

“热泵”是一种能从自然界的空气、水或土壤中获得低位热能，经过电能做功，提供可被人们所用的高位热能的装置。从周围环境中吸取热量，并把它传递给被加热的对象（温度较高的物体），其工作原理与制冷机相同，都是按照逆卡诺循环工作的，所不同的只是工作温度范围不一样。热泵在工作时，它本身消耗一部分能量，把环境介质中贮存的能量加以挖掘，通过传热工质循环系统提高温度进行利用，而整个热泵装置所消耗的功仅为输出功中的一小部分，因此，采用热泵技术可以节约大量高品位能源。

### 应用领域 Application Domain



**应用领域1：洗浴**  
热泵WHP产品规格齐全，可满足不同出水量的应用需求  
Application 1: Shower  
WHP models with a full line of specification cover different water amount demand



**应用领域2：厨卫**  
高出水温度，满足厨卫杀菌消毒卫生要求  
Application 2: Kitchen  
High outlet water temperature for sanitation and sterilization application

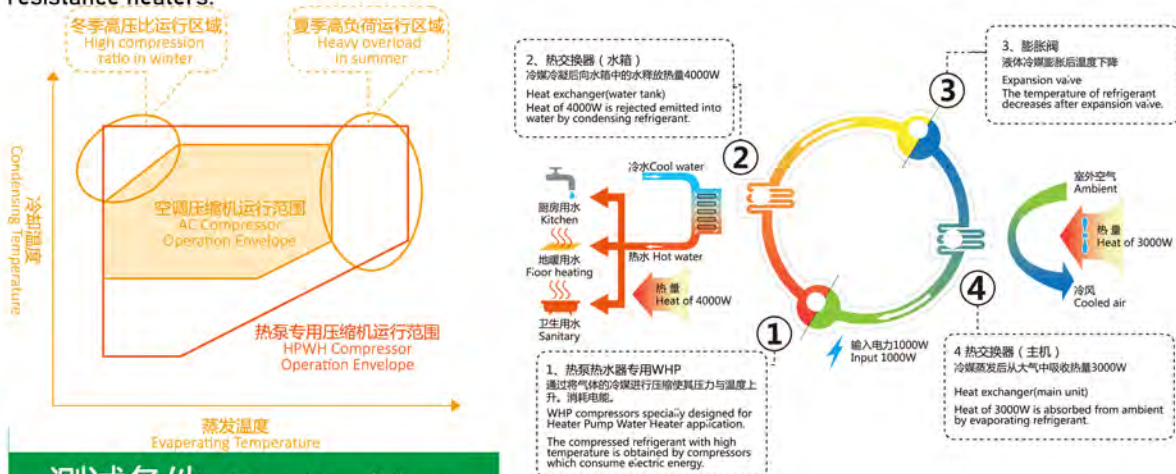


**应用领域3：地暖**  
高可靠性，满足冬季长时间恶劣工况运行  
Application 3: Floor heating  
High reliability for long time operation in winter.



**应用领域4：泳池**  
大规模压缩机设计，满足大制热量需求  
Application 4: Swimming pool  
high heating capacity model for large water flow rate application.

A heat pump is a device that provides heat energy from a source of heat to a destination called a "heat sink". Heat pumps are designed to move thermal energy opposite to the direction of spontaneous heat flow by absorbing heat from a cold space and releasing it to a warmer one. It uses some amount of external power to accomplish the work of transferring energy from the heat source to the heat sink. While air conditioners and freezers are familiar examples of heat pumps, the term "heat pump" is more general and applies to many HVAC (heating, ventilating, and air conditioning) devices used for space heating or space cooling. When a heat pump is used for heating, it employs the same basic refrigeration - type cycle used by an air conditioner or a refrigerator, but in the opposite side-releasing heat into the conditioned space rather than the surrounding environment. In this use, heat pumps generally draw heat from the cooler external air or from the ground. In heating mode, heat pumps are three to four times more efficient in their use of electric power than simple electrical resistance heaters. Typically installed cost for a heat pump is about 20 times greater than for resistance heaters.



