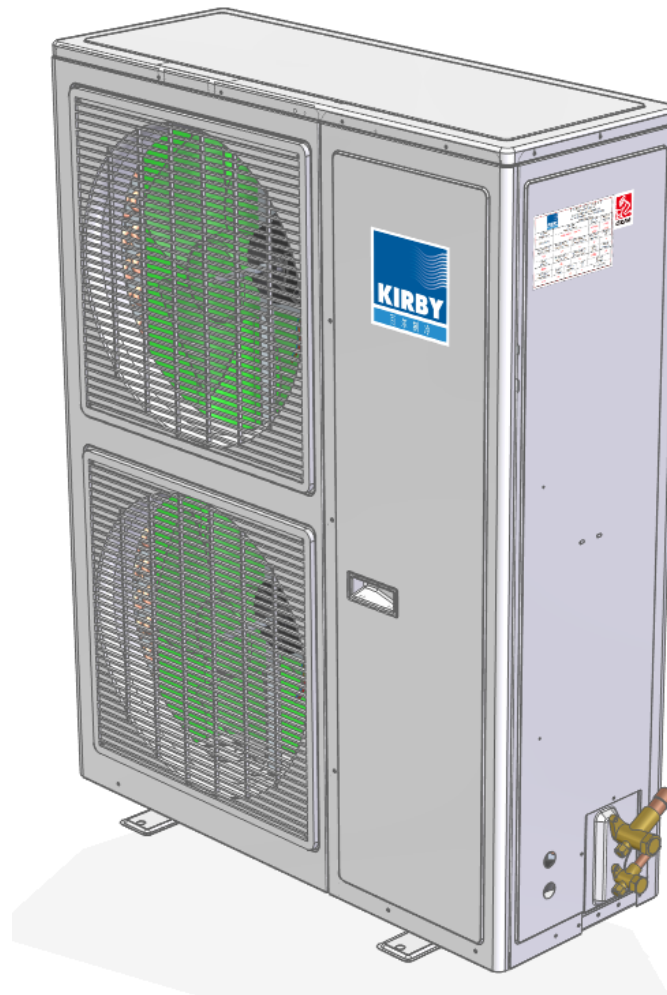


“精锐”  
压缩冷凝机组使用手册  
“SLIM POWER” Condensing Unit  
Installation Instructions

适用于 2.0~7.5HP  
For 2.0~7.5HP



感谢您选择  制冷压缩冷凝机组

该手册可为您提供正确的安装及调试指导








THANK YOU FOR CHOOSING THE BEIJER  CONDENSING UNIT.

TO ENSURE TROUBLE FREE INSTALLATION. PLEASE REFER REF TO THE CONTENTS OF THIS HANDBOOK

在调试冷凝机组前, 请仔细阅读“警告和防护措施”及“安装说明”两部分。

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## 1. 警告和预防措施 Warning and Safeguards

百尔在设计制造该产品时非常关注安全问题，但是终端用户，工程安装商，维护人员在操作设备时也要注意安全。Beijer Ref is very conscious of safety issues during designing and manufacturing with refrigerating system, We have to ensure the end user, installer or service personnel exercises the safety caution when working with the units.

 警告 Warning	<p>请特别注意此标识所示内容，忽视其提醒可能会造成人员的伤害或者伤亡。 <b>This indicates contents for which, if disregarded, the possibility of human death or severe injury can be happened.</b></p>
 注意 Caution	<p>请特别注意此标识所示内容，忽视其提醒可能会造成人员的伤害或财产的损失。 <b>This indicates contents for which, if disregarded, the possibility of human injury or the possibility of material damage can be happened.</b></p>

### 1.1 概述 General Notes

壁挂室外型风冷冷凝机组是参照 GB/T 21363-2008 生产，只有持相关资质的人员才能进行此类产品的安装及维修，且安装和维修都应符合当地的规范。

Beijer Ref “SLIM POWER” condensing units fall under the requirements for commercial electrical equipment as per Standards Beijer Ref guidelines. Installation and major service of this unit must be carried out by a licensed contractor and in accordance with local regulatory guidelines.

### 1.2 警告 电气连接 Warning Electrical Hazard



**所有电气操作人员必须持证上岗，并且遵守有关规定执行。**

在任何情况下，都要首先切断设备的电源，然后才能进行电控箱或其他部件的操作。**电源线材必须符合 GB5023-2008**

**A qualified Electrician must carry out all electrical work.** Always isolate the power to the unit before checking and / or diagnosing the units. Never work on any electrical item without isolating or disconnecting the power supply. **All field wiring must conform to the requirements of the equipment and all applicable National and Local Codes.**

### 1.3 注意 压缩机自动启动和复位 Caution Compressor Start-Up & Reset

压缩机的过载保护功能或高、低压开关起作用时，压缩机的供电电路被切断，压缩机将停止运行，当保护恢复后，在没有任何警告的情况下压缩机会自动复位或运行。

Condenser fans and compressors are thermally protected. When tripped, these components will not operate. Once sufficiently cooled, the component will automatically reset and may operate without warning.

The unit is equipped with a High/Low pressure switch as standard. The standard switch is an auto-reset type on both high and low sides.

#### 1.4 注意 压缩机 Caution Compressor

对于较大型号的机组，电机启动时可能会影响供电情况，从而导致相邻设备出现故障，一旦出现这种情况，请向当地的百尔售后服务寻求建议或帮助。

High capacity models of the unit, may affecting the due to power supply, resulting unnecessary equipment fault, once appear this kind of circumstance, please seek advice or get assistant from your local Beijer Ref after-sales service support.

#### 1.5 个人防护设备 Personal Protective Equipment



建议在机组相关的任何工作情况下（包括维修、安装或拆卸）都应戴上手套，眼罩，耳罩等防护用品，并注意以下情况：

- 压缩机或排汽管的温度很高，接触物体可能会达到物体的着火点而引起火灾。
- 制冷剂泄漏时，要特别注意对眼睛和皮肤的保护。
- 如果需要移除制冷剂，请不要直接将其排放到空气中，请用回收装置回收制冷剂。

Beijer Ref recommends as a secondary safety precaution that all personnel working with the unit wear appropriate Personal Protective Equipment (PPE) such as gloves, eyewear and footwear.

- Compressor or discharge pipe temperature is high, anything contacted may reach the ignition point to fire.
- Leaking refrigerant, please pay attention to the protection of the eyes and skin.
- When removing refrigerant, refrigerants cannot be vented into atmosphere. Please reclaim the refrigerants.

#### 1.6 制冷剂回收 Refrigerant Reclaim

如果要把设备中的制冷剂排出，应用专用设备收集，不可将制冷剂直接排放到环境中。只有专业技术人员才有权进行此操作，其他任何人员不得擅自操作。

If the refrigerant in the device is discharged, a proper recovery system has to be in place, Do not directly discharged into the environment. Only professional personnel have the right to carry out this operation.

#### 1.7 禁止吸烟 No Smoking


百尔建议在距离设备 15 米之内严禁吸烟。

Beijer Ref recommends No Smoking within a distance of 15 metres of the unit.

#### 1.8 注意 设备充压 Caution Unit Pressurized

所有机组都预先充注了高压干燥空气或氮气，在对机组进行安装或调试之前，请小心排放出设备中的高压气体。

All units are pressurised with dry air or Nitrogen gas. Care must be taken to discharge the pressurized gas prior to installing or commissioning the equipment.

**1.9**  **注意 制冷剂类型 Caution Refrigerant Type**

为了提高机组的工作效率，机组可使用的制冷剂包括 R404A、R22。在任何情况下，都不能使用氨、碳氢化合物、水或乙二醇。

All units are designed to work effectively with refrigerants R404A, R22. Under no circumstances, a refrigerant such as Ammonia, Hydrocarbon, Water or Glycol can be used in this product.


