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VFD510

IP55 VECTOR CONTROL FREQUENCY INVERTER





ShenZhen VEIKONG Electric CO., Ltd.
VEIKONG INDUSTRIAL CO., LIMITED (HK)

Company Profile



Brief introduction

Shenzhen VEIKONG ELECTRIC CO., LTD is a reputable high-tech enterprise that specializes in researching, manufacturing, and trading both medium and low voltage inverters and solar pumping inverter. We offer our clients integrated system solutions, and our professional R&D team and devoted management with over 20 years of experience have made us one of the first independent AC drives companies in China.

We incorporate latest high efficiency mppt calculations and SPWM, sensorless vector control, and vector and torque control technology into our VFD and solar pump inverter which have reached international advanced standards, making them able to directly replace and be equivalent to Europe, the United States, Japan, and other brands, providing our clients with the highest level of technical support.

Quality is the foundation of our enterprise, and we consistently follow ISO9001 standards to manage and supervise quality. Our products have passed CE and IEC certifications and other technical approvals, and we continuously upgrade our technologies and products to better meet our customers' requirements and market needs.

VEIKONG team believes that the customer is the source of our enterprise. We take great pride in placing our customers' requirements first and ensuring that we meet and exceed their expectations. Our products have been widely used in various industries, including solar pumping, petroleum, chemical, melting, hoisting, electric power, building materials, water supply, plastics, textiles, printing, packing, and more, to create value for our customers.

VEIKONG, your trusted supplier!



20+

Over 20 years of professional management experience

Company Certifications



















Product Introduction

The VFD510 series high protection inverter is an IP55 protection grade inverter launched by our company. VFD510 is a product developed and improved based on VEIKONG VFD530 series. It not only has the high-quality performance of VFD530 series, but also has the additional high protection function. The product is especially suitable for application environments with a lot of dust, oil, and water mist. VFD510 can drive both asynchronous motors and permanent magnet synchronous motors. It has a standard STO function and supports a variety of encoder types and communication interfaces. It has excellent performance, rich functions, good reliability and environmental adaptability.

Supported motor types	asynchronous motor, synchronous motor
Control mode	V/F control, speed sensorless vector control (SVC), speed sensor vector control (VC)
Powerrange	4.0~110kw
Voltage level	Single-phase/three-phase 220V model: 200V~240V three-phase 380V model: 380V~480V
Allowable voltage fluctuation range	-15%~10%



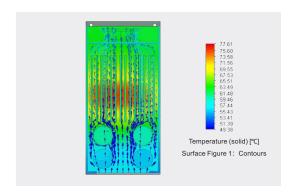
High Protection Level



High Reliability

Thermal design simulation experiment

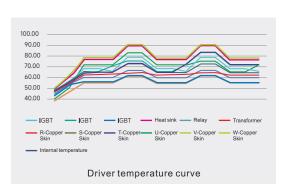
The accurate thermal simulation platform software is used to ensure the reliability of thermal simulation. The VFD510 series inverters have all undergone thermal simulation tests. Only within the thermal simulation safety design requirements, physical prototypes are developed. After actual testing, the thermal simulation results are very close to the physical test results. Under extreme test conditions, thermal simulation can replace actual load simulation, adding an extra layer of scientific thermal testing.



Strict temperature rise test

The whole Drive temperature rise test adopts the most stringent cycle overload test to ensure long-term reliable operation under extreme load conditions.

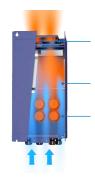
Cyclic overload test: At an ambient temperature of 50° , run at 1.5 times the overload current for 1 minute, then run at the rated current for 4 minutes, and then run at 1.5 times the rated current for 1 minute. This continuous cycle runs for 5 minutes per cycle until the system reaches a thermal equilibrium state and the whole Drive is within the thermal design safety range.



Independent air duct design

Independent air duct design effectively prevents dust from entering the inverter and causing short circuit and other faults, thereby improving reliability;

The use of large air volume and long life cooling fan effectively reduces the internal temperature rise of the inverter and ensures reliable and stable operation of the inverter.



Large air volume, long life IP65 cooling fan

Extra large heat dissipation aluminum fins

Independent air duct

Complete protection system

The whole series has STO protection, output short circuit protection to ground, overcurrent protection, driver overload protection, motor overload protection, driver overtemperature protection, optional PT100/PT1000/KTY84 motor overtemperature protection, etc.

