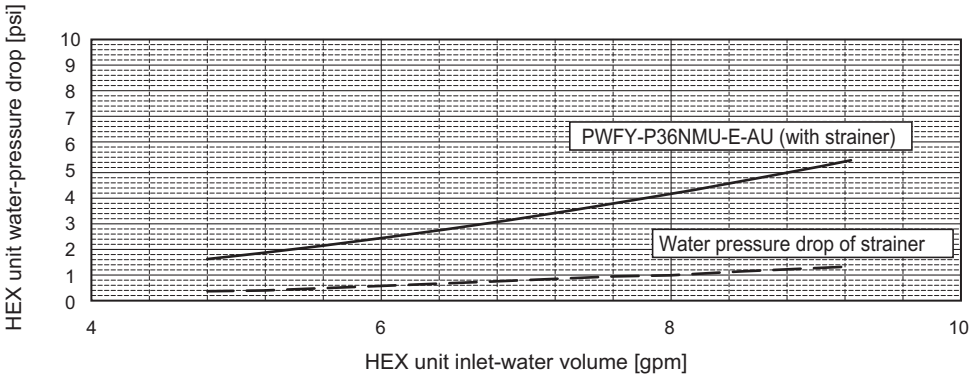


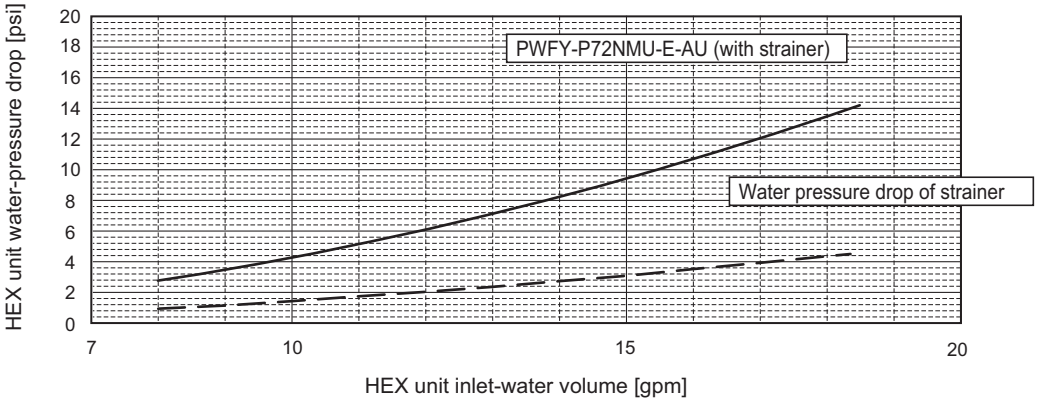


(6)-2 PWFY-P36, P72NMU-E-AU

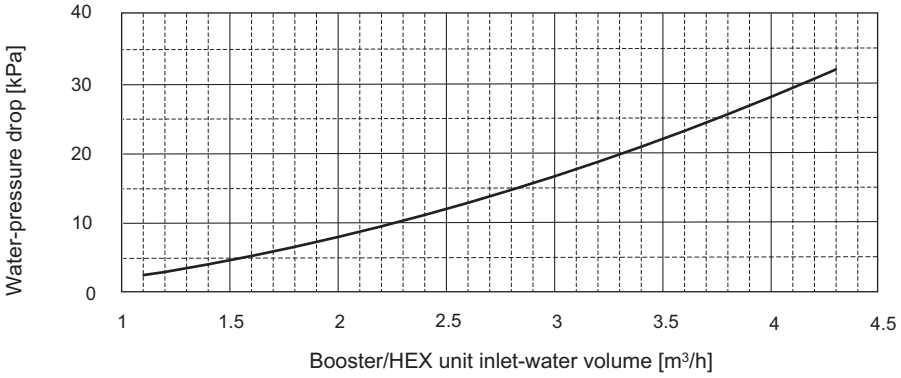


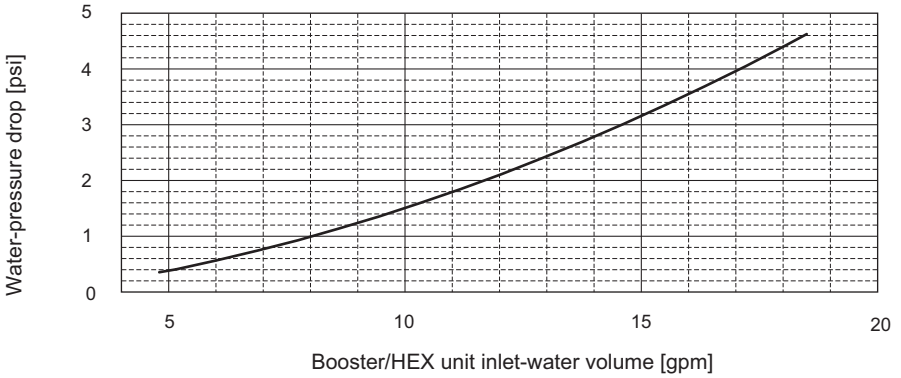






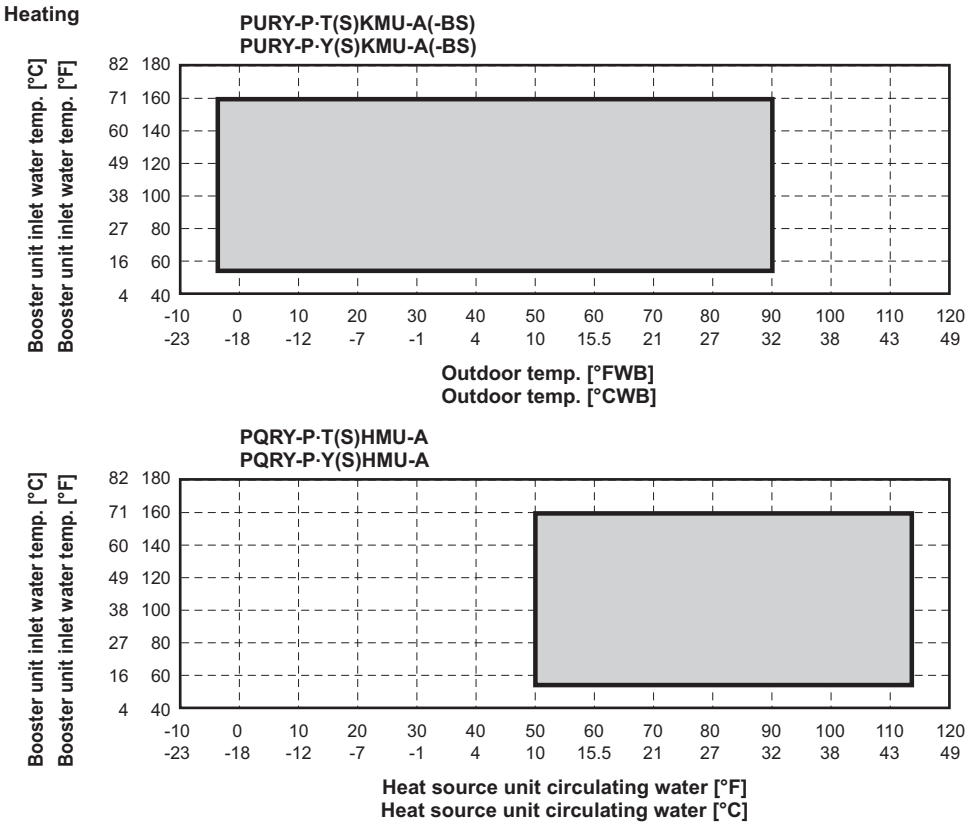
(6)-3 Water pressure drop of strainer only
(accessory for PWFY-P36NMU-E-BU and PWFY-P36/72NMU-E-AU)



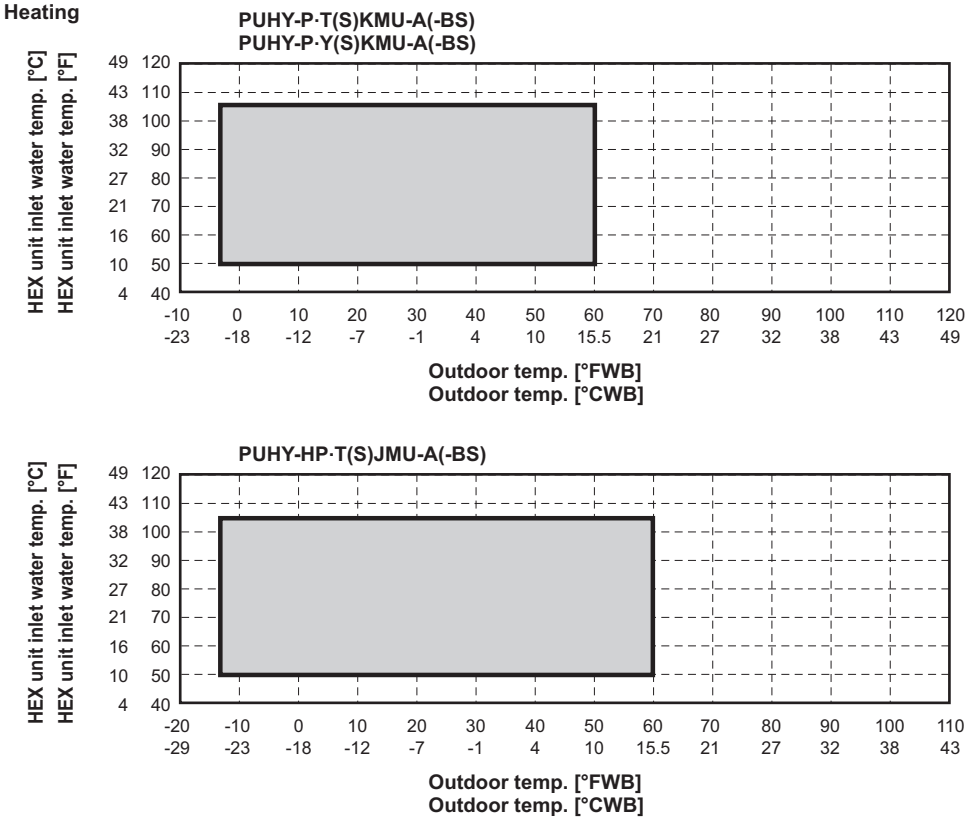


(7) Operation temperature range

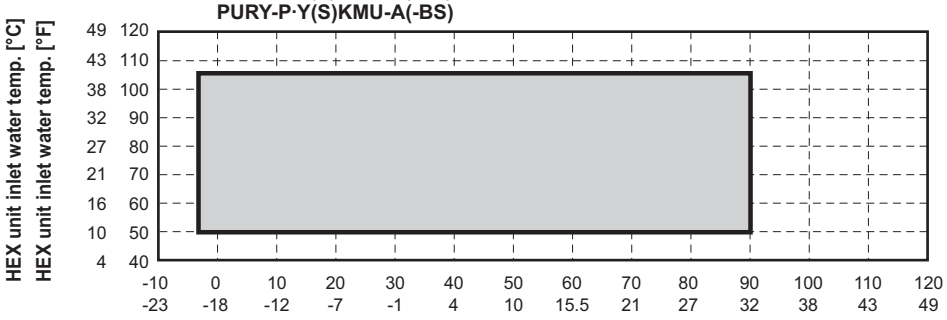
(7)-1 PWFY-P36NMU-E-BU



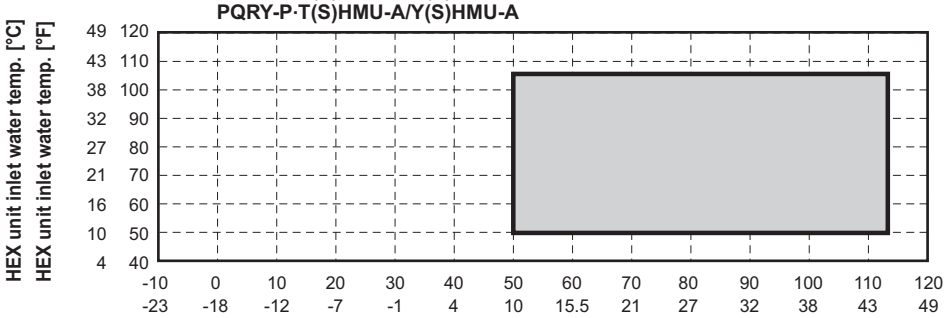
(7)-2 PWFY-P36, P72NMU-E-AU



PURY-P·T(S)KMU-A(-BS)
PURY-P·Y(S)KMU-A(-BS)

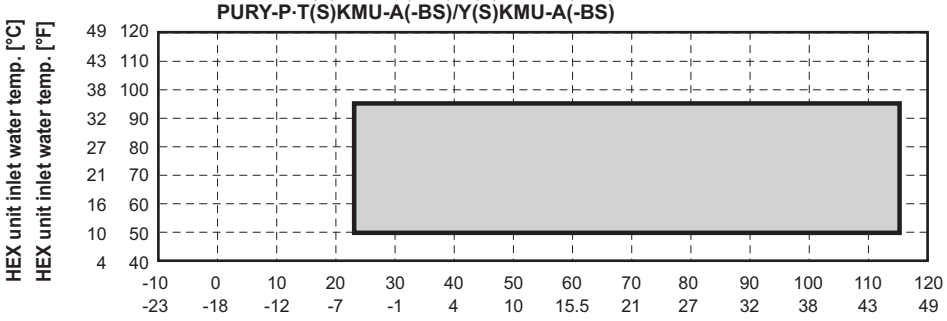


PQHY-P·T(S)HMU-A/Y(S)HMU-A
PQRY-P·T(S)HMU-A/Y(S)HMU-A

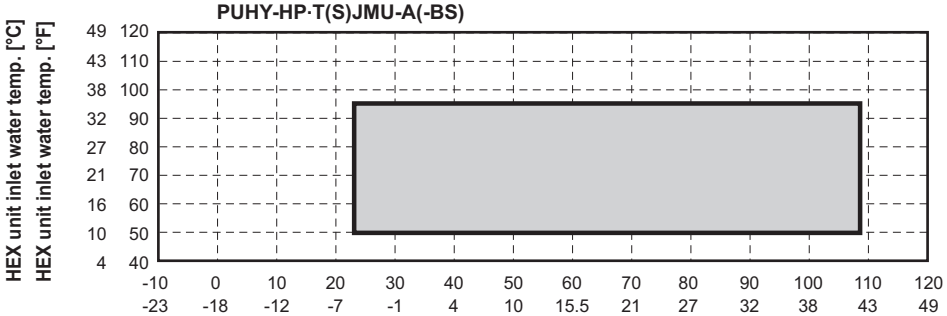


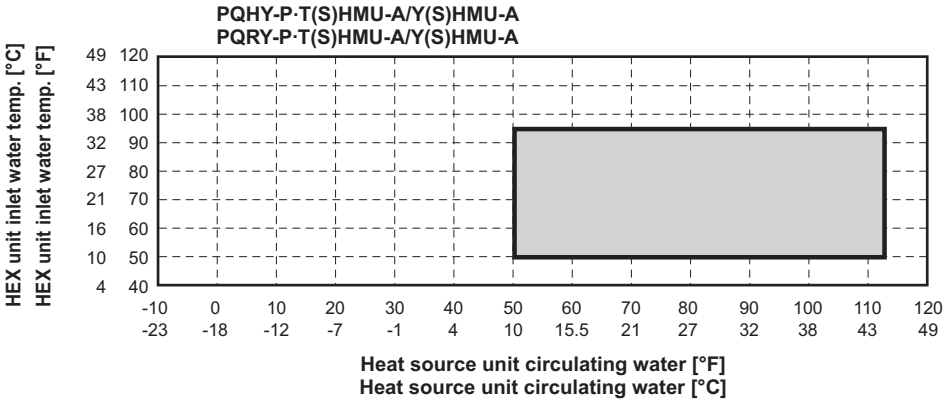
Cooling

PUHY-P·T(S)KMU-A(-BS)/Y(S)KMU-A(-BS)
PURY-P·T(S)KMU-A(-BS)/Y(S)KMU-A(-BS)



PUHY-HP·T(S)JMU-A(-BS)

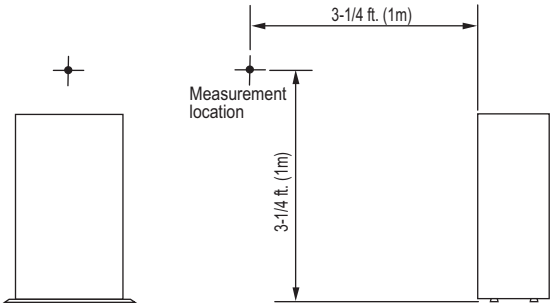



PQHY-P·T(S)HMU-A/Y(S)HMU-A
PQRY-P·T(S)HMU-A/Y(S)HMU-A
HEX unit inlet water temp. [°C]
HEX unit inlet water temp. [°F]
49 120
43 110
38 100
32 90
27 80
21 70
16 60
10 50
4 40
-10 0 10 20 30 40 50 60 70 80 90 100 110 120
-23 -18 -12 -7 -1 4 10 15.5 21 27 32 38 43 49
Heat source unit circulating water [°F]
Heat source unit circulating water [°C]

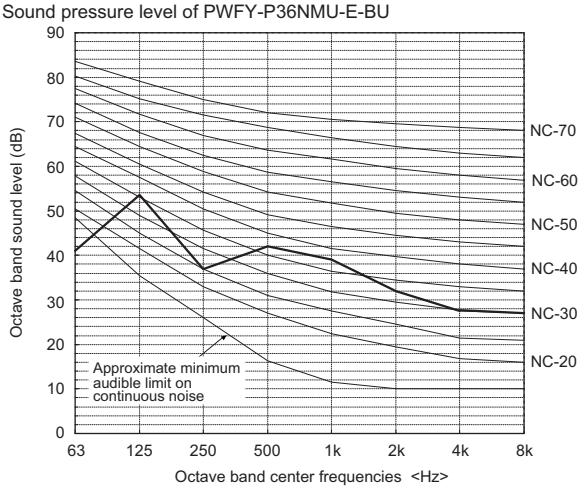
2. Sound pressure levels

(1) PWFY-P36NMU-E-BU

Measurement condition
PWFY-P36NMU-E-BU



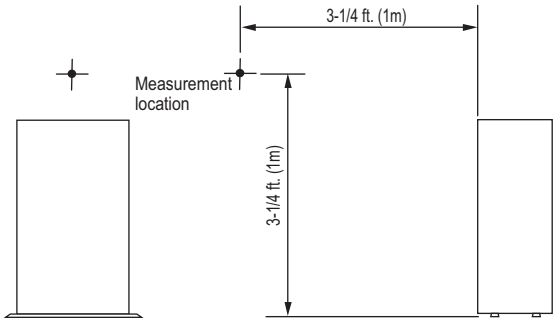
Sound pressure level of PWFY-P36NMU-E-BU



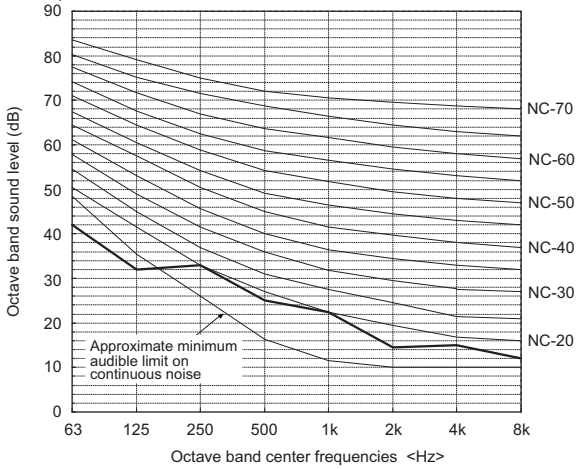
	63	125	250	500	1k	2k	4k	8k	dB(A)
60Hz	41.0	53.5	37.0	42.0	39.0	32.0	27.5	27.0	44.0

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

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



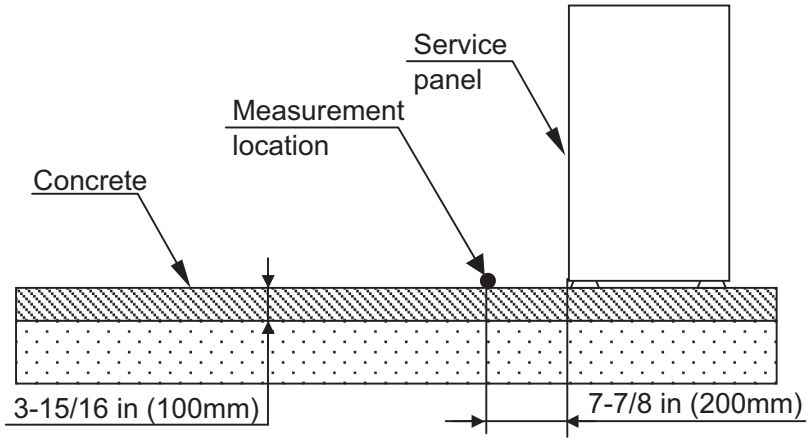
Sound pressure level of PWFY-P36, 72NMU-E-AU



	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

3. Vibration levels

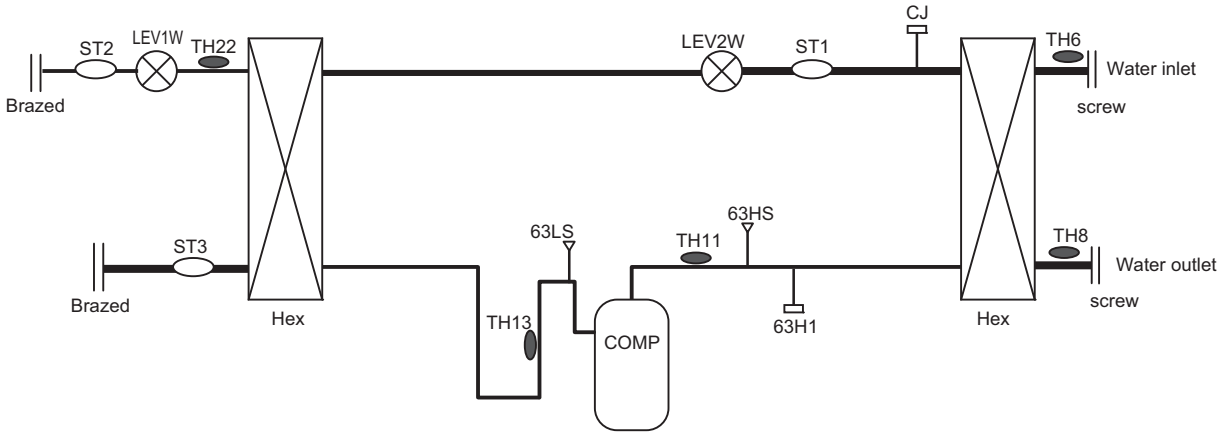
(1) PWFY-P36NMU-E-BU



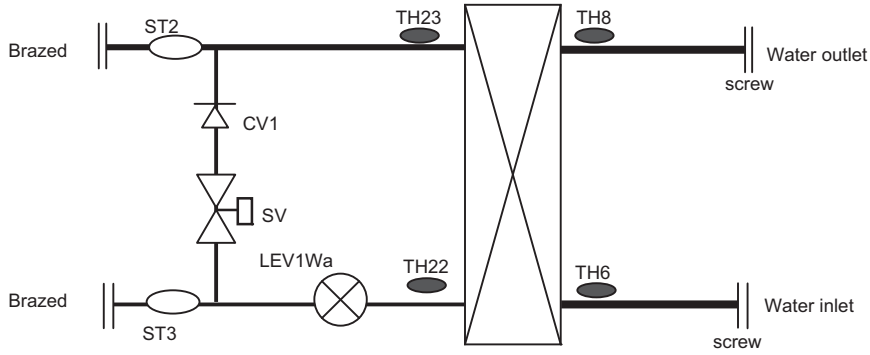
Model	Vibration Levels[dBA]
PWFY-P36NMU-E-BU	34

4. Refrigerant circuit diagrams and thermal sensors

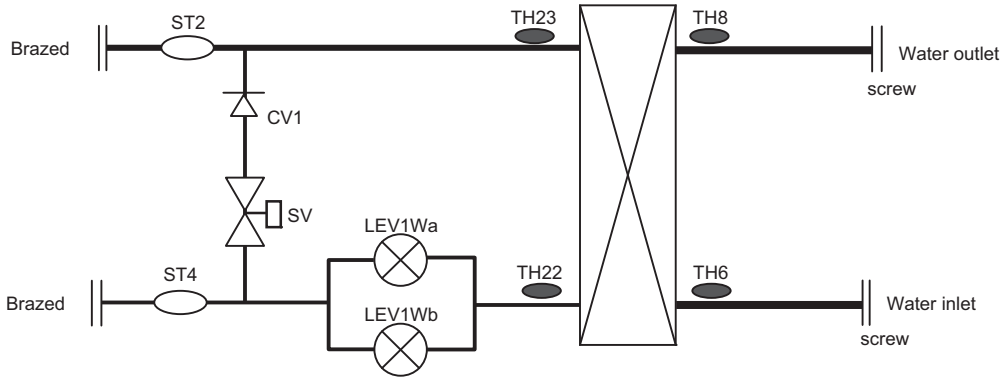
(1) PWFY-P36NMU-E-BU



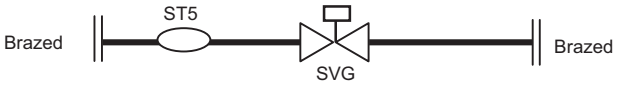
(2) PWFY-P36NMU-E-AU



(3) PWFY-P72NMU-E-AU

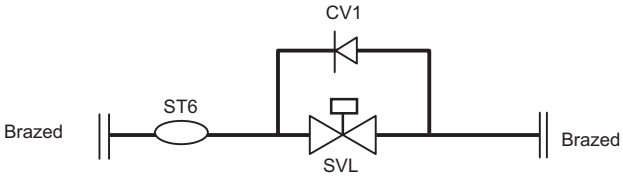


(4) PAC-SV02PW-E



Outdoor unit side

PWFY side



IV Installation

1. How to calculate the necessary heat capacity

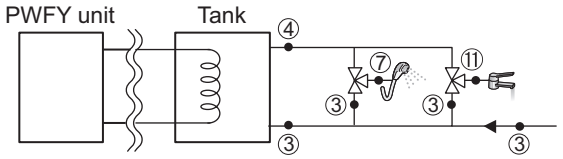
(1) Heating capacity calculation (Unit : °F/BTU/G)

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

⇩

⑳ units are required

(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

⇩

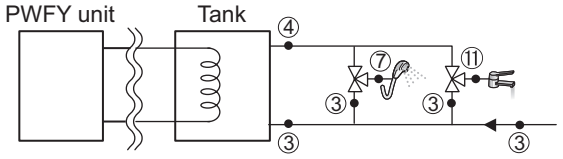
3 units are required

(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

(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

2. Installation

(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.**

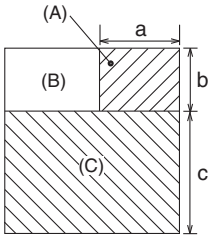
- The inverter equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the air conditioner to operate erroneously, or fail to operate. On the other hand, the air conditioner may affect such equipment by creating noise that disturbs medical treatment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

(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

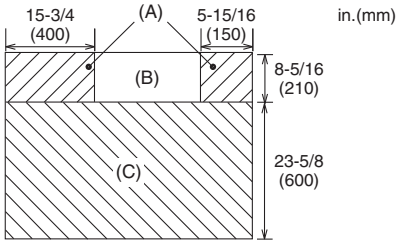


(A) Piping space (right side)
(B) Top view
(C) Service space (front side)

Unit : in (mm)

Model	PWFY-P36NMU-E-BU	PWFY-P36NMU-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)

•Solenoid valve kit



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

⚠ **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.

(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.

(2) Installing the unit

(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.

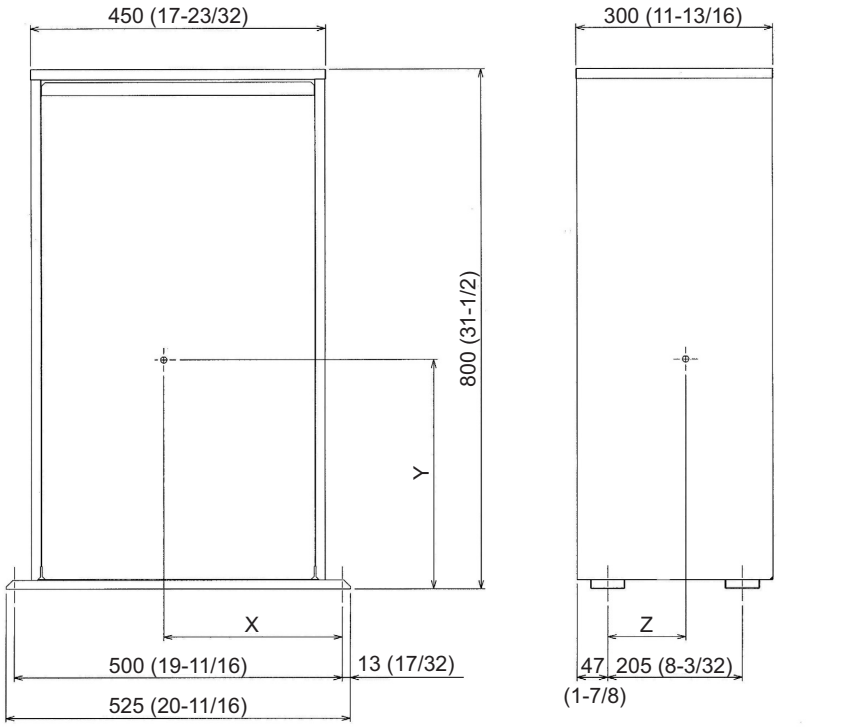
(2)-2 Product net weight

Model	PWFY-P36NMU-E-BU	PWFY-P36NMU-E-AU	PWFY-P72NMU-E-AU
Net weight	133 lbs (60 kg)	78 lbs (35 kg)	84 lbs (38 kg)

(2)-3 Center of gravity

(2)-3-1 PWFY-P36NMU-E-BU

unit : mm (in)

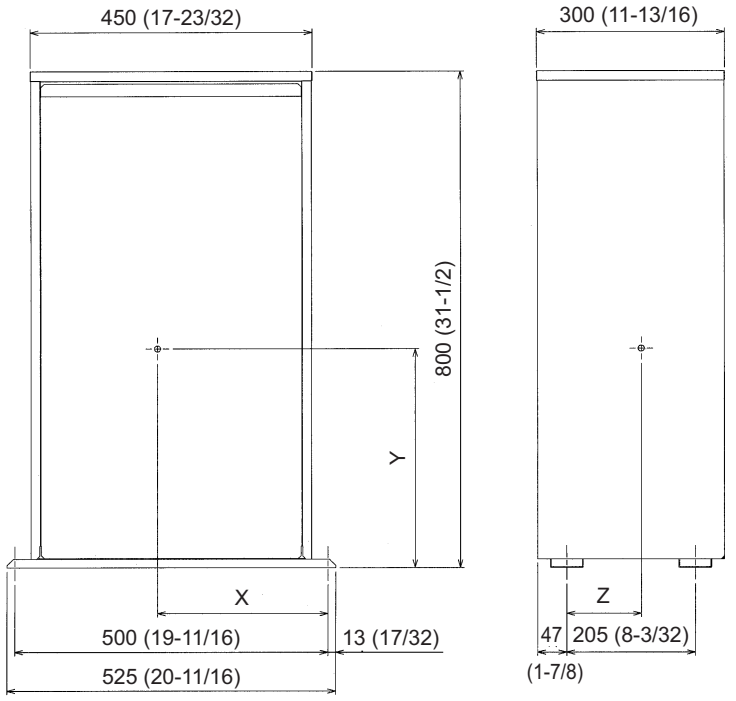


unit : mm (in)

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

(2)-3-2 PWFY-P36, P72NMU-E-AU

unit : mm (in)



unit : mm (in)

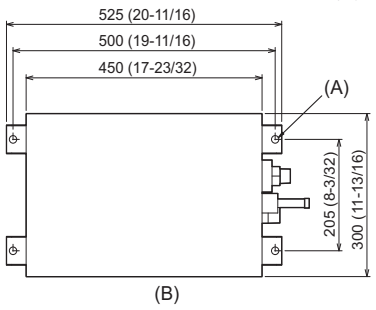
Model	X	Y	Z
PWFY-P36NMU-E-AU	289 (11-13/32)	346 (13-5/8)	103 (4-1/16)
PWFY-P72NMU-E-AU	277 (10-29/32)	347 (13-11/16)	99 (3-29/32)

(2)-4 Installation method

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

•PWFY unit

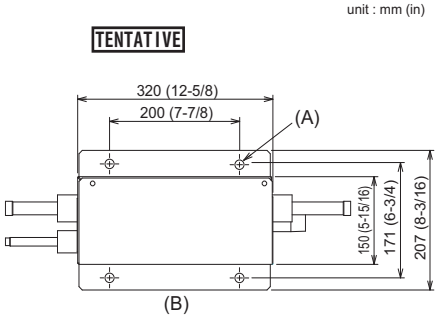
unit : mm (in)



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

•Solenoid valve kit

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.

(3) Refrigerant pipe and drain pipe specifications

(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.

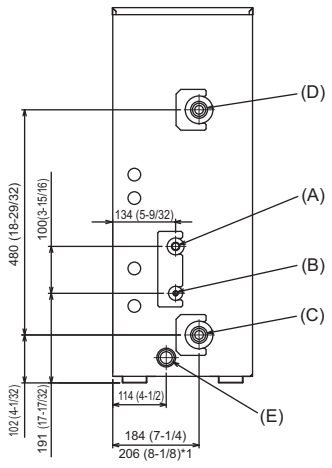
Unit : mm (in)

Model	PWFY-P36NMU-E-BU	PWFY-P36NMU-E-AU	PWFY-P72NMU-E-AU	PAC-SV02PW-E
Gas	ø15.88 (5/8)	ø15.88 (5/8)	ø19.05 (3/4)	Depends on the pipe diameter of the PWFY unit to be connected.
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.

(3)-2 Refrigerant pipe, drain pipe and filling port

•PWFY unit

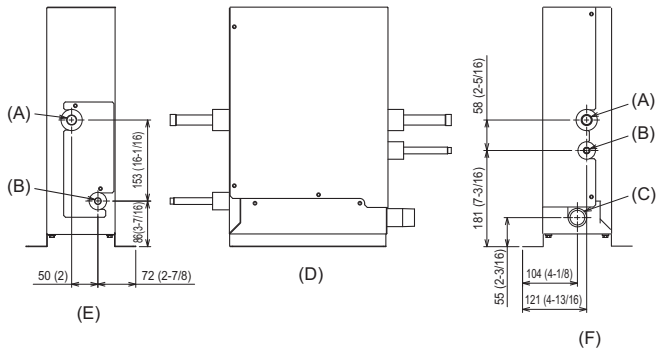


Unit: mm (in)

(A) Refrigerant piping (gas)
(B) Refrigerant piping (liquid)
(C) Water inlet
(D) Water outlet
(E) Drain outlet
*1: PWFY-P36, 72NMU-E-AU

•Solenoid valve kit

TENTATIVE



Unit: mm (in)

(A) Refrigerant piping (gas)
(B) Refrigerant piping (liquid)
(C) Drain outlet
(D) Front view
(E) Left side view
(F) Right side view

(4) Connecting refrigerant pipes and drain pipes

(4)-1 Refrigerant piping work

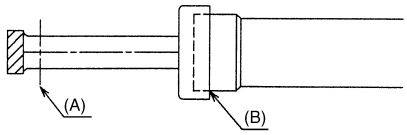
This piping work must be done in accordance with the installation manuals for both outdoor unit and BC controller (simultaneous cooling and heating R2 series).

- Series R2 is designed to operate in a system that the refrigerant pipe from an outdoor unit is received by BC controller and branches at the BC controller to connect between indoor units.
- The PWFY unit should be connected to 2 ports on the BC controller. (Set BC controller DIP SW 4-6 to ON)
- For constraints on pipe length and allowable difference of elevation, refer to the outdoor unit installation manual.
- The method of pipe connection is brazing connection.

⚠ **Caution:**

- **Install the refrigerant piping for the indoor unit in accordance with the following.**

1. Cut the tip of the indoor unit piping, remove the gas, and then remove the brazed cap.
   [Fig. IV. 2. (4). 1]



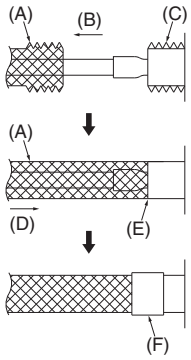
(A) Cut here
(B) Remove brazed cap

2. Pull out the thermal insulation on the site refrigerant piping, braze the unit piping, and replace the insulation in its original position.
   Wrap the piping with insulating tape.

Note:

- **Pay strict attention when wrapping the copper piping since wrapping the piping may cause condensation instead of preventing it.**

* Before brazing the refrigerant piping, **always wrap the piping on the main body, and the thermal insulation piping, with damp cloths to prevent heat shrinkage and burning the thermal insulation tubing.** Take care to ensure that the flame does not come into contact with the main body itself.
[Fig. IV. 2. (4). 2]



(A) Thermal insulation
(B) Pull out insulation
(C) Wrap with damp cloth
(D) Return to original position
(E) Ensure that there is no gap here
(F) Wrap with insulating tape

(4)-2 Mixed system of PWFY-AU and Indoor unit (Y, H2i, WY system)

Take one of the options listed below.
1) Install the External Solenoid Valve
   (External Solenoid Valve kit (PAC-SV02PW-E) will be available in the future.)
2) Add brine, assuming that the temperature will drop to -20°C.
   Set Dip SW 1-10 (on ATW unit) to ON if brine is added.
   See the section IV. 3. (9) for the brine concentration graphs.

