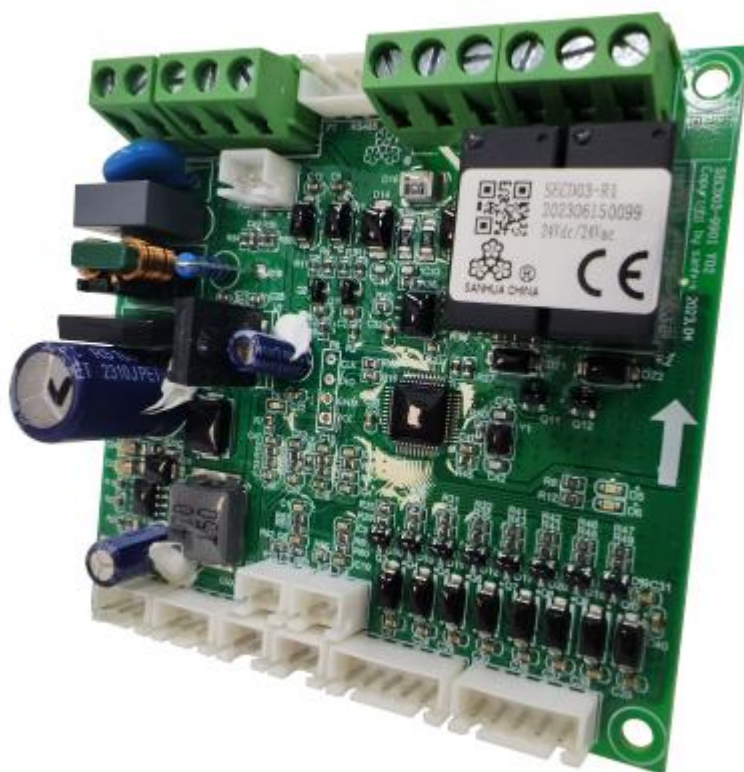
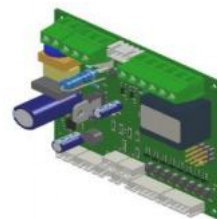




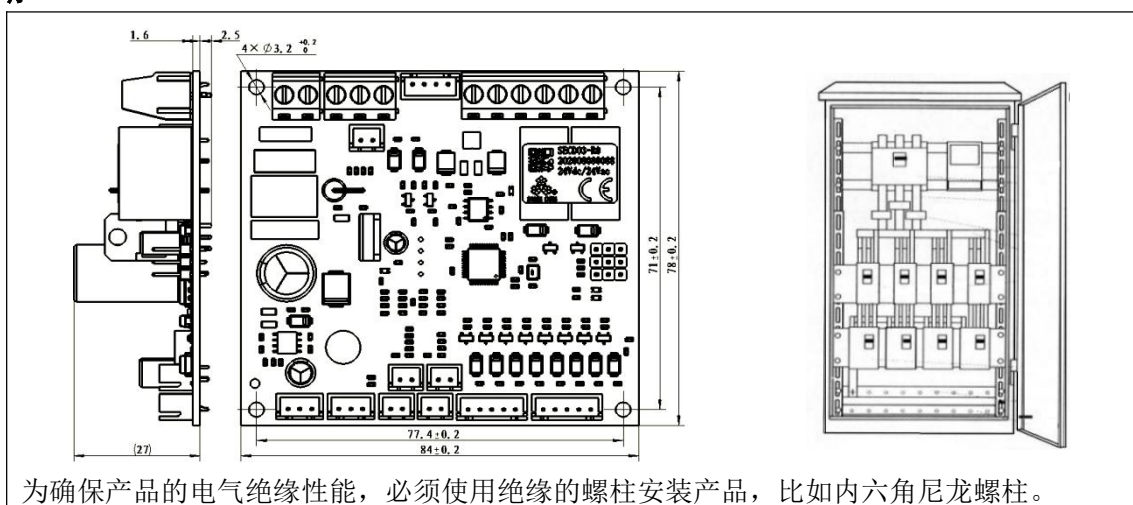
SECD03-R1 电子膨胀阀控制器说明书——P01~16

II-SECD03-R1-EN-202502——P17~36



SECD03-R1 电子膨胀阀控制器使用说明

一. 安装说明



二. 接线说明

2.1 订购代码

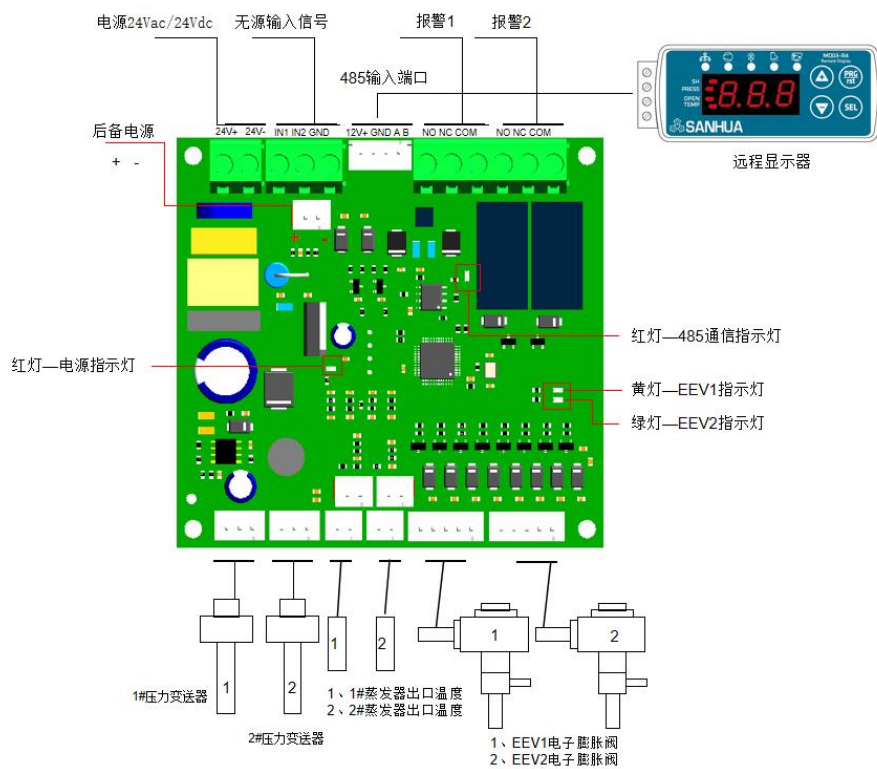
序号	备注	产品型号	规格
1	主控制器	SECD03-R1	
2	电压型压力变送器 (输出信号: 0.5~3.5V/0.5~4.5V)	YCQB02H01-1	1/4" 焊接, 2m 引线
		YCQB02H18-1	1/4" 焊接, 4.9m 引线
		YCQB02L12-1	内螺纹: SAE-1/4" 7/16-20UNF-2B, 2m 引线
		YCQB02L28-1	内螺纹: SAE-1/4" 7/16-20UNF-2B, 4.9m 引线
3	温度传感器 (NTC 5K)	NTC2A1	2 米
		NTC5A1	5 米
		NTC9A1	9 米
4	远程显示器	MD03-R4	显示、设定参数
5	RS485 转接线	SECD03-3101	RS485 通信转接线
6	后备电源 (可选)	SP01/SP02	

2.2 传感器信息

项目	产品描述	
温度传感器	传感器类型	NTC 5K Ω β 值: 3970K
	引线规格	2/5/9 m $\times$ 0.5mm ²
	保护等级	IP 67
	精度	$\pm 1^{\circ}\text{C}$ (-40 $^{\circ}\text{C}$)
	量程	-40 $^{\circ}\text{C}$ ~ 105 $^{\circ}\text{C}$
压力变送器	电源电压	YCQB: (5 $\pm$ 0.25) VDC
	输出信号	YCQB: (0.5~3.5) / (0.5~4.5) VDC
	适用压力范围/综合精度	$\pm 2\%$ F.S. (-40 $^{\circ}\text{C}$ /+40 $^{\circ}\text{C}$)
	防护等级	IP 67
★注意: 以上为三花推荐的压力变送器标准型号, 如果选用其他型号可参考三花样本, 输出信号必须满足以下条件: 电压型 YCQB: 0.5~3.5V/0.5~4.5V。		

2.3 控制器功能连接示意图

类型	功能	标贴		描述
5.08 螺 钉 端子	电源输入端口	24Vac/Vdc	24V+	输入 AC24V 或者 DC24V+
			24V-	输入 AC24V 或者 DC24V-
	压缩机启停信号端口	RUN	IN1	无源开关量信号，压缩机运行时闭合，压缩机关闭时断开，使用手动模式时需闭合
			IN2	
XHP 端子	通讯端口	MODBUS	GND	GND
			12V+	
			GND	
			A	
5.08 螺钉 端子	继电器报警端口 1	常开 1	NO	
			NC	
			COM	
	继电器报警端口 2	常开 2	NO	
			NC	
			COM	
XHP 端子	电子膨胀阀输出端口 1	EEV1	COM	
			B	
			A	
			B	
			A	
XHP 端子	电子膨胀阀输出端口 2	EEV2	COM	
			B	
			A	
			B	
			A	
XHP 端子	压力变送器端口 1	P-SENS1	G	接地 GND（黑）： GND
			S1	输入 S（白）： 0.5-3.5V/0.5-4.5V
			VCC	电源 Power（红）： +5V
	压力变送器端口 2	P-SENS2	G	接地 GND（黑）： GND
			S2	输入 S（白）： 0.5-3.5V/0.5-4.5V
			VCC	电源 Power（红）： +5V
	温度传感器端口 1	T-1	IN	NTC5K@3970 温度传感器
			G	
	温度传感器端口 2	T-2	IN	NTC5K@3970 温度传感器
			G	
	后备电源端口	SP	+	后备电源预留端口
			-	



