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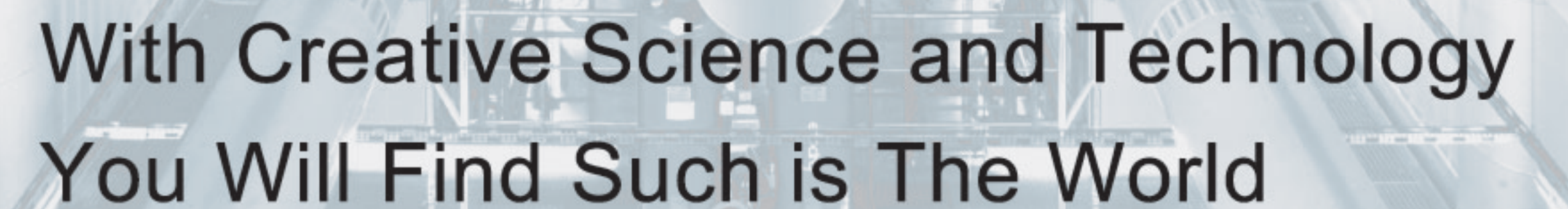
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AS800 High-Voltage Drive V1.1



With Creative Science and Technology
You Will Find Such is The World

COMPANY CULTURE

STEP Spirit: Face the world; pursue the best, stay always ahead of the line.

STEP Value: Faith, innovation, excellence.

STEP Tenet: Customer satisfaction, employee pride, community benefit.

STEP Mission: Provide the best controller, drive and energy-saving products for our customers.

STEP vision: To be an international high-tech enterprise in electric industry.

COMPANY INTRODUCTION

Shanghai Sigriner STEP Electric Co., Ltd is a subsidiary of Shanghai STEP Electric Corporation. Shanghai STEP Electric Corporation is an enterprise group and was founded in 1995, and the registered trademark is "STEP". STEP Group mainly specializes in R&D, manufacture and sales of industrial control systems and drive products, owning 4 domestic companies and 2 overseas companies.

In 2006, Shanghai STEP Electric Corporation invested in and established the Shanghai Sigriner STEP Electric Co., Ltd, having a modern R&D and manufacture facility of drive product, with area of 30000 square meters, equipped with the first class test instruments and production equipments in the world. And advanced management systems and strict quality controls are implemented to make sure of providing clients with drive products and services of high quality. The company owns various series of products, including high/low voltage fan/pump drive, high/low voltage vector drive, four-quadrant drive, drive for elevator, common DC bus drive, integrated driving controller, energy regenerator device, door drive, AC servo system, etc.

As utilization of the STEP global strategy, the products have been exported to over 30 countries and regions in Europe, North America, and Asia. In China, STEP has set up 18 agencies and liaison offices in Beijing, Shanghai, Guangzhou, etc., with sales of service covering the entire country.

STEP insists in the enterprise spirit: Face the world; pursue the best, stay always ahead of the line. It strives to provide the best controller, driver and energy-saving products for our customers and desires to be an international high-tech enterprise in electric industry step by step.

AS800
High-Voltage Drive



AS800
High-Voltage Drive

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PRODUCT INTRODUCTION

AS800 high-voltage frequency converter is a kind of high-voltage frequency conversion governor, featuring on energy saving and environmental protection, developed by Shanghai Sigriner STEP Electric Co., Ltd by using the international sophisticated power electronic technology and vector control technique. It not only owns outstanding control performance, but also integrates with application characteristics in China, to further strengthen the reliability of the product and environmental adaptability as well as customized and industrialized design, which better meet a wide range of applications in coal mining, cement, thermal power, petroleum, rubber, metal, chemical, paper making industries, etc.

