TECO AIRCON

Comfort , Energy Efficient, Clean, and Environmentally Friendly.

TECO

Driving and Connecting Globally

Air-Cooled Chiller and Air-Cooled Modular Type Chiller

Technology-Rooted, Service-Oriented

LEADING BRAND IN TIAWAN

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Driving and Connecting Globally

Since its founding in June of 1956, TECO Elcetric & Machinery Co., Ltd. has never rested on the laurels of its own success. Not satified with producing motors or limited to heavy machinery, the TECO Group has extended its scope of operations into the household appliances, air conditioner information, communication, semiconductor, optronics, network, software infrastructure, financial investment, food services, and distribution industries, becoming a globalized, high-tech enterprise group. TECO is forever dedicated to long-term development, creating new competitive advantages, enhancing services quality, developing top-flight personnel, and creating outstanding products.

Head quarters in Taiwan

Air conditioning - TECO's excellent core business

The air-conditioning business is one of the core industries in the TECO Group. Manufacturing air conditioners for 34 years, TECO has achieved remarkable successes with Annual Award for Quality Excellence, Gold Medal for Design, Award for Best Technology, etc. In Taiwan, TECO takes 40% market share of commercial air conditioners, while its home air conditioner market share reaches 20%.

PRW factory in Taiwan

No matter residence, factories, office buildings, shopping malls, or the general air-conditioning projects, building hydroelectric projects, hospital special air-conditioning projects, precise factory special air-conditioning projects and hi-tech semiconductor dustless laboratory projects, TECO's air conditioning always gain a good reputation.

Relying on its advantages of strong brand and excellent quality, TECO Air Conditioners has been building up its worldwide marketing and service network, which swiftly covered Taiwan, China, South East Asia, Japan, South Africa, Australia & Europe.

PAC factory in China

Products series

Air-Cooled Chiller

- Room air conditioner
- Commercial Dehumidifier
- Air Curtain

- Water-cooled chiller
- Mini Chiller
- Air-cooled ducted type air conditioner

- Fan coil unit
- Air-cooled packaged type air conditioner
- Air-cooled Chiller

- Water-cooled packaged type air conditioner
- Thermostatic & humidistatic air conditioner
- Air handling unit

Model Number Nomenclature

P U A T - D 200 M S H

- **H** : Heat pump type; Unmarked-Cooling only type
- **S** : Screw compressor type: **L** : -Scroll compressor type
- **M** : Power Supply: 3ø, 380V, 50Hz
- **200** : Rated capacity, 200 x 1.0kW=200kW
- **D** : Manufacturer
- **T** : Modular type; Unmarked: Standard type
- **A** : R22 Refrigerant; **B** : 407C Refrigerant
- **U** : Air-cooled chiller
- **P** : TECO Air Conditioning Series Products

Scroll Compressor Series

Feature 1 Super slim shape saves installation space

Super slim shape saves installation space, avoiding the trouble of hanging for split type air conditioner.
The unit is designed with the super slim and pretty appearances.The system is connected with fan coil pipes at the end. It can comply with the high-class interior decorations and fully utilize the ceiling-hanging space so as to avoid the trouble of hanging for split type units.

Feature 2 High efficiency and low noise

High efficiency and low noise
Reliable operation and low noise. The heat exchange efficiency is high. The service lifespan (15-20 years) doubles that of a household air conditioner.

Feature 3 Wide range of cooling capacity

Wide range of cooling capacity
The cooling capacity: TB 25kw-47kw, TA 60kw, 90kw,120kw. The products are especially suitable for garden villas, apartments, offices and commercial buildings.

Feature 4 Intelligent control, bother free

Intelligent control, bother free
Scheduled start-stop and running. The product gives failure auto alarm and displays failure code. Automatic adjustment of cooling capacity.
Display of the water temperature at the inlet and outlet with automatic protection against voltage fluctuation. Room temperature can be independently adjusted and controlled.
Users can install air conditioner switches for different rooms according to the practical condition, saving power and avoiding the problem of one switch controlling all air conditioners during maintenance.

Feature 5 Installation of fresh air system is available

Installation of fresh air system is available.
Introduce fresh air to improve air quality and avoid diseases due to the use of air conditioner.

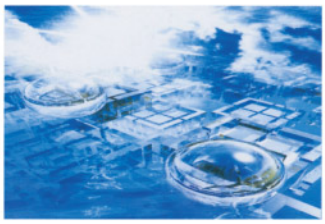
Feature 6 Flexible weather adaptability

Flexible weather adaptability
The use range is wide and it can run within the outdoor temperature form -10°C to 50°C.

Feature 7 World famous brand fittings

World famous brand scroll compressor with high efficiency.
Use imported high efficiency water pump (in some air conditioner types).
Easy application and less cost.

Screw Compressor Series



Introduction:

TECO Air-cooled screw chillers are equipped with world famous brand semi-hermetic dual-screw compressors and superior quality electrical components, it prevails in the following advantages in compact structure, reliable control, low running cost, convenient installation and so on. Heating and cooling modes are both available, so it can meet the customers' requirement of cooling in summer and heating in winter.
The products are widely used in shopping malls, hotels, office buildings, business centers and so on as central air-conditioner systems, and they can also meet the processing technical requirements in the light spin and weave industry, chemistry industry, metallurgy industry, pharmacy, electric power, mechanical industries etc.

The climatic range of operation

Type		The ambient temperature °C	Water outlet temperature °C
Heat pump	Cooling	15~48	5~15
	Heating	-10~21	40~50
Single cooled type	Cooling	15~48	5~15

Screw Compressor Series

Product features

- **Energy-saving:**
  Screw chillers are made by excellent design and reach the optimized configuration. Four-step (25%-50%-75%-100%) capacity adjustment is available, thus when the machine is running under partial loading conditions, it can save your energy to a great extent.
- **High efficiency:**
  World Brand compressors are employed while the system was designed and matched excellently. The electric controllers all passed strict reliability tests so that we can ensure the machine operates with excellent efficiency in both full load and part load working conditions.
- **High reliability:**
  All the components equipped are carefully chosen and tested strictly to make sure the chiller will run with high reliability.
- **Long life span:**
  Reliable cooling technique and reliable refrigerating system oil return technique can supply moderate operating conditions for the compressors and thus prolong the service life.
- **Convenient installation:**
  The cooling (heating) agent of machine is air, so it does not need a large cooled-water system. And the modules can be combined together according to the real demands of the project.
- **Easy operation:**
  The unit uses the liquid crystal display with both Chinese an English languages available.
- **Multiple functions:**
  With complete functions of safety and protection, it can effectively ensure the machine runs stably, meanwhile the self-diagnosis and alarm function make the operation more user-friendly.
- **Remote monitoring:**
  LY506A microcomputer control board is used for microcomputer controller system and matched with DM23 touch sensor interface. The RS-485 communication transmission technology, it can reach a long data transmission distance up to 1200m without signal attenuation. If a repeater is added, the communication distance can go beyond 3000m. And it is possible to connect at least 16 modules all over the entire RS-485 communications line.

World Famous Brand compressor

The famous brand compressors are employed. With high-efficiency and reliable operation, it is possible to be controlled by non-stepwise or four (three)-step capacity adjustment

- High-efficiency screw rotor patented in many countries.
- The ultra long life bearing design allows the accessories to be used for various applications.
- The machine was outfitted inside and outside with high-efficiency silicon steel and special through type design. And point at the same direction type design which can minimize the pressure drop at the duct inlet and outlet.
- Four capacity adjustment solenoid valves can realize four-step (25%-50%-75%-100%) capacity adjustment and 25% to 100% continuous capacity adjustment.
- Four directions air exhaust check valve and stop valve.

Screw Compressor Series

High-Efficiency Shell-and-tube Exchanger

A. The heat exchanger of each machine is a high-efficiency horizontal shell-tube heat exchanger. With the manufacturer license of BR1-national class pressure container, all the heat exchangers used can definitely meet the standards of GB150 (steeliness pressure vessel regulation), GB151 (shell-tube heat exchanger regulation), JB/T4750-2003 (refrigeration use pressure vessel) and the other national relevant industry regulations.

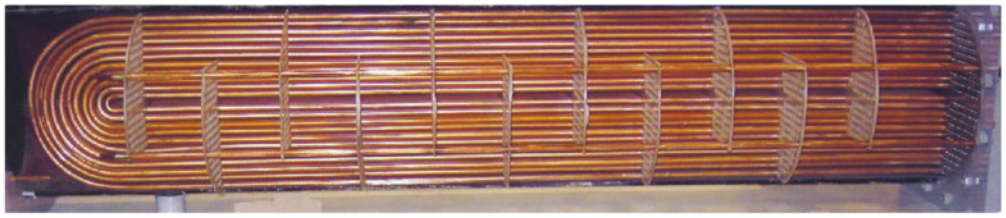
B. The most advanced high-efficiency transfer heat tube in the world is used in our heat exchangers. The multi-headed internal pipe screw shred and screw shape inner surface can effectively strengthen the heat transfer efficiency and the heat exchange ability. Being processed and finished with numerical control operation and self-joint equipment, all the heat exchangers passed the national pressure vessel tests.

C. The inside configuration of the evaporator is specially made with liquid suitable optimized design. Installed with high efficiency liquid flow equalizer, it can resolve the problem of distributed non-uniformity in the system. And the heat exchange efficiency is 50% higher than the common heat exchanger.

D. The hermetical configuration of the liquid board of refrigerant had been greatly improved, so the problems of leakiness, etc. in the liquid board had been resolved. The heat exchange efficiency of the evaporator has been improved a lot, and less the resistance of water flow. So it can be ensured that the machine has excellent capability level

E. The patented design technique for heat exchanger and refrigeration flow optimize the whole system flow chart and make sure the refrigeration chart can match the water-side capacity, thus it can fully strengthen the high efficiency of the heat exchanger to make the system be more energy saving.

F. The following are main advantages: simple system flow chart, steady heat exchanging, easy to maintain and repair, elegant appearance, compact size, excellent heat transferring capacity, low malfunction possibility and so on.



High efficiency shell-tube heat exchanger

Revised M type Condenser

A. The surface of heat exchanger aluminum fin was processed with special anti-corrosion treatment, so it can improve the ability of resisting corrosion for fin, to prolong the heat exchanger operation lifetime.

B. Air-cooled condensers are designed by the configuration of the copper tubes bushing aluminum fins. High efficiency internal screw copper tubes together with super thin aluminum fins was formed by swelling machine, thus ensure its tightness, high heat exchange efficiency, and large coefficient of transfer heat.

C. Condensers are cleaned by the advanced cleaning technique during its processing to make the surface of heat exchanger extreme clean, thus ensure the heat exchange efficiency.

D. The patent designed flow chart optimize the relationship of air flow volume and the air flow speed, thus it can fully take advantage of the max cooling capacity of the compressor and the heat exchanging capacity of the heat exchangers to make the system be more energy saving.

E. The condensers are disposed with especial reversed M shape, this configuration of disposal is tight, in compact size, the air flow can pass symmetrically, and it prevails over the common type heat exchangers, air short circuit can be definitely avoided in this structure, thus the heat exchanging efficiency is greatly improved.

Screw Compressor Series

Microcomputer controlle

LY506A microcomputer controllers are employed in our microcomputer controller system, to gather with DM23 touching sensor interface, our microcomputer controller can reach the following functions： the running status display, real performance curve display, malfunction information enquiry, history record etc.