安全须知：

1. 请勿在完成接线之前接通电源，如需更改接线请确保先切断电源；
2. RUN 端口 (压缩机启停信号) 为无源端口，如输入电压可能导致控制器烧毁；
3. 电源的端子、无源输入信号的端子、报警 1 的端子、报警 2 的端子适用最大/最小线径 $0.25\text{mm}^2 \sim 2.5\text{mm}^2$ ；
4. 我们建议 PCBA 安装时，PCBA 底面距离电控箱金属板的距离要 $\geq 10\text{mm}$ 。

三. 按键及参数设定

3.1 远程显示器显示面板

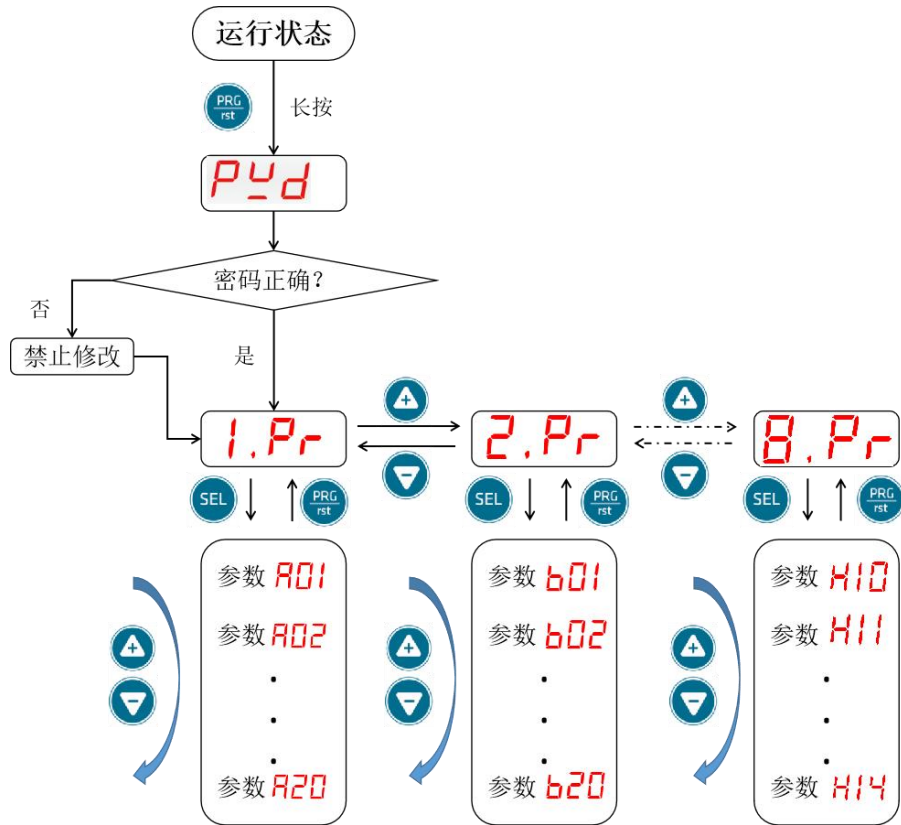


3.2 远程显示器按键以及显示

定义		描述
按钮		长按进入参数设置模式或短按返回上一层
		增加或上翻
		减少或下翻
		选择与保存
LED	°C/bar	显示温度/压力的单位
	★SH	显示 1#吸气过热度
	PRESS	显示 1#蒸发器出口压力
	OPEN	显示 1#电子膨胀阀开度
	TEMP	显示 1#蒸发器出口温度
	SH PRESS	显示 2#吸气过热度
	PRESS + OPEN	显示 2#蒸发器出口压力
	OPEN + TEMP	显示 2#电子膨胀阀开度
	无	显示 2#蒸发器出口温度
		当控制器报警时点亮

★默认显示当前吸气过热度；按【+】或【-】键可切换显示内容，查看完其他实时数据，无按键操作 1 分钟之后自动回归“SH”数据显示。

3.3 远程显示器参数设置



长按【PRG】键 3 秒，并通过【+】或【-】按钮输入密码，按【SEL】键确认，进入参数设置模式（密码正确时，数值闪烁可以修改，密码错误时，只能查看参数而无法修改）；

输入密码后进入页码菜单（1. Pr、2. Pr、3. Pr、4. Pr、5. Pr...），通过【+】【-】键选择需进入的页码菜单，按【SEL】键确认；

通过【+】【-】键选择需要修改的参数，按【SEL】键确认，并使用【+】【-】按钮修改该参数的值，完成修改后按【SEL】键保存参数；按【PRG】键返回页码菜单；

长按 SEL 键，退出参数设置模式。无按键操作时，5 分钟后自动退出参数设置模式。

3.4 远程显示器批量复制参数

批量复制参数用于将控制器中最终的参数保存到控制器的 EEPROM 中；

长按远程显示器 “+” 按键 3 秒钟，数码管显示 “CPY”，再短按 “+” 键，待左侧指示数码管全部亮起来表示参数已经上传到远程显示器中。

3.5 远程显示器批量下载参数

长按远程显示器 “-” 按键 5 秒，蜂鸣器响一声，数码管显示 “PSt”，再次按下 “-” 按键，此时数码管左侧指示灯以流水灯的方式显示，待流水灯显示消失，且蜂鸣器长鸣一声，表示参数已经下载到控制器中。

- 备注：1. 批量复制操作完成后，才能进入批量下载参数界面。
2. 如果在 2 分钟内远程显示器数码管指示灯一直以流水灯方式运行，则说明批量下载失败。

3.6 远程显示器通讯故障处理

当远程显示器与电子膨胀阀控制器通讯失败持续 1 分钟，远程显示器主界面显示 “CoM” 报警，并提示通讯不正

常。待通讯恢复后，报警消失。

3.7 远程显示器故障处理

当控制器报故障或者报警时，数码管报警指示灯▲亮，并已 1 秒的频次交替显示正常运行显示界面以及故障显示代码。远程显示器显示故障代码如下：

序号	故障名称	数码管故障显示标志
1	1#压力传感器故障	E01
2	1#蒸发器出口温度传感器故障	E02
4	2#压力传感器故障	E04
5	2#蒸发器出口温度传感器故障	E05
8	1#低过热度报警	AL1
9	2#低过热度报警	AL4
10	1#MOP 报警	AL2
11	2#MOP 报警	AL5

电子膨胀阀控制器通讯失败持续 1 分钟，远程显示器主界面显示“CoM”报警，并提示通讯不正常。待通讯恢复后，报警消失。

四、控制器参数设置

4.1 制冷剂选择

地址	代码	描述	默认值	范围
40004	A03	制冷剂选择	5 (R507)	-1~36

控制器中有 37 种常用制冷剂可供选择，如下表：

NO.	制冷剂	NO.	制冷剂	NO.	制冷剂	NO.	制冷剂	NO.	制冷剂
-1	自定义	7	R1234YF	15	R744A (N2O)	23	R407H	31	R1270
0	R22	8	R290	16	R32	24	R454C	32	R1233zdE
1	R404A	9	R450A	17	R245FA	25	R455A	33	R1234zeZ
2	R410A	10	R513A	18	R23	26	R454B	34	R452C
3	R134A	11	R448A	19	R407A	27	R452B	35	R457A
4	R407C	12	R449A	20	R407F	28	R600A	36	R515B
5	R507	13	R452A	21	R124	29	R600		
6	R1234ZE	14	R744 (CO2)	22	R717	30	R454A		

当制冷剂地址选择为-1 时，通过下表参数进行能力计算：

地址	描述		备注	默认值
40106	冷媒自定义参数 A1	/	A1 Min -20000 Max 20000 A2 Min -20000 Max 20000 A3 Min -20000 Max 20000 A1、A2、A3 为自定义参数，仅支持 485 通讯设置	(R449A) A1:9975 A2:-2020 A3:2424
40107	冷媒自定义参数 A2	/		
40108	冷媒自定义参数 A3	/		

4.2 传感器控制模式

保持寄存器地址	代码	描述	默认值	范围
40007	A06	传感器控制模式	0	0-2

当设置成 0 时，1#阀和 2#阀使用各自独立的温度传感器和压力传感器，1#阀控制和 2#阀控制没有关联；
当设置成 1 时，2#阀跟随 1#阀的目标开度变化，该模式下，须要求两个电子膨胀阀型号一致；
当设置成 2 时，1#阀和 2#阀分别使用 Teo1 和 Teo2 温度传感器，1#阀和 2#阀压力传感器都使用 Ps1，1#阀和 2#阀根据开关机指令或者通讯启停信号分别进行过热度控制。

