V&T

VTS inverter/ servo drive

Outstanding performance/rich development/book narrow-body/module design

Development from Accumulation, Achievement from Innovation,
Following Trend of the World, Forging Paradigm of Industry

SMART GENERATION Co. for Intelligent Engineering Solutions
Headquarters Aderss：Office 6, Third Floor, Grand Mall, El-Ordonia Square,
10th of Ramadan City, Sharqia Governorate, Egypt.
Post code: 44629
Service Department Tel: (+20) 015-5277-8135
Sales Department Tel: (+20) 011-4566-8638
Email: Info@smartgeneration-eg.com
Website: www.smartgeneration-eg.com

CE

VTS inverter/servo drive

Because of adopting brand-new vector control technology, VTS series inverter can be compatible with the control of synchronous motor, asynchronous motor and reluctance motor, as well as the encoders with multiple specification and abundant communication interface and support Chinese/English liquid crystal display, five-digit digital pipe display operation panel; and with the protection functions of usability, extendibility, small volume, light weight and perfection, the VTS series inverter can meet the medium-high application demands.

Operation panel

●Chinese/English liquid crystal display keyboard and LED keyboard, abundant information and convenient debugging;
●With multi-functional combination key; for example, realize remote/local switching, emergency shutdown and other humanized functions;
●Include parameter storage chip, so that the customer is convenient to storage, upload and download the parameters. It is specifically suitable for batch supporting customers; the debugging time is saved greatly; and the installed efficiency is improved.
●Support the scheme of extension cord;

Strong motor adaptation ability

●Be compatible with synchronous motor, asynchronous motor, reluctance motor, electric main shaft and other motors;
●Support the open-loop vector of synchronous motor, open-loop vector of asynchronous motor, closed-loop vector of synchronous motor, open-loop vector control of asynchronous motor, etc.

Be compatible with the encoders with multiple specifications

●Support the photoelectric encoder, rotary transformer encoder and sine and cosine encoder;
●Support accessing the motor encoder and auxiliary encoder into the drive at the same time to realize the double-loop control; when ensuring the stability of the control system, the error of the mechanical drive can be eliminated, so the encoder is specifically suitable for the machine tool, bending machine and other industries. For example, the motor encoder is used as the motor speed control; and the auxiliary encoder is used as the position control.

Abundant and perfect protection function

●It has abundant and perfect protection functions, such as undervoltage, overvoltage, overcurrent, overheat, overload, peripheral protection, output grounding short circuit, encoder disconnection, motor overload and overheating, etc.

Abundant extended function

● I/O card can be highly customized according to the demands of the customers.
●Support plug and convenient for wiring and maintenance.
●I/O terminals with different functions select the design with different colors so as to reduce the probability of error wiring of users greatly; and it is easy to use, beautiful and practical.

Book structure, small volume and light weight

●Compared with other products of the Company, the volume and weight are reduced by 50%.
●The book structure can save the installation space.

Abundant communication interface

●Standard Modbus 485 communication, CANopen communication, optional Ether CAT, PROFIBUS-DP, Profinet, MIII, RTEX, POWERLINK and other communications.
●Modbus 485 supports 15 groups of user address free mapping, so it is flexible and convenient.

Abundant multi-functional card

●Three groups of high-speed chip communication interface
●Support extension CPU development
●Development of function extension card for industrial machine
●Support the secondary application and development of customers to the hardware and software;

Product overview

■ Multi-function

Advanced high performance motor control algorithm

◆Support multiple motor drive, such as synchronous motor, asynchronous motor, reluctance motor, etc.;

◆Support multiple communication protocols

◆Support multiple encoders

■ Small volume

Book design, save installation space

■ High performance

◆High-speed and high-precision control

◆ Strong motor torque, speed and position control ability

◆Better voltage and current control

■ Convenient use

Support liquid crystal display screen and five-digital digital pipe display operation panel

◆Modularized plug design of extension card

■Multi-function

◆Advanced high performance motor control algorithm

VF control of asynchronous motor, open-loop vector control 1 of asynchronous motor, open-loop vector control 2 of asynchronous motor, open-loop vector control of synchronous motor, closed-loop vector control of asynchronous motor and closed-loop vector control of synchronous motor;

Support multiple motor drive, such as synchronous motor, asynchronous motor, reluctance motor, etc.;

Integrate with asynchronous and synchronous motors drive;

Drive each kind of motor: direct drive motor, permanent magnet synchronous motor, motorized spindle, asynchronous servomotor, common asynchronous motor, variable frequency motor, etc.

