编 号(No.）：YC220382

日 期(DATE)：20200916

涡旋压缩机技术规格书（参考）

Specification for Scroll Compressor

型号（MODEL）：AA50PHDG-D1K2

客户名称：（CUSTOMER）			
客 户 确 认 （CONFIRMATION）			
确认日期 (DATE)		空调器型号 (MODEL)	

江 森 自 控 日 立 万 宝 压 缩 机（广 州）有 限 公 司

Johnson Controls-Hitachi Wanbao Compressor (Guangzhou) Co., Ltd.

编　制 (DRAFT)	审　核 (CHECK)	批　准 (APPROVE)

0. 变更履历 Record of Revisions

变更履历 RECORD OF REVISIONS				
序号 NO.	日期 DATE	变更页码 PAGE	变更内容 DESCRIPTION	修订人 REVD.
1	2020/9/17	16	电机参数修正	罗秀玉

1. 规格 Specification

1.1 压缩机 Compressor

压缩机型号 Compressor Model	AA50PHDG-D1K2
压缩机型式 Compressor Type	直流变频压缩机 DC Compressor
压缩机方式 Compression Type	涡旋式 Scroll Type
使用冷媒 Refrigerant	R410A
排气容积 Displacement	50cm^3/rev
润滑油 / 油量 Oil / Oil Charge	FV68H / 1600ml
防护等级/IP Rating	IPX3
涂装 Painting	黑色 Black Color Paint
重量(含油) Net Mass(Including Oil)	33kg
吸气管接口内径 Suction Accept I.D	Φ22.4mm
排气管接口内径 Discharge Accept I.D	Φ16.1mm
喷气管接口内径 Injection Accept I.D	Φ9.7mm
CQC 认证号 CQC Certification No.	CQC16008155318

1.2 电机 Motor

变频器电源 Inverter Power	380-415V, 50/60Hz
电动机型式 Motor Type / 起动方式 Star Mode	三相直流变频同步电机 / 直流专用变频器起动 3 Phase DC Synchronous Motor / DC Inverter Starting
极数 Poles	6极 6 Poles
运转频率范围 Running Frequency Range	45～420Hz
转速范围 Rotate Speed Range	15～140rps
绝缘等级 Insulation Class	E级 E Class
绕组阻抗 Winding Resistance(at 20℃)	0.197±7%Ω

1.3 性能 Performance

项目 Items	转速 Rotate Speed	规格值 Nominals	允差 Franchise
制冷能力 Capacity	At 90rps (ARI 工况)	24660W	95% Min
输入功率 Motor Input		8060W	105% Max
能效比 EER		3.06W/W	95% Min
噪音 Sound Level		72dB(A) Max	—
振动 Vibration		100μm Max	—

ARI 测试条件 Test condition of ARI:

冷凝温度 Condensing temp.: 54.4 ℃　　蒸发温度 Evaporating temp.: 7.2 ℃

回气温度 Return gas temp.: 18.3 ℃　　周围温度 Ambient temp.: 35.0 ℃

膨胀阀前液体温度 Liquid temp.: 46.1℃

1.4 一般特性 Characteristics

气密试验压力 Leak Tight Pressure	4.2MPa[高压侧 H.P. Side] / 2.2MPa[低压侧 L.P. Side]
耐压试验压力 Hydrostatic Strength Pressure	6.3MPa[高压侧 H.P. Side] / 3.3MPa[低压侧 L.P. Side]
绝缘阻抗 Insulation Resistance	10MΩ Min.
绝缘耐压 Withstand Voltage	1880V-1Min.
残余水分量 Residual Moisture	350mg Max.
含尘量 Residual Impurities	100mg Max.

2. 压缩机配件 Accessories Of Compressor

NO.	名称 Parts Name	数量 Qty	代号 Drawing NO.	备注 Remarks
1	支撑螺栓 Blot	4	CSE00289	标准部件 Standard Parts
2	防震胶垫 Rubber Grommet B	4	CSE00290	
3	防震胶座 Rubber Grommet A	4	CSE00292	
4	垫圈 Washer	4	CSE00303	
5	M6 螺母 M6 Screw Nut	4	CSN00302	
6	M8 螺母 M8 Screw Nut	4	CSN00304	
7	弹性垫圈 Spring Washer	4	CSN00305	

3.使用条件范围 Operating Conditions

蒸发温度 Evaporating Temp.	参考《压缩机运行范围》对应饱和温度 Reference Running Range Of Compressor corresponding saturation temperature
排气温度 Discharge Temp.	120℃以下 120℃ Max.
绕组温度 Winding Temp.	135℃以下 135℃Max.
压缩机上壳温度 Shell Temp.	(冷凝温度＋5℃)～120℃以下 (Condensing Temp.＋5℃)～120℃ Max.
压缩机底部温度 Bottom Temp	(冷凝温度＋10℃)～120℃以下 (Condensing Temp.＋10℃)～120℃ Max.
吸气压力 Suction Pressure	0.15～1.3MPa（起动、除霜等短时间运转除外；Except the short period such as start, defrost） **注*/ Note***
排气压力 Discharge Pressure	1.0～3.8MPa **注*/ Note ***
压力比 Pressure Ratio	1.5～8.0（起动、除霜等短时间运转除外;Except the short period such as start, defrost）
启动时系统平衡压力 System Pressure At Starting	2.08MPa 以下 2.08MPa Max
起动时的压力差 Pressure Difference At Starting	启动时高低压力要平衡 Starting up at pressure balance
启停周期 On/Off Period	周期为 10 分钟以上，停止时间必须 3 分钟以上 10 minutes min/cycle, OFF should be over 3 minutes
异常升压/降压 Abnormal Press. Rise/Drop	上升:3.8MPa 以下 Rise:3.8MPa Max. 下降:0.3MPa 以上 Drop:0.3MPa Min.
配管（铜管）应力 Copper Piping Stress	启动时:50MPa 以下 Start:50MPa Max. 运转时:10MPa 以下 Run:10MPa Max.
冷媒水分含量 Refrigerant Moisture Level	目标值 60ppm Target Value 60ppm 限定值 100ppm Boundary Value 100ppm
系统固体杂质含量 Solid Impurities Level	100mg 以下 100mg Max.
运转倾斜角度 Tilt In Operation	压缩机倾斜最大 5° 以内 5 deg. Max.

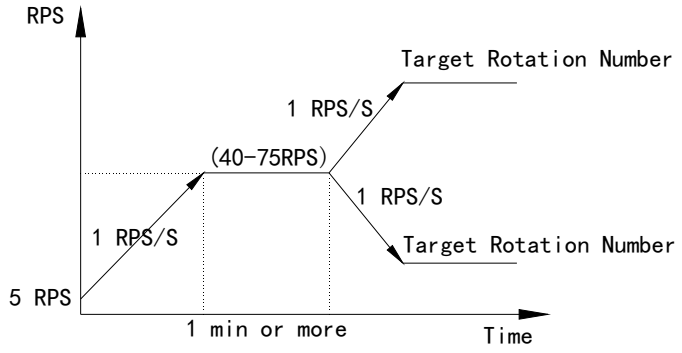
注*：标注的运行压力范围为一般运行范围，超出部分请参考《压缩机运行范围》。

Note*: With marking pressure range for general operating range, please refer to the excess part of the Running Range Of Compressor.

4.压缩机转速变化控制　The Compressor Speed Change Control

变频压缩机启动、运转和停机时的频率升降速度应按以下规则进行

The frequency of the compressor start-up, operation and stop when rising speed and descend speed should be in accordance with the following rules



说明： Explain:

A.起动过程　The Starting Process

压缩机由关到开时必须在平台（40-75 RPS）保持 1 min 或以上，再调至目标值 。

From closed to open compressor must be on the platform (40-75 RPS) keep 1 min or more, then transferred to the target number.

B.频率上升、下降速度　The frequency rate of rising speed and descend speed

频率上升、下降速度为 1 RPS/S

Frequency rate of rising speed and descend speed must be 1 RPS/S.

C.停止过程　The stopping Process

根据控制需要，可切断电源停机或者用变频器降速停机。

To stop the compressor, you can cut off the electricity or stop by slowing down the inverter based on your control need.

