山东能源
SHANDONG ENERGY

FGI新风光

MINE FLAMEPROOF AND INTRINSICALLY

SAFE INVERTER

WINDSUN
新时代·新风光

SAVE **ENERGY**

SERVE **SOCIETY**

Mission: Master core technology and continuously promote power electronic equipment to integrate various industries

Vision: save energy, serve society, to strive for centuries

Core values: Integrity, Innovation, Cooperation, Struggle

CONTENTS

COMPANY PROFILE

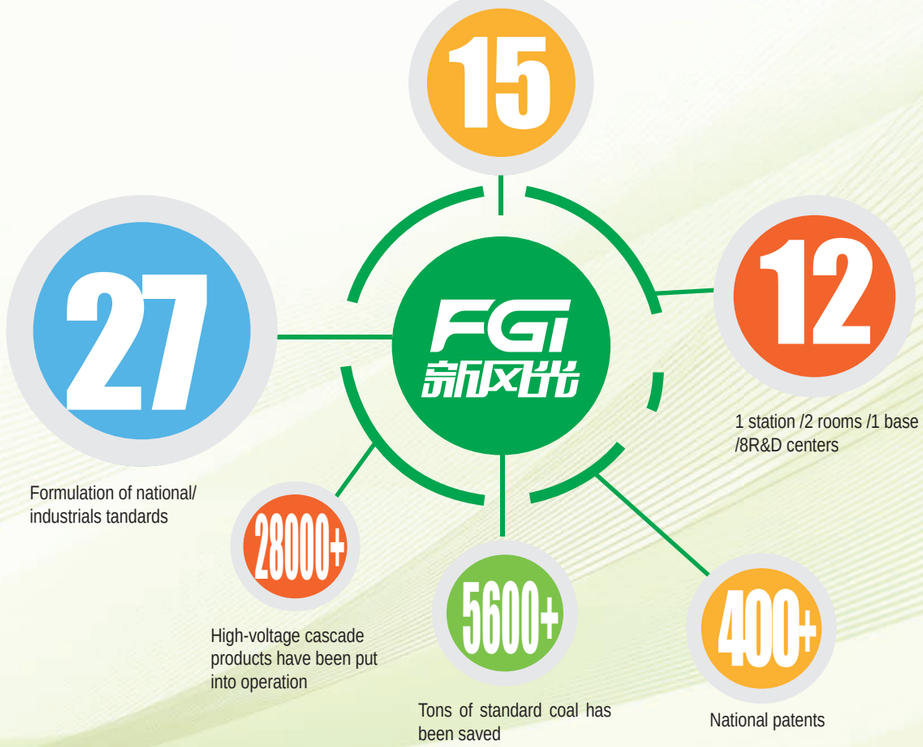
WindSun Science & Technology CO., LTD (FGI, stock code: 688663) is a national high-tech enterprise and a listed enterprise on the STAR market under the world's top 500 Shandong Energy Group, specializing in the R & D, production, sales and service of power electronic energy-saving control technology and related products. At present, the company has more than 800employees, accounting for 95% of them with bachelor's degree or above, 65 with master's degree, 3 with doctor's degree, and 2 academicians of Chinese Academy of Engineering with long-term cooperation.

FGI not only led and participated in the formulation of national standards for variable frequency inverter (high, medium and low voltage), national standards for rail transit braking energy absorption device and industrial standards for power quality Static Var Generator, but also participated in the drafting of IEEE International Standards for energy feedback devices of DC traction power supply system.

FGI is the vice chairman unit of frequency converter branch of China Electrical Industry Association. It has established national and local joint Engineering Research Center for new energy and high efficiency and energy saving, academician workstation of Shandong Province, postdoctoral innovation and practice base, frequency conversion and speed regulation technology research and promotion center of Shandong Province, power electronics and frequency conversion engineering technology research center of Shandong Province, and enterprise technology center of Shandong Province, Shandong software engineering technology center and other scientific and technological innovation platforms.

FGI mainly produces all kinds of high, medium and low voltage inverters, high and low voltage Static Var Generator(SVG),energy storage system, rail transit energy feedback device, flame-proof products (inverter, SVG), special power supply, etc.,which are widely used in power, coal, cement, metallurgy, mining, rail transit, photovoltaic power generation, wind power generation, petroleum, chemical industry, municipal administration and other fields, It can also tailor products and solutions for customers in terms of system energy saving, intelligent control and solving power quality problems.

15powerelectronicsperformance laboratories:EMClaboratory, environmentallaboratoryandsafetycomplianceLaboratory, failur eana lysislaboratory,materialanalysislaboratory, temperature rielaboratory, servicelifelaboratory……



MILESTONE

1970
"Four Oriented" Gathered talents

State owned Wenshang Radio Factory was established

2004
Property rights reform to inject vitality

Restructured to establish FGI

2011
Enterprise hybrid reform to enhance power

Attracted investment from Shandong Energy Group for flourishing development.

2019
Build a talent gathering place

Established Jinan Branch and R&D Center

2021
A new chapter of corporate listing

Listed on STAR Market.
Code No.:688668

2022
Focus on global development

Established Suzhou Branch and Overseas Department

2023
Layout of new industrial highland

Established Qingdao Branch

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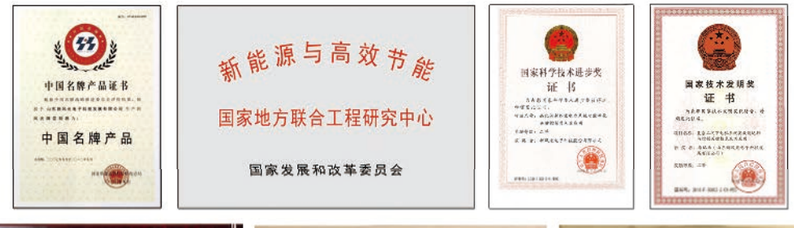
FGI
New voyage
Further development

HONORS&CERTIFICATIONS



EU CE certificate

Flame-proof certificate

National Type-test Report

PCCC certifcation

Invention patent

National standard

Software copyright certificate

Utility model patent certificate

Design Certificate

QUALITY ASSURANCE

FGI has passed the ISO certification of quality, environment and safety, and has been rated as an AAAA enterprise with good standardized behavior, an advanced enterprise with excellent performance in quality and management in Shandong Province, and a qualified enterprise with measurement assurance.

