

直 | 流 | 变 | 频 | 驱 | 动



SPB 通用电机 控制平台

SPB
Series Universal
Motor Control
Platform

杭州洲钜电子科技有限公司

HANGZHOU ZHOJU ELECTRONIC TECHNOLOGICAL CO.,LTD



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杭州洲钜电子科技有限公司

HANGZHOU ZHOJU ELECTRONIC TECHNOLOGICAL CO.,LTD

产品特点

PRODUCT CHARACTERISTIC

- 电机驱动通用平台，适用于风机、压缩机、水泵、空压机等多品类电机驱动系统
- 适配永磁同步电机、交流异步电机、磁阻电机等各类电机
- 无传感器矢量控制算法
- 功率1KW至30KW
- 直流电压DC12V/24V/48V
- 交流电压AC110V/220V/380V/480V
- 可提供风冷液冷多种散热方式
- 具有软/硬件过流保护，欠/过压保护，电机堵转/缺相保护，通讯故障保护，过热保护
- RS485标准接口，可适配各种协议
- 用户可利用PC软件或手机APP自助修改控制参数
- 支撑点对点远程程序升级
- 可支持CE/UL/TUV各种认证
- 全系列防爆处理
- Universal Platform applicable to wide range motor driving system, such as ventilation motor, refrigerant compressor, water pump, air compressor and so on
- Adaption for PMSM motor, AC asynchronous motor, reluctance motor, etc
- Sensorless with FOC control algorithm
- Input Power: 1KW - 30KW
- DC Input: 12V/24V/48V
- AC Input: 110V/220V/380V/480V
- Heat dissipation: air-cooled, liquid-cooled, etc
- Protection: over current, over/lack voltage, locked rotor/phase failure, communication failure, overheat
- Standard RS485 Modbus interface, suitable for multiple communication protocol
- Parameters updating by PC tools or mobile app
- Support OTA
- CE/UL/TUV certification available if required
- Explosion-proof protection treatment

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技术特色

TECHNICAL FEATURES

- 低速大转矩启动
- 风机顺逆风闭环启动
- 交流电压拍频现象抑制
- 电压瞬态跌落抑制
- 低噪音单电阻方案
- SVPWM过调制
- 单转子压缩机转矩波动自适应补偿
- 死区补偿
- 谐波补偿
- 载频抖动
- 变载频调速
- 5段/7段载频切换
- 板载单相交错PFC
- 模块化三相全桥PFC
- Low speed and large torque start
- Upwind /tailwind closed-loop start
- AC voltage beat phenomenon suppression
- Transient voltage drop suppression
- Low noise and single resistor solution
- SVPWM over-modulation
- Adaptive torque compensation of single rotor compressor
- Dead-time compensation
- Harmonic compensation
- Carrier frequency vibration
- Variable carrier frequency speed
- 5/7 steps carrier frequency switching
- Integrated board Interleaved PFC(220VAC)
- Modularization design& full-Bridge PFC(380VAC)

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SPB1系列产品解释

SPB1 SELECTION TABLE



SPB1-D26080AA1产品名称解释

SPB1-D26080AA1 Definition

例子/e.g	SPB	1-	D	2	6	080	A	A	1	解释Description
洲钜标准产品平台代号 Platform Code	SPB									通用电机驱动平台 / Universal Motor Driver Platform
	SPC									通用待定平台 / Universal TBD Platform
技术平台版本 Technical Platform Version		1								平台第一代/1st Generation
		2								平台第二代/2nd Generation
产品组件分类 Parts			C							电容模块/ Capacitor Board
			D							驱动模块/ Driver Borad
			F							滤波器模块/ EMC Filter Board
			M							逻辑控制模块/ Logic Control Board
			I							带壳体集成模块/ With Enclosure Integrated Unit
系统输入电压类型 System Input Voltage Style				1						直流电压输入 / DC Input
				2						单相交流电压输入 / Single AC Input
				3						三相交流电压输入 / 3-phase AC Input
系统额定输入电压 System Input Rated Voltage					1					额定输入电压为12V/ Rated Input Voltage 12V
					2					额定输入电压为24V/ Rated Input Voltage 24V
					3					额定输入电压为48V/ Rated Input Voltage 48V
					4					额定输入电压为72V/ Rated Input Voltage 72V
					5					额定输入电压为110V/ Rated Input Voltage 110V
					6					额定输入电压为220V / Rated Input Voltage 220V
					7					额定输入电压为310V/ Rated Input Voltage 310V
					8					额定输入电压为380V/ Rated Input Voltage 380V
					9					额定输入电压为480V/ Rated Input Voltage 480V
					A					额定输入电压为550V/ Rated Input Voltage 550V
					B					额定输入电压为800V/ Rated Input Voltage 800V
系统最大输入功率 Max Input Power						120W				最大输入功率为120W/ Max Input Power 120W
						050				最大输入功率为5KW/ Max Input Power 5KW
						075				最大输入功率为7.5KW / Max Input Power 7.5KW
						080				最大输入功率为8KW / Max Input Power 8KW
功能分类 Classification by Function							A			A类产品（风冷方案） / Air Cooled
							B			B类产品（液冷方案） / Liquid Cooled
硬件方案版本 Hardware Version								A		硬件方案A / Hardware Version A
								B		硬件方案B/ Hardware Version B

SPB1系列选型表总汇

SPB1 SELECTION TABLE



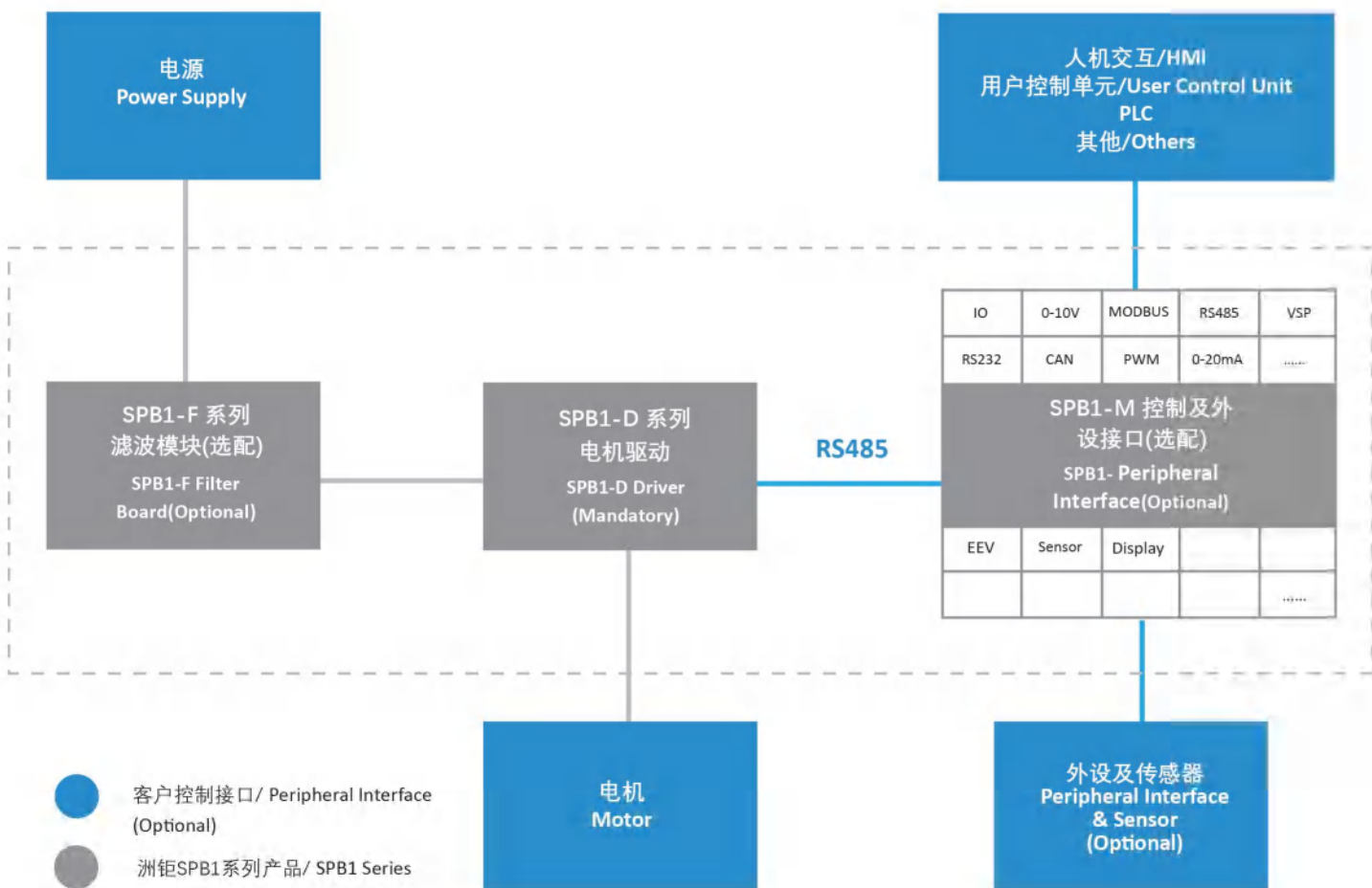
SPB1系列选型表总汇

SPB1 Model Selection Table

型号 Item	额定输入电压 Rated Input Voltage(V)	25℃最大输入功率 25℃Max Input Power(KW)	25℃最大输出峰值电流 25℃Max Output Peak Current Value (A)	功率因数校正 PFC	冷却方式 Cooling Model	调速接口 Speed Model	直流风机接口 DC Fan Interface	尺寸信息 Dimension (L * W * H)	认证 Certifi-cation	必备配件 Accessories
SPB1-D11010AA1	DC12	1	110	无 Unavailable	风冷 Air cooled	PWM模拟调速 Analog Speed Regulation RS485	1	200*150*54	TBD	
SPB1-D12020AA1	DC24	2	100							
SPB1-D13025AA1	DC48	2.5	100							
SPB1-D26010AA1	AC220	1	5	有 Available	风冷 Air cooled	RS485	2	210*160*98	TBD	
SPB1-D26020AA1		2	9					210*160*108		
SPB1-D26030AA1		3	13					210*160*118		
SPB1-D26040AA1		4	18					237*232*95		
SPB1-D26050AA1		5	23					237*232*124		
SPB1-D26065AA1		6.5	30					245*200*119		
SPB1-D26080AA1		8	36					245*200*119		SPB1-F26080AA1
SPB1-D26080BA1		8	36		液冷 Liquid cooled			368*260*84		
SPB1-D38040AA1	AC380/480	4		无 Unavailable	风冷 Air cooled	RS485	0		TBD	
SPB1-D38080AA1		8	21		风冷 Air cooled			231*207*114		
SPB1-D38080AB1		8	21		风冷 Air cooled			230*230*111		
SPB1-D38120AA1		12	32		风冷 Air cooled			280*220*138		
SPB1-D38120BA1		12	32		液冷 Liquid cooled			350*220*100		
SPB1-D38150BA1		15	40		液冷 Liquid cooled			353*230*79		
SPB1-D38150AA1		15	40		风冷 Air cooled			265*230*125		
SPB1-D38180BA1		18	47		液冷 Liquid cooled			336*312*79		
SPB1-D38220AA1		22	58		风冷 Air cooled			312*272*127		
SPB1-D38250BA1		25	65		液冷 Liquid cooled			336*312*79		
SPB1-D38280AA1		28	73		风冷 Air cooled			312*272*127		
SPB1-D38300BA1		30	79		液冷 Liquid cooled			336*312*79		

如何应用洲钜SPB系列产品

HOW TO CHOOSE SPB SERIES



SPB1-F系列特点 SPB1-F Characteristic

- 结合客户EMC需求按需设计
- 客户本地自购，节省物流成本
- Customized design based on EMC standard
- Save freight cost based by local purchase

SPB1-D系列特点 SPB1-D Characteristic

- 标准件，性能稳定，工艺成熟
- 库存备货，交期稳定
- Components standardization, stable performace, maturity process control
- Stock up and stable lead time

SPB1-M系列特点 SPB1-M Characteristic

- 客户定制化，按需设计
- 通过钣金设计与SPB1-D模块一体化集成，无需单独固定
- 可支持客户自主开发
- Customized design
- Integrated with SPB1-D, no extra fixing required
- OEM software available

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如何应用洲钜SPB系列产品

HOW TO CHOOSE SPB SERIES

Q: 客户如何快速选择合适的SPB产品?

A: 产品选型需要根据系统功率、环境温度、散热条件等综合因素，客户可以填写《参数选型调查表》，我司工程师为您推荐最合适的产品。

Q: 洲钜SPB系列产品能用在哪些产品上?

A: 洲钜SPB系列产品是一个平台类产品，理论上可以驱动任何合适的电机，和应用场所无关。

Q: 目前调速接口与客户的系统不匹配，客户还能用洲钜SPB系列产品吗?

A: 洲钜大部分SPB1-D系列产品都用隔离RS485通讯接口调速，如与客户系统不匹配，洲钜可以为客户重新设计SPB1-M接口板，以最小的代价，最快的时间满足客户需求。

Q: 拿到控制器需要如何适配电机?

A: 洲钜用于修改电机参数的软件有两种：1、PC软件，通过标准USB2RS485的适配器即可实现与控制器连接，即可实现电机参数监控、修改及程序升级，适用于调试阶段；2、手机APP，通过专用蓝牙转RS485适配器实现与控制器连接，即可实现电机参数监控、修改及程序升级，适用于售后阶段。

Q: 产品符合什么认证标准？防护等级满足什么要求？

A: 可以根据客户需求做相关认证

Q: 散热方式有什么？是否可以兼容？

A: 风冷和液冷都有相应的设计方案，而且方案成熟度高，经过批量验证过，对于液冷散热方案会考虑防爆安全性能。风冷和液冷可以根据客户需求做兼容设计。

Q: 如果安装系统固定如何适配客户结构？

A: 固定孔位可以根据客户系统调整

Q: 关于故障如何排查？

A: 根据错误码明确故障信息

Q: How to select the SPB item?

A: Zhouju Engineer will match proper driver according to 《the Parameters Requirement Excel》 including the whole systems electric power, working temperature, heat dissipation and other conditions.

Q: Which products can be chosen SPB?

A: It is universal standard inverter and can be used any motor in all conditions within limited power.

Q: How to solve the problems if customer's regular speed model is different from SPB?

A: SPB1-D series use isolation RS485 communication speed control, if different from zhouju protocol, we can customized special RS485 SPBA-M in short time and low cost according to customer requirement.

Q: How to match the motor and SPB parameter?

A: There are two solutions.
1st By PC used for testing period: the standard USB2RS485 adapter, refer to "DEBUG TOOL", the computer can monitor test datasheet and update software.
2nd Mobile App for after sales: by mobile bluetooth connect RS485, mobile can monitor test datasheet and update software.

Q: What's Certification of SPB approved? what's IP degree?

A: SPB1 meets CE, UL, TUV other customized certification; IP degree: IP54

Q: What's driver cooling model? It is compatible with customers solution?

A: Air cooled and liquid cooled. Both cool modes are with highly mature and explosion-proof performance, batch production verifying. They are compatible with customers requirement.

Q: How to installation according to customer's construction?

A: Fix holes can be adjustable.

Q: How to deal with the fault codes?

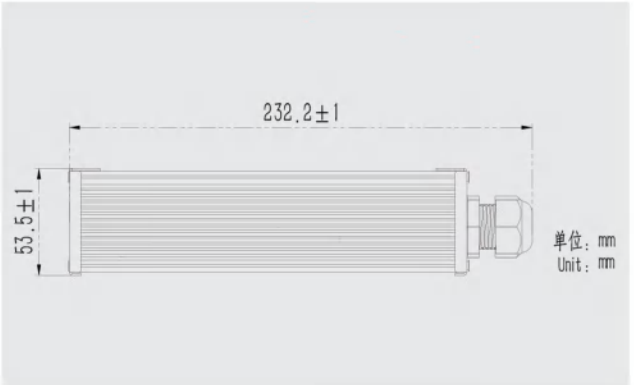
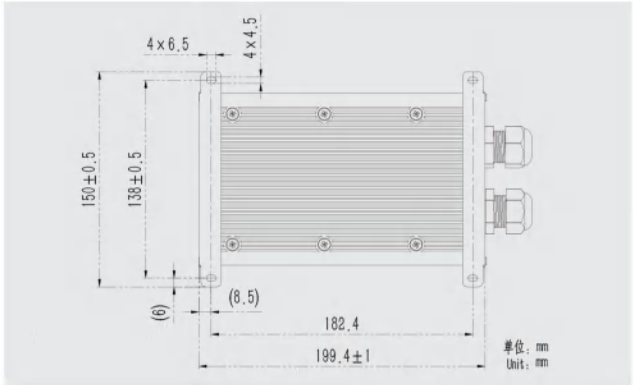
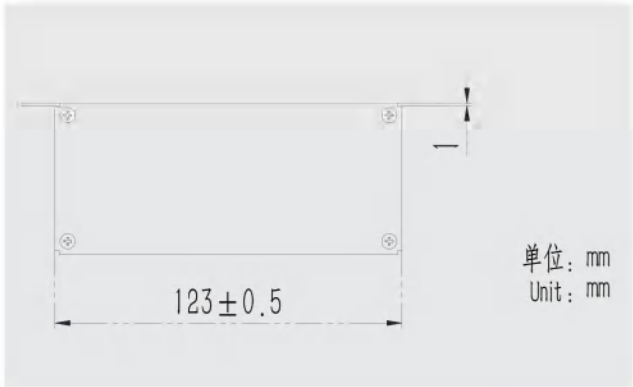
A: Analyze the fault information according to the error codes.

