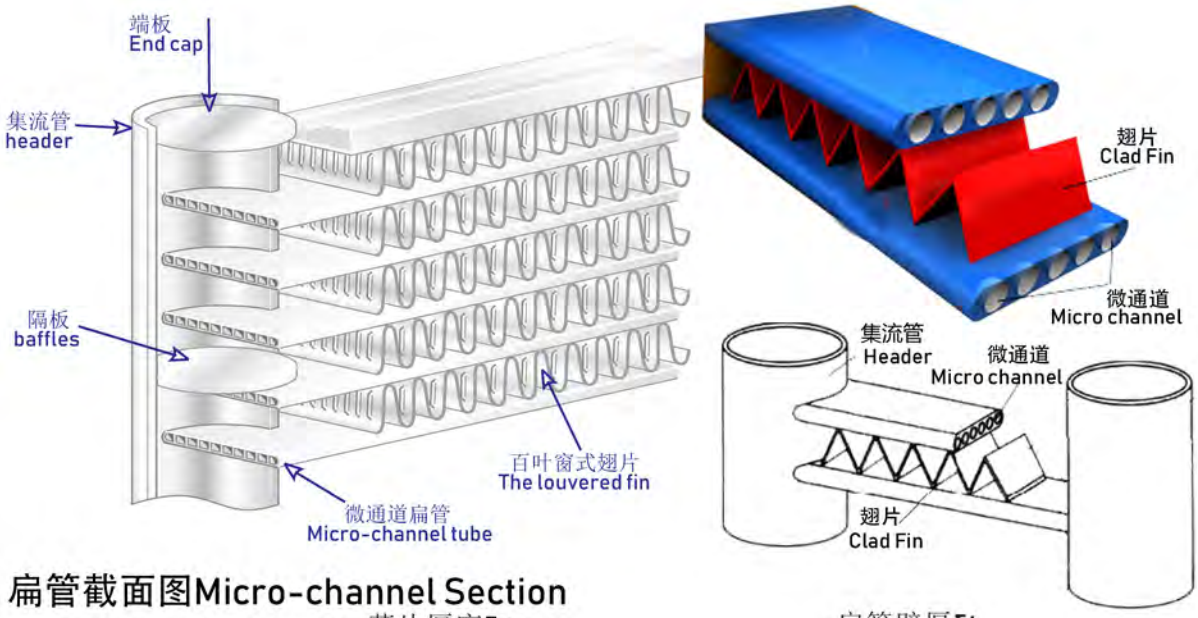
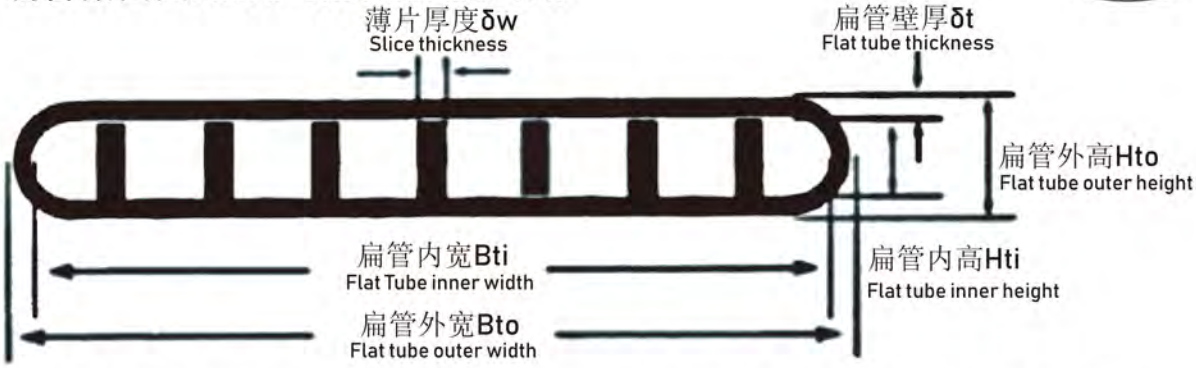
微通道换热器计算
Microchannel HEX calculation

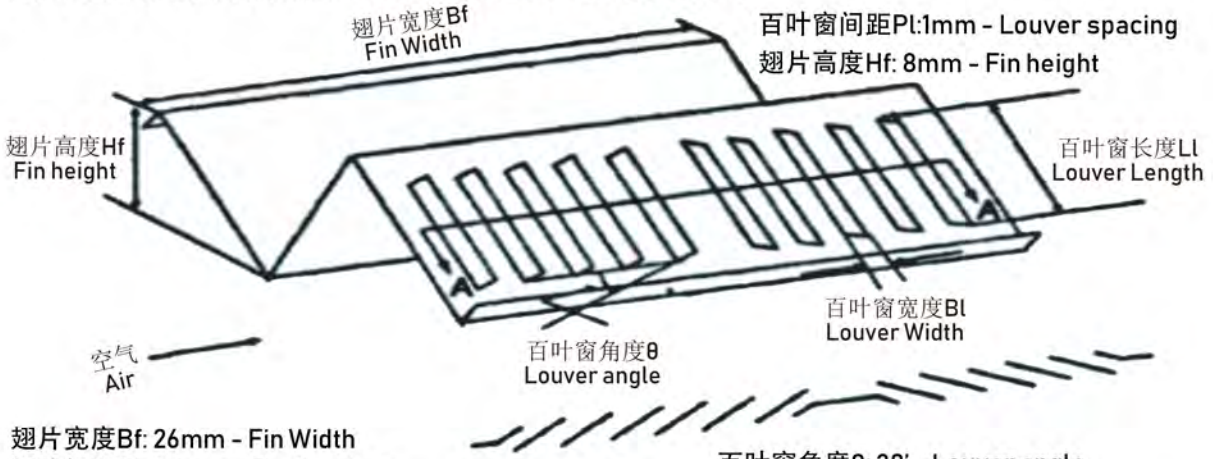


扁管截面图Micro-channel Section



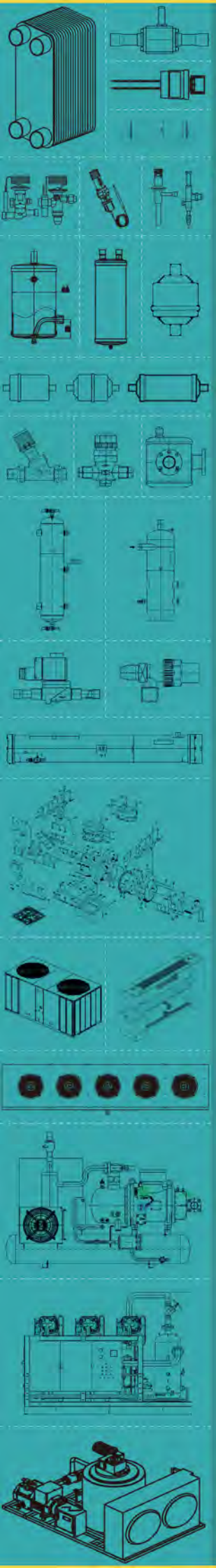
薄片数量Nw: 12 - Slice quantity　　换热器总长L: 1932mm - Total length of heat exchanger
铝扁管热导率λt: 237W/(m2.k)-Thermal Conductivity of Aluminum Flat Tube
扁管计算单位长度Lt: 30mm - Calculated Unit Length of Flat Tube
制冷剂侧传热系数ht: 1600W/(m2.k) - Heat transfer coefficient of refrigerant side

百叶窗式翅片截面图 the louvered fin section



翅片宽度Bf: 26mm - Fin Width
翅片间距Pf: 2.6mm -Fin Spacing
百叶窗长度Ll: 6mm - Louver Length
百叶窗宽度Bl: 1mm - Louver Width

百叶窗间距Pl:1mm - Louver spacing
翅片高度Hf: 8mm - Fin height
百叶窗角度θ: 30' - Louver angle
翅片厚度δf: 0.1mm - Louver thickness
铝的密度ρ: 2.7 - Aluminum density



肋片效率ηt
Fin efficiency

$$\sqrt{\frac{Hto*(Lt+\delta w)*ht}{\lambda t*\delta w*Lt*0.001}}=189.689056$$

$$\eta t=\frac{TANH(189.689056*\frac{Hto-2*\delta t}{500})}{189.689056*(Hto-2*\delta t)*0.005}=0.99638755$$

扁管的横截面积At - Section Area of Flat Tube

$$At=(Hto-2*\delta t)*(Bti-Hto+2*\delta t)+\pi*(Hto-2*\delta t)*(Hto-2*\delta t)/4=27.35$$

扁管的有效流通面积Ate - Effective Flow Area of Flat Tube

$$Ate=At-Nw*\delta w*(Hto-2*\delta t)=22.3343$$

扁管湿周Xt - Wetted perimeter of flat tube

$$Xt=\pi*(Hto-2*\delta t)+2*【Bti-(Hto-2*\delta t)-\delta w*Nw】+2*Nw*(Hto-2*\delta t)=68.73565$$

扁管水力直径Dt - Hydraulic diameter

$$Ate=4*Ate/Xt=1.29972169$$

直接热交换面积At1 - Direct heat exchange area

$$At1=2*[Bti-(Hto-2*\delta t)-\delta w*Nw]*Lt+\pi*Lt*(Hto-2*\delta t)=1270.0695$$

间接热交换面积At2 - Indirect heat exchange area

$$At2=2*(Hto-2*\delta t)*Nw*Lt=792$$

总换热面积At0 - Total heat exchanger area

$$At0=At1+At2*\eta t=2059.20844$$

迎风面积Af - Frontal Area

$$Af=(Hf+Hto)*Lt=300$$

空气被扁管阻挡的面积Af1
Area of air blocked by flat tubes

$$Af1=(Hf+Hto)*Lt=60$$

空气被翅片阻挡的面积Af2
The area of air blocked by fins

$$Af2=\frac{Lt}{Pf}*[Hf*\delta f+(Pf-\delta f)*\delta f]=12.11538$$

有效迎风面积Afe
Effective windward area

$$Afe=Af-Af1-Af2=227.88$$

空气流过扁管及翅片的湿周Xa
Wetted perimeter of air flowing through flat tubes and fins

$$Xa=2*[\frac{Lt}{Pf}*(Hf-\delta f)+Lt-Lt*\frac{\delta f}{Pf}]=240$$

翅片侧的水力直径Df
Hydraulic Diameter of Fin Side

$$Df=4*\frac{Afe}{Xa}$$

空气侧直接热交换面积Aa1
Direct Heat Exchange Area on Air Side

$$Aa1=[2*(Bto-Hto)*(1-\frac{\delta f}{Pf})+\pi*Hto]*Lt=1573.1$$

空气侧间接热交换面积Aa2
Indirect Heat Exchange Area on Air Side

$$Aa2=2*Bf*Lt*(Hf-\delta f)/Pf=4740$$

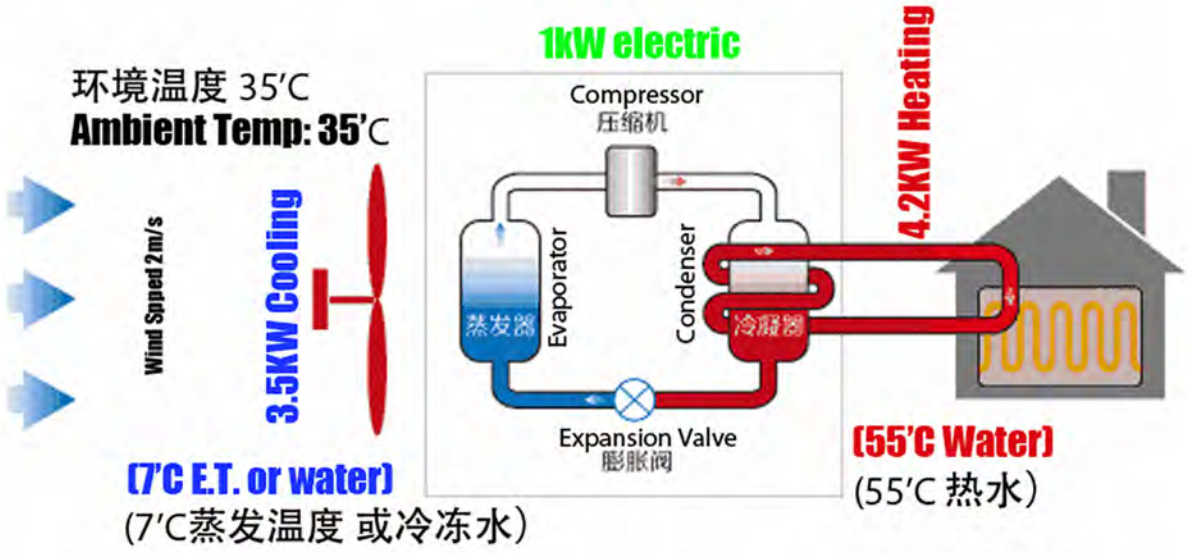
空气侧单元总传热面积Aa
Total heat exchanger on air side

