STEP®

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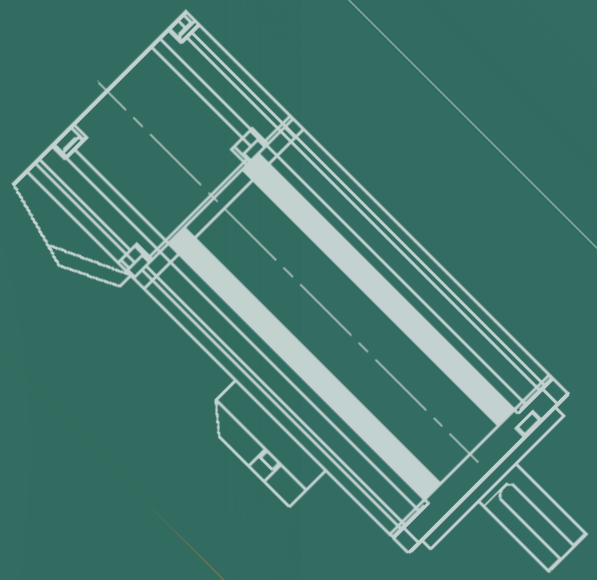

INDUSTRIAL CONTROL

VER 1.0

www.stepelectric.com

Shanghai Yixin International Trade Co,Ltd. was found in April 2011, which is a wholly-owned subsidiary of Shanghai STEP Electric Corporation.
Yixin International is a comprehensive international trading company with multilanguage support of business, including English, Russian, Spanish, German, Japanese and so on. As an elevator part integrated supplier, we provide professional lift solutions.We cooperate with partners from more than 50 different countries such as Germany, Malaysia, Vietnam, Indonesia, Russia, Singapore,Australia, India, Turkey and so on.

Our company creates a global advantage by means of good service.
We have established overseas wholly owned subsidiaries, namely STEP Sigriner Elektronik GmbH in Germany and Hong Kong International STEP Holdings Co., Ltd. as well as two subsidiary joint-venture companies STEP-Sigriner DO BRASIL in Brazil and Sigriner Automation (MFG) SDN. BHD.in Malaysia.
The Middle East and Southeast

Asia region have also been in the selection process,planning to set up offices in the coming year.Yixin will continue to expand the business scope all over the world.

1995

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STEP Spirit: Strive for global competitiveness, pursue the best practice and always stay ahead of the industry.

STEP Mission: Provide the best controllers, drives and energy-saving products for the sustainable benefits of the society and the employees.

STEP Vision: To be a worldwide leading high-tech enterprise in electrical industry.

High Voltage Inverter

Product application

Product introduction

AS800 high-voltage inverter, as Voltage source HV to HV frequency designed and manufactured by Shanghai Sigriner STEP Electric Co., Ltd. and integrating the cutting-edge international power electronic technology and vector control technology, greatly suppresses the input harmonic current on the grid side through phase-shifting rectifier transformer, achieves voltage superposition through cascade connection of multistage H-bridge power units and obtains almost perfect high pressure sine wave output. It can directly drive the high-voltage motor without any filter and its harmonic indicator meets the requirements for the power harmonics in IEC std 519-1992 (International Electrotechnical Commission) and GB/T 12668.4-2006 (national standard).

Product introduction

AS800-12000-T10-PAD high-voltage inverter/nuclear power station pump test bench application case

Power industry: primary fan, secondary fan, forced draught blower, induced draft fan, exhauster, booster fan, compressor, storage pump, condensate pump, boiler feed pump, circulating water pump and morta, etc.

Steel and metallurgy industry: main exhaust fan, blast furnace blower, compressing blower, converter dedusting fan, induced draft fan, secondary dedusting fan, gas compressor, forced draught blower, high temperature fan, combustion fan, oxygen compressor, sulfur dioxide fan, water delivery pump, feed pump, lift pump, circulating water pump and slag flushing pump, etc.

chemical industries: oil extraction and water injection pump, oil-submerged pump, fuel delivery pump, electric submersible pump, brine pump, circulating water pump, pipeline delivery pump, boiler primary fan, secondary fan, induced draft fan, Roots blower, compressor and coal milling circulating fan, etc.

Coal and mine: belt conveyor, counter-rotating fan, axial flow fan, dedusting fan, forced draught blower, compressor, slurry pump, clean water pump, charge pump, agitator pump, descaling pump, slush pump, medium pump and kiln drive, etc.

Municipal water affairs: sewage pump, clean water pump, lift pump, water supply pump, heat circulating pump, pressure pump, induced draft fan and forced draught blower, etc.

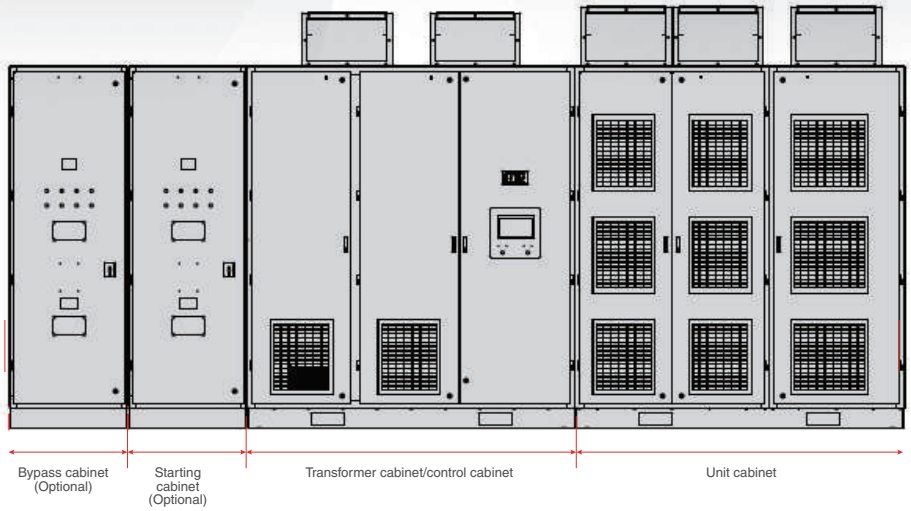
Cement and building materials: high temperature fan, circulating fan, kiln induced draft fan, kiln tail fan, kiln air supply fan, raw material wind mill, coal mill, separator fan, forced draft fan, cement mill exhaust fan and coal mill dedusting fan, etc.

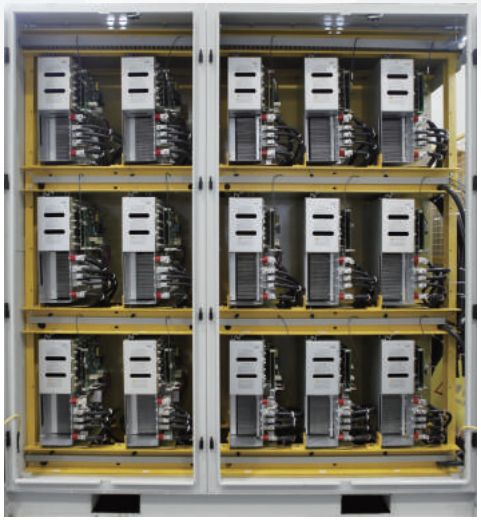
Rubber and plastic industry: internal mixer, extruder and air compressor, etc.

Other industries: air conditioning compressor, various fan pump test stands and wind tunnel tester, etc.

Product structure

Product structure





Unit cabinet

Introduction to system components

Unit cabinet: a unit cabinet consists of several power units in series. A power unit consists of the elements such as three-phase diode-bridge rectifier, IGBT inverter bridge, capacitor bank and the drive, protection, monitoring and communication components; all power units are of intelligent design and have powerful fault self-diagnosis capacity; the power unit is of modular design for production and maintenance.

Control cabinet: the control cabinet is the control part of the whole frequency inverter and the core components of its main control system include A RM, DSP and FPGA. The multi-level PWM control algorithm is used to ensure optimized operation of the motor.

Transformer cabinet: the transformer is dry phase shifting transformer with H class insulation. The maximum system temperature is up to 180°C and ± 5% tap at the primary side is adjustable.Function of phase shifting transformer: reducing harmonic interference and improving the power factor.

Bypass cabinet: function of the manual bypass cabinet system: manually switch the motor to the common frequency power grid after frequency inverter fault and decommissioning.Main function of automatic bypass system: directly switch the motor to the common frequency power grid in case of frequency inverter fault to guarantee production continuity. The automatic switching process has no impact on the grid and motor.

Starting cabinet: preventing large exciting current in the high-voltage transmission of the frequency inverter from causing quick-disconnect protection of the superior circuit breaker. Starting cabinet configuration standard: 3kV630kW, 6kV1250kW, 10kV2000kW and above standard configuration, other power sections optional.

Control cabinet

Transformer cabinet

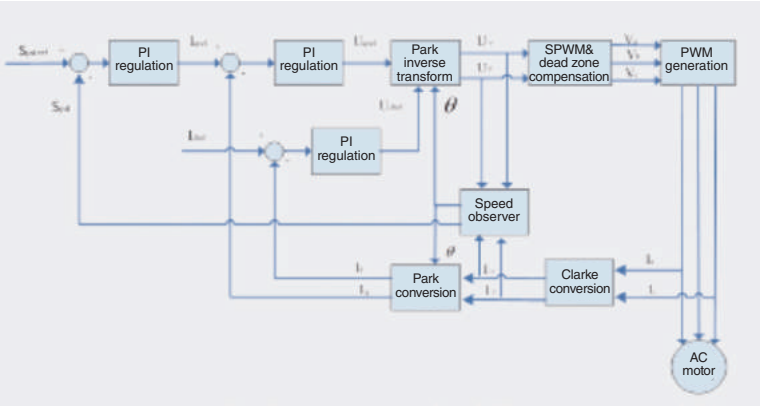
Technical features

Flexible terminal expansion without the need for PLC

The flexible terminal configuration and expansion and the digital/analog input/output terminal functions may be flexibly expanded as required by the user without the need for PLC programming. Only corresponding parameter functions shall be set.

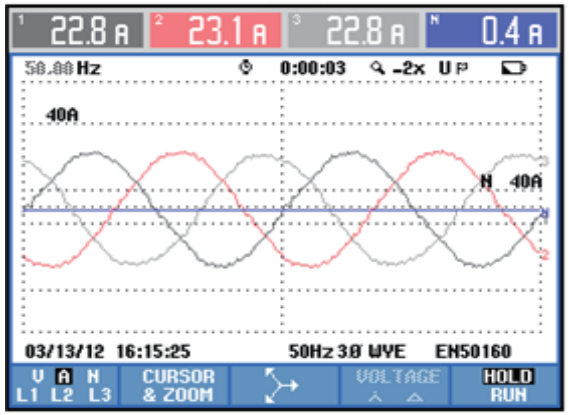
Vector control

- Calculate the motor speed and achieve the AC motor decoupling control according to the motor speed detected by the encoder and combined with the software vector control algorithm. The control performance may be comparable with DC speed regulation system.
- Support constant power operation and support operation above base frequency (flux weakening function).



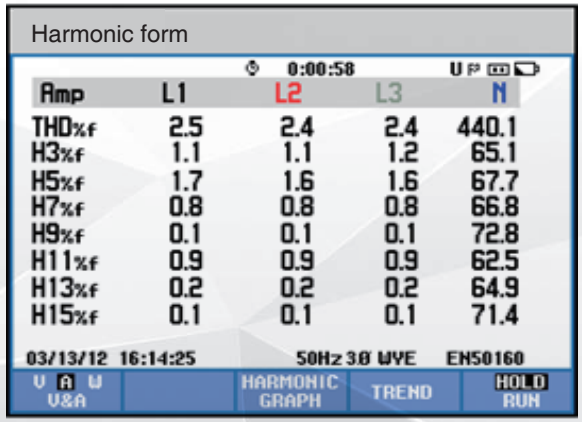
High quality drive of motor

- Multi-level PWM control mode and sinusoidal current output.
- Common mode voltage and du/dt, no special requirement for motor and cable, frequency conversion renovation of old equipment without the need for motor replacement



Low harmonic content

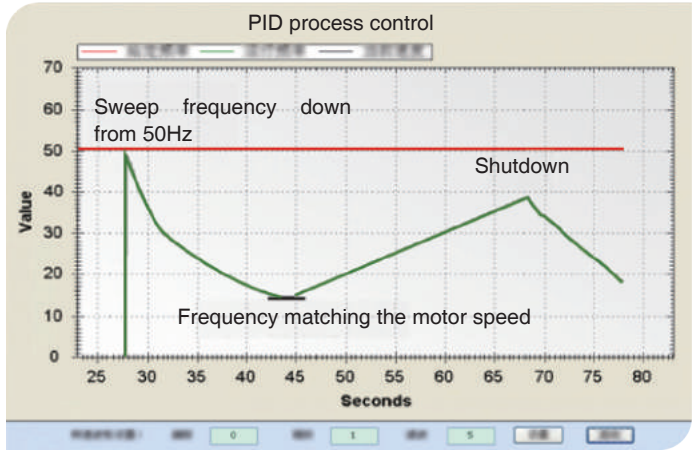
- No additional output filtering device is required and the motor may not be subject to derating use due to harmonics.
- Harmonic content <5%.
- No pulsating torque caused by harmonics. Prolong the service life of the motor and mechanical equipment, reduce maintenance and save the maintenance cost.



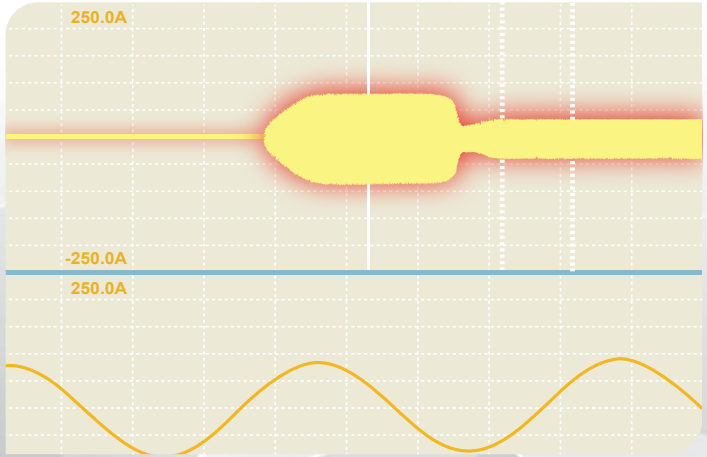
Product functions

Speed tracking start

Speed tracking start is also called "Fly a car start". The frequency inverter first sweeps frequency down from the maximum frequency. When tracking the frequency matching the motor speed, the frequency inverter quickly rises to the voltage-frequency curve by unique phase detection technology and achieves direct start on the basis of current motor speed.



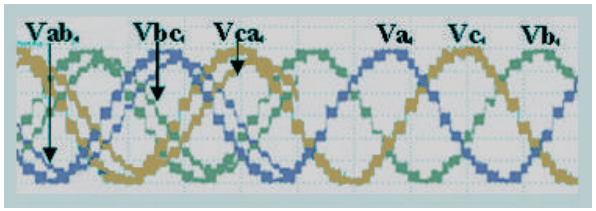
"Speed tracking start" frequency scanning curve



"Speed tracking start" current curve

Mechanical unit bypass

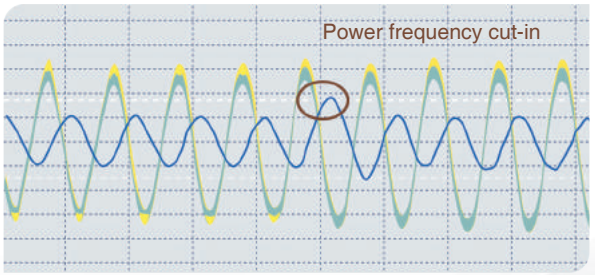
- Mechanical unit bypass: automatically bypass the fault unit in case of the unit fault in the high-voltage frequency inverter operation process to guarantee continuous operation of the equipment;
- The maximum bypass unit number is 2 in each phase;
- Independent design of the unit bypass control system to guarantee reliable equipment operation.

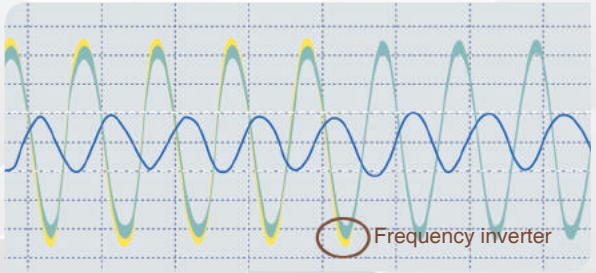


Voltage waveform output by unit A3 after bypass

Undisturbed switching between power frequency and variable frequency

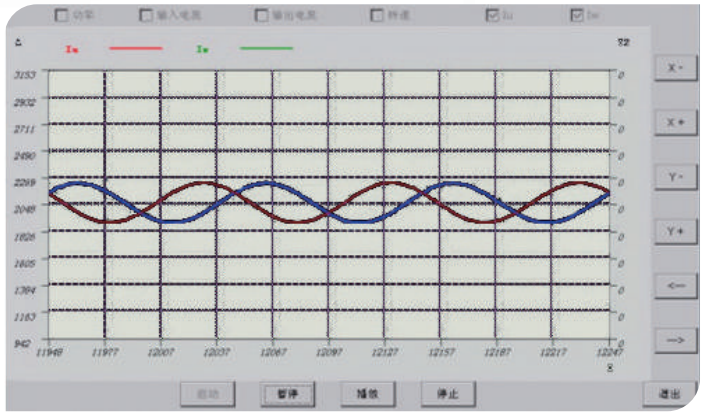
Control the high-voltage frequency inverter to output the same frequency and phase with the network voltage after detecting the voltage amplitude, frequency and phase to achieve undisturbed switching between the frequency inverter power supply and power frequency power supply.



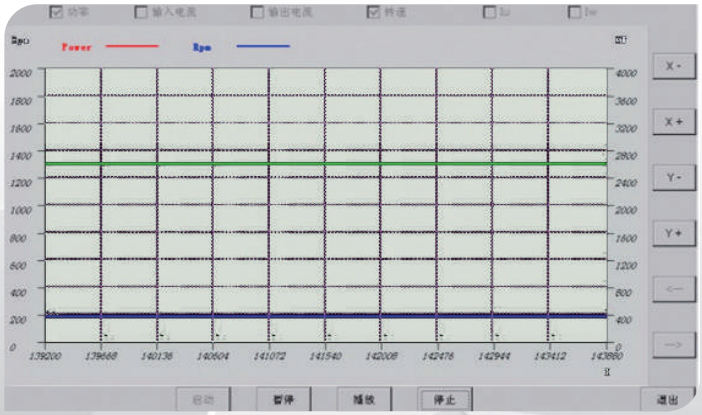


Curve display

The operation interface of the frequency inverter touch screen can display the real-time output current waveform of the frequency inverter and choose to output the real-time curves of the motor speed and frequency inverter output power to observe equipment operation.



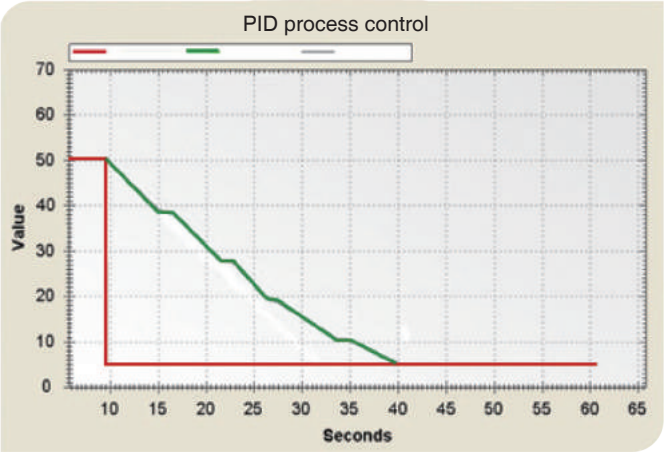
Output current waveform display



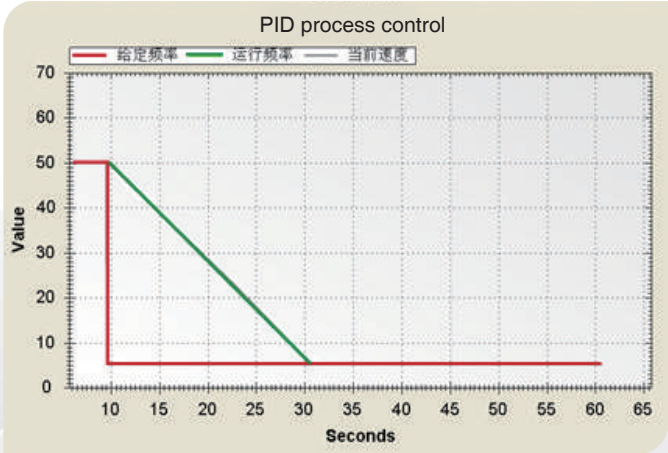
Motor speed and frequency inverter output power

Bus voltage self-equalization technology

Overvoltage of a unit in the deceleration process by means of the original S curve will result in deceleration process stagnation and extend the deceleration time; the bus voltage self-equalization technology solves deceleration stop of a single unit in the deceleration process, so that the deceleration time of the frequency inverter is shortened by about 66%, avoiding the unit overvoltage fault in the deceleration process.



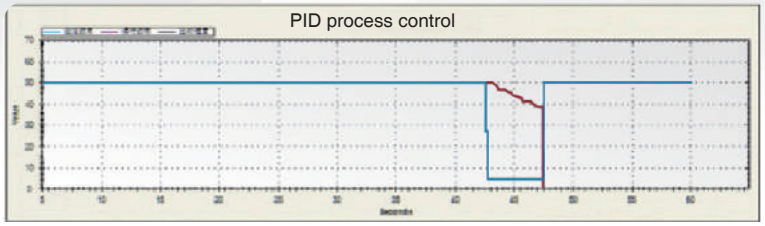
Normal deceleration curve



Self-equalization technology deceleration curve

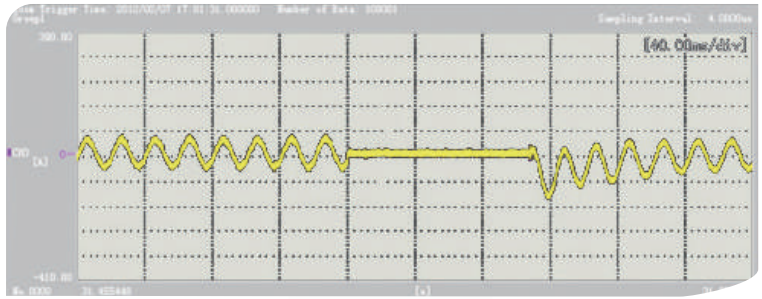
Endurance after power failure

The high-voltage frequency inverter may constantly output 2s in case of high voltage instantaneous loss of power during operation. In case of high voltage recovery in this period, the frequency inverter may recover normal operation.



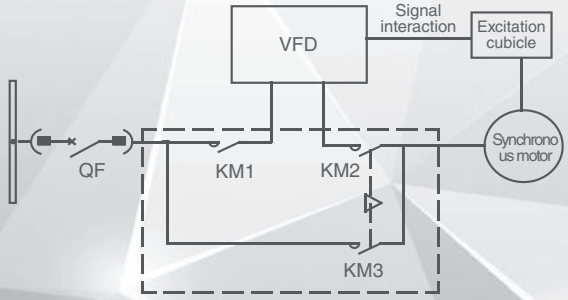
Cycle soft start

- Start multiple motors successively by 1 frequency inverter. It has accurate phase locking and frequency locking functions;
- The maximum starting current is twice the rated current of the motor and the switching time is within 1s.



Synchronous motor control

- Support permanent magnet synchronous and separately excited synchronous motors;
- The absolute type encoder is chosen for the permanent magnet synchronous motor and can provide the absolute position signal of the motor angle;
- The excitation cubicle of the separately excited synchronous motor is controlled by the frequency inverter. The power frequency start and variable frequency synchronous start modes are supported.



Technical indicators

item		Description
Input	Input line voltage	3.0/6.0/10.0kV (-10%～+10%)
	Input rated frequency	50Hz (-2% ～+2%)
	Input power factor	Up to more than 0.95 when the load exceeds 20%
	Control power supply	380V in three-phase four-wire system (configured according to the frequency inverter capacity)
Output	Output line voltage	0～3.0/6.0/10.0 kV
	Output frequency drift	± 0.5%
	Output frequency resolution	0.01Hz
Control parameter	Frequency range	(0.5 ～120) Hz (related to motor)
	Overload capacity	120%, 60s (designed according to user requirements)
	Control mode	VF control/Vector control
	Control accuracy	± 0.5% of maximum frequency
	Speed-torque characteristic of load	Square torque load and constant torque load
	Acceleration and deceleration time	(0 ～ 3200) s (related to load characteristic)
	Signal input and output	4-channel analog input/output, 16-channel digital input and 8-channel digital output
	Main protection functions	Overvoltage, undervoltage, overcurrent, short circuit, over-temperature and power unit fault
	Communication functions	Standard: Modbus; optional: Profibus-DP
Display	Operation interface	Touch screen
Transformer	Insulation grade	H
Construction	Protection grade	IP30
	Cooling mode	Force air cooling
	Maintenance	Front and rear maintenance
Environmental conditions	Operating ambient temperature	0°C～+40°C
	Storage and transport temperature	-20°C～+70°C
	Humidity	< 95%, no condensation
	Vibration	Below 0.5g
	Usage occasion	Place without corrosive or explosive gas and dust and with the altitude less than 1000m

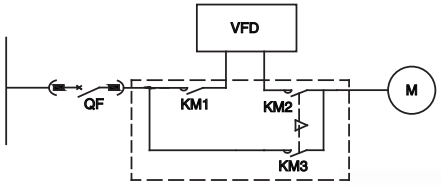
Model selection and application

High-voltage frequency inverter model definition

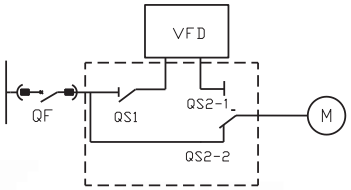
AS800 - 0400 - T06 - PA A

- Power unit model
- Load: light load PA, heavy load VC
- Rated output voltage
- Adaptive motor power
- STEP high-voltage frequency inverter series

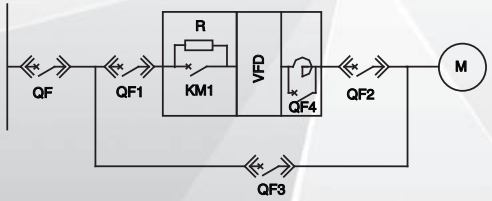
System application scheme



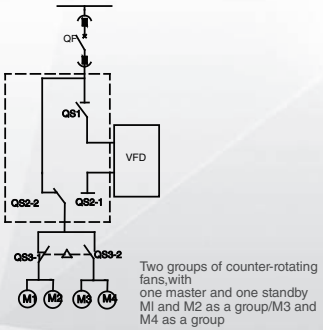
One with one automatic bypass system



One with one manual bypass system



Undisturbed switching system



Counter-rotating fan system scheme

Note: Consult Shanghai Sigriner STEP Electric Company Ltd. for other system schemes

frequency inverter system selection

- Square torque load
  Load type: fan, water pump and oil pump. Select the frequency inverter according to the maximum current of the motor in operation at power frequency; if one frequency inverter drags multiple motors simultaneously, the frequency inverter s selected according to 1.25 times the rated current sum of the motor.
- Constant power load
  Load type: rolling mill and paper machine. The frequency inverter is selected according to 1.25 times the rated current of the motor.
- Constant torque load
  Load type: frictional load such as conveyor belt, agitator and extruder; gravity load such as crane and elevator; air compressor, roots blower, ball mill and reciprocating injection pump. The frequency inverter is selected on the basis that the frequency inverter output current is greater than 1.25 times the maximum operating current of the motor (selected according to 1.25 times the motor current sum for one with two).
- Special process load
  Load type: cement plant high temperature fan. The frequency inverter is selected according to 1.25 times the rated current of the motor.

Bypass system selection

- Automatic bypass system
  It is recommended to select the automatic bypass system when the frequency inverter accidental shutdown may seriously affect production or result in major safety accident in some important load occasions, such as boiler fan, induced draft fan, air blower, mill exhauster, pressure pump and water delivery pump.
- Manual bypass system
  The manual bypass cabinet is used in absence of high voltage power supply in case of safe maintenance, obvious cut-off point or timely standby motor operation after the frequency inverter accidental shutdown to achieve switching between the motor variable frequency status and power frequency status. The manual bypass system may be selected if the shutdown will not cause impact or accident to production.

Starting cabinet selection

- Starting cabinet functions
  The large exciting current and large DC bus capacitance loop charging current of the units at all levels at the moment of phase-shifting isolation transformer power-on when the frequency inverter is powered on at high voltage will cause quick-disconnect protection of the superior power cabinet. This situation may be avoided effectively by a starting abinet.
- Application occasions
  Old equipment project renovation and occasions that the setting value of the motor front-end high-voltage circuit-breaker cannot be changed according to the application requirements.

3kV product selection guide

Frequency inverter power (kW)	Transformer capacity (kVA)	Output current (A)	Product model	Overall blast capacity (m^3/h)	Frequency inverter size（mm）	Total weight （T）
250	300	58	AS800-0250-T03-PAA	9000	2600x1500x2667	4.0
280	350	67	AS800-0280-T03-PAA	9000	2600x1500x2667	4.0
300	375	72	AS800-0300-T03-PAA	9000	2600x1500x2667	4.0
400	500	96	AS800-0400-T03-PAA	9000	2600x1500x2667	4.1
450	560	108	AS800-0450-T03-PAA	9000	2600x1500x2667	4.2
500	630	121	AS800-0500-T03-PAA	9000	2600x1500x2667	4.2
560	700	135	AS800-0560-T03-PAA	9000	2600x1500x2667	4.3
630	800	154	AS800-0630-T03-PAA	12000	3400x1500x2707 (including starting cabinet)	5.3
710	900	173	AS800-0710-T03-PAA	12000	3400x1500x2707 (including starting cabinet)	5.4
800	1000	192	AS800-0800-T03-PAB	12000	4300x1500x2895 (including starting cabinet)	5.6
900	1120	216	AS800-0900-T03-PAB	13000	4300x1500x2895 (including starting cabinet)	5.6
1000	1250	241	AS800-1000-T03-PAB	13000	4300x1500x2895 (including starting cabinet)	5.6
1120	1400	269	AS800-1120-T03-PAB	13000	4300x1500x2895 (including starting cabinet)	5.9
1250	1600	301	AS800-1250-T03-PAB	13500	4300x1500x2895 (including starting cabinet)	6.1
1400	1800	346	AS800-1400-T03-PAC	19500	5534x1500x2895 (including starting cabinet)	8.2
1500	1900	366	AS800-1500-T03-PAC	19500	5534x1500x2895 (including starting cabinet)	8.2
1600	2000	385	AS800-1600-T03-PAC	19500	5534x1500x2895 (including starting cabinet)	8.2
1800	2250	433	AS800-1800-T03-PAC	25500	5534x1500x2895 (including starting cabinet)	8.2
2000	2500	481	AS800-2000-T03-PAC	25500	5534x1500x2895 (including starting cabinet)	9.1
2240	2800	539	AS800-2240-T03-PAC	31500	5534x1500x2895 (including starting cabinet)	9.1
2500	3150	600	AS800-2500-T03-PAC	31500	5534x1500x2895 (including starting cabinet)	9.1

6kV product selection guide

Frequency inverter power (kW)	Transformer capacity (kVA)	Output current (A)	Product model	Overall blast capacity (m^3/h)	Frequency inverter size（mm）	Total weight （T）
280	350	34	AS800-0280-T06-PAS	9000	3006x1500x2512	4.5
315	400	38	AS800-0315-T06-PAS	9000	3006x1500x2512	4.5
355	450	43	AS800-0355-T06-PAS	9000	3006x1500x2512	4.5
400	500	48	AS800-0400-T06-PAS	9000	3006x1500x2512	4.5
450	560	54	AS800-0450-T06-PAA	9000	2900x1500x2667	4.7
500	630	61	AS800-0500-T06-PAA	9000	2900x1500x2667	4.7
560	700	67	AS800-0560-T06-PAA	9000	2900x1500x2667	4.7
630	800	77	AS800-0630-T06-PAA	12000	2900x1500x2707	4.9
710	900	87	AS800-0710-T06-PAA	12000	2900x1500x2707	5.3
800	1000	96	AS800-0800-T06-PAA	12000	2900x1500x2707	5.3
900	1120	108	AS800-0900-T06-PAA	12000	3300x1500x2707	5.7
1000	1250	120	AS800-1000-T06-PAA	13000	3300x1500x2707	5.9
1120	1400	135	AS800-1120-T06-PAA	13500	3300x1500x2667	6.4
1250	1600	154	AS800-1250-T06-PAA	19500	4100x1500x2707 (including starting cabinet)	8.3
1400	1800	173	AS800-1400-T06-PAA	19500	4100x1500x2707 (including starting cabinet)	8.3
1500	1900	183	AS800-1500-T06-PAB	19500	5205x1500x2895 (including starting cabinet)	9.0
1600	2000	192	AS800-1600-T06-PAB	19500	5205x1500x2895 (including starting cabinet)	9.0
1800	2250	217	AS800-1800-T06-PAB	22500	5205x1500x2895 (including starting cabinet)	9.0
2000	2500	241	AS800-2000-T06-PAB	25500	5205x1500x2895 (including starting cabinet)	9.0
2240	2800	269	AS800-2240-T06-PAB	25500	5205x1500x2895 (including starting cabinet)	9.0
2500	3150	303	AS800-2500-T06-PAB	31500	5205x1500x2895 (including starting cabinet)	9.0
2600	3300	318	AS800-2600-T06-PAB	31500	5205x1500x2895 (including starting cabinet)	9.8
2800	3500	337	AS800-2800-T06-PAC	34500	7434x1600x2895 (including starting cabinet)	11.3
3150	4000	385	AS800-3150-T06-PAC	34500	7434x1600x2895 (including starting cabinet)	12.9
3550	4500	433	AS800-3550-T06-PAC	42500	7434x1600x2895 (including starting cabinet)	14.0
4000	5000	481	AS800-4000-T06-PAC	52500	7434x1600x2895 (including starting cabinet)	14.3
4500	5800	558	AS800-4500-T06-PAC	52500	7834x1700x2895 (including starting cabinet)	15.5
5000	6300	600	AS800-5000-T06-PAC	59500	7834x1700x2895 (including starting cabinet)	16.7
5600	7000	673	AS800-5600-T06-PAD	68160	9270x1980x3438 (including starting cabinet)	20.7
6300	8000	770	AS800-6300-T06-PAD	68160	9270x1980x3438 (including starting cabinet)	20.7
7100	9000	870	AS800-7100-T06-PAD	96680	9470x1980x3438 (including starting cabinet)	22.2
8000	10000	962	AS800-8000-T06-PAD	96680	9470x1980x3438 (including starting cabinet)	22.2

Renewable energy utilization center

10kV product selection guide

Frequency inverter power (kW)	Transformer capacity (kVA)	Output current (A)	Product model	Overall blast capacity (m^3/h)	Frequency inverter size（mm）	Total weight（T）
280	350	20	AS800-0280-T10-PAS	13500	3608x1500x2512	5.8
315	400	23	AS800-0315-T10-PAS	13500	3608x1500x2512	5.9
355	450	26	AS800-0355-T10-PAS	13500	3608x1500x2512	5.9
400	500	29	AS800-0400-T10-PAS	13500	3608x1500x2512	5.9
450	560	32	AS800-0450-T10-PAS	13500	3608x1500x2512	5.9
500	630	36	AS800-0500-T10-PAS	13500	3608x1500x2512	5.9
560	700	40	AS800-0560-T10-PAS	13500	3608x1500x2512	5.9
630	800	46	AS800-0630-T10-PAS	13500	3608x1500x2512	6.5
710	900	52	AS800-0710-T10-PAA	13500	3800x1500x2667	6.5
800	1000	58	AS800-0800-T10-PAA	13500	4200x1500x2667	6.8
900	1120	65	AS800-0900-T10-PAA	13500	4200x1500x2667	6.8
1000	1250	72	AS800-1000-T10-PAA	13500	4200x1500x2667	7.4
1120	1400	81	AS800-1120-T10-PAA	13500	4200x1500x2667	7.4
1250	1600	92	AS800-1250-T10-PAA	19500	4200x1500x2707	7.9
1400	1800	104	AS800-1400-T10-PAA	19500	4200x1500x2707	7.9
1500	1900	110	AS800-1500-T10-PAA	19500	4200x1500x2707	7.9
1600	2000	115	AS800-1600-T10-PAA	22500	4400x1600x2707	9.0
1800	2250	130	AS800-1800-T10-PAA	25500	4400x1600x2707	9.0
2000	2500	144	AS800-2000-T10-PAA	25500	5200x1600x2707 (including starting cabinet)	9.8

- 10kV product selection guide

Frequency inverter power (kW)	Transformer capacity (kVA)	Output current (A)	Product model	Overall blast capacity (m^3/h)	Frequency inverter size（mm）	Total weight（T）
2240	2800	162	AS800-2240-T10-PAA	30000	5200x1600x2707 (including starting cabinet)	10.3
2500	3150	182	AS800-2500-T10-PAB	31500	6900x1600x2895 (including starting cabinet)	11.3
2650	3300	191	AS800-2650-T10-PAB	31500	7200x1600x2895 (including starting cabinet)	11.5
2800	3500	202	AS800-2800-T10-PAB	34500	7200x1600x2895 (including starting cabinet)	11.7
3150	4000	231	AS800-3150-T10-PAB	34500	7200x1600x2895 (including starting cabinet)	13.2
3400	4250	245	AS800-3400-T10-PAB	42000	7200x1600x2895 (including starting cabinet)	13.7
3550	4400	254	AS800-3550-T10-PAB	42000	7200x1600x2895 (including starting cabinet)	14.5
4000	5000	289	AS800-4000-T10-PAB	42000	7200x1600x2895 (including starting cabinet)	14.5
4500	5800	335	AS800-4350-T10-PAB	60000	7200x1600x2895 (including starting cabinet)	15.2
5000	6300	364	AS800-5000-T10-PAC	59500	11034x1700x2895 (including starting cabinet)	16.7
5600	7000	404	AS800-5600-T10-PAC	63000	11034x1700x2895 (including starting cabinet)	18.5
6300	8000	462	AS800-6300-T10-PAC	90000	11334x1700x2895 (including starting cabinet)	18.9
7100	9000	520	AS800-7100-T10-PAC	97500	11334x1700x2895 (including starting cabinet)	20.2
8000	10000	577	AS800-8000-T10-PAC	97500	11334x1700x2895 (including starting cabinet)	21.5
9000	11200	650	AS800-9000-T10-PAD	127800	16550x1980x3438 (including starting cabinet)	41
10000	12500	720	AS800-10000-T10-PAD	127800	16550x1980x3438 (including starting cabinet)	41
11200	14000	810	AS800-11200-T10-PAD	127800	16550x1980x3438 (including starting cabinet)	41.8
12500	16000	920	AS800-12500-T10-PAD	127800	16550x1980x3438 (including starting cabinet)	42.4

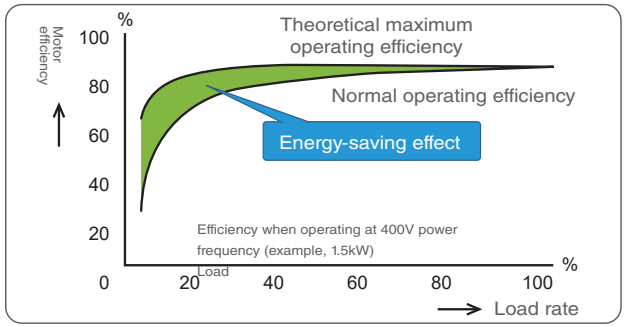
Note: Contact Shanghai Sigriner STEP Electric Co., Ltd. for the power sections not provided in the selection table.

