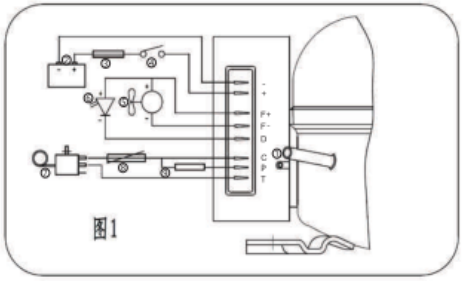
直流压缩机安装说明
DC Compressor Instruction

控制器接线图 Electronic Unit Wiring Diagram



①螺丝钉 Screw
②电池 Battery
③保险丝 Fuse
④主开关 Main Switch
⑤风扇 DC FAN
⑥LED灯 LED Light
⑦温控 Thermostat
⑧控速电阻 Resistor for presetting speed
⑨电池保护电阻
Resistor for presetting battery protection voltage

控制器使用说明 Electronic Unit Specification

1、此控制器能自动适应双电压即直流12V和24V电源输入系统，直流12V系统时最大输入电压为17V，24V系统时最大输入电压为31.5V。控制器工作环境温度不大于60℃；当控制器外壳温度过高时将停止压缩机而产生温度过高保护。

2、安装方式：如图1所示，将控制器三相输出插件紧插在压缩机的连接线端上，控制器套入压缩机的装卡片后拧紧螺钉（1）。

3、电源连接：如图1所示。

a、控制器的电源输入线直接连接至电池的正负极（2），控制器的（－）极连至电池的负极；控制器的（＋）极连至电池的正极，否则控制器将不能正常工作，控制器具有电源反接保护。

b、为了保护装置，必须在正电源连线中接入一个保险丝（3），并尽可能靠近电池的正输出极，QDZH25G, QDZH30G和QDZH35G压缩机推荐12V系统采用15A，24V系统采用7.5A；QDZH65G压缩机推荐12V系统采用30A，24V系统采用15A。

c、如果加入主开关（4），则QDZH25G,
QDZH30G和QDZH35G压缩机开关的最小通断电流值大于20A；QDZH65G压缩机开关的最小通断电流值为12V DC-40A或者24VDC-20A。

d、电源线的选择（线径及长度）可参照表2，否则会因电源连线上的电压降影响到控制器的电池保护点的设置值。

4、电池的保护：如图1所示。

a、控制器通过检测输入极（＋）和（－）之间的电压值来确定停止压缩机及重启压缩机，用于保护不同的供电电池。

b、标准电池的保护设备推荐值见表3；其他电压的设定可通过调节控制器的端子（C）和（F）的连接电阻（9），具体数值参照表1。

5、温度开关：如图1所示。

a、温度开关（7）连接在控制器的C、T端，如果中间不连接任何电阻，则当温度开关闭合时压缩机的运行速度为2000rpm。

b、其他压缩机的设定转速可通过电阻（8）来调节电流（mA）来获得，具体电阻数值参照表4。

6、外接风扇：如图1所示。

a、控制器的端子（＋）和（F）之间可接入一个12V的直流风扇（5），风扇的正极连接控制器的（＋）端，负极连接控制器的（F）端。当控制器的输入电压超过12V时，端子（＋）和（F）之间输出的值总是保持12V。不管输入电压系统是12V还是24V，风扇必须是12V的直流风扇。

b、控制器可持续输出0.5A的风扇驱动能力。

7、外接LED显示：如图1所示。

a、控制器的端子（＋）和（D）之间可接入一个10mA的LED（6）用于显示故障，LED的阳极连接控制器的（＋）端，阴极连接控制器的（D）端。

b、当发生故障时，LED每3秒循环，在每个循环中连续闪烁，根据不同的故障闪烁不同的次数，每次闪烁为0.2秒，持续增值3分钟，具体代码和闪烁次数见表5。

Electronic Unit Specification

1.The electronic unit is a dual voltage device. This means that the same unit can be used in both 12V and 24V power supply systems, maximum voltage is 17V for a 12V system and 31.5V for a 24V system. Maximum ambient temperature is 60℃. The electronic unit has a built-in thermal protection which is actuated and stops compressor operation if the electronic unit temperature gets too high.

2.Installation (Fig.1)

Connect the terminal plug from the electronic unit to the compressor terminal. Mount the electronic unit on the compressor by snapping the cover over the screw head(1).

