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SPECIFICATION REVISION RECORD

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1. SCOPE 应用范围

This specification is applied to SHANGHAI HIGHLY Heat pump water heater compressor.
此规格适用于上海海立电器有限公司生产的热泵热水器专用压缩机。

2. SPECIFICATION OF THE MODEL 压缩机的规格

项目 Item	规格 Spec
2.1 Model Type 型号	WHP37600PSKTQ9JK
2.2 Power source input to inverter 变频器外加电源	Rated voltage 额定电压 380V Rated frequency 额定频率 50Hz Phase 相数 3phase 三相 内部试验用变频器输入电源，仅供参考
2.3 Application 应用	Heat pump water heater compressor 热泵热水器
2.4 Refrigerant 制冷剂	R290
2.5 Displacement 排气量	84.8ml/rev （double-cylinder 双缸）
2.6 Allowable frequency range 转速允许变化范围	900～7200rpm
2.7 Oil 油	Synthetic oil or equivalent 2000±20ml
2.8 Allowable amount of refrigerant charge 制冷剂充注量	Below 3200g(R290) 3200g(R290)以下
2.9 pace volume of inner case 壳体内容积	3200cm^3
2.10 Compressor weight 压缩机重量	26.5 kg incl. Oil (包括油)
2.11 Refrigerant 制冷剂	R290
2.12 Rated Heating Capacity (W) 额定制热能力（W）	21570
2.13 Compressor Rated Input (W) 额定压缩机输入功率（W）	4820
2.14 COP 能效比	4.48
2.15 Current 电流（ A ）	15.0
2.16 Capacity measuring conditions and noise & vibration measuring condition 性能测定条件和噪音振动测试条件	Rotational speed 转速 3600rpm Evaporating temp. 蒸发温度 7.2 ℃ Condensing temp. 冷凝温度 54.4℃ Liquid temp. 液体温度 46.1℃ Ambient temp. 周围温度 35.0℃ Return gas temp. 回气温度 35.0℃ Wind speed 通风 2m/s

*.COP= Heating capacity 名义制热量 (W)
Motor input 电机输入功率 (W)

* Rated Capacity and input are measured with HIGHLY inverter circuit by secondary Refrigerant calorimeter Methods of GB/T 5773-2016.
Nominal heating capacity equals refrigerant capacity adding motor input. Allowable capacity should be more than 95% of the rated capacity. Allowable input should be less than 107% of rated motor input.
额定能力和输入功率为用本公司专用变频器根据 GB/T 5773-2016 的第二制冷剂法测试.
名义制热量等于制冷量和电机输入功率之和。允许冷量应为额定冷量的 95%以上,允许电机输入功率为额定输入功率的 105%以下.
测定噪音振动时，不规定测定条件中的周围温度和风速。

3. MOTOR PARAMETER 电机参数

项目 Item	参数 Spec	说明 explanation
3.1 Motor Type 电机种类	Direct current brushless motor 直流无刷电机	——
3.2 Rotor Pole（Pole） 转子极数（极）	6	——
3.3 Rated Frequency Range（Hz）运行频率范围（Hz）	45-36	Electrical Frequency, Relating to VDCmax of Inverter 电频率，取决于驱动器 VDCmax
3.4 Demagnetizing Curren（A） 永磁体减磁电流（A）	63.00A	Peak Current, at 120℃, -5% Demagnetizing Rate 峰值电流，120℃下测定，通电时间 2 秒，减磁率低于 5%
3.5 Inductance Ld、Lq（mH） d 轴、q 轴电感（mH）	Sheet 2 见表 2	——
3.6 定子线圈电阻（20℃）（Ω）	0.499（20℃）	line-to-line 线间

项目 Item	参数 Spec	说明 explanation
3.7 Voltage Constant（Vrms/krpm） 感应电压常数（Vrms/krpm）	59.7V/krpm	line-to-line 线间
3.8 Torque Constant（N •m/Arms） 电机转矩常数（N m/Arms）	0.851	Torque/Current 力矩/电流
3.9 Inertia （Kg • m2） 转动惯量（Kg m^2）	0.0020793	
3.10 Flux Φa（Wb） 磁通量Φa（Wb）	0.15516	ϕ (Per Phase, Peak)= $\frac{\sqrt{2}\times E0}{2\pi f\sqrt{3}}$ Φ (一相 peak 值)= $\frac{\sqrt{2}\times E0}{2\pi f\sqrt{3}}$
3.11 Magnet Material 电磁铁类型	NdFeB	——
3.12 Insulation class 绝缘等级	E class(级)	——

表 2：

电流	1	2	3	4	5	6	8	10	12	14	16	18	20	22	24
q 轴	5.78	6.01	5.98	5.92	5.85	5.78	5.61	5.45	5.29	5.14	4.97	4.82	4.66	4.54	4.4
d 轴	4.06	4.14	4.17	4.18	4.17	4.15	4.09	4.02	3.94	3.86	3.77	3.7	3.61	3.53	3.45

4. CHARACTERISTICS 一般特性

4.1 The surface of the compressor is painted to black, without obvious flaw ,impact scar, paint peel off, rust and so on.

压缩机的表面全部喷涂黑色油漆。外观上没有明显的伤痕、碰伤、剥落、生锈等现象。

4.2. Indication 表示

Compressor model type, manufacturing data are clearly indicated on the surface of compressor。

压缩机的表面注明压缩机的形式、制造年月日。

4.3. Residual moisture 残余水分含量 300mg MAX (以下)

4.4. Residual impurities 杂质含量 90mg MAX (以下)

5 PARTS AND DRAWING LIST 零件及图纸清单

PARTS NAME 零件名称		QTY/SET 数量/套	DRAWING NO. 图纸号	REMARKS 备注
Compressor 压缩机		1	4CYCE0104	Dimensioned sketch 尺寸简图
Mounting Parts 安装件	Rubber grommet 橡胶避振脚	4	4CYC01288	
	Bolt 固定螺栓	--	4CYC00700	*
	Nut 固定螺母	--	M8	*
Electrical Parts 电器部品	Terminal cover 接线盒盖	1	4CYC00988	
	Gasket 接线盒盖垫片	1	4CYC01047	
	Thermostat 热动开关	1	4CYC01403	
	Nut 固定螺母	1	3CYC00004	
	Rubber washer 固定垫圈	1	4CYC00174	
	Sleeve 螺杆护套	1	4CYC01042	
			4CYC01272	Lead routing 接线图
			Graph1 图 1	Pressure guarantee Chart 压力保证范围图
			Graph2 图 2	Oil level datum 油面基准图
			Graph3 图 3	Notes for rotational speed change 转速变化使用说明

*. Out of supply, for reference. 不提供，仅供参考。

COMPRESSOR CRITERIA 压缩机使用基准

1 Strictly observe the specification 严格遵守规格书

The compressor should be used in specifications written in this "compressor specification" and not be used in specifications outside it. Moreover, accessories should be specified parts used in specified way, service must use specified parts too. The main circuit must link up with fuse or breaker.

本压缩机应在本规格书记载的规格内使用，不要在记载以外的规格中使用。同时，附件也应使用指定的零部件,维修等也必须使用指定的零部件。对于主电路必须连接保险丝和断路器。

2 Source voltage 电源电压

Specified inverter is linked up with compressor terminals . Applied voltage of this inverter should be voltage specified in this "compressor specification". Alternating voltage should never be applied on terminals (for example: commercial alternating voltage of 1φ100V,200V,3φ200V).This is because that if applied alternating current the direct current motor will demagnetize.

压缩机的端子间连接本压缩机专用的变频器，该变频器外加的电源电压应为压缩机规格中规定的电压。

压缩机端子间绝对不能加交流电压（例如：工业交流 1φ100V,200V,3φ200V），这是因为一旦加了交流电，压缩机内的直流电机会退磁。

3 Operating voltage range 运转电压范围

The compressor should be operated in the range of rated voltage ±10% , under standard condition and overload condition of rated frequency (applied voltage to inverter).

The overload condition should not be continuous.

But the standard condition and overload condition mentioned here refer to condition that specified in GB/T 7725. (The standard condition refers to the rating cooling condition and the overload condition refers to the maximum operating condition.)

在额定频率的标准条件下，额定电压的±10%;过负荷条件下，额定电压的±10%内使用。(变频器的外加电源)

过负荷条件应是不连续的。

但是，本项所指的标准条件和过负荷条件是如 GB/T 7725 所规定的条件。（标准条件指额定制冷工况；过负荷条件指最大运行工况。）

4 Operating temperatures and pressures 运行温度及压力

The operating temperatures and pressures of a compressor should be within the range shown in the graph 1.