Production management has a rigorous quality control plan, strictly implements the requirements of ISO9001 standard, pays attention to PDCA management of production process, strict process control, production process control, and implements the whole process quality control. Combined with the on-site "6S" management tools, the qualified rate of product delivery inspection is 100%.

The production and test system covers an area of 80000m2, has a product test centralized control center with complete machine detection automation function and high degree of integration, introduces automatic SMT, wave soldering and automatic paint spraying lines imported from Germany and South Korea, and develops testing equipment and environmental testing equipment. It has 5 unit assembly lines, with an annual production capacity of 3000-5000 sets of high-voltage products.

Purifcation parts manufacturing center

PCB three-proof painting line

PCB board testing - FCT, ICT function test line

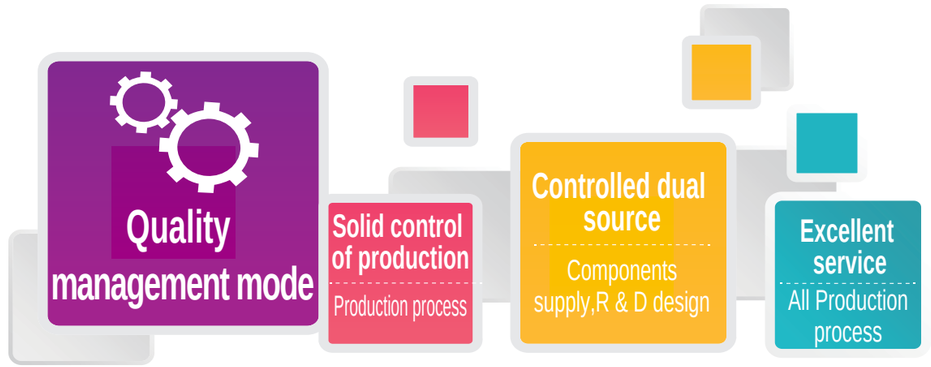
SMT-AOI automatic mounter—Optical detection line

Power module production line

Whole machine assembly line

High voltage whole machine test area

Four-quadrant inverter test system



Central controlcenterof test system

10MW High Power full load test system

High voltage and high power test motor

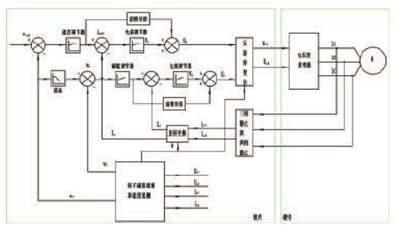
Full automatic test system

Salt spray environment simulator

Algorithmic excellence and excellent performance

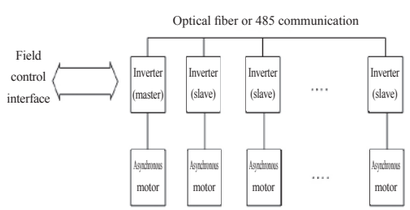
01 Vector control, fast response

- By measuring and controlling the stator current vector of an AC motor, the excitation current and torque current of the AC motor are controlled according to the principle of magnetic field orientation, in order to achieve the goal of controlling the torque of the AC motor.
- High starting torque, fast torque dynamic response, high control accuracy, and strong load carrying capacity.
- It can drive synchronous or asynchronous motors, especially suitable for impact loads such as ball mills, belt conveyors, compressors, etc.



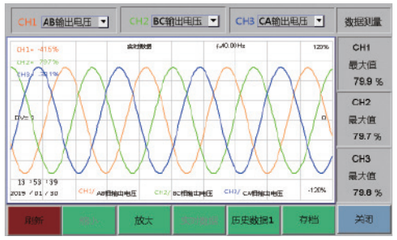
02 Multi machine linkage, power balance

- The inverter has a master-slave control function, and multiple inverters can form a master-slave control network through a data bus. Set one of them as the host and the others as the slaves. The host collects real-time status information of each slave and sends frequency and torque instructions to each slave to achieve power balance and comprehensive control of each inverter.
- This technology is suitable for situations that require power balance control, such as belt conveyors, scraper machines, and friction elevators.



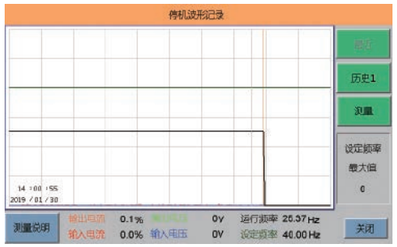
03 Comprehensive waveform display and recording

- The master control system monitors the input current and voltage, output voltage and current in real time, and displays their waveforms. It also performs harmonic analysis on each phase voltage and current, helping users to grasp various power parameters of the device.



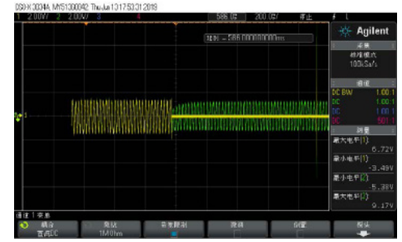
04 Black box function and intelligent analysis

- The device has the function of automatically recording theoperating status and display, allowing users to view the output current, output voltage, set frequency, operating frequency, input current, and input voltage values of a total of 200 points (100ms) before and after protection, facilitating daily maintenance and rapid abnormal diagnosis.



