

AOWID 奥威制冷

采用4极变频电机的螺杆压缩机在冷链系统中的应用



目录

CATALOGUE

1

螺杆压缩机电机极数

2

CO₂ 内容积比可调半封螺杆压缩
机组

3

串并联可切换的双机双级螺杆制冷
压缩机组

PART 01

螺杆压缩机电机极数



2极电机

| MODEL | COMPRESSOR | | | | | MOTOR | | | | LUBRICANT CHARGE | WEIGHT | | | | | | | |
|--------------------|---------------------------|----------------|-----|------------------|----------|------------|-----------|------------------|-------------|------------------|--------|---------|---------|------|-----|-----|----|-----|
| | Displacement 60 / 50Hz | Rated Speed | Vi | Cap. Control (%) | | Nominal Hp | | Motor Starter | Voltage (V) | | | | | | | | | |
| | m ³ /hr | 60 / 50Hz | | Step | Stepless | 60Hz(A/B) | 50Hz(A/B) | | 60Hz | | | 50Hz | | | | | | |
| RE-230A(P) / B(P) | 280/232 | 3550/ 2950 | 2.2 | 25 | 25~100 | 56/74 | 47/63 | Y-Δ | 220* | 380 | 14 | 380 | | | | | | |
| RE-260A(P) / B(P) | 320/266 | | | | | 63/82 | 52/68 | | | | 16 | 440 | | | | | | |
| RE-300A(P) / B(P) | 369/307 | | | | | 70/97 | 58/80 | | | | 16 | 480 | | | | | | |
| RE-340A(P) / B(P) | 423/352 | | | | | 80/108 | 67/90 | | | | 16 | 550 | | | | | | |
| RE-380A(P) / B(P) | 471/392 | | 2.6 | | | 25 | 90/122 | 75/102 | PWS | 380 | 400 | 16 | 570 | | | | | |
| RE-420A(P) / B(P) | 501/417 | | | | | | 97/146 | 80/122 | | | | 16 | 600 | | | | | |
| RE-480A(P) / B(P) | 579/481 | | | | | | 50 | 25~100 | | | | 107/166 | 90/138 | DOL | 440 | 415 | 17 | 630 |
| RE-550A(P) / B(P) | 666/554 | | | | | | | | | | | 75 | 110/154 | | | | 19 | 670 |
| RE-620A(P) / B(P) | 752/625 | | 100 | | | 3.0 | 25~100 | 146/215 | 122/178 | Y-Δ | 460 | 440 | 23 | 870 | | | | |
| RE-710A(P) / B(P) | 857/712 | | | | | | | 166/233 | 138/194 | | | | 26 | 920 | | | | |
| RE-820A(P) / B(P) | 987/820 | | | | | | | 196/257 | 164/215 | | | | 28 | 1050 | | | | |
| RE-920A(P) / B(P) | 1112/924 | | | | | | | 215/298 | 178/248 | | | | 28 | 1135 | | | | |
| RE-1050A(P) / B(P) | 1254/1045 | | 4.4 | | | 3.5 | 25~100 | 241/322 | 201/268 | DOL | 480 | 480 | 40 | 1480 | | | | |
| RE-1150A(P) / B(P) | 1374/1145 | | | | | | | 264/354 | 220/295 | | | | 40 | 1500 | | | | |



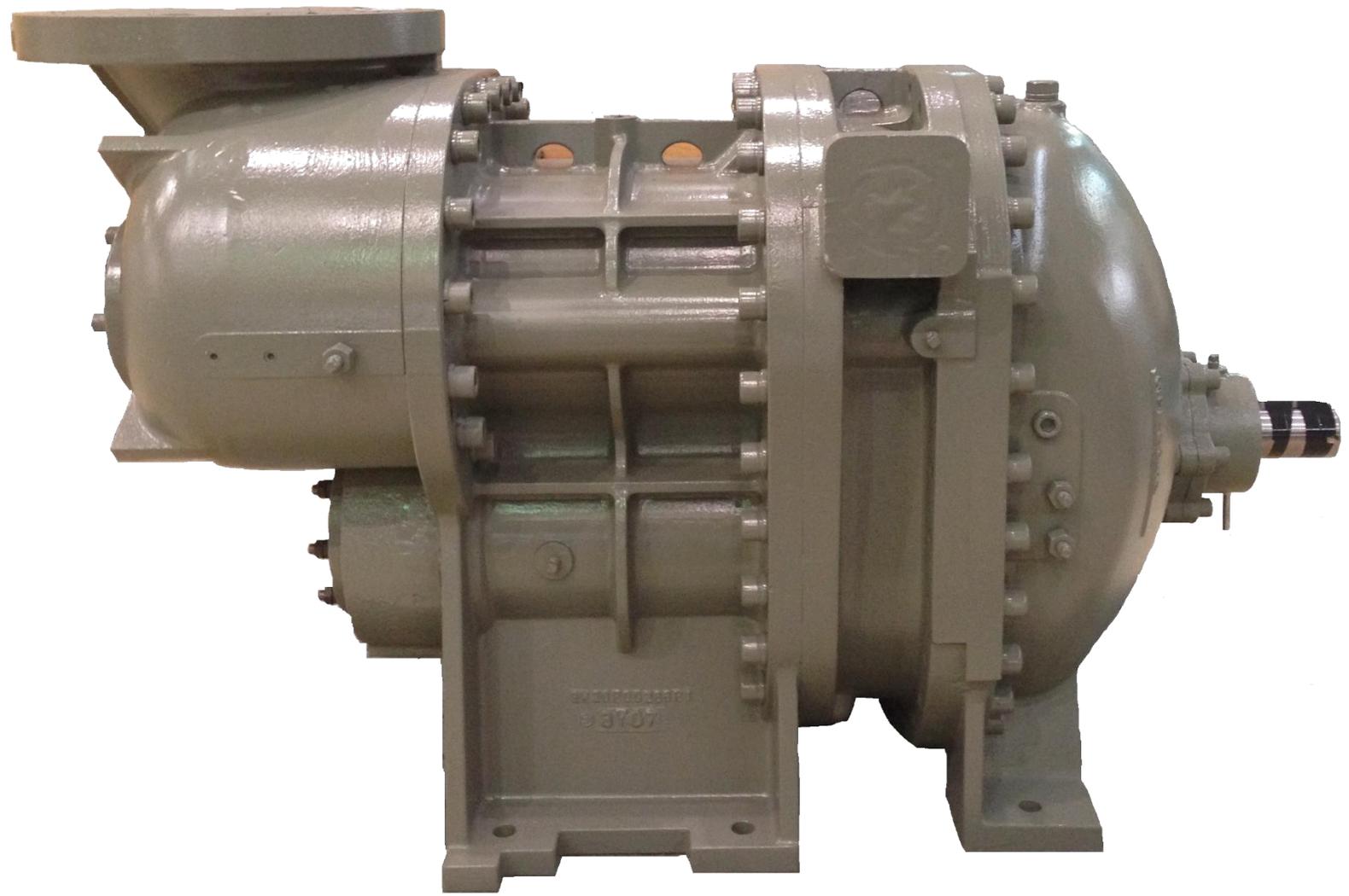
2极电机

| 项目 Item | | 单位 Unit | 20M | 20L | 25M | 25L | |
|--------------------------------------|---|-----------------------------|--------------|-------------------------------------|---------------------|-----------|---------|
| 制冷剂 Refrigerant | 品种 Varieties | | R717/R507A | | | | |
| 压缩机 Compressor | 理论排量 Swept volume | m³/h | 1139 | 1346 | 2321 | 2875 | |
| | 能量调节范围 Energy range | | 15 ~ 100% | | | | |
| 制冷量 Cooling capacity | 高温工况 High temperature working conditions | kW | 1127/1102 | 1352/1320 | 2337/2299 | 2915/2875 | |
| | 中温工况 Medium temperature working conditions | kW | 756/745 | 906/892 | 1568/1556 | 1958/1947 | |
| | 低温工况 Low temperature working conditions | 带经济器 With economizer | kW | 273/339 | 328/404 | 576/711 | 720/884 |
| | | 不带经济器 Without economizer | kW | 229/237 | 275/285 | 482/501 | 605/629 |
| 电机额定功率 Rated power of motor | 高温工况 High temperature working conditions | kW | 250/315 | 315/355 | 560/630 | 630/800 | |
| | 中温工况 Medium temperature working conditions | kW | 250/315 | 280/355 | 450/630 | 560/800 | |
| | 低温工况 Low temperature working conditions | kW | 200/280 | 250/315 | 400/560 | 500/710 | |
| 电制 ^① Electrical system | | | 3N 50Hz 380V | 3N 50Hz 380V 3N 50Hz 10kV (或6kV) | 3N 50Hz 10kV (或6kV) | | |
| 额定转速 Rated speed | | r/min | 2970 | | | | |