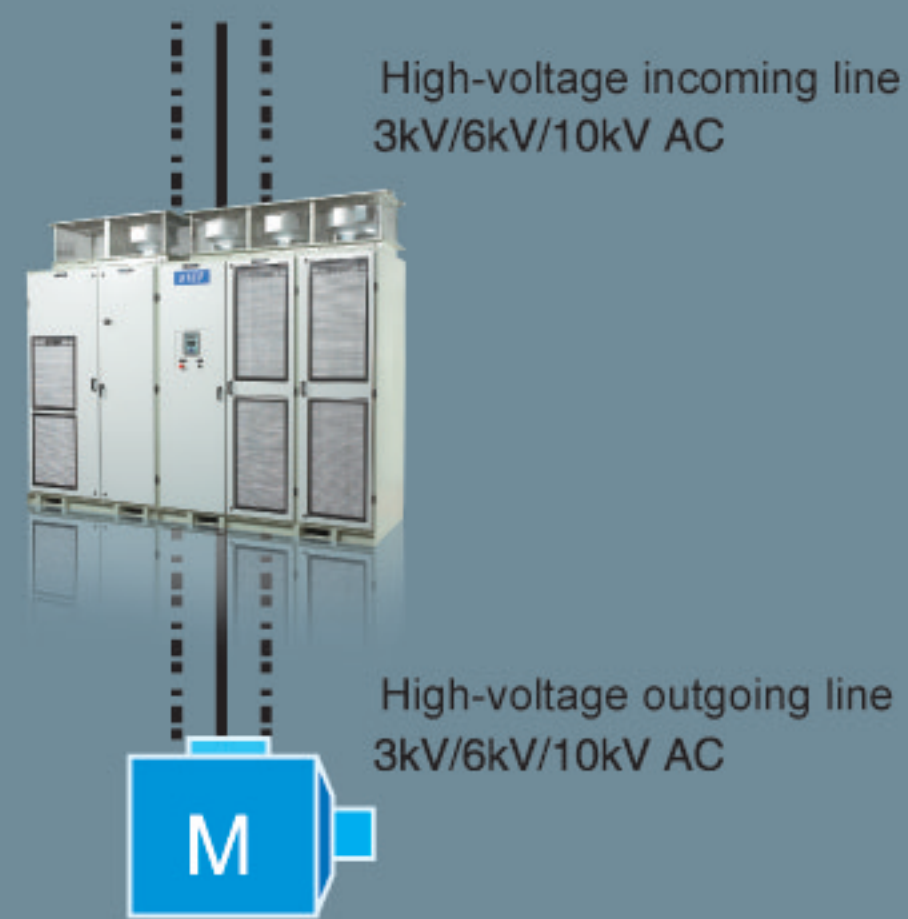


AS800
High-Voltage Drive

SYSTEM PRINCIPLES

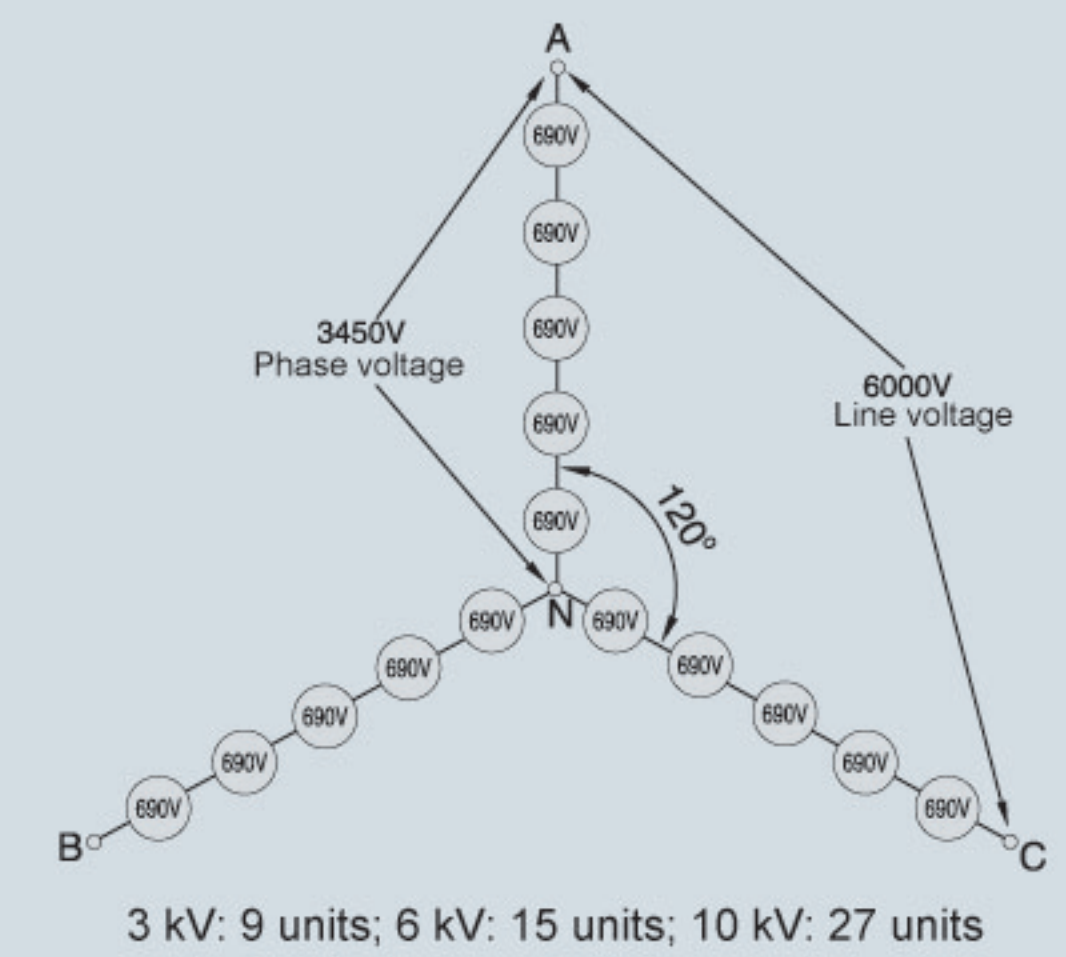
High-high structure

AS800 belongs to high-high voltage source drive, adopting internationally advanced H bridge cascaded multi-level superposition technology, input 6 kV (3 kV or 10 kV) AC directly, output 6 kV (3 kV or 10 kV) AC directly to motor without output transformer.



Multi-level superposition

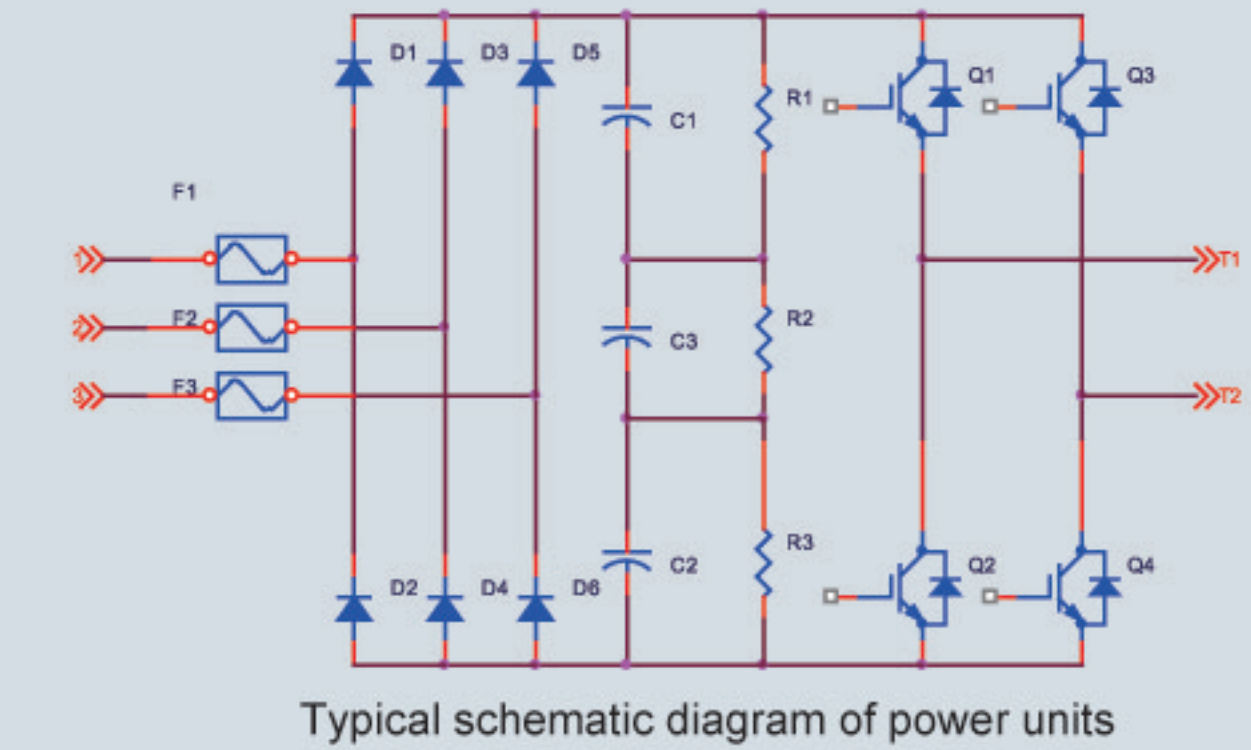
AS800 high-voltage drive consists of multiple 690 V power units in series, power of each unit is supplied by the secondary winding of phase shifting transformer, and each phase is composed of 3, 5 or 9 power units depending on the difference in class of output voltage (3kV/6kV/10 kV). The taped phase-shifting rectification mode may greatly improve the grid-side current waveform and make the grid-side power factor under load close to 1. The independence of secondary winding of transformer makes the main circuit of each power unit independent relatively, greatly increasing the reliability of verter.