Depending on the fault type, it can be set to fault free stop, fault deceleration stop, fault continue to run, which brings convenience to on-site emergency handling.





Short circuit protection

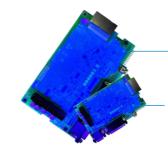


Overload protection

Automatic spraying process of conformal coating

Multiple high-quality conformal coatings are used to enhance the environmental adaptability of the product.

The conformal coating adopts automatic spraying process to ensure the uniformity of the circuit board spraying thickness and the consistency of product batching.

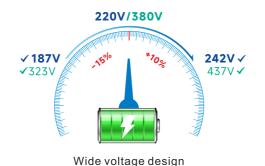


Automatic spraying of conformal coating, high thickness consistency

Double-sided multi-spraying, single layer thickness>30um

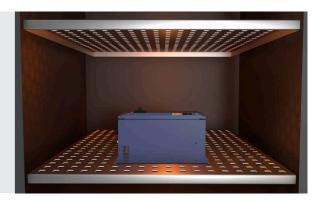
Wide voltage input range that complies with international standards

Rated voltage	Single-phase/three-phase 220V models: 200V~240V Three-phase 380V models: 380V~480V
Allowable voltage fluctuation range	-15%-10%
Input power frequency	50Hz or 60Hz, allowable fluctuation range ±5%



Full-cycle testing

During product development, the whole PCB board will be systematically tested. After assembly, the whole machine will be tested and the EMC environment will be tested. After passing the quality inspection, a 12-hour, 50°C hightemperature aging test will be performed to ensure the delivery quality of the entire series of products.



Drive test



- Drive test
- Withstand voltage test
- Insulation resistance test
- Drive test - Braking test
- Charging resistance test
- Current sampling and
- balance test - Output voltage and
- balance test
- Bus ripple voltage test - Overvoltage test
- Overcurrent test
- Quick impact test
- Overload test
- Phase loss test
- Each power supply voltage test
- High and low input power supply test
- Overtemperature test
- Instant power off and then on
- Short circuit test
- DC braking test

PCB single board test for the whole Drive



- Drive board withstand
- voltage test
- Switching power supply
- Switching power supply stability test
- Output voltage and output voltage dynamic ripple test
- Power-on instant overshoot test
- Bus voltage linearity test
- Main circuit relay test
- Fan signal test
- Drive and brake waveform test
- Current and bus voltage sampling signal bandwidth test
- SC signal test
- Key component temperature rise test
- Output voltage short circuit test

EMC test



- Lightning surge test High frequency noise
- immunity test
- High and low temperature test
- Electrostatic discharge

Aging test



- Perform an aging test on the whole Drive for more than 12 hours at an ambient temperature of 50°C

More flexible braking circuit solution

- SIZE C and below are equipped with built-in braking unit as standard, and SIZE D and above are optional;
- Strong braking force, short-term braking capacity can reach 1.1~1.4 times the rated power of the inverter;
- Strong braking protection, models above 30kW have braking resistor short-circuit protection and braking circuit overcurrent protection, etc.



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Multiple practical functions

Process PID control

Multiple options for reference and feedback sources, with multiple functions such as feedback loss detection, output compensation, parameter switching, etc.

Independent sleep and wake-up functions extent

The sleep source and wake-up source can be set independently and arbitrarily to save power to the greatest

Flexible counter function

It can accumulate product output/length according to external photoelectric switches, encoder pulses and other signals, and perform corresponding actions when the output is reached.

Two sets of motor parameters can be switched

Supports parameter switching of two sets of motors. You can use the D terminal or modify the parameters to change the adapter motor to achieve one-to-two applications.

Multi-stage program operation

16-stage speed program operation and multiple cycle modes can meet various flexible process requirements.

Minor faults without shutdown

For most non-fatal faults, the fault handling mode can be set to continue running, emergency stop, stop according to the set stop mode, free stop and other response levels to reduce the impact on equipment operation.