容积效率

喷油螺杆阳转子齿顶线速度

●●● 神户制钢螺杆压缩机



氨单机双级机



神户制钢螺杆压缩机

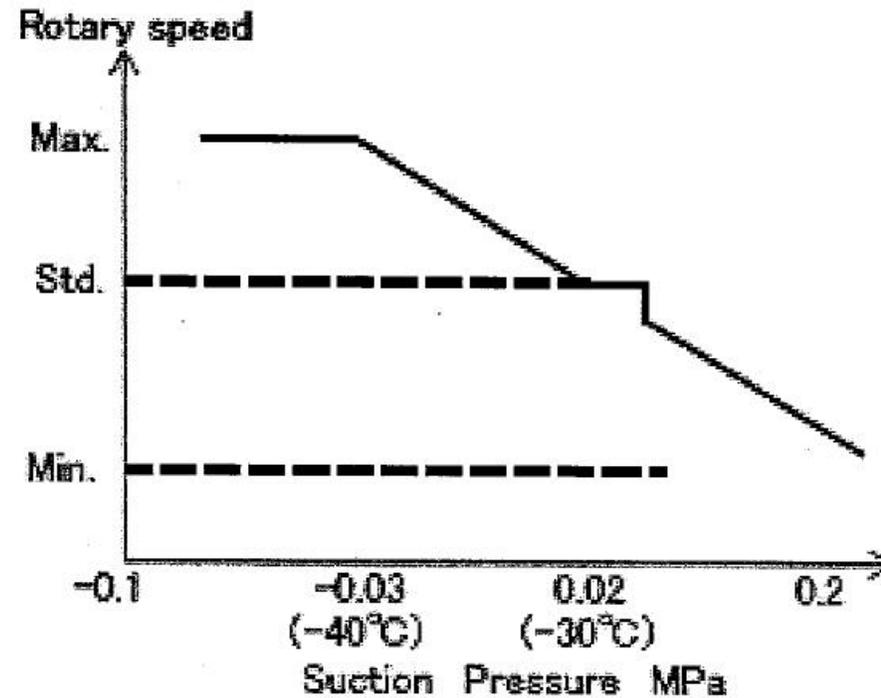
| | | | | | |
|--|---------------------------------|-------------------|--|----------------|------------|
| Model | | | iZN16TX II -5W / 5A | iZN20TX II -3A | iZN20TX-4A |
| Refrigerant | | | NH3 | | |
| Saturated temperature at suction pressure | | °C | -50 to -30 | | |
| Legal refrigerating capacity | | | 40.16 | 65.07 | 95.81 |
| Voltage (50/60Hz) | | | Main: 380·400/ 400·440 V, 3-phase Control circuit: 200/ 220 V, single-phase | | |
| Compressor | Model | | KS16TX II | KS20TX II | |
| | Standard speed (50/60Hz) | min ⁻¹ | 4,060 | 2,290 | 3,375 |
| | Capacity control | | Step control (50, 75, 100% 3 step) or Continuous control *1 | | |
| Motor | Nominal output | kW | 135 | 180 | 250 |
| | Type | | Totally enclosed fan cooled motor, 4P, 3 phase | | |
| | Starting system | | INVERTER | | |



神户制钢螺杆压缩机

3-1-5 Limit of rotary speed according to suction pressure

In order to prevent motor from being overloaded, we set limitations to the rotary speed as below.