$$Aa=Aa1+Aa2*\eta f=6069.23$$

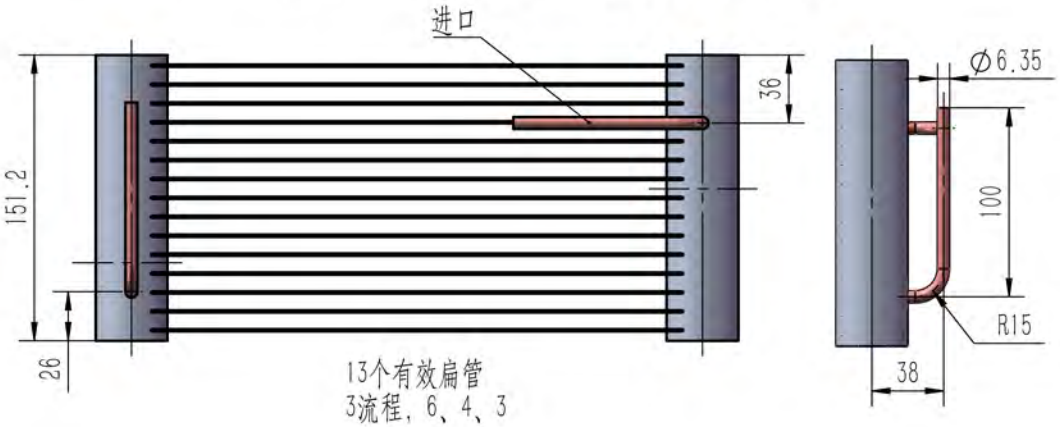
BOWA solution

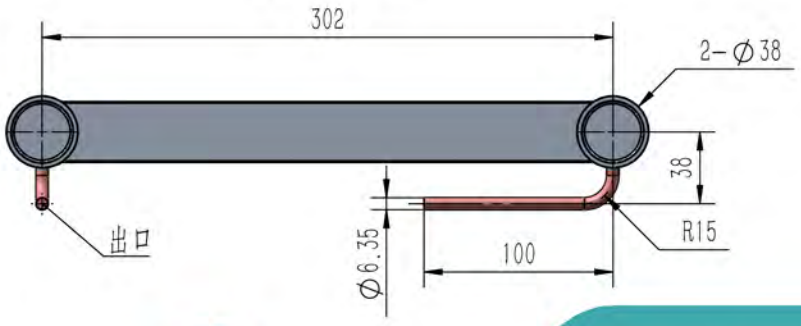
空调、热泵
Air conditoner, Heat Pump

Follow the laws of Conservation of energy
遵循能量守恒定律（热力学第一定律）

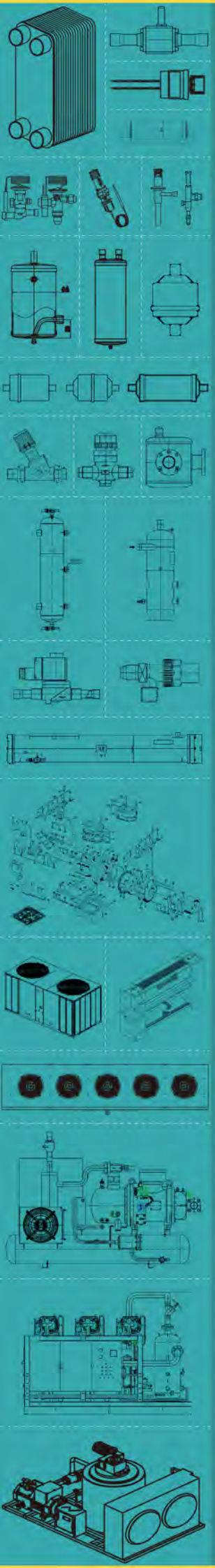


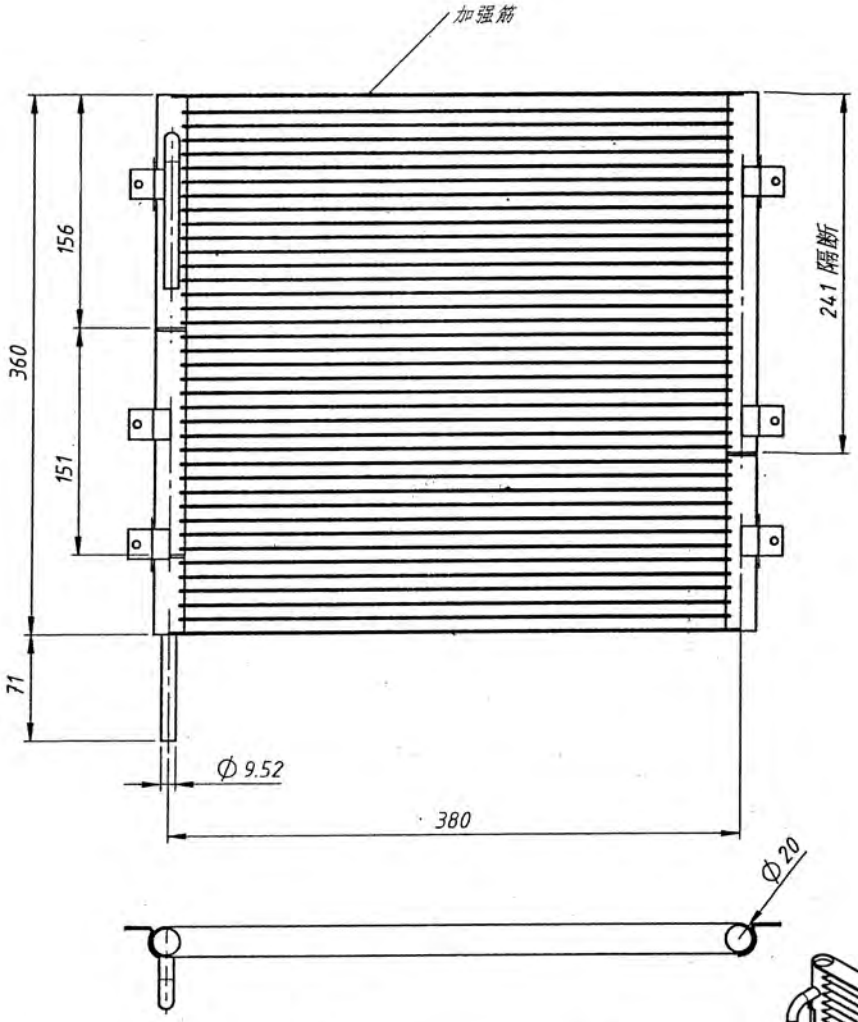
Heating Capacity= Cooling capacity + Compressor indicated power
制热量 = 制冷量 + 压缩机指示功率

