



SV660ND Series Servo Drive Function Guide



Industrial
Automation



Intelligent
Elevator



New Energy
Vehicle



Industrial
Robot



Rail
Transit



Data code PS00005890 A00

Preface

Introduction

Thank you for purchasing the SV660ND series servo drive developed by Inovance.

The SV660ND AC servo drive is a high performance multi-drive product. It comes with a capacity of 0.4 kW an 0.75 kW, as well as support for EtherCAT bus communication. It features STO (SIL3), one-key tuning and adaptive notch filter, which allow for easy use of the product. It offers quiet and stable operation and accurate position control by working with an MS1 series high-response servo motor with a 23-bit-turn absolute encoder.

Its high integration, bus support, small size, easy commissioning and environment robustness make it a perfect match for equipment of cell phone manufacture, robots, machine tool, lithium battery, silicon semiconductor, touchscreen and LED.

This guide presents product functions and parameters, including function overview, basic servo functions, adjustment and parameter list.

More Documents

Name	Data Code	Description
SV660ND Series Servo Drive Selection Guide	PS00005789	Provides instructions on product selection, including the list of supporting components, technical data on the drive and motor, and the selection guide of cables.
SV660ND Series Servo Drive installation Guide	PS00005790	Presents installation of the servo drive, including installation steps, mechanical installation, and electrical installation.
SV660ND Series Servo Drive Hardware Guide	PS00005125	Presents electrical design guidance of the equipment, description of terminals, required certificates and standards and solutions to common EMC problems.
SV660ND Series Servo Drive Commissioning Guide	PS00006000	Presents servo commissioning, parameter descriptions, troubleshooting, including the operating panel, commissioning software, commissioning procedure and a parameter list.
SV660ND Series Servo Drive Function Guide	PS00005890	Presents functions and parameters, including function overview, basic servo functions, adjustment and parameter list.
SV660ND Series Servo Drive Communication Guide	PS00006002	Presents functions and parameters of the servo drive, including EtherCAT communication configuration, parameter description, and communication application cases.

Name	Data Code	Description
SV660ND Series Servo Drive Troubleshooting Guide	PS00006001	Introduces faults and fault levels, the troubleshooting process, warning codes and fault codes.
SV660ND Series Servo Drive Maintenance Guide	PS00005791	Provides instructions on maintenance and repair of the equipment.
SV660ND Series Servo Drive Safety Guide	PS00005950	Presents the safety function and related certifications and standards, wiring, commissioning process, troubleshooting and functions.
SV660ND Series Servo Drive Manual Package	PS00005852	Provides information on selection, installation, commissioning, function, troubleshooting and parameters of the equipment.

Revision History

Date of Revision	Version	Description
2022-06	A00	First release.

Document Acquisition

This manual is not delivered with the product. You can obtain the PDF version in either of the following ways:

- Do keyword search under Service and Support at <http://www.inovance.com>.
- Scan the QR code on the equipment to acquire more.

Table of Contents

Preface	1
General Safety Instructions	7
1 Function Overview	14
2 Basic Functions of the Servo Drive	16
2.1 Conversion Factor	17
2.2 Servo State	18
2.3 Modes of Operation	21
2.4 Cyclic Synchronous Position (CSP) Mode	21
2.4.1 Function Block Diagram	21
2.4.2 Configuration Block Diagram	22
2.4.3 Recommended Configuration	22
2.4.4 Related Parameters	22
2.4.5 Related Functions	24
2.5 Cyclic synchronous torque (CST) mode	24
2.5.1 Function Block Diagram	24
2.5.2 Configuration Block Diagram	25
2.5.3 Recommended Configuration	25
2.5.4 Related Parameters	25
2.5.5 Related Functions	27
2.6 Cyclic synchronous velocity (CSV) mode	28
2.6.1 Function Block Diagram	29
2.6.2 Configuration Block Diagram	29
2.6.3 Recommended Configuration	29
2.6.4 Related Parameters	29
2.6.5 Related Functions	31
2.7 Profile Position (PP) Mode	31
2.7.1 Function Block Diagram	32
2.7.2 Configuration Block Diagram	32
2.7.3 Recommended Configuration	35
2.7.4 Related Parameters	35
2.7.5 Related Functions	37
2.8 Profile torque (PT) mode	38
2.8.1 Function Block Diagram	39
2.8.2 Configuration Block Diagram	39
2.8.3 Recommended Configuration	39
2.8.4 Related Parameters	39
2.8.5 Related Functions	41
2.9 Profile Velocity (PV) Mode	44
2.9.1 Function Block Diagram	44

2.9.2 Configuration Block Diagram	45
2.9.3 Recommended Configuration	45
2.9.4 Related Parameters	45
2.9.5 Related Functions	47
2.10 Homing Mode (HM)	48
2.10.1 Function Block Diagram	49
2.10.2 Configuration Block Diagram	49
2.10.3 Recommended Configuration	49
2.10.4 Related Parameters	50
2.10.5 Related Functions	52
2.10.6 Homing Operation	53
3 Applications	77
3.1 Absolute System	77
3.1.1 Overview	77
3.1.2 Related Parameters	77
3.1.3 Precautions for Use	81
3.2 Software position limit	82
3.3 Position Comparison	83
3.4 Black Box	92
3.5 Touch Probe	97
3.6 Forced EtherCAT DO	99
4 STO Safety Function	102
4.1 General	102
4.1.1 Terms and Abbreviations	102
4.1.2 Safety Standards	102
4.1.3 Precautions for Use	105
4.2 Safe Torque Off (STO)	110
4.2.1 Overview	110
4.2.2 Function Use and Monitoring	111
4.2.3 Fault Reset	112
4.2.4 Safety Function Response Time	114
4.3 Acceptance	114
5 Description of Parameters	117
5.1 H00 Servo Motor Parameters	117
5.2 H01 Servo Drive Parameters	130
5.3 H02 Basic Control Parameters	145
5.4 H03 Terminal Input Parameters	156
5.5 H04 Terminal Output Parameters	166
5.6 H05 Position Control Parameters	171

5.7 H06 Speed Control Parameters	178
5.8 H07 Torque Control Parameters.....	188
5.9 H08 Gain Parameters.....	196
5.10 H09 Auto-tuning Parameters.....	214
5.11 H0A Fault and Protection Parameters.....	229
5.12 H0b Monitoring Parameters	246
5.13 H0d Auxiliary Parameters.....	263
5.14 H0E Communication Function Parameters	268
5.15 H18 Position Comparison Output	276
5.16 H19 Target Position Parameters.....	280
5.17 H1F Software Tool Parameters.....	320
5.18 H30 Related Variables Read through Communication	322
5.19 H31 Communication Setting	323
5.20 1000h Object Dictionary.....	325
5.21 6000h Object Dictionary.....	341
6 Parameter List.....	370
6.1 List of H00 Servo Motor Parameters	370
6.2 List of H01 Drive Parameters.....	372
6.3 List of H02 Basic Control Parameters	377
6.4 List of H03 Terminal Input Parameters.....	381
6.5 List of H04 Terminal Output Parameters	385
6.6 List of H05 Position Control Parameters.....	387
6.7 List of H06 Speed Control Parameters	389
6.8 List of H07 Torque Control Parameters.....	392
6.9 List of H08 Gain Parameters	394
6.10 List of H09 Auto-adjust Parameters.....	400
6.11 List of H0A Fault and Protection Parameters	404
6.12 List of H0b Monitoring Parameters	409
6.13 List of H0d Auxiliary Function Parameters.....	415
6.14 List of H0E Communication Function Parameters.....	416
6.15 List of H18 Position Comparison Output Parameters	419
6.16 List of H19 Target Position Parameters	421
6.17 List of H1F Software Tool Parameters.....	441
6.18 List of H30 Communication Read Parameters	442
6.19 List of H31 Communication Set Parameters	443

6.20 List of 1000h Object Dictionary..... 443

6.21 List of 6000h Object Dictionary..... 446

7 Appendix 452

7.1 Display of Monitoring Parameters 452

7.2 DI/DO Function Definitions 460

General Safety Instructions

Safety Precautions

- This section explains the safety precautions that need to be observed to use this product correctly. Before using this product, please read the instruction manual and correctly understand the relevant information of safety precautions. Failure to comply with the safety precautions may result in death, serious injury, or equipment damage.
- "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.
- Use this equipment according to the designated environment requirements. Damage caused by improper use is not covered by warranty.
- 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 selection 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. Install the covers or protective guards as specified, and use the equipment in accordance with the instructions described in the user guide.
- The drawings in the guide are shown for illustration only and may be different from the product you purchased.

Unpacking

WARNING

- Do not install the equipment if you find damage, rust, or signs of use on the equipment or accessories upon unpacking.
- Do not install the equipment if you find water seepage or missing or damaged components upon unpacking.
- 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.

**CAUTION**

- 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**DANGER**

- The equipment can be operated by well-trained and qualified professionals only. Non-professionals are not allowed.

**WARNING**

- Read through the guide and safety instructions before installation.
- Do not install this equipment in places with strong electric or magnetic fields.
- Before installation, check that the mechanical strength of the installation site can bear the weight of the equipment. Failure to comply will result in mechanical hazards.
- Do not wear loose clothes or accessories during installation. Failure to comply may result in an electric shock.
- When installing the equipment in a closed environment (such as a cabinet or casing), use a cooling device (such as a fan or air conditioner) to cool the environment down to the required temperature. Failure to comply may result in equipment over-temperature or a fire.
- Do not retrofit the equipment.
- Do not fiddle with the bolts used to fix equipment components or the bolts marked in red.
- When the equipment is installed in a cabinet or final assembly, a fireproof enclosure providing both electrical and mechanical protections must be provided. The IP rating must meet IEC standards and local laws and regulations.
- Before installing devices with strong electromagnetic interference, such as a transformer, install a shielding device for the equipment to prevent malfunction.
- Install the equipment onto an incombustible object such as a metal. Keep the equipment away from combustible objects. Failure to comply will result in a fire.

**CAUTION**

- Cover the top of the equipment with a piece of cloth or paper during installation. This is to prevent unwanted objects such as metal chippings, oil, and water from falling into the equipment and causing faults. After installation, remove the cloth or paper on the top of the equipment to prevent over-temperature caused by poor ventilation due to blocked ventilation holes.
- Resonance may occur when the equipment operating at a constant speed executes variable speed operations. In this case, install the vibration-proof rubber under the motor frame or use the vibration suppression function to reduce resonance.

Wiring**DANGER**

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals.
- Before wiring, cut off power connections with all equipment. Residual voltage exists after power cut-off. Therefore, wait at least the time designated on the equipment warning label before further operations. Measure the DC voltage of the main circuit and make sure it is below the safe voltage, otherwise there will be the danger of 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.

**CAUTION**

- 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

**DANGER**

- 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.

**WARNING**

- 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, make sure 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

**DANGER**

- The equipment must be operated only by professionals. Failure to comply will result in death or personal injuries.
- Do not touch any connecting terminals or disassemble any unit or component of the equipment during operation. Failure to comply will result in an electric shock.

**WARNING**

- Do not touch the equipment casing, fan, or resistor with bare hands to feel the temperature. Failure to comply may result in personal injuries.
- Prevent metal or other objects from falling into the equipment during operation. Failure to comply may result in a fire or equipment damage.

Maintenance

**DANGER**

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals.
- Do not maintain the equipment with power ON. Failure to comply will result in an electric shock.
- Before maintenance, cut off all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.
- In case of a permanent magnet motor, do not touch the motor terminals immediately after power-off because the motor terminals will generate induced voltage during rotation even after the equipment power supply is off. Failure to comply will result in an electric shock.



WARNING

- Perform routine and periodic inspection and maintenance on the equipment according to maintenance requirements and keep a maintenance record.

Repair



DANGER

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals.
- Do not repair the equipment with power ON. Failure to comply will result in an electric shock.
- 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

- Submit the repair request according to the warranty agreement.
- 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



WARNING

- 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.

Additional Precautions


Cautions for the dynamic brake

- Dynamic braking can only be used for emergency stop in case of failure and sudden power failure. Do not trigger failure or power failure frequently.
- Ensure that the dynamic braking function has an operation interval of more than 5 minutes at high speed, otherwise the internal dynamic braking circuit may be damaged.

- Dynamic braking is common in rotating mechanical structures. For example, when a motor has stopped running, it keeps rotating due to the inertia of its load. In this case, this motor is in the regenerative state and short-circuit current passes through the dynamic brake. If this situation continues, the drive, and even the motor, may be burned.

Safety Label

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
	<ul style="list-style-type: none"> • Never fail to connect the protective earth (PE) terminal. Read through the guide and follow the safety instructions before use. • Never fail to connect Protective Earth (PE) terminal. Read the manual and follow the safety instructions before use. • Do not touch terminals within 15 minutes after disconnecting the power supply to prevent the risk of electric shock. • Do not touch terminals with 15 minutes after Disconnect the power. Risk of electrical shock. • Do not touch the heatsink with power ON to prevent the risk of burn. • Do not touch heatsink when power is ON. Risk of burn.

1 Function Overview

Functions of the servo drive are listed below. See details in corresponding chapters.

Function	Description
Cyclic synchronous position mode	The host controller generates position references and sends the references cyclically through the bus. The servo drive performs positioning control.
Cyclic synchronous velocity mode	The host controller generates speed references and sends the references cyclically through the bus. The servo drive performs speed control.
Cyclic synchronous torque mode	The host controller generates torque references and sends the references cyclically through the bus. The servo drive performs torque control.
Profile position mode	The host controller sets parameters through the bus, and the servo drive generates position references and performs positioning control.
Profile velocity mode	The host controller sets parameters through the bus, and the servo drive generates speed references and performs speed control.
Profile torque mode	The host controller sets parameters through the bus, and the servo drive generates torque references and performs torque control.
Homing mode	The host controller selects the homing mode through parameters, and the drive performs homing automatically with the position feedback set to the preset value.
Touch Probe	The servo drive latches the position information when an external DI signal or motor Z signal changes.
High-resolution encoder	The servo drive is equipped with a high-performance encoder with resolution up to 8388608 PPR.
Mechanical characteristics analysis	Used to analyze the resonance frequency and characteristics of the mechanical system through a PC installed with Inovance software tool.
Gain auto-tuning	The servo drive generates gain parameters automatically to match present working conditions through just one parameter.
Gain switchover	Used to apply different gains to different status (operating or stop) of the motor. Gains can also be switched by bit26 of OD 60FE during operation.
Torque disturbance observer	The servo drive estimates the disturbance torque suffered by the system to suppress vibration through compensation.
Resonance suppression	The servo drive sets filter characteristics automatically to suppress mechanical system vibration after detecting the resonance point.
Torque Reference Filter	Used to suppress the mechanical resonance that may be generated when the response speed is excessively high.

Function	Description
Position first-order low-pass filter	Used to achieve smooth acceleration and deceleration.
Torque limit	The servo drive limits the output torque of the servo motor.
Speed limit	The servo drive limits the servo motor speed.
External regenerative resistor	Used in case of insufficient braking capacity of the built-in regenerative resistor.
DI signal assignment	DI functions such as emergency stop can be assigned to corresponding pins.
Fault log	Used to record the latest twenty faults/warnings, which can also be cleared.
Status display	Used to display the drive status through the LED on the keypad.
External I/O display	Used to display ON/OFF status of external I/O signals.
Forced DO	Used to output signals not related to the drive status forcibly or used to check the wiring of output signals.
Trial run mode	Used to enable the motor through the keypad without a start signal.
Inovance software tool	Used to set parameters, perform trial run, and check status through a PC.
Warning code output	Used to output a four-bit warning code when a warning occurs.
Position Comparison	The servo drive outputs a DO signal with designated width after reaching the preset target position.
Black box	The servo drive captures the data before and after the designated condition and cooperates with the software tool to read the data for further analysis.

2 Basic Functions of the Servo Drive

The servo system consists of three major parts, the servo drive, servo motor, and feedback encoder.

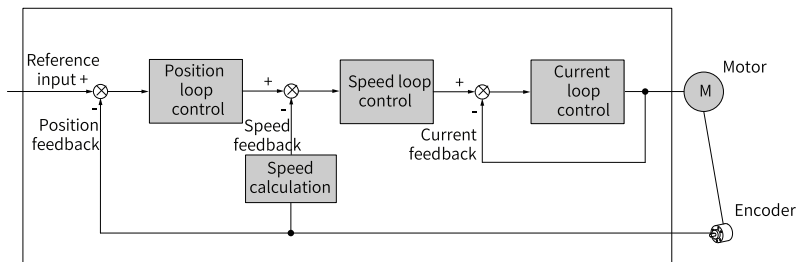


Figure 2-1 Structure of a basic servo system

As the control core of the servo system, the servo drive performs accurate position, speed, torque, or hybrid control on the servo motor by processing the input signals and feedback signals. Position control is the most important mode of a servo system.

Descriptions of the control modes are as follows:

- **Position control** In the position control mode, the target position of a motor is determined by the sum of position references, and the motor speed is determined by the position reference frequency. The servo drive performs quick and accurate position control and speed control through the feedback encoder installed on the motor. This control mode is applicable to scenarios requiring positioning control, such as mechanical arm, moulder, engraving and milling machine (pulse sequence reference), and computer numerical control (CNC) machine tool.
- **Speed control** In the speed control mode, the servo drive performs quick and accurate speed control through the speed reference sent through communication. The speed control mode mainly applies to application requiring speed control or where a host controller is used for position control or the commands sent from the host controller are used as the speed references for the servo drive, such as the engraving and milling machine.
- **Torque control** In the torque control mode, the motor current is in linear relation with the torque. Therefore, torque control is implemented through current control. The servo drive controls the motor output torque based on torque references. The torque reference can be set through communication. This control mode is mainly applicable to the winding and unwinding devices with strict tension requirements. In these scenarios, the torque always changes with the winding radius so that the tension will not change along with the change of the winding radius.

2.1 Conversion Factor

Gear ratio refers to the motor displacement (encoder unit) corresponding to the load shaft displacement of one reference unit.

The gear ratio is comprised of the numerator 6091.01h and denominator 6091.02h. It determines the proportional relation between the load shaft displacement (reference unit) and the motor displacement (encoder unit), as shown below.

Motor displacement = Load shaft displacement x Gear ratio

The motor is connected to the load through the reducer and other mechanical transmission mechanism. The gear ratio is related to the mechanical reduction ratio, mechanical dimensions and motor resolution.

The calculation formula is as follows.

$$\text{Gear ratio} = \frac{\text{Encoder resolution}}{\text{Load shaft resolution}}$$

☆ Related parameters:

See "[6091_en.01h](#)" on page 356 for details.

See "[6091_en.02h](#)" on page 356 for details.

Taking the ball screw as an example:

Minimum reference unit $f_c = 1 \text{ mm}$

Lead $P_B = 10 \text{ mm/r}$

Reduction ratio (n) = 5:1

Resolution of Inovance 23-bit motor (P) = 8388608 PPR

The position factor is therefore calculated as follows:

Position factor:

$$\begin{aligned} \text{Position factor} &= \frac{\text{Motor resolution } P \times n}{P_B} \\ &= \frac{8388608 \times 5}{10} \\ &= \frac{41943040}{10} \\ &= 4194304 \end{aligned}$$

Therefore, 6091.01h = 33554432; 6091.02h = 1. That means when the load shaft displacement is 1 mm, the motor displacement is 33554432.

Reduce the values of 6091.01h and 6091.02h to a point where there is no common divisor, and take the final value.

2.2 Servo State

To make the servo drive run in the designated state, observe the process stipulated in the standard CiA402 protocol when operating the drive.

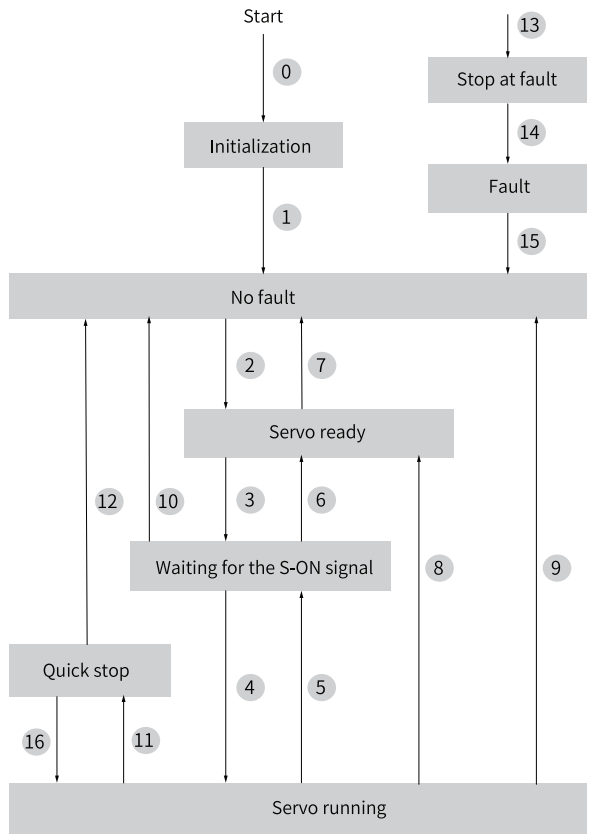


Figure 2-2 Switchover of CiA402 state machine

See the following table for descriptions of different status.

Initialization	Initialization of the servo drive and internal self-inspection 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 ON	The servo drive is operating properly and a certain operation mode has been enabled. The motor is energized and starts rotating when the speed reference value inputted is not 0. Only parameters whose "Setting Condition" is "During running" can be set.
Quick stop	Quick stop is activated and the servo drive is in the process of quick stop. Only parameters whose "Setting Condition" 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 "Setting Condition" is "During running" can be set.
Fault	The stop process is done and all the drive functions are disabled. Parameters can be modified for troubleshooting purpose.

The following table describes the control commands and status switchover.

CiA402 Status Switchover		Control word 6040h	bit0 to bit9 ^[1] of status word 6041h
0	Power-on → Initialization	Natural transition, control command not required	0x0000
1	Initialization → No fault	Natural transition, control command not required If an error occurs during initialization, the servo drive directly enters status 13.	0x0250/0x270
2	No fault → Servo ready	0x0006	0x0231
3	Servo ready → Waiting for the S-ON signal	0x0007	0x0233
4	Waiting for the S-ON signal → Servo running	0x000F	0x0237
5	Servo running → Waiting for the S-ON signal	0x0007	0x0233
6	Waiting for the S-ON signal → Servo ready	0x0006	0x0231
7	Servo ready → No fault	0x0000	0x0250
8	Servo running → Servo ready	0x0006	0x0231
9	Servo running → No fault	0x0000	0x0250
10	Waiting for the S-ON signal → No fault	0x0000	0x0250

CiA402 Status Switchover		Control word 6040h	bit0 to bit9 ^[1] of status word 6041h
11	Servo running → Quick stop	0x0002	0x0217
12	Quick stop → No fault	Set 605A to a value between 0 and 3. Natural transition applies after stop and no control command is required.	0x0250
13	→ Stop at fault	If a fault occurs in any status other than "fault", the servo drive automatically switches to the stop-at-fault state, without the need for a control command.	0x021F
14	Stop at fault→Fault	Natural transition applies after stop and no control command is required.	0x0218
15	Fault→No fault	0x80 Bit7 is rising edge-triggered. bit7 Keeps at 1, and other control commands are invalid.	0x0250
16	Quick stop → Servo running	Set 605A to a value between 5 and 7. 0x0F will be sent after stop.	0x0237

Note

[1]: Bit 10 to bit 15 of 6041h are related to the operating state of the servo drive, and their values are represented as "0" in the preceding table. For details on the status of these bits, check the operation mode of the servo drive.

☆ Related parameters:

See "[6040h](#)" on [page 342](#) for details.

See "[6041h](#)" on [page 342](#) for details.

2.3 Modes of Operation

Introduction to the operation modes

The drive supports 7 servo modes. The pre-operational mode is set in 6060h. The current operation mode of the servo drive can be viewed in 6061h.

☆Related parameters

See "[6060h](#)" on [page 345](#) for details.

See "[6061h](#)" on [page 346](#) for details.

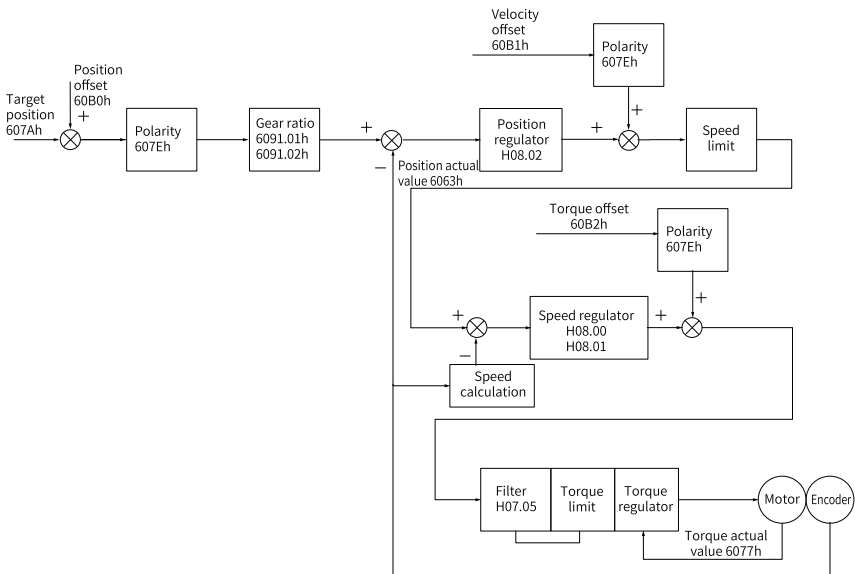
Communication cycle supported by each mode

The SV660ND series servo drive supports a synchronization cycle of 1 ms or an integer multiple of 1 ms. The maximum synchronization cycle is 20 ms.

2.4 Cyclic Synchronous Position (CSP) Mode

In the CSP mode, the host controller generates the position references and sends the target position to the servo drive cyclically. The servo drive executes position control, speed control, and torque control.

2.4.1 Function Block Diagram



2.4.2 Configuration Block Diagram

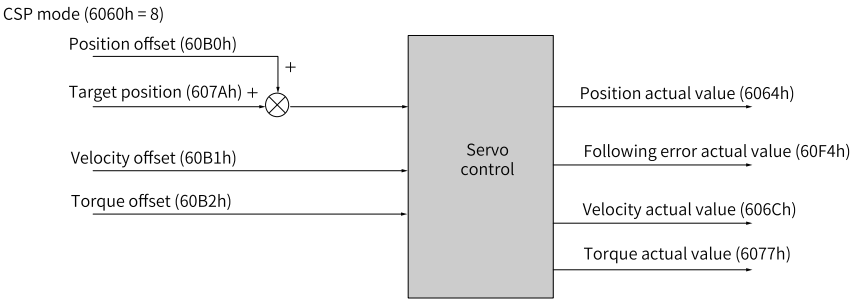


Figure 2-3 Cyclic synchronous position mode

2.4.3 Recommended Configuration

RPDO	TPDO	Remarks
6040h: Control word	6041h: Status word	Mandatory
607Ah: Target position	6064h: Position actual value	Mandatory
6060h: Modes of operation	6061h: Modes of operation display	Optional

2.4.4 Related Parameters

6040h Control word

Address: 0x3502

Min.: 0

Max.: 65535

Default: -

Access: RW

Unit: -

Data Type: Uint16

Change: Immediately

Mapping: RPDO

Value Range:

0–65535

Description:

Defines the control command.

bit	Name	Description
0	Switch on	1: Enabled, 0: Disabled
1	Enable voltage	1: Enabled, 0: Disabled
2	Quick stop	0: Enabled, 1: Disabled
3	Enable operation	1: Enabled, 0: Disabled

The CSP mode only supports absolute position references.

6041h Status word

Address: 0x3504

Min.: -

Unit: -

Max.: -

Data Type: Uint16

Default: -

Change: -

Access: RO

Mapping: TPDO

Value Range:

-

Description:

Indicates the servo drive status.

bit	Name	Description
0	Ready to switch on	1: Enabled, 0: Disabled
1	Switch on	1: Enabled, 0: Disabled
2	Operation enabled	1: Enabled, 0: Disabled
3	Fault	1: Enabled, 0: Disabled
4	Voltage enabled	1: Enabled, 0: Disabled
5	Quick stop	0: Active, 1: Inactive
6	Switch on disabled	1: Enabled, 0: Disabled
7	Warning	1: Enabled, 0: Disabled
8	Manufacturer-specific	Undefined
9	Remote	1: Enabled, control word activated 0: Disabled
10	Target reach	Not supported, always being 1
11	Internal limit active	0: Position reference within the limit 1: Position reference beyond the limit
12	Drive follow the command value	Not supported, always being 1
13	Following error	0: EB00.0 (Excessive position deviation) not reported 1: EB00.0 (Excessive position deviation) reported
14	Manufacturer-specific	Undefined
15	Home Find	0: Home not found 1: Home found

☆ Related parameters:

See "[6060h](#)" on [page 345](#) for details.See "[6061h](#)" on [page 346](#) for details.See "[6064h](#)" on [page 347](#) for details.See "[6066h](#)" on [page 348](#) for details.

See "606Ch" on page 349 for details.

See "6077h" on page 351 for details.

See "607Ah" on page 351 for details.

See "607Eh" on page 353 for details.

See "60B0h" on page 359 for details.

See "60B1h" on page 359 for details.

See "60B2h" on page 359 for details.

See "60F4h" on page 366 for details.

2.4.5 Related Functions

Position deviation monitoring function

☆ Related parameters:

See "6065h" on page 347 for details.

See "6066h" on page 348 for details.

Position reference polarity

You can change the position reference direction through setting the position reference polarity.