Low Voltage Inverter

Universal AS series inverter performance characteristics & technical specifications

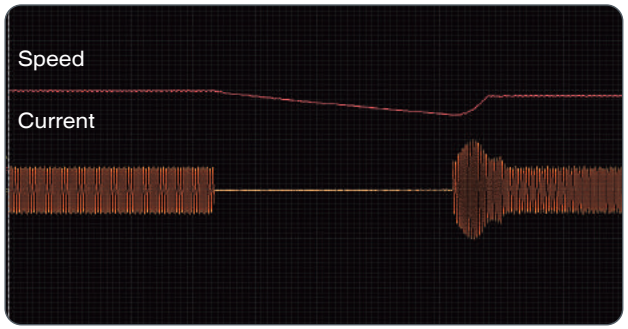
High-efficient & energy-saving operation

With high-efficient & energy-saving operation and new PWM dead zone compensation technology, motor consumption can be effectively reduced, achieving maximum power saving rate.



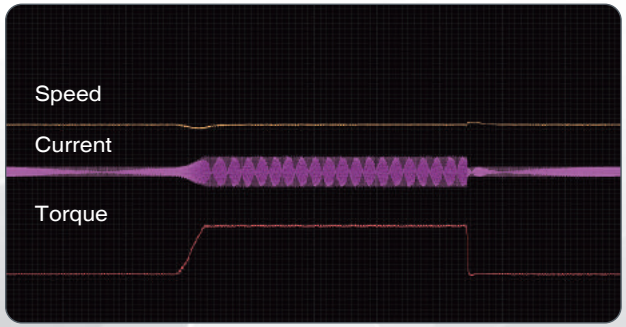
Smooth tracking start

At any time, smooth start can be perfectly achieved without impacting the rotating motor.



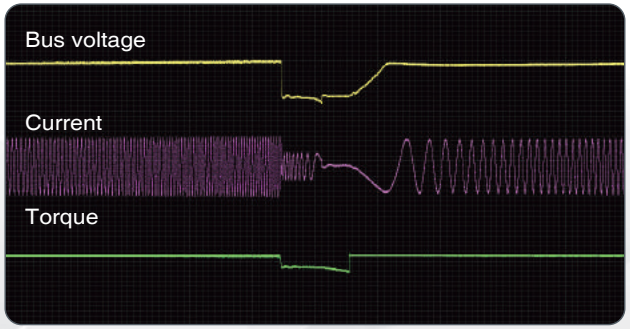
Fast dynamic response

Advanced motor mode control can also quickly response to load change without PG card.



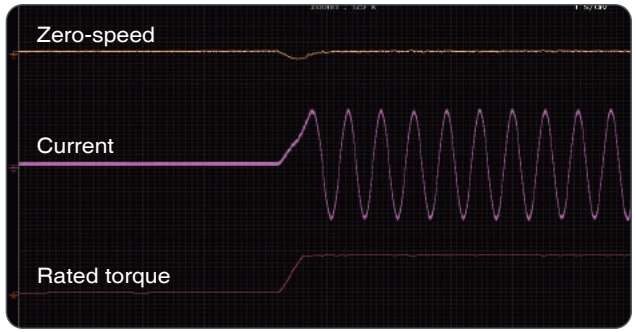
Powerful grid adaptability

Automatic voltage adjustment function: when the grid voltage changes, the output voltage can be automatically kept constant. In the case of sudden loss of electricity, unique non-blackout function can keep inverter running.



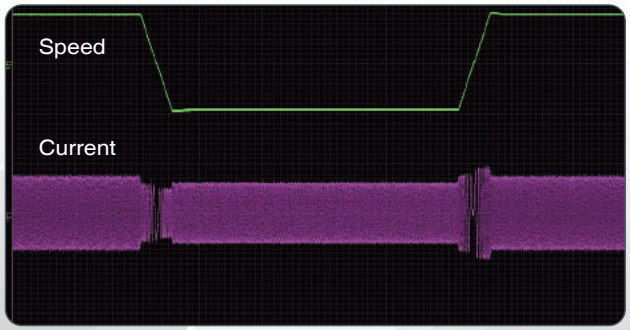
- Stable operation with low frequency and high torque

Dynamic calculation of IGBT internal temperature ensures that the IGBT module operates within the temperature limits, improving reliability of the module.



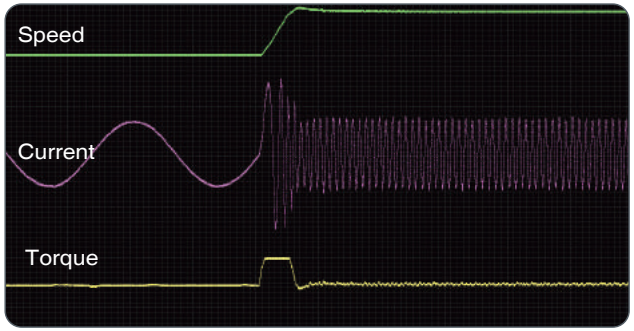
- Positive-reverse switch

When positive-reverse motor switch to the zero-speed, the phase of current has no change or oscillation, and speed has no ripple.



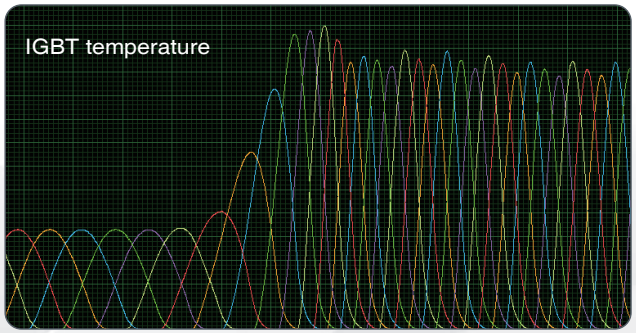
- Rapid acceleration

0.1s full load acceleration with fast torque response and low speed overshoot.



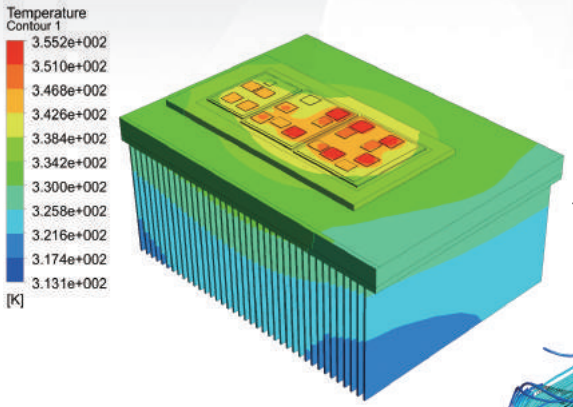
- IGBT temperature protection curve

Dynamic calculation of IGBT internal temperature ensures that the IGBT module operates within the temperature limits, improving reliability of the module.

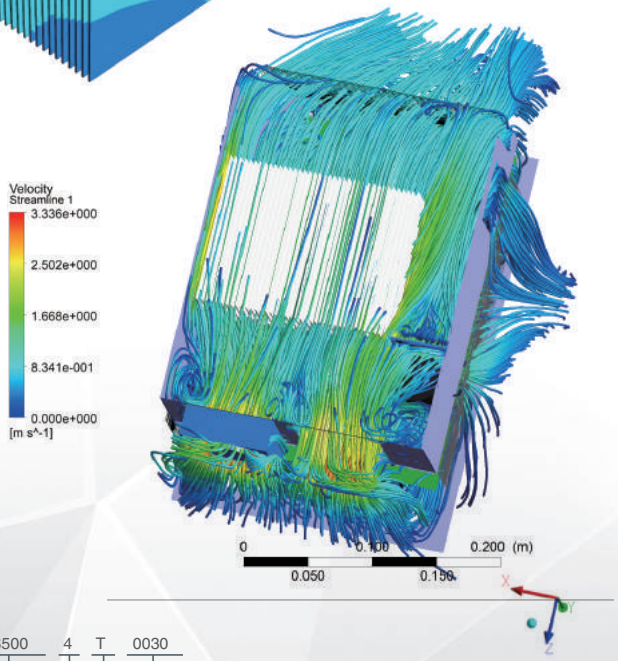


- Reliable design for heat dissipation

The temperature distribution and wind direction of inverter have strict simulation calculation, improving environmental adaptability.



Thermal analysis of power components



Product series

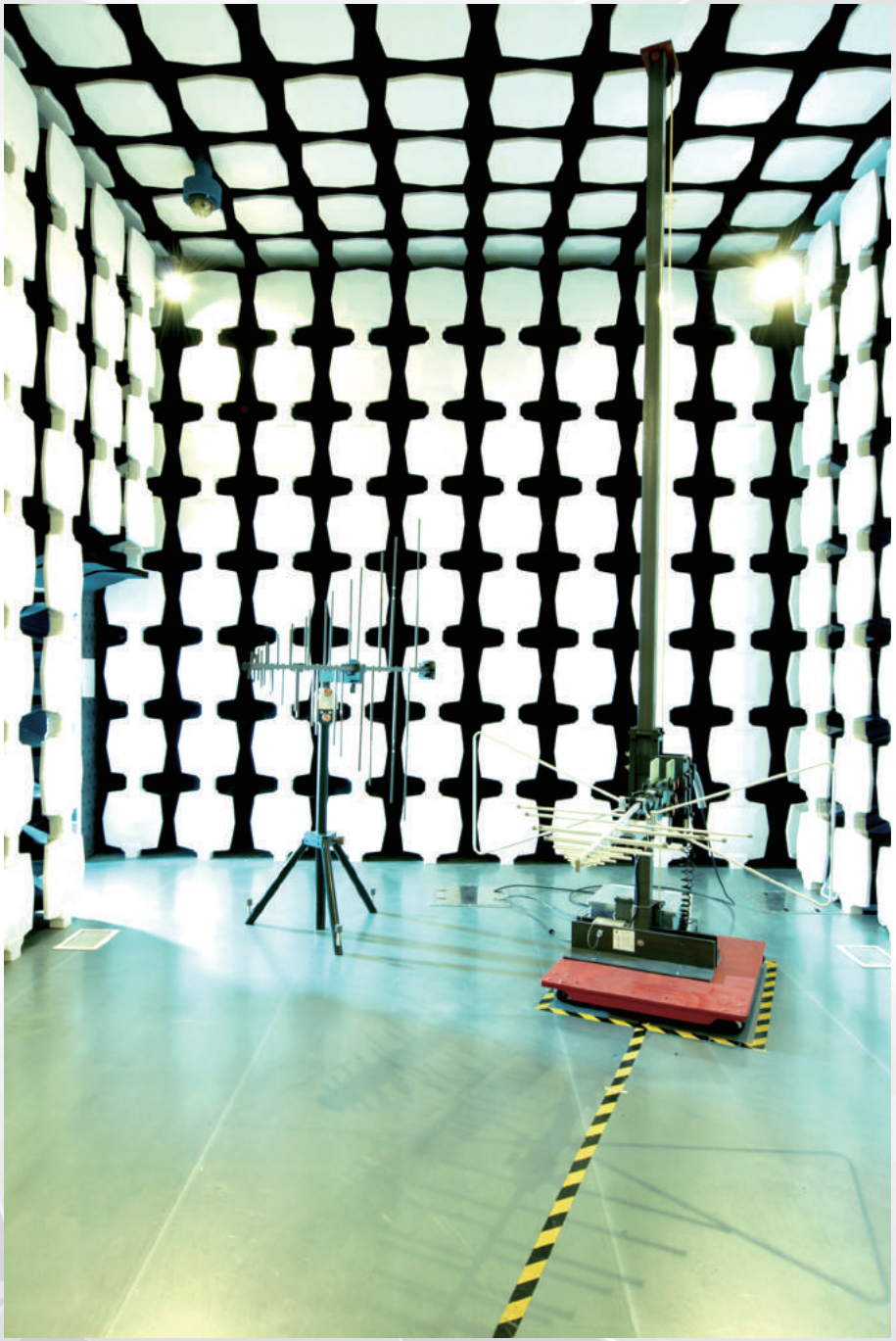
AS500 4 T 0030

Model	Introduction
AS180	Vector V/F
AS450	Universal vector
AS500	High-performance vector

Code	Voltage grade
4	400v
2	200v

Code	Voltage phase
T	Three-phas

Code	Adaptive motor power
0030	30kW



Comparison on technical performance of universal AS series inverter

Universal AS series inverter	Universal AS180 series V/F inverter		Universal AS450 series vector inverter			AS 500 series high-performance vector inverter				
Adaptive motor (kw)	2.2-7.5, 11-30, 37-400		1.1-5.5, 7.5-22, 30-355			200V grade 1.1- 3.7, 400V grade 1.1- 5.5, 7.5-22, 30-560				
Overload grade	120%,60s		150%,60s			150%,60s				
Output frequency	V/F control: 0.00-300.00Hz		V/F control: 0.00- 300.00Hz vector control 0 .00- 120.00Hz			V/F control: 0.00- -300.00Hz vector control 0 .0.00- -120.00Hz				
PG card electron spray			5V、12V，300mA			5V、12V，300mA				
PG card signal			Set-open / push-pull / differential incremental type, Resolver type			Set-open / push-pull / differential incremental type, SIN/COS incremental type, Endat absolute value type,				
PG card signal	Asynchronous motor		Asynchronous motor			ARseysnoclhveror ntyope			SPM synchronous motor, IPM synchronous motor,	
Control mode	V/F control	High-performance control	V/F control	Open-loop vector control	Closed-loop vector control	V/F control	Open-loop vector control	Closed-loop vector control	Open-loop vector control	Closed-loop vector control
Start torque	2.50Hz 120%	0.5Hz 120%	2.50Hz 150%	0.5Hz 150%	0.00Hz 150%	2.50Hz 150%	0.5Hz 150%	0.00Hz 150%	SPM：5%speed，150% IPM：0.00Hz，200%	0.00Hz，200%
Speed range	1:50	1:200	1:50	1:200	1:1000	1:50	1:200	1:1000	1:100	1:1500
Steady-speed accuracy	± 2%	± 0.5%	± 2%	± 0.2%	± 0.02%	±2%	±0.2%	±0.02%	±0.2%	±0.02%
Torque accuracy			± 5% (closed-loop control)			±5%(closed-loop control)				
Torque control			Torque / speed control can be switched through terminal with a variety of torque setpoint.			Torque / speed control can be switched through terminal with a variety of torque setpoint.				
Zero servo drives control			Achieve zero-speed position locked			Achieve zero-speed position locked, accurate positioning, position control				
Build-in braking unit	30kW及以下		Below 22kW			Below 22kW				
Build-in direct current reactor	30kW以上		Above 22kW			Above 22kW				
Application fields	light industry standard load, 1.2 times overload fan Exhaust, blast Water pump: Constant pressure for water supply, water supply and drainage HVAC: Heating, air conditioning terminal		Light industry heavy load, 1.5 times overload Puffing machine: food extruder Air compressor: screw compressor; centrifugal compressor Construction material machine: woodworking carving machine, centrifugal industrial washing machine Heavy medium pump, roots blower			Heavy industry, engineering machinery load, 1.5 times overload Metal processing machine comb: tube expanding machine, punch machine, forging machine, milling machine Construction engineering machine comb: concrete mixer, brick making machine; mining machinery: mine hoist, ball mill material storage/transfer | transport: stereoscopic warehouse, belt conveyor, in/out brick machine Petrochemical industry: pumping unit; permanent magnet synchronous application: compressor, food extruder				

Universal AS series inverter technical specifications

Power input	Input voltage	380-460V (-15%-+10%), three-phase power
	Input Frequency	45-65Hz
	Accepting voltage change	Voltage unbalance<3%
	Voltage Dips	When three phase AC380-460V power, and input voltage<AC300V, low-voltage protection was implemented after 15ms.
Power output	Voltage	OVAC-input voltage
	Overload grade	Stable running 45 , overloading 120% 1min
	Efficiency (full load)	≥0.94
	Output frequency accuracy	±0.01% digital command- 10 - +45°C); ±0.1%(analog command 25 10°C)
Digital input/output	Optical coupling isolation input	7 channels, 24V high and low level can be set, input function can be defined
	Open collector output	2 channels, output function can be defined
	Relay output	2 channels, normally open contacts, contact capacity: inductive, 1.5A/250VAC, output function can be defined, 2 channels, dual normally open/closed contacts, contact capacity, resistive, 4.5A/250VAC or 4.5A/30VOC; inductive: 0.4A/250VAC or 0.4A/30VDC, output function can be defined
Analog input/output	Analog voltage input	2 channels, accuracy 0.1%; voltage- 10V - +10VDC or current 0-20mA optional signal
	Analog voltage input	2 channels, accuracy 0.1%; voltage- 10V - +10VDC or current: 0-20mA optical signal
Control characteristics	Carrier frequency	1.1-8kHz: carrier frequency can be adjusted automatically according to load characteristics
	Frequency setting resolution	0.01Hz (digital command) 0.06Hz/120Hz (analog command 11 bit + no signal
	Running command channel	Given operation panel, given control terminal, given communication
	Frequency-given channe	Given operation panel, given digital quantity/analog quantity, given communication, given performance function
	Torque improved	Automatic torque improved, manual torque improved
	V/F curve	User-defined V/F curves, linear V/F curves, and three reduced torque characteristic curves
	Automatic voltage adjustment (AVR)	The duty ratio of output PWM signal is adjusted automatically based on the fluctuation of bus voltage, to reduce the influence of grid voltage fluctuation on output voltage fluctuation
	Electricity loss and keep-running process	In the case of instantaneous power-off, achieve uninterrupted operation through bus voltage control
	Direct current braking capability	Brake current: 0.0 - 120.0% motor rated current
Characteristic function	Parameters copy	The standard operation panel can upload and download parameters, and indicate copy progress
	Process PID	Used for closed-loop control of process quantities
	Common DC bus	All series can achieve the power supply of common DC bus for multiple inverter
Motor protection	Rotor blocked, motor overloaded, speed limited	
Inverter protection	Output current limited, inverter overload, GBT I 't overloaded, undervoltage/overvoltage of input power, undervoltage/overvoltage of DC bus, GBT overheating, heat sink overheating, power faulty, analog input signal loss (loss speed reference), communication abnormality, self-tuning faulty	
environment condition	Operation place	Installed vertically in a well-ventilated electrical control cabinet. Horizontal or other installation is not allowed. Cooling medium is air. Installed in environment without direct sunlight, dust, corrosive gas, flammable gas, oil mist, steam, or water
	Environment temperature	-10 +40
	Used in diminished temperature	> 40 ° C, a rise of 1 ° C, rated output current is reduced by 2%, the highest temperature is 50
	Altitude	<1000m
	Used in diminished height	> 1000m, a rise of 100m, rated output current is reduced by 1%(up to 3000m)
	Environment humidity	5-95%, without condensation
	Vibration (transport)	2≤f 9Hz 3.5mm 9≤f 200Hz 10m/s² 200≤f 500Hz 15m/s²
	Vibration (install)	2≤f 9Hz 0.3mm 9≤f 200Hz 1m/s²
	Storage temperature	-40 +70
	Protection grade	IP20
Control panel	Type	Movable
	Length	1m 3m
	Connect	RJ45
	LCD text display	4 row
	LED display	5 bit
	Visible LED indicator	4 pcs
	Key	9 pcs
Others	Cooling approach	Force-air cooling
	Installation mode	Installed in cabinet with wall-mounted
	Certificate	CE

Universal AS180 series V/F inverter

AS180 series inverter is an universal inverter designed for Chinese market . The product was adopted with German technology, made in China, and combined with the characteristics of domestic application, further strengthening the product reliability, environmental adaptability and design for customer and the industry, with excellent performance of V/F control to perfectly satisfy a variety of light load-driven application requirements.

Intimate application function

- PID control Dedicated menu to set PID parameters, calculate inside the inverter, without independent external regulator option.
- DC braking before operation: when the rotating direction of motor during free sliding isuncertain, DC braking automatically stop the motor before starting.
- For the square torque load of fan and water pump, high-performance excitation control can make the motor run at the optimal efficiency point and achieve optimal energy saving effect.

AS180 series inverter technical parameters & dimensions

Stable running 40 °C, overloading					Dimensions
Inverter model AS180	Rated input current (A)	Rated output current (A)	Adaptive motor (kW)	Overloaded 120% (1min) output current (A)	
4T02P2	5.3	5	2.2	6	A1
4T03P7	7.5	7	3.7	8.4	
4T05P5	11.5	11	5.5	13.2	
4T07P5	16	15	7.5	18	
4T0011	21	20	11	24	A2
4T0015	30.5	29	15	34.8	
4T18P5	38	36	18.5	43.2	A3
4T0022	46	44	22	52.8	
4T0030	59	56	30	67.2	
4T0037	75	72	37	86.4	A4
4T0045	94	90	45	108	
4T0055	115	110	55	132	A5
4T0075	154	148	75	177.6	
4T0090	183	176	90	211.2	A6
4T0110	216	208	110	249.6	A7
4T0132	261	252	132	302.4	
4T0160	306	296	160	355.2	A8
4T0185	367	356	185	427.2	
4T0200	402	390	200	468	
4T0220	427	415	220	498	
4T0250	481	468	250	561.6	
4T0280	533	520	280	624	A9
4T0315	614	600	315	720	
4T0355	664	650	355	780	
4T0400	755	740	400	888	

Universal AS450 series vector inverter

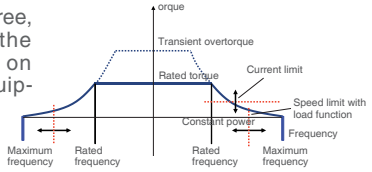
AS450 series inverter is an universal vector inverter. The product was adopted with typical V/F control technology, zero-speed sensor vector control technology, closed-loop vector control and torque control technology, combined with the characteristics of domestic application, further strengthening the product reliability, environmental adaptability and design for customer and the industry, perfectly satisfying a variety of heavy load-driven application requirements.

Intimate application function

Multi-segment speed operation · Based on the combination of signals, run with the frequency of internal memory (up to 16 segment speed instructions). Easy to be continuously controlled and determined the position by limit switch.

Rapid promotion

Under light load or load-free, the inverter calculates the maximum speed based on the load, to improve equipment efficiency.



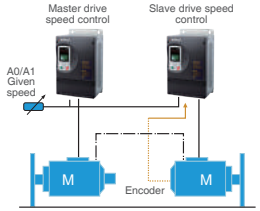
AS450 series inverter technical parameters & dimensions

Stable running 40 °C, overloading					Dimensions
Inverter model AS450	Rated input current A	Rated output current (A)	Adaptive motor (kW)	Overloaded 150% (1min) output current (A)	
4T01P1	3.7	3.5	1.1	5.3	A1
4T02P2	6.6	6.2	2.2	9.3	
4T03P7	9.5	9	3.7	13.5	
4T05P5	12.7	12	5.5	18	
4T07P5	18	17	7.5	25.5	A2
4T0011	26	25	11	36.5	
4T0015	35	33	15	47.5	A3
4T18P5	43	41	18.5	59.5	
4T0022	47	45	22	67.5	
4T0030	63	60	30	90	A4
4T0037	73	70	37	105	
4T0045	95	91	45	136.5	A5
4T0055	117	112	55	168	
4T0075	156	150	75	225	A6
4T0090	187	180	90	270	A7
4T0110	224	216	110	324	
4T0132	269	260	132	390	A8
4T0160	312	302	160	451	
4T0185	383	370	185	555	
4T0200	401	390	200	585	
4T0220	438	426	220	639	
4T0250	492	480	250	720	A9
4T0280	532	520	280	780	
4T0315	613	600	315	900	
4T0355	663	650	355	975	

Master-slave control

Flexible connection

- Master drive is the speed control, and slave drive is the speed control. Small speed differences are allowed between slave drive and master drive.
- Slave drive receiving the speed signal from the master drive is implemented with Droop.

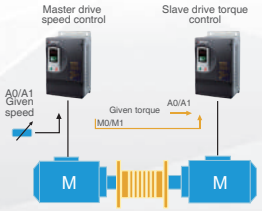


Rigid connection

- Master drive is the speed control, and slave drive is the speed control. Speed difference is not allowed between slave drive and master drive.
- The torque signal of the master drive is transmitted to the slave drive inverter with high speed and accuracy in the following ways:

1) profibus-DP communication connection realizes master-slave control (applicable to high-accuracy master-slave control)

2) analog input and output outlet (master machine-M0 /M1, slave machine-A0/A1) connection realizesmaster-slave control (applicable to master-slave control with low-speed and low control accuracy)



AS 500 series high-performance vector inverter

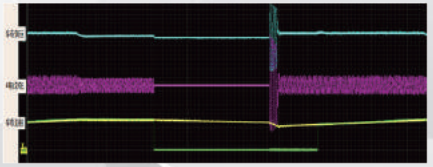
AS500 series high-performance inverter was adopted with typical V/F control technology, zero-speed sensor vector control technology, closed-loop vector control and torque control technology, as well as synchronous open-loop vector control technology and synchronous closed-loop vector control technology, combined with the characteristics of domestic application, further strengthening the product reliability, environmental adaptability and design for customer and the industry. Products are widely used in heavy industry and engineering machinery load, suitable for asynchronous motor and synchronous motor.

AS 500 series high-performance vector inverter model & technical parameters

Stable running 40 °C, overloading					Dimensions
Inverter model AS500	Rated input current A	Rated output current (A)	Adaptive motor (kW)	Overloaded 150% (1min) output current (A)	
2T01P1	7	6	1.1	9	A1
2T02P2	13	12	2.2	18	
2T03P7	19	18	3.7	27	
4T01P1	3.7	3.5	1.1	5.3	A1
4T02P2	6.6	6.2	2.2	9.3	
4T03P7	9.5	9	3.7	13.5	
4T05P5	13.7	13	5.5	19.5	
4T07P5	20	19	7.5	28.5	A2
4T0011	29	27	11	40.5	
4T0015	35	34	15	51	A3
4T18P5	43	41	18.5	61.5	
4T0022	50	48	22	72	
4T0030	66	65	30	97.5	A4
4T0037	82	80	37	120	
4T0045	106	96	45	144	A5
4T0055	138	128	55	192	
4T0075	170	160	75	240	A6
4T0090	205	195	90	292.5	A7
4T0110	250	240	110	360	
4T0132	280	270	132	405	A8
4T0160	312	302	160	453	
4T0185	380	370	185	555	
4T0200	400	390	200	585	
4T0220	436	426	220	639	
4T0250	490	480	250	720	A9
4T0280	530	520	280	780	
4T0315	610	600	315	900	
4T0355	660	650	355	975	

- Suitable for multiple motor

- For rotating synchronous motor, achieve speed tracking within 10ms and start up perfectly



Universal AS series inverter dimension specification

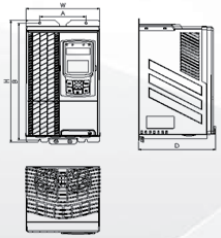
Specification	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Installation aperture Φ(mm)	Install			Torque fastener (Nm)	Mass Max (kg)
							Bolt	Nut	Gasket		
A1	100	288.5	300	160	162	5.0	4M4	4M4	4Φ4	1.1	4.5
A2	166.5	357	379	222	182	7.0	4M6	4M6	4Φ6	3.5	8
A3	165.5	392	414	232	182	7.0	4M6	4M6	4Φ6	3.5	10.3
A4	200	512	530	330	288	9.0	4M8	4M8	4Φ8	9	29.5
A5	200	585	610	330	310	9.0	4M8	4M8	4Φ8	9	38
A6	320	718	750	430	350	13.0	4M12	4M12	4Φ12	29	79.5
A7	320	768	800	430	350	13.0	4M12	4M12	4Φ12	29	81
A8	374	844	880	500	350	14.0	4M12	4M12	4Φ12	29	112.5
A9	500	997	1030	630	370	14.0	4M12	4M12	4Φ12	29	170
A10	600	1157	11895	852	4312	140	4M12	4M12	4Φ12	29	280
A11	600	1326	1359	852	4312	140	4M12	4M12	4Φ12	29	310

• Model for A1

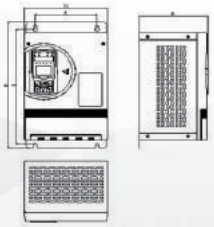
• Model for A2, A3

• Model for A4-A9

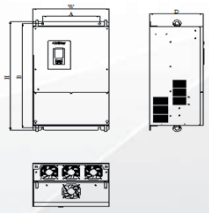
• Model for A10-A11



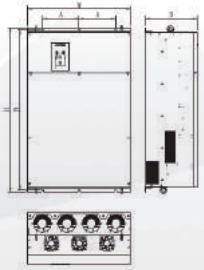
• Inverter installation figure for A1



• Inverter installation figure for A2-A3

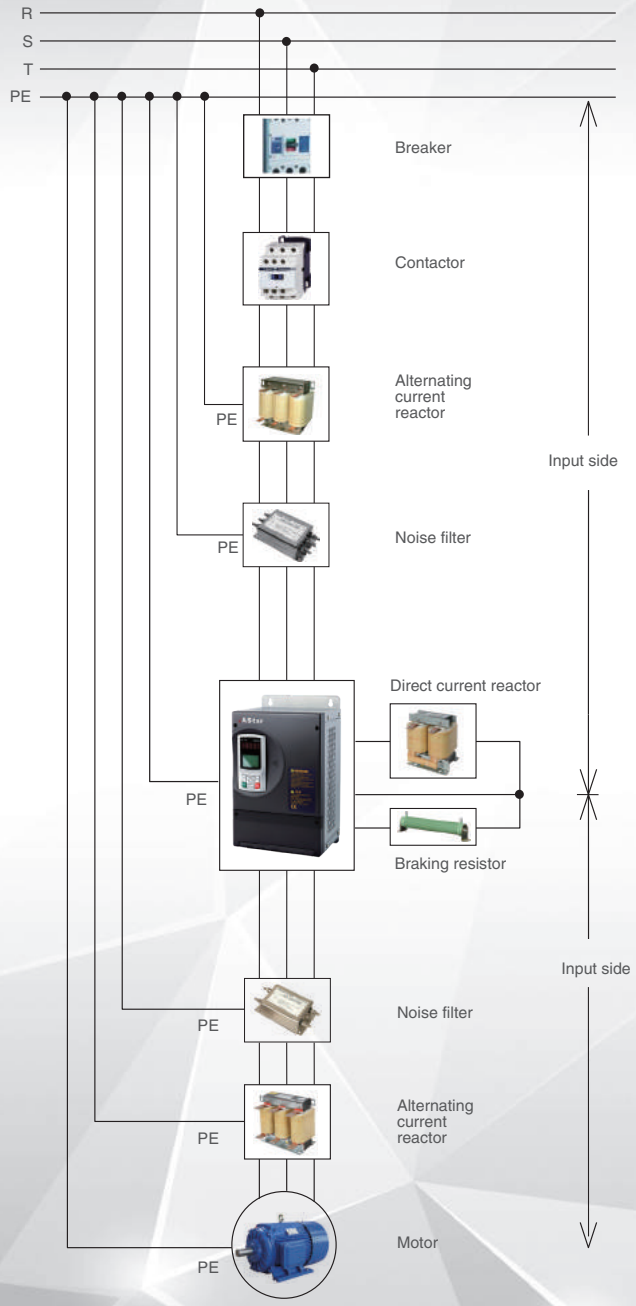


• Inverter installation figure for A4-A9



• Inverter installation figure for A10-A11

Peripheral wiring figure



AS700 series engineering inverter

Brief introduction of AS700 engineering inverter

AS700 engineering inverter, as the latest medium and low voltage and high power inverter of Shanghai Sigriner STEP Electric Company Ltd. and characterized by modularity, high reliability and flexible expansion, may provide the complete set of motor drive system solutions, provide the module form and meet the user, OEM and system integration requirements. AS700 engineering inverter is designed according to rated current and may be applied in the occasions with high overload capacity, such as hoisting industry. The product is also suitable for industrial process control fields, such as pulp and paper making, metal, mining, cement, electric power, chemical, petroleum and natural gas industries.

- Basic characteristics: single unit drive and multi-unit drive; two-quadrant and four-quadrant
- Voltage class: 400V 690V
- Power range: 250KW—1600KW
- Control motor: AC asynchronous motor and permanent magnet synchronous motor
- Control mode: V/F control, open-loop vector control and closed-loop vector control

Application fields of AS700 engineering inverter

Hoisting equipment

Air conditioning

Petroleum drilling machine

Marine equipment

Mining machinery

Metallurgy

Test stand

Variable frequency power supply

Model description of AS700 engineering inverter

AS700 23 0700 T04 XXX

- XXX: Customer code
- T04: Three-phase power voltage:
  T04: 380V-500V
  T06: 525V-690V
- 0700: Rated current (A)
- 23: Type
  03: inverter drive unit
  05: SCR unit
  07: LCL filter unit
  11: two-quadrant inverter module
  12: four-quadrant inverter module
  13: inverter drive module
  14: PWM rectifier module
  15: SCR module
  21: two-quadrant inverter cabinet
  22: four-quadrant inverter cabinet
  23: inverter drive cabinet
  24: PWM rectifier cabinet
  25: SCR cabinet
- AS700: Product series

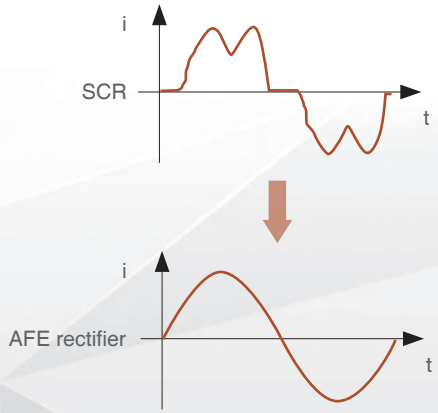
Performance characteristics

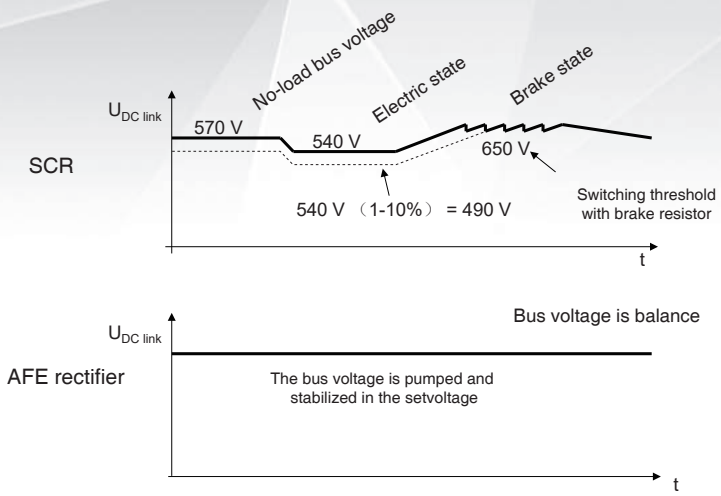
Strong system integration capability

AS700 engineering inverter has SCR and AFE active rectifier modes for choice. SCR mode is mainly applied in the occasions without requirement for the grid harmonics and without the need for energy regeneration, such as centrifugal machine and pump; while AFE active rectifier mode is mainly applied in the occasions requiring low grid harmonics or requiring energy regeneration, such as hoisting machinery.