氨罐保压



小冷量

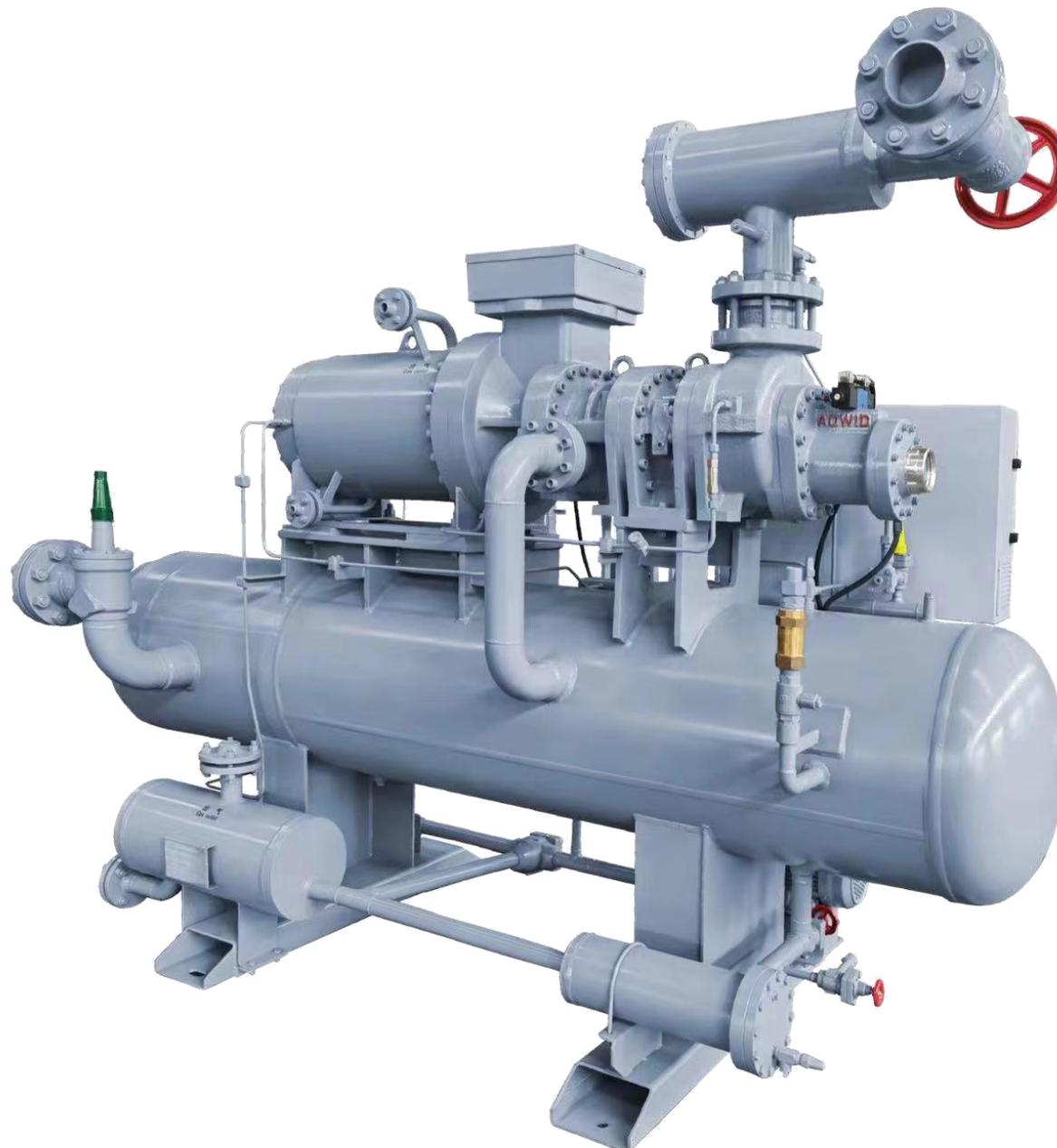
PART 02

采用4极永磁变频
电机的CO₂ 内容积
比可调半封螺杆压
缩机组



半封闭结构

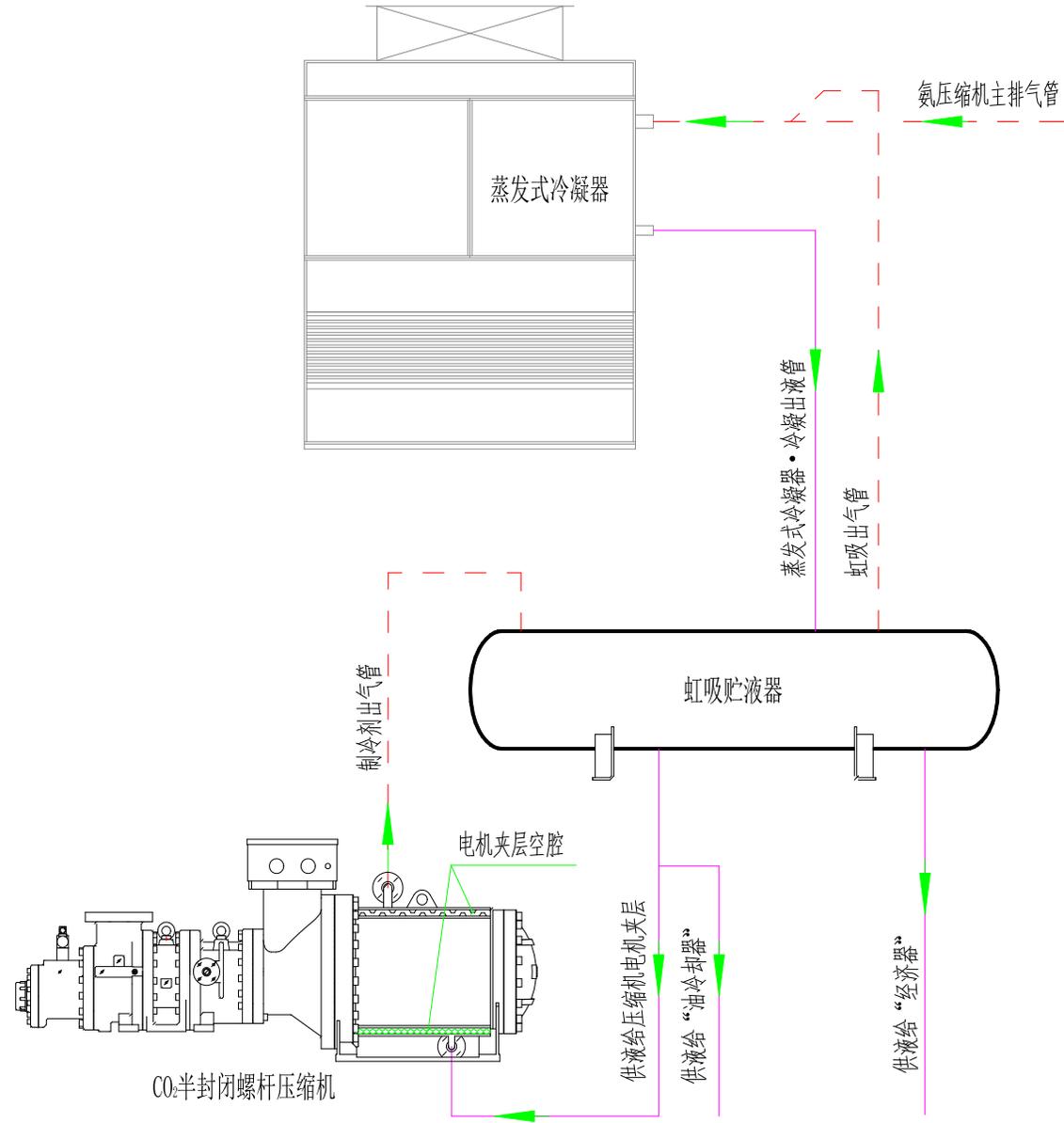
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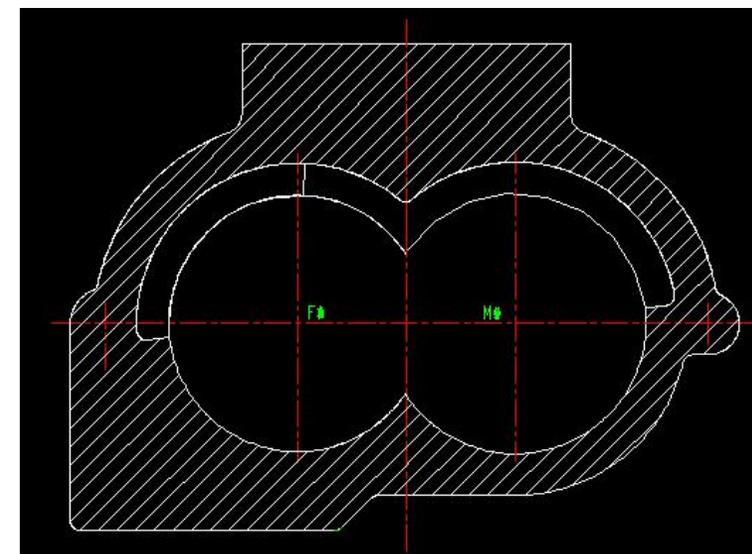
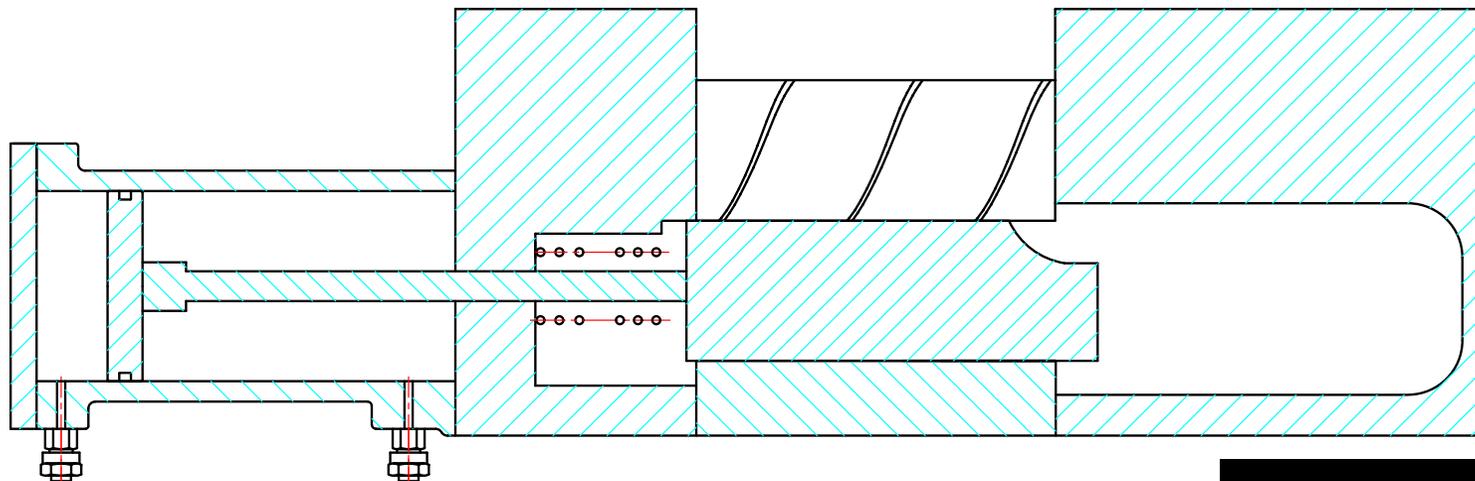
24年制冷展

虹吸液冷电机

- 制冷剂虹吸液体冷却电机
- 虹吸冷却形式对制冷系统性能没有影响
- 电机冷却效果好
- 电机壳体采用碳钢焊接，结构稳定
- 冷却系统管路简单
- 冷却效果无衰减
- 电机轴双轴承支撑，电机功率尺寸不受限制，安全性好



