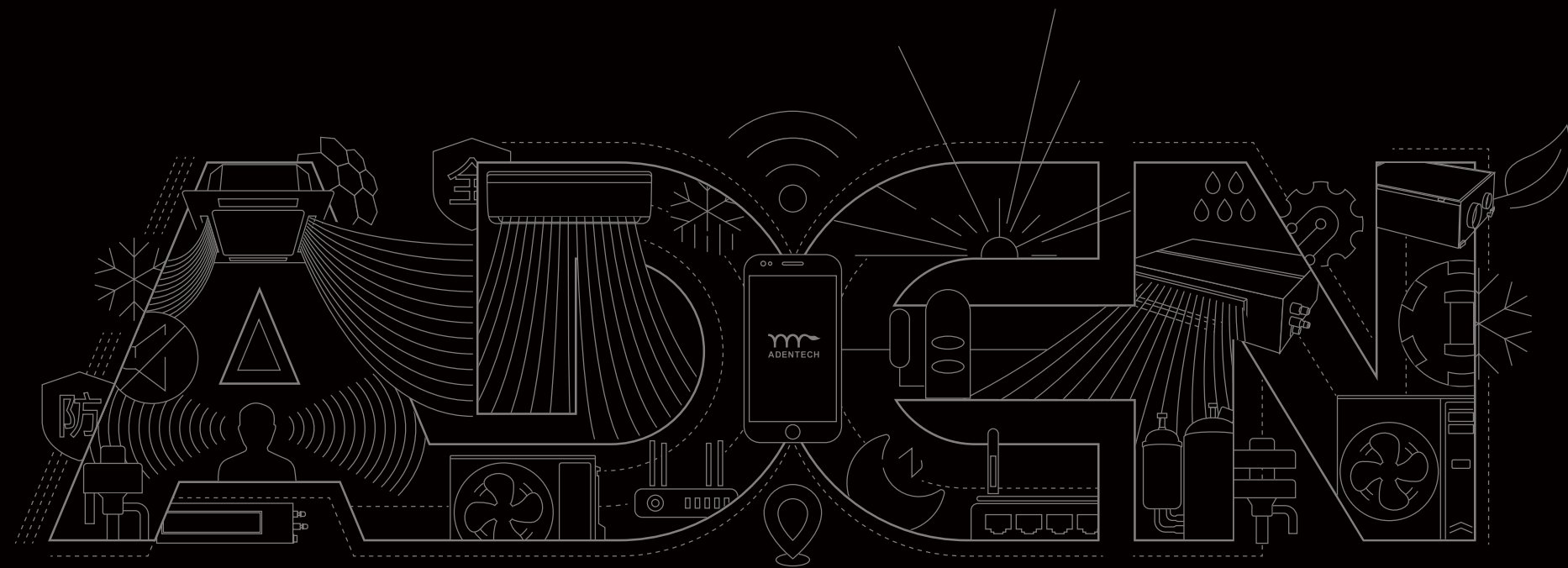




INVERTER DRIVE & CONTROL SOLUTION

变频驱动与控制解决方案

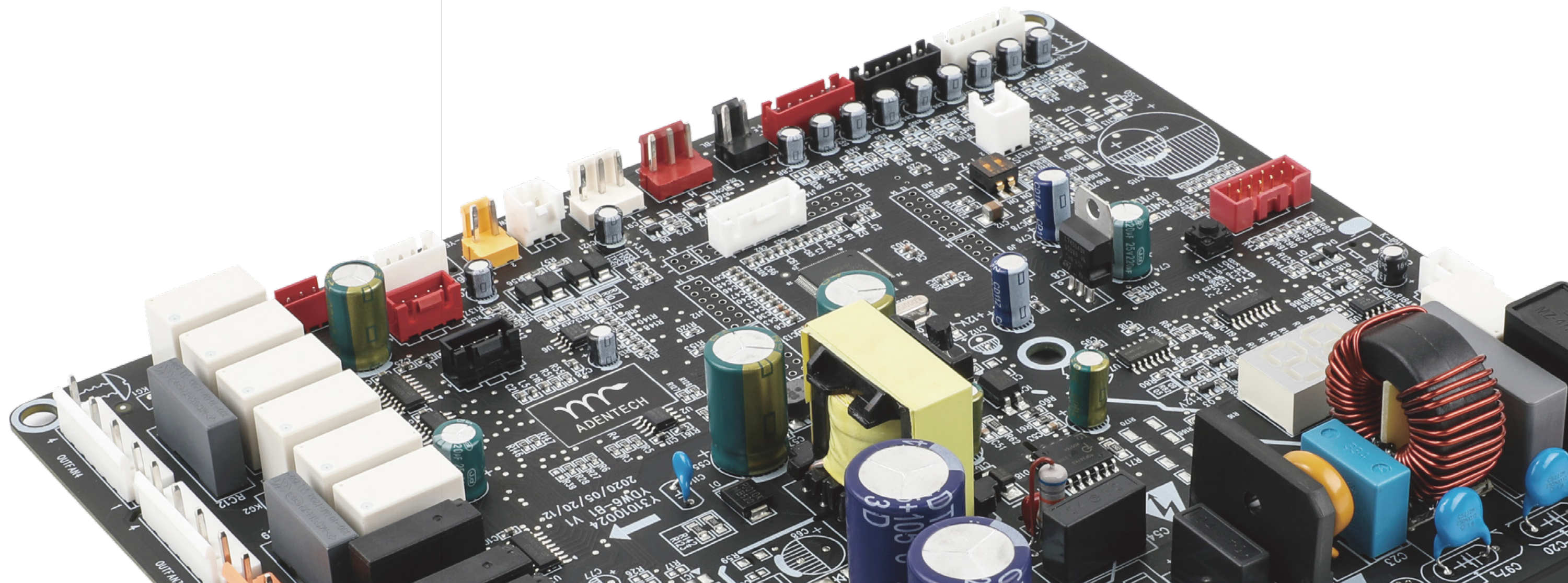
INVERTER DRIVE & CONTROL SOLUTION

HVAC领域变频驱动及智能控制方案

Empower the HVAC Industry

拥有超过 20 年的 HVAC 行业控制领域经验

Over 20 years experience in HVAC control systems





亚丁科技

ADEN TECHNOLOGY

亚丁科技是一家创新性技术驱动型企业，成立于2016年，致力于为全球暖通空调及储能企业提供安全稳定、高效节能的变频驱动器及智能控制解决方案。

公司拥有员工300余人，其中工程师超过150名，核心技术团队均来自全球500强企业，拥有超过20年的行业经验。能够从研发到生产为客户提供全方位产品及技术服务，覆盖家用商用空调，热泵采暖、新风系统，空气净化器，除湿机、特种空调、储能基站设备等。产品均经过长期严苛的极限测试，能兼容多种压缩机、风机及系统方案，满足多种应用场景需求。

2024年，亚丁荣获国家高新技术企业和省级专精特新企业称号，目前公司产品及服务已销售至全球30多个国家和地区。

未来，亚丁将深耕暖通空调领域的技术迭代，同时大力拓展新能源领域的产品研发，为行业伙伴提供绿色、高效、可持续发展的解决方案。

ADENTECH is an innovative, technology-driven company founded in 2016, dedicated to providing safe, stable, and energy-efficient inverter drives and intelligent control solutions for the HVAC and energy storage industries.

ADENTECH employs over 300 people, including more than 150 engineers. Our experts bring over 20 years of experience, having previously worked in Fortune 500 companies, where they gained extensive expertise in servicing global brands. With this in-depth industry knowledge, they are able to provide comprehensive product and services, from R&D to production, ensuring tailored solutions that meet the needs of each customer.

Our products include residential and commercial air conditioning, heat pump heating, ventilation systems, air purifiers, dehumidifiers, specialty air conditioners, and energy storage equipment. All products undergo rigorous, long-term testing to ensure compatibility with various compressors, fans, and system solutions.

In 2023, ADENTECH was recognized as a National High-tech Enterprise and a Provincial-level Specialized and Innovative Enterprise. Our products and services are now available in over 30 countries and regions around the world.

Looking ahead, ADENTECH will continue to focus on advancing technology in the HVAC sector while expanding into the new energy field, providing green, efficient, and sustainable solutions for industry partners.

荣誉与资质 / Awards and Certifications

- 国家高新技术企业 \ 国家级专精特新"小巨人"企业 \ 珠海市创新百强企业 \ 珠海市重点科技企业 \ 珠海市自动化学会企业
- 依托集团170+项授权专利及完善的研发体系，亚丁科技持续推进暖通控制技术创新，荣获多项省市重大科技项目奖
- National High-Tech Enterprise \ National-Level Specialized and Innovative “Little Giant” Enterprise \ One of Zhuhai Top 100 Innovative Enterprises \ Zhuhai Key Science and Technology Enterprise \ Corporate Member of the Zhuhai Automation Society.
- Backed by the Group’ s portfolio of over 170 granted patents and a well-established R&D system, Adentech continues to drive innovation in HVAC control technologies. Recipient of multiple awards for major provincial and municipal-level science and technology projects.



拥有 CNAS、SGS、Intertek 认可检测中心，配套 30+ 专业实验室
Operates a CNA, SSGS, Intertek accredited testing center with over 30 specialized laboratories



