



Heat Pump TICA

Contents






PART **1** **Production Lineup**

PART **2** **Split Heat Pump**

PART **3** **Air Source Heat Pump**

PART **4** **CO₂ Heat Pump**

PART1 **Production Lineup**

Split heat pump		Air-source heat pump		CO2 Heat pump
12/14/16 kW (wall mounted type)	12/14/16/18/20 kW (Ceiling type)	14/21/42 kW Direct heating	18.6/38.5 kW Circulating heating	80kW
				

PART 2 Split Heat Pump

Wall mounted type	ODU	TSCA120FHL	TSCA140FHL	TSCA160FHL
	IDU	TSCI120FHL	TSCI140FHL	TSCI160FHL
Cooling capacity	Capacity(kW)	12	14	16
Heating capacity 1	Capacity(kW)	14	16	18
Heating capacity 2	Capacity(kW)	8.6	10.5	12.5
Circulate Water flow(m ³ /h)		2.06	2.41	2.75
Power supply		220V ~/50Hz	220V ~/50Hz	220V ~/50Hz
Ambient temp range(°C)	Cooling mode	+16...+48	+16...+48	+16...+48
	Heating mode	-25...+25	-25...+25	-25...+25
Refrigerant/Charge volume		R410A/2.50kg	R410A/3.05kg	R410A/3.05kg
Sound level(ODU/IDU) (dB(A))		56/37	56/37	56/37

Nominal cooling test conditions: The water outlet temp. is 7C and the outdoor dry bulb temp is 35C.

Nominal heating test 1 conditions: The water outlet temp. is 45C, the outdoor temp. is 7/6C.

Nominal heating test 2 conditions: The water outlet temp. is 41C, the outdoor temp. is -12C.

Unit Parameter-Ceiling Type

Ceiling type	ODU	TSCA120FHL	TSCA140FHL	TSCA160FHL	TSCA180FHL	TSCA200FHL
	IDU	TSCI120FHLD	TSCI140FHLD	TSCI160FHLD	TSCI180FHLD	TSCI200FHLD
Cooling capacity	Capacity(kW)	12	14	16	18	20
Heating capacity 1	Capacity(kW)	14	16	18	20	22
Heating capacity 2	Capacity(kW)	8.6	10.5	12.5	13.5	14.5
Circulate Water flow(m ³ /h)		2.06	2.41	2.75	3.1	3.44
Power supply	ODU	220V ~/50Hz	220V ~/50Hz	220V ~/50Hz	380V 3N 50Hz	380V 3N 50Hz
	IDU				220V ~/50Hz	220V ~/50Hz
Ambient temp range(°C)	Cooling mode	+16...+48	+16...+48	+16...+48	+16...+48	+16...+48
	Heating mode	-25...+25	-25...+25	-25...+25	-25...+25	-25...+25
Refrigerant/Charge volumn		R410A/2.50kg	R410A/3.05kg	R410A/3.05kg	R410A/4.40kg	R410A/4.40kg
Sound level(ODU/IDU) (dB(A))		56/37	56/37	56/37	59/33	59/33

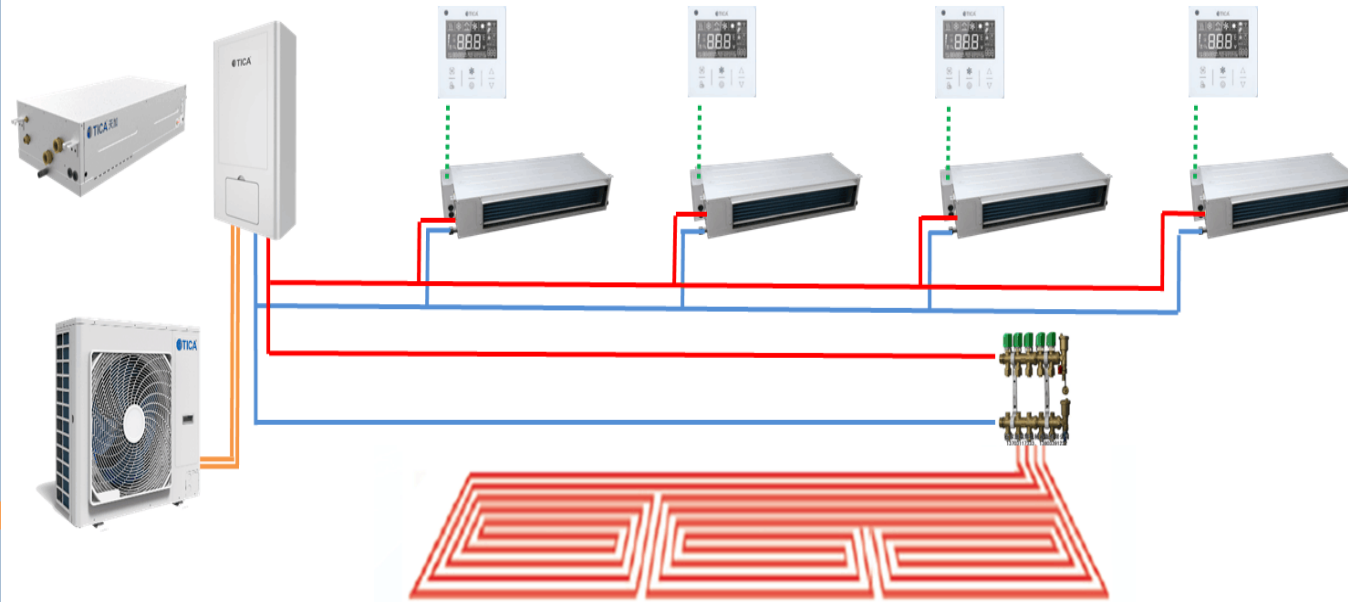
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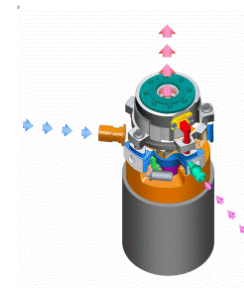
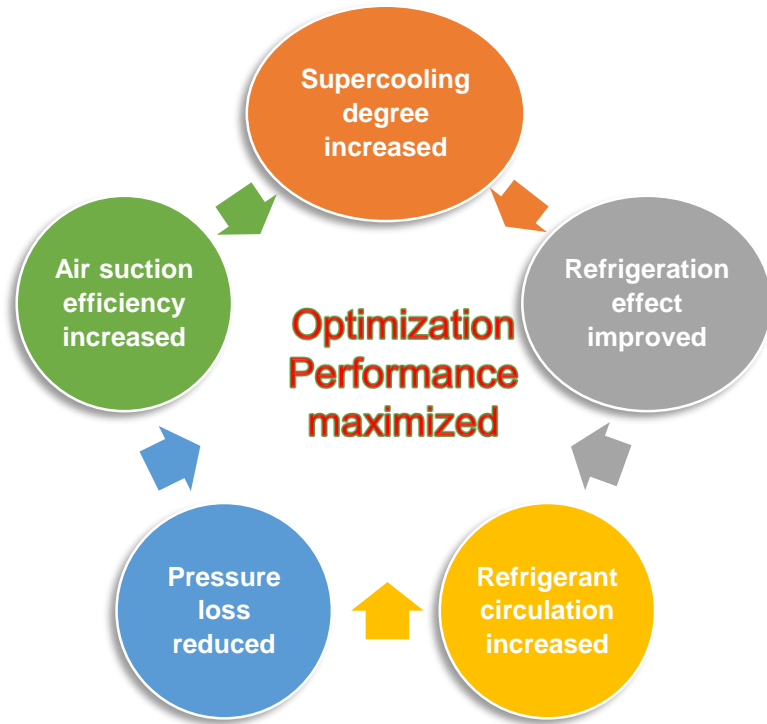
Split Heat Pump System

Air conditioning + Floor heating system



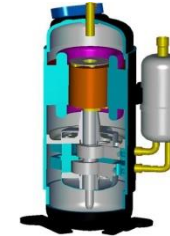
Mode :

- ✓ Cooling (FCU)
- ✓ Heating (FCU)
- ✓ Floor heating (Floor heating pipe)
- ✓ Heating & Floor heating

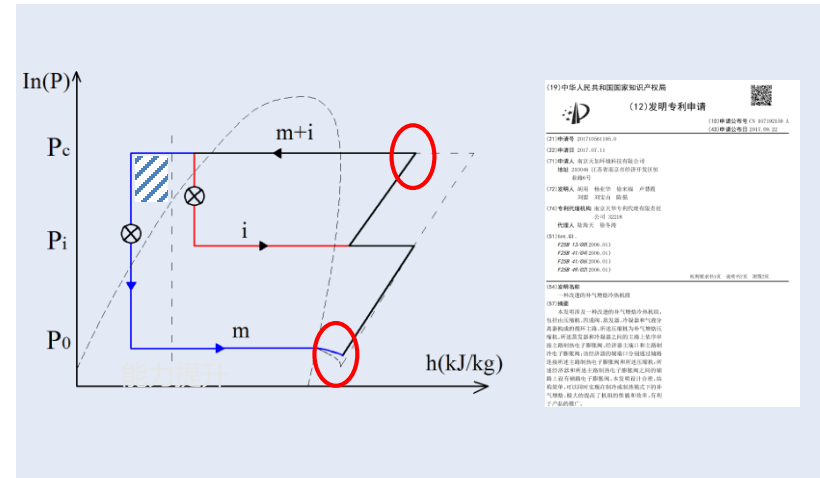


Scroll type + EVI

V.S.



