双吸气双排气压缩机及其应用

张 利

上海海立电器有限公司

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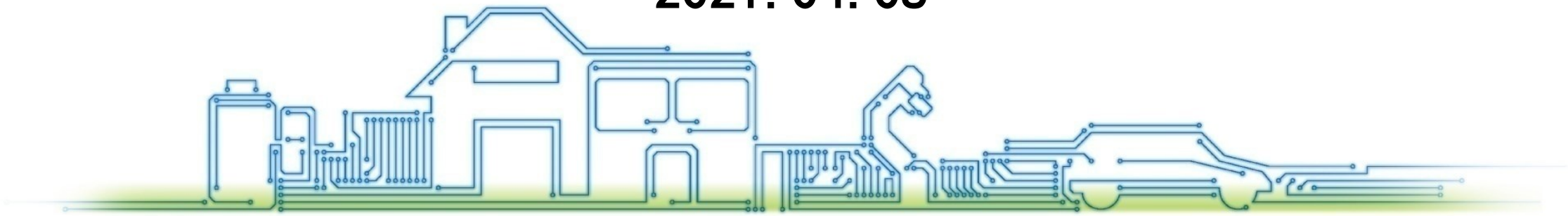

- **双吸气单排气压缩机及其应用**
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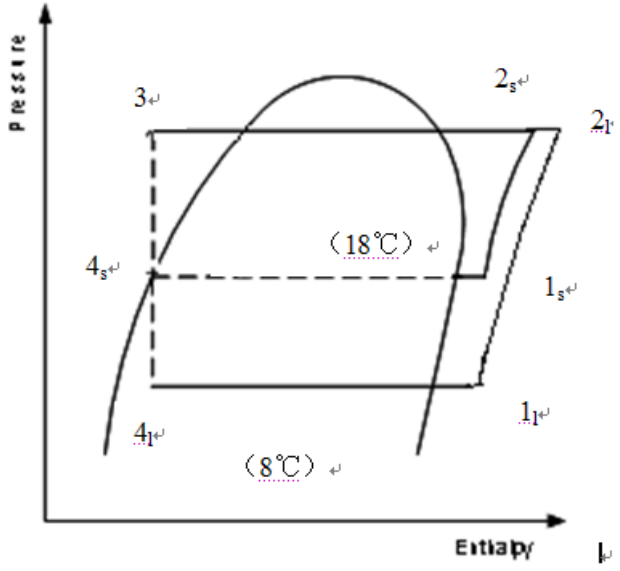
1. 双吸气单排气压缩机及其应用

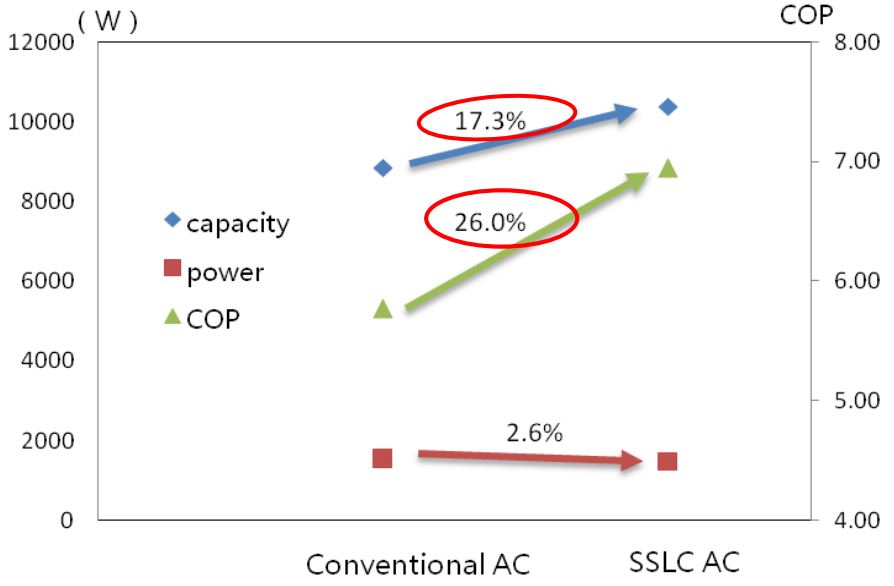
制冷模式下，能效和除湿舒适性改善

空调除湿原理是将室内回风温度降至露点温度以下，由于露点温度低，引起舒适性下降；同时由于压比增大，导致系统能效下降。

•恒温除湿 ——提高舒适性，但不节能

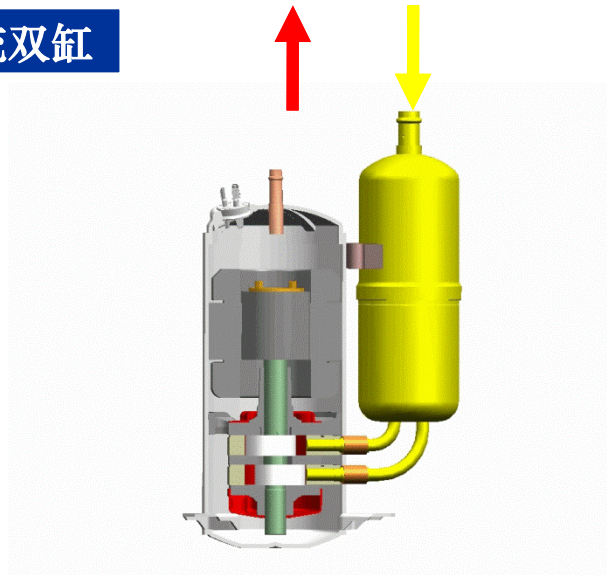
•SSLC（潜热/显热分离技术Separate Sensible and Latent Cooling ）——双蒸独立控制，除湿的同时，提升空调系统能效。