* With the WY system, the above steps apply only when operating the WY at the water temperature below 10ºC.

(4)-3 PWFY-AU in cooling operation (Y, H2i, WY system)

Add brine, assuming that the temperature will drop to -20°C.
Set Dip SW 1-10 (on ATW unit) to ON if brine is added.

* With the WY system, the above steps apply only when operating the WY at the water temperature below 10ºC.

Cautions On Refrigerant Piping

- **Be sure to use non-oxidative brazing for brazing to ensure that no foreign matter or moisture enter into the pipe.**
- **Be sure to apply refrigerating machine oil over the flare connection seating surface and tighten the connection using a double spanner.**
- **Provide a metal brace to support the refrigerant pipe so that no load is imparted to the indoor unit end pipe. This metal brace should be provided 500 mm (19-11/16 in) away from the indoor unit's flare connection.**

⚠ **Warning:**

When installing and moving the unit, do not charge it with refrigerant other than the refrigerant (R407C or R22) specified on the unit.

- Mixing of a different refrigerant, air, etc. may cause the refrigerant cycle to malfunction and result in severe damage.

⚠ **Caution:**

- **Use refrigerant piping made of C1220 (CU-DHP) phosphorus deoxidized copper as specified in the JIS H3300 "Copper and copper alloy seamless pipes and tubes". In addition, be sure that the inner and outer surfaces of the pipes are clean and free of hazardous sulphur, oxides, dust/dirt, shaving particles, oils, moisture, or any other contaminant.**
- **Never use existing refrigerant piping.**

- The large amount of chlorine in conventional refrigerant and refrigerator oil in the existing piping will cause the new refrigerant to deteriorate.

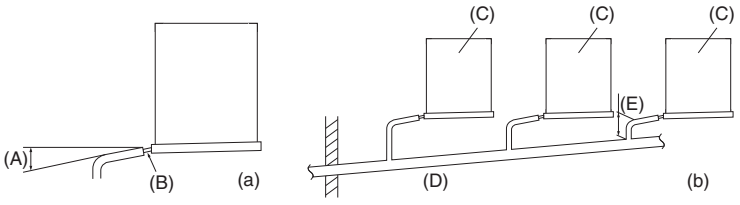
- **Store the piping to be used during installation indoors and keep both ends of the piping sealed until just before brazing.**

- If dust, dirt, or water gets into the refrigerant cycle, the oil will deteriorate and the compressor may fail.

(4)-4 Drain piping work

1. Ensure that the drain piping is downward (pitch of more than 1/100) to the outdoor (discharge) side. Do not provide any trap or irregularity on the way. (a)
2. Ensure that any cross-wise drain piping is less than 20 m (65 ft) (excluding the difference of elevation). If the drain piping is long, provide metal braces to prevent it from waving. Never provide any air vent pipe. Otherwise drain may be ejected.
3. Use a hard vinyl chloride pipe VP-25 (with an external diameter of 32 mm (1-9/32 in)) for drain piping.
4. Ensure that collected pipes are 100 mm (3-15/16 in) lower than the unit body's drain port as shown in (b).
5. Do not provide any odor trap at the drain discharge port.
6. Put the end of the drain piping in a position where no odor is generated.
7. Do not put the end of the drain piping in any drain where ionic gases are generated.

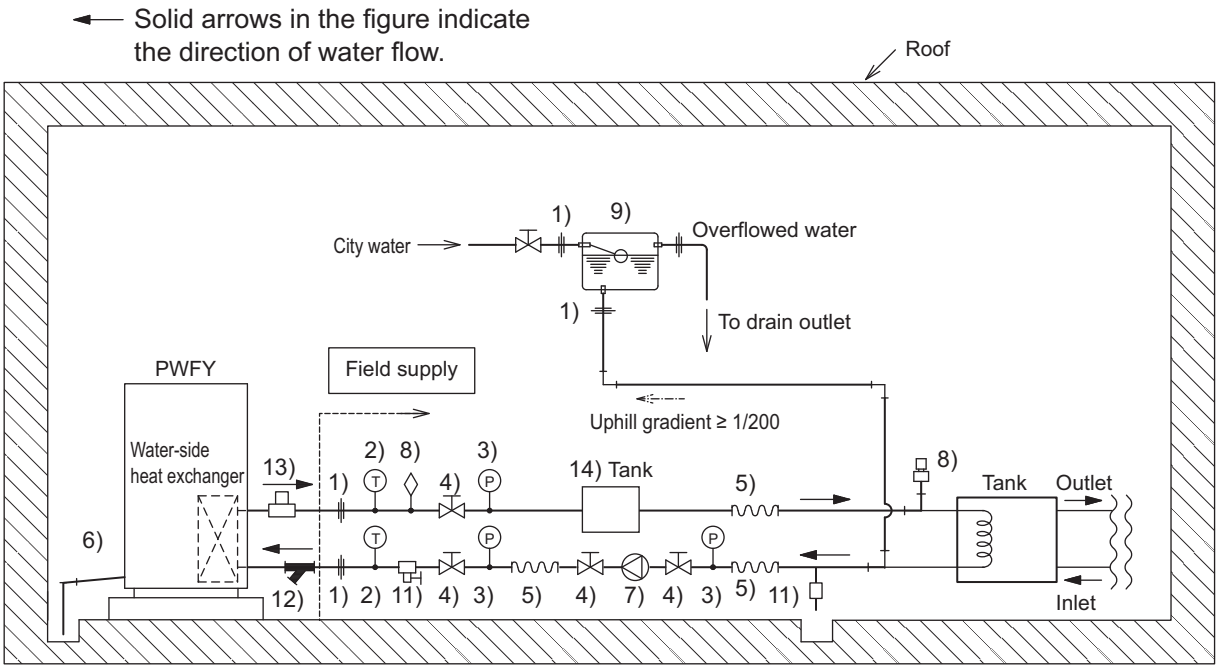
[Fig. IV. 2. (4).3]



(A) Downward slope 1/100 or more
(B) Drain hose
(C) Unit
(D) Collective piping
(E) Maximize this length to approx. 100 mm (3-15/16 in)

3. Water pipe installation

(1) Water circuit sample



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)

(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-E-AU	PT 3/4 Screw	PT 3/4 Screw
PWFY-P72NMU-E-AU *1 When the attached expansion joints are installed.	PT 1 Screw*1	PT 1 Screw*1

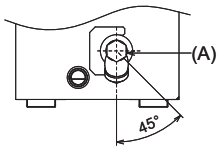
(2) Selecting a water pump

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

(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

(4) Precautions during installation

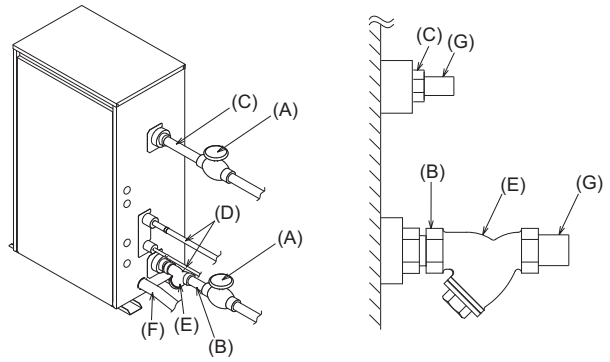
- Use the reverse-return method to insure proper pipe resistance to each unit.
- To insure easy maintenance, inspection, and replacement of the unit, use a proper joint, valve, etc. on the water intake and outlet port. In addition, be sure to install a strainer on the water intake pipe. (In order to 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-E-AU model, install the expansion joint (accessory) at the inlet after installing the strainer, and outlet.

(5) Example of unit installation

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

PWFY- P72NMU-E-AU



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

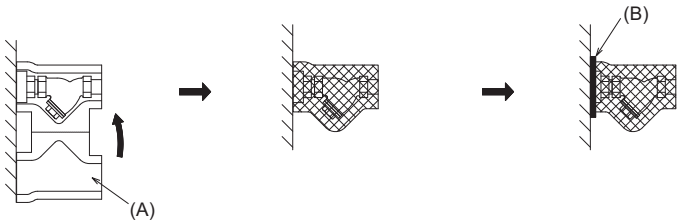
(6) Insulation installation

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-E-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.

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



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

(7) Flow switch installation

<Caution>

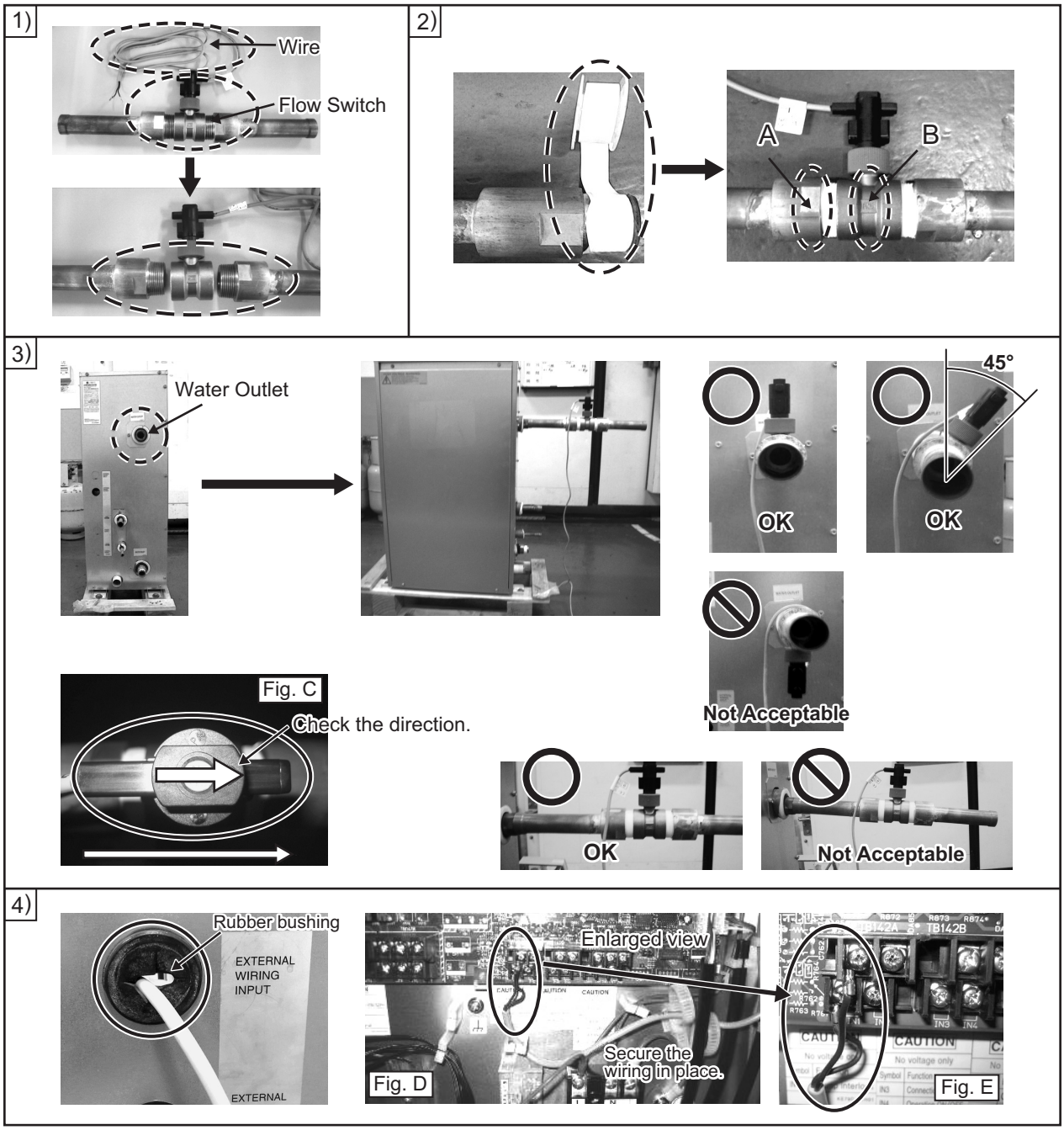
When installing the unit, be sure to install the supplied flow switch on the water outlet side of the unit and connect the wire to IN1 of TB142A on the unit.

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.



(8) 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 [300 or less]	30 or less [300 or less]	30 or less [300 or less]	30 or less [300 or less]	○	○
	(μ s/cm)	77 ˚F (25 ˚C)						
	Chloride ion	(mg Cl^-/liter)	50 or less	50 or less	30 or less	30 or less	○	
	Sulfate ion	(mg $SO4^{2-}$/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		○
Refer-ence 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.

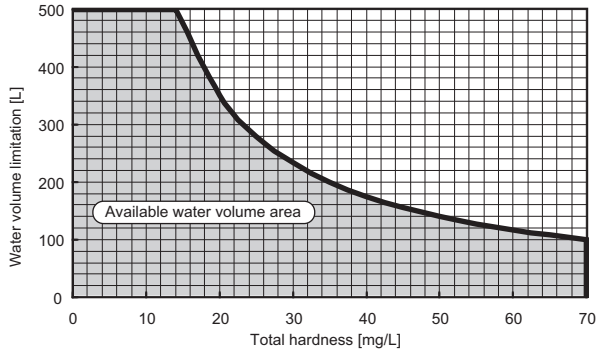
Corrosion can occur in cold-water systems even if there has been no prior signs of corrosion.

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.

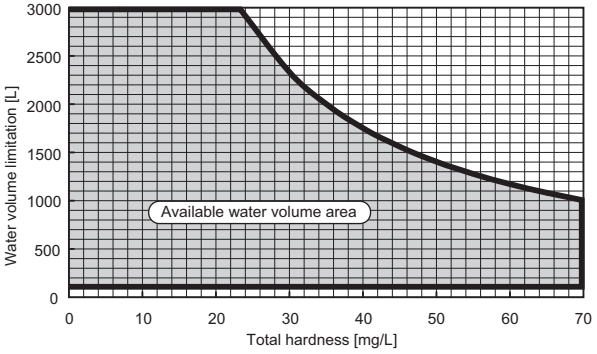
[Fig. IV. 3. (8).1] Maximum circulating water

PWFY-P36NMU-E-BU



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

PWFY-P36/72NMU-E-AU

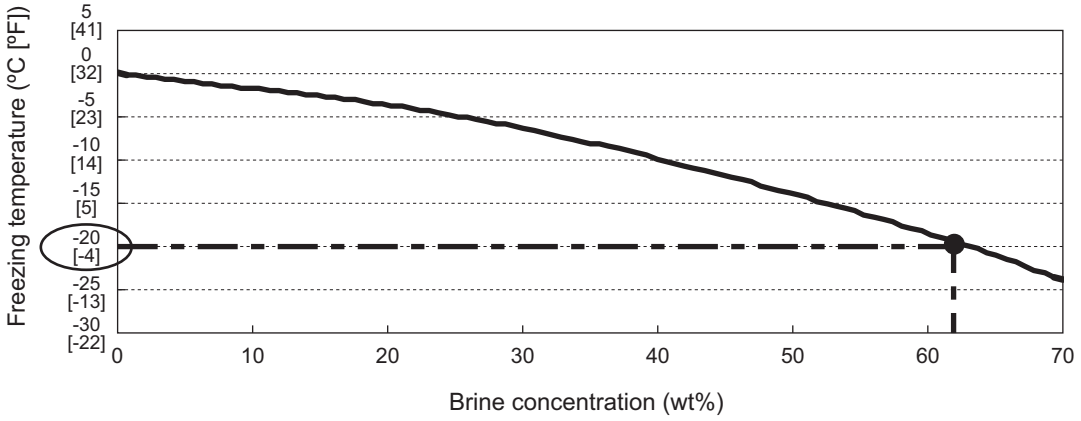


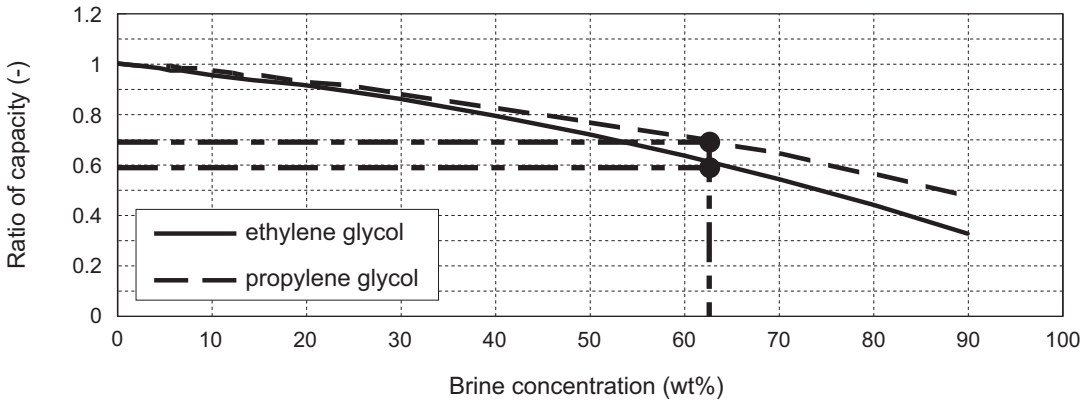
Condition: Water outlet temp. 113°F (45°C)

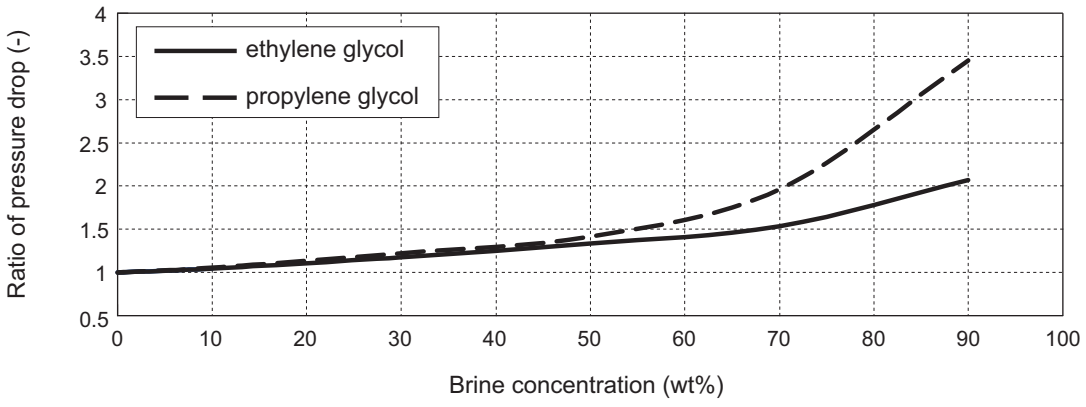
(9) Brine

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.



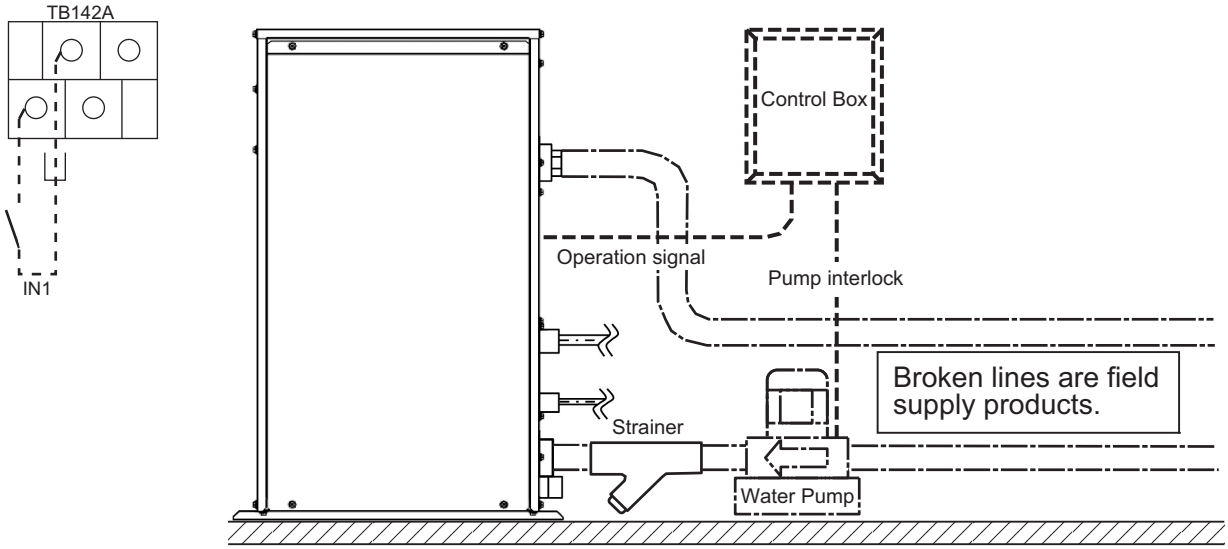




(10) Pump interlock

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]



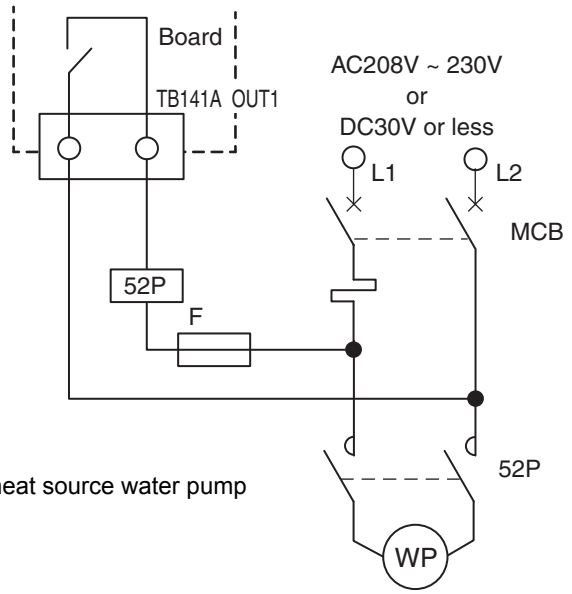
Example drawing for pump interlock

In the system including PWFY-P36/P72NMU-E-AU, the circulating water may freeze, and result in a unit malfunction.
Perform the electrical work as shown in [Fig. IV. 3. (10).2] to prevent water from freezing.
Set the DipSW as shown in the table below.

DipSW3-6	External output contact
ON	Effective when Thermo-ON
OFF	Effective when Operation-ON (Remote controller-ON)

Be sure to turn on the power supply of the pump, since the control does not work if the power supply of the pump is turnd off.
* Refer to (7) Flow switch installation for details.

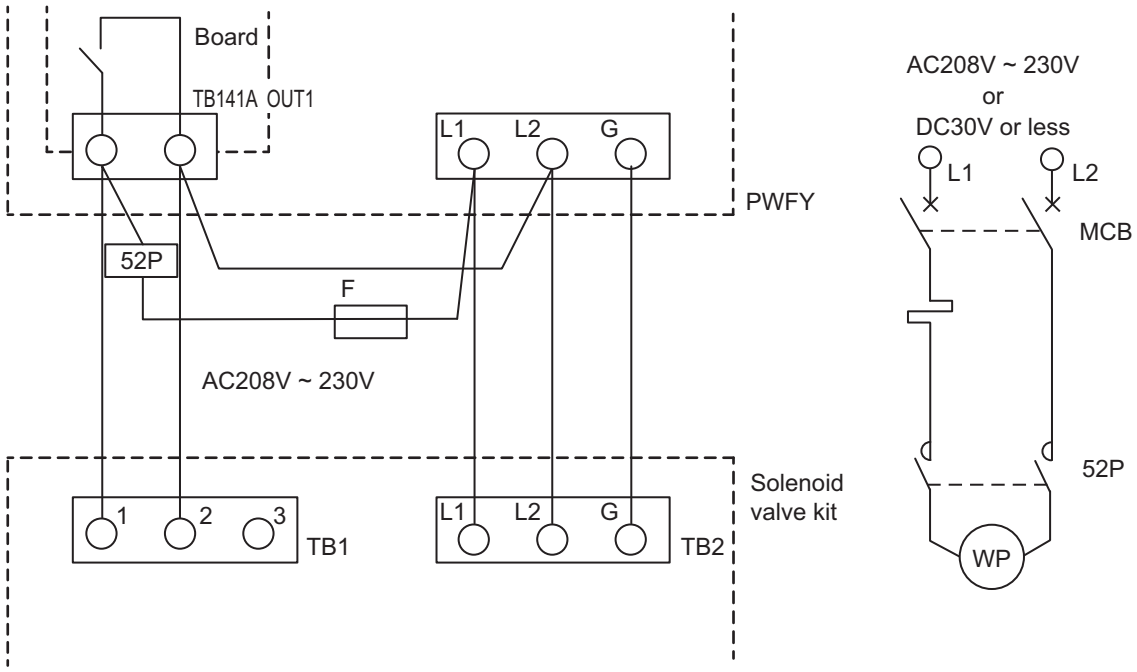
[Fig. IV. 3. (10).2]



F: Fuze
52P: Magnetic contactor for heat source water pump
MCB: Circuit breaker
WP: Water pump

In a system that includes PWFY-P36, 72NMU-E-AU, if the operation of the pump is interlocked with the operation of the air conditioning units AND if the Solenoid valve kit (PAC-SV02PW-E) is connected to the system, connect the wires as shown in [Fig. IV.3.(10).3]. Set Dip SW3-6 to ON, and make sure that the version of the software is 1.18 or later.

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



F: Fuze
52P: Magnetic contactor for heat source water pump
MCB: Circuit breaker
WP: Water pump

(11) Anti freeze mode (Dip SW4-4 ON)

Anti freeze mode is to prevent water pipe from freezing.
The Anti freeze mode can set the heating temperature range between 50ºF~113ºF(10ºC~45ºC) enabling the unit to maintain low water temperature to prevent water pipes from freezing.

V System Design

1. Electrical work

(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 **58**.

⚠ **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.

(2) Power supply for PWFY unit

(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-E-AU PWFY-P72NMU-E-AU	60Hz	208/230V	188 to 253V	0.072/0.065	0.09	15

Model	Power supply			RLA(A)
	Hz	Volts	Voltage range	
PAC-SV02PW-E	60Hz	208/230V	188 to 253V	0.073/0.085

(2)-2 Power cable specifications

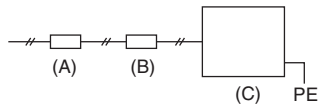
1-phase 2-wire, 208/230V,60Hz	Minimum wire thickness(mm^2/AWG)			Switch(A)		Breaker for wiring (NFB)	Breaker for current leakage
	Main cable	Branch	Ground	Capacity	Fuse		
PWFY-P36NMU-E-BU	2.5/12	-	2.5/12	25	25	25	25A 30mA or 100mA 0.1sec. or less

1-phase 2-wire, 208/230V,60Hz	Minimum wire thickness(mm^2/AWG)			Switch(A)		Breaker for wiring (NFB)	Breaker for current leakage
	Main cable	Branch	Ground	Capacity	Fuse		
PWFY-P36NMU-E-AU PWFY-P72NMU-E-AU	1.5/14	-	1.5/14	15	15	15	15A 30mA or 100mA 0.1sec. or less

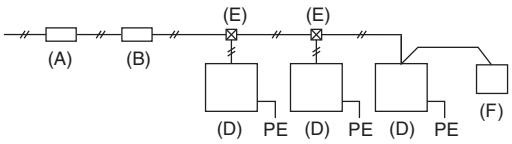
Model	Minimum wire thickness(mm^2/AWG)		
	Main cable	Branch	Ground
PAC-SV02PW-E	1.5/14	-	1.5/14

[Fig. V. 1.(2).1]

PWFY-P36NMU-E-BU



PWFY-P36, 72NMU-E-AU

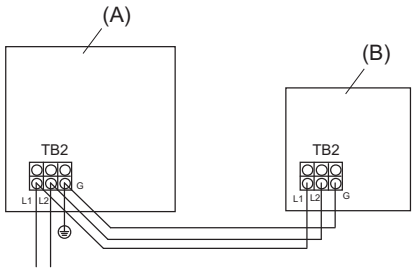


(A) Breaker for current leakage
(B) Local switch or breakers for wiring
(C) PWFY-P36NMU-E-BU
(D) PWFY-P36, 72NMU-E-AU
(E) Pull box
(F) PAC-SV02PW-E

(2)-3 When a solenoid valve kit is connected

- Connect the solenoid valve kit TB2 and PWFY TB2.
- Run the power supply wire through the access hole for power supply wire on the PWFY unit. If the hole is already used to run other wires from the existing PWFY units, use any other wire access holes except the control wire access hole.

[Fig. V. 1.(2).2]



(A) PWFY-P-NMU-E-AU
(B) PAC-SV02PW-E

⚠ **Caution:**

Do not use anything other than the correct capacity breaker and fuse. Using fuse, wire or copper wire with too large capacity may cause a risk of malfunction or fire.

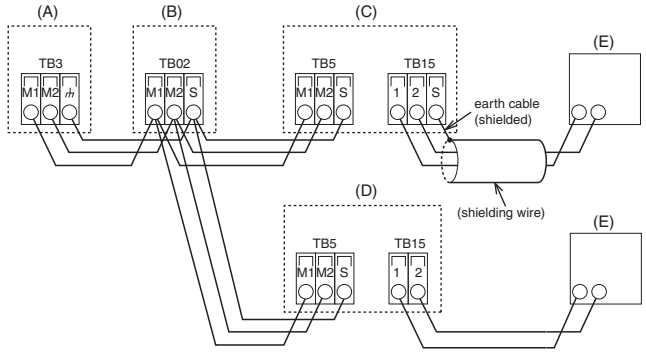
(3) Connecting remote controller, indoor and outdoor transmission cables

- Connect unit TB5 and outdoor unit TB3. (Non-polarized 2-wire (shield))
  The “S” on unit TB5 is a shielding wire connection. For specifications about the connecting cables, refer to the outdoor unit installation manual.
- Install a remote controller following the manual supplied with the remote controller.

(3)-1 Power supply examples

(3)-1-1 Using MA Remote controller (Remote controller is optionally available)

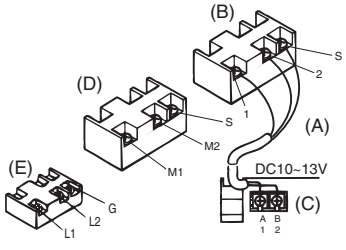
- Connect the “1” and “2” on unit TB15 to a MA remote controller. (Non-polarized 2-wire)
  [Fig. V. 1. (3). 1] MA Remote controller



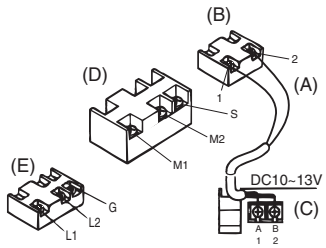
(A) Outdoor unit
(B) BC controller
(C) PWFY-P36NMU-E-BU
(D) PWFY-P36, 72NMU-E-AU
(E) MA remote controller

- DC 10 to 13 V between 1 and 2 (MA remote controller)
  [Fig. V. 1. (3). 2] MA Remote controller

PWFY- P36NMU-E-BU



PWFY- P36, 72NMU-E-AU



(A) Non-polarized
(B) TB15 (MA remote controller cables)
(C) MA remote Controller
(D) TB5 (Transmission cables)
(E) TB2 (Power supply wiring)

- The MA remote controller cannot be used at the same time or interchangeably.

Note:

Ensure that the wiring is not pinched when fitting the terminal box cover. Pinching the wiring may cut it.

⚠ **Caution:**

- Use wire with supplemental insulation.
- Input to TB142A, TB142B, and TB142C should not carry voltage.
- Cables from equipment connected to external input/output should have supplemental insulation.
- Use a single multiple-core cable for external input/output to allow for connection to the PG screw.

⚠ **Caution:**

Wire the power supply so that no tension is imparted. Otherwise disconnection, heating or fire result.

(4) Transmission cable specifications

(4)-1 Transmission cables

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-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 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

(5) Connecting electrical connections

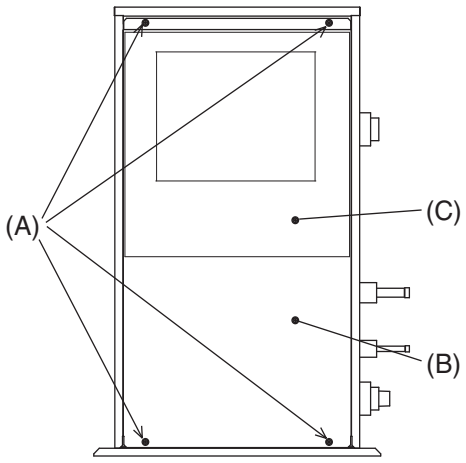
Verify that the model name on the operating instructions on the cover of the control box is the same as the model name on the nameplate.

Step 1

Remove the screws holding the terminal box cover in place.

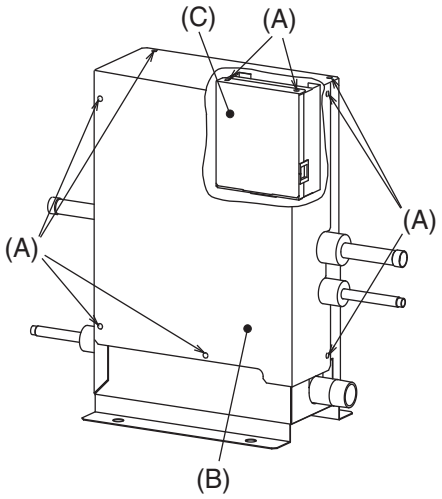
[Fig. V.1.(5).1]

•PWFY unit



(A) Screws
(B) Front panel
(C) Control box

•Solenoid valve kit



Note:

Ensure that the wiring is not pinched when fitting the terminal box cover. Pinching the wiring may cut it.

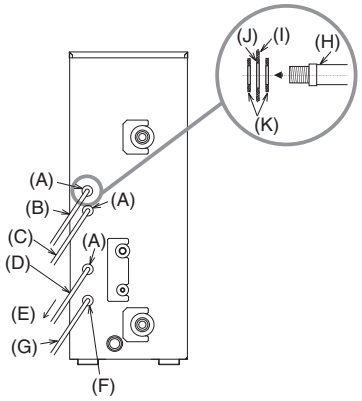
⚠ **Caution:**

Install wiring so that it is not tight and under tension. Wiring under tension may break, or overheat and burn.

- Fix power source external input/output line wiring to control box by using buffer bushing for tensile force to prevent electric shock. (PG connection or the like.) Connect transmission wiring to transmission terminal block through the knockout hole of control box using ordinary bushing.
- After wiring is complete, make sure again that there is no slack on the connections, and attach the cover onto the control box in the reverse order removal.

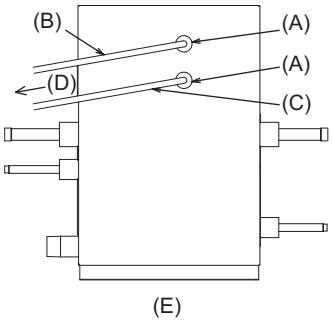
[Fig. V. 1.(5).2]

•PWFY unit



(A) To prevent external tensile force from applying to the wiring connection section of power source terminal block use buffer bushing like PG connection or the like.
(B) External signal input cable (C) External signal output cable
(D) Power source wiring (E) Tensile force
(F) Use ordinary bushing
(G) Transmission cable and MA remote controller cable
(H) Conduit (I) Side frame
(J) Knockout hole (for power source wiring)
(K) Washer (accessory)

•Solenoid valve kit



(A) To prevent external tensile force from applying to the wiring connection section of power source terminal block use buffer bushing like PG connection or the like.
(B) External signal input cable
(C) Power source wiring
(D) Tensile force
(E) Back view

⚠ **Caution:**

Wire the power supply so that no tension is imparted. Otherwise disconnection, heating or fire result.

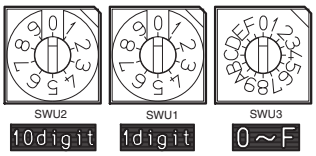
(6) Address setting

(6)-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

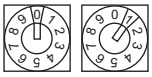
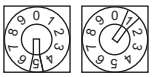
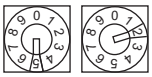
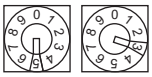
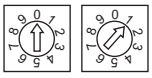
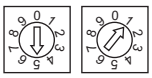
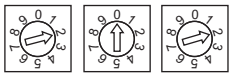
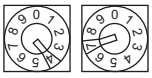
Example: If Address is “3”, remain SWU2 (for over 10) at “0”, and match SWU1 (for 1 to 9) with “3”.

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.