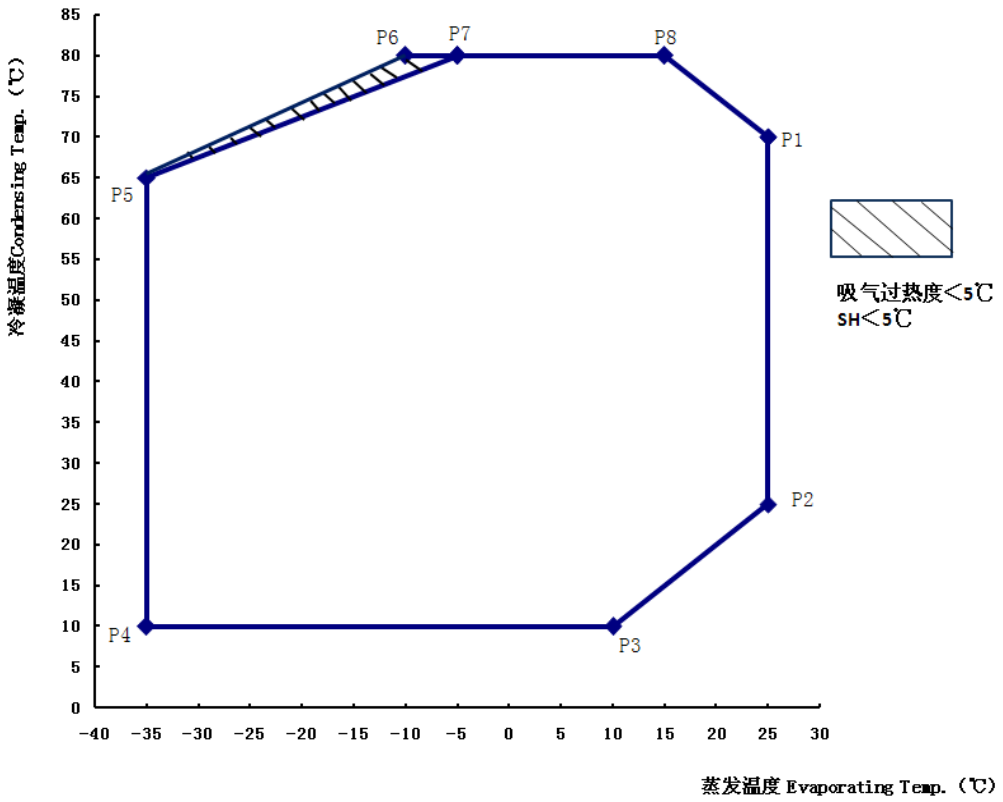
压缩机运行温度及压力应与表 1 中所示规定相符，

Table 1　　表 1

Item 项目	Operating Envelope 运行范围
	see graph 1
Refrigerant 冷媒	R290
Discharge pressure 排气压力 MPa[A]	3.13MAX　以下 （condensing temperature 冷凝温度:80℃）
Suction Pressure 吸气压力 MPa[A]	0.139~0.95
	(Evaporation Temperature 蒸发温度：-35℃~25℃). Compressor suction side can handle the same maximum pressure as discharge side without damage when compressor is not running. 压缩机停机时，吸气侧可以承受与排气侧相同的最高压力值。
Compressor case bottom temp 壳体底部温度	Under steady operating conditions case bottom temperature must be lower than 99 ° C and 6 K higher than condensing temperature and discharge superheat must be 10 K or higher. Under transient operating conditions (e.g. start-up, 4WV switch, …), the above mentioned conditions must be reached within 15 min. Relevant requirement for high pressure ratio condition can be seen on page 28. 只有当壳体底部温度应低于 99℃并比冷凝温度高 6℃（每次比冷凝温度低 6℃的状态应在 15 分钟以内）并且当排气过热度大于 10K，持续 10 分钟以上时压缩机方可正常运行。高压比的情况时，相关要求参见 P28 附页。
Motor winding temp 电机线圈温度	R.Voltage±10%: 额定电压±10%时 lower than 130℃ MAX 130℃以下 MAX
Accumulator temp 储液器温度	Higher than outlet pipe of evaporator 比蒸发器出口高
Ambient temp 环境温度	Meet for the condition of above mentioned motor winding temp. 能满足电机线圈温度的条件即可

Notes: Overload condition should not be continuous.

备注：　过负荷条件应是不连续的。



Graph 1 图 1

	P1	P2	P3	P4	P5	P6	P7	P8
Condensing temperature 冷凝温度	70℃	25℃	10℃	10℃	65℃	80℃	80℃	80℃
Evaporation Temperature 蒸发温度	25℃	25℃	10℃	-35℃	-35℃	-10℃	-5℃	15℃

5 Pressure difference between suction and discharge 吸气、排气压力差

In all allowable rotational speed range, the difference of pressure should be more than 0. 39MPa{4kgf/cm^2}. But if there is no problem of noise when assembled in air conditioner, it can also below this value.

在可使用的转速全范围内，压力差在 0.39MPa{4kgf/cm^2}以上。但是，组装在产品上未发生噪音问题时，也可在该数值以下。

6 Discharge pipe temperature 排气管温度

Discharge pipe temperature is measured at a distance 300mm from the surface of compressor and should be less than 115℃.But When the compressor is running from 900 to 1800min-1, it should be below 100℃， The tip of the thermocouple is fixed by soldering when measuring discharge pipe temperature .Furthermore, soldering point is covered with urethane foam to prevent the effect of wind.

排气管的温度是在距离压缩机表面 300mm 的位置测定，应在 115℃以下，但在 900～1800min^{-1}运行时，应在 100℃以下。而且，测量排气管温度时热电偶的前端用锡焊固定，并且为了防止送风的影响，用氨基甲酸乙脂泡沫塑料罩住锡焊的部位。

7 Air leakage test pressure 空压试验压力

The pressure should be less than 4.32MPa{42kgf/cm^{2}G}.

应在 4.32MPa{42kgf/cm^{2}G}以下

8 Oil back and oil level 回油及油面

The oil should be returned continuously to the compressor and the structure of the refrigerating system should not make oil stay in the system. The oil level in compressor should be satisfied with chart 2.If not keep the oil level, the shortage will occur, and influence the reliability of the compressor.(please check the oil level in the compressor with the sight glass which supplied form SHEC. When the oil can not return to the compressor properly, oil separator should be equipped.

压缩机应连续回油，制冷系统构造中不应有存油部分。且，压缩机内的油面高度应满足图 2 的条件。但是，当产生泡沫状态，液体变泡沫时，这部分不属于油面高度。假如不能满足油面高度，将造成滑动部分的供油不足，严重影响可靠性。（可以用观察油面用的带视镜的压缩机进行确认）。如出现压缩机回油问题，则需在系统中增加油分离器。

9 Dust of compressor hermetic terminals 压缩机密封接线柱的灰尘

Compressor hermetic terminals should be mounted with specified cover in right way to prevent dust entering, and should be used in direction which dust is hard to enter in.

为防止灰尘进入，压缩机的密封接线柱应按指定的方法安装指定的防护罩，应在灰尘不易进入的方向使用。

10 Lead wire of compressor hermetic terminals 压缩机密封接线柱部的导线

Measuring the temperature of hermetic terminals , lead wire should be resist to the temperature and be clamped so as not in touch with the surface of compressor and pipe.

测量压缩机密封接线柱部的温度,应使用能耐其温度的导线。固定导线使其不与压缩机表面及配管接触。

11 Start-stop frequency 起动、停止的频度

The frequency should be less than 6 times per hour. Operating time from start to stop should be more than 3 minutes. Stopping time should be more than 3minutes. But oil level should be met to item 8. Suction and discharge pressure should balance completely before restarting.

1 小时在 6 次以下，从再次起动到下一次停止为止运转时间在 3 分钟以上，停止时间 3 分钟以上。但是，应满足项目 9 的油面高度。且在起动时吸气、排气压力应完全平衡。

12 Rate of rotational speed change 压缩机的转速变化率

The rate of compressor rotational speed (acceleration) should be less than 120rpm/s, But if The variable range is below 120rpm, rate can also be less than 600rpm/s when rotational Speed is reduced to avoid temporary over- current. The change of compressor rotational speed is referred to chart 3.

压缩机的转速变化率(加速比率)应在 120rpm/s 以下。但是当为了防止电流的瞬间过载而降低转速时，转速的可变幅只要在 120rpm 以下，转速变化率允许在 600rpm/s 为止。转速的变化说明参考图 3。

13 Air and moisture in refrigerating system 制冷系统中的空气和水分

The degree of vacuum in refrigerating system should be less than 50Pa (375×10^{-3}mmHg) at room temperature just before charging refrigerant. The quantity of water should be less than 0.2ml.

制冷系统的真空度，在常温、制冷剂充注前应为 50Pa (375×10^{-3}mmHg)以下。含水量应在 0.2ml 以下。

14 Impurities in refrigerating system 制冷系统中的杂质

(1) The weight of residue on the inside surface of the heat exchanger and tube should be less than 0.2g/m^2. But metallic dust should not be permitted in the system. This value means the weight of foreign residue collected by filer paper after washing inside surface of the heat exchanger tubes with R-11.

附着在热交换器、配管内侧表面杂质量应为 0.2g/m^2 以下。但是，不允许含有金属粉。

该数值是用 R-11 洗净热交换器管道表面后用滤纸收集到的杂质量。

(2) Prevent the impurities from entering into the enclosed unit system. When the impurities entered into the enclosed system, it will damage the moving mechanism parts and result in the capillary depositing.

应当避免垃圾等进入系统。当系统里混入了较多的垃圾等杂质时，将成为促使压缩机的滑动部件发生损伤和毛细管堵塞的原因。

(3) Eliminate all system contaminants such as trichlorethylene, alkalies, soaps, oil, acids & washing fluid used at machining heat exchanger and tubes.

清洗所有在加工热交换器管道时残留的污物如三氯乙烯、酸、碱、肥皂液、油和清洗液等。

15 Compressor vacuum operation 压缩机的真空运转

Compressor should never be operated while under vacuum. Otherwise, internal arcing can cause damaging parts.

压缩机绝对不能在真空状态运转，否则压缩机内部易产生电弧放电导致损坏内部零件。

16 The compressor should be operated for more than 20 seconds within 15 minutes after charging refrigerant into the system so proper lubrication results.

在充注制冷剂之后的 15 分钟内，压缩机必须运转 20 秒以上，以保证适当的润滑。

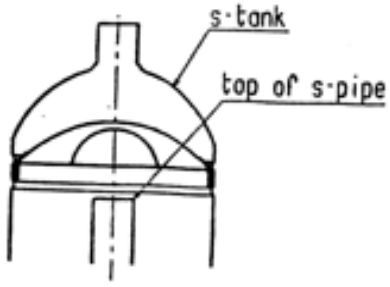
17 Liquid refrigerant return limitations

有关液体制冷剂回流的限制项目

(1) Liquid refrigerant level in s-tank should be lower than the top of s-pipe in s-tank.(see chart at right)

储液器内的液面应比储液器内 S 管的前端位置低。

(参照右图)



(2) There should not exist noise of the liquid refrigerant compression, current and vibrancy increase. System can append the assistant stank or reduce the amount of refrigerant to prevent from liquid refrigerant compression. Refrigerant system forbid liquid refrigerant from flowing back compressor in any case. In normal condition the overheat gas refrigerant should flow back compressor.

无液压缩音、电流增加、振动增加等情况发生。为了防止液压缩，可以追加辅助储液器或减少冷媒封入量。无论在何种条件下，制冷系统都不应有液体向压缩机回流。在正常运转条件下，应有过热气体向压缩机回流。

18 Purge parts with dry nitrogen or dry air to remove remains in parts (dust, detergent, etc.) before assembly of system. Time fur purging: over one second for pipe; over three seconds for heat exchanger. Purging pressure: 0.9±0.1MpaG. Dew point of dry air: Below -20℃.