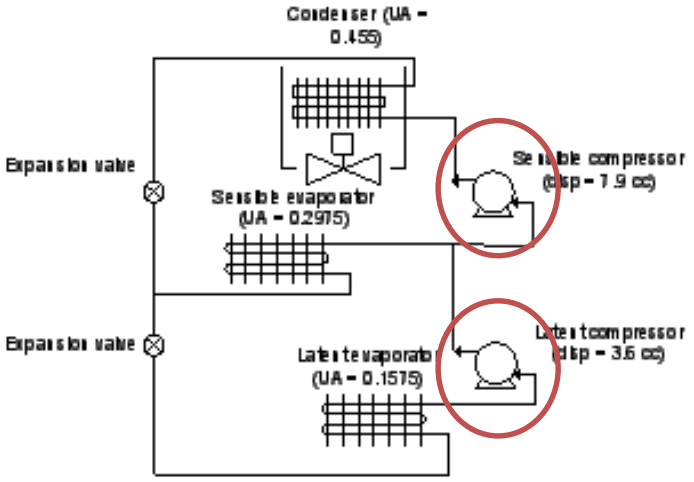




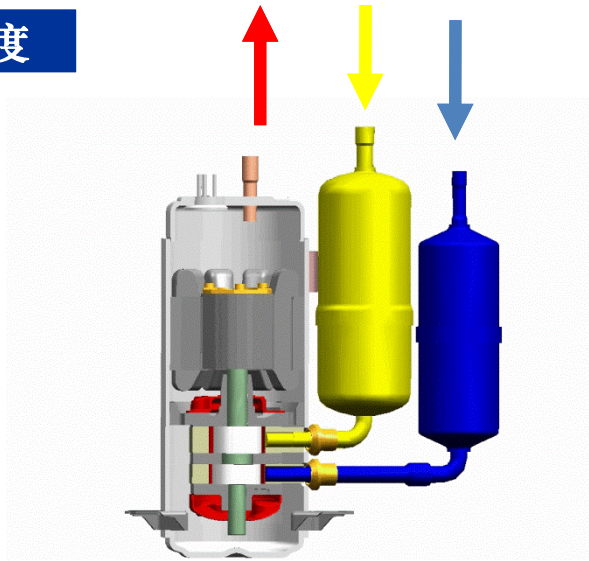
1. 双吸气单排气压缩机及其应用

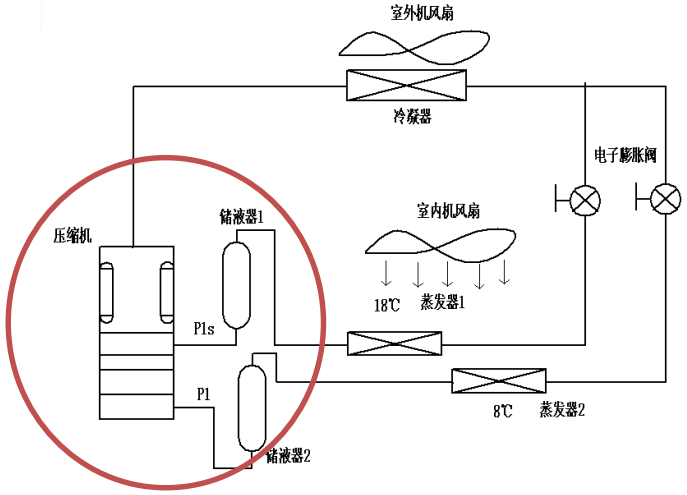
传统双缸





双蒸发温度





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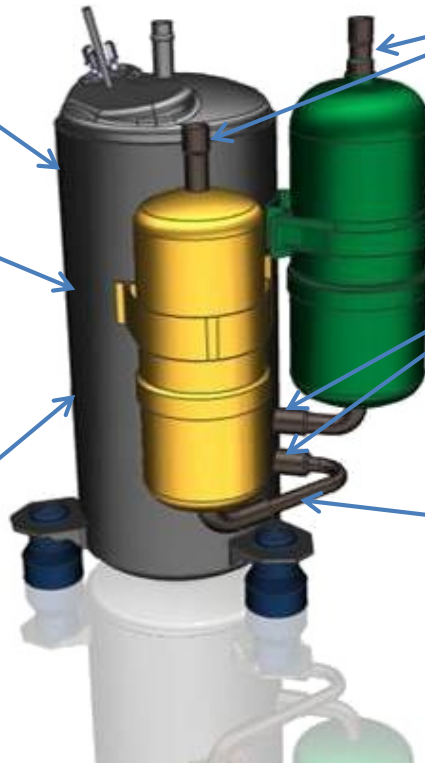
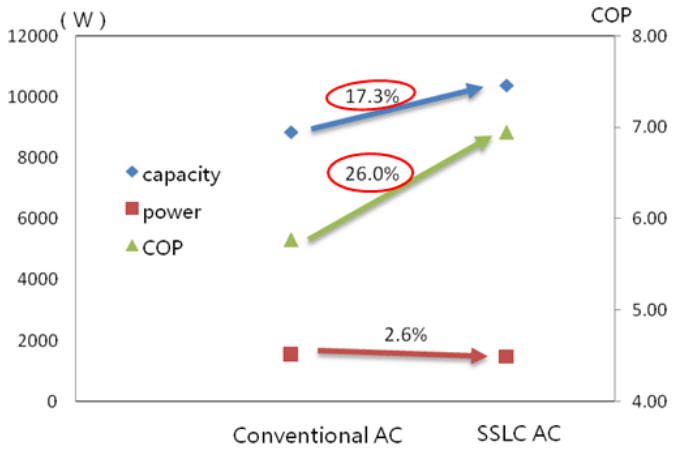


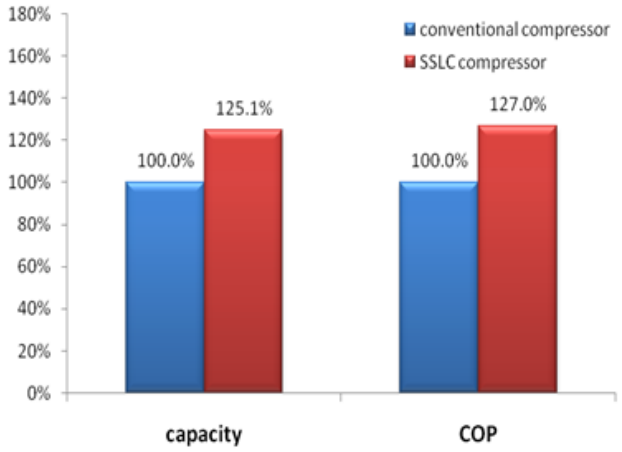
- ➢先进的动平衡优化技术
- ➢双缸排气不同步时的气体脉动耦合处理
- ➢温、湿两路泵体制冷能力的合理分配
- ➢管路设计及噪音震动递减
- ➢吸气弯管优化
- ➢适用于双蒸发系统的压缩机结构分布（含储液器设计）

1. 双吸气单排气压缩机及其应用

➢压缩机单体性能

Mode of AC system	传统压缩机	SSLC压缩机	
		Sensible	Latent
蒸发温度 ℃	5	15	5
吸气温度 ℃	10	20	10
冷凝温度 ℃	45	45	45
转速 , rpm	3600	3600	3600





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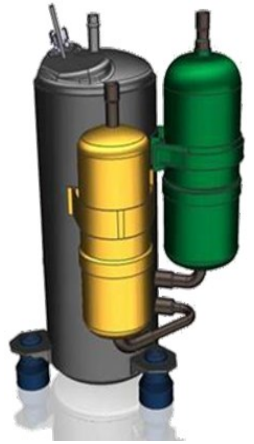
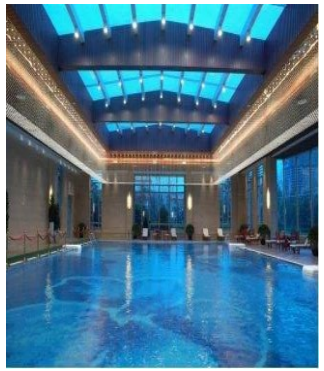
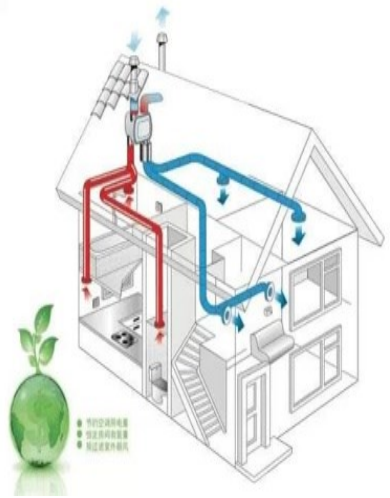


