

编号(No.): YC220428

日期(Date): 20201116

涡旋压缩机技术规格书(参考)

Specification for Scroll Compressor

型号 (MODLE) : CA56TLAG-D1S8

客户名称 (CUSTOMER):			
客户确认 (CONFIRMATION)			
日期 (DATE)		空调器型号 (MODLE)	

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	2020/06/24	P10	性能曲线增加横坐标	李杜
2	2020/11/16	P3	更新使用条件范围参数	罗秀玉
3	2020/11/16	P9	更新运行范围图	罗秀玉

1. 规格 Specification

1.1 压缩机 Compressor

压缩机型号 Compressor Model	CA56TLAG-D1S8
压缩机型式 Compressor Type	全封闭型电动压缩机 Hermetic Motor Compressor
压缩机方式 Compression Type	涡旋式 Scroll Type
使用冷媒 Refrigerant	R513A
排气容积 Displacement	56cm ³ /rev
润滑油 / 油量 Oil / Oil Charge	FVC56EA / 1700ml
防护等级 IP Rating	IP66
涂装 Painting	黑色 Black Color Paint
总质量(含油) Net Mass(Including Oil)	35kg
吸气管接口内径 Suction Accept I.D	Φ19.3mm
排气管接口内径 Discharge Accept I.D	Φ12.9mm

1.2 电机 Motor

电动机型式 / 起动方式 Motor Type / Start Mode	三相感应电机 / 直接 3 Phase Induction Motor / Direct Start
极数 Pole	2极 2 Pole
额定电压 / 频率 Rated Voltage / Frequency	3Ph - 380~415V-50Hz / 3Ph - 415~440V-60Hz
额定转数 Rated Revolution	2,880 [50Hz] / 3,470 [60Hz]
绝缘等级 Insulation Class	F级 F Class
绕组阻抗 Winding Resistance (at 20℃)	4.263±7%Ω

1.3 性能 Performance

项目 Items	规格值 Nominals	允差 Franchise
制冷能力 Capacity	6,700W [380V, 50Hz] / 8,100W [440V, 60Hz]	95% Min
输入功率 Motor Input	2,230W [380V, 50Hz] / 2,700W [440V, 60Hz]	105% Max
能效比 EER	3.00W/W	95% Min
运行电流 Running Current	4.1A [380V, 50Hz] / 4.6A [440V, 60Hz]	105% Max
堵转电流 Locked Rotor Ampere	37A [380V, 50Hz]	——
噪音 Sound Level	63dB(A) Max.	——
振动 Vibration	15m/s ² Max.	——

※ 制冷能力测试条件 Test condition of cooling capacity:

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℃

※温度条件是露点方式 Temperature condition is based on dew point.

1.4 一般特性 Characteristics

气密试验压力 Leak Tight Pressure	3.3MPa[高压侧 H.P. Side] / 1.6MPa[低压侧 L.P. Side]
耐压试验压力 Hydrostatic Strength Pressure	5.0MPa[高压侧 H.P. Side] / 2.4MPa[低压侧 L.P. Side]
绝缘阻抗 Insulation Resistance	10MΩ Min.
绝缘耐压 Withstand Voltage	1,880V-1min.
残余水分量 Residual Moisture	350mg Max.
含尘量 Residual Impurities	100mg Max.

HITACHI

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	管 Tube	4	4TG0400A00200	标准部件 Standard Parts
2	防震胶垫 Rubber Grommet	4	4TG0100D00100	
3	防震胶座 Rubber Grommet	4	3TG0100B00100	
4	垫圈 Washer	4	4TG0600A00400	
5	M10 螺母 M10 Screw Nut	4	9TG0500A00300	
6	M10 螺栓 M10 bolt	4	9TG0100C00200	
7	弹性垫圈 Spring Washer	4	9TG0600A00500	
8	排气温控器 Discharge Thermostat	1	CSE05551	
9	温控器挡板 Thermostat Baffle	1	CSD00299	

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.	(冷凝温度+15°C)~120°C以下 (Condensing Temp. +15°C)~120°C Max.
绕组温度 Winding Temp.	135°C以下 135°CMax.
压缩机外壳温度 Shell Temp.	(冷凝温度+15°C)~120°C以下 (Condensing Temp. +15°C)~120°C Max.
吸气压力 Suction Pressure	0.08~0.55MPa (起动、除霜等短时间运转除外; Except the short period such as start, defrost)
排气压力 Discharge Pressure	0.67~2.32MPa
压力比 Pressure Ratio	2~8 (起动、除霜等短时间运转除外; Except the short period such as start, defrost)
异常升压/降压 Abnormal Press. Rise/Drop	上升:2.32MPa 以下 Rise:2.32MPa Max.
	下降:0.08MPa 以上 Drop:0.08MPa 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.
配管的应力在超过上记的容许应力的时候、为了限制它在容许应力的范围之内、请使用弹性管等。 In case the stress become higher than above limitation, flexible tube or other buffer shall be installed to reduce the stress to these limitation.	
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.