内容积比可调



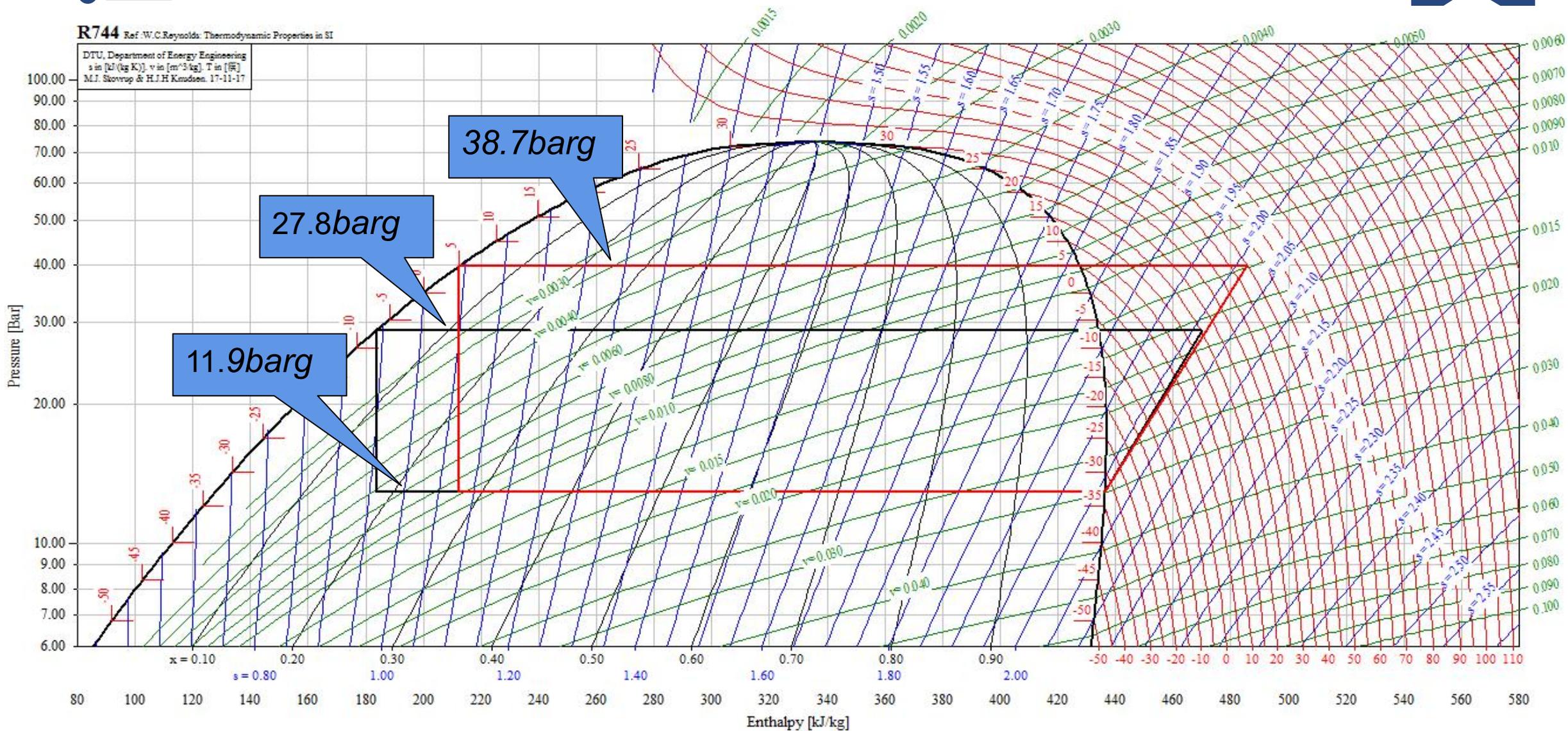
能量及内容积比合一的调节结构



排管热气融霜

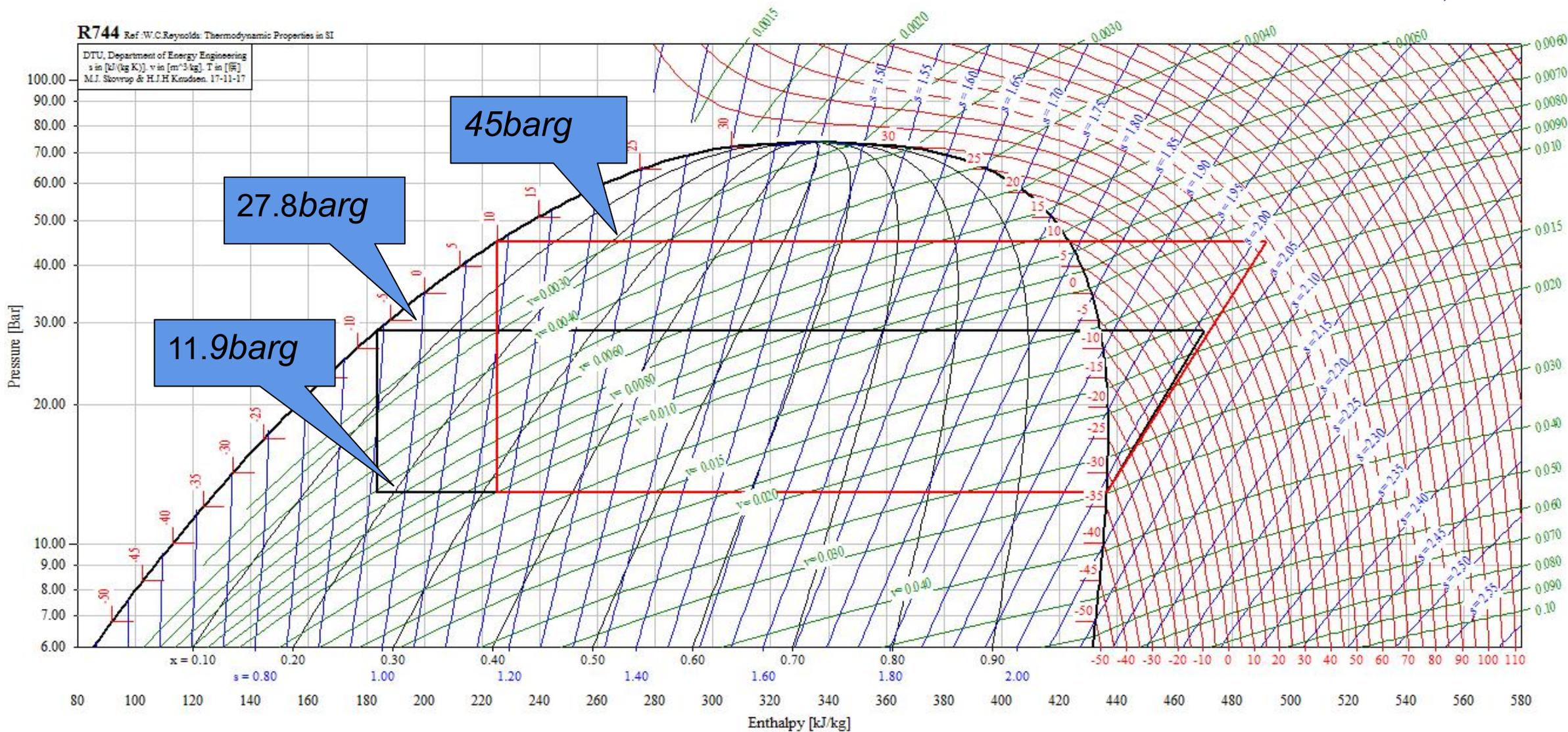
R744 Ref. W.C.Reynolds: Thermodynamic Properties in SI

DTU, Department of Energy Engineering
s in [J/(kg K)], v in [m³/kg], T in [°C]
M.F. Skovrup & H.J.H. Knudsen, 17-11-17