- 运用模式1
  温湿分控调节



- 运用模式2
  功能分区调节

- 运用模式3
  新风系统



- 双吸气单排气压缩机及其应用
- **双吸气双排气压缩机**
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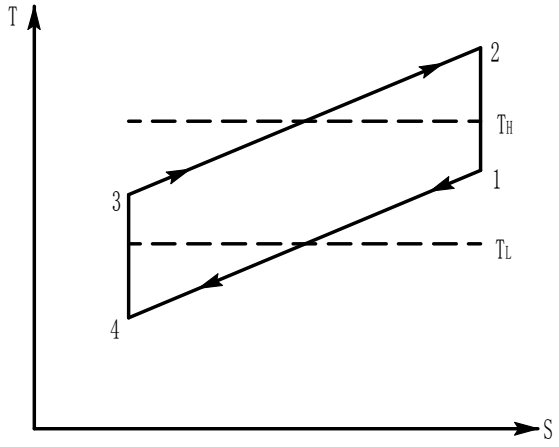
2. 双吸气双排气压缩机

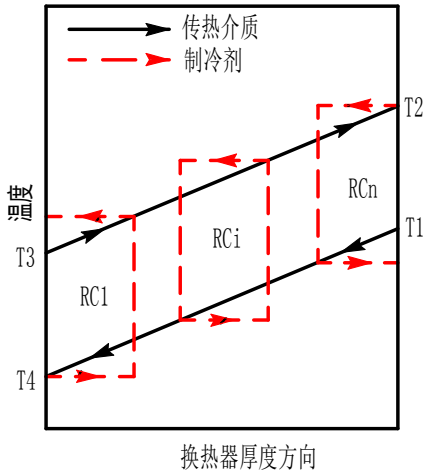
- 实际空调系统工作过程中，外部传热介质的温度随着换热器的厚度方向温度会发生变化，这种情况下效率最高的循环是劳伦兹循环，COP只与外部传热介质的平均温度有关。

$$COP = \frac{\overline{T_L}}{\overline{T_H} - \overline{T_L}}$$

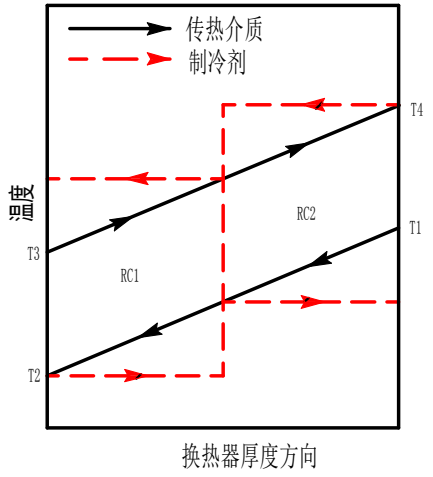
- 为了实现劳伦兹循环需要将空调系统分割为无数个可逆卡诺循环，分割次数越多越接近劳伦兹循环。
- 独立双吸气双排气压缩机能够将一个空调系统切割为两个小循环来提高空调系统能效。