The features of the control system are as follows：

1) Adopt advanced high processing speed embedded microprocessor, its capability surely is far more excellent than a single chip.

2) The SMT surface mounted technique is used for the system's main board to make the configuration tight, the radiation is low while the ability of anti-disturbance is high.

3) A preserved serial port is kept in the main board, so it can directly unload program from PC at a high speed, thus it will be easy for program upgrading and hardware extending.

4) The RS-485 communication transmission technology is employed with a long data transmission distance up to 1200 m without signal attenuation. If a relay is added, the communication distance can go beyond 3000 m.

5) It is possible to connect at most 16 modules on the RS485 communications whole line.

6) One single telephone line can be used for communication connection.To facilitate the data communication between the main board and the secondary board, so it is easy to install and detach the controller.

7) The hardware can diagnose by itself, it also can relieve hardware malfunctions, and the trap and redundancy technique devices are connected with WATCHDOG of hardware, so it can improve the anti-interference ability.

8) Large memory capacity, the program memory capacity is 512K, the power off data self- preservation capacity is 128K. And the steady, reliable memory CMOS chip is used for parameter memory which is impossible to lose.

9) Functions of short messages and PC computer control functions are preserved in the system.

10) The screen (320*240) Liquid Crystal touch screens with high differentiation rate are employed. It can show 16(row)*40(column) =640 words or 1280 characters at one single page.

11) The screen display has perfect displaying effect, both character and pictures can be displayed clearly with strong solid effect, especially when it displays the gray effect pictures, the solid effect will be more satisfying.

12) It is operated by touching Liquid Crystal Display with fingers. The comfortable touching experience comes from the advanced touching technology and the sensitive touch screen. And every point can be touched more than one million times; it can ensure the machine is used for a long time.

13) The unique screen protection system can make Liquid Crystal Display be used more than ten years, thus solve the common short life span problem of the LCD.

14) Multi- controller connection available.

15) Complete parameters are set in the system ex-factory; they can be reset according to the real requirements of the projects. The function of password protection is available.

16) One brief guide is available for the user.

17) The real temperature, switch on quantities, relay output quantities can be enquired at any time on the micro computer controller, the temperature valve needed can be reset at any time, and the temperature curve of one hour or one day can be displayed.

18) The present malfunctions status and memorial malfunctions can be inquired, the statistics function can help to analyze and find out the unstable running parts of the whole chart thus can check the malfunction causes in time. The history malfunction records can be enquired in three methods: error code, error happening times and error happening date.

19) Functions of on/off with remote control, scheduled startup and shutdown for one time or each week are available. And the scheduled startup and shutdown can be used for at most three times each day.

20) Multiple displaying styles are selectable according to your interest and favorite.

21) Multiple languages are available for on-line selection

Air-Cooled Chiller Specifications (R-22) Top Blow Type

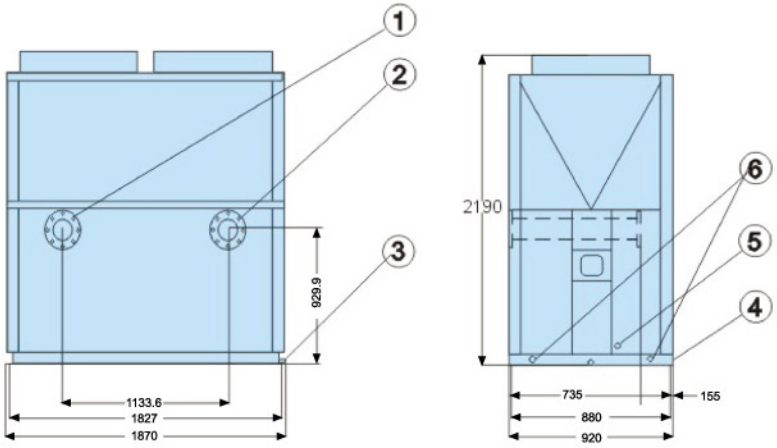
Item \ Model			PUAT-D 60MLH	PUAT-D 90MLH	PUAT-D 120MLH	PUAT-D 160MSH	PUAT-D 200MSH	PUAT-D 240MSH
Cooling capacity		kW	60	90	120	160	200	240
Heating capacity		kW	65	98	130	176	220	264
Power supply		Ø-V-Hz	3Φ , 380V , 50Hz					
Cooling	Power consumption	kW	18.64	27.95	37.27	49.2	61.3	74.5
	Running current	A	33.0	48.0	61.0	99.30	114.5	165.4
	Starting current	A	140.0	175.0	230.0	275.0	445.0	510.0
Heating	Power consumption	kW	17.8	26.85	35.6	48.4	60.9	73.3
	Running current	A	32.0	46.0	59.5	97.80	103.0	157.4
	Starting current	A	140.0	175.0	230.0	275.0	445.0	510.0
Compressor	Type		Scroll type			Semi-hermetic screw type		
	Starting method		IR			Y-Δ		
	Crank case heater	w	70 X 2	70 X 2	90 X 2	300	300	300
Fan Blower	Type x quantity		Axial type x 2	Axial type x 2	Axial type x 4	Axial type x 4	Axial type x 4	Axial type x 6
	Power Consumption	W	1680	1680	3720	5000	5000	7500
	Air Flow	m^3/h	26,000	39,000	52,000	60,000	60,000	90,000
Condenser			Plate type aluminum fin/Copper tube					
Evaporator	Type		Shell & tube			Shell & tube		
	Water flow	m^3/h	10.3	15.5	20.6	27.5	34.4	41.3
	Head loss	kPa	27.0	39.2	49.0	51.0	54.9	57.0
	Water pipe		DN125	DN125	DN125	DN80	DN80	DN100
Refrigerant	Type		R-22					
	Charge volume	kg	15	18.4	36.0	56.0	68.0	85.0
Dimension	Height	mm	2190	2190	2190	2380	2380	2380
	Width	mm	1870	1870	1870	2436	2436	3086
	Depth	mm	920	1120	1800	2096	2096	2096
Net Weight		kg	720	820	1300	2050	2350	2550
Running Weight		kg	760	870	1350	2095	2410	2610
Noise		dB	71	72	74	80	82	82

Note: Cooling mode working conditions: water inlet temperature 12°C, water outlet temperature 7°C and ambient 35°C DB.
If the real working conditions are different, the cooling capacity will be different.
Heating mode working conditions: water inlet temperature 40°C, water outlet temperature 45°C, 7°C DB,
and ambient 6°C WB. If the real working conditions are different, the heating capacity will be different.

Outline Dimensions

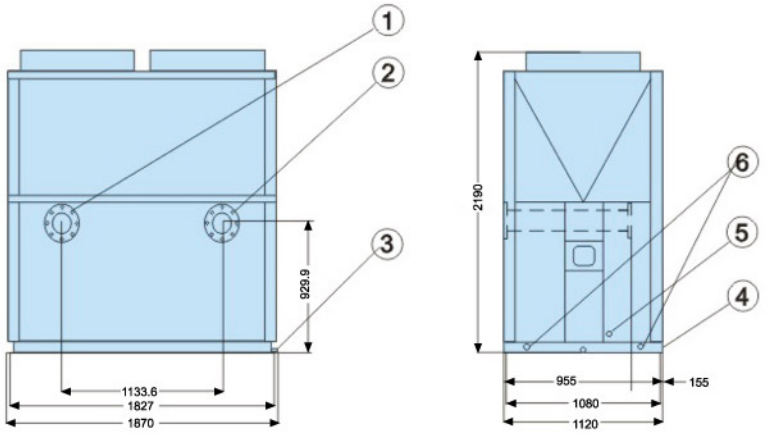
PUAT-D60MLH Outline Dimensions

① 5B Chilled water outlet
② 5B Chilled water inlet
③ DN32 mechanical room drain hole
④ Φ10 base hole
⑤ Φ52 power supply hole
(communication line hole)
⑥ M16 hanging ring bolt



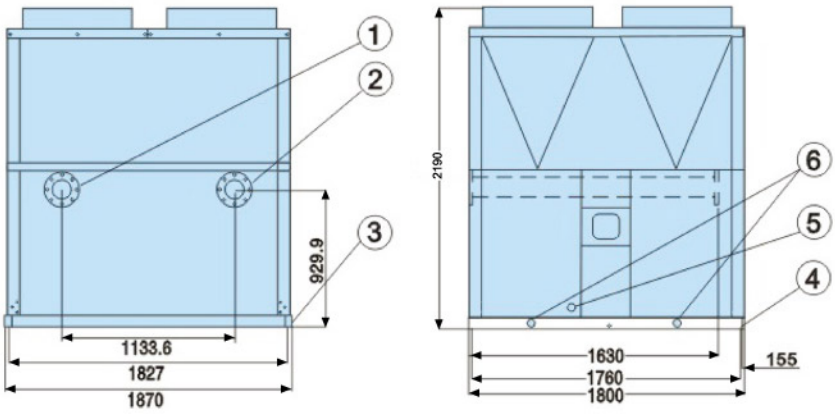
PUAT-D90MLH Outline Dimensions

① 5B Chilled water outlet
② 5B Chilled water inlet
③ DN32 mechanical room drain hole
④ Φ10 base hole
⑤ Φ52 power supply hole
(communication line hole)
⑥ M16 hanging ring bolt



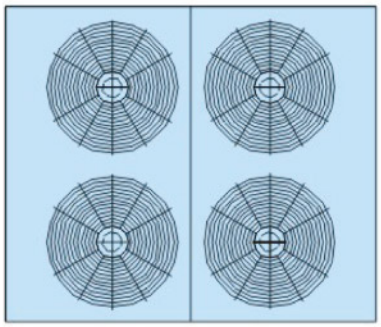
PUAT-D120MLH Outline Dimensions

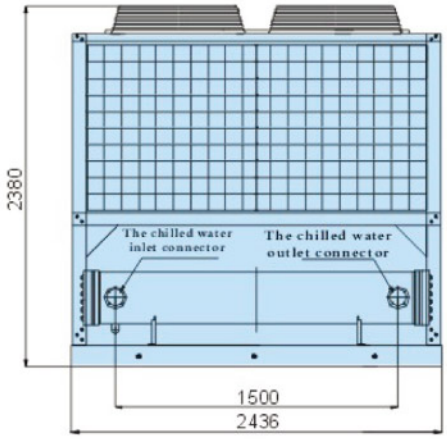
① 5B Chilled water outlet
② 5B Chilled water inlet
③ DN32 mechanical room drain hole
④ Φ10 base hole
⑤ Φ52 power supply hole
(communication line hole)
⑥ M16 hanging ring bolt

