

GD5000 Series

High Performance Vector Control Medium Voltage Drive



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About INVT



2019 revenue
314 million



Announced time
13th Jan, 2010



Employer
more than **3000**



Patent
More than **1140** pics



R&D center
10



Manufacturing base
2



Subsidiary
15



Overseas subsidiary&office
11 countries



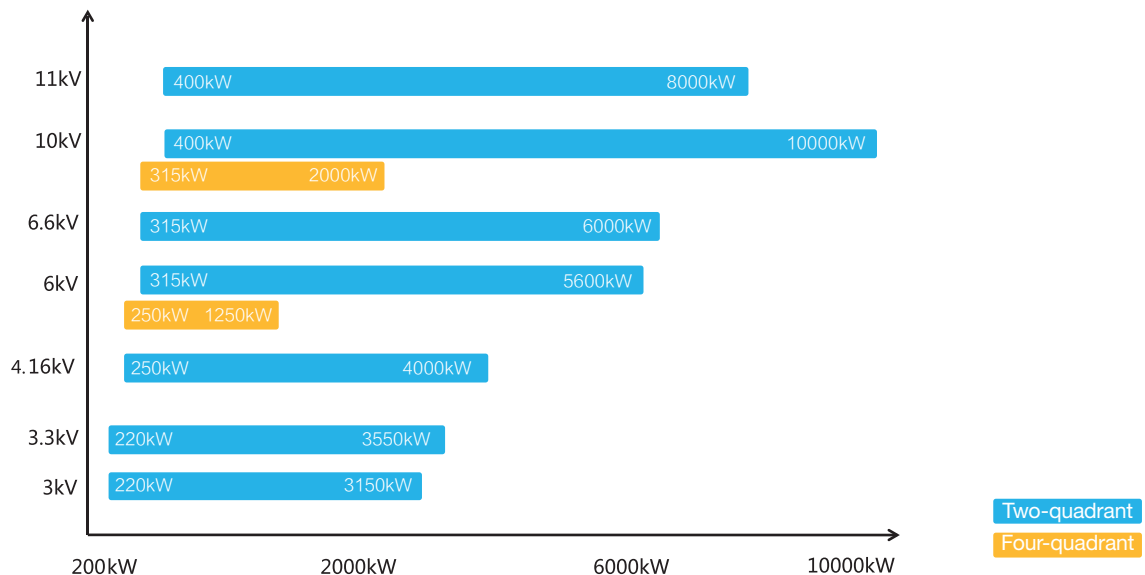
Global partners
more than **80** countries



Product introduction

GD5000 series medium-voltage VFDs are the second generation medium-voltage variable frequency drive independently developed, designed and manufactured by Shenzhen INVT Electric Co., Ltd. By adopting the most popular serial technology of power units, taking DSP+ARM+FPGA three-core processor as the control core, and integrating the most advanced motor vector control algorithm, the system owns the characteristics of high control precision, fast response speed, and low frequency and large torque, which are quite suitable for medium-voltage asynchronous motor and synchronous motor energy saving speed regulation and process improvement. GD5000 series medium-voltage VFDs have been widely used in fans, pumps, compressors, belt conveyors, hoists, and other loads.

Product family tree



Application fields

Power

ID (induced draft) fan, FD (forced draught) fan, primary fan, secondary fan, feed water pump, circulating pump, condensate pump, mortar pump, etc.



Mining

Main ventilator, forcing fan, exhaust fan, air compressor, gas drainage pump, medium pump, draining pump, belt conveyor, roller press, primary and secondary mine hoist, etc.



Metallurgy

Sintering main drawing fan, blast furnace blower, dusting blower, sulfur dioxide blower, ring cooling fan, combustion fan, circulating pump, slag washing pump, dephosphorization pump, chemical liquid pump, slurry pump, rolling mill, etc.



Oil and gas

Fuel supply pump, water injection pump, electric submersible pump, LNG pressure pump, etc.



Cement

High temperature fan, exhaust fan at furnace head, exhaust fan at furnace end, coal mill circulating fan, raw mill circulating fan, cement mill circulating fan, ball mill fan, etc.



Municipal engineering

Clean water pump, sewage pump, purifying pump, mixed-flow pump, oxygen blower, etc.



Chemical

Dusting blower, gas blower, roots blower, sweetening fan, gas compressor (nitrogen, CO₂, and ammonia), circulating pump, etc.



Others

Pharmacy and paper making: fan, and water pump.
Sugar industry: feeder, and presser
Rubber and plastic industry: internal mixer.



Product structure

Cooling fan

- Well-known brand, high reliability, large air flow, and small noise

Power unit cabinet

- Power units in series connection. Each power unit is equivalent to one AC-DC-AC voltage-type single-phase low-voltage VFD;
- Modular design. All power units can be interchanged.



Touch screen

- TFT LCD, lifelike display;
- User-friendly interface, easy to operate.



Transformer cabinet

- Adopting phase-shifting transformer for multi-pulse rectification greatly improves current waveforms at the grid side and effectively reduces harmonic pollution to the grid;
- Equipped with temperature controller to monitor the real-time states of the transformer and ensure the safe operation.

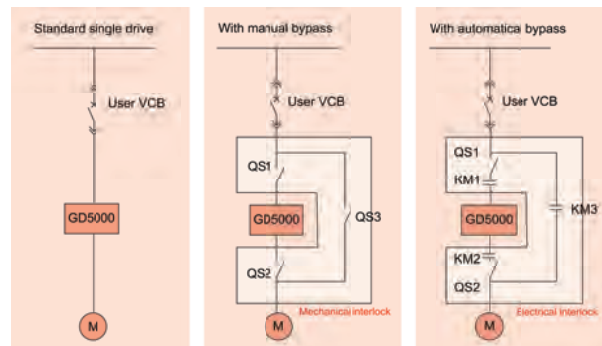


Control cabinet

- DSP+FPGA+ARM 3-core control technology, high system control precision and rapid response speed;
- Adopt optical fiber communication with strong anti-interference performance between main control board and units.

System bypass solution

- Manual bypass system need extra GD5000-MS manual bypass cabinet
- Automatic bypass system need extra GD5000-AS automatic bypass cabinet
- Support 1 drive more solution base on client requirements



Product features

1 Three kinds of motor control technologies

High-performance V/F

Motor common control mode, supports various control curves and V/F separation function.

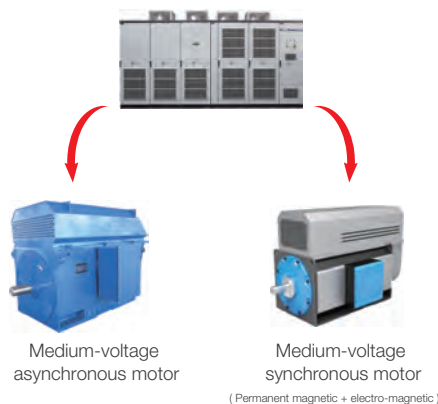
Open-loop vector

High precision control mode, and there is no need to install the speed sensor.

Closed-loop vector

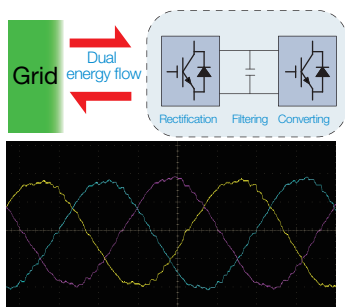
Ultra-high precision control mode, supports incremental encoders.

2 Drive two kinds of motors



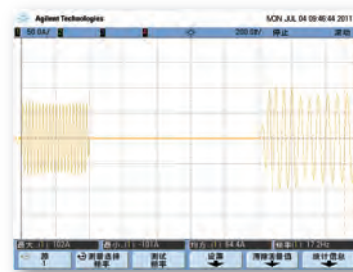
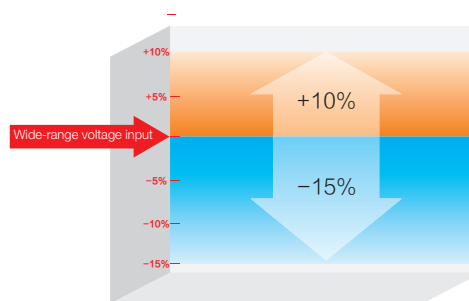
3 Four-quadrant driving technology (Four-quadrant VFDs)

- The power units use IGBT for rectification, achieving dual energy flow, energy saving and environmental protection.
- With 100% full power energy feedback capability.



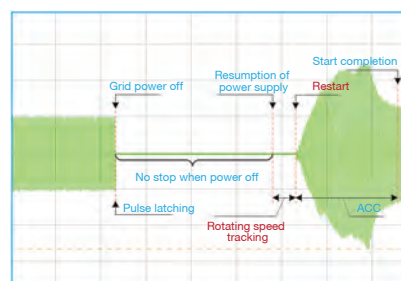
4 LVRT low-voltage ride through technology

- Wide-range voltage anti-interference capability. The system has AVR (automatic voltage regulation) function for meeting the harsh grid environment.
 - 85%-110% Full-load output
 - 65%-85% Derating output
 - 110%-120% Derating output
- No stop upon instantaneous power-off. During running, the system will not stop after the user medium-voltage bus powers off in the allowed time (0-5s). The former set value can be reached again if the voltage is restored within 0.1-1s after power-off.



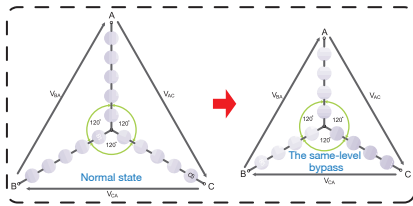
5 Full-band rotating speed tracking

- When the VFD is started under the condition that the running state of the motor is unknown, the system can accurately track the current rotating speed and direction of the motor, and control matching output voltage, so as to realize the flying start and reduce the impact on the power grid.

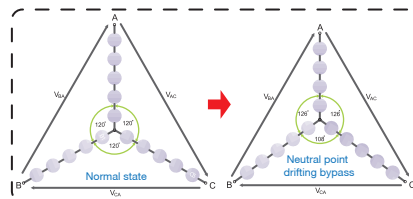


6 Unit bypass technology

- The same-level bypass. When one unit is failed, the system can automatically bypasses the corresponding unit of each phase, which is suitable for occasions where derating to run can be conducted.