CNAS认可实验室
CNAS Recognized Lab



SGS认可实验室
SGS Recognized Lab



Intertek认可实验室
Intertek Recognized Lab



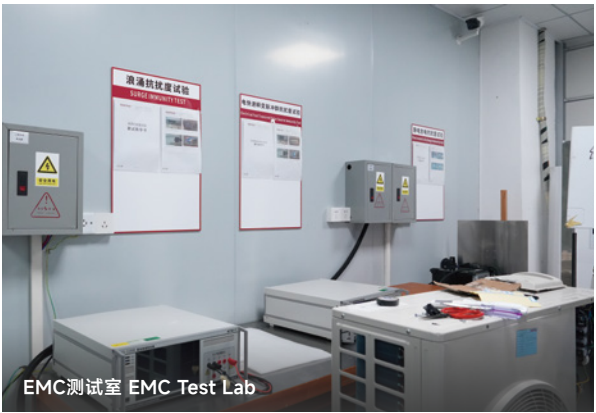
研发与制造 / R&D Manufacturing



我们建立了严格的要求、高品质、高标准的生产体系,拥有完善的产品开发流程,并采用国际水准的质量评估标准。产品已通过40多项标准测试项目。

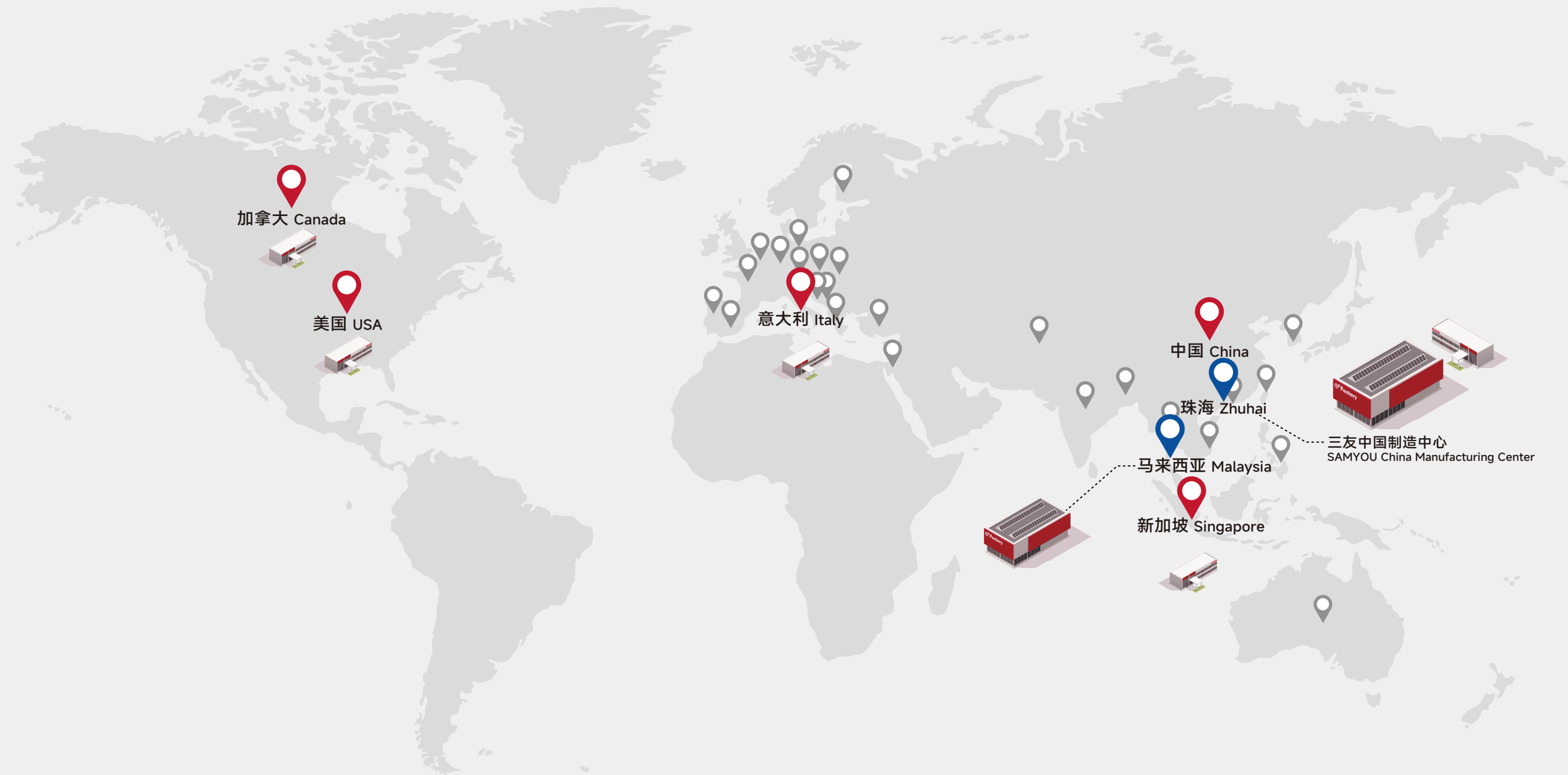
We have established strict requirements, high quality, high standard production system, with perfect product development process, and have the international level of quality evaluation standards. More than 40 standard test procedures are carried out for the products.

实验室设施 / Laboratory Facilities



测试能力覆盖 软件验证、硬件测试、环境可靠性、EMC电磁兼容、电气安全 等全维度依据国际标准：IEC60335、IEC61000、EN55014 等系列标准执行测试典型设备：AC/DC 电压绝缘测试仪、综合电气安全分析仪、控制器压力测试仪。

Our testing capabilities cover full-dimensional items including software verification, hardware testing, environmental reliability, EMC electromagnetic compatibility and electrical safety. All tests are conducted in compliance with international standards such as IEC60335, IEC61000 and EN55014. Typical testing equipment includes AC/DC voltage and insulation testers, comprehensive electrical safety analyzers, and controller pressure testing systems.



合作客户 遍布全球

Global Cooperation Partners

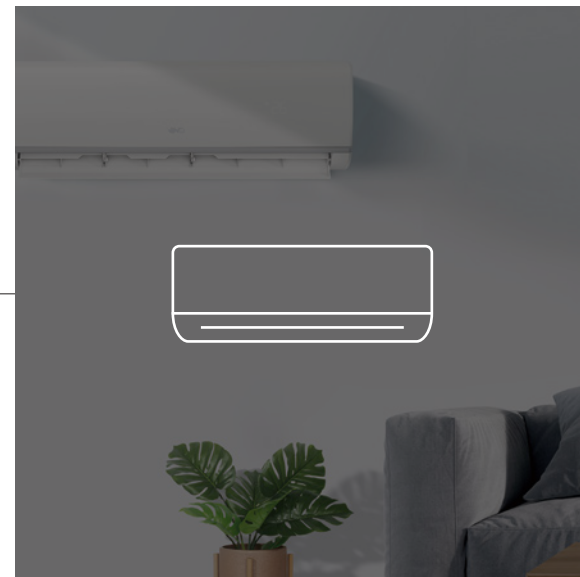
我们的全球业务网络涵盖中国珠海制造中心和马来西亚制造中心，并由位于加拿大、美国、意大利和新加坡的销售公司提供支持。

Our global footprint includes manufacturing centers at Zhuhai China and Malaysia, supported by sales companies in Canada, the USA, Italy, and Singapore.

目录 Contents

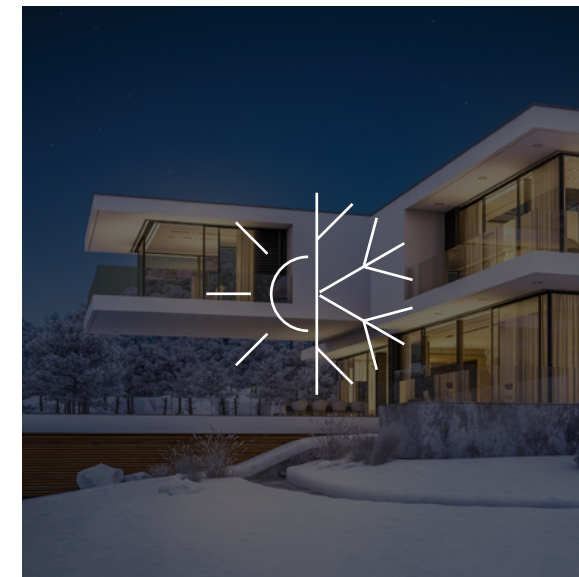
10

分体式空调产品
控制解决方案
Drive & Control Solution
For Split Type AC



24

整体式HVAC产品
控制解决方案
Integrated HVAC Product
Control Solution



02

变频压缩机驱动
Inverter Drive
Compressor



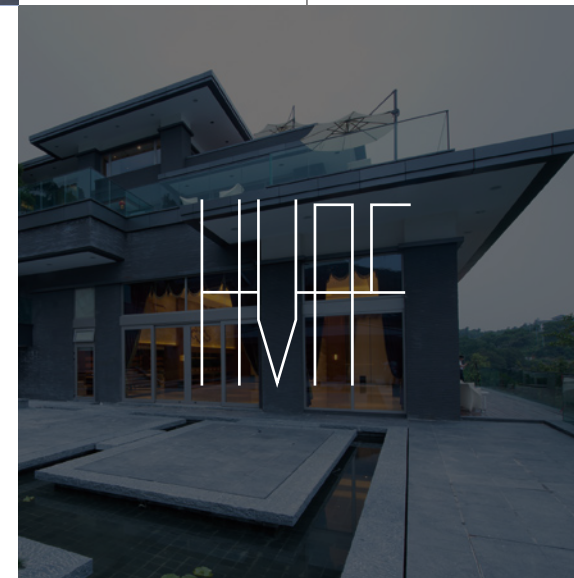
14

轻型商用一拖多空调
产品控制解决方案
Drive & Control Solution For
Light Commercial Multi Split AC



20

热泵产品控制解决方案
Drive & Control Solution
For Heat Pump



28

IoT智能控制方案
IoT Smart Control
Solution

01

ADENTECH

变频压缩机驱动

INVERTER DRIVE COMPRESSOR

凭借长期的应用实践与持续的升级迭代，亚丁的压缩机驱动技术具备宽电压、宽频率适应性及快速响应能力，确保产品在各种复杂工况下的优异表现。经过极限环境与高温测试，结合完善的故障保护系统，亚丁驱动在保障稳定性、可靠性、安全性与高效性的同时，适用于多种工作场景，满足不同需求。

此外，亚丁驱动能够兼容多种品牌压缩机，轻松实现精准选型，帮助客户提升系统整体效能。

ADENTECH's in-house developed compressor drive technology offers wide voltage and frequency adaptability, along with fast response times, ensuring reliable performance in various conditions.

Thoroughly tested in extreme environments and equipped with comprehensive fault protection, ADENTECH drive is able to provide stability, safety and energy efficiency across a range of applications.

Compatible with multiple compressor brands, ADENTECH drives make selection easy and help optimize system performance.





特点 / Features

高效节能 / High efficiency energy saving



电流控制策略
Permanent magnetsynchronous motor
适用于永磁同步电机，最大转矩电流比控制技术，更高的效率

Advanced Maximum Torque Per Ampere (MTPA) technology Adopted to obtain higher efficiency



新型空间矢量调制（SVPWM）技术和过调制（Over modulation）技术
New space vector modulation & over modulation technology

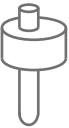
结合新型的空间矢量调制和过调制技术，降低驱动开关损耗

Combined with New space vector modulation & over modulation technology reduce the switching loss of the driver



弱磁控制技术
Weakening magnetic control(Flux weakening) technology

压缩机可运行到更高的转速，拓宽压缩机转速运行范围
弱磁区域压缩机转速无波动，电流无震荡，动态响应快
Compressor runs to a higher speed and expand the speed range
No fluctuation of compressor speed and current in the weak magnetic area fast dynamic response



低频转矩补偿技术
Low frequency torque compensation technology

得益于低频转矩补偿技术，压缩机可稳定运转于低频，温度控制更加精确，更加舒适和节能

Thanks to low frequency torque compensation technology, the compressor can operate stably at ow-frequency, and the temperature controller is more accurate, more comfortable and energy-saving

品质可靠 / Reliable quality



宽电压范围运行
Wide voltage operatio

单相：Single phase 140V-265V
三相：Three phase 304V-460V



极限环境温度运行
Extreme ambient temperature operation

超高60°C和极低-30°C环境温度运行
Reliable operation under ultra high 60°C and ultra low -30°C



自适应限频、降频功能
Adaptive frequency limit and reduction



完善的故障保护功能
Perfect the fault protection function

具有过/欠压、过流、过热、防雷、抗冲击等保护功能
Over high / low voltage, over current, over temperature, lightning, resistance impact and other protection

应用方便 / Application convenient

标准化

Standard

采用标准Modbus 通讯协议
Standard Modbus
communication protocol

自动化

Flexible

同一驱动
可自动匹配多款压缩机
One drive Matches
with multiple compressors

体积小

Compact

集成设计, 体积小,
安装使用方便
Integrated design, small size,
easy installation and use

核心技术 / Core Technology

1 最大转矩电流比控制技术（MTPA）
Maximum Torque Current Rate Control Technology(MTPA)