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SPB1-D11010AA1

- 适用于驻车空调、风机等产品的驱动
 - 风冷散热，驱动部分和控制部分分开设计，增加散热器面积，降低系统温升、延长功率器件寿命
 - RS485、电压、电阻以及PWM等多种调速方式
 - 具有启停控制功能、RS485通信功能、风机调速、温度监控、故障指示等功能
- Applicable to parking air conditioning compressor, ventilator and other driver systems
 - Air cooled, driver separated from controller board, enhance heat dissipation capacity and reduce system temperature rise, and lengthen lifetime
 - Variety speed model of RS485, voltage, resistor and PWM other speed regulation solutions
 - Multiple functions: start and stop control function, RS485 communication, fan speed adjustment, temperature monitor and fault code etc

额定输入电压/Rated Input Voltage: DC12V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power: 1 KW	直流电输入端子/DC Input Current Terminal
最大输入电流/Max Input Current: 83 RMSA	三相输出连接压缩机端子/UVW Connection
最大输出电流/Max Output Current: 80 RMSA	VSP调速信号/VSP Speed Modulation
冷却方式/Cool Model: 风冷/Air Cooled	PWM调速信号/PWM Speed Modulation
工作环境温度/Working Temperature:-25 ~ 60℃	485通讯接口/RS485
直流风机接口/DC Fan:1	温度开关接口/Temperature Switch
调速方式/ Speed Modulation:RS485、VSP、PWM	AC开关接口/AC Switch
认证/ Certification:TBD	直流风机接口/DC Fan Connection

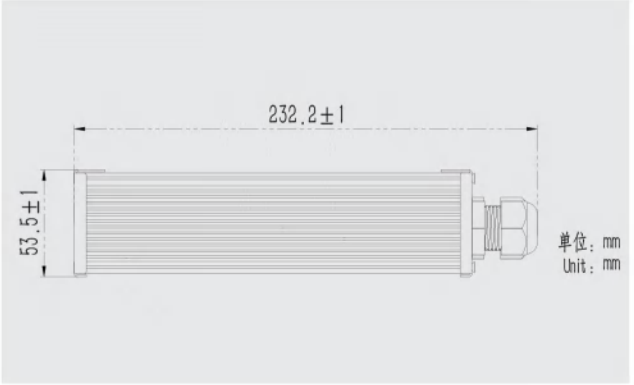
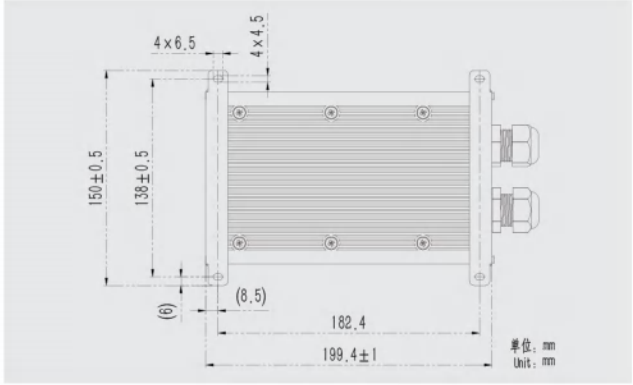
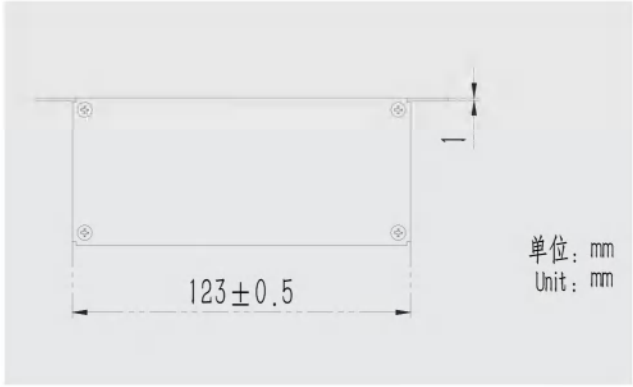


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SPB1-D12020AA1

- 适用于驻车空调、风机等产品的驱动
 - 风冷散热，驱动部分和控制部分分开设计，增加散热器面积，降低系统温升、延长功率器件寿命
 - RS485、电压、电阻以及PWM等多种调速方式
 - 具有启停控制功能、RS485通信功能、风机调速、温度监控、故障指示等功能
- Applicable to parking air conditioning compressor, ventilator and other driver systems
 - Air cooled, driver separated from controller board, enhance heat dissipation capacity and reduce system temperature rise, and lengthen lifetime
 - Variety speed model of RS485, voltage, resistor and PWM other speed regulation solutions
 - Multiple functions: start and stop control function, RS485 communication, fan speed adjustment, temperature monitor and fault code etc

额定输入电压/Rated Input Voltage: DC24V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power: 2 KW	直流电输入端子/DC Input Current Terminal
最大输入电流/Max Input Current: 83 RMSA	三相输出连接压缩机端子/UVW Connection
最大输出电流/Max Output Current: 70 RMSA	VSP调速信号/VSP Speed Modulation
冷却方式/ Cool Model: 风冷/Air Cooled	PWM调速信号/PWM Speed Modulation
工作环境温度/Working Temperature:-25 ~ 60℃	485通讯接口/RS485
直流风机接口/DC Fan:1	温度开关接口/Temperature Switch
调速方式/ Speed Modulation:RS485、VSP、PWM	AC开关接口/AC Switch
认证/ Certification:TBD	直流风机接口/DC Fan Connection

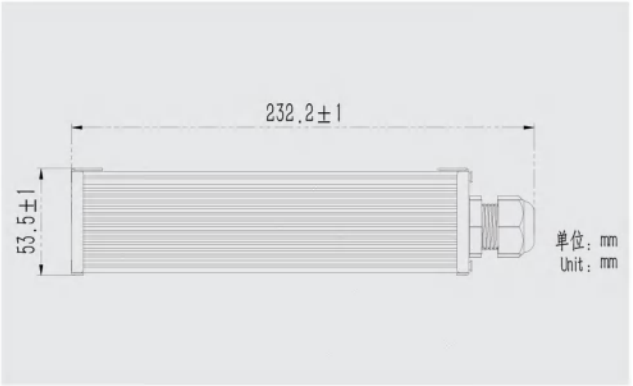
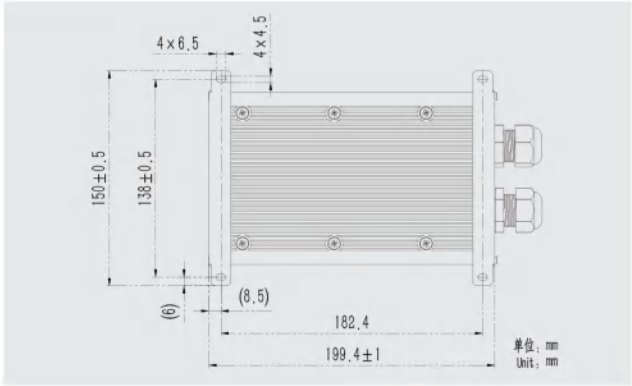
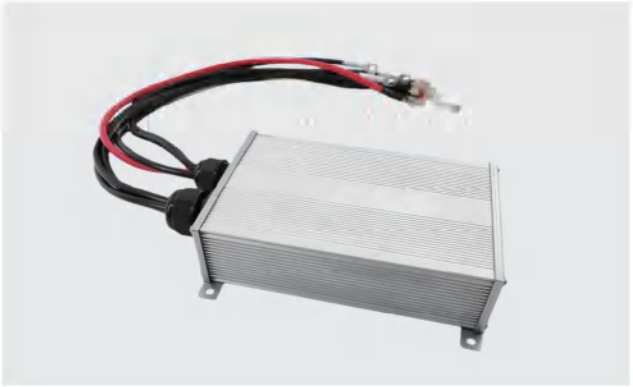
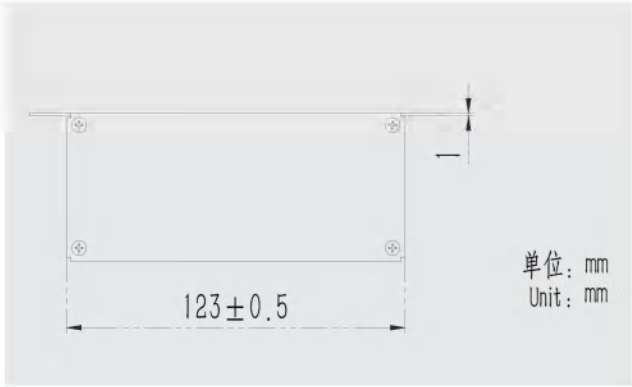


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SPB1-D13025AA1

- 适用于驻车空调、风机等产品的驱动
- 风冷散热，驱动部分和控制部分分开设计，增加散热器面积，降低系统温升、延长功率器件寿命
- RS485、电压、电阻以及PWM等多种调速方式
- 具有启停控制功能、RS485通信功能、风机调速、温度监控、故障指示等功能
- Applicable to parking air conditioning compressor, ventilator and other driver systems
- Air cooled, driver separated from controller board, enhance heat dissipation capacity and reduce system temperature rise, and lengthen lifetime
- Variety speed model of RS485, voltage, resistor and PWM other speed regulation solutions
- Multiple functions: start and stop control function, RS485 communication, fan speed adjustment, temperature monitor and fault code etc

额定输入电压/Rated Input Voltage: DC48V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power: 2.5 KW	直流电输入端子/DC Input Current Terminal
最大输入电流/Max Input Current: 52 RMSA	三相输出连接压缩机端子/UVW Connection
最大输出电流/Max Output Current: 70 RMSA	VSP调速信号/VSP Speed Modulation
冷却方式/Cool Model: 风冷/Air cooled	PWM调速信号/PWM Speed Modulation
工作环境温度/Working Temperature:-25 ~ 60℃	485通讯接口/RS485
直流风机接口/DC Fan:1	温度开关接口/Temperature Switch
调速方式/ Speed Modulation:RS485、VSP、PWM	AC开关接口/AC Switch
认证/ Certification:TBD	直流风机接口/DC Fan Connection

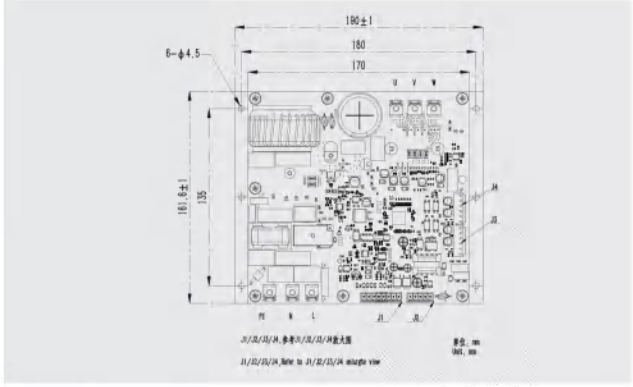
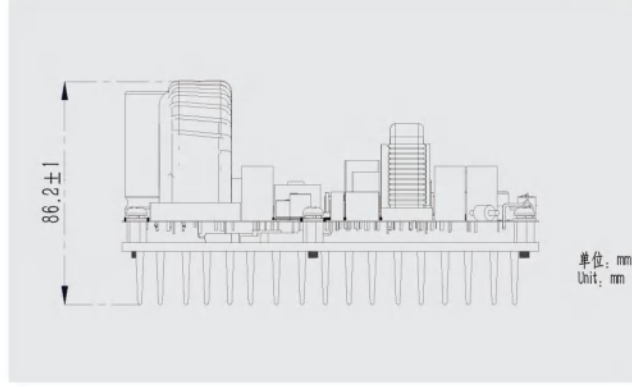
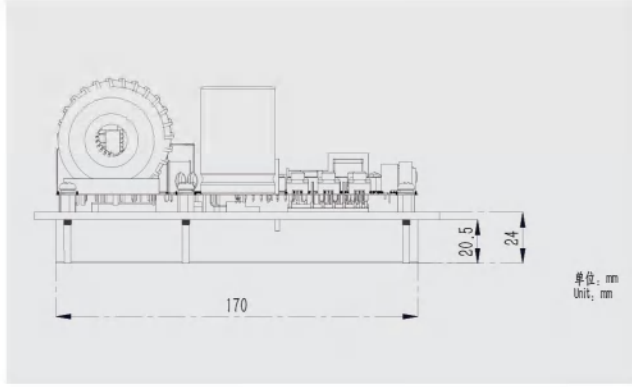


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SPB1-D26010AA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
- 风冷散热，降低系统温升、延长功率器件寿命
- 单相PFC，两个直流风机接口，便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
- Air cooled, reduce system temeprature rise and lengthen power components lifetime
- 220V PFC, double DC fan inerface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC220V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:1KW	单相交流电输入端子 Single Phase AC Input Terminal
功率因数/PFC: > 99%	
最大输入电流/Max Input Current:5RMSA	接地端子/GND
最大输出电流/Max Output Current:3RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:风冷/Air cooled	485通讯接口/RS485
工作环境温度/Working Temperature:-25 ~ 60℃	直流风机1接口/DC Fan1 Connection
直流风机接口/DC Fan:2	直流风机2接口/DC Fan2 Connection
调速方式/ Speed Modulation:RS485	
认证/ Certification:TBD	

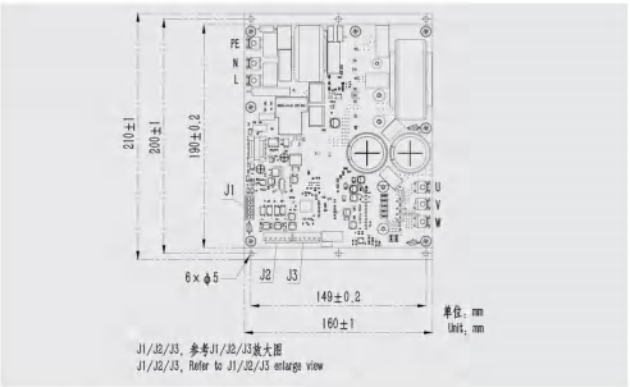
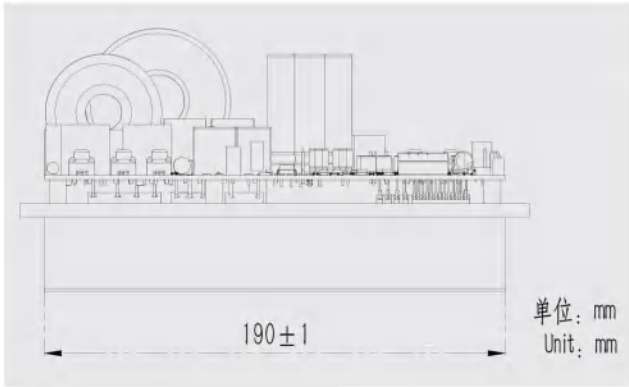
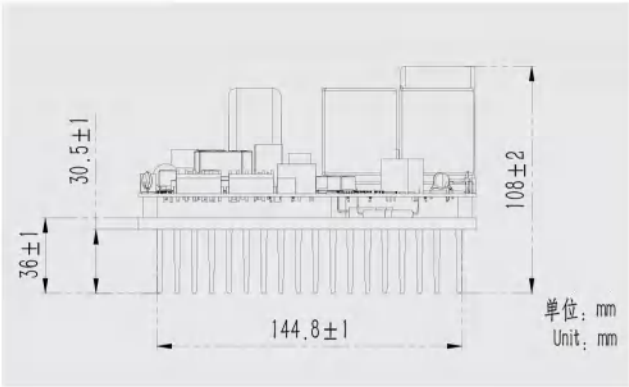


Innovation makes it easy

SPB1-D26020AA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
 - 风冷散热，降低系统温升、延长功率器件寿命
 - 单相PFC，两个直流风机接口，便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
 - Air cooled, reduce system temeptrature rise and lengthen power components lifetime
 - 220V PFC, double DC fan interface, convenient for cascade system

额定输入电压/Rated Input Voltage:AC220V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:2KW	单相交流电输入端子 Single Phase AC Input Terminal
功率因数/PFC: > 99%	
最大输入电流/Max Input Current:9RMSA	接地端子/GND
最大输出电流/Max Output Current:6RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:风冷/Air Cooled	485通讯接口/RS485
工作环境温度/Working Temperature:-25 ~ 60℃	直流风机1接口/DC Fan1 Connection
直流风机接口/DC Fan:2	直流风机2接口/DC Fan2 Connection
调速方式/ Speed Modulation:RS485	
认证/ Certification:TBD	

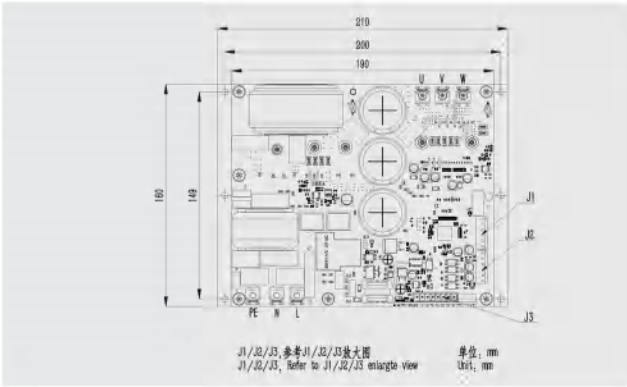
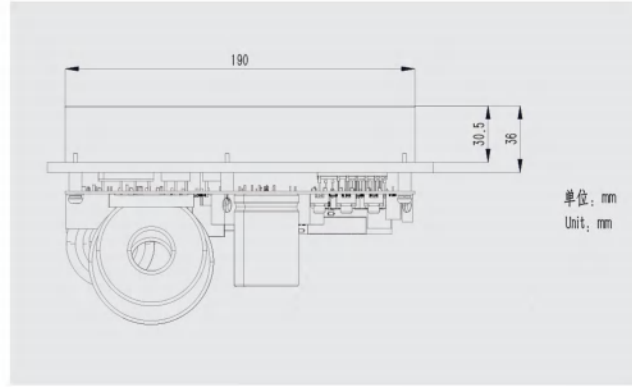
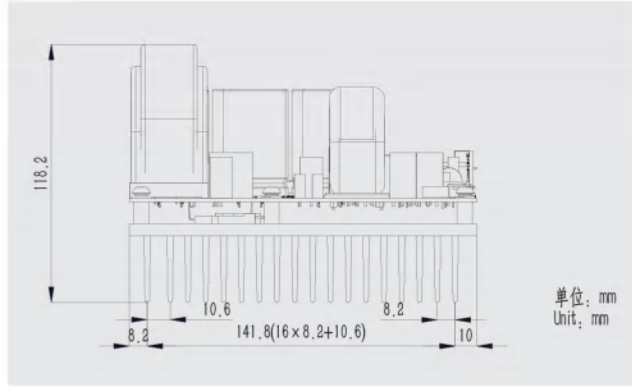