**制冷剂的吸入或直接与皮肤接触，都会对人体造成伤害。制冷剂的使用及回收都应非常注意，为了防止人员伤害，务必小心！**

**Refrigerant can be harmful if it is inhaled and/or makes contact with exposed skin. Refrigerant must be used and recovered responsibly. Extreme care must be taken when handling refrigerant, as personnel injury or death may occur!**

**1.10**  **注意 润滑油类型 Caution Lubricant Oil Type**

“精锐” 冷凝机组，润滑油为聚脂油或矿物油，矿物油用于 R22；聚酯油用于 R404A，也可用于 R22，但使用 R404A 时，切不可与其他润滑油混用。

All compressors are charged with Polyol Ester (POE) oil or Mineral oil. Mineral oil can be used with Refrigerant R22. POE oil can be used with refrigerants R22 and R404A. Use ONLY POE oil, do NOT mix POE with other oils, when using refrigerants R404A.

**1.11**  **注意 锋利的边角 Caution Sharp Edges**

所有机组都有钣金件，在使用过程中要特别注意金属钣金的边缘，要避免接触钣金的边缘或盘管翅片，这些锋利边角可能会对对人产生潜在的危险，靠近机组工作时更要特别注意安全问题。

All units are manufactured with sheet metal, thus this process had been taken to ensure the edges are concealed. Avoid contact with sheet-metal edges and the coil fins. They can be sharp and may cause possible to personal injury hazard. Please take care when handle with this unit.

**1.12**  **警告 员工资质 Warning Qualified Personnel**

机组的安装、调试、拆除以及维护都要由有资质的专业人员来操作（制冷工程师或电工），他们需具备丰富的专业知识和实践经验，用户可自行协调专业技术人员进行此类操作。

All units may only be installed, commissioned, decommissioned and serviced by licensed personnel (refrigeration mechanics and/or electricians) who have sufficient knowledge in this type of equipment. It is the purchaser's responsibility to co-ordinate with qualified personnel as required.

**1.13**  **注意 高温和低温 Caution High and Low Temperatures**

当系统出现故障时，压缩机的壳体和排气管的温度最高可达 150℃，这样的高温可能对线路或其他材料造成损坏，所以不可直接接触壳体和排气管。

此外，即使机组运行正常，压缩机壳体和铜管表面也会产生超过 100℃ 的高温 and 低于 -40℃ 的低温，这可能会对人员造成严重的高温或低温烫伤，所以在机组附近作业时要特别注意安全。

Compressor housing and discharge line temperatures may reach 150℃ due to failure of system components. Wiring and other materials which could be damaged by these temperatures avoid contact with the housing or discharge line.

Moreover, even in normal working operation, the unit can generate very high temperature (may exceed 100 °C) and very low (below -40 °C) temperatures on compressor housing and tubing surfaces resulting in the possibilities of severe contact burns. Special caution must be taken when working around the unit.

#### 1.14 **注意 真空环境 Caution Deep Vacuum**

**请勿在高真空条件下使用压缩机，这可能导致电器故障。对于制冷或空调系统，请不要用压缩机抽真空。**

**Do NOT operate compressors in deep vacuum conditions as this can cause electrical failure. Compressors should never be used to evacuate refrigeration or air conditioning systems.**

#### 1.15 **注意 电机保护 Caution Motor Protection**

**警告：不要往正在运行中的风机中插入任何物体。这样将导致严重的人员伤亡或设备损坏。**

**WARNING: Do not insert any object into operating fans. Ignoring this warning may result in personal injury and/or severe equipment damage and consequences.**

“精锐” 压缩冷凝机组使用涡旋压缩机，其带有内置过载保护装置，在压缩机过载的情况下，可自动断开压缩机的电源，从而保证压缩机的安全。未经充分冷却，内置过载保护不会自动复位，时间可能需要几个小时。涡旋压缩机仅能一个方向运行。请参考安装和试运行说明，以确保压缩机正确运行。

“SLIM POWER” condensing units use scroll compressor, which are fitted with inherent internal line break motor protection. After opening, the protector may not reset for several hours until the motor cools sufficiently.

Scroll compressors can only run in one direction. Refer to Installation and Commissioning Instructions for details of how to identify if the compressor is running correctly.

#### 1.16 **原理 Purpose**

“精锐” 压缩冷凝机组，包括中温、低温，按照设计，冷量是由制冷剂在蒸发器中蒸发不断提供的，冷凝机组向环境放出热量。

冷凝机组应水平安装在室内/室外环境下，（细节部分请参照总体布置图），冷凝温度建议不高于 55 °C，返回压缩机的吸气温度不大于 20 °C（具体请参考样本数据）。

机组不宜安装在有害、腐蚀或易燃的环境中。海洋性气候对设备是有腐蚀危害的，若必须安装在此环境下请咨询百尔公司。

“SLIM POWER” condensing units are standard OEM products of Beijer Ref including “medium” and low temperature application ranges. They are designed for continuously supplying and receiving the refrigerant to and from the evaporator(s), and rejecting the heat extracted from the cold space to the surrounding atmosphere where the units are installed.

“SLIM POWER” condensing units are intended for installing in a typical ventilated indoor or outdoor environment (Refer to the General Arrangement Drawing section for details) with the condensing temperature no greater than 55 °C and compressor return vapour temperature no greater than 20 °C (Refer to catalogue).



They are not intended for environments that may have harmful, corrosive or flammable atmospheres. Marine environments are considered corrosive; please consult Beijer Ref before installing in this environment.

### 1.17 标准设计工况 Standard Design Conditions

“精锐” 压缩冷凝机组，中温使用谷轮 ZB 压缩机，低温使用 ZF/ZFI/ZSI 压缩机。

中温系列使用 R404A 制冷剂时，蒸发温度范围从-15℃ 到+5℃。

中温系列使用 R22 制冷剂时，蒸发温度范围从-10℃ 到+10℃。

低温 X 系列使用 R404A/R22 制冷剂时，蒸发温度范围从-40℃ 到-20℃。

低温 N 系列使用 R404A/R22 制冷剂时，蒸发温度范围从-30℃ 到 0℃。

低温 N-F 系列使用 R404A/R22 制冷剂时，蒸发温度范围从-40℃ 到-20℃。

“SLIM POWER” condensing units use Copeland ZB series compressor for Medium temperature range, ZF/ZFI/ZSI series compressor for Low temperature range

Medium temperature range, with refrigerant R404, evaporating temperature is from -15℃ to +5℃.

Medium temperature range, with refrigerant R22, evaporating temperature is from -10℃ to +10℃.

Low temperature range, X-series units with refrigerant R404/R22, evaporating temperature is from -40℃ to -20℃.

Low temperature range, N series units with refrigerant R404/R22, evaporating temperature is from -30℃ to 0℃.

Low temperature range, N-F series units with refrigerant R404/R22, evaporating temperature is from -40℃ to -20℃.

**详细的蒸发温度范围及数据请参考样本**

For usage data, evaporating temperature ranging and any more details, please refer to product catalogue.

对于特殊设计要求的(非标工况/制冷剂), 请咨询当地分公司或者上海分公司电话: 021-64071616

## 2. 拆卸与调试说明 Installation Instructions

### 2.1 一般说明 General Notes

#### 2.1.1 机组的提升 Lifting of Unit

**该机组重量较大，在提升时要特别小心。**

压缩机是机组的核心部件，在提升时应注意压缩机的所在位置，叉脚应位于机组的底部，并根据其重量分布调节合适的宽度。

**在提升或运输机组的过程中务必注意保持平衡**

**The unit weight is heavy, ensure proper lifting and installing**

The compressor is the core component of the unit, and should pay attention to the position of the compressor in the lifting, the Forklift of Truck should be located at the bottom of the unit, and adjust the appropriate width according to the weight distribution.

**Always take care to ensure a proper weight balance before lifting and moving unit.**

### 2.1.2 机组的拆箱 **Unpacking of Unit**

拆箱后, 检查机组及其他备件是否有任何损坏, 如发现任何损坏, 请及时联系百尔。

When unpacking, inspect for any damage to packing material or the unit itself which may affect the unit's performance. If any such damage is evident, please contact your local Beijer Ref branch.