- 永磁同步电机因转子结构差异分为：隐极永磁同步电机（Lq = Ld）和凸极永磁同步电机（Lq > Ld）

Permanent magnet synchronous motor is divided into: hidden pole permanent magnet synchronous motor (lq = ld) and convex pole permanent magnet synchronous motor (lq>ld)

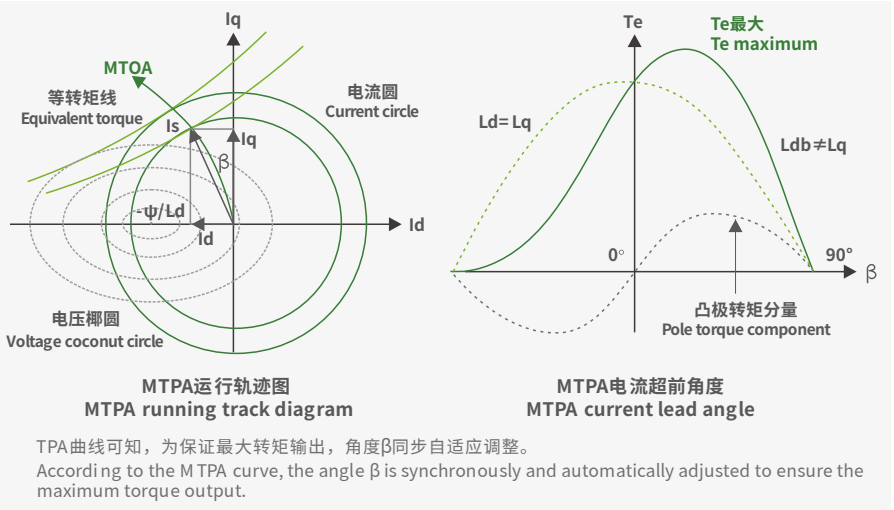
- 凸极永磁同步电机（Lq > Ld）因转子磁路不对称形成磁阻转矩

根据电机转矩公式： $T_e = \frac{3}{2} P [K_e i_q + \underbrace{(L_d - L_q)}_{\text{磁阻转矩}} i_d i_q]$

Convex pole permanent magnet synchronous motor (Lq > Ld) due to the rotor magnetic circuit asymmetry formed magnetic resistance torque according to the

motor torque formula: $T_e = \frac{3}{2} P [\underbrace{K_e i_q}_{\text{permanent-magne t torque}} + \underbrace{(L_d - L_q)}_{\text{reluctance torque}} i_d i_q]$

为了让最小电流产生最大的转矩，必须充分利用磁阻转矩。设定最大转矩时，电流超前角度为β。
In order to produce the maximum torque of the minimum current, the magnetic resistance torque must be fully utilized. When the maximum torque is set, the current lead angle is β.



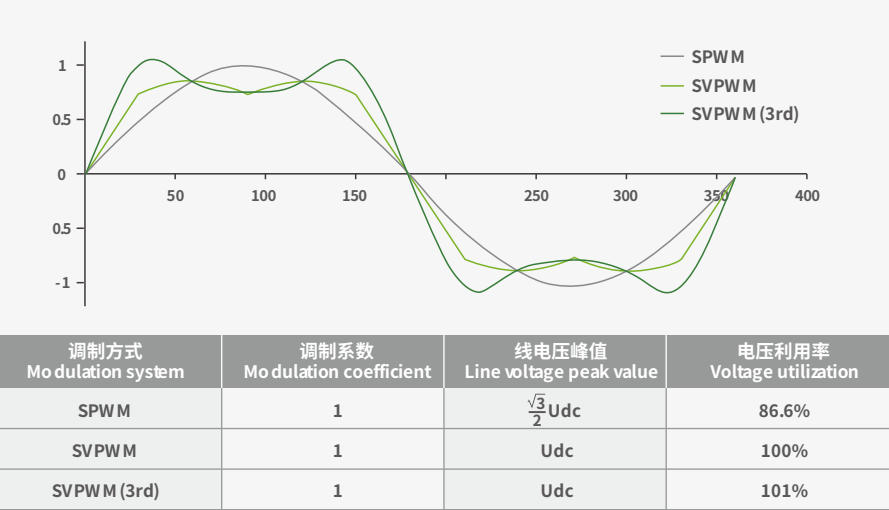
2 空间矢量脉宽调制（SVPWM）及三次谐波注入技术
Spatial vector pulse width modulation (SVPWM) and
thirdharmonic injection technology

- 相对传统的正弦脉宽调制（SPWM），采用7段式电压空间矢量脉宽调制（SVPWM）具有以下优点：
 - (1) 基本矢量对称输出减少电流谐波分量
 - (2) 零矢量的分散分布减小了电机绕组的电流脉动
 - (3) 非零矢量的分散分布减小了电压空间矢量的抖动

Compared to conventional sinusoidal pulse width modulation (SPWM), the 7-segment voltage-space vector pulse width modulation (SVPWM) offers the following advantages:

- (1) The symmetric output of the basic vector reduces current harmonic distortion.
- (2) The dispersion of the zero vector reduces current pulsation in the motor windings.
- (3) The dispersion of the non-zero vectors reduces voltage space vector jitter.

- 三次谐波注入技术，提高输出电压，减小电机电流，减少整体损耗，提升效率
Triple harmonic injection technology, improve the output voltage, reduce the motor current, reduce the overall loss, improve the efficiency



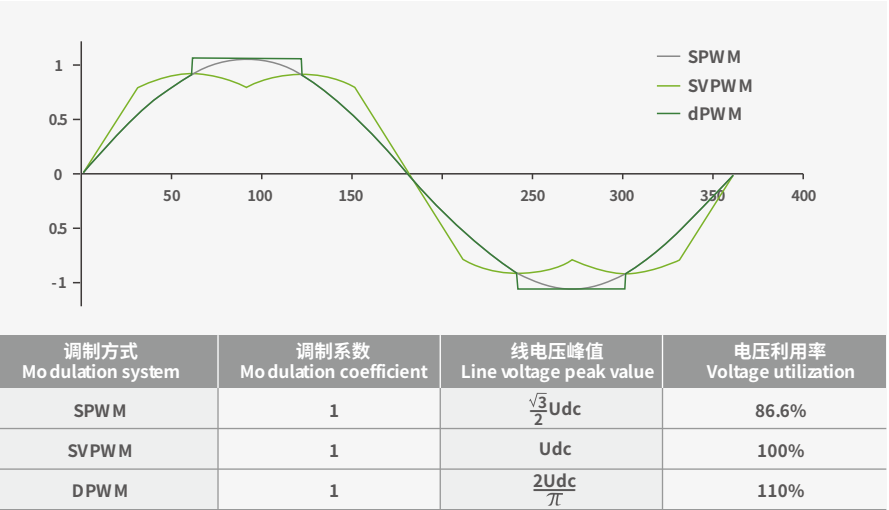
3 过调制控制技术
Overmodulation control technology

- 为进一步提升直流母线利用率，提高高速弱磁下的压缩机输出功率，扩展电机运转范围，同时兼容电机电流波形的平滑，转速稳定等要求，研究基于数字脉宽调制（DPWM）的过调制技术

根据实验得出：
实测波形，三相输入电压380V
电抗器压降35V，母线电压约505V
变频器输出372V，电压利用率104%

In order to further improve the utilization rate of DC bus, improve the output power of compressor under high-speed weak magnet, and expand the operation range of motor, Also compatible with the requirements of motor current waveform smoothing and speed stability, based on digital pulse width modulation (DPWM) Over-modulation technology of Measured waveform.

According to the experiment:
With a three- phase input voltage of 380V
The reactor voltage drop is 35V, the bus voltage is about 505V
The inverter output is 372V, and the voltage utilization rate is 104%



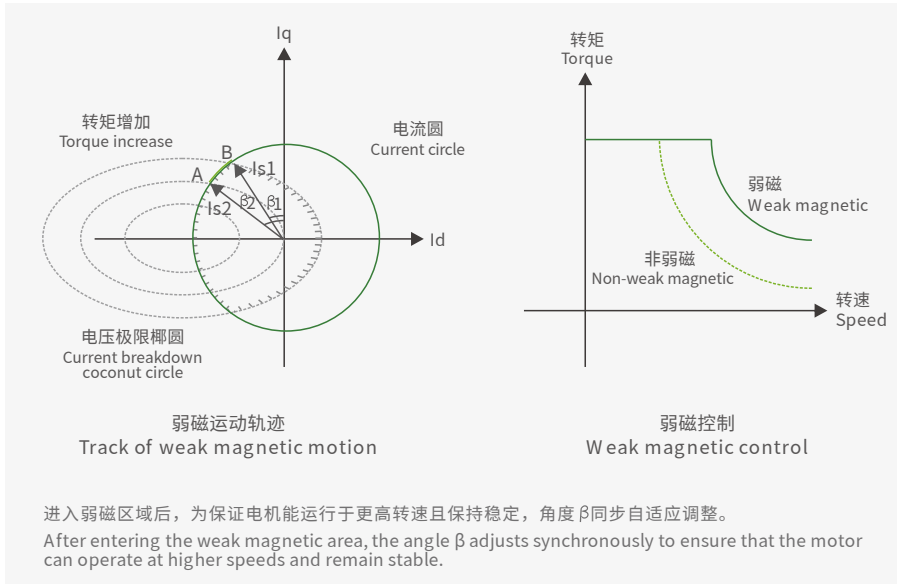
4 自适应弱磁控制技术
Maximum Torque Current Rate Control Technology(MTPA)

- 相当电机端电压达到最大电压时，只能通过降低电动机的励磁电流，改变励磁磁通，才能运行于更高的转速

When the motor end voltage reaches the maximum voltage, it can only operate by reducing the excitation current of the motor and changing at a higher speed

- 电机电流包括：转矩电流（Iq）和励磁电流(Id)
当转速 $\omega\omega_1$ 增加 $\omega\omega_2$ ，定子电流轨迹由B(Is1)到A(Is2)，对应转矩角 β_1 和 β_2 , $\beta_2>\beta_1$ 随着转速增加，进入弱磁区域，电机输出转矩变小

Motor current includes: torque current (Iq) and excitation current (Id)
When the rotation speed is increased from $\omega\omega_1$ to $\omega\omega_2$, the stator current track is changed from B (Is 1) to A (Is 2), with the corresponding torque angles of β_1 and β_2 , and $\beta_2>\beta_1$ As the speed increases, entering the weak magnetic area, the motor output torque becomes smaller