4.3 阀使能

保持寄存器地址	代码	描述	默认值	范围
40009	A08	1#阀使能	1	0-1
40069	d08	2#阀使能	1	0-1

当设置成 0 时，1#阀/2 阀不使用，禁止运行，也不会检测 1#阀/2 阀的故障与报警；
当设置成 1 时，1#阀/2 阀使用。

4.4 阀控制模式

保持寄存器地址	代码	描述	默认值	范围
40011	A10	1#阀控制模式	1	0-2
40071	d10	2#阀控制模式	1	0-2

当设置成 0 时为手动控制模式，此时不需要启停信号或者开关机指令，通过上位机设定目标开度即可运行到此开度；

当设置成 1 时为自动控制模式，通过启停信号导通或者设置开关机指令=1，阀按照过热度进行自动控制。

当设置成 2 时为 1~5V 电压驱动模式，当启停信号导通或者设置阀通讯开关机指令=1，阀按照 1V 对应 0%开度，5V 对应 100%开度按比例控制。

4.5 阀通讯开关机

保持寄存器地址	代码	描述	默认值	范围
40067	d06	1# 开关机	0	0-1
40068	d07	2# 开关机	0	0-1

当设置成 0 时，给相应阀下发停机命令；当设置成 1 时，给相应阀下发开机命令。

当该参数设置为 1 或者启停信号闭合，则相应阀开机；当启停信号断开且启停信号闭合，则相应阀关机。

4.6 目标过热度设置

保持寄存器地址	代码	描述	默认值	单位	范围
40026	b05	1#目标过热度	M:6.0 US:10.8	K	M:0~30.0 US:0~54
40086	E05	2#目标过热度	M:6.0 US:10.8	K	M:0~30.0 US:0~54

4.7 开机初始开度及保持时间

保持寄存器地址	代码	描述	默认值	单位	范围
40012	A11	1#开机初始开度	40	%	0-100
40013	A12	1#初始开度持续时间	10	S	0-120
40072	d11	2#开机初始开度	40	%	0-100
40073	d12	2#初始开度持续时间	10	S	0-120

当控制器接收到压缩机启停信号时，首先将膨胀阀开度打开至设定的初始开度百分比，并持续设定的保持时间。根据系统实际需求，设置初始开度以避免系统初期波动。

4.8 手动开度设置

保持寄存器地址	代码	描述	默认值	单位	范围
40018	A17	1#阀手动开度	500	‰	0~1000
40078	d17	2#阀手动开度	500	‰	0~1000

当 1#阀或者 2#阀设置成手动控制时，则按照【A17】或者【d17】运行目标开度。

4.9 MOP 报警参数

保持寄存器地址	代码	描述	默认值	单位	范围
40019	A18	1#阀 MOP 使能	1	/	0=不启用 1=自动复位
40020	A19	1#MOP 触发数值	M:12.0 US:53.6	℃ ℉	

40079	d18	2#阀 MOP 使能	1		0=不启用 1=自动复位
40080	d19	2#MOP 触发数值	M:12.0 US:53.6	°C °F	

当 MOP 报警使能设置为 1 时，当饱和温度达到设定 MOP 时，电子膨胀阀开度不再开大，限制压力变大，当饱和温度到达【A19】+1℃或者【d19】+1℃，相应电子膨胀阀开始关闭，直到饱和温度下降到 MOP 温度为止。

4.10 过热度过低报警参数

保持寄存器地址	代码	描述	默认值	单位	范围
40006	A05	1#低过热度报警使能	0	/	0=不启用 1=启用
40122	g01	1#低过热度报警值	M:0.5 US:0.9	K	M:-0.5~30 US:-0.9~54
40123	g02	1#低过热度报警持续时间	60	秒	10~600
40124	g03	1#低过热度报警恢复值	M:3.0 US:5.4	K	M:3~35 US:5.4~63
40066	d05	2#低过热度报警使能	0	/	0=不启用 1=启用
40125	g04	2#低过热度报警值	M:0.5 US:0.9	K	M:-0.5~30 US:-0.9~54
40126	g05	2#低过热度报警持续时间	60	秒	10~600
40127	g06	2#低过热度报警恢复值	M:3.0 US:5.4	K	M:3~35 US:5.4~63

当低过热度报警使能设置（【A05】=1 或【d05】=1）启用时，当过热度≤【g01】或【g04】K 持续【g02】或【g05】秒，触发过热度过低报警，电子膨胀阀关闭。触发报警后，当过热度≥【g03】或【g06】K，则解除报警，恢复正常运行。

4.11 恢复出厂设置

保持寄存器地址	代码	描述	默认值	范围
40010	A09	恢复默认参数	0	0~999

当该参数设置成当前参数密码值 5 或者 913 时，恢复默认值。

注意：当 1#或者 2#阀处于运行状态时，该参数修改无效。

4.12 机型代码与软件版本参数（只读）

保持寄存器地址	描述	代码	单位	间隔	Min.	Max.	默认值
43901	机型代码	/	/	/	/	/	0xD031
43902	软件版本	/	/	/	/	/	130

4.13 只读数据

保持寄存器地址	描述	代码	单位	间隔	Min.	Max.	默认值
40501	1#阀吸气过热度	/	K/°F	0.1	/	/	/
40502	1#阀吸气压力	/	bar/psi	0.1/1	/	/	/
40503	1#阀开度	/	%	1	/	/	/
40504	1#蒸发器出口温度	/	°C/°F	0.1	/	/	/
40505	2#阀吸气过热度	/	K/°F	0.1	/	/	/
40506	2#阀吸气压力	/	bar/psi	0.1/1	/	/	/
40507	2#阀开度	/	%	1	/	/	/
40508	2#蒸发器出口温度	/	°C/°F	0.1	/	/	/
40509	1#饱和温度	/	°C/°F	0.1	/	/	/

40510	2#饱和温度	/	℃/°F	0.1	/	/	/
40511	软件版本	/	/	/	/	/	/
40512	机型码	/	/	/	/	/	/
40513	1#压力传感器 AD 值	/	/	1	/	/	/
40514	2#压力传感器 AD 值	/	/	1	/	/	/
40515	1#启停（bit0）、2#启停（bit1）	/	/	1	/	/	/

五、报警信息与故障处理

5.1 故障代码表

故障名称	故障代码	负载保护动作		
		电子膨胀阀	通讯	继电器
1#压力传感器故障	E01	自动控制时，当不共享时，1#阀保持故障开度； 自动控制时，当共享时，1#阀与 2#阀保持故障开度； 手动控制时，1#阀按照上位机指令开度，不报故障； 电压驱动模式时，不报故障	上传该报警	不共享：1#继电器输出； 共享：1#继电器报警输出；2#不输出
1#蒸发器出口温度传感器故障	E02	自动控制时，当不共享时，1#阀保持故障开度； 自动控制时，当共享时，1#阀与 2#阀保持故障开度； 手动控制时，1#阀按照上位机指令开度，不报故障； 电压驱动模式时，不报故障	上传该报警	不共享：1#继电器输出； 共享：1#继电器报警输出；2#不输出
2#压力传感器故障	E04	当不共享时，自动模式下 2#阀保持故障开度 手动模式下，2#阀按照上位机指令开度，不报故障； 当共享时，不报故障； 电压驱动模式时，不报故障	不共享，则上报故障； 共享，则不报故障	不共享：2#继电器输出； 共享：2#继电器报警不输出；
2#蒸发器出口温度传感器故障	E05	当不共享时，自动模式下 2#阀保持故障开度； 手动模式下，2#阀按照上位机指令开度，不报故障； 当共享时，不报故障； 电压驱动模式时，不报故障	不共享，则上报故障； 共享，则不报故障。	不共享：2#继电器输出； 共享：2#继电器报警不输出；
1#低过热度报警	AL1	手动模式下不报警 自动模式下，1#阀关闭 电压驱动模式时，不报故障	上传该报警	1#继电器输出；

2#低过热度报警	AL4	手动模式下不报警 自动模式下，2#阀关闭 电压驱动模式时，不报故障	上传该报警	2#继电器输出；
1#MOP 报警	AL2	手动模式下不报警 自动模式下，1#阀逐渐关闭 电压驱动模式时，不报故障	上传该报警	1#继电器输出；
2#MOP 报警	AL5	手动模式下不报警 自动模式下，2#阀逐渐关闭 电压驱动模式时，不报故障	上传该报警	2#继电器输出；
1#阀端子开关机(非故障)	DZ1	/	/	/
2#阀端子开关机（非故障）	DZ2	/	/	/

5.2 故障寄存器显示

寄存器地址 40034：1#报警信息																
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
										DZ1		AL2	AL1		E02	E01

寄存器地址 40094：2#报警信息																
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
											DZ2	AL5	AL4		E05	E04

六、参数表

6.1 设置参数表

MODBUS 地址	代号	参数名称	单位	步进	默认值	最大值	最小值	备注
40001	A00	MODBUS 通讯地址	/	1	1	254	1	
40002	A01	公英制切换	/	1	0	1	0	0=公制 M，1=英制 US
40003	A02	压力传感器类型	/	1	0	1	0	0=0.5V~3.5V 1=0.5V~4.5V
40004	A03	制冷剂选择	/	1	5	36	-1	见 5.1 节制冷剂表
40005	A04	通讯波特率	bps	1	1	29	0	0=4800 8bit NONE 1Stop 1=9600 8bit NONE 1Stop 2=19200 8bit NONE 1Stop 3=38400 8bit NONE 1Stop 4=2400 8bit NONE 1Stop 5=4800 8bit EVEN 1Stop 6=9600 8bit EVEN 1Stop 7=19200 8bit EVEN 1Stop 8=38400 8bit EVEN 1Stop 9=2400 8bit EVEN 1Stop 10=4800 8bit ODD 1Stop