4. 安全注意事项 Cautionary Instructions

1. 为了防止因漏电发生重大的事故，压缩机的接地装置必须接地连接；
In order to prevent any fatal accidents due to an electrical leakage, this compressor MUST be earthed.
2. 为了防止过压时候发生事故、请一定在压缩机排气管上安装高压断路装置或安全阀；
In order to prevent any overpressure hazards, install a high-pressure switch or a pressure relief valve in the compressor discharge line.
3. 在进行泄漏和气密性检测的时候、请一定不要把氧气、硫化氢等可燃的和有毒性的气体装入冷冻循环系统里面。这些气体都有发生爆炸的可能性、非常危险。在做这些检查的时候请用氮气或者铭牌上标记的制冷剂；
Do not charge OXYGEN, ACETYLENE or other flammable and poisonous gases into the compressor when performing a leakage test or a pressure-tight test. These types of gases are extremely dangerous, because explosion can occur. It is recommended that nitrogen or refrigerant mentioned on label be charged for these types of tests.
4. 压缩机禁止反转，因反转可能导致压缩机故障。请在 3 相压缩机供电线路上安装逆相保护器；
Reverse rotation is absolutely forbidden, as faults can occur. A reverse phase protection relay should be installed for 3 phase compressors.
5. 在没装上电源端子专用的标准保护盖前请不要开始运行。并且在进行维修服务之前、一定要关掉所有的电源；
Do not operate the compressor without the standard plug cover over terminals. Before commencing to service the compressor, disconnect all electrical power.
6. 压缩机的表面温度在运行进行中和停止以后一段时间之内温度很高。为避免被烫伤，请不要用手触摸压缩机表面；
The surface temperature of the compressor casing becomes high during and just after operation. To prevent burns, do not touch this surface.
7. 为保证安全、在任何条件、密封型电源端子的温度保持在 150°C 以下；
The hermetic terminal temperature should be less than 150°C at all conditions for safety reason.
8. 不能直接把商用电源直接连接压缩机、会导致马达烧损的原因；
Compressor should not be connected to commercial power, because it may burn out motor.
9. 压缩机的保管和运输一定要卧放。保管温度：-20°C-50°C。搬动压缩机时、不能端电源端子箱、不能用力放下。
The compressor should be transported and stored in the horizontal position. The storage temperature should be within -20°C to 50°C. Do not hold the terminal box and do not apply strong forces to it when handling the compressor.
10. 电线要使用耐热 150°C 导线。
Apply a heat resistant 150°C rating cable for the power supply to the compressor.

※ 其他注意事项 Remarks:

1. 制冷系统 The refrigeration system

- 1) 润滑油与冷媒的重量比（润滑油/冷媒）范围以 0.25~0.4 作为原则，但是应尽量减少制冷剂注入量；
The ratio of oil to the refrigerant (oil / refrigerant) should be within 0.25 - 0.40 in weight basis, but the amount of refrigerant should be reduced as much as possible.
 - 2) 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.
 - 3) 向压缩机充注冷媒时，必须从液管路进行且冷媒必须以液体的形式注入；
Charge refrigerant from the liquid pipe. And refrigerant should be charged by liquid;
 - 4) 压缩机在各个方向 5.6° 以内倾斜运行时、减少油量场合、最少油量应保证 600ml 以上（此油量没有考虑 5.6° 以上倾斜场合以及列车始发、停止时油面变化）。
When the compressor is operated with maximum 5.6 degree inclination for all directions, the compressor should contain more than 600 ml oil (This minimum oil quantity of 600 ml may not assure the proper oil supply when the inclination exceeds 5.6 degree, or the train starts or stopped abnormally).
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；
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. 高压切断值为 2.5MPaG 以下、而且必须要停止运行,保护装置是必须要手动恢复；
High pressure cut off value is below 2.5MPaG, and must stop running. The protection device must be manual recovery.
8. 启停周期：起动·停止的频度 6 次 / 每小时以下、起动时间最低 3 分钟、停止时间是从起动点开始高低压达到平衡时间为（3 分钟程度），启动时高低压力要平衡，且平衡压力应低于 0.84MPaG；
On/Off Period: The compressor should not be restarted more than 6 times per hour. When once started (ON), the compressor should be kept operated more than 3 minutes. When once stopped (OFF), the compressor should be kept stopped for approximately 3 minutes, and the discharge/suction pressure should be balanced. The balanced pressure before restarting should be lower than 0.84 MPaG.
9. 成箱压缩机包装件的叠放堆码极限为 3 箱, 装卸过程中严禁翻滚；
Pile limits 3 pallet. Tumbling is forbidden during handling.
10. 焊接配管时，必须通氮气进行以避免管道产生氧化物；
When brazing the copper pipe, blow nitrogen gas through the brazing part, in order to protect against oxidization in the pipe.

11. 热泵系统必须在压缩机底部安装油加热器，且在环境温度 10°C 以下，压缩机停机时，需要对压缩机冷冻机油进行加热；压缩机长时间停机，首次启动前，需对冷冻机油进行预热，热油器功率规格（推荐）要求：60W，220V。

Crankcase heater is required if the refrigeration system is heat pump. When environment temperature less than 10°C, and the compressor stop, crankcase heater must be open; When the compressor has stopped for a long time, the oil must be preheat before the compressor start up. Crankcase heater specifications (recommended) requirements: 60W, 220V.

5. 附图 Attachment

压缩机外形图 Dimension of Compressor

压缩机运转范围 Running Range Of Compressor

压缩机性能曲线 Compressor Performance Curve

电源端子盒结构图 Terminal Box Structure

防震胶座装配图 Mounting Assembly

基本电气原理图 Basic Circuit Diagram

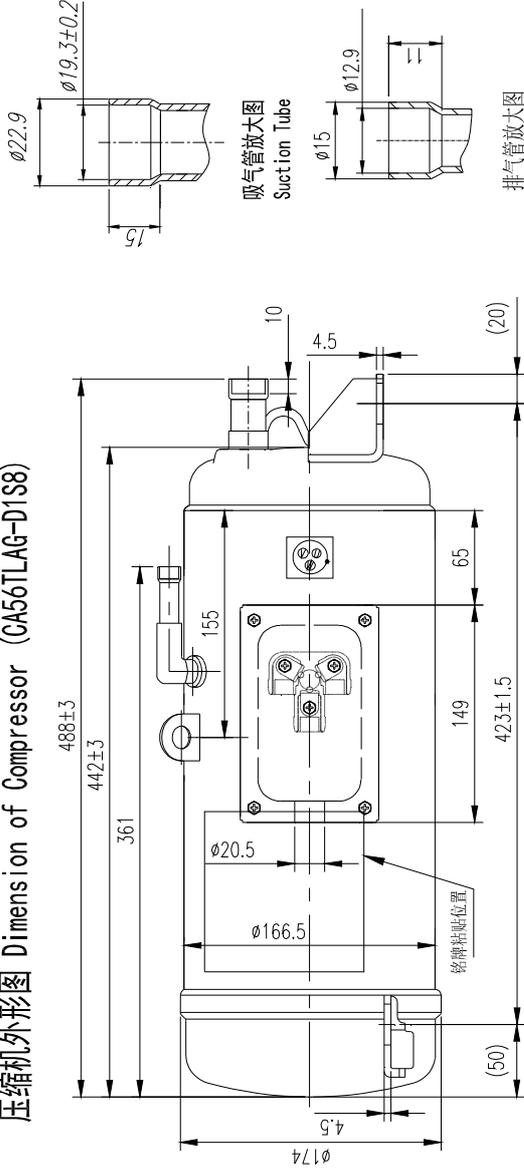
排气温控器组装图及零件图 Discharge Gas Thermostat Assembly Diagram