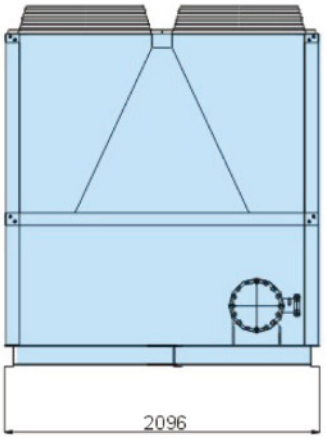


Outline Dimensions

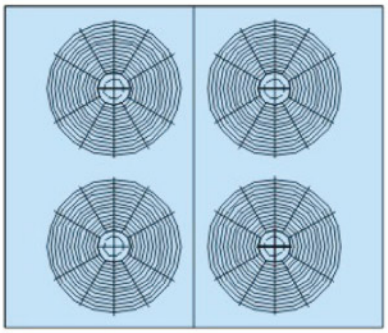
PUAT-D160MSH Outline Dimensions

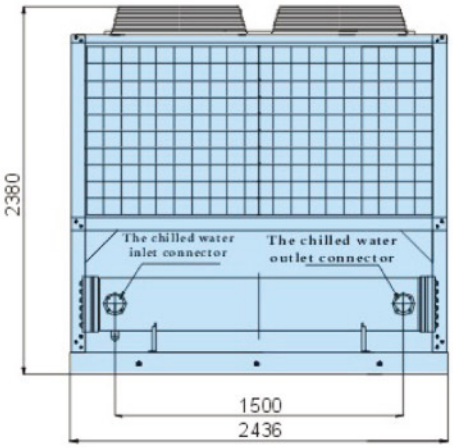


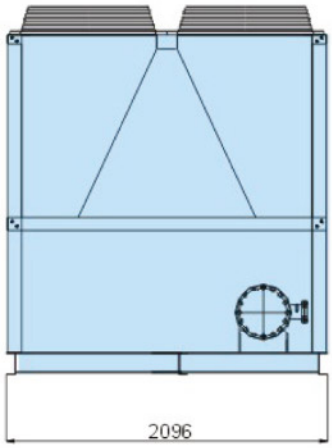




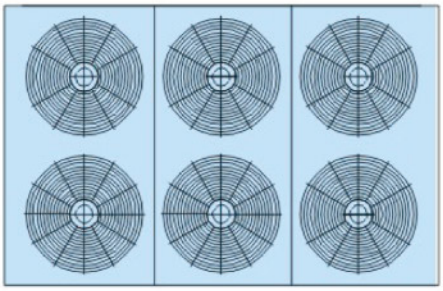
PUAT-D200MSH Outline Dimensions

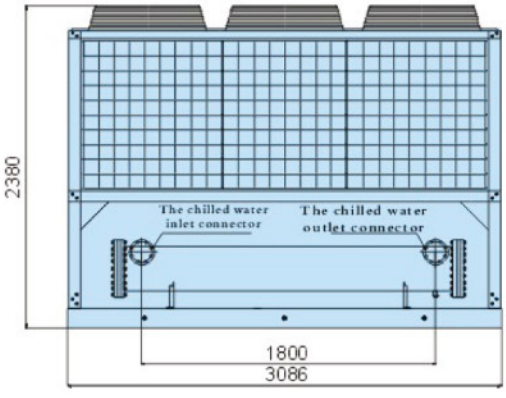


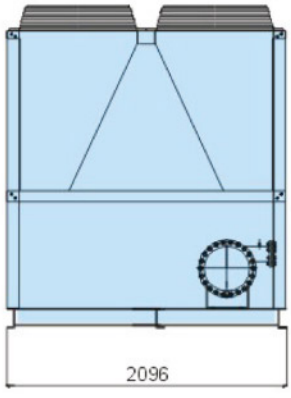




PUAT-D240MSH Outline Dimensions







Flexible combination

With the modular design combined with the module units, 1 to 15 module units can be selected based on different load requirements. In case enlarging capacity, add modules or select suitable modules to form a set and connect to the existing system, then it can work properly.

Convenient installation

The module connection only needs to connect the pipes of the water inlet and outlet in one module.
The whole water line can be connected and it is unnecessary to equip each unit with water in and out pipes.
Rubber soft hose is employed to connect modules, it makes easy construction.

Compact structure and simple maintenance

The structure of module unit is compact and easy to maintain. According to civil engineering requirement, the modules can be installed zero distance or at intervals.

Easy control, optimized and power saving

When the module set is running, the micro computer controller automatically adjusts module capacity or on/off corresponding modules according to system load requirement. Power saving is at any time. The module unit adopts double compressors, and the system capacity adjusting range becomes enlarged after module combination.

Centralized control and remote control

RS485 communications device (optional) can perform remote control over the module unit as well as the microcomputer networking.

Air-Cooled Modular Type Chiller (R-22)

Model			PUAT-D 150MLH	PUAT-D 180MLH	PUAT-D 210MLH	PUAT-D 240MLH	PUAT-D 270MLH	PUAT-D 300MLH	PUAT-D 330MLH	PUAT-D 360MLH
Cooling capacity		kW	150	180	210	240	270	300	330	360
Heating capacity		kW	163	196	228	260	294	326	359	390
Power supply		Ø-V-Hz	3Φ , 380V , 50Hz							
Cooling	Power consumption	kW	46.6	55.9	65.2	74.5	84	93	102.5	111.8
	Running current	A	81.0	96.0	109.0	122.0	144	157	177.0	183.0
	Starting current	A	232.0	247.0	308.5	321.5	295.0	356.5	300.5	382.5
Heating	Power consumption	kW	44.7	53.7	62.5	71.2	81	89	98.4	106.9
	Running current	A	78.0	92.0	105.5	119.0	138	152	170.0	178.5
	Starting current	A	230.0	244.0	305.8	319.3	290.0	351.8	294.0	378.8
Compressor	Type		Scroll							
	Power Output	kW	8.5X2+13.62X2	13.62X4	13.62X2+18.78X2	18.78X4	13.62X6	13.62X4+18.78X2	13.62X6+8.5X2	18.78X6
	Crank case heater	W	70X4	70X4	70X2+90X2	90X4	70X6	70X4+90X2	70X8	90X6
Fan Blower	Type x quantity		Axial type×4	Axial type×4	Axial type×6	Axial type×8	Axial type×6	Axial type×8	Axial type×8	Axial type×12
	Power consumption	W	2,720	3,360	3,360	7,440	5,040	5,800	6,720	11,160
	Air flow	m^3/h	65,000	78,000	91,000	104,000	117,000	130,000	143,000	156,000
Evaporator	Water side heat exchanger		Shell & tube							
Condenser	Air side heat exchanger		Plate type aluminum fin/Copper tube							
Water flow		m^3/h	25.8	31.0	36.1	41.3	46.4	51.60	56.8	61.9
Water Head Loss		kPa	49.2	49.2	59.0	59.0	59.2	69.0	69.2	69.0
Noise			74	75	76	77	77	78	78	78
Refrigerant	Type		R-22							
	Charge volume	kg	33.4	36.8	54.4	72.0	55.2	73	70.2	108.0
Dimension	Height	mm	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190
	Width	mm	1,870	1,870	1,870	1,870	1,870	1,870	1,870	1,870
	Depth	mm	2,040	2,240	2,920	3,600	3,360	4,040	4,280	5,400
Weight	Net	kg	1,540	1,640	2,120	2,600	2,460	2,940	3,180	3,900
	Gross	kg	1,630	1,740	2,220	2,700	2,610	3,090	3,370	4,050
Piping Size		inch/mm	5"/DN125							

1.The cooling capacity is measured under the conditions of outdoor 35°CDB, chilled water inlet 12°C and chilled water outlet 7°C. Heating capacity is measured under the conditions of outdoor 7°CDB, 6°CWB, hot water inlet 40°C and hot water outlet 45°C.

2.The ambient temperature available can be as low as -10°C.

3.The specifications above will be subject to changes without prior notification.

4.LMK15AC (Central control displayer) is optional according to the customer needs.

Air-Cooled Modular Type Chiller (R-22)

Model			PUAT-D 420MLH	PUAT-D 450MLH	PUAT-D 480MLH	PUAT-D 540MLH	PUAT-D 570MLH	PUAT-D 600MLH	PUAT-D 660MLH	PUAT-D 720MLH	PUAT-D 780MLH	PUAT-D 840MLH	PUAT-D 930MLH	PUAT-D 990MLH
Cooling capacity		kW	420	450	480	540	570	600	660	720	780	840	930	990
Heating capacity		kW	457	490	520	588	618	650	715	780	845	910	1008	1073
Power supply		Ø-V-Hz	3Φ , 380V , 50Hz											
Cooling	Power consumption	kW	130.4	139.8	149.1	167.7	177.0	186.4	205	223.6	242.3	260.9	288.8	307
	Running current	A	225.0	240.0	244.0	288.0	292.0	305.0	338	366.0	399.0	427.0	475.0	508
	Starting current	A	348.5	391.0	443.5	439.0	443.0	504.5	537.5	565.5	522.5	626.5	626.0	659.0
Heating	Power consumption	kW	125.2	134.3	142.5	161.1	169.3	178.1	196	213.7	231.5	249.3	276.2	294
	Running current	A	216.0	230.0	238.0	276.0	284.0	297.5	330	357.0	389.0	416.5	462.5	495
	Starting current	A	340.0	382.0	438.3	428.0	436.0	497.8	529.8	557.3	513.0	616.8	614.5	646.5
Compressor	Type		Scroll											
	Power Output	kW	13.62x8+8.5x2	13.62x10	18.78x8	13.62x12	18.78x8+13.62x2	18.78x10	18.78x10+8.5x2	18.78x12	18.78x12+8.5x2	18.78x14	18.78x14+ 13.62x2	18.78x14+ 13.62x2+8.5x2
	Crank case heater	W	70X10	70X10	90X8	70X12	90X8+ 70X2	90X10	90X10+ 70X2	90X12	90X12+ 70X2	90X14	90X14+ 70X2	90X14+ 70X4
Fan Blower	Type x quantity		Axial type×10	Axial type×10	Axial type×16	Axial type×12	Axial type×18	Axial type×20	Axial type×22	Axial type×24	Axial type×26	Axial type×28	Axial type×30	Axial type×32
	Power consumption	W	8,400	8,400	14,880	10,080	16,560	18,600	20,280	22,320	24,000	26,040	27,720	29,400
	Air flow	m^3/h	182,000	195,000	208,000	234,000	247,000	260,000	286,000	312,000	338,000	364,000	403,000	429,000
Evaporator	Water side heat exchanger		Shell & tube											
Condenser	Air side heat exchanger		Plate type aluminum fin/Copper tube											
Water flow		m^3/h	72	77.4	82.6	92.9	98	103.2	114	123.8	134.2	144.5	160.0	170
Water Head Loss		kPa	79.2	79.2	79.0	89.2	89.0	89.0	99.0	99.0	109.0	109.0	119.0	119.2
Noise			79	79	80	80	81	81	82	82	83	83	84	84
Refrigerant	Type		R-22											
	Charge volume	kg	88.6	92.0	144.0	110.4	162.4	180.0	195	216.0	231.0	252.0	270	285
Dimension	Height	mm	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190
	Width	mm	1,870	1,870	1,870	1,870	1,870	1,870	1,870	1,870	1,870	1,870	1,870	1,870
	Depth	mm	5,400	5,600	7,200	6,720	8,320	9,000	9,920	10,800	11,720	12,600	13,720	14,640
Weight	Net	kg	4,000	4,100	5,200	4,920	6,020	6,500	7,220	7,800	8,520	9,100	9,920	10,640
	Gross	kg	4,240	4,350	5,400	5,220	6,270	6,750	7,510	8,100	8,860	9,450	10,320	11,080
Piping Size		inch/mm	5"/DN125											

1.The cooling capacity is measured under the conditions of outdoor 35°CDB, chilled water inlet 12°C and chilled water outlet 7°C. Heating capacity is measured under the conditions of outdoor 7°CDB, 6°CWB, hot water inlet 40°C and hot water outlet 45°C.