为把部品内的残留物（灰尘、清洗剂等）除去，在组装系统的部品前，要用干燥氮气或干燥空气吹净部品。吹的时间：管件要在 1 秒以上，热交换器在 3 秒以上。吹气压力：0.9MpaG，干燥空气露点：－20℃以下。

Dry nitrogen should be charged in compressor before assembly of system. Welding should be finished within one minute after charge of nitrogen. Dry nitrogen needs to be charged again and weld if over one minute. Always purge the compressor with dry nitrogen during assembly of system.

系统组装时，先往压缩机里充入氮气。充入氮气后，在一分钟之内完成焊接。如果超过一分钟，须再次充入氮气焊接。在系统装配时要经常用干燥氮气吹净压缩机。

The motor winding temperature should be less than 149℃and hermetic terminal body temperature should be less than 177℃in process of manufacturing.

制冷系统制造过程中，电机的卷线温度应在 149℃以下。且密封接线柱本体的温度应在 177℃以下。

19 Apply for vehicle 车辆等的装载

The compressor should not be used on moving equipment such as automobiles, trains, ships, etc.

压缩机不能使用在汽车、铁路、船舶等移动物体上。

20 Installation 安装方式

The rotational axis of compressor should be kept vertical during operation. But in actual application the axis incline must be within 5°at all directions during operation.

压缩机的旋转轴应保证在垂直方向运转，但是实际应用时在各方向倾斜 5°以内使用。

21 Pipe vibration 管道振动

The displacement of the pipes, which connect from the compressor to other parts of the refrigerator systems, should be less than 0.8mm(1/32")when the compressor is operating at allowable rotational speed range and voltage range of rated ±10%.

Displacement in excess of 0.8mm(1/32") will require changing tube length and/or routing.

如压缩机在转速允许范围内及额定电压的±10%的范围内运转，连接压缩机及制冷系统部的管道的位移小于 0.8mm(1/32")，上述位移超过 0.8mm，则应该改变管子的长度或路径。

22 Connecting tube desigh

In designing and routing tubing that connect from the comprssor to the other parts of the air conditioner, following should be considered.

Moving tubes to the moving parts; minimum clearance 12.7mm(1/2")

Moving tubes to non-moving parts; minimum clearance 9.5mm((3/8")

Moving tubes never touch to lead wire.

在设计及考虑连接压缩机及空调机其它部件的管子路径时，应考虑以下各因素：

移动管道至移动部件：最小间隙 12.7mm(1/2")

移动管道至非移动部件：最小间隙 9.5mm(3/8")

移动管道不得与引线接触。

23 Water pressure resistance 耐水压

保持 17.0Mpa[G] {173.3Kgf/cm2[G]}的压力 1 分钟以上，确认有无破裂以及破裂压力值

Keep 17.0Mpa[G]{173.3Kgf/cm2 [G]}(over 1 minute)，confirm if there is someplace broken and note the pressure data.

24 Miscellany 其他

(1) The compressor should be carried carefully to avoid drop, drag ,impact and should not apply partial force on projection parts such as pipe, hermetic terminals, foot during carrying and processing.

小心搬运，防止在搬运、作业中落下、拖拉、冲击及在管子、密封接线柱、底脚等凸出部施加局部力。

(2) The compressor should not be operated to form a vacuum and to absorb air. The compressor only can run in one direction which according to lead routing wiring diagram. Never reversion otherwise the compressor will be in trouble.

压缩机不得自身抽真空、空运转。压缩机只能按一个方向运转，所以必须按照接线图所示接线。逆运转时压缩机会发生故障，所以要绝对禁止。

(3) The compressor should not be left opened in the atmosphere for more than 5 minutes.

压缩机不得在空气中持续打开 5 分钟以上。

When the air entered into the unit system, it will expedite the deterioration of the oil and result in the capillary depositing and the reducing of insulation resistance.

应避免空气进入系统，当系统里面混入过多的空气时，将促使冷冻机油分解和劣化，从而成为毛细管堵塞和压缩机绝缘不良的原因。

(4) Electric pulse should not be applied to compressor when it is in vacuum.

压缩机内部处于真空状态时，不得加电脉冲。

(5) The compressor should be kept in the place with low-dust, low-moisture.

压缩机应保存在灰尘少、湿气少的环境中。

(6) The compressor can't be used in the place with corrosive atmosphere such as hot spring and chemical warehouse. It should not be the structure often splash water on the surface of the compressor forcibly.

压缩机不能在温泉、化学品仓库等有腐蚀性气体环境中使用。 制冷系统不应是强制地经常向压缩机表面浇水的构造。

(7) The trouble of cross valve, electromagnetic valve, defroster, refrigerant controller, fan motor used in refrigerating system may cause compressor accident .So their reliability should be ensured completely. Moreover, the way of design, manufacture, application of refrigeration cycle with less-leak should be adopted.

制冷系统使用的四通阀、电磁阀、除霜装置、冷媒控制器、风扇电机等的故障会引起压缩机事故。所以应充分保证这些零部件的可靠性。同时，采用泄漏少的设计、制造、使用方法。

(8) The main electric circuit should be equipped with fuse or breaker.

主电路必须连接保险丝或断路器。

(9) Refrigerant should be charged from the end of condenser of refrigerating systems. Never Charge refrigerant to the compressor directly.

制冷剂应从制冷系统冷凝器的尾端注入，而不能直接注入压缩机。

The refrigerant should always be charged in liquid state. When the refrigerant is charged in gas state, The percent component will possibly be changed. Do not recharge with the remaining refrigerant in the system when leakage happened. Because the percent component of the refrigerant in the unit system had possibly been changed.

冷媒应该在液体状态下进行充填，在气体状态时进行充填时冷媒的组分将发生变化。在发生冷媒泄漏的情况下请不要追加充填，因为组分可能已经发生了变化。

(10) Temperatures within systems during stable compressor operation should not be less than -35℃ to prevent wax precipitation from the oil.

系统内温度在压缩机稳定运行时，不应低于-35℃以防止油中蜡的成分沉淀。

(11) Compressor mounting 压缩机防振构造

Rubber grommets are designed soft to provide the noise isolation and to lessen vibration Energy transmission. Stud bolt should be designed to provide sufficient clearance for noise and vibration isolation and to prevent compressor from coming off its mount.

橡胶避振脚是采用防止由于噪音引起的振动及振动能量吸收原理设计的。

所设计的固定杆应提供足够的间隙用于噪音及振动隔离，并且防止压缩机从避振脚上滑落。

(12) The units of refrigerating system should be connected to earth.

制冷系统装置应接地。

(13) There should be adequate clearance between the OD23-under-surface of Push-Nut and the upper surface of rubber grommets.

在卡圈下表面与橡胶避振脚的上表面之间应保留足够的间隙。

(14) SHEC will not take any responsibility against accident that is caused by the accessories equipped by yourselves.

关于客户自己配备的压缩机附件(例如热敏电阻等)的事故，与上海海立电器有限公司无关。

(15) The hermetic terminals of compressor should not be inserted slantingly and not be applied twisting force after inserting so as to avoid reducing of terminal fixed force.

压缩机的密封接线柱端子与空调器的端子连接时，不得斜插或插入后不得施加扭曲力等以免降低端子固定力。

(16) The pipe and hermetic pens attached to the compressor should not be bent.

与压缩机连接的管道及密封接线柱销子不得弯曲。

(17) The dropped compressor can't be used anymore.

跌落的压缩机不能再使用。

(18) Compressor can be used when ambient temperature is higher than -10℃. Confirm the start-up of compressor if the temperature of compressor surface is below -10℃. Heat up compressor to reach the temperature higher than -10℃ with heater if the ambient temperature is below -10℃.

环境温度在-10℃以上时，压缩机可以使用。当压缩机表面温度低于-10℃时，要确认压缩机的启动情况。如果环境温度低于-10℃，用加热器将压缩机加热到-10℃以上再启动也可以。

(19) Set a thermistor on the case cover of compressor to prevent from accident of leakage of refrigerant. The thermistror can stop the operation of compressor when compressor in abnormal temperature. The lead wires of thermostat is enveloped with tube, as same as that of the terminals, to avoid direct contact with the compressor and pipe.

为了防止由于冷媒泄漏引起的事故，在压缩机头部放置热动开关，异常高温时通过电器品动作，使压缩机停止运转。热动开关的引出线与连接接线端子的引出线相同，外面用套管包住，不能直接接触压缩机及配管。

(20) The compressor should not be splashed with water intentionally. Prevent moisture from entering into the enclosed unit system. When the moisture entered into the unit of the refrigerant R290, the refrigerant oil and the organic compound material presented in the hermetic motor will possibly decompose on the affecting of water. It will result in the capillary depositing and the reducing of insulation resistance.

不得有水溅入压缩机。应避免水分进入系统。当使用 R290 冷媒的系统里面混入过多的水分时，冷冻机油和压缩机电机中使用的有机材料在水分的作用下将发生水解，从而导致毛细管堵塞、压缩机绝缘不良。

It is necessary to install a dryer to dehumidify the residual moisture mixed in the refrigerant in the cycling system. The specially defined molecular-sieve dryer is advised.

为除去残存在系统中并与冷媒一起循环的水分，有必要安装一个除去系统中水分用的干燥器。请使用指定的分子筛。

(21) Use the refrigerant of specified brand. When the refrigerant not specified used, it will possibly cause trouble of the performance and reliability of the compressor by the impurities in the refrigerant.

请使用指定的冷媒。当使用指定以外的冷媒时，会因不纯物较多而影响压缩机的性能和可靠性。

(22) The lead wires should be connected to hermetic terminals without being touched on the surface of the compressor.

引线连接至密封接线柱时，不得与压缩机表面相接触。

(23) Be careful of avoiding oxide scale while soldering during assembly of refrigerating system.

(for example: flow or fulfill dry nitrogen)

在组装制冷系统时，若采用钎焊应考虑防止氧化皮的产生。(例如在充满干燥氮气的气氛下作业)

(24) The quantity and kind of contamination (the process materials) in the cycle should be grasped and managed. Carry on reliability test that input contamination a lot than anticipated contamination quantity.

在制冷循环中必须控制和掌握污染物（生产辅料）以及垃圾的量。并增加系统中比预期设定多的污垢物含量进行可靠性使用。

(25) To avoid water and impurity into he refrigeration system and make sure no leakage of refrigerant during the operating course. It's required to direct the erector and maintenance man of air-conditioner.

