



Application of V&T EcoDriveCN inverter (variable speed drives, VSD, variable frequency drives, VFD) for tower crane (tower hoist)

Introduction

Nowadays, tower cranes (or tower hoists) are applied widely, such as normal multi-storey building, real estate engineering, high-rise building, large scale railway engineering, bridge engineering, electrical engineering, hydraulic engineering. CAD, microelectronic technology, and programmable language control technology are used in tower cranes. The development trend of control for slewing mechanism, hoisting mechanism and trolley mechanism is via EcoDriveCN frequency inverter (variable speed drive, variable frequency drive).

Slewing mechanism

The features of slewing mechanism include large inertial impaction, large impaction while excessively fast start, disallow excessively fast while stopping and reverse running. Otherwise, the running is not smooth, and the mechanism will be damaged. The better solution is adopting special slewing reducer, variable speed and frequency controls for smooth start-brake. With EcoDriveCN frequency inverter (variable speed drive, AC drive, VSD, VFD), the control will be easy. The control system will have multiple protections. And the whole system will be safer and more reliable.

EcoDriveCN variable frequency drive: V5-H-4T3.7G/5.5L, with built-in brake unit. The brake resistor is 150 Ohm, 390W.

The parameters are as follows: P0.03=0; P0.05=20; P0.06=1; P0.08=5; P0.09=7; P3.09=0; P4.23=27 ; P4.25=35; P4.29=46

P5.00=2; P5.01=3; P5.02=10; P5.03=11; P5.04=1; PA.09=1

Hoisting mechanism

Hoisting mechanism is the most important motion mechanism of tower crane (tower hoist). Under traditional speed control, it requires low speed with heavy load, fast speed with light duty, large speed adjustment range. The speed control of hoisting mechanism impacts the performance of whole tower crane (tower hoist) directly. There are 3 principles for speed adjustment of hoisting mechanism:

1. Smooth, low impaction
2. Economical, reliable
3. Easy to maintain

The small-medium tower crane (tower hoist), which capacity is less than 6 tons, multiple pole motors are widely used, such as 4 pole motor, 8 pole motor, 32 pole motor.

We use the wiring of 8 pole motor while not changing the former motor.

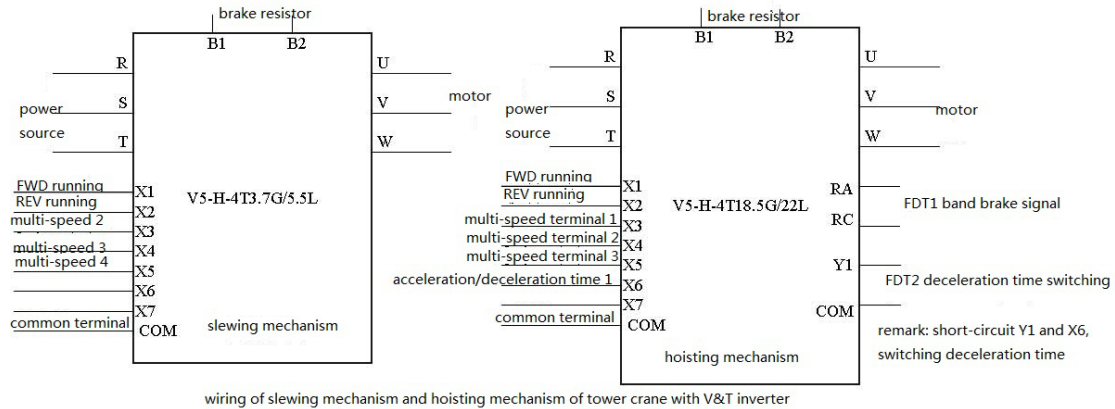
Variable frequency drive: V5-H-4T18.5G/22L, with built-in braking unit. The braking resistor is 32 Ohm, 4800 W.

Manufacturer of vector control & torque control frequency inverter (AC drive, variable speed drives, variable frequency drives, VSD, VFD), servo, motor soft starter...

Motor parameters: 15kw, 8 pole, 720 rpm, 26A.

Parameters of EcoDriveCN drive: P9.00=0; P9.01=8; P9.02=72; P9.03=15; P9.04=26; P9.05=8.5; P0.03=0; P0.06=1; P0.08=3; P0.09=2; P0.11=100; P0.13=100; P3.09=0; P4.09=3.0; P4.10=45; P4.22=15; P4.23=50; P4.25=100; P5.00=2; P5.01=3; P5.02=9; P5.03=10; P5.04=11; P5.05=13; P7.00=3; P7.02=2; P7.20=2; P7.21=2.0; P7.22=2.0; P7.23=2.0; P7.25=10; PA.09=1

Wiring diagram of slewing mechanism and hoisting mechanism



Remark

For some hoisting application, the FDT function of the inverter should be set to suitable position. Then while releasing the band brake, no slide down. And grabbing tightly band brake should be done in the proper time too, to ensure no sliding down, and no failure of the inverter.

For some applications, one EcoDriveCN variable frequency drive controls two motors. Thus motor self-learning can't be achieved for this case. But the values of motor nameplate needed to be input to the drive too. Or there will be alarm of over current or over load of the motor.

For some applications, because of the impact of wind and large inertia of site, the speed of motor is not stable (the frequency of inverter is stable, current fluctuation is large). To solve this, change P0.16 to manual torque boost. The torque boost is 1%~3%. PA.02=0.

Deceleration time of slewing mechanism can't be too short. If deceleration time is too short, will cause it stopped, then reverse, then forward-rotating to original point. Because the large inertia causes it reverse to generating electricity.

Summary

There are the following advantages while applying V&T EcoDriveCN variable frequency drives (AC drives, frequency inverters, variable speed drives, VSD, VFD, VVVF):

Start or stop is controlled smoothly when slewing

Manufacturer of vector control & torque control frequency inverter (AC drive, variable speed drives, variable frequency drives, VSD, VFD), servo, motor soft starter...



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Safe, reliable, high efficient, energy saving

Under control of the inverter, the running speed of the motor is less than rated speed for most of the time. The efficiency of energy saving is obvious.

For hoisting mechanism, soft start and stop decrease the impact of mechanical motion, improve the bearing capacity of steel structure, and extend the lifetime of equipment.

Simple introduction of company:

V&T Technologies Co., Ltd. (<http://www.EcoDriveCN.com>) was certificated as a "National Hi-tech and Double-Software Enterprise" in China. We are professional and experienced in the field of motor control, energy saving and motion control, manufacturing many products, including Variable Frequency Drive (VFD, frequency inverter, AC drive, variable speed drive), Servo Drive, Electric Vehicle Controller, Inverter and other power electronics products. We have our own independent intellectual property rights, which cover related R&D, manufacturing, marketing.

EcoDriveCN drives are widely applied in almost all industries for energy saving or precision control, improving the production line for the clients, increasing the quality of the clients. The applications of our inverters include: **mechanics, electronics, metallurgy, mining, petrochemical, transportation, building materials, municipal, metal processing, textile, printing and dyeing, paper making, Injection molding machine, central air conditioning, numerical control machine tool, air-compressor, fan and pump, blower, air conditioner for large buildings, wastewater treatment system, water supply system for large buildings, public water supply system, etc.**

With the profound know-how in the field of motor control, motion control, and energy saving, we have won the technical innovation prize, the most competitive brands prize, Champions of National Hybrid Electric Vehicle competition and one of Top Ten Variable Frequency Drive (frequency inverter) Enterprises in China and etc.

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