Directory

1、Introduction to basic application of servo driver

The servo driver mainly has three working modes: position mode, speed mode and torque mode.

The position mode takes the motor target position as the control target. The position command can be given by external pulses. The number of pulses determines the final motor target position, and the pulse frequency determines the motor rotation speed. The position instruction can also be given by the internal position instruction planning. The user sets the final target position, target speed, acceleration and deceleration time, and triggers the action by inputting the function bits.

The speed control takes the motor speed as the control target. Speed command can be set by analog voltage or parameter.

The torque control takes the motor output torque as the control target. Torque command can be set by analog voltage or parameter.

Each mode is controlled by the corresponding control parameter Pxx.xx and the corresponding input function bit INFnxxx, and the operation results will be output to the corresponding monitoring parameter Pxx.xx and output function bit OUTNxxx.

The control parameters (Pxx. xx) can be set through VECOserve, modbus master station, keyboard or (Dxxx) through PLC program assignment. The last setting shall prevail.

The input functional bit (INFn. xxx) can be bound to the entity input terminal (DIx), and the entity input terminal drives the input functional bit.

For example, P06.01=1 means that the input function bit INFn.001 (enable) is bound to DI1, and the input terminal DI1 drives INFn001.When DI1 is activated, INFn001 (enable) is activated.

For example, P06.02=1 is to bind the input function bit INFn001 (enable) to DI2. INFn001 is driven by input terminal DI2. When DI2 is activated, INFn001 (enable) is activated.

The same input functional bit INFn cannot be bound to two DIs. If two DI terminals drive the same input functional bit, there will be conflicts.

The input function bit can also be directly operated through Mxxx of PLC. If an input function bit has been bound to the entity DIx, the PLC will not be able to operate the input function bit through Mxxx, that is, the entity terminal has the highest priority to operate the input function bit.

Monitoring parameters (Pxx. xx) can be displayed on the panel or obtained by reading Dxxx of PLC.

The output function bit (OUTFN. xxx) can be bound to the physical output terminal (DOx) to output its effective status, or can be obtained through Mxxx of the PLC.

（1）Simple application example of speed mode.

If you want the motor to move at 500 rpm. The following parameters need to be set:

P02.01=1(Select speed mode)

P04.01=0(Speed command comes from main speed command A)

P04.02=0(The main speed command A comes from P04.03)

P04.03=500(Set the value of main speed command A)

Then activate the input function bit INFn.001 (enable motor), and the motor will rotate at 500rpm. The real-time speed of the motor is displayed by P09.09.

（2）Simple application example of position mode.

If you want to make the motor rotate 10 times in the forward direction through a signal trigger, the rotation speed is 2000 rpm. The following parameters need to be set:

P02.01=0(Select position mode)

P03.01=1(The location instruction comes from the internal planning location)

P03.08=0　P03.10=10000(Set 10000 position command units to rotate the motor for 1 turn)

P13.01=0(Stop after single trigger movement)

P13.02=1(Running section 1 position after triggering)

P13.05=1(Run in relative position mode)

P13.10=10 0000 (The position command is 10 cycles in the positive direction, and it is set to - 100000 in the negative direction)

P13.12=2000 (Command speed is 2000rpm)

Then activate the input function bit INFn.001 (enable motor). The rising edge triggers the INFn27 motor to rotate for 10 cycles in the positive direction.

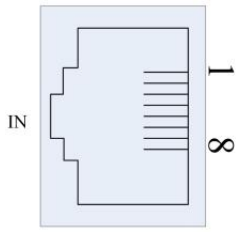
2、Introduction to built-in PLC functions

VC600 series servo adds PLC function on the basis of general servo, and PLC function is enabled through parameter P01.90=1. The PLC program is developed, downloaded and tested through GX Works 2. PLC supports ladder language programming. VC600 also supports parsing RS instructions in various formats. The parsed data is placed in the parameters and provided to the PLC for use. For the RS instruction parsing function, refer to VC600 RS Instruction Parsing Introduction.

The CN5 monitoring port (serial port 1) of the VC600 series servo can be used as the servo monitoring port to communicate with VECobserver, as the PLC download debugging port to communicate with GX Works2, and as the RS command receiving port to communicate with the RS upper computer, which can be selected through parameter P01.91. When connecting CN5 monitoring port (serial port 1), you need to set P01.91 correctly to communicate with relevant software.

VC600 series servo adds an RS232 interface (serial port 2) in the CN1 network port to realize RS command communication with the machine tool. Select the serial port from which the RS instruction originates through P01.94. The signals of the CN1 network interface are defined as follows.

The operation of the PLC program is controlled by INFn171. Under the default parameter P06.04=171, DI4 controls the start and stop of the PLC. P06.24=1, the DI level is reversed, so the system defaults to PLC operation without wiring.



CN1 signal definition

Pin	Define	Explanation
1	CANH	High signal of CAN bus
2	CANL	Low signal of CAN bus
3	GND	Power supply ground
4	SG+	RS485 signal positive
5	SG-	RS485 signal is negative
6	TXD	Data transmission
7	RXD	Data reception
8	GND	Power supply ground

2.1、Description of PLC related parameters

Parameter No	Parameter Description	set range	Default	Read Write Type	Effective method
P01.90	PLC function enabling parameters	0~1	0	RW	immediately
	0-PLC function is not enabled 1-Enable PLC functions				
P01.91	Serial port 1 (micro usb) protocol type	0~2	0	RW	immediately
	0-VEC debugging software protocol 1-PLC program download protocol 2-RS instruction protocol				
P01.93	PLC non-standard function	0~1	0	RW	immediately
	0-General RS function 1-Non standard RS instruction parsing function				
P01.94	Serial port source of RS instruction	0~1	0	RW	immediately
	0-Serial port 2 (RS232 in the network port) 1-Serial port 1 (RS232 in the monitoring port)				

Special note: By default, the driver is P06.04 (DI4 function configuration)=171 (PLC operation DI function number), P06.24 (DI4 level)=1, and the DI level is reversed. Therefore, the system defaults to PLC operation when there is no wiring.

