

# 变频器尖峰电压吸收器 (HVT-A4)

## Inverter peak voltage absorber

### 产品概述 (Product Introduction)

变频器驱动电机的电压是脉冲波形(PWM波形),这种波形包含了丰富的高频成份。当变频器与电机之间的连线超过30米时,高频驱动电压脉冲会对电机产生很多不良影响,其中主要包括:电机轴承寿命缩短,电机定子绕组绝缘击穿等。例如,对于额定电压380V的变频器,脉冲电压的尖峰幅度可超过1200V,这种尖峰电压每秒对电机冲击上千次,很快就导致电机定子绕组的损坏。此外,变频器的输出脉冲电压还会在电机的轴承中产生轴承电流,轴承中长时间流过轴承电流,会造成电机轴承的损坏。

The voltage of the motor driven by the frequency converter is a pulse waveform (PWM waveform), which contains rich high-frequency components. When the connection between the frequency converter and the motor exceeds 30 meters, high-frequency driving voltage pulses can have many adverse effects on the motor, including shortened bearing life and insulation breakdown of the motor stator winding. For example, for a frequency converter with a rated voltage of 380V, the peak amplitude of the pulse voltage can exceed 1200V. This peak voltage can impact the motor thousands of times per second, quickly causing damage to the motor stator winding. In addition, the output pulse voltage of the frequency converter will also generate bearing current in the bearings of the motor. If the bearing current flows through the bearings for a long time, it will cause damage to the motor bearings.



### 产品应用 (Product Application)

HVT尖峰电压吸收器是保护电机定子绕组绝缘和轴承的创新性产品。HVT并联安装在电机的电源输入端能够有效吸收变频器在电机上产生的尖峰电压和轴承电流,极大地延长电机的寿命。

HVT spike voltage absorber is an innovative product that protects the insulation of motor stator windings and bearings. HVT is installed in parallel at the power input end of the motor, which can effectively absorb the peak voltage and bearing current generated by the frequency converter on the motor, greatly

与传统的du/dt滤波器或正弦波滤波器相比, HVT优点有

- 1.与电动机并联安装, 简便易行;
- 2.没有电压降, 不降低力矩, 也不影响变频器对电机的控制;
- 3.体积小、重量轻, 性价比高, 特别是对于大功率电机, 优势更加明显;
- 4.选用方便, 与电机的转速和载波频率无关, 不用与特定功率的电机配型;
- 5.智能控制, 根据载波频率和电缆长度, 自动调节吸收功率, 确保效果最佳;
- 6.内置保险, 故障时自动从系统中脱出, 同时, 面板上显示故障状态;
- 7.全密封设计, 适应恶劣的工业现场环境。

Compared with traditional du/dt filters or sine wave filters, HVT has the advantages of

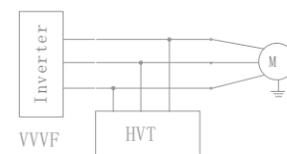
1. Parallel installation with electric motor, simple and easy to implement;
2. No voltage drop, no reduction in torque, and no impact on the control of the motor by the frequency converter;
3. Small size, light weight, high cost-effectiveness, especially for high-power motors, the advantages are more obvious;
4. Convenient selection, independent of motor speed and carrier frequency, without the need to match with specific power motors;
5. Intelligent control, automatically adjusts the absorbed power according to the carrier frequency and cable length to ensure optimal performance;
6. Built in insurance, automatically disengages from the system in case of malfunction, and displays the fault status on the panel;
7. Fully sealed design, suitable for harsh industrial site environments.

### 产品特点 (Product Features)

- 1.解决变频器烧毁电机定子绕组;
  - 2.实时检测尖峰电压, 快速吸收尖峰
  - 3.智能控制能量吸收阀门, 发挥最大吸收能力,
  - 4.IGBT技术控制尖峰电压能量吸收, 尖峰电压吸收干净彻底;
  - 5.轴承电流吸收电路, 大大延长轴承寿命;
  - 6.智能控制模块工作不用外接电源;
  - 7.工作状态面板显示, 随时了解工作状态;
  - 8.与电机并联安装, 接线简单。
1. Solve the problem of frequency converter burning out the motor stator winding;
  2. Real time detection of peak voltage and rapid absorption of peaks
  3. Intelligent control of energy absorption valves to maximize absorption capacity,
  4. IGBT technology controls the absorption of peak voltage energy, ensuring clean and thorough absorption of peak
  5. The bearing current absorption circuit greatly extends
  6. The intelligent control module does not require an external power supply to operate;
  7. Display the work status panel to keep track of the work status at any time;
  8. Parallel installation with motor, simple wiring.

