

SV660N Series Servo Drive Communication Guide



Data code 19011435 A01

Preface

Overview

The SV660N series high-performance AC servo drive covers a power range from 50 W to 7.5 kW. It supports EtherCAT communication protocol and carries Ethernet communication interfaces to work with the host controller for a networked operation of multiple servo drives.

The SV660N series servo drive supports stiffness level setting, inertia auto-tuning and vibration suppression to simplify the operation process. It allows a quiet and stable operation together with an MS1 series high-response servo motor with low or medium inertia and a 23-bit single-turn or multi-turn absolute encoder.

The SV660N series servo drive aims to implement fast and accurate control in automation equipment such as semi-conductor manufacturing equipment, chip mounters, PCB punching machines, handling machineries, food processing machineries, machine tools, and transmission machineries.

This guide presents commissioning process, parameters, and solutions to faults and warnings, including the keypad, and software tool, and commissioning procedure.

More Documents

Name	Data Code
SV660N Series Servo Drive Selection Guide	19011431
SV660N Series Servo Drive Hardware Guide	19011432
SV660N Series Servo Drive Commissioning Guide	19011433
SV660N Series Servo Drive Function Guide	19011434

Revision History

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Document Acquisition

This guide is not delivered along with the product. To download the PDF version, visit http://en.inovance.cn/support/download.html.

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Fundamental Safety Instructions

Safety Precautions

- This chapter presents essential safety instructions for a proper use of the equipment. Before operating the equipment, read through the guide and comprehend all the safety instructions. Failure to comply with the safety instructions may result in death, severe personal injuries, or equipment damage.
- 2. "CAUTION", "WARNING", and "DANGER" items in the guide only indicate some of the precautions that need to be followed; they just supplement the safety precautions.
- 3. Use this equipment according to the designated environment requirements. Damage caused by improper use is not covered by warranty.
- 4. Inovance shall take no responsibility for any personal injuries or property damage caused by improper use.

Safety Levels and Definitions



Indicates that failure to comply with the notice will result in death or severe personal injuries.

Indicates that failure to comply with the notice may result in death or severe personal injuries.

Indicates that failure to comply with the notice may result in minor or moderate personal injuries or equipment damage.

General Safety Instructions

- Drawings in the guide are sometimes shown without covers or protective guards. Remember to install the covers or protective guards as specified first, and then perform operations in accordance with the instructions.
- The drawings in the guide are shown for illustration only and may be different from the product you purchased.



• Do not install the equipment if you find the packing list does not conform to the equipment you received.

🔨 CAUTION

- Check whether the packing is intact and whether there is damage, water seepage, dampness, and deformation before unpacking.
- Unpack the package by following the unpacking sequence. Do not strike the package violently.
- Check whether there is damage, rust, or injuries on the surface of the equipment and equipment accessories before unpacking.
- Check whether the package contents are consistent with the packing list before unpacking.

Storage and Transportation

🕂 WARNING

- Large-scale or heavy equipment must be transported by qualified professionals using specialized hoisting equipment. Failure to comply may result in personal injuries or equipment damage.
- Before hoisting the equipment, ensure the equipment components such as the front cover and terminal blocks are secured firmly with screws. Loosely-connected components may fall off and result in personal injuries or equipment damage.
- Never stand or stay below the equipment when the equipment is being hoisted by the hoisting equipment.
- When hoisting the equipment with a steel rope, ensure the equipment is hoisted at a constant speed without suffering from vibration or shock. Do not turn the equipment over or let the equipment stay hanging in the air. Failure to comply may result in personal injuries or equipment damage.

<u> C</u>AUTION

DANGER

- Handle the equipment with care during transportation and mind your steps to prevent personal injuries or equipment damage.
- When carrying the equipment with bare hands, hold the equipment casing firmly with care to prevent parts from falling. Failure to comply may result in personal injuries.
- Store and transport the equipment based on the storage and transportation requirements. Failure to comply will result in equipment damage.
- Avoid storing or transporting the equipment in environments with water splash, rain, direct sunlight, strong electric field, strong magnetic field, and strong vibration.
- Avoid storing the equipment for more than three months. Long-term storage requires stricter protection and necessary inspections.
- Pack the equipment strictly before transportation. Use a sealed box for long-distance transportation.
- Never transport the equipment with other equipment or materials that may harm or have negative impacts on this equipment.

Installation

• The equipment must be operated only by professionals with electrical knowledge.



- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals.
- Before wiring, cut off all the power supplies of the equipment, and wait for at least the time designated on the equipment warning label before further operations because residual voltage still exists after power-off. After waiting for the designated time, measure the DC voltage in the main circuit to ensure the DC voltage is within the safe voltage range. Failure to comply will result in an electric shock.
- Do not perform wiring, remove the equipment cover, or touch the circuit board with power ON. Failure to comply will result in an electric shock.
- Check that the equipment is grounded properly. Failure to comply will result in an electric shock.

🕂 WARNING

- Do not connect the input power supply to the output end of the equipment. Failure to comply will result in equipment damage or even a fire.
- When connecting a drive to the motor, check that the phase sequences of the drive and motor terminals are consistent to prevent reverse motor rotation.
- Cables used for wiring must meet cross sectional area and shielding requirements. The shield of the cable must be reliably grounded at one end.
- Fix the terminal screws with the tightening torque specified in the user guide. Improper tightening torque may overheat or damage the connecting part, resulting in a fire.
- After wiring is done, check that all cables are connected properly and no screws, washers or exposed cables are left inside the equipment. Failure to comply may result in an electric shock or equipment damage.



- During wiring, follow the proper electrostatic discharge (ESD) procedure, and wear an antistatic wrist strap. Failure to comply will damage the equipment or the internal circuits of the equipment.
- Use shielded twisted pairs for the control circuit. Connect the shield to the grounding terminal of the equipment for grounding purpose. Failure to comply will result in equipment malfunction.

Power-on



- Before power-on, check that the equipment is installed properly with reliable wiring and the motor can be restarted.
- Check that the power supply meets equipment requirements before power-on to prevent equipment damage or a fire.
- After power-on, do not open the cabinet door or protective cover of the equipment, touch any terminal, or disassemble any unit or component of the equipment. Failure to comply will result in an electric shock.



- Perform a trial run after wiring and parameter setting to ensure the equipment operates safely. Failure to comply may result in personal injuries or equipment damage.
- Before power-on, check that the rated voltage of the equipment is consistent with that of the power supply. Failure to comply may result in a fire.
- Before power-on, check that no one is near the equipment, motor, or machine. Failure to comply may result in death or personal injuries.

Operation



• Before inspection and repair, cut off all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.

WARNING When the fuse is blown or the circuit breaker or earth leakage current breaker (ELCB) trips, wait for at least the time designated on the equipment warning label before power-on or further operations. Failure to comply may result in death, personal injuries or equipment damage. When the equipment is faulty or damaged, the troubleshooting and repair work must be performed by professionals that follow the repair instructions, with repair records kept properly. Replace quick-wear parts of the equipment according to the replacement instructions. Do not use damaged equipment. Failure to comply may result in death, personal injuries, or severe equipment damage. After the equipment is replaced, check the wiring and set parameters again.

Disposal



- Dispose of retired equipment in accordance with local regulations and standards. Failure to comply may result in property damage, personal injuries, or even death.
- Recycle retired equipment by observing industry waste disposal standards to avoid environmental pollution.

Safety Labels

For safe equipment operation and maintenance, comply with the safety labels on the equipment. Do not damage or remove the safety labels. See the following table for descriptions of the safety labels.

Safety Label	Description
▲ 団 ▲ ⑦ 10min	 Read through the safety instructions before operating the equipment. Failure to comply may result in death, personal injuries, or equipment damage. Do not touch the terminals or remove the cover with power ON or within 10 min after power-off. Failure to comply will result in an electric shock.

1 Product Information

1.1 Nameplate and Model Number of the Servo Drive



Figure 1-1 Nameplate and model number of the servo drive



Example: The serial number 010502024H700001 indicates the servo drive is manufatured in July 2017.

Figure 1-2 Encryption of the production serial number

1.2 Technical Data of EtherCAT Communication

Item		Specifications	
	Communication protocol	EtherCAT protocol	
	Available services	CoE (PDO, SDO)	
	Synchronization mode	DC - Distributed clock	
	Physical layer	100BASE-TX	
	Baud rate	100 Mbit/s (100Base-TX)	
	Duplex mode	Full duplex	
	Topology	Ring and linear	
Basic	Transmission medium	Shielded cables of Cat 5e or higher	
performance	Transmission distance	Less than 100 m between two nodes (with proper environment and cables)	
of EtherCAT	Number of slaves	Up to 65535 by protocol, not exceeding 100 in actual use	
slave	EtherCAT frame length	44 bytes to 1498 bytes	
	Process data	A maximum of 1486 bytes per Ethernet frame	
	Synchronous jitter of two slaves	< 1 us	
	Update time	About 30 μs for 1000 DI/DOs About 100 μs for 100 servo axes Define different update time for different interfaces.	
	Communication code error rate	10 ⁻¹⁰ Ethernet standard	
	Number of FMMU units	8	
	Number of storage		
EtherCAT	synchronization	8	
configuration	management units		
unit	Process data RAM	8 kB	
	Distributed clock	64 bits	
	EEPROM capacity	32 kbit	

2 EtherCAT Communication

2.1 Wiring

2.1.1 Description of EtherCAT Communication Terminals (CN3 & CN4)



Table 2–1 EtherCAT communication terminal pins

Pin No.	Name	Description
1	TD+	Transmit data (+)
2	TD-	Transmit data (-)
3	RD+	Receive data (+)
4 and 5	-	-
6	RD-	Receive data (-)
7 and 8	-	-
9	TD+	Transmit data (+)
10	TD-	Transmit data (-)
11	RD+	Receive data (+)
12 and 13	-	-
14	RD-	Receive data (-)
15 and 16	-	-

2.1.2 Connection of EtherCAT Communication Signals (CN3 and CN4)





Figure 2-1 Network topology





CN3 and CN4 are EtherCAT connectors. Connect CN3 (IN) to the communication port of the master and CN4 (OUT) to the next slave. For assignment of CN3/CN4 terminal pins, see "2.1.1 Description of EtherCAT Communication Terminals (CN3 & CN4)" on page 13.

Communication cable selection

Cable Length	Price	Supplier
0.2 m to 10 m	See "Table 2–3 Information for ordering the communication cable" on page 16.	
More than 10 m	The cable price is added by RMB 5 for every additional 1 m based on the price of S6-L-T04- 10.0. The cable price is also related to the magnitude of the order.	Inovance, Haituo and others

Table 2–2 Instructions for communication cable selectio	n
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Note

Cable selection is subject to the instructions provided by the cable supplier. See "Instructions for purchasing servo encoder cables/power cables" in Inovance business system.

Material Code	Cable Model	Length (m)
15040261	S6-L-T04-0.3	0.3
15040262	S6-L-T04-3.0	3.0
15041960	S6-L-T04-0.2	0.2
15041961	S6-L-T04-0.5	0.5
15041962	S6-L-T04-1.0	1.0
15041963	S6-L-T04-2.0	2.0
15041964	S6-L-T04-5.0	5.0
15041965	S6-L-T04-10.0	10.0

Table 2–3 Information for ordering the communication cable

Cables are ordered from suppliers including Haituo (the cable price is added by RMB 5 for every additional 1 m based on the price of S6-L-T04-10.0. The cable price is also related to the magnitude of the order).

Note

The head of the dual-port network terminal cannot be too thick, otherwise, interference may occur. The recommended thickness is 2.4 mm, as shown below.



Table 2–4 Specifications

Item	Description
UL	Compliant with UL certification
Cat 5e cable	Cat 5e cable
Double shielded	Braided shield (coverage: 85%), aluminum foil shield (coverage: 100%)
Environmental worthiness	Ambient temperature: -30°C to +60°C, resistant to industrial oil, corrosive acid and alkali
EMC test standard	GB/T 24808-2009

Basic features

Interfaces

EtherCAT cables are connected to the network ports (IN and OUT) equipped with metal shield. The electrical characteristics comply with standards IEEE 802.3 and ISO 8877.



Pin	Assignment	Description
1	TX+	Transmit data (+)
2	TX-	Transmit data (-)
3	RX+	Receive data (+)
4	NULL	Not connected
5	NULL	Not connected
6	RX-	Receive data (-)
7	NULL	Not connected
8	NULL	Not connected

Topology

The communication topology of EtherCAT is flexible without any limit, as shown in the following figures. The SV660N series servo drive carries IN and OUT ports.

Linear topology



• Redundancy ring topology



Note

When using the redundant ring, set H0E-36 (EtherCAT AL enhanced link) to 1 (Enable), then power on the servo drive again.

• Communication cable

The EtherCAT communication cable must be Ethernet Category 5 (100BASE-TX) network cable or high-strength shielded network cable. The network cables used for the servo drive must also be shielded, with cable length not exceeding 100 m. The shielded network cable enhances the anti-interference capacity of the system.

• EMC standard

The servo drive complies with the following standards: IEC 61800-3:2004/A1:2011 (Adjustable speed electrical power drive systems—part 3:EMC requirements and specific test methods) and GB/T12668.3.

• Introduction to CiA402 control



Figure 2-3 CiA402 state machine switchover

To make the servo drive run in the designated state, observe the process stipulated in the standard 402 protocol when operating the SV660N servo drive.

Status	Description
Initialization	Initialization of the servo drive and internal self-check are done. Parameters cannot be set. Drive functions cannot be executed.
No fault	No fault exists in the servo drive or the fault has been cleared. Parameters can be set.
Servo ready	The servo drive is ready to run. Parameters can be set.
Waiting for the S-ON signal	The servo drive is waiting for the S-ON signal. Parameters can be set.
Servo running	The servo drive is running properly and a certain operation mode is enabled. The motor is energized and starts rotating when the speed reference is not 0. Only parameters whose "Effective time" is "During running" can be set.

See the following table for descriptions of different status.

Status	Description
Quick stop	The quick stop function is activated and the servo drive is in the process of quick stop. Only parameters whose "Effective time" is "During running" can be set.
Stop at fault	A fault occurs and the servo drive is in the process of stop. Only parameters whose "Effective time" is "During running" can be set.
Fault	The process of stop-at-fault is done and all the drive functions are inhibited. Parameters can be edited for the convenience of troubleshooting.

2.2 Communication Configuration

2.2.1 Overview of EtherCAT Protocol

EtherCAT is an industrial Ethernet-based fieldbus system that features high performance, low cost, easy use and flexible topology. It is applicable to applications requiring ultra-high speed I/O network. EtherCAT adopts standard Ethernet physical layer with twisted pairs or optical fibers (100Base-TX or 100Base-FX) used as the transmission media.



An EtherCAT system includes the master and the slave. The master requires a common network adapter, and the slave requires a special slave control chip, such as ET1100, ET1200, and FPGA.

EtherCAT can process data at the I/O layer without sub-bus or gateway delay.

- One system covers all devices, including I/O devices, sensors, actuators, drives, and displays.
- Transmission rate: 2 x 100 Mbit/s (high-speed Ethernet, full duplex mode).
- Synchronization: synchronization jitter < 1 μs (number of nodes up to 300, cable length within 120 m)
- Update time:

256 DI/DOs: 11 μs

1000 DI/DOs distributed in 100 nodes: 30 μ s = 0.03 ms

200 AI/AOs (16-bit): 50 µs, sampling rate: 20 kHz

100 servo axes (8 bytes IN + 8 bytes OUT for each): 100 μ s = 0.1 ms

12000 DI/DOs: 350 µs

To support more types of devices and applications, EtherCAT establishes the following application protocols:

- CANopen over EtherCAT (CoE)
- Safety over EtherCAT (SoE, compliant with IEC 61800-7-204)
- Ethernet over EtherCAT (EoE)
- File over EtherCAT (FoE)

The slave only needs to support the most suitable application protocol.



Note

 $\mathsf{EtherCAT}^*$ is registered trademark and patented technology, licensed by $\mathsf{Beckhoff}$ Automation GmbH, Germany.

2.2.2 System Parameter Setting

Parameter address structure

Parameter access address: index+subindex, both of which are in hexadecimal.

CiA402 establishes the following restrictions on the parameter address:

Index (Hex)	Description
0000-0FFF	Data type
1000-1FFF	CoE communication object
2000-5FFF	Manufacturer-specific object
6000-9FFF	Profile object
A000-FFFF	Reserved

System parameter setting

Set related parameters to allow the SV660N servo drive to be connected to the EtherCAT fieldbus network.

Index	Sub- index	Name	Value Range	Default
2002	01h	Control mode	0: Speed control mode 1: Position control mode 2: Torque control mode 9: EtherCAT mode	9
200E	02h	Save objects written through communication to EEPROM	0: Neither parameters nor object dictionaries written through communication saved to EEPROM 1: Only parameters written through communication saved to EEPROM 2: Only object dictionaries written through communication saved to EEPROM 3: Both parameters and object dictionaries written through communication saved to EEPROM	3
200E	16	EtherCAT slave alias	0 to 65535	0

Note

Before saving parameters to EEPROM, set 200E-02h to a proper value. Otherwise, parameters will be restored to default values at next power-on.

Item		Specifications
Communication protocol		IEC 61158 Type 12, IEC 61800-7 CiA 402 drive profile
	SDO	SDO request, SDO response
	PDO	Variable PDO mapping
		Profile position mode (PP)
		Profile velocity mode (PV)
Application		Profile torque mode (PT)
layer	CiA402	Homing mode (HM)
		Cyclic synchronous position mode (CSP)
		Cyclic synchronous velocity mode (CSV)
		Cyclic synchronous torque mode (CST)
Dhusiaal	Transmission protocol	100BASE-TX (IEEE802.3)
layer	Maximum distance	100 m
	Interface	RJ45 x 2 (INT, OUT)

2.2.3 Specifications of EtherCAT Communication

2.2.4 Structure of EtherCAT Communication

Multiple kinds of application protocols are available for EtherCAT communication. The IEC 61800-7 (CiA 402)-CANopen motion control profile is used for SV660N series servo drives. The following figure shows the EtherCAT communication structure at CANopen application layer.



Figure 2-5 EtherCAT communication structure at CANopen application layer

The object dictionary in the application layer includes communication parameters, application program data and PDO mapping data. The process data object (PDO) includes the real-time data generated during operation, which is read and written cyclically. In the SDO mailbox communication, some communication objects and PDO objects are being accessed and edited non-cyclically.

2.2.5 Communication State Machine

The following figure shows the status transition diagram of EtherCAT state machine.





The EtherCAT state machine must support the following four states and coordinate the states between the master and slave application program during initialization and operation.

• These four states are Init (I), Pre-Operational (P), Safe-Operational (S), and Operational (O).

Transition from "Init" to "Operational" must be in the sequence of "Init \rightarrow Pre-Operational \rightarrow Safe-Operational \rightarrow Operational". Transition from "Operational" to "Init" can be done with certain states skipped. The following table lists the state transition and the initialization process.

State	SDO	RPDO	TPDO	Description
lnit (l)	No	No	No	Communication initialization; No communication in the application layer, EtherCAT slave controller (ESC) register can only be read/written by the master
IP	No	No	No	Slave address configured by the master; Mailbox channel configured; Distributed clock (DC) configured; Request for Pre-Operational state
Pre- Operational (P)	Yes	No	No	Mailbox data communication in the application layer (SDO)
PS	Yes	No	No	SDO initialization process data mapping used by the master; Sync Manager channel used during process data communication configured by the master; FMMU configured by the master; Request for Safe-Operational state
Safe- Operational (S)	Yes	No	Yes	SDO, TPDO, and distributed clock mode available
SO	Yes	No	Yes	Valid output data sent by the master; Request for Safe-Operational state
Operational (O)	Yes	Yes	Yes	Normal operational state; Both the input and output valid ; Mailbox communication still available

2.2.6 Process Data

The real-time data transmission of EtherCAT is achieved through PDO. PDOs can be divided into RPDOs (Receive PDO) and TPDOs (Transmit PDO) based on the data transmission direction. RPDOs transmit the master data to the slave, and TPDOs returns the slave data to the master.



The SV660N series servo drive allows users to assign the PDO list and define the PDO mapping objects.

PDO mapping

PDO mapping is used to establish the mapping relation between the object dictionary and the PDO. 1600h...17FFh are RPDOs, and 1A00h... 1BFFh are TPDOs. The SV660N series servo drive provides six RPDOs and five TPDOs, as listed in the following table.

RPDO	1600h	Variable mapping
(6)	1701h 1705h	Fixed mapping
TPDO	1A00h	Variable mapping
(5)	1B01h 0x1B04h	Fixed mapping

Fixed PDO mapping

SV660N provides five fixed RPDOs and four fixed TPDOs.

The following table lists the typical instances of RPDOs and TPDOs.

Control Mode	PP/CSP
1701h (Outputs)	Mapping objects (4 mapping objects, 12 bytes)
	6040h (Control word) 607Ah (Target position) 60B8h (Touch probe function) 60FEh sub-index 1 (Physical outputs)
	Mapping objects (9 mapping objects, 28 bytes)
1B01h (Inputs)	603Fh (Error code) 6041h (Status word) 6064h (Position actual value) 6077h (Torque actual value) 60F4 (Following error actual value) 60B9 (Touch probe status) 60BA (Touch probe 1 positive edge) 60BC (Touch probe 2 positive edge) 60FD (Digital inputs)

Control Mode	PP/PV/PT/CSP/CSV/CST		
	Mapping objects (7 mapping objects, 19 bytes)		
1702h (Outputs)	6040h (Control word) 607Ah (Target position) 60FFh (Target velocity) 6071h (Target torque) 6060h (Modes of operation) 60B8h (Touch probe function) 607Fh (Max. profile velocity)		
	Mapping objects (9 mapping objects, 25 bytes)		
1B02h (Inputs)	603Fh (Error code) 6041h (Status word) 6064h (Position actual value) 6077h (Torque actual value) 6061h (Modes of operation display) 60B9 (Touch probe status) 60BA (Touch probe 1 positive edge) 60BC (Touch probe 2 positive edge) 60FD (Digital inputs)		

Control Mode	PP/PV/CSP/CSV
1703h (Outputs)	Mapping objects (7 mapping objects, 17 bytes)
	6040h (Control word) 607Ah (Target position) 60FFh (Target velocity) 6060h (Modes of operation) 60B8h (Touch probe function) 60E0h (Positive torque limit value) 60E1h (Negative torque limit value)
	Mapping objects (10 mapping objects, 29 bytes)
1B03h (Inputs)	603Fh (Error code) 6041h (Status word) 6064h (Position actual value) 6077h (Torque actual value) 60F4 (Following error actual value) 6061h (Modes of operation display) 60B9 (Touch probe status) 60BA (Touch probe 1 positive edge) 60BC (Touch probe 2 positive edge) 60FD (Digital inputs)

Control Mode	PP/PV/PT/CSP/CSV/CST
	Mapping objects (9 mapping objects, 23 bytes)
1704h (Outputs)	6040h (Control word) 607Ah (Target position) 60FFh (Target velocity) 6071h (Target torque) 6060h (Modes of operation) 60B8h (Touch probe function) 607Fh (Max. profile velocity) 60E0h (Positive torque limit value) 60E1h (Negative torque limit value)
	Mapping objects (9 mapping objects, 25 bytes)
1B02h (Inputs)	603Fh (Error code) 6041h (Status word) 6064h (Position actual value) 6077h (Torque actual value) 6061h (Modes of operation display) 60B9 (Touch probe status) 60BA (Touch probe 1 positive edge) 60BC (Touch probe 2 positive edge) 60FD (Digital inputs)

Control Mode	PP/PV/CSP/CSV		
	Mapping objects (8 mapping objects, 19 bytes)		
1705h (Outputs)	6040h (Control word) 607Ah (Target position) 60FFh (Target velocity) 6060h (Modes of operation) 60B8h (Touch probe function) 60E0h (Positive torque limit value) 60E1h (Negative torque limit value) 60B2h (Torque offset)		
	Mapping objects (10 mapping objects, 29 bytes)		
1B04h (Inputs)	603Fh (Error code) 6041h (Status word) 6064h (Position actual value) 6077h (Torque actual value) 6061h (Modes of operation display) 60F4 (Following error actual value) 60B9 (Touch probe status) 60BA (Touch probe 1 positive edge) 60BC (Touch probe 2 positive edge) 606C (Velocity actual value)		

Variable PDO mapping

SV660N provides one variable RPDO and one variable TPDO.

Variable PDO	Index	Max. Number of Mapping Objects	Max. Length of the Byte	Default Mapping Object		
RPDO1	1600h	10	40	6040h (Control word) 607Ah (Target position) 60B8 (Touch probe function)		
TPDO1	1A00h	10	40	603F (Error code) 6041h (Status word) 6064h (Position actual value) 60BC (Touch probe 2 positive edge) 60B9 (Touch probe status) 60BA (Touch probe 1 positive edge) 60FD (Digital inputs)		

Sync Manager PDO assignment

The process data can contain multiple PDO mapping data objects during cyclic EtherCAT data communication. The CoE protocol defines the PDO mapping object list of the Sync Manager using data objects 0x1C10 to 0x1C2F. Multiple PDOs can be mapped to different sub-indexes. The SV660N series servo drive supports assignment of one RPDO and one TPDO, as described in the following table.

Index	Sub-index	Description
0x1C12	01h	One of 0x1600 and 0x17010x1705 selected as the RPDO to be used
0x1C13	01h	One of 0x1A00 and 0x1B010x1B04 selected as the TPDO to be used

PDO configuration

PDO mapping parameters contain indicators of the process data for PDOs, including the index, sub-index and mapping object length. The sub-index 0 indicates the number (N) of mapping objects in the PDO, and the maximum length of each PDO is 4 x N bytes. One or multiple objects can be mapped simultaneously. Sub-indexes 1 to N indicate the mapping content, as defined below:

Bit	31		16	15		8	7		0
Meaning	Index			S	ub-inde	х	Ob	ject leng	gth

The index and sub-index together define the position of an object in the object dictionary. The object length indicates the bit length of the object in hexadecimal, as shown below:

Object Length	Bit Length		
08h	8 bits		
10h	16 bits		
20h	32 bits		

For example, the mapping parameter of the 16-bit control word 6040h-00 is 60400010h.

- Observe the following procedure for PDO mapping:
 - 1. Configure the mapping group of PDO.
 - a. Clear the original mapping group. Write 0 to sub-index 00h of 1C12h (or 1C13h) to clear the original mapping group.
 - b. Write the PDO mapping group. Write the mapping group according to application needs. Pre-write the values of 1600h/1701h...1705h to 1C12h and the values of 1A00h/1B01h...1B04h to 1C13h. Note: Only 1600h and 1A00h are configurable mapping groups.
 - c. Write the number of the mapping objects in the PDO mapping group to subindex 0 of 1C12h (or 0x1C13h).
 - 2. Configure the mapping objects of PDO.
 - a. Clear the original mapping objects. Write 0 to sub-index 00h of 1600h (or 1A00h) to clear the original mapping objects.
 - b. Write the PDO mapping content. Write the mapping content to sub-index
 1...10 of the mapping parameter based on object parameter definitions in the XML file. Only mappable objects can be configured as PDO mapping content.
 - c. Write the total number of mapping objects. Write the number of mapping objects in step b to sub-index 0.

Note

- Configure the PDO only when the EtherCAT state machine is in Pre-operation state ("2" displayed on the keypad). Otherwise, an error will be reported.
- Do not save the PDO configuration parameters to EEPROM. Configure the mapping objects again each time upon power-on. Otherwise, the mapping objects are the default parameters of the servo drive.

An SDO fault code will be returned during the following operations:

- Modify PDO parameters in status other than pre-operational.
- Write a value outside the range of 1600/1701...1705 to 1C12h. Write a value outside the range of 1A00/1B01...1B04 to 1C13h.

2.2.7 Service Data Object (SDO)

The EtherCAT SDO is used to transfer non-cyclic data, such as communication parameter configuration and servo drive parameter configuration. The CoE service types of EtherCAT include:

• Emergency message

- SDO request
- SDO response
- TxPDO
- RxPDO
- Remote TxPDO transmission request
- Remote RxPDO transmission request
- SDO message

The SV660N supports SDO request and SDO response.

2.2.8 Distributed Clock (DC)

The DC enables all EtherCAT devices to use the same system time and allows synchronous execution of slave tasks. A slave can generate synchronous signals according to the synchronized system time. The SV660N series servo drive supports the DC synchronization mode only. The synchronization cycle is determined by SYNC0. The cycle range varies with the operation mode.

Note

- The SYNC signal can be used to synchronize all the salves with an error less than 1 µs. The master must synchronize all the slaves to the same clock and continues doing so during operation to prevent clock skew caused by difference in the crystal oscillator. This is usually done by synchronizing the 0x910 register in ESC.
- SYNC starting time = 0x990 register (with ESC) 0x920 Note that the DC mode (0x981 = 0x03) can be enabled only after 0x910 reaches the starting time. If the starting time of SYNC is set improperly, the 0x134 status register of ESC will report the error code of 0x2D.

2.2.9 Status Indication



Figure 2-7 Status indication

If the value 0 is displayed, it indicates no value is written or the value 0 is written to 0x6060h, or H02-00 is set to 0, 1, and 2.

Communication connection

The connection status of the two RJ45 ports are indicated by "-" on the upper and lower part of the first LED on the keypad. The upper "-" indicates the status of PORT1, and the lower "-" indicates the status of PORT0.

Solid OFF: No communication connection is detected in the physical layer.

Solid ON: Communication connection is detected in the physical layer.

Communication status

The 2nd LED indicates the status of the EtherCAT state machine of the slave in the form of characters, as described in the following table.

State of EtherCAT state machine

State	SDO	RPDO	TPDO	Description	Display
Initialization	No	No	No	Communication initialization	1: Solid ON
Pre-operational	Yes	No	No	Network configuration initialized SDO available	2: LED blinking at an interval of 400 ms
Safe-operational	Yes	No	Yes	SDO, TPDO, and distributed clock mode available	4: LED blinking at an interval of 1200 ms (ON for 200 ms and OFF for 1000 ms)
Operational	Yes	Yes	Yes	Normal operational state	8: Solid ON

Display of operation modes

The 3rd LED indicates the operation mode of the servo drive in hexadecimal without blinking, as described in the following table.

Modes of operation (6060h)	Display
1: Profile position mode	1
3: Profile velocity mode	3
4: Profile torque mode	4
6: Homing mode	6
8: Cyclic synchronous position mode	8
9: Cyclic synchronous velocity mode	9
10: Cyclic synchronous torque mode	А

Display of servo status

The 4th and 5th LEDs indicate the status of the slave (servo drive) in the form of characters, as described in the following table.

State	Description	Display
Reset	Initialization	reset
Not ready	Initialization is done. The control circuit is switched on but the main circuit is not switched on. (Not ready)	nr

State	Description	Display			
Ready	The main circuit is switched on, but the S-ON signal is inactive. (Ready)	ry The character "y" blinks when the motor speed is not 0 RPM. When the communication layer is in the pre-operational or safe-operational state, the blinking frequency is the same as that of characters "2" or "4" (see "Communication status" in the previous page for details). When the communication layer is in Init or Operational state, the blinking frequency is 2 Hz.			
Run	The S-ON signal is active and the motor is energized. (Run)	rn The letter "n" blinks when the motor speed is not 0 RPM. When the communication layer is in the pre-operational or safe-operational state, the blinking frequency is the same as that of characters "2" or "4" (see "Communication status" in the previous page for details). When the communication layer is in Init or Operational state, the blinking frequency is 2 Hz.			

2.3 Troubleshooting

2.3.1 List of Fault and Warning Codes

List of fault codes

Fault Code	Display	Fault Name	Fault Type	Resettable	Fault Range	Error Code (603Fh)	Aux. Code (203Fh)
	E101.0	System parameter error	No. 1	No	Servo drive fault	0x6320	0x01010101
E101	E101.1	Parameter error in group 2000h/2001h	No. 1	No	Servo drive fault	0x6320	0x11010101
	E101.2	Address error in read/write after total number of parameters changes	No. 1	No	Servo drive fault	0x6320	0x21010101
E102	E102.0	Logic configuration fault	No. 1	No	Servo drive fault	0x7500	0x01020102
	E102.8	Software version mismatch	No. 1	No	Servo drive fault	0x7500	0x81020102
Fault Code	Display	Fault Name	Fault Type	Resettable	Fault Range	Error Code (603Fh)	Aux. Code (203Fh)
---------------	---------	---	---------------	------------	----------------------	-----------------------	----------------------
	E104.1	MCU operation timeout	No. 1	No	Servo drive fault	0x7500	0x11040104
E104	E104.2	Current loop operation timeout	No. 1	No	Servo drive fault	0x7500	0x21040104
	E104.4	Command update timeout	No. 1	No	Servo drive fault	0x7500	0x41040104
	E108.0	Parameter write error	No. 2	Yes	Servo drive fault	0x5530	0x01080108
	E108.1	Parameter read error	No. 2	Yes	Servo drive fault	0x5530	0x11080108
E108	E108.2	Invalid check on data written in EEPROM	No. 2	Yes	Servo drive fault	0x5530	0x21080108
	E108.3	Invalid check on data read in EEPROM	No. 2	Yes	Servo drive fault	0x5530	0x31080108
	E120.0	Unknown encoder type	No. 1	No	Axis fault	0x7122	0x01200120
	E120.1	Unknown motor model	No. 1	No	Axis fault	0x7122	0x11200120
E120	E120.2	Unknown drive model	No. 1	No	Axis fault	0x7122	0x21200120
	E120.5	Motor and drive current mismatch	No. 1	No	Axis fault	0x7122	0x51200120
	E120.6	FPGA and motor model mismatch	No. 1	No	Axis fault	0x7122	0x61200120
	E122.0	Multi-turn absolute encoder setting error	No. 2	Yes	Axis fault	0x6320	0x01220122
F122	E122.1	Different DIs assigned with the same function	No. 2	Yes	Axis fault	0x6320	0x11220122
EIZZ	E122.2	Different DOs assigned with the same function	No. 2	Yes	Servo drive fault	0x6320	0x21220122
	E122.3	Upper limit in the rotation mode invalid	No. 2	Yes	Axis fault	0x6320	0x31220122
	E136.0	Encoder parameter error	No. 1	No	Axis fault	0x7305	0x01360136
E136	E136.1	Encoder communication error	No. 1	No	Axis fault	0x7305	0x11360136
E140	E140.0	Encryption chip check fault	No. 1	No	Servo drive fault	0x0140	0x01400140
E140	E140.1	Encryption chip check failure	No. 1	No	Servo drive fault	-	-

Fault Code	Display	Fault Name	Fault Type	Resettable	Fault Range	Error Code (603Fh)	Aux. Code (203Fh)
	E150.0	STO signal input protection	No. 1	Yes	Servo drive fault	0x0150	0x01500150
	E150.1	STO signal input error	No. 1	Yes	Servo drive fault	0x0150	0x11500150
E150	E150.2	Buffer 5 V supply voltage error	No. 1	Yes	Servo drive fault	0x0150	0x21500150
	E150.3	STO upstream optocoupler detection failure	No. 1	Yes	Servo drive fault	0x0150	0x31500150
	E150.4	PWM Buffer detection failure	No. 1	Yes	Servo drive fault	0x0150	0x41500150
	E201.0	Phase-P overcurrent	No. 1	No	Servo drive fault	0x2312	0x02010201
F201	E201.1	Phase-U overcurrent	No. 1	No	Axis fault	0x2312	0x12010201
LZUI	E201.2	Phase-V overcurrent	No. 1	No	Axis fault	0x2312	0x22010201
	E201.4	Phase-N overcurrent	No. 1	No	Servo drive fault	0x2312	0x42010201
	E208.0	MCU position reference updated frequently	No. 1	Yes	Axis fault	0x0208	0x02080208
E208	E208.2	Encoder communication timeout	No. 1	Yes	Axis fault	0x0208	0x22080208
	E208.3	Current sampling fault	No. 1	Yes	Axis fault	0x0208	0x32080208
	E208.4	FPGA current loop operation timeout	No. 1	Yes	Axis fault	0x0208	0x42080208
E210	E210.0	Output short- circuited to ground	No. 1	No	Axis fault	0x2330	0x02100210
E234	E234.0	Runaway protection	No. 1	No	Axis fault	0x0234	0x02340234
E400	E400.0	Main circuit overvoltage	No. 1	Yes	Servo drive fault	0x3210	0x04000400
E410	E410.0	Main circuit undervoltage	No. 1	Yes	Servo drive fault	0x3220	0x04100410
E420	E420.0	Phase loss	No. 2	Yes	Servo drive fault	0x3130	0x04200420
E430	E430.0	Control power supply undervoltage	No. 2	Yes	Servo drive fault	0x3120	0x04300430
	E500.0	Motor overspeed	No. 1	Yes	Axis fault	0x8400	0x05000500
EEOO	E500.1	Speed feedback overflow	No. 1	Yes	Axis fault	0x8400	0x15000500
ESUU	E500.2	FPGA position feedback pulse overspeed	No. 1	Yes	Axis fault	-	0x25000500

Fault Code	Display	Fault Name	Fault Type	Resettable	Fault Range	Error Code (603Fh)	Aux. Code (203Fh)
	E602.0	Angle auto-tuning error	No. 1	Yes	Axis fault	0x0602	0x06020602
E602	E602.2	Wrong U/V/W phase sequence detected in angle auto-tuning	No. 1	Yes	Axis fault	0x0602	0x26020602
E605	E605.0	Motor speed upon S- ON too high	No. 1	Yes	Axis fault	0x8400	0x06050605
E620	E620.0	Motor overload	No. 1	Yes	Axis fault	0x3230	0x06200620
E630	E630.0	Motor stalled	No. 1	Yes	Axis fault	0x7121	0x06300630
5640	E640.0	IGBT over- temperature	No. 1	Yes	Axis fault	0x4210	0x06400640
E040	E640.1	Flywheel diode over- temperature	No. 1	Yes	Axis fault	-	0x06050605
E650	E650.0	Heatsink over- temperature	No. 1	Yes	Axis fault	0x4210	0x06500650
E660	E660.0	Air-cooled motor over-temperature	No. 1	Yes	Axis fault	0x4210	0x06600660
E661	E661.0	Auto-tuned gains too low	No. 2	Yes	Axis fault	0x4210	0x06610661
E731	E731.0	Encoder battery failure	No. 2	Yes	Axis fault	0x0661	0x07310731
E733	E733.0	Encoder multi-turn counting error	No. 2	Yes	Axis fault	0x7305	0x07330733
E735	E735.0	Encoder multi-turn counting overflow	No. 2	Yes	Axis fault	0x7305	0x07350735
	E740.2	Absolute encoder error	No. 1	No	Axis fault	0x7305	0x27400740
E740	E740.3	Absolute encoder single-turn calculation error	No. 1	No	Axis fault	0x7305	0x37400740
	E740.6	Encoder write error	No. 1	No	Axis fault	0x7305	0x67400740
E755	E755.0	Nikon encoder communication fault	No. 1	No	Axis fault	-	0x07550755
E765	E765.0	Nikon encoder out of limit	No. 1	No	Axis fault	-	0x07650765
E760	E760.0	Encoder over- temperature	No. 2	Yes	Axis fault	0x4210	0x07600760
EA33	EA33.0	Encoder read/write check error	No. 1	No	Axis fault	0x7305	0x0A330A33
FROO	EB00.0	Position deviation too large	No. 2	Yes	Axis fault	0x8611	0x0B000B00
LDUU	EB00.1	Position deviation overflow	No. 2	Yes	Axis fault	0x8611	0x1B000B00

Fault Code	Display	Fault Name	Fault Type	Resettable	Fault Range	Error Code (603Fh)	Aux. Code (203Fh)
	EB01.1	Individual position reference increment too large	No. 2	Yes	Axis fault	0x6320	0x1B010B01
EB01	EB01.2	Position reference increment too large continuously	No. 2	Yes	Axis fault	0x6320	0x2B010B01
	EB01.3	Command overflow	No. 2	Yes	Axis fault	0x6320	0x3B010B01
	EB01.4	Target position beyond upper/lower limit	No. 2	Yes	Axis fault	0x6320	0x4B010B01
	EE08.0	Synchronization (SYNC) signal loss	No. 2	Yes	Axis fault	0x0FFF	0x0E080E08
	EE08.1	Status switchover error	No. 2	Yes	Axis fault	0x0FFF	0x1E080E08
	EE08.2	IRQ loss	No. 2	Yes	Axis fault	0x0FFF	0x2E080E08
EE08	EE08.3	Network cable connected improperly	No. 2	Yes	Axis fault	0x0FFF	0x3E080E08
	EE08.4	Data frame loss protection error	No. 2	Yes	Axis fault	0x0FFF	0x4E080E08
	EE08.5	Data frame transfer error	No. 2	Yes	Axis fault	0x0FFF	0x5E080E08
	EE08.6	Data update timeout	No. 2	Yes	Axis fault	0x0FFF	0x6E080E08
	EE09.0	Software position limit setting error	No. 2	Yes	Axis fault	0x6320	0x0E090E09
	EE09.1	Home setting error	No. 2	Yes	Axis fault	0x6320	0x1E090E09
EE09	EE09.2	Gear ratio beyond the limit	No. 2	Yes	Axis fault	0x6320	0x2E090E09
	EE09.3	No synchronization signal	No. 2	Yes	Axis fault	0x6320	0x3E090E09
	EE09.5	PDO mapping beyond the limit	No. 2	Yes	Axis fault	0x6320	0x5E090E09
	EE11.0	ESI check error	No. 2	Yes	Servo drive fault	0x5530	0x0E110E11
EE11	EE11.1	EEPROM read error	No. 2	Yes	Servo drive fault	0x5530	0x1E110E11
	EE11.2	EEPROM update failure	No. 2	Yes	Servo drive fault	0x5530	0x2E110E11
EE12	EE12.0	EtherCAT external device error	No. 1	No	Servo drive fault	0x0E12	0x0E120E12
EE13	EE13.0	Synchronization cycle setting error	No. 2	Yes	Servo drive fault	0x6320	0x0E130E13
EE15	EE15.0	Synchronization cycle error too large	No. 2	Yes	Servo drive fault	0x0E15	0x0E150E15

List of warning codes

Warning Code	Display	Name	Fault Type	Resetta ble	Fault Range	Error Code (603Fh)	Aux. Code (203Fh)
E121	E121.0	S-ON command invalid	No. 3	Yes	Warning	0x0121	0x01210121
E600	E600.0	Inertia auto-tuning failure	No. 3	Yes	Warning	0x0600	0x06000600
	E601.0	Homing warning	No. 3	Yes	Warning	0x0601	0x06010601
E601	E601.1	Homing switch error	No. 3	Yes	Warning	0x0601	0x16010601
2001	E601.2	Homing method setting error	No. 3	Yes	Warning	0x6320	0x2601E602
E730	E730.0	Encoder battery warning	No. 3	Yes	Warning	0x7305	0x07300730
E900	E900.0	Emergency stop	No. 3	Yes	Warning	0x0900	0x09000900
	E902.0	DI setting invalid	No. 3	Yes	Warning	0x6320	0x09020902
F902	E902.1	DO setting invalid	No. 3	Yes	Warning	0x0902	0x19020902
2302	E902.2	Invalid setting for torque reach	No. 3	Yes	Warning	0x0902	0x29020902
E908	E908.0	Model identification failure	No. 3	Yes	Warning	0x0908	0x09080908
E909	E909.0	Motor overload	No. 3	Yes	Warning	0x3230	0x09090909
E920	E920.0	Regenerative resistor overload	No. 3	Yes	Warning	0x3210	0x09200920
E922	E922.0	Resistance of external regenerative resistor too small	No. 3	Yes	Warning	0x6320	0x09220922
E924	E924.0	Regenerative transistor over- temperature	No. 3	Yes	Warning	0x3230	0x09240924
E941	E941.0	Parameter modifications activated at next power-on	No. 3	Yes	Warning	0x6320	0x09410941
E942	E942.0	Parameters saved frequently	No. 3	Yes	Warning	0x7600	0x09420942
E950	E950.0	Forward overtravel	No. 3	Yes	Warning	0x5443	0x09500950
E952	E952.0	Reverse overtravel	No. 3	Yes	Warning	0x5444	0x09520952
EA41	EA41.0	Torque fluctuation compensation failure	No. 3	Yes	Warning	0x0A41	0x0A410A41
E902	E902.3	Homing method setting error	No. 3	Yes	Warning	0x6320	0x4E090E09

2.3.2 Solutions to Communication Faults

This section describes solutions to communication faults. For solutions to the servo drive faults, see the preceding sections.

• EE08.0: Synchronization (SYNC) signal loss Cause:

The SYNC signal is turned off when the EtherCAT network is in the OP state.

Cause	Confirming Method	Solution
The SYNC signal is not generated due to hardware errors.	Check whether the SYNC signal cycle is 0 using the oscilloscope in the software tool.	Replace the servo drive. Contact Inovance for maintenance.

• EE08.1: Network status switchover error Cause:

When the servo drive is enabled, the EtherCAT network status switches from OP to other status.

Cause	Confirming Method	Solution
This fault is caused by mal- operation of the master or the operator.	Check whether the master switches the network status when the servo drive is enabled.	Check the network status switchover program of the host controller.

• EE08.2: IRQ loss

Cause:

- For servo drives with H01-00 (MCU software version) = 902.0 or earlier, causes for IRQ loss include all the causes for EE08.0...EE08.6 without differentiation.
- For servo drives with H01-00 (MCU software version) = 902.1 or later, causes for IRQ loss are further differentiated and categorized into different faults, which means EE08.2 will no longer be reported.
- EE08.3: Network cable connected improperly Cause:

The network cable of the servo drive is connected improperly. (The low 16 bits of H0E-29 represent the number of IN port loss events. The high 16 bits of H0E-29 represent the number of OUT port loss events.)

Cause	Confirming Method	Solution
The physical connection of the data link is unstable or the process data is lost due to plug-in/ plug-out of the network cable.	Check: 1) whether the network cable of the servo drive is connected securely. 2) whether strong vibration occurs on site. 3) whether the network cable is plugged in or out. 4) whether the network cable provided by Inovance is used.	Check the connection of the network port through the value change of H0E-29. Replace with a new network cable.

• EE08.4 Data frame loss protection error Cause:

The PDO data is corrupted due to EMC interference or inferior network cable.

Cause	Confirming Method	Solution
The data is lost due to EMC interference, poor quality of the network cable or improper connection.	Check whether the high 16 bits of H0E-25 have values that are increased.	 Check whether the servo drive is grounded properly and rectify the EMC problem. Check whether the network cable used is the one designated by Inovance. Check whether the network cable is connected properly.

• EE08.5: Data frame transfer error Cause:

As error data frames are generated from the upstream slave, the downstream slave receives invalid data frames.

Cause	Confirming Method	Solution
The upstream slave detects that the data frame has been corrupted and marked, which is then transferred to the downstream slave, leading to a warning event.	Check whether a processing unit error occurs due to transfer error (H0E-27) or invalid frames (H0E-28) upon occurrence of the fault, and check whether no counting is performed in RX- ERR of Port0.	Check the upstream slave to locate the fault cause.

• EE08.6: Data update timeout Cause:

The slave is in the OP status and does not receive the data frame in a long time.

Cause	Confirming Method	Solution
The data frame is lost or aborted in the upstream slave or the master performance is not up to standard.	Check through the software tool whether the phase difference between SYNC and IRQ exceeds the value of H0E-22 multiplied by the communication cycle.	 Check whether the operating load of the master CPU is excessive. Increase the communication time or set H0E-22 to a high value. Check whether link loss occurs on the upstream slave.

• EE11.0: ESI check error Cause:

The attempt to load the XML file fails during EtherCAT communication.

Cause	Confirming Method	Solution
 The XML file is programmed in the EEPROM. The XML file in the EEPROM is modified unexpectedly. 	Check whether the XML version displayed in H0E-96 is normal.	Program the XML file.

• EE11.1: EEPROM read failure Cause:

The EEPROM communication of external EtherCAT devices fails.

Cause	Confirming Method	Solution
The EtherCAT data in the EEPROM cannot be read	This fault persists after the servo drive is powered off and on several times.	Replace the servo drive.

• EE11.2: EEPROM update failure Cause:

The communication is normal but the message in the EEPROM is wrong or lost.

Cause	Confirming Method	Solution
The EtherCAT data in the EEPROM cannot be updated.	This fault persists after the servo drive is powered off and on several times.	Replace the servo drive.

• EE12.0: EtherCAT external device error Cause:

The EtherCAT network cannot be initialized.

Cause	Confirming Method	Solution	
1. The FPGA firmware is not programmed.	Check whether 2001-02h is 09xx.Y.	Program the FPGA firmware.	
2. The servo drive is faulty.	The servo drive is faulty.	Replace the servo drive.	

• EE13.0: Synchronization cycle setting error Cause:

The synchronization cycle is not an integer multiple of 125 μs or 250 μs after the network switches to the OP mode.

Cause	Confirming Method	Solution
The synchronization cycle is not an integer multiple of 125 μs or 250 μs.	Check the setting of the synchronization cycle in the controller.	Set the synchronization cycle to an integer multiple of 125 µs or 250 µs.

• EE15.0: Synchronization cycle error too large Cause:

The synchronization cycle error exceeds the threshold.

Cause	Confirming Method	Solution
The synchronization cycle error of the controller is too large.	• Measure the synchronization cycle of the controller using a digital oscilloscope or the oscilloscope tool in the software tool.	Increase the value of 200E- 21h.

2.3.3 SDO Transfer Abort Code

Abort Code	Function
0503 0000	Toggle bit not altered
0504 0000	SDO protocol timed out
0504 0001	Client/Server command specifier not valid or unknown
0504 0005	Out of memory
0601 0000	Unsupported access to an object
0601 0001	Attempt to read a write only object
0601 0002	Attempt to write a read only object
0602 0000	Object does not exist in the object dictionary
0604 0041	Object cannot be mapped to the PDO
0604 0042	The number and length of the objects to be mapped would exceed PDO length
0604 0043	General parameter incompatibility reason
0604 0047	General internal incompatibility in the device

Abort Code	Function
0606 0000	Access failed due to an hardware error
0607 0010	Data type does not match, length of service parameter does not match
0607 0012	Data type does not match, length of service parameter too high
0607 0013	Data type does not match, length of service parameter too low
0609 0011	Sub-index does not exist
0609 0030	Invalid value for parameter
0609 0031	Value of parameter written too high
0609 0032	Value of parameter written too low
0609 0036	Maximum value is less than minimum value
0800 0000	General error
0800 0020	Data cannot be transferred or stored to the application
0800 0021	Data cannot be transferred or stored to the application because of local control
0800 0022	Data cannot be transferred or stored to the application because of the present device state
0800 0023	Object dictionary dynamic generation fails or no object dictionary is present
0800 0024	No data available

2.4 List of Parameters

2.4.1 Parameter Groups

Parameter access address: index+subindex, both of which are in hexadecimal.

