

编号(No.) : YC222201

日期(DATE) : 20221027

## 涡旋压缩机技术规格书（参考）

Specification for Scroll Compressor (For reference only)

型号 (MODEL) : DD110KHDG-D3J7

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)



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## 1. 规格 Specification

### 1.1 压缩机 Compressor

压缩机型号 Compressor Model	DD110KHDG-D3J7
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	R454B
排气容积 Displacement	110cm <sup>3</sup> /rev
润滑油 / 油量 Oil / Oil Charge	FVC85EA / 2300ml
防护等级/IP Rating	IPX3
涂装 Painting	黑色 Black Color Paint
重量(含油) Net Mass(Including Oil)	46kg
吸气管接口内径 Suction Accept I.D	Φ28.9mm
排气管接口内径 Discharge Accept I.D	Φ19.3mm

### 1.2 电机 Motor

变频器电源 Inverter Power	380~570V, 50/60Hz
电动机型式 Motor Type / 启动方式 Star Mode	三相直流变频同步电机 / 直流专用变频器启动 3 Phase DC Synchronous Motor / DC Inverter Starting
极数 Poles	6极 6 Poles
运转频率范围 Running Frequency Range	30~420Hz
转速范围 Rotate Speed Range	10~140rps
绝缘等级 Insulation Class	E级 E Class
绕组阻抗 Winding Resistance(at 20℃)	0.135±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 60rps (ARI 工况)	34000W	95% Min
输入功率 Motor Input		10300W	105% Max
额定电流 Current		32 A	105% Max
能效比 EER		3.30W/W	95% Min
噪音 Sound Level		73dB(A) Max	—
振动 Vibration		100μm Max	—

ARI 测试条件 Test condition of ARI:

冷凝温度 Condensing temp.: 54.4 °C

蒸发温度 Evaporating temp.: 7.2 °C

回气温度 Return gas temp.: 18.3 °C

周围温度 Ambient temp.: 35.0 °C

膨胀阀前液体温度 Liquid temp.: 46.1 °C

### 1.4 一般特性 Characteristics

气密试验压力 Leak Tight Pressure	4.8MPa
爆破压力 Burst Test Pressure	17MPa
绝缘阻抗 Insulation Resistance	10MΩ Min.
绝缘耐压 Withstand Voltage	2150V-1Min.
残余水分量 Residual Moisture	350mg Max.
含尘量 Residual Impurities	100mg Max.

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## 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	4CG0100C00100	标准部件 Standard Parts
2	防震胶垫 Rubber Grommet B	4	4CG0100D00200	
3	防震胶座 Rubber Grommet A	4	4CG0100B00600	
4	垫圈 Washer	4	4CG0600A00400	
5	M6 螺母 M6 Screw Nut	4	9CG0500A00100	
6	M8 螺母 M8 Screw Nut	4	9CG0500A00200	
7	弹性垫圈 Spring Washer	4	9CG0600A00200	

## 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	0.06~1.5MPa (启动、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	1.0~3.9MPa 注*/ Note *
压力比 Pressure Ratio	1.5~14.3 (启动、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
启动时的压力差 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 3.9MPa 以下 Rise:3.9MPa 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 Note:

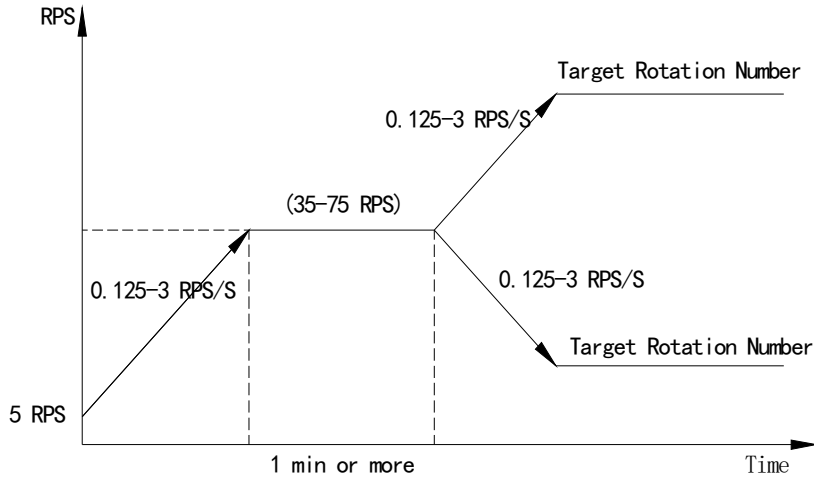
- \*标注的运行压力范围为一般运行范围, 超出部分请参考《压缩机运行范围》;  
With \* marking pressure range for general operating range, please refer to the excess part of the Running Range of Compressor.
- 规格书中未特别注明的压力均为表压。  
Pressure not specified in the specification is the gauge pressure.

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## 4. 压缩机转速变化控制 The Compressor Speed 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. 启动过程 The Starting Process

压缩机由关到开时必须先在平台（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 0.125 ~ 3 RPS/S

Frequency rate of rising speed and descend speed must be 0.125 ~ 3 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.