3.Power supply (Fig.1)

a.The electronic unit must always be connected directly to the battery poles(2), connect the plus to (+) and the minus to (–), otherwise the electronic unit will not work. The electronic unit is protected against reverse battery connection.

b.For protection of the installation, a fuse (3) must be mounted in the (+) cable as close to the battery as possible. 15A fuse for 12V and 7.5A fuse for 24V circuits are recommended for model QDZH25G, QDZH30G and QDZH35G; 30A fuse for 12V and 15A fuse for 24V circuits for model QDZH65G.

c.If a main switch (4) is used, model QDZH25G, QDZH30G and QDZH35G should be rated to a current of min. 20A; model QDZH65G should be rated to a current of 40A @ 12V and 20V @ 24V.

d.The wire dimensions in Table. 2 must be observed. Avoid extra junctions in the power supply system to prevent voltage drop from affecting the battery protection setting.

4.Battery protection (Fig.1)

a.The compressor is stopped and re-started again according to the decided voltage limits measured on the (+) and (–) terminals of the electronic unit.

b.The standard settings for 12V and 24V power supply systems appear from Table.3. Other setting (Table.1) are optional if a connection which includes a resistor (9) is established between terminals C and F.

5.Thermostat switch(Fig.1)

a.The thermostat (7) is connected between the terminals C and T. Without any resistor in the control circuit, the compressor with electronic unit will run with a fixed speed of 2000rpm when the thermostat is switched on.

b.Other fixed compressor speeds in the range between 2000 and 3500rpm can be obtained when a resistor (8) us installed to adjust the voltage (V) of the control circuit. Resistor values for various motor speeds appear from Table.4.

6.Fan (Optional, Fig.1)

a.A fan (5) can be connected between the therminals (+) and (F). Connect the plus to (+) and the minus to (F). Since the output voltage between the terminals (+) and (F) is always regulated to 12V, a 12V fan must be used for 12V and 24V power supply systems.

b.The fan output can supply a continous current of 0.5A. A higher current draw is allowed for 2 seconds during start.

7.LED(Optional, Fig.1)

a.A 10mA light emitting diode (LED)(6) can be connected between the terminals (+) and (D).

b.In case the electronic unit records an operational error, the diods will flash a number of times. The number of flashes depends on what kind of operational error was recorded. Each flash will last 1/5 second. After the actual number of flashes there will be a delay with no flashes, so that the sequence for each error recording is repeated every 3 minutes.

注意事项：

1、控制器通电前，请仔细阅读说明书，并检查连接线是否正确，不正确的连接可能损坏控制器；

2、控制器输入电压值不能大于直流35V。

Notes:

1.Power electronic Unit, please read the manual; and check the connection is correct, incorrect connection may damage controller.

2.Electronic Unit can not be greater than the value of the input voltage 35V.

工作电压设定表（表1）
Optional battery protection settings (Table 1)

外接电源 Resistor (9)KΩ	12V停机值 12V cut-out V	12V开机值 12V cut-in V	12V高压停机值 12V Max cut-out V	24V停机值 24V cut-out V	24V开机值 24V cut-in V	24V高压停机值 24V Max cut-out V
0.0	9.6	10.9	17.0	21.3	22.7	31.5
1.6	9.7	11.0	17.0	21.5	22.9	31.5
2.4	9.9	11.1	17.0	21.8	23.2	31.5
3.6	10.0	11.3	17.0	22.0	23.4	31.5
4.7	10.1	11.4	17.0	22.3	23.7	31.5
6.2	10.2	11.5	17.0	22.5	23.9	31.5
8.2	10.4	11.7	17.0	22.8	24.2	31.5
11.0	10.5	11.8	17.0	23.0	24.5	31.5
14.0	10.6	11.9	17.0	23.3	24.7	31.5
18.0	10.8	12.0	17.0	23.6	25.0	31.5
24.0	10.9	12.2	17.0	23.8	25.2	31.5
33.0	11.0	12.3	17.0	24.1	25.5	31.5
47.0	11.1	12.4	17.0	24.3	25.7	31.5
82.0	11.3	12.5	17.0	24.6	26.0	31.5
220	9.6	10.9	17.0	21.3	22.7	31.5

电源进线推荐（表2）
Wire dimensions (Table 2)

线号 AWG Guage	线径 Cross setion (mm2)	12V最大长度Max Length 12V DC		24V最大长度Max Length 24V DC	
		ft	m	ft	m
13	2.5	8	2.5	16	5
12	4	13	4	26	8
10	6	20	6	39	12
8	10	23	10	66	20

标准电池保护设定推荐表（表3）
Standard battery protection settings (Table 3)