◆Support multiple communication protocols

MODBUS 485-RTU
CAN
EtherCAT
PROFIBUS-DP
PROFINET
MⅢ
RTEX
POWERLINK

◆Support multiple encoders

photoelectric encoder, rotary transformer encoder and sine and cosine encoder;

■High performance

◆ High speed and high precision control

It is 120,000 rotations for open-loop control and 40,000 rotations for closed-loop control;

◆ Strong motor rotary torque, speed and position control ability

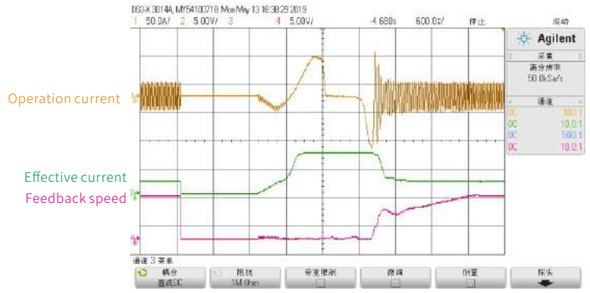
Control features	Control method	Open-loop control of synchronous motor/ open-loop control of asynchronous motor	Closed-loop control of synchronous motor/ closed-loop control of asynchronous motor
	Start rotary torque	Asynchronous: 0.25Hz 200% rated torque Synchronous: 1.5% of rated rotary speed and 150% of rated rotary torque	0 Hz 200% of rated rotary torque
	Speed range	1:200	1:5000
	Steady speed precision	± 0.5%	± 0.02%
	Maximum frequency	2000Hz	2000Hz
	Torque control	Yes	Yes
	Torque precision	±5%	±3%
	Torque response time	<20ms	<10ms
	Positioning control	None	Yes
	Positioning precision	None	±1 pulse

◆Excellent tracking performance of current, voltage and rotary speed

Current limiting test

The inverter is set as free parking and 0-speed starting method; and the acceleration time is 4s. Under 50Hz of steady speed operation state of motor, the enabling is closed. The enabling is started gain, the motor starts again after reducing to 0 quickly during the process of free parking. The output current of the inverter does not exceed the torque limiting current (rated current of motor * torque limiting).

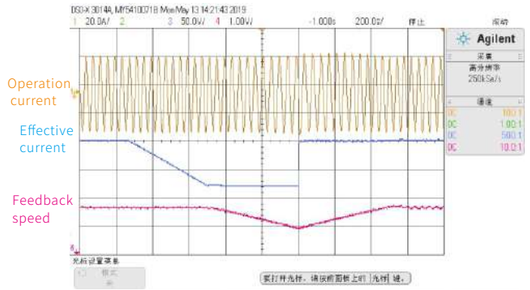
- The yellow signal is the operation current.
- The green is effective current; it is the no-load operation current at the beginning; after closing the enabling, the current is 0; after opening the enabling again, the current can reach the torque limiting current (1.5 times of motor rated current) until the motor stops completely; and then it is speeded up the command speed; and then the current is recovered to the no-load current.
- The purple is feedback rotary speed; it is 50Hz at the beginning; after closing the enabling, the speed feedback is 0; after opening the enabling again, the feedback speed is increased to 50Hz from 0.



Undervoltage regulation test

The allowable undervoltage control of the inverter is set; the undervoltage control voltage is 460V; under 50Hz steady speed operation state of motor, the three-phase power is disconnected; when the bus voltage is reduced to 460V, the inverter is reduced automatically so as to maintain 460V of bus. The three-phase power is connected during this period; the bus is recovered to 540V; the inverter is automatically speeded up to the original operation speed. During the process of deceleration generation, three-phase power is disconnected, and the inverter maintains the deceleration undervoltage at 460V until the motor stops running.

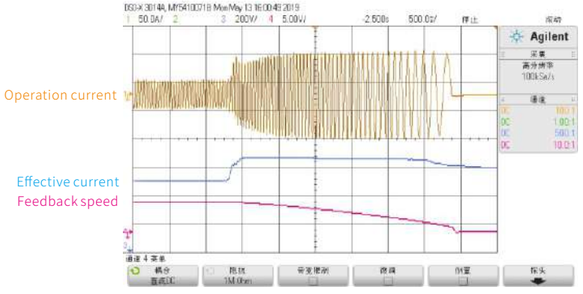
- The yellow is the operation current.
- The blue is bus voltage; it is 540V at the beginning; the three-phase power is disconnected; the bus voltage is reduced to 460V; the inverter maintains the bus voltage at 460V automatically; and then it is powered again, and the bus voltage is recovered to 540V.
- The purple is the speed feedback signal; the starting speed is 50Hz; after power failure, the rotary speed is declined; it recovers to 50Hz after power on.



Magnetic flux brake overvoltage test:

The inverter is set as the reducing parking; the reducing time is 0; the magnetic flux braking is allowed; and the energy consumption braking is closed. Under 50Hz steady speed operation state of the motor, the enabling reducer is closed; the inverter outputs the steady current; the bus voltage rises to the setting value of the magnetic flux voltage (700V) from 540V; the motor is decelerated quickly to stop; and it is not overvoltage.