Structure of power units

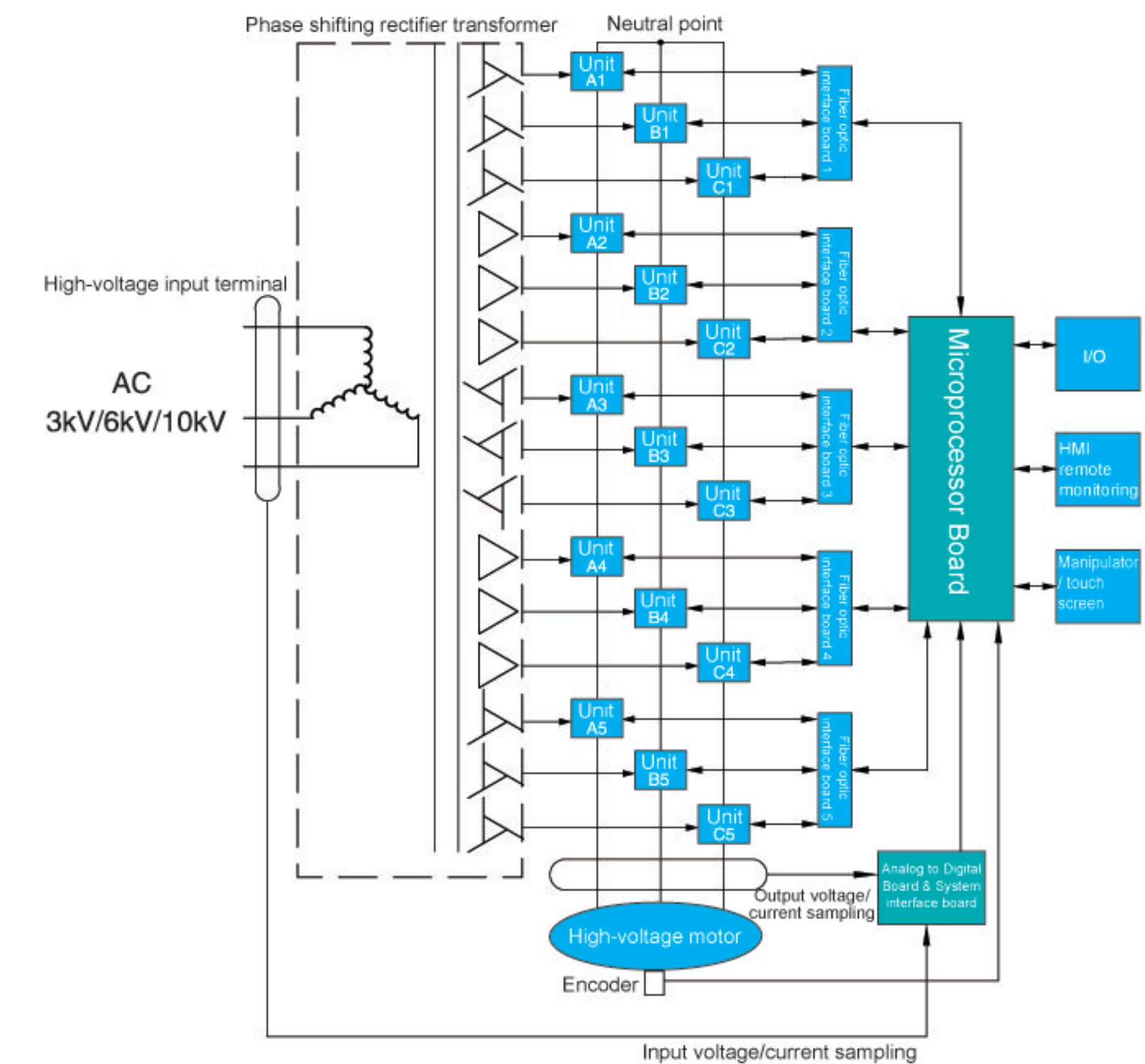
Power units consist of 3-phase diode bridge rectifier, IGBT inverter bridge, capacitor bank as well as driving, protecting, monitoring, communicating components, etc. All power modules have an intellectualized design, providing with a powerful self-diagnostic capability.

The power unit modules in a certain power range are uniform in structure and electrical behavior so as to replace with the backup module with the identical functions in several minutes and reduce down time while the module appears fault.



AS800
High-Voltage Drive

SYSTEM PRINCIPLES



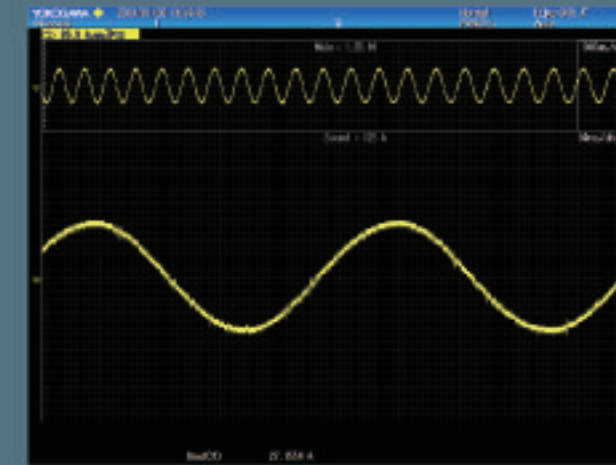
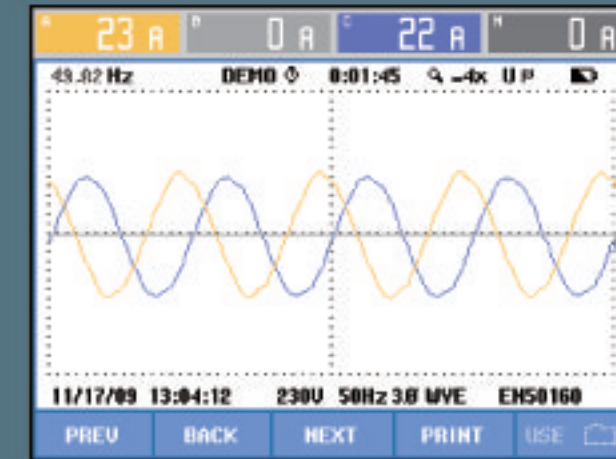
FEATURES