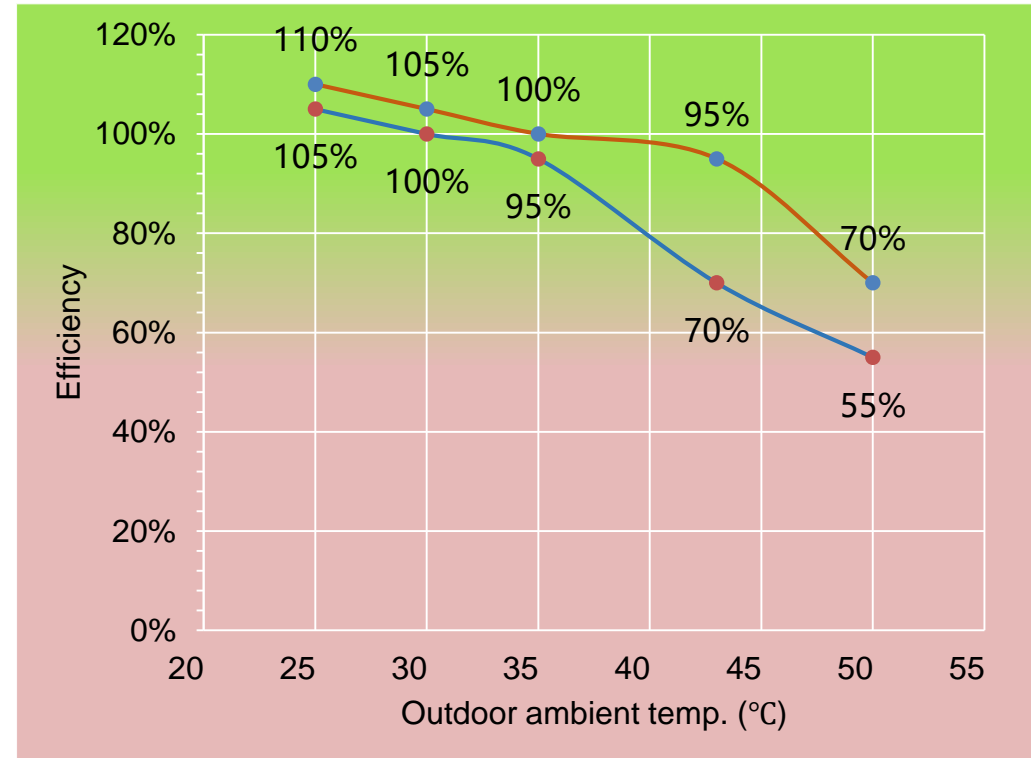
Common double rotor



No heating capacity attenuation at 43°C, enjoy cozy air in summer

Cooling capacity increased by 15% at 50°C, effectively respond to extreme weather

Supercooling at 30°C, low noise of refrigerant flow, more stable control



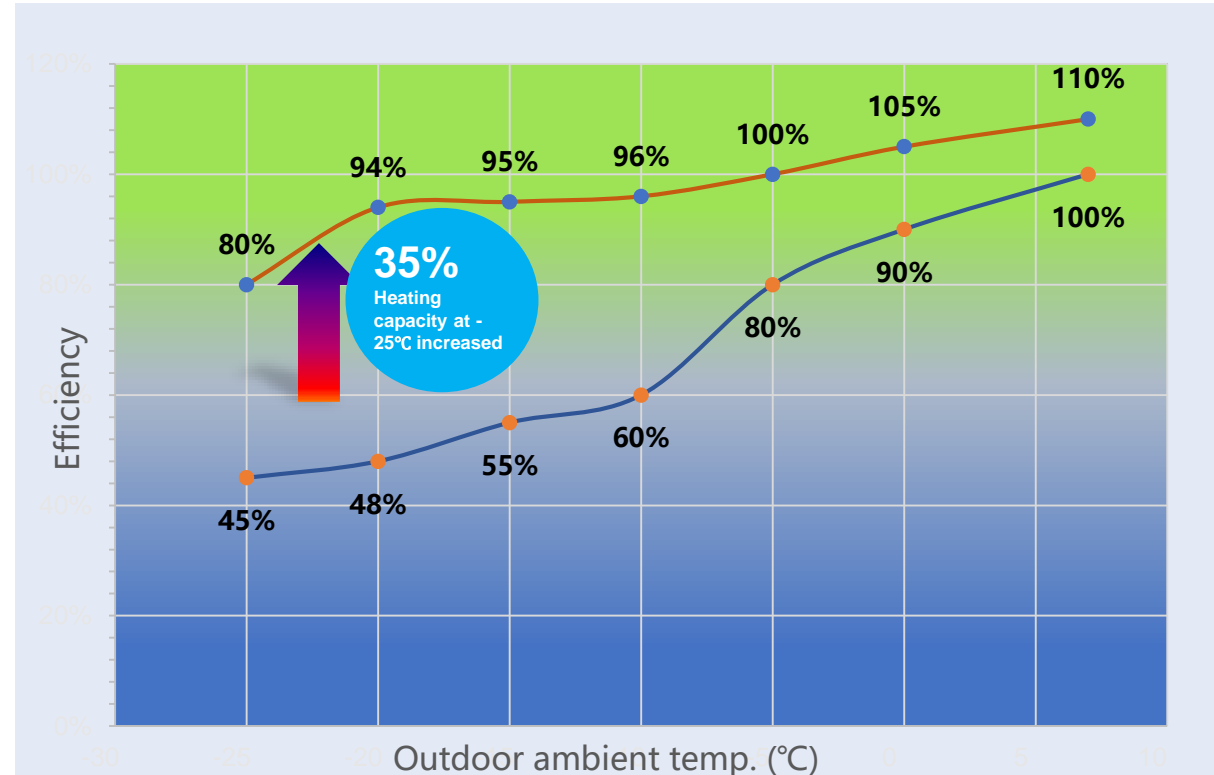
— with EVI unit

— ordinary unit

No heating attenuation at -20°C

Heating capacity increased by 35% at -25°C,
no electric heater required
Electric heater is not safe/not energy
efficient/not comfortable

Discharge temperature significantly
reduced for enhanced operation
reliability



— with EVI unit — ordinary unit

Emerson Copeland full DC inverter scroll compressor is adopted to adjust unit running frequency based on load. (Unique to TICA)



Inverter compressor (Emerson Copeland)

01

Match-well/Weiling inverter motor is configured, increasing the efficiency by 20% than common motors.



Inverter motor (Match-well/Weiling)

02

Inverter water pump can automatically adjust the unit water flow based on load at the air side and the use status. (Unique to TICA)



Inverter water pump (Grundfos)

04

TICA self-developed compressor driver can better match the unit running efficiency, so as to substantially increase the operation reliability.



Advanced Inverter control

03



Comparison of Heat Exchanger

Item	Double-pipe type	Plate heat exchanger	TICA shell-and-tube heat exchanger
Heating efficiency	Good	Excellent ✓	Excellent ✓
Cooling efficiency	Poor	Excellent ✓	Excellent ✓
Water-side volume	Spread ✓	Small	Spread ✓
Water quality requirements	Low	High	Low ✓
Water resistance	Spread	Common	Small ✓
Cleaning frequency of the water filter screen	Low	High	Low ✓
Local freeze-damaged part	Good	Poor	Excellent ✓



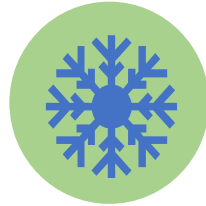
**Unique
to TICA**



Multiple safety protection measures

Protection of low outlet water temperature

Prevent tube freezing if the water outlet temperature of the evaporator is too low.



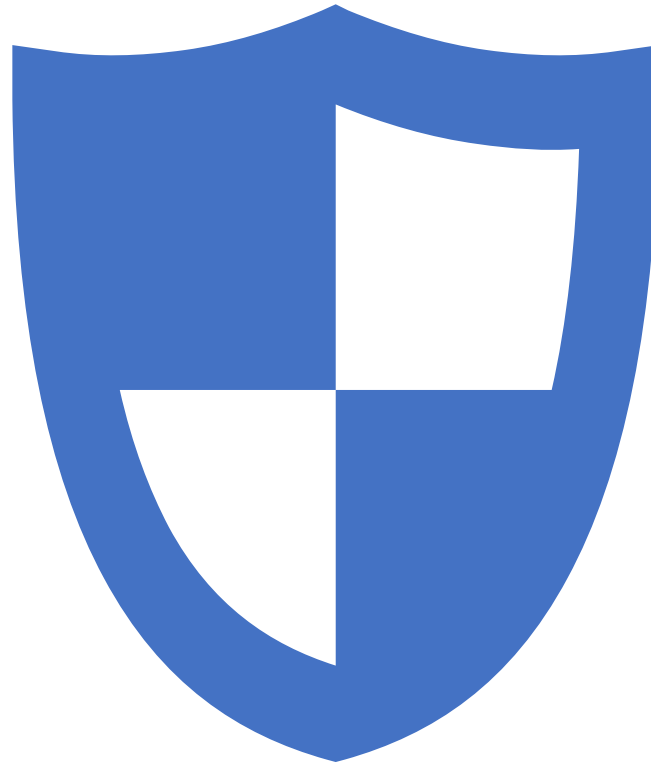
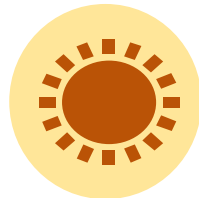
High/low pressure fault protection

Ensure that the components of the system run in the safe range.