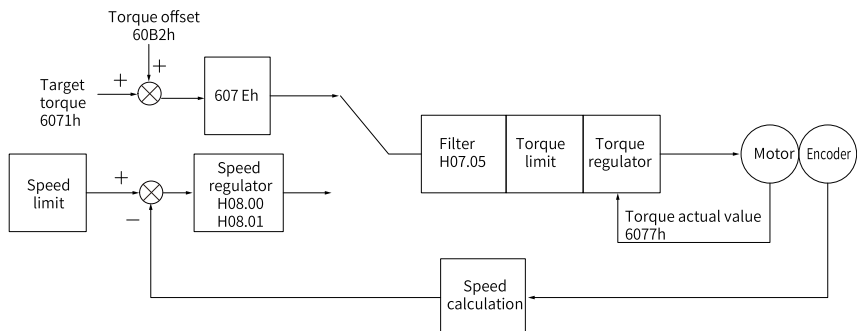
☆ Related parameters:

See "607Eh" on page 353 for details.

2.5 Cyclic synchronous torque (CST) mode

In the CST mode, the host controller sends the target torque to the servo drive through cyclic synchronization. The servo drive executes torque control.

2.5.1 Function Block Diagram



2.5.2 Configuration Block Diagram

CST mode (6060h = 10)

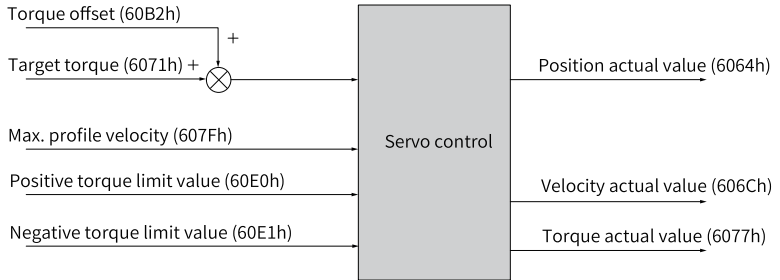


Figure 2-4 CST mode

2.5.3 Recommended Configuration

The basic configuration of cyclic synchronous torque (CST) mode is described in the following table.

RPDO	TPDO	Remarks
6040h: Control word	6041h: Status word	Mandatory
6071h: Target torque	-	Mandatory
-	6064h: Position actual value	Optional
-	606Ch: Velocity actual value	Optional
-	6077h: Torque actual value	Optional
6060h: Modes of operation	6061h: Modes of operation display	Optional

2.5.4 Related Parameters

6040h Control word

Address: 0x3502

Min.: 0

Max.: 65535

Default: -

Access: RW

Value Range:

0–65535

Description:

Defines the control command.

Unit: -

Data Type: Uint16

Change: Immediately

Mapping: RPDO

bit	Name	Description
0	Switch on	1: Enabled, 0: Disabled
1	Enable voltage	1: Enabled, 0: Disabled
2	Quick stop	0: Enabled, 1: Disabled
3	Enable operation	1: Enabled, 0: Disabled

6041h Status word

Address: 0x3504

Min.: -

Unit: -

Max.: -

Data Type: Uint16

Default: -

Change: -

Access: RO

Mapping: TPDO

Value Range:

-

Description:

Indicates the servo drive status.

bit	Name	Description
0	Ready to switch on	1: Enabled, 0: Disabled
1	Switch on	1: Enabled, 0: Disabled
2	Operation enabled	1: Enabled, 0: Disabled
3	Fault	1: Enabled, 0: Disabled
4	Voltage enabled	1: Enabled, 0: Disabled
5	Quick stop	0: Enabled, 1: Disabled
6	Switch on disabled	1: Enabled, 0: Disabled
7	Warning	1: Enabled, 0: Disabled
8	Manufacturer-specific	Undefined
9	Remote	1: Enabled, control word activated 0: Disabled
10	Target reach	Not supported, always being 1
11	Internal limit active	0: Position reference within the limit 1: Position reference beyond the limit
12	Drive follow the command value	Not supported, always being 1
13	NA	NA
14	Manufacturer-specific	Undefined
15	Home Find	0: Home not found 1: Home found

☆ Related parameters:

See "[6060h](#)" on page 345 for details.

See "[6061h](#)" on page 346 for details.

See "[6071h](#)" on page 350 for details.

See "[6072h](#)" on page 350 for details.

See "[6074h](#)" on page 351 for details.

See "[6077h](#)" on page 351 for details.

See "[607Eh](#)" on page 353 for details.

See "[607Fh](#)" on page 353 for details.

See "[60B2h](#)" on page 359 for details.

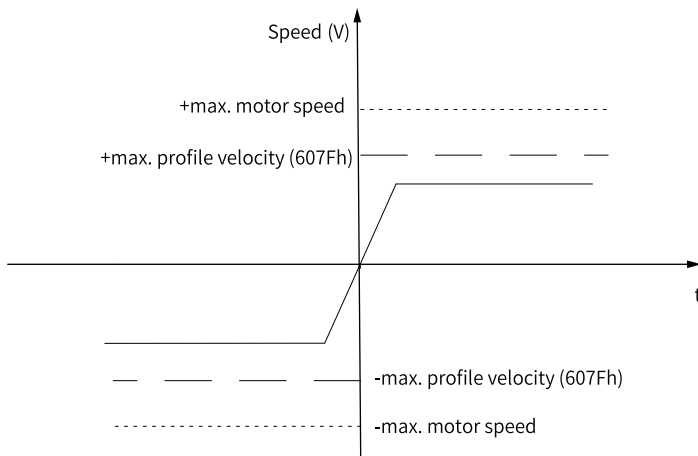
See "[60E0h](#)" on page 366 for details.

See "[60E1h](#)" on page 366 for details.

2.5.5 Related Functions

Speed limit in the torque control mode

In the torque mode, 607Fh can be used to limit the maximum speed in forward/reverse operation. Note that the maximum operating speed allowed by the motor cannot be exceeded.



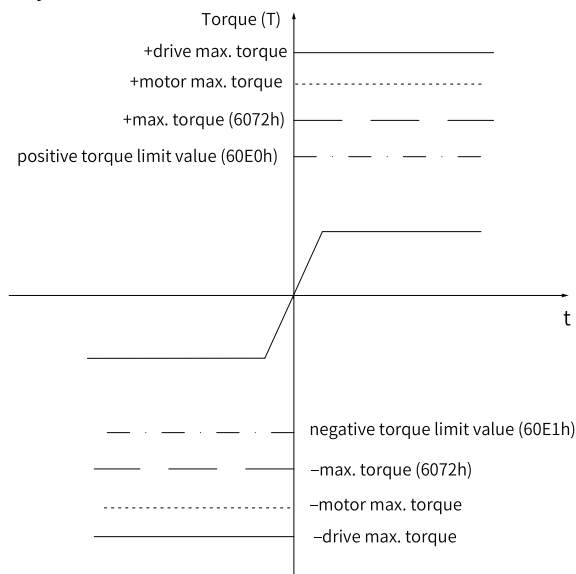
☆ Related parameters:

See "[607Fh](#)" on page 353 for details.

Torque limit

To protect mechanical devices, you can limit the torque reference in the position, speed, and torque control modes by setting 6072h (Maximum torque), 60E0h (Positive

torque limit value), and 60E1h (Negative torque limit value). Note that the maximum torque allowed by the servo drive cannot be exceeded.



☆ Related parameters:

See "[6072h](#)" on [page 350](#) for details.

See "[60E0h](#)" on [page 366](#) for details.

See "[60E1h](#)" on [page 366](#) for details.

Torque reference polarity

You can change the torque reference direction through setting the torque reference polarity.

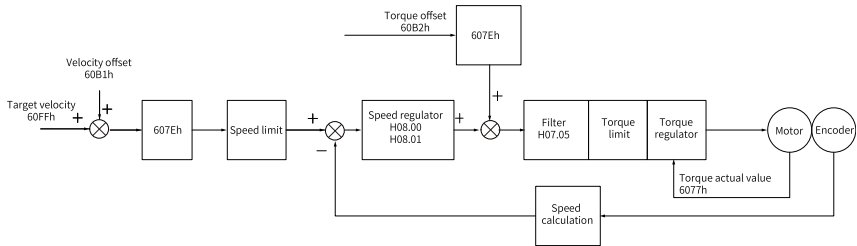
☆ Related parameters:

See "[607Eh](#)" on [page 353](#) for details.

2.6 Cyclic synchronous velocity (CSV) mode

In CSV mode, the host controller sends the target speed to the servo drive through cyclic synchronization. The servo drive executes speed control and torque control.

2.6.1 Function Block Diagram



2.6.2 Configuration Block Diagram

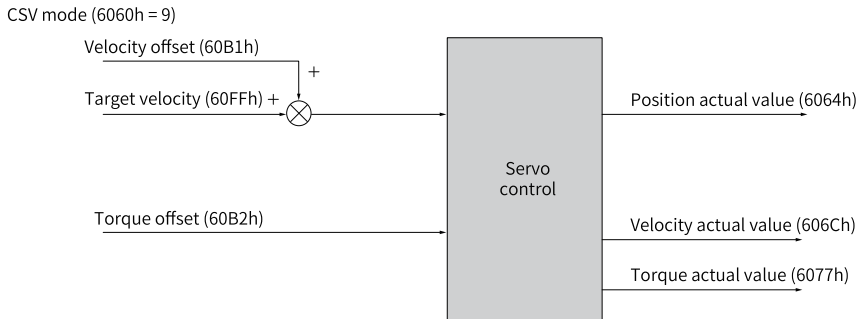


Figure 2-5 CSV mode

2.6.3 Recommended Configuration

The basic configuration for CSV mode is described in the following table.

RPDO	TPDO	Remarks
6040h: Control word	6041h: Status word	Mandatory
60FFh: Target velocity	-	Mandatory
-	6064h: Position actual value	Optional
-	606Ch: Velocity actual value	Optional
6060h: Modes of operation	6061h: Modes of operation display	Optional

2.6.4 Related Parameters

6040h Control word

Address: 0x3502

Min.: 0

Max.: 65535

Default: -

Unit: -

Data Type: Uint16

Change: Immediately

Access: RW

Mapping: RPDO

Value Range:

0–65535

Description:

Defines the control command.

bit	Name	Description
0	Switch on	1: Enabled, 0: Disabled
1	Enable voltage	1: Enabled, 0: Disabled
2	Quick stop	0: Enabled, 1: Disabled
3	Enable operation	1: Enabled, 0: Disabled

6041h Status word

Address: 0x3504

Min.: -

Unit: -

Max.: -

Data Type: Uint16

Default: -

Change: -

Access: RO

Mapping: TPDO

Value Range:

-

Description:

Indicates the servo drive status.

bit	Name	Description
0	Ready to switch on	1: Enabled, 0: Disabled
1	Switch on	1: Enabled, 0: Disabled
2	Operation enabled	1: Enabled, 0: Disabled
3	Fault	1: Enabled, 0: Disabled
4	Voltage enabled	1: Enabled, 0: Disabled
5	Quick stop	0: Enabled, 1: Disabled
6	Switch on disabled	1: Enabled, 0: Disabled
7	Warning	1: Enabled, 0: Disabled
8	Manufacturer-specific	Undefined
9	Remote	1: Enabled, control word activated 0: Disabled
10	Target reach	Not supported, always being 1
11	Internal limit active	0: Position reference within the limit 1: Position reference beyond the limit
12	Drive follow the command value	Not supported, always being 1

bit	Name	Description
13	N/A	N/A
14	Manufacturer-specific	Undefined
15	Home Find	0: Home not found 1: Home found

☆ Related parameters:

See "[6060h](#)" on page 345 for details.

See "[6061h](#)" on page 346 for details.

See "[6064h](#)" on page 347 for details.

See "[606Ch](#)" on page 349 for details.

See "[6077h](#)" on page 351 for details.

See "[607Eh](#)" on page 353 for details.

See "[60B1h](#)" on page 359 for details.

See "[60B2h](#)" on page 359 for details.

See "[60FFh](#)" on page 367 for details.

2.6.5 Related Functions

Velocity reference polarity

You can change the speed reference direction through setting the speed reference polarity.

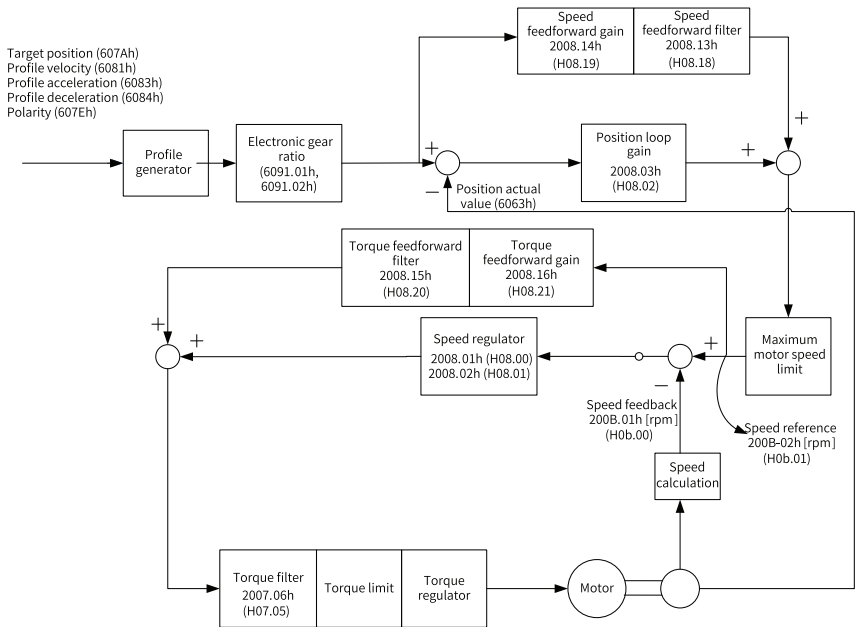
☆ Related parameters:

See "[607Eh](#)" on page 353 for details.

2.7 Profile Position (PP) Mode

The PP mode mainly applies to point-to-point positioning. In PP mode, the host controller sets the target position, operating speed, acceleration rate, and deceleration rate. The position profile generator inside the servo drive generates position profiles based on preceding settings, and the servo drive executes position control, speed control, and torque control.

2.7.1 Function Block Diagram



2.7.2 Configuration Block Diagram

PP mode (6060h = 1)

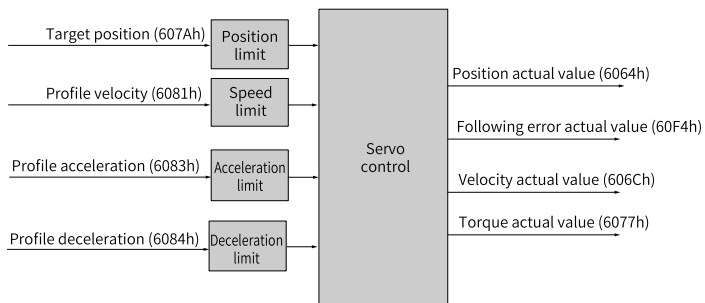


Figure 2-6 PP mode

In PP mode, the target position is triggered and activated based on the time sequence of the new set-point (bit4 of the control word) and set-point acknowledge (bit12 of the status word).

The controller sets the New set-point bit (bit4 of the control word) to 1 to inform the servo drive of the new target position. The servo drive, after receiving the new target

position, sets the Set-point acknowledge bit (bit12 of the status word) to 1. After the controller sets the New set-point to 0, if the servo drive can receive the new target position, the Set-point acknowledge bit will be set to 0. Otherwise, it is kept to 1.

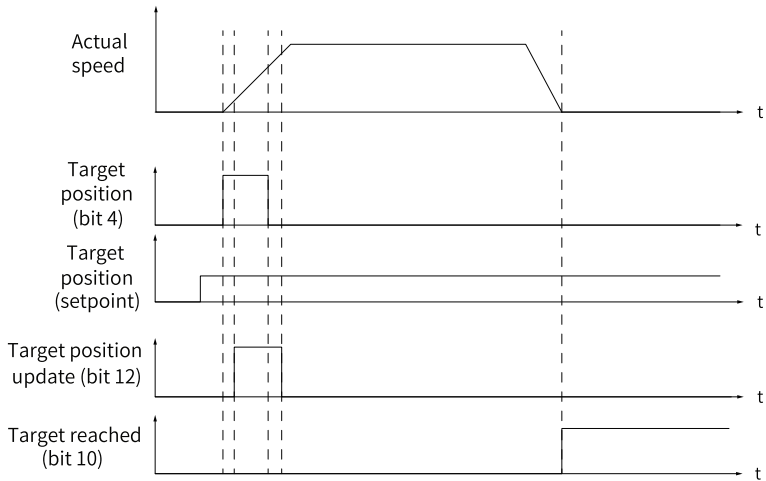


Figure 2-7 Sequence in sequential mode

The linkage mode of position references is determined by bit5 (Change set immediately) of the control word. When bit5 is set to 1 (Sequential mode), sequential linkage applies between position references, which is called sequential mode. When bit5 is set to 0 (Single-point mode), zero-cross linkage applies to position references, which is called single-point mode.

Sequential mode:

The target position of present segment is in the process of positioning. After the new target position is generated, the controller sets the New set-point bit to 1, and the servo drive performs positioning towards the new target position.

In sequential mode, the sequence diagram of bit4 of the control word (New set-point) and bit12 of the status word (Set-point acknowledge) is as follows.

Single-point mode:

The target position of present segment is in the process of positioning. After the new target position is generated, the controller sets the bit4 (New set-point) of the control word to 1, and the servo drive executes positioning towards the new target position after the position reference of present segment is done transmitting.

The time sequence diagram of the new set-point (bit4 of the control word) and the set-point acknowledge (bit12 of the status word) is as follows.

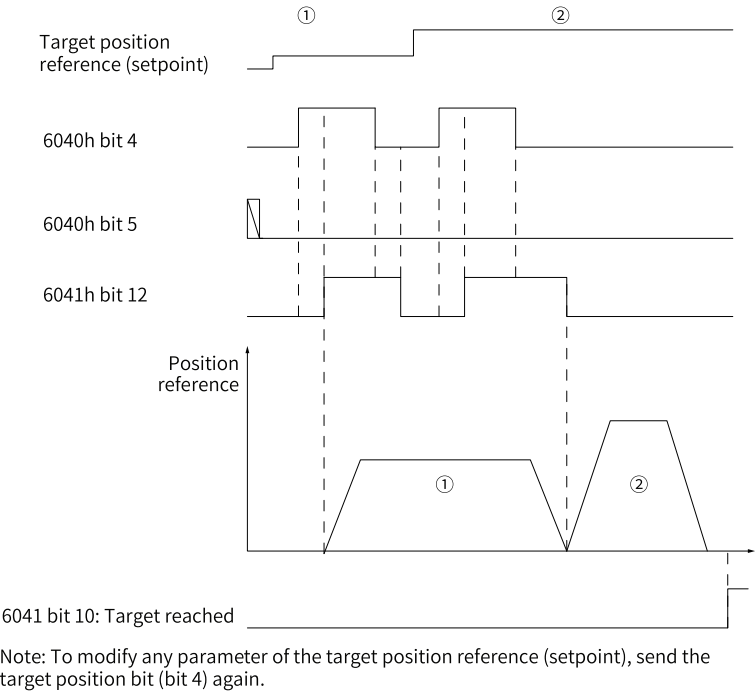
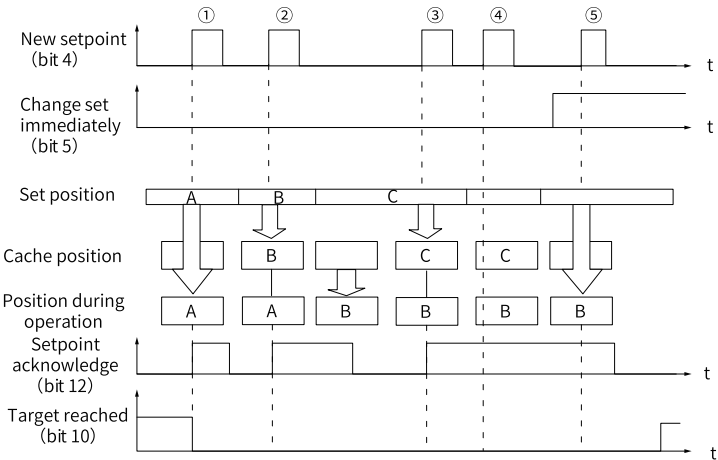


Figure 2-8 Sequence in the single-point mode

In the single-point mode, the servo drive caches one target position, which is to cache a new segment of target position when current target position is under execution. The sequence diagram is as follows.



- ① If the cache position is empty, the set position will be executed immediately.
- ②③ If a position reference is under execution currently, the new position setpoint will be saved in the cache. After current position reference is done transmitting, the cached setpoint will be executed, after which a new setpoint can be received.
- ④⑤ The new setpoints cannot be received if the cache is full. In this case, you can set the attribute bit (Change set immediately) of the set value to 1 to activate the set value.

2.7.3 Recommended Configuration

The basic configuration for PP mode is described in the following table.

RPDO	TPDO	Remarks
6040h: control word	6041h: status word	Mandatory
607Ah: target position	6064h: position actual value	Mandatory
6081h: profile velocity	-	Mandatory
6083h: profile acceleration	-	Optional
6084h: profile deceleration	-	Optional
6060h: modes of operation	6061h: modes of operation display	Optional

2.7.4 Related Parameters

6040h Control word

Address: 0x3502

Min.: 0

Max.: 65535

Default: -

Access: RW

Unit: -

Data Type: Uint16

Change: Immediately

Mapping: RPDO

Value Range:

0–65535

Description:

Defines the control command.

bit	Name	Description
0	Switch on	1: Enabled, 0: Disabled
1	Enable voltage	1: Enabled, 0: Disabled
2	Quick stop	0: Enabled, 1: Disabled
3	Enable operation	1: Enabled, 0: Disabled
4	New set-point	0→1: Trigger new target position 1→0: clear bit12 of the status word

bit	Name	Description
5	Change set immediately	0: Target set-point cannot be updated immediately 1: Target set-point can be updated immediately
6	abs/rel	0: Target position being absolute 1: Target position being relative
8	Halt	0: Keep present operating state 1: Halt

6041h Status word

Address: 0x3504

Min.: -

Unit: -

Max.: -

Data Type: Uint16

Default: -

Change: -

Access: RO

Mapping: TPDO

Value Range:

-

Description:

Indicates the servo drive status.

bit	Name	Description
0	Ready to switch on	1: Enabled, 0: Disabled
1	Switch on	1: Enabled, 0: Disabled
2	Operation enabled	1: Enabled, 0: Disabled
3	Fault	1: Enabled, 0: Disabled
4	Voltage enabled	1: Enabled, 0: Disabled
5	Quick stop	0: Enabled, 1: Disabled
6	Switch on disabled	1: Enabled, 0: Disabled
7	Warning	1: Enabled, 0: Disabled
8	Manufacturer-specific	Undefined
9	Remote	1: Enabled, control word activated 0: Disabled
10	Target reach	0: Target position not reached 1: Target position is reached
11	Internal limit active	0: Position reference within the limit 1: Position reference beyond the limit
12	Set-point acknowledge	0: Set-point can be updated 1: Set-point cannot be updated

bit	Name	Description
13	Following error	0: EB00.0 (Excessive position deviation) not reported 1: EB00.0 (Excessive position deviation) reported
14	Manufacturer-specific	Undefined
15	Home Find	0: Home not found 1: Home found

☆ Related parameters:

See ["6060h" on page 345](#) for details.

See ["6061h" on page 346](#) for details.

See ["6064h" on page 347](#) for details.

See ["6065h" on page 347](#) for details.

See ["6066h" on page 348](#) for details.

See ["6067h" on page 348](#) for details.

See ["6068h" on page 348](#) for details.

See ["607Ah" on page 351](#) for details.

See ["607Eh" on page 353](#) for details.

See ["607Fh" on page 353](#) for details.

See ["6081h" on page 354](#) for details.

See ["6083h" on page 354](#) for details.

See ["6084h" on page 355](#) for details.

2.7.5 Related Functions

Positioning completed

Positioning completed: When position deviation fulfills the set condition, the positioning process is done. In this case, the servo drive sets bit10 of the status word, and the host controller, once receives the signal, acknowledges that positioning is done.

☆ Related parameters:

See ["6067h" on page 348](#) for details.

See ["6068h" on page 348](#) for details.

Position deviation monitoring function

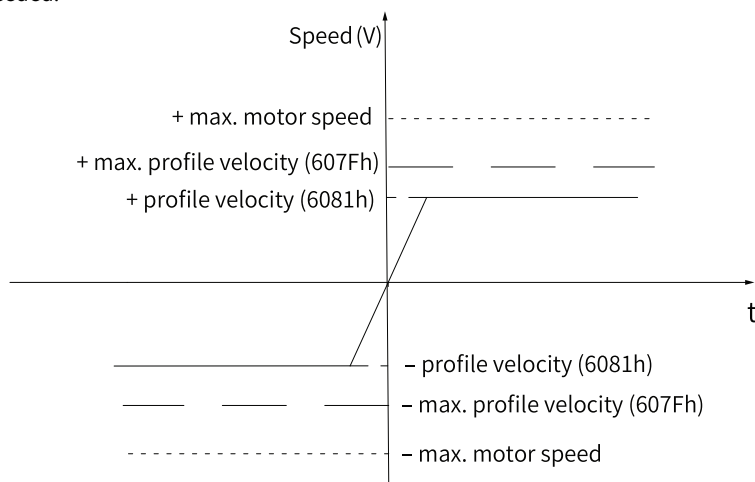
☆ Related parameters:

See ["6065h" on page 347](#) for details.

See ["6066h" on page 348](#) for details.

Speed limit

In PP mode, 607Fh can be used to limit the maximum speed in forward/reverse operation. Note that the maximum operating speed of the motor cannot be exceeded.



☆ Related parameters:

See "[607Fh](#)" on [page 353](#) for details.

Acceleration and deceleration limits

In PP mode, the change rate of position references can be limited through the acceleration and deceleration limits.

☆ Related parameters:

See "[6083h](#)" on [page 354](#) for details.

See "[6084h](#)" on [page 355](#) for details.

Reference polarity

You can change the position reference direction through setting the position reference polarity.

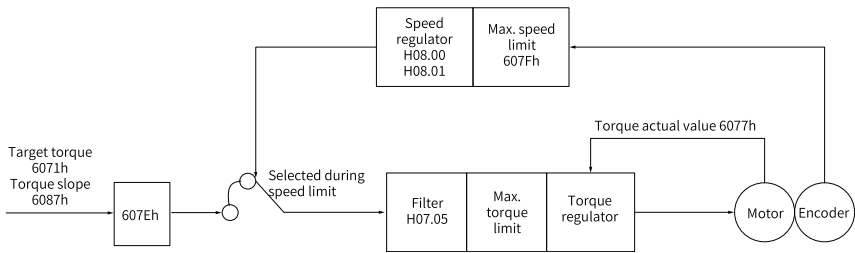
☆ Related parameters:

See "[607Eh](#)" on [page 353](#) for details.

2.8 Profile torque (PT) mode

In the PT mode, the host controller sends the target torque (6071h) and the torque slope (6087h) to the servo drive. The servo drive generates the torque reference curve and executes torque control.

2.8.1 Function Block Diagram



2.8.2 Configuration Block Diagram

PT mode (6060h = 4)

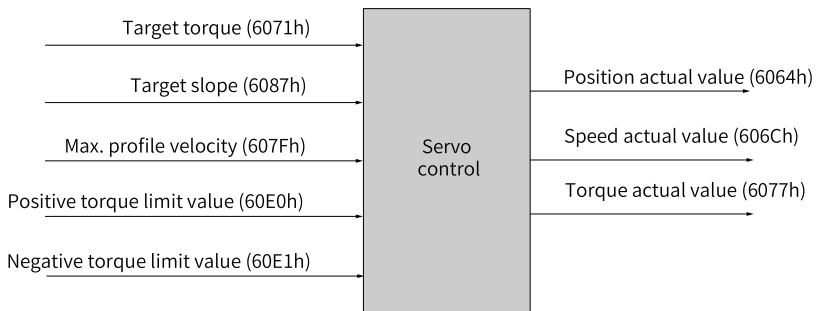


Figure 2-9 PT mode

2.8.3 Recommended Configuration

The basic configuration for the PT mode is described in the following table.

RPDO	TPDO	Remarks
6040h: Control word	6041h: Status word	Mandatory
6071h: Target torque	-	Mandatory
6087h: Torque slope	-	Optional
-	6064h: Position actual value	Optional
-	606Ch: Velocity actual value	Optional
-	6077h: Torque actual value	Optional
6060h: Modes of operation	6061h: Modes of operation display	Optional

2.8.4 Related Parameters

6040h Control word
Address: 0x3502

Min.: 0
 Max.: 65535
 Default: -
 Access: RW

Unit: -
 Data Type: Uint16
 Change: Immediately
 Mapping: RPDO

Value Range:

0–65535

Description:

Defines the control command.

bit	Name	Description
0	Switch on	1: Enabled, 0: Disabled
1	Enable voltage	1: Enabled, 0: Disabled
2	Quick stop	0: Enabled, 1: Disabled
3	Enable operation	1: Enabled, 0: Disabled
8	Halt	0: Keep present operating state, 1: Halt

6041h Status word

Address: 0x3504

Min.: -
 Max.: -
 Default: -
 Access: RO

Unit: -
 Data Type: Uint16
 Change: -
 Mapping: TPDO

Value Range:

-

Description:

Indicates the servo drive status.

