Preface

First of all, thank you for choosing the VT320E follow-up controller developed by Weihong!

This manual introduces the use of VT320E servo controller in detail, including functional characteristic, installation instruction, operation method, etc.

Before installing and using this product, please read this manual carefully, which will help you quickly become familiar with the product and use it better.

In order to continue to provide more professional products, we will continue to upgrade product functions. The information provided is subject to change without prior notice. If you have any questions about product use or have any suggestions about our products and services, please feel free to contact us.

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Modify Record:

VERSION	DATE	DESCRIPTION
R1	2023.09.27	VT320E 1st version established.

Safety Instruction

Before using this control system, please read this manual carefully before performing related operations.

Read this manual and user safety instructions carefully, and take necessary safety precautions. If users have other needs, please contact our company.

Working Environment Requirement

Please store and use this product under the following environmental conditions.

ITEM	REQUIRE
Environment temperature (during use)	0℃～50℃
Environment temperature (during storage)	-40℃～70℃
Environment humidity	0%～90% (no condensation)
Vibration resistant	<0.35mm (9 Hz～150 Hz); <0.15mm (2 Hz～9 Hz)
Usage environment	No corrosive gas, dust, oil mist
Max heating power	<10W

Precautions

If such information is not followed, personal injury, machine damage, or other property damage could result.

Transportation and Storage Related Matters:

- Please do not drag or carry the products via cables or devices connected to them.
- Pay attention to moisture-proof during storage and transportation.

Installation Related Matters:

- The cable interface of the follow-up controller should be sealed.
- The product must be installed firmly and without vibration.
- During installing, do not cast or knock the product, and do not have any impact or load on the product.

Wiring Related Matters:

- The follow-up controller must be reliably grounded, and the grounding resistance should be less than 2Ω.
- Please do not use DC 0V or neutral wire instead of ground wire, otherwise it may not work normally.
- The wiring must be correct and firm, otherwise malfunctions may occur.
- The voltage value and positive/negative (+/-) polarity on any wiring connector must comply with the specifications in the Interface Description chapter, otherwise faults such as short circuit or permanent damage to the device may occur.
- Before plugging or unplugging the connector or toggling the switch, keep your fingers dry to prevent electric shock or damage to the follow-up controller.
- Please do not plug or unplug the connector or disassemble the follow-up controller with power on.

Precautions for Running and Debugging:

- Before running, check whether the parameter settings are correct, and wrong settings will cause unexpected movements of the machine.

- The modification of parameters must be within the allowable range of the system (including mechanical and servo drive). Exceeding the allowable range may cause system instability or damage the machine.

Precautions for Use:

- Before power on, make sure the switch is in the off position to avoid unexpected start up.
- In order to avoid or reduce the effect of electromagnetic interference to follow-up controller. When making electrical arrangements, please ensure electromagnetic compatibility. Connecting low-pass filter can avoid or reduce electromagnetic interference generated by other electronic equipment.
- Please do not power on and off frequently. After power failure or blackout, it needs to be powered on again after an interval of 10s.

Safety Warning and Note Sign

Some contents that need attention when using this product are explained in the following format.

> **⚠ WARNING**
>
> This sign is used to warn of potential danger situations. If not avoided, personal injury may result.

> **⚠ CAUTION**
>
> The sign is used to provide device or environment safety warning information. If not avoided, device damage, data loss, reduced device performance, or other unpredictable results may result.

> **NOTE**
>
> This sign is used for content that requires special attention except for safety issues, and provides some supplementary instructions and notes.

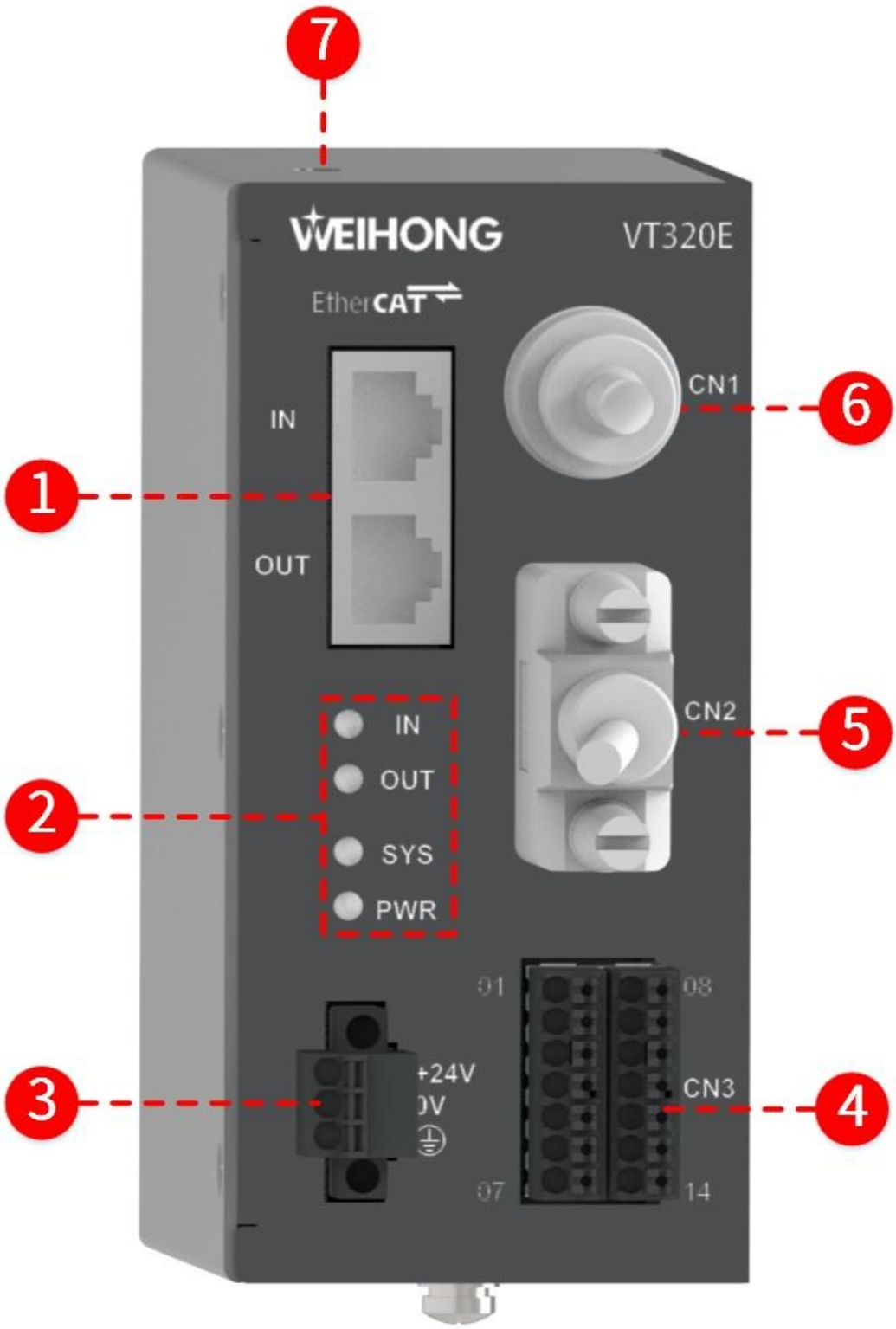
Product Introduction

VT320E is a slave controller that supports EtherCAT communication and is used as a slave station in the EtherCAT bus communication system.

VT320E uses a reliable closed-loop control method and greatly improves the sampling rate, so it has good dynamic response performance and ultra-high positioning accuracy.

Product Appearance and Dimension

VT320E appearance figure:



1. EtherCAT slave interface 2.Indicator light 3.Power interface 4.Input/output interface 5.Servo drive interface 6.Precapacitor amplifier interface 7.miniUSB

The name and function of the interface are as follows. For details, please see Interface Description.

NAME	FUNCTION
EtherCAT slave interface	Used for EtherCAT communication, transmission rate 100Mbps.
Indicator light	Used to indicate controller status. **PWR** is the power indicator light, and **SYS** is the system indicator light. □ Flashing frequency 0.33Hz means that EtherCAT is in non-OP state; □ Flashing frequency 2Hz means EtherCAT is in OP state and can communicate; □ Flashing frequency 10Hz means DNA verification failure; □ Flashing frequency of 1Hz and 3Hz alternately means that the xml file read failed. **IN** and **OUT** are EtherCAT indicators. Steady light means connected, flashing means there is data communication.
Power interface	For connecting to 24VDC power supply.
Input/output interface	Used to connect the input and output of PLC/CNC (including brake port).
Servo drive interface	Used to connect analog servo drive.
Precapacitor amplifier interface	For connecting pre-capacitor amplifier SE001.
miniUSB	Used to connect and debug the host computer.

Technical Features

The technical features of VT320E are as follows.

ITEM	DESCRIPTION
Power input	24VDC±10%, 0.5A (output port closed), with anti-reverse connection protection.
Indicator light	1×Power supply, 1×SYS, 2×EtherCAT.
EtherCAT interface	2×RJ45, 100Mbps
miniUSB	Debug serial port
Precapacitor amplifier interface	
Analog output	±10V (16bits)
Digital input port	Channel number: 5 Signal type: low level effective Maximum switching frequency: 1kHz Threshold voltage: high level 20~24V/low level 0~4V Minimum drive current: 2mA

ITEM	DESCRIPTION
Digital output port	Channel number: 4 Maximum switching frequency: 1kHz Support maximum sink current input:100mA Maximum leakage current:100μA
Brake port	Output voltage: 24VDC@1A(max)

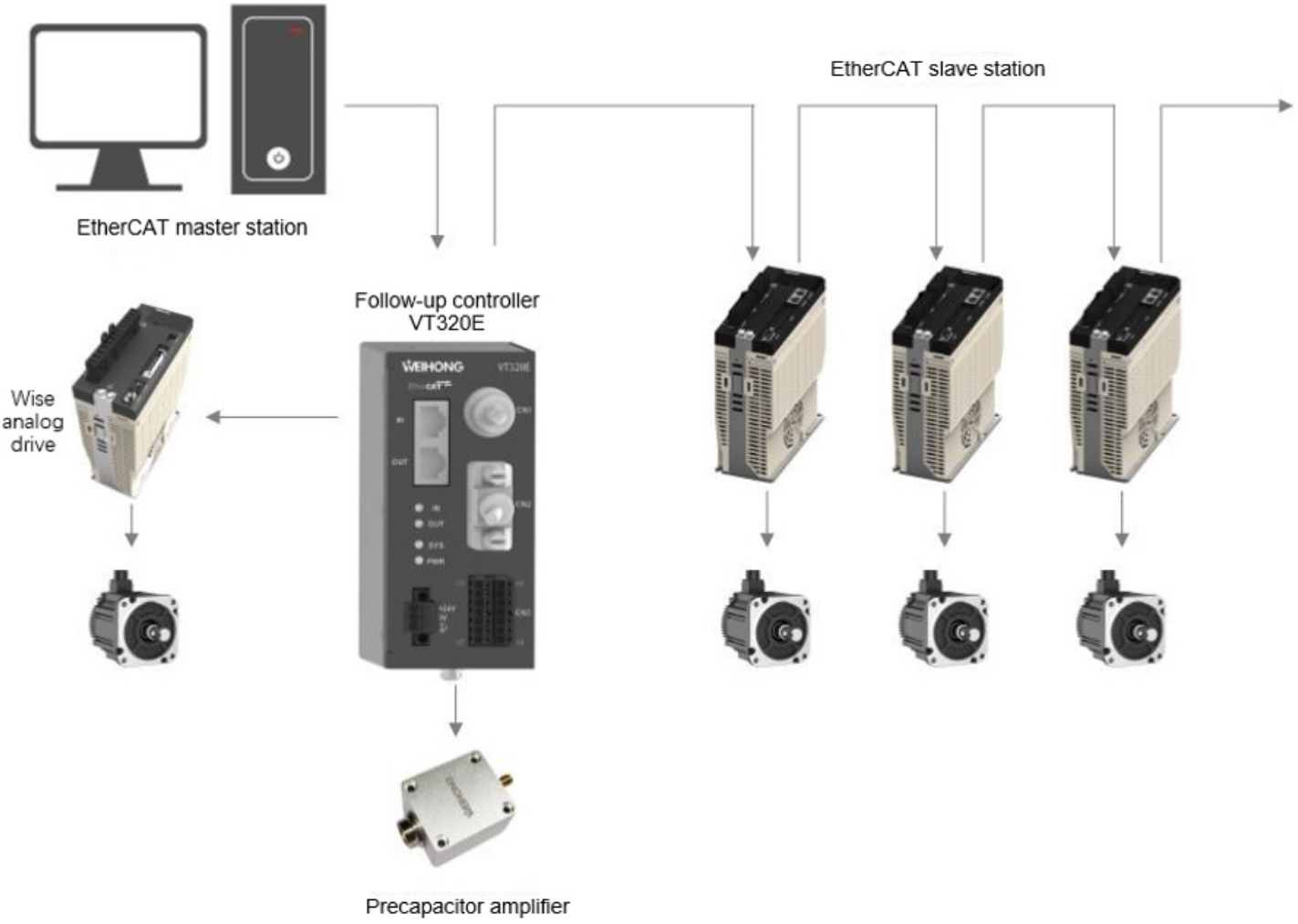
Working Environment Requirement

Please store and use this product under the following environmental conditions.

ITEM	REQUIREMENT
Working temperature	0℃～55℃
Working humidity	10%~95% (no condensation water)
Storage temperature	-40℃～70℃
Storage humidity	≤95% (no condensation water)
Air pressure range	92-106kPa
Protection level	IP30
Vibration resistant	<0.35mm (9 Hz～150 Hz) <0.15mm (2 Hz～9 Hz)
Usage environment	No corrosive gas, dust, oil mist
Maximum heating power	<10W

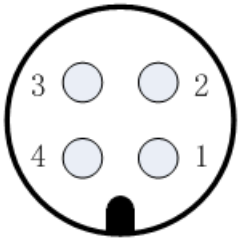
System Connection and Interface Description

VT320E external device is as follows.



Precapacitor Amplifier Interface

The sensor M16 interface is as follows.

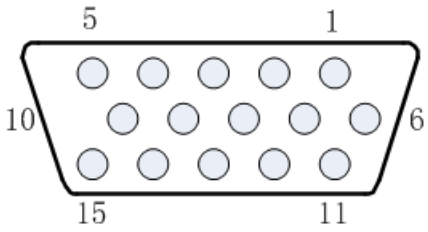


See the following table for the pin number definition of the sensor M16 interface:

PIN NO.	DEFINITION
1	+5 V: power supply
2	GND: power ground
3	SIG: capacitive signal
4	PE: shield layer

Servo Drive Interface

The following is a three-row DB15 servo drive interface.