								11=9600 8bit ODD 1Stop 12=19200 8bit ODD 1Stop 13=38400 8bit ODD 1Stop 14=2400 8bit ODD 1Stop 15=4800 8bit NONE 2Stop 16=9600 8bit NONE 2Stop 17=19200 8bit NONE 2Stop 18=38400 8bit NONE 2Stop 19=2400 8bit NONE 2Stop 20=4800 8bit EVEN 2Stop 21=9600 8bit EVEN 2Stop 22=19200 8bit EVEN 2Stop 23=38400 8bit EVEN 2Stop 24=2400 8bit EVEN 2Stop 25=4800 8bit ODD 2Stop 26=9600 8bit ODD 2Stop 27=19200 8bit ODD 2Stop 28=38400 8bit ODD 2Stop 29=2400 8bit ODD 2Stop 断电上电有效。
40006	A05	1#阀低过热度报警使能	/	1	0	1	0	0=禁止, 1=使能
40007	A06	传感器控制模式	/	1	1	2	0	0=独立控制, 1=温度与压力共享 2=压力共享
40009	A08	1#阀使能	/	1	1	1	0	0=禁止, 1=使能
40010	A09	恢复默认值	/	1	0	999	0	
40011	A10	1#阀控制模式	/	1	1	2	0	0=手动控制, 1=自动控制, 2=1~5V 驱动控制
40012	A11	1#阀初始开度	/	1	40	100	0	
40013	A12	1#阀初始开度保持时间	秒	1	10	120	0	
40014	A13	1#阀型号	/	1	1	1	1	1=DPF/LPF
40015	A14	1#阀总步数	P	1	500	1000	0	
40016	A15	1#阀 PPS	/	1	30	1000	0	
40017	A16	1#阀运行最大开度	%	1	100	100	0	
40018	A17	1#阀手动开度	‰	1	500	1000	0	
40019	A18	1#MOP 使能	/	1	1	1	0	0=禁止, 1=使能
40020	A19	1#MOP 触发数值	℃ /°F	M:0.1 US:0.1	M:12 US:53.6	M:30 US:86	M:10 US:50	
40022	b01	1#阀 P	/	0.1	1.0	99.9	0	
40023	b02	1#阀 I	/	1	50	999	0	
40024	b03	1#阀 D	/	1	30	999	0	

40026	b05	1#阀目标过热度	K	0.1	M: 6 US: 10.8	M:30 US:54	M:0 US:0	
40027	b06	1#阀 0.5V 对应压力值	M:bar US:psi	M:0.1 US:1	M:0 US:0	M:60.0 US:870	M:-1 US:-14	
40028	b07	1#阀 3.5V/4.5V 对应压力值	M:bar US:psi	M:0.1 US:1	M:20 US:290	M:60.0 US:870	M:0 US:0	
40030	b09	1# 饱和温度测量方式	/	1	0	1	0	0=压力测量, 1=温度测量 (预留)
40061	d00	1#阀出口温度传感器校准	M:℃ US:℉	0.1	0	M:9.9 US:9.9	M:-9.9 US:-9.9	
40062	d01	1#阀压力传感器校准	M:bar US:psi	M:0.1 US:1	0	M:9.9 US:99	M:9.9 US:-99	
40063	d02	2#阀温度传感器校准	M:℃ US:℉	0.1	0	M:9.9 US:9.9	M:-9.9 US:-9.9	
40064	d03	2#阀压力传感器校准	M:bar US:psi	M:0.1 US:1	0	M:9.9 US:99	M:9.9 US:-99	
40066	d05	2#阀低过热度使能	/	1	0	1	0	
40067	d06	1#阀开关机	/	1	0	1	0	0=关机, 1=开机
40068	d07	2#阀开关机	/	1	0	1	0	0=关机, 1=开机
40069	d08	2#阀使能	/	1	1	1	0	
40071	d10	2#阀控制模式	/	1	1	2	0	0=手动控制, 1=自动控制, 2=1~5V 驱动控制
40072	d11	2#阀启动开度	/	1	40	100	0	
40073	d12	2#阀初始开度保持时间	秒	1	10	120	0	
40074	d13	2#阀型号	/	1	1	1	1	1=DPF/LPF
40075	d14	2#阀最大步数	P	1	500	999	0	
40076	d15	2#阀 PPS	/	1	30	999	0	
40077	d16	2#阀最大百分比	%	1	100	100	0	
40078	d17	2#阀手动开度	‰	1	500	1000	0	
40079	d18	2#阀 MOP 使能	/	1	1	1	0	0=禁止, 1=使能
40080	d19	2#阀 MOP 触发数值	℃	M:0.1 US:0.1	M:12.0 US:53.6	M:30.0 US:86.0	M:10.0 US:50.0	
40082	E01	2#阀 P	/	0.1	1.0	99.9	0	
40083	E02	2#阀 I	/	1	50	999	0	
40085	E04	2#阀 D	/	1	30	999	0	
40086	E05	2#阀 目标过热度	K	M:0.1 US:0.1	M: 6.0 US: 10.8	M:30.0 US:54.0	M:0.0 US:0.0	
40087	E06	2#阀 0.5V 对应低压值	M:bar US:psi	M:0.1 US:1	M:0 US:0	M:60.0 US:870	M:-1 US:-14	

40088	E07	2#阀 3.5V/4.5V 对应压力值	M:bar US:psi	M:0.1 US:1	M:20 US:290	M:60.0 US:870	M:0 US:0	
40090	E09	2#阀 饱和温度测量方式	/	1	0	1	0	0=压力测量, 1=温度测量 (预留)
40101	F00	阀基准步数	/	1	0	100	0	(需断电上电)
40102	F01	阀驱动类型	/	1	0	1	0	0=1-2 相励磁, 1=2-2 相励磁 (需断电上电)
40103	F02	阀上电复位百分比	%	1	12	20	0	
40104	F03	阀过程复位步数	PLS	1	8	20	0	
40105	F04	阀励磁时间	ms	1	50	500	30	
40106	F05	冷媒自定义参数 A1	A1 Min -20000 Max 20000 A2 Min -20000 Max 20000 A3 Min -20000 Max 20000 Te: 饱和温度 Pe: 绝压值 A1、A2、A3 为自定义参数, 仅支持 485 通讯设置					(R449A)
40107	F06	冷媒自定义参数 A2						A1:9975
40108	F07	冷媒自定义参数 A3						A2:-2020
								A3:2424
40109	F08	1#阀故障固定开度百分比	%	1	50	100	0	
40110	F09	2#阀故障固定开度百分比	%	1	50	100	0	
40111	F10	1#阀最小开度百分比	%	1	0	100	0	
40112	F11	1#阀线圈励磁速度上限	%	1	1000	1000	0	
40113	F12	2#阀最小开度百分比	%	1	0	100	0	
40114	F13	2#阀线圈励磁速度上限	%	1	1000	1000	0	
40121	g00	MOP 参数	/	1	200	999	1	
40122	g01	1#低过热度报警值	K	0.1	M:0.5 US:0.9	M:30 US:54	M:-0.5 US:-0.9	
40123	g02	1#低过热度报警持续时间	秒	1	60	600	10	
40124	g03	1#低过热度报警恢复值	K	0.1	M:3.0 US:5.4	M:35 US:63	M:3 US:5.4	
40125	g04	2#低过热度报警值	K	0.1	M:0.5 US:0.9	M:30 US:54	M:-0.5 US:-0.9	
40126	g05	2#低过热度报警持续时间	秒	1	60	600	10	
40127	g06	2#低过热度报警恢复值	K	0.1	M:3.0 US:5.4	M:35 US:63	M:3 US:5.4	
40130	g09	密码	/	1	5	999	0	当设定为该设定值或者 913, 则可以进行参数设置
40155	H14	传感器滤波时间	秒	1	10	999	1	
40156	H15	1#继电器控制	/	1	0	2	0	0=自动控制, 1=强制关, 2=强制开。
40157	H16	2#继电器控制	/	1	0	2	0	

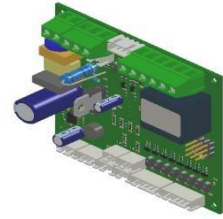
七、通讯逻辑

7.1 RS485 通讯逻辑

通讯硬件层采用 RS485 模块，协议采用 Modbus RTU 协议，SERD03-R1 控制器作为从机；
对于 MODBUS 通讯 ID，当上位机 ID=255 或者 ID=【A00】时，都可以实现与 SERD03-R1 控制器的正常通讯；
对于通讯波特率，上电后 4 秒内，控制器按照 9600bps 波特率运行，若在该时间段内，控制器收到 9600bps 的数据并解析正确，则 4 秒后控制器都按 9600bps 运行；若在该时间段内，控制器未收到 9600bps 的数据或数据接收错误，则 4 秒后，控制器按照【A04】设定的波特率运行。