Bit	Name	Description
0	Ready to switch on	1: Enabled, 0: Disabled
1	Switch on	1: Enabled, 0: Disabled
2	Operation enabled	1: Enabled, 0: Disabled
3	Fault	1: Enabled, 0: Disabled
4	Voltage enabled	1: Enabled, 0: Disabled
5	Quick stop	0: Enabled, 1: Disabled
6	Switch on disabled	1: Enabled, 0: Disabled
7	Warning	1: Enabled, 0: Disabled
8	Manufacturer-specific	Undefined
9	Remote	1: Enabled, control word activated 0: Disabled

Bit	Name	Description
10	Target reach	0: Target velocity not reached 1: Target velocity reached
11	Internal limit active	0: Position feedback within the limit 1: Position feedback beyond the limit
12–14	N/A	No assignment, always being 0
15	Home Find	0: Home not found 1: Home found

☆ Related parameters:

See "[H07_en.17](#)" on [page 191](#) for details.

See "[6060h](#)" on [page 345](#) for details.

See "[6061h](#)" on [page 346](#) for details.

See "[6064h](#)" on [page 347](#) for details.

See "[6072h](#)" on [page 350](#) for details.

See "[6074h](#)" on [page 351](#) for details.

See "[6077h](#)" on [page 351](#) for details.

See "[607Eh](#)" on [page 353](#) for details.

See "[607Fh](#)" on [page 353](#) for details.

See "[6087h](#)" on [page 355](#) for details.

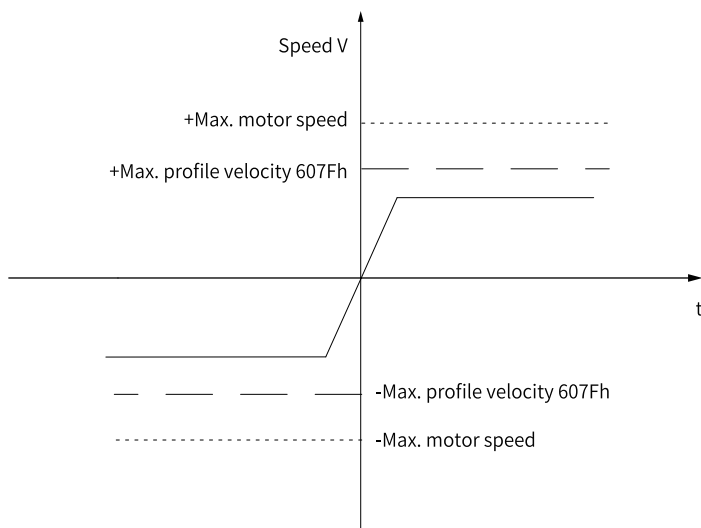
See "[60E0h](#)" on [page 366](#) for details.

See "[60E1h](#)" on [page 366](#) for details.

2.8.5 Related Functions

Speed limit in the torque control mode

In the torque mode, 607Fh can be used to limit the maximum speed in forward/reverse operation. Note that the maximum speed cannot exceed the maximum running speed allowed by the motor.

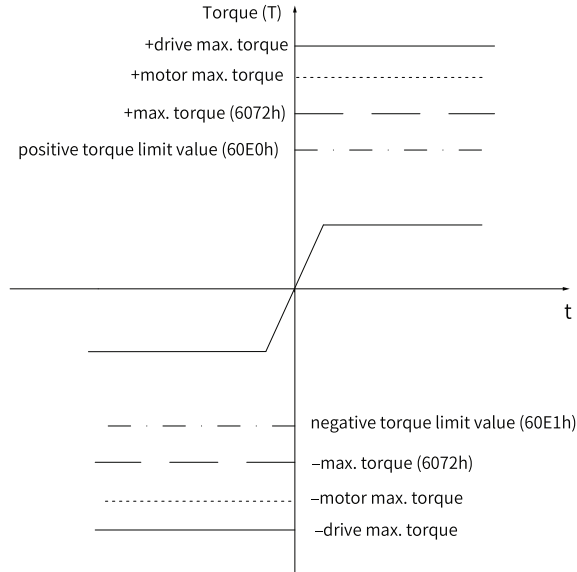


☆ Related parameters:

See "[6087h](#)" on [page 355](#) for details.

Torque limit

To protect mechanical devices, you can limit the torque reference in the position, speed, and torque control modes by setting 6072h (Maximum torque), 60E0h (Positive torque limit value), and 60E1h (Negative torque limit value). Note that the maximum torque allowed by the servo drive cannot be exceeded.



☆ Related parameters:

See "[6072h](#)" on [page 350](#) for details.

See "[60E0h](#)" on [page 366](#) for details.

See "[60E1h](#)" on [page 366](#) for details.

Torque reference polarity

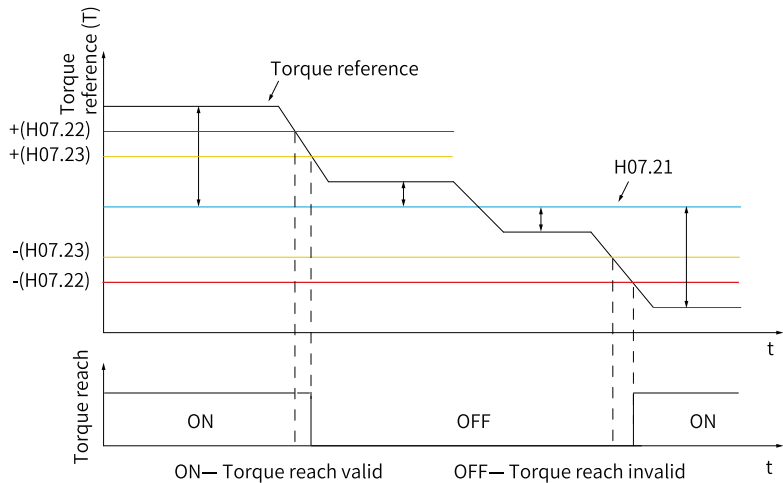
You can change the torque reference direction through setting the torque reference polarity.

☆ Related parameters:

See "[607Fh](#)" on [page 353](#) for details.

Monitoring on torque reach

It is used to determine whether the torque reference value reaches the set torque base value. If yes, a corresponding torque reach signal will be output to the host controller.



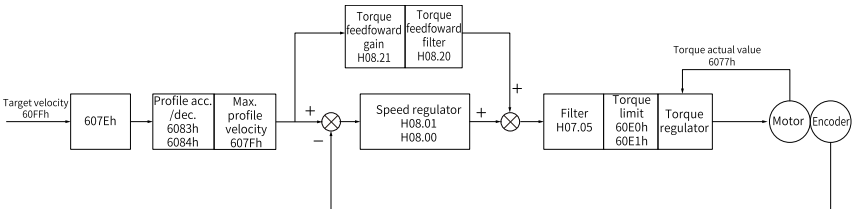
If the absolute difference between the torque reference and H07.21 (Base value for torque reach) is higher than H07.22 (Threshold for valid torque reach), the torque reach signal is active. Otherwise, the original status applies.

If the absolute difference between the torque reference and H07.21 (Base value for torque reach) is lower than H07.23 (Threshold for invalid torque reach), the torque reach signal is inactive. Otherwise, the original status applies.

2.9 Profile Velocity (PV) Mode

In the PV mode, the host controller sends the target speed, acceleration rate, and deceleration rate to the servo drive. The servo drive generates the speed reference curve and executes speed control and torque control.

2.9.1 Function Block Diagram



2.9.2 Configuration Block Diagram

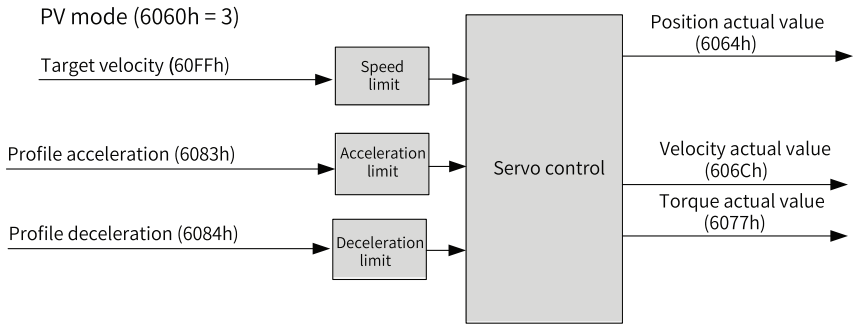


Figure 2-10 PV mode

2.9.3 Recommended Configuration

The basic configuration for PV mode is described in the following table.

RPDO	TPDO	Remarks
6040h: control word	6041h: status word	Mandatory
60FFh: Target velocity	-	Mandatory
-	6064h: position actual value	Optional
-	606Ch: Velocity actual value	Optional
6083h: profile acceleration	-	Optional
6084h: profile deceleration	-	Optional
6060h: modes of operation	6061h: modes of operation display	Optional

2.9.4 Related Parameters

6040h Control word

Address: 0x3502

Min.: 0

Max.: 65535

Default: -

Access: RW

Unit: -

Data Type: Uint16

Change: Immediately

Mapping: RPDO

Value Range:

0–65535

Description:

Defines the control command.

bit	Name	Description
0	Switch on	1: Enabled, 0: Disabled
1	Enable voltage	1: Enabled, 0: Disabled
2	Quick stop	0: Enabled, 1: Disabled
3	Enable operation	1: Enabled, 0: Disabled
8	Halt	0: Keep present operating state, 1: Halt

6041h Status word

Address: 0x3504

Min.: -

Unit: -

Max.: -

Data Type: Uint16

Default: -

Change: -

Access: RO

Mapping: TPDO

Value Range:

-

Description:

Indicates the servo drive status.

bit	Name	Description
0	Ready to switch on	1: Enabled, 0: Disabled
1	Switch on	1: Enabled, 0: Disabled
2	Operation enabled	1: Enabled, 0: Disabled
3	Fault	1: Enabled, 0: Disabled
4	Voltage enabled	1: Enabled, 0: Disabled
5	Quick stop	0: Enabled, 1: Disabled
6	Switch on disabled	1: Enabled, 0: Disabled
7	Warning	1: Enabled, 0: Disabled
8	Manufacturer-specific	Undefined
9	Remote	1: Enabled, control word activated 0: Disabled
10	Target reach	0: Target velocity not reached 1: Target velocity reached
11	Internal limit active	0: Position feedback within the limit 1: Position feedback beyond the limit
12	Speed	0: Speed not being 0 1: Speed being 0
13	NA	NA
14	Manufacturer-specific	Undefined
15	Home Find	0: Home not found 1: Home found

☆ Related parameters:

See "[606Ch](#)" on page 349 for details.

See "[606Dh](#)" on page 349 for details.

See "[606Eh](#)" on page 349 for details.

See "[606Fh](#)" on page 350 for details.

See "[6070h](#)" on page 350 for details.

See "[607Eh](#)" on page 353 for details.

See "[607Fh](#)" on page 353 for details.

See "[6083h](#)" on page 354 for details.

See "[6084h](#)" on page 355 for details.

See "[60FFh](#)" on page 367 for details.

2.9.5 Related Functions

Monitoring on speed reach status

It is used to check whether the speed reference of the servo drive is consistent with the motor speed feedback.

☆ Related parameters:

See "[606Dh](#)" on page 349 for details.

See "[606Eh](#)" on page 349 for details.

Monitoring on zero speed

It is used to check whether the absolute value of motor speed feedback is lower than the set threshold. If yes, the motor is close to a standstill (zero speed) and bit12 of the status word is set to 1.

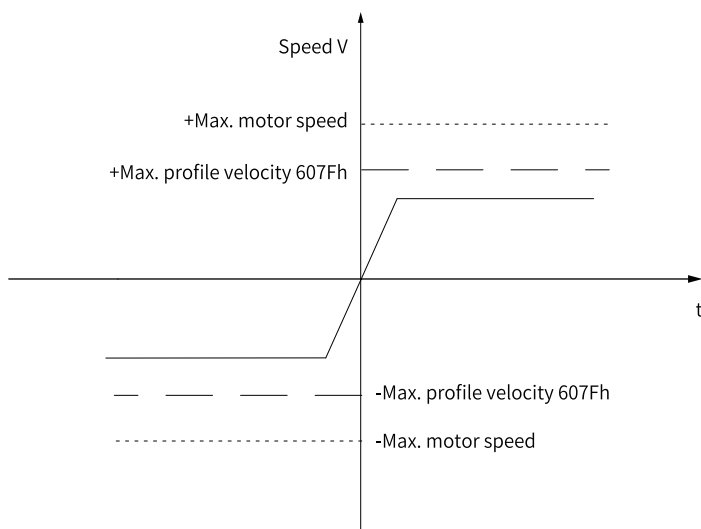
☆ Related parameters:

See "[606Fh](#)" on page 350 for details.

See "[6070h](#)" on page 350 for details.

Speed limit

In PP mode, 607Fh can be used to limit the maximum speed in forward/reverse operation. Note that the maximum speed cannot exceed the maximum running speed allowed by the motor.



☆ Related parameters:

See "[607Fh](#)" on [page 353](#) for details.

Acceleration and deceleration limits

In PV mode, the change rate of speed references can be limited through acceleration and deceleration limits.

☆ Related parameters:

See "[60C5h](#)" on [page 364](#) for details.

See "[60C6h](#)" on [page 364](#) for details.

Reference polarity

You can change the speed reference direction through setting the speed reference polarity.

☆ Related parameters:

See "[607Eh](#)" on [page 353](#) for details.

2.10 Homing Mode (HM)

The homing mode is used to search for the mechanical home and determine the position relationship between the mechanical home and mechanical zero.

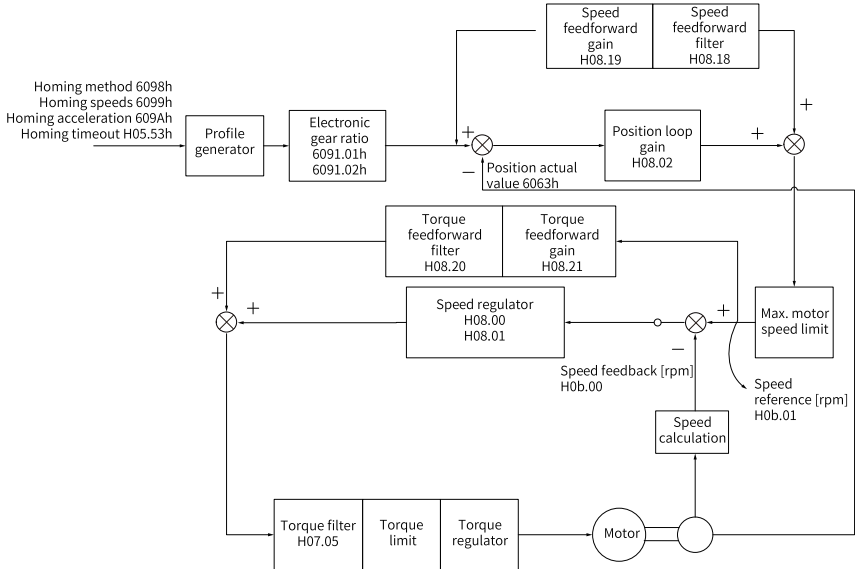
- Mechanical home: a fixed position on the machine, which corresponds to a certain home switch or the motor Z signal.
- Mechanical zero: absolute zero position on the machine

After homing is done, the motor stops at the mechanical home. The relationship between the mechanical home and mechanical zero can be set in 607Ch.

Mechanical home = Mechanical zero + 607Ch (Home offset)

When 607Ch = 0, the mechanical home coincide with the mechanical zero.

2.10.1 Function Block Diagram



2.10.2 Configuration Block Diagram

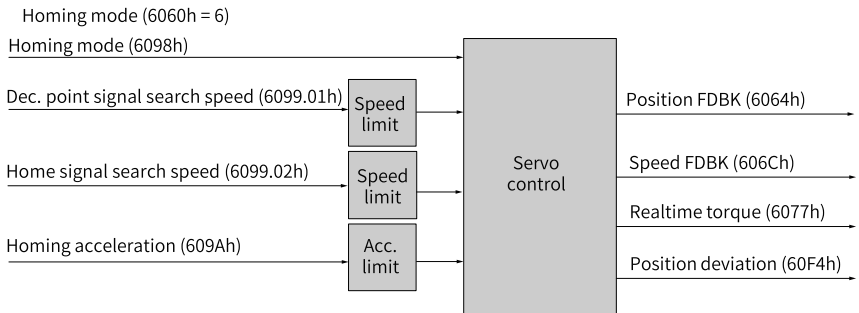


Figure 2-11 HM mode

2.10.3 Recommended Configuration

The basic configuration for the homing mode is shown in the following table.

RPDO	TPDO	Remarks
6040h: Control word	6041h: Status word	Mandatory
6098h: Homing method	-	Optional
6099.01h: Speed during search for switch	-	Optional
6099.02h: Speed during search for zero	-	Optional
609Ah: Homing acceleration	-	Optional
-	6064h: Position actual value	Optional
6060h: Modes of operation	6061h: Modes of operation display	Optional

2.10.4 Related Parameters

6040h Control word

Address: 0x3502

Min.: 0

Max.: 65535

Default: -

Access: RW

Value Range:

0–65535

Description:

Defines the control command.

Unit: -

Data Type: Uint16

Change: Immediately

Mapping: RPDO

bit	Name	Description
0	Switch on	1: Enabled, 0: Disabled
1	Enable voltage	1: Enabled, 0: Disabled
2	Quick stop	0: Enabled, 1: Disabled
3	Enable operation	1: Enabled, 0: Disabled
4	Enable homing	0→1: Start, 1→0: Stop
8	Halt	0: Keep present operating state, 1: Halt

6041h Status word

Address: 0x3504

Min.: -

Max.: -

Default: -

Access: RO

Value Range:

-

Unit: -

Data Type: Uint16

Change: -

Mapping: TPDO

Description:

Indicates the servo drive status.

bit	Name	Description
0	Ready to switch on	1: Enabled, 0: Disabled
1	Switch on	1: Enabled, 0: Disabled
2	Operation enabled	1: Enabled, 0: Disabled
3	Fault	1: Enabled, 0: Disabled
4	Voltage enabled	1: Enabled, 0: Disabled
5	Quick stop	0: Enabled, 1: Disabled
6	Switch on disabled	1: Enabled, 0: Disabled
7	Warning	1: Enabled, 0: Disabled
8	Manufacturer-specific	Undefined
9	Remote	1: Enabled, control word activated 0: Disabled
10	Target reach	1: Home located or homing interrupted 0: Disabled or home is not found
12	Homing attained	0: Home signal not found 1: Home signal found
13	Homing error	0: Homing error not occurred 1: Homing error occurred
15	Home Find	0: Home not found 1: Home found

☆ Related parameters:

See "[6060h](#)" on [page 345](#) for details.

See "[6061h](#)" on [page 346](#) for details.

See "[6065h](#)" on [page 347](#) for details.

See "[6066h](#)" on [page 348](#) for details.

See "[6098h](#)" on [page 357](#) for details.

See "[6099_en.01h](#)" on [page 358](#) for details.

See "[6099_en.02h](#)" on [page 358](#) for details.

See "[609Ah](#)" on [page 359](#) for details.

See "[607Ch](#)" on [page 352](#) for details.

See "[607Fh](#)" on [page 353](#) for details.

See "[60C5h](#)" on [page 364](#) for details.

2.10.5 Related Functions

Homing timeout

When the homing duration exceeds the value defined by H05.35 (Homing time limit), the servo drive reports E601.0 (Homing timeout).

E601.0 can be used to determine whether the homing speed, the acceleration setpoint are proper and whether the deceleration point signal and home signal are connected properly.

☆ Related parameters:

See "[H05_en.35" on page 174](#) for details.

Actual position calculation method

After homing, the calculation method for current mechanical position can be set in 60E6h.

☆ Related parameters:

See "[607Fh" on page 353](#) for details.

See "[609Ah" on page 359](#) for details.

Position deviation monitoring function

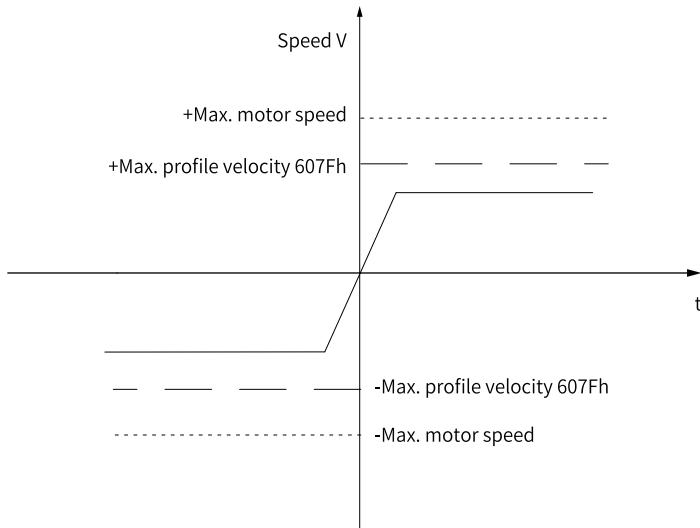
☆ Related parameters:

See "[6065h" on page 347](#) for details.

See "[6066h" on page 348](#) for details.

Speed limit

In the HM mode, 607Fh can be used to limit the maximum speed in forward/reverse operation. Note that the maximum speed cannot exceed the maximum running speed allowed by the motor.



☆ Related parameters:

See "[607Fh](#)" on [page 353](#) for details.

Acceleration limit

In the homing mode, the change rate of position references can be limited through the acceleration limit.

☆ Related parameters:

See "[60C5h](#)" on [page 364](#) for details.

2.10.6Homing Operation

6098h = 1

Mechanical home: Z signal

Deceleration point: negative limit switch (N-OT)

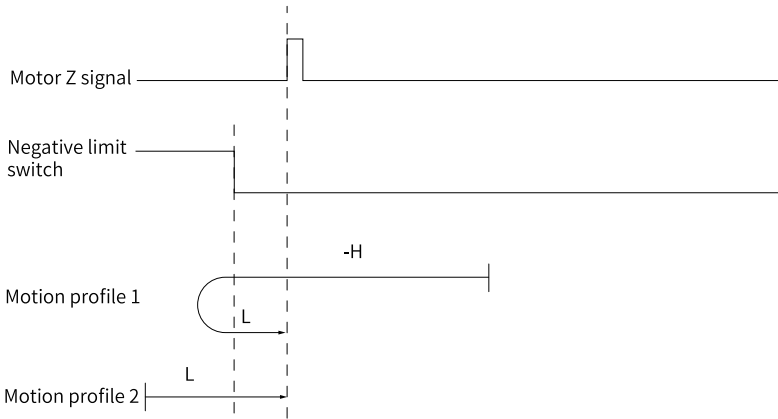


Figure 2-12 Motor running curve and speeds in Mode 1

- Motion profile 1: Deceleration point signal inactive at start.
- Motion profile 2: Deceleration point signal active at start.

Note

Note: In the figure, "H" represents high speed 6099.01h, and "L" represents low speed 6099.02h, and "-" indicates reverse run.

6098h = 2

Home: Z signal

Deceleration point: positive limit switch (P-OT)

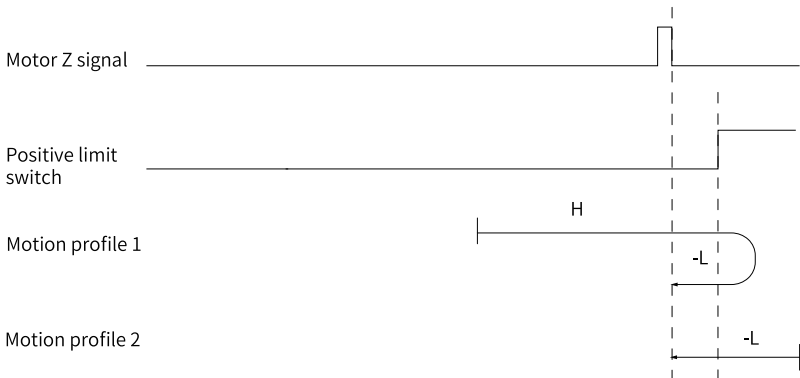


Figure 2-13 Motor running curve and speeds in Mode 2

- Motion profile 1: Deceleration point signal inactive at start.

- Motion profile 2: Deceleration point signal active at start.

6098h = 3

Home: Z signal

Deceleration point: home switch (HW)

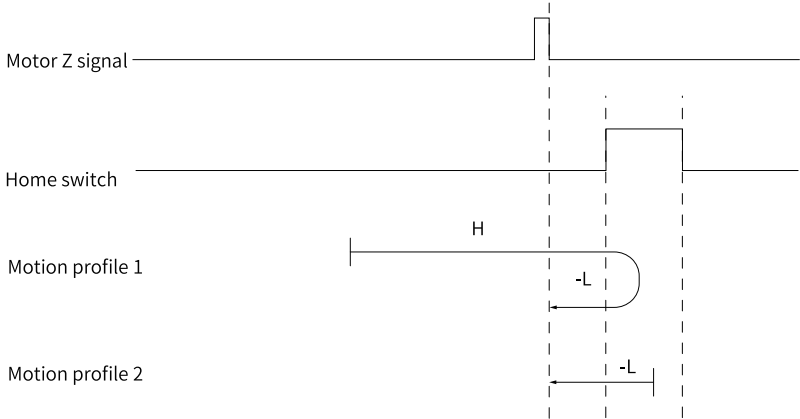


Figure 2-14 Motor running curve and speeds in Mode 3

- Motion profile 1: Deceleration point signal inactive at start.
- Motion profile 2: Deceleration point signal active at start.

6098h = 4

Home: Z signal

Deceleration point: home switch (HW)

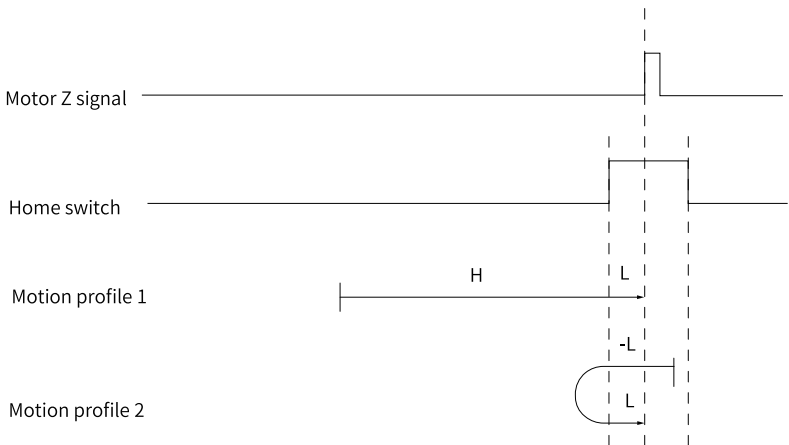


Figure 2-15 Motor running curve and speeds in Mode 4

- Motion profile 1: Deceleration point signal inactive at start.
- Motion profile 2: Deceleration point signal active at start.

6098h = 5

Home: Z signal

Deceleration point: home switch (HW)

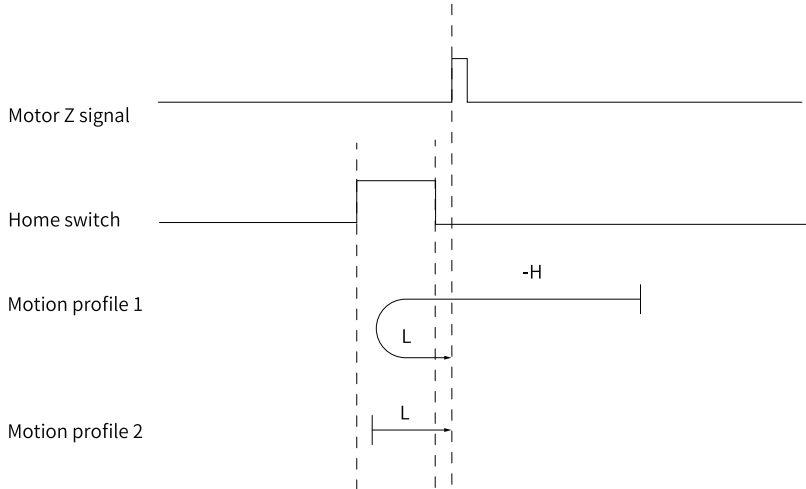


Figure 2-16 Motor running curve and speeds in Mode 5

- Motion profile 1: Deceleration point signal inactive at start.
- Motion profile 2: Deceleration point signal active at start.

6098h = 6

Home: Z signal

Deceleration point: home switch (HW)

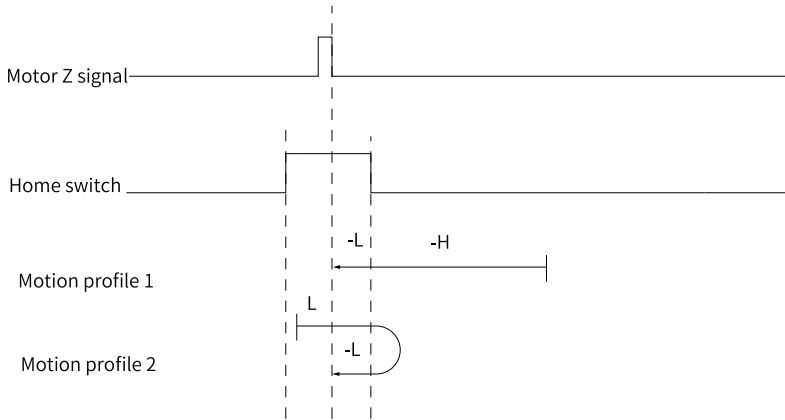


Figure 2-17 Motor running curve and speeds in Mode 6

- Motion profile 1: Deceleration point signal inactive at start.
- Motion profile 2: Deceleration point signal active at start.