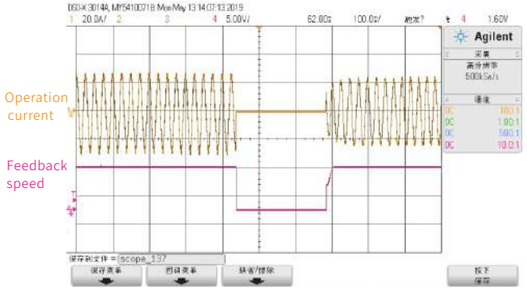
- The yellow is the operation current.
- The blue is bus voltage; it is 540V at the beginning; after the decelerating stop is started, the bus rises to 700V until the motor stops completely; and then the bus voltage is declined slowly.
- The purple is the feedback speed; the starting speed is 50Hz; after the reducer is opened, it is decelerated to 0.



Rotary speed tracking test:

The starting method of the inverter is set as the rotary speed tracking method; the parking method is free stop; and under 50Hz steady speed operation state of the inverter, the free parking of the enabling motor is closed; the enabling is started again, the inverter tracks the current operation rotary speed, and then it is speeded up the command rotary speed; and the current has no changed rotary speed or fluctuation.

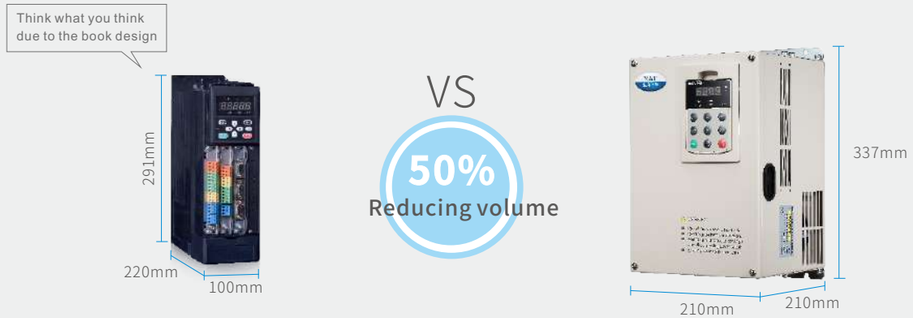
- The yellow is the operation current.
- The purple is the feedback speed; it runs at 50Hz at the starting position; after the enabling is closed, the free sliding speed feedback of the motor is 0; and after opening the enabling, it is speeded up to 50Hz from the current operation rotary speed.



■Small volume and light weight

Book-compact design, nearly double installation space is saved; it occupies little space and installs more; it is straight radiation up and down; the installation in rows can be realized in the minimum gap, so the cost and space of the cabinet are greatly reduced.

Book installation structure, the volume is reduced to 50% greatly.

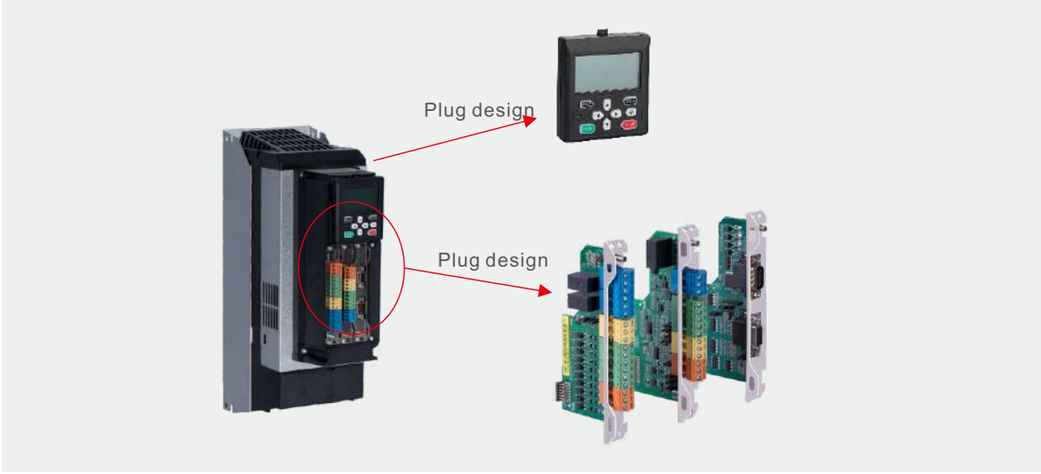


■Convenient use:

Support liquid crystal display screen, five-digit digital pipe display operation panel;

Adopt the key design conforming to ergonomics; the user can inquire and modify the common parameters by the liquid crystal screen directly. The trouble entering multi-level menu is exempted; and it can support Chinese/English display.