The CiA402 protocol establishes the following restrictions on the parameter address:

Index (Hex)	Description
0001h–0FFFh	Data type description
1000h–1FFFh	CoE communication object
2000h–5FFFh	Manufacturer-specific object
6000h–9FFFh	Profile object
A000h–FFFFh	Reserved

2.4.2 Parameter Group 1000h

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default
1000	0	Device type	RO	No	Uint32	-	-	0x00020192
1008	0	Manufacturer device name	RO	No	-	-	-	SV660N- ECAT
1009	0	Manufacturer hardware version	RO	No	-	-	-	Software version dependent
100A	0	Manufacturer software version	RO	No	-	-	-	Hardware version dependent
				lo	dentity object			
	0	Number of entries	RO	No	Uint8	-	-	0x04
1019	1	Vendor ID	RO	No	Uint32	-	-	0x00100000
1010	2	Product code	RO	No	Uint32	-	-	0x000C010 D
	3	Revision number	RO	No	Uint32	-	-	0x00010001
	4	Serial number	RO	No	Uint32	-	-	0x00000000
				Sync Manag	ger communicatio	on type		
	0	Number of SYNC Manager channels	RO	No	Uint8	-	-	0x04
	1	SM0 communication type	RO	No	Uint8	-	-	0x01
1C00	2	SM1 communication type	RO	No	Uint8	-	-	0x02
	3	SM2 communication type	RO	No	Uint8	-	-	0x03
	4	SM3 communication type	RO	No	Uint8	-	-	0x04

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default				
		1st Receive PDO mapping										
	0	Number of mapped objects in RPDO1	RW	No	Uint8	-	0 to 0x0A	0x03				
	1	1st mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	0x60400010				
	2	2nd mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	0x60600008				
	3	3rd mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	0x60 B80010				
	4	4th mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	-				
1600	5	5th mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	-				
	6	6th mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	-				
	7	7th mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	-				
	8	8th mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	-				
	9	9th mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	-				
	0A	10th mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	-				
				258th Re	eceive PDO mapp	ing						
	0	Number of mapped objects in RPDO258	RO	No	Uint8	-	-	0x04				
4704	1	1st mapped object	RO	No	Uint32	-	-	0x60400010				
1701	2	2nd mapped object	RO	No	Uint32	-	-	0x607 A0020				
	3	3rd mapped object	RO	No	Uint32	-	-	0x60 B80010				
	4	4th mapped object	RO	No	Uint32	-	-	0x60F E0120				

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default		
			1	259th Re	eceive PDO mapp	ing				
	0	Number of mapped objects in RPDO259	RO	No	Uint8	-	-	0x07		
	1	1st mapped object	RO	No	Uint32	-	-	0x60400010		
	2	2nd mapped object	RO	No	Uint32	-	-	0x607 A0020		
1702	3	3rd mapped object	RO	No	Uint32	-	-	0x60FF0020		
	4	4th mapped object	RO	No	Uint32	-	-	0x60710010		
	5	5th mapped object	RO	No	Uint32	-	-	0x60600008		
	6	6th mapped object	RO	No	Uint32	-	-	0x60 B80010		
	7	7th mapped object	RO	No	Uint32	-	-	0x607F0020		
	260th Receive PDO mapping									
	0	Number of mapped objects in RPDO260	RO	No	Uint8	-	-	0x07		
	1	1st mapped object	RO	No	Uint32	-	-	0x60400010		
	2	2nd mapped object	RO	No	Uint32	-	-	0x607 A0020		
1703	3	3rd mapped object	RO	No	Uint32	-	-	0x60FF0020		
	4	4th mapped object	RO	No	Uint32	-	-	0x60600008		
	5	5th mapped object	RO	No	Uint32	-	-	0x60 B80010		
	6	6th mapped object	RO	No	Uint32	-	-	0x60 E00010		
	7	7th mapped object	RO	No	Uint32	-	-	0x60 E10010		

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default	
	261st Receive PDO mapping								
	0	Number of mapped objects in RPDO261	RO	No	Uint8	-	-	0x09	
	1	1st mapped object	RO	No	Uint32	-	-	0x60400010	
	2	2nd mapped object	RO	No	Uint32	-	-	0x607 A0020	
	3	3rd mapped object	RO	No	Uint32	-	-	0x60FF0020	
1704	4	4th mapped object	RO	No	Uint32	-	-	0x60710010	
	5	5th mapped object	RO	No	Uint32	-	-	0x60600008	
	6	6th mapped object	RO	No	Uint32	-	-	0x60 B80010	
	7	7th mapped object	RO	No	Uint32	-	-	0x607F0020	
	8	8th mapped object	RO	No	Uint32	-	-	0x60 E00010	
	9	9th mapped object	RO	No	Uint32	-	-	0x60 E10010	
				262nd Re	eceive PDO mapp	ing			
	0	Number of mapped objects in RPDO262	RW	No	Uint8	-	-	0x08	
	1	1st mapped object	RW	No	Uint32	-	-	0x60400010	
	2	2nd mapped object	RW	No	Uint32	-	-	0x607 A0020	
1705	3	3rd mapped object	RW	No	Uint32	-	-	0x60FF0020	
1705	4	4th mapped object	RW	No	Uint32	-	-	0x60600008	
	5	5th mapped object	RW	No	Uint32	-	-	0x60 B80010	
	6	6th mapped object	RW	No	Uint32	-	-	0x60 E00010	
	7	7th mapped object	RW	No	Uint32	-	-	0x60 E10010	
	8	8th mapped object	RW	No	Uint32	-	-	0x60 B20010	

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default
				1st Trar	ismit PDO mappi	ng		
	0	Number of mapped objects in TPDO1	RW	No	Uint8	-	0 to 0x0A	0x07
	1	1st mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	0x60410010
	2	2nd mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	0x60640020
	3	3rd mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	0x60 B90010
1400	4	4th mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	0x60B A0020
1400	5	5th mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	0x60B C0020
	6	6th mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	0x603F0010
	7	7th mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	0x60F D0010
	8	8th mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	-
	9	9th mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	-
	0A	10th mapped object	RW	No	Uint32	-	0 to 0xFFFFFFFF	-

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default
				258th Tra	ansmit PDO mapp	oing		
	0	Number of mapped objects in TPDO258	RO	No	Uint8	-	-	0x09
	1	1st mapped object	RO	No	Uint32	-	-	0x603F0010
	2	2nd mapped object	RO	No	Uint32	-	-	0x60410010
	3	3rd mapped object	RO	No	Uint32	-	-	0x60640020
1B01	4	4th mapped object	RO	No	Uint32	-	-	0x60770010
	5	5th mapped object	RO	No	Uint32	-	-	0x60F40020
	6	6th mapped object	RO	No	Uint32	-	-	0x60 B90010
	7	7th mapped object	RO	No	Uint32	-	-	0x60B A0020
	8	8th mapped object	RO	No	Uint32	-	-	0x60B C0020
	9	9th mapped object	RO	No	Uint32	-	-	0x60F D0010

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default
				259th Tra	ansmit PDO mapp	oing		
	0	Number of mapped objects in TPDO259	RO	No	Uint8	-	-	0x09
	1	1st mapped object	RO	No	Uint32	-	-	0x603F0010
	2	2nd mapped object	RO	No	Uint32	-	-	0x60410010
	3	3rd mapped object	RO	No	Uint32	-	-	0x60640020
1B02	4	4th mapped object	RO	No	Uint32	-	-	0x60770010
	5	5th mapped object	RO	No	Uint32	-	-	0x60610008
	6	6th mapped object	RO	No	Uint32	-	-	0x60 B90010
	7	7th mapped object	RO	No	Uint32	-	-	0x60B A0020
	8	8th mapped object	RO	No	Uint32	-	-	0x60B C0020
	9	9th mapped object	RO	No	Uint32	-	-	0x60F D0010

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default
		1	1	260th Tra	ansmit PDO mapp	oing		1
	0	Number of mapped objects in TPDO260	RO	No	Uint8	-	-	0x0A
	1	1st mapped object	RO	No	Uint32	-	-	0x603F0010
	2	2nd mapped object	RO	No	Uint32	-	-	0x60410010
	3	3rd mapped object	RO	No	Uint32	-	-	0x60640020
1000	4	4th mapped object	RO	No	Uint32	-	-	0x60770010
1803	5	5th mapped object	RO	No	Uint32	-	-	0x60F40020
	6	6th mapped object	RO	No	Uint32	-	-	0x60610008
	7	7th mapped object	RO	No	Uint32	-	-	0x60 B90010
	8	8th mapped object	RO	No	Uint32	-	-	0x60B A0020
	9	9th mapped object	RO	No	Uint32	-	-	0x60B C0020
	0A	10th mapped object	RO	No	Uint32	-	-	0x60F D0010

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default
				261st Tra	ansmit PDO mapp	oing		
	0	Number of mapped objects in TPDO261	RO	No	Uint8	-	-	0x0A
	1	1st mapped object	RO	No	Uint32	-	-	0x603F0010
	2	2nd mapped object	RO	No	Uint32	-	-	0x60410010
	3	3rd mapped object	RO	No	Uint32	-	-	0x60640020
	4	4th mapped object	RO	No	Uint32	-	-	0x60770010
1804	5	5th mapped object	RO	No	Uint32	-	-	0x60610008
	6	6th mapped object	RO	No	Uint32	-	-	0x60F40020
	7	7th mapped object	RO	No	Uint32	-	-	0x60 B90010
	8	8th mapped object	RO	No	Uint32	-	-	0x60B A0020
	9	9th mapped object	RO	No	Uint32	-	-	0x60B C0020
	0A	10th mapped object	RO	No	Uint32	-	-	0x606 C0020
				Sync Manag	ger 2_RPDO assig	nment		
1C12	0	Number of assigned RPDOs	RW	No	Uint8	-	0 to 0x1	0x01
	1	Index of assigned RPDO	RW	Yes	Uint16	-	0 to 0xFFFF	0x1701
				Sync Manag	ger 2_TPDO assig	nment		
1C13	0	Number of assigned TPDOs	RW	No	Uint8	-	0 to 0x1	0x01
	1	Index of assigned TPDO	RW	Yes	Uint16	-	0 to 0xFFFF	0x1B01

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default
		1		Sync Manag	ger 2 output parar	neters	I	
	0	Number of synchronization parameters	RO	No	Uint8	-	-	0x20
	xx index (HEX)NameAccessPDO MappingData TypeUnitData RangeC0Number of synchronization typeRONoUint81Synchronization typeRONoUint1602Cycle timeRONoUint32ns-02Cycle timeRONoUint32ns-03Synchronization typeRONoUint32ns-04Synchronization type supportedRONoUint32ns-05Minimum cycle timeRONoUint32ns-09Delay timeRONoUint32ns-09Delay timeRONoUint32ns-01Synchronization type supportedRONoUint32ns-09Delay timeRONoUint32ns-001Synchronization parametersRONoUint303ASynchronization typeRONoUint32ns-03ASynchronization type supportedRONoUint32ns-03ASynchronization typeRONoUint32ns-04Synchronization typeRONo	0x0002						
		0						
1C32	4	Synchronization types supported	RO	No	Uint16	-	-	0x0004
	5	Minimum cycle time	RO	No	Uint32	ns	-	0x0003 D090
	6	Calc and copy time	RO	No	Uint32	ns	-	-
	9	Delay time	RO	No	Uint32	ns	-	-
	20	Sync error	RO	No	BOOL	-	-	-
				Sync Mana	ger 2 input param	neters		
	0	Number of synchronization parameters	RO	No	Uint8	-	-	0x20
	1	Synchronization type	RO	No	Uint16		-	0x0002
	2	Cycle time	RO	No	Uint32	ns	-	0
1C33	4	Synchronization types supported	RO	No	Uint16	-	-	0x0004
	5	Minimum cycle time	RO	No	Uint32	ns	-	0x0003 D090
	6	Calc and copy time	RO	No	Uint32	ns	-	-
	9	Delay time	RO	No	Uint32	ns	-	-
	20	Sync error	RO	No	BOOL	-	-	-

2.4.3 Parameter Group 2000h

Para. HEX	Group DEC	Name	Description	Value Range	Default	Unit	Data Type	Change	Effective
Index	Para.						.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	condition	Time
			2000h/H00: Se	rvo motor parar	neters				
01h	H00-00	Motor code	-	0 to 65535	14101	-	16 bits	At stop	Next power- on
03h	H00-02	Customized no.	-	0 to (2 ³² - 1)	0	-	32 bits	-	-

Para	Group						Data		
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Change	Effective
Index	Para.						турс	Condition	mile
05h	H00-04	Encoder version	-	0 to 6553.5	0	-	16 bits	-	-
06h	H00-05	Serial-type motor code	-	0 to 65535	0	-	16 bits	-	-
07h	H00-06	FPGA customized No.	-	0 to 655.35	0	-	16 bits	-	-
08h	H00-07	STO version	-	0 to 655.35	0	-	16 bits	-	-
09h	H00-08	Serial encoder type	-	0 to 65535	0	-	16 bits	-	-
		L	2001h/H01: Se	ervo drive param	neters				
01h	H01-00	MCU software version	-	0 to 6553.5	0	-	16 bits	-	-
02h	H01-01	FPGA software version	-	0 to 6553.5	0	-	16 bits	-	-
0Bh	H01-10	Servo drive model	2: 1R6 3: S2R8 5: S5R5 60005: S6R6 6: S7R6 7: S012 10001: T3R5 10002: T5R4 10003: T8R4 10004: T012 10005: T017 10006: T021 10007: T026	0 to 65535	3	-	16 bits	At stop	Next power- on
0Ch	H01-11	DC-AC voltage class	-	0 to 65535	220	V	16 bits	-	-
0Dh	H01-12	Rated power of the servo drive	-	0 to 1073741824	0.4	kW	32 bits	-	-
0Fh	H01-14	Max. output power of the servo drive	-	0 to 1073741824	0.4	kW	32 bits	-	-
11h	H01-16	Rated output current of the servo drive	-	0 to 1073741824	2.8	A	32 bits	-	-
13h	H01-18	Max. output current of the servo drive	-	0 to 1073741824	10.1	A	32 bits	-	-
29h	H01-40	DC bus overvoltage protection threshold	- - -	0 to 2000	420	V	16 bits	-	-

Para.	Group						Data	CI.	
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						Type	condition	Time
01h	H02-00	Control mode	0: Speed control mode 1: Position control mode 2: Torque control mode 9: EtherCAT mode	0 to 9	9	-	16 bits	At stop	At once
02h	H02-01	Absolute system selection	0: Incremental mode 1: Absolute position linear mode 2: Absolute position rotation mode 3: Absolute position linear mode (encoder overflow not detected) 4: Absolute position single-turn mode	0 to 4	0	-	16 bits	At stop	Next power- on
03h	H02-02	Direction of rotation	0: CCW as the forward direction 1: CW as the forward direction	0 to 1	0	-	16 bits	At stop	Next power- on
06h	H02-05	Stop mode at S- ON OFF	-3: Stop at zero speed, keeping dynamic braking status -2: Ramp to stop as defined by 6084h/ 609Ah, keeping dynamic braking status -1: Dynamic braking stop, keeping dynamic braking status 0: Coast to stop, keeping de- energized status 1: Ramp to stop as defined by 6084h/ 609Ah, keeping de- energized status	-3 to +1	0	_	16 bits	At stop	At once

Para.	Group						Data		
HEX	DEC	Name	Description	Value Range	Default	Unit	Typo	Change	Effective
Index	Para.						Type	Condition	nme
07h	H02-06	Stop mode at No. 2 fault	-5: Stop at zero speed, keeping dynamic braking status -4: Stop at the emergency-stop torque, keeping dynamic braking status -3: Ramp to stop as defined by 6085h, keeping dynamic braking status -2: Ramp to stop as defined by 6084h/ 609Ah, keeping dynamic braking status -1: Dynamic braking status -1: Dynamic braking status 0: Coast to stop, keeping de- energized status 1: Ramp to stop as defined by 6084h/ 609Ah, keeping de- energized status 2: Ramp to stop as defined by 6085h, keeping de- energized status 3: Stop at emergency-stop torque, keeping de- energized status	-5 to +3	2		16 bits	At stop	At once

Para.	Group						Data	Chauses	Effective
HEX	DEC	Name	Description	Value Range	Default	Unit	Туре	Condition	Time
08h	Para.	Stop mode at overtravel	0: Coast to stop, keeping de- energized state 1: Stop at zero speed, keeping position lock state 2: Stop at zero speed, keeping de- energized status 3: Ramp to stop as defined by 6085h, keeping de- energized status 4: Ramp to stop as defined by 6085h, keeping position lock status 5: Dynamic braking stop, keeping de- energized status 6: Dynamic braking stop, keeping dynamic braking status 7: Not responding to overtravel (with warning displayed only)	0 to 7	1	-	16 bits	At stop	At once
09h	H02-08	Stop mode at No. 1 fault	0: Coast to stop, keeping de- energized state 1: Dynamic braking stop, keeping de- energized status 2: Dynamic braking stop, keeping dynamic braking status	0 to 2	2	-	16 bits	At stop	At once
0Ah	H02-09	Delay from brake (BK) output ON to command received	-	0 to 500	250	ms	16 bits	During running	At once

Para.	Group						Data		
HEX	DEC	Name	Description	Value Range	Default	Unit	Data Type	Change	Effective
Index	Para.						турс	condition	Time
0Bh	H02-10	Delay from brake (BK) output OFF to motor de- energized	-	50 to 1000	150	ms	16 bits	During running	At once
0Ch	H02-11	Speed threshold at brake (BK) output OFF in the rotation state	-	20 to 3000	30	RPM	16 bits	During running	At once
0Dh	H02-12	Delay from S- ON OFF to brake (BK) output OFF in the rotation state	-	1 to 1000	500	ms	16 bits	During running	At once
10h	H02-15	Warning display on the keypad	0: Warning information outputted immediately 1: Warning information not outputted	0 to 1	0	-	16 bits	During running	At once
11h	H02-16	Brake enable switch	0: Disable 1: Enable	0 to 1	1	-	16 bits	During running	At once
15h	H02-20	Dynamic brake relay coil ON delay	-	30 to 30000	30	ms	16 bits	During running	At once
16h	H02-21	Permissible minimum resistance of the regenerative resistor	-	1 to 1000	40	Ω	16 bits	-	-
17h	H02-22	Power of built- in regenerative resistor	-	0 to 65535	0	w	16 bits	-	-
18h	H02-23	Resistance of built-in regenerative resistor	-	0 to 65535	0	Ω	16 bits	-	-
19h	H02-24	Resistor heat dissipation coefficient	-	10 to 100	30	%	16 bits	During running	At once

Para.	Group						Data	cl	
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	condition	Time
1Ah	H02-25	Regenerative resistor type	0: Built-in 1: External, natural cooling 2: External, forced air cooling 3: No resistor needed, braking energy absorbed by the capacitor	0 to 3	3	-	16 bits	During running	At once
1Bh	H02-26	Power of external regenerative resistor	-	1 to 65535	40	w	16 bits	During running	At once
1Ch	H02-27	Resistance of external regenerative resistor	-	15 to 1000	50	Ω	16 bits	During running	At once
1Fh	H02-30	User password	-	0 to 65535	0	-	16 bits	During running	At once
20h	H02-31	System parameter initialization	0: No operation 1: Restore default settings 2: Clear fault log	0 to 2	0	-	16 bits	At stop	At once
21h	H02-32	Selection of parameters in group H0B	-	0 to 99	50	-	16 bits	During running	At once
24h	H02-35	Keypad data update frequency	-	0 to 20	0	Hz	16 bits	During running	At once
2Ah	H02-41	Factory password	-	0 to 65535	0	-	16 bits	During running	At once
			2003h/H03: Ter	minal input para	ameters				
03h	H03-02	DI1 function	0: No assignment 1: Servo ON 2: Fault reset 14: Positive limit switch 15: Negative limit switch 31: Home switch 34: Emergency stop 38: Touch probe 1 39: Touch probe 2	0 to 40	14	-	16 bits	During running	At once
04h	H03-03	DI1 logic	0: NO 1: NC	0 to 1	0	-	16 bits	During running	At once

Para.	Group						Data	CI.			
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Effective		
Index	Para.						турс	Condition	nine		
05h	H03-04	DI2 function	0 to 39 See the description of H03-02 for details.	0 to 40	15	-	16 bits	During running	At once		
06h	H03-05	DI2 logic	0 to 1 See the description of H03-03 for details.	0 to 1	0	-	16 bits	During running	At once		
07h	H03-06	DI3 function	0 to 39 See the description of H03-02 for details.	0 to 40	31	-	16 bits	During running	At once		
08h	H03-07	DI3 logic	0 to 1 See the description of H03-03 for details.	0 to 1	0	-	16 bits	During running	At once		
09h	H03-08	DI4 function	0 to 39 See the description of H03-02 for details.	0 to 40	39	-	16 bits	During running	At once		
0Ah	H03-09	DI4 logic	0 to 1 See the description of H03-03 for details.	0 to 1	0	-	16 bits	During running	At once		
0Bh	H03-10	DI5 function	0 to 39 See the description of H03-02 for details.	0 to 40	38	-	16 bits	During running	At once		
0Ch	H03-11	DI5 logic	0 to 1 See the description of H03-03 for details.	0 to 1	0	-	16 bits	During running	At once		
3Dh	H03-60	DI1 filter time		0 to 500	0.5	ms	16 bits	During running	At once		
3Eh	H03-61	DI2 filter time		0 to 500	0.5	ms	16 bits	During running	At once		
3Fh	H03-62	DI3 filter time		0 to 500	0.5	ms	16 bits	During running	At once		
40h	H03-63	DI4 filter time		0 to 500	0.5	ms	16 bits	During running	At once		
41h	H03-64	DI5 filter time		0 to 500	0.5	ms	16 bits	During running	At once		
	2004h/H04: Terminal output parameters										

Para.	Group						Data	Chauses	-fff = = ti = t
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						.)pc	condition	Time
01h	H04-00	DO1 function	0: No assignment 1: Servo ready 2: Motor rotating 9: Brake (BK) output 10: Warning 11: Fault 25: Comparison output 31: EtherCAT forced output 32: EDM safety state	0 to 32	1	-	16 bits	During running	At once
02h	H04-01	DO1 logic	0: NO 1: NC	0 to 1	0	-	16 bits	During running	At once
03h	H04-02	DO2 function	0 to 32 See the description of H04-00 for details.	0 to 32	11	-	16 bits	During running	At once
04h	H04-03	DO2 logic	0 to 1 See the description of H04-01 for details.	0 to 1	0	-	16 bits	During running	At once
05h	H04-04	DO3 function	0 to 32 See the description of H04-00 for details.	0 to 32	9	-	16 bits	During running	At once
06h	H04-05	DO3 logic	0 to 1 See the description of H04-01 for details.	0 to 1	0	-	16 bits	During running	At once

Para.	Group						Data		
HEX	DEC	Name	Description	Value Range	Default	Unit	Data Type	Change	Effective
Index	Para.						.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	condition	Time
18h	H04-23	EtherCAT forced DO logic in non- OP status	0: Status of DO1, DO2, and DO3 unchanged in the non-OP status 1: No output in DO1 and status of others unchanged in the non-OP status 2: No output in DO2 and status of others unchanged in the non-OP status 3: No output in DO1 or DO2 and status of others unchanged in the non-OP status 4: No output in DO3 and status of others unchanged in the non-OP status 5: No output in DO1 or DO3 and status of others unchanged in the non-OP status 5: No output in DO1 or DO3 and status of others unchanged in the non-OP status 6: No output in DO2 or DO3 and status of others unchanged in the non-OP status 7: No output in DO1, DO2, or DO3 in the non-OP status	0 to 7	0		16 bits	During running	At once
	1	ſ	2005h/H05: Posi	tion control para	ameters		1	[
05h	H05-04	First-order low- pass filter time constant	-	0 to 6553.5	0	ms	16 bits	At stop	At once
06h	H05-05	Moving average filter time constant 1	-	0 to 1000	0	ms	16 bits	At stop	At once
07h	H05-06	Moving average filter time constant 2	-	0 to 128	0	ms	16 bits	At stop	At once
08h	H05-07	Numerator of electronic gear ratio	-	0 to 4294967295	1	1	32 bits	During running	At once
0Ah	H05-09	Denominator of electronic gear ratio	-	0 to 4294967295	1	1	32 bits	During running	At once

Para.	Group						Data		
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						турс	condition	Time
14h	H05-19	Speed feedforward control	0: No speed feedforward 1: Internal speed feedforward 2: 60B1 used as speed feedforward 3: Zero phase control	0 to 3	1	-	16 bits	At stop	At once
15h	H05-20	Condition for COIN (positioning completed) signal output	0: Position deviation = Filtered position reference - Position feedback	0 to 3	0	-	16 bits	At stop	At once
1F	H05-30	Homing function	0: Disable 6: Current position as the home	0, 6	0	-	16 bits	During running	At once
24h	H05-35	Homing time limit	-	0 to 6553.5	5000	s	16 bits	During running	At once
25h	H05-36	Local home offset	-	-1073741824 to +1073741824	0	-	32 bits	During running	At once
2Fh	H05-46	Position deviation in absolute position linear mode (low 32 bits)	-	-2 ³¹ to +(2 ³¹ - 1)	0	-	32 bits	At stop	Next power- on
31h	H05-48	Position deviation in absolute position linear mode (high 32 bits)	-	-2 ³¹ to +(2 ³¹ -1)	0	-	32 bits	At stop	Next power- on
33h	H05-50	Numerator of mechanical gear ratio	-	1 to 65535	1	-	16 bits	At stop	At once
34h	H05-51	Denominator of mechanical gear ratio	-	1 to 65535	1	-	16 bits	At stop	At once
35h	H05-52	Pulses per load revolution in absolute position rotation mode (low 32 bits)	-	0 to (2 ³² - 1)	0	1 p	32 bits	At stop	At once

Para.	Group						Data	Chause	Effective
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						21	condition	
37h	H05-54	Pulses per load revolution in absolute position rotation mode (high 32 bits)	-	0 to (2 ³² - 1)	0	1 p	32 bits	At stop	At once
2006h/H06: Speed control parameters									
04h	H06-03	Speed reference	-	-6000 to +6000	200	RPM	16 bits	During running	At once
06h	H06-05	Acceleration ramp time of speed reference	-	0 to 65535	0	RPM	16 bits	During running	At once
07h	H06-06	Deceleration ramp time of speed reference	-	0 to 65535	0	RPM	16 bits	During running	At once
09h	H06-08	Forward speed limit	-	0 to 6000	6000	RPM	16 bits	During running	At once
0Ah	H06-09	Reverse speed limit	-	0 to 6000	6000	RPM	16 bits	During running	At once
0Bh	H06-10	Deceleration unit in emergency stop	0: x 1 1: x 10 2: x 100	0 to 2	0	-	16 bits	At stop	At once
0Ch	H06-11	Torque feedforward control	0: No torque feedforward 1: Internal torque feedforward 2: 60B2h used as external torque feedforward	0 to 2	1	-	16 bits	During running	At once
0Dh	H06-12	Acceleration ramp time of jog speed	-	0 to 65535	10	ms	16 bits	During running	At once
0Eh	H06-13	Speed feedforward smoothing filter	-	0 to 2000	0	us	16 bits	During running	At once
11h	H06-16	Threshold of TGON (motor rotation) signal	-	0 to 1000	20	RPM	16 bits	During running	At once
1Dh	H06-28	Cogging torque compensation selection	0: No 1: Yes	0 to 1	1	-	16 bits	During running	At once
			2007h/H07: Tor	que control para	ameters				

Para.	Group						Data	cl	
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Change	Effective
Index	Para.						турс	condition	Time
04h	H07-03	Torque reference set through keypad	-	-400.0 to +400.0	0	%	16 bits	During running	At once
06h	H07-05	Torque reference filter time constant 1	-	0 to 30.00	0.2	ms	16 bits	During running	At once
07h	H07-06	Torque reference filter time constant 2	-	0 to 30.00	0.27	ms	16 bits	During running	At once
0Ah	H07-09	Forward internal torque limit	-	0 to 400.0	350	%	16 bits	During running	At once
0Bh	H07-10	Reverse internal torque limit	-	0 to 400.0	350	%	16 bits	During running	At once
10h	H07-15	Emergency-stop torque	-	0 to 400.0	100	%	16 bits	During running	At once
14h	H07-19	Internal speed limit in torque control	-	0 to 6000	3000	RPM	16 bits	During running	At once
15h	H07-20	Negative internal speed limit in torque control	-	0 to 6000	3000	RPM	16 bits	During running	At once
16h	H07-21	Reference value for torque reach	-	0 to 400.0	0	%	16 bits	During running	At once
17h	H07-22	Torque output value when DO signal for torque reach turned on	-	0 to 400.0	20	%	16 bits	During running	At once
18h	H07-23	Torque output value when DO signal for torque reach turned off	-	0 to 400.0	10	%	16 bits	During running	At once
19h	H07-24	Depth of field- weakening	-	60 to 115	115	%	16 bits	During running	At once
1Ah	H07-25	Max. permissible demagnetizing current	-	1 to 200	100	%	16 bits	During running	At once
1Bh	H07-26	Field- weakening selection	0: Disable 1: Enable	0 to 1	0	-	16 bits	At stop	At once

Para.	Group						Data	Chause	Effe etite
HEX	DEC	Name	Description	Value Range	Default	Unit		Condition	Time
Index	Para.						21	condition	· · · · · ·
1Ch	H07-27	Field- weakening gain	-	0.001 to 1.000	0.03	-	16 bits	During running	At once
25h	H07-36	Time constant of low-pass filter 2	-	0 to 10.00	0	ms	16 bits	During running	At once
26h	H07-37	Torque reference filter selection	0: First-order filter 1: Biquad filter	0 to 1	0	-	16 bits	During running	At once
27h	H07-38	Biquad filter attenuation ratio	-	0 to 50	16	-	16 bits	At stop	At once
			2008h/H08	3: Gain paramete	ers				
01h	H08-00	Speed loop gain	-	0.1 to 2000	39	Hz	16 bits	During running	At once
02h	H08-01	Speed loop integral time constant	-	0.15 to 512	20.51	ms	16 bits	During running	At once
03h	H08-02	Position loop gain	-	0.1 to 2000	55.7	Hz	16 bits	During running	At once
04h	H08-03	2nd speed loop gain	-	0.1 to 2000	75	Hz	16 bits	During running	At once
05h	H08-04	2nd speed loop integral time constant	-	0.15 to 512	10.61	ms	16 bits	During running	At once
06h	H08-05	2nd position loop gain	-	0.1 to 2000	120	Hz	16 bits	During running	At once
09h	H08-08	2nd gain mode setting	0: Fixed to the 1st gain set, P/PI switched by bit26 of 60FE 1:Switched between the 1st gain set and 2nd gain set as defined by H08-09	0 to 1	1	-	16 bits	During running	At once

Para.	Group						Data	Chause	Effective
HEX	DEC	Name	Description	Value Range	Default	Unit	Туре	Condition	Time
Index	Para.								
0Ah	H08-09	Gain switchover condition	0: Fixed to the 1st gain set (PS) 1: Switched by bit26 of 60FE 2: Torque reference too large (PS) 3: Speed reference too large (PS) 4: Speed reference change rate too large (PS) 5: Speed reference high/low-speed threshold (PS) 6: Position deviation too large (P) 7: Position reference available (P) 8: Positioning completed (P) 9: Actual speed (P) 10: Position	0 to 10	0	-	16 bits	During running	At once
0Bh	H08-10	Gain switchover delay	-	0 to 1000	5	ms	16 bits	During running	At once
0Ch	H08-11	Gain switchover level	-	0 to 20000	50	-	16 bits	During running	At once
0Dh	H08-12	Gain switchover dead time	-	0 to 20000	30	-	16 bits	During running	At once
0Eh	H08-13	Position gain switchover time	-	0 to 1000	3	ms	16 bits	During running	At once
10h	H08-15	Load moment of inertia ratio	-	0 to 120	3	-	16 bits	During running	At once
12h	H08-17	Zero phase delay	-	0 to 4	0	ms	16 bits	During running	At once
13h	H08-18	Speed feedforward filter time constant	-	0 to 64	0.5	ms	16 bits	During running	At once
14h	H08-19	Speed feedforward gain	-	0 to 100	0	%	16 bits	During running	At once

Para.	Group						Data		
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Change	Effective
Index	Para.						.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	condition	mile
15h	H08-20	Torque feedforward filter time constant	-	0 to 64	0.5	ms	16 bits	During running	At once
16h	H08-21	Torque feedforward gain	-	0 to 300	0	%	16 bits	During running	At once
17h	H08-22	Speed feedback filtering option	0: Inhibited 1: Two times 2: Four times 3: Eight times 4: Sixteen times	0 to 4	0	-	16 bits	At stop	At once
18h	H08-23	Cutoff frequency of speed feedback low-pass filter	-	100 to 8000	8000	Hz	16 bits	During running	At once
19h	H08-24	PDFF control coefficient	-	0 to 200	100	%	16 bits	During running	At once
1Ch	H08-27	Speed observer cutoff frequency	-	50 to 600	170	Hz	16 bits	During running	At once
1Dh	H08-28	Speed observer inertia correction coefficient	-	1 to 1600	100	%	16 bits	During running	At once
1Eh	H08-29	Speed observer filter time	-	0 to 10	0.8	ms	16 bits	During running	At once
1Fh	H08-30	Disturbance compensation time	-	0 to 100	0.2	ms	16 bits	During running	At once
20h	H08-31	Disturbance cutoff frequency	-	10 to 4000	600	Hz	16 bits	During running	At once
21h	H08-32	Disturbance compensation gain	-	0 to 100	0	%	16 bits	During running	At once
22h	H08-33	Disturbance observer inertia correction coefficient	-	0 to 1600	100	%	16 bits	During running	At once
26h	H08-37	Phase modulation for medium- frequency jitter suppression 2	-	-90 to +90	0	o	16 bits	During running	At once

Para.	Group						Data		
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Change	Effective
Index	Para.						турс	condition	Time
27h	H08-38	Frequency of medium- frequency jitter suppression 2	-	0 to 1000	0	Hz	16 bits	During running	At once
28h	H08-39	Compensation gain of medium- frequency jitter suppression 2	-	0 to 300	0	%	16 bits	During running	At once
29h	H08-40	Speed observer selection	0: Disable 1: Enable	0 to 1	0	-	16 bits	During running	At once
2Bh	H08-42	Model control selection	0: Disable 1: Enable	0 to 1	0	-	16 bits	During running	At once
2Ch	H08-43	Model gain	-	0.1 to 2000	40	-	16 bits	During running	At once
2Fh	H08-46	Feedforward value	-	0 to 102.4	95	-	16 bits	During running	At once
36h	H08-53	Medium- and low-frequency jitter suppression frequency 3	-	0 to 300	0	Hz	16 bits	During running	At once
37h	H08-54	Medium- and low-frequency jitter suppression compensation 3	-	0 to 200	0	%	16 bits	During running	At once
39h	H08-56	Medium- and low-frequency jitter suppression phase modulation 3	-	0 to 600	100	%	16 bits	During running	At once
3Ch	H08-59	Medium- and low-frequency jitter suppression frequency 4	-	0 to 300	0	Hz	16 bits	During running	At once
3Dh	H08-60	Medium- and low-frequency jitter suppression compensation 4	-	0 to 200	0	%	16 bits	During running	At once
Para.	Group						Data	cl	
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HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	condition	mile
3Eh	H08-61	Medium- and low-frequency jitter suppression phase modulation 4	-	0 to 600	100	%	16 bits	During running	At once
3Fh	H08-62	Position loop integral time constant	-	0.15 to 512	512	-	16 bits	During running	At once
40h	H08-63	2nd position loop integral time constant	-	0.15 to 512	512	-	16 bits	During running	At once
41h	H08-64	Speed observer feedback source	0: Disable 1: Enable	0 to 1	0	-	16 bits	During running	At once
49h	H08-72	Viscous friction of zero deviation control	-	0 to 100	0	-	16 bits	During running	At once
4Ah	H08-73	Forward coulomb friction of zero deviation control	-	0 to 100	0	-	16 bits	During running	At once
4Bh	H08-74	Reverse coulomb friction of zero deviation control	-	-100 to 0	0	-	16 bits	During running	At once
4Ch	H08-75	Friction compensation selection of zero deviation control	0: Disable 1: Enable	0 to 1	0	-	16 bits	During running	At once
4Dh	H08-76	Acceleration compensation factor of zero deviation control	-	0 to 900	0	-	16 bits	During running	At once
4Eh	H08-77	Static friction of zero deviation control	-	0 to 100	0	-	16 bits	During running	At once

Para.	Group						Data	Chauses	Effective
HEX	DEC	Name	Description	Value Range	Default	Unit		Condition	Time
Index	Para.						21	condition	· ·····c
4Fh	H08-78	Transition speed between coulomb friction and viscous friction of zero deviation control	-	0 to 100	0	-	16 bits	During running	At once
50h	H08-79	Initial torque shock of zero deviation control	-	0 to 100	0	-	16 bits	During running	At once
51h	H08-80	Friction compensation delay of zero deviation control	-	0 to 1000	20	-	16 bits	During running	At once
			2009h/H09: Gain	auto-tuning par	rameters				
01h	H09-00	Gain auto- tuning mode	0: Invalid, gain parameters tuned manually 1: Valid, gain parameters tuned automatically based on the stiffness level 2: Positioning mode, gain parameters tuned automatically based on the stiffness level 3: Interpolation mode + Inertia auto- tuning 4: Normal mode + Inertia auto-tuning 6: Quick positioning mode + Inertia auto- tuning	0 to 7	4	-	16 bits	During running	At once
02h	H09-01	Stiffness level	-	0 to 41	15	-	16 bits	During running	At once

Para.	Group						Data	cl	
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						211-2	condition	·····c
03h	H09-02	Adaptive notch mode	0: Adaptive notch not updated 1: One adaptive notch activated (3rd notch) 2: Two adaptive notches activated (3rd and 4th notches) 3: Resonance point tested only, displayed in H09-24 4: Adaptive notch cleared, values of the 3rd and 4th notches restored to default settings	0 to 4	3	-	16 bits	During running	At once
04h	H09-03	Online inertia auto-tuning mode	0: Disabled 1: Enabled, changing slowing 2: Enabled, changing normally 3: Enabled, changing quickly	0 to 3	2	-	16 bits	During running	At once
06h	H09-05	Offline inertia auto-tuning mode	0: Bidirectional 1: Unidirectional	0 to 1	0	-	16 bits	At stop	At once
07h	H09-06	Maximum speed of inertia auto-tuning	-	100 to 1000	500	RPM	16 bits	At stop	At once
08h	H09-07	Time constant for accelerating to the max. speed during inertia auto- tuning	-	20 to 800	125	ms	16 bits	At stop	At once
09h	H09-08	Waiting time after an individual inertia auto- tuning	-	50 to 10000	800	ms	16 bits	At stop	At once
0Ah	H09-09	Number of motor revolutions per inertia auto- tuning	-	0 to 100	1	-	16 bits	-	-

Para.	Group						_		
HEX	DEC	Name	Description	Value Range	Default	Unit	Data	Change	Effective
Index	Para.						туре	Condition	lime
		Vibration					16	During	
0Ch	H09-11	threshold	-	0 to 100	5	%	bits	running	At once
		Frequency of					16	During	
0Dh	H09-12	the 1st notch	-	50 to 8000	8000	Hz	bits	running	At once
0.51	1100 10	Width level of		0.1	2		16	During	
UEN	H09-13	the 1st notch	-	0 to 20	2	-	bits	running	At once
OEb		Depth level of		0 to 00	0		16	During	At onco
UFII	HU9-14	the 1st notch	-	01099	U	-	bits	running	ALOICE
10h	H00 15	Frequency of		50 to 8000	8000	Ц7	16	During	At onco
1011	1105-15	the 2nd notch	-	30 10 8000	8000	112	bits	running	AUDICE
11h	H09-16	Width level of	-	0 to 20	2	_	16	During	At once
1111	1105-10	the 2nd notch	-	0 10 20	2		bits	running	At office
12h	H09-17	Depth level of	-	0 to 99	0	_	16	During	At once
1211	1105 11	the 2nd notch		0.0000	Ű		bits	running	All Office
13h	H09-18	Frequency of	-	50 to 8000	8000	1 Hz	16	During	At once
10.11	1100 10	the 3rd notch					bits	running	/ te office
14h	H09-19	Width level of	-	0 to 20	2	-	16	During	At once
	1100 10	the 3rd notch		0.0020	-		bits	running	/ conce
15h	H09-20	Depth level of	-	0 to 99	0	-	16	During	At once
		the 3rd notch			-		bits	running	
16h	H09-21	Frequency of	-	50 to 8000	8000	1 Hz	16	During	At once
		the 4th notch					bits	running	
17h	H09-22	Width level of	-	0 to 20	2	-	16	During	At once
		the 4th notch					bits	running	
18h	H09-23	Depth level of	-	0 to 99	0	-	16	During	At once
		the 4th notch					bits	running	
101	1100.04	Auto-tuned		0.1 5000			16		
19n	H09-24	frequency	-	0 to 5000	0	HZ	bits	-	-
		Tansian							
		fluctuation					16		
1Fh	H09-30	compensation	-	-100 to +100	0	-	hits	-	-
		gain					Ditto		
		Tension							
		fluctuation					16		
20h	H09-31	compensation	-	0 to 25	0.5	-	bits	-	-
		filter time							
		Gravity					16	During	
21h	H09-32	compensation	-	0 to 100	0	%	bits	running	At once
		value							
224	1100.22	Forward friction		0 to 100	<u> </u>	0/	16	During	At 0200
22N	HNA-22	value	-	0 10 100	U	70	bits	running	ALONCE
		value	1	1		1		1	1

Para.	Group						Data		
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Change	Effective
Index	Para.						турс	condition	Time
23h	H09-34	Reverse friction compensation value	-	-100 to 0	0	%	16 bits	During running	At once
24h	H09-35	Friction compensation speed	-	0 to 20	2	-	16 bits	During running	At once
25h	H09-36	Friction compensation speed	0x00: Slow mode + Speed reference 0x01: Slow mode + Model speed 0x02: Slow mode + Speed feedback 0x10: Quick mode + Speed reference 0x11: Quick mode + Model speed 0x12: Quick mode + Speed feedback	0 to 19	0	-	16 bits	During running	At once
26h	H09-37	Vibration monitoring time	-	0 to 65535	1200	-	16	During running	At once
27h	H09-38	Frequency of low-frequency resonance suppression 1 at the mechanical end	-	1 to 100	100	Hz	16 bits	During running	At once
28h	H09-39	Low-frequency resonance suppression 1 at the mechanical end	-	0 to 3	2	-	16 bits	At stop	At once
2Ah	H09-41	Frequency of the 5th notch	-	50 to 8000	8000	Hz	16 bits	During running	At once
2Bh	H09-42	Width level of the 5th notch	-	0 to 20	2	-	16 bits	At stop	At once
2Ch	H09-43	Depth level of the 5th notch	-	0 to 99	0	-	16 bits	At stop	At once
2Dh	H09-44	Frequency of low-frequency resonance suppression 2 at mechanical load end	-	0 to 200	0	-	16 bits	During running	At once

Para.	Group						Data	Change	Effective
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						.)pc	condition	mine
2Eh	H09-45	Responsiveness of low- frequency resonance suppression 2 at the mechanical load end	-	0.01 to 10	1	-	16 bits	During running	At once
30h	H09-47	Width of low- frequency resonance suppression 2 at mechanical load end	-	0 to 2	100	-	16 bits	During running	At once
32h	H09-49	Frequency of low-frequency resonance suppression 3 at mechanical load end	-	0 to 2000	0	-	16 bits	During running	At once
33h	H09-50	Responsiveness of low- frequency resonance suppression 3 at mechanical load end	-	0.01 to 10	1	-	16 bits	During running	At once
35h	H09-52	Width of low- frequency resonance suppression 3 at mechanical load end	-	0 to 2	1	-	16 bits	During running	At once
39h	H09-56	STune mode setting	-	0 to 4	4	-	16 bits	During running	At once
3Ah	H09-57	STune resonance suppression switchover frequency	-	0 to 4000	900	Hz	16 bits	During running	At once
3Bh	H09-58	STune resonance suppression reset selection	0: Disable 1: Enable	0 to 1	0	-	16 bits	During running	At once
			200Ah/H0A: Fault a	and protection p	arameters				

Para.	Group						Data	Change	Effective
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.								
01h	H0A-00	Power input phase loss protection	0: Phase loss fault detected 1: Phase loss fault not detected 3: Power loss detection enabled Note: In the common bus mode, set 200A- 01h to 1. Otherwise, the servo drive cannot enter "rdy" state after power-on.	0 to 3	0	-	16 bits	During running	At once
02h	H0A-01	Absolute position limit	0: Disable 1: Enable 2: Enabled after homing	0 to 2	0	-	16 bits	At stop	At once
05h	H0A-04	Motor overload protection gain	-	50 to 300	100	-	16 bits	At stop	At once
09h	H0A-08	Overspeed threshold	-	0 to 20000	0	RPM	16 bits	During running	At once
0Bh	H0A-10	Threshold of excessive local position deviation	-	0 to (2 ³² - 1)	25185824	-	16 bits	During running	At once
0Dh	H0A-12	Runaway protection	0: Disable 1: Enable	0 to 1	1	-	16 bits	During running	At once
13h	H0A-18	IGBT over- temperature threshold	-	120 to 175	135	°C	16 bits	During running	At once
14h	H0A-19	Filter time constant of touch probe 1	-	0 to 6.3	2	us	16 bits	During running	At once
15h	H0A-20	Filter time constant of touch probe 2	-	0 to 6.3	2	us	16 bits	During running	At once
16h	H0A-21	STO function display selection	0: Display STO status 1: Display STO fault	0 to 1	0	-	16 bits	During running	At once
18h	H0A-23	TZ signal filter time	-	0 to 31	15	25 ns	16 bits	At stop	Next power- on
1Ah	H0A-25	Filter time constant of speed feedback display value	-	0 to 5000	50	ms	16 bits	At stop	At once

Para.	Group						Data		
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Change	Effective
Index	Para.						турс	Condition	Time
1Bh	H0A-26	Motor overload detection	0: Enable 1: Hide motor overload warning (E909.0) and motor overload fault (E620.0)	0 to 1	0	-	16 bits	At stop	At once
1Ch	H0A-27	Motor rotation DO speed filter time	-	0 to 5000	50	ms	16 bits	During running	At once
21h	H0A-32	Motor stall over- temperature protection time window	-	10 to 65535	200	ms	16 bits	During running	At once
22h	H0A-33	Motor stall over- temperature detection	0: Hide 1: Enable	0 to 1	1	-	16 bits	During running	At once
25h	H0A-36	Encoder multi- turn overflow fault selection	0: Not hide 1: Hide	0 to 1	0	-	16 bits	During running	At once
29h	H0A-40	Overtravel compensation switch	0: Enable 1: Disable	0 to 1	0	-	16 bits	At stop	At once
32h	H0A-49	Regenerative transistor over- temperature threshold	-	100 to 175	115	°C	16 bits	During running	At once
33h	H0A-50	Encoder communication fault tolerance threshold	-	0 to 31	3	-	16 bits	During running	At once
34h	H0A-51	Phase loss detection filter times	-	3 to 36	20	55 ms	16 bits	During running	At once
35h	H0A-52	Encoder over- temperature threshold	-	0 to 175	0	°C	16 bits	During running	At once
38h	H0A-55	Runaway current threshold	-	100 to 400	200	%	16 bits	During running	At once
39h	H0A-56	Overload fault reset delay	-	0 to 60000	10000	ms	16 bits	During running	At once
3Ah	H0A-57	Runaway speed threshold	-	1 to 1000	50	RPM	16 bits	During running	At once

Para.	Group						Data		
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Change	Effective
Index	Para.						турс	condition	Time
3Bh	H0A-58	Runaway speed filter time	-	0.1 to 100	2	ms	16 bits	During running	Next power- on
3Ch	H0A-59	Runaway protection detection time	-	10 to 1000	30	ms	16 bits	During running	At once
47h	H0A-70	Overspeed threshold 2	-	0 to 20000	0	RPM	16 bits	During running	At once
48h	H0A-71	MS1 motor overload curve switchover	0: New overload curve 1: Old overload curve 2: Disable voltage discharge upon power failure 3: Old overload curve and disable voltage discharge upon power failure	0 to 3	0		16 bits	During running	At once
49h	H0A-72	Maximum stop time of ramp- to-stop	-	0 to 65535	10000	ms	16 bits	At stop	At once
4Ah	H0A-73	STO 24 V disconnection filter time	-	0 to 5	5	ms	16 bits	During running	At once
4Bh	H0A-74	Fault tolerance filter time of two STO channels	-	0 to 10	10	ms	16 bits	During running	At once
4Ch	H0A-75	Servo OFF delay after STO triggered	-	0 to 25	20	ms	16 bits	During running	At once
			200Bh/H0B: M	lonitoring paran	neters		1	1	
01h	H0B-00	Motor speed actual value	-	-32767 to +32767	0	RPM	16 bits	-	-
02h	H0B-01	Speed reference	-	-32767 to +32767	0	RPM	16 bits	-	-
03h	H0B-02	Internal torque reference	-	-500 to +500	0	%	16 bits	-	-
04h	H0B-03	Monitored DI status	-	0 to 65535	0	-	16 bits	-	-
06h	H0B-05	Monitored DO status	-	0 to 65535	0	-	16 bits	-	-

Para.	Group								
HEX	DEC	Name	Description	Value Range	Default	Unit	Data	Change	Effective
Index	Para.						туре	Condition	Time
08h	H0B-07	Absolute position counter	-	-2 ³¹ to +(2 ³¹ - 1)	0	1 p	32 bits	-	-
0Ah	H0B-09	Mechanical angle	-	0 to 360	0	0	16 bits	-	-
0Bh	H0B-10	Electrical angle	-	0 to 360	0	0	16 bits	-	-
0Dh	H0B-12	Average load rate	-	0 to 800	0	%	16 bits	-	-
10h	H0B-15	Position following error (encoder unit)	-	-2147483648 to +2147483647	0	р	32 bits	-	-
12h	H0B-17	Feedback pulse counter	-	-2147483648 to +2147483647	0	р	32 bits	-	-
14h	H0B-19	Total power-on time	-	0 to 429496729.5	0	s	32 bits	-	-
19h	H0B-24	RMS value of phase current	-	0 to 6553.5	0	A	32 bits	-	-
1Bh	H0B-26	Bus voltage	-	0 to 6553.5	0	v	16 bits	-	-
1Ch	H0B-27	Power module temperature	-	-20 to +200	0	°C	16 bits	-	-
1Dh	H0B-28	Absolute encoder fault information given by FPGA	-	0 to 65535	0	-	16 bits	-	-
1Eh	H0B-29	Axis status information given by FPGA	-	0 to 65535	0	-	16 bits	-	-
1Fh	H0B-30	Axis fault information given by FPGA	-	0 to 65535	0	-	16 bits	-	-
20h	H0B-31	Encoder fault information	-	0 to 65535	0	-	16 bits	-	-
22h	H0B-33	Fault log	0: Present fault 1: Last fault 2: 2nd to last fault 3: 3rd to last fault 4: 4th to last fault 5: 5th to last fault 6: 6th to last fault 7: 7th to last fault 8: 8th to last fault 9: 9th to last fault	0 to 9	0	-	16 bits	During running	At once

Para.	Group						.		- "
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Change	Effective
Index	Para.						турс	Condition	Time
		Fault code of					10		
23h	H0B-34	the selected	-	0 to 65535	0	-	10 bitc	-	-
		fault					DILS		
		Time stamp							
		upon		0 to			30		
24h	H0B-35	occurrence of	-	429496729 5	0	s	bits	-	-
		the selected		423430123.3			DIUS		
		fault							
		Motor speed							
		upon		-32767 to			16		
26h	H0B-37	occurrence of	-	+32767	0	RPM	hits	-	-
		the selected		02101			5105		
		fault							
		Motor phase U							
		current upon		-3276.7 to			16		
27h	H0B-38	occurrence of	-	+3276.7	0	A	bits	-	-
		the selected							
		fault							
		Motor phase V							
		current upon		-3276.7 to			16		
28h	H0B-39	occurrence of	-	+3276.7	0	A	bits	-	-
		the selected							
		fault							
		Bus voltage							
201-	1100 40	upon		0 +- 0552 5	0		16		
29n	H0B-40	occurrence of	-	0 to 6553.5	0	v	bits	-	-
		fault							
		Distatus unan							
		occurrence of					16		
2Ah	H0B-41	the selected	-	0 to 65535	0	-	hitc	-	-
		fault					DILS		
		occurrence of					16		
2Ch	H0B-43	the selected	-	0 to 65535	0	-	hits	-	-
		fault					Ditto		
		Internal fault					16		
2Eh	H0B-45	code	-	0 to 65535	0	-	bits	-	-
		Absolute							
		encoder fault							
		information							
		given by FPGA					16		
2Fh	H0B-46	upon	-	0 to 65535	0	-	bits	-	-
		occurrence of							
		the selected							
		fault							