2.2、Introduction to PLC software components

The content of this section is very important, which is related to the programming of built-in PLC. The PLC contains the following software components.

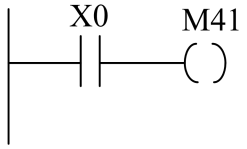
element	describe	Drive internal starting address	Drive internal end address	Universal Start Address	Universal End Address	Start address of power-off storage	End address of power-off storage
M	Auxiliary relay	0	511	512	3071	512	1535
C16 bit	Counter			0	199	100	199
C32 bit	High speed counter			200	255	200	255
T	Timer			0	255	246	255
D	Data register	0	2047	2048	7999	2048	3071
X	Input relay			0	10		
Y	Output relay			0	6		

2.2.1 Detailed introduction of X soft component, Y soft component and M soft component.

X0~X9 The valid state of the physical DI terminals DI1~DI10 of the corresponding driver.
Y0~Y5 The effective state of the physical DO terminals DO1~DO6 of the corresponding driver.

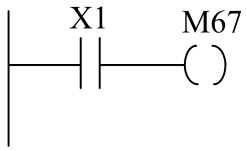
M0~M511 are the input and output function bits inside the driver. It has specific functions. Among them, M41~M116 correspond to the servo input function bits INFn01~INFn76; The fixed offset address of INFn is 40. M141~M173 correspond to servo output function bits OUTN01~OUTN33; The fixed offset address of OUTFn is 140. Other input function bits of M0~M511 are reserved for servo use. M512~M1535 are universal M-bits, which can be maintained in case of power failure. M1536~M3071 are universal M bits, which will be lost in case of power failure.

（1）Application example 1.



When DI1 is activated, the servo driver is enabled.

（2）Application example 2.



When DI2 is activated, internal planning location execution is triggered.

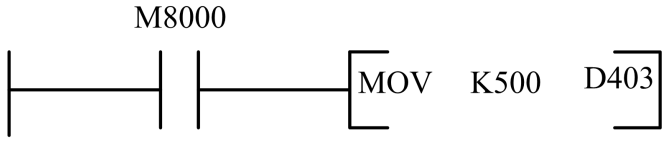
2.2.2 Introduction to Zone D.

D0~D2047 correspond to servo parameters P00.00-P20.47. Some parameters have not been used yet and are reserved for servo.

D2048~D3071 are the addresses maintained during power failure.

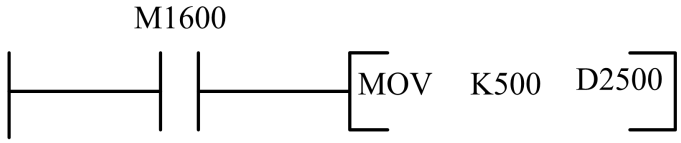
D3072~D7999 are addresses lost during power failure.

（1）Application example 1.



Run PLC program to automatically assign 500 to D403, that is, servo parameter P04.03=500.

（2）Application example 2.



After running PLC program and closing M1600, power off and power on again. The value of D2500 is still 500. Because the D2500 has the power down holding function.

2.2.3 Introduction to other software components.

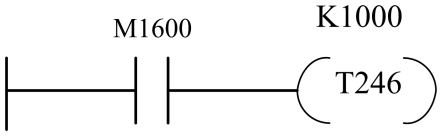
FX3U • FX3UC Programmable controller

100ms type 0. 1～3276. 7 sec	10ms type 0. 01～327. 67 sec	1ms Cumulative*4 0. 001～32. 767 sec	100ms Cumulative*4 0. 1～3276. 7 sec	1ms type 0. 001～32. 767 sec
T0～T199 200 point For subprogram T192～T199	T200～T245 46 point	T246～T249 For 4-point execution interrupt saving * 4	T250～T255 6 points hold * 4	T256～T511 256 point

T0~T245 are general T positions, which will be lost in case of power failure.

T246~255 is the general T position, which will be maintained after power failure.

（1）Application Example 1

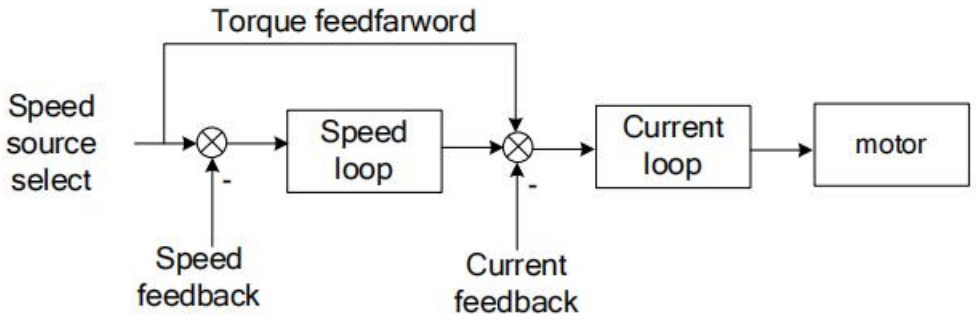


Run the PLC program and close M1600. T246 starts counting. When the value reaches 1000, T246 is valid and remains at 1000. Generally, the count value of T246 should be cleared within one cycle after running.

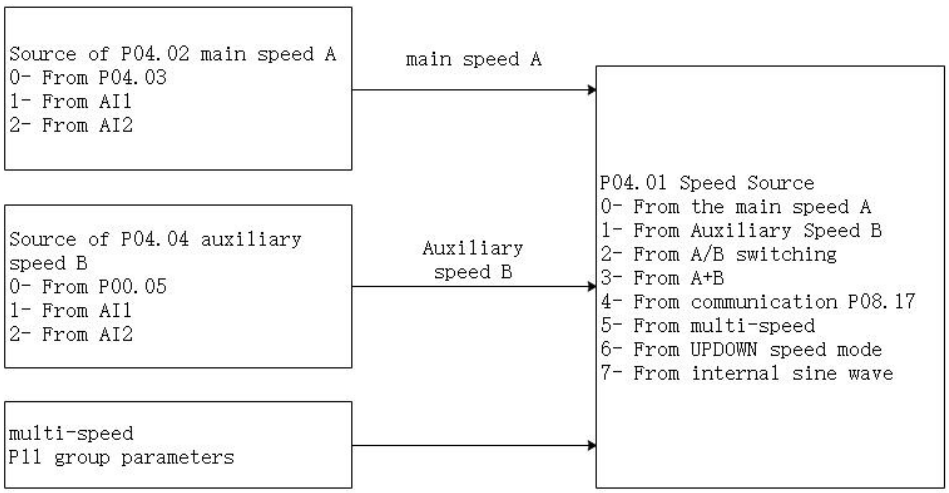
3、Use the built-in PLC servo drive motor to move at a fixed speed

3.1 Brief introduction of servo speed mode.

Speed mode is a control mode with motor speed as the control target. It is commonly used for driving the spindle. Speed command can be set through analog voltage or parameters. The realization of speed mode is shown in the figure below.