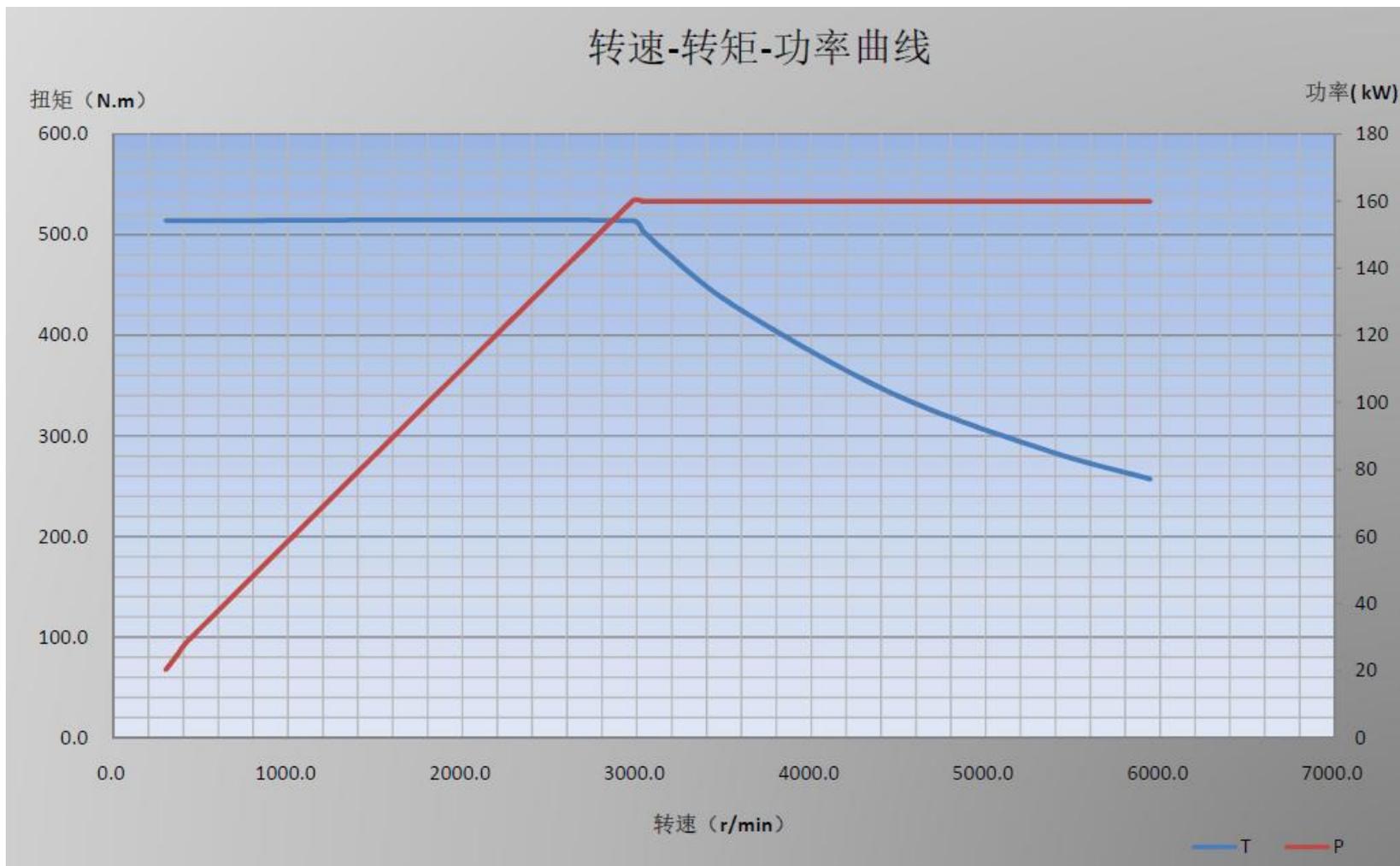


冷风机热气融霜





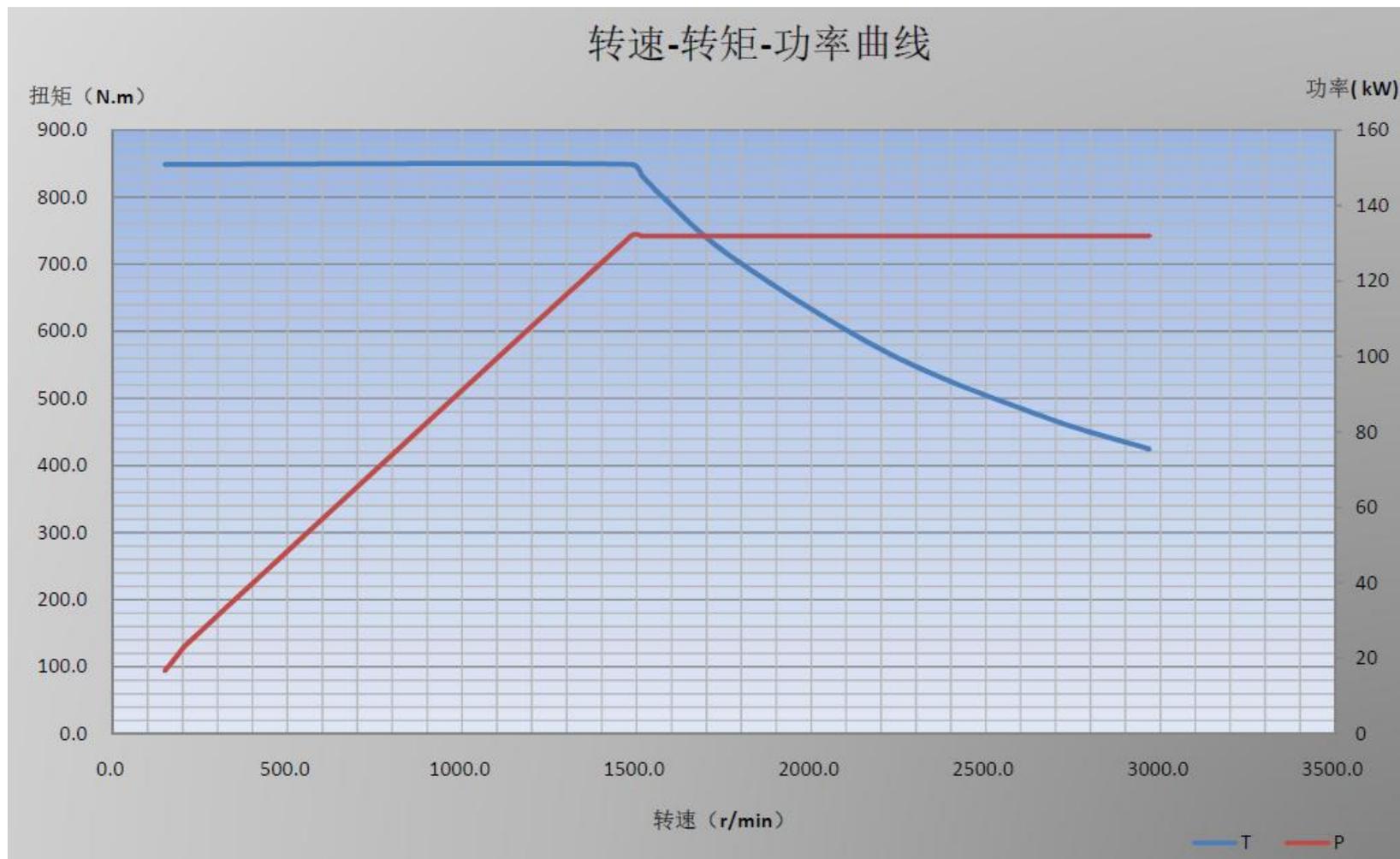
2极电机



恒转矩



4极变频电机

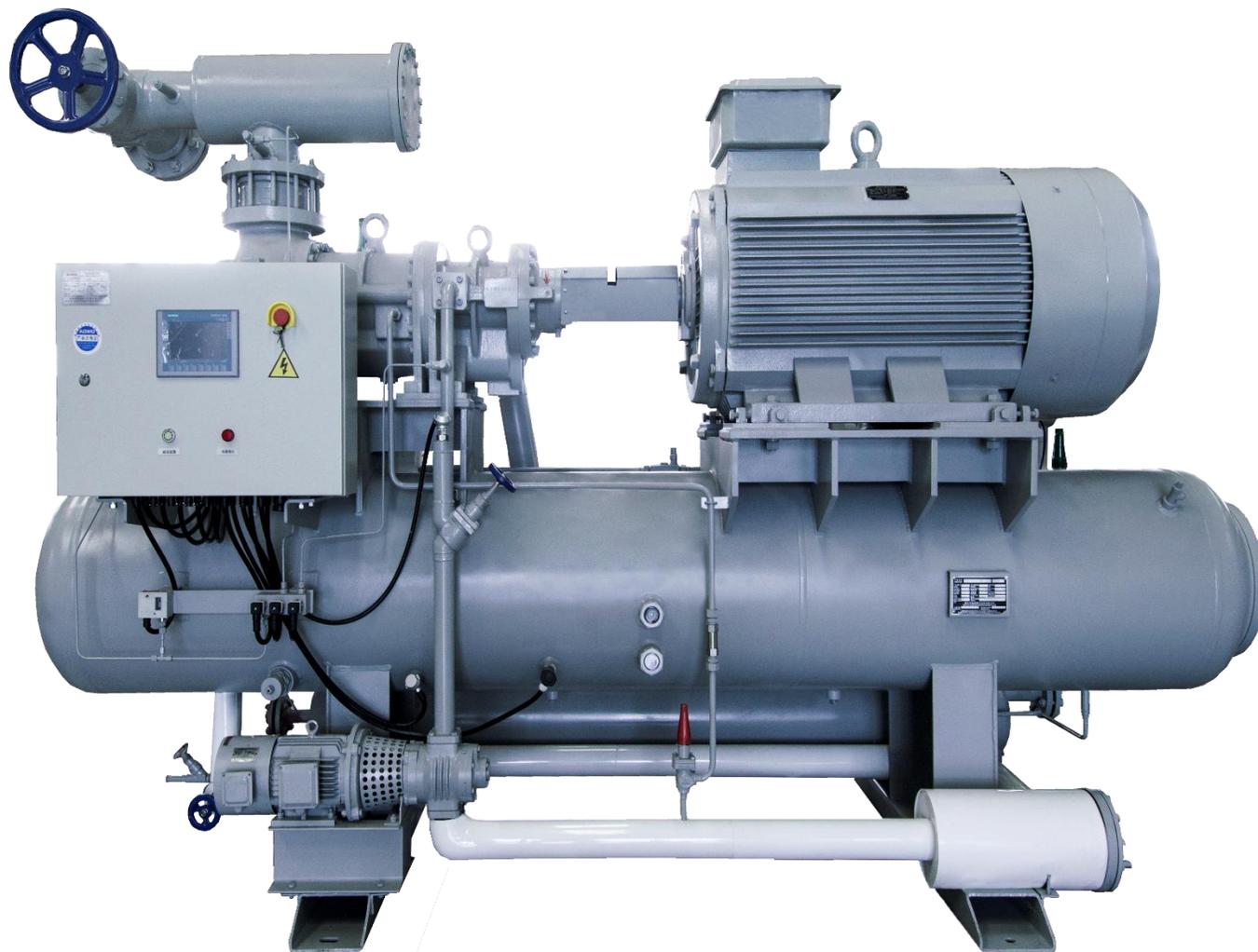


恒功率

PART 03

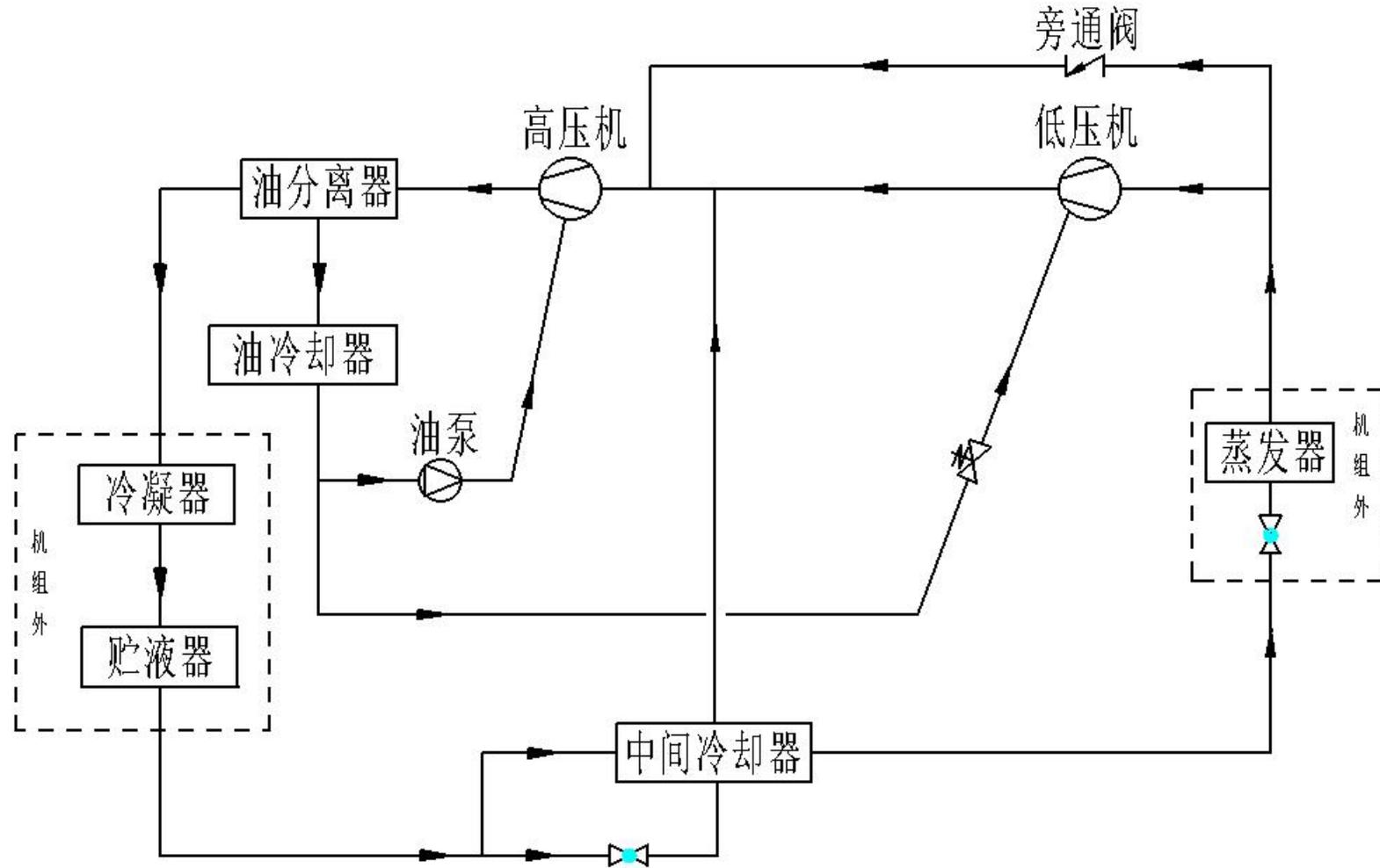
串并联可切换的
双机双级螺杆制
冷压缩机组

●●● 单级带经济器机组