Innovation makes it easy

SPB1-D26030AA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
 - 风冷散热，降低系统温升、延长功率器件寿命
 - 单相PFC，两个直流风机接口，便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
 - Air cooled, reduce system temeptrature rise and lengthen power components lifetime
 - 220V PFC, double DC fan interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC220V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:3KW	单相交流电输入端子 Single Phase AC Input Terminal
功率因数/PFC: > 99%	
最大输入电流/Max Input Current:14RMSA	接地端子/GND
最大输出电流/Max Output Current:10RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:风冷/Air cooled	485通讯接口/RS485
工作环境温度/Working Temperature:-25 ~ 60℃	直流风机1接口/DC Fan1 Connection
直流风机接口/DC Fan:2	直流风机2接口/DC Fan2 Connection
调速方式/ Speed Modulation:RS485	
认证/ Certification:TBD	

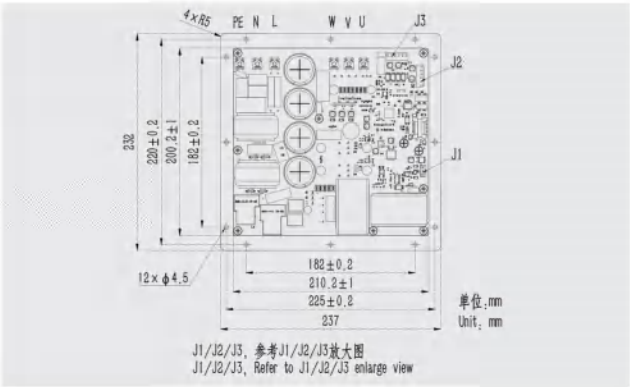
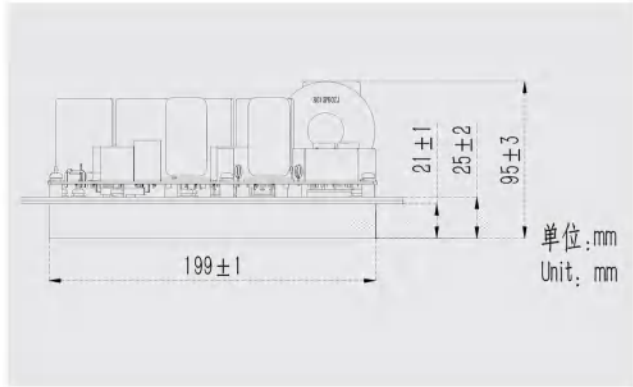
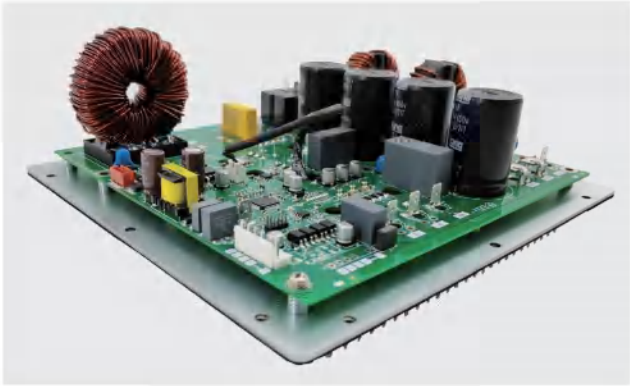
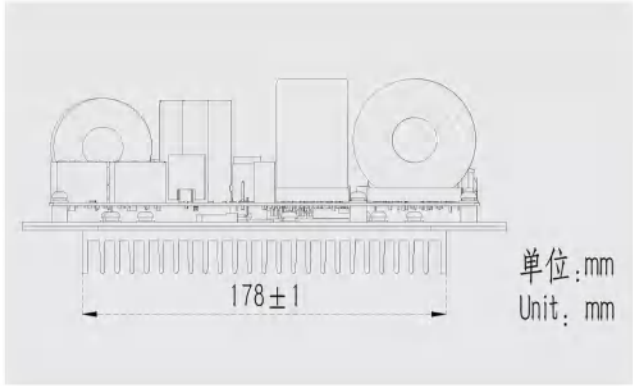


Innovation makes it easy

SPB1-D26040AA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
 - 风冷散热，降低系统温升、延长功率器件寿命
 - 板载EMC滤波器和PFC电感，节省安装空间，减少互连线束
 - 单相PFC，额定状态功率因数 > 99%，隔离485通信，两个直流风机接口，便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
 - Air cooled, reduce system temepature rise and lengthen power components lifetime
 - Integrated EMC filter circuit to save space and less wires
 - PFC > 99% under rated condition, isolated RS485, double Dc fan interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC220V	端子功能说明/DC input current terminal
最大输入功率/Max Input Power:4KW	单相交流电输入端子 Single Phase AC Input Terminal
功率因数/PFC: > 99%	
最大输入电流/Max Input Current:18RMSA	接地端子/GND
最大输出电流/Max Output Current:13RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:风冷/Air cooled	485通讯接口/RS485
工作环境温度/Working Temperature:-25 ~ 60℃	直流风机1接口/DC Fan1 Connection
直流风机接口/DC fan:2	直流风机2接口/DC Fan2 Connection
调速方式/ Speed Modulation:RS485	
认证/ Certification:TBD	

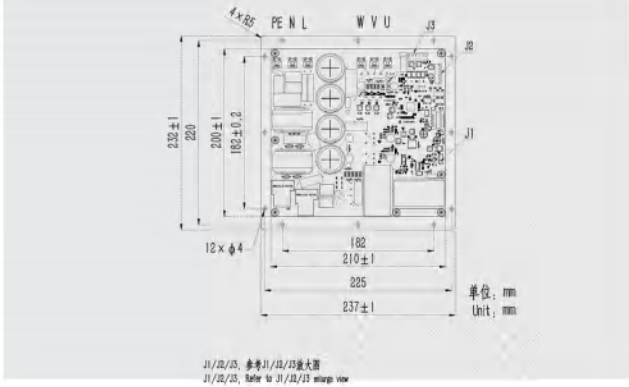
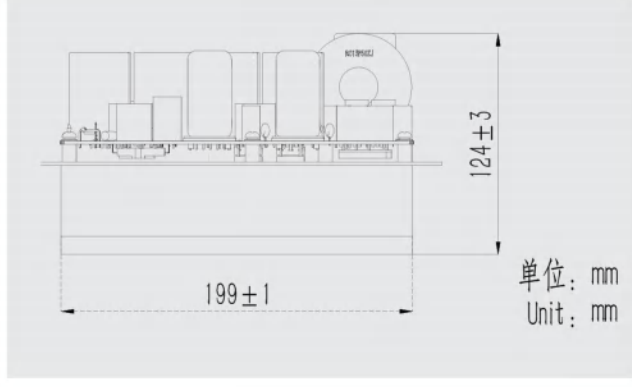
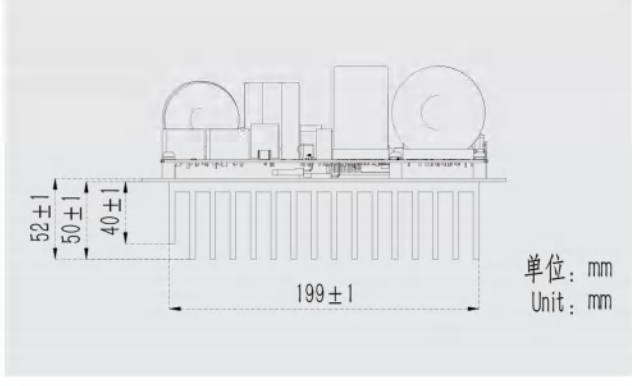


Innovation makes it easy

SPB1-D26050AA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
 - 风冷散热，降低系统温升、延长功率器件寿命
 - 板载EMC滤波器和交错式PFC电感，节省安装空间，减少互连线束
 - 交错PFC，额定状态功率因数 > 99%，隔离485通信，两个直流风机接口，便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
 - Air cooled, reduce system temepature rise and lengthen power components lifetime
 - Integrated EMC filter circuit to save space and less wires
 - PFC > 99% under rated condition, isolated RS485, double DC fan interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC220V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:5KW	单相交流电输入端子 Single Phase AC Input Terminal
功率因数/PFC: > 99%	
最大输入电流/Max Input Current:23RMSA	接地端子/GND
最大输出电流/Max Output Current:16RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:风冷/Air cooled	485通讯接口/RS485
工作环境温度/Working Temperture:-25 ~ 60℃	直流风机1接口/DC Fan1 Connection
直流风机接口/DC Fan:2	直流风机2接口/DC Fan2 Connection
调速方式/ Speed Modulation:RS485	
认证/ Certification:TBD	

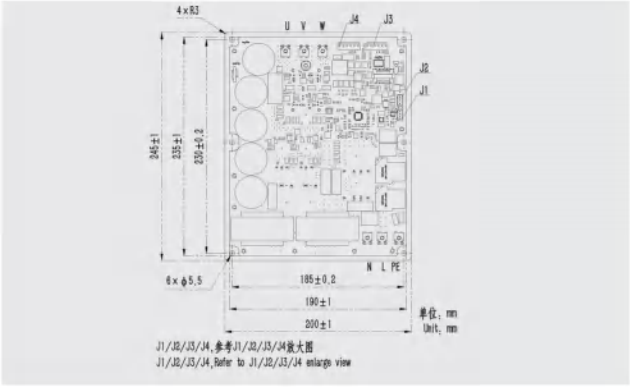
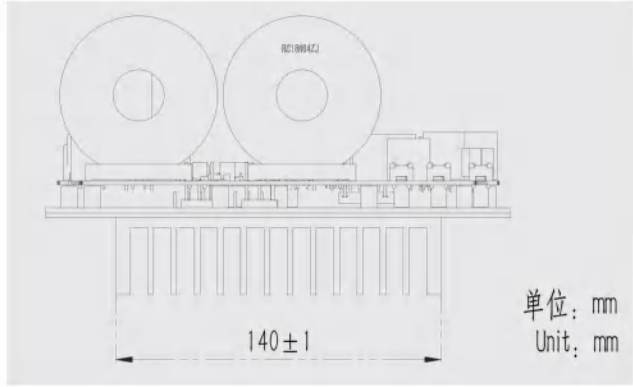
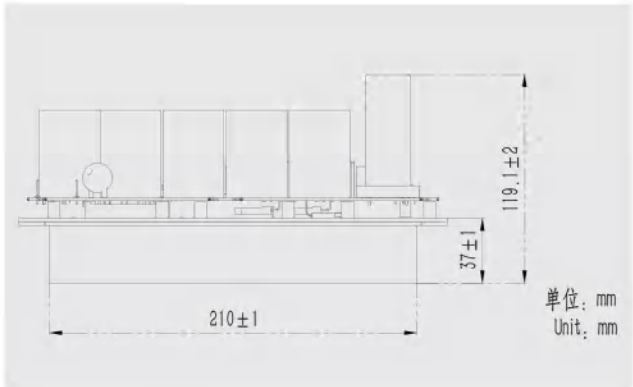


Innovation makes it easy

SPB1-D26065AA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
 - 风冷散热，降低系统温升、延长功率器件寿命
 - 交错PFC，额定状态功率因数 > 99%，两个直流风机接口，便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
 - Air cooled, reduce system temepature rise and lengthen power components lifetime
 - PFC > 99% under rated condition, isolated RS485, double Dc fan interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC220V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:6.5KW	单相交流电输入端子 Single Phase AC Input Terminal
功率因数/PFC: > 99%	
最大输入电流/Max Input Current:30RMSA	接地端子/GND
最大输出电流/Max Output Current:21RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:风冷/Air cooled	TTL通讯接口/TTL
工作环境温度/Working Temprature:-25 ~ 60℃	485通讯接口/RS485
直流风机接口/DC Fan:2	直流风机1接口/DC Fan1 Connection
调速方式/ Speed Modulation:RS485、TTL	直流风机2接口/DC Fan2 Connection
认证/ Certification:TBD	

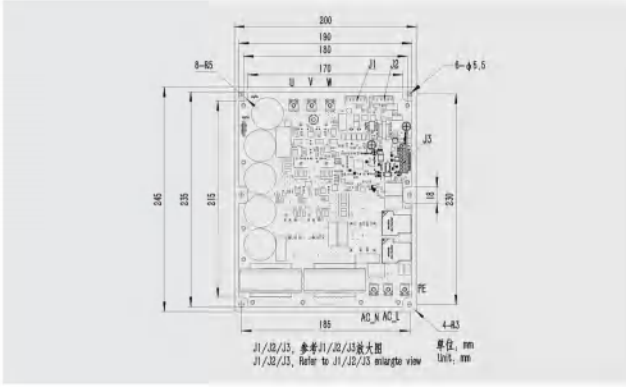
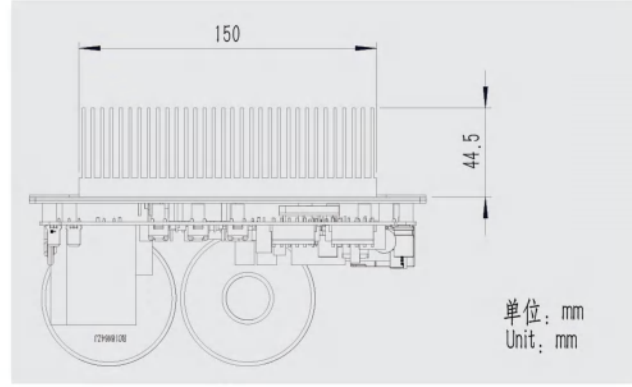
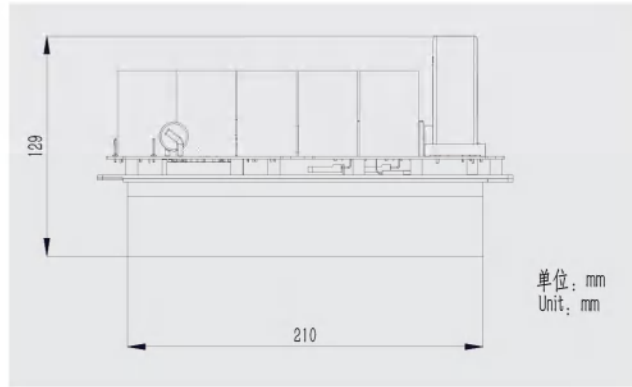


Innovation makes it easy

SPB1-D26080AA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
 - 风冷散热，降低系统温升、延长功率器件寿命
 - 交错PFC，额定状态功率因数 > 99%，两个直流风机接口，便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
 - Air cooled, reduce system temepature rise and lengthen power components lifetime
 - PFC > 99% under rated condition, isolated RS485 double Dc fan interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC220V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:8KW	单相交流电输入端子 Single Phase AC Input Terminal
功率因数/PFC: > 99%	
最大输入电流/Max Input Current:36RMSA	接地端子/GND
最大输出电流/Max Output Current:25RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:风冷/Air cooled	TTL通讯接口/TTL
工作环境温度/Working Temprature:-25 ~ 60℃	485通讯接口/RS485
直流风机接口/DC Fan:2	直流风机1接口/DC Fan1 Connection
调速方式/ Speed Modulation:RS485、TTL	直流风机2接口/DC Fan2 Connection
认证/ Certification:TBD	

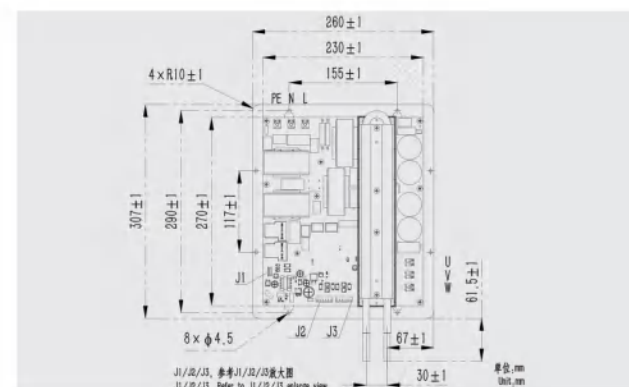
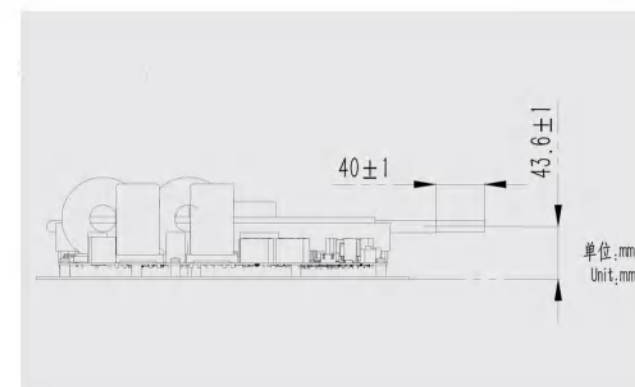
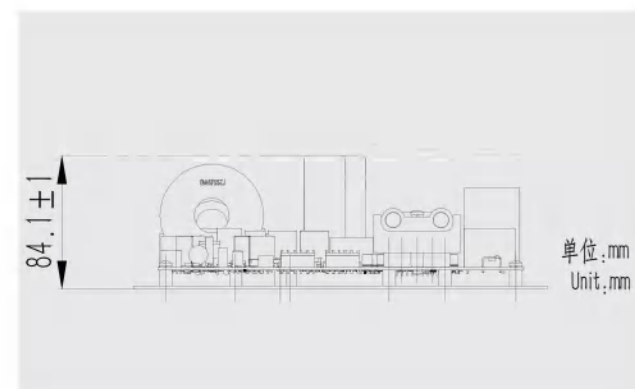


Innovation makes it easy

SPB1-D26080BA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
- 液冷散热, 降低系统温升、延长功率器件寿命
- 板载EMC滤波器和PFC电感, 节省安装空间, 减少互连线束
- 交错PFC, 额定状态功率因数 > 99%, 两个直流风机接口, 便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
- Liquid cooled, reduce system temeperature rise and lengthen power components lifetime
- Integrated EMC filter circuit to save space and less wires
- PFC > 99% under rated condition, isolated RS485, double Dc fan interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC220V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:8KW	单相交流电输入端子 Single Phase AC Input Terminal
功率因数/PFC: > 99%	
最大输入电流/Max Input Current:36RMSA	接地端子/GND
最大输出电流/Max Output Current:25RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:液冷/Liquid cooled	485通讯接口/RS485
工作环境温度/Working Temperature:-25 ~ 60℃	直流风机1接口/DC Fan1 Connection
直流风机接口/DC Fan:2	直流风机2接口/DC Fan2 Connection
调速方式/ Speed Modulation:RS485	
认证/ Certification:TBD	