12V停机值 12V cut-out V	12V开机值 12V cut-in V	24V停机值 12V cut-out V	24V开机值 24V cut-in V
10.4	11.7	22.8	24.2

速度设定表（表4）
Compressor speed settings (Table 4)

压缩机转速Motor speed (rpm)	C/T(8)间电阻C/T Resistor(8)Ω	C/T(8)间电流C/T current mA
2000	0	0.87–1.02
2100	51	1.02–1.17
2200	100	1.17–1.32
2300	150	1.32–1.48
2400	200	1.48–1.63
2500	277	1.63–1.78
2600	330	1.78–1.93
2700	400	1.93–2.08
2800	490	2.08–2.24
2900	586	2.24–2.39
3000	692	2.39–2.54
3100	816	2.54–2.69
3200	963	2.69–2.84
3300	1137	2.84–3.0
3400	1331	3.0–3.15
3500	1523	3.15–3.61
Stop	>3000	3.61–5

故障类型表（表5）
Error Type (Table 5)

闪烁次数 Number of Flashes	故障类型Error Type
1	电压故障--输入电压处于设定的范围之外。 Battery protection cut-out(The voltage is outside the cut-out setting.)
2	风扇电流故障--风扇电流端输出电流大于1A。 Fan over-currentcut-out(The fan loads the electronic unit with more than 1A.)
3	压缩机启动故障--压缩机电机堵转或系统压力太大（>6kg/cm3） Motor start error (The rotor is blocked or the differential pressure in the refrigeration system is too high（>6kg/cm3）)
4	压缩机最小速度故障--压缩机负荷过大或电机的转速过小。 Minimum motor speed error(If the refrigeration system is too heavily loaded, the motor cannot maintain minimum speed 1850rpm or controller cannot find the rotor position.)
5	控制器温度故障--控制器外壳温度太高（>75℃）。 Thermal cut-out of electronic unit (if the refrigeration system had too heavily loaded,or if the ambient temperature is high, the electronic unit will run too hot (case temperature >75℃))
6	控制器硬件故障--控制器检测到不正常的参数。 Controller hardware failure(Controller detects abnormal parameters.)

数字温控器 DIGITAL THERMOSTAT

数字温控器具备两路高精度温度探头来采集冰箱冰柜的冷藏冷冻温度，同时与压缩机驱动模块相连，控制压缩机的转速以及启停。温控器上的数码管实时显示冷藏冷冻区的当前温度。在系统出现故障时通过不同的报错形式来定位相应的系统问题。

Digital thermostat has two high precision temperature probes are used to collect the freezing temperature of the refrigerator and is connected with the compressor drive module to control the rotation speed, start and stop of the compressor.The digital tube on the thermostat displays the current temperature of the frozen area in real time.In the case of system failure, the corresponding system problem is located through different error reporting forms.

一、电气参数(Electrical Parameters)

电压范围: 直流12-24V，极限电压35V。	Voltage range: DC12–24V, Limited voltage 35V.
工作电流: 0.1A。	Working current : 0.1A.
具备休眠模式。	With sleep mode.
门灯功能: 门灯电压跟随输入电压。	Gate lamp function:The gate lamp voltage follows the input voltage.
温度探头精度 ±1℃。	Temperature probe accuracy ±1℃.
工作环境温度-10℃～60℃，相对湿度 20%～90%；	Ambient temperature –10℃～60℃,Relative humidity 20%～90%.

二、外观(Appearance)

三、操作说明(Operation)

1、按键操作(keys operation)：

加减设置按键，支持短按、长按。
Set the add or subtract button,Support short press, long press

设置按键。短按进入温度设置状态，长按进入菜单选项。
Set Button.Short press to enter the temperature setting state, long press to enter menu options

电压保护挡位设置按键，用于欠压值设定。
Voltage protection guard position setting button, used for setting under voltage value

压缩机运行模式按键。
Compressor operation mode button

开机/关机按键。长按3秒进入休眠模式。
Switch button.Press Long for 3 seconds to enter hibernation mode

2、显示内容(Display content)：

显示冷冻区域温度。
Displays the temperature of the frozen area

显示当前的供电电压。
Displays the current supply voltage

代表选择高速档或节能档。
High gear or energy efficient

代表选择高档、中档或低档电压保护值。
High, medium or low voltage protection value

四、功能说明(Function)