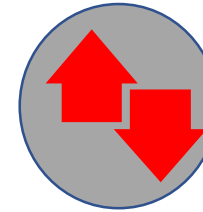


Protection of high outlet water temperature

Prevent compressor overload if the water outlet temperature of the condenser is too high.



20+ protection functions



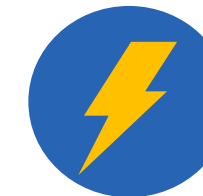
Protection of compressor reverse rotation

Prevent the compressor from operating reversely to avoid compressor damage.



Disconnection protection

Stop the unit in a timely manner if the evaporator and condenser are disconnected, to avoid tube freezing.



Compressor overcurrent protection

Prevent overcurrent to avoid compressor damage.

- The unit adopts a split structure (unique to TICA). The water system can be installed indoors for anti-freezing.
- Multiple anti-freezing measures of the unit can effectively prevent local damage to the water pipe in winter due to low temperature.
- The unit supports anti-freezing check from aspects of ambient temperature, water temperature, and standby time, and allows for two sets of anti-freezing programs. Heating operation with the water pump and heat pump, no electric heater.

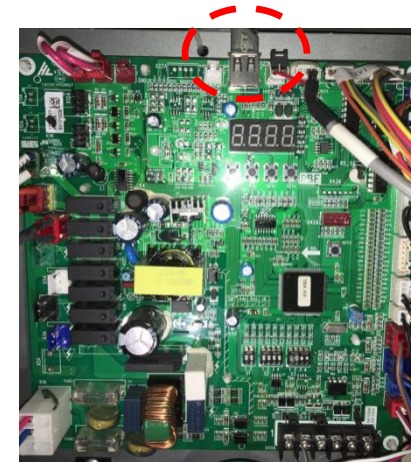


- Single fan design, high-efficiency heat exchanging technology; compact and powerful. Unit height at small as 840mm (smallest in the industry), can be easily installed in small space such as under a bay window.
- No need to reserve special space for installation; particularly applicable to high-rise flats.

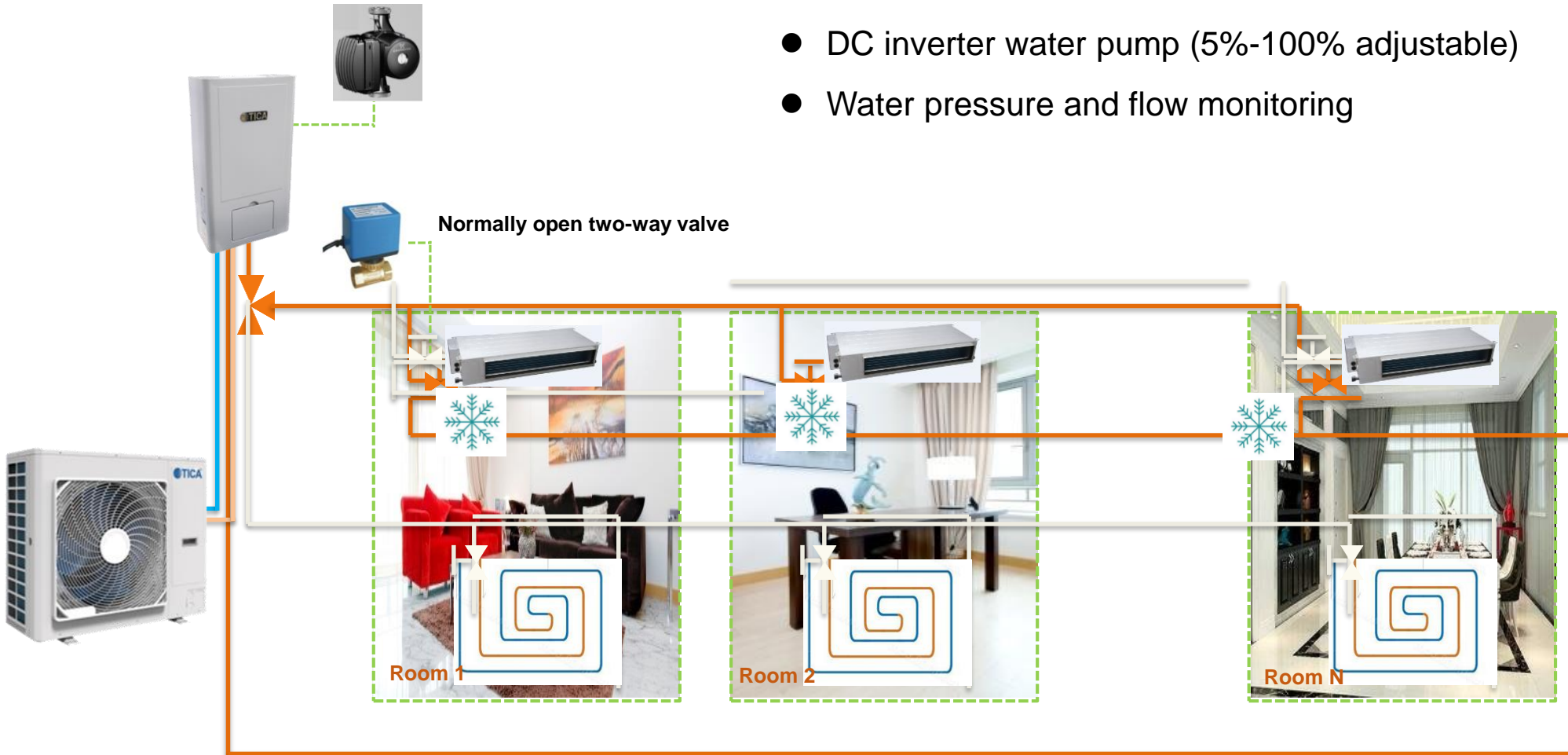


Easy-to-maintain blackbox

- The blackbox can record various running parameters (failure code, expansion valve opening, unit frequency, water temperature, etc.) of the unit in real time manner. In case of a unit failure, data can be rapidly exported for diagnosis.
- The updated control program allows for more convenient use.



Intelligent Control-Cooling



Intelligent control

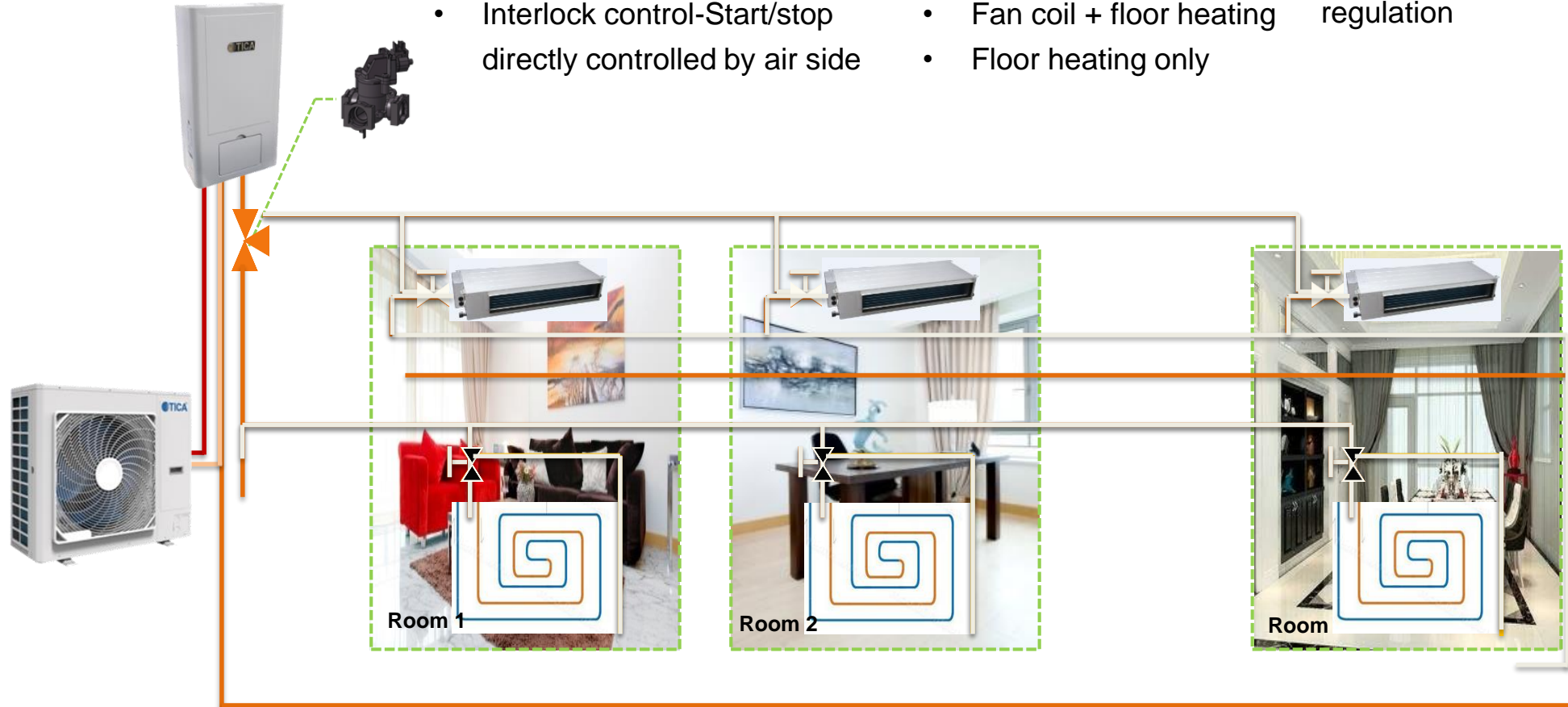
- Rapid heating
- Interlock control-Start/stop directly controlled by air side