(6)-2 Rule of setting address

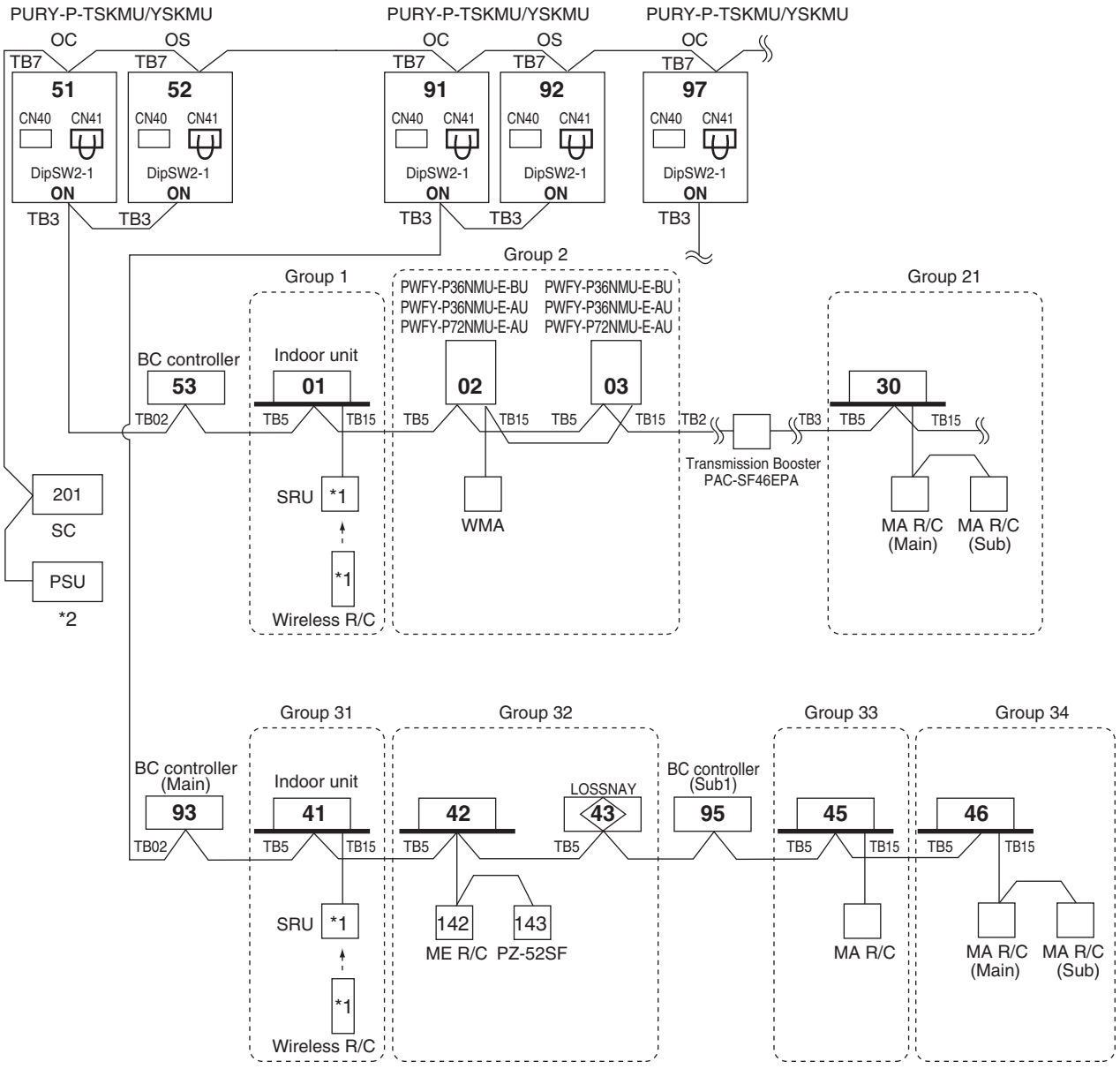
Unit		Address setting	Example	Note
PWFY unit Standard indoor unit		01 ~ 50		Use the most recent address within the same group of indoor units. Make the indoor units address connected to the BC controller (Sub) larger than the indoor units address connected to the BC controller (Main). If applicable, 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	ON/OFF remote controller	000, 201 ~ 250		
	AG-150A GB-50ADA GB-24A AT-50A	000, 201 ~ 250	0,2 0~5 0~9 100 10 1	
	PAC-YG50ECA	000, 201 ~ 250	0,2 0~5 0~9 100 10 1	* Settings are made on the initial screen of AG-150A.
	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.

(6)-3 System examples

(6)-3-1 MA remote controller, Multi-refrigerant-system, System Controller at TB7 side, Booster for long M-NET wiring

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



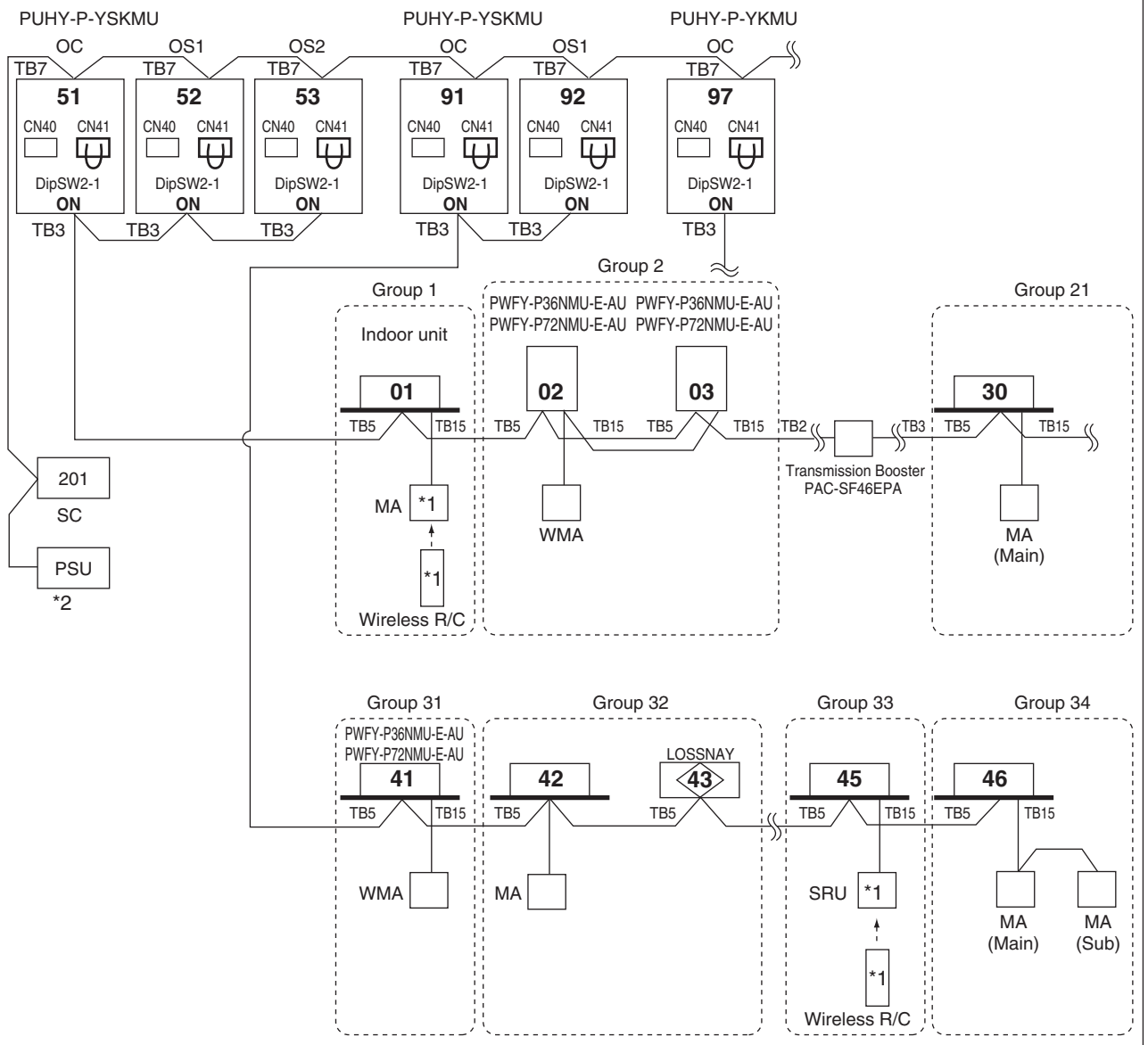
*1 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

*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. The power balance is needed to consider for long M-NET wiring. Details refer to Data book SYSTEM DESIGN, R2 SERIES, **2-3 "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-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:

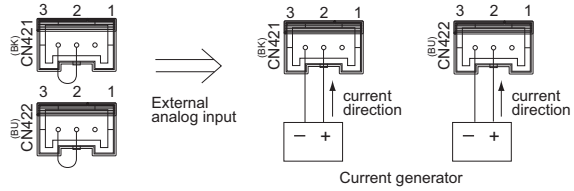
1. Outdoor units OC, OS1 and OS2 in one refrigerant circuit system are automatically detected.
   OC, OS1 and OS2 are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.
2. Address should be set to Indoor units, LOSSNAY and central 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. The power balance is needed to consider for long M-NET wiring. Details refer to Data book SYSTEM DESIGN, Y SERIES, **2-3 "System configuration restrictions".**

(7) 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.

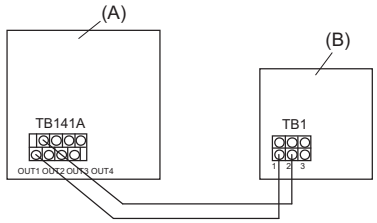
Refer to Table V. 1.(7).1 for information about each contact.

The current and voltage in the circuit to be connected to external output terminal (TB141A OUT1) must meet the following conditions.

When a solenoid valve kit is connected

- Connect the "1" and "2" on solenoid valve kit TB1 to the OUT1 on PWFY external output terminal.
- Run the external signal input cable through the access hole for external wiring output wire on the PWFY unit.
  If the hole is already used to run other wires from the existing PWFY units, use any other wire access holes except the control wire access hole.

[Fig. V. 1.(7).2]



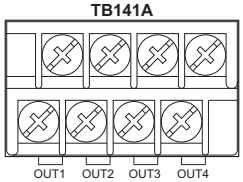
(A) PWFY-P-NMU-E-AU
(B) PAC-SV02PW-E

		Contact rating current
Contact rating voltage	AC250V	1A or less
	AC125V	3A or less
	DC30V	3A or less

Table V. 1.(7).1

OUT1	Operation ON/OFF
OUT2	Defrost
OUT3 *7	Compressor
OUT4	Error signal

[Fig. V. 1.(7).3]



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.

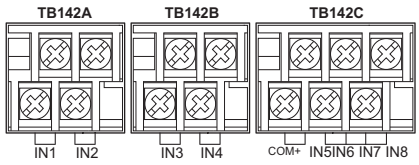
The specifications of the relay circuit to be connected must meet the following conditions.

Contact rating voltage >= DC15V

Contact rating current >= 0.1A

Minimum applicable load =< 1mA at DC

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



[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

*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.

*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).

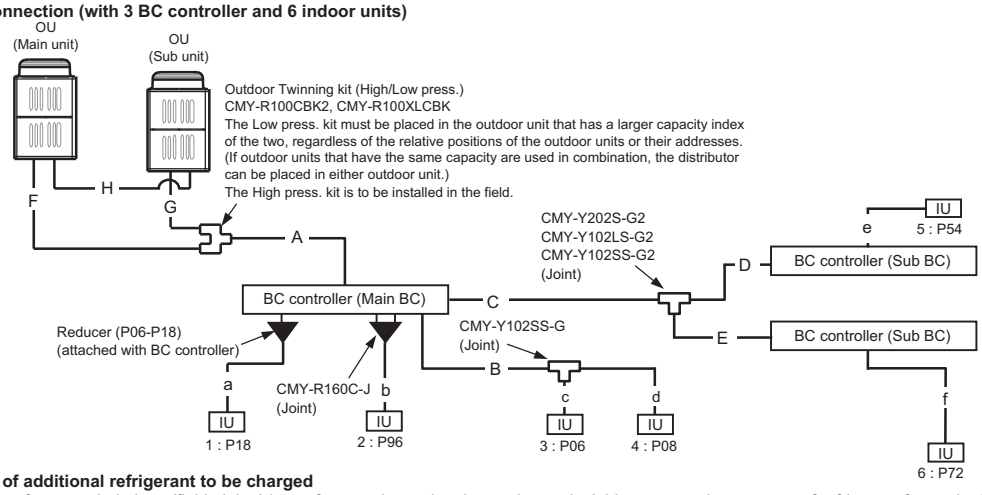
Note: Dip S/W 1-1 OFF: Water Inlet Temp.
Dip S/W 1-1 ON : Water Outlet Temp.
The factory setting for Dip SW 1-1 is OFF.

Signal priority = External input > centralized controller > remote controller

2. Piping Design

(1) Refrigerant charging caluculation (R2 system)

Sample connection (with 3 BC controller and 6 indoor units)



■Amount of additional refrigerant to be charged

Refrigerant for extended pipes (field piping) is not factory-charged to the outdoor unit. Add an appropriate amount of refrigerant for each pipes on site.
Record the size of each high pressure pipe and liquid pipe, and the amout of refrigerant that was charged on the outdoor unit for future reference.

■Calculating the amount of additional refrigerant to be charged

The amount of refrigerant to be charged is calculated with the size of the on-site-installed high pressure pipes and liquid pipes, and their length.
Calculate the amount of refrigerant to be charged according to the formula below.
Round up the calculation result to the nearest 0.1kg[4oz]. (i.e., 16.08 kg = 16.1 kg)

<Amount of additional refrigerant to be charged>

■Calculating the amount of additional refrigerant to be charged

Additional refrigerant charge	=	High pressure pipe size Total length of ø 28.58mm[1-1/8 in]	+	High pressure pipe size Total length of ø 22.2mm[7/8 in]	+	High pressure pipe size Total length of ø 19.05mm[3/4 in]	+	High pressure pipe size Total length of ø 15.88mm[5/8 in]
(kg)[oz]		(m) × 0.36(kg/m) (ft) × 3.88(oz/ft)		(m) × 0.23(kg/m) (ft) × 2.48(oz/ft)		(m) × 0.16(kg/m) (ft) × 1.73(oz/ft)		(m) × 0.11(kg/m) (ft) × 1.19(oz/ft)

+	Liquid Piping size Total length of ø 15.88mm[5/8 in]	+	Liquid Piping size Total length of ø 12.7mm[1/2 in]	+	Liquid Piping size Total length of ø 9.52mm[3/8 in]	+	Liquid Piping size Total length of ø 6.35mm[1/4 in]
	(m) × 0.2(kg/m) (ft) × 2.16(oz/ft)		(m) × 0.12(kg/m) (ft) × 1.30(oz/ft)		(m) × 0.06(kg/m) (ft) × 0.65(oz/ft)		(m) ×0.024(kg/m) (ft) ×0.26(oz/ft)

+	Total Outdoor Unit Model Name	Charged amount per BC controller (Standard / Main)
	P72	3.0 kg [106 oz]
	P96	4.5 kg [160 oz]
	P120	
	P144	6.0 kg [212 oz]
	P168	
	P192	
	P216	
	P240	
	P264	
	P288	

+	BC controller (Main) HA-Type
	2.0 kg [71 oz]

+	BC controller (Sub) Total Units	BC controller (Sub) Per Unit
	1	1.0 kg [36 oz]
	2	2.0 kg [71 oz]

+	Total Capacity of Connected Indoor Units	Charged amount
	Models ~ 27	2.0 kg [71 oz]
	Models 28 ~ 54	2.5 kg [89 oz]
	Models 55 ~ 126	3.0 kg [106 oz]
	Models 127 ~ 144	3.5 kg [124 oz]
	Models 145 ~ 180	4.5 kg [159 oz]
	Models 181 ~ 234	5.0 kg [177 oz]
	Models 235 ~ 273	6.0 kg [212 oz]
	Models 274 ~ 307	8.0 kg [283 oz]
	Models 308 ~ 342	9.0 kg [318 oz]
	Models 343 ~ 411	10.0 kg [353 oz]
	Models 412 ~	12.0 kg [424 oz]

+	Total Outdoor Unit Model Name		Charged amount for outdoor unit (s)
	Single	P72	0.0 kg [0 oz]
		P96	1.0 kg [36 oz]
		P120	5.5 kg [195 oz]
		P144	5.5 kg [195 oz]
	Combination	P144	0.0 kg [0 oz]
		P168	1.0 kg [36 oz]
		P192	2.0 kg [71 oz]
		P216	6.5 kg [230 oz]
		P240	11.0 kg [389 oz]
		P264	11.0 kg [389 oz]
		P288	11.0 kg [389 oz]

■Maximum refrigerant charge

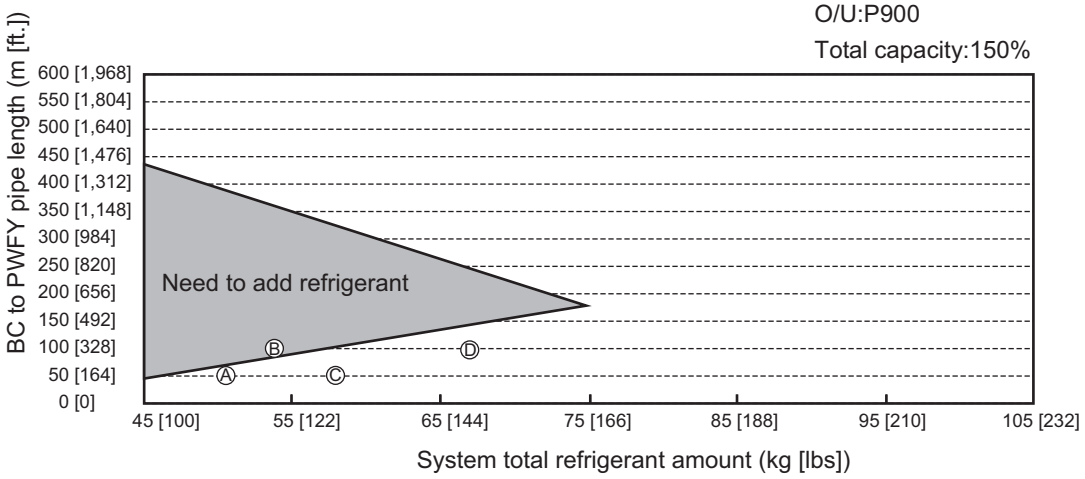
There is a limit to the amount of refrigerant that can be charged into a unit. Regardless of the amount yielded by the formula above, observe the maximum refrigerant charge in the table below.

Total index of the outdoor units	P72	P96	P120	P144	P168	P192	P216	P240	P264	P288
Maximum *1 refrigerant charge	39.0kg [86LBS]	47.3kg [104LBS 3oz]	52.8kg [116LBS 5oz]	58.5kg [129LBS]	73.0kg [161LBS]	86.3kg [190LBS 3oz]	104.6kg [230LBS 6oz]	107.1kg [236LBS 2oz]	115.1kg [253LBS 8oz]	115.1kg [253LBS 8oz]

*1 Maximum refrigerant charge: the amount of factory-charged refrigerant and the amount of refrigerant to be added on site

(2) Refrigerant charging caluculation (PWFY-AU with R2 system)

It is needed to add extra refrigerant if the system is under the following conditions.
See the attachment for how to decide the amount of refrigerant to be added to each outdoor unit.
The graph below shows an example.



Ⓐ Main pipe: 40m [131ft.]
PWFY: P200 x 4, Pipe 12.5m [41ft.] each

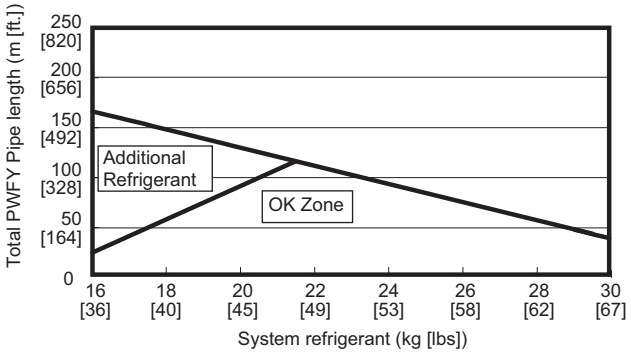
Ⓑ Main pipe: 40m [131ft.]
PWFY: P200 x 4, Pipe 25m [82ft.] each

Ⓒ Main pipe: 40m [131ft.]
PWFY: P200 x 2, Pipe 25m [82ft.] each
IC: P50 x 10, Pipe 20m [65ft.] each (100%)

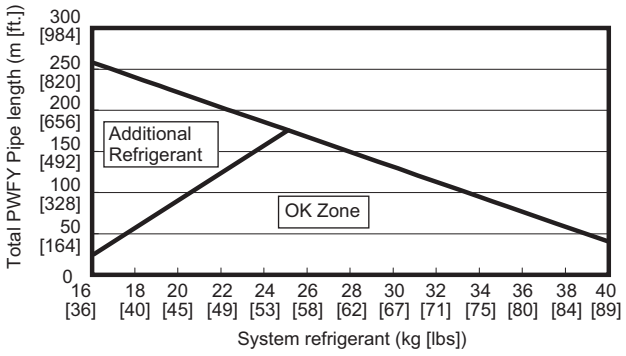
Ⓓ Main pipe: 40m [131ft.](BC) + 20m [65ft.](BS)
PWFY: P200 x 4, Pipe 25m [82ft.] each
IC: P50 x 11, Pipe 20m [65ft.] each (150%)

Extra charge amount (kg [lbs]): BC to PWFY pipe length (m [ft.]) × 0.1

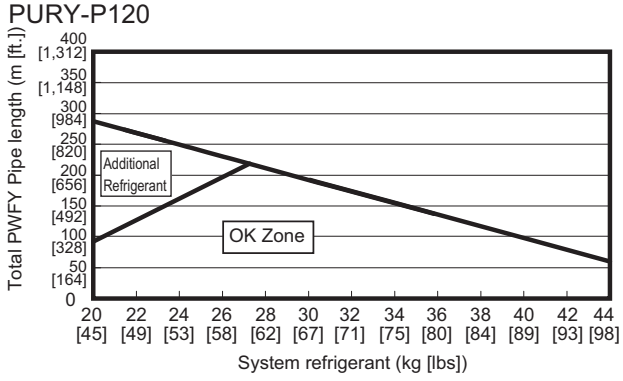
PURY-P72



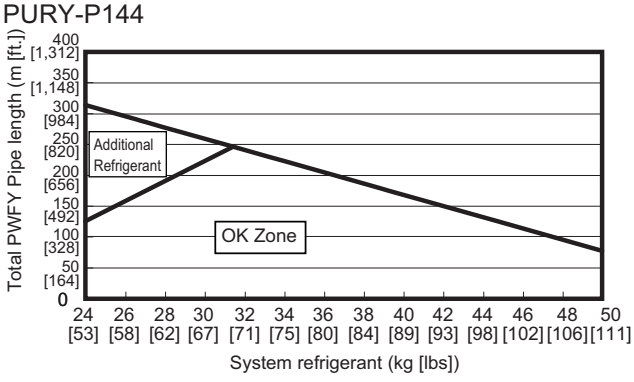
PURY-P96



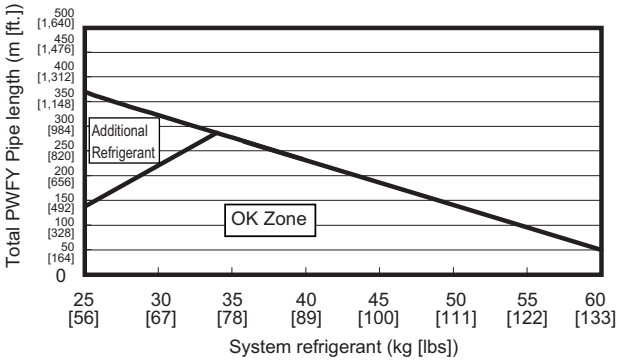
PURY-P120



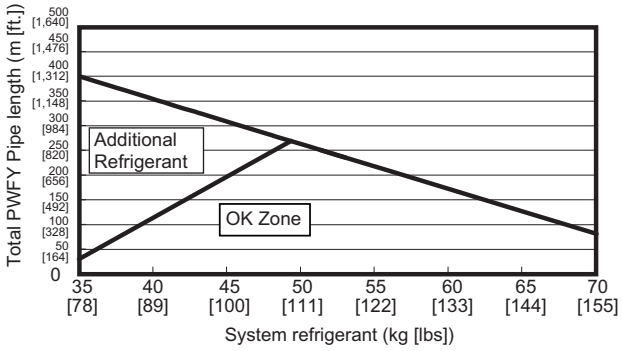
PURY-P144



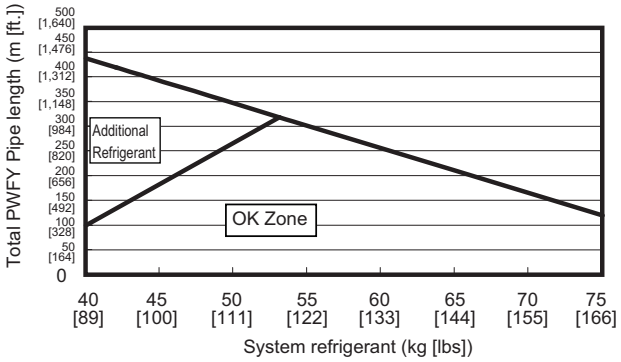
PURY-P168



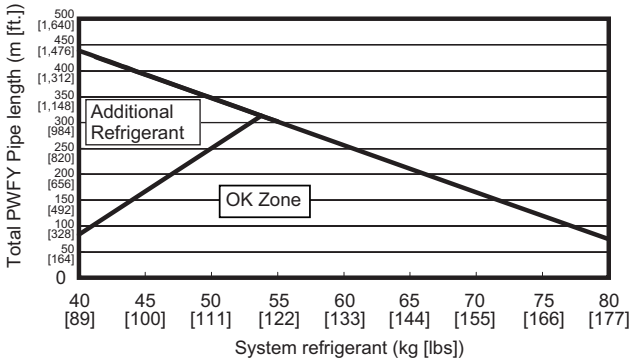
PURY-P192



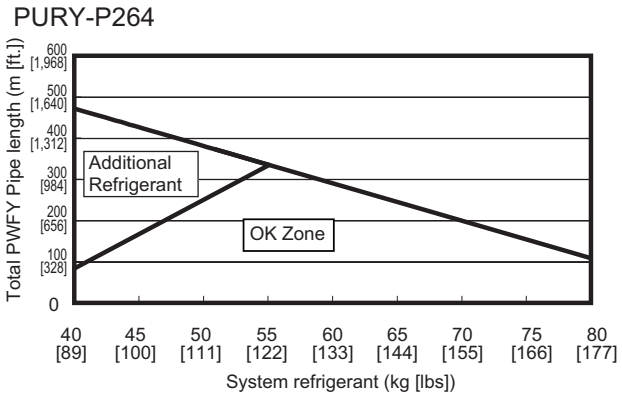
PURY-P216



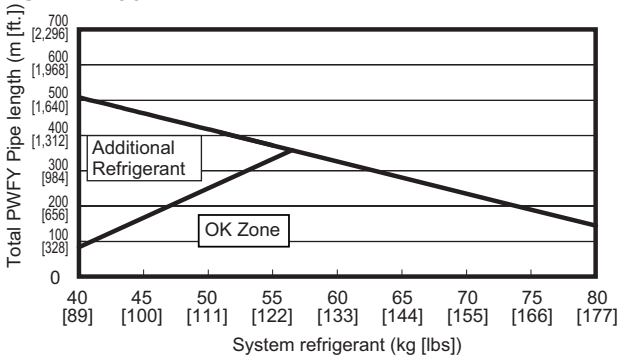
PURY-P240



PURY-P264

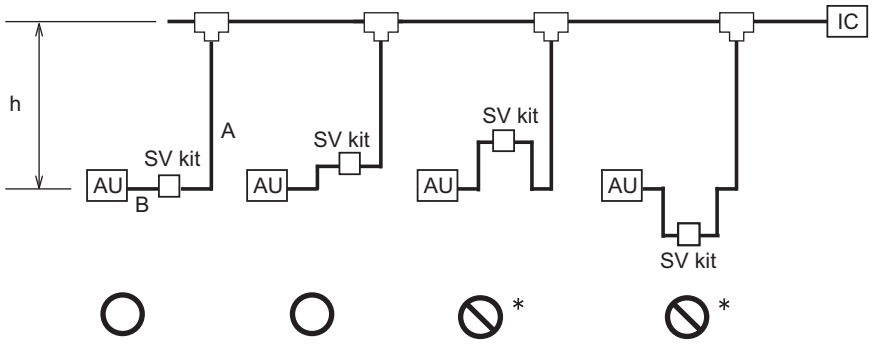


PURY-P288



*Total PWFY pipe length
Shows the total length of gas pipes from PWFY units that are connected to the system

(3) Solenoid valve kit piping design



*Do not install the Solenoid valve kit on the square-arch-shaped piping as shown in the figure above.

Piping length limitation

Item	Piping in the figure	Max. length (m)
Farthest AU from first joint	A+B	40
Length between AU and SV kit	B	5
Height between AU and IC (AU)	h	15

VI Controller

1. PAR-W21MAA Specifications

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

2. Dip switch functions

Switch		Function	Function according to switch setting		Switch setting timing
			OFF	ON	
SW1	1	TH0 thermistor selection	Water inlet thermistor TH6	Water outlet thermistor TH8	Before power on
	2	-	-	-	-
	3	Operation after power recovery *1	Remains stopped	Auto recovery (to the status before power failure)	Before power on
	4	Operation after power recovery	Depends on the SW1-3 setting	Forced to operate	Before power on
	5	-	-	-	-
	6	-	-	-	-
	7	Test-run mode	OFF	ON	Any time
	8	Error history deleted	Normal	Deleted	Any time
	9	Effective only when SW1-7 is set to ON and only on the HEX models.	Heating	Cooling	Any time
	10	Brine mode *2	Ineffective	Effective	Any time
SW2	1-10	For self-diagnosis/operation monitoring	-	-	Any time
SW3	1	Capacity setting (HEX unit only)	4HP	8HP (HEX unit only)	Before power on
	2	Service LED display selection	Display in Centigrade	Display in Fahrenheit	Any time
	3	-	-	-	-
	4	-	-	-	-
	5	Cumulative compressor operation time is deleted.	Normal	Deleted	Any time
	6	Pump interlock operation	During Thermo-ON or Thermo-OFF	During Thermo-ON only	Any time
	7	-	-	-	-
	8	-	-	-	-
	9	Heating Thermo OFF differential change *3			Any time
	10	-	-	-	-
SW4	1	Do not change from factory setting.			
	2	Do not change from factory setting.			
	3	Use to change preset temperature range for the Heating ECO mode.	Booster : Ineffective HEX : Ineffective	Booster : 86°F to 122°F (30°C to 50°C) HEX : 86°F to 122°F (30°C to 50°C)	Before power on
	4	Use to change preset temperature range for the Anti-freeze mode.	Booster : Ineffective HEX : Ineffective	Booster : 50°F to 115°F (10°C to 45°C) HEX : 50°F to 115°F (10°C to 45°C)	Before power on
	5	-	-	-	-
	6	-	-	-	-
	7	-	-	-	-
	8	-	-	-	-
	9	-	-	-	-
	10	-	-	-	-
SW5	1	Enabling/disabling ACCT sensor error detection	Error detection enabled	Error detection disable (No load operation is possible)	Any time
	2	-	-	-	-
	3	-	-	-	-
	4	-	-	-	-

*1 Valid only when SW1-4 is set to OFF
*2 Refer to P57.
*3 The following changes can be made by changing the setting of the switch from OFF to ON.
0.5 → 1 → 0.5 → 2 → 0.5 → 3 → 0.5 → 4 → 0.5 → 5 → 0.5 → 6 → 0.5 → 7 → 0.5 → 8

VII Maintenance Cycle

1. Routine maintenance checks

- Periodically and thoroughly check the circulating water circuit. (See table below.)
- Consult a maintenance technician.

2. Parts replacement cycle

Regular preventive maintenance and parts replacement help keep the unit running smoothly and minimize problems. The table below shows the maintenance schedule. Use the replacement timing in the table only as a guide. Some parts may need to be replaced sooner, depending on the usage.

Components		What to look for	Maintenance cycle (times/year)	Replacement cycle
Refrigerant circuit components	Compressor	High/low pressure, vibration, noise Insulation resistance, loose terminals	2	20,000 hours
	Water-refrigerant heat exchanger	High/low pressure, water pressure loss	2	10 Years
	Solenoid valve (PWFY-P36, 72NMU-E-AU)	Operation, leakage, clogging	2	7 Years
	Check valve (PWFY-P36, 72NMU-E-AU)	Operation, leakage, clogging	1	10 Years
	Linear expansion valve	Operation	2	7 Years
	Strainer	Inlet/outlet temperature difference	1	While in heavy use
	Capillary tube	Contact wear, Vibration	1	10 Years
	Pipes	Contact wear, Vibration	1	10 Years
Electric circuit parts	Electromagnetic contactor	Corroded contact, loose terminals Insulation resistance	2	8 Years
	Overcurrent relay	loose terminals	2	7 to 10Years
	Relay	Operation, Contact resistance. Insulation resistance	2	6 Years
	Solenoid valve	Insulation resistance	2	7 Years
	Fuse	External appearance	2	8 Years
	Electronic board	External appearance	2	8 Years
	Switch	Operation, Contact resistance.	2	8 Years
	Pressure switch	Contact resistance.	2	7 to 10Years
	Terminal block	loose terminals	2	8 Years
	Cable/connector	Looseness, corrosion, and wearing	2	10 Years
	Fan	Balance	2	10 Years
	Motor	Insulation resistance, noise, vibration	2	6 to 10Years

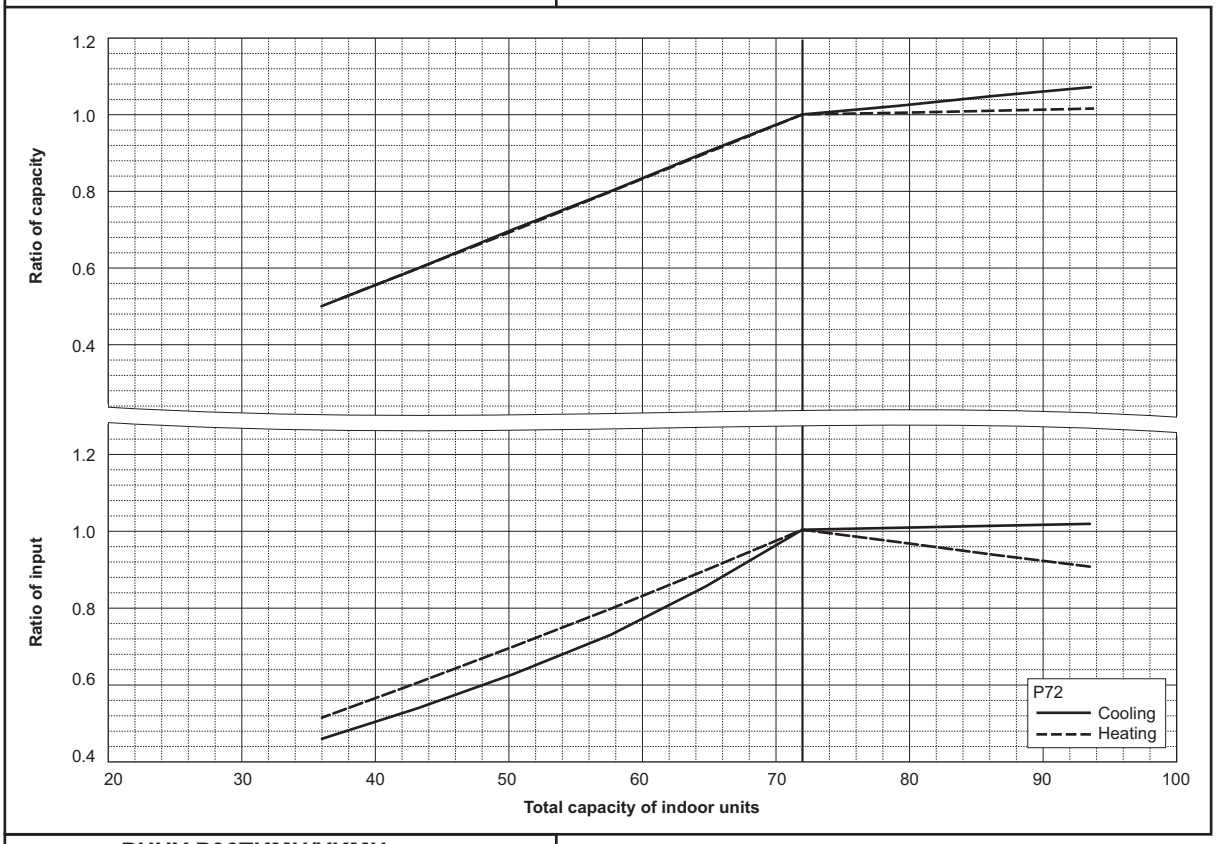
VIII Product Data (additional information for chapter III.)