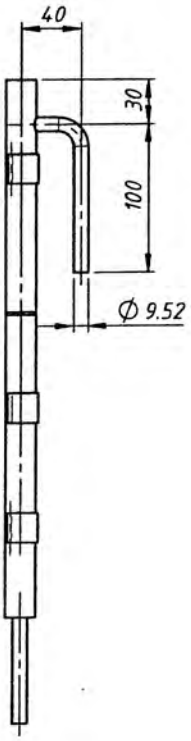




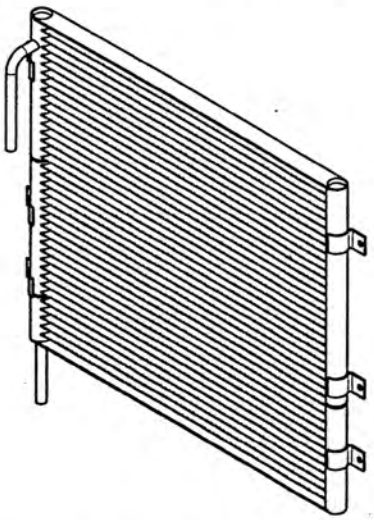
2.5KW Micro-channel Heat Exchanger

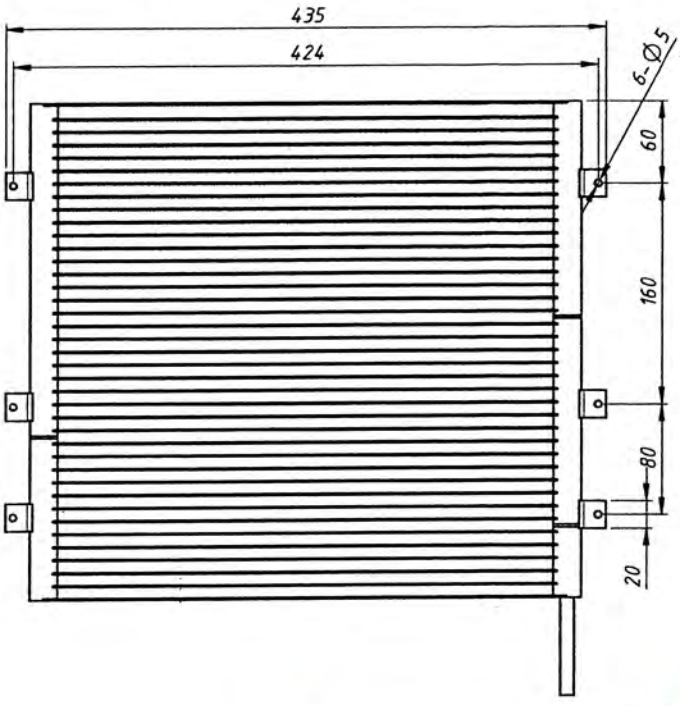






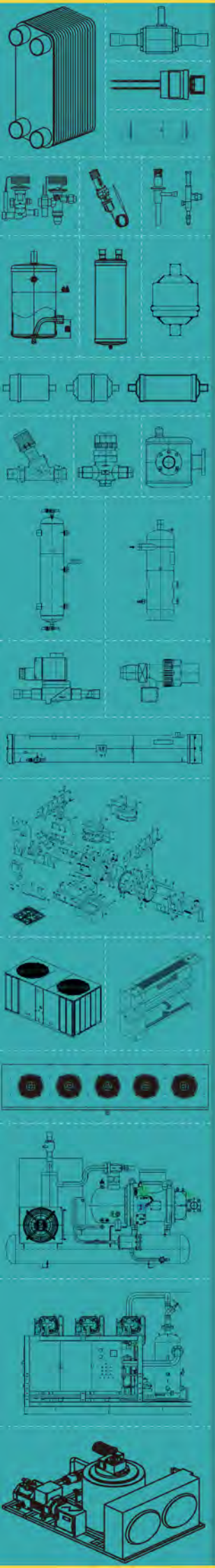
1.1KGS

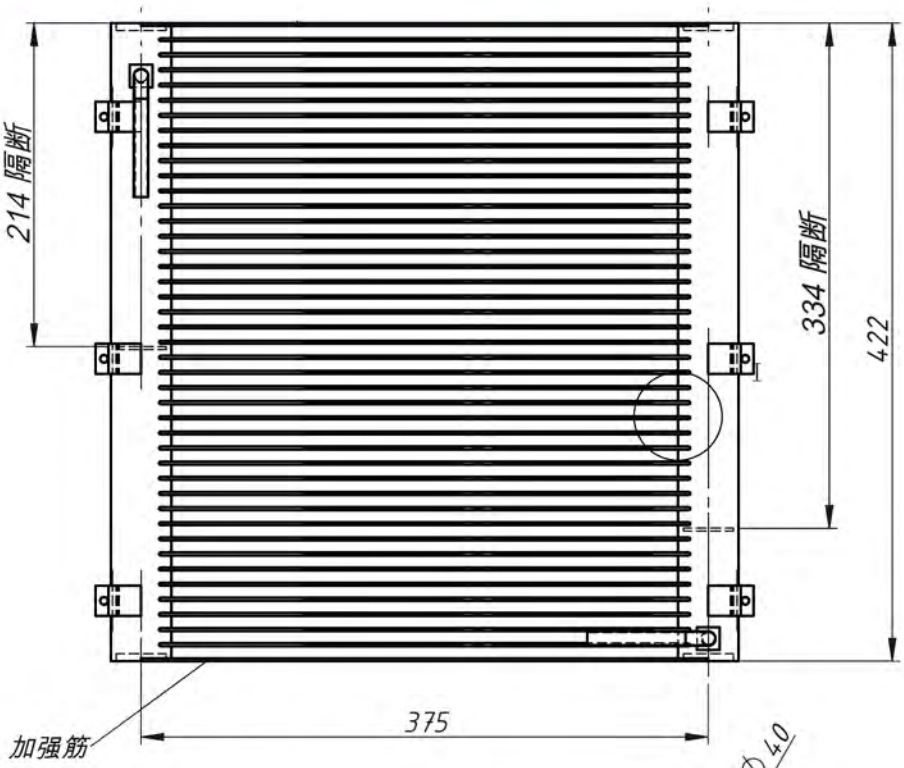


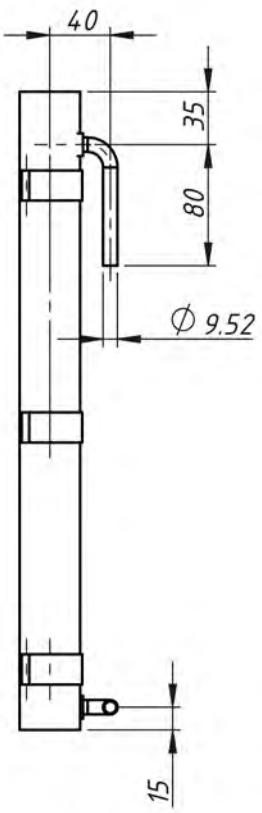


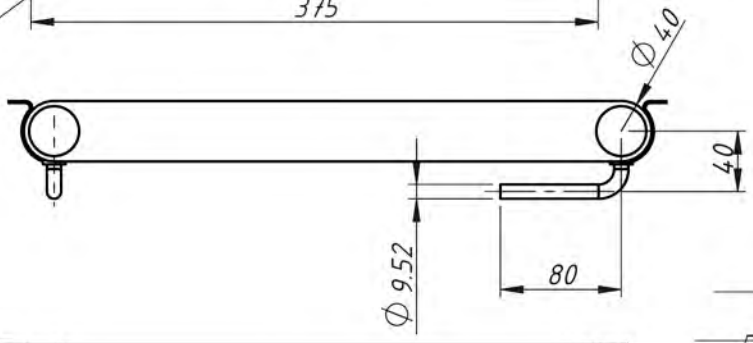
扁管规格16*1.3mm，16孔， 材质为A3102
翅片规格：16*8.1*0.08mm，开窗片，翅片峰距2.8mm
集液管规格20*1.15mm，孔间距9.4mm，中间按标注尺寸隔断