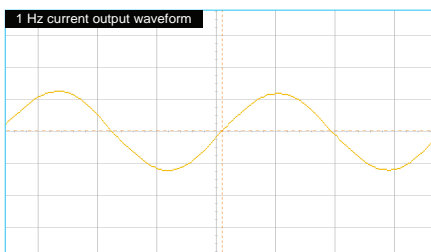


- Neutral point drifting bypass. Only bypass failed units. With medium voltage output capability and strong on-site adaptability, it is suitable for extreme cases.



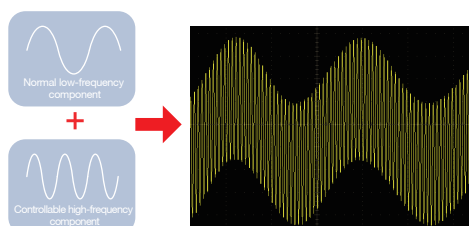
7 Excellent low frequency control

- With advanced dead zone compensation technology, good low-frequency waveforms, and optimized algorithm of low frequency oscillation suppression, no motor resonance will occur.



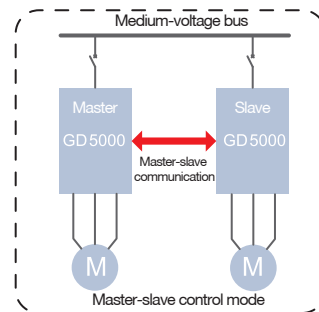
8 Dual-frequency braking technology

- By superimposing the reverse high-frequency component on the output voltage, a strong braking torque is generated, which can greatly reduce the motor deceleration time and apply to the occasions with high requirements on load braking.

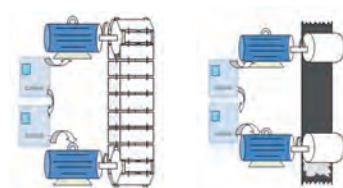


9 Master-slave control technology

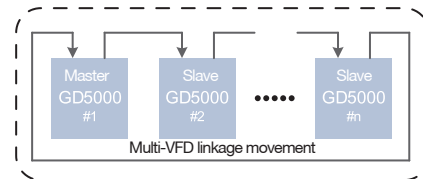
- With the multi-motor drive system solution, it can realize multi-motor coordination control and obtain power balance.



- The load can be connected rigidly or flexibly;

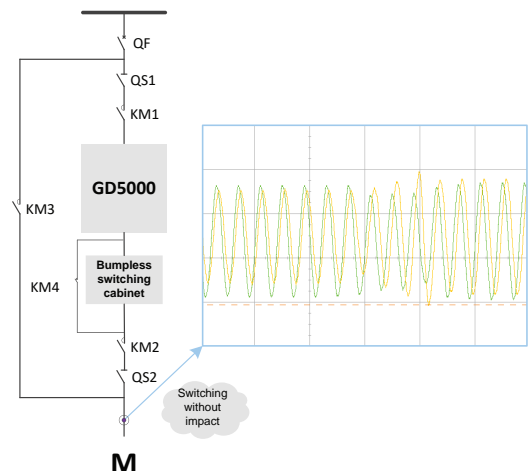


- Optical loop connection. Support a maximum of 16 motors for master-slave control, and the master can be set flexibly according to on-site conditions.



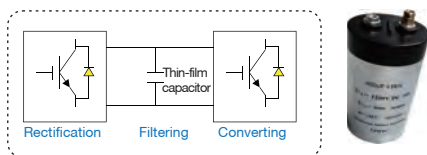
10 Synchronous bumpless switching

- With advanced "frequency-phase locking" control technology and high frequency-phase synchronization precision, smooth switching without impact between variable frequency and power frequency can be realized.
- Apply to the occasions of one-drive-more and soft start of the motor with large capacity.



11 Optional thin-film capacitor with long service life

- Medium voltage endurance capability and very high insulation resistance;
- Low ESR (equivalent series resistance) and strong resistance to ripple current;
- Good anti-pulse capability and high reliability;
- Very low loss, less heat, and long service life.



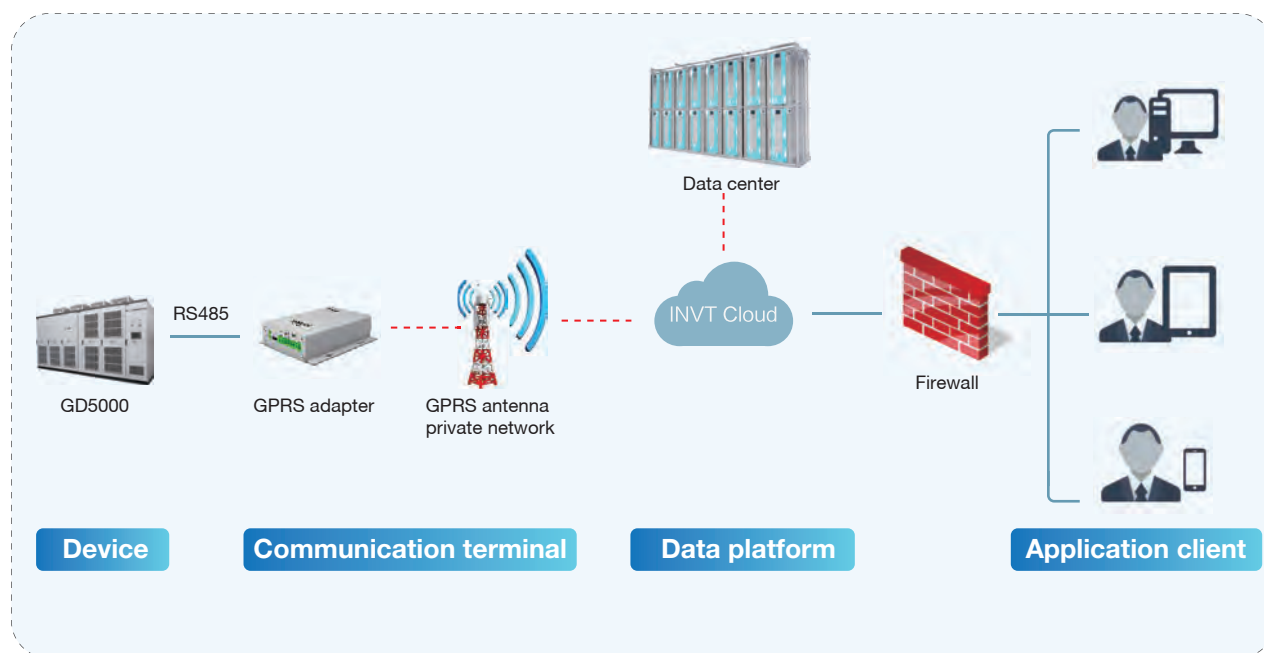
12 Rich bus interfaces

- Support various communication protocols including Modbus-RTU, Profibus-DP, Profinet, and UDP/IP, facilitating the connection with user DCS system and realization of device centralized management.



13 IoT monitoring program

- Remote monitoring: Conduct real-time monitoring on device status and operation data through computer, mobile phone or tablet PC.
- Device management: Establish data files and reports for each device to so as to facilitate historical tracing.
- Active fault alarm: Push the fault information to the customer in real time by SMS and change the passive inspection to active alarm for improving the work efficiency.
- Remote fault diagnosis: The manufacturer assists in fault analysis positioning to shorten the maintenance time.