Servo has two speeds to choose from, namely main speed A and auxiliary speed B. These two speeds can be superimposed or switched with each other. Both primary speed A and secondary speed B have multiple speed sources. As shown in the figure below.



By default, P04.01=0, P04.02=0. The speed command (rpm) is set by P04.03. If P04.03 is positive, it will rotate forward, and if P04.03 is negative, it will reverse.

Relevant parameters are as follows:

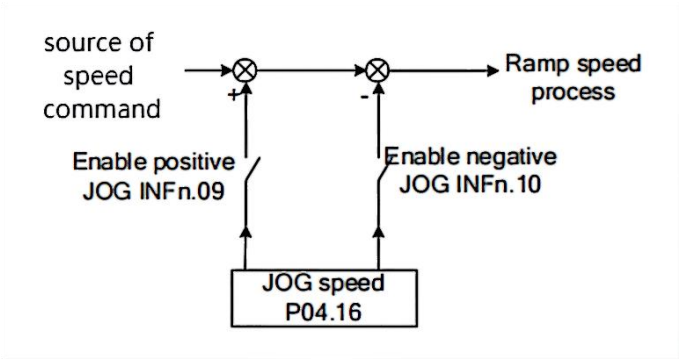
Parameter No	Parameter Description	Set range	units	Set method	Effective way	Defaults	read and write method
P04.01	Speed source	0~7	-	Run Settings	immediately	0	RW
	Select the speed command source. 0- Main speed A 1- Auxiliary speed B 2- Through INFn.12 Perform A/B switching 3- A+B 4- Communication 5- Multistage speed 6- UP/DOWN speed mode 7- Internal sine wave						
P04.02	Source of main speed A	0~4	-	Run Settings	immediately	0	RW
	Set the speed command source of the main speed command A source 0- 0-From P04.03 1- From AI1 2- From AI2 3- From AI3 4- From pulse rate						
P04.03	Setting value of main speed A	-32767~ 32767	rpm	Run Settings	immediately	500	RW
	When the main speed A source selects the digital given source, set the speed command value through P04.03.						
P04.04	Auxiliary speed B source	0~4	-	Run Settings	immediately	0	RW
	Set the speed command source of auxiliary speed command B. 0- From P04.05 1- From AI1 2- From AI2 3- From AI3 4- From pulse rate						
P04.05	Setting value of auxiliary speed B	-32767~ 32767	rpm	Run Settings	immediately	500	RW
	When the auxiliary speed B source selects the digital given source, set the speed command value						

	through P04.05.						
P08.17	Speed communication setting	-32767~ 32767	rpm	Run Settings	immediately	0	RW
	In speed control mode, the source of speed command is communication timing, and the speed command value is set.						

If the speed command comes from AIx, please refer to "6.3.1 Analog Input AI" in the instruction manual of VIKODA servo for details.

3.2 Introduction to inching function

The inching function is widely used in the field. The operator often uses the inching function when trying to run the material to a certain position manually. There are two kinds of inching: forward inching and reverse inching, respectively through INFn 09 and INFn 10 Control. INFn 09 or INFn When 10 is valid, the speed output will stack a jogging speed P04.16 on the basis of the current speed command.



3.3 Common input function bits.

No.	Bit description
INFn.01	Enable the servo controller after activation, otherwise disconnect the enable
INFn.02	Rising edge reset servo controller
INFn.09	The speed output will superimpose a positive inching speed P04.16 on the current speed command
INFn.10	The speed output will superimpose a reverse jogging speed P04.16 on the current speed command
INFn.11	The speed command will be reversed on the original basis.
INFn.13	The speed command is set to zero directly.

XX in (INFn. XX) is the parameter value of the sixth group of DIX function control registers

3.4 Common output function bits.

No.	Bit description
OUTFn.01	When the servo controller is enabled, OUTFN.01 is valid
OUTFn.02	When the absolute value of the actual output speed P04.21 is greater than the speed threshold P04.23, the speed reaches the signal OUTFn.02 Valid.
OUTFn.05	When the amplitude of the actual output speed P04.21 is less than the zero speed threshold P04.25, the zero speed signal OUTFn.05 is valid.
OUTFn.07	When the actual output speed P04.21 is greater than the zero speed threshold, the forward rotation signal OUTFn.07 is valid
OUTFn.08	When the actual output speed P04.21 is less than the negative zero speed threshold, the reverse signal OUTFN.08 is valid
OUTFn.32	When the difference between the actual output speed P04.21 and the speed given command is less than the speed consistency threshold P04.24, the speed consistency signal OUTFn.32 Valid

XX in (OUTFN. XX) is the parameter value of the sixth group of DOX function control registers

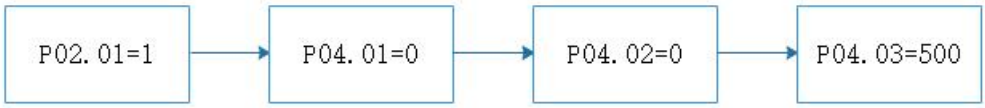
3.5 Common control parameters.