6098h = 7

Home: Z signal

Deceleration point: home switch (HW)

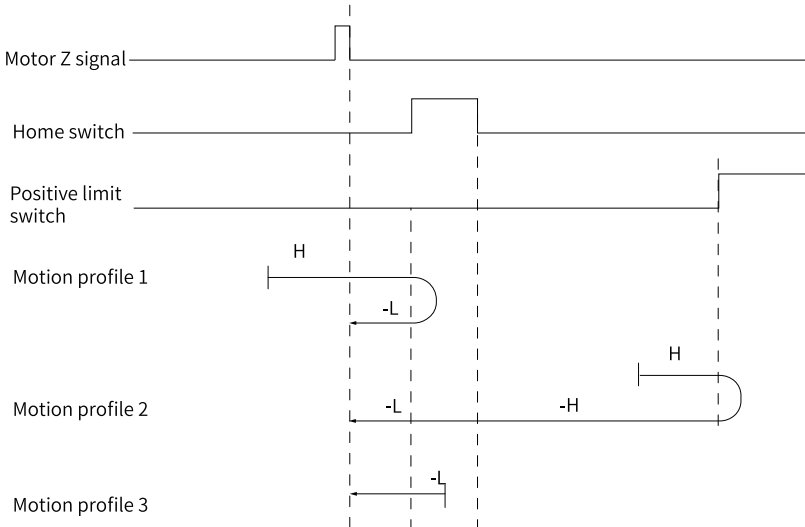


Figure 2-18 Motor running curve and speeds in Mode 7

- Motion profile 1: Deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: HW signal inactive at start, hitting the positive limit switch.

- Motion profile 3: Deceleration point signal active at start.

6098h = 8

Home: Z signal

Deceleration point: home switch (HW)

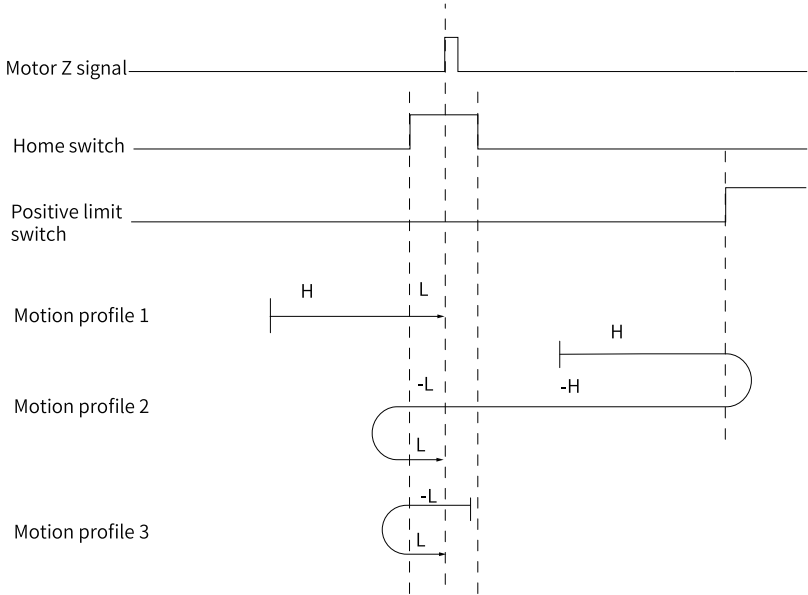


Figure 2-19 Motor running curve and speeds in Mode 8

- Motion profile 1: Deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: HW signal inactive at start, hitting the positive limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 9

Home: Z signal

Deceleration point: home switch (HW)

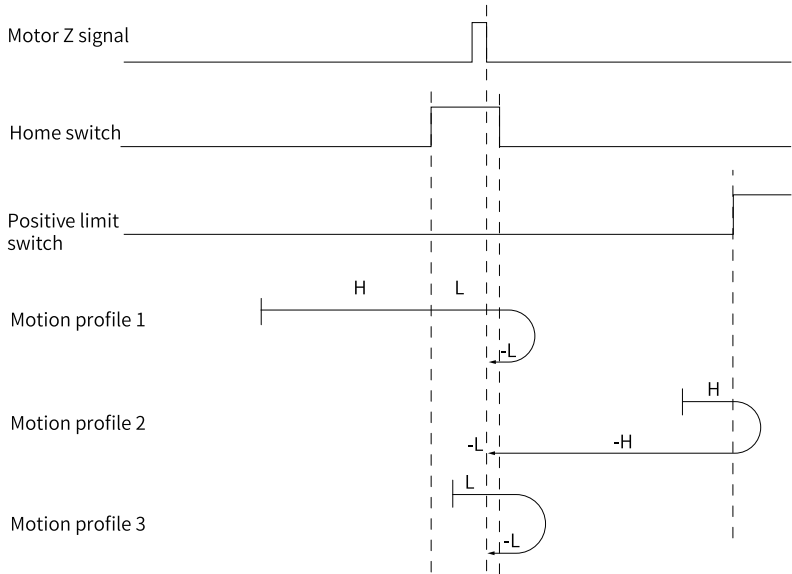


Figure 2-20 Motor running curve and speeds in Mode 9

- Motion profile 1: Deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: HW signal inactive at start, hitting the positive limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 10

Home: Z signal

Deceleration point: home switch (HW)

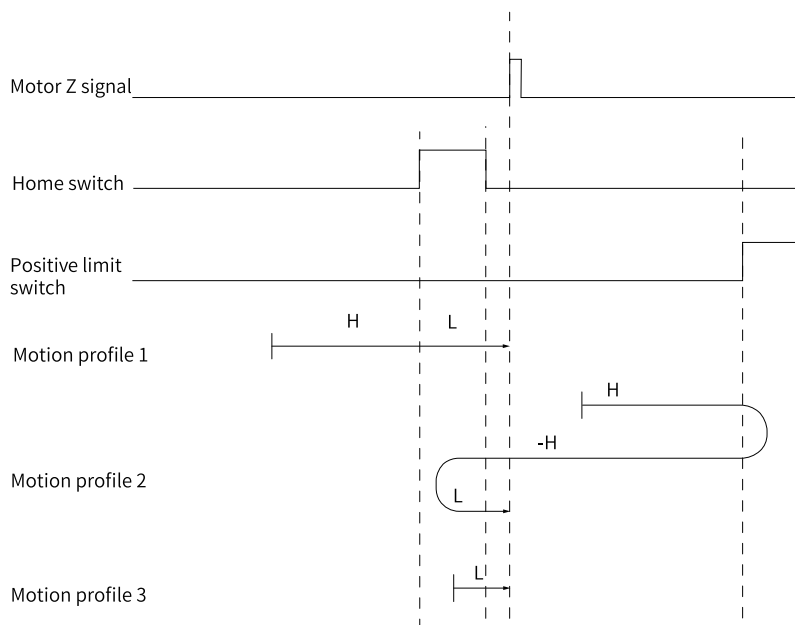


Figure 2-21 Motor running curve and speeds in Mode 10

- Motion profile 1: Deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: HW signal inactive at start, hitting the positive limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 11

Home: Z signal

Deceleration point: home switch (HW)

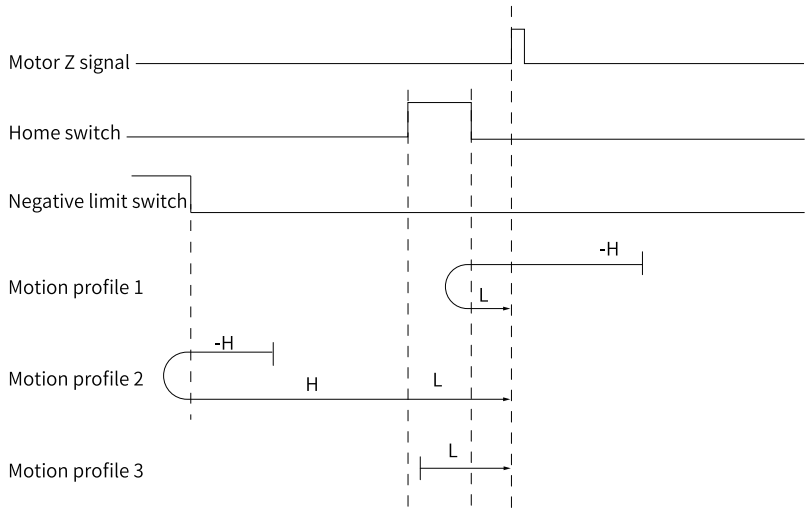


Figure 2-22 Motor running curve and speeds in Mode 11

- Motion profile 1: Deceleration point signal inactive at start, not hitting the reverse limit switch.
- Motion profile 2: HW signal inactive at start, hitting the reverse limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 12

Home: Z signal

Deceleration point: home switch (HW)

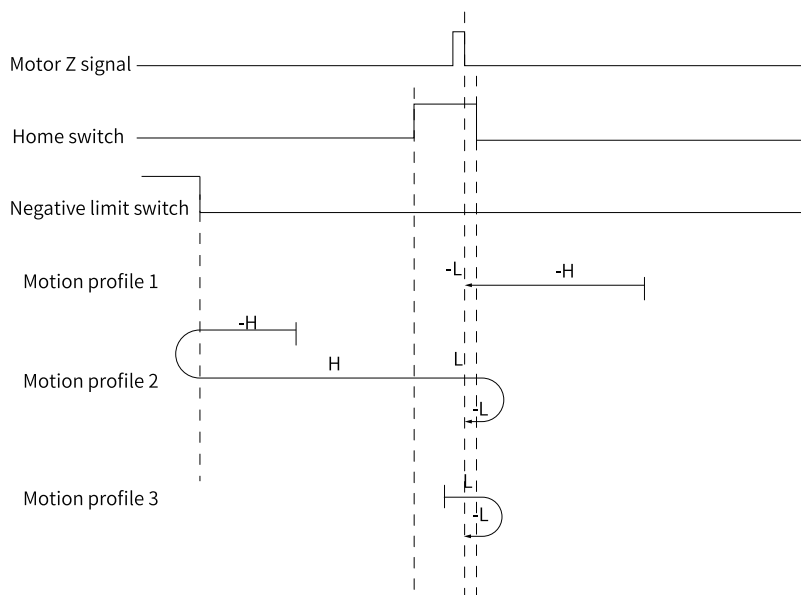


Figure 2-23 Motor running curve and speeds in Mode 12

- Motion profile 1: Deceleration point signal inactive at start, not hitting the reverse limit switch.
- Motion profile 2: HW signal inactive at start, hitting the reverse limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 13

Home: Z signal

Deceleration point: home switch (HW)

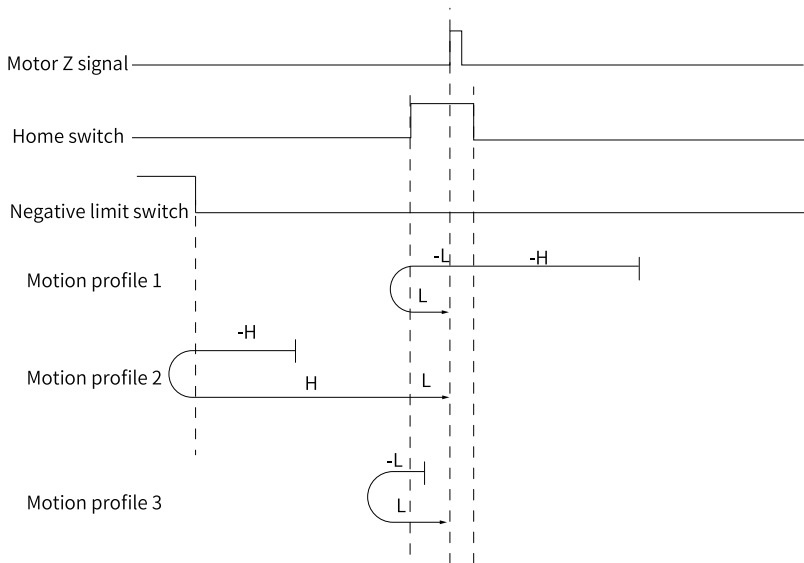


Figure 2-24 Motor running curve and speeds in Mode 13

- Motion profile 1: Deceleration point signal inactive at start, not hitting the reverse limit switch.
- Motion profile 2: HW signal inactive at start, hitting the reverse limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 14

Home: Z signal

Deceleration point: home switch (HW)

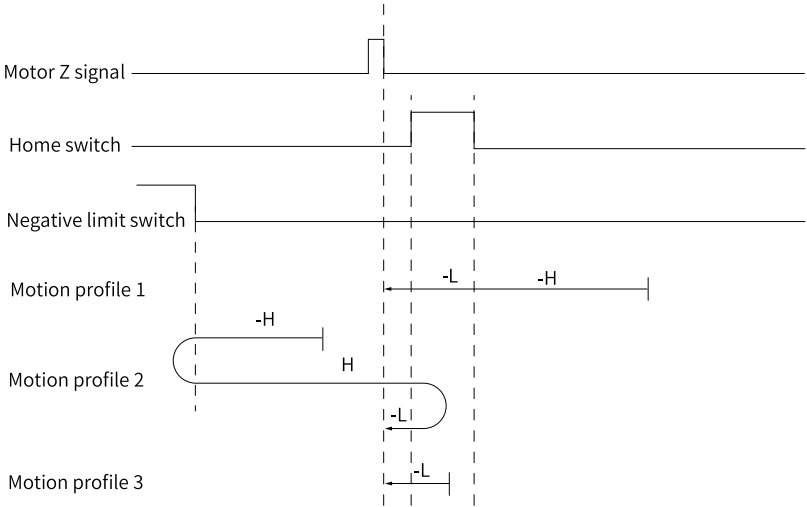


Figure 2-25 Motor running curve and speeds in Mode 14

- Motion profile 1: Deceleration point signal inactive at start, not hitting the reverse limit switch.
- Motion profile 2: HW signal inactive at start, hitting the reverse limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 17

Home: negative limit switch

Deceleration point: negative limit switch (N-OT)

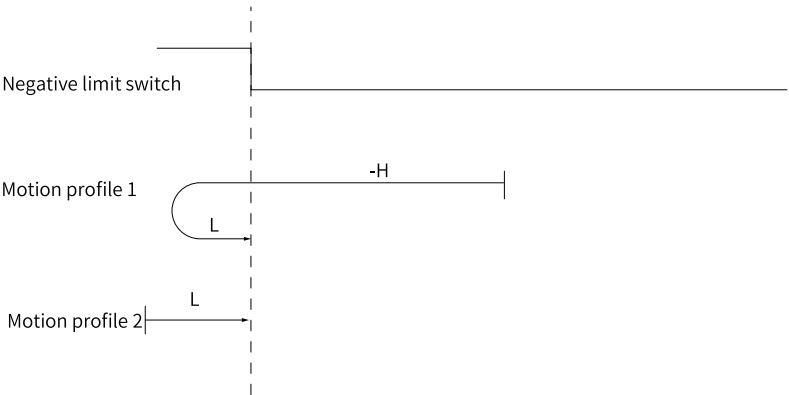


Figure 2-26 Motor running curve and speeds in Mode 17

- Motion profile 1: Deceleration point signal inactive at start.
- Motion profile 2: Deceleration point signal active at start.

6098h = 18

Home: positive limit switch

Deceleration point: positive limit switch (P-OT)

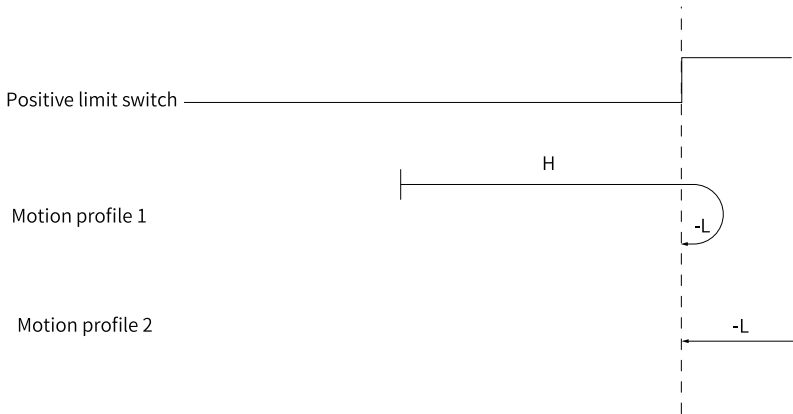


Figure 2-27 Motor running curve and speeds in Mode 18

- Motion profile 1: Deceleration point signal inactive at start.
- Motion profile 2: Deceleration point signal active at start.

6098h = 19

Home: home switch (HW)

Deceleration point: home switch (HW)

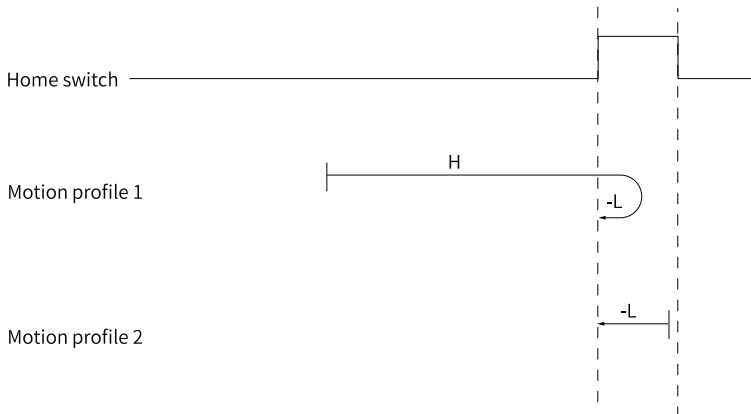


Figure 2-28 Motor running curve and speeds in Mode 19

- Motion profile 1: Deceleration point signal inactive at start.
- Motion profile 2: Deceleration point signal active at start.

6098h = 20

Home: home switch (HW)

Deceleration point: home switch (HW)

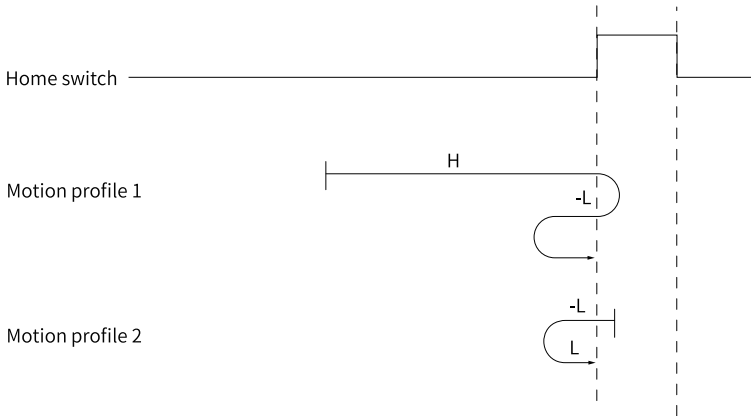


Figure 2-29 Motor running curve and speeds in Mode 20

- Motion profile 1: Deceleration point signal inactive at start.
- Motion profile 2: Deceleration point signal active at start.

6098h = 21

Home: home switch (HW)

Deceleration point: home switch (HW)

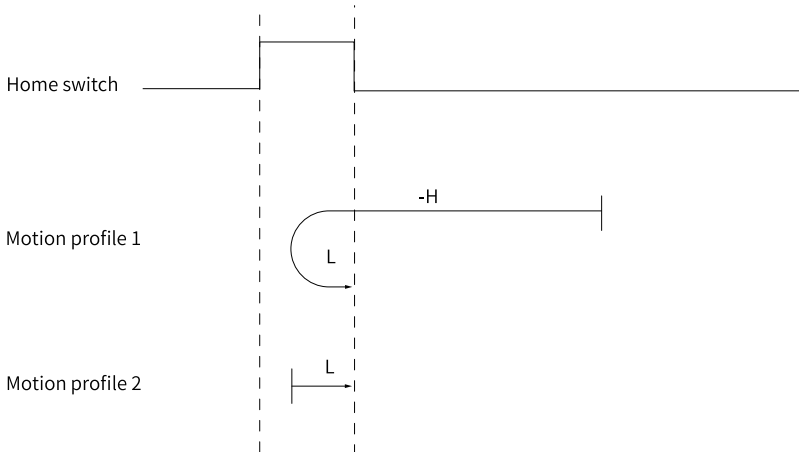


Figure 2-30 Motor running curve and speeds in Mode 21

- Motion profile 1: Deceleration point signal inactive at start.

- Motion profile 2: Deceleration point signal active at start.

6098h = 22

Home: home switch (HW)

Deceleration point: home switch (HW)

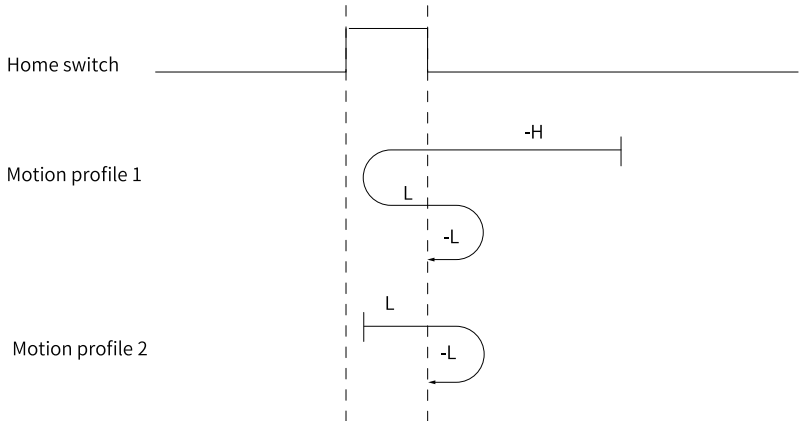


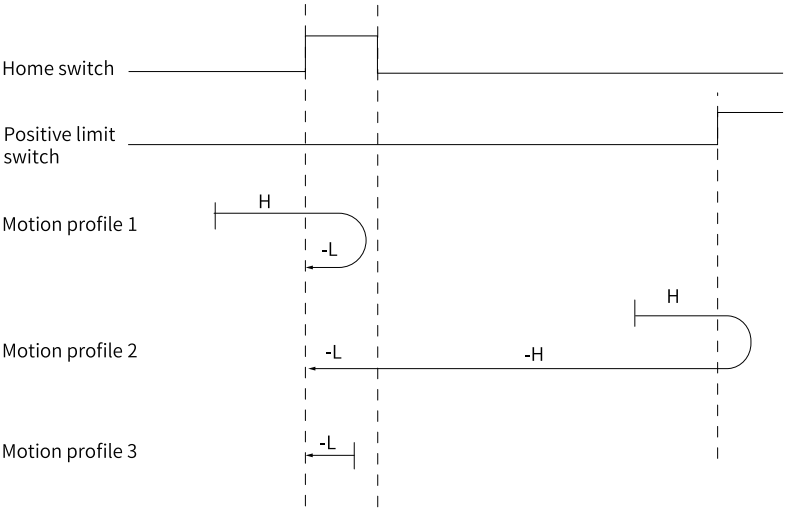
Figure 2-31 Motor running curve and speeds in Mode 20

- Motion profile 1: Deceleration point signal inactive at start.
- Motion profile 2: Deceleration point signal active at start.

6098h = 23

Home: home switch (HW)

Deceleration point: home switch (HW)

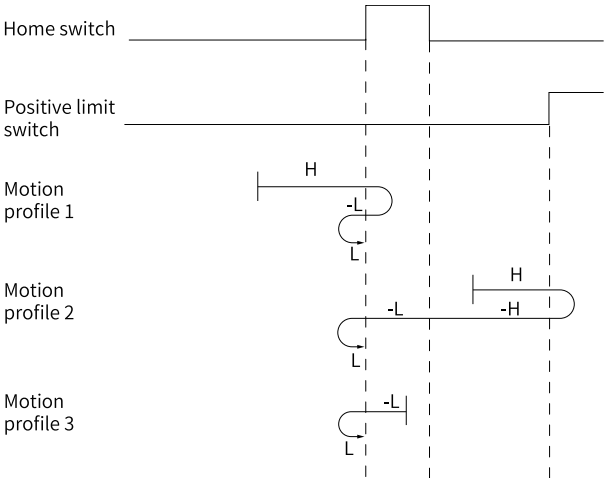


- Motion profile 1: Deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: HW signal inactive at start, hitting the positive limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 24

Home: home switch (HW)

Deceleration point: home switch (HW)



- Motion profile 1: Deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: HW signal inactive at start, hitting the positive limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 25

Home: home switch (HW)

Deceleration point: home switch (HW)

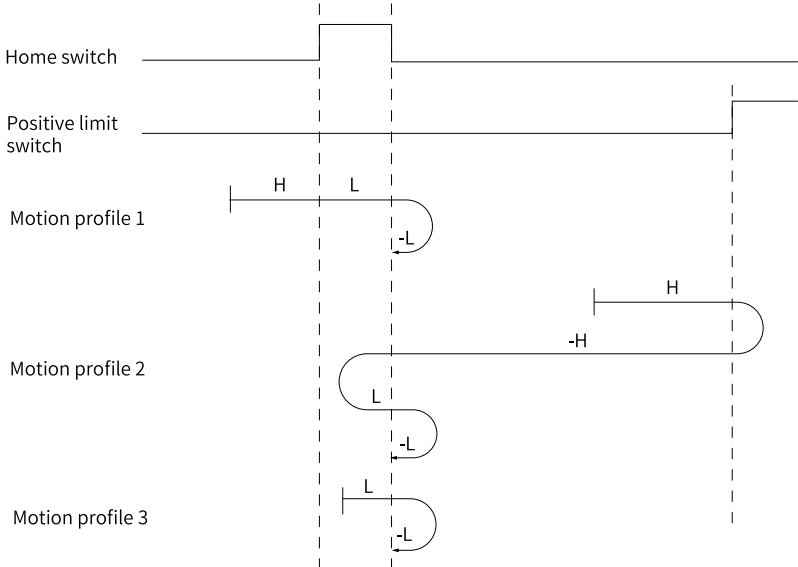


Figure 2-34 Motor running curve and speeds in Mode 25

- Motion profile 1: Deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: HW signal inactive at start, hitting the positive limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 26

Home: home switch (HW)

Deceleration point: home switch (HW)

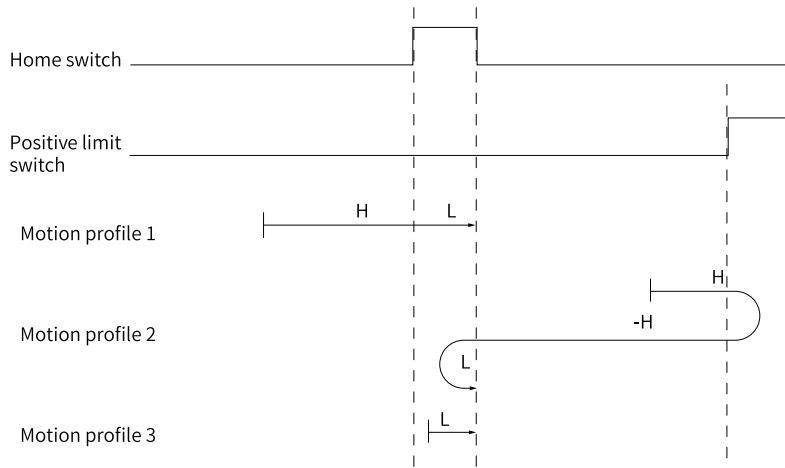


Figure 2-35 Motor running curve and speeds in Mode 26

- Motion profile 1: Deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: HW signal inactive at start, hitting the positive limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 27

Home: home switch (HW)

Deceleration point: home switch (HW)

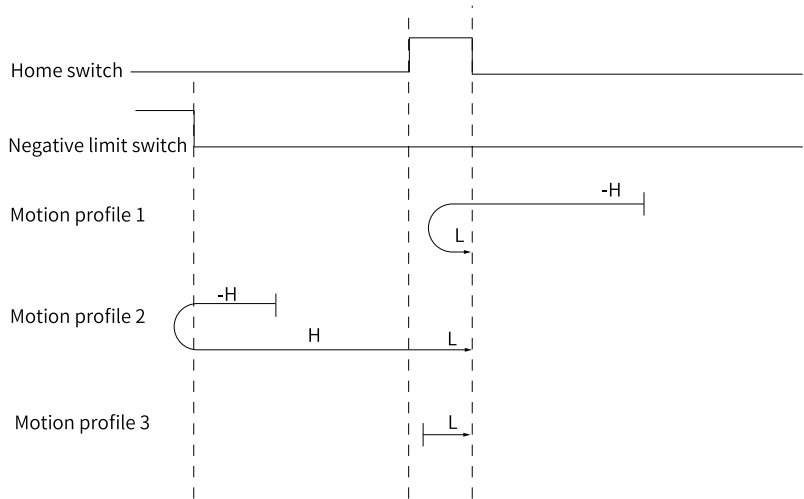


Figure 2-36 Motor running curve and speeds in Mode 27

- Motion profile 1: Deceleration point signal inactive at start, not hitting the reverse limit switch.
- Motion profile 2: HW signal inactive at start, hitting the reverse limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 28

Home: home switch (HW)

Deceleration point: home switch (HW)

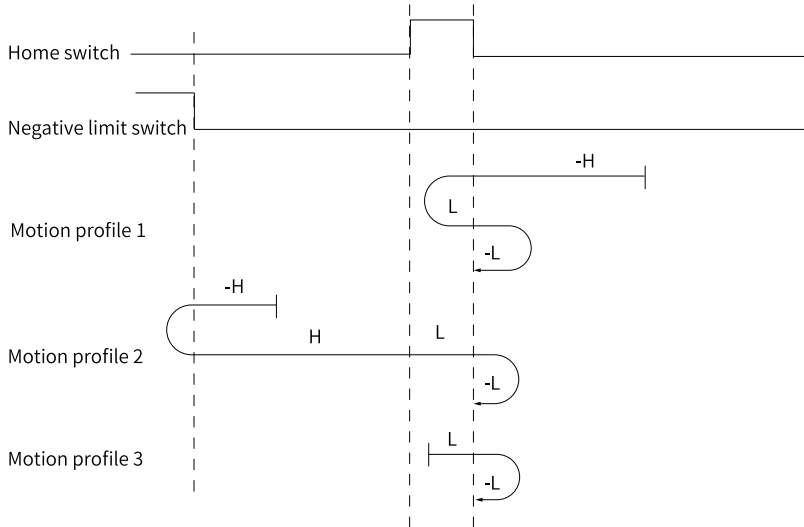


Figure 2-37 Motor running curve and speeds in Mode 28

- Motion profile 1: Deceleration point signal inactive at start, not hitting the reverse limit switch.
- Motion profile 2: HW signal inactive at start, hitting the reverse limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 29

Home: home switch (HW)

Deceleration point: home switch (HW)

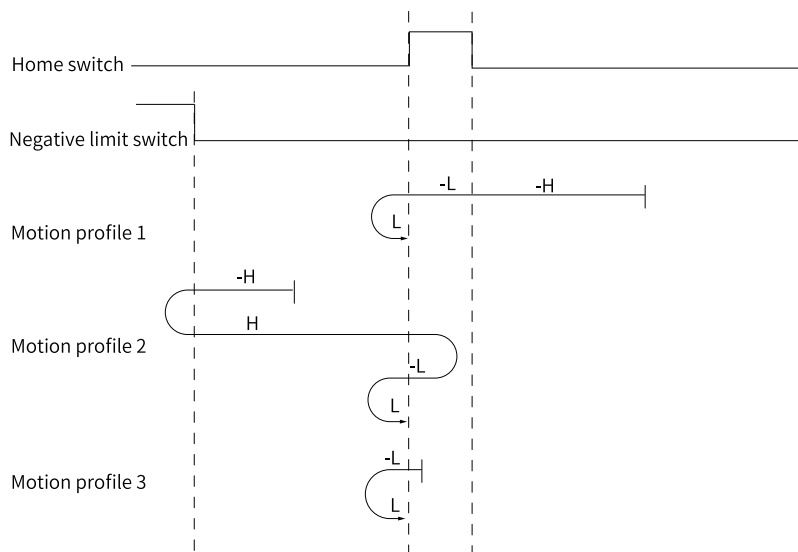


Figure 2-38 Motor running curve and speeds in Mode 29

- Motion profile 1: Deceleration point signal inactive at start, not hitting the reverse limit switch.
- Motion profile 2: HW signal inactive at start, hitting the reverse limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 30

Home: home switch (HW)

Deceleration point: home switch (HW)

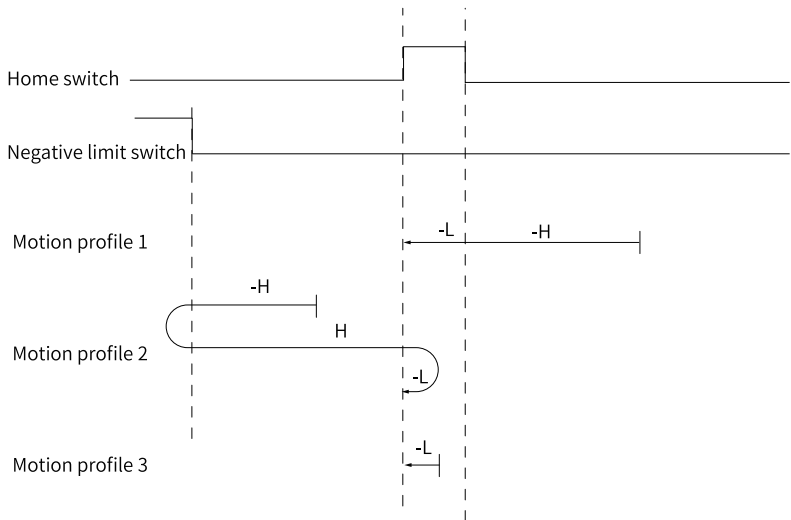


Figure 2-39 Motor running curve and speeds in Mode 30

- Motion profile 1: Deceleration point signal inactive at start, not hitting the reverse limit switch.
- Motion profile 2: HW signal inactive at start, hitting the reverse limit switch.
- Motion profile 3: Deceleration point signal active at start.