对于实施空调安装、维修等作业的服务人员，要求对其进行指导和教育，在相关作业时，必须确保制冷系统中不能进入水分、异物，必须确认无冷媒泄漏。

(26) The start-up current and torsion of compressor 压缩机启动电流及扭距

Adjust the start-up torsion of the compressor to above 0.55Nm by inverter. Confirm and measure the start-up current if change the parts and design.

通过变频器调整压缩机的启动扭距，达到 0.55Nm 以上。部品结构或设计变更后一定要测定启动电流，确认没有问题。

（27）the thickness of the refrigerating system using tube 制冷系统配管的壁厚

the tube thickness as followed 制冷系统使用的铜管壁厚如下表所示

external diameter(mm) 外径(mm)	Thickness 壁厚（mm）
6.35 以上	0.5 以上
6.35～11.0	0.5 以上
11.0～13.0	0.6 以上
13.0～15.0	0.6 以上
15.0～19.0	0.8 以上

1. Basis for Checking upon Delivery 验收依据

The Performance test will be carried out in accordance with this “compressor Specification”.

The Safety Performance in accordance with GB4706.1 Safety of household and similar electrical appliances General requirements and GB 4706.17 Safety of household and similar electrical appliances Particular requirements for motor-compressor.

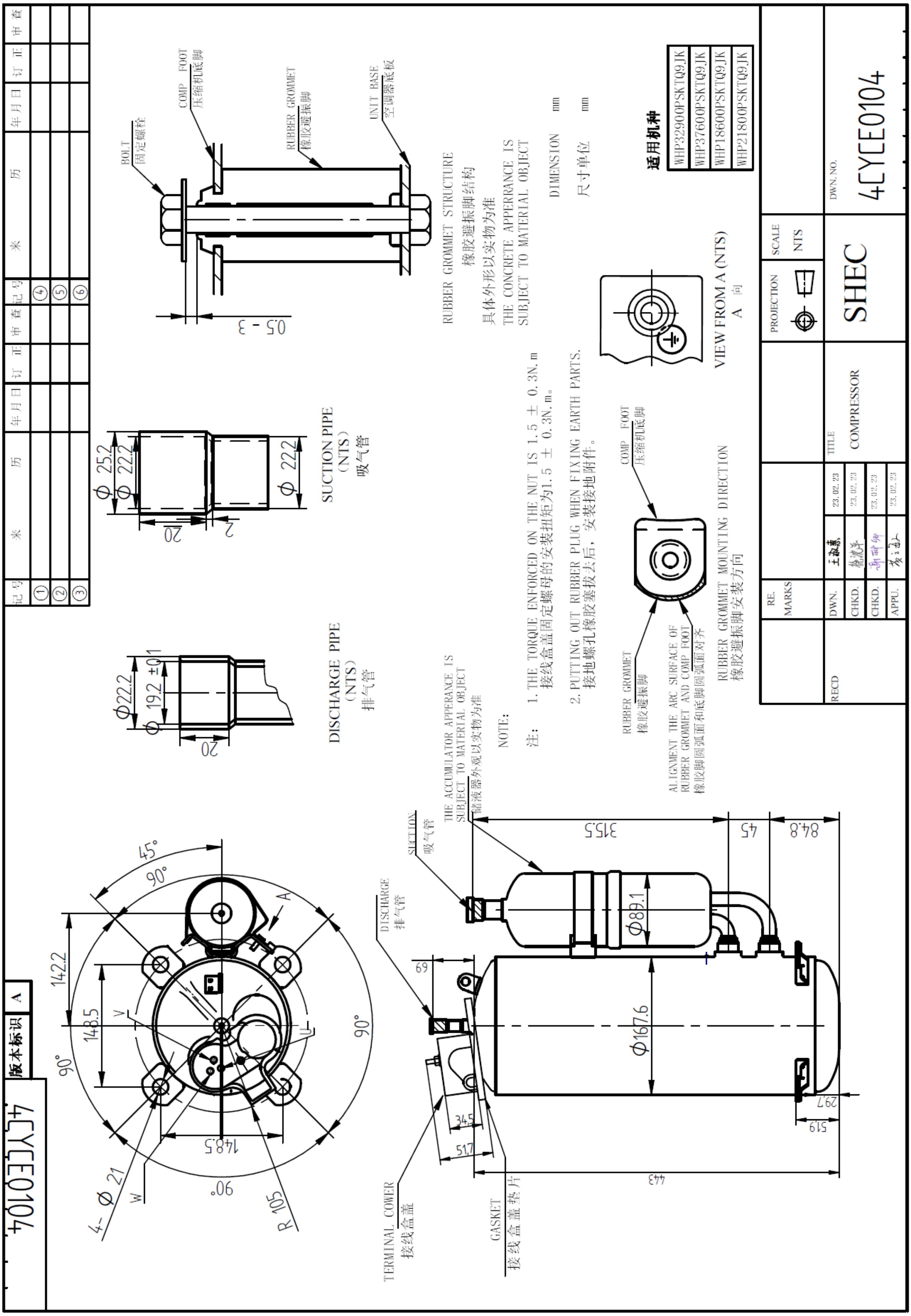
性能试验方法按本仕样书中有关内容执行。

安全性能按 GB4706.1 家用和类似用途电器的安全通用要求及 GB4706.17 家用和类似用途电器的安全电动机--压缩机的特殊要求。

2. Rule for Checking upon Delivery 验收规则

If come across any quality problem, please notify the company in written form within 30 days after the arrival of the cargo, the company shall exchange exactly the number of the products, otherwise they shall be regarded as being up to standard.

若发现质量问题，请在到货后 30 天内向本公司提出书面通知，经确认确属本公司责任，本公司将如数掉换，否则将作自然合格。


BOLT 固定螺栓
COMP FOOT 压缩机底脚
RUBBER GROMMET 橡胶避振脚
UNIT BASE 空调器底板
0.5 - 3
RUBBER GROMMET STRUCTURE
橡胶避振脚结构
具体外形以实物为准
THE CONCRETE APPERANCE IS SUBJECT TO MATERIAL OBJECT
DIMENSION mm
尺寸单位 mm
适用机种
WHP32900PSKTQ9JK
WHP37600PSKTQ9JK
WHP18600PSKTQ9JK
WHP21800PSKTQ9JK
VIEW FROM A (NTS)
A 向
SUCTION PIPE (NTS) 吸气管
Φ 25.2
Φ 22.2
Φ 22.2
20
2
DISCHARGE PIPE (NTS) 排气管
Φ22.2
Φ 19.2 ±0.1
20
THE ACCUMULATOR APPERANCE IS SUBJECT TO MATERIAL OBJECT
储液器外观以实物为准
NOTE:
注:
1. THE TORQUE ENFORCED ON THE NUT IS 1.5 ± 0.3N.m
接线盒盖固定螺母的安装扭矩为1.5 ± 0.3N.m。
2. PUTTING OUT RUBBER PLUG WHEN FIXING EARTH PARTS.
接地螺孔橡胶塞拔去后，安装接地附件。
COMP FOOT 压缩机底脚
RUBBER GROMMET 橡胶避振脚
ALIGNMENT THE ARC SURFACE OF RUBBER GROMMET AND COMP FOOT
橡胶脚圆弧面和底脚圆弧面对齐
RUBBER GROMMET MOUNTING DIRECTION
橡胶避振脚安装方向
45°
90°
90°
90°
90°
142.2
148.5
148.5
4- Φ 21
R 105
A
SUCTION 吸气管
DISCHARGE 排气管
315.5
45
84.8
Φ89.1
Φ167.6
69
34.5
51.7
29.7
51.9
443
TERMINAL COWER 接线盒盖
GASKET 接线盒盖垫片
版本标识 A
4CYCE0104
记号 ① ② ③ ④ ⑤ ⑥
米 历 年月日 订正 审查
RE. MARKS
RECD
DWN. 23.02.23
CHKD. 23.02.23
CHKD. 23.02.23
APPU. 23.02.23
TITLE COMPRESSOR
PROJECTION
SCALE NTS
SHEC
DWN.NO. 4CYCE0104

版本标识	B

4CYC01288

记号	来历	年月日	订正	审查	记号	来历	年月日	订正	审查
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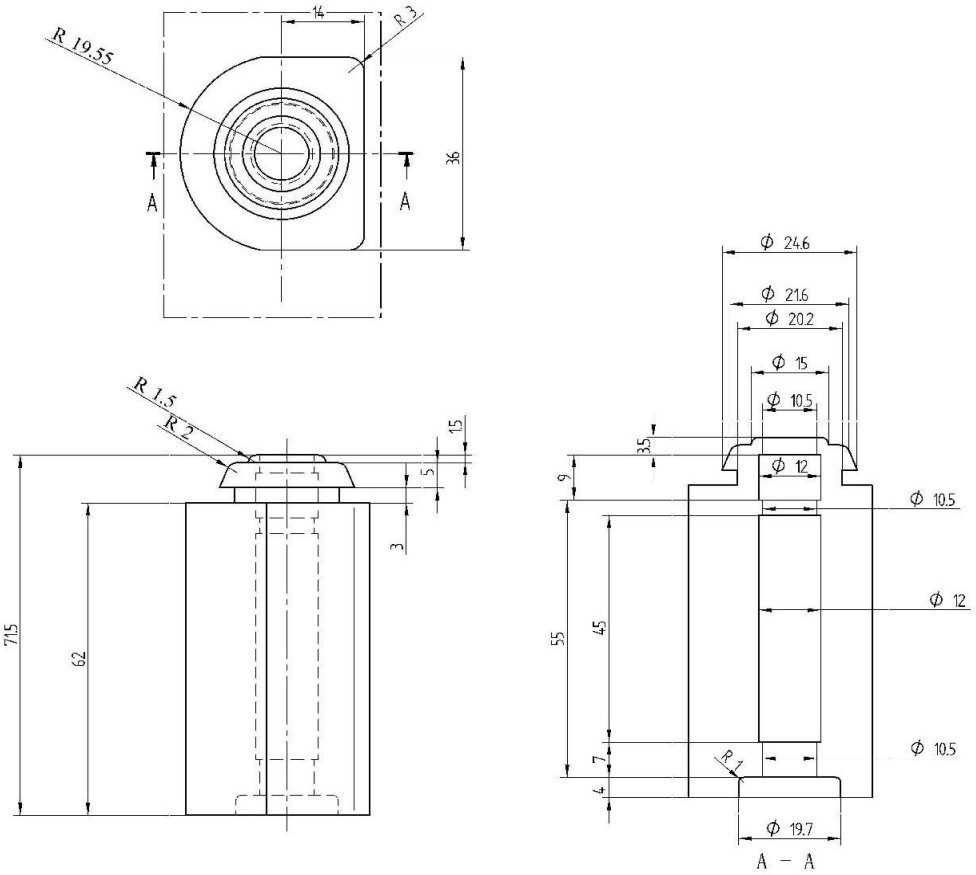