### 2.1.3 机组的放置与固定 **Installation Location (Refer to the General Arrangement Drawing section)**

如果机组放置在靠近墙壁的场所或者密闭通道内, 需要确保机组能获得足够的风量, 以供风量的的畅通及机组的维修。机组必须牢固地安装在坚固水平的地面上, 以防止它掉下或翻倒。

尤其是要保证机组有一个通畅的环境, 以阻止冷凝机组排放出的热空气回流。

压缩机冷凝机组须用相应的地脚螺栓水平固定在基础上。

机组的供液管路均装有视液镜, 在机组运行时, 应留有足够的空间来观察视液镜。

If the unit is to be located in close proximity to a wall or similar obstruction, the minimum distance from the coil face to the obstruction shall comply with the general arrangement drawing. The unit shall be mounted on a horizontal plane surface.

It is particularly important for the units to allow sufficient unobstructed air-discharge space in front of the unit to prevent warm air recirculation to the condenser.

**Condensing Unit should be properly installed on horizontal base with corresponding foot bolts.**

The liquid sight glass is located inside the unit. Allow sufficient space around the access panels for opening the panels.



### 2.1.4 系统充注 **System Holding Charge**

系统在出厂时均充注干燥空气或氮气。

如果收货验收时发现系统未经充压, 请及时联系百尔制冷公司。

将系统预先充注的气体以适当的方式排出。在制冷系统中选择合适的排气位置。

机组在试运行之前需将系统中的压力抽空至 200 微米以下。

The system as supplied is pressurised at the factory with Dry Air or Nitrogen gas.

If the system is not pressurised on delivery, please contact your Beijer Ref branch.

Care must be taken to release the pressure before attempting to gain access to any part of the refrigeration system.

The unit should be evacuated to a pressure of 200 microns ( $\mu\text{mHg}$ ) prior to commissioning.

### 2.1.5 压力设置 **Pressure Settings**

风冷冷凝机组的最大运行压力为 **29bar**, 这主要取决于与压力容器 (储液器) 的限制。因此卸压装置的压力应小于 **29bar**。压力开关的设置, 如高压侧压力必须小于 **26bar**, 建议, 卸压装置设置应不大于 **0.9** 倍最高工作压力。“精锐”风冷机组最大设计的冷凝温度为 **60°C**。当使用 **HP** 控制设备时, 必须考虑到使用制冷剂的类型以及环境的最高温度。

**“SLIM POWER” condensing units have a maximum operating pressure of 29 Bar(g) determined on pressure vessels (such as liquid receivers). Thus any pressure relief device setting must be 29 bar(g) or lower.**

**Pressure limiting device settings such as the HP control must be 26 Bar(g) or lower. Adviced that the pressure limiting device setting is no greater than 0.9 times the maximum operating pressure.**

**In general, Beijer Ref recommends 60 °C condensing temperature as the maximum operating condition for “SLIM POWER” condensing units.**

**When using the HP controller, the type of refrigerant and the max environment temperature would be taken into account.**

百尔公司还配备了低压开关作为安全保护装置。根据应用场合、压缩机型号的不同，低压开关的设置应考虑以下几点：

- 低压开关的”切断”温度值应低于最小设计饱和吸气温度 3-5K
- 低压开关的”切断”值应该在正压区。
- 当机组安装在温度较低的环境下，低压开关的”切断”压力值应低于其安装在此环境下温度对应的饱和压力值

Beijer Ref also recommends the LP switch to be used as a safety protection device. Depending on the application and compressor, LP cut-in and differential points should be set with the following considerations:

- Set the cut-out points at 3–5 K below the respective minimum design saturated suction temperatures (Refer to the Standard Design Conditions section for saturated suction temperature ranges).
- The cut-out pressure shall be in the positive pressure region.
- When the unit is installed in a cold ambient, the cut-out pressure shall be lower than the pressure corresponding to the ambient temperature.



#### 2.1.6 **警告 自动重启&电机保护 Warning Reset & Motor Protect**

压缩机过载时，过载保护断开电路，使压缩机停止运行，负载恢复正常后，不需要预先警告就会自动复位或运行。

When compressor over-load, the overload protection circuit disconnected, the compressor stops running, after load is returned to normal, the compressor will automatically reset and may operate without warning.

#### 2.1.7 **压缩机高温 Compressor High Temperature**

系统出现故障时，压缩机的壳体和排气管的温度最高可达 150°C，这样的高温可能对线路或其他材料造成损坏，所以不可直接接触壳体和排气管。

Compressor housing and discharge line temperatures may reach 150 °C due to failure of system components. Wiring and other materials which could be damaged by these temperatures should not come into contact with the housing or discharge line.

#### 2.1.8 **高真空 Deep Vacuum**

不要在高真空条件下使用压缩机，这可能导致电器故障。

对于制冷或空调系统，不能用压缩机抽真空。

Do NOT operate compressors in deep vacuum conditions as this can cause electrical failure.

Compressors should never be used to evacuate refrigeration or air conditioning systems.

#### 2.1.9 **润滑油 Lubrication**

“精锐” 冷凝机组，使用的润滑油是聚脂油（POE）或矿物油。

“SLIM POWER” compressors use Polyester (POE) oil or mineral oil.

**注意 – POE 润滑油 Caution - Notes on POE Oils**

**用 HFC (如 R404A) 制冷剂时, 仅可使用 POE 油, 在使用此类制冷剂时切莫混合其它的润滑油。当 POE 油用于 HCFC (如 R22) 制冷剂时也许可以混合少量其它润滑油。**

**Use only POE oil with HFC refrigerants. Do NOT mix POE oil with other oils when using HFC refrigerants (eg R404A). Small quantities of other oil types may be mixed with POE oil when using HCFC refrigerants (eg R22).**

### 2.1.10 机组的维护 Unit maintenance

#### 冷凝器 Condenser:

冷凝器建议每三个月进行一次清洁。

The condenser is recommended every three months to be clean.

#### 系统运行 System Running:

每六个月应进行系统检查, 包括制冷剂充注量检查及电气连接检查。

System is recommended to be checked every six months, including refrigerant charge inspection and electrical connection check.

### 2.1.11 曲轴箱加热器 Compressor Crankcase heater

曲轴箱加热器将曲轴箱维持在一个适合的温度, 能防止制冷剂发生迁移。曲轴箱加热器的效率是通过测量油温来检查的, 油温应该比环境温度高至少 10K。理想的油温应控制在 50°C~70°C 之间。在各种环境温度下, 应经常检查保证有适当的油温。

Crankcase heater maintain the crankcase in a suitable temperature, prevent the occurrence of refrigerant migration. The efficiency of the crankcase heater is checked by measuring the oil temperature. Oil temperature should be higher than the ambient temperature for at least 10K. The expected temperature would be between 50°C~70°C. Recommend to check oil temperature regular, for ensure that oil is in appropriate temperature.

### 2.1.12 机组接线 Unit Electrical Connection

请参阅 (电气图), 图为壁挂室外型机组的推荐接线方式。图中机组的接线方式已完全反映出来, 而其它连接和总的系统连接则需安装者自行设计。

Attached Wiring Schematic is recommended to electrical connection spacing (For detail, Please Refer to Wiring Schematic). If other connections are required for the installation of the system, please connect contractor or dealer.

