STEP Share the convenience and happiness in an intelligent society

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STEP

AS 180N(-B) Series Generic Inverter

Catalogue

About STEP

Founded in 1995, Shanghai STEP Electric Corporation is the enterprise backed by the state, has been awarded as National High-Tech Enterprise, National Innovative Enterprise. In 2010, STEP was listed on the Shenzhen Stock Exchange as an A-share with abbreviation as Xinshida, and stock code as 002527. STEP is a member of the National Robot Standardization General Group, member of National Technical Committee 196 on Elevators of Standardization Administration of China, vice president of China Robot Industry Alliance, vice president of Shanghai Robot Industry Association, and vice president of Shanghai Intelligent Manufacturing Industry Association.

With focus on 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 in top quality.

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, elevators, water pumps, HVACs, rubber and plastics, general energy saving, construction machineries, 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, has established research and development centers in Shanghai, Shenzhen, Xi'an, Hangzhou, Germany and Japan. Additionally, we have post-doctoral research stations, and the laboratory at the technology center has been certified as the national CNAS. STEP actively participates the 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 up to June 30th, 2023.

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

About STEP Variable Frequency Drives

Leading brand in the VFD industry in China

STEP has been dedicated to the field of variable frequency drive (VFD) technologies for over two decades. It has an independent R&D platform, a comprehensive chain covering design, production, sales, and quality inspection, as well as a fully intelligent automated assembly line for integrated drive-control systems. STEP's high and low voltage VFD platforms cover the full power range, with an annual production capacity of 500,000 units.

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.

Contents

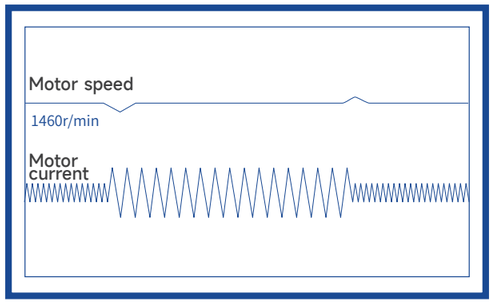
AS180N(-B)2.2kW-630kW

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

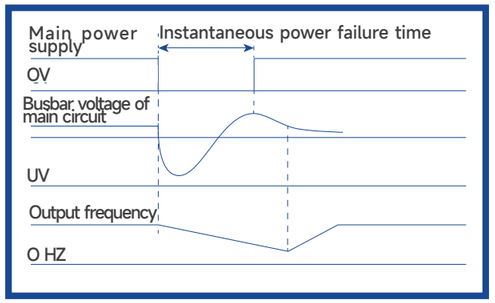
GVC vector control technology

- 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



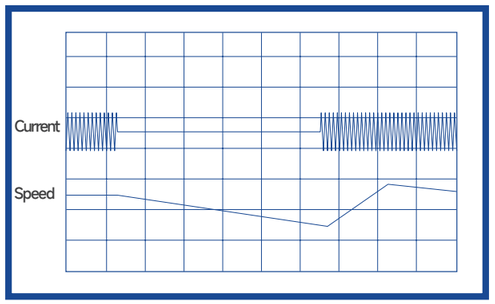
Low voltage ride through

- 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



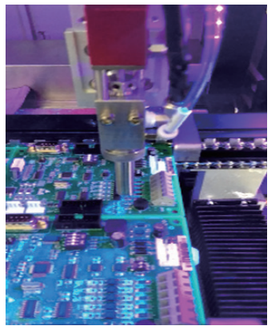
Flying start

- 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

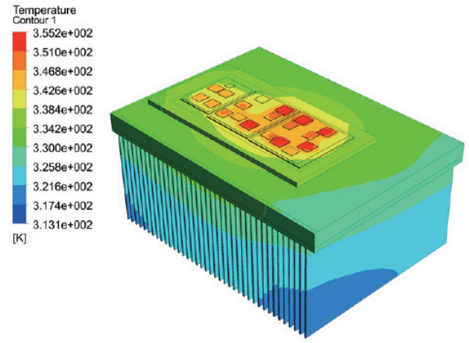
- Special conformal coating automatic spraying equipment, UV glue imported from Germany, conforming to 3C4 standard



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

AS 180N -B 4 T 0250

Product series:

AS180N(-B) series drive

Note: GVC control mode

Keypad configuration

N: standard LED

B: standard LCD

Voltage class:

4T: three-phase 400V

Power code:

Code	Adaptive motor
02P2	2.2kW
03P7	3.7kW

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	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	
4T0132	261	252	132	302.4	A7
4T0160	306	296	160	355.2	
4T0185	367	356	185	427.2	
4T0200	402	390	200	468	A8
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	
4T0450	845	830	450	996	A10
4T0510	965	950	510	1140	
4T0560	1086	1070	560	1284	A11
4T0630	1186	1170	630	1404	

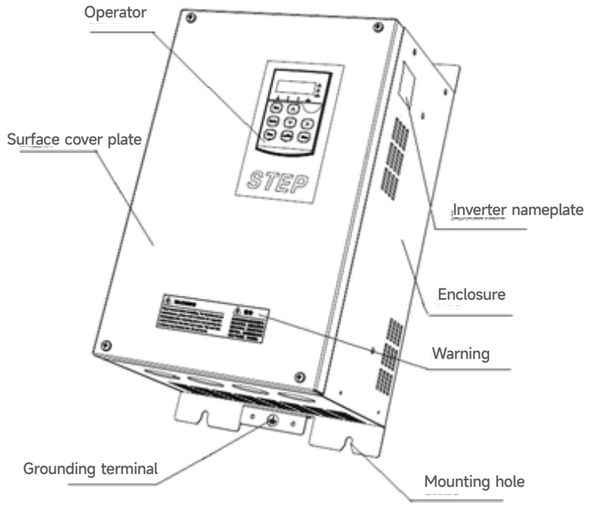
Note 1: input voltage: 380~460V.

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.

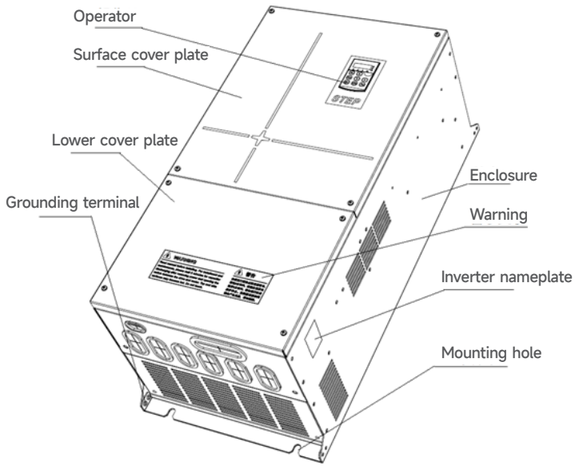
Note 3: The above are rated currents under the default carrier. For rated current ⩽ 15kW, the carrier frequency is 6kHz; < 30kW, the carrier frequency is 5kHz; ⩽ 55kW, the carrier frequency is 4kHz; ⩽ 75kW, the carrier frequency is 3kHz; and > 75kW, the carrier frequency is 2kHz.

Requirements for Product Dimensions and Installation

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



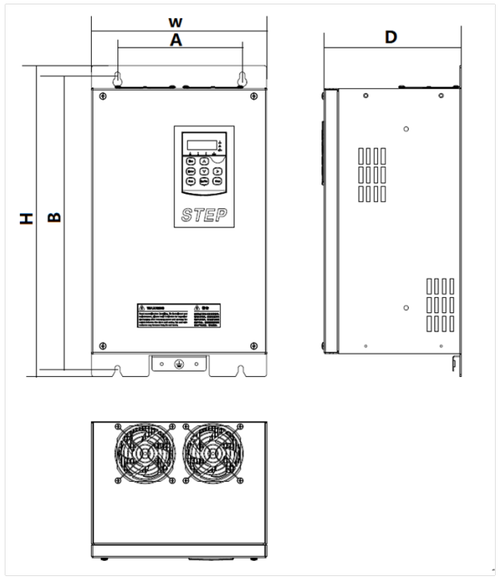
A1-A3 specification



A4-A11 specification

Product Overall Dimensions and Installation Dimensions

Dimensions of A1-A11 specification



A1-A11 规格的尺寸

Specification	Inverter model AS180N(-B)	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Mounting hole diameter Φ(mm)	Installation			Tightening torque (N·m)	Mass (kg)
								Bolt	Nut	Washer		
A1	4T02P2	100	278	300	160	172	5.0	4M4	4M4	4Φ4	1.1	4.5
	4T03P7											
	4T05P5											
	4T07P5											
A2	4T0011	166.5	357	379	222	182	7.0	4M6	4M6	4Φ6	3.5	8
	4T0015											
A3	4T18P5	165.5	392	414	232	182						10.3
	4T0022											
	4T0030											
A4	4T0037	200	520	530	270	296	9.0	4M8	4M8	4Φ8	9	29.5
	4T0045											
A5	4T0055	200	517	540	315	315						38
	4T0075											