MATERIAL: EPDM
材料: 三元乙丙胶
硬度为 Hs65 ± 5°

DIMENSION: mm

尺寸单位: mm

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REGD	DWN.		18. . 9	TITLE	SHEC	DWN.NO.
	CHKD.			DIMENSIONED SKETCH		4CYC01288
	CHKD.		18. 1. 9			
	APPD.		18. 1. 9			

4CYC00700 | 版本标识 | B

记号	来历	年 月 日	订正	审查	记号	来历	年 月 日	订正	审查
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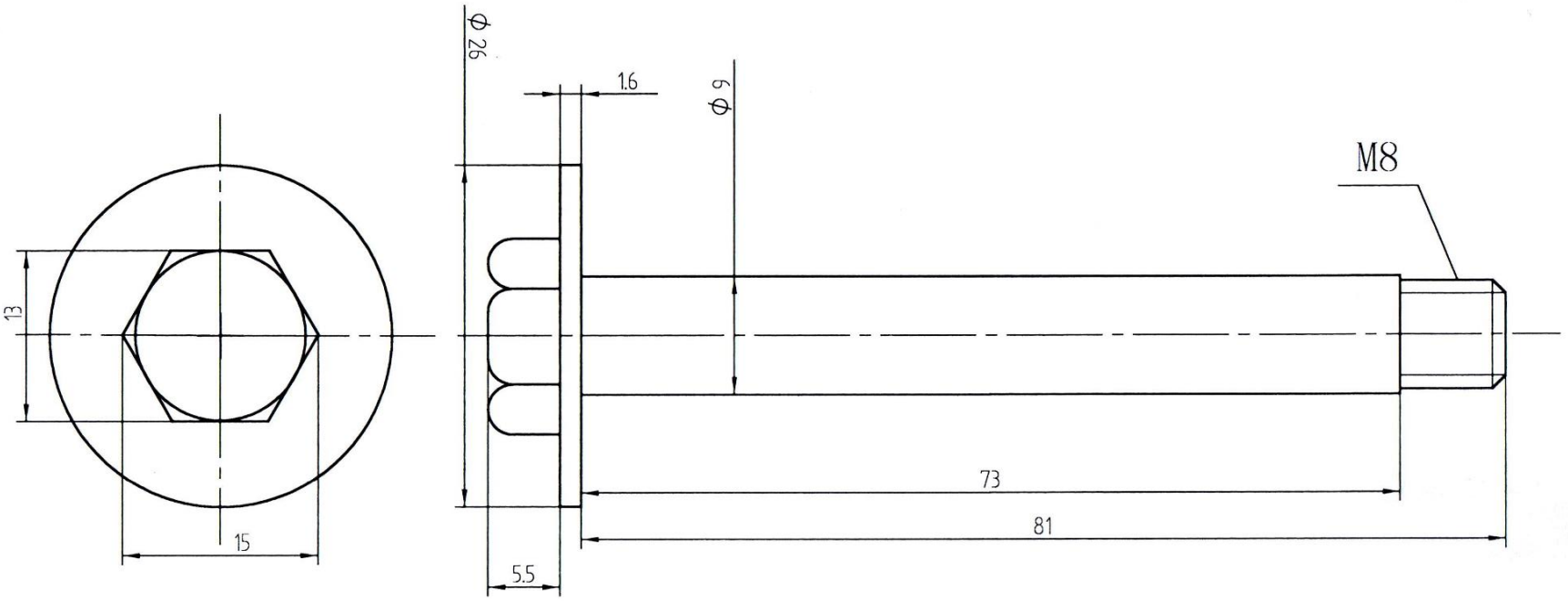
③					⑥				



注记

表面处理：电镀

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	CHKD.			DWN.NO. 4CYC00700
	CHKD.			
	APPD.	郭文涛 18.5.17		

4CYC00988 | 版本标识 | C

记号	来历	年月日	订正	审查	记号	来历	年月日	订正	审查
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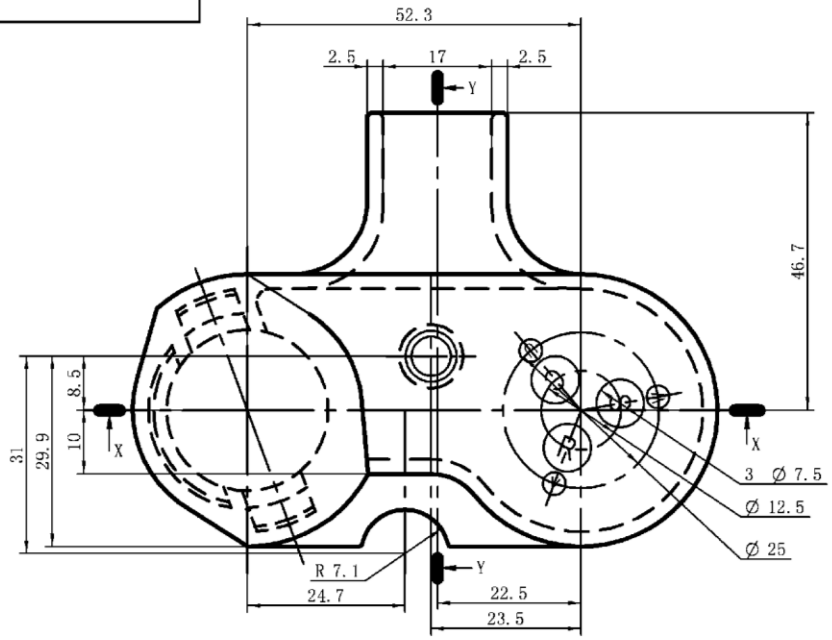

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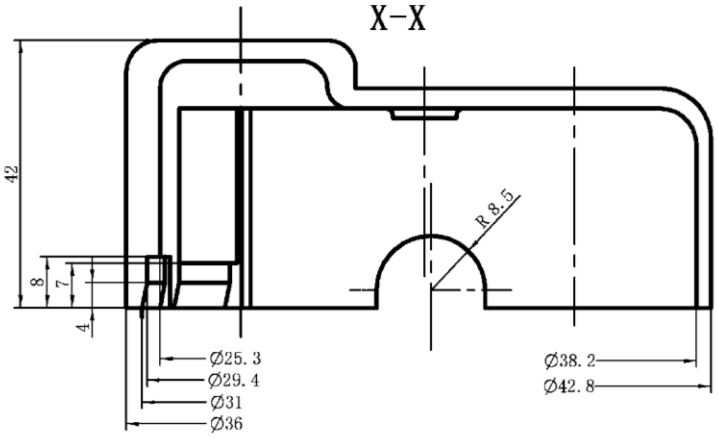
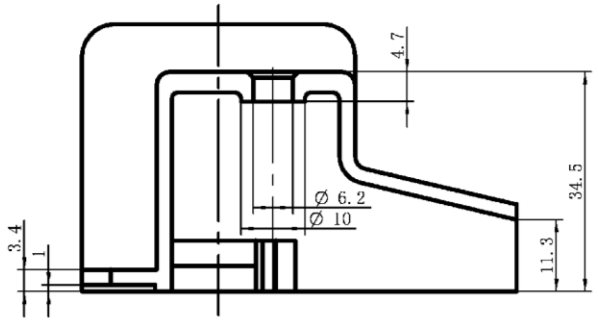


MATERIAL: VALOX 420 SEO BK1066
材料: 聚对苯二甲酸丁二醇脂
DIMENSION: mm
尺寸单位: mm

Y-Y



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	CHKD.					
	CHKD.					
	APPD.		18.6.5			

4CYC01047

版本标识	B

记号	来历	年月日	订正	审查	记号	来历	年月日	订正	审查
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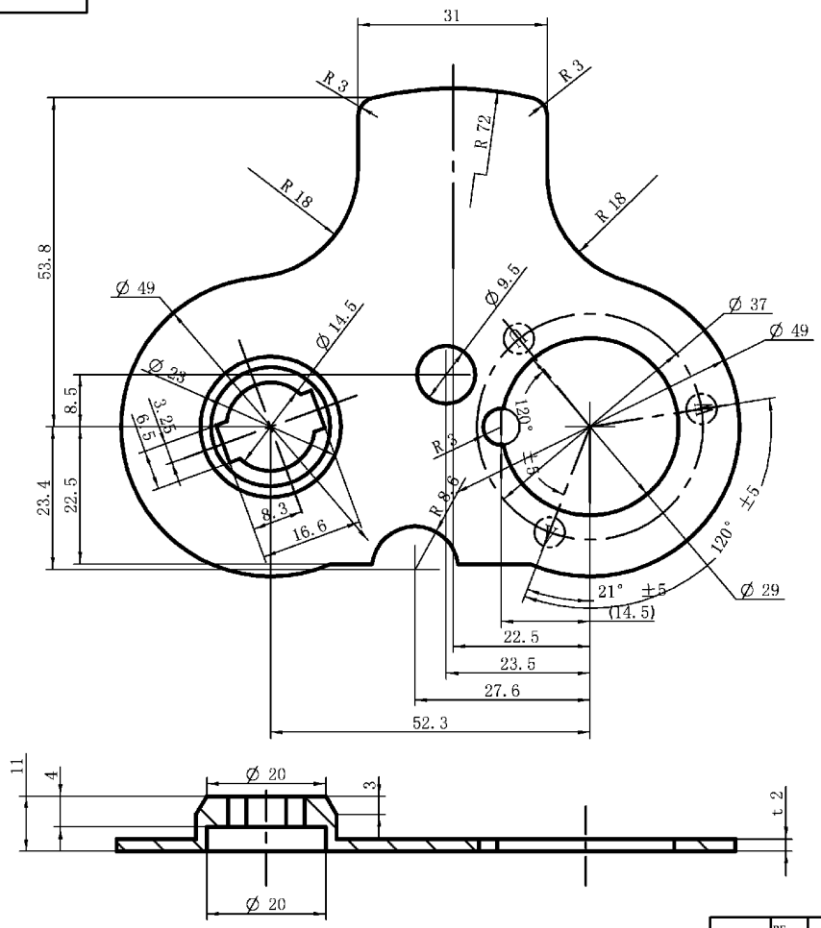