Para.	Group						Data	Channer	Effective
HEX	DEC	Name	Description	Value Range	Default	Unit		Condition	Time
Index	Para.						.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	condition	Time
30h	H0B-47	System status information given by FPGA upon occurrence of the selected fault	-	0 to 65535	0	-	16 bits	-	-
31h	H0B-48	System fault information given by FPGA upon occurrence of the selected fault	-	0 to 65535	0	-	16 bits	-	-
32h	H0B-49	Encoder fault information upon occurrence of the selected fault	-	0 to 65535	0	-	16 bits	-	-
34h	H0B-51	Internal fault code upon occurrence of the selected fault	-	0 to 65535	0	-	16 bits	-	-
36h	H0B-53	Position following error (reference unit)	-	-2 ³¹ to +(2 ³¹ - 1)	0	р	32 bits	-	-
38h	H0B-55	Motor speed actual value	-	-6000 to +6000	0	RPM	32 bits	-	-
3Ah	H0B-57	Bus voltage of the control circuit	-	0 to 6553.5	0	V	16 bits	-	-
3Bh	H0B-58	Mechanical absolute position (low 32 bits)	-	0 to 2 ³²	0	р	32 bits	-	-
3Dh	H0B-60	Mechanical absolute position (high 32 bits)	-	-2 ³¹ to +(2 ³¹ - 1)	0	р	32 bits	-	-

Para.	Group						Data	Change	Effective
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						,		
40h	H0B-63	NotRdy state	0: None 1: Control circuit power supply error (H0B-57) 2: Phase loss detection error 3: Main circuit power supply detection error (including short-circuited to ground error) 4: Other servo faults 5: Short-circuited to ground detection not done	0 to 5	0	-	16 bits	-	-
43h	H0B-66	Encoder temperature	-	-100 to +200	0	°C	16 bits	-	-
44h	H0B-67	Load rate of regenerative transistor	-	0 to 200	0	%	16 bits	-	-
47h	H0B-70	Number of revolutions fed back by the absolute encoder	-	0 to 65535	0	Rev	16 bits	-	-
48h	H0B-71	Single-turn position feedback of the absolute encoder	-	0 to (2 ³¹ - 1)	0	р	32 bits	-	-
4Bh	H0B-74	System fault information given by FPGA	-	0 to 65535	0	-	16 bits	-	-
4Eh	H0B-77	Position feedback of the absolute encoder (low 32 bits)	-	-2 ³¹ to +(2 ³¹ - 1)	0	р	32 bits	-	-
50h	H0B-79	Position feedback of the absolute encoder (high 32 bits)	-	-2 ³¹ to +(2 ³¹ - 1)	0	р	32 bits	-	-

Para.	Group						Data	Chause	Effective
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						21	condition	· ·····c
52h	H0B-81	Single-turn position of the rotating load (low 32 bits)	-	0 to (2 ³² - 1)	0	р	32 bits	-	-
54h	H0B-83	Single-turn position of the rotating load (high 32 bits)	-	-2 ³¹ to +(2 ³¹ - 1)	0	р	32 bits	-	-
56h	H0B-85	Single-turn position of the rotating load (reference unit)	-	-2 ³¹ to +(2 ³¹ - 1)	0	р	32 bits	-	-
5Bh	H0B-90	Group No. of the abnormal parameter	-	0 to 65535	0	-	16 bits	-	-
5Ch	H0B-91	Offset of the abnormal parameter within the parameter group	-	0 to 65535	0	-	16 bits	-	-
			200Dh/H0D: Auxi	liary function pa	rameters				
01h	H0D-00	Software reset	0: No operation 1: Enable	0 to 1	0	-	16 bits	At stop	At once
02h	H0D-01	Fault reset	0: No operation 1: Enable	0 to 1	0	-	16 bits	At stop	At once
03h	H0D-02	Offline inertia auto-tuning selection	0: Disable 1: Enable	0 to 1	0	-	16 bits	At stop	At once
04h	H0D-03	Encoder initial angle auto- tuning	0: No operation 1: Enable	0 to 1	0	-	16 bits	At stop	At once
05h	H0D-04	Read/write in encoder ROM	0: No operation 1: Write ROM 2: Read ROM	0 to 2	0	-	16 bits	At stop	At once
06h	H0D-05	Emergency stop	0: No operation 1: Enable	0 to 1	0	-	16 bits	During running	At once
0Ch	H0D-12	Phase U/V current balance correction	0: Disable 1: Enable	0 to 1	0	-	16 bits	At stop	At once

Para.	Group						Data	cl	
HEX	DEC	Name	Description	Value Range	Default	Unit	Data Type	Change	Effective
Index	Para.						.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	condition	Time
12h	H0D-17	Forced DI/DO enable switch	0: No operation 1: Forced DI enabled, forced DO disabled 2: Forced DI disabled, forced DO enabled 3: Forced DI and DO enabled 4: EtherCAT forced DO enabled	0 to 4	0	-	16 bits	During running	At once
13h	H0D-18	Forced DI value	-	0 to 31	0	-	16 bits	During running	At once
14h	H0D-19	Forced DO value	-	0 to 7	0	-	16 bits	During running	At once
15h	H0D-20	Absolute encoder reset selection	0: No operation 1: Reset encoder fault 2: Reset encoder fault and multi-turn data	0 to 2	0	-	16 bits	At stop	At once
			200Eh/H0E: Auxil	iary function pa	rameters				
01h	H0E-00	Node address	-	0 to 127	1	-	16 bits	During running	At once
02h	H0E-01	Save objects written through communication to EEPROM	0: Parameters and object dictionaries written through communication not saved to EEPROM 1: Only parameters written through communication saved to EEPROM 2: Only object dictionaries written through communication saved to EEPROM 3: Parameters and object dictionaries written through communication saved to EEPROM	0 to 3	3	-	16 bits	During running	At once
15h	H0E-20	EtherCAT slave name	-	0 to 65535	0	-	16 bits	-	-
16h	H0E-21	EtherCAT slave alias	-	0 to 65535	0	-	16 bits	At stop	At once

Para.	Group						Data		
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Change	Effective
Index	Para.						турс	Condition	nine
		Number of							
		synchronous					16	During	
17h	H0E-22	loss events	-	1 to 20	8	-	10 bitc	running	At once
		allowed by					DILS	Turring	
		EtherCAT							
		EtherCAT					16	During	
18h	H0E-23	station alias	-	0 to 65535	0	-	hits	running	At once
		from EEPROM					Ditto		
		Number of					16		
19h	H0E-24	SYNC loss	-	0 to 65535	0	-	hits	-	-
		events					5105		
		Max. error value							
		and invalid					16		
1Ah	H0E-25	frames of	-	0 to 65535	0	-	hits	-	-
		EtherCAT port 0					5105		
		per unit time							
		Max. error value							
		and invalid					16		
1Bh	H0E-26	frames of	-	0 to 65535	0	-	bits	-	-
		EtherCAT port 1							
		per unit time							
		Max. transfer							
1Ch	H0E-27	error of	-	0 to 65535	0	-	16	-	-
1000		EtherCAT port		0.00.00000	Ŭ		bits		
		per unit time							
		Max. EtherCAT							
		data frame					16		
1Dh	H0E-28	processing unit	-	0–255	0	-	bits	-	-
		error per unit							
		time							
		Max. link loss							
1Eh	H0E-29	Value of	-	0 to 65535	0	-	16	-	-
		por unit time					DITS		
		EtherCAI					16	A	Next
20h	H0E-31	synchronization	-	0 to 2	1	-	bits	At stop	power-
		mode setting							on
		EtherCAT					16	A	
21h	H0E-32	synchronization	-	0 to 4000	3000	us	bits	At stop	At once
		error threshold							
		EtherCAI state							
226	1105 22	machine status		0 to 65525	0		16		
220	⊓UE-33	and port	-	0 10 00035	U	-	bits	-	-
		status							
1		รเลเนร	1	1			1	1	

Para.	Group						Data	Change	Effective
HEX	DEC	Name	Description	Value Range	Default	Unit	Туре	Condition	Time
Index	Para.								
23h	H0E-34	Number of excessive position reference increment events in CSP mode	-	0 to 7	1	-	16 bits	During running	At once
24h	H0E-35	AL fault code	-	0 to 65535	0	-	16 bits	-	-
25h	H0E-36	EtherCAT AL enhanced link selection	0: Disable 1: Enable	0 to 1	0	-	16 bits	During running	Next power- on
26h	H0E-37	EtherCAT XML reset selection	0: Disable 1: Enable	0 to 1	0	-	16 bits	During running	Next power- on
51h	H0E-80	Modbus baud rate	9: 300 bps 1: 600 bps 2: 1200 bps 3: 2400 bps 4: 4800 bps 5: 9600 bps 6: 19200 bps 7: 38400 bps 8: 57600 bps 9: 115200 bps 10: 230400 bps	0 to 10	9	-	16 bits	During running	At once
52h	H0E-81	Modbus data format	0: No parity, 2 stop bits (8-N-2) 1: Even parity, 1 stop bit (8-E-1) 2: Odd parity, 1 stop bit (8-O-1) 3: No parity, 1 stop bit (8-N-1)	0 to 3	3	-	16 bits	During running	At once
53h	H0E-82	Modbus response delay	-	0 to 20	0	ms	16 bits	During running	At once
54h	H0E-83	Modbus communication timeout	-	0 to 600	0	ms	16 bits	During running	At once
5Bh	H0E-90	Modbus version	-	0 to 655.35	0	-	16 bits	-	-
5Eh	H0E-93	EtherCAT COE version	-	0 to 655.35	0	-	16 bits	-	-
61h	H0E-96	XML version	-	0 to 655.35	0	-	16 bits	-	-
			2018h/H18: Posi	tion comparisor	n output				

Para.	Group						Data	cl	
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						турс	condition	Time
01h	H18-00	Position comparison output selection	0: Disable 1: Enable (rising edge-triggered)	-	0	-	16 bits	During running	At once
03h	H18-02	Position comparison resolution	0: 24-bit 1: 23-bit 2: 22-bit 3: 21-bit 4: 20-bit 5: 19-bit 6: 18-bit 7: 17-bit	-	1	-	16 bits	During running	At once
04h	H18-03	Position comparison mode	0: Individual comparison 1: Cyclic comparison	-	0	-	16 bits	During running	At once
05h	H18-04	Current position as zero	0: Disable 1: Enable (rising edge-triggered)	-	0	-	16 bits	During running	At once
06h	H18-05	Position comparison output width	-	-	0	0.1 ms	16 bits	During running	At once
08h	H18-07	Start point of position comparison	-	-	0	-	16 bits	During running	At once
09h	H18-08	End point of position comparison	-	-	0	-	16 bits	During running	At once
0Ah	H18-09	Current status of position comparison	-	-	0	-	16 bits	Unedita ble	At once
0Bh	H18-10	Real-time position of position comparison	-	-	0	-	32 bits	Unedita ble	At once
0Dh	H18-12	Zero offset of position comparison	-	-	0	-	32 bits	During running	At once
			2019h/H19: Tar	get position para	ameters				
01h	H19-00	Target value of position comparison 1	-	-	0	-	32 bits	During running	At once

Para.	Group						Data	Chause	Effe etime
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	condition	mile
03h	H19-02	Attribute value of position comparison 1	0: Skip this point 1: Output DO active signal if current position changes from "less than" to "more than" the comparison point 2: Output DO active signal if current position changes from "more than" to "less than" the comparison point 3: Output DO active signal in both situations	-	0	-	16 bits	During running	At once
04h	H19-03	Target value of position comparison 2	-	-	0	-	32 bits	During running	At once
06h	H19-05	Attribute value of position comparison 2	0: Skip this point 1: Output DO active signal if current position changes from "less than" to "more than" the comparison point 2: Output DO active signal if current position changes from "more than" to "less than" the comparison point 3: Output DO active signal in both situations	-	0	-	16 bits	During running	At once
07h	H19-06	Target value of position comparison 3	-	-	0	-	32 bits	During running	At once

Para.	Group						Data	cl	
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	condition	Time
09h	H19-08	Attribute value of position comparison 3	0: Skip this point 1: Output DO active signal if current position changes from "less than" to "more than" the comparison point 2: Output DO active signal if current position changes from "more than" to "less than" the comparison point 3: Output DO active signal in both situations	-	0	-	16 bits	During running	At once
0Ah	H19-09	Target value of position comparison 4	-	-	0	-	32 bits	During running	At once
0Ch	H19-11	Attribute value of position comparison 4	0: Skip this point 1: Output DO active signal if current position changes from "less than" to "more than" the comparison point 2: Output DO active signal if current position changes from "more than" to "less than" the comparison point 3: Output DO active signal in both situations	-	0	-	16 bits	During running	At once
0Dh	H19-12	Target value of position comparison 5	-	-	0	-	32 bits	During running	At once

Para.	Group						Data	Chause	Effe etime
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	condition	Time
0Fh	H19-14	Attribute value of position comparison 5	0: Skip this point 1: Output DO active signal if current position changes from "less than" to "more than" the comparison point 2: Output DO active signal if current position changes from "more than" to "less than" the comparison point 3: Output DO active signal in both situations	-	0	-	16 bits	During running	At once
10h	H19-15	Target value of position comparison 6	-	-	0	-	32 bits	During running	At once
12h	H19-17	Attribute value of position comparison 6	0: Skip this point 1: Output DO active signal if current position changes from "less than" to "more than" the comparison point 2: Output DO active signal if current position changes from "more than" to "less than" the comparison point 3: Output DO active signal in both situations	-	0	-	16 bits	During running	At once
13h	H19-18	Target value of position comparison 7	-	-	0	-	32 bits	During running	At once

Para.	Group						Data	CI.	
HEX	DEC	Name	Description	Value Range	Default	Unit	Type	Condition	Time
Index	Para.						.)pc	condition	Time
15h	H19-20	Attribute value of position comparison 7	0: Skip this point 1: Output DO active signal if current position changes from "less than" to "more than" the comparison point 2: Output DO active signal if current position changes from "more than" to "less than" the comparison point 3: Output DO active signal in both situations	-	0	-	16 bits	During running	At once
16h	H19-21	Target value of position comparison 8	-	-	0	-	32 bits	During running	At once
18h	H19-23	Attribute value of position comparison 8	0: Skip this point 1: Output DO active signal if current position changes from "less than" to "more than" the comparison point 2: Output DO active signal if current position changes from "more than" to "less than" the comparison point 3: Output DO active signal in both situations	-	0	-	16 bits	During running	At once

2.4.4 Parameter Group 6000h

The parameter group 6000h contains objects supported by the servo drive in DSP402 device profile.

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default	Change Condition	Effective Time
603Fh	0	Error code	RO	TPDO	Uint 16	-	-	-	-	-
6040h	0	Control word	RW	RPDO	Uint 16	-	0 to 65535	0	During running	At once
6041h	0	Status word	RO	TPDO	Uint 16	-	-	-	-	-
605Ah	0	Quick stop option code	RW	No	int 16	-	0 to 7	2	During running	At stop
605Ch	0	Disable operation option code	RW	No	int 16	-	-4 to +1	0	During running	At stop
605Dh	0	Stop option code	RW	No	int 16	-	1 to 3	1	During running	At stop
605Eh	0	Fault reaction option code	RW	No	int 16	-	-5 to +3	2	During running	At stop
6060h	0	Modes of operation	RW	RPDO	int 8	-	0 to 10	0	During running	At once
6061h	0	Modes of operation display	RO	TPDO	int 8	-	-	-	-	-
6062h	0	Position demand value	RO	TPDO	int 32	Reference unit	-	-	-	-
6063h	0	Position actual value*	RO	TPDO	int 32	Encoder unit	-	-	-	-
6064h	0	Position actual value	RO	TPDO	int 32	Reference unit	-	-	-	-
6065h	0	Following error window	RW	RPDO	Uint 32	Reference unit	0 to (2 ³² - 1)	0	During running	At once
6066h	0	Following error time out	RW	RPDO	Uint 16	ms	0 to 65535	0	During running	At once
6067h	0	Position window	RW	RPDO	Uint 32	Reference unit	0 to (2 ³² - 1)	734	During running	At once
6068h	0	Position window time	RW	RPDO	Uint 16	ms	0 to 65535	0	During running	At once
606Ch	0	Velocity actual value	RO	TPDO	int 32	Reference unit/s	-	-	-	-
606Dh	0	Velocity window	RW	RPDO	Uint 16	RPM	0 to 65535	10	During running	At once

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default	Change Condition	Effective Time
606Eh	0	Velocity window time	RW	RPDO	Uint 16	ms	0 to 65535	0	During running	At once
606Fh	0	Velocity threshold	RW	RPDO	Uint 16	RPM	0 to 65535	10	During running	At once
6070h	0	Velocity threshold time	RW	RPDO	Uint 16	ms	0 to 65535	0	During running	At once
6071h	0	Target torque	RW	RPDO	int 16	0.1%	-4000 to +4000	0	During running	At once
6072h	0	Max. torque	RW	RPDO	Uint 16	0.1%	0 to 4000	3500	During running	At once
6074h	0	Torque demand value	RO	TPDO	int 16	0.1%	-	0	-	-
6077h	0	Torque actual value	RO	TPDO	int 16	0.1%	-	0	-	-
607Ah	0	Target position	RW	RPDO	int 32	Reference unit	-2 ³¹ to +(2 ³¹ - 1)	0	During running	At once
607Ch	0	Home offset	RW	RPDO	int 32	Reference unit	-2 ³¹ to +(2 ³¹ - 1)	0	During running	At once
					Softw	are position lin	nit			
	0	Highest sub- index supported	RO	No	Uint 8	-	-	0x02	-	-
607D	1	Min. position limit	RW	RPDO	int 32	Reference unit	-2 ³¹ to +(2 ³¹ - 1)	-2 ³¹	During running	At once
	2	Max. position limit	RW	RPDO	int 32	Reference unit	-2 ³¹ to +(2 ³¹ - 1)	2 ³¹ - 1	During running	At once
607Eh	0	Polarity	RW	RPDO	Uint 8	-	0–255	0	During running	At once
607Fh	0	Max. profile velocity	RW	RPDO	Uint 32	Reference unit/s	0 to (2 ³² - 1)	104857600	During running	At once
6081h	0	Profile velocity	RW	RPDO	Uint 32	User-defined velocity unit	0 to (2 ³² - 1)	1747627	During running	At once
6083h	0	Profile acceleration	RW	RPDO	Uint 32	Reference unit/s ²	0 to (2 ³² - 1)	174762666	During running	At once
6084h	0	Profile deceleration	RW	RPDO	Uint 32	Reference unit/s ²	0 to (2 ³² - 1)	174762666	During running	At once
6085h	0	Quick stop deceleration	RW	RPDO	Uint 32	Reference unit/s ²	0 to (2 ³² - 1)	2 ³¹ - 1	During running	At once

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default	Change Condition	Effective Time
6086h	0	Motion profile type	RW	RPDO	int 16	-	-32767 to +32767	0	During running	At once
6087h	0	Torque slope	RW	RPDO	Uint 32	0.1%/s	0 to (2 ³² - 1)	2 ³² - 1	During running	At once
						Gear ratio				
6001h	0	Highest sub- index supported	RO	No	Uint 8	Uint 8	-	0x02	-	-
009111	1	Motor revolutions	RW	RPDO	Uint 32	-	0 to (2 ³² - 1)	1	During running	At once
	2	Shaft revolutions	RW	RPDO	Uint 32	-	1 to (2 ³² - 1)	1	During running	At once
6098h	0	Homing method	RW	RPDO	int 8	-	-2 to +35	1	During running	At once
					H	oming speeds				
	0	Highest sub- index supported	RO	No	Uint 8	-	-	2	-	-
6099h	1	Speed during search for switch	RW	RPDO	Uint 32	Reference unit/s	0 to (2 ³² - 1)	1747627	During running	At once
	2	Speed during search for zero	RW	RPDO	Uint 32	Reference unit/s	10 to (2 ³² - 1)	174763	During running	At once
609Ah	0	Homing acceleration	RW	RPDO	Uint 32	Reference unit/s ²	0 to (2 ³² - 1)	1747626667	During running	At once
60B0h	0	Position offset	RW	RPDO	int 32	Reference unit	-2 ³¹ to +(2 ³¹ - 1)	0	During running	At once
60B1h	0	Velocity offset	RW	RPDO	int 32	Reference unit/s	-2 ³¹ to +(2 ³¹ - 1)	0	During running	At once
60B2h	0	Torque offset	RW	RPDO	int 16	0.10%	-4000 to +4000	0	During running	At once
60B8h	0	Touch probe function	RW	RPDO	Uint 16	-	0 to 65535	0	During running	At once
60B9h	0	Touch probe status	RW	TPDO	Uint 16	-	-	0	-	-
60BAh	0	Touch probe 1 positive edge	RW	TPDO	int 32	Reference unit	-	0	-	-
60BBh	0	Touch probe 1 negative edge	RW	TPDO	int 32	Reference unit	-	0	-	-

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default	Change Condition	Effective Time
60BCh	0	Touch probe 2 positive edge	RW	TPDO	int 32	Reference unit	-	0	-	-
60BDh	0	Touch probe 2 negative edge	RW	TPDO	int 32	Reference unit	-	0	-	-
60C5h	0	Max. acceleration	RW	RPDO	Uint 32	User-defined acceleration unit	0 to 2 ³² - 1	2 ³¹ - 1	During running	At once
60C6h	0	Max. deceleration	RW	RPDO	Uint 32	User-defined acceleration unit	0 to 2 ³² - 1	2 ³¹ - 1	During running	At once
60D5h	0	Touch probe 1 positive edge counter	RO	TPDO	Uint 16	-	-	0	-	-
60D6h	0	Touch probe 1 negative edge counter	RO	TPDO	Uint 16	-	-	0	-	-
60D7h	0	Touch probe 2 positive edge counter	RO	TPDO	Uint 16	-	-	0	-	-
60D8h	0	Touch probe 2 negative edge counter	RO	TPDO	Uint 16	-	-	0	-	-
60E0h	0	Positive torque limit value	RW	RPDO	Uint 16	0.1%	0 to 4000	3500	During running	At once
60E1h	0	Negative torque limit value	RW	RPDO	Uint 16	0.1%	0 to 4000	3500	During running	At once

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default	Change Condition	Effective Time
					Support	ed homing me	thod			
	0	Highest sub- index supported	RO	No	Uint 8	-	-	31	-	-
	1	1st supported homing method	RO	No	Uint 16	-	-	769	-	-
60E3h	2	2nd supported homing method	RO	No	Uint 16	-	-	770	-	-
	3	3rd supported homing method	RO	No	Uint 16	-	-	771	-	-
	4	4th supported homing method	RO	No	Uint 16	-	-	772	-	-

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default	Change Condition	Effective Time
	5	5th supported homing method	RO	No	Uint 16	-	-	773	-	-
	6	6th supported homing method	RO	No	Uint 16	-	-	774	-	-
	7	7th supported homing method	RO	No	Uint 16	-	-	775	-	-
	8	8th supported homing method	RO	No	Uint 16	-	-	776	-	-
	9	9th supported homing method	RO	No	Uint 16	-	-	777	-	-
OUESH	A	10th supported homing method	RO	No	Uint 16	-	-	778	-	-
	В	11th supported homing method	RO	No	Uint 16	-	-	779	-	-
	С	12th supported homing method	RO	No	Uint 16	-	-	780	-	-
	D	13th supported homing method	RO	No	Uint 16	-	-	781	-	-
	E	14th supported homing method	RO	No	Uint 16	-	-	782	-	-

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default	Change Condition	Effective Time
	F	15th supported homing method	RO	No	Uint 16	-	-	783	-	-
	10	16th supported homing method	RO	No	Uint 16	-	-	784	-	-
	11	17th supported homing method	RO	No	Uint 16	-	-	785	-	-
	12	18th supported homing method	RO	No	Uint 16	-	-	786	-	-
60526	13	19th supported homing method	RO	No	Uint 16	-	-	787	-	-
00L3H	14	20th supported homing method	RO	No	Uint 16	-	-	788	-	-
	15	21th supported homing method	RO	No	Uint 16	-	-	789	-	-
	16	22th supported homing method	RO	No	Uint 16	-	-	790	-	-
	17	23th supported homing method	RO	No	Uint 16	-	-	791	-	-
	18	24th supported homing method	RO	No	Uint 16	-	-	792	-	-

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default	Change Condition	Effective Time
	19	25th supported homing method	RO	No	Uint 16	-	-	793	-	-
	1A	26th supported homing method	RO	No	Uint 16	-	-	794	-	-
	1B	27th supported homing method	RO	No	Uint 16	-	-	795	-	-
60E3h	1C	28th supported homing method	RO	No	Uint 16	-	-	796	-	-
	1D	29th supported homing method	RO	No	Uint 16	-	-	797	-	-
	1E	30th supported homing method	RO	No	Uint 16	-	-	798	-	-
	1F	31th supported homing method	RO	No	Uint 16	-	-	799	-	-
60E6h	0	Actual position calculation mode	RW	No	Uint 16	-	0 to 1	0	During running	At once
60F4h	0	Following error actual value	RO	TPDO	int 32	Reference unit	-	-	-	-
60FCh	0	Position demand value*	RO	TPDO	int 32	Encoder unit	-	-	-	-
60FDh	0	Digital inputs	RO	TPDO	Uint 32	-	-	-	-	-
					D	igital outputs				
	0	DO state	RO	No	Uint 8	-	-	2	-	-
60FEh	1	Physical outputs	RW	RPDO	Uint 32	-	0 to 2 ³² - 1	0	During running	At once
	2	Bitmask	RW	No	Uint 32	-	0 to 2 ³² - 1	0	During running	At once

Index (HEX)	Sub- index (HEX)	Name	Access	PDO Mapping	Data Type	Unit	Data Range	Default	Change Condition	Effective Time
60FFh	0	Target velocity	RW	RPDO	int 32	Reference unit/s	-2 ³¹ - 1 to +(2 ³¹ - 1)	0	During running	At once
6502h	0	Supported drive modes	RO	No	Uint 32	-	-	941	-	-

2.5 Description of Parameters

2.5.1 Classification of Object Dictionary

The object dictionary is the most important part in device specifications. It is an ordered set of parameters and variables that include device descriptions and all parameters of device network status. A group of objects can be accessed in an ordered and pre-defined way through the network.

The CANopen protocol adopts the object dictionary with 16-bit indexes and 8-bit subindexes. The structure of the object dictionary is shown in the following table.

Index	Object
0	Not used
0001h–001Fh	Static data types (standard data types, such as Boolean and Integer16)
0020h–003Fh	Complex data types (predefined structure consisting of simple types, such as PDOCommPar and SDOParmeter)
0040h–005Fh	Manufacturer-specific complex data types
0060h–007Fh	Device profile-specific static data types
0080h–009Fh	Device profile-specific complex data types
00A0h–0FFFh	Reserved
1000h–1FFFh	Communication profile area (such as the device type, error register, and number of supported PDOs)
2000h–5FFFh	Manufacturer-specific profile area (such as parameter mapping)
6000h–9FFFh	Standardized device profile area (for example, CiA402 protocol)
A000h–FFFFh	Reserved



Figure 2-8 Structure of CANopen object dictionary

Objects in SV660N include the following attributes: index, sub-index, data structure, data type, access, mapping, setting condition & effective time, related mode, data range, and default

★Definitions of terms

Position of the object dictionary in the parameter list is specified by the "Index" and "Sub-index".

- "Index": This field (in hexadecimal) specifies the position of the same type of objects in the object dictionary.
- "Sub-index": This field specifies the offset of each object under the same index.

The mapping relation between the parameter and the object dictionary is as follows:

- Object dictionary index = 0x2000 + Parameter group number
- Object dictionary sub-index = Hexadecimal offset within the parameter group + 1

For example, parameter H02-10 is mapped to object 2002-0Bh (H02-07).

Objects in the object dictionary are described based on types.

For example, 607Dh, which limits the software position, describes the minimum and maximum position limits as defined below:

Index	Sub-index	Name	Meaning
607Dh	00h	Number of entries	Defines the number of object data (exclusive of the sub-index 00h).
607Dh	01h	Min. position limit	Defines the minimum position limit (absolute position mode).
607Dh	02h	Max. position limit	Defines the maximum position limit (absolute position mode).

"Data Structure": See the following table for details.

Table 2–5 Description	n for "Data	Structure"
-----------------------	-------------	------------

Туре	Meaning	DS301 Value
VAR	Single simple value, including data types Int8, Uint16, and String	7
ARR	Data block of the same type	8
REC	Data block of different types	9

"Data Type": See the following table for details.

Table 2–6 Description for "Data Type"

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

"Access": See the following table for details.

Table 2-7 Description fo	r "Access"
--------------------------	------------

Access	Description
RW	Read/Write
WO	Write-only
RO	Read-only
CONST	Constant, read-only

"Mapping": See the following table for details.

-	Fable	2 - 8	Descri	ntion	for	"Man	ning	"
	ubic	20	DCJCII	puon	101	mup	ping	

Mapping	Description
No	Cannot be mapped to PDO
RPDO	Can be used as RPDO
TPDO	Can be used as TPDO

"Setting Condition & Effective Time": See the following table for details.

Table 2-9 Description for Setting Condition & Effective Time	Table 2–9 Descript	on for "Setting	Condition &	Effective	Time'
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Setting Condition	Description
At stop	The parameter can be edited only when the servo drive is not in the operational state.
During running	The parameter can be edited when the servo drive is in any state.
At once	The change in the parameter value is activated at once.
At stop	The change in the parameter value is activated after the servo drive is not in the operational state.
Next power-on	The change in the parameter value is activated at next power-on. Note: The servo drive reports E941 when the value of the parameter whose "Effective Time" is "Next power-on" is changed.

"Related Mode": See the following table for details.

Table 2–10 Description	n for "Related Mode"
------------------------	----------------------

Related Mode	Description
-	The parameter is not related to the control mode.
All	The parameter is related to all the control modes.
PP/PV/PT/HM/CSP/CSV/CST	The parameter is related to specific control modes.

"Data Range": Indicates the upper and lower limits of writable parameters.

If the value of a parameter modified through SDO exceeds the data range, the servo drive returns a SDO transmission abort code to deactivate the modification.

If the value of a parameter is modified through PDO, the servo drive does not check the validity of the value.

"Default": Indicates the default value of the parameter.

2.5.2 Communication Parameters (Group 1000h)

Index 1000h	Name		[Device typ	e		Data Structure	VAR	Data Type	Int32	
	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	0x00020192	
Defines t	Defines the CoE device profile type.										

Index 1008h	Name		Manufac	turer dev	ice name		Data Structure	-	Data Type	-	
	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	SV660-ECAT	
Defines t	Defines the manufacturer device name.										

	Name		Manufactu	urer hardw	vare versior	I	Data Structure	-	Data Type	-
Index 1009h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	Dependent on the hardware version of the drive.
Defines the	he hardwa	are versio	on of the ma	anufacture	er device.					

	Name		Manufact	urer softw	vare version		Data Structure	-	Data Type	-
Index 100Ah	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	Dependent on the software version of the drive.
Defines th	ne softwar	e versior	n of the ma	nufacture	r device.					

Index 1018h	Name		lc	lentity ob	ject		Data Structure	REC	Data Type	OD data type
	Access	RO	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the device information.										

Sub-	Name		Nur	nber of er	ntries		Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	4	Default	4

Sub- index 01h	Name			Vendor ID)		Data Structure	-	Data Type	Uint32
	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	0x00100000
Defines the series number of the drive.										

Sub- index 02h	Name		Р	roduct coc	le		Data Structure	-	Data Type	Uint32
	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	786696
Defines the internal code of the drive.										

Sub-	Name		Rev	vision num	ber		Data Structure	-	Data Type	Uint32
03h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	65537
Defines the software update record number of the drive.										

Index 1C00h	Name	:	Sync Manag	er commur	nication typ	e	Data Structure	REC	Data Type	OD data type
	Access	RO	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the communication type of the Sync Manager.										

Sub- index 00h	Name		Number of	Sync Mang	er channels		Data Structure	-	Data Type	Uint8
	Access	RO	Mapping	No	Related Mode	-	Data Range	4	Default	4

Sub-	Name		SM0 co	mmunicati	on type		Data Structure	-	Data Type	Uint8
01h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	0x01
SM0 communication type : mailbox write										

Sub- index 02h	Name		SM1 co	mmunicat	ion type		Data Structure	-	Data Type	Uint8
	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	0x02
SM1 communication type : mailbox read										
Sub-	Name		SM2 communication type					-	Data Type	Uint8
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03h	Access	RO	RO Mapping No Related - Mode				Data Range	-	Default	0x03
SM2 Comr	nunicatio	n type: p	ype: process data output							

Sub-	ub- Name SM3 communication type						Data Structure	-	Data Type	Uint8
04h	Access	RO	RO Mapping No Related - Mode				Data Range	-	Default	0x04
SM3 comn	nunication	n type: p	ype: process data input							

Index	Name		1st Rec	eive PDO n	napping		Data Structure	REC	Data Type	Uint32
1600h	Access	RW	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	e mappeo	l objects	bjects of RPDO1.							

Sub-	Name	Ν	lumber of m	apped obj	ects in RPDO	1	Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 10	Default	3

Sub-	Name 1st mapped object						Data Structure	-	Data Type	Uint32
01h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60400010

Sub-	Name		2nd	mapped o	bject		Data Structure	-	Data Type	Uint32
02h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	607A0020

Sub-	Name		3rd	mapped o	bject		Data Structure	-	Data Type	Uint32
03h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B80020

Sub- index	Name		4th to 1	0th mappe	d objects		Data Structure	-	Data Type	Uint32
04h to 0Ah	Access	RW	Mapping	No	Related Mode	All	Data Range	0 to 4294967295	Default	-

Index	Name		258th Re	eceive PDO	mapping		Data Structure	REC	Data Type	Uint32
1701h	Access	RO	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	e mapped	object of RPDO258								

Sub-	Name	Number of mapped objects in RPDO25					Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	4

Sub-	Name		1st	mapped ol	bject		Data Structure	-	Data Type	Uint32
01h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60400010

Sub-	Name		2nd	l mapped c	bject		Data Structure	-	Data Type	Uint32
02h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	607A0020

Sub-	Name		3rd	mapped o	bject		Data Structure	-	Data Type	Uint32
03h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B80010

Sub-	Name		4th	mapped o	bject		Data Structure	-	Data Type	Uint32
04h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60FE0120

Indox	Name		259th R	eceive PDC	D mapping		Data Structure	REC	Data Type	Uint32
1702h	Access	RO	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	mapped	object o	bject of RPDO259.							

Sub-	Sub- Name Number of mapped objects in RPDO259					259	Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	7

Sub-	Name		1st	mapped o	bject		Data Structure	-	Data Type	Uint32
01h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60400010

Sub-	Name		2nd	mapped o	bject		Data Structure	-	Data Type	Uint32
02h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	607A0020

Sub-	ub- Name 3rd mapped object						Data Structure	-	Data Type	Uint32
03h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60FF0020

Sub-	Name		4th	mapped	object		Data Structure	-	Data Type	Uint32
04h	Access	RO	Mapping	No	Related Mode	All	Data Range	0 to 4294967295	Default	60710010

Sub-	Name		5th	mapped o	bject		Data Structure	-	Data Type	Uint32
05h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60600008

Sub-	Name		6th	mapped o	bject		Data Structure	-	Data Type	Uint32
06h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B80010

Sub-	Name		7th	mapped o	bject		Data Structure	-	Data Type	Uint32
07h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	607F0020

Index	Name		260th Re	eceive PDC) mapping		Data Structure	REC	Data Type	Uint32
1703h	Access	RO	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	mapped	object	of RPDO260.							

Sub-	Name	N	umber of ma	apped obj	ects in RPDO2	60	Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	7

Sub-index	Name		1st	mapped c	object		Data Structure	-	Data Type	Uint32
01h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60400010

Sub-index	Name		2nd mapped object					-	Data Type	Uint32
02h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	607A0020

Sub-index	Name 3rd mapped object					Data Structure	-	Data Type	Uint32	
03h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60FF0020

Sub-index	Name		4th	mapped o	bject		Data Structure	-	Data Type	Uint32
04h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60600008

Sub-index	ub-index Name 5th mapped object						Data Structure	-	Data Type	Uint32
05h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B80010

Sub-index 06h	Name		6th	mapped	object		Data Struc ture	-	Data Type	Uint32
	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60E00010

Sub-index	Name		7tl	n mapped	object		Data Structure	-	Data Type	Uint32
07h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60E10010

Index	Name		261st Re	eceive PDC) mapping		Data Structure	REC	Data Type	Uint32
1704h	Access	RO	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	mapped	object	oject of RPDO261.							

Sub-index	Name		1st	t mapped	object		Data Structure	-	Data Type	Uint32
01h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60400010

Sub-index 02h	Name		2n	d mapped	l object		Data Struc ture	-	Data Type	Uint32
	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	607A0020

Sub-index	Name		3r	d mapped	l object		Data Structure	-	Data Type	Uint32
03h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60FF0020

Sub-index	Name		4t	h mappec	l object		Data Struc ture	-	Data Type	Uint32
04h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60710010

Sub-index	Sub-index Name 5th mapped object		Data Structure	-	Data Type	Uint32				
05h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60600008

Sub-index	ub-index Name 6th mapped object				object		Data Structure	-	Data Type	Uint32
06h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B80010

Sub-index	Name		7tł	n mapped	object		Data Structure	-	Data Type	Uint32
07h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	607F0020

Sub-index	Name	Name 8th mapped object					Data Structure	-	Data Type	Uint32
08h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60E00010

Sub-index	Name	ne 9th mapped object					Data Structure	-	Data Type	Uint32
09h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60E10010

la davi	Name		262nd F	Receive PD	00 mapping		Data Structure	REC	Data Type	Uint32
1705h	Access	RO	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	mapped o	object	ject of RPDO262.							

Sub-index	Name	N	umber of m	apped ob	jects in RPDO2	262	Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	8

Sub-index	Name		1s	t mapped	object		Data Structure	-	Data Type	Uint32
01h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60400010

Sub-index	Name		2n	d mapped	object		Data Structure	-	Data Type	Uint32
02h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	607A0020

Sub-index	Name		3rd mapped object				Data Structure	-	Data Type	Uint32
03h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60FF0020

Sub-index	ub-index Name 4th mapped object			object		Data Structure	-	Data Type	Uint32	
04h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60600008

Sub-index	Name		5t	h mapped	object		Data Structure	-	Data Type	Uint32
05h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B80010

Sub-index	Name		6t	h mapped	object		Data Structure	-	Data Type	Uint32
06h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60E00010

Sub-index	Name		7t	h mapped	l object		Data Structure	-	Data Type	Uint32
07h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60E10010

Sub-index	Name		8t	h mapped	object		Data Structure	-	Data Type	Uint32
08h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B20010

Indov	Name		1st Tra	insmit PD	O mapping		Data Structure	REC	Data Type	Uint32
1A00h	Access	RW	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	mapped of	object	t of TPDO1.							

Sub-index	Name		Number of	mapped o	objects in TPD	001	Data Structure	-	Data Type	Uint8
00h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 10	Default	7

Sub-index	Name		1:	st mapped	l object		Data Structure	-	Data Type	Uint32
01h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60400010

Sub-index	Name		2r	nd mappe	d object		Data Structure	-	Data Type	Uint32
02h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60640020

Sub-index	Name		3rd mapped object					-	Data Type	Uint32
03h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B90010

Sub-index	Name		4	th mapped	d object		Data Structure	-	Data Type	Uint32
04h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60BA0020

Sub-index	Name		5	th mapped	d object		Data Structure	-	Data Type	Uint32
05h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60BC0020

Sub-index	Name		6	th mappe	d object		Data Structure	-	Data Type	Uint32
06h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	603F0010

Sub-index	Name		7	th mapped	d object		Data Structure	-	Data Type	Uint32
07h	Access	RW	Map ping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60FD0020

Sub-index	Name		81	th mapped	d object		Data Structure	-	Data Type	Uint32
08h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	-

Sub-index	Name		9t	h mapped	l object		Data Structure	-	Data Type	Uint32
09h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	-

Sub-index	Name		10	th mappe	d object		Data Structure	-	Data Type	Uint32
10h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	-

Index	Name		258th 1	ransmit P	DO mapping		Data Structure	REC	Data Type	Uint32
1B01h	Access	RO	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	mapped o	object	ject of TPDO258.							

Sub-index	Name	١	Number of r	napped ol	bjects in TPD(D258	Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	8

Sub-index	Name		1st mapped object				Data Structure	-	Data Type	Uint32
01h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	603F0010

Sub-index	Name		2r	nd mapped	d object		Data Structure	-	Data Type	Uint32
02h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60410010

Sub-index	Name		3r	d mapped	l object		Data Structure	-	Data Type	Uint32
03h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60640020

Sub-index	Name		4th mapped object				Data Structure	-	Data Type	Uint32
04h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60770010

Sub-index	Name		5t	h mapped	l object		Data Structure	-	Data Type	Uint32
05h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60F40020

Sub-index	Name		6t	h mapped	l object		Data Structure	-	Data Type	Uint32
06h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B90010

Sub-index	Name		71	th mapped	d object		Data Structure	-	Data Type	Uint32
07h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60BA0020

Sub-index	Name		8t	h mapped	d object		Data Structure	-	Data Type	Uint32
08h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60FD0020

la davi	Name		259th 1	Fransmit P	DO mapping		Data Structure	REC	Data Type	Uint32
1B02h	Access	RO	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	mapped o	objec	jject of TPDO259.							

Sub-index	Name	1	Number of r	napped ol	ojects in TPDC	0259	Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	9

Sub-index	Name		19	st mapped	object		Data Structure	-	Data Type	Uint32
01h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	603F0010

Sub-index	Name		2r	nd mapped	d object		Data Structure	-	Data Type	Uint32
02h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60410010

Sub-index	Name		3r	d mapped	object		Data Structure	-	Data Type	Uint32
03h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60640020

Sub-index	Name		4t	h mappeo	l object		Data Structure	-	Data Type	Uint32
04h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60770010

Sub-index	Name		5t	h mappeo	l object		Data Structure	-	Data Type	Uint32
05h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60610008

Sub-index	Name		6t	h mappec	l object		Data Structure	-	Data Type	Uint32
06h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B9001 0

Sub-index	Name		7t	h mapped	l object		Data Structure	-	Data Type	Uint32
07h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B A0020

Sub-index	Name		8t	h mapped	l object		Data Structure	-	Data Type	Uint32
08h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B C0020

Sub-index	Name		9t	h mapped	l object		Data Structure	-	Data Type	Uint32
09h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	,. 60FD0020

la davi	Name		260th T	ransmit Pl	DO mapping		Data Structure	REC	Data Type	Uint32
1B03h	Access	RO	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	mapped	objec	bject of TPDO260.							

Sub-index	Name	Number of mapped objects in TPDO260					Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	10

Sub-index	Name		15	t mapped	object		Data Structure	-	Data Type	Uint32
01h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	603F0010

Sub-index	Name		2nc	d mapped	object		Data Structure	-	Data Type	Uint32
02h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60410010

Sub-index	Name		3rc	l mapped	object		Data Structure	-	Data Type	Uint32
03h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60640020

Sub-index	Name		4th	n mapped	object		Data Structure	-	Data Type	Uint32
04h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60770010

Sub-index	Name		5th	mapped	object		Data Structure	-	Data Type	Uint32
05h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60F40020

Sub-index	Name		6th	mapped	object		Data Structure	-	Data Type	Uint32
06h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60610008

Sub-index	Name		7th	mapped	object		Data Structure	-	Data Type	Uint32
07h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B90010

Sub-index	Name		8th	mapped	object		Data Structure	-	Data Type	Uint32
08h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B A0020

Sub-index	Name		9th	mapped	object		Data Structure	-	Data Type	Uint32
09h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60BC0020

Sub-index	Name		10tł	n mapped	object		Data Structure	-	Data Type	Uint32
0Ah	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60FD0020

Indov	Name		261st Tr	ansmit PD	0 mapping		Data Structure	REC	Data Type	Uint32
1B04h	Access	RO	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	mapped	objec	piect of TPDO261.							

Sub-index	Name Number of mapped objects in TPDO261						Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	0

Sub-index	Name		1s	t mapped	object		Data Structure	-	Data Type	Uint32
01h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	603F0010

Sub-index	Name	e 2nd mapped object					Data Structure	-	Data Type	Uint32
02h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60410010

Sub-index	Name		3r	d mapped	object		Data Structure	-	Data Type	Uint32
03h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60640020

Sub-index	Name		4tl	n mapped	object		Data Structure	-	Data Type	Uint32
04h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60770010

Sub-index	Name		5th	n mapped	object		Data Structure	-	Data Type	Uint32
05h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60610008

Sub-index	Name		6tł	n mapped	object		Data Structure	-	Data Type	Uint32
06h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60F40020

Sub-index	Name		7tł	n mapped	object		Data Structure	-	Data Type	Uint32
07h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B90010

Sub-index	Name		8th mapped object					-	Data Type	Uint32
08h	Access	RO	Map ping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60B A0020

Sub-index	Name	9th mapped object					Data Structure	-	Data Type	Uint32
09h	Access	RO	Map ping	No	Related Mode	-	Data Range	0 to 4294967295	Default	60BC0020

Sub-index	b-index Name 10th mapped object				Data Structure	-	Data Type	Uint32		
0Ah	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 4294967295	Default	606C0020

la davi	Name		Sync Mana	nger 2 RPD	0 assignme	nt	Data Structure	ARR	Data Type	Uint16
1C12h	Access	RW	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	index of t	he ob	e object assigned.							

Sub-index	Name Number of assigned RPD			ned RPDOs		Data Structure	-	Data Type	Uint8	
00h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 1	Default	1

Sub-index	Name		Index	of assign	ed RPDO		Data Structure	-	Data Type	Uint16
01h	Access	RW	Mapping	Yes	Related Mode	-	Data Range	0 to 65535	Default	5889
Defines the	index of t	he ob	ject assigne	ed.						
Observe the	followin	g proc	edure:							
1. Perform o	conofigura	ation	only when t	he EtherC	AT state ma	chine is i	n the pre-op	erational ("P" disp	layed on the	keypad)
state.										
2. There is n	io need to	o set 1	C12h in cas	es where	the assigned	RPDO is	selected thr	ough the twinCAT	host controll	er
software. In	other cas	ses, as	sign the PD	0 accordi	ng to the fo	llowing p	rocedure.			
• Step 1: Wr	ite 0 to 10	212-00	Dh.							
• Step 2: Wr	ite RPDO	x (160	0/1701170)5) to be u	sed to 1C12	-01h.				
• Step 3: If a	in index a	mong	, 1701170	5 is used a	s RPDO and	the map	ped object c	annot be modified	l, go to step 5	. If 1600 is
used as RF	DO, writ	e the	value 0 to th	ne sub-ind	ex 00h of RF	DOx, an	d write mapp	ed objects to 01h.	0Ah. Then, g	o to step

4.

• Step 4: After the mapped objects in 1600 are written, write the number of mapped objects to 1600-00h.

• Step 5. Write 1 to 1C12-00h.

la davi	Name		Sync Mana	ager 2 TPD	0 assignme	ent	Data Structure	ARR	Data Type	Uint16
1C13h	Access	RW	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	index of t	he ob	e object assigned.							

Sub-index	Name Number of assigned TPDOs					Data Structure	-	Data Type	Uint8	
00h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 1	Default	1

Sub-index	Sub-index Name Index of assigned TPDO					Data Structure	-	Data Type	Uint16	
01h	Access	RW	Mapping	Yes	Related Mode	-	Data Range	0 to 65535	Default	5889

Defines the index of the object assigned.

Observe the following procedure:

1. Perform configuration only when the EtherCAT state machine is in the pre-operational ("P" displayed on the keypad) state.

2. There is no need to set 1C12h in cases where the assigned TPDO is selected through the twinCAT host controller software. In other cases, assign the PDO according to the following procedure.

• Step 1: Write 0 to 1C13-00h.

• Step 2: Write the TPDOx (1A00/1B01...1B04) to be used to 1C13-01h.

• Step 3: If an index among 1B01...1B04 is used as TPDO and the mapped object cannot be modified, go to step 5. If 1A00 is used as TPDO, write the value 0 to the sub-index 00h of 1A00, and write mapped objects to 01h...0Ah. Then, go to step 4.

• Step 4: After the mapped objects in 1A00h are written, write the number of mapped objects to 1A00-00h.

• Step 5: Write 1 to 1C13-00h.

Indov	Name		Sync Mana	ger 2 outp	out paramet	ers	Data Structure	REC	Data Type	Uint16
1C32h	Access	RO	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	output pa	arame	ameters of Sync Manager 2.							

Sub-index	Name	Ν	umber of sy	/nchroniza	ation param	eters	Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	32

Sub-index	Name		Syne	chronizati	on type		Data Structure	-	Data Type	Uint16
01h	Access	RO	RO Mapping No Related - Mode -				Data Range	-	Default	2
"0x0002" in	dicates th	e dist	distributed clock synchronization mode 0 ([Sync mode	0).		

Sub-index	Name		Сус	:le time (u	nit: ns)		Data Structure	-	Data Type	Uint32
02h	Access	RO	RO Mapping No Related - Mode -				Data Range	-	Default	0
Defines the	cycle of D	C Syr	Sync 0.							

Sub-index	Name		Synchroni	zation typ	es supporte	ed	Data Structure	-	Data Type	Uint16
04h	Access	RO	O Mapping No Related - Mode -				Data Range	-	Default	4
Defines the	type of th	ne dist	ributed clo	:k.						
"0x0004" in	dicates th	e dist	ributed cloo	k synchro	nization m	ode 0 (DC	Sync mode	0).		

Sub-index	Name		Min	imum cyc	le time		Data Structure	-	Data Type	Uint32
05h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	125000
Defines the	minimum	n sync	ynchronization cycle (unit: ns) supported b			orted by t	he slave.			

The minimum cycle time supported by SV660N is 125000 ns. The network cannot enter the OP state if the actual cycle time is less than 125000 ns.

Sub-index	Name		Calc an	d copy tim	ne (unit: ns)		Data Structure	-	Data Type	Uint32
06h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	-
Defines the	time for t	he mi	e microprocessor to copy data from Sync M			Sync Man	ager to loca			

Sub-index	Name		Del	ay time (u	nit: ns)		Data Structure	-	Data Type	Uint32
09h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	-

Sub-index	Name			Sync err	or		Data Structure	-	Data Type	BOOL
20h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	-
Indicates w True: Synch False: Synch	hether the ronization ronizatio	e sync n activ n inae	hronizatior ve and sync ctive and sy	n error occ hronizatic nchroniza	urs. on error not ition error o	occurred ccurred				

Index	Name	Sync Manager 2 input parameters					Data Structure	REC	Data Type	OD data type
1C33h	Access	RO	Mapping	No	Related Mode	-	Data Range	OD data range	Default	OD default value
Defines the	input par	amete	meters of Sync Manager 2.							