AFE active rectifier technology

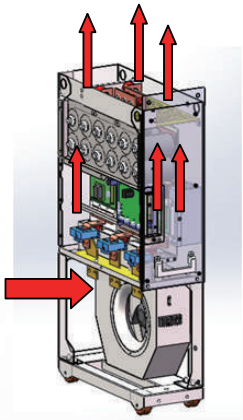
- IGBT rectifier technology is used to achieve energy regeneration;
- Active rectifier control technology under non-ideal grid improves the system suitability and reduces interference with the grid;
- The grid current waveform tends to be sinusoidal, the current harmonics THDi is below 4% and the power factor is close to 1;
- The DC bus is more stable, reducing the impact of the grid fluctuation on the equipment.





- Dual duct design to improve the product reliability

The dual duct design of AS700 engineering inverter power unit can quickly dissipate the heat of IGBT module, capacitor and other components, prolonging the component life and improving the product reliability.

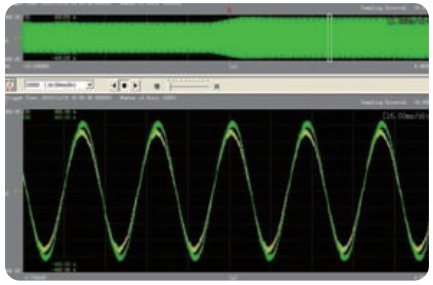


- Reasonable structural design for easy maintenance

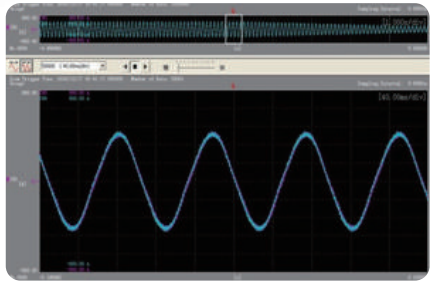
The drawer type design thought is used for the power unit, with the pulley at the bottom, for easy unit installation and disassembly.

- Current sharing technology

The advanced current-sharing control algorithm for real-time adjustment of the current of each unit and for current sharing distribution of the load unit among the units.



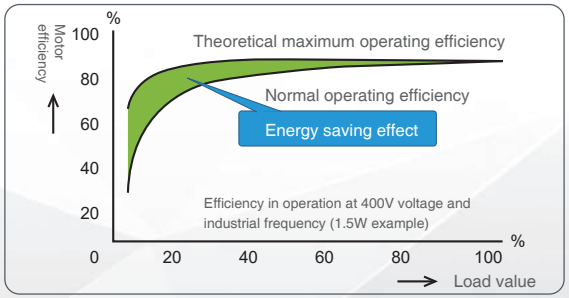
Waveform before current-sharing control
(current unbalance)



Waveform after current-sharing control
(current balance)

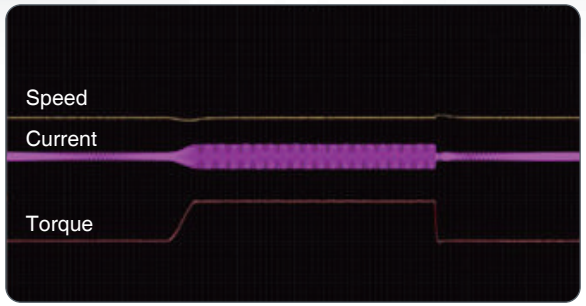
- Efficient and energy-saving operation mode

The advanced current-sharing control algorithm for real-time adjustment of the current of each unit and for current sharing distribution of the load unit among the units.



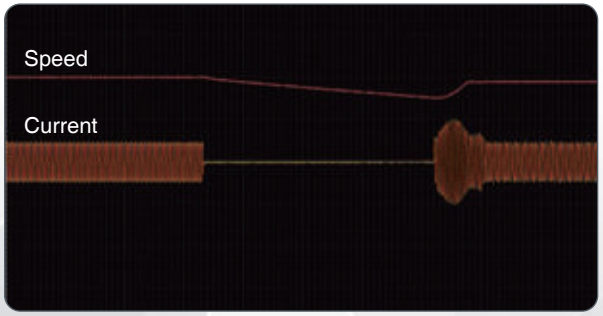
Fast dynamic response

The advanced motor control mode can quickly respond to the sudden change in the load even if no PG card is applied.



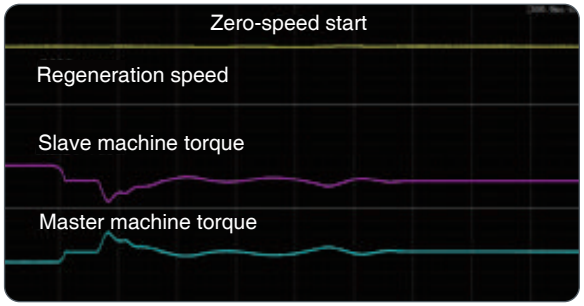
Smooth speed tracking start

The advanced motor control mode can quickly respond to the sudden change in the load even if no PG card is applied.



Torque memory function

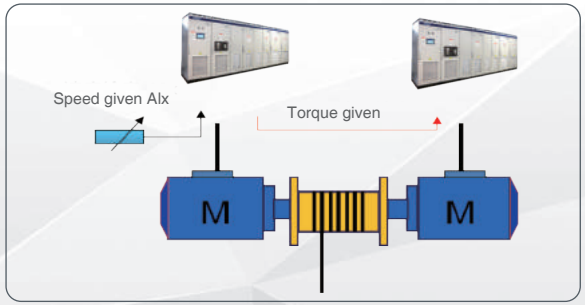
Record the output torque of the motor every time when the brake is closed. When the brake is open next time, output the memory torque of last time to ensure that the heavy object does not slip from the hook. (Support closed-loop control only)



Master-slave control technology

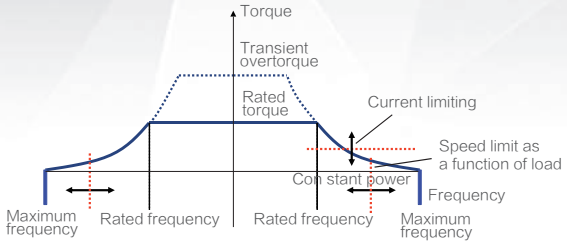
Rigid coupling

- The master drive unit is controlled by speed and the slave drive unit is controlled by torque.
- torque analog of the master drive unit is output to the slave drive unit as the torque given signal.



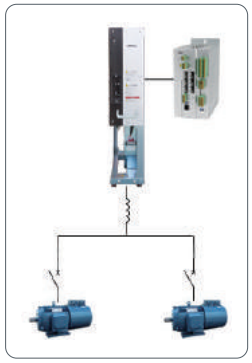
Weakened flux and constant power function

The inverter independently calculates the maximum speed (above base frequency) under the rated power to improve the equipment working efficiency.



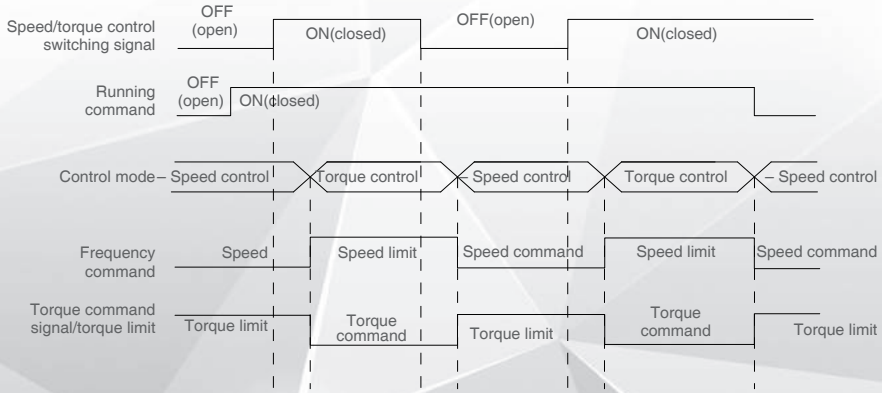
Motor parameter and operation curve switching function

Record the output torque of the motor every time when the brake is closed. When the brake is open next time, output the memory torque last time to ensure that the heavy object does not slip from the hook. (Support closed-loop control only)

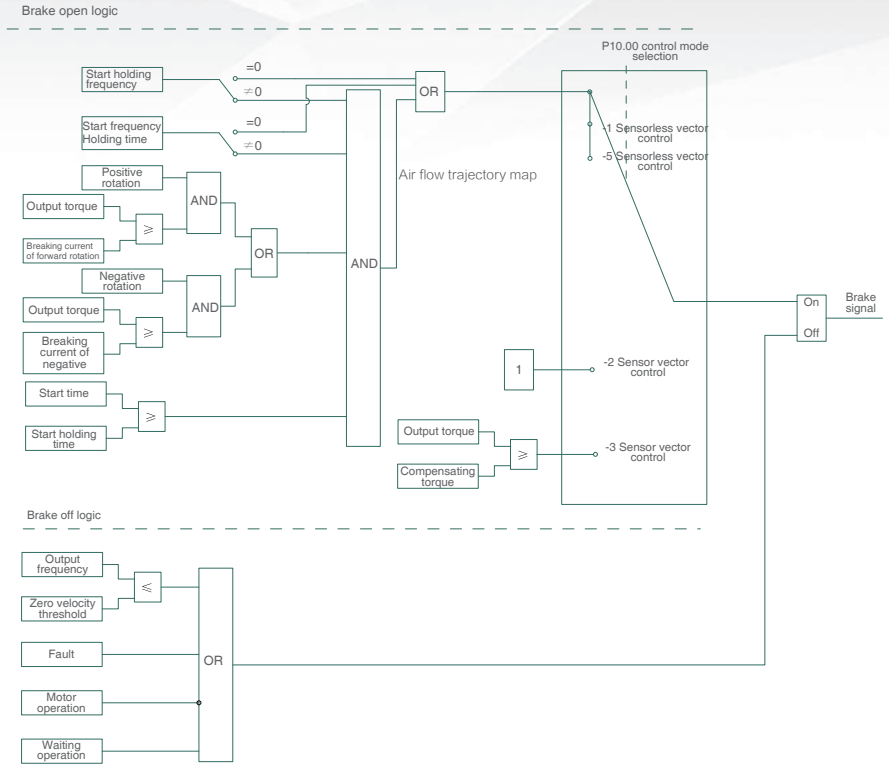


Speed and torque switching function

Achieve static and dynamic speed/torque switching



Brake logic: perfect, safe and reliable



Optical fiber communication technology

- The optical fiber communication is adopted between the control unit and the power drive unit to ensure the signal transmission speed and to improve the signal transmission accuracy;
- The optical fiber communication technology avoids electromagnetic interference and improves the anti-interference ability of the whole machine.

PCB thickened protective coating

All PCB boards including control board and I/O board are provided with the thickened protective coating to improve the environmental erosion resistance of the inverter and to extend the service life of the inverter.

Fault diagnosis function

In case of inverter fault, the software can quickly locate the fault point and display the fault code and specific fault unit through the manipulator for easy fault diagnosis and equipment maintenance.

Technical specifications

Technical indicators and specifications of inverter module

Power input	Input voltage	U4N: DC power supply: 450 ~ 800VDC U6N: DC power supply: 740~ 1200VDC		
Power output	Output voltage	0VAC ~ Un		
	Output frequency	V/F control: 0.00 ~300.00Hz Vector control: 0.00 ~ 120.00Hz		
	Overload capacity	Stable operation at 40°C, heavy load 150%, 1 min; light load 120%, 1 min		
	Efficiency (full load)	≥97%		
Control characteristics	Control mode	V/F control	Open-loop vector control	Closed-loop vector
	Starting torque	2.50Hz 150%	0.5Hz 200%	0.5Hz 200%
	Speed adjustable range	1:50	1:200	1:1000
	Steady speed precision	± 2%	± 2%	± 0.02%
	Torque precision	±5% (Closed-loop control)		
	Carrier frequency	2~5kHz		
	Frequency setting Resolution	0.01Hz (digital command) ±0.06Hz/120Hz (analog command 11bit+unsigned)		
	Running command channel	Operation panel , control terminal and communication		
	Frequency channel	Operation panel , digital quantity/analog quantity, communication given and function		
	Torque compensation	Automatic torque compensation and manual torque compensation		
	V/F curve	User-defined V/F curve, linear V/F curve and 3 reduced torque characteristic curves		
	Automatic voltage regulation	Automatically adjust the duty cycle of PWM signal according to the bus voltage fluctuation, so as to reduce the impact of the network voltage fluctuation on the output voltage fluctuation		
	DC braking capacity	Braking current: 0.0~120.0 % rated current		
Characteristic functions	Parameter copy	The standard operation panel may achieve parameter upload and download and indicate the copy progress		
	Process PID	Used for closed-loop control of process quantities		
	Torque control function	Torque/speed control switching through terminals, many torque modes		
	Zero servo and position control function	Achieve zero speed position lock, accurate positioning and position control		
Motor protection	Locked rotor, motor overload, speed limit, torque limit, output current limiting, inverter overload, IGBTI2t protection, input power undervoltage/overvoltage, DC bus undervoltage/overvoltage, IGBT overheating, heatsink OT, power supply fault, analog input signal loss (speed reference value loss), communication exception, encoder connection fault and self-tuning fault			

Technical indicators and specifications of PWM rectifier module

Power input	Voltage and power range	3-Phase U4N: 380~500VAC[-10%...+10%] 3-phase U6N: 520- 690VAC[-10%...+10%]
	Input frequency	45~65Hz
Control characteristics	Control mode	Vector control
	THDi (rated current)	<4% (harmonics meet IEEEE519 requirements)
	Power factor	Above 0.95 (rated current)
	Overload capacity	150% 1 min
	Carrier frequency	2~ 4k (Hz)
	Efficiency (rated power)	>97%

Operating environment and standard requirements

Environmental conditions	Usage occasion	It is installed vertically in a well-ventilated electrical control cabinet; horizontal or other installation mode is not allowed. Keep out of direct sunlight, dust, corrosive gases, combustible gases, oil mist, water vapor or dropping water The cooling medium is the air.
	Operating ambient temperature	-10°C[no condensing]...+40°C
	Temperature derating use	>40°C; when the temperature rises by 1°C, the rated output current is reduced by 2% (up to 50°C)
	Storage temperature	-40°C ...+70°C
	Transport temperature	-40°C ...+70°C
	Relative humidity	5~95%RH, no condensation, corrosion or dropping water
	Storage	IEC60721 -3-1 Class 1C2 (chemical gas) Class 1S2 (solid particle)
	Transportation	IEC60721 -3-2 Class 2C2 (chemical gas) Class 2S2 (solid particle)
	Operation	IEC60721 -3-3 Class 3C1/3C2* (chemical gas) Class 3S2 (solid particle) C= chemical active substance, S= mechanical active substance, * coated circuit board
	Altitude	1000m
	Height derating use	>1000M; when the height rises by 100m, the rated output current is reduced by 1% (up to 3000m)
	Earthquake-proof characteristics	3.5m/s2, 2~9Hz; 10m/s2,9~120Hz;
	Protection grade	IP 20
Others	Cooling mode	Forced air cooling
	Installation mode	In-cabinet installation
Product standards	CE LVD clauses 73/23/EEC including amending clauses 93/68/EEC Mechanical clauses 98/37/EC EMC clauses 89/336/EEC including amending clauses 93/68/EEC Quality assurance system ISO 9001 Environmental system ISO 14001	
EMC	Follow EN61800-3 standard	

Introduction of inverter unit

AS700-03 inverter drive unit

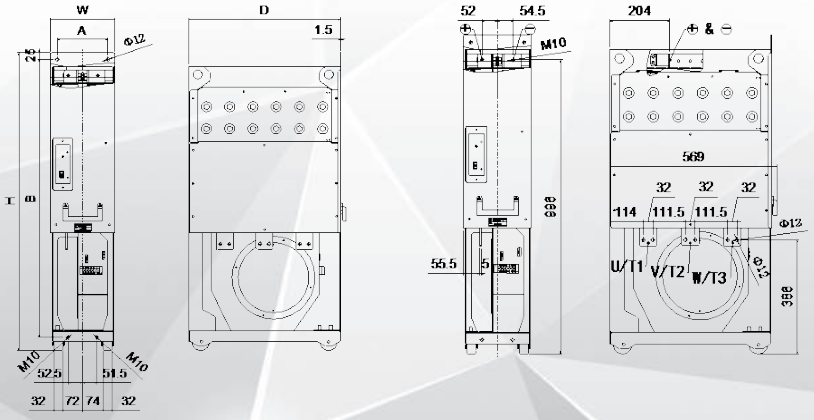
Hardware characteristics:

- Bidirectional DC power supply inverter is used for motor power supply and drive;
- More convenient modular design and diversified installation;
- Cooling fan and capacitor with ultra-long life;
- Thickened coated circuit board design;
- Drive and control optical fiber communication and improve the anti-interference ability of the system
- Support parallel connection of multiple units

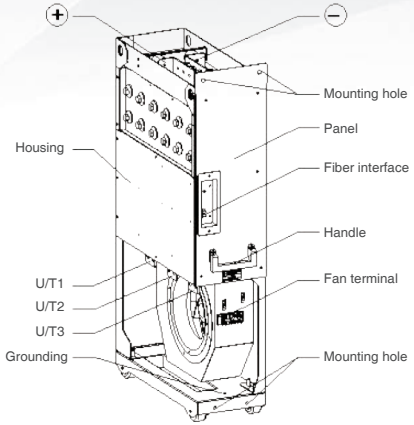
AS700 inverter drive unit specification

Product model	Standard application		Heavy load application			L * W * H mm
	In A	Pn kW	IhdA	PhdkW		
Un=400V (range 380~500V)						
AS700 03 0490 T04	490	250	382	200	D08	232*549.5*1080
AS700 03 0600 T04	600	315	468	250	D08	232*549.5*1080
AS700 03 0700 T04	700	355	545	280	D08	232*549.5*1080
Un=690V (range 525-690V)						
AS700 03 0322 T06	322	315	251	220	D08	232*549.5*1080
AS700 03 0367 T06	367	355	286	280	D08	232*549.5*1080
AS700 03 0429 T06	429	400	334	315	D08	232*549.5*1080

Main circuit terminal size of inverter drive unit



Terminal label	Terminal function description
⊕	DC bus positive and negative terminals, common DC bus. ① DC bus output when used as rectifier unit; ② DC bus input when used as inverter unit
⊖	
U/T1	① Three-phase AC input when used as rectifier unit ② Three-phase AC output when used as inverter unit
V/T2	
W/T3	
⏚	Ground terminal, connecting the protection ground



Outline and installation dimensions of inverter drive unit

A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Mounting hole diameter Φ (mm)	Installation			Fastening torque (Nm)	Mass (kg)
						Bolt	Flat washer	Spring washer		
182	1007.5	1080	232	549.5	12	4M10	40 Φ 10	40 Φ 10	14	84

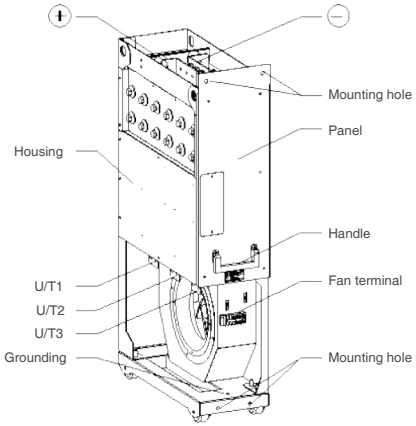
AS700-05 SCR unit

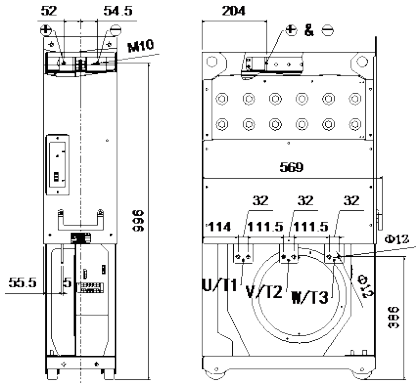
Hardware characteristics:

- Unidirectional (electric direction) rectifier device in the common DC bus system;
- The dedicated reactor at the input side supports parallel connection of units;
- Support 12,18 or 24-pulse rectification;
- External charging circuit is not required for SCR unit;
- SCR unit may charge the DC bus and is suitable for the occasions without higher requirement for the harmonic quantity or without the need for energy regeneration.

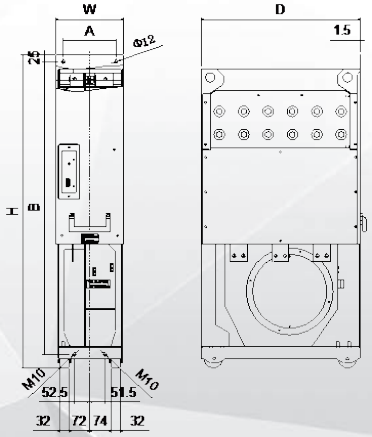
SCR unit specification

Product model	Standard application		Heavy load application		Framework
		Pn kW	Ihd A	Phd kW	
Un=400V (range 380 ~ 500V)					
AS700 05 0730 T04	730	432	546	321	D08
Un=690V (range 525-690V)					
AS700 05 0450 T06	450	450	351	351	D08





Terminal label	Terminal function description
⊕	DC bus positive and negative terminals, common DC bus, DC bus output;
⊖	
U/T1	Three-phase AC input
V/T2	
W/T3	
⏚	Ground terminal, connecting the protection ground



Outline and installation dimensions of SCR unit

A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Mounting hole diameter Φ (mm)	Installation			Fastening torque (Nm)	Mass (kg)
						Bolt	Flat washer	Spring washer		
182	1007.5	1080	232	549.5	12	4M10	40 Φ 10	40 Φ 10	14	84

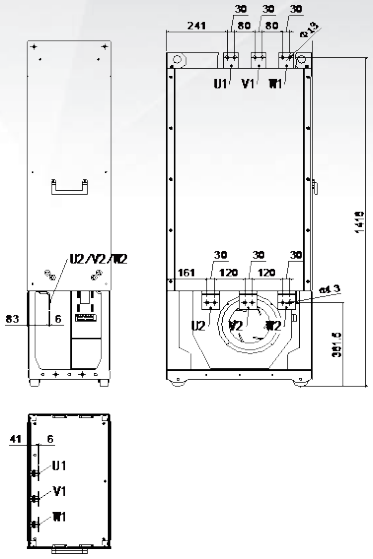
● AS700-07 LCL filter unit

Outline and installation dimensions of SCR unit

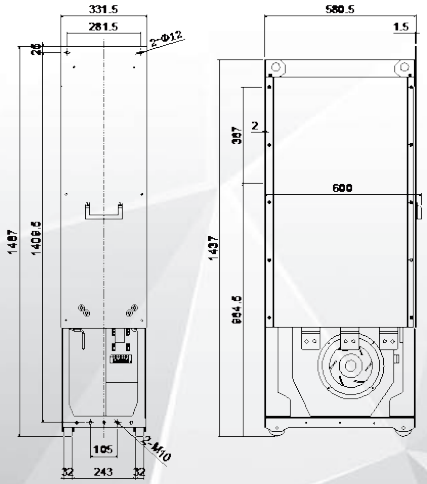
Product model	In A	Framework
Un=400V (range 380~500V)		
AS700 07 0407 T04	407	L01
AS700 07 0647 T04	647	L01
AS700 07 0968 T04	968	L01
Un=690V (range 525-690V)		
AS700 07 0301 T06	301	L01
AS700 07 0462 T06	462	L01
AS700 07 0592 T06	592	L01

Main circuit terminal size of LCL filter unit

Terminal label	Terminal function description
U1	Three-phase AC input
V1	
W1	
U2	Three-phase AC input
V2	
W2	
⏚	Ground terminal, connecting the protection ground



Overall dimensions of LCL filter unit



Outline and installation dimensions of LCL filter unit

Current A	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Mounting hole diameter Φ (mm)	Installation			Fastening torque (Nm)	Mass (kg)
							Bolt	Flat washer	Spring washer		
Un=400V (range 380~500V)											
407	182	1007.5	1080	232	549.5	12	4M10	4 Φ 10	4 Φ 10	14	
647											274
968											370
Un=690V (range 525~690V)											
301	182	1007.5	1080	232	549.5	12	4M10	4 Φ 10	4 Φ 10	14	316
462											352
592											380

AFE active rectifier

Hardware characteristics:

- Bidirectional (energy regeneration) rectifier device in the common DC bus system;
- Consist of power drive unit and LCL filter;
- AFE shall be configured with a pre-charging circuit separately;
- AFE may be connected in parallel mutually without the need for a special connector;
- Apply to the application occasions requiring low grid harmonics or energy regeneration;
- Wide power capacity range:

Level 400V: 250kW—1400kW
Level 690V: 315kW--1600kW

Control unit

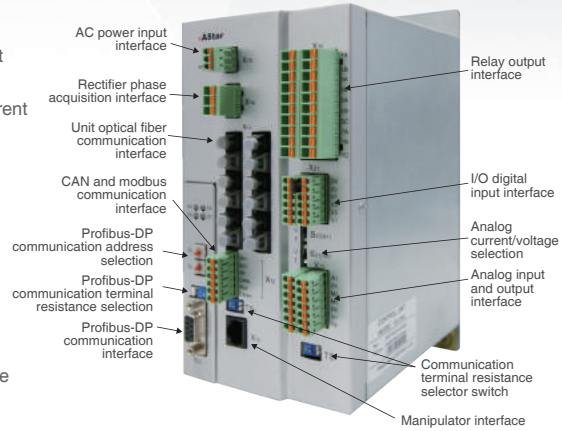
Hardware characteristics:

- Adopt STM32 control chip, internally installed with ARM Cortex-M3 kernel;
- High performance, low power consumption and strong operational capability;
- Control and drive optical fiber isolation to improve the product anti-interference ability ;
- Built-in multiple interfaces, such as digital quantity, analog quantity, communication and encoder;
- Choose to burn the motor driver or AFE rectifier program;

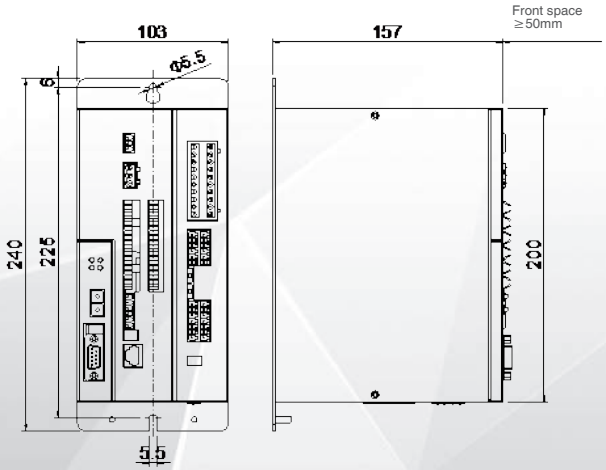
AS700.CN/A 01 rectifier control unit (code C01)
AS700.CN/A 02 inverter control unit (code C02)

Peripheral interfaces:

Digital input:
8-way opto-isolator input, with function definable
Relay output:
4-way power relay and 4-way signal relay
Analog input:
2-way voltage/current optional analog input
Analog output:
2-way voltage signal output and 2-way current signal output
Communication interface:
2-way 485 communication interface for Modbus communication
1-Way CAN interface, used in inverter
1-way parallel port expansion interface, supporting
Profibus-DP communication card
Encoder interface:
1-way built-in incremental PG card interface
1-way expanded PG card interface



Control unit size:



Rectifier control circuit terminal function description

X21

X0	Main contactor status
X1	External fault status
X2	Power starting signal
X3	Running signal
X4	LCL over-temperature status
X5	Fault reset
X6	
X7	
XV	+24VDC maximum load current 100mA
24	
XC	Digital ground
XC	

X20

1B	
1A	
2B	Main contactor control
2A	
3B	Soft start contactor control
3A	
4B	Fan contactor control
4A	
5C	Run
5B	
5A	
6C	
6B	
6A	
7C	
7B	
7A	
8C	
8B	
8A	

Inverter drive control circuit terminal function description

X21

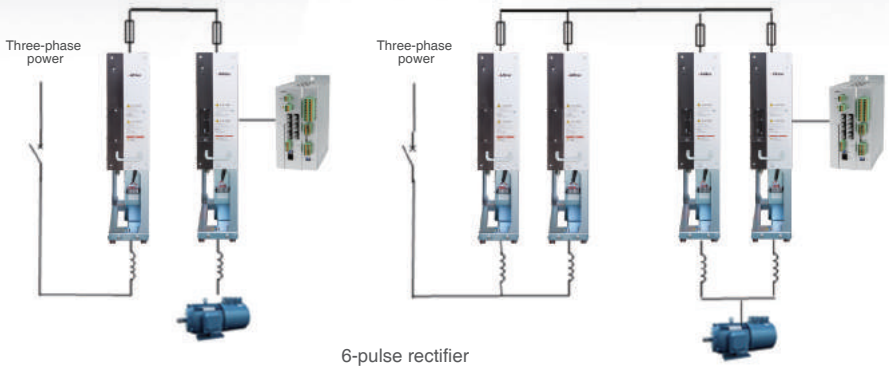
X0	Forward
X1	
X2	
X3	
X4	
X5	Base blocking
X6	External fault (AFE)
XV	+24VDC maximum load current 100mA
24	
XC	Digital ground
XC	

X20

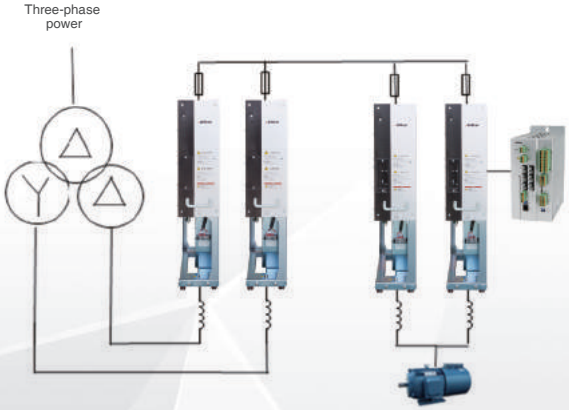
1B	
1A	
2B	Run
2A	
3B	Fault
3A	
4B	Unit fan
4A	
5C	
5B	
5A	
6C	
6B	
6A	
7C	
7B	
7A	
8C	
8B	
8A	

System design scheme

- SCR scheme



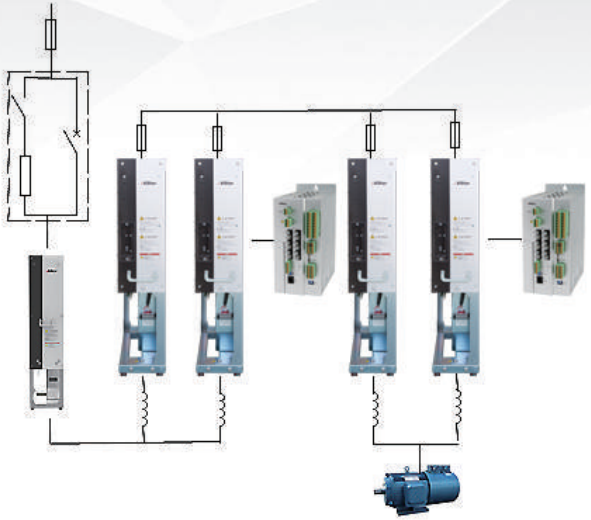
6-pulse rectifier



12-pulse rectifier

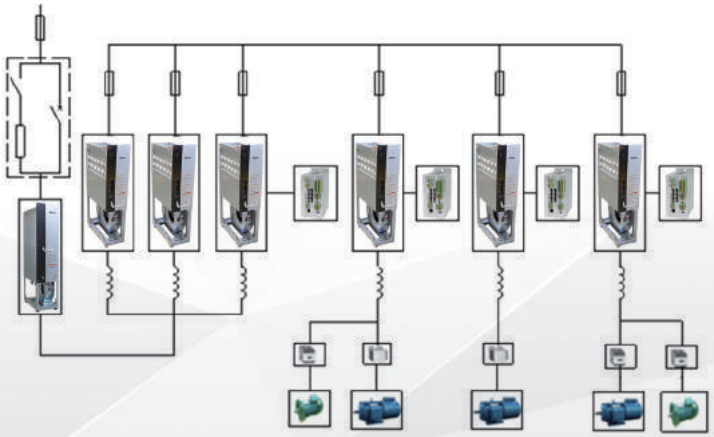
Note:
Separate drive scheme may achieve site standardization.
Single-drive parallel drive scheme connects a number of AS700 03 in parallel to achieve higher output current.

AFE configuration scheme



Note:
AFE full-feedback rectifier scheme may construct AFE drive system by means of the standard drive module configured as motor driver or AFE rectifier, so as to achieve energy regeneration and eliminate harmonics.

Multi-motor-drive system scheme



Note:
In multi-motor-drive configuration, the controller number is consistent with the motor number.