MATERIAL: EPDMFOP-B
材料: 三元乙丙胶
DIMENSION: mm
尺寸单位: mm

	RE. MARKS				PROJECTION	SCALE	
REGD	DWN.	刘长生	18.6.5	TITLE RUBBER GROMMET	SHEC	NTS	DWN NO. 4CYC01047
	CHKD.						
	CHKD.						
	APPD.		18.6.5				

4CYC01403 版本标识 A

记号	来历	年月日	订正	审查	记号	来历	年月日	订正	审查
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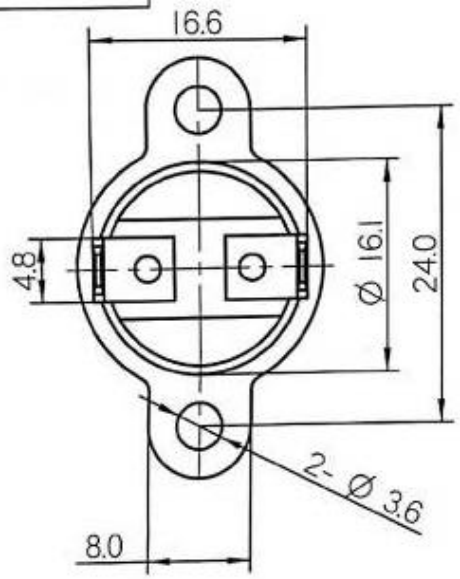

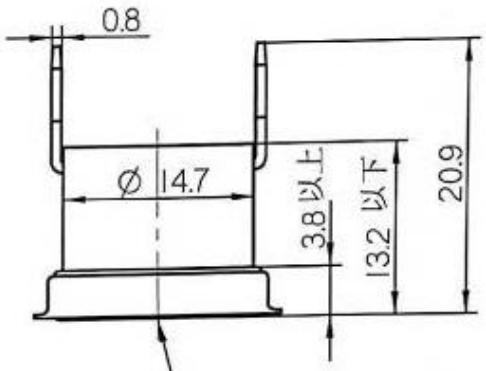

部品号/动作温度代号
Prodct Model / Code of the operating temp

SPECIFIED LIMITS
规格值

厂家 manufacturer	部品号 Product Model	动作温度(OFF) Operating Temp(OFF)	动作温度(ON) Operating Temp(ON)	测定电压 Testing Voltage	测定电流 Testing Current
通宝 Tongbao	KSD301-11.5/10BC22S20-S2	115±3℃	95±5℃	AC250V	10A

	RE. MARKS			PROJECTION	SCALE
REGD	DWN.	20.1.19	TITLE THERMOSTAT	SHEC	DWG NO. 4CYC01403
	CHKD.	20.1.19			
	CHKD.				
	APPD.	20.1.19			

3CYC00004 | 版本标识 | E

记号	来历	年月日	订正	审查	记号	来历	年月日	订正	审查
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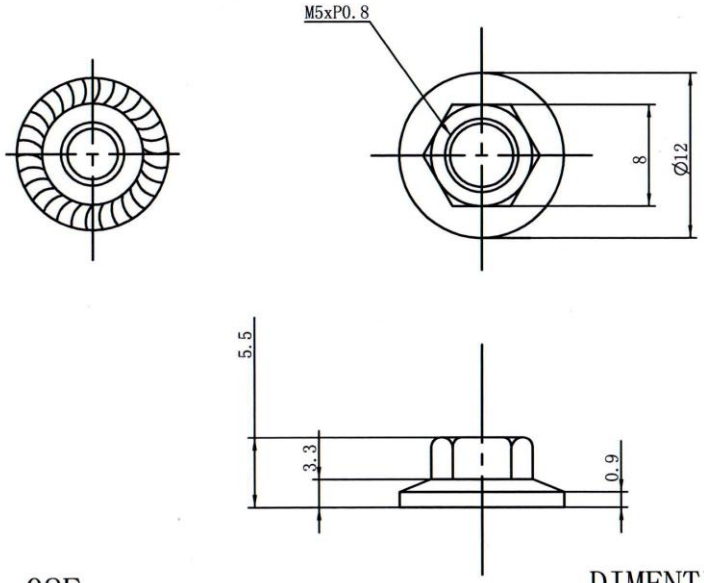

MATERIAL：08F
材料：碳素结构钢

DIMENTION：mm
尺寸单位：mm

	RE. MARKS				PROJECTION	SCALE	
REGD	DWN.	周扬	18.5.21	TITLE	SHEC	NTS	DWN.NO.
	CHKD.	钱之浩	18.5.21	NUT			3CYC00004
	CHKD.						
	APPD.	郭路	18.5.21				

4CYC00174	版本标识	B

记号	来历	年月日	订正	审查	记号	来历	年月日	订正	审查
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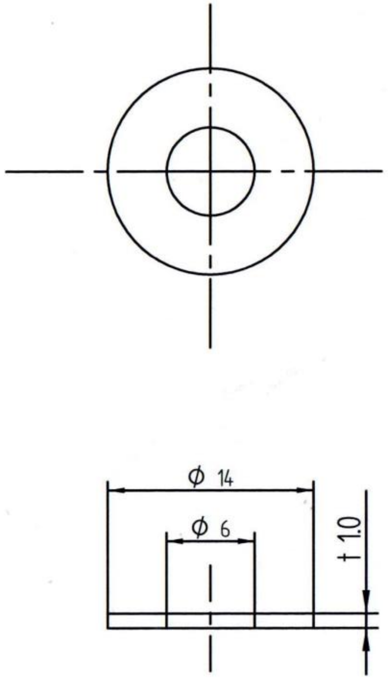

MATERIAL:EPDM

材料：三元乙丙胶

RE. MARKS		PROJECTION	SCALE NTS	
REGD	DWN. 周扬 18.5.21 / CHKD. 陆子浩 18.5.21 / CHKD. / APPD. 耿VL炜 18.5.21	TITLE RUBBER WASHER	SHEC	DWN.NO. 4CYC00174

4CYC01042 | 版本标识 | C

记号	来历	年月日	订正	审查	记号	来历	年月日	订正	审查
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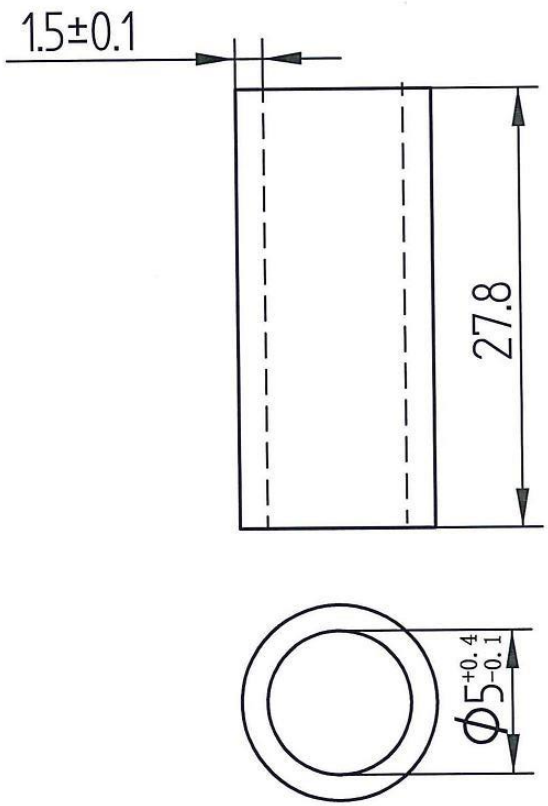

注：
1、颜色为白色
2、材料为硅橡胶

NOTE:
1、COLOR:WHITE
2、MATERIAL:SILICONE RUBBER

	RE. MARKS				PROJECTION	SCALE	
REGD	DWN. 黄文文	18.5.18	TITLE		SHEC	NTS	DWN.NO.
	CHKD. 王德	18.5.18	SLEEVE				4CYC01042
	CHKD.						
	APPD. 马利强	18.5.18					

4CYC01272	版本标识	B

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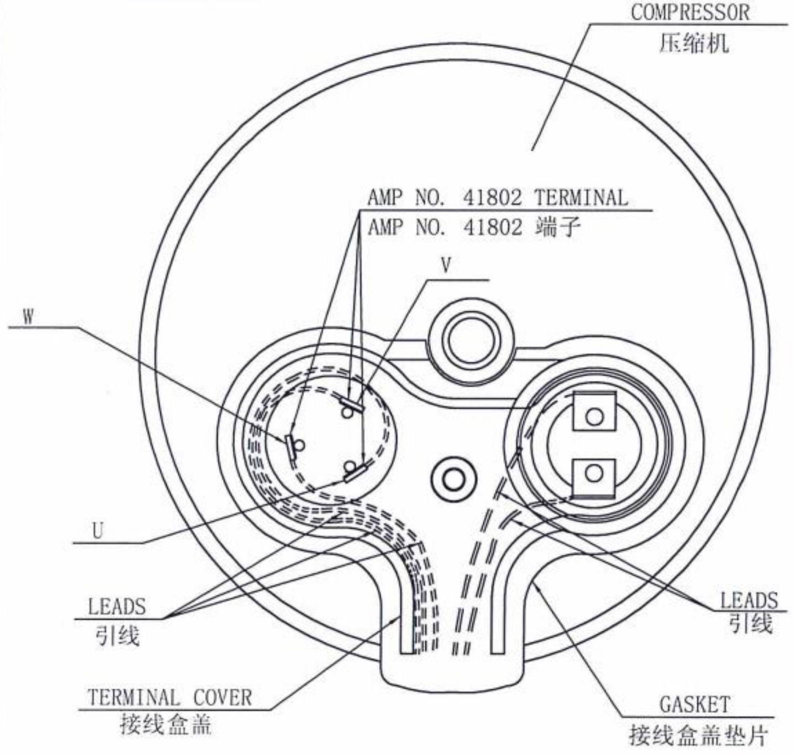
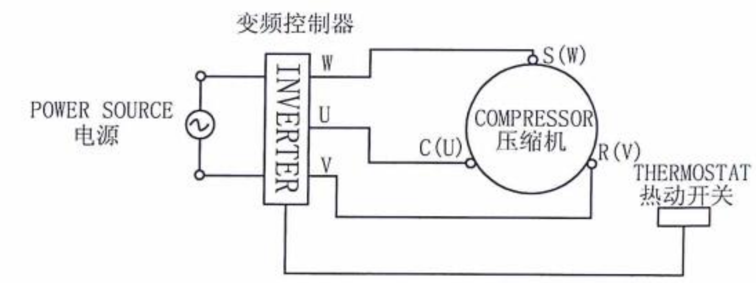
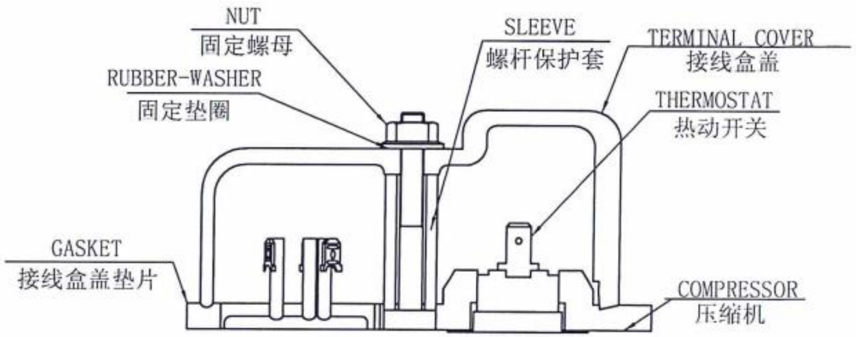
②					⑤				
③					⑥				