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## ※ 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 FVC85EA 的冷冻机油;  
Oil separator must be located. If compressor oil fall short of 350ml, The FVC85EA must be injected from the discharge pipe.
  - 4) 压缩机需要独立设置电流、压力、温度等保护装置;  
Some protected device should be mounted for compressor, for instance current, pressure and temperature.
  - 5) 系统高压压力开关参考设定值为 4.0MPa, 低压压力开关参考设定值为 0.1MPa  
We advise setting pressure of the high pressure shut off is less than 4.2MPa, a low pressure shut off is more than 0.1MPa.
  - 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.
  - 10) 并联系统中回油毛细管前必须安装过滤器。  
A filter is required before capillary tube in multiple refrigerant.
  - 11) 并联制冷系统维护 Maintenance of the multi-compressor system  
如果出现压缩机损坏, 并且能确认该压缩机机械部分异常磨损或存在电机烧损的情况时, 必须更换整台并联型压缩机组。如果系统中有气液分离器和油分离器, 竭力推荐将其更换, 同时对空调系统进行彻底清洗。  
If the compressor was broken, and can confirm that was caused by malfunction of motor or abnormal wear out of mechanic parts, all of compressors in this system should be changed. We also highly suggest that the accumulator and refrigerant oil separator should be changed, and make a full washing of the system before installing the new compressors.
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;

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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.

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## 5. 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

防震胶座装配图 Mounting Assembly

接线柱保护盖 Terminal cover

温度传感器组装图 Temperature Sensor Assembly Diagram

热油器安装图 Crankcase Heater Assembly

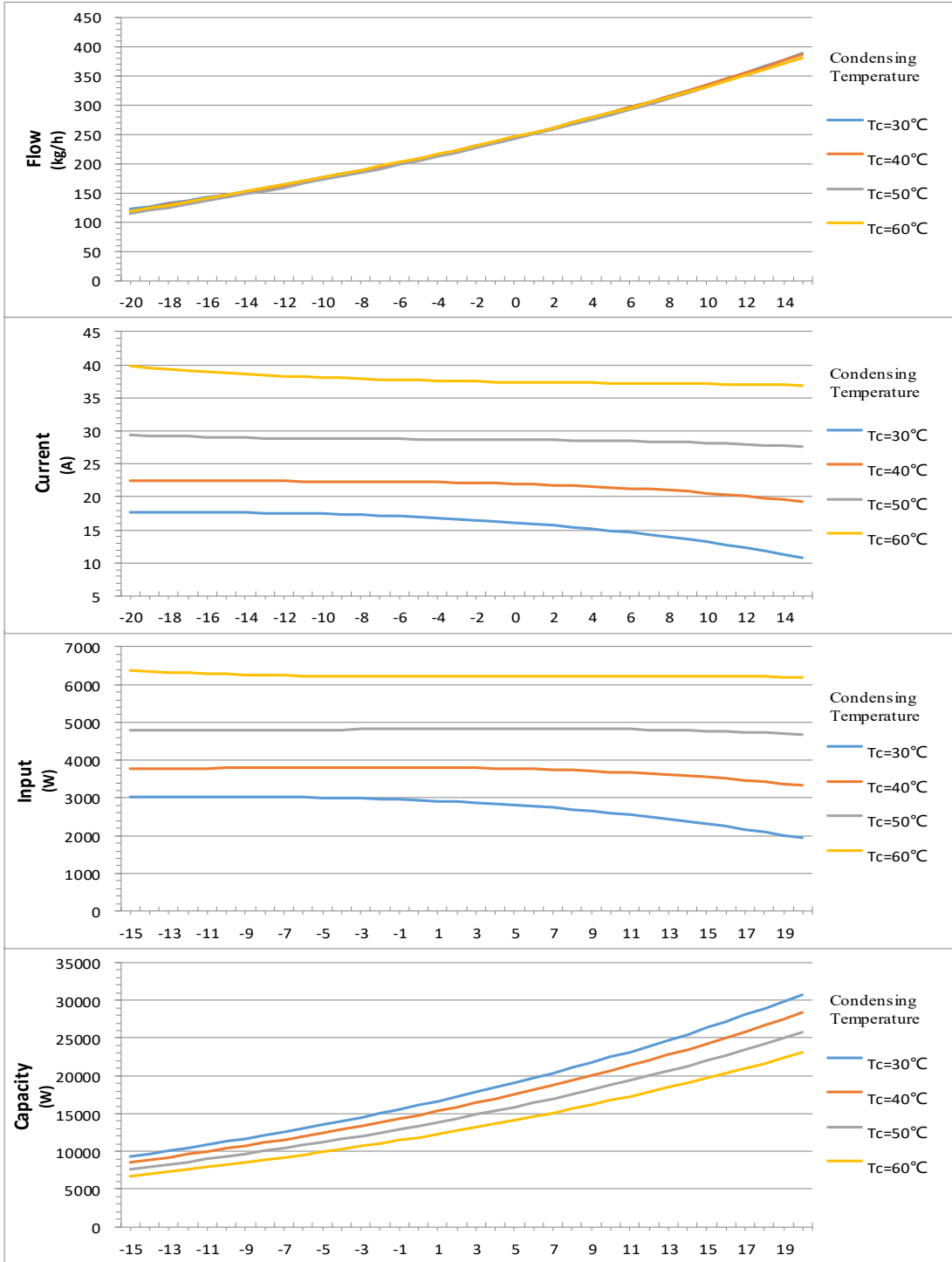




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压缩机制冷性能曲线 Compressor Cooling Performance Curve (DD110KHDG\*-D3)

制冷剂	Refrigerant	R454B
吸气过热度	Suction Superheat	11.1℃
过冷度	Subcooling	8.3℃
转速	Rotate Speed	30RPS
喷气增焓	Injection	OFF