Running Mode

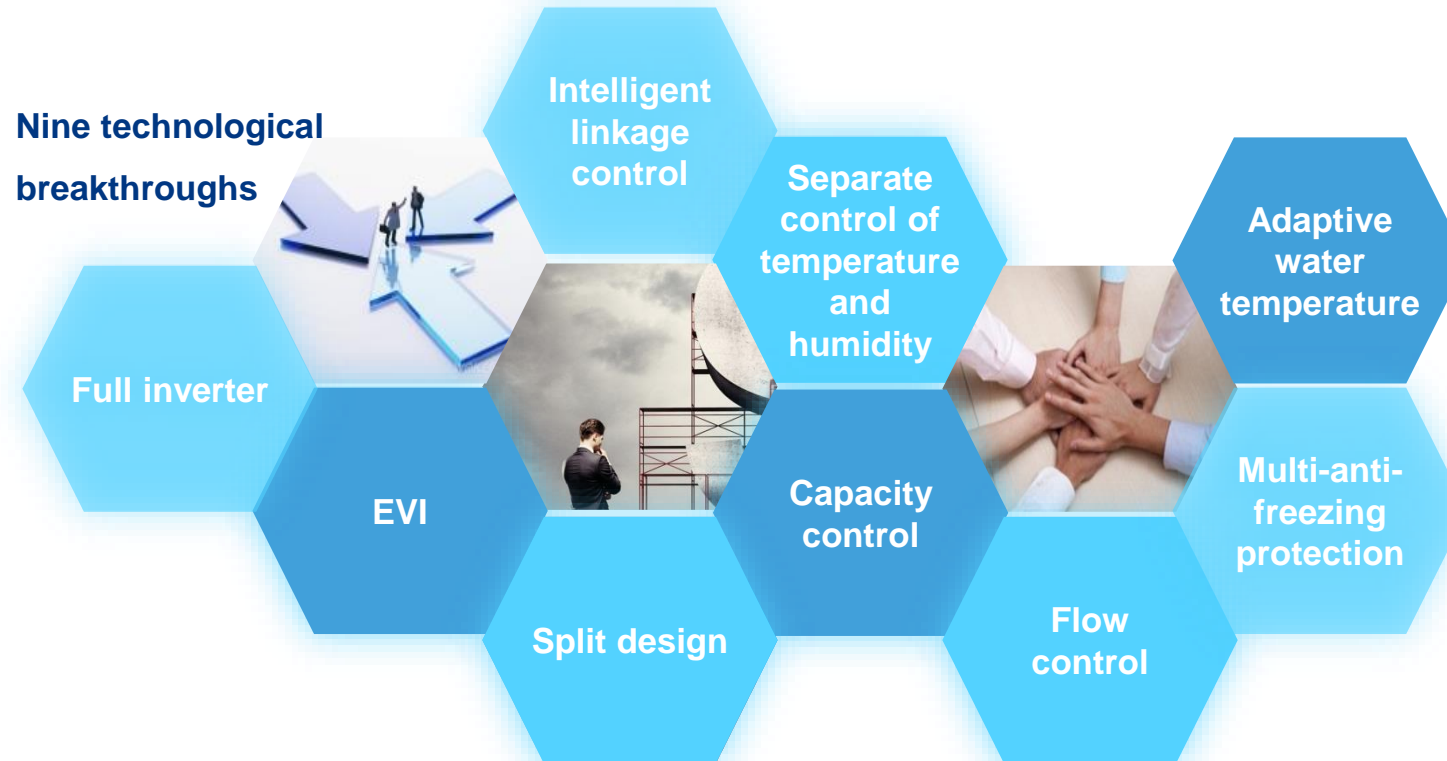
- Fan coil heating only
- Fan coil + floor heating
- Floor heating only

Three-way valve

Intelligent proportional regulation



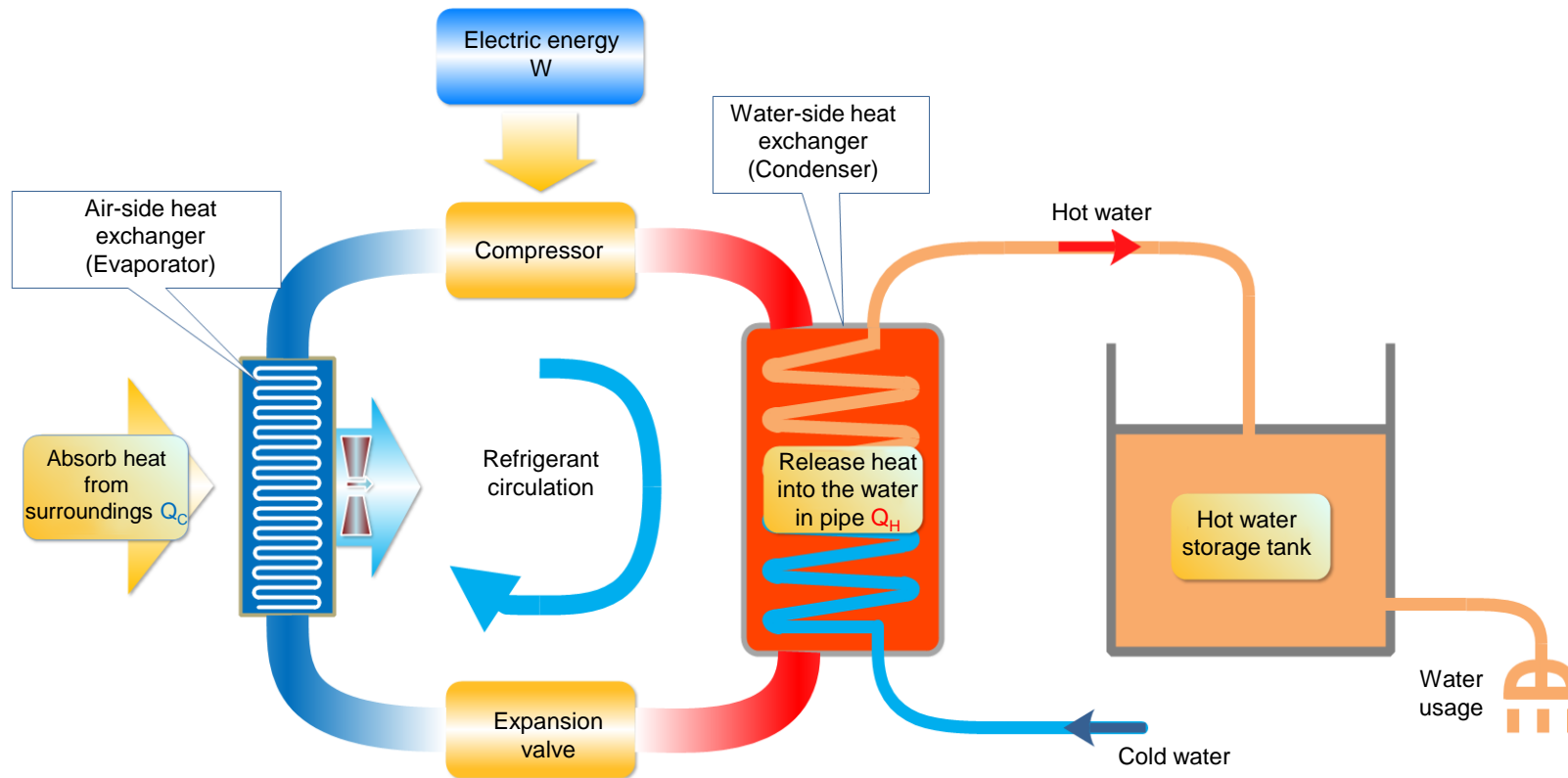
Powerful+Efficient+Smart, comfort and precise control, G5 mini central air conditioner