Sub-index	Name	Number of synchronization parameters				eters	Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	32

Sub-index	Name		Sync	hronizatic	on type		Data Structure	-	Data Type	Uint16
01h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	2
"0x0002" in	dicates th	e dist	distributed clock synchronization mode 0 (de 0 (DC	Sync mode	0).		

Sub-index	Name Cycle time (unit: ns)						Data Structure	-	Data Type	Uint32
02h	Access	RO	RO Mapping No Related - Mode -				Data Range	-	Default	-
Defines the	synchron	izatio	ation cycle of DC Sync 0.							

Sub-index	Name		Synchroniz	ation type	es supporte	d	Data Structure	-	Data Type	Uint16
04h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	4
Defines the "0x0004" in	type of th dicates th	e dist e dist	distributed clock. distributed clock synchronization mode 0 (ode 0 (D0	C Sync mode	0).			

Sub-index	Name		Mini	mum cycle	e time		Data Structure	-	Data Type	Uint32
05h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	125000
Defines the	minimum	n sync	ynchronization cycle (unit: ns) supported l			rted by t	the slave.			

The minimum cycle time supported by SV660N is 125000 ns. The network cannot enter the OP state if the actual cycle time is less than 125000 ns.

Sub-index	Name		Calc and	copy time	e (unit: ns)		Data Structure	-	Data Type	Uint32
06h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	-
Defines the	time for t	he mi	e microprocessor to copy data from Sync Ma			ync Man	ager to local			

Sub-index	Name		Delay time (unit: ns)					-	Data Type	Uint32
09h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	-

Sub-index	Name			Sync erro	or		Data Structure	-	Data Type	BOOL
20h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	-
Indicates w True: Synch	hether the	e sync n activ	hronization ve and synch	error occi ironizatio	urs. n error not	occurre	d			
False: Syncl	hronizatic	on inao	ctive and syr	nchronizat	tion error o	ccurred				

2.5.3 Manufacturer-specific Parameters (Group 2000h)

2.5.3.1 Group 2000h: Servo Motor Parameters

Index 2000h -	Name		Servo moto parameter	or s	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
	Access	1	Mapping	Yes	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Defines servo motor parameters.										

Sub- index	Sub- index Name Number of	umber of en	tries	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint8
UUN	Access RO Mapping No		No	Related Mode	-	Data Range	-	Default	6

Sub- index 01h	Name	Motor code			Setting Condition & Effective Time	At stop Next power- on	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 65535	Default	14101

Defines the code of the servo motor.

The SV660N series servo drive is intended to be used with a serial-type motor. The motor code is fixed to "14XXX". See 2000-06h for details on serial-type motor models.

Setpoint	Motor code	Remarks
14000	Inovance motor equipped with a 20-bit encoder	-
14101	Inovance motor equipped with a 23-bit absolute encoder	For details on the absolute encoder, See section "Introduction to the Absolute Encoder System" in SV660N Series Servo Drive Function Guide.

Setting the motor code to a wrong value will lead to E120.1 (Unknown motor model).

Sub- index	Name	Cu	stomized No		Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint32
03h	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to (2 ³² - 1)	Default	0
Displays cu XXX: Fixed YY: Upgrad	ustomized No. for cu le record l	l softwa Istomiz No. for	are No. in he ed software customized	xade softv	cimal (XXX.YY). vare					

Sub- index	Name	Encoder version			Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
05h	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 6553.5	Default	0
Displays th	Displays the encoder software version in the format of 2XXX.Y, with one decimal place.									

Sub- index	Name	Serial-type motor model		Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16	
06h	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 65535	Default	0
Displays th	Displays the code of the serial-type motor, which is determined by the motor model and unmodifiable.									

Sub- index	Name FPGA customized No.		ed	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16	
07h	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 655.35	Default	0

Sub- index	Name		STO version		Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
08h	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 655.35	Default	0

Sub- index	Name	Serial encoder type			Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
09h	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 65535	Default	0

2.5.3.2 Group 2001h: Servo Drive Parameters

Index	Name		Servo drive parameters		Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
2001h	Access	-	Mapping	Yes	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Defines parameters of the servo drive.										

Sub- index	Name	Nu	Imber of ent	ries	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	32

Sub- index	Name	MCU	software ve	rsion	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
01h	Access	RO	RO Mapping -		Related Mode	-	Data Range	0 to 65535	Default	0
Displays th	e MCU so	ftware	ware version.							
The displa	y format i	s XXXX	XXXX.Y, with one decim		al place.					

Sub- index	Name	FPGA	A software ve	ersion	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
02h	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 65535	Default	0
Displays th	ne FPGA so	oftwar	tware version.							
The displa	y format i	s XXXX	<.Y, with one	decim	al place.					

Sub- index	Name	Se	ervo drive mo	del	Setting & Effe	g Condition ctive Time	At stop Next power- on	Data Structure	-	Data Type	Uint16
0Bh	Access	RW	Mapping	-	Rela	ted Mode	-	Data Range	0 to 65535	Default	0
Defines the SV660N se	e servo dr ries servo	rive m drive	odel. e models are l	listed i	n the fol	lowing table.					
Set	point		Servo Dr	ive Mo	del			Remarks			
	2		S1	.R6		Rated powe Power supp	er of the servo dr	rive: 0.2 kW ircuit: Single-p	hase 220	v	
	3 S2R8 Rated power of the servo drive: 0.4 kW Power supply of the main circuit: Single-phase 220 V										
	5 S5R5 Rated power of the servo drive: 0.75 kW Power supply of the main circuit: Single-phase 220 V										
6 S7R6 Rated power of the servo drive: 1.0 kW Power supply of the main circuit: Single-phase/Three-phase 220 V [1]										220 V	
	7		SC)12		Rated power Power supp [1]	er of the servo dr Ily of the main ci	ive: 1.5 kW ircuit: Single-p	hase/Thre	ee-phase 2	220 V
10	0001		ТЗ	R5		Rated power Power supp	er of the servo dr ly of the main c	ive: 1.0 kW ircuit: Three-pl	hase 380 V	V	
10	0002		Т5	R4		Rated powe Power supp	er of the servo dr ly of the main c	ive: 1.5 kW ircuit: Three-pl	hase 380 V	V	
10	0003		T8	R4		Rated powe Power supp	er of the servo dr ly of the main ci	ive: 2.0 kW ircuit: Three-pl	hase 380 V	V	
10004 T012 Rated power of the servo drive: 3.0 kW Power supply of the main circuit: Three-phase 380 V											
10	0005		тс	017		Rated powe Power supp	er of the servo dr ly of the main c	ive: 5.0 kW ircuit: Three-pl	hase 380 V	V	
10	0006		тс)21		Rated powe Power supp	er of the servo dr Ily of the main ci	ive: 6.0 kW ircuit: Three-pl	hase 380 V	/	
10007 T026 Rated power of the servo drive: 7.5 kW Power supply of the main circuit: Three-phase 380 V											

If the voltage input to the main circuit of the servo drive does not comply with the preceding specifications, E420.0 (Main circuit phase loss) occurs.

[1]: The main circuit of the servo drive supports single-phase 220 V power supplies without derating.

Sub-	Name	DC-	AC voltage o	lass	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
0Ch	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 65535	Default	220

Sub-	Name	Rat	ed power of servo drive	the	Setting Condition & Effective Time	-	Data Structure	=	Data Type	Uint32
0Dh	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 1073741824	Default	0.4

Sub-	Name	Max. t	. output pow he servo driv	/er of /e	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint32
0Fh	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 1073741824	Default	0.4

Sub-	Name	Rate of	ed output cu the servo dr	rrent ive	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint32
11h	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 1073741824	Default	2.8

Sub-	Name	Max. t	output curre he servo driv	ent of /e	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint32
13h	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 1073741824	Default	10.1

Sub-	Name	DC prot	bus overvolt ection thres	tage hold	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
29h	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 2000	Default	420

2.5.3.3 Group 2002h: Basic Control Parameters

Index	Name		Basic contro parameter	ol s	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
2002h	Access	-	Mapping	Yes	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Defines ba	sic contro	ol par	ameters.							

Sub-	Name	Nu	Imber of en	tries	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	36

Sub-	Name	С	ontrol mode	•	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16		
01h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 9	Default	9		
Defines the When the s For the op	e control servo driv eration m	mode e is in odes o	of the servo the EtherCA of the servo o	ie servo drive. EtherCAT bus control mode, bit 9 of the status word 6041h is set to 1. e servo drive, see Chapter "Basic Functions" in SV660N Series Servo Drive Function Guide.								
Se	tpoint					Description						
	0				S	peed control mod	le					
	1			Position control mode								
	2			Torque control mode								
	9					EtherCAT mode						

S	Sub- 1dex	Nam	Abs sys	solute enco stem selecti	der on	Sett E	ing Condition &	At stop & Next power- on	Data Structure	-	Data Type	Uint16	
	02h	Acce	ss RW	Mapping	I	R	Related Mode	All	Data Range	0 to 4	Default	0	
Def	ines the	e mod	e of the a	bsolute enc	oder s	syster	m.						
	Setpoir	nt	Absolut	te encoder s selection	systen	n		R	emarks				
	0	1	ncremental position mode				The encoder is used as a serial incremental encoder without power-off memory.						
	1	1	Absolute position linear mode				The encoder is used as an absolute encoder with power-off memory. This mode is applicable to applications where the load travel range is fixed and multi-turn data does not overflow.						
	2	1	Absolute mode	position rot	ation		The encoder is u This mode appli limited and the r	sed as an absolut es to applications number of unidire	e encoder wit where the loa ctional revolu	h power-o ad travel r itions is lo	off memor ange is no wer than	ry. ot 32767.	
	3	1	Absolute position linear mode (encoder overflow not detected)			ot	Encoder overflov	w will not be dete	cted in this m	ode.			
	4	1	detected) Absolute position single-turn mode				-						

In the absolute position mode, the system automatically detects the motor code to check whether an absolute encoder is used. If not, E122.0 (Multi-turn absolute encoder setting error) will be reported.

For details on the absolute position mode, see section "Introduction to the Absolute Encoder System" in SV660N Series Servo Drive Function Guide.

Sub- index	Name	Dire	ection of rot	ation	Sett & E	ing Condition ffective Time	At stop & Next power- on	Data Structure	-	Data Type	Uint16
03h	Access	RW	Mapping	-	Re	elated Mode	All	Data Range	0 to 1	Default	0
Defines th	e forward	l direc	tion of the r	notor v	when v	viewed from the	e motor shaft side				
Setpo	oint	Di	Direction of rotation Remarks								
0		Coun	unterclockwise (CCW) as forward direction Defines the CCW direction as the forward direction when a forward run command is received, indicating the motor rotates in the CCW direction when viewed from the motor shaft side.							rd run	
1		Clocl	direction when viewed from the motor shaft side. Clockwise (CW) as forward direction direction when viewed from motor shaft side. Defines the CW direction as the forward direction when a forward run command is received, indicating the motor rotates in the CW direction when viewed from motor shaft side.						d run ection		
	Forward CW										
		Reverse CCW									

Name	Sto	p mode at S OFF	S-ON	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	int16		
Access	RW	Mapping	-	Related Mode	All	Data Range	-3 to +1	Default	0		
deceler	ation ı	mode of the motor for stopping rotating upon S-ON OFF and the motor status after stop.									
nt		Stop Mode									
0	Stop at	t zero speec	l, keep	ing dynamic braking s	status						
F	Ramp t	to stop as d	efined	by 6084h/609Ah, keej	ping dynamic bral	king status					
[Dynam	ic braking s	stop, ke	eeping dynamic braki	ng status						
C	Coast t	past to stop, keeping de-energized status									
F	Ramp t	mp to stop as defined by 6084h/609Ah, keeping de-energized status									
	Name Access deceler nt S F C C C	Name Sto Access RW deceleration in t Stop at Ramp 1 Coast t Ramp 1	Name Stop mode at SOF Access RW Mapping deceleration mode of the nt Stop at zero speed Ramp to stop as d Dynamic braking s Coast to stop, kee Ramp to stop as d	Name Stop mode at S-ON OFF Access RW Mapping - deceleration mode of the motor - deceleration stop at zero speed, keep - Ramp to stop as defined Dynamic braking stop, keep - Coast to stop, keeping defined Ramp to stop as defined -	Name Stop mode at S-ON OFF Setting Condition & Effective Time Access RW Mapping - Related Mode deceleration mode of the motor for stopping rotating nt Stop at zero speed, keeping dynamic braking stop, keeping dynamic braking stop, keeping dynamic braking stop, keeping dynamic braking Dynamic braking stop, keeping de-energized status Coast to stop as defined by 6084h/609Ah, keeping Ramp to stop as defined by 6084h/609Ah, keeping Ramp to stop as defined by 6084h/609Ah, keeping	Name Stop mode at S-ON OFF Setting Condition & Effective Time At stop & At once Access RW Mapping - Related Mode All deceleration mode of the motor for stopping rotating upon S-ON OFF at the stop at zero speed, keeping dynamic braking status Stop Mode Ramp to stop as defined by 6084h/609Ah, keeping dynamic braking status Coast to stop, keeping de-energized status Ramp to stop as defined by 6084h/609Ah, keeping de-energized	Name Stop mode at S-ON OFF Setting Condition & Effective Time At stop & At once Data Structure Access RW Mapping - Related Mode All Data Range deceleration mode of the motor for stopping rotating upon S-ON OFF and the motor Stop Mode Stop Mode nt Stop at zero speed, keeping dynamic braking status Stop Mode Stop Stop Mode Ramp to stop as defined by 6084h/609Ah, keeping dynamic braking status Coast to stop, keeping de-energized status Status Coast to stop, keeping de-energized status Ramp to stop as defined by 6084h/609Ah, keeping de-energized status Status	Name Stop mode at S-ON OFF Setting Condition & Effective Time At stop & At once Data Structure Access RW Mapping - Related Mode All Data Range -3 to +1 deceleration mode of the motor for stopping rotating upon S-ON OFF and the motor status af - - - - ft Stop at zero speed, keeping dynamic braking status Stop at zero speed, keeping dynamic braking status - - Ramp to stop as defined by 6084h/609Ah, keeping dynamic braking status Coast to stop, keeping de-energized status - Coast to stop as defined by 6084h/609Ah, keeping de-energized status Ramp to stop as defined by 6084h/609Ah, keeping de-energized status -	Name Stop mode at S-ON OFF Setting Condition & Effective Time At stop & At once Data Structure Data Type Access RW Mapping - Related Mode All Data Range -3 to +1 Default deceleration www.www.www.www.www.www.www.www.www.ww		

Set a proper stop mode according to the mechanical status and operation requirements.

For comparison of stop modes, see section "Servo OFF" in SV660N Series Servo Drive Commissioning Guide.

After the brake output function is enabled, the stop mode upon S-ON OFF is forcibly set to "Ramp to stop as defined by 6085h, keeping dynamic braking status".

Sub-	Name	Sto	p mode at I fault	No. 2	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	int16	
07h	Access	RW	Mapping	-	Related Mode	All	Data Range	-5 to +3	Default	2	
Defines the	e decele	ration	mode of the	e moto	r for stopping rotating	upon occurrence	e of a No. 2 fai	ult and the	e motor st	atus	
after stop.											
Setpoi	int		Stop Mode								
-5		Stop at	p at zero speed, keeping dynamic braking status								
-4		Stop at	emergency	-stop t	orque, keeping dynan	nic braking status					
-3		Ramp t	o stop as de	efined I	oy 6085h, keeping dyn	amic braking stat	tus				
-2		Ramp t	o stop as de	efined I	oy 6084h/609Ah, keep	ing dynamic brak	ing status				
-1		Dynam	ic braking s	top, ke	eping dynamic brakin	g status					
0		Coast t	o stop, keep	oing de	-energized status						
1		Ramp t	np to stop as defined by 6084h/609Ah, keeping de-energized status								
2		Ramp to stop as defined by 6085h, keeping de-energized status									
3	1	Stop at	emergency	-stop t	orque, keeping de-en	ergized status					

After the brake (BK) output function is enabled, the stop mode at No. 2 fault is forcibly set to "Ramp to stop as defined by 6085h, keeping dynamic braking status".

Sub-	Name		Stop mode a overtravel	at	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16	
08h	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to 7	Default	1	
Defines the	e decele	eration	mode of the	e motoi	r for stopping rotating	g upon overtravel	and the moto	r status af	ter stop.		
Setpoi	int		Stop Mode								
0		Coast to	st to stop, keeping de-energized status								
1		Stop at	zero speed	, keepi	ng position lock statu	S					
2		Stop at	zero speed	, keepi	ng de-energized statu	S					
3		Ramp t	o stop as de	efined b	oy 6085h, keeping de-	energized status					
4		Ramp t	o stop as de	efined b	oy 6085h, keeping pos	ition lock status					
5		Dynami	ynamic braking stop, keeping de-energized status								
6		Dynami	ynamic braking stop, keeping dynamic braking status								
7		Not res	t responding to overtravel								

When the servo motor drives a vertical axis, set 2002-08h (H02-07) to 1 or 4 to allow the motor shaft to stay locked upon overtravel.

For comparison of stop modes, see section "Servo OFF" in SV660N Series Servo Drive Commissioning Guide.

After the brake output function is enabled, the stop mode at S-ON OFF is forcibly set to "Ramp to stop as defined by 6085h, keeping position lock status".

S	Sub- ndex	Name	Sto	p mode at N fault	lo. 1	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16		
(09h	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to 2	Default	2		
Def sto	ines the	e deceler	ration r	n mode of the motor for stopping rotating when a No. 1 fault occurs and the motor status after									
. —	·												
	Setpoi	nt				:	Stop Mode						
				Stop Mode									
	0	C	loast to	t to stop, keeping de-energized state									
	0	C	.oast to)ynami	t to stop, keeping de-energized state amic braking stop, keeping de-energized status									
	0 1 2		Dynami Dynami Dynami	o stop, keep c braking st c braking st	ing de op, kee op, kee	energized state eping de-energized st eping dynamic brakin	atus g status						

For details on No. 1 fault and comparison of stop modes, see Chapter "Troubleshooting" and section "Servo OFF" in SV660N Series Servo Drive Commissioning Guide.

After the brake output function is enabled, the stop mode at No. 1 fault is forcibly set to "Dynamic braking stop, keeping dynamic braking status".

Sub-	Name	De con	elay from br output ON t nmand rece	ake o ived	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Ah		-	command received					0 to		050
	Access	RW	RW Mapping -		Related Mode	All	Data Range	500 (ms)	Default	250
Defines th	l e delav fr	om th	n the moment the brak		ke (BK) output signal	is ON to the mom	ent the servo	drive star	ts to recei	ve
command	s after po	wer-o	n.							
Within the	time defi	ned b	er-on. d by 2002-0Ah (H02–0		9), the servo drive do	es not receive po	sition/speed/t	orque ref	erences.	
See sectio	n "Brake	Settin	gs" in SV660)N Seri	es Servo Drive Comm	issioning Guide to	o check the br	ake seque	nce for th	e
motor at s	tandstill.									

Sub- index	Name	Delay outp de-	y from brak out OFF to r energized in stop state	e (BK) notor n the	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Bh	Access	RW	Mapping	-	Related Mode	All	Data Range	50 to 1000 (ms)	Default	150
Defines th	e delav fr	om the	e moment h	orake (F	3K) output is OFF to th	ne moment when	the motor at	standstill	enters the	de-

Defines the delay from the moment brake (BK) output is OFF to the moment when the motor at standstill enters the deenergized status.

See section "Brake Settings" in SV660N Series Servo Drive Commissioning Guide to check the brake sequence for the motor at standstill.

Sub- index	Name	thr (BK the	Motor spee eshold at b () output Of e rotation s	d rake FF in tate	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Ch	Access	RW	Mapping	-	Related Mode	All	Data Range	20 to 3000 (ms)	Default	30
Defines th	e motor s	peed t	hreshold w	, hen br	ake (BK) output is OF	F in the rotation	state.			

See section "Brake Settings" in SV660N Series Servo Drive Commissioning Guide to check the brake sequence for a rotating motor.

Sub- index	Name	Dela to b OFF	y from S-C rake (BK) o in the rot state	ON OFF output ation	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Dh	Access	RW	Map ping	-	Related Mode	All	Data Range	1 to 1000 (ms)	Default	500

Defines the delay from the moment the S-ON signal is OFF to the moment the brake (BK) output is OFF in the rotation state.

See section "Brake Settings" in SV660N Series Servo Drive Commissioning Guide to check the brake sequence for a rotating motor.

Sub-	Name	War	ming displ the keypa	ay on d	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
10h	Access	RW	Map ping	-	Related Mode	-	Data Range	0 to 1	Default	0
Defines wh	s whether to switch the keypad to th		ad to the	e fault display mode v	vhen a No. 3 fault	occurs.				

For details on No.3 warnings, see Chapter "Troubleshooting" in SV660N Series Servo Drive Commissioning Guide.

Sub- index	Name	Bra	ke enable s	switch	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
11h	Access	RW	Map ping	-	Related Mode	-	Data Range	0 to 1	Default	1
Se	tpoint					Description				
	0					Inhibited				
	1					Enable				

Sub- index 15h	Name	Dyna	amic brake coil ON del	e relay ay	Setting Condition & Effective Time	During running At once	Data Structure	-	Data Type	Uint16
	Access	RW	Map ping	-	Related Mode	-	Data Range	30 to 30000	Default	30

Sub- index	Name	mini of	Permissib mum resis f regenera resistor	le stance tive	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
16N	Access	RO	Map ping	-	Related Mode	-	Data Range	1 to 1000	De fault	40
The permi	ssible mir	nimum	n resistanc	e of the	regenerative resistor	is only related to	the servo driv	e model.		

Sub-	Name	Pc rege	ower of bui nerative r	ilt-in esistor	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16	
17h	Access	RO	Map ping	-	Related Mode	-	Data Range	0 to 65535	De fault	0	
The power of the built-in regenerative resistor is only related to the servo drive model, which is unmodifiable.											

Sub- index 18h	Name	Resistance regenerat	e of built-ii ive resisto	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
	Access	RO	Map ping	- Related Mode	-	Data Range	0 to 65535	De fault	0

The resistance of the built-in regenerative resistor is only related to the servo drive model, which is unmodifiable. The built-in regenerative resistor comes into rescue when the maximum braking energy calculated exceeds the absorption capacity of the capacitor.

When using the built-in regenerative resistor, connect a jumper bar between terminals $\mathsf{P}\oplus$ and $\mathsf{D}.$

When the value of 2001-0Bh (Servo drive model) is 2 or 3, the built-in regenerative resistor is not installed in the servo drive.

Game	Duite Madel	Specifications of Built-i	n Regenerative Resistor
Servo	Drive Model	Resistance (Ω)	Power (W)
	SV660NS1R6I	-	-
Single-phase 220 V	SV660NS2R8I	-	-
	SV660NS5R5I	50	50
Three phase 220 V	SV660NS7R6I	25	20
Three-phase 220 V	SV660NS012I	25	80
	SV660NT3R5I	100	80
	SV660NT5R4I	100	80
	SV660NT8R4I	50	00
Three-phase 380 V	SV660NT012I	50	80
	SV660NT017I		
_	SV660NT021I	35	100
	SV660NT026I		

Sub- index	Name	Resist dissip coeff	or heat oation ficient	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
19h	Access	RW	Map ping	Related Mode	-	Data Range	10 to 100 (%)	De fault	30
Defines the	e heat dis	sipation co	efficient of	the regenerative resis	tor, which is appl	icable to both	external an	d built-in	1
regenerati	regenerative resistors.								
Set the heat dissipation coefficient 2002-19h (H02-24) based on actual cooling conditions of the resistor.									

Recommendations:

Set 2002-19h (H02-24) to a value lower than or equal to 30% in case of natural ventilation.

Set 2002-19h (H02-24) to a value lower than or equal to 50% in case of forced-air cooling.

Sub- Name		Regenerat ty	ive resisto pe	r	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
1Ah	Access	RW Map -		-	Related Mode	-	Data Range	0 to 3	De fault	3
Defines the Select the	Defines the regenerative resistor type and the mode of absorbing and releasing the braking energy. Select the regenerative resistor type based on section "Wiring and Setting of Regenerative Resistor" in SV660N Series Servo									

Drive Hardware Guide.

Sub-	Name	Power of regenerati	Power of external regenerative resistor		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
1Bh	Access	RW Map - ping -		Related Mode	-	Data Range	1 to 65535 (W)	De fault	40	
Defines the	e power o value of 2	of the extern	al regenei 02-26) can	rat	ive resistor.	calculated value				

Sub- index	Name	Resista external re resi	ance of generativ stor	e	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
1Ch	Access	RW	RW Map - ping -		Related Mode	-	Data Range	15 to 1000 (W)	De fault	50
Defines the resistance of the external regenerative resistor.										

Note: The value of 2002-1Ch (H02-27) cannot be lower than the calculated value.

Sub- index	Name	User password			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
1Fh	Access	RW	Map ping	-	Related Mode	-	Data Range	0 to 65535	De fault	0

Sub-	Nam	e System p initial	arameter ization	Se &	etting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16		
20h	Acces	s RW	Map ping	-	Related Mode	-	Data Range	0 to 2	De fault	0		
Used to re	store d	efault values o	or clear fau	ılt rec	cords.							
Setpoi	Doint Description					Remarks						
0		No operation			-							
1		Restore defau	lt setting		Restore parame and 2001h.	Restore parameters to default values except parameters in groups 2000h and 2001h.						
2	2 Clear fault records				Clear the latest	10 faults and war	nings.					
If necessary, use Inovance software tool to back up parameters except those in groups 2000h and 2001h								nd 2001h.				

Sub- index	Name	Default dis	keypad play	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16	
21h	Access	RW	Map ping	- Related Mode	-	Data Range	0 to 99	De fault	50	
The keypa	The keypad can switch to the monitored value display mode (group 200Bh) based on settings. 2002-21h is used to set the									
offset of the parameter within group 200Bh.										
If a param	If a parameter not in group 200Bh is set, the keypad does not switch to the monitored value display mode.									

Sub- index 24h	Name	Keypad data update frequency		2	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Map ping	-	Related Mode	-	Data Range	0 to 20	De fault	0

Sub- index 2Ah	Name	Manufacturer password			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Map ping	-	Related Mode	-	Data Range	0 to 65535	De fault	0

2.5.3.4 Group 2003h: Input Terminal Parameters

Index 2003h	Name	T	Ferminal inp parameters	ut s	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
	Access	-	Mapping	Yes	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Used to set terminal input parameters.										

Sub- index	Name	Nu	mber of ent	ries	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint8
00h	Access	RO	RO Mapping No		Related Mode	-	Data Range	-	Default	65

Sub- index	Name	1	DI1 function		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16		
03h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 40	Default	14		
Defines th	e functior	n of D	11.									
Descriptio	ns for the	setp	oints are sho	s are shown in the following table.								
Setp	oint		DI Function									
0		No a	assignment									
1		Serv	o ON									
2		Faul	t reset									
14	4	Posi	tive limit sw	/itch								
1	5	Neg	ative limit sv	witch	1							
3.	1	Hom	me switch									
34	4	Eme	rgency stop)								
38	3	Tou	ch probe 1									
39	Э	Tou	Touch probe 2									

1. Set 2003-03h to a value listed in the preceding table. Otherwise, E122.1 will occur.

2. Do not assign the same function to different DIs. Otherwise, E122.1 will occur.

3. If a certain function is assigned to a DI and the logic of this DI is activated, this DI function will remain active even if you cancel the function assignment.

4. DI1...DI4 are normal DIs, requiring the input signal width to be larger than 1 ms.

5. DI5 is a high-speed DI, requiring the input signal width to be larger than 0.25 ms.

6. When the touch probe function is enabled, DI5 and DI4 are assigned with touch probe 1 and touch probe 2 respectively by default.

Sub- index	Name		DI1 logic		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
04h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0
Used to se	Ised to set the level logic of DI1 when t				function assigned to D	011 is active.				
DI1 to DI4	are norm	al DIs	, requiring t	he in	put signal width to be l	arger than 1 ms.	Set active le	vel logic co	orrectly acc	cording
to the host	t controll	oller and peripheral circuits. The width of the input signal is shown in the following table for your								
reference.										

Setpoint	DI Logic Upon Active DI Function	Remarks
0	Low level	Low level must remain active for more than 1 ms.
1	High level	High level must remain active for more than 1 ms.

Sub- index 05h	Name	DI2 function			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 40	Default	15

Sub- index 06h	Name	DI2 logic			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0

Sub- index 07h	Name	DI3 function			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 40	Default	31

Sub- index 08h	Name	DI3 logic			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0

Sub- index 09h	Name	I	DI4 function		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 40	Default	39

Sub- index 0Ah	Name	DI4 logic			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0

Sub- index	Name	DI5 function			Setting Condition & During Effective Time & At once Related Mode -		Data Structure	-	Data Type	Uint16
0Bh	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 40	Default	38

Sub- index	Name		DI5 logic		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Ch	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0

Sub- index 3Dh	Name	DI1 filter time		2	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 500 (ms)	Default	0.5

Sub- index	Name	C	012 filter time	2	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
3Eh	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 500 (ms)	Default	0.5

Sub- index 3Fh	Name	C	DI3 filter time		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 500 (ms)	Default	0.5

Sub- index 40h	Name	D	DI4 filter time		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 500 (ms)	Default	0.5

Sub- index 41h	Name	C	015 filter time	2	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 500 (ms)	Default	0.5

2.5.3.5 Group 2004h: Output Terminal Parameters

Index	Name		Output term paramete	inal rs	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
2004h	Access	-	Mapping	Yes	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Used to se	Used to set output terminal param		eters.							

Sub- index	Name	Number of entriesRO Mapping No		Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint8
00h	Access			Related Mode	-	Data Range	-	Default	6

Sub- index	Name		DO1 function		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16		
01h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 32	Default	1		
Defines th	e functio	n of D	01.									
Descriptio	ns for the	e setp	oints are sho	ints are shown in the following table.								
Setp	oint		DO Function									
0)	No a	ssignment									
1		Ser	rvo ready									
2	2	Mot	or rotation									
9)	Bral	ke									
10	0	War	ning									
1	1	Fau	lt									
2	5	Con	Comparison output									
3	1	Ethe	erCAT-forced	outpu	ıt							
32	2	EDM	I safety state	outpu	ıt							
Set 2004-0	01h to a value listed in the preceding table.											

Different DOs can be assigned with the same function.

Sub- index 02h	Name	DO1 logic level			Setting Condition & Effective Time		During running & At once	Data Structure	-	Data Type	Uint16	
	Access	RW	Mapping	-	Rela	ited Mode	-	Data Range	0 to 1	Default	0	
Defines the level logic of DO1 when the function assigned to DO1 is active. DO1 to DO3 are normal DOs, requiring the minimum output signal width to be 1 ms. The host controller must be able to receive valid DO logic changes.									ole to			
Setpoir	it	DO1 Logic Upon Active DO Function				Transistor Status			Minimum Signal Width			
0		Low level				ON			h w	1 ms Active	•	
1	1 High level			OFF			High Low Active 1 ms					
Before rec	eiving DO) logic actual	changes, vie l operating st	w the	setpoint	t of 200D-12h (vo drive or by	Forced DI/DO se forced DO (2001	election) to c D-14h or 60FE	heck whet Eh).	ther the DC) level is	

Sub- index 03h	Name	DO2 function			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 32	Default	11

Sub- index	Name	DO2 logic level			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
04h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0

Sub- index 05h	Name	DO3 function			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 32	Default	9

Sub- index 06h	Name	DO3 logic level			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16		
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0		
Sub- index	Name	Eth logid	erCAT-forcec c in non-OP s	l DO tatus	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16		
---------------	-----------	--	-------------------------------	---------------	---------------------------------------	--------------------------------	-------------------	--------	--------------	--------	--	--
18h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 7	Default	1		
Descriptio	ns for th	e setp	oints are sho	wn in	the following table.							
Setpoin	t	DO Function										
0	Stat	atus of DO1, DO2, and DO3 unchanged in the non-OP status										
1	No d	output	in DO1 and	status	of others unchanged i	n the non-OP sta	atus					
2	No d	output	in DO2 and	status	of others unchanged i	n the non-OP sta	atus					
3	No o	output	in DO1 or D	D2 and	l status of others unch	anged in the no	n-OP status					
4	No o	output	in DO3 and	status	of others unchanged i	n the non-OP sta	atus					
5	No o	o output in DO1 or DO3 and status of others unchanged in the non-OP status										
6	No c	output	in DO2 or D	D3 and	l status of others unch	anged in the no	n-OP status					
7	No d	output	: in DO1, DO2	, or D(03 in the non-OP statu	S						

2.5.3.6 Group 2005h: Position Control Parameters

Index 2005h	Name	Po	osition con parameter	trol s	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
	Access	-	Mapping	Yes	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Used to set position control parameters										

Sub- index	Name	N	umber of en	tries	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint8
00h	Access	RO Mapping No		No	Related Mode	-	Data Range	-	Default	55

Sub-	Name	Firs filt	st-order low er time con	-pass stant	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
05h	Access	RW	Mapping	Yes	Related Mode	PP/HM/ CSP	Data Range	0 to 6553.5 (ms)	Default	0

Sub-	Name	Mov ti	ving average ime constar	e filter nt 1	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
06h	Access	RW	Mapping	Yes	Related Mode	PP/HM/ CSP	Data Range	0 to 1000 (ms)	Default	0

Sub- index 07h	Name	Mov ti	ring average me constar	e filter nt 2	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	Yes	Related Mode	PP/HM/ CSP	Data Range	0 to 128.0 (ms)	Default	0

Sub-	Name	Numerator of electronic gear ratio			Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint32
08h	Access	RW	Mapping	Yes	Related Mode	PP/HM/ CSP	Data Range	0 to (2 ³² - 1)	Default	1

Sub-	Name	Denominator of electronic gear ratio			Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint32
index 0Ah	Access	RW	Mapping	Yes	Related Mode	PP/HM/ CSP/CSV/ PV	Data Range	0 to (2 ³² - 1)	Default	1

Sub-	Name	Speed feedforward control selection		vard ion	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
14h	Access	RW	Mapping	Yes	Related Mode	PP/HM/ CSP	Data Range	0 to 3	Default	1

Defines the source of the speed loop feedforward signal.

In the position control mode, speed feedforward can be used to improve the position reference response speed.

Setpoint	Speed feedforward source	Remarks
0	No speed feedforward	-
1	Internal speed feedforward	The speed information corresponding to the position reference (encoder unit) is used as the speed loop feedforward source.
2	60B1 used as speed feedforward	60B1h is used as the source of external speed feedforward signal in the CSP mode. The polarity of 60B1h can be set in bit6 of 607Eh.
3	Zero phase control	Zero phase control can be used together with H8-17 (Zero phase delay) to reduce the position follow-up deviation during startup.

Speed feedforward control parameters include 2008-13h (Speed feedforward filter time constant) and 2008-14h (Speed feedforward gain). See section "Feedforward Gain" in SV660N Series Servo Drive Function Guide for details.

Sub- index	Name	Condition for COIN (positioning completed) signal output			Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
1311	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 3	Default	0

Sub-	Name	Loca	al homing m	node	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
1Fh	Access	RW	Mapping	Yes	Related Mode	All	Data Range	0, 6	Default	0
Set	Setpoint					Description				
	0	0:	Disable							
	6	6:	Current pos	ition a	is the home					
Used to ex	ecute loo	al ho	ming when	the ho	ming method defined i	n CiA402 prof	ile cannot b	e called by th	e host con	troller

through operating bit4 of the control word.

Note

Use this function in the Servo OFF state only. Failure to comply may result in malfunction of the motor due to sudden change in the position feedback. After homing is done successfully, the present position feedback will be cleared.

Sub- index	Name	Hc	oming time	limit	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
24h	Access	RW	Mapping	RPDO	Related Mode	НМ	Data Range	0 to 6553.5 (s)	Default	5000.0
Defines th If 2005-24	e maxim h is set to	um ho o an ex	ming time. cessively lo	w value	or if the home is not	t found within	the time de	fined by 2005	-24h, E601.	0

(Homing timeout) occurs.

Sub- index	Name	Loca	l home offs	et	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Int32
25h	Access	RW	Mapping	-	Related Mode	НМ	Data Range	-1073741824 to +1073741824	Default	0
2005-25h i	is used to	gethe	r with 2005	-1Fl	n. After homing is doi	ne, the prese	nt position fe	edback is the value	e of 2005-2	5h.

Sub- index	Name	Posi abso linea	tion offset i lute positio ar mode (lo 32 bits)	in on w	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Int32
ZEN	Access	RW	Mapping	-	Related Mode	All	Data Range	-2 ³¹ to (2 ³¹ - 1) (encoder unit)	Default	0

Sub- index	Name	Posi abso linea	tion offset i lute positio r mode (hig	in on gh	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Int32
31h			32 bits)					21 21		
	Access	RW	Mapping	-	Related Mode	All	Data	-2 ³¹ to (2 ³¹ - 1)	Default	0
							Range	(encoder unit)		
These two	paramet	ers de	fine the off	set	of the mechanical at	osolute posit	ion (encoder	unit) relative to the	motor ab	solute
position (e	osition (encoder unit) when the absolute encoder system works in the linear mode (2002-02 = 1).									
Position of	osition offset in the absolute position linear mode = Motor absolute position - Mechanical absolute position									

Default values of 2005-2Fh and 2005-31h are 0 in the absolute position linear mode. After homing is done, the servo drive calculates the difference between the absolute position fed back by the encoder and the mechanical absolute position first. Then, the servo drive assigns the difference to 2005-2Fh and 2005-31h and saves it to EEPROM.

Sub- index 33h	Name	Mechanical gear ratio (numerator) in the absolute position rotation mode			Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	All	Data Range	1 to 65535	Default	1

Sub- index 34h	Name	Mec (den abso rota	hanical gea ratio Iominator) i Iute positic ation mode	n n	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	All	Data Range	1 to 65535	Default	1
Defines th encoder w Assume th 0, then the	e ratio of /hen the a nat the en e followin	the fe absolu coder g form	edback pul te encoder resolution nula applies	ses syst is R : R	(encoder unit) per lo tem works in the rot. E , the encoder puls M = R E x 2005-33h/2	ad revolution ation mode (2 es per load re 005-34h	n to the abso 2002-02 = 2). evolution is R	lute position fed ba M , and 2005-35h a	ack by the and 2005-3	7h are

Note

The servo drive calculates the upper limit of mechanical absolute position based on 2005-35h and 2005-37h first. If 2005-35h and 2005-37h are set to 0, the servo drive turns to calculating the upper limit based on 2005-33h and 2005-34h.

Sub- index 35h	Name	Puls rev abso rota (lo	ses per load volution in lute positio ation mode ow 32 bits)	d on	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint32
	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to (2 ³² - 1) (encoder unit)	Default	0

Sub- index 37h	Name	Puls rev abso rota (hi	ses per load volution in lute positic ation mode gh 32 bits)	d on	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint32
	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to (2 ³² - 1) (encoder unit)	Default	0

Defines the feedback pulses (encoder unit) per load revolution when the absolute encoder system works in the rotation mode (2002-02 (H02–01)= 2).

Assume the encoder pulses per load revolution is R M and 2005-35h or 2005-37h is not 0, the following formula applies: P M = $2005-37h \times 2^{32} + 2005-35h$

Note

The servo drive calculates the upper limit of mechanical absolute position based on 2005-35h and 2005-37h first. If 2005-35h and 2005-37h are set to 0, the servo drive turns to calculating the upper limit based on 2005-33h and 2005-34h.

2.5.3.7 Group 2006h: Speed Control Parameters

Index	Name	:	Speed cont paramete	rol rs	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
2006h	Access	-	Mapping	Yes	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Used to se	et speed o	contr	ol paramet	ers						

Sub- index	Name	Nu	mber of en	tries	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	16

Sub- index	Name	Sp	beed referer	nce	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Int16
04h	Access	RW	Mapping	-	Related Mode	Local speed mode	Data Range	-6000 to +6000 (RPM)	Default	200
2006-04h i	s valid in	the lo	ocal speed i	mode	and invalid in the E	therCAT mode.				

Sub- index	Name	Acc t	eleration ra ime of spee reference	amp ed	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
06h	Access	RW	Mapping	-	Related Mode	Local speed mode	Data Range	0 to 65535 (ms)	Default	0
2006-06h i	s valid in	the lo	cal speed i	mode	and invalid in the E	therCAT mode.				

Sub-	Name	Dec t	eleration ra ime of spee reference	amp :d	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
07h	Access	RW	Mapping	Yes	Related Mode	Local speed mode	Data Range	0 to 65535 (ms)	Default	0
2006-07h is valid in the local speed mode and invalid in the Ether						herCAT mode.				

Sub-	Name	Pos	itive speed	limit	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
09h	Access	RW	Mapping	Yes	Related Mode	Local speed mode	Data Range	0 to 6000 (RPM)	Default	6000
2006-09h i	s valid in	the lo	cal speed r	node a	and invalid in the Et	herCAT mode.				

Sub-	Name	me Negative speed limit			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Ah	Access	RW	Mapping	Yes	Related Mode	Local speed mode	Data Range	0 to 6000 (RPM)	Default	6000
2006-0Ah i	-0Ah is valid in the local speed mode		and invalid in the Et	herCAT mode						

Sub-	Name	Qu	ick declarat coefficient	tion	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
0Bh	Access	RW	Mapping	Yes	Related Mode	-	Data Range	0–2	Default	0
The defau the expect	lt value is ed value,	0. Wh enlar	ien 6085h (i ge the valu	Quick e of 60	stop deceleration) is 085h through 2006-0	aximum valu the stop tim	e but the ramp e.	time still e	xceeds	
Setp	oint					Name				
()					x 1				
1	L					x 10				
2	2					x 100				

When the brake function is enabled and the stop mode at S-ON OFF is set to "Ramp to stop", the maximum time of ramp-to-stop is Min (H02-12, stop time defined by 6085h).

Sub- index 0Ch	Name	Torque feedforward control			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	Yes	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0–2	Default	1

Defines whether to enable internal torque feedforward in the control modes other than torque control. Torque feedforward can be used to improve the torque reference response speed and reduce the position deviation during acceleration/deceleration at constant speed.

Setpoint	Torque feedforward control	Remarks
0	/	-
1	Internal torque feedforward	The speed reference is used as the torque feedforward signal source, which is further divided into the following two situations: In the position control mode, the speed reference refers to that output from the position controller. In the speed control mode, the speed reference refers to that set by the user.
2	60B2h used as external torque feedforward source	60B2h is used as the external torque feedforward signal source in the CSP and CSV modes. The polarity of the torque feedforward signal can be set in bit5 of 607Eh. Note: When 60B2h is used as the torque feedforward signal, you can adjust 2008-16h (H08-21) and 2008-15h (H08-20) to achieve the desired performance.

Torque feedforward parameters include 2008-16h (Torque feedforward gain) and 2008-15h (Torque feedforward filter time constant). For details, see section "Feedforward Gain" in SV660N Series Servo Drive Function Guide.



Sub- index	Name	Acceleration/ Deceleration ramp time of jog speed			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Dh	Access	RW	Mapping	Yes	Related Mode	-	Data Range	0 to 65535 (ms)	Default	10
Defines the acceleration/deceleration time in the jog mode set through H0D-11 or the software tool.										

Sub- index	Name	Spe sm	ed feedforv noothing fil	vard ter	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Eh	Access	RW	Mapping	Yes	Related Mode	-	Data Range	0 to 2000 (us)	Default	0
Defines th	ines the speed feedforward filter time				constant.					

Sub- index	Name	Threshold of TGON (motor rotation) signal		GON on)	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
11h	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 1000	Default	20

Sub- index	Name	Co	ogging torq ompensatic selection	ue on	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
1Dh	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	1

2.5.3.8 Group 2007h: Torque Control Parameters

Index	Name		Torque contr parameters	ol	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
2007h	Access	-	Mapping	Yes	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Used to set torque control parameters.										

Sub-	Name	Number of entries			Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	40

Sub-	Name	Tor val	que referenc ue set throug keypad	e h	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Int16
04h	Access	RW	Mapping	-	Related Mode	Local torque mode	Data Range	-400.0 to +400.0 (unit: %)	Default	0

Sub- index	Name	Toı filter	rque referenc time constar	e nt 1	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
06h	Access	RW	Mapping	-	Related Mode	All	Data Range	0.00 to 30.00 (ms)	Default	0.20

Sub- index	Name	Tor filter	que referenc time constar	e nt 2	Setting Condition & Effective Time	During running & At once	Data Structure	_	Data Type	Uint16
07h	Access	RW	Mapping	-	Related Mode	All	Data Range	0.00 to 30.00 (ms)	Default	0.27

Defines the torque reference filter time constant.

Low-pass filtering of torque references helps smoothen torque references and reduce vibration.

Pay attention to the responsiveness during setting as an excessively high setpoint lowers down the responsiveness.

Note

The servo drive offers two low-pass filters, in which the low-pass filter 1 is used by default.

Gain switchover can be used in the position or speed control mode. Once certain conditions are satisfied, the servo drive can switch to filter 2. For details on gain switchover, see section "Gain Switchover".

Sub-	Name	Po: t	sitive interna orque limit	l	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Ah	Access	RW	Mapping	-	Related Mode	Local torque mode	Data Range	0.0 to 400.0 (%)	Default	350

Sub-	Name	Neg t	gative interna orque limit	al	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Bh	Access	RW	Mapping	-	Related Mode	Local torque mode	Data Range	0.0 to 400.0 (%)	Default	350

2007-0Ah and 2007-0Bh are valid only in the local torque mode (H02-00 = 2). For torque limit in the EtherCAT mode, use 60E0h/60E1h/6072h. Use the torque limit with caution as an excessively low limit value may lead to insufficient motor torque output.

If the setpoint exceeds the maximum torque of the servo drive and motor, the actual torque will be limited to a value within the maximum torque of the servo drive and motor.

Sub- index	Name	Em	iergency-sto torque	C	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
10h	Access	RW	Mapping	-	Related Mode	-	Data Range	0.0 to 400.0 (%)	Default	100

Sub-	Name	Po: speed	sitive interna l limit in torc control	l que	Setting Condition & Effective Time	During running & At once	Data Structure	_	Data Type	Uint16
14h	Access	RW	Mapping	-	Related Mode	Local torque mode	Data Range	0 to 6000 (RPM)	Default	3000

Sub-	Name	Neg speed	gative interna d limit in torc control	al que	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
15h	Access	RW	Mapping	-	Related Mode	Local torque mode	Data Range	0 to 6000 (RPM)	Default	3000
2007-14h a and PT mo	nd 2007- des.	15h are	e valid in the	loca	al torque mode only (H	102-00 = 2). Us	se 607F for sp	peed limit in t	ne EtherCA	T, CST,

Sub- index	Name	Ba	ase value for orque reach		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
16h	Access	RW	Mapping	-	Related Mode	PT	Data Range	0.0 to 400.0 (%)	Default	0.0

Sub- index	Name	Thre to	eshold for val orque reach	lid	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
17h	Access	RW	Mapping	-	Related Mode	PT	Data Range	0.0 to 400.0 (%)	Default	20



Sub- index	Name	De	epth of field- weakening		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
19h	Access	RW	Mapping	-	Related Mode	-	Data Range	60 to 115 (%)	Default	115
Use the de field-weak	fault valu ening are	e in ge a and i	neral cases. educes curre	Red ent i	ucing the field-weaker ripple, but also leads t	ning depth im o load rate ris	proves the d	ynamic perfor	mance of t	he

Sub- index	Name	Max de	 c. permissible magnetizing current 	9	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
1Ah	Access	RW	Mapping	-	Related Mode	-	Data Range	1 to 200 (unit: %)	Default	100
Use the de poses a gre Inovance f	fault valu eater chal irst.	e in ge llenge (neral cases. on the bearir	Incr ng ca	easing the demagnetiz apacity of the motor. I	zing current e f you need to	xtends the m increase the	otor speed ra setpoint of 20	nge, but al: 07-1Ah, co	so ntact

Sub-	Name	Fiel	Field-weakening selection		Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uin t16
1Bh	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0
0: Disable;	1: Enable									

Sub- index	Name	Fiel	ld-weakenin gain	g	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
1Ch	Access	RW	Mapping	-	Related Mode	-	Data Range	0.001 to 1.000	Default	0.030

Sub- index	Name	ame Time constant of low-pass filter 2		of 2	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
25h	Access	RW	Mapping	-	Related Mode	-	Data Range	0.00 to 10.00 (ms)	Default	0.00

Sub- index	Name	Tor fil	Torque reference		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
26h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0
0: First-ord 1: Biquad f	ler filter ilter									

Sub- Nam		E atte	liquad filter enuation rati	0	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uin t16
27h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 50	Default	16

2.5.3.9 Group 2008h: Gain Parameters

Index	Name	G	iain parame	ters	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
2008h	Access	-	Mapping	Yes	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Used to se	et gain pa	ran	neters.							

Sub- index	Name	Nu	Number of entries		Setting Condition & Effective Time	·	Data Structure	-	Data Type	Uint8
00h	Access	RO	RO Mapping No		Related Mode	-	Data Range	-	Default	65

Sub- index 01h	Name	Spe	ed loop gai	n	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0.1 to 2000 (Hz)	Default	39

Defines the proportional gain of the speed loop.

2008-01h determines the responsiveness of the speed loop. The higher the setpoint, the higher the responsiveness. Note that an excessively high setpoint may cause vibration.

In the position control mode, the position loop gain must be increased together with the speed loop gain.

Sub- index	Name	S in	peed loop tegral time constant		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
02h	Access	RW	Mapping	1	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0.15 to 512 (ms)	Default	20.51
Defines th	e integral	time	constant of	the	e speed loop.					

The lower the setpoint, the better the integral action, and the quicker will the deviation value be close to 0. Note: There is no integral action when 2008-02h is set to 512.00.

Sub- index 03h	Name	Position loop gain			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	1	Related Mode	PP/HM/CSP	Data Range	0.1 to 2000 (Hz)	Default	55.7

Defines the proportional gain of the position loop.

2008-03h determines the responsiveness of the position loop. A high setpoint shortens the positioning time. Note that an excessively high setpoint may cause vibration.

The first gain set include parameters 2008-01h, 2008-02h, 2008-03h, and 2007-07h.

Sub-	Name	2nd speed loop gain			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
04h	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0.1 to 2000 (Hz)	Default	75

Sub- index	Name	2no in	l speed loop tegral time constant	C	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
05h	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0.15 to 512.00 (ms)	Default	10.61

Sub- index	Name	2nd position loop gain			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
06h	Access	RW	Mapping	-	Related Mode	PP/HM/CSP	Data Range	0.1 to 2000.0 (Hz)	Default	120
Defines the second gain of the position loop and speed loop. The second gain set include parameters 2008-04h, 2008-05h, 2008-06h and 2007-07h. For details on gain switchover, see section "Gain Switchover".										

Sub- Name		2nd	d gain mode setting	e	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16	
09h	Access	ccess RW Mapping -		-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 1	Default	1	
Defines th	e switcł	nover m	ode of the	2nd	l gain set.						
Setpoi	nt					Mode					
0	0	: Fixed	Fixed to the 1st gain set, P/PI switched by bit26 of 60FE (switched to P when bit26 of 60FE is set to 1)								
1 Switched between the 1st gain set (2008-01h2008-03h, 2007-06h) and the 2nd gain set (2008-04h2008-06h, 2007-07h) as defined by 2008-0Ah											

Sub- index	Name	Gai	n switchove condition	er	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Ah	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 10	Default	0
See the fo	See the following table for gain switchover conditions.									