5.喷气回路建议　The Vapor Injection cycle suggestion

1.喷气回路可在制冷或制热模式下工作。

The Vapor Injection cycle should be applied in Cooling or Heating model.

2.喷射过程应确保压缩机顶部过热度至少 10K。

The DSH should be over 10K at injection model.(DSH=shell temp.-condensing temp.)

3.喷气回路应设置电磁阀，喷射过程打开，其他模式关闭；且停机前，应关闭电磁阀。

Solenoid valve is required in the vapor injection cycle, and open at the injection model, close at others; the valve should be closed before compressor stops.

4.喷射回路节流部件应选择电子膨胀阀，可根据压缩机顶部过热度控制开度；

The electronic expansion valve is required as throttle unit which should be controlling by the DSH,

5.喷射回路应使用过滤器，避免节流部件堵塞。

Filter is necessary in injection cycle avoiding blocking.

※ 其他注意事项 Remarks:

1. 制冷系统 The refrigeration system

1) 当系统中压缩机存在液态冷媒回流情况时，应采用储液罐等设计避免液态冷媒回流；
When the compressor in the system has the liquid refrigerant flooding back operation, the accumulator is required.

2) 向压缩机充油或冷媒时，必须从排气侧进行；
Charge oil or refrigerant from the discharge pipe.

3) 系统必须设置油分离器。如不能够保证压缩机运行的最低油量 350ml 时，可以从压缩机排气侧补充适量牌号为 FV68H 的冷冻机油；
Oil separator must be located. If compressor oil fall short of 350ml, The FV68H must be injected from the exhaust.

4) 每台压缩机都需要独立设置电流、压力、温度等保护装置；
Some protected device should be mounted for any compressor, for instance current, pressure and temperature.

5) 系统高压压力开关参考设定值为 4.15MPa，但是高压压力控制目标为 3.7Mpa 以下，请以 3.7MPa 以下为目标进行控制
We advise setting pressure of the high pressure switch as follow: 4.15MPa, but the high pressure control target 3.7Mpa or less, please 3.7MPa the following targets for the control.

6) 设置排气单向阀可以起到能量调节与压缩机不带压差启动；
The exhaust check valve may adjust capacity, and startup at no pressure difference.

7) 压缩机顶部安装温度传感器来进行排气温度保护。
The Temperature sensor must be located on top of the compressor to protect the discharge temperature.

8) 在焊接压缩机配管时，要特别注意避免焊料进入压缩机内部。
Attention that avoiding solder falls into the compressor when soldering the tubes.

9) 吸气管上需安装过滤器（100 目）。
A filter is required before the suction tube of the compressor.

2. 压缩机在去除吸、排气接头盖后，请勿放置 10 分钟以上；
Installation shall be completed within 10 minutes after removing the caps of suction and discharge tube.

3. 请勿压缩空气；
Do not compress air.

4. 在真空状态下请勿通电；
Do not energize under vacuumed condition.

5. 热泵系统必须在压缩机底部安装油加热器（40～80W,220V）；
Crankcase heater is required if the refrigeration system is heat pump.

6. 运转时，各相间的电压偏差应在额定电压的 3%以内；
Voltage (run): Voltage deviation each phase shall be within 3% of the rated voltage.

7. 请勿反向旋转；
Do not reverse rotate.

8. 压缩机的接地装置应永久与制冷器具的接地装置连接；
The compressors earth connection should be connected with that of refrigeration system permanently and firmly.

9. 成箱压缩机包装件的叠放堆码极限为 2 箱,装卸过程中严禁翻滚。
Pile limits 2 pallet. Tumbling is forbidden during handling.

10.向压缩机添加冷冻机油时，请采用注油机进行。注油机由净油单元和注油单元组成，如果只有注油单元没有净油单元，不具备净油功能，是不能去除油中水分，导致压缩机油中水分超标。加入到空调系统中油的水分要控制在 50PPM 以下，否则可能会引发压缩机耐电压不良。

Please use the oiling machine charge oil to the compressor. The oiling machine was composed of neat oil and charging parts. If only the charging unit is not neat oil unit do not have the neat oil function, can not remove the moisture of oil, leading to ovenproof. The moisture of oil should be controlled within 50PPM, otherwise it may cause withstand voltage test fault.

6. 附图 Attachment

压缩机外形图 Dimension of Compressor

压缩机性能曲线 Compressor Performance Curve

压缩机运转范围 Running Range Of Compressor

直流电机参数 DC Motor Parameter

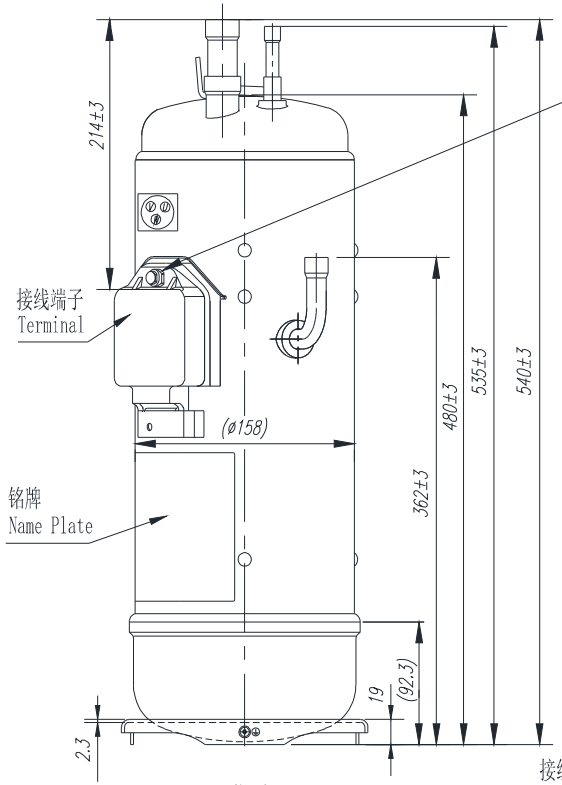
防震胶座安装图 Mounting Assembly

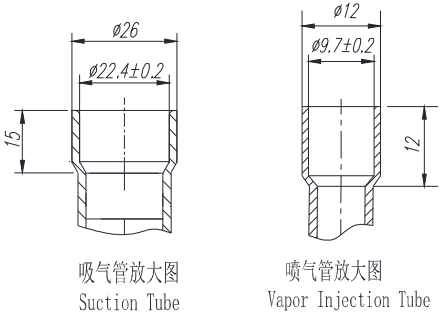
接线柱保护盖 Terminal cover

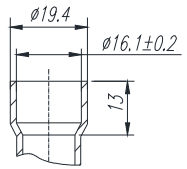
温度传感器安装图 Temperature Sensor Assembly Diagram

热油器安装图 Crankcase Heater Assembly

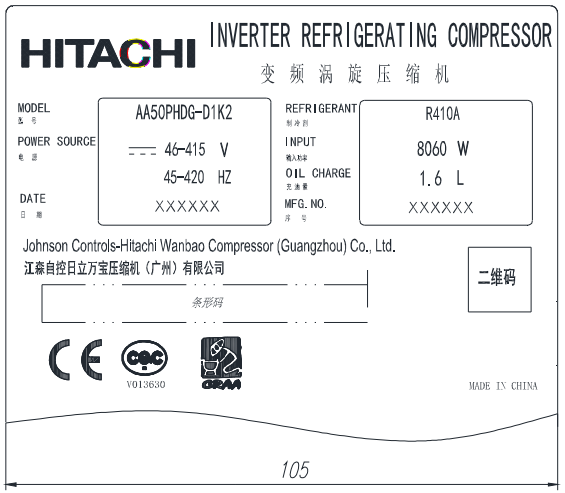
压缩机外形图 Dimension of Compressor (AA50PHDG-D1K2)