PART 3 Air-source Heat Pump

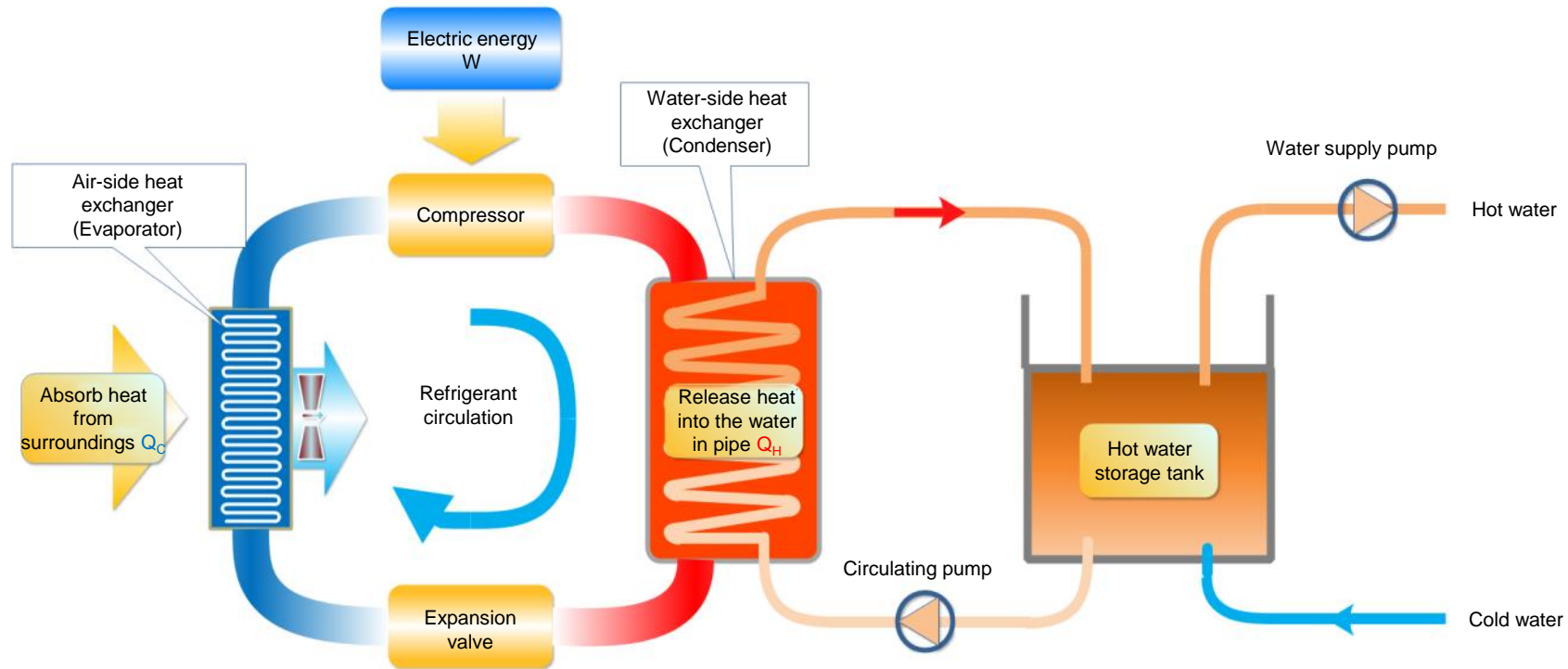
Model	TCAH100F	TCAH50F	TCAH30F
Nominal heating capacity (kW)	42	21	14
Nominal water output (L/h)	0.902	0.451	0.301
Max outlet water temp (°C)	60	60	60
Circulating water flow (m ³ /h)	6.5	3.4	1.86
Circulating max inlet water temp (°C)	50	50	50
Power supply	380V 3N~50Hz	380V 3N~50Hz	220V 1N~50Hz
Ambient temp range (°C)	-10 - 48		
Sound level (dB(A))	65	60	60
Refrigerant/Volume	R410A/5.2 kg	R410A/2.4kg	R410A/1.5kg

Model	TCAH100FC	TCAH50FC
Nominal heating capacity (kW)	38.5	18.6
Nominal water output (L/h)	0.828	0.4
Max outlet water temp (°C)	60	60
Circulating water flow (m ³ /h)	6.6	3.2
Circulating max inlet water temp (°C)	50	50
Power supply	380V 3N~50Hz	
Ambient temp range (°C)	-10 - 48	
Sound level (dB(A))	65	60
Refrigerant/Volume	R410A/5.2 kg	R410A/2.4kg



- Direct-heating type air-source heat pump hot water unit supports direct heating by heating up the incoming cold water and generating hot water.
- It applies to scenarios where 24-hour hot water supply is required.

Circulating-heat System

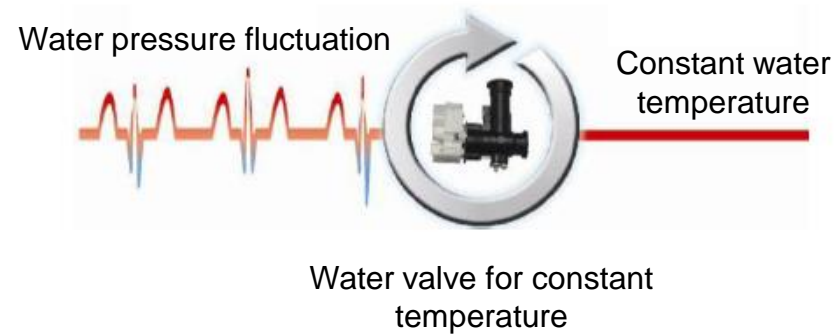
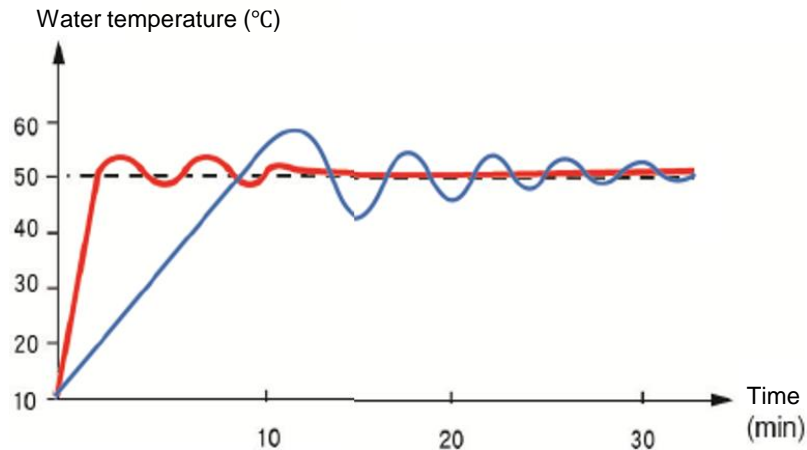


- Circulating type air-source heat pump hot water unit supports circulating heating by gradually increasing the temperature of cold water replenished in the tank.
- It applies to scenarios where centralized water supply system is adopted.



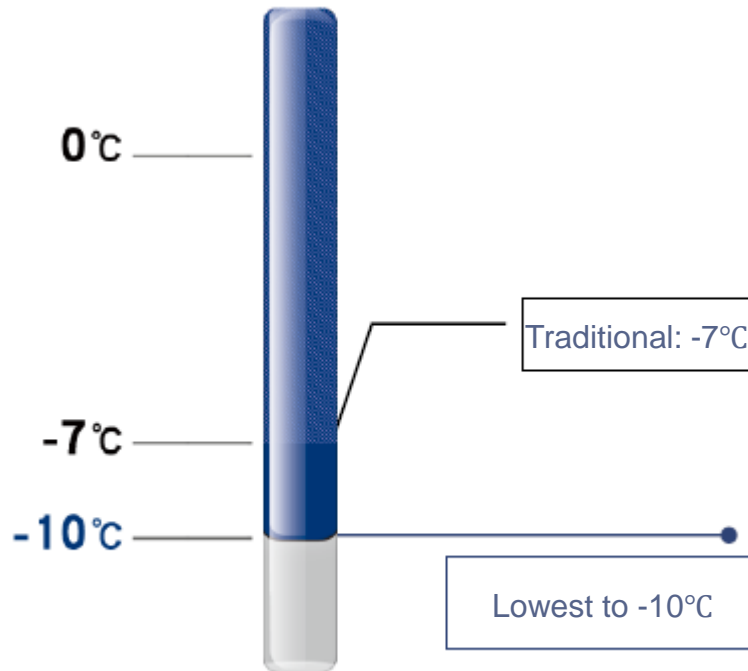
- Fast heating and excellent defrosting to ensure sufficient hot water supply during winters
- Reliable performance and advanced integration of hot water systems to guarantee smooth operation in winters
- EEI level 2 energy-saving product
- Smarter control

- Rapid heating and constant temperature to ensure sufficient hot water supply in winters
- Double-regulated water entering for fast heating and constant water temperature
- Accurate adjustment according to water entering temperature and water flow



