



V350 Series

Low-power Closed-loop Vector Inverter

V350 series low power closed-loop vector inverter

To satisfy needs of equipment like machine tool, printing, textile and chemical fiber, V350 series inverter is designed on the basis of new hardware platform. Characterized by the excellent performance, compact structure, perfect protection function and various peripheral interface, V350 series inverter can be used for the secondary development in accordance with process requirement in all kinds of field.



Setting simplification

- ※ Parameter backup and restore
- ※ One-click setting of common parameters
- ※ Virtual I/O port
- ※ Timer/counter

Easy debugging

- ※ Double-line LED(LCD) display with five numbers
- ※ Voltage and current curve monitoring
- ※ Power consumption monitoring
- ※ Electricity and running time monitoring

Abundant function

- ※ PID controller
- ※ Synchronous communication linkage
- ※ Load dynamic balance

Basic function

- ※ Open/closed-loop vector control
- ※ Torque control
- ※ Motor parameter's self-identification
- ※ Wobbling
- ※ Excessive current, voltage inhibition and low voltage inhibition
- ※ MODBUS/Profibus-DP communication
- ※ Synchronous communication linkage
- ※ Three-phase balance protection
- ※ Short circuit of protection

Innovation

- ※ Product's modular design
- ※ Abundant expansion card provided to satisfy the field requirement
- ※ 6 types of keyboards optional
- ※ Fast response, high accuracy and frequency resolution

Configuration

- ※ Molded case design
- ※ Ergonomic operation panel
- ※ Closed circuit board
- ※ Independent duct design

Software

- ※ V/F control and open/closed-loop vector control
- ※ Virtual I/O port
- ※ Intuitive real-time monitoring
- ※ Synchronous communication linkage
- ※ Lock, unlock, download, upload of operation panel

Hardware

- ※ New hardware platform
- ※ Passing EMC test
- ※ MCU with high performance
- ※ Double-line LED display with five numbers
- ※ Frequency measurement accuracy in low frequency mode up to 0.01 Hz
- ※ Switching power with unique patent

»» **PRODUCT ANALYSIS**

Performance ➤ ➤ ➤ ➤ Competitiveness ➤ ➤ ➤ Value		
Low-power high performance application	Low-power inverter with excellent performance, 110% load for long-term, torque at zero-speed up to 200% under the closed-loop vector control	High-end application in low power field
Load analysis	Real-time monitoring of variables such as current, voltage, freq and rotate speed to help analyze motor load	Convenient for load running analysis
Status monitoring	Monitor inverter self-setting/running parameters such as setting/running freq, PID set/feedback, communication bus status, output/input terminal status, analog output/input, counter, timer and spindle positioning state	Intuitive display and easy debugging
Control mode	Open/closed-loop vector control, V/F control, VF separate control to optimize motor controlling performance	Wide-range of application
Operation characteristics	Parameter backup; one-click setting of common parameter, unique panel lock and unlock function	Reliable and easy operation
Modular design	Optional I/O module, PG module, communication module and dedicated intelligent control module	Diversified portfolio
Software	V/F control, VF separate control, open/closed-loop control, priority setting, several setting portfolio of freq/rotatory speed/torque, motor parameter self-identification, multi-segment running, PID controller, double motor parameter, virtual I/O port, excessive current/voltage inhibition and low voltage limit, wobble running, temperature detection, main spindle indexing, torque at zero freq maintenance	Various function setting
Communication	Supported modbus, Profibus-DP communication protocol	networking
Protection	Excessive current, voltage, heating and load protection, low voltage and short circuit protection	Perfect protection system
Fault detection	Eight pairs of historical failure record and the detail of freq, output current, output voltage, DC voltage and modular temperature of the last failure	Convenient maintenance
Dynamic braking	Braking unit available	Rapid shutdown
Product testing	Short circuit test, vibration test, temperature test, radiated interference test, surge test and voltage dips immunity	Quality assurance