1. Outdoor unit capacity tables

(1) Correction by total indoor

(1)-1 Y series

PUHY-P72TKMU/YKMU



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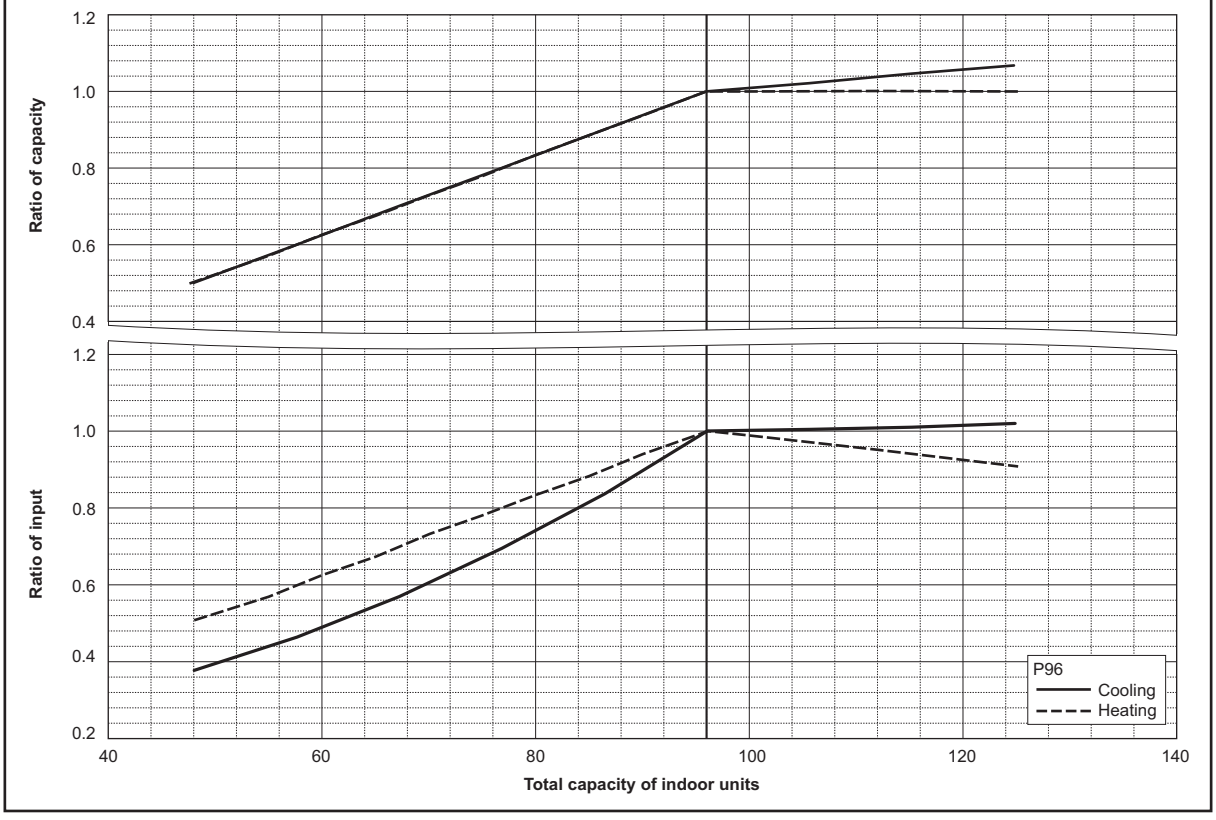

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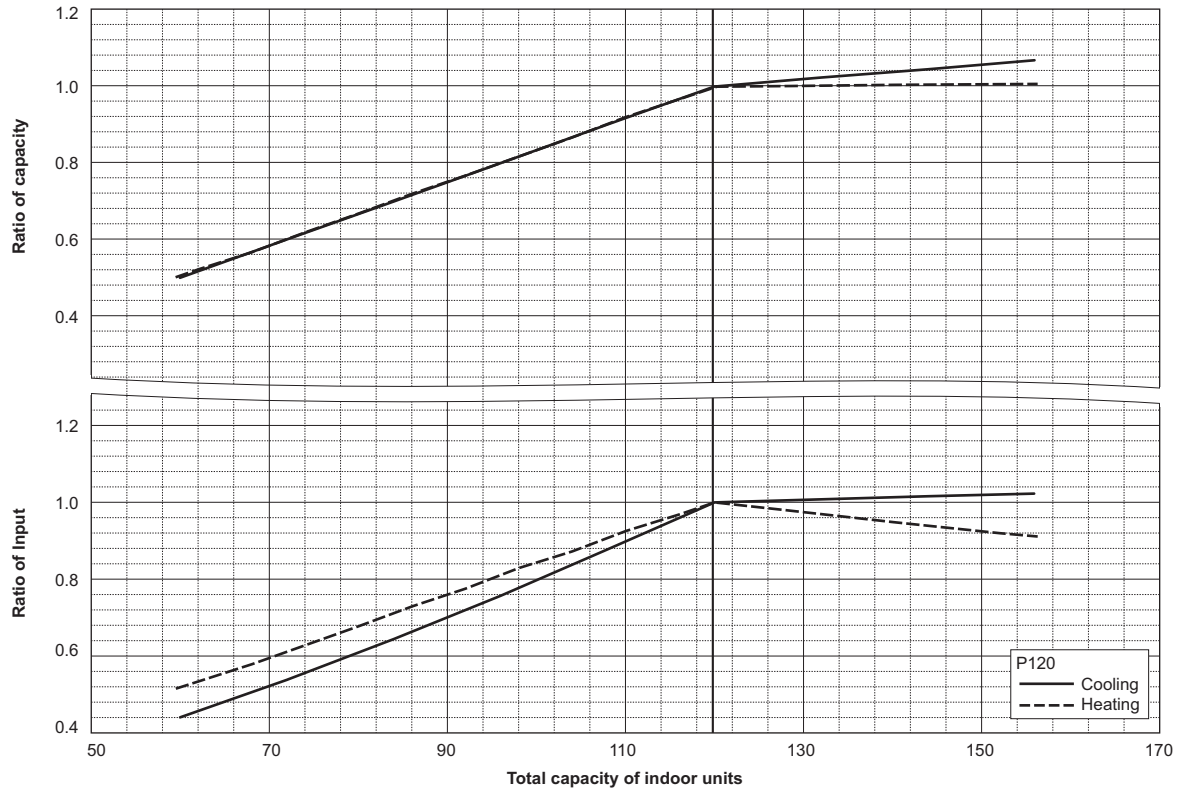

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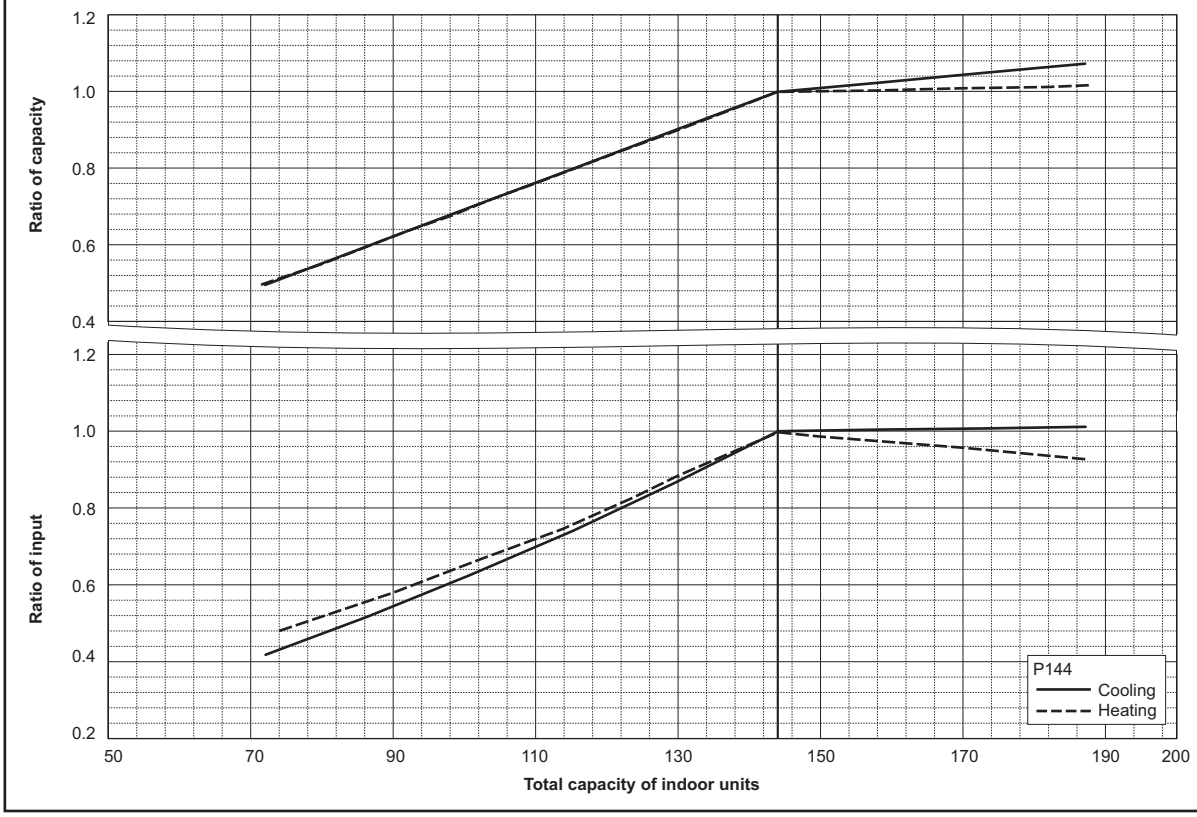

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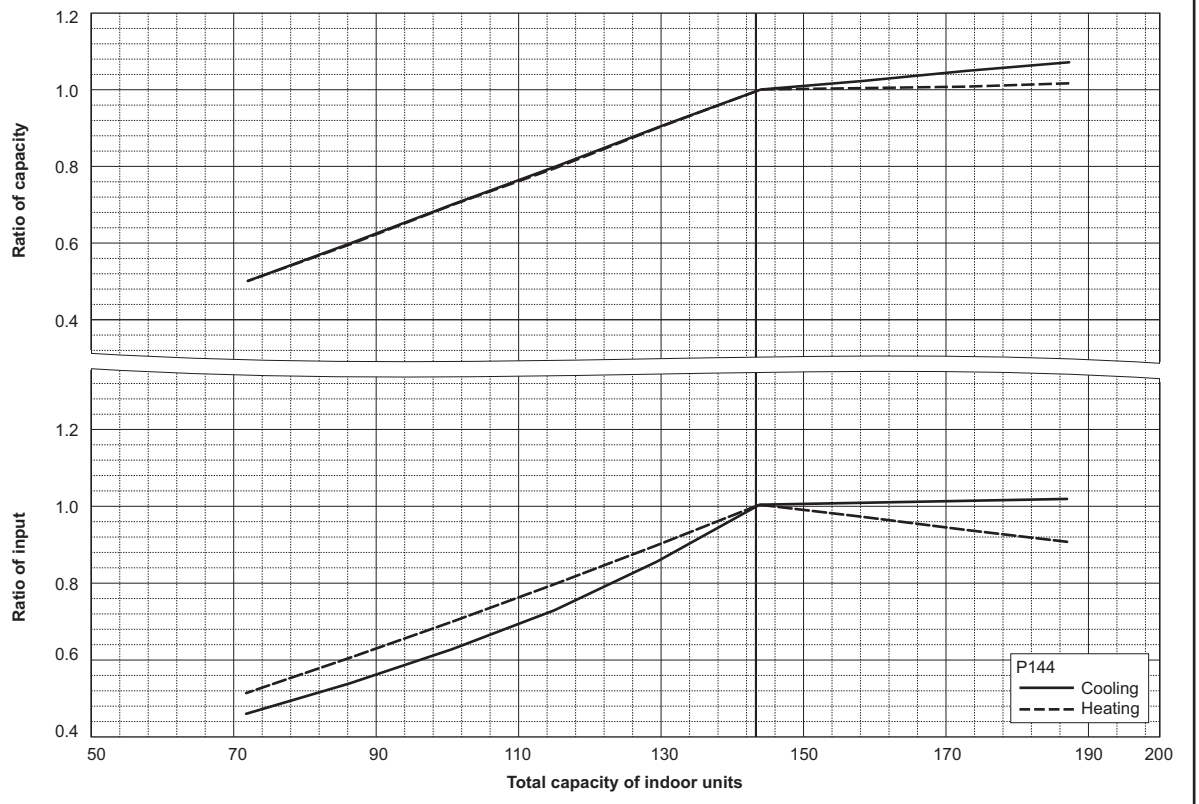

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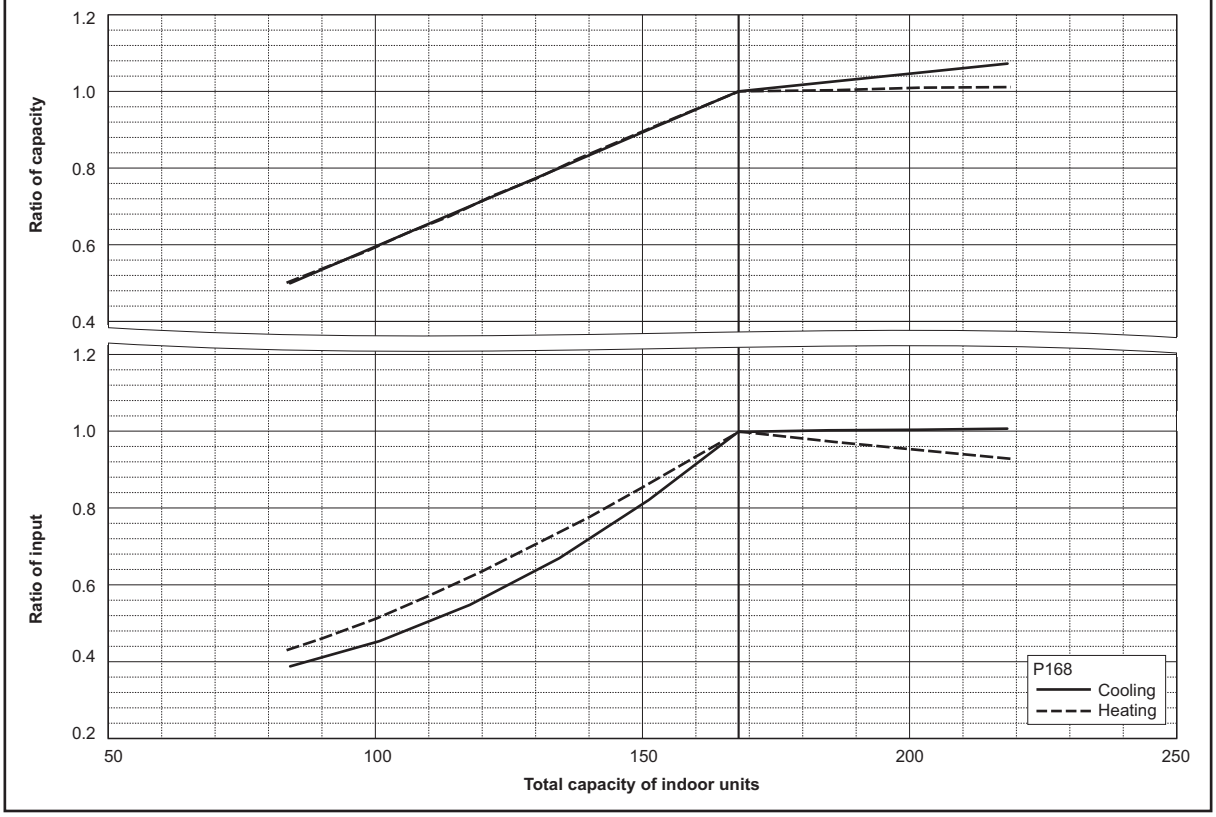

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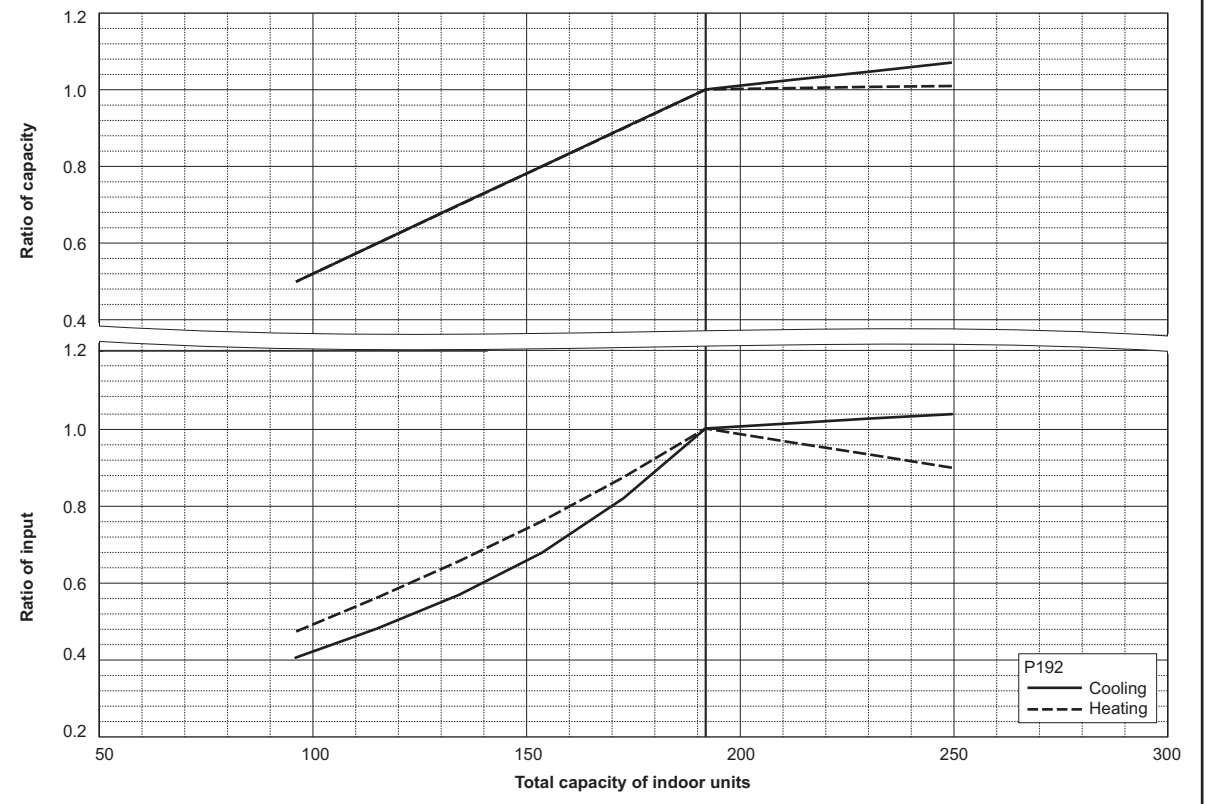

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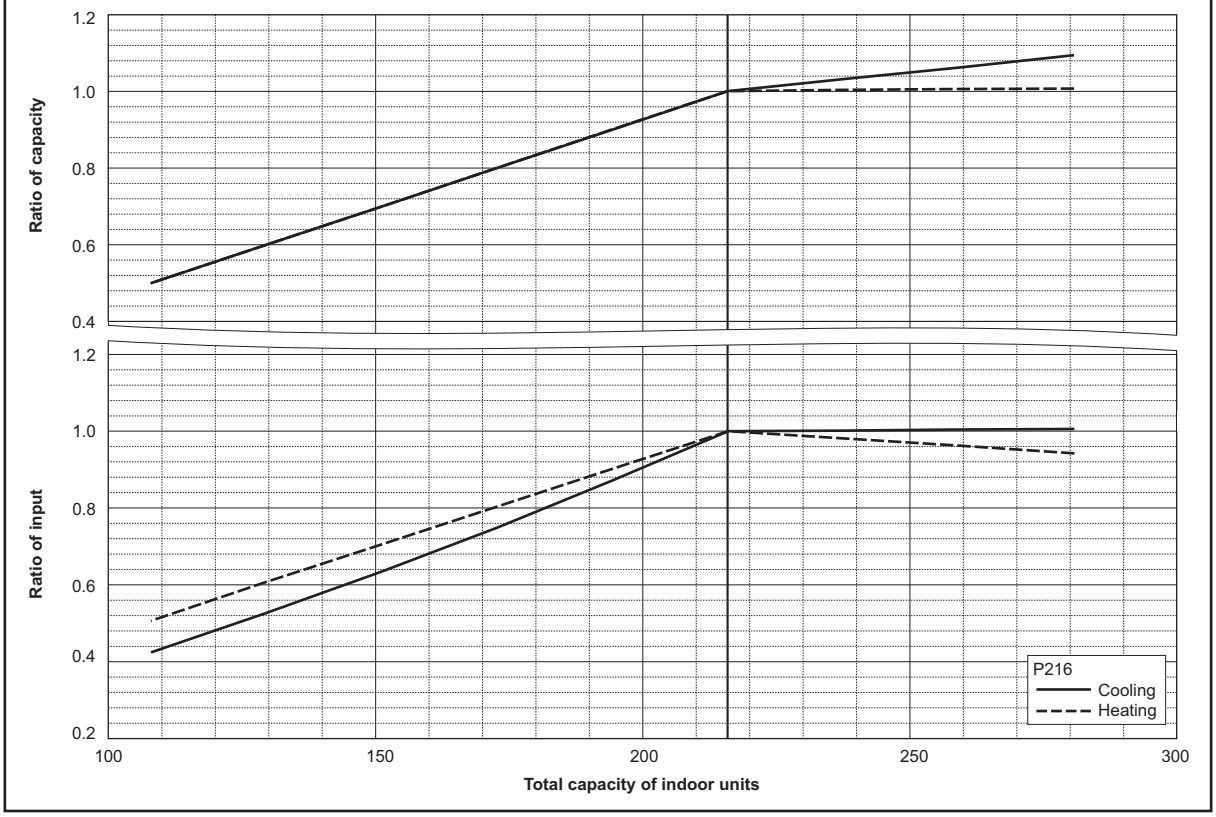

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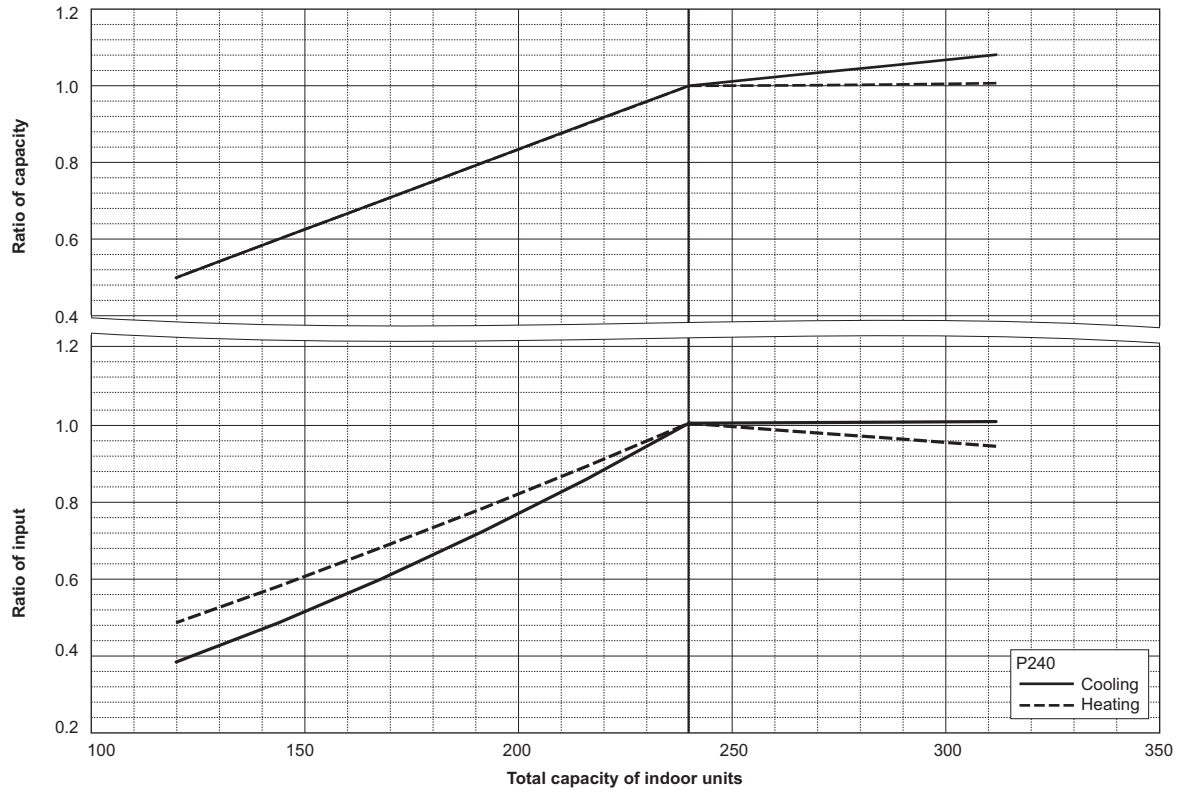

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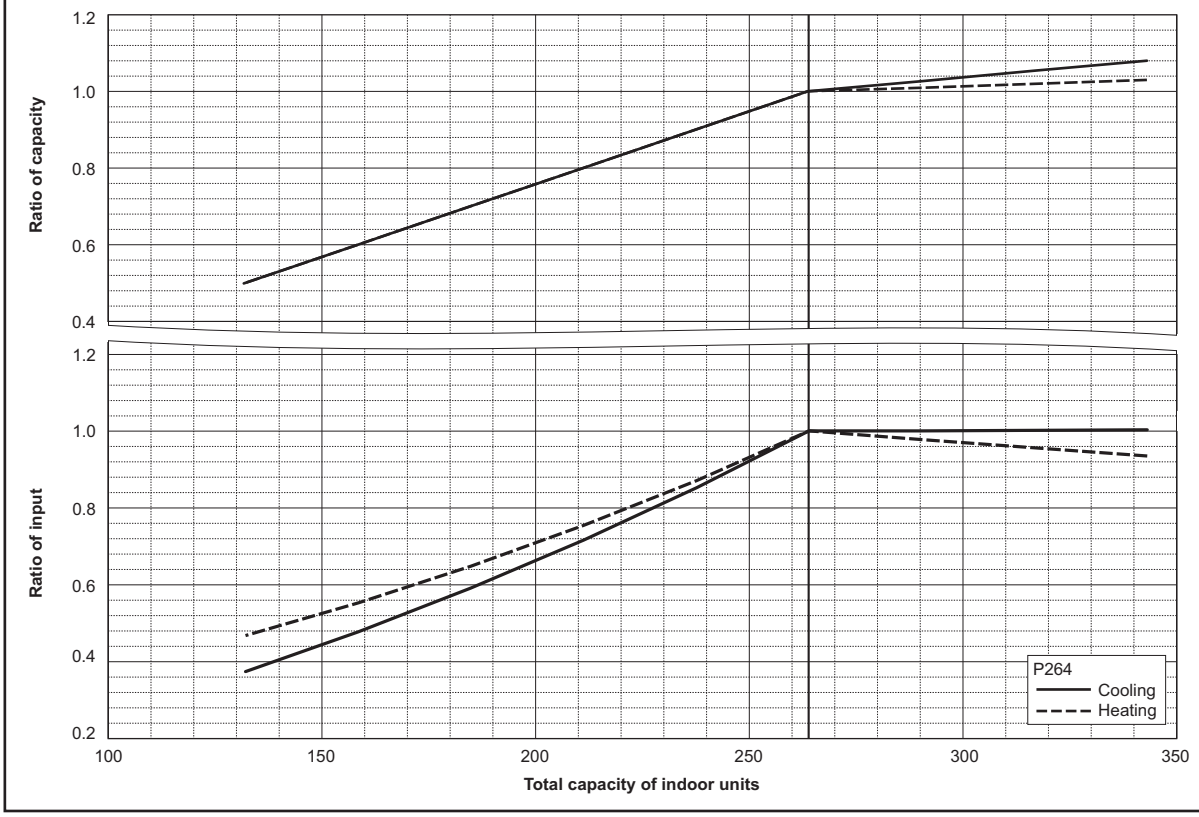

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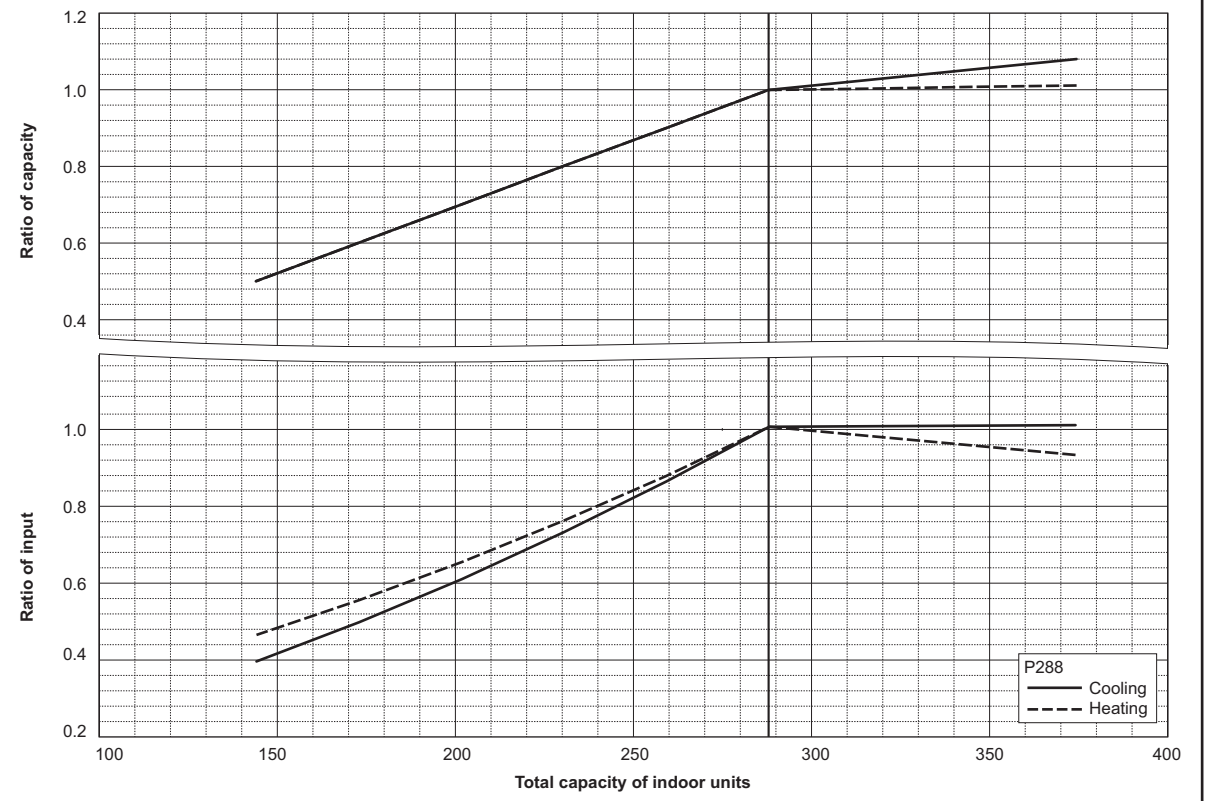

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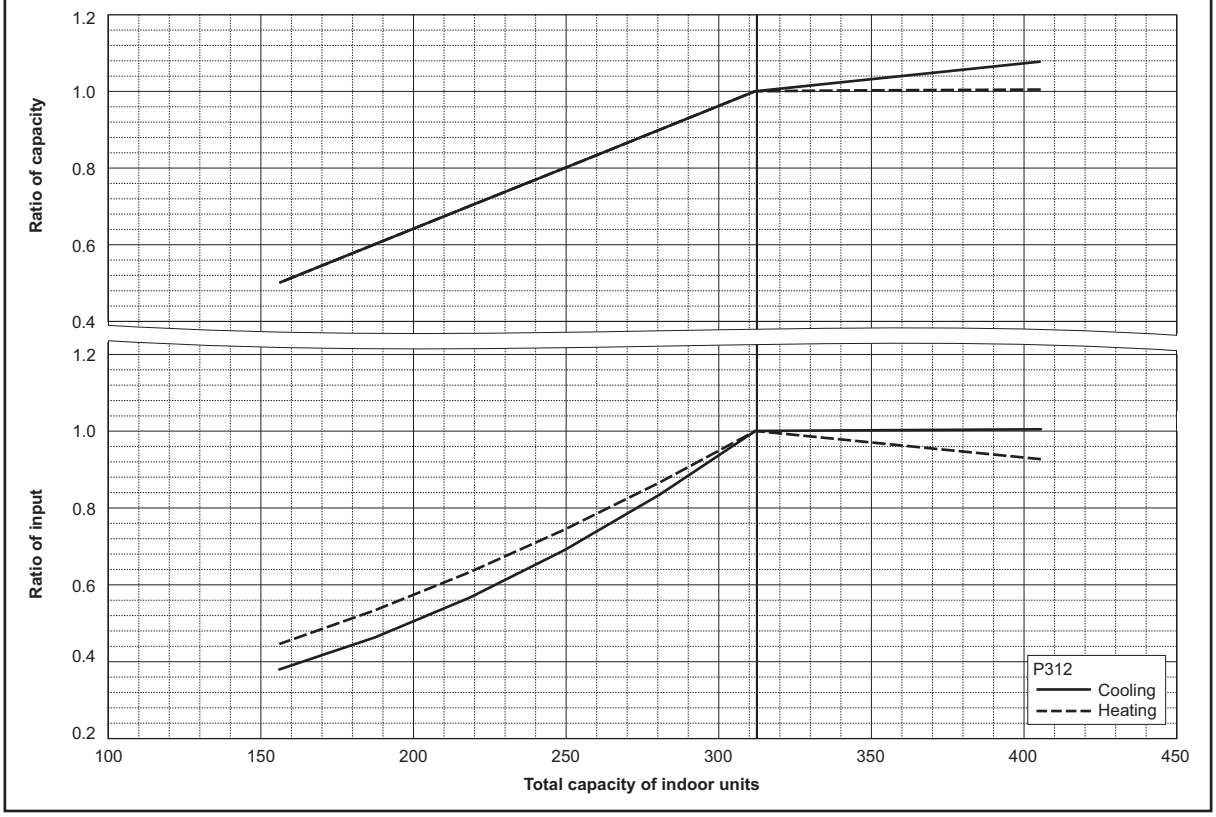

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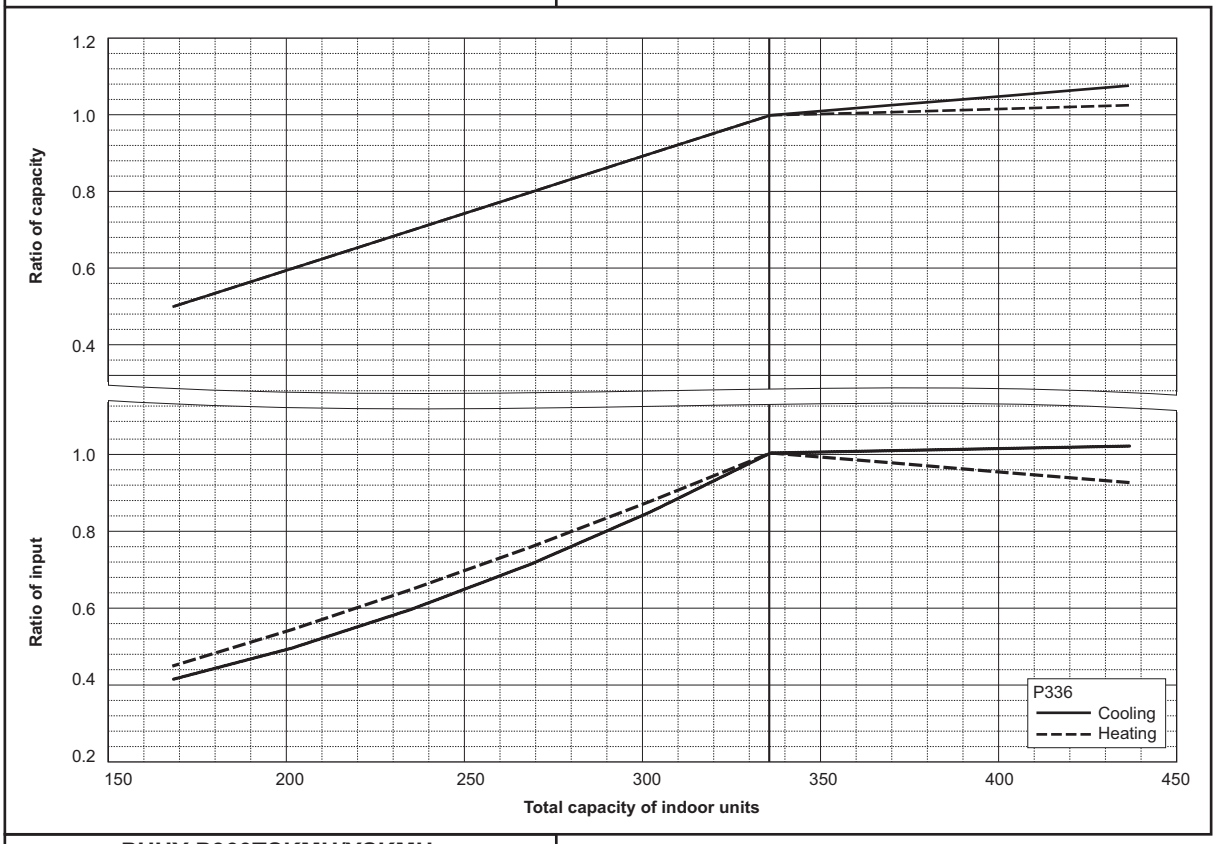