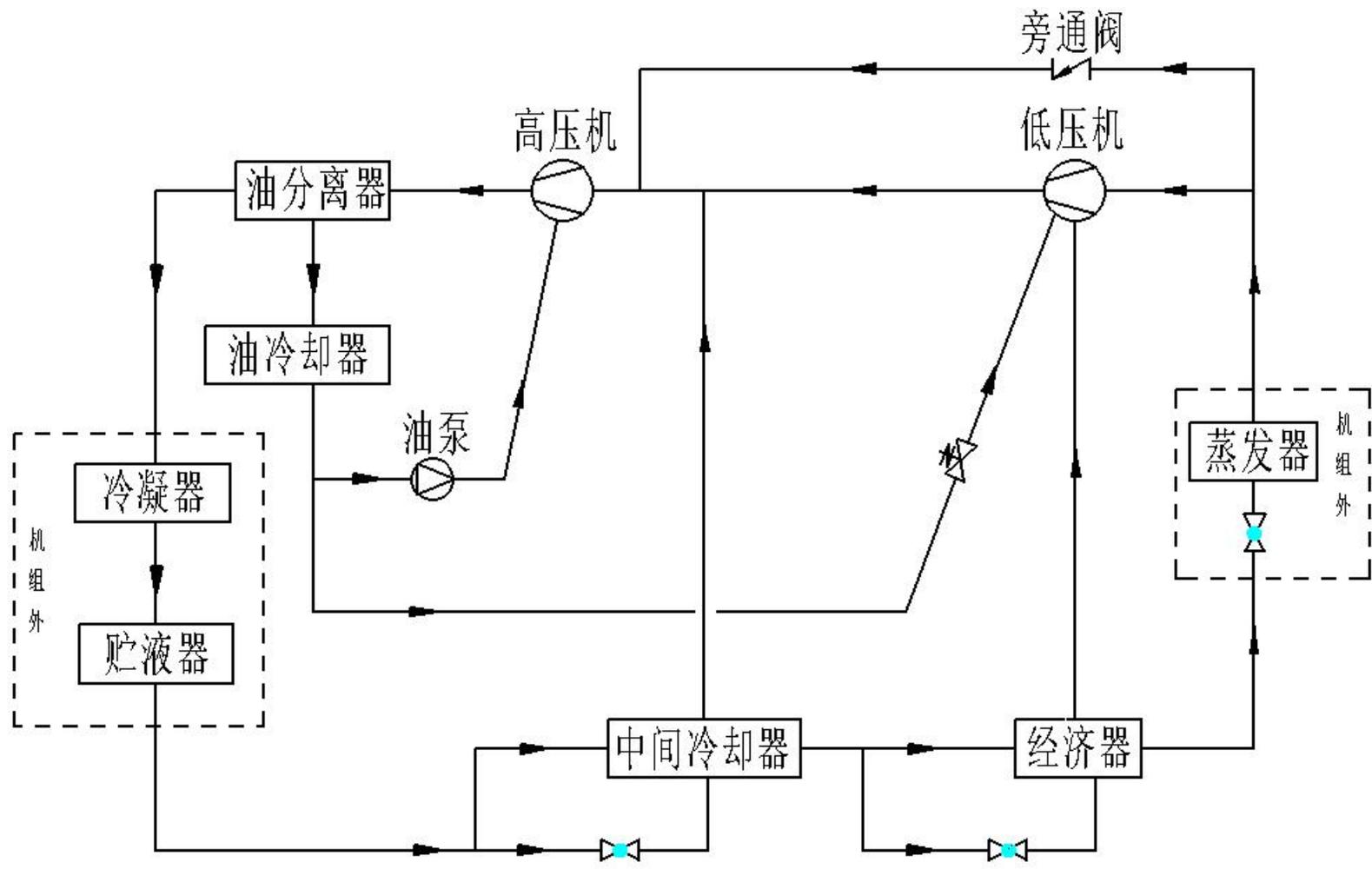
优点是高温冷量大拉温快，系统简单，缺点是电机功率大、低温COP低

双机双级流程图

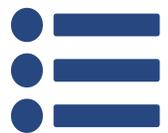


优点是配机功率小、低温COP高，缺点是高温冷量小，拉温慢

双机双级流程图



低压机带经济器



双机双级压缩机组

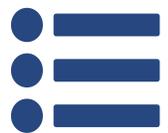
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21年制冷展

