VEICHI

Manual

RB200 Joint Module

Overview

Safety Precautions

Please use this product only after the safety precautions described in this manual are fully understood to protect both persons and the products.

Signs and Meanings

The following signs are used in this manual to highlight the key safety points. Failure to observe these points may result in damages to this product and the associated system, or even personal injuries.

⚠ DANGER	Incorrect operation may result in death or major safety incidents.
⚠ CAUTION	Incorrect operation may result in minor injuries.

Please read and comply with all requirements in this manual, which will help you properly use and configure the servo joint module to meet your application needs. Take note of each precaution below and follow them exactly; otherwise, malfunctions, product damage, or even dangerous situations may occur.

- Inspect the product's appearance and included accessories upon unpacking; if any defects or missing parts are found, do not install.
- Store or install the product in a well-ventilated, dry, dust-free environment free of cutting fluid, oil mist, iron powder, and metal shavings, and ensure no flammable materials are nearby to prevent foreign objects from entering the module and causing malfunctions or electrical hazards.
- Use the original packaging for storage and transport, as it provides sufficient protection against common damage.
- Do not apply external force (e.g., dropping or striking) to the product during unpacking or installation.
- Do not use gasoline, thinners, acidic, or alkaline cleaning agents, as they may discolor the casing or corrode cables.
- Ensure the external power voltage matches the product's rated voltage, that all wiring connections are correct, and that there are no short circuits or loose connections in the peripheral circuitry; otherwise, the drive may be damaged.
- Confirm the input power is switched off before performing any wiring.
- Do not connect or disconnect communication cables while the power is on, as this may damage the product.
- Do not touch any rotating parts while the device is operating, as this may cause personal injury.
- The surface temperature may exceed 80°C during operation; beware of burns.
- Do not perform maintenance or servicing with the power on, as there is a risk of electric shock.

Operation

⚠ Caution
● Perform test operation with no load (not connected to the drive shaft) to prevent accidents; otherwise, injury may occur. ● Do not touch any rotating parts of the joint module while it is running to avoid injury. ● Set user parameters to match the supporting machinery before installing and operating the product; failure to do so may result in loss of control or malfunction. ● Do not use positive-limit (P-OT) or negative-limit (N-OT) signals during origin return. ● Do not touch the joint module while power is on or has just been turned off to prevent burns. ● Clear the cause and ensure safety before resetting and restarting after an alarm to avoid injury. ● Do not use the brake of a brake motor for regular braking, as this may cause malfunction.

Maintenance

⚠ Caution
● Have a qualified operator perform power-on and power-off operations. ● Disconnect all circuits connected to the driver before performing insulation resistance tests to prevent driver malfunction. ● Do not use gasoline, thinners, alcohol, acidic, or alkaline detergents, as they may discolor or damage the casing. ● Do not change wiring while power is on to avoid electric shock. ● Do not disassemble the product to prevent electric shock or injury.

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Version Change Log

Date	Version	Content
2026.01	V1.0	First version released

1 Product Description

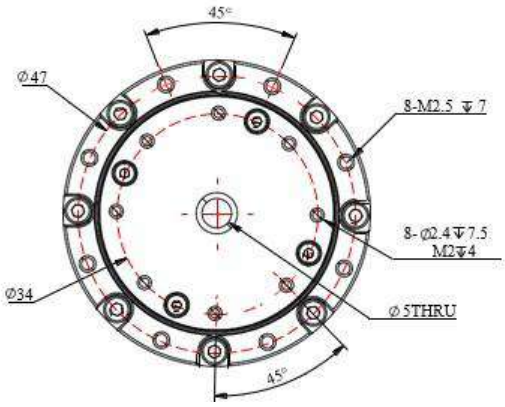
1.1 Naming Rules

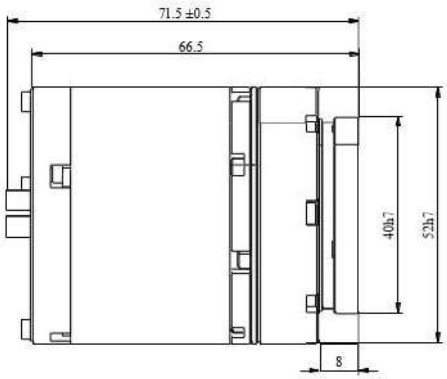
RB200	-	G	70	14	-	R40	30	-	100	D	JM	1	E
①		②	③	④		⑤	⑥		⑦	⑧	⑨	⑩	⑪

①	Product Series	RB200	RB200 Series	⑧	Motor-end Encoder	D	Single-turn absolute type
②	Voltage Level	E	DC24V			DM	Multi-turn absolute type
		G	DC48V			N	None
③	Max. Outer Diameter	70	70mm	⑨	Output-end Encoder	J	Single-turn absolute type
		110	110mm			JM	Multi-turn absolute type
④	Harmonic Pitch Circle Diameter Specification Code	14	Code 14			N	None
		25	Code 25	⑩	Brake	1	Without brake
⑤	Motor Power	R40	400W			2	With brake
		1R5	1500W	⑪	Communication	C	CANopen
⑥	Rated Speed	30	3000rpm			E	EtherCAT
		20	2000rpm			P	Pulse
⑦	Harmonic Reducer	100	100 speed ratio	-	-	-	-
		120	120 speed ratio				

1.2 Dimensions

- RB200-G5211-R0630-100DJM1E





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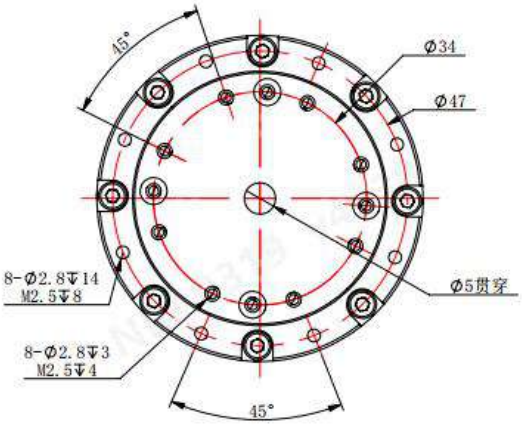

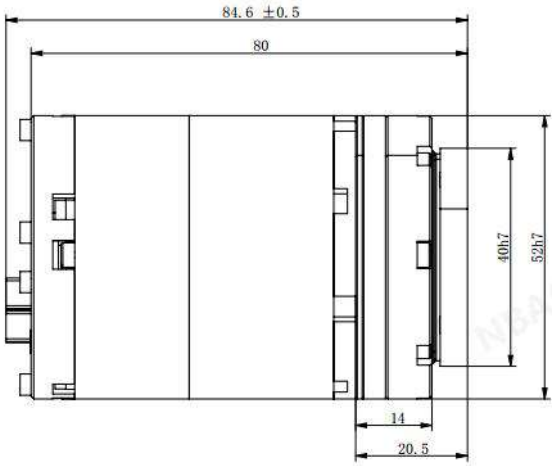

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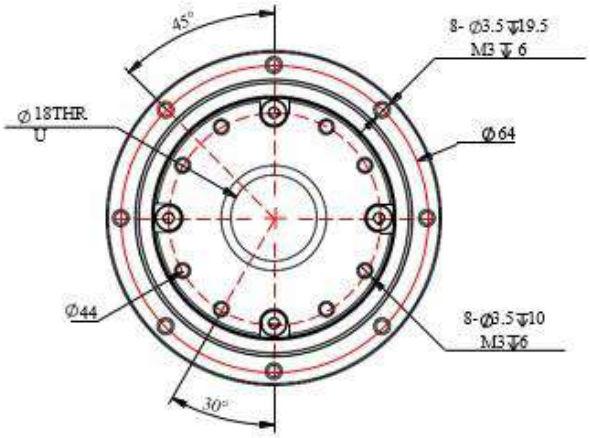

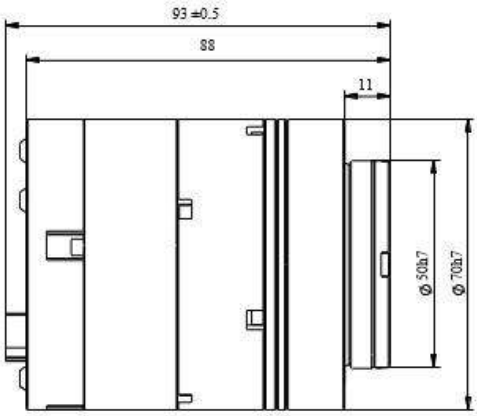

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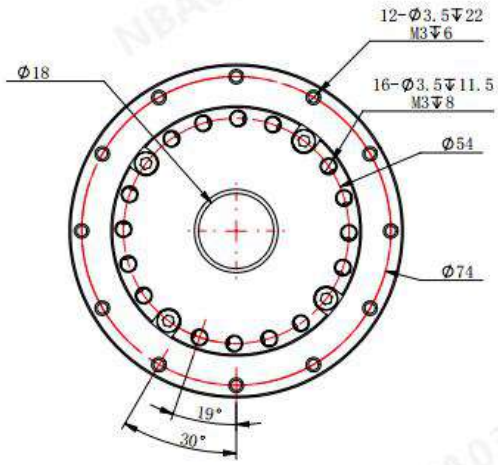

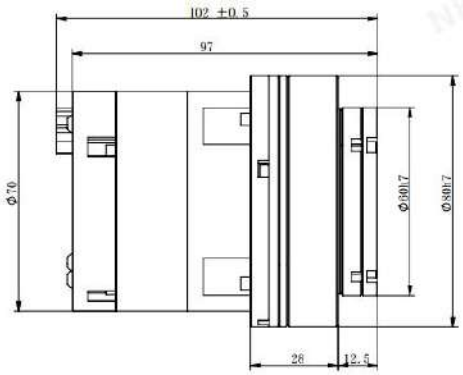

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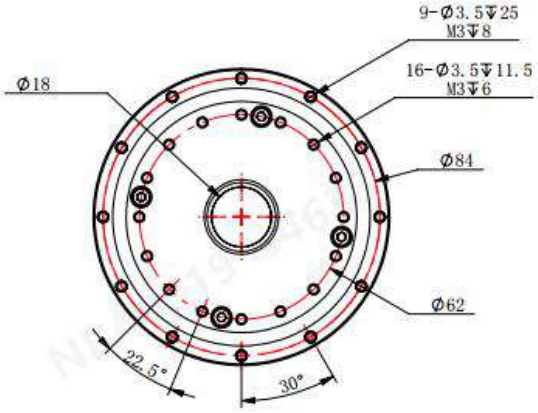

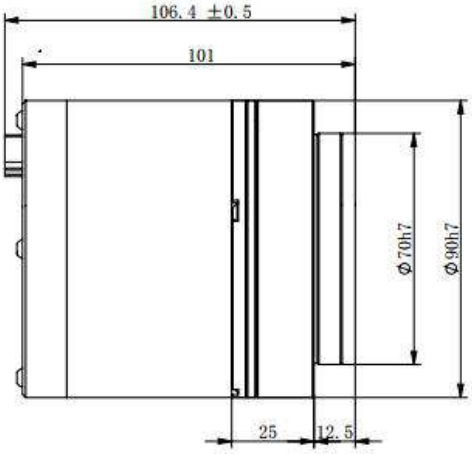

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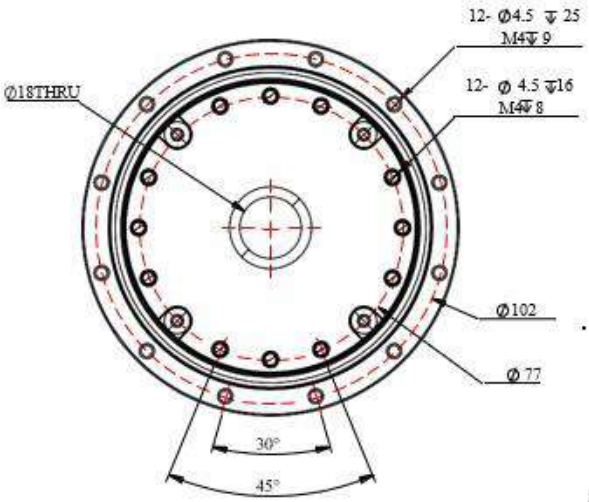

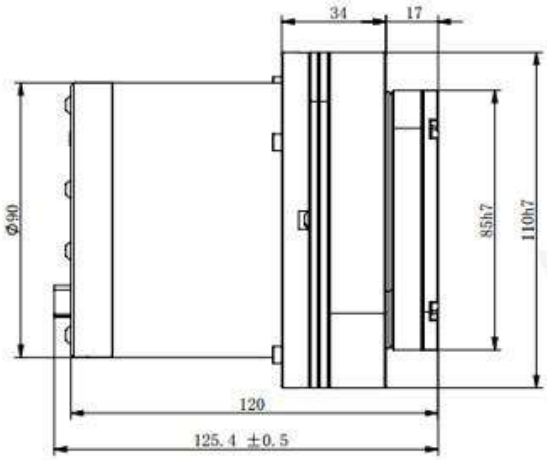

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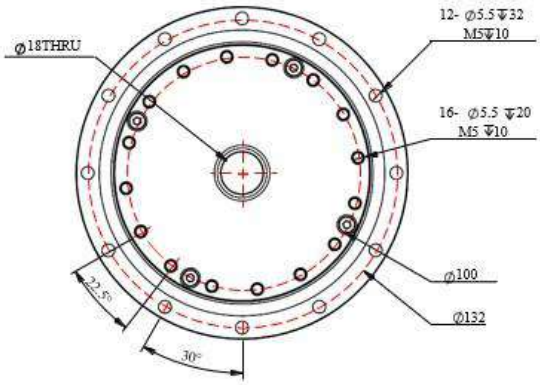

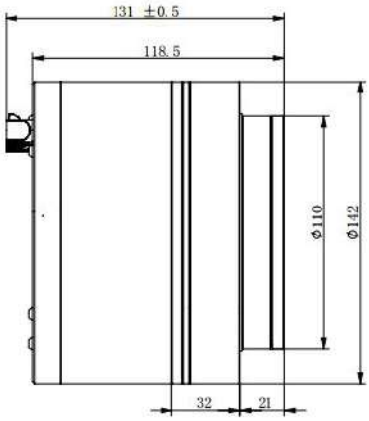

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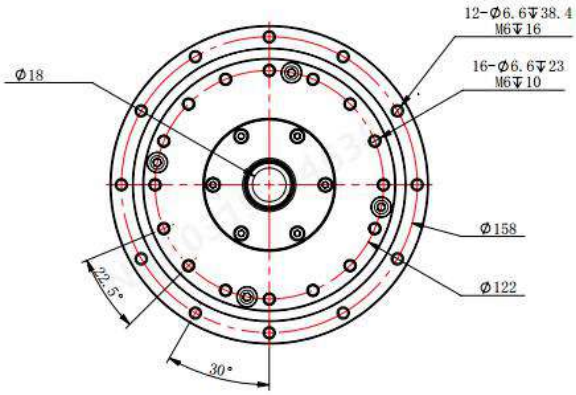
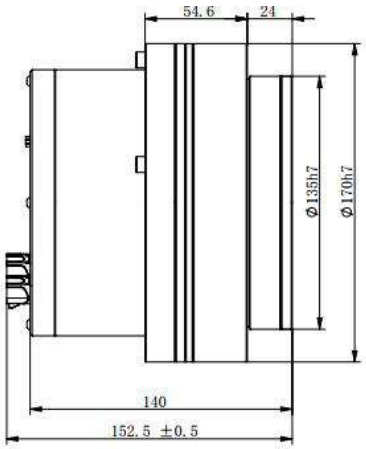




1.3 Product Specification

Item	Unit	RB200-G4008	RB200-G5211	RB200-G7014	RB200-G8017	RB200-G9020	RB200-G11025	RB200-G14232	RB200-G17040
Performance Parameters									
Rated voltage	V	48	48	48	48	48	48	48	48
Rated power	W	30	60	100	180	380	650	1000	1000
Rated current	A	1.3	3.5	2.6	6.3	10	13.5	22	25
Rated torque	N·m	2.6	8.9	10	31	52	87	170	363

Item	Unit	RB200-G4008	RB200-G5211	RB200-G7014	RB200-G8017	RB200-G9020	RB200-G11025	RB200-G14232	RB200-G17040
Peak torque	N·m	9	25	70	134	183	352	850	1450
Rated speed	rpm	40	30	30	30	30	30	25	20
Peak speed	rpm	50	60	40	40	40	40	30	30
Reducer Parameters									
Type	-	Harmonic Reducer							
Reducer	-	100（50/80/120）	100（50/80/120）	100（50/80/120）	100（50/80/120）	100（50/80/120）	100（50/80/120）	120（50/80/100）	120（50/80/100）
Backlash	arcsec	≤ 20	≤ 20	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10
Dimensions									
Length	mm	45	71.5/84.6	93	102	106.4	125.4	131	152.5
Maximum diameter	mm	40	52	70	80	90	110	142	170
Hollow diameter	mm	5	5	18	18	18	18	20	20
Weight	kg	0.35	0.5/0.6	1.07	1.35	2.1	3.3	6.1	8.5
Communication method		CANopen / EtherCAT / Modbus							
Ingress protection rating		IP54							

1.4 Cable Specification

No.	Cable	Applicable Wire Specification		Wiring Specification	Remarks
		AWG	mm²	AWG/ mm²	
1	RB200-G5211 power cable	30-28	0.05-0.08	28/0.081	Compatible with PTFE (Teflon®) flexible wire, OD 0.8mm ~ 0.88mm

No.	Cable	Applicable Wire Specification		Wiring Specification	Remarks
		AWG	mm²	AWG/ mm²	
2	RB200-G7014 power cable	22-16	0.34-1.3	16/1.41	PTFE (Teflon®) flexible wire
3	RB200-G8017 power cable				
4	RB200-G9020 power cable				
5	RB200-G11025 power cable				
6	RB200-G14230 power cable	14-12	2.5-4	14/2.5	-
7	RB200-G17042 power cable				
8	I/O communication cable	32-26	0.05-0.13	28/0.081	Compatible with PTFE (Teflon®) flexible wire, OD 0.76mm ~1.0mm
9	Ethercat communication cable/adapter cable				

2 Debugging

2.1 VCSDSoft_L Debugging Software

VCSDSoft_L is a host application for monitoring and debugging the RB200 driver on a PC.

Figure 2-1 VCSDSoft_L Debugging Software Interface

Users connect the RB200 driver to the PC via a USB-to-RS-485 cable. After installing VCSDSoft_L and its driver, users can configure and debug the RB200 driver's functions and performance.

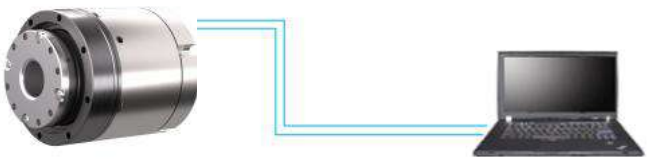


Figure 2-2 Physical Connection Between RB200 and PC

Table 2-1 VCSDSoft_L Host Software Details

VCSDSoft_L	Details
Software version	VCSDSoft_L Ver 2.1 (compatible debugging software for SD100/RB200)
Supported OS	Windows 7/Windows 10/Windows 11
Driver path	 \VCSDSoft_L Ver2.1\driver
Communication cable	USB to RS-485

2.2 Basic Operation

2.2.1 Connection

Open the host debugging software and establish a connection via RS-485.

First, launch the software and click [Project] to create a new project. A temporary-project option is available; this manual uses a temporary project as an example. Create the project as shown in the figure below.

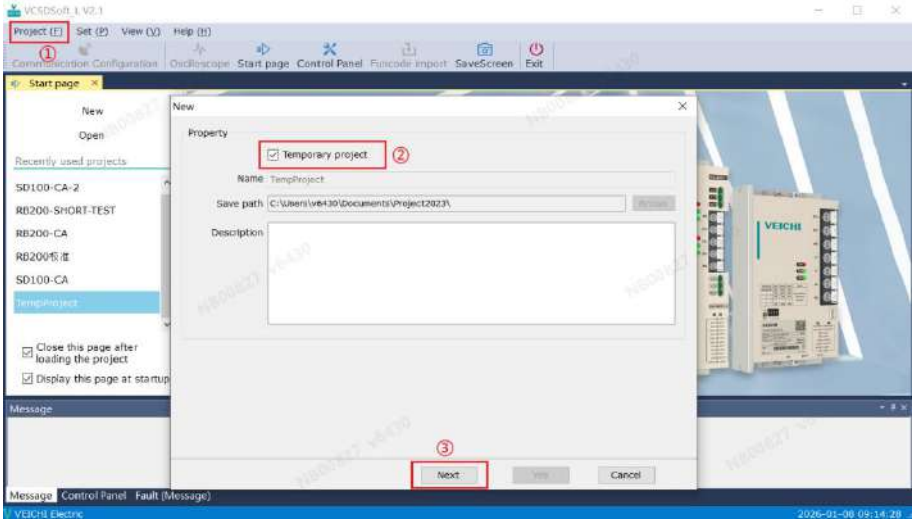


Figure 2-3 New Project

Next, set [Communication Method] to [RS485]. Click the [Refresh] button to rediscover the port number (can also verify it in the PC's Device Manager). Configure the communication parameters as follows (RS-485 factory default baud rate: 115200). Click [Online Search]—when the device is detected, communication is successful. Select the device and click [Sure] (Figure below).

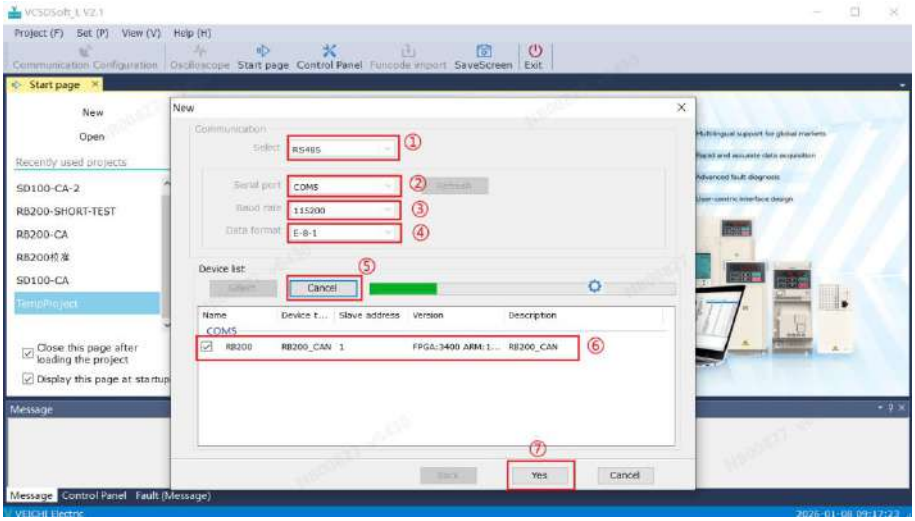


Figure 2-4 Communication Parameters Configuration

Once the project is created, the main VCSDSoft_L interface will appear, as shown in the figure below.

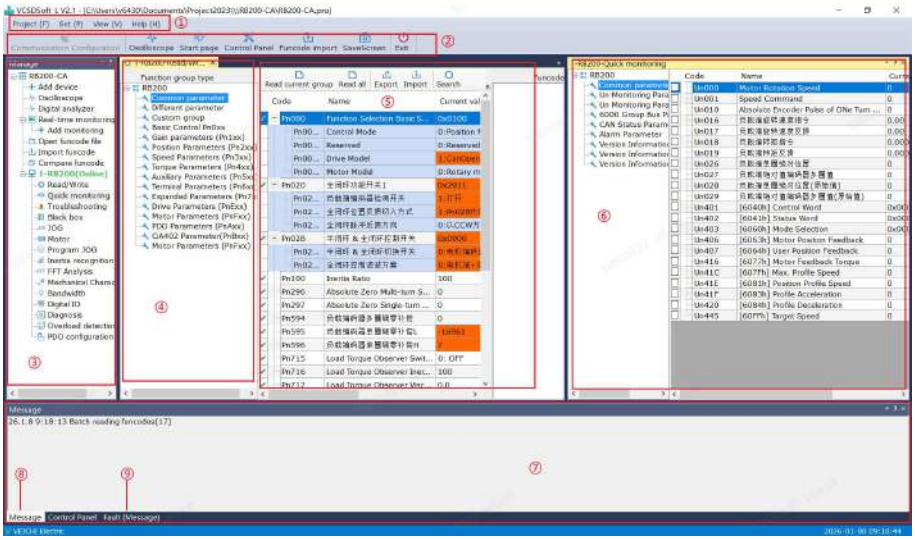


Figure 2-5 VCSDSoft_L Main Interface

①Navigation bar: Manages project file operations and project configuration information, and displays the bottom page layout view and Help information.

②Quick toolbar: Offers quick-access buttons for commonly used tools such as communication configuration, oscilloscope, control panel, and function code import.

③ Project management area: Provides project management operations and entry points for controller-supported auxiliary functions, including read/write parameters, real-time monitoring, fault diagnosis, JOG, motor write, program JOG, inertia identification, FFT analysis, mechanical characteristics, bandwidth setting, digital I/O, diagnostic parameters, overload monitoring, and PDO configuration.

④Read/Write parameters: Displays a categorized list of parameters used to switch the content shown in the main function parameter interface.

⑤ Main function parameter interface: Serves as the primary interface for reading and writing all Pn parameters, with support for batch data import, export, and comparison. (Note: Areas ④ and ⑤ form a single interface, accessed by double-clicking Read/Write Parameters in area ③.)

⑥ Real-time monitoring interface: Displays real-time monitoring of various parameters. (Accessed by double-clicking [Real-time Monitoring] in area ③.)

⑦Control panel: Provides quick debugging functions for the servo controller, including enable, factory reset, and fault status.

⑧Message: Displays debugging messages output by the host.

⑨Fault notification: Displays fault information.

2.2.2 Read/Write Parameters and Real-time Monitoring

The Read/Write Parameters interface (see the figure below) allows reading and writing of all Pn parameters and supports the following functions:

- Write: Select the target function code, enter the desired value, and press Enter to apply the change.
- Read: Click the to load all parameters in the current group or all groups.
- Import/export: Export the modified parameters of the current group to a ".param" file, which can be imported in batch later.
- Frequently Used Parameters: Add frequently used parameters for quick access and modification.

- Compare: Compare the current parameter set with the default settings or a previously saved ".param" file to identify any changes and facilitate analysis.

Figure 2-6 Read/Write Parameters Interface

In the real-time monitoring interface (see the figure below), all Un-group parameters and the 6000-group bus communication object dictionary parameters can be read in real time by selecting the checkbox to enable data acquisition. Right-click frequently used monitoring parameters to add them to the Frequently Used Parameters for continuous real-time reading, filtering out unnecessary parameters.

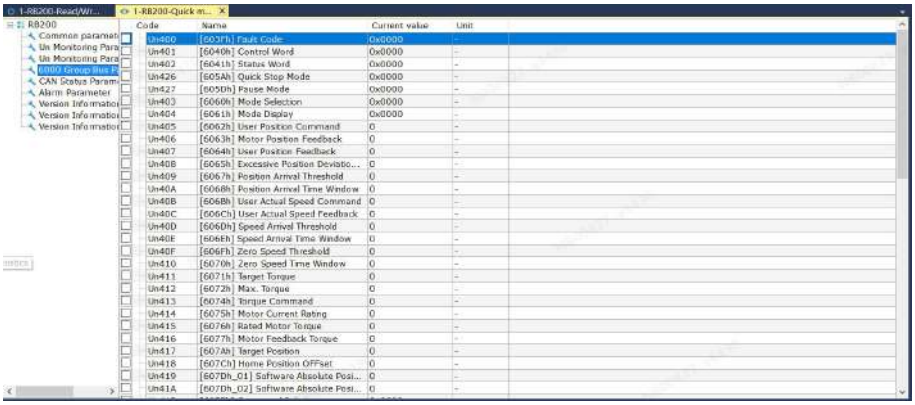


Figure 2-7 Real-time Monitoring Interface

2.3 Oscilloscope

A high-speed digital oscilloscope is integrated into the host software for data capture and waveform display, facilitating data analysis.

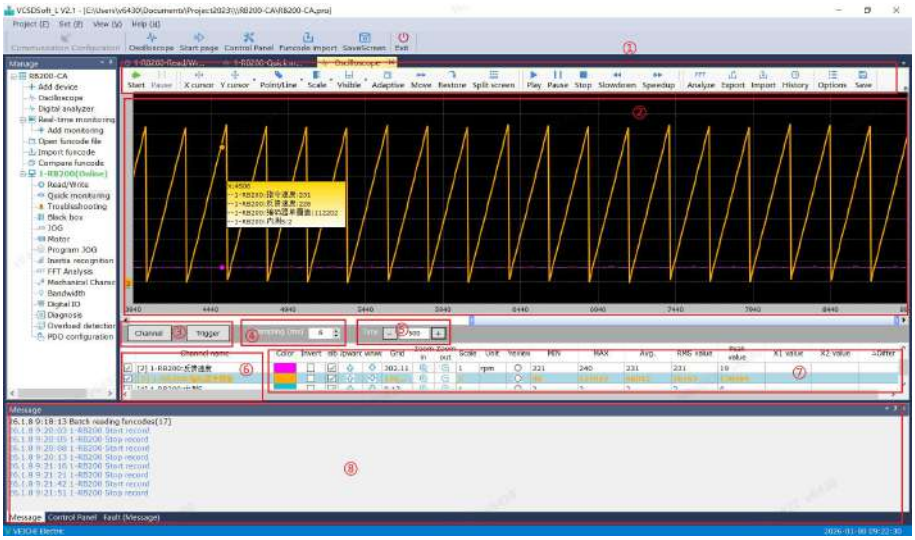


Figure 2-8 Oscilloscope Interface

①Toolbar: Includes Start, Pause, X/Y Cursors, Labels, Scale, Visible (show/hide curves), Adaptive, Move, Restore, Play, Pause, Stop, Decelerate, Accelerate, Export, Import, History, Options (oscilloscope settings), Save, and Full Screen.

② Waveform display area: Provides a visual waveform of each channel's data and serves as the main interface for toolbar operations.

③Channel & Trigger settings: Allows selection of channel parameters and configuration of trigger settings, including trigger mode and trigger conditions.

④ Sampling cycle: Defines the sampling cycle in real-time recording mode (unit: ms). The minimum sampling cycle is 1ms in Real-Time Mode and 125μs in Trigger Mode.

⑤Time axis: Adjusts the horizontal time scale in the display area; increasing the time axis stretch shows more waveform cycles.

⑥Channel name: Shows the monitoring parameters for each channel added via channel setting.

⑦Channel details: Displays basic waveform information and the actual sampled values for each channel.

⑧Message window: Displays output messages exchanged between the oscilloscope and the servo controller.

⚠ Caution
● The oscilloscope is unavailable when using auxiliary debugging functions.

2.4 CANopen Debugging Example

The RB200 series supports the CANopen communication protocol, allowing users to debug the RB200 driver via CANopen. In this section, a VC5-3232MAT-32 PLC is used as the master controller and an RB200 as the slave device to demonstrate Profile Position Mode control and outline the CANopen control process.

There are two primary methods for configuring the servo controller over CANopen: using SDO access or PDO communication.

2.4.1 Environment Setup and PDO Configuration

Step 1: Open the PLC programming software AutoStudio and create a new temporary project with PLC type VC5, as shown in the figure below.

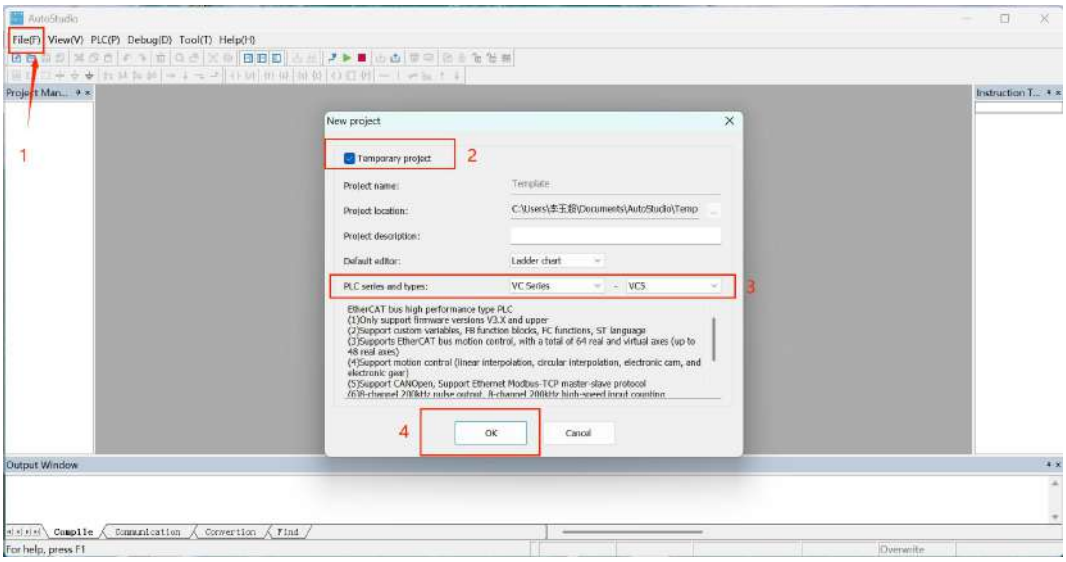


Figure 2-9 Create VC5 New Project

Step 2: In the Project Manager on the left, locate the Communication Configuration tab. Double-click “CAN” to open the CAN configuration window. Set Protocol Type to “Master,” enter the correct baud rate and station ID, and then click OK, as shown in the figure below.

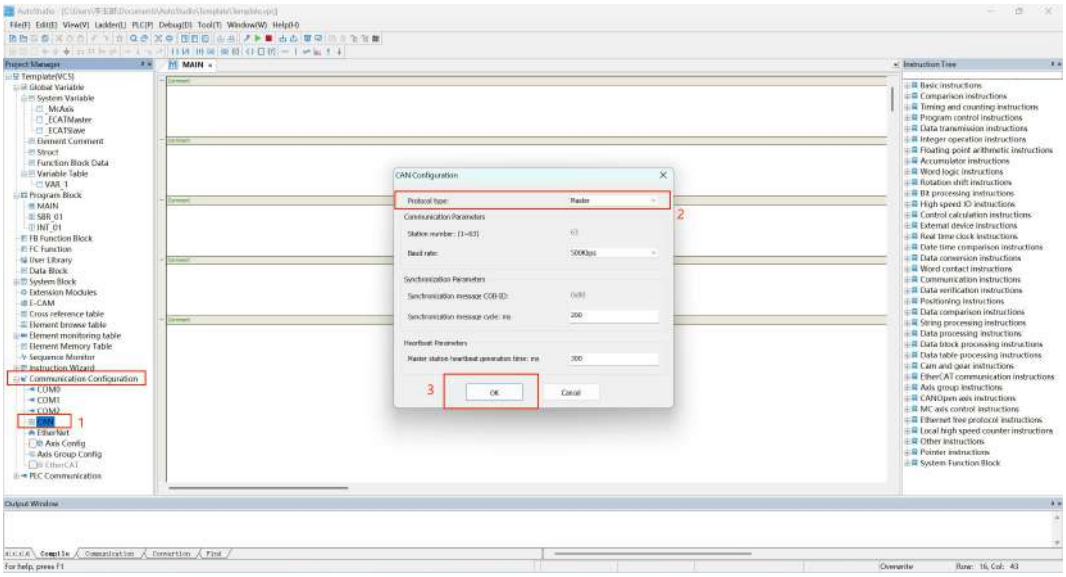


Figure 2-10 Configure CAN

Step 3: Right-click the “CAN” and select Add Configuration, as shown in the figure below.

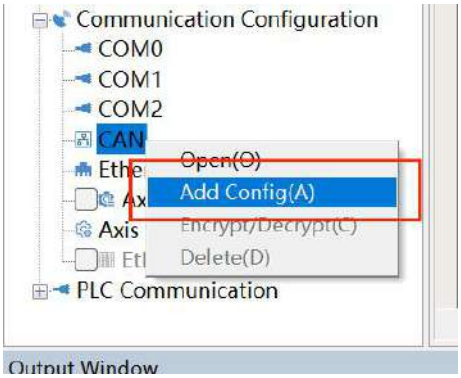


Figure 2-11 Add CAN Configuration

Step 4: Double-click the newly added CANopen configuration to open the CANopen setup interface, as shown in the figure below.

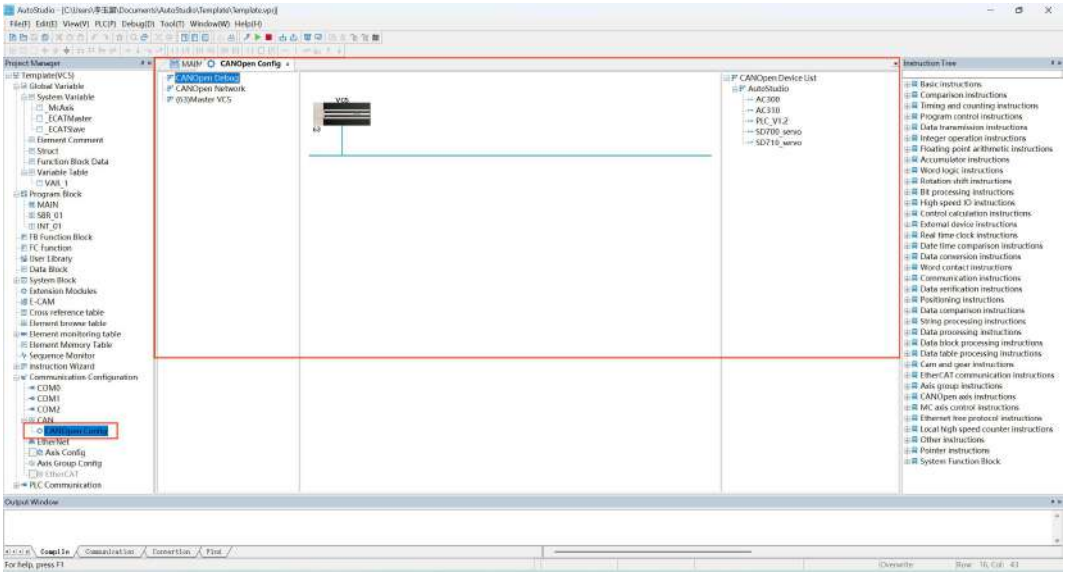


Figure 2-12 CANopen Configuration

Step 5: In the configuration interface, right-click the CANopen Device List on the right and click Import EDS. This imports the EDS file that matches the servo controller, as shown in the figure below.

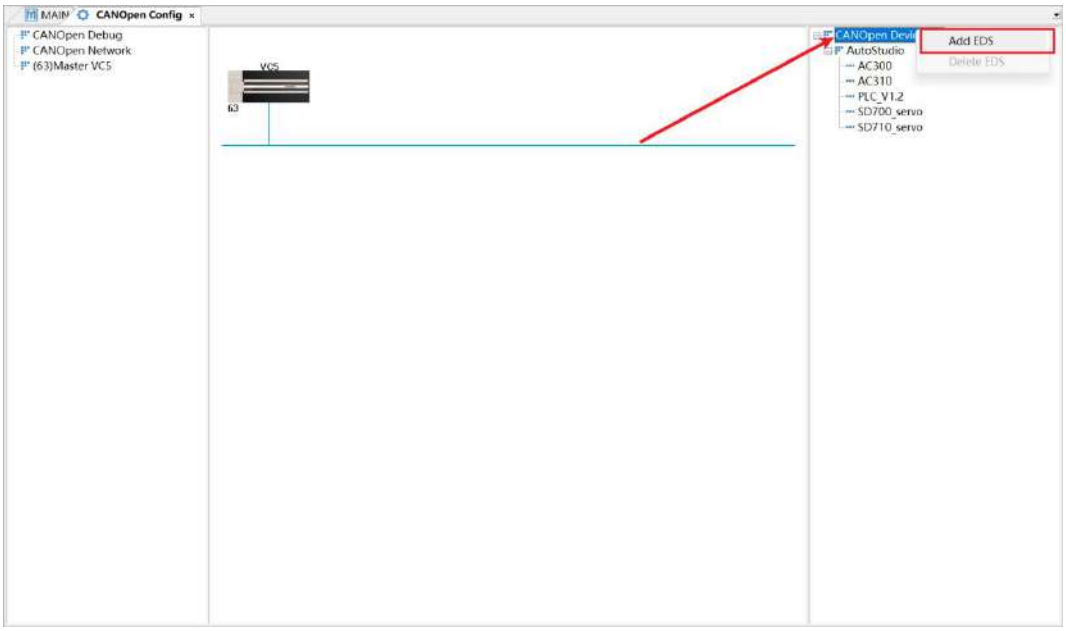


Figure 2-13 Import EDS File

Step 6: After importing the EDS file, a device entry with the same name as the controller appears in the list. Double-click it to add the controller to the bus deployment on the left, as shown in the figure below.

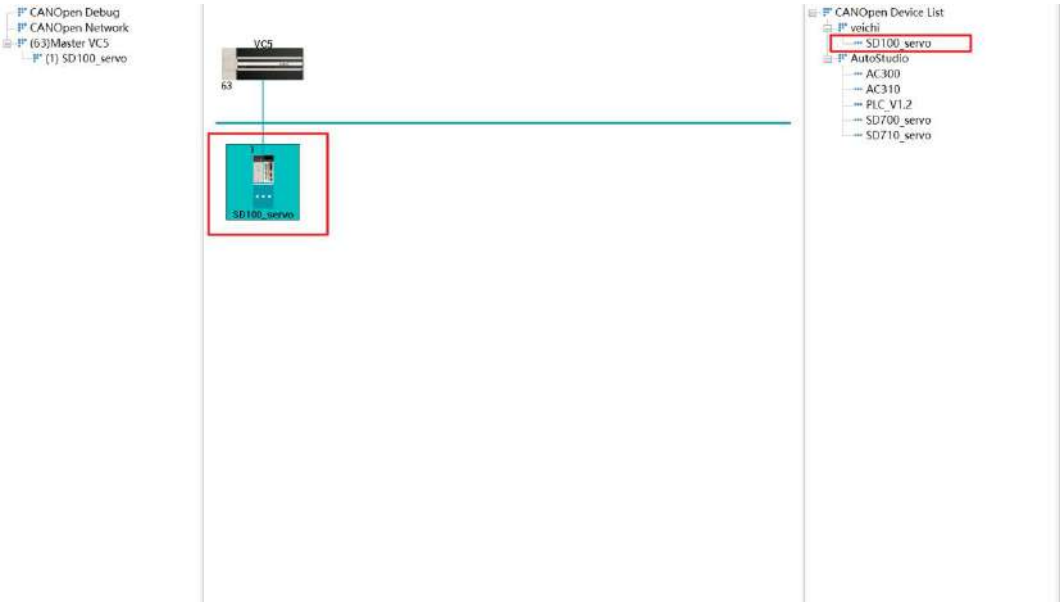


Figure 2-14 Add Controller to Bus Deployment

Step 7: Double-click the slave controller icon on the bus to open the slave configuration interface, as shown in the figure below.

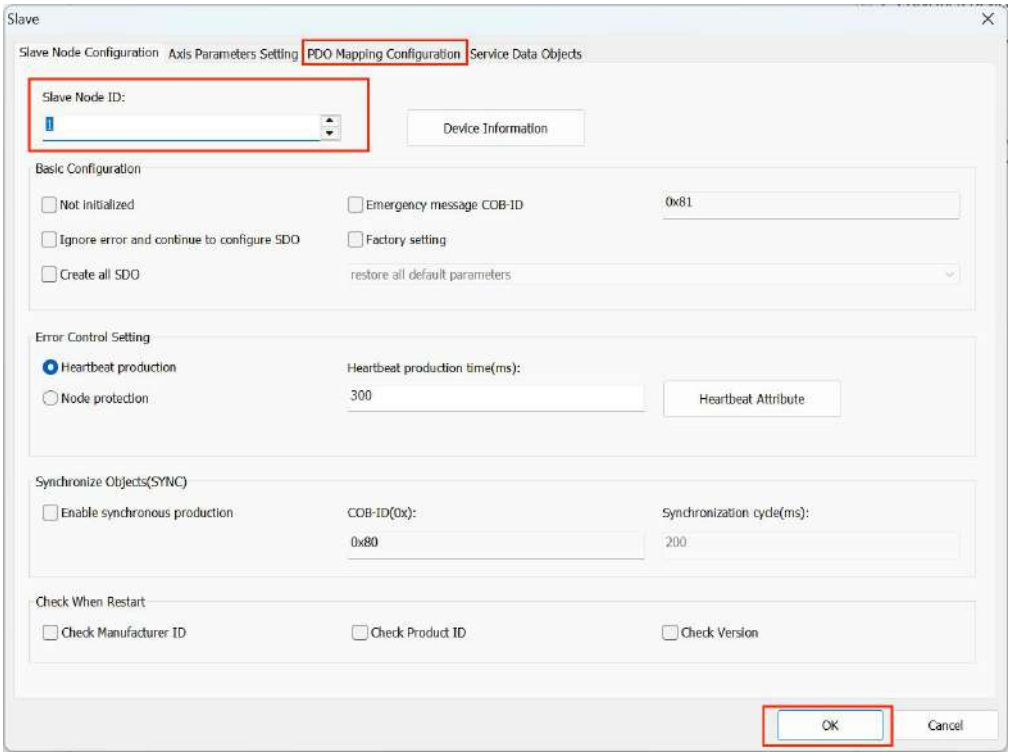


Figure 2-15 Slave Configuration

Step 8: With the slave node ID matching the target device, click the PDO Mapping and Configuration tab to open PDO settings. To configure RPDO2 mapped to object dictionary index 6060 (Control Mode), select PDO2 under RDO, click Add to open the object dictionary index list, find index 6060, select it, and click Add. This adds the PDO mapping at the appropriate location, as shown in the figure below.

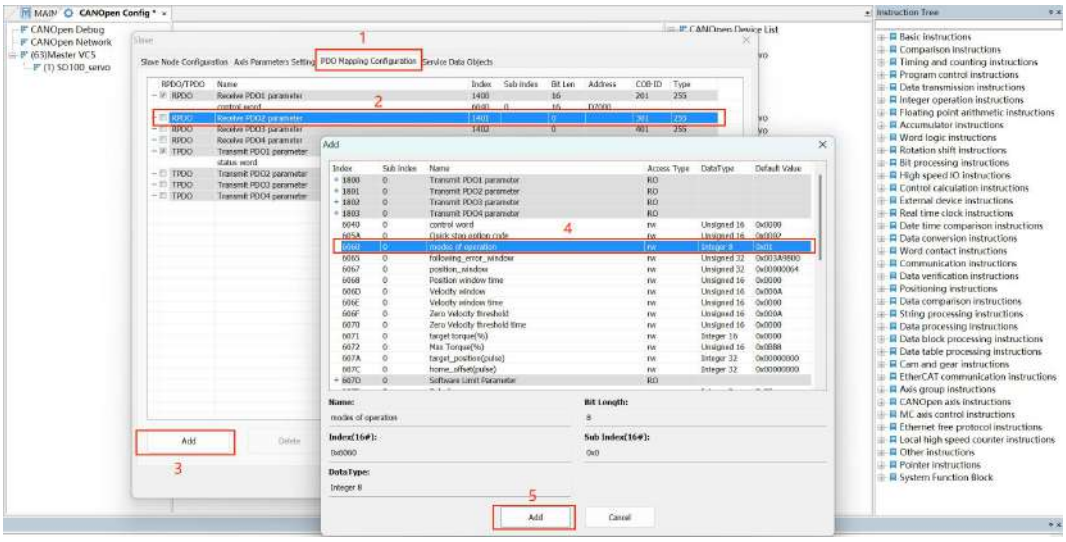


Figure 2-16 Configure PDO Mapping

To enable this PDO, check the box before it, as shown in the figure below.