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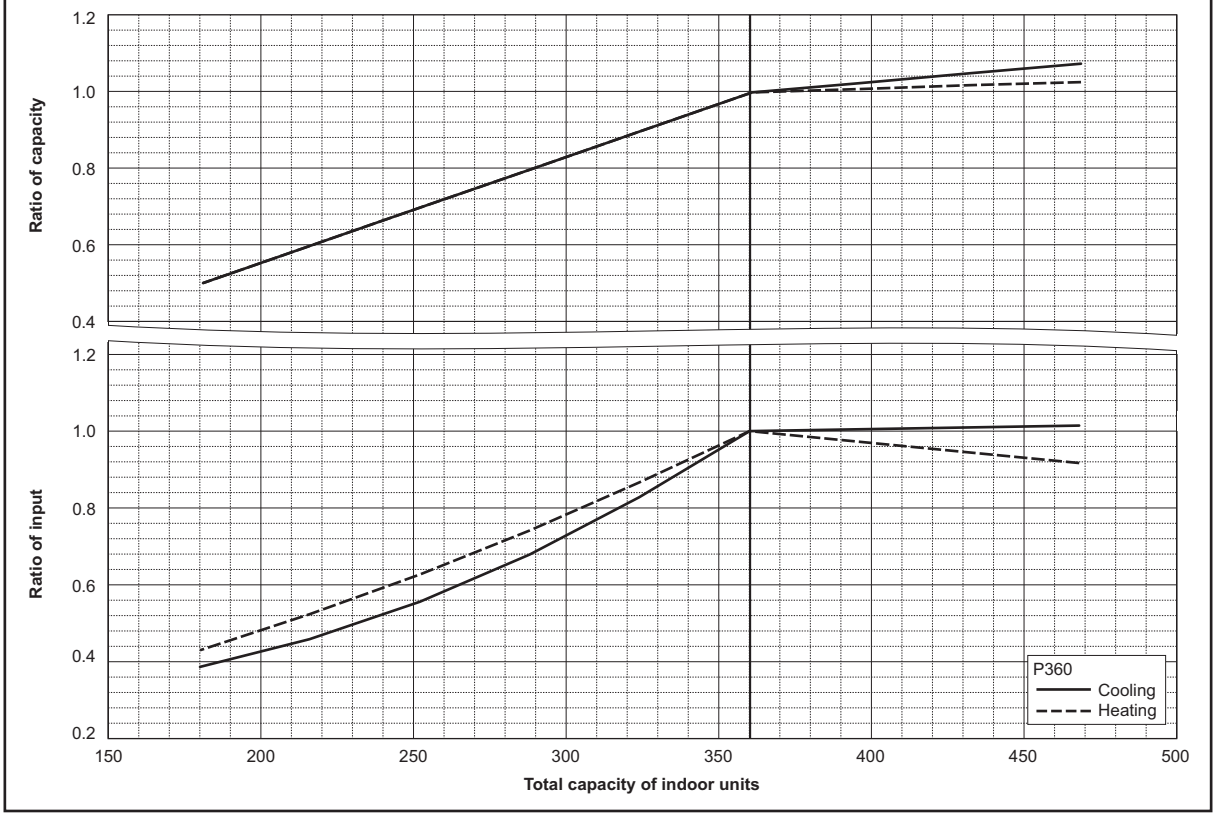
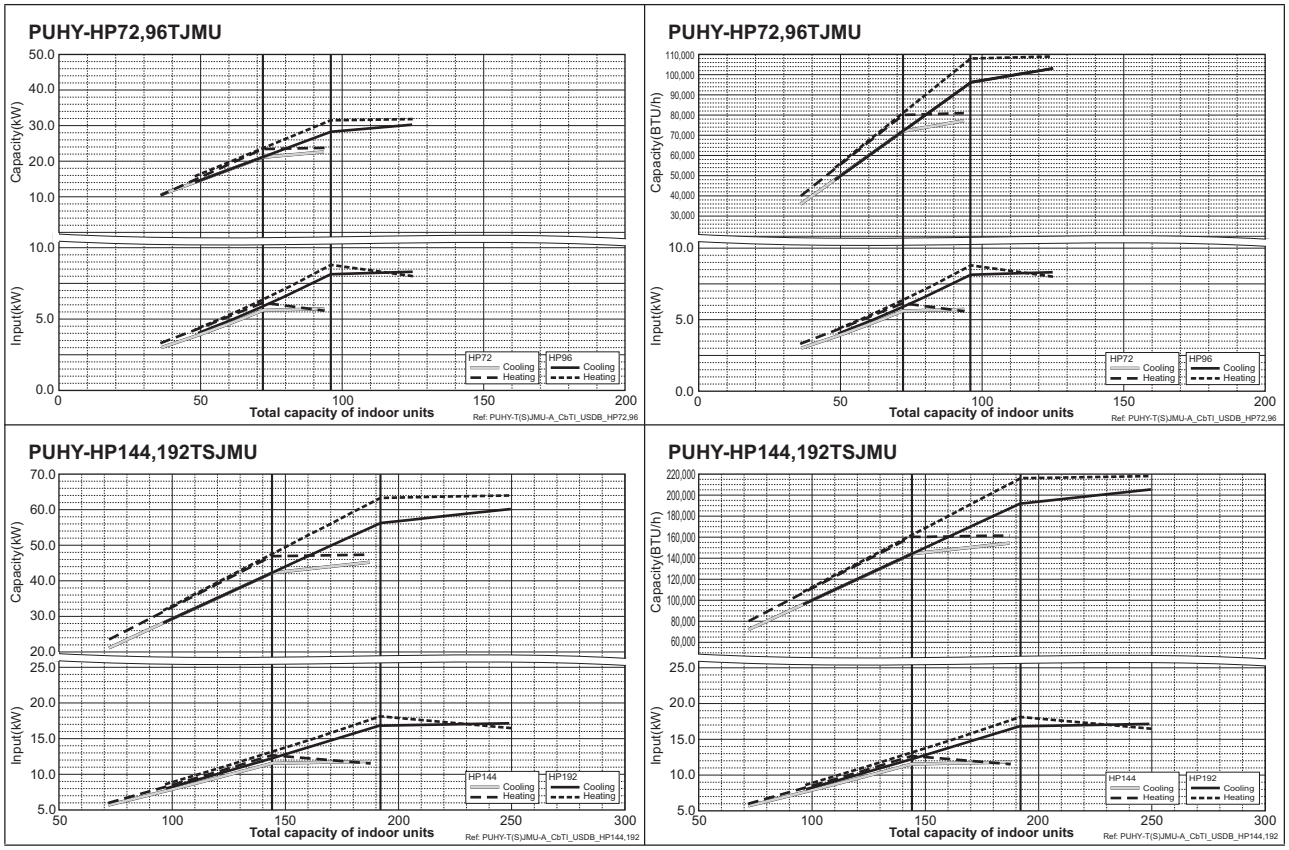


(1)-2 H2i series



(1)-3 R2 series

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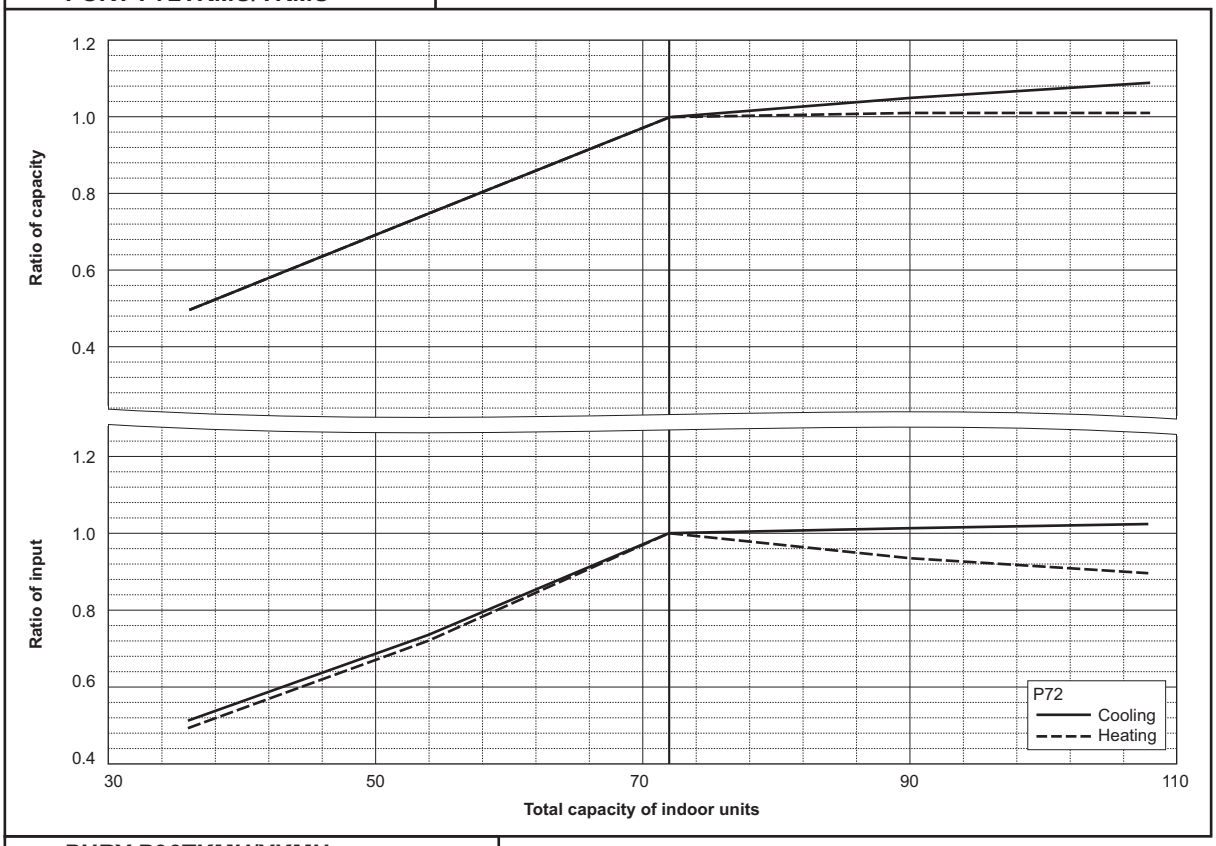

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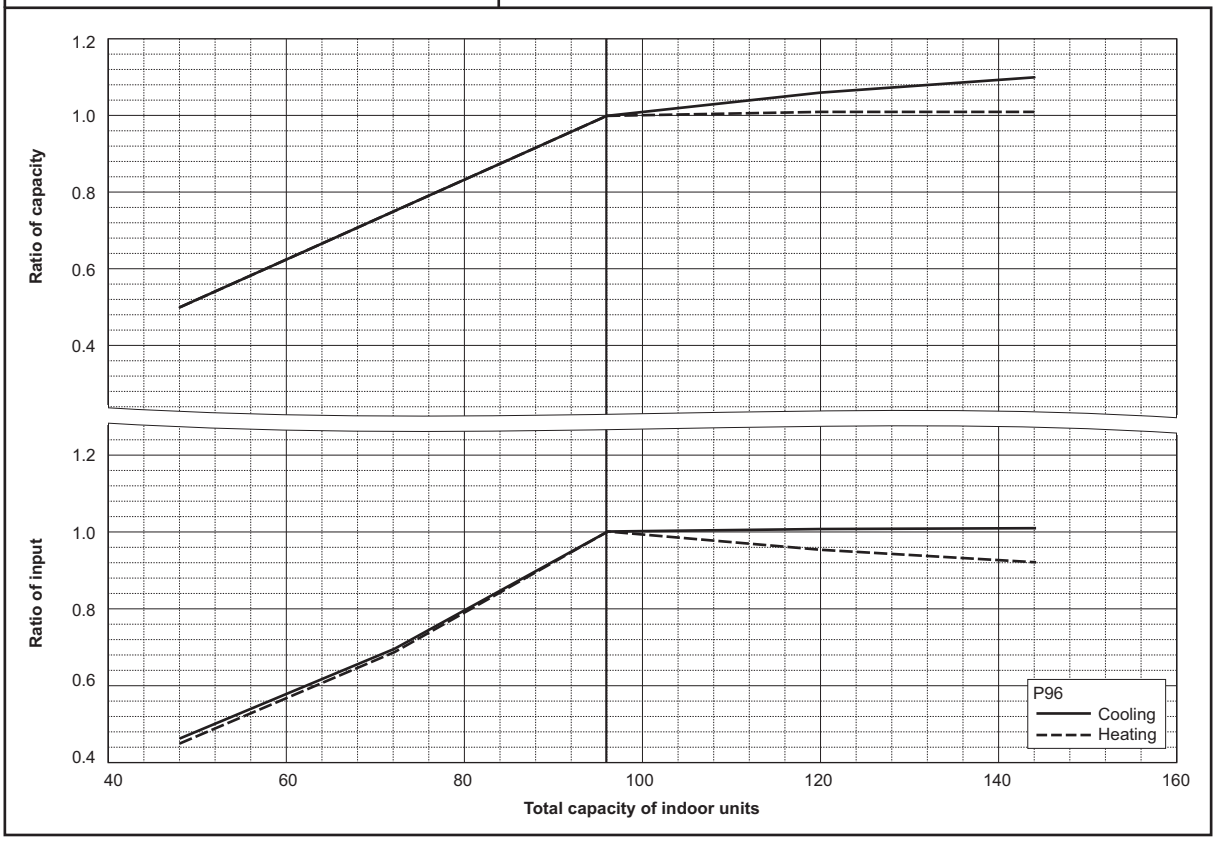

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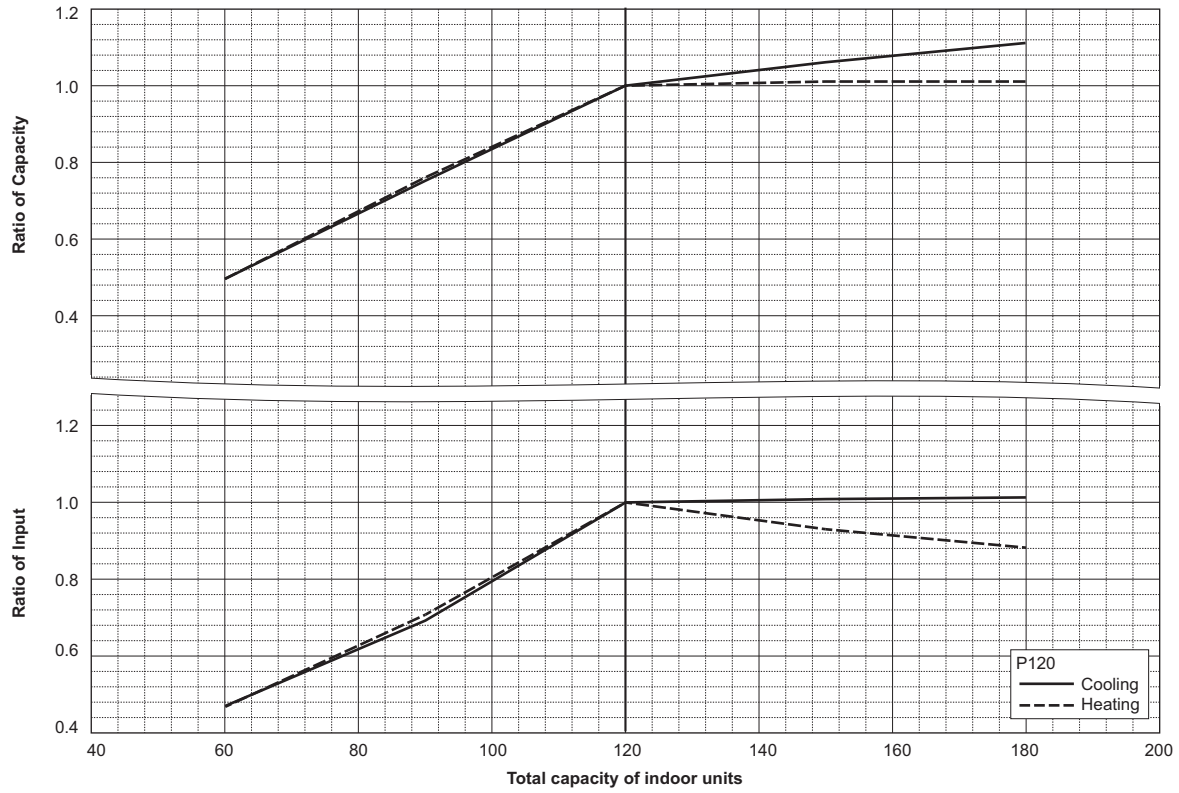

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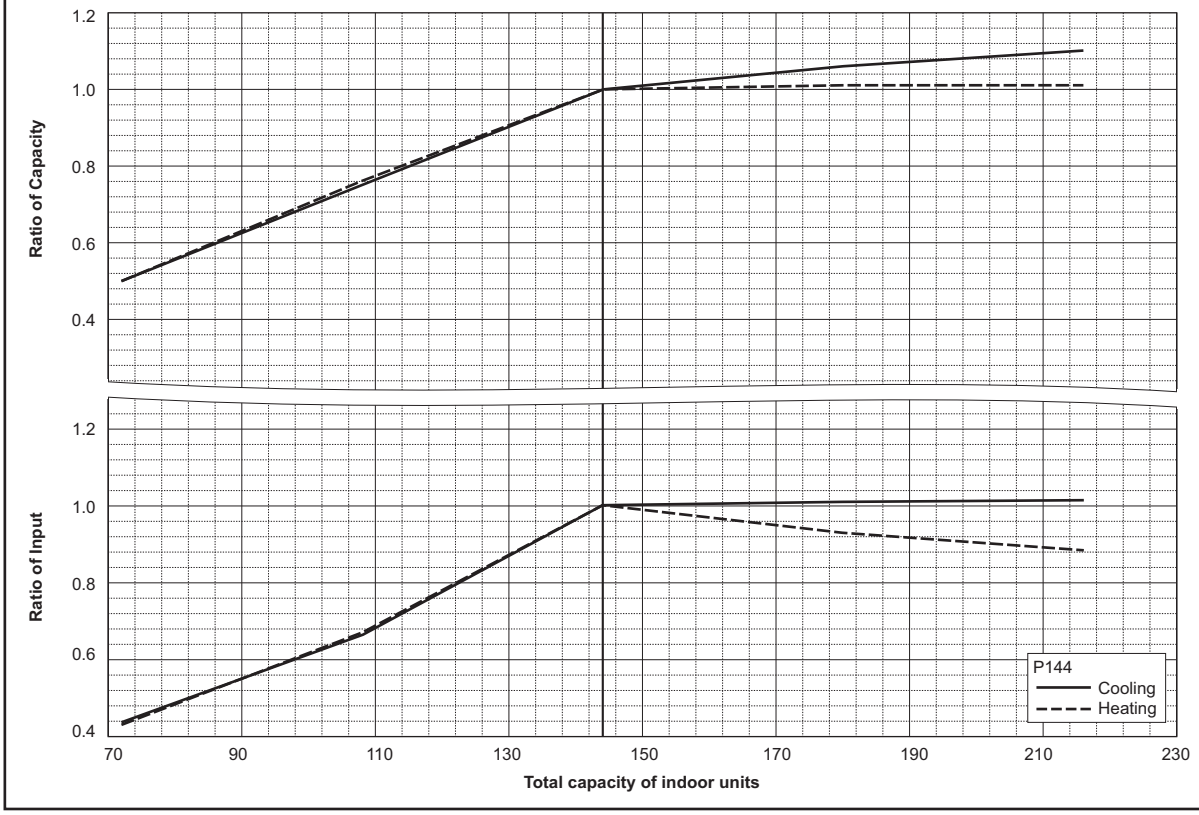

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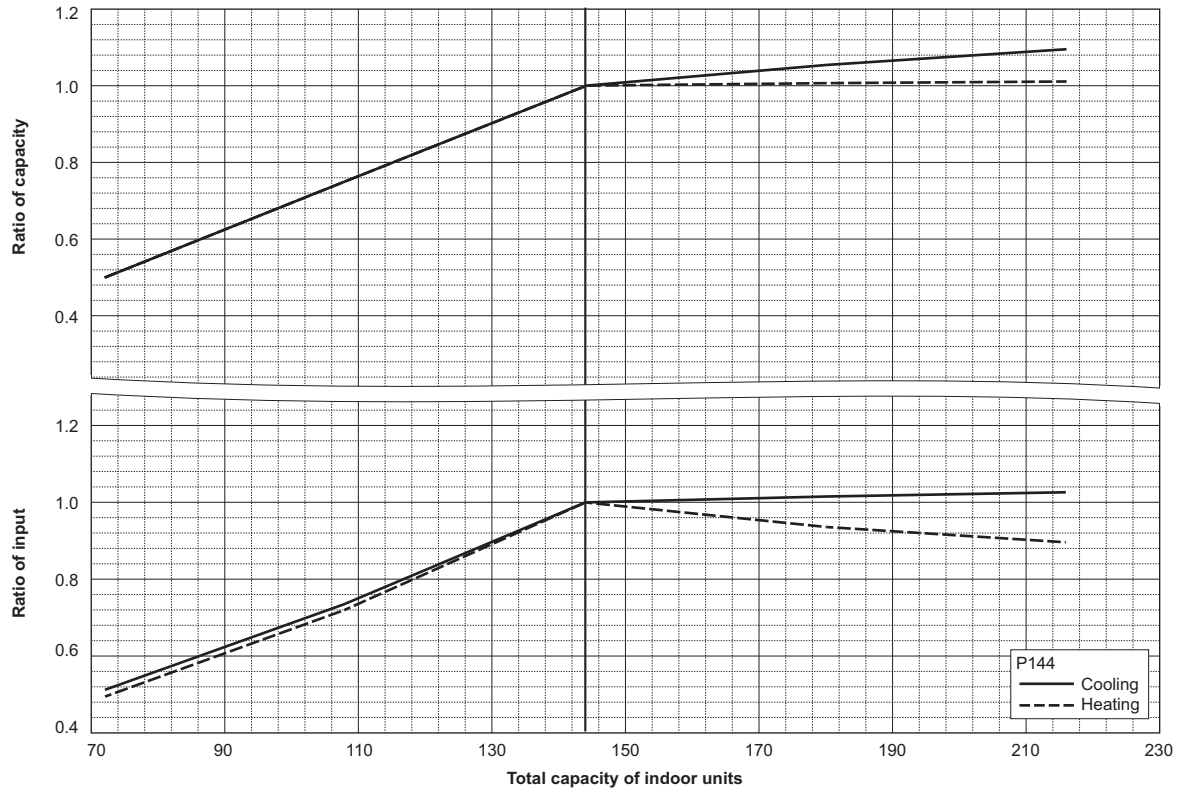

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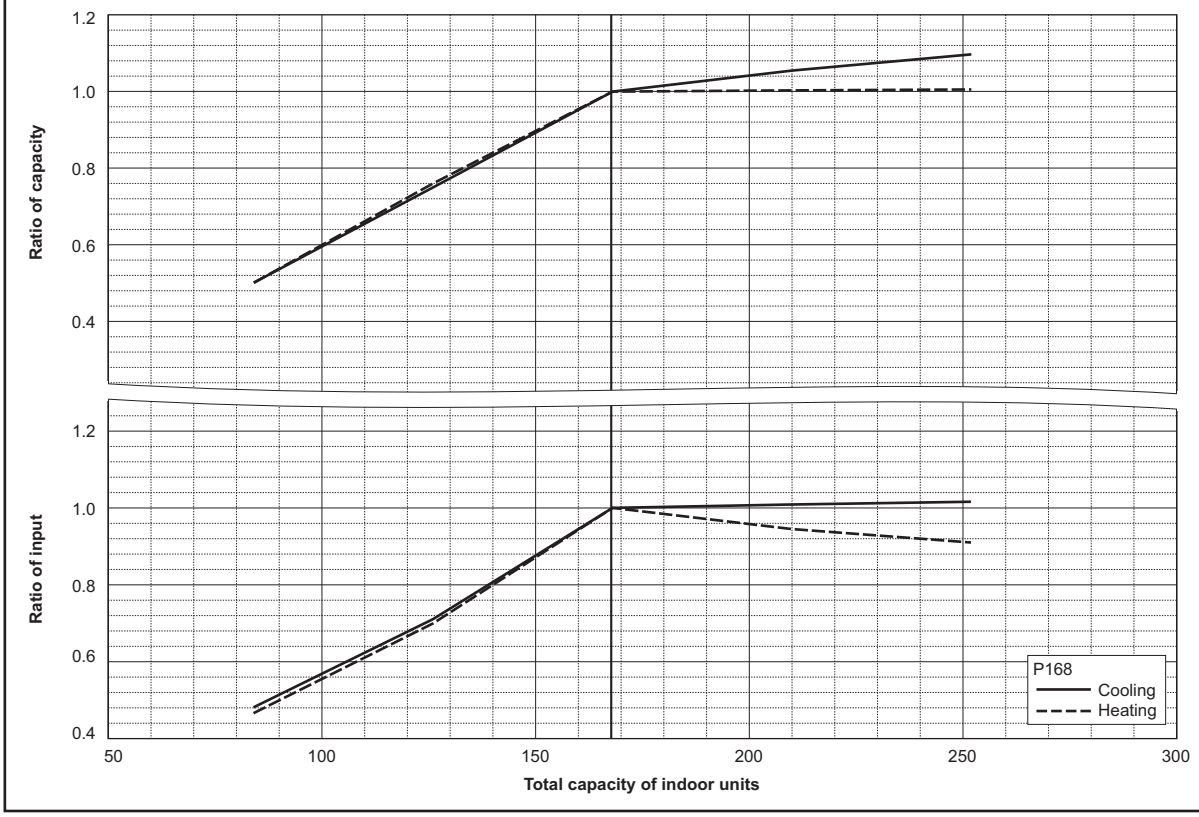

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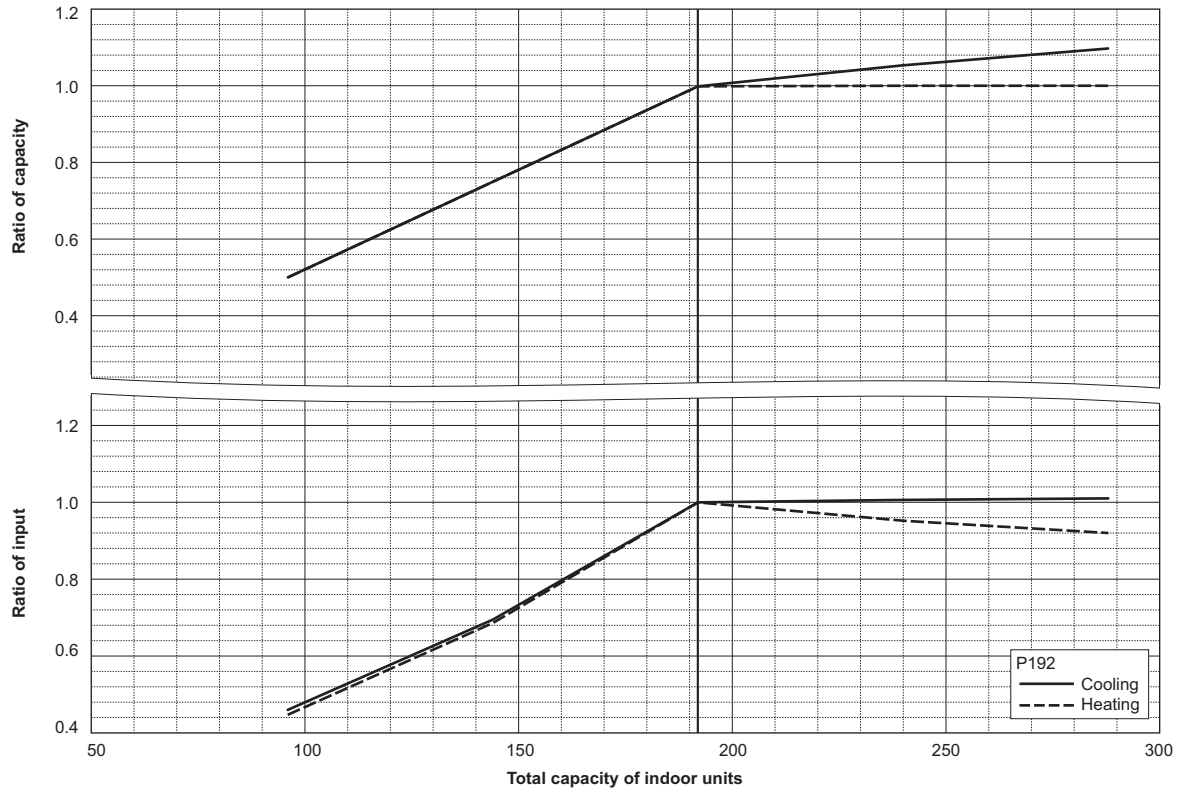

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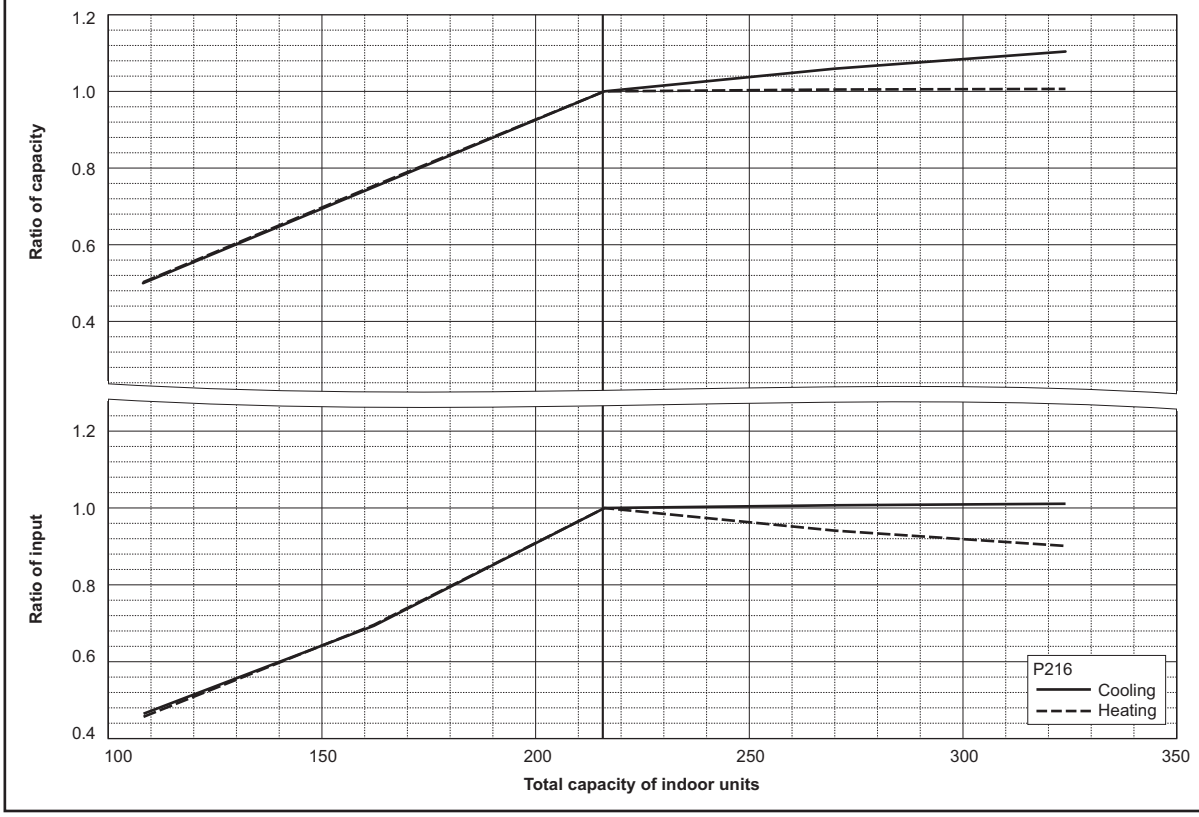

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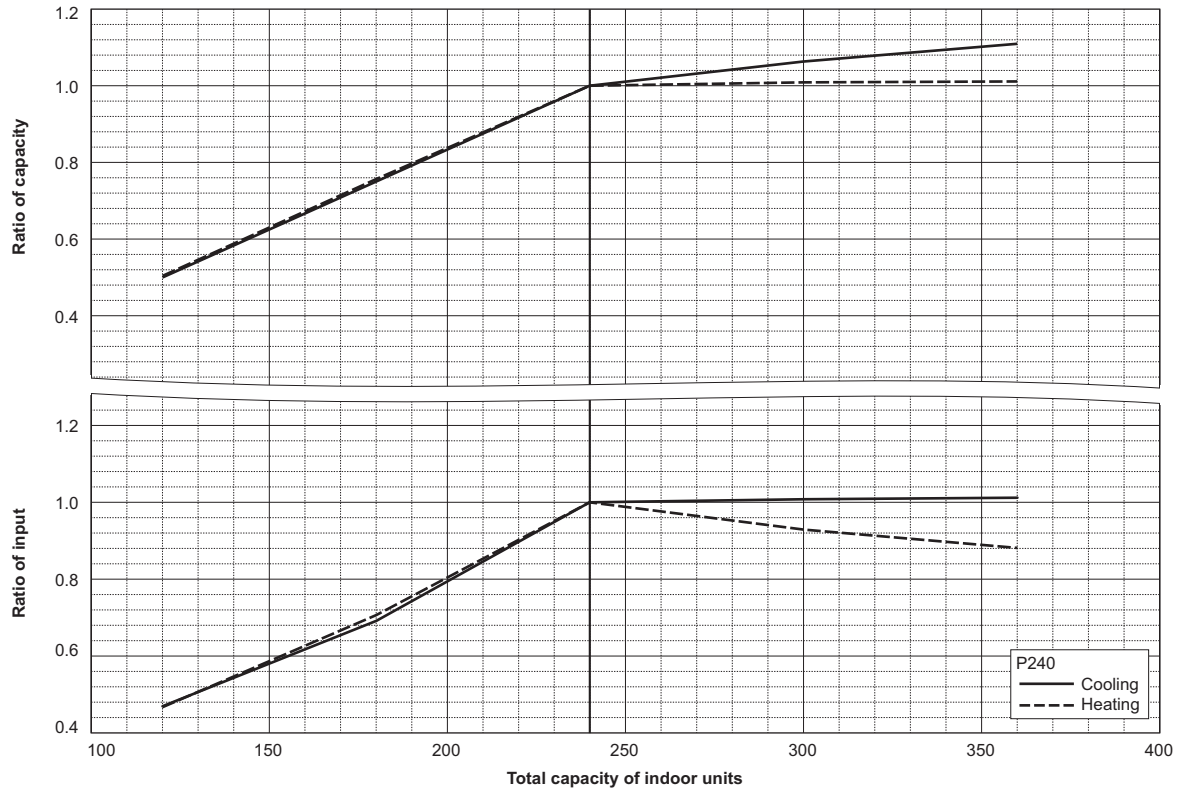

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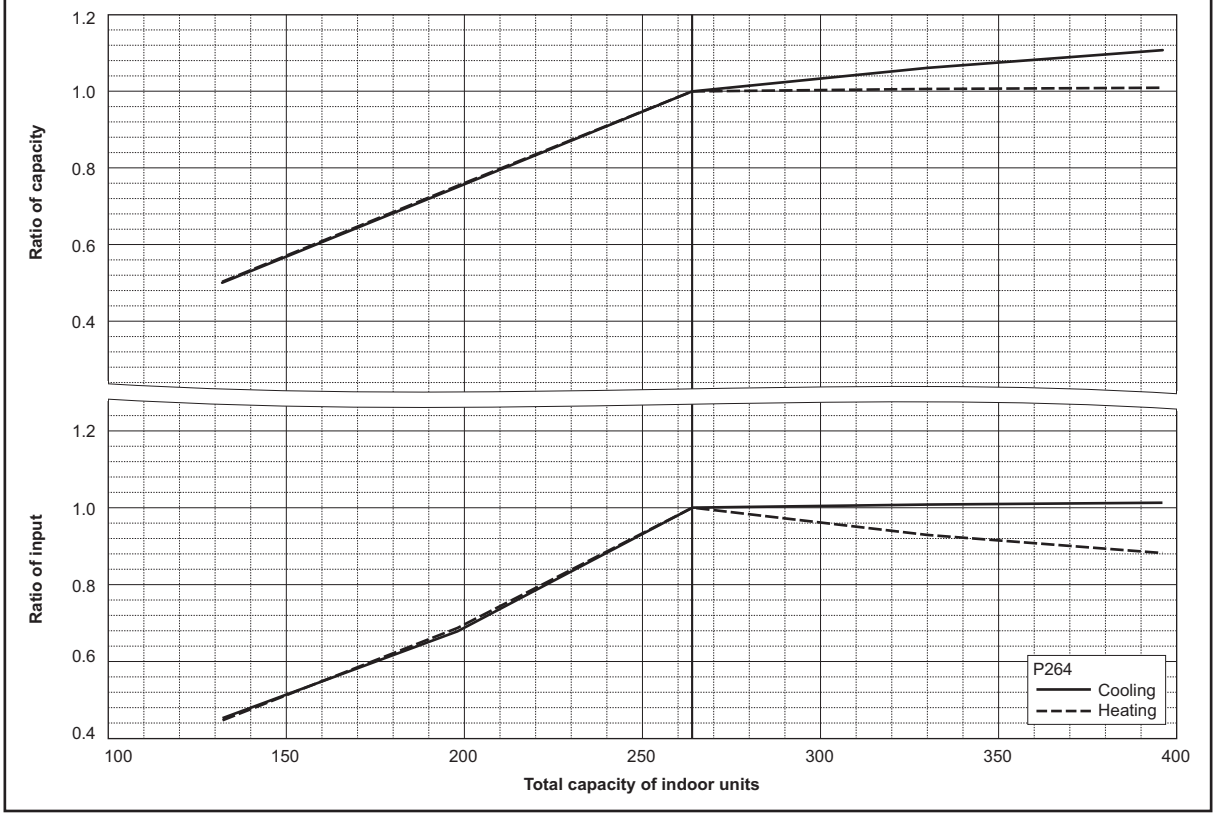