Model selection by customer

- Module specification

AS700 two-quadrant inverter module specification

Product model	Standard application		Heavy load application		Framework
	In A	Pn KW	Ihd A	Pnd KW	
Un=400V (range 380~500V)					
AS700 11 0490 T04	490	250	382	200	D08*1+D08*1
AS700 11 0600 T04	600	315	468	250	D08*1+D08*1
AS700 11 0700 T04	700	355	545	280	D08*1+D08*1
AS700 11 0960 T04	960	500	750	400	D08*2+D08*2
AS700 11 1176 T04	1176	630	918	500	D08*2+D08*2
AS700 11 1372 T04	1372	710	1071	560	D08*2+D08*2
AS700 11 1746 T04	1746	900	1372	710	D08*3+D08*3
AS700 11 2037 T04	2037	1120	1591	900	D08*3+D08*3
AS700 11 2688 T04	2688	1400	2100	1120	D08*4+D08*4
Un=690V (range 525~690V)					
AS700 11 0322 T06	322	315	251	220	D08*1+D08*1
AS700 11 0367 T06	367	355	286	280	D08*1+D08*1
AS700 11 0429 T06	429	400	334	315	D08*1+D08*1
AS700 11 0632 T06	632	630	493	450	D08*2+D08*2
AS700 11 0700 T06	700	710	545	500	D08*2+D08*2
AS700 11 0840 T06	840	800	655	630	D08*2+D08*2
AS700 11 1067 T06	1067	1120	831	800	D08*3+D08*3
AS700 11 1206 T06	1206	1200	940	900	D08*3+D08*3
AS700 11 1423 T06	1423	1400	1109	1000	D08*4+D08*4
AS700 11 1591 T06	1591	1600	1240	1200	D08*4+D08*4

AS700 four-quadrant inverter module specification

Product model	Standard application		Heavy load application		Framework
	In A	Pn KW	Ihd A	Pnd KW	
Un=400V (range 380~500V)					
AS700 12 0490 T04	490	250	382	200	D08*1+D08*1+L01
AS700 12 0600 T04	600	315	468	250	D08*1+D08*1+L01
AS700 12 0700 T04	700	355	545	280	D08*1+D08*1+L01
AS700 12 0960 T04	960	500	750	400	D08*2+D08*2+L01
AS700 12 1176 T04	1176	630	918	500	D08*2+D08*2+L01
AS700 12 1372 T04	1372	710	1071	560	D08*2+D08*2+L01
AS700 12 1746 T04	1746	900	1372	710	D08*3+D08*3+L01*2
AS700 12 2037 T04	2037	1120	1591	900	D08*3+D08*3+L01*2
AS700 12 2688 T04	2688	1400	2100	1120	D08*4+D08*4+L01*2
Un=690V (range 525~690V)					
AS700 12 0322 T06	322	315	251	220	D08*1+D08*1+L01
AS700 12 0367 T06	367	355	286	280	D08*1+D08*1+L01
AS700 12 0429 T06	429	400	334	315	D08*1+D08*1+L01
AS700 12 0632 T06	632	630	493	450	D08*2+D08*2+L01
AS700 12 0700 T06	700	710	545	500	D08*2+D08*2+L01
AS700 12 0840 T06	840	800	655	630	D08*2+D08*2+L01
AS700 12 1067 T06	1067	1120	831	800	D08*3+D08*3+L01*2
AS700 12 1206 T06	1206	1200	940	900	D08*3+D08*3+L01*2
AS700 12 1423 T06	1423	1400	1109	1000	D08*4+D08*4+L01*2
AS700 12 1591 T06	1591	1600	1240	1200	D08*4+D08*4+L01*2

AS700 inverter drive module specification

Product model	Standard application		Heavy load application		Framework
	In A	Pn KW	Ihd A	Pnd KW	
Un=400V (range 380~500V)					
AS700 13 0490 T04	490	250	382	200	D08*1
AS700 13 0600 T04	600	315	468	250	D08*1
AS700 13 0700 T04	700	355	545	280	D08*1
AS700 13 0960 T04	960	500	750	400	D08*2
AS700 13 1176 T04	1176	630	918	500	D08*2
AS700 13 1372 T04	1372	710	1071	560	D08*2
AS700 13 1746 T04	1746	900	1372	710	D08*3
AS700 13 2037 T04	2037	1120	1591	900	D08*3
AS700 13 2688 T04	2688	1400	2100	1120	D08*4
Un=690V (range 525~690V)					
AS700 13 0322 T06	322	315	251	220	D08*1
AS700 13 0367 T06	367	355	286	280	D08*1
AS700 13 0429 T06	429	400	334	315	D08*1
AS700 13 0632 T06	632	630	493	450	D08*2
AS700 13 0700 T06	700	710	545	500	D08*2
AS700 13 0840 T06	840	800	655	630	D08*2
AS700 13 1067 T06	1067	1120	831	800	D08*3
AS700 13 1206 T06	1206	1200	940	900	D08*3
AS700 13 1423 T06	1423	1400	1109	1000	D08*4
AS700 13 1591 T06	1591	1600	1240	1200	D08*4

AS700 PWM rectifier module specification

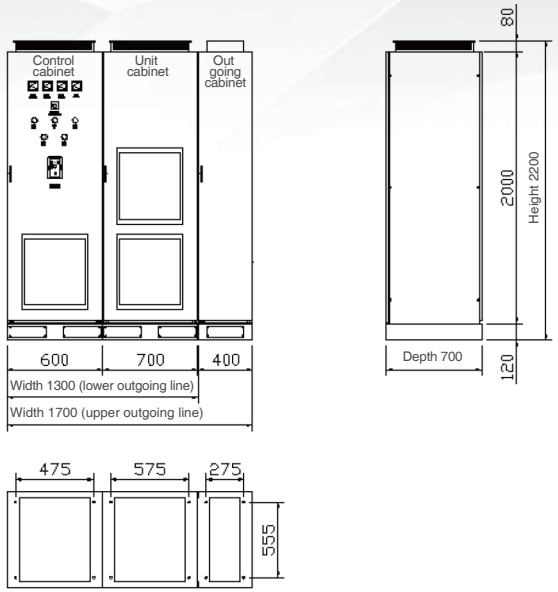
Product model	Standard application		Heavy load application		Framework
	In A	Pn KW	Ihd A	Pnd KW	
Un=400V (range 380~500V)					
AS700 14 0384 T04	384	250	300	200	D08*1+L01
AS700 14 0473 T04	473	315	370	250	D08*1+L01
AS700 14 0573 T04	573	355	447	280	D08*1+L01
AS700 14 0752 T04	752	500	588	400	D08*2+L01
AS700 14 0927 T04	927	630	724	500	D08*2+L01
AS700 14 1123 T04	1123	710	880	560	D08*2+L01
AS700 14 1376 T04	1376	900	1075	710	D08*3+L01*2
AS700 14 1667 T04	1667	1120	1302	900	D08*3+L01*2
AS700 14 2200 T04	2200	1400	1718	1120	D08*4+L01*2
Un=690V (range 525~690V)					
AS700 14 0274 T06	274	315	214	220	D08*1+L01
AS700 14 0328 T06	328	355	256	280	D08*1+L01
AS700 14 0352 T06	352	400	274	315	D08*1+L01
AS700 14 0538 T06	538	630	420	450	D08*2+L01
AS700 14 0642 T06	642	710	500	500	D08*2+L01
AS700 14 0690 T06	690	800	538	630	D08*2+L01
AS700 14 0956 T06	956	1120	746	800	D08*3+L01*2
AS700 14 1024 T06	1024	1200	798	900	D08*3+L01*2
AS700 14 1272 T06	1272	1400	994	1000	D08*4+L01*2
AS700 14 1351 T06	1351	1600	1053	1200	D08*4+L01*2

Note:
D08*N，L01*N, in which, N is the unit number
D08 boundary dimensions W*H*D(width * height *depth): 232*1080*549.5(mm);
L01 boundary dimensions W*H*D(width * height *depth): 331.5*1481*580.5(mm);
Standard application (120% overload capacity) and heavy load application (150% overload capacity)
In— rated current of inverter Ihd—heavy load current of inverter
Pn—rated power of inverter Phd—heavy load power of inverter
Remarks:
Contact the company for other powers and dimensions.

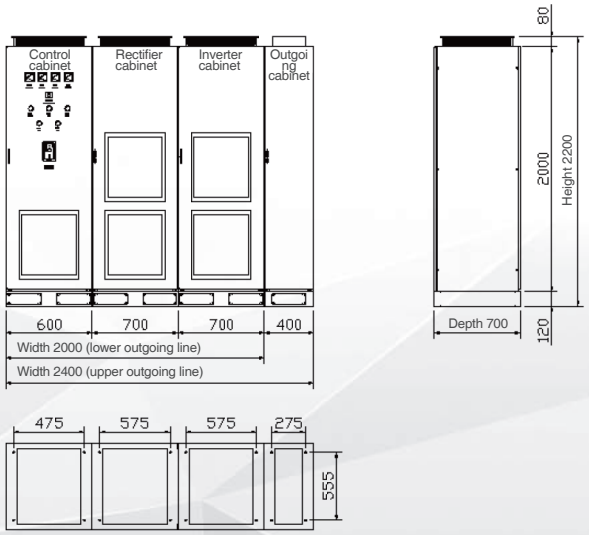
Four-quadrant inverter cabinet

Product model	Standard application		Heavy load application		Framework
	In A	Pn KW	Ihd A	Pnd KW	
Un=400V (range 380~500V)					
AS700 22 0490 T04	490	250	382	200	B1
AS700 22 0600 T04	600	315	468	250	B1
AS700 22 0700 T04	700	355	545	280	B1
AS700 22 0960 T04	960	500	750	400	B2
AS700 22 1176 T04	1176	630	918	500	B2
AS700 22 1372 T04	1372	710	1071	560	B2
AS700 22 1746 T04	1746	900	1372	710	B3
AS700 22 2037 T04	2037	1120	1591	900	B3
AS700 22 2688 T04	2688	1400	2100	1120	B4
Un=690V (range 525~690V)					
AS700 22 0322 T06	322	315	251	220	B1
AS700 22 0367 T06	367	355	286	280	B1
AS700 22 0429 T06	429	400	334	315	B1
AS700 22 0632 T06	632	630	493	450	B2
AS700 22 0700 T06	700	710	545	500	B2
AS700 22 0840 T06	840	800	655	630	B2
AS700 22 1067 T06	1067	1120	831	800	B3
AS700 22 1206 T06	1206	1200	940	900	B3
AS700 22 1423 T06	1423	1400	1109	1000	B4
AS700 22 1591 T06	1591	1600	1240	1200	B4

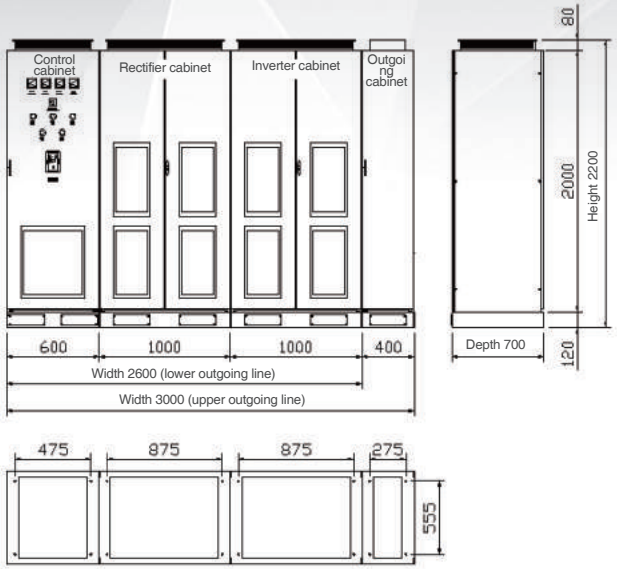
● Cabinet frame size



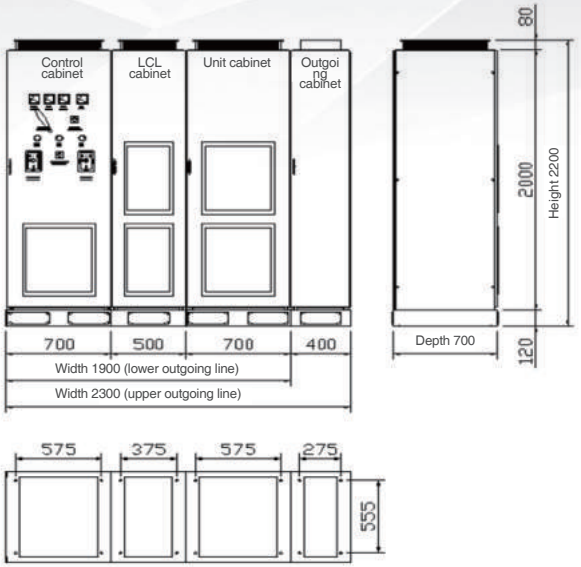
Frame A1 (the outgoing cabinet is the upper outgoing line option)



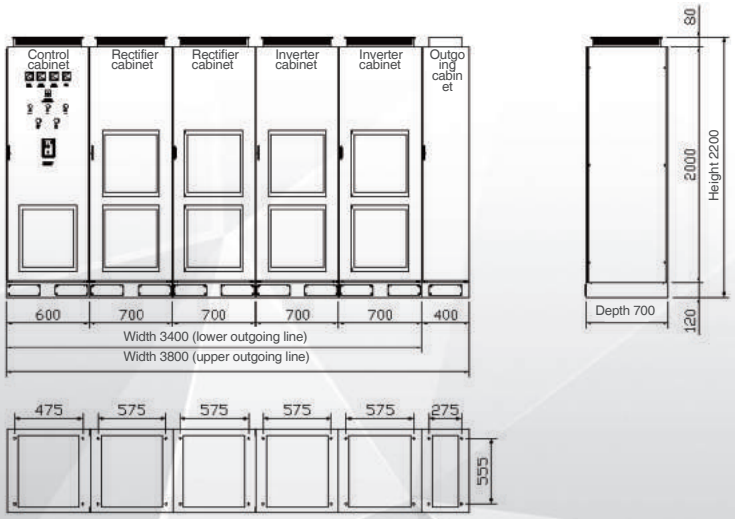
Frame A2 (the outgoing cabinet is the upper outgoing line option)



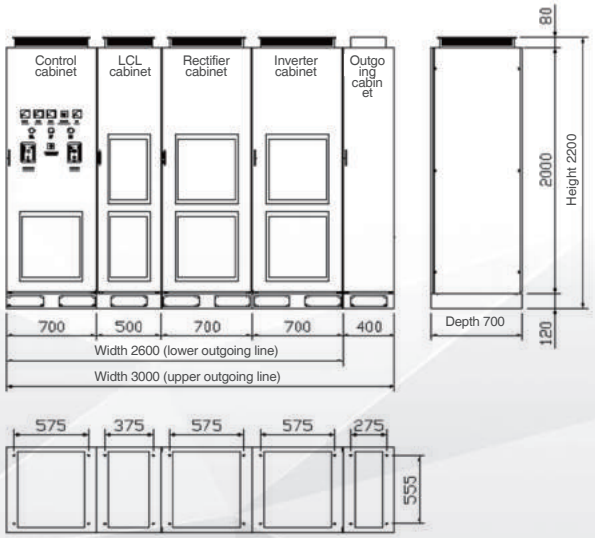
Frame A3 (the outgoing cabinet is the upper outgoing line option)



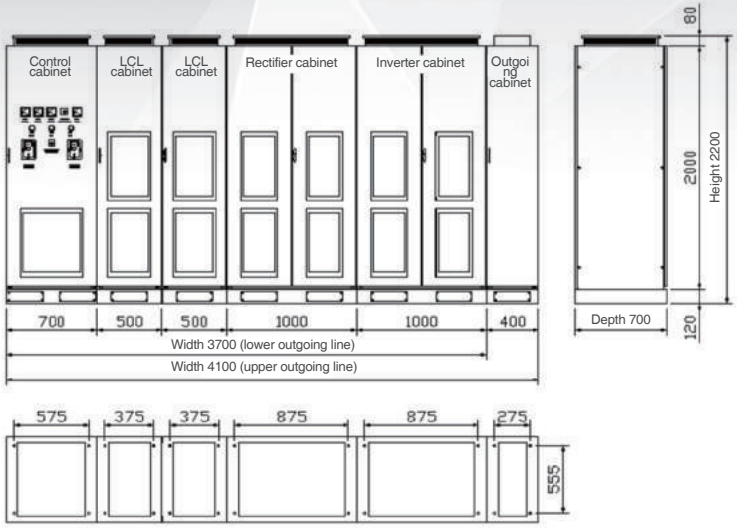
Frame B1 (the outgoing cabinet is the upper outgoing line option)



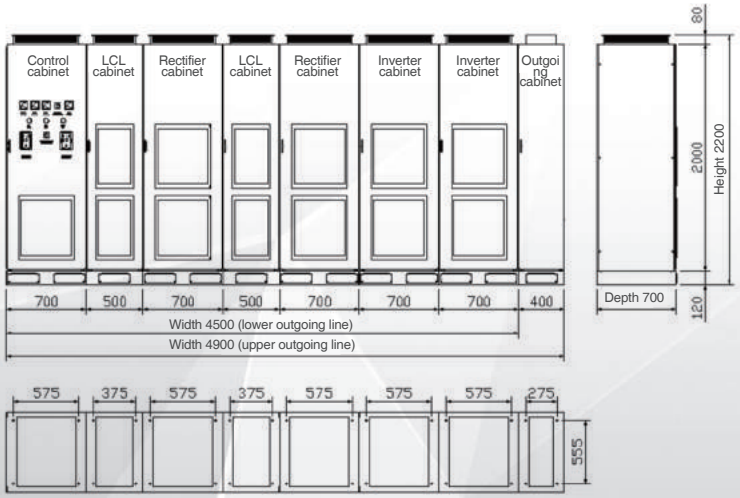
Frame A4 (the outgoing cabinet is the upper outgoing line option)



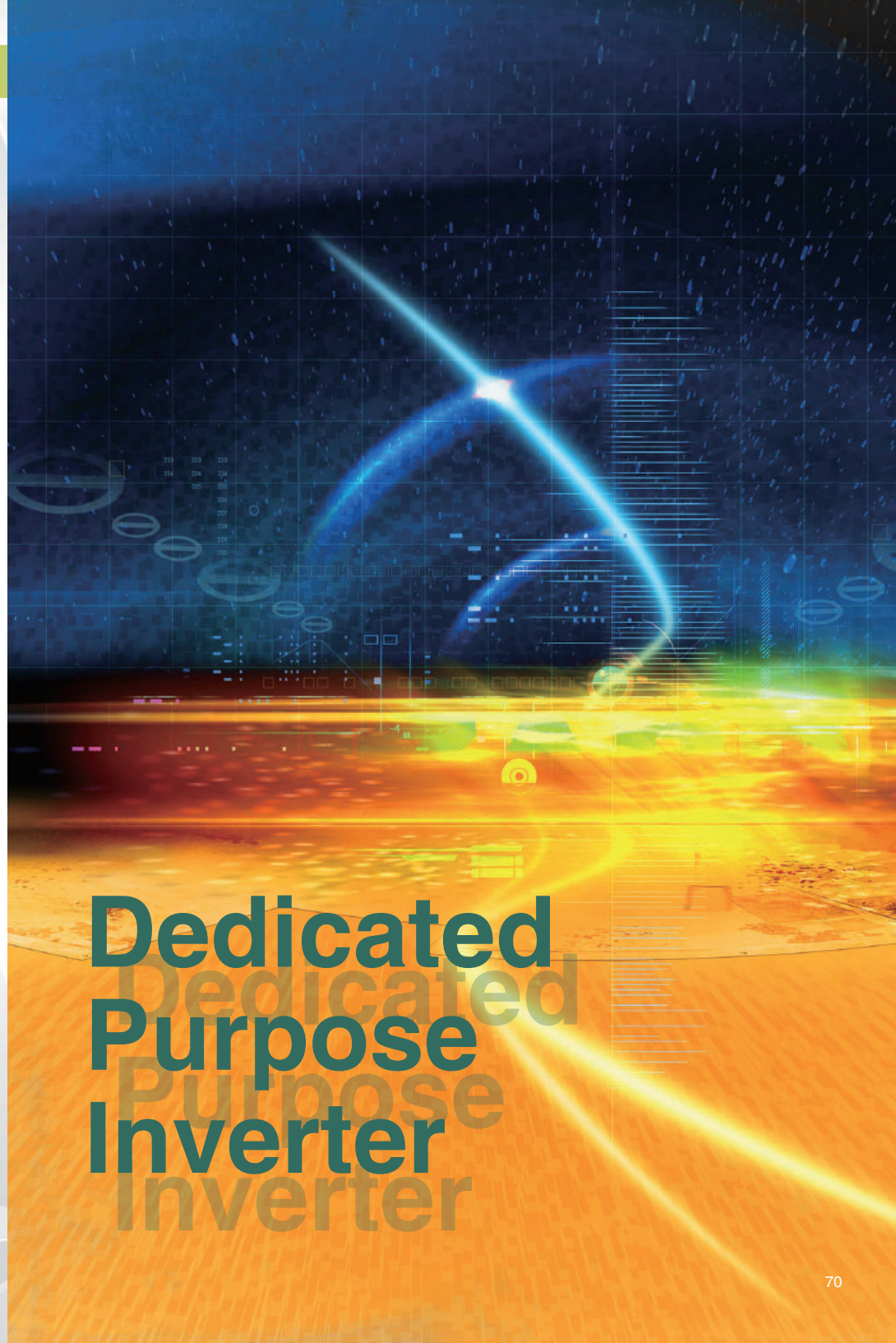
Frame B2 (the outgoing cabinet is the upper outgoing line option)



Frame B3 (the outgoing cabinet is the upper outgoing line option)



Frame B4 (the outgoing cabinet is the upper outgoing line option)



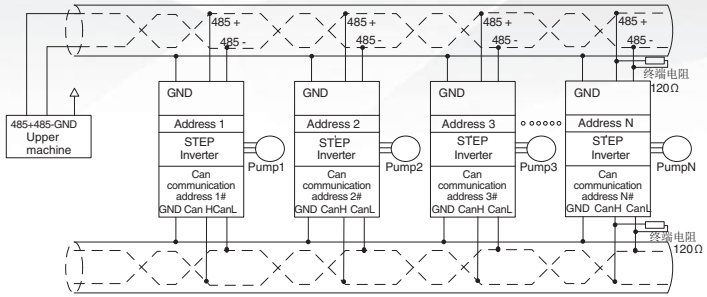
AS170 Series Motor-Integrated Inverter

Product characteristics

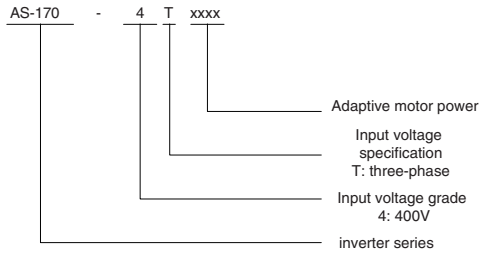
AS170 series inverter is a motor-driven integrated machine with high protection grade developed by Shanghai Sigriner Electric Co., Ltd., adopting unique appearance design and installation methods, with local and remote control mode, more convenient, reliable and safe to install and use.

- Advanced high-performance vector VF control mode improved the motor control accuracy, and reduced the motor consumption, achieving superior energy-saving effect
- Dedicated function of water pump: achieve full frequency conversion constant pressure water supply without PLC or control cabinet
- Periodic break control, balance working hours of water pump, and effectively prevent corrosion of water pump
- Flexible power off/on mode meets the requirements of minimal system pressure, avoiding water pump frequent starting and stopping
- Warning function of pipe network over /under voltage can early warn water pump idle or pipeline leakage
- In case of failure, pump automatically exiting from the system, quickly compensate for pipe network pressure drop
- Good environmental adaptability: whole series products have IP55 protection grade, 2g shock protection grade
- Automatic voltage regulation function (AVR), keep output voltage constant, ensure the characteristic curve of water pump not affected by grid fluctuation
- Automatically diminished frequency function for overcurrent, overvoltage/undervoltage, reduce the report of fault, and make the system running smoothly longer
- The external interface of the inverter adopts aviation fast plug, which is more convenient, timeand effort-saving

System topology



Model specification



Technical parameters and dimensions

Stable running 45℃, overloading					Dimensions
Inverter model AS170	Rated input current (A)	Rated output current (A)	Adaptive motor (kw)	Overloaded 120%(1min) output current (A)	
4T01P5	3.8	3.5	1.5	4.2	A1
4T02P2	5.3	5	2.2	6	
4T03P0	6.5	6	3.0	7.2	
4T04P0	8.5	8	4.0	9.6	
4T05P5	11.5	11	5.5	13.2	A2
4T07P5	16	15	7.5	18	
4T0011	21	20	11	24	A3
4T0015	30.5	29	15	34.8	

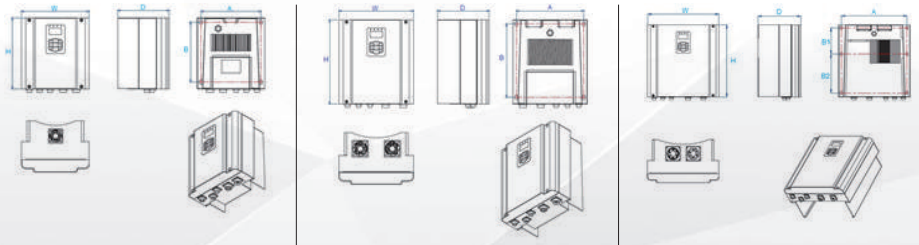
Technical specifications

Power intput	Input voltage	380-460V (-15% - +10%)，three-phase power	
	Input Frequency	45-65Hz	
	Accepting voltage change	Voltage unbalance<3%	
	Instantaneous voltage drop	When three phase AC380-460V power, and input voltage<AC300V, low-voltage protection was implemented after 15ms.	
Power output	Voltage	OVAC-input voltage	
	Overload grade	Stable running 45℃, overloading 120%，1min	
	Efficiency	≥97%(full-load)	
	Output frequency accuracy	±0.01%（digital command -10 - +45℃); ±0.1%(analog command 25 ± 10℃)	
Digital input/output	Optical coupling isolation input	6 channels, 24V high and low level can be set, input function can be defined	
	Open collector output	1 channel, output function can be defined	
	Relay output	2 channels, dual normally open/closed contacts, contact capacity: resistive, 4.5A/250 VAC or 4.5A/30VDC: inductive: 0.4A/250VAC or 0.4A/30VDC; output function can be define	
Analog input/output	Analog voltage input	2 channels, accuracy 0.1%; voltage:0V - +10VDC or current: 0-20mA optional signal	
	Analog voltage output	1 channel, accuracy 0.1%; voltage :OV - +10VDC or current: 0-20mA optical signal	
Control characte-ristics	Control mode	V/F control	High-performance V/F (VFVC)
	Start torque	2.50Hz，120%	0.5Hz，120%
	Speed range	1:50	1:200
	Steady-speed accuracy	± 2%	± 0.5%
	Load frequency	1.1- 8kHz: carrier frequency can be regulated automatically according to load characteristics	
	Frequency setting resolution	0.01Hz (digital command)，±0.06Hz/120Hz (analog command 11 bit + no signal)	
	Running command channel	Given operation panel, given control terminal, given communication	
	Frequency-given channel	Given operation panel, given digital quantity/analog quantity, given communication, given performance function	
	Torque improved	Automatic torque improved, manual torque improved	
	V/F curve	User-defined V/F curves, linear V/F curves, and three reduced torque characteristic curves	
	Automatic voltage Regulation(AVR)	The duty ratio of output PWM signal is regulated automatically based on the fluctuation of busbar voltage fluctuation, to reduce the influence of grid voltage fluctuation on output voltage fluctuation	
	Electricity loss and keep-running process	In the case of instantaneous power-off, achieve uninterrupted operation through busbar voltage control	
	Direct current braking capability	Brake current: 0.0 - 120.0% rated current	
Characteristic function	Parameters copy	The standard operation panel can upload and download parameters, and indicate copy progress	
	Process PIO	Used for closed-loop control of process quantities	
	Common DC busbar	All series can achieve the power supply of common DC busbar for multiple inverter	
	Reduce frequency function for overcurrent/overvoltage	When the current and voltage reach the setting value, inverter shall run with reduced frequency.	
	Reduce frequency function for overheating	When the temperature of cooling plate is higher than 95℃, inverter shall run with reduced frequency.	
	Build-in constant pressure water supply control (Full frequency)	Through CAN communication, the operation logic of multiple full-frequency pumps to increase or decrease the number of pump can be achieved.	
Motor protection	Rotor block		
	Motor overload		
	Speed limit		
Inverter protection	Current limit		
	Inverter overload		
	IGBT I^2t overloaded		
	Input power undervoltage/overvoltage		
	DC Bus undervoltage/overvoltage		
	IGBT overheating		

Inverter protection	Heat sink overheating	
	Power faulty	
	Analog input signal loss (loss speed reference value)	
	communication abnormality	
	self-tuning faulty	
Environment condition	Operation place	Indoor use only, vertically or horizontally installed with motor fixed through the adapter plate, andcooling medium is air.
	Environment temperature	-10～+55℃
	Used in derating temperature	> 45℃, a rise of 1℃, rated output current is reduced by 2%, the highest temperature is 55 ℃
	Altitude	<3000m
	Used in derating height	>2000 m, a rise of 100m, rated output current is reduced by 2% (up to 3000m)
	Environment humidity	5-95%, without condensation
	Vibration grade	2g
	Storage temperature	-40～+70℃
	Protection grade	IP55
Control panel	Type	Fixation
	Connect	RJ45
	LCD text display	4 row
	Visible LED indicator	4 pcs
	Key	9 pcs
Others	Cooling approach	Force-air cooling
	Installation mode	Install vertically or horizontally

General AS series inverter dimensions and specifications

Specification	A (mm)	B (mm)		H (mm)	W (mm)	D (mm)
A1	230	230		272	260	196
A2	266	288		330	294	203
A3	340	135	200	373	369	222

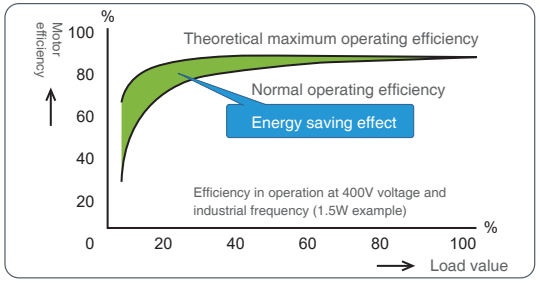


A1 A2 A3

AS hoisting industry inverter performance characteristics

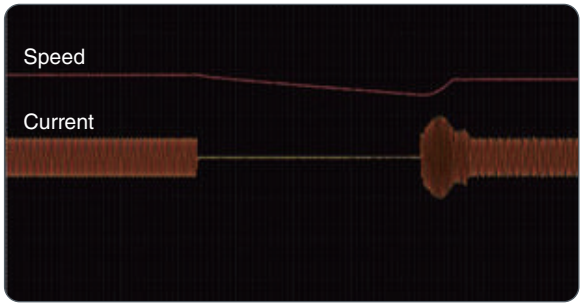
Efficient and energy-saving operation mode

The high-efficiency driven energy-saving operation mode and new PWM dead zone compensation technique can effectively reduce the motor loss and maximize the power saving rate.



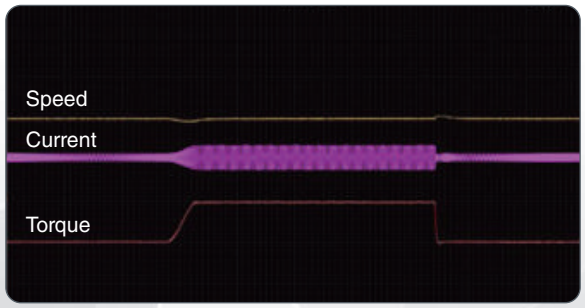
Smooth tracking start

Perfectly achieve smooth start of the motor in rotation without impact at any time.



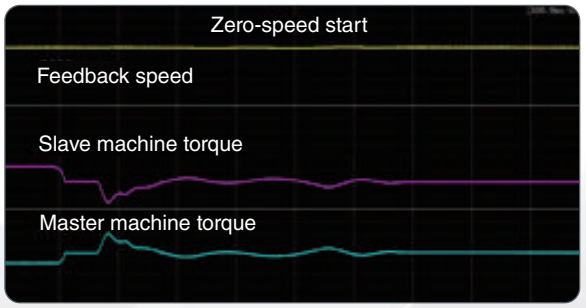
Fast dynamic response

The advanced motor control mode can quickly respond to the sudden change in the load even if no PG card is available.



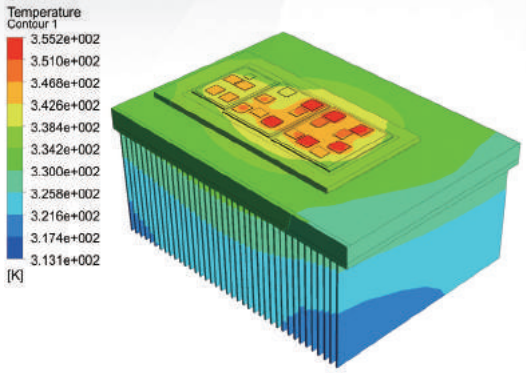
Torque memory function

Record the output torque of the motor every time when the brake is closed. When the brake is open next time, output the memory torque last time to ensure that the heavy object does not slip from the hook. (Support closed-loop control only)

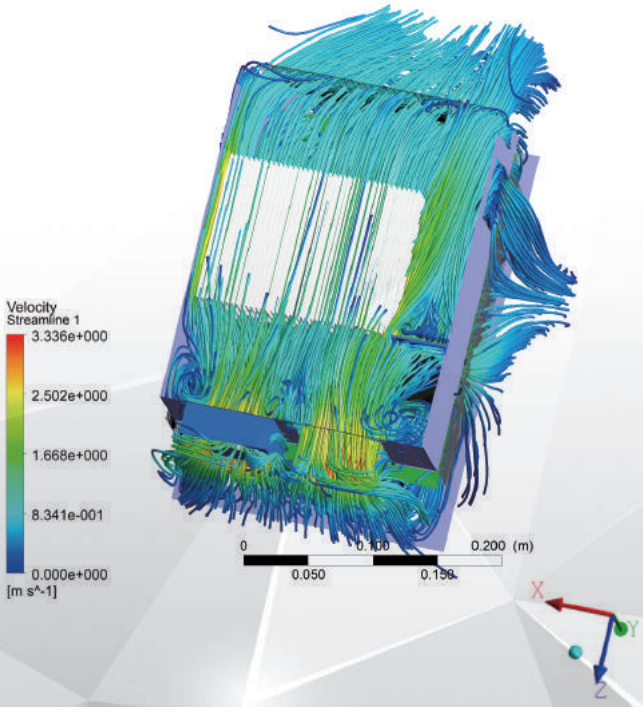


Structure: reasonable and scientific

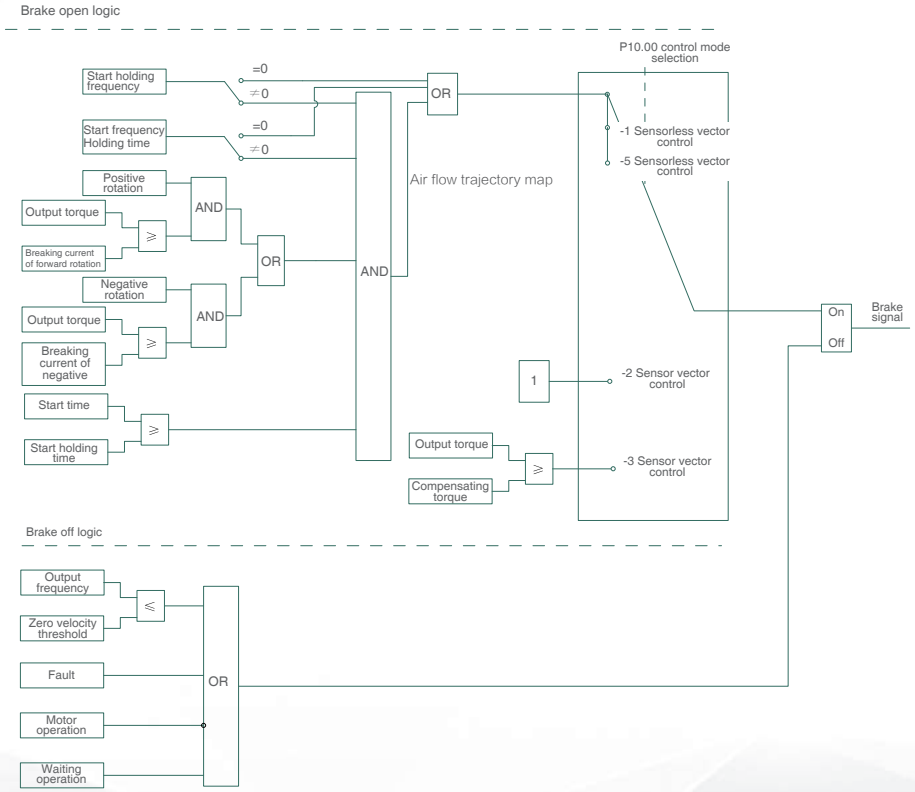
Unique air duct and compact thermal design, making the temperature rise far below the national standard



Thermal analysis of power device



Brake logic: perfect, safe and reliable



Self-learning: rich and intelligent

To control the motor more accurately, the inverter may obtain relevant parameters of the motor by self-learning.

Self-learning: rich and intelligent

- Static self-learning of editor
- Static self-learning of motor
- Optimized self-learning of inverter
- Static advanced learning of motor
- Dynamic self-learning of editor

Protection functions: perfect, safe and reliable

Motor protection

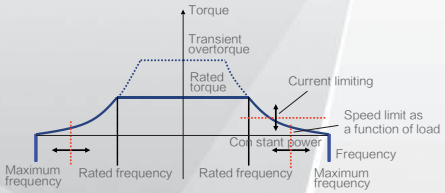
- Motor over-temperature protection (PTC)
- Locked rotor protection
- Motor overload protection
- Motor open-phase protection
- Speed limit

Inverter protection

- Output current limiting
- Inverter over-temperature protection
- I2t protection
- Heatsink OT protection
- Power supply fault
- IGST over-temperature protection
- Analog input signal loss (speed reference value loss)
- Communication exception

Weakened flux and constant power function

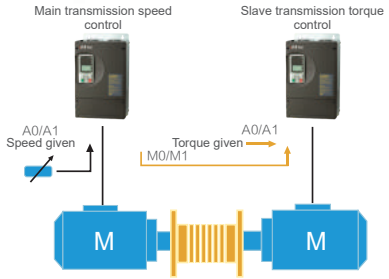
The inverter independently calculates the maximum speed (above base frequency) under the rated power to improve the equipment working efficiency.



Master-slave control functions

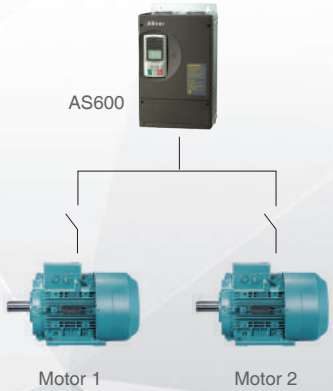
Rigid coupling

- The master drive unit is controlled by speed. The slave drive unit is controlled by torque.
- The torque analog of the master drive unit is output to the slave drive unit as the torque given signal.



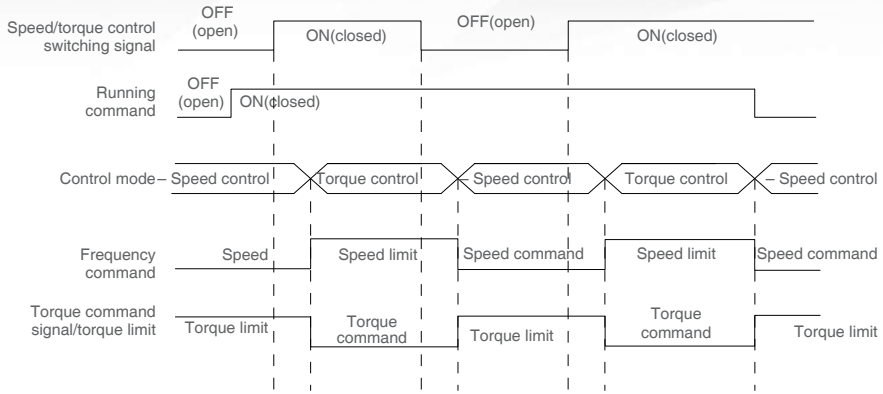
Motor parameter and operation curve switching function

One inverter is used to control 2 mechanisms by output contactor switching to reduce equipment input. The inverter completes the motor parameter and operation curve parameter switching immediately upon receipt of the switching signal to ensure normal equipment operation.