Parameter No	Parameter Description	Set range	units	Set method	Effective way	Defaults	read and write method
P04.03	Setting value of main speed A	-32767~ 32767	rpm	Run Settings	immediately	0	RW
	When the main speed A source selects the digital given source, set the speed command value through P04.03.						
P04.16	Jog speed	0~32767	rpm	Run Settings	immediately	20	RW
	When using the DI inching function, set the inching operation speed command value.						
P04.17	Acceleration time	0~32767	ms	Run Settings	immediately	500	RW
	Time for speed command to accelerate from 0 to rated speed.						
P04.18	Deceleration time	0~32767	ms	Run Settings	immediately	500	RW
	The time when the speed command decelerates from the rated speed to 0.						

3.6 Common monitoring parameters.

No.	Parameter Description	set range	unit	Reading and writing mode
P04.21	Display the filtered value of speed	0~32767	rpm	RO
P09.09	Real time speed monitoring	0~32767	rpm	RO

3.7 Servo speed mode parameter setting process.



This flow chart means that the driver control mode selects the speed mode. The speed comes from the main speed A, and the main speed A comes from P04.03.

3.8 Mitsubishi PLC programming case.

Case description:

Set the drive control mode to speed mode, the speed comes from speed A, speed A comes

from P04.03, P04.03 is set to 500, that is, the motor will run at the speed of 500 rpm/min after enabling. There is also a jog function. When (INFn. 09) or (INFn. 10) is valid, the speed output will superimpose a jog speed P04.16 on the current speed command.

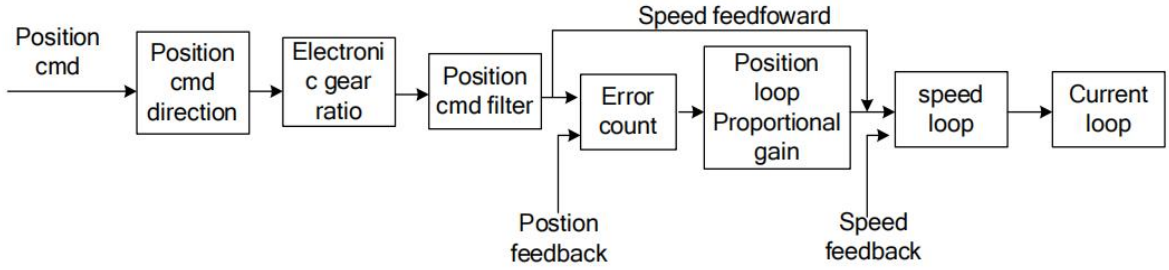
This PLC programming case is compiled according to the "Servo speed mode parameter setting process". Press Un000 on the panel to check whether the speed is correct.

M1004	Used to configure drive control mode to speed mode	M8000	Used to configure speed mode parameters
X001	Used to enable servo driver	X002	Reset the servo driver (fault can also be reset)
X003	Positive inching button	X004	Reverse inching button

4、Positioning control with built-in PLC servo control motor

4.1 Brief introduction of servo position mode.

Position mode is a control mode that takes the target position of the motor as the control target, and is often used to achieve high-precision positioning. The position command can be given by external pulses. The number of pulses determines the final motor target position, and the pulse frequency determines the motor rotation speed. The position instruction can also be given by the internal position instruction planning. The user sets the final target position, target speed and acceleration/deceleration time, and triggers the action by entering the function bit INFn27. The position mode is implemented as shown in the figure below.



The position instructions in the above figure can be derived from pulse instructions or internal planning position instructions. Only instructions from internal location planning are introduced here. That is to say, the user sets the size of the user's position command, the command speed, and the acceleration/deceleration time. After the trigger position is executed, the motor acts according to the setting. After the action is completed, the positioning completion signal is output.

No.	Parameter Description	set range	unit	Set method	Effective way	Defaults	Reading and writing mode
P03.01	Position command source	0~6	-	Run Settings	immediately	0	RW
	0- From external pulse command 1- From internal multi segment location planning (internal planning location instruction) 2~6 Refer to the detailed instructions						

There are two kinds of internal planning position instructions: absolute position instruction and relative position instruction, both of which are called user position instructions.

The absolute position command refers to the position relative to the zero point. Before going to the absolute position command, you must return to zero to calibrate the zero point of the absolute position, while the relative position command refers to the position relative to the current position.

For example, suppose three absolute position commands are used, the size of the first segment is set to 10000, the size of the second segment is set to 20000, and the size of the third segment is set to 0. First, carry out the zero return operation, and then trigger the motor to move to the position of 3 sections. The motor moves to 10000 in the positive direction, 10000 in the positive direction, 20000 in the reverse direction, and finally returns to zero.

For another example, suppose to go through 3 segments of relative position command, the first segment of position command is set to 10000, the second segment of position command is set to 20000, and the third segment of position command is set to - 10000. After triggering the multi segment position, the motor moves forward for 10000, then forward for 20000, and then backward for 10000.

The positioning action is triggered by INFn27. After positioning, OUTFn.13 is effective. The positioning completion output condition can be set through parameter P03.45.

The parameters related to the setting of the internal planning position command are shown in the following table.

No.	Parameter Description	set range	unit	Set method	Effective way	Defaults	Reading and writing mode
P13.01	Multi segment location (internal planning location) working mode	0~2	-	Disable setting	immediately	0	RW
	0- Shutdown after single operation 1 - Cyclic operation 2- DI switches operation and reads the values of INFn.31, INFn.30, INFn.29 and INFn.28 as segment numbers for operation						
P13.02	Total number of segments	1~16	-	Run Settings	immediately	16	RW
P13.03	Idle waiting time	0~1	-	Run	immediately	1	RW

	unit			Settings			
	0- millisecond 1- second						
P13.05	Absolute or relative position command setting	0~1	-	Run Settings	immediately	1	RW
	0- Absolute position command 1- Relative position command						
P13.10	Number of position commands of the first segment	-2147483647 ~ 2147483647	User unit	Run Settings	immediately	10000	RW
P13.12	Running speed of the first segment position	0~32767	rpm	Run Settings	immediately	500	RW
P13.13	Running acceleration time of the first segment position	0~32767	ms	Run Settings	immediately	500	RW
P13.90	Running deceleration time of the first segment position	0~32767	ms	Run Settings	immediately	500	RW
P13.14	The idle time of the first segment is generally set to 0	0~32767	ms (s)	Run Settings	immediately	1	RW