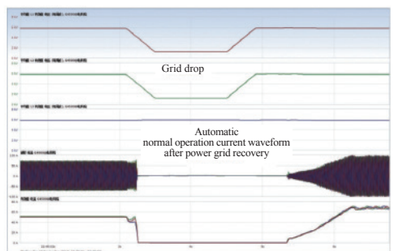
05 1140V-10kVFlame-proof inverter with Undisturbed switching function

- Online undisturbed switching technology: To achieve the coexistence of variable frequency output, power grid,and motor, ensuring that the inverter exits operation after the power grid is connected to the motor.
- Switching impulse: When switching, the impulse current does not exceed the rated current of the motor when the power grid and inverter coexist.
- High reliability: With multiple current limiting conditions, it ensures safe frequency conversion and solves the impact problem of underground power frequency startup and multi machine startup in coal mines.



06 High and low voltage ride through,no worries fluctuations(0%-100%)

When the user's main power supply experiences an instantaneous power outage, drop, or switch to the factory power grid, the inverter can ensure that the power grid can automatically operate normally within a limited time after recovery, enhancing the adaptability of the power grid.
Can adapt to different depths of U0(100% -0%) Grid drop.



660V/1140V Mine flameiproof and intrinsically safe inverter

Product Introduction

The main circuit adopts a two-level/three-level topology structure, and the main power devices are all first-line domestic and foreign brand, with high reliability. It is mainly used to control and regulate the speed and torque of three-phase AC asynchronous motors. It adopts high-performance vector control technology, with low-speed high-torque output, friendly human-computer information interaction, and stable performance. It can be applied in coal mines and explosive environments with coal dust, gas, etc. It can achieve functions such as soft start, soft stop, and speed control during operation.

BPJ1-400/1140(K)

BPJ3-1250/1140(K)

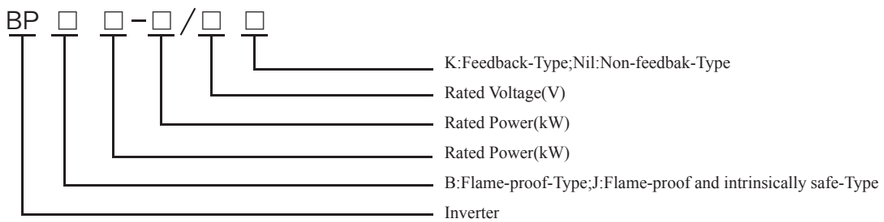
Features

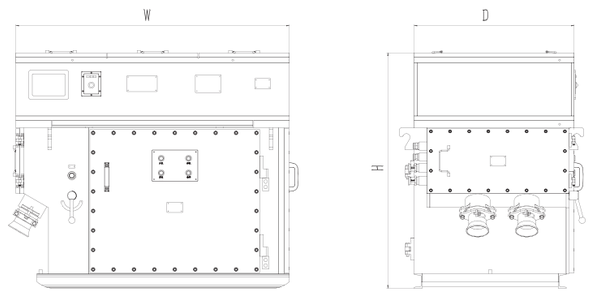
- **High operational reliability**
  - The key processes are produced in dust-free workshops to strictly ensure the production process;
  - Strict factory inspection and process control.
- **Easy installation and maintenance**
  - The main components of the internal modular separate design, easy to disassemble between modules, daily inspection, maintenance convenien ce, saving time and labor.
- **Less interference to the power grid and other equipment, with reactive power compensation function for the power grid**
  - 660V and 1140V inverters are equipped with input and output filter reactors to effectively suppress high-frequency interference;
  - The four-quadrant inverter is equipped with a special LCL filter to ensure that the interference of the inverter to the front-end power supply and distribution equipment is minimized to meet the requirements of the national standard;
  - Through the feedback flame-proof inverter to detect the power quality of the power grid to compensate the reactive power in the line, to solve the local problem of low power factor of the power grid and big line loss in the coal mine, by compensating the loss of the power supply line significantly reduced, saving energy and reducing consumption.
- **Mature solutions for motor insulation damage**
  - 1140V flame-proof inverter adopts three-level structure, the voltage rise rate value (dv/dt) is reduced to half of two-level inverter, the output voltage level is increased, the relative amplitude of each level is reduced, the voltage change is reduced, the current pulse is reduced, the electromagn etic interference is indirectly reduced, the insulation damage caused by inverter output to the motor is greatly reduced, the problem of motor insulation damage is effectively solved, and the service life of the motor is extended.
- **IGBT neutral clamp technology**
  - When the output voltage of a phase is zero in the three-phase output voltage, the current flows into or out of the DC capacitor midpoint, and when the inflow and outflow current are not equal, the voltage of the upper and lower capacitors is different, the midpoint potential drift,which affects the quality of the output voltage waveform.
- **With excellent power balance function, ensure that the motor output of the multi-machine drive system is balanced, and the unbalance is less than 3%**
- **With excellent closed-loop (PID) control function, to meet the requirements of pump use**