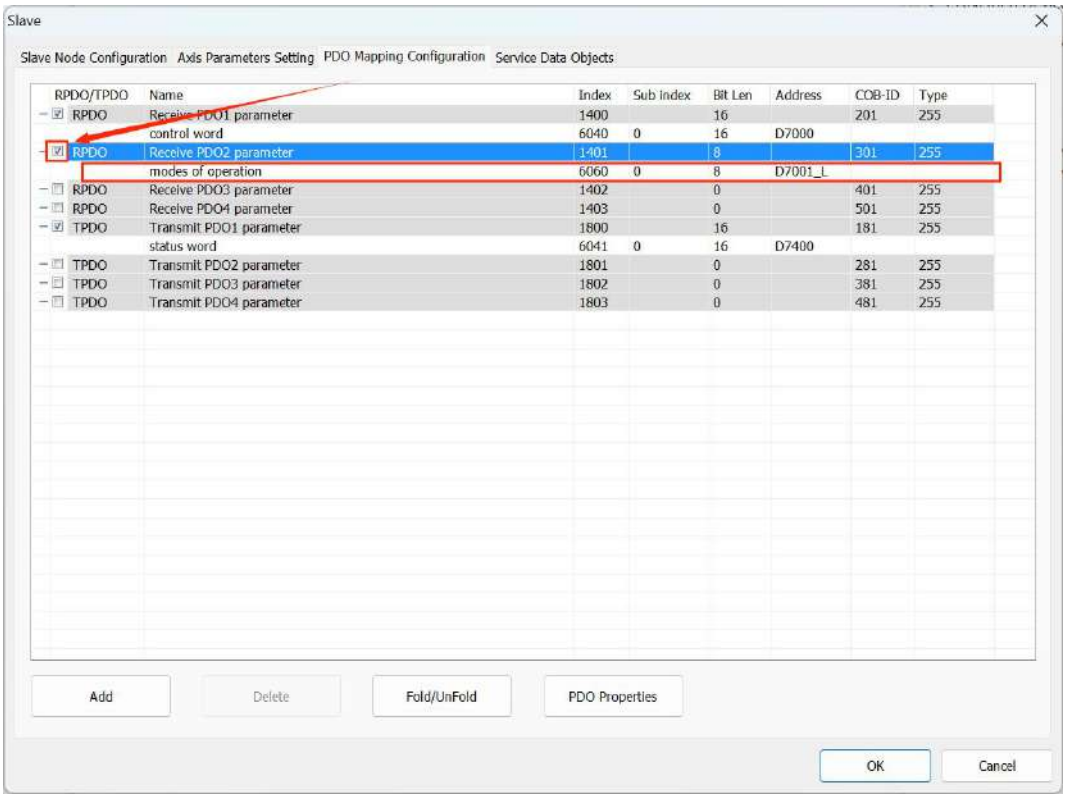


Figure 2-17 Check the PDO

Step 9: After adding the basic indexes needed for Profile Velocity Mode to the PDO mapping, note the corresponding address variables (highlighted in red in the figure below). Click OK to exit the configuration interface. Each time you modify the PLC program, download it to the PLC and switch the PLC to Run mode.

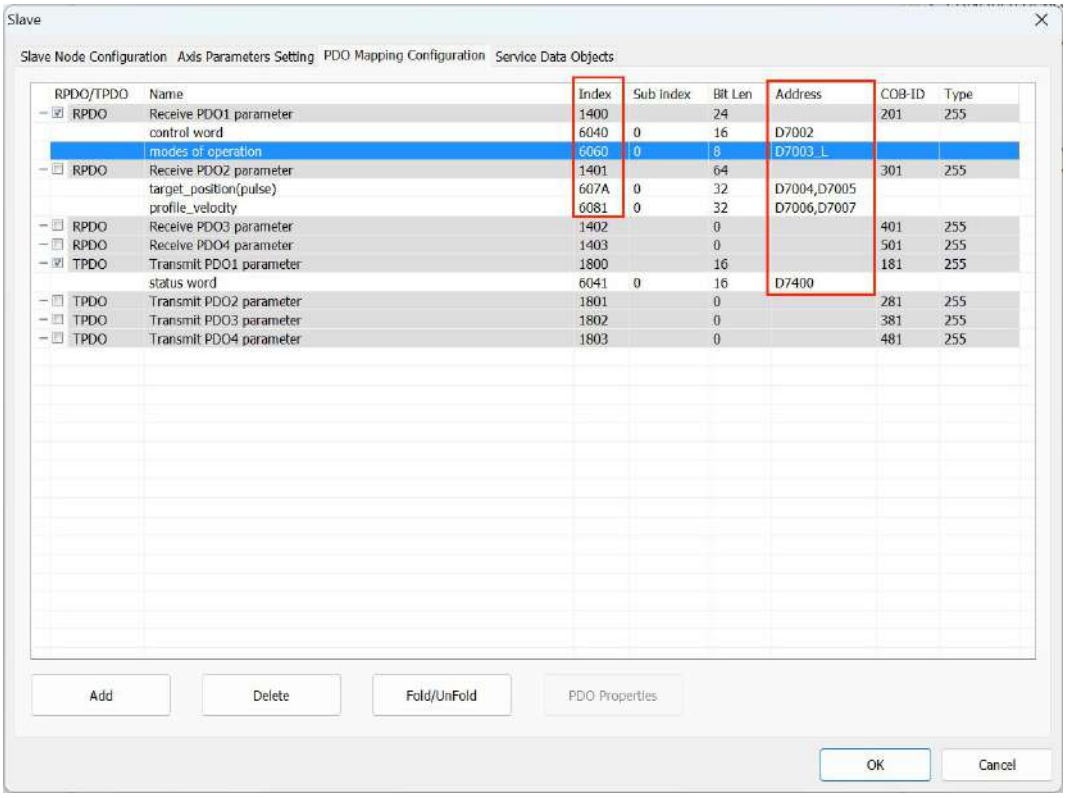


Figure 2-18 PDO Mapping

Step 10: Write the CANopen control program using the parameters listed in the table below.

Table 2-2 Object Dictionary Parameter Writing

Item	Step	Parameter Input
Profile Position Parameter Assignment	0	607Ah=100000
	1	6081h=10000
Control Mode Switching	4	6060h=0x01
Servo Enable	5	6040h=0x06
	6	6040h=0x07
	7	6040h=0x0F
	8	6040h=0x1F

After enabling the servo, the motor moves at 60rpm until the user position feedback (6064) reaches 100000. Open the oscilloscope to observe the written object and feedback velocity waveforms, as shown in the figure below.

Figure 2-19 Oscilloscope Waveforms

2.4.2 SDO Read/Write

In CANopen communication, PDO mapping is implemented via SDO. SDO can also perform data exchange, though at lower efficiency. The following steps demonstrate Profile Position Mode configuration using SDO.

Step 1: In the CANopen configuration interface, click CANopen Debug to open the CANopen Debug window and start monitoring, as shown in the figure below.

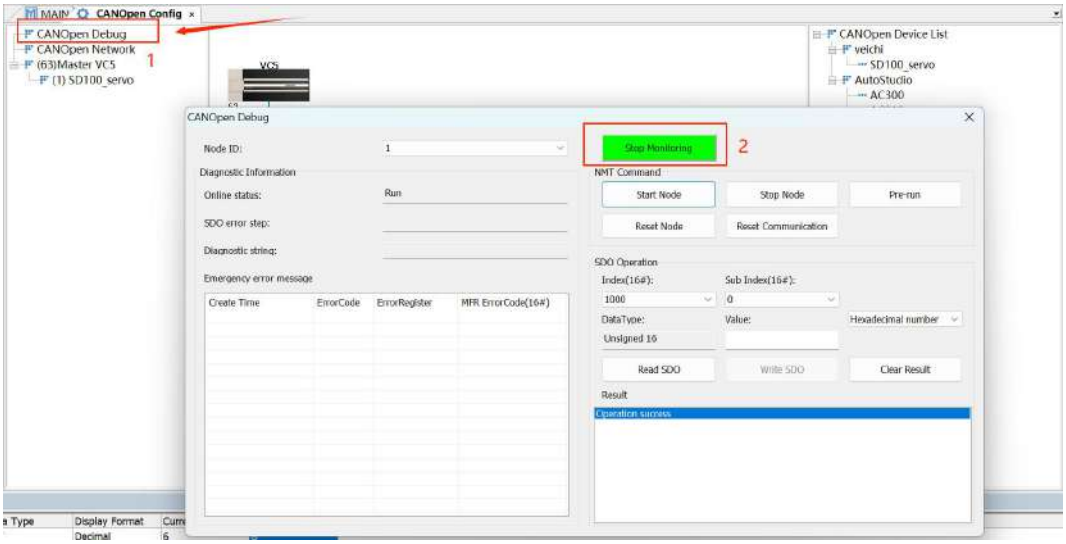


Figure 2-20 CANopen Debug Monitoring

Step 2: In the SDO Read/Write section, locate indexes 607A, 6081, 6060 and 6040. In the Data Value field, enter the values listed in the figure below. (Note: Select the appropriate data type from the dropdown based on the value entered.)

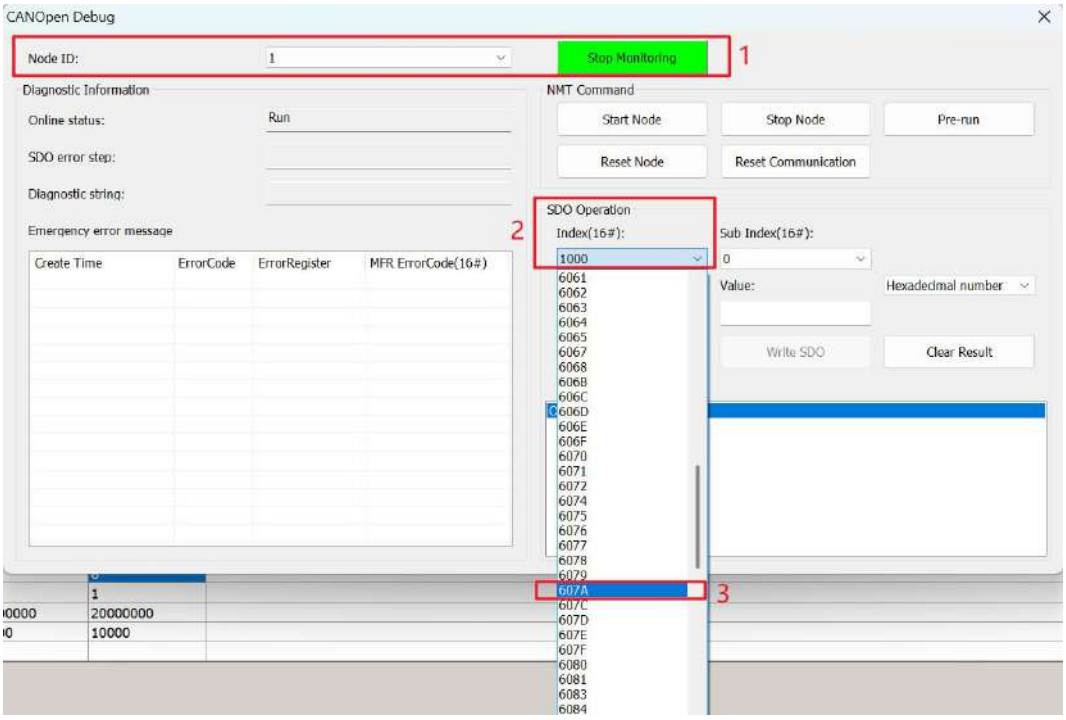


Figure 2-21 SDO Read/Write Object Dictionary

Step 3: Use Write SDO and Read SDO to access each index, as shown in the figure below. After writing the parameters, the motor will move in Profile Position Mode.

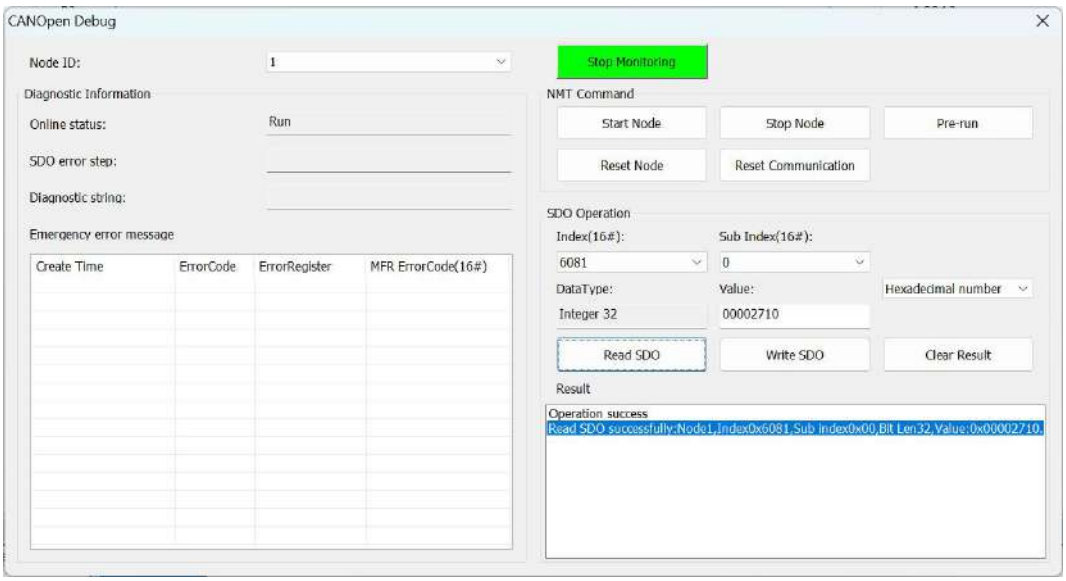


Figure 2-22 SDO Read/Write Interface

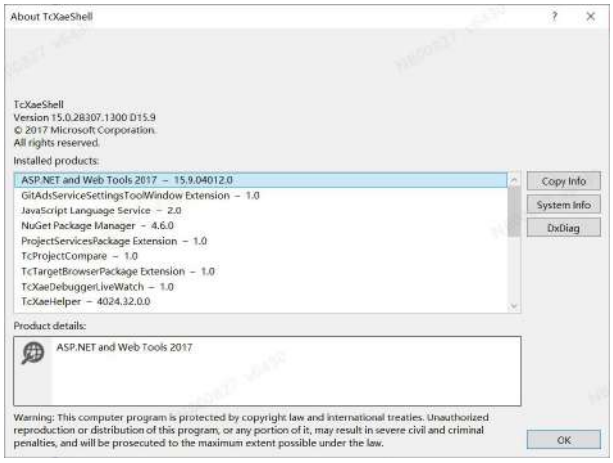
For object dictionary parameters required by other control modes, refer to the motion-mode descriptions in the Communication chapters.

2.5 EtherCAT Debugging Example

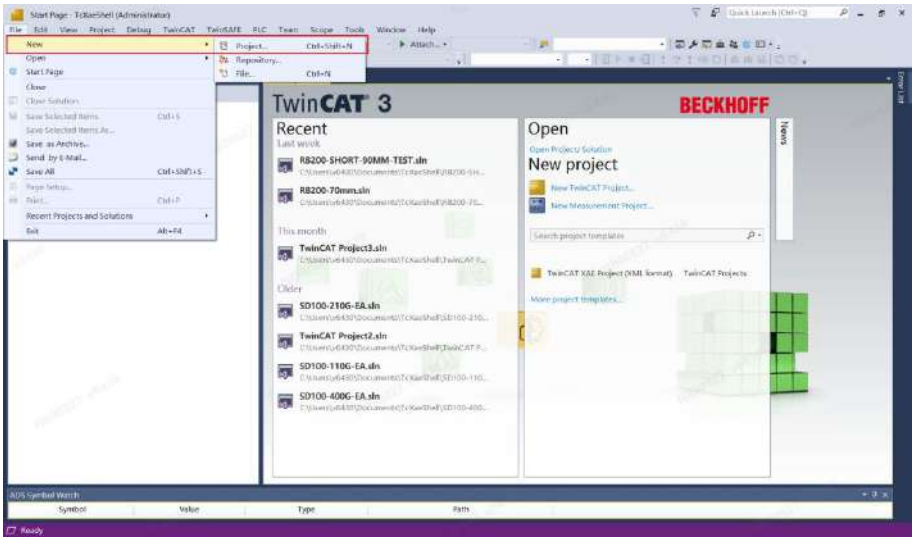
The RB200 series supports the EtherCAT communication protocol, allowing users to debug the RB200 driver via EtherCAT. This section uses TWINCAT as the master controller and the RB200 as the slave device to demonstrate an example operation of Profile Position Mode control, briefly outlining the control flow for EtherCAT.

2.5.1 TWINCAT Debugging Steps

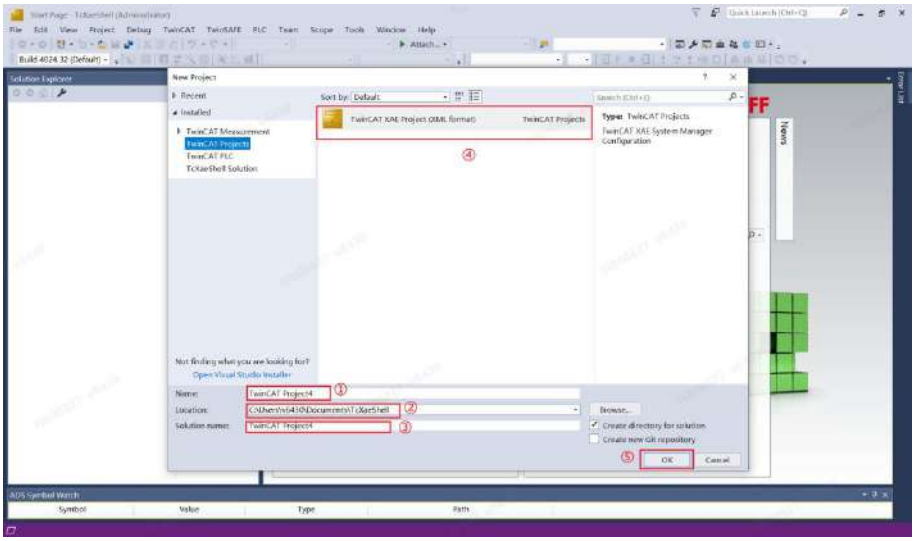
TWINCAT version:



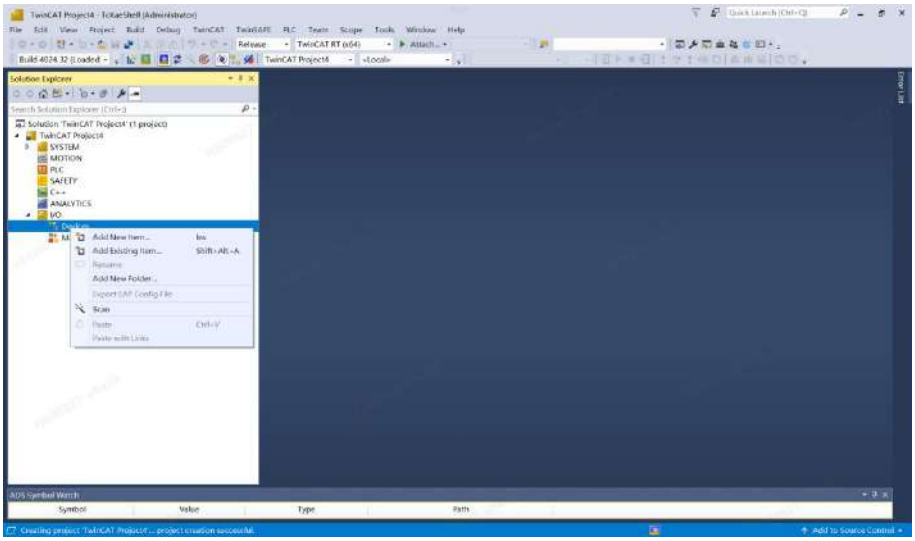
Step 1: Create a new project.



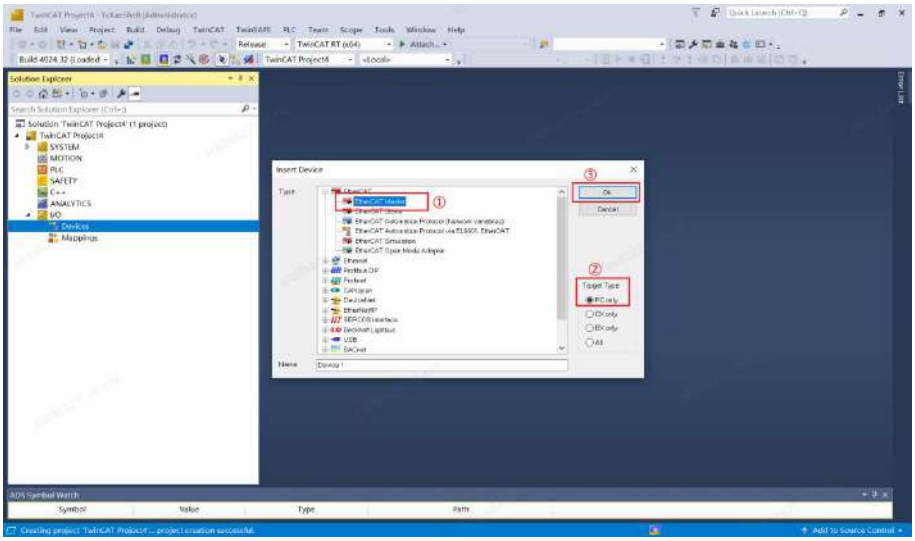
Step 2: Choose a project template and enter project information.



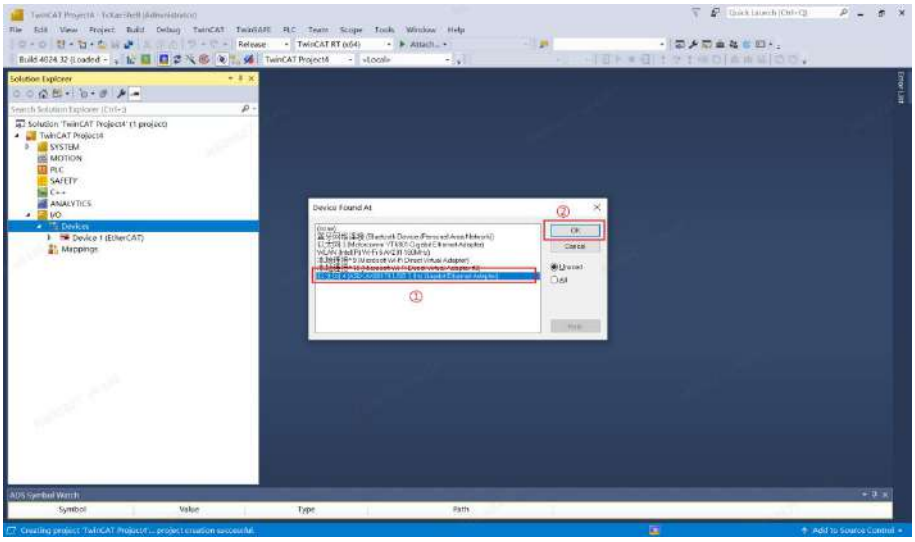
Step 3: Add a new item under Devices.



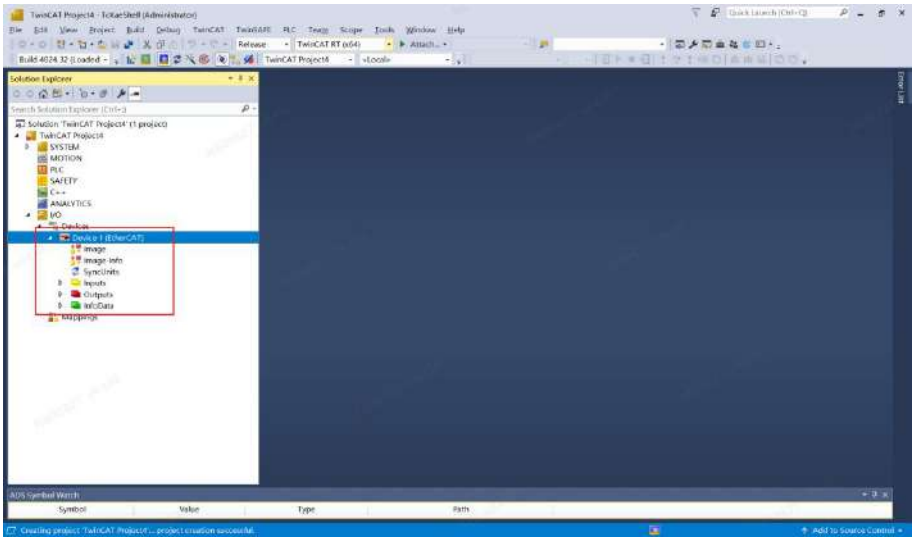
Step 4: Add EtherCAT Master as the control master.



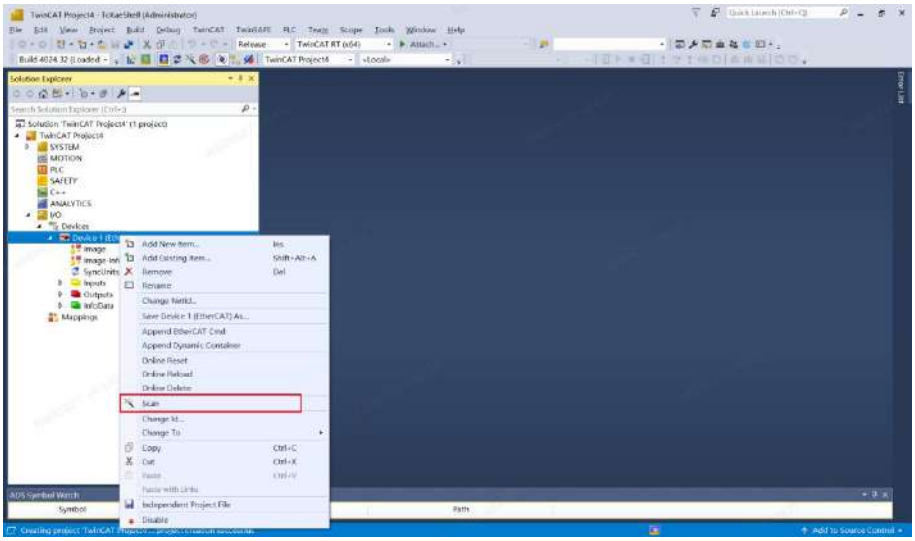
Step 5: Select the PC network interface.



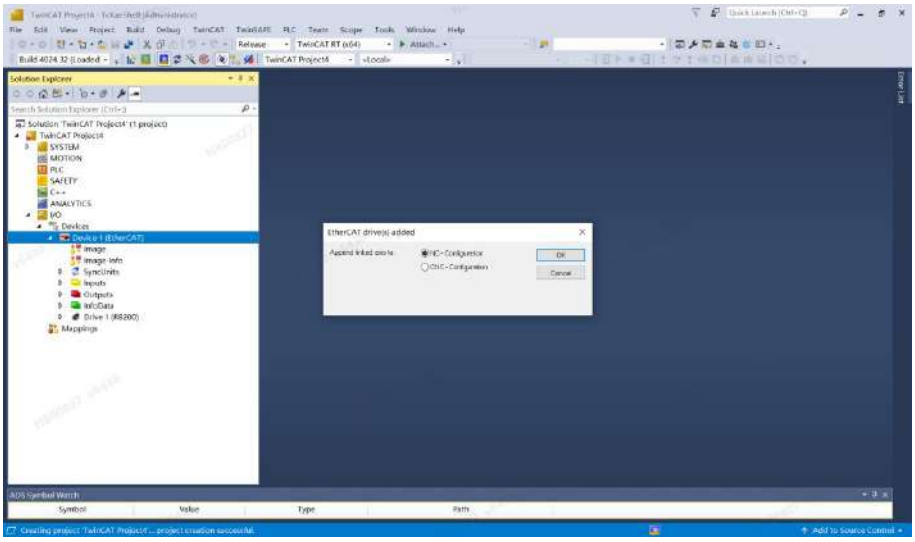
After adding, the EtherCAT master information will appear under Devices in the Project Manager.



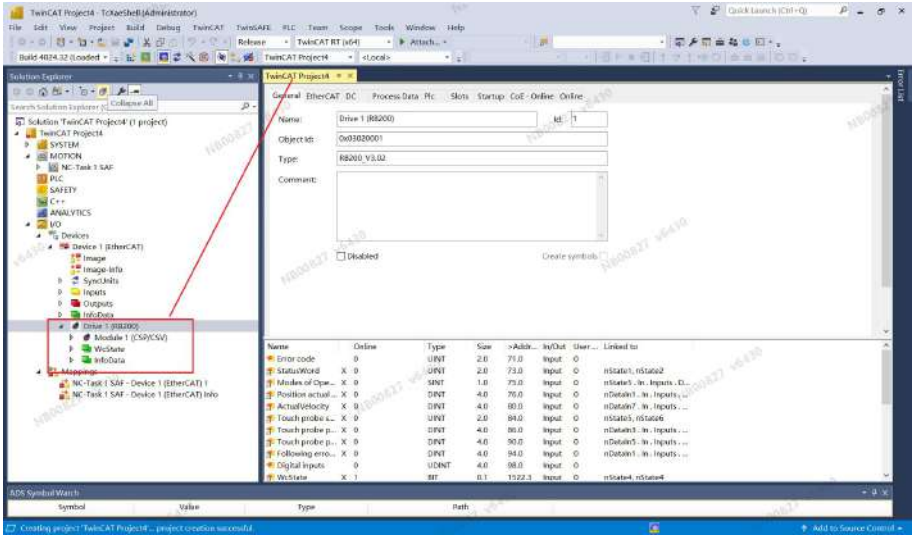
Step 6: Add a slave under the EtherCAT Master.



Step 7: Select the NC configuration.



After adding the slave, the SD100 slave will appear under the EtherCAT Master in the Project Manager on the left; double-click the SD100 slave to open the slave setting interface.



2.5.2 EtherCAT Troubleshooting

1. Problem:

The TwinCAT cannot find EtherCAT devices from the installed network adapter (NIC), and only RT-Ethernet devices are shown.

Resolution:

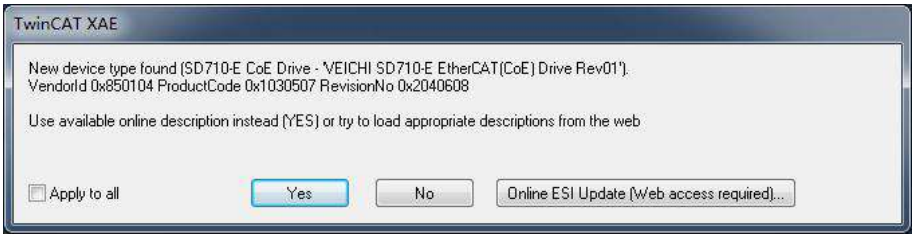
(1) Check TwinCAT settings and confirm the network adapter (NIC) is correctly installed.

(2) Verify wiring and that the EtherCAT network status is normal (function code Un032).

(3) Check that the function code Pn000.Z is set to the EtherCAT (Pn000.Z = 2).

2. Problem:

During device scan with TwinCAT, a dialog appears: “New device type found”, as shown in Figure below.

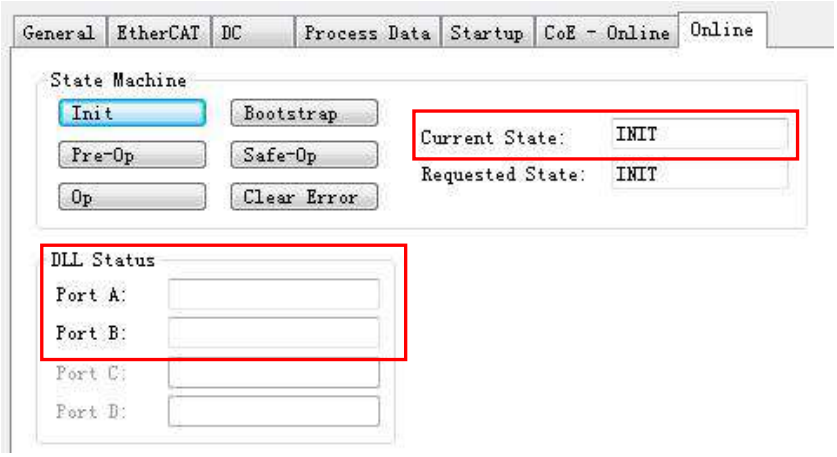


Resolution:

Copy the RB200 XML file to the TwinCAT folder (typically C:\TwinCAT\IO\EtherCAT) and restart the TwinCAT system.

3. Problem:

The TwinCAT shows the EtherCAT Current State as INIT in Config Mode while the DLL Status field is blank, as shown in the figure below:



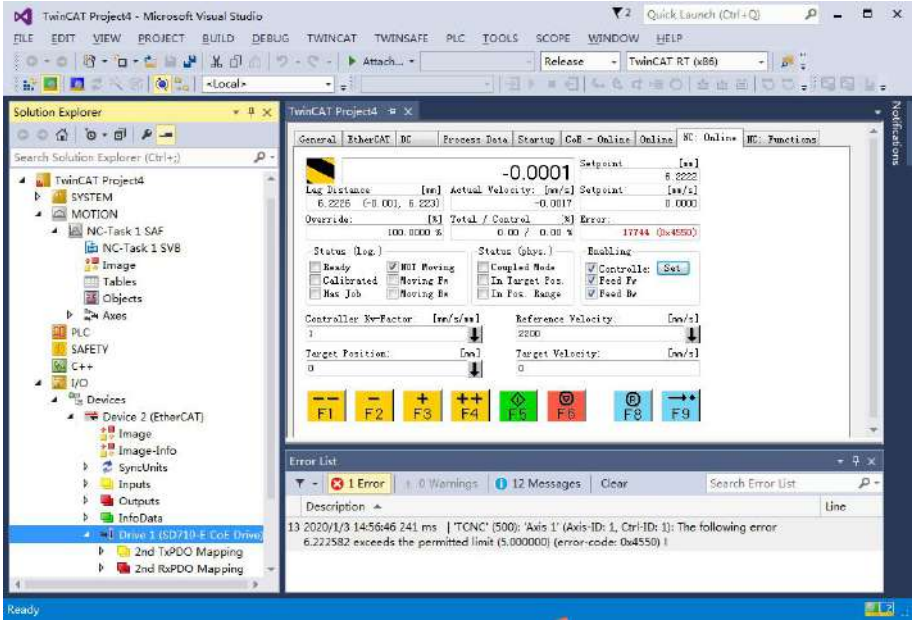
Resolution:

(1) Set function code Pn000.Z to 2 (EtherCAT).

(2) Check the wiring of the EtherCAT communication ports between the host PC and the drive (function code Un032).

4. Problem:

TwinCAT reports a “Following Error” (Error code: 0x4550).



Resolution:

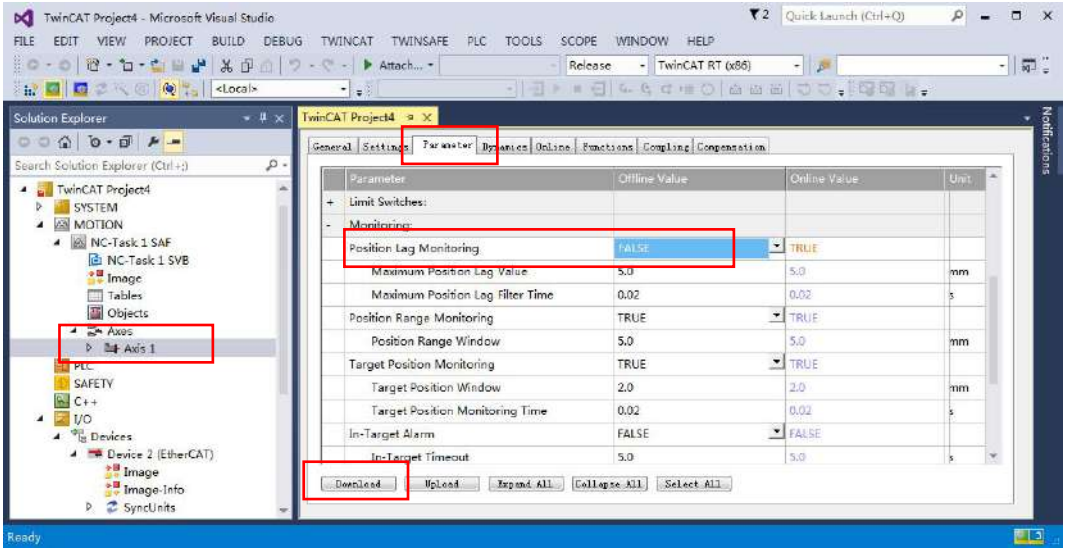
(1) Check the drive for faults or alarms and clear any existing faults/alarms.

(2) Set “Following Error Calculation” to “Extern”.

Step 1: Select “Axis 1” in the left window;

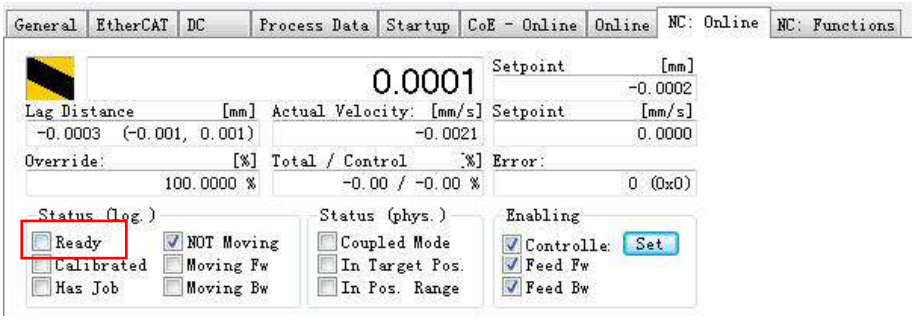
Step 2: On the “Parameter” tab, set “Position Lag Monitoring” to “False”;

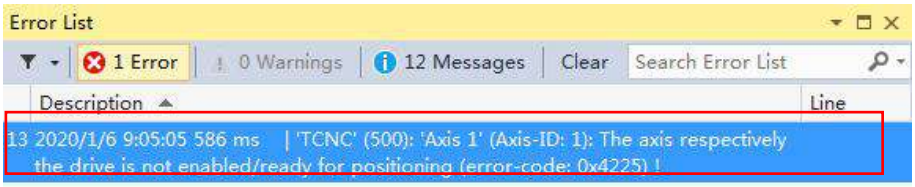
Step 3: Click “Download” and confirm by clicking “OK” in the dialog.



5. Problem:

In NC mode, after the drive is enabled, “Ready” in Status remains inactive; jogging forward or backward produces fault code 0x4225.





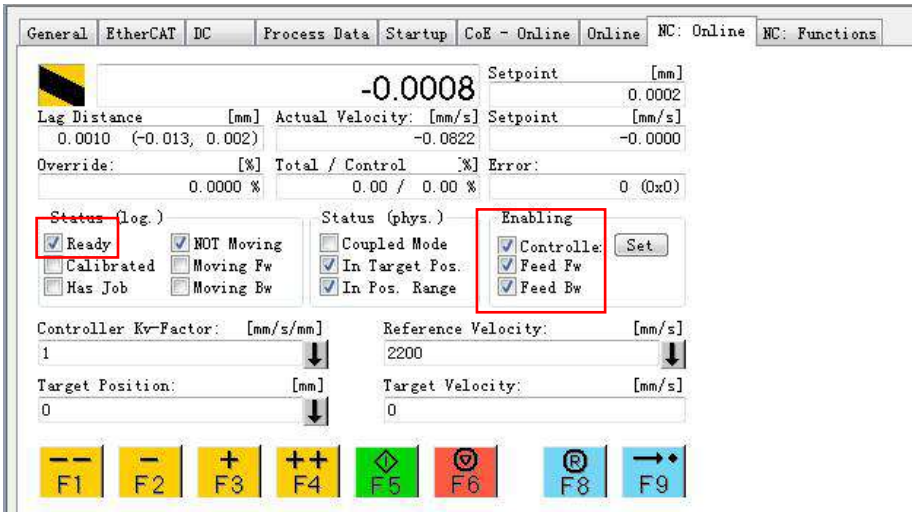
Resolution:

(1) Check whether the drive currently has any faults.

(2) Check whether the drive’s main power circuit is powered.

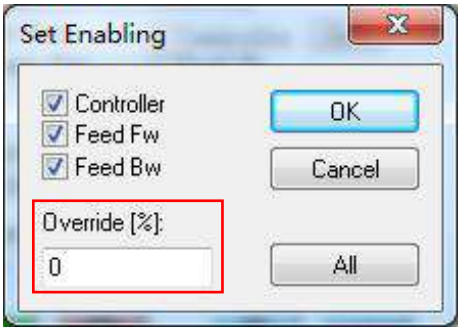
6. Problem:

In NC mode, after the drive is enabled, “Ready” becomes active and forward/backward jogging is allowed, but the motor does not rotate during jogging.



Resolution:

After pressing the “Set” button, check whether “Override (%)” is “0”; if so, change it to a non-zero value.



3 Parameter Description

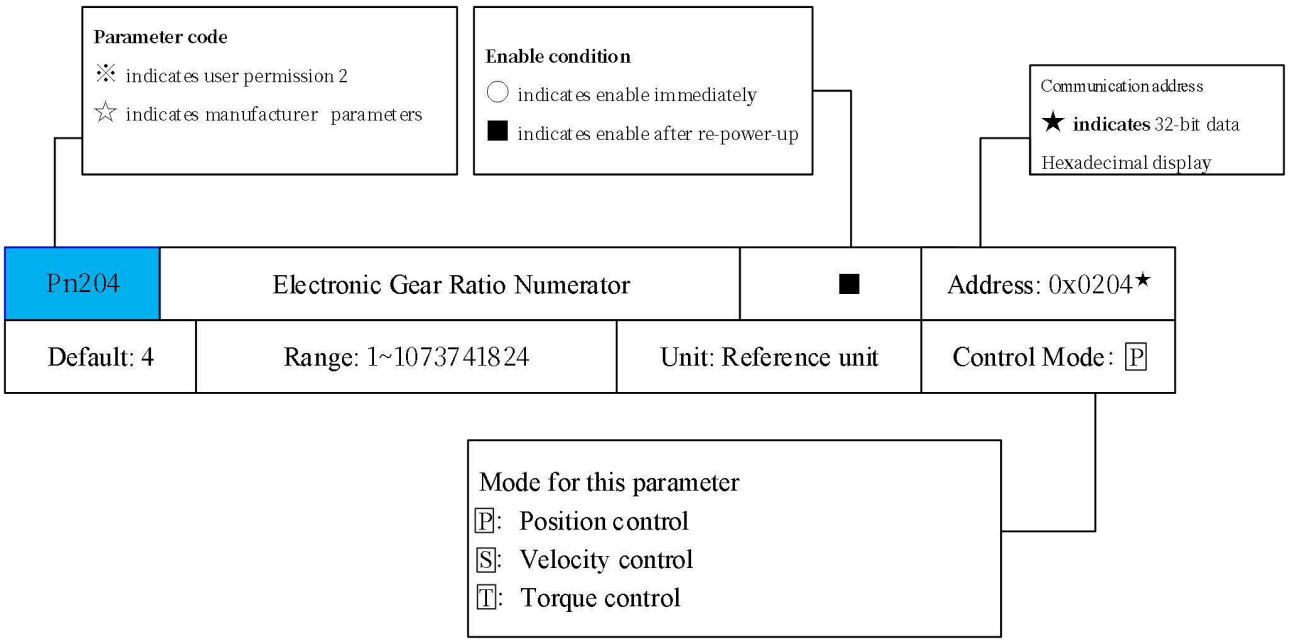
3.1 Parameter Type

The RB200 drive includes 11 groups of Pn setting parameters and one group of Un monitoring parameters. All parameters are categorized as follows:

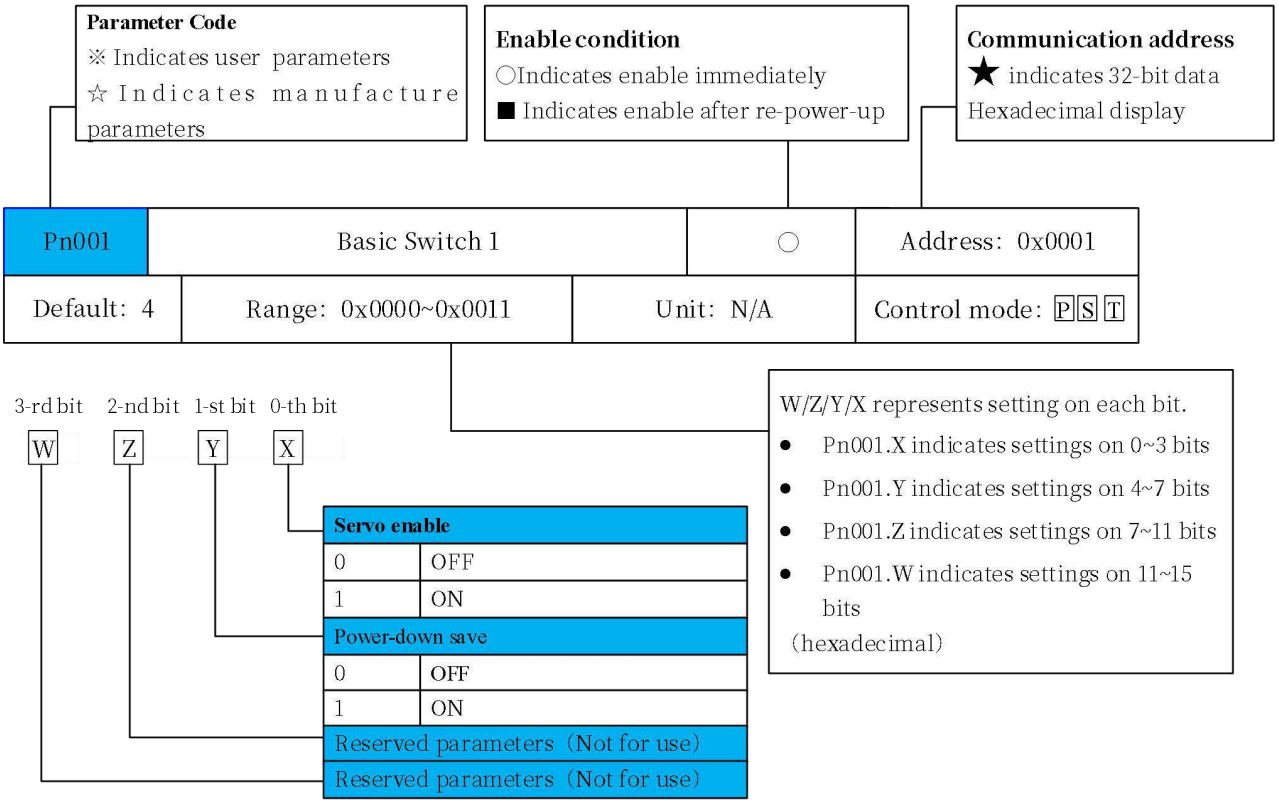
Parameter Group	Function
Pn0xx	Basic parameters: Settings for control mode, brake control, encoder reset, and communication
Pn1xx	Gain parameters: Settings for basic speed/position loop/ASR gains and advanced tuning functions such as auto-tuning, no-tuning, A-type vibration suppression, notch filtering, friction compensation, speed observer, and disturbance observer.
Pn2xx	Position parameters: Basic configuration for position command selection, electronic gearing, backlash compensation, origin return, and position control output, plus low-frequency suppression and model-following control.
Pn3xx	Speed parameters: Internal speed setting, acceleration/deceleration settings, zero-speed clamp, and speed control output.
Pn4xx	Torque parameters: Internal torque setting, torque filtering, and speed limiting.
Pn5xx	Auxiliary parameters: JOG settings
Pn6xx	Terminal parameters: Configuration of digital input/output functions and polarities; supports virtual I/O
Pn7xx	Extended parameters
Pn8xx	Motion control parameters: Pr internal position parameters
PnExx	Driver parameters (Internal parameters; modification not recommended)
PnFxx	Motor parameters (Internal parameters; modification not recommended)
Unxxx	Monitoring parameters

3.2 Pn Parameter Format

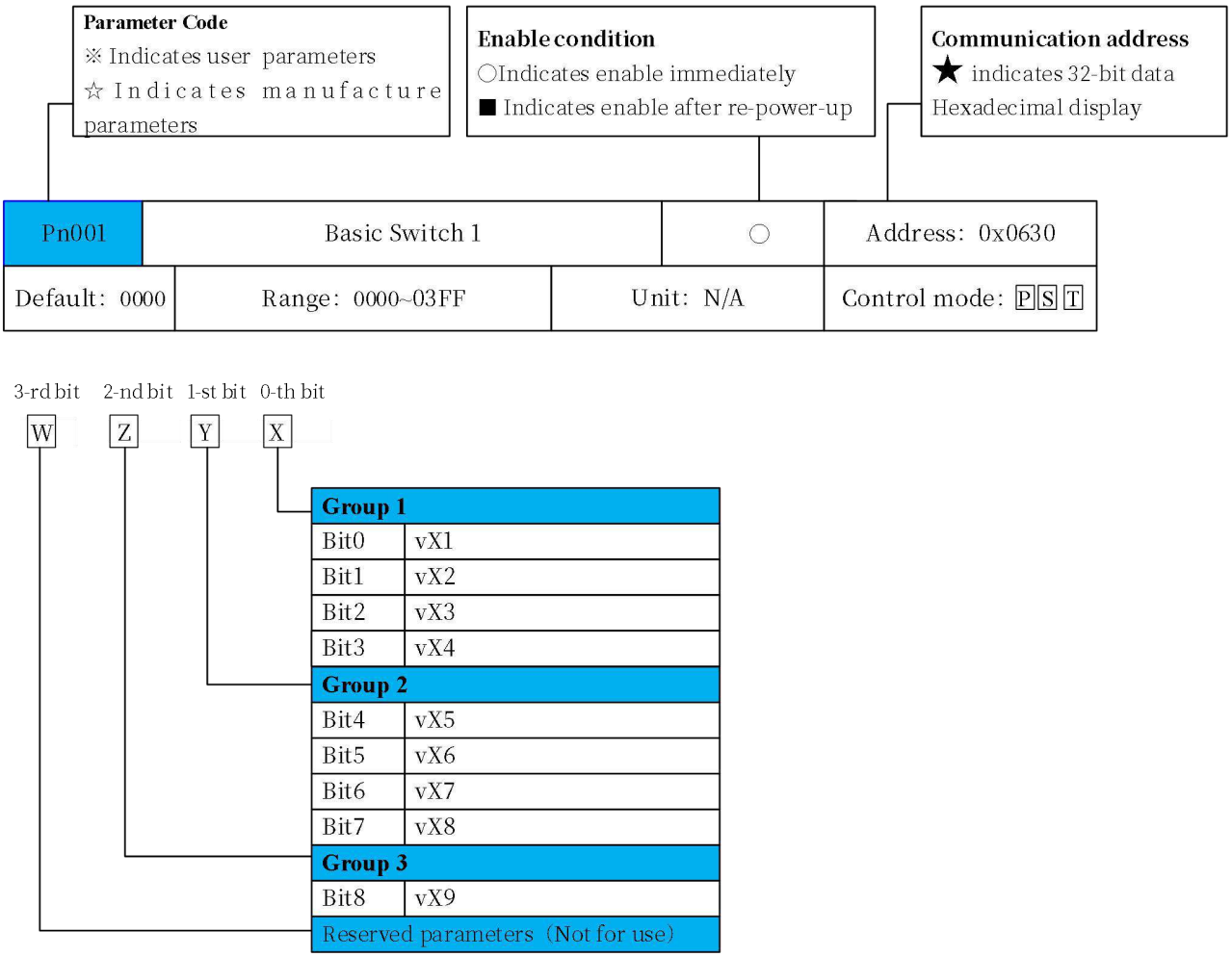
3.2.1 Numeric Setting Parameters



3.2.2 Function Selection Parameters



3.2.3 Switch-Type Parameters



3.3 Pn Parameter Overview

3.3.1 Basic Parameter (Pn0xx)

Pn000	Basic Switch 0	■	Address: 0x0000
Default: 0x0000	Range: 0x0000~0x2217	Unit: N/A	Control Mode: P S T

		Control mode	
parameter setting	0-th bit X	0	Position mode
		1	Velocity mode
		2	Torque mode
		3	Velocity-Position mode
		4	Torque-Position mode
		5	Velocity-Torque mode
		6	Velocity-Position-Torque mode
		7	I-F mode

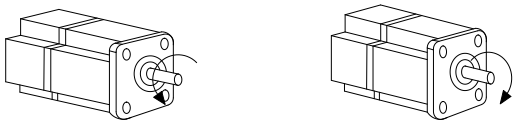
	1-st bit Y	Reserved parameters (Not for use)	
	2-nd bit Z	Drive type	
		0	Standard pulse
		1	CANopen
		2	EtherCAT
	3-rd bit W	Motor type	
		0	Rotary motor
		1	Liner motor
		2	Virtual motor
Description	Set the reference source of the drive, Pn200 under position mode, Pn300 under speed mode, while Pn400 under torque mode.		