No.	Parameter Description	set range	unit	Set method	Effective way	Defaults	Reading and writing mode
P03.45	Positioning completion output conditions	0~3	-	Run Settings	immediately	0	RW
	In the position control mode, when the servo is running, the absolute value of position error P03.17 is within the set value of P03.46 (positioning completion threshold), and P03.49 (positioning completion/approaching time threshold) is maintained, the servo can output the positioning completion signal; The output condition of positioning completion signal can be set through P03.45. 0 - Output when the position error is less than the positioning completion threshold, otherwise clear the output; 1-Output when the position error is less than the positioning completion threshold and the speed command P03.95 in the position mode is zero, otherwise the output is cleared; 2 - Output when the position error is less than the positioning completion threshold and the						

	filtered speed command P03.96 in the position mode is zero, otherwise the output is cleared; 3-Output when the position error is less than the positioning completion threshold and the speed command P03.95 is zero in the position mode, and clear the output when the speed command P03.95 is not zero in the position mode						
P03.46	Positioning completion threshold	0~32767	0.0001 week	Run Settings	immediately	10	RW
	Set the threshold value of the absolute value of the position deviation when the servo driver outputs the positioning completion signal. (The positioning completion signal is only valid when the servo driver is in the position control mode and in the running state)						

4.2 Introduction to electronic gear ratio

The electrnic gear ratio is used to convert the user's position command unit to the motor encoder's position unit. It has two settings.

（1）The first is to set how many user position commands are required to make the motor rotate for 1 circle, or how many user position commands are required to make the motor rotate for 1 circle. Set P03.08=0, P03.10 value is the user position command value to make the motor rotate for 1 turn.

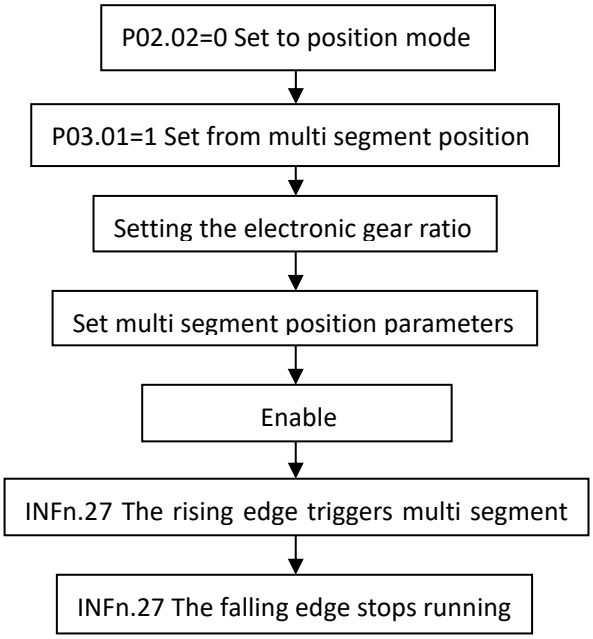
The second is to directly set the numerator and denominator of the electronic gear ratio. I.e

$$\text{User position command} \times \frac{\text{Electronic gear ratio numerator}}{\text{Electronic gear ratio denominator}} = \text{Location of motor encoder}$$

For example, if a 17 digit absolute value motor goes to the internal multi segment position and 10000 user positions are specified to command the motor to rotate for one circle, then the electronic gear ratio numerator is set to 131072, and the electronic gear ratio is set to 10000 respectively.

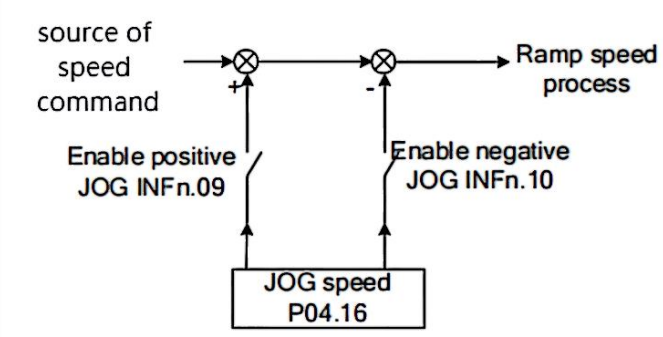
No.	Parameter Description	set range	unit	Set method	Effective way	Defaults	Reading and writing mode
P03.08	Electronic gear ratio 1 molecule	1~2147483647	-	Run Settings	immediately	1000	RW
	Set the numerator of the first group of electronic gear ratios for position command division/multiplication.						
P03.10	Denominator of electronic gear ratio 1	1~2147483647	-	Run Settings	immediately	1000	RW
	Set the denominator of the first group of electronic gear ratios for position command division/multiplication						

4.3 Positioning function parameter setting process



4.4 Introduction to inching function

The inching function is widely used in the field. The operator often uses the inching function when trying to run the material to a certain position manually. There are two types of inching: forward inching and reverse inching, which are controlled by (INFn. 09) and (INFn. 10) respectively. When enabling servo (INFn. 09) or (INFn. 10) is valid, the speed output will superimpose a inching speed P04.16 on the current speed command.(The inching function in the position mode is a little different from that in the speed mode. That is, if the multi segment position mode is used in the position mode, the inching function does not need to consider the speed command when it is enabled.)



