



Quietor 系列室外型风冷全封压缩冷凝 机组使用说明书



专用号：0080501927

使用前请仔细阅读本说明书

请妥善保管此说明书，以备参阅

本产品执行国家标准 GB/T 21363 《容积式制冷压缩冷凝机组》

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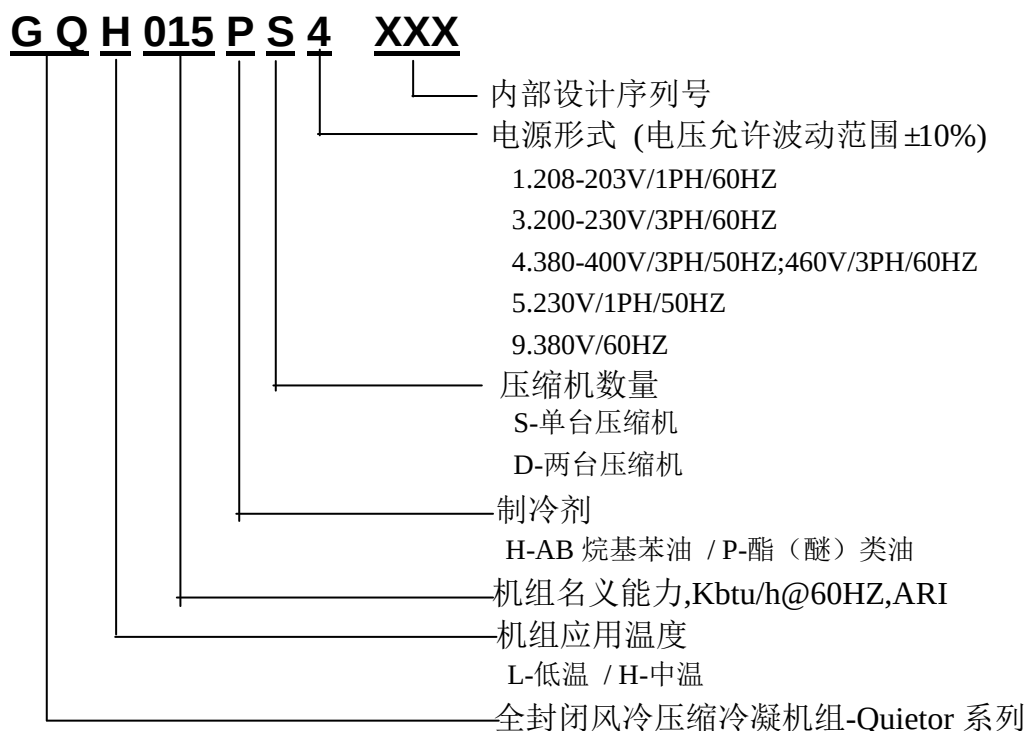
1.概述

室外型全封压缩风冷冷凝机组适用于便利超市食品展示柜、小型冷库食品冷藏冷冻等场所。现有 1.5~7HP 机组可供选择，满足用户多方位需求。

冷凝机组主要有如下优点：

- 机组采用全球知名高效压缩机，具有抗振性好、高效、低噪等优点
- 机组采用电脑板控制，能根据环境温度的变化，智能控制冷凝风机双速运行，实现稳定运行，压力及温度波动小，实现食品高品质存储。
- 高低压保护、过热过载保护、相序保护（涡旋）等多重保护，保障机组安全运行。
- 特别设计过冷冷凝器，使机组获得更高的制冷量及能效。
- 机组体积小、安装灵活，对建筑空间要求低，无需特设机房。
- 手操器（可选）：便于查看故障代码，方便检测机组运行状态

2.机组型号说明



标准型号内部序列号末尾代码为“X”，低环温型号内部设计序列号末尾代码为“L”

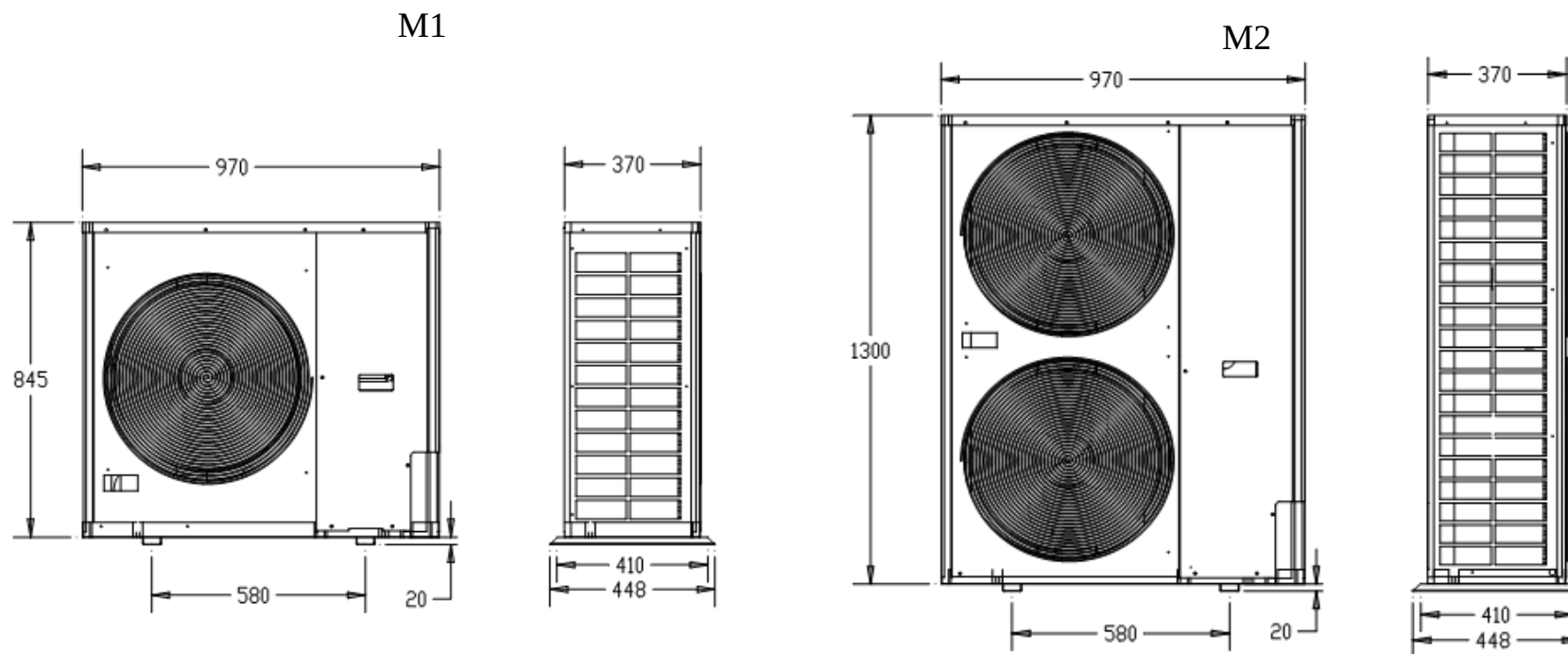
3.机组性能参数

GQH（中温机组）				015PS	021PS	026PS	030PS	038PS	045PS	048PS
匹数 Horse Power				2	3	3.5	4	5	6	7
制冷剂 Refrigerant				R404A/R22						
壳体规格 Size of casing				M1	M1	M1	M1	M2	M2	M2
R404A	名义制冷量 Capacity	(1)	kW	4.15	5.57	6.28	8.06	10.16	12.08	13.03
	名义输入功率 Input power	(1)	kW	1.58	2.24	2.64	3.37	3.86	4.71	5.09
R22 (3)	名义制冷量 Capacity	(1)	kW	3.74	5.01	5.65	7.25	9.64	11.42	12.52
	名义输入功率 Input power	(1)	kW	1.42	2.02	2.38	3.03	3.40	4.08	4.48
压缩机 Compressor	数量 Number			1	1	1	1	1	1	1
	型号 Model			MLZ015/ MLM015	MLZ021/ MLM021	MLZ026/ MLM026	MLZ030/ MLM030	MLZ038/ MLM038	MLZ045/ MLM045	MLZ048/ MLM048
曲轴箱加热带 Crankcase heater	数量 x 功率 No.x Power		W	65	65	65	75	75	75	75
噪音 Sound level			dB（A）	60	60	60	60	60	60	60
风扇电机 Fan motor	数量 x 直径 No.x Diameter		mm	1xØ500	1xØ500	1xØ500	1xØ500	2xØ500	2xØ500	2xØ500
	最大风量 Max. Air flow		m³/h	4445	4445	4445	4445	8890	8890	8890
总电流 Total current A/B（2）	风机额定电流 Rated I		A	0.71	0.71	0.71	0.71	1.42	1.42	1.42
	压缩机启动电流 LRA comp.		A	30/60	45/97	45/97	60/127	70/Null	82/Null	87/Null
	压缩机最大持续电流 MCC comp.		A	7/19	9.5/25	11/26	13/32	15/Null	15/Null	16/Null
热继出厂设定 Overload Relay setting(A)			A/B（2）	A	5.5/15	7.5/20	9/25	11/30	12/Null	13/Null
储液器容积 Receiver volume			L	6	6	6	6	7.6	7.6	7.6

冷冻机油 Lubricant(R404A/R22)			PVE oil 醚类油 320HV(R404a) / Alkylbenzene(AB) oil 烷基苯油(R22)						
压机注油 Oil charge of comp	L		1.1	1.1	1.1	1.6	1.6	1.6	1.6
接口尺寸 回气 Suction	inch		5/8"	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"
Connections/SAE 供液 Liquid	inch		1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
尺寸 Dimension	详见附图								
重量 Weight	kg		68	68	68	74	125	125	125

表 1 中温机组参数表

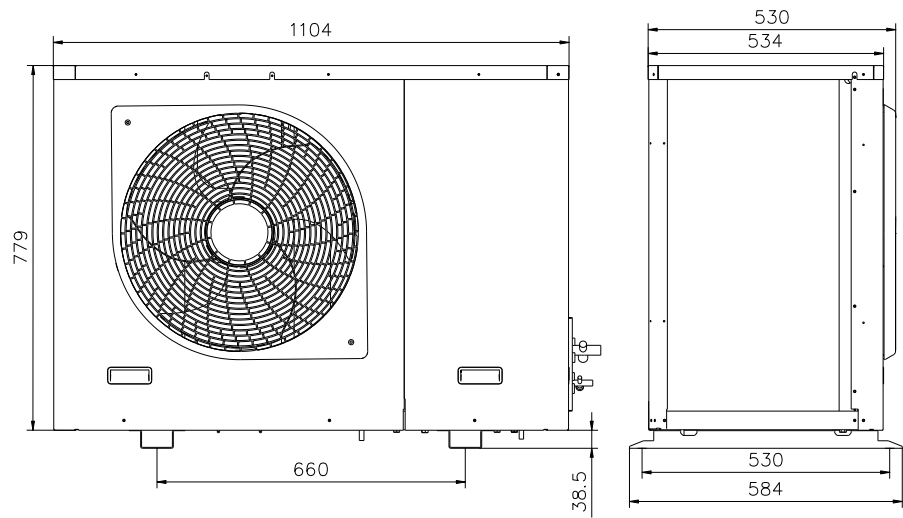
- 注：(1) 参数基于国标 GB/T 21363-2008 中温工况:蒸发温度-7℃，环境温度 32℃，吸气温度 18℃；
(2) A/B，A 代表电源代码为“4”的机型对应的电气参数值，B 代表电源代码为“5”的机型对应的电气参数值；
(3) 电源代码为“5”的机型仅适用 R404A 制冷剂，且仅包含 GQH015/21/26/30 四个型号。