Specification

Input	Phase,frequency,voltage	3phase 50/60Hz□660V/1140V
	Allowable fluctuation	Power supply voltage ±20%, 50-60Hz±5%, voltage imbalance rate <3%
Output	Rated Voltage	The maximum output voltage is the same as the input voltage
	Rated Current	100% rated current continuous
	Output Frequency	The value ranges from 0 to 120Hz
Basic Performance parameter	Control Mode	V/F control, open loop vector control (SVC)
	Carrier Frequency	0.5kHz ~ 16kHz, the carrier frequency can be automatically adjusted according to the load characteristics.
	Frequency Resolution	Digital setting: 0.01Hz Analog setting: maximum frequency ×0.025%
	Speed Range	1:100(SVC)
	Speed stability accuracy	±0.5%(SVC)
	Torque control accuracy	±5%
	Overload Capacity	120%/0.5h 150%/1min protection
	Torque Boost	Automatic torque boost; Manual torque is increased by 0.1% ~ 30.0%
	Simple PLC, multi-speed operation	Maximum 16 segment speed operation via built-in PLC or control terminal
	Built-in PID	Easy to realize the closed-loop control system of process control
	Automatic Voltage Regulation (AVR)	When the grid voltage changes, maintain the output voltage constant
	Over voltage over loss rate control	Automatic limit of voltage and current during operation to prevent frequent overvoltage and overcurrent failure tripping
	Fast current limiting function	Minimize the overcurrent fault and protect the normal operation of the inverter
	Torque limitation and control	The "backhoe" feature automatically limits torque during operation to prevent frequent overcurrent tripping
Personalized function	Point-to-Point Protocol	Master/slave control can be realized
	Multithread bus support	Supports 3 fieldbuses: Modbus, CANlink, and network port communication
	Fast current limiting	Avoid frequent overcurrent failure of inverter
	Excellent performance	The control of asynchronous and synchronous motor is realized with high performance current vector control technology
Input function	Digital input channel	8 programmable digital inputs
	Analog input channel	2-4 analog signal input
Output function	Digital output channel	6 digital outputs
	Analog output channel	2-4 analog signal output
Protec tion	Over voltage, under voltage, over current, over load, short circuit, over temperature, leakage lock, phase protection and other functions.	
operation	Command Source	Operation panel given, control terminal given, serial communication port given.Can be switched in a variety of ways.
	Frequency source	10 frequency sources: digital set, analog voltage set, analog current set, serial port set. Can be switched in a variety of ways
Display and keyboard operation	LED display	Display setting parameter
	HMI display	Display running status: output frequency, output current, temperature, running curve, alarm information, fault analysis, etc.
envi ron ment	Use place	Underground coal mines, free of corrosive gases, in an environment with an explosive mixture of coal dust and gas, in an environment without destroying the insulation of gas or steam.
	Altitude	Below 2000 meters; Mine atmospheric pressure (0.08 ~ 0.11) Mpa;
	Work Temp	0℃ ~ +40℃ (can be derated when the ambient temperature is above 40□)
	Humidity	Less than 95%RH (+25℃), no moisture condensation
	Vibration	In the absence of significant vibration and shock
	Storage Temp	-20℃～ +60℃
Structure	IP Grade	IP54
	Flame-proof grade	Ex db[ibMb] Ⅰ Mb
	Cooling Method	Heat pipe cooling + forced air cooling, water cooling
	Size and weight	Reference Specification Model (including size)

Product Model(Including Size)





Outline Dimension Diagram

660V/1140V Mine flameiproof and intrinsically safe inverter

Model	Rated Power (kW)	Rated input voltage (V)	Rated output voltage(V)	operating range	Cooling Method	Dimension(mm)		
						Width(W)	Depth(D)	Height(H)
BPJ1-132/660(K)	132	660	0~660	2/ 4 phase	Heat pipe cooling + for ced air cooling	2136	1206	1218
BPJ1-200/660(K)	200							
BPJ1-250/660(K)	250							
BPJ1-75/1140(K)	75	1140	0~1140	2/ 4 phase	water cooling	1500	878	1292
BPJ1-90/1140(K)	90							
BPJ1-110/1140(K)	110							
BPJ1-132/1140(K)	132							
BPJ1-160/1140(K)	160							
BPJ1-200/1140(K)	200							
BPJ1-250/1140(K)	250							
BPJ1-315/1140(K)	315							
BPJ1-400/1140(K)	400							
BPJ3-400/1140(K)	400	1140	0~1140	2/ 4 phase	water cooling	1830	1100	1490
BPJ3-500/1140(K)	500							
BPJ3-630/1140(K)	630							
BPJ3-710/1140(K)	710							
BPJ3-800/1140(K)	800							
BPJ3-1000/1140(K)	1000							
BPJ3-1250/1140(K)	1250							

Note:
1.The above dimensions are for reference only. Please refer to the real object for details;
2.Due to product upgrading,this manual will be updated regularly. If you need to purchase our products, please refer to the latest product manual;
3.For more information, please scan the QR code(wechat) on the right or log in the company website(www.fengguang.com).

For more information, please scan the code

3.3kV/6kV/10kV mine flame-proof and intrinsically safe transformer converter

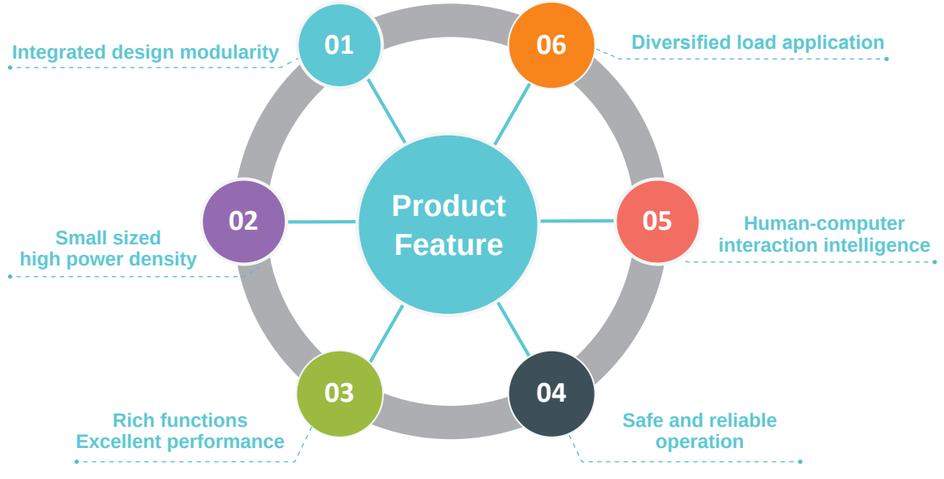
Product Introduction

This product adopts SPWM technology, high-performance V/F control and speed sensorless vector control technology, multi-unit cascade topology structure, equipped with dry film capacitors, and uses water cooling as the cooling method;
It is suitable for power supply with 6kV or 10kV input voltage in coal mines, and for the drive control of motors with voltage levels of 3.3kV,6kV, and 10kV, especially for the remote drive control of high-power scraper conveyors, crushers, loaders, belt conveyors, and other heavy-duty motors; it has excellent characteristics such as large starting torque, high power factor, motor soft start, remote power supply, and multimachine power balance function.