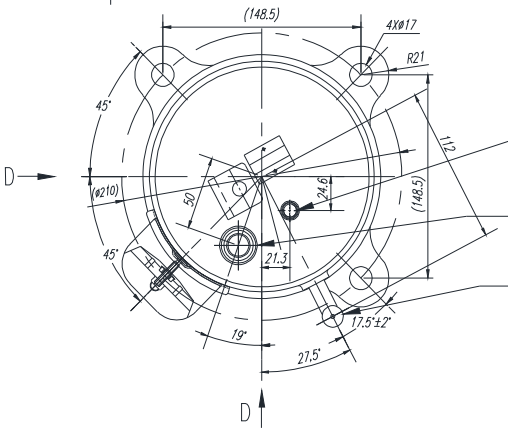






铭牌 Name Plate



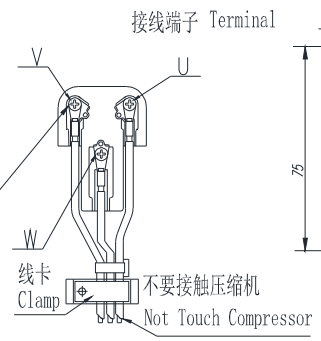


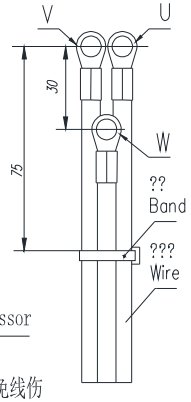
接线端子螺钉 Terminal Screw M5-6G
紧固扭矩 Tightening Torque 2.5~3.0 N·m

喷气管 Injection Accept
(I.D ø9.7钎焊连接 Welded Connection)

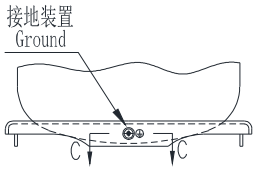
吸气管 Suction Accept
(I.D ø22.4钎焊连接 Welded Connection)

排气管 Discharge Accept
(I.D ø16.1钎焊连接 Welded Connection)





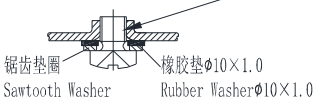
注意：必须使用线卡固定引出线，避免线伤
Note: Fixed the wires by clamp avoiding hurt on the surface.



D向 2处

C－C

接地螺钉 Grounding Screw M4-6G/6g
紧固扭矩 Tightening Torque 1.5~2.0 N·m



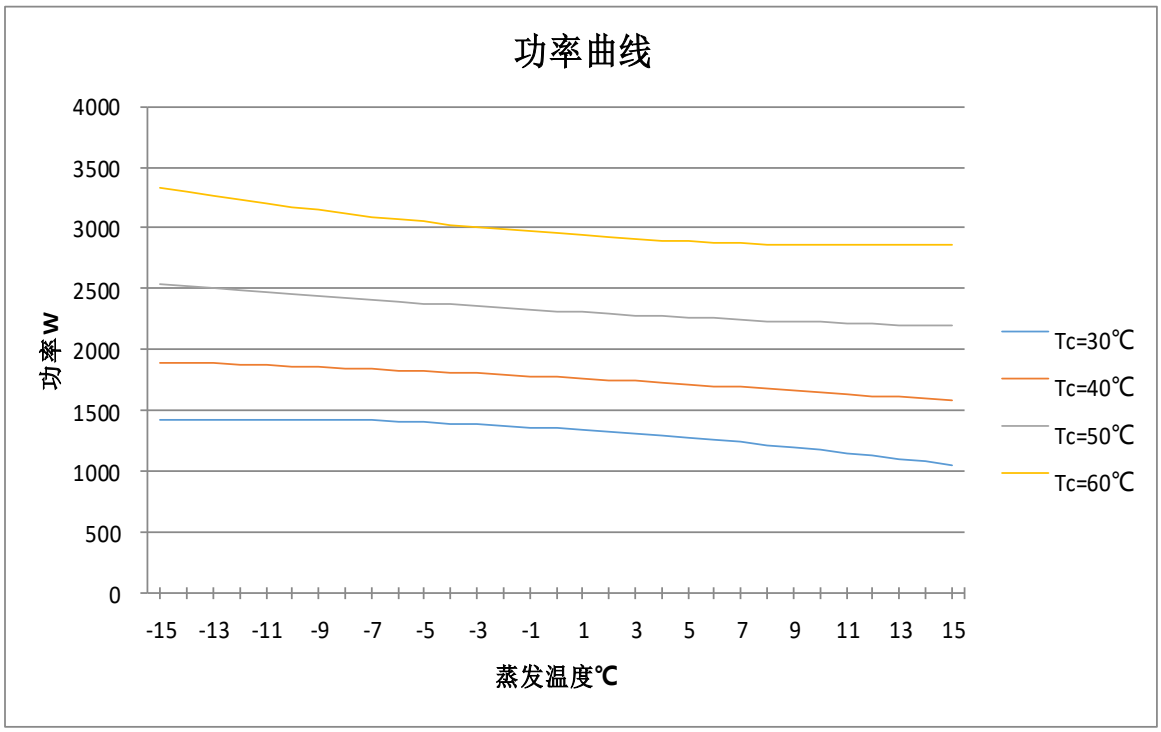
备注:接地孔及其附近无油漆,接地装置处橡胶垫在使用时必须拆除。
Remark: There should be no paint around grounding hole and its nearby, While be application, the rubber washer must be dismantled 。

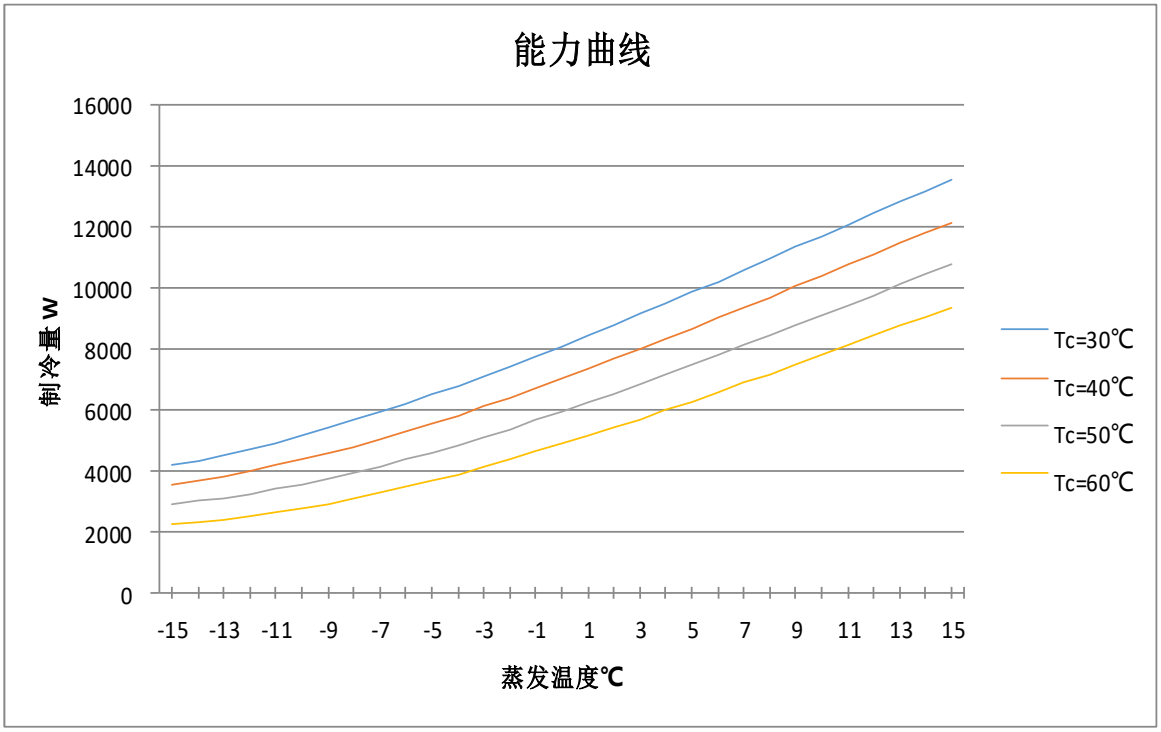
DWN.	Ruijia_C	161213	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co.,Ltd.	TITLE: Dimension of Compressor	NO.: SH-E133
CHKD.	Zhibao_W	161213			
APPD.					