Pn001	Basic Switch 1	○	Address: 0x0001
Default: 0x0000	Range: 0x0000~0x0011	Unit: N/A	Control Mode:: P S T
parameter setting	0-th bit X	Servo enable	
		0	OFF
		1	Servo ON
	1-st bit Y	Power-down save	
		0	OFF
		1	ON
	2-nd bit Z	Reserved parameters (Not for use)	
	3-rd bit W	Reserved parameters (Not for use)	

Pn002	Motor Direction	■	Address: 0x0002
Default: 0x0000	Range: 0x0000~0x0001	Unit: N/A	Control Mode: P S T

Set the motor operation direction.

Setting	Description	Comment
0	CCW(counterclockwise) as positive direction	-
1	CW(clockwise) as positive direction	-



Motor rotates counterclockwise in face of the axis end (CCW)

Motor rotates clockwise in face of the axis end (CW)

Pn004	Servo OFF and Gr.1 Error Stop Mode	■	Address: 0x0004
Default: 0x0002	Range: 0x0000~0x0002	Unit: N/A	Control Mode: P S T

To set drive stop mode during OFF and a 1st fault type warning

Setting	Description	Comment
2	Coasting stop	By default

Pn005	Gr.2 Error Stop Mode	■	Address: 0x0005
Default: 0x0000	Range: 0x0000~0x0001	Unit: N/A	Control Mode: P S T

To set drive stop mode during Gr.2 errors.

Setting	Description	Comment
0	Zero-speed stop	-
1	Free stop	Up to model

Pn006	Basic Switch 6	■	Address: 0x0006
Default: 0x1001	Range: 0x0000~0x4121	Unit: N/A	Control Mode: P S T

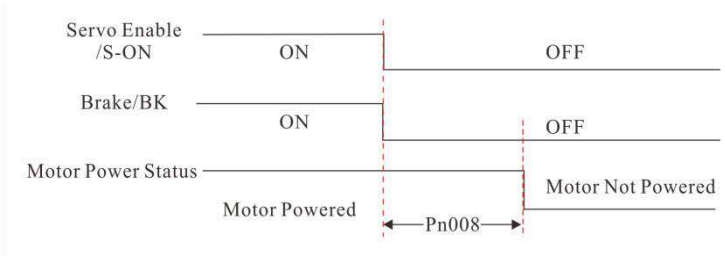
parameter setting	0-th bit X	Over-travel (OT) alarm detection	
		0	OFF
		1	ON
	1-st bit Y	Reserved parameter (Do not change)	
	2-nd bit Z	Alarm detection	
		0	ON
		1	OFF(A.971 excluded)

	3-rd bit W	Cooling fan control (for drivers with fan)
		When servo is ON, fan runs if temperature >45°C and stops if <42°C. When servo is OFF, fan stops immediately.
		When servo is ON, fan runs immediately. When servo is OFF, fan runs if temperature >45°C and stops if <42°C.
		When servo is ON, fan runs immediately. When servo is OFF, fan stops immediately.
		Forced off
		Forced on

Pn007	Over-travel (OT) Stop Mode		■	Address: 0x0007
Default: 0x0001	Range: 0x0000~0x0012	Unit: N/A		Control Mode: P S T
parameter setting	0-th bit X	Over-Travel alarm enable		
		0	DB stop or coasting stop (the same as Pn004[Servo OFF and Gr.1 Error Stop Mode])	
		1	Pn053 as the max. torque to stop motor and motor locked	
		2	Pn053 as the max. torque to stop motor and motor not locked	
	1-st bit Y	Pulse deviation clear during overtravel		
		0	OFF	
		1	ON	
	2-nd bit Z	Reserved parameters (not for modification)		
	3-rd bit W	Reserved parameters (not for modification)		

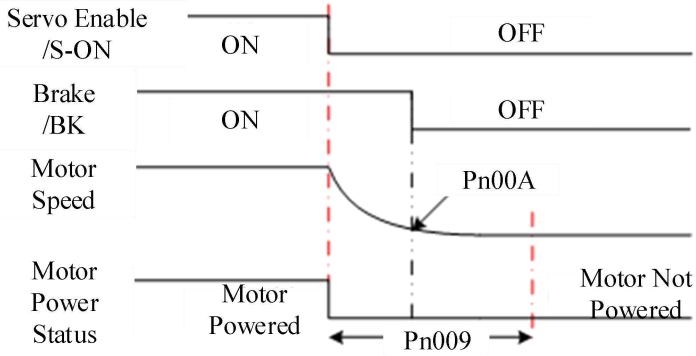
Caution	
	● For vertical axes, after overtravel, the brake signal (/BK) turns ON (brake released), and the workpiece may fall. To prevent this, set to make the servo motor fixed at the zero position after stopping (Pn007=1)"; ● Under external force, after overtravel, the motor enters a base-lock state when stopped, and the load shaft may be pushed back. To prevent this, set to make the servo motor fixed at the zero position after stopping (Pn007=1)";

Pn008	Brake Command - Motor Output Delay when Servo OFF		○	Address: 0x0008
Default: 10	Range: 0~2000	Unit: ms		Control mode: P S T

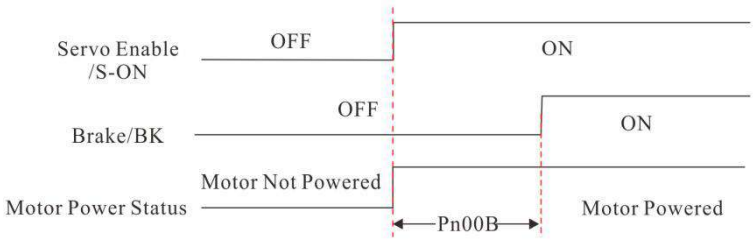
Description	● When the servo motor stops, the brake(/BK) and servo ON(/S-ON) signal are OFF at the same time. This parameter determines the delay from the moment the servo ON (/S-ON) signal is deactivated to when the motor actually becomes . ● On a vertical axis, the weight of the moving components or external forces may cause slight motion; by extending the energized state after the brake engages, this delay eliminates minor movement.  Note: In the event of an alarm, this delay does not apply. The servo motor immediately de-energizes, so the machine may move before the brake engages due to component weight or external forces.

Pn009	Servo OFF - Brake Command Waiting Time	○	Address: 0x0009
Default: 500	Range: 100~2000	Unit: ms	Control mode:PST

Pn00A	Motor Speed Upon Brake Release	○	Address: 0x000A
Default: 100	Range: 0~10000	Unit: rpm	Control mode:PST

Description	When an alarm occurs during the rotation of the servo motor, the servo motor stops and the brake signal(/BK) OFF is sent. In this case, the brake(/BK) sending time can be adjusted by setting Brake Command Speed and Servo OFF-Brake Command Wait Time. When any of the following conditions is met, the brake will engage: ● After the motor is de-energized, its speed falls below the electromagnetic brake release-speed setting; ● After the motor is de-energized, the Servo OFF- Brake Command Wait Time has elapsed. 

Caution	
⚠	● When an alarm occurs, the motor is stopped to zero speed: After issuing the zero-speed command to stop the motor, the system uses function code Pn007 to output the brake signal (/BK). ● Even if Pn009 is set to a value exceeding the maximum speed of the servo motor in use, it will be limited to the servo motor's maximum speed.

Pn00B	Brake Command - Servo-On Brake Release Delay		○	Address: 0x000B
Default: 10	Range: 0~2000	Unit: ms		Control mode: P S T
Description	● When the servo motor starts, users can set the brake-release delay time (Pn00B) to control the interval from receiving the ON signal until the motor is actually powered. ● For vertical axes, the moving parts' weight or external forces may cause slight movement; by setting this function code, the brake releases after the motor is enabled. 			

Caution	
⚠	● For single-tube circuits, when Pn00B=0, after the servo enable signal (/S-ON) turns ON, the brake output signal (/BK) releases after approximately 20ms.

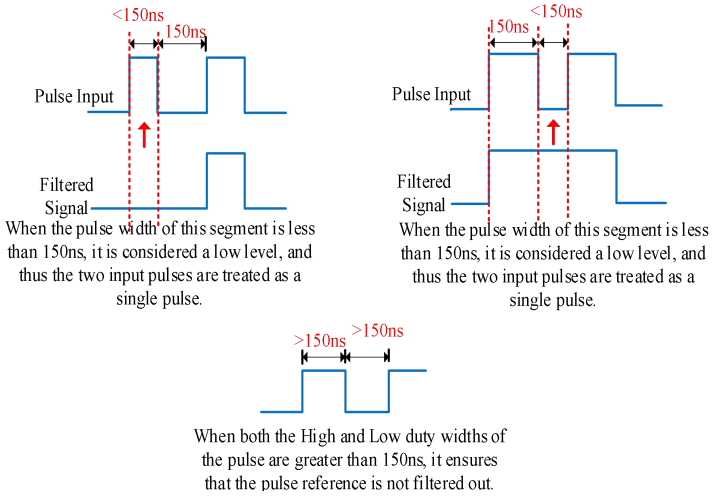
Pn00D	Basic Switch D		■	Address: 0x000D
Default: 0x0000	Range: 0x0000~0x2111	Unit: N/A		Control Mode: P S T
parameter setting	0-th bit X	Reserved parameters (not for modification)		
	1-st bit Y	Reserved parameters (not for modification)		
	2-nd bit Z	Speed detection mode		
		0	Mode 0	
		1	Mode 1	
		2	Mode 2	
		3	Mode 3	

	3-rd bit W	Absolute position limit enable (software)	
		0	OFF
		1	ON, set via function codes Pn030 and Pn032
		2	ON, set via object dictionary [607Dh]

Caution	
⚠	● The absolute-position soft limit switch can only be enabled when both of the following are true: ➢ The motor encoder is an absolute encoder (PnF00.W = 1); ➢ The absolute encoder is in normal use (Pn040 = 1). ● Regardless of whether the absolute-position limit switch is enabled, the external input terminal limit switch remains effective (if configured).

Pn00E	Basic Switch E		■	Address: 0x000E
Default: 0x4000	Range: 0x0000~0x4111		Unit: N/A	Control Mode: P S T
parameter setting	0-th bit X	Absolute encoder multi-turn overflow error enable (ER.C21)		
		0	ON	
		1	OFF	
	1-st bit Y	Drive and motor voltage match detection enable		
		0	ON	
		1	OFF	
	2-nd bit Z	Virtual motor encoder type		
		0	Incremental	
		1	Absolute	
	3-rd bit W	Virtual motor encoder bit		
		0	16-bit	
		1	17-bit	
		2	20-bit	
		3	23-bit	
		4	24-bit	

Caution	
⚠	● The absolute encoder multi-turn overflow detection is enabled only when both of the following are true: ➢ The motor encoder is an absolute encoder (PnF00.W = 1); ➢ The absolute encoder is in normal use (Pn040 = 1). ● The multi-turn count range is [-32768, 32767]; exceeding this range triggers an ER.C21 error. ● When the rotation-count upper-limit function (Pn276 ≠ 0) is enabled, multi-turn overflow detection is automatically disabled.

Pn011	Pulse Filter Time	○	Address: 0x0011
Default: 400	Range: 0~5000	Unit: 12.5ns	Control Mode: P
Description	● Set the filter time for external reference pulses. ● When Pn011[External Regenerative Resistor Power]=12 (12×12.5ns=150ns), the filter width shorter than 150ns will be regarded as interference.  ● Calculation method: The maximum pulse frequency sent by the host controller is fkHz, then $$Pn011 = \frac{40000}{f} + 1$$ Note: This time calculation is valid when the hardware filter is turned off, please adjust it according to the actual working condition if the hardware filter is actually on.		

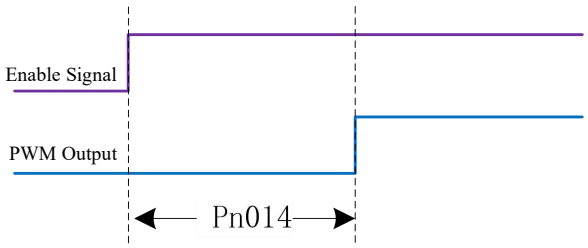
Pn012	External Regenerative Resistor Power	○	Address: 0x0012
Default: 0	Range: 0~65535	Unit: 10W	Control Mode: P S T

Description	● Set this according to the connected external regenerative resistor. Note: It varies according to the cooling condition of the external regenerative resistor. When an error occurs and the temperature of the regenerative resistor is not high, please increase the corresponding power value, otherwise set a smaller value. ● Self-cooling method (natural): Set the regenerative resistor power to 20% or lower (W). ● Forced air cooling: Set the regenerative resistor power to 50% or lower (W). For example, if the power of self-cooling external regenerative resistor is 100W, 100W×20%=20W, Pn012 should be set to "2" (Unit: 10W).

Notes	
⚠	● If the drive is standard with a built-in regenerative braking resistor, the drive protects the built-in resistor when this setting is 0. ● If the setting value is inappropriate, the drive may report ER.320.

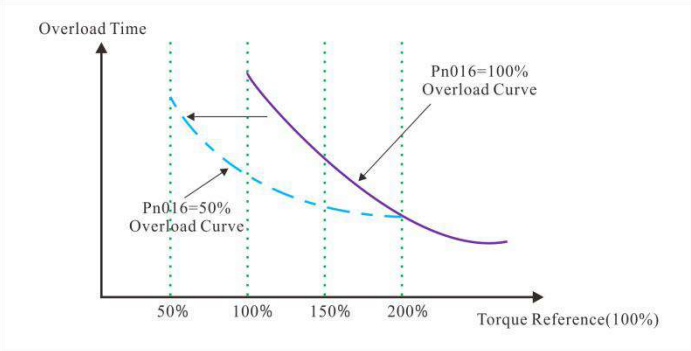
Pn013	External Regenerative Resistance	○	Address: 0x0013
Default: 0	Range: 0~65535	Unit: 1Ω	Control mode: P S T
Description	When an external regenerative resistor is connected, set Pn013 to match its resistance.		

Caution	
⚠	● The min. regeneration resistance allowed for each power band is different, see "Setting Regeneration Resistance" for details, otherwise the internal components of the servo unit may be damaged.

Pn014	Servo Drive Power ON Delay	○	Address: 0x0014
Default: 0	Range: 0~6000	Unit: ms	Control Mode: P S T
Description	Set a period of time after the bus voltage is built up before power to the drive is enabled.  		

Pn015	Motor Overload Alarm Level	■	Address: 0x0015
Default: 50	Range: 1~100	Unit: %	Control Mode: P S T

Pn016	Motor Overload Base Current Derating	■	Address: 0x0016
Default: 100	Range: 10~100	Unit: %	Control mode: P S T

Description	● This function allows early detection of ER.720 [Max. Continuous Overload Error] to prevent motor overheating and burning. ● By using the derated base current (calculated as shown below) to trigger the overload alarm, fault detection time is shortened. Note that the detection threshold of ER.710 [Max. Instantaneous Overload Error] can not be changed. ● Derated Motor Base Current = Motor Base Current × Motor Overload Base Current Derating Terminology: ● Motor Base Current: The threshold current at which overload detection begins. ● Motor Overload Base Current Derating: The percentage by which the motor base current is reduced. Example: If Pn016 is set to 50%, then an overload error is reported earlier because the motor overload is calculated from 50% of the base current. When Pn016 is changed, the overload error detection time is changed accordingly, so overload alarm detection time is changed too. 

Pn020	CLC Switch 1	○	Address: 0x0020
Default: 0	Range: 0x0000~0x9112	Unit: -	Control mode: P S T
Description	● Pn020.X Load encoder detection switch 0: OFF 1: ON When enabled, this function can detect the load-side encoder position and record the hybrid deviation in real time. ● Pn020.Y Full closed-loop position feedback engagement method 0: DI terminal 1: Pn02B When enabled, this function can detect the load-side encoder position and record the hybrid deviation in real time. ● Pn020.Z Full closed-loop pulse feedback direction 0: CCW as the positive rotation direction; 1: CW as the positive rotation direction.		

Pn021	CLC Switch 2	○	Address: 0x0021
Default: 0	Range: 0x0000~0x9112	Unit: -	Control mode: P S T

Description	● Pn021.Y Full closed-loop hybrid error clearing method 0: OFF 1: Clear when position error exceeds Pn262 2: Clear when hybrid error exceeds Pn029

Pn022	CLC Position Feedback Filter Time	○	Address: 0x0022
Default: 0	Range: 0~400.0	Unit: ms	Control mode: P S T
Description	Increasing the filter value effectively suppresses jitter in full closed-loop control; while setting it too large may adversely affect the full closed-loop control response.		

Pn023	Load-Side Encoder E-Gear Numerator [N]	○	Address: 0x0023
Default: 0	Range: 1~1073741824	Unit:	Control mode: P S T
Description	Represents the linear relationship between the load-side encoder and the motor-side encoder. Set this value according to the actual joint module reduction ratio and the resolution of the load-side encoder. N / M = pulses per revolution of the load-side encoder / pulses per revolution of the motor-side encoder.		

Pn025	Load-Side Encoder E-Gear Denominator [M]	○	Address: 0x0025
Default: 0	Range: 1~1073741824	Unit:	Control mode: P S T
Description	The same as above.		

Pn027	Hybrid Deviation Upper Limit	○	Address: 0x0027
Default: 0	Range: 0~1073741824	Unit: load encoder units	Control mode: P S T
Description	When load encoder detection is enabled, Pn021 starts accumulating the hybrid deviation each time the drive is enabled. If the hybrid deviation Un024 (in load encoder units) exceeds this set value, Er.D03 is reported. Un024 = load-side position feedback - motor-side encoder position feedback × Pn023/Pn024		

Pn029	Hybrid Deviation Clear	○	Address: 0x0029
Default: 0	Range: 0~1073741824	Unit: load encoder units	Control mode: P S T
Description	The drive clears the hybrid deviation according to the clearing method specified by Pn021.Y. When the deviation exceeds this set value, the hybrid deviation Un023 is reset to zero.		

Pn02B	Semi-Closed & Full-Closed Loop Control Switch	○	Address: 0x002B
Default: 0	Range: 0~0x11	Unit: -	Control mode: P S T

Description	Pn02B.X = 0: The current full-closed loop position control feedback is sourced from the motor encoder. Under this scheme, the effectiveness of closed-loop control depends on the valid feedback from the motor encoder. Pn02B.X = 1: The current full-closed loop position control feedback is sourced from the load encoder. Under this scheme, the effectiveness of closed-loop control depends on the valid feedback from the load encoder.

Pn030	Absolute Position Single-Turn Max. Limit (Internal Soft Limit)	○	Address: 0x0030★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: Encoder unit	Control mode: P S T

Pn032	Absolute Position Multiple Turn Max. Limit (Internal Soft Limit)	○	Address: 0x0032
Default: 32767	Range: -32768~32767	Unit: Turn	Control mode: P S T
Description	The drive compares its internal position feedback with the set limit values; if the limit is exceeded, it immediately issues an alarm and executes the corresponding action. The user can enable or disable this feature via Pn000A.3. Note: ● When (Pn030×one turn pulse count+Pn032) is lower than (Pn035×one turn pulse count+Pn033), the absolute position limit minimum and maximum values will be interchanged; ● Only applicable to absolute encoders.		

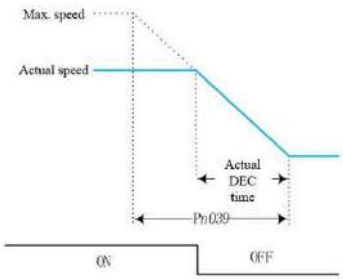
Pn033	Absolute Position Min. Limit (Internal Soft Limit)	○	Address: 0x0033★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: Encoder unit	Control mode: P S T

Pn032	Absolute Position Multiple Turn Max. Limit (Internal Soft Limit)	○	Address: 0x0032
Default: 32767	Range: -32768~32767	Unit: Turn	Control mode: P S T
Description	The drive compares its internal position feedback with the set limit values; if the limit is exceeded, it immediately issues an alarm and executes the corresponding action. The user can enable or disable this feature via Pn000A.3. Note: ● When (Pn030×one turn pulse count+Pn032) is lower than (Pn035×one turn pulse count+Pn033), the absolute position limit minimum and maximum values will be interchanged; ● Only applicable to absolute encoders.		

Pn033	Absolute Position Min. Limit (Internal Soft Limit)	○	Address: 0x0033★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: Encoder unit	Control mode: P S T

Pn035	Absolute Position Multiple Turn Min. Limit (Internal Soft Limit)	○	Address: 0x0035
Default: -32768	Range: -32768~32767	Unit: Turn	Control mode: P S T
Description	The drive compares its internal position feedback with the set limit values; if the limit is exceeded, it immediately issues an alarm and executes the corresponding action. The user can enable or disable this feature via Pn000A.3. Note: ● When (Pn030×one turn pulse count+Pn032) is lower than (Pn035×one turn pulse count+Pn033), the absolute position limit minimum and maximum values will be interchanged; ● Only applicable to absolute encoders.		

Pn036	Absolute Position Limit Hysteresis	○	Address: 0x0036
Default: 200	Range: 0~30000	Unit: Encoder unit	Control mode: P S T
Description	When using this function, since it is encoder unit for soft limit, frequent entering and exiting may occur after entering soft limit state. Setting an appropriate hysteresis value based on actual conditions effectively prevents this frequent toggling.		

Pn039	Servo OFF DEC Stop Time	○	Address: 0x0039
Default: 0	Range: 0~10000	Unit: 1ms	Control mode: P S T
Description			

Caution	
⚠	● When Pn039=0, the deceleration-stop function on servo OFF is disabled. ● The servo OFF stop function applies only when using external input terminals or internal Pn001.X; it does not apply to other enable methods. ● Effective in position, speed, and torque modes.

Pn040	Absolute Encoder Usage	■	Address: 0x0040
Default: 0x0001	Range: 0x0000~0x0021	Unit: N/A	Control Mode: P S T
parameter setting	0-th bit X	Standard pulse-type absolute encoder mode	
		0	Use as an absolute encoder
		1	Use as an incremental encoder

	1-st bit Y	EtherCAT absolute encoder mode	
		0	Use as an absolute encoder
		1	Use as an incremental encoder
		2	Use as a single-turn absolute encoder
	2-nd bit Z	Reserved parameters (Not for use)	
	3-rd bit W	Reserved parameters (Not for use)	

Notes	
⚠	• An externally equipped battery is required when it is used as an absolute encoder, otherwise the drive generates a battery undervoltage error or alarm.

Pn041	Absolute Encoder Battery Undervoltage Error/Alarm	○	Address: 0x0041
Default: 0x0000	Range: 0x0000~0x0001	Unit: N/A	Control mode: P S T

Used to configure the operating method for a battery-backed absolute encoder.

Setpoint	Description	Comment
0	Set battery undervoltage as an error (Er.830)	-
1	Set battery undervoltage as an alarm (AL.930)	-

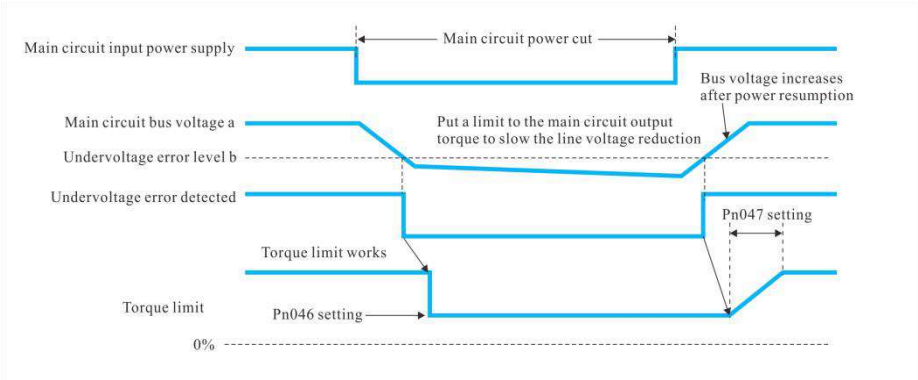
⚠	• Er.830: Within 8 seconds after power-on, the drive checks whether the encoder's backup battery is normal; after 8 seconds, it stops checking the battery voltage. • AL.930: After power-on, the drive continuously monitors the encoder's backup battery voltage; if it falls below the alarm threshold, an alarm is issued, and when it rises above the threshold, the alarm clears automatically.

Pn045	Main Circuit (DC) Undervoltage Detection Mode	○	Address: 0x0045
Default: 0x0000	Range: 0x0000~0x0002	Unit: N/A	Control mode: P S T

Used to configure the torque threshold for drive output.

Setpoint	Description	Comment
0	OFF	-
1	ON	-
2	ON, apply torque limit via Pn046 and Pn047	-

Pn046	Torque Limit During Main Circuit Drop	○	Address: 0x0046
Default: 50	Range: 0~100	Unit: 1%	Control mode: P S T
Description	Percentage of motor's rated torque.		

Pn047	Torque Limit Release Time During Main Circuit Drop	○	Address: 0x0047
Default: 100	Range: 0~1000	Unit: 1ms	Control mode: P S T
Description	When an undervoltage alarm occurs, the drive internally limits torque. Once the alarm clears, torque is restored according to this set time. 		

Pn050	Torque Limit Mode	○	Address: 0x0050
Default: 0x0002	Range: 0x0000~0x0005	Unit: N/A	Control mode: P S T

Used to configure the torque threshold for drive output.

Setpoint	Description	Comment
0	Reserved	-
1	Reserved	-
2	Internal forward/reverse limit	-
3	Internal forward limit and internal reverse limit	-
4	External terminal limit	-
5	Limit active when pulse command=0 and positioning complete	-

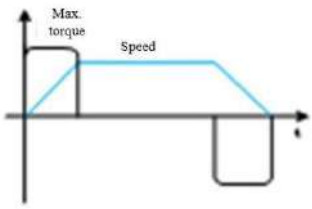
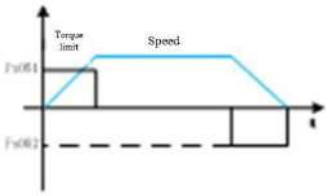
Torque Limit Mode Description

Pn050	FWD	REV	Description
0	Reserved		-
1	Reserved		-
2	Pn051		Set max. torque for both forward/reverse rotation using Pn051.
3	Pn051	Pn0052	Set max. forward torque limit using Pn051; Set max. reverse torque limit using Pn052.

4	OFF	Pn054	Set torque limit value via external terminal. TL-SEL=Low (OFF): Set max. torque for both directions using Pn054. TL-SEL=High (ON): Set max. torque for both directions using Pn055.
	ON	Pn055	
5	OFF	Pn051	①External pulse command = 0 (after filtering);②Positioning complete. When either condition is not met: set max. torque for both directions using Pn051. When both conditions are met: set max. torque for both directions using Pn052.
	ON	Pn052	

Caution	
⚠	● Torque limiting is only effective in non-torque control modes. In torque control mode, torque limiting can only be implemented via: ➢ Pn051 for both forward and reverse torque limiting; ➢ External torque limiting, switched to Pn054 [External Torque Limit] via an external X terminal.

Pn051	Internal FWD Torque Limit	○	Address: 0x0051
Default: by model	Range: 0~500	Unit: 1%	Control mode: P S T

Pn052	Internal REV Torque Limit	○	Address: 0x0052
Default: by model	Range: 0~500	Unit: 1%	Control mode: P S T
Description	Output torque can be limited to protect the machines. Internal torque limiting continuously restricts the maximum output torque via parameter settings. Note: ● The setting unit is a percentage of the motor's rated torque. ● If the torque limit is set too low, insufficient torque may occur during servo motor acceleration or deceleration. Without internal torque limit  With internal torque limit  		

Pn053	Emergency Stop Torque	○	Address: 0x0053
Default: 800	Range: 0~800	Unit: 1%	Control mode: P S T

Description	Display the maximum torque during an emergency stop under specific conditions (e.g., overtravel).

Pn054	External Torque Limit 1	○	Address: 0x0054
Default: 100	Range: 0~500	Unit: 1%	Control mode: P S T

Pn055	External Torque Limit 2	○	Address: 0x0055
Default: 100	Range: 0~500	Unit: 1%	Control mode: P S T

Pn056	Overspeed Torque Threshold	○	Address: 0x0056
Default: 100	Range: 0~255	Unit: 1%	Control mode: P S T
Description	If the current torque exceeds the Pn056 and the speed exceeds the Pn057, the overspeed detection function is activated. Note: ● The torque threshold is relative to the maximum torque; ● Setting Pn056 to 0 disables the overspeed detection function.		

Pn057	Overspeed Threshold	○	Address: 0x0057
Default: 20	Range: 0~200	Unit: 1%	Control mode: P S T
Description	If the current torque exceeds the Pn056 and the speed exceeds the Pn057, the overspeed detection function is activated. Note:The speed threshold is relative to the maximum speed;		

Pn059	KTY-type Sensor Overheat Threshold	○	Address: 0x0059
Default: 0	Range: 0~180	Unit: 1℃	Control mode: P S T
Description	Provide overheat protection for motors equipped with KTY-type sensors. When the motor temperature exceeds this threshold, an overheat alarm (ER.42A) is issued. Note: ● Setting the threshold to 0 disables the overheat monitoring function. ● This parameter applies only to motors fitted with KTY-type temperature sensors.		

Pn076	Serial Encoder Single-turn Resolution	■	Address: 0x0076
Default: 0x0020	Range: 0x0000~0x0051	Unit: N/A	Control Mode: P S T
Parameter setting	0-th bit X	Encoder single-turn resolution adjustment enable	
		0	OFF
		1	ON

	1-st bit Y	0	15-bit
		1	16-bit
		2	17-bit
		3	18-bit
		4	19-bit
		5	20-bit
	2-nd bit Z	Reserved parameters (Not for use)	
	3-rd bit W	Reserved parameters (Not for use)	

Caution	
⚠	● Applies only to serial encoders. ● If the set resolution is lower than the encoder's actual resolution, the actual resolution is used.

Pn07F	Serial Encoder Multi-Turn & Fault Reset	○	Address: 0x007F
Default: 0x0000	Range: 0x0000~0xFFFF	Unit: N/A	Control mode: P S T
Description	This function code resets the multi-turn count and battery fault of a serial encoder. Writing "1" executes the reset, identical in effect to the auxiliary function Fn008, allowing users to zero the absolute encoder's multi-turn count via RS-485.		

Caution	
⚠	● Applies only to absolute serial encoders. ● Pn07F is not retained after power-off and clears itself after execution. ● Do not execute while the drive is enabled.

Pn080	Local Communication Address (485&CANopen)	■	Address: 0x0080
Default: 1	Range: 0~255	Unit: N/A	Control mode: P S T
Description	This function code sets the drive's axis address: 0: Broadcast address. The host controller can write to all drives simultaneously; drives act on broadcast frames but do not reply. 1~255: Unique addresses for each drive in a multi-drive network to avoid communication conflicts. Note: For CANopen models, the maximum allowable address is 63.		

Pn081	Local Communication Format	■	Address: 0x0081
Default: 0x0502	Range: 0x0000~0x0655	Unit: N/A	Control Mode: P S T

Parameter setting	0-th bit X	RS485 baud rate	
		0	4800bps
		1	9600bps
		2	19200bps
		3	38400bps
		4	57600bps
		5	115200bps
	1-st bit Y	RS485 communication parity	
		0	No parity, 8-bit data, 1 stop bit (N-8-1)
		1	Even parity, 8 bits data, 1 stop bit (N-8-1)
		2	Odd parity, 8-bit data, 1 stop bit (O-8-1)
		3	No parity, 8-bit data, 2 stop bit (N-8-2)
		4	Even parity, 8 bits data, 2 stop bit (N-8-2)
		5	Odd parity, 8-bit data, 2 stop bit (N-8-2)
	2-nd bit Z	CAN communication baud rate	
		0	20K
		1	50K
		2	100K
		3	125K
		4	250K
		5	500K
		6	1000K(1M)
	3-rd bit W	Reserved parameter (Do not change)	

Caution	
	• The servo drive's baud rate and communication parity mode must match the host controller's settings; otherwise, communication will fail.

Pn085	Communication Modification Power-down Save	○	Address: 0x0085
Default: 0x0000	Range: 0x0000~0x0111	Unit: N/A	Control Mode: P S T

Parameter setting	0-th bit X	RS485 power-down save enable	
		0	OFF
		1	ON

	1-st bit Y	CANopen power-down save enable	
		0	OFF
		1	ON
	2-nd bit Z	Reserved parameters (Not for modification)	
	3-rd bit W	Reserved parameters (Not for modification)	
Description	If the changed parameter does not need to be stored during power down, please set the corresponding function to off, otherwise, it will take up too much room in the EEPROM, and cause damage, and the drive will report ER.021.		

Pn087	Modbus Register Address Mapping Enable	○	Address: 0x0087
Default: 0x0000	Range: 0x0000~0x0011	Unit: N/A	Control Mode: P S T
Parameter setting	0-th bit X	Register 1 address mapping enable	
		0	OFF
		1	ON
	1-st bit Y	Register 2 address mapping enable	
		0	OFF
		1	ON
	2-nd bit Z	Reserved parameters (Not for use)	
	3-rd bit W	Reserved parameters (Not for use)	

Pn088	1# Register Mapping Source Address	○	Address: 0x0088
Default: 0x0000	Range: 0x0000~0x1FFF	Unit: N/A	Control mode: P S T

Pn089	1# Register Mapping Target Address	○	Address: 0x0089
Default: 0x0000	Range: 0x0000~0x1FFF	Unit: N/A	Control mode: P S T

Pn08A	2# Register Mapping Source Address	○	Address: 0x008A
Default: 0x0000	Range: 0x0000~0x1FFF	Unit: N/A	Control mode: P S T

Pn08B	2# Register Mapping Target Address	○	Address: 0x008B
Default: 0x0000	Range: 0x0000~0x1FFF	Unit: N/A	Control mode: P S T

3.3.2 Gain Parameters (Pn1xx)

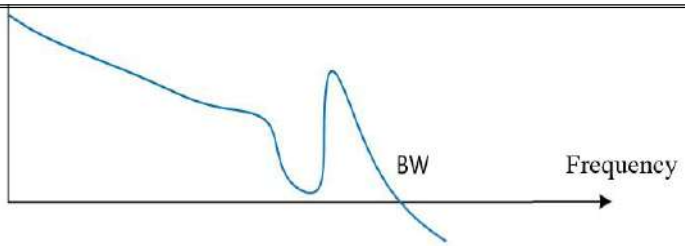
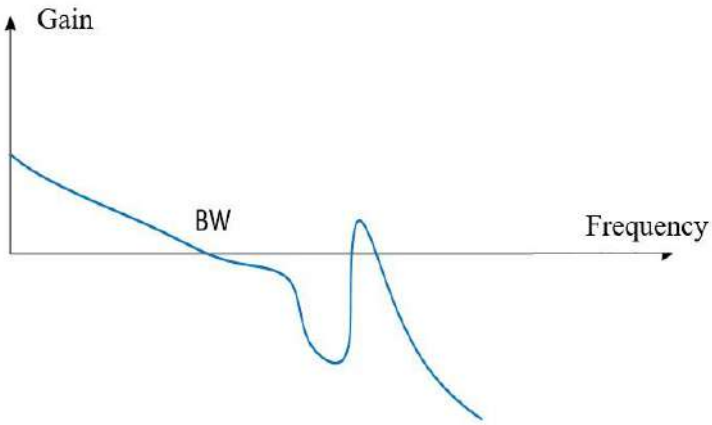
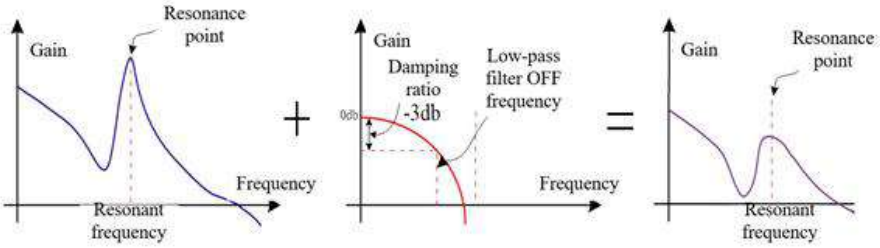
Pn100	Moment of Inertia Ratio (J)	○	Address: 0x0100
Default: 100	Range: 0~20000	Unit: 1%	Control mode: P S T
Description	Set the ratio of total inertia to the motor's rotor inertia. $Pn100 = \frac{\text{load inertia} + \text{motor rotor inertia}}{\text{motor rotor inertia}} \times 100\%$		

Pn101	ASR Proportional Gain (ASR_KP)	○	Address: 0x0101
Default: 40.0	Range: 1.0~2000.0	Unit: Hz	Control mode: P S T
Description	Set the automatic speed regulator gain (ASR_KP), determining the speed control loop's responsiveness. The larger the ASR_KP value is, the higher the speed loop response frequency and the better it follows speed commands. While increasing gain enhances response, excessive ASR_KP may cause oscillation.		

Pn102	ASR Integral Time (ASR_KI)	○	Address: 0x0102
Default: 20.00	Range: 0.15~512.00	Unit: ms	Control mode: P S T
Description	Set the automatic speed regulator integral time (ASR_Ki), determining the speed control loop's responsiveness. The smaller the ASR_Ki value is, the higher the response frequency of the speed loop and the better it follows speed commands. While decreasing integral time enhances response, too low ASR_Ki may cause oscillation.		

Pn103	APR Proportional Gain (APR_KP)	○	Address: 0x0103
Default: 40.0	Range: 1.0~2000.0	Unit: 1/s	Control mode: P S T
Description	Set the automatic position regulator gain (APR_KP), determining the position control system's responsiveness. The larger the APR_KP value is, the higher the position response frequency, the better it follows position commands, the smaller the position deviation, and the shorter the positioning setup time. However, excessive APR_KP may cause oscillation.		

Pn104	Torque Command Filter Time	○	Address: 0x0104
Default: 1.00	Range: 0.00~655.35	Unit: ms	Control mode: P S T

Description	Set the low-pa ... bles the filter. When the reso ... idity of the drive control s ... e resonance of the control ... meter of resonance sup   When the torque command filter time parameter is gradually increased from 0, the corresponding BW point will become smaller and smaller. Resonance frequency generation will be solved, but the bandwidth and phase boundaries of the system response will be reduced at the same time. When low-pass filter suppression is ON:  As the time constant increases from 0, the filter's pass-band decreases. Although the resonance generation is solved, the system response bandwidth and phase boundaries are also reduced and the system becomes more unstable. Sugg. Adjust value of stable control range:Pn104[ms] = $\frac{1000}{2\pi \times Pn102[Hz] \times 4}$ Adjust value of limit control range: Pn104[ms] = $\frac{1000}{2\pi \times Pn102[Hz] \times 1}$

Pn105	2nd ASR Proportional Gain	○	Address: 0x0105
Default: 40.0	Range: 1.0~2000.0	Unit: Hz	Control mode: P S T

Pn106	2nd ASR Integral Time	○	Address: 0x0106
Default: 20.0	Range: 0.15~512.00	Unit: ms	Control mode: P S T

Pn107	2nd APR Proportional Gain	○	Address: 0x0107
Default: 40.0	Range: 1.0~2000.0	Unit: 1/s	Control mode: P S T

Pn108	2nd Torque Command Filter Time	○	Address: 0x0108
Default: 1.00	Range: 0.00~655.35	Unit: 1ms	Control mode: P S T

Pn10A	Auto-Tuning Mode	○	Address: 0x010A
Default: 0	Range: 0~1	Unit: -	Control mode: P S T

Setpoint	Description	Comment
0	Manual	-
1	Standard rigidity table	-

Pn10B	Rigidity Level	○	Address: 0x010B
Default: 15	Range: 1~32	Unit: -	Control mode: P S T

Pn110	Auto Gain Shift	○	Address: 0x0110
Default: 0x0000	Range: 0x0000~0x0051	Unit: N/A	Control Mode: P S T

Parameter setting	0-th bit X	Gain shift mode	
		0	Manual shift by external gain signal (/G-SEL)
		1	Auto shift When condition is true, the gain is automatically switched from the 1st gain to the 2nd gain. When condition is not true, the gain is automatically switched from the 2nd gain to the 1st gain.
	1-st bit Y	Shift condition	
		0	/COIN ON
		1	/COIN OFF
		2	/NEAR ON
		3	/NEAR OFF
		4	Position reference filter output equal to 0 and reference input OFF
		5	Position reference pulse input ON
	2-nd bit Z	Reserved parameters (Not for modification)	

	3-rd bit W	Reserved parameters (Not for modification)

Pn112	Gain Shift Time 1	○	Address: 0x0112
Default: 0	Range: 0~65535	Unit: ms	Control mode: P S T

Pn113	Gain Shift Time 2	○	Address: 0x0113
Default: 0	Range: 0~65535	Unit: ms	Control mode: P S T

Pn114	Gain Shift Waiting Time 1	○	Address: 0x0114
Default: 0	Range: 0~65535	Unit: ms	Control mode: P S T

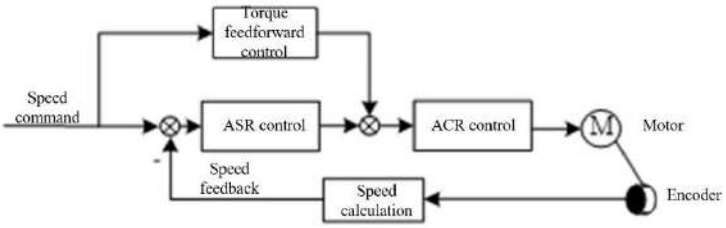
Pn115	Gain Shift Waiting Time 2	○	Address: 0x0115
Default: 0	Range: 0~65535	Unit: ms	Control mode: P S T

Pn120	Position Integral Time	○	Address: 0x0120
Default: 0.0	Range: 0.0~5000.0	Unit: ms	Control mode: P
Description	Enable the integrator in the position loop, typically used for electronic cam and electronic shaft functions. Note: A value of 0 disables position-loop integral action.		

Pn121	Velocity Feedforward Gain	○	Address: 0x0121
Default: 0	Range: 0~100	Unit: 1%	Control mode: P
Description	Shorten the positioning time by applying a feedforward term during position control. The feedforward command is generated by differentiating the host's position instruction. Increasing the gain improves tracking when commands change smoothly; decreasing it reduces mechanical vibration when commands are irregular. Feedforward gain reduces phase-lag error.		

Pn122	Speed Feedforward Filter Time	○	Address: 0x0122
Default: 2.00	Range: 0.00~64.00	Unit: ms	Control mode: P

Pn123	Torque Feedforward Gain	○	Address: 0x0123
Default: 0	Range: 0~500	Unit: %	Control mode: P S

Description	Torque feedforward is effective only in position-control and speed-control modes. 

Pn124	Torque Feedforward Filter Time	○	Address: 0x0124
Default: 2.00	Range: 0.00~64.00	Unit: ms	Control mode: P S

Pn125★	Velocity Feedback Low-Pass Filter Time	○	Address: 0x0125
Default: 0.00	Range: 0.00~655.35	Unit: ms	Control mode: P S T
Description	Apply a first-order low-pass filter to the speed-loop feedback. It removes resonance and high-frequency noise from the speed signal. Higher values yield smoother feedback and less vibration but introduce delay, slowing loop response.		

Pn130	ASR P/PI Shift	■	Address: 0x0130
Default: 0x0000	Range: 0x0000~0x0114	Unit: N/A	Control Mode: P S T

Parameter setting	0-th bit X	ASR P/PI shift condition	
		0	Switch by internal torque command (Pn132)
		1	Switch by speed command (Pn133)
		2	Switch by acceleration (Pn134)
		3	Switch by position error (Pn135)
		4	No mode-switch function
	1-st bit Y	ASR control mode	
		0	PI control
		1	P control
	2-nd bit Z	Reserved parameters (Not for modification)	
	3-rd bit W	Reserved parameters (Not for modification)	

Pn132	ASR P/PI Shift Condition (Torque Reference)	○	Address: 0x010C
Default: 200	Range: 0~800	Unit: 1%	Control mode: P S T

Pn133	ASR P/PI Shift Condition (Speed Reference)	○	Address: 0x010D
Default: 0	Range: 0~10000	Unit: 1rpm	Control mode: P S T

Pn134	ASR P/PI Shift Condition (Acceleration)	○	Address: 0x010E
Default: 0	Range: 0~30000	Unit: 1rpm/s	Control mode: P S T

Pn135	ASR P/PI Shift Condition (Position Deviation)	○	Address: 0x010F
Default: 0	Range: 0~10000	Unit: 1 command unit	Control mode: P S T

Pn140	Type-A Vibration Suppression	○	Address: 0x0140
Default: 0x0010	Range: 0x0000~0x0011	Unit: N/A	Control Mode: P S

Parameter setting	0-th bit X	Type-A vibration suppression enable	
		0	OFF
		1	ON
	1-st bit Y	Type-A vibration suppression utility function	
		0	OFF
		1	ON
	2-nd bit Z	Reserved parameters (Not for modification)	
	3-rd bit W	Reserved parameters (Not for modification)	

Pn141	A-Type Vibration Suppression Gain Compensation	○	Address: 0x0141
Default: 100	Range: 1~1000	Unit: %	Control mode: P S T

Pn142	A-Type Vibration Suppression Frequency	○	Address: 0x0142
Default: 100.0	Range: 1.0~2000.0	Unit: Hz	Control mode: P S T

Pn143	A-Type Vibration Suppression Damping Gain	○	Address: 0x0143
Default: 0	Range: 0~300	Unit: %	Control mode: P S T

Pn144	A-Type Vibration Suppression Filter Constant 1 Compensation		○	Address: 0x0144
Default: 0	Range: -10.00~10.00	Unit: ms	Control mode: P S T	

Pn145	A-Type Vibration Suppression Filter Constant 2 Compensation		○	Address: 0x0145
Default: 0	Range: -10.00~10.00	Unit: ms	Control mode: P S T	

Pn14A	Type-II Notch Filter 1 Frequency		○	Address: 0x014A
Default: 5000	Range: 50~5000	Unit: Hz	Control mode: P S T	
Description: Set the center frequency of the notch filter 1.				