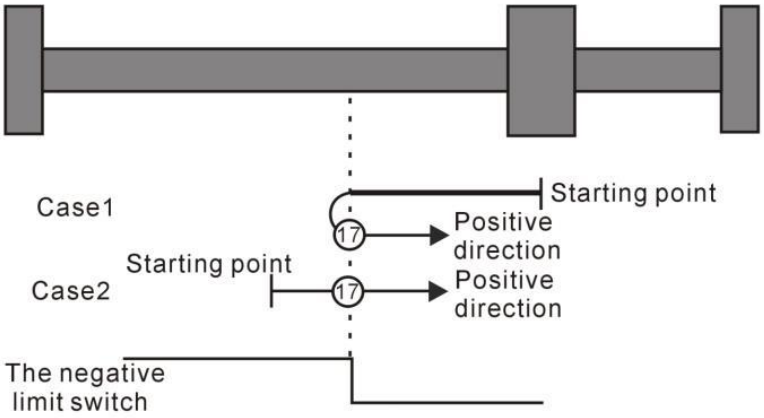
4.5 Zero return function introduction

In some applications, it is often necessary to set an origin. It is required to return to zero when power on for the first time. When returning to zero, it can be calibrated with the position of the origin switch, reverse operation limit switch or forward operation limit switch, or with the current position. For various applications, our servo system has developed a variety of return to zero modes. The return to zero mode is set through P03.51. The commonly used modes are return to zero mode 17, return to zero mode 18, and return to zero mode 35. The zero return action is triggered by INFn26. After zero return, OUTFn.15 is set. After zero return, user position P03.90 is equal to zero return offset P03.55. The following describes three commonly used return to zero modes.

（1）Homing method 17：Origin return depending on the reverse operation limit switch

Case 1: When the user triggers the execution of homing, if the negative position limit switch state is in the low level, the axis starts to move in the reverse direction at the first speed. When the negative limit switch is in the high level, the moving direction changes and starts to move at the second speed; the position when the negative limit switch state is in the low level is the zero point position.

Case 2: When the user triggers the execution of zero return, if the state of the reverse operation limit switch is at a high position, the axis starts to move forward at the second speed, and the position when the reverse operation limit switch state is at a low position is the origin position.

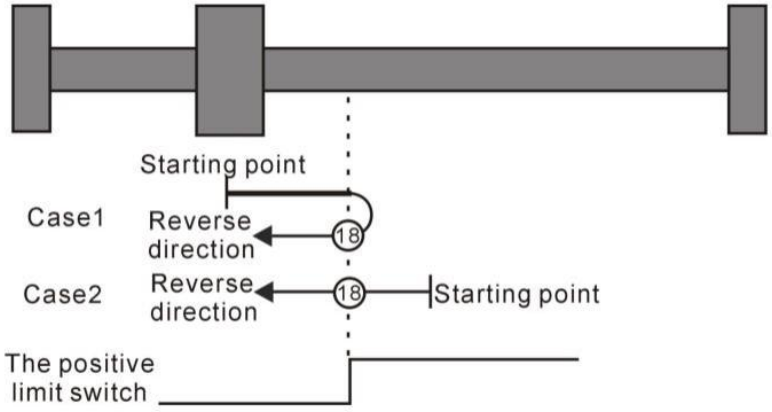


Homing method 17: Homing on the negative limit switch

（2）Homing method 18:Homing on the positive limit switch

Case 1: When the user triggers the execution of homing, if the positive position limit switch state is in the low level, the axis starts to move forward at the first speed, and when the positive position limit switch is in the high level, the moving direction changes and starts to move at second speed, and the position at the time when the positive limit switch state is at the low level is the zero point position.

Case 2: When the user triggers the execution of the zero return, if the forward running limit switch state is at a high position, the axis will directly start reverse movement at the second speed, and the position when the forward running limit switch state is at a low position is the origin position.



Homing method 18: Homing on the positive limit switch

（3）Homing method 35：depends on current location

In mode 35, when the user triggers the home return, the axis does not move, and the current position of the axis is considered to be the home position.

For details of the homing mode, please refer to the "Zero point homing function" section of the "VECServo Manual".

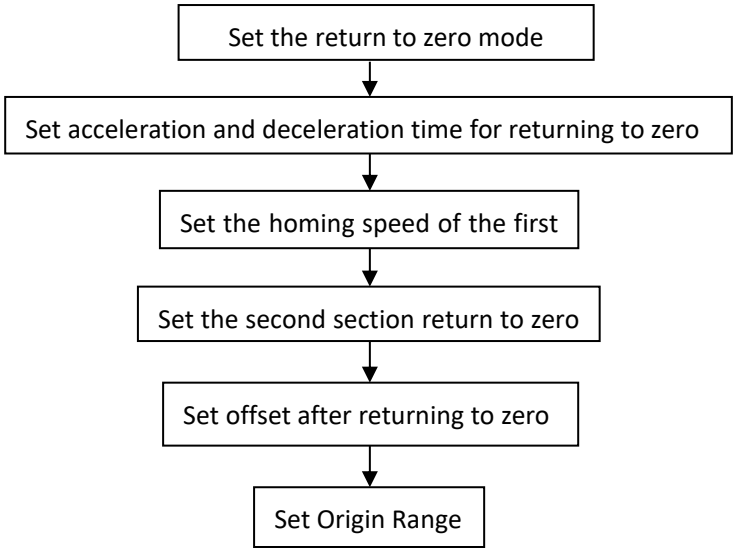
Note: When using the zero return mode with the operating limit limit switch (limit switch), before using the zero return function, you need to set P03.73 to 0 or 2. When setting P03.73 to 1, triggering the forward and reverse limit will cause the servo motor to enter the fault protection state directly and cannot continue to complete the zero return operation.

Related parameters

No.	Parameter Description	set range	unit	Set method	Effective way	Defaults	Reading and writing mode
P03.51	Zero return mode Set the zero return mode and trigger signal source.	0~99	-	Disable setting	immediately	0	RW
P03.52	Zero return acceleration and deceleration time	0~32767	ms	Run Settings	immediately	500	RW
	Set the time when the motor accelerates from 0 to the rated speed when the original point returns to zero. Therefore, when the original point returns to zero, the actual motor acceleration time t=P03.53/rated speed * (P03.52)						

P03.53	Zero return speed of the first section	0~32767	rpm	Run Settings	immediately	500	RW
	It is also called high speed return to zero speed. When the zero point is set, the motor speed is searched for the deceleration point signal.						
P03.54	Zero return speed of the second section	0~32767	rpm	Run Settings	immediately	100	RW
	It is also called low speed return to zero speed. When the zero point is set, the motor speed when searching the zero point signal.						
P03.55	Offset after returning to zero Set the absolute position value of the motor after zero return.	-2147483647~2147483647	User unit	Run Settings	immediately	0	RW
	When BIT9 of P01.46 is set to 1, the motor will not go to the offset position after finding the origin, and will directly set the origin to the offset position. When BIT9 of P01.46 is set to 0, find the zero point, take the zero point as the zero point, and the motor moves to an offset position.						
P03.57	Origin range	0~32767	0.0001 week	Run Settings	immediately	5	RW
	When the position of the motor encoder is within the range of the original point, and the speed is given P09.89=0 under the position ring mode, P03.49 time is also maintained, the zero return completion signal is output.						