5 自适应转矩补偿技术
Adaptive torque compensation technology

- 单转子压缩机只有一个气缸，旋转一周有一次吸取和一次排气过程；吸气吸收的是低压气体，排气排出的是压缩后的高压气体，因此旋转一周转矩并不均匀

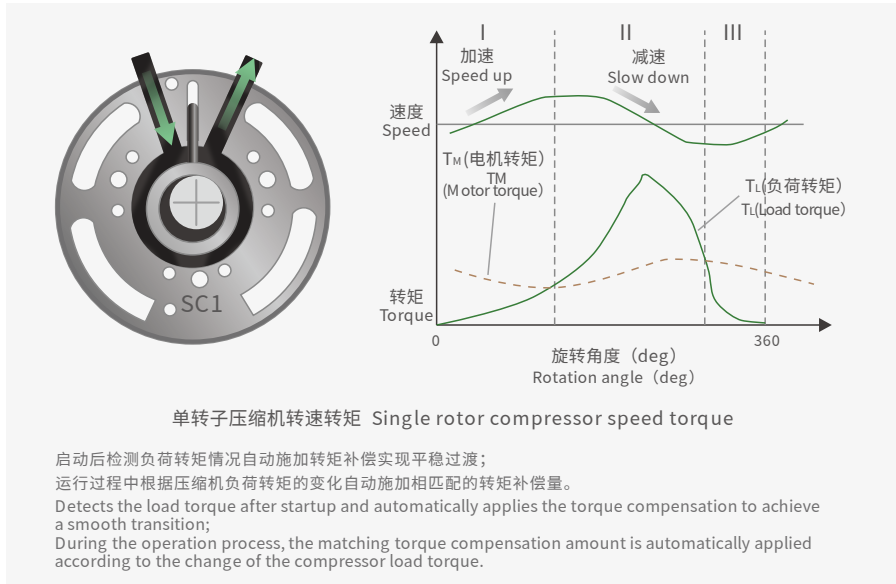
Single rotor compressor has only one cylinder, rotating once a week and once exhaust process; the suction absorbs low pressure gas, the exhaust exhaust is compressed high pressure gas, so the rotation torque is not uniform

- 传统的恒转矩控制方法在一周内输出近视恒定的电机转矩，与负荷转矩并不匹配，导致在转动的一周内会有加速和减速产生转速波动，如右图，从而导致压缩机产生振动和噪音问题

The traditional constant torque control method outputs myopic constant motor torque within a week, which does not match the load torque, resulting in acceleration and deceleration in a week of rotation, such as the figure on the right, resulting in vibration and noise problems of the compressor

- 自适应转矩补偿技术打破常规恒转矩控制输出恒定电机转矩的控制方法，根据压缩机在一周内的负荷转矩变化输出与之匹配的电机转矩，从而保证在一个运转周期内转速均匀，抑制压缩机由于负荷变化导致的转速波动，从而完美解决振动和噪音问题

Adaptive torque compensation technology to break the conventional constant torque control output constant motor torque control method, according to the compressor in a week of load torque change output matching motor torque, so as to ensure the uniform speed in a running cycle, inhibit the compressor speed fluctuations caused by load changes, to perfectly solve the problem of vibration and noise



参数规格 / Parameter

产品类型 Category	单相 1 Phase					三相 3 Phase						
型号 Model	D01-BDQ35A2F2	D02-BDQ50A1F3	D03-BDQ72A1F2	D04-BDQ100C1F1	D06-BDQ175B1F2	D07-BSQ180F1	D07-BSQ180B2	D10-BSQ250B1	D12-BSQ280B1	D16-BSQ450B1	D20-BSQ560A1	D25-BSQ700A1
机组制冷量 Unit Cooling Capacity	1HP	2HP	3HP	4HP	5 ~ 6HP	4 ~ 5P	4 ~ 7HP	10HP	8 ~ 12HP	13 ~ 16HP	17 ~ 20HP	20 ~ 25HP
机组制热量 Unit Heating Capacity	1 ~ 2HP	2 ~ 3HP	3 ~ 4HP	4 ~ 5HP	6 ~ 7HP	5 ~ 6P	7 ~ 8HP	10HP	12 ~ 16HP	17 ~ 20HP	21 ~ 25HP	25 ~ 30HP
工作电压范围 Operating voltage range	220VAC ± 20%	220VAC ± 20%	220VAC ± 20%	220VAC ± 20%	220VAC ± 20%	380V ± 20%	380V ± 20%	380V ± 20%	380V ± 20%	380V ± 20%	380V ± 20%	380V ± 20%
频率 Frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz
最大输入电流 Max Input Current	9A	12A	17A	23A	29A	13A	17A	20A	25A	33A	42A	50A
最大输入功率 Max Input Power	1.97kW	2.6kW	3.8kW	5kW	6.5kW	7kW	10kW	12kW	15kW	20kW	25kW	25kW
最大输出电流 Max Output Current	7A	10A	14A	18A	25A	16A	20A	22A	32A	40A	55A	65A
功能接口 Function Interface	压缩机+内置驱动器 直流风扇*1+STO Compressor+Built in driver DC FAN*1+STO	压缩机+内置驱动器 直流风扇*1+STO Compressor+Built in driver DC FAN*1+STO	压缩机+内置驱动器 直流风扇*1+STO Compressor+Built in driver DC FAN*1+STO	压缩机+内置驱动器 直流风扇*1+STO Compressor+Built in driver DC FAN*1+STO	压缩机+内置驱动器 直流风扇*2+STO Compressor+Built in driver DC FAN*2+STO	压缩机+内置驱动器 直流风扇*2+STO Compressor+Built in driver DC FAN*2+STO	压缩机+STO Compressor+STO	压缩机+STO Compressor+STO	压缩机+STO Compressor+STO	压缩机+STO Compressor+STO	压缩机+STO Compressor+STO	压缩机+STO Compressor+STO
通讯接口 Communication Interface	RS-485	RS-485	RS-485	RS-485	RS-485(Need+5VCC)	RS-485	RS-485	RS-485	RS-485	RS-485	RS-485	RS-485
尺寸 Size (mm)	182*164*89	182*164*105	182*164*105	214*205*117	276*177*135	276 * 177*137	276*177*149	230*200*147	244*200*140	264*205*146	270*229*146	290*229*146
冷却形式 Cooling Mode	风冷 Air-cooled	风冷 Air-cooled	风冷/制冷剂冷却 Air-cooled/ Refrigerant cooled	风冷 Air-cooled	风冷 Air-cooled	风冷 Air-cooled	风冷/制冷剂冷却 Air-cooled/ Refrigerant cooled	风冷/制冷剂冷却 Air-cooled/ Refrigerant cooled	风冷/制冷剂冷却 Air-cooled/ Refrigerant cooled	风冷/制冷剂冷却 Air-cooled/ Refrigerant cooled	风冷/制冷剂冷却 Air-cooled/ Refrigerant cooled	风冷/制冷剂冷却 Air-cooled/ Refrigerant cooled
工作温度 Ambient Temp	-30 ~ 60℃	-30 ~ 60℃	-30 ~ 60℃	-30 ~ 60℃	-30 ~ 60℃	-30 ~ 60℃	-30 ~ 60℃	-30 ~ 60℃	-30 ~ 60℃	-30 ~ 60℃	-30 ~ 60℃	-30 ~ 60℃
储存温度 Storage Temp	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃
最大储存湿度 Max. Storage Relative Humidity	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
电磁兼容认证 EMI Certificaiton	EN 55014	EN 55014	EN 55014	EN 55014	EN 55014	EN 55014	EN 55014	EN 55014	EN 55014	EN 55014	EN 55014	EN 55014
谐波认证 Harmonic Certificaiton	EN 61000	EN 61000	EN 61000	EN 61000	EN 61000	EN 61000(Passive PFC)	/	/	/	/	/	/
保护功能 Protection	电压/电流/温度/压力开关 Voltage/Current/Temp./ Pressure Switch	电压/电流/温度/压力开关 Voltage/Current/Temp./ Pressure Switch	电压/电流/温度/压力开关 Voltage/Current/Temp./ Pressure Switch	电压/电流/温度 Voltage/Current/ Temp	电压/电流/温度 Voltage/Current/ Temp	电压/电流/温度 Voltage/Current/ Temp	电压/电流/温度 Voltage/Current/ Temp	电压/电流/温度 Voltage/Current/ Temp	电压/电流/温度 Voltage/Current/ Temp	电压/电流/温度 Voltage/Current/ Temp	电压/电流/温度 Voltage/Current/ Temp	电压/电流/温度 Voltage/Current/ Temp
组件 Component	驱动板, 电抗器 Driver Board, Reactor	驱动板, 电抗器 Driver Board, Reactor	驱动板, 电抗器 Driver Board, Reactor	驱动板, 电抗器 Driver Board, Reactor	驱动板, 滤波板, 电抗器 Driver Board, EMI Board, Reactor	驱动板, 电抗器 Driver Board, Reactor	驱动板, 滤波板, 电抗器 Driver Board, EMI Board, Reactor	驱动板, 滤波板, 电抗器 Driver Board, EMI Board, Reactor	驱动板, 滤波板, 电抗器 Driver Board, EMI Board, Reactor	驱动板, 滤波板, 电抗器 Driver Board, EMI Board, Reactor	驱动板, 滤波板, 电抗器 Driver Board, EMI Board, Reactor	驱动板, 滤波板, 电抗器 Driver Board, EMI Board, Reactor

02

ADENTECH

分体式空调产品控制解决方案

DRIVE & CONTROL SOLUTION FOR SPLIT TYPE AC

亚丁科技专注于分体空调控制技术，依托20年的行业经验，为客户提供经过市场验证的成熟方案。

我们的控制解决方案已成功应用于上千万台产品，始终保持稳定可靠的性能表现。

凭借多样化的灵活功能和持续的技术优化，我们的控制方案不仅助力合作伙伴打造差异化产品，还致力于引领技术创新，助力客户在激烈的市场中脱颖而出。

ADENTECH specializes in advanced split air conditioning control technologies, With 20 years of industry expertise, AdenTech delivers reliable, market-tested solutions designed to meet customer needs. Our control solutions have been successfully implemented in tens of millions of products, ensuring durable and reliable performance. With versatile features and ongoing technical refinement, our solutions empower partners to create differentiated products, enhance market competitiveness, and drive innovation across the HVAC industry.



产品系列 / Product Series

- 挂机空调控制器
Split AC Controls
- 柜机空调控制器
Floor standing AC Controls
- 天井式空调控制器
Cassette AC Controls
- 风管式空调控制器
Ducted AC Controls
- 座吊式空调控制器
Floor Ceiling AC Controls

特点 / Features



自主知识产权的控制算法
Patented control algorithms



高频PFC功率因数>0.99
High efficiency PFC, power factor>0.99



倒扣防尘紧凑设计
Undercut dust prevention design



全方位保护功能
Full protection



低频平顺运行
Low frequency smooth running



超宽频精准运行
Ultra-wide frequency accurate running



云智能控制技术
Cloud intelligent remote control technology



宽工作电压范围
Wide voltage range 140V-265V (50/60Hz)