HITACHI

压缩机性能曲线 Compressor Performance Cruve (AA50PHDG)

制冷剂	Refrigerant	R410A
吸气过热度	Suction Superheat	11℃
过 冷 度	Subcooling	8℃
转 速	Rotate Speed	30RPS



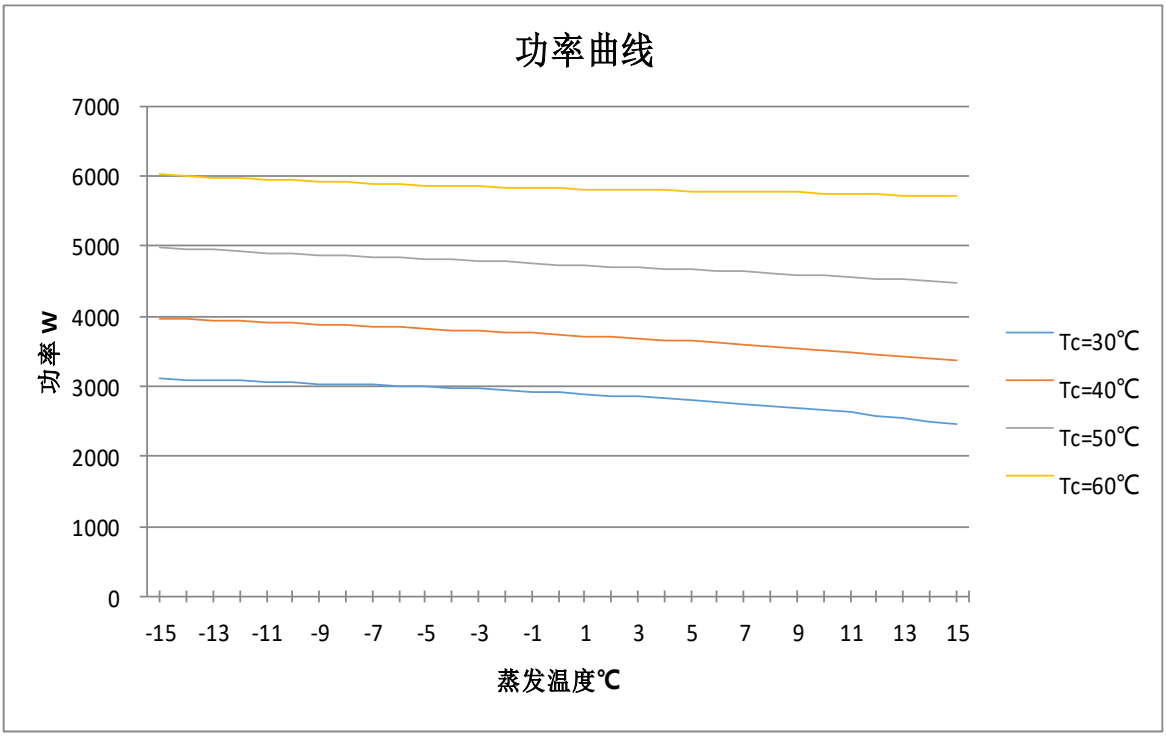


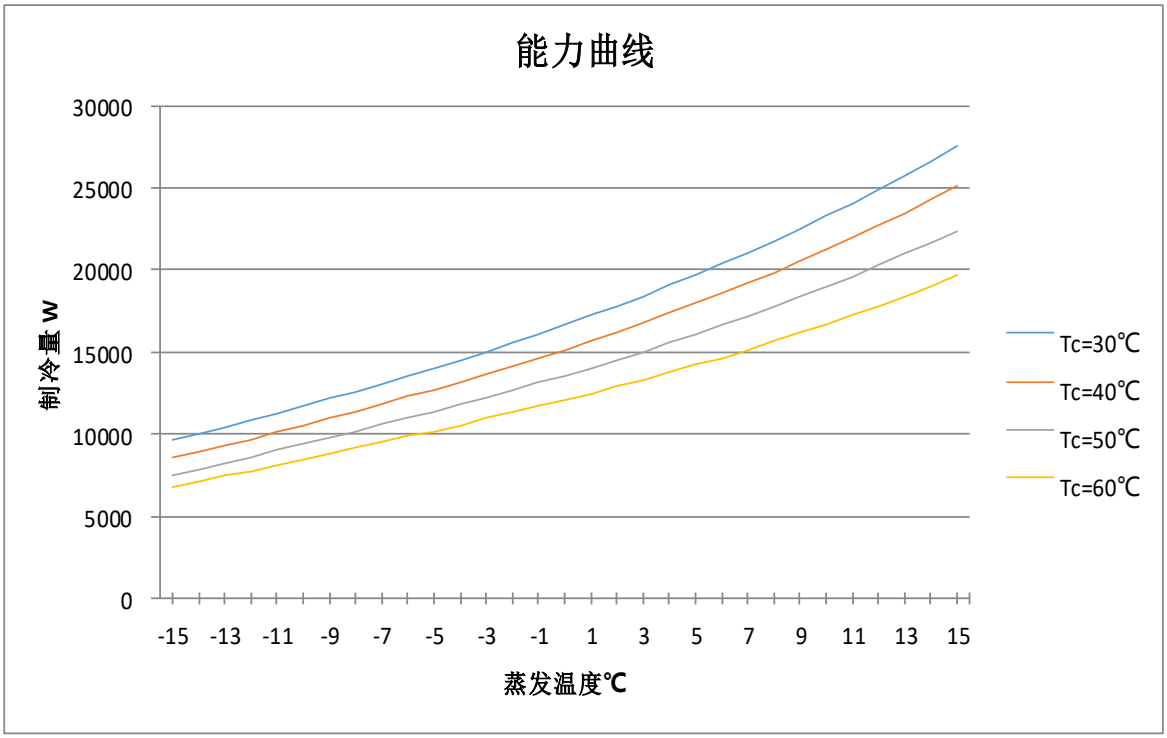
DWN.	Ruijia_C	161213	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou)Co.,Ltd.	Compressor Performance Curve	NO.: PE-E76
CHKD.	Zhibao_W	161213			
APPD.					

HITACHI

压缩机性能曲线 Compressor Performance Cruve (AA50PHDG)

制冷剂	Refrigerant	R410A
吸气过热度	Suction Superheat	11℃
过 冷 度	Subcooling	8℃
转 速	Rotate Speed	60RPS