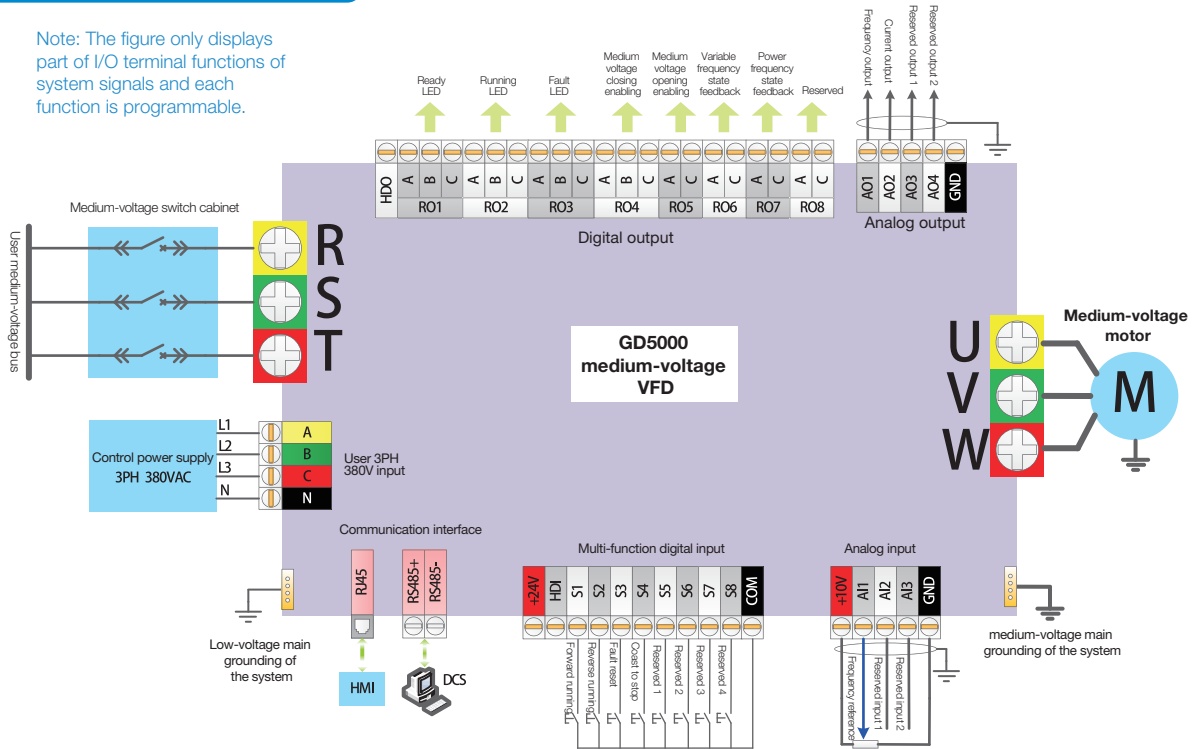


Technical parameters

| Item | | Two-quadrant parameters | | | | | | | Four-quadrant parameters | |
|---------------------|--|--|-------|--------|-----|-------|------|--|--|------|
| Input | Voltage degree | AC 3PH | | | | | | | AC 3PH | |
| | | 3kV | 3.3kV | 4.16kV | 6kV | 6.6kV | 10kV | 11kV | 6kV | 10kV |
| | Pulse number | 18 | 18 | 24 | 30 | 36 | 48 | 54 | 30 | 48 |
| | Voltage fluctuation range | -15%→+10%(Max. support: -35%→+20%, derating power output) | | | | | | | | |
| | Voltage frequency | 50/60Hz; ±5% | | | | | | | | |
| | Power factor | ≧0.97 (full load) | | | | | | | | |
| | System efficiency | Converter Efficiency ≧98%, system Efficiency ≧96%(full load) | | | | | | | | |
| Current harmonic | ≧4% | | | ≧2% | | | | ≧4% | | |
| Output | Voltage range | 0–rated input voltage | | | | | | | | |
| | Frequency range | 0–120Hz (customized) | | | | | | | | |
| | Current harmonic | ≧4% | | | ≧2% | | | | ≧4% | |
| Control performance | Control mode | V/F; SVC; VC | | | | | | | | |
| | Speed ratio | 1:50 (VF); 1:100 (SVC); 1:200 (VC) | | | | | | | | |
| | Speed control precision | ±1% (VF); ±0.4% (SVC); ±0.2% (VC) | | | | | | | | |
| | Torque response time | <200ms (SVC); <100ms (VC)vw | | | | | | | | |
| | Starting torque | 0.5Hz 150% of the rated torque (SVC); 0Hz 180% of the rated torque (VC) | | | | | | | | |
| | Overload capacity | 120%: 120s; 150%: 5s; 200%: protect immediately | | | | | | | | |
| | ACC/DEC time | 0-3600s (customized) | | | | | | | | |
| | Feedback control mode | None | | | | | | | Synchronous rectification control technology | |
| Feedback capacity | None | | | | | | | 100%, that is, the maximum feedback power of the VFD is the same as the maximum output power | | |
| User terminals | Digital input | 8 channels digital input (extensible and programmable) | | | | | | | | |
| | Digital output | 8 channels relay output (extensible and programmable) | | | | | | | | |
| | Analog input | 3 channels: AI1, AI2: 0–10V/0–20mA; AI3: -10V–10V | | | | | | | | |
| | Analog output | 4 channels: AO1, AO2, AO3, AO4: 0–10V/0–20mA | | | | | | | | |
| | High-speed pulse input | 1 channel: input range: 0–50kHz | | | | | | | | |
| | High-speed pulse output | 1 channel: output range: 0–50kHz | | | | | | | | |
| Protection function | System protection | Overcurrent, overvoltage, undervoltage, motor overload, VFD overload, phase loss, overheating, temperature controller fault, access fault, communication fault, etc. | | | | | | | | |
| | Unit protection | Undervoltage, overvoltage, power supply, overheating, input phase loss, VCE fault, power supply fault, communication fault, bypass failure, etc. | | | | | | | | |
| Others | HMI | Touch screen | | | | | | | | |
| | Communication mode | Support Modbus protocol (with standard RS485 interface), Profibus, Profinet, and Ethernet | | | | | | | | |
| | Installation method | Cabinet mounting | | | | | | | | |
| | Protection degree | Standard IP30 (Others optional) | | | | | | | | |
| | Noise degree | ≤75dB | | | | | | | | |
| | Feed in and out method | Bottom in and out; other methods are optional | | | | | | | | |
| | Cooling | Forced-air cooling | | | | | | | | |
| | Control power supply | AC 380V±10% (Others optional) | | | | | | | | |
| | MTBF | 100000h | | | | | | | | |
| | Environment temperature | -5C→+40C, derate 1.5% for every additional 1C if the temperature is above 40C and the maximum temperature is 50C; run without load if the temperature reaches 60C. | | | | | | | | |
| | Environment humidity | 5%–95%, no condensation | | | | | | | | |
| | Altitude | Below 1000m; derate 1% for every additional 100m if the altitude is above 1000m | | | | | | | | |
| Storage | Keep away from dust, direct sunlight, flammable or corrosive gas, oil, steam and vibration | | | | | | | | | |
| Vibration amplitude | 0.59g below | | | | | | | | | |

Standard terminals

Note: The figure only displays part of I/O terminal functions of system signals and each function is programmable.



Product model instruction

GD5000-A□□□□-□□□-XXXX

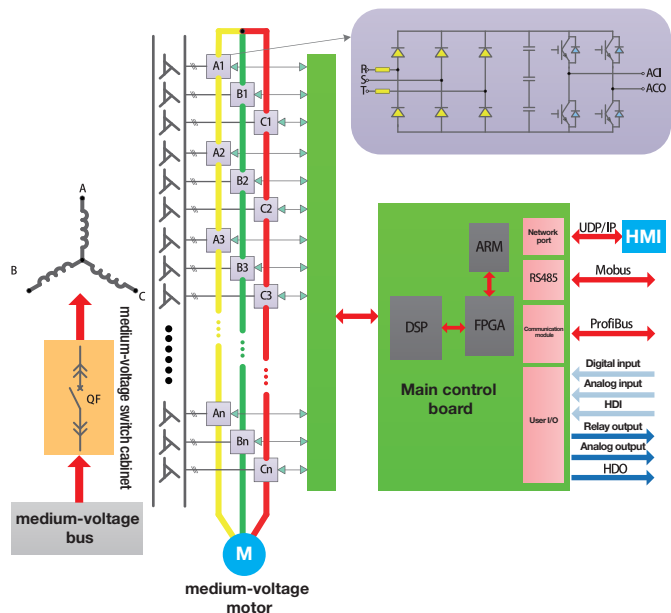
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

| | | |
|---|----------------------------------|---|
| ① | High-voltage product series name | GD5000: High-performance high-voltage VFD |
| ② | Product type | A: Asynchronous vector product (AM) B: Synchronous vector product (SM) |
| ③ | Rated capacity | 0500: 500kVA |
| ④ | Voltage degree | 03: 3kV 3.3: 3.3kV 4.16: 4.16kV 06: 6kV 10: 10kV 11: 11kV |
| ⑤ | Lot No. | D: Dual-side maintenance S: Front maintenance L: Integrated machine |
| ⑥ | Lot No. | R: Energy feedback system X: If no, default |
| ⑦ | Lot No. | C: Bypass system with unit contactor X: If no, default |
| ⑧ | Lot No. | Lot No. for special products based on the specific industry or for other purposes |

For example:

GD5000-A3150-06-D indicates GD5000 series high-performance medium-voltage VFD, vector control, drive asynchronous motor, rated capacity 3150kVA, dual-side maintenance, and two-quadrant operation.

Two-quadrant topology



Two-quadrant selection table

3kV series

| VFD model | Rated power (kW) | Rated current (A) | Dimensions W*D*H (mm) | Weight (kg) |
|-------------------|------------------|-------------------|-----------------------|-------------|
| GD5000-A0280-03-S | 220 | 54 | 3200X1200X2720 | 2416 |
| GD5000-A0315-03-S | 250 | 61 | 3200X1200X2720 | 2466 |
| GD5000-A0355-03-S | 280 | 68 | 3200X1200X2720 | 2506 |
| GD5000-A0400-03-S | 315 | 77 | 3800X1200X2720 | 2731 |
| GD5000-A0450-03-S | 355 | 87 | 3800X1200X2720 | 2881 |
| GD5000-A0500-03-S | 400 | 96 | 3800X1200X2720 | 2961 |
| GD5000-A0560-03-S | 450 | 108 | 4000X1200X2720 | 3149 |
| GD5000-A0630-03-S | 500 | 121 | 4000X1200X2720 | 3299 |
| GD5000-A0710-03-S | 560 | 137 | 4000X1200X2720 | 3349 |
| GD5000-A0800-03-S | 630 | 154 | 4000X1200X2720 | 3549 |
| GD5000-A0900-03-S | 710 | 173 | 4000X1200X2720 | 3790 |
| GD5000-A1000-03-S | 800 | 192 | 4000X1200X2720 | 3890 |
| GD5000-A1120-03-S | 900 | 216 | 4000X1200X2720 | 4030 |
| GD5000-A1250-03-S | 1000 | 241 | 4000X1200X2720 | 4380 |
| GD5000-A1400-03-D | 1120 | 269 | 5000X1500X2820 | 5560 |
| GD5000-A1600-03-D | 1250 | 308 | 5000X1500X2820 | 5810 |
| GD5000-A1800-03-D | 1400 | 346 | 5400X1500X2820 | 6710 |
| GD5000-A2000-03-D | 1600 | 385 | 5400X1500X2820 | 7010 |
| GD5000-A2240-03-D | 1800 | 431 | 5800X1500X2820 | 7760 |
| GD5000-A2500-03-D | 2000 | 481 | 5800X1500X2820 | 8160 |
| GD5000-A2800-03-D | 2240 | 539 | 5800X1500X2820 | 8860 |
| GD5000-A3150-03-D | 2500 | 609 | 5800X1500X2820 | 9300 |
| GD5000-A3550-03-D | 2800 | 722 | 5800X1500X2820 | 10160 |