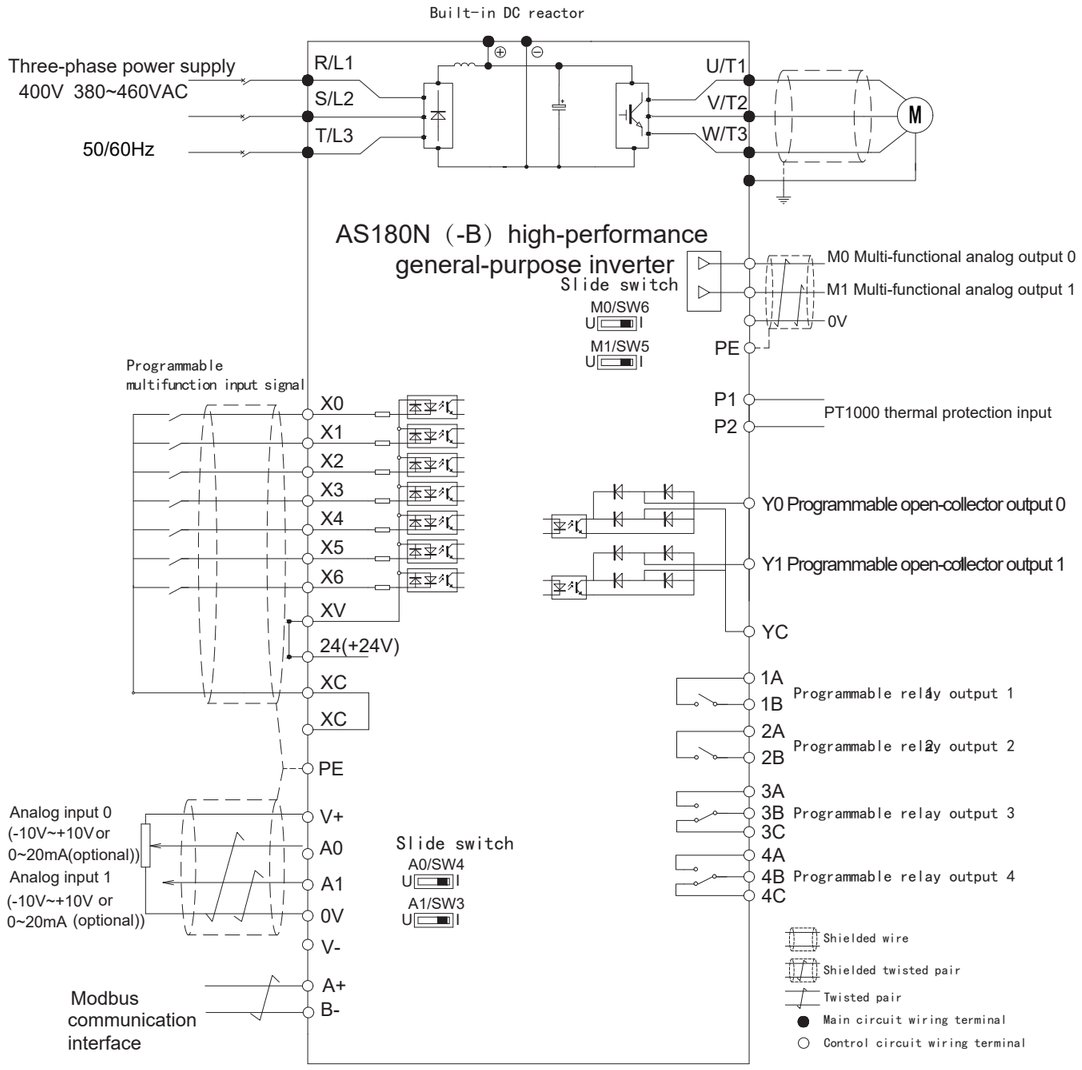
Specification	Inverter model AS180N(-B)	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Mounting hole diameter Φ(mm)	Installation			Tightening torque (N·m)	Mass (kg)
								Bolt	Nut	Washer		
A6	4T0090	320	650	680	420	354	13.0	4M8	4M8	4Φ8	9	79.5
	4T0110											81
A7	4T0132	294	851	880	420	356	13.0	4M12	4M12	4Φ12	29	
	4T0160											106.5
	4T0185											
A8	4T0200	294	851	880	500	356	14.0					
	4T0220											112.5
	4T0250											
A9	4T0280	500	997	1030	630	370	14.0	4M12	4M12	4Φ12	29	141
	4T0315											168
	4T0355											169
	4T0400											170
A10	4T0450	600	1157	1189.5	852	431.2	14.0	4M12	4M12	4Φ12	29	280
	4T0510											
A11	4T0560	600	1326	1359	852	431.2	14.0	4M12	4M12	4Φ12	29	310
	4T0630											