### 测试条件 Test Conditions

项目 Model	标准工况 Standard Condition	夏季工况 Summer Condition	冬季工况 Winter Condition	额定工况 Rated Condition
蒸发温度 Evaporating Temp	10°C	15°C	0°C	7.2°C
冷凝温度 Condensing Temp	55°C	55°C	55°C	54.4°C
过冷度 Sub cooling Temp	8.3°C	8.3°C	8.3°C	8.3°C
回气温度 return gas Temp	20°C	25°C	10°C	35°C
周围温度 Ambient Temp	35°C	35°C	15°C	35°C
风速 Wind Speed	2m/s	2m/s	2m/s	2m/s

### 型号命名规则 Model Designation

**压缩机类型 Compressor Type**  
C = 定速 Constant Speed  
V = 变速 Variable Speed

**工作模式 Working Mode**  
1 = 单热 Single heating  
2 = 冷暖 Cooling & heating  
3 = 三联 3-in-1

**版本 Version**  
1 = 一体机 All-in-one  
2 = 分体式 Split Type

Z - C - 0015 - P - 1 - E - 1

**冷媒 Refrigerant**  
Z = R410a  
M = R134a  
L = R290  
Ha = R22/R417a  
N = R407c  
S = R404a

**Compressor Displacement**  
= cc/rev (家用 household)  
x 0.001 = m³/h (商用 Commerce)

**Power Supply**  
P 220~240V, 1P, 50Hz  
T 380~420V, 3P, 50Hz

无 None = 普通型 Common  
E = 带补气增焓 with EVI  
I = 喷液冷却 liquid injection  
B = 带补气增焓口和喷液冷却 with EVI & liquid injection



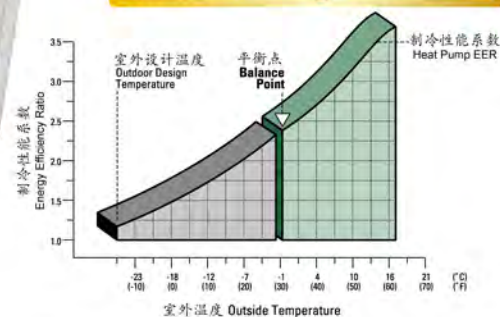
**Condenser**

$q_k = i - i_c$     kJ/kg  
   kcal/kg

$Q_k = G * q_k$     kJ/h  
   kcal/h

$Q_k = Q_0 + N_i$     kW

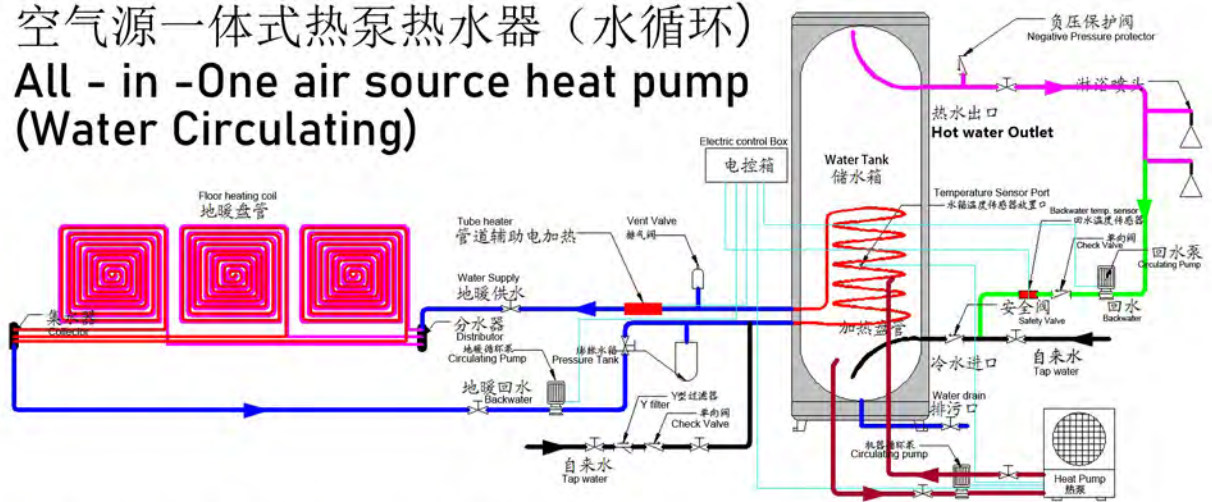
$q_k$  = 冷凝器单位理论散热量  
and energy transfer capacity of condenser  
 $Q_k$  = 冷凝器总理论散热量  
Total energy transfer capacity of condenser  
 $Q_0$  = 制冷量 Cooling Capacity  
 $G$  = 制冷剂流量 Refrigerant Flow Rate  
 $N_i$  = 压缩机指示功率 Compressor Indicated Power  
www.bowasolution.com  
Heat Exchanger Calculation 换热器计算