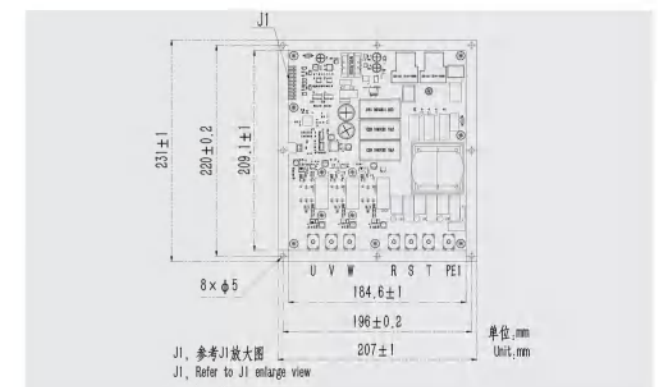
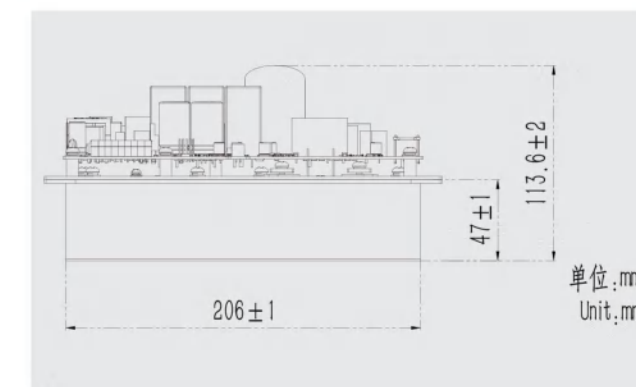
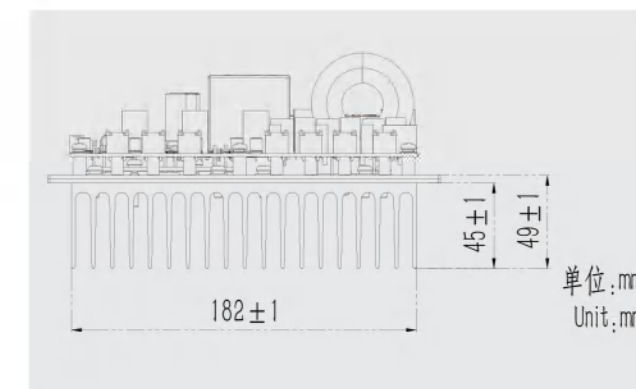


Innovation makes it easy

SPB1-D38080AA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
- 风冷散热, 降低系统温升、延长功率器件寿命
- 板载EMC滤波器, 节省安装空间, 减少互连线束
- 无电解电容方案, 功率因数>90%, 两个独立的485通讯接口, 便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
- Air cooled, reduce system temeperature rise and lengthen power components lifetime
- Integrated EMC filter circuit to save space and less wires
- Without electrolytic capacitor, PFC > 90% rated power, double individual RS485 interface, convenient for cascade system

额定输入电压/Rated Input Voltage:AC380V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:8KW	三相交流电输入端子 3-phase AC Input Terminal
功率因数/PFC: > 90%	
最大输入电流/Max Input Current:21RMSA	接地端子/GND
最大输出电流/Max Output Current:15RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:风冷/Air cooled	外接电容板预留端子/Capacitor Connection
工作环境温度/Working Temperature:-25 ~ 60℃	通讯及预留接口 Communicate Interface or Reserved Interface
直流风机接口/DC Fan	
调速方式/ Speed Modulation:RS485	
认证/ Certification:TBD	

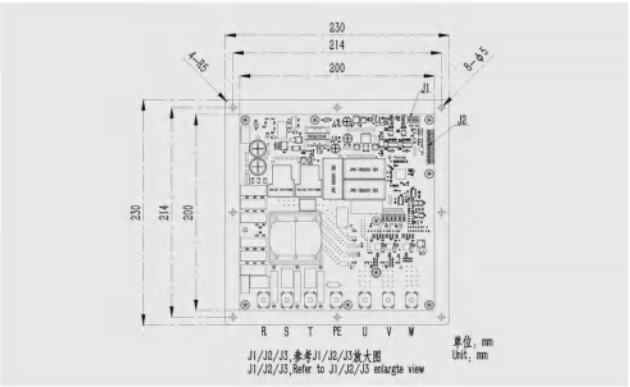
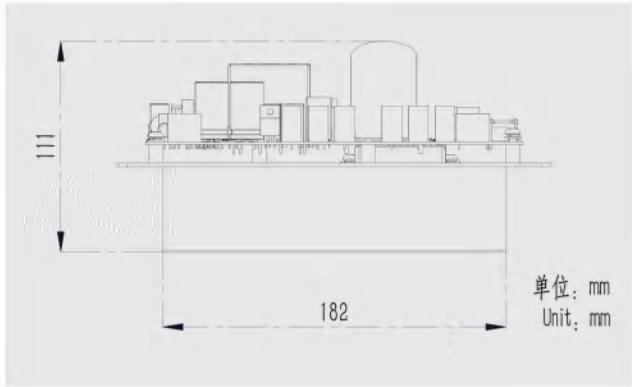
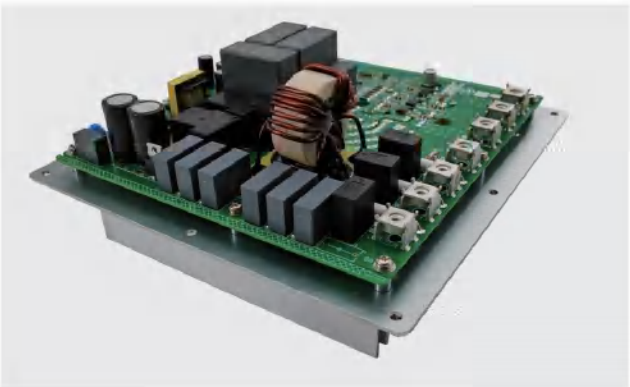
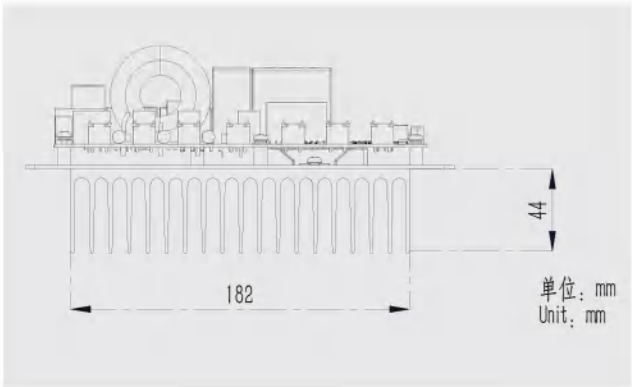


Innovation makes it easy

SPB1-D38080AB1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
 - 风冷散热，降低系统温升、延长功率器件寿命
 - 板载EMC滤波器，节省安装空间，减少互连线束
 - 无电解电容方案，功率因数>90%
 - 两个独立的485通讯接口，便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
 - Air cooled, reduce system tempeprature rise and lengthen power components lifetime
 - Integrated EMC filter circuit to save space and less wires
 - Without electrolytic capacitor, PFC > 90% rated power
 - Double individual RS485 interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC380V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:8KW	三相交流电输入端子 3-phase AC Input Terminal
功率因数/PFC: > 90%	
最大输入电流/Max Input Current:21RMSA	接地端子/GND
最大输出电流/Max Output Current:15RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:风冷/Air Air cooled	外接电容板预留端子/Capacitor Connection
工作环境温度/Working Temperature:-25 ~ 60℃	通讯及预留接口 Communicate Interface or Reserved Interface
直流风机接口/DC Fan	
调速方式/ Speed Modulation:RS485	
认证/ Certification:TBD	

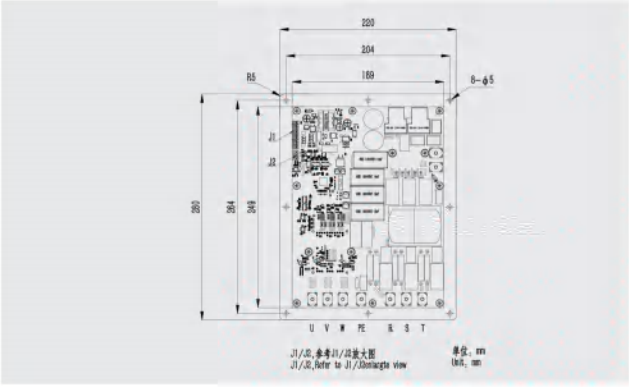
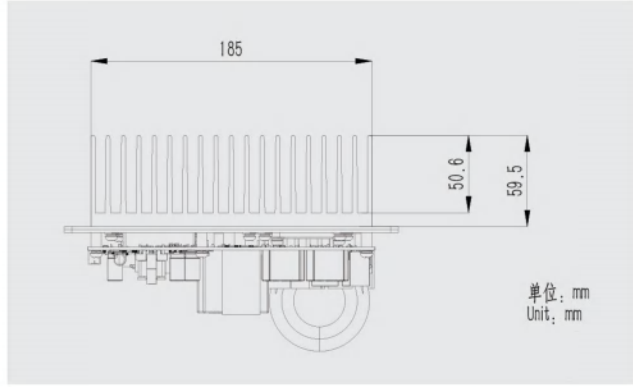
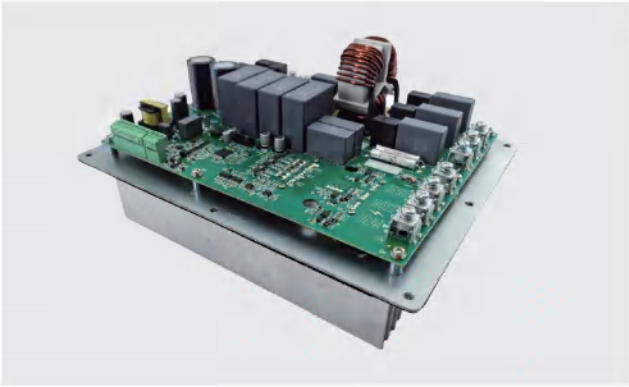


Innovation makes it easy

SPB1-D38120AA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
 - 风冷散热，降低系统温升、延长功率器件寿命
 - 板载EMC滤波器，节省安装空间，减少互连线束
 - 无电解电容方案，功率因数>90%
 - 两个独立的485通讯接口，便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
 - Air cooled, reduce system tempeprature rise and lengthen power components lifetime
 - Integrated EMC filter circuit to save space and less wires
 - Without electrolytic capacitor, PFC > 90% rated power
 - Double individual RS485 interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC380V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:12KW	三相交流电输入端子 3-phase AC Input Terminal
功率因数/PFC: > 90%	
最大输入电流/Max Input Current:31RMSA	接地端子/GND
最大输出电流/Max Output Current:22RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:风冷/Air cooled	外接电容板预留端子/Capacitor Connection
工作环境温度/Working Temperature:-25 ~ 60℃	通讯及预留接口 Communicate Interface or Reserved Interface
直流风机接口/DC Fan	
调速方式/ Speed Modulation:RS485	
认证/ Certification:TBD	



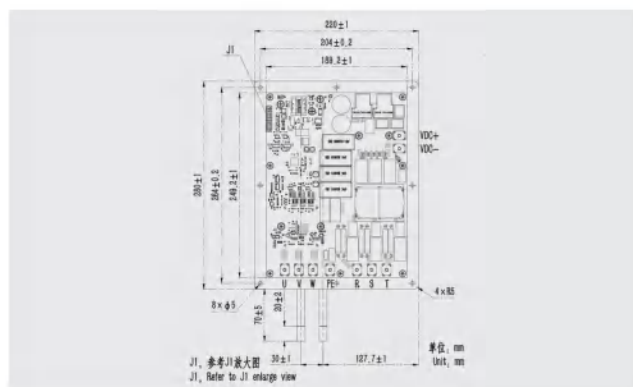
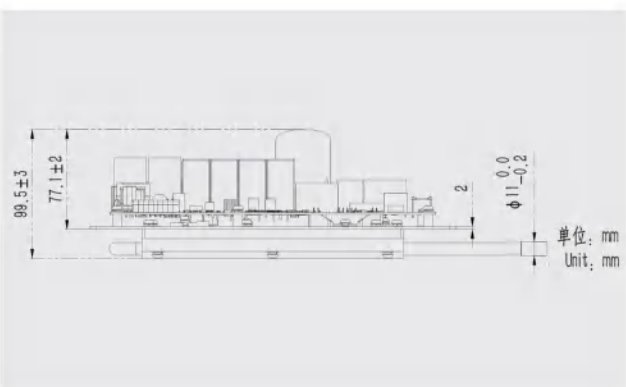
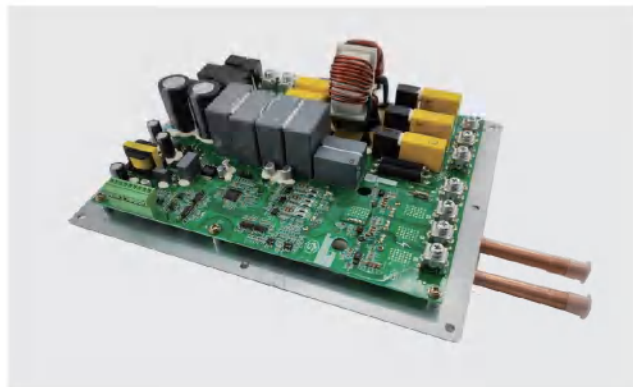
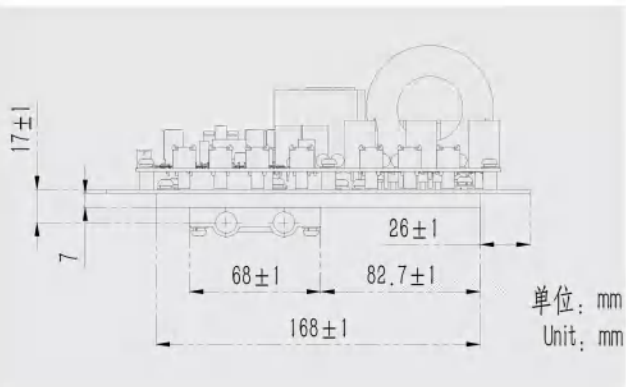
Innovation makes it easy

SPB1-D38120BA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
- 风冷散热，降低系统温升、延长功率器件寿命
- 板载EMC滤波器，节省安装空间，减少互连线束
- 无电解电容方案，功率因数>90%，两个独立的485通讯接口，便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
- Air cooled, reduce system temperature rise and lengthen power components lifetime
- Integrated EMC filter circuit to save space and less wires
- Without electrolytic capacitor, PFC > 90% rated power, double individual RS485 interface, convenient for cascade systems

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
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额定输入电压/Rated Input Voltage:AC380V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:12KW	
功率因数/PFC	
最大输入电流/Max Input Current:31RMSA	三相交流电输入端子 3-phase AC Input Terminal
最大输出电流/Max Output Current:22RMSA	接地端子/GND
冷却方式/Cool Model:液冷/Liquid cooled	三相输出连接压缩机端子/UVW Connection
工作环境温度/Working Temperature:-25 ~ 60℃	外接电容板预留端子/Capacitor Connection
直流风机接口/DC Fan	通讯及预留接口 Communicate Interface or Reserved Interface
调速方式/ Speed Modulation:RS485	
认证/ Certification:TBD	



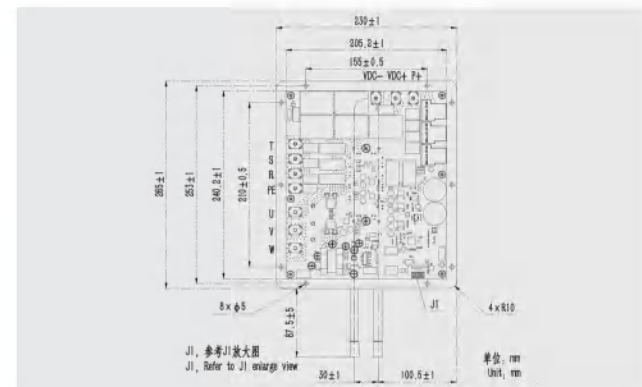
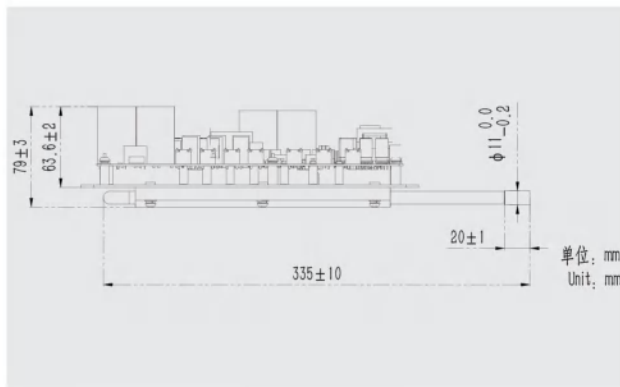
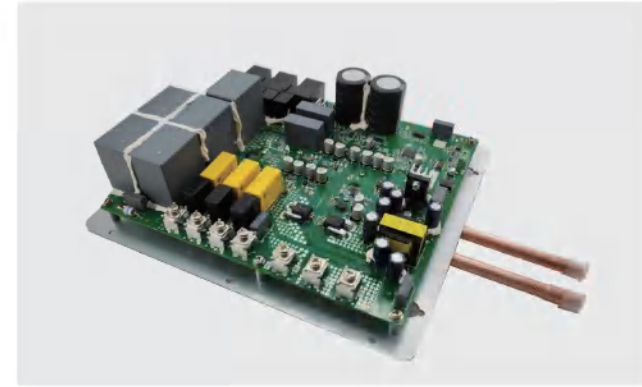
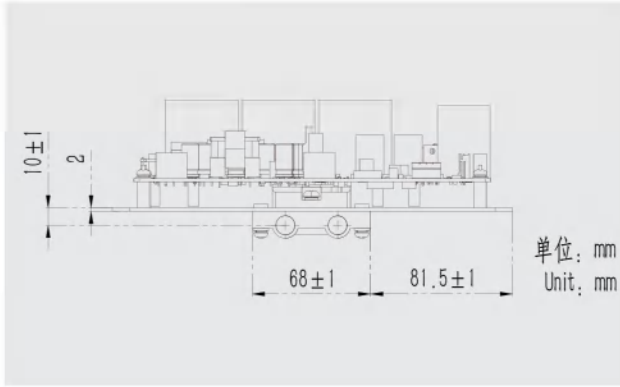
Innovation makes it easy