2.The ambient temperature available can be as low as -10°C.

3.The specifications above will be subject to changes without prior notification.

4.LMK15AC (Central control displayer) is optional according to the customer needs.

Air-Cooled Chiller Specifications (R-22)

Item \ Model			PUAT-D 320MSH	PUAT-D 360MSH	PUAT-D 400MSH	PUAT-D 440MSH	PUAT-D 480MSH
Cooling capacity		kW	320	360	400	440	480
Heating capacity		kW	352	396	440	484	528
Power supply		Φ-V-Hz	3Φ , 380V , 50Hz				
Cooling	Power consumption	kW	98.5	110.6	122.7	135.9	149.1
	Running current	A	198.6	213.8	264.7	279.9	330.8
	Starting current	A	550.0	720.0	785.0	955.0	1020.0
Heating	Power consumption	kW	96.7	109.3	121.7	134.3	146.7
	Running current	A	195.6	200.8	255.2	260.4	314.8
	Starting current	A	550.0	720.0	785.0	955.0	1020.0
Compressor	Type		Semi-hermetic Screw Type				
	Starting method		Y-Δ				
	Crank Case heater	W	300 X 2	300 X 2	300 X 2	300 X 2	300 X 2
Fan Blower	Type x quantity		Axial type x 8	Axial type x 8	Axial type x 10	Axial type x 10	Axial type x 12
	Power Consumption	W	10,000	10,000	12,500	12,500	15,000
	Air Flow	m^3/h	120,000	120,000	150,000	150,000	180,000
Condenser			Plate type aluminum fin/Copper tube				
Evaporator	Type		Shell & tube				
	Water flow	m^3/h	55.0	61.9	68.8	75.7	82.6
	Head loss	kPa	61.2	64.9	67.0	67.0	67.0
	Water pipe		DN80 X 2	DN80 X 2	DN80+DN100	DN80+DN100	DN100 X 2
Refrigerant	Type		R-22				
	Charge volume	kg	112.0	124.0	141.0	153.0	170.0
Dimension	Height	mm	2,380	2,380	2,380	2,380	2,380
	Width	mm	4,872	4,872	5,522	5,522	6,172
	Depth	mm	2,096	2,096	2,096	2,096	2,096
Net Weight		kg	4,100	4,400	4,600	4,900	5,100
Running Weight		kg	4,160	4,460	4,660	4,960	5,160
Noise		dB(A)	80	82	82	82	82

Note: Conditions for cooling operation: water inlet 12°C, water outlet 7°C and outdoor 35°CDB,
The measured cooling capacity will be different according to the actual operation condition.
Conditions for heating operation: water inlet 40°C, water outlet 45°C, outdoor 7°C DB and 6°CWB.
The measured heating capacity will be different according to the actual operation condition.

Air-Cooled Chiller Specifications (R-22)

Item \ Model			PUAT-D 520MSH	PUAT-D 560MSH	PUAT-D 600MSH	PUAT-D 640MSH	PUAT-D 680MSH	PUAT-D 720MSH	PUAT-D 760MSH	PUAT-D 800MSH
Cooling capacity		kW	520	560	600	640	680	720	760	800
Heating capacity		kW	572	616	660	704	748	792	836	880
Power supply		ϕ-V-Hz	3ϕ , 380V , 50Hz							
Cooling	Power consumption	kW	159.8	171.9	184.0	197.2	210.4	223.6	233.3	245.4
	Running current	A	313.1	328.3	343.5	394.4	445.3	496.2	442.8	458.0
	Starting current	A	995.0	1,165.0	1,335.0	1,400.0	1,465.0	1,530.0	1,610.0	1,780.0
Heating	Power consumption	kW	157.6	170.2	182.8	195.2	207.6	220.0	231.2	243.8
	Running current	A	298.6	303.8	309.0	363.4	417.8	472.2	406.8	412.0
	Starting current	A	995.0	1,165.0	1,335.0	1,400.0	1,465.0	1,530.0	1,610.0	1,780.0
Compressor	Type		Semi-hermetic Screw type							
	Starting method		Y-Δ							
	Crank Case heater	W	300 X 3	300 X 3	300 X 3	300 X 3	300 X 3	300 X 3	300 X 4	300 X 4
Fan Blower	Type x quantity		Axial type x12	Axial type x12	Axial type x12	Axial type x14	Axial type x16	Axial type x18	Axial type x16	Axial type x16
	Power Consumption	W	15,000	15,000	15,000	17,500	20,000	22,500	20,000	20,000
	Air Flow	m^3/h	180,000	180,000	180,000	210,000	240,000	270,000	240,000	240,000
Condenser			Plate type aluminum fin/Copper tube							
Evaporator	Type		Shell & tube							
	Water flow	m^3/h	89.4	96.3	103	110.1	117.0	123.9	130.7	137.6
	Head loss	kPa	64.9	64.9	67.0	67.0	67.0	67.0	68.9	69.0
	Water pipe		DN80 X 3	DN80 X 3	DN80 X 2+DN100	DN80+DN100 X 2	DN80+DN100 X 2	DN100 X 3	DN80 X 4	DN80 X 4
Refrigerant	Type		R-22							
	Charge volume	kg	180.0	192.0	204	212.0	238.0	255.0	260.0	272.0
Dimension	Height	mm	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380
	Width	mm	7,308	7,308	7,308	7,958	8,608	9,258	9,744	9,744
	Depth	mm	2,096	2,096	2,096	2,096	2,096	2,096	2,096	2,096
Net Weight		kg	6,450	6,750	7,050	7,250	7,450	7,650	9,100	9,400
Running Weight		kg	6,510	6,810	7,110	7,310	7,510	7,710	9,160	9,460
Noise		dB(A)	82	82	82	82	82	82	82	82

Note: Conditions for cooling operation: water inlet 12°C, water outlet 7°C and outdoor 35°CDB,
The measured cooling capacity will be different according to the actual operation condition.
Conditions for heating operation: water inlet 40°C, water outlet 45°C, outdoor 7°CDB and 6°CWB.
The measured heating capacity will be different according to the actual operation condition.

Air-Cooled Chiller Specifications (R-22)

Item \ Model			PUAT-D 840MSH	PUAT-D 880MSH	PUAT-D 920MSH	PUAT-D 960MSH	PUAT-D 1000MSH	PUAT-D 1040MSH	PUAT-D 1080MSH	PUAT-D 1120MSH	PUAT-D 1160MSH	PUAT-D 1200MSH
Cooling capacity		kW	840	880	920	960	1000	1040	1080	1120	1160	1200
Heating capacity		kW	924	968	1012	1056	1100	1144	1188	1232	1276	1320
E.E.R(Cooling) / C.O.P(Heating)		W/W	3.24/3.61	3.24/3.60	3.23/3.60	3.24/3.60	3.26/3.61	3.25/3.61	3.24/3.61	3.24/3.60	3.23/3.60	3.22/3.60
Power supply		ϕ-V-Hz	3ϕ , 380V , 50Hz									
Cooling	Power consumption	kW	258.6	271.8	285.0	298.1	306.7	319.9	333.1	346.3	359.5	372.7
	Running current	A	508.9	559.8	610.7	661.6	572.5	623.4	674.3	725.2	776.1	827.0
	Starting current	A	1,845.0	1,910.0	1,975.0	2,040.0	2,225.0	2,290.0	2,355.0	2,420.0	2,485.0	2,550.0
Heating	Power consumption	kW	256.2	268.6	280.9	293.3	304.7	317.1	329.5	341.9	354.3	366.7
	Running current	A	466.4	520.8	575.2	629.6	515.0	569.4	623.8	678.2	732.6	787.0
	Starting current	A	1845.0	1,910.0	1,975.0	2,040.0	2,225.0	2,290.0	2,355.0	2,420.0	2,485.0	2,550.0
Compressor	Type		Semi-hermetic Screw Type									
	Starting method		Y-Δ									
	Crank Case heater	W	300 X 4	300 X 4	300 X 4	300 X 4	300 X 5	300 X 5	300 X 5	300 X 5	300 X 5	300 X 5
Fan Blower	Type x quantity		Axial type x 18	Axial type x 20	Axial type x 22	Axial type x 24	Axial type x 20	Axial type x 22	Axial type x 24	Axial type x 26	Axial type x 26	Axial type x 30
	Power Consumption	W	22,500	25,000	27,500	30,000	25,000	27,500	30,000	32,500	35,000.0	37,500.0
	Air Flow	m^3/h	270,000	300,000	330,000	360,000	300,000	330,000	360,000	390,000	420,000	450,000
Condenser			Plate type aluminum fin/Copper tube									
Evaporator	Type		Shell & tube									
	Water flow	m^3/h	144.5	151.4	158.3	165.2	172.0	178.9	185.8	192.7	199.6	206.5
	Head loss	kPa	69.0	69.0	69.9	69.9	68.9	68.9	69.0	69.0	69.0	69.9
	Water pipe		DN80x3+DN100	DN80x2!+DN100x2	DN100x3+DN80	DN100 x 4	DN80 x 5	DN80x4+DN100x1	DN80x2+DN100x3	DN80x1+DN100x4	DN80x1+DN100x4	DN100 x 5
Refrigerant	Type		R-22									
	Charge volume	kg	289.0	306.0	323.0	340.0	340.0	357.0	348.0	391.0	408.0	425.0
Dimension	Height	mm	2,380	2,380	2,380	2,380	2,380	2,300	2,300	2,300	2,300	2,300
	Width	mm	10,394	11,044	11,694	12,344	12,180	12,830	13,480	14,130	14,780	15,430
	Depth	mm	2,096	2,096	2,096	2,096	2,096	2,096	2,096	2,096	2,096	2,096
Net Weight		kg	9,600	9,800	10,000	10,200	11,750	11,950	12,150	12,350	12,550	12,750
Running Weight		kg	9,645	9,860	10,060	10,260	11,810	12,010	12,450	12,410	12,610	12,810
Noise		dB(A)	82	82	82	82	80	80	80	80	80	80

Note: Conditions for cooling operation: water inlet 12°C, water outlet 7°C and outdoor 35°CDB,
The measured cooling capacity will be different according to the actual operation condition.
Conditions for heating operation: water inlet 40°C, water outlet 45°C, outdoor 7°C DB and 6°CWB.
The measured heating capacity will be different according to the actual operation condition.