Pn14B	Type-II Notch Filter 1 Attenuation Rate		○	Address: 0x014B
Default: 0	Range: 0~32	Unit: dB	Control mode: P S T	
Description: Set the attenuation rate of the notch filter 1; a value of 0 disables the filter.				

Pn14C	Type-II Notch Filter 2 Frequency		○	Address: 0x014C
Default: 5000	Range: 50~5000	Unit: Hz	Control mode: P S T	
Description: Set the center frequency of the notch filter 2.				

Pn14D	Type-II Notch Filter 2 Attenuation Rate		○	Address: 0x014D
Default: 0	Range: 0~32	Unit: dB	Control mode: P S T	
Description: Set the attenuation rate of the notch filter 2; a value of 0 disables the filter.				

Pn150	Notch Filter Enable		○	Address: 0x0150
Default: 0x0000	Range: 0x0000~0x1101	Unit: N/A	Control Mode: P S T	

Parameter setting	0-th bit X	Notch filter 1 enable	
		0	OFF
		1	ON
	1-st bit Y	Reserved parameters (Not for modification)	
	2-nd bit Z	Notch filter 2 enable	
		0	OFF
		1	ON

	3-rd bit W	Friction compensation enable	
		0	OFF
		1	ON

Pn151	Notch Filter Utility Function Enable	○	Address: 0x0151
Default: 0x0101	Range: 0x0000~0x0101	Unit: N/A	Control Mode: P S T
Parameter setting	0-th bit X	Notch filter 1 utility function enable	
		0	OFF
		1	ON
	1-st bit Y	Reserved parameters (Not for modification)	
	2-nd bit Z	Notch filter 2 utility function enable	
		0	OFF
		1	ON
	3-rd bit W	Reserved parameters (Not for modification)	

Pn152	Auto Notch Resonance Detection Sensitivity	○	Address: 0x0152
Default: 100	Range: 1~200	Unit: %	Control mode: P S T

Pn153	Notch Filter 1 Frequency	○	Address: 0x0153
Default: 5000	Range: 50~5000	Unit: Hz	Control mode: P S T

Pn154	Notch Filter 1Q Value	○	Address: 0x0154
Default: 0.70	Range: 0.50~10.00	Unit: N/A	Control mode: P S T

Pn155	Notch Filter 1 Depth	○	Address: 0x0155
Default: 0.000	Range: 0.000~1.000	Unit: N/A	Control mode: P S T

Pn156	Notch Filter 2 Frequency	○	Address: 0x0156
Default: 5000	Range: 50~5000	Unit: Hz	Control mode: P S T

Pn157	Notch Filter 2Q Value	○	Address: 0x0157
Default: 0.70	Range: 0.50~10.00	Unit: N/A	Control mode: P S T

Pn158	Notch Filter 2 Depth	○	Address: 0x0158
Default: 0.000	Range: 0.000~1.000	Unit: N/A	Control mode: P S T

Pn159	Notch Filter 3 Frequency	○	Address: 0x0159
Default: 5000	Range: 50~5000	Unit: Hz	Control mode: P S T
Description: Set the center frequency of the notch filter; a value of 5000 disables the filter.			

Pn15A	Notch Filter 3Q Value	○	Address: 0x015A
Default: 0.70	Range: 0.50~10.00	Unit: N/A	Control mode: P S T

Pn15B	Notch Filter 3 Depth	○	Address: 0x015B
Default: 0.000	Range: 0.000~1.000	Unit: N/A	Control mode: P S T

Pn15C	Notch Filter 4 Frequency	○	Address: 0x015C
Default: 5000	Range: 50~5000	Unit: Hz	Control mode: P S T
Description: Set the center frequency of the notch filter; a value of 5000 disables the filter.			

Pn15D	Notch Filter 4Q Value	○	Address: 0x015D
Default: 0.70	Range: 0.50~10.00	Unit: N/A	Control mode: P S T

Pn15E	Notch Filter 4 Depth	○	Address: 0x015E
Default: 0.000	Range: 0.000~1.000	Unit: N/A	Control mode: P S T

Pn161	Oscillation Compensation Gain	○	Address: 0x0161
Default: 100	Range: 10~1000	Unit: %	Control mode: P S

Pn162	2nd Oscillation Compensation Gain	○	Address: 0x0162
Default: 100	Range: 10~1000	Unit: %	Control mode: P S

Pn163	Oscillation Compensation Factor	○	Address: 0x0163
Default: 0	Range: 0~100	Unit: %	Control mode: P S

Pn164	Oscillation Compensation Frequency Correction	○	Address: 0x0164
Default: 0.0	Range: 0.0~1000.0	Unit: Hz	Control mode: P S

Pn165	Oscillation Compensation Gain Correction	○	Address: 0x0165
Default: 100	Range: 0~1000	Unit: %	Control mode: P S

Pn175	No-tuning Control	■	Address: 0x0175
Default: 0x1400	Range: 0x0000~0x2911	Unit: N/A	Control Mode: P

Parameter setting	0-th bit X	No-tuning enable		
		0	OFF	
		1	ON	
	1-st bit Y	No-tuning speed control mode		
		0	For speed control	
		1	For speed control and upper device used for position control	
	2-nd bit Z			
		0	Rigidity 0	Response: slow
		1	Rigidity 1	↕
		2	Rigidity 2	
		3	Rigidity 3	
		4	Rigidity 4	
		5	Rigidity 5	
		6	Rigidity 6	
		7	Rigidity 7	
		8	Rigidity 8	
		9	Rigidity 9	Response: fast
	3-rd bit W	No-tuning load inertia		
		0	Low	
		1	Medium	
		2	High	

Pn17A	Tuning-Free Disturbance-Compensation Gain	○	Address: 0x017A
Default: 600.0	Range: 0.0~6553.5	Unit: Hz	Control mode: P S

Pn17B	Tuning-Free Inertia-Correction Coefficient	○	Address: 0x017B
Default: 100	Range: 0~100	Unit: %	Control mode: P S

Pn17C	Tuning-Free Torque-Filter Time	○	Address: 0x017C
Default: 0.10	Range: 0.00~655.35	Unit: ms	Control mode: P S

Pn17D	Tuning-Free Speed-Feedback LPF Time	○	Address: 0x017D
Default: 0.10	Range: 0.00~655.35	Unit: ms	Control mode: P S

Pn185	Vibration Error/Alarm	○	Address: 0x0185
Default: 0x0000	Range: 0x0000~0x0002	Unit: N/A	Control Mode: P

Parameter setting	0-th bit X	Vibration fault prompt mode	
		0	OFF
		1	ON and report AL.911
		2	ON and report ER.520
	1-st bit Y	Reserved parameters (Not for modification)	
	2-nd bit Z	Reserved parameters (Not for modification)	
	3-rd bit W	Reserved parameters (Not for modification)	

Pn186	Motor Abnormal Vibration Detection Sensitivity	○	Address: 0x0186
Default: 100	Range: 50~500	Unit: %	Control mode: P S T

Pn187	Motor Abnormal Vibration Detection Value	○	Address: 0x0187
Default: 50	Range: 0~5000	Unit: rpm	Control mode: P S T
Description	Set the vibration-detection threshold: Detection value = Pn186×Pn187. Lower threshold increases sensitivity but may cause false alarms during normal operation.		

Pn192	Overshoot Detection Sensitivity during Tuning (Relative Position Coincidence)	○	Address: 0x0192
Default: 100	Range: 0~100	Unit: %	Control mode: P S T

Pn193	Max. Gain during Tuning	○	Address: 0x0193
Default: 300.0	Range: 1.0~400.0	Unit: Hz	Control mode: P S T

3.3.3 Position Parameters (Pn2xx)

Pn200	Position Reference Source	■	Address: 0x0200
Default: 0x0020	Range: 0x0000~0x0084	Unit: N/A	Control Mode: P

Parameter setting	0-th bit X	Pulse reference type	
		0	High-speed pulse train
		1	Low-speed pulse train
		2	Reserved
		3	Internal target position
	1-st bit Y	Pulse reference filter (software)	
		0	Filter 1 (~52Kpps, 9.6μs)
		1	Filter 2 (~104Kpps, 4.8μs)
		2	Filter 3 (~208Kpps, 2.4μs)
		3	Filter 4 (~416Kpps, 1.2μs)
		4	Filter 5 (~832Kpps, 0.6μs)
		5	Filter 6 (~1664Kpps, 0.3μs)
		6	Filter 7 (~3328Kpps, 0.15μs)
		7	Filter 8 (~4Mpps, 0.125μs)
		8	Pn011 setting
	2-nd bit Z	Reserved parameters (Not for modification)	
	3-rd bit W	Reserved parameters (Not for modification)	

Caution	
⚠	• The maximum pulse frequency for open-collector inputs is 200kHz; filters 0~2 apply. • Open-collector and differential pulse inputs have different pin assignments—refer to the wiring diagram.

Pn201	External Pulse Logic	■	Address: 0x0202
Default: 0x0000	Range: 0x0000~0x0004	Unit: N/A	Control mode: P

Set the type of incoming pulse signal under position mode.

Setpoint	Description	Comment
0	Pulse+Direction	-
1	CW+CCW pulse sequences	-
2~3	Reserved	-
4	Quadrature AB pulses (×4 count)	-

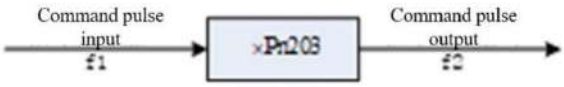
Pn202	Pulse Reference Logic	■	Address: 0x0202
Default: 0x0000	Range: 0x0000~0x0001	Unit: N/A	Control Mode:Ⓟ

Parameter setting	0-th bit X	Pulse reference logic	
		0	Positive (Default)
		1	Negative (Reverse)
	1-st bit Y	Reserved parameters (Not for modification)	
	2-nd bit Z	Reserved parameters (Not for modification)	
	3-rd bit W	Reserved parameters (Not for modification)	

Pn203	External Pulse Multiplier	○	Address: 0x0203
Default: 1	Range: 1~100	Unit: ×1	Control mode:Ⓟ

Description

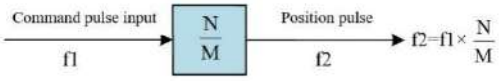
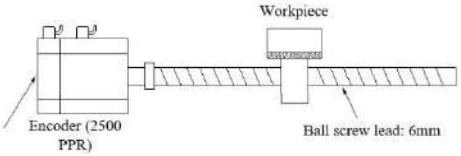
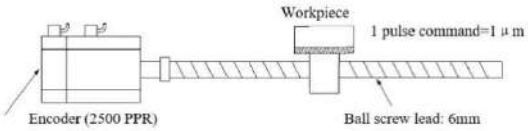
Used to apply a multiplier to external pulse commands. The multiplier can be switched via digital input terminal X (P-GAIN). Can be set from 1× up to N× (max 100×).



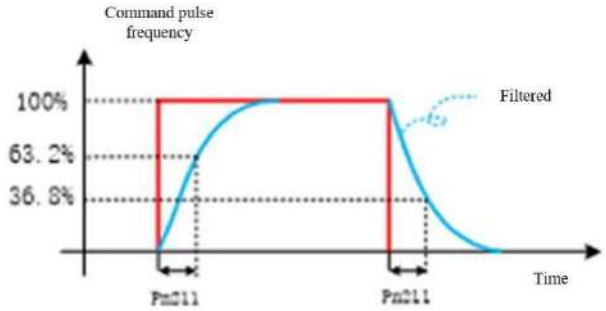
Note: This multiplier only applies to external pulse commands; it does not affect internal functions such as JOG or auto-tuning.

Pn204	Electronic Gear Numerator (N)	○	Address: 0x0204★
Default: 1	Range: 0~1073741824	Unit: N/A	Control mode:Ⓟ
Description	Set the numerator value of the electronic gear ratio.		

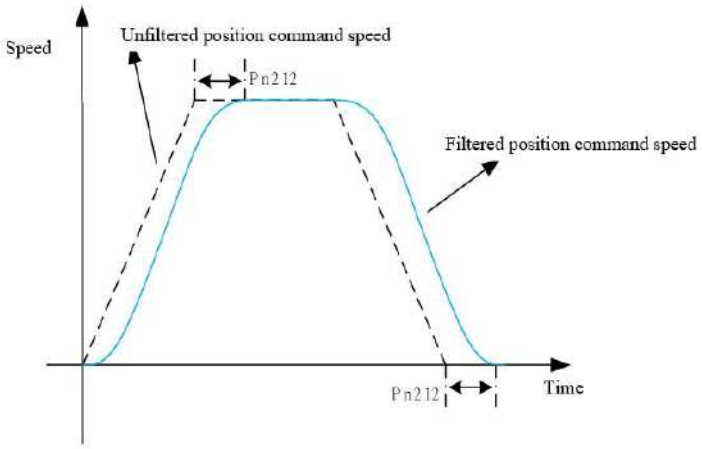
Caution	
⚠	If this function code is set to 0, the drive automatically sets the numerator based on the encoder resolution. For example: ● When the serial encoder resolution is 17 bits and is set to 0, the drive sets N=131072; ● When the serial encoder resolution is 24 bits and is set to 0, the drive sets N=16777216; ● When the serial encoder resolution is 23 bits and is set to 0, the drive sets N=8388608.

Pn206	Electronic Gear Denominator (M)		○	Address: 0x0206★
Default: 1	Range: 1~1073741824	Unit: NA		Control mode:Ⓟ
Description	The electronic gearing function is designed to provide easy proportional travel changes. Large electronic gear ratios usually result in a step change in the position command, which can be improved by smoothing it out with an S-curve or a low-pass filter. For example, when the electronic gear ratio is equal to 1, the motor encoder enters the weekly pulse number of 10000ppr, when the electronic gear ratio is equal to 0.5, every two pulses on the command side corresponds to one pulse wave of motor rotation. If set incorrectly, the servo motor may exhibit sudden surges; therefore, the user must set the electronic gear ratio reasonably.  When the deceleration ratio between the motor axis and the load side is (motor rotates B turns while the load rotates A turns), the electronic gear ratio can be determined by the following formula: ● Electronic gear ratio Example: Given a servo motor encoder resolution of 10,000 pulses per revolution (p/rev) and a ball screw lead of 6mm, calculate the command pulses required from the host PC to achieve a 10 mm workpiece displacement  ● Without electronic gear ratio: Since the screw moves 6mm per motor revolution, moving10 mm requires 10÷6 = 1.6666 revolutions, which requires 1.6666 × 2500 × 4 = 16666 pulses; the host outputs 16666 pulses.  ● With electronic gear ratio: Since 1 pulse is set to represent 1μm, then moving 10mm (10000μm) requires 10000 ÷ 1 = 10000 pulses; the host outputs 10000 pulses.			

Caution	
⚠	● It is recommended to change the electronic gear ratio when the motor is stopped or running at low speed to avoid large vibrations. If vibration occurs during switching, use position-smoothing related parameters to reduce it. ● When using multi-segment internal position control, if the electronic gear ratio is changed while the drive is executing a position segment, the change will not apply to the current segment; it takes effect from the next position segment. ● When using external pulse commands, changes to the electronic gear ratio take effect immediately on the input pulses. ● Electronic gear ratio setting range: if exceeded, an ER.d04 error will be reported.

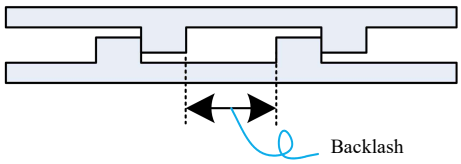
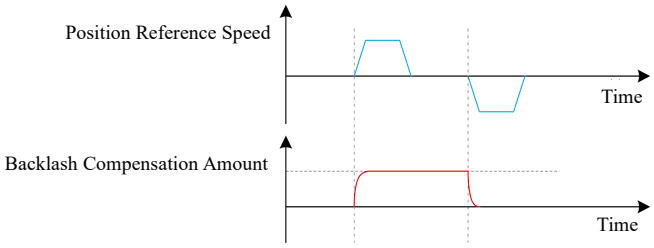
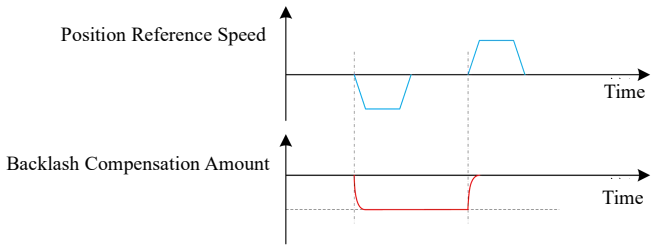
Pn211	Position Command Low-Pass Filter Time		○	Address: 0x0211
Default: 0.0	Range: 0.0~655.0	Unit: ms		Control mode:Ⓟ
Description	Low-pass filtering of position commands, primarily providing buffering for rapidly changing input pulse commands. Note: When set to 0 the low-pass filter is disabled.  Generally used when: ● The host PC does not provide acceleration/deceleration; ● The electronic gear ratio is relatively large; ● The pulse command frequency is low; ● The motor exhibits stepping, jumps, or instability during operation.			

Pn212	Position Command Moving Average Filter		○	Address: 0x0212
Default: 0.0	Range: 0.0~1000.0	Unit: ms		Control mode:Ⓟ

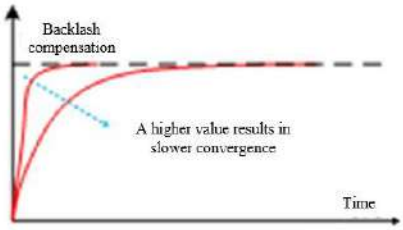
Description	Performs smoothing of position commands. Smoothing occurs at the start and end of step commands but introduces a delay in the position command. 

Caution	
⚠	● When set to 0, the position command linear-filter function is disabled.

Pn220	Backlash Compensation		■	Address: 0x0220
Default: 0x0000	Range: 0x0000~0x0011	Unit: N/A		Control Mode:P
Parameter setting	0-th bit X	Backlash compensation enable		
		0	OFF	
		1	ON	
	1-st bit Y	Backlash compensation direction		
		0	Positive	
		1	Negative	
	2-nd bit Z	Reserved parameters (Not for use)		
	3-rd bit W	Reserved parameters (Not for use)		

Description	For ball screws and other similar drive mechanisms, there will be a repeatability error after a long period of wear and tear. Set backlash compensation at this time to reduce the error caused by the design of the mechanism.  Pn220.Y=0 (Positive)  Pn220.Y=1 (Negative) 

Pn221	Backlash Compensation Quantity		○	Address: 0x0221★
Default: 0.0	Range: -5000.0~5000.0	Unit: 0.1 command unit		Control mode:Ⓟ

Pn223	Backlash Compensation Filter Time		○	Address: 0x0223
Default: 10.00	Range: 0.00~100.00	Unit: ms		Control mode:Ⓟ
Description	During point-to-point start/stop, the relationship between backlash compensation quantity and time is exponential. This parameter determines the convergence speed of that compensation curve.  			

Pn232	LF Vibration Detection Sensitivity (Relative to Positioning Completion Signal Threshold)	○	Address: 0x0232
Default: 40.0	Range: 0.1~300.0	Unit: %	Control mode:Ⓟ
Description	Set the threshold for low-frequency vibration detection, vibration detection value = Pn232 × Pn262. A lower threshold setting enables easier vibration detection.		

Pn233	Anti LF Vibration 1 Frequency A	○	Address: 0x0233
Default: 50.0	Range: 1.0~250.0	Unit: Hz	Control mode:Ⓟ

Pn234	Anti LF Vibration 1 Frequency B	○	Address: 0x0234
Default: 70.0	Range: 1.0~250.0	Unit: Hz	Control mode:Ⓟ

Pn235	Anti LF Vibration 2 Frequency	○	Address: 0x0235
Default: 200.0	Range: 1.0~200.0	Unit: Hz	Control mode:Ⓟ
Description	Sets the center frequency for low-frequency vibration suppression. This function is enabled when the value is not 200.0Hz. Enabling this function reduces the drive's responsiveness. After the model-tracking function is enabled (Pn240.X=1), this feature can be activated via function code Pn240.Y=2.		

Pn236	Anti LF Vibration 2 Gain	○	Address: 0x0236
Default: 100	Range: 10~1000	Unit: %	Control mode:Ⓟ
Description	Set the gain for low-frequency vibration suppression. The lower the setting, the stronger the suppression; setting it too low may result in excessively long positioning times.		

Pn240	MFC Function Switch	○	Address: 0x0240
Default: 0x0100	Range: 0x0000~0x1121	Unit: N/A	Control mode:ⓅⓈⓉ

Pn241	Model Tracking Gain	○	Address: 0x0241
Default: 50.0	Range: 1.0~2000.0	Unit: 1/s	Control mode:Ⓟ

Pn242	Model Tracking Gain Compensation	○	Address: 0x0242
Default: 100.0	Range: 50.0~200.0	Unit: %	Control mode:Ⓟ

Pn243	Model Tracking Speed Feedforward Compensation	○	Address: 0x0243
Default: 100.0	Range: 0.0~1000.0	Unit: %	Control mode:Ⓟ

Pn244	Model Tracking Bias (FWD)	○	Address: 0x0244
Default: 100.0	Range: 0.0~1000.0	Unit: %	Control mode:Ⓟ

Pn245	Model Tracking Bias (REV)	○	Address: 0x0245
Default: 100.0	Range: 0.0~1000.0	Unit: %	Control mode:Ⓟ

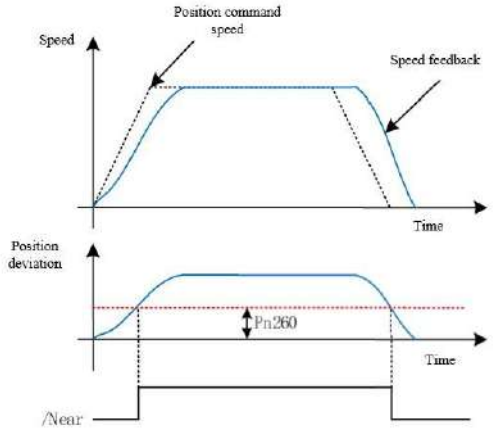
Pn246	2nd Model Tracking Gain	○	Address: 0x0246
Default: 50.0	Range: 1.0~2000.0	Unit: 1/s	Control mode:Ⓟ

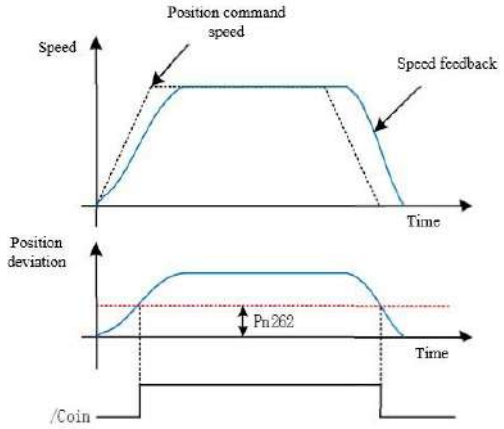
Pn247	2nd Model Tracking Gain Compensation	○	Address: 0x0247
Default: 100.0	Range: 50.0~200.0	Unit: %	Control mode:Ⓟ

Pn248※	Control Switch	■	Address: 0x0248
Default: 0x0001	Range: 0x0000~0x0011	Unit: N/A	Control Mode:ⓅⓈⓉ

Parameter setting	0-th bit X	MFC mode	
		0	I-type MFC
		1	II-type MFC
	1-st bit Y	No-tuning mode	
		0	I-type no-tuning
		1	II-type no-tuning
	2-nd bit Z	Reserved parameters (Not for modification)	
	3-rd bit W	Reserved parameters (Not for modification)	

Pn260	Position Near Signal (/Near) Threshold	○	Address: 0x0260★
Default: 1073741824	Range: 1~1073741824	Unit: Command unit	Control mode:Ⓟ

Description	A signal is output when the difference between the command pulse number of the upper unit and the servomotor movement (position deviation) is lower than Pn260. In position control, the upper unit can receive a position near signal before positioning completion signal to prepare for the sequence of movements or other operations that are to be performed after the positioning is completed.  Note: Typically set this value larger than the Positioning Complete Signal (/COIN) Threshold (Pn262).

Pn262	Positioning Complete Signal (/COIN) Threshold	○	Address: 0x0262
Default: 7	Range: 0~1073741824	Unit: Command unit	Control mode:P
Description	A signal is output when the difference between the command pulse number of the upper unit and the servomotor movement (position deviation) is lower than Pn262.  Note: ① This parameter does not affect final positioning accuracy. ② If set too large, the /COIN signal may remain asserted for an extended time during low-speed operation when deviation is small. If /COIN remains asserted continuously, reduce the positioning-complete threshold until the signal is no longer continuously output.		

Pn264	Position Deviation Error Threshold		○	Address: 0x0264★
Default: 5242880	Range: 1~1073741824	Unit: Command unit		Control mode:Ⓟ
Description	If, during motor motion, the deviation between the position command and the actual feedback exceeds this threshold, the drive issues a position deviation error. Normal position deviation depends on motion speed, gains, feedforward, etc., so in practice set this parameter using the following formula: $Pn264=\frac{F_c}{K_p}\times(1.2\sim2.0)$ In the formula: ● F_c: maximum position-command pulse frequency (pulse/s); ● K_p: position-loop gain (1/s); ● 1.2~2.0: Safety coefficient (protection against frequent excessive position deviation)			

Pn266	Position Deviation Alarm Threshold		○	Address: 0x0266
Default: 100	Range: 10~100	Unit: %		Control mode:Ⓟ
Description	Set the alarm threshold for excessive position deviation. When the current position deviation exceeds this value, the drive issues a position deviation alarm.			

Pn267	Servo ON Position Deviation Error Threshold		○	Address: 0x0267★
Default: 5242880	Range: 1~1073741823	Unit: Command unit		Control mode:Ⓟ
Description	During motor motion, if the position deviation at the instant the servo is switched ON exceeds this value, the drive generates a servo-ON position deviation error.			

Pn269	Servo ON Position Deviation Alarm Threshold		○	Address: 0x0269
Default: 100	Range: 10~100	Unit: %		Control mode:Ⓟ
Description	During motor motion, if the position deviation at the instant the servo is switched ON exceeds this value, the drive generates a servo-ON position deviation alarm.			

Pn270	Servo ON Speed Limit		○	Address: 0x0270
Default: 1000	Range: 0~10000	Unit: rpm		Control mode:Ⓟ

Pn271	External Pulse Multiplier		■	Address: 0x0271
Default: 0x0000	Range: 0x0000~0x0002	Unit: N/A		Control mode:Ⓟ

Pn272	External Terminal Position Deviation Clear Signal		■	Address: 0x0272
Default: 0x0000	Range: 0x0000~0x0003	Unit: N/A		Control mode:Ⓟ

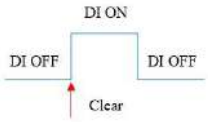
Set the method for clearing position deviation in position mode.

Setpoint	Description	Comment
0	Clear on high level (H)	-
1	Clear on rising edge	-
2	Clear on low level (L)	-
3	Clear on falling edge	-

CLR signal states:

Clear on rising edge

Clear on falling edge



Pn273	Position Deviation Clear Mode	■	Address: 0x0273
Default: 0x0000	Range: 0x0000~0x0002	Unit: N/A	Control mode:Ⓟ

When specific conditions are met under different set values, the position deviation clear is executed.

Setpoint	Description	Comment
0	Clear when servo is OFF and on error occurrence	-
1	Clear only via CLR signal	-
2	Clear on error occurrence	-

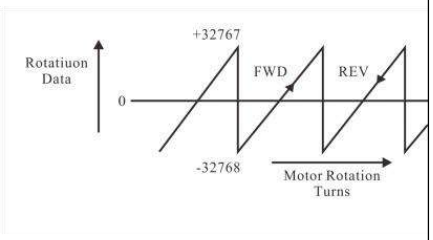
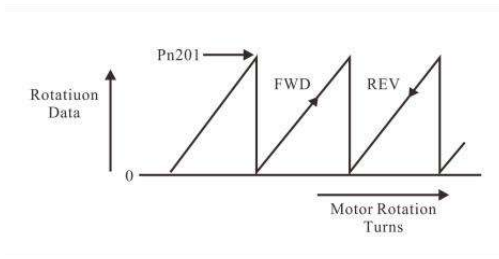
Pn274	Positioning Complete Signal (/COIN) Output Timing	○	Address: 0x0274
Default: 0x0000	Range: 0x0000~0x0002	Unit: N/A	Control mode:Ⓟ

Set the output timing of the positioning complete signal in position mode.

Setpoint	Description	Comment
0	Output when absolute position deviation < Positioning Complete Signal (/COIN) Threshold (Pn262)	-
1	Output when absolute position deviation < Pn262 and filtered position command = 0	-
2	Output when absolute position deviation < Pn262 and position command input = 0	-

Pn276	Max. Rotation Turns	■	Address: 0x0276
Default: 0	Range: 0~30000	Unit: Turn	Control mode:ⓅⓈⓉ

Description	This parameter applies to position control of rotating mechanisms (e.g., turntables). The upper limit of the number of revolutions is used to keep the number of revolutions of the motor and the number of revolutions of the rotary table as an integer ratio and to avoid the generation of decimals.

Pn201 = 0	Pn201 ≠ 0
	

Caution	
	● Effective only when using an absolute encoder. ● When Pn201 = 0, this setting is invalid.

Pn277	Encoder Unidirection Mode		■	Address: 0x0277
Default: 0x0000	Range: 0x0000~0x0011	Unit: N/A		Control Mode: P S T
Parameter setting	0-th bit X	Encoder unidirection enable		
		0	OFF	
		1	ON	
	1-st bit Y	Position feedback period		
		0	Cyclic	
		1	Acyclic	
	2-nd bit Z	Reserved parameters (Not for modification)		
	3-rd bit W	Reserved parameters (Not for modification)		

Pn291	Home Return High Speed		○	Address: 0x0291
Default: 100.0	Range: 0.0~3000.0	Unit: rpm		Control mode: P
Description	During home return, the reference point (deceleration point) is located first to determine the home range. The speed should not be too slow to avoid home return timeout faults.			

Pn292	Home Return Low Speed		○	Address: 0x0292
Default: 10.0	Range: 0.0~1000.0	Unit: rpm		Control mode: P

Description	After determining the home range, the motor decelerates to accurately position at the home point and then locks it. Speed should not be too high to prevent missing the home point or causing large positioning errors.

Pn293	Home Return ACC/DEC Time		○	Address: 0x0293
Default: 3000	Range: 0~3000	Unit: ms		Control mode:P
Description	Acceleration time refers to the duration to accelerate from 0rpm to 3000rpm. Deceleration time refers to the duration to decelerate from 3000rpm to 0rpm.			

Pn294	Zero Offset Position		○	Address: 0x0294★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: Command unit		Control mode:P
Description	The zero offset position is the additional distance the motor moves after finding the home position, representing the motor's absolute position coordinate.			

Pn296	Absolute Position Zero Multi-turn Value		○	Address: 0x0296
Default: 0	Range: -32768~32767	Unit: rev		Control mode:PST

Pn297	Absolute Position Zero Single-turn Value		○	Address: 0x0297★
Default: 0	Range: 0~2147483647	Unit: Encoder unit		Control mode:PST
Description	The multi-turn and single-turn values together define the motor’s target absolute position. When absolute position homing is selected, the motor stops when its multi-turn and single-turn values match or are close to the set values.			

Pn299	Home Return Timeout Setting		○	Address: 0x0299
Default: 10000	Range: 0~65535	Unit: ms		Control mode:PST
Description	Set the maximum search time for the home signal. If this value is too small or the home signal is not found within the set time, the drive will trigger a Home Return Timeout error (ER.8A1). Note: Set to 0 to disable this function.			

3.3.4 Speed Parameters (Pn3xx)

Pn300	Speed Command Source		○	Address: 0x0300
Default: 0000	Range: 0x0000~0x0005	Unit: N/A		Control mode:S

Select the speed command source in speed mode.

Setpoint	Description	Comment
0	Funcode	Set via Pn304
2	Reserved	-
3	Reserved	-
4	Multiple funcodes	

SPDB	SPDA	Command Source
0	0	Pn303.X
0	1	Pn303.Y
1	0	Pn303.Z
1	1	Pn303.W

Setpoint	Description	Comment
5	Reserved	-

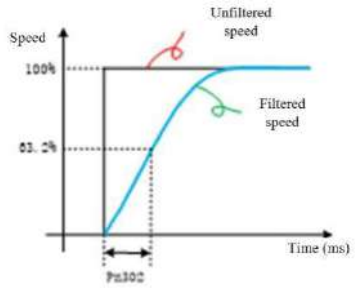
Pn301	Speed Command Direction	○	Address: 0x0301
Default: 0x0000	Range: 0x0000~0x0001	Unit: N/A	Control mode:Ⓢ

Setpoint	Description	Comment
0	Same as current speed command	-
1	Opposite to current speed command	-

Pn302	Speed Command Low-Pass Filter	○	Address: 0x0302
Default: 0.40	Range: 0.00~655.35	Unit: ms	Control mode:Ⓢ

Description

Apply a first-order low-pass filter to the speed command input for smoothing.



Pn303	Speed Control 1	■	Address: 0x0303
Default: 0x0000	Range: 0x0000~0x2222	Unit: N/A	Control Mode:Ⓢ

Parameter setting	0-th bit	Speed reference source 1	
	X	0	Pn304 setting

	1-st bit Y	Speed reference source 2	
		0	Pn305 setting
	2-nd bit Z	Speed reference source 3	
		0	Pn306 setting
	3-rd bit W	Speed reference source 4	
		0	Pn307 setting

Pn304	Internal Speed 0	○	Address: 0x0304
Default: 100	Range: -10000~10000	Unit: 1rpm	Control mode:S

Pn305	Internal Speed 1	○	Address: 0x0305
Default: 200	Range: -10000~10000	Unit: 1rpm	Control mode:S

Pn306	Internal Speed 2	○	Address: 0x0306
Default: 300	Range: -10000~10000	Unit: 1rpm	Control mode:S

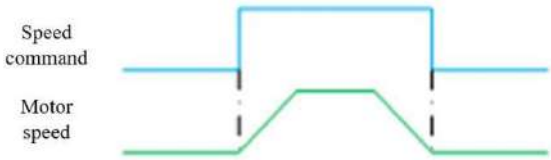
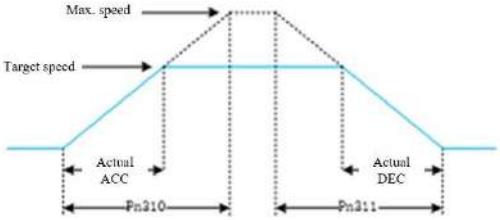
Pn307	Internal Speed 3	○	Address: 0x0307
Default: 400	Range: -10000~10000	Unit: 1rpm	Control mode:S

Pn308	Internal Speed Command Unit	○	Address: 0x0308
Default: 0x0000	Range: 0x0000~0x0001	Unit: N/A	Control mode:S

Setpoint	Description	Comment
0	1rpm	-
1	0.1rpm	-

Caution	
	• The internal speed command unit applies only to internal speed commands Pn304~Pn307.

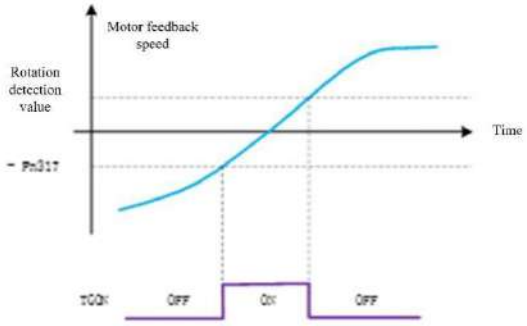
Pn310	Soft-Start ACC Time in Speed Control Mode	○	Address: 0x0310
Default: 200	Range: 0~10000	Unit: 1ms	Control mode:S

Pn311	Soft-Start DEC Time in Speed Control Mode		○	Address: 0x0311
Default: 200	Range: 0~10000	Unit: 1ms		Control mode:Ⓢ
Description	The soft-start function converts step speed commands into smooth constant-acceleration/deceleration speed profiles. Acceleration time and deceleration time can be set separately.  Pn310: Time required for the motor to accelerate from stop to maximum speed. Pn311: Time required for the motor to decelerate from maximum speed to stop. The actual acceleration/deceleration times are calculated by the following formula.  			

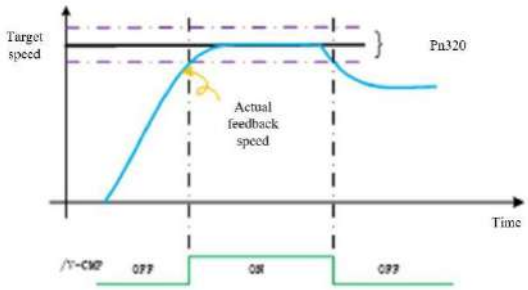
Pn313	Zero-Clamp Speed Threshold		○	Address: 0x0313
Default: 10	Range: 0~10000	Unit: rpm		Control mode:Ⓢ
Description	When the Zero-Clamp signal (/ZCLAMP) is ON and the input speed command falls below this threshold, the servo locks position (internal position loop active) and ignores speed commands. Used where the host does not implement a position loop in speed-control systems.			

Caution	
⚠	● When zero-clamped, the servo may exhibit ±1 pulse position fluctuation; if external force causes rotation, the axis will return to the zero-clamp position.

Pn314	Zero-Clamp Compensation Max. Return Speed		○	Address: 0x0314
Default: 1000	Range: 50~10000	Unit: rpm		Control mode:Ⓢ
Description	Set the maximum return speed when the servo, held at zero-clamp, is displaced by external force and returns to the zero-clamp position.			

Pn317	Rotation Detection Value		○	Address: 0x0317
Default: 20	Range: 1~10000	Unit: rpm		Control mode:Ⓟ Ⓢ Ⓣ
Description	Set the detection range for the /TGON rotation signal. When the actual feedback speed of the motor is within the range set by this function code, report the corresponding TGON signal. 			

Pn318	Max. Operating Speed		○	Address: 0x0318
Default: 10000	Range: 0~10000	Unit: rpm		Control mode:Ⓟ Ⓢ
Description	Set the servo motor's maximum operating speed. If this limit exceeds the motor's physical maximum speed, the motor's maximum speed is used.			

Pn320	Speed Achievement Signal Threshold		○	Address: 0x0320
Default: 10	Range: 0~100	Unit: rpm		Control mode:Ⓟ Ⓢ Ⓣ
Description	Set the allowable speed deviation for judging that the actual speed has reached the target. If the motor feedback speed is within ±Pn320 of the target, the /V-CMP signal (assigned to an output terminal) turns ON (high level). Example: If Pn320 = 50rpm and the target speed is 2000rpm, the /V-CMP signal activates when the motor speed is within 1950rpm to 2050rpm. 			

3.3.5 Torque Parameters (Pn4xx)

Pn400	Torque Control 1		■	Address: 0x0400
Default: 0x0020	Range: 0x0000~0x0045	Unit: N/A		Control Mode:Ⓣ
Parameter setting	0-th bit X	Torque reference source		
		0	Internal digital setting	Pn410[Torque Reference Source 1] setting
		1	Reserved	-

		2	Reserved	-		
		3	Hybrid setting	TorqB	TorqA	Reference Source
				0	0	Pn409.X setting
				0	1	Pn409.Y setting
				1	0	Pn409.Z setting
				1	1	Pn409.W setting
		4	Single trigger mode	-		
		5	CANopen	-		
	1-st bit Y	Torque mode velocity limit source				
		0	Reserved	-		
		1	Reserved	-		
		2	Internal digital setting	Pn415 setting		
		3	DI terminal	OFF: Pn415 setting ON: Pn416 setting		
		4	Torque reference direction	Positive: Pn415 setting Negative: Pn416 setting		
	2-nd bit Z	Reserved parameters (Not for modification)				
	3-rd bit W	Reserved parameters (Not for modification)				

Pn401	Torque Command 2nd Low-pass Filter OFF Frequency	○	Address: 0x0401
Default: 5000	Range: 100~5000	Unit: Hz	Control mode:T
Description	When set to 5000, the filter is disabled.		

Pn402	Torque Command 2nd Low-pass Filter Q Value	○	Address: 0x0402
Default: 0.50	Range: 0.50~1.00	Unit: N/A	Control mode:T

Pn403	Torque Command Direction	○	Address: 0x0403
Default: 0x0000	Range: 0x0000~0x0001	Unit: N/A	Control mode:T

Setpoint	Description	Comment
0	Same direction as torque command	-
1	Opposite direction to torque command	-

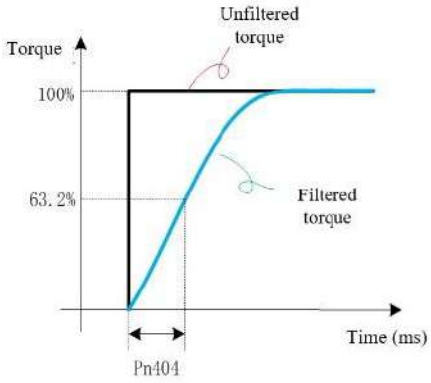
Caution	
⚠	● Pn403 and the external terminal torque direction (TPR-D) affect the internal register torque command. ● The logical combination of Pn403 and the external torque-direction terminal (TPR-D) is as follows (CCW = positive reference):

Torque Command	External Terminal TPR-D	Pn403.X	Command Direction
FWD	OFF	0	FWD
		1	REV
	ON	0	REV
		1	FWD
REV	OFF	0	REV
		1	FWD
	ON	0	FWD
		1	REV

Pn404	Torque Command Filter Time	○	Address: 0x0404
Default: 0.00	Range: 0.00~655.35	Unit: ms	Control mode:T

Description

Apply a first-order low-pass filter to the torque command input to smooth the torque command.



Pn409	Torque Control 3	○	Address: 0x0409
Default: 0x0000	Range: 0x0000~0x2222	Unit: N/A	Control Mode:T

Parameter setting			
	0-th bit X	Torque reference source 1	
		0	Pn410 setting
	1-st bit Y	Torque reference source 2	
		0	Pn411 setting

	2-nd bit Z	Torque reference source 3	
		0	Pn412 setting
	3-rd bit W	Torque reference source 4	
		0	Pn413 setting

Pn410	Internal Torque Command 1 Value	○	Address: 0x0410
Default: 0.0	Range: -500.0~500.0	Unit: %	Control mode:T

Pn411	Internal Torque Command 2 Value	○	Address: 0x0411
Default: 0.0	Range: -500.0~500.0	Unit: %	Control mode:T

Pn412	Internal Torque Command 3 Value	○	Address: 0x0412
Default: 0.0	Range: -500.0~500.0	Unit: %	Control mode:T

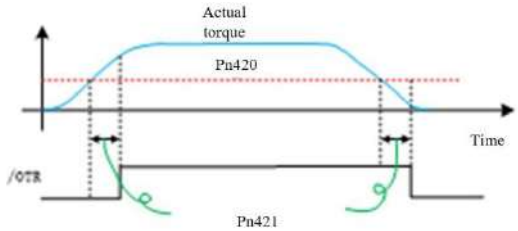
Pn413	Internal Torque Command 4 Value	○	Address: 0x0413
Default: 0.0	Range: -500.0~500.0	Unit: %	Control mode:T

Pn415	Speed Limit 1 under Torque Control	○	Address: 0x0415
Default: 1000	Range: 0~10000	Unit: rpm	Control mode:T

Pn416	Speed Limit 2 under Torque Control	○	Address: 0x0416
Default: 1000	Range: 0~10000	Unit: rpm	Control mode:T

Pn420	Torque Reference Coincidence	○	Address: 0x0420
Default: 100.0	Range: 0.0~500.0	Unit: %	Control mode:PST

Pn421	Torque Reference Coincidence Window	○	Address: 0x0421
Default: 5	Range: 0~1000	Unit: ms	Control mode:PST

Description	When the drive output torque exceeds the target torque and remains above it for longer than Pn421, the "target torque reached" signal is output. 

Pn430	Torque Control 2		○	Address: 0x0430
Default: 0x0001	Range: 0x0000~0x0013	Unit: N/A		Control Mode:T

Parameter setting	0-th bit X	Reserved parameters (Not for modification)	
		0	Low level
		1	Rising edge
		2	High level
		3	Falling edge
	1-st bit Y	Control priority in torque mode	
		0	Speed priority
		1	Torque priority
	2-nd bit Z	Reserved parameters (Not for modification)	
	3-rd bit W	Reserved parameters (Not for modification)	

3.3.6 Auxiliary Parameters (Pn5xx)

Pn500	JOG Speed		○	Address: 0x0500
Default: 200	Range: 0~3000	Unit: rpm		Control mode:PST

Pn502	Programmed Jog Mode		○	Address: 0x0502
Default: 0x0000	Range: 0x0000~0x0005	Unit: N/A		Control Mode:PST

Parameter setting	0-th bit X	Programmed jog mode	
		0	(Wait Pn535 → Forward move Pn531) × Move count Pn536
		1	(Wait Pn535 → Reverse move Pn531) × Move count Pn536
		2	(Wait Pn535 → Forward move Pn531) × Move count Pn536 (Wait Pn535 → Reverse move Pn531) × Move count Pn536

		3	(Wait Pn535 → Reverse move Pn531) × Move count Pn536 (Wait Pn535 → Forward move Pn531) × Move count Pn536
		4	(Wait Pn535 → Forward move Pn531 → Wait Pn535 → Reverse move Pn531) × Move count Pn536
		5	(Wait Pn535 → Reverse move Pn531 → Wait Pn535 → Forward move Pn531) × Move count Pn536
	1-st bit Y	Reserved parameters (Not for modification)	
	2-nd bit Z	Reserved parameters (Not for modification)	
	3-rd bit W	Reserved parameters (Not for modification)	

Pn503	Program JOG Travel Distance	○	Address: 0x0503★
Default: 60000	Range: 1~1073741824	Unit: Command unit	Control mode:PST

Pn505	Program Jog ACC/DEC Time	○	Address: 0x0505
Default: 100	Range: 2~10000	Unit: ms	Control mode:PST

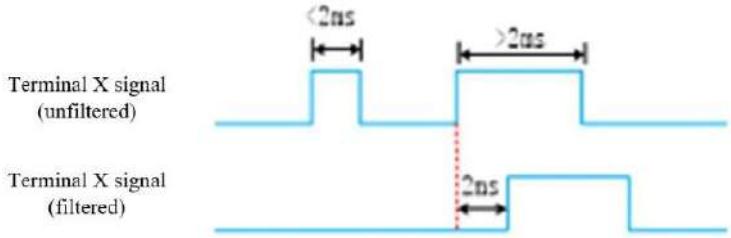
Pn506	Program Jog Waiting Time	○	Address: 0x0506
Default: 100	Range: 0~10000	Unit: ms	Control mode:PST

Pn507	Program Jog Move Count	○	Address: 0x0507
Default: 1	Range: 0~1000	Unit: times	Control mode:PST
Description	Set the number of cycles for Program JOG.		

Caution	
⚠	• If Pn502 = 2 or 3 and Pn507 = 0, Program JOG is disabled. • If Pn507 = 0, move count is unlimited.

Pn508	Jog Program Move Speed	○	Address: 0x0508
Default: 500	Range: 1~10000	Unit: rpm	Control mode:PST

3.3.7 Terminal Parameters(Pn6xx)

Pn600	Switch Terminal X Filter Time		○	Address: 0x0600
Default: 2	Range: 0~3000	Unit: ms		Control mode:Ⓟ Ⓢ Ⓣ
Description	Set the filter time for external signals on the drive's X input terminals. Example: When Pn600 filter time is 2ms, signals smaller than 2ms are filtered out.  			

Caution	
⚠	• The filter time applies to terminals X1~X4. • The monitored terminal X status bits reported by Un100 reflect the filtered states.

Pn601	IN1 Configuration		○	Address: 0x0601
Default: 0x0001	Range: 0x0000~0x112F	Unit: N/A		Control Mode:Ⓟ Ⓢ Ⓣ
Parameter setting	0-th bit 1-st bit X Y	Assigned Value		
		00	Disabled	
		01	See Terminal X Functions	
		...		
		2F		
	2-nd bit Z	Input terminal contact property		
		0	Normally open (NO)	
		1	Normally closed (NC)	
	3-rd bit W	Input terminal signal source		
		0	External hardware terminal X1	
		1	Pn630.Bit0	

Pn602	IN2 Configuration		○	Address: 0x0602
Default: 0x0002	Range: 0x0000~0x112F	Unit: N/A		Control Mode:Ⓟ Ⓢ Ⓣ
Parameter setting	0-th bit 1-st bit X Y	Assigned Value		
		00	OFF	
		01	See Terminal X Functions	
		...		