GQL(低温机组)	005PS	009PS	010PS	012PS	016PS
匹数 Horse Power(HP)	1.5	2.5	3	4	5
制冷剂 Refrigerant	R404A				
制冷量 Capacity(kW)	2.09	3.01	3.7	4.44	5.47
额定功率 Input power(kW)	1.49	2.25	2.87	3.22	4.47
压机型号 Compressor model	NTZ048	NTZ068	NTZ096	NTZ108	NTZ136
机组噪音 Noise dBA@1m	65	66	66	66	66
风扇数量 Fan NO.	1				
风扇直径 Fan diameter(mm)	Ø500				
最大风量 Max. Air flow(m ³ /h)	5287	5287	5287	5287	5287
风机额定功率 Fan power(W)	90	90	90	90	90
风机额定电流 Rated I Fan(W)	0.67				
压机启动电流 LRA Comp (A)	16	25	32	45	51
压机最大持续电流 MCC Comp(A)	4.8	8.4	10.1	12.1	14.3
热继出厂设定 Overload Relay setting(A)	4	7	8	10	12
储液器容量 Receiver vol.(L)	5.6				
冷冻机油 Lubricant	酯类油 P.O.E oil 160Z				
压机注油 Oil charge of comp(L)	0.95				
油分注油量 Oil charge of oil separator(L)	0.5				
回气管接口尺寸 Suction connector SAE	5/8"	5/8"	7/8"	7/8"	1"1/8
供液管接口尺寸 Liquid connector SAE	1/2"	1/2"	3/4"	3/4"	3/4"
尺寸 Dimension(mm)	详见附图				
重量 Weight(kg)	98	104	112	112	112

表 2 低温机组参数表

注：表中参数基于国标 GB/T 21363，低温工况:蒸发温度-23℃，环境温度 32℃，吸气温度 5℃。



4.机组运行

4.1 机组运行范围

4.1.1 机组运行范围方框图

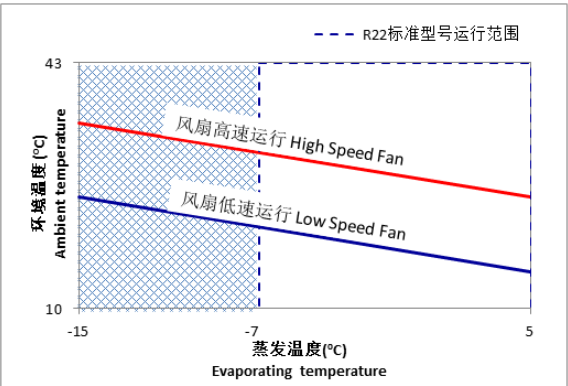


图 1 中温机组运行范围方框图

(R404a 最大吸气温度 20℃，阴影区 R22 最大回气过热度 11K)

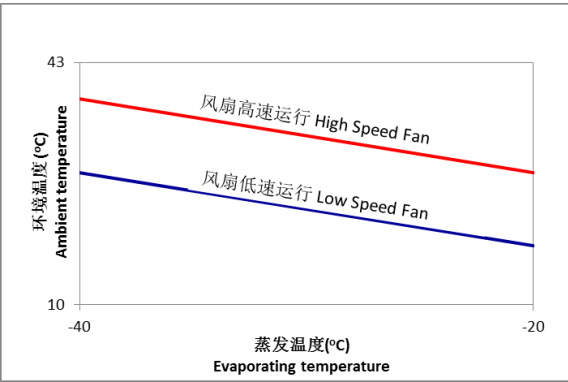


图 2 低温机组运行范围方框图

(R404a 最大回气过热度 10K)

注：对于低环温型专用 CDU，其应用环境温度下限可延伸至-30℃.

4.1.2 机组必须在安全范围内运行，包括最高、最低环境温度和最高、最低蒸发温度，对于机组应用最低环温低于-10℃地区，请咨询公司技术人员。

4.2 压力开关设定

4.2.1 压力开关设定如表 3 所示

4.2.2 特别注意：由于低压控制器本身误差所致，调节蒸发温度时请考虑余量

开关类别	功能	应用范围	断开值/Barg	复位值/Barg
高压定值开关	保护压缩机安全	中温	25, R404a 21, R22	20, R404a 16, R22
低压控制器	调节蒸发温度		2.6≤R≤5.0, R404a 1.9≤R≤4.0, R22	R≤d≤7.0, R404a R≤d ≤5.8, R22
低压定值开关	保护压缩机安全		1.6	3.0
高压定值开关	保护压缩机安全	低温	24, R404a	18, R404a
低压控制器	调节蒸发温度		0.35≤R≤2.0, R404a	R≤d≤3.4, R404a
低压定值开关	保护压缩机安全		0.3	1

表 3 机组压力开关设定

以上设定仅作为特定温度下压力设定参考，实际应用请根据系统不同、使用温度不同进行适当的调整，以保证正常的压机开停和使用效果，但低压可调开压力开关的设定值不得小于最小断开值！