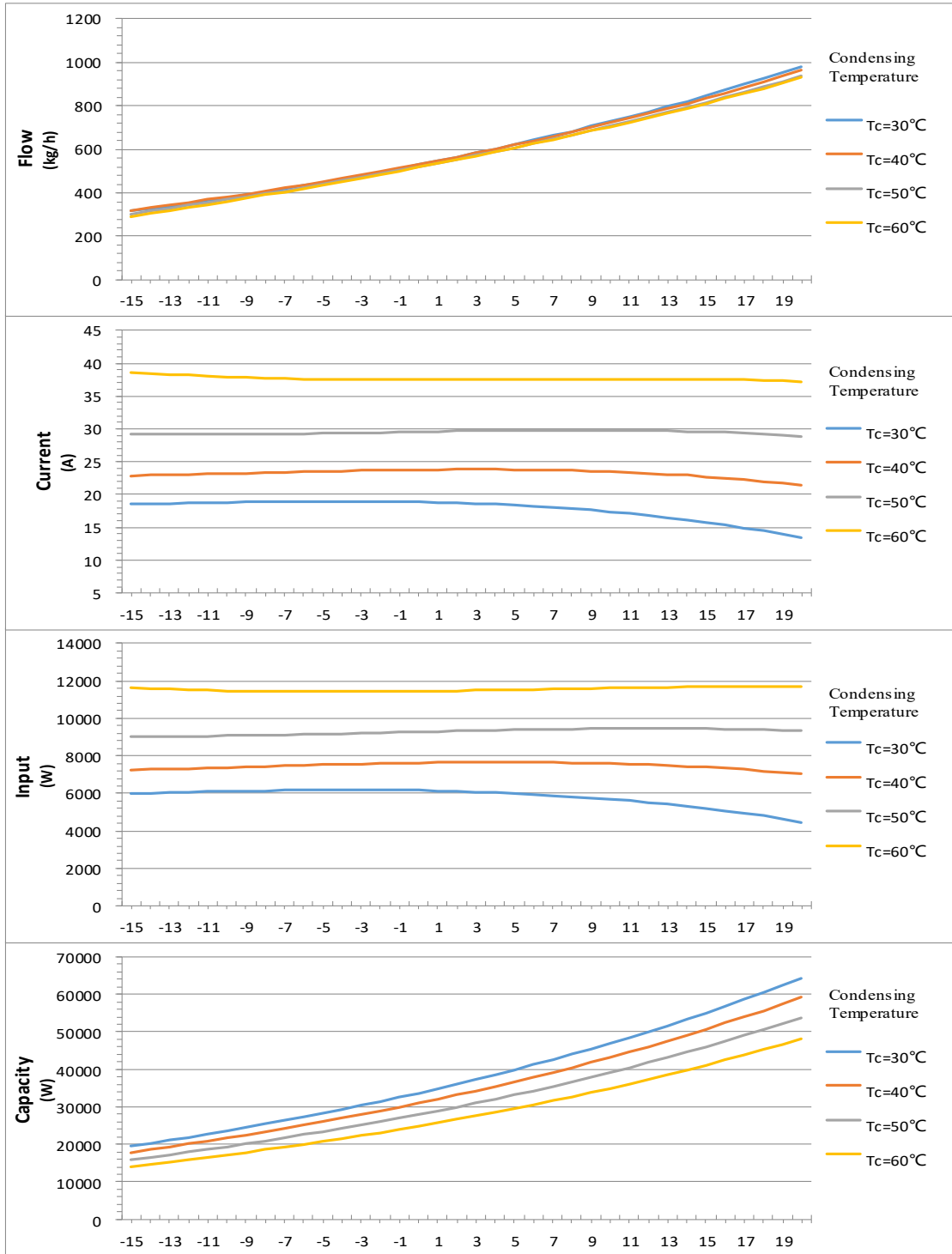


DWN.	Du_L	220925	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou)Co., Ltd.	Compressor Performance Curve	NO. :
CHKD.	Xiuyu_L	220925			PE-J01
APPD.					

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压缩机制冷性能曲线 Compressor Cooling Performance Curve (DD110KHDG\*-D3)

制冷剂	Refrigerant	R454B
吸气过热度	Suction Superheat	11.1℃
过冷度	Subcooling	8.3℃
转速	Rotate Speed	60RPS
喷气增焓	Injection	OFF