容许倾斜度图 Allowable inclination

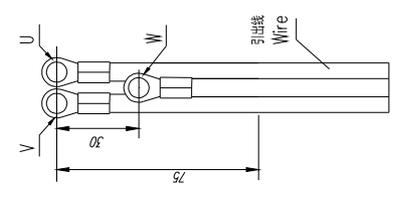
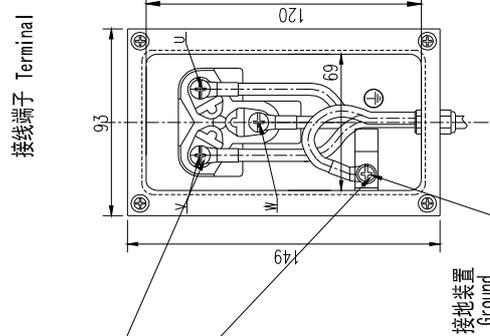
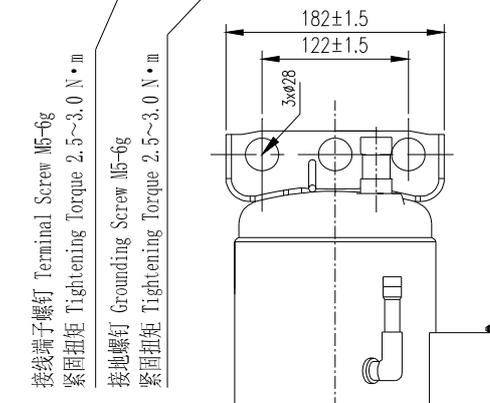
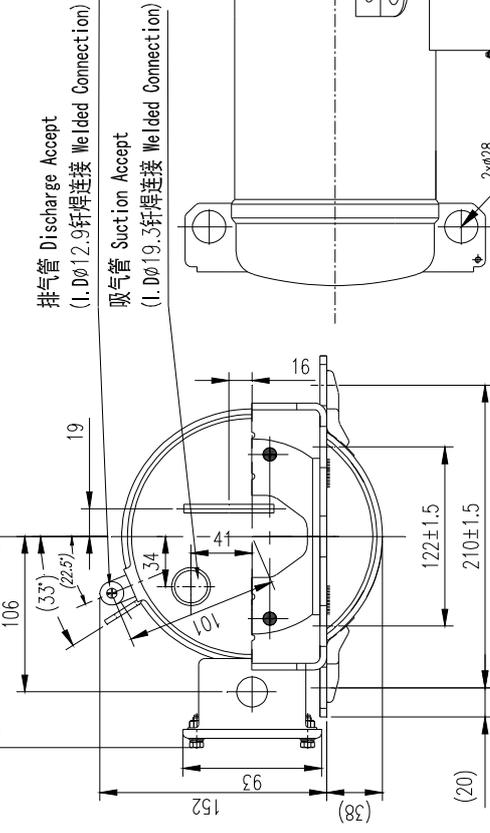
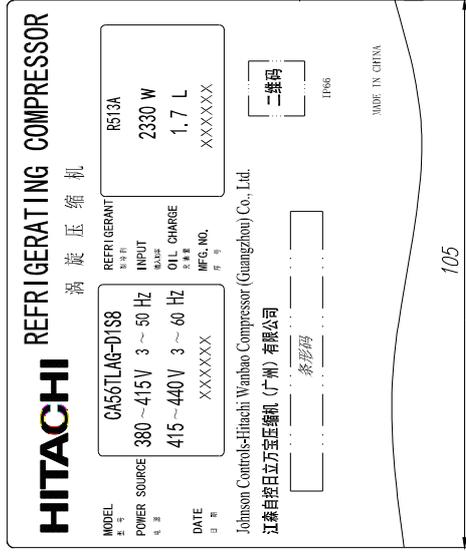
配管连接图 Piping connection

热油器安装图 Crankcase Heater Assembly

压缩机外形图 Dimension of Compressor (CA56TLAG-D1S8)