6098h = 31/32

This mode is not defined in the CiA402 protocol. It can be used for extension purpose.

6098h = 33/34

Home: Z signal

Deceleration point: None

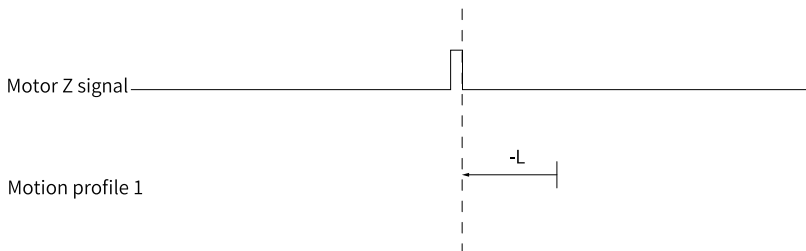


Figure 2-40 Motor running curve and speeds in Mode 33

- Motion profile 1: The motor runs in the reverse direction at low speed and stops at the first Z signal..

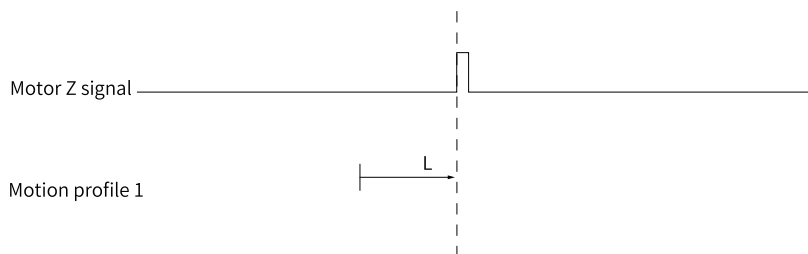


Figure 2-41 Motor running curve and speeds in Mode 34

- Motion profile 1: The motor runs in the forward direction at low speed and stops at the first Z signal..

6098h = 35

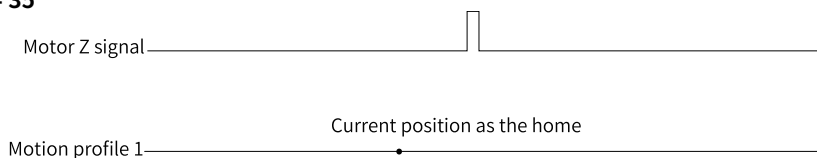


Figure 2-42 Motor running curve and speeds in Mode 35

Homing mode 35: The present position is taken as the mechanical home. After homing is triggered (control word 6040h: 0x0F → 0x1F).

60E6h = 0 (Absolute homing):

6064h (Position actual value) is equal to 607Ch (Home offset) after homing is done.

60E6h = 1 (Relative homing):

6064h is the sum of the original value plus 607Ch (Home offset) after homing is done.

6098h = -1

The motor runs in the reverse direction at high speed first. If the status where the torque reaches the limit and the speed is near zero after the axis hits the mechanical limit persists, it indicates the axis has reached the mechanical limit position. In this case, the motor runs in the forward direction at low speed and stops after reaching the rising edge of the Z signal for the first time.

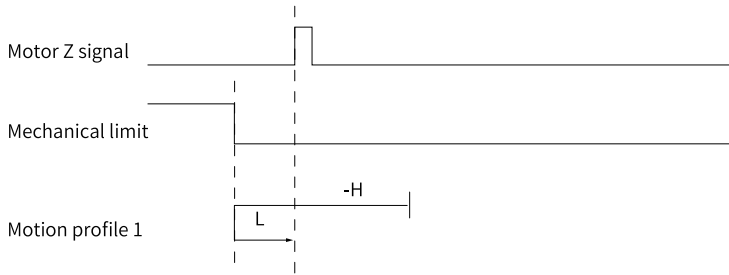


Figure 2-43 Motor running curve and speeds in Mode -1

6098h = -2

The servo motor runs in the forward direction at a high speed first. If the torque reaches the limit and the speed is near zero when the motor hits the mechanical limit, and such status persists, it indicates the motor reaches the mechanical limit position. In this case, the motor runs in the reverse direction at a low speed and stops at the first Z signal after reaching the rising edge.

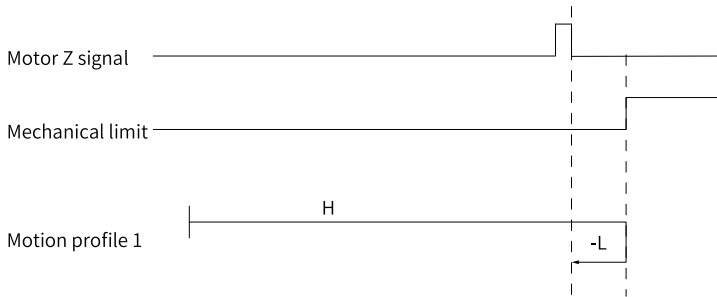


Figure 2-44 Motor running curve and speeds in Mode -2

6098h = -3

Home: Z signal

Deceleration point: None

- If the single-turn position is close to the reverse home, the homing profile is motion profile 1.
- If the single-turn position is close to the forward home, the homing profile is motion profile 2.

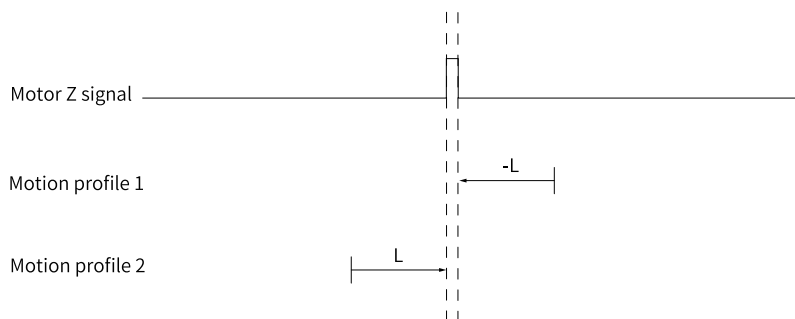


Figure 2-45 Motor running curve and speeds in Mode -3

- Motion profile 1: The motor runs in the reverse direction at low speed and stops at the first Z signal.
- Motion profile 2: The motor runs in the forward direction at low speed and stops at the first Z signal.

Evaluation condition for torque homing: After the motor reaches the hard limit, and the torque feedback reaches the limit value defined in H05.58 (mechanical torque limit, in 0.1%), the first Z signal in the reverse direction is searched for and regarded as the home after the motor stops.

3 Applications

3.1 Absolute System

3.1.1 Overview

The absolute encoder, which features a single-turn resolution of 8388608 (2^{23}), is used to detect the motor position within one turn and count the number of motor revolutions, with 23-bit multi-turn data recorded. The absolute encoder can be used to build an absolute system that works in the absolute position linear mode or absolute position rotation mode, both of which can be applied in position/speed/torque control. In the absolute system, the absolute encoder is powered up by a battery to back up the data upon power-off. These data are used by the servo drive for calculating the absolute position of the machine upon power-on, removing the need for a homing operation.

To match the absolute encoder with the SV660ND series servo drives, H00.00 (Motor code) to 14101 (Inovance 23-bit absolute encoder). Then set H02.01 (Absolute system selection) based on actual conditions. E731.0 (Encoder battery failure) will occur upon initial power-on of the battery. Set H0d.20 (Absolute encoder reset function) to 1 to reset E731.0 before performing the homing operation.

Note

When you change the value of H02.02 (Direction of rotation) or H0d.20 (Absolute encoder reset selection), the absolute position recorded by the encoder changes suddenly, causing the mechanical absolute position reference to change. In this case, perform the homing operation. After homing is done, the deviation between the mechanical absolute position and that recorded in the encoder will be calculated automatically and saved in the EEPROM of the drive.

3.1.2 Related Parameters

Absolute encoder system settings

Set H00.00 (Motor code) to 14101 (Inovance motor with 23-bit absolute encoder), and select the absolute position mode in H02.01.

See "[H00_en.00](#)" on [page 117](#) for details.

See "[H00_en.08](#)" on [page 118](#) for details.

See "[H02_en.01](#)" on [page 145](#) for details.

Note

In the absolute position mode, the system detects the motor code automatically to check whether the motor used is configured with an absolute encoder. If not, E122.0 (Product mismatch in the absolute position mode) occurs.

Encoder feedback data

The encoder feedback data is divided into the number of revolutions and the single-turn position. For the incremental position mode, the number of revolutions is not recorded.

See "[H0b_en.70](#)" on page 260 for details.

See "[H0b_en.71](#)" on page 260 for details.

See "[H0b_en.77](#)" on page 260 for details.

See "[H0b_en.79](#)" on page 261 for details.

Absolute position linear mode

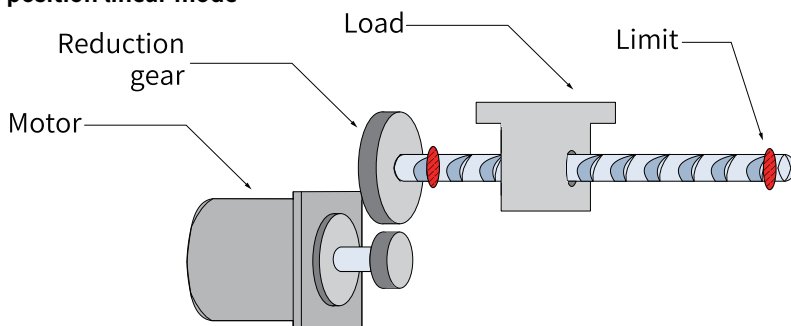


Figure 3-1 Application of the linear mode

Assume the absolute mechanical position (H0b.58 and H0b.60) is P_M , the encoder absolute position is P_E , the position offset in the absolute position linear mode is P_O , their relationship will be: $P_M = P_E - P_O$.

If the electronic gear ratio is $B \div A$, then the following formula applies: H0b.07 (Absolute position counter) = $P_M \div (B \div A)$ H0b.07 indicates present mechanical absolute position (in reference unit).

The multi-turn data range in the absolute position linear mode is -32768 to +32767. If the number of forward revolutions is higher than 32767 or the number of reverse revolutions is lower than -32768, E735.0 (Encoder multi-turn counting overflow) occurs. In this case, set H0d.20 to 2 (Reset multi-turn data), and then perform homing

again. In special occasions, you can set H0A.36 to 1 to hide E735.0 or use absolute position linear mode 2.

See "[H05_en.36](#)" on page 175 for details.

See "[H0b_en.07](#)" on page 247 for details.

See "[H0b_en.58](#)" on page 258 for details.

See "[H0b_en.60](#)" on page 258 for details.

Absolute position rotation mode

This mode applies in cases where the load travel range is unlimited and the number of unidirectional revolutions is lower than 32767 upon power failure, as shown in the following figure.

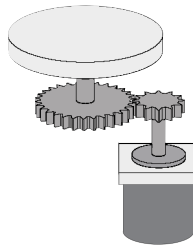
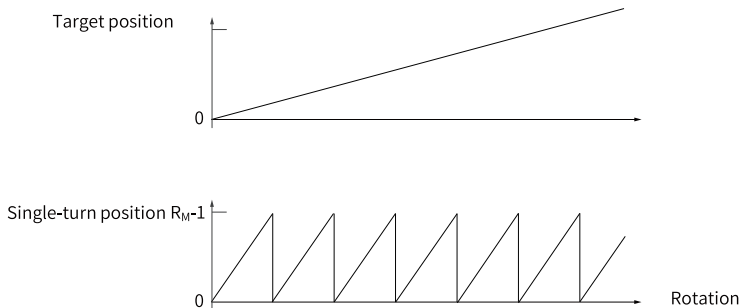
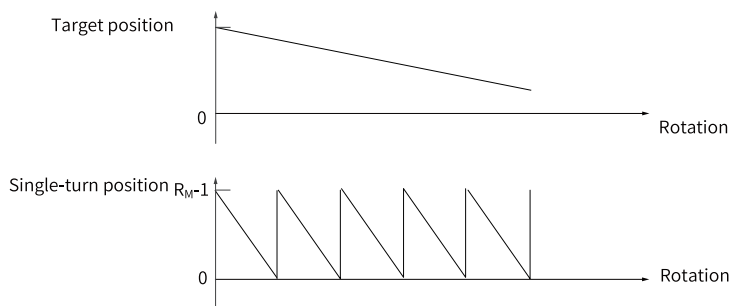


Figure 3-2 Application of the linear mode

The single-turn position range of the rotary load is 0 to $(R_M - 1)$ (R_M : Encoder pulses per load revolution). When the gear ratio is 1:1, the variation law of the target position and the single-turn position of the rotary load during forward operation is shown as follows.



The variation law of the target position and the single-turn position of the rotary load during reverse operation is shown as follows.



When the motor operates in the absolute rotation mode and the drive operates in the hm mode, the setting range of the home offset is 0 to $(R_M - 1)$. If the home offset is set to a value outside this range, the drive reports EE09.1.

The multi-turn data range is unlimited in the absolute position rotation mode. Therefore, E735.0 (Encoder multi-turn counting overflow) is hidden automatically.

Related parameters:

See "[H05_en.50](#)" on page 175 for details.

See "[H05_en.51](#)" on page 176 for details.

See "[H05_en.52](#)" on page 176 for details.

See "[H05_en.54](#)" on page 176 for details.

See "[H0b_en.81](#)" on page 261 for details.

See "[H0b_en.83](#)" on page 261 for details.

See "[H0b_en.85](#)" on page 262 for details.

Single-turn absolute mode

This mode applies to applications where the load travel range is within the single-turn range of the encoder. In this case, the absolute encoder needs no battery as it records the single-turn data only.

- Target position input range

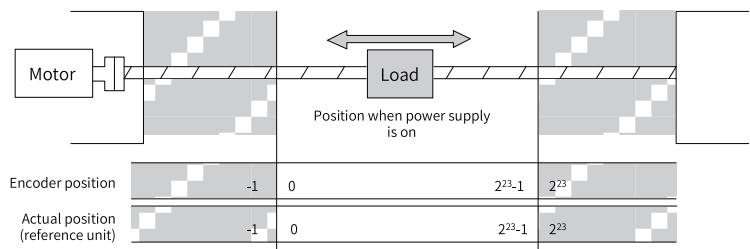
If a 23-bit absolute encoder is used in the single-turn absolute mode, the drive operates in the position control mode, and the electronic gear ratio 1:1, then:

When H05.36 (Mechanical home offset) is set to 0, the target position range is 0 to $(2^{23} - 1)$.

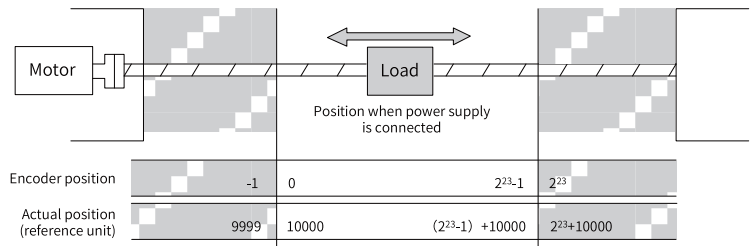
After homing is done, the target position range is H05.36 to $(2^{23} - 1 + H05.36)$.

- Example

Gear ratio: 1:1; H05.36 = 0:



Gear ratio: 1:1; H05.36 = 10000:



3.1.3 Precautions for Use

E731.0 (Encoder battery failure) will occur at initial power-on of the battery. Set H0d.20 (Absolute encoder reset function) to 1 to reset E731.0 before further operations.

When the battery voltage detected is lower than 3.0 V, E730.0 (Encoder battery warning) occurs.

In this case, replace the battery according to the following steps.

1. Power on the servo drive and make it stay in the non-operational state.
2. Replace the battery.
3. After the servo drive resets E730.0 automatically. If no other warning occurs, continue to operate the servo drive.

Note

- If you replace the battery after powering off the servo drive, E731.0 (Encoder battery failure) will occur at next power-on, leading to an abrupt change in the multi-turn data. In this case, set H0d.20 to 1 to reset the encoder fault. Then perform the homing operation again.
- Ensure the maximum motor speed does not exceed 6000 rpm upon power-down of the servo drive. This is to enable the encoder to record the position accurately.
- Keep the battery in environments within the required ambient temperature range and ensure the battery is in reliable contact and carries sufficient power capacity. Otherwise, encoder data loss may occur.

See "[H0d_en.20](#)" on page 267 for details.

Note

The absolute position recorded by the encoder changes abruptly after multi-turn data reset. In this case, perform mechanical homing.

3.2 Software position limit

Description

Hardware position limit is implemented by inputting external encoder signals to CN1 of the servo drive.

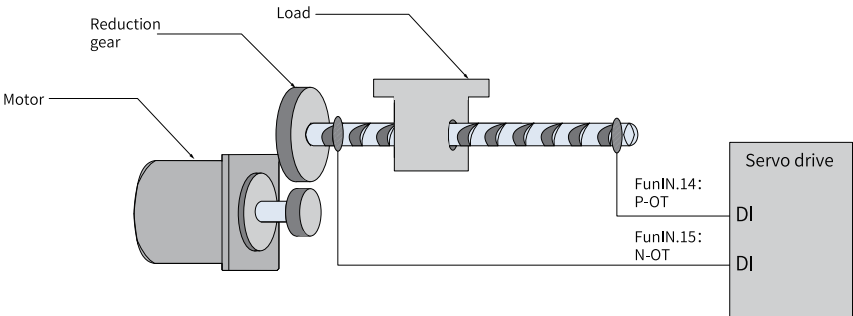


Figure 3-3 Installation of limit switches

Software position limit is implemented through a comparison between the internal position feedback and the set limit value. If the set limit value is exceeded, the servo drive reports a warning and stops immediately. Software position limit is available both in the absolute position mode and the incremental position mode. To use the software position limit in the incremental position mode, set H0A.01 (Software position limit) to 2 (Enabled after homing) first, and then perform homing upon power-on before applying software position limit.

Table 3-1 Comparison between the hardware position limit and software position limit

Hardware Position Limit		Software position limit	
1	Restricted to linear motion and single-turn rotational motion.	1	Applicable to both the linear motion and the rotational motion.
2	Requires an external mechanical limit switch.	2	Removes the need for hardware wiring, preventing malfunction due to poor cable contact.

Hardware Position Limit		Software position limit	
3	Suffered from the risk of mechanical slip.	3	Prevents malfunction due to mechanical slip through internal position comparison.
4	Unable to sense or detect an overtravel fault after power-off.		

Related objects

☆ Related parameters:

See "[H0A_en.01](#)" on page 230 for details.

See "[H0A_en.41](#)" on page 235 for details.

See "[H0A_en.43](#)" on page 235 for details.

- When H0A.01 is set to 0, software position limit is disabled.
- When H0A.01 is set to 1, software position limit is enabled immediately upon power-on. 607D.01h and 607D.02h are used by the function. Ensure the value of 607D.01h is lower than or equal to 607D.02h. If 607D.01h is set to a value higher than 607D.02h, EE09.0 (Software position limit setting error) will occur.
- If H0A.01 is set to 2, software position limit is not enabled after homing upon power-on. When the value of the absolute position counter is higher than the value of 607D.02h after homing, E950.0 (Forward overtravel warning) occurs and the drive stops accordingly. When the value of the absolute position counter is lower than the value of 607D.01h after homing, E952.0 (Reverse overtravel warning) occurs and the drive stops accordingly.

Note

Ensure the value of 607Ch (Home offset) is within the software position limit. Otherwise, the servo drive reports EE09.1.

3.3 Position Comparison

Description

Position comparison works by comparing the instantaneous position feedback with the value pre-saved in the data array and, once available, outputting a DO signal with pulse width settable. Position comparison is applicable to high-speed motion axes as comparison actions are implemented by FPGA, removing the risk of software communication delay between processors.

The following table describes the specifications of position comparison output.

Specifications of Position Comparison Output		Description
Trigger output	Output terminal	4 DOs or frequency-division output ABZ/OCZ signals.
	Logic	The effective level of DO is defined by the DO logic in group H04.
	Pulse width	The pulse output width is defined by H18.05.
	Delay compensation	Defined by H18.14 and used to compensate for hardware output delay.
Comparison source	Motor encoder feedback	Supported
Comparison value	Number of comparison points	40 points, signed 32-bit integer
Comparison attribute	Attribute of comparison point	Defines the attribute of the comparison point.
		Defines the output terminal for comparison.

Related objects

When the position comparison output function is enabled, you can configure position comparison output on, for example, axis 1 (configured as 125) or axis 2 (configured as 225). Both axes cannot be configured as position comparison output at the same time, otherwise an alarm E902.1 will be given.

Position comparison output parameters:

Parameter	Name	Description
H18: Position comparison output		
H18.00	Position comparison switch	1: Enable
H18.01	Position comparison output feedback source	0: Motor encoder feedback
H18.02	Position comparison resolution ^[1]	Defines the number of pulses per revolution. For example, if H18.02 is set to 1, the number of pulses per revolution is 2 ²³ . 0: 24-bit 1: 23-bit 2: 22-bit 3: 21-bit 4: 20-bit 5: 19bit 6: 18-bit 7: 17-bit

Parameter	Name	Description
H18: Position comparison output		
H18.03	Position comparison mode	0: Individual comparison 1: Cyclic comparison 2: Fixed cyclic comparison
H18.04	Current position as zero	1: Enable (rising edge-triggered) Note: This function needs to be used when the comparison state is inactive, otherwise the comparison logic may malfunction.
H18.05	Position comparison pulse output width	Defines the active pulse width of the DO when the comparison point is reached. The value range is 0.1 to 204.7 (in ms).
H18.07	Start point of position comparison	Activated when H18.00 is set to 1 again.
H18.08	End point of position comparison	Activated when H18.00 is set to 1 again.
H18.09	Current state of position comparison	0: No comparison; n: Waiting for the comparison point N
H18.10	Real-time position of position comparison	The DO configuration clears the position comparison real-time position when performing axis switch.
H18.12	Zero offset of position comparison	Defines the offset value after current position is taken as the zero point Value range: -2^{31} to $+2^{31} - 1$
H18.14	Position comparison output delay compensation	Comparison delay compensation time: -12 us to +12 us
H18.15	Fixed cyclic comparison	1–65535
H18.17	Number of fixed mode cycles	Range: 1 to 65535

Parameter	Name	Description
H19: Target position parameters		
H19.00	Target value of position comparison 1	Defines the target value of position comparison 1. Value range: -2^{31} to $2^{31} - 1$
H19.02	Attribute value of position comparison 1	Defines the attribute value of position comparison 1. bit0: 1: Output DO active signal if current position changes from "less than" to "more than" the comparison point; 0: Skip this point bit1: 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point; 0: Skip this point bit2 to bit6: NA bit7: DO1 bit8: DO2 bit9: DO3 bit10: DO4 Bit11: N/A
H19.03	Target value of position comparison 2	Defines the target value of position comparison 2. Value range: -2^{31} to $2^{31} - 1$
H19.05	Attribute value of position comparison 2	Defines the attribute value of position comparison 2. Value range: Same as above
...
H19.117	Target value of position comparison 40	Defines the target value of position comparison 40. Value range: -2^{31} to $2^{31} - 1$
H19.119	Attribute value of position comparison 40	Defines the attribute value of position comparison 40. Value range: Same as above

Function operation

1. Description

Position comparison works by comparing the instantaneous position feedback with the value pre-saved in the data array and, once available, outputting a DO signal with pulse width settable for future use in subsequent motion control. Position comparison is applicable to high-speed motion axes as comparison actions are implemented by FPGA, removing the risk of software communication delay between processors.

- Position comparison switch

When the value of H18.00 (Position comparison switch) changes from 0 to 1, position comparison starts and the value of H18.09 (Current state of position comparison) is updated to the start point of position comparison. When the

value of H18.00 changes to 0, position comparison stops and the current comparison state will be cleared.

- **Position comparison resolution**
The comparison resolution defines the number of pulses per revolution. Given the maximum and minimum limits on the target position (defined by group H19), you can reset the resolution when data overflow occurs on the comparison value. For example, when H18.02 is set to 7, the maximum value of the target position is $2^{31} - 1$, and the motor rotates $(2^{31} - 1)/2^{17}$ turns.

Note

The target position in group H19 is only related to the set resolution.

- **Individual comparison mode**
In the individual comparison mode, when comparison of the end point is done, the comparison function is switched off automatically and the current comparison value is cleared. Position comparison can be enabled again only when the position comparison switch is switched on again.

The real-time position feedback in the individual comparison mode is an absolute value, which means it is an accumulative value based on preceding comparison points, which cannot be cleared automatically.
- **Cyclic comparison**
In the cyclic comparison mode, position comparison will not be switched off when the comparison end point is reached, and current position comparison value will be reset as the start point for position comparison. After comparison of each point is done, the real-time position feedback (H18.10) will be cleared and counted again for cyclic comparison. In the cyclic comparison mode, the target position is a relative (incremental) value. Each time a comparison point is reached, the real-time position feedback is cleared and counted again for comparison with the new target.
- **Fixed cyclic comparison**
In fixed cyclic comparison mode, the comparison process works in the same way as the cyclic comparison mode. The number of cycles is defined by H18.15. After the set number of cycles are done executing, comparison will be disabled automatically.
- **Position comparison output width**
When the position comparison conditions are fulfilled, the servo drive outputs DO active level signal. The width of the active signal can be set in H18.05 (value range: 1 to 2047 × 0.1 ms). 1 to 2047 × 0.1 ms.

When position comparison DO is active, the comparison logic is suspended and no comparison will be performed. In this case, ensure the operating time between two target points is larger than the output width of DO.

- Target value of position comparison
There are 40 target values for position comparison. The target value and attribute value of position comparison must be updated to parameters in group H19 in advance.

Note

Set the target position properly. The position comparison mode does not support H18.10 (Real-time position of position comparison) overflow comparison.