Air-Cooled Chiller Specifications (R-22)

Item \ Model			PUAT-D 1240MSH	PUAT-D 1280MSH	PUAT-D 1320MSH	PUAT-D 1360MSH	PUAT-D 1400MSH	PUAT-D 1440MSH	PUAT-D 1640MSH	PUAT-D 1680MSH
Cooling capacity		kW	1240	1280	1320	1360	1400	1440	1640	1680
Heating capacity		kW	1364	1408	1452	1496	1540	1584	1804	1848
E.E.R(Cooling) / C.O.P(Heating)		W/W	3.25/3.61	3.25/3.61	3.24/3.61	3.23/3.60	3.23/3.60	3.22/3.60	3.23/3.60	3.22/3.60
Power supply		Φ-V-Hz	3Φ , 380V , 50Hz							
Cooling	Power consumption	kW	381.3	394.5	407.7	420.8	434.0	447.2	508.6	521.7
	Running current	A	737.9	788.8	839.7	890.6	941.5	992.4	1,106.9	1,157.8
	Starting current	A	2,735.0	2,800.0	2,865.0	2,930.0	2,995.0	3,060.0	3,505.0	3,570.0
Heating	Power consumption	kW	378.0	390.4	402.8	415.2	427.6	440.0	500.9	513.3
	Running current	A	672.4	726.8	781.2	835.6	890.0	944.4	1,047.4	1,101.8
	Starting current	A	2,735.0	2,800.0	2,865.0	2,930.0	2,995.0	3,060.0	3,505.0	3,570.0
Compressor	Type		Semi-hermetic Screw Type							
	Starting method		Y-Δ							
	Crank Case heater	W	300 X 6	300 X 6	300 X 6	300 X 6	300 X 6	300 X 6	300 X 7	300 X 7
Fan Blower	Type x quantity		Axial type x26	Axial type x28	Axial type x30	Axial type x32	Axial type x34	Axial type x36	Axial type x40	Axial type x42
	Power Consumption	W	32,500.0	35,000.0	37,500.0	40,000.0	42,500.0	45,000.0	50,000.0	52,500.0
	Air Flow	m^3/h	390,000.0	420,000.0	450,000.0	480,000.0	510,000.0	540,000.0	600,000.0	630,000.0
Condenser			Plate type aluminum fin/Copper tube							
Evaporator	Type		Shell & tube							
	Water flow	m^3/h	213.3	220.2	227.1	234.0	240.9	247.8	282.2	289.1
	Head loss	kPa	68.9	68.9	69.0	69.9	70.9	70.9	70.9	70.9
	Water pipe		DN80x5+DN100x1	DN80x4+DN100x2	DN80x3+DN100x3	DN80x2+DN100x4	DN80+DN100x5	DN100 X 6	DN80x1+DN100x6	DN100 X 7
Refrigerant	Type		R-22							
	Charge volume	kg	425.0	442.0	459.0	476.0	493.0	510.0	578.0	595.0
Dimension	Height	mm	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300
	Width	mm	15,266	15,916	16,566	17,216	17,866	18,516	20,952	21,602
	Depth	mm	2,096	2,096	2,096	2,096	2,096	2,096	2,096	2,096
Net Weight		kg	14,300	14,500	14,700	14,900	15,100	15,300	17,650	17,850
Running Weight		kg	14,360	14,560	14,760	14,960	15,160	15,360	17,710	17,910
Noise		dB(A)	81	81	81	81	81	81	82	82

Note: Conditions for cooling operation: water inlet 12°C, water outlet 7°C and outdoor 35°CDB,
The measured cooling capacity will be different according to the actual operation condition.
Conditions for heating operation: water inlet 40°C, water outlet 45°C, outdoor 7°CDB and 6°CWB.
The measured heating capacity will be different according to the actual operation condition.

Scroll Compressor Series.

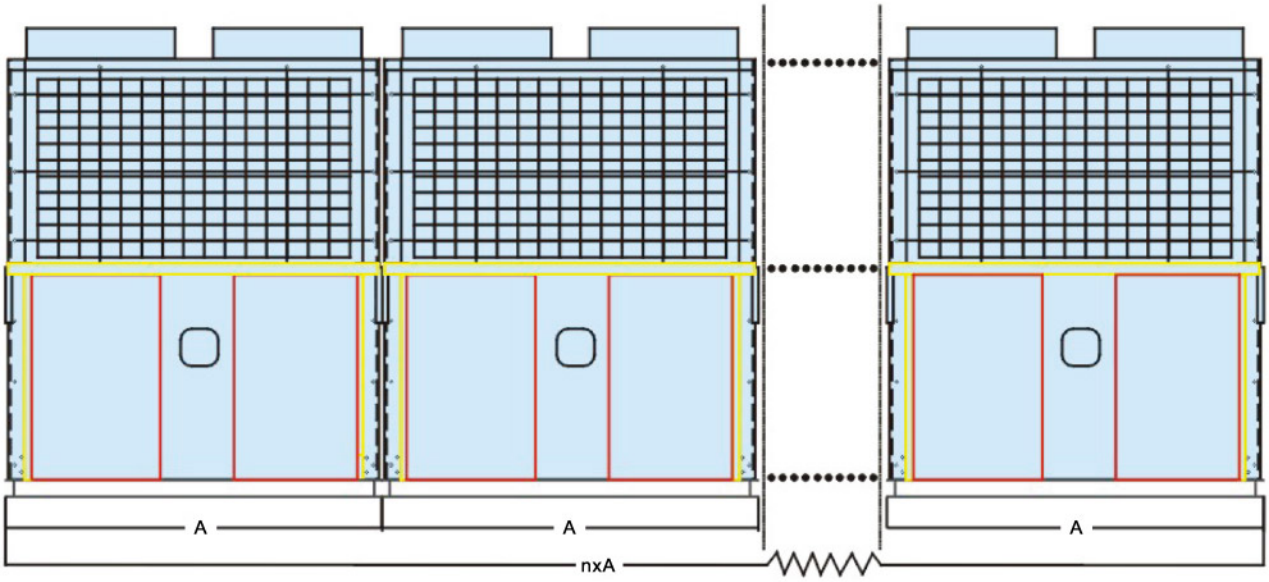
Unit: mm

Model	Model Dimension (A)	Dimension
PUAT-D60MLH	920	n x A
PUAT-D90MLH	1120	
PUAT-D120MLH	1800	

Description:

It is possible for the modules to be connected with zero distance.

Zero-distance connection can be achieved as follows:



Combination Dimensions

Unit: mm

Item	Model	180MSH	240MSH	270MSH	360MSH	450MSH	480MSH	540MSH	600MSH
The width of module anchor bolts interval	D	1827	1827	1827	1827	1827	1827	1827	1827
The width of module	C	1870	1870	1870	1870	1870	1870	1870	1870
The width of module anchor bolts interval	B	1080	1760	1080	1760	1080	1760	1080	1760
The depth of module	A	1120	1800	1120	1800	1120	1800	1120	1800
Combination Dimension	n xA	2240	3600	3360	5400	5600	7200	6720	9000
Modules Quantity	n	2	2	3	3	5	4	6	5

Note:1. The above dimensions are based on zero-distance combination.

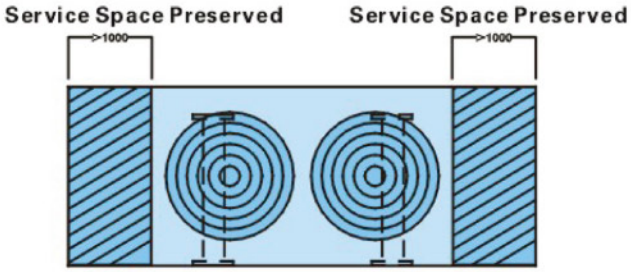
2. Soft rubber joints are optional to connect modules while placing the order.

3. The anchor bolts are Φ10 (size) to be fixed on the ground.

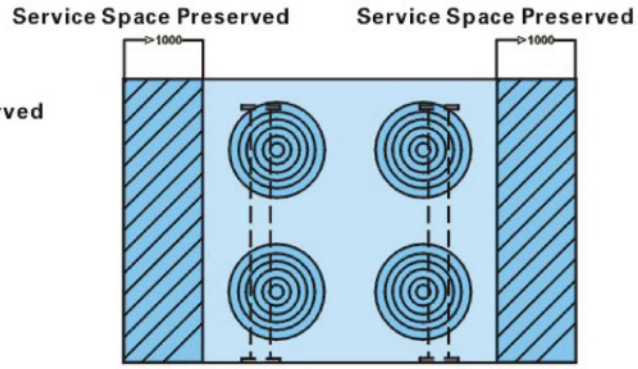
4. For other combination dimensions, you can refer to the above form to calculate in the same way.

Preserve Service Space

PUAT-D60MLH
PUAT-D90MLH



PUAT-D120MLH



Refer to the following figure to choose the foundation for installation and the installation method.

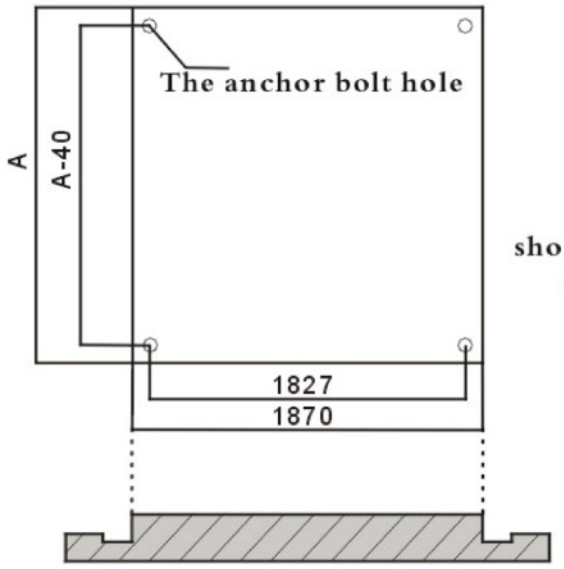


Figure1 Foundation for installation

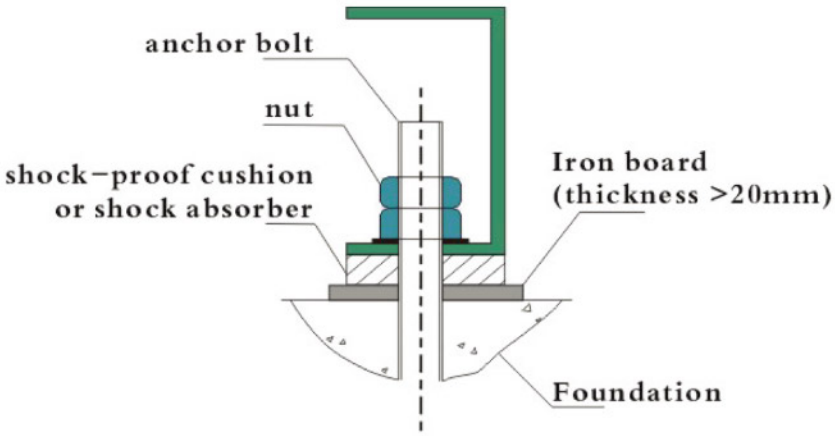


Figure 2

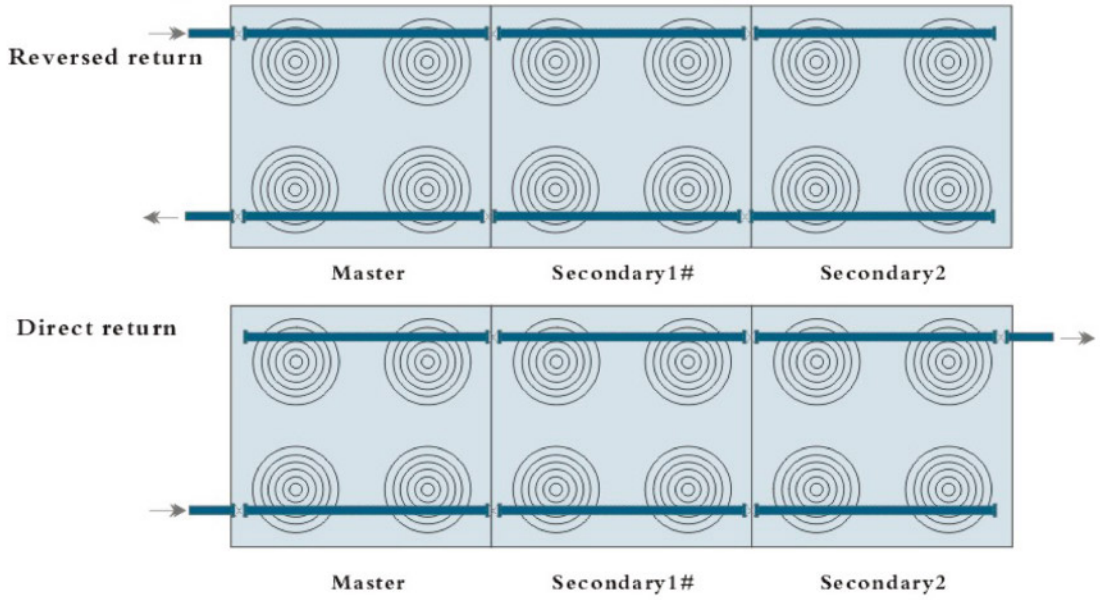
Note:

1.Figure 1 indicates how to install one single module, please pay attention to the real project size.