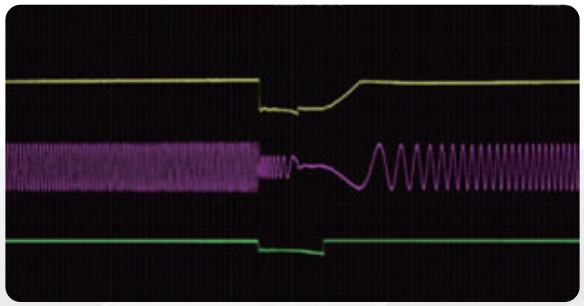
Static and dynamic speed and torque switching function

Achieve static and dynamic speed/torque switching



Strong grid adaptability

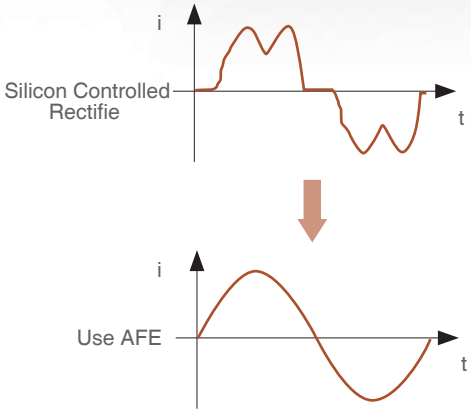
Automatic voltage regulation function: automatically keep the output voltage constant in case of change in the network voltage. The unique instant uninterrupted power function can keep the inverter running without shutdown in case of sudden power loss.



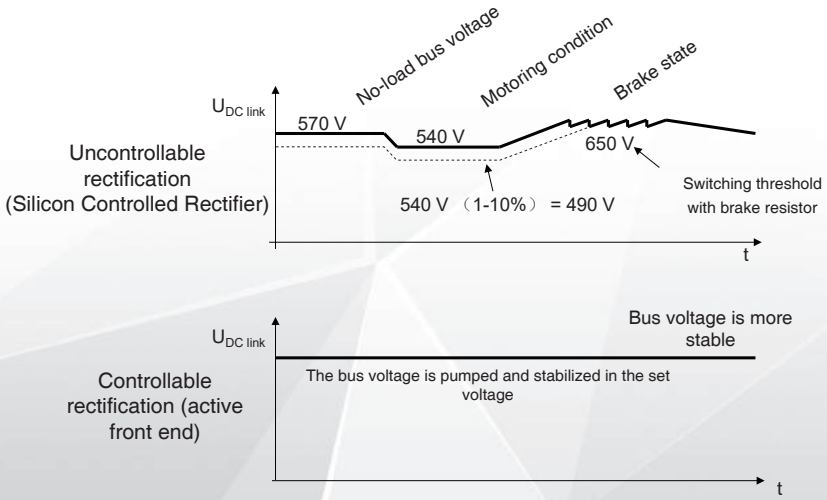
Hoist/Crane

- Reduce reactive power and current harmonics

  - Cos ϕ = 1
  - THDi < 4%



- DC bus voltage is more stable



AS600 special inverter for cranes

Product introduction

AS600 special inverter for crane is designed for the industrial cranes, such as quayside container bridge crane, container gantry crane, portal crane and beam crane. With the use of advanced vector control technology and torque control technology, the product has the same excellent control performance with high-end international inverter and, combined with the application characteristics in the hoisting machinery industry, further strengthens the product output characteristics, reliability and environmental adaptation and can better meet various application requirements of the hoisting machinery.

Technical features

High torque and high load capacity

- Support synchronous and asynchronous motors
- Perfect, safe and reliable brake logic
- Fast, preeminent and high adaptive dynamic response
- Smooth and shockless speed tracking start
- Support Profibus-DP and Modbus communication
- Perfect, safe and reliable motor inverter protection function
- Master and slave control func Weakened flux and constant power function
- Torque memory function
- Parameter and operation curve switching function of 2 sets of motors
- Static and dynamic speed and torque switching function
- Non-stop at instantaneous stop

Application industries

- Harbor machinery: quayside container bridge crane, tyre crane and portal crane
- Standard lifting: bridge crane, portal crane, electric hoist, belt conveyor and winch
- Construction lifting: tower crane

Product model

AS600 4T 0075

Model	Description
AS600	Lifting

Code	Voltage class
4	400V

Code	Adaptive motor power
0075	75kW

Code	Voltage phase number
T	Three-phase

Model and technical data

Inverter model AS400 4T-	02P2	03P7	05P5	07P5	0011	0015	18P5	0022	0030	0037	0045
Maximum power of adaptive motor (kW) (SHD)	1.1	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37
Maximum power of adaptive motor (kW) (SHD)	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45
Rated output current (A) (SHD)	3.5	6.2	11	15	21	27	34	41	52	65	80
Rated output current (A) (SHD)	6.2	9	13	17	25	31	39	45	60	75	91
Carrier frequency (kHz)	2-8kHz (modified in parameters)										

Inverter model AS600 4T-	0055	0075	0090	0110	0132	0160	0185	0200	0220	0250	0280	0315	0355
Maximum power of adaptive motor (kW) (SHD)	45	55	75	90	110	132	160	185	200	220	250	280	315
Maximum power of adaptive motor (kW) (SHD)	55	75	90	110	132	160	185	200	220	250	280	315	355
Rated output current (A) (SHD)	97	128	165	195	236	270	330	360	390	430	470	525	585
Rated output current (A) (SHD)	112	150	180	216	260	300	370	390	426	480	520	600	650
Carrier frequency (kHz)	2-8kHz (modified in parameters)						2-5kHz (modified in parameters)						
Supply voltage	AC 3-phase, 380-460V 50/60Hz												
Permissible power fluctuation	-15%-10% (interphase unbalance rate ≤3%, add the DC reactor to improve the power factor)												
Permissible frequency fluctuation	-5% 5%												
Instantaneous low voltage tolerance	Continue to run above 300V: continue to run 15ms when the rated voltage falls below 300V (test valye at 80% load)												

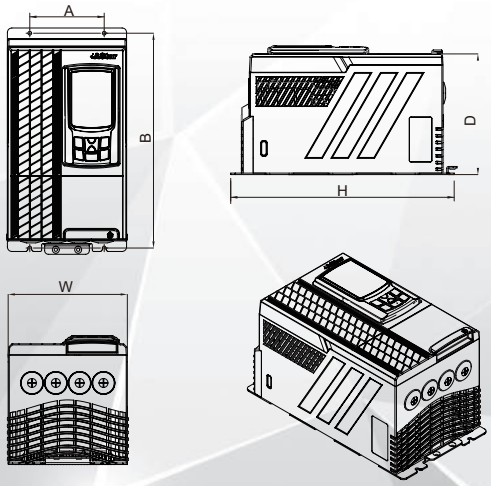
Technical features

Power input	Input voltage	（380-460）V (-15%-+10%), three-phase supply, voltage unbalance <3%
	Input frequency	（45-65）Hz
	Instantaneous power drop	Undervoltage protection when the input voltage is less than AC300V in the power supply AC(380-460)V
Power output	Voltage	OVAC - input voltage
	Output frequency	V/F control: (0.00/300.00）Hz, vector control: (0.00-120.00）Hz
	Overload level	Heavy load: 150%, 60S; super-heavy load: 150%，60S；200%，2S
Digital IO	Output frequency accuracy	±0.01% (digital command- 10 - +45°C) ; ± 0. 1% (analog command 25 ± 10 °C)
	Opto-isolator input	7-channel, 24V active high and low settable and input functions definable
Analog input and output	Open collector output	2-channel, output functions definable
	Relay output	2-channel normally open, 2-channel normally open and normally closed contacts
	Analog voltage input	2-channel, voltage: （-10~+10）VDC or current: (0-20）mA optional signal
	Analog voltage output	2-channel, voltage: （-10~+10）VDC or current: (0-20）mA optional signal

Encoder input	PG card power	5V, 12V,300mA		
	PG card signal	Open collector, push-pull, differential, SIN/COS incremental, Endat absolute value type, Resover type,orthogonal open collector output and division factor 2/4/8/16/32/64/128 settable (optional)		
Control characteristics	Control mode	V/F control	Open-loop vector control	Closed-loop control
	Starting torque	2.50Hz,150%	0.5Hz,200%	0.00Hz,200%
	Steady speed precision	± 2%	± 0.2%	± 0.02%
	Torque precision	5% (Closed-loop control)		
	Torque compensation	Automatic torque compensation and manual torque compensation		
	V/F curve	User-defined V/F curve, linear V/F curve and 3 reduced torque characteristic curves		
	Automatic voltage regulation (AVR)	Automatically adjust the duty cycle of PWM signal according to the bus voltage fluctuation		
	Non-stop at instantaneous stop	Achieve continuous operation through bus voltage control in case of instantaneous power failure		
	Dynamic braking capacity	Built-in brake unit and external brake resistor (optional) for the power 22kW and below External brake unit (optional) for the power above 22kW		
	DC braking capacity	Braking current: (0.0-120.0 % rated current		
	Torque control function	Torque/speed control switching through terminals, many torque given modes		
	Zero servo and position control function	Achieve zero speed position lock, accurate positioning and position control		
	Common DC bus	The whole series may achieve power supply of many inverters by common DC bus		
Environmental conditions	Usage occasion	Keep out of direct sunlight, dust, corrosive gases, combustible gases, oil mist, water vapor or dropping water		
	Environment temperature	(-10~+40)℃		
	Altitude	<1000m		
	Environment humidity	(5-95)%, no condensation allowed		
	Vibration (installation)	2≤f＜9Hz,0.3mm；9≤f＜200Hz，1m/s2		
	Protection grade	IP20		
Others	Cooling mode	Forced air cooling		

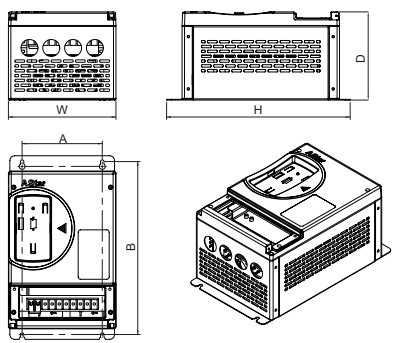
● Inverter size

Inverter size diagram of A1 specification

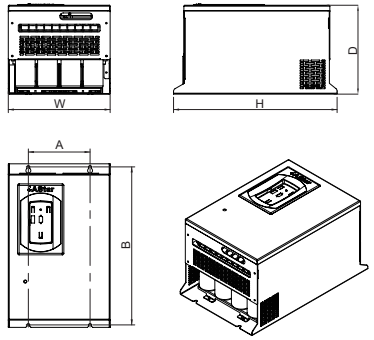


Inverter size specification of A1 specification

Specification	Inverter model AS6000	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Mounting hole diameter Φ（mm）	Installation			Fastening torque (Nm)	Mass (kg)
								Bolt	Nut	Washer		
A1	4T02P2	100	288.5	300	160	162	5.0	4M4	4M4	4Φ4	1.1	4.5
	4T03P7											
	4T05P5											



Inverter size diagram of A2-A3 specification



Inverter size diagram of A4-A9 specification

Inverter size specification of A2-A9 specification

Specification	Inverter model AS6000	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Mounting hole diameter Φ（mm）	Installation			Fastening torque (Nm)	Mass (kg)
								Bolt	Nut	Washer		
A2	4T07P5	165.5	357	379	222	182	7.0	4M6	4M6	4Φ6	3.5	8
	4T0011											
A3	4T0015	165.5	392	414	232	182	7.0	4M6	4M6	4Φ6	3.5	10.3
	4T18P5											
	4T0022											
A4	4T0030	200	512	530	330	288	9.0	4M8	4M8	4Φ8	9	29.5
	4T0037											
A5	4T0045	200	585	610	330	310	9.0	4M8	4M8	4Φ8	9	38
	4T0055											
A6	4T0075	320	718	750	430	350	13.0	4M12	4M12	4Φ12	29	79.5
A7	4T0090	320	768	800	430	350	13.0	4M12	4M12	4Φ12	29	81
	4T0110											
A8	4T0132	374	844	880	500	352	13.0	4M12	4M12	4Φ12	29	106.5
	4T0160											
	4T0185											
	4T0200	374	844	880	500	52	13.0	4M12	4M12	4Φ12	29	112.5
	4T0220											
A9	4T0250	500	997	1030	630	370	14.0	4M12	4M12	4Φ12	29	141
	4T0280											168
	4T0315											169
	4T0355											170

AS620 special inverter for construction lifts

Product introduction

AS620 inverter is the latest inverter designed for the lift market and is also used for the lift driving occasions. With the use of the motor control technique fully synchronous with the international advanced technique, the product has the same excellent control performance with high-end international inverter and, combined with the application characteristics of the Chinese lifts, further strengthens the product reliability, environmental adaptation and custom and professional design and can well meet the application requirements of the building hoists.

Model and technical data

Inverter model AS620	Rated capacity	Rated output current (A)	Adaptive motor (kW)
4T05P5	9	13	5.5
4T07P5	13	18	7.5
4T0011	19	27	11
4T0015	24	34	15
4T18P5	29	41	18.5
4T0022	34	48	22
4T0030	45	65	30
4T0037	55	80	37
4T0045	68	97	45
4T0055	89	128	55
4T0075	115	165	75
4T0090	125	180	90
4T0110	150	216	110
4T0132	190	260	132
4T0160	240	302	160

Technical features

- A variety of V/F curves, meeting various field usage requirements
- Positive and negative torque start and fixed torque start for better comfort
- Safe and reliable AFR function
- Brake control function to avoid absolute sliding
- Hopping frequency control function to effectively avoid the resonance point of mechanical load
- Automatic slip compensation to reduce the impact of load change on the motor speed
- New PWM dead zone compensation technology effectively reduces the motor loss

Application industries

Target application object: building hoist

Application industries

Target application object: building hoist

AS620 4T 0022

Model	Description
AS620	Lifting

Code	Voltage class
4	400V

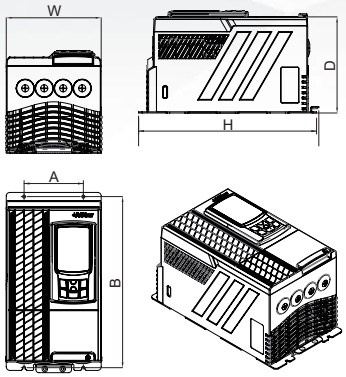
Code	Adaptive motor power
0022	22kW

Code	Voltage phase number
T	Three-phase

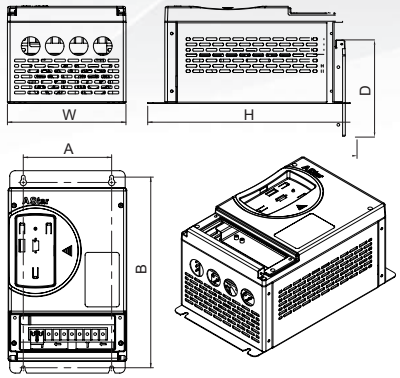
New energy bus air conditioning

Power input	Input voltage	380-460V (-15%-+10%), three-phase supply, voltage unbalance <3%
	Input frequency	45-65Hz
	Instantaneous power drop	Undervoltage protection when the input voltage is less than AC300V in the three-phase power supply AC380-460V
Power output	Motor output voltage	OVAC - input voltage, three-phase supply
	Output frequency	V/F control: 0.00/300.00Hz
	Overload level	150%,60s
	Output frequency accuracy	0.01% (digital command- 10 - +45°C) ; 0.1% (analog command 25 10 °C)
Digital IO	Opto-isolator input	8-channel, 24V active high and low settable and input functions definable
	Open collector output	4-channel, output functions definable
	Relay output	2-channel normally open, 2-channel normally open and normally closed contacts
Analog input and output	Analog voltage input	2-channel, 10~+10VOC or 0-flOVDC precision 0.1%
	Potentiometer voltage	Provide +10VDC power supply (maximum 20mA) for the potentiometer set speed
Control characteristics	Control mode	VIF control
	Starting torque	2.50Hz 150%
	Steady speed precision	2%, obtain 0.5% precision in case of slip compensation
	Carrier frequency	2-8kHz; different default carrier frequency for different inverter power
	Frequency setting resolution	0.01Hz (digital command), 0.06Hz/120Hz (analog command 11bit unsigned)
	Torque compensation	Automatic torque compensation; manual torque compensation
	V/F curve	User-defined V/F curve, linear V/F curve and 5 reduced torque characteristic curves
	Automatic voltage regulation	Automatically adjust the duty cycle of PWM signal according to the bus voltage fluctuation
	Automatic frequency regulation	Automatically adjust the output frequency with the bus voltage fluctuation to maintain the torque constant
	Instantaneous stop processing	Achieve continuous operation through bus voltage control in case of instantaneous power failure
	Dynamic braking capacity	External brake resistor for the built-in brake unit at the power 75kW and below
	DC braking capacity	Braking current: 0.0-120.0% rated current
	Common DC bus	The whole series may achieve power supply of many inverters by common DC bus
Environmental conditions	Usage occasion	Keep out of direct sunlight, dust, corrosive gases, combustible gases, oil mist, water vapor or dropping water
	Environment temperature	-10-+40℃
	Altitude	Less than 1000m
	Environment humidity	5~95%, no condensation allowed
	Vibration	3.5 m/s², 2～9Hz；10 m/s², 9～120Hz
	Protection grade	IP20
Others	Cooling mode	Forced air cooling

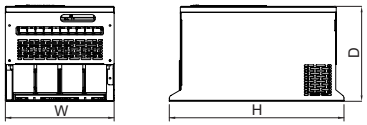
Inverter size

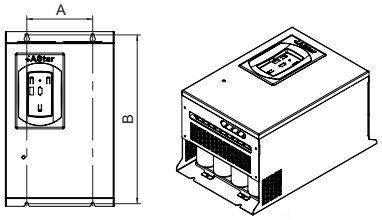


Inverter size diagram of A1 specification



Inverter size diagram of A2-A3 specification





Inverter size diagram of A4-A7 specification

Specification	Inverter model AS6000	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Mounting hole diameter Φ（mm）	Installation			Fastening torque (Nm)	Mass (kg)
								Bolt	Nut	Washer		
A1	4T05P5	100	288.5	300	160	162	5.0	4M4	4M4	4Φ4	2.5	4.5
A2	4T07P5	165.5	357	379	222	182	7.0	4M6	4M6	4Φ6	3	8
	4T0011											
A3	4T0015	165.5	392	414	232	182	7.0	4M6	4M6	4Φ6	3	10.3
	4T18P5											
	4T0022											
A4	4T0030	200	512	530	330	288	9.0	4M8	4M8	4Φ8	9	29.5
	4T0037											
A5	4T0045	200	587	610	330	310	9.0	4M8	4M8	4Φ8	9	38
	4T0055											
A6	4T0075	320	718	750	430	350	13.0	4M12	4M12	4Φ12	18	79.5
	4T0090	320	768	800	430	350	13.0	4M12	4M12	4Φ12	29	81
	4T0110											
A7	4T0132	374	844	880	500	352	13.0	4M12	4M12	4Φ12	29	106.5
	4T0160											

AS510 AFE rectified feedback unit

Product introduction

AS610 AFE products, with the use of advanced controllable rectification technique and coupled with LCL filter, achieves the active rectification and provides constant DC power and energy feedback for the system. One or more inverter units may operate in the DC bus to form the multi-motor-drive system of four-quadrant operation, providing an ideal solution for the motor control application in various occasions.

Technical features

- Active rectification technique to reduce the reactive power, with the power factor close to 1
- Four-quadrant operation, with energy feedback function
- The DC bus is more stable
- Current harmonics less than 4% in full load
- Standard LCL filter and charging circuit
- Perfect heat dissipation structure design

Application industries

- Harmonic suppression occasions: pump, wind turbine and compressor
- Energy feedback occasions: crane, winch, pipeline, hoist, test bench, turbine motor and other complex drive systems

Product model

AS510 4T 0055

Model	Description
AS510	Rectification

Code	Voltage class
4	400V

Code	Adaptive motor power
0055	55kW

Code	Voltage phase number
T	Three-phase

Model and technical data

Dimensions	Inverter model AS510	Rated output power (kW)	Rated output current (A)	Rated input current (A)
A1	4T0030	41	62	65
A2	4T0055	80	122	128
A3	4T0110	150	228	240
A4	4T0185	220	334	352
	4T0220	266	403	426
A5	4T0280	325	492	520
	4T0350	405	615	650
A6	4T0450	511	775	820
	Stable operation at 40 , heavy load			

LCL filter and charge resistance configuration table

Product model AS510	Quantity	4T0030	4T0055	4T0110	4T0185	4T0220	4T0280	4T0355	4T0450
Line side L1(mH)	1	0.32	0.13	0.07	0.048	0.04	0.032	0.026	0.02
Machine side L2(mH)	1	1.28	0.52	0.28	0.192	0.16	0.128	0.105	0.08
Capacitance (uF)	3	50	100	150	250	250	300	300	250×2
Charge resistance	3	60W	60W	200W	200W	200W	300W	400W	500W
		10Ω	10Ω	2Ω	2Ω	2Ω	2Ω	2Ω	2Ω

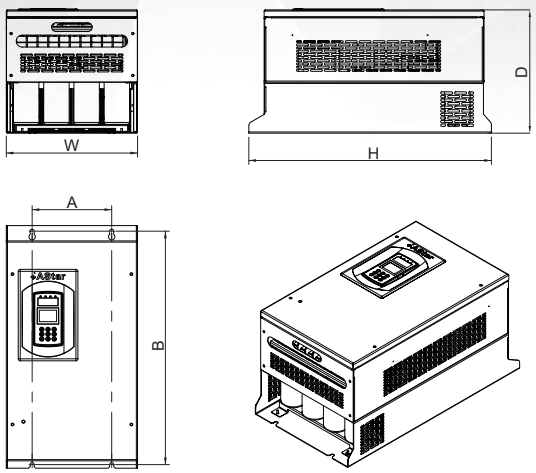
Capacitance and charge resistance model

Product model AS510	4T0030	4T0055	4T0110	4T0185	4T0220	4T0280	4T0355	4T0450
Capacitance model SHA-500-	50	100	150	250	250	300	300	250×2
Charge resistance model RXLG	60W-10R	60W-10R	200W-2R	200W-2R	200W-2R	300W-2R	400W-2R	500W-2R

Technical features

Product model AS510		4T0030	4T0055	4T0110	4T0185	4T0220	4T0280	4T0355	4T0450
Adaptive power (kW)		30	55	110	185	220	280	355	450
Rated capacity (kVA)		38	76	142	209	253	308	358	487
Rated output current (when DC is 660V) A		58	115	215	316	383	467	584	737
Rated input current (AC)A		65	128	240	352	426	520	650	820
Controllable voltage range Vdc		600~740V							
Power input	Input power	380~460V（±15%），Three-phase power							
	Input frequency	45~65Hz							
	Instantaneous power drop	Undervoltage protection when the input voltage is less than AC300V in the three-phase power supply AC380-460V							
Control characteristics	Control mode	Vector control							
	Input power factor	Above 0.95 (under rated current)							
	Harmonic	Less than 4% (under rated current)							
	Overload capacity	150%，1min							
	Carrier frequency	4-6kHz							
Environmental conditions	Usage occasion	Keep out of direct sunlight, dust, corrosive gases, combustible gases, oil mist, water vapor or dropping water							
	Environment temperature	-10~+40℃							
	Altitude	1000m							
	Environment humidity	5~95%，No condensation allowed							
	Vibration	3.5 m/s²，2~9Hz；10 m/s²，9~120Hz；							
	Storage temperature	-40~+70℃							
	Protection grade	IP20 for 4T055 and below, IP00 for 4T110 and above							
Others	Cooling mode	Forced air cooling							
	Certification	CE							

- Inverter size



Inverter size diagram of
A1-A6 specification

- AS510 rectified feedback unit size specification

Specification	Inverter model AS510	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Mounting hole diameter Φ（mm）	Installation		Fastening torque (Nm)	Mass (kg)
								Bolt	Nut		
A1	4T0030	200	512	530	330	290.5	9.0	4M8	4M8	9	29.5
A2	4T0055	200	587	610	330	312.5	9.0	4M8	4M8	9	38
A3	4T0110	320	768	800	430	351	13.0	4M10	4M10	11	81
A4	4T0185	374	844	880	500	353	13.0	4M10	4M10	11	106.5
	4T0220	374	844	880	500	353	13.0	4M10	4M10	11	112.5
A5	4T0280	500	997	1030	630	372.5	14.0	4M12	4M12	18	168
	4T0355	500	997	1030	630	372.5	14.0	4M12	4M12	18	170
A6	4T0450	560	1309	1352	774	392	14.0	4M12	4M12	18	180

■ AS520 inverter drive unit

- Product introduction

AS520 product is an inverter drive unit developed for the common DC bus occasions. With the use of advanced vector control technology and torque control technology, the product has the same excellent control performance with high-end international inverter and, combined with the application characteristics in the hoisting machinery industry, further strengthens the product reliability, environmental adaptation and custom design and can better meet various drive application requirements.

- Technical features
  - Common DC bus supply
  - Automatic voltage regulation to reduce voltage fluctuation
  - A variety of V/F curves
  - Non-stop at instantaneous stop of control bus
  - Perfect, safe and reliable brake logic
  - Fast, preeminent and high adaptive dynamic response
  - Smooth and shockless speed tracking start
  - Support Prol1bus-DP and MODBUS communication
  - Perfect, safe and reliable motor inverter protection function

- Application industries
  - Lifting occasions: quayside container bridge crane, container gantry crane, portal crane and beam crane
  - Elevator occasions: high speed elevator

- Product model

AS520 4T 0055

Model	Description
AS520	Inverter

Code	Voltage class
4	400V

Code	Adaptive motor power
0055	55kW

Code	Voltage phase number
T	Three-phase

Model and technical parameters

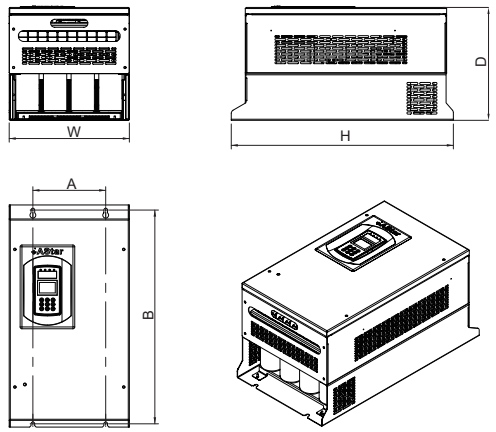
Unit model (AS520 4T)	0030	0037	0045	0055	0075	0090	0110	0132
Maximum power of adaptive motor (kW) (SHD)	22	30	37	45	55	75	90	110
Maximum power of adaptive motor (kW) (HD)	30	37	45	55	75	90	110	132
Rated output current (A) (SHD)	52	65	80	97	128	165	195	236
Rated output current (A) (HD)	60	75	91	112	150	180	216	260
Carrier frequency (kHz	2-8kHz (modified in parameters)							
Unit model (AS5204T)	0160	0185	0200	0220	0250	0280	0315	0355
Maximum power of adaptive motor (kW) (SHD)	132	160	185	200	220	250	280	315
Maximum power of adaptive motor (kW) (HD)	160	185	200	220	250	280	315	355
Rated output current (A) (SHD)	270	330	360	390	430	470	525	585
Rated output current (A) (HD)	300	370	390	426	480	520	600	650
Carrier frequency (kHz	2-5kHz (modified in parameters)							
Supply voltage (V)	DC power supply 460-750VDC							

Technical features

Power input	Input power	DC power supply 460-750VDC		
Power output	Motor output voltage	OVAC - input voltage/1.35, three-phase supply		
	Output frequency	V/F control: 0.00/300.00Hz, vector control: 0.00-120.00Hz		
	Overload level	Heavy load: 150%, 60S; super-heavy load: 150% 60S 200% 2S		
	Efficiency (full load)	≥94%		
	Output frequency accuracy	0.01% (digital command- 10 - +45°C) ; 0. 1% (analog command 25 10 °C)		
Control characteristics	Control mode	V/F control	Open-loop vector control	Closed-loop control
	Starting torque	2.50Hz 150%	0.5Hz 200%	0.00Hz 200%
	Speed adjustable range	1:50	1:200	1:1000
	Steady speed precision	± 2%	± 0.2%	± 0.02%
	Torque precision	5% (Closed-loop control)		
	Carrier frequency	2-8kHz; automatically adjust the carrier frequency according to load characteristics		
	Frequency setting resolution	0.01Hz (digital command), 0.06Hz/120Hz (analog command)		
	Torque compensation	Automatic torque compensation and manual torque compensation		
	V/F curve	User-defined V/F curve, linear V/F curve and 5 reduced torque characteristic curves		
	Automatic voltage regulation	Automatically adjust the duty cycle of PWM signal according to the bus voltage fluctuation		
	Non-stop at instantaneous stop	Achieve continuous operation through bus voltage control in case of instantaneous power failure		
	DC braking capacity	Braking current: 0.0-120.0% rated current		
	Torque control function	Torque/speed control switching through terminals, many torque given modes		
	Zero servo and position control function	Achieve zero speed position lock, accurate positioning and position control		
	Common DC bus	The whole series may achieve power supply of many inverters by common DC bus		

Environmental conditions	Usage occasion	Keep out of direct sunlight, dust, corrosive gases, combustible gases, oil mist, water vapor or dropping water
	Environment temperature	-10～+40℃
	Altitude	Less than 1000m
	Environment humidity	5~95%, no condensation allowed
	Vibration	3.5m/s^2, 2～9Hz; 10m/s^2, 9～120Hz;
	Storage temperature	-40～+70℃
	Protection grade	IP00、IP20
Others	Cooling mode	Forced air cooling

Inverter size



Inverter size diagram of A4-A9 specification

Specification	Inverter drive unit model AS520	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Mounting hole diameter Φ（mm）	Installation			Fastening torque (Nm)	Mass (kg）
								Bolt	Nut	Washer		
A4	4T0030	200	512	530	330	288	9.0	4M8	4M8	4Φ8	9	29.5
	4T0037											
A5	4T0045	200	585	610	330	310	9.0	4M8	4M8	4Φ8	9	38
	4T0055											
A6	4T0075	320	718	750	430	350	13.0	4M12	4M12	4Φ12	29	79.5
A7	4T0090	320	768	800	430	350	13.0	4M12	4M12	4Φ12	29	81
	4T0110											
A8	4T0132	374	844	880	500	352	13.0	4M12	4M12	4Φ12	29	106.5
	4T0160											
	4T0185											
	4T0200	374	844	880	500	352	13.0	4M12	4M12	4Φ12	29	112.5
	4T0220											
A9	4T0250	500	997	1030	630	370	14.0	4M12	4M12	4Φ12	29	141
	4T0280											168
	4T0315											169
	4T0355											170

HVAC Liquid Cooling

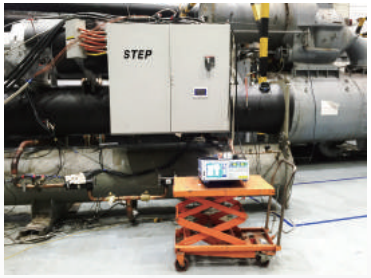
Overview

STEP AS720 liquid-cooled inverter is an integrated product developed for HVAC industry based on STEP mature hardware platform. The inverter adopts the air conditioning refrigerant for cooling with high power density. The HVAC working environment, installation, volume, protection, heat dissipation, efficiency and harmonics requirements are fully considered in the design process to ensure safe and reliable operation of the product.

- Basic characteristics: small volume, high efficiency, high protection level and onboard design
- Voltage range: 380-460VAC
- Power range: 250kW—-1200kW
- Control motor: AC asynchronous motor and permanent magnet synchronous motor
- Control mode: V/F control and open-loop vector control

Application field

Big power centrifugal machine



Water cooled screw machine

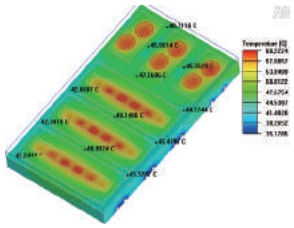
Small power centrifugal machine

Air-cooled screw machine

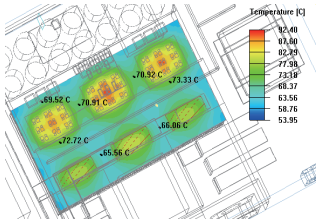
Functional characteristics

- **Refrigerant cooling**

  The compressor refrigerant was used to dissipate the heat of the inverter cold plate and can achieve good heat dissipation effect and improve the module utilization rate. The inverter cold plate takes away 85% heat of the inverter, greatly reduce the inverter cabinet temperature rising and prolong the service life of the electrical components; the end user may not perform heat dissipation treatment for the air-conditioning control room, reducing the project cost and increasing the competitiveness of HVAC products.



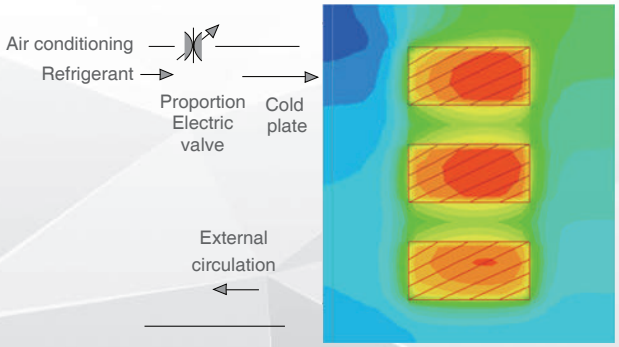
400kW liquid-cooled
490X305.5x18mm (length x width x height)
Maximum temperature of radiator 60°C



400kW air-cooled
680x350x110mm (length x width x height)
Maximum temperature of radiator s92°C

- **Anti-condensation function**

  Perform real-time monitoring of IGBT cold plate temperature and inverter cavity temperature. The inverter controls on-off of the electric proportional valve in the front of the cold plate through advanced algorithm to prevent condensation in the cold plate.



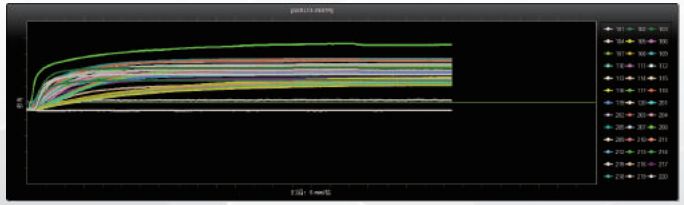
HVAC Liquid Cooling

Onboard installation mode

The elements (refrigerant copper tube connect with the compressor, cabinet height design no more than compressor height and support of a number of in and out line modes) for installation of the inverter products in the compressor bracket in onboard manner shall be fully considered in the structure design process for easy onboard installation and transportation. HVAC manufacturer has completed the inverter wiring and debugging before delivery to effectively reduce the debugging costs for end user.

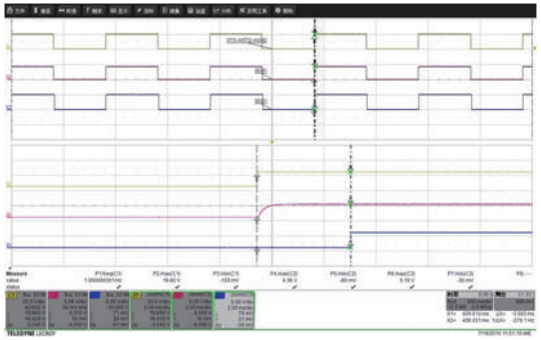
High operating ambient temperature

The inverter can reach the maximum output capacity at the temperature up to 45°C and can still operate by derating capacity at the maximum ambient temperature of 55°C (type test and temperature rise test; conduct the temperature rise test for each heat device to ensure that it can work normally).



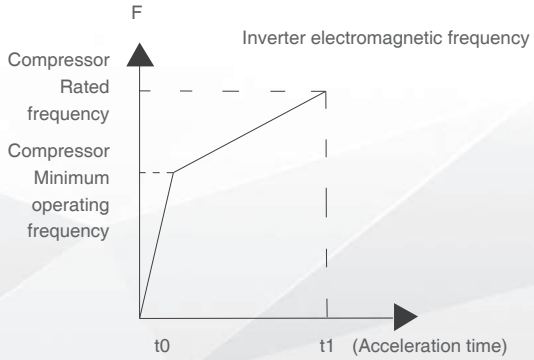
Hardware shutdown function

The hardware shutdown function port can be controlled by the compressor high voltage protection switch or emergency stop switch. The hardware seals PWM wave and turns off the inverter output in emergency (guarantee effective shutdown of software out of control) to prevent the malfunction injury to the human and equipment.



Segmented acceleration function

Design the segmented acceleration function and quickly pass through the minimum operating frequency of the compressor according to the compressor load characteristics to prevent the compressor system faults such as resonance and undervoltage and perform steady acceleration and deceleration in the normal operating frequency range.



High frequency output function

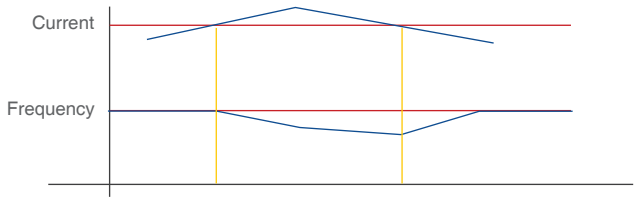
The output frequency range 0-600Hz which can meets the permanent magnet synchronous, direct drive and magnetic compressor drive requirements.

Multiple protection grades for choice

With full consideration to the use conditions of the indoor and outdoor units of HVAC, the inverter cabinet protection grade is optional in IP20, IP22 and IP54.