For the pin number definition of the three-row DB15 servo drive interface, please refer to the following table:

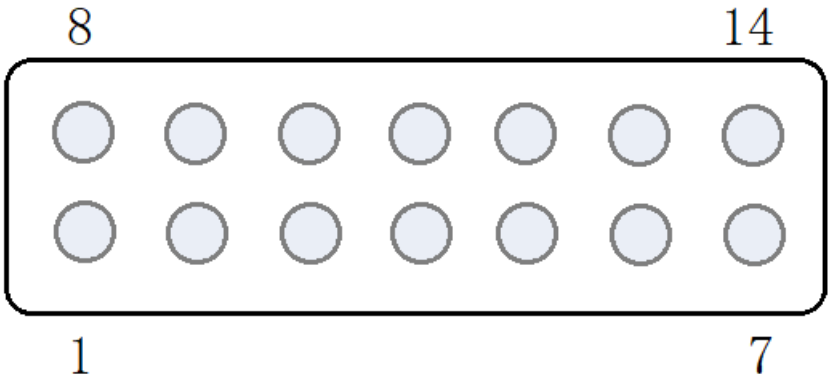
PIN NO.	DEFINITION	PIN NO.	DEFINITION
1	A + (encoder A-phase positive)	9	SON (servo enable signal)
2	A - (encoder A-phase negative)	10	RstALM (alarm clear signal)
3	B + (encoder B-phase positive)	11	AGND (analog reference ground)
4	B - (encoder B-phase negative)	12	DA (-10-10 V analog quantity)
5	Z + (encoder Z-phase positive)	13	OS (zero speed clamp signal)
6	VCC_24V (24 V output)	14	NC (not used)
7	Z - (encoder Z-phase negative)	15	COM (digital signal reference ground)
8	ALM (servo alarm signal)	PE	Shield layer

Among them:

- VCC_24V, COM: Provide 24 V DC power supply for the servo drive.
- DA, AGND: Output analog signals to provide speed signals for the drive.
- OS: Output zero speed clamp, used to suppress the zero drift of the servo.
- SON: Output servo drive enable signal.
- ALM: Receive the alarm signal of the servo drive.
- RstALM: Alarm clear signal of output servo drive.
- A+, A-, B+, B-, Z+, Z-: Encoder three-phase input signal.

Input/Output Interface

The input/output interface is as follows.

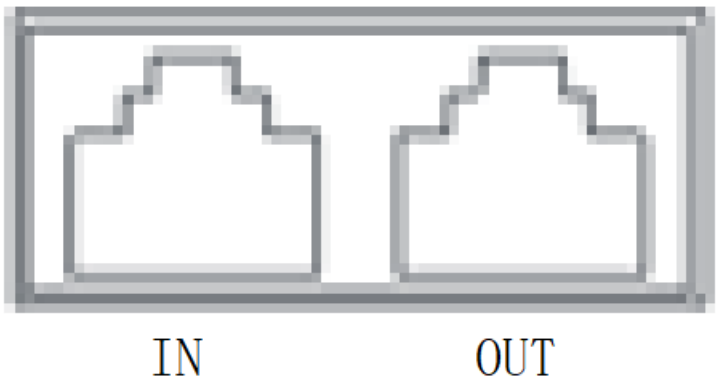


The pin number definition of the input/output interface is shown in the following table:

PIN NO.	DEFINITION	PIN NO.	DEFINITION
Y0	Output 0 reserved	X0	Input 0 upper limit
Y1	Output 1 reserved	X1	Input 1 emergency stop
Y2	Output 2 reserved	X2	Input 2 lower limit
Y3	Output 3 reserved	X3	Input 3 reserved
GND	24V power ground	X4	Input 4 reserved
+24V	24V power output	BK+	Brake output positive, active output 24V
GND	24V power ground	BK-	Brake output negative pole, active output 24V reference ground

EtherCAT Slave Station Interface

The EtherCAT slave station interface is as follows.



For the definition of the EtherCAT slave station interface, see the following table:

NAME	DESCRIPTION
IN	Connect to the OUT of the EtherCAT master station or upper level slave station

NAME	DESCRIPTION
OUT	Connect the IN of the next level EtherCAT slave station

Power Interface

The power terminal is a three-core terminal, which are **+24V**, **0V**, and **PE** from left to right.

NAME	DESCRIPTION
+24V	Connect to 24 V or positive terminal of DC power supply
0V	Connect to 0V/COM or negative terminal of DC power supply
PE	Connect the ground wire of the machine tool **Note:** Please do not connect the PE terminal to the neutral wire of the power supply line.

mimiUSB Interface

The miniUSB interface is debugging interface, connected to the host computer.

Installation Precautions

The metal structural parts of the machine tool and the shell of SE001 are the negative pole of the capacitor under test. In order to ensure the stable operation of the SE001 measurement circuit, the ground pin of the power interface of VT320E must be reliably connected to the metal structural parts of the machine tool (that is, it is well connected with the machine tool). The shell of SE001 must also be well connected with the metal structural parts of the machine tool.

When the follow-up controller is connected to related peripheral devices, the requirements for the connection cable are as follows:

- Digital signal transmission lines need to use twisted pairs.
- Analog signal transmission lines require shielded twisted pairs.
- The power supply cable can use unshielded three-core wire, and the PE wire needs to be connected to the ground cable of the machine tool control cabinet.
- It is recommended to use a minimum φ0.25mm^2 specification for the IO signal line.
- It is recommended to use a minimum φ0.5mm^2 specification for the power supply line.
- It is recommended to use a minimum size of φ1.5mm^2 specification for the ground cable.

In order to ensure the stability of the follow-up and comply with the EMS and EMI characteristics specified by CE standards, the following basic rules must be followed:

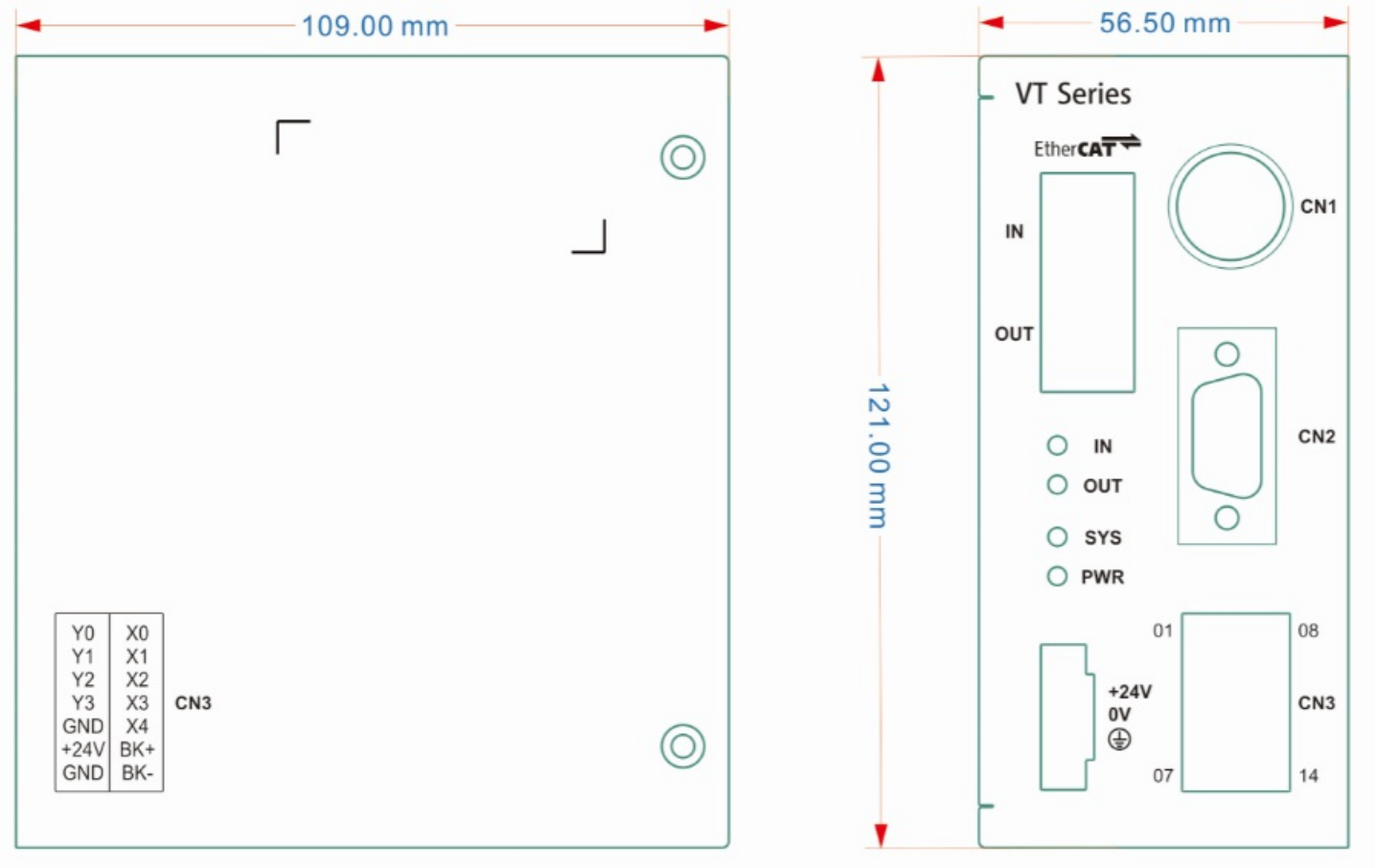
- Ensure that there is a good electrical connection between the follow-up controller shell and the machine tool control cabinet (DC resistance is less than 10Ω).
- Ensure a low impedance connection between the follow-up controller and the precapacitor amplifier shell (DC resistance less than 10Ω).
- Ensure that the machine tool control cabinet is star grounded.
- For safety reasons, add an additional ground cable between the PE terminal of the follow-up controller power supply and the star ground point of the machine tool control cabinet.
- Analog signal line, digital signal line, and power line should be routed separately to avoid interference and abnormal operation of the controller.

Install Follow-up Controller

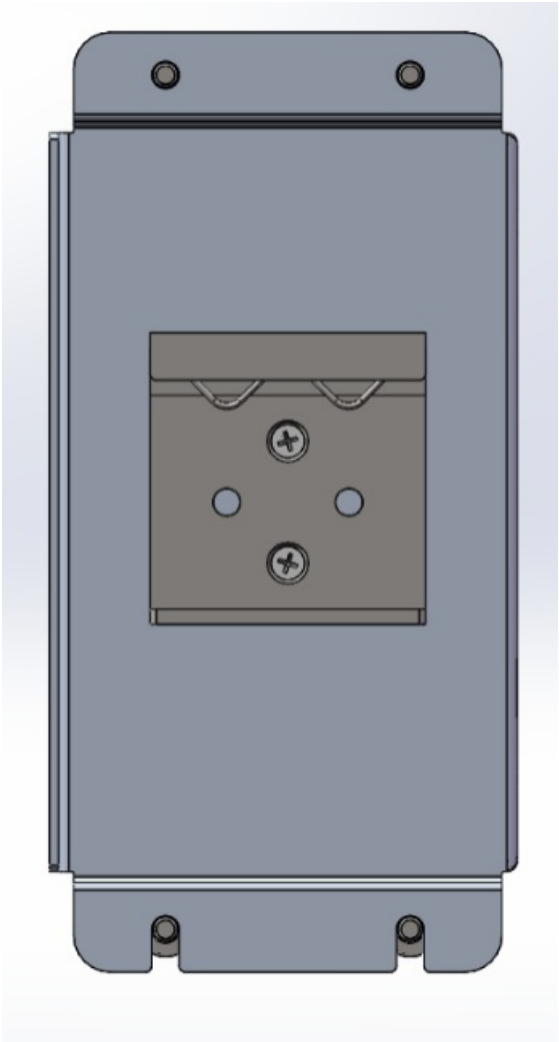
The package of the follow-up controller includes: the follow-up controller host, terminal blocks, and guide rail buckles (already installed on the host).

The follow-up controller is installed in a guide rail type (DIN 35*7.5mm). To facilitate wiring, please leave 100mm space at the top, bottom, left and right, and keep it ventilated.

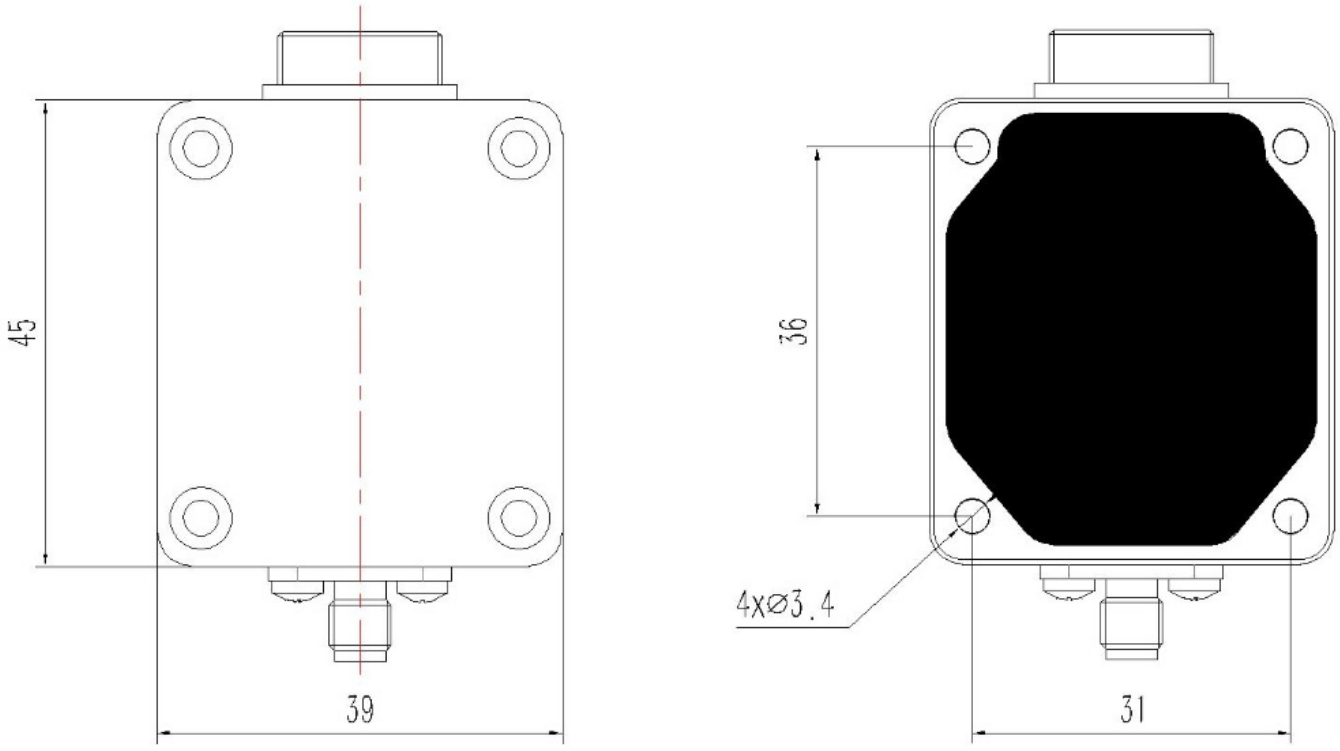
The front view and side view of VT320E are as follows (unit: mm):



The VT320E installation rails are as follows:



SE001 front view and rear view (dimension drawing) are as follows (unit: mm):



Overview

After the VT320E follow-up control system is correctly wired, debugging work is required before using the system.