1、门灯功能: LED灯板额定工作电压应与输入电压保持一致。开关 led 灯：短按 ON/OFF 键，开启或关闭 led 灯。

2、显示功能：1）1个四位(单温)或2个四位(双温)红色数码管显示，显示范围-40℃～50℃/-40℉～104℉；当箱内温度低于-40℃（-40℉）时，显示-40℃（-40℉）；当箱内温度高于 50℃（104℉)时，显示 50℃（104℉)。

3、温度设定（冷冻停机温度）调节：短按set 按键进入控制温度设定状态，再按▵或▿键变更数值并。如不按任何键，3秒后恢复显示箱内温度。温度设定值带记忆功能。

4、开机/关机：按 ON/OFF 键 3 秒，关闭制冷工作模式，数码管无显示，停止所有控制输出，再按 ON/OFF 键 1 秒，显示测量温度，经延时后启动制冷工作模式。

5、按下 欠压设定按键, 可以选择三档欠压值。

分为三档：

档位	12V 时保护电压	12V 时恢复工作电压	24V 时保护电压	24V 时恢复工作电压
L	10.0V	11V	21.6V	23.0V
M	10.7V	11.7V	22.6V	24.0V
H	11.5V	12.5V	24.6V	26.0V

6、上电经过延时后，当箱内温度大于（控制温度+温度回差），压缩机启动；当箱内温度小于等于控制温度时，压缩机停止。

7、为防止压缩机频繁启停，压缩机每次停止的时间必须超过延时时间（E4 参数）才能重新启动。

8、数码管显示的温度=测量温度+ 温度补偿。

9、用户设置参数均带有记忆功能，重新上电后无须重复设置。

10、复位功能：进入RE菜单，选择参数1，即可恢复所有参数至初始值。

11、开机自检功能：数码管、指示灯全显 2 秒 数码管以 000-111……999 显示， 制冷灯亮 POWER 灯亮，数码管显示箱内温度。

1. Gate lamp function:The rated working voltage of LED panel should be consistent with the input voltage. Switch the led lamp:short press on or off,turned on or off LED panel.

2. Display function: A fourth(Single temperature) or a forth(Double temperature) red digital tube display,display range -40℃～50℃/-40℉～104℉;When the temperature in the box is below -40℃ (-40℉) , it will show -40℃ (-40℉) ;When the temperature in the box is above 50℃ (104℉),it will show 50℃ (104℉).

3. Temperature regulation(Freezing shutdown temperature):Short press 'set' enter the control temperature setting state,use ▵or▿to change date.If no key is pressed,restore the temperature in the display box after 3 seconds.Temperature setting with memory function.

4. ON/OFF:Press three seconds on ON/OFF,turn off refrigeration mode,no digital display,stop all control output.Press one second on ON/OFF again,display measuring temperature and start the refrigeration operation mode after the delay.

5. Press under voltage setting button,you can choose three levels of under voltage.

Gear position	12VProtect the voltage	12VRecovery working voltage	24VProtect the voltage	24VRecovery working voltage
L	10.0V	11V	21.6V	23.0V
M	10.7V	11.7V	22.6V	24.0V
H	11.5V	12.5V	24.6V	26.0V

6. After the current has passed the delay,the compressor starts when the temperature in the box is greater than(Control the temperature+temperature return difference);The compressor starts when the temperature in the box is less than or equal to the control temperature.

7. In order to prevent frequent start and stop of the compressor, the time of each stop must exceed the delay time of (E4 parameter) before the compressor can be restarted.

8. Digital tube display temperature=measure temperature+temperature compensation.

9. User setting parameters are equipped with memory function,there is no need to repeat the setting after the current are reset.

10. Reset function:Enter the RE system and select parameter 1,you can restore all parameters to the initial value.

11. Start automatic detection:Digital tube and the indicator lights are all on for 2 seconds,digital tube with 000-111..... 999 show,refrigeration lights,POWER lights,the digital tube shows the temperature in the box.

一、菜单设置(The Menu Settings)

1. 长按 set 键持续 3 秒后,进入菜单参数设定状态，同时闪烁显示 E1;
2. 再按▵或▿按键改变参数选择，依序显示 E1、E2、E3、E4、E5、E6、E7、E8，E9,E10,E11,E12,E13,E14,E15 依序循环;
3. 按+或-键，可显示该参数的数值并修改、存储数据;
4. 6秒内未再按任何键，返回正常操作方式;

1. Long press on 'set' for 3 seconds to enter the menu parameter setting state,the flash shows the E1 at the same time.
2. Use ▵or▿to change parameter,Display in sequence:E1、E2、E3、E4、E5、E6、E7、E8，E9,E10,E11,E12,E13,E14,E15,recycle.
3. Press +/-,display the value of the parameter and modify and store the data.
4. No more keys pressed for 6 seconds,return to normal operation mode.