Current limit and frequency reduction function

Automatically reduce the frequency and limit the current if the running current over the set current to effectively protect the compressor.

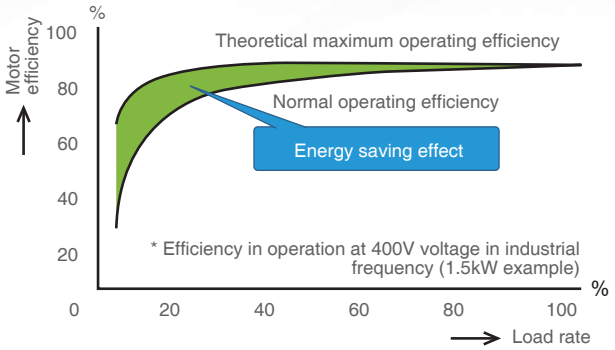


Low current harmonics

The long-term service life of the capacitor was achieved through optimal matching design of the filter capacitor and reactor. THDI of the standard inverter products is less than 35% and the low harmonic inverter scheme (passive filter configured in the front end) meets THDI<5%; the harmonic meets IEEEE519 requirements.

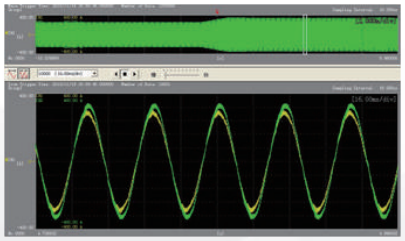
Efficient and energy-saving operation mode

The high-efficiency drive & energy-saving operation mode and new PWM dead zone compensation technology can effectively reduce the motor loss and maximize the power saving rate.

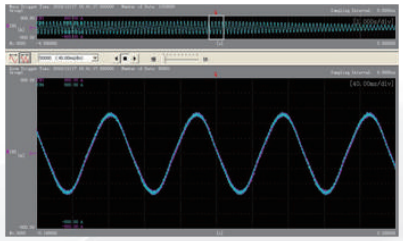


Current-sharing control technology

Strict hardware matching is not required among the units through current-sharing control and it is only required to increase algorithm in control to achieve good current-sharing effect among the units.



Before current-sharing control



After current-sharing control

Technical parameters

Power input	Input voltage	380-460V (-15% ~ +10%), three-phase supply
	Input frequency	45-65Hz
	Allowable voltage fluctuation	Voltage unbalance <3%
	THDI	<35% (full load, standard inverter), <5% (full load, low harmonic inverter)
Power output	Voltage	0VAC - input voltage
	Output frequency	V/F control: 0.00-600.00Hz (depending on the power)
	Overload level	120%, 1 min
Digital input and output	Opto-isolator input	7-channels, 24V active high and low settable and input functions definable
	Open collector output	2-channels, output functions definable
	Relay output	2-channels, normally open contact, contact capacity: inductive, 1.5A/250VAC, output function definable 2-channels, normally open and closed double contact, contact capacity: resistive, 4.5A/250VAC or 4.5A/30VDC; Inductive: 0.4A/250VAC or 0.4A/30VDC; output functions definable
Analog input and output	Analog input	2-channels, precision 0.1%; Voltage: -10V ~ + 10VDC or current: 0-20mA optional signal
	Analog output	2-channels, precision 0.1%; Voltage: -10V ~ + 10VDC or current: 0-20mA optional signal
Communication mode and command channel	Communication mode	Profibus_DP、Modbus
	Running command channel	Operation panel given, control terminal given and communication given
	Frequency given channel	Operation panel given, digital/analog given, communication given and function given
Motor protection	Rotor locked	
	Motor overload	
	Motor over-temperature (PTC)	
	Speed limit	
Inverter protection	Output current limiting	
	inverter overload	
	I^2t protection	
	Input power undervoltage/overvoltage	
	DC bus undervoltage/overvoltage	
	IGBT overheating	
	Radiator overheating	
	Power source fault	
	Analog input signal loss (speed reference value loss)	
	Communication anormal	
	Self-setting fault	
Environmental conditions	Usage occasion	The whole series may be subject to onboard installation and the installation environment shall reach the heat dissipation potential required by the inverter
	Operating ambient temperature	-10°C[no frosting] ~ +45°C
	Temperature derating use	When the temperature is 1°C higher than the operating ambient temperature stipulated for the product, the rated output current is reduced by 2%/1°C (up to 55°C)
	Storage temperature	-40℃ ～ +70℃
	Transport temperature	-40℃ ～ +70℃
	Relative humidity	5~95%RH, no condensation, corrosion or dropping water
	Altitude	1000m
	Height derating use	>1000M; when the height rises by 100m, the rated output current is reduced by 1% (up to 3000m)
	Vibration -proof characteristics	3.5m/s², 2-9Hz; 10m/s², 9-120Hz
	Protection grade	IP22/IP54
Product standards	CE EN61800-3:2004; adjustable speed electrical power drive systems - Part 3	

Technical parameters

AS720 21 0700 T04 XXXX

- XXXX: Customer code
- T04: 400V class
- 0700: Rated current (A)
- 21: Type:
  21: two-quadrant inverter cabinet
  22: four-quadrant inverter cabinet
- AS720: Product line:
  700: air-cooled
  710: water-cooled
  720: liquid-cooled

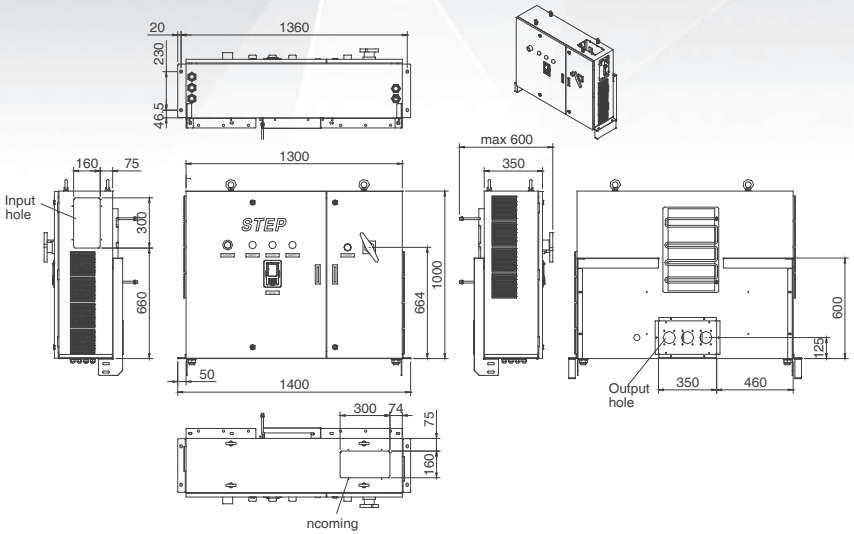
Inverter cabinet specification

T04:380-460V stable operation at 45°C						
No.	Inverter cabinet name	Rated power (kW)	Rated current (A)	Cabinet size W x H x D (mm)		Incoming and outgoing line mode
				IP21 / IP22	IP54	
1	AS720 21 0468 T04	250	468	1300×1000×350	1300×1000×350	Input line: bottom back Output: bottom
2	AS720 21 0520 T04	280	520			
3	AS720 21 0600 T04	315	600			
4	AS720 21 0650 T04	355	650			
5	AS720 21 0740 T04	400	760			
6	AS720 21 0850 T04	450	850			
7	AS720 21 0960 T04	500	960	1800×1500×670	1800×1700×670	Input line: top left and side left Output line: right
8	AS720 21 1176 T04	630	1176			
9	AS720 21 1372 T04	710	1372			
10	AS720 21 1519 T04	800	1519			
11	AS720 21 1746 T04	900	1746	3000×1500×670	3000×1700×670	
12	AS720 21 1886 T04	1000	1886			
13	AS720 21 2037 T04	1200	2037			

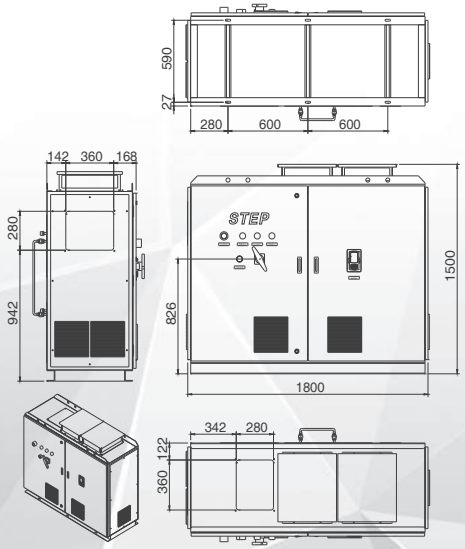
Passive filter cabinet configuration

No.	Inverter cabinet name	Filter model	Filter quantity	Filter cabinet size (mm)
1	AS720 21 0468 T04	FN3410-470-99-O	1	1500×1000×500
2	AS720 21 0520 T04	FN3410-470-99-O	1	
3	AS720 21 0580 T04	FN3410-580-99-O	1	
4	AS720 21 0650 T04	FN3410-580-99-O	1	
5	AS720 21 0740 T04	FN3410-650-99-O	1	
6	AS720 21 0820 T04	FN3410-380-99-O	2	2000×1300×500
7	AS720 21 0880 T04	FN3410-470-99-O	2	
8	AS720 21 1176 T04	FN3410-580-99-O	2	
9	AS720 21 1372 T04	FN3410-650-99-O	2	

Boundary dimensions



250kW-450kW boundary dimensions



500kW-710kW boundary dimensions

Cabinet layout

- 250kW-450kW inverter layout

① Input copper bar

Upper input and side input line two modes.

② Main power switch (circuit breaker)

Standard configuration of the inverter cabinet for easy installation and maintenance

③ Input AC reactor

External AC reactor effectively reduces the harmonic interference of the power supply, meets the international standard 61000 and effectively improves the grid adaptability. In case of network voltage change, the inverter can automatically keep constant output voltage. In case of sudden power loss of the grind, the inverter is kept on without shutdown.

④ Control panel

The local control panel may be pulled or plugged in operation and the setup parameters can be copied from one inverter to another through the control panel; the given command and user can set password.

⑤ Electrolytic capacitor

Select 105°C electrolytic capacitor to guarantee the product life and select the product with the withstand voltage 450V to guarantee reliable product operation under the grid voltage fluctuation.

⑥ Output copper bar

Back output and lower output line two modes.

⑦ Transformer

Provide power for control system. The system control power supply is isolated from the network source to ensure stable system control.

⑧ Customer wiring terminal

The inverter connecting terminal is led to the customer's port for easy wiring.

⑨ Control line input and output holes

Select the product with IP54 protection grade to guarantee the inverter protection grade IP54.

⑩ Indicator light and emergency stop button

Indicator lights include power light, running indicator light and fault indicator light.

HVAC Liquid Cooling

- 500kW-800kW inverter layout

① Input copper bar
Upper input and side input line two modes.

② Main power switch (circuit breaker)
Standard configuration of the inverter cabinet for easy installation and maintenance

③ Input AC reactor
External AC reactor effectively reduces the harmonic interference of the power supply, meets the international standard 61000 and effectively improves the grid adaptability. In case of power voltage change, the inverter can automatically keep constant output voltage. In case of sudden power loss of the grind, the inverter is kept on without shutdown.

④ Control box
Send PWM wave to the inverter unit through optical fiber.

⑤ Transformer
Provide power for control system. The system control power supply is isolated from the network power source to ensure stable system control.

⑥ Rectifier unit
Adopt the rectifier and inverter unit split design for easy installation and maintenance.

⑦ Inverter unit
Invert DC to the three-phase AC with controllable frequency

⑧ DC fuse
Protect the effectively fusing of rectifier and inverter units

⑨ Output copper bar
Support a number of output line modes.

Light Commercial VRF

Overview

AS570 dicated inverter for light commercial VRF drives the DC inverter compressor by space vector pulse width modulation (SVPWM). The inverter is suitable for VRF with its modularity. The whole set of product consists of drive board, capacitor boardplate, EMC filter board and DC reactor.

- Basic features: space saving, flexible, high cost effectivenes and excellent heat dissipation
- Voltage class: 400V
- Power range: 11kW—30kW
- Control mode: sensorless SVPWM sine wave control

Drive board

Capacitor board

EMC filter board

DC reactor

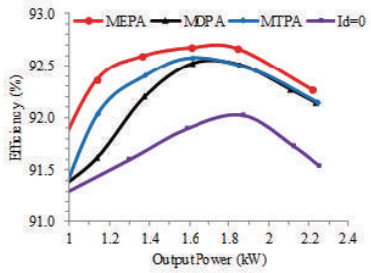
Application field

● Applicable compressor

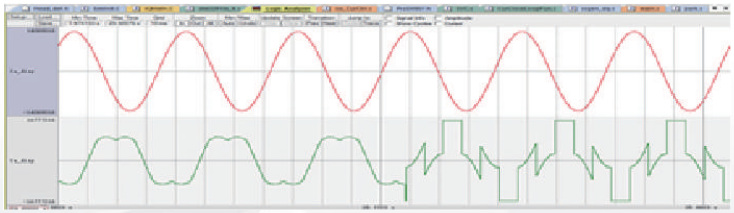
No.	Compressor model	Category	Brand
1	C-SDP330H02B	Three-phase	Panasonic
2	C-SDP205H01B	Three-phase	Panasonic
3	JPW066AC-4X9	Three-phase	Copeland
4	JPW053AC-4X9	Three-phase	Copeland
5	LNB65FTEMC	Three-phase	Mitsubishi
6	LNB53FTAMC	Three-phase	Mitsubishi
7	E655DHD-65D2G	Three-phase	Hitachi

■ Functional characteristics

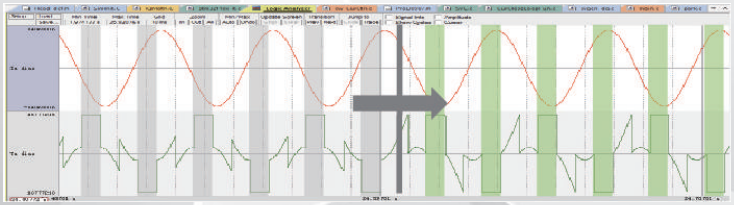
● Efficient and energy-saving operation mode



2) New PWM modulation mode - control with minimum switching loss to reduce the inverter switching loss.



SVPWM → DPWM, reduced by 1/3 on-off action



DPWM → MSLPWM, the on-off action is not conducted in case of high current

3) New motor control method - using sensorless vector control algorithm for the synchronous reluctance motor to improve the motor efficiency. The efficiency is tested as follows:

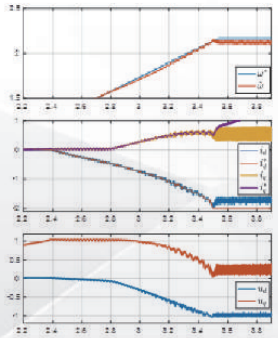
IE4 (>93.8%)	IE3 (>92.6%)	IE2 (>91.2%)	IE1 (>89.3%)

Motor Efficiency (Motoring)							
Freq(Hz) \ Load	20%	40%	50%	60%	80%	100%	120%
0.5	36.77%	38.80%	34.36%	33.46%	30.14%	26.21%	24.71%
5	83.56%	83.57%	82.83%	80.91%	79.70%	76.92%	73.90%
10	89.17%	89.32%	90.00%	88.44%	86.88%	85.37%	83.52%
15	90.39%	91.30%	92.37%	92.31%	90.67%	89.48%	88.57%
20	92.27%	93.75%	94.08%	92.15%	92.45%	91.78%	89.25%
25	92.02%	92.85%	94.44%	92.97%	92.66%	91.87%	89.51%

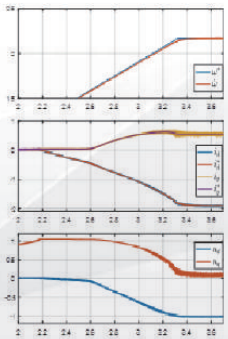
Motor Efficiency (Motoring)						
Freq(Hz) \ Load	20%	40%	60%	80%	100%	120%
0.5	−52.33%	−64.90%	−87.04%	−118.22%	−151.39%	−189.82%
5	80.42%	81.60%	79.86%	76.40%	73.97%	69.39%
10	86.58%	89.42%	89.50%	88.64%	86.91%	84.93%
15	90.01%	92.92%	92.73%	92.31%	91.50%	90.47%
20	92.32%	94.72%	94.14%	94.58%	94.07%	92.95%
25	89.61%	93.70%	94.27%	94.51%	94.11%	93.48%

● Ultra high speed operation mode is supported

The new flux weakening control strategy is used to drive the compressor to reach a higher speed. The current in the flux weakened area has no shock and the dynamic response is fast. Operation conditions of the motor under 2.17 times frequency and 0.83 times load.



Traditional flux weakening control mode



New flux weakening control mode

High reliability design

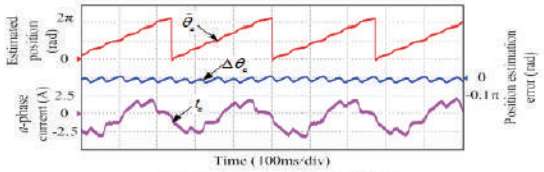
1) Automatic frequency reduction function - with the functions such as frequency reduction with limited current, frequency reduction with limited power and frequency reduction for overheating, the product can achieve automatic frequency reduction to guarantee reliable and stable operation of the compressor.

2) Super high temperature test - conduct temperature rise test at 42°C environment temperature to verify the hardware reliability.

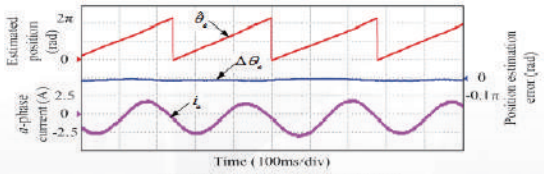
3) Fault protection - perfect fault protection system to minimize the inverter and compressor damage.

Ultralow noise operation design

Automatically identify the dead zone size and make compensation control by advanced software algorithm and reduce sixth harmonic components to reduce the noise.

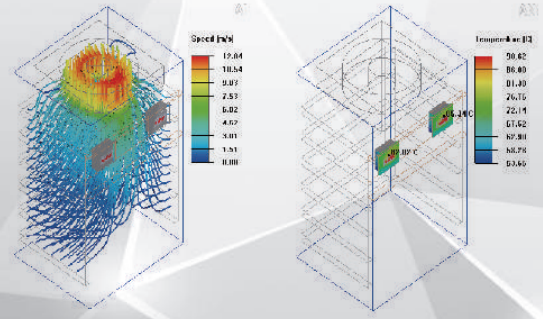


Waveform of Angle Error & Phase Current before dead zone compensation



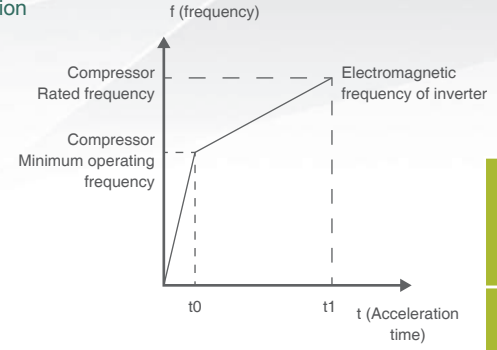
Waveform of Angle Error & Phase Current before dead zone compensation

Reliable thermal design



Compressor segmented acceleration function

Segmented acceleration function is designed according to the compressor load characteristics to quickly pass through the minimum operating frequency of the compressor and prevent the compressor system faults such as resonance and undervoltage, and perform steady acceleration and deceleration in the normal operating frequency range.



Technical parameters

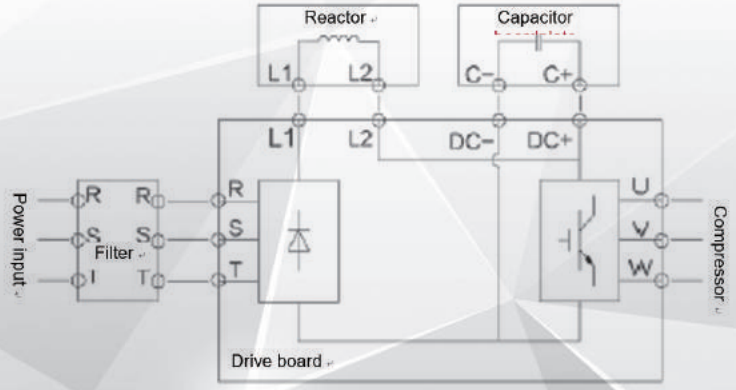
Power input	Input voltage	Three-phase 400V: 320-460V (±10%)
	Input frequency	45-65HZ
	Allowable voltage fluctuation	Voltage imbalance <3%
Power output	Voltage range	0VAC~ input voltage
	Output frequency	Vector control: 0.00～460.00Hz
	Carrier frequency	4-8k adjustable, default 4k
	Efficiency (full load)	≥ 0.97
Control characteristics	Control mode	The sensorless SVPWM sine wave control effectively reduces the higher harmonic components, motor vibration, torque ripple and noise
	Control strategy	Speed loop + current loop double closed-loop motor control model;the speed loop (external loop) ensures stable output frequency and the current loop (internal loop) ensures torque accuracy
	Enabling torque	Enable zero-speed rated torque
	Enable differential pressure	10P410A system passes 20bar differential pressure enabling
Characteristic functions	Manual operator connection	The manual operator connection port is reserved and meets the usage functions of LCD manual operator
	The drive board has nixie tube	4-digit red seven-segment nixie tube displays the running status and fault information
	Communication interface	RS485interface as standard; the protocol is changed according to the user requirements
	Fan control interface	N/A; the fan and power supply are provided externally for heat dissipation
	I/O port	The reserved IO port can extend various IO boards; the expansion card is attached with instructions
	Process PID	Used for closed-loop control
	Module frequency reduction for overheating	When the radiator temperature is higher than the set temperature threshold, the inverter frequency is reduced automatically
	Frequency limit for input undervoltage	The output frequency may be limited automatically according to the bus voltage in case of low input
	Frequency reduction for overcurrent	The frequency may be reduced automatically when the set current is reached according to the compressor characteristics
	Flux weakening control	The limited voltage input improves the compressor operating frequency range
Protection functions	Compressor overload	
	Compressor overcurrent	
	Inverter overload	
	Inverter overcurrent	
	Radiator overheated	

Protection functions	Output phase-missing	
	Input phase-missing	
	Input undervoltage/overvoltage	
	Communication protection	
Environmental conditions	Usage occasion	VRF electric control cabinet application installation
	Ambient temperature	-25 ~+70°C
	Temperature derating use	Derating use at high temperature due to the impact of the ambient temperature and heat dissipation
	Storage temperature	-40 ~+85°C
	Environment humidity	5~95%, no condensation allowed
	Vibration (transportation)	2≤f<9Hz, 3.5mm; 9≤f<200Hz, 10m/s²; 200≤f<500Hz, 15m/s²
	Vibration (installation)	2≤f<9Hz, 0.3mm; 9≤f<200Hz, 1m/s²
Other	Protection grade	IP00
	Installation mode	The drive board and radiator are embedded; other circuit boards are tiled in the cabinet
	Cooling mode	The capacitor board, filter board and reactor are self-cooled in the cabinet; the drive board radiator is embedded in the air conditioning heat exchanger for heat dissipation
	Certification	Inverter standard for civil use, supporting certain certification requested by the customer

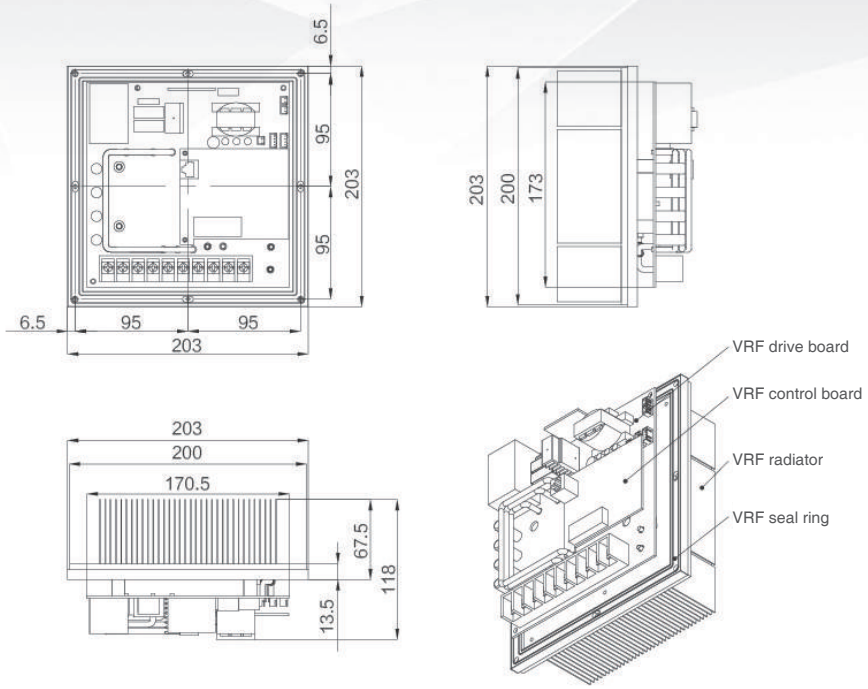
Product specification

Product specification	Rated power (kW)	Rated current (A)
AS570 4T 0011	11	17
AS570 4T 0015	15	27
AS570 4T18P5	18.5	37.5
AS570 4T 0022	22	44
AS570 4T 0030	30	61

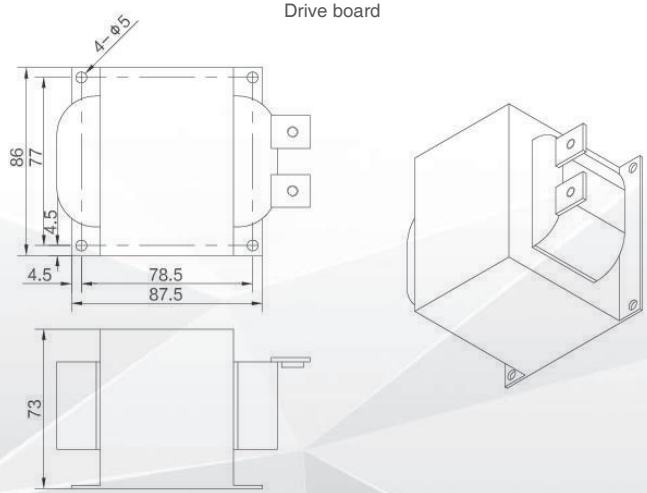
Wiring example



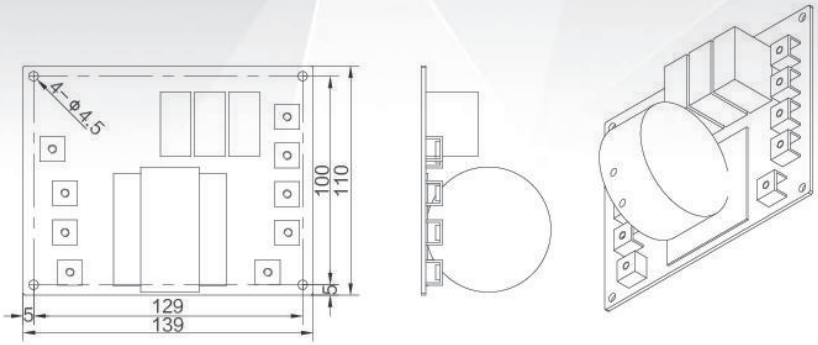
Dimensions



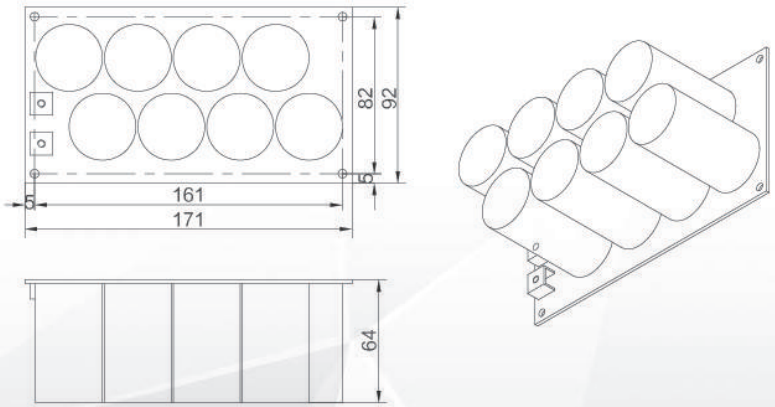
Drive board



Reactor



Filter board



Capacitor board

Mobile air conditioning and refrigeration solution

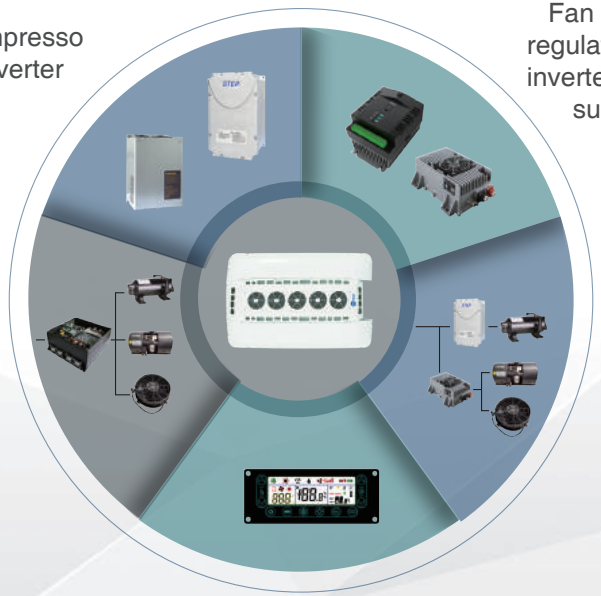
- New energy bus air conditioning

New energy adopts battery power supply to replace the traditional engine, so a new solution is required for the air conditioning system.

AS560 inverter

Vehicle DC

- Product solution



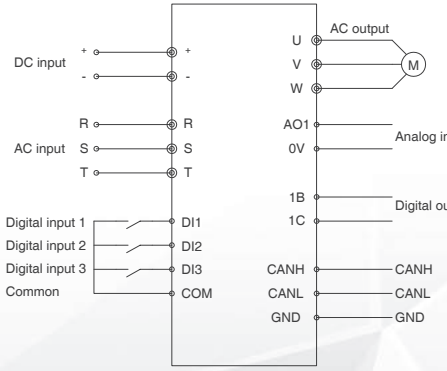
Refrigerator car

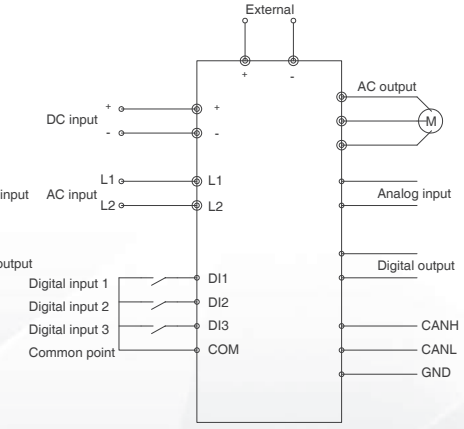
The electrification trend of the refrigerator car brings the electrification of the refrigeration unit

Cold chain transport vehicle

AS610 inverter

External capacitor





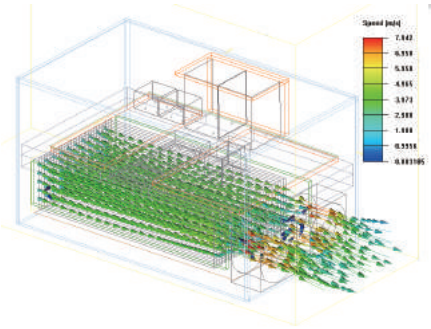
- Specification A: support DC and AC input, voltage range 250- 800 VDC after converted to DC, rated output current 8.5A
- Specification B: support DC and AC input, voltage range 200- 450 VDC after converted to DC, rated output current 8.5A
- With rectification function,can supply power for DC/DC in standby battery application.
- With extremely small volume, suitable for cars

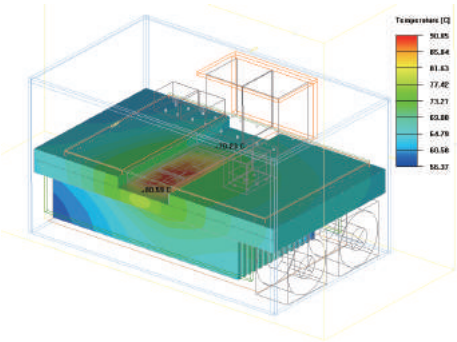
Vehicle air conditioning inverter characteristics

High reliability design

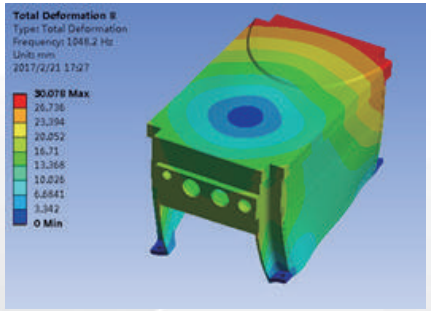
- Automatic frequency reduction function
  With the functions such as frequency reduction with limited current, frequency reduction with limited power and frequency reduction for overheating, the product can achieve automatic frequency reduction to guarantee reliable and stable operation of the compressor.
- Super high temperature test
  Conduct the temperature rise test at 55℃ environment temperature to verify the hardware reliability.
- Fault protection
  Perfect fault protection system to minimize the damage of inverter and compressor.

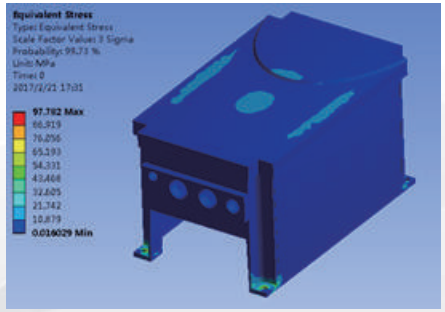
Reliable thermal design





High anti-vibration performance



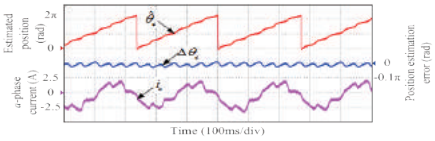


High protection level

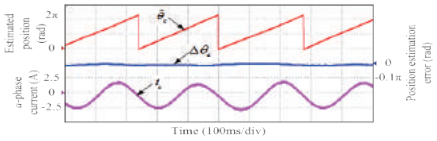
The product is designed and developed as IP67 high protection level to meet various working environment requirements in allweather

Ultralow noise operation

Automatically identify the dead zone size and make compensation control by advanced software algorithm and reduce sixth harmonic components to reduce the noise.



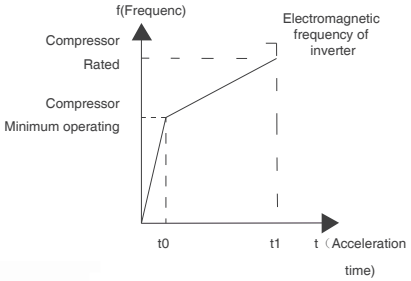
Angle error and phase current waveform before dead zone compensation



Angle error and phase current waveform after dead zone compensation

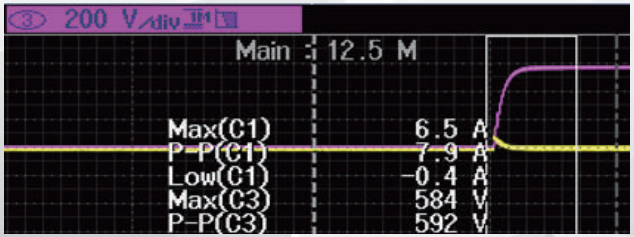
Compressor segmented acceleration function

Design the segmented acceleration function and quickly pass through the minimum operating frequency of the compressor according to the compressor load characteristics to prevent the compressor system faults such as resonance and undervoltage and perform steady acceleration and deceleration in the normal operating frequency range.



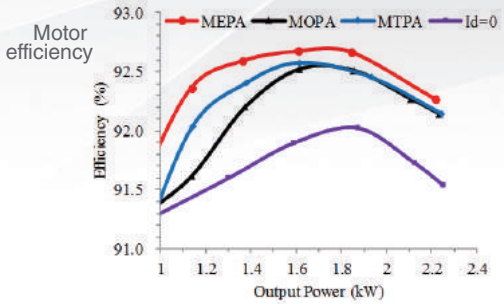
Anti-reverse connection circuit design with DC input

Advanced control logic to suppress current shock and prevent fuse from burning

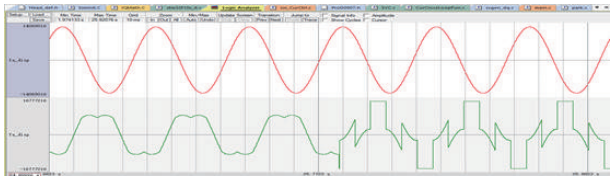


Efficient and energy-saving operation mode

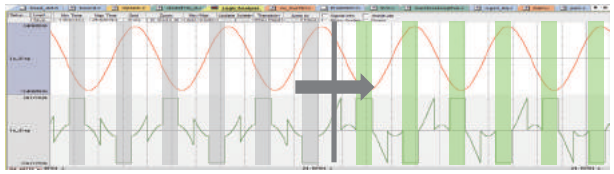
- Current control strategy Adopt advanced current control strategy for the permanent magnet synchronous motor to obtain the highest efficiency



- New PWM modulation mode
  Adopt the least switching loss control to reduce the inverter switching loss.