The basic debugging process includes:

1. According to the drive used, set the corresponding servo parameters. For details, please see Description of Select Different Drives.
2. Power on and wait for initialization to complete and enter the main page.
3. Set mechanical parameter. For details, please see Set Mechanical Parameter.
4. Test whether each input and output port is valid and whether the mechanical parameter are set correctly. For details, please see Detection Device.
5. Return to the machine origin and calibrate the follow-up coordinate system. For details, please see Return to Machine Origin.
6. Servo calibration. For details, please see Execute Servo Calibration.
7. Capacitance calibration. For details, please see Execute Capacitance Calibration.
8. Verify the switch following action and the following function is normal. For details, please see Detect Follow and Lift.
9. After completing the above settings and function verification, you can set other parameters as needed. For details, please see Parameter Description.

Set Mechanical Parameter

Setting the correct mechanical parameters is used to ensure that the machine tool's running direction, speed, etc. are consistent with the control direction, speed, etc. Avoid damage to the machine tool or unexpected situations caused by inconsistent axis directions, speeds, etc. as expected when the machine tool is moving.

Operation Step:

1. Set parameters by operating the corresponding SDO. For details, please see Mechanical Parameter Description.
2. After the parameter setting is completed, write save(0x2100_0x01) as 1 to save the parameters.

> **NOTE**
> - The value of save cannot be actually written as 1. You only need to write 1 once to complete the parameter saving.
> - You can perform the once parameter saving operation after setting all the parameters.

Mechanical Parameter Description

This section detailed introduces the meaning of mechanical related parameters.

- **Screw Pitch**

  Transmission mechanism per travel used. Such the screw rod is the screw pitch (lead). Theoretically, at the same speed, the larger the lead of the screw used, the faster the axis moves. It is recommended to use a ball screw with a lead of 5mm~10mm.

- **Speed Upper Limit**

  The upper limit of the allowable speed of the servo motor is set according to the characteristics of the motor and load, and generally does not exceed 3000r/min.

- **Speed Gain**

  The actual rotational speed corresponding to each volt of voltage. It needs to be consistent with the parameters set in the drive. Generally, this value is 300~500r/min/V.

- **Pulse Number per Revolution**

  The pulse number of servo motor per rotation encoder feedback. It needs to correspond to the **Feedback Pulse Number of Motor per Rotation 1 Turn** keep in the drive.

  > **NOTE**
  > - Generally, the pulse number per revolution here is 4 times the number of feedback pulses of the drive corresponding to one revolution of the motor.
  > - The pulse number per revolution and pitch need to satisfy the formula: `Pulse equivalent = pitch*1000/pulse number per revolution`, which can be divisible to 1 decimal place to ensure that the speed is correct.
  > - Example: When the current pitch is 10mm, the pulse number per revolution should be set to 10000, 20000, 50000, 100000 to ensure normal speed.

- **Servo Direction**

  The rotation direction of the servo motor.

- **Encoder Direction**

  The direction of encoder pulse feedback.

- **Brake Release Delay**

  After the follow-up controller gives the servo enable signal, it delays the time to release the brake.

- **Servo Type Classification**

  Different servo, the control logic of zero-speed clamp, the logic of input and output signals and the system control parameters are different, so the corresponding servo type needs to be set.

  - Panasonic, Mitsubishi series servo.
  - Yaskawa, Delta, and Wise series servo.
  - TECO series servo.

- **Input Port Software Logic**

  There are five parameters in total, corresponding to the software logic (NO/NC) of the input ports (X0~X4)

  - Normally closed (NC): When there is no signal from the hardware, the software determines it to be valid.
  - Normally open (NO): When the hardware has a signal, the software determines it to be valid.

Detection Device

After setting the mechanical parameters, you can use the test function to check whether the following functions of the device are correct:

- Servo analog output function
- General IO port function
- Servo IO port function

Operation Step:

1. Detect general IO port function
    - You can directly view the input status of the general IO port in the input PDO.
    - According to the settings of the software port logic in the mechanical parameters, when the input signal is valid, the corresponding port will become true.
    - After entering the test mode, set the corresponding output port status open-loop control IO output in the SDO device test (0x2400).

    > **NOTE**
    >
    > SDO device test (0x2400) only takes effect in test mode

2. Detect servo IO port function
    - You can check the input status of the servo IO port directly in the input PDO.
    - When the input signal is valid, the corresponding port will become true.
    - After entering the test mode, set the corresponding output port status open-loop control IO output in the SDO device test (0x2400).

    > **NOTE**
    >
    > SDO device test (0x2400) only takes effect in test mode

3. Detect servo analog function
    - First enter the test mode and perform function testing of the servo analog quantity by setting Test_AVO (0x2400_0x01)
    - When Test_AVO(0x2400_0x01) is set to `1`, according to the servo direction setting, VT320E will move downward (positive direction) at a speed of 1/50 of the maximum speed for 1s
    - When Test_AVO(0x2400_0x01) is set to `-1`, according to the servo direction setting, VT320E will move upward (negative direction) at a speed of 1/50 of the maximum speed for 1s
    - The normal situation is: the follow-up axis moves downward, and the coordinates of the follow-up axis increase. The follow-up axis moves upward, and the coordinates of the follow-up axis decrease.

    > **NOTE**
    >
    > SDO device test (0x2400) only takes effect in test mode If the movement direction is inconsistent with the button, please modify the **Servo Direction** of the mechanical parameter. If the movement direction is inconsistent with the follow-up axis position change, please modify the **Encoder Direction** of the mechanical parameter. If the actual movement distance is inconsistent with the displayed distance, please modify the mechanical parameter **Screw Pitch** and **Pulse Number per Revolution**.

Return to Machine Origin

The purpose of returning to the machine origin is to calibrate the coordinate axis of the current follow-up axis to ensure stable operation of the machine tool and accurate coordinates.

The direction of returning to the machine origin defaults to the direction away from the workpiece, and the upper limit switch is the origin switch.

Prerequisite:

- Mechanical parameter have been correctly set. For details, please see Set Mechanical Parameter.
- It has been verified and ensured that the movement direction, follow-up axis coordinates, and upper limit switch signals are correct and valid. For details, please see Detection Device.

> ⚠ **CAUTION**
>
> In order to prevent possible damage to the machine tool, it is prohibited to return to machine origin without setting the mechanical parameters or failing the test.

Operation Step

1. Correctly set related parameters

   For the description of parameters related to returning to machine origin, please refer to the following table.

PARAMETER NAME	MEAN
Whether to zero return when power on	Whether to automatically execute the return to machine origin operation when power on. Please set this option to `Yes` after debugging is completed
Return to berth after zero return	After returning to machine origin, whether to move to the set berth position
Zero return speed	Movement speed during return to machine origin
Retract distance	After touching the upper limit switch, retract the distance and set this position as the machine coordinate origin

2. Operate `Motor Control` to execute the action of returning to machine origin.

> Note:
>
> **Quickly Set the Machine Origin:** VT320E can operate SetZero (0x2100_0x04) to quickly set the current position as machine origin.

Perform Servo Calibration

The main function of servo calibration is to detect and compensate the zero drift voltage of the servo motor to ensure that the follow-up controller can accurately control the movement of the servo motor.

Due to servo calibration, the motor may oscillate back and forth in a small amplitude. Therefore, it is necessary to manually control the follow-up axis in the middle of the travel to prevent the follow-up axis from exceeding the travel range when oscillating.

Prerequisite:

- Mechanical parameters have been set correctly. For details, please see Set Mechanical Parameter.
- The cutting head has been manually moved to the middle of the travel.

Operation Step:

1. Operate `Motor Control` to perform servo calibration.
2. `CurFollowState` displays `Servo Calibration`, which starts servo calibration.
3. After the servo calibration is completed, `CurFollowState` displays `Still`.

Perform Capacitance Calibration

The main function of capacitance calibration is to detect and calibrate the distance between the precapacitance amplifier and the workpiece to ensure that the follow-up controller can accurately control the servo motor to follow.

During capacitance calibration, the cutting head will first approach the workpiece slowly and then slowly lift up. The result of capacitance calibration will directly affect the following effect.

Prerequisite:

Make sure that there is no debris near the cutting head and the workpiece during the capacitance calibration process, and that the workpiece does not move or vibrate.

> **⚠ WARNING**
>
> To avoid calibration failure or personal injury, please stay away from the cutting head during the calibration process.

Operation Step:

1. Set parameters related to capacitance calibration

   For the functions and uses of calibration parameters, please refer to the following table:

PARAMETER NAME	FUNCTION USE
Calibration object	The material that follows the object.
Touch part capacitance	When the cutting head is in contact with the workpiece, the capacitance value collected by the precapacitance amplifier. And it is judged that when the capacitance value is less than the value, it is the touch part.
Calibration length	The lifting distance during calibration and record the corresponding data. The default is 18mm.
One-key calibration	One-key calibration function switch.

2. Operate `Motor Control` to perform capacitance calibration:

   > **NOTE**
   >
   > If you operate `Motor Control` to perform other operations during the capacitance calibration process, the capacitance calibration process will be interrupted. The normal capacitance calibration process takes about 10 seconds.

3. After the capacitance calibration is completed, the cutting head will be raised to the berth position, and `CurFollowState` will display `Still`.

4. The capacitance calibration results can be viewed in SDO (0x2200).

For parameter descriptions of calibration results, see the following table:

PARAMETER NAME	DESCRIPTION
Stability	The stability of the calibration curve is automatically generated after the calibration is completed. When the stability is **Excellent** or **Good**, the calibration result is considered to be good and can be followed normally.
Smoothness	The smoothness of the calibration curve is automatically generated after the calibration is completed. When the stability is **Excellent** or **Good**, the calibration result is considered to be good and can be followed normally.
Valid value	The difference between the capacitance value and the capacitance of the cutting head body when the cutting head is 0.5mm away from the plate. The larger the value, the better the following performance when the following height is larger. This value is mainly related to the structure of the cutting head.

Detect Follow and Lift

After setting the correct mechanical parameter and completing servo calibration and capacitor calibration, you can turn on and off the follow-up by operating `Motor Control`. Perform the switch follow action to verify whether the following function is normal.

> **NOTE**
>
> When performing the follow ON operation, it is necessary to ensure that there is a workpiece below the cutting head during movement.

This section introduces the steps for using the follow switch button to detect follow and lift.

Prerequisite:

- Mechanical parameter have been set correctly. For details, please see Set Mechanical Parameter.
- Servo calibration completed. For details, please see Perform Servo Calibration.
- Capacitance calibration completed. For details, please see Perform Capacitance Calibration.

Operation Step:

1. Operate `Motor Control` to `0x0002`, turn on follow enable.
2. Observe that the follow-up controller control the follow height between the cutting head and the workpiece.

   > **NOTE**
   >
   > Detection standard: The follow-up controller control the set follow height between the cutting head and the workpiece.

3. Operate `Motor Control` to `0x0003` to turn off follow enable.
4. Observe the berth position of the cutting head.

   > **NOTE**
   >
   > Detection standard: If the **Return to Machine Origin** operation is not performed, the default is to lift to the **Safe Height** and will not lift to the **Berth Position**.

Parameter Description

0x2100

- **Parameter Save (Save)**

  Set *Save* to `TRUE`, VT320E performs the operation of writing parameters to FLASH once (the parameters are not lost after power failure)

- **Restore Default Parameter (Restore)**

  Set *Restore* to `TRUE`, and VT320E will perform the operation of restoring all parameters to factory default parameters once

- **Clear Zero-Drift (Clear_Dift)**

  Set *Clear_Dift* to `TRUE`, VT320E will clear the zero-drift voltage of the servo calibration

- **Set Machine Origin (SetZero)**

  Set *SetZero* to `TRUE`, VT320E will set the current position as the machine origin

0x2101

- **Follow Object (Material)**

  The material that follows the object.

- **Calibration Length (Calib.Length)**

  Calibrate the lifting distance and record the corresponding data.

- **One-key Calibration Enable (OneKey_Calib.)**

  The one-key calibration function switch can perform capacitance calibration even at a long distance after it is turned on.

0x2102

- **Midpoint A Coordinate (MidPointA)**

  Midpoint coordinate A within the follow-up axis travel

- **Midpoint B Coordinate (MidPointB)**

  Midpoint coordinate B within the follow-up axis travel

- **Berth Point Coordinate (BerthCoord.)**

  After turning off follow, the cutting head lift the target position coordinate of berth.

- **Axis Travel (Z-Range)**

  The travel of the follow-up axis. When the soft limit is turned on, if the travel is exceeded during operation, it will stop immediately and generate an alarm **Soft Limit Alarm**.

- **R Angle Compensation Function Enable (RAngleCOMP)**

  R angle compensation function switch.

- **Follow Mode (FollowMode)**

Set the follow mode when VT320E follow ON, direct follow or pierce.

- **One-stage Pierce Height (One-StagePierceHeight)**

  The piercing height when performing the first level piercing.

- **One-Stage Pierce Delay (One-StagePierceDelay)**

  The time required to keep this height when first level piercing.

- **Two-stage Pierce Height (Two-StagePierceHeight)**

  The piercing height when performing the two level piercing.