> Flexible closed-loop control

- ◆ The method of Vector control without sensor control the speed stably.
- ◆ For accurate speed control or greater starting torque, select the closed-loop vector control with speed sensor

> High-grade load of power supply

- ◆ the secondary winding of the input transformer with multiple reduces the pollution to power supply by higher harmonic current, conforming to the strictest IEEE 519 standard.
- ◆ it is a real sense of Perfect Harmony series of frequency converter, which inherently provides a sinusoidal output without the use of external output filters and power factor compensation.



> The quality drive of motor

- ◆ Multi-level PWM control mode, providing sine wave output current.
- ◆ Small common mode voltage and dV/dt, without special requirements for motor and cables, modifying the aging equipments without replacing the motor.

AS800
High-Voltage Drive

> Ideal mechanical power

- ◆ The upper harmonics of output current is minute and the effect of the torque pulsations to shaft system can be ignored

> High efficiency

- ◆ Output current is sine wave basically, reducing the upper harmonics loss of motor.
- ◆ The upper harmonics in the transformer primary is low and the system efficiency is above 97%.
- ◆ Output transformer is not required, eliminating the loss hereof.
- ◆ Multi-level PWM control, reduce the loss of IGBT high frequency switch.

> High power

- ◆ Use diode full-bridge rectification, the power factor may be up to 95% above without power factor compensation.

> High reliability

- ◆ IGBT inverter: adopt 1700 V high-voltage IGBT, reduce the number of components, and improve the reliability of system.
- ◆ Strong anti-interference: the control system is isolated from the power units by optical fibers, safe and reliable.
- ◆ Powerful self-diagnostic capability: precise and timely pre-warning protection for various unexpected events in the system

> Energy saving

- ◆ Soft startup of inverter, greatly reducing the starting current of motor
- ◆ Variable speed drive for variable torque load of fan, pump, etc., saving the energy excessively



AS800
High-Voltage Drive

OPERATION METHOD

> Simplified failure diagnosis

- ◆ Fault location and inquiry function. For minor fault, the main interface of inverter display the alarm information; for serious fault, the inverter provides not only the alarm information but sound of alarm bell. On the main interface of HMI, user may inquire the history of fault through "daily alarm record".

Time	Alarm Code	Alarm Description	Alarm Status
11/17/09 13:04:12	01	IGBT Overcurrent	OK
11/17/09 13:04:15	02	IGBT Overtemperature	OK
11/17/09 13:04:18	03	IGBT Undercurrent	OK
11/17/09 13:04:21	04	IGBT Undertemperature	OK
11/17/09 13:04:24	05	IGBT Overvoltage	OK
11/17/09 13:04:27	06	IGBT Undervoltage	OK
11/17/09 13:04:30	07	IGBT Overfrequency	OK
11/17/09 13:04:33	08	IGBT Underfrequency	OK
11/17/09 13:04:36	09	IGBT Overcurrent	OK
11/17/09 13:04:39	10	IGBT Overtemperature	OK

> Simplified maintenance

- ◆ Front care structure, convenient to maintain; the transformer cabinet and unit cabinet are in the same line, no need of external cables.
- ◆ Modularized power units communicate with fibre-optical, 3 input cables and 3 output cables in total, easy to repair.

PRODUCT APPLICATION

Application mode

Single-machine application

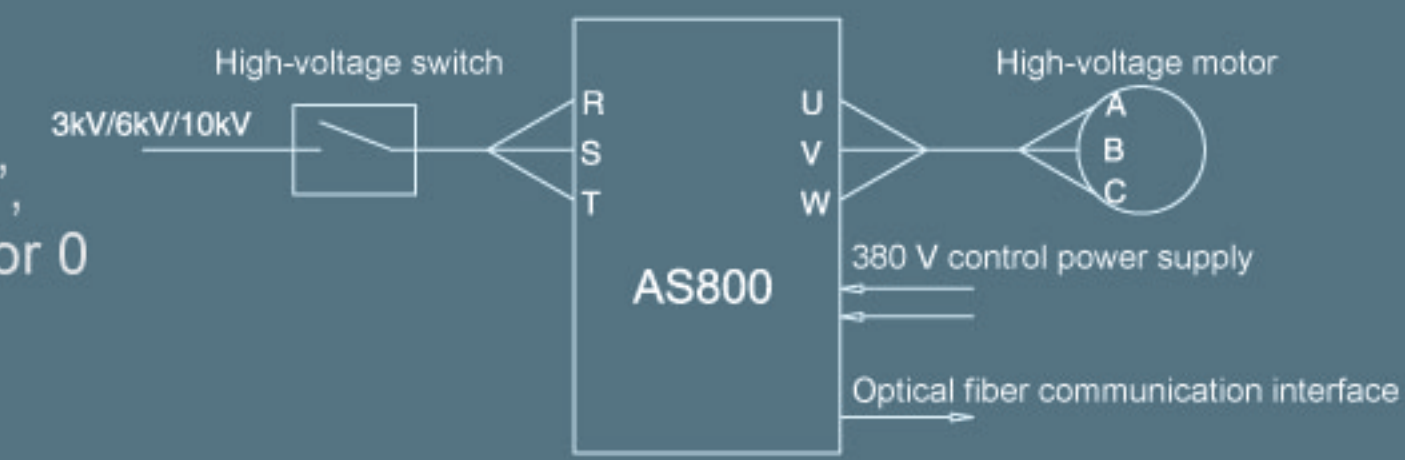
Advanced technology and stable performance meet requirements for different conditions. "One driving one", ensure the long-term stable running for 0 ~ 120 Hz frequency modulation and voltage modulation.