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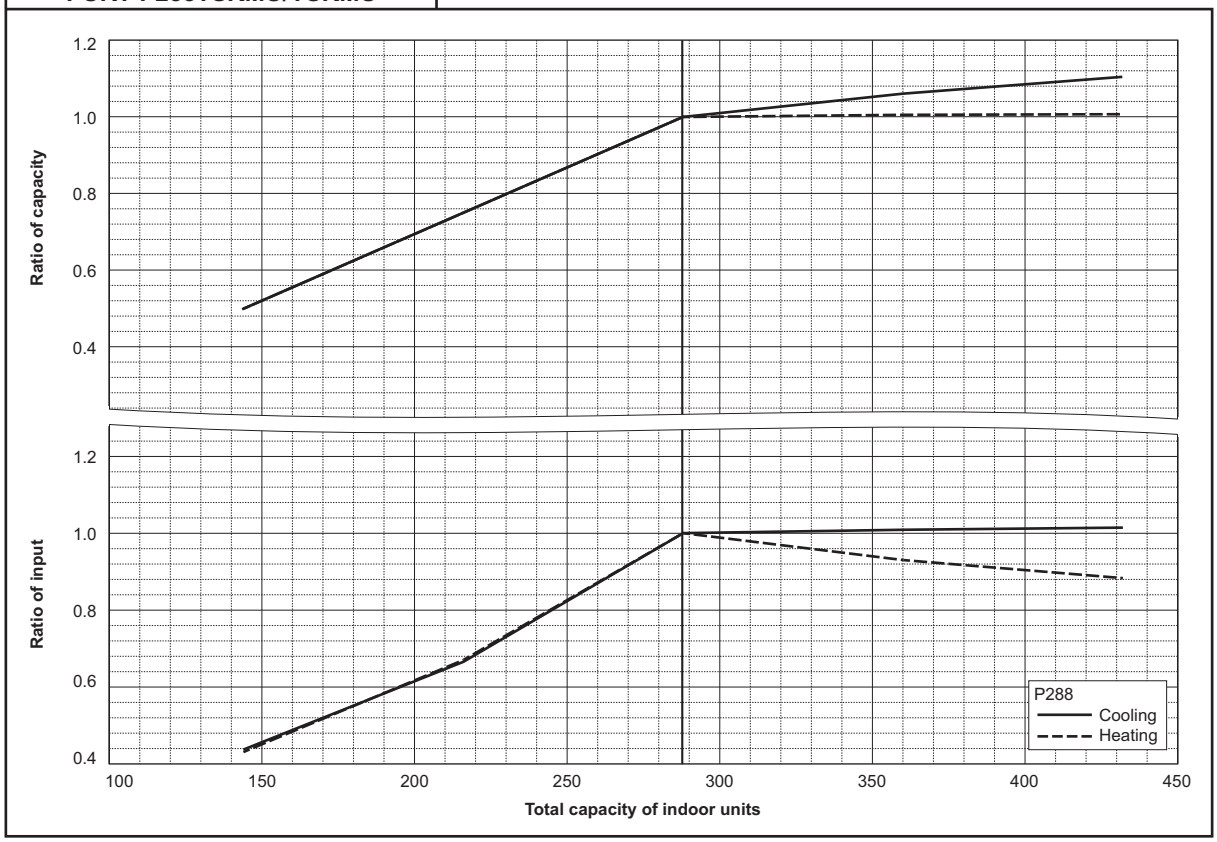

(1)-4 WY series

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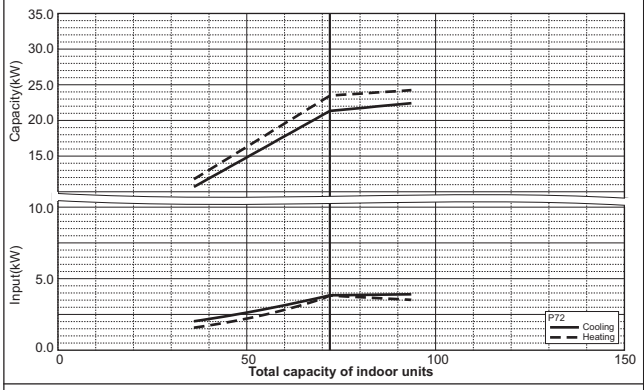

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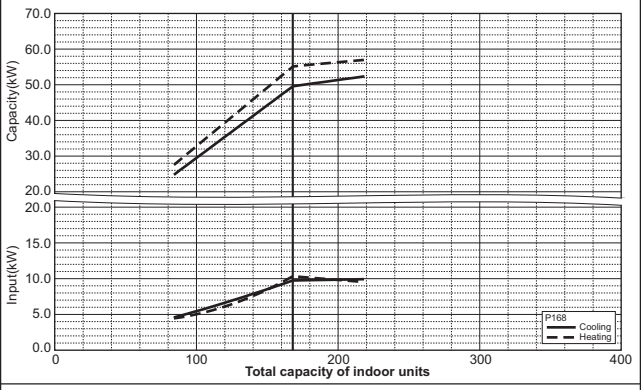

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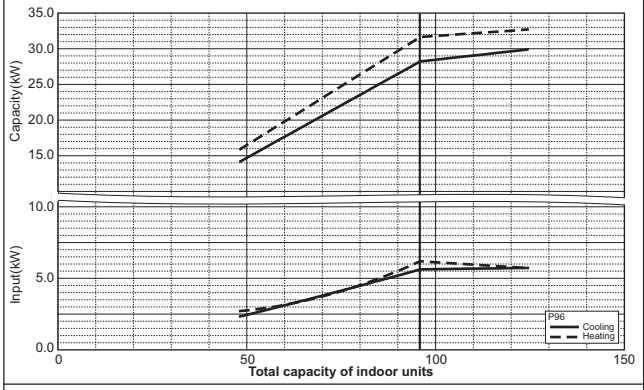

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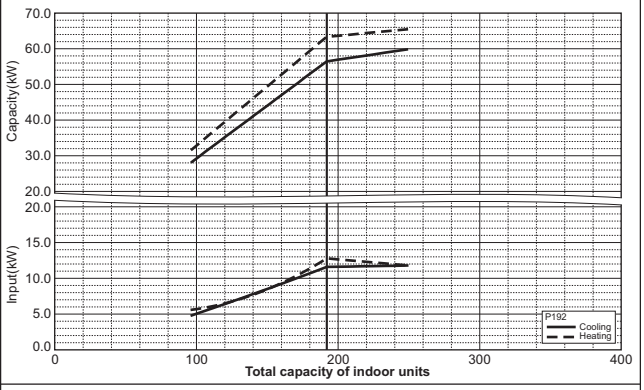

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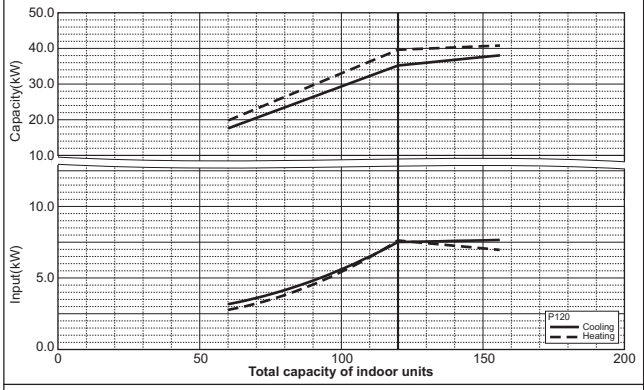

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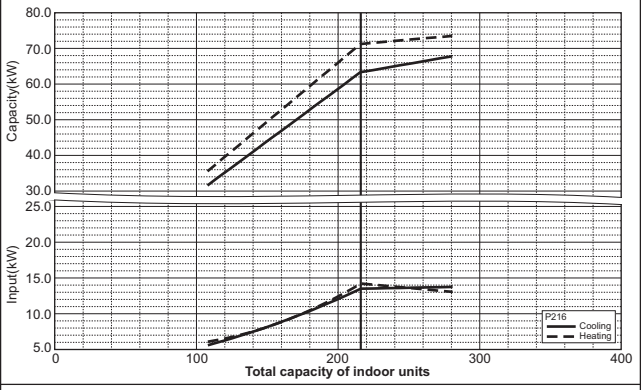

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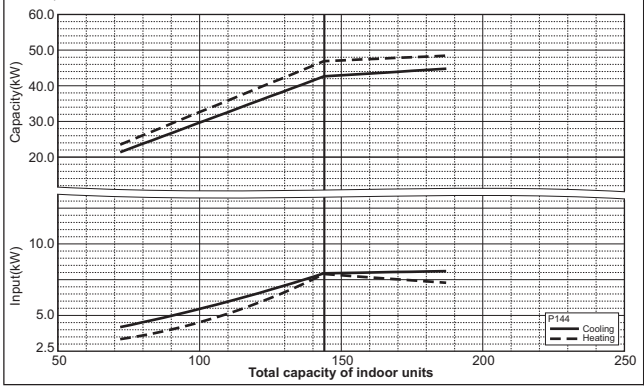

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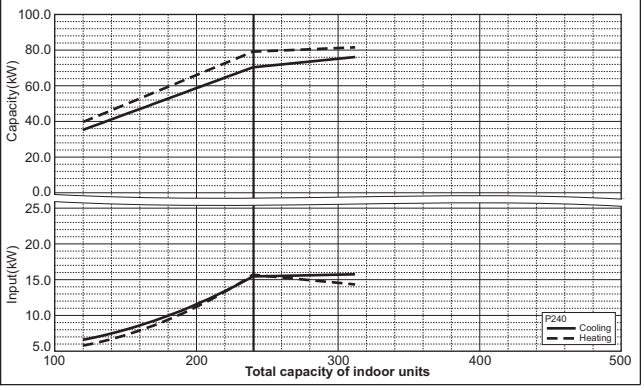

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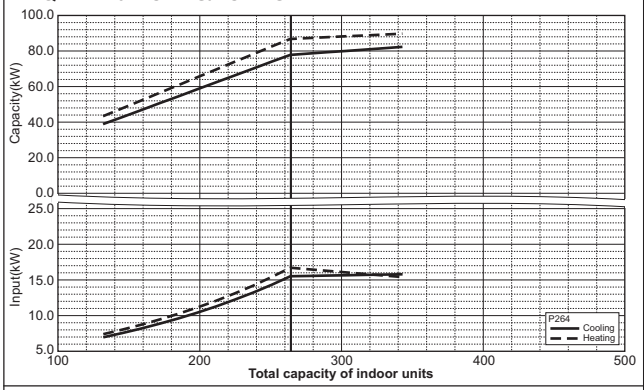

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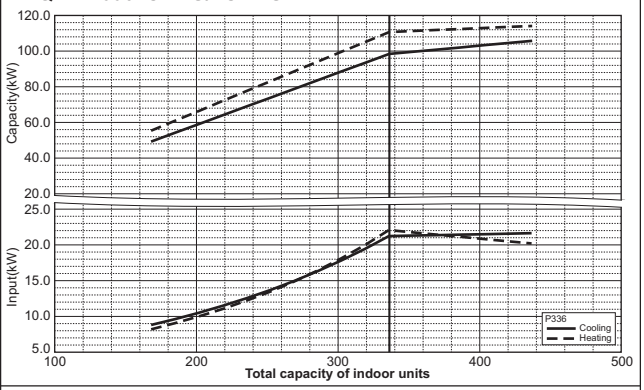

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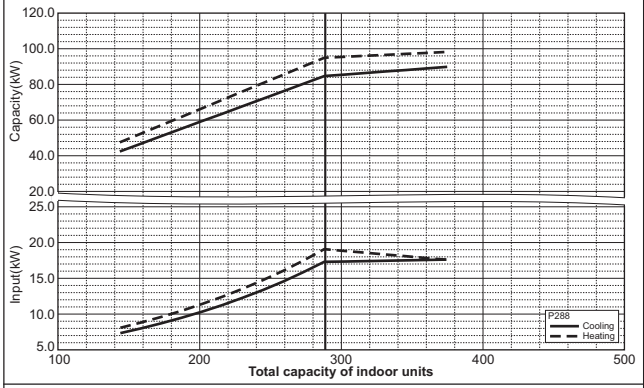

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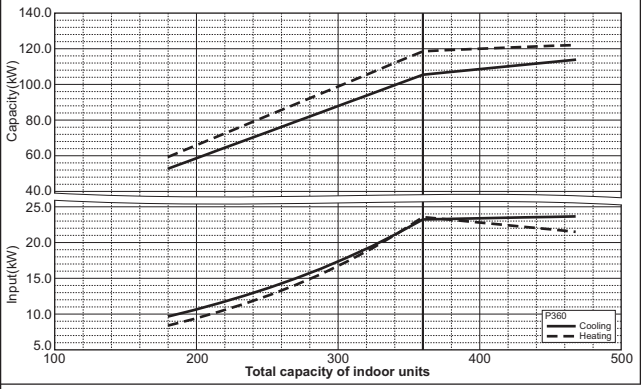

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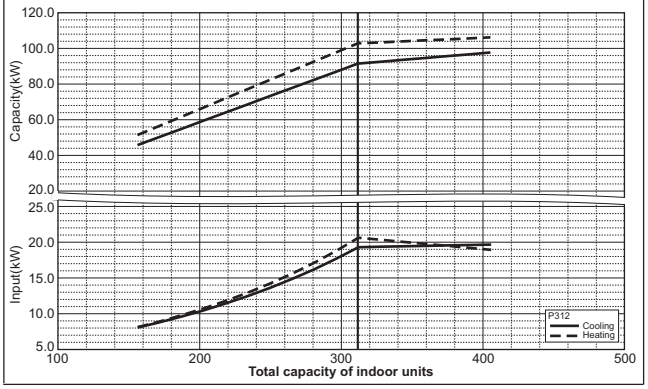

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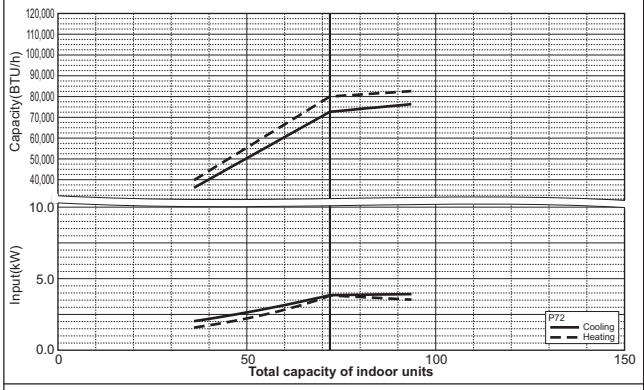

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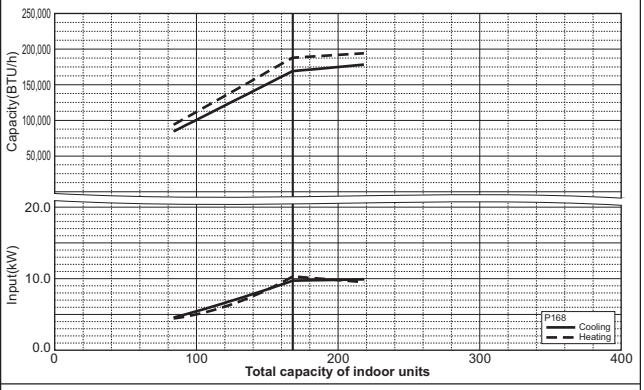

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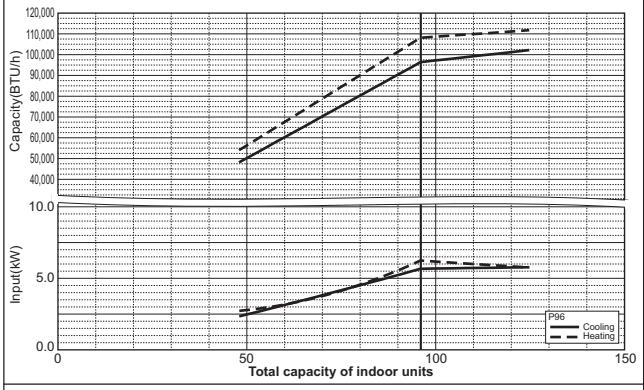

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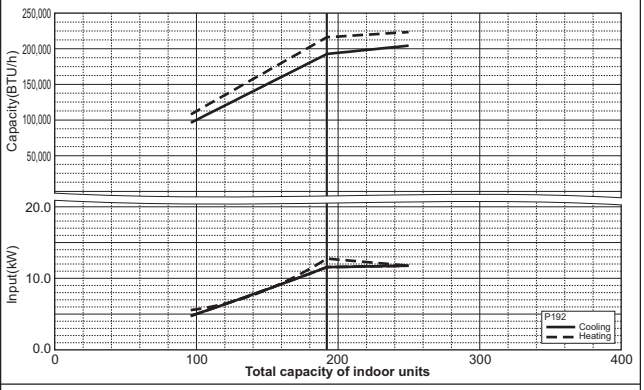

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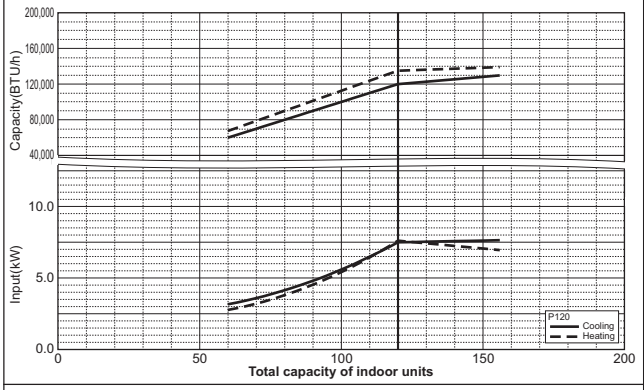

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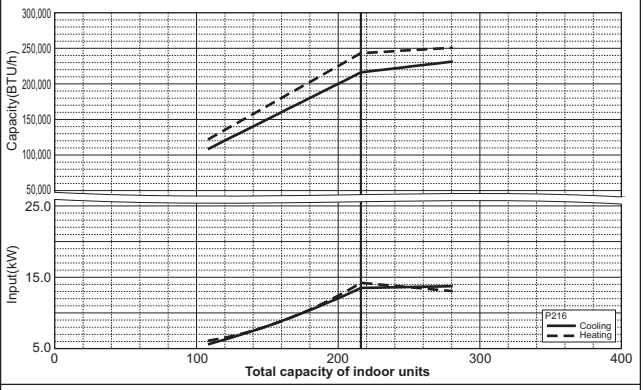

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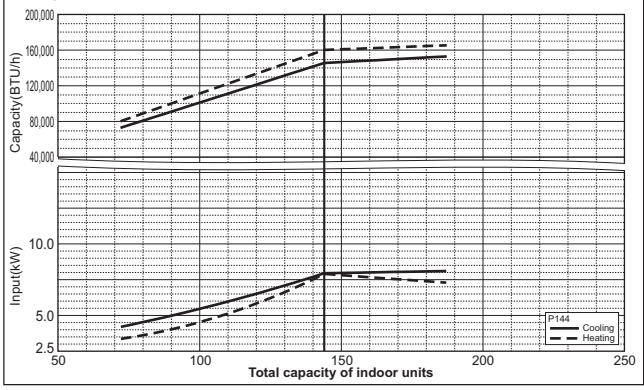

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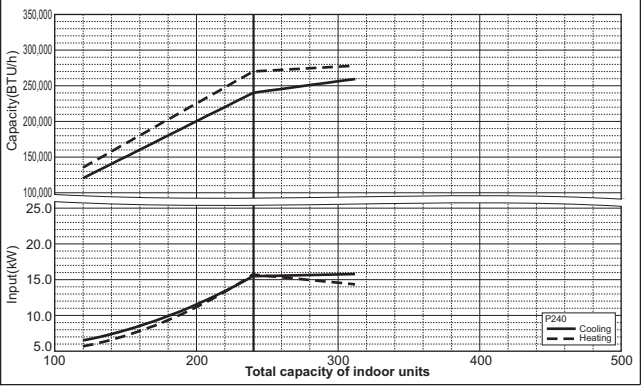

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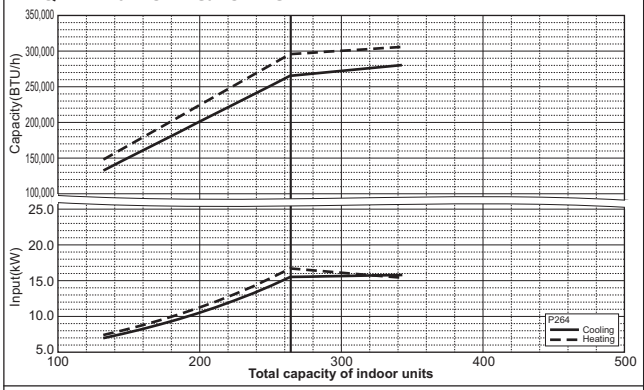

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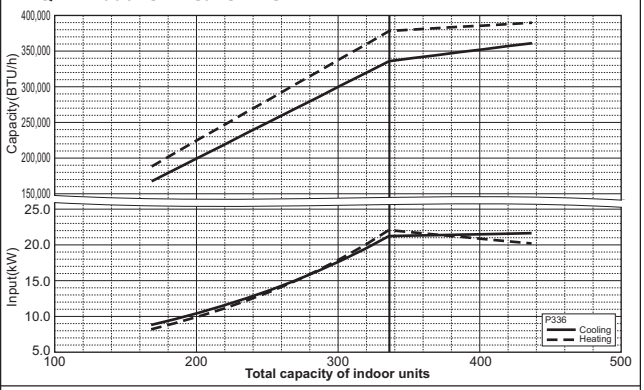

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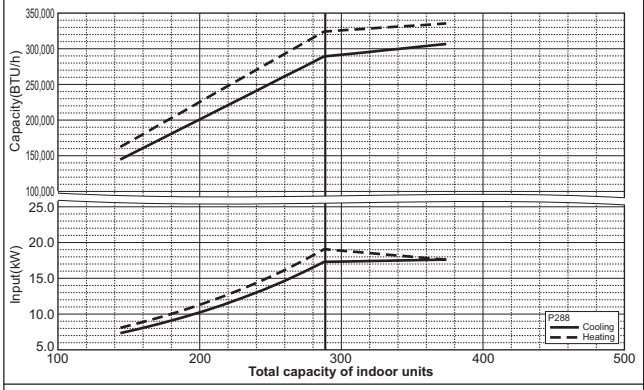

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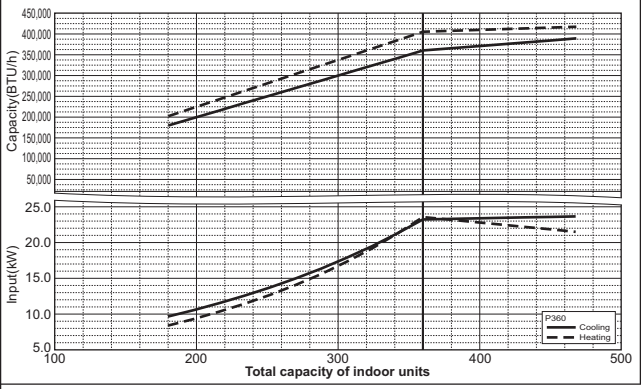

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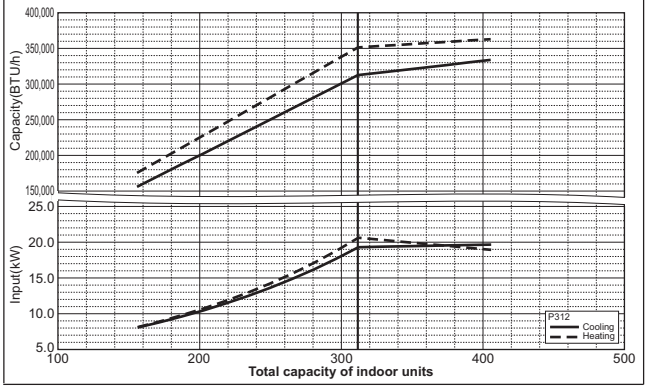

(1)-5 WR2 series

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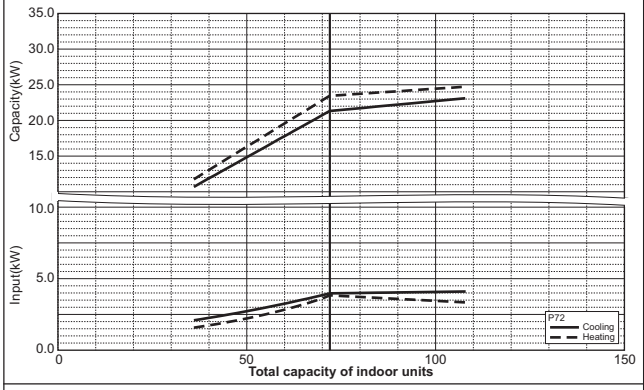

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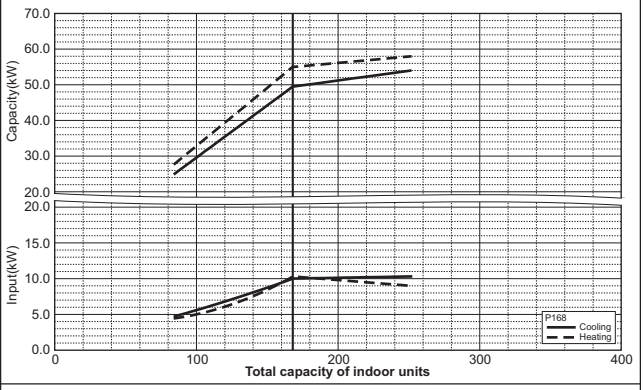

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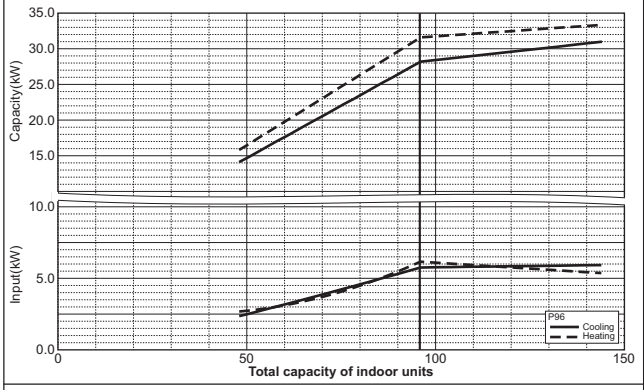
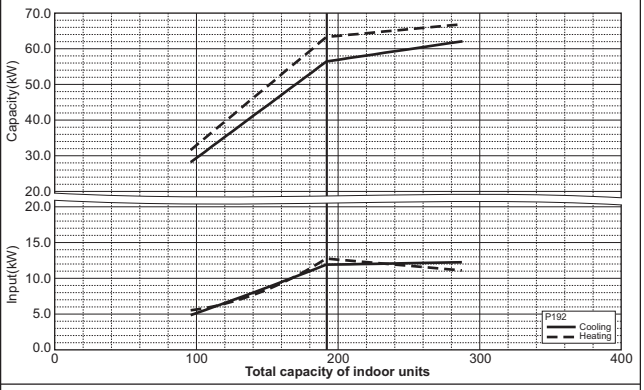
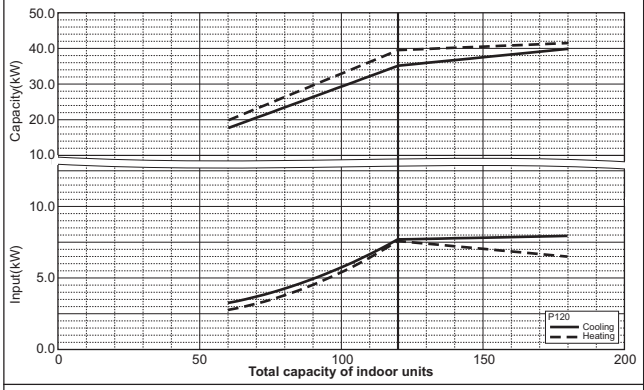


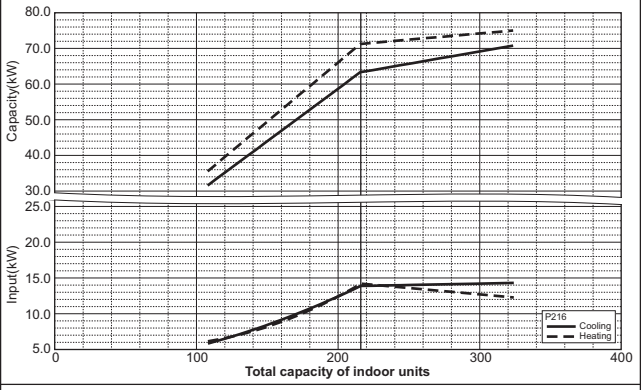
PQRY-P192TSHMU/YSHMU



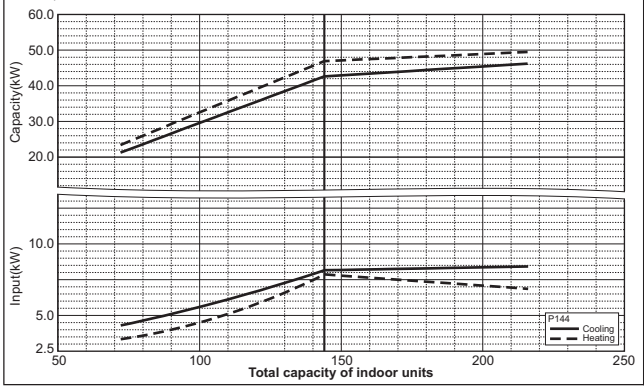
PQRY-P120THMU/YHMU



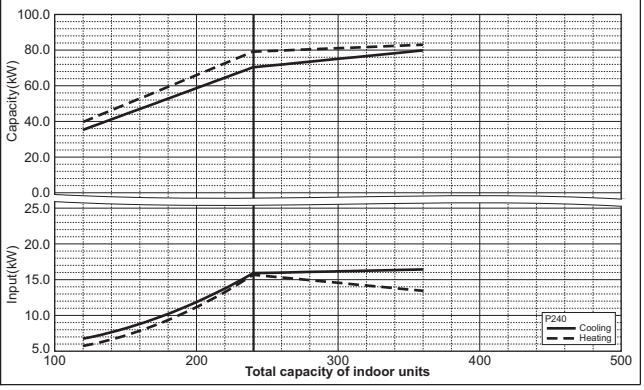
PQRY-P216TSHMU/YSHMU



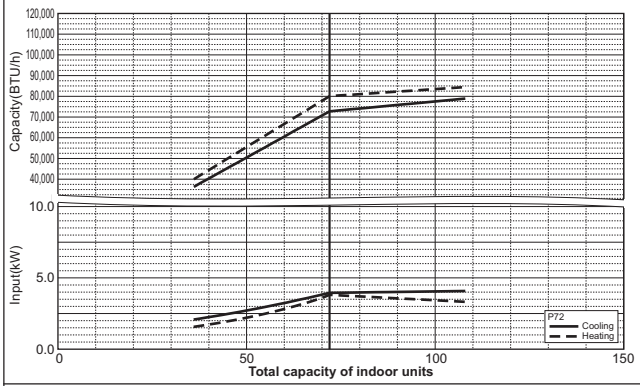
PQRY-P144TSHMU/YSHMU



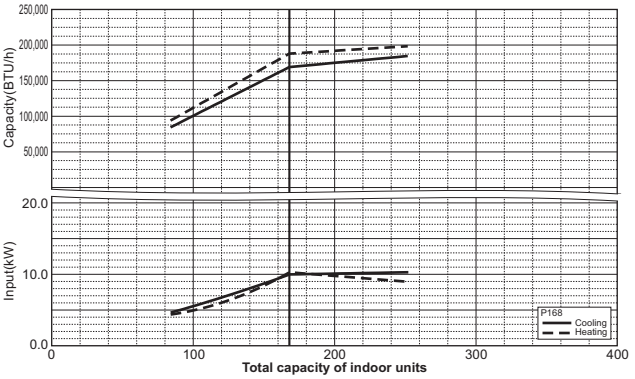
PQRY-P240TSHMU/YSHMU



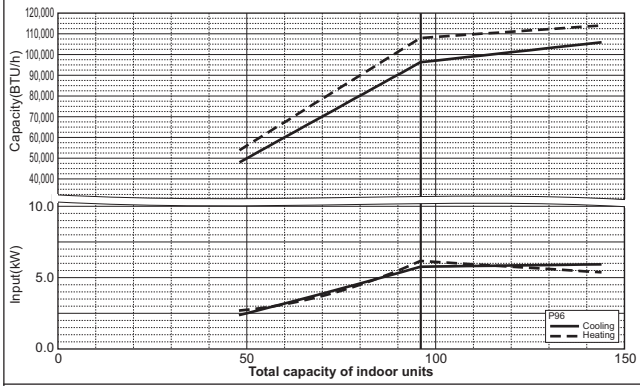
PQRY-P72THMU/YHMU



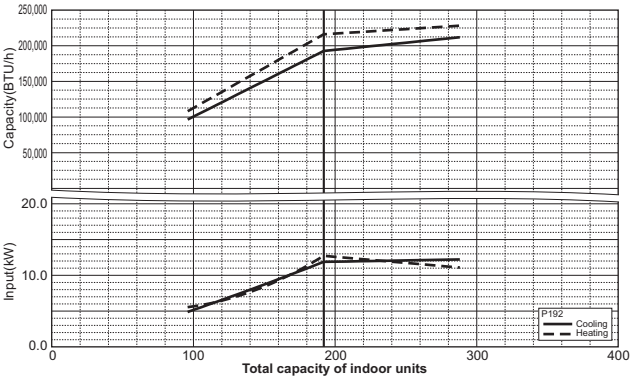
PQRY-P168TSHMU/YSHMU



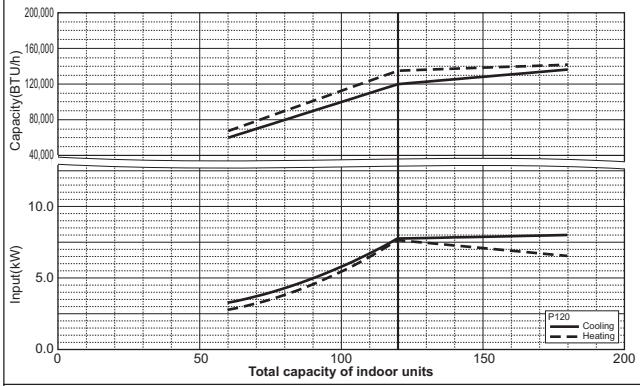
PQRY-P96THMU/YHMU



PQRY-P192TSHMU/YSHMU



PQRY-P120THMU/YHMU



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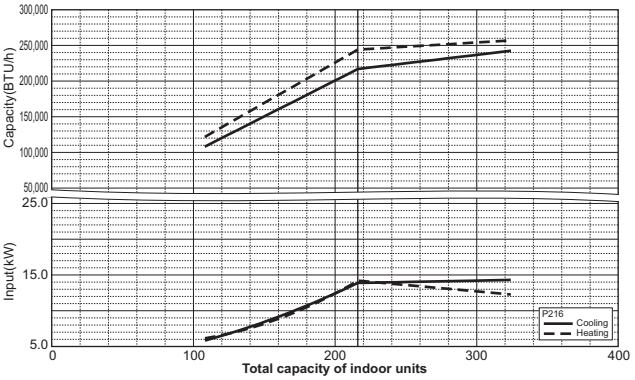
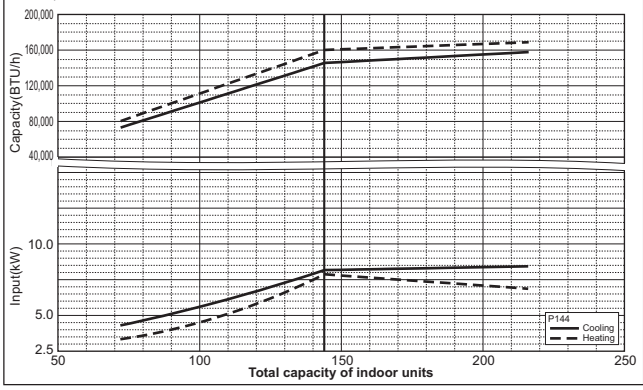
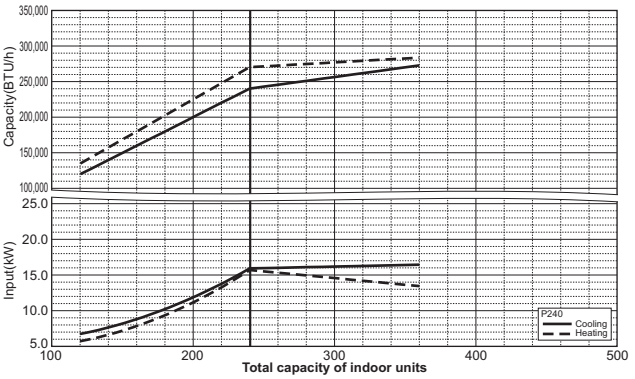


PQRY-P144TSHMU/YSHMU



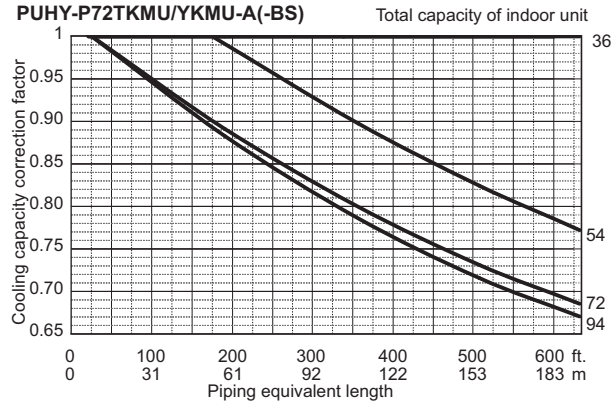
PQRY-P240TSHMU/YSHMU

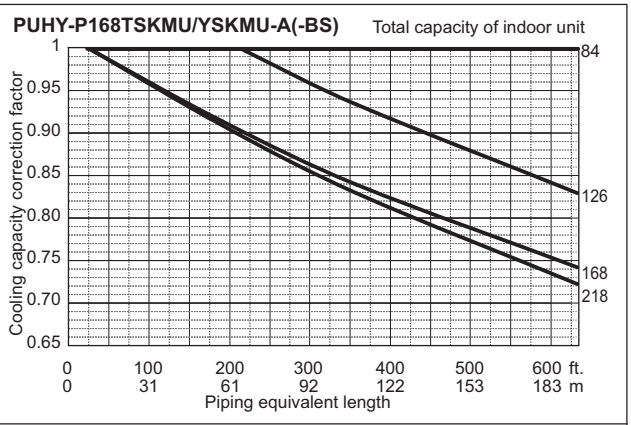


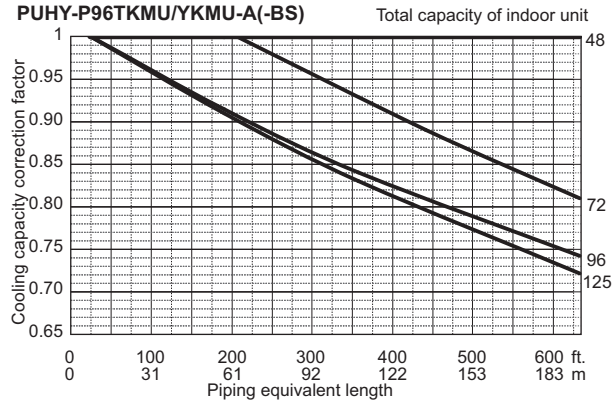
(2) Correction by refrigerant piping length