- **Two-Stage Pierce Delay (Two-StagePierceDelay)**

  The time required to keep this height when two level piercing.

- **Three-stage Pierce Height (Three-StagePierceHeight)**

  The piercing height when performing the three level piercing.

- **Three-Stage Pierce Delay (Three-StagePierceDelay)**

  The time required to keep this height when three level piercing.

- **Edge Finding Gain (EdgeDetectionFollowKp)**

  In edge finding mode, the gain of the follow-up control. The smaller the value, the higher the edge finding accuracy while ensuring the surface level of the workpiece.

- **Edge Finding Detection Threshold (CapSaltusTolerance)**

  Determine the threshold for detecting out edge. The smaller the value, the higher the sensitivity, and the probability of false touches may increase.

- **Edge Finding Filter Time (CapSaltusFilter)**

  Detect the filtering time of out edge. The smaller the value, the higher the sensitivity, and the probability of false touches increase.

- **Edge Finding Output Delay (CapSaltusDelay)**

  After out edge is detected, the duration of output the out edge signal.

0x2103

- **Follow Speed (FollowSpeed)**

  The maximum speed of the cutting head when following and lifting.

- **Follow Acceleration (FollowAcc.)**

  The maximum acceleration of the cutting head when following and lifting.

- **Positioning Speed (PositionSpeed)**

  The maximum speed of the cutting head's movement to fixed point A, B or return to berth.

0x2104

- **Whether to Zero Return when Power On (HomeAfterPower)**

  Set whether to automatically return to machine origin after power-on.

- **Return to Berth after Zero Return (BerthAfterHome)**

  Set whether to automatically return to the berth position after returning to machine origin.

- **Zero Return Speed (HomingSpeed)**

  Set the movement speed when returning to machine origin.

- **Retract Distance (BackDistance)**

  Set the retract distance after returning to machine origin, and set the retracted position as the origin.

0x2105

- **Manual Movement High-speed (HighSpeed)**

  When performing manual movement, the movement speed of the "High-speed" gear.

- **Manual Movement Low-speed (LowSpeed)**

  When performing manual movement, the movement speed of the "Low-speed" gear.

- **Soft Limit Protection (SoftwareLimit)**

  Set whether to enable soft limit protection. If it is enabled, it will not allow manual movement to negative coordinates or movement to the coordinate range of the exceeded follow-up axis travel to avoid collision with the limit switch or high-speed collision with the workpiece during manual movement.

0x2106

- **Screw Pitch (ScrewPitch)**

  Transmission mechanism per travel used. Such the screw rod is the screw pitch (lead). Theoretically, at the same speed, the larger the lead of the screw used, the faster the axis moves. It is recommended to use a ball screw with a lead of 5mm~10mm.

- **Speed Upper Limit (MaxSpeed)**

  The upper limit of the allowable speed of the servo motor is set according to the characteristics of the motor and load, and generally does not exceed 3000r/min.

- **Speed Gain (S-VGain)**

  The actual rotational speed corresponding to each volt of voltage. It needs to be consistent with the parameters set in the drive. Generally, this value is 300~500r/min/V.

- **Pulse Number per Revolution (PulsePreRev.)**

  The pulse number of servo motor per rotation encoder feedback. It needs to correspond to the **Feedback Pulse Number of Motor per Rotation 1 Turn** keep in the drive.

  > **NOTE**
  > - Generally, the pulse number per revolution here is 4 times the number of feedback pulses of the drive corresponding to one revolution of the motor.

- The pulse number per revolution and pitch need to satisfy the formula: `Pulse equivalent = pitch*1000/pulse number per revolution`, which can be divisible to 1 decimal place to ensure that the speed is correct.
- Example: When the current pitch is 10mm, the pulse number per revolution should be set to 10000, 20000, 50000, 100000 to ensure normal speed.

- **Servo Direction (ServoDir)**

  The rotation direction of the servo motor.

- **Encoder Direction (EncoderDir)**

  The direction of encoder pulse feedback.

- **Brake Release Delay (BrakeoffDelay)**

  After the follow-up controller gives the servo enable signal, it delays the time to release the brake.

- **Servo Type Classification (ServoType)**

  Different servo, the control logic of zero-speed clamp, the logic of input and output signals and the system control parameters are different, so the corresponding servo type needs to be set.

  - Panasonic, Mitsubishi series servo.
  - Yaskawa, Delta, and Wise series servo.
  - TECO series servo.

- **Input Port 0 Software Logic (X0_Logic)**

  Corresponding to the software logic (normally open/normally closed) of the input port (X0).

- **Input Port 1 Software Logic (X1_Logic)**

  Corresponding to the software logic (normally open/normally closed) of the input port (X1).

- **Input Port 2 Software Logic (X2_Logic)**

  Corresponding to the software logic (normally open/normally closed) of the input port (X2).

- **Input Port 3 Software Logic (X3_Logic)**

  Corresponding to the software logic (normally open/normally closed) of the input port (X3).

- **Input Port 4 Software Logic (X4_Logic)**

  Corresponding to the software logic (normally open/normally closed) of the input port (X4).

0x2107

- **In Position Tolerance (InPositionTolerance)**

  The standard used to judge whether the movement is in position. When the difference between the current position and the target position is less than this value, the corresponding in position signal will be output.

- **Positioning Touch Part Delay (JogTouchDelay)**

  The follow-up controller is in manual control or stop state. If the duration of the touch part reaches this time, the touch part alarm will be displayed on the interface, and the input/output interface will output the alarm status. When this value is set to 0, touch part alarms when stationary or in manual motion are disabled.

- **Follow-up Touch Part Delay (FollowTouchDelay)**

  When the follow-up controller is in the follow-up state, if the duration of the touch part reaches this time, the touch part alarm will be displayed on the interface, and the input/output interface will output the alarm status. When this value is set to 0, the touch part alarm during follow-up will be disabled.

- **Pierce Touch Part Delay (PierceTouchDelay)**

  The follow-up controller is in piercing. If the duration of the touch part reaches this time, the touch part alarm will be displayed on the interface, and the input/output interface will output the alarm status. When this value is set to 0, the touch part alarm during piercing will be disabled.

- **Body Capacitance Tolerance (BodyCapTolerance)**

  The maximum value of cutting head body capacitance change. When it is detected that the cutting head body capacitance change is greater than this value, a cutting head capacitance abnormal alarm is generated.

- **Capacitance Fluctuation Check Threshold (CapFlucValue)**

  When capacitance is calibrated, the capacitance change value is detected by moving 2mm. The actual capacitance change value should be greater than the set value.

- **Touch Part Forced Lift (BerthwhenTouch)**

  After the follow-up controller detects the touch part signal while stationary, whether to control the cutting head to move to the berth coordinate (when the touch part signal is detected in the piercing and follow-up state, it defaults to the berth position and cannot be changed).

- **Miss-part Alarm Switch (Miss-PartDetect)**

  Switch of miss-part alarm detection function.

- **Miss-part Detection Tolerance (Miss-PartValue)**

  Used to adjust the sensitivity of the miss-part alarm.

0x2108

- **Lift Safety Height (SafetyHeight)**

  When the follow-up controller does not return to origin, lift relative height when the follow-up is turned off.

- **Vibration Suppression Level (NoiseSuppression)**

  The vibration suppression level of the follow-up during workpiece vibration. The higher the vibration suppression level, the stronger the vibration suppression effect, but the sensitivity and responsiveness of the follow-up will become lower.

- **Positioning Gain Kp (JogKp)**

  Parameters of the PID algorithm during positioning.

- **Follow-up Sensitivity (FollowKp)**

  Parameters of the PID algorithm in the follow-up process. The larger the value, the faster the response when follow-up. However, if the value is too large, resonance may occur if the machine is not fixed stably.

- **Follow-up Gain Kd (FollowKd)**

  Parameters of the PID algorithm in the follow-up process.

- **Follow-up Feedforward Amount (FollowKi)**

  During the follow-up process, the parameter values of the algorithm. The larger the value, the faster the response during the following process, but if the drive is not rigid enough, problems such as overshoot may occur.

- **Directly Follow Maximum Height (MaxDirectlyFollowHeight)**

  The height range that can stabilize follow. It is related to the pierce process. When the pierce height is less than this value, it is directly in position, and when it is greater than this value, it is in position.

0x2109

- **Application Scene (ApplicationScene)**

  Select `Plane` or `3D` according to the actual usage scenario of the cutting head.

0x210A

- **Capacitance Correction (CapCompensationMode)**

  During machining, the cutting head body will heat up, causing the body capacitance value to change, resulting in inaccurate following distance. After capacitance correction is turned on, VT320E will collect the capacitance value of the cutting head body for capacitance compensation every time machining is completed, which can reduce the manual capacitance calibration times.

- **Body Capacitance Extra Tolerance (ExBodyCapErr)**

  Extra tolerance for body capacitance changes when performing capacitance compensation.

- **Calibrated High-speed (Calib.HighSpeed)**

  During capacitance calibration, the speed of cutting head rapid movement.

- **Calibrated Low-speed (Calib.LowSpeed)**

  During capacitance calibration, the speed of cutting head slow movement.

- **IO Filter Time (IOFliterTime)**

  Digital filter time of IO port.

- **Follow-up Filter Time (FollowFilterTime)**

  The filter time of the follow-up control output.

0x210B

- **Controller Enable Switch (VT_Enable)**

  As a slave controller, VT320E requires external control enable. VT320E can work normally only when the controller enable is valid.

Edge Finding Function

Function Introduction

In the edge finding mode, according to the horizontal movement of the host computer, the characteristics of the capacitive sensor can be used to accurately find the out edge point of the relative workpiece, auxiliary the host computer to complete position judgment, and realize the function of tube positioning.

Operation Guide

Prerequisite:

- System has no alarm.
- Meet the prerequisites for follow ON.

Parameter Setting:

Correct setting following parameters as required:

- Edge finding gain
- Edge finding detection threshold
- Edge finding filter time
- Edge finding output delay

Control Process:

1. The host computer operates `Motor Control` to control the follow-up controller to enter the edge finding mode.
2. The upper computer controls the horizontal axis to start moving, causing the cutting head to produce an out edge movement.
3. After the follow-up controller detects the out edge, it output **OutEdge** and lift to the berth position at the same time.
4. The host computer reads the coordinate values of the current X, Y and other axes according to the out edge signal, and performs calculations to obtain the required information.
5. **OutEdge** continues to automatically turn off the output after **Edge Finding Output Delay**.

Precaution

1. If the host computer operates `Motor Control` and controls the follow-up controller to enter the edge finding mode, and the follow-up controller does not meet the preconditions, the follow-up controller will not enter the edge finding mode. After meeting the prerequisites, you need to operate `Motor Control` again to make the follow-up controller enter the edge finding mode.
2. During edge finding, the host computer operates `Motor Control`, and the follow-up controller exits the edge finding mode, lifts it to the berth position, and returns to the static state.
3. After **OutEdge** is output, before the end of **Edge Finding Output Delay**, the host computer turns off the **Edge Finding Mode Enable** signal output, and the follow-up controller immediately turns off the out edge signal output.

Capacitance Correction

Function Introduction

This function can correct the body capacitance value. It mainly solves the problem that the capacitance value of the cutting head changes due to the temperature change of the cutting head during the laser cutting process, and the following height is inaccurate.

Capacitance correction is divided into two methods:

- **Auto**: When the cutting head is at the berth position, before executing the follow action, it will automatically collect the current body capacitance value and compare it with the body capacitance value during capacitance calibration and perform compensation.
- **IO**: When the cutting head is at the berth position, when receiving the **IO Cal Signal** signal output from the host computer, it collects the current body capacitance value and compares it with the body capacitance value during capacitance calibration and perform compensation.

Operation Guide

Auto Correction

Prerequisite:

- The current origin position is valid, and the cutting head is at the berth position.
- The capacitance calibration is successful and the body capacitance value is valid.

Operation Step:

1. Set CapCompensationMode (0x210A_0x01) to `Auto`.

   When the cutting head is at the berth position, capacitance compensation is automatically performed before executing the follow ON action.

   > ⚠ **CAUTION**
   >
   > When the cutting head is not at the berth position, no compensation is performed; The cutting head is at the berth position, the follow ON action is not executed, and no compensation is performed; When the difference between the collected current body capacitance value and the body capacitance value exceeds the set sum of **Body Capacitance Tolerance** and **Body Capacitance Extra Tolerance**. It will prompt *Body Capacitance Value Abnormality* alarm, and cancel the follow ON action.

IO Correction

Prerequisite:

- The current origin position is valid, and the cutting head is at the berth position.
- The capacitance calibration is successful and the body capacitance value is valid.

Operation Step:

1. Set CapCompensationMode (0x210A_0x01) to `IO`.
2. Perform capacitance calibration normally, and within **10s** after the cutting head returns to the berth position after completing the calibration, the host computer outputs **IO Cal Signal**.
3. VT320E collects the body capacitance after receiving the **IO Cal Signal** signal.
4. After collection success, output *Capacitance Correction Successful*, if collection fails, output *Capacitance Correction Failed*
5. After collection success, when the cutting head is at the berth position during the machining process, after VT320E receives

the **IO Cal Signal** signal input, the follow-up controller performs capacitance compensation.

⚠ CAUTION

- If not returned to machine origin before performing capacitance calibration, the IO correction function cannot be used;
- When the difference between the collected current body capacitance value and the body capacitance value exceeds the set sum of **Body Capacitance Tolerance** and **Body Capacitance Extra Tolerance**. It will prompt *Body Capacitance Value Abnormality* alarm, and cancel the follow ON action.
- During the machining process, when the cutting head is at the berth position, if VT320E does not receive the **IO Cal Signal** signal input, the follow-up controller uses the previous compensation data or does not compensate for the capacitance.

Common Troubleshooting

Servo Alarm

Fault Phenomenon:

The status bar on the main page displays **Servo Alarm**.

Possible Cause:

When the **No.8** pin **ALM** signal of the VT320E servo interface detects a servo alarm signal input, a servo alarm will be generated.

Since the high/low level logic of the alarm is different for different servos, the "Servo Type" parameter must be set correctly.

The following reasons may cause servo alarm on VT320E:

- **Servo Type** parameter setting is incorrect.
- The wiring is incorrect.
- The servo itself has alarmed.
- Being interfered (the probability is small, the system itself has input port filter).

Processing Method:

According to different reasons, choose to execute the corresponding processing method.