Modularized plug design of extension card, so the extension of the accessories is flexible and convenient;



Description of VTS general model

VTS 1 0 0-4T 22K 1 B -1 1 0 0

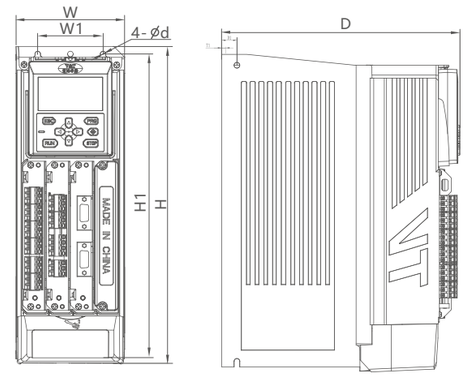
VTS	Control technology platform
1	General inverter
2	Light-load general inverter
3	High-performance general inverter
4	Multi-function drive
5	High-performance servo drive
0	General type
1	Industry A
2	Industry B
3	Industry C
…	Industry…
0	Industry…general
1	Industry…dedicated 1
2	Industry…dedicated 2
3	Industry…dedicated 3
…	Industry…dedicated
2S	200V single-phase
4T	400V single-phase
22K	Rated power 22kW
22A	Rated current 22A
1	LED keyboard
2	LCD keyboard
0	No expansion card
1	DI/DO extension card
0	No secondary development card
1	Process control extension card 1
0	No encoder card
1	Double-feedback encoding card (photoelectric + photoelectric)
2	Double-feedback encoding card (rotary transformer + photoelectric)
3	Double-feedback encoding card (sine and cosine + photoelectric)
4	Sine and cosine encoding card
5	Tamagawa absolute value encoder card
6	Heidenhain absolute value encoder card
7	Double-feedback encoding card (photoelectric + photoelectric)
0	No extension card
1	CAN/RS485+AI/AO
2	EtherCAT+RS485+STO
3	PROFIBUS-DP+RS485+STO
4	PROFINET+RS485+STO
5	MIII+RS485+STO
6	RTEX+RS485+STO
7	POWERLNK+RS485+STO
	No built-in brake unit
B	Built-in brake unit

Description of VTS mini model

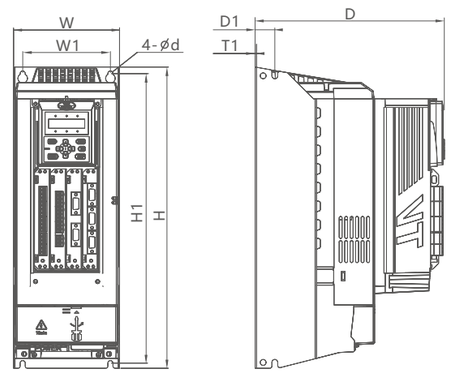
VTS 3 0 -4T 3.7K

VTS	Control technology platform
30	Mini type inverter
3.7K	Rated power 3.7kW
2S	200V single-phase
4T	400V single-phase

Appearance, installation dimension and approximate weight of VTS general model



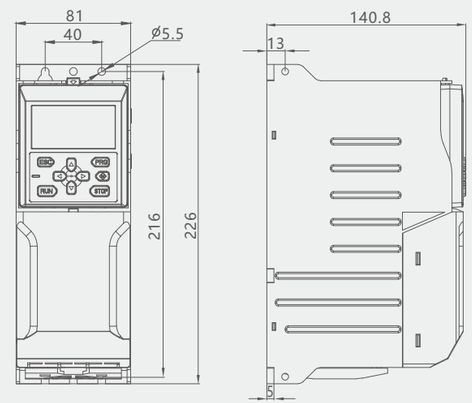
5.5kW-15kW power level



18.5kW-160kW power level

Voltage level	Drive model	Appearance and installation dimension (mm)							Approximate weight (kg)
		W	H	D	W1	H1	T1	ød	
400V	VTS 100-4T5.5K	100	291	220	60	275	4.5	5	3.5
	VTS 100-4T7.5K								
	VTS 100-4T11K								
	VTS 100-4T15K								
	VTS 100-4T18.5K	145	412	260	120	396	1.0	3.5	9.5
	VTS 100-4T22K								
	VTS 100-4T30K								
	VTS 100-4T37K	210	498	290	150	478	3.0	10	20.5
	VTS 100-4T45K								
	VTS 100-4T55K								

Appearance, installation dimension and approximate weight of VTS mini type model



Appearance and installation dimension of 0.75kW-3.7kW product (weight: 1.3kg)