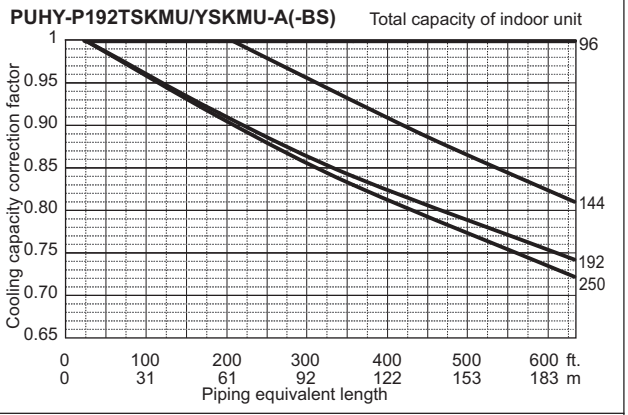
(2)-1 Y series

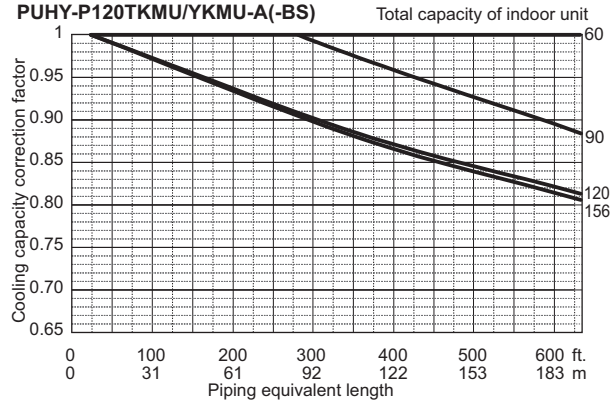
(2)-1-1 Cooling capacity correction

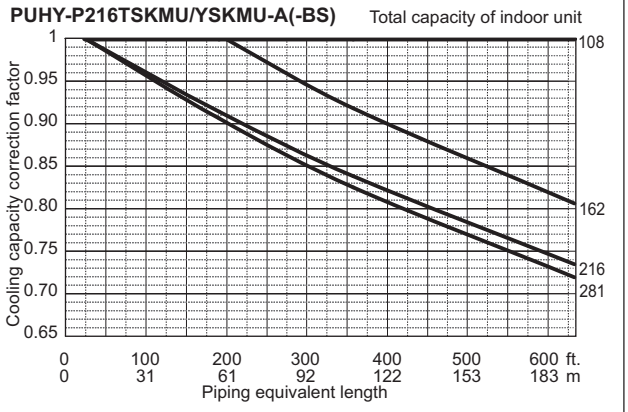


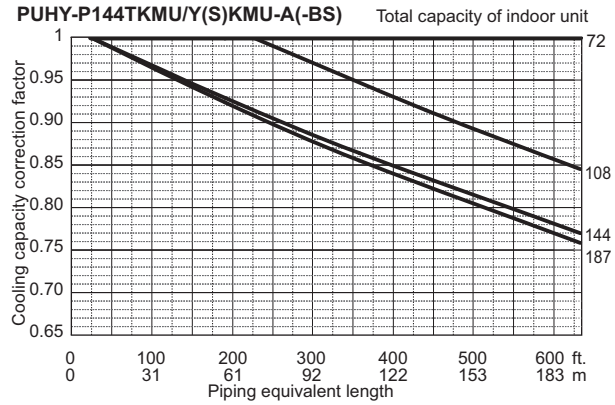


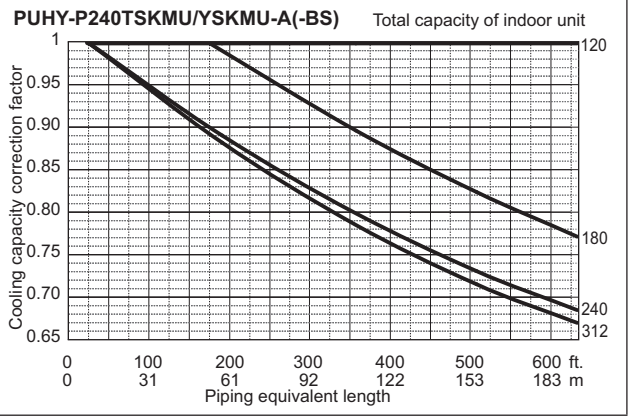




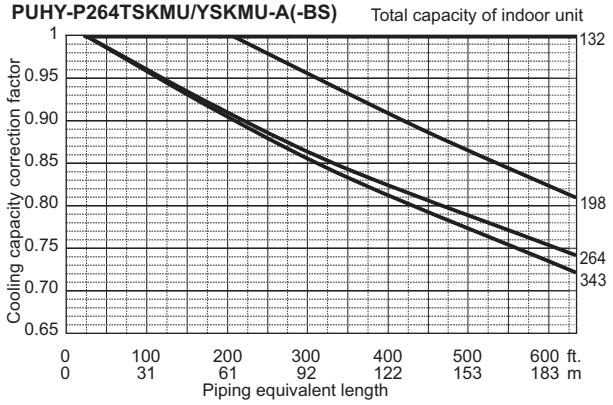




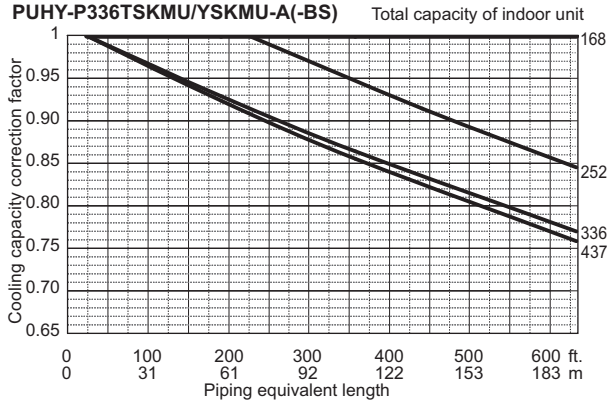




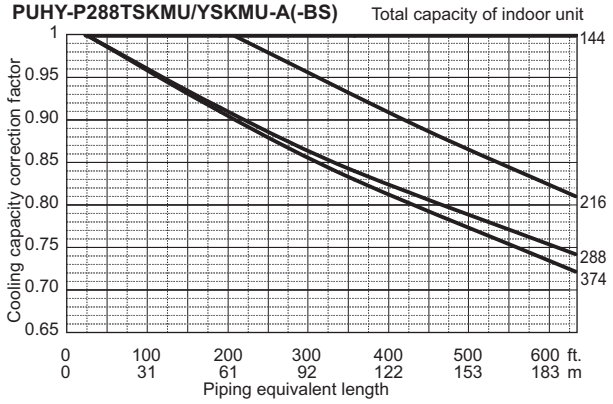
PUHY-P264TSKMU/YSKMU-A(-BS) Total capacity of indoor unit



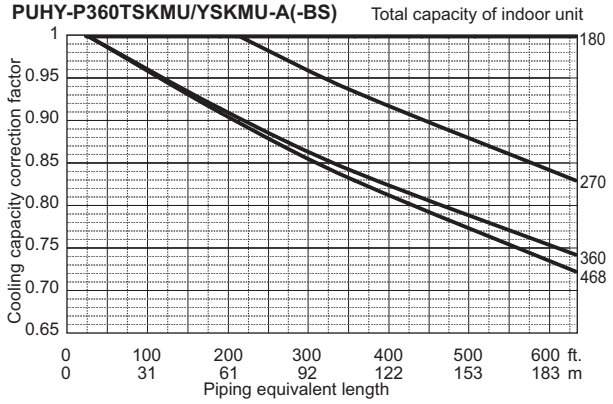
PUHY-P336TSKMU/YSKMU-A(-BS) Total capacity of indoor unit



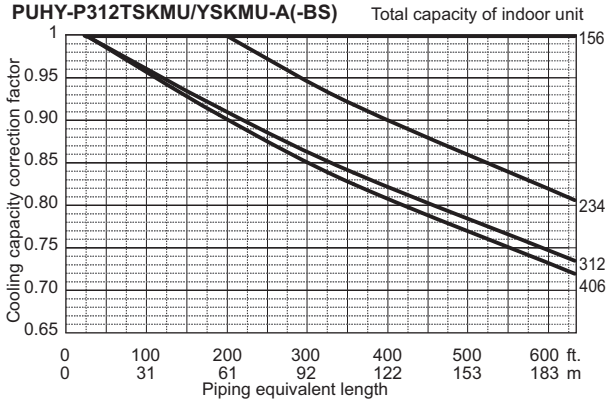
PUHY-P288TSKMU/YSKMU-A(-BS) Total capacity of indoor unit



PUHY-P360TSKMU/YSKMU-A(-BS) Total capacity of indoor unit

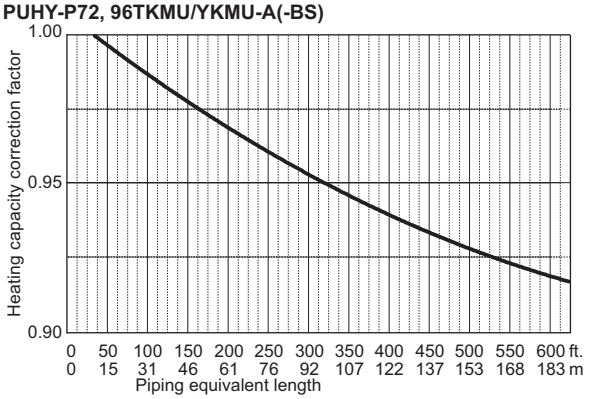


PUHY-P312TSKMU/YSKMU-A(-BS) Total capacity of indoor unit

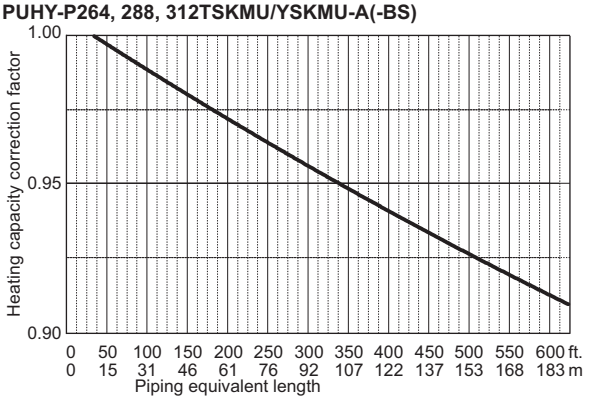


(2)-1-2 Heating capacity correction

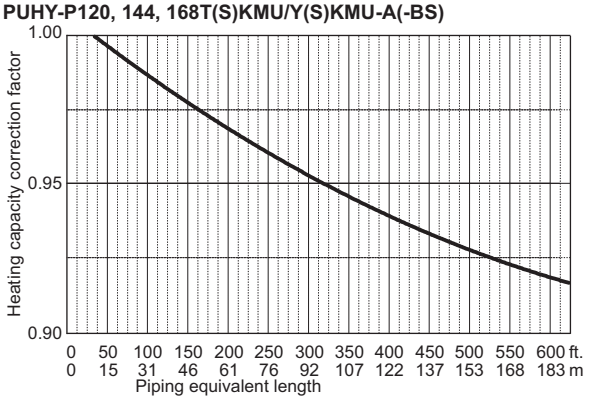
PUHY-P72, 96TKMU/YKMU-A(-BS)



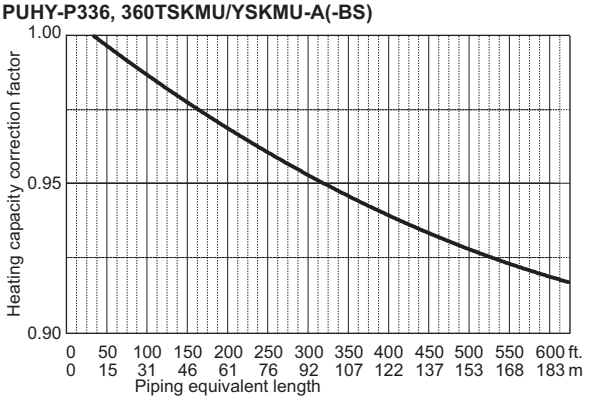
PUHY-P264, 288, 312TSKMU/YSKMU-A(-BS)



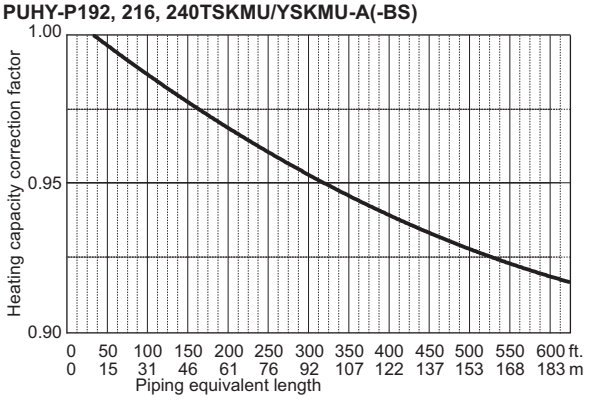
PUHY-P120, 144, 168T(S)KMU/Y(S)KMU-A(-BS)



PUHY-P336, 360TSKMU/YSKMU-A(-BS)



PUHY-P192, 216, 240TSKMU/YSKMU-A(-BS)



(2)-1-3 How to obtain the equivalent piping length

1. PUHY-P72, 96, 120, 144, 168, 192, 216, 240T(S)KMU/Y(S)KMU

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

2. PUHY-P264, 288, 312TSKMU/YSKMU

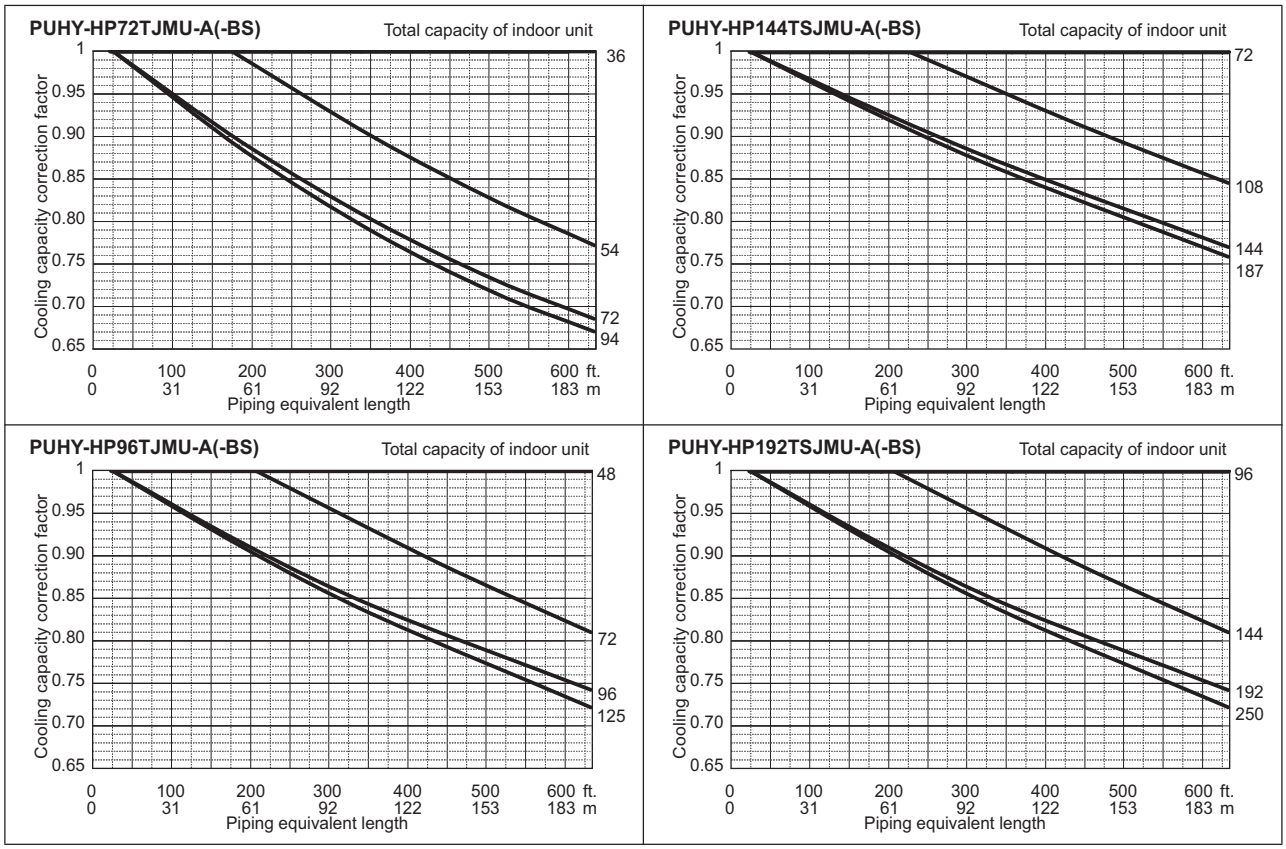
Equivalent length = (Actual piping length to the farthest indoor unit) + (2.30 x number of bent on the piping) [ft.]
Equivalent length = (Actual piping length to the farthest indoor unit) + (0.70 x number of bent on the piping) [m]

3. PUHY-P336, 360TSKMU/YSKMU

Equivalent length = (Actual piping length to the farthest indoor unit) + (2.63 x number of bent on the piping) [ft.]
Equivalent length = (Actual piping length to the farthest indoor unit) + (0.80 x number of bent on the piping) [m]

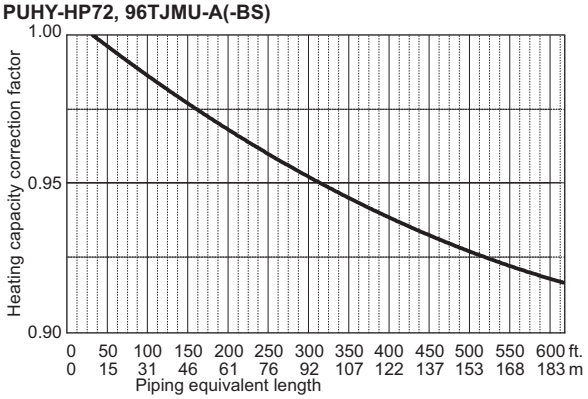
(2)-2 H series

(2)-2-1 Cooling capacity correction

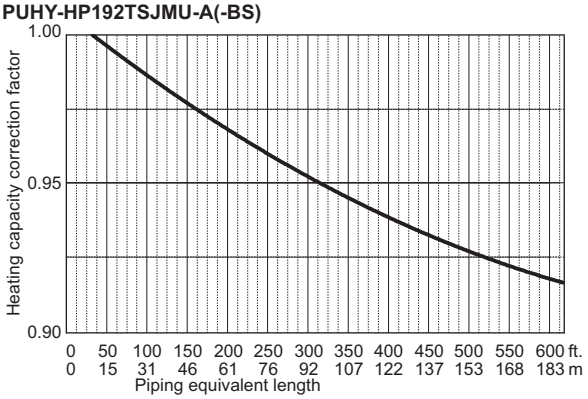


(2)-2-2 Heating capacity correction

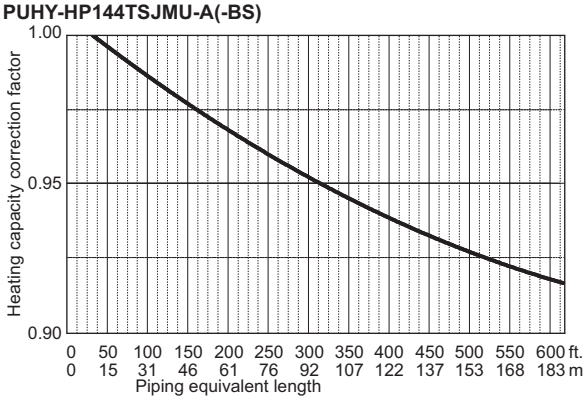
PUHY-HP72, 96TJMU-A(-BS)



PUHY-HP192TSJMU-A(-BS)



PUHY-HP144TSJMU-A(-BS)



(2)-2-3 How to obtain the equivalent piping length

1 PUHY-HP72TJMU-A

Equivalent length = (Actual piping length to the farthest indoor unit) + (0.35 x number of bends in the piping) m / + (1.15 x number of bends in the piping) ft.

2 PUHY-HP96TJMU-A

Equivalent length = (Actual piping length to the farthest indoor unit) + (0.42 x number of bends in the piping) m / + (1.38 x number of bends in the piping) ft.

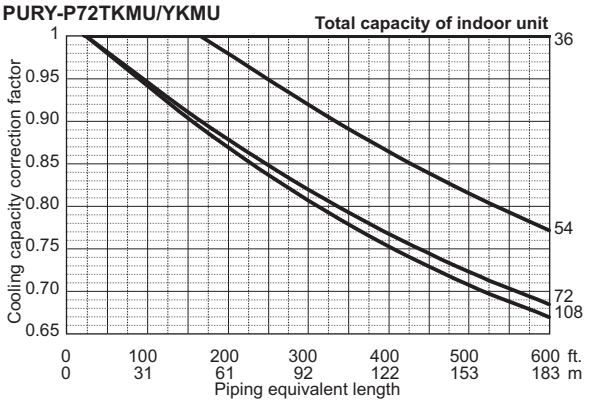
3 PUHY-HP144,192TSJMU-A

Equivalent length = (Actual piping length to the farthest indoor unit) + (0.50 x number of bends in the piping) m / + (1.64 x number of bends in the piping) ft.

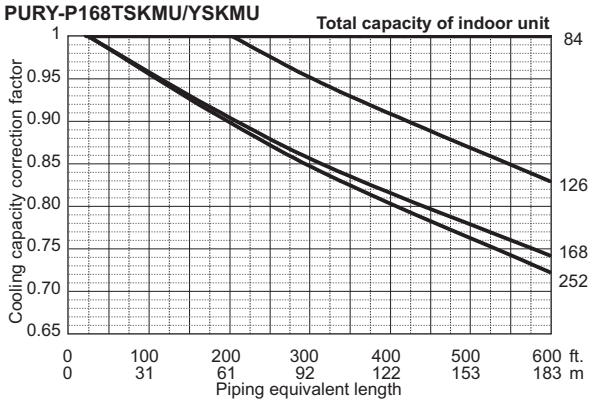
(2)-3 R2 series

(2)-3-1 Cooling capacity correction

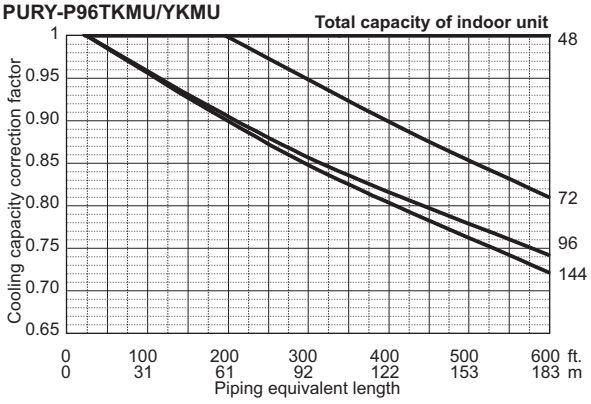
PURY-P72TKMU/YKMU



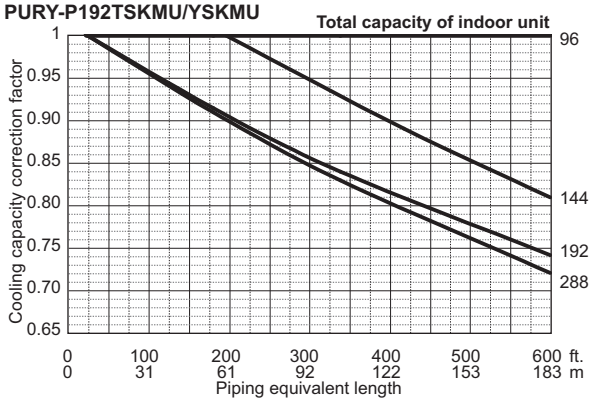
PURY-P168TSKMU/YSKMU



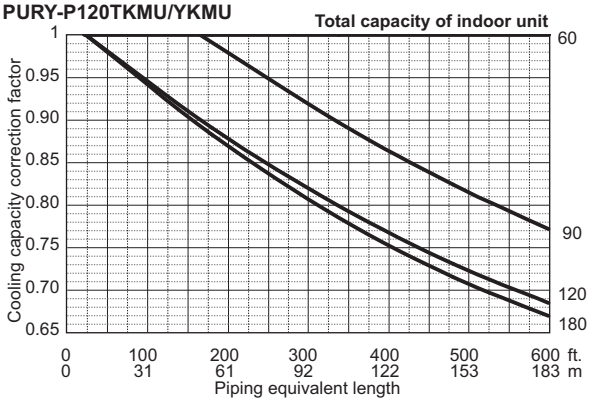
PURY-P96TKMU/YKMU



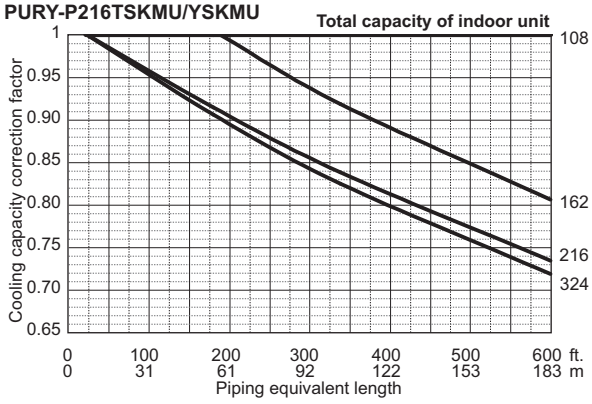
PURY-P192TSKMU/YSKMU



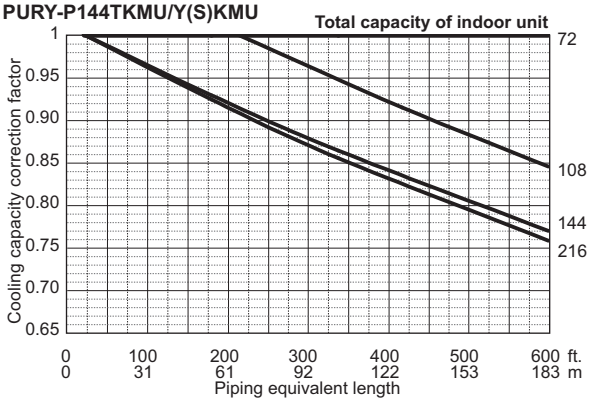
PURY-P120TKMU/YKMU



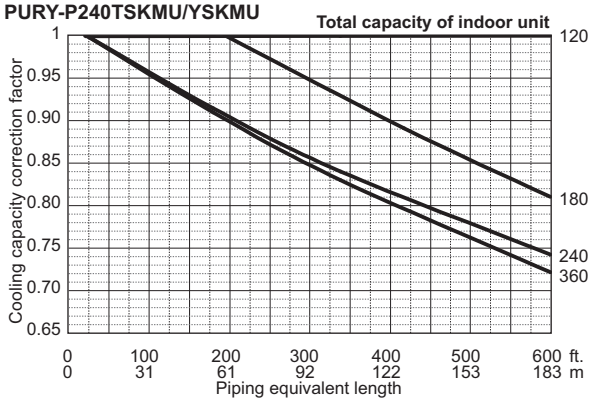
PURY-P216TSKMU/YSKMU

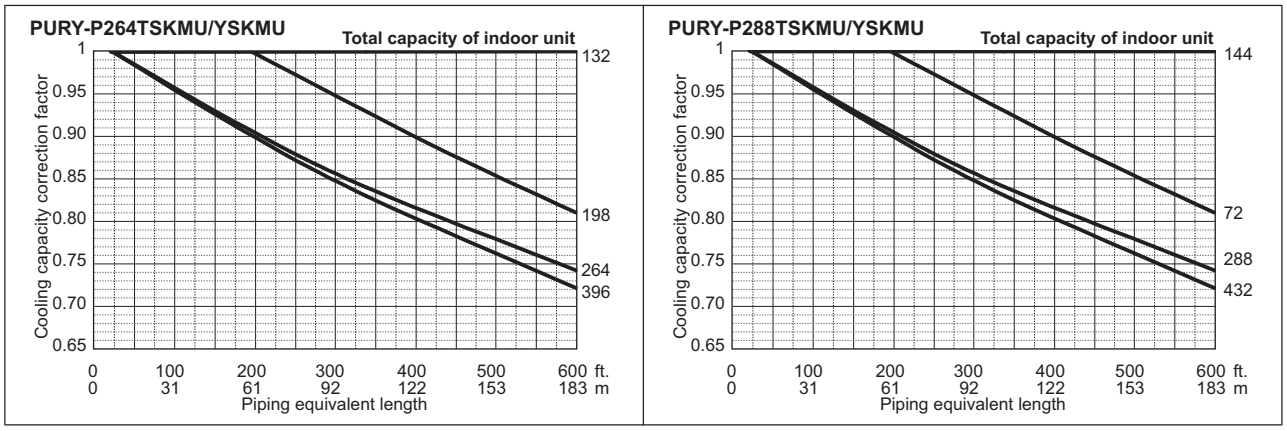


PURY-P144TKMU/Y(S)KMU



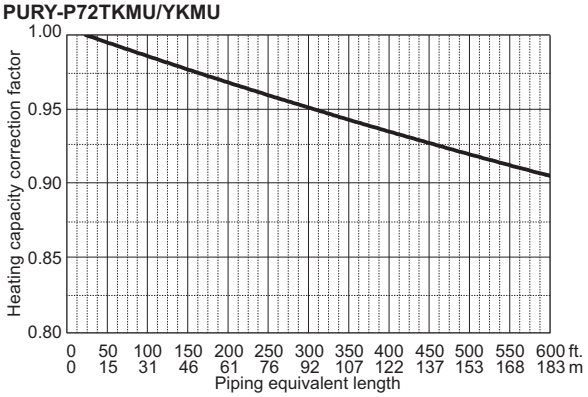
PURY-P240TSKMU/YSKMU



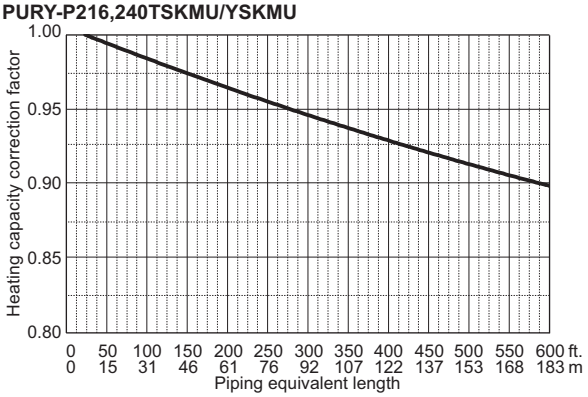

PURY-P264TSKMU/YSKMU
Total capacity of indoor unit
Cooling capacity correction factor
1
0.95
0.90
0.85
0.80
0.75
0.70
0.65
132
198
264
396
0 100 200 300 400 500 600 ft.
0 31 61 92 122 153 183 m
Piping equivalent length
PURY-P288TSKMU/YSKMU
Total capacity of indoor unit
Cooling capacity correction factor
1
0.95
0.90
0.85
0.80
0.75
0.70
0.65
144
72
288
432
0 100 200 300 400 500 600 ft.
0 31 61 92 122 153 183 m
Piping equivalent length

(2)-3-2 Heating capacity correction

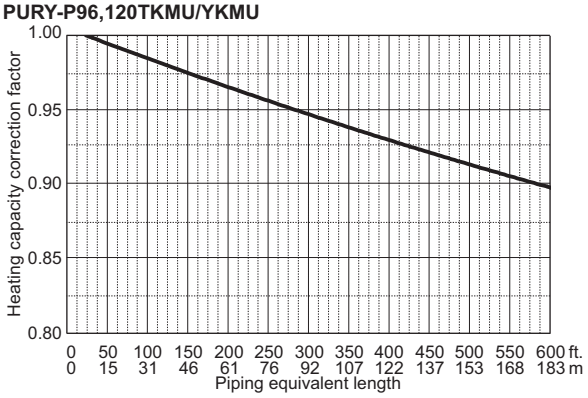
PURY-P72TKMU/YKMU



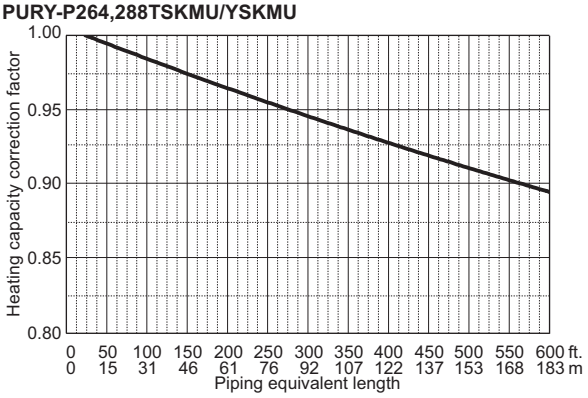
PURY-P216,240TSKMU/YSKMU



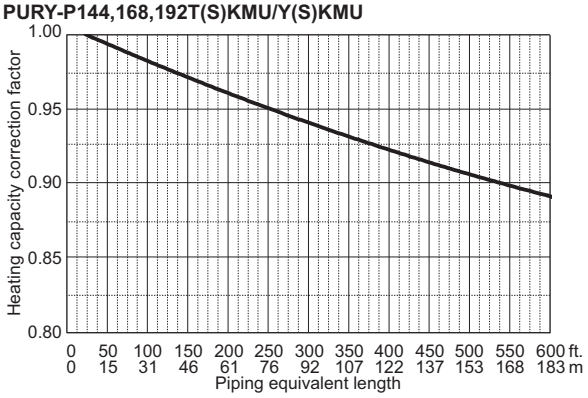
PURY-P96,120TKMU/YKMU



PURY-P264,288TSKMU/YSKMU



PURY-P144,168,192T(S)KMU/Y(S)KMU



(2)-3-3 How to obtain the equivalent piping length

1. PURY-P72TKMU/YKMU

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

2. PURY-P96TKMU/YKMU

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

3. PURY-P120TKMU/YKMU

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

4. PURY-P144TKMU/Y(S)KMU

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

5. PURY-P168TSKMU/YSKMU

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

6. PURY-P192TSKMU/YSKMU

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

7. PURY-P216TSKMU/YSKMU

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

8. PURY-P240TSKMU/YSKMU

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

9. PURY-P264TSKMU/YSKMU

Equivalent length = (Actual piping length to the farthest indoor unit) + (2.30 x number of bent on the piping) [ft.]
Equivalent length = (Actual piping length to the farthest indoor unit) + (0.70 x number of bent on the piping) [m]

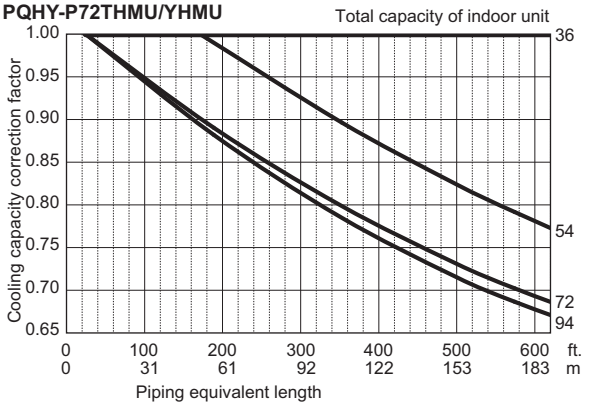
10. PURY-P288TSKMU/YSKMU

Equivalent length = (Actual piping length to the farthest indoor unit) + (2.30 x number of bent on the piping) [ft.]
Equivalent length = (Actual piping length to the farthest indoor unit) + (0.70 x number of bent on the piping) [m]