Water leaving temperature

- **Reaches 45°C in 1 minute**
- **Reaches the set temperature within 3 minutes**



- R410A with better performance of low-temperature resistance is applied to effectively alleviate the problem of decreased performance of heat pump hot water units in winter
- Supporting of ambient temperature as lower as -10°C (-7°C for traditional units) ensures normal operation and hot water supply even in severe weather conditions in winter in southern areas



Scroll compressor

- High-efficiency



Axial-flow fan

- Low noise
- Low power consumption
- High efficiency

High efficiency
and energy
saving



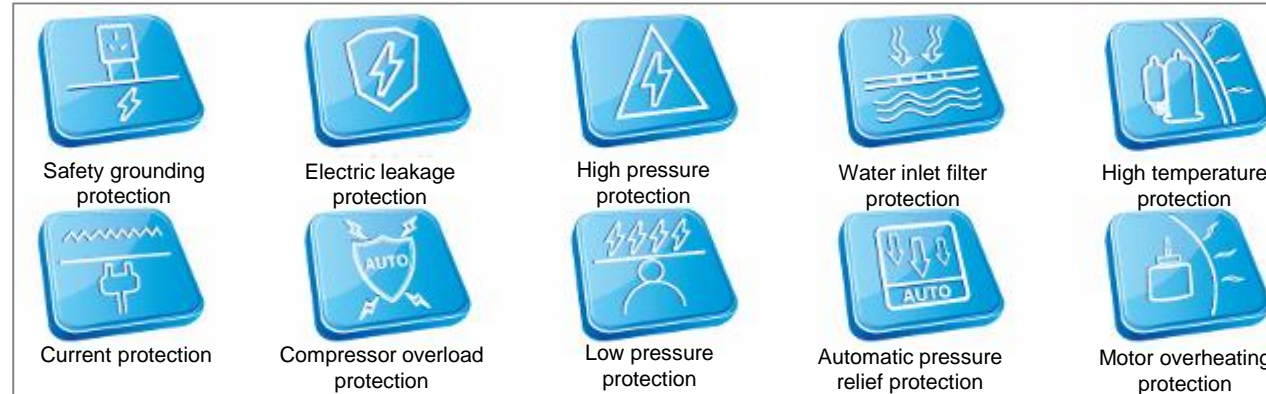
Uni-axial heat exchanger

- Grooved copper tube
- High heat exchange coefficient



EXV

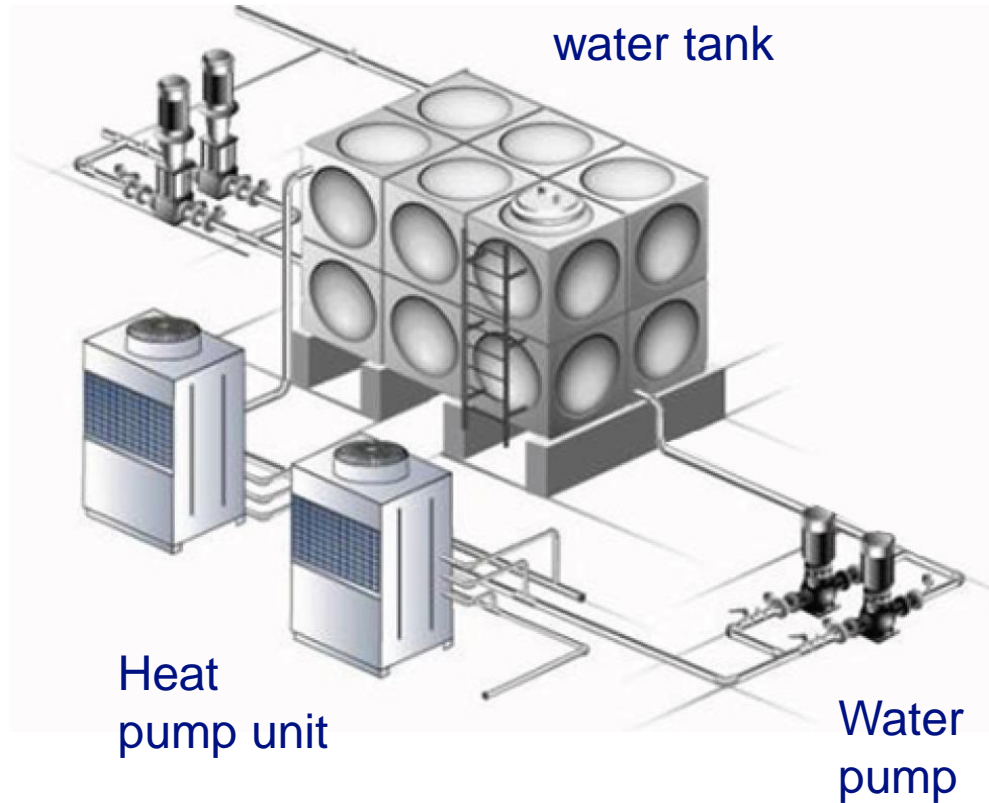
- Stable
- High-precision



- Professionally developed LCD
- Real-time display of water outlet and power consumption
- Self-equipped leakage circuit breaker
- Self-equipped overflow protection
- Combined control of up to 16 units (of the same model)



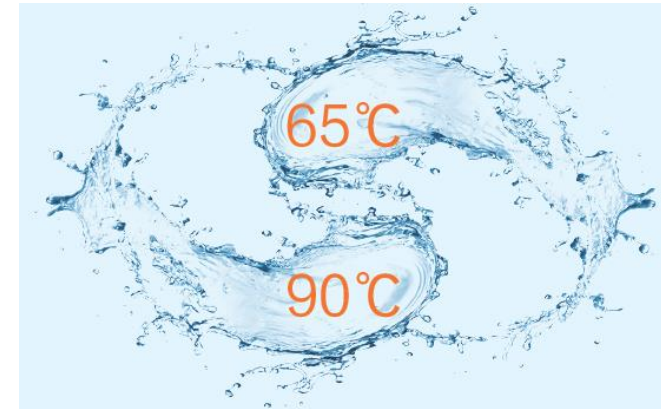
Integrated smart control for a more efficient system



- Include all parts of the hot water unit in control;
- Control every set of hot water unit accurately in real time, and adjust the operation status of system accessories through the intelligent analysis and calculation;
- Reduce considerable operation costs for users by improving unit operation efficiency and lowering energy consumption of accessories.

PART4 CO2 Heat Pump

Model	TCAH200HH
Power supply	Three-phase AC 380 V 50 Hz
Heating capability (kW)	80
Water Flow (m ³ /h)	1.38
Heating capability (kW)	79
Water Flow (m ³ /h)	0.92
Heating capability (kW)	56
Water Flow (m ³ /h)	1.22
Dimensions W × L × H (mm)	1,250 × 1,900 × 2,085
Weight(kg)	Net weight: 1,344; operating weight: 1,359
Water inlet temperature (°C)	5~65°C
Max. water flow (m ³ /h)	1.98
Water inlet pressure	0.15 - 0.49
Water outlet temperature (°C)	65 or 90
Ambient temperature (°C)	-15 - 43