3.3 kV series

| VFD model | Rated power (kW) | Rated current (A) | Dimensions W*D*H (mm) | Weight (kg) |
|--------------------|------------------|-------------------|-----------------------|-------------|
| GD5000-A0280-3.3-S | 220 | 49 | 3200X1200X2660 | 2283 |
| GD5000-A0315-3.3-S | 250 | 55 | 3200X1200X2720 | 2416 |
| GD5000-A0355-3.3-S | 280 | 62 | 3200X1200X2720 | 2466 |
| GD5000-A0400-3.3-S | 315 | 70 | 3200X1200X2720 | 2506 |
| GD5000-A0450-3.3-S | 355 | 79 | 3800X1200X2720 | 2731 |
| GD5000-A0500-3.3-S | 400 | 87 | 3800X1200X2720 | 2881 |
| GD5000-A0560-3.3-S | 450 | 98 | 3800X1200X2720 | 2961 |
| GD5000-A0630-3.3-S | 500 | 110 | 4000X1200X2720 | 3149 |
| GD5000-A0710-3.3-S | 560 | 124 | 4000X1200X2720 | 3299 |
| GD5000-A0800-3.3-S | 630 | 140 | 4000X1200X2720 | 3349 |
| GD5000-A0900-3.3-S | 710 | 157 | 4000X1200X2720 | 3549 |
| GD5000-A1000-3.3-S | 800 | 175 | 4000X1200X2720 | 3790 |
| GD5000-A1120-3.3-S | 900 | 196 | 4000X1200X2720 | 3890 |
| GD5000-A1250-3.3-S | 1000 | 219 | 4000X1200X2720 | 4030 |
| GD5000-A1400-3.3-S | 1120 | 245 | 4000X1200X2720 | 4380 |
| GD5000-A1600-3.3-D | 1250 | 280 | 5000X1500X2820 | 5560 |
| GD5000-A1800-3.3-D | 1400 | 315 | 5000X1500X2820 | 5810 |
| GD5000-A2000-3.3-D | 1600 | 350 | 5400X1500X2820 | 6710 |
| GD5000-A2240-3.3-D | 1800 | 392 | 5400X1500X2820 | 7010 |
| GD5000-A2500-3.3-D | 2000 | 437 | 5800X1500X2820 | 7760 |
| GD5000-A2800-3.3-D | 2240 | 490 | 5800X1500X2820 | 8160 |
| GD5000-A3150-3.3-D | 2500 | 551 | 5800X1500X2820 | 8860 |
| GD5000-A3550-3.3-D | 2800 | 620 | 5800X1500X2820 | 9650 |
| GD5000-A4000-3.3-D | 3150 | 722 | 5800X1500X2820 | 10200 |

4.16 kV series

| VFD model | Rated power (kW) | Rated current (A) | Dimensions W*D*H (mm) | Weight (kg) |
|---------------------|------------------|-------------------|-----------------------|-------------|
| GD5000-A0315-4.16-S | 250 | 44 | 3600X1200X2720 | 3405 |
| GD5000-A0355-4.16-S | 280 | 49 | 3600X1200X2720 | 3455 |
| GD5000-A0400-4.16-S | 315 | 56 | 3600X1200X2720 | 3638 |
| GD5000-A0450-4.16-S | 355 | 62 | 3600X1200X2720 | 3718 |
| GD5000-A0500-4.16-S | 400 | 69 | 3600X1200X2720 | 3798 |
| GD5000-A0560-4.16-S | 450 | 78 | 4200X1200X2720 | 4053 |
| GD5000-A0630-4.16-S | 500 | 87 | 4200X1200X2720 | 4353 |
| GD5000-A0710-4.16-S | 560 | 99 | 4200X1200X2720 | 4483 |
| GD5000-A0800-4.16-S | 630 | 111 | 4600X1200X2720 | 4743 |
| GD5000-A0900-4.16-S | 710 | 125 | 4600X1200X2720 | 5093 |
| GD5000-A1000-4.16-S | 800 | 139 | 4600X1200X2720 | 5243 |
| GD5000-A1120-4.16-S | 900 | 155 | 4600X1200X2720 | 5593 |
| GD5000-A1250-4.16-S | 1000 | 173 | 4600X1200X2720 | 5975 |
| GD5000-A1400-4.16-S | 1120 | 194 | 4600X1200X2720 | 6425 |
| GD5000-A1600-4.16-S | 1250 | 222 | 4600X1200X2720 | 6865 |
| GD5000-A1800-4.16-S | 1400 | 236 | 4600X1200X2720 | 7515 |
| GD5000-A2000-4.16-D | 1600 | 278 | 5000X1500X2820 | 8910 |
| GD5000-A2240-4.16-D | 1800 | 311 | 5000X1500X2820 | 9410 |
| GD5000-A2500-4.16-D | 2000 | 347 | 5400X1500X2820 | 10860 |
| GD5000-A2800-4.16-D | 2240 | 389 | 5400X1500X2820 | 11510 |
| GD5000-A3150-4.16-D | 2500 | 437 | 5800X1500X2820 | 13210 |
| GD5000-A3550-4.16-D | 2800 | 493 | 5800X1500X2820 | 14110 |
| GD5000-A4000-4.16-D | 3150 | 555 | 5800X1500X2820 | 15010 |
| GD5000-A4500-4.16-D | 3550 | 624 | 6200X1500X2820 | 16000 |
| GD5000-A5000-4.16-D | 4000 | 722 | 6200X1500X2820 | 17010 |

6 kV series

| VFD model | Rated power (kW) | Rated current (A) | Dimensions W*D*H (mm) | Weight (kg) |
|-------------------|------------------|-------------------|-----------------------|-------------|
| GD5000-A0400-06-S | 315 | 38 | 3800X1200X2660 | 2965 |
| GD5000-A0500-06-S | 400 | 48 | 3800X1200X2660 | 3035 |
| GD5000-A0560-06-S | 450 | 54 | 3800X1200X2660 | 3170 |
| GD5000-A0630-06-S | 500 | 61 | 3800X1200X2660 | 3320 |
| GD5000-A0710-06-S | 560 | 68 | 3800X1200X2660 | 3370 |
| GD5000-A0800-06-S | 630 | 77 | 4400X1200X2660 | 3635 |
| GD5000-A0900-06-S | 710 | 87 | 4400X1200X2660 | 3785 |
| GD5000-A1000-06-S | 800 | 96 | 4400X1200X2660 | 3885 |
| GD5000-A1120-06-S | 900 | 108 | 4800X1200X2720 | 4268 |
| GD5000-A1250-06-S | 1000 | 120 | 4800X1200X2660 | 4408 |
| GD5000-A1400-06-S | 1120 | 135 | 4800X1200X2660 | 4758 |
| GD5000-A1600-06-D | 1250 | 154 | 4650X1500X2660 | 5058 |
| GD5000-A1800-06-D | 1400 | 173 | 4650X1500X2720 | 5610 |
| GD5000-A2000-06-D | 1600 | 192 | 4650X1500X2720 | 5810 |
| GD5000-A2240-06-D | 1800 | 216 | 4650X1500X2720 | 6060 |
| GD5000-A2500-06-D | 2000 | 241 | 4650X1500X2720 | 6560 |
| GD5000-A2800-06-D | 2240 | 269 | 5800X1200X2820 | 7550 |
| GD5000-A3150-06-D | 2500 | 303 | 5800X1200X2820 | 8350 |
| GD5000-A3550-06-D | 2800 | 342 | 6400X1200X2820 | 9750 |
| GD5000-A4000-06-D | 3150 | 385 | 6800X1200X2820 | 10000 |
| GD5000-A4500-06-D | 3550 | 433 | 7400X1200X2820 | 11600 |
| GD5000-A5000-06-D | 4000 | 481 | 7400X1200X2820 | 12000 |
| GD5000-A5600-06-D | 4500 | 539 | 7600X1200X2820 | 13180 |
| GD5000-A6300-06-D | 5000 | 606 | 8200X1500X2820 | 15510 |
| GD5000-A7500-06-D | 6000 | 722 | 8200X1500X2820 | 16110 |

6.6 kV series

| VFD model | Rated power (kW) | Rated current (A) | Dimensions W*D*H (mm) | Weight (kg) |
|--------------------|------------------|-------------------|-----------------------|-------------|
| GD5000-A0400-6.6-S | 315 | 35 | 4000X1200X2720 | 3026 |
| GD5000-A0450-6.6-S | 355 | 39 | 4000X1200X2720 | 3056 |
| GD5000-A0500-6.6-S | 400 | 44 | 4000X1200X2720 | 3096 |
| GD5000-A0560-6.6-S | 450 | 49 | 4000X1200X2720 | 3126 |
| GD5000-A0630-6.6-S | 500 | 55 | 4000X1200X2720 | 3402 |
| GD5000-A0710-6.6-S | 560 | 62 | 4000X1200X2720 | 3482 |
| GD5000-A0800-6.6-S | 630 | 70 | 4000X1200X2720 | 3552 |
| GD5000-A0900-6.6-S | 710 | 79 | 4600X1200X2720 | 3917 |
| GD5000-A1000-6.6-S | 800 | 87 | 4600X1200X2720 | 4017 |
| GD5000-A1120-6.6-S | 900 | 98 | 4600X1200X2720 | 4117 |
| GD5000-A1250-6.6-D | 1000 | 109 | 4650X1500X2650 | 4597 |
| GD5000-A1400-6.6-D | 1120 | 122 | 4650X1500X2650 | 4657 |
| GD5000-A1600-6.6-D | 1250 | 140 | 4650X1500X2650 | 5077 |
| GD5000-A1800-6.6-D | 1400 | 157 | 4650X1500X2650 | 5301 |
| GD5000-A2000-6.6-D | 1600 | 175 | 4650X1500X2650 | 5693 |
| GD5000-A2240-6.6-D | 1800 | 196 | 4650X1500X2650 | 6050 |
| GD5000-A2500-6.6-D | 2000 | 219 | 4650X1500X2650 | 6284 |
| GD5000-A2800-6.6-D | 2240 | 245 | 4650X1500X2650 | 6564 |
| GD5000-A3150-6.6-D | 2500 | 276 | 5800X1500X2820 | 8425 |
| GD5000-A3550-6.6-D | 2800 | 311 | 5800X1500X2820 | 8725 |
| GD5000-A4000-6.6-D | 3150 | 350 | 6800X1500X2820 | 9625 |
| GD5000-A4500-6.6-D | 3550 | 394 | 6800X1500X2820 | 10825 |
| GD5000-A5000-6.6-D | 4000 | 437 | 7400X1500X2820 | 12975 |
| GD5000-A5600-6.6-D | 4500 | 490 | 7600X1500X2820 | 13755 |
| GD5000-A6300-6.6-D | 5000 | 551 | 7600X1500X2820 | 14555 |
| GD5000-A7100-6.6-D | 5600 | 620 | 7600X1500X2820 | 15355 |
| GD5000-A8000-6.6-D | 6300 | 722 | 10000X1500X2820 | 20000 |