Table 2–11 Conditions for gain switchover

Setpoint	Gain switchover condition	Remarks
0	Fixed to the 1st gain set	The 1st gain set applies.
1	DI	Gains are switched through bit26 of 60FE. bit26 signal inactive: 1st gain set (2008-01h2008-03h, 2007-06h) bit26 signal active: 2nd gain set (2008-04h2008-06h, 2007-07h) If the bit26 signal cannot be assigned to DI, the 1st gain set applies.
2	Torque reference too large Speed reference too large	If the torque reference absolute value exceeds (Level + Dead time) [%] in the last 1st gain set, the servo drive switches to the 2nd gain set. If the torque reference absolute value is lower than (level – dead time) [%] and such status lasts within the delay defined by 2008- 0Bh (Gain switchover delay) in the last 2nd gain set, the servo drive switches to the 1st gain set.
3		If the speed reference absolute value exceeds (Level + Dead time) [RPM] in the last 1st gain set, the servo drive switches to the 2nd gain set. If the speed reference absolute value keeps lower than (Level + Dead time) [RPM] within the delay defined by 2008-0Bh in the last 2nd gain set, the servo drive switches to the 1st gain set.
4	Speed reference too large	Active in the control modes other than speed control If the absolute value of the change rate in the speed reference exceeds (Level + Dead time) [10 RPM/s] in the last 1st gain set, the servo drive switches to the 2nd gain set. If the absolute value of the change rate in the speed reference keeps lower than (Level - Dead time) [10 RPM/s] within the delay defined by 2008-0Bh in the last 2nd gain set, the servo drive switches to the 1st gain set. In the speed control mode, the 1st gain set always applies.
5	Speed reference high-speed/low- speed threshold	If the speed reference absolute value exceeds (Level - Dead time) [RPM] in the last 1st gain set, the servo drive starts switching to the 2nd gain set, with gains changed gradually. When the speed reference absolute value reaches (Level + Dead time) [RPM], the 2nd gain set applies. If the speed reference absolute value is lower than (Level + Dead time) [RPM] in the last 2nd gain set, the servo drive starts reverting to the 1st gain set, with gains changed gradually. When the speed reference absolute value reaches (Level - Dead time) [RPM], the 1st gain set, applies.

Setpoint	Gain switchover condition	Remarks
6	Position deviation too large	Active only in the position control mode If the position deviation absolute value exceeds (Level + Dead time) [encoder unit] in the last 1st gain set, the servo drive switches to the 2nd gain set. If the position deviation absolute value keeps lower than (Level - Dead time) [encoder unit] within the delay defined by 2008-0Bh in the last 2nd gain set, the servo drive switches to the 1st gain set. The 1st gain set applies in control modes other than position control.
7	Position reference available	Active only in the position control mode If the position reference is not 0 in the last 1st gain set, the servo drive switches to the 2nd gain set. If the position reference keeps being 0 within the delay defined by 2008-0Bh in the last 2nd gain set, the servo drive switches to the 1st gain set. The 1st gain set applies in control modes other than position control.
8	Positioning completed	Active only in the position control mode If positioning has been completed in the last 1st gain set, the servo drive switches to the 2nd gain set. If positioning has been completed within the delay defined by 2008-0Bh in the last 2nd gain set, the servo drive switches to the 1st gain set. The 1st gain set applies in control modes other than position control.
9	Actual speed too high	Active only in the position control mode If the absolute value of actual speed exceeds (Level + Dead time) [RPM] in the last 1st gain set, the servo drive switches to the 2nd gain set. If the absolute value of actual speed exceeds (Level - Dead time) [RPM] within the delay defined by 2008-0Bh in the last 2nd gain set, the servo drive switches to the 1st gain set. The 1st gain set applies in control modes other than position control.
10	Position reference + Actual speed	Active only in the position control mode If the position reference is not 0 in the last 1st gain set, the servo drive switches to the 2nd gain set. If the position reference keeps being 0 within the delay defined by 2008-0Bh in the last 2nd gain set, the 2nd gain set applies. When the position reference keeps being 0 after the time defined by 2008-0Bh elapses, if the absolute value of actual speed does not reach (Level) [RPM], the servo drive switches to the 1st gain set (except the speed integral time constant which is fixed to 2008-05h (2nd speed loop integral time constant)); if the absolute value of the actual speed is lower than (Level - Dead time) [RPM], the servo drive switches to the 1st gain set without any exception. The 1st gain set applies in control modes other than position control.

Sub- index	Name	Gai	n switchove delay	er	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Bh	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 1000 (ms)	Default	5
Defines the delay when the servo drive switches from the 2nd gain set to the 1st gain set.										

Sub- index 0Ch	Name	Gaiı	n switchove level	er	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 20000	Default	50
Defines th descriptio	Defines the gain switchover level. Gain switchover is affected by both the level and the dead time. For details, see descriptions of 2008-0Ah. The unit of gain switchover level varies with the switchover condition.									

Sub- index	Name	Gaii	n switchove lead time	r	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Dh	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 20000	Default	30
Defines th	Defines the dead time for gain switchover.									
Gain switchover is affected by both the level and the dead time. For details, see descriptions of 2008-0Ah. The unit of gain										

Set 2008-0Ch to a value higher than 2008-0Dh. If 2008-0Ch is set to a value lower than 2008-0Dh, the servo drive sets 2008-0Ch to the same value as 2008-0Dh.

Sub- index	Name	Position gain switchover time		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16	
0Eh	Access	RW	RW Mapping -		Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 1000 (ms)	Default	3
In the pos gain), set 1 2008-0Eh 2008-06h i gain set in	ition con the time f can be us is invalid nmediate	trol mo for swi sed to if it is s	ode, if 2008 tching from reduce the set to a valu	-06 i 20 im	h (2nd position loop)08-03h to 2008-06h. pact caused by an inc ower than or equal to	gain) is set to a strease in the pos	value far high ition loop ga iis case, the s	ier than 2008-03 in. ervo drive swite	3h (Position	n loop 2nd

Sub- Name		Load in	l moment o ertia ratio	of	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
10h	Access	RW	W Mapping -		Related Mode	All	Data Range	0 to 120 (multiplier)	Default	3
Defines the The setpoi equals the In inertial When onli manually,	e mechai nt 0 indio motor n auto-tun ne inertia disable c	nical lo cates t nomen ing (of a auto- online i	bad inertia the motor is the finertia fline and o tuning (200 inertia auto	rati s di nlir)9-0)-tu	io relative to the moto sconnected from the ne), the servo drive au 04h \neq 0) is used, the uning (2009- 04h = 0).	or moment of incload. The setpoi tomatically calc servo drive sets 3	ertia. int 1.00 indic ulates and u 2008-10h aut	ates the mecha pdates the valu omatically. To s	nical load i e of 2008-1 set 2008-10	nertia 0h. h

When the value of 2008-10h is the same as the actual inertia ratio, the value of speed loop gain (2008-01h/2008-04h) indicates the actual maximum follow-up frequency of the speed loop.

Sub- index	Name	Zero phase delay			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
12h	Access	RW	Mapping	-	Related Mode	PP/HM/CSP	Data Range	0 to 4 (ms)	Default	0

Sub- Name		Speed feedforward filter time constant			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16	
13h	Access	RW	Map ping	-	Related Mode	PP/HM/CSP	Data Range	0 to 64 (ms)	Default	0.5	
Defines th	Defines the filter time constant of speed feedforward.										

Sub- index	Name	feed	Speed forward gai	n	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
14h	Access	RW	Mapping	-	Related Mode	PP/HM/CSP	Data Range	0 to 1000 (%)	Default	0

In the position control mode, speed feedforward is the value of 2008-14h multiplied by the speed feedforward signal, which is part of the speed reference.

Increasing the value of 2008-14h improves the responsiveness of position references and reduces the position deviation during operation at a constant speed.

Set 2008-13h to a fixed value first, and then gradually increase the value of 2008-14h from 0 to a certain setpoint at which speed feedforward achieves the desired effect.

Adjust 2008-13h and 2008-14h repeatedly until a balanced setting is achieved.

Note

For the speed feedforward function and speed feedforward signal selection, see 2005-14h (Speed feedforward control selection).

Sub- index	Name	feed [:] tim	Torque forward filte ne constant	er	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
15h	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 64 (ms)	Default	0.5
Defines th	e filter tir	ne cor	istant of to	rqu	e feedforward.					

Sub- index	Name	feedf	Torque forward gaiı	n	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
16h	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 300 (%)	Default	0

In the non-torque control mode, torque feedforward is the value of 2008-16h multiplied by the torque feedforward signal, which is part of the torque reference.

Increasing the value of 2008-16h improves the responsiveness to variable speed references.

Increasing the value of 2008-16h improves the responsiveness to position references and reduces the position deviation during operation at a constant speed.

When adjusting torque feedforward parameters, use the default value of 2008-15h first and gradually increase the value of 2008-16h to enhance the torque feedforward effect. When speed overshoot occurs, keep the value of 2008-16h unchanged and increase the value of 2008-20h. Adjust 2008-15h and 2008-16h repeatedly until a balanced setting is achieved.

Note

For the torque feedforward function and torque feedforward signal selection, see 2006-0Ch (Torque feedforward control selection).

Sub-	Name	Spee filte	ed feedbac ering optior	k 1	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
17h	Access	RW	RW Map - ping -		Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 4	Default	0
Defines th The highe	e moving r the setp	avera oint, t	average filtering tim int, the weaker the		nes for speed feedbac speed feedback fluc	ck. tuation, but the	longer the fee	edback delay w	vill be.	

Note

When 2008-17h is set to a value higher than 0, 2008-18h (Cutoff frequency of speed feedback low-pass filter) is invalid.

Sub- index	Name	Cuto fee p	off frequenc of speed dback low- bass filter	у	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
1011	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 8000 (Hz)	Default	8000
Defines th	e cutoff fi	requer	ncy for first-	or	der low-pass filtering	on the speed fee	edback.			

The lower the setpoint, the weaker the speed feedback fluctuation, and the longer the feedback delay will be.

Setting 2008-18h to 8000 negates the filtering effect.

Sub- index 19h	Name	Pseud fee fee	do derivativ dback and edforward control oefficient	/e	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	1	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 200 (%)	Default	100

Defines the control mode of the speed loop.

When 2008-19h is set to 200.0, PI control (default control mode of the speed loop) is applied to the speed loop, which features fast dynamic response.

When 2008-19h is set to 0.0, speed loop integral action is enhanced, which filters out low-frequency interferences but also slows down the dynamic response.

2008-19h can be used to keep a good responsiveness of the speed loop, with the anti-interference capacity in low-frequency bands improved and the speed feedback overshoot not increased.

Sub- index	Name	Spe cuto	ed observer	Y	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
1Ch	Access	RW	Mapping	-	Related Mode	-	Data Range	50 to 600 (Hz)	Default	170

Sub- index	Name	Spe inert c	ed observe ia correctio oefficient	n	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
1Dh	Access	RW	Mapping	-	Related Mode	-	Data Range	1 to 1600 (%)	Default	100

Sub- index	Name	Spe f	ed observer ilter time	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
1Eh	Access	RW	Mapping	Related Mode	-	Data Range	0 to 10 (ms)	Default	0.8

Sub- index	Name	Di cor	isturbance mpensation time		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
1Fh	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 100 (ms)	Default	0.2

Sub- index	Name	Di cuto	isturbance off frequenc	у	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
20h	Access	RW	Mapping	-	Related Mode	-	Data Range	10 to 4000 (Hz)	Default	600

Sub- index	Name	D coi	isturbance mpensation gain		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
21h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 100 (%)	Default	0

Sub- index 22h	Name	D obs c	isturbance erver inertia correction coefficient	3	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
22N	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1600 (%)	Default	100

Sub- index 26h	Name	mc free su	Phase odulation for medium- quency jitter ppression 2	r	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
	Access	RW	Mapping	-	Related Mode	-	Data Range	-90 to +90 (%)	Default	0

Sub- index 27h —	Name	Fr free su	requency of medium- quency jitter ppression 2	r	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
2111	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1000 (Hz)	Default	0

Sub- index 28h	Name	Co gair fre su	mpensation n of medium quency jitter ppression 2	-	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
2811	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 300 (%)	Default	0

Sub- index	Name	Spe	eed observer selection		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
29h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0

Sub- index	Name	Mo	odel control selection		Setting Condition & Effective Time	During running &At once	Data Structure	-	Data Type	Uin t16
2Bh	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0

Sub- Na index 2Ch	Name	I	Model gain		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
2Ch	Access	RW	Mapping	-	Related Mode	-	Data Range	0.1 to 2000	Default	40

Sub- index	Name	Fe	eedforward value		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
2Fh	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 102.4	Default	95

Sub- index 36h	Name	Med free si	ium- and lov quency jitter uppression requency 3	V-	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
2011	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 300 (Hz)	Default	0

Sub- index 37h -	Name	Med fre s cor	ium- and lov quency jitter uppression npensation 3	v- 3	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
3711	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 200 (%)	Default	0

Sub- index 39h	Name	Med fre supp m	ium- and lov quency jitter pression pha odulation 3	v- r se	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
39N	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 600 (%)	Default	100

Sub- index	Name	Med fre si	ium- and lov quency jitter uppression requency 4	V-	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
501	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 300 (Hz)	Default	0

Sub- index	Name	Medi free su con	ium- and lov quency jitter uppression npensation 4	v- 1	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
3011	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 200 (%)	Default	0

Sub- index	Name	Med fre supp m	ium- and low quency jitter pression pha odulation 4	v- se	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
3EN	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 600 (%)	Default	100

Sub- index	Name	Po	osition loop ntegral time constant		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
3Fh	Access	RW	Mapping	-	Related Mode	-	Data Range	0.15 to 512	Default	512

Sub- index	Name	2nd in	position loo itegral time constant	р	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
40h	Access	RW	Mapping	-	Related Mode	-	Data Range	0.15 to 512	Default	512

Sub- index	Name	Sp fee	eed observer dback source	r e	Setting Condition & Effective Time	During running & At once	Data Structure	_	Data Type	Uin t16
41h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0

Sub- index	Name	Visc ze	ous friction c ro deviation control	of	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
49h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 100	Default	0

Sub- index	Name	Forv frie dev	vard coulom ction of zero iation contro	b ol	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
4Ah	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 100	Default	0

Sub- index	Name	Rev fri dev	erse coulom ction of zero iation contro	b ol	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Int16
4Bh	Access	RW	Mapping	-	Related Mode	-	Data Range	-100 to 0	Default	0

Sub- index	Name	co sele devi	Friction mpensation ection of zerc iation contro) I	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
4Cn	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0

Sub- index	Name	A co fa devi	cceleration mpensation ctor of zero iation contro	ol	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
4Dn	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 900	Default	0

Sub- index	Name	Sta ze	tic friction of ro deviation control	-	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
4Eh	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 100	Default	0

Sub- index 4Fh	Name	Tra betv frictio fric dev	nsition speed veen coulom on and visco ction of zero iation contro	d b us ol	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 100	Default	0

Sub- index	Name	Initia of z	Il torque sho ero deviatior control	ck 1	Setting Condition & Effective Time	During running & At once	Data Struc ture	-	Data Type	Uint16
50h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 100	Default	0

Sub- index	Name	co d dev	Friction mpensation elay of zero iation contro	ı	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
510	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1000	Default	20

2.5.3.10 Group 2009h: Gain Auto-tuning Parameters

Index	Name	G	ain auto-tur parameter	ning s	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
2009h	Access	-	Mapping	Yes	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Used to se	et gain aut	:o-tu	ining param	eters.						

Sub- index	Name	Nui	Imber of entries		Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	60

Sub- index	Name Gain auto-tuning mode	g	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16		
01h	Access	RW	Mapping	1	Related Mode	All	Data Range	0 to 7	Default	4
2009-01h i	s set to 4 l	oy defa	ault.							

Sub- index	Name	Stif the	Stiffness level in the 1st gain set		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
02n	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to 41	Default	15
Defines th response The setpo	e stiffness will be. Bu int 0 indica	level (t an e) ates th	of the servo cessively hi e weakest s	sys gh : tiffi	tem. The higher the stiffness level will c ness and 41 indicat	e stiffness leve ause vibration es the stronge	l, the stronger st stiffness.	the gains an	d the quick	er the

Sub- index	Name	Adaptive notch mode		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16	
03h	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 4	Default	3
Defines th	e working	mode	of the adap	tive	e notch.					

Sub- index	Name	Name Online inertia auto-tuning mode	de	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16	
04n	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to 3	Default	2
Defines w	hether to e	enable	online iner	tia a	auto-tuning and the	e inertia ratio u	pdate speed o	luring online	inertia aut	o-tuning.

Sub- index	Name	Offlin tu	e inertia aut ning mode	0-	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
06n	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to 1	Default	1
Defines the For details	e offline in on offline	nertia a e inerti	auto-tuning a auto-tunir	mo ng, :	de. The offline iner see section "Inertia	tia auto-tuning Auto-tuning"	g function can in SV660N Seri	be enabled t es Servo Dri [,]	through 200 ve Functior	DD-03h. n Guide.

Sub-	Name	Maxii inerti	mum speed a auto-tunir	in 1g	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
07h	Access	RW	Mapping	-	Related Mode	All	Data Range	100 to 1000 (RPM)	Default	500

Defines the maximum permissible speed reference value in offline inertia auto-tuning mode.

During inertia auto-tuning, the higher the speed, the more accurate the auto-tuned values. Use the default value of 2009-07h in general cases.

Sub- index 08h	Name	Time accel max durin	e constant fo erating to th imum speed g inertia aut tuning	or ne d :o-	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	All	Data Range	20 to 800 (ms)	Default	125
Defines the	e time for	the m	otor to acce	lera	ate from 0 RPM to th	ne speed defin	ed by 2009-07l	n during offl	ine inertia a	uto-

Sub-	Name	Inte indiv au	rval after ar vidual inerti uto-tuning	n a	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
09h	Access	RW	Mapping	-	Related Mode	All	Data Range	50 to 10000 (ms)	Default	800
Defines th set to 0 (B	e time int idirection	erval b al).	etween two	coi	nsecutive speed ref	erences when	2009-06h (Offl	ine inertia a	uto-tuning	mode) is

Sub- index	Name	Num rev inerti	ber of moto olutions per a auto-tunir	ng	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
0Ah	Access	RO	Mapping	-	Related Mode	All	Data Range	0 to 100 (r)	Default	1
Defines the (Bidirectio	e number nal).	of mo	tor revolutio	ns	needed when 2009	-06h (Offline ir	nertia auto-tun	ing mode) is	set to 0	

In offline inertia auto-tuning, check whether the travel distance of the motor at the stop position is larger than the setpoint of 2009-0Ah. If not, decrease the setpoint of 2009-07h or 2009-08h until the travel distance at the stop position is larger than the setpoint of 2009-0Ah.

Sub- index	Name	Vibra	tion thresho	ld	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Ch	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 100 (%)	Default	5
Defines the starts world	e thresho king.	ld of vi	bration dete	ecte	d by the notch. Wh	en the curren	t feedback exce	eeds the thre	eshold, the i	notch

Sub- index	Name	Frec	Frequency of the 1st notch		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Dh	Access	RW	- Napping		Related Mode	PP/PV/HM/ CSP/CSV	Data Range	50 to 8000 (Hz)	Default	8000
Defines the In the torq	e center fi ue contro	requen	icy of the no e, setting 20	tch 09-	, which is the mech 0Dh to 8000 deacti	nanical resona vates the notc	nce frequency. h function.			

Sub- index	Name	Widt	Width level of the 1st notch RW Mapping -		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Eh	Access	RW			Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 20	Default	2
Defines the Width leve	e width le I is the ra	vel of t tio of t	the notch. U	se † dth	the default value of to the notch cente	f 2009-0Eh in g er frequency.	eneral cases.			

Sub- index	Name	Dept	Depth level of the 1st notch		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
0Fh	Access	RW	Mapping	1	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 99	Default	0

Defines the depth level of the notch.

The depth level of the notch is the ratio between the input to the output at the notch center frequency.

The higher the setpoint, the lower the notch depth and the weaker the mechanical resonance suppression will be. Note that an excessively high setpoint may cause system instability.

For use of notches, see section "Vibration Suppression" in SV660N Series Servo Drive Function Guide.

Sub- index	Name	Frec 2	requency of the 2nd notch		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
10h	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	50 to 8000 (Hz)	Default	8000

Sub- index	Name	Widt 2	Width level of the 2nd notch		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
11h	Access	RW	Mapping	1	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 20	Default	2

Sub- index	Name	Dept 2	Depth level of the 2nd notch		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
12h	Access	RW	Mapping	1	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 99	Default	0
Descriptio	ons for par	amete	meters of the 2nd no		otch are the same a	s that of the 1	st notch (2009	-0Dh, 2009-0	Eh, 2009-0Fł	ı).

Sub- index	Name	Freq	requency of the 3rd notch		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
13h	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	50 to 8000 (Hz)	Default	8000

Sub- index	Name	Widt 3	Width level of the 3rd notch		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
14h	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 20	Default	2

Sub- index	Name	Depth level of the 3rd notch		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16	
15h	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 99	Default	0
Descriptio	ns for par	amete	neters of the 3rd notc		tch are the same as	that of the 1s	st notch (2009-	0Dh, 2009-0E	h, 2009-0Fh)	

The 3rd notch can be configured as an adaptive notch (2009-03h = 1 or 2). In this case, notch parameters are updated automatically and cannot be modified manually. If the notch frequency is 8000 Hz, the notch function is disabled.

Sub- index	Name	Freq 4	requency of the 4th notch		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
16h	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	50 to 8000 (Hz)	Default	8000

Sub- index	Name	Widt 4	h level of the Ith notch	9	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
17h	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 20	Default	2

Sub- index	Name	Dept 4	h level of th Ith notch	e	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
18h	Access	RW	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 99	Default	0
Descriptio	ns for par	ametei	rs of the 4th	no	tch are the same as	that of the 1s	st notch (2009-	0Dh, 2009-0E	h, 2009-0Fh)	

The 4th notch can be configured as an adaptive notch (2009-03h = 1 or 2). In this case, parameters are updated automatically by the servo drive and cannot be modified manually. If the notch frequency is 8000 Hz, the notch function is disabled.

Sub- index	Name	Ai re fi	uto-tuned esonance requency		Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
19h	Access	RO	Mapping	-	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	0 to 5000	Default	0
When 2009	9-03h (Ad	aptive ı	notch mode) is	set to 3, the presen	t mechanical	resonance fre	quency will b	e displayed.	

Sub- index	Name	Tensie comp	on fluctuatio ensation ga	on in	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int16
1Fh	Access	RO	Mapping	-	Related Mode	-	Data Range	-100 to +100	Default	0

Sub- index	Name	Tensio comp	on fluctuatio ensation filt time	on er	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
ZUN	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 25	Default	0.5

Sub- index	Name	cor	Gravity npensation value		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
21h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 100 (%)	Default	0

Sub- index	Name	Pos cor	itive friction npensation value		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
22h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 100 (%)	Default	0

Sub- index	Name	Nega con	ative frictior npensation value	ו	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Int16
23h	Access	RW	Mapping	-	Related Mode	-	Data Range	-100 to 0 (%)	Default	0

Sub- index	Name	cor	Friction npensation speed		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
2411	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 20	Default	2

Sub- index	Nam	ne cor spe	Friction npensation ed selection		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16		
2511	Acce	ss RW	Mapping	-	Related Mode	-	Data Range	0 to 19	Default	0		
Descriptio	n											
Setpoi	nt		Description									
0		Slow spee	d mode + Speed reference									
1		Slow spee	d mode + M	od	el speed							
2		Slow-spee	ed mode + S	pee	d feedback							
16		High-spee	peed mode + Speed reference									
17		High-spee	peed mode + Model speed									
18		High-spee	speed mode + Speed feedback									

Sub- index	Name	۱ mor	/ibration hitoring time	9	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
Zon	Access	RW	RW Mapping -		Related Mode	-	Data Range	0 to 65535	Default	1200

Sub- index 27h	Name	Frequ fi re supp the	uency of low requency esonance pression 1 a mechanical end	v-	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	1 to 100 (Hz)	Default	100

Sub- index 28h	Name	Low re supp the	v-frequency esonance pression 1 a mechanical end	t	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
	Access	Access RW Mapping -		Related Mode	-	Data Range	0 to 3	Default	2	

Sub- index	Name	Freq 5	uency of the	e	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
2Ah	Access	RW	Mapping	-	Related Mode	-	Data Range	50 to 8000 (Hz)	Default	8000

Sub- index	Name	Widt 5	h level of th th notch	e	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
ZBU	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 20	Default	2

Sub- index	Name	Depth level of the 5th notch		e	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
2Cn	Access	RW	RW Mapping -		Related Mode	-	Data Range	0 to 99	Default	0

Sub- index 2Dh	Name	Frequ fi supp mec	uency of low requency esonance pression 2 a hanical load end	/- t	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW Mapping -		Related Mode	-	Data Range	0 to 200	Default	0	

Sub- index 2Eh	Name	Respo low re supp mec	onsiveness c -frequency esonance pression 2 at hanical load end	of	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW Mapping -	Related Mode	-	Data Range	0.01 to 10	Default	1		

Sub- index 30h	Name	Wid fr re supp mec	dth of low- requency esonance pression 2 at hanical loac end	t	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	cess RW Mapping -		Related Mode	-	Data Range	0 to 2	Default	100	

Sub- index 32h	Name	Frequ fr re supp mec	uency of low requency esonance pression 3 at hanical load end	/- : I	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access RW Mapping -		-	Related Mode	-	Data Range	0 to 2000	Default	0	

Sub- index 33h	Name	Respo low re supp mecl	onsiveness o -frequency esonance pression 3 at hanical load end	of t	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	Access RW Mapping -		Related Mode	-	Data Range	0.01 to 10	Default	1	

Sub- index 35h	Name	Wi fi supp mec	dth of low- requency esonance pression 3 a hanical load end	t	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW Mapping -		Related Mode	-	Data Range	0 to 2	Default	100	

Sub- index	Name	STune mode setting		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16	
390	Access	RW	RW Mapping -		Related Mode	-	Data Range	0 to 4	Default	4

Sub- index 3Ah	Name	STur su sv fr	e resonanc ppression vitchover equency	e	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 4000	Default	900

Sub- index	Name	STun supp s	e resonanc ression rese election	e et	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
3BN	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0

2.5.3.11 Group 200Ah: Fault and Protection Parameters

Index 200Ah	Name	Fault and protection parameters			Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
	Access	-	Mapping	Yes	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Used to set the fault and protection parameters.										

Sub- index	Name	Number of entries		ries	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint8
00h	Access	RO	RO Mapping No		Related Mode	-	Data Range	-	Default	60

Sub- index 01h	Name	Pow los	er input pha	ase n	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 3	Default	0

SV660N series servo drives support single-phase/three-phase 220 V and three-phase 380 V power supplies. When voltage fluctuation or phase loss occurs on the power supply, power input phase loss protection will be triggered by the servo drive based on the setting of 200A-01h.

Note

200A-01h = 0: The servo drive reports E420.0 (Phase loss fault) when H01-10 (Servo drive model) is set to 60005 (850 W).

200A-01h = 1: The servo drive does not report E420.0 (Phase loss fault). When H01-10 (Servo drive model) is set to 60005 (850 W), derate 80%.

Three-phase 220 V servo drives (S7R6, S012) need no derating in case of single-phase power input. Three-phase 380 V servo drives enter the NRD status in case of a phase loss fault. In this case, you cannot operate the servo drive by hiding the phase loss fault.

Sub- index	Name	Absolute position		Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16	
02h	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to 2	Default	0
Defines whether the absolute position limit is active and the condition for activating the position limit.										
After the	absolute j	oositio	on limit is er	nable	ed, when the target p	oosition referei	nce exceeds th	ne position l	imit in the p	osition
control m	control mode, the servo drive takes the position limit as the target and stops after reaching the limit; when the absolute									
position feedback reaches the position limit in other control modes, the servo drive reports an overtravel warning and										
stops in the mode defined by 2002-08h (Stop mode at overtravel).										

Sub- index 05h	Name	Motor overload protection gain			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	All	Data Range	50 to 300 (%)	Default	100

Defines the motor overload duration before E620.0 (Motor overload) is reported.

You can change the setpoint of 200A-05h based on motor temperature to reduce or prolong the time to trigger overload protection. The setpoint 50% indicates the trigger time is reduced by 50%. The setpoint 150% indicates the trigger time is prolonged by 50%.

Set 200A-05h based on the actual temperature of the motor.

Sub- index 09h	Name	Overspeed threshold			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16	
	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to 20000 (RPM)	Default	0	
Defines th	Defines the overspeed threshold of the motor.										

Sub- index 0Bh	Name	Threshold of excessive local position deviation			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to (2 ³² - 1)	Default	25185 824
Defines the threshold for reporting EB00.0 (Position deviation too large). The function of 200A-0Bh is the same as 6065h (Following error window), both of which are active.										

Sub- index 0Dh	Name		Runaway protection		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to 1	Default	1
Used to enable runaway protection.										

Sub- index	Name	te	IGBT over- emperature threshold		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16	
13h	Access	RW	Mapping	-	Related Mode	All	Data Range	120 to 175 (°C)	Default	135	
Defines the over-temperature protection threshold of the power module.											
Sub- index 14h	Name	Filter of t	time const ouch probe	ant 1	Setting Condition & Effective Time	During running & Next power-on	Data Structure	-	Data Type	Uint16	
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	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 6.3 (us)	Default	2	

Sub- index 15h	Name	Filter of t	r time const ouch probe	ant 2	Setting Condition & Effective Time	During running & Next power-on	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to 6.3 (us)	Default	2

Touch probe 1 and touch probe 2 are high-speed DIs. When external input signals suffer from spike interference, set 200A-14h or 200A-15h to filter the out spike interference.

Note: The oscilloscope in the software tool displays the unfiltered signals of touch probe 1 and touch probe 2. Signals with width lower than 0.25 ms will not be displayed.

Sub- index 16h Access	S	TO function display		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default

Defines whether to display the STO status or report E150.0 after the STO function is triggered.

0: Displays the STO status. The keypad displays "sto_" after the STO function is triggered. In this case, no fault is reported and no output is generated from the fault DO.

1: Displays the STO fault. The keypad displays "E150.0" after the STO function is triggered. In this case, the servo drive reports E150.0 and the fault DO generates output.

Sub- Name index	TZ signal filter time			Setting Condition & Effective Time	At stop & Next power-on	Data Structure	-	Data Type	Uint16	
18h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 31 (unit: 25 ns)	Default	15

Sub- index	Name	Filter of sp di	time const beed feedba splay value	ant ick	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
1Ah	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to 5000 (ms)	Default	50
Defines th 200Ah-1A monitore	ne filter tir h applies d through	ne con to the the so	stant of the monitoring ftware tool	e spe para	ed feedback displa ameter 200B-01h (N	y value to smoo lotor speed acti	othen the specular value) and	ed feedback. I the speed dis	play value	

Sub- index	Name	Мо	Motor overload detection		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
1Bh	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0
Defines w	whether to enable motor overloa		rloa	d detection.						



Take caution when hiding the motor overload fault as such operation may damage the motor.

Sub- index	Name	Moto spe	or rotation I ed filter tim	00 e	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uin t16
1Ch	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to 5000 (ms)	Default	50
Defines th 200A-1Ch	e low-pas is active o	s filter	time const nen the spe	ant o ed fe	of speed feedback s edback signals are	signals. used to judge	the speed-rela	ated DO signals	5.	

Sub- index	Name	Over pro winc	r-temperatu otection time low for stall motor	re e ed	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
21n	Access	RW	Mapping	1	Related Mode	All	Data Range	0 to 65535 (ms)	Default	200
Defines th You can ad	e over-ter djust the s	mperat sensitiv	ture duratio vity for dete	n be ctin	efore E630.0 (Motor g E630.0 by changiı	stalled) is deten ng the setpoint	cted by the se of 200A-21h.	ervo drive.		

Sub- index 22h	Name	Ove prote	er-temperat ection for sta motor	ure alled	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
ZZN	Access	RW	Mapping	Yes	Related Mode	-	Data Range	0 to 1	Default	1
Defines whether to		enable	the over-te	mper	ature protection det	tection on E630	.0 (Motor stalle	ed).		

Sub- index	Name	Abs mult fa	olute encoc ti-turn overf ult selectio	ler low n	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
250	Access	RW	Mapping	No	Related Mode	All	Data Range	0 to 1	Default	0
200A-25h s	sets whet	her to	hide the de	ectio	n on E735.0 (Encode	r multi-turn cou	unting overflow	v) in the ab	solute posit	ion
linear mod	le.									

Sub- index 29h	Name	Overtravel compensation selection			Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
2911	Access	RW	Mapping	Yes	Related Mode	All	Data Range	0 to 1	Default	0
0: Enabled	Enabled, used to handle the position rel		on refe	erence loss caused b	y disturbed po	sition limit sigi	nals in CSP i	mode		

Sub- index 32h	Name	F tra t	Regenerative ansistor ove cemperature threshold	e er-	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
32N	Access	RW	Mapping	Yes	Related Mode	All	Data Range	100 to 175 (°C)	Default	115

Sub- index	Name	com tole	Encoder munication rance thresh	error 10ld	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
330	Access	RW	Mapping	Yes	Related Mode	All	Data Range	0 to 31	Default	3

Sub- index	Name	Phas	se loss detec filter times	tion	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
34h	Access	RW	Mapping	Yes	Related Mode	All	Data Range	3 to 36	Default	20

Sub- index	Name	Enco prote	der tempera ection thres	nture hold	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
35N	Access	RW	Mapping	Yes	Related Mode	All	Data Range	0 to 175	Default	0
0: Disable										

Sub- N index	Name	Runaway current threshold			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
38h	Access	RW	Mapping	Yes	Related Mode	All	Data Range	100 to 400 (%)	Default	200

Sub-	Name		Reset delay		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
39h	Access	RW	Mapping	Yes	Related Mode	All	Data Range	0 to 60000 (ms)	Default	10000
Faults E62	0.0, E630.	0, E64(0.0, E640.1, a	and E6	50.0 can be reset o	nly after the tir	ne defined by 2	200A-39h ela	apses.	

Sub- index	Name	Rı	inaway spee threshold	ed	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
3Ah	Access	RW	Mapping	Yes	Related Mode	All	Data Range	1 to 1000 (RPM)	Default	50

Sub-	Name	Runa	away speed f time	ilter	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
3Bh	Access	RW	Mapping	Yes	Related Mode	All	Data Range	0.1 to 100.0 (ms)	Default	2

Sub-	Name	Runa	away protect etection time	tion e	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
3Ch	Access	RW	Mapping	Yes	Related Mode	All	Data Range	10 to 1000 (ms)	Default	30

Sub- index	Name	Over	speed thresh	nold	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
47h	Access	RW	Mapping	Yes	Related Mode	All	Data Range	0 to 20000	Default	0

Sub- index	Name	MS1 cu	motor overl rve switchov	oad er	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
48h	Access	RW	Mapping	Yes	Related Mode	All	Data Range	0 to 3	Default	0

Sub-	Name	Ma r	ximum time amp-to-stop	of	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uin t16
49h	Access	RW	Mapping	Yes	Related Mode	All	Data Range	0 to 65535 (ms)	Default	1000 0
Defines th "Ramp to	e maximu stop as de	m time efined l	n time taken by the moto ined by 6084h/609Ah (H		or in decelerating f M)" or "Ramp to st	rom 6000 RPM op as defined b	to 0 RPM when by 6085h".	the stop m	ode is set to)

Sub- index	Name	disc	STO 24 V onnection fi time	lter	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
4Ah	Access	RW	Mapping	Yes	Related Mode	All	Data Range	0 to 5 (ms)	Default	5
Defines the moment w	e filter tim /hen the S	ie from TO sta	the momen tus is displa	t whei /ed or	n STO1 and STO2 a E150.0 is reported.	ire disconnecte	d from the 24 \	/ power sup	ply to the	

Sub- N index	Name	STC	fault tolera filter time	nce	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
4Bh	Access	RW	Mapping	Yes	Related Mode	All	Data Range	0 to 10 (ms)	Default	10
Defines the E150.1 is re	e filter tim eported.	e from	the momen	t whe	n STO1 and STO2 a	re input with d	ifferent voltage	es to the mo	oment when	

Sub- index	Name	Servo S	o OFF delay a TO triggered	after I	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uin t16
4Ch	Access	RW	Mapping	Yes	Related Mode	All	Data Range	0 to 25 (ms)	Default	20
Defines filt the S-ON s	er time fro ignal is sv	om the vitched	e moment wh I off.	nen th	e STO status is disp	olayed or E150.	0/E150.1 is rep	orted to the	moment wh	nen

2.5.3.12 Group 200Bh: Monitoring Parameters

Index	Name		Monitoring parameter	g 'S	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
200Bh	Access	-	Mapping	Yes	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Used to se	t monito	ring p	arameters.							

Sub- index	Name	Nu	mber of ent	ries	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	65

Sub-	Name	Мо	tor speed a value	ctual	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int16
01h	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	-32767 to +32767 (RPM)	Default	0
Indicates t You can se	he actual t the filte	motor speed after round- r time constant for 200B-0		off, which is accurate t 1h in 200A-1Ah (Filter t	o 1 RPM ime cor	1. Istant of spe	ed feedback dis	play value).		

Sub-	Name	S	peed refere	nce	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int16
index 02h	Access	RO	Mapping	TPDO	Related Mode	PP/PV/HM/ CSP/CSV	Data Range	-32767 to +32767 (RPM)	Default	0
Indicates t	the prese	nt spee	d reference	(accura	te to 1 RPM) of the se	ervo drive in t	he position a	nd speed contr	ol modes	

Sub-	Name	Ir	nternal torq reference	ue	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int16
03h	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	-500 to +500 (%)	Default	0
Indicates motor.	oresent to	orque re	eference wł	nich is ac	curate to 0.1%. The va	lue 100	.0% corresp	onds to the rate	ed torque of	the

Sub-	Name	Мо	nitored DI s	tatus	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
04h	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	0 to 65535	Default	0

Indicates the level status of DI1 to DI5 without filtering.

Upper LED segments ON: high level (indicated by "1")

Lower LED segments ON: low level (indicated by "0")

In cases where DI1 is low level and DI2 to DI5 are high level, the corresponding binary value is 11110, the value of 200B-04h read in the software tool is 30, and the corresponding keypad display is as follows.



Sub-	Name	Mon	itored DO s	tatus	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
06h	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	0 to 65535	Default	0

Indicates the level status of DO1 to DO3 without filtering.

Upper LED segments ON: high level (indicated by "1")

Lower LED segments ON: low level (indicated by "0")

In cases where DO1 is low level and DO2 to DO3 are high level, the corresponding binary value is "110", the value of 200B-06h read in the software tool is 6, and the corresponding keypad display is as follows.



Sub-	Name	Ab	solute posit counter	ion	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int32
index 08h	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	-2 ³¹ to 2 ³¹ - 1 (reference unit)	Default	0
Indicates p This paran	oresent al neter is a	absolute position (references a 32-bit integer, which is di			unit) of the motor in t played as a decimal or	he posit 1 the key	ion control ypad.	mode.		

Sub-	Name	Me	chanical ar	Igle	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
0Ah	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	0 to 360 (°)	Default	0
Indicates p	dicates present mechanical angle (encoder		ncoder i	unit) of the motor. The	value 0	indicates th	at the mechan	ical angle is	0°.	

Sub-	Name	E	lectrical ang	şle	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
0Bh	Access	cess RO Mapping TPDO		Related Mode	All	Data Range	0 to 360 (°)	Default	0	
Indicates t	the preser	esent electrical angle of the n			otor, which is accurate	e to 0.1°.				
The electr	trical angle variation range is ± 360 .			$\pm 360.0^{\circ}$	when the motor rotat	es. If the	e motor has	four pairs of po	oles, each re	volution
generates	enerates four rounds of angle changes from			es from 0)° to 359.9°.					
Similarly,	if the mot	or has f	five pairs of	poles, e	ach revolution genera	tes five	rounds of an	gle changes fro	om 0° to 359	.9°.

Sub-	Name	Av	Average load rate		Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
0Dh	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	0 to 800 (%)	Default	0
Indicates 100.0% co	the percentric percentrics the percentrics of the percentric percentrics of the percentric of the percentric of the percentric of the percentrics of the percentric of the perce	ntage o s to the	f the averag rated torqu	e load t ue of the	orque to the rated torc motor.	ue of th	ne motor, wł	nich is accurate	to 0.1%. Th	e value

Sub-	Name	Po: deviat	sition follov tion (encode	ving er unit)	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int32
index 10h	Access	RO	Mapping	TPDO	Related Mode	PP/ HM/ CSP	Data Range	-2 ³¹ to 2 ³¹ - 1 (reference unit)	Default	0
Counts the This parar	e position neter is a	pulses 32-bit ii	fed back by nteger, whic	the end this disp	coder in any control mo played as a decimal on	ode. the key	vpad.			

Note

When the motor is equipped with an absolute encoder, 200B-12 displays only the low 32 bits of the motor position feedback. The actual motor position feedback can be obtained in 200B-4E (Absolute position (low 32 bits) of absolute encoder) and 200B-50 (Absolute position (high 32 bits) of absolute encoder).

Sub-	- Name Feedback pulse counter		ounter	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Int32	
12h	Access	RO	Mapping	No	Related Mode	-	Data Range	-2 ³¹ to +(2 ³¹ - 1) (p)	Default	0

Sub-	Name	Tota	al power-on	time	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint32
14h	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	- (s)	Default	0
Indicates t	the total o	operatin	ig time of th	e servo	drive.					
i nis paran	neter is a	32-DIT II	nteger, whic	in is aisp	played as a decimal or	і тпе кеу	pad.			

Note

If the servo drive is switched on and off continuously within a short period of time, a deviation within 1 h may be present in the total power-on record.

Sub-	Name	RMS	5 value of pl current	nase	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
19h	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	0 to 6553.5 (A)	Default	-
Indicates the RMS value of the phase current of the servo motor, which is accurate to 0.1 A.										

Sub-	Name		Bus voltage	2	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
1Bh	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	0 to 6553.5 (V)	Default	-
Indicates 1	the DC bu	s voltag	ge of the ma	in circui	t after rectification, w	hich is a	ccurate to 0	.1 V.		

Sub-	Name	Mod	Module temperature		Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int16
1Ch	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	-20 to +200 (°C)	Default	-
Indicates t temperatu	the tempe ire of the	erature servo d	of the modu rive.	ile insid	e the servo drive, whic	h can be	e used as a r	eference for est	imating the	actual

Sub- index	Name	Absol info	lute encode rmation give FPGA	r fault en by	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
1Dh	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	0 to 65535	Default	0

Sub-	Name	Axis s g	tatus inforn iven by FPG	nation iA	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
1Eh	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	0 to 65535	Default	0

Sub-	Name	Axis f g	fault inform iven by FPG	ation A	Setting Condition & Effective Time	-	Data Structure	=	Data Type	Uint16
1Fh	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	0 to 65535	Default	0

Sub-	Name	E	incoder faul information	t	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
20h	Access	RO	Mapping	TPD O	Related Mode	-	Data Range	0 to 65535	Default	0

Sub-	Name		Fault log		Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
22h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 9	Default	-
Used to vi	ew any or	ne of the	e latest 10 fa	ults tha	t occurred on the ser	vo drive.				

Sub-	Name	Fa	ult code of t elected faul	he t	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
23h	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	-	Default	-

Sub-	Name	Tir	ne stamp of selected fau	the lt	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int32
24h	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	(s)	Default	-

Sub- index	Name	Mo oc	otor speed up currence of selected fau	pon the lt	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int16
26h	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	(RPM)	Default	-

Sub- index	Name	Moto upon	or phase-U co occurrence selected fau	urrent of the lt	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int16
27h	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	(A)	Default	-

Sub- index	Name	Moto upon	r phase-V cu occurrence selected faul	urrent of the It	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int16
28h	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	(A)	Default	-

Sub- index	Name	Bu oc	is voltage up currence of selected fau	oon the It	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
29h	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	(V)	Default	-

Sub- index	Name	D oci	I status upo currence of selected faul	on the It	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
2Ah	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	(V)	Default	-

Sub- index	Name	D oc	O status up currence of selected fau	on the It	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
2Ch	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	-	Default	-
200B-23h.	200B-2B	h displa	y correspor	nding pa	rameter values whe	n the fau	lt displayed	in 200B-23h o	occurs.	

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Sub-	Name	Inte	ernal fault c	ode	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
2Eh	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	0 to 65535	Default	0

Sub- index	Name	Abso info FPGA of tl	lute encode rmation give upon occur ne selected	r fault en by rrence fault	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
ZEN	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	0 to 65535	Default	0

Sub- index	Name	S infor FPGA of th	ystem statu mation give upon occu ne selected	is en by rrence fault	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
30N	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	0 to 65535	Default	0

Sub- index	Name	Systen give occ	n fault infor n by FPGA u currence of elected faul	mation ipon the t	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
31h	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	0 to 65535	Default	0

Sub- index	Name	E info occ s	incoder faul ormation up currence of t elected faul	t ion the t	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
32h	Access	RO	Mapping	TPD O	Related Mode	-	Data Range	0 to 65535	Default	0

Sub- index	Name	Interna occ s	al fault code currence of f elected faul	e upon the t	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
34h	Access	RO	Mapping	TPD O	Related Mode	-	Data Range	0 to 65535	Default	0

Sub-	Name	Pos	ition deviat counter	ion	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int32
index 36h	Access	RO	Mapping	TPDO	Related Mode	PP/HM/ CSP	Data Range	-2 ³¹ to (2 ³¹ - 1) (reference unit)	Default	0

Indicates the position deviation value which has not been divided or multiplied by the electronic gear ratio in the position control mode.

This parameter is a 32-bit integer, which is displayed as a decimal on the keypad.

Note: Position deviation (reference unit) refers to the value converted with encoder position deviation, so the precision may be compromised.

Sub-	Name	Motor s	peed actua	l value	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int32
38h	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	-6000 to +6000 (RPM)	Default	0
Indicates f This parar You can se	the actua neter is a et the filte	l value o 32-bit in er time co	f the motor teger, whic onstant for	speed, h is disp speed fe	which is accurate to played as a decimal d eedback in 200A-1Ah	0.1 RPM. on the key	pad.			

Sub- index	Name	Bus	voltage of ontrol circu	the it	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
3Ah	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	0 to 6553.5	Default	0
Indicates	the DC bu	s voltag	e of the con	trol circ	uit after rectification	ı .				

Sub-	Name	Mech posit	nanical abso tion (low 32	olute bits)	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint32
index 3Bh	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	0 to 2 ³² (reference unit)	Default	0
Indicates t	the low 32	2-bit valu	ue (encoder	unit) of	the mechanical pos	ition f	eedback when	an absolute enc	oder is use	ed.

Sub- index	Name	Mee posi	chanical abs ition (high 32	olute 2 bits)	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int32
3Dh	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	-2 ³¹ to (2 ³¹ - 1) (reference unit)	Default	0
Indicates	the high 3	2-bit v	alue (encode	er unit) o	f the mechanical po	sition	feedback w	nen an absolute enc	oder is use	d.

Sub- index	Name	Notr	dy (Not ready) state	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint32	
40n	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	0 to 5	Default	0	
Disp	lay Value			Meaning							
	0		None	ne							
	1		Control circu	it power	supply error (H0B-	57)					
	2		Phase loss de	etection	error						
	3		Main circuit p	ain circuit power supply error (including short-circuited-to-ground error)							
	4		Other servo drive faults								
	5		Short-circuite	ed-to-gro	ound detection not	done					

Sub- index	Name	Enc	oder temper	ature	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int16
43h	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	-100 to +200	Default	-
Indicates	the encoc	ler tem	perature val	ue.						

Sub- index	Name	I	Brake load ra	ite	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int16
44h	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	0 to 200 (%)	Default	0
Indicates 1	the brake	load ra	ate. When the	e load ra	te exceeds 100%, th	ie servo	drive stops br	aking.		

Sub- index	Name	Numb the	per of revolute en	tions of coder	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
4 <i>1</i> n	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	0 to 65535	Default	0
Indicates	the numb	er of re	volutions of	the abso	olute encoder.					

Sub- index	Name	Sin feed	gle-turn pos lback of abs encoder	ition olute	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint32
48h	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	0 to (2 ³¹ - 1) (encoder unit)	Default	0
Indicates	the single	-turn p	osition feed	back of t	he encoder.					

Sub- index	Name	Absol bits al	ute position s) feedback o psolute enco	(low 32 of the oder	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int32
4Eh	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	-2 ³¹ to (2 ³¹ - 1) (encoder unit)	Default	0
Indicates	the low 32	2-bit va	lue of the po	osition fe	edback of the abso	lute en	coder.			

Sub- index	Name	Abso 32 bi al	olute position ts) feedback psolute enco	n (high a of the oder	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int32
50h	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	-2 ³¹ to (2 ³¹ - 1) (encoder unit)	Default	0
Indicates	the high 3	2-bit v	alue of the p	osition fe	edback of the abso	olute er	ncoder.			

Single-turn position (low Setting Data Data 32 bits) of the rotating Sub-Name Condition & Uint32 Structure Туре load Effective Time index 0 to (2³² - 1) 52h Data Mapping Access RO TPDO Related Mode All Default 0 (encoder unit) Range Indicates the low 32-bit value (encoder unit) of the position feedback of the load when the absolute encoder system works in the rotation mode (2002-02h = 2).

Sub- index	Name	Sin (hi	gle-turn pos gh 32 bits) o rotating loa	ition f the d	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int32
54h	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	-2 ³¹ to (2 ³¹ - 1) (encoder unit)	Default	0
Indicates works in t	the high 3 he rotatio	2-bit v n mod	alue (encode e (2002-02h	er unit) o = 2).	f the position feed	back of	the load whe	n the absolute encod	der system	l

Sub- index	Name	Sing tł	le-turn posit ne rotating lo	tion of bad	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Int32
56h	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	-2 to (2 ³¹ - 1) (reference unit)	Default	0
Indicates	the positi	on feec	lback of the	load whe	en the absolute end	coder sy	/stem works	in the rotation mode	(2002-02h	= 2).

Sub- index	Name	Gro abn	up number o ormal parar	of the neter	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
5Bh	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	0 to 65535	Default	0
Indicates	the group	numb	er of the abr	normal pa	arameter when E10	01 occu	rs.			

Sub- index	Name	Of para	fset of abno ameter with group	rmal in the	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
5Ch	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	0 to 65535	Default	0
Indicates	ndicates the offset of the abnormal parameter		within the parame	eter gro	up when E10	1 occurs.				

2.5.3.13 Group 200Dh: Auxiliary Function Parameters

Index	Name		Auxiliary functions		Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
200Dh	Access	-	Mapping	-	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Used to se	et monito	ring	parameters	s.						

Sub- index	Name	Nu	mber of ent	ries	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint8
00h	Access	RO Mapping No		Related Mode	-	Data Range	-	Default	21	

Sub- index	Name	So	ftware rese	t	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16	
01h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0	
Defines w	hether to	enable	enable software reset.								
Setp	oint	C	Description Remarks								
0	1	N	o operation		-						
1			Enable		Programs in the ser reset upon power-o need for a power cy	vo drive are r n) after the s cle.	eset automatic oftware reset f	cally (simila unction is e	r to the prog nabled, with	gram nout the	
Software r The servo No. 1 non-	Software reset is available in the following conditions: The servo drive is in the S-OFF state. No. 1 non-resettable faults do not occur.										

No operation is performed on EEPROM (the software reset function is invalid when 200A-04h is set to 1).