»» PRODUCT STRUCTURE

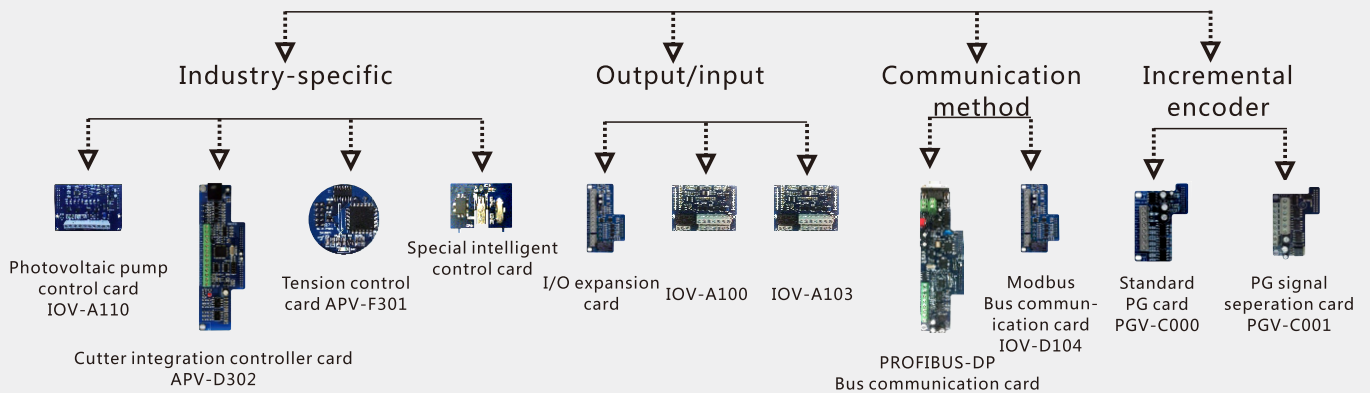


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Display Panel



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» SOLUTION

Application of inverter in lathe spindle

Introduction

The traditional machine tool is difficult to satisfy the need of modern industry due to its narrow range of speed governing, terrible precision, long downtime led by inertia, great impulse of startup and high failure rate. The frequency converter has advantages of wider range of speed regulation, faster response speed and excellent low-frequency torque idiosyncrasy, which make it widely used in the machine tool.



Technological requirements

- Low rotate speed of spindle and high feed rate in roughing require high torque output at low frequency
- Low feed rate and high rotate speed of spindle in fashioning requires stable rotate speed at high frequency
- High requirement for the given frequency signal and practical speed linearity , few disturbance of load
- Short acceleration/deceleration time to improve efficiency

Systematic solution

It is recommended to use V350 closed-loop vector inverter to realize the spindle speed and startup & shutdown through analog rotating speed signal given by numerical control system and running signal. In addition, the inverter is required to connect braking resistance to consume the inertia energy resulted by spindle shutdown.

Features and advantages

- 200% rated torque output at low frequency of 0.3Hz to ensure superb cutting capacity
- The highest torque up to 1000Hz to meet the demand of high frequency process
- Analog input curve rectification to ensure the precision of rotating speed and practical spindle linearity with the error of $\pm 0.2\%$
- Closed-loop vector control with the spindle accelerating up to 5000 in three seconds
- Built-in braking unit equipped with braking resistance to satisfy the need of rapid deceleration

The application of inverter in the rolling part of film blowing machine

Introduction

The present rolling of film blowing machine mainly uses the torque motor to realize the constant tension control in which users need to manually adjust tension with inconvenient operation. The motor keeps a heat capacity in the long-time running and the controller easily broke with awful reliability. The use of inverter in the part of rolling can avoid problems above efficiently.