劳伦兹循环



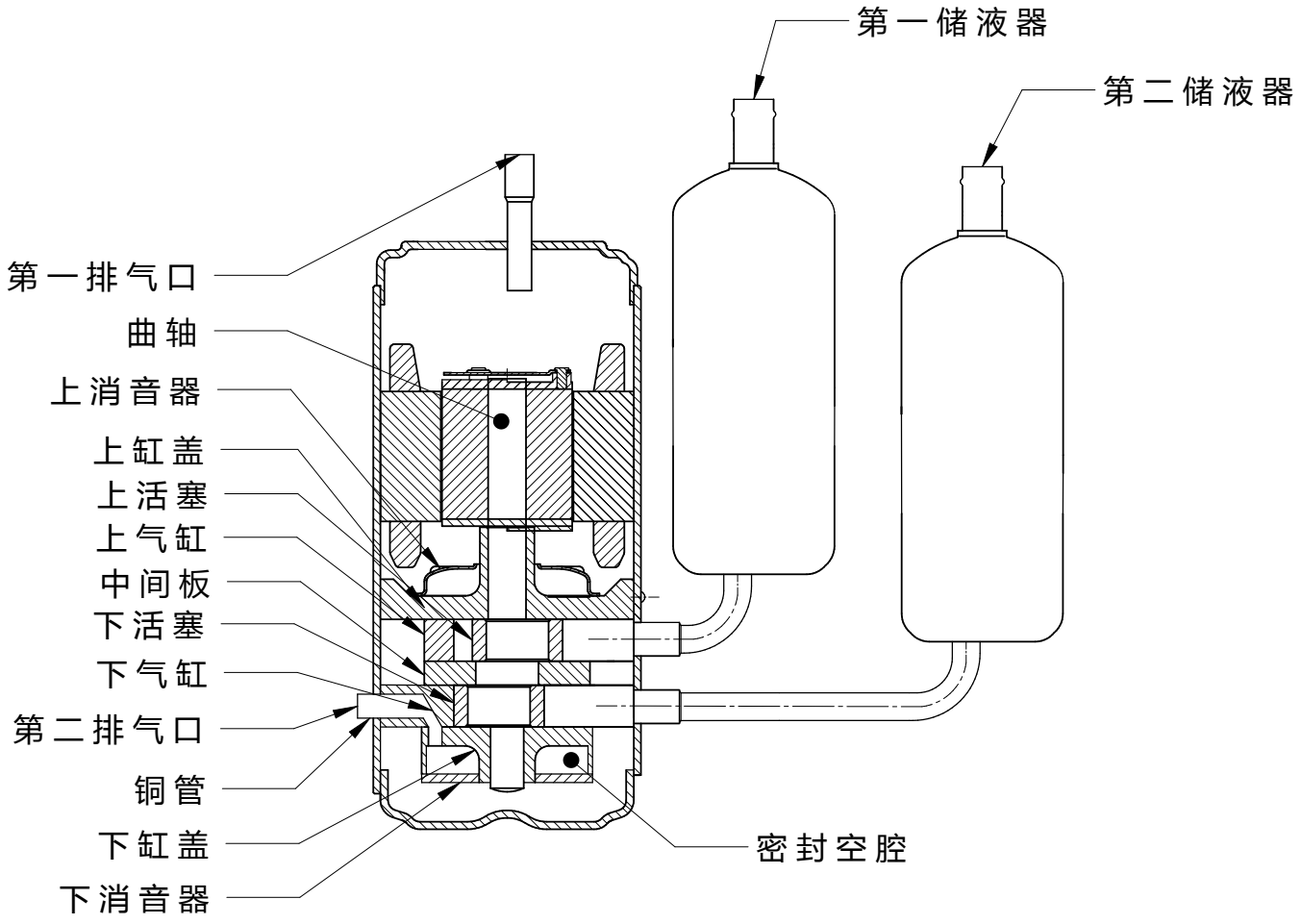
N个可逆卡诺循环



2个小循环

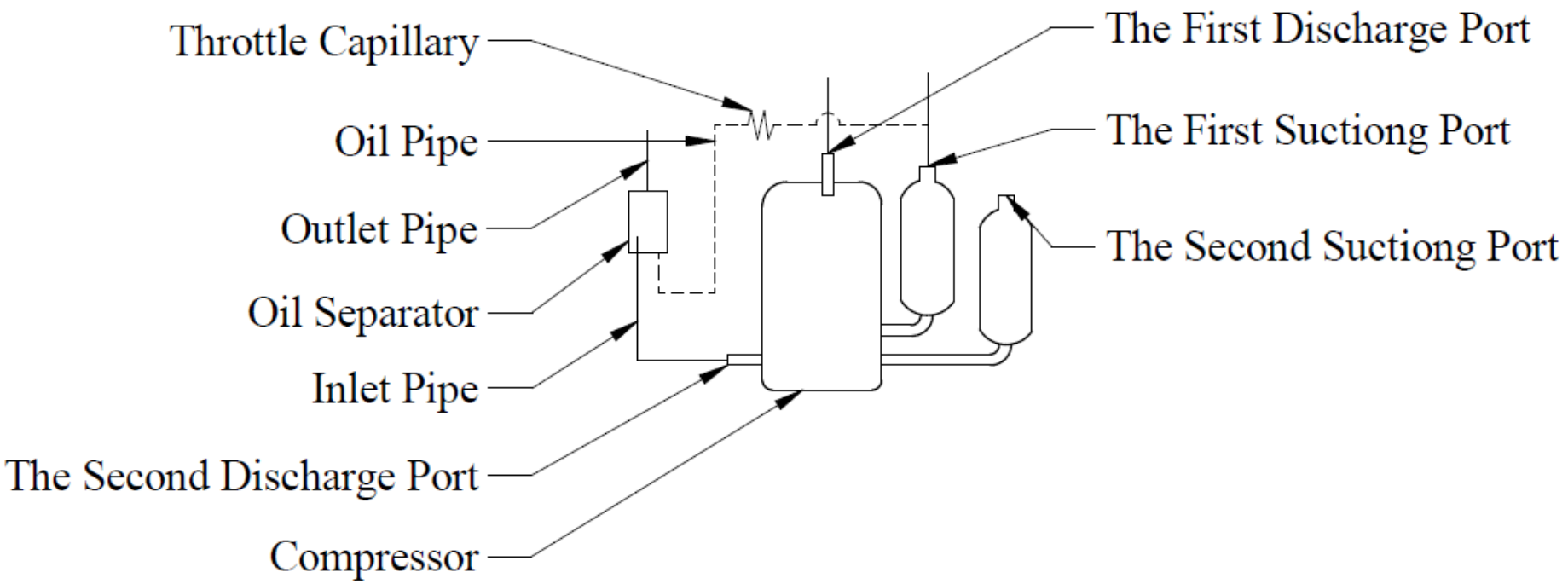
2. 双吸气双排气压缩机

双吸气双排气压缩机结构



2. 双吸气双排气压缩机

双吸气双排气压缩机回油



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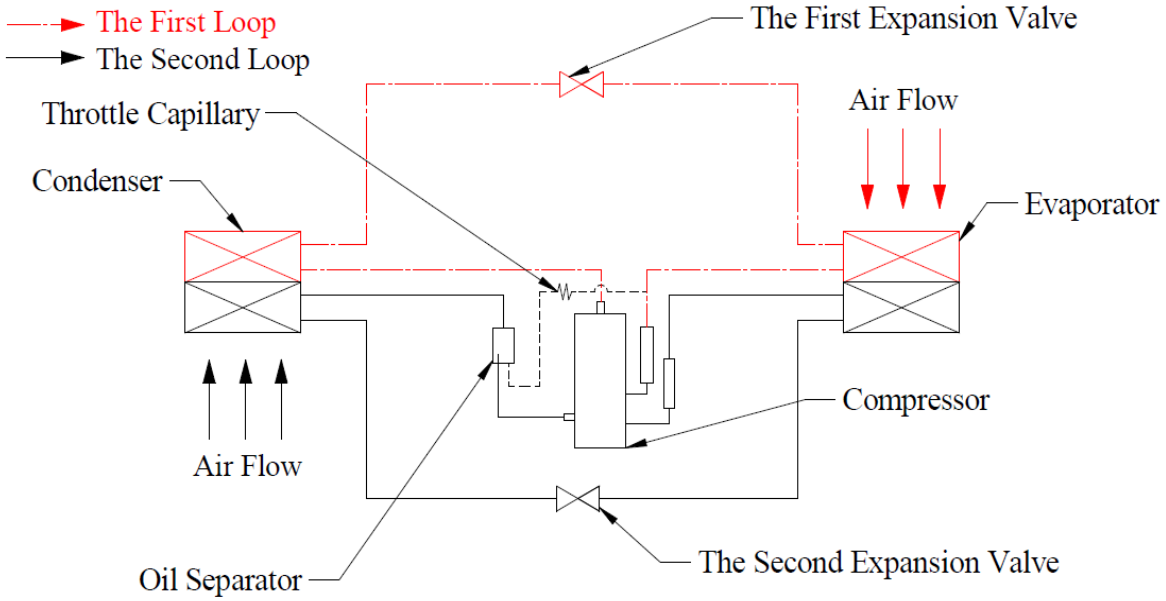
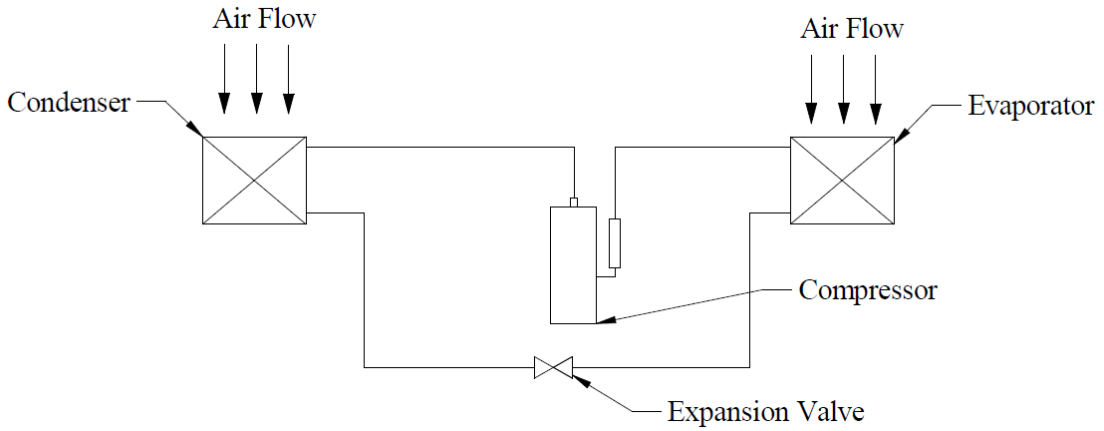
3. 双吸气双排气压缩机应用