2.If you choose the configuration in Figure 2, please refer to the anchor bolt position in Figure 1. Preserve the installation holes for anchor bolts or the shock absorber fixing hole.

Installation Precautions

1.Place the set where it is flat and well ventilated. Leave moderate space around the machine.
For details, see the figure above.
2.In set combination, pay attention to the sequence of master and secondary modules as well as the wire connection and water pipe connection (reversed return recommended).
3.Follow the steps in the manual and related notes during construction.

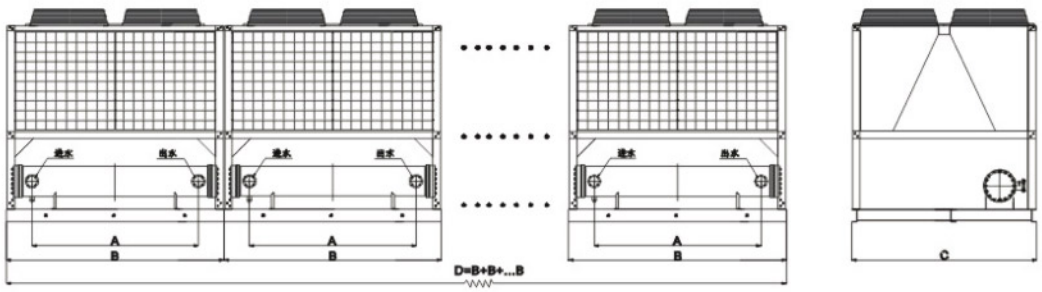


Screw Compressors Series

Installation location and foundation

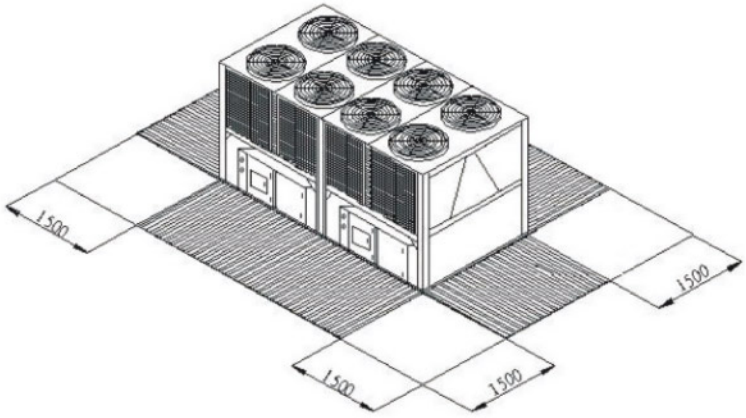
1.Place the machine set on a solid and smooth concrete foundation or metal frame.
The installation platform should be strong enough to bear the machine weight. If the strength is insufficient, it is very easy to generate shake and noise.
2.The concrete foundation surface is generally treated with plaster and has waterproof treatment.
3.Draining ditches shall be constructed around the foundation. And the slope shall be greater than 0.5% and incline to the drain opening.
4.Vibration absorber shall be placed between the machine base and the foundation to avoid the downward transmission of shock and noise. And the machine shall keep horizontal. Shockproof base may be added if it is necessary.
5.Anchoring measures shall be taken to avoid the machine translocation which may twist connecting pipes due to earthquake, typhoon or long time operation.

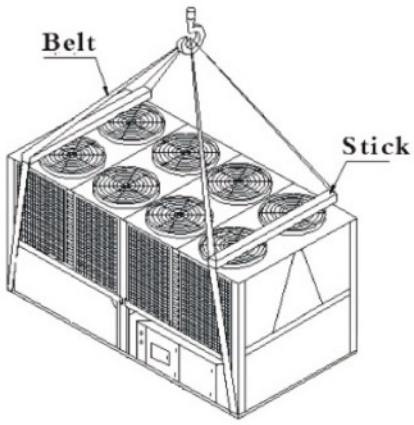
Schematic Diagram of Module Combination (PUAT-D160/200/240MSH)



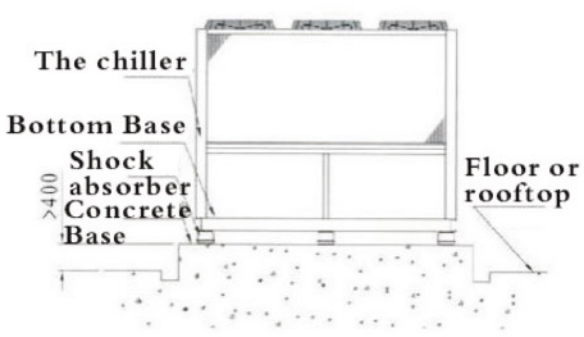
Installation Precautions

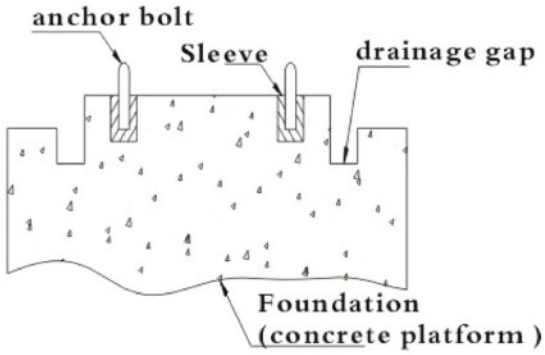
1.There should be more than 1.5m space for maintenance service purpose. There should be a spacing of 2.0 m preserved between two modules.
2.The machine should be installed in area with good ventilation,
3.If the machine is installed indoor, the room height should be maintained more than 3.0m.
4.The machine should be installed on solid foundation and take necessary shock-proof measures to avoid vibration.
5.While hoisting the machines please be careful. Prevent the machine from collision so as to keep it complete.
6.If the machine is installed in an area where it snows in winter, a shed should be built to cover the machine and keep it away from the snow. Do make sure the shed will not affect the ventilation conditions. When the chiller is shut down for a long time, necessary measures should be taken to prevent freezing in the water pipe.
7.Our standard type air-cooled modular chiller is mainly suitable for supplying cold air and warm air to make your living environment more comfortable. If your process requires the use of water chillers, please contract us for special order.
8.The evaporator (water side heat exchanger) of our air-cooled chillers is a dry type heat exchanger. It is not suitable for using in open water cycle system. To avoid possible damage to the evaporator due to polluted water, please contact us if your project has such possibilities.





Schematic Diagram of the Foundation for Installation

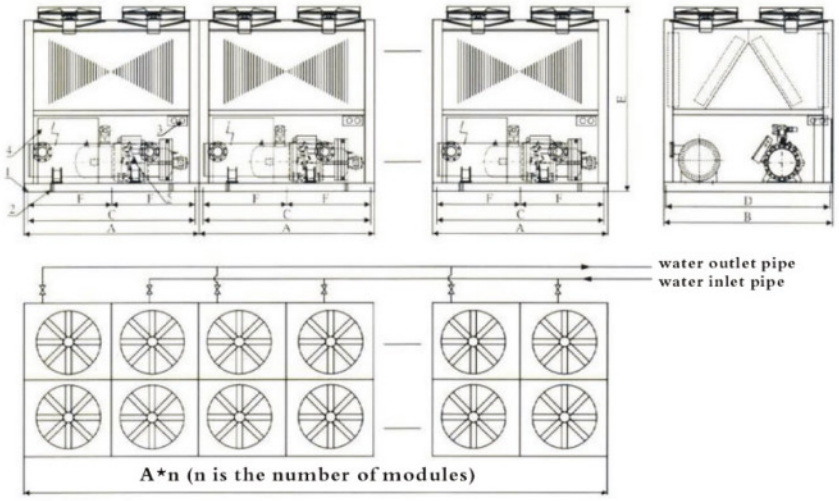




a)When the machine is installed, you must consider the conformation of foundation whether it is strong enough. And pay more attention to how to reduce the noise. It is better to discuss with the building designer before install it.
b)To make the equipment operate quietly, avoid shocking or making noise. You should separate the machine base from foundation interface with shock absorber. And to pay attention to keep it level when it is installed. If it is necessary, you can install a shockproof cushion.

Screw Compressor Series

Schematic Diagram of the Water Piping for Module Combination



1, Anchor hole 2, Hoisting hole 3, Surface Board 4, Electrical Box 5, Compressor

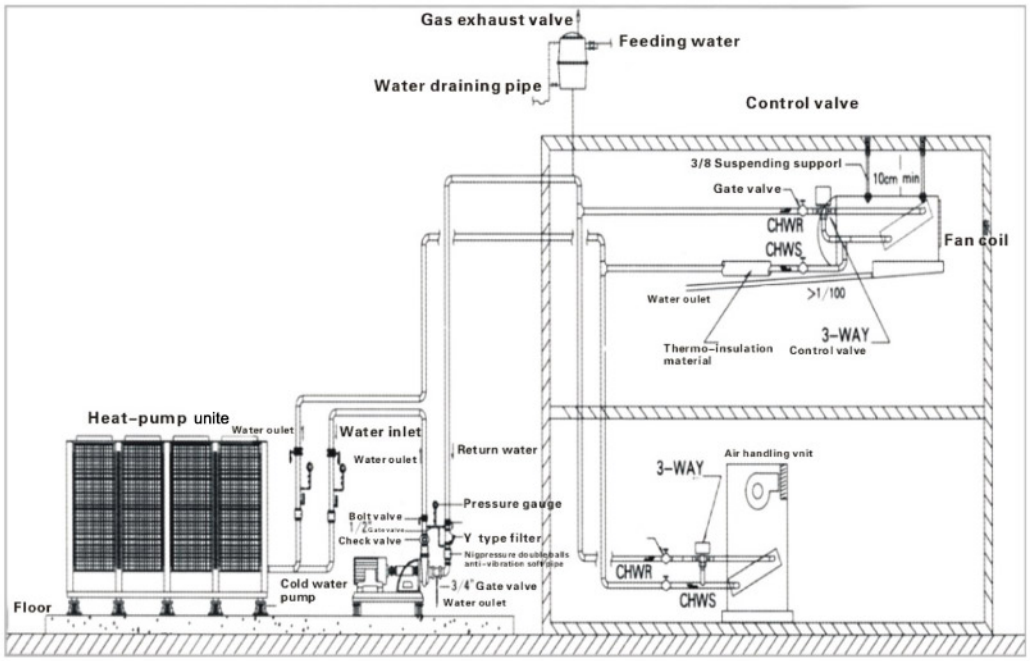
Note:

1.You can combine random modules together to get the intergraded combination working group with the required cooling capacity, N is the module quantity, you can choose three basic models (160/200/240 KW module) to combine, the total length is the summation of the length of each module you chose.