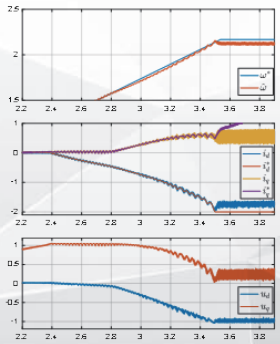
SVPWM → DPWM，Reduced by 1/3 switching action



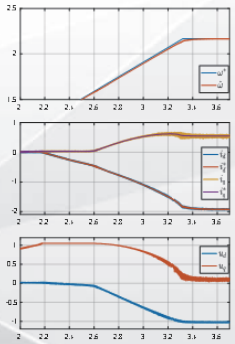
DPWM → MSLPWM，The on-off action is not conducted when it comes to the large current.

Flux weakening control strategy

The new flux weakening control strategy is used to drive the compressor to reach the higher speed at low voltage input. The current in the flux weakened area has no shock and the dynamic response is fast. The operation conditions of the motor are under 2.17 times frequency and 0.83 times load , as shown in the figure



Traditional flux weakening control mode



New flux weakening control mode

AS560 inverter

AS560 inverter, as a product customized for the on-board air conditioning application, may match AC inverter compressor and DC inverter compressor. The inverter is designed on basis of deep understanding of the industry characteristics to reduce some unnecessary functions, improve the product compactness, reduce the volume and greatly strengthen the product reliability, life and environmental adaptability. The series products may be optionally equipped with the built-in EMC filter and IP67 housing according to different customer requirements.

Total weight
（T）

Model description

AS560 4T 0015 IP67 E

Mark	Description
AS560 4T	For vehicle air conditioner

Mark	Inverter power
0011	11kW
0015	15kW

Mark	Protection grade
NA	IP20
IP67	IP67

Mark	Description
E	Built-in EMC circuit
NA	No EMC circuit

Product specifications

No.	Model AS560-4T	Ratedpower(kW)	Rated current(A)	Peak current(A)
1	0011	11	25	37.5
2	0015	15	32	48

Product technical specifications

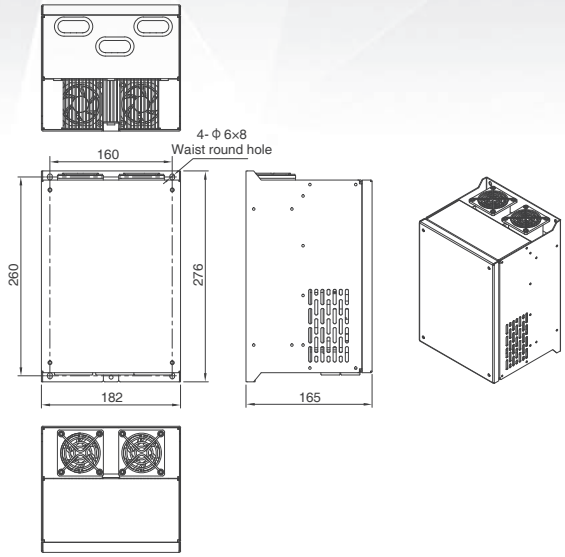
Power input	Input voltage range	300-800V	
	Positive and negative reverse connection protection	In case of positive and negative reverse connection, the inverter does not work but will not be damaged	
Power output	Output voltage	Three-phase AC output, highest 460V	
	Output frequency	0-300Hz	
	Rated efficiency	＞97.5%	
Control characteristics	Control mode	High-performance V/F	Open-loop vector
	Starting torque	0.5Hz，150%	0.25Hz，150%
	Steady speed precision	±0.5%	±0.2%
	Automatic voltage regulation	Automatically adjust PWM duty cycle when input voltage fluctuation to keep the output voltage constant	
IO port	Digital input	6-channel, 24V high and low level are settable and input functions are definable	
	Open collector output	1-channel, output functions are definable	
	Relay output	1-channel, with normally open and normally closed function, output functions are definable	
	Analog input	1-channel, support 0- 10V or 4- 20mA	
	Communication	Optional CAN or Modbus function IO board	
Motor protection	Compressor locked-rotor		
	Compressor overload		
inverter protection	Output current limit		
	inverter overload		
	I^2tprotection		
	Input undervoltage/overvoltage		
	Heatsink overheat		
Environment requirements	Usage occasion	New energy bus air conditioner	
	Installation mode	Horizontal installation	
	Operating temperature	-20℃～75℃，≤50℃without derating	
	Storage temperature	-30℃～75℃	
	Vibration standard	Refer to 3.12 of QC/T 413- 2002-- product vibration resistance requirements	
	Humidity	5～95%，no condensation allowed	
	Altitude	3000m, derating use above 1000m and rated output current reduced by 1% for every rise of 100m	
Others	Cooling mode	Forced air cooling	
	Protection grade	IP67，IP20	
	Certification	CE	

■ AS610 inverter

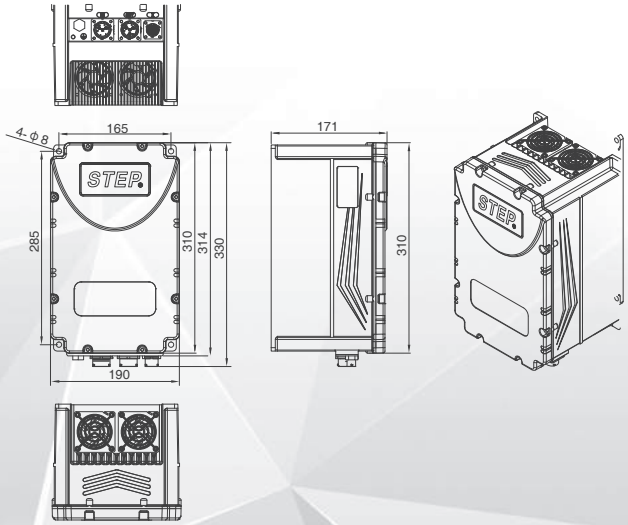
AS610 inverter, as the air conditioning low-power inverter specially developed for low-power compressors and fans, has the greatest advantage of small volume and high performance and can be used to drive the asynchronous motor and synchronous motor.

● Product size

AS560 4T0011(15)



AS560 4T0011(15) IP67 E



● Product specifications

Stable operation 40℃			
Model	Power capacity (kVA)	Rated current (A)	Adaptive motor (kW)
AS610-4T0P75	1.5	2.3	0.75
AS610-4T01P5	3.0	4.1	1.5
AS610-4T02P2	4.0	5.5	2.2
AS610-4T03P7	7.2	8.5	3.7

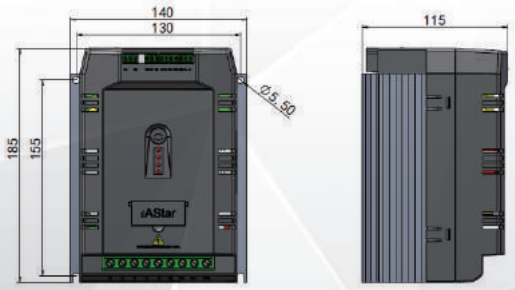
Input power	Input voltage range	AC: 380-460V;-15% - +10%, three-phase supply	
	Input frequency	50/60Hz	
	Current harmonics	Current harmonics <40%(full load) (for reference)	
	Voltage unbalance	(The voltage unbalance is less than 2% in 95% time period and less than 4% in 5% time period) and the overall voltage unbalance is less than 3%	
Basic characteristics	Output voltage	OVAC-input voltage	
	Starting torque	V/F control 2.5Hz/150%	Open-loop control 0.5Hz/200%
	Speed adjustable range	1:50	1:200
	Steady speed precision	± 2%	± 0.2%
	Overload capacity	150% rated current for 1min, 300S cycle. (Test mode) stable operation at40℃	
	Rated efficiency	≥0.93	
	Carrier frequency	2~10kHz	
	Automatic voltage regulation	Automatically adjust the duty cycle of PWM signal according to the busbar voltage fluctuation, so as to reduce the impact of the network voltage fluctuation on the output voltage fluctuation	

General specifications

Motor protection	Locked rotor	
	Motor overload	
	Speed limit	
	Torque limit	
inverter protection	Output current limit	
	inverter overload	
	IGBT overheating	
	Input power undervoltage/overvoltage	
	DC busbar undervoltage/overvoltage	
	Detailed attachment list	
Options	LCD handheld teach pendant, Bluetooth and wireless module	
Working environment	Usage occasion	Keep out of direct sunlight, dust, corrosive gases, combustible gases, oil mist, water vapor, dropping water or salt
	Installation mode	Wall mounting
	Installation site	Roll backplate, moving with trolley
	Cooling mode	Natural cooling and air cooling
	Environment temperature	-10-+50'C (derating use at the environment temperature 40- 50'C)
	Temperature derating use	>40'C; when the temperature rises by 1'C, the rated output current is reduced by 2%, up to 50'C
	Protection grade	IP20
Environment requirements	Vibration standard	9.8m/s² at 5~150Hz
	Storage temperature	－ 20℃～＋ 70℃
	Humidity	Less than 95%RH, without water condensation
	Altitude	<1000m
	Height derating use	<1000m; when the height rises by 100m, the rated output current is reduced by 1% (up to 3000m)

Product size

AS610 inverter, as the air conditioning low-power inverter specially developed for low-power compressors and fans, has the greatest advantage of small volume and high performance and can be used to drive the asynchronous motor and synchronous motor.



No.	Power (kW)	Dimensions H x W x D(mm)	Mounting hole size (mm)	Installation mode
1	0.75	150×140×120	5	Wall mounting
2	1.5		5	
3	2.2	185×140×115	5	
4	3.7		5	

Vehicle DC power supply

This product is the isolated switching power supply designed and produced for the electric bus industry fan drive and adopts the advanced digital and analog hybrid control technology. The input and output are fully electrically isolated, safe and reliable. The product is characterized by wide input voltage range, high output power, convenient installation, high conversion efficiency, stable output voltage, complete protection functions, high reliability and long service life.

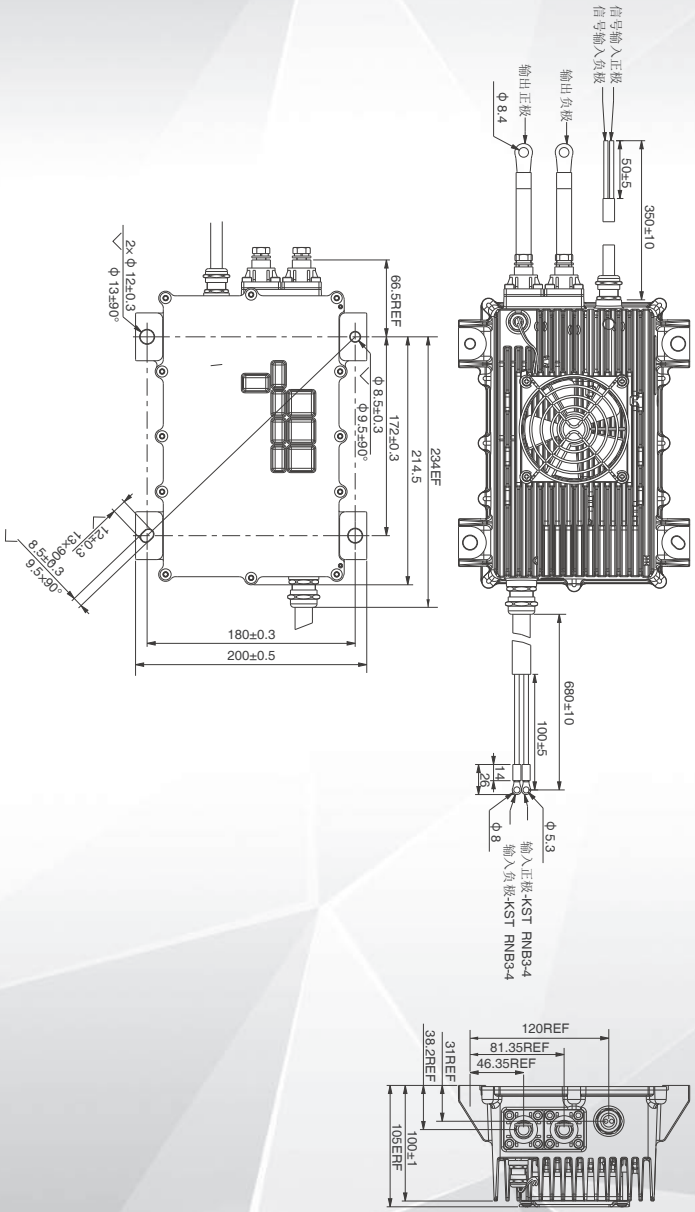
Power supply specifications

Rated power (kW)	Rated output current (A)	Rated output voltage (VDC)
3	110	27.5
2	75	27.5

Main technical parameters

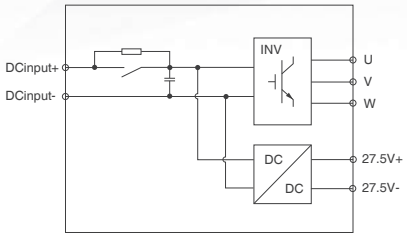
Input characteristics	Input voltage	200-750V	
	Efficiency	≥97%	
	Maximum input voltage	11A	
	Static loss current	1mA	
Input protection	Input overvoltage	760 ±5VDC, the module output is off in case of input overvoltage and recovers automatically at the recovery point	
	Output overvoltage	190 ±5VDC, the module output is off in case of input undervoltage and recovers automatically at the recovery point	
Output characteristics	Rated output voltage	27.5V	
	Rated output current	3kW，110A	2kW，75A
Output protection	Output overcurrent protection	Constant voltage and limited current, output voltage recovery after limited current status exit	
	Output overvoltage protection	>31V DC ±1 V output off, recovered automatically when in normal conditions	
	Over-temperature protection	Over-temperature protection, recover automatically when the temperature falls to the safe temperature	
	Short-circuit protection	Shutdown protection, recover automatically until failure solution	
Environment requirements	Operating temperature	-40℃~55℃	
	Operating humidity	5%-90%, non-condensing	
	Storage place	Place with controlled temperature and humidity	
	Storage temperature	-40℃~85℃	
	Storage humidity	10%～90%	
Insulation voltage	Input－output	2500VDC, 60s, ≤10mA, without breakdown or flashover	
	Input－housing	2500VDC, 60s, ≤10mA without breakdown or flashover	
Insulation resistance	Input－output	500VDC, ≥20MΩ/min (standard pressure and environment humidity)	
	Input - housing	500VDC, ≥20MΩ/min (standard pressure and environment humidity)	
Protection grade		IP67 (except fan, IP65 including fan)	
Noise		＜55dB	

- DC power size



Two-in-one product

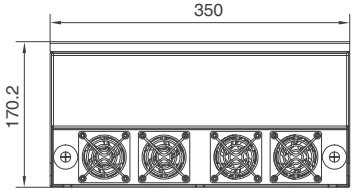
Two-in-one is integration and development of two platforms of AS560 inverter and DC power supply. It is characterized by high integration, compact volume and easy use

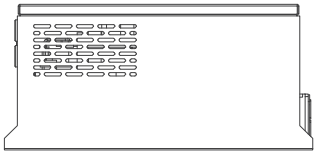


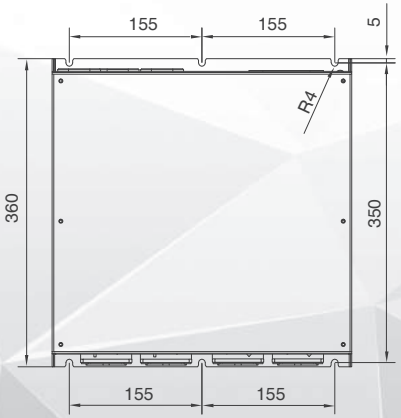
- Product technical specifications

Specification	I0011/D0002	I0015/D0003
Rated power of inverter(kW)	11	15
Rated current of inverter(A)	25	32
peak current of inverter(A)	37.5	48
DC rated power(kW)	2	3
DC rated current(A)	75	110

- Product size



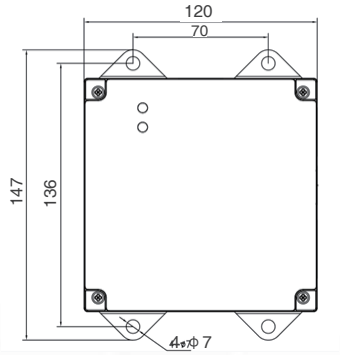




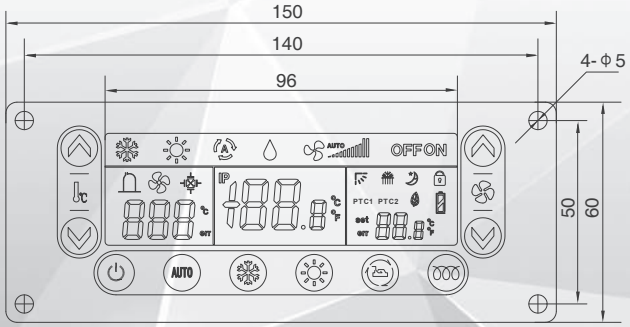
Vehicle air conditioner controller

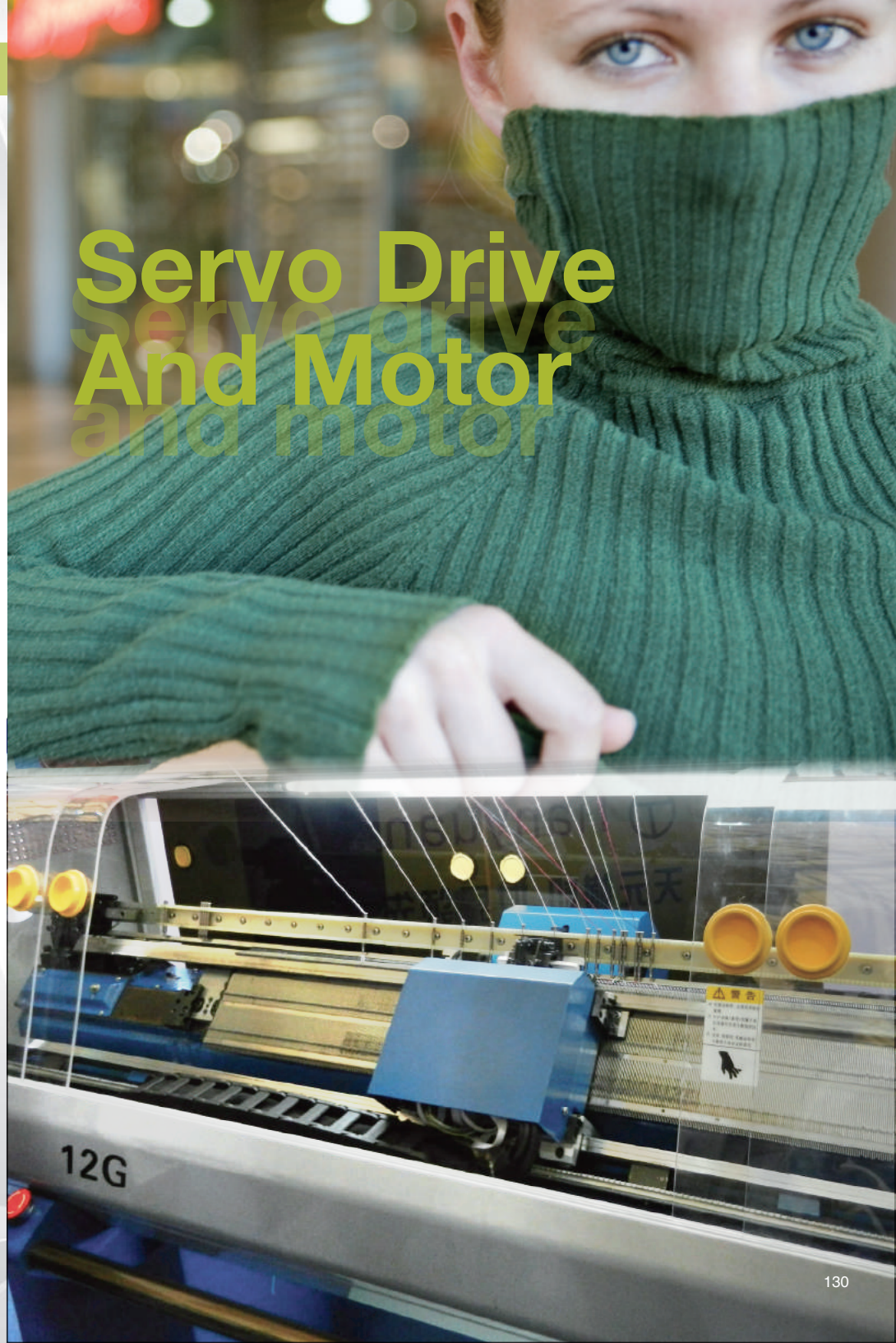
- The new energy vehicle air conditioner controllers characterized by reliable quality, complete functions and exquisite appearance. The system functions include refrigeration, heating, defrosting, internal and external wind circulation, wind speed (automatic/manual) regulation, failurewarning, voltage monitoring, corresponding indicator light and Nixie tube display interface.
- 8-Level wind speed, adjustable compressor speed, PTC auxiliary heating, air conditioning protection, forced defrosting and other protection functions.

- Control box size



- Panel size





High performance servo drive

- **Faster response**
  Advanced control algorithm greatly improves system response. The current loop frequency response is at 2.5kHz and the speed loop frequency response is at 1.6kHz.
- **Higher precision**
  It supports many brands of encoders with a maximum precision up to 23bit, and the high resolution encoder meets the requirement of high precision positioning control and smooth operation. The E series is equipped with dual encoder interface to support full closed loop.
- **Smaller size**
  With a minimum thickness of only 42mm, the product is lighter and saves installation space.
- **Richer functionality**
  Real-time automatic gain control and adaptive filter greatly improve the use convenience, and the end jitter suppression, vibration suppression, inertia identification, instruction smooth, friction compensation, cogging torque compensation, self-tuning functions can greatly ease debugging together with various vibration damping filters as well as software analysis and monitoring functions.
- **Standard industrial Ethernet**

CANopen MECHATROLINK ETHERNET POWERLINK EtherCAT

- **Safer**
  It is consistent with international safety standards of STO/SBC/SS1/SS2, reliable and stable.
- **Complete product line**
  Servo driver power range: 50W ~ 7.5kW. Drivers fall into pulse type, analog voltage-type, and CANopen communication command type, MECHATROLINK-II communication command type, EtherCAT communication command type, and POWERLINK communication command type. Motor supports a variety of encoders, magnetic arrangers, rotary transformers, incremental dart/non-dart lines (2500 lines, 5000 lines), absolute value (17bit, 20bit, 23bit), rich models and motors of many specifications, easy to build the system the customer needs.

High-order pulse K5 series servo drive

- **Technical indexes**

① Power range: 50W ~ 3kW.

② Input voltage: single or three-phase 220VAC (-15~+10%), 50~60HZ control mode: position control.

③Encoder type: 2500-line incremental photoelectric encoder (dart/non-dart line), 17bit/20bit/23bit absolute value encoder.

④Communication mode: RS232, RS485

⑤ I/O counts: IO is programmable and supports positive and negative logic settings and functional relocation; line 10 is for input and line 6 for output.

⑥ Monitoring function: provide 16 monitoring states such as position, speed, current, voltage, input and output, etc.

- **Product advantages**

① The advanced motor control algorithm is used to achieve a faster system response. The current loop frequency response is at 2.5khz, the speed loop frequency response is at 1.6khz, and the communication rate is 100Mbps.

② Adaptive filter, under the actual act conditions, infers resonance frequency according to the vibration in the motor speed component and automatically set the coefficient of the notching filter where the resonance components are removed, to reduce the vibration of the resonance point.

③ Real-time automatic gain adjustment is made to deduct the load characteristics of the machine and the result is then used to set the basic gain value and the friction compensation value of the corresponding rigidity.

④ End jitter suppression function is applied to calculate and compensate vibration frequency, to suppress low-frequency jitter.

⑤ It supports PC software of the upper machine for parameter settings (upload, download, reset, import and export), waveform monitor (it supports automatic save of waves during the period before and after failure, if any, and can support historical waveform data call, playback, management analysis, linear transformation, FFT analysis);and it supports servo position, speed and torque control, start and stop, positive - reverse control, status monitoring, fault diagnosis and other operations.

⑥ With security functions corresponding to international standards of STO/SS1/SS2/SBC, safe and reliable.

High order bus E series servo drive

Technical indexes

① Power range: 50W ~ 3kW.

② Input voltage: single or three-phase 220VAC (-15~+10%), 50~60HZ

③ Control modes: position control, speed control, torque control and bus control.

④ Encoder type: 2500-line incremental photoelectric encoder (dart/non-dart line), 17bit/20bit/23bit absolute value encoder.

⑤ Communication mode: EtherCAT.

⑥ I/O counts: IO is programmable and supports positive and negative logic settings and functional relocation; line 5 input supports 16 functional configurations, and line 3 output supports 12 functional configurations.

⑦ Monitoring function: provide 16 monitoring states such as position, speed, current, voltage, input and output, etc.

Product advantages

① The current loop frequency response is at 2.5kHz and the speed loop frequency response is at 1.6kHz. The communication rate is 100Mbps.

② End jitter suppression, friction compensation function and cogging torque compensation functions are arranged with the self tuning function and matched with various vibration damping filters.

③ It supports PC software of the upper machine for parameter settings (upload, download, reset, import and export), waveform monitor (it supports automatic save of waves during the period before and after failure, if any, and can support historical waveform data call, playback, management analysis, linear transformation, FFT analysis);and it supports servo position, speed and torque control, start and stop, positive - reverse control, status monitoring, fault diagnosis and other operations.

④ It is equipped with a hand-held operation panel for setting parameters and monitoring the state of servo and motor, allowing the system debugging to be more convenient.

⑤ It supports the standard industrial Ethernet and achieves synchronous control of many servo drivers.

EtherCAT

⑥ With security functions corresponding to international standards of STO/SS1/SS2/SBC, safe and reliable.

⑦ A variety of instruction input methods greatly improve the use convenience, and can achieve position control, speed control and torque control by external terminals, hand-held operators, PC software of the upper machine and bus.

Universal bus iK3 series servo drive

Technical indexes

① Power range: 50W ~ 5kW.

② Input voltage: single or three-phase 220VAC (-15~10%), 50~60HZ

③ Control modes: position control, speed control, torque control and bus control.

④ Encoder type: 2500-line incremental photoelectric encoder (dart/non-dart line), 17bit/20bit/23bit absolute value encoder.

⑤ Communication mode: EtherCAT, POWERLINK, CANopen.

⑥ I/O counts: IO is programmable and supports positive and negative logic settings and functional relocation; line 5 input supports 16 functional configurations, and line 3 output supports 12 functional configurations.

⑦ Monitoring function: provide 16 monitoring states such as position, speed, current, voltage, input and output, etc.

EtherCAT ETHERNET POWERLINK CANopen

Product advantages

① The current loop frequency response is at 2.5kHz and the speed loop frequency response is at 1.6kHz; the communication rate is 100Mbps.

② It is equipped with a variety of subtraction filters to improve the control stability, support speed curve planning, allow settings of acceleration and deceleration as well as acceleration and deceleration corner.

③ End jitter suppression, friction compensation function and cogging torque compensation functions.

④ It supports the weak magnetic control, and in the high speed operation under light load, can continue to raise the motor speed.

⑤ It supports many auxiliary function parameter reset, self-learning, inching, fault history query and fault history clearance.

⑥ It supports PC software of the upper machine for parameter settings (upload, download, reset, import and export), waveform monitor (it supports automatic save of waves during the period before and after failure, if any, and can support historical waveform data call, playback, management analysis, linear transformation, FFT analysis);and it supports servo position, speed and torque control, start and stop, positive - reverse control, status monitoring, fault diagnosis and other operations.

⑦ It supports communications with servo drivers with different addresses.

⑧ With security functions corresponding to international standards of STO/SS1/SS2/SBC, safe and reliable.

⑨ It can be optionally equipped with a hand-held operation panel for setting parameters and monitoring the state of servo and motor, allowing the system debugging to be more convenient.

■ Universal S series servo motor

1.The new electromagnetic design scheme can reduce the motor cogging torque, lower temperature rise and better performance;
2.The design of 5 pairs of motor poles is characterized by smooth start, low noise, high power density and high efficiency;
3.The optimization of magnetic steel and the new structural process design realize the small lightweight design;
4.The protection grade of IP65 greatly improves the environmental resistance;
5.The maximum speed of 5000RPM meets the need of high-speed application;
6.Equipped with encoders of various specifications, up to 23bit, it can achieve high precision servo control.

Product model

Base (mm)	Working voltage (VAC)	Rated speed (rpm)	Max Speed (rpm)	Rated power (kW)	Rated torque (Nm)
60 ~ 130	220	1000～3000	1500～5000	0.1～1.5	0.32～14.3
Insulation grade	Installation mode	Pole-pairs	Environment temperature	Environment humidity	Protection grade
F	Flange plate	5	0~55°C	Below 90% (non condensing)	IP65

● Naming rules of general - purpose servo motor models:

130 S D _ A 102 20 D1 B
X1 X2 X3 X4 X5 X6 X7 X8

X1: Flange size

Code	Explanations:
40	40mm side length square flange plate
60	60mm side length square flange plate
80	80mm side length square flange plate
90	90mm side length square flange plate
100	100mm side length square flange plate
110	110mm side length square flange plate
130	130mm side length square flange plate
...	...

X3: Inertia

Code	Explanations:
S	Small inertia
D	Medium inertia
H	Large inertia
C	Super large inertia
...	...

X6: Rated voltage

Code	Explanations:
10	1000r/min
15	1500r/min
20	2000r/min
...	...

X7: Input voltage and encoder brand

Code	Explanations:
D1	Tamagawa photoelectric increment 2500lines
D2	Tamagawa photoelectric dart line type 2500 lines
D3	Tamagawa photoelectric increment 5000lines
D4	Tamagawa photoelectric multi-ring absolute value 17
D6	Tamagawa photoelectric single-ring absolute value 17
D10	Tamagawa multi-ring absolute value 23
K1	Nikon single-ring absolute value 17
K2	Nikon multi-ring absolute value 17
K3	Nikon single-ring separated type absolute value 24
K4	Nikon multi-ring separated type absolute value 24
...	...

X2: Motor series

Code	Explanations:
S	Zhishan S series
A	Zhishan A series
B	Zhishan B series
E	Zhishan E series

X4: Input voltage

Code	Explanations:
A	220V
B	380V
C	48V
...	...

X5: Power

Code	Explanations:
201	200W
401	400W
751	750W
102	1KW
152	1.5KW
202	2KW
302	3KW
...	

X8: Special definitions

Code	Explanations:
Null	General motor
B	Electromagnetic contracting brake
B2	permanent magnetic contracting brake
...	...

■ High-order pulse K5 series servo drive

K5 series naming way

ZSD – K5 A S 15 A A

- A: Type of encoder: A represents 2500 lines, B represents absolute value 17bit, C represents increment 17 bits.
- A: Input signal: A represents pulse
- 15: Power level: 04 represents 0.4KW, 0.8 represents 0.75kW, 15 represents 1.5kW, and 20 represents 2kW.
- S: Output mode: S represents uniaxial output
- A: Power voltage :A represents 3-phase 220V
- K5: Series code: K5 represents K5 series products
- ZSD: Enterprise code :ZSD represents the Zhishan servo drive

Specification parameter

Series			High-order pulse K5 series servo drive			
Output power (kW)			0.4	0.75	1.5	2.2
Output current (A)			2.8	5.5	10	12
Basic specifications	Control mode		IGBT PWM control sinusoidal current drive mode			
			220V: single or three-phase full wave rectification			
	Encoder feedback		ABZ dart/ non dart line encoder			
			Panasonic 17/23bit encoder, Tamagawa 17/23bit encoder, Nikon encoder			
	Use condition	Use/storage temperature*1	0～45°C (Please derate when ambient temperature above 45 °C, the average load rate no higher than 80%)/40～70°C			
		Use/storage humidity	90%RH below (non condensing).			
		Vibration-resistance/impact strength	4.9m/s2 / 19.6m/s2			
		Altitude	Below 1000m			
Pulse input	Input		2-line input			
			Differential input: 4M ([Pulse/s]); optocoupler input: 500K ([Pulse/s]).			
	Output		4-line output			
			Differential output 3 lines, open-collector output 1 line encoder			
Analog signals	Analog speed Command input	Input voltage	0~10V			
	Analog torque Command input	Input voltage	0~10V			
Input/output signal	Figure Input signal	Signal distribution can be changed	Universal 10-line input			
			Selecting the function of universal input according to the parameters			
	Figure Output signal	Signal distribution can be changed	Universal 6-line output			
			Selecting the function of universal output according to the parameters			
Built-in capabilities	Over travel (OT) prevention function		Stop immediately when P-OT and N-OT act			
	Electronic gear ratio		0.1048576 ≤ B/A ≤ 419430.4			
	Protection functions		Over current, overvoltage, voltage shortage, overload, exceptions of main circuit, heat sink overheat, lack of one phase, overspeed, encoder anomaly, CPU anomaly, parameter anomaly, etc			
	LED display function		5-bit key, 6-bit LED display			

High order bus E series servo drive

E series naming way

ZSD - E A S 08 E A

- A: Type of encoder: A represents ABZ increment type, B represents absolute value
- E: Input signal: E represents EtherCAT, C represents CANopen, P represents POWERLINK.
- 08: Power level: 02 represents 0.2KW, 0.4 represents 0.4kW, 0.8 represents 0.75kW, 10 represents 1kW, and 15 represents 1.5kW.
- S: Output mode: S represents uniaxial output
- A: Power voltage :A represents 3-phase 220V
- E: Series code: E represents the E series
- ZSD: Enterprise code :ZSD represents the Zhishan servo drive

Specification parameter

Series			h order bus E series servo driv				
Output power (kW)			0.2	0.4	0.75	1	1.5
Output current (A)			1.7	2.8	3.3	5	10
Basic specifications	Control mode		IGBT PWM control, sinusoidal current drive mode.				
			220V: single or three-phase full wave rectification.				
	Encoder feedback		17 bit incremental encoder				
			ABZ fully closed loop / non dart line encoder				
	Use condition	Use/storage temperature*1	0～45°C (please use at a lower rate when the ambient temperature is at or above 45 °C, and the average load rate shall not be higher than 80%.)/40～70°C				
		Use/storage humidity	90%RH below (non condensing).				
		Vibration-resistance/ impact strength	4.9m/s2 / 19.6m/s2				
		Altitude	Below 1000m				
EtherCAT Slave station specifications	Basic EtherCAT slave station properties	Communication protocol	EtherCAT protocol				
		Support services	CoE (PDO、SDO)				
		Synchronization mode	DC-distributed clock				
		Physical layer	100BASE-TX				
		Baud rate	100 Mbit/s (100Base-TX)				
		Duplex mode	Full duplex				
		Topology structure	Ring and linear type				
		Transmission medium	A shielded Super 5 or better network				
		Transmission distance	It is less than 100M between the two nodes (good environment and excellent cable).				
		Number of slave stations	The protocol supports up to 65535, but there are no more than 100 in use				
		EtherCAT frame length	44~1498 bytes				
		Process data	The maximum size of a single Ethernet frame is 1486 bytes				
		Synchronization jitter between two slave stations	< 1us				
		Refresh time	The input or output of 1000 switch oprations is about 30us				
			100 servo axes are about 100US				
		Communication error rate	10-10 Ethernet standards				
	EtherCAT configuration unit	FMMU unit	8 pcs				
		Store synchronization management units	8 pcs				
		Process data RAM	8KB				
		Clock distribution	64 bit				
		EEPROM capacity	32Kbit				
Analog signals	Analog speed Command input	Input voltage	-10V~ + 10V				
	Analog torque Command input	Input voltage	-10V~ + 10V				
Input/output signal	Figure Input signal	Signal distribution can be changed	5-line DI				
			DI function: servo enable, forward motion inhibit, reverse motion inhibit, forward current limit, reverse current limit, positive limit switch, negative limit switch, zero return proximity switch, bus IO input, probe 1, probe 2, fault reset				
	Figure Output signal	Signal distribution can be changed	3-line DO				
			DO function: servo return zero completion, servo operation preparation completion, servo fault, position tracking overlimit, target location reach, STO enable sign, bus IO output, contracting brake output				
Built-in capabilities	Over travel (OT) prevention function		Stop immediately when P-OT and N-OT act				
	Electronic gear ratio		0.1048576 ≤ B/A ≤ 419430.4				
	Protection functions		Over current, over voltage, under voltage, overload, main circuit detection abnormality, heat sink overheating, overspeed, encoder abnormality, CPU abnormality, parameter abnormality, others				
	LED display function		Main power supply CHARGE, 2-digit LED display				
	RS232 communication		State display, user parameter setting, monitor display, alert tracking display, JOG operation and self-tuning operation, speed, torque command signal mapping, and other functions				
	Others		Gain adjustment, alert logging				