5.机组结构

5.1 中温机组结构图

5.1.1 单风机机组结构图

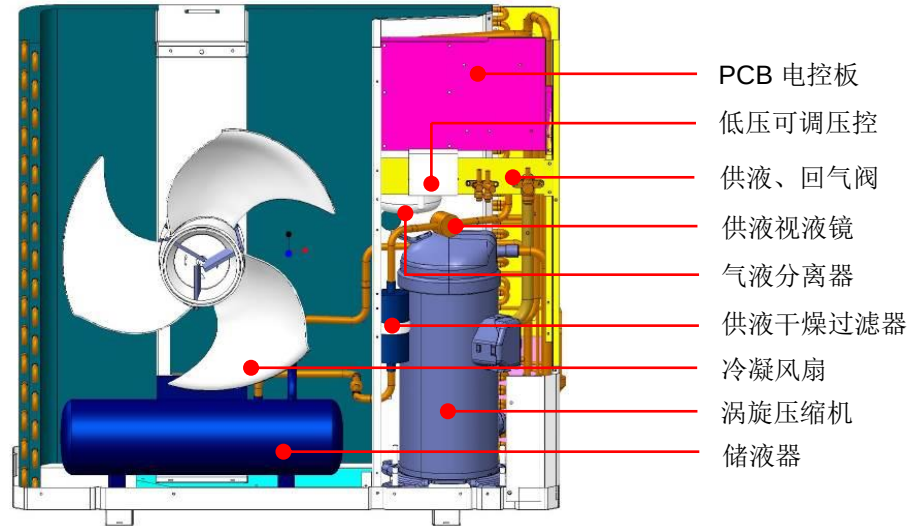


图 3

5.1.2 双风机机组结构图

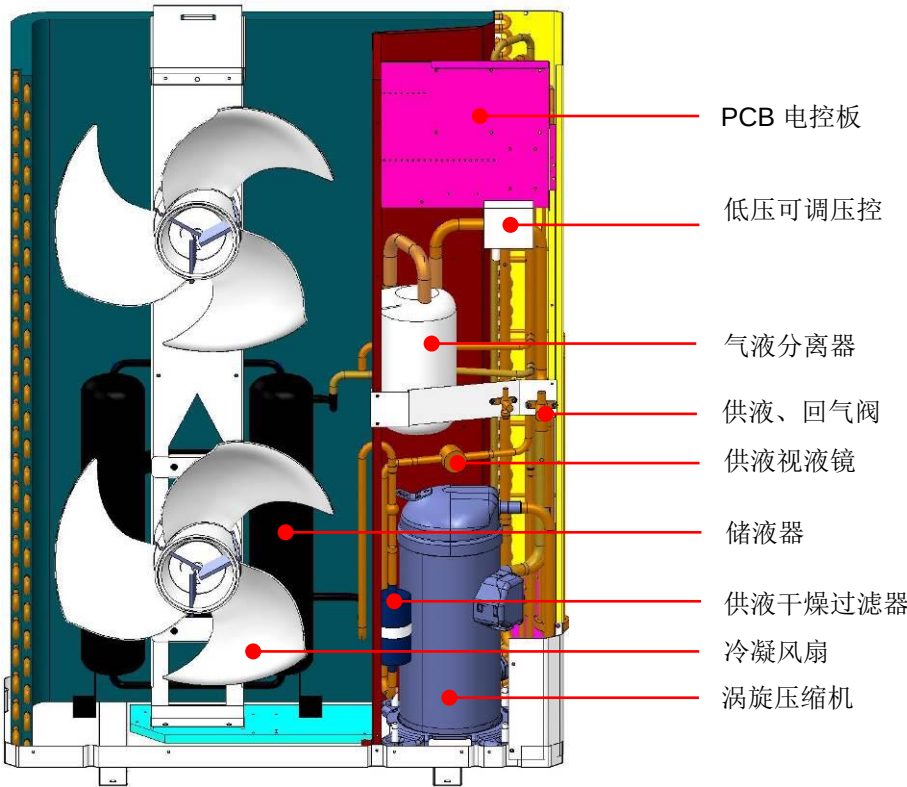


图 4

5.2 低温机组结构图

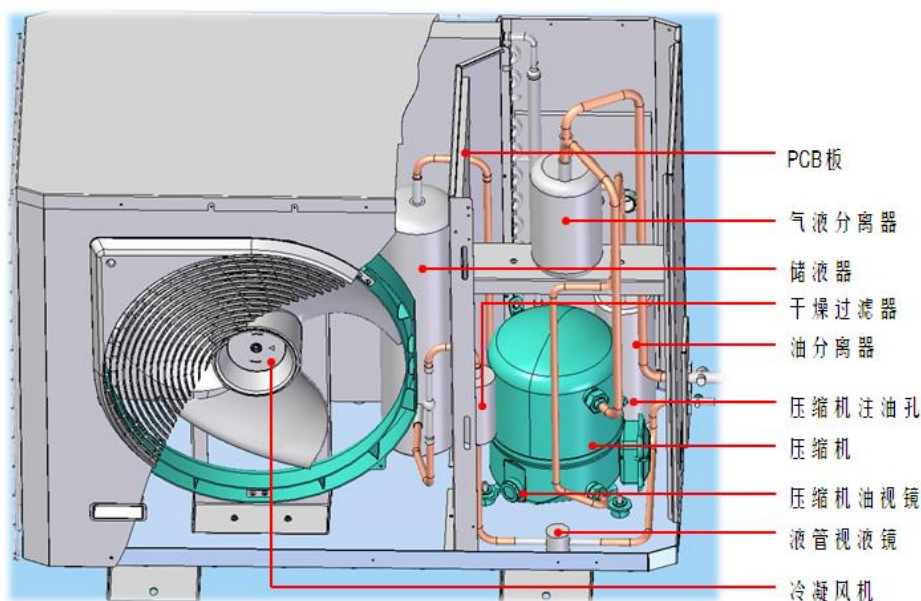


图 5

注意：海尔开利冷冻设备有限公司保留对产品外观及技术设计加以改进和改变的权利，恕不另行通知。

6. 电气

6.1 电气安全

6.1.1 请勿将接地线与气体燃料管道、水管、避雷导体或电话的接地线相连，接地不当可引起意外触电，请经常检查接地线与机组接地终端和接地电极连接是否牢靠。

6.1.2 切勿使用锋利物件来操作手操器，以免损毁手操器。切勿扭曲或拉扯控制柜内电线，以免造成接线松动，引起控制失灵。

6.1.3 控制柜内带有强电，未切断机组电源之前，切勿接触除手操器之外的其他任何控制元件及端子部件，以免造成人身伤害。

敬告：整机务必做好接地工程，供电电路应配置断路器，其它未尽事宜请参照相关标准执行。

6.2 电源代码“4”电气接线图

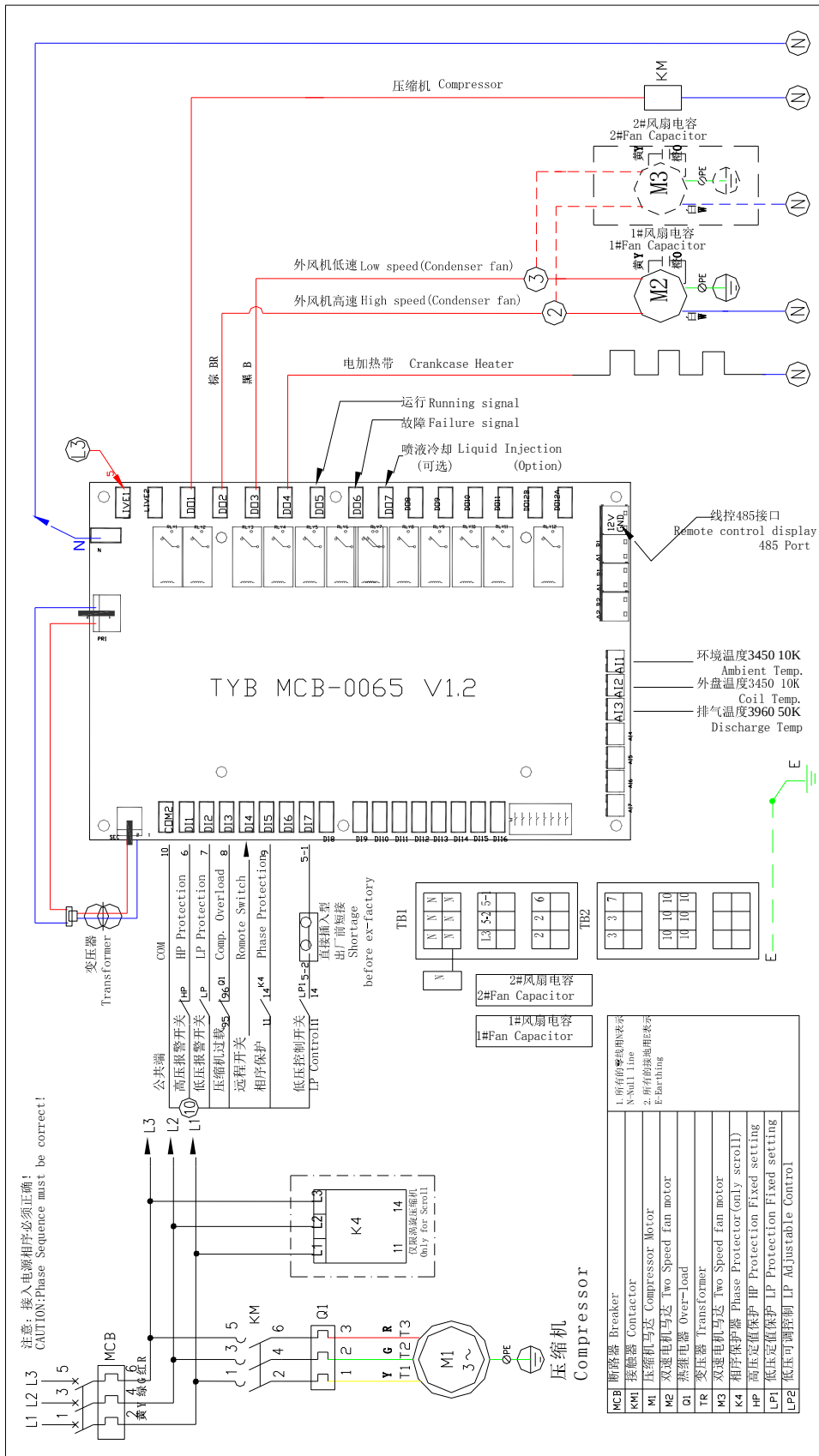


图 6 电源代码 4 电气接线图

注：机械控制机组电气线路图另附！

6.3 电源代码“5”电气接线图

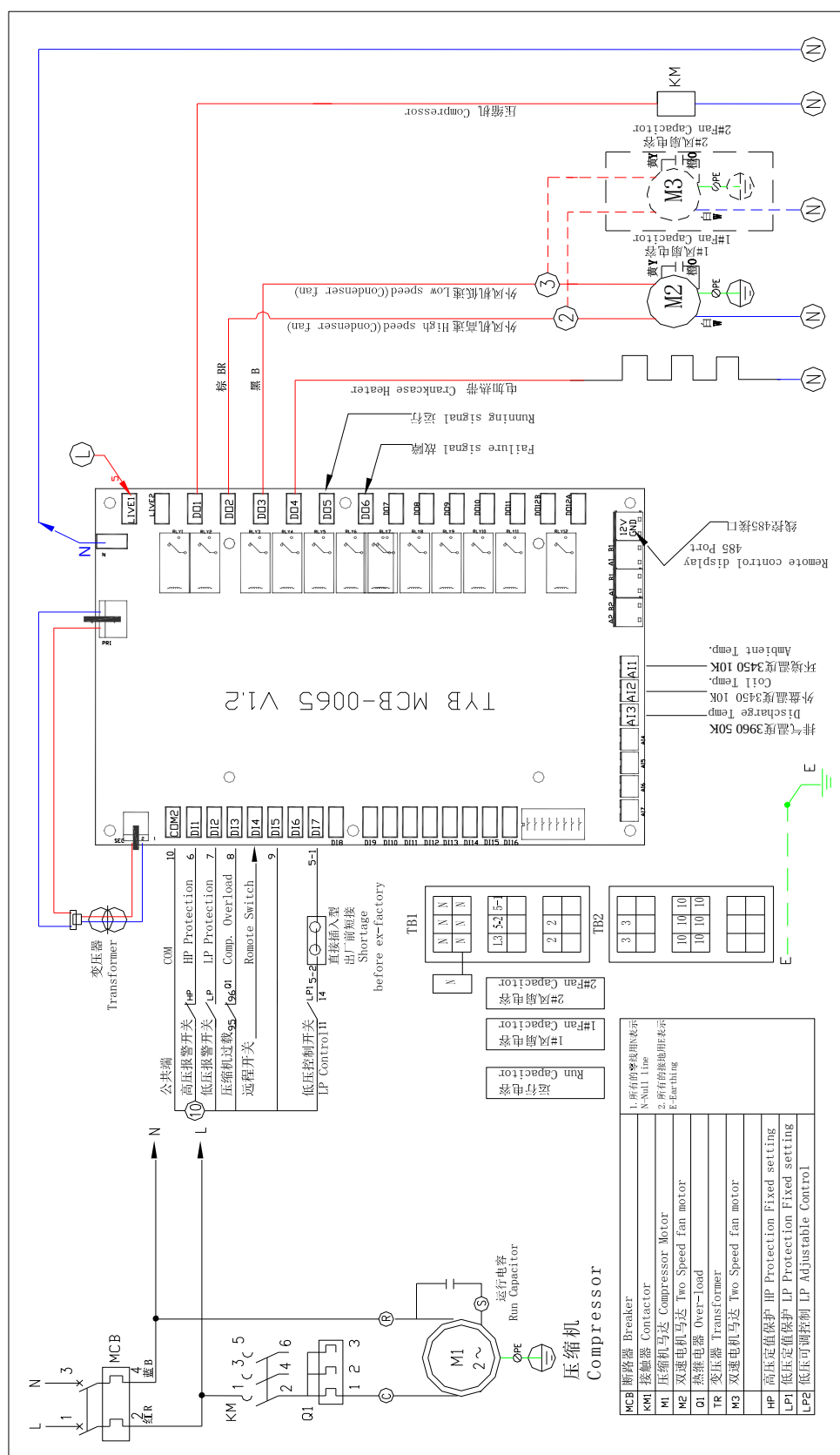


图 7 电源代码 5 电气接线图

注：机械控制机组电气线路图另附！

7.压缩机正常运行功能

7.1 初始启动程序

7.1.1 第一次通电，机组会进入初始启动程序:三分钟延时.对于 GQH 系列机组，压缩机经历三次跳停，运行时间为 3 秒，时间间隔为 20 秒（GQL 系列机组无三次跳停动作）。

7.1.2 初始程序结束后，经过 20 秒延时后，压缩机开始正常运行。

7.2 正常运转

7.2.1 压缩机最短停机时间为 3 分钟，最短运行时间为 2 分钟

7.2.2 压缩机运转过程中，冷凝风扇会根据室外环境温度与外盘管温度进行高低速模式的切换

7.3 停机

7.3.1 当出现停机信号时，如低压下降到设定停机压力时，压缩机和冷凝风扇同时停止，

7.3.2 正常停机再次启动时，压缩机和冷凝风扇立即开始持续的正常运转

7.4 断电

7.4.1 断电后机组内部所有部件马上停止运转，电脑板数据清零，

7.4.2 断电后再次启动会进入初始启动程序

8.自动保护功能及故障显示

8.1 当出现故障时，需通过手操器查看故障代码。如果在同一时间不止一个故障出现，故障代码将逐个闪烁显示。

8.2 故障代码及对应的故障与复位方式见表 4、表 5.

故障代码	故障/报警	控制器暂时停机自动复位	控制器停机锁定手动复位
E0	系统高压保护/报警	1 小时内出现次数 ≤ 5	1 小时内第 6 次保护动作
E1	系统低压保护/报警	每次保护	无
E2	压缩机过载保护	1 小时内出现次数 ≤ 5	1 小时内第 6 次保护动作
E3	相序保护	无	每次保护
E4	排气温度超限	1 小时内出现次数 ≤ 5 延时两分钟启动	1 小时内第 6 次保护动作
E8	环境温度传感器故障	不停机	
E9	外盘温度传感器故障	不停机	
E10	排气温度传感器故障	压缩机运行 2min，停机 3min，交替进行	
E32	手操器与主板通讯故障	不停机	

表 4 机组故障及复位

9.电脑板初始化

9.1 电脑板上设置八个拨码开关，拨码开关选择请参照表 4

9.2 拨码出厂初始设置 Sw1-0,Sw2-1,Sw4-1,Sw5-0,SW6-0

位号	功能	位号	功能
Sw1	0-普通电机 1-EC 电机	Sw5	00- 无内机； 01-1 台内机 10-两台内机； 11-三台内机
Sw2	0-单速 1-双速	Sw6	
Sw3	0-GQL 机组 1-GQH 机组	Sw7	保留
Sw4	0- 电加热带受环境温度影响 1- 电加热带不受环境温度影响	Sw8	手动复位全部故障

表 5 拨码开关定义

10.手操器使用说明

10.1 手操器显示面板

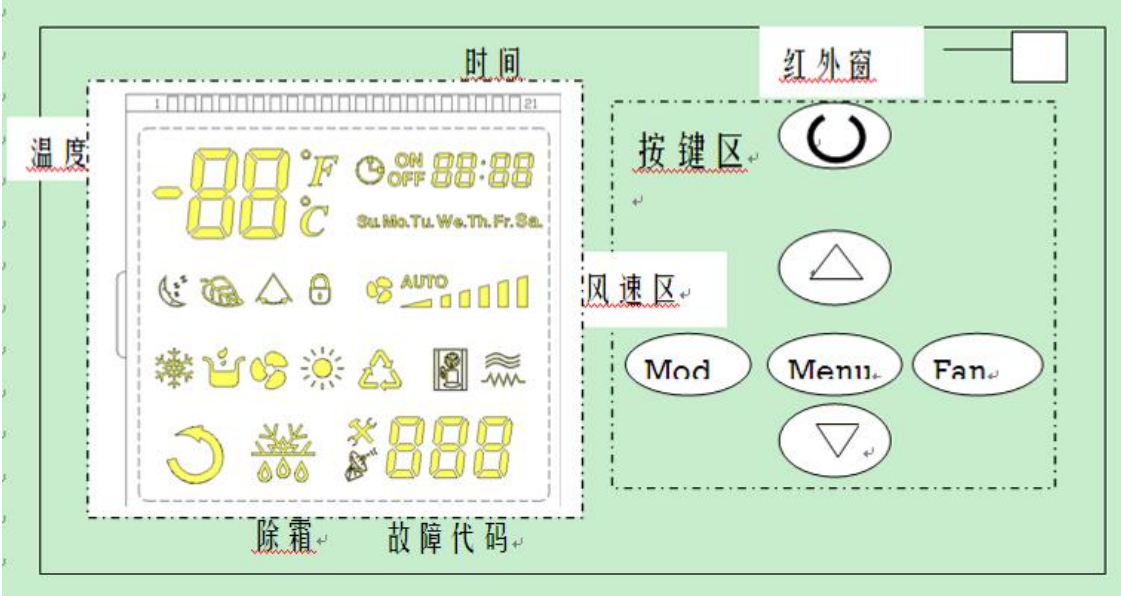


图 8 手操器显示面板

10.2 手操器操作

10.2.1 开/关

短按 “” 键开关机。

开机状态： 温度区持续显示及正在运行的功能符号。

关机状态 ： 仅显示时间、定时开关机及键盘锁定符号（如果设置了定时开关机或键盘锁定）

10.2.2 强制除霜功能

在默认显示下同时按住 “Menu” + “Mode” 键 1 秒，蜂鸣器响一下，进内风机强制除霜。（在接内机的情况下有效）

10.2.3 按住 “” + “Fan” 键 3 秒钟，手动清除故障

10.2.4 按 “Menu” + “fan” 进入历史故障查询菜单，按 fan 键查询下一条历史记录。

10.2.5 按键锁定

为防止误操作，系统设有按键锁定功能。同时按下 “” + “Mode” 键并持续 1 秒钟进入

此模式。可以以同样的方式退出按键锁定。在键盘锁定模式下，“”指示会亮起

10.2.6 温度查询

同时按下“Menu”+“”键 3 秒,温度显示区将显示 C1,按下“”或“”键可选择 C1 外盘温度和 C2 排气温度 C6 环境温度,按退出此菜单

注：手操器为可选部件，请根据工程需要选购！

11.机组安装施工

11.1 场地要求

11.1.1 地面应坚实、平整；机组最好高出地面 200mm 以上，以保持冷凝器清洁

11.1.2 机组应留出足够的空间，以便机组能有足够的通风条件，同时也便于日后机组维护；机组后侧留出不少于 300mm 的通风空间，左右侧留出不少于 450mm、前侧留出不少于 1500mm、顶部留出不少于 1300mm 的维修空间。