Technical specification of VTS product

Model		VTS30-4T series				VTS100-4T series/VTS300-4T series/VTS400-4T series														
Power(kW)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160
Adaptive motor(kW)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160
Output	Voltage (V)	03-phase 0-rated input voltage																		
	Rated current (A)	2.5	3.8	5.5	9	13	17	24	30	39	45	60	75	91	112	150	176	210	253	304
	Maximum current(A)	4.5	6.7	9.5	16	23	31	43	54	70	81	108	135	164	202	270	317	378	400	547
	Overload ability	150% 1min, 180% 10s, 200% 0.5s, 10min interval (inverse-time characteristic)																		
Input	Rated voltage /frequency	3-phase 380V-480V, 50Hz/60Hz																		
	Allowable voltage	323V-528V, degree of voltage unbalance, less than or equal to 3%, allowable frequency fluctuation: ±5%																		
	Rated current (A)	2.8	4.2	6.1	10	15	19	26	33	37	42	57	69	89	106	139	164	196	240	287
Brake unit		Standard internal											optional built-in brake unit						need external brake unit	
Recommended brake resistor power (W) (10%ED)		150	260	440	740	1100	1500	2200	3000	4000	4800	6000	9600	9600	12000	15000	18000	22000	–	–
Recommended brake resistor value (ohm)		750	380	250	75	75	75	50	32	27	22	17	16	13	10.5	6.8	6	5.5	–	–
Minimum limiting resistance value (ohm)		66.7	66.7	66.7	66.7	40	30	20	20	20	15	10	14	11	11	5.5	5.5	5.5	–	–
Level of protection		IP20																		
Cooling method		Forced air cooling																		
DC electric reactor		No built-in DC electric reactor								standard built-in DC electric reactor										

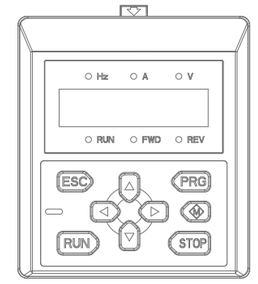
List of function and accessories

Product name	Series	Power	Communication		Control method			Encoder feedback			Brake unit
			Modbus/CAN	EtherCAT	Open-loop asynchronization	Open-loop synchronization	Closed-loop control	Rotary transformer PG card	Sine and cosine PG card	Photoelectric PG card	Built-in
VTS30 series mini inverter	VTS30	⩽4kW	Yes	No	Yes	Yes	Yes	Optional	No	Optional	Standard
VTS100 series general inverter	VTS100	⩾5.5kW	Yes	No	Yes	No	No	No	No	No	5.5-30kW build in. The others don't have
VTS200 series light-load general inverter	VTS200	⩾5.5kW	Yes	No	Yes	No	No	No	No	No	5.5-30kW build in. The others don't have
VTS300 series high-performance general inverter	VTS300	⩾5.5kW	Yes	Optional	Yes	Yes	No	No	No	No	5.5-30kW build-in. The others are optional
VTS400 series	VTS400	⩾5.5kW	Yes	Optional	Yes	Yes	Yes	Optional	Optional	Optional	Yes
VTS500 series high-performance servo drive	VTS500	⩾5.5kW	Yes	Optional	Yes	Yes	Yes	Optional	Optional	Optional	Yes