Heating 1 :65/15°C water outlet/inlet,
Ambient DB/WB temperature is 20/15°C

Heating 2 :90/15°C water outlet/inlet,
Ambient DB/WB temperature is 20/15°C

Heating 3 :90/50°C water outlet/inlet,
Ambient DB/WB temperature is 20/15°C

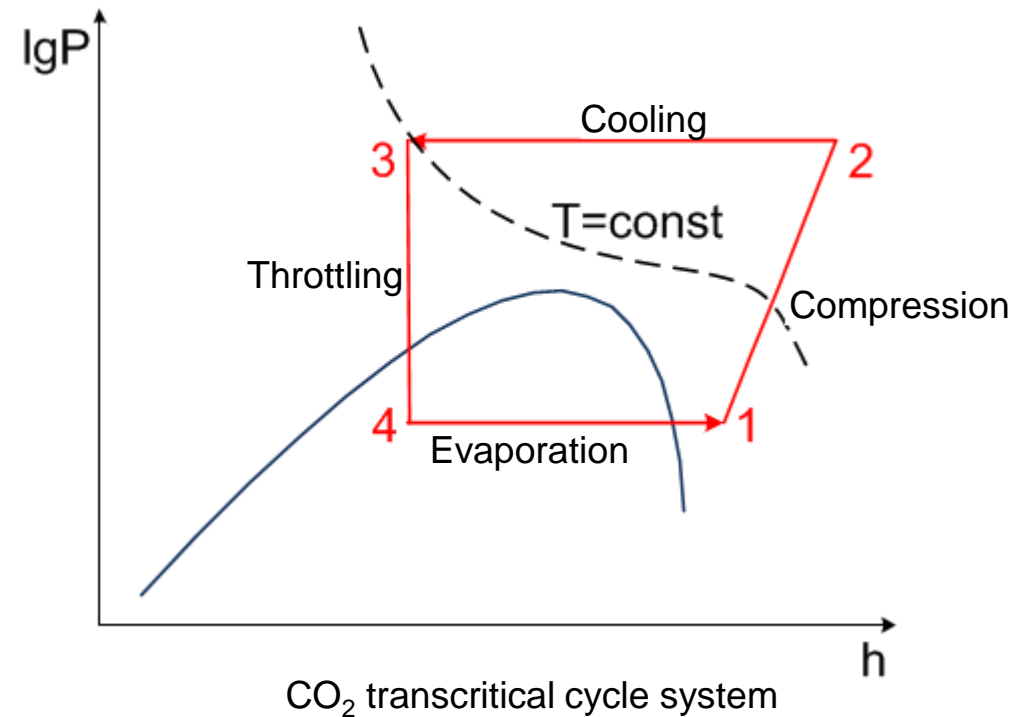
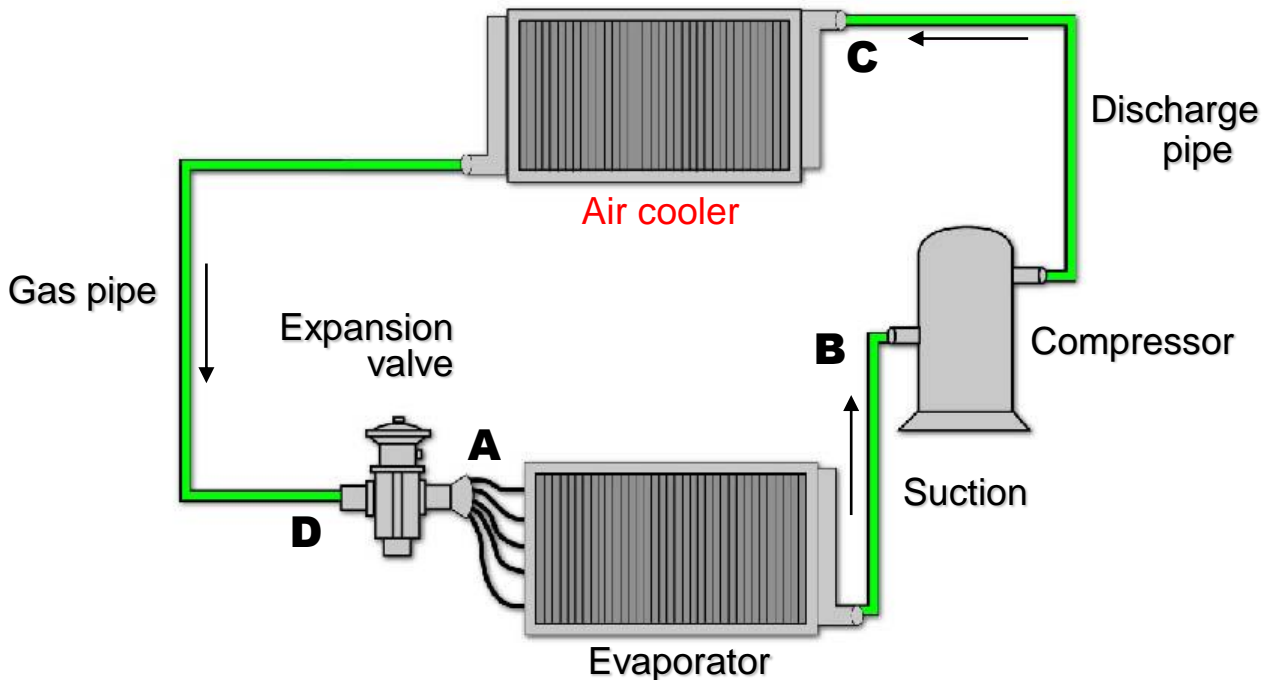
Technology Licensed by Mayekawa Japan



- ◆ CO₂ as refrigerant (R744), UNEP-recommended.
- ◆ License of MAYEKAWA (Japan), cutting-edge technology.
- ◆ Imported core parts (compressor, controller, heat exchanger) from Japan.
- ◆ Single unit capacity of 80kW, combination of multiple units is supported.
- ◆ Best alternative to small water boiler.

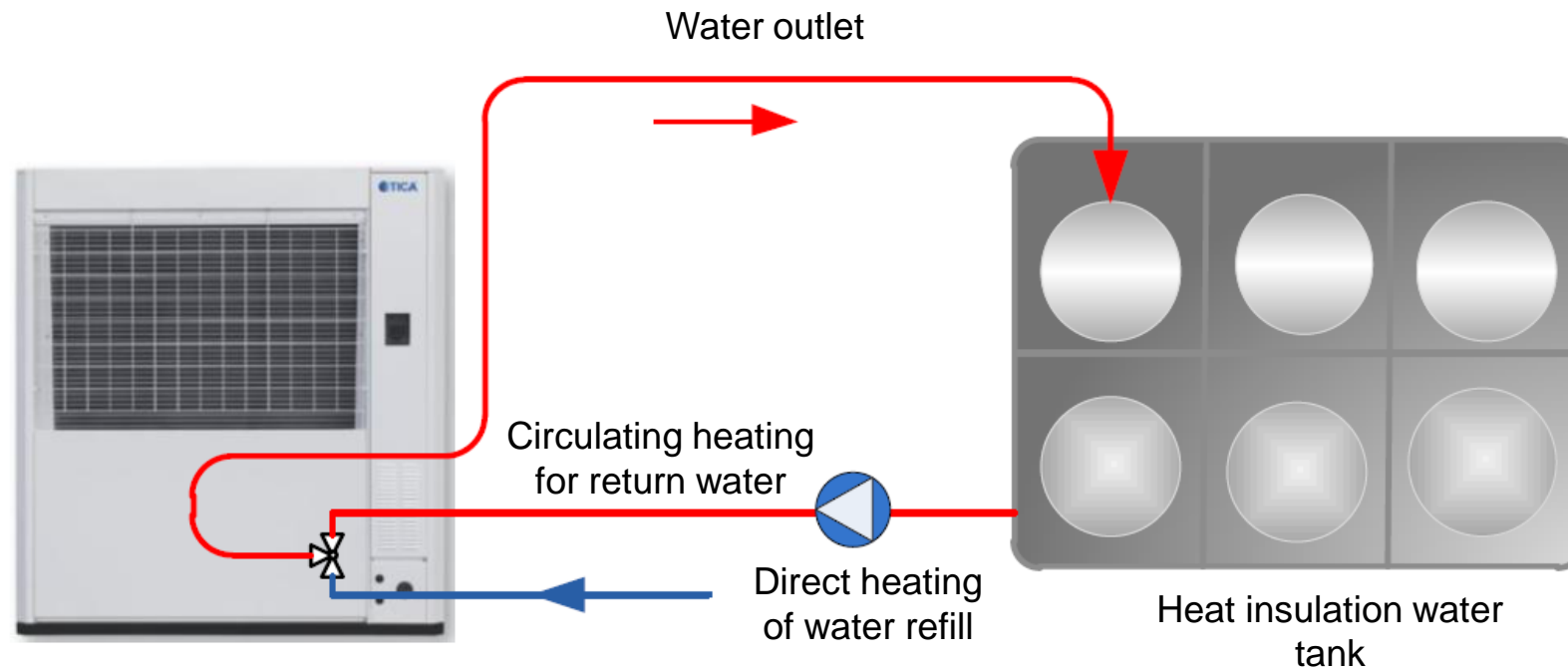


The critical temperature of CO₂ is very low (31.1°C). Therefore, when it is used in heat pump circulation, the temperature must be higher than the critical temperature. Under the supercriticality condition, CO₂ is not saturated, and thanks to its large specific heat capacity, high coefficient of thermal conductivity and small coefficient of dynamic viscosity, it is easy for CO₂ to flow and achieve heat exchange. As a result, the pipeline and heat exchanger size can be reduced, contributing to a more compact system.