SPB1-D38150BA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
 - 液冷散热，降低系统温升、延长功率器件寿命
 - 无电解方案兼容有电解，配套滤波板，电容板使用，功率因数最大>90%，隔离485通讯接口，便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
 - Liquid cooled, reduce system temperature rise and lengthen power components lifetime
 - The non-electrolysis solution is compatible with electrolysis, matching filter boards and capacitor boards and max PFC >90%, isolated RS485 interface, convenient for cascade systems

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
 - 液冷散热，降低系统温升、延长功率器件寿命
 - 无电解方案兼容有电解，配套滤波板，电容板使用，功率因数最大>90%，隔离485通讯接口，便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
 - Liquid cooled, reduce system temperature rise and lengthen power components lifetime
 - The non-electrolysis solution is compatible with electrolysis, matching filter boards and capacitor boards and max PFC >90%, isolated RS485 interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC380V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:15KW	
功率因数/PFC: >90%	三相交流电输入端子 3-phase AC Input Terminal
最大输入电流/Max Input Current:40RMSA	接地端子/GND
最大输出电流/Max Output Current:28RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:液冷/Liquid cooled	外接电容板或电抗预留端子 External Capacitor Board or Reactor
工作环境温度/Working Temperatur:-25 ~ 60℃	
直流风机接口/DC Fan	通讯及预留接口 Communicate Interface or Reserved Interface
调速方式/ Speed Modulation:RS485	
认证/ Certification:TBD	



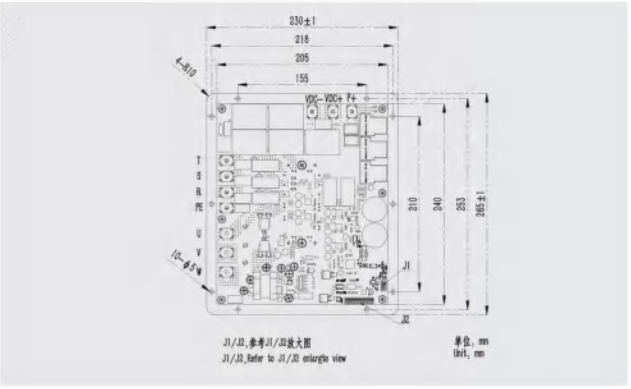
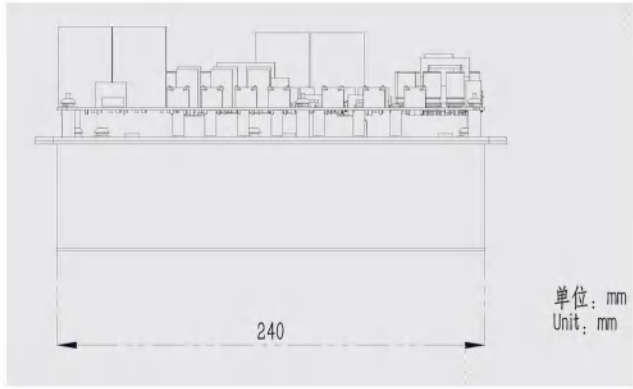
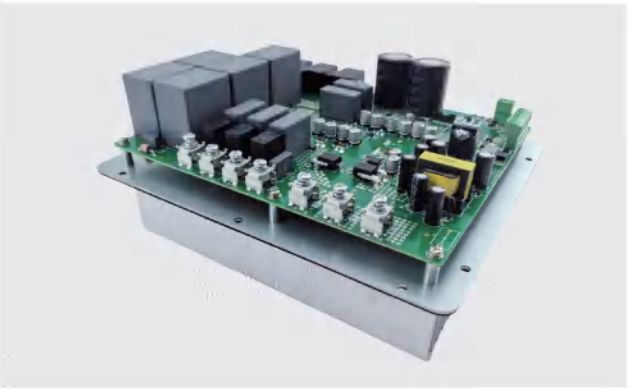
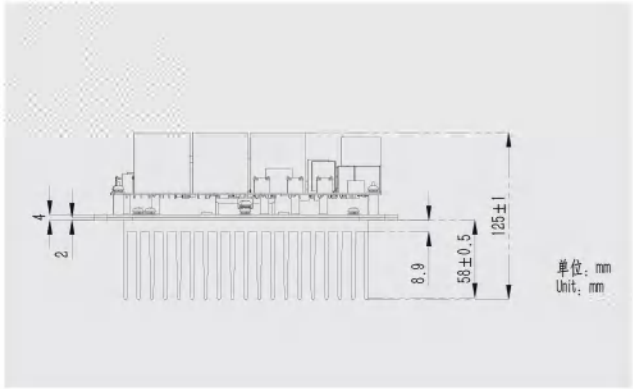
Innovation makes it easy

SPB1-D38150AA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
- 风冷散热，降低系统温升、延长功率器件寿命
- 无电解方案兼容有电解，配套滤波板，电容板使用，功率因数最大>90%
- 隔离485通讯接口，便于客户系统级联

- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
- Air cooled, reduce system temepature rise and lengthen power components lifetime
- The non-electrolysis solution is compatible with electrolysis, matching filter boards and capacitor boards, and max PFC >90%
- Isolated RS485 interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC380V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:15KW	三相交流电输入端子
功率因数/PFC: >90%	3-phase AC Input Terminal
最大输入电流/Max Input Current:40RMSA	接地端子/GND
最大输出电流/Max Output Current:28RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:风冷/Air cooled	外接电容板或电抗预留端子
工作环境温度/Working Temperature:-25 ~ 60℃	External Capacitor Board or Reactor
直流风机接口/DC Fan	通讯及预留接口
调速方式/ Speed Modulation:RS485	Communicate Interface or Reserved Interface
认证/ Certification:TBD	



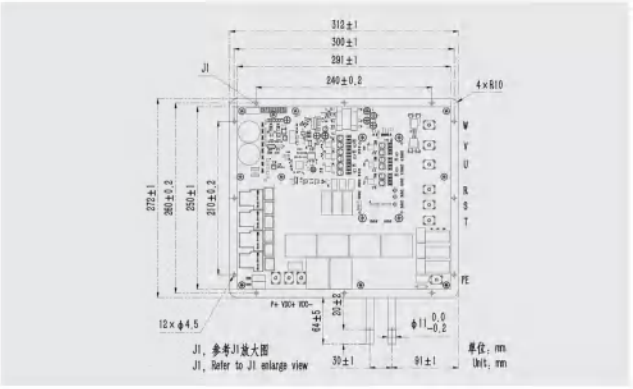
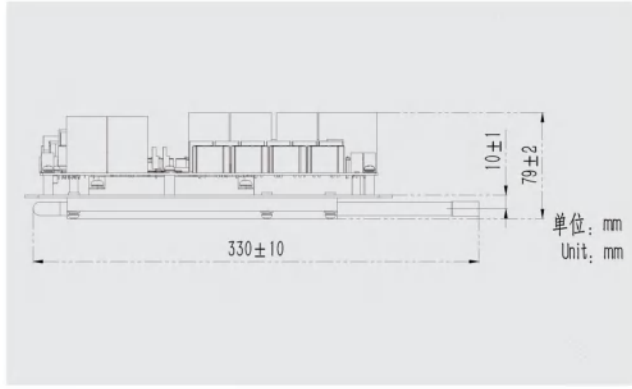
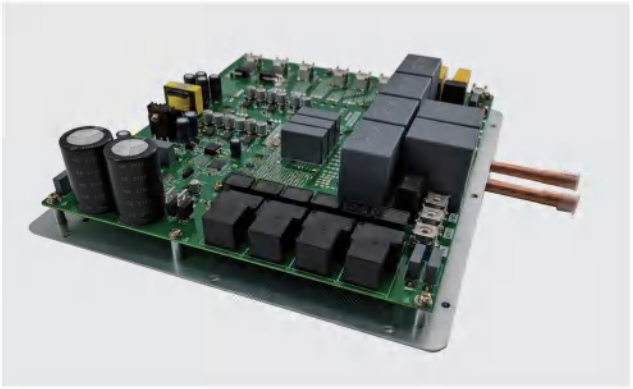
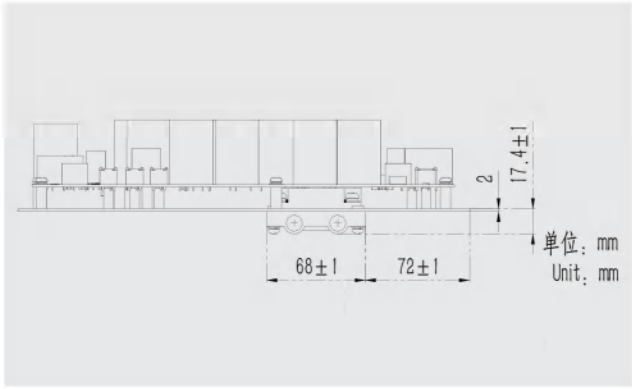
Innovation makes it easy

SPB1-D38180BA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
- 液冷散热，降低系统温升、延长功率器件寿命
- 节省安装空间，减少互连线束
- 无电解电容方案，功率因数>90%
- 隔离485通讯接口，便于客户系统级联

- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
- Liquid cooled, reduce system temepature rise and lengthen power components lifetime
- Reduced installation space and less wires installation
- Without electrolytic capacitor, PFC > 90% rated power
- Isolated RS485 interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC380V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:18KW	三相交流电输入端子
功率因数/PFC: >90%	3-phase AC Input Terminal
最大输入电流/Max Input Current:47RMSA	接地端子/GND
最大输出电流/Max Output Current:33RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:液冷/Liquid cooled	外接电容板或电抗预留端子
工作环境温度/Working Temperature:-25 ~ 60℃	External Capacitor Board or Reactor
直流风机接口/DC Fan	通讯及预留接口
调速方式/ Speed Modulation:RS485	Communicate Interface or Reserved Interface
认证/ Certification:TBD	



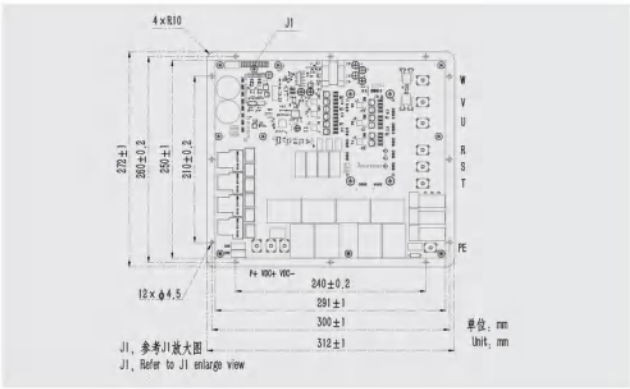
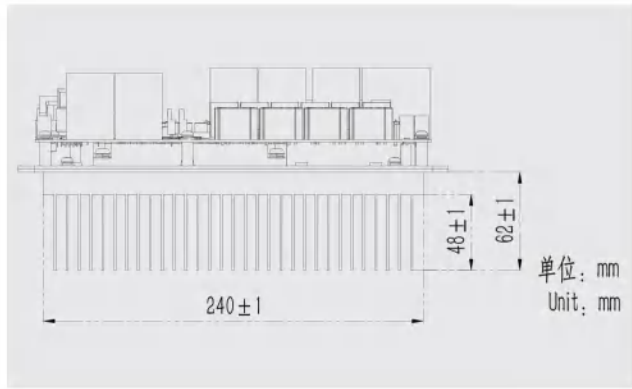
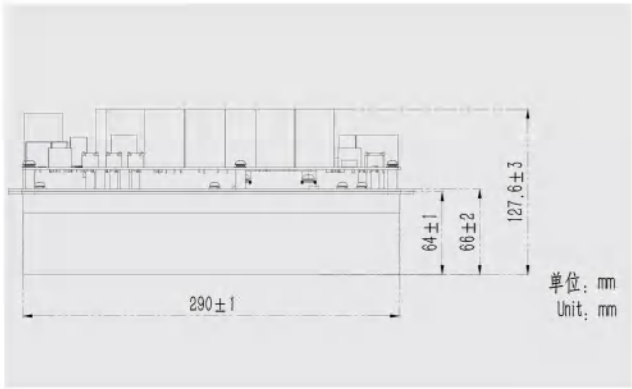
Innovation makes it easy

SPB1-D38220AA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
- 风冷散热，降低系统温升、延长功率器件寿命
- 节省安装空间，减少互连线束
- 无电解电容方案，功率因数>90%，两个独立的485通讯接口，便于客户系统级联

- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
- Air cooled, reduce system temeprature rise and lengthen power components lifetime
- Save installation space and reduce wires connection
- PFC up to 90% with non-electrolytic capacitor, double individual RS485 interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC380V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:22KW	三相交流电输入端子
功率因数/PFC: >90%	3-phase AC Input Terminal
最大输入电流/Max Input Current:58RMSA	接地端子/GND
最大输出电流/Max Output Current:41RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:风冷/Air cooled	外接电容板或电抗预留端子
工作环境温度/Working Temperature:-25 ~ 60℃	External Capacitor Board or Reactor
直流风机接口/DC Fan	通讯及预留接口
调速方式/ Speed Modulation:RS485	Communicate Interface or Reserved Interface
认证/ Certification:TBD	



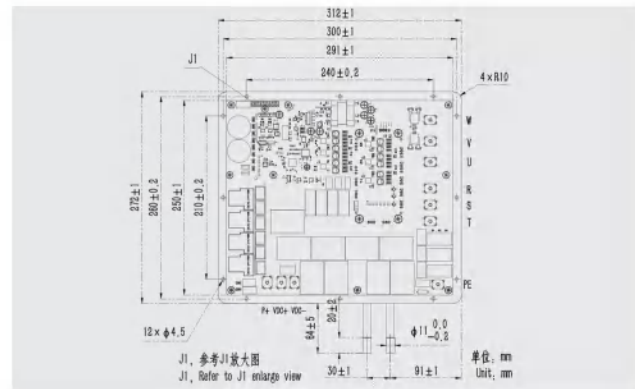
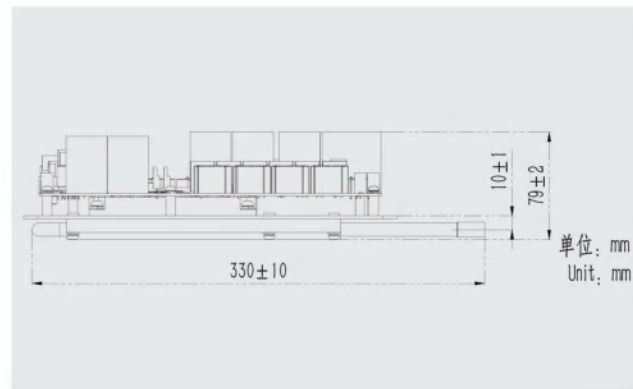
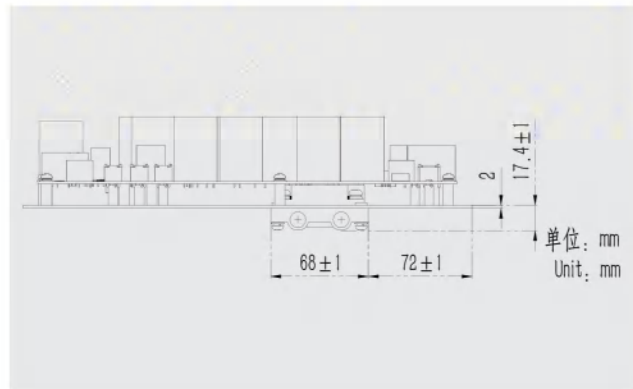
Innovation makes it easy

SPB1-D38250BA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
- 液冷散热，降低系统温升、延长功率器件寿命
- 节省安装空间，减少互连线束
- 无电解电容方案，功率因数>90%，两个独立的485通讯接口，便于客户系统级联

- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
- Liquid cooled, reduce system temeprature rise and lengthen power components lifetime
- Save installation space and reduce wires connection
- Power factor > 90% with non-electrolytic capacitor, double individual RS485 interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC380V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:25KW	三相交流电输入端子
功率因数/PFC: >90%	3-phase AC Input Terminal
最大输入电流/Max Input Current:66RMSA	接地端子/GND
最大输出电流/Max Output Current:46RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:液冷/Liquid cooled	外接电容板或电抗预留端子
工作环境温度/Working Temperature:-25 ~ 60℃	External Capacitor Board or Reactor
直流风机接口/DC Fan	通讯及预留接口
调速方式/ Speed Modulation:RS485	Communicate Interface or Reserved Interface
认证/ Certification:TBD	

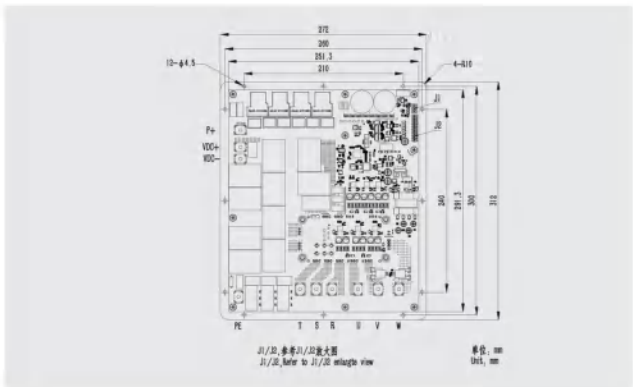
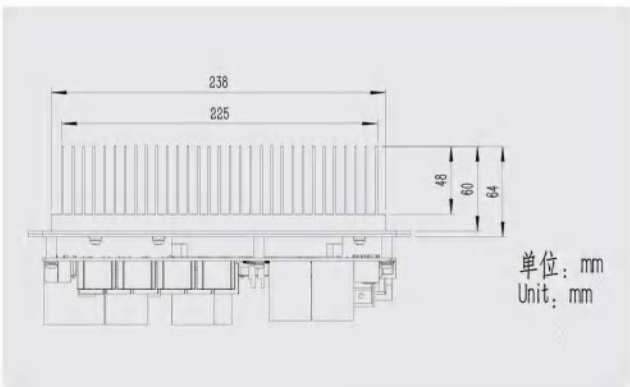
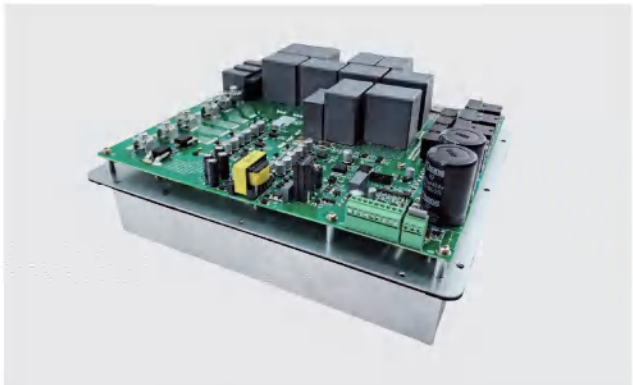