Software changes the motor phase sequence

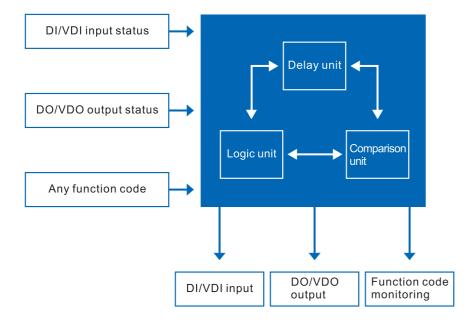
Whether it is open-loop control or closed-loop vector control, the motor phase sequence can be changed by software with one click, avoiding the need to change the motor wiring.

Parameter backup and restore

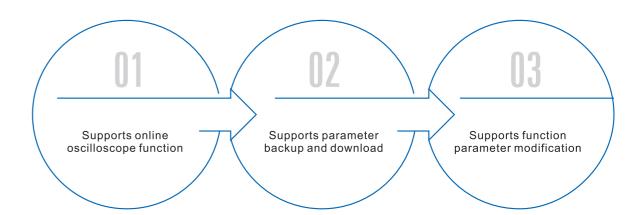
All current parameters can be saved in a copy to the built-in EEPROM backup area, and can be called out from the memory when restoration is needed.

Powerful internal logic function

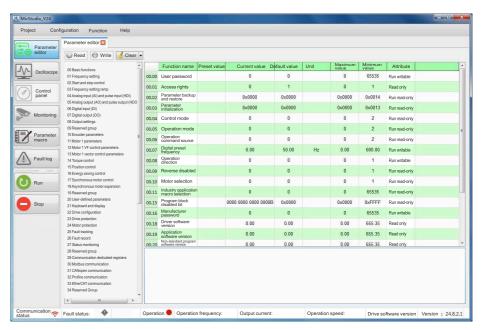
- Built-in up to 4 groups of delay units, rich and diverse input sources, and output can be used as input for various other built-in modules.
- Built-in up to 4 groups of comparator units, arbitrary input, multiple comparison functions, and output can be used as input for various other built-in modules.
- Built-in up to 4 groups of logic units, arbitrary input, multiple logical operations, and output can be used as input for various other built-in blocks.
- The above modules can be used alone or in combination to achieve flexible logic functions, meet various applications, and save peripheral equipment and wiring.



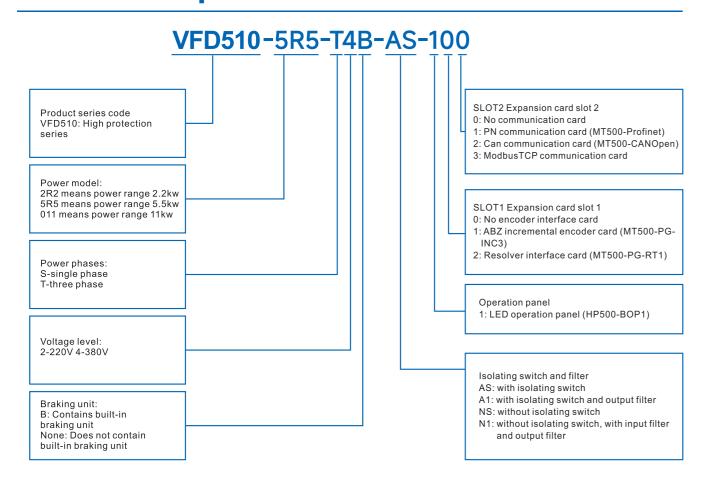
Powerful debugging software







Model Description



Product Selection Table

Inverter			Rated output current (A)	Applicable motor	Structural	Braking		
Model	capacity (kVA)	input current (A)	Heavy load	(kw)	size	unit		
Three phase voltage: 380V,50/60Hz								
VFD510-4R0-T4B	5.9	10.5	9.4	4kW	SIZE A	Built-in		
VFD510-5R5-T4B	8.9	14.6	13.0	5.5 kw	SIZE A			
VFD510-7R5-T4B	11	20.5	17.0	7.5 kW	SIZE B			
VFD510-011-T4B	17	26.0	25.0	11 kW	SIZE B			
VFD510-015-T4B	21	35.0	32.0	15 kW				
VFD510-018-T4B	24	38.5	37.0	18.5kW	SIZE C			
VFD510-022-T4B	30	46.5	45.0	22 kW				
VFD510-030-T4(B)	40	62.0	60	30kw				
VFD510-037-T4(B)	50	76.0	75	37kW	SIZE D			
VFD510-045-T4(B)	60	92.0	90	45kW				