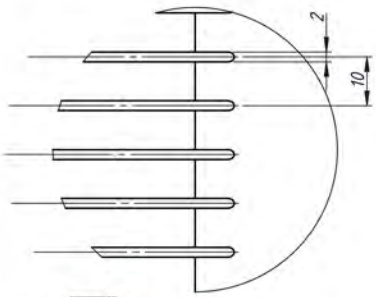
4.5KW Micro-channel Heat Exchanger

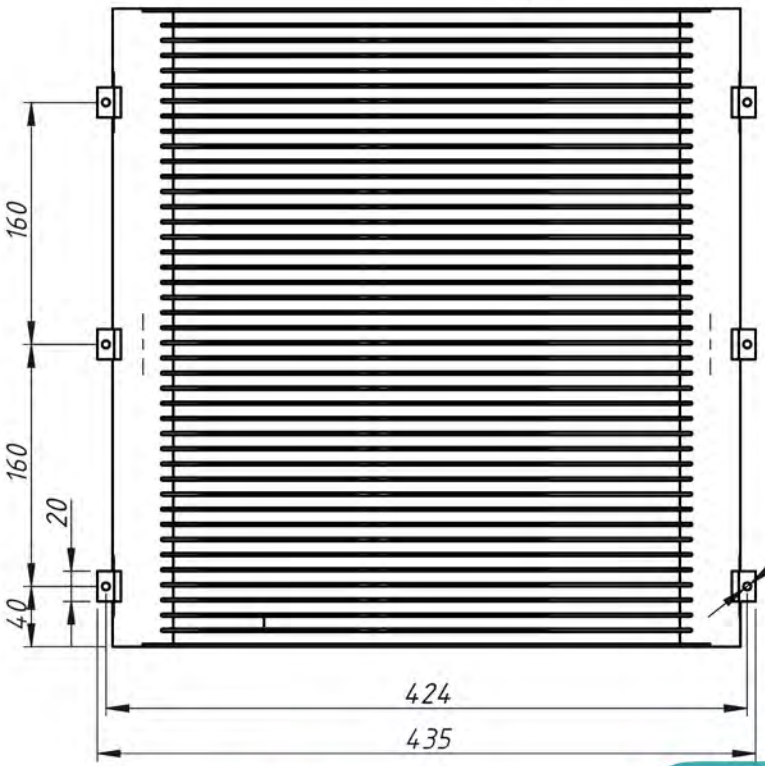


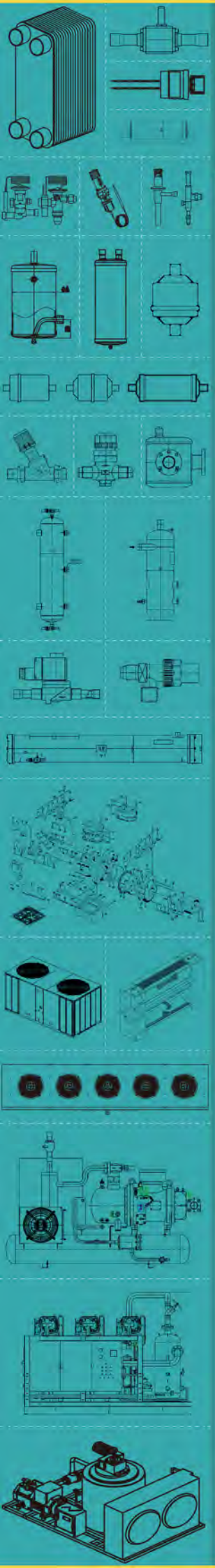






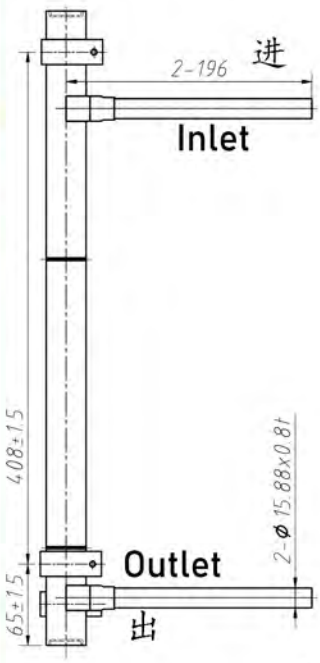




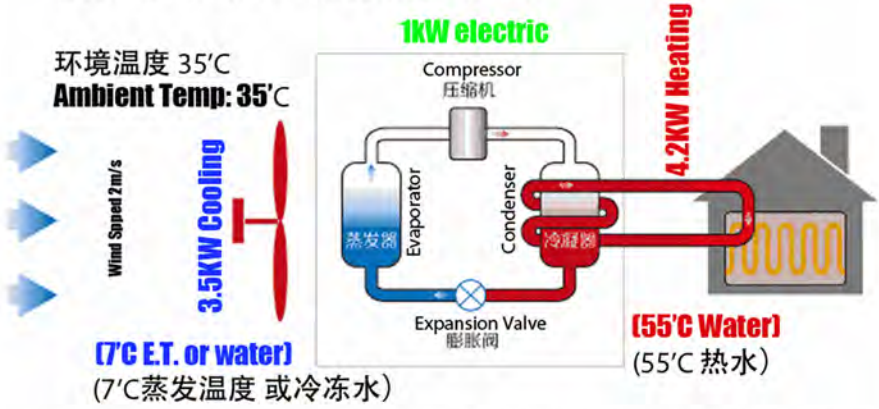


BOWA solution

空调、热泵
Air conditoner, Heat Pump



Follow the laws of Conservation of energy
遵循能量守恒定律（热力学第一定律）



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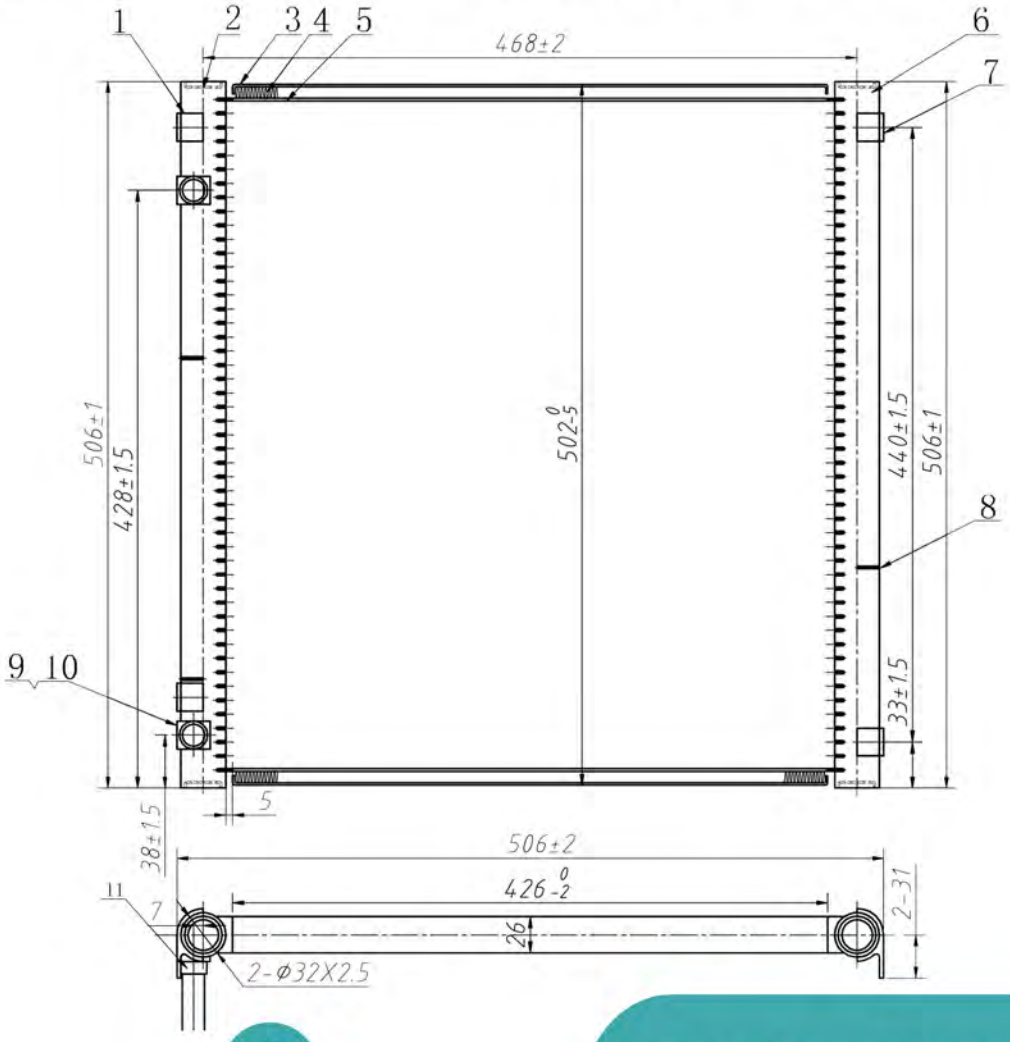
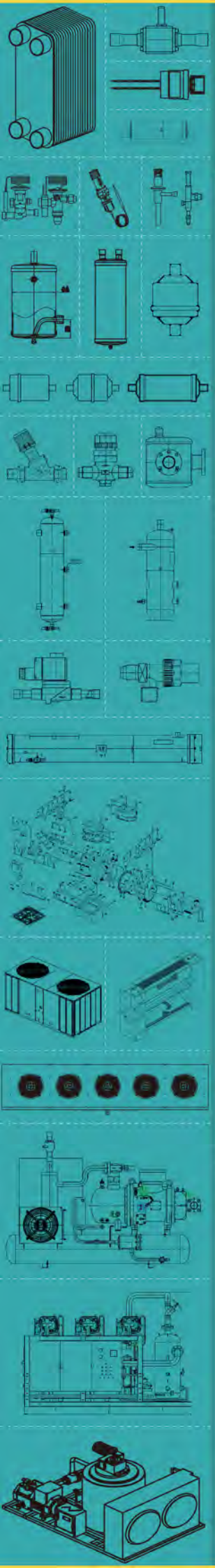
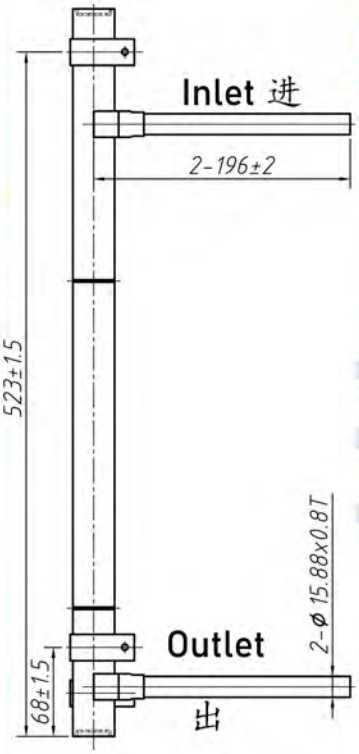
制热量 = 制冷量 + 压缩机指示功率







BOWA solution

空调、热泵
Air conditoner, Heat Pump

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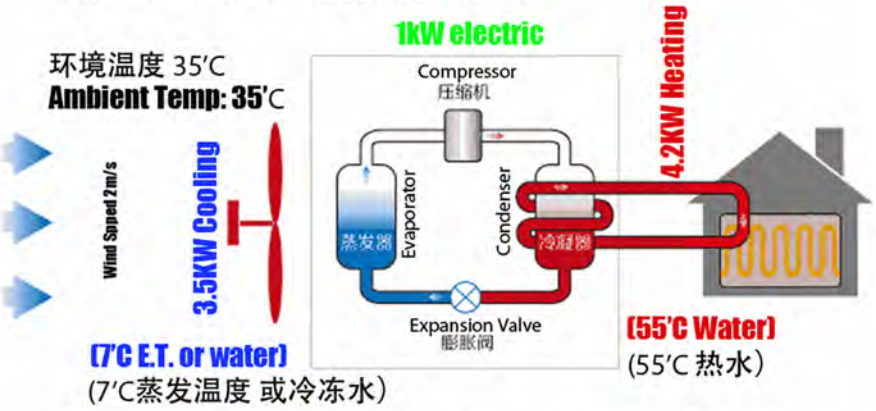
环境温度 35'C
Ambient Temp: 35'C



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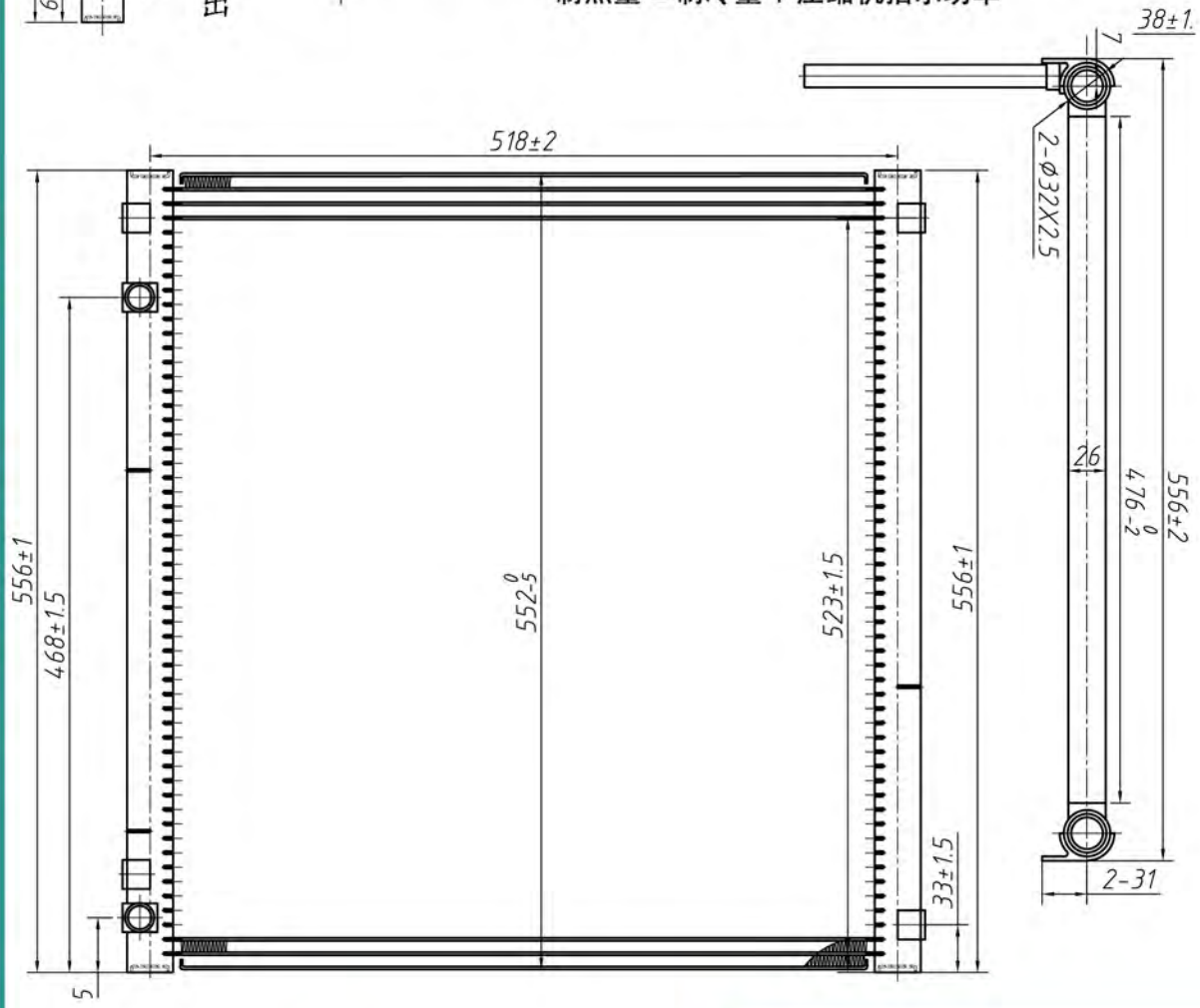

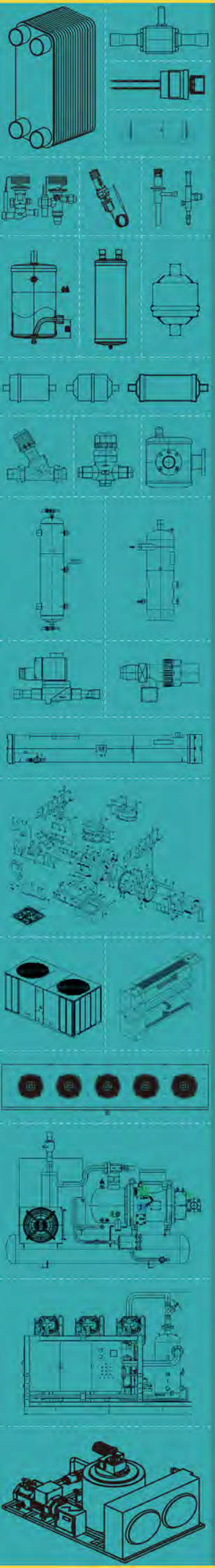

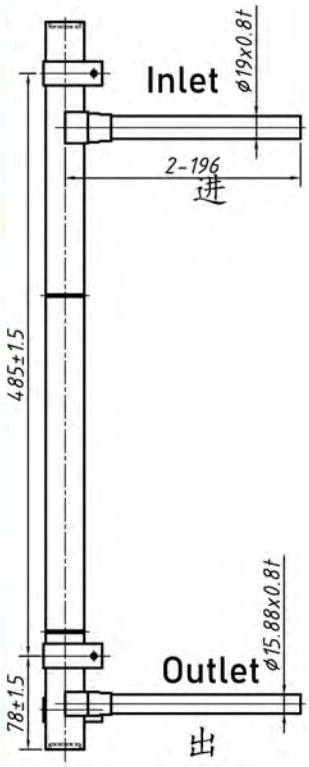

BOWA solution

空调、热泵
Air conditoner, Heat Pump

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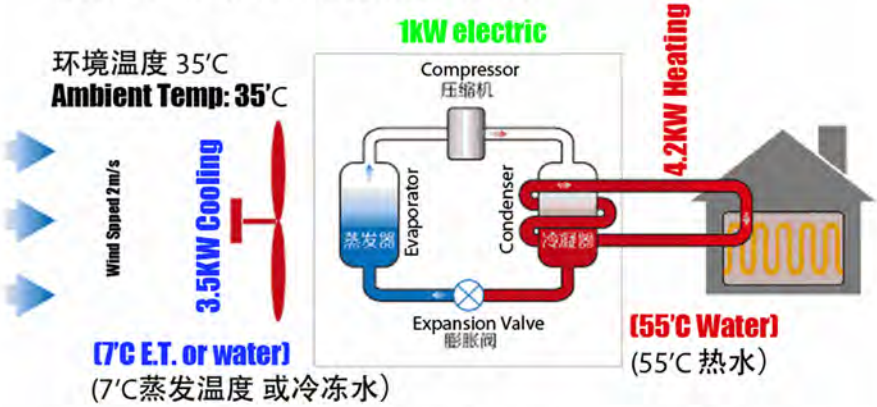