### 2.1.13 旋锁阀, 直线阀和压力软管 Roto-Lock Valve, Line Valve & Pressure hose

#### 旋锁阀注意事项 Roto-Lock Valve Attention:

在旋转机组中相应的旋锁阀的阀杆以前, 压紧螺母必须先松开, 以确保密封圈不会因为阀杆的转动而受到损坏, 在旋转阀杆以后, 用扭矩扳手以 13 扭矩将压紧螺母锁紧, 防止制冷剂泄漏。具体数据如下:

Before turning valve rod of R/L valve, the gland nut must be released. Make sure that the sealing ring is not damaged by the rotation of the valve rod. After turning valve rod, lock the gland nut with a torque wrench for 13 torque, to prevent leakage of refrigerant. The detail is below:

机组型号 Unit Model				压紧螺母 扭矩 Gland Nut Torque (N.m)	旋转螺母扭矩 Rotary Nut Torque (N.m)	
BD020MZ2*D	BDX020LZ2*D-AG	BDN020LZ2*D-F	BDN020LZ2*D		压缩机排气端 Disc. Valve	压缩机吸气端 Suction Valve
				13	70-80	100-110

BD030MZ2*D	BDX030LZ2*D-AG	BDN030LZ2*D-F	BDN030LZ2*D	13	70-80	100-110
BD040MZ2*D	BDX040LZ2*D-AG	BDN040LZ2*D-F	BDN040LZ2*D	13	70-80	100-110
BD050MZ2*D	BDX050LZ2*D-AG	BDN050LZ2*D-F	BDN050LZ2*D	13	70-80	100-110
BD060MZ2*D	BDX060LZ2*D-AG	BDN060LZ2*D-F	BDN060LZ2*D	13	70-80	100-110
BD075MZ2*D	BDX075LZ2*D-AG	BDN075LZ2*D-F	BDN075LZ2*D	13	70-80	100-110

另外,将阀安装在系统上时,须确保旋转螺母按下表规定的扭矩值旋紧:

Installed the valve in the system, to ensure that the rotary nut were tighten with below torque:

旋转端尺寸 Rotary Nut Size	扭矩规定 Torque (N.m)
Rotalock 3/4"-16UNF	40-50
Rotalock 1"-14UNF	70-80
Rotalock 1 1/4"-12UNF	100-110
Rotalock 1 3/4"-12UNF	170-180
Rotalock 2 1/4"-12UNF	190-200

角阀注意事项:

在旋转机组中相应的角阀的阀杆以前,压紧螺母必须先松开,以确保密封圈不会因为阀杆的转动而受到损坏,在直线阀杆以后,用扭矩扳手以13扭矩将压紧螺母锁紧,防止制冷剂泄漏。具体数据如下:

Line Valve attention:

Before turning valve rod of Line valve, the gland nut must be released. Make sure that the sealing ring is not damaged by the rotation of the valve rod. After turning valve rod, lock the gland nut with a torque wrench for 13 torque, to prevent leakage of refrigerant. The detail is below:

机组型号 Unit Model				压紧螺母扭矩 Gland Nut Torque (N.m)
BD020MZ2*D	BDX020LZ2*D-AG	BDN020LZ2*D-F	BDN020LZ2*D	13
BD030MZ2*D	BDX030LZ2*D-AG	BDN030LZ2*D-F	BDN030LZ2*D	13
BD040MZ2*D	BDX040LZ2*D-AG	BDN040LZ2*D-F	BDN040LZ2*D	13
BD050MZ2*D	BDX050LZ2*D-AG	BDN050LZ2*D-F	BDN050LZ2*D	13
BD060MZ2*D	BDX060LZ2*D-AG	BDN060LZ2*D-F	BDN060LZ2*D	13
BD075MZ2*D	BDX075LZ2*D-AG	BDN075LZ2*D-F	BDN075LZ2*D	13

“精锐”CDU上安装的压力软管在出厂前已做密封检查。如需维护,请使用扭力扳手参照如下扭矩数据操作:  
The pressure hose has been sealed checked before delivery. For maintenance, use torque wrench to refer to torque data below:

开口尺寸 Size	螺纹管径 Thread	力矩 Torque (N.m)
17	1/4"	20
15	1/4"	20
14	1/4"	16-18

## 2.2 制冷管道 Refrigeration Piping

制冷管道的安装应由专业的制冷工操作,并符合国家及当地的安装要求,对制冷系统有丰富的工程实践经验。

**Refrigeration piping work shall be carried out professionally by qualified refrigeration mechanics in accordance with applicable national and local regulations and in conformance with good engineering practices required for the proper operation of the refrigeration system.**

百尔生产的压缩冷凝机组有较高的洁净度和干燥度，并且系统内部充注了干空气或氮气，可以防止氧化和湿气及异物的进入。管道在安装时应格外小心，减小管道安装的时间可以防止湿气或异物的进入。

内部相连的制冷管道的大小不必与机组的出口管道大小一致。管道尺寸的选择/计算是基于确保最小制冷剂压降和有效回油最低制冷剂流速。百尔公司可提供相应的管道尺寸计算的技术支持。

水平吸气管与机组连接的时候应有适当的坡度，使油因为重力而自由返回压缩机。1: 100 的坡度是比较合适的。竖直段管道必须使用回油弯及双立管。吸气管道应有保温措施，减小过热影响。

**如果在安装时有任何疑问，请向当地的销售代表咨询。**

All Centurion condensing units manufactured by Beijer Ref are supplied clean and internally charged with dry air or nitrogen to prevent oxidation and ingress of moisture or foreign matter. Care shall be taken during installation of the piping to prevent entrance of foreign matter or moisture by minimizing the time that the piping is uncapped.

The interconnecting refrigeration pipe size is not necessarily the same size as the outlet on the unit. The pipe sizes shall be selected/calculated based on the best compromise of minimizing refrigerant pressure drop and refrigerant velocity to ensure efficient oil return.

Horizontal suction lines shall slope towards to the units to allow the oil return freely to the compressor by gravity. A 1:100 slope is considered sufficient. The use of oil trap and double risers may be necessary on vertical sections. Suction line piping shall be insulated to minimize the superheat effect to the vapour.

**If in doubt during the installation, please consult with your local sales representatives and/or application engineers from Beijer Ref for technical support.**

## 2.3 压缩机启动 Compressor Starting

对于较大型的压缩机启动时产生的瞬间启动电流要格外小心。

Care should be taken to establish starting requirements for the larger compressors due to high in-rush current.

## 2.4 冷凝风扇控制 Condenser Fan Controller

“精锐” 冷凝机组可选配冷凝风扇控制器。

使用R404A制冷剂时，推荐设定值为:单风扇11 Bar(g)，双风扇11 Bar(g) 和14Bar(g)。

R22制冷剂时，推荐设定值为:单风扇9 Bar(g)，双风扇9 Bar(g) 和12Bar(g)。

Condenser Fan controller is option for “SLIM POWER” condensing unit.

For R404A refrigerant, recommended setting : 11Bar (g) for single fan, 11Bar (g) and 14Bar (g) for dual fan.

For R22 refrigerant, recommended setting : 9 Bar (g) for single fan, 9Bar (g) and 12Bar (g) for dual fan.



**警告——其他制冷剂的设置 Warning——Setting for other refrigerant**

**对于不是使用本系列样本所示制冷剂的机组，安装者有义务对其进行合理设置。**

**The installer has a duty to make reasonable settings for the unit, which used none-catalogue refrigerant.**

## 2.5 常规调试&拆卸指南 General Commissioning & Decommissioning Guide



### 2.5.1 警告——调试 Warning – Commissioning

**制冷系统的调试应由专业的制冷技工完成，其必须具备良好的正确操作制冷系统的工程实践能力。  
Refrigeration system commissioning shall be carried out professionally by qualified refrigeration mechanics in conformance with good engineering practices required for the proper operation of the refrigeration system.**

在所有安装及电气连接完成之后，整个制冷系统必须进行泄漏测试。如果系统没有泄漏，制冷系统的管路需要保温，室外环境下保温材料应具有防紫外线功能。

在充注制冷剂之前，制冷系统需要由一台良好的高真空泵来抽气，将其连接在高压侧和低压侧的检修阀或检修口上。

充注任何制冷剂时，具备良好的工程实践能力是必要的。特别是混合（共沸）制冷剂，如 R404A，必须遵守适当的程序。

抽气至合适的压力，先充注 60%~80%的制冷剂量，以液态的形式充注到储液器，压缩机未运行，当系统压力稳定后，启动压缩机，向吸气管缓慢充注剩余的制冷剂，以液态的形式通过仪表节流阀，使其在进入压缩机之前蒸发，如果系统中有汽分，在汽分前充注。

在系统初始运行后，从视液镜中查看制冷剂充注情况，如果制冷剂量不够，从吸气管添加，若制冷剂过多，将多余的释放到回收桶中。

After all installation and electrical work is completed, the entire refrigeration system must be leak tested. After satisfactory testing of the refrigeration system, then refrigeration lines shall be insulated as necessary. The insulation located in “SLIM POWER” environments shall be protected from UV exposure.

Before charging the refrigerant, the entire refrigeration system shall be evacuated by connecting a good, high vacuum pump to both the high-pressure side and low-pressure side service valves or ports.