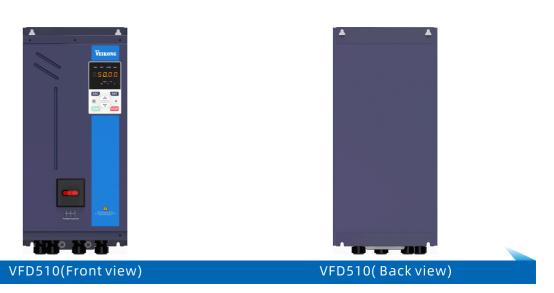
Technical Specifications

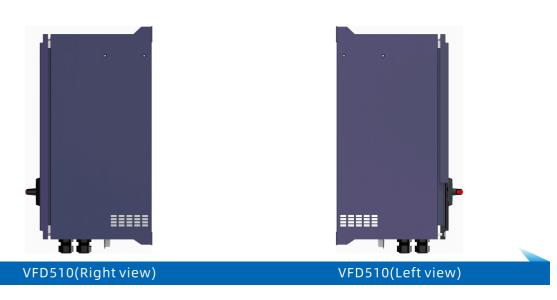
Project		Specifications Specification Specifi					
	Input power supply voltage	Single-phase/three-phase 220V models: 200V~240V Three-phase 380V models: 380V~480V					
Power	Allowable voltage fluctuation range	-15%~10%					
supply	Input power supply frequency	50Hz or 60Hz, the allowable fluctuation range is +5%					
	Input filter	Three-phase 380V models SIZEC and above can be connected to an external DC reactor					
	Maximum output voltage	Three-phase: 0~Input voltage standard					
Output	Overload capacity	(Heavy load) application: 150% rated output current for 60 seconds Light load application: 120% rated output current for 60 seconds					
	Control mode	V/f control Sensorless vector control (SVC) Sensored vector control (VC)					
	Operation mode	Speed control, torque control (SVC and VC)					
	Speed range	1:100 (V/f) ; 1:200 (SVC) ; 1:1000 (VC)					
	Speed control accuracy	±0.5% (V/f); ±0.2% (SVC); ±0.02% (VC)					
	Speed response	5Hz (V/f); 20Hz (SVC); 50Hz (VC)					
0	Frequency control range	0.00~600.00Hz (V/f); 0.00~200.00Hz (SVC); 0.00~400.00Hz (VC)					
) on	Input frequency resolution	Digital input: 0.01Hz;Analog input: 0.1% of maximum frequency					
tro	Starting torque	150%/0.5Hz (V/f); 150%/0.25Hz (SVC); 150%/0Hz (VC)					
ch	Torque control accuracy	SVC: 10% within 5Hz, 5% above 5Hz VC: 3.0%					
Control characteristics	V/f characteristics	V/f curve types: straight line, multi-point, power function, V/f separation; Torque boost support: automatic torque boost (factory setting), manual torque boost.					
eristi	Frequency setting ramp	Supports linear and S-curve acceleration and deceleration; 4 groups of acceleration and deceleration time setting range $0.00s-60000s$					
ics	DC bus voltage control	Overvoltage stall control: limit the power generation of the motor by adjusting the output frequency to avoid skipping undervoltage faults Undervoltage stall control: control the power consumption of the motor by adjusting the output frequency, which avoids skipping undervoltage faults					
	Carrier frequency	1kHz~12kHz (varies with random models)					
	Start mode	Direct start (DC braking can be superimposed); speed tracking start					
	Stop mode	Deceleration stop (DC braking can be superimposed); free stop					
	Main control functions	Jog control, droop control, support up to 16 speeds, dangerous speed avoidance, swing frequency operation, acceleration and deceleration time switching, VF separation, overexcitation braking, process PID control, sleep and wake-up function, built-in simple PLC logic, virtual input and output terminals, built-in delay unit, built-in comparison unit and logic unit, etc., parameter backup and recovery, complete fault record, fault retry, free switching of two sets of motor parameters, software exchange output wiring, terminal UP/DOWN, etc.					
	Keyboard	Standard LED digital keyboard, optional LCD keyboard (MTSOPO), dual display keyboard					
	Communication	Standard: MODBUS communication:Extension: CANopen communication card, Profinet communication card, ModbusTCP communication card					
	Encoder interface card	Incremental encoder interface card, resolver interface card					
Function	Input terminal	Standard: 5 digital input terminals, 1 of which supports high-speed pulse input up to 50kHz; 2 analog input terminals, supporting 0~10V voltage input or 0~20mA current input Expansion (MT500-IOEX1): 4 digital input terminals: 2 analog input terminals.					
	Output terminal	Standard: 1 digital output terminal; 1 high-speed pulse output terminal (open collector type), supporting 0~50kHz square wave signal output: 2 relay output terminals 2 analog output terminals, supporting 0~20mA current output or 0~10V voltage out					
Protection	For protection functions, ple	ase refer to Chapter 6 "Fault Diagnosis and Countermeasures"					
	Place of use	Away from electromagnetic radiation sources; No metal powder, corrosive gas, flammable gas, oil mist, or salt; No direct sunlight					
Environ	Altitude	0~3000 meters. Above 1000 meters, the rated output current is reduced by 1% for every 100 meters increase					
ment	Ambient temperature	-10 $^\circ$ C~+40 $^\circ$ C, maximum 50 $^\circ$ C. From 40 $^\circ$ C, the rated output current is reduced by 1.5% for every 1 $^\circ$ C increase					
mont	Humidity	Less than 95%RH, no condensation					
	Vibration	Less than 5.9m/s'(0.6g)					
	Storage temperature	-20°C∼+60°C					
	Installation method	Wall-mounted					
Others	Protection level Cooling method	IP55 Forced air cooling					
	Cooming method	i orood dir obbilling					