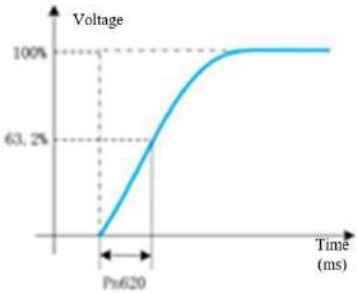
		2F	
	2-nd bit Z	Input terminal contact property	
		0	Normally open (NO)
		1	Normally closed (NC)
	3-rd bit W	Input terminal signal source	
		0	External hardware terminal X2
		1	Pn630.Bit1

Pn603	IN3 Configuration		○	Address: 0x0603
Default: 0x0003	Range: 0x0000~0x112F	Unit: N/A		Control Mode: P S T
Parameter setting	0-th bit 1-st bit X Y	Assigned Value		
		00	OFF	
		01	See Terminal X Functions	
		...		
		2F		
	2-nd bit Z	Input terminal contact property		
		0	Normally open (NO)	
		1	Normally closed (NC)	
	3-rd bit W	Input terminal signal source		
		0	External hardware terminal X3	
		1	Pn630.Bit2	

Pn604	IN4 Configuration		○	Address: 0x0604
Default: 0x0005	Range: 0x0000~0x112F	Unit: N/A		Control Mode: P S T
	0-th bit 1-st bit X Y	Assigned Value		
		00	OFF	
		01	See Terminal X Functions	
		...		
		2F		
	2-nd bit Z	Input terminal contact property		
		0	Normally open (NO)	
		1	Normally closed (NC)	
	3-rd bit W	Input terminal signal source		
		0	External hardware terminal X4	
		1	Pn630.Bit3	

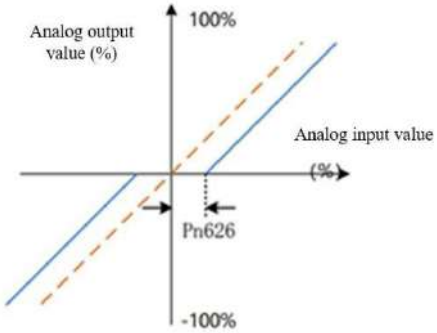
Pn611	OUT1 Configuration		○	Address: 0x0611
Default: 0x0001	Range: 0x0000~0x110F	Unit: N/A		Control Mode: P S T
Parameter setting	0-th bit 1-st bit X Y	Assigned Value		
		00	See Terminal Y Functions	
		...		
		0F		
	2-nd bit Z	Output terminal contact property		
		0	Normally open (NO)	
		1	Normally closed (NC)	
	3-rd bit W	Output terminal signal source		
		0	Pn610 setting	
		1	Pn631.Bit0 setting	

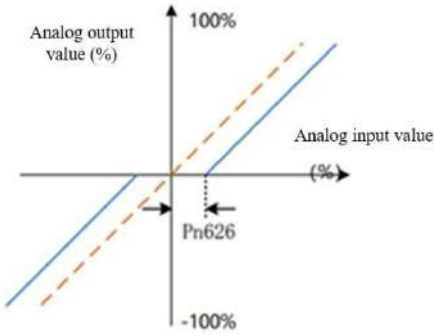
Pn612	OUT2 Configuration		○	Address: 0x0612
Default: 0x0002	Range: 0x0000~0x110F	Unit: N/A		Control Mode: P S T
Parameter setting	0-th bit 1-st bit X Y	Assigned Value		
		00	See Terminal Y Functions	
		...		
		0F		
	2-nd bit Z	Output terminal contact property		
		0	NO	
		1	NC	
	3-rd bit W	Output terminal signal source		
		0	Pn610 setting	
		1	Pn631.Y setting	

Pn620	AI1 Low-Pass Filter Time		○	Address: 0x0620
Default: 0	Range: 0~65535	Unit: ms		Control mode: P S T
Description	Apply a first-order low-pass filter to voltage signals acquired via AI1 to smooth the sampled data.  			

Pn622	AI1 Offset Correction		○	Address: 0x0622
Default: 0	Range: -50%~50%	Unit: 0.01%		Control mode:Ⓟ Ⓢ Ⓣ
Description	Correct the midpoint bias (0% point) when deviation exists between the theoretical analog input midpoint (2.5V or 5V) and actual midpoint (0%).			

Pn624	AI1 Gain		○	Address: 0x624
Default: 100%	Range: 1%~500%	Unit: %		Control mode:Ⓟ Ⓢ Ⓣ
Description	Adjust the linearity when deviation exists between the theoretical maximum analog input (5V or 10V) and actual maximum input (100%). For linearity calculation, see later instructions.			

Pn626	AI1 Zero-point Threshold		○	Address: 0x0626
Default: 0%	Range: 0%~50%	Unit: 0.01%		Control mode:Ⓟ Ⓢ Ⓣ
Description	Adjust the zero-point threshold to eliminate zero-point fluctuation at the analog voltage midpoint.  			

Pn626	AI1 Zero-point Threshold		○	Address: 0x0626
Default: 0%	Range: 0%~50%	Unit: 0.01%		Control mode:Ⓟ Ⓢ Ⓣ
Description	Adjust the zero-point threshold to eliminate zero-point fluctuation at the analog voltage midpoint.  			

Pn630	Internal Setting on X Terminal		○	Address: 0x0630
Default: 0x0000	Range: 0x0000~0x03FF	Unit: N/A		Control Mode:Ⓟ Ⓢ Ⓣ
Parameter setting	0-th bit X	Group 1		
		Bit0	Virtual input terminal X1	
		Bit1	Virtual input terminal X2	
		Bit2	Virtual input terminal X3	
		Bit3	Virtual input terminal X4	
	1-st bit Y	Group 2		
		Bit4	Reserved	
		Bit5	Reserved	
		Bit6	Reserved	
		Bit7	Reserved	
	2-nd bit Z	Group 3		
		Bit8	Reserved	
	3-rd bit W	Reserved parameters (Not for use)		

Pn631	Internal Setting on Y Terminal		○	Address: 0x0631
Default: 0x0000	Range: 0x0000~0x003F	Unit: N/A		Control Mode:Ⓟ Ⓢ Ⓣ
Parameter setting	0-th bit X	Group 1		
		Bit0	Terminal Y1	
		Bit1	Terminal Y2	
		Bit2	Reserved	
		Bit3	Reserved	
	1-st bit Y	Group 2		
		Bit4	Reserved	
		Bit5	Reserved	
	2-nd bit Z	Reserved parameters (Not for use)		
	3-rd bit W	Reserved parameters (Not for use)		

3.3.8 Extended Parameters(Pn7xx)

Pn702	Advance Tuning Range		○	Address: 0x0702
Default: 3.0	Range: 0.5~10.0	Unit: Turn		Control mode:Ⓟ Ⓢ Ⓣ

Pn705	Inertia Recognition Initial Value	○	Address: 0x0705
Default: 300	Range: 0~20000	Unit: %	Control mode:Ⓟ Ⓢ Ⓣ

Pn706	Inertia Identification Vibration Detection Threshold	○	Address: 0x0706
Default: 250	Range: 0~5000	Unit: rpm	Control mode:Ⓟ Ⓢ Ⓣ

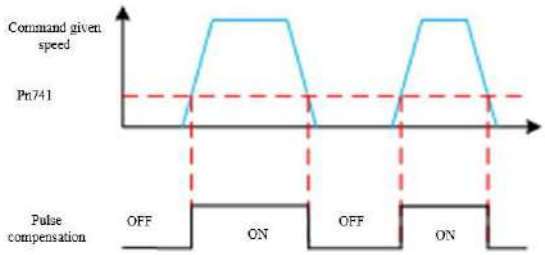
Pn720※	EasyFFT Sweep Start Frequency	○	Address: 0x0720
Default: 400	Range: 1~5000	Unit: Hz	Control mode:Ⓟ Ⓢ Ⓣ

Pn721※	EasyFFT Sweep End Frequency	○	Address: 0x0721
Default: 4000	Range: 50~5000	Unit: Hz	Control mode:Ⓟ Ⓢ Ⓣ

Pn722※	EasyFFT Resonance Frequency Lower Limit	○	Address: 0x0722
Default: 500	Range: 50~5000	Unit: Hz	Control mode:Ⓟ Ⓢ Ⓣ

Pn723※	EasyFFT Scanning Torque Command Amplitude	○	Address: 0x0723
Default: 15	Range: 1~800	Unit: %	Control mode:Ⓟ Ⓢ Ⓣ
Description	Set the amplitude of the torque command for EasyFFT scanning.		

Pn740※	Velocity Ripple Compensation	○	Address: 0x0740
Default: 0x0000	Range: 0x0000~0x0011	Unit: N/A	Control Mode:Ⓟ Ⓢ Ⓣ
Parameter setting	0-th bit X	Function switch	
		0	OFF
		1	ON
	1-st bit Y	Activation condition	
		0	Speed command
		1	Motor speed
	2-nd bit Z	Reserved parameters (Not for use)	
	3-rd bit W	Reserved parameters (Not for use)	
Description	Enable/disable the speed ripple compensation function.		

Pn741※	Speed Ripple Compensation Speed Range		■	Address: 0x0741
Default: 0	Range: 0~10000	Unit: rpm		Control mode:Ⓟ Ⓢ Ⓣ
Description	When active, ripple compensation may occur even at zero speed command or motor standstill. This setting prevents compensation below the specified speed threshold. 			

Pn742※	Speed Ripple Compensation Gain		■	Address: 0x0742
Default: 80	Range: 0~100	Unit: %		Control mode:Ⓟ Ⓢ Ⓣ

Pn743※	Speed Ripple Compensation Component 1 Frequency		■	Address: 0x0743
Default: 0	Range: 0~100	Unit: N/A		Control mode:Ⓟ Ⓢ Ⓣ

Pn744※	Speed Ripple Compensation Component 1 Amplitude (relative to max. current)		■	Address: 0x0744
Default: 0.0	Range: -10.0%~10.0%	Unit: %		Control mode:Ⓟ Ⓢ Ⓣ

Pn745※	Speed Ripple Compensation Component 1 Phase		■	Address: 0x0745
Default: 0	Range: 0~360	Unit: °(deg)		Control mode:Ⓟ Ⓢ Ⓣ

Pn746※	Speed Ripple Compensation Component 2 Frequency		■	Address: 0x0746
Default: 0	Range: 0~100	Unit: N/A		Control mode:Ⓟ Ⓢ Ⓣ

Pn747※	Speed Ripple Compensation Component 2 Amplitude (relative to max. current)		■	Address: 0x0747
Default: 0.0	Range: -10.0%~10.0%	Unit: %		Control mode:Ⓟ Ⓢ Ⓣ

Pn748※	Speed Ripple Compensation Component 2 Phase		■	Address: 0x0748
Default: 0	Range: 0~360	Unit: °(deg)		Control mode:Ⓟ Ⓢ Ⓣ

Pn749※	Speed Ripple Compensation Component 3 Frequency	■	Address: 0x0749
Default: 0	Range: 0~100	Unit: N/A	Control mode:Ⓟ Ⓢ Ⓣ

Pn74A※	Speed Ripple Compensation Component 3 Amplitude (relative to max. current)	■	Address: 0x074A
Default: 0.0	Range: -10.0%~10.0%	Unit: %	Control mode:Ⓟ Ⓢ Ⓣ

Pn74B※	Speed Ripple Compensation Component 3 Phase	■	Address: 0x074B
Default: 0	Range: 0~360	Unit: °(deg)	Control mode:Ⓟ Ⓢ Ⓣ

Pn74C※	Speed Ripple Compensation Component 4 Frequency	■	Address: 0x074C
Default: 0	Range: 0~100	Unit: N/A	Control mode:Ⓟ Ⓢ Ⓣ

Pn74D※	Speed Ripple Compensation Component 4 Amplitude (relative to max. current)	■	Address: 0x074D
Default: 0.0	Range: -10.0%~10.0%	Unit: %	Control mode:Ⓟ Ⓢ Ⓣ

Pn74E※	Speed Ripple Compensation Component 4 Phase	■	Address: 0x074E
Default: 0	Range: 0~360	Unit: °(deg)	Control mode:Ⓟ Ⓢ Ⓣ

Pn755	Field Weakening Control	○	Address: 0x0755
Default: 0x0001	Range: 0x0000~0x0001	Unit: N/A	Control Mode:Ⓟ Ⓢ Ⓣ

Parameter setting	0-th bit X	Field weakening control enable	
		0	OFF
		1	ON
	1-st bit Y	Reserved parameters (Not for use)	
	2-nd bit Z	Reserved parameters (Not for use)	
	3-rd bit W	Reserved parameters (Not for use)	

Pn756	Field Weakening Control Loop Proportional Gain		○	Address: 0x0756
Default: 30	Range: 10~1000	Unit: Hz		Control mode:Ⓟ Ⓢ Ⓣ

Pn757	Field Weakening Control Loop Integral Time		○	Address: 0x0757
Default: 16	Range: 10~1000	Unit: μs		Control mode:Ⓟ Ⓢ Ⓣ

Pn758	Field Weakening Control Loop Max. Integral		○	Address: 0x0758
Default: 100	Range: 0~200	Unit: %		Control mode:Ⓟ Ⓢ Ⓣ

Pn759	Field Weakening Control Voltage Threshold		○	Address: 0x0759
Default: 115	Range: 50~150	Unit: %		Control mode:Ⓟ Ⓢ Ⓣ

Pn75A	Max. Field-Weakening Current		○	Address: 0x075A
Default: 95	Range: 50~150	Unit: %		Control mode:Ⓟ Ⓢ Ⓣ

Pn75B	Main Circuit Voltage Filter Time		○	Address: 0x075B
Default: 2.0	Range: 1.0~10.0	Unit: ms		Control mode:Ⓟ Ⓢ Ⓣ
Description	Perform moving average filtering on the DC voltage used for field-weakening calculations.			

Pn781※	Drive Bus Voltage Upper Limit		■	Address: 0x0781
Default: by model	Range: 0~1000	Unit: V		Control mode:Ⓟ Ⓢ Ⓣ
Description	Set the bus voltage upper limit. Exceeding this value triggers an overvoltage error. For DC 48V models: Defaulted to 85V (range: 80V~90V). Note: Do not change the parameters without the factory's permission, or it may cause irreversible damage to the machine!			

Pn784※	Drive Bus Voltage Lower Limit		■	Address: 0x0784
Default: by model	Range: 0~500	Unit: V		Control mode:Ⓟ Ⓢ Ⓣ
Description	Set the bus voltage lower limit. Falling below this value triggers an undervoltage error. For DC 48V models: Defaulted to 18V (range: 18V~20V).			

Pn785※	Drive Bus Undervoltage Detection Filter Time		■	Address: 0x0785
Default: 10	Range: 0~2000	Unit: ms		Control mode:Ⓟ Ⓢ Ⓣ

Pn786※	Drive Bus Undervoltage Alarm Value	■	Address: 0x0785
Default: by model	Range: 0~1000	Unit: V	Control mode:Ⓟ Ⓢ Ⓣ
Description	Set the bus undervoltage alarm threshold. Falling below this value triggers an alarm. For DC 48V models: Defaulted to 20V.		

Pn788	Motor Max. Speed Tuning	■	Address: 0x0788
Default: 0	Range: 0~2	Unit: 100rpm	Control mode:Ⓟ Ⓢ Ⓣ

Pn790※	Motor Code	○	Address: 0x0790
Default: by model	Range: 0x0000~0xFFFF	Unit: N/A	Control mode:Ⓟ Ⓢ Ⓣ
Description	Serial encoder motor (factory value): 0x1000~0x1005. If this code is set to 0x1000, the drive will auto-detect the encoder type and update the detected encoder value to function code Pn791.		

Pn791※	Encoder Control	○	Address: 0x0791
Default: Up to model	Range: 0x0000~0x000A	Unit: N/A	Control Mode:Ⓟ Ⓢ Ⓣ

Parameter setting	0-th bit X	Encoder type	
		11	ICHaus MU chip
	1-st bit Y	Reserved parameters (Not for use)	
	2-nd bit Z	Reserved parameters (Not for use)	
	3-rd bit W	Reserved parameters (Not for use)	
Description	Set the encoder type.		

Pn792※	Motor Zero Magnetic Pole Position	○	Address: 0x0792
Default: by model	Range: -360~360	Unit: °	Control mode:Ⓟ Ⓢ Ⓣ
Description	Display the motor's zero-point magnetic pole reference position. This value updates automatically after executing auxiliary function Fn080, and is dedicated to serial encoders.		

Pn793※	Position Sensor Resolution	■	Address: 0x0793★
Default: 10000	Range: 1~2^{31}	Unit: N/A	Control mode:Ⓟ Ⓢ Ⓣ

Description	Set the custom encoder resolution. For incremental encoders, enter the 4×-count value. Example: For a 2500-line incremental encoder, set Position Sensor Resolution = 10000.

Pn795※	Incremental Encoder Control Switch		■	Address: 0x0795
Default: 0x0000	Range: 0x0000~0x0111	Unit: N/A		Control mode:Ⓟ
Parameter setting	0-th bit X	Hall WVU angle values		
		0	Internal factory values	
		1	External Pn796~Pn79B values	
	1-st bit Y	Encoder Z latch value		
		0	Internal factory values	
		1	External Pn79C value	
	2-nd bit Z	Incremental encoder resolution		
		0	Internal factory values	
		1	External Pn793 value	
	3-rd bit W	Reserved parameters (Not for use)		

Pn793※	Position Sensor Resolution		■	Address: 0x0793★
Default: 10000	Range: 1~2^{31}	Unit: N/A		Control mode:ⓅⓈⓉ
Description	Set the custom encoder resolution. For incremental encoders, enter the 4×-count value. Example: For a 2500-line incremental encoder, set Position Sensor Resolution = 10000.			

Pn795※	Incremental Encoder Control Switch		■	Address: 0x0795
Default: 0x0000	Range: 0x0000~0x0111	Unit: N/A		Control mode:Ⓟ
Parameter setting	0-th bit X	Hall WVU angle values		
		0	Internal factory values	
		1	External Pn796~Pn79B values	
	1-st bit Y	Encoder Z latch value		
		0	Internal factory values	
		1	External Pn79C value	
	2-nd bit Z	Incremental encoder resolution		
		0	Internal factory values	
		1	External Pn793 value	

	3-rd bit W	Reserved parameter (Not for use)

Pn796※	Angle Value (Incremental Encoder Hall WVU = 1 (001))	■	Address: 0x0796
Default: 240.0	Range: 0.0~359.9	Unit:	Control mode:Ⓟ Ⓢ Ⓣ

Pn797※	Angle Value (Incremental Encoder Hall WVU = 2 (010))	■	Address: 0x0797
Default: 0.0	Range: 0.0~359.9	Unit: °	Control mode:Ⓟ Ⓢ Ⓣ

Pn798※	Angle Value (Incremental Encoder Hall WVU = 3 (011))	■	Address: 0x0798
Default: 300.0	Range: 0.0~359.9	Unit: °	Control mode:Ⓟ Ⓢ Ⓣ

Pn799※	Angle Value (Incremental Encoder Hall WVU = 4 (100))	■	Address: 0x0799
Default: 120.0	Range: 0.0~359.9	Unit: °	Control mode:Ⓟ Ⓢ Ⓣ

Pn79A※	Angle Value (Incremental Encoder Hall WVU = 5 (101))	■	Address: 0x079A
Default: 180.0	Range: 0.0~359.9	Unit: °	Control mode:Ⓟ Ⓢ Ⓣ

Pn79B※	Angle Value (Incremental Encoder Hall WVU = 6 (110))	■	Address: 0x079B
Default: 60.0	Range: 0.0~359.9	Unit: °	Control mode:Ⓟ Ⓢ Ⓣ

Pn79C※	Incremental Encoder Z-Signal Angle Value	○	Address: 0x079C
Default: 330.0	Range: 0.0~359.9	Unit: °	Control mode:Ⓟ Ⓢ Ⓣ

Pn79E	Reserved	■	Address: 0x079E
Default: 0000	Range: 00000~65535	Unit: N/A	Control mode:Ⓟ Ⓢ Ⓣ

Pn79F	User Password	○	Address: 0x079F
Default: 0x0000	Range: 0x0000~0xFFFF	Unit: N/A	Control mode:Ⓟ Ⓢ Ⓣ

3.3.9 Motion Control Parameters(Pn8xx)

Pn800	Internal Position Reference	■	Address: 0x0800
Default: 0x0000	Range: 0x0000~0x0000	Unit: N/A	Control Mode:P

Parameter setting	0-th bit X	Internal position reference source	
		0	Internal multi-segment position (Pr command)
	1-st bit Y	Reserved parameters (Not for use)	
	2-nd bit Z	Reserved parameters (Not for use)	
	3-rd bit W	Reserved parameters (Not for use)	

Pn802	Internal Pr Reference	○	Address: 0x0802
Default: 0x0000	Range: 0x0000~0x1113	Unit: N/A	Control Mode:P

Parameter setting	0-th bit X	Internal position mode	
		0	Single segment (X terminal or communication)
		1	Single cycle and stop
		2	Cyclic
		3	Sequential
	1-st bit Y	Remaining path handling	
		0	Finish the remaining path
		1	Restart from path 1
	2-nd bit Z	Single-segment operation update	
		0	Non-immediate update
		1	Immediate update after communication reference
	3-rd bit W	Absolute position reference	
		0	Post-homing motor position
		1	Pn296[Absolute Zero Multi-turn Value] and Pn297[Absolute Zero Single-turn Value]
Description	When Pn802.Z=0, the DI or communication-based Pr commands are buffered until and the system finishes the current command, then the Pr commands are retrieved. When Pn802.Z=1, the communication-based Pr command is executed immediately.		

Pn803	Multi-segment Position (Speed) End Path	○	Address: 0x0803
Default: 1	Range: 1~15	Unit: N/A	Control mode:Ⓟ

Pn804	Sequential Run Start Path	○	Address: 0x0804
Default: 1	Range: 0~15	Unit: N/A	Control mode:Ⓟ
Description	①The first cycle of sequential run starts at Pr1 and runs to the path indicated by Pn803; ②If Pn804 = 0 or Pn804 > Pn803, the drive stops after one cycle; ③If Pn804≤Pn803, the first round is followed by cyclic operation, and the starting segment number is Pn804; ④The enable signal CTRG is valid at high level.		

Pn806	Pr Command Communication Parameter (Single-Segment Run)	○	Address: 0x0806
Default: 10000	Range: 0~65535	Unit: N/A	Control mode:Ⓟ
Description	①When DI terminal switching mode is active, input 1~15 triggers the corresponding Pr path; input 1000 forces termination of the current run mode; ②In position mode, input 0 triggers homing; input 1000 forces termination of homing.		

Pn810	Pr Reference-Path1 Control Word L	○	Address: 0x0810
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control Mode:Ⓟ

Parameter setting	0-th bit X	PR Type (TYPE)	
		0	Position control
		1	Constant-speed control
	1-st bit Y	Position control type	
		0	Incremental position
		1	Absolute position
		2	Relative position
	2-nd bit Z	Speed control unit	
		0	In 0.1rpm
		1	In PPS
	3-rd bit W	Reserved parameters (Not for use)	

Pn811	Pr Reference-Path 1 Control Word H	○	Address: 0x0811
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control Mode:Ⓟ

Parameter setting	0-th bit X	Acceleration time (ACC)	
		0	Set ACC time via function codes Pn890~Pn89F.
		...	

		7	
	1-st bit Y	Deceleration time (DEC)	
		0	Set DEC time via function codes Pn890~Pn89F.
		...	
		7	
	2-nd bit Z	Internal target velocity	
		0	Set internal target speed via function codes Pn8A0~Pn8A7.
		...	
		7	
	3-rd bit W	Delay time (pause time)	
		0	Set delay time via function codes Pn898~Pn89F.
		...	
		7	

Pn812	PR1 Data	○	Address: 0x0812★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: N/A	Control mode:P

Pn814	PR2 Control Word L	○	Address: 0x0814
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control mode:P

Pn815	PR2 Control Word H	○	Address: 0x0815
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control mode:P

Pn816	PR2 Data	○	Address: 0x0816★
Default: 0	Range: -231~231-1	Unit: N/A	Control mode:P

Pn818	PR3 Control Word L	○	Address: 0x0818
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control mode:P

Pn819	PR3 Control Word H	○	Address: 0x0819
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control mode:P

Pn81A	PR3 Data	○	Address: 0x081A★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: N/A	Control mode:P

Pn81C	PR4 Control Word L	○	Address: 0x081C
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control mode:Ⓟ

Pn81D	PR4 Control Word H	○	Address: 0x081D
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control mode:Ⓟ

Pn81E	PR4 Data	○	Address: 0x081E★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: N/A	Control mode:Ⓟ

Pn820	PR5 Control Word L	○	Address: 0x0820
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control mode:Ⓟ

Pn821	PR5 Control Word H	○	Address: 0x0821
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control mode:Ⓟ

Pn822	PR5 Data	○	Address: 0x0822★
Default: 0	Range: -2^{31}~2^{3}1-1	Unit: N/A	Control mode:Ⓟ

Pn824	PR6 Control Word L	○	Address: 0x0824
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control mode:Ⓟ

Pn825	PR6 Control Word H	○	Address: 0x0825
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control mode:Ⓟ

Pn826	PR6 Data	○	Address: 0x0826★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: N/A	Control mode:Ⓟ

Pn828	PR7 Control Word L	○	Address: 0x0828
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control modeⓅ:

Pn829	PR7 Control Word H	○	Address: 0x0829
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control mode:Ⓟ

Pn82A	PR7 Data	○	Address: 0x082A★
Default: 0	Range: -2^{31}~2^{3}1-1	Unit: N/A	Control mode:Ⓟ

Pn82C	PR8 Control Word L	○	Address: 0x082C
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control mode:Ⓟ

Pn82D	PR8 Control Word H	○	Address: 0x082D
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control mode:Ⓟ

Pn82E	PR8 Data	○	Address: 0x082E★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: N/A	Control mode:Ⓟ

Pn830	PR9 Control Word L	○	Address: 0x0830
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control mode:Ⓟ

Pn831	PR9 Control Word H	○	Address: 0x0831
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control mode:Ⓟ

Pn832	PR9 Data	○	Address: 0x0832★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: N/A	Control mode:Ⓟ

Pn834	PR10 Control Word L	○	Address: 0x0834
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control mode:Ⓟ

Pn835	PR10 Control Word H	○	Address: 0x0835
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control mode:Ⓟ

Pn836	PR10 Data	○	Address: 0x0836★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: N/A	Control mode:Ⓟ

Pn838	PR11 Control Word L	○	Address: 0x0838
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control mode:Ⓟ

Pn839	PR11 Control Word H	○	Address: 0x0839
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control mode:Ⓟ

Pn83A	PR11 Data	○	Address: 0x083A★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: N/A	Control mode:Ⓟ

Pn83C	PR12 Control Word L	○	Address: 0x083C
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control mode:Ⓟ

Pn83D	PR12 Control Word H	○	Address: 0x083D
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control mode:Ⓟ

Pn83E	PR12 Data	○	Address: 0x083E★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: N/A	Control mode:Ⓟ

Pn840	PR13 Control Word L	○	Address: 0x0840
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control mode:Ⓟ

Pn841	PR13 Control Word H	○	Address: 0x0841
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control mode:Ⓟ

Pn842	PR13 Data	○	Address: 0x0842★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: N/A	Control mode:Ⓟ

Pn844	PR14 Control Word L	○	Address: 0x0844
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control mode:Ⓟ

Pn845	PR14 Control Word H	○	Address: 0x0845
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control mode:Ⓟ

Pn846	PR14 Data	○	Address: 0x0846★
Default: 0	Range: -2^{31}~2^{31}-1	Unit: N/A	Control mode:Ⓟ

Pn848	PR15 Control Word L	○	Address: 0x0848
Default: 0x0000	Range: 0x0000~0x0121	Unit: N/A	Control mode:Ⓟ

Pn849	PR15 Control Word H	○	Address: 0x0849
Default: 0x0000	Range: 0x0000~0x7777	Unit: N/A	Control mode:Ⓟ

Pn890	ACC/DEC Time (#0)	○	Address: 0x0890
Default: 30	Range: 0~65500	Unit: ms	Control mode:Ⓟ
Description	Set the PR mode acceleration/deceleration time, defined as the time required to accelerate from 0rpm to 3000rpm. The same applies below.		

Pn891	ACC/DEC Time (#1)	○	Address: 0x0891
Default: 50	Range: 0~65500	Unit: ms	Control mode:Ⓟ

Pn892	ACC/DEC Time (#2)	○	Address: 0x0892
Default: 200	Range: 0~65500	Unit: ms	Control mode:Ⓟ

Pn893	ACC/DEC Time (#3)	○	Address: 0x0893
Default: 300	Range: 0~65500	Unit: ms	Control mode:Ⓟ

Pn894	ACC/DEC Time (#4)	○	Address: 0x0894
Default: 500	Range: 0~65500	Unit: ms	Control mode:Ⓟ

Pn895	ACC/DEC Time (#5)	○	Address: 0x0895
Default: 600	Range: 0~65500	Unit: ms	Control mode:Ⓟ

Pn896	ACC/DEC Time (#6)	○	Address: 0x0896
Default: 800	Range: 0~65500	Unit: ms	Control mode:Ⓟ

Pn897	ACC/DEC Time (#7)	○	Address: 0x0897
Default: 900	Range: 0~65500	Unit: ms	Control mode:Ⓟ

Pn898	Delay Time after Position Arrival (#0)	○	Address: 0x0898
Default: 0	Range: 0~60000	Unit: ms	Control mode:Ⓟ
Description	Delay time after position arrival in PR mode. The same as below.		

Pn899	Delay Time after Position Arrival (#1)	○	Address: 0x0899
Default: 100	Range: 0~60000	Unit: ms	Control mode:Ⓟ

Pn89A	Delay Time after Position Arrival (#2)	○	Address: 0x089A
Default: 200	Range: 0~60000	Unit: ms	Control mode:Ⓟ

Pn89B	Delay Time after Position Arrival (#3)	○	Address: 0x089B
Default: 400	Range: 0~60000	Unit: ms	Control mode:Ⓟ

Pn89C	Delay Time after Position Arrival (#4)	○	Address: 0x089C
Default: 500	Range: 0~60000	Unit: ms	Control mode:Ⓟ

Pn89D	Delay Time after Position Arrival (#5)	○	Address: 0x089D
Default: 800	Range: 0~60000	Unit: ms	Control mode:Ⓟ

Pn89E	Delay Time after Position Arrival (#6)	○	Address: 0x089E
Default: 1000	Range: 0~60000	Unit: ms	Control mode:Ⓟ

Pn89F	Delay Time after Position Arrival (#7)	○	Address: 0x089F
Default: 1500	Range: 0~60000	Unit: ms	Control mode:Ⓟ

Pn8A0	Internal Target Speed (#0)	○	Address: 0x08A0
Default: 20.0	Range: 0.0~6000.0	Unit: rpm	Control mode:Ⓟ
Description	Target speed setting in PR mode. The same as below.		

Pn8A2	Internal Target Speed (#2)	○	Address: 0x08A2
Default: 100.0	Range: 0.0~6000.0	Unit: rpm	Control mode:Ⓟ

Pn8A3	Internal Target Speed (#3)	○	Address: 0x08A3
Default: 200.0	Range: 0.0~6000.0	Unit: rpm	Control mode:Ⓟ

Pn8A4	Internal Target Speed (#4)	○	Address: 0x08A4
Default: 300.0	Range: 0.0~6000.0	Unit: rpm	Control mode:Ⓟ

Pn8A5	Internal Target Speed (#5)	○	Address: 0x08A5
Default: 500.0	Range: 0.0~6000.0	Unit: rpm	Control mode:Ⓟ

Pn8A6	Internal Target Speed (#6)	○	Address: 0x08A6
Default: 600.0	Range: 0.0~6000.0	Unit: rpm	Control mode:Ⓟ

Pn8A7	Internal Target Speed (#7)	○	Address: 0x08A7
Default: 800.0	Range: 0.0~6000.0	Unit: rpm	Control mode:Ⓟ

3.3.10 Drive Parameters(PnExx)

PnE00☆	Servo Drive Model	■	Address: 0x0E00
Default: by model	Range: 0x0000~0xFFFF	Unit: N/A	Control mode:ⓅⓈⓉ

Description	Set the servo drive model. Changes require power cycle to take effect.

Setpoint	Servo Drive Code	Comment
0x001A	RB200-100W	Rated current 4A, main power DC 48V. For 70mm modules.
0x002A	RB200-180W	Rated current 6.3A, main power DC 48V. For 80mm modules.
0x004A	RB200-180W	Rated current 13.5A, main power DC 48V. For 90mm/110mm modules.
0x006A	RB200-180W	Rated current 25A, main power DC 48V. For 142mm/170mm modules.

PnE01☆	Servo Drive Power	■	Address: 0x0E01
Default: by model	Range: 0~65535	Unit: W	Control mode:PST

PnE02☆	Servo Drive Voltage	■	Address: 0x0E02
Default: Up to model	Range: 0x0000~0x0004	Unit: N/A	Control Mode:PST

		Servo drive voltage	
Parameter setting	0-th bit X	0	AC 100V (reserved)
		1	AC 220V
		2	AC 380V
		3	DC 24V
		4	DC 48V
	1-st bit Y	Reserved parameters (Not for modification)	
	2-nd bit Z	Reserved parameters (Not for modification)	
	3-rd bit W	Reserved parameters (Not for modification)	

PnE03☆	Servo Drive Rated Current (Peak)	■	Address: 0x0E03
Default: by model	Range: 0.0~6553.5	Unit: A	Control mode:PST

PnE04☆	Servo Drive Max. Current (Peak)	■	Address: 0x0E04
Default: by model	Range: 0.0~6553.5	Unit: A	Control mode:PST

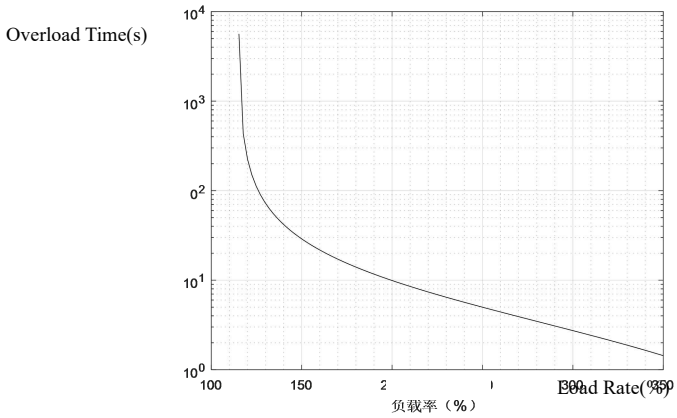
PnE05☆	Drive Module Overheat Limit	■	Address: 0x0E05
Default: by model	Range: 60.0~100.0	Unit: ℃	Control mode:Ⓟ Ⓢ Ⓣ
Description	Set the temperature limit for module overheat detection. If module temperature exceeds this limit, the drive issues an overheat error.		

PnE06☆	Drive Overload Current Level	■	Address: 0x0E06
Default: Up to model	Range: 0x0000~0xFFFF	Unit: N/A	Control Mode:Ⓟ Ⓢ Ⓣ

Parameter setting	0-th bit 1-st bit X Y	Base overload current	
		00 ... FF	Range: 0~255, unit: 1%
	2-nd bit 3-rd bit Z W	Intermediate overload current	
		00 ... FF	Range: 0~255, unit: 10%

PnE07☆	Drive Overload Time Level	■	Address: 0x0E07
Default: Up to model	Range: 0x0000~0xFFFF	Unit: N/A	Control Mode:Ⓟ Ⓢ Ⓣ

Parameter setting	0-th bit 1-st bit X Y	Drive overload intermediate time	
		00 ... FF	Range: 0~255, unit: 1s
	2-nd bit 3-rd bit Z W	Drive overload maximum time	
		00 ... FF	Range: 0~255, unit: 1s
Description	Sets the time threshold for the drive to trigger an overload protection.		



PnE08☆	Drive Overload Time Calibration		■	Address: 0x0E08
Default: Up to model	Range: 0x0000~0xFFFF	Unit: N/A		Control Mode:Ⓟ Ⓢ Ⓣ
Parameter setting	0-th bit 1-st bit X Y	Intermediate time fine tuning		
		00 ... FF	Range: 0~255, unit: 1%	
	2-nd bit 3-rd bit Z W	Max. time calibration		
		00 ... FF	Range: 0~255, unit: 1%	

PnE09☆	Motor Overload Time Calibration		■	Address: 0x0E09
Default: Up to model	Range: 0x0000~0xFFFF	Unit: N/A		Control Mode:Ⓟ Ⓢ Ⓣ
Parameter setting	0-th bit 1-st bit X Y	Intermediate time calibration		
		00 ... FF	Range: 0~255, unit: 1%	
	2-nd bit 3-rd bit Z W	Max. time calibration		
		00 ... FF	Range: 0~255, unit: 1%	

PnE0A☆	Low 8 bits (L): Reserved High 8 bits (H): Motor Overspeed Level Calibration		■	Address: 0x0E0A
Default: Up to model	Range: 0x0000~0xFFFF	Unit: N/A		Control Mode:Ⓟ Ⓢ Ⓣ
Parameter setting	0-th bit 1-st bit X Y	Reserved parameters (Not for use)		
		00 ... FF	Reserved	
	2-nd bit 3-rd bit Z W	Motor overspeed level calibration		
		00 ... FF	Range: 0~255, and the overspeed level calibration is calculated as follows: Overspeed level =PnE0A.WZ*PnF06.YX	

PnE0B☆	Internal Regenerative Brake Resistor Value		■	Address: 0x0E0B
Default: by model	Range: 0~65535	Unit: Ω		Control mode:Ⓟ Ⓢ Ⓣ

PnE0C☆	Internal Regenerative Resistance Capacity	■	Address: 0x0E0C
Default: by model	Range: 0.0~6553.5	Unit: %	Control mode:Ⓟ Ⓢ Ⓣ

PnE10☆	P-N Voltage Detection Level (Max. Detectable Hardware Voltage)	■	Address: 0x0E10
Default: by model	Range: 0~1000	Unit: V	Control mode:Ⓟ Ⓢ Ⓣ
Description	Calibrate the bus-voltage detection value according to hardware. For DC 48V models, set to 123V. Note: Do not modify this parameter without manufacturer approval, or it may cause irreversible damage to the machine!		

PnE11☆	P-N Voltage Detection Low-Pass Filter Time	■	Address: 0x0E11
Default: 0	Range: 0~10000	Unit: μs	Control mode:Ⓟ Ⓢ Ⓣ

PnE12☆	P-N Voltage Detection Zero Set	○	Address: 0x0E12
Default: factory setting	Range: -50~50	Unit: V	Control mode:Ⓟ Ⓢ Ⓣ

PnE13☆	P-N Voltage Detection Gain Tuning	○	Address: 0x0E13
Default: 0	Range: -127~127	Unit: N/A	Control mode:Ⓟ Ⓢ Ⓣ
Description	Adjust linearity of bus-voltage detection. $U_{dc} \times \frac{256+PnE13}{256}$ Note: Do not modify this parameter without manufacturer approval, or it may cause irreversible damage to the machine!		

PnE14☆	Main Circuit Filter	■	Address: 0x0E14
Default: 0x0055	Range: 0x0000~0x7777	Unit: N/A	Control Mode:Ⓟ Ⓢ Ⓣ

Parameter setting	0-th bit X	Voltage error filter	
		0	Range: 0~7, unit: 250μs
		...	
		7	
	1-st bit Y	Overvoltage error filter	
		0	Range: 0~7, unit: 250μs
		...	
		7	

	2-nd bit Z	Rege braking filter start	
		0	Range: 0~7, unit: 250μs
		...	
		7	
	3-rd bit W	Rege braking filter end	
		0	Range: 0~7, unit: 250μs
		...	
		7	

PnE15☆	Error Prompt 1	■	Address: 0x0E15
Default: 0x0000	Range: 0x0000~0xFFFF	Unit: N/A	Control Mode:P
Parameter setting	0-th bit X	System switch A	
		Bit0	ER.BF4(Drive hardware overcurrent) detection (0:ON;1:OFF)
		Bit1	Motor and drive capacity 4 × detection (0:ON;1:OFF)
		Bit2	Motor and drive overload detection (0:ON;1:OFF)
		Bit3	ER.860 (Abs encoder overheat) detection (0:ON;1:OFF)
	1-st bit Y	System switch B	
		Bit4	EtherCAT mode supported by drive detection (0:OFF;1:ON)
		Bit5	FPGA backup program operation detection (0:ON;1:OFF)
		Bit6	Non-standard CANopen lifespan detection (0:ON;1:OFF)
		Bit3	Reserved
	2-nd bit Z	Reserved parameters (Not for use)	
		Bit7	FPGA backup operation detection switch(0:OFF;1:ON)
		Bit8	MicroChip ESC manual mode (0:9253;1:9252)
		Bit9	MicroChip ESC mode (0: Auto;1: Manual)
		Bit10	Reserved
	3-rd bit W	Reserved parameters (Not for use)	

PnE17☆	Single-IGBT Protection & Bootstrap Charging Time	■	Address: 0x0E17
Default: Up to model	Range: 0x0000~0xFFFF	Unit: N/A	Control Mode:Ⓟ Ⓢ Ⓣ

Parameter setting	0-th bit 1-st bit X Y	Rated velocity Range: 0~255 Unit: 1ms Incremental encoder
	2-nd bit 3-rd bit Z W	Max. speed Range: 0~255 Unit: 1ms Incremental encoder

PnE1D☆	System Switch 3	■	Address: 0x0E1D
Default: 0000	Range: 0x0000~0x0001	Unit: N/A	Control Mode:Ⓟ

Parameter setting	0-th bit X	System switch 3A	
		0	Funcode write enable
		1	Funcode write disable
	1-st bit Y	Reserved parameters (Not for use)	
	2-nd bit Z	Reserved parameters (Not for use)	
	3-rd bit W	Reserved parameters (Not for use)	

PnE1E☆	Serial Encoder Communication Consecutive Failure Count	■	Address: 0x0E1E
Default: Up to model	Range: 0x0000~0x00FF	Unit: N/A	Control Mode:Ⓟ Ⓢ Ⓣ

Parameter setting	0-th bit 1-st bit X Y	Serial encoder consecutive failure count	
		00	Range: 0~255, unit: Times
		...	
		FF	
	2-nd bit 3-rd bit Z W	Reserved parameters (Not for use)	
Description	Set the number of consecutive communication failures between the drive and the serial encoder, and it reports ER.C90 when actual count is higher than this setting.		

PnE1F☆	Quiet Mode Filter Time	■	Address: 0x0E1F
Default: by model	Range: 1~65535	Unit: μs	Control mode:Ⓟ Ⓢ Ⓣ

PnE20☆	ACR D-axis Gain	■	Address: 0x0E20
Default: Up to model	Range: 100~10000	Unit: Hz	Control Mode:Ⓟ Ⓢ Ⓣ

PnE21☆	ACR Q-axis Gain	■	Address: 0x0E21
Default: Up to model	Range: 100~10000	Unit: Hz	Control Mode:Ⓟ Ⓢ Ⓣ

PnE22☆	ACR D-axis Integral Time	■	Address: 0x0E22
Default: Up to model	Range: 0~65535	Unit: μs	Control Mode:Ⓟ Ⓢ Ⓣ

PnE23☆	ACR Q-axis Integral Time	■	Address: 0x0E23
Default: Up to model	Range: 0~65535	Unit: μs	Control Mode:Ⓟ Ⓢ Ⓣ

PnE24☆	ACR D-axis Integral Limit	■	Address: 0x0E24
Default: 10430	Range: 0~65535	Unit: N/A	Control Mode:Ⓟ Ⓢ Ⓣ

PnE25☆	ACR Q-axis Integral Limit	■	Address: 0x0E25
Default: 10430	Range: 0~65535	Unit: N/A	Control Mode:Ⓟ Ⓢ Ⓣ

PnE28☆	Current Detection Gain 1	■	Address: 0x0E28
Default: Up to model	Range: 0~16384	Unit: N/A	Control Mode:Ⓟ Ⓢ Ⓣ
Description	Set the hardware current detection factor of the drive. $PnE28 = \frac{\text{Current Sense Resistor Value (m}\Omega) \times \text{Drive Peak Current PnE15 (0.1 A)}}{\text{ADC Full} - \text{scale Voltage (320 mV)}} \times 8192$ Note: Do not change the parameters without the factory's permission, or it may cause irreversible damage to the machine!		

PnE29☆	Voltage Compensation Gain	■	Address: 0x0E29
Default: 115	Range: 0~300	Unit: %	Control Mode:Ⓟ Ⓢ Ⓣ
Description	Set the voltage compensation gain.		

PnE2A☆	Carrier Frequency	■	Address: 0x0E2A
Default: Up to model	Range: 2000~16000	Unit: HZ	Control Mode:Ⓟ Ⓢ Ⓣ
Description	Set the carrier (PWM) frequency of the servo driver.		

PnE2B☆	Deadband Compensation Gain/Time	■	Address: 0x0E2B
Default: Up to model	Range: 0x0000~0xFFFF	Unit: N/A	Control Mode:Ⓟ Ⓢ Ⓣ
Parameter setting	0-th bit 1-st bit X Y	Deadtime	
		00 ... FF	Range: 1.6~6.0, unit: 0.1μs
	2-nd bit 3-rd bit Z W	Deadband compensation gain	
		00 ... FF	Range: 0~100, unit: 1%

PnE2C☆	Current Detection Gain 1	■	Address: 0x0E2C
Default: Up to model	Range: 0.00~100.00	Unit: N/A	Control Mode:Ⓟ Ⓢ Ⓣ

PnE2D☆	Current Detection Gain 2	■	Address: 0x0E2D
Default: Up to model	Range: 0~16384	Unit: N/A	Control Mode:Ⓟ Ⓢ Ⓣ

PnE30☆	Max. Drive Overvoltage Level	■	Address: 0x0E30
Default: Up to model	Range: 0~1000	Unit: V	Control Mode:Ⓟ Ⓢ Ⓣ
Description	Set the max. overvoltage of the servo drive allowed.		

PnE31☆	Min. Drive Overvoltage Level	■	Address: 0x0E31
Default: Up to model	Range: 0~1000	Unit: V	Control Mode:Ⓟ Ⓢ Ⓣ
Description	Set the min. overvoltage of the servo drive allowed.		

PnE32☆	Drive Overcurrent Protection Filter Time	■	Address: 0x0E32
Default: Up to model	Range: 0x0000~0xFFFF	Unit: NA	Control Mode:Ⓟ Ⓢ Ⓣ
Parameter setting	0-th bit 1-st bit X Y	Drive overcurrent protection filter time	
		00 ... FF	Range: 0~255, unit: 1.6μs

	2-nd bit 3-rd bit Z W	External hardware overcurrent filter time	
		00	Range: 0~255, unit: 1μs

PnE33☆	Drive Overcurrent Protection Level	■	Address: 0x0E33
Default: Up to model	Range: 0.0~6553.5	Unit: A	Control Mode:PST
Description	Set the hardware overcurrent thresholds of the drive for different models. Do not change the parameter without the manufacturer's permission, or it may cause irreversible damage to the machine!		

PnE35☆	PWM Frequency Upper Limit	■	Address: 0x0E34
Default: Up to model	Range: 3000~16000	Unit: Hz	Control Mode:PST
Description	Set the upper limit frequency of the PWM control.		