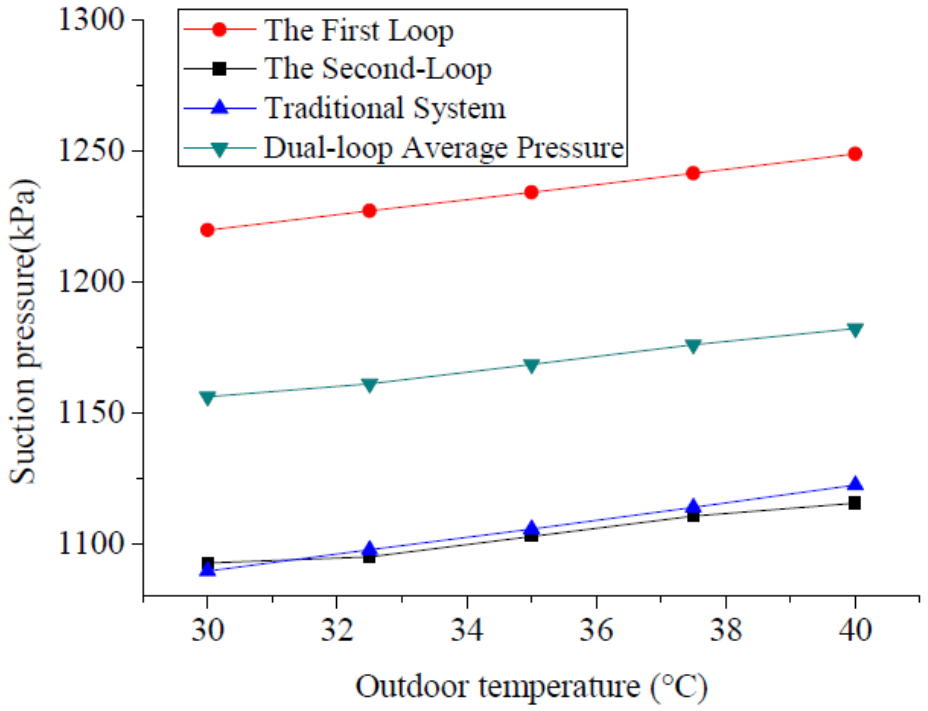
① 空调热泵系统

Conditions	Indoor temperature （dry bulb / wet bulb）(℃)	Outdoor Temperature (℃)	Relative humidity
Heating	20/15	-3, 2, 7, 12, 17	87%
Cooling	27/19	30, 32.5, 35, 37.5, 40	40%