It is important to apply good engineering practice when charging any refrigerant, but in particular blended ( zeotropic ) refrigerant, such as R404A, require proper procedures to be observed:

- Initially charge 60 to 80% of the expected refrigerant charge in liquid form into the liquid receiver with the compressor not running (after evacuation to the correct pressure).
- When the system pressure has stabilized, start the compressor & slowly charge the remaining refrigerant quantity into the suction line in liquid form through a gauge manifold or a throttling valve to allow it to vaporize before entering the compressor. If the system is fitted with an accumulator, it is preferable to charge upstream of the accumulator.
- After initial running of the system, check the refrigerant charge condition at the sight glass and add any required refrigerant in the suction side as noted above, or remove excess refrigerant into an approved reclaim cylinder

**百尔致力于生产安全、环境友好型产品，所有产品都遵守相关国家法律法规和保护环境条例。制冷剂都不能直接排放到大气中。使用过的制冷剂要进行回收。**

**Beijer Ref is dedicated to providing safe products and protecting the environment by complying with all applicable national laws and regulations governing environmental protection. New and used refrigerants cannot be vented into atmosphere. Reclaim all used refrigerants. Ensure your refrigerant handling procedure complies with the relevant regulations.**

再次检查现场布线及工厂端口接线。由于运送过程中的振动，工厂连接处可能会松动，保证合适的风叶转向，使气流从盘管侧进入，从风扇电机侧排出，确保压缩机的曲轴箱加热器在初始启动之前和/或在关闭之后，通电至少 12 小时。

在系统成功启动之后，请检查：

- 电流和电压水平，
- 吸气过热度设置和排气温度，
- 异常的管路振动，
- 油位和制冷剂充注。

Double check all field wiring connections and factory terminations. Factory connections can vibrate loose during shipment. Ensure correct fan motor rotation, airflow is induced from coil side and forced out of fan motor side.

If fitted, ensure that the crankcase heater has been energised for a minimum 12 hours before initial start-up and / or after prolonged shutdown periods.

After the successful start up of the system, check:

- Current draw and voltage levels.
- Suction superheat settings and discharge temperatures.
- Abnormal refrigeration piping vibrations.
- Oil level and refrigerant charge.

## 2.5.2

**警告—拆卸 Warning—Decommissioning**

**对于机组从安装的地方拆除，需要专业技术人员按照一定的程序来进行。假如不按步骤进行的话可能引起机组失火或爆炸，这将导致人员的伤亡，财产损失。不允许把制冷剂直接排放到大气中。**

**In order to remove the unit from its mounting place, the following procedures need to be carried out professionally by qualified personnel. Failure to do so may result in personal injury or death, property damage by fire or explosion. Discharge of refrigerant to atmosphere is illegal and may result in heavy fines by relevant regulatory authorities.**

- 要把所有的制冷剂泵到储液器或适当的容器中（如回收桶），然后关闭相关阀门。所有不能重新使用的制冷剂必须回收或者销毁；
- 切断电源，拆除所有现场的电线以及相关设备，最后拆除接地线；
- 由于机组和外界环境存在压差，在拆除制冷剂管道时要特别小心。系统的润滑油中存有少量的制冷剂，系统中压力的升高使制冷剂不断的沸腾和汽化这对人会造成潜在的危害；
- 切割并密封液管和吸气管的连接处；
- 把机组从安装位置上搬走，需要适当的搬运设备。
- Pump down the entire refrigerant charge into the liquid receiver or appropriate container such as reclaim cylinder, and shut related valves. All reclaimed refrigerant that is not re-used must be taken to an approved refrigerant recycling or destruction facility. Beijer Ref Branches will accept the used refrigerant.
- Disconnect the power supply. Remove all necessary field electrical wiring and related components, leaving the earth wire to the last.
- Care must be taken when disconnecting the refrigeration piping because of unbalanced pressure between the unit and ambient. There may be a small amount of refrigerant trapped in the oil, the



pressure rise in the system will boil and vaporise the refrigerant resulting in a potential personal injury hazard.

- Cut and solder seal the refrigeration liquid line and suction line pipe connections.
- Remove the unit from its mounting place. Adequate equipment must be provided as per lifting notes.

## 2.6 材料安全数据表—M.S.D.S Material Safety Data Sheets – M.S.D.S

可以从离您最近的百尔分公司买到其冷凝机组所需的制冷剂、润滑油以及其它所需材料。

These are available from your nearest Beijer Ref Branch for all refrigerants, and for oils and other materials as needed.

## 2.7 重要事项 Important Notes

- 为了保证百尔冷凝机组的运转效率和工作寿命，需要经常更换部分零件，这些零件需要使用当地百尔分公司的产品，这些零件是有保修范围。具体的保修条款请参阅价格指南中标准条款和销售条件。
- 产品持续改进是我们公司的政策。百尔公司如有产品规格或指导手册的变化恕不另行通知。
- To ensure “SLIM POWER” condensing units operate efficiently and for a long working life, always obtain genuine replacement parts from your local Beijer Ref Wholesale Branch. Genuine replacement parts are covered by the warranty. Refer to the Standard Terms & Conditions of Sale in the Price Guide for warranty statements.
- Continuous product improvement is our company policy. Beijer Ref reserves the right to make changes in product specifications and/or this instruction manual without notice.

**百尔致力于生产安全、环保型产品，所有产品都遵守相关国家法律法规和保护环境条例。制冷剂不能直接排放到大气中。使用过的制冷剂要进行回收。**

**Beijer Ref is dedicated to providing safe products and protecting the environment by complying with all applicable national laws and regulations governing environmental protection. New and used refrigerants cannot be vented into atmosphere. Reclaim all used refrigerants. EPA regulations are constantly updated. Ensure your refrigerant handling procedure complies with the relevant regulations.**

## 3. 安装要求及外形尺寸 Installation requirements & Dimensions

### 3.1 安装说明 Installation instructions

该设备的安装必须由专业的制冷安装公司或者专业技术人员进行，并遵循相关的安装技术规范，本手册仅提供下列原则供参考

The installation of the equipment must be carried out by a professional refrigeration installation company or professional technical personnel, and follow the relevant installation technical specifications, below rules for reference only

#### 3.1.1 场地要求 Field requirements:

- 1、设备禁止安装在易燃、易爆、蒸汽、热风或油烟废气周围；
- 2、如特殊需要安装在腐蚀性气体周围，那么需特别定制；
- 3、不管是室内或者室外机组，安装空间必须有足够的空气流动量和良好的通风条件，避免空气短循环，并严禁安装在密闭的空间内；
- 4、设备最好是安装在远离噪音敏感区域，并适当考虑避震和隔音措施，避免震动和噪音进入建筑物；

5、设备推荐安装在走廊尽头、空旷区域、卫生间或其它对噪音不敏感区域；

1. Equipment is prohibited to be installed in flammable, explosive, steam, hot air or fume waste gas;
2. If install in the corrosive gas around, need to be customized;
3. Whether it is indoor or “SLIM POWER” unit, the installation space must have enough air flow and good ventilation conditions, to avoid air short cycle, and is strictly prohibited in the confined space;
4. Installed away from the noise sensitive areas, and to take proper account of the shock absorption and sound insulation measures, to avoid vibration and noise into the building;
5. Recommended to install in the end of the corridor, open area, bathroom or any nose insensitive area;

### 3.1.2 位置要求 Location requirements:

- 1、所选择的设备安装位置，其基座、地面、支撑物或地基必须足够牢固，并能支持设备的重量；
- 2、建议采取必要的措施防止地面积水对机组的危害；
- 3、设备安装时应在周围留有足够的空间，便于机组的通风及日常的维护保养或维修工作，具体参考尺寸请见 3.2；
- 4、对于多台设备安装在一起的情况，必须合理布置，避免相互之间的气流干扰形成短循环；
- 5、为保证机组的安全及寿命，建议安装在阴凉遮阳的地方；

1. The installation position, base, ground, or foundation must be strong enough to support the weight of the equipment;
2. Take the necessary measures to avoid the ponding damage to the unit;
3. Space around unit should be enough, for easy ventilation and daily maintenance, for specific dimension, please refer to 3.2;
4. For a number of equipment installed in the case, must be reasonable layout, to avoid mutual interference to air flow of unit;
5. To ensure the safety and life of the unit, recommended to install in a shade place;