Product Structure

Flame-proof inverter overall structure diagram

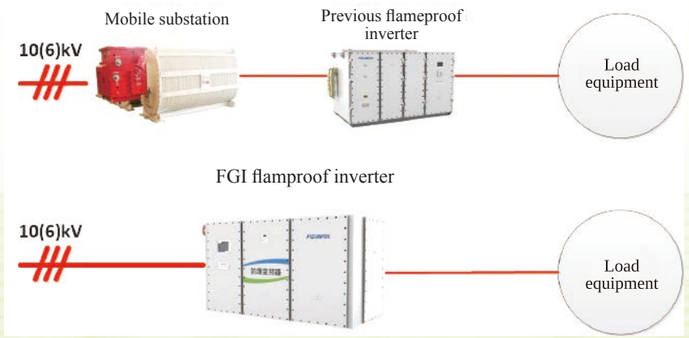
Features



01 Modular integrated design

The flame-proof high-voltage inverter adopts a modular design concept, with power unit modules, control system modules, and water coo ling system modules designed with a single-sided design concept for ease of on-site maintenance. Input and output lines, control signal lines, and water machine interfaces are all set up on one side for ease of user installation and operation.

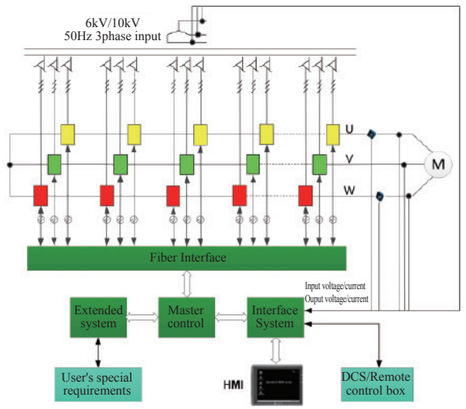
02 Small size and high power density, convenient for downhole transportation and installation



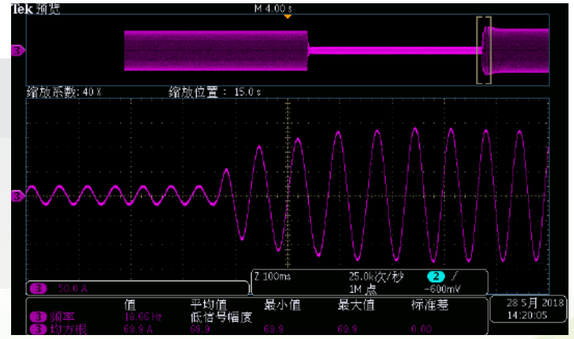
- **Design of all-in-one machine:** the traditional flame-proof inverter power supply mode is mobile transformer+inverter, which not only covers a large area, but also has a large amount of on-site wiring construction; The integrated design of transfer transformer and inverter is adopted by FGI, which greatly saves the floor area and facilitates the site construction.
- **High power density:** water cooling design is adopted for the power unit to improve the overall power density. Dimensions of 10/6/3.3kV in verter below 1600kW: 3000 * 1400 * 1800mm. Dimensions of products in 1600-2200kW power section: 3300 * 1400 * 1800mm. The products meet the requirements for transportation and installation dimensions of the mine.

03 Rich functions Excellent performance

- **No harmonic, long-distance power supply:**
  The phase-shifting transformer technology is used to achieve the functions of voltage reduction, isolation, and harmonic elimination, eliminating power harmonic distortion, with the input harmonic distortion less than 3%, meeting the national standard, and high input power factor, without the need for input harmonic filters and power factor compensation devices; The unit series superimposition technology makes the output waveform of the inverter basically similar to the sine waveform of the power frequency voltage, without the need for an output filter; Due to the small value of dv/dt, there is no damage to the motor and cable insulation, which is suitable for ordinary motors and can realize long-distance power supply for 5000m motors; It meets the high-quality requirements and is known as a "green flame-proof high-voltage inverter".



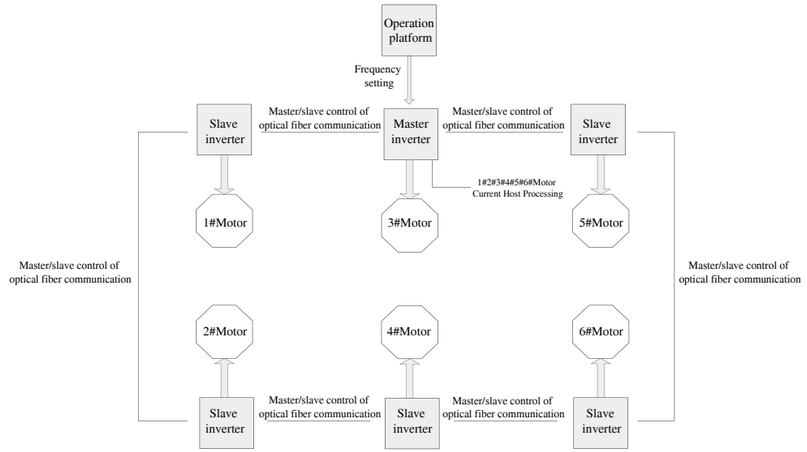
- **Low-frequency startup with large torque:**
  Applicable to occasions with high control accuracy, 2.2 times of startup torque and large load change in the underground; Precise speed control adopts non-inductive vector control algorithm to realize double loop accurate control of current and speed.