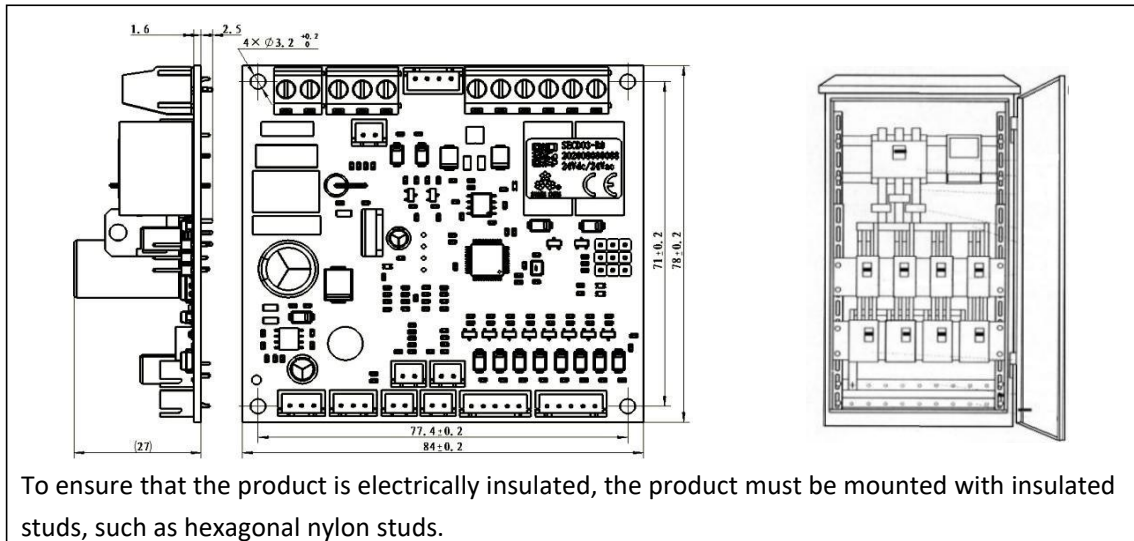
7.2 通讯规格

项目	描述
传输线连接	多线传输
通讯方式	RS485（2 线，半双工）
波特率	默认 9600bps，范围 2400~38400bps
奇偶校验，data，停止位	无/奇/偶校验， 8 data， 1/2 停止位
协议类型	Modbus RTU
功能码	0x03、0x06、0x10
最大读取字数	32
电缆类型	Belden 9841/9842, LG LIREV-AMESB
建议轮询间隔	> 100ms



Instructions of SECD03-R1

1. Installation notes



2. Wire connections

2.1 Ordering references

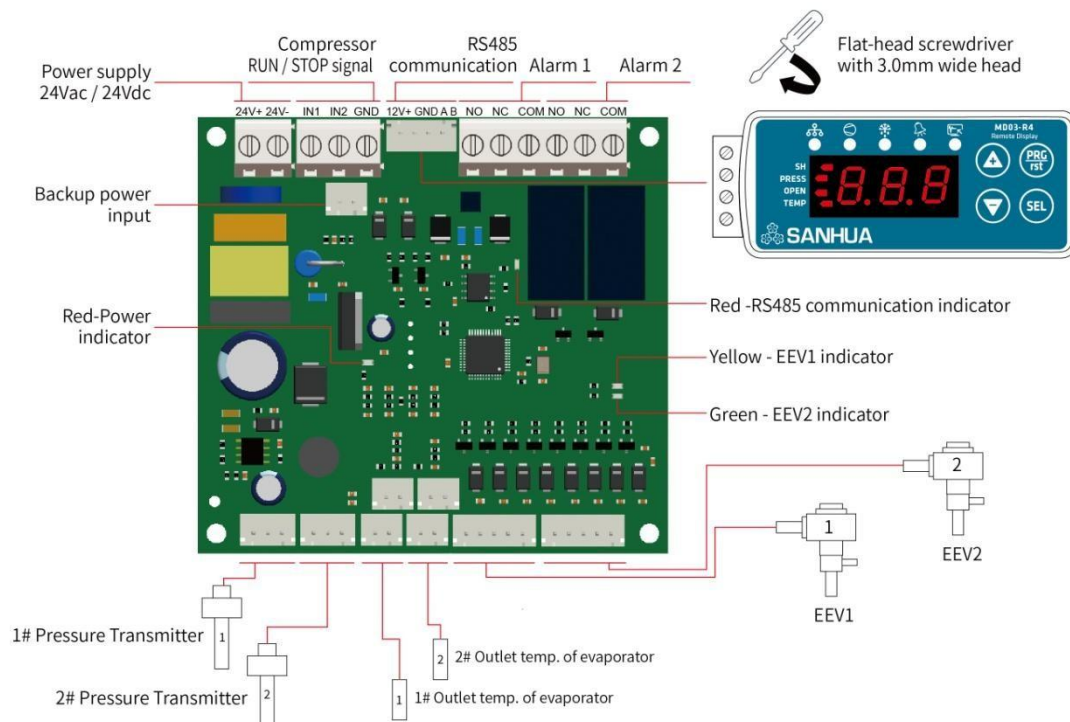
No.	Description	Model	Specification
1	Controller	SECD03-R1	
2	Voltage type pressure transmitter (Output:0.5~3.5V)	YCQB02H01-1	Solder ¼", 2m cable
		YCQB02H18-1	Solder ¼", 4.9m cable
		YCQB02L12-1	female thread: SAE-1/4" 7/16-20UNF-2B, 2m cable
		YCQB02L28-1	female thread: SAE-1/4" 7/16-20UNF-2B, 4.9m cable
3	Temperature Sensor (NTC 5K)	NTC2A1	Cable length 2 m
		NTC5A1	Cable length 5 m
		NTC9A1	Cable length 9 m
4	Remote Display	MD03-R4	For displaying and parameter setting
5	RS485 adapter cable	SECD03-3101	RS485 communication adapter cable
6	backup power (optional)	SP01/SP02	

2.2 Sensor information

Sensor	Description	
Temperature Sensor	Sensor type	NTC 5KΩ β value: 3970K
	Wire	2/5/9 m×0.5mm²
	Protection level	IP 67
	Accuracy	±1℃(-40℃)
	Temperature Range	-40℃~ 105℃
Pressure Transducer	Voltage supply	YCQB: (5±0.25) VDC
	Output	YCQB: (0.5~3.5) VDC
	Pressure range/ Accuracy	(0~20) bar±2% F.S. (-40℃/+40℃)
	Protection level	IP 67
★Note: The above is the standard model of pressure transmitter recommended by SANHUA, if you choose other models, please refer to the SANHUA datasheet, the output signal must meet the following conditions: Voltage YCQB: 0.5~3.5V.		

2.3 Controller Function Connection Diagram

Type	Function	Label		Description
5.08 Screw Terminals	Power supply	24Vac/Vdc	24V+	Input AC24V or DC24V+
			24V-	Input AC24V or DC24V-
	RUN / STOP	RUN	IN1	Passive switching signal, open or close synchronously with the compressor, close when using manual mode
			IN2	
			GND	GND
XHP terminal	RS485	MODBUS	12V+	
			GND	
			A	
			B	
5.08 Screw Terminals	Alarm 1	NO 1	NO	
		NC 1	NC	
		COM 1	COM	
	Alarm 2	NO 2	NO	
		NC 2	NC	
		COM 2	COM	
XHP terminal	Eletronic Expansion Valve 1	EEV1	+12V	
			B#	
			A#	
			B	
			A	
XHP terminal	Eletronic Expansion Valve 2	EEV2	+12V	
			B#	
			A#	
			B	
			A	
XHP terminal	1#Pressure Transmitter	P-SENS1	G	GND (black) : GND
			S1	Input S (white) : 0.5-3.5V
			VCC	Power supply Power (Red) : +5V
	2#Pressure Transmitter	P-SENS2	G	GND (black) : GND
			S2	Input S (white) : 0.5-3.5V
			VCC	Power supply Power (Red) : +5V
	1#Evaporator outlet temperature	T-1	IN	NTC5K@3970 Temperature sensor
			G	
	2# Evaporator outlet temperature	T-2	IN	NTC5K@3970 Temperature sensor
			G	
	Reserve port for backup power	SP	+	Reserve port for backup power
			-	



Safety tips:

1. Do not turn on the power before completing the wiring, cut off the power before changing the wiring;
2. The RUN port (compressor signal) is a passive port. If add a voltage it may cause the controller burn out;
3. The terminals for power supply, the terminals for passive input signal, the terminals for alarm 1, and the terminals for alarm 2 are applicable to the maximum/minimum wire diameters of $0.25\text{mm}^2 \sim 2.5\text{mm}^2$;
4. It is recommended that when PCBA is installed, the distance of the bottom surface of PCBA from the metal plate of the electric control box should be $\geq 10\text{mm}$.