参数规格 / Parameter 外机 Outdoor Unit

产品类型 Category	单元式外机 Unitary Outdoor Unit							
型号 Model	BW26A*	BW26*/BW35*	BW50*	BW72*	BW100A*+BDQ100A*	BW100A*+BSQ140A*	BW175A*+BDQ175A*	BW175A*+BSQ180B*
适用能力 Capacity	2.6 ~ 3.5kW	2.6 ~ 4.1kW	5 ~ 6.5kW	7.2 ~ 8kW	10 ~ 12kW	10 ~ 12kW	10 ~ 16kW	10 ~ 16kW
工作电压范围 Operating Voltage Range	115V ± 10%	220VAC ± 20%	220VAC ± 20%	220VAC ± 20%	220VAC ± 20%	380 ± 20%	220VAC ± 20%	380 ± 20%
频率 Frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz
最大输入电流 Max Input Current	11A	8A	12A	16A	23A	11A	34A	15A
最大输入功率 Max Input Power	1200W	1760W	2640W	3520W	5500kW	6500kW	7500kW	9000kW
最大输出电流 Max Output Current	8A	8A	12A	16A	15A	16A	22A	23A
工作温度 Ambient Temp	-30 ~ 60°C	-30 ~ 60°C	-30 ~ 60°C	-30 ~ 60°C	-30 ~ 60°C	-30 ~ 60°C	-30 ~ 60°C	-30 ~ 60°C
储存温度 Storage Temp	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C
通讯方式 Communication Mode	风冷 Air-cooled	风冷 Air-cooled	风冷 Air-cooled	风冷 Air-cooled	风冷 Air-cooled	风冷 Air-cooled	风冷 Air-cooled	风冷 Air-cooled
冷却形式 Cooling Mode	零火线通讯 Current loop communication	零火线通讯 Current loop communication	零火线通讯 Current loop communication	零火线通讯 Current loop communication	零火线通讯 Current loop communication	零火线通讯 Current loop communication	零火线通讯 Current loop communication	零火线通讯 Current loop communication
输入参数 Input	压缩机过载保护开关、排气温感包、管温感温包、环境感温包 Compressor overload protection switch, Discharge temp sensor, tube temp. sensor, Ambient temp. sensor				高压开关、低压开关、压缩机过载保护开关、排气温感包、管温感温包、环境感温包、容量/机型跳线帽 High pressure switch、Low pressure switch、Compressor overload protection switch、Discharge temp sensor、tube temp. sensor、Ambient temp. sensor、Capacity/ Model jumper			
控制对象 Object Control	直流电机 / 交流电机、四通阀、压缩机电加热、底盘电加热 DC motor / AC motor、4-way valve、Compressor electric heater、Chassis electric heater				直流电机 / 交流电机、四通阀、电子膨胀阀、压缩机电加热、底盘电加热 DC motor / AC motor、4-way valve、EEV、Compressor electric heater、Chassis electric heater			

功能点 / Functions



低功耗待机0.5w
Low power standby 0.5w



掉电记忆
Power-off memory



快速制冷制热
Fast heating/cooling



智能化霜
Intelligent defrost



智能Wi-Fi
Smart Wi-Fi (Optional)



冷等离子
Cold plasma (Optional)



低温制热 -25°C
-25°C low temperature heating (optional)



低温制冷 -15°C
-15°C low temperature cooling (optional)



自诊断功能
Self-diagnostic function

解决方案 / Solution



内机 Indoor unit

产品类型 Category	壁挂 Split Type	柜机 Floor Standing	风管 Duct Unit	天井 Cassette	座吊 Floor Ceiling
型号 Model	BNF35*	BNL120A*	BNG175A*	BNT160A*	BNL160A*
适用能力 Capacity	2.6 ~ 7.2kW	7.2 ~ 16kW	2.6 ~ 16kW	7.2 ~ 16kW	5 ~ 16kW
工作电压范围 Operating voltage range	220VAC ± 20%	220VAC ± 20%	220VAC ± 20%	220VAC ± 20%	220VAC ± 20%
频率 Frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz
工作温度 Ambient Temp	0 ~ 60°C	0 ~ 60°C	0 ~ 60°C	0 ~ 60°C	0 ~ 60°C
储存温度 Storage Temp	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C
内外机通讯方式 Communication mode	零火线通讯 Current loop communication	零火线通讯 Current loop communication	零火线通讯 Current loop communication	零火线通讯 Current loop communication	零火线通讯 Current loop communication
输入参数 Input	线控器(遥控器)、水位开关、环境感温包、管温感温包、门禁、Wi-Fi、跳线帽 Wired controller (Remote controller)、Water level switch、Ambient temp.sensor、Pipe temp. sensor、Gate control、Wi-Fi、Jumper				
控制对象 Object Controller	交流风机/直流电机、扫风电机x2、灯板、电加热 AC motor/DC motor、swing motorx2、displayboard、electrical heater	交流风机/直流电机、扫风电机x2、显示板、电加热 AC motor/DC motor、swing motorx2、displayboard、electrical heater	交流风机/直流电机、交流/12V直流水泵、电加热 AC motor/DC motor、AC/12V DC pump、electrical heater	交流风机、交流水泵、扫风电机x2、灯板、电加热 AC motor、AC pump、swing motorx2、display board、electrical heater	直流风机x2、12V直流水泵、扫风电机x3、灯板、电加热 DC motorx2、12V DC pump、swing motorx3、display board、electrical heater
组件 Component	主板+灯板+遥控 Mainboard + displayboard +remote Controller	主板+灯板+遥控 Mainboard + displayboard +remote Controller	主板+线控/灯板和遥控 Mainboard + Wired controller /displayboard+remote Controller	主板+线控/灯板和遥控 Mainboard + Wired controller /displayboard +remote Controller	主板+线控/灯板和遥控 Mainboard + Wired controller /displayboard +remote Controller

03

ADENTECH

轻型商用一拖多空调产品控制解决方案

DRIVE & CONTROL SOLUTION FOR LIGHT COMMERCIAL MULTI SPLIT AC

亚丁电控团队自主研发的技术，与合作伙伴的控制技术优势互补，共同成就了亚丁商用产品的卓越控制方案。

这些方案已在超过百万台设备中得到充分验证，表现出卓越的安全性、稳定性与高效性。

产品支持长配管和灵活安装，内机可超配外机150%的能力。外机兼容家用内机及商用末端设备，满足更广泛的用户需求。

ADENTECH's in-house developed multi-split control technology, combined with the strengths of our partners' control solutions, has resulted in an advanced control system for commercial products.

These solutions have been fully validated in over a million units, demonstrating exceptional safety, stability and efficiency.

The system supports long piping and flexible installation, indoor units capable of exceeding 150% of the outdoor unit's capacity. The outdoor units are compatible with both residential indoor units and commercial terminal units, meeting a wide range of customer needs.



产品系列 / Product Series

- 小型一拖多空调控制器
Multi split AC Controls
- 小型VRF空调控制器
Mini-VRF AC Controls

小型一拖多空调控制器 Multi split AC Controls

特点 / Features



自主知识产权的控制算法
Patented control algorithms



高频PFC 功率因数>0.99
High efficiency pfc, power factor>0.99



支持最多可搭配5台不同类型内机
Supports up to 5 different indoor units



倒扣防尘紧凑设计
Undercut dust prevention design



超宽频精准运行
Ultra-wide frequency accurate running



低频平顺运行
Low frequency smooth running



云智能控制技术
Cloud intelligent remote control technology



宽工作电压范围
Wide voltage range
165V - 265V (50/60Hz)



全方位保护功能
Full protection

功能点 / Functions



低功耗待机0.5w
Low power standby 0.5w



掉电记忆
Power-off memory



快速制冷制热
Fast heating/cooling



智能化霜
Intelligent defrost



智能Wi-Fi
Smart Wi-Fi (optional)



冷等离子
Cold plasma (optional)



低温制热 -25°C
Low temperature heating (optional)



低温制冷 -15°C
Low temperature cooling (optional)



超静音功能
Quiet function



故障智能检测
Fault intelligent detection



自诊断功能
Self-diagnostic function

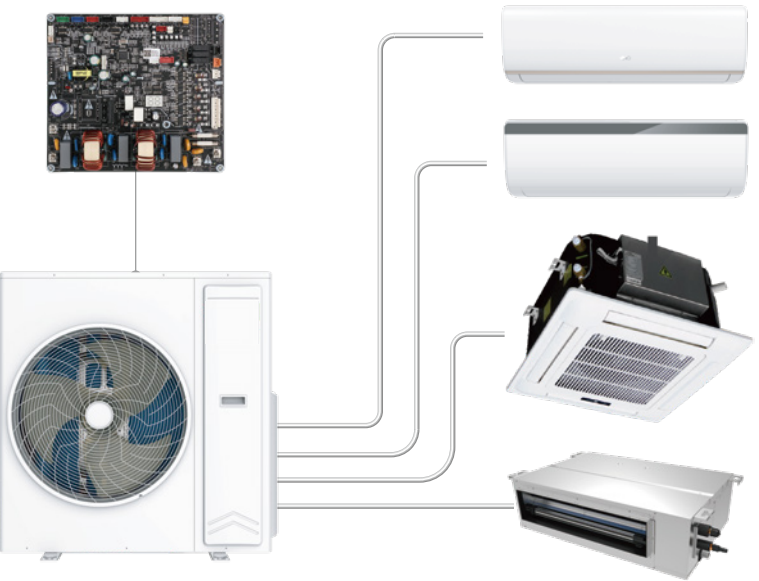


舒适睡眠功能
Comfortable sleep function



随身感功能
I feel function

解决方案 / Solution



参数规格 / Parameter

产品类型 Category	一拖二外机 System 2 CU	一拖三外机 System 3 CU	一拖三/四外机 System 3/4 CU	4p一拖四/五外机 System 4/5 CU
型号 Model	BWZ50A1R*	BWZ72A1R*	BWZ72A1R*	BWZ100A1R*+BDQ100A*
适用能力 Capacity	18K	24K/28K	28K/30K	36K/42K
工作电压范围 Operating Voltage Range	220VAC ± 20%	220VAC ± 20%	220VAC ± 20%	220VAC ± 20%
频率 Frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz
最大输入电流 Max Input Current	7A	12A	16A	25A
最大输入功率 Max Input Power	1540W	2640W	3520W	5500W
工作温度 Ambient Temp	-30 ~ 60°C	-30 ~ 60°C	-30 ~ 60°C	-30 ~ 60°C
储存温度 Storage Temp	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C
驱动冷却形式 Cooling Mode	风冷 Air-cooled	风冷 Air-cooled	风冷 Air-cooled	风冷 Air-cooled
通讯方式 Communication Mode	零火线通讯 Current loop communication	零火线通讯 Current loop communication	零火线通讯 Current loop communication	零火线通讯 Current loop communication
输入参数 Input	感温包x7、开关量x2; Temp. Sensor x7、Switch x2	感温包x9、开关量x2; Temp. Sensor x9、Switch x2	感温包x11、开关量x2; Temp. Sensor x11、Switch x2	感温包x13、开关量x4、跳线帽; Temp. Sensor x13、Switch x4、Jumper
控制对象 Object Control	交/直流电机、电子膨胀阀x2、 交流220V负载x4; AC motor/DC motor、 EEV x2、AC 220V Load x4	交/直流电机、电子膨胀阀x3、 交流220V负载x4; AC motor/DC motor、 EEV x3、AC 220V Load x4	交/直流电机、电子膨胀阀x4、 交流220V负载x4; AC motor/DC motor、 EEV x4、AC 220V Load x4	交/直流电机、电子膨胀阀x5、 交流220V负载x4; AC motor/DC motor、 EEV x5、AC 220V Load x4
组件 Component	主控板 + PFC电抗器 Mainboard + PFC Reactor	主控板 + PFC电抗器 Mainboard + PFC Reactor	主控板 + PFC电抗器 Mainboard + PFC Reactor	主控板+驱动板+PFC电感 Mainboard + Driver Board + PFC Inductor