2.The outlet and inlet water pipes of the machine are connected and installed on site and the way of connection is shown in the above figure. The components or accessories used for the construction and installation, for example, the pump accessories, the soft joints, the water flow switch, check valves, water filters, water pipe, expansion tank and so on, the end user should prepare separately in advance before the installation.

Schematic Diagram of the Piping of the Water System

1.A pump must be installed at the water inlet. The expansion water tank must be installed at a pump inlet.
2.If the machine is installed at a low temperature environment outdoor, or it is turned on/off for a long time (months), it is possible that the water pipe shall freeze. Thus, when the water pipe was installed and designed, the anti-freeze function should be taken into consideration to avoid damage to the chiller.
3.When the machine was turned off for a long time (months) in the winter, in order to prevent the pipeline from being frozen, it is better to discharge all the water in the pipeline.
4.There must be equipment for preventing the pipeline being frozen so that the operation efficiency would not be affected.
5.The filter should be installed in the pump inlet to avoid external objects entering the water side heat exchanger.
6.If the machine is installed in an area where the quality of water is poor, the water must be purged again before it enters into the water system to avoid damage to the heat exchanger.
7.To improve the operation efficiency of the water system, the exhaust valve must be installed in the pipeline where it is easy to gather air.
8.To ensure the operation efficiency of the machine, the pipeline needs to be cleaned after working, to avoid external objects staying in the pipeline.
9.When the machine is installed, grounding engineering should be done to prevent electric leakage accident
10.The water flow switches must be installed in the pipeline, and it must be interlocked with the electric control circuit system of the machine
11.After long power off status, it is strictly forbidden to start the compressor at once. When the power supply was cut off for more than two hours in winter or the machine is shut down for more than 5 hours, the refrigeration oil should be heated for two hours first before starting the compressor.
12.When the heat pump unit is running inside the room while the outdoor ambient temperature is below 5°C, to avoid high pressure failure during starting due to too low water temperature, the three-way valve must be installed for controlling the temperature of inlet water in the water return pipeline。
13.Under cooling mode, the highest water temperature at the water inlet is 20°C, while under heating mode the lowest water temperature at the water inlet is 30°C.
14.When the heat pump unit is operated in the winter, in order to maintain the temperature of water when it is turned off at night, the main power supply and the power supply of the pump should not be shut down to ensure the anti-freeze function will not be shut down (because the machine unit is equipped with the anti-freeze operation function in the winter).

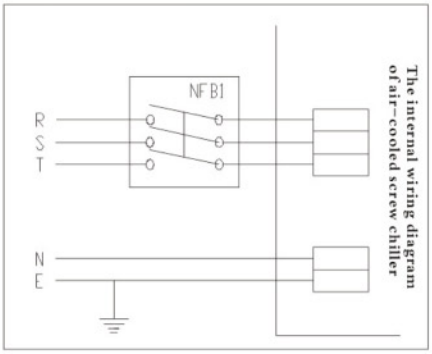


Reference drawing of engineering system (Figure 4)

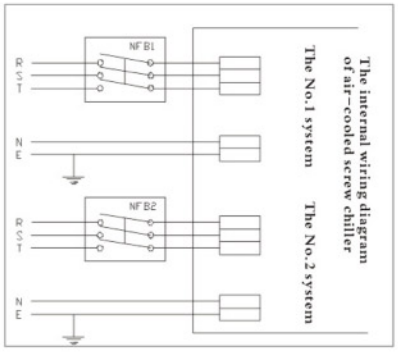
Table of the Configuration of Power Supply for User

Model (Single System)	Rated current of circuit breaker (A)	Max diameter of line for the wiring board	Diameter of power core
PUAT-D160MSH	100	22mm²	16mm²
PUAT-D200MSH	150	38mm²	25mm²
PUAT-D240MSH	150	38mm²	35mm²