3.Buttons and parameter setting

3.1 Remote display

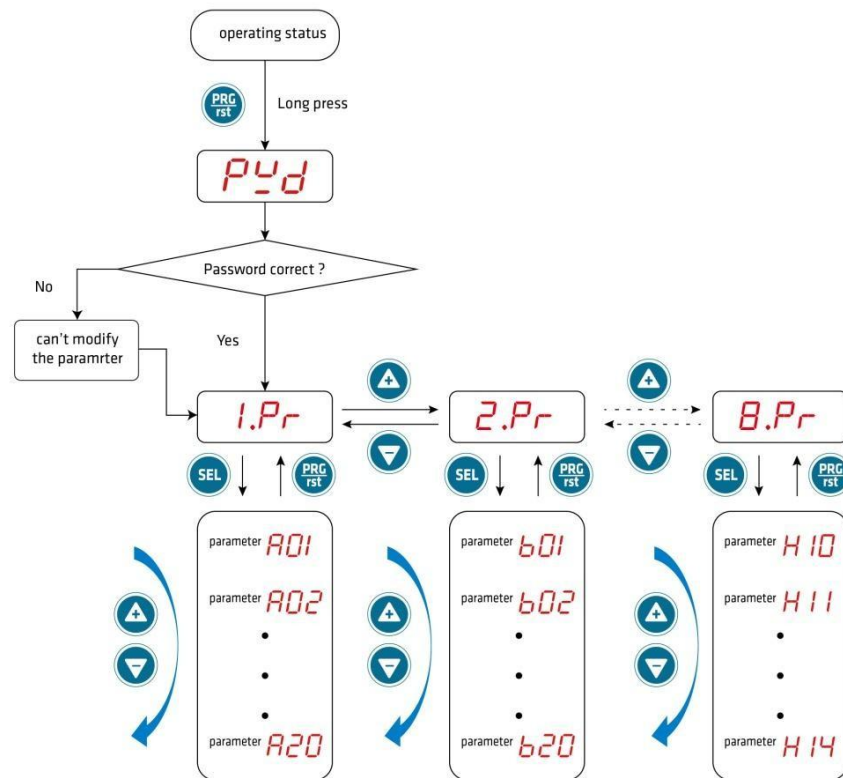


3.2 Buttons and display of remote display

Item		Description
Buttons		long press to enter the parameter setting interface / press to return parameter list
		Switch screen display parameters, increase/decrease parameters
		
		Confirm key, parameter switch in parameter table, long press save parameter
LED	°C/bar	Units of temperature and pressure
	★SH 	Display 1# superheat
	PRESS 	Display outlet pressure of 1# evaporator
	OPEN 	Display opening of 1# EEV
	TEMP 	Display outlet temp. of 1# evaporator
	SH  + PRESS 	Display 2# superheat
	PRESS  + OPEN 	Display outlet pressure of 2# evaporator
	OPEN  + TEMP 	Display opening of 2# EEV
	None	Display outlet temp. of 2# evaporator
		Alarm indicator lights up on controller alarm

★The current suction superheat is displayed by default. Press the [+] or [-] key to switch the display content, check other real-time data, and automatically return to the "SH" data display after 1 minute without key operation.

3.3 Parameter setting of remote display



- ① Press **【PRG】** for 3 seconds, enter the password through **【+】** or **【-】**, press **【SEL】** to confirm, and enter the parameter setting mode (if the password is correct, the value blinks, indicating that you can modify it; if the password is wrong, you can only view the parameter but cannot modify it).
- ② Enter the password and enter parameter list (1.Pr, 2.Pr, 3.Pr, 4.Pr, 5.Pr...). Press **【+】【-】** to select the parameter list to be entered, and press **【SEL】** to confirm;
- ③ Press the **【+】【-】** key to select the parameter to be modified, press the **【SEL】** key to confirm, and use the **【+】【-】** button to modify the parameter value. After the modification, press the **【SEL】** key to save the parameter. Press **【PRG】** to return to the parameter list menu;
- ④ Long press **【SEL】** to exit the parameter setting mode. If no key is pressed, the parameter setting mode automatically exits after 5 minutes.

3.4 Batch Copy Parameters for Remote Display

Batch copy parameters is used to save the final parameters in the controller to the EEPROM of the controller.

Long press the  button of the remote display for 3 seconds, and the digital tube displays" CPY ". Then short press the



"" key. When the left indicator digital tube all lights up, the parameters have been uploaded to the remote display.

3.5 Batch Downloading Parameters from Remote Display



Long press the remote display "" button for 5 seconds, the buzzer sounds, the digital tube displays "PSt", press the "" button again, at this time, the indicator on the left side of the digital tube in the form of a running lamp display. When the running light disappears and the buzzer beeps once, it means that the parameters have been downloaded into the controller.

- Note: 1. Only after the batch copy operation is completed can you enter the batch download parameter interface.
- 2.If the digital tube indicator of the remote display keeps running in the way of running lamp within 2 minutes, it means the batch download fails.

3.6 Remote Monitor Communication Troubleshooting

When the communication between the remote display and the electronic expansion valve controller fails for 1 minute, the main interface of the remote display shows "CoM" alarm and indicates that the communication is abnormal. When the communication is restored, the alarm disappears.

3.7 Remote Monitor Troubleshooting

When the controller reports a fault or an alarm, the digital alarm indicator  lights up and displays the normal operation display interface and the fault display code alternately in 1-second intervals. The remote monitor displays the following fault codes:

No.	Fault name	Code
1	1# Pressure sensor failure	E01
2	1# Evaporator outlet temperature sensor failure	E02
4	2# Pressure sensor failure	E04
5	2# Evaporator outlet temperature sensor failure	E05
8	1# Low superheat alarm	AL1
9	2#Low superheat alarm	AL4
10	1#MOP alarm	AL2
11	2#MOP alarm	AL5

When the communication between the remote display and the electronic expansion valve controller fails for 1 minute, the main interface of the remote display shows "CoM" alarm and indicates that the communication is abnormal. When the

communication is restored, the alarm disappears.

4. Main parameter setting

4.1 Refrigerant selection

Holding register address	Code	Description	Default value	Range
40004	A03	Refrigerant selection	5（R507）	-1~36

There are 37 commonly used refrigerants available in the controller, as listed below:

NO.	Refrigerant	NO.	Refrigerant	NO.	Refrigerant	NO.	Refrigerant	NO.	Refrigerant
-1	Custom	7	R1234YF	15	R744A(N2O)	23	R407H	31	R1270
0	R22	8	R290	16	R32	24	R454C	32	R1233zdE
1	R404A	9	R450A	17	R245FA	25	R455A	33	R1234zeZ
2	R410A	10	R513A	18	R23	26	R454B	34	R452C
3	R134A	11	R448A	19	R407A	27	R452B	35	R457A
4	R407C	12	R449A	20	R407F	28	R600A	36	R515B
5	R507	13	R452A	21	R124	29	R600		
6	R1234ZE	14	R744(CO2)	22	R717	30	R454A		

When the refrigerant is selected as custom, capacity is calculated using the parameters in the following table:

Address	Description		Note	Default value
40106	Refrigerant custom parameter A1	/	A1 Min -20000 Max 20000 A2 Min -20000 Max 20000 A3 Min -20000 Max 20000	(R449A) A1:9975 A2:-2020 A3:2424
40107	Refrigerant custom parameter A2	/		
40108	Refrigerant custom parameter A3	/		

4.2 Pressure sensor control mode

Holding register address	Code	Description	Default value	Range
40007	A06	Pressure sensor control mode	0	0-2

When set to 0, the 1# valve and the 2# valve use their own independent temperature sensor and pressure sensor, and the A valve control and the B valve control are not related;

When set to 1, the 2# valve follows the target opening of the 1# valve. In this mode, the models of the two electronic

expansion valves must be same;

When set to 2, valves #1 and #2 use Teo1 and Teo2 temperature sensors respectively, and the 1# pressure sensors Ps1 are shared. Valve #1 and valve #2 control the superheat respectively according to the switching valve command or communication start/stop signal.

4.3 Valve enable

Holding register address	Code	Description	Default value	Range
40009	A08	1# valve enable	1	0-1
40069	d08	2# valve enable	1	0-1

When set to 0, valve #1/valve #2 is not in use, operation is prohibited, and faults and alarms of valve #1/valve #2 will not be detected;

When set to 1, valve #1/valve #2 is used.

4.4 Valve control mode

Holding register address	Code	Description	Default value	Range
40011	A10	1# Valve control mode	1	0-2
40071	d10	2# Valve control mode	1	0-2

When set to 0 for manual control mode, there is no need for start-stop signal or switch valve command, and the target opening degree can be set by the upper computer to run to this opening degree;

When set to 1 for automatic control mode, through the start-stop signal conduction or set the switch valve command = 1, the valve is automatically controlled according to the superheat.

When set to 2 for 1~5V voltage drive mode, when the start-stop signal conduction or set the valve communication switching command = 1, the valve according to 1V corresponds to 0% openness, 5V corresponds to 100% openness proportional control.

4.5 Valve open and close Command

Holding register address	Code	Description	Default value	Range
40067	d06	1# open and close valve	0	0-1
40068	d07	2# open and close valve	0	0-1

When set to 0, a close command is issued to the corresponding valve; when set to 1, a open command is issued to the corresponding valve.

When this parameter is set to 1 or the start-stop signal is connected, the corresponding valve will be opened; when the start-stop signal is disconnected, the corresponding valve will be closed.

4.6 Target superheat setting

Holding register address	Code	Description	Default value	unit	Range
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40026	b05	1# target superheat	M: 6.0 US: 10.8	K	M:0~30.0 US:0~54.0
40086	E05	2# target superheat	M: 6.0 US: 10.8	K	M:0~30.0 US:0~54.0

* If the target superheat value is small, it may lead to incomplete evaporation of refrigerant; if the target value is large, the energy efficiency of evaporator is too low.

4.7 Valve start opening and duration time

Holding register address	Code	Description	Default value	unit	Range
40012	A11	1#Valve initial opening	40	%	0-100
40013	A12	1# Valve initial opening duration time	10	S	0-120
40072	d11	2# Valve initial opening	40	%	0-100
40073	d12	2# Valve initial opening duration time	10	S	0-120

When the controller receives the start and stop signal of compressor, first open the EEV to the set initial opening, and hold opening for the setting duration time. Set the initial opening based on the actual system requirements to avoid initial system fluctuations.