Operation panel introduction and function description

VTS-DP01

Chinese/English liquid crystal operation panel

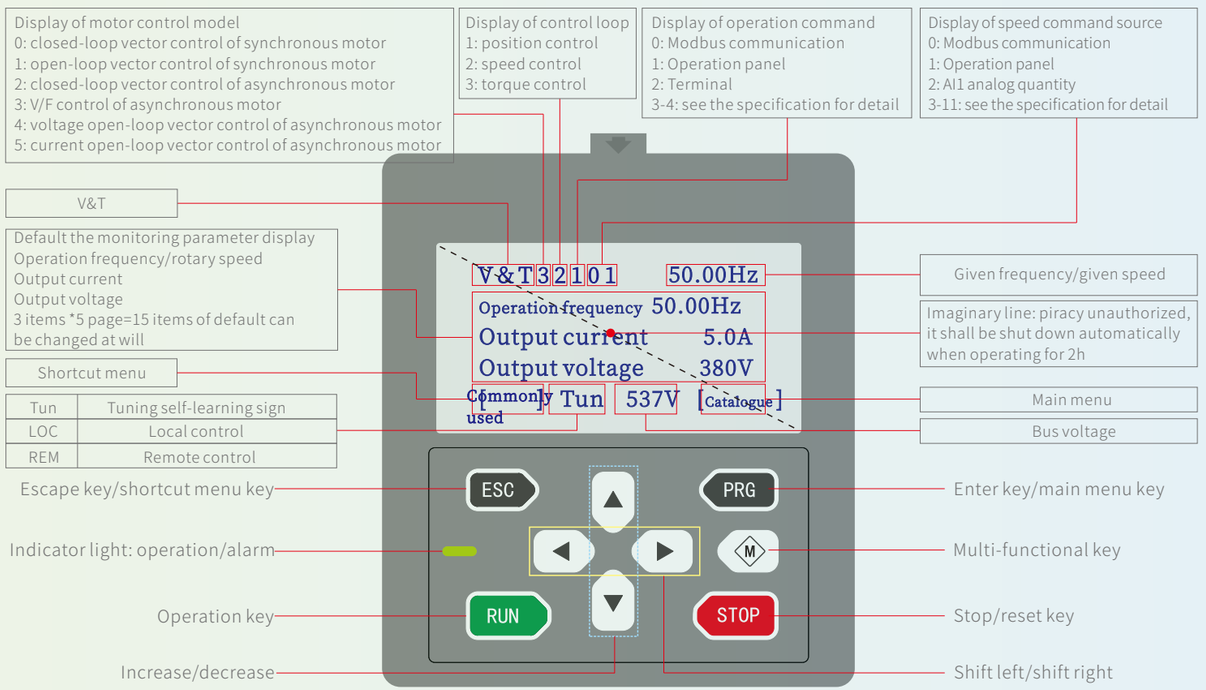


VTS-DP02

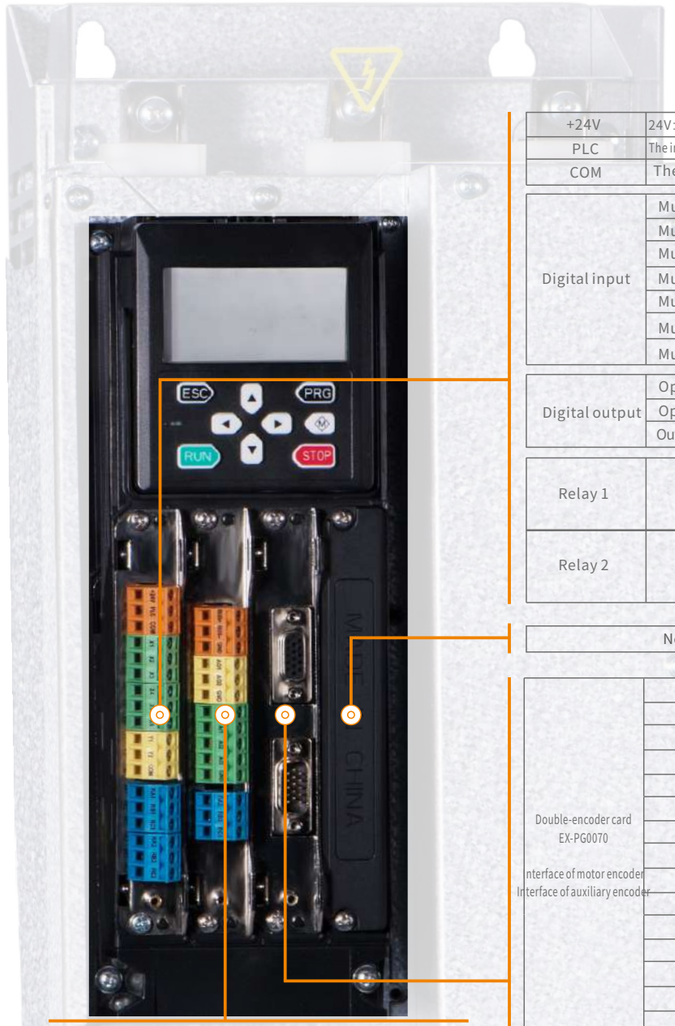
Digital pipe operation panel

Description of LCD Operation Panel Display Function

It supports the brand-new design operation of liquid crystal display screen, five-digit digital pipe display screen; and it has excellent panel keyboard and conforms to the keyboard design conforming to the ergonomics. The users can inquire and modify the common parameters directly by the liquid crystal display screen; and it supports the Chinese/English display.



Introduction to interface function of VTS control unit



+24V	24V±10%, The interior isolated fromGND	+24
PLC	The internal jumper wire is in short circuit with +24V	PLC
COM	The interior is isolated from GND	COM
Digital input	Multi-functional input terminal 1	X1
	Multi-functional input terminal 2	X2
	Multi-functional input terminal 3	X3
	Multi-functional input terminal 4	X4
	Multi-functional input terminal 5	X5
	Multi-functional input terminal 6	X6
	Multi-functional input terminal 7	X7
Digital output	Open-loop collector output 1	Y1
	Open-loop collector output 2	Y2
	Output public end of open-loop collector	COM
Relay 1	RA1-RB1:normally closed RA1-RC1:normally isolated	RA1 RB1 RC1
Relay 2	RA2-RB2:normally closed RA2-RC2:normally isolated	RA2 RB2 RC2
No secondary development		