"One controlling multiple"

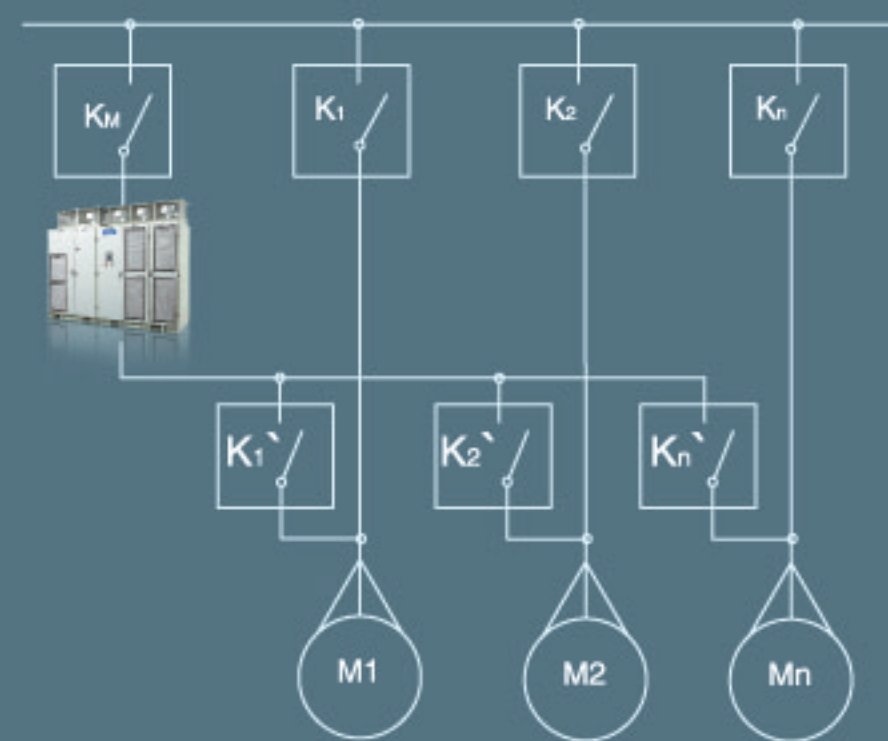
Because the inverter adopts the high-high mode, the rated output voltage is equal to the grid power supply voltage and rated voltage of motor, easy to implement the plan of "one inverter controlling multiple motors".

Ki (i = 1, 2...N) closed, Ki' (i = 1, 2...N) open, the motor may run by power frequency. Ki open, Ki' closed, KM closed, the motor may operate by speed regulation. The preconditions that realize the soft startup of motor and start/stop auto speed regulation: Ki and Ki' are both vacuum electric-operated switches.

Bypass function



Typical wiring diagram for single-machine application



Typical wiring diagram for "one controlling multiple" application



AS800
High-Voltage Drive

STANDARD WIRING DIAGRAM

AS800
High-Voltage Drive

Scope of application

AS800 series high-voltage drive applies to not only the common load such as fan, pump, belt feeder, etc., but the internal mixer, extruder, stirrer, etc. needing accurate speed control or greater startup torque.

Thermal power

Induced draft fan, blower, dust absorber, compressor, drainage pump, boiler feed pump, belt conveyor, etc.

Water supply, heat supply

Municipal water supply (pump, etc.)

Sewage treatment (sludge pump, goodness pump, clean water pump)

Central heating station (for driving various water transport pump, water supply pump, water service pump, sludge pump, aeration blender, etc)

Rubber, plastics

Internal mixer, extrusion press, agitator, kneader, etc

Metal

Sintering fan, blast furnace fan, converter dust removing fan, electric furnace dust removing fan, ventilator, continuous casting and rolling cooling fan, phosphorus removal pump

Cement, ceramics

Kiln head fan, kiln end fan, high temperature fan, raw mill fan, coal mill dust removal fan, cement mill dust removal fan, etc

Others

Food industry (filter, blower, pump, separator, kneader, stirrer, extruder, grinder)

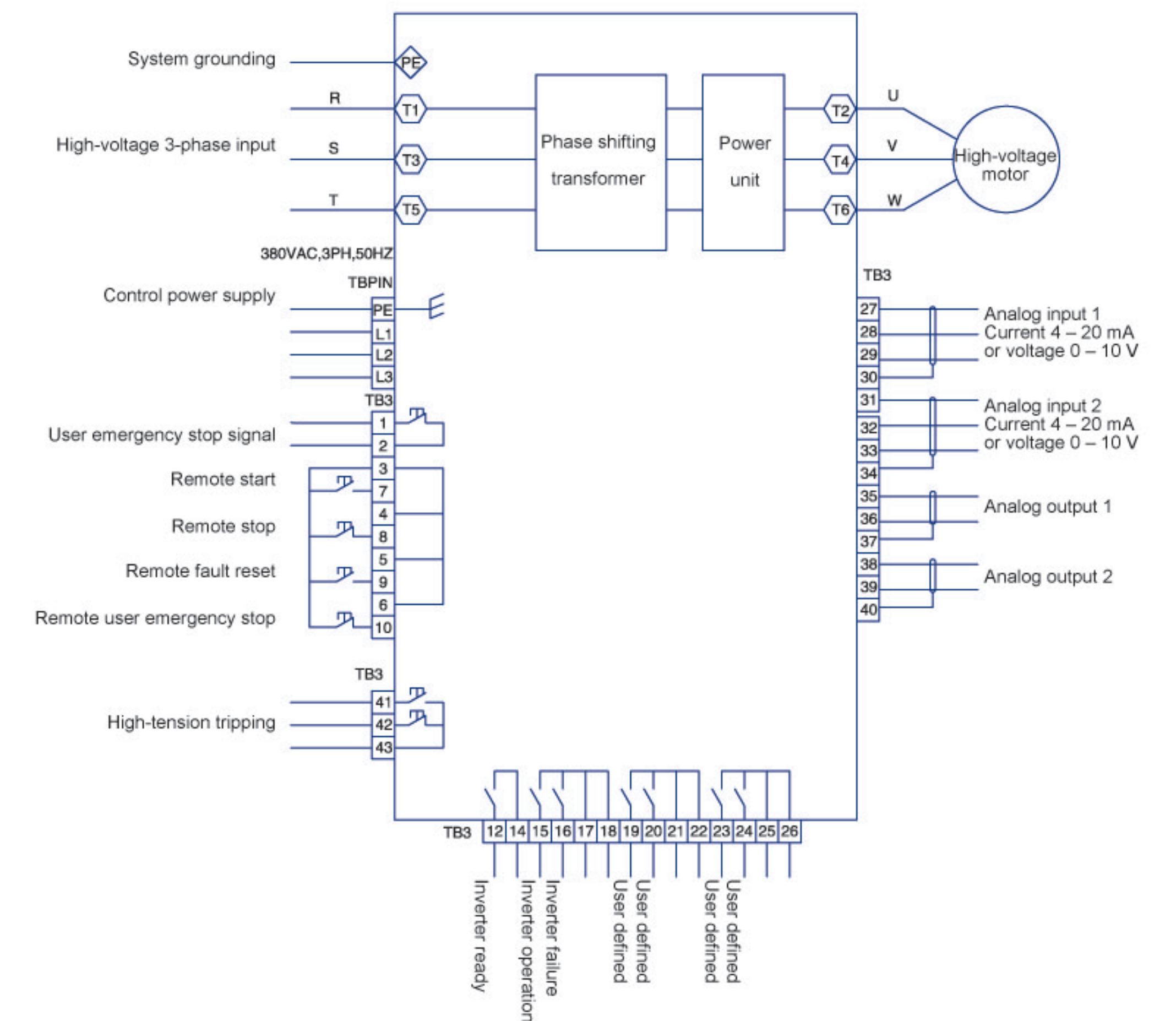
Paper making (beating machine)