11.2 搬运

机组搬运过程中严禁将机组倒立，应尽可能稳定、垂直的运输、搬运；搬运时倾角不得大于 45 度。

11.3 管路安装

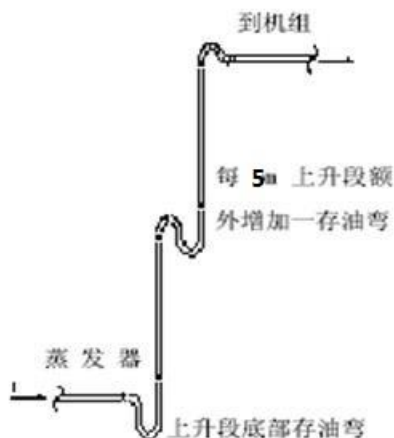
为了您的使用，请使用符合国家标准的制冷管件。管路设计请参考如下事项：

11.3.1 液管设计注意事项：

如果蒸发器比机组位置高出很多，会产生闪蒸气体，使制冷能力大大下降，因此应该控制蒸发器与机组的高度差，范围为 6m；如果超过 6m，应安装专用装置（如热交换器）以清除闪蒸气体和降低液管温度。

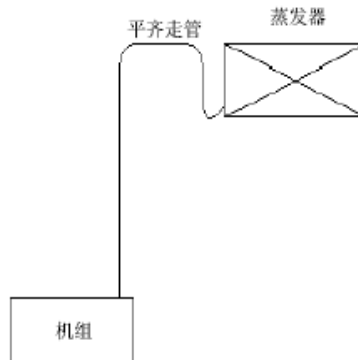
11.3.2 回气管设计注意事项：

a.如果蒸发器比机组位置低，一方面水平管段应以 1:100~2:100 的斜度向下通至压缩机，以使油能尽可能多的从蒸发器回流到压缩机。因为油在氟利昂制冷剂中有一定的溶解度，因此油可能在液态制冷剂中与制冷剂一起流入到蒸发器中，如果管路设置不当，一些油将滞留在蒸发器中无法返回，这样有可能造成压机缺油。另一方面，为了克服高落差保证回油，回气管径的选择时应保证使冷媒气体流速的回油效果；且上升管路高度大于 5 米时，要每隔 5 米设置一个回油弯，如下图所示：



b.如果蒸发器比机组高，回气管路应加防逆流弯，如果液管安装了电磁阀，则无此必要。

如下图所示：



11.3.3 系统补充冷冻油

当单程管路长度超过 20m 时，需要根据超出部分的长度和气管管径补充对应型号的润滑油。

管路规格 (inch/mm)	加油量 (ml/m)
1/2"(Φ12.7)	10
5/8"(Φ15.9)	20
3/4"(Φ19)	30
7/8"(Φ22)	40
1"(Φ25.4)	50

敬告：根据系统制冷剂 R404A/R22 的不同，应选用相应的润滑油，详见本说明书第 4、5 页！

11.4 冷凝压力调节阀 KVR 的调节设定

相比标准型号定频 CDU，低环温专用 CDU 增加了冷凝压力调节阀组件 (KVR+NRD)，冷凝压力调节阀 KVR 出厂设定值为 10bar，可满足大部分工程应用所需。如确有必要对 KVR 阀设定值进行调节，可打开阀盖，用内六角顺时针或逆时针调节，顺时针设定值升高，逆时针设定值下降，每调整一圈 360°，压力设定值相对变化量为 2.5bar。

12. 系统检漏及抽真空

12.1 保压检漏时，系统高压侧压力应小于 18barg；低压侧压力应小于 12barg；

12.2 也可用保真空的办法检漏；

12.3 严禁使用压机给系统抽空；

12.4 抽真空应从高压侧、低压侧同时进行；

12.5 真空度必须达到 30Pa (0.25mm Hg) 以下，且不得以抽真空的时间长短来判断是否结束抽真空；

12.6 真空度的测量必须使用真空计，不得使用普通压力表度量真空度。

13. 制冷剂充注及过热度调整

13.1 开机前从高低压侧同时充注，系统充注液态制冷剂压力不小于 6barg，尽量在开机前完成最大冲注，最佳充注口应在液管截止阀处；

13.2 开机进行制冷剂补充时，可从回气管截止阀处充注，必须以液态制冷剂充注，同时保证压缩机无明显回液现象；

13.3 充注过程中可能出现多次压力保护而停机和启动延时的情况，在此期间禁止旁通低压控制器及低压保护器而强行充注。

13.4 系统过热度设置

13.4.1 过热度计算方法

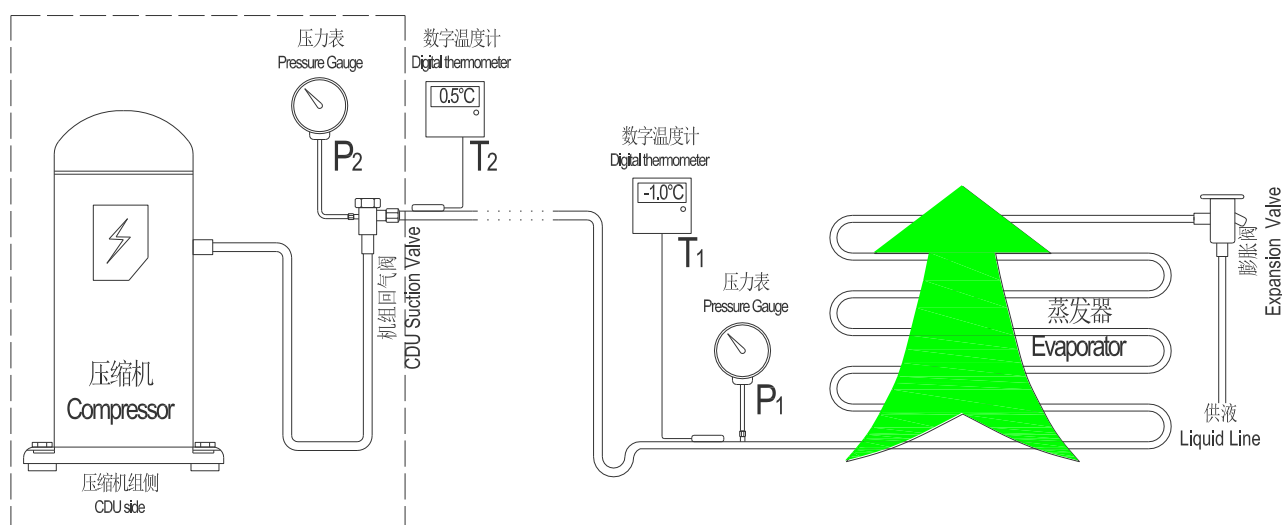
根据实际需要测量蒸发器回气管或机组回气管处对应蒸发压力(P_1/P_2)和实测温度(T_1/T_2)，根据蒸发压力(P_1/P_2)查找对应制冷剂物性参数表气态饱和蒸发温度(T_{S1}/T_{S2})，计算如下：

a. 蒸发器侧过热度 $\Delta t_1 = T_1 - T_{S1}$

b. 机组回气过热度 $\Delta t_2 = T_2 - T_{S2}$

13.4.2 过热度设定要求

蒸发器侧过热度 Δt_1 一般为蒸发器换热温差（蒸发温度与回风温度差值）的 0.5~0.7 倍；蒸发器出口至机组的回气阀口管路过热度（ $\Delta t_2 - \Delta t_1$ ）应控制在 3K 以下，由于系统差异，以上数值在实际应用中应根据调试情况做适当调整。



过热度采集位置示意图

14. 保养检查及处理

为了充分维护机组的性能与寿命，方便您的使用，请核实以下项目：

- 14.1 机组运行压力是否正常，温度有无异常；
- 14.2 压缩机视油镜油位是否可见；
- 14.3 压缩机及冷凝风扇有无异常声音及振动；
- 14.4 压缩机是否频繁启动；
- 14.5 保护装置、控制装置有无异常动作；
- 14.6 制冷剂是否泄露；
- 14.7 电线及电气元件有无老化或过热，线头有无松动；
- 14.8 冷凝器翅片附着灰尘是否过厚，冷凝器是否堵塞；
- 14.9 机组通风是否良好。

注意：

- ▲因修理、更换等原因需要抽出制冷剂时，一定要用专业设备回收处理，不得直接排放大气。
- ▲机组因维修需要抽出制冷剂时，因部分冷冻油溶解在制冷剂中，造成系统冷冻油减少；维修完毕重新运行前，需要酌情补充冷冻油。
- ▲更换压缩机、冷凝器时，要同时更换过滤器；如压缩机电机烧毁导致管路严重污染时，必须彻底清除系统内制冷剂和冷冻机油。
- ▲所有的维修都需要专业人士进行处理，不要擅自拆卸机组。

■ 常见故障及排除方法

故障现象	故障原因	排除方法
压缩机不启动	电源没接通或保险丝断	接通电源或更换保险丝
	电气故障	查明原因并恢复
	某个保护起作用	查明原因，解除保护
	机组电脑板故障	修复或更换电脑板
	压缩机电机烧毁	查找原因、排除并更换压缩机
不制冷	制冷剂泄漏、过滤器或膨胀阀脏堵	查明原因，进行清理或更换
	蒸发器风机失效	维修更换
	压缩机失效	检查修复或更换压缩机
高压压力过高 高压控制器保护	冷凝风机未转	查明原因，启动风机
	冷凝器堵塞	清扫冷凝器
	环境温度过高或通风不良	改善环境或改善通风
	制冷剂过多或系统内有空气	排除过多制冷剂或空气
低压压力低	膨胀阀或过滤器堵塞	清洗膨胀阀，清理或更换过滤器
	制冷剂过少	补充制冷剂
	系统有泄漏	找出漏点进行修复
排气温度过高	吸气过热度过大	检查膨胀阀并调整
	制冷剂偏少	补充制冷剂
压缩机气缸盖结霜	膨胀阀开启度过大	减小膨胀阀开度
	蒸发器盘管结霜或脏堵	化霜、清洁蒸发器
	蒸发器风机未转	检查或更换蒸发风机
压缩机噪音异常	相序错误（涡旋压缩机）	调整相序
	压缩机机械故障	拆机检修或更换压缩机
机组振动较大	机组放置不平	将机组找平
	管路振动	固定好管路
	压缩机机械故障	拆机检修或更换压缩机
压机启动频繁	低压控制器设置不当	重新设定压控
	电气控制线路故障	排除电气控制线路故障
	末端温控器故障	维修更换
	电脑板故障	更换

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XK06-015-02300



Quietor Out-door Condensing Unit Manual



Part NO.0080501927

Please read the Instruction carefully before installation.