REASON	PROCESSING METHOD
Servo Type parameter setting is incorrect	Select the correct servo type on the **Mechanical Parameter** page.
Incorrect wiring	Modify to the correct wiring method. For details, please see Instruction for Select Different Drive.
The servo itself has alarmed	Check the cause of the servo alarm and handle it to clear the servo alarm.
Affected by interference	Check wiring, cable shielding, etc. to eliminate interference.

Encoder Direction Mismatch Alarm

Fault Phenomenon:

The status bar of the main page displays **Encoder Direction Mismatch**.

Possible Cause:

The encoder direction settings of the drive and follow-up controller do not match.

Processing Method:

Modify the parameters of the follow-up controller or drive to match.

Capacitance not Calibrated Alarm

Fault Phenomenon:

The status bar on the main page displays **Capacitance not Calibrated**.

Possible Cause:

No capacitance calibration has been performed.

Processing Method:

Perform capacitance calibration operation.

Cutting Head Capacitance Abnormally Increase Alarm

Fault Phenomenon:

The status bar on the main page displays **Cutting Head Capacitance Abnormally Increase**.

Possible Cause:

The following reasons may cause an abnormal capacitance alarm on the VT320E:

- The nozzle, cutting head body and other components are loose.
- The temperature of the cutting head nozzle changes too much.
- **Body Capacitance Tolerance** parameter setting is inappropriate.
- Replaced cutting head assembly.

Processing Method:

Select the corresponding processing method based on different reasons.

REASON	PROCESSING METHOD
The nozzle, cutting head body and other components are loose	Check and tighten the cutting head nozzle, cutting head body, RF wire, precapacitor amplifier, and sensor signal cable, and perform capacitance calibration again.
The temperature of the cutting head nozzle changes too much	Enable the **Real-time Calibration Function** on the **Manufacturer Parameter** page.
Body Capacitance Tolerance parameter setting is inappropriate	On the **Alarm Parameter** page, appropriately increase the **Body Capacitance Tolerance** value. (The parameter value of the body capacitance tolerance should normally not exceed the effective value of the capacitance calibration result)
Replaced sensor or cutting head assembly	After tightening the cutting head components (such as ceramic rings, nozzles, etc.), perform capacitance calibration again.

Capacitance Zero Alarm

Fault Phenomenon:

The status bar on the main page displays **Capacitance Zero**.

Possible Cause:

- The cutting head touch the workpiece (in static state).

- The amplifier is damaged.
- There is a short circuit or open circuit in the connection between the follow-up controller, amplifier, and cutting head.

Processing Method:

Select the corresponding processing method based on different reasons.

REASON	PROCESSING METHOD
The cutting head touch the workpiece	Move the cutting head away from the workpiece.
The amplifier is damaged	Replace the amplifier with function normal.
An open circuit in the connection between the follow-up controller, amplifier and cutting head	Check or replace the wiring between the follow-up controller, amplifier, and cutting head.

Touch Part Alarm

Fault Phenomenon:

The status bar on the main page displays **Touch Part Alarm**.

Possible Cause:

- The cutting head touch the workpiece.
- The amplifier is damaged.
- The connections between the follow-up controller, amplifier, and cutting head are in poor contact.
- Cutting head damaged.
- Replaced cutting head component.

Processing Method:

Select the corresponding processing method based on different reasons.

REASON	PROCESSING METHOD
The cutting head touch the workpiece	Move the cutting head away from the workpiece.
The amplifier is damaged	Replace the amplifier with function normal.
The connections between the follow-up controller, amplifier, and cutting head are in poor contact	Replace or tighten the wiring between the follow-up controller, amplifier, and cutting head. Perform capacitance calibration again.
Cutting head damaged	Replace the cutting head with normal function and perform capacitance calibration again.
Replaced cutting head component	Perform capacitance calibration again.

Body Capacitance Abnormal Alarm

Fault Phenomenon:

The status bar on the main page displays **Body Capacitance Abnormal**.

Possible Cause:

The following reasons may generate the body capacitance abnormal alarm on VT320E:

- The capacitive induction loop has device loose.
- The cutting head nozzle temperature changes too much.
- **Body Capacitance Tolerance** parameter setting is inappropriate.

Processing Method:

Select the corresponding processing method based on different reasons.

REASON	PROCESSING METHOD
The capacitive induction loop has device loose	Check and tighten the cutting head nozzle, cutting head body, RF wire, precapacitor amplifier, and sensor signal cable, and perform capacitance calibration again.
The cutting head nozzle temperature changes too much	Enable the **Real-time Calibration Function** on the **Manufacturer Parameter** page.
Body Capacitance Tolerance parameter setting is inappropriate	On the **Alarm Parameter** page, appropriately increase the **Body Capacitance Tolerance** value.

Hardware Upper/Lower Limit Alarm

Fault Phenomenon:

The status bar on the main page displays **Hardware Upper Limit Alarm** or **Hardware Lower Limit Alarm**.

Possible Cause:

- Incorrect wiring.
- Mechanical parameter interface **Limit Input Software Logic** or **Input Port Hardware Logic** select wrong.
- The upper and lower limits induce the object and output the effective level.
- Sensor damaged.

Processing Method:

Select the corresponding processing method based on different reasons.

REASON	PROCESSING METHOD
Incorrect wiring	Modify to the correct wiring method.
Mechanical parameter interface **Limit Input Software Logic** or **Input Port Hardware Logic** select wrong	Set the correct parameter according to the actual sensor selection.
The upper and lower limits induce the object and output the effective level	Check the situation of induce the object and clear the abnormally detected object.
Sensor damaged	Replace sensor.

Soft Upper/Lower Limit Alarm

Fault Phenomenon:

The status bar on the main page displays **Soft Limit Alarm**.

Possible Cause:

- The follow-up axis does not return to origin.
- Follow-up axis travel set wrong.

Processing Method:

Select the corresponding processing method based on different reasons.

REASON	PROCESSING METHOD
The follow-up axis does not return to origin	Perform the return to origin operation and calibrate the follow-up coordinate system.
Follow-up axis travel set wrong	Set the correct follow-up axis travel parameter according to the actual situation.

Registration Expired Alarm

Fault Phenomenon:

The status bar on the main page displays **Registration Expired**.

Possible Cause:

The follow-up controller usage time has expired.

Processing Method:

Contact the vendor or manufacturer for extension of usage time.

Write Adapter Information Type Error Alarm

Fault Phenomenon:

The status bar of the main page displays **Write Adapter Information Type Error**.

Possible Cause:

The device type of the software write adapter information does not match the device type of the device itself.

Processing Method:

Contact the vendor or manufacturer to replace the system software or write adapter information again.

Capacitance Deviation Exceed Alarm

Fault Phenomenon:

The status bar on the main page displays **Capacitance Deviation Exceed Alarm**.

Possible Cause:

- The cutting head moves to the edge of the workpiece, and there have miss-part phenomenon.
- The workpiece surface is uneven.

Processing Method:

Select the corresponding processing method based on different reasons.

REASON	PROCESSING METHOD
The cutting head moves to the edge of the workpiece	Avoid moving the cutting head to the edge of the workpiece.
The workpiece surface is uneven	Turn off the miss-part alarm function, or appropriately increase the miss-part detection tolerance.

DIFF Fluctuate Greatly

Fault Phenomenon:

The current capacitance fluctuation value (RTCap_Diff) is greater than 100.

Possible Cause:

- There are devices with large electromagnetic radiation nearby.
- Poor grounding.

Processing Method:

Select the corresponding processing method based on different reasons.

REASON	PROCESSING METHOD
There are devices with large electromagnetic radiation nearby	Power off nearby devices to identify devices with large electromagnetic radiation, and try to stay away from the device or ground the device well.
Poor grounding	1.Connect the device shell to the nearby ground pile; 2.Connect the amplifier shell to the device shell; 3.Connect the workpiece and workbench to the ground pile.

Oscillation when Following

Fault Phenomenon:

Cutting head oscillation when following.

Possible Cause:

- Parameter setting is unreasonable.
- Poor grounding.
- Mechanical structure unstable.

Processing Method:

Select the corresponding processing method based on different reasons.

REASON	PROCESSING METHOD
Parameter setting is unreasonable	1. Reduce follow-up sensitivity, follow speed, and follow acceleration; 2. Improve vibration suppression level.
Poor grounding	1. Connect the device shell to the nearby ground pile; 2. Connect the amplifier shell to the device shell; 3. Connect the workpiece and workbench to the ground pile.
Mechanical structure unstable	Increase mechanical structure stability.

VT320E Object Dictionary

Process Data (Process Data)

Output PDO (PLC to VT)

INDEX NO.	DATA TYPE	OBJECT NAME	PDO INDEX NO.	OBJECT SUB-INDEX NO.	REMARK
0x1600	U16	Motor Control	0x2000	0x01	Motion control command
0x1600	U16	Follow Height	0x2000	0x02	Follow height (um)
0x1600	U16	Compensate Height R	0x2000	0x03	R angle compensation height (um)
0x1600	BOOL	Compensate R	0x2000	0x04	R angle compensation signal
0x1600	BOOL	IO Cal Signal	0x2000	0x05	IO correction signal

Note: Motor Control motion control command corresponding description

VALUE	DESCRIPTION
0x0000	Stop
0x0001	Return to origin
0x0002	Follow ON
0x0003	Follow OFF
0x0004	Move to point A
0x0005	Move to point B
0x0007	Low speed positive manual continuous motion
0x0107	Low speed negative manual continuous motion
0x0207	High-speed positive manual continuous motion
0x0307	High-speed negative manual continuous motion
0x0008	Start capacitance calibration
0x0009	Start servo calibration
0x000A	Return to berth position
0x000B	Start edge finding

VALUE	DESCRIPTION
Other value	Invalid operation

Input PDO (VT to PLC)

INDEX NO.	DATA TYPE	OBJECT NAME	PDO INDEX NO.	OBJECT SUB-INDEX NO.	DESCRIPTION
0x1A00	U8	CurFollowState	0x3000	0x01	Current status description
0x1A01	U8	OperationState	0x3001	0x01	Current operation status description
0x1A02	S32	Coordinate	0x3002	0x01	Current coordinate value (um)
0x1A02	U16	FollowHeight	0x3002	0x02	Current follow height (um)
0x1A02	S16	Dynamic_Error	0x3002	0x03	Dynamic error (um)
0x1A02	U32	RTCap	0x3002	0x04	Current capacitance value
0x1A02	S32	Cap_Err_Value	0x3002	0x05	Capacitance change value
0x1A02	U32	RTCap_Diff	0x3002	0x06	Current capacitance fluctuation value
0x1A03	BIT	Origin_Reached	0x3003	0x01	Return to origin in position
0x1A03	BIT	Parking_Reached	0x3003	0x02	Berth in position
0x1A03	BIT	Follow_Reached	0x3003	0x03	Follow in position
0x1A03	BIT	Move_Reached	0x3003	0x04	Motion in position
0x1A03	BIT	Pierce_1_Reached	0x3003	0x05	First level pierce in position
0x1A03	BIT	Pierce_2_Reached	0x3003	0x06	Second level pierce in position
0x1A03	BIT	Pierce_3_Reached	0x3003	0x07	Third level pierce in position
0x1A03	BIT	Follow_Enable	0x3003	0x08	Follow enable
0x1A03	BIT	Homed	0x3003	0x09	Whether homed
0x1A03	BIT	CapComp_Enable	0x3003	0x0A	Whether real-time capacitance take effect
0x1A04	BIT	Up_Limit	0x3004	0x01	Hardware upper limit alarm
0x1A04	BIT	Down_Limit	0x3004	0x02	Hardware lower limit alarm
0x1A04	BIT	Soft_Up_Limit	0x3004	0x03	Software upper limit alarm
0x1A04	BIT	Soft_Down_Limit	0x3004	0x04	Software lower limit alarm

INDEX NO.	DATA TYPE	OBJECT NAME	PDO INDEX NO.	OBJECT SUB-INDEX NO.	DESCRIPTION
0x1A04	BIT	CapZero	0x3004	0x05	Capacitance zero alarm
0x1A04	BIT	Bump	0x3004	0x06	Touch part alarm
0x1A04	BIT	Exceed	0x3004	0x07	Body capacitance abnormality
0x1A04	BIT	No_Sample	0x3004	0x08	Capacitance not calibrated
0x1A04	BIT	Servo_Err	0x3004	0x09	Servo alarm
0x1A04	BIT	Encoder_Dir_Err	0x3004	0x0A	Encoder direction mismatch
0x1A04	BIT	Cap_Large	0x3004	0x0B	Cutting head capacitance abnormally increases
0x1A04	BIT	Expired	0x3004	0x0C	Registration expired
0x1A04	BIT	Mismatch	0x3004	0x0D	Write adapter information type error
0x1A04	BIT	MissPanel	0x3004	0x0E	Miss-part alarm
0x1A05	BIT	OutEdge	0x3005	0x01	Out edge detected
0x1A05	BIT	IOCaliSuccess	0x3005	0x02	IO correction successful
0x1A05	BIT	IOCaliFailed	0x3005	0x03	IO correction failed
0x1A06	BIT	IO_X0	0x3006	0x01	Upper limit
0x1A06	BIT	IO_X1	0x3006	0x02	E-stop
0x1A06	BIT	IO_X2	0x3006	0x03	Lower limit
0x1A06	BIT	IO_X3	0x3006	0x04	Reserved input
0x1A06	BIT	IO_X4	0x3006	0x05	Reserved input
0x1A06	BIT	IO_Y0	0x3006	0x06	Reserved output
0x1A06	BIT	IO_Y1	0x3006	0x07	Reserved output
0x1A06	BIT	IO_Y2	0x3006	0x08	Reserved output
0x1A06	BIT	IO_Y3	0x3006	0x09	Reserved output
0x1A06	BIT	IO_BK	0x3006	0x0A	Brake
0x1A07	U16	Servo_AVO	0x3007	0x01	Servo analog output
0x1A07	BIT	Servo_ALM	0x3007	0x02	Servo alarm

INDEX NO.	DATA TYPE	OBJECT NAME	PDO INDEX NO.	OBJECT SUB-INDEX NO.	DESCRIPTION
0x1A07	BIT	Servo_RstALM	0x3007	0x03	Servo alarm clear
0x1A07	BIT	Servo_SON	0x3007	0x04	Servo enable
0x1A07	BIT	Servo_OS	0x3007	0x05	Servo zero speed clamp

