STEP

Share the convenience and happiness in an intelligent society

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Ver.2022.5 We are committed to the continuous improvement of our products. The product specifications herein may be modified without prior notice.

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STEP Inverter Drive

STEP STEP Service Account Subscription Account



AS 180N(-B) Series

High Performance General-Purpose Inverter Selection Brochure



Shanghai Sigriner STEP Electric Co., Ltd

Company Profile

Founded in 1995, Shanghai STEP Electric Corporation is an enterprise backed by the state and has been awarded as a National

High-Tech Enterprise and National Innovative Enterprise. In 2010, STEP was listed on the Shenzhen Stock Exchange as an A-share with the abbreviation Xinshida and the stock code 002527. STEP is a member of the National Robot Standardization General Group, the National Technical Committee 196 on Elevators of Standardization Administration of China, the vice president of China Robot Industry Alliance, the vice president of Shanghai Robot Industry Association, and the vice president of Shanghai Intelligent Manufacturing Industry Association.

With focuses on the motion control technology, together with servo drives, speed controls by frequency variation, robots, and industrial controllers as key products, STEP advances digital and intelligent technologies and provides customers with integrated, intelligent manufacturing solutions of top quality. STEP operates following five business lines:

Electric Control: STEP is a leading brand in the field of elevator control systems over the world. In the past 27 years, STEP has provided smart electrical control systems, components and technical support for more than 2 million elevators worldwide. STEP Elevator Cloud is to build an ecosystem with key electrical control interconnected and supplies 100% original products for safety. Low harmonic energy feedback technology effectively reduces energy consumption and emission.

Inverter Drive: STEP operates an independent research and development platform, covering the whole process chain, including design, production, sales and inspection. The intelligent assembly line is powered by fully automatic drive and integrated control system. It can produce 350,000 units a year. STEP's latest intelligent and flexible drive ET6/EP6/EH6 are designed for the full power and layout logistics, lifting, high-end equipment and more industries.

Motion Control: At STEP, we use our own key technologies, including multi-axis synchronization, bus control, platform-based control, multi-machine collaboration, commissioning-free adaptation for applications ranging from servo drive and motion control to system integration. The multi-level solutions, from automated machine to intelligent manufacturing, are choices for equipment builders and system integrators of both upstream and downstream customers over our intelligent ecological services.

Robots: STEP is positioned leading share in Chinese industrial robot market. With the complete key technologies, including robot control systems, servo systems and software systems, STEP provides industrial robots and system integration solutions to help the manufacturing industry upgrading for higher quality. STEP Robot Super Factory is the second robot factory manufacturing by robot in the world. It has been selected as the one of the first 20 smart factories in Shanghai. STEP has been rewarded as a Model Factory of Intelligent Manufacturing by Ministry of Industry and Information Technology of the People's Republic of China in 2022. Amal Robot provides key products and intelligent solutions for the unmanned services in smart buildings of the public service industry

Intelligent Manufacturing: STEP serves the various industries including automotive body-in-white and parts, construction machinery, furniture, sanitary ware, CNC machine tools, PCBA testing and provides key products for automation, integrated solutions of technologies and intelligent manufacturing for China's high-end intelligent manufacturing.

STEP's products and solutions are widely used in 3C electronics, lithium batteries, semiconductors, photovoltaics, logistics, food and beverage, medical, automotive, dispensers, laser, machine tools, PCBA testing, elevators, water pumps, HVACs, rubber and plastics, general energy saving, construction machinery, metal products, chemical products, furniture, and other industries and segments, serving more than 110 countries and regions around the world.

STEP keeps focusing on research and development. It has established research and development centers in Shanghai, Shenzhen, Xi'an, Hangzhou, Germany and Japan. Additionally, it runs postdoctoral research stations, and its laboratories at the technology centers have been certified by CNAS. STEP actively participates in preparation and revision of a number of national technical standards and industry technical standards. STEP has been awarded 730 nationally patents, including 242 invention patents and 266 software copyrights by the end of 2021.

Headquartered in Shanghai, STEP operates production bases in Shanghai, Kunshan, Hangzhou and Shenzhen, and more than 20 business offices across China. As part of the globalization strategy, STEP operates overseas subsidiaries in Germany, Japan and a joint venture in Malaysia, and will set up more offices in the world to develop the global market.