小型VRF空调控制器 Mini-VRF AC Controls

特点 / Features



自主知识产权的控制算法
Control algorithm of independent intellectual property rights



无极性通讯技术
Non-polar communication technology



内外机自动寻址技术
Internal and external machine automatic addressing technology



高频PFC 功率因数>0.99
High efficiency PFC, power factor>0.99



补气增焓
双级压缩控制技术
Enriched enthalpy / two-stage compression control technology



双电子膨胀阀
控制技术
Dual electronic expansion valve control technology



双重过冷却技术
Dual supercooling technology



三重油分离技术
Triple oil separation technology



多重油控制技术
Multiple oil control technology



油平衡技术
Oil balancing technology



制热不换向回油技术
Heating without reversing oil return technology



冷媒平衡技术
Refrigerant balance technology



快速智能匹配压缩机
Fast and intelligent matching compressor



云智能控制技术
Cloud intelligent remote control technology



全方位保护功能
Full protection



自诊断功能
Self-diagnostic function



工作温度范围-30 ~ 60°C
Operating temperature range: -30 ~ 60 °C



宽工作电压范围
Wide voltage range
165V - 265V (50/60Hz)

功能点 / Functions



超静音功能
Quiet function



故障智能检测
Intelligent fault detection



高精度压力传感器
High-Precision pressure sensor



快速制冷制热
Fast heating/cooling



低温除湿
Low temperature dehumidification



掉电记忆
Power-off memory



智能化霜
Intelligent defrost

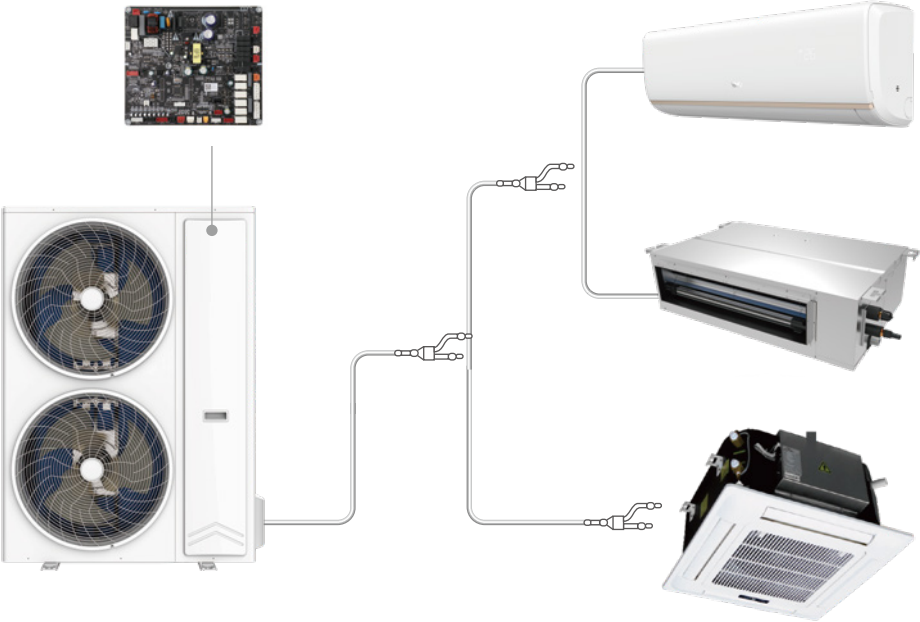


-30°C超低温制热
-30°C low temperature heating (optional)



16重安全保护
16 Safety protection

解决方案 / Solution



参数规格 / Parameter

产品类型 Category	4HP	6HP	8HP
型号 Model	BW175B*+BDQ100A*	BW175B*+BDQ175A*	BW175B*+BSQ180B*
适用能力 Capacity	10kW	16kW	22.4kW
工作电压范围 Operating Voltage Range	220VAC ± 20%	220VAC ± 20%	380VAC ± 20%
频率 Frequency	50/60Hz	50/60Hz	50/60Hz
最大输入电流 Max Input Current	25A	34A	18A
最大输入功率 Max Input Power	5500W	7500W	10500W
工作温度 Ambient Temp	-30 ~ 60°C	-30 ~ 60°C	-30 ~ 60°C
储存温度 Storage Temp	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C
通讯方式 Communication Mode	RS-485	RS-485	RS-485
驱动冷却形式 Cooling Mode	风冷 Air-cooled	风冷 Air-cooled	风冷 Air-cooled
输入参数 Input	感温包x9、压力传感器x2、开关量x3、2位拨码、跳线帽、Wi-Fi /GPRS Temp. Sensor x9, Pressure sensor x2, Switch x3, 2 Digit dial code, Jumper, Wi-Fi /GPRS	感温包x9、压力传感器x2、开关量x3、2位拨码、跳线帽、Wi-Fi /GPRS Temp. Sensor x9, Pressure sensor x2, Switch x3, 2 Digit dial code, Jumper, Wi-Fi /GPRS	感温包x9、压力传感器x2、开关量x3、2位拨码、跳线帽、Wi-Fi /GPRS Temp. Sensor x9, Pressure sensor x2, Switch x3, 2 Digit dial code, Jumper, Wi-Fi /GPRS
控制输出 Control Output	交/直流风机、电子膨胀阀x2、交流220V负载x7 AC/DC motor x2, EEV x2, AC 220V Load x7	交/直流风机X2、电子膨胀阀x2、交流220V负载x7 AC/DC motor x2, EEV x2, AC 220V Load x7	交/直流风机X2、电子膨胀阀x2、交流220V负载x7 AC/DC motor x2, EEV x2, AC 220V Load x7
组件 Component	主控板+驱动板+滤波板+PFC电感 Mainboard + Driver Board + EMI Board + PFC Inductor	主控板+驱动板+滤波板+PFC电感 Mainboard + Driver Board + EMI Board + PFC Inductor	主控板+驱动板+滤波板+PFC电感 Mainboard + Driver Board + EMI Board + PFC Inductor

04

ADENTECH

热泵产品控制解决方案

DRIVE & CONTROL SOLUTION FOR HEAT PUMP

AdenTech的热泵控制方案采用精准的直流变频技术，全面调控压缩机、风机、电子膨胀阀等核心部件。

我们的方案能够在-30°C至60°C的广泛温度范围内提供精准的温控，并通过智能调节提升能效，简化安装调试，进一步优化用户体验，带来更加舒适、平稳的使用感受。

ADENTECH's heat pump control solutions utilizes precise DC inverter technology to efficiently manage key components.

The system operates reliably across a wide temperature range from -30°C to 60°C, while also optimizing energy efficiency, simplifying installation and enhancing the overall user experience, providing comfort and stable in all conditions.



产品系列 / Product Series

- 采暖机控制器
Air Source Heat Pump Controls
- 热水机控制器
Water Heater Heat Pump Controls
- 欧洲热泵控制器
European Heat Pump Controls

特点 / Features



自主知识产权的控制算法
Patented control algorithms



高频PFC 功率因数>0.99
High efficiency PFC, power factor>0.99



多电子膨胀阀
流量分配技术
Dual electronic expansion valve control technology



补气增焓
双级压缩控制技术
Enriched enthalpy / two-stage compression control technology



双电子膨胀阀控制技术
Dual electronic expansion valve control



多重油控制技术
Multiple oil control technology



低频平顺运行
Low frequency smooth running



超宽频精准运行
Ultra-wide frequency accurate running



全方位保护功能
Full protection



工作温度范围
Operating temperature range: -30 ~ 60 °C



宽工作电压范围
Wide voltage range 165V - 265V (50/60Hz)

功能点 / Functions



超静音功能
Quiet function



地板干燥功能
Floor drying function



超低温制热 -30°C
low temperature heating (optional)



高出水温度
High outlet water temp



高精度压力传感器
High-precision pressure sensor



防冻结功能
Anti-freeze function



快速制冷制热
Fast heating /cooling



智能化霜
Intelligent defrost



自诊断功能
Self-diagnostic function

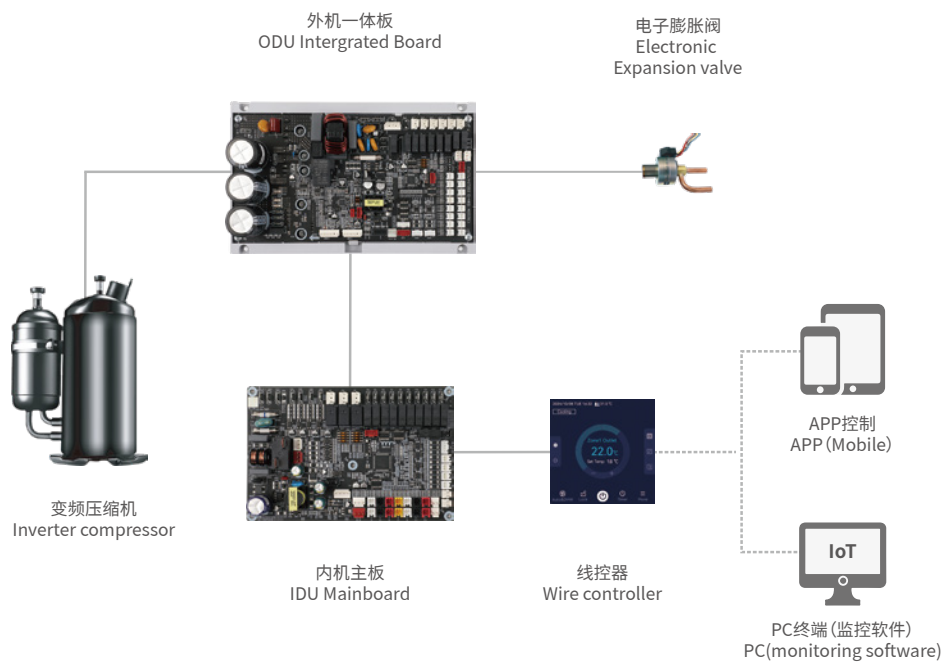


掉电记忆
Power-off memory



智能Wi-Fi
Smart Wi-Fi (optional)

解决方案 / Solution



参数规格 / Parameter

产品类型 Category	4kW~8kW 220~240V-1Ph	8kW~12kW 220~240V-1Ph	12kW~16kW 220~240V-1Ph	12kW~16kW 380~415V-3Ph
	一体板 Integrated Board	一体板 Integrated Board	外机板+驱动 Outdoor Unit Board +Driver Board	外机板+驱动 Outdoor Unit BoardDriver Board
型号 Model	BW100C*/BW72C*	BW175C*	BWPA1N1+BDQ170C*	BWPA1N1+BSQ180F*
工作电压范围 Operating Voltage Range	220VAC±20%	220VAC±20%	220VAC±20%	380VAC±20%
频率 Frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz
最大输入电流 Max Input Current	18A	23A	30A	12A
最大输入功率 Max Input Power	4000W	5000W	6500W	7000W
工作温度 Ambient Temp	-30 ~ 60℃	-30 ~ 60℃	-30 ~ 60℃	-30 ~ 60℃
储存温度 Storage Temp	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃
通讯方式 Communication Mode	RS-485*3	RS-485*3	RS-485*3	RS-485*3
驱动冷却形式 Cooling Mode	风冷Air-cooled	风冷Air-cooled	风冷Air-cooled	风冷Air-cooled
输入参数 Input	感温包x20、压力传感器x3、开关量x10、4位拨码x2 Temp. Sensor x20、Pressure Sensor x3、On-Off Switch x10、Dial Switch x2			
控制对象 Object Control	直流电机x2、电子膨胀阀x2、交流220V负载x20 DC motor x2、EEV x2、AC220V Load x20			
组件 Component	内机板 + 一体板 (集成主板、驱动板、滤波板为一体板) + 电抗器 Indoor Unit Board + Integrated Board (Control & Drive Board, Filter Board) + Reactor		内机板 + 外机板 + 驱动板 (集成滤波) + 电抗器 Indoor Unit Board+Outdoor Unit Board + Driver Board (Intergrated Filter Board) + Reactor	
产品类型 Category	内机板 Indoor Unit Board			
型号 Model	BNPB2N1			
控制对象 Object Controller	三通阀（混水）、生活水箱电加热、外置辅助电加热*2、混水泵、外置水泵、太阳能水泵、生活热水回水泵、二通阀、三通阀（生活热水）、温控器（低电压）、温控器（高电压）、智能电网、太阳能模块输入信号、外部热源（干触点） 3-way Valve (Mixed Water), Tank Electric Heater, External Auxillary Electric Heater*2, Mixing Water Pump, External Water Pump, Solar Water Pump, DHW Return Water Pump, 2-way Valve, 3-way Valve、Thermostat (Low Voltage), Thermostat (High Voltage), Smart Grid, Solar Kit Input Signal, Auxillary Heat Source (Dry Contact)			