Note: Current status description

VALUE	DESCRIPTION
0x00	In static
0x01	Following
0x02	Return to berth
0x03	Return to origin
0x04	Servo calibrating
0x05	Capacitance calibrating
0x06	Piercing
0x07	Piercing positioning
0x08	Positioning
0x09	Not ready
0x0A	Test mode
0xFF	Invalid value

Note: Operation status description

VALUE	DESCRIPTION
0x00	Operation normal
0x01	Data illegal or exceed limit
0x02	Current have alarm
0x03	Not returned to origin
0x04	Current status busy

VALUE	DESCRIPTION
0x05	Save FLASH failed

Service Data (Service Data)

Parameter Type Data

INDEX NO.	DATA TYPE	OBJECT NAME	OBJECT SUB-INDEX NO.	ATTRIBUTE	REMARK	DESCRIPTION
0x2100	BIT	Save	0x01	R/W	Save parameter	
0x2100	BIT	Restore	0x02	R/W	Restore default parameter	
0x2100	BIT	Clear_Dift	0x03	R/W	Clear zero-drift	
0x2100	BIT	SetZero	0x04	R/W	Set machine origin	Set the current position as the machine origin
0x2101	U8	Material	0x01	R/W	Follow object	0: Metal 1: Non-metal
0x2101	U16	Calib.Length	0x02	R/W	Calibration length	Unit: um
0x2101	U8	OneKey_Calib.	0x03	R/W	One-key calibration enable	0: Disable 1: Enable
0x2102	U32	MidPointA	0x01	R/W	Midpoint A coordinate	Unit: um
0x2102	U32	MidPointB	0x02	R/W	Midpoint B coordinate	Unit: um
0x2102	U32	BerthCoord.	0x03	R/W	Berth point coordinate	Unit: um
0x2102	U32	Z-Range	0x04	R/W	Axis travel	Unit: um
0x2102	U8	RAngleCOMP	0x05	R/W	R angle compensation function enable	
0x2102	U8	FollowMode	0x06	R/W	Follow method	0: Directly follow 1: First level pierce 2: Second level pierce 3: Third level pierce
0x2102	U16	One-StagePierceHeight	0x07	R/W	First level pierce height	Unit: um
0x2102	U16	One-StagePierceDelay	0x08	R/W	First level pierce delay	Unit: ms

INDEX NO.	DATA TYPE	OBJECT NAME	OBJECT SUB-INDEX NO.	ATTRIBUTE	REMARK	DESCRIPTION
0x2102	U16	Two-StagePierceHeight	0x09	R/W	Second level pierce height	Unit: um
0x2102	U16	Two-StagePierceDelay	0x0A	R/W	Second level pierce delay	Unit: ms
0x2102	U16	Three-StagePierceHeight	0x0B	R/W	Third level pierce height	Unit: um
0x2102	U16	Three-StagePierceDelay	0x0C	R/W	Third level pierce delay	Unit: ms
0x2102	U8	EdgeDetectionFollowKp	0x0D	R/W	Edge finding gain	
0x2102	U16	CapSaltusTolerance	0x0E	R/W	Edge finding detection threshold	Unit: um
0x2102	U8	CapSaltusFilter	0x0F	R/W	Edge finding filter time	Unit: ms
0x2102	U16	CapSaltusDelay	0x10	R/W	Edge finding output delay	Unit: ms
0x2103	U16	FollowSpeed	0x01	R/W	Follow speed	Unit: mm/min
0x2103	U16	FollowAcc.	0x02	R/W	Follow acceleration	Unit: mm/s^2
0x2103	U16	PositionSpeed	0x03	R/W	Positioning speed	Unit: mm/min
0x2104	U8	HomeAfterPower	0x01	R/W	Whether to zero return when power on	0: No 1: Yes
0x2104	U8	BerthAfterHome	0x02	R/W	Return to berth after zero return	0: No 1: Yes
0x2104	U16	HomingSpeed	0x03	R/W	Zero return speed	Unit: mm/min
0x2104	U16	BackDistance	0x04	R/W	Retract distance	Unit: um
0x2105	U16	HighSpeed	0x01	R/W	Manual movement high-speed	Unit: mm/min
0x2105	U16	LowSpeed	0x02	R/W	Manual movement low-speed	Unit: mm/min
0x2105	U8	SoftwareLimit	0x03	R/W	Soft limit protection	0: Disable 1: Enable
0x2106	U16	ScrewPitch	0x01	R/W	Screw pitch	Unit: um
0x2106	U16	MaxSpeed	0x02	R/W	Speed upper limit	Unit: r/min

INDEX NO.	DATA TYPE	OBJECT NAME	OBJECT SUB-INDEX NO.	ATTRIBUTE	REMARK	DESCRIPTION
0x2106	U16	S-VGain	0x03	R/W	Speed gain	Unit: r/min/V
0x2106	U16	PulsePreRev.	0x04	R/W	Pulse number per revolution	Unit: pulse/r
0x2106	U8	ServoDir	0x05	R/W	Servo direction	0: Forward 1: Reverse
0x2106	U8	EncoderDir	0x06	R/W	Encoder direction	0: Forward 1: Reverse
0x2106	U16	BrakeoffDelay	0x07	R/W	Brake release delay	Unit: ms
0x2106	U8	ServoType	0x08	R/W	Servo type classification	0: Matsushita/Mitsubishi 1: Yaskawa/Delta 2: TECO
0x2106	U8	X0_Logic	0x09	R/W	Input port 0 software logic	0: NC 1: NO
0x2106	U8	X1_Logic	0x0A	R/W	Input port 1 software logic	0: NC 1: NO
0x2106	U8	X2_Logic	0x0B	R/W	Input port 2 software logic	0: NC 1: NO
0x2106	U8	X3_Logic	0x0C	R/W	Input port 3 software logic	0: NC 1: NO
0x2106	U8	X4_Logic	0x0D	R/W	Input port 4 software logic	0: NC 1: NO
0x2107	U16	InPositionTolerance	0x01	R/W	In position tolerance	Unit: um
0x2107	U16	JogTouchDelay	0x02	R/W	Positioning touch part delay	Unit: ms
0x2107	U16	FollowTouchDelay	0x03	R/W	Follow-up touch part delay	Unit: ms
0x2107	U16	PierceTouchDelay	0x04	R/W	Pierce touch part delay	Unit: ms
0x2107	U16	BodyCapTolerance	0x05	R/W	Body capacitance tolerance	
0x2107	U16	CapFlucValue	0x06	R/W	Capacitance fluctuation check threshold	
0x2107	U8	BerthwhenTouch	0x07	R/W	Touch part forced lift	0: Disable 1: Enable

INDEX NO.	DATA TYPE	OBJECT NAME	OBJECT SUB-INDEX NO.	ATTRIBUTE	REMARK	DESCRIPTION
0x2107	U8	Miss-PartDetect	0x08	R/W	Miss-part alarm switch	0: Disable 1: Enable
0x2107	U16	Miss-PartValue	0x09	R/W	Miss-part detection tolerance	Unit: um
0x2108	U32	SafetyHeight	0x01	R/W	Lift safety height	Unit: um
0x2108	U8	NoiseSuppression	0x02	R/W	Vibration suppression level	
0x2108	U8	JogKp	0x03	R/W	Positioning gain Kp	
0x2108	U8	FollowKp	0x04	R/W	Follow-up sensitivity	
0x2108	U8	FollowKd	0x05	R/W	Follow-up gain Kd	
0x2108	U8	FollowKi	0x06	R/W	Follow-up feedforward amount	
0x2108	U16	MaxDirectlyFollowHeight	0x07	R/W	Directly follow maximum height	Unit: um
0x2109	U8	ApplicationScene	0x01	R/W	Application scene	0: Plane 1: 3D
0x210A	U8	CapCompensationMode	0x01	R/W	Capacitance correction	0: Disable 1: Auto 2: IO
0x210A	U16	ExBodyCapErr	0x02	R/W	Body capacitance extra tolerance	
0x210A	U16	Calib.HighSpeed	0x03	R/W	Calibrated high-speed	Unit: mm/min
0x210A	U16	Calib.LowSpeed	0x04	R/W	Calibrated low-speed	Unit: mm/min
0x210A	U8	IOFliterTime	0x05	R/W	IO filter time	Unit: ms
0x210A	U8	FollowFilterTime	0x06	R/W	Follow-up filter time	Unit: ms
0x210B	U8	VT_Enable	0x01	R/W	Controller enable switch	0: Turn off enable 1: Enable

Status Type Service Data

INDEX NO.	DATA TYPE	OBJECT NAME	OBJECT SUB-INDEX NO.	ATTRIBUTE	REMARK	DESCRIPTION
0x2200	U8	SampleResultCode	0x01	RO	Capacitance calibration result code	

INDEX NO.	DATA TYPE	OBJECT NAME	OBJECT SUB-INDEX NO.	ATTRIBUTE	REMARK	DESCRIPTION
0x2200	U16	SampleValidValue	0x02	RO	Calibration data valid value	
0x2200	U8	Smooth	0x03	RO	Calibration smoothness	0: Excellent 1: Good 2: Medium 3: Poor
0x2200	U8	Stability	0x04	RO	Calibration stability	0: Excellent 1: Good 2: Medium 3: Poor
0x2200	U32	TouchCap	0x05	RO	Touch part capacitance value	
0x2200	U32	BodyCap	0x06	RO	Body capacitance value	
0x2200	U8	ServoResultCode	0x07	RO	Servo calibration result code	
0x2200	S8	DriftVoltage	0x08	RO	Servo calibration result	

Note: Capacitance calibration result code description:

VALUE	DESCRIPTION
0x00	Capacitance calibration has not effective start
0x01	Normal calibration successful
0x02	Capacitance change value too small
0x03	Data entry too small
0x04	The collected data is lost by more than 3mm
0x05	The first 5mm capacitance trend is wrong
0x06	The capacitance range is very small during the calibration process
0x07	Servo alarm
0x08	Encoder direction mismatch
0x09	Limit alarm
0x0A	Calibration process manually interrupted
0x0B	Failed to save data

Note: Servo calibration result code description:

VALUE	DESCRIPTION
0x00	Servo calibration has not effective start
0x01	Normal calibration successful
0x03	The motor speed is greater than the zero-drift maximum speed 100r/min
0x04	Calibration time exceeds 4s, failure
0x07	Servo alarm
0x08	Encoder direction mismatch
0x09	Limit alarm
0x0A	Calibration process manually interrupt
0x0B	Store data failed

Manufacturer Service Data

Write Adapter Information Registration

INDEX NO.	DATA TYPE	OBJECT NAME	OBJECT SUB-INDEX NO.	ATTRIBUTE	REMARK	DESCRIPTION
0x2300	U8	ReadDeviceCode	0x01	R/W	Read device code and dynamic code	
0x2300	U32	DeviceCodeChar1	0x02	RO	Device code	
0x2300	U32	DeviceCodeChar2	0x03	RO	Device code	
0x2300	U32	DeviceCodeChar3H	0x04	RO	Device code	
0x2300	U32	DeviceCodeChar3L	0x05	RO	Device code	
0x2300	U32	DeviceCodeChar4	0x06	RO	Device code	
0x2300	U32	DeviceCodeChar5	0x07	RO	Device code	
0x2300	U32	DynamicCodeH	0x08	RO	Dynamic code	
0x2300	U32	DynamicCodeL	0x09	RO	Dynamic code	
0x2300	U32	RegisterCode1	0x0A	R/W	Registration code	23 characters are split into 4B is one segment, total of six segments, and then expressed in ASCII

INDEX NO.	DATA TYPE	OBJECT NAME	OBJECT SUB-INDEX NO.	ATTRIBUTE	REMARK	DESCRIPTION
0x2300	U32	RegisterCode2	0x0B	R/W	Registration code	
0x2300	U32	RegisterCode3	0x0C	R/W	Registration code	
0x2300	U32	RegisterCode4	0x0D	R/W	Registration code	
0x2300	U32	RegisterCode5	0x0E	R/W	Registration code	
0x2300	U32	RegisterCode6	0x0F	R/W	Registration code	
0x2300	U8	Register	0x10	R/W	Registration	
0x2300	U16	RegisterRemainTime	0x11	RO	Remaining usage time (hours)	0x0001-0xFFFE: Remaining time1~65534 0xFFFF: Infinite 0x0000: Registration expired

Device Testing

INDEX NO.	DATA TYPE	OBJECT NAME	OBJECT SUB-INDEX NO.	ATTRIBUTE	REMARK	DESCRIPTION
0x2400	S16	Test_AVO	0x01	R/W	Servo analog output test	
0x2400	BIT	Test_Y0	0x02	R/W	Y0 output test	
0x2400	BIT	Test_Y1	0x03	R/W	Y1 output test	
0x2400	BIT	Test_Y2	0x04	R/W	Y2 output test	
0x2400	BIT	Test_Y3	0x05	R/W	Y3 output test	
0x2400	BIT	Test_BK	0x06	R/W	Brake output test	
0x2400	BIT	Test_RstALM	0x07	R/W	Servo alarm clear output test	
0x2400	BIT	Test_SON	0x08	R/W	Servo enable output test	
0x2400	BIT	Test_OS	0x09	R/W	Servo clamp output test	

Instruction for Selecting Different Drives

This chapter lists the wiring instructions and parameter setting instructions for selecting different types of drives. It only ensures the normal movement of the machine tool, but does not ensure the machining effect. Users can adjust related parameters according to actual conditions.

When connecting the servo drive, you need to pay attention to the following matters:

- Make sure the selected servo drive supports speed mode. For example, the Panasonic A5/6 series servo must be a full-function type, and the pulse type cannot be used.
- Make sure that the input and output of the selected servo drive interface are active at low level.
- Make sure that the selected servo motor has a brake, strictly follow the wiring method in the servo manual and set the parameters related to the brake.
- Make sure that the shield layer of the control signal line is connected to the servo drive shell, and ensure that the servo drive is well grounded.

Wise Servo

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 1: Yaskawa, Delta, and Wise series servo.