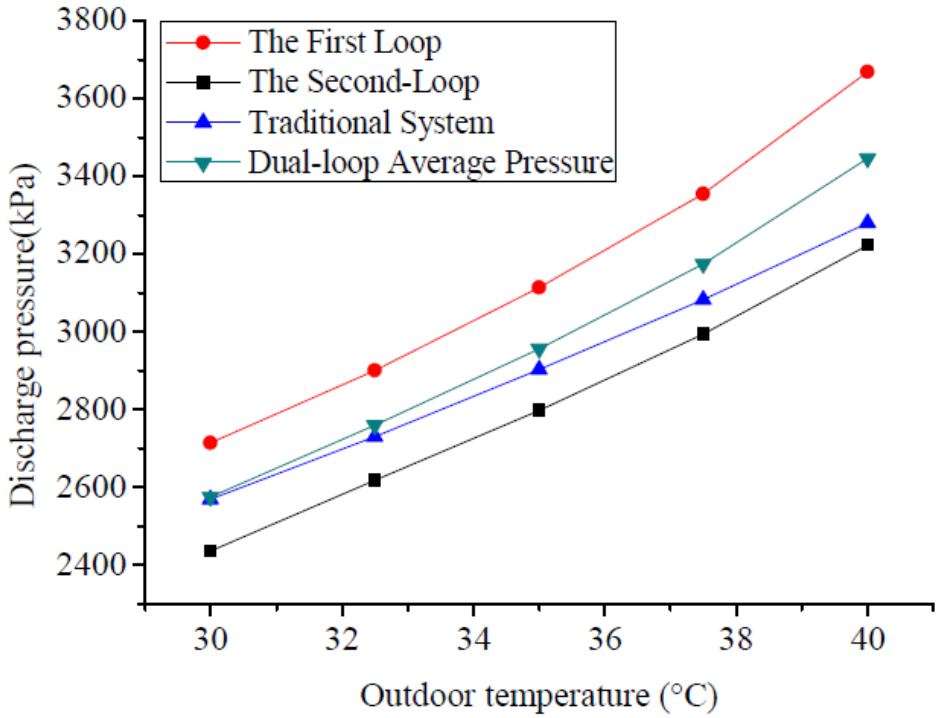




3. 双吸气双排气压缩机应用



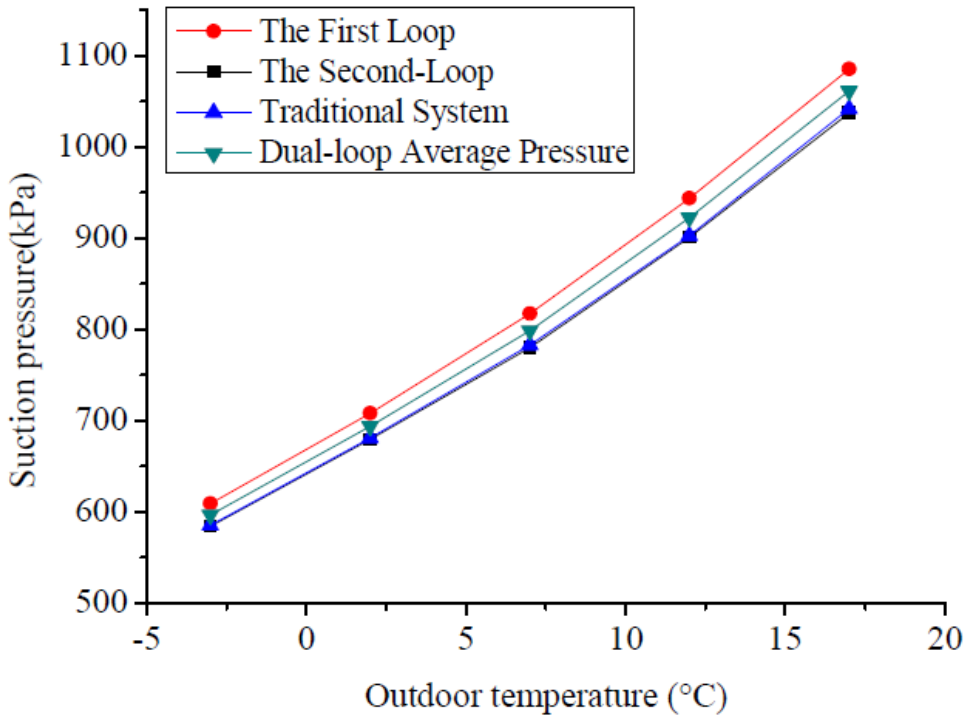
(a) Suction Pressure



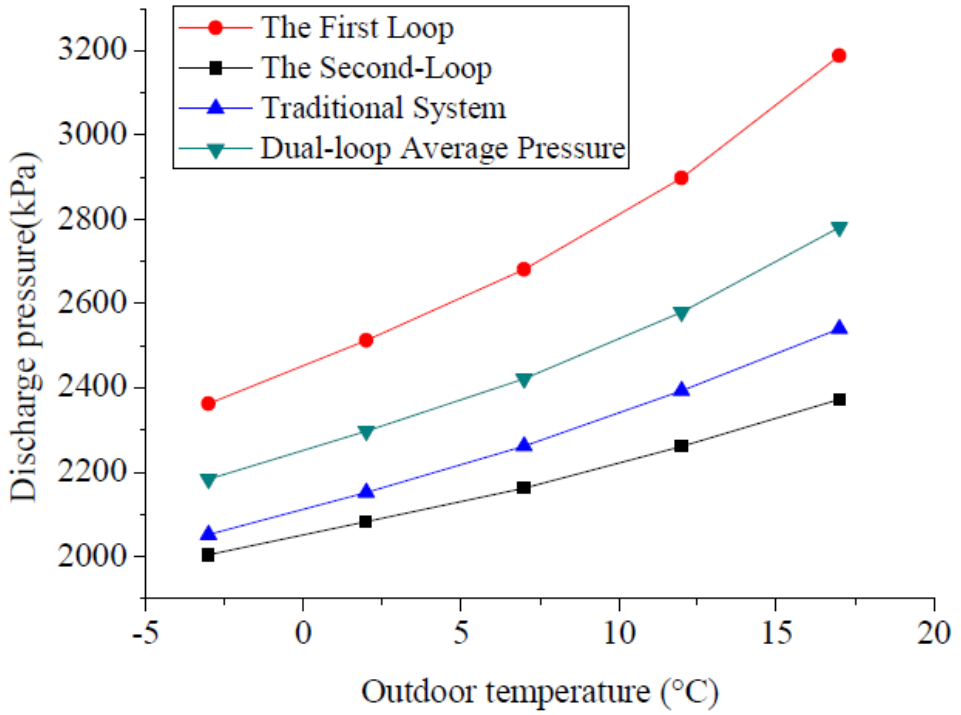
(b) Discharge Pressure

制冷工况下吸排气压力的变化

3. 双吸气双排气压缩机应用



(a) Suction Pressure

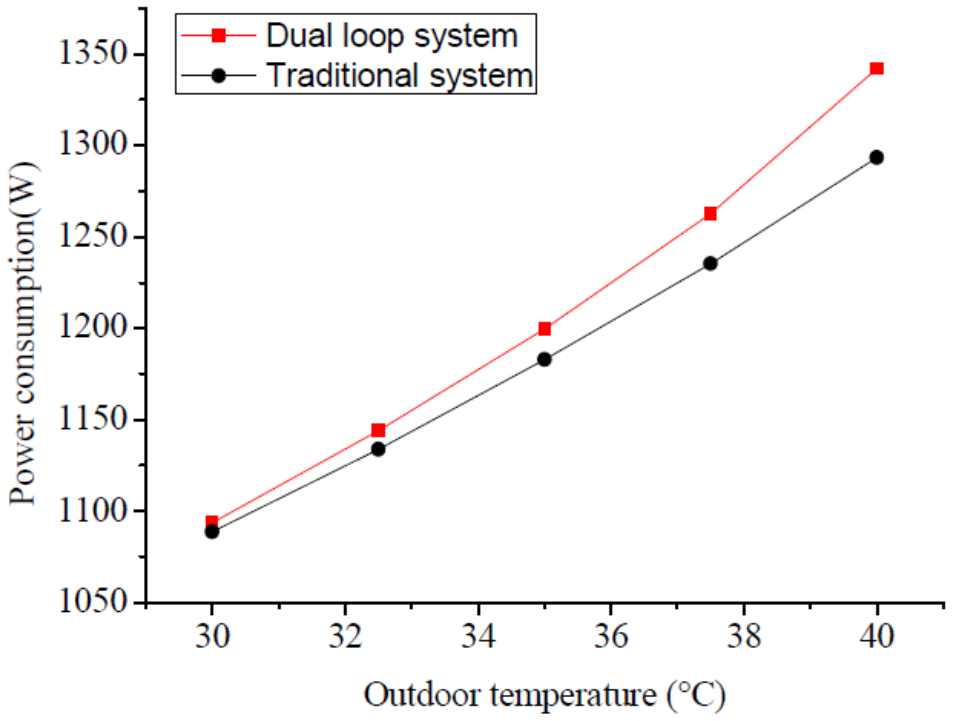


(b) Discharge Pressure

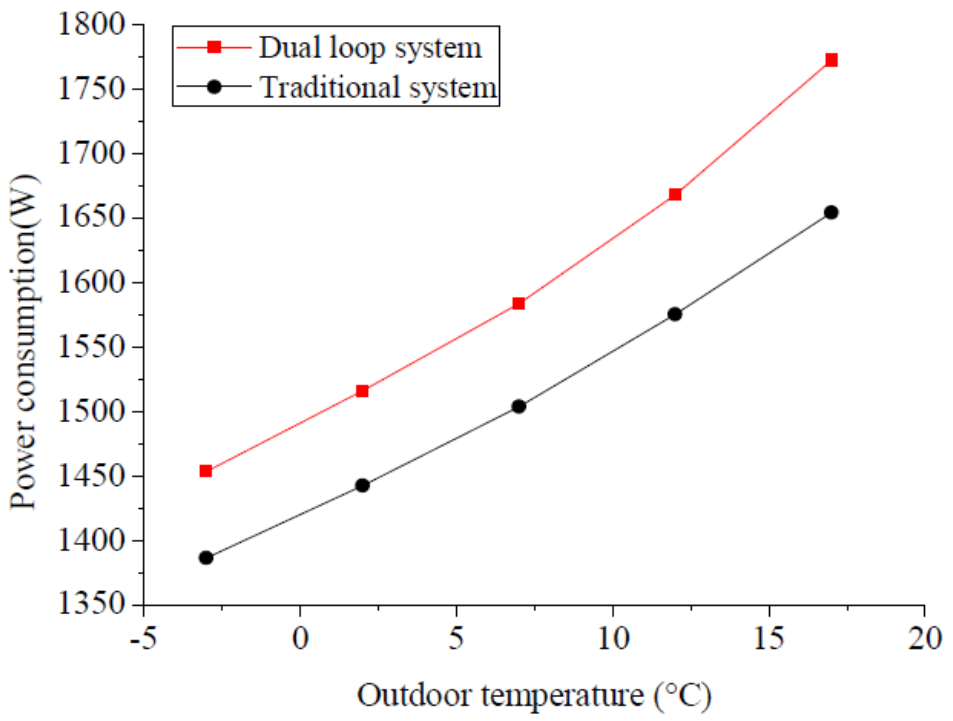
制热工况下吸排气压力的变化

3. 双吸气双排气压缩机应用

功率的变化



(a) Cooling condition

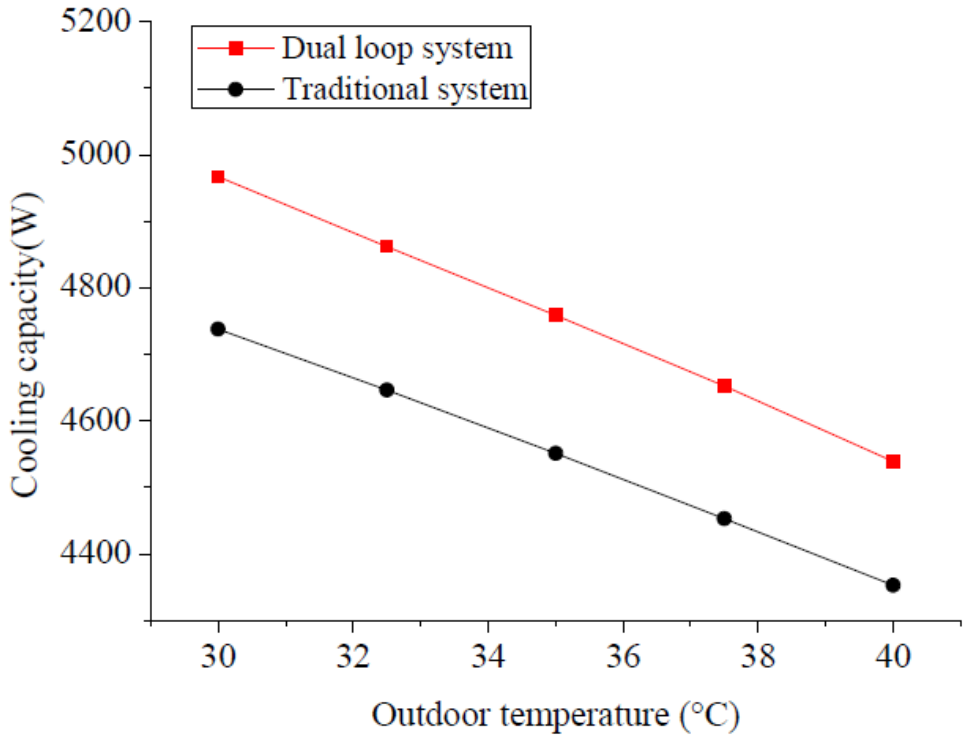


(b) Heating condition

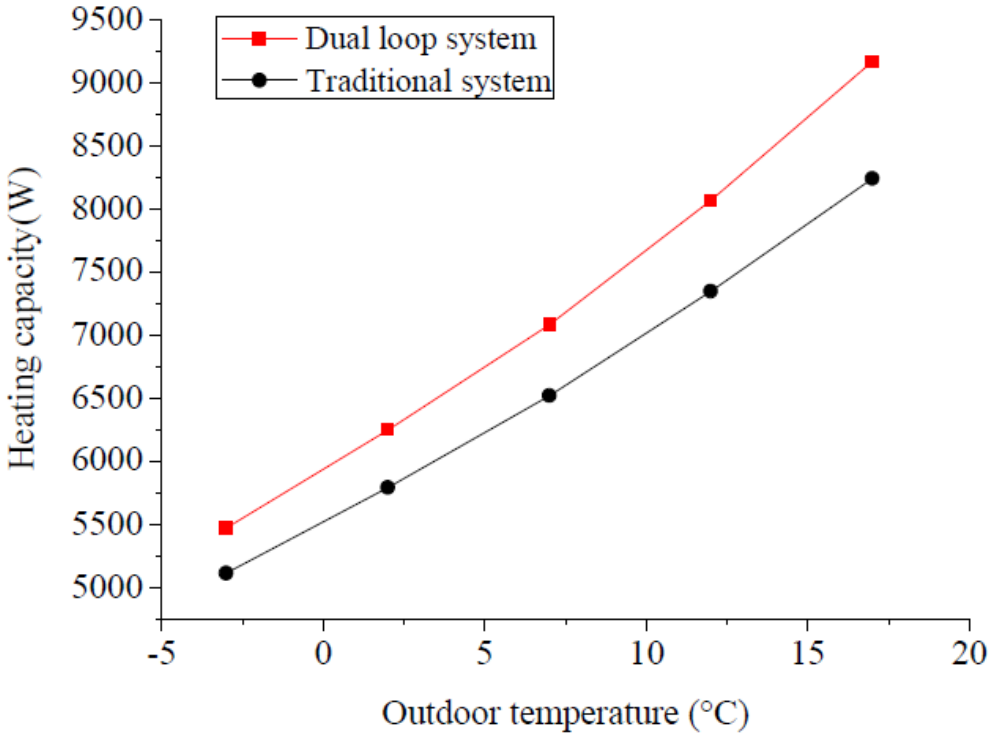