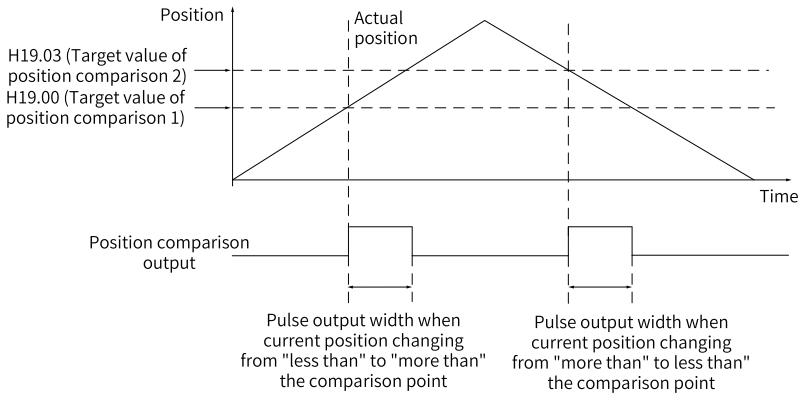
- Start point for comparison
The start point indicates the position of the first comparison point. For example, if the start point is set to 5, the comparison starts from position comparison 5.
- End point for comparison
The end point indicates the position of the last comparison point. For example, if the end point is set to 7, the comparison stops or restarts from the start point after position comparison 7 is reached.
- Zero offset of position comparison
The value of H18.10 (Real-time position feedback) will be changed to the offset value defined by H18.12 (Zero offset of position comparison) at the rising edge (0 → 1) of H18.04 (Present position as zero).

Note

Check whether zero offset needs to be set before enabling position comparison output. Otherwise, comparison error may occur.

2. Function operation

- When the position feedback of the encoder passes the target position comparison points, the output width of the output terminal is defined by H18.05 (Position comparison output width).



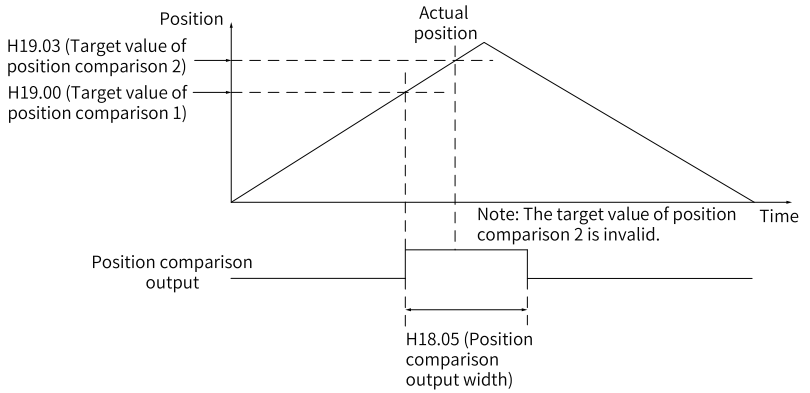
When the attribute of the comparison point is set to "bit0 = 1" (Output DO active signal if current position changes from "less than" to "more than" the comparison point), the DO outputs the position comparison signal when the axis passes the target position comparison point with position changing from "less than" to "more than" the comparison point position.

When the attribute of the comparison point is set to "bit1 = 1" (Output DO active signal if current position changing from "more than" to "less than" the comparison point), the DO outputs the position comparison signal when the axis passes the target position comparison point with position changing from "more than" to "less than" the comparison point position.

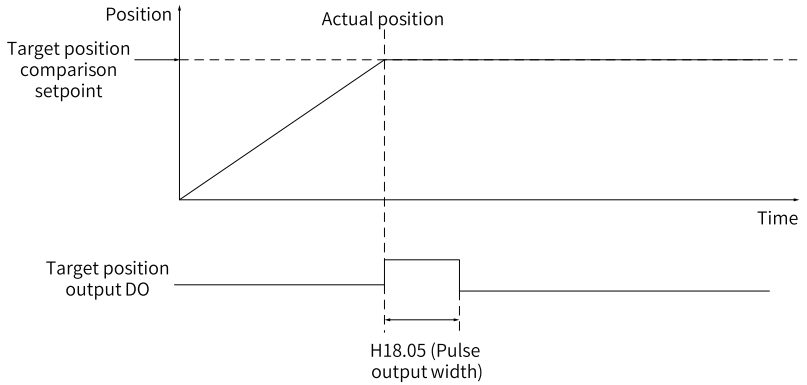
When the attribute of the comparison point is set to "bit0/bit1 = 1" (Output DO active signal in both situations), the DO outputs the position comparison signal when the position feedback passes the target position comparison point.

- When multiple position comparison values are set, no comparison will be performed once the position comparison output terminal is active. Therefore, ensure the operating time between two position comparison points is larger than the pulse output width.

As shown in the following figure, comparison is not performed when the position changing from "more than" to "less than" the comparison point position. This is because the operating time between the two comparison points is lower than the pulse output width.



- Only one pulse will be outputted when the stop position is the same with the target value of position comparison. See the following figure.



3. Interface of the software tool

- Individual comparison mode
 - Set H18.03 (Position comparison mode) to 0 (Individual position comparison).

Select axis: **Axis 1**

Position comparison setting

Position comparison output enable: **[0] (Disable)**

Position comparison value resolution: **[1] (23-bit)**

Position comparison mode selection: **[0] (Individual comparison mode)**

Zero at current position: **[0] (Disable)**

Position comparison output width: **10** **0.100000 - 204.700000**

Position comparison starting point: **1** **0 - 40**

Position comparison termination point: **3** **0 - 40**

Position comparison zero offset: **0** **-2147483648 - 2147483647**

Setting **Read**

Position comparison monitoring

Position comparison current status: **0.000000** Position comparison real-time position: **0.000000**

Target position parameter setting

Distance length: **10000** Compare points: **8** **Equal setting** **Upload** **Download**

Comparison point range: **1** - **8** Target attribute value: **0** **Set properties**

Ro...	Description	Address	Setting value	Current val...	Minimum v...	Maximum v...
[1]	Target value of p...	1900	***	0	-2147483648	2147483647
[2]	Attribute value of...	1902	***	0	0	65535
[3]	Target value of p...	1903	***	0	-2147483648	2147483647
[4]	Attribute value of...	1905	***	0	0	65535
[5]	Target value of p...	1906	***	0	-2147483648	2147483647
[6]	Attribute value of...	1908	***	0	0	65535
[7]	Target value of p...	1909	***	0	-2147483648	2147483647
[8]	Attribute value of...	1908	***	0	0	65535
[9]	Target value of p...	190C	***	0	-2147483648	2147483647
[10]	Attribute value of...	190E	***	0	0	65535
[11]	Target value of p...	190F	***	0	-2147483648	2147483647
[12]	Attribute value of...	1911	***	0	0	65535
[13]	Target value of p...	1912	***	0	-2147483648	2147483647
[14]	Attribute value of...	1914	***	0	0	65535

- b. **Target position parameter setting: Distance length** (total operating distance) and **Compare points**
- c. After clicking **Equal setting**, the target value of the first point is updated to "**Distance length x 1/Compare points**", the target value of the second point is updated to "**Distance length x 2/Compare points**", and the target value of the Nth point is updated to: **Distance x N/Compare points**

Select axis: **Axis 1**

Position comparison setting

Position comparison output enable: **[0] (Disable)**

Position comparison value resolution: **[1] (23-bit)**

Position comparison mode selection: **[0] (Individual comparison mode)**

Zero at current position: **[0] (Disable)**

Position comparison output width: **10** **0.100000 - 204.700000**

Position comparison starting point: **1** **0 - 40**

Position comparison termination point: **3** **0 - 40**

Position comparison zero offset: **0** **-2147483648 - 2147483647**

Setting **Read**

Position comparison monitoring

Position comparison current status: **0.000000** Position comparison real-time position: **0.000000**

Target position parameter setting

Distance length: **10000** Compare points: **8** **Equal setting** **Upload** **Download**

Comparison point range: **1** - **8** Target attribute value: **0** **Set properties**

Ro...	Description	Address	Setting value	Current val...	Minimum v...	Maximum v...
[1]	Target value of p...	1900	***	0	-2147483648	2147483647
[2]	Attribute value of...	1902	***	0	0	65535
[3]	Target value of p...	1903	***	0	-2147483648	2147483647
[4]	Attribute value of...	1905	***	0	0	65535
[5]	Target value of p...	1906	***	0	-2147483648	2147483647
[6]	Attribute value of...	1908	***	0	0	65535
[7]	Target value of p...	1909	***	0	-2147483648	2147483647
[8]	Attribute value of...	1908	***	0	0	65535
[9]	Target value of p...	190C	***	0	-2147483648	2147483647
[10]	Attribute value of...	190E	***	0	0	65535
[11]	Target value of p...	190F	***	0	-2147483648	2147483647
[12]	Attribute value of...	1911	***	0	0	65535
[13]	Target value of p...	1912	***	0	-2147483648	2147483647
[14]	Attribute value of...	1914	***	0	0	65535

When H18.00 (Position comparison output selection) changes from 0 to 1 (Enable rising edge-triggered), H18.09 (Current state of position comparison) changes from 0 to 1 and the first target position value will be compared. When H18.10 (Real-time position feedback) reaches the value of the first target position, H18.09 changes from 1 to 2, and so on.

- **Cyclic comparison mode/Fixed cyclic comparison mode**

- a. Set **Position comparison mode selection** to **1 (Cyclic comparison mode)**.

Select axis
Axis 1

Position comparison setting

Position comparison output enable
[0] Disable

Position comparison value resolution
1[23-bit]

Position comparison mode selection
2[Fixed cyclic comparison mode]

Zero at current position
[0] Disable

Position comparison output width
10 0.100000 - 204.700000

Position comparison starting point
1 0 - 40

Position comparison termination point
3 0 - 40

Position comparison zero offset
0 -2147483648 - 2147483647

Setting

Read

Position comparison monitoring

Position comparison current status
0.000000

Position comparison real-time position
0.000000

Target position parameter setting

Distance length
10000

Compare points
8

Equal setting

Upload

Download

Comparison point range
1 - 8

Target attribute value
0

Set properties

Ro...	Description	Address	Setting value	Current val...	Minimum v...	Maximum
1	Target value of p...	1900	***	0	-2147483648	2147483647
2	Attribute value of...	1902	***	0	0	65535
3	Target value of p...	1903	***	0	-2147483648	2147483647
4	Attribute value of...	1905	***	0	0	65535
5	Target value of p...	1906	***	0	-2147483648	2147483647
6	Attribute value of...	1908	***	0	0	65535
7	Target value of p...	1909	***	0	-2147483648	2147483647
8	Attribute value of...	1908	***	0	0	65535
9	Target value of p...	190C	***	0	-2147483648	2147483647
10	Attribute value of...	190E	***	0	0	65535
11	Target value of p...	190F	***	0	-2147483648	2147483647
12	Attribute value of...	1911	***	0	0	65535
13	Target value of p...	1912	***	0	-2147483648	2147483647
14	Attribute value of...	1914	***	0	0	65535

- b. **Target position parameter setting: Distance length** (distance between two adjacent points) and **Compare points** (points to be compared cyclically)
- c. After clicking **Equal setting**, the target values of the 1st point to the Nth point are updated to equal interval distance values.

Select axis
Axis 1

Position comparison setting

Position comparison output enable
[0] Disable

Position comparison value resolution
1[23-bit]

Position comparison mode selection
2[Fixed cyclic comparison mode]

Zero at current position
[0] Disable

Position comparison output width
10 0.100000 - 204.700000

Position comparison starting point
1 0 - 40

Position comparison termination point
3 0 - 40

Position comparison zero offset
0 -2147483648 - 2147483647

Setting

Read

Position comparison monitoring

Position comparison current status
0.000000

Position comparison real-time position
0.000000

Target position parameter setting

Distance length
10000

Compare points
8

Equal setting

Upload

Download

Comparison point range
1 - 8

Target attribute value
0

Set properties

Ro...	Description	Address	Setting value	Current val...	Minimum v...	Maximum
1	Target value of p...	1900	***	0	-2147483648	2147483647
2	Attribute value of...	1902	***	0	0	65535
3	Target value of p...	1903	***	0	-2147483648	2147483647
4	Attribute value of...	1905	***	0	0	65535
5	Target value of p...	1906	***	0	-2147483648	2147483647
6	Attribute value of...	1908	***	0	0	65535
7	Target value of p...	1909	***	0	-2147483648	2147483647
8	Attribute value of...	1908	***	0	0	65535
9	Target value of p...	190C	***	0	-2147483648	2147483647
10	Attribute value of...	190E	***	0	0	65535
11	Target value of p...	190F	***	0	-2147483648	2147483647
12	Attribute value of...	1911	***	0	0	65535
13	Target value of p...	1912	***	0	-2147483648	2147483647
14	Attribute value of...	1914	***	0	0	65535

When H18.00 (Position comparison output selection) changes from 0 to 1 (Enable rising edge-triggered), H18.09 (Current state of position comparison) changes from 0 to 1 and the first target position value will be compared. When H18.10 (Real-time position feedback) reaches the value of the first target position, H18.09 changes from 1 to 2, and so on.

3.4 Black Box

Description

The black box function is used to capture and save the data generated upon occurrence of faults or under designated conditions. Such data can be read and uploaded by users through the software tool to facilitate troubleshooting.

The black box is enabled by default. It is triggered upon occurrence of a fault or a sampling frequency of 8k. The black box function will be turned off automatically

after it is being triggered, or turned on automatically upon fault reset or power cycling.

Triggering the black box

Condition Setting

Sampling frequency: 0-Fast

BlackBox Mode Selection: 0-Not open

Specify Error Code: 101.0 (Abnormal parameters in group)

Trigger Condition

Trigger Source: Interrupt time

Trigger Level: 0

0.01 (0-65535)

Trigger Level Selection: 0-Rising edge

Trigger position: 0 %

Setting

Read Last Configuration

1. Axis selection: Axis 1, Axis 2;

Axis selection: Axis 1

Read Blackbox Data

Clear Blackbox Data

Read all channel black boxes

Channel Selection

Channel

- Fault child code
- Speed reference
- Speed feedback
- Torque reference
- Current feedback
- D-axis instruction
- Phase U feedback curr
- Phase V feedback curr

>>

<<

Condition Setting

Sampling frequency: 0-Fast

BlackBox Mode Selection: 0-Not open

Specify Error Code: 101.0 (System parameter error)

Trigger Condition

Trigger Source: Fault child code

Trigger Level: 0

(0-65535)

Trigger Level Selection: 0-Rising edge

Trigger position: 0 %

Setting

Read Last Configuration

2. Sampling frequency: including three sampling frequencies, namely 8k (**Fast**), 4k (**Medium**), and 1k (**Slow**).

Condition Setting

Sampling frequency: 0-Fast

BlackBox Mode Selection: 0-Fast
1-Medium
2-Slow

Specify Error Code: 101.0 (Abnormal parameters in group)

Trigger Condition

Trigger Source: Interrupt time

Trigger Level: 0
0.01 (0-65535)

Trigger Level Selection: 0-Rising edge

Trigger position: 0 %

Setting

Read Last Configuration

3. Black box mode selection: including three modes, namely **Arbitrary failure**, **Specified fault**, and **Specified condition trigger**.

Condition Setting

Sampling frequency: 1-Medium

BlackBox Mode Selection: 0-Not open

Specify Error Code: 1-Arbitrary failure
2-Specified fault
3-Specified condition trigger

Trigger Condition

Trigger Source: Interrupt time

Trigger Level: 0

0.01 (0-65535)

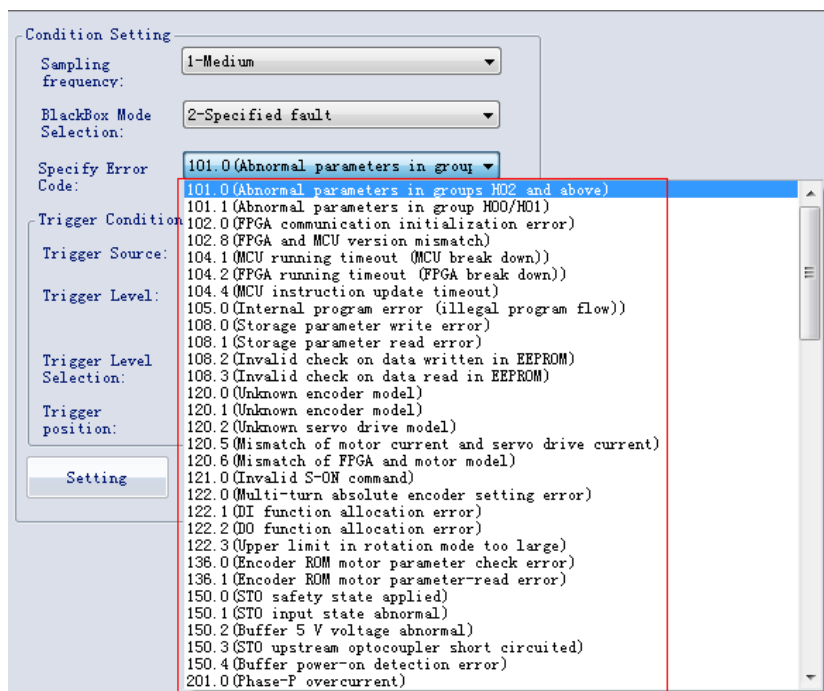
Trigger Level Selection: 0-Rising edge

Trigger position: 0 %

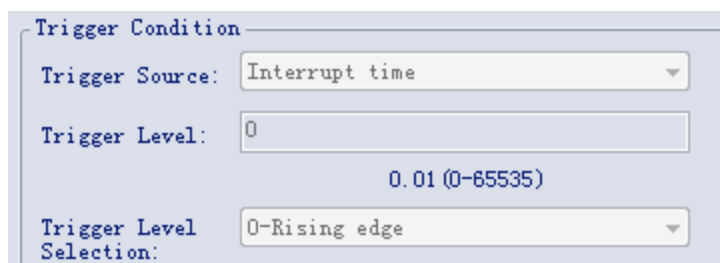
Setting

Read Last Configuration

4. Select designated fault in the combo box, as shown below.



5. The **Trigger Condition** includes **Trigger Source**, **Trigger Level**, and **Trigger Level Selection**, as shown below.



6. **Trigger position** is used to set the position of the trigger time in the total sampling time, which is set to 75% by default.
7. After the black box is set, click **Setting** to download configuration parameters to the servo drive.

Reading black box data

You can select the black box channels (4 channels at most) by clicking **>>** or **<<**, or read data of all the channels by clicking **Read all**, then click **Save** to save the waveform files.

3.5 Touch Probe

Description

The touch probe function is the same as the position latch function. Position feedback sources include motor position. This feature latches the position information (in reference unit) when an DI signal or Z signal changes.

The drive offers 2 axes and 4 touch probes to record position values corresponding to the rising edge and falling edge of each touch probe signal, which means four position values can be latched simultaneously.

When a DI is used to trigger the touch probe, the relation between the DI logic and the touch probe edge is shown in the following table.

Table 3-2 Description of bit3 of H0A.40

Bit3 of H0A.40	Touch Probe Edge	DI logic	DI switch
0	Rising edge	NO	OFF → ON
		NC	ON → OFF
	Falling edge	NO	ON → OFF
		NC	OFF → ON
1	Rising edge	NO/NC	OFF → ON
	Falling edge	NO/NC	ON → OFF

When a DI is used to trigger the touch probe, you can set the filter window of the touch probe signal through H0A.19 and H0A.20.

The DI touch probe supports hardware action delay compensation to compensate for the precision loss incurred by ON/OFF delay of the DI. Related parameters are shown in the following table.

Parameter		Description
H0A.40	bit1	Touch probe rising edge compensation: 1: Enabled, 0: Disabled
	bit2	Touch probe falling edge compensation: 1: Enabled, 0: Disabled
H0A.53		DI ON-compensation time for DI touch probe (DI switch changing from OFF to ON)
H0A.54		DI OFF-compensation time for DI touch probe (DI switch changing from ON to OFF)

To shorten the hardware delay to about 7 μ s, it is recommended to set the touch probe latch through the ON-edge of the DI.

There are three Z touch probe triggers: motor Z signal, frequency division output Z signal and fully closed loop Z signal, as shown in the following table.

Feedback Source	Parameter	Description
Motor encoder	H05.41.bit2 = 0, motor Z signal	The Z touch probe is triggered by the motor Z signal.

Related objects

See "[60B8h](#)" on page 360 for details.

See "[60B9h](#)" on page 361 for details.

See "[60BAh](#)" on page 363 for details.

See "[60BBh](#)" on page 363 for details.

See "[60BCh](#)" on page 363 for details.

See "[60BDh](#)" on page 364 for details.

See "[60D5h](#)" on page 365 for details.

See "[60D6h](#)" on page 365 for details.

See "[60D7h](#)" on page 365 for details.

See "[60D8h](#)" on page 365 for details.

Operation procedure

Example:

Use DI5 to trigger the touch probe. Background: touch probe 1 positive edge, continuous latching

Observe the following steps:

1. Set the function of DI5 (H03.14 = 138). Set the DI5 logic to NO (H03.11 = 0).
2. Set the touch probe function in 60B8h.

Assignment of each bit of the touch probe function (60B8h) is shown in the following table.

See "[60B8h](#)" on page 360 for details.

Set 60B8h to 0x0013 in this example.

3. Read the touch probe status in 60B9h.

Assignment of each bit of 60B9h is shown in the following table.

See "[60B9h](#)" on page 361 for details.

In this example, you can read bit1 of 60B9h to check whether the touch probe 1 positive edge value is latched.

4. Read the latch position of the touch probe

The four position values of the touch probe are recorded in 60BAh to 60BDh.

In this example, if the function of position latch at positive edge of touch probe 1 is executed, you can read the position value in 60BAh (Touch probe 1 positive edge, reference unit). The latching count can be read in 60D5h.

Illustration

The following figure shows touch probe function settings and status feedback sequence when DI5 is used as the trigger signal in case of latching at positive edge and continuous triggering.

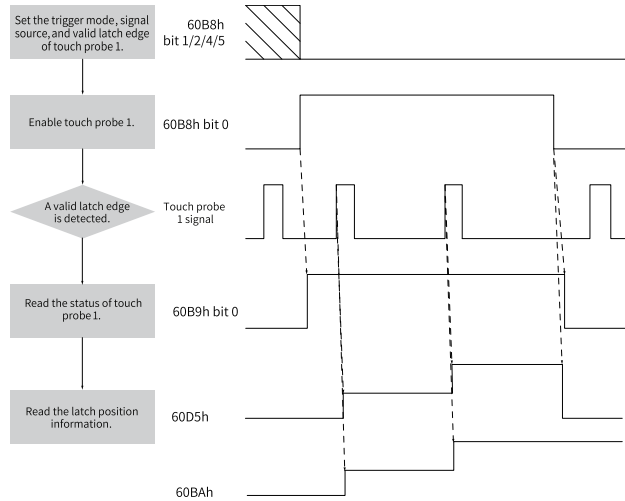


Figure 3-4 Procedure for use of the touch probe

3.6 Forced EtherCAT DO

Description

Two DO options are available by default in the non-operational (non-OP) status (including network offline) for EtherCAT-forced DO status:

1. Status unchanged in the non-OP status: The servo status switches to the non-OP status and the forced DO status stays unchanged.
2. Initialization status: No forced DO is generated when the servo drive is in the non-OP status.

When the network switches to the operational (OP) status, the forced DO is determined by 60FE.01h and 60FE.02h.

Select the forced DO function by bits. You can select the DO as EtherCAT-forced DO by bits, which means both the local functions and EtherCAT forced-DO function can be supported by the DO.

Related objects

See the following for related parameter settings.

See "[H04_en.23](#)" on page 170 for details.

Descriptions for the setpoints are shown in the following "[Table 3–3](#)" on page 100table.

Table 3–3 Description of setpoints

bit0	bit1	bit2	bit3	Description
0	0	0	0	Status of DO1, DO2, and DO4 unchanged in the non-operational status
1	0	0	0	No output in DO1 and status of DO2–DO4 unchanged in the non-operational status.
0	1	0	0	No output in DO2 and status of DO1 and DO3–DO4 unchanged in the non-operational status.
1	1	0	0	No output in DO1 and DO2 and status of DO3–DO4 unchanged in the non-operational status.
0	0	1	0	No output in DO3 and status of DO1–DO2 and DO4 unchanged in the non-operational status.
1	0	1	0	No output in DO1 and DO3 and status of DO2 and DO4 unchanged in the non-operational status.
0	1	1	0	No output in DO2 and DO3 and status of DO1 and DO4 unchanged in the non-operational status.
1	1	1	0	No output in DO1–DO3 and status of DO4 unchanged in the non-operational status.
0	0	0	1	No output in DO4 and status of DO1–DO3 unchanged in the non-operational status.
1	0	0	1	No output in DO1 and DO4 and status of DO2 and DO3 unchanged in the non-operational status.
0	1	0	1	No output in DO2 and DO4 and status of DO1 and DO3 unchanged in the non-operational status.
1	1	0	1	No output in DO1–DO2 and DO4 and status of DO3 unchanged in the non-operational status.

bit0	bit1	bit2	bit3	Description
0	0	1	1	No output in DO3 and DO4 and status of DO1 and DO2 unchanged in the non-operational status.
1	0	1	1	No output in DO1 and DO3–DO4 and status of DO2 unchanged in the non-operational status.
0	1	1	1	No output in DO2–DO4 and status of DO1 unchanged in the non-operational status.
1	1	1	1	No output in DO1–DO4 in the nonoperational status.

Setting method:

1. Assign DO function 31 (EtherCAT-forced DO) to the DO to be controlled forcibly by EtherCAT, and then set the bit of H04.23 as needed to select the forced DO status in the non-OP status.
2. Configure 60FE.01h/60FE.02h as RPDO, and operate on bit16...bit18 to control the DO.

4 STO Safety Function

4.1 General

4.1.1 Terms and Abbreviations

Terms and Abbreviations	Description
Cat.	Safety category It includes B, 1, 2, 3, and 4.
CCF	Common cause failure
DCavg	Average diagnostic coverage (%)
DTI	Diagnostic test interval time
SFF	Safe failure fraction
HFT	Hardware fault tolerance
PFH _D	Probability of a dangerous Failure per Hour
PL	Performance Level
SC	Systematic capability
SIL	Safety integrity level
T ₁	Test interval
DI	Digital input
DO	Digital output
PCB	Printed circuit board
MCU	Micro computer unit
FPGA	Field programmable gate array
MTTF _D	Mean time to dangerous failure
STO	The safe torque off (STO) function brings the machine safely into a no-torque state and prevents it from unexpected start. If the motor is running when STO function is activated, it coasts to 0 RPM.

4.1.2 Safety Standards

Standards compliance

- EC directives and standards
 - Low Voltage Directive 2014/35/EU Standard EN 61800-5-1
 - EMC Directive 2014/30/EU Standard EN 61800-3: 2018
 - Machinery Directive 2006/42/EC (Safety Functions) Standard IEC 61800-5-2
- Safety standard

Safety standard	Reference
Functional safety	IEC 61508: 2010 ISO 13849-1: 2015 ISO 13849-2: 2012 IEC 62061: 2021 EN 61508: 2010 EN ISO 13849-1: 2015 EN ISO 13849-2: 2012 EN IEC 62061: 2021 IEC 60204-1: 2016 (in extracts) EN 60204-1: 2018 (in extracts)
EMC	IEC 61800-5-2: 2016 IEC 61800-3: 2017 IEC 61326-3-1: 2017 IEC 61000-6-7: 2014 EN 61800-5-2: 2017 EN IEC 61800-3: 2018 EN 61326-3-1: 2017 EN 61000-6-7:2015
LVD	IEC 61800-5-1:2007/AMD1:2016 EN 61800-5-1:2007/A1:2017

- Safety data

Item	Safety data
SIL	SIL3, IEC61508 Maximum SIL3, EN IEC62061
PFH _D	$PFH_D \leq 1.1 \times 10^{-7} [1/h]$ (1.1% of SIL3)
Cat.	3, EN ISO 13849-1
PL	e, EN ISO 13849-1
MTTF _d	854 years (high)
DCavg	≥90% (medium)
T ₁	20 years
HFT	1
SC	SC3
λ _s	$2.6 \times 10^{-7}/h$
λ _{DD}	$1.4 \times 10^{-7}/h$
λ _{DU}	$2.7 \times 10^{-9}/h$
MTTR	0 hour
MRT	0 hour
Application mode	High demand or continuous mode
Device type	Type B

λ_s means the failure rate of safe failure which brings the system into safe state.

λ_{DD} means the failure rate of dangerous failure but can be diagnosed by the diagnosis subsystem.

λ_{DU} means the failure rate of dangerous failure and can't be diagnosed by the diagnosis subsystem.

Note

- See ISO13849-2: 2012 for failure modes of devices.
 - Failure sharing of different failure modes of each device.
 - See SN29500 for failure rate of each device.
-

Note

STO safety function certification is in progress.

Specifications

- Electrical safety according to IEC 61800-5-1:2016, overvoltage category II
- Environment test requirement according to IEC 61800-5-1:2016
- Operating conditions are shown as follows.