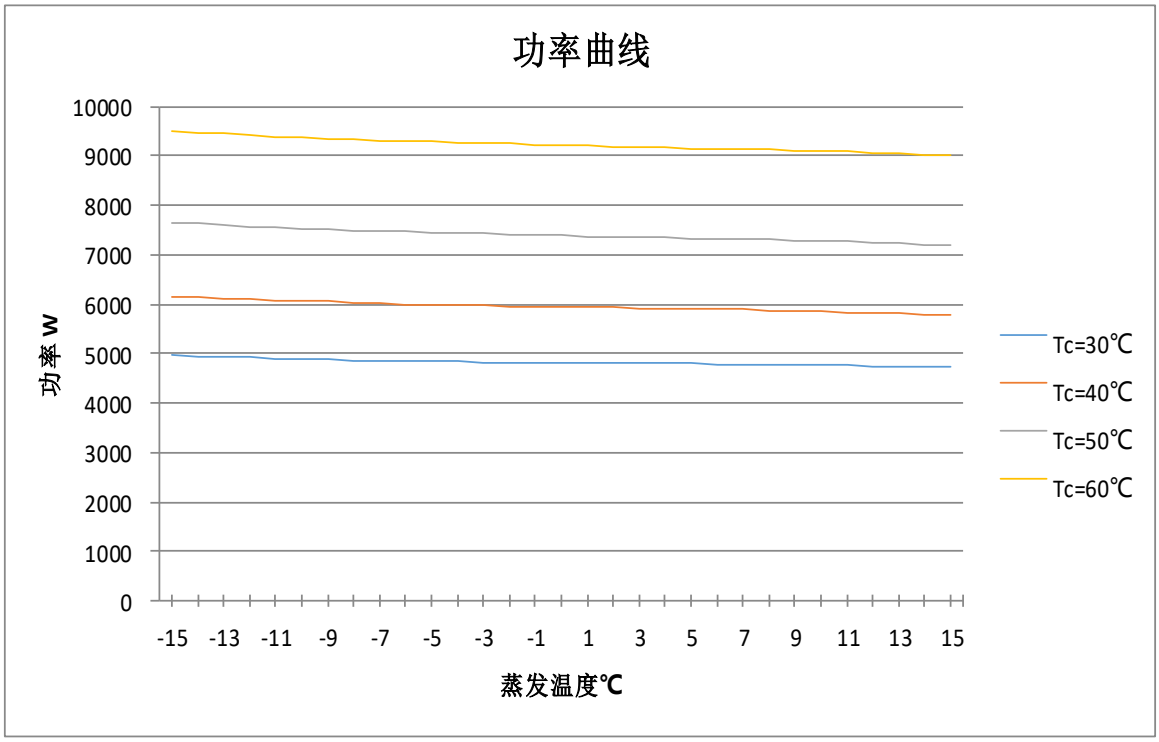


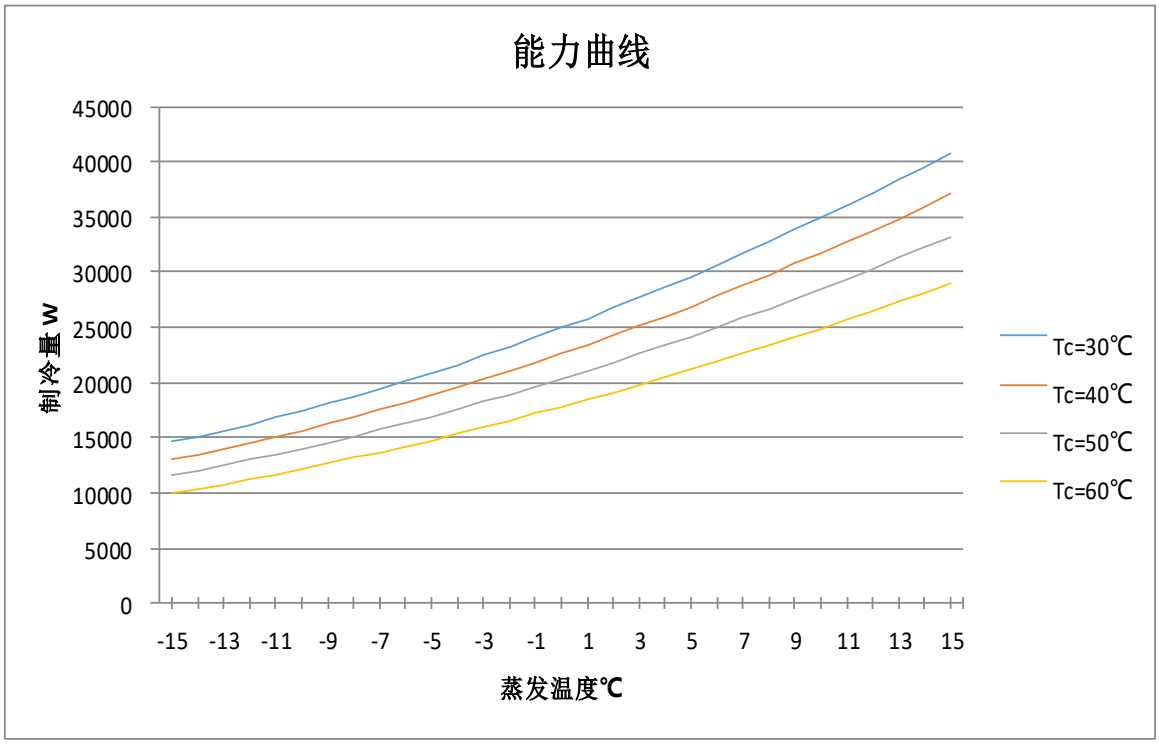
DWN.	Ruijia_C	161213	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou)Co.,Ltd.	Compressor Performance Curve	NO.: PE-E77
CHKD.	Zhibao_W	161213			
APPD.					

HITACHI

压缩机性能曲线 Compressor Performance Cruve (AA50PHDG)

制冷剂	Refrigerant	R410A
吸气过热度	Suction Superheat	11℃
过 冷 度	Subcooling	8℃
转 速	Rotate Speed	90RPS