The power consumption of the dual-loop system is 0.5~3.8% higher than that of the traditional system in cooling condition and 4.8%~7.1% higher than that of the traditional system in heating condition.

3. 双吸气双排气压缩机应用

制冷/制热量的变化



(a) Cooling condition

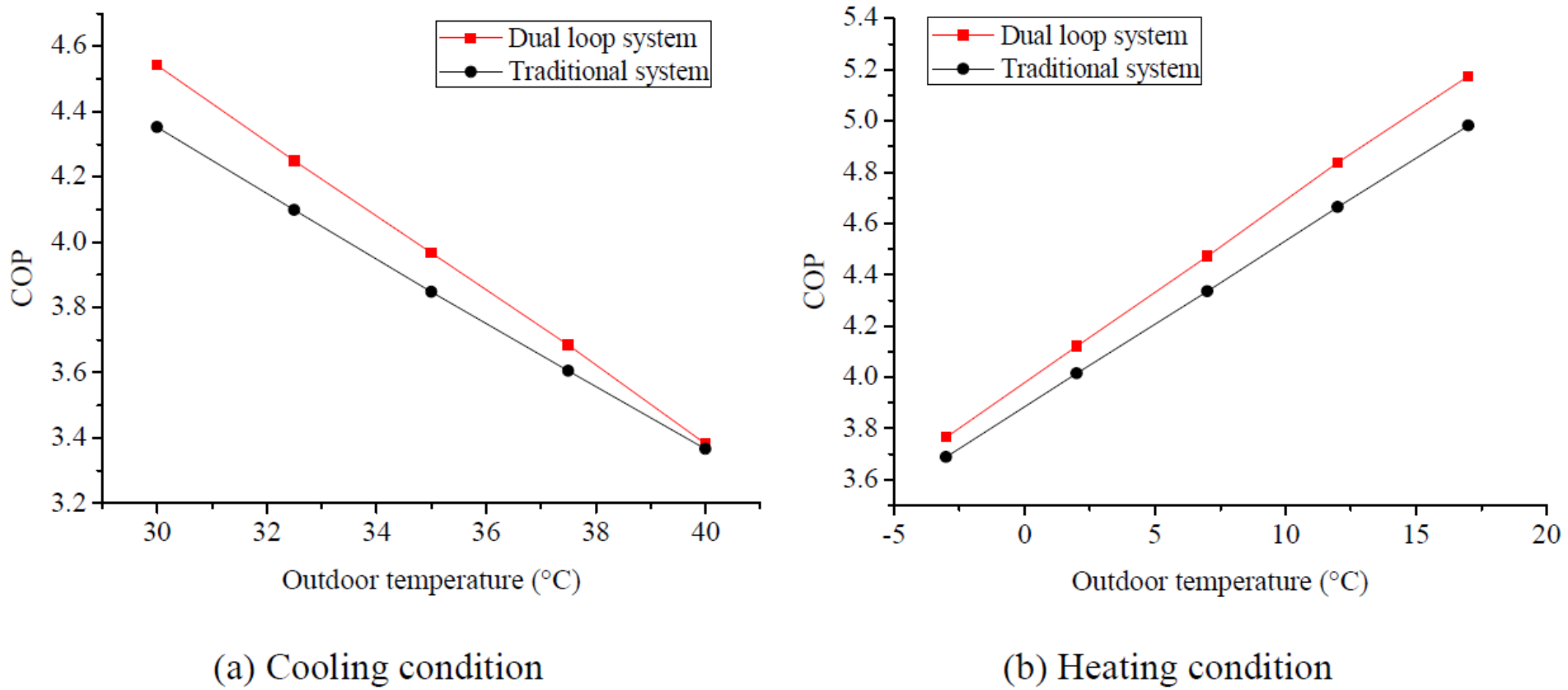


(b) Heating condition

The cooling capacity of the dual-loop system is 4.3~4.8% higher than that of the traditional system and the heating capacity of the dual-loop system is 7.0~11.3% higher than that of the traditional system.