Mission: Share the convenience and happiness in an intelligent society.

Vision: To be a world-renowned brand in intelligent manufacturing industry.

Core values: Customer oriented, Striving foremost, Team collaboration, Full responsibility, Practical innovation.

System Security



European Security Certification



ISO9001



North American Security Certification



ISO14001



American NRTI Certification



ISO45001

American UI

Certification





IATE 16949

OPLUS Certification



CNAS-L6430

Certification

3C Certification

CR Certification

Product Overview

AS180 series converter designed by Shanghai Sigriner STEP Electric Co., Ltd is a general-purpose inverter that has been highly recognized by users after more than ten years of application and inspection in the market; on this basis, AS180N (-B) series inverter has been iteratively upgraded, with reduced size and increased power density. AS180 series converter is equipped with a standard LED keypad, AS180N (-B) series inverter is equipped with a standard LCD keypad, and both keypads can be installed on the cabinet door outside. The appearance has an industrial feel. The application of GVC vector control technology further strengthens the reliability of the product and its adaptability to the environment. The customized and industrialized design better meets various light-load transmission requirements and is widely used in fans and water pumps.

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AS180N(-B)2.2kW-630kW

Product Performance

Differences between V/F and GVC							
	V/F	GVC					
Motor type	Asynchronous motors only	Asynchronous motors, permanent magnet synchronous motors, synchronous reluctance motors and other types					
Efficient control	No	Yes					
Commissioning convenience	Easy	Slightly troublesome in case of efficient control					
Load capacity	Some motors are prone to overcurrent when started	Hardly					
Output current	Waveform distortion at some frequencies	Good waveform in the whole frequency band					

GVC vector control technology

- The original advanced GVC algorithm can effectively drive synchronous motors and reluctance motors only by inputting the motor parameters without self-learning, which is convenient for customers and reduces the difficulty of commissioning.
- Low-speed voltage compensation: increasing the output voltage capacity at low speed
- Self-adaptive to motor load characteristics, realizing stable on-load, fast current response during acceleration, and fast dynamic response when load changes





Low voltage ride through

- Automatic voltage regulation function: When the voltage of the power grid changes, it can automatically maintain the output voltage constant
- Instantaneous uninterrupted power supply function: It enables the inverter to keep running in case of sudden power failure

Flying start

• It can realize impact-free smooth startup of rotating motors at any time, reduce the impact on the power grid, and reduce the impact of instantaneous power failure on production



Automatic spraying process of conformal coating

• Special conformal coating automatic spraying equipment, UV glue imported from Germany, conforming to 3C4 standard



Efficient heat dissipation structure design, more compact overall dimensions

- Independent air duct effectively prevents foreign matters from entering the inverter
- Strict simulation and calculation of temperature distribution, wind speed and flow direction ensure the adaptability of the inverter to the environment



Reliable product design

- Application of long-life components makes the service life of the inverter reach more than 10 years
- Low-inductance busbar technology greatly reduces the inductance of busbar
- Prevent important components such as IGBT from being broken down, greatly improving the safety of the module
- All-round machine protection
- High-precision current detection and protection
- Comprehensive switching power supply protection...

Component	Service life
Main circuit capacitance	10 years
Control circuit capacitance	10 years

Application function

- Multiple startup and frequency setting methods to meet complex and changeable field applications
- Standard configuration of LED keyboard to facilitate operation
- Optional LCD keyboard
- Special PID control function easily realizes the process control and hopping frequency control and effectively avoids the mechanical resonance point
- Power-on self-test function makes every startup extremely safe and reliable
- Built-in SPFC constant pressure water supply function supports the soft start of up to 4 water pumps and auxiliary pump control applications

Model Description

N: standard LED

B: standard LCD



Power code: Adaptive Code motor 02P2 2.2 kW03P7 3.7kW

Voltage class:

0250

4T: three-phase 400V

Product Model and Specification

Inverter model AS180N (-B)	Rated input current (A)	Rated output current (A)	Adaptive motor (kW)	Overload 120% (1min) Output current (A)	Dimensions and specifications
4T02P2	5.3	5	2.2	6	
4T03P7	7.5	7	3.7	8.4	
4T05P5	11.5	11	5.5	13.2	AI
4T07P5	16	15	7.5	18	
4T0011	21	20	11	24	
4T0015	30.5	29	15	34.8	A2
4T18P5	38	36	18.5	43.2	
4T0022	46	44	22	52.8	A3
4T0030	59	56	30	67.2	
4T0037	75	72	37	86.4	
4T0045	94	90	45	108	A4
4T0055	115	110	55	132	
4T0075	154	148	75	177.6	A5
4T0090	183	176	90	211.2	
4T0110	216	208	110	249.6	A6
4T0132	261	252	132	302.4	
4T0160	306	296	160	355.2	A7
4T0185	367	356	185	427.2	
4T0200	402	390	200	468	
4T0220	427	415	220	498	A8
4T0250	481	468	250	561.6	

Inverter model AS180N (-B)	Rated input current (A)	Rated output current (A)	Adaptive motor (kW)	Overload 120% (1min) Output current (A)	Dimensions and specifications
4T0280	533	520	280	624	
4T0315	614	600	315	720	
4T0355	664	650	355	780	A9
4T0400	755	740	400	888	
4T0450	845	830	450	996	
4T0510	965	950	510	1140	A10
4T0560	1086	1070	560	1284	
4T0630	1186	1170	630	1404	A11

Note 1: input voltage: 380~460V.

Note 2: The rated power of a 4-pole motor is 50Hz. Please contact STEP for higher powers. The motor nameplate must be checked to ensure that the selected inverter matches the motor.

Note 3: The above are rated currents under the default carrier. For rated current ≤ 15 kW, the carrier frequency is 6kHz; < 30kW, the carrier frequency is 5kHz; ≤ 55 kW, the carrier frequency is 2kHz.

Requirements for Product Dimensions and Installation

See the following figures for the outline and name of each part of the inverter.





A4-A11 specification

A1-A3 specification

Product Overall Dimensions and Installation Dimensions

Dimensions of A1-A11 specification



C	Inverter		В	Н	W	D	Mounting		Installation		Tightening	M (1)
Specification	model AS180N (-B)	(mm)	(mm)	(mm)	(mm)	(mm)	hole diameter Φ (mm)	Bolt	Nut	Washer	torque (N·m)	Mass (kg)
	4T02P2											
	4T03P7											
A1	4T05P5	100	278	300	160	172	5.0	4M4	4M4	4Φ4	1.1	4.5
	4T07P5											
	4T0011					100						
A2	4T0015	166.5	357	379	222	182						8
	4T18P5						7.0	4M6	4M6	4Ф6	3.5	
A3	4T0022	165.5	392	414	232	182						10.3
	4T0030											
	4T0037											
A4	4T0045	200	520	530	270	296						29.5
	4T0055	200			015	015	9.0	4M8	4M8	4Φ8	9	20
A5	4T0075	200	517	540	315	315						38

G	Inverter	А	В	Н		D Mounting		Installation			Tightening	Mass (kg)
Specification	model AS180N (-B)	(mm)	(mm)	(mm)	(mm)	(mm)	hole diameter Φ (mm)	Bolt	Nut	Washer	torque (N∙m)	Mass (kg)
	4T0090											79.5
A6	4T0110	320	650	680	420	354	13.0	4M8	4M8	4Φ8	9	
	4T0132											81
A7	4T0160	294	851	880	420	356	13.0					
	4T0185											106.5
	4T0200							4M12	4M12	4Φ12	29	
A8	4T0220	294	851	880	500	356	14.0					112.5
	4T0250											112.5
	4T0280											141
4.0	4T0315											168
A9	4T0355	500	997	1030	630	370	14.0	4M12	4M12	4 Φ 12	29	169
	4T0400											170
4.10	4T0450	(00)	1157	1100 5	0.50	421.2	14.0	4) (12)	4) (12)	4610	20	200
A10	4T0510	600	1157	1189.5	852	431.2	14.0	41/112	41/112	4Φ12	29	280
A 1 1	4T0560	600	1226	1250	950	421.2	14.0	41412	41412	4012	20	210
AII	4T0630	000	1320	1339	832	431.2	14.0	41VI12	41VI12	4Ψ1 <i>2</i>	29	510