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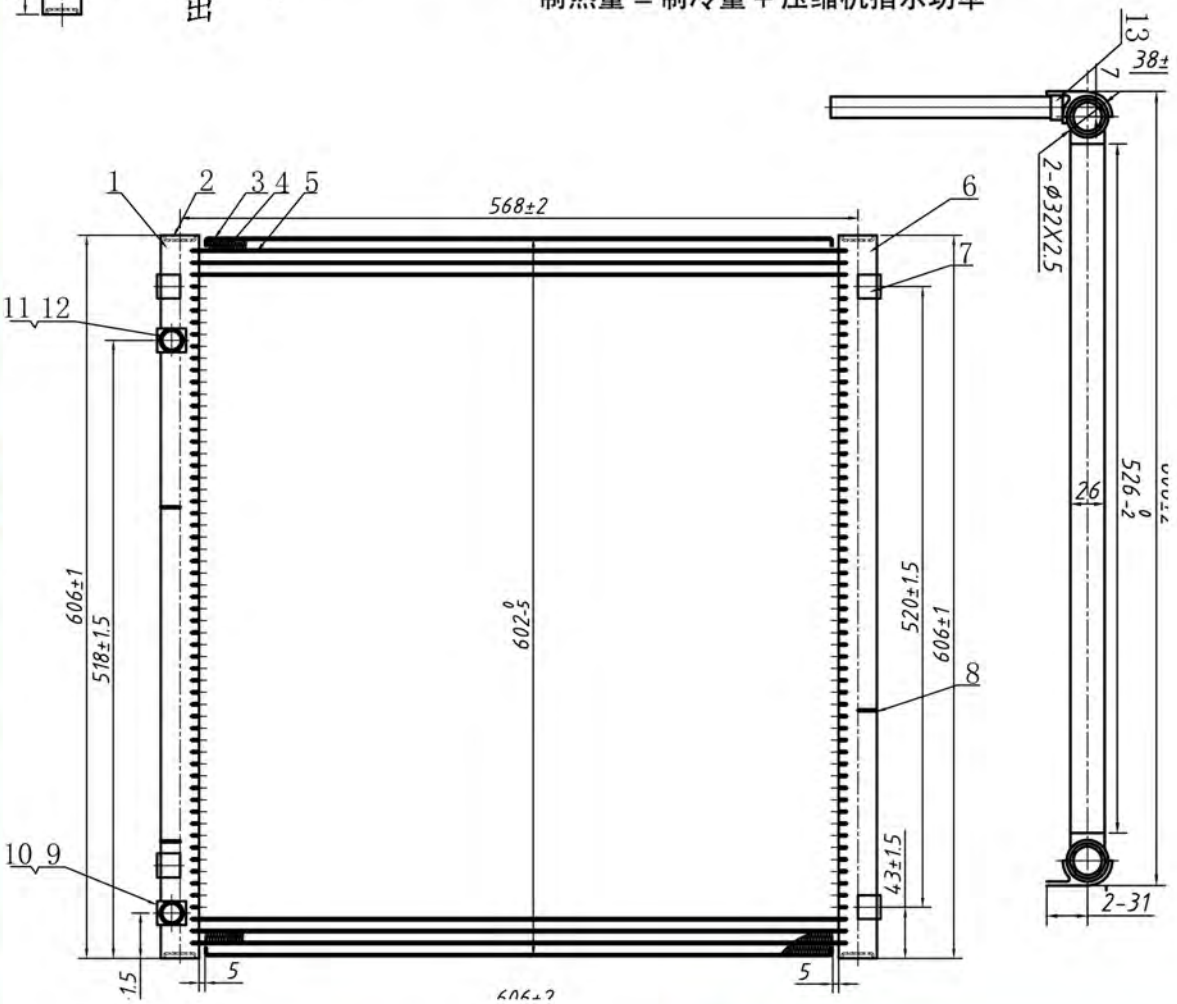

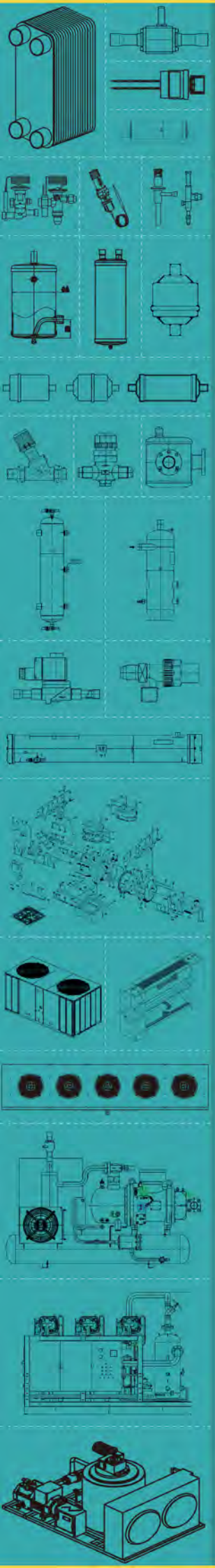

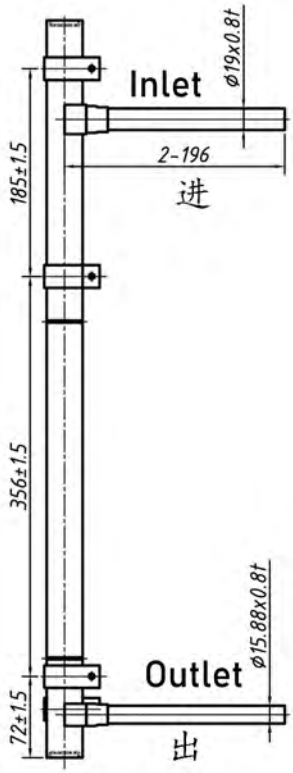

BOWA solution

空调、热泵
Air conditoner, Heat Pump

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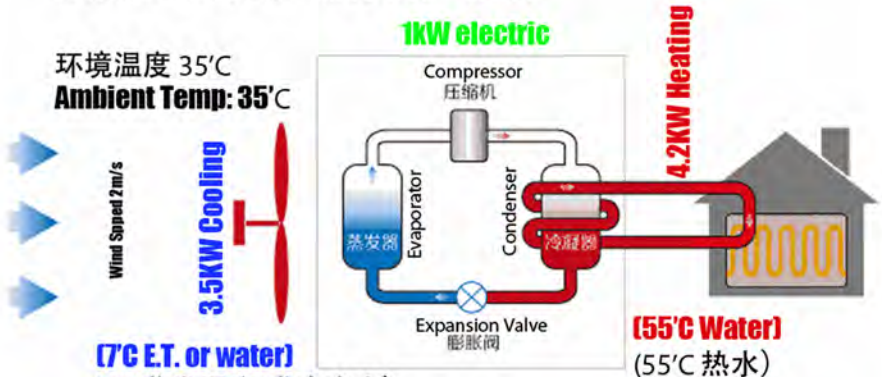

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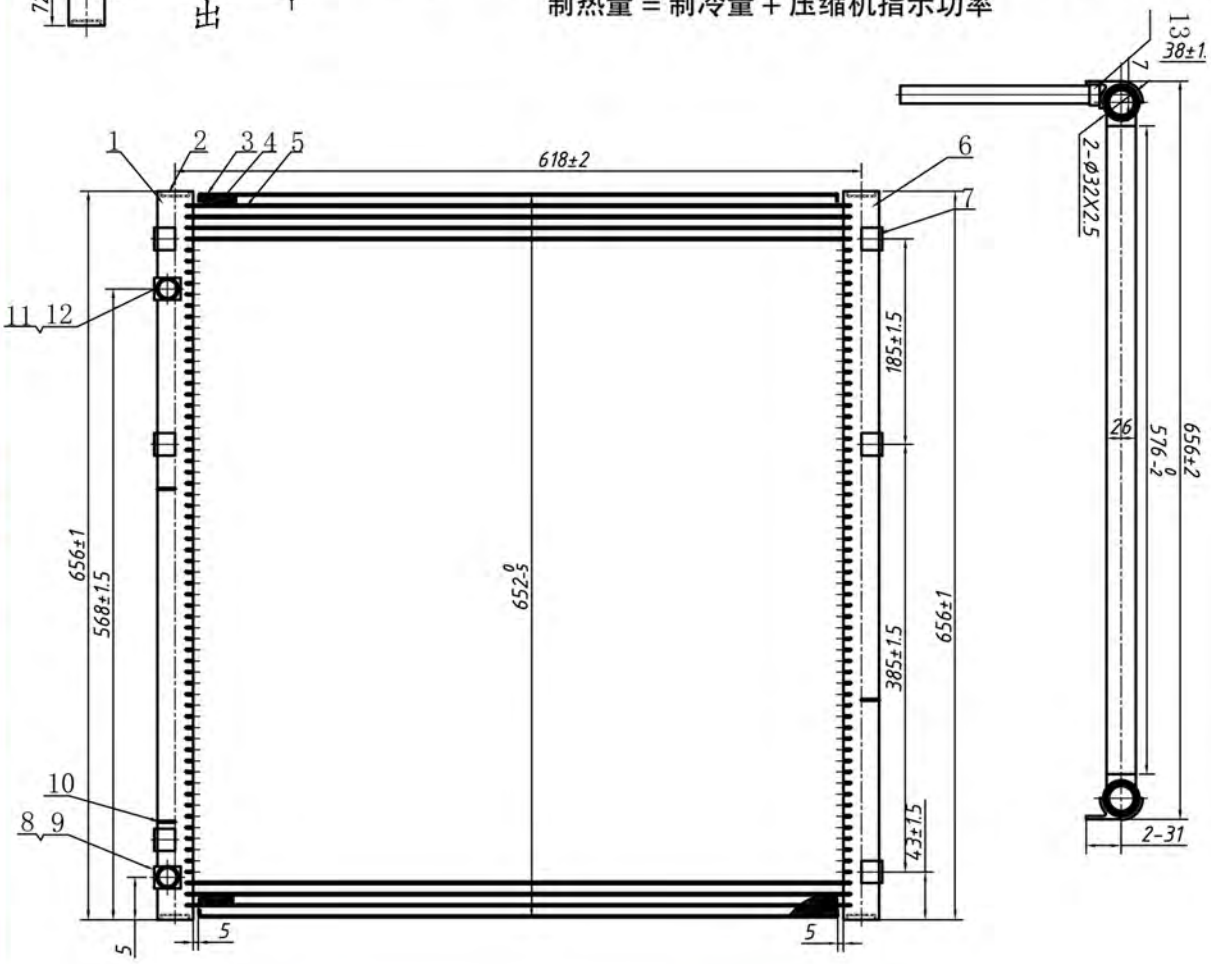