铭牌 Name Plate

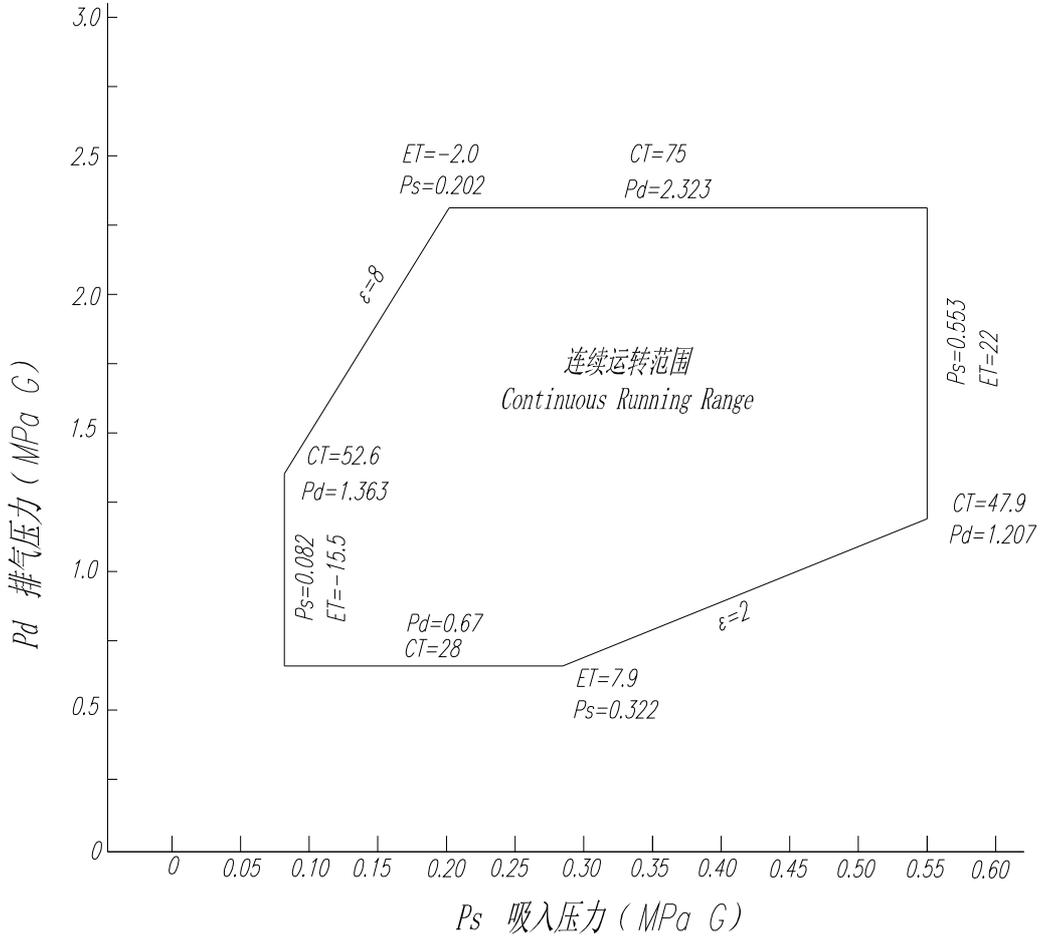


DWN.	Du_L	200603	Johnson Controls-Hitachi	TITLE: Dimension of Compressor	NO. : SH-T125
CHKD.	Zhibao_W	200603	Wanbao Compressor		
APPD.			(Guang Zhou) Co., Ltd.		

压缩机运行范围 (Running Range Of Compressor)

适用机型(Model):
CA47TLAG\CA56TLAG

冷媒(Refrigerant): R513A
冷冻机油(Oil): FVC56EA



注(Remarks):

1. 图示压力为表压;
2. 压力比为绝对压力之比。
 $\epsilon = \text{排气绝对压力} / \text{吸气绝对压力}$

Remarks:

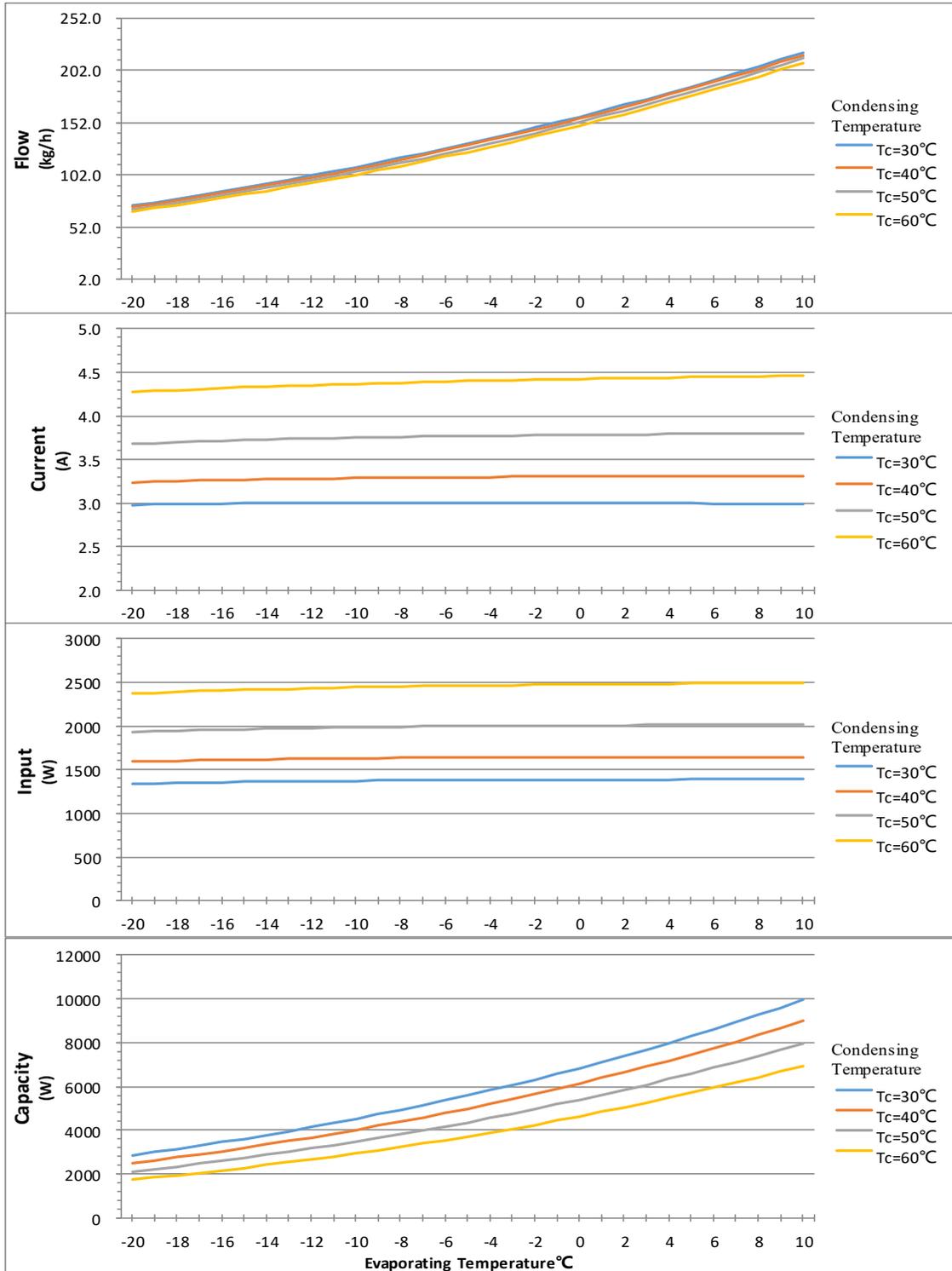
1. Graphic pressure represents gauge pressure;
2. Pressure ratio represents absolute pressure ratio.

$$\epsilon = \frac{\text{Discharg absolut pressure}}{\text{Suction absolute pressure}}$$

DWN.	Xiuyu_L	201116	Johnson Controls-Hitachi	TITLE:	NO. :
CHKD.	Zhibao_W	201116	Wanbao Compressor	Running Range Of Compressor	EL-65
APPD.			(Guang Zhou) Co., Ltd.		