Innovation makes it easy

SPB1-D38280AA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
 - 风冷散热，降低系统温升、延长功率器件寿命
 - 节省安装空间，减少互连线束
 - 无电解电容方案，功率因数>90%，两个独立的485通讯接口，便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
 - Air cooled, reduce system temperature rise and lengthen power components lifetime
 - Save installation space and reduce wires connection
 - PFC up to 90% with non-electrolytic capacitor, double individual RS485 interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC380V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:28KW	
功率因数/PFC: >90%	
最大输入电流/Max Input Current:73RMSA	三相交流电输入端子 3-phase AC Input Terminal
最大输出电流/Max Output Current:52RMSA	接地端子/GND
冷却方式/Cool Model:风冷/Air cooled	三相输出连接压缩机端子/UVW Connection
工作环境温度/Working Temperature:-25 ~ 60℃	外接电容板或电抗预留端子 External capacitor Board or Reactor
直流风机接口/DC Fan	通讯及预留接口 Communicate Interface or Reserved Interface
调速方式/ Speed Modulation:RS485	
认证/ Certification:TBD	

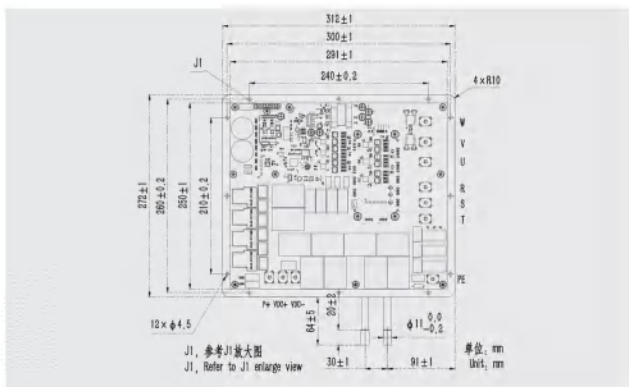
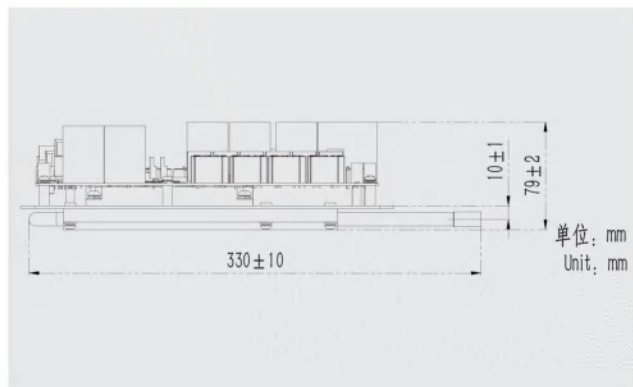
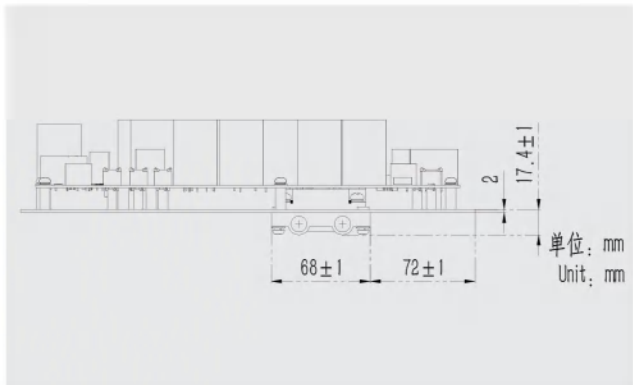


Innovation makes it easy

SPB1-D38300BA1

- 适用于空调、热泵、冷柜、水泵、风机等产品的驱动
 - 液冷散热，降低系统温升、延长功率器件寿命
 - 节省安装空间，减少互连线束
 - 无电解电容方案，功率因数>90%，两个独立的485通讯接口，便于客户系统级联
- Applicable to air conditioner, heat pump, freezer, water pump, ventilator and other driver systems
 - Liquid cooled, reduce system temperature rise and lengthen power components lifetime
 - Save installation space and reduce wires connection
 - PFC up to 90% with non-electrolytic capacitor, double individual RS485 interface, convenient for cascade systems

额定输入电压/Rated Input Voltage:AC380V	端子功能说明/Terminal Definition
最大输入功率/Max Input Power:30KW	三相交流电输入端子 3-phase AC Input Terminal
功率因数/PFC: >90%	
最大输入电流/Max Input Current:79RMSA	接地端子/GND
最大输出电流/Max Output Current:56RMSA	三相输出连接压缩机端子/UVW Connection
冷却方式/Cool Model:液冷/Liquid cooled	外接电容板或电抗预留端子 External capacitor Board or Reactor
工作环境温度/Working Temperature:-25 ~ 60℃	
直流风机接口/DC Fan	通讯及预留接口 Communicate Interface or Reserved Interface
调速方式/ Speed Modulation:RS485	
认证/ Certification:TBD	



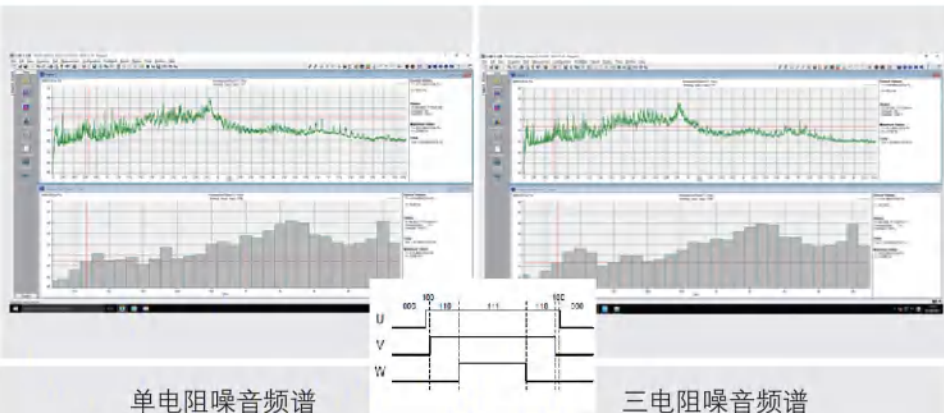
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SPB1系列技术特色

SPB1 TECHNICAL FEATURES

低噪音单电阻方案

Low Noise Single Resistor Solution



单电阻噪音频谱
Single Shunt Noise Spectrum

三电阻噪音频谱
Three-shunts Noise Spectrum

SVPWM过调制

SVPWM Overmodulation



调制比1:1
Modulation Index 1.1

在成本或空间要求极致的应用中，电机控制器不可避免的应用到单电阻电流采样方案。传统的单电阻方案中因为采样方式的原因会引入较大的电磁噪音和转矩脉动，并造成机械振动。洲钜单电阻方案可完美解决该问题，在对电机进行适当匹配后，可明显减小电机噪音与振动，甚至降低至三电阻噪音的水平。

In the application of extreme cost or space requirements, motor controller is inevitably applied to the single resistance current sampling scheme. In the traditional single resistance scheme, due to the sampling mode, large electromagnetic noise and torque ripple will be introduced, and mechanical vibration will be caused. The Zhouju single resistance scheme can perfectly solve this problem. After proper matching of the motor, the motor noise and vibration can be significantly reduced, even to the level of three resistance noise.

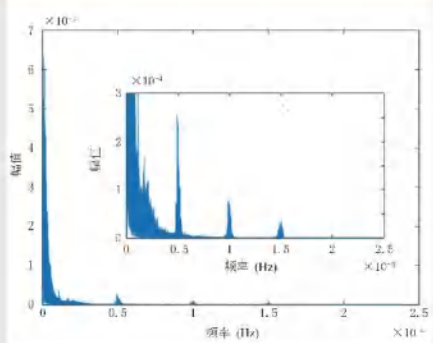
In the application of extreme cost or space requirements, motor controller is inevitably applied to the single resistance current sampling scheme. In the traditional single resistance scheme, due to the sampling mode, large electromagnetic noise and torque ripple will be introduced, and mechanical vibration will be caused. The Zhouju single resistance scheme can perfectly solve this problem. After proper matching of the motor, the motor noise and vibration can be significantly reduced, even to the level of three resistance noise.

SVPWM过调制技术可将逆变器输出电压最大化，可以减少控制器温升，在供电条件不变时进一步提高电机最大转速，提升电机效率。

SVPWM over modulation technology can maximize the output voltage of the inverter, reduce the temperature rise of the controller, further improve the maximum speed of the motor and improve the efficiency of the motor when the power supply conditions remain unchanged.

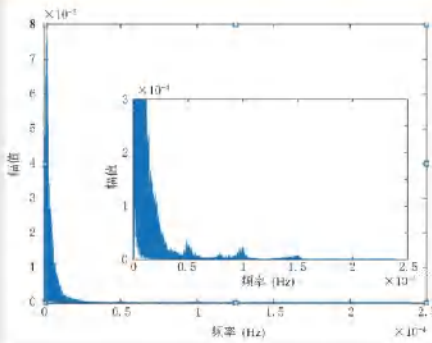
载频优化策略

Carrier Frequency Optimization Strategy



优化前幅频特性

Amplitude Frequency Characteristics Without Optimization



优化后幅频特性

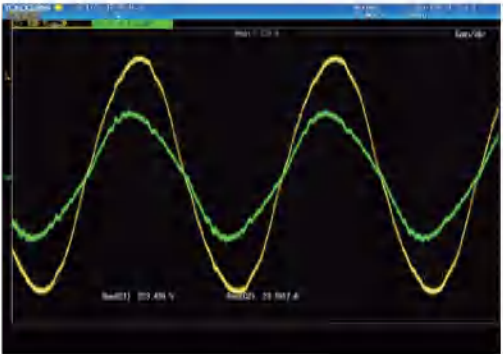
Amplitude-frequency Characteristics Without Optimization

洲钜载频优化策略包含变载频、随机载频、变调制方式等多种方案，可以适应各类电机系统的个性化需求，在减少控制器温升、降低电磁噪音、提高控制器效率等多方面有明显效果。

Carrier frequency optimization strategy including vary carrier frequency, random carrier frequency, frequency modulation and other solutions. It is suitable for variety motor systems requirement. Especially to reduce unit temperature rise, reduce magnetic noise, improve controller efficiency obviously.

完善的PFC方案

Perfect PFC Plan



电流电压波形

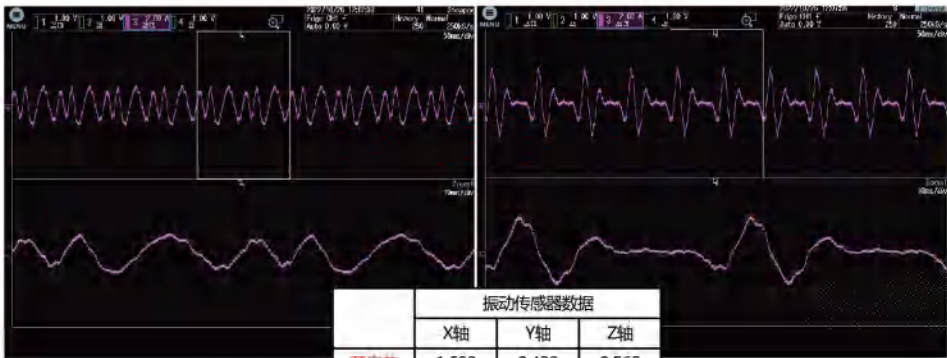
Current and Voltage Waveforms

为满足法规中的谐波要求，洲钜针对功率因数校正有单相板载方案，单相交错方案，三相全桥方案，可满足客户的各种不同要求。

To meet standard harmoinc wave requirement and customers customized requiments, Zhouju develop PFC design with integrated board, (220V)single phase interleaved (220V), full-bridge solutions(380V).

单转子压缩机转矩波动自适应补偿

Adaptive Compensation for Torque Fluctuation of Single Rotor Compressor



转矩补偿开启前

Without Torque Compensation

转矩补偿开启后

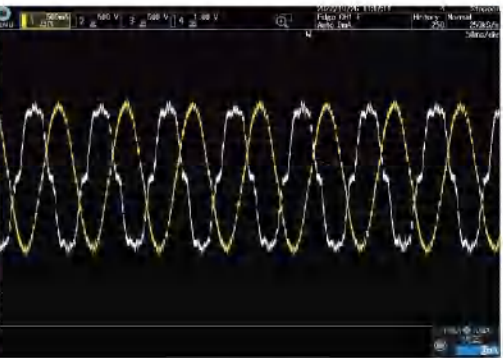
With Torque Compensation

单转子压缩机由于结构的特殊性，电机端负载转矩不平衡，具有周期性波动，这会产生较明显的系统振动与机械噪音，甚至缩短系统寿命。洲钜转矩补偿技术通过额外的转矩输出抑制电机转速波动，从而减小系统振动，有效改善系统噪音和使用周期。对于这种周期性波动的负载或者现象，洲钜的转矩补偿技术具有普适性与自适应性。

Due to the special structure of the single rotor compressor, the load torque at the motor end is unbalanced and has periodic fluctuations, which will produce obvious system vibration and mechanical noise, and even shorten the system life. Zhouju torque compensation technology can suppress motor speed fluctuation through additional torque output, thus reducing system vibration and effectively improving system noise and service life. For such periodically fluctuating load or phenomenon, Zhouju's torque compensation technology has universality and adaptability.

死区谐波补偿

Dead Time Effect Harmonic Compensation



补偿前后对比

Comparison Between With and Without Compensation

由于逆变器死区时间的存在以及功率器件压降等原因，电机电流不可避免地存在谐波，使得电机产生电磁噪音和振动。在一些室内应用的场景，洲钜死区谐波补偿技术可以主动抑制电流谐波，减轻系统噪音及振动。

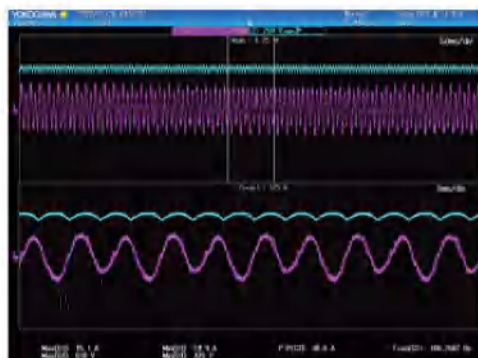
Due to the existence of dead time of inverter and voltage drop of power components, there are inevitably harmonics in the motor current, which makes the motor generate electromagnetic noise and vibration. In some indoor application scenarios, Zhouju dead zone harmonic compensation technology can actively suppress current harmonics and reduce system noise and vibration.

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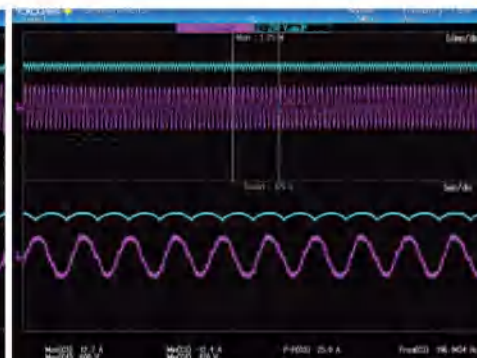
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交流电压拍频现象抑制

AC Voltage Beat Phenomenon Suppression



抑制前
Before Suppression



抑制后
After Suppression

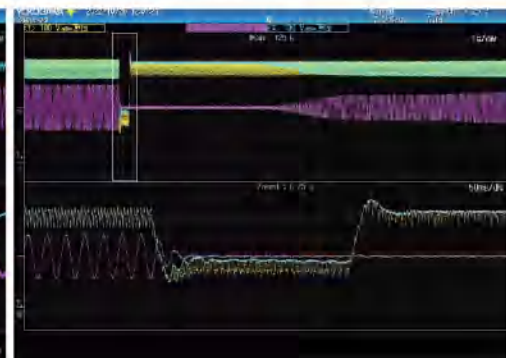
在以交流电供电的电机系统中，网侧的电源频率与逆变器驱动电机的电源频率会发生耦合，形成拍频现象。在某些电机转速下，这两种频率的耦合会使得电机产生低频振动。利用洲钜的拍频现象抑制策略可以有效抑制拍频现象，进而减少系统低频振动。

AC Voltage beat phenomenon caused by the coupling between AC power frequency and modulated power frequency of motor driving, which will cause the vibration of motor.

The AC beat frequency suppression logic can effectively suppress the beat frequency phenomenon to reduce the motor vibration.

电压跌落抑制

Voltage Drop Suppression



系统外部供电不可避免地会出现如瞬态跌落等异常，洲钜产品可以在这种异常态下维持短时间运行直至供电恢复正常，异常期间电机可正常运行，无需重启系统。

Voltage drop suppression logic maintains short time normal working status without restart the whole systems when voltage dropping down happened.

调试工具

DEBUG TOOL

为满足客户的开发、调试需求，洲钜开发三种调试工具，不仅能缩短开发周期，便于客户调试，还可以实现远程技术支持，三种调试工具以电脑或手机为载体，搭配自主开发的APP以及专用的调试设备，连接驱动器后均可实现电机控制、调试功能。

In order to optimize customer's development and function test, Zhouju develop three debug tool. They can shorten development cycle by facilitating customer sample test and remotely technical support. All debug tool will need installing special APP(zhouju design) or special intsaall pack (zhouju design)by computers and mobile to attain the monitor process.