PnEA8☆	2nd Speed Feedback Filter Time	■	Address: 0x0EA8
Default: Up to model	Range: 0.02~655.35	Unit: ms	Control Mode:PST

3.3.11 Motor Parameters (PnFxx)

PnF00☆	Encoder Type & Motor Voltage	■	Address: 0x0F00
Default: Up to model	Range: 0x0000~0x22FF	Unit: N/A	Control Mode:PST

Parameter setting	0-th bit 1-st bit X Y	Reserved parameters (Not for use)	
	2-nd bit Z	Motor voltage	
		0	Reserved
		3	DC24V
		4	DC48V
	3-rd bit W	Encoder type	
		1	Multi-turn absolute encoder
		2	Incremental or single-turn absolute encoder

PnF02☆	Motor Power	■	Address: 0x0F02
Default: Up to model	Range: 0~65535	Unit: W	Control Mode:PST

PnF03☆	Encoder Bit/Resolution	■	Address: 0x0F03
Default: Up to model	Range: 0x0000~0x00FF	Unit: N/A	Control Mode:PST

Parameter setting	0-th bit 1-st bit X Y	Encoder bit 0x01: 2500 PPR 0X11: 17-bit 0X17: 23-bit 0X18: 24-bit
	2-nd bit 3-rd bit Z W	Reserved parameters (Not for use)

PnF05☆	Max. Velocity & Rated Velocity	■	Address: 0x0F05
Default: Up to model	Range: 0x0000~0xFFFF	Unit: N/A	Control Mode:PST
Parameter setting	0-th bit 1-st bit X Y	Rated speed Range: 0~255 Unit: 100rpm Incremental encoder	
	2-nd bit 3-rd bit Z W	Max. speed Range: 0~255 Unit: 100rpm Incremental encoder	

PnF06☆	Motor Poles & Overspeed Level	■	Address: 0x0F06
Default: Up to model	Range: 0x0000~0xFF32	Unit: N/A	Control Mode:PST
Parameter setting	0-th bit 1-st bit X Y	Overspeed level Range: 0x00~0x32 Unit:% Incremental encoder	
	2-nd bit 3-rd bit Z W	Motor poles	
		06	6-pole (3 pairs)
		08	8-pole (4 pairs)
		0A	10-pole (5 pairs)

PnF07☆	Rated Torque	■	Address: 0x0F07
Default: Up to model	Range: 0.00~655.35	Unit: Nm	Control Mode:PST

PnF08☆	Max. Torque	■	Address: 0x0F08
Default: Up to model	Range: 0~65535	Unit: %	Control Mode:PST

PnF09☆	Motor Rated Current		■	Address: 0x0F09
Default: Up to model	Range: 0.0~6553.5	Unit: A		Control Mode:Ⓟ Ⓢ Ⓣ

PnF0A☆	Motor Peak Current		■	Address: 0x0F0A
Default: Up to model	Range: 0.0~6553.5	Unit: A		Control Mode:Ⓟ Ⓢ Ⓣ

PnF0B☆	Reverse Potential (RMS)		■	Address: 0x0F0B
Default: Up to model	Range: 0.0~6553.5	Unit: mV/rpm		Control Mode:Ⓟ Ⓢ Ⓣ

PnF0C☆	Motor Rotor Inertia		■	Address: 0x0F0C
Default: Up to model	Range: 0~65535	Unit: 10-6kgm2		Control Mode:Ⓟ Ⓢ Ⓣ

PF0D☆	Motor Stator Resistance (Line Resistance)		■	Address: 0x0F0D
Default: Up to model	Range: 0.000~65.535	Unit: Ω		Control Mode:Ⓟ Ⓢ Ⓣ

PF0E☆	Motor Inductance (Line Inductance)		■	Address: 0x0F0E
Default: Up to model	Range: 0.00~655.35	Unit: mH		Control Mode:Ⓟ Ⓢ Ⓣ

PnF0F☆	Motor Overload Base Current		■	Address: 0x0F0F
Default: Up to model	Range: 0~65535	Unit: %		Control Mode:Ⓟ Ⓢ Ⓣ

PnF10☆	Motor Overload Intermediate Current		■	Address: 0x0F10
Default: Up to model	Range: 0~65535	Unit: %		Control Mode:Ⓟ Ⓢ Ⓣ

PnF11☆	Motor Overload Intermediate Current Duration		■	Address: 0x0F11
Default: Up to model	Range: 0~65535	Unit: 10s		Control Mode:Ⓟ Ⓢ Ⓣ

PnF12☆	Max. Motor Overload Current		■	Address: 0x0F12
Default: Up to model	Range: 0~65535	Unit: %		Control Mode:Ⓟ Ⓢ Ⓣ

PnF13☆	Max. Motor Overload Current Duration		■	Address: 0x0F13
Default: Up to model	Range: 0~65535	Unit: S		Control Mode:Ⓟ Ⓢ Ⓣ

PnF15☆	Rotary Motor Type & Encoder Manufacturer		■	Address: 0x0F15
Default: 0000	Range: 0x0000~0xFFFF	Unit: N/A		Control Mode: P S T

Parameter setting	0-th bit X	Encoder Manufacturer	
		0	General
		1	NK
		2	DMC
		3	RY
	1-st bit Y	Rotary Motor Type	
		0	Surface mounted permanent magnet (SPM)
		1	Interior permanent magnet (IPM)
	2-nd bit Z	Reserved parameters (Not for use)	
	3-rd bit W	Reserved parameters (Not for use)	

PF16☆	Quadrature-axis Inductance		■	Address: 0x0F16
Default: Up to model	Range: 0.00~655.35	Unit: mH		Control Mode: P S T

PF17☆	Direct-axis Inductance		■	Address: 0x0F17
Default: Up to model	Range: 0.00~655.35	Unit: mH		Control Mode: P S T

PnF18☆	Rotor Inertia/Rated Torque Index Unit		■	Address: 0x0F18
Default: Up to model	Range: 0x0000~0xFFFF	Unit: N/A		Control Mode: P S T

Parameter setting	0-th bit 1-st bit X Y	Rated torque index unit	
		n	Range: -128~127, 10n
	2-nd bit 3-rd bit Z W	Rotor inertia index unit	
		n	Range: -128~127, 10n

PnF19☆	Velocity/Power Index Unit		■	Address: 0x0F19
Default: Up to model	Range: 0x0000~0xFFFF	Unit: N/A		Control Mode: P S T

Parameter setting	0-th bit 1-st bit X Y	Power index unit	
		n	10n

	2-nd bit3-rd bit Z W	Velocity index unit	
		n	10n

PnF1B☆	Motor Pole Start Position	■	Address: 0x0F1B
Default: Up to model	Range: -360~360	Unit: deg	Control Mode:PST

PnF1E☆	Associated flag bit (FLAG)	■	Address: 0x0110
Default: Up to model	Range: 0x0000~0xFFFF	Unit: N/A	Control Mode:PST
Parameter setting	0-th bit X	Flag bit switch 1	
		Bit0	Reserved
		Bit1	Reserved
		Bit2	Velocity feedback 2nd filter enable (0:OFF;1: ON)
		Bit3	Reserved
	1-st bit Y	Flag Bit Switch 2	
		Bit4	Reserved
		Bit5	Reserved
		Bit6	Reserved
		Bit7	Reserved
	2-nd bit Z	Reserved parameters (Not for modification)	
	3-rd bit W	Reserved parameters (Not for modification)	

3.4 Un Parameter Overview

The monitor display function starts with Un for displaying the status of input and output signals and related information of the servo drive.

Code	Description	Unit	Data Type	Address
Un000	Motor Feedback Speed	rpm	int16	0xE000
Un001	Speed Command	rpm	int16	0xE001
Un002	Internal Torque Command	%	int16	0xE002
Un004	Rotation Angle (electrical angle from pole zero)	deg	uint16	0xE004
Un005	Input Command Pulse Speed (valid in position control only)	rpm	int16	0xE005

Un006	Input Command Pulse Counter	Command unit	int32	0xE006
Un007	Encoder Feedback Pulse Counter 1	Command unit	int32	0xE007
Un008	Encoder Feedback Pulse Counter 2	Encoder unit	int32	0xE008
Un009	Position Deviation (valid in position control only)	User unit	int32	0xE009
Un00A	Accumulated Load Rate (10s RMS, relative to rated torque = 100%)	%	uint16	0xE00A
Un010	Motor-side Encoder Single-turn Pulses	Encoder unit	int32	0xE010
Un011	Motor-side Encoder Multi-turn Value	-	int32	0xE011
Un020	Load-side Encoder Feedback Pulse Count 1	Encoder unit	int32	0xE020
Un021	Load-side Encoder Feedback Pulse Count 2	Encoder unit	int32	0xE021
Un023	Load-side Encoder Feedback Position Deviation 1	Encoder unit	int32	0xE023
Un024	Load-side Encoder Feedback Position Deviation 2	User unit	int32	0xE024
Un026	Load-side Encoder Single-turn Absolute Position	Encoder unit	int32	0xE026
Un027	Load-side Encoder Multi-turn Value	-	int32	0xE027
Un00B	Regenerative Load Rate (displays the regeneration power consumption over a 10s cycle, with 100% representing the handleable regenerative energy)	%	uint16	0xE00B
Un00D	Effective Gain Monitoring (1: gain1; 2: gain2)	-	uint16	0xE00D
Un00E	Total Drive Power-on Time	0.1s	uint32	0xE00E
Un00F	Port Input Signal Monitoring	-	uint16	0xE00F
Un010	Absolute Encoder Single-turn Value	Encoder unit	uint32	0xE010
Un011	Absolute Encoder Multi-turn Value	rev	int16	0xE011
Un017	Encoder Z Signal Output Count	-	int32	0xE017
Un018	Encoder Z Signal One-way Output Count	-	int32	0xE018
Un02A	Internal Control Status 1	-	uint16	0xE02A
Un02B	Internal Control Status (input terminal) 2	-	uint16	0xE02B
Un02C	Internal Control Status (input terminal) 3	-	uint16	0xE02C
Un02D	Internal Control Status (output terminal) 4	-	uint16	0xE02D
Un02E	CAN Status	-	uint16	0xE02E

Un02F	CAN Command Word	-	uint16	0xE02F
Un030	Servo Run Status	-	uint16	0xE030
Un031	CANopen Run Status	-	uint16	0xE031
Un035	MCU Main Version No.	-	uint16	0xE035
Un036	FPGA Main Version No.	-	uint16	0xE036
Un037	MCU Sub Version No.	-	uint16	0xE037
Un038	FPGA Sub Version No.	-	uint16	0xE038
Un087	Serial Encoder Communication Error Counter	times	uint16	0xE087
Un089	Module Temp.	0.1℃	uint16	0xE089
Un100	Input Signal Monitoring	-	uint16	0xE100
Un101	Output Signal Monitoring	-	uint16	0xE101
Un105	Position Tuning Time	0.1ms	uint16	0xE105
Un106	Position Overshoot Amount	Command unit	uint16	0xE106
Un10D	Internal Chip Temp. (ambient)	0.1℃	uint16	0xE10D
Un140	Bus Voltage	1V	uint16	0xE140
Un141	Current Detection Value (RMS)	0.1A	uint16	0xE141
Un142	Accumulated Load Rate (2ms RMS, relative to rated torque = 100%)	0.1%	uint16	0xE142
Un143	Regenerative Load Accumulated Value	0.1%	uint16	0xE143
Un203	Abnormal Parameter Code Setting (Er.040)	-	uint16	0xE203
Un212	System Time Monitoring A (Avg)	0.1μs	uint16	0xE212
Un213	System Time Monitoring A (Max)	0.1μs	uint16	0xE213
Un214	System Time Monitoring B (Avg)	0.1μs	uint16	0xE214
Un215	System Time Monitoring B (Max)	0.1μs	uint16	0xE215
Un216	System Time Monitoring C (Avg)	0.1μs	uint16	0xE216
Un217	System Time Monitoring C (Max)	0.1μs	uint16	0xE217
Un218	System Time Monitoring R (Avg)	0.01ms	uint16	0xE218
Un219	System Time Monitoring R (Max)	0.01ms	uint16	0xE219
Un511	U-phase Current Zero Offset Value	-	int16	0xE511
Un512	V-phase Current Zero Offset Value	-	int16	0xE512
Un513	Hardware Version Code	-	int16	0xE513
Un603	Absolute Encoder Pulse [low 32-bit]	Encoder unit	uint32	0xE603
Un605	Absolute Encoder Pulse [high 32-bit]	Encoder unit	uint32	0xE605
Un607	Mechanical Absolute Position [low 32-bit]	Encoder unit	uint32	0xE607

Un609	Mechanical Absolute Position [high 32-bit]	Encoder unit	uint32	0xE609
Un800	Current Error/Alarm Code	-	uint16	0xE800
Un801	Alarm Code	-	uint16	0xE801
Un802	Alarm Timestamp	100ms	uint32	0xE802
Un803	Motor Speed at Alarm	rpm	int16	0xE803
Un804	Speed Command at Alarm	rpm	int16	0xE804
Un805	Internal Torque Command at Alarm	%	int16	0xE805
Un806	Input Pulse Speed at Alarm	rpm	int16	0xE806
Un807	Position Deviation at Alarm	pulse	int32	0xE807
Un808	DC Bus Voltage at Alarm	V	uint16	0xE808
Un809	Current Feedback RMS at Alarm	A	int16	0xE809
Un80A	Cumulative Load Rate at Alarm [2ms]	%	uint16	0xE80A
Un80B	Regenerative Load Rate at Alarm [2ms]	%	uint16	0xE80B
Un80C	DB Resistor Power Consumption at Alarm [2ms]	%	uint16	0xE80C
Un80D	Peak Cumulative Load Rate at Alarm	%	uint16	0xE80D
Un80E	Inertia Ratio at Alarm	%	uint16	0xE80E
Un80F	Serial Encoder Error Count at Alarm	-	uint16	0xE80F
Un810	Internal Signal Status at Alarm	-	uint32	0xE810
Un814	Internal Input Signal Status at Alarm	-	uint32	0xE814
Un818	Internal Output Signal Status at Alarm	-	uint32	0xE818
Un820	Alarm Record 0	-	uint16	0xE820
Un821	Alarm Record 1	-	uint16	0xE821
Un822	Alarm Record 2	-	uint16	0xE822
Un823	Alarm Record 3	-	uint16	0xE823
Un824	Alarm Record 4	-	uint16	0xE824
Un825	Alarm Record 5	-	uint16	0xE825
Un826	Alarm Record 6	-	uint16	0xE826
Un827	Alarm Record 7	-	uint16	0xE827
Un828	Alarm Record 8	-	uint16	0xE828
Un829	Alarm Record 9	-	uint16	0xE829
Un830	Alarm Record 0 Occurrence Time	0.1s	uint32	0xE830
Un832	Alarm Record 1 Occurrence Time	0.1s	uint32	0xE832
Un834	Alarm Record 2 Occurrence Time	0.1s	uint32	0xE834
Un836	Alarm Record 3 Occurrence Time	0.1s	uint32	0xE836
Un838	Alarm Record 4 Occurrence Time	0.1s	uint32	0xE838

Un83A	Alarm Record 5 Occurrence Time	0.1s	uint32	0xE83A
Un83C	Alarm Record 6 Occurrence Time	0.1s	uint32	0xE83C
Un83E	Alarm Record 7 Occurrence Time	0.1s	uint32	0xE83E
Un840	Alarm Record 8 Occurrence Time	0.1s	uint32	0xE840
Un842	Alarm Record 9 Occurrence Time	0.1s	uint32	0xE842

Note:

The data type definitions marked ① in the above table are described as follows.

Data Type	Description
int16	Signed (16-bit)
uint16	Unsigned (16-bit)
int32	Signed (32-bit)
uint32	Unsigned (32-bit)

② The monitoring function code Un00E may actually have a deviation of ±1 hour.

4 CANopen Communication

4.1 Object Dictionary

4.1.1 Object Attributes Description

Definitions

"Index": Specifies the location of each object in the object dictionary, expressed in hexadecimal (h).

"Data Type": See te table below.

Table 4-1 Data Type Description

Data Type	Range	Length	DS301 Value
Int8	-128~127	1 byte	2
Uint8	0~255	1 byte	5
Int16	-32768~+32767	2 bytes	3
Uint16	0~65535	2 bytes	6
Int32	-2147483648~+2147483647	4 bytes	4
Uint32	0~4294967295	4 bytes	7
String	ASCII	-	9

"R/W": See te table below..

Table 4-2 Read/Write Type Description

R/W	Description
RW	Read/Write
WO	Write only
RO	Read only
CONST	Constant (Read only)

"Object Structure": See te table below..

Table 4-3 Object Structure Description

Object Structure	Description	DS301 Value
VAR	Single simple value; uses the data types listed in Table 4-1	7
ARR	Array of elements of the same type	8
REC	Record composed of elements of different types	9

4.1.2 Group 1000h Object List

Index	Sub-index	Name	Object Structure	Data Type	R/W	Mappable
1000h	-	Device Type	VAR	Uint16	RO	N
1001h	-	Error Register	VAR	Uint8	RO	N
1003h	-	Predefined Error Field	ARR	Uint32	RO	N
	00h	Number of Errors	VAR	Uint8	RW	N
	01 ~ 04h	Standard Error Field	VAR	Uint32	RO	N
1005h	-	COB-ID SYNC Message	VAR	Uint32	RW	N
1006h	-	Communication Cycle Period	VAR	Uint32	RW	N
100Ch	-	Guard Time	VAR	Uint16	RW	N
100Dh	-	Life Time Factor	VAR	Uint8	RW	N
1010h	-	Store Parameters	ARR	Uint32	RW	N
	00h	Max Supported Sub-index	VAR	Uint8	RO	N
	02h	Store All Object Parameters	VAR	Uint16	RW	N
1011h	-	Restore Default Parameters	ARR	Uint32	RW	N
	00h	Max Supported Sub-index	VAR	Uint8	RO	N
	02h	Restore All Default Parameters	VAR	Uint16	RW	N
1014h	-	COB-ID Emergency Message	VAR	Uint32	RW	N
1016h	-	Consumer Heartbeat Time	ARR	-	-	-
	00h	Largest Sub-index Supported	VAR	Uint8	RO	N
	01h	Consumer Heartbeat Time	VAR	Uint32	RW	N
1017h	-	Producer Heartbeat Time	VAR	Uint16	RW	N
1018h	-	Producer Heartbeat Time	REC	-	-	-
	00h	Largest Sub-index Supported	VAR	Uint8	RO	N
	01h	Vendor-ID	VAR	Uint16	RO	N
	02h	Product Code	VAR	Uint16	RO	N
	03h	Revision Number	VAR	Uint16	RO	N
1029h	-	Error Behavior	ARR	-	-	-
	00h	Largest Sub-index Supported	VAR	Uint8	RO	N
	01h	Communication Error	VAR	Uint8	RW	N
1200h	-	SDO Server Parameter	ARR	-	-	-
	00h	Largest Sub-index Supported	VAR	Uint8	RO	N
	01h	COB-ID Client → Server (rx)	VAR	Uint32	RW	N

Index	Sub-index	Name	Object Structure	Data Type	R/W	Mappable
	02h	COB-ID Server → Client (tx)	VAR	Uint32	RW	N
1400h	-	RPDO1 Mapping Parameter	REC	-	-	-
	00h	Largest Sub-index Supported	VAR	Uint8	RO	N
	01h	COB-ID Used by RPDO1	VAR	Uint32	RW	N
	02h	RPDO1 Reception Type	VAR	Uint8	RW	N
1401h	-	RPDO2 Mapping Parameter	REC	-	-	-
	00h	Largest Sub-index Supported	VAR	Uint8	RO	N
	01h	COB-ID Used by RPDO2	VAR	Uint32	RW	N
	02h	RPDO2 Reception Type	VAR	Uint8	RW	N
1402h	-	RPDO3 Mapping Parameter	REC	-	-	-
	00h	Largest Sub-index Supported	VAR	Uint8	RO	N
	01h	COB-ID Used by RPDO3	VAR	Uint32	RW	N
	02h	RPDO3 Reception Type	VAR	Uint8	RW	N
1403h	-	RPDO4 Mapping Parameter	REC	-	-	-
	00h	Largest Sub-index Supported	VAR	Uint8	RO	N
	01h	COB-ID Used by RPDO4	VAR	Uint32	RW	N
	02h	RPDO4 Reception Type	VAR	Uint8	RW	N
1600h	-	RPDO1 Mapping Parameter	REC	-	-	-
	00h	Number of Mapped Application Objects in RPDO1	VAR	Uint8	RW	N
	01h	RPDO1 Mapping for the 1st Application Object to be Mapped	VAR	Uint32	RW	N
	02h	RPDO1 Mapping for the 2nd Application Object to be Mapped	VAR	Uint32	RW	N
	03h	RPDO1 Mapping for the 3rd Application Object to be Mapped	VAR	Uint32	RW	N
	04h	RPDO1 Mapping for the 4th Application Object to be Mapped	VAR	Uint32	RW	N
1601h	-	RPDO2 Mapping Parameter	REC	-	-	-

Index	Sub-index	Name	Object Structure	Data Type	R/W	Mappable
	00h	Number of Mapped Application Objects in RPDO2	VAR	Uint8	RW	N
	01h	RPDO2 Mapping for the 1st Application Object to be Mapped	VAR	Uint32	RW	N
	02h	RPDO2 Mapping for the 2nd Application Object to be Mapped	VAR	Uint32	RW	N
	03h	RPDO2 Mapping for the 3rd Application Object to be Mapped	VAR	Uint32	RW	N
	04h	RPDO2 Mapping for the 4th Application Object to be Mapped	VAR	Uint32	RW	N
1602h	-	RPDO3 Mapping Parameter	REC	-	-	-
	00h	Number of Mapped Application Objects in RPDO3	VAR	Uint8	RW	N
	01h	RPDO3 Mapping for the 1st Application Object to be Mapped	VAR	Uint32	RW	N
	02h	RPDO3 Mapping for the 2nd Application Object to be Mapped	VAR	Uint32	RW	N
	03h	RPDO3 Mapping for the 3rd Application Object to be Mapped	VAR	Uint32	RW	N
	04h	RPDO3 Mapping for the 4th Application Object to be Mapped	VAR	Uint32	RW	N
1603h	-	RPDO4 Mapping Parameter	REC	-	-	-
	00h	Number of Mapped Application Objects in RPDO4	VAR	Uint8	RW	N

Index	Sub-index	Name	Object Structure	Data Type	R/W	Mappable
	01h	RPDO4 Mapping for the 1st Application Object to be Mapped	VAR	Uint32	RW	N
	02h	RPDO4 Mapping for the 2nd Application Object to be Mapped	VAR	Uint32	RW	N
	03h	RPDO4 Mapping for the 3rd Application Object to be Mapped	VAR	Uint32	RW	N
	04h	RPDO4 Mapping for the 4th Application Object to be Mapped	VAR	Uint32	RW	N
1800h	-	TPDO1 Parameter	REC	-	-	-
	00h	Largest Sub-index Supported	VAR	Uint8	RO	N
	01h	COB-ID Used by TPDO1	VAR	Uint32	RW	N
	02h	TPDO1 Transmission Type	VAR	Uint8	RW	N
	03h	Inhibit Time	VAR	Uint16	RW	N
	04h	NA	VAR	Uint8	RW	N
	05h	Event Timer	VAR	Uint16	RW	N
1801h	-	TPDO2 Parameter	REC	-	-	-
	00h	Largest Sub-index Supported	VAR	Uint8	RO	N
	01h	COB-ID Used by TPDO2	VAR	Uint32	RW	N
	02h	TPDO2 Transmission Type	VAR	Uint8	RW	N
	03h	Inhibit Time	VAR	Uint16	RW	N
	04h	NA	VAR	Uint8	RW	N
	05h	Event Timer	VAR	Uint16	RW	N
1802h	-	TPDO3 Parameter	REC	-	-	-
	00h	Largest Sub-index Supported	VAR	Uint8	RO	N
	01h	COB-ID Used by TPDO3	VAR	Uint32	RW	N
	02h	TPDO3 Transmission Type	VAR	Uint8	RW	N
	03h	Inhibit Time	VAR	Uint16	RW	N
	04h	NA	VAR	Uint8	RW	N
	05h	Event Timer	VAR	Uint16	RW	N

Index	Sub-index	Name	Object Structure	Data Type	R/W	Mappable
1803h	-	TPDO4 Parameter	REC	-	-	-
	00h	Largest Sub-index Supported	VAR	Uint8	RO	N
	01h	COB-ID Used by TPDO4	VAR	Uint32	RW	N
	02h	TPDO4 Transmission Type	VAR	Uint8	RW	N
	03h	Inhibit Time	VAR	Uint16	RW	N
	04h	NA	VAR	Uint8	RW	N
	05h	Event Timer	VAR	Uint16	RW	N
1A00h	-	TPDO1 Mapping Parameter	REC	-	-	-
	00h	Number of Mapped Application Objects in TPDO1	VAR	Uint8	RW	N
	01h	1st Application Object	VAR	Uint32	RW	N
	02h	2nd Application Object	VAR	Uint32	RW	N
	03h	3rd Application Object	VAR	Uint32	RW	N
	04h	4th Application Object	VAR	Uint32	RW	N
1A01h	-	TPDO2 Mapping Parameter	REC	-	-	-
	00h	Number of Mapped Application Objects in TPDO2	VAR	Uint8	RW	N
	01h	1st Application Object	VAR	Uint32	RW	N
	02h	2nd Application Object	VAR	Uint32	RW	N
	03h	3rd Application Object	VAR	Uint32	RW	N
	04h	4th Application Object	VAR	Uint32	RW	N
1A02h	-	TPDO3 Mapping Parameter	REC	-	-	-
	00h	Number of Mapped Application Objects in TPDO3	VAR	Uint8	RW	N
	01h	1st Application Object	VAR	Uint32	RW	N
	02h	2nd Application Object	VAR	Uint32	RW	N
	03h	3rd Application Object	VAR	Uint32	RW	N
	04h	4th Application Object	VAR	Uint32	RW	N
1A03h	-	TPDO4 Mapping Parameter	REC	-	-	-
	00h	Number of Mapped Application Objects in TPDO4	VAR	Uint8	RW	N
	01h	1st Application Object	VAR	Uint32	RW	N
	02h	2nd Application Object	VAR	Uint32	RW	N

Index	Sub-index	Name	Object Structure	Data Type	R/W	Mappable
	03h	3rd Application Object	VAR	Uint32	RW	N
	04h	4th Application Object	VAR	Uint32	RW	N

4.1.3 Group 2000h Object List

The 2000h group in the object dictionary maps the drive's internal parameters. Object dictionary ranges 2000h~2006h correspond to parameter groups Pn0xx~Pn6xx; 2E00h~2E08h correspond to monitoring parameters Un0xx~Un8xx. A drive function code maps to a 2000h group sub-index: the function code's last two hex digits plus 1 equal the corresponding sub-index.

The table below shows the correspondence between 2000h group object indexes and drive function codes.

Index	Sub-index	Description	Data Type	R/W	Mappable
2000h	-	Pn0xx Basic Parameters	-	-	-
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Pn000: Function Selection Switch 0	Uint16	RW	N
	02h	Pn001: Function Selection Switch 1	Uint16	RW	N
	03h	Pn002: Motor Direction	Uint16	RW	N
	…	…	…	RW	N
	82h	Pn081: Local Communication Format	Uint16	RW	N
	86h	Pn085: Communication Funcode Write to EEPROM	Uint16	RW	N
2001h	-	Pn1xx Gain Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Pn100: Moment of Inertia Ratio	Uint16	RW	N
	02h	Pn101: ASR Proportional Gain	Uint16	RW	N
	…	…	…	RW	N
	94h	Pn193: Max. Gain during Tuning	Uint16	RW	N
2002h	-	Pn2xx Position Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Pn200: Position Command Source	Uint16	RW	N
	02h	Pn201: External Pulse Logic	Uint16	RW	N
	03h	Pn202: Position Control Function Switch 1	Uint16	RW	N
	04h	Pn203: External Pulse Multiplier	Uint16	RW	N
	…	…	…	RW	N

Index	Sub-index	Description	Data Type	R/W	Mappable
	98h	Pn297: Absolute Position Zero Single-turn Value	Uint16	RW	N
	9Ah	Pn299: Home Return Timeout Setting	Uint16	RW	N
2003h	-	Pn3xx Speed Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Pn300: Speed Command Source	Int16	RW	N
	02h	Pn301: Speed Command Direction	Int16	RW	N
	…	…	…	RW	N
	21h	Pn320: Speed Achievement Signal Threshold	Uint16	RW	N
2004h	-	Pn4xx Torque Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Pn400: Torque Control Switch 1	Uint16	RW	N
	02h	Pn401: Torque Command 2nd Low-pass Filter OFF Frequency	Uint16	RW	N
	…	…	…	RW	N
	31h	Pn430: Torque Control Switch 2	Uint16	RW	N
2005h	-	Pn5xx Auxiliary Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Pn500: JOG Speed	Uint16	RW	N
	02h	Pn502: Program JOG Operation Mode	Uint16	RW	N
	…	…	…	RW	N
	09h	Pn508: Program JOG Move Speed	Uint16	RW	N
2006h	-	Pn6xx Terminal Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Pn600: Switch Terminal X Filter Time	Uint16	RW	N
	02h	Pn601: Terminal X IN1 Configuration	Uint16	RW	N
	…	…	…	RW	N
	31h	Pn630: Internal Software Set Terminal X Status	Uint16	RW	N
2E00h	-	Un0xx Monitoring Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Un000: Motor Feedback Speed	Int16	RO	N

Index	Sub-index	Description	Data Type	R/W	Mappable
	02h	Un001: Speed Command	Int16	RO	N
	…	…	…	RO	N
	38h	Un038: MCU Sub Version No.	Uint16	RO	N
	39h	Un039: FPGA Sub Version No.	Uint16	RO	N
2E01h	-	Un1xx Monitoring Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Un100: Input Signal Monitoring	Uint16	RO	N
	02h	Un101: Output Signal Monitoring	Uint16	RO	N
	06h	Un105: Position Tuning Time	Uint16	RO	N
	…	…	…	RO	N
	45h	Un144: DB Load Accumulated Value	Uint16	RO	N
2E02h	-	Un2xx Monitoring Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	04h	Un203: Abnormal Parameter Code Setting (Er040)	Uint16	RO	N
	13h	Un212: System Time Monitoring A (Avg)	Uint16	RO	N
	…	…	…	RO	N
	1Ah	Un219: System Time Monitoring R (Max)	Uint16	RO	N
2E05h	-	Un5xx Monitoring Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	12h	Un511: U-phase Current Zero Offset Value	Uint16	RO	N
	13h	Un512: V-phase Current Zero Offset Value	Uint16	RO	N
2E06h	-	Un6xx Monitoring Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	04h	Un603: Absolute Encoder Pulse [low 32-bit]	Uint32	RO	N
	06h	Un605: Absolute Encoder Pulse [high 32-bit]	Uint32	RO	N
2E08h	-	Un8xx Monitoring Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Un800: Current Error/Alarm Code	Uint16	RO	N
	02h	Un801: Alarm Code	Uint16	RO	N
	…	…	…	RO	N
	43h	Un842: Alarm Record 9 Occurrence Time	Uint32	RO	N

Caution	
⚠	• Function-code last two hex digits correspond to sub-index (both in hex). Example: To read/write function code Pn299, access object 2002:9Ah.

4.1.4 Group 6000h Object List

The group object dictionary for CANopen 6000h is allocated as shown in the table below.

Index	Sub-index	Name	R/W	Mappable	Data Type	Unit	Range
603Fh	00h	Error Code	RO	Y	UINT16	-	UINT16
6040h	00h	Control Word	RW	Y	UINT16	-	UINT16
6041h	00h	Status Word	RO	Y	UINT16	-	UINT16
605Ah	00h	Quick Stop Option Code	RW	Y	UINT16		UINT16
605Dh	00h	Halt Stop Option Code	RW	Y	UINT16		UINT16
6060h	00h	Modes of Operation	RW	Y	INT8	-	INT8
6061h	00h	Modes of Operation Display	RO	Y	INT8	-	INT8
6062h	00h	Position Demand Value	RO	Y	INT32	Command unit	INT32
6063h	00h	Motor Position Actual Value	RO	Y	INT32	Encoder unit	INT32
6064h	00h	User Position Actual Value	RO	Y	INT32	Command unit	INT32
6065h	00h	Following Error Window	RW	Y	UINT32	Command unit	UINT32
6067h	00h	Position Window	RW	Y	UINT32	Command unit	UINT32
6068h	00h	Position Window Time	RW	Y	UINT16	0.1ms	UINT16
606Bh	00h	Velocity Demand Value	RO	Y	INT32	Command unit/s	INT32
606Ch	00h	Velocity Actual Value	RO	Y	INT32	Command unit/s	INT32
606Dh	00h	Velocity Window	RW	Y	UINT16	0.1rpm	UINT16
606Eh	00h	Velocity Window Time	RW	Y	UINT16	ms	UINT16
606Fh	00h	Velocity Threshold	RW	Y	UINT16	0.1rpm	UINT16

Index	Sub-index	Name	R/W	Mappable	Data Type	Unit	Range
6070h	00h	Zero Velocity Threshold Time	RW	Y	UINT16	ms	UINT16
6071h	00h	Target Torque	RW	Y	INT16	0.1%	INT16
6072h	00h	Maximum Torque Limit	RW	Y	UINT16	0.1%	UINT16
6074h	00h	Torque Demand Value	RO	Y	INT16	0.1%	INT16
6075h	00h	Motor Rated Current	RO	Y	UINT32	mA	UINT32
6076h	00h	Motor Rated Torque	RO	Y	UINT32	mNm	UINT32
6077h	00h	Motor Actual Torque	RO	Y	INT16	0.1%	INT16
6078h	00h	Current Actual Value	RO	Y	INT16	0.1%	INT16
607Ah	00h	Target Position	RW	Y	INT32	Command unit	INT32
607Ch	00h	Home Offset	RW	Y	INT32	Command unit	INT32
607Dh	01h	Min Position Limit	RW	Y	INT32	Command unit	INT32
	02h	Max Position Limit	RW	Y	INT32	Command unit	INT32
607F	00h	Max Profile Velocity	RW	Y	UINT32	Command unit/s	UINT32
6080h	00h	Max Motor Speed	RW	Y	UINT32	rpm	UINT32
6081h	00h	Profile Velocity	RW	Y	INT32	Command unit/s	INT32
6083h	00h	Profile Acceleration	RW	Y	UINT32	Command unit/s^2	UINT32
6084h	00h	Profile Deceleration	RW	Y	UINT32	Command unit/s^2	UINT32
6085h	00h	Quick Stop Deceleration	RW	Y	UINT32	Command unit/s^2	UINT32
6086h	00h	Motion Profile Type	RW	Y	INT16	-	INT16
6087h	00h	Torque Slope	RW	Y	UINT32	0.1%/s	UINT32
6091h	01h	Electronic Gear Numerator	RW	Y	UINT32	-	UINT32

Index	Sub-index	Name	R/W	Mappable	Data Type	Unit	Range
	02h	Electronic Gear Denominator	RW	Y	UINT32	-	UINT32
6098h	00h	Homing Method	RW	Y	INT8	-	INT8
6099h	01h	Speed During Search for Switch	RW	Y	UINT32	Command unit/s	UINT32
	02h	Speed During Search for Zero	RW	Y	UINT32	Command unit/s	UINT32
609Ah	00h	Homing Acceleration/ Homing Deceleration	RW	Y	UINT32	Command unit/s^2	UINT32
60C1h	01h	Interpolation Data Record	RW	Y	INT32	Command unit	INT32
60C2h	01h	Interpolation Time Units	RW	Y	UINT8	-	UINT8
	02h	Interpolation Time Index	RW	Y	INT8	-	INT8
60C5h	00h	Max Profile Acceleration	RW	Y	UINT32	Command unit/s^2	UINT32
60C6h	00h	Max Profile Deceleration	RW	Y	UINT32	Command unit/s^2	UINT32
60E0h	00h	Positive Torque Limit	RW	Y	UINT16	0.1%	UINT16
60E1h	00h	Negative Torque Limit	RW	Y	UINT16	0.1%	UINT16
60F4h	00h	Following Error Actual Value	RO	Y	INT32	Command unit	INT32
60FCh	00h	Position Demand Value	RO	Y	INT32	Encoder unit	INT32
60FDh	00h	Digital Input	RO	Y	UINT32	-	UINT32
60FEh	00h	Number of Entries	RO	N	UINT8	-	UINT8
	01h	Physical Outputs	RO	Y	UINT32	-	UINT32
60FFh	00h	Target Velocity	RW	Y	INT32	Command unit/s	INT32
6502h	00h	Supported Drive Modes	RO	Y	UINT16	-	UINT16

4.1.5 Group 1000h Object Description

1000h		
Index	1000h	-
Name	Device Type	

Object Structure	VAR	Data Type	Uint16	Range	Uint16
Mappable	NO	R/W	RO	Default	0x20192
Description	This parameter describes the device sub-protocol or application profile used.				

Bit	Name	Description
0~15	Device sub-protocol	402(0×192): Device sub-protocol
16~23	Type	02: Servo drives
25~31	Mode	Vendor-defined

1001h					
Index	1001h	-			
Name	Error Register				
Object Structure	VAR	Data Type	Uint8	Range	Uint8
Mappable	NO	R/W	RO	Default	0x0
Description	The Error Register contains error type information by bit, as detailed below:				

Bit	Meaning	Bit	Meaning
0	Generic error	4	Communication error
1	Current error	5	Device sub-protocol error
2	Voltage error	6	NA
3	Temperature error	7	Manufacturer-specific error

When an error occurs, the corresponding bit is set to "1". As long as any error exists, bit 0 must be "1".

1003h					
Index	1003h	-			
Name	Pro-defined Error Field				
Object Structure	ARR	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RO	Default	-

Sub-index	00h	-			
Name	Number of Errors				
Object Structure	-	Data Type	Uint8	Range	Uint8
Mappable	NO	R/W	RW	Default	0x0
Description	This parameter can only be written as 0, which clears all error records.				

Sub-index	1~4h	-			
Name	Standard Error Field				
Object Structure	-	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RO	Default	0x0
Description	Sub-index 0 is not readable. When errors exist, they are stored in the following format:				

MSB		LSB
31 16	15 0	
Manufacturer error code	Standard error code	

1005h					
Index	1005h	-			
Name	COB-ID SYNC Message				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RW	Default	0x80
Description	Only writable as 0x80 or 0x40000080. Writing 0x80 deactivates the SYNC producer. Writing 0x40000080 activates the SYNC producer. Before activation, the Communication Cycle Period (1006h) must be configured as non-zero.				

1006h					
Index	1006h	-			
Name	Communication Cycle Period				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RW	Default	0x0
Description	Set the cycle time for the SYNC producer (unit: 125μs).				

1008h					
Index	1008h	-			
Name	Manufacturer Device Name				
Object Structure	REC	Data Type	Uint8	Range	-
Mappable	NO	R/W	RO	Default	Servo Device

100Ah		
Index	100Ah	-

Name	SoftWare Version				
Object Structure	REC	Data Type	Uint8	Range	-
Mappable	NO	R/W	RO	Default	Up to model

100Ch					
Index	100Ch	-			
Name	Guard Time				
Object Structure	VAR	Data Type	Uint16	Range	Uint16
Mappable	NO	R/W	RW	Default	0x0
Description	Applies only to the SYNC producer (unit: ms). Used with the Life Time Factor for node guarding.				

100Dh					
Index	100Dh	-			
Name	Life Time Factor				
Object Structure	VAR	Data Type	Uint8	Range	Uint8
Mappable	NO	R/W	RW	Default	0x0
Description	Must be greater than 1 when used.				

1010h					
Index	1010h	-			
Name	Store Parameters				
Object Structure	ARR	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RW	Default	0x0

Description

It stores current values to EEPROM. Upon next EEPROM loading (after power cycling, node reset, or communication reset), the device restores these saved values.

To save parameters, specify the sub-index corresponding to the save area, and write the ASCII string "save". Writing any other value will fail.

Write value mapping:

MSB				LSB
ASCII	E	v	a	s
Hex	65h	76	61h	73h

The sub-index read return value indicates the saving method. Return value format and meaning:

MSB			LSB
31	2	1	0
NA		0/1	0/1

Value	Meaning
0	No auto-save or command-triggered save
1	Command-triggered save only (no auto-save)
2	Auto-save only (does not accept command-based saving)
3	Supports both auto-save and command-triggered save

1011h					
Index	1011h	-			
Name	Restore Default Parameters				
Object Structure	ARR	Data Type	Uint32	Range	-
Mappable	NO	R/W	RW	Default	-

<table>
<tr><td>Description</td><td>
Restoring default parameters writes factory settings to EEPROM. This does not take effect immediately. Upon next EEPROM loading (after power cycling, node reset, or communication reset), the device loads default values (factory settings). To restore default parameters, specify the sub-index corresponding to the restore area, and write the ASCII string "load". Writing any other value will fail.
Write value mapping:
<table>
<tr><td>MSB</td><td></td><td></td><td></td><td>LSB</td></tr>
<tr><td>ASCII</td><td>d</td><td>a</td><td>o</td><td>l</td></tr>
<tr><td>Hex</td><td>64h</td><td>61h</td><td>6Fh</td><td>6Ch</td></tr>
</table>
The sub-index read return value indicates parameter restoration capability. Return format and meaning:
<table>
<tr><td>MSB</td><td>LSB</td></tr>
<tr><td>MSB</td><td>LSB</td></tr>
<tr><td>31 1</td><td>0</td></tr>
<tr><td>NA</td><td>0/1</td></tr>
</table>
<table>
<tr><th>Value</th><th>Meaning</th></tr>
<tr><td>0</td><td>Device cannot restore defaults</td></tr>
<tr><td>1</td><td>Device can restore defaults</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th colspan="6">1014h</th></tr>
<tr><td>Index</td><td>1014h</td><td colspan="4">-</td></tr>
<tr><td>Name</td><td colspan="5">COB-ID Emergency Message</td></tr>
<tr><td>Object Structure</td><td>VAR</td><td>Data Type</td><td>Uint32</td><td>Range</td><td>Uint32</td></tr>
<tr><td>Mappable</td><td>NO</td><td>R/W</td><td>RW</td><td>Default</td><td>0x80 + Node-ID</td></tr>
<tr><td>Description</td><td colspan="5">
Bit 31 = 0: Emergency (EMCY) function enabled (servo sends EMCY commands).
Bit 31 = 1: Emergency (EMCY) function disabled (servo does not send EMCY commands).
<table>
<tr><td>MSB</td><td></td><td>LSB</td></tr>
<tr><td>31</td><td>30 11</td><td>10 0</td></tr>
<tr><td>0/1</td><td>0x0</td><td>11-bit COB-ID</td></tr>
</table>
When active, the EMCY COB-ID must match this object.
</td></tr>
</table>

<table>
<tr><th colspan="6">1016h</th></tr>
<tr><td>Index</td><td>1016h</td><td colspan="4">-</td></tr>
<tr><td>Name</td><td colspan="5">Consumer Heartbeat Time</td></tr>
<tr><td>Object Structure</td><td>ARR</td><td>Data Type</td><td>Uint32</td><td>Range</td><td>Uint32</td></tr>
</table>

Mappable	NO	R/W	RW	Default	
Description	Parameters include the monitored node address and heartbeat time (unit: ms). The time must exceed the heartbeat producer time of the corresponding node. Duplicate consumer times for the same node are prohibited. Parameter structure: MSB LSB 31 24 / 23 16 / 15 0 NA / Monitored Address / Monitoring Time Additionally, the sub-index read return value indicates the method for restoring default parameters.				

Sub-index	00h	-			
Name	Number Entries				
Object Structure	-	Data Type	Uint8	Range	1
Mappable	NO	R/W	RO	Default	1
Description	This parameter can only be written as 0, which clears all error records.				

Sub-index	01h	-			
Name	Consumer Heartbeat Time				
Object Structure	-	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RW	Default	0
Description	Saves all parameters in the object dictionary list.				

1017h					
Index	1017h	-			
Name	Producer Heartbeat Time				
Object Structure	VAR	Data Type	Uint16	Range	Uint16
Mappable	NO	R/W	RW	Default	
Description	Unit (ms).				

1018h					
Index	1018h	-			
Name	Producer Heartbeat Time				
Object Structure	REC	Data Type	Uint16	Range	-
Mappable	NO	R/W	RO	Default	-

Sub-index	00h	-			
Name	Number of Entries				
Object Structure	-	Data Type	Uint8	Range	3
Mappable	NO	R/W	RO	Default	3

Sub-index	01h	-			
Name	Vendor-ID				
Object Structure	-	Data Type	Uint16	Range	Uint16
Mappable	NO	R/W	RO	Default	0x3B9
Description	A unique number assigned by the CiA.				

Sub-index	02h	-			
Name	Product Code				
Object Structure	-	Data Type	Uint16	Range	Uint16
Mappable	NO	R/W	RO	Default	-
Description	Corresponds to the product series and model in the electronic label, mapped as follows:				

MSB			LSB
31	16	15	0
Product series		Product model	

Sub-index	03h	-			
Name	Revision Number				
Object Structure	-	Data Type	Uint16	Range	Uint16
Mappable	NO	R/W	RO	Default	-
Description	Correlates with software version (100Ah), with the following structure:				

MSB			LSB
31	16	15	0
Major revision		Minor revision	

1029h					
Index	1029h	-			
Name	Error Behavior				
Object Structure	ARR	Data Type	Uint8	Range	Uint8
Mappable	NO	R/W	RW	Default	-

Description	Controls the NMT state transition triggered by different error classes. The NMT shifts to specified states based on the configured value.

Value	Meaning
0	Transition to Pre-operational state when in Operational state
1	Maintain current state
2	Transition to Stopped state
Other	NA

Sub-index	01h	-			
Name	Communication Error				
Object Structure	-	Data Type	Uint8	Range	Uint8
Mappable	NO	R/W	RW	Default	0
Description	Includes protocol errors: NMT guard timeout, PDO length error, Bus-off condition				

Sub-index	00h	-			
Name	Largest Sub-index Supported				
Object Structure	-	Data Type	Uint8	Range	Uint8
Mappable	NO	R/W	RO	Default	1

Sub-index	01h	-			
Name	Communication Error				
Object Structure	-	Data Type	Uint8	Range	Uint8
Mappable	NO	R/W	RW	Default	0
Description	Includes protocol errors: NMT guard timeout, PDO length error, Bus-off condition				

1200h					
Index	1200h	-			
Name	SDO Server Parameter				
Object Structure	REC	Data Type	-	Range	-
Mappable	NO	R/W	RO	Default	-
Description	MSB = 0: SDO valid; MSB = 1: SDO invalid. Default SDO always exists as a read-only constant.				

MSB		LSB
31	30 11	10 0
0/1	0x0	11-bit COB-ID

Sub-index	00h	-			
Name	Number of Entries				
Object Structure	-	Data Type	Uint8	Range	Uint8
Mappable	NO	R/W	RO	Default	2

Sub-index	01h	-			
Name	COB-ID Client → Server(rx)				
Object Structure	-	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RW	Default	0x600 + Node-ID

Sub-index	02h	-			
Name	COB-ID Server → Client(tx)				
Object Structure	-	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RW	Default	0x580 + Node-ID

1400h: RPDO1 Communication Parameter 1402h: RPDO2 Communication Parameter 1403h: RPDO3 Communication Parameter 1404h: RPDO4 Communication Parameter					
Index	1400h ~ 1403h	-			
Name	RPDO Message COB-ID				
Object Structure	REC	Data Type	-	Range	-
Mappable	NO	R/W	RW	Default	-

Sub-index	00h	-			
Name	Largest Sub-index Supported				
Object Structure	-	Data Type	Uint8	Range	0~2
Mappable	NO	R/W	RO	Default	2

Sub-index	01h	-			
Name	COB-ID Used by RPDO				
Object Structure	-	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RW	Default	See description below

Description	Only the MSB is modifiable: MSB = 0: PDO valid; MSB = 1: PDO invalid MSB LSB 31 / 30 11 / 10 0 0/1 / 0 / 11-bit COB-ID Factory Settings (Default Node-ID = 1): 1400h: 0x80000200 + Node-ID 1401h: 0x80000300 + Node-ID 1402h: 0x80000400 + Node-ID 1403h: 0x80000500 + Node-ID

Sub-index	02h	-			
Name	Reception Type				
Object Structure	-	Data Type	Uint8	Range	Uint8
Mappable	NO	R/W	RW	Default	0
Description	Modifiable only when the PDO is invalid. Defines PDO transmission types: Value / Meaning 0 / Synchronous acyclic 1~240 / Synchronous cyclic 254255 / Asynchronous				

1600h: RPDO1 Mapping Parameter 1601h: RPDO2 Mapping Parameter 1602h: RPDO3 Mapping Parameter 1603h: RPDO4 Mapping Parameter					
Sub-index	1600h~1603h	-			
Name	RPDO Mapping Parameter				
Object Structure	REC	Data Type	-	Range	-
Mappable	NO	R/W	RW	Default	-
Description	Modifiable only when the PDO is invalid. The total mapped length must not exceed 64 bits. Only byte-aligned mapping is supported; bit-level mapping is not supported.				

Sub-index	00h	-			
Name	Number of Mapped Application Objects in PDO				
Object Structure	-	Data Type	Uint8	Range	0~4
Mappable	NO	R/W	RW	Default	-

Description	Writing 0 invalidates all mapping sub-indexes.