10 kV series

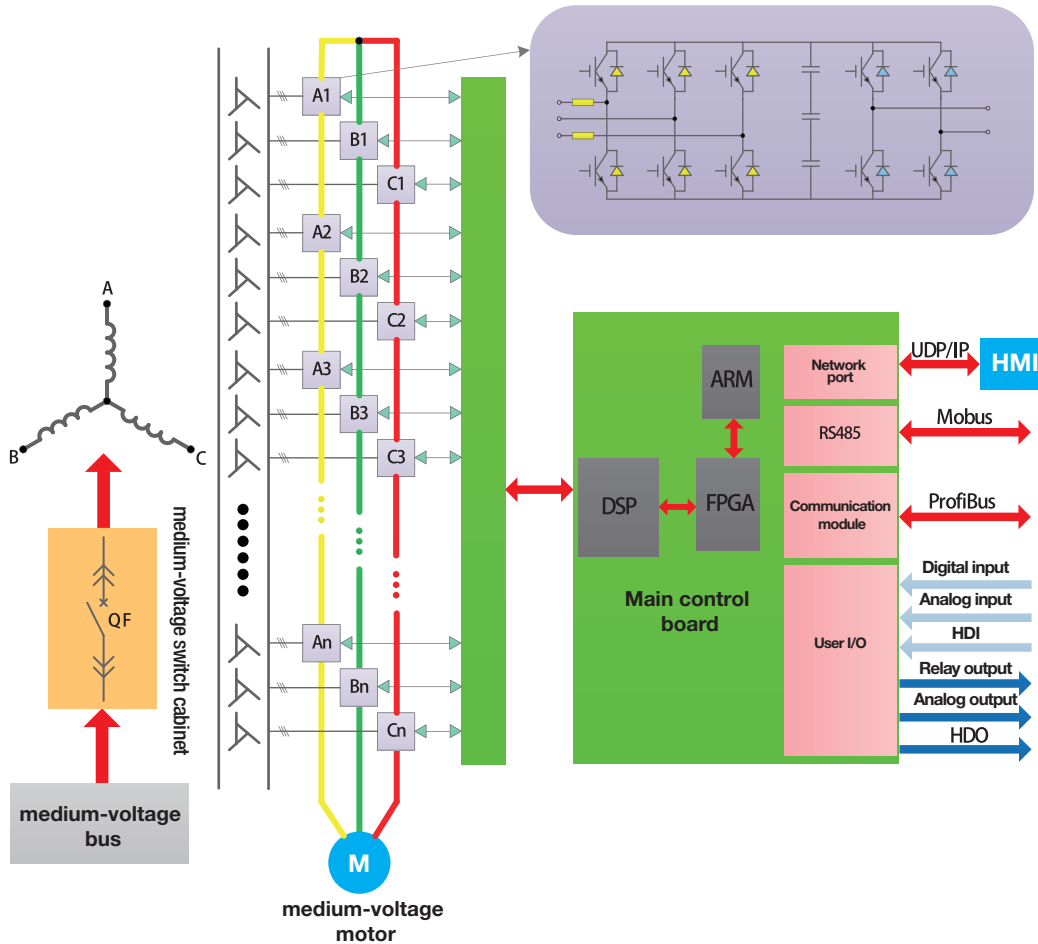
| VFD model | Rated power (kW) | Rated current (A) | Dimensions W*D*H (mm) | Weight (kg) |
|-------------------|------------------|-------------------|-----------------------|-------------|
| GD5000-A0500-10-S | 400 | 29 | 4600X1200X2660 | 3550 |
| GD5000-A0560-10-S | 450 | 32 | 4600X1200X2660 | 3550 |
| GD5000-A0710-10-S | 560 | 41 | 4800X1200X2660 | 3960 |
| GD5000-A0800-10-S | 630 | 46 | 4800X1200X2720 | 4070 |
| GD5000-A0900-10-S | 710 | 52 | 4800X1200X2720 | 4366 |
| GD5000-A1000-10-S | 800 | 58 | 4800X1200X2660 | 4426 |
| GD5000-A1120-10-S | 900 | 65 | 4800X1200X2660 | 4776 |
| GD5000-A1250-10-S | 1000 | 72 | 4800X1200X2660 | 4976 |
| GD5000-A1400-10-S | 1120 | 81 | 5200X1200X2720 | 5271 |
| GD5000-A1600-10-S | 1250 | 92 | 5200X1200X2720 | 5421 |
| GD5000-A1700-10-S | 1400 | 98 | 5200X1200X2720 | 5621 |
| GD5000-A2000-10-S | 1600 | 115 | 5800X1200X2720 | 6481 |
| GD5000-A2240-10-S | 1800 | 129 | 6200X1500X2720 | 6876 |
| GD5000-A2500-10-S | 2000 | 144 | 6200X1500X2720 | 7276 |
| GD5000-A2800-10-D | 2240 | 162 | 5050X1500X2720 | 7576 |
| GD5000-A3150-10-D | 2500 | 182 | 5050X1500X2720 | 8210 |
| GD5000-A3550-10-D | 2800 | 205 | 5050X1500X2720 | 9310 |

| VFD model | Rated power (kW) | Rated current (A) | Dimensions W*D*H (mm) | Weight (kg) |
|--------------------|------------------|-------------------|-----------------------|-------------|
| GD5000-A4000-10-D | 3150 | 231 | 5050X1500X2720 | 10030 |
| GD5000-A4500-10-D | 3550 | 260 | 7000X1500X2820 | 10960 |
| GD5000-A5000-10-D | 4000 | 289 | 7000X1500X2820 | 11260 |
| GD5000-A5600-10-D | 4500 | 323 | 7200X1500X2820 | 11940 |
| GD5000-A6300-10-D | 5000 | 364 | 8000X1500X2820 | 14340 |
| GD5000-A7100-10-D | 5600 | 410 | 8800X1500X2820 | 15990 |
| GD5000-A7500-10-D | 6000 | 433 | 11200X1500X2820 | 19880 |
| GD5000-A8000-10-D | 6300 | 462 | 11200X1500X2820 | 21080 |
| GD5000-A9000-10-D | 7100 | 520 | 11200X1500X2820 | 22280 |
| GD5000-A10000-10-D | 8000 | 577 | 11200X1500X2820 | 23080 |
| GD5000-A11200-10-D | 9000 | 647 | 12000X1500X2820 | 26020 |
| GD5000-A12500-10-D | 10000 | 722 | 12000X1500X2820 | 26820 |

11 kV series

| VFD model | Rated power (kW) | Rated current (A) | Dimensions W*D*H (mm) | Weight (kg) |
|------------------|------------------|-------------------|-----------------------|-------------|
| GD5000-A0500-11 | 400 | 26 | 4800X1200X2720 | 3699 |
| GD5000-A0560-11 | 450 | 29 | 4800X1200X2720 | 3749 |
| GD5000-A0630-11 | 500 | 33 | 4800X1200X2720 | 3849 |
| GD5000-A0710-11 | 560 | 37 | 5000X1200X2720 | 4129 |
| GD5000-A0800-11 | 630 | 42 | 5000X1200X2720 | 4179 |
| GD5000-A0900-11 | 710 | 47 | 5000X1200X2720 | 4279 |
| GD5000-A1000-11 | 800 | 52 | 5000X1200X2660 | 4608 |
| GD5000-A1120-11 | 900 | 59 | 5000X1200X2660 | 4918 |
| GD5000-A1250-11 | 1000 | 66 | 5000X1200X2660 | 5118 |
| GD5000-A1400-11 | 1120 | 73 | 5000X1200X2660 | 5368 |
| GD5000-A1600-11 | 1250 | 84 | 5400X1200X2720 | 5503 |
| GD5000-A1800-11 | 1400 | 94 | 5400X1200X2720 | 5843 |
| GD5000-A2000-11 | 1600 | 105 | 4650X1500X2650 | 5906 |
| GD5000-A2240-11 | 1800 | 118 | 4650X1500X2650 | 6211 |
| GD5000-A2500-11 | 2000 | 131 | 5050X1500X2650 | 6656 |
| GD5000-A2800-11 | 2240 | 147 | 5050X1500X2650 | 6977 |
| GD5000-A3150-11 | 2500 | 165 | 5050X1500X2650 | 7219 |
| GD5000-A3550-11 | 2800 | 186 | 5050X1500X2650 | 8355 |
| GD5000-A4000-11 | 3150 | 210 | 5050X1500X2650 | 8619 |
| GD5000-A4500-11 | 3550 | 236 | 5050X1500X2650 | 9698 |
| GD5000-A5000-11 | 4000 | 262 | 7800X1500X2820 | 12005 |
| GD5000-A5600-11 | 4500 | 294 | 8000X1500X2820 | 14385 |
| GD5000-A6300-11 | 5000 | 331 | 9000X1500X2820 | 16885 |
| GD5000-A7000-11 | 5600 | 367 | 9000X1500X2820 | 17585 |
| GD5000-A8000-11 | 6300 | 420 | 12600X1500X2820 | 21765 |
| GD5000-A9000-11 | 7100 | 472 | 12600X1500X2820 | 23265 |
| GD5000-A10000-11 | 8000 | 525 | 12600X1500X2820 | 25665 |
| GD5000-A11200-11 | 9000 | 587 | 12600X1500X2820 | 28625 |
| GD5000-A12500-11 | 10000 | 656 | 12600X1500X2820 | 30555 |
| GD5000-A13500-11 | 10800 | 722 | 12600X1500X2820 | 33265 |

Four-quadrant topology



Four-quadrant selection table









6kV series

| VFD model | Rated power (kW) | Rated current (A) | Dimensions W*D*H (mm) | Weight (kg) |
|-----------------|------------------|-------------------|-----------------------|-------------|
| GD5000-A0315-06 | 250 | 30 | 4400X1200X2660 | 3190 |
| GD5000-A0355-06 | 280 | 34 | 4400X1200X2660 | 3240 |
| GD5000-A0400-06 | 315 | 38 | 4400X1200X2660 | 3370 |
| GD5000-A0450-06 | 355 | 43 | 4400X1200X2660 | 3420 |
| GD5000-A0500-06 | 400 | 48 | 4400X1200X2660 | 3470 |
| GD5000-A0560-06 | 450 | 54 | 4400X1200X2660 | 3520 |
| GD5000-A0630-06 | 500 | 61 | 4800X1200X2660 | 3890 |
| GD5000-A0710-06 | 560 | 68 | 4800X1200X2660 | 3990 |
| GD5000-A0800-06 | 630 | 77 | 4800X1200X2660 | 4090 |
| GD5000-A0900-06 | 710 | 87 | 4800X1200X2660 | 4290 |
| GD5000-A1000-06 | 800 | 96 | 4800X1200X2660 | 4540 |
| GD5000-A1120-06 | 900 | 108 | 4800X1200X2720 | 4755 |
| GD5000-A1250-06 | 1000 | 120 | 4800X1200X2720 | 4945 |
| GD5000-A1400-06 | 1120 | 135 | 4800X1200X2720 | 5145 |
| GD5000-A1600-06 | 1250 | 154 | 4800X1200X2720 | 5345 |