4.6 Zero return function setting process



4.7 Common input function bits

No.	Bit description
INFn.21	The position command is prohibited. When it is valid, the position command is prohibited to be input into the servo. It can be used for emergency stop operation.
INFn.22	The position command is reversed. If it is valid, the reverse position command is input into the servo.
INFn.26	Trigger return to zero
INFn.27	Trigger multi segment position command The rising edge triggers the execution of the multi segment position command, and the falling edge stops the execution of the multi segment position command, or only the rising edge triggers the execution of the multi segment position command, and the falling edge does not act. Refer to P13.92 for details
INFn.34	Zero return origin switch input
INFn.43	Position mode forward operation limit switch (forward limit switch)
INFn.44	Position mode reverse operation limit switch (reverse limit switch)

4.8 Common output function bits

No.	Bit description
OUTFn.1	Servo enable, output valid signal
OUTFn.13	Positioning is completed and output is completed when it is valid
OUTFn.15	The zero point return completes the output. When the encoder position of the motor is within the range of the origin, and the speed is given P09.89=0 under the position ring mode, P03.49 time is also maintained, the zero return completion signal is output.

4.9 Common setting parameters

No.	Parameter Description
P03.01	Used to select the source of the position command.
P03.02	Used to select pulse command counting mode.
P03.06	Set the time constant of median filtering at the given position
P03.07	Set the time constant of the given low-pass filter at the position
P03.08	Electronic gear ratio 1 molecule
P03.10	Denominator of electronic gear ratio 1
P03.45	Set positioning completion output conditions
P03.46	Set the positioning completion threshold
P03.49	Set the positioning completion/approaching time threshold

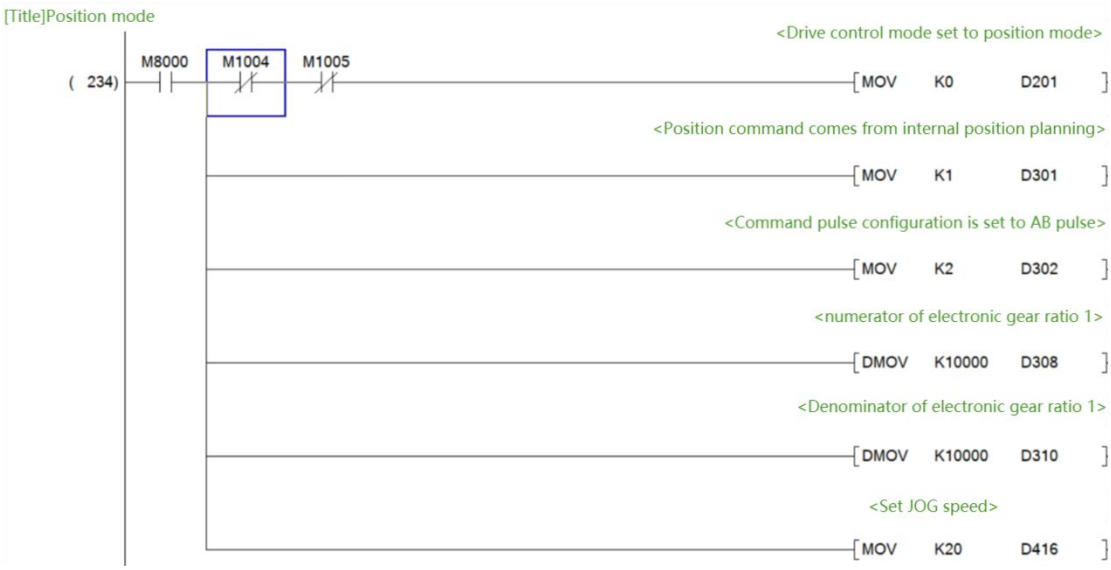
P03.51	Set the return to zero mode
P03.52	Set acceleration and deceleration time for returning to zero
P03.53	Set the homing speed of the first section
P03.54	Set the second section return to zero speed
P03.55	Set offset after returning to zero
P03.57	Set Origin Range
P13.XX	Configure parameters for multi segment position mode