Technical Specifications

	Control mode	V/F control	GVC control				
	Starting torque	2.50Hz 120%	0.5Hz 120%				
	Range of speed regulation	1:50	1:200				
Technical	Speed stabilizing accuracy	±2%	±0.5%				
performance		Fan: exhaust air, blowing air					
	Applications	Water pump: constant pressure water supply, water supply and drainage					
		HVAC: heating, air conditioning terminal					
	Input voltage	380-460V (-15%~+10%), three-phase power sup	pply				
	Input frequency	45-65Hz					
Power input	Allowable voltage variation	Voltage unbalance <3%					
	Power loss ride crossing	In case of power failure during full-load operation	, it can persist for 15 ms				
	Voltage	0 VAC~input voltage					
	Overload	Stable operation at 40°C, 120%, 1 min					
Power output	Efficiency (full load)	≥94%~99%					
	Output frequency accuracy	±0.01% (digital command -10~+45°C); ±0.1% (analog command $25\pm10^{\circ}$ C)				
	Optocoupler isolation input	7/8-channel (PT1000 input can be converted to DI point), 24 V high and low levels are effective and can be set, and input functions can be defined					
Digital I/O	Open-collector output	2-way, output function can be defined					
	Relay output	 2-channel, NO contact, contact capacity: inductive, 1.5 A/250 VAC, output function can be defined 2-channel, NO and NC double contacts, contact capacity: resistive, 4.5A/250VAC or 4.5A/30VDC; inductance: 0.4A/250VAC or 0.4A/30VDC; output function can be defined 					
	Analog voltage input	2-channel, accuracy 0.1%; voltage: -10V~+10VDC or current: 0-20mA optional signal					
Analog I/O	Analog voltage output	2-channel, accuracy 0.1%; voltage: -10V~+10VDC or current: 0-20mA optional signal					
	Carrier frequency	1.1-8 kHz; the carrier frequency can be automatically adjusted according to the load characteristics					
	Frequency setting resolution	0.01Hz (digital command), ±0.06Hz/120Hz (analog command 11bit + unsigned)					
	Run command channel	Given operation panel, control terminal and com	munication				
	Frequency given channel	Given operation panel, digital/analog quantity, communication and function					
	Torque boosting	Automatic torque boosting; manual torque boosting					
Control		User-defined V/F curve, linear V/F curve and 3 torque reduction characteristic curves					
characteristics	V/F curve	User-defined V/F curve, linear V/F curve and 3	torque reduction characteristic curves				
	V/F curve Automatic voltage regulation (AVR)	User-defined V/F curve, linear V/F curve and 3 The duty cycle of the output PWM signal is adju fluctuation, thereby reducing the impact of the p voltage fluctuation	torque reduction characteristic curves isted automatically based on the busbar voltage ower grid voltage fluctuation on the output				
	V/F curve Automatic voltage regulation (AVR) Flying start	User-defined V/F curve, linear V/F curve and 3 The duty cycle of the output PWM signal is adju fluctuation, thereby reducing the impact of the p voltage fluctuation There is a start request when the motor rotates fr current running frequency to quickly control the	torque reduction characteristic curves usted automatically based on the busbar voltage ower grid voltage fluctuation on the output reely, and the inverter automatically searches the drive				
	V/F curve Automatic voltage regulation (AVR) Flying start DC braking capacity	User-defined V/F curve, linear V/F curve and 3 The duty cycle of the output PWM signal is adju fluctuation, thereby reducing the impact of the p voltage fluctuation There is a start request when the motor rotates fr current running frequency to quickly control the Braking current: 0.0~120.0% of rated current	torque reduction characteristic curves isted automatically based on the busbar voltage ower grid voltage fluctuation on the output reely, and the inverter automatically searches the drive				
0	V/F curve Automatic voltage regulation (AVR) Flying start DC braking capacity Parameter copy	User-defined V/F curve, linear V/F curve and 3 The duty cycle of the output PWM signal is adju fluctuation, thereby reducing the impact of the p voltage fluctuation There is a start request when the motor rotates fr current running frequency to quickly control the Braking current: 0.0~120.0% of rated current The standard operation panel can realize parame progress indication	torque reduction characteristic curves usted automatically based on the busbar voltage ower grid voltage fluctuation on the output reely, and the inverter automatically searches the drive ter uploading and downloading, with copy				
Special functions	V/F curve Automatic voltage regulation (AVR) Flying start DC braking capacity Parameter copy Process PID	User-defined V/F curve, linear V/F curve and 3 The duty cycle of the output PWM signal is adju fluctuation, thereby reducing the impact of the p voltage fluctuation There is a start request when the motor rotates fr current running frequency to quickly control the Braking current: 0.0~120.0% of rated current The standard operation panel can realize parame progress indication Used for closed-loop control of process quantitie	torque reduction characteristic curves Insted automatically based on the busbar voltage ower grid voltage fluctuation on the output reely, and the inverter automatically searches the drive ter uploading and downloading, with copy 25				