### 3.1.3 配电要求 Distribution requirements:

- 1、设备尽量使用专用电源，避免和其它用电设备共用；
- 2、客户应提供足够的配电容量；
1. Special power supply is recommended, avoid to sharing with other electric equipment;
2. Power distribution capacity should be enough;

## 3.2 外形尺寸 Dimensions

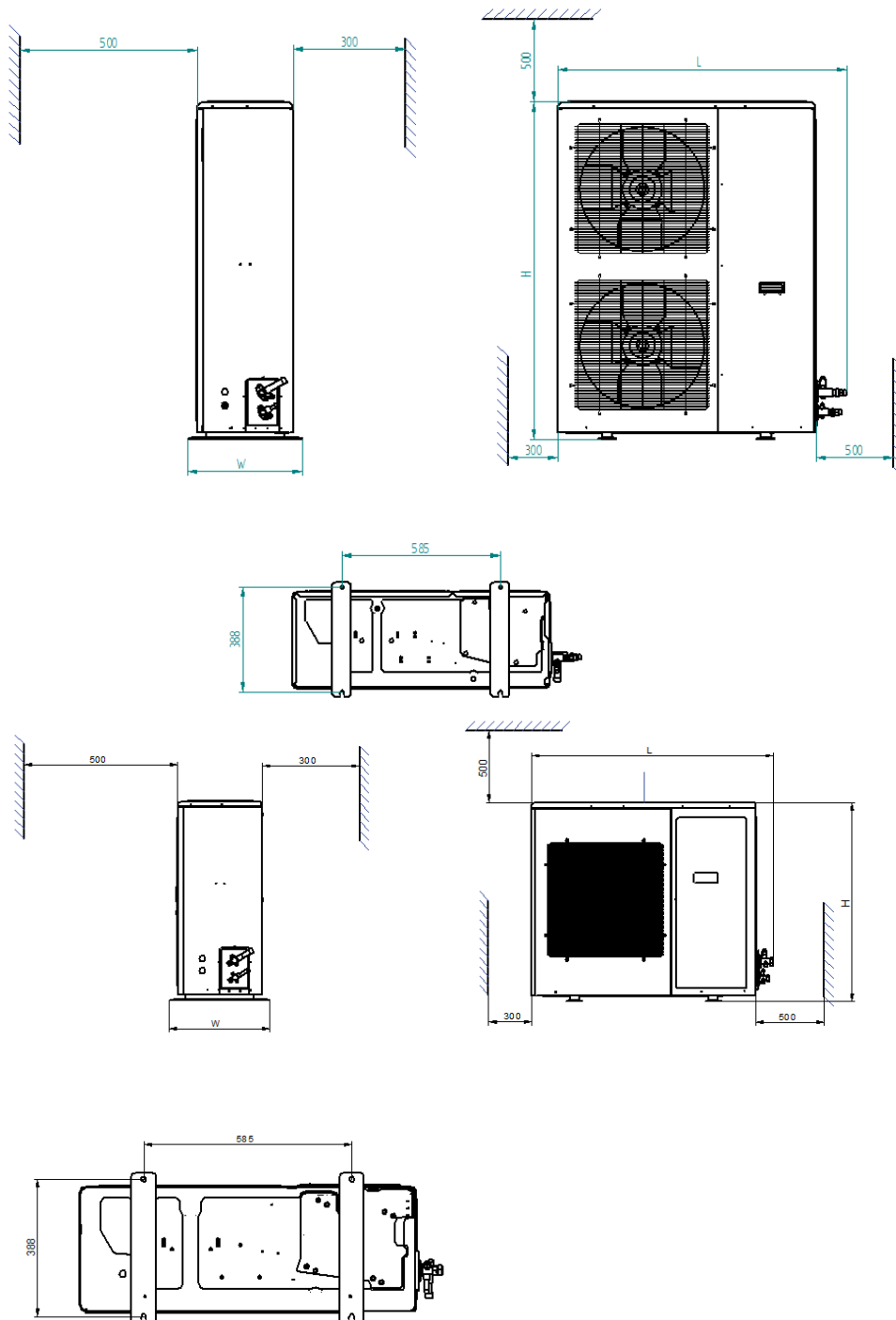
### 3.2.1 外形尺寸表（表中单位：mm） Dimensions (unit: mm)

机组型号 Model		安装孔长 Mounting Hole Length	安装孔宽 Mounting Hole Width	LxWxH
BD020MZ2*D	BDX020LZ2*D-AG	585	388	1032x425x845
BD030MZ2*D	BDX030LZ2*D-AG	585	388	1032x425x845
BD040MZ2*D	BDX040LZ2*D-AG	585	388	1032x425x845
BD050MZ2*D	BDX050LZ2*D-AG	585	388	1032x425x1245
BD060MZ2*D	BDX060LZ2*D-AG	585	388	1032x425x1245
BD075MZ2*D	BDX075LZ2*D-AG	585	388	1032x425x1245

机组型号 Model		安装孔长 Mounting Hole Length	安装孔宽 Mounting Hole Width	L x W x H
BDN020LZ2*D-F	BDN020LZ2*D	585	388	1032x425x845
BDN030LZ2*D-F	BDN030LZ2*D	585	388	1032x425x845

BDN040LZ2*D-F	BDN040LZ2*D	585	388	1032x425x845
BDN050LZ2*D-F	BDN050LZ2*D	585	388	1032x425x845
BDN060LZ2*D-F	BDN060LZ2*D	585	388	1032x425x845
BDN075LZ2*D-F	BDN075LZ2*D	585	388	1032x425x1245

### 3.2.2 室外机组外形尺寸图 General Arrangement Drawing



注意：图上所有安装尺寸均为最小尺寸（图中单位：mm）

Note: Above dimensions are minimum (Unit: mm)

### 4. 接线示意图 WIRING SCHEMATIC DIAGRAMS

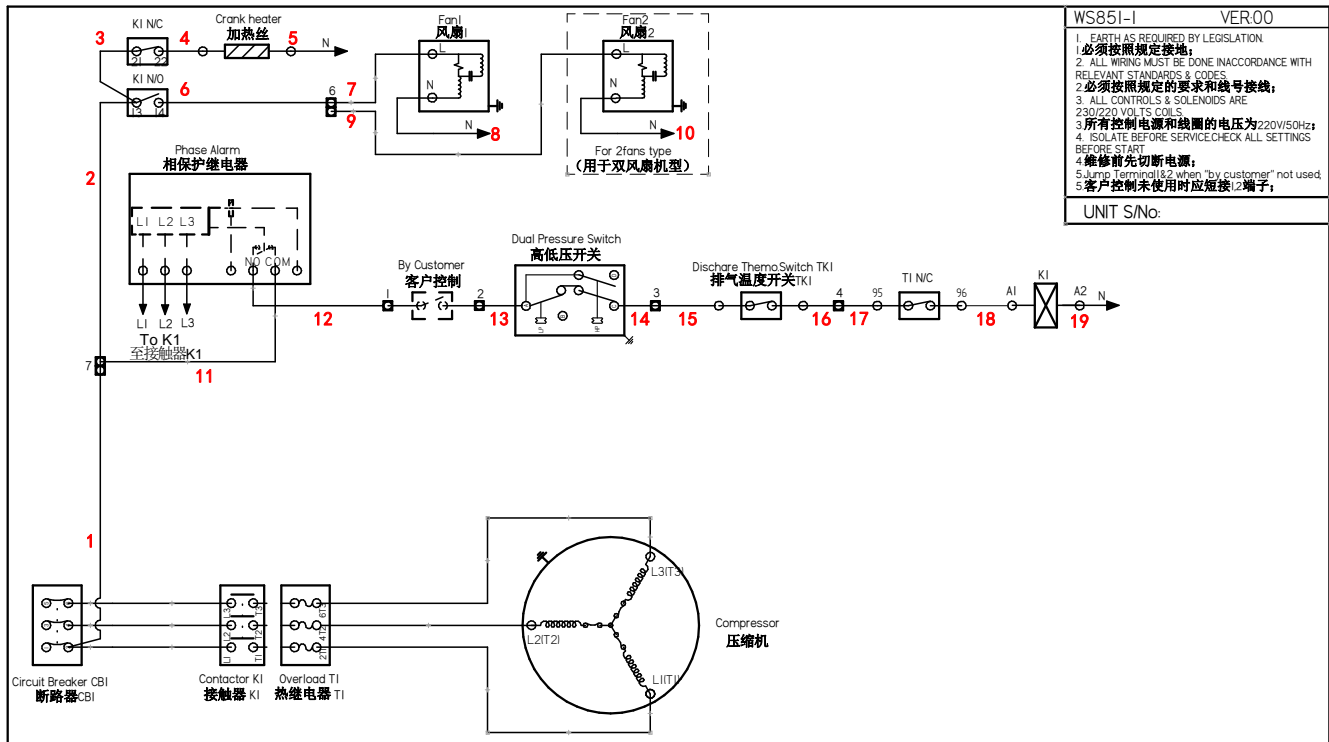
#### 4.1 “精锐” 压缩冷凝机组中低温标准配置接线示意图 “SLIM POWER” Unit MT/LT - standard