压缩机制冷性能曲线 Compressor Heating Performance Curve (CA56TLAG-D1S8)

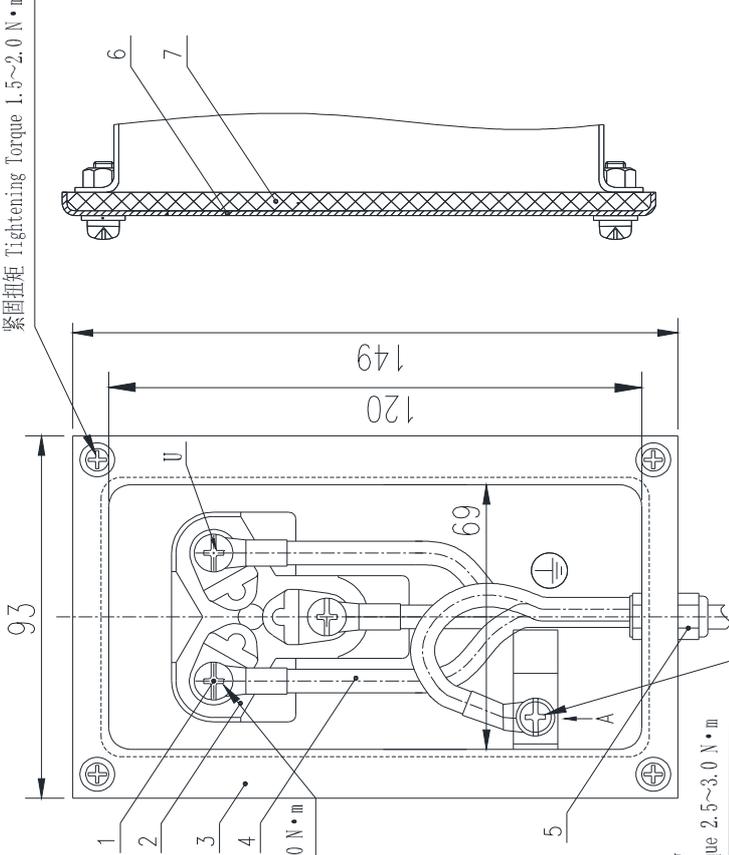
电 源	Power Source	3Ph 380-415V
频 率	Frequency	50HZ
制 冷 剂	Refrigerant	R513A
吸 气 过 热 度	Suction Superheat	11.1K
过 冷 度	Subcooling	8.3K



DWN.	Du_L	200603	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co., Ltd.	Compressor Performance Curve	NO. :
CHKD.	Zhibao_W	200603			PE-T56
APPD.					

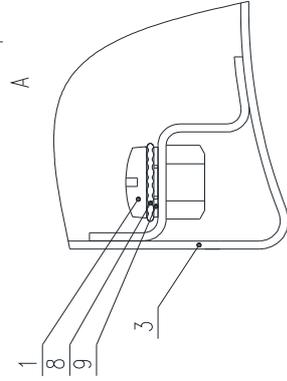
电源端子盒结构图(参考) Terminal Box Structure

保护盖螺栓 Protection Cover Bolt
紧固扭矩 Tightening Torque 1.5~2.0 N·m



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

接地螺钉 Grounding Screw
紧固扭矩 Tightening Torque 2.5~3.0 N·m



1	电源端子螺钉 Terminal Screw
2	端子连接板 Terminal Plate
3	保护盖 Protector
4*	电源线 Power Supply Cable
5*	导线密封管 Cable Gland
6	盖板 Cover
7	密封垫 Foam Cover
8	锯齿垫圈 Sawtooth Washer
9*	地线 Earthing Cable

注意:

Notes:

1. 带有*的部件客户自备。
Parts with mark (*) are not available.
2. 尽管电源端子盒能够防止固体外物和液体进入压缩机 (防护等级 IP66) , 但请不要把压缩机安装在室外或者有水滴到压缩机的地方。
Although the power supply terminal box of the compressor provides protection against ingress of solid foreign objects and water (Degree of protection: IP66), do not install the compressor outdoors and do not install it to a place where water-drops from the circumferences are poured on to the compressor.
3. 电源端子盒外的导线不能接触到压缩机。如果接触导线将会损坏而导致漏电。
The cables from the power supply terminal box should not contact the surface of the compressor. If contacted, the cables will be damaged by contacting, resulting in an electrical leakage.
4. 如果不使用导线密封管, 有损伤电源线的可能。为保护电源线, 请不要接触端子盒外圈。
If cable gland is not installed, power supply cable may be damaged by contacting. Please protect the cable from contacting directly to terminal fence.

5. 电源端子盒的防止固体外物和液体进入功能是通过密封端子盒的洞穴 (直径 20.5mm) 达到的。务必使用导线密封管或者 IP66 绝缘插头将端子盒的洞穴密封起来。
The protection against ingress of solid foreign objects and water (IP66) at the power supply terminal box is attained by sealing the hole (ø20.5) on the box. Be sure to seal the holes by cable glands and/or blind plugs of IP66 or more

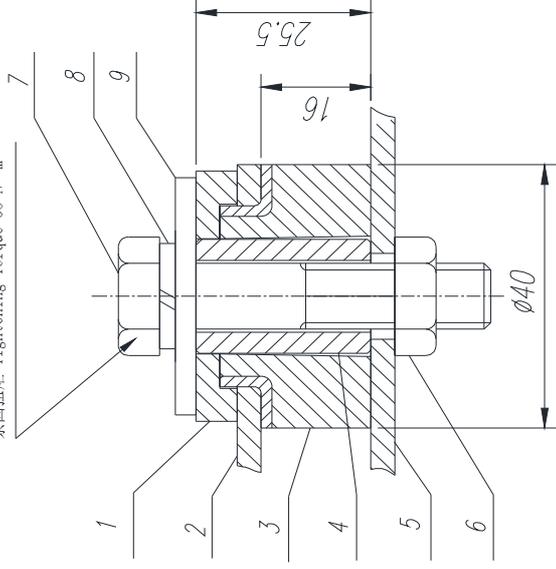
DWN.	Ruijia_C	161213	Johnson Controls-Hitachi	TITLE:	NO.:
CHKD.	Zhibao_W	161213	Wanbao Compressor (Guang Zhou) Co., Ltd.	Terminal Box Structure	AC-02
APPD.					