	Blocked rotor								
Motor protection	Motor overload								
	Speed limit								
	Output current limit								
	Inverter overload	Inverter overload							
	IGBT I ² t overload								
	Input power undervoltage/overv	bltage							
	DC busbar undervoltage/overvol	tage							
Invortor	IGBT overheating								
protection	Radiator overheating								
	Power failure								
	Loss of analog input signal (loss	of speed reference)							
	Abnormal communication								
-	Self-tuning fault								
-	Service location	It should be installed perpendicularly in a well-ventilated electric control cabinet. Horizontal or other installation methods are not allowed. The cooling medium is air.							
		mist steam and drinning							
	Ambient temperature	-10~+40°C							
	Temperature derating	In case of >40°C, the rated output current is reduced by 1% for every 1°C increase; the maximum temperature is 50°C							
Ambient	Altitude	<1000m							
conditions	Altitude derating	In case of >1000m, the rated output current is reduced by 2% for every 100m increase (the highest altitude is 3000m)							
	Ambient humidity	5~95%, no condensation allowed							
	Vibration	0.15mm; 10≤ f<57Hz, 57≤ f<150Hz, 1g							
	Storage temperature	-40~+70°C							
	IP rating	IP20							
	Туре	Movable							
	Length	1m, 3m (length can be customized up to 5m)							
	Connection	RJ45							
Control panel	Optional LCD text display	4 rows							
F F	Standard LED display	5 - b i t							
	Visual indicator	9 for LED panel and 4 for LCD panel							
	Button	8 for LED panel and 9 for LCD panel							
	Cooling mode	Forced air cooling							
Others	Installation method	Wall-mounted installation in the cabinet							
	Optional extension accessories	ProfiNet communication card, LCD panel for external cabinet door installation							

Wiring Schematic Diagram



Selection and Installation Dimensions of Keypad

See Fig. a and Fig. b for the keypad dimensions of the inverter. AS180N inverter is configured with a digital tube LED keypad as shown in Fig. a, and the AS180N-B inverter is configured with an LCD keypad as shown in Fig. b. Both keypads can be installed on the cabinet door through extension cords.



Application and Characteristics of Constant Pressure Water Supply Function

Application of SPFC constant pressure water supply function

• According to the target pressure given by the system, the inverter starts the water pump, if one water pump fails to reach the target pressure, the inverter will switch the motor to power frequency mode, and then start the other pump until the target pressure is reached.



Characteristics of SPFC constant pressure water supply function

- Special function of the water pump, which can realize multiple water supply modes without PLC or a water supply controller
- Cyclic frequency conversion and constant pressure water supply mode with one main pump and multiple auxiliary pumps, supporting up to 4 water pumps/auxiliary pumps
- Timed shift control to balance the operating time of the water pump and effectively prevent the water pump from rusting
- Flexible sleep/wake-up mode to meet the minimum pressure demand of the system and avoid frequent start and stop of the water pump
- Over/under pressure alarm function of pipe network, early warning of water pump idling or pipeline leakage
- Faulty pumps automatically exit the system so that pressure drop of the pipe network can be compensated quickly
- Automatic voltage regulation function keeps the output voltage constant and ensures that the characteristic curve of the water pump is not affected by the fluctuation of the power grid



Applications



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AS180N(-B) Inverter Sample AS180N(-B) Inverter Manual