Contents

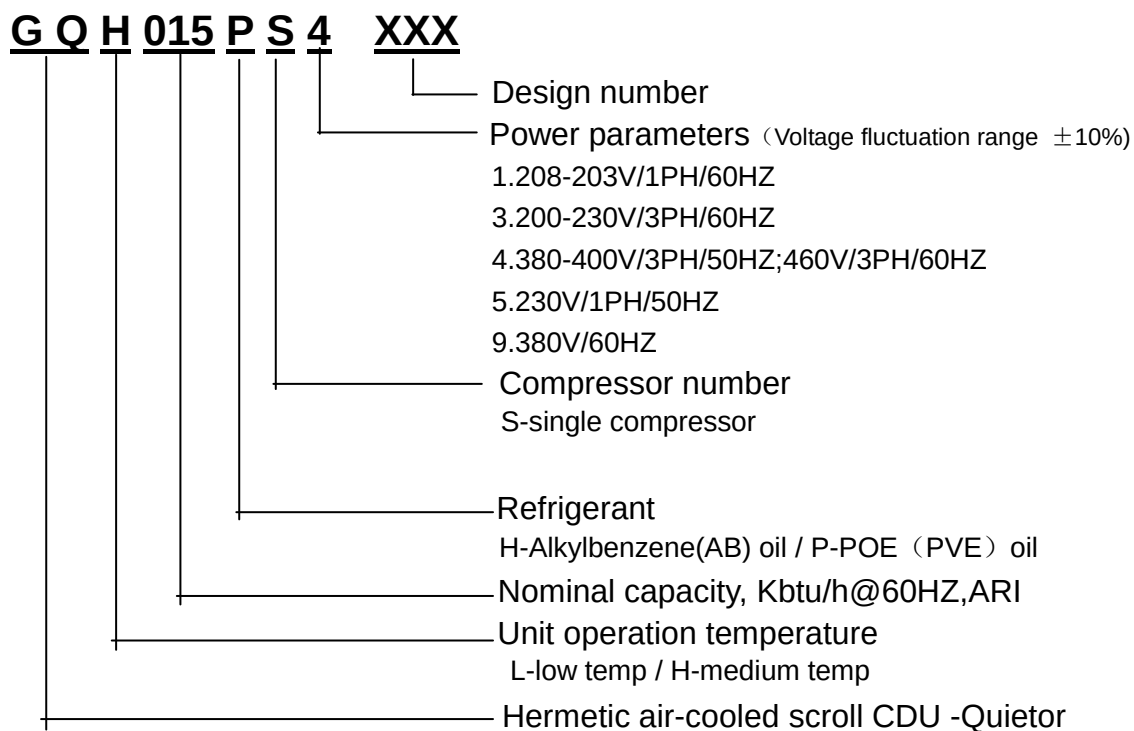
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1.Product Introduction

Quietor Out-door Condensing Unit, which is very suitable for small Supermarket and Convenience store refrigeration system, capacity range from 1.5~7 HP, advantages is as following:

- Adopt famous top-brand compressor, high efficiency, good anti-vibration performance and low noise.
- PCB control system, adjust fan running-speed according to ambient temperature, steady running, smaller fluctuation of system pressure and temperature to realize high-quality foods storage.
- HP and LP pressure protection, compressor overload and overheat protection and phase sequence protection (Option) to guarantee system safety.
- Special design condenser, improve system sub-cooled, in which to increase refrigeration capacity and improve unit COP.
- Small size, easy installation and don't need special machine room.
- Optional wired remote controller in which you could find malfunction code, convenient to maintenance and repair.

2. Nomenclature



The last code in design number of standard CDU models is “X”, and that of low OAT(operation ambient temperature) CDU is “L”.

3. Specification

GQH（中温机组）				015PS	021PS	026PS	030PS	038PS	045PS	048PS
匹数 Horse Power				2	3	3.5	4	5	6	7
制冷剂 Refrigerant				R404A/R22						
壳体规格 Size of casing				M1	M1	M1	M1	M2	M2	M2
R404A	名义制冷量 Capacity	(1)	kW	4.15	5.57	6.28	8.06	10.16	12.08	13.03
	名义输入功率 Input power	(1)	kW	1.58	2.24	2.64	3.37	3.86	4.71	5.09
R22 (3)	名义制冷量 Capacity	(1)	kW	3.74	5.01	5.65	7.25	9.64	11.42	12.52
	名义输入功率 Input power	(1)	kW	1.42	2.02	2.38	3.03	3.40	4.08	4.48
压缩机 Compressor	数量 Number			1	1	1	1	1	1	1
	型号 Model			MLZ015/ MLM015	MLZ021/ MLM021	MLZ026/ MLM026	MLZ030/ MLM030	MLZ038/ MLM038	MLZ045/ MLM045	MLZ048/ MLM048
曲轴箱加热带 Crankcase heater	数量 x 功率 No.x Power		W	65	65	65	75	75	75	75
噪音 Sound level			dB (A)	60	60	60	60	60	60	60
风扇电机 Fan motor	数量 x 直径 No.x Diameter		mm	1xØ500	1xØ500	1xØ500	1xØ500	2xØ500	2xØ500	2xØ500
	最大风量 Max. Air flow		m³/h	4445	4445	4445	4445	8890	8890	8890
总电流 Total current A/B (2)	风机额定电流 Rated I		A	0.71	0.71	0.71	0.71	1.42	1.42	1.42
	压缩机启动电流 LRA comp.		A	30/60	45/97	45/97	60/127	70/Null	82/Null	87/Null
	压缩机最大持续电流 MCC comp.		A	7/19	9.5/25	11/26	13/32	15/Null	15/Null	16/Null
热继出厂设定 Overload Relay setting(A)			A/B (2)	A	5.5/15	7.5/20	9/25	11/30	12/Null	13/Null
储液器容积 Receiver volume			L	6	6	6	6	7.6	7.6	7.6

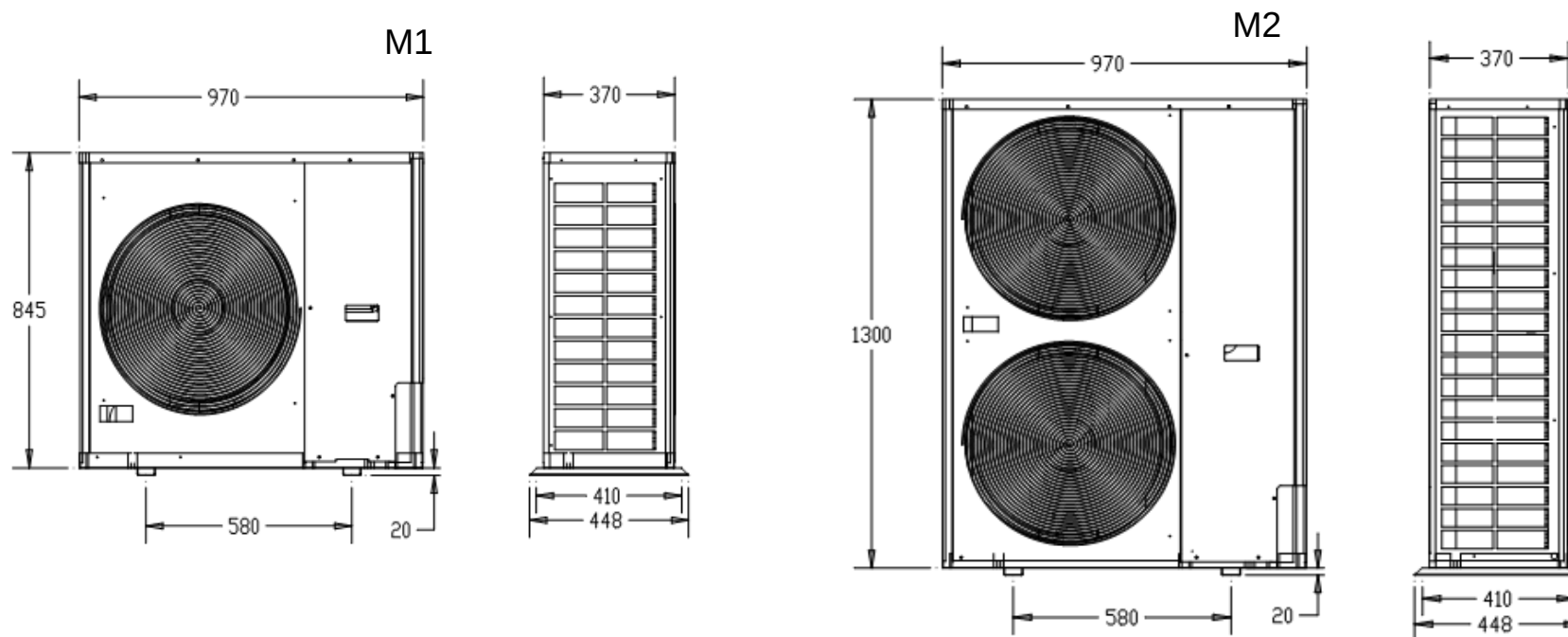
冷冻机油 Lubricant(R404A/R22)			PVE oil 醚类油 320HV(R404a) / Alkylbenzene(AB) oil 烷基苯油(R22)					
压机注油	Oil charge of comp	L	1.1	1.1	1.1	1.6	1.6	1.6
接口尺寸	回气 Suction	inch	5/8"	5/8"	5/8"	5/8"	3/4"	3/4"
Connections/SAE	供液 Liquid	inch	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
尺寸 Dimension	详见附图							
重量 Weight		kg	68	68	68	74	125	125

Sheet 1 MT Unit Specification

Note: (1)Data above is based on SST=-7°C, ambient temp=32°C,return gas temp=18°C; National Standard of China GB/T 21363;

(2) A/B, A—Electrical parameters of model with code " 4 " power supply; B—Electrical parameters of model with code " 5 " power supply;

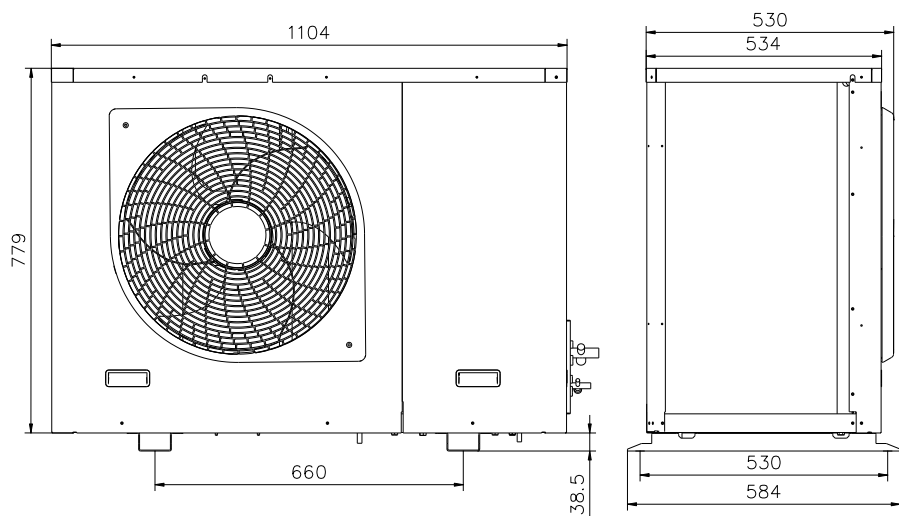
(3) CDU models with code " 5 " power supply are used for R404A exclusively, and include GQH015/21/26/30 only.