Wise WSDA Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	23	PAO	Twisted pair
A-	2	8	/PAO	Twisted pair
B+	3	9	/PBO	Twisted pair
B-	4	24	/PBO	Twisted pair
Z+	5	38	PCO	Twisted pair
Z-	7	37	/PCO	Twisted pair
Analog Control Signal				
DA	12	21	V-REF	Twisted pair
AGND	11	6	SG	Twisted pair
IO Status Signal				
VCC_24V	6	28	+24V	-
COM	15	5&19	SG&/ALM-	-
ALM	8	4	ALM+	-
SON	9	42	SRV-ON	-
CLR	10	44	SI1	-
OS	13	29	ZEROSPD	-
SPDIR	14	-		-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Wise WSDA Series Servo Parameter Setting Instruction: | Parameter Type | Recommended Value | Meaning | | ---------- | ---------- | ---------- | | Pr001 | 2 | Set to speed control mode. | | Pr011 | 2500 | The output pulse number of the motor per revolution corresponds to the pulse parameter per revolution of VT320E, which is 10000. | | Pr300 | 0 | Set V-REF as analog speed command input. | | Pr302 | 300 | Speed command input gain, corresponding to the speed gain of VT320E 300r/min/V. | | Pr315 | 2 | Turn on the zero-speed clamp function. | | Pr316 | 20000 | Set the zero-speed clamp value to maximum. | | Pr400 | 00--04--h （1024） | SI1 is set to ARST clear alarm function, and the logic is normally open (NO). | | Pr405 | 00--11--h （1118472） | SI6 is set to ZCLAMP zero-speed clamp, and the logic is normally open (NO). | | Pr406 | 00--03--h （197379） | SI7 is set to SON servo enable, and the logic is normally open (NO). | | Pr410 | 00--01--h （65793） | S03 is set to

the ALRM servo alarm function, and the logic is normally closed (NC). | | Pr639 | 0 | When using SI1, this parameter needs to be set to 0. | ## Panasonic Servo In the **Mechanical Parameter** of VT320E, select **Servo Type** as 0: Panasonic and Mitsubishi series servo. **Panasonic MINAS A5/A6 Servo Wiring Table:**

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	21	OA+	Twisted pair
A-	2	22	OA-	Twisted pair
B+	3	48	OB+	Twisted pair
B-	4	49	OB-	Twisted pair
Z+	5	23	OZ+	Twisted pair
Z-	7	24	OZ-	Twisted pair
Analog Control Signal				
DA	12	14	SPR/TRQR	Twisted pair
AGND	11	15	GND	Twisted pair
IO Status Signal				
VCC_24V	6	7	COM+	-
COM	15	36&41	ALM-/COM-	-
ALM	8	37	ALM+	-
SON	9	29	SRV-ON	-
CLR	10	31	A-CLR	-
OS	13	26	ZEROSPD	-
SPDIR	14	-	-	-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Panasonic MINAS A5/A6 Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
Pr0.01	1	Control mode must be set to speed mode.

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
Pr0.11	2500	The output pulse number of the motor per revolution corresponds to the pulse parameter per revolution of VT320E, which is 10000.
Pr3.02	300	Speed command input gain, corresponding to the speed gain of VT320E 300r/min/V.
Pr3.15	2	Turn on the zero-speed clamp function.
Pr3.16	20000	Zero-speed clamp level.
Pr4.02	00--91—h（9539850）	Set "SI3" to ZEROSPD, and the logic is normally closed (NC).
Pr4.05	00--03—h（197379）	Set "SI6" to SRV-ON, and the logic is normally open (NO).
Pr4.07	00--04—h（263172）	Set "SI8" to A-CLR, and the logic is normally open (NO).
Pr4.12	00--01—h（65793）	Set "SO3" to ALM, and the logic is normally closed (NC).

Yaskawa Servo

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 1: Yaskawa, Delta, and Wise series servo.

Yaskawa Σ Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	33	PAO	Twisted pair
A-	2	34	/PAO	Twisted pair
B+	3	35	PBO	Twisted pair
B-	4	36	/PBO	Twisted pair
Z+	5	19	PCO	Twisted pair
Z-	7	20	/PCO	Twisted pair
Analog Control Signal				
DA	12	5	V-REF	Twisted pair
AGND	11	6	SG	Twisted pair

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
IO Status Signal				
VCC_24V	6	47	+24 VIN	-
COM	15	1&32	SG/ALM-	-
ALM	8	31	ALM+	-
SON	9	40	/S-ON	-
CLR	10	44	/ALM-RST	-
OS	13	41	/ZCLAMP	-
SPDIR	14	-	-	-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Yaskawa Σ-7S Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
Pn000	n.□□A□	Speed control with zero-position fixation function.
Pn212	2500	The output pulse number of the motor per revolution corresponds to the pulse parameter per revolution of VT320E, which is 10000.
Pn300	10.00	The unit is 0.01V, setting 10.00V corresponds to the servo motor rated speed. If the servo motor rated speed is 3000r/min, the corresponding speed gain of VT320E is 300r/min/V.
Pn501	10000	Zero-position fixation value, sets the effective speed of zero-position fixation function.
Pn50A	n.□□□0	Use the input signal terminals with factory-set assignments. ZCLAMP logic is normally open (NO) /S-ON logic is normally open (NO) /ALM-RST logic is normally open (NO) ALM logic is normally closed (NC)

Delta A Series Servo

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 1: Yaskawa, Delta, and Wise series servo.

Delta ASDA-A Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
A+	1	21	OA	Twisted pair
A-	2	22	/OA	Twisted pair
B+	3	25	OB	Twisted pair
B-	4	23	/OB	Twisted pair
Z+	5	50	OZ	Twisted pair
Z-	7	24	/OZ	Twisted pair
Analog Control Signal				
DA	12	42	V-REF	Twisted pair
AGND	11	44	GND	Twisted pair
IO Status Signal				
VCC_24V	6	11	COM+	-
COM	15	27&45	DO5-/COM-	-
ALM	8	28	DO5+/ALM	-
SON	9	9	DI1/SON	-
CLR	10	33	DI5/ARST	-
OS	13	10	DI2/ZCLAMP	-
SPDIR	14	-	-	-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Delta ASDA-A Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P1-01	0002	The control mode must be set to speed control mode.
P1-38	200	Set the zero-speed clamp value to maximum.
P1-40	3000	The corresponding speed gain of VT320E is 300r/min/V.

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P1-46	12500	The output pulse number of the motor per revolution corresponds to the pulse parameter per revolution of VT320E, which is 10000.
P2-10	101	DI1 is set to SON servo enable, and the logic is normally open (NO).
P2-11	105	DI2 is set to ZCLAMP zero-speed clamp, and the logic is normally open (NO).
P2-12	114	Set the speed command to external analog control.
P2-13	115	Set the speed command to external analog control.
P2-14	102	DI5 is set to ARST clear alarm function, and the logic is normally open (NO).
P2-22	007	DO5 is set to ALRM servo alarm function, and the logic is normally closed (NC).

Delta A2 Series Servo

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 1: Yaskawa, Delta, and Wise series servo.

Delta ASDA-A2 Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	21	OA	Twisted pair
A-	2	22	/OA	Twisted pair
B+	3	25	OB	Twisted pair
B-	4	23	/OB	Twisted pair
Z+	5	50	OZ	Twisted pair
Z-	7	24	/OZ	Twisted pair
Analog Control Signal				
DA	12	42	V-REF	Twisted pair
AGND	11	44	GND	Twisted pair
IO Status Signal				
VCC_24V	6	11	COM+	-
COM	15	27&45	DO5-/COM-	-

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
ALM	8	28	DO5+/ALM	-
SON	9	9	DI1-/SON	-
CLR	10	33	DI5-/ARST	-
OS	13	10	DI2-/ZCLAMP	-
SPDIR	14	-	-	-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Delta ASDA-A2 Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P1-01	0002	The control mode must be set to speed control mode.
P1-38	200	Set the zero-speed clamp value to maximum.
P1-40	3000	The corresponding speed gain of VT320E is 300r/min/V.
P1-46	2500	The output pulse number of the motor per revolution corresponds to the pulse parameter per revolution of VT320E, which is 10000.
P2-10	101	DI1 is set to SON servo enable, and the logic is normally open (NO).
P2-11	105	DI2 is set to ZCLAMP zero-speed clamp, and the logic is normally open (NO).
P2-12	114	Set the speed command to external analog control.
P2-13	115	Set the speed command to external analog control.
P2-14	102	DI5 is set to ARST clear alarm function, and the logic is normally open (NO).
P2-22	007	DO5 is set to ALRM servo alarm function, and the logic is normally closed (NC).

Delta B2 Series Servo

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 1: Yaskawa, Delta, and Wise series servo.

Delta ASDA-B2 Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
A+	1	21	OA	Twisted pair
A-	2	22	/OA	Twisted pair
B+	3	25	OB	Twisted pair
B-	4	23	/OB	Twisted pair
Z+	5	13	OZ	Twisted pair
Z-	7	24	/OZ	Twisted pair
Analog Control Signal				
DA	12	20	V-REF	Twisted pair
AGND	11	19	GND	Twisted pair
IO Status Signal				
VCC_24V	6	11	COM+	-
COM	15	14&27	DO5-/COM-	-
ALM	8	28	DO5+ ALM	-
SON	9	9	DI1 SON	-
CLR	10	33	DI5 ARST	-
OS	13	10	DI2 ZCLAMP	-
SPDIR	14	-	-	-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Delta ASDA-B2 Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P1-01	0002	The control mode must be set to speed control mode.
P1-38	200	Set the zero-speed clamp value to maximum.
P1-40	3000	The corresponding speed gain of VT320E is 300r/min/V.

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P1-46	2500	The output pulse number of the motor per revolution corresponds to the pulse parameter per revolution of VT320E, which is 10000.
P2-10	101	DI1 is set to SON servo enable, and the logic is normally open (NO).
P2-11	105	DI2 is set to ZCLAMP zero-speed clamp, and the logic is normally open (NO).
P2-12	114	Set the speed command to external analog control.
P2-13	115	Set the speed command to external analog control.
P2-14	102	DI5 is set to ARST clear alarm function, and the logic is normally open (NO).
P2-22	007	DO5 is set to ALRM servo alarm function, and the logic is normally closed (NC).

Delta B3 Series Servo (M, F, E Models)

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 1: Yaskawa, Delta, and Wise series servo.

Delta ASDA-B3 Series Servo (M, F, E Models) Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	1	OA	Twisted pair
A-	2	2	/OA	Twisted pair
B+	3	11	OB	Twisted pair
B-	4	12	/OB	Twisted pair
Z+	5	3	OZ	Twisted pair
Z-	7	4	/OZ	Twisted pair
Analog Control Signal				
DA	12	19	V-REF	Twisted pair
AGND	11	10	GND	Twisted pair
IO Status Signal				
VCC_24V	6	5	COM+	-
COM	15	10&18	GND/DO2-	-

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
ALM	8	17	DO2+ ALRM	-
SON	9	6	DI1 SON	-
CLR	10	8	DI3 ARST	-
OS	13	7	DI2 ZCLAMP	-
SPDIR	14	-	-	-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Delta ASDA-B3 Series Servo (M, F, E Models) Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P1.001	0002	The control mode must be set to speed control mode.
P1.038	200	Set the zero-speed clamp value to maximum.
P1.040	3000	The corresponding speed gain of VT320E is 300r/min/V.
P1.046	2500	The output pulse number of the motor per revolution corresponds to the pulse parameter per revolution of VT320E, which is 10000.
P2.010	101	DI1 is set to SON servo enable, and the logic is normally open (NO).
P2.011	105	DI2 is set to ZCLAMP zero-speed clamp, and the logic is normally open (NO).
P2.012	102	DI3 is set to ARST clear alarm function, and the logic is normally open (NO).
P2.019	007	DO2 is set to ALRM servo alarm function, and the logic is normally closed (NC).

Delta E3 Series Servo

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 1: Yaskawa, Delta, and Wise series servo.

Delta ASDA-E3 Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	21	OA	Twisted pair
A-	2	22	/OA	Twisted pair

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
B+	3	25	OB	Twisted pair
B-	4	23	/OB	Twisted pair
Z+	5	13	OZ	Twisted pair
Z-	7	24	/OZ	Twisted pair
Analog Control Signal				
DA	12	20	V-REF	Twisted pair
AGND	11	19	GND	Twisted pair
IO Status Signal				
VCC_24V	6	11	COM+	-
COM	15	19&27&29&40	DO5-/GND	-
ALM	8	28	DO5+ ALM	-
SON	9	9	DI1 SON	-
CLR	10	33	DI5 ARST	-
OS	13	10	DI2 ZCLAMP	-
SPDIR	14	-	-	-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Delta E3 Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P1-001	0002	The control mode must be set to speed control mode.
P1-038	200	Set the zero-speed clamp value to maximum.
P1-040	3000	The corresponding speed gain of VT320E is 300r/min/V.
P1-046	2500	The output pulse number of the motor per revolution corresponds to the pulse parameter per revolution of VT320E, which is 10000.
P2-010	101	DI1 is set to SON servo enable, and the logic is normally open (NO).

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P2-011	105	DI2 is set to ZCLAMP zero-speed clamp, and the logic is normally open (NO).
P2-012	114	Set the speed command to external analog control.
P2-013	115	Set the speed command to external analog control.
P2-014	102	DI5 is set to ARST clear alarm function, and the logic is normally open (NO).
P2-022	007	DO5 is set to ALRM servo alarm function, and the logic is normally closed (NC).

Mitsubishi Servo

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 0: Panasonic, Mitsubishi series servo.

Mitsubishi MR-JE-_A Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	4	LA	Twisted pair
A-	2	5	LAR	Twisted pair
B+	3	6	LB	Twisted pair
B-	4	7	LBR	Twisted pair
Z+	5	8	LZ	Twisted pair
Z-	7	9	LZR	Twisted pair
Analog Control Signal				
DA	12	2	VC	Twisted pair
AGND	11	28	LG	Twisted pair
IO Status Signal				
VCC_24V	6	20	DICOM	-
COM	15	46&42	DOCOM&EM2	-
ALM	8	48	ALM	-
SON	9	15	SON	-

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
CLR	10	19	RES	-
OS	13	-	-	-
SPDIR	14	-	-	-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Mitsubishi MR-JE-_A Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
PA01	2	Control mode - speed mode.
PA15	10000	The encoder pulse number per revolution × 4 corresponds to the pulse parameter per revolution of VT320E 10000.
PC12	3000	Input speed under maximum analog speed command (10V), the corresponding speed gain of VT320E is 300r/min/V.
PC17	0	The 0 speed function is not used (the zero-speed clamp function is implemented through the ST2 port).
PD03	02_ _	Set the CN1-15 pin to SON and the logic to normally open (NO).
PD11	03_ _	Set the CN1-19 pin to RES and the logic to normally open (NO).
PD34	*_1*	ALM logic is normally closed (NC).

Schneider Servo

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 0: Panasonic, Mitsubishi series servo.