NOTES:
1. PLEASE PREPARE LEADS BY YOURSELF.
2. THE LETTER U, V OR W STANDS FOR EACH TERMINAL.
3. TABS FOR HERMETIC TERMINAL ARE AMP #250.
4. THERMOSTAT TO BE SET ON THE TOP OF COMPRESSOR AS SHOWN.

注意:
1. 引线自备。
2. U、V、W表示每个接线端子。
3. 密封接线柱接片为AMP NO. #250。
4. 热动开关应如图放置于压缩机顶端。

	RE. MARKS		PROJECTION	SCALE NTS	
REGD	DWN. 杨茂莲	18.6.7	TITLE LEAD ROUTING WIRING DIAGRAM	SHEC	DWN NO. 4CYC01272
	CHKD.				
	CHKD.				
	APPD. 郁玮	18.6.7			

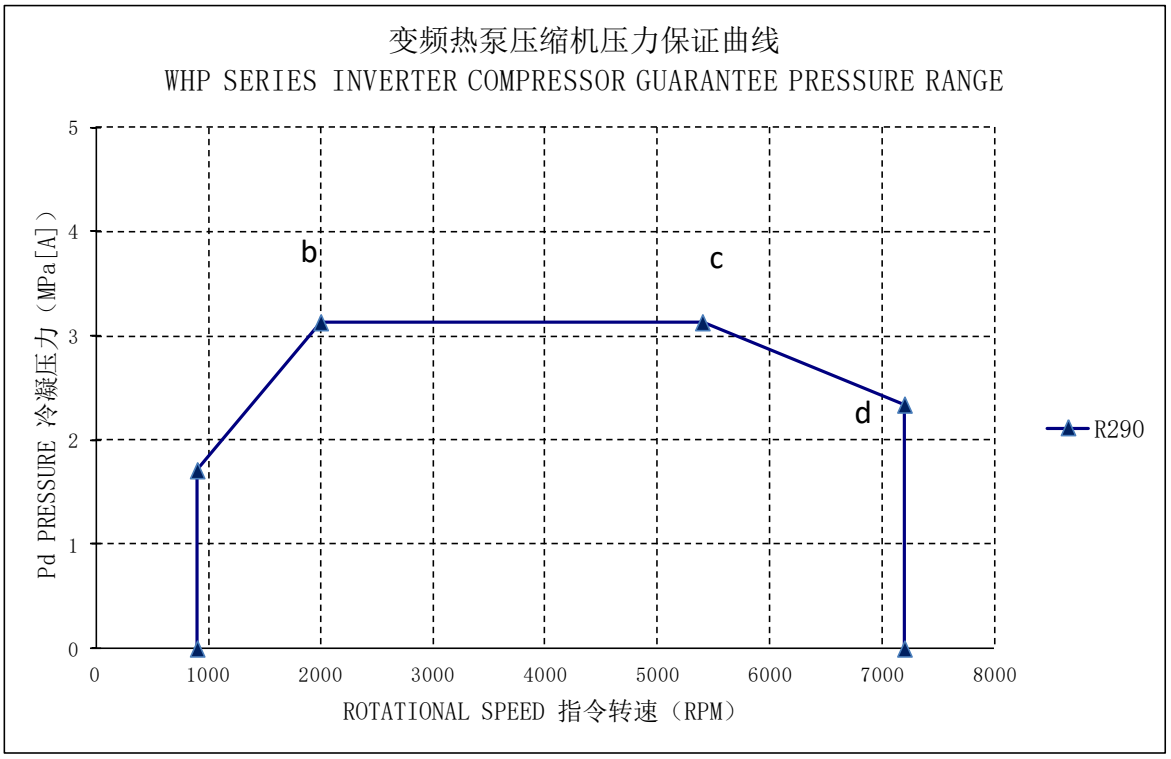


图 1

Compressor running speed range： Min 900min^{-1}～Max 7200min^{-1}

压缩机转速范围：Min 900 min^{-1}～Max 7200min^{-1}

Rotational speed 转速	Pd limit 压力上限
	R290
900	1.71
2000	3.13
5400	3.13
7200	2.34

说明 instructions：

1.压缩比 Pcr 需满足如下要求:

The pressure ratio(Pcr) should satisfy the following conditions:

1）900~2000rpm：1.5≤Pcr≤8.0

2）2000~7200rpm：2.0≤Pcr≤8.0

2.常规运行时，若出现吸气压力、压比等超过运行范围的情况，需要根据以下条件确认压缩机的可靠性

If the suction pressure, pressure ratio out of the used envelop under normal operating conditions, the following tips should be considered to make the compressor operating reliability.

	Condition 1	Condition 2	Condition 3	Condition 4	Condition5	Condition6
条件运行区域 Range of the conditions	Ps≥Psmax	0.137≤Ps≤0.168MPa[A]	压比 Pressure ratio≥8	压比 pressure ratio ≤1.5	高低压差 Pressure difference ≤ 0.39MPa	油温 The oil temperature SH≤6℃
需满足的运行要求 Operations requirement	1）频率 Frequecy≤70Hz 2）Ps≤1.3MPa(A) 3）Pd≤ Pdmax	1）转速 Rotational speed N≤6600rpm 2）压力比 Pressure ratio≤10 3）限定时间 Lasting time: ≤360hr 4）油面在规定范围内 The oil level should be in the fixed range 5）Td 在规定范围内 The discharge temperature should be in the fixed range 6）油温 SH≥6℃或油粘度≥0.5cP The oil temperature SH≥6℃ or oil viscosity≥0.5cP	1）须在制热模式 In the heating mode 2）Pd 在规定范围内 The discharge pressure should be in the fixed range 3）Ps 在规定范围内(含条件运转区域) The suction pressure should be in the fixed range(include ranges under limited conditions) 4）Td 在规定范围内 The discharge temperature should be in the fixed range	压缩机无异音 The working compressor has no abnormal noise	压缩机无异音 The working compressor has no abnormal noise	油粘度 The oil viscosity≥0.5cP

3.过渡运行阶段，吸气压力和压缩比需满足以下要求（每次时长≤5min）：

In the transitional stage to the final operating condition, the suction pressure and pressure ratio should satisfy the following conditions.(lasting time≤5min each time):

a）吸气压力可以低于 0.168MPa，但不得低于 0.137MPa

The suction pressure can be lower than 0.168MPa, but should not below 0.137MPa.

b）在 Td<100℃且油粘度≥0.5cp,允许最大压缩比为 10

Pressure ratio value ten was allowable when the discharge temperature <100℃ and oil viscosity≥0.5cP.

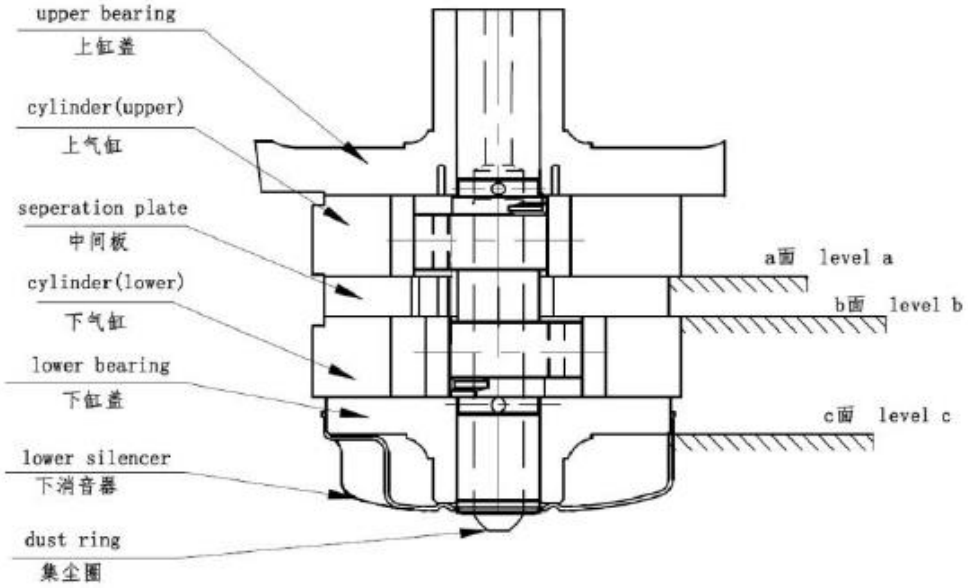
※过渡运行阶段是指系统启动、除霜等运行控制（开/停或工况切换）或环境快速变化导致系统压力、温度等发生快速变化阶段。The transitional stage：the system start-up, defrosting or other operating control(on/off or transformation of operating conditions), the stage when pressure or temperature changing rapidly.