Technical Specifications

Technical performance	Control mode	V/F control	GVC control
	Starting torque	2.50Hz 120%	0.5Hz 120%
	Range of speed regulation	1:50	1:200
	Speed stabilizing accuracy	± 2%	± 0.5%
	Applications	Fan: exhaust air, blowing air	
		Water pump: constant pressure water supply, water supply and drainage	
		HVAC: heating, air conditioning terminal	
Power input	Input voltage	380-460V (-15%~+10%), three-phase power supply	
	Input frequency	45-65Hz	
	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	
Power output	Voltage	0 VAC~input voltage	
	Overload	Stable operation at 40° C, 120%, 1 min	
	Efficiency (full load)	≥ 94%~99%	
	Output frequency accuracy	±0.01% (digital command -10~+45° C); ±0.1% (analog command 25±10° C)	
Digital I/O	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	
	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 I/O	Analog voltage input	2-channel, accuracy 0.1%; voltage: -10V~+10VDC or current: 0-20mA optional signal	
	Analog voltage output	2-channel, accuracy 0.1%; voltage: -10V~+10VDC or current: 0-20mA optional signal	
Control characteristics	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 communication	
	Frequency given channel	Given operation panel, digital/analog quantity, communication and function	
	Torque boosting	Automatic torque boosting; manual torque boosting	
	V/F curve	User-defined V/F curve, linear V/F curve and 3 torque reduction characteristic curves	
	Automatic voltage regulation (AVR)	The duty cycle of the output PWM signal is adjusted automatically based on the busbar voltage fluctuation, thereby reducing the impact of the power grid voltage fluctuation on the output voltage fluctuation	
	Flying start	There is a start request when the motor rotates freely, and the inverter automatically searches the current running frequency to quickly control the drive	
	DC braking capacity	Braking current: 0.0~120.0% of rated current	
Special functions	Parameter copy	The standard operation panel can realize parameter uploading and downloading, with copy progress indication	
	Process PID	Used for closed-loop control of process quantities	
	Common DC busbar	Multiple inverters can share a DC busbar for power supply	

Motor protection	Blocked rotor	
	Motor overload	
	Speed limit	
Inverter protection	Output current limit	
	Inverter overload	
	IGBT I^2t overload	
	Input power undervoltage/overvoltage	
	DC busbar undervoltage/overvoltage	
	IGBT overheating	
	Radiator overheating	
	Power failure	
	Loss of analog input signal (loss of speed reference)	
	Abnormal communication	
	Self-tuning fault	
Ambient conditions	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. Installed in an environment free from direct sunlight, dust, corrosive gas, combustible gas, oil mist, steam and dripping
	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
	Altitude	<1000m
	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
Control panel	Type	Movable
	Length	1m, 3m (length can be customized up to 5m)
	Connection	RJ45
	Optional LCD text display	4 r o w s
	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
Others	Cooling mode	Forced air cooling
	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.

Fig. a Dimensions of standard LED keypad for AS180N inverter (supporting installation on cabinet door)

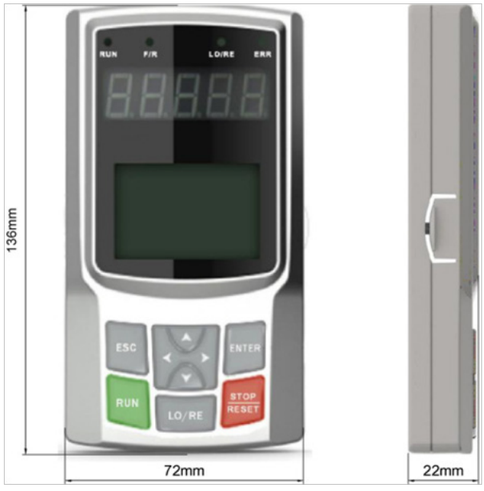


Fig. b Dimensions of standard LCD keypad for AS180N-B inverter (supporting installation on cabinet door)

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