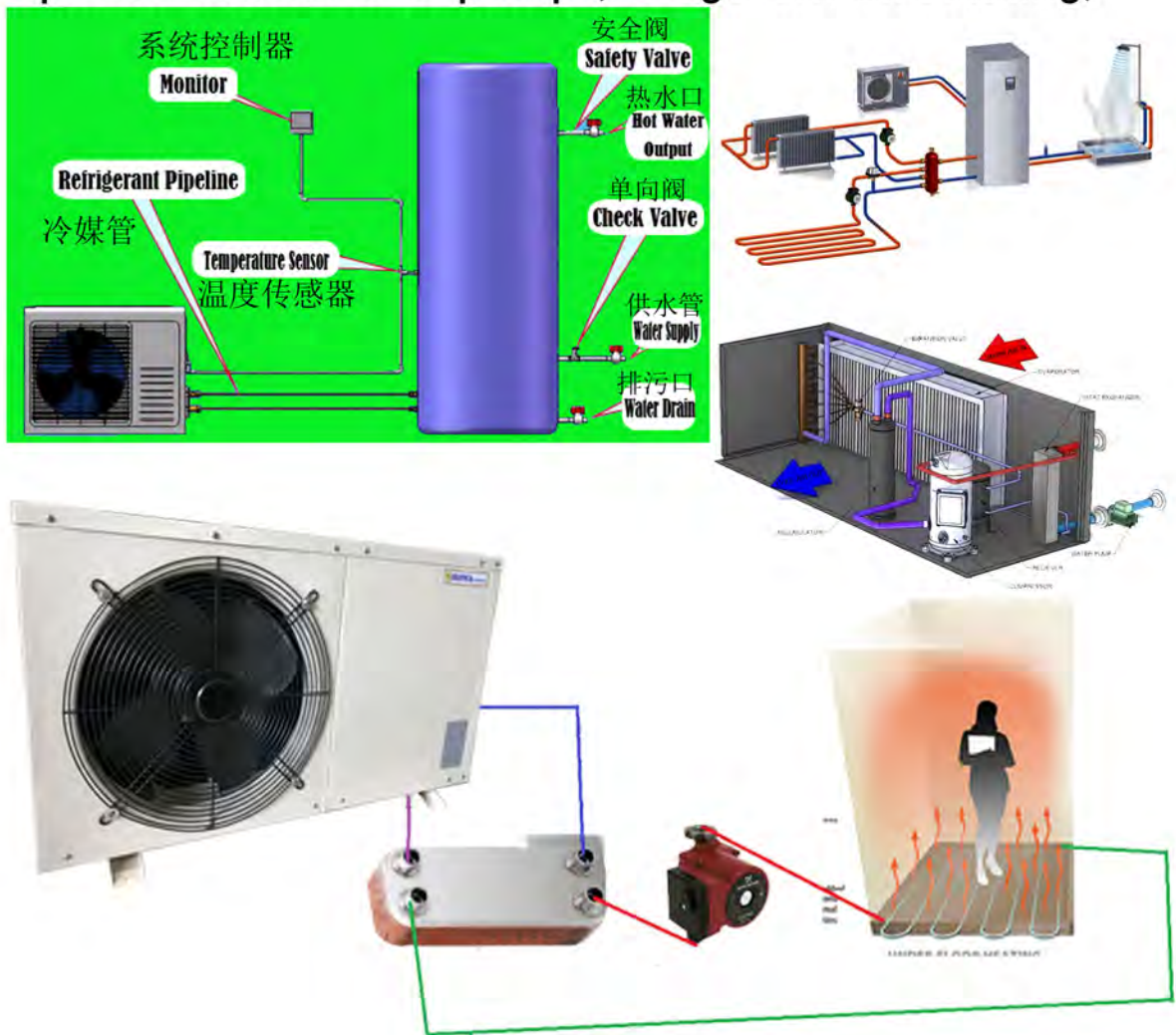
冷媒类型 Refrigerant Type:	R410a	R134a	R290	R22/R417a
电源 Power Supply:	220Vac, 1P, 50Hz			
压缩机排气量 Comp. displacement (cc/rev):	15.5	25	24	22
冷量 Cooling Capacity(KW):	3.7	2.9	3.55	3.74
COP:	2.9	2.69	3.3	3.05
最高出水温度(°C) Max. output temp.:	55	65	55	55