Abundant optional accessories

Accessory Type	Model Image		Description					
PG card	Incremental Encoder Interface Card MT500-PG-INC1		Differential or open collector input is optional, supporting up to 500kHz for differential input and 150kHz for open collector input; supports UVW differential input; without frequency division output.					
	Differential Output and Open Collector MT500-PG-INC2		Differential or open collector input is optional, up to 500kHz for differential input and up to 150kHz for open collector input: supports 1~63 frequency division differential and open collector output, no UVW input.					
	Differential Output and Open Collector MT500-PG-INC3		Differential or open collector input is optional, supporting up to 500kHz for differential input and 150kHz for open collector input; does not support UVW differential input; does not have frequency division output.					
	Resolver PG card MT500-PG-RT1		Resolver PG card, supports 7Vrms, 10kHz excitation signal, DB9 female socket wiring.					
Communication extension card	Modbus-TCP	NI N	Modbus-TCP communication card is a Modbus-TCP fieldbus adapter card, which complies with the international Modbus-TCP bus standard and has the advantages of high efficiency, flexible topology and easy operation. This card is used to connect the VFD500/510/530 series inverter to the Modbus-CP network, making the inverter a slave station of the fieldbus and accepting the control of the fieldbus master station.					
	CANopen communication Canopen MT500-CAN1 (optional)		Used to connect VFD500/510/530 series inverters to CANopen communication network, supports NodeGuard protocol, the master station can use this function to query the device status; supports Heartbeat protocol; the slave station reports the current status to the master station regularly; supports NMT network management protocol: SDP only supports accelerated transmission mechanism to transmit up to 4 bytes, which can be used to read and write inverter parameters; supports 4 groups of PDO.					
	Profinet communication card MT500-Profinet (optional)	ni	MT500-Profinet is a Profinet fieldbus adapter card that complies with the internationally accepted Profinet Ethernet standard. This card is installed on the VFD510 series inverter to improve communication efficiency and facilitate the inverter networking function, making the inverter a slave station of the fieldbus and accepting the control of the fieldbus master station. MT500-Profinet card is suitable for all VFD510 series models.					
IO extension card	IO extension card MT500-IOEX1	1000	4 digital input terminals 2 analog input terminals 4 digital output terminals Supports the processing of PT100, PT1000, KTY84-130 temperature sensor signals.					