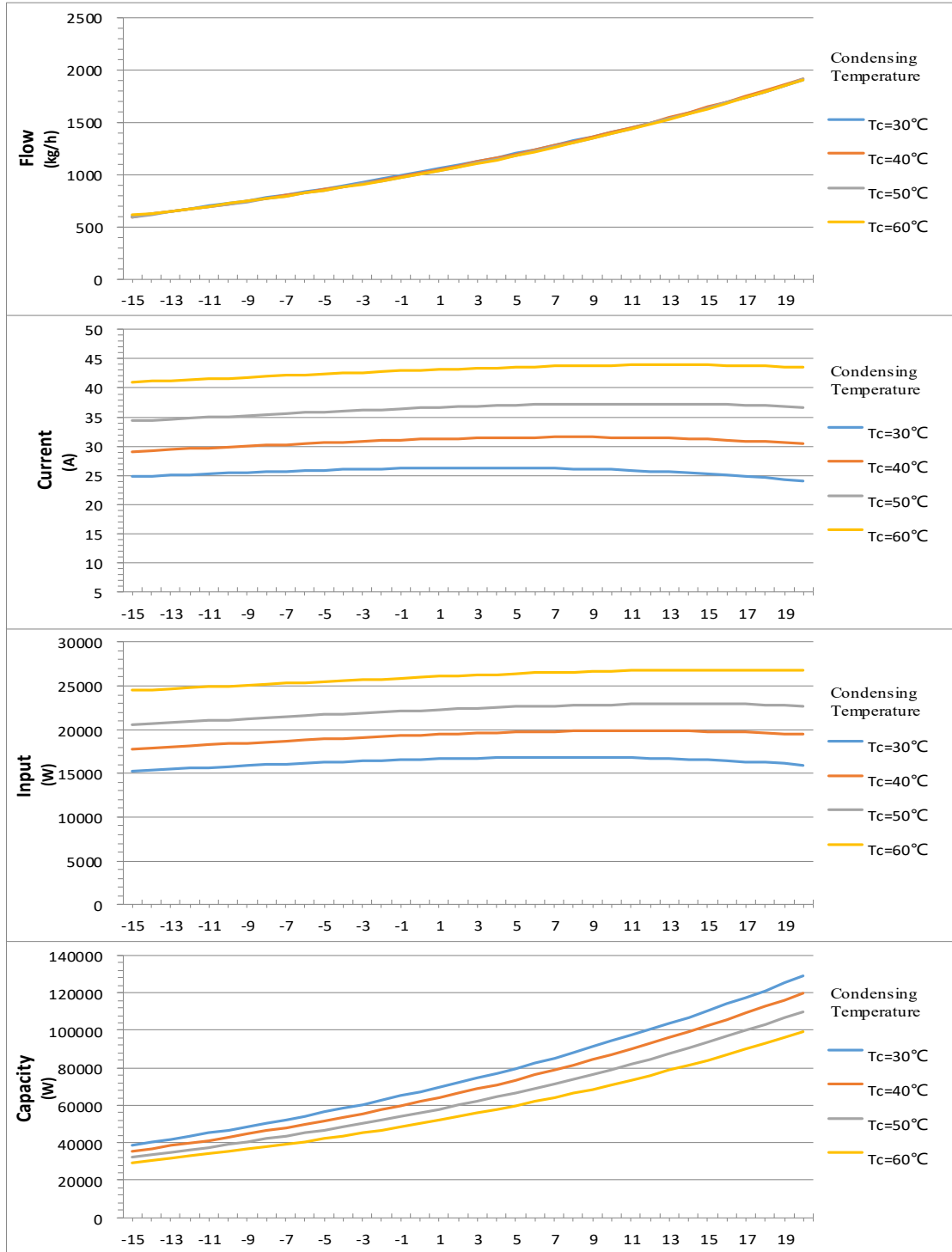


DWN.	Du_L	220925	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co., Ltd.	Compressor Performance Curve	NO. :
CHKD.	Xiuyu_L	220925			PE-J02
APPD.					

# HITACHI

压缩机制冷性能曲线 Compressor Cooling Performance Curve (DD110KHDG\*-D3)

制冷剂	Refrigerant	R454B
吸气过热度	Suction Superheat	11.1°C
过冷度	Subcooling	8.3°C
转速	Rotate Speed	120RPS
喷气增焓	Injection	OFF