参数 Parameter	功能Function	设定范围Setting range	出厂值 Factory default
E1	最低控制温度 Minimumcontroltemperature	-40℃～控制温度 -40℃～control temperature	-22℃
E2	最高控制温度 Maximum control temperature	控制温度～40℃ control temperature～40℃	+15℃
E3	温度回差 Temperatures return difference	1～10℃	2℃
E4	停机保护时间 Shutdown protection time	0～10 分钟（min）	3 分钟（min）
E5	测量温度补偿 0 Measurement temperature compensation 0	-10℃～10℃	0℃
E6	测量温度补偿 1(用于双温Double temperature) Measurement temperature compensation 1	-10℃～10℃	0℃
E7	高温报警相对值 Relative value of high temperature alarm	0-25	(该款未提供) Unavailable
E8	低温报警相对值 Relative value of low temperature alarm	0-25	(该款未提供) Unavailable
E9	延时开机时间 Delayed start time	0-15 分钟（min）	0
E10	温度报警延时时间 Temperature alarm delay time	0-60 分钟（min）	(该款未提供) Unavailable
E11	开机报警延时时间 Startalarm delay time	0-60 小时（hrs）	(该款未提供) Unavailable
E12	关闭温度设定 close temperature setting	0-10: 可以设定1:表示关闭 0-10: setting 1:close	0
CF	华氏摄氏转换 Fahrenheit Celsius conversion	C/F0-1	C
RE	复位出厂设定值 Reset factory Settings	1 表示进行复位 1 Means to reset	0

一、报警功能(Alarm Function)

当压缩机驱动模块运行出现故障时，模块 D 端输出脉冲电平故障信号，温控器收到故障信号进行处理之后，通过数码管分别显示ER0,ER1,ER2,ER3,ER4,ER5，ER9。 当存在故障信号时压缩机停止运转，面板按键功能失效。排出故障 2 秒后，系统回到运行状态。

Er0 故障表示感温头短路, 此时压缩机进入定时工作模式，压缩机运行 30 分钟，停止 30 分钟。检查温度探头是否短路，建议更换温度探头。

Er1 故障表示模块输入欠压保护。检查输入电压是否过低，输入引线是否过细导致压降偏大。建议选择电压保护L档。

Er2 故障表示直流风扇过流保护。检查风扇是否短路，建议更换风扇。

Er3 故障表示压缩机启动异常保护。确认系统压力是否过大，建议等待3分钟后重新启动。

Er4 故障表示压缩机转速异常保护。确认系统压力是否过大，建议等待3分钟后重新启动。

Er5 故障表示模块温度异常保护。建议加强压缩机驱动模块通风条件。

Er9 故障表示感温头断路, 此时压缩机进入定时工作模式，压缩机运行 30 分钟，停止 30 分钟。请检查温度探头是否断路，接口是否松动，建议更换温度探头。

1. When the compressor driver module runs in fault, module D output pulse level fault signal.After the thermostat receives the fault signal for processing, it displays ER0,ER1,ER2,ER3,ER4,ER5 and ER9 respectively through the digital tube.When there is a fault signal, the compressor stops operation, and the function of the panel key is invalid. 2 seconds after the failure, the system returned to operation.
2. ER0 fault indicates short circuit of temperature sensor head.At this time, the compressor enters the regular working mode. The compressor runs for 30 minutes and stops for 30 minutes.Check whether the temperature probe is short-circuited and suggest to replace the temperature probe.
3. ER1 failure indicates module input undervoltage protection.Check whether the input voltage is too low and whether the input lead is too thin, resulting in a large voltage drop.Suggest to choose Voltage protection L.
4. ER2 failure indicates dc fan overcurrent protection.Check the fan for short circuit and suggest to replace the fan.
5. ER3 failure indicates compressor start up abnormal protection.Confirm if the system pressure is too high. It is recommended to wait 3 minutes before restarting.
6. ER4 Fault indicates abnormal compressor speed protection.Confirm if the system pressure is too high. It is recommended to wait 3 minutes before restarting.
7. ER5 failure indicates module temperature anomaly protection.It is suggested to strengthen the ventilation condition of compressor drive module.
8. ER9 fault indicates that the temperature sensing head is broken. At this time, the compressor enters the timing working mode.The compressor runs for 30 minutes and stops for 30 minutes.Please check whether the temperature probe is broken and the interface is loose. It is recommended to replace the temperature probe.