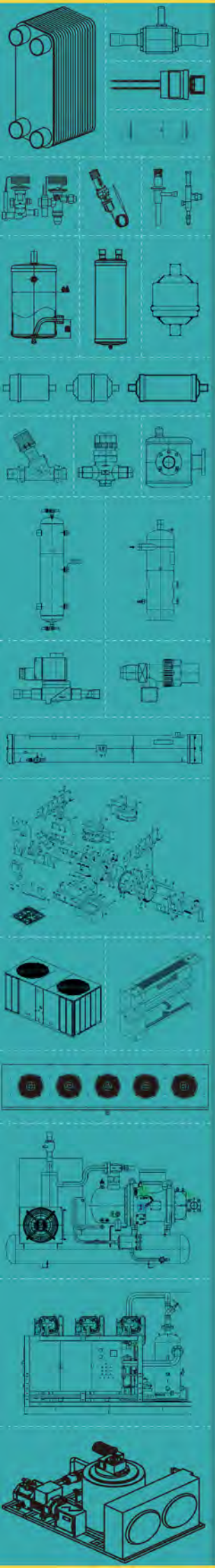

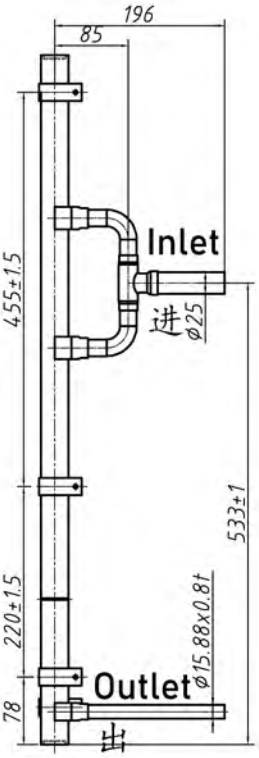

BOWA solution

空调、热泵
Air conditoner, Heat Pump

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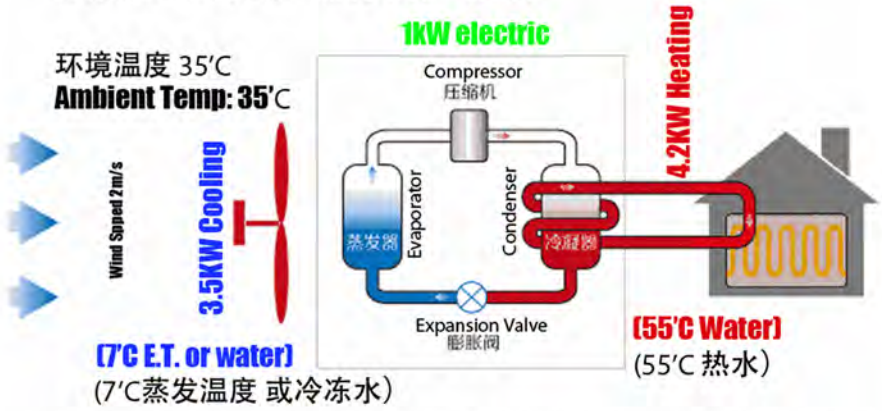
遵循能量守恒定律（热力学第一定律）



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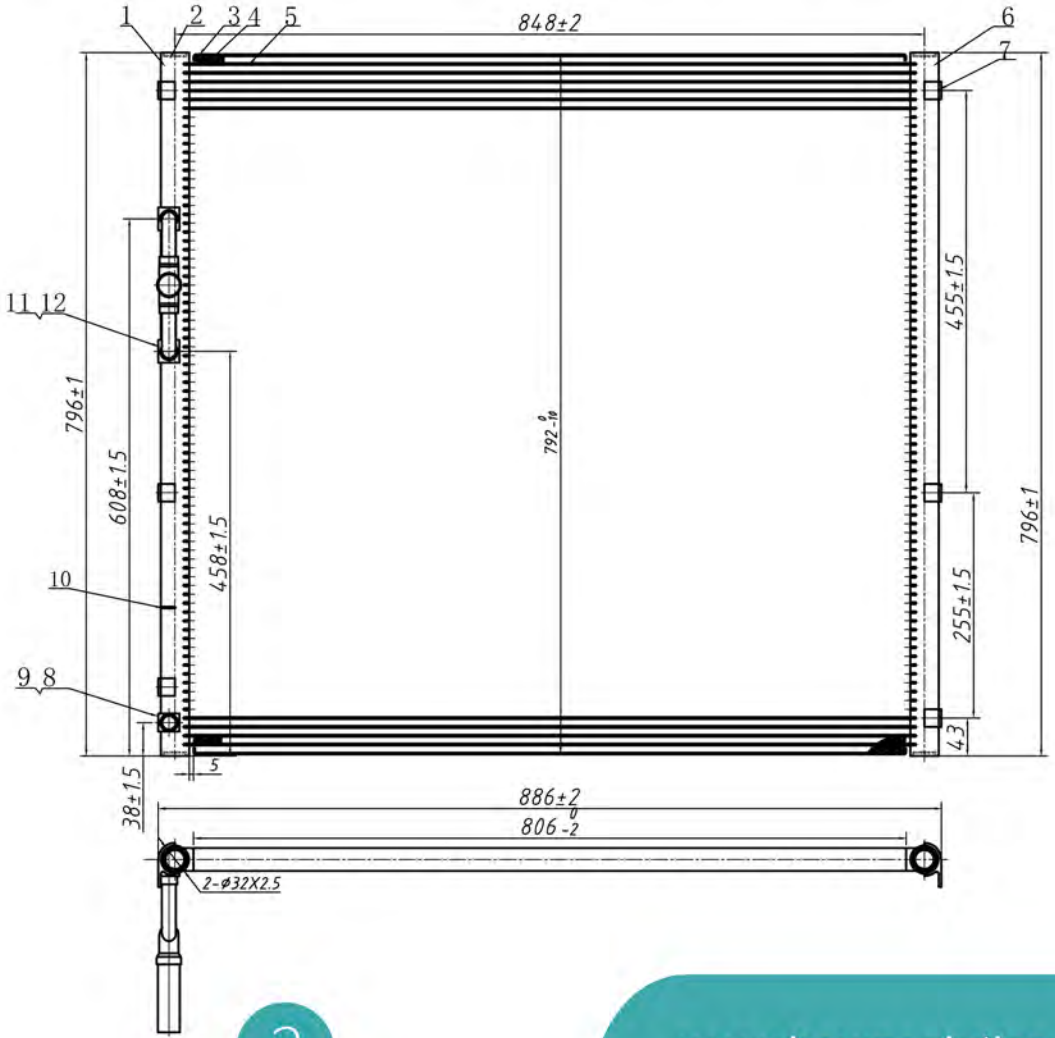
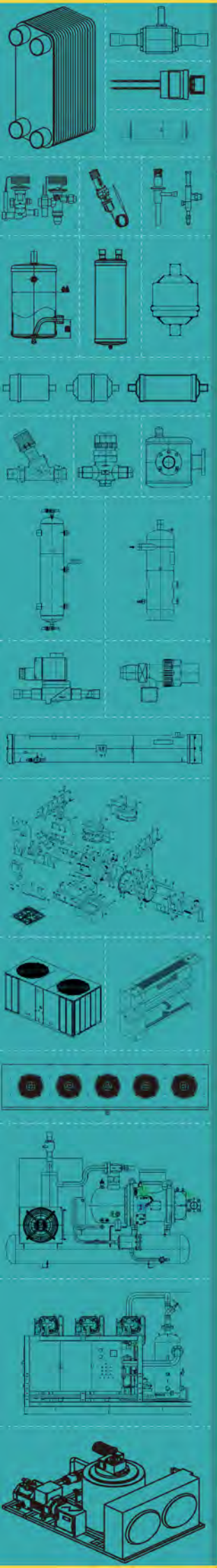
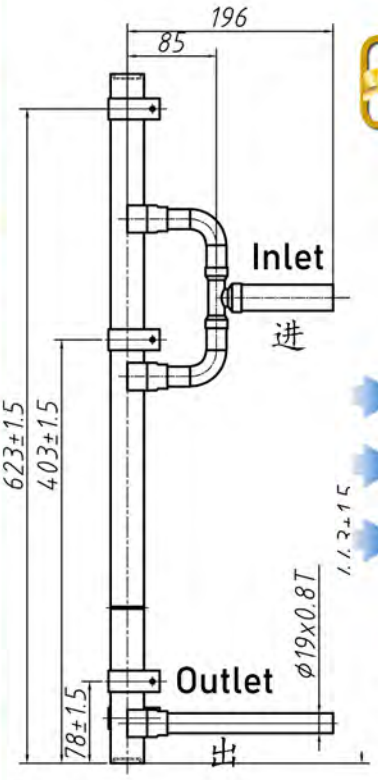