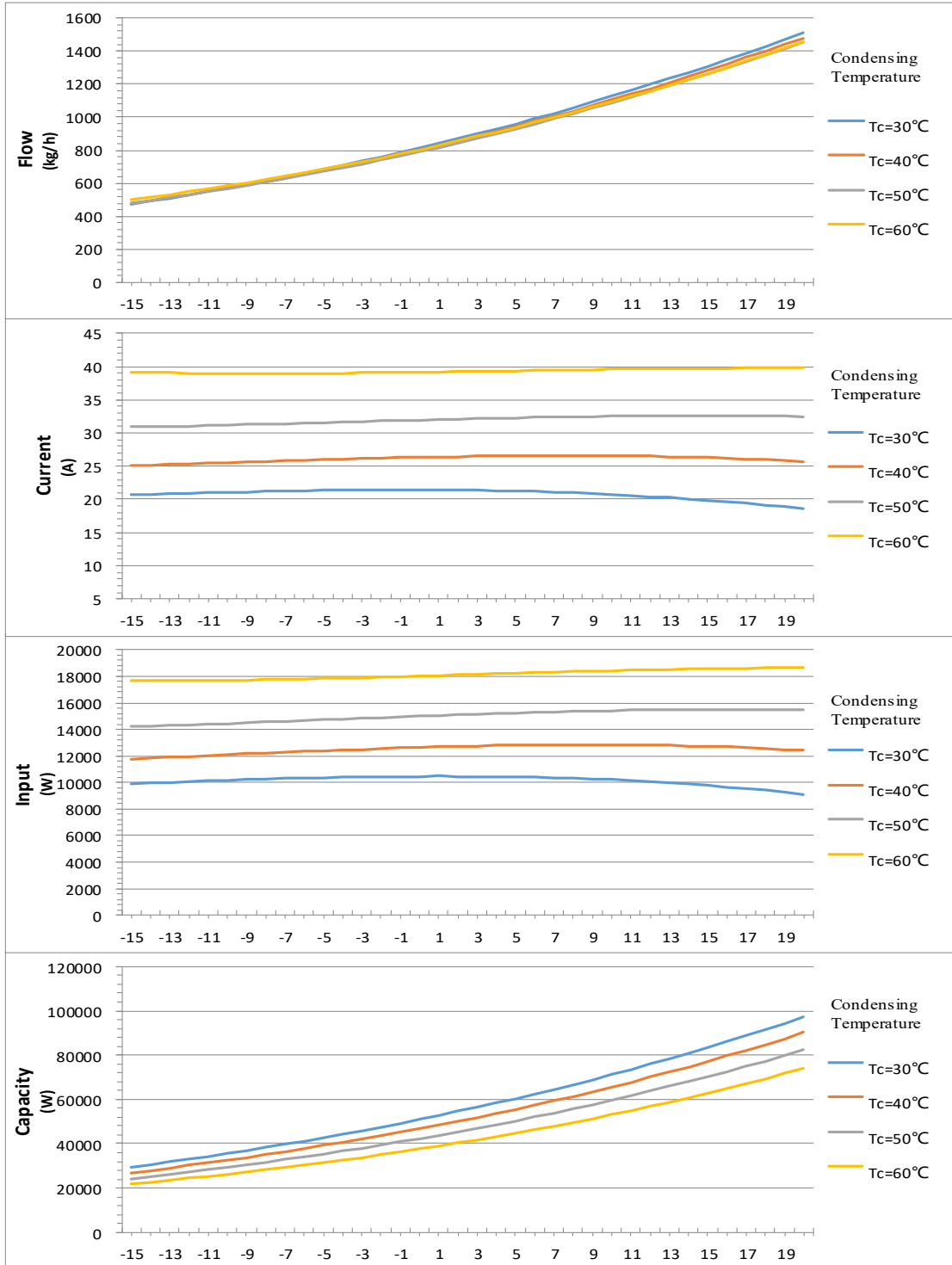


DWN.	Du_L	220925	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co., Ltd.	Compressor Performance Curve	NO. :
CHKD.	Xiuyu_L	220925			PE-J04
APPD.					

# HITACHI

压缩机制冷性能曲线 Compressor Cooling Performance Curve (DD110KHDG\*-D3)

制冷剂	Refrigerant	R454B
吸气过热度	Suction Superheat	11.1°C
过冷度	Subcooling	8.3°C
转速	Rotate Speed	90RPS
喷气增焓	Injection	OFF

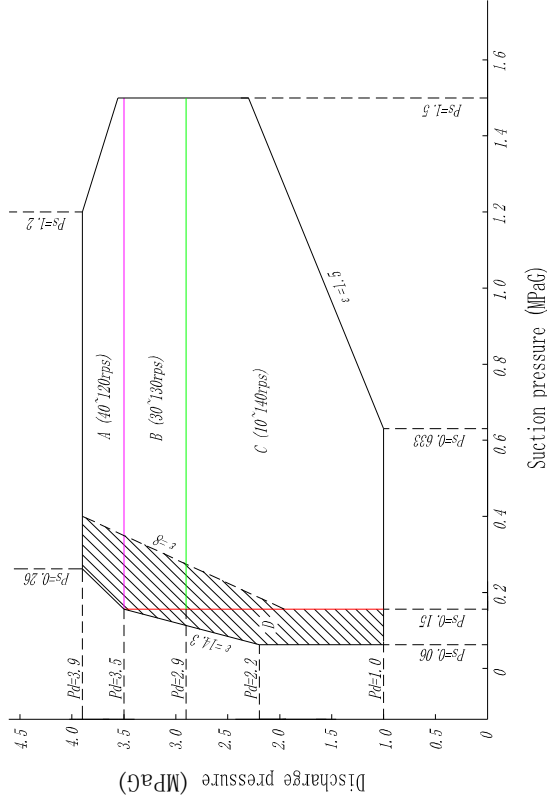


DWN.	Du_L	220925	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co., Ltd.	Compressor Performance Curve	NO. :
CHKD.	Xiuyu_L	220925			PE-J03
APPD.					

## 压缩机运行范围 (Running Range Of Compressor)

### 连续运转范围 (MPaG)

Continuous operating range



注：1. 内是带条件的运行压力范围。 Represents the running range under condition.

① 要求  $T_d \leq 110^\circ\text{C}$  且  $T_dSH \geq 20\text{K}$ ；The operating range with conditions requires  $T_d \leq 110^\circ\text{C}$  and  $T_dSH \geq 20\text{K}$ ;

② 带条件的运行范围运行时间累计不超过500小时。The running range under condition should be less than 500 hours.

2. 当开启 Injection 功能时，需满足以下工况条件：When opening the Injection function, the following conditions must be met:

① 吸气压力  $P_s$  小于 1.2MPa；The suction pressure is less than 1.2MPa;

② 转速大于 40rps；The speed is greater than 30rps.

③ 绝对压力比大于 2；Absolute pressure ratio above 2；

④ 喷射过热度需保证在 0K 以上。Tinsh should be above 0K.