Item	Description	
Ambient/Storage temperature	0°C to 55°C/-20°C to +70°C	
Ambient/Storage humidity	20%–95% RH (no condensation)	
Vibration		
	Item	Test Condition
	Test reference	See IEC 60068-2-6 4.6
	Condition	EUT powered on, operating normally
	Motion mode	Sinusoidal
	Vibration amplitude/ Acceleration	-
	10 Hz ≤ f ≤ 57 Hz	0.075 mm amplitude
	57 Hz < f ≤ 150 Hz	1 kg
	Duration of vibration	10 sweep cycles per axis on each of three mutually perpendicular axes
	Axes	X, Y, Z
Detail of mounting	According to manufacturer's specification	

Item	Description																
Shock resistance	<table> <tr> <th>Item</th><th>Test Condition</th></tr> <tr> <td>Test reference</td><td>See IEC 60068-2-27: 2008 Table 17</td></tr> <tr> <td>Condition</td><td>EUT powered on, operating normally</td></tr> <tr> <td>Motion mode</td><td>Half-sine pulse</td></tr> <tr> <td>Shock amplitude/ Time</td><td>50 m/s² (5 g) 30 ms</td></tr> <tr> <td>Number of shocks</td><td>3 per axis on each of three mutually perpendicular axes</td></tr> <tr> <td>Axes</td><td>±X, ±Y, ±Z</td></tr> <tr> <td>Detail of mounting</td><td>According to manufacturer's specification</td></tr> </table>	Item	Test Condition	Test reference	See IEC 60068-2-27: 2008 Table 17	Condition	EUT powered on, operating normally	Motion mode	Half-sine pulse	Shock amplitude/ Time	50 m/s ² (5 g) 30 ms	Number of shocks	3 per axis on each of three mutually perpendicular axes	Axes	±X, ±Y, ±Z	Detail of mounting	According to manufacturer's specification
Item	Test Condition																
Test reference	See IEC 60068-2-27: 2008 Table 17																
Condition	EUT powered on, operating normally																
Motion mode	Half-sine pulse																
Shock amplitude/ Time	50 m/s ² (5 g) 30 ms																
Number of shocks	3 per axis on each of three mutually perpendicular axes																
Axes	±X, ±Y, ±Z																
Detail of mounting	According to manufacturer's specification																
IP rating	IP20																
Pollution degree (PD)	PD2: free of corrosive or explosive gases; free of exposure to water, oil or chemicals; free of dust, salts or iron dust																
Altitude	2000 m or below																
Cooling method	Dry clean air (natural convection)																
Others	Free of static electricity, strong electromagnetic fields, magnetic fields, or exposure to radioactivity																

- The drive complies with EMC standards EN/IEC 61800-3:2017, IEC 61326-3-1, and IEC 61800-5-2
- Others

Item	Description
Applicable servo drives	SV6***S2R8I-FS SV6***S5R5I-FS
Position	Integrated on the control board of the drive
Safety function - Inputs	Two channels: STO1/STO2

The STO subsystem elements must always be able to operate within the range of temperature, humidity, corrosion, dust, and vibration and other requirements specified above.




4.1.3 Precautions for Use

General Safety Instructions

The chapter contains the warning symbols used in this manual and the safety instructions which you must obey when you install or connect an option module to a drive or inverter. If you ignore the safety instructions, injury, death or damage can occur. Read this chapter before you start the installation.

Any illustrations, photographs, or examples used in this manual are provided as examples only and may not apply to all products to which this manual is applicable. The products and specifications described in this manual or the content and presentation of the manual may be changed without notice to improve the product and/or the manual.

Table 4–1 Warnings, Cautions and Notes

Pictogram	Signal word	Meaning	Consequences in case of disregard
Example:  DANGER  Hazardous voltage e.g. electric shock	DANGER	DANGER	Indicates that failure to comply with the notice will result in death or severe personal injuries
	WARNINGS	Warning	Indicates that failure to comply with the notice may result in death or severe personal injuries
	CAUTION	Note	Indicates that failure to comply with the notice may result in minor or moderate personal injuries or equipment damage
	STOP	Prohibit	Indicates that failure to comply with the notice will result in equipment or environmental damage

Caution

- High attention is required for electrical installation and at the system design to avoid hazards either in normal operation or in the event of equipment malfunction.
- System design, installation, commissioning and maintenance must be carried out by personnel who have the necessary training and experience. They must read the operating instruction and this safety information.

It is the responsibility of the machine builder/OEM/system integrator to make sure that the essential health and safety function requirements specified in the Machinery Directive are met. Risk analysis and risk assessment is needed before using a product. Make sure that adequate measures are taken to eliminate/reduce the relating risks and components chosen must meet the safety requirements.

This section describes the information that needs to be noted before starting operation. Read the following safety precautions, risk assessment information, and limitations before starting operation.

Safety function: Use the safety function after properly understanding all of these information. Incorrect use of safety functions or use of safety functions that are not sufficient to meet the safety requirements of the site may result in personal injury.

Safety Precautions

Carefully read the following important precautions and observe them when using the safety function.

- STO function is not intended as a replacement for the emergency stop function (E-stop). If only the STO function is triggered, with no extra measures taken, the power supply cannot be cut off in emergencies and high-current parts of the motor and drive are still energized, incurring the risk of electric shock or other risks result in electric energy. Therefore maintenance work on electrical parts of the drive or motor can only be carried out after isolating the drive system from the main supply.
- Depending on the standards and requirements for a particular application, it may be possible to use STO as an integral part of an E-stop system. However, its main purpose is for use in a dedicated safety control arrangement whose purpose is to prevent any hazard from occurring, without the use of an E-stop.
- An E-stop is often provided in a machine to allow for unexpected situations where an operator sees a hazard and can take action to prevent an accident.
- The design requirement for an E-stop differs from that of a safety interlock. Generally, the E-stop is required to be independent from any complex or "intelligent" control. It may use purely electromechanical devices to either disconnect the power or initiate a controlled rapid stop using other means such as dynamic or regenerative braking.

Note

- The design of safety-related systems requires specialist knowledge. To ensure that a complete control system is safe, it is necessary for the whole system to be designed according to recognized safety principles. The use of individual sub-systems such as drives with STO function, which are intended for safety-related applications, does not in itself ensure that the complete system is safe.
 - The STO function can be used to stop the drive in emergency stop situations.
 - In processes without personnel protection, it is recommended not to stop the drive by using the STO function. If a drive running is stopped by using STO, the drive performs a coast-to-stop. If this is not acceptable, the system should be stopped using the correct mode instead of the STO function.
 - This publication is a guide to the application of Inovance SV660 series safety functions, and also on the design of safety-related systems for machinery control.
 - It is the responsibility of the designer of the end product or application to ensure that it is safe and in compliance with the relevant regulations.
-

Risk Assessment

- When using the safety functions, perform risk assessment on the servo system in advance. Make sure that the safety integrity level of the standards is met.
 - The following residual risks can be present even when the safety functions operate. Therefore, safety must always be given consideration during risk assessment.
 - If external forces (such as gravitational force with a vertical axis) are applied when the safety functions are operating, the motor will rotate due to the action of these external forces. Therefore, you must use a separate mechanical brake to secure the motor.
-

Note

- In the case of failure of multiple IGBTs, regardless of whether the STO function is enabled, the servo drive can generate an alignment torque. This torque can cause the motor shaft to rotate within a range of up to $180 \div p$ (for a synchronous reluctance motor, the range is $180 \div 2p$).
 - p: Number of motor pole pairs.
-

To ensure safety, users should decide all the risk assessments and residual risks in the entire machine equipment. A company and individual who constructed the safety related system must take full responsibility for installation and commissioning of the system. Additionally, when complying with a European machinery directive, the system must acquire safety standards certification as a whole.

Perform all risk assessments and safe level certification to the machine or the system as a whole. It is recommended that a Certification Body final safety certification of the system be used.

The following shows residual risks concerning the safety function of this product.

Common residual risks

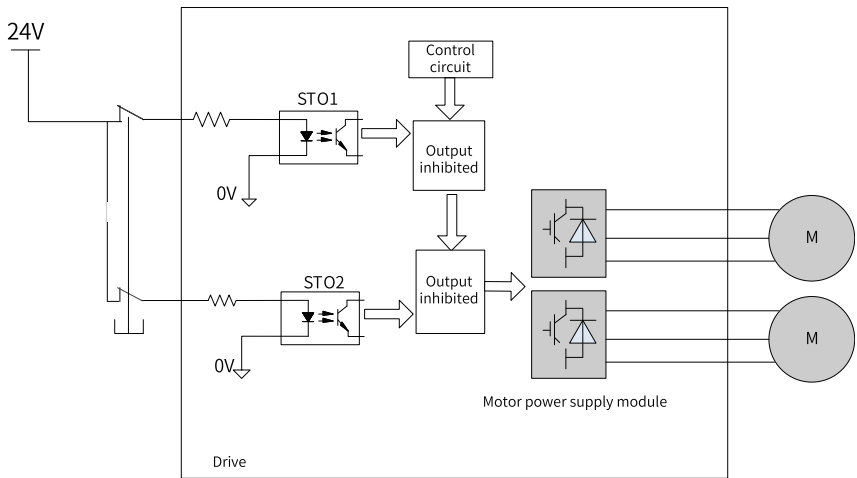
- At the shipment to end-users, check the settings of safety related components with programming tools and monitored/displayed contents on display and record and save the setting data concerning the safety observation function and the programming tools you used. Perform them using a check sheet, etc.
- The safety will not be ensured such as in assembling machine until installing, wiring, and adjustment are completed properly. Install, wire, and adjust your system referring to installation guide for each unit.
- Only qualified personnel are authorized to install, start-up, repair or adjust the machines in which these components are installed. Only trained engineers should install and operate the equipment.
- Separate the wiring for safety observation function from other signal wiring.
- Protect the cables with appropriate ways (routing them in a cabinet, using a cable guard, etc.).
- We recommend using a switch, relay, sensor, etc. which comply with safety standards. When using a switch, relay, sensor, etc. which do not comply with safety standards, perform a safety confirmation.
- Keep the required clearance/creepage distance depending on voltage you use.
- The time to a safety observation error depends on parameter settings.

Safe torque off (STO)

This function only cuts off the torque of the motor, and does not cut off the power supply of the servo/inverter. Before servicing the servo/inverter, cut off the power supply and ensure that the servo/inverter are not energized.

4.2 Safe Torque Off (STO)

4.2.1 Overview



Switch off the motor power supply module to cut off the motor current and motor torque.

Figure 4-1 Schematics of the STO function

Safe Torque Off (STO) is a safety function that complies with IEC 61800-5-2:2016. It is built into Inovance SV660 series servo drives.

The STO function prohibits the control signal of the power semiconductors of the drive output stage, thus preventing the driver from generating torque at the motor shaft end.

The STO function prevents movement of the motor by two redundant external hardware signals (STO1 and STO2) that block the PWM signals from being transmitted to the power layer of the servo drive. STO1 and STO2 input signals must be both active ("H") to allow the servo drive to operate normally.

The following table describes the STO function.

STO1 Input	STO2 Input	PWM Signal
H	H	Normal
L	H	Disabled
H	L	Inhibited
L	L	Disabled

STO (Safe Torque Off)	
Definition	Cuts off the power of the motor.
Description	The STO function brings the machine safely into a no-torque state and prevents it from unexpected start. If the motor is running when STO function is enabled, it coasts to stop.
Safe state	Disables the PWM gating signal of the drive.
Operating mode	High demand mode or continuous mode

4.2.2 Function Use and Monitoring

Function Use

The keypad displays the STO function state and error information.

See the following table to identify the cause of a fault and the action to be taken.

Contact Inovance technical support if the fault persists after corrective actions listed in the following table are taken.

Fault codes related to the STO function are listed in the following table:

Fault Code	State	Description	Cause	Corrective Action
E150.1	Status of STO1 and STO2 inconsistent	Only one of STO1 and STO2 is in "Low" state, status of STO1 and STO2 are inconsistent.	The input states of STO1 and STO2 are inconsistent.	1. Ensure the requests for disconnecting the voltage of STO1 and STO2 are triggered simultaneously. 2. The input circuit is abnormal and a certain STO input signal is still in the "H" state after the 24 V signal is disconnected. Contact Inovance for technical support.
E150.2	STO activated	OV/UV of the 5V power supply is detected.	OV/UV of the 5V power supply.	Restore the 5 V power supply to normal state. Contact Inovance for technical support.
E150.3	STO activated	The input circuit of STO works improperly.	The input circuit of STO works improperly.	Fix the input circuit fault. Contact Inovance for technical support.
E150.4	STO activated	The buffer circuit of STO works improperly.	The buffer circuit of STO works improperly.	Fix the buffer circuit fault. Contact Inovance for technical support.

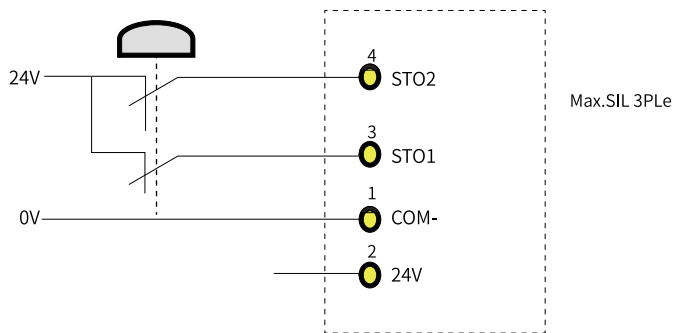
Note

- For a motor with brake, if either STO1 or STO2 closes, the drive will be disabled within 30 ms (STO response time).
 - For a motor without brake, if either STO1 or STO2 closes, the drive will be disabled within 5 ms (STO response time).
-

Application Example of Safety Function

Example 1:

Emergency button (dual-contact) Class 3 ISO13849



4.2.3 Fault Reset

The exceptional operation refers to the durations of power-on and initialization, and how to return from the STO state.

- The PWM buffer is disabled as the enable terminal is pulled up during power-on, so the PWM signal is inhibited.
- The PWM buffer is disabled as the enable terminal is pulled up during initialization of the MCU, so the PWM signal is inhibited. Such condition is cleared and servo drive works normally after initialization is done.
- When all of the following conditions are met, the servo system that enters the safe state through the STO function can be back to normal with the safe state cleared after auto-reset of the drive.
 - The input state of the STO request must be "high".
 - The servo ON or servo RUN command must be inactive.
 - No dangerous faults exist.

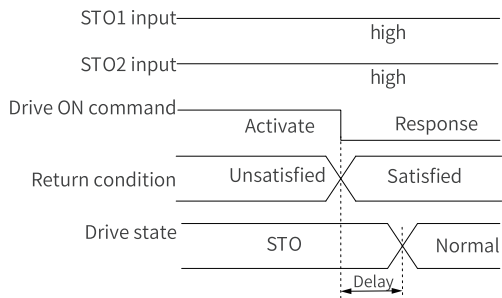


Figure 4-2 Return condition of servo ON/RUN command

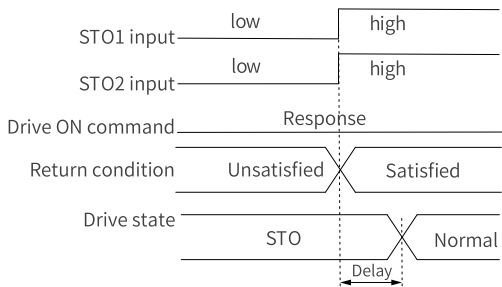


Figure 4-3 Return condition of external STO request state

- When STO_IN (STO1 or STO2 input) is restored to 24 V, the EDM and servo ready signals are immediately reset to 0. After 400 milliseconds, the servo operation signal is activated (when STO_IN keeps at 24 V). Servo operation is PWM drive signal output.

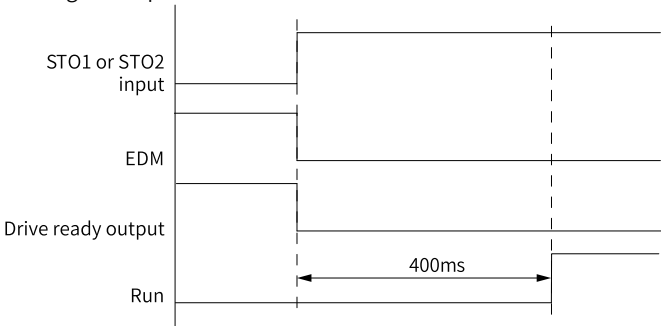
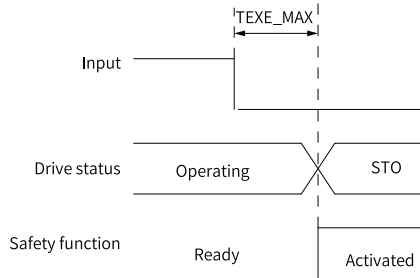


Figure 4-4 Servo drive reset timing diagram

4.2.4 Safety Function Response Time

The STO function prevents movement of the motor by two redundant external hardware signals (STO1 and STO2) that block the PWM signals from being outputted to the power layer of the servo drive. STO1 and STO2 input signals must be both active to allow the servo drive to operate normally.

If either one or both signals are set to "Low" level, the PWM signals will be blocked within 30 ms.



4.3 Acceptance

Basic requirements

- Technical staff must be trained to understand the requirements and principles of designing and operating safety-related systems.
- Person performing the maintenance must be trained to understand the requirements and principles of designing and operating safety-related systems.
- Operators must be trained to understand the requirements and principles of designing and operating safety-related systems.
- The safety-related circuit on the control board that fails to operate must be replaced with a new one as it is not repairable.

Commissioning Checklist

- Start-up test and validation
IEC 61508, EN/IEC 62061 and EN ISO 13849 require the final assembler of the equipment to verify the operation of the safety function through acceptance testing. This acceptance test is described in the drive manual. The testing of optional safety features is described in the corresponding manuals.

The acceptance test must be performed:

- at initial start-up of the safety function
- after any changes related to the safety function (wiring, components, settings and so on).
- after any maintenance work related to the safety function.

The acceptance test of the safety function must be carried out by an authorized person with expertise and knowledge of the safety function. The test must be documented and signed by the test staff.

Signed acceptance test reports must be stored in the logbook of the machine. The report shall include documentation of start-up activities and test results, references to failure reports and resolution of failures. Any new acceptance tests performed due to changes or maintenance need to be logged into the logbook.

- Checklist

Step	Action	Result
1	Ensure that the drive runs and stops freely during commissioning.	
2	Stop the drive (if running), switch the input power supply off and isolate the drive from the power line by a disconnecter.	
3	Check the STO circuit connections based on the circuit diagram.	
4	Check that the shield of the STO input cable is grounded to the drive frame.	
5	Close the disconnecter and switch the power supply on.	
5.1	Test the STO signal #1 when the motor stops: Set STO1 and STO2 to "H". Send a stop command to the drive (if running) and wait until the motor shaft is at standstill. Awake the STO function by de-energizing (low state or open-circuit) the STO input signal #1 and send a start command to the drive. Ensure that the motor stays at a standstill and the keypad of the drive displays "E150.1".	
5.2	Set STO1 to "H" and disable the ON/RUN command of the drive. Then, reset the drive automatically and enable ON/RUN command of the drive. Finally, check whether the motor runs normally.	
5.3	Test the STO signal #2 when the motor stops: Set STO1 and STO2 to "H". Send a stop command to the drive (if running) and wait until the motor shaft is at standstill. Awake the STO function by de-energizing (low state or open-circuit) the STO input signal 2 and send a start command to the drive. Ensure that the motor stays at a standstill and the keypad of the drive displays "E150.1".	
5.4	Set STO2 to "H" and disable the ON/RUN command of the drive. Then, reset the drive automatically and enable ON/RUN command of the drive. Finally, check whether the motor runs normally.	

Step	Action	Result
6.1	Test the STO channel 1 when the motor is running: Set STO1 and STO2 to "H". Start the drive and ensure the motor is running. Awake the STO function by de-energizing (low state or open-circuit) the STO input signal 1. Ensure that the motor stops and the drive trips. Reset the fault and try to start the drive. Ensure that the motor stays at a standstill and the keypad of the drive displays "E150.1".	
6.2	Set STO1 to "H" and disable the ON/RUN command of the drive. Then, reset the drive automatically and enable ON/RUN command of the drive. Finally, check whether the motor runs normally.	
6.3	Test the STO channel 2 when the motor is running: Set STO1 and STO2 to "H". Start the drive and ensure the motor is running. Awake the STO function by de-energizing (low state or open-circuit) the STO input signal 2. Ensure that the motor stops and the drive trips. Reset the fault and try to start the drive. Ensure that the motor stays at a standstill and the keypad of the drive displays "E150.1".	
6.4	Set STO2 to "H" and disable the ON/RUN command of the drive. Then, reset the drive automatically and enable ON/RUN command of the drive. Finally, check whether the motor runs normally.	
7	Document and sign the acceptance test report which verifies that the safety function is safe and acceptable for operation.	

Special requirements

You must conduct STO diagnosis every three month by powering off and powering on the drive once, or running the STO function once.

Note

There are two ways to perform STO diagnosis:

- Power off and restart;
- Trigger and then cancel STO.

You can use either of them.

5 Description of Parameters

5.1 H00 Servo Motor Parameters

H00.00 Motor code

Address:	-	Effective	Upon the next power-on
Min.:	0	Time:	
Max.:	14101	Unit:	-
Default:	14101	Data Type:	UInt16
		Change:	At stop

Value Range:

0–14101

Description

14000: Inovance 20-bit incremental encoder motor

14101: Inovance 23-bit absolute encoder motor

14102: Inovance 26-bit absolute encoder motor (26-bit is not supported)

H00.02 Customized No.

Address:	-	Effective	-
Min.:	0.00	Time:	
Max.:	4294967295.00	Unit:	-
Default:	0.00	Data Type:	UInt32
		Change:	Unchangeable

Value Range:

0.00–4294967295.00

Description

Differentiates the customized MCU software version, which is not applicable to standard models.

H00.04 Encoder version

Address:	-	Effective	-
Min.:	0.0	Time:	
Max.:	6553.5	Unit:	-
Default:	0.0	Data Type:	UInt16
		Change:	Unchangeable

Value Range:

0.0–6553.5

Description

Saved in the encoder and used to differentiate the encoder software version.

H00.05 Serial-type motor code

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Displays the code of the serial-type motor, which is determined by the motor model and unchangeable.

H00.06 FPGA customized SN

Address:	-	Effective	-
		Time:	
Min.:	0.00	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0.00	Change:	Unchangeable

Value Range:

0.00–655.35

Description

Differentiates the customized FPGA software version, which is not applicable to standard models.

H00.07 STO version

Address:	-	Effective	-
		Time:	
Min.:	0.0	Unit:	-
Max.:	655.4	Data Type:	UInt16
Default:	0.0	Change:	Unchangeable

Value Range:

0.0–655.4

Description

Display the software version number of STO function.

H00.08 Serial encoder type

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0–65535

Description

14100: Multi-turn absolute encoder

Others: Single-turn absolute encoder

H00.09 Rated voltage

Address: -

Effective Upon the next power-on

Time:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0: 220 V

1: 380 V

Description

0: 220 V

1: 380 V

H00.10 Rated power

Address: -

Effective Upon the next power-on

Time:

Min.: 0.01

Unit: kW

Max.: 655.35

Data Type: UInt16

Default: 0.75

Change: At stop

Value Range:

0.01 kW–655.35 kW

Description

-

H00.11 Rated current

Address: -

Effective Upon the next power-on

Time:

Min.: 0.01

Unit: A

Max.: 655.35

Data Type: UInt16

Default: 4.70

Change: At stop

Value Range:

0.01 A to 655.35 A

Description

-

H00.12 Rated torque

Address: -

Min.: 0.10

Max.: 655.35

Default: 2.39

Value Range:

0.10N·m–655.35N·m

Description

-

Effective Upon the next power-on

Time:

Unit: N·m

Data Type: UInt16

Change: At stop

H00.13 Max. torque

Address: -

Min.: 0.10

Max.: 655.35

Default: 7.16

Value Range:

0.10N·m–655.35N·m

Description

-

Effective Upon the next power-on

Time:

Unit: N·m

Data Type: UInt16

Change: At stop

H00.14 Rated speed

Address: -

Min.: 100

Max.: 9999

Default: 3000

Value Range:

100rpm–9999rpm

Description

-

Effective Upon the next power-on

Time:

Unit: rpm

Data Type: UInt16

Change: At stop

H00.15 Maximum speed

Address: -

Min.: 100

Max.: 9999

Default: 6000

Value Range:

100rpm–9999rpm

Effective Upon the next power-on

Time:

Unit: rpm

Data Type: UInt16

Change: At stop

Description

-

H00.16 Moment of inertia

Address: -

Min.: 0.01

Max.: 655.35

Default: 1.30

Value Range:0.01 kgcm²–655.35 kgcm²**Description**

-

Effective Upon the next power-on

Time:

Unit: kgcm²

Data Type: UInt16

Change: At stop

H00.17 Number of PMSM pole pairs

Address: -

Min.: 2

Max.: 65535

Default: 5

Value Range:

2–65535

Description

-

Effective Upon the next power-on

Time:

Unit: -

Data Type: UInt16

Change: At stop

H00.18 Stator resistance

Address: -

Min.: 0.001

Max.: 65.535

Default: 0.500

Value Range:

0.001 Ω to 65.535 Ω

Description

-

Effective Upon the next power-on

Time:

Unit: Ω

Data Type: UInt16

Change: At stop

H00.19 Stator inductance Lq

Address: -

Min.: 0.01

Max.: 655.35

Effective Upon the next power-on

Time:

Unit: mH

Data Type: UInt16

Default: 3.27

Change: At stop

Value Range:

0.01mH–655.35mH

Description

-

H00.20 Stator inductance Ld

Address: -

Effective Upon the next power-on

Time:

Min.: 0.01

Unit: mH

Max.: 655.35

Data Type: UInt16

Default: 3.87

Change: At stop

Value Range:

0.01mH–655.35mH

Description

-

H00.21 Linear back EMF coefficient

Address: -

Effective Upon the next power-on

Time:

Min.: 0.01

Unit: mV/rpm

Max.: 655.35

Data Type: UInt16

Default: 33.30

Change: At stop

Value Range:

0.01 mV/rpm to 655.35 mV/rpm

Description

-

H00.22 Torque coefficient Kt

Address: -

Effective Upon the next power-on

Time:

Min.: 0.01

Unit: N·m/Arms

Max.: 655.35

Data Type: UInt16

Default: 0.51

Change: At stop

Value Range:

0.01 N·m/Arms to 655.35 N·m/Arms

Description

-

H00.23 Electrical constant Te

Address: -

Effective Upon the next power-on

Time:

Min.: 0.01
 Max.: 655.35
 Default: 6.54

Unit: ms
 Data Type: UInt16
 Change: At stop

Value Range:

0.01 ms to 655.35 ms

Description

-

H00.24 Mechanical constant Tm

Address: -

Effective Upon the next power-on

Time:

Min.: 0.01
 Max.: 655.35
 Default: 0.24

Unit: ms
 Data Type: UInt16
 Change: At stop

Value Range:

0.01 ms to 655.35 ms

Description

-

H00.28 Absolute encoder position offset

Address: -

Effective Upon the next power-on

Time:

Min.: 0
 Max.: 4294967295
 Default: 8192

Unit: -
 Data Type: UInt32
 Change: At stop

Value Range:

0–4294967295

Description

Saves the values obtained from angle auto-tuning.

H00.30 Encoder selection (Hex)

Address: -

Effective Upon the next power-on

Time:

Min.: 0
 Max.: 4095
 Default: 19

Unit: -
 Data Type: UInt16
 Change: At stop

Value Range:

19: Inovance encoder

Description

0x00: Regular incremental encoder (UVW-ABZ)
0x01: Wire-saving encoder (ABZ[UVW])
0x02: Regular incremental encoder (ABZ, without UVW)
0x10: TAMAGAWA encoder
0x12: Nikon encoder
0x13: Inovance encoder
0x30: Optical scale

H00.31 Encoder PPR

Address:	-	Effective Time:	Upon the next power-on
Min.:	1	Unit:	PPR
Max.:	1073741824	Data Type:	UInt32
Default:	67108864	Change:	At stop

Value Range:

1P/Rev–1073741824P/Rev

Description

Defines the number of pulses fed back by the encoder per motor revolution.

H00.33 Electrical angle of Z signal

Address:	-	Effective Time:	Upon the next power-on
Min.:	0.0	Unit:	°
Max.:	360.0	Data Type:	UInt16
Default:	180.0	Change:	At stop

Value Range:

0.0° to 360.0°

Description

-

H00.34 Electrical angle of phase U rising edge

Address:	-	Effective Time:	Upon the next power-on
Min.:	0.0	Unit:	°
Max.:	360.0	Data Type:	UInt16
Default:	180.0	Change:	At stop

Value Range:

0.0° to 360.0°

Description

-

H00.35 Serial-type motor model

Address:	-	Effective	Upon the next power-on
Min.:	0	Time:	
Max.:	65535	Unit:	-
Default:	0	Data Type:	UInt16
Value Range:		Change:	At stop
0–65535			
Description			
-			

H00.37 Absolute encoder function setting bit

Address:	-	Effective	Upon the next power-on
Min.:	0	Time:	
Max.:	65535	Unit:	-
Default:	0	Data Type:	UInt16
Value Range:		Change:	At stop
0–65535			
Description			
-			

H00.60 Motor attribute

Address:	-	Effective	Upon the next power-on
Min.:	0	Time:	
Max.:	65535	Unit:	-
Default:	0	Data Type:	UInt16
Value Range:		Change:	At stop
0–65535			
Description			
-			

H00.61 Brake close time

Address:	-	Effective	Upon the next power-on
Min.:	0	Time:	
Max.:	65535	Unit:	ms
Default:	0	Data Type:	UInt16
Value Range:		Change:	At stop
0 ms to 65535 ms			

Description

-

H00.62 Brake release time

Address: -

Min.: 0

Max.: 65535

Default: 0

Value Range:

0 ms to 65535 ms

Description

-

Effective Time: Upon the next power-on
Unit: ms
Data Type: UInt16
Change: At stop

H00.63 Maximum motor current

Address: -

Min.: 0.00

Max.: 65535.00

Default: 0.00

Value Range:

0.00 A to 65535.00 A

Description

-

Effective Time: Upon the next power-on
Unit: A
Data Type: UInt32
Change: At stop

H00.65 Rated motor current

Address: -

Min.: 0.00

Max.: 65535.00

Default: 0.00

Value Range:

0.00 A to 65535.00 A

Description

-

Effective Time: Upon the next power-on
Unit: A
Data Type: UInt32
Change: At stop

H00.67 Moment of inertia

Address: -

Min.: 0

Max.: 42950

Default: 0

Effective Time: Upon the next power-on
Unit: kgcm²
Data Type: UInt32
Change: At stop

Value Range:0 kgcm²–42950 kgcm²**Description**

-

H00.69 Linear back EMF coefficient

Address: -

Effective Upon the next power-on

Time:

Min.: 0.01

Unit: mV/rpm

Max.: 42949672.95

Data Type: UInt32

Default: 0.00

Change: At stop

Value Range:

0.01 mV/rpm to 42949672.95 mV/rpm

Description

-

H00.71 Motor carrier frequency

Address: -

Effective Upon the next power-on

Time:

Min.: 0

Unit: Hz

Max.: 65535

Data Type: UInt16

Default: 8000

Change: At stop

Value Range:

0 Hz to 65535 Hz

Description

Sets the carrier frequency of the motor. It is effective when bit13 of H00.60 is 1.