05

ADENTECH

整体式HVAC产品控制解决方案

INTEGRATED HVAC PRODUCT CONTROL SOLUTION

亚丁科技不仅为传统HVAC产品提供电控方案，还根据客户需求提供定制化解决方案，包括除湿、新风、先进热回收等多种制冷、制热系统等。

亚丁科技的一站式产品设计服务，涵盖结构和电控设计、系统方案及物联网解决方案。

作为技术驱动型公司，亚丁科技始终致力于为用户提供领先的智能控制解决方案。

ADENTECH provides integrated electrical control solutions for traditional HVAC products, along with customized solutions tailored to customer needs, including dehumidification, fresh air systems, advanced heat recovery, and a range of cooling and heating systems.

In addition, ADENTECH offers comprehensive product design services, including structural design, system solutions, electrical control design and IoT integration.

As a technology-driven company, ADENTECH is committed to providing leading-edge smart control solutions for customers.



产品系列 / Product Series

- 除湿机控制器
Dehumidifier Controls
- 移动机控制器
Portable AC Controls
- 新风机控制器
Air Purifier Controls

特点 / Features



自主知识产权的控制算法
Patented control algorithms



高频PFC 功率因数>0.99
High efficiency PFC, power factor>0.99



全方位保护功能
Full protection



低频平顺运行
Low frequency smooth running



超宽频精准运行
Ultra-wide frequency accurate running



云智能控制技术
Cloud intelligent remote control technology



宽工作电压范围
Wide voltage range
165V - 265V (50/60Hz)

功能点 / Functions



低功耗待机0.5w
Low power standby



掉电记忆
Power-off memory



快速除湿
Rapid dehumidification



自动化霜
Intelligent defrost



智能Wi-Fi
Smart Wi-Fi (optional)



24小时定时功能
24 hour timing function



冷等离子
Cold plasma (optional)



智能换新风
Smart fresh air system



电子控制
Electronic control



自诊断功能
Self-diagnostic function

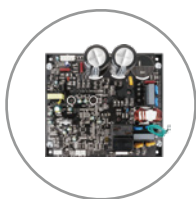


自动停机
Automatic stop



水满提示
Water full alert

解决方案 / Solution



除湿机驱动板
dehumidifier driver board



除湿机主板
dehumidifier control mainboard

参数规格 / Parameter

产品类型 Category	家用定频除湿机 Residential Fixed Speed Dehumidifier	家用变频除湿机 Residential Inverter Dehumidifier	中央变频除湿机 Commerical Dehumidifier Inverter Type
型号 Model	DNH*	BNH*	BW35B*
适用能力 Capacity	10 ~ 30L	10 ~ 50L	30 ~ 100L
工作电压范围 Operating Voltage Range	220VAC ± 20%	220VAC ± 20%	220VAC ± 20%
频率 Frequency	50/60Hz	50/60Hz	50/60Hz
最大输入电流 Max Input Current	5A	8A	15A
最大输入功率 Max Input Power	1100W	1760W	3300W
工作温度 Ambient Temp	0 ~ 60°C	0 ~ 60°C	0 ~ 60°C
储存温度 Storage Temp	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C
通讯方式 Communication Mode	/	UART	RS-485
驱动冷却形式 Cooling Mode	/	风冷 Air-cooled	风冷 Air-cooled
输入参数 Input	温湿度传感器、感温包、水位开关 Temperature And Humidity Sensor, Temperature Package, Water Level Switch	温湿度传感器、感温包、水位开关 Temperature And Humidity Sensor, Temperature Package, Water Level Switch	温湿度传感器、感温包、水位开关 Temperature And Humidity Sensor, Temperature Package, Water Level Switch
控制输出 Output	定频压缩机、pg电机、扫风电机 Fixed Speed Compressor, Pg Motor, Sweep Motor	变频压缩机、pg电机、扫风电机 Inverter Compressor, Pg Motor, Sweep Motor	变频压缩机、直流电机*2、电子膨胀阀、交流负载*3 Inverter Compressor, DC Fan Motor*2, EEV, AC Load*3
组件 Component	显示板+主板+温湿度传感器 Display Board + Main Board + Temperature And Humidity Sensor	显示板+主板+温湿度传感器 Display Board + Main Board + Temperature And Humidity Sensor	线控器+主板+温湿度传感器 Wired Controller + Main Board + Temperature And Humidity Sensor

06

ADENTECH

IoT智能控制方案

IOT SMART CONTROL SOLUTION

亚丁科技的IoT智能控制方案覆盖智能家居、工商业和开放性场所，打造全场景智慧物联网体验。

通过专属Wi-Fi模块、NB、4G/5G无线控制方案，用户可便捷管理各类智能设备，享受无缝连接带来的操作体验。

我们的独立APP支持多种家电产品的集中控制，并结合私有云服务确保数据安全，提供个性化的智能管理方式。亚丁将物联网与人工智能技术深度融合，为用户带来更便捷、更智能的生活方式，充分展现技术驱动的创新实力。

ADENTECH' s IoT solutions for smart homes, commercial spaces, and industrial settings, providing seamless connectivity and intuitive control.

With Wi-Fi, NB and 4G/5G options, users can easily manage devices for maximum convenience.

Our app supports centralized control of multiple household appliances and combines private cloud services to ensure data security.

Provide personalized intelligent management. AdenTech integrates the IoT and AI technology, bringing users a more convenient and intelligent lifestyle.

Demonstrating the technology driven strength of AdenTech.



IoT全景架构 / Smart IoT Platform

物联网平台完整技术架构图



横向通用能力 / Cross-Cutting Capabilities

- 安全体系 Security Framework**
 - 身份认证 (OAuth2.0/LDAP) / Identity Authentication (OAuth 2.0 / LDAP)
 - TLS/HTTPS加密传输 / TLS / HTTPS Encrypted Transmission
 - 数据安全 (脱敏/加密) / Data Security (Masking / Encryption)
 - 密钥与证书管理 (KMS) / Key and Certificate Management (KMS)
- 权限体系 Access Control Framework**
 - RBAC权限控制 / RBAC-Based Access Control
 - 多租户管理 / Multi-Tenant Management
 - 资源隔离与数据隔离 / Resource and Data Isolation
- 运维体系 Operations and Maintenance Framework**
 - 服务监控 (APM) / Application Performance Monitoring (APM)
 - 自动化运维 (HPA) / Automated Operations and Maintenance (HPA)
 - 故障告警与恢复 (自愈) / Fault Alerting and Recovery (Self-Healing)
 - 容量管理 / Capacity Management
- AI能力体系 AI Capability Framework**
 - 知识检索 / Knowledge Retrieval
 - 语音交互 / Voice Interaction
 - 场景联动 / Scenario-Based Automation
 - 设备咨询答疑 / Device Consultation and Support
- 日志审计体系 Logging and Audit Framework**
 - 操作日志 / Operation Logs
 - 安全审计日志 / Security Audit Logs
 - 行为追踪与溯源 / User Behavior Tracking and Traceability
 - 合规报表 / Compliance Reporting

● 物联数据枢纽

IoT Data Hub

汇聚全域设备数据，通过可视化大屏实时展示状态与趋势，为业务决策提供精准数据支撑。

Aggregates device data across the entire system and presents real-time status and trends through a visual dashboard, providing accurate data support for business decision-making.

● 产品智能化管理

Product Intelligence Management

提供标准化配置模板，简化产品定义与功能迭代流程，高效支撑多品类产品的快速智能化落地。

Standardized configuration templates simplify product definition and feature iteration, efficiently supporting the rapid intelligent deployment of multiple product categories.

● 设备全维管控

Full-Dimensional Device Management

全生命周期监控设备运行，支持批量远程调试、故障自动诊断与追溯，保障设备稳定在线。

Monitors device operation throughout the full lifecycle, supporting batch remote commissioning, automatic fault diagnosis, and traceability to ensure stable device connectivity.

● 分级账号体系

Hierarchical Account System

基于RBAC的精细化权限管控，适配管理员、运维、运营等多角色协同，确保数据访问安全。

Fine-grained RBAC-based permission control supports multi-role collaboration among administrators, maintenance personnel, and operations teams, ensuring secure data access.

● 项目全流程管理

End-to-End Project Management

覆盖设备安装、区域运营、交付验收全流程进度跟踪，提升项目执行效率与落地规范性。

Covers end-to-end progress tracking across device installation, regional operations, delivery, and acceptance, improving project execution efficiency and implementation standardization.

● OTA固件中枢

OTA Firmware Hub

全流程管控固件升级，支持灰度发布、断点续传与故障回滚，保障设备OTA过程安全稳定。

Provides full-process control over firmware upgrades, supporting phased rollout, resumable transfer, and fault rollback to ensure a secure and stable OTA update process.

■ 全链路可视化

End-to-End Visual Management

构建从设备配置、网络连接到云端运维的全流程可视化看板，实时呈现设备运行指标与异常预警，让运维状态一目了然，有效降低企业的远程运维与管理成本。

Builds a full-process visual dashboard covering device configuration, network connectivity, and cloud-based operation and maintenance, presenting real-time operating metrics and abnormal alerts for clear visibility into O&M status, while effectively reducing remote operation and management costs for enterprises.

■ 多品类快速接入

Rapid Multi-Category Access

内置多协议解析引擎，全面覆盖家电、工业设备、消费电子等品类，通过标准化配置与预制驱动，可实现设备3天内快速完成适配与接入，大幅降低设备联网门槛。

The built-in multi-protocol parsing engine covers a wide range of categories, including home appliances, industrial equipment, and consumer electronics. With standardized configuration and pre-built drivers, devices can be rapidly adapted and connected within 3 days, significantly lowering the barrier to device onboarding.

核心能力筑牢技术底座，中枢功能串联业务全流程，构建高效、安全、可扩展的物联网平台体系；以全链路管理赋能 B 端增长，让设备智能化更高效、更可控。

Core capabilities strengthen the technical foundation, while central platform functions connect the entire business workflow, building an efficient, secure, and scalable IoT platform ecosystem. With full-chain management, the platform empowers B2B growth and makes device intelligence more efficient and controllable.



