ZJT
The Explosion and Essential Safety AC Variable Frequency Drive for Mining Application

Product catalog -2011 version
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Company profile

Hiconics Drive Technology Co., Ltd. is a professional manufacturer in designing and producing medium voltage variable frequency drives (MV VFD). HIVERT series MV VFD have been widely used in power generation, metals, mining & minerals, petrochemical, water, cement, pulp & paper etc. to realize the speed regulation, energy saving, soft start and intelligent zed control for all kinds of high voltage motors which driving equipments such as centrifugal fans, blowers, pumps and compressors, etc. Customers can get high benefits by using HIVERT drives.

The company now has over 300 personnel, including a top professional R&D team and technical workers which take 30% of the staff. Over 50% of the staff has bachelor’s degree. The company pays much attention to human resource development.

HIVERT series have independent intellectual property right, and already pass the strict tests of National Electric Scientific Acadeone and National Quality Supervision Test Center for Electric Control and Distribution, and also pass authentication of ISO9001-2000 quality guarantee system.

HICONICS is one of the participate members in the formulation of national medium voltage standard.

HIVERT series have obtained outstanding achievements in operation. Both products’ quality and service receive good comments from users and lead the position in many national application fields. HICONICS’ 1800kW VFD has been used in Daye Special Steel Group, the running capacity is one of the biggest domestic MV VFDs at that time. The 630kW VFD which used in the centre of Cheng Island of Shengli Oil Field is the first domestic MV drive applied at offshore platform. HIVERT 6kV/4000kW high-power MV VFD was exported to Russia in 2006.

Along with the perfect performance on fans and pumps, HICONICS solves two technology difficulties vector control and grid feedback in 2 years, and successfully launched grid feedback type HIVERT-YVF MV VFD which has 4 quadrant running performance. Compared to universal series this kind of products has excellent constant torque start and fast braking characteristics. They are especially applicable for mine hoists. HICONICS launched new series products which can apply for high power synchronous motors in 2007. In August 2008, a unit of 10kV/7600kW HIVERT high power MV VFD ran successfully and pass the commissioning at Beijing Heavy Machinery Works which is HICONICS’ test partner. End of 2008, HICONICS already sold more than 40 units to Russia. The biggest capacity is 6kV/4000kW. At present HICONICS established friendly relationship with some countries in East Europe and South Asia.

HICONICS’ products have professional technical design, stable & reliable quality, preponderant price ratio.

HICONICS would like to work together with domestic and overseas partners to devote to the technology innovation of industrial control, and develop a green future.
Product development

Flameproof product is new developed since 2010. The product is mainly manufactured in Shijingshan production base. Now the product has obtained several national technology patents and flameproof certificate for mining, now the product has been produced and promoted in Chinese market.
Product definition
HICONICS- ZJT series the Explosion and Essential Safety AC Variable Frequency Drive for Mining Application

The product is taken the imported inverter which is high performance compared with DC variable speed system, featured with simple structure, reliable quality and easy maintenance.

ZJT series product applied mining and surrounded environment which is mixed with methane and coal dust to soft start/stop and adjust the drive with heavy load. With small starting current, stable starting speed, adjustable starting time, it is with advantages of less crush to grid and larger output torque. When the VFD running, it is possible to adjust the running frequency according to motor running frequency to achieve the speed and torque required. Starting mode can divided into steps and direct start and protect like normal magnetic starter, and stop in emergency, all of these functions guarantee the secure running and energy saving.

Product certification

Mining product safety certification
Flameproof certification
The Explosion and Essential Safety AC Variable Frequency Drive for Mining Application

<table>
<thead>
<tr>
<th>Product model</th>
<th>Certification number</th>
<th>Flameproof certification number</th>
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<td>ZJT-500/1140</td>
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<td>10021812</td>
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<tr>
<td>ZJT-315/1140</td>
<td>MAB110020</td>
<td>10021813</td>
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<td>ZJT-400/660</td>
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<td>ZJT-250/660</td>
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Flameproof filter reactor for mining application