Fast response to sudden load change

- **Visual Intrinsic Safety Monitoring:**
  Intrinsically safe touch screen design is adopted to record and monitor the input and output voltage of the whole machine, temperature of current data power unit, bus voltage and each protection data in real time; Fault location, data recording and automatic early warning; Anti-explosion environment automatic warning, temperature, humidity, pressure detection and warning inside the shell, automatic dehumidification function.

- **Load adaptive self-balance:**
  adaptive to various load operation, multi-level drive load has automatic power balance, no manual intervent ion, and support 6 machines master/slave control.

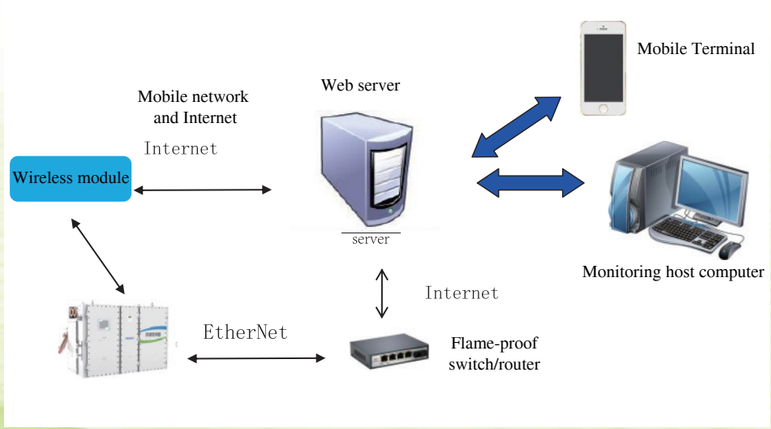


04 Safe and reliable, worry-free operation

- The unit has the automatic bypass function, and the power unit can be quickly bypassed if there is an abnormal problem, which does not affect the overall operation of the field;
- The machine has automatic reset, and can be automatically restarted for overcurrent, overload and overvoltage faults on site, which is suitable for fan load;
- Use external and internal power supply, any power supply can be switched to another power supply, to ensure the reliable operation of the entire control system;
- With the function of cable insulation monitoring, real-time online monitoring of output cable insulation to ensure the safe and reliable operation of the entire power supply system;
- The transformer in the flame-proof shell adopts the innovative design concept of water-cooled heat dissipation, which effectively reduces the temperature rise and operation reliability of the transformer, and extends the service life of the transformer.

05 Human-machine interaction intelligence

- Smart mine communication interface: meeting the requirements of smart mine communication interface, supporting optical fiber, network cable, wireless and other network access modes; Remote monitoring fault diagnosis:relevant data monitoring, fault analysis and device life prediction can be carried out through PC or mobile APP.



Specifications

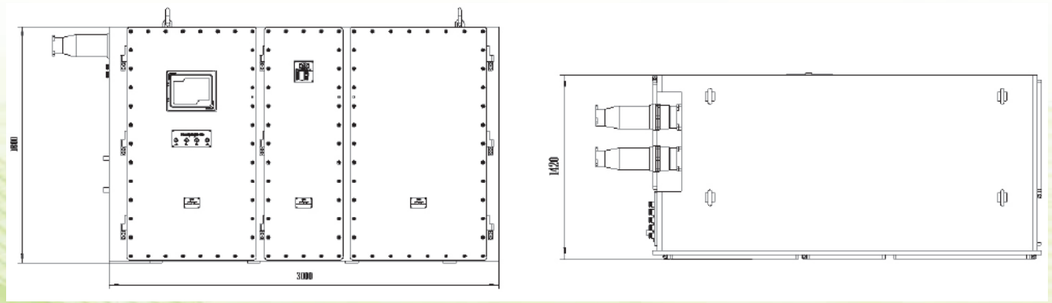
Input	Phase,frequency,voltage	3phase 50/60Hz,3.3kV/6.6kV/10kV
	Allowable fluctuation	Power supply voltage ±20%, 50 ~ 60Hz±5%, voltage imbalance rate <3%
Output	Rated Voltage	3.3kV/6kV/10kV
	Rated Current	100% rated current continuous
	Output Frequency	Value ranges from 0 to 120Hz
	Waveform	Multiplex SPWM sine wave
Basic Performance parameters	Control Mode	V/F control, open loop vector control (SVC)
	Carrier Frequency	0.5kHz ~ 16kHz, the carrier frequency can be automatically adjusted according to the load characteristics
	Frequency Resolution	Digital setting: 0.01Hz ;Analog setting: maximum frequency ×0.025%
	Speed Range	1:100(SVC)
	Speed stability accuracy	±0.5%(SVC)
	Torque control accuracy	±5%
	Overload Capacity	120%/0.5h 150%/1min
	Torque Boost	Automatic torque boost; Manual torque is increased by 0.1% ~ 30.0%
	Simple PLC, multispeed operation	Up to 16 segment speeds are possible with built-in PLC or control terminals
	Built-in PID	Easy to realize the closed-loop control system of process control
	Automatic VoltageRegulation (AVR)	Maintain the output voltage constant when the grid voltage changes
	Over voltage over loss rate control	Automatic voltage and current limitation during operation to prevent frequent overvoltage and overcurrent fault tripping
	Fast current limiting functio	Minimize overcurrent fault and protect normal operation of inverter
	Torque limitation and contro	The "backhoe" feature automatically limits torque during operation to prevent frequent overcurrent tripping.
Personalized function	Point-to-Point Protocol	Master/slave control can be realized
	Multithread bus support	Supports 3 fieldbuses: Modbus, CANlink, and network port communication
	Fast current limiting	Avoid frequent overcurrent failure of inverter
	Excellent performance	The control of asynchronous and synchronous motor is realized with high performance current vector control technology
Input function	Digital input channel	8 programmable digital inputs
	Analog input channel	4 analog inputs: 0 ~ 10V/0 ~ 20mA can be switched
Output function	Digital output channel	6 digital outputs
	Analog output channel	4 analog signal outputs: 0 ~ 10V/0 ~ 20mA can be switched
Protection	Over voltage, under voltage, over current, over load, short circuit, over temperature, leakage lock, phase protection and other functions	
Operation	Command Source	Operation panel given, control terminal given, serial communication port given.Can be switched in a variety of ways.
	Frequency Source	10 frequency sources: digital set, analog voltage set, analog current set, serial port set. Can be switched in a variety of ways
Display and keyboard operation	LED display	Display setting parameter
	HMI display	Display running status: output frequency, output current, temperature, running curve, alarm information, fault analysis, etc.