Sub-index	1h ~ 4h	-			
Name	PDO Mapping for the nth Application Object to be Mapped				
Object Structure	-	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RW	Default	-
Description	The index and sub-index must exist in the object dictionary list, with writable and mappable attributes. Write to the corresponding sub-index in the following format:				

MSB		LSB
31 16	15 8	7 0
Index	Sub-index	Length

Default RPDO Mapping Configuration:

(1) RPDO1 (1600_h)

Sub-index	Value	Description
0	1	1 object mapped
1	0x60400010	Control word

(2) RPDO2 (1601_h)

Sub-index	Value	Description
0	2	2 objects mapped
1	0x60410010	Control word
2	0x60600008	Operation mode selection

(3) RPDO3 (1602_h)

Sub-index	Value	Description
0	2	2 objects mapped
1	0x60410010	Control word
2	0x607A0020	Target position (position command)

(4) RPDO4 (1603_h)

Sub-index	Value	Description
0	2	2 objects mapped
1	0x60410010	Control word
2	0x60FF0020	Target velocity (velocity command)

1800h: TPDO1 Communication Parameter 1801h: TPDO2 Communication Parameter 1802h: TPDO3 Communication Parameter 1803h: TPDO4 Communication Parameter					
Index	1800h ~ 1803h	-			
Name	TPDO Communication Parameter				
Object Structure	REC	Data Type	-	Range	-
Mappable	NO	R/W	RW	Default	-

Sub-index	00h	-			
Name	Largest Sub-index Supported				
Object Structure	-	Data Type	Uint8	Range	0~4
Mappable	NO	R/W	RO	Default	5

Sub-index	01h	-			
Name	COB-ID Used by TPDO				
Object Structure	-	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RW	Default	See description below
Description	Only the MSB is modifiable: MSB = 0: TPDO valid; MSB = 1: TPDO invalid MSB LSB 31 / 30 ~ 11 / 10 ~ 0 0/1 / 0 / 11-bit COB-ID Factory Settings (Default Node-ID = 1): 1800h: 0x80000180 + Node-ID 1801h: 0x80000280 + Node-ID 1802h: 0x80000380 + Node-ID 1803h: 0x80000480 + Node-ID				

Sub-index	02h	-			
Name	Transmission Type				
Object Structure	-	Data Type	Uint8	Range	Uint8
Mappable	NO	R/W	RW	Default	255

Description	Modifiable only when the PDO is invalid. Defines PDO transmission types:

Value	Meaning
0	Synchronous, non-periodic
1~240	Synchronous cyclic
255	Asynchronous, periodic

Sub-index	03h	-			
Name	Inhibit Time				
Object Structure	-	Data Type	Uint16	Range	Uint16
Mappable	NO	R/W	RW	Default	8
Description	Modifiable only when the PDO is invalid. Unit: 125μs. Note: A value of 0 disables Inhibit Time.				

Sub-index	04h	-			
Name	Reserved				
Object Structure	-	Data Type	Uint8	Range	Uint8
Mappable	NO	R/W	RW	Default	0

Sub-index	05h	-			
Name	Event Timer				
Object Structure	-	Data Type	Uint16	Range	Uint16
Mappable	NO	R/W	RW	Default	2
Description	Modifiable only when the PDO is invalid. Unit: 1ms. Note: A value of 0 disables Event Timer.				

1A00h: TPDO1 Mapping Parameter 1A01h: TPDO2 Mapping Parameter 1A02h: TPDO3 Mapping Parameter 1A03h: TPDO4 Mapping Parameter					
Index	1A00h ~ 1A03h	-			
Name	TPDO Mapping Parameter				
Object Structure	REC	Data Type	-	Range	-
Mappable	NO	R/W	RW	Default	-
Description	Modifiable only when the PDO is invalid. The total mapped length must not exceed 64 bits. Only byte-aligned mapping is supported; bit-level mapping is not supported.				

Sub-index	00h	-			
Name	Number of Mapped Application Objects in PDO				
Object Structure	-	Data Type	Uint8	Range	0~4
Mappable	NO	R/W	RW	Default	-
Description	Writing 0 invalidates all mapping sub-indexes.				

Sub-index	1h ~ 4h	-			
Name	Application Object				
Object Structure	-	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RW	Default	-
Description	The index and sub-index must exist in the object dictionary list, with writable and mappable attributes. Write to the mapping object in the following format: MSB LSB 31 16 / 15 8 / 7 0 Index / Sub-index / Length				

Default TPDO Mapping Configuration:

(1) TPDO1(1A00$_h$)

Sub-index	Value	Description
0	1	1 object mapped
1	0x60410010	Status word

(2) TPDO2(1A01$_h$)

Sub-index	Value	Description
0	2	2 objects mapped
1	0x60410010	Status word
2	0x60610008	Current operation mode

(3) TPDO3(1A02$_h$)

Sub-index	Value	Description
0	2	2 objects mapped
1	0x60410010	Status word
2	0x60640020	Current position

(4) TPDO4(1A03$_h$)

Sub-index	Value	Description
0	2	2 objects mapped
1	0x60410010	Status word

2	0x606C0020	Current velocity

4.1.6 Group 6000h Object Description

603Fh	-			PP	PV	PT	HM	IP
Index	603Fh	-						
Name	Error Code							
Object Structure	VAR	Data Type	Uint16	Range	0~65535			
Mappable	Y	R/W	RO	Default	-			
Description	The error code indicates the most recent error that occurred in the drive. See the error list for details.							

6040h	-			PP	PV	PT	HM	IP
Index	6040h	-						
Name	Control Word							
Object Structure	VAR	Data Type	Uint16	Range	0~65535			
Mappable	Y	R/W	RW	Default	0			
Description	Bit definition of control word:							
	Bit	Meaning	Description					
	0	Servo ready	0: OFF; 1: ON					
	1	Main circuit power on	0: OFF; 1: ON					
	2	Quick stop	1: OFF; 0: ON					
	3	Servo running	0: OFF; 1: ON					
	4~6	Mode-dependent	Bit	Mode				
				PP	PV	PT	HM	
			4	New position rising edge trigger	NA	NA	Homing enable	
			5	0: Non-immediate update 1: Immediate update	NA	NA	NA	
			6	0: Absolute position 1: Relative position	NA	NA	NA	
	7	Error reset	Rising edge of bit7 is valid If bit7 remains 1, other control commands are invalid					
	8	Pause	0: OFF; 1: ON					
	9~10	NA	-					

	11~15	Vendor-defined	-
	Note: Each bit in the control word needs to work together with all other bits to collectively form a control command.		

6041h	-			PP	PV	PT	HM	IP
Index	6041h	-						
Name	Status Word							
Object Structure	VAR	Data Type	Uint16	Range	0~65535			
Mappable	Y	R/W	RO	Default	0			
Description	Bit definition of status word:							
	Bit	Name	Description					
	0	Servo ready	1: ON 0: OFF					
	1	Servo enable pending	1: ON 0: OFF					
	2	Servo running	1: ON 0: OFF					
	3	Error	0: No error; 1: Error					
	4	Main circuit power on	1: ON 0: OFF					
	5	Quick stop	0: ON 1: OFF					
	6	Power-on run enable	1: ON 0: OFF					
	7	Alarm	1: ON 0: OFF					
	8	Vendor-defined	-					
	9	Remote control	0: Non-CANopen mode 1: CANopen remote control mode					
	10	Target reached	Velocity mode 0: Target velocity not reached 1: Target velocity reached Position mode 0: Target position not reached 1: Target position reached					
	11	Software internal position over-limit	0: Position command/feedback within limit 1: Position command/feedback exceeds limit					
	12~13	Control mode-dependent	-					
	14	NA	-					
	15	Homing completed	0: Homing not performed or not completed 1: Homing completed, reference point found					

605Ah	-			PP	PV	PT	HM	IP
Index	605Ah	-						
Name	Quick Stop Option Code							
Object Structure	VAR	Data Type	Int16	Range	0~2			
Mappable	NO	R/W	RW	Default	2			
Description	Display	Control Mode						
	0	Freewheel stop. Enters freewheel state after stop is completed.						
	1	Stops using the deceleration ramp set in 6084h (HM: 609Ah). Enters freewheel state after stop is completed.						
	2	Stops using the deceleration ramp set in 6085h. Enters freewheel state after stop is completed.						

605Dh	-			PP	PV	PT	HM	IP
Index	605Dh	-						
Name	Halt Stop Option Code							
Object Structure	VAR	Data Type	Int16	Range	1~3			
Mappable	NO	R/W	RW	Default	1			
Description	Display	Control Mode						
	1	Stops using the ramp set in 6084h/6087h (HM: 609Ah). Maintains position lock state after stop is completed.						
	2	Stops using the ramp set in 6085h/6087h. Maintains position lock state after stop is completed.						
	3	Stops via quick stop torque. Maintains position lock state after stop is completed.						

6060h	-			PP	PV	PT	HM	IP
Index	6060h	-						
Name	Modes of Operation							
Object Structure	VAR	Data Type	Int8	Range	0~7			
Mappable	Y	R/W	RW	Default	1			
Description	Set the servo operation mode:							
	Setpoint	Description						
	0	NA						
	1	Profile Position mode (PP)						

	3	Profile Velocity mode (PV)
	4	Profile Torque mode (PT)
	6	Homing mode (HM)
	7	Interpolated Position mode (IP)

6061h	-			PP	PV	PT	HM	IP
Index	6061h	-						
Name	Modes of Operation Display							
Object Structure	VAR	Data Type	Int8	Range	0~7			
Mappable	Y	R/W	RO	Default	0			
Description	Display	Control Mode						
	0	NA						
	1	Profile Position mode (PP)						
	3	Profile Velocity mode (PV)						
	4	Profile Torque mode (PT)						
	6	Homing mode (HM)						
	7	Interpolated Position mode (IP)						

6062h	-			PP	HM	IP
Index	6062h	-				
Name	Position Demand Value					
Object Structure	VAR	Data Type	Int 32	Range	-2^{31}~$(2^{31}-1)$	
Mappable	Y	R/W	RO	Default	0	
Description	Position command value (unit: command units).					

6063h	-			PP	PV	PT	HM	IP
Index	6063h	-						
Name	Position Actual Value							
Object Structure	VAR	Data Type	Int32	Range	-2^{31}~$(2^{31}-1)$			
Mappable	Y	R/W	RO	Default	0			
Description	Reflects the real-time motor absolute position feedback (unit: encoder units).							

6064h	-			PP	PV	PT	HM	IP
Index	6064h	-						
Name	Position Actual Value							
Object Structure	VAR	Data Type	Int32	Range	-2^{31}~$(2^{31}-1)$			
Mappable	Y	R/W	RO	Default	0			
Description	Reflects the real-time motor absolute position feedback (unit: command units). Position Actual Value (6064h) × gear ratio (6091h) = Position Actual Value (6063h).							

6065h	-				PP	HM	IP
Index	6065h	-					
Name	Following Error Window						
Object Structure	VAR	Data Type	Uint32	Range	0~$(2^{31}-1)$		
Mappable	Y	R/W	RW	Default	3840000		
Description	Sets the threshold for excessive position deviation (unit: command units). If the difference between the Position Demand Value (6062h) and Position Actual Value (6064h) exceeds ±6065h, an excessive position deviation error (ER.d00) occurs. When 6065h is set to 4294967295, the servo disables excessive position deviation monitoring.						

6067h	-				PP	HM	IP
Index	6067h	-					
Name	Position Window						
Object Structure	VAR	Data Type	Uint32	Range	0~$(2^{31}-1)$		
Mappable	Y	R/W	RW	Default	100		
Description	Sets the position reached threshold (unit: command units). When the difference between the Position Demand Value (6062h) and Position Actual Value (6064h) is within ±6067h for the duration set in 6068h, the position is considered reached. In Profile Position mode, bit 10 of the Status Word (6041h) is set to 1.						

6068h	-				PP	HM	IP
Index	6068h	-					
Name	Position Window Time						
Object Structure	VAR	Data Type	Uint16	Range	0~65535		
Mappable	Y	R/W	RW	Default	0		

Description	Sets the valid time window for determining position reached (unit: 0.1ms). When the difference between the Position Demand Value (6062h) and Position Actual Value (6064h) is within ±6067h for the duration set in 6068h, the position is considered reached. In Profile Position mode, bit 10 of the Status Word (6041h) is set to 1.

606Bh	-			PP	PV	PT	HM	IP
Index	606Bh	-						
Name	Velocity Demand Value							
Object Structure	VAR	Data Type	Int32	Range	-2^{31}~$(2^{31}-1)$			
Mappable	Y	R/W	RO	Default	-			
Description	Reflects the user's actual velocity command (unit: command units/s). In position modes, it reflects the velocity command corresponding to the output of the position controller. In velocity modes, it reflects the input command to the velocity controller.							

606Ch	-			PP	PV	PT	HM	IP
Index	606Ch	-						
Name	Velocity Actual Value							
Object Structure	VAR	Data Type	Int32	Range	-2^{31}~$(2^{31}-1)$			
Mappable	Y	R/W	RO	Default	-			
Description	Reflects the user's actual velocity feedback value (unit: command units/s).							

606Dh	-				PV
Index	606Dh	-			
Name	Velocity Window				
Object Structure	VAR	Data Type	Uint16	Range	0~65535
Mappable	Y	R/W	RW	Default	100
Description	Sets the velocity reached threshold (unit: 0.1rpm). When the difference between the Target Velocity (60FFh) and the Velocity Actual Value (606Ch) remains within ±606Dh for the duration set in 606Eh, the velocity is considered reached. In Profile Velocity mode, bit 10 of the Status Word (6041h) is set to 1. Otherwise, bit 10 of Status Word (6041h) is set to 0.				

606Eh	-				PV
Index	606Eh	-			
Name	Velocity Window Time				
Object Structure	VAR	Data Type	Uint16	Range	0~65535

Mappable	Y	R/W	RW	Default	0
Description	Sets the valid time window for determining velocity reached (unit: ms). When the difference between the Target Velocity (60FFh) and the Velocity Actual Value (606Ch) remains within ±606Dh for the duration set in 606Eh, the velocity is considered reached. In Profile Velocity mode, bit 10 of the Status Word (6041h) is set to 1. Otherwise, bit 10 of Status Word (6041h) is set to 0.				

606Fh	-				PV
Index	606Fh	-			
Name	Velocity Threshold				
Object Structure	VAR	Data Type	Uint16	Range	0~65535
Mappable	Y	R/W	RW	Default	10
Description	Sets the threshold for determining zero user velocity (unit: 1 rpm). When the Velocity Actual Value (606Ch) remains within ±606Fh for the duration set in 6070h, the user velocity is considered zero and bit 12 of Status Word (6041h) is set to 1. If either condition is not met, the user velocity is considered non-zero and bit 12 is set to 0.				

6070h	-				PV
Index	6070h	-			
Name	Zero Velocity Threshold Time				
Object Structure	VAR	Data Type	Uint16	Range	0~65535
Mappable	Y	R/W	RW	Default	0
Description	Sets the time window for determining zero user velocity (unit: 2ms). When the Velocity Actual Value (606Ch) remains within ±606Fh for the duration set in 6070h, the user velocity is considered zero and bit 12 of Status Word (6041h) is set to 1. If either condition is not met, the user velocity is considered non-zero and bit 12 is set to 0.				

6071h	-				PT
Index	6071h	-			
Name	Target Torque				
Object Structure	VAR	Data Type	Int16	Range	-5000~5000
Mappable	Y	R/W	RW	Default	0
Description	Sets the target command value for Profile Torque mode and Cyclic Synchronous Torque mode (unit: 0.1%).				

6072h	-	PP	PV	PT	HM	IP
Index	6072h	-				
Name	Maximum Torque Limit					

Object Structure	VAR	Data Type	Uint16	Range	-5000~5000
Mappable	Y	R/W	RW	Default	3000
Description	Sets the maximum output torque value of the servo (unit: 0.1%).				

6074h	-			PP	PV	PT	HM	IP
Index	6074h	-						
Name	Torque Demand Value							
Object Structure	VAR	Data Type	Uint16	Range	-5000~5000			
Mappable	Y	R/W	RO	Default	-			
Description	Displays the current torque command value (unit: 0.1%).							

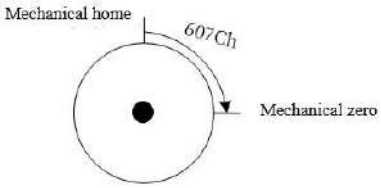
6075h	-			PP	PV	PT	HM	IP
Index	6075h	-						
Name	Motor Rated Current							
Object Structure	VAR	Data Type	Uint 32	Range	Uint 32			
Mappable	Y	R/W	RO	Default	0			
Description	Rated current as shown on the motor nameplate (unit: mA). All current-related parameter values are relative to this parameter.							

6076h	-			PP	PV	PT	HM	IP
Index	6076h	-						
Name	Motor Rated Torque							
Object Structure	VAR	Data Type	Uint32	Range	Uint32			
Mappable	Y	R/W	RO	Default	0			
Description	Rated torque as shown on the motor nameplate (unit: mNm). All torque-related parameter values are relative to this parameter.							

6077h	-			PP	PV	PT	HM	IP
Index	6077h	-						
Name	Motor Actual Torque							
Object Structure	VAR	Data Type	Int16	Range	Int16			
Mappable	Y	R/W	RO	Default	0			
Description	Reflects the instantaneous torque output of the servo motor (unit: 0.1%).							

6078h	-			PP	PV	PT	HM	IP
Index	6078h	-						
Name	Current Actual Value							
Object Structure	VAR	Data Type	Int16	Range	Int16			
Mappable	Y	R/W	RO	Default	0			
Description	Reflects the instantaneous current output of the servo motor (unit: 0.1%).							

607Ah	-				PP
Index	607Ah	-			
Name	Target Position				
Object Structure	VAR	Data Type	Int32	Range	-2^{31}~$(2^{31}-1)$
Mappable	Y	R/W	RW	Default	0
Description	Sets the target position for the servo in Profile Position mode (unit: command units). When bit 6 of Control Word (6040h) is 0, 607Ah is the target absolute position of the current segment. When bit 6 of Control Word (6040h) is 1, 607Ah is the target incremental displacement of the current segment.				

607Ch	-				HM
Index	607Ch	-			
Name	Home Offset				
Object Structure	VAR	Data Type	Int32	Range	-2^{31}~$(2^{31}-1)$
Mappable	Y	R/W	RW	Default	0
Description	In position control modes, the physical offset of the mechanical zero point relative to the motor origin (unit: command units). Mechanical zero point = Mechanical origin + 607Ch (Home Offset). When set to 0, no offset is applied. 				

607Dh	-			PP	PV	PT	HM	IP
Index	607Dh	-						
Name	Software Position Limit							
Object Structure	ARR	Data Type	Int32	Range	Int32			

Mappable	Y	R/W	RW	Default	0
Description	Sets the minimum and maximum software absolute position limits. Minimum absolute position limit = (607D:01h) Maximum absolute position limit = (607D:02h) Software absolute position limit settings: 1. When both (607D:01h) and (607D:02h) are set to default values, software limits are disabled. 2. If the minimum absolute position limit (607D:01h) is greater than the maximum absolute position limit (607D:02h), the values are automatically adjusted internally. 3. When the position command or feedback reaches the software limit, in position mode, the servo will move toward the limit position and stop upon reaching it, triggering an over-travel warning. A reverse command can move the motor out of the over-travel state. 4. Absolute position limits are relative to the Position Actual Value 6064h (user units).				

Sub-index	00h	-			
Name	Number of Entries				
Object Structure	VAR	Data Type	Uint8	Range	2
Mappable	Y	R/W	RO	Default	2

Sub-index	01h	-			
Name	Min Position Limit				
Object Structure	VAR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RW	Default	-2^{31}

Sub-index	02h	-			
Name	Max Position Limit				
Object Structure	VAR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RW	Default	2^{31}

607Eh	-		PP	PV	PT	HM	IP
Index	607Eh	-					
Name	Polarity						
Object Structure	VAR	Data Type	Uint8	Range	Int8		
Mappable	Y	R/W	RW	Default	0		

<table>
<tr><td>Description</td><td>Sets the polarity of position, velocity, and torque commands.
<table>
<tr><td colspan="4">MSB LSB</td></tr>
<tr><td>7</td><td>6</td><td>5</td><td>4 0</td></tr>
<tr><td>Pos Cmd Pol</td><td>Vel Cmd Pol</td><td>Trq Cmd Pol</td><td>NA</td></tr>
</table>
Bit7 = 1: Standard position mode. Position command × (-1), motor direction reverses. In Profile Position and Cyclic Synchronous Position modes, inverts the position command and target position.
Bit6 = 1: Velocity mode. Velocity command (60FFh) × (-1), motor direction reverses.
Bit5 = 1: Torque mode. Torque command × (-1).</td></tr>
</table>

<table>
<tr><td>607Fh</td><td colspan="4">-</td><td>PP</td><td>PV</td><td>PT</td><td>HM</td><td>IP</td></tr>
<tr><td>Index</td><td>607Fh</td><td colspan="8">-</td></tr>
<tr><td>Name</td><td colspan="9">Max Profile Velocity</td></tr>
<tr><td>Object Structure</td><td>VAR</td><td>Data Type</td><td>Uint32</td><td colspan="2">Range</td><td colspan="4">0~(2^{32}-1)</td></tr>
<tr><td>Mappable</td><td>Y</td><td>R/W</td><td>RW</td><td colspan="2">Default</td><td colspan="4">838860800</td></tr>
<tr><td>Description</td><td colspan="9">Sets the user's maximum operating speed (unit: command units/s).
Takes effect when the slave velocity command changes.
$$\text{Max Profile Velocity (rpm)} = \frac{607\text{Fh} \times \frac{6091:01\text{h}}{6091:02\text{h}}}{\text{Encoder Resolution}} \times 60$$
Note: In all modes, the maximum operating speed is limited by both 607Fh and function code Pn318, with the lower value applied.</td></tr>
</table>

<table>
<tr><td>6080h</td><td colspan="4">-</td><td>PP</td><td>PV</td><td>PT</td><td>HM</td><td>IP</td></tr>
<tr><td>Index</td><td>6080h</td><td colspan="8">-</td></tr>
<tr><td>Name</td><td colspan="9">Max Motor Speed</td></tr>
<tr><td>Object Structure</td><td>VAR</td><td>Data Type</td><td>Uint32</td><td colspan="2">Range</td><td colspan="4">0~(2^{32}-1)</td></tr>
<tr><td>Mappable</td><td>Y</td><td>R/W</td><td>RW</td><td colspan="2">Default</td><td colspan="4">Max Profile Velocity</td></tr>
<tr><td>Description</td><td colspan="9">Maximum allowable operating speed of the motor, obtainable from the servo motor manual (unit: rpm).</td></tr>
</table>

<table>
<tr><td>6081h</td><td colspan="8">-</td><td>PP</td></tr>
<tr><td>Index</td><td>6081h</td><td colspan="9">-</td></tr>
<tr><td>Name</td><td colspan="10">Profile Velocity</td></tr>
<tr><td>Object Structure</td><td>VAR</td><td>Data Type</td><td>Uint32</td><td colspan="2">Range</td><td colspan="5">0~(2^{32}-1)</td></tr>
<tr><td>Mappable</td><td>Y</td><td>R/W</td><td>RW</td><td colspan="2">Default</td><td colspan="5">8388608</td></tr>
</table>

Description	In Profile Position mode, the constant speed reached after the acceleration phase (unit: command units/s). $$\text{Motor Speed (rpm)} = \frac{6081\text{h} \times \frac{6091:01\text{h}}{6091:02\text{h}}}{\text{Encoder Resolution}} \times 60$$

6083h	-			PP	PV
Index	6083h	-			
Name	Profile Acceleration				
Object Structure	VAR	Data Type	Uint32	Range	0~(2^{32}-1)
Mappable	Y	R/W	RW	Default	83886080
Description	Sets the acceleration for Profile Position and Profile Velocity modes (unit: command units/s²). In Position Profile mode: Changes take effect before the segment command is triggered. After triggering, changes apply after the current segment completes. In Velocity Profile mode: Changes take effect immediately. If set to 0, the software internally forces it to 1.				

6084h	-			PP	PV
Index	6084h	-			
Name	Profile Deceleration				
Object Structure	VAR	Data Type	Uint32	Range	0~(2^{32}-1)
Mappable	Y	R/W	RW	Default	83886080
Description	Sets the deceleration for Profile Position and Profile Velocity modes (unit: command units/s²). In Velocity Profile mode: Changes take effect immediately. If set to 0, the software internally forces it to 1.				

6085h	-			PP	PV	PT	HM	IP
Index	6085h	-						
Name	Quick Stop Deceleration							
Object Structure	VAR	Data Type	Uint32	Range	0~(2^{32}-1)			
Mappable	Y	R/W	RW	Default	2147483647			
Description	Effective when Quick Stop (6040h: bit2=0) is active and when 605Ah (Quick Stop Option Code)=2, it defines the deceleration rate for the ramp-down segment.							

6086h	-		PP	PV
Index	6086h	-		
Name	Motion Profile Type			

Object Structure	VAR	Data Type	Int16	Range	Int16
Mappable	Y	R/W	RW	Default	-
Description	Defines the curve type for the motor's position or velocity command.				

6087h	-				PT
Index	6087h	-			
Name	Torque Slope				
Object Structure	VAR	Data Type	Uint32	Range	0~65535
Mappable	Y	R/W	RW	Default	1000
Description	Sets the rate of change (acceleration) of the torque command in Profile Torque mode, expressed as the incremental change per second (0.1%/s). In Profile Torque mode, when Quick Stop Option Code (605Ah)=1 or 2, or when Halt Stop Option Code (605Dh)=1 or 2, the system will decelerate to a stop using the value set in 6087h. If the parameter is set to 0, it is automatically forced to a value of 1.				

6091h	-			PP	PV	PT	HM	IP
Index	6091h	-						
Name	Gear Ratio							
Object Structure	ARR	Data Type	Uint32	Range	Uint32			
Mappable	Y	R/W	RW	Default	-			
Description	The position factor establishes a proportional relationship between user-defined load displacement and motor displacement. Motor Displacement (motor units) = Load Displacement (user units) × Position Factor The setting of the position factor is related to the mechanical reduction ratio, mechanical dimension parameters, and motor resolution. Calculation method is as follows: $\text{Position Factor} = \frac{\text{Motor Resolution} \times \text{Gear Ratio}}{\text{Load Feed}}$ The gear ratio set in 6091h is in series with the gear ratio settings in Pn204 and Pn206. For CAN-based models, the resulting electronic gear ratio is calculated as: $\text{Gear Ratio} = \frac{\text{Pn204}}{\text{Pn206}} \times \frac{6091:01\text{h}}{6091:02\text{h}}$							

Sub-index	00h	-			
Name	Number of Entries				
Object Structure	VAR	Data Type	Uint8	Range	2
Mappable	Y	R/W	RO	Default	2

Sub-index	01h	-			
Name	Motor Revolutions				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	Y	R/W	RW	Default	1

Sub-index	02h	-			
Name	Shaft Revolutions				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	Y	R/W	RW	Default	1

6098h	-				HM
Index	6098h	-			
Name	Homing Method				
Object Structure	VAR	Data Type	Int8	Range	0~35
Mappable	Y	R/W	RW	Default	0
Description	Selects the method for homing:				
	Value	Description			
	1	Return on negative limit switch and Z pulse signal			
	2	Return on positive limit switch and Z pulse signal			
	3, 4	Return on positive home switch and Z pulse signal			
	5, 6	Return on negative home switch and Z pulse signal			
	7~14	Return on home switch and Z pulse signal			
	15~16	NA			
	17~30	Return without referencing the Z pulse signal			
	31~32	NA			
	33~34	Return without referencing the Z pulse signal			
	35	Set the current position as the zero point			

Caution	
⚠	• Setting values other than those specified above will trigger an ER.E03 error.

6099h	-				HM
Index	6099h	-			
Name	Homing Speeds				
Object Structure	ARR	Data Type	Uint8	Range	Uint32
Mappable	Y	R/W	RW	Default	-
Description	In Homing mode, includes the setting of two speed values: 6099:01h: Speed during search for the deceleration point signal (unit: command units/s) 6099:02h: Speed during search for the home signal (unit: command units/s)				

Sub-index	00h	-			
Name	Number of Entries				
Object Structure	VAR	Data Type	Uint8	Range	2
Mappable	Y	R/W	RO	Default	2

Sub-index	01h	-			
Name	Speed During Search for Switch				
Object Structure	VAR	Data Type	Uint32	Range	$0\sim2^{32}-1$
Mappable	Y	R/W	RW	Default	27962027
Description	This sub-index sets the speed for searching for the deceleration point signal. This speed can be set to a higher value to prevent homing timeout faults due to excessive homing duration.				

Sub-index	02h	-			
Name	Speed During Search for Zero				
Object Structure	VAR	Data Type	Uint32	Range	1~500
Mappable	Y	R/W	RW	Default	5592405

Caution	
	● During homing, the slave will decelerate after finding the deceleration point. ● During deceleration, the slave ignores changes in the home signal. To avoid encountering the home signal during deceleration, the switch position of the deceleration point signal should be set appropriately (e.g., allowing sufficient deceleration distance or increasing homing acceleration).

609Ah	-				HM
Index	609Ah	-			
Name	Homing Acceleration/ Homing Deceleration				
Object Structure	VAR	Data Type	Uint32	Range	$0\sim2^{32}-1$
Mappable	Y	R/W	RW	Default	83886080
Description	Sets the acceleration and deceleration for Homing mode (unit: command units/s^2).				

60C1h	-				IP
Index	60C1h	-			
Name	Interpolation Data Record				
Object Structure	ARR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RW	Default	0
Description	Parameter setting for interpolation mode commands.				

Sub-index	00h	-			
Name	Number of Entries				
Object Structure	VAR	Data Type	Uint8	Range	3
Mappable	N	R/W	RO	Default	3

Sub-index	01h	-			
Name	Position Command				
Object Structure	VAR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RW	Default	0
Description	Absolute position command value in Interpolation mode (unit: command units).				

60C2h	-				IP
Index	60C2h	-			
Name	Interpolation Time Period				
Object Structure	ARR	Data Type	Uint8	Range	Uint8
Mappable	Y	R/W	RW	Default	0

Sub-index	00h	-			
Name	Number of Entries				
Object Structure	VAR	Data Type	Uint8	Range	2
Mappable	N	R/W	RO	Default	2
Description	Number of sub-indexes in the interpolation period object dictionary.				

Sub-index	01h	-			
Name	Interpolation Time Units				
Object Structure	VAR	Data Type	Uint8	Range	Uint8
Mappable	Y	R/W	RW	Default	1
Description	Interpolation period time. The unit is defined by 60C2:02h. Example: If 60C2:02h is -3 and 60C2:01h is 1, the interpolation period is set to 1ms. Note: The interpolation period must match the synchronous cycle period.				

Sub-index	02h	-			
Name	Interpolation Time Index				
Object Structure	VAR	Data Type	Int8	Range	Int8
Mappable	Y	R/W	RW	Default	-3
Description	Defines the unit of the interpolation period. A value of -3 indicates the unit is ms. A value of -4 indicates the unit is 0.1ms. A value of -2 indicates the unit is 10ms.				

60C5h	-			PP	PV	PT	HM	IP
Index	60C5h	-						
Name	Max Profile Acceleration							
Object Structure	VAR	Data Type	Uint32	Range	0~(2^{32}-1)			
Mappable	Y	R/W	RW	Default	2147483647			
Description	Maximum profile acceleration (unit: command units/s^2).							

60C6h	-			PP	PV	PT	HM	IP
Index	60C6h	-						
Name	Max Profile Deceleration							

Object Structure	VAR	Data Type	Uint32	Range	$0\sim(2^{32}-1)$
Mappable	Y	R/W	RW	Default	2147483647
Description	Maximum profile deceleration (unit: command units/s²).				

60E0h	-			PP	PV	PT	HM	IP
Index	60E0h	-						
Name	Positive Torque Limit							
Object Structure	VAR	Data Type	Uint16	Range	Uint16			
Mappable	Y	R/W	RW	Default	3000			
Description	Limits the maximum positive torque (unit: 0.1%).							

60E1h	-			PP	PV	PT	HM	IP
Index	60E1h	-						
Name	Negative Torque Limit							
Object Structure	VAR	Data Type	Uint16	Range	Uint16			
Mappable	Y	R/W	RW	Default	3000			
Description	Limits the maximum negative torque (unit: 0.1%).							

60F4h	-			PP	HM	IP
Index	60F4h	-				
Name	Following Error Actual Value					
Object Structure	VAR	Data Type	Int32	Range	$-2^{31}\sim(2^{31}-1)$	
Mappable	Y	R/W	RO	Default	0	
Description	Real-time position deviation (unit: user units).					

60FCh	-			PP	HM	IP
Index	60FCh	-				
Name	Position Demand Value*					
Object Structure	VAR	Data Type	Int32	Range	$-2^{31}\sim(2^{31}-1)$	
Mappable	Y	R/W	RO	Default	0	
Description	Real-time motor position command (unit: encoder units). User position command (6062h) × electronic gear ratio = Motor position command (60FCh).					

60FDh	-			PP	PV	PT	HM	IP
Index	60FDh	-						
Name	Digital Input							
Object Structure	VAR	Data Type	Uint32	Range	$0\sim(2^{32}-1)$			
Mappable	Y	R/W	RO	Default	0			
Description	Reflects the current logic state of the driver's DI terminals. 0: Inactive, 1: Active. The bits represent the following DI signals:							

MSB						LSB
31 16	15 4	3	2	1	0
Vendor-defined	NA	Undefined	Undefined	Positive overtravel switch	Negative overtravel switch

60FEh	-			PP	PV	PT	HM	IP
Index	60FEh	-						
Name	Digital Output							
Object Structure	ARR	Data Type	Uint32	Range	Uint32			
Mappable	Y	R/W	RO	Default	0			

Sub-index	00h	-			
Name	Number of Entries				
Object Structure	VAR	Data Type	Uint8	Range	1
Mappable	N	R/W	RO	Default	1

Sub-index	01h	-			
Name	Physical Outputs				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	Y	R/W	RO	Default	0

Description	Reflects the current logic state of the driver's DO terminals. 0: Inactive, 1: Active. MSB LSB 31 16 / 15 1 / 0 Vendor-defined / NA / Brake output

60FFh	-				PV
Index	60FFh	-			
Name	Target Velocity				
Object Structure	VAR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RW	Default	0
Description	User velocity command in Profile Velocity mode (unit: command units/s).				

Supported Drive Modes					
Index	6502h	-			
Name	Supported Drive Modes				
Object Structure	VAR	Data Type	Uint16	Range	Uint16
Mappable	Y	R/W	RO	Default	6Dh
Description	Drive modes supported by the driver. 0: Not Supported, 1: Supported.				
	Bit	Description		Value	
	0	Profile Position mode		1	
	1	NA		0	
	2	Profile Velocity mode		1	
	3	Profile Torque mode		1	
	4	NA		-	
	5	Homing mode		1	
	6	Interpolated Position mode		1	
	7~15	NA		0	

4.2 CANopen Abort Codes

Abort Code	Description
0x05040001	Invalid control command (SDO only supports 0x40, 0x2F, 0x2B, 0x23 commands)
0x06010002	Attempted to write to a read-only object
0x06020000	Object does not exist in the object dictionary

Abort Code	Description
0x06040041	Object cannot be mapped to PDO
0x06040042	Number and length of mapped objects exceeds PDO length
0x06070010	Data length mismatch (object dictionary length differs from write data length)
0x06070012	Data type mismatch, service parameter length mismatch
0x06090011	Sub-index does not exist
0x06090031	Parameter value written is too large
0x06090032	Parameter value written is too small

5 EtherCAT Communication

5.1 Object Dictionary

5.1.1 Object Attributes Description

Definitions

"Index": Specifies the location of each object in the object dictionary, expressed in hexadecimal (h).

"Data Type": See the table below.

Table 5-1 Data Type Description

Data Type	Range	Data length	DS301 Value
Int8	-128~127	1 byte	2
Uint8	0~255	1 byte	5
Int16	-32768~+32767	2 bytes	3
Uint16	0~65535	2 bytes	6
Int32	-2147483648~+2147483647	4 bytes	4
Uint32	0~4294967295	4 bytes	7
String	ASCII	-	9

"R/W": See the table below.

Table 5-2 Read/Write Type Description

R/W	Description
RW	Read/Write
WO	WO
RO	Read-only
CONST	Constant (Read only)

"Object Structure": See the table below.

Table 5-3 Object Structure Description

Object Structure	Description	DS301 Value
VAR	Single simple value; uses the data types listed in Table 5-1	7
ARR	Array of elements of the same type	8
REC	Record composed of elements of different types	9

5.1.2 Group 1000h Object List

Index	Sub-index	Name	Type	R/W	Data Type	Mappable
1000h	-	Device Type	VAR	RO	Uint32	N

Index	Sub-index	Name	Type	R/W	Data Type	Mappable
1001h	-	Error Register	VAR	RO	Uint8	Y
1008h	-	Manufacturer Device Name	STRING	RO	Uint8	N
1009h	-	Hardware Version	STRING	RO	Uint8	N
100Ah	-	Software Version	STRING	RO	Uint8	N
1018h	-	Identity Object	REC	RO	Uint16	N
	00h	Number of Entries	-	RO	Uint8	N
	01h	Vendor-ID	-	RO	Uint32	N
	02h	Product Code	-	RO	Uint32	N
	03h	Revision Number	-	RO	Uint32	N
Index	Sub-index	Name	Type	R/W	Data Type	Mappable
1600h	-	RPDO1 Mapping Parameter	REC	RW	-	N
	00h	Number of Mapped Application Objects in RPDO1	-	RW	Uint8	N
	1~15h	RPDO1 Mapping for the nth Application Object to be Mapped	-	RW	Uint32	N
1601h	-	RPDO2 Mapping Parameter	REC	RW	-	N
	00h	Number of Mapped Application Objects in RPDO2	-	RW	Uint8	N
	1~15h	RPDO2 Mapping for the nth Application Object to be Mapped	-	RW	Uint32	N
1602h	-	RPDO3 Mapping Parameter	REC	RW	-	N
	00h	Number of Mapped Application Objects in RPDO3	-	RW	Uint8	N
	1~15h	RPDO3 Mapping for the nth Application Object to be Mapped	-	RW	Uint32	N
1603h	-	RPDO4 Mapping Parameter	REC	RW	-	N

Index	Sub-index	Name	Type	R/W	Data Type	Mappable
	00h	Number of Mapped Application Objects in RPDO4	-	RW	Uint8	N
	1~15h	RPDO4 Mapping for the nth Application Object to be Mapped	-	RW	Uint32	N
1A00h	-	TPDO1 Mapping Parameter	REC	RW	-	N
	00h	Number of Mapped Application Objects in RPDO4	-	RW	Uint8	N
	1~15h	RPDO4 Mapping for the nth Application Object to be Mapped	-	RW	Uint32	N
1A01h	-	TPDO2 Mapping Parameter	REC	RW	-	N
	00h	Number of Mapped Application Objects in RPDO4	-	RW	Uint8	N
	1~15h	RPDO4 Mapping for the nth Application Object to be Mapped	-	RW	Uint32	N
1A02h	-	TPDO3 Mapping Parameter	REC	RW	-	N
	00h	Number of Mapped Application Objects in RPDO4	-	RW	Uint8	N
	1~15h	RPDO4 Mapping for the nth Application Object to be Mapped	-	RW	Uint32	N
1A03h	-	TPDO4 Mapping Parameter	REC	RW	-	N
	00h	Number of Mapped Application Objects in RPDO4	-	RW	Uint8	N
	1~15h	RPDO4 Mapping for the nth Application Object to be Mapped	-	RW	Uint32	N

Index	Sub-index	Name	Type	R/W	Data Type	Mappable
1C00h	-	Sync Manager Type	REC	RO	48	N
1C12h	-	Sync Manager 2_RPDO Assignment	ARR	RW	Uint8	N
	00h	Largest Sub-index Supported	-	RW	Uint16	N
	01h	Index of the Assigned RPDO	-	RW	Uint16	N

Index	Sub-index	Name	Type	R/W	Data Type	Mappable
1C13h	-	Sync Manager 2_RPDO Assignment	ARR	RW	Uint8	N
	00h	Largest Sub-index Supported	-	RW	Uint16	N
	01h	Index of the Assigned RPDO	-	RW	Uint16	N

Index	Sub-index	Name	Type	R/W	Data Type	Mappable
1C32h	-	Sync Manager 2 Output Parameter	REC	RO	-	N
	00h	Largest Sub-index Supported	-	RO	Uint8	N
	01h	Sync Type	-	RO	Uint16	N
	02h	Cycle Time	-	RO	Uint32	N
	04h	Supported Sync Types	-	RO	Uint16	N
	05h	Min Cycle Time	-	RO	Uint32	N
	06h	Calculation and Copy Time	-	RO	Uint32	N
	08h	Get Cycle Time	-	RO	Uint16	N
	09h	Delay	-	RO	Uint32	N
	0Ah	SYNC0 Cycle Time	-	RO	Uint32	N
	0Bh	Sync Event Loss Count	-	RO	Uint16	N
	0Ch	Cycle Overrun Count	-	RO	Uint16	N
1C32h	20h	Sync Error	-	RO	BOOL	N

Index	Sub-index	Name	Type	R/W	Data Type	Mappable
1C33h	-	Sync Manager 2 Input Parameter	REC	RO	-	N
	00h	Largest Sub-index Supported	-	RO	Uint8	N
	01h	Sync Type	-	RO	Uint16	N
	02h	Cycle Time	-	RO	Uint32	N
	04h	Supported Sync Types	-	RO	Uint16	N
	05h	Min Cycle Time	-	RO	Uint32	N
	06h	Calculation and Copy Time	-	RO	Uint32	N
	08h	Get Cycle Time	-	RO	Uint16	N
	09h	Delay	-	RO	Uint32	N
	0Ah	SYNC0 Cycle Time	-	RO	Uint32	N
	0Bh	Sync Event Loss Count	-	RO	Uint16	N
	0Ch	Cycle Overrun Count	-	RO	Uint16	N
	20h	Sync Error	-	RO	BOOL	N

5.1.3 Group 2000h Object List

The 2000h group in the object dictionary maps the drive's internal parameters. Object dictionary ranges 2000h~2006h correspond to parameter groups Pn0xx~Pn6xx; 2010h~2018h correspond to monitoring parameters Un0xx~Un8xx. A drive function code maps to a 2000h group sub-index: the function code's last two hex digits plus 1 equal the corresponding sub-index.

The table below shows the correspondence between the 2000h object dictionary index and the drive function code. See 3.3 Pn Parameter Overview and 3.4 Un Parameter Overview for details.

Index	Sub-index	Description	Data Type	R/W Type	Mappable
2000h	-	Pn0xx Basic Parameters	-	-	-
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Pn000: Function Selection Switch 0	Uint16	RW	N
	02h	Pn001: Function Selection Switch 1	Uint16	RW	N
	03h	Pn002: Motor Direction	Uint16	RW	N
	…	…	…	RW	N
	82h	Pn081: Local Communication Format	Uint16	RW	N
	83h	Pn082: EtherCat Station Alias	Uint16	RW	N
2001h	-	Pn1xx Gain Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N

Index	Sub-index	Description	Data Type	R/W Type	Mappable
	01h	Pn100: Moment of Inertia Ratio	Uint16	RW	N
	02h	Pn101: ASR Proportional Gain	Uint16	RW	N
	…	…	…	RW	N
	94h	Pn193: Max. Gain during Tuning	Uint16	RW	N
2002h	-	Pn2xx Position Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Pn200: Position Command Source	Uint16	RW	N
	02h	Pn201: External Pulse Logic	Uint16	RW	N
	03h	Pn202: Position Control Function Switch 1	Uint16	RW	N
	04h	Pn203: External Pulse Multiplier	Uint16	RW	N
	…	…	…	RW	N
	98h	Pn297: Absolute Position Zero Single-turn Value	Uint16	RW	N
	9Ah	Pn299: Home Return Timeout Setting	Uint16	RW	N
2003h	-	Pn3xx Speed Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Pn300: Speed Command Source	Int16	RW	N
	02h	Pn301: Speed Command Direction	Int16	RW	N
	…	…	…	RW	N
	21h	Pn320: Speed Achievement Signal Threshold	Uint16	RW	N
2004h	-	Pn4xx Speed Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Pn400: Torque Control Switch 1	Uint16	RW	N
	02h	Pn401: Torque Command 2nd Low-pass Filter OFF Frequency	Uint16	RW	N
	…	…	…	RW	N
	31h	Pn430: Torque Control Switch 2	Uint16	RW	N
2005h	-	Pn5xx Speed Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Pn500: JOG Speed	Uint16	RW	N
	02h	Pn502: Program JOG Operation Mode	Uint16	RW	N
	…	…	…	RW	N
	09h	Pn508: Program JOG Move Speed	Uint16	RW	N

Index	Sub-index	Description	Data Type	R/W Type	Mappable
2006h	-	Pn6xx Speed Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Pn600: Switch Terminal X Filter Time	Uint16	RW	N
	02h	Pn601: Terminal X IN1 Configuration	Uint16	RW	N
	…	…	…	RW	N
	31h	Pn630: Internal Software Set Terminal X Status	Uint16	RW	N
2010h	-	Un0xx Monitoring Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Un000: Motor Feedback Speed	Int16	RO	N
	02h	Un001: Speed Command	Int16	RO	N
	…	…	…	RO	N
	39h	Un038: CANopen Sub Version No.	Uint16	RO	N
	3Ah	Un039: EtherCAT Sub Version No.	Uint16	RO	N
2011h	-	Un1xx Monitoring Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	05h	Un104: Serial Encoder Communication Error Counter	Uint16	RO	N
	06h	Un105: Position Tuning Time	Uint16	RO	N
	…	…	…	RO	N
	54h	Un153: Analog Channel 2 Voltage (after bias/gain/zero point adjustment)	Uint16	RO	N
2012h	-	Un2xx Monitoring Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	04h	Un203: Abnormal Parameter Code Setting (Er040)	Uint16	RO	N
	13h	Un212: System Time Monitoring A (Avg)	Uint16	RO	N
	…	…	…	RO	N
	1Ah	Un219: System Time Monitoring R (Max)	Uint16	RO	N
2015h	-	Un5xx Monitoring Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	13h	Un512: U-phase Current Zero Offset Value	Uint16	RO	N

	14h	Un513: V-phase Current Zero Offset Value	Uint16	RO	N
2016h	-	Un6xx Monitoring Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	04h	Un603: Absolute Encoder Pulse [low 32-bit]	Uint32	RO	N
	06h	Un605: Absolute Encoder Pulse [high 32-bit]	Uint32	RO	N

Index	Sub-index	Description	Data Type	R/W Type	Mappable
2018h	-	Un8xx Monitoring Parameters	-	-	N
	00h	Largest Sub-index Supported	Uint8	RO	N
	01h	Un800: Current Error/Alarm Code	Uint16	RO	N
	02h	Un801: Alarm Code	Uint16	RO	N
	…	…	…	RO	N
	43h	Un842: Alarm Record 9 Occurrence Time	Uint16	RO	N

Caution	
⚠	• Function-code last two hex digits correspond to sub-index (both in hex). Example: To read/write function code Pn299, access object 2002_9Ah.

5.1.4 Group 6000h Object List

Index	Sub-index	Name	R/W	Mappable	Data Type	Unit
603Fh	00h	Error Code	RO	Y	Uint16	-
6040h	00h	Control Word	RW	Y	Uint16	-
6041h	00h	Status Word	RO	T	Uint16	-
605Ah	00h	Quick Stop Option Code	RO	Y	Int16	-
605Dh	00h	Halt Stop Option Code	RO	Y	Int16	-
6060h	00h	Modes of Operation	RW	Y	Int8	-
6061h	00h	Modes of Operation Display	RO	Y	Int8	-
6062h	00h	Position Demand Value	RO	Y	Int32	Command unit
6063h	00h	Motor Position Actual Value	RO	Y	Int32	Encoder unit

Index	Sub-index	Name	R/W	Mappable	Data Type	Unit
6064h	00h	Position Actual Value	RO	Y	Int32	Command unit
6065h	00h	Following Error Window	RW	Y	Uint32	Command unit
6067h	00h	Position Window	RW	Y	Uint32	Command unit
6068h	00h	Position Window Time	RW	Y	Uint16	ms
606Bh	00h	Velocity Demand Value	RW	Y	Int32	0.1rpm
606Ch	00h	Velocity Actual Value	RO	Y	Int32	Command unit/s
606Dh	00h	Velocity Window	RW	Y	Uint16	0.1rpm
606Eh	00h	Velocity Window Time	RW	Y	Uint16	2ms
606Fh	00h	Velocity Threshold	RW	Y	Uint16	0.1rpm
6070h	00h	Zero Velocity Threshold Time	RW	Y	Uint16	ms
6071h	00h	Target Torque	RW	Y	Int16	0.1%
6072h	00h	Maximum Torque Limit	RW	Y	Uint16	0.1%
6074h	00h	Torque Demand Value	RO	Y	Uint32	0.1%
6075h	00h	Motor Rated Current	RO	Y	Uint32	mA
6076h	00h	Motor Rated Torque	RO	Y	Uint32	mNm
6077h	00h	Motor Actual Torque	RO	Y	Uint16	0.1%
607Ah	00h	Target Position	RW	Y	Int32	Command unit
Index	Sub-index	Name	R/W	Mappable	Data Type	Unit
607Ch	00h	Home Offset	RW	Y	Int32	Command unit
607Dh	01h	Min Position Limit	RW	Y	Int32	Command unit
	02h	Max Position Limit	RW	Y	Int32	Command unit
607Eh	00h	Polarity	RW	Y	Uint8	-

Index	Sub-index	Name	R/W	Mappable	Data Type	Unit
607Fh	00h	Max Profile Velocity	RW	Y	Uint32	Command unit/s
6080h	00h	Max Motor Speed	RW	Y	Uint32	rpm
6081h	00h	Profile Velocity	RW	Y	Uint32	Command unit/s
6083h	00h	Profile Acceleration	RW	Y	Uint32	Command unit/s^2
6084h	00h	Profile Deceleration	RW	Y	Uint32	Command unit/s^2
6086h	00h	Motion Profile Type	RW	Y	Int16	-
6087h	00h	Torque Slope	RW	Y	Uint32	ms
6091h	01h	Gear Ratio Numerator	RW	Y	Uint32	-
	02h	Gear Ratio Denominator	RW	Y	Uint32	-
6098h	00h	Homing Method	RW	Y	Int8	-
6099h	01h	Speed During Search for Switch	RW	Y	Uint32	Command unit/s
	02h	Speed During Search for Zero	RW	Y	Uint32	Command unit/s
609Ah	00h	Homing Acceleration/Homing Deceleration	RW	Y	Uint32	Command unit/s^2
60B0h	00h	Position Offset	RW	Y	Int32	Command unit
60B1h	00h	Velocity Offset	RW	Y	-	Command unit/s
60B2h	00h	Torque Offset	RW	Y	Int16	0.1%
60B8h	00h	Probe	RW	Y	Uint16	-
60B9h	00h	Touch Probe Status	RO	Y	Uint16	-
60BAh	00h	Touch Probe Pos1 Pos Value	RO	Y	Int32	Command unit
60BBh	00h	Touch Probe Pos1 Neg Value	RO	Y	Int32	Command unit

Index	Sub-index	Name	R/W	Mappable	Data Type	Unit
60BCh	00h	Touch Probe Pos2 Pos Value	RO	Y	Int32	Command unit
60BDh	00h	Touch Probe Pos2 Pos Value	RO	Y	Int32	Command unit
60E0h	00h	Positive Torque Limit	RW	Y	Uint16	0.1%
60E1h	00h	Negative Torque Limit	RW	Y	Uint16	0.1%
60F4h	00h	Following Error Actual Value	RO	Y	Int32	Command unit
60FCh	00h	Position Demand Value	RO	Y	Int32	Encoder unit
60FDh	00h	Digital Input	RO	Y	Uint32	-
60FEh	00h	Number of Entries	RO	N	Uint8	-
	01h	Physical Outputs	RO	Y	Uint16	-
60FFh	00h	Target Velocity	RW	Y	Uint32	Command unit/s
6502h	00h	Supported Drive Modes	RO	Y	Uint32	-

5.1.5 Group 1000h Object Description

1000h					
Index	1000h	-			
Name	Device Type				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RO	Default	0x20192
Description	This parameter describes the device sub-protocol or application profile used.				