防震胶座装配图 (参考)

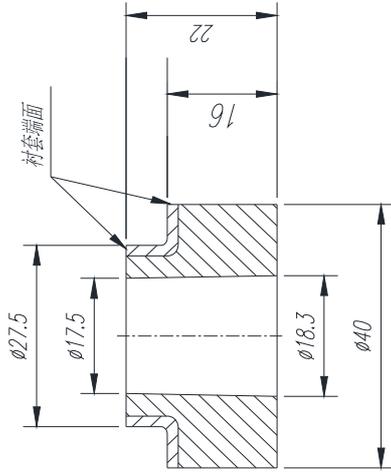
Mounting Assembly (Reference)

1	防震胶垫	Rubber Grommet
2	压缩机底座	Compressor Foot
3	防震胶座	Rubber Grommet
4	管	Tube
5	空调器底座	Unit Base
6	M10螺母	M10 Screw Nut
7	M10螺栓	M10 Bolt
8	弹簧垫圈	Spring Washer
9	垫圈	Washer

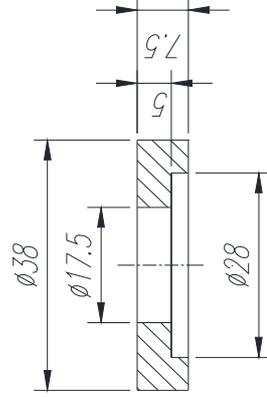
螺母 Screw Nut
紧固扭矩 Tightening Torque 35 N·m



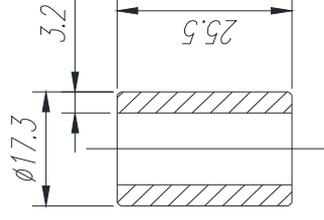
防震胶座 (3TG0100B00100)
Rubber Grommet



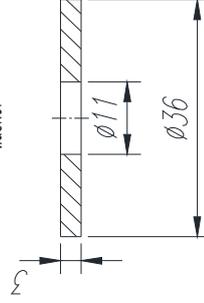
防震胶垫 (4TG0100D00100)
Rubber Grommet



管 (4TG0400A00200)
Tube



垫圈 (4TG0600A00400)
Washer

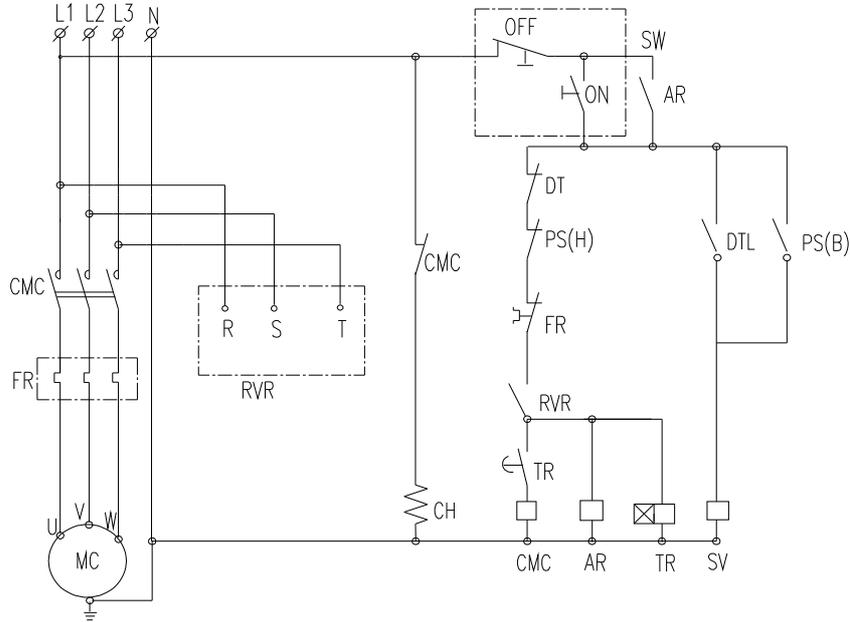


DWN.	Ruijia_C	161213
CHKD.	Zhibao_W	161213
APPD.		

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

TITLE:	Mounting Assembly
NO.:	AC-25

基本电气原理图 (参考) Basic Circuit Diagram (Reference)



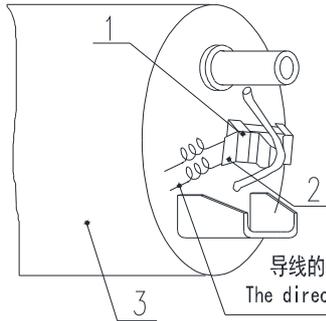
代号 Code	名称 Parts Name	备注 Remarks	代号 Code	名称 Parts Name	备注 Remarks
MC	压缩机 Compressor		*DT	排气温控器 Discharge Gas Thermostat	Close: 100°C±15°C Open: 130°C±6°C
*CMC	交流接触器 Magnetic Contactor		*SV	电磁阀 Solenoid Valve	液旁通冷却用 For Cooling Of Liquid Bypass
*FR	过热载继电器 Overcurrent Relay		*DTL	液旁通用温控器 Gas Thermoswitch For Liquid Bypass	Close: 110°C±6°C Open: 70°C±7.5°C
*RVR	逆相继电器 Reversing Valve Relay		*TR	时间继电器 Timer	设定时间: 3分钟 Set Time: 3 minutes
*SW	开关 Switch		*PS(H)	高压断路装置 High Pressure Switch	
*AR	中间断电器 Auxiliary Relay		*PS(B)	液旁通用压力断开装置 Pressure Switch For Liquid Bypass	
*CH	热油器 Crankcase Heater				

注: 带"*"的零部件由用户自备;

Note: All the parts marks "*" should prepared by customer .

DWN.	Ruijia_C	161213	Johnson Controls-Hitachi	TITLE:	NO. :
CHKD.	Zhibao_W	161213	Wanbao Compressor	Basic Circuit Diagram	AC-05
APPD.			(Guang Zhou) Co., Ltd.		