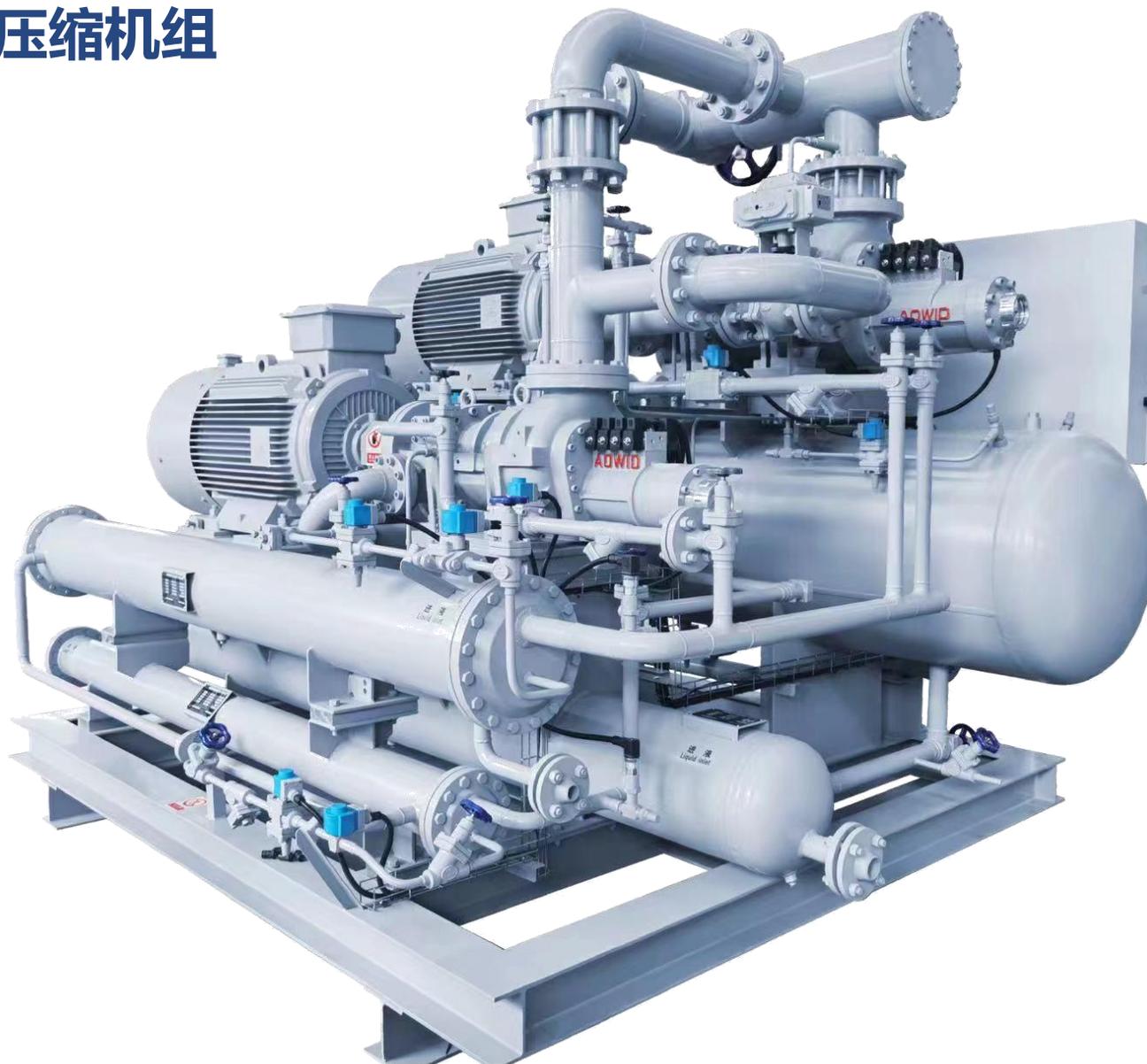
占地面积小
尽快满载拉温
一次入货量大
造价不要太高
最好还节能

○ ○ ○ ○ ○ ○



双机双级压缩机组

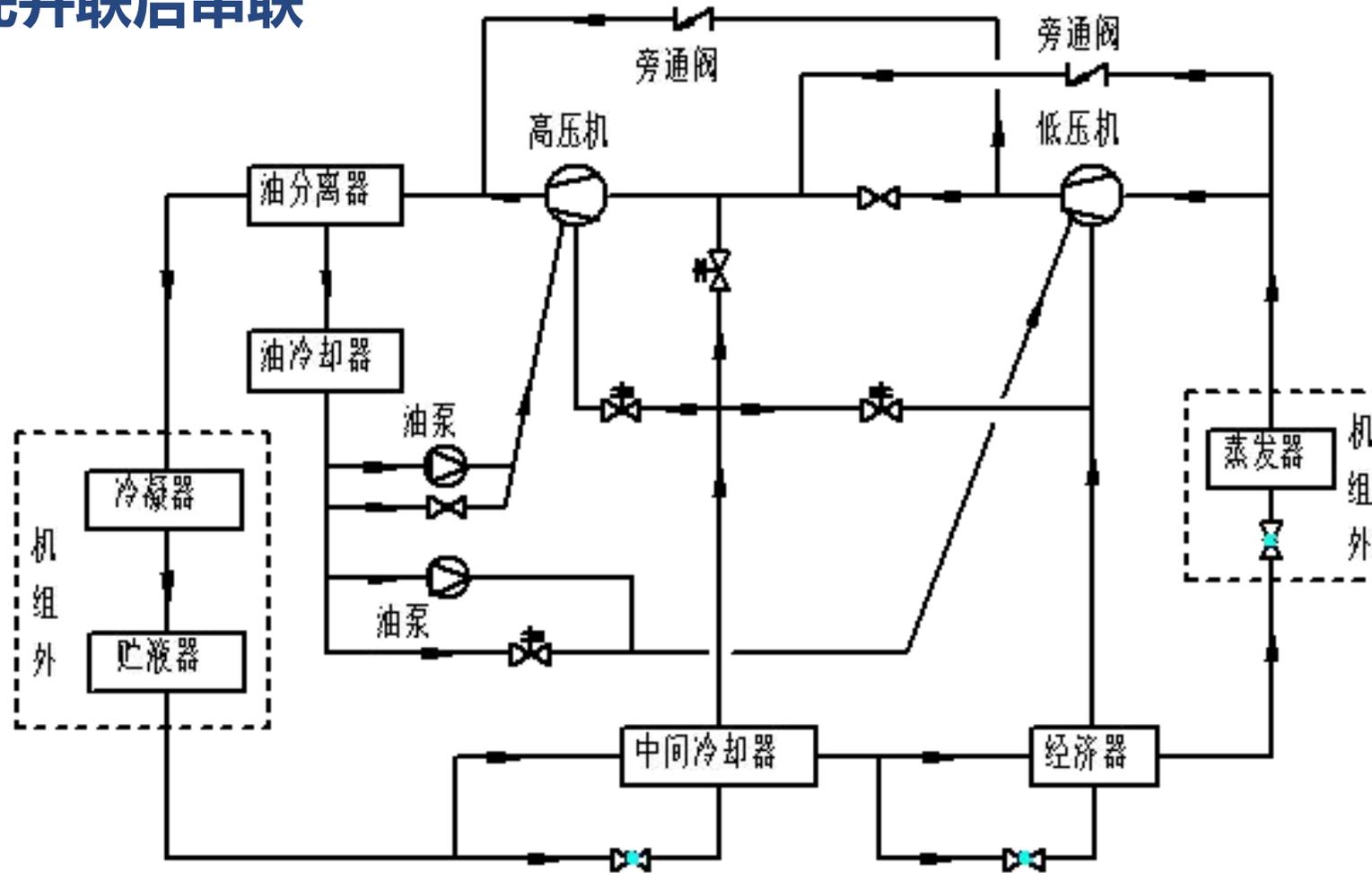
AOWID
奥威制冷



24年制冷展



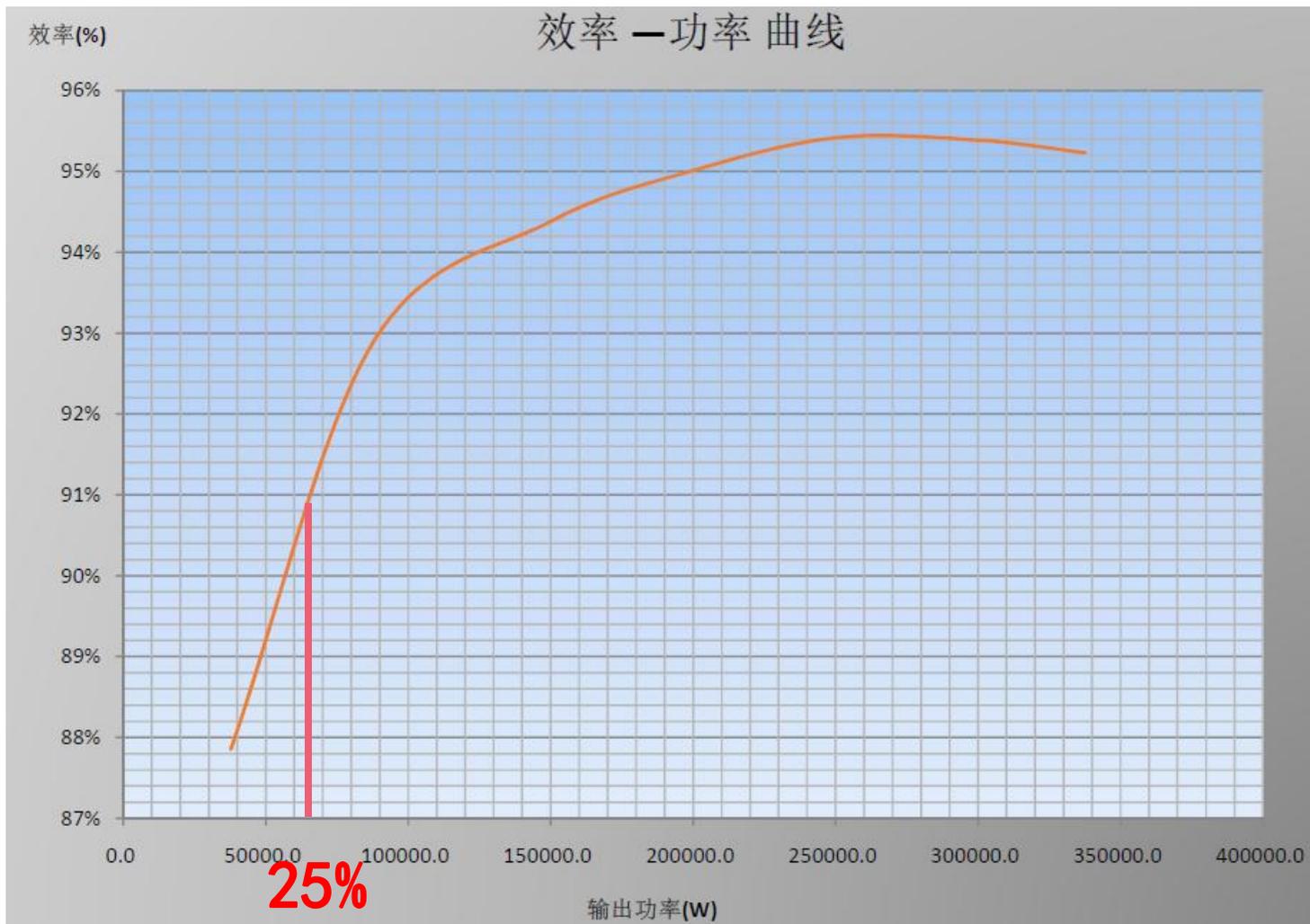
先并联后串联



- 高、低压机均可带**经济器**，提高COP；
- 高、低压机均可单独运行，用于速冻间时，高、低压机先并联后串联运行，实现快速降温，始终保持高效率。

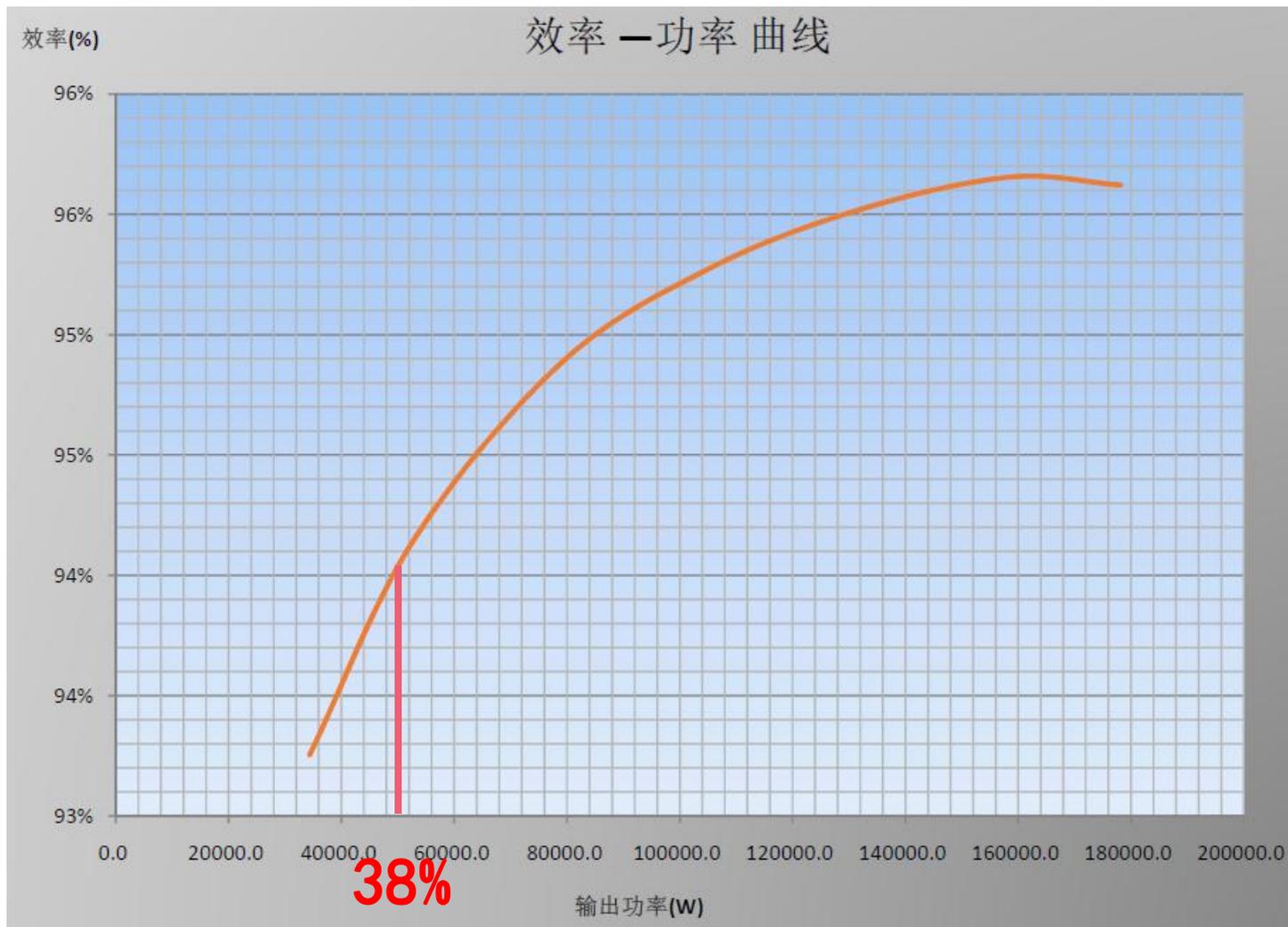


电机效率



2极250kW电机

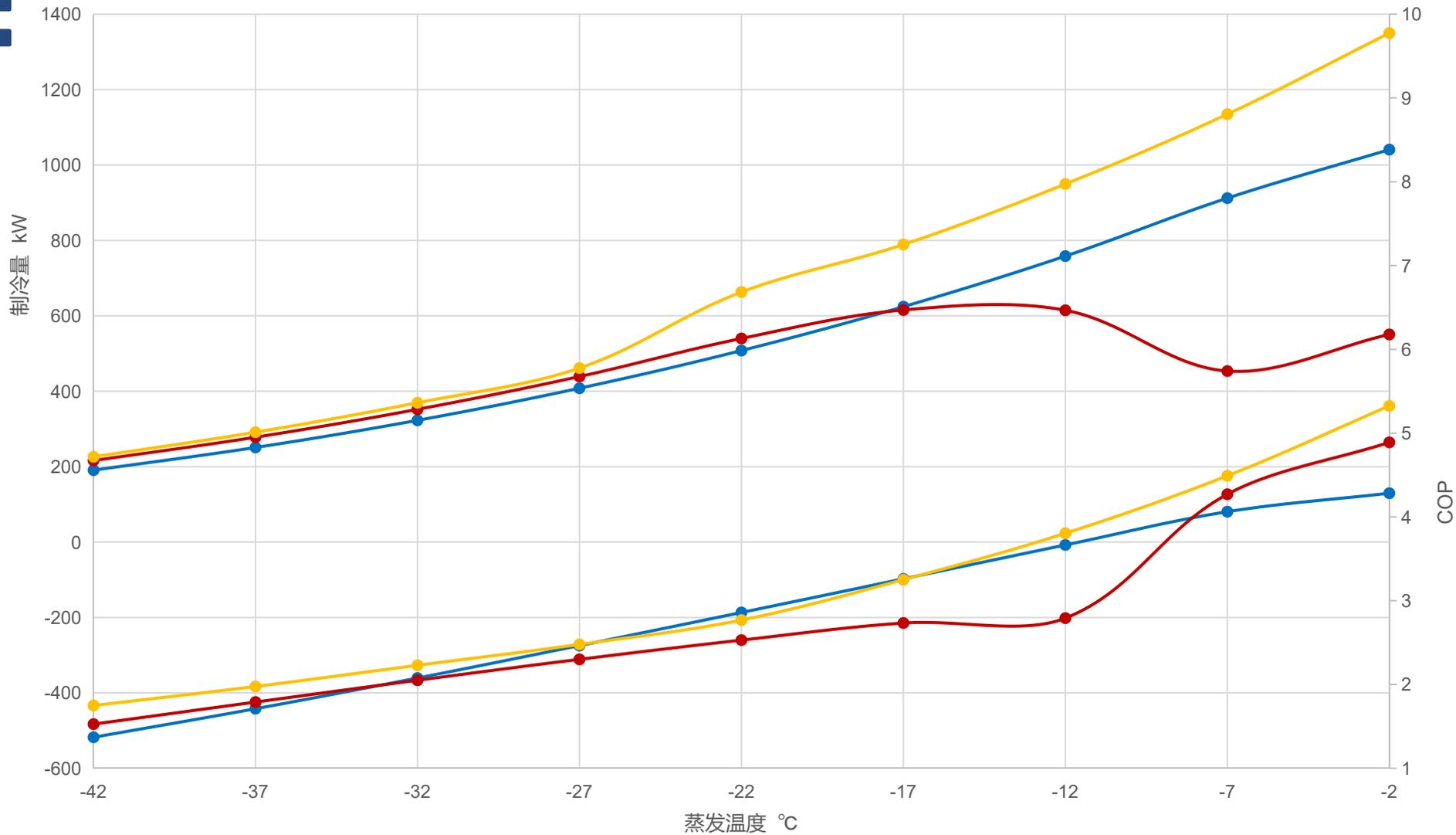
电机效率



4极变频132kW电机



性能对比



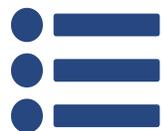
—●— 单级带经济器 —●— 单中冷双机双级 —●— 串并联双机双级 —●— 单级带经济器 —●— 单中冷双机双级 —●— 串并联双机双级



产品特点

- ◆ 速冻间系统高温段实现并联运行，高低压机一起带经济器（**流程中的中间冷却器**）降温，排量下降温快；
- ◆ 高温段结束，系统切换为串联运行，高低压配搭，低压级带经济器运行；
- ◆ 高、低压压缩机均采用**内容积比可调**型，减少压缩机的过压缩和欠压缩，系统更节能；
- ◆ 低压级采用**四级变频**电机，不配较大功率的二级电机，避免串联运行时的电机效率低；
- ◆ 低压级、高压级均采用**变频**调节，可保证机组在各工况下始终高效、经济的运行；
- ◆ 采用干式中间冷却器和经济器，既提高系统经济性又保证末端供液的安全；
- ◆ 并联运行油泵供油，串联运行时低压级采用压差供油方式；
- ◆ 控制方式为自动，设有单级并联、双级串联模式切换。

一次性入货量大，生产周期短



4极变频电机

*E Series, focusing on energy saving,
incorporates an economizer as standard.*

*C Series takes advantage of
advanced cooling technology.*

30kW/37kW/45kW/75kW

(Multi-unit) ————— 60kW/74kW/90kW/150kW



Standard specifications (-10°C to -35°C)

| Item | Unit type | | SH30E-20 | SH37E-25 | SH45E-30 | SH60E-40 | SH75E-50V | SH90E-70 | SH150E-120V |
|-----------------------------|-----------------|----------|--|----------|----------|----------|-----------|----------|-------------|
| | E Series | C Series | SH30C-20 | SH37C-25 | SH45C-30 | SH60C-40 | SH75C-50V | SH90C-70 | SH150C-120V |
| Frequency | Hz | | 50/60 | | | | | | |
| Refrigerant | | | R-22 | | | | | | |
| Power source | | | ※Motor 380/400/440V, three-phase peration circuit 200/220V, single-phase | | | | | | |