10kV series

| VFD model | Rated power (kW) | Rated current (A) | Dimensions W*D*H (mm) | Weight (kg) |
|-----------------|------------------|-------------------|-----------------------|-------------|
| GD5000-A0400-10 | 315 | 23 | 5200X1200X2660 | 3877 |
| GD5000-A0450-10 | 355 | 26 | 5200X1200X2660 | 3927 |
| GD5000-A0500-10 | 400 | 29 | 5200X1200X2660 | 4057 |
| GD5000-A0560-10 | 450 | 32 | 5200X1200X2660 | 4157 |
| GD5000-A0630-10 | 500 | 36 | 5200X1200X2660 | 4207 |
| GD5000-A0710-10 | 560 | 41 | 5200X1200X2660 | 4357 |
| GD5000-A0800-10 | 630 | 46 | 5200X1200X2720 | 4547 |
| GD5000-A0900-10 | 710 | 52 | 5200X1200X2720 | 4747 |
| GD5000-A1000-10 | 800 | 58 | 5800X1200X2660 | 5261 |
| GD5000-A1120-10 | 900 | 65 | 5800X1200X2660 | 5411 |
| GD5000-A1250-10 | 1000 | 72 | 5800X1200X2660 | 5611 |
| GD5000-A1400-10 | 1120 | 81 | 5800X1200X2720 | 5921 |
| GD5000-A1600-10 | 1250 | 92 | 5800X1200X2720 | 6221 |
| GD5000-A1700-10 | 1400 | 98 | 5800X1200X2720 | 6321 |
| GD5000-A1900-10 | 1500 | 110 | 5800X1200X2720 | 6797 |
| GD5000-A2000-10 | 1600 | 115 | 5800X1200X2720 | 6997 |
| GD5000-A2120-10 | 1700 | 122 | 5800X1200X2720 | 7097 |
| GD5000-A2240-10 | 1800 | 129 | 6200X1500X2720 | 7392 |
| GD5000-A2500-10 | 2000 | 144 | 6200X1500X2720 | 7792 |

List of options and parts

| Name | Model | Picture | Description |
|------------------------------------|------------------------|---|--|
| Bypass cabinet | GD5000-AS GD5000-MS |  | Manual bypass cabinet: 2 knife switches. Isolating automatic bypass cabinet: 2 knife switches, 3 contactors. Can select different bypass solutions according to on-site conditions. |
| Bumpless switching cabinet | GD5000-SS |  | Embedded with reactors, used for synchronous bumpless switching between power frequency and variable frequency. |
| Remote operation cabinet | GD5000-CB |  | Used for on-site remote control, and the button functions and the displayed parameters can be customized as needed. |
| Communication card | GD5000-DP |  | Support Profibus-DP protocol |
| PG card | GD5000-PG |  | Encoder interface, support push-pull encoder A, B, Z signal input, differential, push-pull and open collector output. |
| Communication card | GD5000 set |  | Support Profinet protocol |
| Isolation grating | GD5000 set |  | Realize device input/output analog isolation, and enhance security and stability of the system. |
| Upper computer monitoring software | INVT Studio |  | Achieve the control of the upper computer on the VFD, and possess the functions of start/stop command, parameter read/write, fault diagnosis and oscilloscope. It can meet clients' non-standard requirements by modifying relative configuration files. |

Application cases

Power industry

Application of GD5000 series medium-voltage VFDs in the feed water pump of circulating fluidized bed boiler

1 Project background

One thermoelectric center of Sinopec has a 300MW coal-fired power generating set whose feed water pump of the bed boiler is driven by a 6kV/2240kW asynchronous motor. During production, the water pump runs in power frequency and the flow is adjusted by the outlet valve of the water pump, causing great energy waste, severe wind board wear, and large noise.

2 Economic benefits

| Parameters | Power frequency | Variable frequency |
|---------------------------|----------------------------|--------------------|
| Practical running current | 220A | 140A |
| Power factor | 0.84 | 0.95 |
| Power saving rate | 28% | |
| Annual power saving cost | 1,681,000 RMB each machine | |



▲ On-site pictures

3 Other applications



2*600M set



Shenhua Guohua (Zhoushan)
Power Plant 2*300M set



Guodian Qingshan Thermal
Power Plant 2*350M set

Application cases

Power industry

Application of GD5000 series medium-voltage VFDs in the condensate pump in power plant

1 Project background

Yidian Holding Group Co., Ltd. is a large industrial circular economy enterprise covering power generation, aluminum smelting, aluminum processing, carbon production, fly ash comprehensive utilization and other industries. In 2014, a power plant of this group invited our technical personnel to go to the plant for analyzing the running statuses of steam water system and air and flue gas system of the 2*330MW set and making energy saving evaluation. According to the field operation data and process requirements, our technical personnel conducted a comprehensive analysis of the operation conditions, submitted an overall solution for the variable-frequency transformation of the boiler and steam turbine auxiliary motors, and finally determined that the condensate pump with a larger energy saving space should be transformed first.

2 Benefit analysis

- ◆ Obvious power saving effect (The following table shows the electric energy statistical data of one month)

| Device pump | Current | Power-frequency power | Valve | Variable-frequency power | Saving power | Power saving rate |
|-----------------|---------|-----------------------|-------|--------------------------|--------------|-------------------|
| Condensate pump | 85A | 742kW | 35% | 439W | 302W | 41% |

Calculating based on that 2# set runs for 7,200 hours per year, using our VFDs can save 2.17 million kWh of auxiliary power per year, equivalent to 1.13 million Yuan.

- ◆ Reduce the current surge when the motor starts.
- ◆ Improve the reliability of the pipe network system.



Application cases

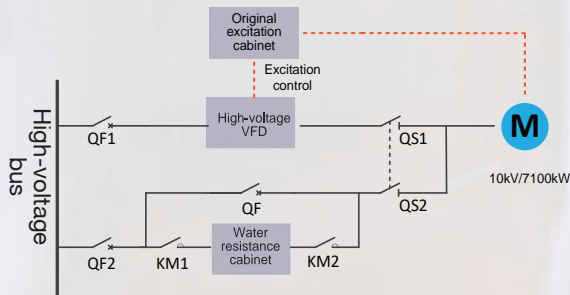
Metallurgy industry

Application of GD5000 series medium-voltage VFDs in the large power synchronous motor

1 Project background

One company of Hebei Iron & Steel Group has two 200m² sintering machines whose main sintering fan is driven by a 10kV/7100kW synchronous motor. At beginning, the water resistance cabinet was used to start the motor. During the process of starting, once the excitation system is under inaccurate control, the motor will be "out of step" and cannot start. Additionally, the wind boards were used to adjust air flow, causing great energy waste.

2 Schematic diagram of scheme



▲ On-site pictures

3 Result after improvement

The excellent synchronous motor control technology of GD5000 products perfectly solves the "out of step" problem of the synchronous motor. The energy saving effect is very obvious, and the power saving rate reaches up to 26%.

4 Other applications



Application cases

Metallurgy industry

Application of GD5000 series medium-voltage VFDs in the sweetening fan

1 Project background

Yunnan Copper Group establishes a set of sweetening system whose induced draft fan is driven by a 6kV/800kW motor. The load plays an important part in production. Once it goes wrong, environmental pollution will be caused. Furthermore, there are a lot of particles and dust on site, putting a high requirement on corrosion resistance.

2 Product feature

The dual-layer conformal coating technology ensures corrosion resistance capability of the components and plates.



▲ On-site pictures

Application cases

Building materials industry

Application of GD5000 series medium-voltage VFDs at high altitude

1 Project background

One building materials company in Tibet is located at over 3700km high altitude. The high temperature fan at furnace end is driven by 10kV/2800kW asynchronous motor. Due to frequent material collapse, the production cannot be continuous.

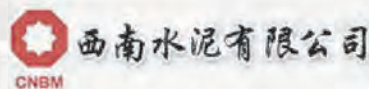
2 Product feature

One building materials company in Tibet is The design of high altitude components ensures the VFD meets the safety requirements at high altitude;
With excellent speed and strong overload capability, GD5000 can ensure continuous production during material collapse.



▲ On-site pictures

3 Other applications



Application cases

Building materials industry

Application of GD5000 series medium-voltage VFDs in permanent-magnet synchronous coal mill

1 Project background

Handan Jinyu Taihang Cement Co., Ltd. belongs to Beijing Jinyu Group which is one of the world's top 100 building materials enterprises and one of 12 large building enterprises supported by the central government. The original ball mills of 6kV,1400kW in Jinyu Taihang coal mill field, after the transformation, were changed to be directly driven by the permanent-magnet synchronous motor, and former asynchronous motor and deceleration mechanism were removed. The permanent-magnet synchronous motor adopts pole pairs of 20 and 150 rpm, insulation grade F, motor power of 1120kW, rated current of 114A and voltage of 6000V. This project adopts INVT GD5000-B1800-06-S VFDs for variable frequency operation in a one-drive-one way, and the running frequency is between 35Hz and 45Hz according to the production requirements. The project adopts vector control, and SVC 1 adopts double closed-loop of speed and torque. In order to suppress the frequency fluctuation, speed filter parameters are added. Considering that fast response needs to be started, speed filter parameters shall not be too large. Restrain current fluctuation in overcurrent operation, appropriately enhance current loop, and low and high frequency band ranges from 20 to 45 Hz, the operation is stable. After transformation, the power saving rate of the whole system is improved by 16% compared with that of the original system.