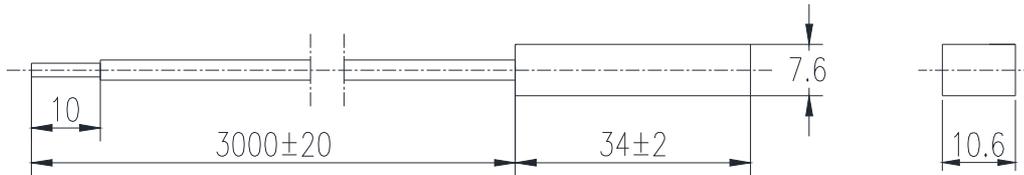
温度传感器安装图 Temperature Sensor Assembly Diagram



导线的引出方向需朝向下
The direction of the wire needs to be downwards

序号 No.	名称 Parts Name	备注 Remarks
1	排气温控器 D.T.	Open: $130 \pm 6^\circ\text{C}$; Close: $100 \pm 15^\circ\text{C}$
2	温控器挡板 D.T. Baffle	
3	压缩机 Compressor	

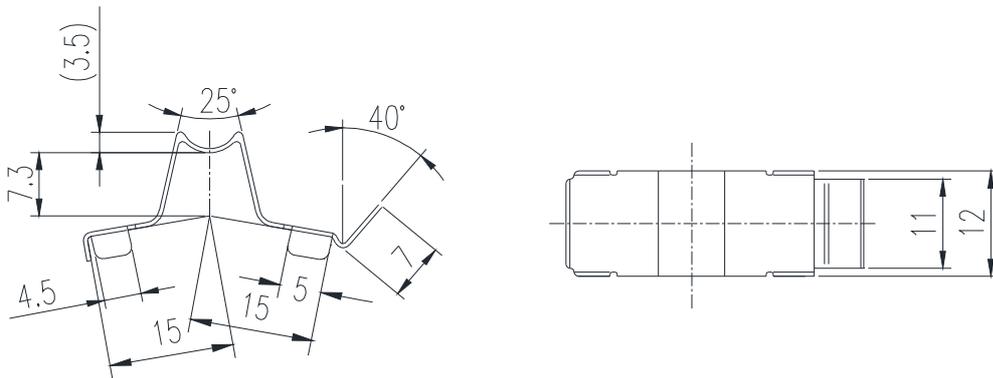
排气温控器 (CSE05551) D.T.



触点容量: AC250V 1.6A (电阻负荷)
使用范围: 250VAC 0.005A以上
5~24VDC 0.005~0.020A

Contact rating: AC250V 1.6A (Resistance load)
Range of use: 250VAC above 0.005A
5~24VDC 0.005~0.020A

温控器挡板 (CSD00299) D.T. Hold



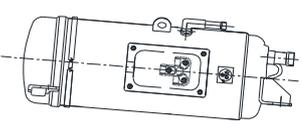
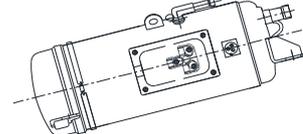
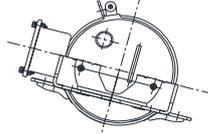
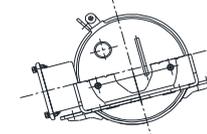
注: 排气温控器的带标记面朝上, 不带标记面朝下紧贴压缩机顶部。

Note: The mark side of the D.T. should be upturned, no mark side should be gadarene and clinged to the top of compressor.

DWN.	Ruijia_C	161213	Johnson Controls-Hitachi	TITLE:	NO.:
CHKD.	Zhibao_W	161213	Wanbao Compressor	Temperature Sensor Assembly Diagram	AC-24
APPD.			(Guang Zhou) Co., Ltd.		

容许倾斜度图 Allowable Inclination

如果压缩机过度倾斜，压缩机内就无法供油，甚至损坏压缩机，所以压缩机必须遵从以下容许的倾斜度。
If the compressor is tilted excessively, the compressor can not supply oil or even damage the compressor, the compressor must comply with the following allowable inclination.

倾斜方向和容许的倾斜度。 The inclination direction and the allowable inclination.			
旋转轴和平行方向的倾斜 The rotation axis and the inclination in the parallel direction		轴的旋转方向的倾斜 The rotation direction of the shaft is inclined	
			
6°	15°	15°	15°
吸气配管向下 Suction piping down	吸气配管向上 Suction piping up	顺时针方向 Clockwise direction	逆时针方向 Counterclockwise

注意(Notes) :

1、避免在倾斜状态下启动压缩机。

Avoid starting the compressor in an inclined position.

2、上述容许倾斜度指的是车体实际运行、启动、停止等状态时压缩机的倾斜度。

The allowable inclination refers to the inclination of the compressor when the vehicle is running, starting, stopping, etc.

DWN.	Ruijia_C	170325	Johnson Controls-Hitachi Wanbao Compressor (Guang Zhou) Co., Ltd.	TITLE: Allowable Inclination	NO. : AC-34
CHKD.	Zhibao_W	170325			
APPD.					