Schneider Lexium 23D Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	21	OA	Twisted pair
A-	2	22	/OA	Twisted pair
B+	3	25	OB	Twisted pair
B-	4	23	/OB	Twisted pair

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Z+	5	50	OC	Twisted pair
Z-	7	24	/OC	Twisted pair
Analog Control Signal				
DA	12	42	V-REF	Twisted pair
AGND	11	44	GND	Twisted pair
IO Status Signal				
VCC_24V	6	11	COM+	-
COM	15	27&45	D05-/COM-	-
ALM	8	28	D05+	-
SON	9	9	SON	-
CLR	10	33	ARST	-
OS	13	34	DI3	-
SPDIR	14	-	-	-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Schneider Lexium23D Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P1-01	2	Change to speed mode.
P1-38	2000	That is 200.0RPM, set the zero comparison value.
P1-40	3000	Analog speed command input maximum voltage (10V) rotation speed, the corresponding speed gain of VT320E is 300r/min/V.
P1-46	2500	The corresponding to the pulse parameter per revolution of VT320E 10000.
P2-10	101	The IN1 of the servo is changed to the SON function, and the logic is normally open (NO).
P2-11	0	IN2 is not used.
P2-12	5	The IN3 of the servo is changed to a zero-speed clamp OS signal, and the logic is normally closed (NC).

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P2-13～P2-17	0	IN4~IN8 are not used.
P2-14	102	DI5 of the servo is the ARST signal, and the logic is normally open (NO).
P2-22	7	DO5 ALM, logic is normally closed (NC).

Fuji Servo ALPHA5 Smart Plus

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 1: Yaskawa, Delta, and Wise series servo.

Fuji ALPHA 5 Smart Plus Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	27	FFA	Twisted pair
A-	2	26	* FFA	Twisted pair
B+	3	29	FFB	Twisted pair
B-	4	28	* FFB	Twisted pair
Z+	5	11	FFZ	Twisted pair
Z-	7	10	* FFZ	Twisted pair
Analog Control Signal				
DA	12	30	VREF	Twisted pair
AGND	11	32	M5	Twisted pair
IO Status Signal				
VCC_24V	6	1	COMIN	-
COM	15	19	COMOUT	-
ALM	8	20	OUT1	-
SON	9	2	CONT1	-
CLR	10	3	CONT2	-
OS	13	4	CONT3	-

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
SPDIR	14	-	-	-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Fuji ALPHA 5 Smart Plus Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
PA1_01	1	Speed control mode.
PA1_08	2500	Encoder feedback pulse, the corresponding to the pulse parameter per revolution of VT320E 10000.
PA1_25	3000	Maximum speed ,the corresponding speed gain of VT320E is 300r/min/V.
PA3_01	1	The CONT1 signal is assigned "Servo ON", and the logic is normally open (NO).
PA3_02	11	The CONT2 signal is assigned "Alarm Reset", and the logic is normally open (NO).
PA3_03	10	The CONT3 signal is assigned "Forced Sop".
PA3_28	10	Set CONT3 to always valid, and the logic is normally closed (NC).
PA3_31	10	Corresponds to the speed gain on VT320E (10.00V corresponds to servo motor rated speed), such as servo motor rated speed is 3000r/min, the corresponding speed gain of VT320E is 300r/min/V.
PA3_51	16	The OUT1 signal is assigned "Alarm Detection", and the logic is normally closed (NC).

Fuji Servo ALPHA5 Smart

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 0: Panasonic, Mitsubishi series servo.

Fuji ALPHA 5 Smart Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	9	FFA	Twisted pair
A-	2	10	* FFA	Twisted pair
B+	3	11	FFB	Twisted pair
B-	4	12	* FFB	Twisted pair
Z+	5	23	FFZ	Twisted pair

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Z-	7	24	* FFZ	Twisted pair
Analog Control Signal				
DA	12	22	VREF	Twisted pair
AGND	11	13	M5	Twisted pair
IO Status Signal				
VCC_24V	6	1	COMIN	-
COM	15	14	COMOUT	-
ALM	8	15	OUT1	-
SON	9	2	CONT1	-
CLR	10	3	CONT2	-
OS	13	4	CONT3	-
SPDIR	14	-	-	-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Fuji ALPHA 5 Smart Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
PA1_01	1	Speed control mode.
PA1_08	2500	Encoder feedback pulse, the corresponding to the pulse parameter per revolution of VT320E 10000.
PA1_25	3000	Maximum speed, the corresponding speed gain of VT320E is 300r/min/V.
PA3_01	1	The CONT1 signal is assigned "Servo ON", and the logic is normally open (NO).
PA3_02	11	The CONT2 signal is assigned "Alarm Reset" and the logic is normally open (NO).
PA3_03	10	The CONT3 signal is assigned "Forced Stop".
PA3_28	10	Set CONT3 to always valid, and the logic is normally closed (NC).
PA3_31	10	Corresponds to the speed gain on VT320E (10.00V corresponds to servo motor rated speed), such as servo motor rated speed is 3000r/min, the corresponding speed gain of VT320E is 300r/min/V.

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
PA3_51	16	The OUT1 signal is assigned "Alarm Detection", and the logic is normally closed (NC).

Hechuan X3E Series Servo

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 1: Yaskawa, Delta, and Wise series servo.

Hechuan X3E Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	36	OUT_A	Twisted pair
A-	2	37	/OUT_A	Twisted pair
B+	3	38	OUT_B	Twisted pair
B-	4	39	/OUT_B	Twisted pair
Z+	5	40	OUT_Z	Twisted pair
Z-	7	41	/OUT_Z	Twisted pair
Analog Control Signal				
DA	12	32	A_SPEED	Twisted pair
AGND	11	33	A_GND	Twisted pair
IO Status Signal				
VCC_24V	6	3	COM +	-
COM	15	12&22	COM-&S_ERR-	-
ALM	8	21	S_ERR+	-
SON	9	4	S_ON	-
CLR	10	5	ERR_RST	-
OS	13	11	DI8	-
SPDIR	14	--	-	-
PE Signal				

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
PE	Shield layer	Shield layer	Shield	-

Hechuan X3E Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P00.01	1	Speed mode.
P00.14	2500	The corresponding to the pulse parameter per revolution of VT320E 10000.
P03.00	1	Select the speed control source as AI1.
P03.19	2	Zero-speed clamp enabled.
P03.20	1000	Set the zero-speed clamp level to 1000rpm.
P04.01	1	Set DI1 to S_ON.
P04.02	2	Set DI2 to ERR_RST.
P04.08	12	Set DI8 to zero-speed clamp function.
P04.11	0	DI1 terminal logic is normally open (NO).
P04.12	0	DI2 terminal logic is normally open (NO).
P04.18	0	DI8 terminal logic is normally open (NO).
P04.28	2	Set DO8 to S_ERR+.
P04.38	1	DO8 terminal logic is normally closed (NC) and does not conduct when valid.
P05.14	3000	The corresponding speed gain of VT320E is 300r/min/V.
P05.16	0	Speed command mode.

Inovance IS620P Series Servo

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 1: Yaskawa, Delta, and Wise series servo.

Inovance IS620P Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	21	PAO+	Twisted pair

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
A-	2	22	PAO-	Twisted pair
B+	3	25	PBO+	Twisted pair
B-	4	23	PBO-	Twisted pair
Z+	5	13	PZO+	Twisted pair
Z-	7	24	PZO-	Twisted pair
Analog Control Signal				
DA	12	20	AI1	Twisted pair
AGND	11	19	GND	Twisted pair
IO Status Signal				
VCC_24V	6	11	COM+	-
COM	15	14&26&29	COM- / DO4-/GND	-
ALM	8	1	DO4+	-
SON	9	33	DI5	-
CLR	10	8	DI4	-
OS	13	32	DI6	-
SPDIR	14	-	-	-
IO Status Signal				
PE	Shield layer	Shield layer	Shield	-

Inovance IS620P Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
H02-00	0	Control mode selects speed mode.
H03-08	2	Set the function of DI4 to ALM-RST (fault and warning reset).
H03-09	0	DI4 terminal logic is normally open (NO).
H03-10	1	Set the function of DI5 to S-ON (servo enable).
H03-11	0	DI5 terminal logic is normally open (NO).

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
H03-12	12	Set the function of DI6 to ZCLAMP (zero-position fixation enable).
H03-13	0	DI6 terminal logic is normally open (NO).
H03-80	3000	The corresponding speed gain of VT320E is 300r/min/V.
H04-06	11	Set the function of DO4 to ALM (fault).
H04-07	1	DO4 terminal logic is normally closed (NC), and outputs H high level when valid.
H05-17	2500	The corresponding to the pulse parameter per revolution of VT320E 10000.
H06-00	1	Select the speed control source as AI1.
H06-02	0	Select the speed command source as the main speed command A source.
H06-15	6000	Set the zero speed fixed speed threshold to 6000rpm.

Inovance SV610P Series Servo

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 1: Yaskawa, Delta, and Wise series servo.

Inovance SV610 Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	21	PAO+	Twisted pair
A-	2	22	PAO-	Twisted pair
B+	3	25	PBO+	Twisted pair
B-	4	23	PBO-	Twisted pair
Z+	5	13	PZO+	Twisted pair
Z-	7	24	PZO-	Twisted pair
Analog Control Signal				
DA	12	20	AI1	Twisted pair
AGND	11	19	GND	Twisted pair
IO Status Signal				
VCC_24V	6	11	COM+	-

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
COM	15	14&26&29	COM- / DO4-/GND	-
ALM	8	1	DO4+	-
SON	9	33	DI5	-
CLR	10	8	DI4	-
OS	13	12	DI9	-
SPDIR	14	--	--	-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Inovance SV610P Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
H02-00	0	Control mode selects speed mode.
H03-08	2	Set the function of DI4 to ALM-RST (fault and warning reset).
H03-09	0	DI4 terminal logic is normally open (NO).
H03-10	1	Set the function of DI5 to S-ON (servo enable).
H03-11	0	DI5 terminal logic is normally open (NO).
H03-18	12	Set the function of DI9 to ZCLAMP (zero-position fixation enable).
H03-19	0	DI9 terminal logic is normally open (NO).
H03-80	3000	The corresponding speed gain of VT320E is 300r/min/V.
H04-06	11	Set the function of DO4 to ALM (fault).
H04-07	1	DO4 terminal logic is normally closed (NC), and outputs H high level when valid.
H05-17	2500	The corresponding to the pulse parameter per revolution of VT320E 10000.
H06-00	1	Select the speed control source as AI1.
H06-02	0	Select the speed command source as the main speed command A source.
H06-15	6000	Set the zero speed fixed speed threshold to 6000rpm.

Xinjie DS5F Series Servo

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 1: Yaskawa, Delta, and Wise series servo.

Xinjie DS5F Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	35	OA+	Twisted pair
A-	2	36	OA-	Twisted pair
B+	3	37	OB+	Twisted pair
B-	4	38	OB-	Twisted pair
Z+	5	39	OZ+	Twisted pair
Z-	7	40	OZ-	Twisted pair
Analog Control Signal				
DA	12	33	VREF+	Twisted pair
AGND	11	34	VREF-	Twisted pair
IO Status Signal				
VCC_24V	6	30	+24V	-
COM	15	15	COM	-
ALM	8	8	SO2	-
SON	9	20	SI1	-
CLR	10	21	SI2	-
OS	13	24	SI5	-
SPDIR	14	--	--	-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Xinjie DS5F Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P0-01	4	Speed control (external analog).

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P0-18	2500	Set the encoder feedback pulse number per revolution (low level), the corresponding to the pulse parameter per revolution of VT320E 10000.
P0-19	0	Set the encoder feedback pulse number per revolution (high level).
P3-00	0	V-REF is used as speed command input.
P3-01	10000	The rated speed corresponds to the analog voltage.
P3-12	0	Zero-speed clamp mode.
P3-13	300	When the ZCLAMP input signal is ON, the forced speed command is 0. When the actual speed drops below P3-13, it switches to position mode control and the servo is locked at this position.
P5-20	n.0001	Set SI1 to /S-ON signal, logic is normally open (NO).
P5-24	n.0002	Set SI2 to /ALM-RST signal, logic is normally open (NO).
P5-31	n.0005	Set SI5 to /ZCLAMP signal, logic is normally open (NO).
P5-47	n.0012	Set SO2 to /ALM signal, logic is normally closed (NC).

Raynen RA1 Series Servo

In the **Mechanical Parameter** of VT320E, select **Servo Type** as 1: Yaskawa, Delta, and Wise series servo.

Raynen RA1 Series Servo Wiring Table:

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
Encoder Feedback Signal				
A+	1	49	PAO+	Twisted pair
A-	2	50	PAO -	Twisted pair
B+	3	24	PBO+	Twisted pair
B-	4	25	PBO -	Twisted pair
Z+	5	22	PZO+	Twisted pair
Z-	7	23	PZO -	Twisted pair
Analog Control Signal				
DA	12	1	AI1	Twisted pair

VT320E SIGNAL NAME	VT320E PIN NO.	DRIVE PIN NO.	DRIVE SIGNAL NAME	CABLE REQUIREMENT
AGND	11	2&3	AGND-	Twisted pair
IO Status Signal				
VCC_24V	6	20&38	24V	-
COM	15	47&48	GND	-
ALM	8	4	DO2+	-
SON	9	39	GDI1	-
CLR	10	37	GDI2	-
OS	13	43	GDI6	-
SPDIR	14	--	--	-
PE Signal				
PE	Shield layer	Shield layer	Shield	-

Raynen RA1 Series Servo Parameter Setting Instruction:

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P000A	0	Speed mode.
P0016	2500	Set the pulse output port. When the motor rotates 1 circle, the pulse number output by the pulse output port. The corresponding to the pulse parameter per revolution of VT320E 10000.
P0107	1	Set GDI1 to S-ON signal.
P0108	0	Set GDI6 logic to normally open (NO).
P0109	3	Set GDI2 to ALM-RST signal.
P010A	0	Set GDI2 logic to normally open (NO).
P0111	8	Set GDI6 to ZCLAMP.
P0112	0	Set GDI6 logic to normally open (NO).
P012A	2	Set DO2 to ALM signal.
P012B	1	Set DO2 logic to normally closed (NC).
P0142	3000	The corresponding motor speed when the analog input is 10V, the corresponding speed gain of VT320E is 300r/min/V.

PARAMETER TYPE	RECOMMENDED VALUE	MEANING
P0601	1	AI1 is input as speed command.
P061A	10000	When the zero-position fixation signal is valid and the speed command is less than this value, the motor shaft is locked.