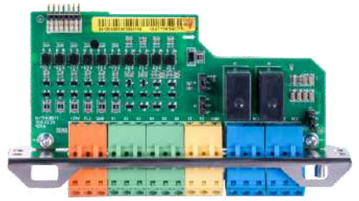
Double-encoder card EX-PG0070 nterface of motor encoder Interface of auxiliary encoder	A1+	1
	A1-	2
	A2+	3
	A2-	4
	+5V	5
	B1+	6
	B1-	7
	B2+	8
	Z2+	9
	(PT100&KTY84)/T	10
	Z1-	11
	Z1+	12
	B2-	13
	Z2-	14
	GND	15

Modbus/CAN jumper switch	Rs485+or CANH	BUS+
	Rs485-or CANL	BUS—
	Modbus/CANcommunication site	GND
Analog output 0~20mA/0~10V	Analog output 1	AO1
	Analog output 2	AO2
	Analog site	GND
Analog input -10V~+10V	Analog input reference voltage	+10V
	Analog input 1	AI1
	Analog input 2	AI2
	Analog input 3	AI3
	Analog site	GND
Relay 3	RA3-RB3:normally closed RA3-RC3:normally open	RA3 RB3 RC3

Double-encoder card EX-PG0070 Pulse given interface Frequency dividing output interface	RA+	1
	RA-	2
	+5V	3
	GND	4
	OA+	5
	RB-	6
	RB+	7
	24V	8
	OZ+	9
	OB+	10
	RZ-	11
	RZ+	12
	OZ-	13
	OB-	14
	OA-	15

(400-4T22K2B-117)

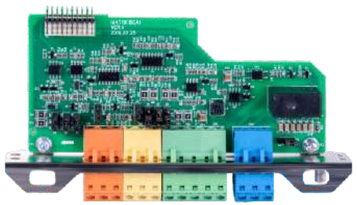
Multi-functional extension card



► DI/DO extension card

Model: VTS-EX-DT1000

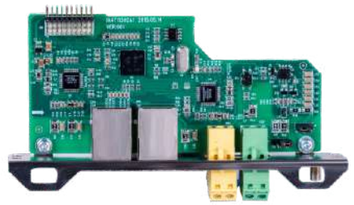
D1*6 (including one-circuit high speed coupling) +DO*2 relay *2+ PLC



► Communication extension card

Model: VTS-EX-CA0100

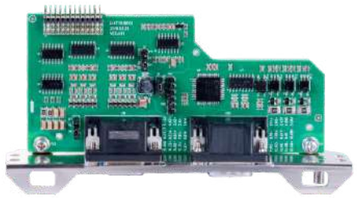
CAN/RS485 communication +A1*3+ AO *2 relay *1+10V power supply *1



► Communication extension card

Model: VTS-EX-CA0200

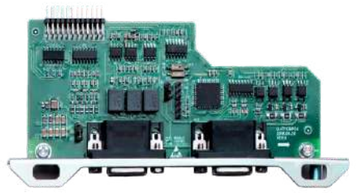
EtherCAT*1+RS485*1+STO emergency stop switch



► Encoder extension card

Model: VTS-EX-PG0010

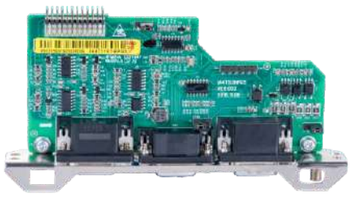
Double-encoder card: the motor encoder is TTL signal; the auxiliary encoder is TTL signal; it supports the pulse command input; the software supports the frequency dividing output of any encoder; there is no OZ signal; and the maximum is 2MHz.



► Encoder extension card

Model: VTS-EX-PG0020

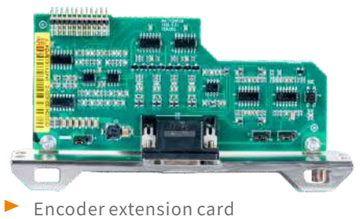
Double-encoder card: the motor encoder is rotary transformer 16-digit resolution; the auxiliary encoder is TTL signal; it supports the pulse command input; the software supports the frequency dividing output of any encoder; there is no OZ signal; and the maximum is 2MHz.



► Encoder extension card

Model: VTS-EX-PG0030

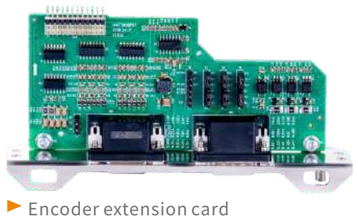
Double-encoder card: the motor encoder is sine and cosine 16-digit resolution; it supports ABZ increment and ABCD absolute type; the auxiliary encoder is TTL signal; it supports the pulse command input; the software supports the frequency dividing output of any encoder; there is no OZ signal; and the maximum is 2MHz.