警告 Warning



3PH 380Volt ± 10%



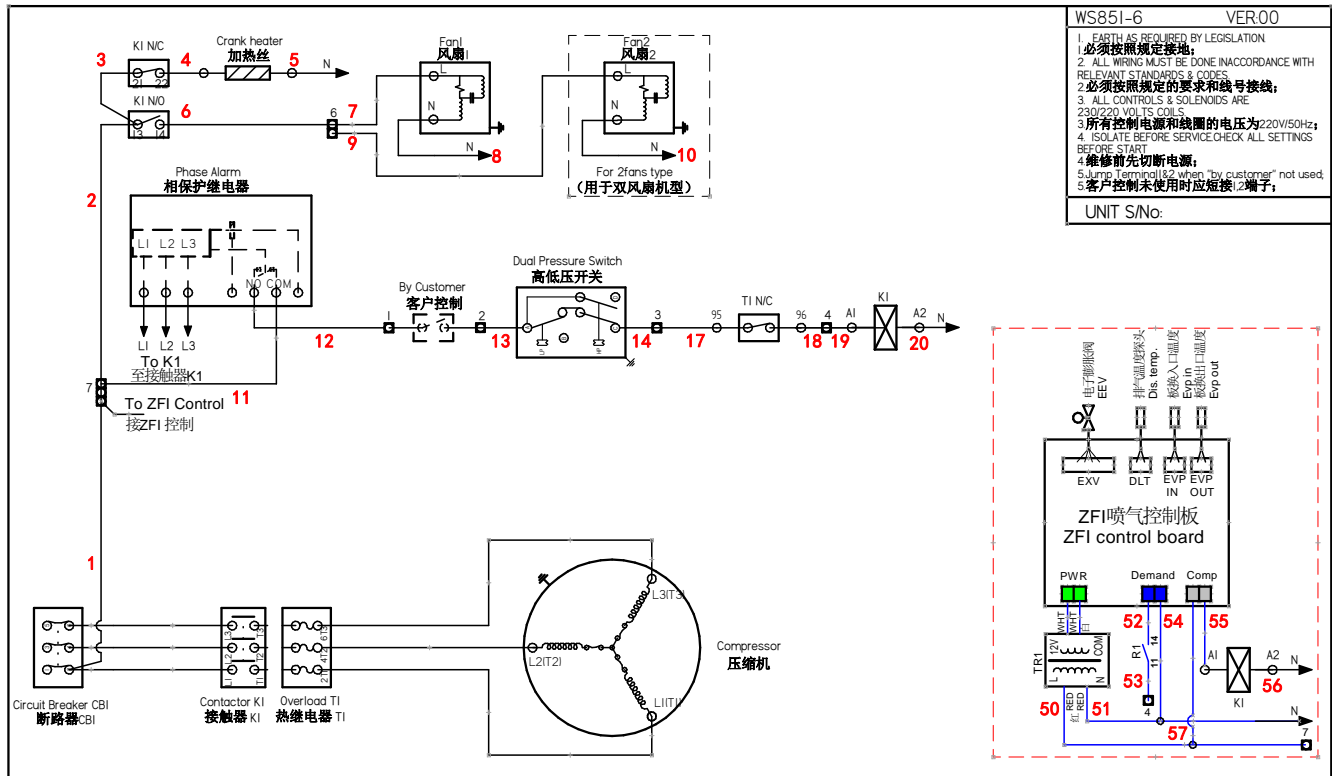
### 4.2 “精锐” 压缩冷凝机组低温（控制板）接线示意图“SLIM POWER” Unit LT –with control panel



警告 Warning



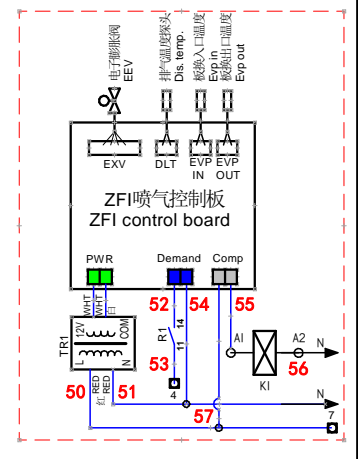
3PH 380Volt ± 10%



WS851-6 VER.00

1. EARTH AS REQUIRED BY LEGISLATION  
2. 必须按照规定接地;
2. ALL WIRING MUST BE DONE IN ACCORDANCE WITH RELEVANT STANDARDS & CODES  
3. 必须按照规定的要求和线号接线;
3. ALL CONTROLS & SOLENOIDS ARE 230/220 VOLTS COILS  
4. 所有控制电源和线圈的电压为220V/50Hz;
4. ISOLATE BEFORE SERVICE CHECK ALL SETTINGS BEFORE START  
5. 维修前先切断电源;
5. Jump terminal 18 when "By customer" not used  
6. 客户控制未使用时应短接12端子;

UNIT S/No:



注: 此接线图仅针对 X 系列低温 4HP/7.5HP  
Note: This Diagram only use for X-series LT 4HP/7.5HP

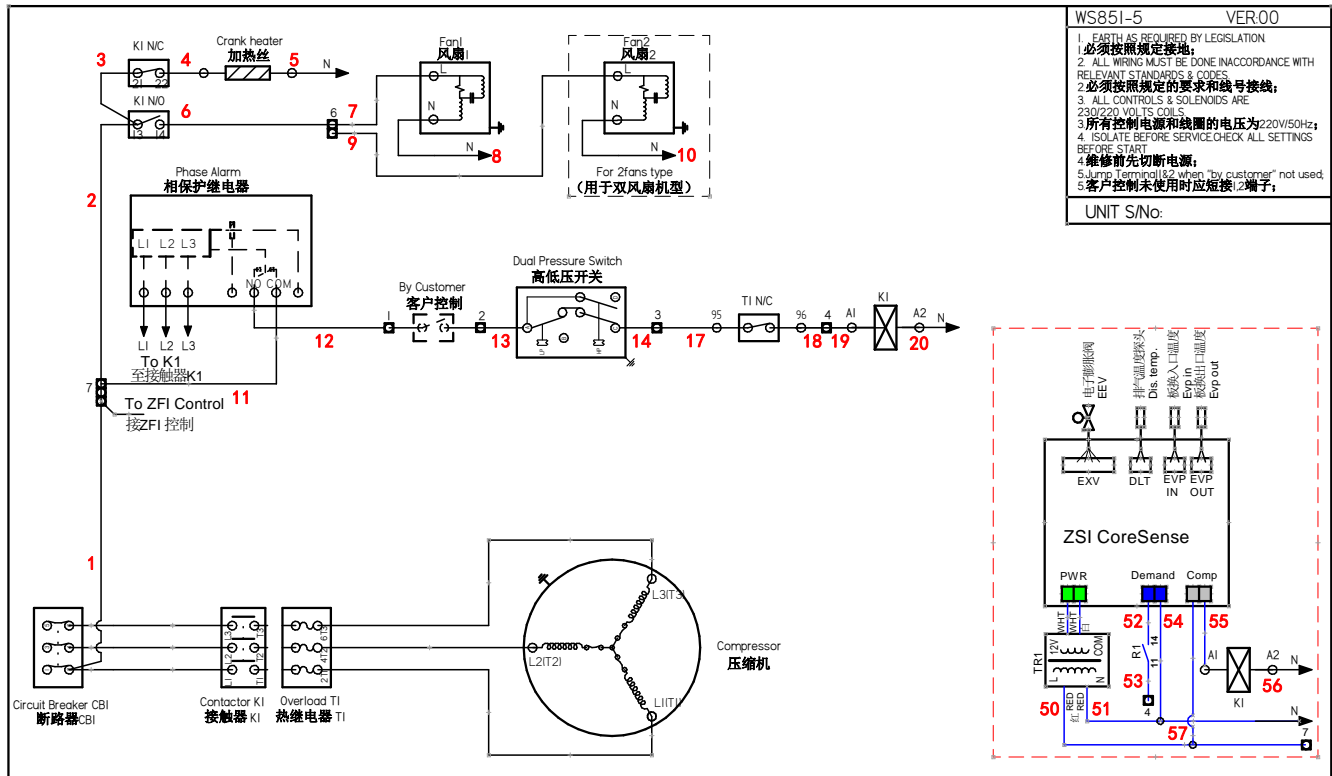
### 4.3 “精锐” 压缩冷凝机组低温 (Coresense) 接线示意图“SLIM POWER” Unit LT –with Coresense