| Compressor capacity control | % | | 100, 45 | | | | | | |
| Motor | Nominal output | kW | 30 | 37 | 45 | 30×2 | 75 | 45×2 | 75×2 |
| | Type | | Semi-hermetic two-pole three-phase induction type | | | | | | |
| | Starting system | | Star delta | | | | | | |



4极变频电机

Series : iZS (single stage) semi-hermetic type inverter drive
application range : CSST: 5 ~ -40 °C CT: 30~55 °C*

Ref : R22

PF-327 (08)

Sheet No. 1 of 2

Apr.2015

Compressor standard specifications

| Model | | | KS9LDHZ | | | KS10LDHZ | | KS13MIH | |
|-----------------------------|------------------------|-------------------|---|-------|-------|----------|-------|---------|--|
| | | | 30 | 37 | 45 | 55 | 75 | 110 | |
| Rotational speed | Base (at CSST=5°C) | min ⁻¹ | 2,674 | 3,343 | 4,011 | 3,486 | 4,298 | 3,320 | |
| | Max | min ⁻¹ | 3,500 | 4,300 | 5,200 | 4,960 | 6,000 | 4,635 | |
| | Min | min ⁻¹ | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | |
| Swept Volume at base speed* | | m ³ /h | 126 | 158 | 190 | 247 | 304 | 419 | |
| Motor | Nominal output | kW | 30 | 37 | 45 | 55 | 75 | 110 | |
| | Type | | semi-hermetic 3-phase,4-pole induction / Suction refrigerant gas cooled | | | | | | |
| | Voltage available | | 380V | | | | | | |
| Inverter * | max. application motor | kW | 37 | 45 | 55 | 75 | 90 | 132 | |
| | Rated output capacity | kVA | 57 | 69 | 85 | 110 | 140 | 200 | |
| | Rated output current | A | 75 | 91 | 112 | 150 | 180 | 260 | |
| Controller | | | 200~230V·50H,60Hz | | | | | | |
| Noise | | dBA | 72 | 73 | 79 | 82 | 83 | 85 | |
| Weight | Compressor * | kg | 260 | | | 340 | | 770 | |



THANK YOU
谢谢欣赏