Universal bus iK3 series servo drive

iK3 series naming way

ZSD – iK3 A S 15 E A

- A: Type of encoder: A represents ABZ increment type, B represents absolute value
- E: Input signal: E represents EtherCAT, C represents CANopen, P represents POWERLINK.
- 15: Power level: 04 represents 0.4KW, 0.8 represents 0.75kW, 15 represents 1.5kW.
- S: Output mode: S represents uniaxial output
- A: Power voltage: A represents 3-phase 220V, B represents 3-phase 380V
- iK3: Series code: iK3 represents the iK3 series
- ZSD: Enterprise code :ZSD represents the Zhishan servo drive

Specification parameter

Series			High order bus E series servo drive					
AC 220V power level (kW)			0.4	0.75	1.5	2.2	3	5
Output current (A)			2.8	5.5	10	12	16	25
AC 380V power level (kW)			5	7.5	--	--	-	-
Output current			12	20	--	--	-	-
Basic specifications	Control mode		IGBT PWM control, sinusoidal current drive mode.					
			220V: single or three-phase full wave rectification.					
	Encoder feedback		2500-line incremental standard type					
			17 bit incremental encoder					
	Use condition	Use/storage temperature*1	0～45°C (please use at a lower rate when the ambient temperature is at or above 45 °C, and the average load rate shall not be higher than 80%.)/40～70°C					
		Use/storage humidity	90%RH below (non condensing).					
		Vibration-resistance/ impact strength	4.9m/s2 / 19.6m/s2					
		Altitude	Below 1000m					
EtherCAT Slave station specifications	Basic EtherCAT slave station properties	Communication protocol	EtherCAT protocol					
		Support services	CoE (PDO、SDO)					
		Synchronization mode	DC-distributed clock					
		Physical layer	100BASE-TX					
		Baud rate	100 Mbit/s (100Base-TX)					
		Duplex mode	Full duplex					
		Topology structure	Ring and linear type					
		Transmission medium	A shielded Super 5 or better network					
		Transmission distance	It is less than 100M between the two nodes (good environment and excellent cable).					
		Number of slave stations	The protocol supports up to 65535, but there are no more than 100 in use					
		EtherCAT frame length	44~1498 bytes					
		Process data	The maximum size of a single Ethernet frame is 1486 bytes					
		Synchronization jitter between two slave stations	< 1us					
		Refresh time	The input or output of 1000 switch oprations is about 30us					
			100 servo axes are about 100US					
		Communication error rate	10-10 Ethernet standards					
	EtherCAT configuration unit	FMMU unit	8 pcs					
		Store synchronization management units	8 pcs					
		Process data RAM	8KB					
		Clock distribution	64 bit					
		EEPROM capacity	32Kbit					
Analog signals	Analog speed Command input	Input voltage	-10V~ + 10V					
	Analog torque Command input	Input voltage	-10V~ + 10V					
Input/output signal	Figure Input signal	Signal distribution can be changed	5-line DI					
			DI function: servo drive enables forward motion prohibition, reverse motion prohibition, forward current restriction, reverse current limit, forward limit switch, negative limit switch, return zero proximity switch, bus IO input, probe 1, probe 2, fault reset					
	Figure Output signal	Signal distribution can be changed	3-line DO					
			DO function: servo return zero completion, servo operation preparation completion, servo fault, position tracking overlimit, target location reach, STO enable sign, bus IO output, contracting brake output					
Built-in capabilities	Over travel (OT) prevention function		Stop immediately when P-OT and N-OT act					
	Electronic gear ratio		0.1048576 ≤ B/A ≤ 419430.4					
	Protection functions		Over current, overvoltage, voltage shortage, overload, exceptions of main circuit, heat sink overheat, lack of one phase, overspeed, encoder anomaly, CPU anomaly, parameter anomaly, etc.					
	LED display function		Main power CHARGE, displayed by 5 bit LED					
	RS232 communication		State display, user parameter setting, monitor display, alert tracking display, JOG operation and self-tuning operation, speed, torque command signal mapping, and other functions					
	Others		Gain adjustment, alert logging					

Universal bus iK2 series servo drive

iK2 series naming method

ZSD - iK2 A S 15 2 B

- B: Type of encoder: B represents absolute value 17bit
- 2: Input signal: 2 represents M2 bus
- 15: Power level: 04 represents 0.4kW, 08 represents 0.75kW, 15 represents 1.5kW
- S: Output mode: S represents uniaxial output
- A: Power voltage: A represents three-phase 220V, B represents three-phase 380V
- iK2: Series code: ik2 represents ik2 series
- ZSD: Enterprise code :ZSD represents the Zhishan servo drive

Specification parameter								
Series			K1/K2					
Output power (unit: kW)			0.4	0.75	1.5	2.2	3	5
Output current			2.8A	5.5A	10A	12	16	25
Type of encoder			17 bit absolute value encoder					
Regeneration resistance			Built-in or external connection					
Properties	Control mode		IGBT PWM control sinusoidal current drive mode					
	Speed control range		1:10000 (The lower limit of the speed control range is stable operation without creep in case of rated load)					
	Fluctuation ratio of speed	Load fluctuation	0 to 100% load: ±0.01% max. (at rated speed)					
		Voltage fluctuation	Rated voltage: ±10%:0% (at rated speed)					
		Temperature fluctuation	25±25°C: ±0.1% max. (at rated speed)					
	Torque control accuracy (repeatability)		1%					
	Soft boot-time setting		0 ~ 10 seconds (acceleration and deceleration can be set separately)					
Communication	RS-485 Communication	Communication protocol	Modbus					
		1; N communication	Up to N = 127 stations					
		Axis address setting	Set by parameter					
Input/output signal	Frequency-dividing pulse output of encoder		A-phase, B-phase, and C-phase: linear drive output; number of divided pulses: can be set arbitrarily					
	Sequential control input signal		7 channels					
			Functions: Origin return deceleration switch signal (/DEC), external latch signal (/EXT 1 to 2), forward rotation prohibition (P-OT), reverse rotation prohibition (N-OT), forward rotation torque limit (/P -CL), reverse rotation torque limit (/N-CL). Changes in the positive/negative logic of the above signal can be performed.					
	Sequential control output signal		5 channels					
			Functions: Servo alarm (ALM), positioning completion (/COIN), speed coincidence detection (/V-CMP), brake (/BK), servo motor rotation detection (/TGON), servo ready (/S- RDY), torque limit detection (/CLT), encoder zero output (PGC). Changes in the positive/negative logic of the above signal can be performed.					
Instruction			CHARGE indicator					
Regeneration handling			Built-in regenerative resistor or external regenerative resistor (optional)					
Over travel handling			Dynamic brake (DB) stops, deceleration stops or free running stops during P-OT and N-OT input operation					
Protection functions			Over current, over voltage, under voltage, overload, regeneration abnormality, etc.					
Accessibility...			Gain adjustment, alarm recording, jog operation, etc.					
Panel operation	Display		7-segment 5-digit red nixie tube					
	Key		5 jog keys					
Communication	Communication protocol		MECHATROLINK-II					
	Transfer Rate		10 Mbps					
	Transmission cycle		250 microseconds, 0.5 to 4.0 milliseconds (multiples of 0.5 milliseconds)					
	Link transfer words		Switch at 17 bytes/station, 32 bytes/station					
	Station address setting		41H to 5FH (maximum number of linked substations: 30)					
Command mode	Instruction specification		Position control, speed control and torque control via MECHATROLINK bus					
	Command input		MECHATROLINK commands (such as sequential control, movement, data setting/reference, monitoring, adjustment, and other instructions)					

Universal bus K1/K2 series servo drive

Specification parameter												
Series			K1						K2			
AC 220V power level (kW)			0.4	0.75	1.5	2.2	3	5	00.4	0.75	1.5	2.2
Output current (A)			2.8	5.5	10	12	16	25	2.8	5.5	10	12
AC 380V power level (kW)			5	7.5	--	--	-	-	--	--	--	--
Output current (A)			12	20	--	--	-	-	--	--	--	--
Encoder type			2500 line incremental encoder 17 bit absolute value encoder									
Regeneration resistance			Built-in or external connection									
Control mode			IGBT PWM control sinusoidal current drive mode									
Properties	Speed control range		1:10000 (The lower limit of the speed control range is stable operation without creep in case of rated load)									
	Fluctuation ratio of speed	Load fluctuation	0 to 100% load: ±0.01% max. (at rated speed)									
		Voltage fluctuation	Rated voltage: ±10%:0% (at rated speed)									
		Temperature fluctuation	25±25°C: ±0.1% max. (at rated speed)									
	Torque control accuracy (repeatability)		1%									
	Soft boot-time set		0 ~ 10 seconds (acceleration and deceleration can be set separately)									
Communication	RS-485 Communication	Communication protocol	Modbus									
		1; N communication	Up to N = 127 stations									
		Axis address setting	Set by parameter									
	CAN communication	Communication protocol	CAN Open (DS301 + DS402)									
		1; N communication	Up to N = 127 stations									
		Axis address setting	Set by parameter									
Input/output signal	Frequency-dividing pulse output of encoder		A-phase, B-phase, and C-phase: linear drive output; number of divided pulses: can be set arbitrarily									
	Sequential control input signal	Fixed input	Send									
		Assignable input signal	Number of channels: K1 series 4 channels, K2 series 8 channels									
			Function: Servo enable (/S-ON), proportional control (/P-CON), forward rotation prohibition (P-OT), reverse rotation prohibition (N-OT), alarm reset (/ALM-RST), forward rotation torque limit (/P-CL), reverse rotation torque limit (/N-CL), position deviation zero clearing (/CLR), internally set speed switch. Changes in the positive/negative logic of the above signal can be performed.									
	Sequential control output signal	Assignable output signal	Number of channels: K1 series 3 channels, K2 series 6 channels									
			Function: Servo alarm (ALM), positioning completion (/COIN), speed coincidence detection (/V-CMP), brake (/BK), servo motor rotation detection (/TGON), servo ready (/S- RDY), Torque Limit Detection (/CLT), Encoder Zero Output (PGC), which can be used to change the positive/negative logic of the above signals.									
Instruction			CHARGE indicator									
Regeneration handling			Built-in regenerative resistor or external regenerative resistor (optional)									
Over travel handling			Dynamic brake (DB) stops, deceleration stops or free running stops during P-OT and N-OT input operation									
Protection functions			Over current, over voltage, under voltage, overload, regeneration abnormality, etc.									
Accessibility...			Gain adjustment, alarm recording, jog operation, etc.									
Panel operation	Display		7-segment 5-digit red nixie tube									
	Key		5 jog keys									
Torque control	Input signal	Command voltage	• Maximum input voltage: ±10V (positive voltage corresponds to positive torque) • Factory setting: 3.3VDC corresponds to rated torque (input gain can be set)									
		Input resistance	About 20KΩ									
		Electrical time constant	47 μs									
	Soft boot-time setting		0 to 10 seconds (acceleration and deceleration can be set separately)									

Speed control	Input signal	Command voltage	• Maximum input voltage: ±10V (positive voltage corresponds to positive rotation) • Factory setting: 150(r/min)/V (input gain can be set)
		Input resistance	About 20KΩ
		Electrical time constant	47 μs
	Internal speed control	Rotation direction selection	Switch direction via /P-CON
		Speed Select	Speed 1 to 3 is selected by forward rotation torque limit (/P-CL) and reverse rotation torque limit (/N-CL). When both signals are OFF, the servo motor stops or switches to another control method.
Position control	Feed forward compensation		0 to 100%
	Positioning completion width		0 to 5000 command units
		Command pulse form	Choose one of the following categories: Symbol + pulse sequence, CW + CCW pulse sequence 90° phase difference two-phase pulse (phase A and phase B)
		Command pulse pattern	Support linear drive, open collector
		Maximum input pulse frequency	Linear drive Symbol + pulse sequence, CW + CCW pulse sequence: 500K pps 90° phase difference two-phase pulse (phase A and phase B): Open collector Symbol + pulse sequence, CW + CCW pulse sequence: 200 Kpps 90° phase difference two-phase pulse (phase A and phase B): 200 Kpps
	Clear signal		Clear position deviation, open collector

K1/K2 series namin g method

ZSD – K1 A S 15 A A

- Type of encoder: A represents 2500 lines, B represents absolute value 17 bits, C represents incremental 17 bits
- Input signal: A represents pulse, B represents analog quantity, C represents CANopen
- Power level: 04 represents 0.4kW, 08 represents 0.75kW, 15 represents 1.5kW, 50 represents 5kW, 75 represents 7.5kW
- Output mode: S represents single-axis output, D represents two-axis output
- Power voltage: A represents three-phase 220V, B represents three-phase 380V
- Series code: K1 represents K1 series, K2 represents K2 series
- Enterprise code :ZSD represents the Zhishan servo drive

Multi-axis KAD/K1AD series servo drive

KAD/K1AD series naming method

ZSD – K1 A D 15 A A

- Type of encoder: A represents 2500 lines, B represents absolute value 17 bits, C represents incremental 17 bits
- Input signal: A represents pulse, B represents analog quantity, C represents CANopen
- Power level: 04 represents 0.4kW, 08 represents 0.75kW, 15 represents 1.5kW, 50 represents 5kW, 75 represents 7.5kW
- Output mode: S represents single-axis output, D represents two-axis output
- Power voltage: A represents three-phase 220V, B represents three-phase 380V
- Series code: K1 represents K1 series, K2 represents K2 series
- Enterprise code :ZSD represents the Zhishan servo drive

Specification parameter					
Model			KAD15A	KAD20A	K1AD08
Output power			1.5kW	2kW	0.75kW
Input power			Three-phase AC220V -15 ~ +10% 50 ~ 60Hz		
Encoder type			2500 line incremental encoder		
Continuous output			6A	10A	5.5A
Regeneration resistance			Built-in or external connection		
Control mode			IGBT PWM control sinusoidal current drive mode		
Properties	Speed control range		1:10000 (The lower limit of the speed control range is stable operation without creep in case of rated load)		
	Fluctuation ratio of speed	Load fluctuation	0 to 100% load: ±0.01% max. (at rated speed)		
		Voltage fluctuation	Rated voltage: ±10%:0% (at rated speed)		
		Temperature fluctuation	25±25°C: ±0.1% max. (at rated speed)		
	Torque control accuracy (repeatability)		1%		
	Soft boot-time setting		0 ~ 10 seconds (acceleration and deceleration can be set separately)		
Communication	RS-485 Communication	Communication protocol	Modbus		
		1; N communication	Up to N = 127 stations		
		Axis address setting	Set by parameter		
	CAN communication	Communication protocol	CANOpen (DS301 + DS402)		
		1; N communication	N=127 max. available		
		Axis address setting	Set by parameter		
Input/output signal	Frequency-dividing pulse output of encoder		A-phase, B-phase, and C-phase: linear drive output; number of divided pulses: can be set arbitrarily		
	Sequential control input signal	Fixed input	Send		
		Assignable input signal	Number of channels: KAD – 8 channels, K1AD - 6 channels		
			Function: Servo enable (/S-ON), proportional control (/P-CON), forward rotation prohibition (P-OT), reverse rotation prohibition (N-OT), alarm reset (/ALM-RST), forward rotation torque limit (/P-CL), internally set speed switch, which can which can be used to change the positive/negative logic of the above signals.		
	Sequential control output signal	Assignable output signal	Number of channels: KAD – 6 channels, K1AD - 4 channels		
			Functions: Servo alarm (ALM), positioning completion (/COIN), speed coincidence detection (/V-CMP), brake (/BK), servo motor rotation detection (/TGON), servo ready (/S- RDY), torque limit detection (/CLT), encoder zero output (PGC), which can which can be used to change the positive/negative logic of the above signals.		
Instruction			CHARGE indicator		
Regeneration handling			Built-in regenerative resistor or external regenerative resistor (optional)		
Over travel handling			Dynamic brake (DB) stops, deceleration stops or free running stops during P-OT and N-OT input operation		
Protection functions			Over current, over voltage, under voltage, overload, regeneration abnormality, etc.		
Accessibility...			Gain adjustment, alarm recording, jog operation, etc.		
Panel operation		Display	7-segment 5-digit red nixie tube		
		Key	5 jog keys		
Torque control	Input signal	Command voltage	• Maximum input voltage: ±10V (positive voltage corresponds to positive torque) • Factory setting: 3.3VDC corresponds to rated torque (input gain can be set)		
		Input resistance	About 20KΩ		
		Electrical time constant	47μS		
	Soft boot-time setting		0 to 10 seconds (acceleration and deceleration can be set separately)		

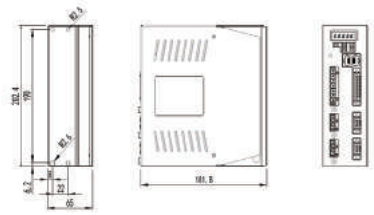
Servo drive and motor

Speed control	Input signal	Command voltage	• Maximum input voltage: ±10V (positive voltage corresponds to positive rotation) • Factory setting: 150(r/min)/V (input gain can be set)
		Input resistance	About 20KΩ
		Electrical time constant	47 μs
	Internal speed control	Rotation direction selection	Switch direction via /P-CON
		Speed Select	Speed 1 to 3 is selected by forward rotation torque limit (/P-CL) and reverse rotation torque limit (/N-CL). When both signals are OFF, the servo motor stops or switches to another control method.
Position control	Feed forward compensation		0 to 100%
	Positioning completion width		0 to 5000 command units
		Command pulse form	Choose one of the following categories: Symbol + pulse sequence, CW + CCW pulse sequence 90° phase difference two-phase pulse (phase A and phase B)
		Command pulse pattern	Support linear drive, open collector
		Maximum input pulse frequency	Linear drive Symbol + pulse sequence, CW + CCW pulse sequence: 500K pps 90° phase difference two-phase pulse (phase A and phase B): Open collector Symbol + pulse sequence, CW + CCW pulse sequence: 200 Kpps 90° phase difference two-phase pulse (phase A and phase B): 200 Kpps
	Clear signal		Clear position deviation, open collector

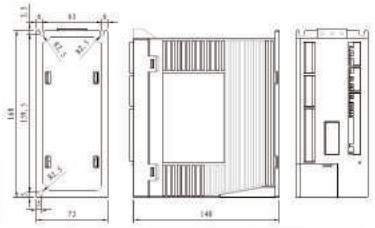
KAD/K1AD series dimension chart

External dimension

KAD's external installation dimension



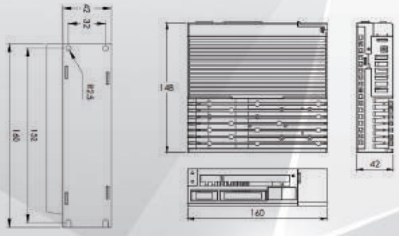
K1AD's installation dimension



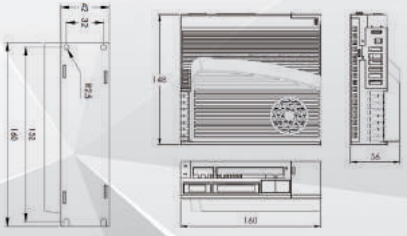
K1/K2/iK2/iK3/K5 series dimension chart

External dimension

0.4kW's installation dimension

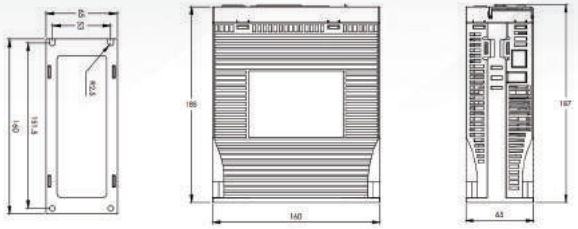


0.75kW driver external dimension



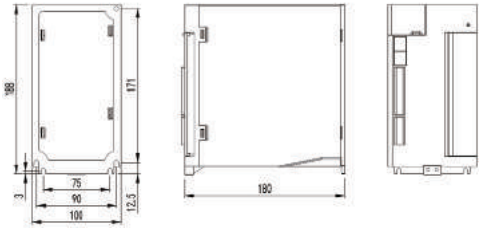
External dimension

1.5kW/2.2kW driver external dimension



External dimension

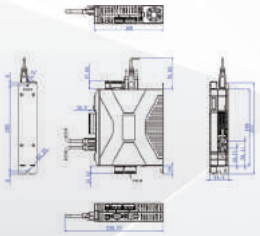
Installation and external dimens ion of 220V---3kW/5kW and 380V---5kW/7.5kW



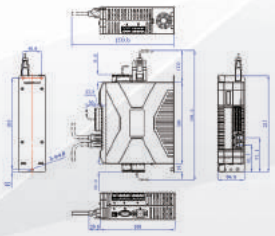
E series dimension chart

External dimension

E series 0.75kW's installation dimension



E series 1.5kW's installation dimension



■ Universal S series servo motor

Specification parameter

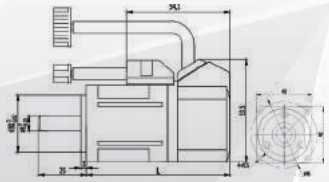
Motor model	40SD-A05130□	40SD-A01130□	60SS-A20130□	60SS-A40130□	80SS-A75130□	30SH-A95115□	130SD-A10210□
Rated power (kw)	0.05	0.1	0.2	0.4	0.75	0.95	1.0
Pole-pairs	4	4	5	5	5	5	5
Rated torque (N.m)	0.16	0.32	0.64	1.27	2.39	6.05	9.55
Maximum torque (N.m)	0.48	0.95	1.92	3.8	7.2	14	21.5
Rated input speed（rpm）	3000	3000	3000	3000	3000	1500	1000
Maximum speed (rpm)	6000	6000	5000	5000	5000	2500	1500
Rated current (A)	0.6	1.1	1.9	2.8	4.0	6	6.2
Maximum current (A)	1.8	3.3	5.7	8.4	11.7	14.2	14.5
Torque constant (N.m/A)	0.26	0.29	0.336	0.453	0.612	1.01	1.54
Counter EMF (V/Krpm)	18.83	19.6	22.9	29.3	39.8	68.1	101
Rotor inertia (Kg.m2)	0.02×10^{-4} 0.02×10^{-4}	0.04×10^{-4} 0.04×10^{-4}	0.16×10^{-4} 0.18×10^{-4}	0.28×10^{-4} 0.3×10^{-4}	1.0×10^{-4} 1.1×10^{-4}	13.9×10^{-4} 15.9×10^{-4}	6.7×10^{-4} 8.6×10^{-4}
Line resistance (Ω)	32.28	13.97	4.5	3.3	1.4	1.444	1.92
Line inductance (mH)	33.13	23.84	12.5	9.61	7.25	14.56	23.0

Specification parameter

Motor model	130SD-A10220□	130SH-A13215□	130SD-A15210□	130SD-A15220□	130SD-A20220□	130SD-A30220□
Rated power (KW)	1.0	1.35	1.5	1.5	2.0	3.0
Pole-pairs	5	5	5	5	5	5
Rated torque (N.m)	4.77	8.6	14.3	7.16	9.55	14.3
Maximum torque (N.m)	14.3	21.5	42.9	21.5	28.65	42.9
Rated input speed（rpm）	2000	1500	1000	2000	2000	2000
Maximum speed (rpm)	3000	2500	1500	3000	3000	3000
Rated current (A)	6	7.6	7.2	8.2	10.5	13.8
Maximum current (A)	18	22.8	21.6	24.6	31.5	41.4
Torque constant (N.m/A)	0.795	1.13	1.99	0.873	0.905	1.04
Counter EMF (V/Krpm)	51.2	75.4	127.5	55	61	65
Rotor inertia (Kg.m2)	4.6×10^{-4} 6.5×10^{-4}	20×10^{-4} 22×10^{-4}	15.1×10^{-4} 17.1×10^{-4}	6.7×10^{-4} 8.6×10^{-4}	8.7×10^{-4} 10.7×10^{-4}	15.1×10^{-4} 17.1×10^{-4}
Line resistance (Ω)	0.955	1	1.31	0.70	0.54	0.3
Line inductance (mH)	7.96	11.4	14	6.1	5.91	3.17

External dimension

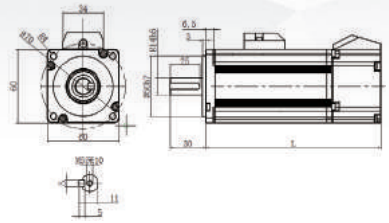
40 Motor



Motor Model	40SD-A05130□	40SD-A01130□
L (without contracting brake)	75	90
L (with electromagnetic contracting brake)	109	124

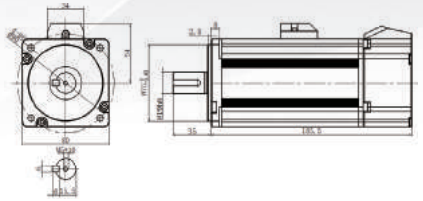
External dimension

60 Motor



Motor Model	60SS-A20130□	60SS-A40130□
L (without brake)	108	133
L (with electromagnetic brake)	146	171

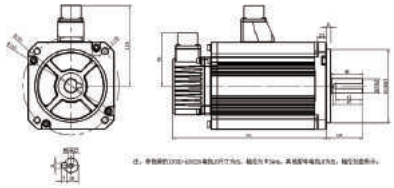
80 Motor



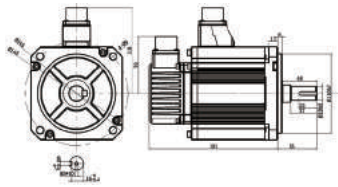
Motor Model	80SS-A75130□
L (without contracting brake)	144
L (with electromagnetic contracting brake)	185

External dimension

130 Motor



130SH-A95115□



Motor Model	130SH-A95115□	130SD-A10210□	130SD-A10220□	130SH-A13215□	130SD-A15210□	130SD-A15220□	130SD-A20220□	130SD-A30220□
L (without brake)	181	181	163.5	198.5	251.5	181	198.5	251.5
L (with electromagnetic brake)	215	215	197.5	232.5	285.5	215	232.5	285.5

Servo drive and motor

Schedule: 220V series servo drive adapter motor table

Motor model	Torque (N.m)	Speed (r/min)	Current (A)	Power (kW)	Servo rated power and rated output current					
					0.4kW	0.75kW	1.5kW	2.2kW	3kW	5kW
					2.8A	5.5A	10A	12A	16A	25A
40ST –M00130	0.16	3000	0.4	0.05	●	○	○	○	○	○
40ST – M00330	0.32	3000	0.6	0.1	●	○	○	○	○	○
60ST – M00630	0.637	3000	1.2	0.2	●	○	○	○	○	○
60ST – M01330	1.27	3000	2.8	0.4	●	○	○	○	○	○
60ST – M01930	1.91	3000	3.5	0.6		●	○	○	○	○
80ST – M01330	1.27	3000	2	0.4	●	○	○	○	○	○
80ST – M02430	2.39	3000	3	0.75		●	○	○	○	○
80ST – M03520	3.5	2000	3	0.73		●	○	○	○	○
80ST – M04025	4	2500	4.4	1.0		○	●	○	○	○
90ST – M02430	2.4	3000	3	0.75		●	○	○	○	○
90ST – M03520	3.5	2000	3	0.73		●	○	○	○	○
90ST – M04025	4	2500	4	1.0		○	●	○	○	○
110ST – M02030	2	3000	2.5	0.6		●	○	○	○	○
110ST – M04020	4	2000	3.5	0.8		○	●	○	○	○
110ST – M04030	4	3000	5.0	1.2			●	○	○	○
110ST – M06020	6	2000	4.5	1.2			●	○	○	○
110ST – M05030	5	3000	6.0	1.5			●	○	○	○
110ST – M06030	6	3000	6.0	1.8				●	○	○
130ST – M04025	4	2500	4.0	1.0		○	●	○	○	○
130ST – M05025	5	2500	5.0	1.3			●	○	○	○
130ST –M06025	6	2500	6.0	1.5			●	○	○	○
130ST – M07725	7.7	2500	7.5	2.0				●	○	○
130ST – M10010	10	1000	4.5	1.0		○	●	○	○	○
130ST – M10015	10	1500	6.0	1.5			●	○	○	○
130ST – M10025	10	2500	10	2.6				●	○	○
130ST – M15015	15	1500	9.5	2.3				●	○	○
130ST – M15025	15	2500	13.5	3.8					○	●
150ST – M15025	15	2500	17	3.8						●
150ST – M15020	15	2000	14	3.0					●	○
150ST – M18020	18	2000	17	3.6						●
180ST – M17215	17.2	1500	10.5	2.7					●	○
180ST – M19015	19	1500	12	3.0					●	○
180ST – M21520	21.5	2000	16	4.5						●
180ST – M27010	27	1000	12	2.9					●	○
180ST – M27015	27	1500	16	4.3						●
180ST – M35010	35	1000	16	3.7					●	●

Note:represents the recommended option, represents the option can be selected, the blank part represents that the option cannot be selected

Standard M Series Motor Naming Method:

130 ST - M 050 15 □ - □
X1 X2 X3 X4 X5 X6 X8

X1: Flange size	
Code	Explanations:
40	40mm side length square flange plate
60	60mm side length square flange plate
80	80mm side length square flange plate
90	90mm side length square flange plate
100	100mm side length square flange plate
110	110 mm side length square flange plate
130	130mm side length square flange plate
150	150mm side length square flange plate
180	180mm side length square flange plate
...	...

X2: Motor series	
Code	Explanations:
ST	220V servo motor
HST	High voltage 380V servo motor
LST	Low voltage 48V servo motor

X3:Rated speed	
Code	Explanations:
10	1000r/min
15	1500r/min
20	2000r/min
...	...

X7: Production line	
Code	Explanations:
Null	N production line
z	Z production line
H	H production line

Axis encoder type	
Code	Explanations:
M	Incremental standard type
AM	Absolute value encoder
E	Magnetic Encoder
X	Resolving Encoder
BM	Incremental 17-bit encoder

X6: External change specification definition	
Code	Explanations:
Null	Standard Definition
B	Electromagnetic contracting brake
J	No. seam allowance
T	Special tailor-made

Code	Explanations:
A00	100N.m
A16	116N.m
...	...
050	5N.m
070	7.7N.m
...	...
001	0.1 N.m
002	0.2N.m
...	...

Schedule: 380V series servo drive adapter motor table

Moto r model	Torque (N.m)	Speed (r/min)	Current (A)	Power (kW)	rated power and rated output current			
					2kW	3.5kW	5kW	7.5kW
					5A	8A	12A	20A
110HST – M02030	2	3000	2.0	0.6	●	○	○	○
110HST – M04020	4	2000	2.0	0.8	●	○	○	○
110HST – M04030	4	3000	3.0	1.2	●	○	○	○
110HST – M05030	5	3000	4.5	1.5	●	○	○	○
110HST – M06020	6	2000	3.0	1.2	●	○	○	○
110HST – M06030	6	3000	4.5	1.8	●	○	○	○
130HST – M04025	4	2500	2.6	1	●	○	○	○
130HST – M05025	5	2500	3	1.3	●	○	○	○
130HST – M06025	6	2500	3.7	1.5	●	○	○	○
130HST – M07725	7.7	2500	4.7	2	●	○	○	○
130HST – M10010	10	1000	2.5	1	●	○	○	○
130HST – M10015	10	1500	3.5	1.5	●	○	○	○
130HST – M10020	10	2000	5.1	2	●	○	○	○
130HST – M10025	10	2500	5.9	2.6		●	○	○
130HST – M15015	15	1500	5	2.3		●	○	○
130HST – M15025	15	2500	7.4	3.8			●	○
150HST – M15020	15	2000	6.8	3.0		●	○	○
150HST – M15025	15	2500	9.5	3.8			●	○
150HST – M18020	18	2000	8.5	3.6			●	○
150HST – M23020	23	2000	12	4.7			●	○
150HST – M27015	27	1500	11	4.2			●	○
150HST – M27020	27	2000	14.5	5.5				●
150HST – M27025	27	2500	17	6.8				●
180HST – M17215	17.2	1500	6.5	2.7		●	○	○
180HST – M19015	19	1500	7.5	3.0		●	○	○
180HST – M21520	21.5	2000	9.5	4.5			●	○
180HST – M27010	27	1000	7.5	2.9		●	○	○
180HST – M27015	27	1500	10	4.3			●	○
180HST – M35010	35	1000	10	3.7			●	○
180HST – M35015	35	1500	12	5.5			●	○

Note: represents the recommended option, represents the option can be selected, The blank part represents that the option cannot be selected

Other series products

Other servo drive products

G2 series: 0.4kW, 0.75kW, 1.5kW, 2.2kW, 3kW
Cost-effective full-function servo driver

G_B series 0.4kW, 0.75kW, 1.0kW, 1.5kW, 2.0kW, 3kW
Fanless full-function servo driver

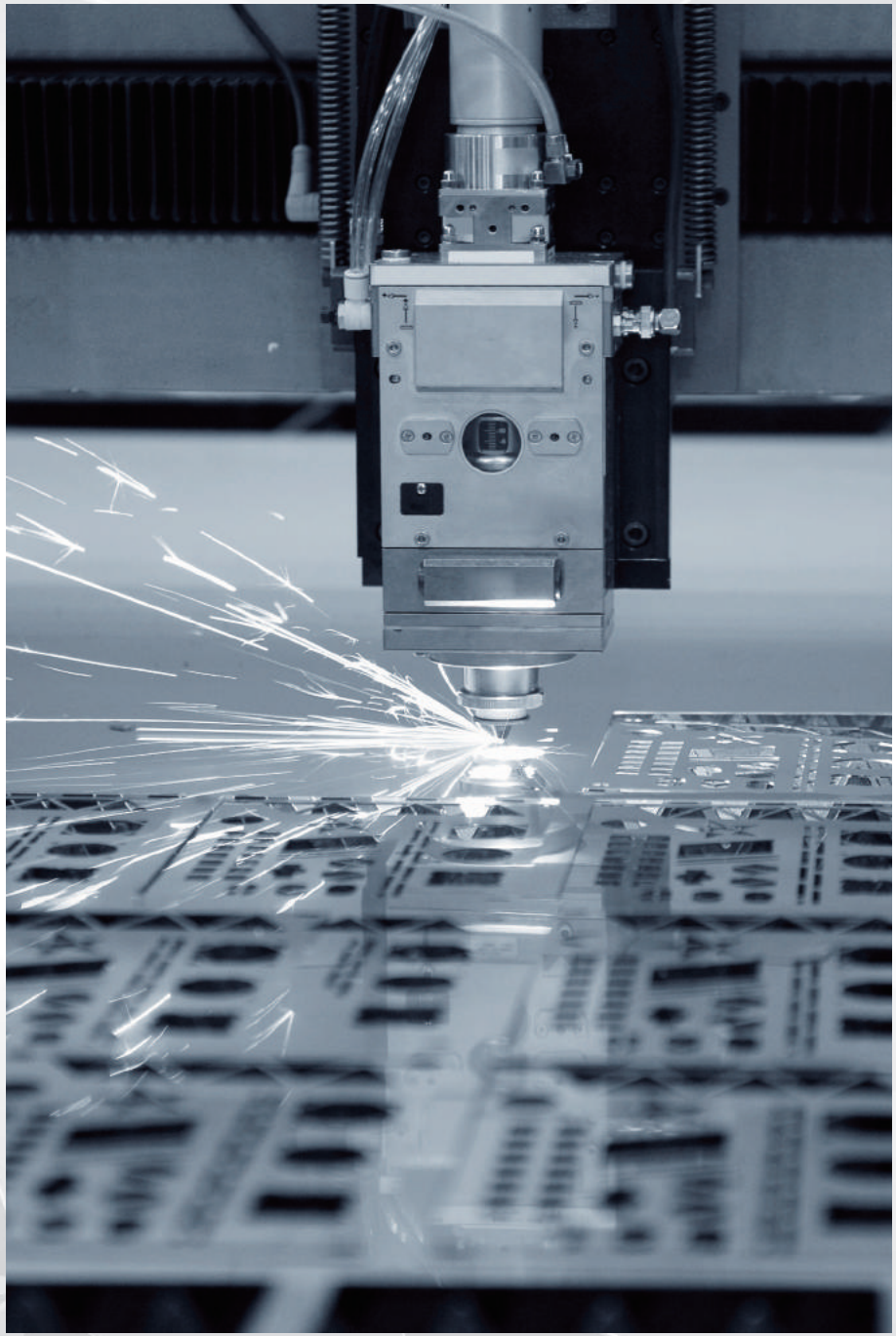
K/iK series (220V and 380V) 2kW, 2.8kW, 3.5kW, 5kW
High Performance Servo Driver, Pulse type, Analog type, CANopen,Mechatrolink II

iKF series two axes 50W ~ 1kW, two axes 0.4kW ~ 1.5k
EtherCAT bus four-axis servo driver

Other servo motor products

A series power section: 0.05 kW ~ 2.8kW
Frame No.: 40、60、80、110、130
Design features: a new electromagnetic design, lower temperature rise, small motor inertia, high controllable precision.

51 series power section: 0.2 kW ~ 0.75kW
Frame No.: 60、80
Design features: low inertia small capacity motor, high power density, with efficiency meeting national first-class energy efficiency standard.

E series power section: 0.1 kW ~ 5kW
Frame No.: 40、60、80、130
Design features: New process, compact structure, short body, small volume, improving system responsiveness.

B series power section: 0.85 kW ~ 1.3kW
Frame No.: 130
Design features: 10-pole, 12-slot design reduces motor cogging torque, low cogging torque with better performance.