Sub- index	Name	I	Fault reset		Settin & Eff	ng Condition fective Time	At stop & At once	Data Structure	-	Data Type	Uint16
02h	Access	RW	Mapping	-	Rel	ated Mode	-	Data Range	0 to 1	Default	0
Defines w	hether to	enable	Pagerintian Demode								
Setp	oint		Description Remarks								
()		No opera	No operation -							
1	L		Enable	2		When a No. 1 reset function cause, stoppi When a No. 3 directly, rega	or No. 2 rese n in the non-c ng the keypa warning occu rdless of the s	ttable fault occ operational sta d from displayi urs, you can en servo drive stat	curs, you ca te after rect ing the fault able the fau tus.	n enable the ifying the fa t. ult reset fund	e fault ult ction

For fault classification, see Chapter "Troubleshooting".

The fault reset function, once enabled, stops the keypad from displaying the fault only. It does not activate modifications made on parameters.

This function is not applicable to non-resettable faults. Use this function with caution in cases where the fault causes are not rectified.

Sub- index	Name	Offlir	ne inertia au tuning	uto-	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
03h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0

Used to enable offline inertia auto-tuning through the keypad.

In the parameter display mode, switch to "200D-03h", and press the SET key to enable offline inertia auto-tuning. For details, see section "Inertia Auto-tuning".

Sub- index	Name	Enco	der initial aı uto-tuning	ngle	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
04h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0
Setp	oint					Descriptio	n			
()	No o	peration							
	L	Enab	le							

Sub- index	Name	F	Read/write in encoder ROM		Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
05h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 2	Default	0
Se	etpoint					Descript	ion			
	0	1	lo operation	ı						
	1	١	Vrite ROM							
	2	F	Read ROM							

Sub- index	Name	Em	ergency stc	р	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16	
06h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 1	Default	0	
Defines w	hether to	enable	emergenc	y stop	р.						
Set	point					Description	on				
	0	No	operation								
	1	Ena	able								

When emergency stop is enabled, the servo drive stops immediately in the stop mode defined by 605Ch regardless of the operating status.

Sub- index	Name	J	og function		Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
0Ch	Access	RW	Mapping	-	Related Mode	-	Data Range	-	Default	-
Used to e	nable the	jog fur	nction throu	igh th	ie keypad.					

The jog function can be set through the keypad. For details, see Section "Jogging" in SV660N Series Servo Drive Commissioning Guide.

This function is not related to the control mode of the servo drive.

Sub- index	Name	Fo	orced DI/DO selection		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
12h	Access	RW	Mapping	1	Related Mode	-	Data Range	0 to 3	Default	0
Defines w	hether to	enable	e forced DI/I	00.						

Sub- index	Name	For	ced DI setti	ng	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
13h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 31	Default	31

Used to set the level logic of the DI functions assigned in group 2003h when forced DI function is enabled (200D-12h = 1 or 3).

The value of 200D-13h is displayed as a hexadecimal on the keypad, when it is converted to a binary value, bit(n) = 1 indicates the DI function logic is high level; bit(n) = 0 indicates the DI function logic is low level. Example:

The value of 200D-13h is 0x1E, which corresponds to the binary value "11110", indicating D11 is low level, and D12 to D15 are high level. You can also monitor the status of D11 to D15 through 200B-04h.



Whether the DI function is active depends not only on 200D-13h but also on the DI logic set in group 2003h.

Sub- index	Name	Forc	ed DO setti	ing	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
14h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 7	Default	0

Defines whether the DO functions assigned in group 2004h are active when the forced DO function is enabled (200D-12h = 2 or 3).

The value of 200D-14h is displayed as a hexadecimal on the keypad. When it is converted to a binary value, bit(n) = 1 indicates the DO function is active; bit(n) = 0 indicates the DO function is inactive.

Example:

The value of 200D-14h is 6, which corresponds to the binary value "110", indicating the function assigned to DO1 is active, and functions assigned to DO2 and DO3 are inactive. Assume DO1...DO3 in group 2004h are "active low", then 200B-06h is displayed as follows:



Sub-	Name	Abs	olute encoo reset	ler	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
index 15h	Access	RW	Mapping	-	Related Mode	All	Data Range	0 to 2	Default	0
Defines w	hether to	reset t	ne encoder	fault	or the multi-turn da	ta of the encod	er.			
Se	tpoint					Descriptio	n			
	0	N	o operatior	ı						
	1	R	eset encode	er fau	lt					
	2	R	eset encode	er fau	lt and multi-turn dat	a				

Note

The absolute position of the encoder changes abruptly after multi-turn data reset. In this case, perform mechanical homing.

2.5.3.14 Group 200Eh: Communication Function Parameters

Indox	Name	Co	ommunicati parameters	on	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
200Eh	Access	-	Mapping	-	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Defines se	ervo moto	r parai	meters.							

Sub-	Name	Nu	mber of ent	ries	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	97

Sub- index	Name	Ν	lode addres	iS	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
01n	Access	RW	Mapping	-	Related Mode	-	Data Range	1 to 127	Default	1
Defines th	e servo di	rive axi	s address d	uring R	S232 communicatior	۱.				
0: Broadca	ast addres	ss. The	host contro	ller per	forms the write oper	ration on all the	e servo drives 1	through the	broadcas	st
address. T	he servo	drives	rives acts accordingly after receiving the broadcast address frames, without respo							
1 to 127: E	ach of the	e servo	drive netwo	orked n	nust have a unique a	ddress. Otherv	vise, communi	cation erro	r or failure	will
occur.										

Sub- index 02h	Name	Upo value cor	date parame s written the nmunication EEPROM	eter rough n to	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 3	Default	3
Defines w EEPROM.	hether to	save p	arameters w	ritten	through RS232 and E	therCAT (writir	ng with SDO or	nly) commu	nication t	0

Note

The value of 200E-02h will always be updated and saved to EEPROM.

If the parameters modified need not be saved after power off, set 200E-02h to 0. This is to prevent EEPROM from being damaged by frequent parameter saving, leading to E108.0 (Parameter write error).

Sub-	Name	Ethe	rCAT slave r	ame	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
15h	Access	RO	Mapping	No	Related Mode	-	Data Range	0 to 65535	Default	-
Indicates	the statio	n numt	per assigned	l to the	slave by the master	during Eth	erCAT comm	unication.		

Sub-	Name	Ethe	erCAT slave	alias	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
16h	Access	RW	Mapping	No	Related Mode	-	Data Range	0 to 65535	Default	-
For maste	rs that fai	l to ass	ign the stat	ion nur	mbers, set the slave s	station nun	nbers throug	h 200Eh-16h d	Juring Ether	rCAT
communic	cation.									
200E-16h =	= 0: The m	naster a	assigns the s	station	numbers by default.					

200E-16h \neq 0: The set station number applies by default, with the one assigned by master deactivated.

Sub- index	Name	Syr	nc loss wind	ow	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
1/n	Access	RW	Mapping	-	Related Mode	-	Data Range	1 to 20	Default	8
Defines th value of 20	e maximu 00E-17h is	im nun s excee	nber of mas ded.	ter sigr	al loss events allowe	ed by the slave.	The slave rep	orts EE08.2	(IRQ loss)	if the

Sub- index	Name	Ether fr	CAT station	alias M	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
18h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 65535	Default	0

Sub- index	Name	Syr	nc loss cour	iter	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
19h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 65535	Default	0

Sub-	Name	Port	0 invalid fr counter	ame	Setting Condition & Effective Time	At display	Data Structure	-	Data Type	Uint16
1Ah	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 65535	Default	0
Indicates	CRC error	of Port	0. If there is	s a cour	nting value, the fram	es received by	Port0 are dam	aged. The p	ossible ca	nuse
may lie in	the cable	or PHY	′ port, inclu	ding 0x	301 RX-ER. Normally	, 0x300 = 0x301	, if 0x300 > 0x3	801, CRC err	ors occur	in the
network.										

Sub-	Name	Port	1 invalid fr counter	ame	Setting Condition & Effective Time	At display	Data Structure	-	Data Type	Uint16
1Bh	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 65535	Default	0
Indicates (may lie in network.	CRC error the cable	of Port or PHY	1. If there is port, inclu	s a cour ding 0x	nting value, the fram 301 RX-ER. Normally	es received by , 0x300 = 0x301	Port0 are dam , if 0x300 > 0x3	aged. The p 801, CRC err	oossible ca ors occur	iuse in the

Sub-	Name	Port	D/1 transfer counter	error	Setting Condition & Effective Time	At display	Data Structure	-	Data Type	Uint16
1Ch	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 65535	Default	0
If the rece stations.	ived data	is wror	ng and ende	ed with	an extra error flag, it	indicates the	data has alrea	dy been pro	ocessed by	other

Sub-	Name	Proc e	ess unit an error counte	d PDI er	Setting Condition & Effective Time	At display	Data Structure	-	Data Type	Uint16
1Dh	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 65535	Default	0
If data exc internal a	hange er nti-disturl	ror occi pance p	urs betweer performance	n ESC a e of the	nd internal MCU, kee board is abnormal.	ep the setpoint	to 0. If the co	unting value	increases	s, the

Sub-	Name	Port	0/1 loss cou	unter	Setting Condition & Effective Time	At display	Data Structure	-	Data Type	Uint16
1Eh	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 65535	Default	0
If data link be caused	k loss is de	etected contact	by the ESC or broken	: port, t cables.	he counting value of	f the correspon	ding link loss	counter inci	reases. Thi	s may

Sub- index	Name	Syn	c mode set	ting	Setting Condit & Effective Ti	tion me	At stop & At once	Data Structure	-	Data Type	Uint16
20h	Access	RW	Mapping	-	- Related Mode - Data Range 0 to 2 Default 1						
Defines th	e synchro	nizatio	n mode.								
Setp	oint		Operation mode Description								
()		Manufact	urer fu	nction	Mar	nufacturer func	tion			
1	L		Synchroni	zation	mode 1	App syn	licable to host chronization.	controllers wi	th a jitter of	1 us durin	ıg
2	2		Synchronization mode 2Applicable to host controllers with a jitter above 1 us during synchronization.							luring	

Note

In synchronization mode, the synchronization cycle must be an integer multiple of 125 us. Otherwise, the servo drive reports EE13.0 (Synchronization cycle setting error).

Sub-	Name	Syn	c error win	dow	Setting Condition & Effective Time	At stop & At once	Data Structure	-	Data Type	Uint16
21h	Access	RW	Mapping	-	Related Mode	-	Data Range	100 to 4000 (ns)	Default	3000
Defines th (200E-20h	e permiss = 1).	ible jitt	er range of	synchi	ronization signals wh	nen the servo d	rive works in s	synchroniza	tion mode	1

Note

In synchronization mode 1 (200E-20h = 1), if the jitter range of synchronization signals exceeds the value of 200E-21h after ESM enters the OP state, the servo drive reports EE15.0 (Synchronization cycle error too large).

Sub-	Name	Eth stat	erCAT netw e and link s	ork tate	Setting Condition & Effective Time	At display	Data Structure	-	Data Type	Uint16
22h	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 65535	Default	0
Indicates 1	the conne	ction s	tatus of the	state n	nachine and EtherCA	T network por	ts.			

Sub- index	Name	CSP e inc	excessive po rement cour	sition nter	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
23h	Access	RO Mapping -		Related Mode	-	Data Range	0 to 65535	Default	0	
Defines th threshold.	e countin . When the	g value e count	value when the position counting value exceeds t		reference incremen the threshold, EB01.	t exceeds the r 0 or EB01.1 occ	maximum posi curs.	tion referer	nce increm	ient

Sub- index	Name	,	AL fault code Setting Effective Times		Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
24h	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 65535	Default	0

Sub- index 25h	Name	E de	Enhanced link detection enable RO Mapping -	Setting Condition & Effective Time	During running & Next power-on	Data Structure	-	Data Type	Uint16
	Access	RO Mapping -		Related Mode	-	Data Range	0 to 1	Default	0

Sub- index 26h	Name	EtherCAT XML rese selection		eset	Setting Condition & Effective Time	During running & Next power-on	Data Structure	-	Data Type	Uint16
	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 1	De fault	0

Sub- index	Name	Seria	l port baud	rate	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16			
510	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 10	Default	9			
Defines th	ne commu	inicatio	n rate between the servo drive and the host controller.										
Setp	oint		Baud rate (bps)										
()		300										
1	1		600										
1	2		1200										
3	3					2400							
4	1					4800							
Į.	5					9600							
6	ŝ					19200							
7	7		38400										
8	3					57600							
9	Ð					115200							
1	0		230400										

The baud rate set in the servo drive must be the same as that in the host controller. Otherwise, communication will fail.

Sub- index	Name	Modbus data format		mat	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16
52n	Access	RW	RW Mapping -		Related Mode	-	Data Range	0 to 3	Default	3
Defines th	ne data ch format se	neck mode between the set		rvo drive and the ho	st controller du	ring commun	ication.	nication w	vill fail	
The data	ionnat 3c	e in the	Serve unive	inast b	e the sume as that h	1 110 11031 00111	ouer. oulerwi	se, commu	incation w	int run.

Sub- index	Name	Мо	Modbus response delay		Setting Condition & Effective Time	During running & At once	Data Structure	e Data Type		Uint16
53N	Access RW Mapping		-	Related Mode	-	Data Range	0 to 20	Default	0	

Sub- index	Name Modbus communication timeout	on	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16	
54N	Access	RW Mapping -		Related Mode	-	Data Range	0 to 600	Default	0

Sub-	Sub- Name	Мо	odbus versi	on	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
5Bh	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 655.35	Default	0

Sub- index	Name	Ether	CAT COE ve	ersion	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
5Eh	Access	RO	Mapping	-	Related Mode	-	Data Range	0 to 655.35	Default	0

Sub- index	Name XML file version		on	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint16	
61h	Access	RW	Mapping	-	Related Mode	-	Data Range	0 to 655.35	Default	0

2.5.3.15 Group 203Fh: Manufacturer Fault Codes

Index	Name	Manu	facturer fau	lt code	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Uint32
203511	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	0 to (2 ³² - 1)	Default	-
Indicates	s the faul	t code o	of the highes	st level.						
The valu	The value of 203Fh is a hexadecimal, in whi				the high 16 bits indica	te the	e manufacture	r internal fault coo	de, and the	e low 16
bits indic	pits indicate the manufacturer external faul				code.					

2.5.4 Parameters Defined by the Device Profile (Group 6000h)

Index	Name		Error code		Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Uint16
603Fh	Access	RO	Mapping TPD		Related Mode	All	Data Range	0 to 65535	Default	-
When an e see "2.3.1 203Fh disp bits represe manufactu	error desci List of Fau olays the a sent the in urer.	ribed in ult and auxiliary nternal e	CiA402 prot Warning Coo y byte of the error code o	ile occu des" on p error co f the ma	rs on the drive, 603F page 35. The value of ode in hexadecimal. inufacturer, and the	h is th f 603F The da low 16	e same as tha is a hexadecin ta type of 203 bits represen	nt described in C mal. 3Fh is Uint32, in nt the external e	CiA402. For which the error code o	details, high 16 of the

Index 6040h Acc		ie	Control word	ł	Setting Condition & Effective Time	At once	Data Structure	VAR	Data Type	Uint16	
6040h	Acce	ss RW	Mapping	RPDO	Related Mode	All	Data Range	0 to 65535	to 65535 Default		
Defines th	e cont	rol comma	nd.								
bit		N	ame			D	escription				
0		Switch on	on 1: Active, 0: Inactive								
1		Enable vol	age	1: Active, 0: Inactive							
2		Quick stop		0: Active, 1: Inactive							
3		Enable ope	eration	1: Ac	tive, 0: Inactive						
4 to 6		Operation specific	mode	Rela	ted to the operation	mode of th	ne servo driv	e.			
7		Fault reset		0: In 0 -> 1: Ot 1->0	active 1: Fault reset is avail her control comma : Invalid	able only fo nds are inva	or faults and alid.	warnings tha	it can be re	eset.	
8		Halt		1: Ac	tive, 0: Inactive						
9		Operation specific	mode	Related to the operation mode of the servo drive.							
10		Reserved		Und	efined						
11 to 1	5	Manufacturer-specific Manufacturer-specific									

Note:

- All bits in the control word constitute a control command.
- The meanings of bit0...bit3 and bit7 are the same in each mode. The servo drive switches to the preset status according to the CiA402 state machine switchover process only when commands are sent in sequence. Each command corresponds to a certain status.
- bit4...bit6 are related to each mode (see the control commands in different modes for details).

• bit9 is not defined.

Index	Nam	e		Status wor	d	Set & E	ting Cond Effective T	lition Time	-	Data Structu	ı ıre	VA	R	[Data Type	Uint16	
604111	Acces	s	RO	Mapping	TPDC	R	elated Mo	ode	All	Data Ra	nge	0 to 6	5535	De	efault	0	
Indicates t	the ser	vo d	lrive sta	atus.													
15	14	13	12	11	10	9	8	7	6	5	4	3		2	1	0	
ms			oms	ila	tr	rm	ms	w	SO	d qs	Ve	e f	(зe	SO	rtso	
MSB																LSB	
Note: n tr=targe enablec	ns=ma et reac d; f=fa	anu hec ault	ıfactuı d;rm= t; oe=	rer-specif =remote; =operatic	ic; on w=wa n enat	ns=op Irning bled;	peration ; sod=s so=swit	mod switcł tch or	e spe n on c n; rts	cific; ila disabled so=ready	a =in ; qs / to s	ternal =quic switch	limi k sto on	tact p; \	ive; /e=volt	age	

bit	Name	Description
0	Ready to switch on	1: Active, 0: Inactive
1	Switch on	1: Active, 0: Inactive
2	Operation enabled	1: Active, 0: Inactive
3	Fault	1: Active, 0: Inactive
4	Voltage enabled	1: Active, 0: Inactive
5	Quick stop	0: Active, 1: Inactive
6	Switch on disabled	1: Active, 0: Inactive
7	Warning	1: Active, 0: Inactive
8	Manufacturer-specific	Undefined
9	Remote	1: Active, control word activated 0: Inactive
10	Target reached	1: Active, 0: Inactive
11	Internal limit active	1: Active, 0: Inactive
12 to 13	Operation mode specific	Related to the servo drive operation mode.
14	Manufacturer-specific	Undefined
15	Home found	1: Active, 0: Inactive

Table 2–12 Description of each bit of 6041h

Table 2–13 Descriptions of setpoints of 6041h

Binary Value	Description
xxxx xxxx x0xx 0000	Not ready to switch on
xxxx xxxx x1xx 0000	Switch on disabled
xxxx xxxx x01x 0001	Ready to switch on
xxxx xxxx x01x 0011	Switched on
xxxx xxxx x01x 0111	Operation enabled
xxxx xxxx x00x 0111	Quick stop active
xxxx xxxx x0xx 1111	Fault reaction active
xxxx xxxx x0xx 1000	Fault

Note

- Meanings of bit0 to bit9 are the same in each mode of operation. After commands are sent in sequence by the control word 6040h, the servo drive feeds back the acknowledged status.
- Meanings of bit12 and bit13 vary with the mode of operation. For details, see parameters related to each mode.
- Meanings of bit10, bit11, and bit15 are the same in each mode of operation and indicate the servo drive status after a certain mode of operation is implemented.

605Ah	Name	Quick	< stop option	code	Setting Condition & Effective Time	Any condition & At stop	Data Structure	VAR	Data Type	Int16		
	Acces	s RW	Mapping	No	Related Mode	All	Data Range	0 to 7	Default	2		
Defines th	ne dece	leration n	ation mode of the motor for stopping rotating upon quick stop and the motor status after stop.									
Setpo	int				S	top Mode						
0		Coast to	ioast to stop, keeping de-energized status									
1		Ramp to	stop as defir	ied by 6	5084h/609Ah (HM), k	eeping de-ene	ergized status					
2		Ramp to	stop as defir	ned by 6	085h, keeping de-e	nergized statu	S					
3		Stop at e	mergency-st	op torq	ue, keeping de-ene	rgized status						
4		N/A										
5		Ramp to	stop as defir	ned by 6	5084h/609Ah (HM), k	eeping positio	on lock status					
6		Ramp to stop as defined by 6085h, keeping position lock status										
7		Stop at e	mergency-st	op torq	ue, keeping positio	n lock status						

When the brake function is enabled and the value of 605Ah is lower than 4, the stop mode is forcibly set to "Ramp to stop as defined by 6085h, keeping de-energized state".

	605Ch	Name	Di	Disable operation option code		Setting Condition & Effective Time	Any condition & At stop	Data Structure	-	Data Type	Int16		
		Acces	s RW	Mapping	No	Related Mode	All	Data Range	-4 to +1	Default	0		
D	efines tł	ne dece	leration r	ion mode of the motor for stopping rotating upon S-ON OFF and the motor status after stop.									
	Setpo	oint				S	itop Mode						
	-4		Ramp to	Imp to stop as defined by 6085h, keeping dynamic braking status									
	-3		Stop at z	ero speed, k	eeping	dynamic braking sta	atus						
	-2		Ramp to	stop under a	all mod	es, keeping dynamic	: braking statu	IS					
	-1		Dynamic	braking sto	o, keepi	ng dynamic braking	status						
	0		Coast to	past to stop, keeping de-energized status									
	1		Ramp to	stop under a	all mod	es, keeping de-ener	gized status						
		1											

Set a proper stop mode according to the mechanical status and operation requirements.

After the brake output (BK) function is enabled, the stop mode upon S-ON OFF is forcibly set to "Ramp to stop as defined by 6085h, keeping dynamic braking status".

605Dh	Name	St	op option co	de	Setting Condition & Effective Time	Any condition & At stop	Data Structure	-	Data Type	Int16	
	Access	RW	Mapping	No	Related Mode	All	Data Range	1 to 3	Default	1	
Defines th PP/PV/HM	ie decel 1 mode:	eration I	node of the I	motor f	for stopping rotating	upon halt and	l the motor st	atus after s	top.		
Setpoi	nt				St	op Mode					
1	R	amp to s	stop as defin	ed by 6	i084h/609Ah (HM), ke	eping position	n lock status				
2	R	amp to s	stop as defin	ed by 6	085h, keeping positi	on lock status					
3	S	top at er	nergency-sto	op torq	ue, keeping position	lock status					
PT mode:											
Setpoi	nt	Stop Mode									
1/2/3	R	Ramp to stop as defined by 6087h, keeping position lock status									

605Eh	Name	Faul	t reaction op code	otion	Setting Condition & Effective Time	Any condition & At stop	Data Structure	-	Data Type	Int16		
	Access	RW	Mapping	No Related Mode All		All	Data Range	-5 to +3	Default	0		
Defines th after stop	es the deceleration mode of the motor for stopping rotating upon occurrence of a No. 2 fault and the motor status stop.							tatus				
Setpoi	nt	Stop Mode										
-5	St	op at ze	ro speed, kee	eping c	lynamic braking stat	us						
-4	St	op at er	nergency-sto	p torq	ue, keeping dynamic	braking status	5					
-3	Ra	mp to s	top as define	ed by 6	085h, keeping dynan	nic braking sta	tus					
-2	Ra	mp to s	top as define	ed by 6	084h/609Ah, keeping	dynamic brak	king status					
-1	Dy	namic ł	oraking stop,	keepir	ng dynamic braking s	tatus						
0	Co	ast to s	top, keeping	de-ene	ergized status							
1	Ra	mp to s	top as define	ed by 6	084h/609Ah, keeping	de-energized	status					
2	Ra	Ramp to stop as defined by 6085h, keeping de-energized status										
3	St	op at er	nergency-sto	p torq	ue, keeping de-energ	ized status						
		(DK) output function is applied, the stan mode at No. 2 foult is farsibly set to "Down to stan as defined by										

After the brake (BK) output function is enabled, the stop mode at No. 2 fault is forcibly set to "Ramp to stop as defined by 6085h, keeping dynamic braking status".

Index	Name	М	odes of opera	ation	Settii & Eff	ng Condition fective Time	At once	Data Structure	VAR	Data Type	Int8			
6060h	Access	RW	Mapping	RPDO	Rel	ated Mode	All	Data Range	0 to 10	Default	0			
Defines th	e servo d	rive op	peration mod	le.										
Setpoin	t					Modes of Operation								
0	N/A					Reserved								
1	Profile	e positi	ion (PP) mod	le		See section "Profile Position Mode" in SV660N Series Servo Drive Function Guide.								
2	N/A					Reserved								
3	Profile	e veloc	ity (PV) mode	e		See section "Profile Velocity Mode" in SV660N Series Servo Drive Function Guide.								
4	Profile	e torqu	e (PT) mode			See section "Profile Torque Mode" in SV660N Series Servo Drive Function Guide.								
5	N/A					Reserved								
6	Homi	ng (HM) mode			See section "H Guide.	loming Mode	" in SV660N S	Series Servo	Drive Fur	nction			
7	Interp	olated	position (IP)	mode		Not supported	ł							
8	Cyclic mode	synch	ronous posit	ion (CSP))	See section "C Servo Drive Fu	Cyclic Synchro Inction Guide	onous Positio	n Mode" in	SV660N S	eries			
9	Cyclic mode	synch	ronous veloc	ity (CSV)		See section "Cyclic Synchronous Velocity Mode" in SV660N Series Servo Drive Function Guide.								
10	Cyclic mode	synch	ronous torqu	ie (CST)		See section "Cyclic Synchronous Torque Mode" in SV660N Series Servo Drive Function Guide.								

If an unsupported operation mode is set through SDO, a SDO error will be returned. For details, see "2.3.3 SDO Transfer Abort Code" on page 44.

If an operation mode not supported is set through PDO, this operation mode is invalid.

Index	Nam	e	odes of opera display	ation	Sett & E	ing Condition ffective Time	-	Data Structure	VAR	Data Type	Int8				
000111	Acces	ss RO	Mapping	TPDO	Re	elated Mode	All	Data Range	0 to 10	Default	0				
Displays 1	the cur	rent oper	ation mode c	of the ser	vo dr	ive.									
Setpoi	nt					Modes of Operation									
0	٩	N/A				Reserved									
1	F	Profile pos	ition (PP) mo	ode		See section "Profile Position Mode" in SV660N Series Servo Drive Function Guide.									
2	٨	N/A				Reserved									
3	F	Profile velo	ocity (PV) mo	de		See section "Profile Velocity Mode" in SV660N Series Servo Drive Function Guide.									
4	F	Profile tore	que (PT) moc	le		See section "Profile Torque Mode" in SV660N Series Servo Drive Function Guide.									
5	١	I/A				Reserved									
6	ŀ	Homing (H	IM) mode			See section "H Guide.	oming	Mode" in SV66	0N Series Ser	vo Drive Fu	nction				
7	h	nterpolate	ed position (I	P) mode		Not supported									
8	C r	Cyclic syno node	hronous pos	ition (CS	5P)	See section "C Servo Drive Fu	yclic Sy nction	/nchronous Po Guide.	sition Mode"	in SV660N S	Series				
9	C r	Cyclic syno node	hronous velo	ocity (CS	V)	See section "Cyclic Synchronous Velocity Mode" in SV660N Series Servo Drive Function Guide.									
10	C n	Cyclic syno node	hronous tor	que (CST	.)	See section "Cyclic Synchronous Torque Mode" in SV660N Series Servo Drive Function Guide.									

6062h	Name	Posi	tion demand	l value	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Int32
000211	Access	RO	Mapping	TPDO	Related Mode	PP/HM/ CSP	Data Range	(reference unit)	Default	0
Indicates the input position reference (reference unit) in the S-ON state.										

cocob	Name	Posi	ition actual v	alue*	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Int32
000311	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	(encoder unit)	Default	0
Indicates	the input	positio	on reference	(encode	r unit) in the S-ON st	ate.				

6064h	Name	Pos	ition actual	value	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Int32
000411	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	-(reference unit)	Default	0
Represen	ts the sing	gle-turi	n absolute p	osition fe	eedback of the rotat	ing load	in real time in	user-defined u	nit. This va	lue is
equal to 2	I to 200B-08h in the absolute position mode.									
Position a	Position actual value (6064h) x Gear ratio (6091h)				1h) = Position actual	value* (6063h)			

Index	Name	Follo	wing error w	indow	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint32
6065h	Access	RW	Mapping	RPDO	Related Mode	PP/HM/ CSP	Data Range	0 to (2 ³² - 1) (reference unit)	Default	314572 8
Defines th	he thresh	old of e	xcessive pos	ition de	viation (reference u	nit).				
For 6065h	n, setpoin	ts beyo	nd 21474836	647 will	be forcibly changed	to 21474836	47.			

Index	Name	Follo	wing error tir	ne out	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint16
6066N	Access	RW	Mapping	RPDO	Related Mode	PP/HM/ CSP	Data Range	0 to 65535 (ms)	Default	0
Defines th	he time la	pse to	trigger exces	sive pos	ition deviation (EB0	0.0).				
When the	e position	deviati	eviation (reference unit) ex		xceeds \pm 6065h and	such status	persists aft	er the time def	ined by 60	66h
elapses, E	EB00.0 (E>	cessive	essive position deviation) w		will occur.					

During Setting Data Data running Name Position window Condition & VAR Uint32 Туре Structure Effective Time & At stop Index 0 to (2³² - 1) 6067h Data (reference Access RW Mapping RPDO Related Mode PP Default 734 Range unit)

Defines the threshold for position reach.

When the position deviation is within \pm 6067h and the time reaches the value defined by 6068h, the position is reached and bit10 of 6041h is set to 1.

This flag bit is valid only when the S-ON signal is active in the PP mode.

Index	Name	Posi	tion window	time	Setting Condition & Effective Time	During running & At stop	Data Structure	VAR	Data Type	Uint16
000811	Access	RW	Mapping	RPDO	Related Mode	PP	Data Range	0 to 65535 (ms)	Default	0
Defines th	ne time w	indow	for position r	each.						

Index	Name	Velo	ocity actual v	alue	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Int32
606Ch	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	-	Default	0
Indicates	the speed	d actua	l value (refer	ence un	it/s).					

Index	Name	V	elocity windo	w	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint16
606DN	Access	RW	Mapping	RPDO	Related Mode	PV	Data Range	0 to 65535 (RPM)	Default	10

Index	Name	Velc	ocity window	time	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint16
606EN	Access	RW	Mapping	RPDO	Related Mode	PV	Data Range	0 to 65535 (ms)	Default	0
606Dh is	used to se	et the tl	hreshold for	speed re	ach. 606Eh is used	to set the wir	ndow time fo	or speed reach		

If the difference between the speed reference and speed feedback is within \pm 606D and such status persists for the time defined by 606E, the speed is reached, and bit10 (Target reached) of 6041h is set to 1.

This flag bit is valid only when the servo drive is enabled in PV mode.

Index	Name	Ve	locity thresh	old	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint16
606FN	Access	RW	Mapping	RPDO	Related Mode	PV	Data Range	0 to 65535 (RPM)	Default	10

Defines the threshold for zero speed.

When the speed feedback is within \pm 606F and the time defined by 6070 elapses, the motor speed is acknowledged to be 0 and bit12 of 6041 is set to 1.

This flag bit is valid only in PV mode.

Index	Name	Veloc	city threshole	d time	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint16
6070n	Access	RW	Mapping	RPDO	Related Mode	PV	Data Range	0 to 65535 (ms)	Default	0
Defines th	ne thresh	old for z	zero speed.							
When the	speed fe	edback	is within ± 6	606F and	the time defined b	y 6070 elaps	es, the moto	r speed is ackr	owledged	to be 0
and bit12	of 6041 i	s set to	1.							
This flag b	oit is valio	l only ir	n PV mode.							

Index	Name	1	Γarget torqu	e	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Int16
6071n	Access	RW	Mapping	RPDO	Related Mode	PT/CST	Data Range	-4000.0 to +4000.0 (%)	Default	0
Defines the The Value	he target e 100.0%	torque corresp	in PT and CS onds to the	T modes rated tor	s. que of the motor.					

Index	Name		Max. torque	2	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint16
6072h	Access	RW	Mapping	RPDO	Related Mode	All	Data Range	0 to 4000.0 (%)	Default	3500
Defines t	he maxin	num tor	que limit of	the serve	o drive in forward/re	everse direct	ion.			

Index	Name	Torq	ue demand	value	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Int16
6074n	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	-(%)	Default	-
Indicates The value	the torque 100.0%	ue refer corresp	ence output onds to the	value du rated toi	uring operation. que of the motor.					

Index	Name	Tor	que actual v	alue	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Int16
6077h	Access	RO	Mapping	TPDO	Related Mode	All	Data Range	-(%)	Default	-
Indicates The value	the actu e 100.0%	al torqu corresp	e output of onds to the	the serve rated to	o drive. rque of the motor.					

Index	Name	Т	arget positio	on	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Int32
607Ah	Access	RW	Mapping	RPDO	Related Mode	PP/CSP	Data Range	-2 to (2 ³¹ - 1) (reference unit)	Default	0
Definest	he terret	nesitie	n in DD mad	and CC	Dmade					

Defines the target position in PP mode and CSP mode.

In CSP mode, 607Ah represents the absolute target position. In PP mode, 607Ah represents either incremental position or absolute position as defined by the control word.

Index	Name		Home offse	t	Setting Condition & Effective Time	During running & At stop	Data Structure	VAR	Data Type	Int32
607Ch	Access	RW	Mapping	RPDO	Related Mode	НМ	Data Range	-2 to (2 ³¹ - 1) (reference unit)	Default	0
Defines t The hom Home off Determ If 607Ch	he physic e offset is fset is use ines the p n is outsic	cal dista s activat ed in the present de the v	nce betweer ed only afte following c position acc alue of 607D	n the me r homing ases: cording to h (Softw	chanical zero and t y is done upon pow o 60E6h after homi are position limit),	he motor ho er-on and bi ng is done. EE09.1 (Hon	me in the ho it15 of 6041h ne setting err	ming mode. is set to 1. ror) will occur.		

Index	Name	S	oftware posi limit	tion	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Uint32
607Dh	Access	-	Mapping	Yes	Related Mode	All	Data Range	OD Data Range	Default	OD Default Value
Defines t	he minim	num a	and maximu	n softw	are position limits.					
• Minimu	ım absolu	ite so	oftware posit	ion limi	t = (607D-1h)					
• Maximu	 Maximum absolute software position limit = (607D-2h) 									
The softw	he software position limit is used to judge the absolute position. When homing is not performed, the internal software									
position	osition limit is invalid.									
The conc	he condition for activating the absolute software position limit is set in the object dictionary 0x200A-02h.									
• 0: No lii	0: No limit									
• 1: Abso	1: Absolute software position limit activated									
• 2: Abso	• 2: Absolute software position limit activated • 2: Absolute software position limit activated after homing									
The abso	lute soft	ware	position limi	it takes	effect once the follow	ing con	ditions are m	et: The device	is powered	on, the
homing o	operation	is do	one, and bit1	5 of 604	1h is set to 1. If the m	inimum	software po	sition limit is h	higher than t	:he
maximur	n softwai	re po	sition limit, E	E09.0 (Software position limi	t setting	g error) will o	ccur.		
When the	e positior	n refe	rence or pos	ition fee	edback reaches the in	ternal so	oftware posit	ion limit, the s	ervo drive t	akes the
position	limit as tl	ne ta	rget position	in the p	oosition control mode	and sto	ops upon read	ching the limit	, with an ov	ertravel fault
being rep	ported. If	a rev	erse displace	ement c	ommand is input, the	motor	exits from the	e overtravel st	ate and this	bit is zeroed
out.	out.									
When bo	th the DI	limit	switch and i	nternal	software position lim	it are ac	tivated, the o	overtravel stat	us is determ	ined by the
DI limit s	witch.									
		F	lighest sub-i	ndex	Sotting Condition		Data		Data	

Sub-	Name	Hi	ghest sub-in supported	dex	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint8
0h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	2

Sub-	Name	М	lin. position	limit	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Int32
index 1h	Access	RW	Mapping	RPDO	Related Mode	All	Data Range	-2 to (2 ³¹ - 1) (reference unit/s)	Default	-2 ³¹

Sub-	Name	M	ax. position	limit	Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Int32
2h	Access	RW	Mapping	RPDO	Related Mode	All	Data Range	-2 to (2 ³¹ - 1) (reference unit/s)	Default	2 ³¹ - 1
Defines t Maximun	the maximum software position limi um software position limit = (607D-2h			relative to the mech	anical zero.					

	Index	Name		Polarity		Setting Condition & Effective Time	During running & At stop	Data Structure	VAR	Data Type	Uint8	
	607EN	Access	RW	Mapping	RPDO	Related Mode	All	Data Range	0 to 255	Default	0	
[Defines tl	he polari	ne polarity of position, speed, and torque references.									
	bit		Description									
	0 to 4	Undefi	Undefined									
		Torque 0: Mult	e refere	ence polarity / 1	/							
	_	1: Mult	iply by	/-1								
	5	PT: Inv	T. Multiply by -1 PT: Inverts the target torque (6071h).									
		CSP/C	SV: Inv	erts the torc	ue offse	t (60B2h).						
		CST: Ir	iverts f	the torque re	eference	(6071h + 60B2h).						
		Speed	refere	nce polarity								
		0: Mult	iply by	/1								
	6	1: Mult	iply by	/ -1								
	0	PT: Inv	erts th	ne target tor	que (607	Lh).						
		CSP: Ir	verts	the velocity	offset (60)B1h)						
		CSV: Ir	CSV: Inverts the speed reference (60FFh + 60B1h).									
		Positic	on refe	rence polari	ty							
		0: Mult	iply by	/1								
	7	1: Mult	iply by	/ -1								
		PP: Inverts the target position (607Ah)										
IL		CSP: Ir	CSP: Inverts the position reference (607Ah + 60B0h).									

Index	Name	Ма	x. profile vel	ocity	Setting Condition & Effective Time	During running & At once	Data Struc ture	VAR	Data Type	Uint32
607Fh	Access	RW	Mapping	RPDO	Related Mode	PP/PV/PT/ HM/CST	Data Range	0 to (2 ³² - 1) (reference unit/s)	Default	10485 7600
Defines t	he speed	limit i	n PP, PV, PT,	, CST, an	id HM modes.					

Index	Name	Ρ	Profile veloc	ity	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint32
6081h	Access	RW	Mapping	RPDO	Related Mode	PP	Data Range	0 to (2 ³² - 1) (reference unit/s)	Default	174762
Defines t	he consta	ant ope	erating spee	d of the	target position in PF	o mode.				

Index	Name	Pro	ofile accelera	ation	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint32
6083h	Access	RW	Mapping	RPDO	Related Mode	PP/PV	Data Range	0 to (2 ³¹ - 1) (reference unit/s ²)	Default	174762 66667
Defines t In PP mo For 6083	the positio ode, if the 8h, the set	on refe value point (rence accele of 6083h exe) will be forc	eration i ceeds th ibly cha	n PP mode. at of 60C5h, the valu nged to 1.	ie of 60C5h v	will be used.			

Index 6084h	Name	Profile deceleration			Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint32
	Access	RW	Mapping	RPDO	Related Mode	PP/PV	Data Range	0 to (2 ³¹ - 1) (reference unit/s ²)	Default	174762 66667
Defines the position reference deceleration in PP mode.										
In PP mode, if the value of 6084h exceeds that of 60C6h, the value of 60C6h will be used. For 6084h, the setpoint 0 will be forcibly changed to 1.										

Index 6085h	Name	Quick stop deceleration			Setting Condition & Effective Time	During running & At stop	Data Structure	VAR	Data Type	Uint32
	Access	RW	Mapping	Yes	Related Mode	PP/PV/ HM/CSP/ CSV	Data Range	0 to 2 ³² - 1 (reference unit/s ²)	Default	2 ³¹ - 1
Defines the deceleration rate during ramp-to-stop when the quick stop command is active in the PP, CSV, PV, and HM										

modes, with 605Ah (Quick stop option code) set to 2 or 6.

Defines the deceleration rate during ramp-to-stop when the halt command is active in the PP, CSV, PV, and HM modes, with 605Dh (Stop option code) set to 2.

For 6085h, the setpoint 0 will be forcibly changed to 1.

Index 6087h	Name	Torque slope			Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint32
	Access	RW	Mapping	RPDO	Related Mode	PT/CST	Data Range	0 to 2 ³² - 1 (%/s)	Default	2 ³² - 1
Defines the acceleration rate (torque reference increment per second) of the torque reference in PT and CST modes.										
In PT and CST modes, if 605A (Quick stop option code) is set to 1, 2, 5, or 6, or 605D (Stop option code) is set to 1 or 2, the										
servo drive decelerates to stop as defined by 6087h.										
If the value of 6087h exceeds the torque reference limit, the limit value will be used.										

For 6087h, the setpoint 0 will be forcibly changed to 1.
$Motor acceleration = \frac{Load shaft acceleration x Gear ratio (6091h)}{Motor revolutions} \times \frac{1000}{60}$

Sub- index 00h	Name	Hig	supported	dex	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint8
	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	2

Sub- index	Name	M	Motor revolutions		Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint32
UIN	Access	RW	Mapping	RPDO	Related Mode	-	Data Range	1 to (2 ³² - 1)	Default	Encoder resolution

Sub- index	Name	Shaft revolutions			Setting Condition & Effective Time	During running & At once	Data Structure	-	Data Type	Uint32
02h	Access	RW Mapping RPDO		Related Mode	-	Data Range	1 to (2 ³² - 1)	De fault	1	

Index	Name	e H	oming met	nod	Setting Condition & Effective Time	During running & At stop	Data Structure	VAR	Data Type	Int8	
009811	Acces	s RW	Mapping	RPDO	Related Mode	НМ	Data Range	-2 to +35	De fault	0	
Indicates	s the se	rvo drive	status.								
Mod	le				C	Description					
-2		Forward,	positive me	echanica	limit as deceleration	on point and	Z signal as hor	ne			
-1		Reverse,	negative me	echanica	l limit as deceleratio	on point and	Z signal as hor	me			
1	:	Reverse, switch sig	negative lin gnal must b	nit switch e reache	as deceleration po d before Z signal	int and Z sig	nal as home, fa	alling edge of th	ne negati	ve limit	
2	:	Forward, switch sig	positive lim gnal must b	nit switch e reache	as deceleration po d before Z signal	int and Z sigr	nal as home, fa	alling edge of p	ositive lir	nit	
3		Forward, home sw	home swite itch signal r	ch as dec nust be r	eleration point and eached before Z sig	Z signal as h mal	ome, falling ec	lge on the sam	e side of	the	
4		Reverse, home sw	home switc itch signal r	h as dece nust be r	eleration point and eached before Z sig	Z signal as ho mal	ome, rising edg	ge on the same	side of th	ne	
5		Reverse, home sw	home switc itch signal r	h as dece nust be r	eleration point and eached before Z sig	Z signal as ho mal	ome, falling ed	ge on the same	e side of t	:he	
6		Forward, home sw	home swite itch signal r	ch as dec nust be r	eleration point and eached before Z sig	Z signal as h mal	ome, rising ed	ge on the same	side of t	he	
7		Forward, home sw	home swite itch signal r	ch as dec nust be r	eleration point and eached before Z sig	Z signal as h mal	ome, falling ec	lge on the sam	e side of	the	
8		Forward, home sw	home swite itch signal r	ch as dec nust be r	eleration point and eached before Z sig	Z signal as h mal	ome, rising ed	ge on the same	side of t	he	
9		Forward, home sw	home swite itch signal r	ch as dec nust be r	eleration point and eached before Z sig	Z signal as h mal	ome, rising ed	ge on the othe	r side of t	he	
10		Forward, home sw	home swite itch signal r	ch as dec nust be r	eleration point and eached before Z sig	Z signal as h mal	ome, falling ec	lge on the othe	er side of	the	
11		Reverse, home sw	home switc itch signal r	h as dece nust be r	eleration point and eached before Z sig	Z signal as ho mal	ome, falling ed	ge on the same	e side of t	:he	
12		Reverse, home sw	home switc itch signal r	h as dece nust be r	eleration point and eached before Z sig	Z signal as ho gnal	ome, rising edg	ge on the same	side of th	ne	
13		Reverse, home, ris	home switc ing edge or	h as dece the oth	eleration point and er side of the home	Z signal on th switch signal	ne other side o must be reacl	f the home swi hed before Z sig	tch signa gnal	las	
14		Reverse, home switch as deceleration point and Z signal on the other side of the home switch signal as home, falling edge on the other side of the home switch signal must be reached before Z signal									
15 to	16	N/A									
17 to	32	Similar to	setpoints	114 exc	ept that the decele	ration point o	oincide with t	he home			
33		Reverse,	Z signal as I	nome							
34		Forward,	Z signal as	home							
35		Current position as home									

Index	Name	Н	oming spee	ds	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint32
6099h	Access	- Mapping Yes		Related Mode	НМ	Data Range	OD Data Range	Default	OD Default Value	
Defines the two speed values used in the ho • Speed during search for switch • Speed during search for zero					ming mode.					

Sub- index	Name	Highest sub-index supported			Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint8
0h	Access	RO Mapping No		Related Mode	-	Data Range	2	Default	2	

Sub-	Name	Speed	d during sea switch	arch for	Setting Condition & Effective Time	During running & At stop	Data Structure	-	Data Type	Uint32
1h	Access	RW	Mapping	RPDO	Related Mode	НМ	Data Range	0 to (2 ³² - 1) (reference unit/s)	De fault	1747627
Defines t	he speed	in sea	rching for th	ne decele	eration point signa	l. A high set	point prever	nts occurrence of	E601.0 (H	loming

Note: After finding the deceleration point, the slave decelerates and blocks the change of the home signal during deceleration. To prevent the slave from encountering the home signal during deceleration, set the switch position of the deceleration point signal properly to leave sufficient deceleration distance or increase the homing acceleration rate to shorten the deceleration time.

Sub-	Name	Speed	d during sea zero	arch for	Setting Condition & Effective Time	During running & At stop	Data Structure	-	Data Type	Uint32
2h	Access	RW	Mapping	RPDO	Related Mode	НМ	Data Range	10 to (2 ³² - 1) (reference unit/s)	Default	174763
Defines the speed in searching for the home signal. Set this sub-index to a low value to avoid overshoot during stop at h speed, preventing excessive deviation between the stop position and the preset mechanical home.								p at high		

Index	Name	Hon	ning accele	ration	Setting Condition & Effective Time	During running & At stop	Data Structure	-	Data Type	Uint32
609A	Access	RW	Mapping	RPDO	Related Mode	НМ	Data Range	0 to (2 ³² - 1) (reference unit/s ²)	Default	100

Defines the acceleration rate in the homing mode.

The setpoint is activated after homing is started.

In the HM mode, if 605Dh (Stop option code) is set to 2, the servo drive decelerates to stop as defined by 609Ah.

609A indicates the position reference (reference unit) increment per second. For 609A, the setpoint 0 will be forcibly changed to 1.

Name Position offset			Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Int32		
Access	RW	RW Mapping RPDO		Related Mode	CSP	Data Range	-2 to (2 ³¹ - 1) (reference unit)	Default	0	
he positi	on refe	rence offset	t in CSP ı	mode.						
of 607Ah	and 6	and 6080h determines the target position of the servo drive.								
	Name Access he positi of 607Ah	Name F Access RW he position refe of 607Ah and 60 spition = 607Ah	Name Position offs Access RW Mapping he position reference offse of 607Ah and 6080h deterr sition = 607Ah + 6080h softable	Name Position offset Access RW Mapping RPDO he position reference offset in CSP in of 607Ah and 60B0h determines the spition = 607Ah ± 60B0h Setermines the	Name Position offset Setting Condition & Effective Time Access RW Mapping RPDO Related Mode he position reference offset in CSP mode. of 607Ah and 60B0h determines the target position of spition = 607Ah ± 60B0h Setting	Name Position offset Setting Condition & Effective Time During running & At once Access RW Mapping RPDO Related Mode CSP he position reference offset in CSP mode. of 607Ah and 60B0h determines the target position of the servo dri spition = 607Ab ± 60B0h CBPh	Name Position offset Setting Condition & Effective Time During running & At once Data Structure Access RW Mapping RPDO Related Mode CSP Data Range he position reference offset in CSP mode. of 607Ah and 60B0h determines the target position of the servo drive. spition = 607Ab + 50R0h GORD + 50R0h	Name $Position offset$ Setting Condition & Effective Time During running & A tonce Data Structure VAR Access RW Mapping RPD0 Related Mode CSP Data Range -2 to (2 ³¹ - 1) (reference unit) he position reference offset in CSP mode. of 607Ah and 60B0h determines the target position of the servo drive. -2 to (2 ³¹ - 1) stitutor = 607Ab + 50R0h cSP Data Range -2 to (2 ³¹ - 1)	Name Position offset Setting Condition & Effective Time During running & At once Data Structure VAR Data Type Access RW Mapping RPD0 Related Mode CSP Data Range -2 to $(2^{31} - 1)$ (reference unit) Default he position reference offset in CSP mode. Of 607Ah and 6080h determines the target position of the servo drive. Joata -2 to $(2^{31} - 1)$ Default stripp = 6074b + 50R9h CSP Data -2 to $(2^{31} - 1)$ Default	

Index	Name Index		/elocity offs	set	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Int32	
60B1h	Access	RW Mapping RPD		RPDO	Related Mode	CSP/CSV	Data Range	-2 to (2 ³¹ - 1) (reference unit/s)	Default	0	
Defines t	he exterr	al spe	ed feedforw	ard sign	al of EtherCAT in CS	P mode (act	ivated when	2005-14h is set t	o 2). 60B1	h can	
be used	to reduce	the po	e position deviation during positioning. After positioning is done, set the velocity offset to 0. Failure to								
comply	will result	in dev	eviation between the target position and the position feedback.								
60B1h al	so define	s the s	peed refere	nce offse	et in CSV mode.						

Index	Name		Torque offs	et	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Int16
60B2N	Access	RW	RW Mapping RPDO		Related Mode	CSP/CSV/ CST	Data Range	-4000.0 to +4000.0 (%)	Default	0
Defines t Defines t Target to	the exterr the torque orque = 60	nal torq e refere 071h +	al torque feedforward sig reference offset in CST n 71h + 60B2h		nal of EtherCAT in C ode. After offset, th	SV mode (ac	tivated when	n 2006-0Ch is set ies:	to 2).	