► Encoder extension card

Model: VTS-EX-PG0040

Double-encoder card: the motor encoder is sine and cosine 16-digit resolution; it supports ABZ increment and ABCD absolute type; there is no pulse input function or frequency dividing output function, so it is suitable for the communication control for bus.



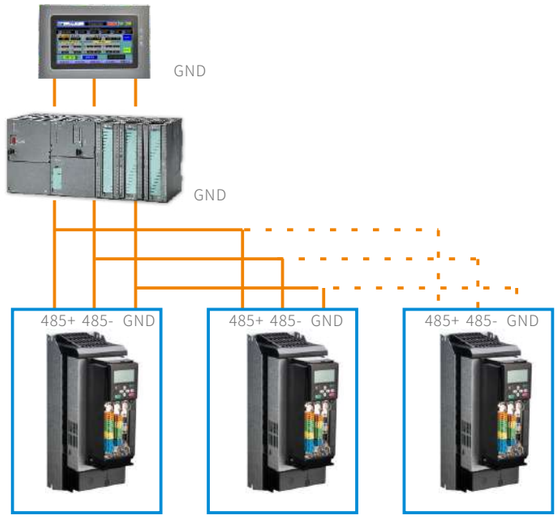
► Encoder extension card

Model: VTS-EX-PG0070

Double-encoder card: the motor encoder is TTL signal; the auxiliary encoder is TTL signal; it supports pulse command input; the feedback signal of the encoder is selected by the hardware jumper wire and output; and it is 2MHz at most.

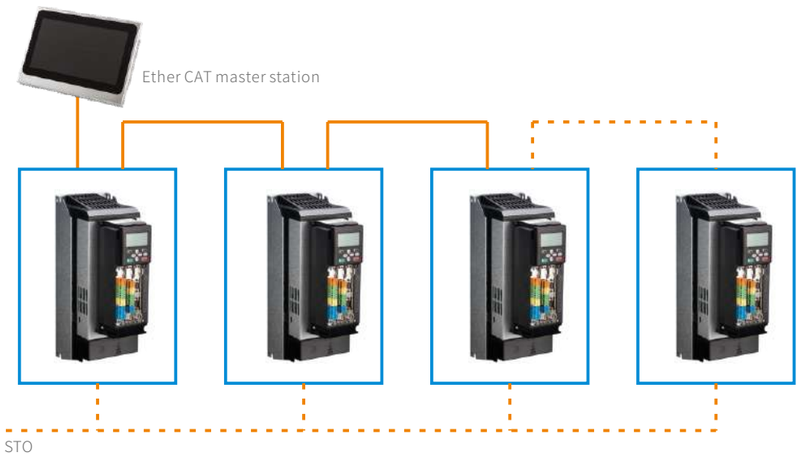
Partial solution:

ModBUS 485 communication scheme



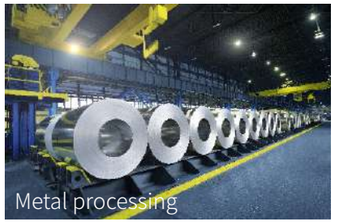
● Strong universality:
International standard MOBUS 485 format, it can be compatible with the master station equipment of all communication protocols on the markets;
● Simple and easy
● Ripe and reliable
● Typical application industry;
Air compressor, industrial washing machine, woodworking rotary cutter, fan, tension winding machine;

Ether CAT communication scheme



●Strong openness
● Simple structure
● Quick transmission speed
● Safety
● Typical industry
Machine tool, wire drawing machine, printing (specifically suitable for the occasion with multiple sets of synchronization and high-precision control);

Partial application areas



Technical support

Internet of Things technology

Increase the Internet of Things to collect and upload the operation information in real time, realize complete detection, uniform management as well as real-time locating, tracking, management and information interaction to each set of equipment.

Technology communication

Collection and analysis of customer demands, on-site professional assistance model selection, on-site trial, train for the field product of customers; and maintenance training of product.

Customer return visit

Give a phone return visit to know about the using condition and satisfaction survey

On-field service

Installation and debugging of new machine, demand survey, fault field maintenance, training for basic operation guide at the site, using notice and collection of on-site photos

Quick response

Set up regional warehouse in main cities of the country, store enough consumable so that to make the quick response, quick supply-chain of spare parts to the local customers;

7*24h full time service

V*T adopts housekeeper-type service standard and shift system so that the customers can conduct the after-sales consultation at any time; the professional customer personnel shall solve your problems for the first time.

Regular detection and maintenance

We shall detect the operation state of your equipment regularly to eliminate the unsafe hidden danger caused by the ageing of the equipment and ensure the safety lifting of the users; and your equipment can be professionally cared.

Data supporting

User manual, product sample, product certificate, technical notice, collection of application case, Wechat news, model selection service of Wechat machine and operation video