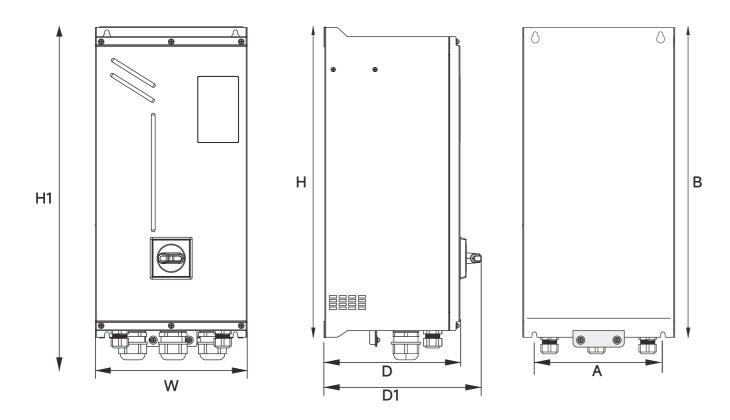
VEIKONG VFD510 New look with different sides





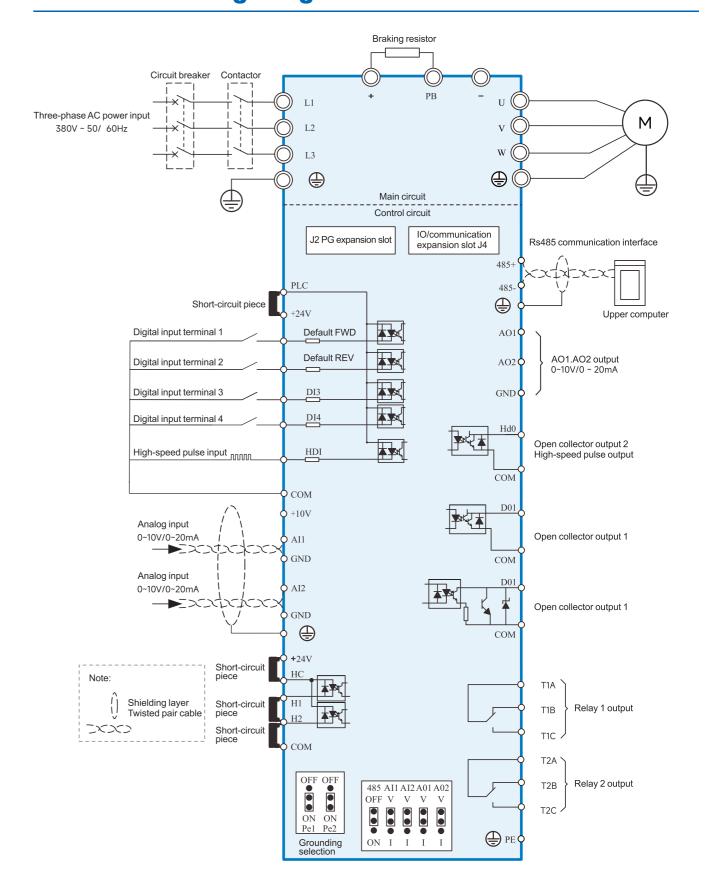


Appearance and installation dimensions



Appearance number	Models included	Appearance and installation dimensions							
		Α	В	Н	H1	W	D/D1	Фd	Mounting screws
SIZE A	VFD510-2R2-T4B	128	372	385	400	160	195/230	Φ6	M5
	VFD510-4R0-T4B								
	VFD510-5R5-T4B								
SIZE B	VFD510-7R5-T4B	165	408	420	445	200	210/245	Ф6	M5
	VFD510-011-T4B								
SIZE C	VFD510-015-T4B	200	470	480	515	235	210/245	Ф7	М6
	VFD510-018-T4B								
	VFD510-022-T4B								
SIZED	VFD510-030-T4(B)	250	550	569	595	334	265/293	Ф10	M8
	VFD510-037-T4(B)								
	VFD510-045-T4(B)								

Standard wiring diagram

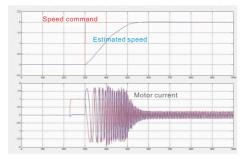


Excellent performance

High speed stabilization accuracy, wide speed range

- Speed command Estimated speed Motor current
- Steady speed accuracy: ±0.5% (SVC), ±0.02% (VC);
- Speed adjustment range: 1:200(SVC), 1:1000(VC)
- Heavy load overload capacity: 110% rated current for long-term stable operation:
- 150% rated current for 1 minute:
- 180% rated current for 8S