WHP SERIES COMPRESSOR OIL/LIQUID LEVEL CONFIRMATION
WHP 系列压缩机回油回液确认

1 COMPRESSOR OIL LEVEL 压缩机油面

In order to ensure the reliability of the compressor, the minimum oil level required for each operating frequency is shown in the following chart:

为了确保压缩机的可靠性，各运转频率所需最低油面按下图所示：



Operating frequency 运行频率	Operating Below 30rps 低于 30rps 运行	30rps-Maximum speed Stable operation 30rps-最大转速 稳定运行	Transitional operation 过渡运行
The oil level height 油面高度	Above level a a 面以上	Above level b b 面以上	Above level b c 面以上

※Transition operation phase refers to the phase of rapid changes in system pressure and temperature caused by the operation control (on/off or working condition switch) of system startup and defrosting or the rapid change of environment.

※过渡运行阶段是指系统启动、除霜等运行控制（开/停或工况切换）或环境快速变化导致系统压力、温度等发生快速变化阶段。

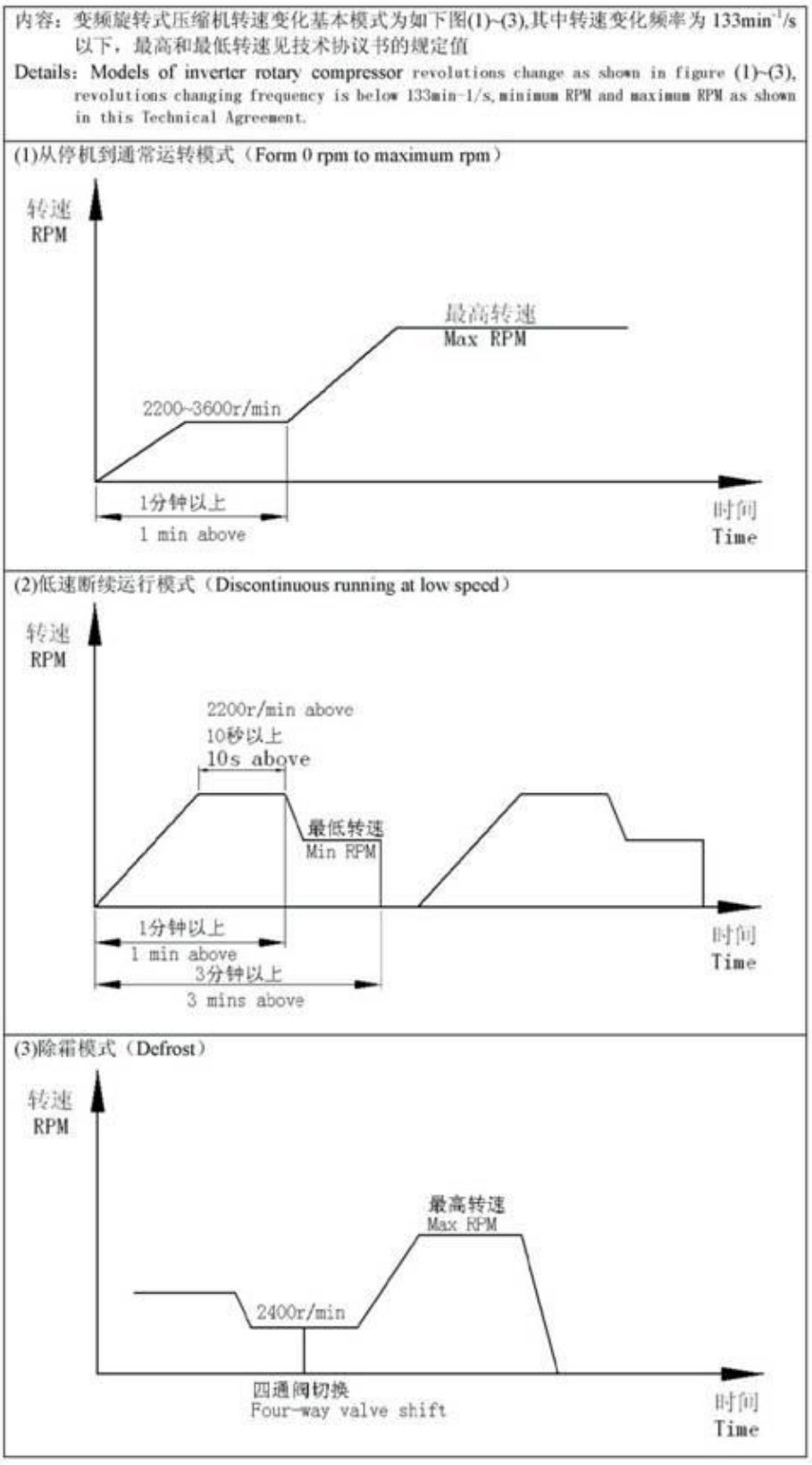
Recommended specifications of compressor heating belt for low temperature heating

低温采暖用压缩机电加热带规格推荐

The environment temperature（℃） 环境温度（℃）	0		-10		-20		-30	
Recommended power of the electric heating （W） 推荐电加热带功率值（W）	90	120	90	120	90	120	90	120
Preheating time（h） 提前预热时间（h）	≥1.1	≥0.8	≥1.4	≥1.0	≥1.8	≥1.3	≥2.3	≥1.5

图 3 直流变频压缩机转速变化的使用说明

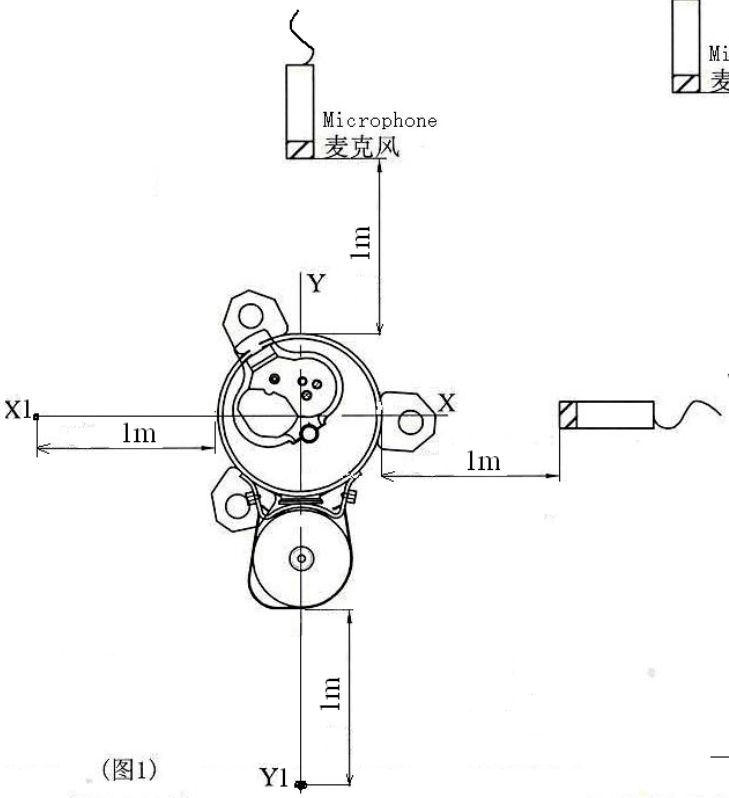
Graph 3 Instructions for Inverter rotary compressor revolutions change



附录
APPENDIX

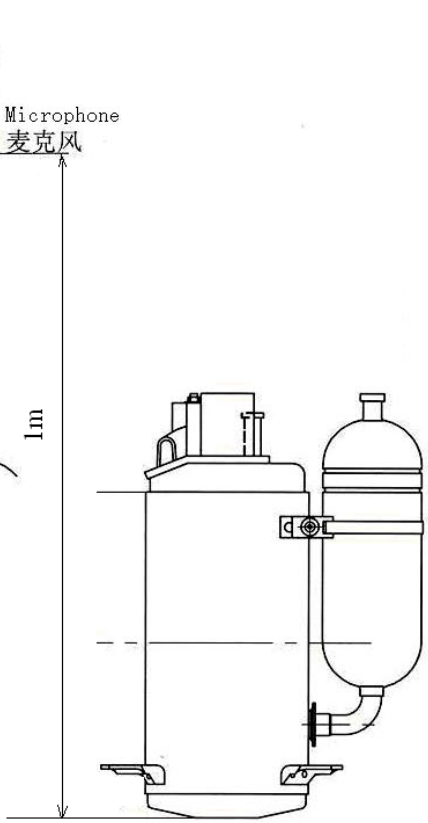
1.噪音测量方法：在下列X,Y,X1,Y1方向四处进行测量，取噪音高的数值。

1. Noise measuring method: Mesaure from X, Y, X1 and Y 1's direction and take the bigger value of noise.



(图1)

(Picture 1)

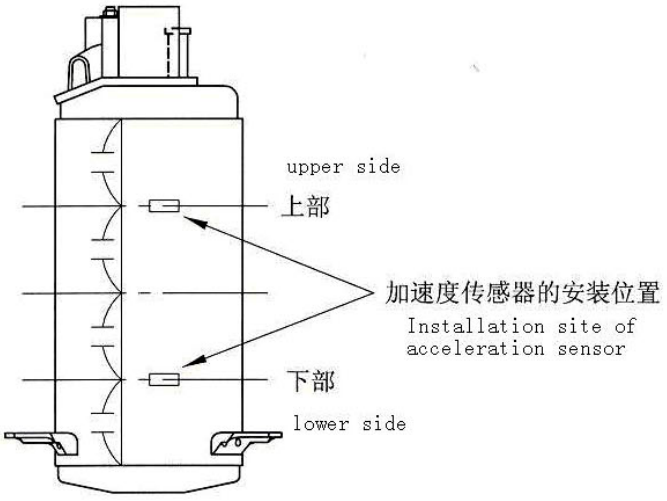


(图2)

(picture 2)

2.振动测量方法:在下图的上部和下部测量振动,取振动大的数值。

2. Vibration measuring method: Measure vibration in the upper and lower side, and take the bigger value.



从图1的Y方向看

View from the Y direction of picture 1

规格书修改经历 Specification Revision Record				
序号 No.	日期 Date	页码 Page in Spec	修订理由 Revision Reason	客户承认日期 Conclusion Date
A				
B				
C				
D				
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