4.8 Manual opening Settings

Holding register address	Code	Description	Default value	unit	Range
40018	A17	1# Valve manual opening	500	‰	0~1000
40078	d17	2# Valve manual opening	500	‰	0~1000

When valve #1 or valve #2 is set to manual control, the target opening is operated according to [A17] or [d17]. Note:

When the manual opening setting > 0, the timer starts to time;

When the manual opening setting =0, the timer stops. If the timer accumulated time is $\geq$ 24 hours (corresponding to parameter address 134), the electronic expansion valve will be reset according to the mode of switching from on to off when the setting of manual opening degree=0, and the timer will be cleared after the reset is completed.

4.9 MOP alarm parameter

Holding register address	Code	Description	Default value	unit	Range
40019	A18	1# Valve MOP enable	1	/	0= Not enabled 1= Automatic reset
40020	A19	1# MOP trigger value	M:12 US:53.6	M:℃ US:°F	
40079	d18	2# Valve MOP enable	1		0= Not enabled 1= Automatic reset

40080	d19	2# MOP trigger value	M:12 US:53.6	M:°C US:°F	
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When MOP alarm enable is set to 1, when the saturation temperature reaches the set MOP, the electronic expansion valve opening will not continue to open, the limiting pressure will increase, when the saturation temperature reaches [A19] +1 °C or [d19] +1 °C , the corresponding electronic expansion valve starts to close until the saturation temperature drops to the MOP temperature.

4.10 Low superheat alarm parameter

Holding Register Address	Code	Description	Default value	unit	Range
40006	A05	1# Low superheat alarm enable	0	/	0=Not enabled 1=enable
40122	g01	1# Low superheat alarm value	M:0.5 US:0.9	K	M:-0.5~30 US:-0.9~54
40123	g02	1# Low superheat alarm duration time	60	S	10~600
40124	g03	1# Low superheat alarm reset value	M:3.0 US:5.4	K	M:0.3~35 US:0.54~63
40066	d05	2# Low superheat alarm enable	0	/	0=Not enabled 1=enable
40125	g04	2# Low superheat alarm value	M:0.5 US:0.9	K	M:0.5~30 US:0.9~54
40126	g05	2# Low superheat alarm duration time	60	S	10~600
40127	g06	2# Low superheat alarm reset value	M:3.0 US:5.4	K	M:0.3~35 US:0.54~63

When the low superheat alarm enable setting ([A05] = 1 or [d05] = 1) is enabled, and the superheat $\leq$ [g01] or [g04] K lasts

for [g02] or [g05] seconds, the superheat is too low that alarm is triggered, and the electronic expansion valve closes. After triggering the alarm, when the superheat $\geq$ [g03] or [g06] K, the alarm is lifted and normal operation is resumed.

4.11 Factory Reset

Holding register address	Code	Description	Default value	Range
40010	A09	Return to default parameters	0	0~999

When set to the current parameter password value 5 or 913, the default value is returned. Note: The parameter modification is invalid when valve #1 or #2 is in operation.

4.12 Controller Code and Software Version Parameters (Read Only)

Holding register address	Description	Code	unit	Interval	Min.	Max.	Default value
43901	Controller Code	/	/	/	/	/	0xD031

43902	Software Version	/	/	/	/	/	130
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4.13 Read Only Data

Holding register address	Description		Code	unit	Interval	Min.	Max.	Default value
40501	1#	Valve suction superheat	/	K	0.1	/	/	/
40502	1#	Valve suction pressure	/	M:Bar US:Psi	0.1	/	/	/
40503	1#Valve opening		/	%	1	/	/	/
40504	1#	Evaporator outlet temperature	/	M:℃ US:℉	0.1	/	/	/
40505	2#	Valve suction superheat	/	K	0.1	/	/	/
40506	2#	Valve suction pressure	/	M:Bar US:Psi	0.1	/	/	/
40507	2# Valve opening		/	%	1	/	/	/
40508	2#	Evaporator outlet temperature	/	M:℃ US:℉	0.1	/	/	/
40509	1#saturation temperature		/	M:℃ US:℉	0.1	/	/	/
40510	2#saturation temperature		/	M:℃ US:℉	0.1	/	/	/
40511	Software Version		/	/	/	/	/	/
40512	Controller code		/	/	/	/	/	/
40513	1#Pressure sensor AD value		/	/	1	/	/	/
40514	2# Pressure sensor AD value		/	/	1	/	/	/
40515	1#RUN/Stop（bit0）、2# RUN/Stop（bit1）		/	/	1	/	/	/

5.Alarm information and troubleshooting

5.1 Fault Code Table

Fault	Fault code	Load protection action		
		EEV	Communication	Relay
1# Pressure sensor failure	E01	In automatic control, when not shared, 1# valve to maintain the fault fixed opening [F08]; In automatic control, when sharing, the 1# valve and the 2# valve maintain the fault fixed opening [F08]; When manually controlled, the 1# valve opens according to the instructions of the upper computer.	Upload the alarm	Not shared: 1# relay alarm output; Shared: 1# & 2# relay alarm outputs;
1# Evaporator outlet temperature sensor failure	E02	In automatic control, when not shared, 1# valve to maintain the fault fixed opening [F08]; In automatic control, when sharing, the 1# valve and the 2# valve maintain the fault fixed opening [F08]; When manually controlled, the 1# valve opens according to the instructions of the upper computer.	Upload the alarm	Not shared: 1# relay alarm output; Shared: 1# & 2# relay alarm outputs;
2# Pressure sensor failure	E04	In automatic control, when not shared, 2# valve to maintain the fault fixed opening [F09]; When manually controlled, the 2# valve opens according to the instructions of the upper computer. When shared, no fault is reported.	Not shared: Upload the alarm; Share: alarm is not uploaded	Not shared: 2# relay alarm output; Shared: 2# relay alarm follows 1# relay;
2# Evaporator outlet temperature sensor failure	E05	In automatic control, when not shared, 2# valve to maintain the fault fixed opening [F09]; When manually controlled, the 2# valve opens according to the instructions of the upper computer. When shared, no fault is reported	Not shared: Upload the alarm; Share: alarm is not uploaded	Not shared: 2# relay alarm output; Shared: 2# relay alarm follows 1# relay;

1# Low superheat alarm	AL1	No alarm in manual mode In automatic mode, the 1# valve is closed	Upload the alarm	1# relay alarm output;
2# Low superheat alarm	AL4	No alarm in manual mode In automatic mode, the 2# valve is closed	Upload the alarm	2# relay alarm output
1#MOP alarm	AL2	No alarm in manual mode In automatic mode, the 1# valve closes gradually	Upload the alarm	1# relay alarm output;
2#MOP alarm	AL5	No alarm in manual mode In automatic mode, the 2# valve closes gradually	Upload the alarm	2# relay alarm output
1# Valve Terminal Switch (non-faulty)	DZ1	/	/	/
2# Valve Terminal Switch (non-faulty)	DZ2	/	/	/

5.2 Fault holding register display

Holding register address 40034 : 1# alarm information																
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
										DZ1		AL2	AL1		E02	E01

Holding register address 40094: 2# alarm information																
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
											DZ2	AL5	AL4		E05	E04

6.Parameter setting

MODBUS address	Code	Description	Unit	interval	Default	Max.	Min.	Note
40001	A00	MODBUS communication address	/	1	1	254	1	
40002	A01	Unit Swich	/	1	0	1	0	0= Metric units 1=Imperial units
40003	A02	Pressure Sensor Type	/	1	0	1	0	0=0.5V~3.5V 1=0.5V~4.5V
40004	A03	Refrigerant	/	1	5	36	-1	See section 5.1 Refrigerant table