Environment	Use place	Underground coal mines, free of corrosive gases, in an environment with an explosive mixture of coal dust and gas, in an environment without destroying the insulation of gas or steam
	Altitude	Below 2000 m; Air pressure of the mine (0.08~0.11) Mpa;
	Work Temp	0℃ ~+40℃ (derated for use when the ambient temperature is above 40℃)
	Humidity	Less than 95%RH (+25), no moisture condensation
	Vibration	In the absence of significant vibration and shock
	Storage Temp	-20℃～ +60℃
Structure	IP grade	IP54
	Flame-proof grade	Exd [ib] Ⅰ Mb
	Cooling Method	Water cooling
	Size and weight	Reference Specification Model (including size)

■ Product Model(Including Size)

BP B J V □-□×□/□/□

- Output voltage (kV)
- Input voltage (kV)
- Rated power (kW)
- Combination mode (3:3 output; None: 1 output)
- Design sequence number
- V: Voltage type
- J: Flameproof and intrinsically safe
- B: Substation
- BP: Inverter



Outline Dimension Diagram

● 3.3kV/6kV/10kV series of mine flame-proof and intrinsically safe high voltage inverter

Model	Rated power (kW)	Rated input voltage (kV)	Output voltage range (kV)	Cooling Method	Dimension(mm)		
					Width(W)	Depth(D)	Height(H)
BPBJV2-525/6/3.3 ~BPBJV2-1600/6/3.3	525、855、1000、1200、1400、1600	6	3.3	Water cooling	3000	1400	1800
BPB JV2-525/6/6 ~BPBJV2-1600/6/ 6		6	6	Water cooling	3000	1400	1800
BPBJV2-525/10/3.3 ~BPBJV2-1600/10/3.3		10	3.3	Water cooling	3000	1400	1800
BPBJV2-525/10/10 ~BPBJV2-2200/10/ 10	525、855、1000、1200、1400、1600、1800、2000、2200	10	10	Water cooling	3300	1400	1800
BPBJV2-1800/10/3.3 ~BPBJV2-2200/10/3.3	1800、2000、2200	10	3.3	Water cooling	3300	1400	1800
BPBJV2-1800/6/6 ~BPBJV2-2200/6/ 6		6	6	Water cooling	3300	1400	1800
BPBJV2-1800/6/3.3 ~BPBJV2-2200/6/3.3		6	3.3	Water cooling	3300	1400	1800
BPJ1-3X 525/3.3 ~BPJ1-3X 1600/3.3	525、855、1000、1200、1400、1600	3.3or 2×1905	3.3	Water cooling	3280	1120	1500
BPBJV1-2X1600/10/3.3	525、855、1000、1200、1400、1600	10	3.3	Water cooling	3300	1400	1800
BPBJV1-2X1600/6/3.3		6	3.3	Water cooling	3300	1400	1800

Note:

1. The above dimensions are for reference only. Please ref er to the real object for details;
2. Due to product upgrading, this manual will be updated r egularly. If you need to purch ase our products, please refer to the latest product manual;
3. For more information, plea se scan the QR code(wechat) on the right or log in the com pany website(www.fengguan g.com).

For moreinformation , please scan the code

525-1600kW Outline diagram

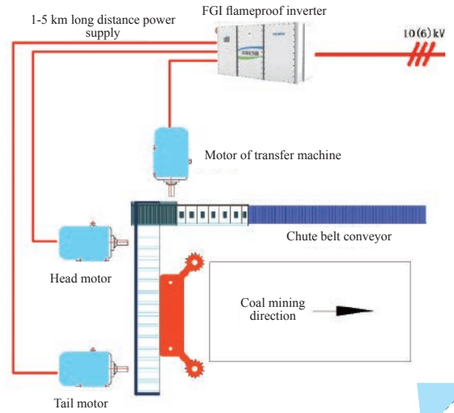
1600-2200kW Outline diagram

BPJ1-3×1600/3.3 Outline diagram

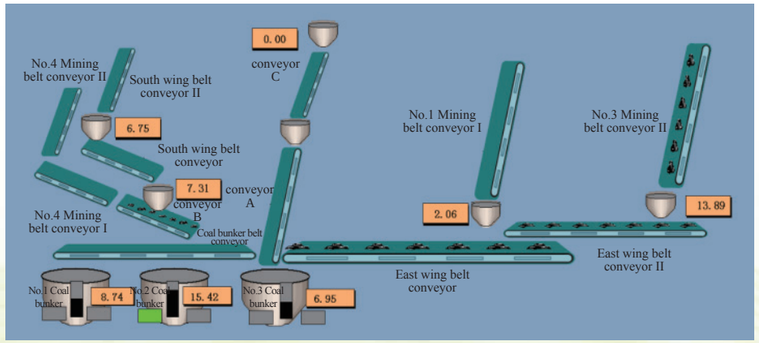
Application places

Flame-proof variable-frequency speed control is a kind of high efficiency and high performance speed control mode. By controlling the asynchronous motor (or synchronous machine), stepless smooth speed control can be realized, which can meet the requirements of various production machinery. The application of variable-frequency speed control in coal mines has become the current trend of mine equipment speed control.