Technological requirements

- Invariable tension of film in the rolling process
- Fast response in acceleration/deceleration to ensure the constant tension
- Adjustable tension to meet process requirements of different film

Systematic solution

It is recommended to use V350 inverter to realize constant tension control of rolling in the film blowing machine through the received tension sensor composing closed-loop tension control and PID output being given torque to ensure the tension in the process of rolling

Features and advantages

- Fast response to support automatically speed regulation and ensure tension
- Convenient for tension controlling with flexible operation
- Steady lap changing between multiple rolling machine

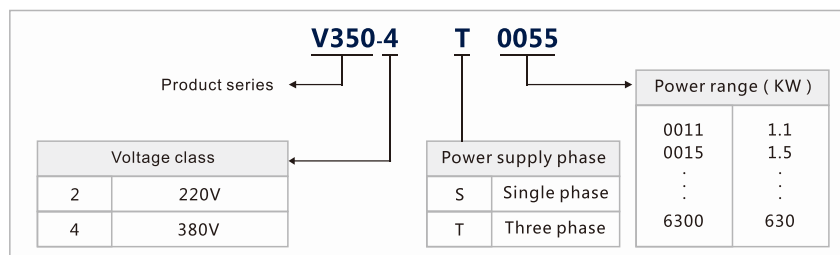
» SPECIFICATIONS

Input&output	Rated voltage/freq.	Three phase (4#)380V 50/60Hz	Three phase (2#) 220V 50/60Hz
	Output voltage	0~380V	0~220V
	Output freq	Low freq running mode:0.0~300.0 Hz. High freq running mode: 0.0~1000.0 Hz	
	Digital input	V350-4T0030/2S0022 model below: standard five-way digital input (DI); V350-4T0040 above:standard six-way digital input(DI), 16-way support (optional extensions)	
	Digital output	V350-4T0030/2S0022 model below: standard one-way digital output (DO),V350-4T0040 model above: standard two-way digital output(DO)	
	Impulse input	0.0~100.0K Hz impulse input, connect optional NPC OC output	
	Impulse output	0.0~100.0kHz impulse output NPC OC output available, support choosing PWM output method as the expansion analog output terminal	
	Analog input	Standard configuration:0~10V voltage input(AI1), 0~20mA current input (AI2); standard expansion I/O card: -10V~10V voltage input(AI3)	
	Analog output	V350-4T0030/2S0022 model below: one-way 0~10V analog output signal (optional 0~20 mA current output mode) V350-4T0040 above: two-way 0~10V analog output signal (optional 0~20 mA current output mode)	
	Contact output	Standard one pair of frequent open/closed AC 250V/2A contactor, allowing for expanding one to six pairs of contactors	

Control characteristics	Control method	Close loop vector control	Open loop vector control	V/F control
	Starting torque	Zero speed 200%	Zero speed 180%	Zero speed 180%
	Adjustment range	1:1000	1:200	1:100
	Speed stabilization accuracy	±0.02%	±0.2%	±0.5%
	Torque control accuracy	±5%	±5%	—
	Torque response time	≤5ms	≤25ms	—
	Freq resolution ratio	Low freq running mode: 0.01 Hz: high freq running mode: 0.10 Hz		
	Freq accuracy	Low freq running: digital setting——0.010 Hz, analog setting——the highest freq 0.1%; High freq running: digital setting——0.1 Hz, analog setting——the highest freq 0.1%		
	Loading capacity	110% for long term; 150% for 60s, 180% for 2.5s;		
	Carrier freq	Three-phased voltage vector synthesis mode: 1.5~10.0 kHz, two-phased voltage vector synthesis mode : 1.5~12.5 kHz		
	Acceleration/deceleration time	0.01~600.00Sec./ 0.01~600.0 Min		
	Magnetic flux brake	Increase the motor magnetic flux to realize the fast brake for acceleration and deceleration		
	DC brake/ clasp brake	DC brake/clasp brake starting freq: 0.0~upper rate limit, brake/clasp injection current 0.0~100.0%		
	Starting freq	0.0~50.0Hz		