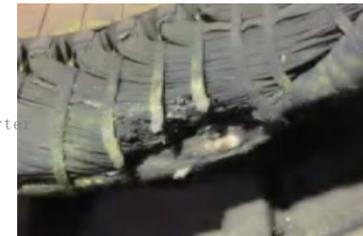
### 典型电路图

(Typical circuit diagram)



变频器对定子绕组的损伤

The damage of inverter to stator winding



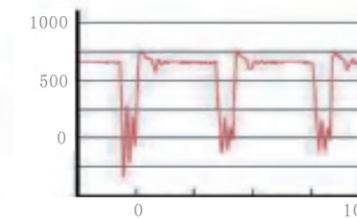
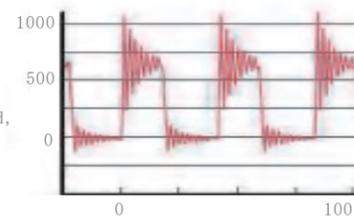
变频器对电机轴承的损伤

Frequency converter to motor bearing damage



没有安装HVT时, 电机端的过冲电压超过1200V, (150米电缆)

When no HVT is installed, the motor-end overshoot voltage



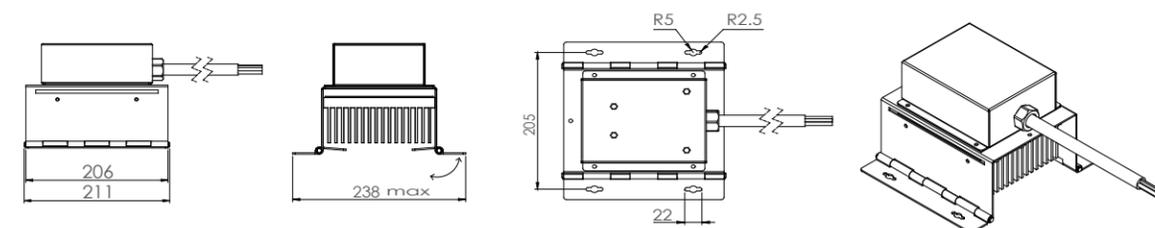
安装HVT后, 电机端的过冲电压低于800V, (150米电缆)

After the installation of HVT, the motor end overshoot, voltage below 800V, (150 m cable)

### 技术规格 (Technical Specifications)

1. 尖峰电压吸收原理: 实时检测尖峰电压, 将电能转变成热能, 耗散到空间  
Principle of Peak Voltage Absorption: Real time detection of peak voltage, converting electrical energy into thermal energy, and dissipating it into space
  2. 轴承电流吸收方式: 高频共模电流旁路网络  
Bearing current absorption method: high-frequency common mode current bypass network
  3. 额定电压: 变频器的额定工作电压为400Vac、690Vac  
Rated voltage: The rated operating voltage of the frequency converter is 400Vac and 690Vac
  4. 变频器载波频率 Carrier frequency of frequency converter: < 12KHz
  5. 变频器最大功率 Maximum power of inverter: 1500KW
  6. 允许电机电缆长度 Allowable motor cable length: 300 m
  7. 工作时壳体温度: 小于90℃, 环境温度为50℃  
Shell temperature during operation: less than 90 °C, ambient temperature is 50 °C
  8. 绝缘电阻 Insulation resistance: > 100MΩ
  9. 耐压: 导电部分与外壳承受2000VAC, 时间1min, 无击穿和闪络现象  
Voltage resistance: The conductive part and the shell can withstand 2000VAC for 1 minute without breakdown or flashover
  10. 工作环境: -10℃至+50℃, 最高海拔3000米, 相对湿度95%  
Working environment: -10 °C to +50 °C, maximum altitude of 3000 meters, relative humidity of 95%
- 备注: 如有超出上述参数, 请于我公司联系。  
Note: If you exceed the above parameters, please contact our company.

### 产品尺寸图 (Product Size)



### 成品识别码 (Product Identification Code)

<b>HVT</b>	-	<b>A</b>	-	<b>4</b>
变频器尖峰电压吸收器 Inverter peak voltage absorber		电机功率 Motor Power A: < 30KW B: 30-100KW C: 100-250KW D: > 250KW		工作电压 Operating voltage 4: 400V 7: 690V