GQL(低温机组)	005PS	009PS	010PS	012PS	016PS
匹数 Horse Power(HP)	1.5	2.5	3	4	5
制冷剂 Refrigerant	R404A				
制冷量 Capacity(kW)	2.09	3.01	3.7	4.44	5.47
额定功率 Input power(kW)	1.49	2.25	2.87	3.22	4.47
压机型号 Compressor model	NTZ048	NTZ068	NTZ096	NTZ108	NTZ136
机组噪音 Noise dBA@1m	65	66	66	66	66
风扇数量 Fan NO.	1				
风扇直径 Fan diameter(mm)	Ø500				
最大风量 Max. Air flow(m³/h)	5287	5287	5287	5287	5287
风机额定功率 Fan power(W)	90	90	90	90	90
风机额定电流 Rated I Fan(W)	0.67				
压机启动电流 LRA Comp (A)	16	25	32	45	51
压机最大持续电流 MCC Comp(A)	4.8	8.4	10.1	12.1	14.3
热继出厂设定 Overload Relay setting(A)	4	7	8	10	12
储液器容量 Receiver vol.(L)	5.6				
冷冻机油 Lubricant	酯类油 P.O.E oil 160Z				
压机注油 Oil charge of comp(L)	0.95				
油分注油量 Oil charge of oil separator(L)	0.5				
回气管接口尺寸 Suction connector SAE	5/8"	5/8"	7/8"	7/8"	1"1/8
供液管接口尺寸 Liquid connector SAE	1/2"	1/2"	3/4"	3/4"	3/4"
尺寸 Dimension(mm)	Refer to Picture				
重量 Weight(kg)	98	104	112	112	112

Sheet 2 LT Unit Specification

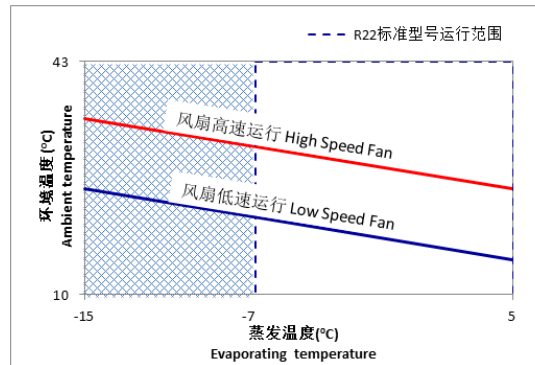
Note: Data above is based on SST=-23°C, ambient temp=32°C,return gas temp=5°C;National Standard of China GB/T 21363.



4.Unit operation

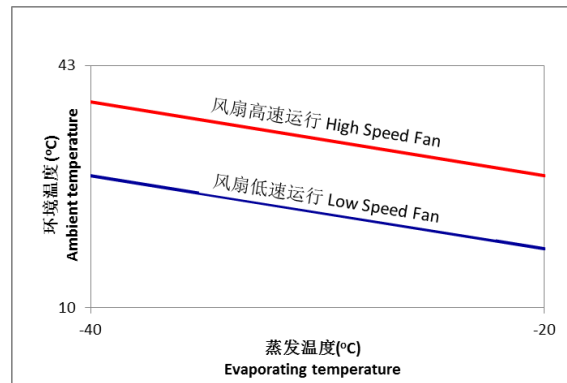
4.1 unit operation range

4.1.1 unit operation envelope



Pic.1 MT CDU Operation Envelope

(R404a Max Return Gas Temp. 20°C, Shadow area R22 Max Superheat of 11K)



Pic.2 LT CDU Operation Envelope

(R404a Max Superheat of 10K)

Note: For the low ambient temperature application CDU, the lowest operation ambient temperature could be extended to -30°C.

4.1.2 Unit must operate within the Envelope, including max. and min. ambient temperature, max. and min. evaporating temperature. Please consult technical engineer, when the lowest ambient temperature is below -10°C.

4.2 Pressure switch settings

4.2.1 Pressure switch pre-setting as below sheet 3

4.2.2 Particularly Note: Due to the accuracy of LP control switch, ensure a reasonable margin for evaporating temperature setting.

Description	Function	MT/LT	Cut out/Barg	Cut in/Barg
HP safe switch	System protection	MT	25, R404a 21, R22	20, R404a 16, R22
LP control switch	SST adjustment		$2.6 \leq R \leq 5.0$, R404a $1.9 \leq R \leq 4.0$, R22	$R \leq d \leq 7.0$, R404a $R \leq d \leq 5.8$, R22
LP safe switch	System protection		1.6	3.0
HP safe switch	System protection	LT	24, R404a	18, R404a
LP control switch	SST adjustment		$0.35 \leq R \leq 2.0$, R404a	$R \leq d \leq 3.4$, R404a

LP safe switch	System protection		0.3	1
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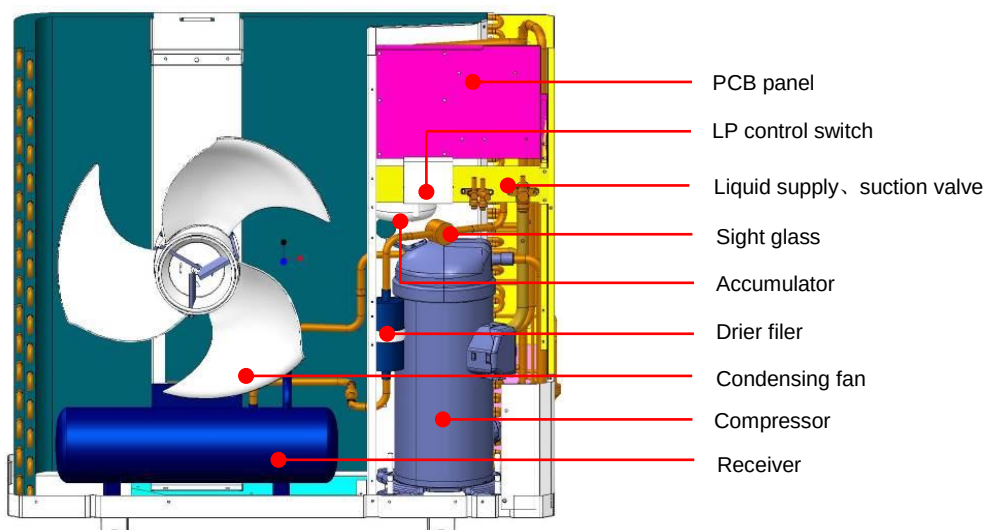
Sheet 3 Pressure Switch Settings

Above pressure switch settings for reference only, please adjust switch setting according to different application. Never in negative pressure operation and ensure the pressure setting for adjustable LP control switch no less than the low limit of Cut out.

5. Unit frame

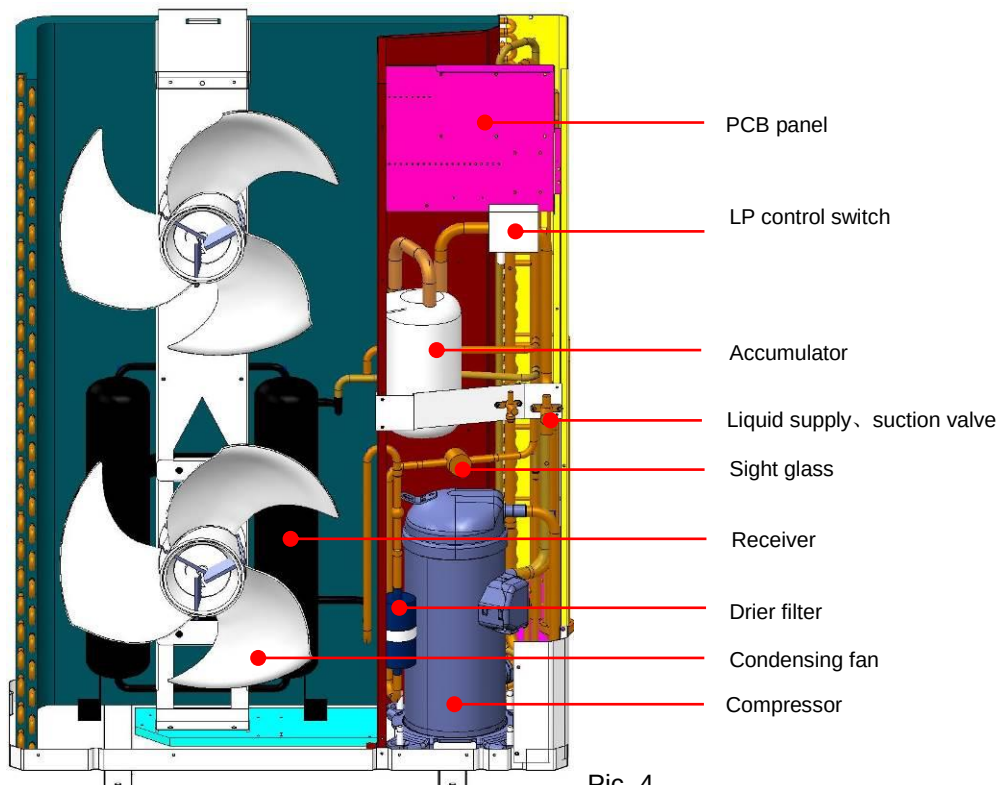
5.1 MT CDU Frame

5.1.1 Frame of single fan unit



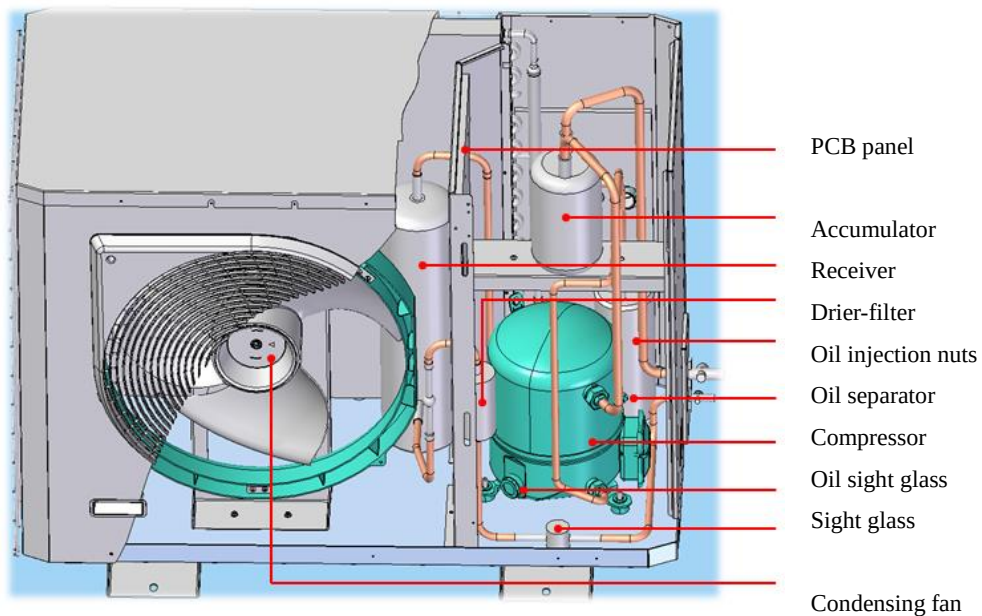
Pic. 3

5.1.2 Frame of double fans unit



Pic. 4

5.2 LT CDU Frame



Pic. 5

Note : Manufacture reserves the right to change any product improvement/specifications without notice.