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<th>Product model</th>
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<th>Flameproof certification number</th>
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<td>10021817</td>
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<td>DKB-195/1140L</td>
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<td>DKB-255/660L</td>
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<td>10021814</td>
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</table>

Product features

- Overall unit imported (HICONICS inverter as one optional), with advanced heat emission technology, which is solve the large power flameproof VFD technology difficulty
• Vector control, AFE phase switch, close loop control technology, small starting current, stable starting speed, less rush to grid

• zero-sequence current protection, short circuit, over load, over current, over voltage, under voltage loss control over temperature protection

• perfect mute control, reduce motor heat and high frequency noise

• on line control, speed set, line shape and S shape acceleration/deceleration set; RS-232 standard communication connection, possible to extend linkage application

• Water cooled method, compared with force air, it is high efficient, smaller volume, lower noise and suitable for subsurface environment.

• ZJT series product obtained national patents which will improve the technology advantage in flameproof field
Product structure

Containment structure

Product is composed of three parts which are rectangle flameproof containment, heat sink and ship form base. Flame containment is constituted with power input cavity, main cavity and load connection output cavity, door facility.

**Power input cavity:** 2 platen mode inlet hole for outer diameter no bigger than Ф 78 rubber cable; internal with 3 connection terminal of A、B、C three phases, power line connected to the three phases terminals, M12 bolt to the internal containment.

**Main cavity:** Behind installed with variable frequency system are Rectifier Bridge, inversion part, main control board, drive board, brake protection power cell, also with control transformer, relay and protection modular, switch and 9 cores terminals.
Comprehensive protection modules
Load connection outlet cavity: 2 platen mode inlet hole for outer diameter no bigger than Φ 78 rubber cable; internal with 3 connection terminals with U、V、W three phases, power line connected to the three phase terminals, control and communication signal outlet from 9 core terminal and control function completed. Control loop with 10 screw outlet hole with outer diameter no bigger than Φ 15 rubber cable, M12; M12 introduce the grounded line to the containment.
Door facility

Flexible door structure is bolt up. Upper middle of the door with screen, under the screen there are 9 buttons which are ‘menu, confirm, plus, minus, upward, downward, start, stop, reset,’ under the screen, there are SW1, SW2 switch. SW1 is local control/remote control switch, SW2 is variable frequency switch. In the middle of the door with 3 buttons which are running, stop and emergency stop.

Running mode

Start and stop

VFD can start under the following conditions:

1) local control

With local control, SW1 to local control, press SB2, relay 2KA, VFD start to work

2) remote control
Under remote control, SW1 to remote control, press remote start, relay 1KA, VFD start to work, motor running. VFD will protect motor directly.

3) VFD stop:

When stop, press SB1, (remote control) 1KA opens, (local control) 2KA opens, VFD device will stop normally. If emergency, press the emergency stop.

**Linkage**

VFD runs with master and slave linkage. Master output is slave set, slave tracks the master parameter, the data exchange goes through PROFIBUS. Take conveyor as example, make
the adjustment according to the conveyor mechanical drive device layout.

More than 2 motor together start and the first 2 are coaxial and the 1st motor is master and 2nd motor is torque, no coaxial 3rd motor is speed tracking. And make the 2nd VFD speed output be the set speed of 3rd VFD. In this case, it is 3 motors power balance.

Product parameter

a) Variable frequency drive model

b) Filter reactor model
### Basic parameter

<table>
<thead>
<tr>
<th>model</th>
<th>ZJT-500/1140</th>
<th>ZJT-315/1140</th>
<th>ZJT-400/660</th>
<th>ZJT-250/660</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>1140V</td>
<td>1140V</td>
<td>660V</td>
<td>660V</td>
</tr>
<tr>
<td>Rated current</td>
<td>310A</td>
<td>195A</td>
<td>405A</td>
<td>255A</td>
</tr>
<tr>
<td>Rated power</td>
<td>500kW</td>
<td>315kW</td>
<td>400kW</td>
<td>250kW</td>
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<tr>
<td>Output voltage range</td>
<td>0~1140V</td>
<td>0~1140V</td>
<td>0~660V</td>
<td>0~660V</td>
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<tr>
<td>Output current range</td>
<td>0~310A</td>
<td>0~195A</td>
<td>0~405A</td>
<td>0~255A</td>
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<tr>
<td>Output frequency range</td>
<td>10~50Hz</td>
<td>10~50Hz</td>
<td>10~50Hz</td>
<td>10~50Hz</td>
</tr>
</tbody>
</table>