Bit	Name	Description
0~15	Device sub-protocol	402(0×192): Device sub-protocol
16~23	Type	02: Servo drives
25~31	Mode	Vendor-defined

1001h					
Index	1001h	-			
Name	Error Register				
Object Structure	VAR	Data Type	Uint8	Range	Uint8

Mappable	NO	R/W	RO	Default	0x0
Description	The Error Register contains error type information by bit, as detailed below:				

Bit	Meaning	Bit	Meaning
0	Generic error	4	Communication error
1	Current error	5	Device sub-protocol error
2	Voltage error	6	Reserved
3	Temperature error	7	Manufacturer-specific error

When an error occurs, the corresponding bit is set to "1". As long as any error exists, bit 0 must be "1".

1008h					
Index	1008h	-			
Name	Manufacturer Device Name				
Object Structure	REC	Data Type	Uint8	Range	Uint8
Mappable	NO	R/W	RO	Default	Servo Device

100Ah					
Index	100Ah	-			
Name	Software Version				
Object Structure	REC	Data Type	Uint8	Range	-
Mappable	NO	R/W	RO	Default	Up to model

1018h					
Index	1018h	-			
Name	Identity Object				
Object Structure	REC	Data Type	Uint16	Range	-
Mappable	NO	R/W	RO	Default	

Sub-index	00h	-			
Name	Number of Entries				
Object Structure	-	Data Type	Uint8	Range	4
Mappable	NO	R/W	RO	Default	4

Sub-index	01h	-			
Name	Vendor-ID				
Object Structure	-	Data Type	Uint32	Range	-
Mappable	NO	R/W	RO	Default	0x850104
Description	A unique number assigned by the ETG.				

Sub-index	02h				
Name	Product Code				
Object Structure	-	Data Type	Uint32	Range	-
Mappable	NO	R/W	RO	Default	-
Description	Corresponds to the product series and model in the electronic label, mapped as follows:				

MSB			LSB
31	16	15	0
Product series		Product model	

Sub-index	03h	-			
Name	Revision Number				
Object Structure	-	Data Type	Uint32	Range	-
Mappable	NO	R/W	RO	Default	-
Description	Correlates with software version (100Ah), with the following structure:				

MSB		LSB	
31	16	15	0
Major revision		Minor revision	

1600h: RPDO1 Mapping Parameter 1601h: RPDO2 Mapping Parameter 1602h: RPDO3 Mapping Parameter 1603h: RPDO4 Mapping Parameter					
Index	1600h~1603h		-		
Name	RPDO Mapping Parameter				
Object Structure	REC	Data Type	-	Range	-
Mappable	NO	R/W	RW	Default	-
Description	Modifiable only when the PDO is invalid. The total mapped length must not exceed 32 bytes. Only byte-aligned mapping is supported; bit-level mapping is not supported.				

Sub-index	00h	-			
Name	Number of Mapped Application Objects in PDO				
Object Structure	-	Data Type	Uint8	Range	0~4
Mappable	NO	R/W	RW	Default	-
Description	Writing 0 invalidates all mapping sub-indexes.				

Sub-index	1h~15h	-			
Name	PDO Mapping for the nth Application Object to be Mapped				
Object Structure	-	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RW	Default	-
Description	The index and sub-index must exist in the object dictionary list, with writable and mappable attributes. Write to the corresponding sub-index in the following format:				

MSB			LSB
31 16	15 8	7 0	
Index	Sub-index	Length	

Default RPDO Mapping Configuration:

(1) RPDO1(1600$_h$)

Sub-index	Value	Description
0	1	1 object mapped
1	0x60400010	Control word

(2) RPDO2(1601$_h$)

Sub-index	Value	Description
0	2	2 objects mapped
1	0x60410010	Control word
2	0x60600008	Operation mode selection

(3) RPDO3(1602$_h$)

Sub-index	Value	Description
0	2	2 objects mapped
1	0x60410010	Control word
2	0x607A0020	Target position (position command)

(4) RPDO4(1603h)

Sub-index	Value	Description
0	2	2 objects mapped
1	0x60410010	Control word
2	0x60FF0020	Target velocity (velocity command)

1A00h: TPDO1 Mapping Parameter 1A01h: TPDO2 Mapping Parameter 1A02h: TPDO3 Mapping Parameter 1A03h: TPDO4 Mapping Parameter					
Index	1A00h~1A03h		-		
Name	TPDO Mapping Parameter				
Object Structure	REC	Data Type	-	Range	-
Mappable	NO	R/W	RW	Default	-
Description	Modifiable only when the PDO is invalid. The total mapped length must not exceed 32 bytes. Only byte-aligned mapping is supported; bit-level mapping is not supported.				

Sub-index	00h	-			
Name	Number of Mapped Application Objects in PDO				
Object Structure	-	Data Type	Uint8	Range	0~4
Mappable	NO	R/W	RW	Default	-
Description	Writing 0 invalidates all mapping sub-indexes.				

Sub-index	1h~8h	-			
Name	PDO Mapping for the nth Application Object to be Mapped				
Object Structure	-	Data Type	Uint32	Range	Uint32
Mappable	NO	R/W	RW	Default	-
Description	The index and sub-index must exist in the object dictionary list, with writable and mappable attributes. Write to the mapping object in the following format:				

MSB			LSB
31 16	15 8	7 0	
Index	Sub-index	Length	

Default TPDO Mapping Configuration:

(1) TPDO1(1A00$_h$)

Sub-index	Value	Description
0	1	1 object mapped
1	0x60410010	Status word

(2) TPDO2(1A01$_h$)

Sub-index	Value	Description
0	2	2 objects mapped
1	0x60410010	Status word
2	0x60610008	Current operation mode

(3) TPDO3(1A02$_h$)

Sub-index	Value	Description
0	2	2 objects mapped
1	0x60410010	Status word
2	0x60640020	Current position

(4) TPDO4(1A03$_h$)

Sub-index	Value	Description
0	2	2 objects mapped
1	0x60410010	Status word
2	0x606C0020	Current velocity

Sync Manager 2 RPDO Assignment					
Index	1C12h				
Name	Sync Manager 2_RPDO Assignment				
Object Structure	ARR	Data Type	Uint16	Range	-
Mappable	NO	R/W	RW	Default	1

Sub-index	00h	-			
Name	Largest Sub-index Supported				
Object Structure	-	Data Type	Uint8	Range	0~1
Mappable	NO	R/W	RW	Default	1

Sub-index	01h	-			
Name	Index of the Assigned RPDO				
Object Structure	-	Data Type	Uint16	Range	0~65535

Mappable	YES	R/W	RW	Default	0x1601
Description	Sets the RPDO assignment index. 1. Can only be configured in the Pre-operational state. 2. If not using TwinCAT software to directly assign RPDO, follow these steps: a. Write 0 to 1C12-00h. b. Write the predefined RPDOx (1600h~1603h) to 1C12-01h and configure the RPDOx mapping object (e.g., 1600h). c. Write 1 to 1C12-00h.				

Sync Manager 2 TPDO Assignment					
Index	1C13h				
Name	Sync Manager 2_TPDO Assignment				
Object Structure	ARR	Data Type	Uint16	Range	-
Mappable	NO	R/W	RW	Default	1

Sub-index	00h	-			
Name	Largest Sub-index Supported				
Object Structure	-	Data Type	Uint8	Range	0~1
Mappable	NO	R/W	RW	Default	1

Sub-index	01h	-			
Name	Index of the Assigned TPDO				
Object Structure	-	Data Type	Uint16	Range	0~65535
Mappable	YES	R/W	RW	Default	0x1A01
Description	Sets the TPDO assignment index. 1. Can only be configured in the Pre-operational state. 2. If not using TwinCAT software to directly assign TPDO, follow these steps: a. Write 0 to 1C13-00h. b.Write the predefined TPDOx (1A00h~1A03h) to 1C13-01h and configure the RPDOx mapping object (e.g., 1A00h). c. Write 1 to 1C13-00h.				

Sync Manager 2 Output Paramater					
Index	1C32h	-			
Name	Sync Manager 2 Output Parameter				
Object Structure	REC	Data Type	-	Range	-
Mappable	NO	R/W	RO	Default	-

Sub-index	00h	-			
Name	Largest Sub-index Supported				
Object Structure	-	Data Type	Uint8	Range	-
Mappable	NO	R/W	RO	Default	32

Sub-index	01h	-			
Name	Sync Type				
Object Structure	-	Data Type	Uint16	Range	-
Mappable	NO	R/W	RO	Default	32
Description	0x0002 indicates SM2's synchronous type is Distributed Clock Synchronization 0 mode.				

Sub-index	02h	-			
Name	Cycle Time (ns)				
Object Structure	-	Data Type	Uint32	Range	-
Mappable	NO	R/W	RO	Default	0
Description	Reflects the SYNC0 cycle period.				

Sub-index	04h	-			
Name	Supported Sync Types				
Object Structure	-	Data Type	Uint16	Range	-
Mappable	NO	R/W	RO	Default	4
Description	Reflects distributed clock types. 0x0004 indicates Distributed Clock Synchronization 0 mode.				

Sub-index	05h	-			
Name	Min Cycle Time (ns)				
Object Structure	-	Data Type	Uint32	Range	-
Mappable	NO	R/W	RO	Default	125000
Description	Reflects the minimum synchronous cycle time supported by the slave.				

Sub-index	06h	-			
Name	Calculation and Copy Time (ns)				
Object Structure	-	Data Type	Uint32	Range	-
Mappable	NO	R/W	RO	Default	-

Sub-index	08h	-			
Name	Get Cycle Time				
Object Structure	-	Data Type	Uint16	Range	-
Mappable	NO	R/W	RW	Default	-

Sub-index	09h	-			
Name	Delay (ns)				
Object Structure	-	Data Type	Uint32	Range	-
Mappable	NO	R/W	RO	Default	-

Sub-index	0Ah	-			
Name	SYNC0 Cycle Time				
Object Structure	-	Data Type	Uint32	Range	-
Mappable	NO	R/W	RW	Default	-
Description	Set the value of ESC register 09A0h in Distributed Clock mode.				

Sub-index	0Bh	-			
Name	Sync Event Loss Count				
Object Structure	-	Data Type	Uint16	Range	-
Mappable	NO	R/W	RO	Default	-

Sub-index	0Ch	-			
Name	Cycle Overrun Count				
Object Structure	-	Data Type	Uint16	Range	-
Mappable	NO	R/W	RO	Default	-
Description	Caused by setting the cycle time too small.				

Sub-index	20h	-			
Name	Sync Error				
Object Structure	-	Data Type	BOOL	Range	-
Mappable	NO	R/W	RO	Default	-
Description	TRUE: Synchronization is active and no error has occurred. FALSE: Synchronization is inactive or a synchronization error has occurred.				

Sync Manager 2 Input Parameter					
Index	1C33h	-			
Name	Sync Manager 2 Input Parameter				
Object Structure	REC	Data Type	-	Range	-
Mappable	NO	R/W	RO	Default	-

Sub-index	00h	-			
Name	Largest Sub-index Supported				
Object Structure	-	Data Type	Uint8	Range	-
Mappable	NO	R/W	RO	Default	32

Sub-index	01h	-			
Name	Sync Type				
Object Structure	-	Data Type	Uint16	Range	-
Mappable	NO	R/W	RO	Default	32
Description	0x0002 indicates SM2's synchronous type is Distributed Clock Synchronization 0 mode.				

Sub-index	02h	-			
Name	Cycle Time (ns)				
Object Structure	-	Data Type	Uint32	Range	-
Mappable	NO	R/W	RO	Default	0
Description	Reflects the SYNC0 cycle period.				

Sub-index	04h	-			
Name	Supported Sync Types				
Object Structure	-	Data Type	Uint16	Range	-
Mappable	NO	R/W	RO	Default	4
Description	Reflects distributed clock types. 0x0004 indicates Distributed Clock Synchronization 0 mode.				

Sub-index	05h	-			
Name	Min Cycle Time (ns)				
Object Structure	-	Data Type	Uint32	Range	-
Mappable	NO	R/W	RO	Default	125000

Description	Reflects the minimum synchronous cycle time supported by the slave.

Sub-index	06h	-			
Name	Calculation and Copy Time (ns)				
Object Structure	-	Data Type	Uint32	Range	-
Mappable	NO	R/W	RO	Default	-

Sub-index	08h	-			
Name	Get Cycle Time				
Object Structure	-	Data Type	Uint16	Range	-
Mappable	NO	R/W	RW	Default	-

Sub-index	09h	-			
Name	Delay (ns)				
Object Structure	-	Data Type	Uint32	Range	-
Mappable	NO	R/W	RO	Default	-

Sub-index	0Ah	-			
Name	SYNC0 Cycle Time				
Object Structure	-	Data Type	Uint32	Range	-
Mappable	NO	R/W	RW	Default	-
Description	The same value as 1C32-0Ah.				

Sub-index	0Bh	-			
Name	Sync Event Loss Count				
Object Structure	-	Data Type	Uint16	Range	-
Mappable	NO	R/W	RO	Default	-

Sub-index	0Ch	-			
Name	Cycle Overrun Count				
Object Structure	-	Data Type	Uint16	Range	-
Mappable	NO	R/W	RO	Default	-

Sub-index	20h	-			
Name	Sync Error				
Object Structure	-	Data Type	BOOL	Range	-
Mappable	NO	R/W	RO	Default	-
Description	TRUE: Synchronization is active and no error has occurred. FALSE: Synchronization is inactive or a synchronization error has occurred.				

5.1.6 Group 6000h Object Description

Term Definition

Abbreviation	Description
HM	Homing mode
CSP	Cyclic Synchronous Position mode
PP	Profile Position mode
CSV	Cyclic Synchronous Velocity mode
PV	Profile Velocity mode
CST	Cyclic Synchronous Torque mode
PT	Profile Torque mode

603Fh	-			PP	PV	PT	HM	CSP	CSV	CST
Index	603Fh	-								
Name	Error Code									
Object Structure	VAR	Data Type	Uint16	Range	Uint16					
Mappable	Y	R/W	RO	Default	-					
Description	The error code indicates the most recent error that occurred in the drive. See the error list for details.									

6040h	-			PP	PV	PT	HM	CSP	CSV	CST
Index	6040h	-								
Name	Control Word									
Object Structure	VAR	Data Type	Uint16	Range	Uint16					
Mappable	Y	R/W	RW	Default	0					
Description	Bit definition of control word:									
	Bit	Meaning		Description						
	0	Servo ready		0: OFF 1: ON						

	1	Main circuit power on	0: OFF 1: ON
	2	Quick stop	0: OFF 1: ON
	3	Servo running	0: OFF 1: ON
	4~6	Mode-dependent	Operation mode-dependent
	7	Error reset	Rising edge of bit7 is valid If bit7 remains 1, other control commands are invalid
	8	Pause	N/A
	9~10	NA	Reserved
	11~15	Vendor-defined	Reserved

6041h	-			PP	PV	PT	HM	CSP	CSV	CST
Index	6041h	-								
Name	Status Word									
Object Structure	VAR	Data Type	Uint16	Range	Uint16					
Mappable	Y	R/W	RO	Default	0					
Description	Reflects servo status:									
	Bit	Name	Description							
	0	Servo ready	1: ON 0: OFF							
	1	Servo enable pending	1: ON 0: OFF							
	2	Servo running	1: ON 0: OFF							
	3	Error	0: No error; 1: Error							
	4	Main circuit power on	0: OFF 1: ON							
	5	Quick stop	0: ON 1: OFF							
	6	Power-on run enable	0: OFF 1: ON							
	7	Alarm	Reserved							
	8	Vendor-defined	-							
	9	Remote control	0: Non-CANopen mode 1: CANopen remote control mode							
	10	Target reached	0: OFF 1: ON							
	11	Software internal position over-limit	0: OFF 1: ON							
	12~13	Mode-dependent	Operation mode-dependent							

	14	NA	Reserved
	15	Homing completed	0: Homing not performed or not completed 1: Homing completed, reference point found

605Ah	-			PP	PV	PT	HM	CSP	CSV	CST
Index	605Ah	-								
Name	Quick Stop Option Code									
Object Structure	VAR	Data Type	Int16	Range	Int16					
Mappable	NO	R/W	RW	Default	2					
Description	Set the servo operation mode:									
	Display	Control Mode								
	0	Freewheel stop. Enters freewheel state after stop is completed.								
	1	Stops using the deceleration ramp set in 6084h (HM: 609Ah). Enters freewheel state after stop is completed.								
	2	Stops using the deceleration ramp set in 6085h. Enters freewheel state after stop is completed.								

605Dh	-			PP	PV	PT	HM	CSP	CSV	CST
Index	605Dh	-								
Name	Halt Stop Option Code									
Object Structure	VAR	Data Type	Int16	Range	Int16					
Mappable	NO	R/W	RW	Default	1					
Description	Set the servo operation mode:									
	Display	Control Mode								
	1	Stops using the ramp set in 6084h (HM: 609Ah). Maintains position lock state after stop is completed.								
	2	Stops using the ramp set in 6085h. Maintains position lock state after stop is completed.								
	3	Stops via quick stop torque. Maintains position lock state after stop is completed.								

6060h	-			PP	PV	PT	HM	CSP	CSV	CST
Index	6060h	-								
Name	Modes of Operation									
Object Structure	VAR	Data Type	Int8	Range	Int8					
Mappable	Y	R/W	RW	Default	8					

Description	Set the servo operation mode:	
	Setpoint	Description
	0	Reserved
	1	Profile Position mode (PP)
	3	Profile Velocity mode (PV)
	4	Profile Torque mode (PT)
	6	Homing mode (HM)
	8	Cyclic Synchronous Position mode (CSP)
	9	Cyclic Synchronous Velocity mode (CSV)
	10	Cyclic Synchronous Torque mode (CST)

6061h	-			PP	PV	PT	HM	CSP	CSV	CST
Index	6061h	-								
Name	Modes of Operation Display									
Object Structure	VAR	Data Type	Int8	Range	Int8					
Mappable	Y	R/W	RO	Default	0					
Description	Displays the servo operating mode. Same format and content as 6060h.									

6062h	-			PP	PV	PT	HM	CSP	CSV	CST
Index	6062h	-								
Name	Position Demand Value									
Object Structure	VAR	Data Type	Int32	Range	Int32					
Mappable	Y	R/W	RO	Default	0					
Description	Reflects the real-time position command (unit: user units).									

6063h	-			PP	PV	PT	HM	CSP	CSV	CST
Index	6063h	-								
Name	Position Actual Value									
Object Structure	VAR	Data Type	Int32	Range	Int32					
Mappable	Y	R/W	RO	Default	0					
Description	Reflects the real-time motor absolute position feedback (unit: encoder units).									

6064h	-	PP	PV	PT	HM	CSP	CSV	CST
Index	6064h	-						

Name	Position Actual Value				
Object Structure	VAR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RO	Default	0
Description	Reflects the real-time motor absolute position feedback (unit: user units). Position Actual Value (6064h) × Gear Ratio (6091h) = Position Actual Value (6063h)				

6065h	-					PP	HM	CSP
Index	6065h	-						
Name	Following Error Window							
Object Structure	VAR	Data Type	Uint32	Range	Uint32			
Mappable	Y	R/W	RW	Default	3840000			
Description	Sets the threshold for excessive position deviation (unit: user units). If the difference between the Position Demand Value (6062h) and Position Actual Value (6064h) exceeds ±6065h, an excessive position deviation error (ER.d00) occurs. When 6065h is set to 4294967295, the servo disables excessive position deviation monitoring.							

6067h	-				PP	HM	CSP
Index	6067h	-					
Name	Position Window						
Object Structure	VAR	Data Type	Uint32	Range	Uint32		
Mappable	Y	R/W	RW	Default	100		
Description	Sets the position reached threshold (unit: user units). When the difference between the Position Demand Value (6062h) and Position Actual Value (6064h) is within ±6067h for the duration set in 6068h, the position is considered reached. In Profile Position mode, bit 10 of the Status Word (6041h) is set to 1.						

6068h	-				PP	HM	CSP
Index	6068h	-					
Name	Position Window Time						
Object Structure	VAR	Data Type	Uint16	Range	Uint16		
Mappable	Y	R/W	RW	Default	2		
Description	Sets the valid time window for determining position reached (unit: 1ms). When the difference between the Position Demand Value (6062h) and Position Actual Value (6064h) is within ±6067h for the duration set in 6068h, the position is considered reached. In Profile Position mode, bit 10 of the Status Word (6041h) is set to 1.						

606Bh	-			PP	PV	PT	HM	CSP	CSV	CST
Index	606Bh	-								
Name	Velocity Demand Value									
Object Structure	VAR	Data Type	Int32	Range	Int32					
Mappable	Y	R/W	RO	Default	-					
Description	Reflects the user's actual velocity command (unit: 0.1rpm). In position modes, it reflects the velocity command corresponding to the output of the position controller. In velocity modes, it reflects the input command to the velocity controller.									

606Ch				PP	PV	PT	HM	CSP	CSV	CST
Index	606Ch	-								
Name	Velocity Actual Value									
Object Structure	VAR	Data Type	Int32	Range	-2^{31}~ $(2^{31}-1)$					
Mappable	Y	R/W	RO	Default	-					
Description	Reflects the user's actual velocity feedback value (unit: user units/s).									

606Dh	-				PV	CSV
Index	606Dh	-				
Name	Velocity Window					
Object Structure	VAR	Data Type	Uint16	Range	0~3000	
Mappable	Y	R/W	RW	Default	10	
Description	Sets the velocity reached threshold (unit: 1rpm). When the difference between the Target Velocity (60FFh) and the Velocity Actual Value (606Ch) remains within ±606Dh for the duration set in 606Eh, the velocity is considered reached. In Profile Velocity mode, bit 10 of the Status Word (6041h) is set to 1. Otherwise, bit 10 of Status Word (6041h) is set to 0.					

606Eh	-				PV	CSV
Index	606Eh	-				
Name	Velocity Window Time					
Object Structure	VAR	Data Type	Uint16	Range	Uint16	
Mappable	Y	R/W	RW	Default	2	
Description	Sets the valid time window for determining velocity reached (unit: 2ms). When the difference between the Target Velocity (60FFh) and the Velocity Actual Value (606Ch) remains within ±606Dh for the duration set in 606Eh, the velocity is considered reached. In Profile Velocity mode, bit 10 of the Status Word (6041h) is set to 1. Otherwise, bit 10 of Status Word (6061h) is set to 0.					

606Fh	-						PV	CSV
Index	606Fh	-						
Name	Velocity Threshold							
Object Structure	VAR	Data Type	Uint16	Range	0~2000			
Mappable	Y	R/W	RW	Default	10			
Description	Sets the threshold for determining zero user velocity (unit: 1 rpm). When the Velocity Actual Value (606Ch) remains within ±606Fh for the duration set in 6070h, the user velocity is considered zero and bit 12 of Status Word (6041h) is set to 1. If either condition is not met, the user velocity is considered non-zero and bit 12 is set to 0.							

6070h	-				PV	PT	CSV	CST
Index	6070h	-						
Name	Zero Velocity Threshold Time							
Object Structure	VAR	Data Type	Uint16	Range	Uint16			
Mappable	Y	R/W	RW	Default	2			
Description	Sets the time window for determining zero user velocity (unit: 2ms). When the Velocity Actual Value (606Ch) remains within ±606Fh for the duration set in 6070h, the user velocity is considered zero and bit 12 of Status Word (6041h) is set to 1. If either condition is not met, the user velocity is considered non-zero and bit 12 is set to 0.							

6071h	-				CST	PT
Index	6071h	-				
Name	Target Torque					
Object Structure	VAR	Data Type	Int16	Range	-5000~5000	
Mappable	Y	R/W	RW	Default	0	
Description	Sets the target command value for Profile Torque mode and Cyclic Synchronous Torque mode (unit: 0.1%).					

6072h	-		PP	PV	PT	HM	CSP	CSV	CST
Index	6072h								
Name	Maximum Torque Limit								
Object Structure	VAR	Data Type	Uint16	Range	-5000~5000				
Mappable	Y	R/W	RW	Default	3000				
Description	Sets the maximum output torque value of the servo (unit: 0.1%).								

6074h	-		PP	PV	PT	HM	CSP	CSV	CST
Index	6074h	-							
Name	Torque Demand Value								
Object Structure	VAR	Data Type	Uint16	Range		-5000~5000			
Mappable	Y	R/W	RO	Default		-			
Description	Displays the current torque command value (unit: 0.1%).								

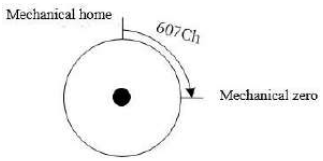
6075h	-		PP	PV	PT	HM	CSP	CSV	CST
Index	6075h	-							
Name	Motor Rated Current								
Object Structure	VAR	Data Type	Uint32	Range		Uint32			
Mappable	Y	R/W	RO	Default		2800			
Description	Rated current as shown on the motor nameplate (unit: mA, peak). All current-related parameter values are relative to this parameter.								

6076h	-		PP	PV	PT	HM	CSP	CSV	CST
Index	6076h	-							
Name	Motor Rated Torque								
Object Structure	VAR	Data Type	Uint32	Range		Uint32			
Mappable	Y	R/W	RO	Default		0			
Description	Rated torque as shown on the motor nameplate (unit: mNm). All torque-related parameter values are relative to this parameter.								

6077h	-		PP	PV	PT	HM	CSP	CSV	CST
Index	6077h	-							
Name	Motor Actual Torque								
Object Structure	VAR	Data Type	Int16	Range		Int16			
Mappable	Y	R/W	RO	Default		0			
Description	Reflects the instantaneous torque output of the servo motor (unit: 0.1%).								

607Ah	-							PP	CSP
Index	607Ah	-							
Name	Target Position								
Object Structure	VAR	Data Type	Int32	Range		Int32			
Mappable	Y	R/W	RW	Default		0			

Description	Sets the target position for the servo in Profile Position mode (unit: user units). When bit 6 of Control Word (6040h) is 0, 607Ah is the target absolute position of the current segment. When bit 6 of Control Word (6040h) is 1, 607Ah is the target incremental displacement of the current segment.

607Ch					HM
Index	607Ch	-			
Name	Home Offset				
Object Structure	VAR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RW	Default	0
Description	In position control modes, the physical offset of the mechanical zero point relative to the motor origin (unit: user units). Mechanical origin = Mechanical zero point + 607Ch (Home Offset). When set to 0, no offset is applied. 				

607Dh	-		PP	PV	PT	HM	CSP	CSV	CST
Index	607Dh	-							
Name	Software Position Limit								
Object Structure	VAR	Data Type	Int32	Range	-				
Mappable	Y	R/W	RW	Default	0				
Description	Sets the minimum and maximum software absolute position limits. Minimum absolute position limit = (607D-01h) Maximum absolute position limit = (607D-02h) Software absolute position limit settings: 1. When both (607D-01h) and (607D-02h) are set to default values, software limits are disabled. 2. If the minimum absolute position limit (607D-01h) is greater than the maximum absolute position limit (607D-02h), the values are automatically adjusted internally. 3. When the position command or feedback reaches the software limit, in position mode, the servo will move toward the limit position and stop upon reaching it, triggering an over-travel warning. A reverse command can move the motor out of the over-travel state. 4. Absolute position limits are relative to the Position Actual Value 6064h (user units).								

Sub-index	00h	-			
Name	Number of Entries				
Object Structure	VAR	Data Type	Uint8	Range	2

Mappable	Y	R/W	RO	Default	2

Sub-index	01h	-			
Name	Min Position Limit				
Object Structure	VAR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RW	Default	-2^{31}

Sub-index	02h	-			
Name	Max Position Limit				
Object Structure	VAR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RW	Default	$2^{31}-1$

607Eh	-			CSP	PP	CSV	PV	CST	PT
Index	607Eh	-							
Name	Polarity								
Object Structure	VAR	Data Type	Uint8	Range	Int8				
Mappable	Y	R/W	RW	Default	0				
Description	Sets the polarity of position, velocity, and torque commands. MSB LSB 7 6 5 4 0 Pos Cmd Pol Vel Cmd Pol Trq Cmd Pol NA Bit7 = 1: Standard position mode. Position command × (-1), motor direction reverses. In Profile Position and Cyclic Synchronous Position modes, inverts the position command and target position. Bit6 = 1: Velocity mode. Velocity command (60FFh) × (-1), motor direction reverses. Bit5 = 1: Torque mode. Torque command × (-1).								

607Fh	-			PP	PV	PT	HM	CSP	CSV	CST
Index	607Fh	-								
Name	Max Profile Velocity									
Object Structure	VAR	Data Type	Uint32	Range	Uint32					
Mappable	Y	R/W	RW	Default	13107200					

Description	Sets the user's maximum operating speed (unit: user units/s). Takes effect when the slave velocity command changes. $$\text{Max Profile Velocity (rpm)} = \frac{607\text{Fh} \times \frac{6091\text{h}-01}{6091\text{h}-02}}{\text{Encoder Resolution}} \times 60$$ Note: In all modes, the maximum operating speed is limited by both 607Fh and function code Pn318, with the lower value applied.

6080h	-		PP	PV	PT	HM	CSP	CSV	CST
Index	6080h	-							
Name	Max Motor Speed								
Object Structure	VAR	Data Type	Uint32	Range		Uint32			
Mappable	Y	R/W	RO	Default		167772160			
Description	Maximum allowable operating speed of the motor, obtainable from the servo motor manual (unit: rpm).								

6081h	-				PP
Index	6081h	-			
Name	Profile Velocity				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	Y	R/W	RW	Default	167772160
Description	In Profile Position mode, the constant speed reached after the acceleration phase (unit: command units/s). $$\text{Motor Speed (rpm)} = \frac{6081\text{h} \times \frac{6091\text{h}-01}{6091\text{h}-02}}{\text{Encoder Resolution}} \times 60$$				

6083h	-			PP	PV
Index	6083h	-			
Name	Profile Acceleration				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	Y	R/W	RW	Default	16777216
Description	Sets the acceleration for Profile Position and Profile Velocity modes (unit: command units/s²). In Position Profile mode: Changes take effect before the segment command is triggered. After triggering, changes apply after the current segment completes. In Velocity Profile mode: Changes take effect immediately. If set to 0, the software internally forces it to 1.				

6084h	-						PP	PV
Index	6084h	-						

Name	Profile Deceleration				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	Y	R/W	RW	Default	16777216
Description	Sets the deceleration for Profile Position and Profile Velocity modes (unit: command units/s²). In Position Profile mode: Changes take effect before the segment command is triggered. After triggering, changes apply after the current segment completes. In Velocity Profile mode: Changes take effect immediately. If set to 0, the software internally forces it to 1.				

6086h					
Index	6086h	-			
Name	Motion Profile Type				
Object Structure	VAR	Data Type	Int16	Range	Int16
Mappable	Y	R/W	RW	Default	-
Description	Defines the curve type for the motor's position or velocity command. 0: linear				

6087h	-				PT	CST
Index	6087h	-				
Name	Torque Slope					
Object Structure	VAR	Data Type	Uint32	Range	0~65535	
Mappable	Y	R/W	RW	Default	1000	
Description	Sets the rate of change (acceleration) of the torque command in Profile Torque mode, expressed as the incremental change per second (0.1%/s). If the parameter is set to 0, it is automatically forced to a value of 1.					

6091h	-			PP	PV	PT	HM	CSP	CSV	CST
Index	6091h	-								
Name	Gear Ratio									
Object Structure	ARR	Data Type	Uint32	Range	Uint32					
Mappable	Y	R/W	RW	Default	-					
Description	The position factor establishes a proportional relationship between user-defined load displacement and motor displacement. Motor Displacement (motor units) = Load Displacement (user units) × Position Factor The setting of the position factor is related to the mechanical reduction ratio, mechanical dimension parameters, and motor resolution. Calculation method is as follows: $\text{Position Factor} = \frac{\text{Motor Resolution} \times \text{Gear Ratio}}{\text{Load Feed}}$									

Sub-index	00h	-			
Name	Number of Entries				
Object Structure	VAR	Data Type	Uint8	Range	2
Mappable	Y	R/W	RO	Default	2

Sub-index	01h	-			
Name	Motor Revolutions				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	Y	R/W	RW	Default	1

Sub-index	02h	-			
Name	Shaft Revolutions				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	Y	R/W	RW	Default	1

6098h	-				HM
Index	6098h	-			
Name	Homing Method				
Object Structure	VAR	Data Type	Int8	Range	0~35
Mappable	Y	R/W	RW	Default	0
Description	Selects the method for homing:				
	Value	Description			
	1	Return on negative limit switch and Z pulse signal			
	2	Return on positive limit switch and Z pulse signal			
	3.4	Return on positive home switch and Z pulse signal			
	5.6	Return on negative home switch and Z pulse signal			
	7~14	Return on home switch and Z pulse signal			
	15~16	Reserved			
	17~30	Return without referencing the Z pulse signal			
	31~32	Reserved			
	33~34	Return without referencing the Z pulse signal			
	35	Reset with current position			

Caution	
⚠	● Setting values other than those specified above will trigger an ER.E03 error.

6099h	-				HM
Index	6099h	-			
Name	Homing Speeds				
Object Structure	ARR	Data Type	Uint8	Range	Uint32
Mappable	Y	R/W	RW	Default	-
Description	In Homing mode, includes the setting of two speed values: 6099:01h: Speed during search for the deceleration point signal (unit: command units/s) 6099:02h: Speed during search for the home signal (unit: command units/s)				

Sub-index	00h	-			
Name	Number of Entries				
Object Structure	VAR	Data Type	Uint8	Range	2
Mappable	Y	R/W	RO	Default	2

Sub-index	01h	-			
Name	Speed During Search for Switch				
Object Structure	VAR	Data Type	Uint32	Range	$0\sim2^{32}-1$
Mappable	Y	R/W	RW	Default	27962027
Description	This sub-index sets the speed for searching for the deceleration point signal. This speed can be set to a higher value to prevent homing timeout faults due to excessive homing duration.				

Sub-index	02h	-			
Name	Speed During Search for Zero				
Object Structure	VAR	Data Type	Uint32	Range	1~500
Mappable	Y	R/W	RW	Default	5592405

Caution	
⚠	● During homing, the slave will decelerate after finding the deceleration point. ● During deceleration, the slave ignores changes in the home signal. To avoid encountering the home signal during deceleration, the switch position of the deceleration point signal should be set appropriately (e.g., allowing sufficient deceleration distance or increasing homing acceleration).

609Ah	-				HM
Index	609Ah	-			
Name	Homing Acceleration				
Object Structure	ARR	Data Type	Uint32	Range	Uint32
Mappable	Y	R/W	RW	Default	100
Description	Sets the acceleration and deceleration for Homing mode. The object dictionary unit is defined as the position command increment per second. If the parameter is set to 0, it is forced to 1.				

60B0h	-				CSP
Index	60B0h	-			
Name	Position Offset				
Object Structure	VAR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RW	Default	0
Description	Sets the position command offset for Cyclic Synchronous Position mode (unit: command units). Target Position = 607Ah + 60B0h				

60B1h	-			CSP	CSV
Index	60B1h	-			
Name	Velocity Offset				
Object Structure	VAR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RW	Default	0
Description	Sets the velocity command offset for Cyclic Synchronous Velocity mode (unit: command units). Target Velocity = 60FFh + 60B1h				

60B2h	-			CSP	CSV	CST
Index	60B2h	-				
Name	Torque Offset					
Object Structure	VAR	Data Type	Int32	Range	Int32	
Mappable	Y	R/W	RW	Default	0	
Description	Sets the torque command offset for Cyclic Synchronous Torque mode (unit: 0.1%). Target Torque = 6071h + 60B2h					

60B8h		
Index	60B8h	-

Name	Touch Probe Function				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	Y	R/W	RW	Default	0

Description

The touch probe function, or position latching function,
latches the position information when an external DI signal or the motor's Z signal changes. This servo supports two touch probe functions, allowing four position values to be latched. Probe 1 can use X3 as the probe signal,
and Probe 2 can use X4 as the probe signal.
Functions of Probe 1 and Probe 2:

Bit	Description	Range
0	Probe 1 enable	0 - Disabled 1 - Enabled
1	Probe 1 trigger mode	0 - Single trigger 1 - Continuous trigger
2	Probe 1 trigger signal	0 - DI3 input signal 1 - Z signal
3	NA	-
4	Probe 1 rising edge enable	0 - Rising edge not latched 1 - Rising edge latched
5	Probe 1 falling edge enable	0 - Falling edge not latched 1 - Falling edge latched
6-7	NA	-
8	Probe 2 enable	0 - Disabled 1 - Enabled
9	Probe 2 trigger mode	0 - Single trigger 1 - Continuous trigger
10	Probe 2 trigger signal	0 - DI4 input signal 1 - Z signal
11	NA	-
12	Probe 2 rising edge enable	0 - Rising edge not latched 1 - Rising edge latched
13	Probe 2 falling edge enable	0 - Falling edge not latched 1 - Falling edge latched
14-15	NA	-

60B9h	-				
Index	60B9h	-			
Name	Touch Probe Status				
Object Structure	VAR	Data Type	Uint16	Range	Uint16
Mappable	Y	R/W	RO	Default	0
Description	Reads the status of Probe 1 and Probe 2.				
	Bit	Description			
	0	0 - Probe 1 disabled 1 - Probe 1 enabled			
	1	0 - Probe 1 rising edge latching not executed 1 - Probe 1 rising edge latching executed			
	2	0 - Probe 1 falling edge latching not executed 1 - Probe 1 falling edge latching executed			
	3~6	Probe 1 execution count			
	7	0 - DI4 low level 1 - DI4 high level			
	8	0 - Probe 2 disabled 1 - Probe 2 enabled			
	9	0 - Probe 2 rising edge latching not executed 1 - Probe 2 rising edge latching executed			
	10	0 - Probe 2 falling edge latching not executed 1 - Probe 2 falling edge latching executed			
	11~14	Probe 2 execution count			
	15	0 - DI5 low level 1 - DI5 high level			

60BAh	-				
Index	60BAh	-			
Name	Touch Probe Pos1 Pos Value				
Object Structure	VAR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RO	Default	0
Description	Displays the position feedback (command units) at the moment of the Probe 1 signal's rising edge.				

60BBh	-				
Index	60BBh	-			
Name	Touch Probe Pos1 Neg Value				
Object Structure	VAR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RO	Default	0
Description	Displays the position feedback (command units) at the moment of the Probe 1 signal's falling edge.				

60BCh	-				
Index	60BCh	-			
Name	Touch Probe Pos2 Pos Value				
Object Structure	VAR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RO	Default	0
Description	Displays the position feedback (command units) at the moment of the Probe 2 signal's rising edge.				

60BDh	-				
Index	60BDh	-			
Name	Touch Probe Pos2 Neg Value				
Object Structure	VAR	Data Type	Int32	Range	Int32
Mappable	Y	R/W	RO	Default	0
Description	Displays the position feedback (command units) at the moment of the Probe 2 signal's falling edge.				

60E0h	-	PP	PV	PT	HM	CSP	CSV	CST
Index	60E0h	-						
Name	Positive Torque Limit							
Object Structure	VAR	Data Type	Uint16	Range	Uint16			
Mappable	Y	R/W	RW	Default	3000			
Description	Limits the maximum positive torque (unit: 0.1%).							

60E1h	-	PP	PV	PT	HM	CSP	CSV	CST
Index	60E1h	-						
Name	Negative Torque Limit							

Object Structure	VAR	Data Type	Uint16	Range	Uint16
Mappable	Y	R/W	RW	Default	3000
Description	Limits the maximum negative torque (unit: 0.1%).				

60F4h	-			PP	HM	CSP
Index	60F4h	-				
Name	Following Error Actual Value					
Object Structure	VAR	Data Type	Int32	Range	Int32	
Mappable	Y	R/W	RO	Default	0	
Description	Real-time position deviation (unit: command units).					

60FCh	-			PP	HM	CSP
Index	60FCh	-				
Name	Position Demand Value*					
Object Structure	VAR	Data Type	Int32	Range	Int32	
Mappable	Y	R/W	RO	Default	0	
Description	Real-time motor position command (unit: increments, before electronic gear ratio). Position Demand Value (6062h) × Gear Ratio (6091h) = Position Demand Value (60FCh).					

60FDh	-		HM	CSP	PP	CSV	PV	CST	PT
Index	60FDh	-							
Name	Digital Input								
Object Structure	VAR	Data Type	Uint32	Range	Uint32				
Mappable	Y	R/W	RO	Default	0				
Description	Reflects the current logic state of the driver's DI terminals. 0: Inactive, 1: Active. The bits represent the following DI signals:								

MSB					LSB
31~16	15~4	3	2	1	0
Vendor-defined	Reserved	Undefined	Origin signal	Positive overtravel switch	Negative overtravel switch

60FEh	-		PP	PV	PT	HM	CSP	CSV	CST
Index	60FEh	-							
Name	Digital Output								

Object Structure	ARR	Data Type	Uint32	Range	Uint32
Mappable	Y	R/W	RO	Default	0

Sub-index	00h	-			
Name	Number of Entries				
Object Structure	VAR	Data Type	Uint8	Range	1
Mappable	N	R/W	RO	Default	1

Sub-index	01h	-			
Name	Physical Outputs				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	Y	R/W	RO	Default	0
Description	Reflects the current logic state of the driver's DO terminals. 0: Inactive, 1: Active. The bits represent the following DO signals:				

MSB		LSB
31~16	15~1	0
Vendor-defined	Reserved	Brake output

Sub-index	02h	-			
Name	Physical Outputs				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	Y	R/W	RW	Default	0
Description	Forces the output logic of DO terminals. 0: Inactive, 1: Active. The bits represent the following DO signals:				

MSB			LSB
31~18	17	16	15~0
NA	Force 2	Force 1	NA

60FFh	-				PV	CSV
Index	60FFh	-				
Name	Target Velocity					
Object Structure	VAR	Data Type	Int32	Range	Int32	
Mappable	Y	R/W	RW	Default	0	
Description	User velocity command (unit: user units/s).					

6502h	-				
Index	6502h	-			
Name	Supported Drive Modes				
Object Structure	VAR	Data Type	Uint32	Range	Uint32
Mappable	N	R/W	RO	Default	3EDh
Description	Drive modes supported by the driver. 0: Not Supported, 1: Supported.				
	Bit	Description			Value
	0	Profile Position mode			1
	1	NA			0
	2	Profile Velocity mode			1
	3	Profile Torque mode			1
	4	NA			0
	5	Homing mode			1
	6	Interpolated Position mode			0
	7	Cyclic Synchronous Position mode (CSP)			1
	8	Cyclic Synchronous Velocity mode(CSV)			1
	9	Cyclic Synchronous Torque mode (CST)			1
	10~31	Vendor-defined			Reserved

5.2 Error Code Information

Display	Name	Error Code	Auxiliary Code
Er.020	User parameter checksum error	0x6000	0x00000020
Er.021	Parameter formatting error	0x6001	0x00000021
Er.022	Manufacturer parameter checksum error	0x6002	0x00000022
Er.023	MCU-FPGA communication error	0x6003	0x00000023
Er.030	FPGA using backup program	0x6004	0x00000030
Er.040	Parameter setting error	0x6005	0x00000040
Er.042	Parameter combination error	0x6007	0x00000042
Er.050	Drive-motor voltage mismatch or power difference >4x	0x6009	0x00000050
Er.0B0	Servo ON command invalid	0x600C	0x000000B0
Er.100	Drive overcurrent (software)	0x600D	0x00000100
Er.101	Drive overcurrent (hardware)	0x600E	0x00000101
Er.320	Regenerative overload	0x6010	0x00000320
Er.400	Overvoltage	0x6012	0x00000400

Display	Name	Error Code	Auxiliary Code
Er.410	Undervoltage	0x6013	0x00000410
Er.42A	KTY temperature sensor overheat	0x6014	0x0000042A
Er.450	DI terminal X function assignment conflict	0x6015	0x00000450
Er.451	DO terminal Y function assignment conflict	0x6016	0x00000451
Er.452	Torque mode AI assignment error	0x6017	0x00000452
Er.520	Vibration error	0x6018	0x00000520
Er.521	Vibration during auto-tuning	0x6019	0x00000521
Er.710	Drive instantaneous overload	0x601A	0x00000710
Er.711	Motor instantaneous overload	0x601B	0x00000711
Er.720	Drive continuous overload	0x601C	0x00000720
Er.721	Motor continuous overload	0x601D	0x00000721
Er.730	DB overload	0x601E	0x00000730
Er.7A0	Drive overtemperature	0x6020	0x000007A0
Er.810	Absolute encoder multi-turn data error	0x6023	0x00000810
Er.820	Absolute encoder data checksum error	0x6024	0x00000820
Er.830	Absolute encoder battery error	0x6025	0x00000830
Er.840	Encoder rotation direction error at upper limit	0x6026	0x00000830
Er.860	Absolute encoder overtemperature	0x6028	0x00000860
Er.890	Motor encoder not present	0x6029	0x00000890
Er.8A1	Homing timeout	0x602C	0x000008A1
Er.B31	U-phase detection circuit error	0x6034	0x00000B31
Er.B32	V-phase detection circuit error	0x6035	0x00000B32
Er.B33	STO input protection	0x6036	0x00000B33
Er.BF0	System operation error	0x6039	0x00000BF0
Er.BF2	MCU data write to FPGA error	0x603B	0x00000BF2
Er.BF3	Pulse command source error	0x603C	0x00000BF3
Er.C10	Runaway detection	0x603E	0x00000C10
Er.C21	Absolute encoder multi-turn overflow	0x6040	0x00000C21
Er.C80	Incremental encoder division setting error	0x6047	0x00000C80
Er.C90	Encoder disconnection	0x6048	0x00000C90
Er.C91	Encoder acceleration anomaly	0x6049	0x00000C91
Er.C92	Incremental encoder Z-signal loss	0x604A	0x00000C92
Er.C95	Encoder UVW signal error	0x604B	0x00000C95
Er.D00	Excessive position deviation	0x6050	0x00000D00

Display	Name	Error Code	Auxiliary Code
Er.D01	Excessive position deviation at Servo ON	0x6051	0x00000D01
Er.D02	Excessive position deviation due to speed limit at Servo ON	0x6052	0x00000D02
Er.D03	Hybrid deviation error (motor feedback vs. scale)	0x6053	0x00000D03
Er.D04	Electronic gear ratio setting out of range	0x6054	0x00000D04
Er.E00	EtherCAT ESC chip error	0x6055	0x00000E00
Er.E01	EtherCAT Eeprom load error	0x6056	0x00000E01
Er.E02	EtherCAT SM0/SM1 mailbox data length error	0x6057	0x00000E02
Er.E03	Homing mode error	0x6058	0x00000E03
Er.E05	Unsupported operation mode	0x605A	0x00000E05
Er.E20	CAN master life factor timeout	0x6064	0x00000E20
Er.E21	CAN master consumer heartbeat timeout	0x6065	0x00000E21

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