3. 当转速低于 30rps 或者吸气压力  $P_s \geq 1.4\text{Mpa}$ ，要求  $T_dSH \geq 20\text{K}$ 。

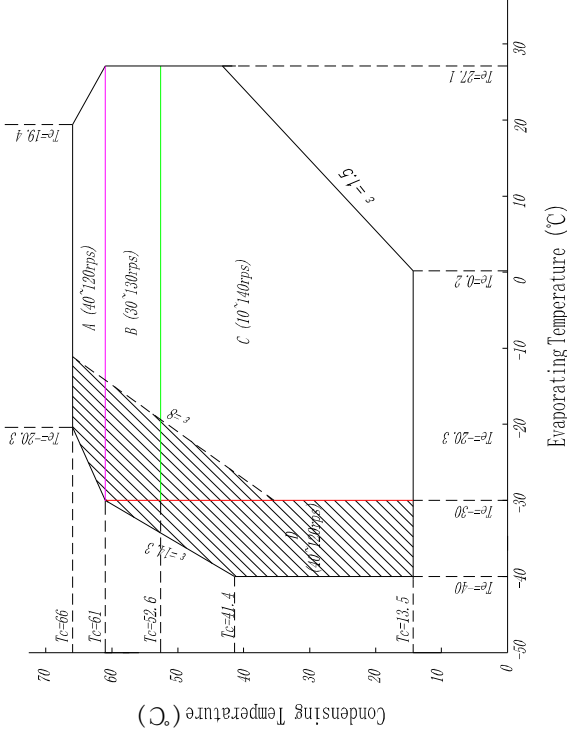
When the speed is lower than 30rps or  $P_s \geq 1.4\text{Mpa}$ ,  $T_dSH \geq 20\text{K}$  is required.

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

适用机型 Model	DD110KHGD
使用冷媒 Refrigerator	R454B
润滑油 Oil	FV65EA

### 连续运转范围 (°C)

Continuous operating range



Area	Speed (rps)	TdSH (min)
A	40~120 rps	10K
B	30~130 rps	10K
C	10~140 rps	10~30rps 20K 30~140rps 10K
D	40~120 rps	20K

NO. :

TITLE:

Johnson Controls-Hitachi

200909

Yongq\_L

200909

CHKD: Zhibao\_W

APPD:

Running Range Of Compressor

Wanbao Compressor

(Guang Zhou) Co., Ltd.

EL-87

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DC电机参数 DC Motor Parameter	
压缩机型号 Compressor Model	DD110KHDG-D3
电源 Power Supply	380~570V
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°C Resistance between terminal Rs(Ω):at 20°C	U-V:0.134Ω V-W:0.134Ω W-U:0.134Ω
⑥电机1相的卷线电阻Rs(Ω):在20°C Phase 1 winding resistance Rs(Ω):at 20°C	0.067Ω
⑦电机额定电流 (A) Rated current (A)	31.4A 3600rpm-3063gm
⑧电机转子和负载转动惯性力矩(kg·m <sup>2</sup> ) Rotor and load rotate torque(kg·m <sup>2</sup> )	4.326x10-3kg·m <sup>2</sup>
⑨电机力矩常数Kt Torque constant Kt	Kt: 0.828(26.0N·m /31.4A )
⑩线间磁通量(U-V间):在20°C Inter wire flux(U-V): at 20°C	481.5mWb·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)	53.1V (0.0531V/rpm) (95.58x1000/1800 )
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140°C, 退磁1% *1 (采用稀土类磁石) Demagnetizing current: at 140°C, demagnetise 1% (using rare earth magnet) <b>注*/Note*</b>	110 Apk
额定转速、额定力矩时的输入功率 Input power at rated rota speed and torque	输出功率为9802W时, 输入功率为10414W When output is 9802W, input power is 10414W

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:

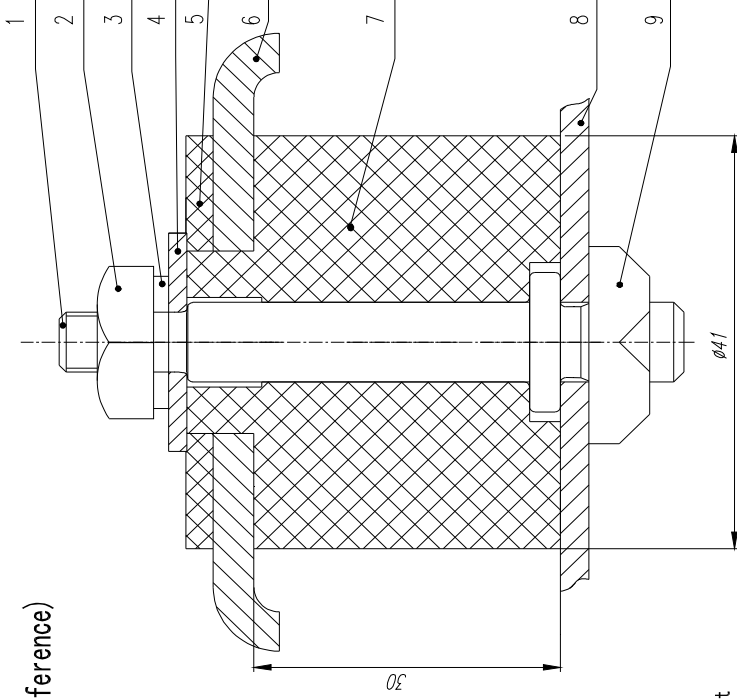
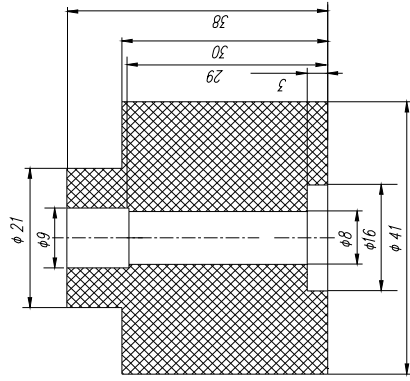
Inductance parameter of Ld&Lq as following:

电流I (A)	5	10	15	20	25	30	35	40
Ld (mH)	1.51	1.51	1.48	1.45	1.41	1.37	1.32	1.28
Lq (mH)	2.61	2.50	2.42	2.30	2.19	2.07	1.96	1.86

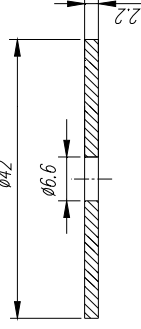
## 防震胶座安装图 (参考) Mounting Assembly (Reference)

1	支撑螺栓 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

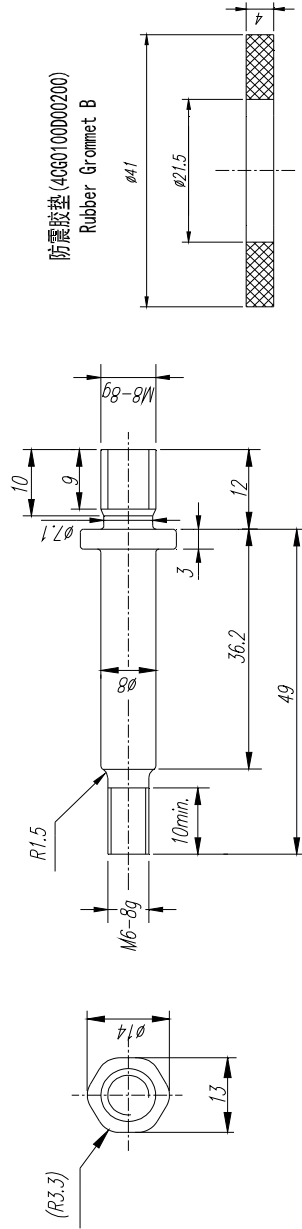
防震胶座 (4CG0100B00600)  
Rubber Grommet A



垫圈 (4CG0600A00400) Washer



支撑螺栓 (4CG0100C00100) Bolt



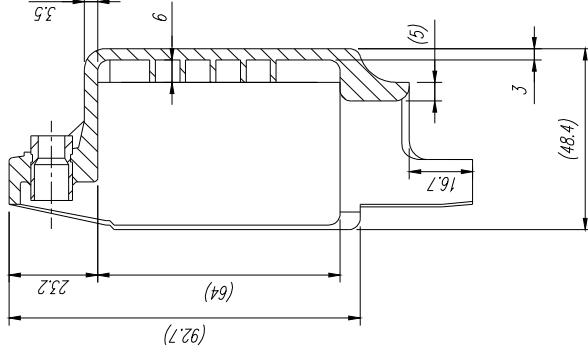
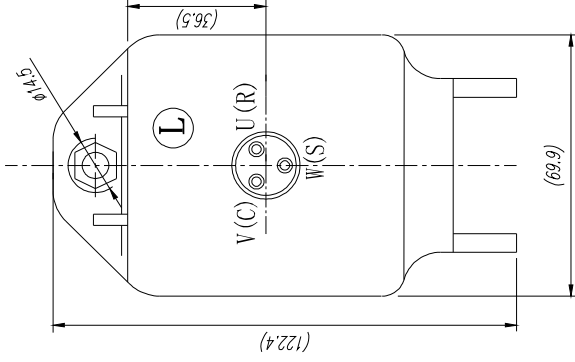
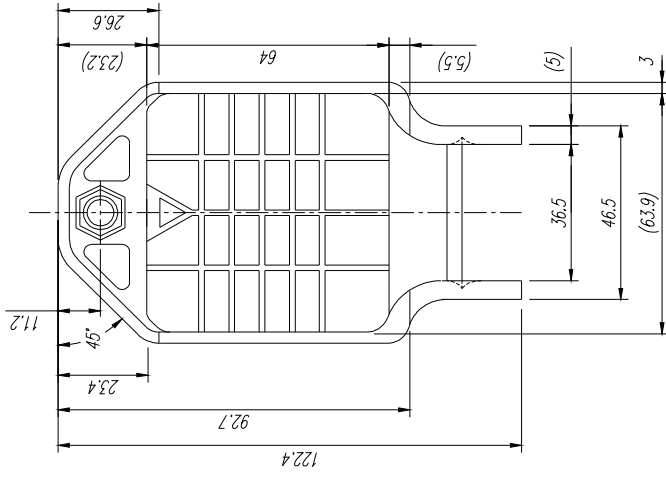
### 防震胶座与防震胶垫技术要求:

1. 颜色为黑色。
  2. 硬度为55±5 (邵尔A)。
- Technical requirements:
1. Color is black.
  2. Hardness is 55 ± 5 (Shao A).

DWN.	Zhibao_W	181221	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co., Ltd.	TITLE: Mounting Assembly	NO. : AC-17
CHKD.	Yongping_L	181221			
APPD.					



接线柱保护盖 Terminal Cover



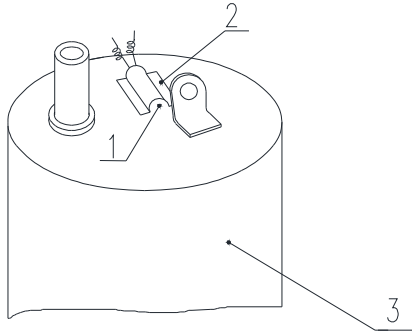
## 技术要求

### Specifications

1. 零件颜色为蓝色。  
The element is blue.
2. 零件材质为PC。  
The material of element is PC.