intrinsically safe max voltage
output
Uo | 24.5V | 24.5V | 24.5V | 24.5V |

intrinsically safe max current
output Io | 60mA | 60mA | 60mA | 60mA |

Working mode | constant | constant | constant | constant |

Cooling mode | Water cooling | Water cooling | Water cooling | Water cooling |

### Filter reactor basic parameter

<table>
<thead>
<tr>
<th>model</th>
<th>DKB-310/1140</th>
<th>DKB-195/1140L</th>
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<tbody>
<tr>
<td>Variable frequency speed device model</td>
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<td>ZJT-400/660</td>
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<tr>
<td>Rated voltage</td>
<td>1140V</td>
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<td>Rated current</td>
<td>310A</td>
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<td>Rated power</td>
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<tr>
<td>Output frequency range</td>
<td>10~50Hz</td>
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<td>10~50Hz</td>
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<tr>
<td>Working mode</td>
<td>constant</td>
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<tr>
<td>Cooling mode</td>
<td>Natural cooling</td>
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</tbody>
</table>

### Flameproof

Variable frequency device: Flameproof and intrinsic safety for mining application

Filter reactor: Flameproof for mining application
**Dimension**

**dimension:** 2230X1090X1305 (mm)

**ZJT:** Flameproof and intrinsic safety Variable frequency device for mining application
VFD product
Reactor product
Running environment

- Altitude less than 2000 m, atmospheric pressure (80～106) kPa;
- Ambient temperature maximum +40℃, minimum −10℃;
- RH >95%±3% (25℃±3℃);
- firedamp or coal dust in the ambient, no corrosive gas
- no severe vibration, shake
- no fluid leakage;
- pollution degree is 3

Application

Product applied in the conveyor, fans, water pump and similar application. Product applied as the switch of the variable frequency system to be used in the start, stop and running control to the heavy load system undergrounded mine coal.

Standard

GB 3836.1-2000 爆炸性气体环境用电气设备 第 1 部分：通用要求
GB 3836.2-2000 爆炸性气体环境用电气设备 第 2 部分：隔爆型“d”
GB 3836.4-2000 爆炸性气体环境用电气设备 第 4 部分：本质安全型“i”
GB 4028-2008 外壳防护等级
GB/T 191-2008 包装储运图示标志
GB/T 2423.4-2008 电工电子产品环境试验 第 2 部分：试验方法 试验 Db：交变湿热（12h+12h 循环）
GB/T 3859.2-1993 半导体变流器 应用导则
GB/T 6388-1986 运输包装收发货标志
GB/T 12668.2-2000 调速电气传动系统 第 2 部分：一般要求 低压交流变频电气传动系统额定值的规定
GB/T 12668.3-2003 调速电气传动系统 第 3 部分：产品的电磁兼容性标准及其特定的试验方法
GB/T 13384-2008 机电产品包装通用技术条件
GB/T 14048.1-2006 低压开关设备和控制设备 第一部分：总则
GB/T 14048.4-2003 低压开关设备和控制设备 机电式接触器和电动机起动器
GB/T 14549-1993 电能质量 公用电网谐波
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<td>GB/T 18039.4-2003</td>
<td>电磁兼容 环境 工厂低频传导骚扰的兼容水平</td>
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<td>MT 1099-2009</td>
<td>矿用变频调速装置</td>
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<td>煤矿用电器设备产品型号编制方法和管理办法</td>
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<td>MT/T 661-1997</td>
<td>煤矿井下用电器设备通用技术条件</td>
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<td>AQ 1043-2007</td>
<td>矿用产品安全标志标识</td>
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<td>Q/SJHKY002-2010</td>
<td>北京合康亿盛变频科技股份有限公司企业标准</td>
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