Wiring diagram of the single-compressor unit

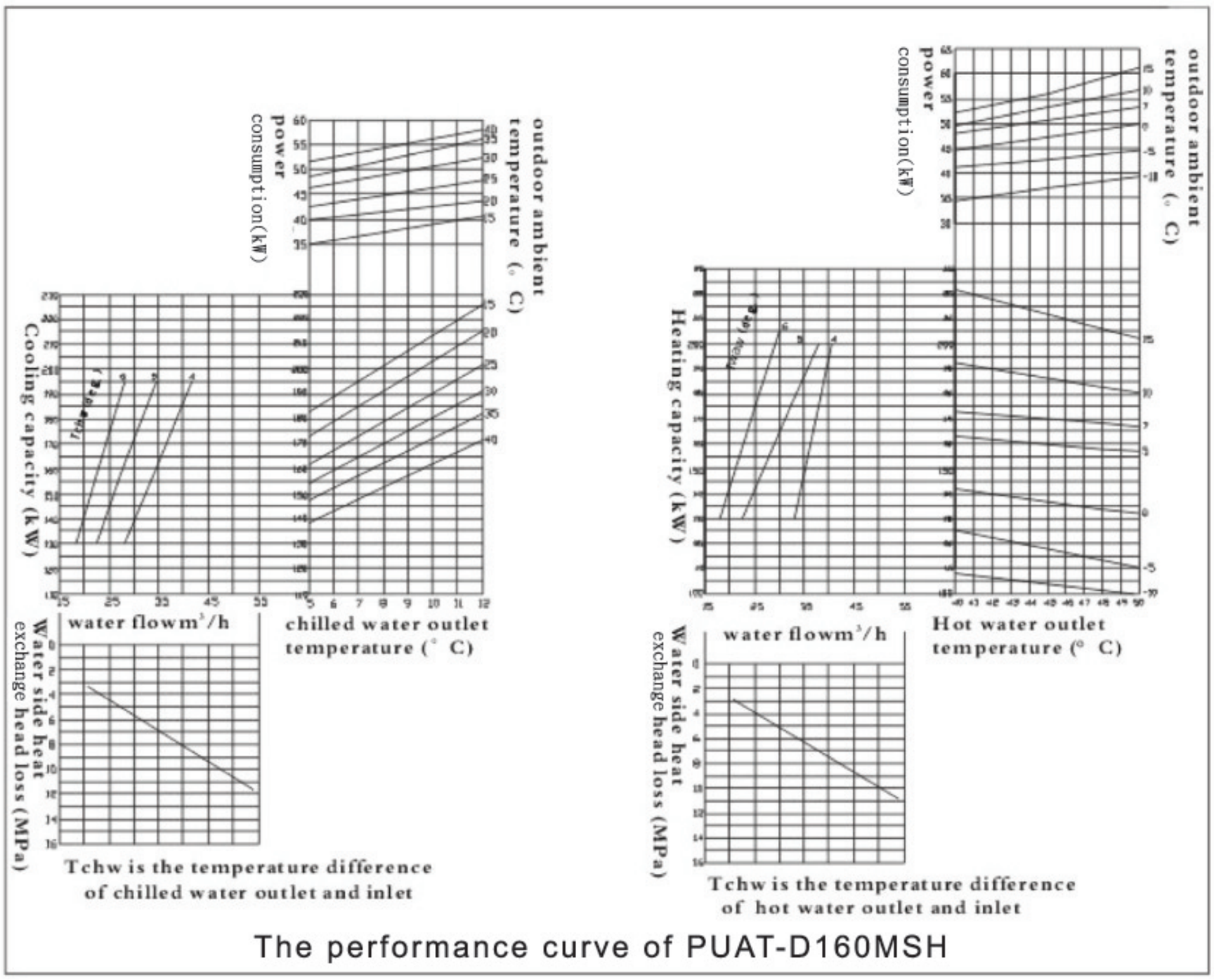


Wiring diagram of the double-compressor unit

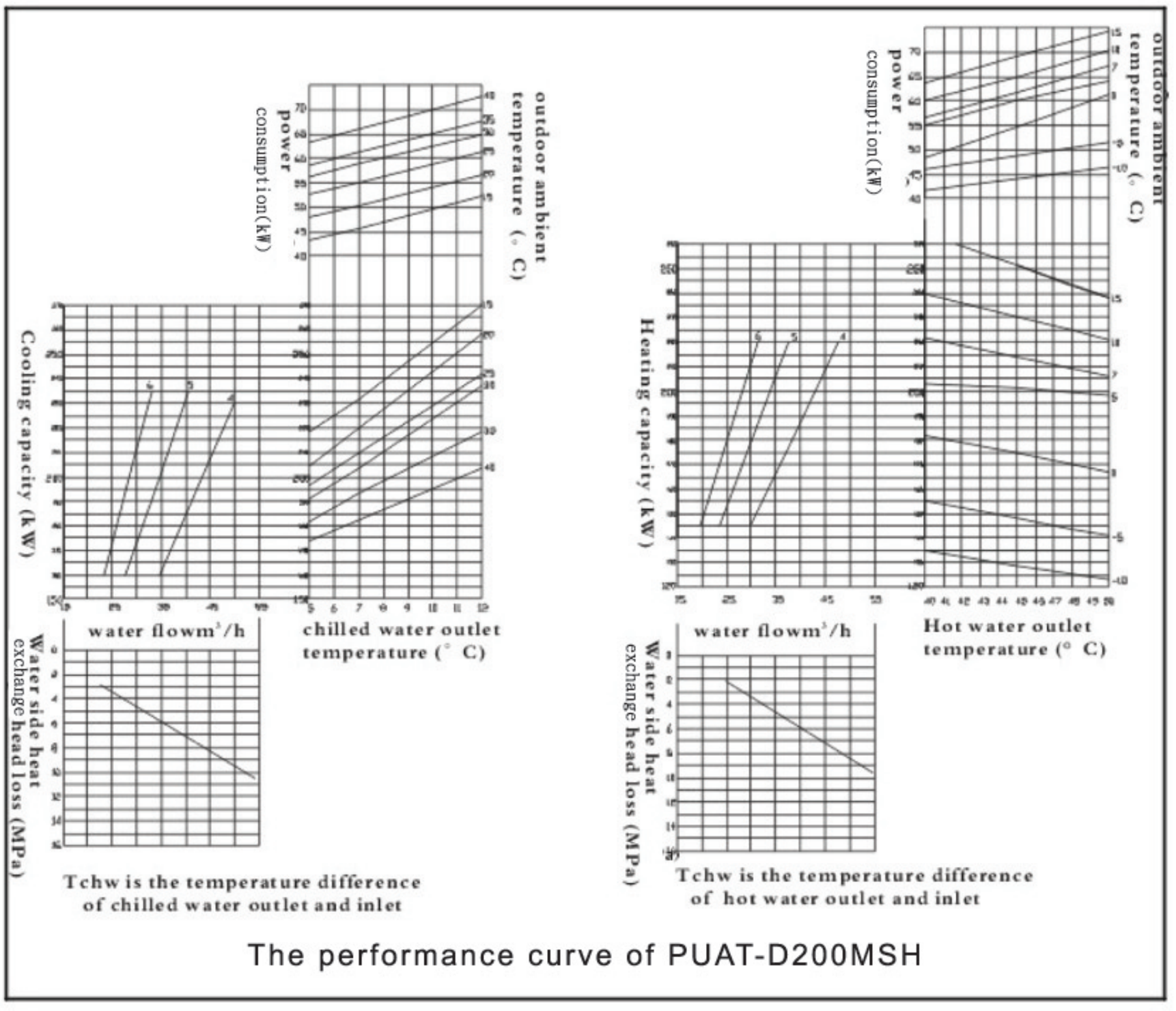


1. The diameter of wiring line in the table is for three phase system wiring. It is better to keep the diameter of null line and ground electrode smaller than live wire by 2 levels (or to consult the standard of general four cores cable).
2. The table is available only when the power supply inlet wire of each pipeline uses one specific PVC pipe. It is forbidden to share the same PVC pipe with other pipelines of power supply. The copper core wire of international BV or BVR or BXR type is used for the wire The surrounding temperature around the wire is 35°C. The only factor considered is the safety current load while the factor of voltage drop is not considered in the table.
3. The user should supply the power supply wire for the single compressor unit, for example, the single system unit shown in the figure, and it should be equipped with one breaker, to get more information, please refer to Figure 1.
4. The user should supply the power supply wire for the dual compressor unit, for example, the single unit only shown in the figure, also it should be equipped with one breaker, for getting more information, please refer to Figure 2.
5. Similar for other configurations.
6. If the diameter of wire you chose is bigger than the maximum diameter of connection in main board. Please consider connecting the wire between the main power supply wire and the chiller electric box with one moderate diameter wire.

The cooling/heating performance curve under changeable working conditions

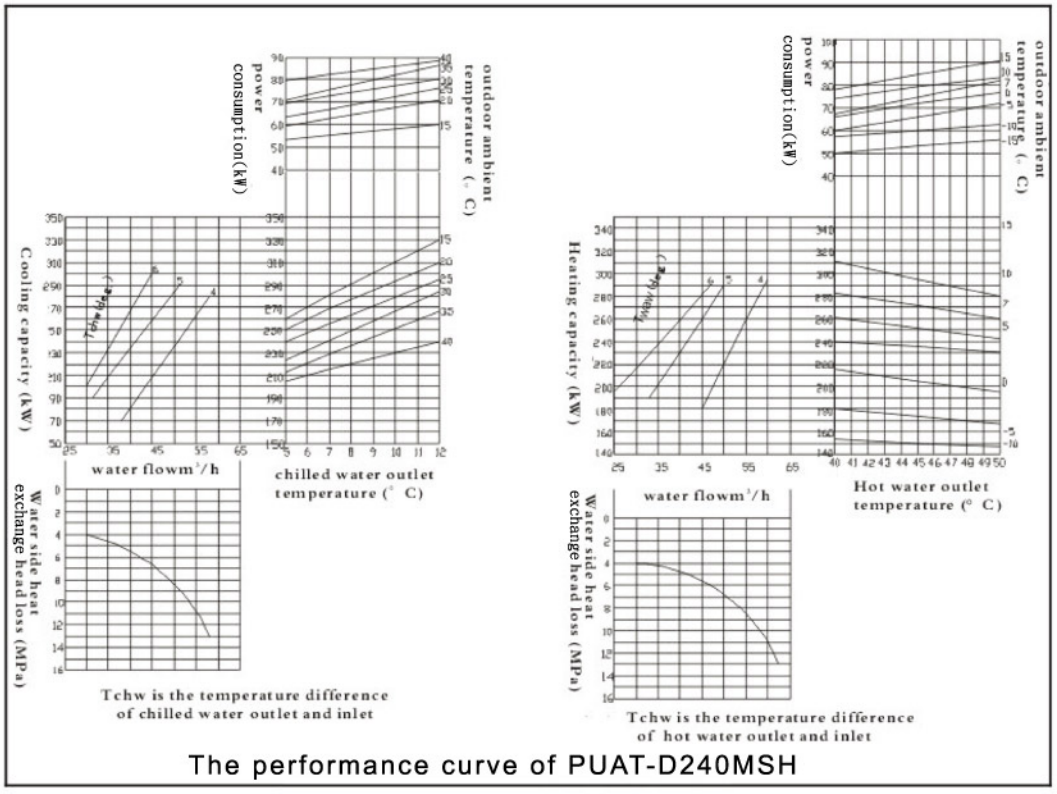


The performance curve of PUAT-D160MSH



The performance curve of PUAT-D200MSH

The cooling/heating performance curve under changeable working conditions



The performance curve of PUAT-D240MSH

Note:

The cooling capacity / power input correction coefficient

The normal furring coefficient is 0.000m² °C /kW in the ex-factory units, and the maximum furring coefficient allowed is 0.086 m² °C /kW so when the furring coefficient is over the maximum the water side heat exchanger should be cleaned.

The furring coefficient (m² °C /kW)	Cooling capacity correction coefficient	Power input correction coefficient
≦0.017	1.045	0.974
0.044	1.022	0.986
0.086	1.000	1.000
0.132	0.980	1.013

The correction coefficient of altitude

Altitude (m above the sea level)	0	300	600	1200	1500	1800
Atmosphere Pressure (bar)	1.013	0.977	0.942	0.875	0.843	0.812
Cooling capacity correction coefficient	1.000	0.993	0.986	0.973	0.967	0.960
Power input correction coefficient	1.000	1.005	1.009	1.021	1.026	1.031

Auxiliary Electric heater

Working Principle

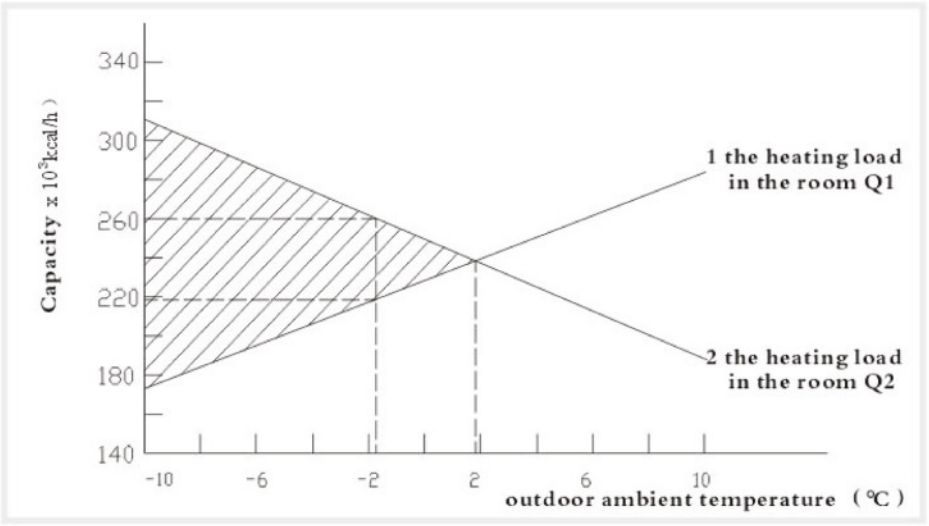
In winter, when the outdoor ambient temp goes down, the evaporation temperature of the heat pump chiller will also go down, in consequence, the heating capacity and the EER will also go down, on the contrary, the heat load of the area is increasing, namely symmetrical equilibrium exists between the heating capacity and the room heat load, right at the equilibrium point, and the heat load equals the heating capacity.
When the outdoor temperature is below the equilibrium point, the room heat load will exceed the heating capacity, in order to make the heating capacity equal to the heat load again, the auxiliary heater should be taken into consideration to achieve the equilibrium point.

Function

Thus, auxiliary electric heaters are employed by our company, which can be interlock controlled by the chiller microcomputer controller, run safely and stably, the functions are as follows:
1.Help to compensate the capacity drop due to low ambient temperature to make the real heating capacity to be equal with the nominal required heating capacity.
2.Due to low temperature of the cycling water in the water system, the compressors would face the problem to be started, the auxiliary electric heaters can help to pre-heat the water in advance and free the compressor from the bad working conditions.
3.In winter, if the coil surface temperature is below 0°C, there would be frost naturally, and the heat exchanging efficiency would be lower down, even worse, if the frost layer is thick, the system low pressure would be overly low, both the motor and the oil would be overheated, the compressor would be under danger of being damaged.
Thus defrost is necessary, auxiliary heater would work to compensate the heat loss during the defrost process and keep the water temperature relatively stable so as to keep the room temperature stable.
4.In winter during the night, when the chiller is shut down, the water system may face the problem of being frozen and the pipe would be broken so that the system may be damaged. The microcomputer controller can perform the anti-freeze monitoring operation to start the auxiliary heater to heat and maintain the water temperature within a normal range and keep the circulation of the hot water in the pipeline system to avoid the water system from being frozen.

Choose the Model

Usually how to choose the heat pump model depends on the cooling load in summer when it is in winter, the chiller runs in heating mode, the real heating capacity should be calculated comprehensively according to whole room heating load and the performance parameters of the chiller itself.
Taking PUAT-D320MSH as one example (water outlet 45°C), the lower temperature outside goes, the lower heating capacity will be, its change is shown in the X curve one of figure.
But the heated load will go up in the room, suppose its change is shown in the curve 1 in the figure below.
Curve 2 represents the change of the room heating load, the cross point of curve 1 and 2 is the balance point.
Right at the balance point, the heat load equals to the heating capacity. When the outdoor temperature is below the equilibrium point temperature, the room heat load will exceed the heating capacity, and the differential is right the needed heating capacity of the auxiliary electric heater.
Refer to the local winter climatic status to confirm the outdoor ambient temperature.



In the above figure, if the outdoor ambient temperature above is -2°C, and the heating load Q2 in the room is 260000kcal/h, the nominal heating capacity of the machine is 302000kcallh, and when the outdoor ambient temperature is -2°C, the coefficient of heating capacity is 0.74 in the machine, so the real heating capacity of the chiller at -2°C would be :

302000 x 0.73=220500kcal/h
So the needed heating capacity of the auxiliary heater is
P=Q2-Q1
= 260000-220500=39500kcal/h=45.9kW

If it is not easy or convenient to calculate for you, the table shown below is for your quick reference (the table of power coefficient of auxiliary heater) :

Equilibrium temperature / Designed outdoor air temperature	-10	-8	-6	-4	-2	0	2	4
-10		0.21	0.47	0.79	1.19	1.70	2.33	3.15
-8			0.24	0.53	0.89	1.35	1.94	2.70
-6				0.26	0.60	1.01	1.55	2.25
-4					0.30	0.68	1.16	1.80
-2						0.34	0.78	1.35
0							0.39	0.90
2								0.45
4	**Without auxiliary heater**							

Note:

1. The designed temperature in the room is 20°C.
2. The power coefficient of auxiliary heater means the required electric heater power kW corresponding to every per unit RT of the chiller.
3. The capacity of auxiliary heater equals to the nominal RT of the chiller* power coefficient.
4. If you have any questions for choosing the model, please feel free to contact us.

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Outstanding Technique

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PUAT-D-9B