Pharmacy industry (cleaning machine)

Air conditioning system (pump, fan, compressor, air supply and exhaust for air course system, etc)

Ships and vessels, marine drilling platform (pump, fan, compressor, air supply and exhaust for air course system, etc)

Other special test centers (for test bed for internal combustion engines and motor, and equipment for physical test of gas or liquid medium)



STEP Website: www.stepelectric.com/signiner
Service hotline: 400-821-0325

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STANDARD WIRING DIAGRAM

Main power wiring terminals

Terminal symbols	Symbols defined for terminal wiring	Remarks
T1	High-voltage input 1st phase R	3-phase high-voltage power supply 3kV/6kV/10kV 50/60Hz
T3	High-voltage input 2nd phase S	
T5	High-voltage input 3rd phase T	
T2	High-voltage output 1st phase U	
T4	High-voltage output 2nd phase V	
T6	High-voltage output 3rd phase W	
PE	System grounding	

Control power wiring terminals

Terminal symbols	Symbols defined for terminal wiring	Remarks
L1	Control power supply Phase A	3PH/380V/50Hz
L2	Control power supply Phase B	
L3	Control power supply Phase C	
PE	Control power supply grounding	

Control cable wiring terminals

Terminal symbols	Symbols defined for terminal wiring	Remarks
TB3:1, TB3:2	User local emergency stop signal	NC contact
TB3:3, TB3:7	Remote start	DC 24 V, source input
TB3:4, TB3:8	Remote stop	
TB3:5, TB3:9	Remote fault reset	
TB3:6, TB3:10	Remote emergency stop	
TB3:11, TB3:13	High-voltage tripping intermediate relay	Relay output, NO contact, contact capacity: 5A 250 VAC
TB3:12, TB3:14	Drive ready	
TB3:15, TB3:17	Drive operation	
TB3:16, TB3:18	Drive failure	
TB3:19, TB3:21	User defined	
TB3:20, TB3:22	User defined	
TB3:23, TB3:25	User defined	
TB3:24, TB3:26	User defined	
TB3:27, TB3:28/TB3:29	Analog input 1	
TB3:30	Analog input 1 shielding	
TB3:31, TB3:32/ TB3:33	Analog input 2	
TB3:34	Analog input 2 shielding	
TB3:35, TB3:36	Analog output 1	
TB3:37	Analog output 1 shielding	
TB3:38, TB3:39	Analog output 2	
TB3:40	Analog output 2 shielding	
TB3:43, TB3:41/ TB3:42	High-voltage tripping signal	
TB3:44-60	User standby	