100Hz step response

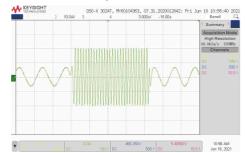


Big torque in low frequency, fast response for output torque

- Load capacity in low frequency: VF:180%@0.50HZ

- SVC: 180%@0.25HZ - VC: 180%@0.00HZ

0.25Hz plus 150% load



Fast Dynamic response

In SVC mode, the acceleration and deceleration time can be set arbitrarily (even 0.0s)The inverter runs stably without alarming, esp in some occasions requiring quick response.

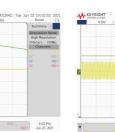
0.0s acceleration/deceleration time fast forward/reverse



Multi-functions & simply use

Deceleration over excitation function

The over-excitation function is set to con.vert the mechanical energy of the motor when it is decelerated into motor heat to be consumed, which can shorten the deceleration time and save accessories such as braking resistors in the occasions where braking is infrequent.



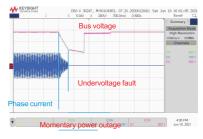
Deceleration over excitation is effective Deceleration over excitation is ineffective



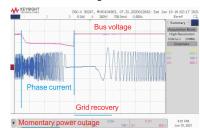
Undervoltage stall function

When the system is powered off instantaneously, the motor is controlled by the regenerative energy during deceleration to maintain the inverter running for a short period of time and reduce the risk of idling under the instability of the grid.

Undervoltage stall is invalid



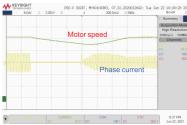
Undervoltage stall is valid



Excellent speed tracking function

Achieve smooth start without impact for the motor which does not stop rotating

Speed tracking current waveform



Energy-saving operation of fans and pumps

With excellent automatic energy-saving function, only need to set the maximum energy-saving target, When the operation meets the energy saving conditions, it can enter the automatic energy-saving state. By setting the VF function, one-to-multiple and longdistance control applications can be realized to meet the application of transformation occasions

Automatic energy saving



Applications

High dust



Mining

ng Machinery manufacturing





Metallurgy industry

Building materials manufacturing





Construction of hydropower facilities

Stone processing





Oil extraction and refining

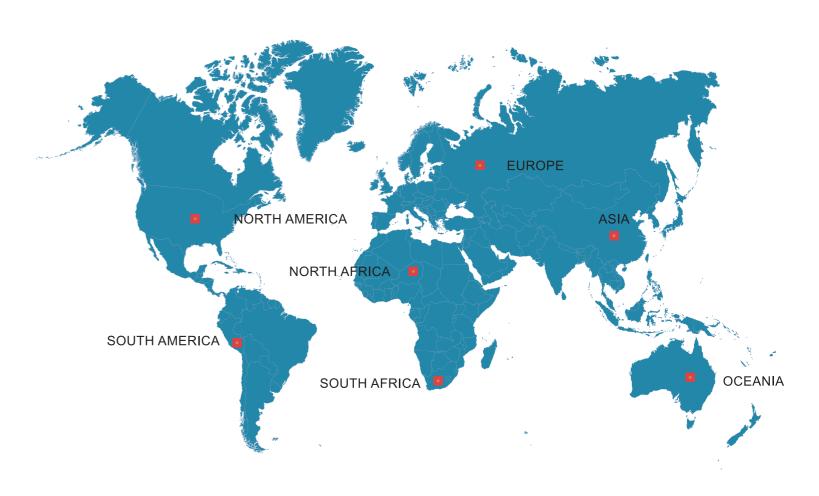
Water mist

Water mist

Sewage treatment

Municipal buildings

After Sale Service System



- 1. VEIKONG offers you 18-month quality guarantee. We will take responsibility for any problems caused during this period. As long as customers provide us with VFD error reports, we will provide free repair parts for them.
- 2. Please contact your sales representative in a timely manner, if you have any problems during usage. Meanwhile, we will build a professional technical team online to solve complex application issues for you.

VEIKONG, your trusted supplier!