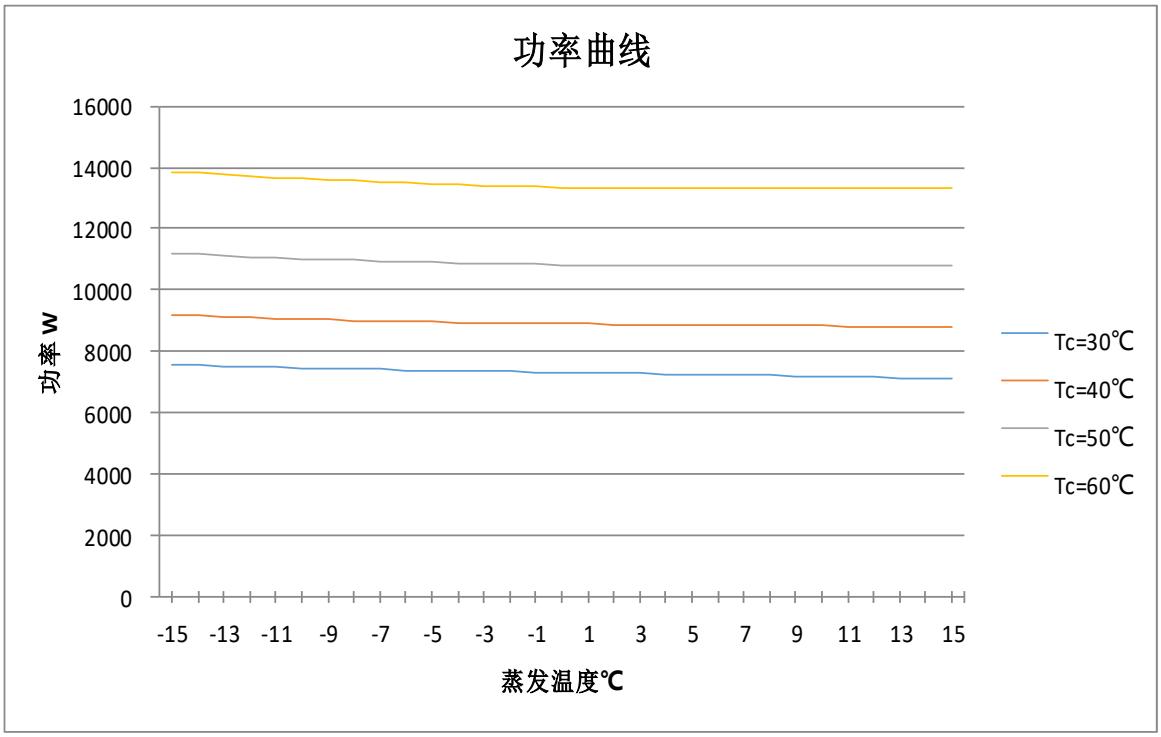


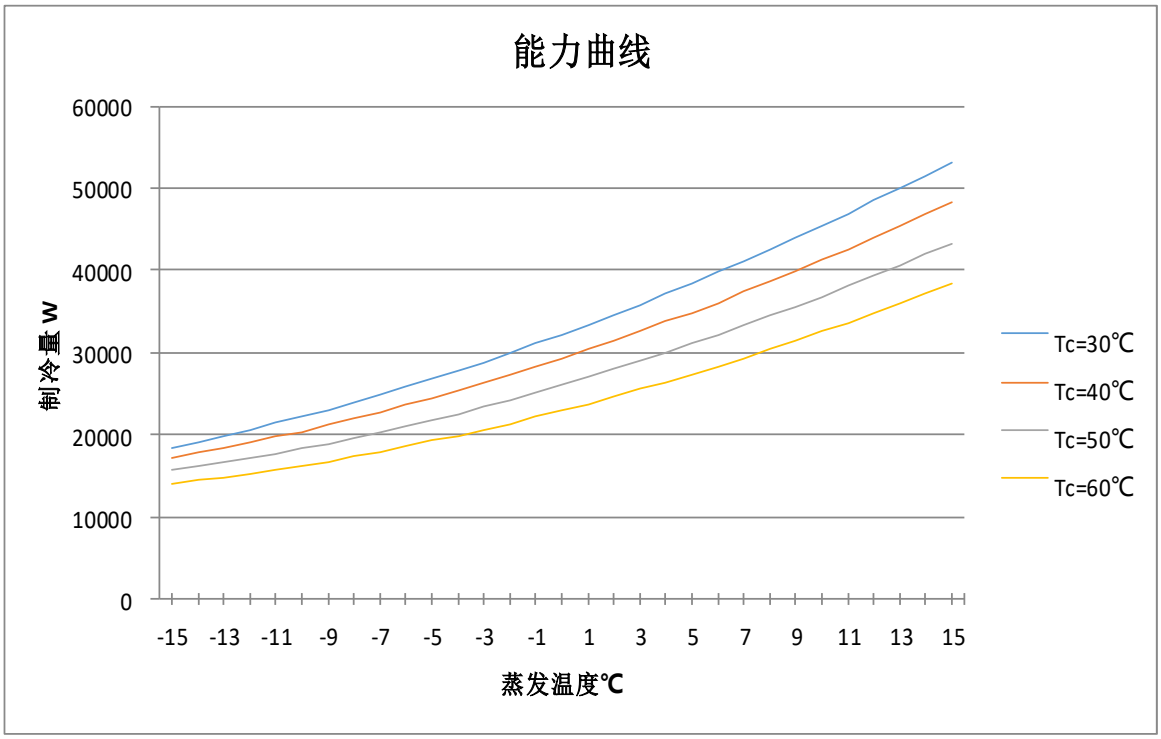
DWN.	Ruijia_C	161213	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou)Co.,Ltd.	Compressor Performance Curve	NO.: PE-E78
CHKD.	Zhibao_W	161213			
APPD.					

HITACHI

压缩机性能曲线 Compressor Performance Cruve (AA50PHDG)

制冷剂 Refrigerant	R410A
吸气过热度 Suction Superheat	11℃
过 冷 度 Subcooling	8℃
转 速 Rotate Speed	120RPS

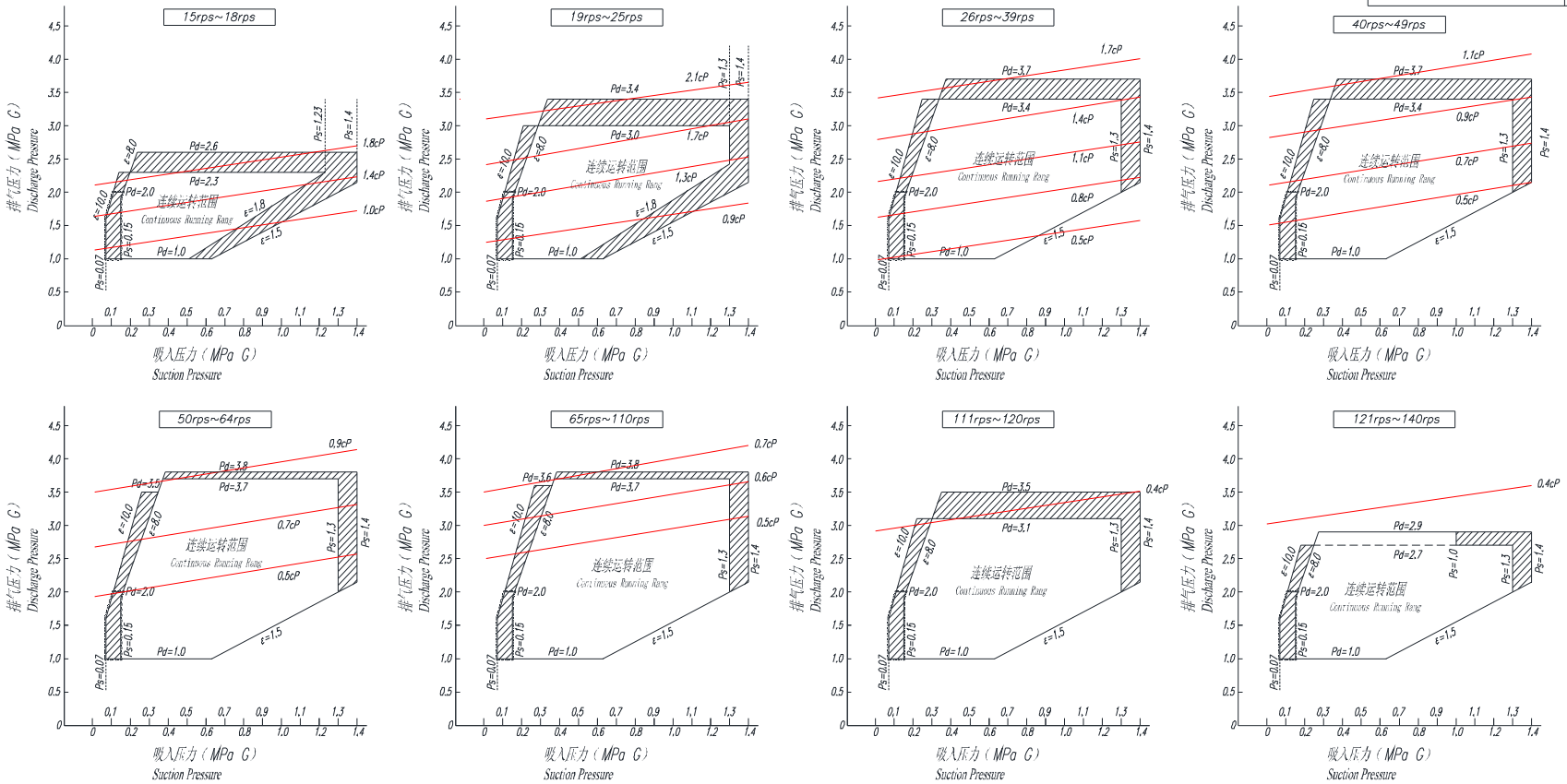




DWN.	Ruijia_C	161213	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co.,Ltd.	Compressor Performance Curve	NO.: PE-E79
CHKD.	Zhibao_W	161213			
APPD.					

压缩机运行范围（Running Range Of Compressor ）

适用机型 Model	AA50PHDG
使用冷媒 Refrigerator	R410A
润滑油 Oil	FV68H



注：1. ▨内是带条件的运行压力范围。▨ The operating pressure range with conditions

2. 其中常条件的运行范围运行时间累计不超过500小时。With conditions of operation range of the time not more than 500 hours

3. 确保图示的混合润滑粘度以上。 Make sure the viscosity of mixed lubrication is higer than the graphical curve.

(例)50rps Pd=3.7MPa，确保粘度0.7cP以上 (Example) Pd=3.7MPa 50rps, to ensure that the viscosity of 0.7cP above

4. 转速在40rps以上60rps以下时，以下条件范围内混合润滑粘度不能确保时也可以运行：

When speed is between 40rps and 60rps, compressor can also operate although viscosity of mixed lubrication could not ensure under the following conditions;

压力条件：排气压力在2.7MPa以下连续运行。Pressure conditions: exhaust pressure in the following continuous operation of 2.7MPa.

时间与频率：13分/次以下，1次/天。 Time and frequency: 13 minutes / time, 1 times / day.

油粘度：0.3cP以上 。 Oil viscosity: 0.3cP above.

5. 双点划线区域内排气温度应在90℃以下：The exhaust temperature in the double dot line area should be below 90:

①过渡阶段(3分钟内)在该区域运转无累计时间限制；The transition phase (3 minutes) in the area of operation without the cumulative time limit;

②超过3分钟累计在500h内。 More than 3 minutes accumulated in the 500h.

6. 以上压力均为表压。The graphic pressure for relative pressure.

DWN.	Ruijia_C	161213	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co., Ltd.	TITLE: Running Range Of Compressor	NO.: EL-18
CHKD.	Zhibao_W	161213			
APPD.					