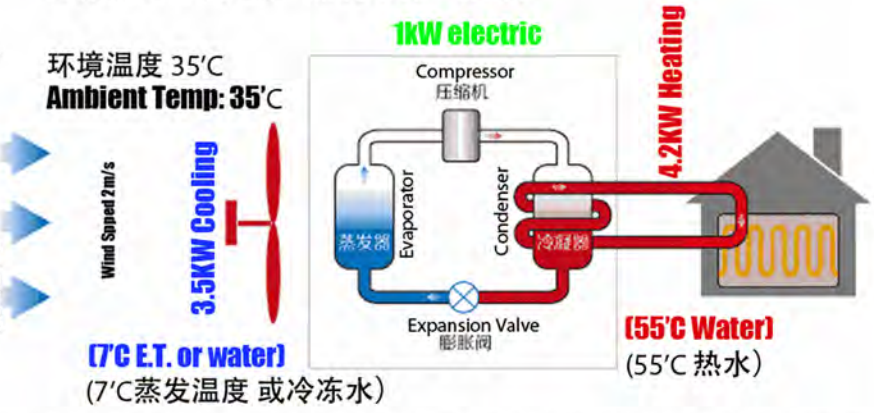


BOWA solution

空调、热泵
Air conditoner, Heat Pump

Follow the laws of Conservation of energy
遵循能量守恒定律（热力学第一定律）

环境温度 35'C
Ambient Temp: 35'C



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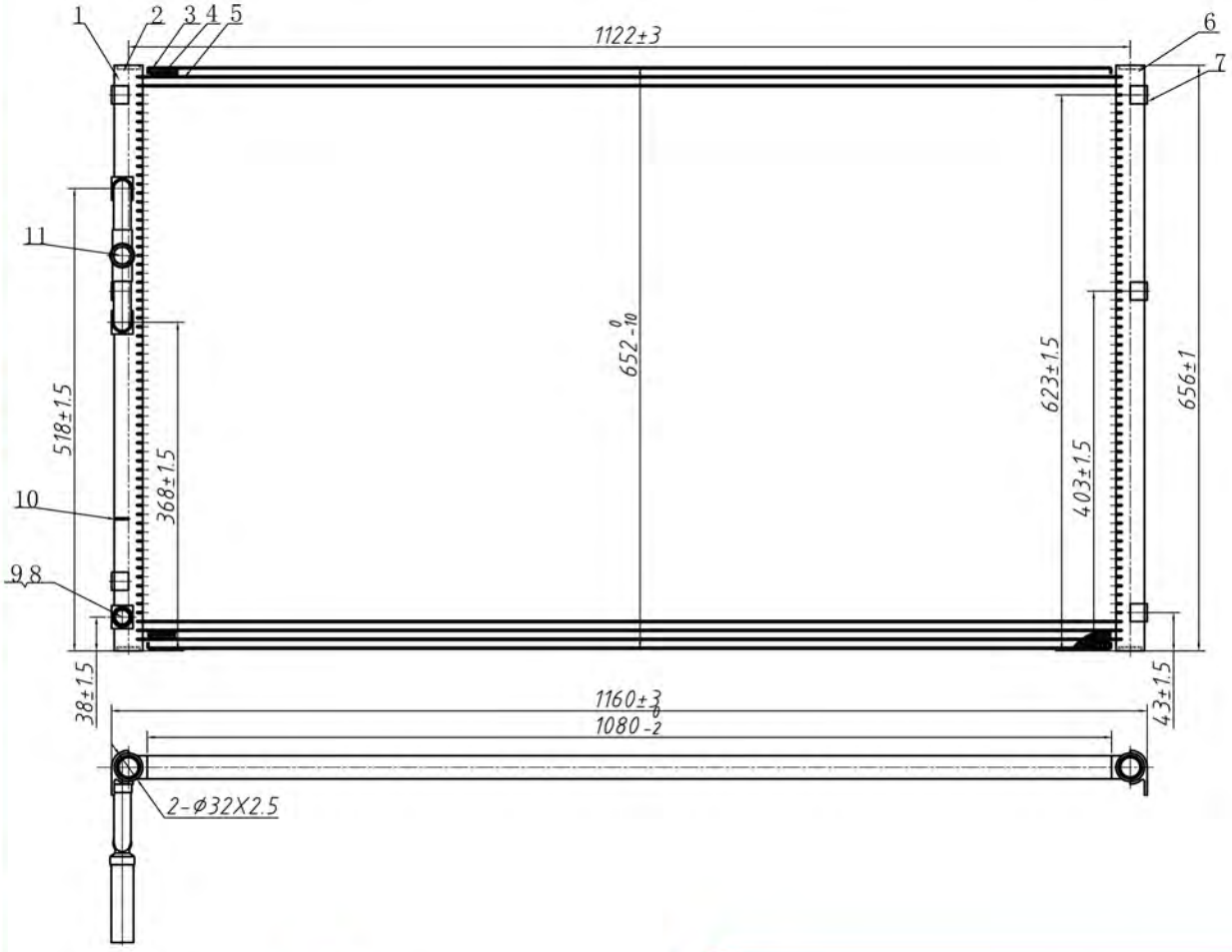
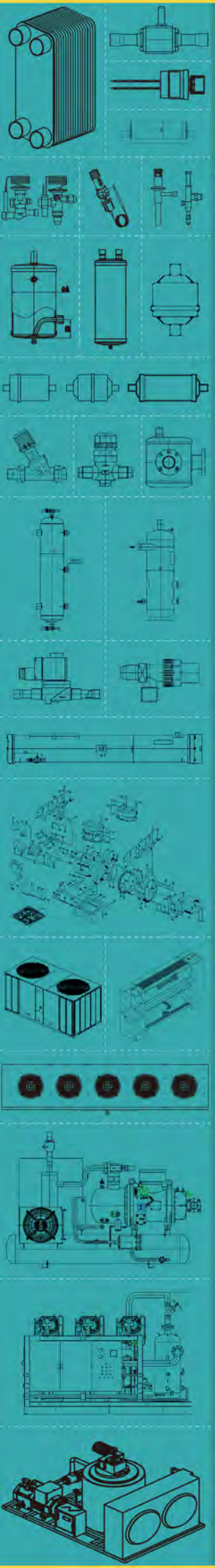
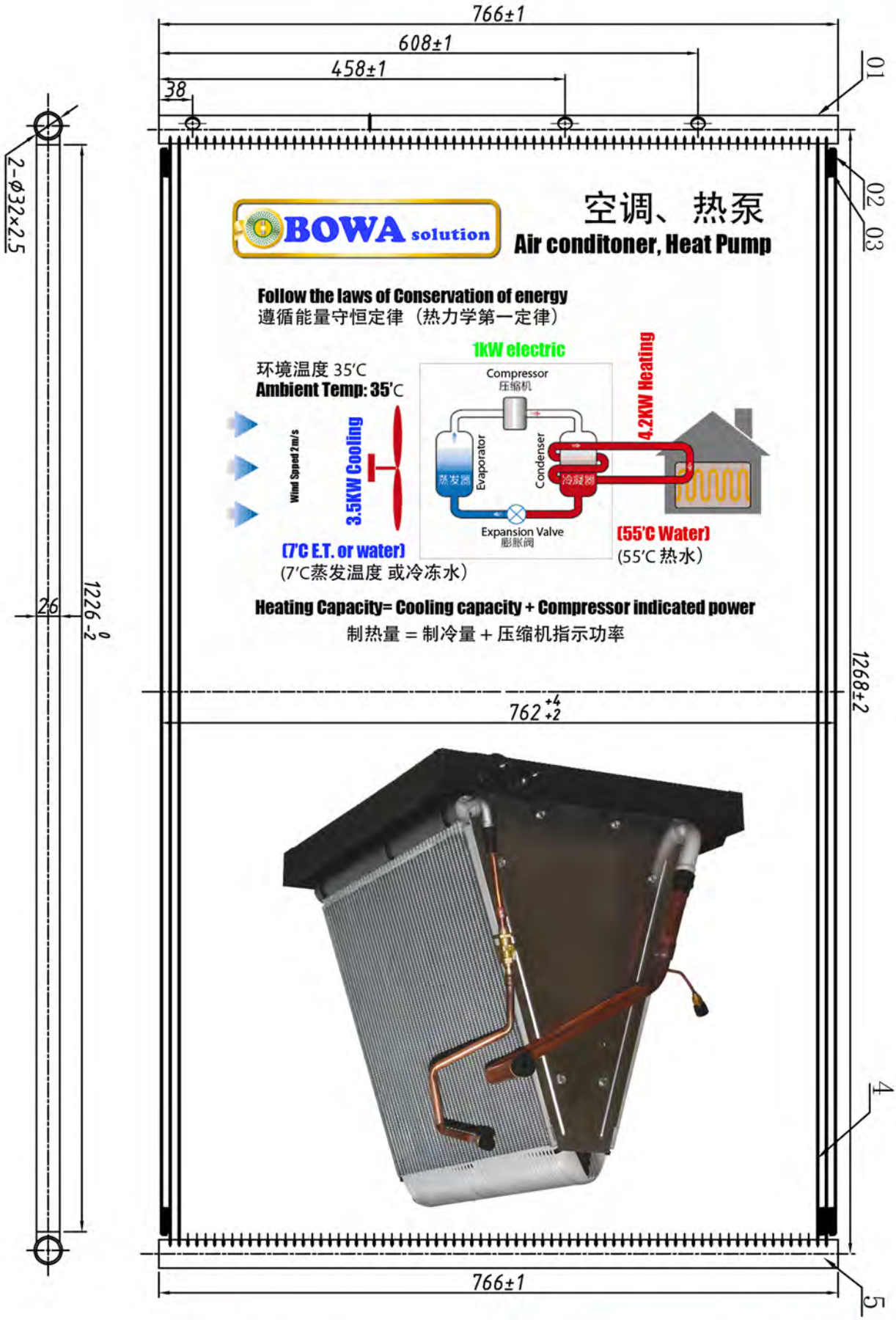
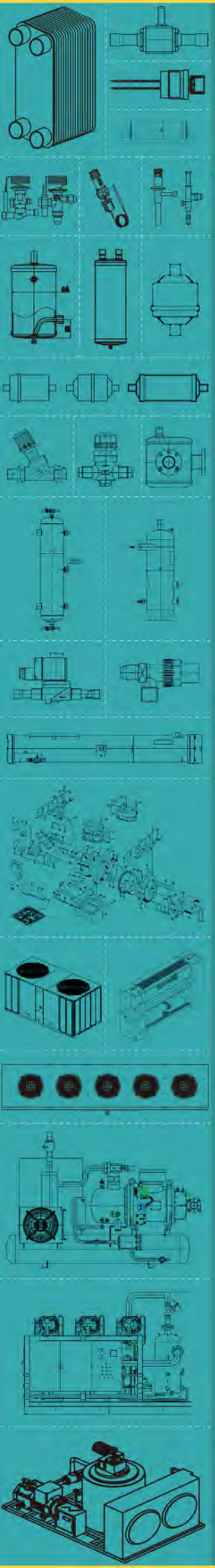
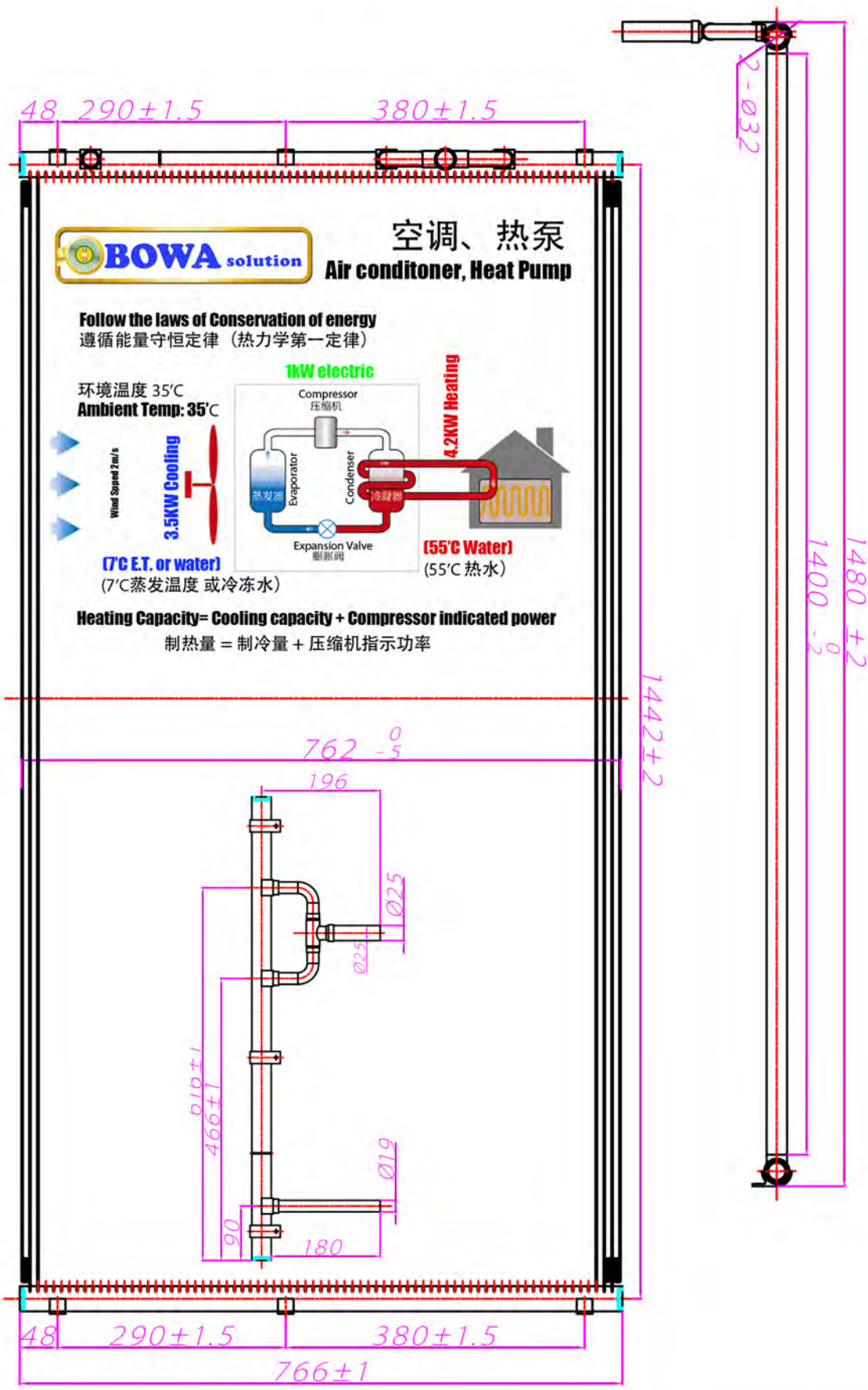
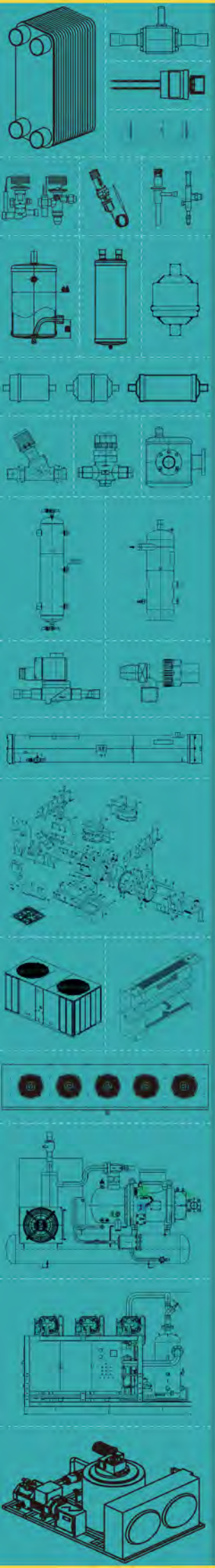