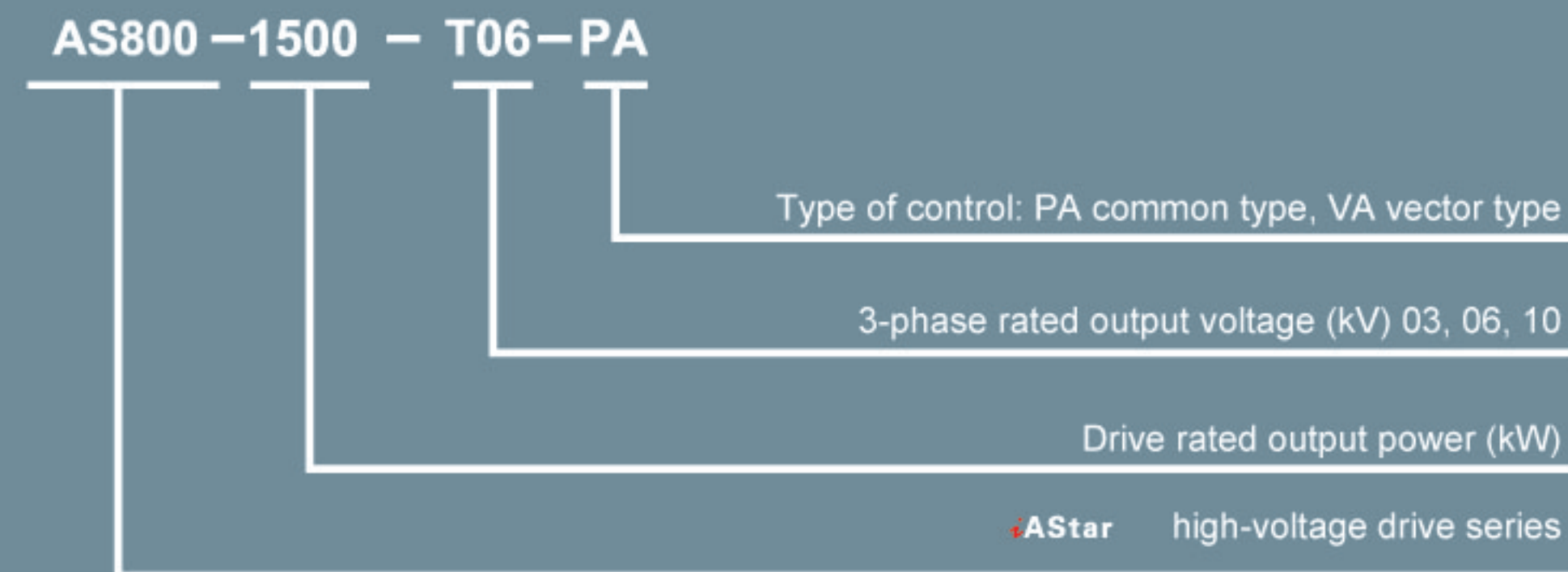
AS800
High-Voltage Drive

TECHNICAL SPECIFICATION

Items	Descriptions	
Input	Range of drive capacity	250-4000KW/315-5000KVA
	Input line voltage	3.0/6.0/10.0 kV
	Permissible error of input voltage	At rated output, ±15% of nominal value
	Input power factor	0.95, if exceeding 20% of load
Output	Output line voltage	3.0/6.0/10.0 kV
	Output frequency drift	± 0.5%
	Output frequency resolution	0.01Hz
Control parameters	Range of speed	0.5-120 Hz (related to motor), 0~200 Hz under vector control
	Overload capacity	VF control: 120%, 60s; 150% 5s; 200%, protected immediately Vector control: 150% 60s; 180%, 10s; 200%, 3 s Special motor: 200%, 60s; 300%, 3s (according to customer's design requirements)
	Control mode	VF control, speed sensorless vector control, or speed sensor vector control, restart after stop (0.3~6s)
	Control accuracy	±0.5% of maximum frequency
	Load torque characteristic	Square torque load, constant torque load
	Acceleration/deceleration time	VF control: 1-3200 s; vector control: 0.5-3200s (related to load inertia characteristic)
	Signal input/output	2-way analog input, 2-way analog output, 16 digital inputs, 8 digital outputs; (may be expanded according to user's demand)
	Major control functions	Soft startup, instantaneous power down control without stopping, curve acceleration control, power frequency synchronous switching (optional), jumping frequency, rotating speed track, accumulated operating time display, automatic voltage regulation
	Major protection functions	Overcurrent limit, overcurrent, overvoltage, undervoltage, power unit fault, cooling fan abnormality, grounding fault, etc.
Communication (optional)	Optical fiber, DeviceNet, Profibus-DP, Modbus, EtherNET, etc.	
Display	OLED manipulator, LCD touch screen (optional)	
Input transformer	H-grade insulation	
Structure	Cabinet	IP20、IP31
	Cooling method	Top fan forced air cooling
	Structure of cabinet	Steel semi-closed independent structure, front maintenance
Environmental conditions	Operating ambient temperature	0 - +40℃
	Storage and transport temperature	-20℃- +70℃
	Humidity	< 95%, no condensation
	Vibration	0.5g
	Location	Indoor
Altitude	Derating required if exceeding 1000m	
Applicable load	Fan, pump, compressor, forming machine, internal mixer, stirrer, etc.	