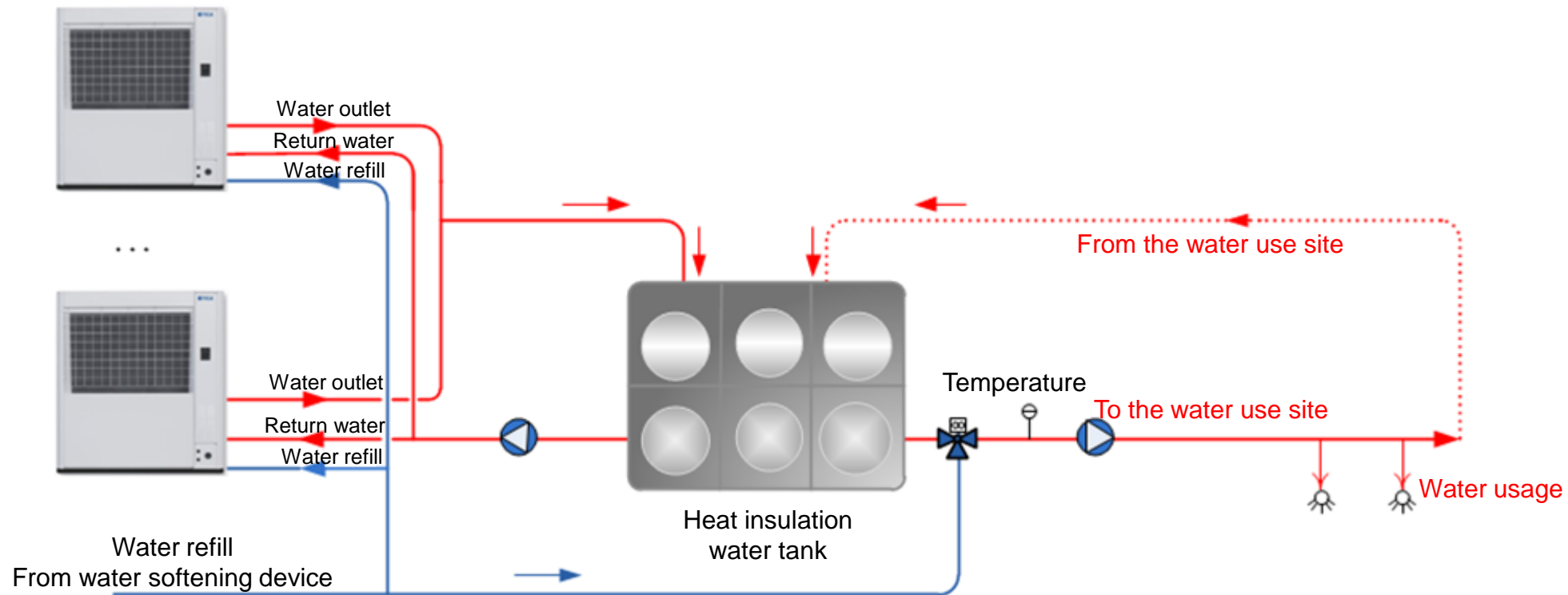


Direct/Recycle Mode Optional





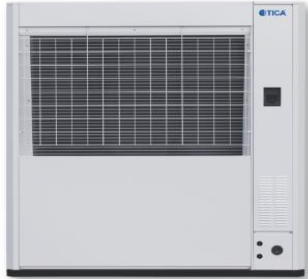
The built-in three-way valve supports switch between direct mode and recycle mode.




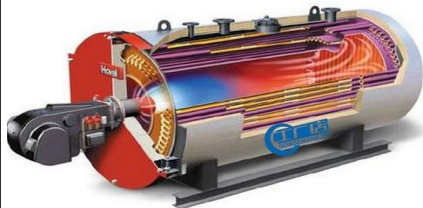



In scenarios with large amount of water required, multiple units can be combined to form a heating system.



Comparison Between Solutions for 20 Tons/Day 90°C Water Generation

	Coal Boiler	Oil Boiler	Gas Boiler	Electric Boiler	CO ₂ Heat Pump
					
Safety	Prone to leakage and explosion	Prone to leakage and explosion	Prone to leakage and explosion	Prone to electric leakage and aging	Safety
Management	Operated by specially-assigned person with certificate	Operated by specially-assigned person with certificate	Operated by specially-assigned person with certificate	Operated by specially-assigned person with certificate	Unattended operation
Intelligence	Unable to adjust parameters	Difficult to adjust parameters	Difficult to adjust parameters	Setting adjustable	Parameters adjustable with intelligent control
Environmental	Severely polluted	Polluted	Pollution-free	Pollution-free	Environmental protection
Efficiency	Low coal utilization ratio	Medium energy efficiency	Medium energy efficiency	Medium energy efficiency	High energy efficiency
Place	Special equipment room required, carbon residue removal facility is required	Special equipment room required, dedicated oil storage place is required	Special equipment room required, high requirement on machine room design	Special equipment room required, high requirement on machine room design	Roof and other vacant space
Life	5 years	10 years	10 years	10 years	20 years

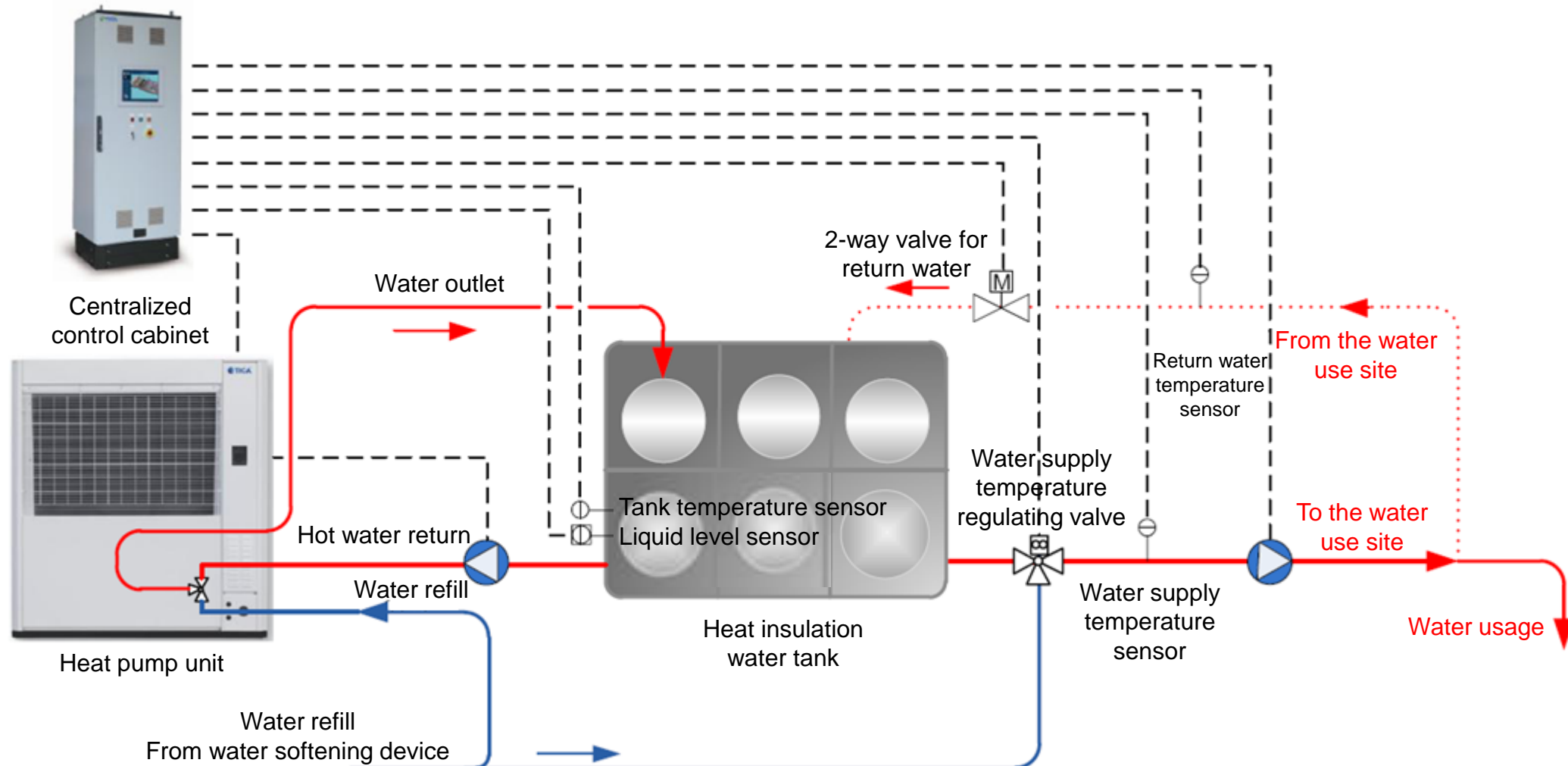
Comparison Between Solutions for 20 Tons/Day 90°C Water Generation

	Coal Boiler	Oil Boiler	Natural Gas Boiler	Electric Boiler	CO ₂ Heat Pump
					
	Energy required to heat 20 tons of tap water from 20°C to 90°C = (90-20)*20000 = 1,400,000 kcal = 5,880,000 kJ				
Calorific value	4000kcal/kg	10200kcal/kg	8600kcal/m ³	860kcal/kW.h	860kcal/kW.h
Efficiency	60%	90%	90%	95%	334%
Price	RMB 0.8/kg	RMB 8/kg	RMB 4.5/m ³	RMB 0.9/kW.h	RMB 0.9/kW.h
Fuel Consumption	583 kg coal	153 kg diesel oil	181m ³ natural gas	1714kW.h	487kW.h
Fuel Cost	RMB 467	RMB 1220	RMB 814	RMB 1542	RMB 439
Labor Cost	RMB 200	RMB 50	RMB 50	RMB 50	RMB 0
Total Cost	RMB 667	RMB 1270	RMB 864	RMB 1592	RMB 439
Annual Total Cost	RMB 240,000	RMB 460,000	RMB 320,000	RMB 580,000	RMB 160,000

Note: The above operating conditions is calculated based on the annual comprehensive efficiency in East China in accordance with JRA4060-2014.

Application -Hospital

TICA CO₂ heat pump hot water system supplies water up to 90°C and can effectively control the water temperature in the transmission and distribution system at above 60°C to kill legionella and prevent pollution.



Washing System -Hospital





We strive for excellence!

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