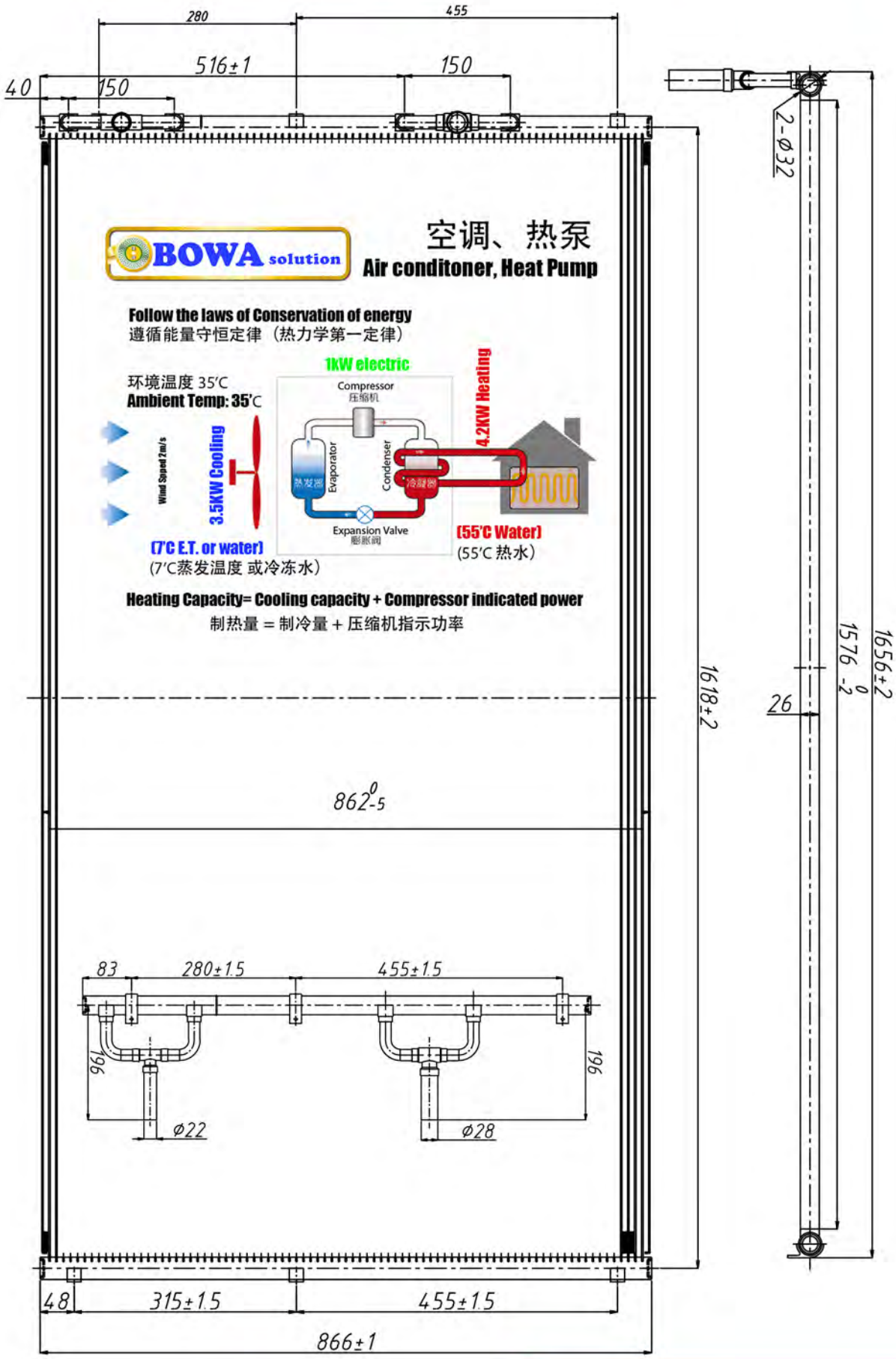


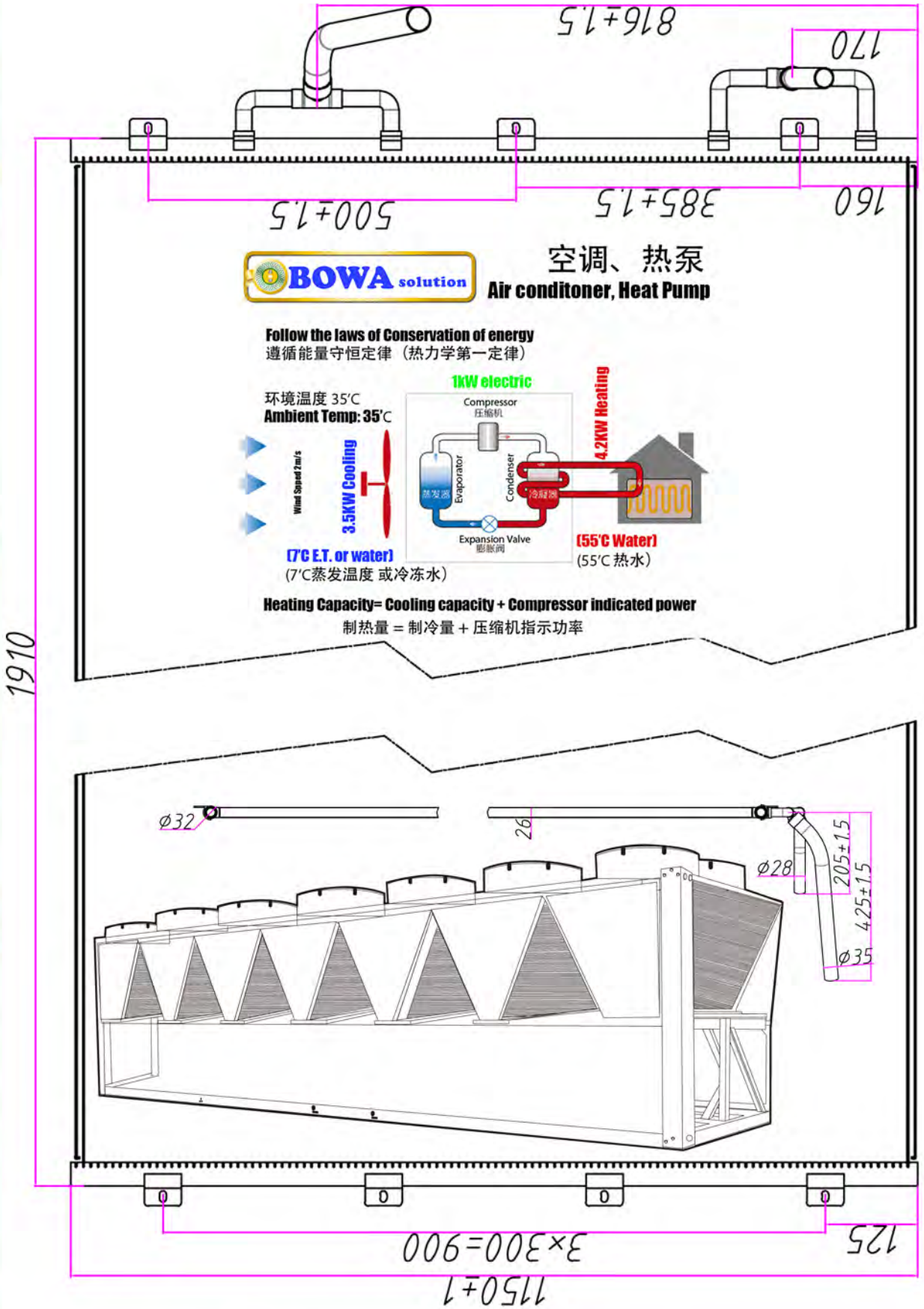

766±1
608±1
458±1
38
01
02
03
2-ø32×2.5
26
1226 -2
BOWA solution
空调、热泵
Air conditoner, Heat Pump
Follow the laws of Conservation of energy
遵循能量守恒定律（热力学第一定律）
环境温度 35'C
Ambient Temp: 35'C
Wind Speed 2m/s
3.5KW Cooling
(7'C E.T. or water)
(7'C蒸发温度 或冷冻水)
1kW electric
Compressor
压缩机
蒸发器
Evaporator
Condenser
冷凝器
Expansion Valve
膨胀阀
4.2KW Heating
(55'C Water)
(55'C 热水)
Heating Capacity= Cooling capacity + Compressor indicated power
制热量 = 制冷量 + 压缩机指示功率
762 +4 +2
1268±2
4
766±1
5




48
290±1.5
380±1.5
2-Ø32
BOWA solution
空调、热泵
Air conditoner, Heat Pump
Follow the laws of Conservation of energy
遵循能量守恒定律（热力学第一定律）
1KW electric
环境温度 35℃
Ambient Temp: 35℃
Compressor
压缩机
Wind Speed 2m/s
3.5KW Cooling
Evaporator
热发器
Condenser
冷凝器
4.2KW Heating
Expansion Valve
膨胀阀
(7℃ E.T. or water)
(7℃蒸发温度 或冷冻水)
(55℃ Water)
(55℃ 热水)
Heating Capacity= Cooling capacity + Compressor indicated power
制热量 = 制冷量 + 压缩机指示功率
1480 ±2
1400 -2
1442±2
762 -5
196
Ø25
Ø25
466±1
Ø19
90
180
48
290±1.5
380±1.5
766±1




280
455
516±1
150
40
150
2-Ø32
BOWA solution
空调、热泵
Air conditoner, Heat Pump
Follow the laws of Conservation of energy
遵循能量守恒定律（热力学第一定律）
1KW electric
环境温度 35'C
Ambient Temp: 35'C
Compressor
压缩机
4.2KW Heating
Wind Speed 2m/s
3.5KW Cooling
Evaporator
热发器
Condenser
冷凝器
Expansion Valve
膨胀阀
(7'C E.T. or water)
(7'C蒸发温度 或冷冻水)
(55'C Water)
(55'C 热水)
Heating Capacity= Cooling capacity + Compressor indicated power
制热量 = 制冷量 + 压缩机指示功率
1656±2
1576 -2
0
26
1618±2
862 -5
0
83
280±1.5
455±1.5
196
196
Ø22
Ø28
48
315±1.5
455±1.5
866±1


816±1.5
170
500±1.5
385±1.5
160
BOWA solution
空调、热泵
Air conditoner, Heat Pump
Follow the laws of Conservation of energy
遵循能量守恒定律（热力学第一定律）
1kW electric
环境温度 35'C
Ambient Temp: 35'C
Compressor
压缩机
4.2KW Heating
Wind Speed 2m/s
3.5KW Cooling
Evaporator
蒸发器
Condenser
冷凝器
Expansion Valve
膨胀阀
(7'C E.T. or water)
(7'C蒸发温度 或冷冻水)
(55'C Water)
(55'C 热水)
Heating Capacity= Cooling capacity + Compressor indicated power
制热量 = 制冷量 + 压缩机指示功率
1910
ø32
26
ø28
205±1.5
425±1.5
ø35
125
3×300=900
1150±1