Flame-proof inverter is mainly used for underground equipment load: belt conveyor, scraper, winch (monkey cart), coal cutter, various fans, water supply and drainage pump, emulsion pump, etc.



Application advantages(Take the main belt conveyor as an example)



Schematic diagram of the main belt conveyor

As required by intelligent construction of coal mine, intelligent drive control of high-pressure and high-power equipment represented by underground main conveyor belt conveyor, scraper, fan and water pump is very important. The belt conveyor is mainly composed of conveyor belt, roller, frame, driving device, etc. The main task is to transport the coal and gangue produced by the underground working face to the coal bunker of the main shaft.

The belt conveyor transportation system plays a very important role in ensuring the normal production of the mine.

The application of flame-proof high voltage inverter to the main conveyor belt has advantages:

01 The belt conveyor is really soft start, smooth start, no impact on the power grid; The low frequency operation can output 2.2 times the rated torque, and the starting time is set according to the demand, which can meet the requirements of the heavy-duty soft starting condition of the belt conveyor.

02 Realize automatic torque balance when the belt conveyor is driven by multiple motors. The masterslaveor coordination cabinet control mode is adopted to achieve torque balance during multi-motor driving and ensure reliable operation of the system.

03 Automatically adjust the running speed of belt conveyor. Cooperate with the coal flow sensor, and automatically adjust the running speed of the belt according to the load, so as to achieve "fast running with more coal and slow running with less coal", and greatly improve the transportation efficiency of the system.

04 Energy conservation and consumption reduction: in application cases, the soft start reduces the impact, the high-speed operation time is reduced according to the coal quantity speed regulation, the wear of mechanical systems such as the motor, roller and belt is greatly reduced, the service life of the equipment is extended, the on-site maintenance workload and maintenance cost of the system equipment are reduced, and the labor intensity of the workers is reduced. At the same time, the electrical energy consumption of the motor in low-speed and high-speed operation is significantly reduced.

Application case

◎ Application Case of 1140V Belt Conveyor in Nantun Coal Mine

Application effects:

1.Realizing soft start of belt conveyor, smooth start and no impact on power grid.

2.Realize various load speed regulation requirements of users, improve production process and work efficiency.

3.Realize automatic torque balance when the belt conveyor is driven by multiple motors.

◎ Application case of 1140V belt conveyor in Jining No. 3 Coal Mine of Yankuang Energy Group

Application effects:

1. There is a process of generating braking and feeding back electric energy to the power grid during the operation of the belt conveyor. Therefore, four quadrant low-voltage flame-proof inverter with corresponding power is configured to drive 6 motors on site to meet the long-term heavy load working conditions of the belt conveyor.

2. The master and slave control between each two sets meets the requirements of the overload soft start working condition of the belt conveyor.

◎ Mingzi Coal Industry of Shanxi Pingyao Fengyan Coal and Coke Group—Variable-frequency drive scheme for 660V250kW elevator

Application effects:

1. During startup and acceleration, the impact current is reduced, and the maximum current during acceleration shall not exceed 1.3 times of the rated current of the motor, so that the elevator can stably and steplessly rise to the maximum speed from low speed under heavy load, without large current and greatly reducing the impact on the site power grid.
2. Feedback braking technology is adopted to successfully solve the problem of potential energy load regenerative power generation energy treatment and ensure the safe operation of inverter.

◎ Application Case of 10kV1800kW High voltage Flame-proof inverter for Drainage Pumps in XinJulong Coal Mine

Application effects:

1. Solve the problem that the diesel generator power supply motor cannot be started when the water pump is in emergency;
2. Reduce the impact of motor startup on the power grid and mechanical equipment through frequency conversion soft start, realize the undisturbed switching function of frequency conversion to power frequency, and the switching process has no impact on the power grid.

◎ Application Case of 10kV855kW High voltage flame-proof inverter for Main Conveyor Belt in Yingxing Coal Mine of Dafang County

Application effects:

1. Realizing soft start of belt conveyor, smooth start and no impact on power grid;
The low frequency operation can output 2.2 times of the rated torque, and the starting time can be set according to the demand, so as to meet the requirements of the belt conveyor heavy load soft start working condition.
2. Realize automatic torque balance when the belt conveyor is driven by multiple motors to ensure reliable operation of the system.
3. Automatically adjust the operating speed of the belt conveyor to achieve "fast running with more coal and slow running with less coal" and greatly improve the transportation efficiency of the system.

◎ Application Case of 3.3kV14000kW High voltage flame-proof inverter for Scraper in Zhaolou Coal MineScraper in Zhaolou Coal Mine

Application effects:

1. Realize automatic power balance function for load drive of 2 scraper machines;
2. Flame-proof cascade topology structure realizes long-distance power supply, and the distance between motor and equipment is 3000m;
3.For low-frequency operation of inverter, 2.2 times of rated torque is output to meet heavy load starting requirements.

◎ Lvliang Shenzhou Coal Industry Permanent Magnet Synchronous Motor Emulsion Pump Application Case (1140V)

Application effects:

1.Indifference vector control, accurate control of frequency and current.

2.Realize accurate control of oil ratio with PID closed-loop control.

3.Reduce pipeline pressure impact, start and stop equipment stably, and extend service life.

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