警告 Warning



3PH 380Volt ± 10%



WS85I-5 VER:00

1. EARTH AS REQUIRED BY LEGISLATION  
2. 必须按照规定接地;
2. ALL WIRING MUST BE DONE IN ACCORDANCE WITH RELEVANT STANDARDS & CODES  
3. 必须按照规定的要求和线号接线;
3. ALL CONTROLS & SOLENOIDS ARE 230/220 VOLTS COILS  
4. 所有控制电源和线圈的电压为220V/50Hz;
4. ISOLATE BEFORE SERVICE CHECK ALL SETTINGS BEFORE START  
5. 维修前先切断电源;
5. Jump terminal 182 when "By customer" not used  
6. 客户控制未使用时应短接12端子;

UNIT S/No:

注: 此接线图仅针对使用 Coresense 的机型  
Note: This Diagram only use for the models with Coresense

## 5、常见故障分析 *General Trouble Shooting Guide*

故 障	可 能 原 因	处 理 方 法
压缩机启动不了或者启动后很快停机 Compressor will not start or shut down soon after the start	1、电源有问题 1、problem with the power supply	检查电源，电压是否正常，开关、熔断器是否已跳开； Check the power supply, switches, fuses
	2、保险丝或开关跳闸 2、Fuse or Air Switch tripped	查找原因,更换保险,合闸 Find out the reasons, replace fuse, and close switch
	3、接触器有故障 3、problem with contactor	更换接触器 Change contactor
	4、压力开关设置问题 4、problem with set-point of Pressure switch	重新设定高低压开关 Re-set pressure switch
	5、电源错相或缺相 5、power supply lose phase or error phase	调整电源并查找缺相原因 Adjust phase sequence and find reason of lose phase
	6、三相不平衡 6、3-phase unbalance	查找原因并纠正 To be rectify and correct it
	7、压缩机过电流 7、Compressor over current	查找原因并纠正 To be rectify and correct it
	8、排气温度过高 8、Discharge temperature is too high	查找系统原因并排除故障 To be rectify and correct it
	9、压缩机电机烧毁 9、Compressor motor burn down	查找原因、排除并更换压缩机 To be rectify and change compressor if required
	10、压缩机机械故障 10、Compressor mechanical failure	查找原因、排除并更换压缩机 To be rectify and change compressor if required
排气压力过高 Discharge Pressure is too high	1、制冷剂过多 1、too much refrigerant	回收部分制冷剂 Reclaim part of refrigerant
	2、冷凝器脏堵 2、Condenser is dirty	清扫冷凝器 Clean condenser
	3、系统内存在空气 3、Non-condensable gas in system	清楚空气 Release non-condensable gas
	4、环境温度过高 4、Ambient over-temperature	改善室内通风情况 Improve indoor ventilation
吸气压力过低 Low suction pressure	1、制冷剂不足或泄漏 1、Refrigerant shortage or leakage	充注制冷剂，检查泄漏并修复 Check leakage and repair, charge refrigerant
	2、膨胀阀调节不当 2、Improper expansion valve adjustment	调整膨胀阀设定 Adjust expansion valve
	3、过滤器堵塞 3、Filter blockage	更换过滤器或滤网 Change filter or mesh

	3、Filter Plugging	Replace filter
	4、吸气管压降过大 4、Suction pressure drop is too large	查找原因并处理 To be rectify and correct it
排气温度过高 High discharge temperature	1、吸气温度偏高 1、High suction temperature	检查吸气管保温材料或膨胀阀设置 Check the suction pipe insulation or expansion valve setting
	2、吸气压力偏低 2、Low suction pressure	充注制冷剂或调节膨胀阀 Charging refrigerant or adjusting expansion valve
	3、冷凝温度偏高 3、High condensing temperature	清洁冷凝器 Clean condenser
	4、油损坏 4、Oil damage	更换润滑油 Change lubricants
压缩机身结霜严重 Compressor frosted serious	1、制冷剂充注过量 1、Too much refrigerant	回收部分制冷剂 Reclaim part of refrigerant
	2、过热度太低 2、Low superheat	重新调整膨胀阀设定 Adjust expansion valve
	3、蒸发器结霜 3、Evaporator frosting	化霜并清理蒸发器 Defrost and clean evaporator
	4、蒸发器风机故障 4、Evaporator fan fault	检查原因并更换风机 To be rectify and change fan if required
压缩机噪音异常 Abnormal noise from compressor	1、压缩机反向运转 1、Compressor reverse rotary	调整相序 Adjust phase sequence
	2、压缩机回液 2、Liquid refrigerant entering the compressor	检查冷风机或膨胀阀排除故障 Check evaporator fan or expansion valve troubleshooting
	3、吸排气管震动严重 3、Suction and discharge pipe shake seriously	固定管道消除震动 Fixed pipe to eliminate vibration
	4、机组固定松动 4、Unit fixed loose	重新固定机组并加减震垫 Reseat unit and add cushions
	5、压缩机缺油 5、Lubricant shortage	加油 Fill lubricants
制冷效果差 Poor refrigerating efficiency	1、制冷剂不足 1、Refrigerant shortage	充注制冷剂 Charge refrigerant
	2、膨胀阀设定不对 2、Improper expansion valve adjustment	重新设定膨胀阀 Adjust expansion valve
	3、管路堵塞 3、System Pipe plugging	检查过滤器或者阀门 Check filter and valve
	4、冷凝温度偏高 4、High condensing temperature	改善通风环境 Improve indoor ventilation



	5、冷风机结霜 5、Evaporator frosting	除霜 Defrost and clean evaporator
	6、冷风机风机故障 6、Evaporator fan fault	修理或更换 To be rectify and change fan if required
	7、机组选型偏小 7、Unit capacity shortage	增加设备 Add unit
	8、机组处于保护状态 8、Unit is protected	排除故障并复位 Troubleshooting and resetting
频繁启动 Compressor start frequently	1、缺少制冷剂 1、Lack refrigerant	查找泄漏并维修后重新充注制冷剂 Check leakage and repair, charge refrigerant
	2、管路堵死 2、Line blocking	查找原因并更换必要部件 To be rectify and change part if required
	3、机组处于保护状态 3、Unit is protected	查找原因，复位，并重新运行 To be rectify , reset and restart
	4、冷风机失效 4、Evaporator failure	查找原因，修理后重新启动 To be rectify , repair and restart
	5、压缩机失效 5、Compressor failure	维修压缩机，必要时更换压缩机 Maintenance compressor and change compressor if required

## 6、保修条件 Warranty

保修条件请参照销售合同约定或咨询公司销售代表！

Please refer to the terms of the sale contract or the consulting company sales representative !

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