3. 双吸气双排气压缩机应用

COP的变化



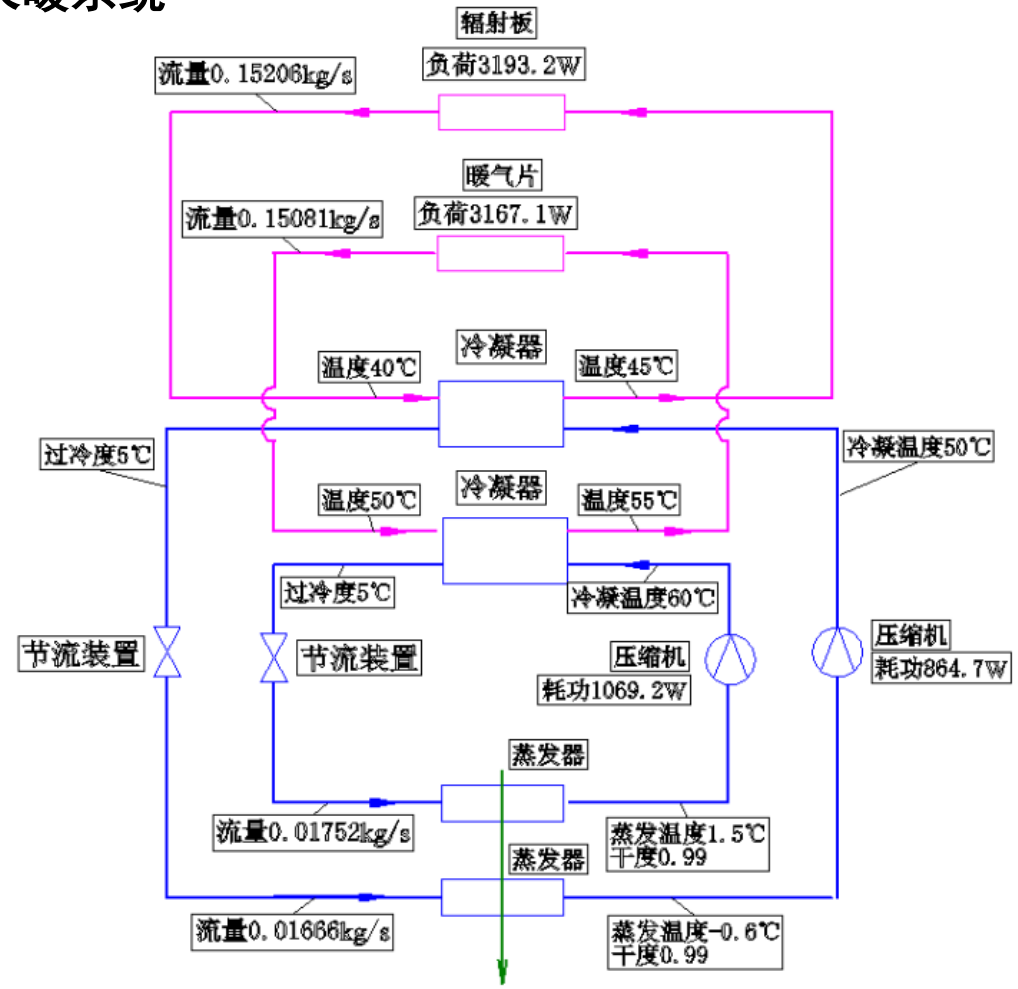
(a) Cooling condition　　(b) Heating condition

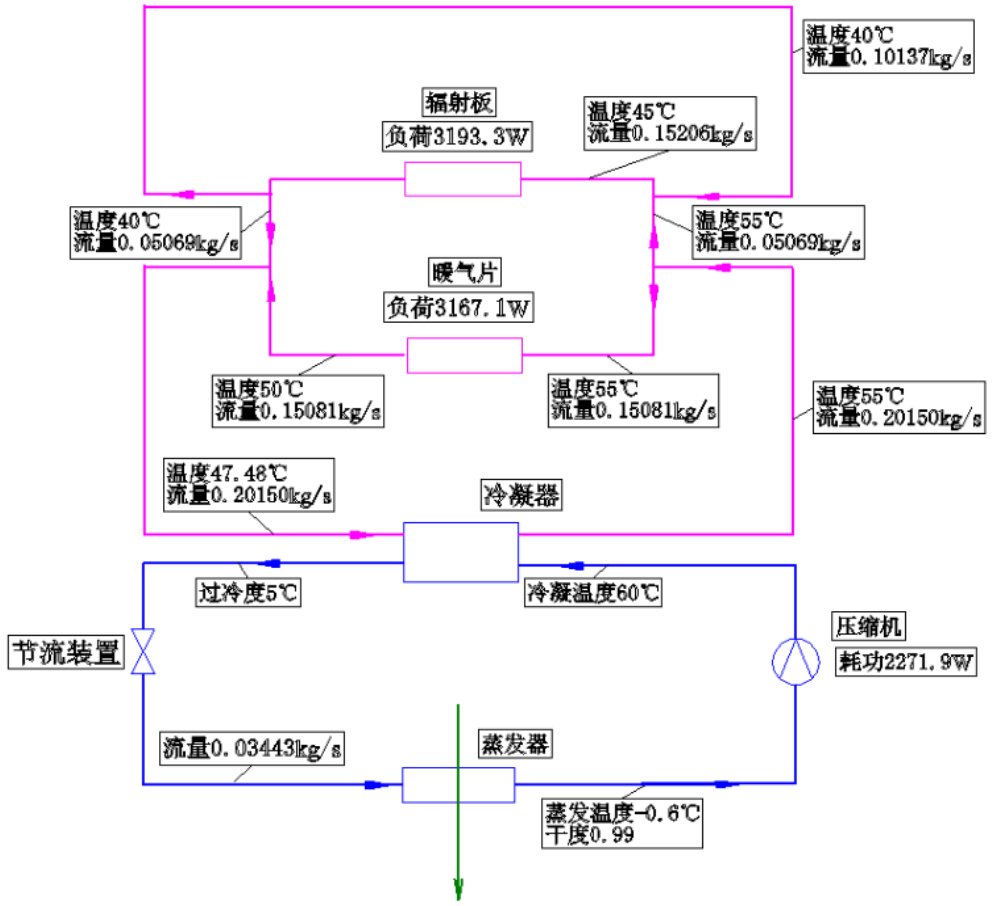
The COP of the dual-loop system is 0.5%~4.4% higher than that of the traditional system in cooling condition and 2.1%~3.9% higher than that of the traditional system in heating condition.

3. 双吸气双排气压缩机应用

计算结果表明，双吸双排系统循环的COP为3.29，常规单吸单排系统循环的COP为2.80，即前者相比后者提升了17.45%。

② 采暖系统





小结

- 在双吸气单排气压缩机的基础上提出了双吸气双排气压缩机；
- 通过合理设置油分，解决了双吸气双排气压缩机的回油问题；
- 将该双吸双排压缩机应用于空调/热泵系统、采暖系统，可显著提升其性能。

感　　谢

T H A N K S


HIGHLY 海立
旋转式压缩机市场的领导者
Leading The Rotary Compressor Market