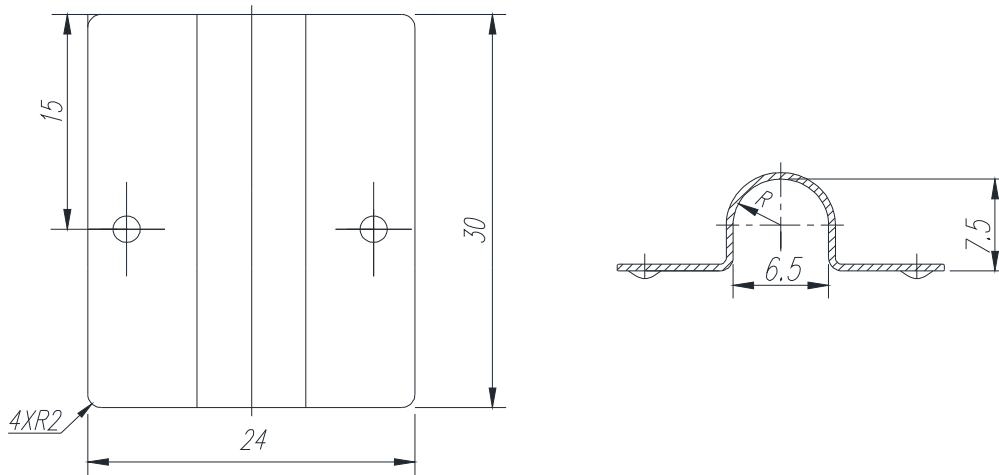
DMN.	Yongxia_C	181225	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co., Ltd.	TITLE: <b>Terminal Cover</b>	NO. : <b>AC-37</b>
CHKD.	Zhibao_W	181225			
APPD.					

## 温度传感器安装图 Temperature Sensor Assembly Diagram



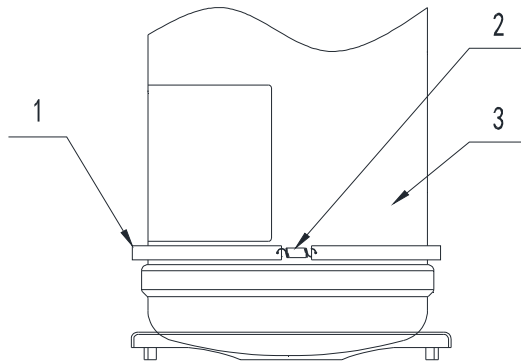
序号 No.	名称 Parts Name	备注 Remarks
1	温度传感器 T. S.	客户自配
2	传感器套管 T. S. Tube	Length: 30mm
3	压缩机 Compressor	

### 传感器套管 T. S. Tube



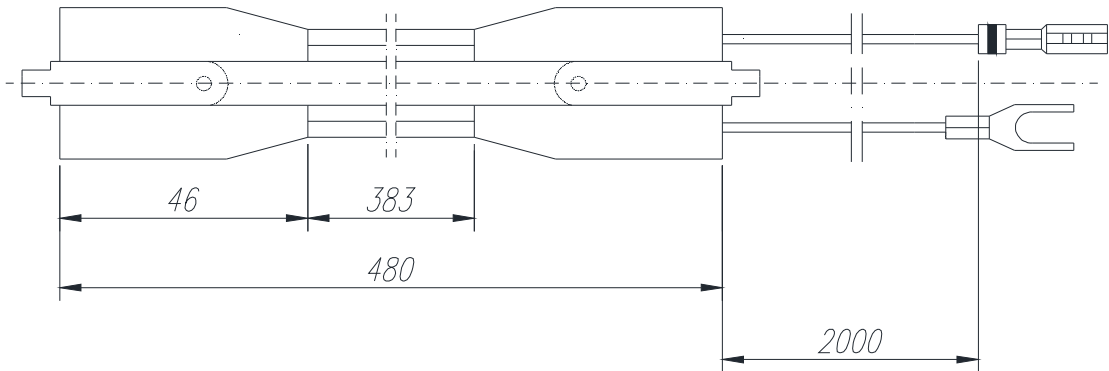
DWN.	Ruijia_C	161213	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co., Ltd.	TITLE: Temprature Sensor Assembly Diagram	NO. : AC-11
CHKD.	Zhibao_W	161213			
APPD.					

## 热油器安装图 Crankcase Heater Assembly

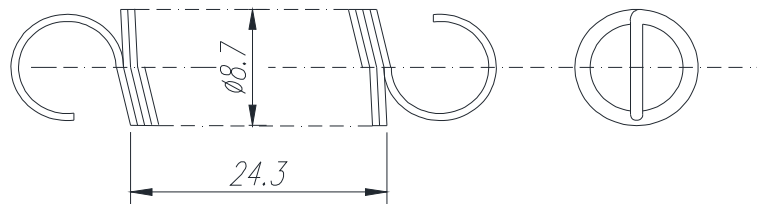


序号 No.	名称 Parts Name	备注 Remarks
1	热油器 Crankcase Heater	220V, 40W
2	弹簧 Spring	
3	压缩机 Compressor	

### 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-10
CHKD.	Zhibao_W	161213			
APPD.					