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DC 电机参数　　DC Motor Parameter

压缩机型号　Compressor Model	AA50PHDG-D1**
电源　　Power Supply	380/415V
① 电机转速范围 Motor’s rotate speed running range	参照运行范围 Refer to running range
② 电机额定转速　Rated rotate speed	3600RPM
③电机 Q 轴相电感 Lq （H） Q axis phase inductance Lq (H)	如下图 As follows
④电机 D 轴相电感 Ld （H） D axis phase inductance Ld (H)	如下图 As follows
⑤电机端子间电阻 Rs(Ω):在 20℃ Resistance between terminal Rs(Ω):at 20℃	U-V:0.197Ω±7% V-W:0.197Ω±7% W-U:0.197Ω±7%
⑥电机 1 相的卷线电阻 Rs(Ω):在 20℃ Phase 1 winding resistance Rs(Ω):at 20℃	0.099Ω
⑦电机额定电流 （A） Rated current （A）	ARI: 20.0A ARI: 3600rpm-1530gm
⑧电机转子和负载转动惯性力矩(kg·m^2) Rotor and load rotate torque(kg·m2)	2.653x10^{-3}kg·m^2
⑨电机力矩常数 Kt Torque constant Kt	ARI:0.748(15.0N-m /20.0A)
⑩线间磁通量(U-V 间):在 20℃ Inter wire flux(U-V): at 20℃	410mWb·t
⑪电机电压常数 Ke(引起电压常数) (1000RPM 转速的电压的实效值) Voltage constant Ke(rise voltage constant) (1000RPM voltage virtual value)	45.2V (0.0452V/rpm) (81.36x1000/1800)
⑫电机的极数(极对数) Number of poles (number of pole-pairs)	6 极(极对数是 3) 6 poles (3 pair of poles)
⑬退磁电流：在 150℃，退磁 1% ***1**（采用稀土类磁石） Demagnetizing current: at 150℃, demagnetize 1% （using rare earth magnet） **注*/Note***	62.80Apk
额定转数、额定力矩时的输入功率 Input power at rated rotation speed and torque	ARI:输出功率为 5647W 时，输入功率为 6034W ARI:When output is 5647 W, input power is 6034 W

注*：标注表示压缩机的容许电流，超过此电流运行时，磁铁会退磁.

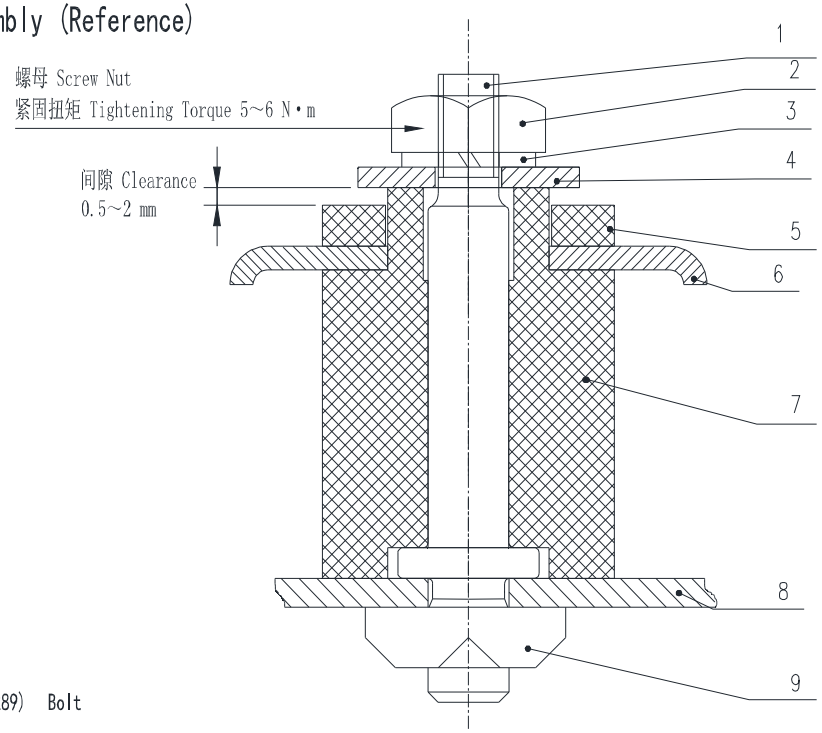
Note*：With marking means allowable current of compressor, when current exceeds this value, magnet will be demagnetized.

Ld＆Lq 电感参数如下表：

Inductance parameter of Ld＆Lq as following：

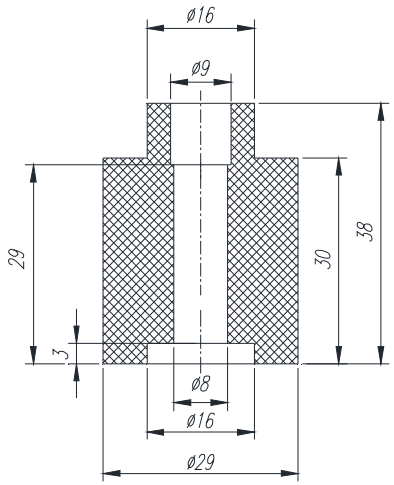
电流I(A)	1	3	5	10	15	20	25	30	35	40
Ld(mH)	1.80	1.92	1.92	1.87	1.79	1.70	1.62	1.55	1.50	1.44
Lq(mH)	3.01	3.03	3.01	2.82	2.60	2.40	2.24	2.11	2.01	1.91

防震胶座安装图(参考)　Mounting Assembly (Reference)

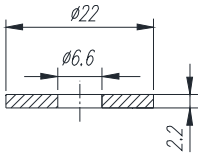


1	支撑螺柱 Bolt
2	M6螺母 M6 Screw Nut
3	弹簧垫圈 Spring Washer
4	垫圈 Washer
5	防震胶垫 Rubber Grommet B
6	压缩机底座 Compressor Foot
7	防震胶座 Rubber Grommet A
8	空调器底座 Unit Base
9	M8螺母 M8 Screw Nut