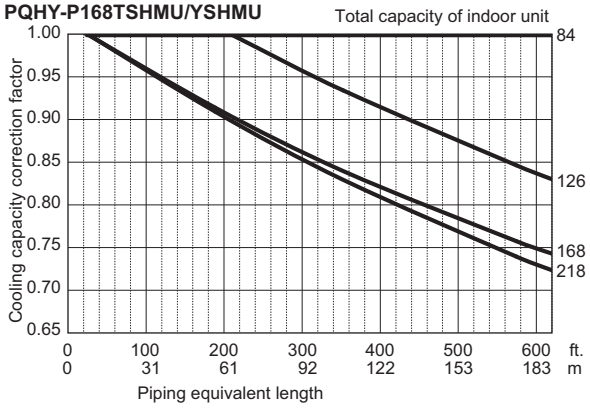
(2)-4 WY series

(2)-4-1 Cooling capacity correction

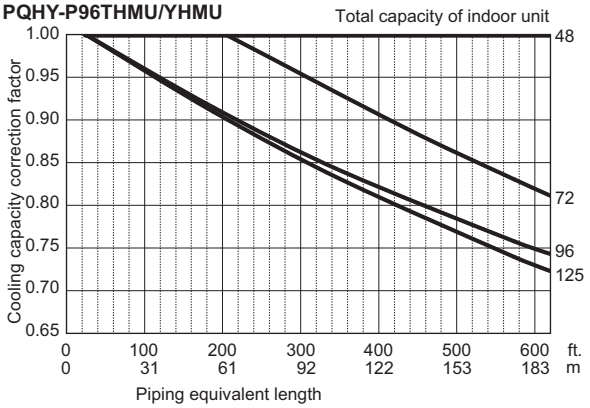
PQHY-P72THMU/YHMU



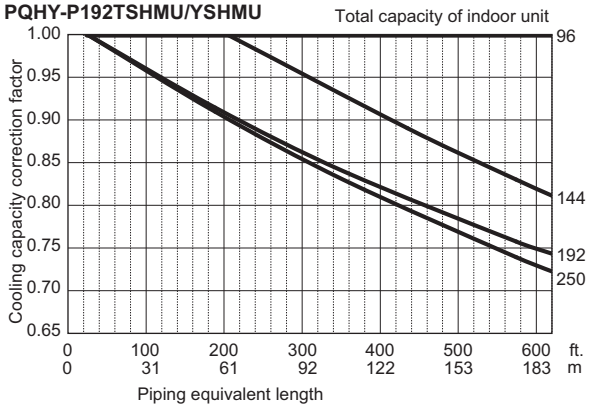
PQHY-P168TSHMU/YSHMU



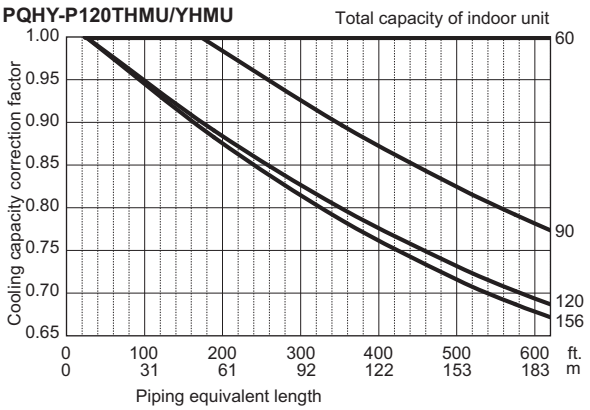
PQHY-P96THMU/YHMU



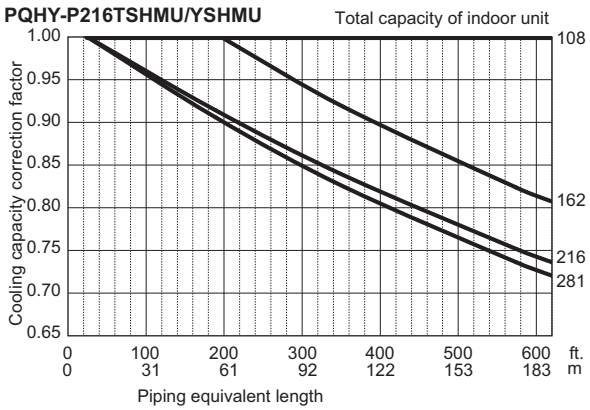
PQHY-P192TSHMU/YSHMU



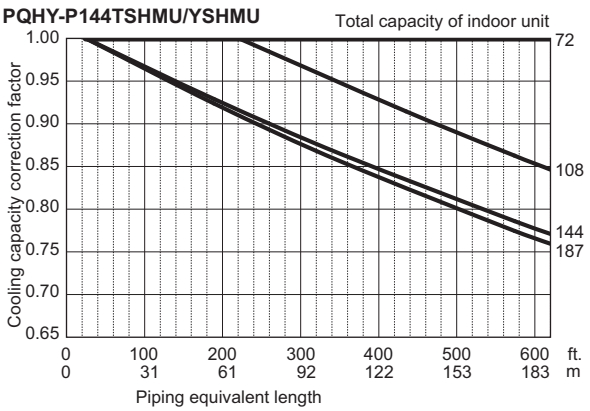
PQHY-P120THMU/YHMU



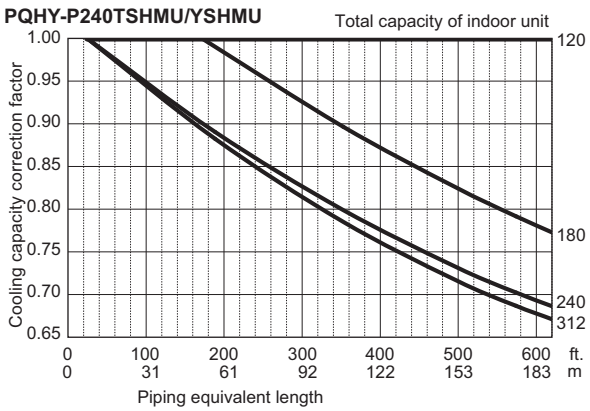
PQHY-P216TSHMU/YSHMU

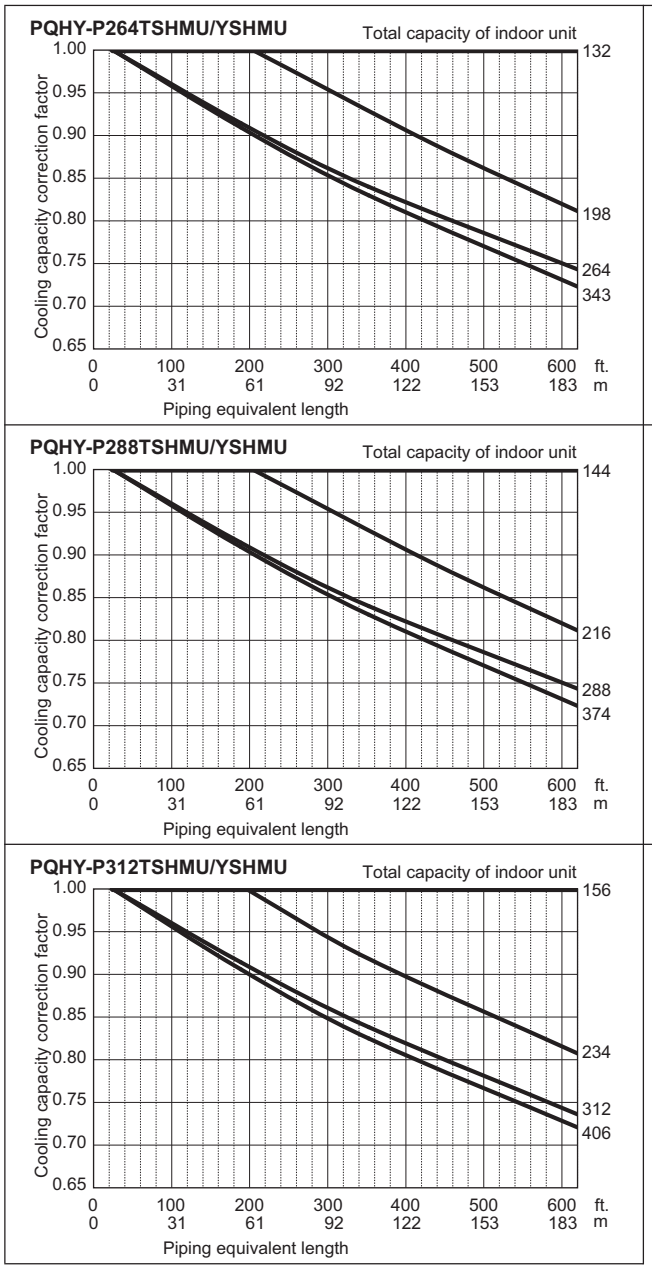


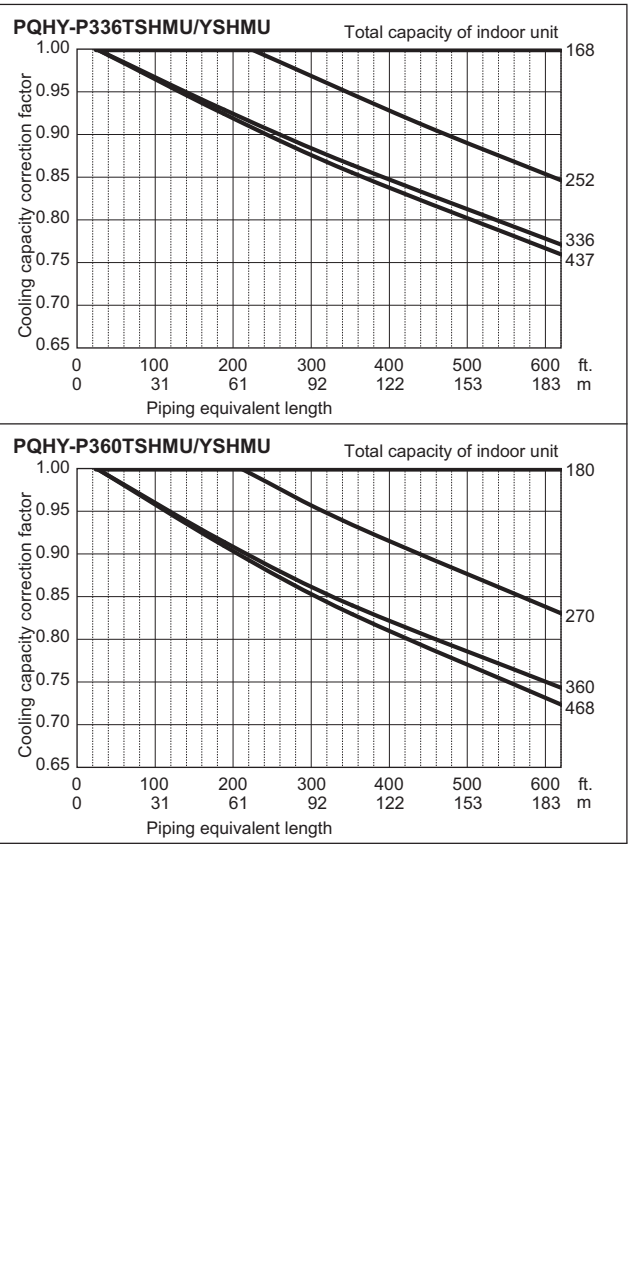
PQHY-P144TSHMU/YSHMU



PQHY-P240TSHMU/YSHMU




PQHY-P264TSHMU/YSHMU
Total capacity of indoor unit
132
198
264
343
Cooling capacity correction factor
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0 100 200 300 400 500 600 ft.
0 31 61 92 122 153 183 m
Piping equivalent length


PQHY-P336TSHMU/YSHMU
Total capacity of indoor unit
168
252
336
437
Cooling capacity correction factor
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0 100 200 300 400 500 600 ft.
0 31 61 92 122 153 183 m
Piping equivalent length

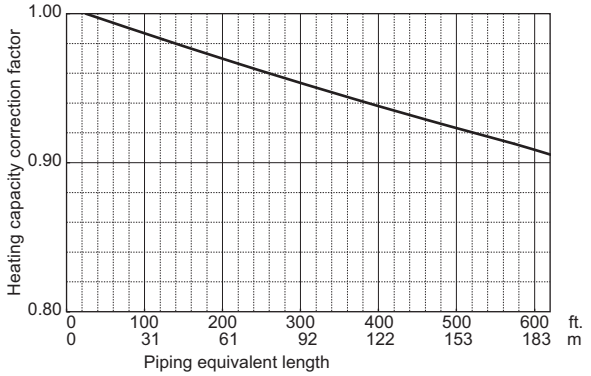
PQHY-P288TSHMU/YSHMU
Total capacity of indoor unit
144
216
288
374
Cooling capacity correction factor
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0 100 200 300 400 500 600 ft.
0 31 61 92 122 153 183 m
Piping equivalent length

PQHY-P360TSHMU/YSHMU
Total capacity of indoor unit
180
270
360
468
Cooling capacity correction factor
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0 100 200 300 400 500 600 ft.
0 31 61 92 122 153 183 m
Piping equivalent length

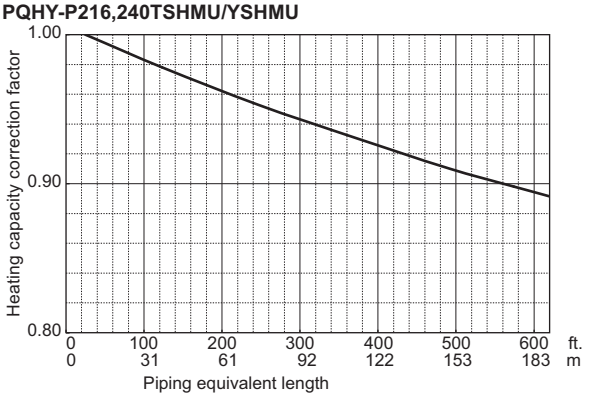
PQHY-P312TSHMU/YSHMU
Total capacity of indoor unit
156
234
312
406
Cooling capacity correction factor
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0 100 200 300 400 500 600 ft.
0 31 61 92 122 153 183 m
Piping equivalent length

(2)-4-2 Heating capacity correction

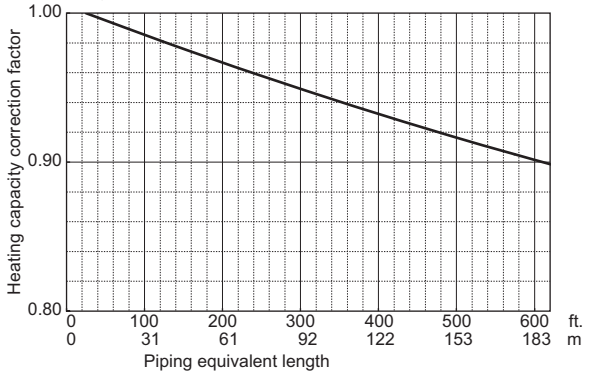
PQHY-P72THMU/YHMU



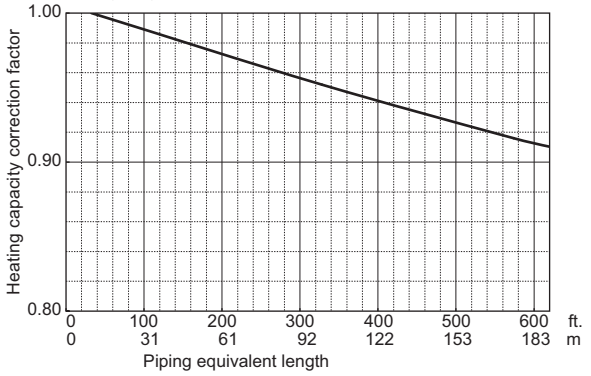
PQHY-P216,240TSHMU/YSHMU



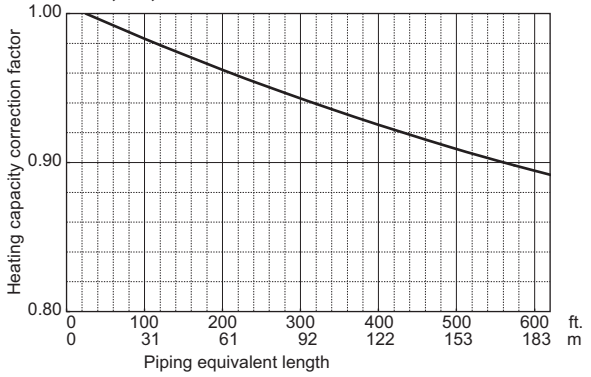
PQHY-P96,120THMU/YHMU



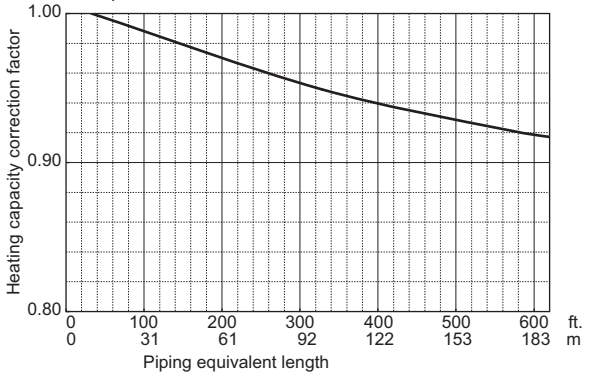
PQHY-P264,288,312TSHMU/YSHMU



PQHY-P144,168,192TSHMU/YSHMU



PQHY-P336,360TSHMU/YSHMU



(2)-4-3 How to obtain the equivalent piping length

1. PQHY-P72THMU/YHMU

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

2. PQHY-P96, 120THMU/YHMU

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

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

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

4. PQHY-P264, 288, 312TSHMU/YSHMU

Equivalent length = (Actual piping length to the farthest indoor unit) + (2.30 x number of bent on the piping) [ft.]
Equivalent length = (Actual piping length to the farthest indoor unit) + (0.70 x number of bent on the piping) [m]

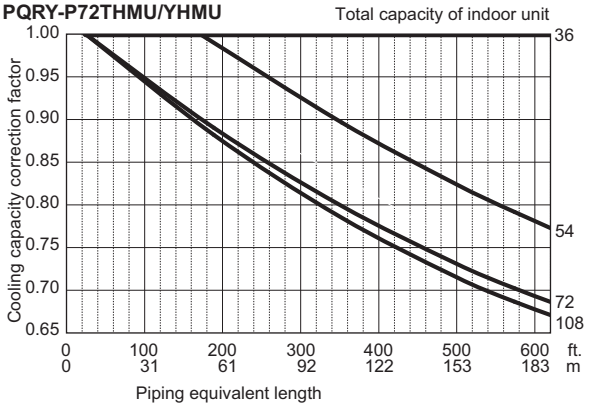
5. PQHY-P336, 360TSHMU/YSHMU

Equivalent length = (Actual piping length to the farthest indoor unit) + (2.63 x number of bent on the piping) [ft.]
Equivalent length = (Actual piping length to the farthest indoor unit) + (0.80 x number of bent on the piping) [m]

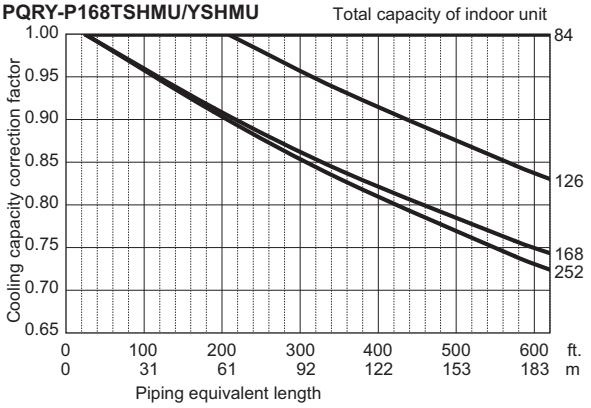
(2)-5 WR2 series

(2)-5-1 Cooling capacity correction

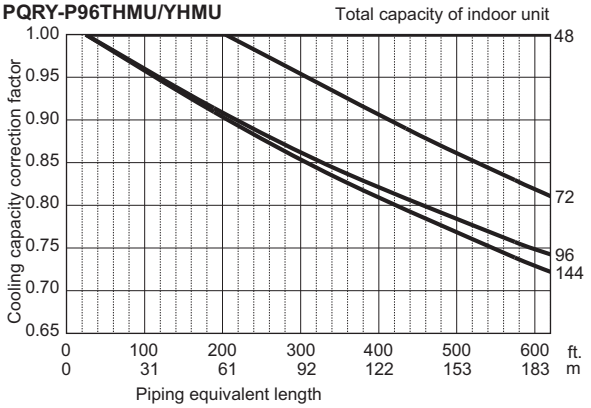
PQRY-P72THMU/YHMU



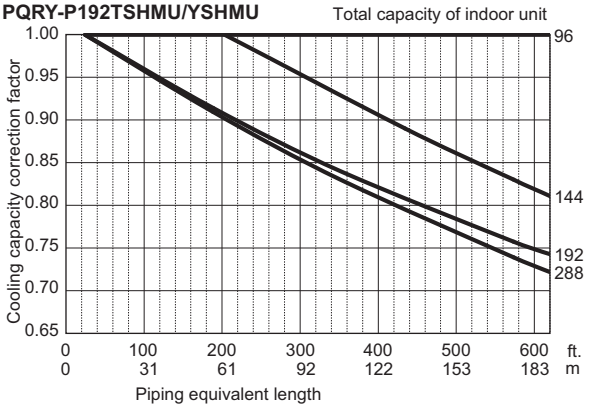
PQRY-P168TSHMU/YSHMU



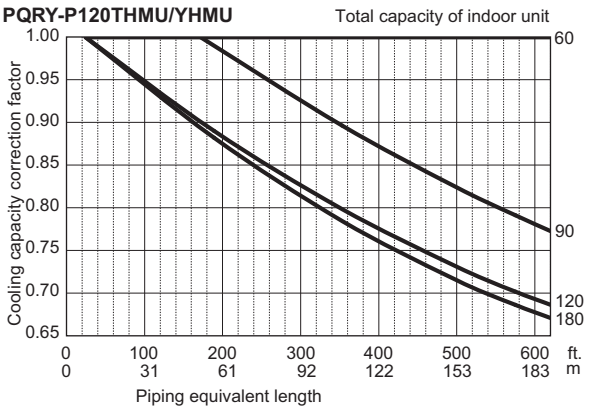
PQRY-P96THMU/YHMU



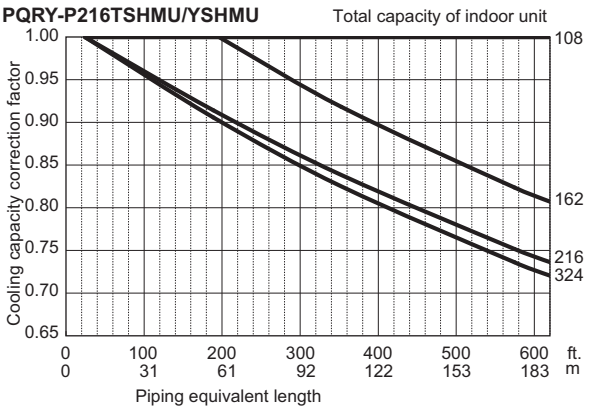
PQRY-P192TSHMU/YSHMU



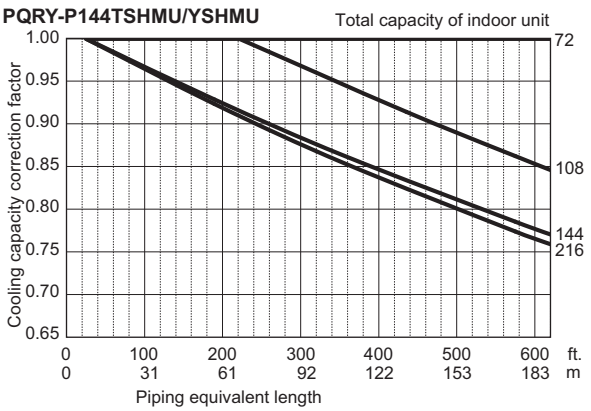
PQRY-P120THMU/YHMU



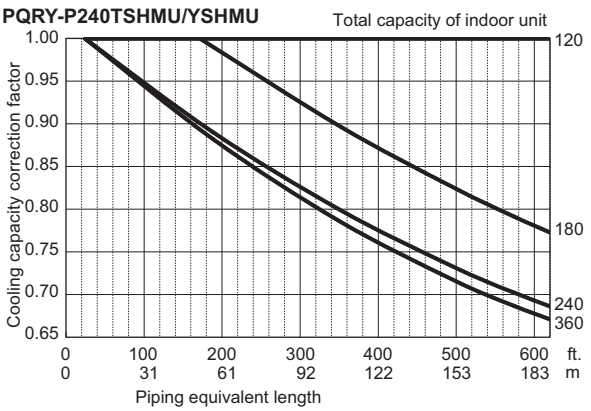
PQRY-P216TSHMU/YSHMU



PQRY-P144TSHMU/YSHMU

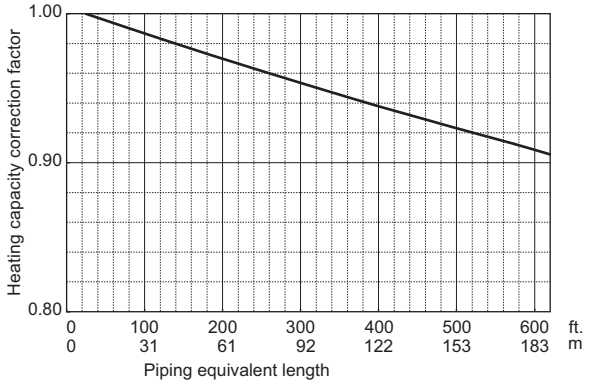


PQRY-P240TSHMU/YSHMU

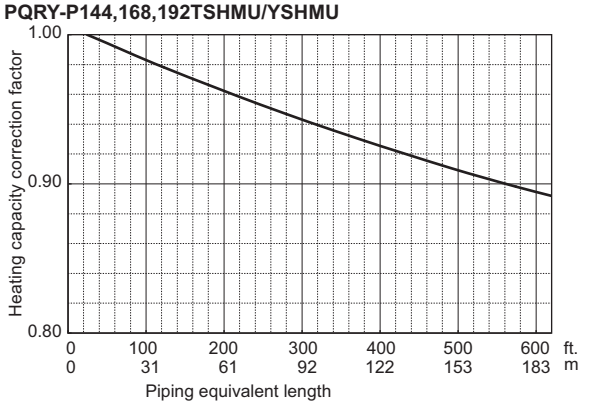


(2)-5-2 Heating capacity correction

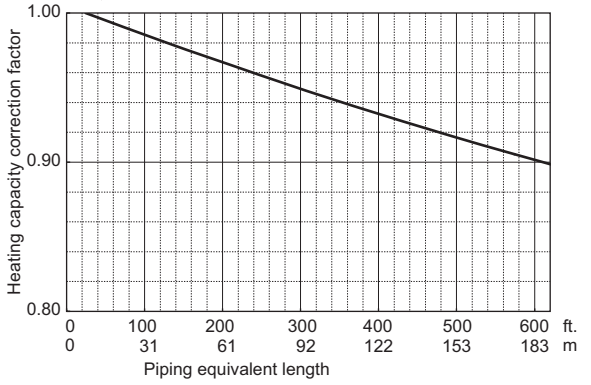
PQRY-P72THMU/YHMU



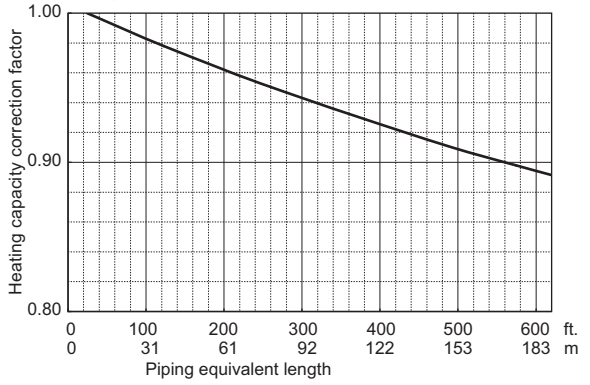
PQRY-P144,168,192TSHMU/YSHMU



PQRY-P96,120THMU/YHMU



PQRY-P216,240TSHMU/YSHMU



(2)-5-3 How to obtain the equivalent piping length

1. PQRY-P72THMU/YHMU

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

2. PQRY-P96,120THMU/YHMU

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

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

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

(3) Correction at frosting and defrosting

Due to frosting at the outdoor heat exchanger and the automatical defrosting operation, the heating capacity of the outdoor unit should be considered by multiplying the correction factor which shown in the table below.

(3)-1 Y series

Table of correction factor at frost and defrost

Outdoor inlet air temp. °C	6	4	2	1	0	-2	-4	-6	-8	-10	-20
Outdoor inlet air temp. °F	43	39	36	34	32	28	25	21	18	14	-4
PUHY-P72TKMU-A (-BS)	1.00	0.95	0.84	0.83	0.83	0.87	0.90	0.95	0.95	0.95	0.95
PUHY-P96TKMU-A (-BS)	1.00	0.95	0.84	0.83	0.83	0.87	0.90	0.95	0.95	0.95	0.95
PUHY-P120TKMU-A (-BS)	1.00	0.93	0.82	0.80	0.82	0.86	0.90	0.90	0.95	0.95	0.95
PUHY-P144TKMU-A (-BS)	1.00	0.93	0.82	0.80	0.82	0.86	0.90	0.90	0.95	0.95	0.95
PUHY-P168TSKMU-A (-BS)	1.00	0.98	0.89	0.87	0.89	0.90	0.92	0.95	0.95	0.95	0.95
PUHY-P192TSKMU-A (-BS)	1.00	0.98	0.89	0.86	0.89	0.90	0.92	0.95	0.95	0.95	0.95
PUHY-P216TSKMU-A (-BS)	1.00	0.94	0.87	0.86	0.87	0.88	0.90	0.90	0.93	0.95	0.95
PUHY-P240TSKMU-A (-BS)	1.00	0.94	0.84	0.86	0.87	0.88	0.90	0.90	0.93	0.95	0.95
PUHY-P264TSKMU-A (-BS)	1.00	0.98	0.89	0.88	0.89	0.90	0.92	0.95	0.95	0.95	0.95
PUHY-P288TSKMU-A (-BS)	1.00	0.98	0.89	0.88	0.89	0.90	0.92	0.95	0.95	0.95	0.95
PUHY-P312TSKMU-A (-BS)	1.00	0.98	0.89	0.88	0.89	0.90	0.92	0.95	0.95	0.95	0.95
PUHY-P336TSKMU-A (-BS)	1.00	0.94	0.87	0.86	0.87	0.88	0.90	0.90	0.93	0.95	0.95
PUHY-P360TSKMU-A (-BS)	1.00	0.94	0.87	0.86	0.87	0.88	0.90	0.90	0.93	0.95	0.95
PUHY-P72YKMU-A (-BS)	1.00	0.95	0.84	0.83	0.83	0.87	0.90	0.95	0.95	0.95	0.95
PUHY-P96YKMU-A (-BS)	1.00	0.95	0.84	0.83	0.83	0.87	0.90	0.95	0.95	0.95	0.95
PUHY-P120YKMU-A (-BS)	1.00	0.93	0.82	0.80	0.82	0.86	0.90	0.90	0.95	0.95	0.95
PUHY-P144YKMU-A (-BS)	1.00	0.93	0.82	0.80	0.82	0.86	0.90	0.90	0.95	0.95	0.95
PUHY-P144YSKMU-A (-BS)	1.00	0.95	0.84	0.83	0.83	0.87	0.90	0.95	0.95	0.95	0.95
PUHY-P168YSKMU-A (-BS)	1.00	0.98	0.89	0.87	0.89	0.90	0.92	0.95	0.95	0.95	0.95
PUHY-P192YSKMU-A (-BS)	1.00	0.98	0.89	0.86	0.89	0.90	0.92	0.95	0.95	0.95	0.95
PUHY-P216YSKMU-A (-BS)	1.00	0.94	0.87	0.86	0.87	0.88	0.90	0.90	0.93	0.95	0.95
PUHY-P240YSKMU-A (-BS)	1.00	0.94	0.84	0.86	0.87	0.88	0.90	0.90	0.93	0.95	0.95
PUHY-P264YSKMU-A (-BS)	1.00	0.98	0.89	0.88	0.89	0.90	0.92	0.95	0.95	0.95	0.95
PUHY-P288YSKMU-A (-BS)	1.00	0.98	0.89	0.88	0.89	0.90	0.92	0.95	0.95	0.95	0.95
PUHY-P312YSKMU-A (-BS)	1.00	0.98	0.89	0.88	0.89	0.90	0.92	0.95	0.95	0.95	0.95
PUHY-P336YSKMU-A (-BS)	1.00	0.94	0.87	0.86	0.87	0.88	0.90	0.90	0.93	0.95	0.95
PUHY-P360YSKMU-A (-BS)	1.00	0.94	0.87	0.86	0.87	0.88	0.90	0.90	0.93	0.95	0.95

* The correction factors in the table above are used for a full-load and above.
Use the formula below to calculate the correction factor to use for a partial load.
Correction factor for partial load : K
Correction factor for a full load and above : K_0
Partial load factor : A

$$K = 1 - (1 - K_0) \times A$$

(3)-2 H2i series

Table of correction factor at frost and defrost

Outdoor inlet air temp. °CWB	6	4	2	1	0	-2	-4	-6	-8	-10	-25
Outdoor inlet air temp. °FWB	43	39	36	34	32	28	25	21	18	14	-13
PUHY-HP72,96TJMU	1.00	0.95	0.84	0.83	0.83	0.87	0.90	0.95	0.95	0.95	0.95
PUHY-HP144,192TSJMU	1.00	0.95	0.84	0.83	0.83	0.87	0.90	0.95	0.95	0.95	0.95

Ref.: CaF_TJMU

* The correction factors in the table above are used for a full-load and above.
Use the formula below to calculate the correction factor to use for a partial load.
Correction factor for partial load : K
Correction factor for a full load and above : K_0
Partial load factor : A

$$K = 1 - (1 - K_0) \times A$$

(3)-3 R2 series

Table of correction factor at frost and defrost

Outdoor inlet air temp. °C	6	4	2	1	0	-2	-4	-6	-8	-10	-20
Outdoor inlet air temp. °F	43	39	36	34	32	28	25	21	18	14	-4
PURY-P72TKMU-A (-BS)	1.00	0.95	0.84	0.83	0.83	0.87	0.90	0.93	0.93	0.95	0.95
PURY-P96TKMU-A (-BS)	1.00	0.95	0.84	0.83	0.83	0.87	0.90	0.93	0.93	0.95	0.95
PURY-P120TKMU-A (-BS)	1.00	0.93	0.85	0.83	0.84	0.86	0.90	0.90	0.92	0.95	0.95
PURY-P144TKMU-A (-BS)	1.00	0.93	0.85	0.83	0.84	0.86	0.90	0.90	0.92	0.95	0.95
PURY-P168TSKMU-A (-BS)	1.00	0.98	0.89	0.87	0.89	0.90	0.91	0.92	0.92	0.95	0.95
PURY-P192TSKMU-A (-BS)	1.00	0.98	0.89	0.86	0.88	0.90	0.91	0.92	0.92	0.95	0.95
PURY-P216TSKMU-A (-BS)	1.00	0.94	0.87	0.86	0.87	0.88	0.90	0.90	0.92	0.95	0.95
PURY-P240TSKMU-A (-BS)	1.00	0.94	0.84	0.86	0.87	0.88	0.90	0.90	0.92	0.95	0.95
PURY-P264TSKMU-A (-BS)	1.00	0.98	0.89	0.88	0.89	0.90	0.92	0.95	0.92	0.95	0.95
PURY-P288TSKMU-A (-BS)	1.00	0.98	0.89	0.88	0.89	0.90	0.92	0.95	0.92	0.95	0.95
PURY-P72YKMU-A (-BS)	1.00	0.95	0.84	0.83	0.83	0.87	0.90	0.93	0.93	0.95	0.95
PURY-P96YKMU-A (-BS)	1.00	0.95	0.84	0.83	0.83	0.87	0.90	0.93	0.93	0.95	0.95
PURY-P120YKMU-A (-BS)	1.00	0.93	0.85	0.83	0.84	0.86	0.90	0.90	0.92	0.95	0.95
PURY-P144YKMU-A (-BS)	1.00	0.93	0.85	0.83	0.84	0.86	0.90	0.90	0.92	0.95	0.95
PURY-P144YSKMU-A (-BS)	1.00	0.93	0.85	0.83	0.84	0.86	0.90	0.90	0.92	0.95	0.95
PURY-P168YSKMU-A (-BS)	1.00	0.98	0.89	0.87	0.89	0.90	0.91	0.92	0.92	0.95	0.95
PURY-P192YSKMU-A (-BS)	1.00	0.98	0.89	0.86	0.88	0.90	0.91	0.92	0.92	0.95	0.95
PURY-P216YSKMU-A (-BS)	1.00	0.94	0.87	0.86	0.87	0.88	0.90	0.90	0.92	0.95	0.95
PURY-P240YSKMU-A (-BS)	1.00	0.94	0.84	0.86	0.87	0.88	0.90	0.90	0.92	0.95	0.95
PURY-P264YSKMU-A (-BS)	1.00	0.98	0.89	0.88	0.89	0.90	0.92	0.95	0.92	0.95	0.95
PURY-P288YSKMU-A (-BS)	1.00	0.98	0.89	0.88	0.89	0.90	0.92	0.95	0.92	0.95	0.95

* The correction factors in the table above are used for a full-load and above.
Use the formula below to calculate the correction factor to use for a partial load.
Correction factor for partial load : K
Correction factor for a full load and above : K_0
Partial load factor : A

$$K = 1 - (1 - K_0) \times A$$

DATA BOOK PWFY-P36NMU-E-BU
PWFY-P36NMU-E-AU
PWFY-P72NMU-E-AU

for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

⚠Warning

■Do not use refrigerant other than the type indicated in the manuals provided with the unit and on the nameplate.
- Doing so may cause the unit or pipes to burst, or result in explosion or fire during use, during repair, or at the time of disposal of the unit.
- It may also be in violation of applicable laws.
- MITSUBISHI ELECTRIC CORPORATION cannot be held responsible for malfunctions or accidents resulting from the use of the wrong type of refrigerant.

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