Outborn Access R Mapping RPD Related Mode . Data Range 0 to 65535 Default 0 Defines the functions of touch probe 1 and touch probe 2. See the following table for descriptions of each bit of 6088. . Description 0 Dit Function Description 0 0: Single trigger mode 0 . Description 1 1: Enable touch probe 1 . . Description 2 0: Di signal . . Default on the touch probe function, the Di surger the touch probe function, the Di surger the touch probe function, the Di surger cannot be changed once the touch probe function, the Di signal 1: Z signal . 3 N/A 4 0: Switch off laching at positive edge 3 N/A 4 0: Switch off laching at positive edge 5 0: Switch of flaching at negative edge 6 to 7 N/A 9 Touch probe 2 function selection .<	Index	Name	Tou	ch probe fu	nction	Setting Condition & Effective Time	During running & At stop	Data Structure	VAR	Data Type	Int16
Defines the functions of touch probe 1 and touch probe 2. See the following table for descriptions of each bit of 60B8. bit Function Description 0 0. Switch off touch probe 1 1 Enable touch probe 1 1 1: Enable touch probe 1 1 Enable touch probe 1 2 0: Di signal 0 0: Single trigger mode 2 0: Di signal 0: Di signal 0: Di signal 1: Z signal 7 For absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 3 N/A of the single-turn positive edge 0: Switch off taching at positive edge 5 0: Switch off taching at positive edge 0: Switch off taching at negative edge 0: Touch probe 1 negative edge 6 to 7 N/A 7 Touch probe 2 function selection 0: Switch off taching at negative edge 6 to 7 N/A 7 Touch probe 2 1 1 1: Enable taching at negative edge 1 1: Enable touch probe 2 1 1: Enable taching at negative edge 1 1 1 6 to 7 N/A 1 1 1 9 1	60B8N	Access	RW	Mapping	RPDO	Related Mode	-	Data Range	0 to 65535	Default	0
See the following table for descriptions of each bit of 6088. bit Function Description 0 0. Switch off touch probe 1 1 1 1 Touch probe 1 trigger mode 1 1 0 0. Switch off touch probe 1 1 1 1 Touch probe 1 trigger mode 1 1 1 Touch probe 1 trigger mode 1 1 2 0. Disignal 1 2 1 Touch probe 1 positive edge 1 1 3 N/A 1 1 3 N/A 1 1 4 0. Switch off latching at positive edge 1 1 1 Enable latching at positive edge 1 1 5 0. Switch off latching at negative edge 1 6 1 1 1 7 Touch probe 2 function selection 0 8 0. Switch off latching at negative edge 1 1 Enable touch probe 2 1 1 Touch probe 2 function selection 0 8 0. Switch off latching at negative edge 9 Touch probe 2 trigger mode 1 N/A 1 N/A 1 N/A </td <td>Defines t</td> <td>he functi</td> <td>ons of</td> <td>touch prob</td> <td>e 1 and t</td> <td>ouch probe 2.</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Defines t	he functi	ons of	touch prob	e 1 and t	ouch probe 2.					
bit Function Description 0 Touch probe 1 function selection 0 1 Enable touch probe 1 1 1 Touch probe 1 trigger mode 0 0 0: Switch off touch probe 1 1 1 Touch probe 1 trigger mode 0 1 Touch probe 1 trigger mode 0 1 Touch probe 1 trigger signal selection 0 2 0.10 signal 1 1.2 signal 5 0 3 N/A 7 4 0.2 switch off latching at positive edge 1 1 Touch probe 1 positive edge 5 5 0.5 witch off latching at negative edge 1 1 Enable latching at negative edge 1 2 Switch off louch probe 2 1 1 Touch probe 2 function selection 0 8 0. Switch off touch probe 2 1 1 Enable touch probe 2 1 1 Couch probe 2 function selection 0 0	See the f	ollowing	table f	or descripti	ons of ea	ach bit of 60B8.					
Touch probe 1 function selection 0 0: Switch off touch probe 1 1: Enable touch probe 1 1 Touch probe 1 trigger mode 0: Songle trigger mode (Latches the position at the first trigger event.) 1: Continuous trigger mode 0: DI signal 1: Z signal 7ouch probe 1 positive edge 1: Switch off latching at positive edge 1: Enable latching at positive edge 1: Enable latching at negative edge 1: Enable latching at negative edge 1: Enable latching at negative edge 1: Enable latching at positive edge 1: Enable latching at negative edge 1: Signal 1: Z signal 1: Continuous trigger mode 0: Signich trigger mode 0: Signich trigger mode 1: Z signal 1: I 1: Continuous trigger mode 1: Z signal<	bit			Fu	nction			[Description		
0 U: Switch off fouch probe 1 1: Enable touch probe 1 Touch probe 1 trigger mode 0: Single trigger mode (Latches the position at the first trigger event.) bit0 to bit5: settings related to touch probe 1 2 D: D signal When a DI is used to trigger the touch probe 1 3 N/A For absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 4 0: Switch off latching at positive edge For absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 5 Touch probe 1 negative edge For absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 6 to 7 N/A Touch probe 2 negative edge For absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 9 0: Switch off latching at negative edge For absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 10 0: Drobe 1 negative edge For absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 9 0: Single trigger mode (Latches the position at the first trigger event.) For absolute probe 2 10 0: Drob probe 2 trigger signal selection For absolute probe 2 11 N/A Touch probe 2 positive edge		Touch	probe	1 function s	election						
1 Now probe 1 rigger mode 0 Single trigger mode (Latches the position at the first trigger event.) 1 Couch probe 1 trigger signal selection 2 0. Di signal 1.2 Z signal Sinch of the charged once the touch probe 1 3 N/A 3 N/A 4 0. Siwitch off latching at positive edge 1.2 Enable latching at negative edge 1.2 Signal 7 Ouch probe 2 function selection 8 0. Signet rigger mode 0. Signet rigger mode 0.3 Signet rigger mode 1.2 Signal 7 Ouch probe 2 function selection 8 0. Single trigger mode 0.5 Signet rigger mode 1.2 Continuous trigger mode 1.3 N/A 7 Ouch probe 2 brigger mode 1.4 Continuous trigger mode 1.5 Signal 1.1 1.2 Signal 1.1 1.2 Signal 1.1	0	0: Swit	ch off t	ouch probe ch probe 1	1						
10: Single trigger mode (Latches the position at the first trigger event.) 1: Continuous trigger modebit0 to bit5: settings related to touch probe 1 when a D1 is used to trigger the touch probe 1 when a D1 is used to trigger the touch probe function, the D1 source cannot be changed once the touch probe function is enabled.20: D1 signal 1: Z signalWhen a D1 is used to trigger the touch probe function, the D1 source cannot be changed once the touch probe function is enabled.3N/AO3Touch probe 1 positive edge 1: Enable latching at positive edge 1: Enable latching at negative edgeO4Touch probe 1 negative edge 0: Switch off latching at negative edge 1: Enable latching at negative edgeO50: Switch off latching at negative edgeO6 tor 7N/ATouch probe 2 function selection 0: Switch off touch probe 2 1: Enable touch probe 2 1: Enable touch probe 2 1: Enable touch probe 2 1: Continuous trigger mode 1: Z signalDit8 to bit13: settings related to touch probe 29Touch probe 2 positive edge 0: Switch off latching at positive edge 1: Z signalDit8 to bit13: settings related to touch probe 2100: D1 signal 1: Z signalDit8 to bit13: settings related to touch probe 211N/ATouch probe 2 positive edge 0: Switch off latching at positive edge 1: Enable latching at negative edge120: Switch off latching at positive edge 1: Enable latching at negative edge13N/A-		Touch	nrohe	1 trigger m	nde		-				
1 first trigger event.) 1: Continuous trigger mode bit0 to bit5: settings related to touch probe 1 2 Touch probe 1 trigger signal selection When a D1 is used to trigger the touch probe function, the D1 source cannot be changed once the touch probe function is enabled. 3 N/A For absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 4 O: Switch off latching at positive edge For absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 5 0: Switch off latching at negative edge For absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 6 to 7 N/A For absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 9 Touch probe 1 negative edge For absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 1 Enable latching at negative edge For absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 8 0: Switch off touch probe 2 For absolute encoders, Z signal refers to the zero point of the single remote function selection 9 Touch probe 2 trigger mode For absolute off touch probe 2 10 Di signal Econtinuous trigger mode 11 N/A Fouch probe 2 positive edge		0: Sing	le trigg	er mode (La	atches th	e position at the					
1: Continuous trigger mode bit0 to bit5: settings related to touch probe 1 2 Touch probe 1 trigger signal selection When a D is used to trigger the touch probe function, the D is ource cannot be changed once the touch probe function is enabled. 3 N/A Touch probe 1 positive edge For absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 4 0: Switch off latching at positive edge 5 0: Switch off latching at negative edge 6 to 7 N/A Touch probe 2 function selection 0: Switch off latching at negative edge 6 to 7 N/A Touch probe 2 function selection 0: Switch off touch probe 2 1: Enable latching at negative edge 1: Continuous trigger mode 9 first trigger event.) 1: Continuous trigger mode 1: Z signal Touch probe 2 positive edge 10 0: Di signal 1: Z signal 11 N/A Touch probe 2 positive edge 12 0: Switch off latching at positive edge 1: Kable latching at positive edge 12 Touch probe 2 positive edge 1: Z signal 11 N/A Touch probe 2 positive edge 12 0: Switch off latching	1	first tri	gger ev	vent.)							
Touch probe 1 trigger signal selectionInitial sector of probe 1 trigger signal selection20: DI signal1: Z signal3N/ATouch probe 1 positive edge40: Switch off latching at positive edge1: Enable latching at positive edge50: Switch off latching at negative edge6 to 7N/ATouch probe 2 function selection80: Switch off touch probe 21: Enable latching at negative edge6 to 7N/ATouch probe 2 function selection80: Switch off touch probe 21: Enable touch probe 21: Continuous trigger mode0: DI signal1: Z signal11N/A111112121314141516171818191911111212131414151515161617181819191111121213141415151516171819191911111213141415<		1: Cont	tinuous	s trigger mo	de		bit0 to bit: When a DI	5: settings rel	ated to touch pi	robe 1 probe func	tion
2 0. Disgnat 1: Z signal function is enabled. 3 N/A 4 0: Switch off latching at positive edge 1: Enable latching at positive edge for absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 6 tork probe 1 negative edge for absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 7 Touch probe 1 negative edge for absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 6 tork probe 1 negative edge for absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 6 tork probe 1 negative edge for absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 7 Touch probe 1 negative edge for absolute encoders, Z signal refers to the zero point of the single-turn position feedback. 8 0: Switch off touch probe 2 for thouch probe 2 10 for thouch probe 2 trigger mode for the single trigger reger mode 10 for thorp z positive edge for thorp at positive edge 12 for Switch off latching at positive edge for thorp at positive edge 12 for thorp 2 negative edge for thorp at negative edge f	_	Touch	probe	1 trigger sig	nal seleo	ction	the DI sou	rce cannot be	e changed once	the touch	probe
3 N/A 3 N/A 4 Touch probe 1 positive edge 1: Enable latching at positive edge 5 0: Switch off latching at negative edge 1: Enable latching at negative edge 6 to 7 8 0: Switch off touch probe 2 1: Enable latching at negative edge 6 to 7 8 0: Switch off touch probe 2 1: Enable latching at negative edge 9 Touch probe 2 function selection 0: Single trigger mode 10 0: Di signal 1: Z signal 11 N/A 11 N/A 12 O: Switch off latching at positive edge 1: Enable latching at positive edge 1: Continuous trigger signal selection 0: Di signal 1: Z signal bit8 to bit13: settings related to touch probe 2 11 N/A Touch probe 2 positive edge 1: Enable latching at negative edge 13 N/A -	2	1: Z sig	mal				function is	enabled.	-		
Image: Second	3	N/A					- For absolu	ite encoders,	Z signal refers t	o the zero	point
4 0: Switch off latching at positive edge 1: Enable latching at positive edge 5 0: Switch off latching at negative edge 6 to 7 N/A 8 0: Switch off taching at negative edge 0: Switch off touch probe 2 1: Enable latching at negative edge 0: Switch off touch probe 2 1: Enable touch probe 2 0: Single trigger mode 0: Single trigger mode 0: Dingla trigger mode 1: Z signal 11 11 N/A 12 0: Switch off latching at positive edge 13 0: Switch off latching at negative edge 13 N/A		Touch	probe	1 positive e	dge		_ of the sing	gle-turn posit	on feedback.		
1: Enable latching at positive edge 5 Touch probe 1 negative edge 5 0: Switch off latching at negative edge 6 to 7 N/A 7 Touch probe 2 function selection 8 0: Switch off touch probe 2 1: Enable touch probe 2 Touch probe 2 trigger mode 0: Single trigger mode 0: Single trigger mode 10 0: Single trigger mode 11 N/A 12 Touch probe 2 trigger signal selection 10 0: Di signal 1: Z signal 11 N/A 12 0: Switch off latching at positive edge 12 0: Switch off latching at positive edge 13 0: Switch off latching at negative edge 13 0: Switch off latching at negative edge 14 to N/A	4	0: Swit	ch off l	atching at p	ositive e	edge					
Touch probe 1 negative edge 0: Switch off latching at negative edge 1: Enable latching at negative edge 6 to 7 N/A Touch probe 2 function selection 0: Switch off touch probe 2 1: Enable touch probe 2 1: Enable touch probe 2 1: Enable touch probe 2 0: Single trigger mode 0: Single trigger mode 0: Single trigger mode 1: Continuous trigger mode 1: Continuous trigger mode 1: Continuous trigger mode 1: Z signal 1: N/A Touch probe 2 positive edge 1: Z signal 1: N/A Touch probe 2 positive edge 1: Enable latching at positive edge 1: Continuous trigger edge 1: Continuous trigger mode 0: Switch off latching at positive edge 1: Douch probe 2 positive edge 1: Enable latching at positive edge 1: Enable latching at negative edge 1: Enable latching at ne		1: Enat	ole latc	hing at pos	tive edg	e					
5 0: Switch off latching at negative edge 1: Enable latching at negative edge 6 to 7 N/A Touch probe 2 function selection 8 0: Switch off touch probe 2 1: Enable touch probe 2 1: Enable touch probe 2 1: Enable touch probe 2 1: Enable touch probe 2 9 0: Single trigger mode 0: Single trigger mode 1: Continuous trigger mode 10 0: Di signal 1: Z signal 1: Z signal 11 N/A 12 0: Switch off latching at positive edge 12 0: Switch off latching at positive edge 12 0: Switch off latching at positive edge 13 0: Switch off latching at negative edge 13 0: Switch off latching at negative edge 13 0: Switch off latching at negative edge 14 to N/A	_	Touch	probe	1 negative e	edge 						
6 to 7 N/A 6 to 7 N/A 8 7 Switch off touch probe 2 1: Enable touch probe 2 1: Enable touch probe 2 9 7 Touch probe 2 trigger mode 0: Single trigger mode (Latches the position at the first trigger event.) 1: Continuous trigger mode 1: Continuous trigger mode 0: DI signal 1: Z signal 11 11 N/A 12 Touch probe 2 positive edge 12 0: Switch off latching at positive edge 13 0: Switch off latching at negative edge 13 0: Switch off latching at negative edge 14 to N/A 14 to N/A	5	0: Swit	ch off i ble latc	atching at r hing at neg	iegative ative eds	eage					
Touch probe 2 function selection80: Switch off touch probe 21: Enable touch probe 29Touch probe 2 trigger mode0: Single trigger mode (Latches the position at the first trigger event.)1: Continuous trigger mode10Touch probe 2 trigger signal selection 0: DI signal 1: Z signal11N/A12Touch probe 2 positive edge 1: Enable latching at positive edge 1: Enable latching at negative edge 1: Enable latching at negative edge130: Switch off latching at negative edge 1: Enable latching at negative edge 1: Enable latching at negative edge14 to 15N/A	6 to 7	N/A		00		5 -					
8 0: Switch off touch probe 2 1: Enable touch probe 2 9 Touch probe 2 trigger mode 0: Single trigger mode (Latches the position at the first trigger event.) 1: Continuous trigger mode 10 Touch probe 2 trigger signal selection 10 O: DI signal 1: Z signal 11 N/A 12 O: Switch off latching at positive edge 13 Touch probe 2 negative edge 13 O: Switch off latching at negative edge 14 to N/A		Touch	probe	2 function s	election		_				
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9 0. Single trigger induce (Latches the position at the position at the position at the price of the position at the position at the price of the position at the position at the price of the price of the position at the price of the price of the price of the price of the position at the price of the p		Touch	probe:	2 trigger mo	ode atchos th	o position at the					
1: Continuous trigger mode Touch probe 2 trigger signal selection 0: DI signal 1: Z signal 11 N/A Touch probe 2 positive edge 12 0: Switch off latching at positive edge 13 Touch probe 2 negative edge 13 0: Switch off latching at negative edge 14 to N/A	9	first tri	gger ev	/ent.)	ateries ti	le position at the					
Touch probe 2 trigger signal selection bit8 to bit13: settings related to touch probe 2 10 DI signal bit8 to bit13: settings related to touch probe 2 11 N/A Touch probe 2 positive edge 12 O: Switch off latching at positive edge Frank Problem Problem Provided Provided Problem Problem Provided Pro		1: Cont	tinuous	s trigger mo	de						
10 0: DI signal 1: Z signal 11 N/A Touch probe 2 positive edge 12 0: Switch off latching at positive edge 13 0: Switch off latching at negative edge 13 0: Switch off latching at negative edge 14 to N/A		Touch	probe	2 trigger sig	nal seleo	ction	bit8 to bit	13 [.] settings re	elated to touch i	orobe 2	
11 N/A 12 Touch probe 2 positive edge 12 0: Switch off latching at positive edge 12 1: Enable latching at positive edge 13 Touch probe 2 negative edge 14 to N/A 15 N/A	10	0: DI si	gnal					8			
11 N/A Touch probe 2 positive edge 12 0: Switch off latching at positive edge 12 0: Switch off latching at positive edge 13 0: Switch off latching at negative edge 14 to 15 N/A	11	1. 2 Sig	iiai				_				
12 0: Switch off latching at positive edge 1: Enable latching at positive edge 13 0: Switch off latching at negative edge 14 to 15		Touch	probe	2 positive e	dge		-				
1: Enable latching at positive edge 13 Touch probe 2 negative edge 13 0: Switch off latching at negative edge 1: Enable latching at negative edge 14 to 15	12	0: Swit	ch off l	atching at p	ositive e	edge					
Touch probe 2 negative edge 13 0: Switch off latching at negative edge 1: Enable latching at negative edge		1: Enat	ole latc	hing at pos	tive edg	e					
13 0: Switch off latching at negative edge 1: Enable latching at negative edge 14 to 15		Touch	probe	2 negative e	edge						
14 to N/A -	13	0: Swit	ch off l ble latc	atching at r hing at neg	iegative ative eds	edge					
15 N/A -	14 to					2-					
	15	N/A					-				

For absolute encoders, Z signal refers to the zero position of the single-turn position feedback.

Index	Name	Τοι	uch probe s	tatus	Setting Condition & Effective Time	-		Data Structure	VAR	Data Type	Uint16		
60BAU	Access	RO	Mapping	TPDO	Related Mode	-		Data Range	-	Default	-		
Indicates	s the stati	us of to	ouch probe	1 and to	uch probe 2.								
bit				Functior	ı				Description				
0	Touch p 0: Switc 1: Enab	brobe 1 h off to le touc	function se buch probe h probe 1	election 1									
1	Touch p 0: No po 1: Positi	orobe 1 ositive ive edg	positive ec edge value e value lato	lge value latched :hed			bit() to bit7: statı	us of touch prob	e 1			
2	Touch p 0: No ne 1: Nega	: Positive edge value latched ouch probe 1 negative edge value : No negative edge value latched : Negative edge value latched //A											
3 to 7	N/A	louch probe I negative edge value D: No negative edge value latched I: Negative edge value latched V/A											
8	Touch p 0: Switc 1: Enab	brobe 2 h off To le touc	function se ouch probe h probe 2	election 2									
9	Touch p 0: No po 1: Positi	orobe 2 ositive ive edg	positive ec edge value se value lato	lge value latched :hed			bit	3 to bit15: sta	tus of touch pro	be 2			
10	Touch p 0: No ne 1: Nega	orobe 2 egative tive ed	negative e edge value ge value lat	dge valu latched ched	e								
11 to 15	N/A												

Index	Name	Touc	h probe 1 p edge	ositive	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Int32
60BAN	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	-(reference unit)	Default	-
Indicates	s the posi	tion va	lue of toucl	h probe 1	L at positive edge (r	eference unit	t).			

Index	Name	Touc	h probe 1 n edge	egative	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Int32
60BBh	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	-(reference unit)	Default	-
Indicates	s the posi	tion value of touch probe		1 at negative edge (reference un	it).				

Index	Name	Touc	h probe 2 p edge	ositive	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Int32
60BCh	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	-(reference unit)	Default	-
Indicates	s the posi	sition value of touch probe		2 at positive edge (reference unit		t).				

Index	Name	Touc	h probe 2 n edge	egative	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Int32
60BDh	Access	RO	Mapping	TPDO	Related Mode	-	Data Range	-(reference unit)	Default	-
Indicates	s the posi	sition value of touch probe		2 at negative edge (reference un	it).				

Index	Name	Ma	ax. accelera	tion	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint32
60C5h	Access	RW	RW Mapping RPDO		Related Mode	All	Data Range	0 to (2 ³² - 1) (reference unit/s ²)	Default	2 ³¹ - 1
Defines t	he maxin	num lir	mit of accel	eration.						
In the HI	∥ mode, i	f the va	alue of 609A	Ah exceed	ds that of 60C5h, th	e value of 6	0C5h will be	used.		
For 60C5	ih, the set	point	0 will be for	cibly cha	nged to 1.					

Index	Name	Pos	itive torque value	limit	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint16
60E0h	Access	RW	Mapping	RPDO	Related Mode	All	Data Range	0 to 4000.0 (%)	Default	3500
Defines	the maxir	um torque limit of the se		vo drive in the forv	vard directio	n.				

Index	Name	Neg	ative torque value	e limit	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint16
60EIN	Access	RW	Mapping	RPDO	Related Mode	All	Data Range	0 to 4000.0 (%)	Default	3500
Defines	the maxir	num to	num torque limit of the se		vo drive in the reve	erse direction				

Index	Name	Su	pported hor methods	ming	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Uint16
60E3h	Access	RO	Mapping	No	Related Mode	НМ	Data Range	OD Data Range	Default	OD Default Value
Indicates	s the supp	ported	homing me	thods.						

Sub-	Name	Hi	ighest sub-ir supported	ndex I	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint8
00h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	31

Sub-	Name	1st s	upported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint8
01h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	769
Meaning	aning:									
	bit0 to bit7 The low 8 bits indicate the supported homing method. Set 6098h to the corresponding									
		C1				valı	Je.			
			Relativ	/e positi	on homing					
	bit8		0: Not	support	ed					
			1: Sup	ported						
			Absolu	ute posit	ion homing					
	bit9		0: Not	support	ed					
1: Supported										
bit10 to bit15 N/A										
Defines whether to use relative or absolute p				osolute p	osition homing thro	ugh 60E6h.				

Sub-	Name	2nd s	supported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uin t16
02h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	770
The low	8 bits ind	icate tł	ne supporte	d homin	g method.					

Sub- index	Name	3rd :	supported h method	oming	Setting Condition & Effective Time	_	Data Structure	-	Data Type	Uin t16
03h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	771
The low	w 8 bits indicate the supported homin		d homing	g method.						

Sub- index	Name	4th s	supported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uin t16
04h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	772
The low	8 bits indi	dicate the supported homin		g method.						

Sub- index	Name	5th s	supported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
05h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	773
The low	8 bits ind	bits indicate the supported homin		g method.						

Sub-	Name	6th supported homing method			Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
06h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	774
The low	The low 8 bits indicate the supported homin		g method.							

Sub- index	Name	7th supported homing method	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16		
07h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	775
The low	8 bits indi	ts indicate the supported homin		g method.						

Sub-	Name	8th :	supported h method	ioming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
08h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	776
The low a	8 bits indi	cate th	e supporte	d homing	g method.					

Sub-	Name	9th s	supported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
09h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	777
The low 8 bits indicate the supported homin			g method.							

Sub-	Name	10th	supported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
0Ah	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	778
The low a	The low 8 bits indicate the supported homin		g method.							

Sub-	Name	11th	supported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
0Bh	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	779
The low a	8 bits indi	cate th	e supported	l homin	g method.					

Sub-	Name	12th	supported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
0Ch	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	780
The low	8 bits ind	icate th	e supported	l homing	g method.					

Sub- index	Name	13th	supported method	homing	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
0Dh	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	781
The low	8 bits ind	icate th	cate the supported homing		method.					

Sub- index	Name	14th	14th supported homing method		Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
0Eh	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	782
The low	8 bits indi	cate th	cate the supported homing		nethod.					

Sub-	Name	15th	supported h method	noming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
0Fh	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	783
The low a	The low 8 bits indicate the supported homing		method.							

Sub-	Name	16th :	supported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
10h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	784
The low 8	3 bits indi	cate th	e supported	homing	; method.					

Sub-	Name	17th :	supported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
11h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	785
The low a	8 bits indi	cate th	e supported	lhoming	g method.					

Sub-	Name	18th :	supported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
12h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	786
The low a	8 bits indi	cate th	ate the supported homin		g method.					

Sub-	Name	19th s	upported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
13h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	787
The low	8 bits indi	icate the	e supported	homing	g method.					

Sub-	Name	20th s	upported ho method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
14h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	788
The low 8	3 bits indi	cate the	supported	homing	method.					

Sub-	Name	21st s	upported ho method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
15h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	789
The low 8	8 bits indi	cate the	supported	homing	g method.					

Sub- index	Name	22nd 9	supported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
16h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	790
The low 8	8 bits ind	icate the	cate the supported homing		method.					

Sub- index	Name	23rd supported homing method		Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16	
17h	Access	RO	RO Mapping No		Related Mode	-	Data Range	-	Default	791
The low 8	3 bits ind	icate the	ate the supported homing		method.					

Sub- index	Name	24th s	upported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
18h	Access	RO	RO Mapping No		Related Mode	-	Data Range	-	Default	792
The low 8	8 bits ind	icate the	ate the supported homing		method.					

Sub-	Name	25th s	upported he method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
19h	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	793
The low 8	3 bits indi	cate the	supported	noming	method.					

Sub- index	Name	26th s	upported ho method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
1Ah	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	794
The low 8	3 bits indi	cate the	supported l	noming I	method.					

Sub- index	Name	27th s	supported ho method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
1Bh	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	795
The low a	8 bits ind	icate the	supported	homing	method.					

Sub-	Name	28th s	upported ho method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
1Ch	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	796
The low 8	8 bits indi	cate the	supported h	noming	method.					

Sub-	Name	29th s	supported ho method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
1Dh	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	797
The low 8	8 bits indi	cate the	supported l	homing	method.					

Sub-	Name	30th :	supported h method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
1Eh	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	798
The low a	8 bits ind	icate the	supported l	noming n	nethod.					

Sub-	Name	31st s	supported ho method	oming	Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint16
1Fh	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	799
The low a	8 bits ind	icate the	supported l	noming n	nethod.					

Index 60E6h	Name	Ac calc	tual positio ulation meth	n 10d	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Uint8		
	Access	RW	Mapping	No	Related Mode	НМ	Data Range	0 to 1	Default	0		
Defines t	:he meth	od for ca	Iculating th	e mech	anical position afte	r homing is do	one.					
Setpo	oint		Actual position calculation method									
0	А А Є	bsolute fter hom 064h (Pc	position hon ing is done, osition actua	ning the fol I value	lowing formula app) = 607Ch (Home off	lies: íset)						
1	F A E	elative p fter hom 064h (Pc	64h (Position actual value) = 607Ch (Home offset) ^I ative position homing ter homing is done, the following formula applies: 164h (Position actual value) = Present position feedback + 607Ch (Home offset)									

After homing is triggered, changes in 60E6h will be blocked.

Index	Name	Follo	owing error a value	actual	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Int32
60F4h	Access	RO	Mapping	TPDO	Related Mode	PP/HM/CSP	Data Range	-	Default	0
Indicates	cates the position deviation (reference un		t).							

Index	Name	Posit	ion demand	value*	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Int32
60FCN	Access	RO	Mapping	TPDO	Related Mode	PP/HM/ CSP	Data Range	-(Encoder unit)	Default	-
Indicates	s the posi	tion ref	erence (enco	oder unit).					
If no war	ning is de	etected	when the S-	ON signa	l is active, the relat	ion between t	he position r	eference in ref	erence unit	and
that in e	ncoder u	nit is as	follows:							
60FCh (e	ncoder u	nit) = 60	062h (referei	nce unit)	x 6091h					

Index	Name		Digital input	S	Setting Condition & Effective Time	-	Data Structure	VAR	Data Type	Int32
60FDN	Access	RO	Mapping	TPDO	Related Mode	PP/HM/CSP	Data Range	-	Default	0
Indicates	s curren	t DI logic	c of the drive							
0: Inactiv	/e									
1: Active										
The DI si	gnal inc	icated b	y each bit is	describe	d as follows:					
Bi	t					Signal				
0		1: Rever	se overtrave	active						
1		1: Forwa	ard overtrave	l active						
2		1: Home	signal active	9						
3 to	15	N/A								
16	5	1: DI1 in	put active							
17	7	1: DI2 in	put active							
18	3	1: DI3 in	put active							
19)	1: DI4 in	put active							
20)	1: DI5 in	put active							
21 to	26	N/A								
27	7	1: STO1	signal input							
28	3	1: STO2	signal input							
29	9	1: EDM c	output active							
30 to	31	N/A								

Index	Name	l	Digital outpu	ts	Setting Condition & Effective Time	-	Data Structure	ARR	Data Type	Int32
60FEh	Access	-	Mapping	Yes	Related Mode	-	Data Range	OD Data Range	Default	OD Default Value
Indicates	s the curr	ent DO	logic of the s	servo driv	/e.					

Sub- index	Name	Hi	Highest sub-index supported		Setting Condition & Effective Time	-	Data Structure	-	Data Type	Uint32
Un	Access	RO	Mapping	No	Related Mode	-	Data Range	-	Default	2

Sub- Name		Physical outputs			Setting Condition & Effective Time	During running & At stop	Data Structure	-	Data Type	Uint32		
1h	Access	RW	Mapping	RPDO	Related Mode	-	Data Range	0 to (2 ³² - 1)	Default	0		
Indicates	Indicates the DO logic.											
The sign	The signal indicated by each bit is described as follows:											
I	Bit		Related Sign	al	Description							
0 t	o 15		N/A		-							
	16		DO1		Forced output (0: OFF; 1: ON), only when H0D-17 is set to 4 and bit16 of 60FE-02 is set to 1							
	17		DO2		Forced output (0: OFF; 1: ON), only when H0D-17 is set to 4 and bit17 of 60FE-02 is set to 1							
	18		DO3		Forced output (0: OFF; 1: ON), only when H0D-17 is set to 4 and bit18 of 60FE-02 is set to 1							
19	to 25		N/A		-							
:	26	(Gain switchov	/er	Switched between P and PI, only when bit26 of 60FE-02 is set to 1							
27	to 31		N/A		-							

Sub- index	Name	e Bit mask			Setting Condition & Effective Time	During running & At stop	Data Structure	-	Data Type	Uint32		
2h	2h Access RW		Mapping	No	Related Mode	-	Data Range	0 to (2 ³² - 1)	Default	0		
Defines whether to enable the forced DO function.												
The signal indicated by each bit is described as follows:												
Bi	t	Re	lated DO		Description							
0 to	15		N/A	-	-							
16	6		D01	HOD	H0D-17 = 4, forced DO1 output enabled							
17	7		DO2	HOD	H0D-17 = 4, forced DO2 output enabled							
18	3		DO3	HOD	H0D-17 = 4, forced DO3 output enabled							
19 to	25		N/A	-								
26	6	Gain	Gain switchover Swi		Switchover between P and PI enabled							
27 to	31		N/A	-								

Index 60FFh	Name	-	Target veloci	ty	Setting Condition & Effective Time	During running & At once	Data Structure	VAR	Data Type	Int32
	Access	RW	Mapping	Yes	Related Mode	PV/CSV	Data Range	-2 ³¹ to +(2 ³¹ - 1)	Default	0
Defines the target velocity in PV and CSV modes. The maximum operating speed of the motor in CSV mode is determined by the maximum motor speed.										

Index 6502b	Name	ame Supported drive modes Cor Effect			etting Idition & Itive Time	-	Data Structure	VAR	Data Type	Uint32		
050211	Access	RO	Mapping	No	Rela	ted Mode	-	Data Range	-	Default	941	
Indicates	s the ope	ration n	nodes suppo	rted by th	ne serv	o drive.						
								Supporte	ed or Not			
bit	Description							0:1	No			
								1: \	'es			
0	Profile position (PP) mode					1						
1	Velocity (VL) mode				0							
2	Profile velocity (PV) mode						1					
3	Profile	torque	(PT) mode			1						
4	N/A					0						
5	Homin	g (HM) r	mode			1						
6	Interpo	plated p	osition (IP) n	node		0						
7	Cyclic s	synchro	nous positio	n (CSP) n	node	1						
8	Cyclic synchronous velocity (CSV) mode				1							
9	Cyclic synchronous torque (CST) mode				1							
10 to 31	Manufacturer-specific				Reserved and undefined							

If 6502h is supported, you can obtain the supported drive modes through 6502h.

2.6 Application Cases

2.6.1 AM600 Series Controller as the Host Controller

This section describes how to configure the SV660N series servo drive for working with the AM600 series controller.



Figure 2-9 Configuration flowchart

Opening the software and creating an AM600 project

Select AM600-CPU1608TP, as shown in the following interface.

🛅 New Proj	ect 📃 🗮						
Categories	: <u>T</u> emplates: 'aries jects Standard project						
A project co	Intaining one device, one application, and an empty implementation for PLC_PRG						
<u>N</u> ame:	SV660NTEST						
Location:	C:\Users\Administrator\Desktop\SV660TEST\AM600						
	OK Cancel						
Standard Pro	ject 🗾						
	You are about to create a new standard project. This wizard will create the following objects within this project: - One programmable device as specified below - A program PLC_PRG in the language specified below - A cyclic task which calls PLC_PRG - A reference to the newest version of the Standard library currently installed.						
1	2evice: AM600-CPU 1608TP/TN (Shenzhen Inovance Control Technology) ▼ 2LC_PRG in: Ladder Logic Diagram (LD) ▼						
	OK Cancel						

Adding the SV660N servo drive as slave

Open the network configuration and import the ECT file of SV660N. Add an SV660N servo drive as a slave, as shown in the following interface.



Configuring PDO

Select **Enable Expert Settings** and configure PDOs in the process data as needed. In this case, CSP is used as the operation mode and the default values of 1600 and 1A00 are used for PDO parameters.

Devices v 4 X	🖉 Network Configuration	InoSV660N x
SV660WTEST Device (AM600-CPU 1608TP/TN)	General	Address Additional
- S Device Diagnosis - M Network Configuration	Process Data	AutoInc Address D T D D D D D D D D D D D D D D D D D
EtherCAT Config EtherCAT Config	Startup parameters(SDD)	/ Distributed Clock
B B PLC Logic	Online	Select DC DC-Syndrron •
C Application Distance Manager	CoE Online	I enable 4000 Sync Unit Cycle (µs)
PLC_PRG (PRG)	Servo Function Code	Sync0:
= 😵 ETHERCAT	ESC Register	Sync Unit Cycle x 1 Vycle Time (µs)
ETHERCAT.EtherCAT_Task	EtherCAT I/O Mapping	🕒 User Defined 0 🚊 Skift Time (µs)
PLC_PRG	Status	Sync1:
HIGH_SPEED_IO (High Speed IO Module)	Information	(i) Sync Unit Cycle x 1 - 4000 🔅 Cycle Time (µs)
ETHERCAT (EtherCAT Master)		User Defined 0 Shift Time (µs)
Axis (Axis)		D Startup checking D Timeouts
		DC cyclic unit control: assign to local µC
		D Watchdog

Devices - 7 X	Network Configuration	InoSV660N X								
- Device (AM600-CPU 1608TP/TN)	General	A A A A A A A A A A A A A A A A A A A	Palata Callanas Disalas All	- Lord B	do more e			Out(Byte): 12.0	
Device Diagnosis		add gedit	Collapse Display All	· Load P	00 PD0	Assign 🛛	PD0 Config	PDO Len In(B)	te): 28.0	
- M Network Configuration	Process Data	In/Out	Name	Index	SubIndex	Len	Type	Flag	SM	
The EtherCAT Config	Darture environmentary(EDO)	* 🕐 🗘 Utput	Outputs	16#1600	16#00	8.0		Editable		
Et Lawbor Conta	Startup parameters(300)	🛞 📝 🤜 Output	Outputs	16#1701	16#00	12.0		F	2	
The cocasts coring	Online	- 🗹 🄿 Qu	Controlword	16#6040	16#00	2.0	UDNT			
III - OH PLC Logic	Comme	🗹 🃫 Ou	Target position	16#607A	16#00	4.0	DONT			
Application	Coll Online	- 📝 🌳 Qu	Touch probe function	16#6088	16#00	2.0	UDNT			
- Division	coe onine	- 🗹 🌳 Ou	Physical outputs	16#60FE	16#01	4.0	UDINT			
PLC PRG (PRG)	Course Reportions Courts	🛞 🔝 🌩 Output	Outputs	16#1702	16#00	19.0		r		
	Serve Pancalon Code	🛞 🛄 🔶 Output	Outputs	16#1703	16#00	17.0		F		
- Igg Task Configuration	PCC During the	🛞 🔄 🍁 Output	Outputs	16#1704	16#00	23.0		F		
🗏 🐉 ETHERCAT	ESC Register	🕸 🖂 🔶 Output	Outputs	16#1705	16#00	19.0		F		
ETHERCAT.EtherCAT_Task	Discont 1/0 Manalas	🛞 🔄 🔶 Input	Inputs	16#1A00	16#00	22.0		Editable		
😑 😒 MainTask	EtherCk T t/O Mapping	😑 🗹 💝 Input	Inputs	16#1801	16#00	28.0		۴	3	
- #1 mic mic			Error code	16#603F	16#00	2.0	LONT			
Weig PDC_PRo	Status	- 🗹 🔶 Input	Statusword	16#6041	16#00	2.0	UDNT			
SoftMotion General Axis Pool		- 🗹 🔶 Input	Position actual value	16#6064	16#00	4.0	DINT			
 HIGH_SPEED_IO (High Speed IO Module) 	Information	- 🗹 🔶 Input	Torque actual value	16#6077	16#00	2.0	INT			
ETHERCAT (EtherCAT Master)		🖉 🔶 Input	Following error actual value	16#60F4	16#00	4.0	DINT			
- FI toosuseen (suse) tour 10 (4)		- 🗹 🔶 Input	Touch probe status	16#6089	16#00	2.0	UDNT			
B.O (r)		- Input	Touch probe pos 1 pos value	16#608A	16#00	4.0	DINT			
Axis (Axis)		- 🗹 🔶 Input	Touch probe pos2 pos value	16#60BC	16#00	4.0	DONT			
		🔤 💛 🖓 🖓 Input	Digital inputs	16#60FD	16#00	4.0	UDINT			
		🕀 🛄 🔶 Input	Inputs	16#1B02	16#00	25.0		F		
		Lat. Hill Arean A	Talah da	10.41000	10,000	20.0		-		
	Messages - Total 0 error(s), 0 warnin	ng(s), 0 message(s)								* 0
			 O error(s) 0 warning(s) 	0 messagel	a × ¥					
(III)) () () () () () () () (• • • • • • • • • • • • • • • • • • •							

Configuring axis parameters

1. Set the software position limit and the operation mode in basic axis settings.

Devices 👻 🖛 🛪	Network Configuration	InoSV660N	∀ Axis x		
= 👌 sveeavrest	1				
Device (AM600-CPU 1608TP/TN)	General Setting	Axis type and Limit	5		
— Q Device Diagnosis	Scaling	🔲 Virtual mode	Software limits	Velocity ramp type	
W Network Configuration			Activate Negative 0.0 puls	e 🖲 Trapozoid	
EtherCAT Config	Homing Setting			in sin ²	
- Eu LocalBus Config		Modulo	Positive 1000.0 puls	e a la companya da companya	
= 11 PLC Logic	Mapping/Uther Setting			Quadratic	
Application	Commissioning		Software error reaction	Quadratic(smooth)	
Library Manager	CH 0.00 FTG 0.000 COM0 1/0	Finite	Deceleration 0 pu	lse/s ²	
PLC_PRG (PRG)	Mapping			Identification	
Task Configuration	Outur		Max Distance 0 pul	se ID 0	
= (SP ETHERCAT					
- WI EINERGALEBIECAL TASK	Information	CNC Dynamic li	nits	Position lag supervision	
		Vel : pulse/s	Acc : pulse/s2 Dec : pulse/s2 Jerk : pulse/	si Deactivated •	
SoftMation Conneral Asia Deal		30	1000 1000 100	0 Lag limit 1.0 pulse	
HIGH SPEED TO (High Speed to Module)					
B ETHERCAT (EtherCAT Master)					
- (iii InoSV660N (SV660 LAxis V0.04)					
EL Axis (Axis)					

2. Select 16#800000 for the 23-bit encoder and 16#100000 for the 20-bit encoder during unit conversion. In this case, the single-turn travel distance is set to 60 mm and 1 mm/s equals to 1 RPM of the motor.



3. Select the homing mode according to actual needs. For details, see section "Introduction to the Homing mode" in SV660N Series Servo Drive Function Guide for details.

Devices v q X	Sk Network Configuration	InoSV660N / Se Axis x	•
S > SY660/TEST S S > SY660/TEST S	General Setting Scaling	Homing Setting Homing methods [Homing Methods 35 v] Postion methods [Absolute v	-
EtherCAT Config	Homing Setting	Homing Vel 10 mm/s Acceleration 100 mm/s ²	
BI PLC Logic	Mapping/Other Setting	Homing Crawl Vel 2 mm/s Time Limit 50000 *10ms	
Application Dirary Manager	Commissioning		
PLC_PRG (PRG) Task Configuration Gradient Configuration	Mapping Status		E
Hercat_EtherCat_Task MainTask	Information	Homing Mathed 35 Current position as the machanical	
SoftMotion General Axis Pool		origin point , triggering back to zero	
ETHERCAT (EtherCAT Master) InoSV660N (SV660_1Axis_V0.04)			
Nois (Axis)			
			-

Adding a program

Add a program to control the servo axis position, as shown in the following interface.

Devices	→ 4	×	🛞 Network Configuration 🗙
SV660NTEST			督Copy 曾Paste 命 Delete 約
E Device (AM600-CPU16	08TP/TN)		
🔍 Device Diagnosis			the second s
🗏 쑸 Network Configura	ation		
📲 EtherCAT Con	fig		Ų 📬
🧤 🗐 LocalBus Conf	ìg		
🖻 📳 PLC Logic		233 (223)	Alarm configuration
= 🔅 Applica 🕞	Copy	62	Axis Group
👘 Libra 👘	Basta	8	Cam table
PLC 👘	Paste	ø	CNC program
🖻 🎆 Task 💩	cut		CNC settings
⊡ 🕸 🗙	Delete	2	DUT
c	Browse •		External File
÷ ♦ 🕞	Properties	1	Global Variable List
N	Add Object 🔹 🕨	e	Image Pool
	Add Folder	÷	Interface
	Edit Object	2	Network Variable List (Receiver)
	Edit Object With	1	Network Variable List (Sender)
Ax	Collapse Application	T	Persistent Variables
Ce Ce	Login	≞	POU
-7	3	₽	POU for implicit checks
		A,	Recipe Manager
		•	Symbol Configuration
			Text List
POUs 😤 Devices		a\$	Trace
Config Device Information C	utput	2	Trend recording manager
		0	Unit conversion

• Implement basic functions such as enabling, homing and positioning through adding function blocks.

Devices 👻 🕂 🗙	PC	U 🗙 📑 PLC_PRG 🛛 🎒 GVL	-
SV660NTEST	1	PROGRAM POU	~ <u>B</u>
Device (AM600-CPU 1608TP/TN)	8 2	VAR	
Device Diagnosis	3	MC_Power_0: MC_Power;	
Metwork Configuration	4	MC_Power_1: MC_Power;	
EtherCAT Config	5	ML_nome_0: NL_nome;	100 % 🕅 -
Locality Config	1	网络注释	*
E Fill processo		MC_Power_1 MC_Home_0	MC_Reset_0
and PLC Logic		gb_test MC_Power MC_Home	MC_Reset
Application		Avis Axis Status oh nowerok Avis Axis Done A	vis Axis Done -
GVL		TRUE Enable bRegulatorRealState gb_home Execute Busy gb_Res	et Execute Busy
Library Manager		gb_powerOnbRegulatorUn_bDriveStartRealStatePosition_CommandAborted	Error -
PLC_PRG (PRG)		Error - ErrorID -	
POU (PRG)		ErrorID	
E 🧱 Task Configuration	2	re délaire	
🖻 🍪 ETHERCAT	-	MC Halt 0 MC Step 0	
ETHERCAT.EtherCAT_Task		ob preversk MC Halt MC Stee	
- B) POU		EN ENO	
- Ste MainTask		Axis Axis Done gb_HaltOK Axis Axis Done	
- BIPIC PRG		ad haltdec Deceleration CommandAborted and stopdec Deceleration Error	
SoftMation General Avir Pool		-Jerk ErrorJerk ErrorID-	
		Choid –	
The second of th	3	网络洋野	
ETHERCAT (EtherCAT Master)		MC_MoveRelative_0 MC_MoveAbsolute_0	1.0
InoSV660N (SV660_1Axis_V0.04)			TT 00 70 [SA *
Axis (Axis)			

• To implement directed motion through the logic program, some variables may need to be called to different POUs. Therefore, set the variables as global variables.



PLC_PRG
 SoftMotion General Axis Pool

Compiling

After compiling the program, click the icon indicated by the red square box to check whether the program is correct.



Downloading and commissioning

 After checking that the program is correct, download the program to PLC. The program can be activated after running. Before downloading, scan the PLCs first to select the PLC to be downloaded, and then click the download icon, as shown in the following interface.

2. After log-in, ensure the servo drive and the axis are in normal state.



3. Monitor critical parameters through the monitoring function. Start the testing program to perform basic tests such as enabling, homing and positioning.



4. After the testing is done, perform directed running program.



2.6.2 Omron NX1P2 Controller as the Host Controller

This section describes how to configure the SV660N series servo drive for working with an Omron NX1P2 controller.



Figure 2-10 Configuration flowchart

Installing the Sysmac Studio software

It is recommended to install the Sysmac Studio software of V1.10 or later.

Importing the xml file

It is recommended to import the device description file of "SV660_1Axis_V0.04-0506. xml" or later version. The file path is as follows: OMRON\Sysmac Studio \IODeviceProfiles\EsiFiles\UserEsiFiles.

If the xml file is saved under this path for the first time, the Sysmac Studio software must be restarted.

Setting the network connection attribute

- If the PC is connected to the controller through an USB, skip this step.
- If the PC is connected to the controller through Ethernet, set the TCP/IP attribute of the PC, as shown below.

Internet Protocol Version 4 (TCP/IP)	/4) Properties	? ×
General		
You can get IP settings assigned autor this capability. Otherwise, you need to for the appropriate IP settings.	natically if your network suppo ask your network administrat	orts tor
C Obtain an IP address automatical	lly	
• Use the following IP address:		
IP address:	192 . 168 . 250 . 2	
Subnet mask:	255 . 255 . 255 . 0	
Default gateway:		
C Obtain DNS server address autor	natically	
• Use the following DNS server add	resses:	
Preferred DNS server:		
Alternate DNS server:		
Validate settings upon exit	Advance	d
	ОК Са	ancel

Configuring the servo drive

Recommended version:

Use MCU software version of 0900.0 (H01-00 = 0900.1) or later for SV660N series servo drives.

Use FPGA software version of 0902.1 (H01-01 = 0902.1) or later for SV660N series servo drives.

Pay attention to the setting of H0E-21.



Creating a project

Device: Select the device according to the actual controller model.

Version: Use V1.09 or later versions. NX1P2-1140DT supports V1.13 only.

Offline	Project Pro	onerties	i i i i i i i i i i i i i i i i i i i	
🛃 New Project	Project name	New Project		
🗁 Open Project	Author	Administrator		
é [₽] Import				
ିଲ୍ଲ Export	Comment			
Online				
4 Connect to Device	Type	Standard Project		
Version Control	la .			
🚯 Version Control Explorer	Select D	evice		
License	Category	Controller		
📼 License	Device	NJ501	v - 1300	
	Version	1.10		
				Create

Communication setting

After entering the main interface, set the connection mode between the PC and the controller in **Controller > Connection type**.

- 1) Select **Remote connection via USB** to perform **USB Communication Test** directly. If the test is succeeded, proceed to the next step.
- 2) Select **Ethernet connection via a hub**, in this case, set the IP address to 192.168.250.1 (controlled by NX), and then perform **Ethernet Communication Test**. If the test is succeeded, proceed to the next step.



Scanning the device

Switch the controller status to ONLINE and RUN mode.

1. Observe the controller status in the lower right corner, which is **ONLINE** and **RUN mode**.



2. A prompt window appears if it is a new controller.

3. Click **Yes** in the window displayed. The name shown in the window is the project name.

Scan the devices and add slaves.

Right click **Configurations and Setup→EtherCAT > Master**, and select **Compare and Merge with Actual Network Configuration**. The controller scans all the slaves in the network (an error will be reported if the station number is 0). After scanning, click **Apply actual network configuration** in the pop-up window to add the slave. You can view the slaves added in the main page.







Setting parameters

Switch the controller to the offline mode and set PDO mapping, axis parameters, and distributed clock.

Setting PDO mapping

1. Setting the PDO mapping.

THE DELICITIES		Taalbo
Mada Addara Matarakara Caratar		↓ Toolbo
Node Address (Network configuration		Group
Master	Item name	Value
1 IndSV660N Rev0x00010000	PDO Map Settings	000FEDI 295H reserve F PAIE 0x603F00 255H transmit. Dx603F00 255H transmit. 0x603F00 255H transmit. Dx605400 255H transmit. 0x607400 255H transmit. Dx607400 255H transmit.
	Enable Distributed Clock Shift Time Setting Reference Clock Setting Parameters	Edit PDO Map Settings Enaulus (CC Synchron) Disabled Exist
	PDO Map Settings The data is input/output p (PDO) communications.	eriodically by the process data

2. Select the editable RPDO and TPDO provided by SV660N for configuration.

📓 Edit PD	O Map Setting	gs	_			_				x
PDO Map				l	PDO entries i	ncluded i	in 258th re	ceive PDO Map	ping	
	Process	s Data Size : Input 224 [bit] / 1	.1472 [bit]		Index	Size	Data type	PDO ent	try name	lCc
Selection	Input/Output	Name			0x6040:00	16 [bit] 32 [bit]	DINT	Controlword	0	
		No option			0x60B8:00	16 [bit]	UINT	Touch probe f	unction	
Ŏ	Output	1st receive PDO Mapping	Editable		0x60FE:01	32 [bit]	UDINT	Physical outpu	ts	
Ο	Output	258th receive PDO Mapping								
	Output	259th receive PDO Mapping								
	Output	260th receive PDO Mapping								
	Output	261th receive PDO Mapping								
	Output	262th receive PDO Mapping								
		No option								
	Input	1st transmit PDO Mapping	Editable							
0	Input	258th transmit PDO Mapping								
	Input	259th transmit PDO Mapping								
	Input	260th transmit PDO Mapping								
	Input	261th transmit PDO Mapping								
					<	_	_			
						Mo	ove Up	Move Down	Alig	n
					Edit PDO	Entry	Add PD	O Entry D	elete PDO I	Intry
								OK Ca	incel A	pply

3. Modify the PDO mapping object through **Add PDO Entry** and **Delete PDO Entry**. The commonly used mapping parameters are shown in the following interface.

Index	Size	Data type	PDO entry name
0x603F:00	16 [bit]	UINT	Error code
0x6041:00	16 [bit]	UINT	Statusword
0x6064:00	32 [bit]	DINT	Position actual value
0x6077:00	16 [bit]	INT	Torque actual value
0x60F4:00	32 [bit]	DINT	Following error actual value
0x60B9:00	16 [bit]	UINT	Touch Probe Status
0x60BA:00	32 [bit]	DINT	Touch Probe pos 1 pos value
0x60BC:00	32 [bit]	DINT	Touch Probe pos 2 pos value
0x60FD:00	32 [bit]	UDINT	Digital inputs

Setting axis parameters

1. Click Motion Control Setup, and right click Axis settings , then click Add > Motion Control Axis, as shown in the following interface.