调试工具1: USB转485设备

应用场景描述: PC(装载PC软件) + USB转485设备 + 驱动器

Debug Tool 1: By customer'USB2RS485 test tool

Application: PC(Install Pack) + USB2RS485 + Driver

调试工具2: 专用蓝牙设备

应用场景描述: 手机(装载APP) + 专用蓝牙设备+驱动器

Debug Tool 2: By bluebooth test tool

Application: Mobile(APP) + Special Bluetooth Equipment/Zhouju Common Mointor Test Tool + Driver

调试工具3: 专用通讯设备

应用场景描述: PC(装载PC软件) + 专用通讯设备+驱动器

Debug Tool 3: Special thorough mointor test tool

Application: PC(Install Pack) quick monitor + Special Communication Equipment/Zhouju Common Mointor Test Tool + Driver

调试工具1应用场景描述: PC (装载PC软件) + USB转485设备 + 驱动器

Debug Tool 1 Application: PC(Install Pack) + USB2R485 + Driver

- 1、电机控制参数修改
Modifying Motor Control Parameter
- 2、电机控制命令发送以及运行状态监控
Monitoring Motor Control Command and Running Status
- 3、故障记录
Fault Code
- 4、驱动器内电机控制程序更新
Update the Motor Driver Control Program



USB2RS485



零速大扭矩启动

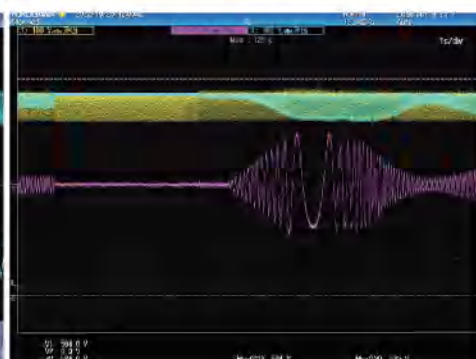
Zero-speed High-torque Start



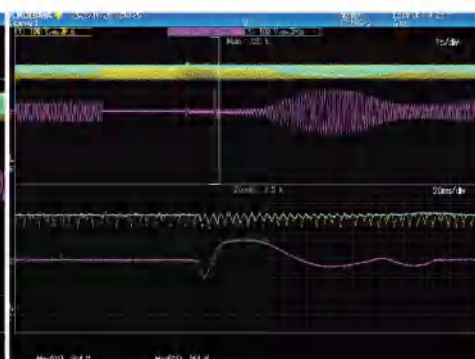
启动电流波形
Starting Current Waveform

风机闭环顺逆风启动

Fan Closed-loop Upwind and Tailwind Start



逆风启动
Upwind Start



顺风启动
Tailwind Start

该技术适用于压缩机、风机、水泵等多种类型电机产品，带载启动能力强，可快速启动电机并达到设定的转速。在压缩机高压差工况、大惯量风机瞬态启动工况、水泵叶轮堵转等工况能发挥有效作用。

Zero-speed high-torque start logic applicable to compressor, ventilator, water pump and other types motor products. It makes quick start available and reliable under high load at set speed. It can play an effective role in big pressure difference condition of compressor, transient startup condition of large inertia fan, locked rotor condition of water pump impeller, etc.

该技术适用于惯量较大电机的非静态启动，尤其是风机类、飞轮类产品，可实现顺风或者逆风工况下快速平稳启动并达到设定的目标转速。尤其适合于无母线电解电容类产品，无需外置制动单元，在初始转速高达40%最高转速的工况下，可实现顺逆风平稳启动。

Closed-loop start under upwind and tailwind applicable to the non static starting of motors with large inertia, especially fans and flywheels. It can realize fast and stable starting under the condition of tailwind or upwind and reach the set target speed. And especially suitable for no electrolytic capacitor products, no external control unit required. It can realize smooth starting in both upwind and tailwind under the working condition of initial speed up to 40% of the maximum speed.

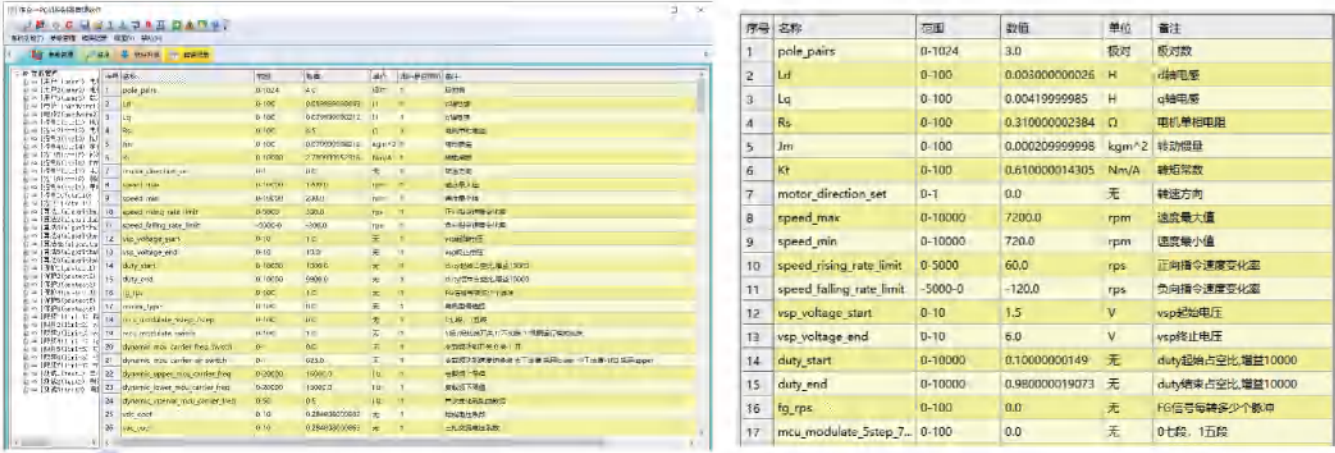
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1 电机控制参数修改
Modifying Motor Control Parameter

此调试界面下可实现驱动器内电机控制参数的实时读取、修改、保存功能，无需反复刷写驱动程序即可简单实现电机调试。

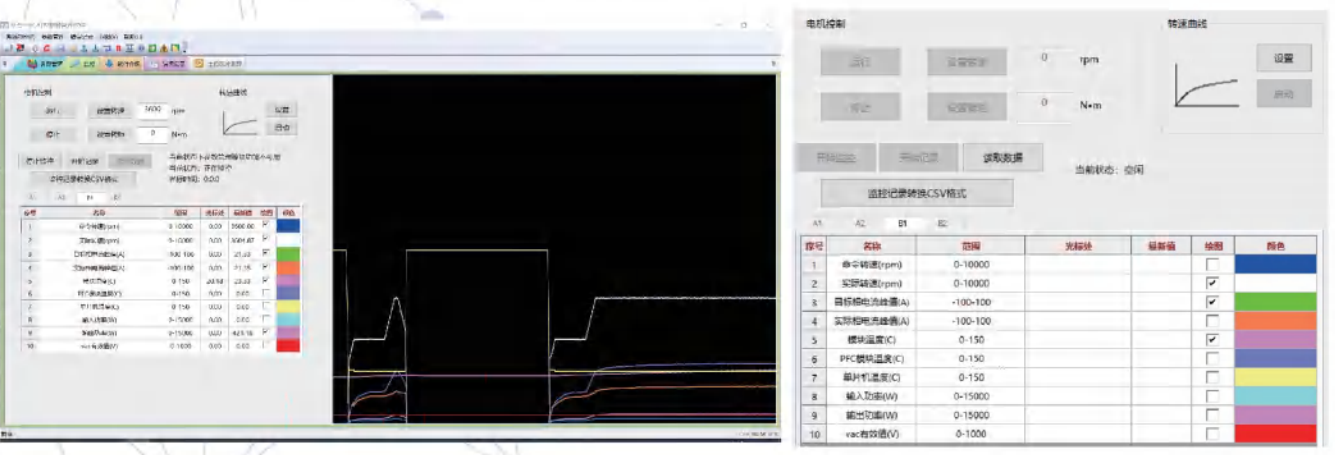
Engineer can read the motor parameters, modify the parameters and save the parameters under the debugging interface, and need not load new software off line.



2 电机控制命令发送以及运行状态监控
Monitoring Motor Control Command and Running Status

此调试界面下可发送电机启停命令或转速命令，可以选择监控数据通道，监控电机运行电流等状态以及驱动器温升等。

This test methods can send command of start and stop motor, speed control, choose the requirement monitor data valve, such as motor running current and the temprature rise etc.

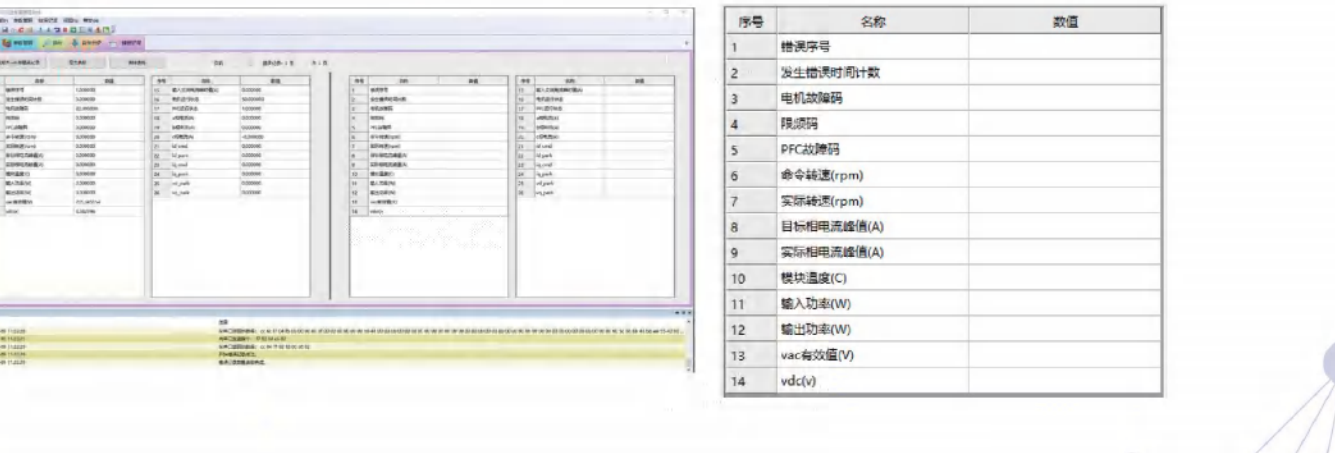


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3 故障记录
Fault Code

此调试界面下可读取驱动器历史故障记录，以及故障发生节点时的故障码、转速、温度、电流、电压等信息。

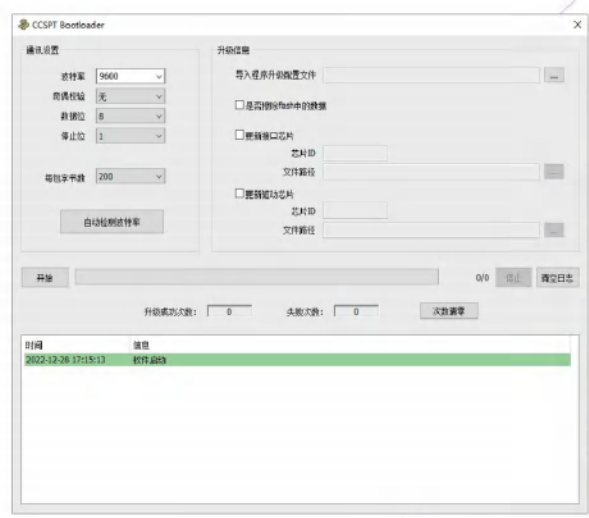
Monitoring and read the fault status datasheet and fault status data in real time, including fault code, speed, temperature, current, voltage etc.



4 驱动器内电机控制程序更新
Update the Motor Driver Control Program

此调试界面下可更新驱动器内的电机控制程序，便于远程调试。

This debug tool can update the driver software to perform the remote debugging.



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调试工具 2应用场描述：手机（装载APP）+ 专用蓝牙设备 + 驱动器 Debug Tool 2 Application: Mobile (App) + Special Bluetooth Box



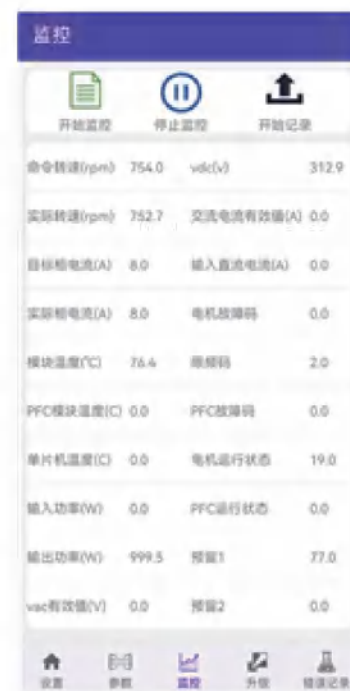
此调试工具可发送电机控制转速或启停命令，监控电机的转速、电流、驱动器温度等状态，也可以通过app更新驱动器内电机控制程序，操作简单，方便。

This debug tool can send motor control speed, start command and stop command, and monitor the motor speed, current, driver temperature and other datasheets of motor. App also can support the motor control program updated easily. It can be used only **android mobile system**.

手机与驱动器数据连接
Phone to Driver Data Connection



电机运行状态及驱动器状态数据监控
Motor Running Status and Driver Status
Data Monitoring



驱动器内电机控制程序升级
Update the Motor Driver Program



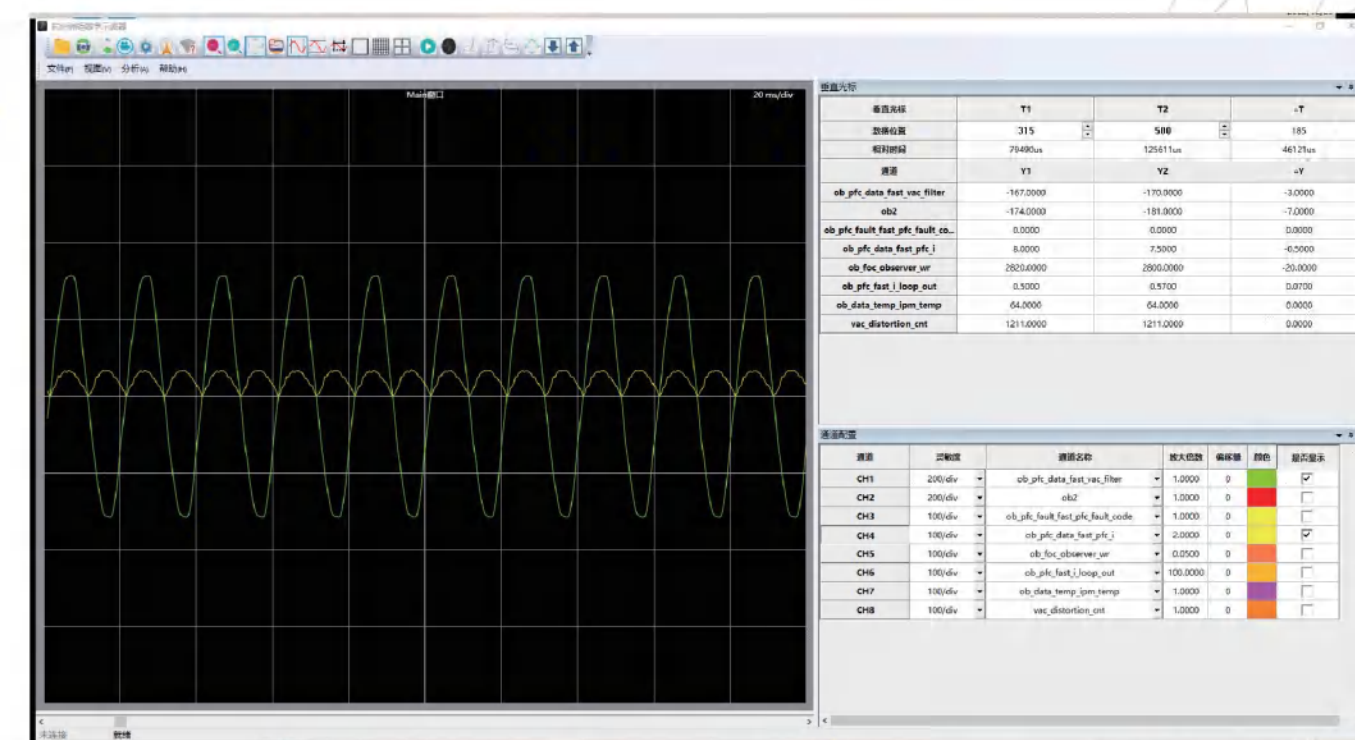
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调试工具 3 应用场描述：PC（装载APP）+ 专用通讯设备 + 驱动器 Debug Tool 3 Application: PC (Install Pack) + Special Communication Device/ Common Mointor Test Tool + Driver



此调试工具可实时监控电机的转速、电流、算法参数、传感器温度等，此方式的优势是不仅可以实现远程调试，而且可以根据实时的反馈状态调整驱动参数，使负载和驱动达到最佳匹配的工作状态。

This debug tool can monitor the real-time motor speed, current, algorithm parameter, temperature sensor and other datasheets. The method advantage can be remotely operated and monitored, in order to run motor at the best status by adjusting the driver parameter according to the real-time feedback status.

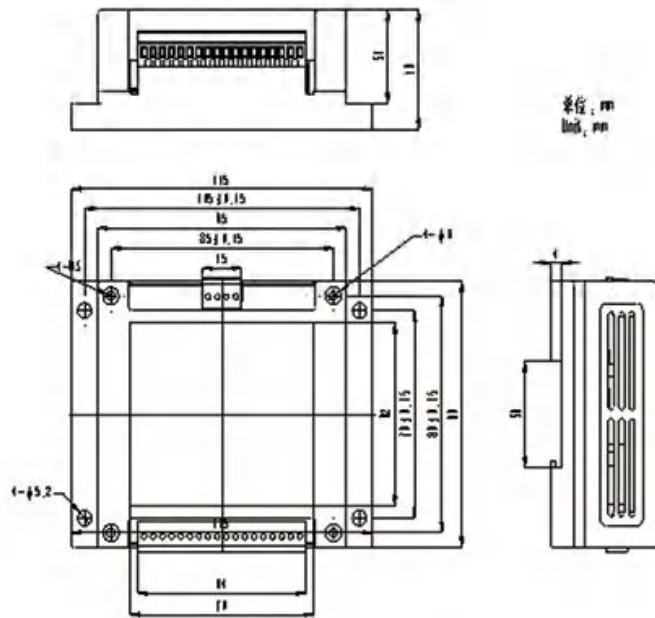


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SPB1-M Interface Board 接口板

SPB1系列平台产品作为电机驱动通用平台不仅应用和适用范围广，可以驱动多种电机驱动系统，而且搭载可扩展的外设接口板SPB1-M，拓宽了用户的应用范围。SPB1-M增加了信号采集电路、通讯电路和干接点等接口，支持多种调速方式：485通讯、TTL通讯、VSP调速、ISP调速、PWM调速、滑动变阻器调速等，释放了更多的对外接口需求，方便客户使用。

SPB1 series platform products as a motor drive universal platform not only has a wide range of applications and applicability, can drive a variety of motor drive systems, but also carries an expandable peripheral interface board SPB1-M, broadening the user's scope of application. SPB1-M increases the signal acquisition circuit, communication circuit and dry contact and other interfaces to support a variety of speed control methods: 485 communication, TTL communication, VSP speed control, ISP speed control, PWM speed control, slide rheostat speed control, etc., releasing the need for more external interfaces and facilitating the use of customers.