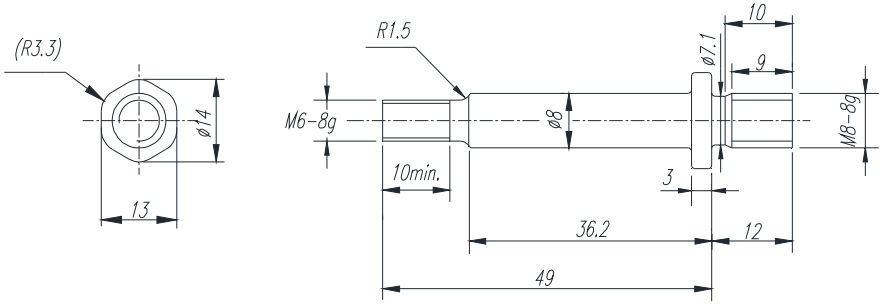
防震胶座(CSE00292)
Rubber Grommet A



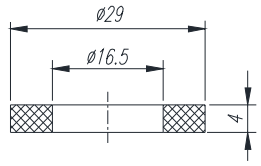
垫圈(CSE00303)　Washer



支撑螺栓(CSE00289)　Bolt

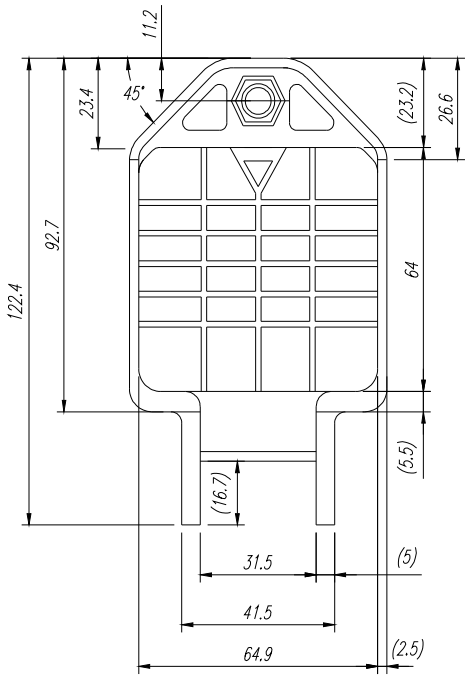


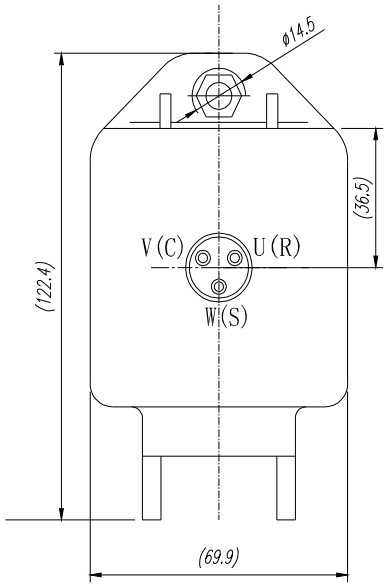
防震胶垫(CSE00290)
Rubber Grommet B

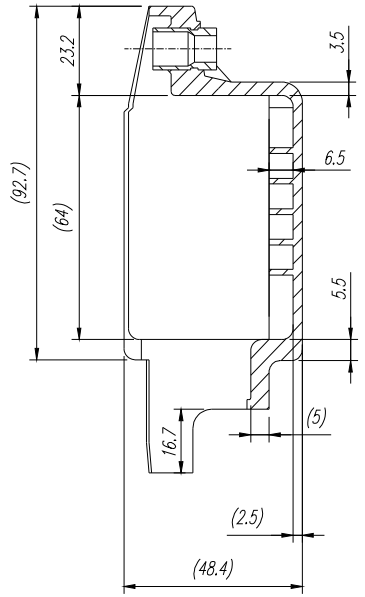


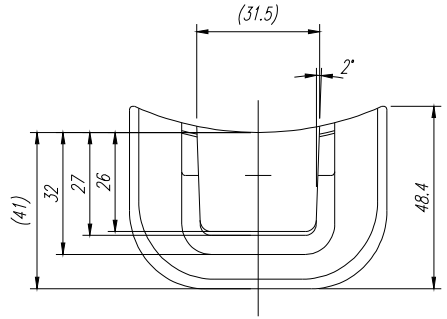
DWN.	Ruijia_C	161213	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co.,Ltd.	TITLE: Mounting Assembly	NO.: AC-03
CHKD.	Zhibao_W	161213			
APPD.					

接线柱保护盖 Terminal Cover









技术要求

Specifications

1. 零件颜色为黑色。
   The element is black.
2. 零件材质为PC。
   The material of element is PC.

DWN.	Ruijia_C	161213	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co.,Ltd.	TITLE: Terminal Cover	NO.: AC-20
CHKD.	Zhibao_W	161213			
APPD.					

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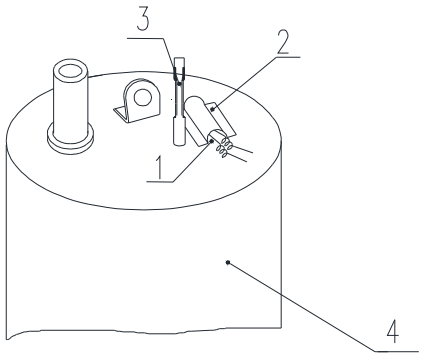
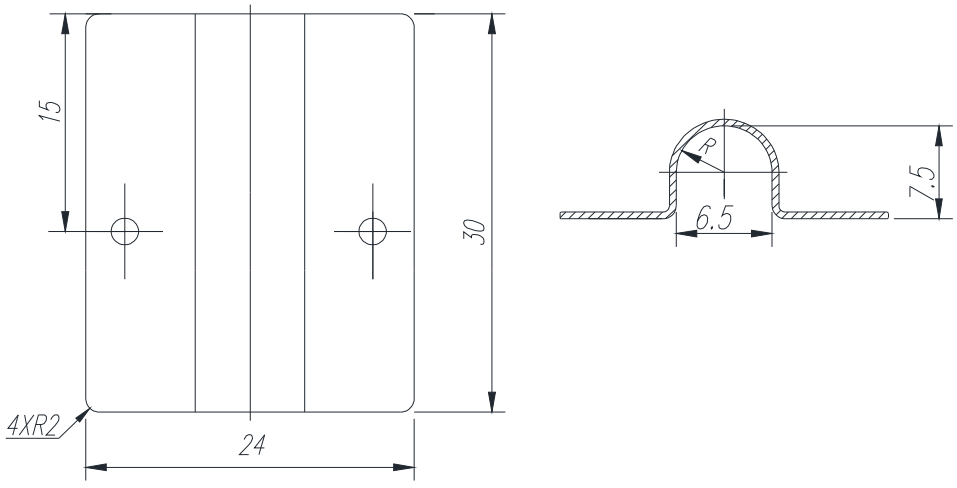
温度传感器安装图 Temprature Sensor Assembly Diagram



序号 No.	名 称 Parts Name	备 注 Remarks
1	温度传感器 T.S.	客户自配
2	传感器套管 T.S. Tube	Length: 30mm
3	喷气管 Vapor Injection Tube	
4	压缩机 Compressor	

传感器套管 T.S. Tube



DWN.	Ruijia_C	161213	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co.,Ltd.	TITLE: Crankcase Heater Assembly	NO.: AC-23
CHKD.	Zhibao_W	161213			
APPD.					

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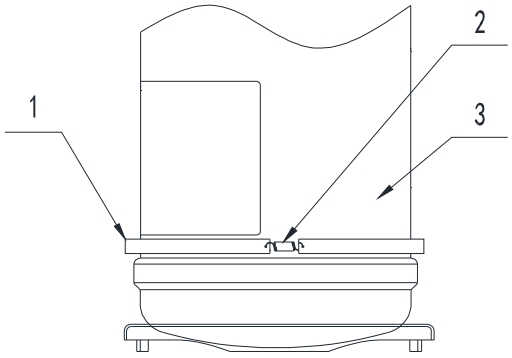
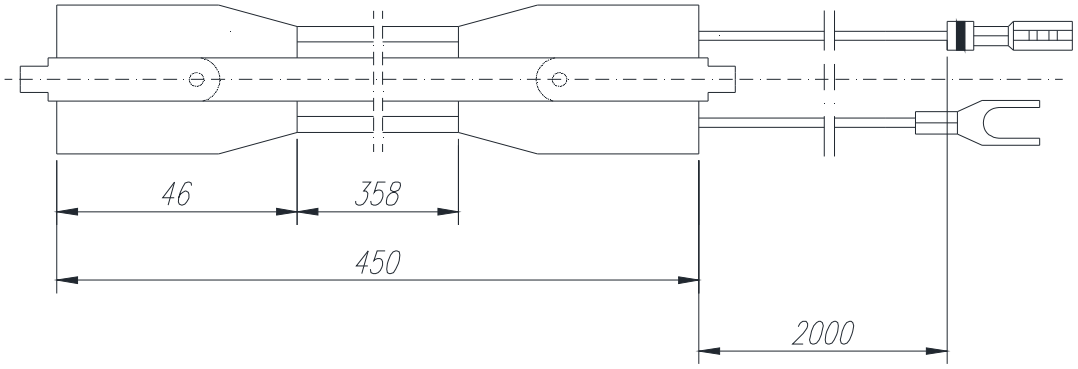
热油器安装图 Crankcase Heater Assembly

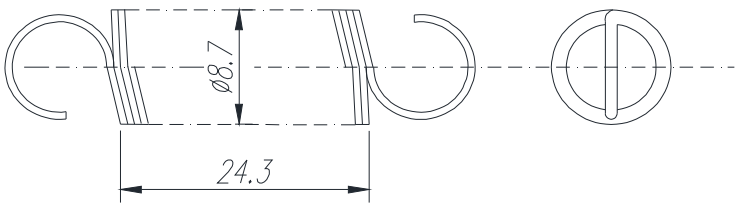


序号 No.	名 称 Parts Name	备 注 Remarks
1	热油器 Crankcase Heater	220V,40W
2	弹簧 Spring	
3	压缩机 Compressor	

热油器(CSD00300) Crankcase Heater



弹簧 Spring



DWN.	Ruijia_C	161213	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co.,Ltd.	TITLE: Crankcase Heater Assembly	NO.: AC-19
CHKD.	Zhibao_W	161213			
APPD.					