Typical function	Multi-segment running	16 segments of freq/ speed running, and the independent setting of each segment's running direction, time and acceleration and deceleration; seven segment PID setting
	Built-in PID	Built-in PID controller which can be used as external equipment
	Wake up and sleep	Simple sleep and wake up function
	MODBUS communication	Optional standard MODBUS communication protocol, flexible parameter reflexive function
	Dynamic braking	Dynamic voltage: 650~760V, braking rate: 50~100%
	General function	Failure restore, power to restart, motor parameter dynamic&static self detection, starting delay, current inhibition, over voltage and low voltage inhibition, V/F self-defining curve

» MODEL DESCRIPTION

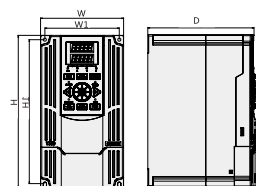


Special function	Analog I/O terminal	Eight-way virtual output/input port with no need to combine any external wiring to realize complex application
	Synchronous communication linkage	Synchronous driving between different motors with no limit to communication linkage, freely choose linkage balance according to current, torque and power
	Load dynamic balance	Realize several motors' dynamic balance and torque motor characteristics
	Powerful starting torque	Support setting powerful starting torque in a certain time to deal with the load of large inertia and static friction
	Priority setting	Freely choose prior sequence according to the freq., rotating speed setting channel, adjust to all kinds of field
	Portfolio setting	More than one hundred setting portfolio of freq., rotating speed and torque
	Timer	Three built-in timers: five kinds of clocks, five kinds of starting trigger mode, several gated signal and working mode, seven output signal
	Counter	Two built-in counters : the choose of clocks, four kinds of starting trigger mode, seven output signal
	Macro parameter	Application macro: convenient to set several paris of fixed parameters and simplify the parameter set of general field
		System macro: convenient to switch the working mode, such as the switchover between the high and low freq., and automatically define parts of parameter
	Parameter debugging	Any unsaved parameters in the spot can be saved, abandoned and restored into the original value
Parameter display	Automatically shield the parameters of unused module or selectively display the parameter altered, saved and changed	

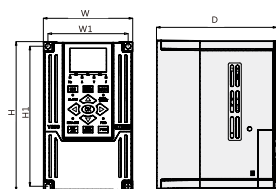
Protection function	Power supply	low voltage protection, three-phased balance power protection
	Running	Excessive current, and voltage protection, inverter over-heating and over loading protection, motor over load protection, phase-lacking protection and IGBT driving protection
	Device unusual	Current detection, EEROM memorizer and control unit unusual, temperature collecting circuit
	Motor connection	Motor not attached, imbalance three-phased motor parameter, error parameter self-identification
	Expansion card	Detection and expansion card protection

Environment	Installation environment	Vertical installation with no direct sunshine, dust, corrosive and combustible gas, smoke and steam
	Altitude	0~1000 meter . 10% reduced output current for each 1000 meter rise
	Temperature	Working environment: -10°C~ +45°C storage environment: -20°C~ +60°C
	Moisture	95% below (no frosting)
	Vibration	<20m/s

» MOUNTING DIMENSION



Applicable model : V350-4T0040 above



Applicable model : V350-4T0030/2S0022 below

Inverter Model (three phase 380V)	Inverter Model (one-phase 220V)	W1 (mm)	W (mm)	H1 (mm)	H (mm)	D (mm)	Screw
V350-4T0011	V350-2S0007	87	97	152	162	130	M4
V350-4T0015	V350-2S0011						
V350-4T0022	V350-2S0015	95	105	190	200	146	M4
V350-4T0030	V350-2S0022						
V350-4T0040	--	121	135	234	248	175	M4
V350-4T0055	--						
V350-4T0075	--	146	160	261	275	179	M5
V350-4T0090	--						
V350-4T0110	--	169	180	290	305	179	M5
V350-4T0150	--						



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