以上数据基于额定工况 All Data is basing on Rated Conditions

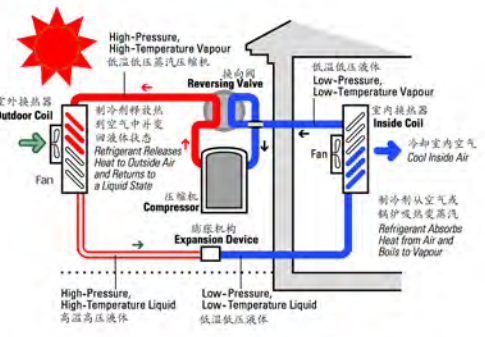
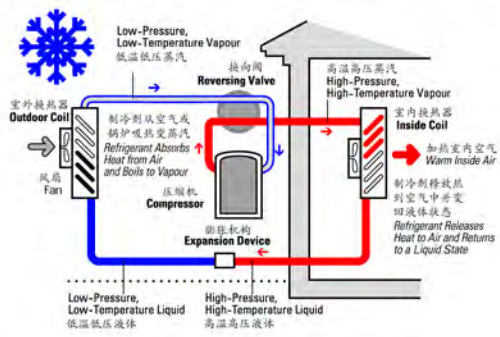
空气源一体式热泵热水器（水循环）  
All-in-One air source heat pump (Water Circulating)



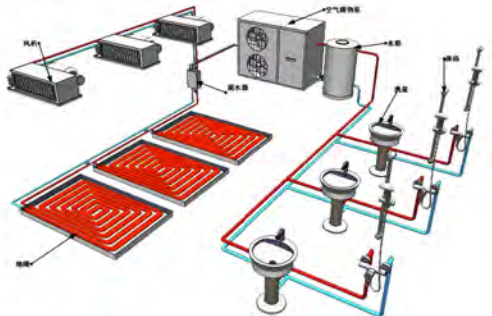
空气源分体式热泵热水器（氟循环）  
Split air source heat pump (refrigerant Circulating)