三友智能App / SAMYOU Smart App

产品定位 Product Positioning

专为环境电器打造的智能管理工具，通过蓝牙+WiFi、蜂窝4G等模式连接暖通设备，精准调控与场景联动，打破操控壁垒，实现舒适生活随「手」掌控。

A smart management tool designed for environmental appliances, connecting HVAC devices via & Bluetooth & Wi-Fi, cellular 4G, and other modes. It enables precise control and scenario-based automation, breaking operational barriers and putting comfortable living at your fingertips.

便捷设备管理：状态可视，操控无忧

Convenient Device Management: Visible Status, Effortless Control

支持设备靠近自动配对、自定义房间分组，在线 / 离线状态实时可视，设备情况一目了然。

Supports automatic pairing when devices are nearby and customized room grouping. Real-time online/offline status visibility allows users to monitor device conditions at a glance.

智能场景设定：批量操控，舒适即刻就位

Smart Scenario Settings: Batch Control for Instant Comfort

内置全开、全关、定时等高频场景，支持单/多设备批量操作，贴合作息节奏，兼顾便捷与节能。

Built-in frequently used scenarios such as All On, All Off, and Timer support batch operation of single or multiple devices, matching daily routines while balancing convenience and energy efficiency.

远程智控双设备：温湿舒适，参数一键拉满

Remote Smart Control for Dual Devices: Temperature and Humidity Comfort, Optimized with One Tap

内置全开、全关、定时等高频场景，支持单/多设备批量操作，贴合作息节奏，兼顾便捷与节能。

Precise temperature control and multi-mode adjustment for air conditioners, combined with preset dehumidifier modes for the rainy and humid season, enable on-demand regulation of indoor temperature and humidity.

围绕“便捷高效”、“智能省心”、“精准舒适”三大核心展开，以用户使用场景为出发点，打磨交互细节与功能逻辑，致力于为用户打造无缝衔接、直观易用且功能强大的智能家居管理体验。

Built around three core values — convenience and efficiency, smart simplicity, and precise comfort — the app starts from real user scenarios to refine interaction details and functional logic, delivering a seamless, intuitive, and powerful smart home management experience.



AI小友 / AI Chat

精准智能答疑 Accurate Smart Troubleshooting

7x24小时在线的技术支持专家，内置专属暖通知识库，支持设备故障自助排查、通用知识问答，快速响应各类使用疑问，无需人工等待。

24/7 online technical support experts, powered by a dedicated HVAC knowledge base, support self-service device troubleshooting, general knowledge Q&A, and rapid responses to various usage inquiries without waiting for manual assistance.

暖通健康指南 HVAC Health Guide

提供科学的室内温湿度健康标准与季节性环境指导，针对老人、儿童、过敏体质等特殊人群，量身定制个性化暖通运行与调节方案。

Provides scientific indoor temperature and humidity health standards, along with seasonal environmental guidance. For elderly users, children, allergy-prone individuals, and other special groups, it delivers personalized HVAC operation and adjustment solutions.

智能运行优化 Intelligent Operation Optimization

基于实时环境数据与用户使用习惯深度学习，主动推送智控调优建议与节能策略，在保障室内舒适体验的前提下，最大化降低设备能耗成本。

Powered by deep learning based on real-time environmental data and user behavior, the system proactively provides intelligent control optimization recommendations and energy-saving strategies, minimizing equipment energy consumption and operating costs while maintaining optimal indoor comfort.

多模态交互体验 Multimodal Interaction Experience

支持文字输入、语音指令双模式交互，预设“一键舒适”“夜间模式”等高频场景快捷卡片，覆盖全年龄段用户，交互更自然、操作更简便。

Supports dual-mode interaction through text input and voice commands, with preset shortcut cards for frequently used scenarios such as “One-Touch Comfort” and “Night Mode.” Designed for users of all ages, it delivers a more natural interaction experience and simpler operation.



AI 小友是三友智能倾力打造的垂直领域专属 AI 助手，深度融合暖通行业知识与人工智能技术，作为三友智能 APP 的核心智能中枢，为全球用户提供一站式、全场景的智能暖通服务。

AI Xiaoyou is a dedicated vertical AI assistant developed by Samyou Intelligence, deeply integrating HVAC industry expertise with artificial intelligence. As the core intelligent hub of the Samyou Smart App, it provides global users with one-stop, full-scenario intelligent HVAC services.

IoT模组与智能生态 / IoT Modules & Smart Ecosystem

该系列模组经过严苛的工业级测试，提供稳定、高效的连接能力。覆盖 LTE Cat.1、Wi-Fi、BLE 等主流协议，赋能万物互联。
This series of modules has undergone rigorous industrial-grade testing to deliver stable and efficient connectivity. Supporting mainstream communication technologies such as LTE Cat.1, Wi-Fi, and BLE, it enables seamless connectivity across a wide range of smart devices.



WiFi Module：DLWFB1-S

乐鑫 esp32-c3-mini-1

配置：内置4M FLASH+400K SRAM，支持Blufi协议配网，采用单分区OTA升级方案，适配轻量级物联网场景。
Configuration: Built-in 4MB Flash + 400KB SRAM. Supports BluFi provisioning and adopts a single-partition OTA upgrade solution, making it suitable for lightweight IoT application scenarios.



WiFi Module：DLWFB2-S

瑞昱 rtl8720cf-vu2

配置：集成FLASH+384K SRAM，Pin2Pin兼容并升级内置4M PSRAM，支持BLE发现WiFi配网，采用A+B双分区OTA机制。
Configuration: Integrated Flash + 384KB SRAM. Pin-to-pin compatible with an upgraded built-in 4MB PSRAM. Supports BLE-based Wi-Fi provisioning and adopts an A/B dual-partition OTA mechanism.



4G/5G Module：DL4G1-MC661-CN

广和通 MC661-CN

配置：内置4M FLASH + 8M SRAM，基于LTE Cat.1 bis通信技术，深度集成三友云生态能力，通过AT指令即可直接控制设备连云。
Configuration: Built-in 4MB Flash + 8MB SRAM. Based on LTE Cat.1 bis communication technology, it is deeply integrated with the Samyou Cloud ecosystem, enabling devices to connect to the cloud directly through AT commands.



WiFi Module：DLWFB1-D

乐鑫 esp32-c5-wroom-1

配置：内置4M/8M FLASH+400K SRAM，支持Blufi配网、BLE电子遥控器及Mesh组网，搭载A+B双分区OTA保障升级稳定。
Configuration: Built-in 4MB / 8MB Flash + 400KB SRAM. Supports BluFi provisioning, BLE electronic remote control, and Mesh networking, with an A/B dual-partition OTA mechanism to ensure stable upgrades.



4G/5G Module：DL4G1-MG661-EU/KR/LA

广和通 MG661系列模组

配置：内置4M FLASH + 8M SRAM，支持LTE Cat.1 bis网络制式，无缝接入三友云生态，支持AT指令直控实现快速连云。
Configuration: Built-in 4MB Flash + 8MB SRAM. Supports LTE Cat.1 bis network standards and seamless access to the Samyou Cloud ecosystem. AT command-based direct control enables fast cloud connectivity.



4G/5G Module：DL4G1-NL668-EU/KR/LA

广和通 NL668-AM

配置：内置4M FLASH + 8M SRAM，支持LTE Cat.4高速网络，接入三友云生态，蜂窝芯片级OTA升级由运营商侧统一负责运维。
Configuration: Built-in 4MB Flash + 8MB SRAM. Supports LTE Cat.4 high-speed networks and access to the Samyou Cloud ecosystem. Cellular chipset-level OTA upgrades are centrally managed and maintained by the carrier side.

多品类智能单品 / Multi-category Smart IoT Products

专为智能家居和商用场景设计的智能单品，涵盖线控器、温控器、遥控器等设备,实现便捷控制、舒适体验与高效管理。

Designed for smart home and commercial applications, this range of intelligent devices includes wired controllers, thermostats, remote controls, and more, delivering convenient control, enhanced comfort, and efficient management.

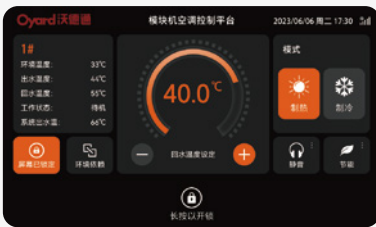
变频模块控制平台 Inverter Module Control Platform

7.0寸彩屏，标准86盒/墙面安装，全触摸操作，适配模块机组。

亮点：高性能处理器、IPS屏、多角度安装、协议与UI深度定制。

7.0-inch color touchscreen, designed for standard 86 wall box or wall-mounted installation, with full-touch operation and compatibility with modular unit systems.

Highlights: High-performance processor, IPS display, multi-angle installation, and in-depth customization of protocols and UI.



旋钮触控彩屏线控器 Rotary Touchscreen Color Display Wired Controller

2.1寸圆形彩屏，86盒安装，适配单元机、多联机及热泵设备

亮点：搭载智能RGB氛围灯，2.5D立体盖板，支持旋转+触摸双重控制。

Featuring a 2.1-inch circular color display and standard 86-type wall box installation, the controller is compatible with unitary systems, multi-split systems, and heat pump equipment.

Highlights: Intelligent RGB ambient lighting, a premium 2.5D cover lens, and dual control through rotary adjustment and touch operation.



旋钮彩屏温控器 Rotary Color Display Thermostat

2.1寸圆形彩屏，分国内/美区版本，全触摸按键操作。

亮点：智能RGB氛围灯效，2.5D立体盖板设计，融合旋转调节与触摸操控体验。

Featuring a 2.1-inch circular color display, the thermostat is available in China and North American versions and supports full-touch key operation.

Highlights: Intelligent RGB ambient lighting, a premium 2.5D cover lens, and an intuitive control experience combining rotary adjustment with touch operation.



全触摸彩屏线控器 Full-Touch Color Screen Wired Controller

集成WiFi远程控制、电容触摸与彩屏显示的新一代线控器。

亮点：支持UI与协议定制化开发，配备灵敏电容触摸屏，交互流畅便捷。

A next-generation wired controller integrating Wi-Fi remote control, capacitive touch operation, and a color display.

Highlights: Supports customized UI and communication protocol development, with a responsive capacitive touchscreen for smooth and convenient interaction.



电容触摸按键款温控器 Capacitive Touch-Key Thermostat

配备彩色VA液晶屏，标准86盒安装，采用全触摸按键操作方式。

亮点：支持七天循环定时，温度精度可调，参数自由设定，适配多类设备。

Equipped with a color VA LCD display, the thermostat is designed for standard 86-type wall box installation and features full-touch key operation.

Highlights: Supports 7-day programmable scheduling, adjustable temperature accuracy, flexible parameter settings, and compatibility with a wide range of equipment.



功能款智能遥控器 Multi-Function Smart Remote Control

专为分体机研发设计，采用双色注塑工艺，外观精致且操作简便。

亮点：液晶显示与硅胶按键内容可定制，背光效果可选，支持定时功能设置。

Specially designed for split air conditioners, this remote control features a two-color injection-molding process, combining a refined appearance with easy operation.

Highlights: Customizable LCD display content and silicone key layout, optional backlighting, and programmable timer settings.