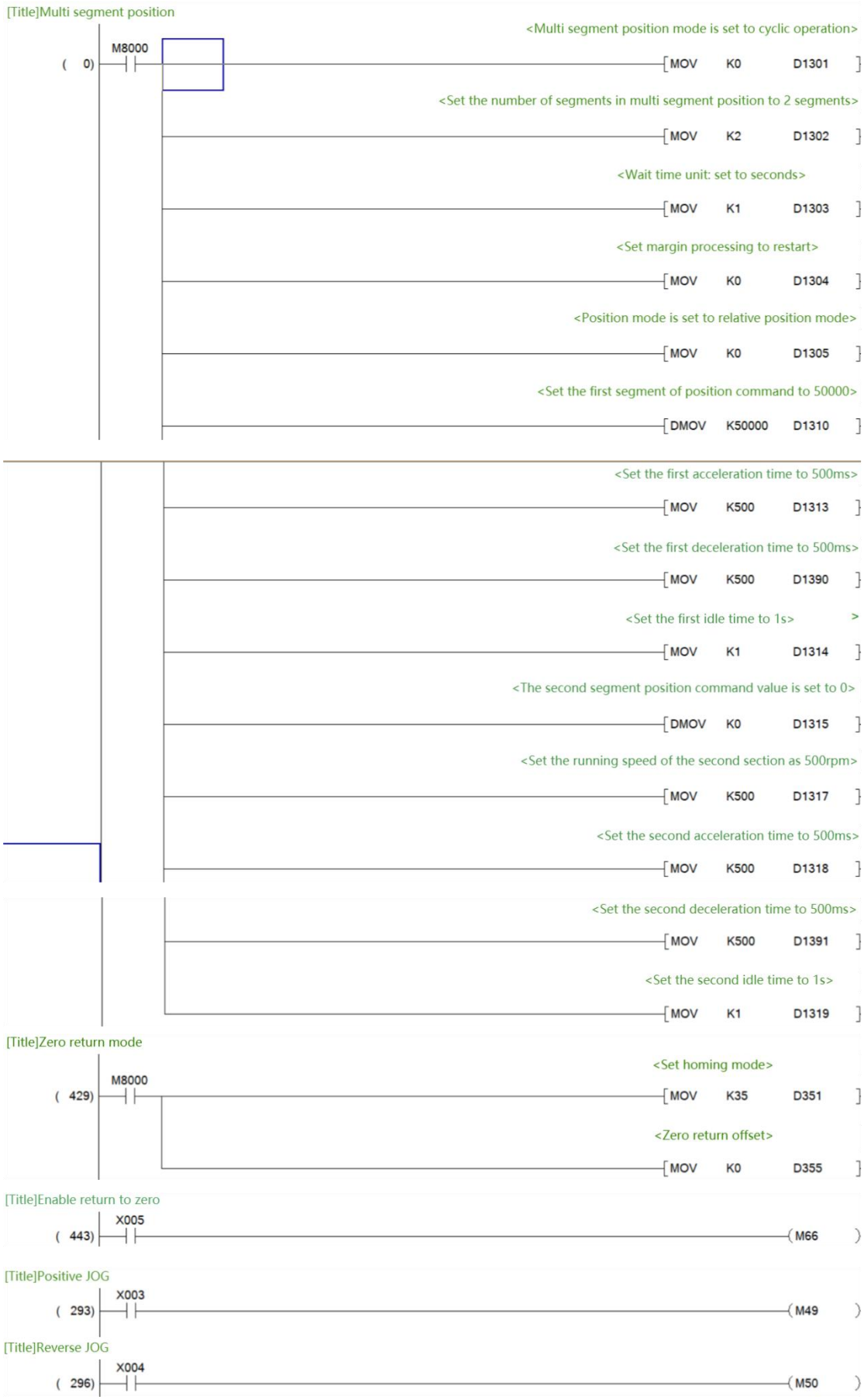
4.10 Common monitoring parameters

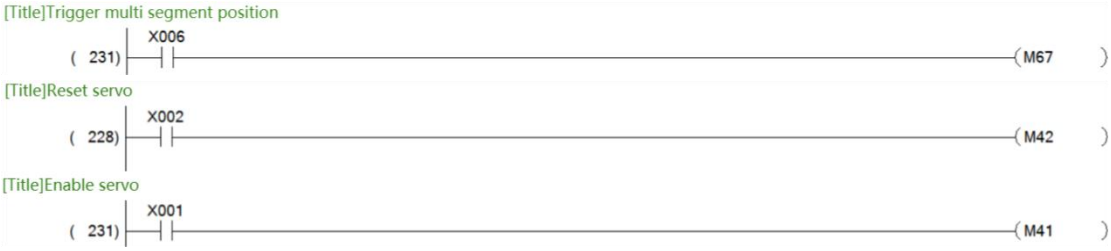
No.	Parameter Description
P00.13	Check the motor encoder position (encoder unit)
P03.04	Check the number of instruction pulses received
P03.17	Position error monitoring (unit: 0.0001 circle)
P03.90	Mechanical position (user position unit)
P03.95	Speed command monitoring in position mode
P03.96	Speed command monitoring after filtering in position mode
P09.09	Real time speed monitoring

4.11 Mitsubishi PLC programming case

4.11.1 Positioning case (motor is 2500 line incremental encoder motor)




[Title]Multi segment position
<Multi segment position mode is set to cyclic operation>
M8000
(0)
[MOV K0 D1301]
<Set the number of segments in multi segment position to 2 segments>
[MOV K2 D1302]
<Wait time unit: set to seconds>
[MOV K1 D1303]
<Set margin processing to restart>
[MOV K0 D1304]
<Position mode is set to relative position mode>
[MOV K0 D1305]
<Set the first segment of position command to 50000>
[DMOV K50000 D1310]
<Set the first acceleration time to 500ms>
[MOV K500 D1313]
<Set the first deceleration time to 500ms>
[MOV K500 D1390]
<Set the first idle time to 1s>
[MOV K1 D1314]
<The second segment position command value is set to 0>
[DMOV K0 D1315]
<Set the running speed of the second section as 500rpm>
[MOV K500 D1317]
<Set the second acceleration time to 500ms>
[MOV K500 D1318]
<Set the second deceleration time to 500ms>
[MOV K500 D1391]
<Set the second idle time to 1s>
[MOV K1 D1319]
[Title]Zero return mode
<Set homing mode>
M8000
(429)
[MOV K35 D351]
<Zero return offset>
[MOV K0 D355]
[Title]Enable return to zero
X005
(443)
(M66)
[Title]Positive JOG
X003
(293)
(M49)
[Title]Reverse JOG
X004
(296)
(M50)



Case description:

The driver control mode is set as the position mode. The position command comes from the internal multi segment position. The pulse type is AB pulse. The electronic gear ratio is set as 1 (10000/10000). The multi segment position runs in the relative position mode (if it is an absolute position mode, it is necessary to return to zero before starting. Pay attention to whether the return to zero is successful. P03.90 should converge to the value of P03.55 (return to zero offset)), First, rotate forward for 5 cycles at the speed of 500 rpm/min and then reverse for 5 cycles at the speed of 500 rpm/min. The acceleration and deceleration time is 500 ms, and there is 1 s idle time between the two positions. Jog function can also be performed in position mode. When servo is enabled (INFn. 09) or (INFn. 10) is valid, the speed output will superimpose a jog speed P04.16 on the current speed command

X001	Enable servo driver	X002	Reset servo driver (can be used to reset fault)
X003	Positive JOG button	X004	Reverse JOG button
X005	Enable return to zero	X006	Trigger multi segment position