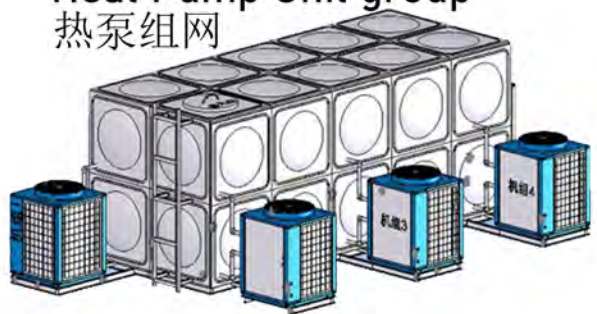
### 冷暖模式 Cooling/heating shift



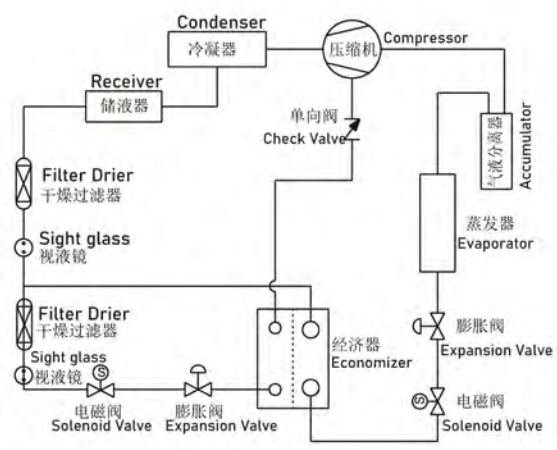
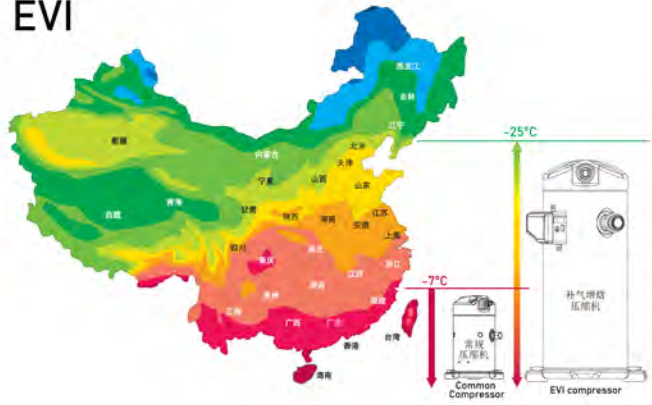
### 三联 3-in-1



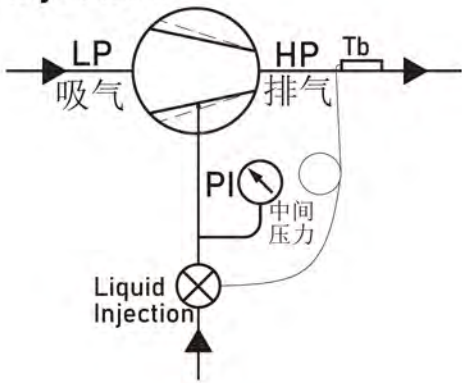
### Heat Pump Unit group 热泵组网



### 补气增焓 EVI



### 喷液冷却 Liquid Injection



**吸排气温度计算**  
Suction Temp. Calculation  
Discharge Temp. Calculation

$$T_2 = T_1 \times \left( \frac{P_2}{P_1} \right)^{\frac{K-1}{K}}$$

$T_2$ : Discharge Temp. 排气温度  
 $T_1$ : Suction Temp. 吸气温度  
 $P_2$ : Discharge Pressure 排气压力  
 $P_1$ : Suction Pressure 吸气压力  
 $K$ : Adiabatic index 绝热指数  
气体的绝热指数

$$K = \frac{C_p}{C_v}$$

$C_p$ : Constant-Pressure Specific Heat 定压比热容  
 $C_v$ : Constant-Volume Specific Heat 定容比热容

a. 制冷剂冷却压缩机加温升温范围大至15-45°C  
Recirculating cooling compressor motor lead to 15-45°C temperature rise.  
b. 润滑油喷入压缩机, 吸收热量, 降低排气温度  
Lubricant oil is injected to compressor to absorb heat to decrease discharge temperature.

**Compressor** Compressor Temp. 压缩机温度