▲ On-site pictures

2 Function characteristics

- ◆ Frequency setting mode: Digital setting, analog setting, high-speed pulse, multi-speed terminal reference, UP/DOWN terminal reference, Modbus remote communication setting, Profibus communication setting, master-slave mode reference, and hierarchical multi-step speed reference.
- ◆ Running mode: Keypad command, terminal command, Modbus communication command, and Profibus communication command.
- ◆ Start pre-torque compensation.
- ◆ Start/stop DC braking.
- ◆ PG card: Asynchronous machine PG card (12V), synchronous machine PG card (5V) (the VFD adopts the closed-loop control, and UWW-type encoder is optional)
- ◆ Automatic voltage regulation function: When the grid voltage changes, it can automatically keep the output voltage constant.

Application cases

Chemical industry

Application of GD5000 series medium-voltage VFDs in the centrifugal compressor

1 Project background

One petrochemical company in Shang dong mainly involving in petroleum refining is one of China's top 500 companies. The circulating gas compressor in the propylene production workshop belongs to heavy load, causing large starting impulse current, large noise and sudden changes in pressure. Furthermore, because the load has large fluctuation, adjusting the pressure only by the opening of the valve will cause great energy waste.



▲ On-site pictures

2 Main advantages

Excellent low frequency control feature of GD5000 series satisfies heavy-load start of the compressor on site, the average running current of the motor reduces greatly, and the energy-saving benefit is obvious.

| Parameters | Power frequency | Variable frequency |
|--------------------------------|--------------------------|--------------------|
| Running current | 47A | 7A |
| Rotating speed of the motor | 2980r/min | 1200r/min |
| Power factor | 0.47 | 0.95 |
| Annual electricity saving cost | 943,000 RMB each machine | |

Application cases

Chemical industry

Application of GD5000 series medium-voltage VFDs in the induced draft fan of the coal chemical industry

1 Project background

In a new urea plant project of one coal chemical company of Jincheng Anthracite Mining Group, our high-voltage VFDs have been used in 8 induced draft fans and 1 feed water pump of the boiler system for project construction. Since putting into operation, the VFDs have been in stable running with good economic benefits and high praise from customers.



▲ On-site pictures

Application of GD5000 series medium-voltage VFDs in the gas pressure blower

1 Project background

For the gas pressure blower of one chemical fertilizer production enterprise in Anhui, the roots blower is driven by one 6kV/560kW 10-pole motor. Before improvement, the large starting current has a bad effect on the devices in the same bus, and the air flow is adjusted by return valve, causing great energy waste.



▲ On-site pictures

Application cases

Mine industry

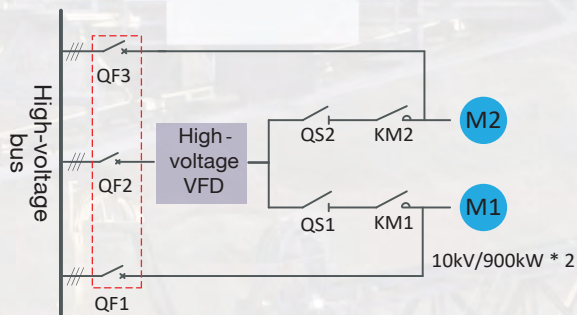
Application of GD5000 series medium-voltage VFDs in the main fan

1 Project background

The counter-rotating fan for ventilation in one mine of Shanxi Meijin Group is driven by two 10kV/900kW asynchronous motors at power frequency and constant speed. Its air flow is adjusted by adjusting the position of the wind board manually, causing great energy waste and having bad effect on production.

2 Schematic diagram of scheme

Excellent low frequency control feature of GD5000 series satisfies heavy-load start of the compressor on site, the average running current of the motor reduces greatly, and the energy-saving benefit is obvious.



▲ On-site pictures

3 Main advantages

- ◆ Obvious energy saving effect, and power saving rate up to 30%;
- ◆ Adopting "One-drive-two" structure, downsizing the devices.

Application cases

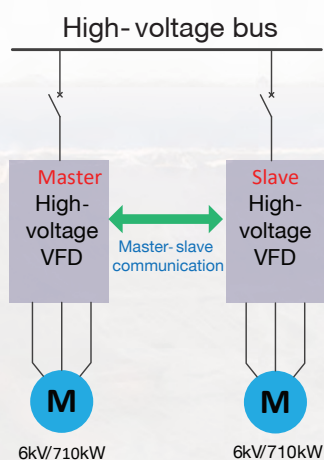
Mine industry

Application of GD5000 series medium-voltage VFDs in the belt conveyor

1 Project background

One coal company of Jincheng Anthracite Mining Group has an annual coal production of 0.6 million tons. The belt conveyor at the outlet of the mine is driven by two motors. The company previously adopted soft starter and hydraulic coupler for solving motor start and speed regulation problems, which comes about a lot of disadvantages. The soft starter may generate a great deal of harmonic, the hydraulic coupler may easily have faults, there is heavy maintenance workload, and the hydraulic coupling cannot solve the problem of power balance among motors during multi-motor driving.

2 Schematic diagram of scheme



3 Main advantages

- ◆ Master-slave control of GD5000 series achieves power balance between two motors.
- ◆ Excellent low frequency control feature of GD5000 series satisfies heavy-load start of the belt conveyor.

▲ On-site pictures

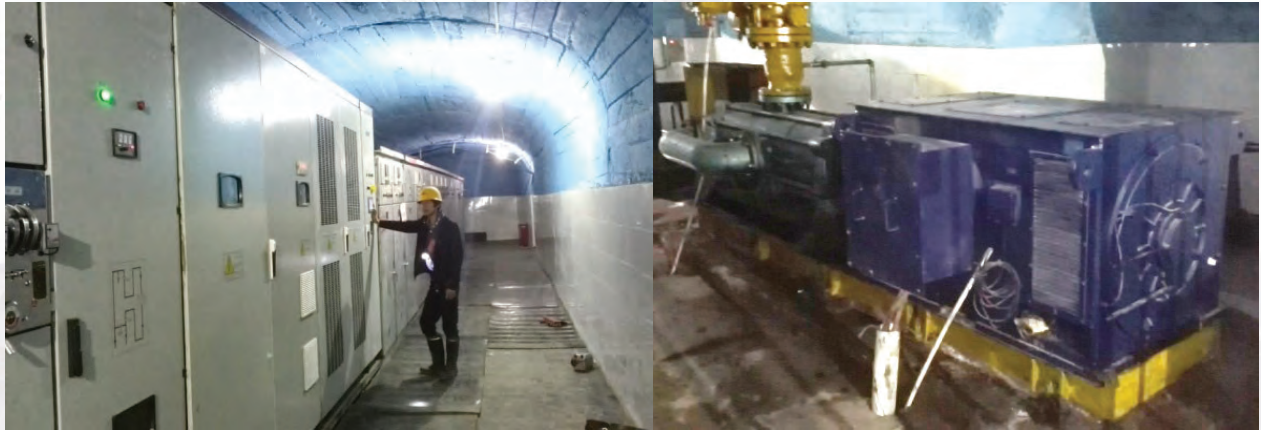
Application cases

Mine industry

Application of GD5000 series medium-voltage VFDs in the underground drainage pump

1 Project background

The underground devices of Guizhou Zijin Mining Group are powered by generators. The capacity of the grid is small. To reduce the starting current, the stator reactor starting is adopted, but the result is not satisfactory. Furthermore, someone is needed on duty for the whole day to start/stop the motor on site when the water level changes, so the labor intensity is great.



▲ On-site pictures

2 Main advantages

- ◆ The design of split-type system structure and underground installation facilitate the maintenance;
- ◆ The soft start and stop of the motor and small starting current completely satisfy the working conditions.

Application cases

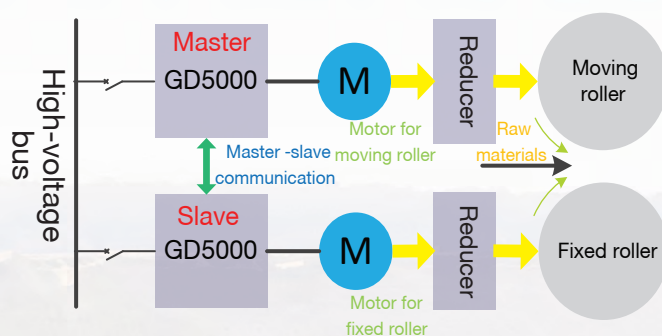
Mine industry

Application of GD5000 series medium-voltage VFDs in the roller press

1 Project background

The moving and fixed rollers of one tungsten ore factory in Fujian are separately driven by two 10kV/630kW motors. Currently, roller presses of almost all enterprises run in constant frequency, resulting the yield cannot be adjusted. In addition, overcurrent may occur due to unbalanced power of the moving roller and fixed roller, affecting the production.

2 Schematic diagram of scheme



3 Main advantages

- ◆ Master-slave control achieves power balance between the moving and fixed rollers, and improves the stability of the system.
- ◆ Excellent low frequency control feature of GD5000 series satisfies heavy-load starting needs of the roller press.



▲ On-site pictures

Application cases

Oil & gas industry

Application of GD5000 series medium-voltage VFDs in the pipeline oil transfer pump

1 Project background

The first oil production plant in Daqing oil field is the largest and the first oil production plant in China to produce 500 million tons of crude oil accumulatively. One oil storage of the oil production plant is equipped with two oil transfer pumps of 6kV/315kW and two of 6kV/280kW. Four pumps runs in parallel with the valve opening of less than 30%, which is the main energy consumption equipment in the production and operation of the oil storage. In order to respond to the call of national energy conservation and emission reduction, reduce operating costs and improve competitiveness, the company used our two sets of GD5000 medium-voltage variable frequency speed regulation system. The main circuit of the site downsizes the equipment through adopting the structure of one-drive-two structure, and meets different working conditions through adjusting the rotating speed of the oil transfer pump by frequency conversion, eliminating the throttling loss caused by the pressure difference of the oil pump pipe, reducing the unit power consumption, saving the electric energy, and improving the process.