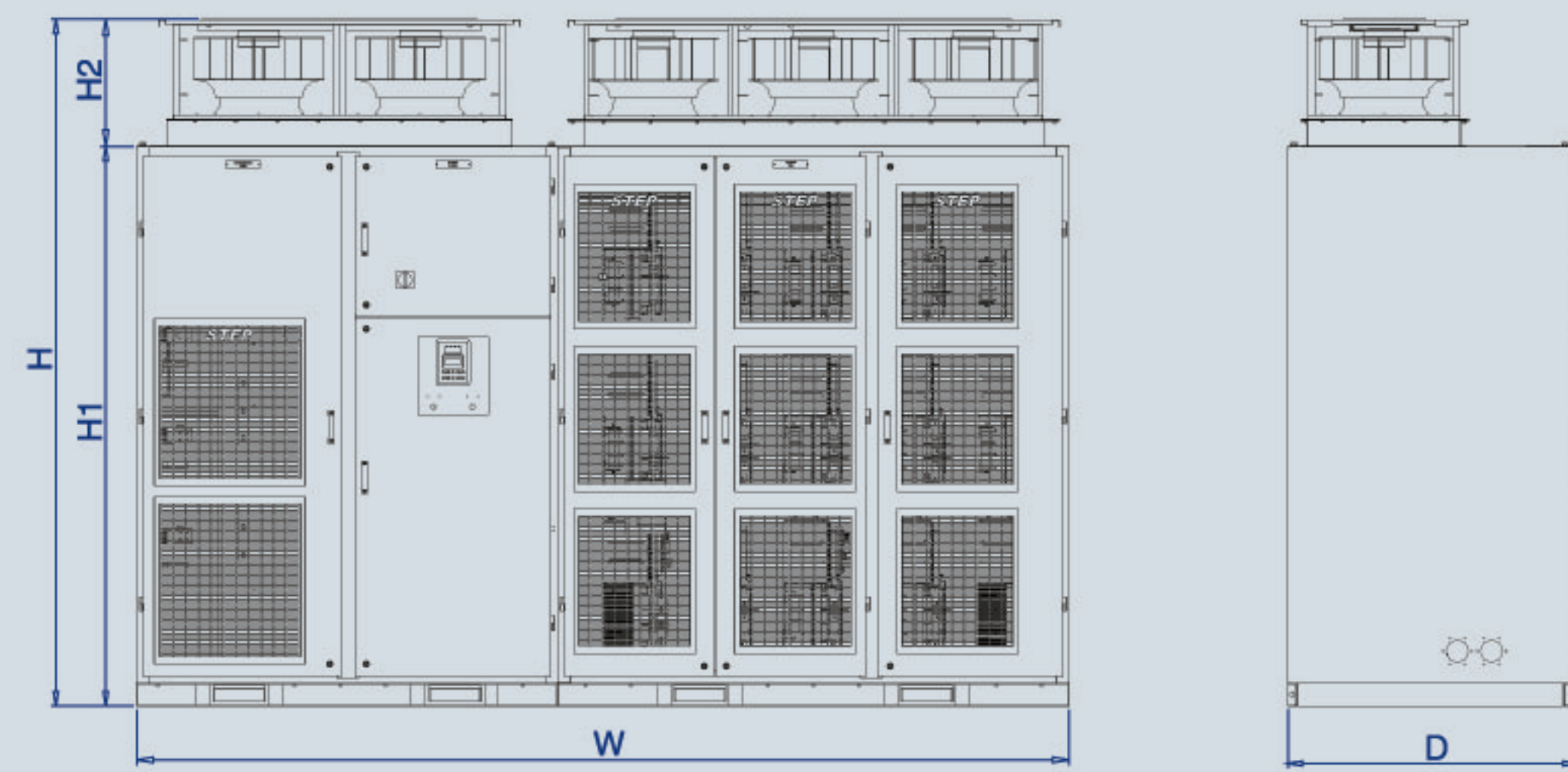
MODEL-SELECTION AND ORDERING

Model definition of high-voltage drive



AS800 High-Voltage Drive MODEL-SELECTION AND ORDERING

Dimensions of high-voltage drive



3kV /6kV/10kV

Data for model-selection and ordering

3 kV series products					
Output current [A]	Drive capacity [kVA]	Applicable Motor [KW]	Model	Number of power units	Dimensions of complete machine (WxDxH) [mm]
70	315	250	AS800-0250-T03-PA	9	2540x1092x2950
70	400	315	AS800-0315-T03-PA	9	
100	500	400	AS800-0400-T03-PA	9	
140	630	500	AS800-0500-T03-PA	9	
140	800	630	AS800-0630-T03-PA	9	
200	1000	800	AS800-0800-T03-PA	9	3480x1092x2950
260	1250	1000	AS800-1000-T03-PA	9	
260	1600	1250	AS800-1250-T03-PA	9	
315	1800	1400	AS800-1400-T03-PA	9	5690x1280x2950
375	2000	1600	AS800-1600-T03-PA	9	
375	2240	1800	AS800-1800-T03-PA	9	
500	2500	2000	AS800-2000-T03-PA	9	

6 kV series products						
Output current [A]	Drive capacity [kVA]	Applicable Motor [KW]	Model	Number of power units	Dimensions of single-door complete machine (WxDxH) [mm]	Dimensions of double-door complete machine (WxDxH) [mm]
70	280	220	AS800-0220-T06-PA	15	3492x1092x2850	2666x1500x2611
70	315	250	AS800-0250-T06-PA	15		
70	355	280	AS800-0280-T06-PA	15		
70	400	315	AS800-0315-T06-PA	15		
70	450	355	AS800-0355-T06-PA	15		
70	500	400	AS800-0400-T06-PA	15		
70	600	450	AS800-0450-T06-PA	15		
70	630	500	AS800-0500-T06-PA	15		
100	800	630	AS800-0630-T06-PA	15		
100	950	750	AS800-0750-T06-PA	15		
100	1000	800	AS800-0800-T06-PA	15		
140	1250	1000	AS800-1000-T06-PA	15		
200	1600	1250	AS800-1250-T06-PA	15		
200	1800	1400	AS800-1400-T06-PA	15		
200	2000	1500	AS800-1500-T06-PA	15		
200	2000	1600	AS800-1600-T06-PA	15		
260	2240	1800	AS800-1800-T06-PA	15		
260	2500	2000	AS800-2000-T06-PA	15		
260	2800	2240	AS800-2240-T06-PA	15		
315	3150	2500	AS800-2500-T06-PA	15		
375	4000	3150	AS800-3150-T06-PA	15		
500	4500	3550	AS800-3500-T06-PA	15		
500	5000	4000	AS800-4000-T06-PA	15		

10 kV series products						
Output current [A]	Drive capacity [kVA]	Applicable Motor [KW]	Model	Number of power units	Dimensions of single-door complete machine (WxDxH) [mm]	Dimensions of double-door complete machine (WxDxH) [mm]
40	280	220	AS800-0220-T10-PA	27	4320x1350x3100	3376x1500x2611
40	315	250	AS800-0250-T10-PA	27		
40	400	315	AS800-0315-T10-PA	27		
40	500	400	AS800-0400-T10-PA	27		
70	630	500	AS800-0500-T10-PA	27		
70	800	630	AS800-0630-T10-PA	27		
70	1000	800	AS800-0800-T10-PA	27		
100	1250	1000	AS800-1000-T10-PA	27		
100	1600	1250	AS800-1250-T10-PA	27		
100	1800	1400	AS800-1400-T10-PA	27		
140	2000	1600	AS800-1600-T10-PA	27		
140	2240	1800	AS800-1800-T10-PA	27		
140	2500	2000	AS800-2000-T10-PA	27		
200	2800	2240	AS800-2240-T10-PA	27		
200	3150	2500	AS800-2500-T10-PA	27		
260	4000	3150	AS800-3150-T10-PA	27		
260	4500	3550	AS800-3550-T10-PA	27		
315	5000	4000	AS800-4000-T10-PA	27		

> SERVICE COMMITMENT

When you contact products of Sigriner STEP for the first time, you will find their differences. Our experts own rich experiences and may help you select drives applicable to your process. From the initial technical specifications to production, delivery and installation, we will comply with all your requirements.

Sigriner STEP's services and supports are not only limited to telephone assistance. At different stages of installation, startup, maintenance and troubleshooting, our representatives will provide technical services and supports for you for 24 hours per day, 7 days per week.

> Range of our services

- Round-the-clock service 24 / 7 / 365
- Preventive maintenance
- Training
- Spares sales
- Product renewal
- Upgrading
- Repair and replacement
- Professional services (harmonic analysis, power supply quality research, electrical system application, remote diagnosis, etc.)

> Our commitment

Sigriner STEP is honorable to its reputation in long-term product services (including high-voltage drive). We commit to provide supports in the whole service life. However long the service life of product is, we shall never give up our responsibilities in product services and will ensure your full satisfaction. To prolong the service life of drivers and strengthen their functions, Sigriner STEP upgrades their programs ceaselessly to make you have opportunity for enjoying the newly upgraded technologies.

> Convenient local services

Because of our long-term field service for all customers, we own numerous professional service personnel. Each one of our service representatives receives all-around special training.

AS800
High-Voltage Drive



AS800
High-Voltage Drive

AFTER-SALES SERVICE NETWORK

> Domestic service network

Domestic market

- 4 agencies
- 14 liaison offices

Agencies

Beijing, Shanghai, Guangzhou, Chengdu

Liaison offices

Dalian, Shenyang, Tianjin, Shijiazhuang, Zhengzhou, Chongqing, Xi'an, Hangzhou, Wuxi, Nanxun, Wujiang, Changsha, Shenzhen, Fuzhou, etc.



> Oversea network

Overseas companies

Germany, Hong Kong

Overseas sales

Germany, England, Denmark, Scotland, Canada, Japan, Brazil, Chile, Singapore, Australia, India, Pakistan, Turkey, Saudi Arabia, Korea, Hong Kong, Macao, Taiwan, etc.