S New Project - new_Controller_0 - Sysmac Studio			- C - X
File Edit View Insert Project Controller Simulation Tools Window Help			
X ● 審 曲 つ ⊂ 個 一部 K 益 応 局 崇 林 ◎ K A ≫ み ⊗ 今 雪 ○ 일 ?	I Q Q K		
Multiview Explorer 🗸 🔻 🗰 EtherCAT 🗙		<u> </u>	Toolbox - 7
new_Controller_0			<search> 🔻 🔎 🗙</search>
Configurations and Setup	Item name	Value	^
▼ W EtherCAT		0x60FEI01 258th receive P 0x603F:00 258th transmit	
L - Nodel : 15620N (600		0x6041:00 258th transmit	
S₁ CPU/Expansion Racks	PDO Map Settings	0x6077:00 258th transmit	
e* VO Map		0x60F4:00 258th transmit	
▼ at Controller Setup		0x608A:00 258th transmit	
L III Operation Settings		0x608C:00 258th transmit 0x60ED:00 258th transmit	
L ger Built-In Etherweider ►		Edit PDO Map Settings	
	Enable Distributed Clock	Enabled (DC-Synchron)	
1. A Avec Groun Setting Add Motion Control Axis	Shift Time Setting Reference Clock	Disabled	
er Cam Data Settings	Setting Parameters		
▶ Event Settings MC Monitor Table	PDO Man Settings		
Its Settings Axis Setting Table	The data is input/output per	iodically by the process data	
🔁 Data Trace Settings	(PDO) communications.		
V Programming	L		
▼ # POUs			
V 31. Programs Build		• 9 ×	
Veii Programu Statemore (Naturenos			
L'el Section I I Description I Program I Location I			
L/II: Function Blocks			
▶ m Data			
► 🖿 Tasks			
🖬 Filter 💽 🚰 Output 🧭 Build			

- 2. MC_Axis000 can be renamed through a simple click. For example, if it is named as "Rewind axis", the axis variable "Rewind axis" used in the NX program represents control on this SV660N servo axis.
- 3. Double-click **MC_Axis000** and configure the SV660N device of the corresponding station in the corresponding basic axis setting interface.
 - a. Axis assignment

EtherCAT	🗙 💞 MC_Axis000 () ×		
薇	Axis Ba	asic Settings		
	Axis number	1		
щщи	Axis use	Used axis 🔻		
₩ Ŧ	Axis type	Servo axis 🔻		
	Feedback control	No control loop		
	Input device 1	<not assigned=""></not>	Channel	
$(\mathbf{t} \bullet)$	Input device 2	<not assigned=""></not>	Channel	
	Output device 3	<ivot assigned=""></ivot>	Channel	
	Output device 2	<not assigned=""></not>	Channel	
	Output device 3	<not assigned=""> 🔻</not>	Channel	T
•	Detailed Setting	35		
٢				
TH -	<			

- **Axis number**: Represents the Ethernet communication station No. of the servo drive, which is also the value of H0E-21.
- Axis use: Represents the axis in use.
- Axis type: Represents the servo axis.
- **Output device 1**: Select the SV660N servo drive.
- b. Detailed settings

• Select the PDO mapping objects according to the preceding step "Setting parameters", which is to assign the output parameters (controller to device) and input parameters (device to controller). Note that the object name, node number, and index number must be set correctly. Each mapping object selected in the preceding step "Setting parameters" must be assigned correctly. Otherwise, an error will be reported.

Function	Name	Device		Process Data			
 Output (Controlle 	r to Device)						
★ 1. Controlword		Node : 1 InoSV660N(E001)	6040h-00.0(259th rece			
★ 3. Target position		Node : 1 InoSV660N(E001	l) 🔻	607Ah-00.0(259th rece			
5. Target velocity		<not assigned=""></not>	- -	<not assigned=""></not>	\mathbf{v}		
7. Target torque		<not assigned=""></not>	▼	<not assigned=""></not>	$\overline{\mathbf{v}}$		
Max profile Velo	ocity	<not assigned=""></not>	▼	<not assigned=""></not>	$\mathbf{\nabla}$		
11. Modes of oper	ation	Node : 1 InoSV660N(E001) 🔻	6060h-00.0(259th rece			
15. Positive torque	limit value	<not assigned=""></not>		<not assigned=""></not>	$\mathbf{\nabla}$		
16. Negative torqu	ie limit value	<not assigned=""></not>	•	<not assigned=""></not>	V		
21. Touch probe fu	unction	Node : 1 InoSV660N(E001) 🔻	60B8h-00.0(259th rece			
44. Software Switc	h of Encoder's Input	<not assigned=""></not>	•	<not assigned=""></not>			
+ Input (Device to C	Controller)						
+ Digital inputs							
The combinations of MC Function Module functions and process data are changed. When changing the combinations, please confirm that they behave as intended. Invalid combinations may cause unexpected operations of the equipment and machines.							

• 60FDh must be mapped to the same as that in the Omron controller, as shown in the following interface. bit0...bit2 of SV660N indicate the negative position limit, positive position limit, and the home respectively. bit16...bit20 indicate the status of DI1...DI5.

	-			
28. Positive limit switch	Node : 1 InoSV660N(E001)	•	60FDh-00.1(Inputs_Digital inputs_60FD_00)	V
29. Negative limit switch	Node : 1 InoSV660N(E001)		60FDh-00.0(Inputs_Digital inputs_60FD_00)	\mathbf{T}
30. Immediate Stop Input	<not assigned=""></not>		<未分配>	$\overline{}$
32. Encoder Phase Z Detection	<not assigned=""></not>		<未分配>	$\mathbf{\nabla}$
33. Home switch	<not assigned=""></not>		60FDh-00.2(Inputs_Digital inputs_60FD_00)	$\mathbf{\nabla}$
37. External Latch Input 1	Node : 1 InoSV660N(E001)		<未分配>	$\overline{\mathbf{v}}$
38. External Latch Input 2	<not assigned=""></not>		<未分配>	∇

Note

As restricted by configurations of Omron software tool, axis configuration for SV660N series servo drives needs to be performed manually.

Unit conversion setting

Set **Command pulse count per motor rotation** based on the resolution of the motor encoder (example: 8388608 PPR for motor equipped with 23-bit encoder). For the convenience of commissioning, set the **Work travel distance per motor rotation** to 60 mm/rev, indicating 1 mm/s equals to 1 RPM of the motor.

R	Unit Conversion Settings
■ ++ +	Unit of display pulse mm um nm degree inch Command pulse count per motor rotation 8388608 pulse/rev Work travel distance per motor rotation 60 mm/rev Reference: Unit conversion formula
3	Number of pulses [pulse] = Command pulse count per motor rotation [UDINT] * Travel distance [Unit of display] Work travel distance per motor rotation [LREAL]

Select **Unit of display** based on the actual operation unit and set the gear ratio. All the position-type parameters in the host controller will be displayed in this unit.

Operation settings

¢ر ا	Operation Settir	ngs			
	Velocity/Acceleration/Deceler	ation			<u>^</u>
₩₩₩ ₩₩₩	Maximum velocity Start velocity Maximum iog velocity	600 m 0 m 600 m	m/s Veloc m/s m/s	ity warning value	0 %
3	Maximum acceleration Maximum deceleration Acceleration/deceleration over Operation selection at Reversing	0 m 0 m Use rapid acceleratio Deceleration stop ▼	m/s^2 Accelerati m/s^2 Decelerati n/deceleration (Blending is char	on warning value	0 % 0 %
ج	▼ Torque Positive torque warning value	0 %	Negative torq	ue warning value	0 %
	 Monitor 				
Ø	In-position range Actual velocity filter time constant	10 m 0 m	m In-pa s Ze	sition check time no sition range no sition sitis sitis sitis sitis site site site	0 ms 0 mm
ш					

- Velocity/Acceleration/Deceleration: Set the maximum speed of the load (if the motor speed converted exceeds 6000 RPM, a parameter setting error, which is marked by a red box, will be reported by the host controller software) according to actual conditions. If the acceleration/deceleration rate is 0, the motion profile will be generated based on the maximum acceleration/deceleration rate (there is no need to set the acceleration/deceleration rate in general cases).
- **Torque**: If the warning value is 0, no warning will be reported. There is no need to set the warning value in general cases
- Monitor: Set the In-position range and Zero position range based on actual motor and mechanical conditions. An excessively low setpoint may result in positioning or homing failure.

Position limit


You can use the function of software position limit. The software position limit will be activated after homing.

Homing

Homing Se	ettings		
▼ Homing Method			
- Ha Homin	Homing method Zer ome input signal Use og start direction Pos	o position preset ▼ Z-phase input as home ▼ tive direction ▼ Operation selection at positive limit input Reverse to	
Home input de	tection direction Pos	tive direction 🔻 Operation selection at negative limit input Reverse tu	ł
Home P Ne	e proximity signal Z-phase input Positive limit input agative limit input		
<		>	

The homing method involves cooperation between the servo drive and host controller. Set the homing method based on the following table.

Description of NX Software	Servo Drive Function	Terminal Configuration
Home proximity signal	Home switch (FunIN.31)	-
Positive limit input	P-OT (FunIN.14)	DI1
Negative limit input	N-OT (FunIN.15)	DI2

Select the homing method of the host controller and set the homing speed, acceleration, and home offset based on actual mechanical conditions.

- Introduction to homing Function block: MC_Home and MC_HomeWithParameter
 - 1. Set MC_Home in the preceding figure and MC_HomeWithParameter in the function block.
 - 2. The two function blocks both include 10 types of homing methods.

MC_Home	MC_HomeWithParameter
Proximity reverse turn/home proximity input OFF Proximity reverse turn/home proximity input ON Home proximity input OFF Home proximity input ON Limit input OFF Proximity reverse turn/home input mask distance Limit inputs only Proximity reverse turn/holding time No home proximity input/holding home input Zero position preset	Designate the homing action to be modified. 0: Promixity reverse turn/home proximity input OFF 1: Proximity reverse turn/home proximity input ON 4: Home proximity input OFF 5: Home proximity input ON 8: Limit input OFF 9: Proximity reverse turn/home input mask distance 11: Limit inputs only 12: Proximity reverse turn/holding time 13: No home proximity input/holding home input 14: Zero position preset

- Home proximity input OFF: The search for the home signal starts after the falling edge of the home proximity switch is reached.
- Home proximity input ON: The search for the home signal starts after the rising edge of the home proximity switch is reached.
- **Proximity reverse turn**: The home proximity signal is ON when homing starts, and reverse running applies after the falling edge of the home proximity signal is reached.
- Home input mask distance: The home signal is masked by the host controller within the set distance after receiving the homing signal (for example, edge change of home proximity signal), and the home signal is received only after the set distance is passed.
- Holding time: The home signal is masked by the host controller within the set period of time after receiving the homing signal (for example, edge change of home proximity signal), and home signal is received only after the set period of time elapses.
- Zero position preset: The home offset is being written to the position reference/ position feedback in the host controller with current position as the home and motor at a standstill.

Note

The low-speed searching for the home signal applies in all the homing methods. In case of operations at high speed, the home signal is hidden during decelerating from high speed to low speed.

Distributed clock

The default clock is 1 ms. The synchronization clock (cycle of primary fixed-cycle tasks) named "PDO communication cycle" can be modified in **Task Settings**. The modification will be activated after switching to the online status at next power-on.

Task Settings		
Task Type	Task Name	Period/Execution CDetailed Execution Task Period ExceedTask Timeout Dete Exe Varial
🖿 Priority-4 Primary Periodic Task	PrimaryTask	4ms 🔻 Detect 💌 20ms(Period 💌 04 3
+ a		

Program-controlled servo operations

1. After configurations are done, you can control the servo operations through the PLC program.

If the **MC_POWER** module is used, it is recommended to add the servo status bit **MC_Axis000.DrvStatus. Ready** (MC_Axis000 is the axis name). This is to prevent the situation where the PLC program is running but the communication configuration is not done.



2. After all the settings and programming are done, switch to the online state, and



to download the program to the controller.

Click **Section** to use the synchronization function. This function serves to compare the difference between the current program and the program in the controller, allowing users to determine whether to download the program to the controller,

upload it from the controller " or leave it unchanged based on the difference.

You can monitor the data through the monitoring list or collect the data waveform by using the data tracking function during operation.



2.6.3 Beckhoff TwinCAT3 as the master

This section describes how to configure the SV660N servo drive for working with Beckhoff TwinCAT3.



Figure 2-11 Configuration flowchart

Installing the TwinCAT software

The TwinCAT3 software, which supports Windows7 32-bit or 64-bit systems, can be downloaded from the official website of Beckhoff.

Note

The Ethernet card must be 100 M Ethernet card equipped with Intel chip. If other brands are used, the EtherCAT operation may fail.

- 1. Copy the SV660N EtherCAT configuration file (SV660_1Axis_V0.04-0506) to the TwinCAT installation directory: TwinCAT\3.1\Config\Io\EtherCAT.
- 2. Open TwinCAT3 and create a New Twincat3 Project.



Installing the network adapter driver

Install the TwinCAT network adapter driver.

1. Open **Show Real Time Ethernet Compatible Devices...** in the menu shown in the following figure to display the following dialog box. Select local connection under **Incompatible devices**, and click **Install**.

FILE EDIT VIEW PROJECT BUILD DEBUG TW	INCAT TWINSAFE PLC TOOLS SCOPE WIND	DOW HELP		
: (O - O) 18 - 12 - 🖆 🔐 🎥 🐰 리쇼 2 - 🞼	Activate Configuration	TwinCAT RT (x64) - 🏓	- 🖓 🖋	5 ± 0 € ⊡ · .
🛛 Build 4022.20 (Losded - 🝦 🔐 🔝 🔜 🛷 🔍 🧰 🛄	Restart TwinCAT System			
Build BO220 (Losadd It') (L') (L') (L') (L') (L') (L') (L') (L	Andart I winch (typerf) Relact Twinch (typer) Relact Twinch (typer) Son Toggie Tree Kun State Show Ohio Dea Show Ohio Dea Show Ohio Dea Show Sub Items Show Sub Items Show Sub Items Show Sub Items Show Sub Items Show Reline Steffer Management. Access & Sto Couple/ID Inits Register Update firmaan/s (FRIOM		Arapantias IntraCAT Project IntraCAT Project IntraCAT Project IntraCAT Intr	False

2. After installation is done, the network adapter installed will be displayed under **Installed and ready to use devices(realtime capable)**.



Searching for devices

1. Create a project and start searching for devices.

Devices

Select

and click 📩 as shown below.

TwinCAT Project3 - Microsoft Visual Studio (Administrator))			
FILE EDIT VIEW PROJECT BUILD DEBUG TWING	AT TWINSAFE PLC	TOOLS SCOPE	WINDOW HELP	
	▶ Attach ×	- Releas	e 👻 TwinCAT RT (xt	54) - 🎜
Build 4022.20 (Loaded 🚽 🚽 🔐 🧱 🌉 🛷 🏹 🏟 🔯	<local></local>			
🔓 Solution Explorer 👻 🕈 🗙				
Š C C A O - 6 P				
Search Solution Explorer (Ctrl+;)				
Solution TwinCAT Project3 '(1 project) Solution TwinCAT Project3 Solution TwinCAT Project3 NOTION PIC SAFETY SAFETY C++ JOU Devices Mappings				
				- 4 ×
		🛕 0 Warnings 🛛 🕕	12 Messages Sea	arch Error List 🛛 🔎 -
	Description	File	Line 🔺 C	olumn Project

2. Click **OK**.

Microsoft Visual Studio
HINT: Not all types of devices can be found automatically
OK Cancel

3. Click **OK**.

یز کے اور کی اور کی اور کی اور کی اور کی اور کی کرد کرد. بازی P - P - P - P - P - P - P - P - P - P	1 new I/O devices found I new I/O devices found To Device 1 [EtherCAT Automation Protocol] 这地生物(TwinCAT-Intel PCI Ethernet A	Cancel Select All Unrelect All	ਵ = © ਲੇ ਲੇ	a (0
	Error List			
	Description		File	Line +

4. Click **OK**.

Error List ▼ ▼ ③ 0 Errors ▲ 0 Warnings ① 12 Messages [™] Search Error List P ▼ Description File Line ▲ Column Project	- م		Microsoft Visual Stud	lio poxes Cancel		
T + (8) 0 Errors (1) 0 Warnings (1) 12 Messages Search Error List (2) + Description File Line Column Project		Error List				+ 4 ×
Description File Line Column Project		▼ ▼ 🛞 0 Errors	0 Warnings 12	2 Messäges	Search Erro	r List 👂 🗸
		Description	File	Line 4	Column	Project

5. Click **OK**.

.م					
	ſ	EtherCAT drive(s) add	led		
		Append linked axis to:	NC - Configuration CNC - Configuration	OK Cancel	

6. Click Cancel.

	Microsoft Visual Studio	e Run Cancel			
Error List					Ψ×
🔻 🗕 🛞 0 Errors	🛕 0 Warnings 🛛 🕕 12 N	Messages "	Search Erro		- م
Description	File	Line 🔺	Column	Project	

7. The search for the device is done, as shown below.



Configuring servo drive parameters

Configure parameters through SDO communication in CoE - Online interface. When 200E-01h is set to 3, the parameter values modified through SDO communication will be saved upon power failure. To modify 6060h to CSP mode (8), follow the procedure shown in the following figure.

÷[Build 4022.20 (Loaded 🚽 🚽 🔛 🔝 📃 🖉 🔨 🗐 [9 t.								
Cla	Solution Explorer	×		-• X					Properties	
55 \									Drive 1 (Inos	V660N) SV660 1Avis)
íe.			Onlin	e NC: C	Inline	1 -	SC: Functio	240	D ¹ D	
		- م	General	EtherUAI IC	Process Data	Starte	ab Cou	- onurne	<u> </u>	
	🔺 🔤 Axis 1		Update L	ist Auto Update	📝 Single Vodat 🗏	Show DEE	line De		Misc	
									(Name)	Drive 1
	Þ ≃ Drive		Navateea						Disabled	SMDS_N
	Les Ctrl		Add to Star	tup Online Data	Wodale UD	UACE	Set Value	Dialog		X
	Inputs		Index	Kenn	Them	Kalue			_	De
	Outputs		Later Corn	Kali antia Cali		1	Dec:		\supset	OK
	PLC .		6057	Realt Beaction antion Co	da Ri	2	Hex	0x08		Cancel
	SAFETY		5050	Hodes of operation	RE P					
	C++		6061	Modes of operation displ	ay B0 P	8	Float:			
	4 🐖 I/O		6062	Position demand value	BO P					
	Cevices		6063	Position actual value*	BO P		Real			Her Edt
	Device 2 (EtherCAT)		- 6064	Position actual value	BO P		0000		· ·	THEN LOL.
	1mage		6065	Following error window	Rf P	0x01A	Binary:	0B		1
	Image-Info		6066	Following error time out	R# P	0x000	Bit Size:	0108	0 16 0 32 0	64 0 7
	Syncl Inits		6067	Position window	RM P	0x000		0.00	0.000	
	b Innuts		5058	Fosition window time	KA P	Ux0000		_		
	Dutruts		BUBU	Velocity actual value	NU F	0,000	6.00	-		
	b InfoData-									
	Drive 1 (InoSV660N)	-81						- + ×		
	A * Magning	- 11	🔻 🚽 🛞 0 Erro	urs 🗌 🗛 O Warnings 🗌 🍙	14 Messages			. م		
	Mappings Mortack 1 SAE - Davide 2 (EtherCAT)	, 111							MISC	
	NC Task 1 SAE - Device 2 (Control)		Description	n File	Line 4	Colu	mn Proje	ect		
	The ruse 1 SAL + Device 2 (EllerCAT)	× .								
	4	Þ.							Properties T	oolbox

Note

This operation is available only when H02-00 (Control mode) is set to 9 (EtherCAT mode).

Configuring PDO

Check **0x1600** and **0x1A00** as shown in the following figure. Change the current PDO only if it does not fulfill your needs. To modify the PDO, right-click on the **PDO**

Content window, click **Delete** to delete the redundant PDO or click **Insert** to add the PDO needed.

c Manager:										
Size Type Flags	Index	Size	Name		Flags	SM	SV			
256 MbxOut	0x1A00	22.0	Inputs			3	0			
256 MbxIn	0x1B01	28.0	Inputs		F		0			
8 Out	0x1B02	25.0	Inputs		F		0			
22 Inputs	0x1B03	29.0	Inputs		F		0			
	0x1B04	29.0	Inputs		F		0			
	0:1600	8.0	Outputs			2	> 0			
	0x1701	12.0	Outputs		F		0			
Assignment (0x1C12):	PDO Conte	nt (Ox160	00):							
x1600	Index	Size	Offs	Nane		Туре	Default .			
x1702 (excluded by 0x1600	0x604	2.0	0.0	Controlword		UINT				
x1703 (excluded by 0x1600	0x607	4.0	2.0	Target position		DINT				
x1704 (excluded by Ox1600	0x60B	2.0	6.0	Touch probe function	-	1111.010	-			
x1705 (excluded by 0x1600			8.0			Insert	\mathcal{A}			
wnload	Predefine	ad PDO As	signment:	(none)	×	Delete				
FDO Assignment	Load PDO	info fro	m device			Edit				
						Maria II.a	_			
PDO Configuration										
ist (🛠) 0 Errors 🗛 0 Warnin AT Project3 + X	ngs 🎧 14	4 Messac	qes Cle	ear		Move Dow	n	Search	Error List	
IPDD Configuration RT Project3 + X rel. EtherCAT DC Project	ngs 👔 14 ress Data S	4 Messad	qes Cle CoE - Onli	eer ne Online NC: Onlin	e NC: Fur	Move Op Move Down	n	Search	Error List	•
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Activating the configuration and switching to the RUN mode



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	🕨 🛄 Outputs		T -	🛞 Ö Err	rors	0 Warni	ings 🗻 🚺 1	4 Messa	ages

2. Click OK.



3. After you click **OK**, the device enters OP status as shown in the Online interface. Meanwhile, the 3rd LED on the keypad displays "8", and the keypad displays "_88RY".



Controlling servo drive operations

Control the servo drive through NC or PLC programs.

- 1. When operating in CSP mode
 - a. Set the unit.

Set the unit to **mm** during test.

Solution Explorer	▼ # × TwinCAT Project3 + ×
୦୦ଘାତ-ଗ ାନ –	General Settings Barameter Dynamics Online Functions Coupling Compensation
Search Solution Explorer (CH+;)	Prime To I/O Drive 1 (InuSVEGON) Link To I/O Drive 1 (InuSVEGON) Link To PLC Axis Type: CAMopen DS402/Frofile MDF 742 (e.g. EtherCAT CoE Drive) ▼ Vinit: mn Position: He Voit: mn/winn
 Inputs Inputs Inputs Inve Ctrl 	Remit Velocity: Acceleration: Jerk: nm nm/s nm/s2 nm/s3
	Axis Cycle Time / Access Divider Divider: 1 Cycle Time (ms): 2.000 Nodulo: 0 🚞
▲ 💭 1/0	

b. Set the scaling factor.

Solution Explorer 👻 🕈 🗙	TwinCAT Project3 🔹 🗙			
ු බ - ම ළ	General MC-Encoder Parameter Time Compensation Online			
Search Solution Explorer (Ctrl+;)		1	1	
NC.Task 1 SVB	Parameter	Offline Value		T. Unit
Timage	- Encoder Evaluation:			
Tables	Invert Encoder Counting Direction	FALSE	FALSE	в
Objects	< Scaling Factor Numerator	0.000007152557373	<u>9</u> .0001	F mm/INC
A B Axis 1	Scaling Factor Denominator (default: 1.0)	1.0	1.0	F
🕑 💉 Enc	Position Bias	0.0	0.0	F mm
Drive	Modulo Factor (e.g. 360.0*)	360.0	360.0	F mm
P Inputs	Tolerance Window for Modulo Start	0.0	0.0	F mm
Outputs	Encoder Mask (maximum encoder value)	OxFFFFFFFF	OxFFFFFFFF	D
PLC	Encoder Sub Mask (absolute range maximum va	0x000FFFFF	0x000FFFFF	D
SAFETY	Reference System	'INCREMENTAL'	'INCREMENTAL'	E
4 🔁 I/O	- Limit Switches:			

Scaling factor: Indicates the distance corresponding to the encoder pulses per position feedback.

For example, 8388608 PPR corresponds to a distance of 60 mm, and the scaling factor is: 60/8388608 = 0.000007152557373 mm/Inc.

c. Set the encoder feedback mode to **POSVELO**.

Solution Explorer	× TwinCA	T Project3 @ X			
°°£i io-£i ⊭_=	Gener	al NO-Encoder Farater Time Compensation Onlin	16		
Search Solution Explorer (Ctrl+;)		Parameter	Offline Value	Online Value	T. Unit 🔶
Image	+	Encoder Evaluation:			
Tables		Limit Switches:			
Objects		Filter:			
4 Tult Axis 1	+	Homing:			
💽 🗳 Enc	•	Other Settings:			
▶ ♥ Drive		Encoder Mode	'POSVELO'	POSVELO'	E
Inputs		Position Correction	FALSE	FALSE	в
Dutputs		Filter Time Position Correction (P-T1)	0.0	0.0	F s
PLC SAFETY SC++ PS VO					
The Devices Device 2 (EtherCAT)		ownload [Upload] Expand All [Collapse	All Select All		

Descriptions for Other Settings:

Encoder mode: There are three encoder modes: POS, POSVELO, and POSVELOACC.

- **POS**: The encoder only calculates the position, which is used when the position loop is in the servo drive.
- **POSVELO**: The encoder only calculates the position and the speed, which is used when the position loop is in TWinCAT NC.
- **POSVELOACC**: The TWinCAT NC uses the encoder to determine the position, speed, and acceleration.
- d. Jogging test

Hide the system deviation temporarily.

Solution Explorer	- 🛛 🗙 TwinCA	T Project3 😐 🗙			
ം പ്രം മം –	Gener	al Settings Persneter Dynamics Daline Func	tions Coupling Compensation		
Search Solution Explorer (Ctrl+;)	۰ م	Parameter	Offline Value	Online Value	T. Unit
MC-Task 1 SVB	÷	Fast Axis Stop:			
Tables	+	Limit Switches:			
Objects	- 1 - E	Monitoring:			
A TANKS 1		Position Lag Monitoring	FALSE		в
the Ene		Maximum Position Lag Value	5.0	5.0	F mm
Þ ≃ Drive		Maximum Position Lag Filter Time	0.02	0.02	F s
> Inputs		Position Range Monitoring	TRUE	TRUE	в
Outputs		Position Range Window	5.0	5.0	F mm
PLC		Target Position Monitoring	TRUE	TRUE	в
SAFETY C++		Target Position Window	2.0	2.0	F mm
4 🗾 1/0		Target Position Monitoring Time	0.02	0.02	F s
 ⁴ Devices 	1				

Solution Explorer 👻 🖣 🗙	TwinCAT Project3 😐 🗙	
ං ය `o - ඞ ዾ -	General EtherCAT DC Process Bata Startup Co8 - Online Online (C: Online R) Functions	
Search Solution Explorer (Ctrl+;)	-12138 4463 Setpoint [m]	
	Lag Bistance [nm] Actual Velocity: [nm/s] Setpoint [nm/s] 0.0001 (-3.448, 3.469) -0.0022 0.0000	
P ≃ Drive L. Ctrl	Override: [%] Total / Centrel [%] Error: 100.0000 S 0.00 / 0.00 S 0 (0e0)	
Inputs	Status (Log.) Status (phys.) Baskling	
P W Outputs	Eswdy WDT Moving Coupled Mode Centralle Set	
SAFETY	Han Job Howing De VIn Pon Range Feed De	
⊿ 🐖 I/O	Controller Kw-Facter: [ms/s/ms] Reference Velocity: [ms/s]	
 *E Devices 	Target Position: [mm] Target Velocity: [mm/s]	
Device 2 (EtherGAT) Image	0 1 0	
👯 Image-Info		
SyncUnits	FI F2 F3 F4 F5 F0 F8 F8	
Outputs		
InfoData Drive 1 (InoSV660N)	Error List	- 9 :
A Mappings	🔻 🗕 🛞 0 Errors 🛛 🛕 0 Warnings 👘 14 Messages 🔤 Clear	Search Error List 🖉 🔎

Click **Set** to display a dialog box and then click **All** to enable the servo drive. Perform jogging through F1 to F4. The jog speed is set as follows.

Solution Explorer	• 7 × 🖪		Project3 🗢 🗙									
o 🏠 🔞 - 🗗 🖊 💻		General	Settings Paraveter Bynamics Online Func	tions Coupling Componention								
	ρ-			Office Velue	Online Vislan							
Solution 'TwinCAT Project3' (1 project) TwinCAT Project3		+	Maximum Dynamics:	Online value	Chimie Valde	1.	UNIX 1					
SYSTEM		+	Default Dynamics:									
		-	Manual Motion and Homing:									
A 1850 NC-Task 1 SAF NC-Task 1 SVB								Homing Velocity (towards plc cam)	30.0	30.0	F	mm/s
📲 Image			Homing Velocity (off plc cam)	30.0	30.0	F	mm/s					
Tables			Manual Velocity (Fast)	600.0	600.0	F	mm/s					
Objects Axes			Manual Velocity (Slow)	100.0	100.0	F	mm/s					
Axis 1			Jog Increment (Fonward)	5.0	5.0	F	mm					
Enc Enc			Jog Increment (Backward)	5.0	5.0	F	mm					
P = Drive		+	Fast Axis Stop:									
Inputs		+	Limit Switches:				-					
Outputs PLC		4	·				•					

- 2. Controlling the servo drive operations through the PLC
 - a. Create a PLC program.

	- م			
⊿ 렖⇔ Axes				
4 📑 Axis 1				
🕨 ᄣ Enc				
⊿ ➡ Drive				
Inputs				
Outputs				
P inputs				
S 🕤 Add New Item	Ins			
🐱 C 🎦 Add Existing Item	Shift+Alt+A			
Paste				
Hide PLC Configuration				
■+ image-into				
SyncUnits		rror List		
P 🛄 Inputs		- 0.5		
P U Outputs		T - 🛞 U Errors		



b. Add a motion control library for calling the motion control function blocks easily.



c. Create a POU program.

Solution Explorer 👻 🕈 🗙	Add POU
Search Solution Explorer (Ctrl+;)	Create a new POU (Program Organization Unit)
🏊 Ctrl	
👂 🔜 Inputs	Name:
Outputs	POU
🔺 🎒 PLC	
🔺 🛄 Untitled1	Type
4 🛗 Untitled1 Project	Program
🕨 🛅 External Types	Function Block
 References 	Extends:
-□ Tc2_MC2	Implements:
- Tc2_Standard	_ implements.
- Tc2_System	Access specifier:
- Tc3_Module	· · · · · · · · · · · · · · · · · · ·
DUTs	Method implementation language:
	Ladder Logic Diagram (LD)
	Function
	Return type:
PlcTask (PlcTask)	
	Err
Untitled1 Instance	Implementation language:
SAFETY	Ladder Logic Diagram (LD)
🔂 C++	
4 🗾 I/O	
Am ,	Open Cancel

d. Call the motion module to implement some simple actions and input the final program to **PlcTask (PlcTask)**.

4 M test650N	7 EID_VAR	100 🔍 🛩
 Test660N Project 	1 NC_Power_0	MC_Home_0
External Types	gb_test mc_power	nc_hone
References		ENO
E DUTs	axisl Axis Status gb_powerOnOk axisl Axis	Done -igb_bacedo
🖿 GVLs	gb_powerOn Enable Busy gb_home Execute	Busy-
🔺 늘 POUs	TRUE Enable_Positive Active - Position	Active -
MAIN (PRG)	TRUE Enable Negative Error HC_Direct HoningNode	CommandAborted
POU_660Ntest (PRG)	- Overile Errorib - BifferMode	Error
🖌 🚞 VISUs	Durrennoe Uptions	Cam
Visualization		
GlobalTextList		
🚮 GVL	2 NC_Jog_0	<pre>MoveAbsolute_0</pre>
PicTask (PicTask)	gb_test nc_jog	MC_MoveAbsolute
(🚆 MAIN)		ENC.
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Test560N.tmc	(ab jost Registrate Day) - de abreats Execute	+
1 Visualization Manager		
It test660N Instance		÷ i x
SAFETY	🝸 👻 🛞 D Errors 🕼 D Warnings 🚯 19 Messages 🛛 Clear	Search Error List 🖉 •

e. Link the axis to the variable defined in the PLC.

○○☆ ○・□ 봗	General Sett	ings Paramete	r Dynamic:	Daline Function	ns Coupling Compe	nsation
Search Solution Explorer (Ctrl+;)	Link To I/O.		Drive 1	(IncSV660M)		
	Link To PLC.		GWL axis	(test660% Instan	ce)	>
INC-Task 1 SAF	Axis Type:	CANopen DS402	Profile MD	P 742 (e.g. EtherC	AT CoE Drive)	•
			Disalar	(De1-a)		_
III Tables Objects	Unit:	m •	Position	t 🗐 Min	Modul o	
A Axes			Velocity	< 🔲 nn/min		
Axis 1	Result					
h in Drive	Position:	Veloci	ty:	Acceleration:	Jerk:	
La Ctrl	nn	nn/s		nn/s2	ma/s3	
🕨 🛄 Inputs	Julia Carla	T: ()	Dimiden			
P 🛄 Outputs	Kars Cycle	Time y Keess	bivider		0.000	
🔺 🎦 PLC	Divider:	1	1	Cycle Time UnsJ:	2.000	
 Lest660N 	Modulo:	0	1 V			
 test660N Project 						

f. Compile the program. If there is not fault, activate the configuration and log onto the PLC.

FILE EDIT VIEW PROJECT BUILD FBD/LD/IL DEBU	G TWINCAT TWINSAF	E PLC TOOLS SC	OPE WINDOW HI	ELP		
Q - O お・h- の ロ 小坊 Build Solution		- Debug -	TwinCAT RT (v64)		- ज	ខ្លែកដុលា ខ
Rebuild Solution		A111660A1				
Claus Solution						
Solution Explorer		Visualization	Scope YT Project	GVL P	OU_660Ntest*	
		atar Demanier Online	Functions Cambins (Connentration		
Rebuild countwinCAT P	roject		and and another of a			
Clean Selection		Drive 1 (IneSV6608)			
Batch Build		GVL maisl (test560	N Instance)			
NC-Task 1 St Configuration Manager.		02/Profile MDP 742 (s.	EtherC47 Coll Bring)			
👯 Image				· · · · ·		
I Tables	Unit: no	- Display (Only)				
Objects		Position: 🔝 🐜	- Nodulo			
A Die Axes		Velocity: 📃 na/a:				
A 10 AND 1	Bornit					
k al Dów	Position: Vel	ozity: Accelera	tion: Jerk:			
Less Ctri	nn na	/s ===/s2	ney's3			
Inputs						
Outputs	Axis Cycle Time / Are	ess Divider				
A PLC	Divider: 1	Cycle Ti	Ne (MS): 2.000			
4 LestőőöN	Modula: 0	<u>\$</u>				
Estopun Project						
 Exercises 						
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🛅 GVLs						
Build 4022-20 fl oaded : 🖓 🔟 📧 🖄 🔅 🚳 🌉	storals -	test660N		=	ten assimu	55 5 B -
			- /			
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Search Solution Explorer (Ctrl+;) 🖉 -	3 MC Power 0	no power;				
D Douts	4 MC_Home_0:	mc_home;				
P 📒 Outputs	5 MC_Jog_0: 1	nc_jog:				
A 🛄 PLC	7 END VAR	proce_o: wc_wovewpace	ube;			
✓ III test660N				A 7		100
 test660N Project 	1	MC_Power	_0		MC_B	ome_0
External Types	db_test	nc_powe	r ruo		TV TV	home
DUTs	axisl		Status - gb_pos	werOnOk	axisl - Axis	Done - gb_hmoedo
GVLs	gb_powerOn	-Enable	Busy		gb_home - Execute	Busy -
🖌 📴 POUs	TRUE	-Enable_Positive	Active -		- Position	Active -
MAIN (PRG)	TRUE	Enable_Negative	Error-	MC	Direct HoningMode	CommandAborted -
POU_660Ntest (PRG)		BufferMode	ATTOTIO		Options	ErrorID
VISUs		Options			-bCalibrationCan	
Visualization						
GiobarrextUst	2		MC Jog 0		ис и	oveAbsolute 0
A an PicTask (PicTask)	gb_test		mc jog		MC 1	MoveAbsolute
MAIN		EN		ENO	EN	ENO
POU 660Ntest		axis1 — CAxis		Done -	axis1 -9 Axis	Done - ob row

g. Click the start button marked in the following figure to make the servo drive run.

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3. Controlling the servo drive operations through the HMI Add the HMI interface to control the servo drive through the HMI interface.



Use the scope view function.

1. Add a scope view project as shown in the following figure.



2. Add parameters to be monitored and monitor these parameters during operation of the PLC.

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2.6.4 KEYENCE KV7500 Controller as the Host Controller

2.6.4.1 Configuring the Servo Drive

• Servo drive version

It is recommended to use the device description file of "SV660N-Ecat_v0.09.xml" or later for trial run of SV660N series servo drives. It is recommended to use the MCU software version of 901.4 (H01-00 = 901.4) or later for SV660N series servo drives.

• Description of 60FD bit0: negative limit bit1: positive limit

bit2: home switch

bit16...bit20: correspond to DI1...DI5 respectively

2.6.4.2 Configuring KEYENCE KV7500 Software Tool

As software tool versions earlier than KV STUDIO 9.45 do not support extension of KEYENCE EtherCAT module "KV-XH16EC", the version of the KEYENCE software tool used must be KV STUDIO 9.45 or later.



Figure 2-12 Configuration flowchart

Unit configuration setting

Create a project and click **OK** to display the following window.

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Click Yes, No, or Read unit setting as needed.

- Click **Read unit setting** when the physical PLC unit is connected properly and able to communicate with the software tool. The software tool obtains unit configurations automatically according to the physical connection.
- If you click **Yes**, the **Unit Editor** window opens, allowing you to select units for configuration through dragging or double-clicking.

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• If you click No, you can click Tool > Unit editor or double-click [0] KV7500 under Unit configuration.

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Axis configuration setting

1. Open Axis configuration setting and double-click Register ESI file.



2. Find the storage directory of the device description file ".xml" and open it to import the ".xml" file.

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Point parameter	Desktop	Papasonic MINAS-A6BE V1.3	2020/9/22 11:30	XML Document		
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- 3. After the device description file is imported, you can start to add axes and set the control cycle in **Axis configuration setting**. The default control cycle is 1 ms and the minimum control cycle is 250 us.
- 4. You can add the axes needed through dragging or double-clicking. Select the corresponding axis and set critical information such the **Encoder resolution**, **Max. motor speed**, and **Max. motor torque** for this axis.

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5. You can add **PDO mapping** in **Slave detailed setting**.

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6. If extension setting is needed, set **Extension setting** to **Enable**.

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 For Motion function setting, you can double-click or click on the combo box (small triangle icon) to select the PDO configuration needed from the dropdown list, or you can right-click > Automatic assignment > Yes, in this way the assigned contents will correspond to preceding PDO contents automatically. During manual assignment, do not neglect any contents in the PDO mapping. Otherwise, a prompt window displays to remind you of the missing contents when you click OK. For Communication command at initialization, DC setting, and Advanced settings, use the default values. After settings are done, click OK.

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8. After settings in **Slave detailed setting** are done, the exclamation symbol disappears.

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9. After adding the axes, click **OK**, and the following dialog box displays, asking you whether to set up coordinate (electronic gear ratio) transformation.

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 Click Yes and the coordinate transformation dialog box displays. Set mechanical parameters and the coordinate unit based on actual conditions and click Execute calculation. The software calculates the denominator and numerator for coordinate transformation automatically and writes parameters to Axis control setting automatically.

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1.4 🖂 🖂 🖉 🖾 🖷 💲 🗞 🖳 🌒 🤅		Coordinate transformation setting value fitted in the operation environment is calculated.	
Project # X	Main X	Operation environment	
Dnit configuration		Mechanic configuration(M) Ball screw pltch	8 9 10 +
E [0] KV-7500		Ball screw P = 10.000	
[1] KV-XH16EC R34000 EM10300 No bris configuration setting		Coordinate unit(V)	
Duit common setting	00001		
- to Axis control setting		Dear rate n (output axis side)(0) 1	
Point parameter		Gearnano m	
a Unit Program	00002	m (motor axis side)(I) 1	
Option setting	00002	Axis control common setting	
Device comment		Decimal place(A) 1 -	
- I Label			
CPU system setting	00003	Ball screw pitch (P) Encoder resolution(S) 1048576	
Program: Test		[PLS/rev]	
m 🖹 Nain		Serve electronic gear nomerator(c)	
Initialize module		Servo electronic gear denominator(D) 1	
Fixed-period module	00004		
Inter-unit sync module		Execute calculation(E)	
Punction Block		Calculation result	
Subroutine macro		In operation environment, Number of PLS required for moving	
D Self-hold macro	00005	is ·····	
Device default		Set up coordinate transformation ratio of axis control common setting as follows.	
0:Nemory card	_	Coordinate transformation denominator	
1:CPU memory		Coordinate transformation numerator ***** Error info(R)	
🖬 🛄 Üser document	00006		
		OK(W) Cancel(C)	- FND
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If you click No, you can click Tool > Coordinate transformation calculation...
 > KV-XH setting.



Axis control setting

- 1. To open axis control setting, click **Tool** > **Axis configuration setting** > **KV-XH setting** > **Axis control setting**, or click **Axis control setting** under **Project**.
- 2. In axis control setting, you can set items including **Unit coordinate** transformation, Software limit coord, Axis error, Axis control function, Common in position control, Operation speed, and JOG.



Operation settings

Homing

Before homing, assign (+) limit switch, (-) limit switch, and Orgin sensor in Motion function setting under Axis configuration setting to each bit of 60FD. 60FD is defined as follows:

bit0: negative limit bit1: positive limit bit2: home switch bit16...bit20 correspond to DI1...DI5 respectively

In automatic assignment, (+) limit switch, (-) limit switch, and Origin sensor must be assigned manually. You can assign them to corresponding bits of 60FD based on the relation shown in the following figure or to bit16...bit20 (which requires DIs of the servo drive to be assigned with (+) limit switch, (-) limit switch, and origin sensor).

KV STUDIO -[Editor:	[1] Axis configuration setting	×.	
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Set the limit parameters for the homing operation in **Axis control setting** > **Origin return**. For detailed trajectories, see KEYENCE instruction manual for positioning/ motion control unit KV-XH16EC.

Default	Value Range	Description
	DOG type (with phase Z)	Decelerating upon DOG signal input and homing through phase Z signal
	DOG type (without phase Z)	Decelerating upon DOG signal input and homing through falling edge of DOG signal
	DOG-type jogging (with phase Z)	Pausing after moving based on Dog ON upon DOG signal input, then moving to the homing direction through position-type speed control and homing with phase Z signal.
	DOG-type jogging (without phase Z)	Moving based on Dog ON upon DOG signal input before homing
	DOG type (contact)	Homing started when the ON duration of the torque limit signal keeps longer than the compression torque time upon DOG signal input
DOG type (with	Origin sensor and phase Z	Homing executed in the initial phase Z position after the origin sensor is ON
phase Z)	Rising edge of origin sensor	Homing executed through the rising edge of the origin sensor
	Middle point of origin sensor (without phase Z)	Taking the middle point of the ON range of origin sensor as the origin and comparing it with that in "Rising edge of origin sensor" Even if the light-receptive performance of the origin sensor degrades, the homing position can hardly change with the time.
	Rising edge of limit switch	Homing executed with the limit switch in the negative direction (direction where the current coordinate decreases) acting as the origin sensor
	Immediate homing with phase Z	Homing executed with phase Z signal
	Data setting type	Taking current coordinate as the origin coordinate

The following homing methods are available in IS620N and SV660N series servo drives.

No.	Homing mode	IS620N	SV660N
1	DOG-type (with phase Z)	ок	ок
2	DOG-type (without phase Z)	ок	ок
3	DOG-type jogging (with phase Z)	No	No
4	DOG-type jogging (without phase Z)	No	No

No.	Homing mode	IS620N	SV660N
5	DOG-type (contact)	ок	Homing is available, but the reference coordinate after homing is not 0. Updating to the xml coordinate of IS620N clears the reference coordinate.
6	Origin sensor and phase Z	ОК	ОК
7	Rising edge of origin sensor	ОК	ОК
8	Middle point of origin sensor	No	No
9	Rising edge of limit switch	Homing is available, but the reference coordinate after homing is not 0	Homing is available, but the reference coordinate after homing is not 0
10	Immediate homing with phase Z	ОК	ОК

Positioning

Set the unit coordinate transformation properly before positioning. The unit coordinate transformation is "PLS" by default, which allows no modification on the numerator or denominator. Assume N revolutions are required by the servo drive, in this case, the number of commands that need to be sent by the host controller is N x Pulses per revolution. If coordinate transformation calculation has been executed, the unit coordinate transformation parameters will match the unit transformation results automatically.

1. To set the motion profile of the servo drive, click **Tool** > **Point parameter** > **KV-XH setting**.



Set the target coordinate and speed per positioning segment as needed. After settings are done, you can call the corresponding **Point No.** through the program to start operation.

2. You can preview the parameter trajectory through the following short-cut.

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- Point parameter	3 1	Single/Position/INC	0 PLS	1000 PLS/s	(+) direction		Thepercentry			
🖪 🧐 Sync control setting	4 1	Single/Position/INC	0 PLS	1000 PLS/s	(+) direction		1			
Onit Program	5 1	Single/Position/INC	0 PLS	1000 PLS/s	(+) direction		0.8			
Toption setting	6 1	Single/Position/INC	0 PLS	1000 PLS/s						
Public configuration switching	7 1	Single/Position/INC	0 PLS	1000 PLS/s	(+) direction		0.6			
T Device comment	8 1	Single/Position/INC	0 PLS	1000 PLS/s						
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a an Program: lest	12 1	SinglePosition/INC	0 PLS	1000 PLS/8			0			
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E Nain	16 1	Single Position INC	0 PLS	1000 PLS/S						
Initialize module	16 1	Single Position INC	0 PLS	1000 PLS/8						
Standby module	17 1	Single/Position/INC	0.015	1000 PL S/s	(+) direction		Speed			
Fixed-period module	18 1	Single/Position/INC	0 PLS	1000 PLS/s	(+) direction		1			
Inter-unit sync module	19 1	Single/Position/INC	0 PLS	1000 PLS/s			0.5			
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🔳 🚍 Macro	21 1	Single/Position/INC	0 PLS	1000 PLS/s	(+) direction		0		1	
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W Tree descent	28 1	Single/Position/INC	0 PLS	1000 PLS/s			Point No.		Lapse tim	ie .
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- 3. Ladder diagrams can be written with regular methods or the following short-cut provided by KEYENCE.
 - a. Drag down the **Point parameter** window with the left mouse button, and zoom out the window to put it in a proper place.

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Fixed-period module	18 1	Single/Position/INC	0 PLS	1000 PLS/8					Wait	0
Inter-unit sync module	19 1	Single/Position/INC	0 PLS	1000 PLS/s					Wait	0
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- Subroutine macro	22 1	Single/Position/INC	0 PLS	1000 PLS/s					Walt	0
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Device default	24 1	Single/Position/INC	0 PLS	1000 PLS/s					Wart	0
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	30 1	Single/Position/INC	OPLS	1000 PL 5/s					Walt	
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	32 1	Single/Position/INC	0 PLS	1000 PLS/s					Wait	ŏ
	4 1									-

b. Move the mouse to the point parameter, such as "No.1-Axis1", and wait until the mouse icon to change from an arrow to a small hand. Then drag towards the program edit interface with the right mouse button, and the following short-cut displays.

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c. Select the function needed, such as **Operation enable**, and click it to generate a DEMO program automatically.

Then designate the part in red as the relay needed. After these actions are done, this function is done compiling.

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4. Unit monitor

The unit monitor supports monitoring on the operating state of KV-XH16EC or the internal data.

- a. You can open **Unit monitor** in the following three ways:
 - Select the unit to be monitored and right-click to select **Unit monitor** in the short-cut menu.

KV STUDIO -[Monitor: KV-	7500] - [success]						-					و بعد ا	×
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- Double-click with the left mouse button to open the **Unit monitor**.
- Right-click the blank section in the **Main** program to select **Unit monitor** in the menu displayed.

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- b. The unit monitor displays the operating state of each axis.
 - 1). To change the operating state of the monitor item, click **Monitor item setting** on the top right corner.

KV STUDIO -[Monitor: KV-7500] - [suc	cess]	Table Madeudia Uslas		
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2). To check whether I/O signals such as limit switch signals and origin sensor signals are normal, open **Unit monitor** and find the corresponding monitoring position.

If corresponding message is received, a small black circle will be displayed.
KV STUDIO - [Monitor: KV-7500] - (succ	ess]			- • ×
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The error state of the unit can also be displayed in the **Unit monitor**. The axis error can be cleared using the **Error clear** button in the bottom right.

2.6.4.3 Trial Run

In trial run, actions can be acknowledged directly, without the need for programming ladder diagrams.

- 1. You can find the **Trial run** button at the bottom right of the unit monitor interface.
- 2. Select the control mode from positioning control, speed control, and torque control.
- 3. Then, select the object axis for trial run.

Note

If trial run is executed in the speed control mode or torque control mode, a warning will be reported. To execute trial run, set the control mode to position control.

The following introduces trial run \rightarrow positioning control.



1. OP enable/Servo ON

Unrelated to the status of the ladder diagram program. "OP enable" and "Servo ON" can be executed through commissioning. After operations are done, the **Operation ready** and **Servo ready** indicators turn green. To ensure safety, set the CPU unit to PROG mode and execute operations again after stopping ladder diagram program.

Confirm the following items when the Servo ready indicator is not in green.

- No error occurs on the axis.
- No warning occurs on the servo drive.
- The main circuit power supply of the servo drive is switched on.
- The Ethernet cable is connected.
- 2. Axis error/Error clear

Check the error details and clear the error. After rectifying the error cause, click **Error clear** button to clear the error.

3. JOG

Click - **direction** or + **direction** buttons to execut forward or reverse jog, which operates with the speed multiplied by a certain ratio (settable with an increment of 1%) between 10% to 100% based on the setpoint in **Axis control setting** > **Jog at high speed**.

4. Inching

Click - direction or + direction buttons to execute forward or reverse inching based on Axis control setting > JOG starting speed and the movement value defined in Axis control setting > Inching movement.

5. Origin return

Click the Origin return button to execut homing.

6. Teaching

Click the **Acquire** button to save current command coordinate value to the buffer memory of the target coordinate of the designated poing number. The teaching function is available only in the online edit mode. The teaching value will also be reflected to the buffer memory and the point parameter.

7. Trial run

Designate a point number and click the **Start** button to execute point positioning. To stop operation, click the **Decel Stop** or **Force Stop** button to stop smoothly with speed reduced to zero gradually or stop immediately with shock being incurred. Clicking the **1 point operation** button makes the servo drive execute positioning of one point. Clicking the **Cont. operation** button makes the servo drive execute positioning of ten points at most. Clicking the **Repeat** button makes the servo drive return to the point in the first row and execute positioning repeatedly after positioning of the point in the last row is done. The time interval between points can be set to a value within 0.1s to 20.0s.

8. Changing current coordinate

Click **Command coordinate** and the **Changing current coordinate** dialog box displays. Enter the coordinate needing to be changed and click the **Change** button to change the current coordinate of the axis in trial run, and then close the **Changing current coordinate** dialog box. If you click the **Close** button after changing current coordinate, the **Changing current coordinate** dialog box will be closed with current coordinate unchanged.



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