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SPB1-M丰富了SPB1-D的外设接口，支持多种调速方式：485通讯、TTL通讯、VSP调速、ISP调速、PWM调速、滑动变阻器调速等，客户可以根据自己的使用环境选择合适便捷的控制方式。除此之外，接口板还有干接点、温度传感器等接口，干接点可以根据客户系统需求做故障提示开关，温度传感器可以外接热敏电阻，检测系统设备温度。

SPB1-M interface board enriches the peripheral interfaces of SPB1-D and supports various speed control methods: 485 communication, TTL communication, VSP speed control, ISP speed control, PWM speed control, sliding rheostat speed control, etc., so that the customers can choose suitable and convenient control methods according to their own usage environment. In addition, the interface board also has dry contact, temperature sensor and other interfaces, dry contact can be made according to the customer's system requirements for fault prompting switch, the temperature sensor can be connected to an external thermistor to detect the temperature of the system equipment.

应用场景1描述：信号发生装置（输出PWM/电流/电压信号）+ 接口板 + 驱动器
Description of Application Scenario 1: Signal Generator (output PWM/current/voltage signal) + Interface Board + Driver

通过信号发生装置输出PWM/ISP/VSP信号指令，接口板根据目标指令转换目标转速，驱动器执行相应指令控制负载运行。

The signal generator outputs PWM/ISP/VSP signal commands, the interface board converts the target speed according to the target commands, and the driver executes the corresponding commands to control the load operation.



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SPB1-M Interface Board 接口板



功能 Function	代号 Symbol
接口板与驱动板板间供电、通讯 Power Supply and Communication between Interface Board and Driver Board	485A 485B GND PWR
对外485通讯接口 External 485 Communication Interface	485A 485B
对外串口通讯接口 External Serial Communications Interface	RX TX GND
PWM调速接口 PWM Speed Control Interface	PWM GND
温度传感器接口 Temperature Sensor Interface	TEMP GND
4-20mA调速接口 4-20mA Speed Control Interface	4-20mA GND
4-20mA调速接口 4-20mA Speed Control Interface	0-10V GND
电阻调速接口 Resistor Speed Control Interface	10V GND
干接点 Dry Contact	COM1 NO1 NC1 COM2 NO2 NC2

应用场景2描述: PC (装载PC软件) + USB2RS485/ USB2TTL + 接口板 + 驱动器
Description of Application Scenario 2: PC (loaded with PC software) + USB2RS485/ USB2TTL
+ Interface Board + Driver

通过PC发送目标指令, 接口板解析目标指令发给驱动板, 驱动板根据目标指令控制负载运行。
PC sends target commands, interface board parses the target commands and sends them to the driver
board, which controls the load according to the target commands.



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应用场景3描述: 线性稳压电源 + 接口板 + 驱动器
Description of Application Scenario 3: Linear Regulated Power Supply + Interface Board + Driver

通过线性稳压电源调压, 接口板根据接收的电压信号解析目标指令发给驱动板, 驱动板根据目标指令控制负载运行。
The voltage is regulated by the linear regulated power supply, the interface board According to the received voltage signal, the interface board parses the target instruction and sends it to the driver board, which controls the load operation according to the target instruction.



应用场景4描述: 电位器 + 接口板 + 驱动器
Description of Application Scenario 4: Potentiometer + Interface Board + Driver

通过电位器调压, 接口板根据接收的电压信号解析目标指令发给驱动板, 驱动板根据目标指令控制负载运行。
The voltage is regulated by a potentiometer, the interface board parses the target command according to the received voltage signal and sends it to the driver board, which controls the load operation according to the target command.



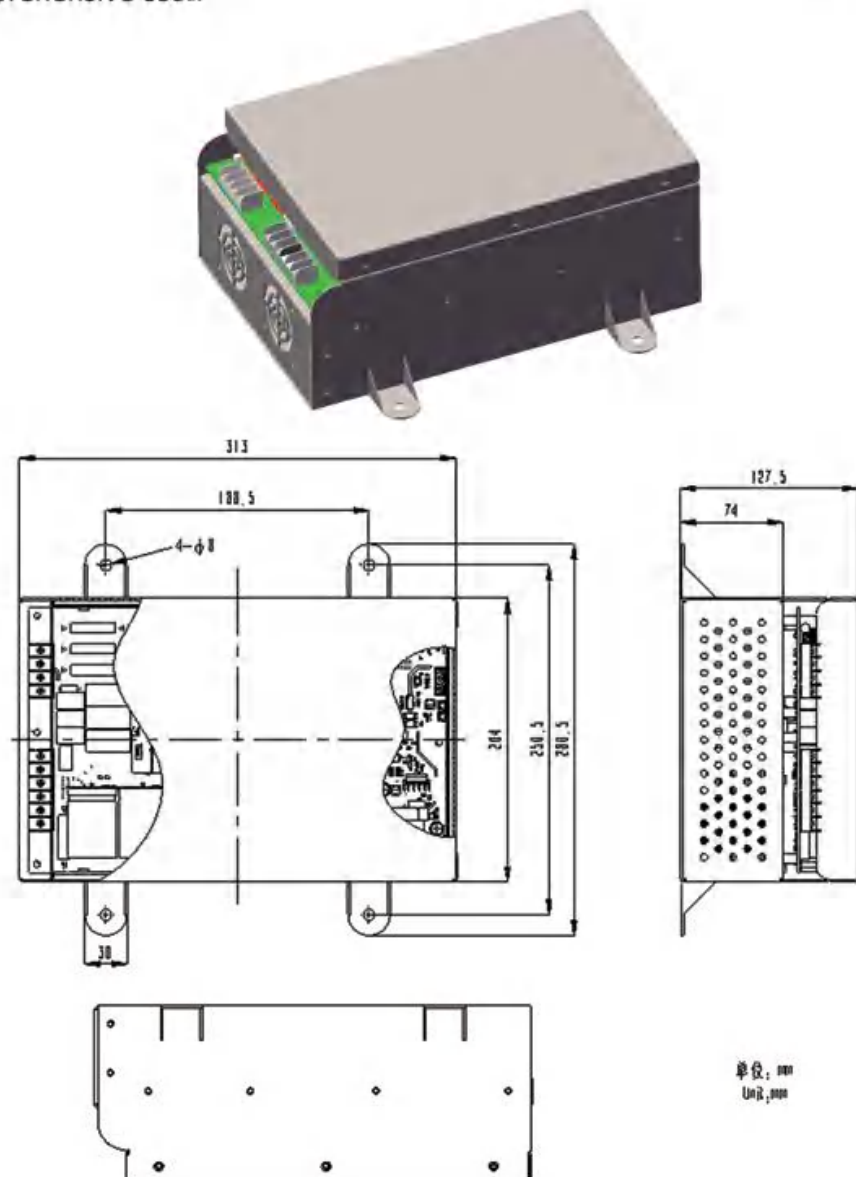
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三相PFC

THREE-PHASE PFC

三相六开关PFC控制器利用三相桥式整流电路以及储能电感、电容，对三相交流电压进行调制整流，输出直流电压，输出的电压可按负载端需求进行实时调节；同时可减小对电网的污染，提高电能质量，达到5%的电流谐波以及90%以上的功率因数，无需额外的滤波器、整流桥，具有综合成本低的优势。

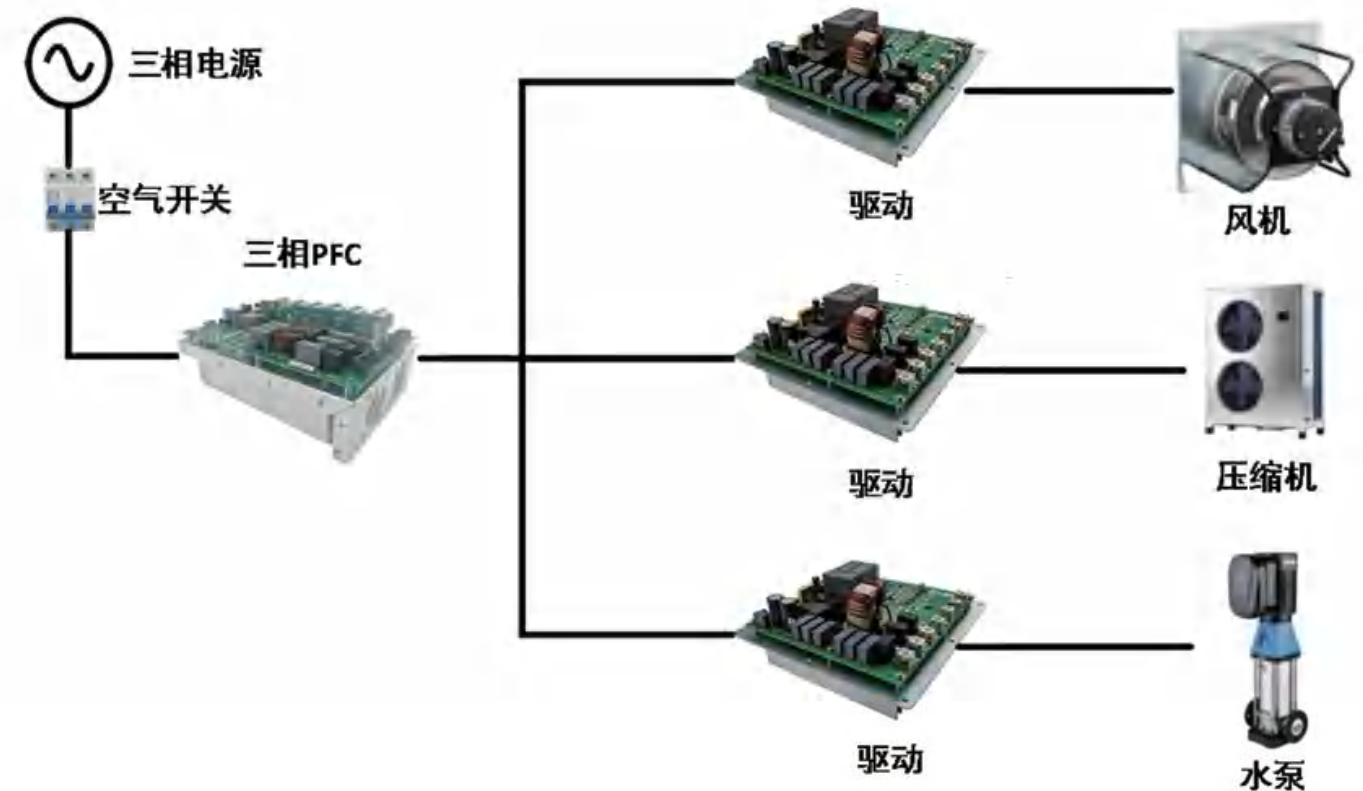
Three-phase six-switch PFC controller uses three-phase bridge rectifier circuit as well as energy storage inductor and capacitor to modulate and rectify the three-phase AC voltage and output DC voltage, which can be adjusted in real time according to the demand of the load side; at the same time, it can reduce the pollution to the power grid and improve the power quality to achieve 5% current harmonics as well as more than 90% of the power factor without the need for additional filters and rectifier bridges, which has the advantage of low comprehensive cost.



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随着国外客户对三相驱动器谐波要求的逐步提高，传统的三相无电解方案已无法满足市场需求，因此开发三相主动式PFC，作为系统前级通用性滤波器，普适性广，该方案选取低载频，高感量，sixpack模块搭配主动式散热，以及紧凑的结构设计，实现10kw 系统级谐波解决方案，可应用与风机、压缩机、水泵等系统前级。

With the gradual increase of foreign customers on three-phase drive harmonic requirements, the traditional three-phase electroless solution can no longer meet the market demand, so the development of three-phase active PFC, as a system front stage general purpose filter, universality wide, the programme selected low carrier frequency, high inductance, sixpack module with active heat dissipation, as well as compact structural design, to achieve the 10kw system level harmonic solution, can be applied to the fans, compressors, pumps and other system front stage.



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SPB1-M Interface Board接口板

项目 Item		参数 Parameters
控制参数 Controller parameterse	电源电压(V) Power voltage	380
	电源频率(Hz) Power frequency	50/60
	最大输入功率(w) Max input power	10000
	最大输入电流(RmsA) Max input current	15
	输入电流谐波(%) Input current distortion	5
	交流输入欠压保护值(RmsV) AC Under-voltage protection	226
	交流输入过压保护值(RmsV) AC Over-voltage protection	566
	输出电流保护(RmsA) Out current protection	25
	输入相电流软件保护(Peak A) Input phase current software protection	40
	输入相电流硬件保护(Peak A) Input phase current hardware protection	45
	功率器件过热保护(°C) Overheat protection of power devices	100
	冷却方式 Cool model	风冷 Air cooled
应用环境 Application environment	环境温度(°C) Ambient temperature	-25~60
	存储温度(°C) Storage temperature	5~30
	存储湿度(RH) Storage humidity	30%~60%RH,无水珠凝结 130%~60%RH,No Condensation
	海拔高度(km) Altitude	
	振动等级 Vibratory level	
	防护等级 IP grade	
辅助接口信息 Auxiliary interface information	RS485 通讯 RS485 Communication	Modbus 定制协议 MModbus custom Protocol
	故障信息指示 Fault information indication	支持 LED 灯指示 Support LED light Indication

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STO 功能

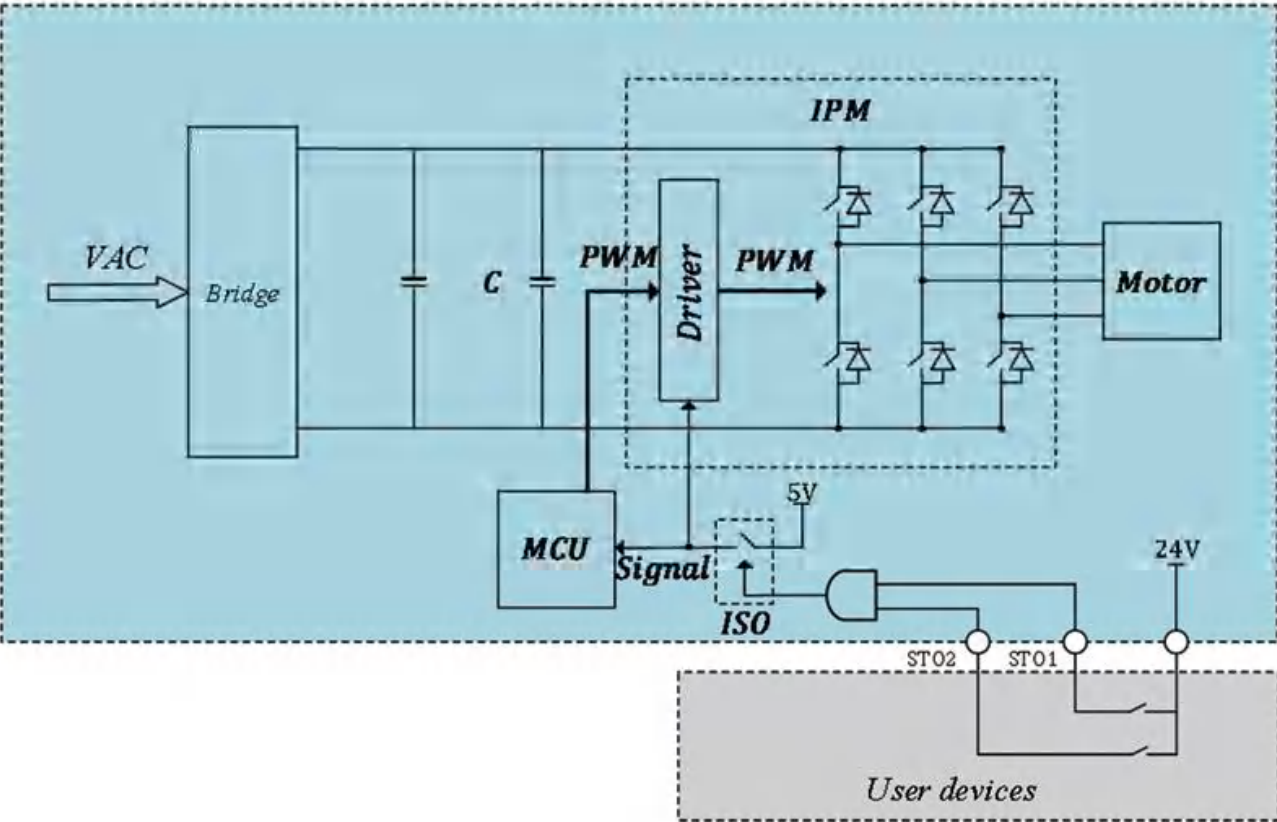
SAFE TORQUE OFF FUNCTION

安全转矩关闭（Safe Torque Off）简称STO，是工业设备中的安全机能，此机能有效时，设备不输出转矩。洲钜SPB系列驱动器均兼容此安全功能，提升了驱动的安全性能。

STO是纯硬件电路保护方案，由双通道电路触发，若其中任意一个或两个通道打开，则STO功能激活，停止驱动的输出，阻止电机的转动，直至STO电路恢复后（双通道均闭合），驱动才可以恢复输出，以此确保系统安全。

Safe Torque Off, or STO for short, is a safety function in industrial equipment that does not output torque when the function is active. Chau-Vantage SPB series drives are compatible with this safety function, which improves the safety performance of the drive.

STO is a pure hardware circuit protection scheme, triggered by the dual-channel circuit, if either or both channels are open, the STO function is activated, stopping the output of the drive and preventing the motor from rotating until the STO circuit is restored (both channels are closed), the drive can resume output, thus ensuring the safety of the system. The driver can not resume output until the STO circuit is restored (both channels are closed) to ensure system safety.



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