6. Electrical Control

6.1 Electrical safety

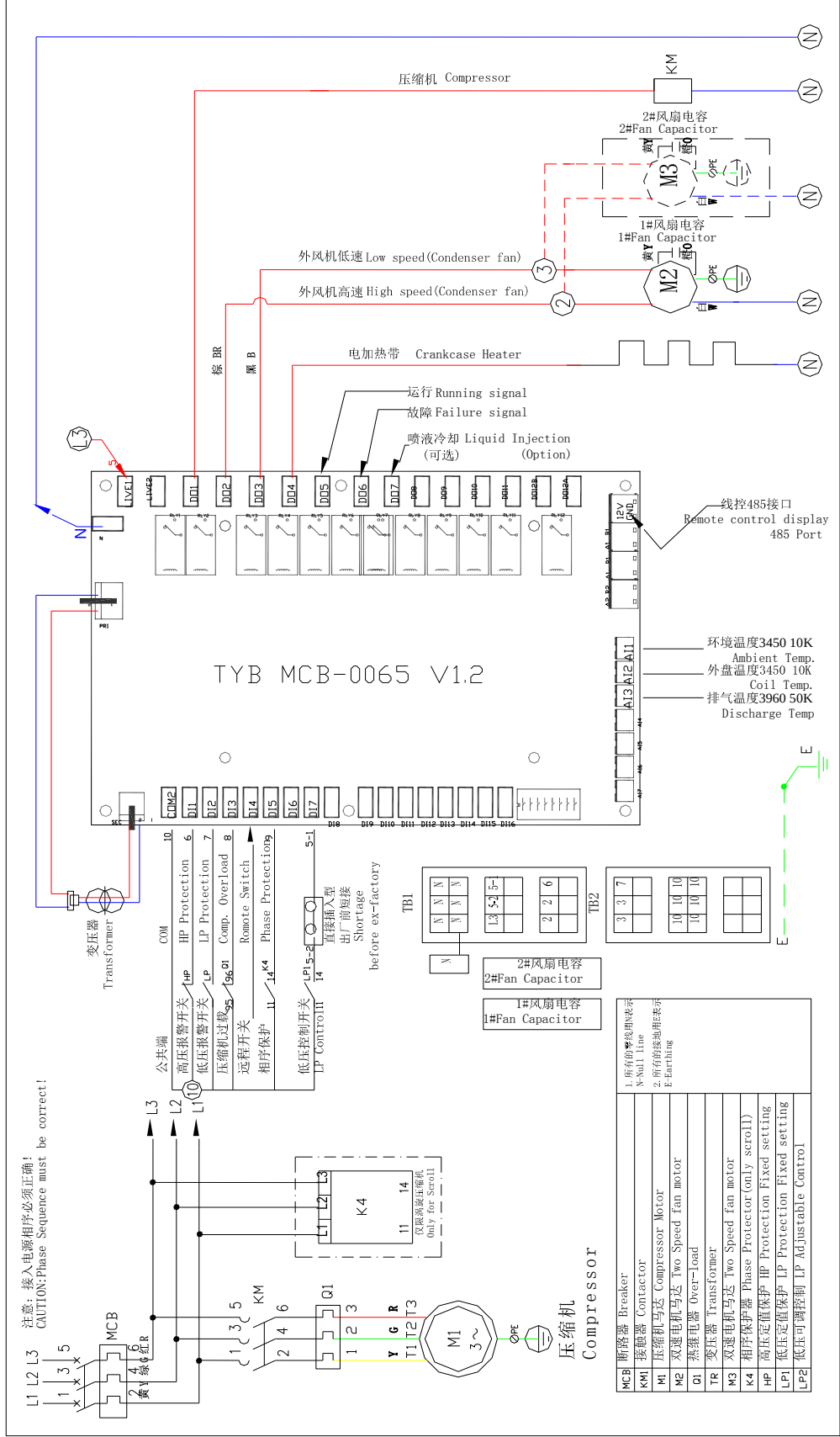
6.1.1 Please connect ground-wire correctly, otherwise it's dangerous to get electric shock. And please check the ground-wire and control circuit frequently in daily maintenance.

6.1.2 Don't operate the wired remote control via sharp metal and similar tool, and don't pull the wire to avoid wire connection failure, which could lead to unit malfunction.

6.1.3 Make sure to Switch off the power before touch any electrical component in the control panel to guarantee human safety.

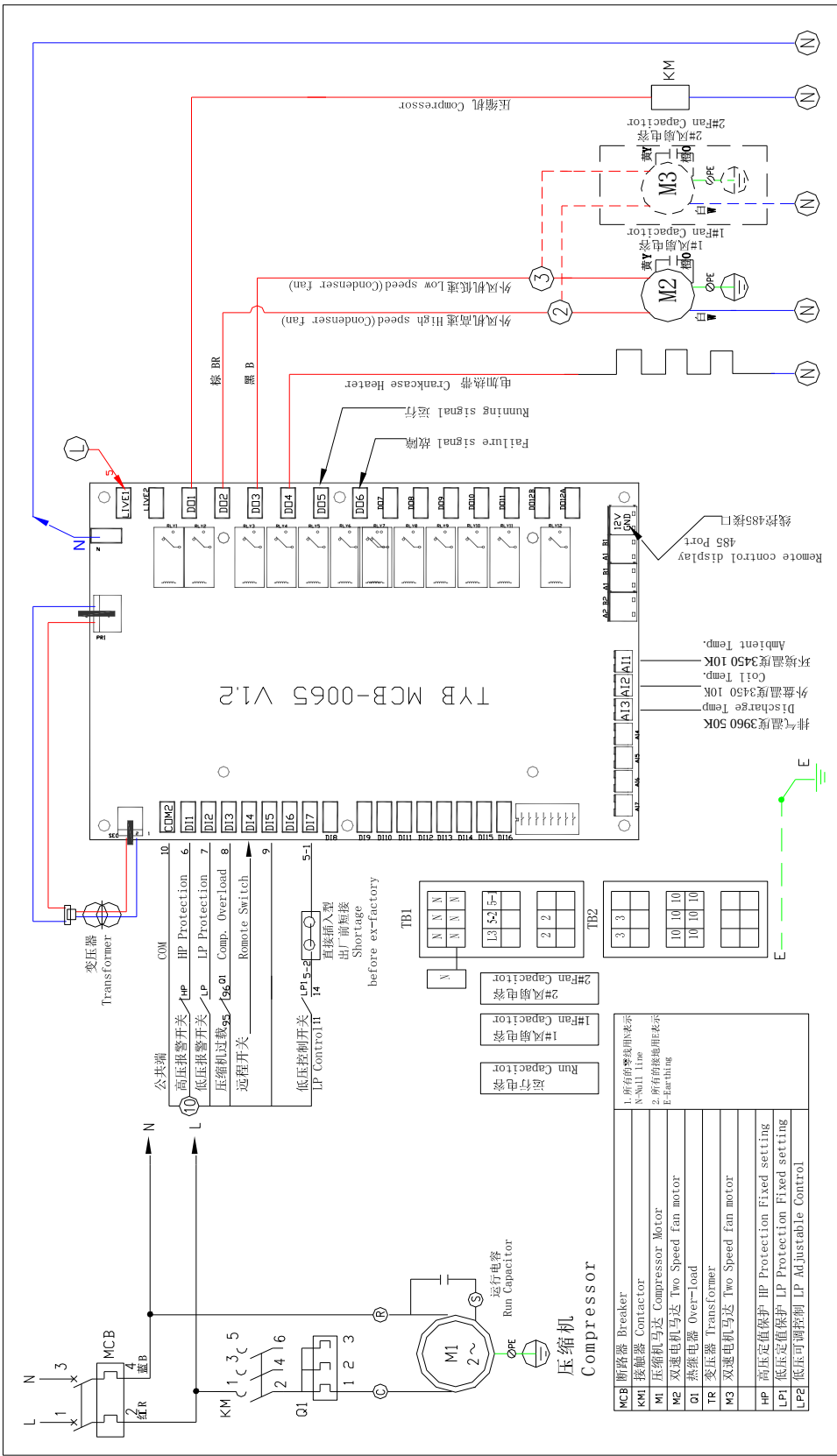
Caution: out-door unit is easy to be exposed in rain, so it's necessary to do the wire-ground connection work. Please install leakage circuit breaker according to relevant electrical standard or local law.

6.2 Electrical Diagram For Code “4”



Pic.6 Electrical Diagram with Code " 4 " (PCB)

6.3 Electrical Diagram For Code “5”



Pic.7 Electrical Diagram with Code " 5 " (PCB)

7. Running Logic Function

7.1 Initial start-up procedure

7.1.1 First start, unit will operate the initial start-up procedure: After 3 minutes delay, compressor will run and stop for 3 times, running 3 seconds and stopping 20 seconds every time (For GQL series only 3 minutes delay).

7.1.2 When the first start procedure processed, compressor will run normally after 20s delay.

7.2 Steady running

7.2.1 Compressor min. halt time is 3 minutes and min. running time is 2 minutes.

7.2.2 During unit running, condensing fan speed could change from high-speed, low-speed and stop according to ambient temperature and coil temperature.

7.3 Unit stop

7.3.1 When get stop signal, such as suction pressure meet LP switch setting, compressor and fan will stop together.

7.3.2 When unit restart, compressor and fan will start running immediately.

7.4 Power supply failure

7.4.1 When power switch off, unit will stop immediately, PCB data will be cleared.

7.4.2 When power switch on, unit will operate initial start-up procedure.

8. Protection and Malfunction Code

8.1 When malfunction happened, you could find the malfunction code via wired remote control. If more than one malfunction occurred, the malfunction code will flash one by one.

8.2 Malfunction code as below:

Code	malfunction/alarm	Unit stop temporarily and recovery start	Unit stop and locked Recovery manually
E0	System HP alarm	≤5times an hour	6 th time in an hour
E1	System LP alarm	Every time	N/A
E2	Compressor overload protection	≤5times an hour	6 th time in an hour
E3	Phase sequence protection	N/A	Every time
E4	Discharge temp protection	≤5times an hour Restart after 2mins delay	6 th time in an hour
E8	Ambient temp sensor failure	Unit keep running	
E9	Condenser temp sensor failure	Unit keep running	
E10	Discharge temp sensor failure	Compressor running 2 mins, stop 3 mins, alternately	
E32	Wired remote control and PCB failure	Unit keep running	

Sheet 4 unit malfunction code

9. PCB Circuit Setting

9.1 Eight DIP switch on the PCB. See below sheet 4

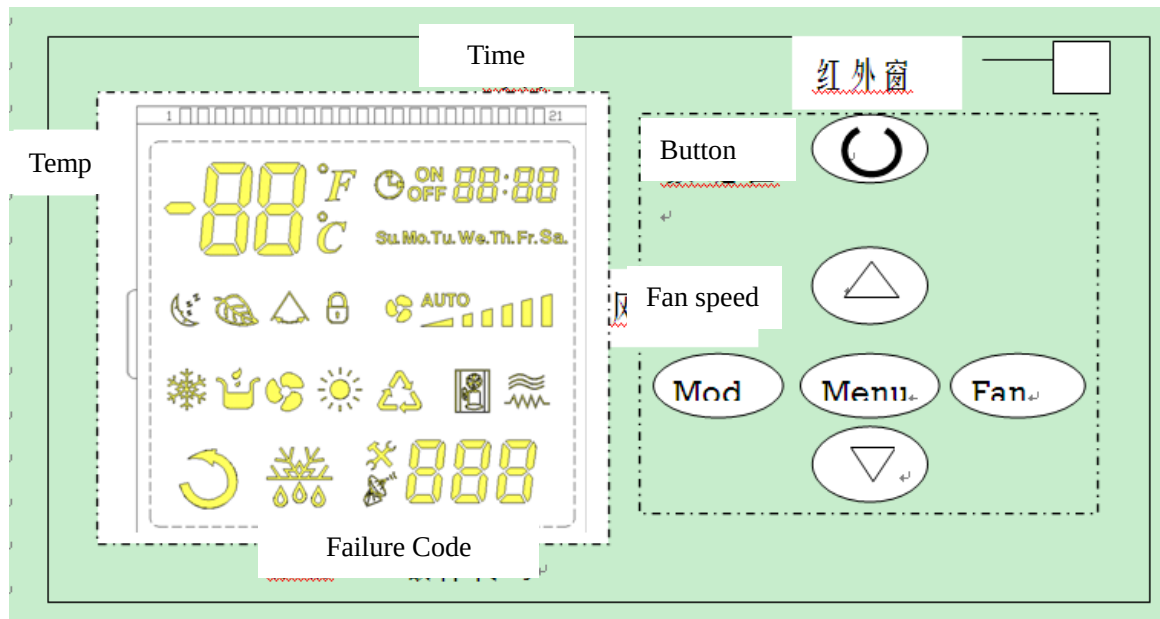
9.2 DIP switch pre-setting: Sw1-0,Sw2-1,Sw4-1,Sw5-0,SW6-0

NO.	Function	NO.	Function
Sw1	0-AC motor 1-EC motor	Sw5	01- Without in-door unit
Sw2	0- single speed motor 1- double speed motor	Sw6	02- 1 in-door unit 10- 2 in-door units 11- 3 in-door units
Sw3	0- reciprocating compressor 1- scroll compressor	Sw7	reserved
Sw4	2- crankcase heater adjusted by ambient temp 3- crankcase heater not adjusted by ambient temp	Sw8	Manual reset all faults

Sheet 5 DIP switch pre-setting

10. Wired Remote Control

10.1 wired remote control display panel



Pic.8 Display Panel

10.2 wired remote control instruction

10.2.1 switch on/off

Press “” button to start or stop unit.