▲ On-site pictures

2 Energy-saving benefit

| Parameter name | | Measuring and calculating results | |
|-------------------------------------|--------------------------------|-----------------------------------|------------|
| | | 1#Oil pump | 2#Oil pump |
| State of running at power frequency | Average current (A) | 28.2 | 31.5 |
| | Day power consumption (KWh) | 5626 | 6285 |
| | Unit power consumption (kWh/t) | 1.04 | 1.03 |
| Running state of the VFD | Average current (A) | 17.6 | 18.5 |
| | Day power consumption (KWh) | 4214 | 4429 |
| | Oil consumption (kWh/t) | 0.76 | 0.77 |
| Power saving rate (%) | | 26.9% | 25.2% |

Application cases

Oil & gas industry

Application of GD5000 series medium-voltage VFDs in the water injection pump

1 Project background

As we all known, the water injection pump consumes large part of electricity in the oil industry, and the water injection of each area needs to be adjusted usually when the exploitation conditions change. The water injection pump in one well of Jiangsu Oil Field adopted the return valve to control the flow, which is a serious energy waste and easy to be mined out. After improvement by using our VFD, not only does the water injection pump become energy-saving, but also the process improves greatly.



▲ On-site pictures

Application cases

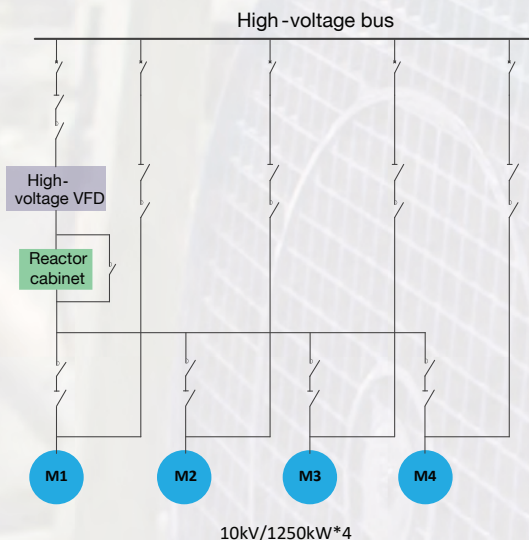
Municipal industry

Application of GD5000 series medium-voltage VFDs in the pumping station

1 Project background

One pumping station in Xinjiang was equipped with 4 centrifugal water pumps and common bus pipe separately driven by 10kV/1250kW asynchronous motors. Currently, the pumping station adopts our high-voltage VFD to conduct the project transformation, and finally reaches the process requirements of three in power frequency and one in variable frequency.

2 Schematic diagram of scheme



▲ On-site pictures

3 Main advantages

- ◆ Adopting "One-drive-four" structure to significantly downsize the device.
- ◆ The motors can realize soft start in turn.
- ◆ The VFD has synchronous bumpless switching function for ensuring no impact current between the power frequency and variable frequency switching.

Application cases

Thermal power industry

Application of GD5000 series medium-voltage VFDs in the secondary fan of thermal power station

1 Project background

In the initial construction period of the boiler system from one thermal power factory in Dongning, Heilongjiang province, the fan kept running at the power frequency, and the air flow was adjusted by the wind board. In the practical production, the opening of the board was very small, causing serious energy waste. After investigating from many aspects, the company chose our VFDs for energy saving reconstruction.



▲ On-site pictures

Application of GD5000 series medium-voltage VFDs in the circulating pump of heat-supply network



◀ On-site pictures

1 Project background

The thermal power plant of one thermal company in Mishan city, Heilongjiang Province mainly applies to central heating for local residents. In the heat source phase II expansion project of heat-supply system, the main pipe network of the extension takes #3 and #4 circulating pump (10kV/560kW) of heat-supply network as the transporting power. The stability of the heat supply network in the heating supply system mainly depends on the boiler, heat network circulation system and pipelines, and the main function of the heat network circulating system is to ensure the stable water circulation and constant pressure, that is to say, control the water level for safe operation. When the heating load changes, the water volume needs to be adjusted. If water volume is adjusted only through the opening of the outlet valve of the circulating pump, it actually means that the feed water flow is reduced by pressure loss while the output torque of the motor does not change, resulting in a large amount of energy waste. After careful analysis by our technical engineers and multiple trade-offs by the company's leaders, the company finally adopted our medium-voltage VFDs as the speed regulating scheme.

2 Energy-saving benefit

| Parameter name | | Measuring and calculating results | |
|-------------------------------------|---------------------|-----------------------------------|--|
| | | Circulating pump#3 | |
| State of running at power frequency | Average current (A) | 43.8 | |
| | Power factor | 0.82 | |
| Running state of the VFD | Average current (A) | 30.1 | |
| | Power factor | 0.96 | |
| Power saving rate (%) | | 17.9% | |

Application cases

Four Quadrant VFDs application

Application of GD5000 series medium-voltage quadrant VFDs in the inclined shaft hoisting system

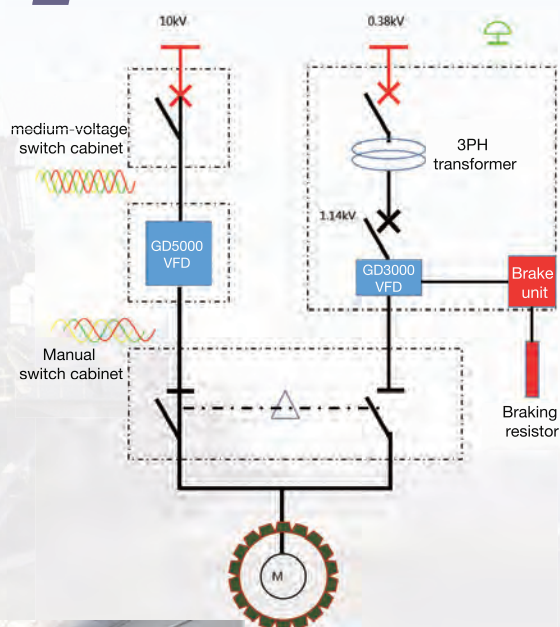
1 Project background

Baoji-Pingkan highway is the largest construction project with the highest construction standards and the largest construction difficult in shaanxi province during the 13th five-year plan period, with total length of 73.238 kilometers, estimated investment of 12.9 billion Yuan, and construction period of 6 years. The inclined shaft hoisting system of the tunnel in this project is composed of INVT quadrant medium-voltage VFDs, three-level medium-voltage VFDs (standby) and control system. The medium-voltage quadrant VFDs can achieve energy feedback. By using vector control, speed closed-loop and current closed-loop control, dynamic response of the torque control is rapid, so as to obtain good speed regulation performance. The control system has a good power-saving effect and improves the resource utilization rate of grid capacity. The application of INVT quadrant products not only meets the improvement of the system operation efficiency and reasonable treatment of the energy management, but also meets the requirements of improving system safe and stable operation with the energy saving effect of up to 15%-20%.



◀ On-site pictures

2 Schematic diagram of scheme



3 Main features

- ◆ The machine adopts the multiplex rectification/feedback to offset harmonics. Current and voltage harmonics at the grid side meet the national standard.
- ◆ Each power unit of the machine is independently phase-locked.
- ◆ The power units can automatically identify the ratio and primary/secondary-side phase difference of the phase-shifting transformer, and the power units have good compatibility, facilitating to achieve the interchange of power units.
- ◆ The working states of the power units (rectification/feedback state) are controlled uniformly by the main control system based on the current working state of the motor, and the state consistency of the each power unit is good.
- ◆ Each power unit has a unique debugging interface. It is convenient to monitor the working status of any unit through photoelectric conversion equipment and upper computer software, which can quickly locate unit faults and shorten the time of fault repairmen.

Application cases

Overseas application cases

Application of GD5000 series medium-voltage VFDs in pressers of one sugar mill in Thailand

1 Project background

One sugar mill in Thailand is one of the leading sugar processing enterprises in Thailand, which can produce 30,000 tons per day, and its annual output can reach above 4 million tons. In one program, the sugar mill transforms the third milling train in the squeezing production line by using our medium-voltage VFDs (asynchronous motor of 3.3kV, 1600kW). The original milling trains were driven by power frequency. Because the frequency and rotating speed are fixed, sugar extraction rate is not high, and the milling train is easy to get stuck, so milling trains are changed to be driven by the VFDs.



▲ On-site pictures

2 Application and advantages

- ◆ Soft start can be realized, and start time and start method can be adjusted according to the site conditions.
- ◆ High power factor (up to more than 0.96).
- ◆ No harmonic pollution is produced to the motor, effectively reducing the heat of the motor.
- ◆ Very low torque pulse doesn't lead to the resonance of the motor and other mechanical equipment, and also reduces the wear of the transmission mechanism.
- ◆ The output waveform is perfect with degree of distortion less than 2%.
- ◆ Reduce the phenomenon of milling train stopping line caused by too thick cane layer and stuck presser.
- ◆ Improve the extraction rate with high efficiency and energy saving, reduce the loss of maintenance downtime, and save a lot of maintenance costs.

Application cases

Overseas application cases

Application of GD5000 series medium-voltage VFDs in one cement plant in India

1 Project background

Located in Beawar, one cement plant in India is a large cement plant whose annual production is 10 million tons. Its 9 blowers, driven by the medium-voltage asynchronous motors of 630KW/6.6kV, controlled the air flow through the traditional wind board, causing a large amount of energy consumption on the wind board and pipe network. Currently, it is changed to be driven by the VFD.



2 Application and advantages

- ◆ Remarkable electricity saving benefits.
- ◆ Small VFD current and voltage harmonics, high efficiency, and low maintenance cost.
- ◆ Rich alarm and fault protection function.



▲ On-site pictures

Application of GD5000 series medium-voltage VFDs in water pumps of one water supply plant in Russia

1 Project background

One water supply pump in Russia is equipped with three centrifugal water pumps whose are separately driven by two 6kV/500kW and one 6kV/250kW asynchronous motors. Before improvement, it controlled the flow through the traditional valve, causing great energy waste. Afterwards, the water pumps have been changed to be driven by our medium-voltage VFDs.



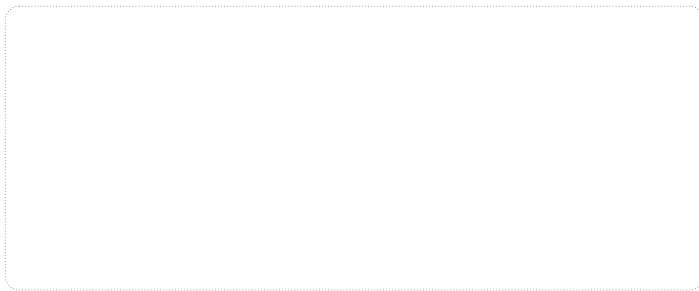
▲ On-site pictures

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