40005	A04	Communication baudrate	bps	1	1	29	0	0=4800 8bit NONE 1Stop 1=9600 8bit NONE 1Stop 2=19200 8bit NONE 1Stop 3=38400 8bit NONE 1Stop 4=2400 8bit NONE 1Stop 5=4800 8bit EVEN 1Stop 6=9600 8bit EVEN 1Stop 7=19200 8bit EVEN 1Stop 8=38400 8bit EVEN 1Stop 9=2400 8bit EVEN 1Stop 10=4800 8bit ODD 1Stop 11=9600 8bit ODD 1Stop 12=19200 8bit ODD 1Stop 13=38400 8bit ODD 1Stop 14=2400 8bit ODD 1Stop 15=4800 8bit NONE 2Stop 16=9600 8bit NONE 2Stop 17=19200 8bit NONE 2Stop 18=38400 8bit NONE 2Stop 19=2400 8bit NONE 2Stop 20=4800 8bit EVEN 2Stop 21=9600 8bit EVEN 2Stop 22=19200 8bit EVEN 2Stop 23=38400 8bit EVEN 2Stop 24=2400 8bit EVEN 2Stop 25=4800 8bit ODD 2Stop 26=9600 8bit ODD 2Stop 27=19200 8bit ODD 2Stop 28=38400 8bit ODD 2Stop 29=2400 8bit ODD 2Stop It is valid after the power is powered off and on again.
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40006	A05	1# Valve low superheat alarm enable	/	1	0	1	0	0=disable 1=enable
40007	A06	Sensor control mode	/	1	1	2	0	0= Separate control, 1= Temperature and pressure are shared 2= Pressure shared
40009	A08	1# Valve enable	/	1	1	1	0	0=disable 1=enable
40010	A09	Return to default values	/	1	0	999	0	When set to the current parameter password value 5 or 913, the default value is returned.
40011	A10	1# Valve control mode	/	1	1	2	0	0= Manual control, 1= Automatic control 2=1~5V Drive control
40012	A11	1#Valve initial opening	/	1	40	100	0	
40013	A12	1# Valve initial opening duration time	s	1	10	120	0	
40014	A13	1# Valve model	/	1	1	1	1	1=DPF/LPF
40015	A14	1# Valve total steps	P	1	500	1000	0	
40016	A15	1#Valve PPS	/	1	30	1000	0	
40017	A16	1#Maximum opening of valve operation	%	1	100	100	0	
40018	A17	1# Valve manual opening	‰	1	500	1000	0	
40019	A18	1#MOP enable	/	1	1	1	0	0=disable 1=enable
40020	A19	1#MOP trigger value	M:℃ US:℉	0.1	M:12 US:53.6	M:30 US:86	M:10 US:50	
40022	b01	1#Valve P	/	0.1	1.0	99.9	0	
40023	b02	1# Valve I	/	1	50	999	0	
40024	b03	1# Valve D	/	1	30	999	0	
40026	b05	1#Valve target superheat	K	0.1	M:6.0 US:10.8	M:30 US:54	0	
40027	b06	1# Valve 0.5V pressure value	M:Bar US:Psi	M:0.1 US:1	M:0 US:0	M:60.0 US:870	M:-1 US:-14	
40028	b07	1# Valve 3.5V pressure value	M:Bar US:Psi	M:0.1 US:1	M:20 US:290	M:60.0 US:870	M:0 US:0	
40030	b09	1# Saturation Temperature Measurement Method(Reserved)	/	1	0	1	0	0= Pressure measurement, 1= Temperature measurement(reserved)
40031	b10	1#Valve saturation temperature	M:℃ US:℉	/	/	/	/	Read only
40032	b11	1# Valve suction temperature	M:℃ US:℉	/	/	/	/	Read only
40033	b12	1#Valve real superheat	K	/	/	/	/	Read only
40034	b13	1#Valve alarm information	/	/	/	/	/	Read only
40035	b14	1# Valve current opening	%	/	/	/	/	Read only

40037	b16	1# Valve pressure	M:Bar US:Psi	/	/	/	/	Read only
40061	d00	1# Valve outlet temperature sensor calibration	M:°C US:°F	0.1	0	M:9.9 US:9.9	M:-9.9 US:-9.9	
40062	d01	1# Valve pressure sensor calibration	M:Bar US:Psi	M:0.1 US:1	0	M:9.9 US:99	M:9.9 US:-99	
40063	d02	2# Valve temperature sensor calibration	M:°C US:°F	0.1	0	M:9.9 US:9.9	M:-9.9 US:-9.9	
40064	d03	2# Valve pressure sensor calibration	M:Bar US:Psi	M:0.1 US:1	0	M:9.9 US:99	M:9.9 US:-99	
40066	d05	2# Valve low superheat enable	/	1	0	1	0	
40067	d06	1#Valve open and close	/	1	0	1	0	0= close, 1= open
40068	d07	2#Valve open and close	/	1	0	1	0	0= close, 1= open
40069	d08	2#Valve enable	/	1	1	1	0	
40071	d10	2# Valve control mode	/	1	1	2	0	0= Manual control, 1= Automatic control 2=1~5V Drive control
40072	d11	2#Valve initial opening	/	1	40	100	0	
40073	d12	2#Valve initial opening duration time	s	1	10	120	0	
40074	d13	2#Valve model	/	1	1	1	1	1=DPF/LPF
40075	d14	2# Valve total steps	P	1	500	999	0	
40076	d15	2#Valve PPS	/	1	30	999	0	
40077	d16	2# Maximum opening of valve operation	%	1	100	100	0	
40078	d17	2#Valve manual opening	‰	1	500	1000	0	
40079	d18	2#Valve MOP enable	/	1	1	1	0	0= Disable 1=enable,
40080	d19	2#Valve MOP trigger value	M:°C US:°F	0.1	M:12 US:53.6	M:30 US:86	M:10 US:50	
40082	E01	2#Valve P	/	0.1	1.0	99.9	0	
40083	E02	2# Valve I	/	1	50	999	0	
40085	E04	2# Valve D	/	1	30	999	0	
40086	E05	2# Valve target superheat	K	0.1	M:6.0 US:10.8	M:30.0 US:54	0	
40087	E06	2#Valve 0.5V low pressure value	M:Bar US:Psi	M:0.1 US:1	M:0 US:0	M:60.0 US:870	M:-1 US:-14	
40088	E07	2# Valve 3.5V pressure value	M:Bar US:Psi	M:0.1 US:1	M:20 US:290	M:60.0 US:870	M:0 US:0	

40090	E09	2# Saturation Temperature Measurement Method(Reserved)	/	1	0	1	0	0= Pressure measurement, 1= Temperature measurement
40091	E10	2# valve saturation temperature	M:℃ US:℉	/	/	/	/	Read only
40092	E11	2# valve suction temperature	M:℃ US:℉	/	/	/	/	Read only
40093	E12	2# Valve real superheat	K	/	/	/	/	Read only
40094	E13	2# Valve alarm information	/	/	/	/	/	Read only
40095	E14	2# Valve current opening	%	/	/	/	/	Read only
40097	E16	2# Valve pressure	M:Bar US:Psi	/	/	/	/	Read only
40101	F00	Valve reference steps	/	1	0	100	0	(Need to power off to power on)
40102	F01	Valve drive type	/	1	0	1	0	0=1-2 Phase excitation, 1=2-2 Phase excitation (Need to power off to power on)
40103	F02	Percentage of valve power-on reset	%	1	12	20	0	
40104	F03	Valve process reset steps	PLS	1	8	20	0	
40105	F04	Valve excitation time	ms	1	50	500	30	
40106	F05	Refrigerant custom parameters A1	A1 Min -20000 Max 20000 A2 Min -20000 Max 20000 A3 Min -20000 Max 20000 A1, A2, and A3 are custom parameters, and only 485 communication Settings are supported.					(R449A) A1:9975 A2:-2020 A3:2424
40107	F06	Refrigerant custom parameters A2						
40108	F07	Refrigerant custom parameters A3						
40109	F08	1# Valve Failure Fixed Opening Percentage						
40110	F09	2# Valve Failure Fixed Opening Percentage	%	1	50	100	0	
40111	F10	1# Valve Minimum Opening Percentage	%	1	0	100	0	
40112	F11	1# Valve coil excitation speed upper limit	%	1	1000	1000	0	
40113	F12	2# Valve Minimum Opening Percentage	%	1	0	100	0	
40114	F13	2# Valve coil excitation speed upper limit	%	1	1000	1000	0	
40121	g00	MOP parameter	/	1	200	999	1	

40122	g01	1# Low superheat alarm value	K	0.1	M:0.5 US:0.9	54	M:-0.5 US:-0.9	
40123	g02	1# Low superheat alarm duration time	s	1	60	600	10	
40124	g03	1# Low superheat alarm reset value	K	0.1	M:3.0 US:5.4	M:35 US:63	M:3 US:5.4	
40125	g04	2# Low superheat alarm value	K	0.1	M:0.5 US:0.9	54	M:-0.5 US:-0.9	
40126	g05	2# Low superheat alarm duration time	s	1	60	600	10	
40127	g06	2# Low superheat alarm reset value	K	0.1	M:3.0 US:5.4	M:35 US:63	M:3 US:5.4	
40130	g09	Password	/	1	5	999	0	When set to this setting value or 913, the parameter can be set
40151	H10	PS1 0.5V corresponds to AD	/	1	410	9999	1	MD03 not displayed
40152	H11	PS1 3.5V corresponds to AD	/	1	2866	9999	1	MD03 not displayed
40153	H12	PS2 0.5V corresponds to AD	/	1	410	9999	1	MD03 not displayed
40154	H13	PS2 3.5V corresponds to AD	/	1	2866	9999	1	MD03 not displayed
40155	H14	Sensor filtering time	Second	1	10	999	1	
40156	H15	1#relay control	/	1	0	2	0	0= automatic control, 1= forced off, 2= Force open The default value is restored after the power is powered on.
40157	H16	2# relay control	/	1	0	2	0	

7、Communication logic

7.1 RS485 Communication logic

The communication hardware layer uses an RS485 module with Modbus RTU protocol and the SERD03-R1 controller is used as the slave computer;

For MODBUS communication ID, normal communication with SERD03-R1 controller can be realized when the upper unit ID=255 or ID=[A00];

For the communication baudrate, within 4 seconds after power-on, the controller operates at 9600bps baudrate; if the controller receives 9600bps data and parses it correctly within this time period, the controller operates at 9600bps after 4 seconds; if the controller doesn't receive 9600bps data or the data is received incorrectly within this time period, the controller operates at the baudrate set by [A04] after 4 seconds.

7.2 Communication specification

Item	Description
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Transmission line connection	Multi-line transmission
communication method	RS485 (2-wire, half-duplex)
Baudrate	Default 9600bps, Range:2400~38400bps
Parity, data, stop bit	None /Odd/Even Parity, 8 Data, 1/2 Stop
Protocol type	Modbus RTU
function code	0x03、0x06、0x10
Max. number of words read	32
Cable type	Belden 9841/9842, LG LIREV-AMESB
Polling interval	> 100ms