Running status: temperature data and other function lighting continually.

Stop status: only time, start/stop time and buttons locked lighting(if you set start/stop time

or buttons locked)

10.2.2 Forced defrost function

By default, press “Menu”+ “Mode” for 1 second meanwhile, and the buzzer rings, the in-door unit will enter into forced defrost function(in-door unit’s installed).

10.2.3 Press “△”+“Fan”for 3 seconds meanwhile, all faults will be cleared.

10.2.4 Press “Menu”+“fan”meanwhile to read faults history menu, press “fan”to read history record one by one.

10.2.5 Button locking

System have button locking function to avoid mis-operation. Press “▽” + “Mode” for 1 second meanwhile enter and exit this model; “”button will light under this circumstance.

10.2.6 Temperature inquiry

Press “Menu” + “▽” for 3 seconds meanwhile, temperature display C1, press “△” or “▽” to choose C1 coil temperature ,C2 discharge temperature and C6 ambient temperature, press  exit.

11. Unit installation

11.1 Space requirement

11.1.1 Installation foundation should be flat, better 200mm higher than ground to keep unit clean.

11.1.2 Enough space should be reserved for maintenance and unit ventilation. No less than 300mm at back side, no less than 450mm at left and right sides, no less than 1500mm at front side and no less than 1300mm at top side.

11.2 Transportation

Unit should keep vertically as much as possible. Inclination angle should not exceed 45°

11.3 Pipes installation

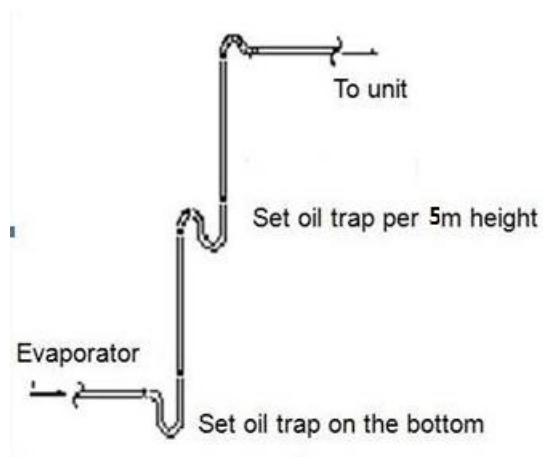
For your system safety, please use national standard refrigeration pipe. Pay attention to:

11.3.1 Refrigeration liquid tube design:

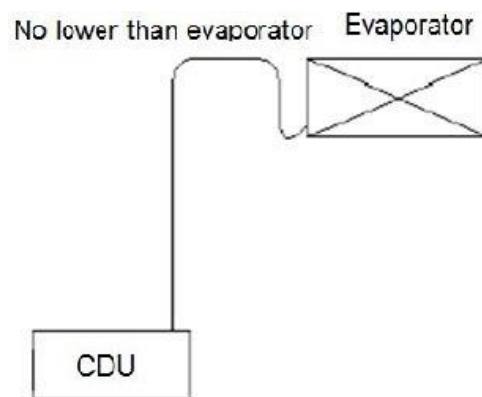
If evaporator placed much higher than unit, with the pressure drop, part liquid refrigerant would turn into flash gas which would decrease the refrigeration capacity. So the height gap should be within 6m. Beyond this limits, special equipment(heat exchange or subcooler ig.)should be adopt to cool the liquid and avoid refrigeration flash gas.

11.3.2 Refrigeration gas tube design:

a: If evaporator placed much lower than unit, we should set the tube with slope 1:100~2:100 down to compressor, in which the oil could as much as possible return compressor. If the gas tube doesn't set properly, the refrigeration oil couldn't return compressor smoothly, which will result in compressor faults; on the other hand, select proper copper tube to get reasonable refrigerant flow speed to ensure oil return. And when the height gap exceeds 5 m, oil trap should be set on the gas tube every 5m to overcome height gap to realize oil return smoothly, as follows:



b: If the evaporator placed higher than unit, return gas tube should set trap as below to avoid much refrigerant flow to compressor except that solenoid valve installed on liquid tube.



11.3.3 Oil Supplement

If refrigeration tube length for one-way exceeds 20m, please add additional lubricating oil into system according to sheet below.

Tube (inch/mm)	Lubricating oil (ml/m)
1/2"(Φ12.7)	10
5/8"(Φ15.9)	20
3/4"(Φ19)	30
7/8"(Φ22)	40
1"(Φ25.4)	50

Sheet 6 lubricating oil supplement

Caution: please use corresponding oil according to system refrigerant, see sheet 1&2 on page 4&5.

11.4 Condensing pressure valve KVR setting and adjustment

Low OAT fixed-speed CDU adopt condensing pressure regulator kits(KVR+NRD), the factory setting valve is 10 bar, which meets most engineering application. If needed, please adjust KVR valve setting valve in clockwise or anticlockwise, clockwise adjustment lead to higher pressure setting and anticlockwise adjustment lead to lower pressure setting. And one circle(360°) adjustment means 2.5 bar pressure range.

12. System leak detection and vacuum

12.1 Leakage test pressure should be less than 18barg on HP side and 12barg on LP side.

12.2 Vacuum holding pressure test is available also.

12.3 Vacuum system via compressor is forbidden.

12.4 Vacuum system should operate at HP and LP sides meanwhile.

12.5 Vacuum should be under 30Pa (0.25mm Hg)

12.6 Vacuum degree should be measured by special vacuum gauge, Ordinary pressure gauge is forbidden.

13. Refrigerant Charge and Superheat Adjustment

13.1 Refrigerant charge should be doing at high pressure side and low pressure side same time and finished before the unit starts, refrigerant pressure should be no less than 6 barg. Liquid line shut-off valve is the best charge inlet port.

13.2 If refrigerant charge added during unit operation, Suction line shut-off valve is the best inlet port and ensure no-significant liquid return. The refrigerant must be liquid in charging.

13.3 Maybe it will be happened that compressor stop and restart with several time during the Refrigerant charging. It is forbidden to force the refrigerant into system with the shortage of the LP or HP switch.

13.4 Refrigeration system superheat setting

13.4.1 Calculation method of superheat

Measure the pressure(P_1/P_2) and temperature(T_1/T_2) at evaporator outlet and unit inlet, and get the saturated evaporation temperature(TS_1/TS_2)based on the pressure P_1/P_2 according to the refrigerant thermal parameters, calculation method as below:

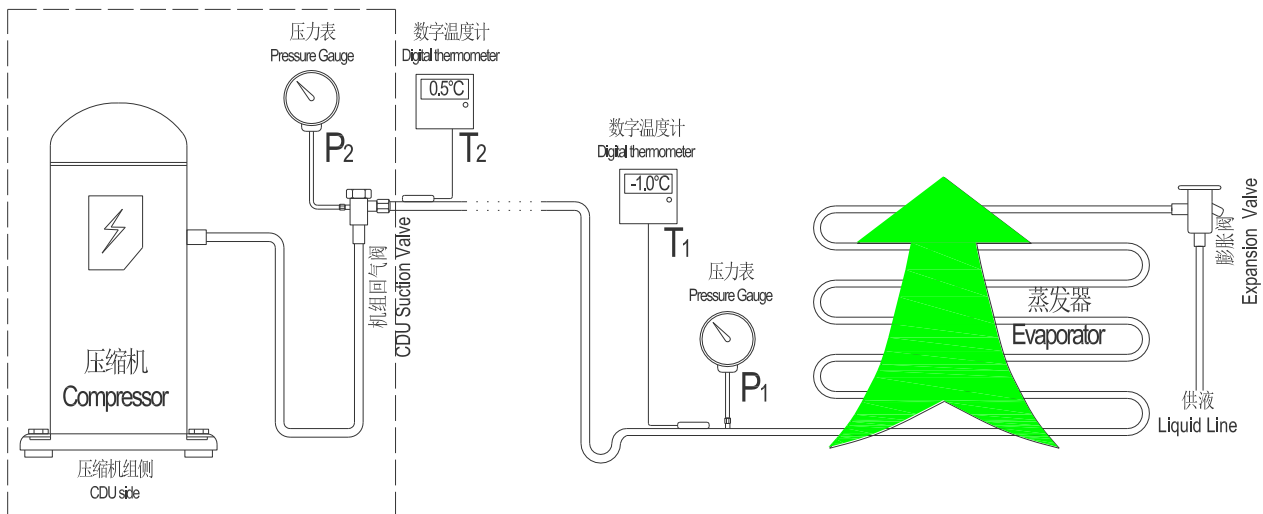
(1) Superheat of evaporator $\Delta t_1 = T_1 - TS_1$;

(2) Superheat of CDU $\Delta t_2 = T_2 - TS_2$.

13.4.2 Superheat setting

For reference that superheat of evaporator should be 0.5~0.7 times of evaporation temperature difference; and the superheat between evaporator outlet and suction

line rotalock valve of CDU should be below 3K. Please adjust superheat flexibly in actual application.



Superheat Data Acquisition Location

14. Maintenance and Failure mode analysis

Maintenance could improve unit performance and product life, please check items as follow.

- 14.1 Weather unit pressure and temperature is normally?
- 14.2 Weather compressor oil level of sight glass is visible?
- 14.3 Weather compressor and condenser fan is running normally?
- 14.4 Weather compressor restart frequently?
- 14.5 Weather protection and control components are operating abnormally?
- 14.6 Weather the system is leak?
- 14.7 Weather any electrical component aging or overheat, and wire connection loose?
- 14.8 Weather condenser is dirty with thick dust and jammed?
- 14.9 Weather unit ventilates well?

Notes:

- ▲When repair or replace components, don't exhaust refrigerant to atmosphere directly, make sure to recover refrigerant with professional equipments.
- ▲When need to let off parts of refrigerant as repairing, add additional oil before unit restart, because parts of oil lost during exhausting refrigerant.
- ▲If compressor or condenser was replaced, make sure to change filter at the same time, when compressor burnt, system refrigerant would be polluted seriously, refrigerant and oil must be cleared thoroughly.
- ▲All repair work should be operated by professional engineer.

■ Failure Solution

Failure	Reason	Solution
Compressor can't start up	Not connect power supply or the fuse broken	Power on or change the fuse
	Electrical failure	Find out the reason and solve them
	Some protection procedure running	Find out the reason, restored it and release manually
High pressure is too high, high pressure controller protection	Condensing fan doesn't work	Find out the reasons and start it
	Condenser is blocked	Clean condenser
	Ambient temperature is too high or the ventilation is not good	Improve surrounding or ventilation
	Too much refrigerant or the internal system has air	Discharge overfull refrigeration or air
High pressure is not high enough	Ambient temperature is too low	Add auxiliary pressure switch controller, our company is in charge of detailed operation
Low pressure is very low	Expansion valve or filter is blocked	Clean expansion valve or filter or replace filter
	Refrigeration is not enough	Add refrigerant
	system leakage	Find out leakage place and repair it
Compressor cover frosting	Open expansion valve too much	Turn down expansion valve
Discharge pipe is not hot	Refrigerant enter compressor crankcase	Shut off compressor suction valve and Open it again slowly
Compressor voice is abnormal	Wrong Power Phase connection	Check and Adjust the phase sequence
	Compressor mechanical failures	Repair compressor or change compressor
Unit vibration is too large	Unit set not horizontally	Set it horizontally
	Compressor locking device is not displaced	Displace locking device
	Pipeline vibration	Fix pipeline
	Compressor mechanical failures	Repair compressor or change compressor
Compressor Start and stop frequently	Settings is wrong for High or low pressure switch	Re-set pressure switch
	Electrical control circuit failure	Manage these failures

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