配管连接图 Piping Connection

吸气管与排气管配管连接的注意事项

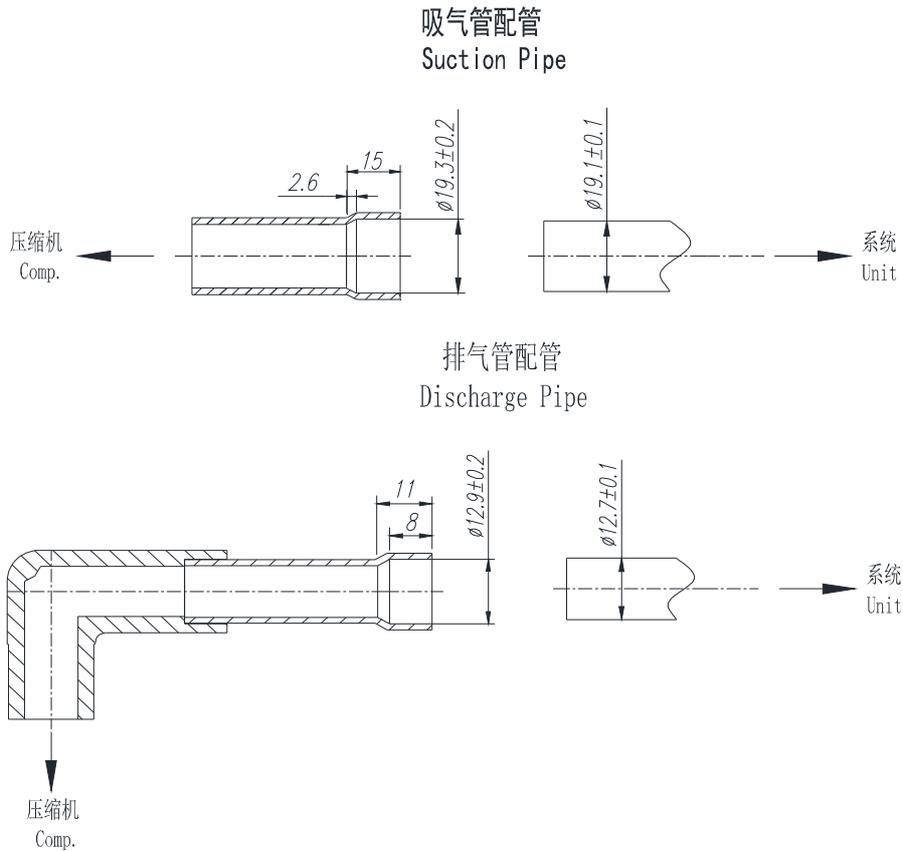
Important matter of piping connection for suction and discharge

如焊料等异物进入压缩机会引起压缩机发生故障，因此对配管的焊接、希望按下述基准实施。

Please weld piping based on below condition since the compressor will be damaged if the brazing materials are put into compressor internal.

1) 请以下列尺寸匹配吸、排气管和连接的循环配管。

Please control the size of cycle pipe which is connected to suction and discharge pipe as below.



(2) 在焊接时，需确认配管有无油异物。在焊接前，擦去铜管中和机器的铜管外边的油。

Please check oil foreign materials are not attached on piping at brazing. Please wipe oil on the brazing pipe inside and the unit brazing pipe outside before brazing.

(3) 焊接时请把铜管放在焊接管的中心。

Please make sure to center the brazing pipe in the compressor at brazing.

(4) 连接配管（焊接型）场合、必须充着氮气进行。

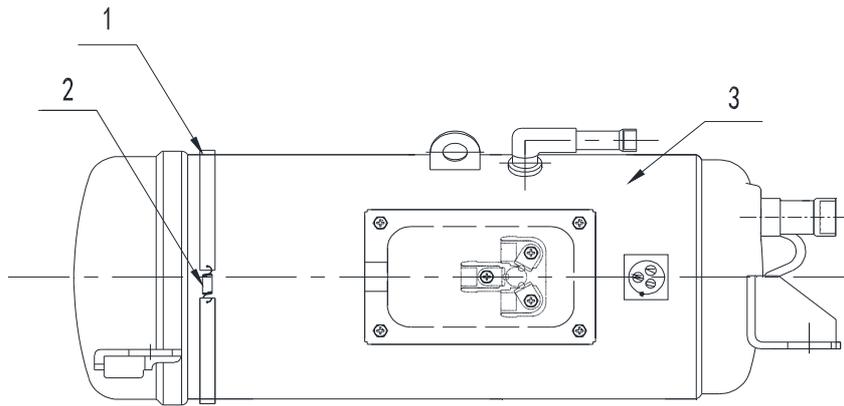
When brazing the copper pipe, blow nitrogen gas through the brazing part, in order to protect against oxidization in the pipe.

(5) 焊接后需对焊接状态进行确认。

Please check finishing after brazing.

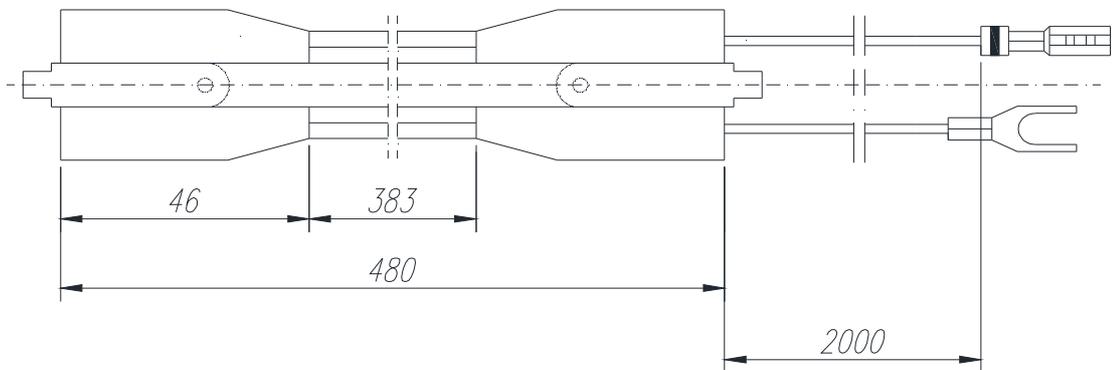
DWN.	Ruijia_C	161213	Johnson Controls-Hitachi	TITLE:	NO. :
CHKD.	Zhibao_W	161213	Wanbao Compressor	Piping Connection	AC-27
APPD.			(Guang Zhou) Co., Ltd.		

热油器安装图 Crankcase Heater Assembly

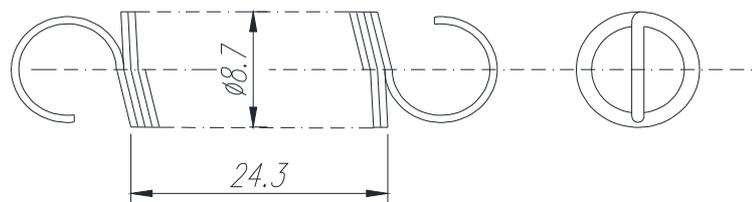


序号 No.	名称 Parts Name	备注 Remarks
1	热油器 Crankcase Heater	220V, 60W
2	弹簧 Spring	
3	压缩机 Compressor	

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-33
CHKD.	Zhibao_W	161213			
APPD.					