H00.72 Max. motor allowable demagnetizing current

Address: -

Effective Upon the next power-on

Time:

Min.: 0

Unit: %

Max.: 65535

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0% to 65535%

Description

Effective when greater than 0. Assigns H00.72 to H07.25 when the motor field weakening is on.

H00.73 Bit01 of motor SN code

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0–65535

Description

-

H00.74 Bit23 of motor SN code

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0–65535

Description

-

H00.75 Bit45 of motor SN code

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0–65535

Description

-

H00.76 Bit67 of motor SN code

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0–65535

Description

-

H00.77 Bit89 of motor SN code

Address: -

Effective -

Time:

Unit: -

Min.: 0

Max.: 65535

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0–65535

Description

-

H00.78 Bit11 of motor SN code

Address: -

Effective -

Time:

Unit: -

Min.: 0

Max.: 65535

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0–65535

Description

-

H00.79 Bit13 of motor SN code

Address: -

Effective -

Time:

Unit: -

Min.: 0

Max.: 65535

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0–65535

Description

-

H00.80 Bit15 of motor SN code

Address: -

Effective -

Time:

Unit: -

Min.: 0

Max.: 65535

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0–65535

Description

-

H00.98 Motor attribute check

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0–65535

Description

-

5.2 H01 Servo Drive Parameters

H01.00 MCU software version

Address: -

Effective -

Time:

Min.: 0.0

Unit: -

Max.: 6553.5

Data Type: UInt16

Default: 0.0

Change: Unchangeable

Value Range:

0.0–6553.5

Description

Displays MCU software version (with one decimal place).

H01.01 FPGA software version

Address: -

Effective -

Time:

Min.: 0.0

Unit: -

Max.: 6553.5

Data Type: UInt16

Default: 0.0

Change: Unchangeable

Value Range:

0.0–6553.5

Description

Displays the FPGA software version, with 1 decimal place.

H01.02 Servo drive series No.

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Display servo drive serial number, with 0 decimal place.

H01.07 Software test version

Address:	-	Effective	-
		Time:	
Min.:	0.00	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0.00	Change:	Unchangeable

Value Range:

0.00–655.35

Description

Displays the software test version, with 2 decimal places.

H01.08 Model parameter version

Address:	-	Effective	-
		Time:	
Min.:	0.0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0.0	Change:	Unchangeable

Value Range:

0.0–6553.5

Description

Displays model parameter version, with 1 decimal place.

H01.10 Drive series No.

Address:	-	Effective	Upon the next power-on
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	3	Change:	At stop

Value Range:

3: S2R8

5: S5R5

Description

Displays the drive series number, with no decimal place.

H01.11 DC-AC voltage class

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	V
Max.:	65535	Data Type:	UInt16
Default:	220	Change:	Unchangeable

Value Range:

0 V to 65535 V

Description

Display inverter voltage level, with 0 decimal place.

H01.12 Rated power of the drive

Address:	-	Effective	-
		Time:	
Min.:	0.00	Unit:	kW
Max.:	10737418.24	Data Type:	UInt32
Default:	0.40	Change:	Unchangeable

Value Range:

0.00 kW–10737418.24 kW

Description

Display the rated power of the drive, with 2 decimal places.

H01.14 Max. output power of the drive

Address:	-	Effective	-
		Time:	
Min.:	0.00	Unit:	kW
Max.:	10737418.24	Data Type:	UInt32
Default:	0.40	Change:	Unchangeable

Value Range:

0.00 kW–10737418.24 kW

Description

Displays the maximum output power of the drive, with 2 decimal places.

H01.16 Rated output current of the drive

Address:	-	Effective	-
		Time:	
Min.:	0.00	Unit:	A
Max.:	10737418.24	Data Type:	UInt32

Default: 2.80

Change: Unchangeable

Value Range:

0.00 A to 10737418.24 A

Description

Displays the rated output current of the drive, with 2 decimal places.

H01.18 Max. output current of the drive

Address: -

Effective -

Time:

Min.: 0.00

Unit: A

Max.: 10737418.24

Data Type: UInt32

Default: 10.10

Change: Unchangeable

Value Range:

0.00 A to 10737418.24 A

Description

Displays the maximum output current of the drive, with 2 decimal places.

H01.20 Carrier frequency

Address: -

Effective Upon the next power-on

Time:

Min.: 4000

Unit: Hz

Max.: 20000

Data Type: UInt16

Default: 8000

Change: At stop

Value Range:

4000 Hz to 20000 Hz

Description

Displays the carrier frequency, with no decimal place.

H01.21 Dead zone time

Address: -

Effective Upon the next power-on

Time:

Min.: 2.00

Unit: us

Max.: 20.00

Data Type: UInt16

Default: 2.00

Change: At stop

Value Range:

2.00us–20.00us

Description

Displays the dead zone time, with two decimal places.

H01.22 D-axis coupling voltage compensation coefficient

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	%
Max.:	1000.0	Data Type:	UInt16
Default:	50.0	Change:	Immediately

Value Range:

0.0% to 1000.0%

Description

Display D-axis coupling voltage compensation coefficient, with 1 decimal place.

H01.23 Q-axis back EMF compensation coefficient

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	%
Max.:	1000.0	Data Type:	UInt16
Default:	50.0	Change:	Immediately

Value Range:

0.0% to 1000.0%

Description

Display Q-axis back EMF compensation coefficient, with 1 decimal place.

H01.24 D-axis current loop gain

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	Hz
Max.:	20000	Data Type:	UInt16
Default:	500	Change:	Immediately

Value Range:

0 Hz to 20000 Hz

Description

Displays D-axis current loop gain, with no decimal place.

H01.25 D-axis current loop integral compensation factor

Address:	-	Effective	Real time
		Time:	
Min.:	0.01	Unit:	-
Max.:	100.00	Data Type:	UInt16
Default:	1.00	Change:	Immediately

Value Range:

0.01–100.00

Description

Display D-axis current loop integral compensation factor, with 2 decimal places.

H01.26 Sinc3 filter data extraction rate in current sampling

Address: -	Effective	Upon the next power-on
	Time:	
Min.: 0	Unit:	-
Max.: 3	Data Type:	UInt16
Default: 0	Change:	At stop

Value Range:

0: Extraction rate 32

1: Extraction rate 64

2: Extraction rate 128

3: Extraction rate 256

Description

Displays Sinc3 filter data extraction rate in current sampling, with no decimal place.

H01.27 Q-axis current loop gain

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	Hz
Max.: 20000	Data Type:	UInt16
Default: 500	Change:	Immediately

Value Range:

0 Hz to 20000 Hz

Description

Displays Q-axis current loop gain, with no decimal place.

H01.28 Q-axis current loop integral compensation factor

Address: -	Effective	Real time
	Time:	
Min.: 0.01	Unit:	-
Max.: 100.00	Data Type:	UInt16
Default: 1.00	Change:	Immediately

Value Range:

0.01–100.00

Description

Displays Q-axis current loop integral compensation factor, with 2 decimal places.

H01.29 Q-axis coupling voltage compensation coefficient

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	%
Max.:	1000.0	Data Type:	UInt16
Default:	50.0	Change:	Immediately

Value Range:

0.0% to 1000.0%

Description

Display Q-axis coupling voltage compensation coefficient, with 1 decimal place.

H01.30 Bus voltage gain tuning

Address:	-	Effective	Real time
		Time:	
Min.:	50.0	Unit:	%
Max.:	150.0	Data Type:	UInt16
Default:	100.0	Change:	At stop

Value Range:

50.0% to 150.0%

Description

Displays bus voltage gain adjustment, with 1 decimal place.

H01.31 Minimum ON time of bootstrap circuit lower bridge

Address:	-	Effective	Upon the next power-on
		Time:	
Min.:	0.0	Unit:	us
Max.:	20.0	Data Type:	UInt16
Default:	0.0	Change:	At stop

Value Range:

0.0us–20.0us

Description

Displays the minimum ON time of bootstrap circuit lower bridge, with 1 decimal place.

H01.32 Relative gain of UV sampling

Address:	-	Effective	Upon the next power-on
		Time:	
Min.:	1	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	32768	Change:	At stop

Value Range:

1-65535

Description

Displays the relative gain of UV sampling, with no decimal place.

H01.34 Drive over-temperature threshold

Address: -	Effective	Upon the next power-on
	Time:	
Min.: 0	Unit:	°C
Max.: 150	Data Type:	UInt16
Default: 95	Change:	Immediately

Value Range:

0°C to 150°C

Description

Displays the drive over-temperature threshold, with no decimal place.

H01.36 Current sensor range

Address: -	Effective	Upon the next power-on
	Time:	
Min.: 0.00	Unit:	A
Max.: 9999.99	Data Type:	UInt32
Default: 21.33	Change:	At stop

Value Range:

0.00 A to 9999.99 A

Description

Displays the current sensor range, with 2 decimal places.

H01.38 FPGA phase current protection threshold

Address: -	Effective	Upon the next power-on
	Time:	
Min.: 0.0	Unit:	%
Max.: 100.0	Data Type:	UInt16
Default: 90.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

Displays FPGA phase current protection threshold, with 1 decimal place.

H01.39 Current loop version

Address: -	Effective	Upon the next power-on
	Time:	
Min.: 0	Unit:	-

Max.: 65535

Default: 0

Value Range:

0–65535

Description

Displays the current loop version, with no decimal place.

Data Type: UInt16

Change: At stop

H01.40 DC bus overvoltage protection threshold

Address: -

Effective Real time

Time:

Min.: 0

Unit: V

Max.: 2000

Data Type: UInt16

Default: 420

Change: Immediately

Value Range:

0 V to 2000 V

Description

Displays DC bus overvoltage protection threshold, with 0 decimal place.

H01.41 DC bus voltage discharge threshold

Address: -

Effective Real time

Time:

Min.: 0

Unit: V

Max.: 2000

Data Type: UInt16

Default: 380

Change: Immediately

Value Range:

0 V to 2000 V

Description

Display DC bus voltage discharge threshold, with no decimal place.

H01.42 DC bus undervoltage threshold

Address: -

Effective Real time

Time:

Min.: 0

Unit: V

Max.: 2000

Data Type: UInt16

Default: 200

Change: Immediately

Value Range:

0 V to 2000 V

Description

Displays DC bus undervoltage threshold, with no decimal place.

H01.52 D-axis proportional gain in performance priority mode

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	Hz
Max.:	20000	Data Type:	UInt16
Default:	2000	Change:	Immediately

Value Range:

0 Hz to 20000 Hz

Description

Display D-axis proportional gain in performance priority mode, with no decimal place.

H01.53 D-axis integral gain in performance priority mode

Address:	-	Effective	Real time
		Time:	
Min.:	0.01	Unit:	-
Max.:	100.00	Data Type:	UInt16
Default:	1.00	Change:	Immediately

Value Range:

0.01–100.00

Description

Displays D-axis integral gain in performance priority mode, with 2 decimal places.

H01.54 Q-axis proportional gain in performance priority mode

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	Hz
Max.:	20000	Data Type:	UInt16
Default:	2000	Change:	Immediately

Value Range:

0 Hz to 20000 Hz

Description

Displays Q-axis proportional gain in performance priority mode, with no decimal place.

H01.55 Q-axis integral gain in performance priority mode

Address:	-	Effective	Real time
		Time:	
Min.:	0.01	Unit:	-
Max.:	100.00	Data Type:	UInt16
Default:	1.00	Change:	Immediately

Value Range:

0.01–100.00

Description

Displays Q-axis integral gain in performance priority mode, with 2 decimal places.

H01.56 Current loop low-pass cutoff frequency

Address: - Effective Upon the next power-on

Time:

Min.: 0

Unit: Hz

Max.: 65535

Data Type: UInt16

Default: 11000

Change: At stop

Value Range:

0 Hz to 65535 Hz

Description

Displays current loop low-pass cutoff frequency, with no decimal place.

H01.59 Serial encoder data transmission compensation time

Address: - Effective Upon the next power-on

Time:

Min.: 0.000

Unit: us

Max.: 10.000

Data Type: UInt16

Default: 0.000

Change: At stop

Value Range:

0.000us–10.000us

Description

Display the data transmission compensation time of the serial encoder, with three decimal places.

H01.60 FPGA scheduling frequency selection

Address: - Effective Upon the next power-on

Time:

Min.: 1

Unit: -

Max.: 2

Data Type: UInt16

Default: 2

Change: At stop

Value Range:

2: 8 kHz

Description

Selects FPGA scheduling frequency, with no decimal place.

H01.61 Command scheduling frequency

Address: -	Effective	Upon the next power-on
	Time:	
Min.: 0	Unit:	-
Max.: 65535	Data Type:	UInt16
Default: 0	Change:	At stop

Value Range:

0: 4 kHz

1: 2 kHz

2: 1 kHz

Description

Selects the command scheduling frequency, with no decimal place.

H01.62 Auto-tuning of drive model

Address: -	Effective	-
	Time:	
Min.: 0	Unit:	-
Max.: 65535	Data Type:	UInt16
Default: 0	Change:	Unchangeable

Value Range:

0–65535

Description

Displays the auto-tuned drive model, with no decimal place.

H01.66 Current loop configuration

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	kHz
Max.: 31	Data Type:	UInt16
Default: 12	Change:	Immediately

Value Range:

0 kHz to 31 kHz

Description

Displays current loop configuration, with no decimal place.

H01.67 Dead zone compensation coefficient

Address: -	Effective	Upon the next power-on
	Time:	
Min.: 0.00	Unit:	-
Max.: 2.00	Data Type:	UInt16
Default: 1.00	Change:	Immediately

Value Range:

0.00–2.00

Description

Displays the dead zone compensation coefficient, with two decimal places.

H01.68 Current observer cutoff frequency

Address:	-	Effective	Real time
		Time:	
Min.:	200	Unit:	-
Max.:	5000	Data Type:	UInt16
Default:	2000	Change:	Immediately

Value Range:

200–5000

Description

Displays current observer cutoff frequency, with no decimal place.

H01.69 Current observer correction coefficient

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	-
Max.:	9.00	Data Type:	UInt16
Default:	1.00	Change:	Immediately

Value Range:

0.00–9.00

Description

Displays current observer correction coefficient, with 2 decimal places.

H01.72 Hide IGBT model identification

Address:	-	Effective	Upon the next power-on
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0–65535

Description

Displays whether to hide IGBT model identification, with no decimal place.

H01.73 Sigma-delta signal phase compensation time

Address:	-	Effective	Upon the next power-on
		Time:	

Min.:	0	Unit:	us
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0us–65535us

Description

Displays Sigma-delta signal phase compensation time, with no decimal place.

H01.75 Current loop amplification factor

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	1.00	Change:	Immediately

Value Range:

0.00–655.35

Description

Displays current loop amplification coefficient, with 2 decimal places.

H01.78 Control voltage undervoltage threshold

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	V
Max.:	2000	Data Type:	UInt16
Default:	200	Change:	Immediately

Value Range:

0 V to 2000 V

Description

Displays control power undervoltage threshold, with no decimal place.

H01.79 Control voltage gain adjustment

Address:	-	Effective	Upon the next power-on
		Time:	
Min.:	50.0	Unit:	%
Max.:	150.0	Data Type:	UInt16
Default:	100.0	Change:	At stop

Value Range:

50.0% to 150.0%

Description

Displays control voltage gain adjustment, with 1 decimal place.

H01.82 Filter time of PL and CPL

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	32767	Unit:	-
Default:	4000	Data Type:	UInt16
		Change:	At stop

Value Range:

0–32767

Description

Displays PL and CPL filter time, with no decimal place.

H01.83 AO zero offset

Address:	-	Effective	Real time
Min.:	-500	Time:	
Max.:	500	Unit:	mV
Default:	0	Data Type:	Int16
		Change:	Immediately

Value Range:

-500 mV to 500 mV

Description

Adjusts AO zero offset.

H01.84 AO ratio

Address:	-	Effective	Real time
Min.:	0.000	Time:	
Max.:	2000.000	Unit:	-
Default:	1000.000	Data Type:	UInt16
		Change:	Immediately

Value Range:

0.000–2000.000

Description

Adjusts the AO ratio.

H01.89 Junction temperature parameter version

Address:	-	Effective	-
Min.:	0.000	Time:	
Max.:	65.535	Unit:	-
Default:	0.000	Data Type:	UInt16
		Change:	Unchangeable

Value Range:

0.000–65.535

Description

Display the version number of the junction temperature parameter.

5.3 H02 Basic Control Parameters

H02.00 Control mode

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 9	Data Type:	UInt16
Default: 9	Change:	At stop

Value Range:

- 0: Velocity mode
- 1: Position mode
- 2: Torque mode
- 9: EtherCAT mode

Description

- 0: Velocity mode
- 1: Position mode
- 2: Torque mode
- 9: EtherCAT mode

H02.01 Absolute system selection

Address: -	Effective	Upon the next power-on
	Time:	
Min.: 0	Unit:	-
Max.: 4	Data Type:	UInt16
Default: 0	Change:	At stop

Value Range:

- 0: Incremental mode
- 1: Absolute position linear mode
- 2: Absolute position rotation mode
- 3: Absolute position linear mode (without encoder overflow warning)
- 4: Absolute position single-turn mode

Description

Used to set the absolute position function.

H02.02 Rotation direction selection

Address: -	Effective	Upon the next power-on
	Time:	
Min.: 0	Unit:	-

Setpoint	Stop Mode
-4	Ramp to stop as defined by 6085h, keeping dynamic braking status
-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
2	Dynamic braking stop, keeping de-energized status

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

For comparison of stop modes, see section Servo Stop.

After the brake output function is enabled, and motor stop mode is "forced braking" (bit2 of H0A.71 is 0), the stop mode upon S-ON OFF is forcibly set to "Ramp to stop as defined by 6085h, keeping dynamic braking status".

H02.06 Stop mode at No.2 fault

Address:	-	Effective	Real time
		Time:	
Min.:	-5	Unit:	-
Max.:	4	Data Type:	Int16
Default:	2	Change:	Immediately

Value Range:

- 5: Stop at zero speed, keeping dynamic braking state
- 4: Stop at emergency stop torque, keeping dynamic braking state
- 3: Ramp to stop as defined by 6085h, keeping dynamic braking state
- 2: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping dynamic braking state
- 1: Dynamic braking stop, keeping dynamic braking state
- 0: Coast to stop, keeping de-energized state
- 1: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping de-energized state
- 2: Ramp to stop as defined by 6085h, keeping de-energized state
- 3: Stop at emergency stop torque, keeping de-energized state
- 4: Dynamic braking stop, keeping de-energized state

Description

Defines the deceleration mode of the servo motor for stopping rotating and the servo motor status when a No. 2 fault occurs.

H02.07 Stop mode at overtravel

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 7	Data Type:	UInt16
Default: 1	Change:	At stop

Value Range:

- 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 state
- 3: Stop based on ramp, keeping de-energized state
- 4: Stop based on ramp, keeping position lock state
- 5: Dynamic braking stop, keeping de-energized state
- 6: Dynamic braking stop, keeping dynamic braking state
- 7: Not responding to overtravel

Description

Defines the deceleration mode of the servo motor for stopping rotating and the servo motor status when overtravel occurs.

H02.08 Stop mode at No.1 fault

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 2	Data Type:	UInt16
Default: 2	Change:	At stop

Value Range:

- 0: Coast to stop, keeping de-energized state
- 1: Dynamic braking stop, keeping de-energized state
- 2: Dynamic braking stop, keeping dynamic braking state

Description

Defines the deceleration mode of the servo motor for stopping rotating and the servo motor status when a No. 1 fault occurs.

H02.09 Delay from brake output ON to command received

Address: -	Effective	At stop
	Time:	
Min.: 0	Unit:	ms
Max.: 500	Data Type:	UInt16
Default: 250	Change:	Immediately

Value Range:

0 ms to 500 ms

Description

Defines the delay from the moment the brake output signal is ON to the moment the servo drive starts to receive commands after power-on.

H02.10 Delay from brake output OFF to motor de-energized

Address: -	Effective	Real time
	Time:	
Min.: 50	Unit:	ms
Max.: 1000	Data Type:	UInt16
Default: 150	Change:	Immediately

Value Range:

50 ms to 1000 ms

Description

Defines the delay from the moment brake output is OFF to the moment when the motor at standstill enters the de-energized status.

H02.11 Motor speed threshold at brake output OFF in rotation state

Address: -	Effective	Real time
	Time:	
Min.: 20	Unit:	rpm
Max.: 3000	Data Type:	UInt16
Default: 30	Change:	Immediately

Value Range:

20 rpm to 3000 rpm

Description

Defines the motor speed threshold when brake (BK) output is OFF in the rotating state.

H02.12 Delay from S-ON OFF to brake output OFF in rotation state

Address: -	Effective	Real time
	Time:	
Min.: 1	Unit:	ms
Max.: 65535	Data Type:	UInt16
Default: 500	Change:	Immediately

Value Range:

1 ms to 65535 ms

Description

Sets the delay time from BK OFF to S-ON OFF when the motor is in rotating state.

H02.15 Warning display on the keypad

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 1	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0: Output warning information immediately

1: Not output warning information

Description

Defines whether to switch the keypad to the fault display mode when a No. 3 fault occurs.

H02.16 Brake enable switch

Address: -	Effective	At stop
	Time:	
Min.: 0	Unit:	-
Max.: 1	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0: OFF

1: ON

Description

Turn on or off the brake function.

H02.17 Stop mode upon main circuit power failure

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 3	Data Type:	UInt16
Default: 2	Change:	Immediately

Value Range:

0: Keep current action

1: Stop upon fault as defined by H02.06

2: Stop at S-ON OFF as defined by H02.05

3: Stop quickly as defined by H02.18

Description

Defines the stop mode of the motor for stopping rotating upon main circuit power failure.

H02.18 Quick stop mode

Address:	-	Effective	At stop
Min.:	0	Time:	
Max.:	7	Unit:	-
Default:	2	Data Type:	UInt16
		Change:	Immediately

Value Range:

0: Coast to stop, keeping de-energized state

1: Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized state

2: Ramp to stop as defined by 6085h, keeping de-energized state

3: Stop at emergency stop torque, keeping de-energized state

5: Ramp to stop as defined by 6084h/609Ah (HM), keeping position lock state

6: Ramp to stop as defined by 6085h, keeping position lock state

7: Stop at emergency stop torque, keeping position lock state

Description

Defines the deceleration mode of the motor for stopping rotating upon quick stop and the motor status after stop.

H02.20 Dynamic brake relay coil ON delay

Address:	-	Effective	Real time
Min.:	10	Time:	
Max.:	30000	Unit:	ms
Default:	30	Data Type:	UInt16
		Change:	Immediately

Value Range:

10 ms to 30000 ms

Description

-

H02.21 Permissible minimum resistance of regenerative resistor

Address:	-	Effective	-
Min.:	1	Time:	
Max.:	1000	Unit:	Ω
Default:	40	Data Type:	UInt16
		Change:	Unchangeable

Value Range:

1 Ω to 1000 Ω

Description

-

H02.22 Power of built-in regenerative resistor

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	W
Max.:	65535	Data Type:	UInt16
Default:	50	Change:	Unchangeable

Value Range:

0 W–65535 W

Description

The power of the built-in regenerative resistor is only related to the servo drive model, which is unmodifiable.

H02.23 Resistance of built-in regenerative resistor

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	Ω
Max.:	65535	Data Type:	UInt16
Default:	50	Change:	Unchangeable

Value Range:0 Ω to 65535 Ω **Description**

The resistance of the built-in regenerative resistor is only related to the servo drive model, which is unmodifiable.

Servo drive model (SV660ND, SV630ND)		Specifications of Built-in Regenerative Resistor	
		Resistance (Ω)	Power (W)
Single-phase 220 V	SV6*0NDS2R8I	-	-
	SV6*0NDS5R5I	25	80
Three-phase 220 V	SV6*0NDS2R8I	-	-
	SV6*0NDS5R5I	25	80

H02.24 Resistor heat dissipation coefficient

Address:	-	Effective	Real time
		Time:	
Min.:	10	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	30	Change:	Immediately

Value Range:

10% to 100%

Description

Defines the heat dissipation coefficient of the regenerative resistor, which is applicable to both external and built-in regenerative resistors.

Defines the heat dissipation coefficient of the regenerative resistor, which is applicable to both external and built-in regenerative resistors.

Set this parameter properly according to actual heat dissipation conditions of the resistor.

Recommendations:

Generally, the value of H02.24 cannot exceed 30% for natural cooling.

The value of H02.24 cannot exceed 50% for forced air cooling.

H02.25 Regenerative resistor type

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	3	Change:	Immediately

Value Range:

0: Built-in

1: External, natural cooling

2: External, forced air cooling

3: No resistor needed

Description

Defines the resistor type and the mode of absorbing and releasing the braking energy.

H02.26 Power of external regenerative resistor

Address:	-	Effective	Real time
		Time:	
Min.:	1	Unit:	W
Max.:	65535	Data Type:	UInt16
Default:	40	Change:	Immediately

Value Range:

1 W–65535 W

Description

Defines the power of external regenerative resistor.

H02.27 Resistance of external regenerative resistor

Address:	-	Effective	Real time
		Time:	
Min.:	15	Unit:	Ω
Max.:	1000	Data Type:	UInt16

Default: 50

Change: Immediately

Value Range:

15 Ω to 1000 Ω

Description

Defines the resistance of the external regenerative resistor.

H02.30 User password

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0–65535

Description

-

H02.31 System parameter initialization

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 2

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0: No operation

1: Restore default settings

2: Clear fault records

Description

Used to restore default values or clear fault records.

H02.32 Selection of parameters in group H0b

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 99

Data Type: UInt16

Default: 50

Change: Immediately

Value Range:

0–99

Description

Sets the offset of the parameter to be displayed on the operating panel.

For example, the setpoint 0 indicates the value of H0b.00 (Motor speed actual value) is displayed on the keypad.

The setpoint 1 indicates the value of H0b.01 is displayed on the operating panel.

H02.35 Keypad data update frequency

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	Hz
Max.: 20	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0 Hz to 20 Hz

Description

-

H02.41 Manufacturer password

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 65535	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0-65535

Description

-

H02.47 Delayed brake closing time of power cable breakage

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 1000	Data Type:	UInt16
Default: 10	Change:	Immediately

Value Range:

0-1000

Description

It is applicable to applications with vertical axis load.

It is effective only when the power cable is broken, the servo speed feedback is greater than H02.11 and there is no servo OFF (H02.12). Otherwise, brake OFF will be implemented if any one of the three conditions is met.

5.4 H03 Terminal Input Parameters

H03.02 DI1 function selection

Address:	-	Effective	Real time
Min.:	100	Time:	
Max.:	139	Unit:	-
Default:	114	Data Type:	UInt16
		Change:	Immediately

Value Range:

- 100: [Axis 1]Undefined
- 101: [Axis 1]Servo enable
- 102: [Axis 1]Alarm reset signal
- 114: [Axis 1]Positive limit switch
- 115: [Axis 1]Negative limit switch
- 131: [Axis 1]Home switch
- 134: [Axis 1]Emergency stop
- 138: [Axis 1]Touch probe 1
- 139: [Axis 1]Touch probe 2

Description

Defines the function of DI1.

H03.03 DI1 logic selection

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	1	Unit:	-
Default:	0	Data Type:	UInt16
		Change:	Immediately

Value Range:

- 0: Normally open
- 1: Closed

Description

Used to set the level logic of DI1 when the function assigned to DI is active.

H03.04 DI2 function selection

Address:	-	Effective	Real time
Min.:	200	Time:	
Max.:	239	Unit:	-
Default:	214	Data Type:	UInt16
		Change:	Immediately

Value Range:

200: [Axis 2]Undefined
 1: [Axis 2]Servo enable
 2: [Axis 2]Alarm reset signal
 214: [Axis 2]Positive limit switch
 215: [Axis 2]Negative limit switch

231: [Axis 2]Home switch
 234: [Axis 2]Emergency stop
 238: [Axis 2]Touch probe 1
 239: [Axis 2]Touch probe 2

Description

-

H03.05 D12 logic selection

Address: -

Effective Real time

Time:

Min.: 0

Unit:

-

Max.: 1

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0: Normally open

1: Closed

Description

-

H03.06 D13 function selection

Address: -

Effective Real time

Time:

Min.: 100

Unit:

-

Max.: 139

Data Type: UInt16

Default: 115

Change: Immediately

Value Range:

100: [Axis 1]Undefined

101: [Axis 1]Servo enable

102: [Axis 1]Alarm reset signal

114: [Axis 1]Positive limit switch

115: [Axis 1]Negative limit switch

131: [Axis 1]Home switch

134: [Axis 1]Emergency stop

138: [Axis 1]Touch probe 1

139: [Axis 1]Touch probe 2

Description

Defines the function of DI3.

H03.07 DI3 logic selection

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0: Normally open

1: Closed

Description

-

H03.08 DI4 function selection

Address: -

Effective Real time

Time:

Min.: 200

Unit: -

Max.: 239

Data Type: UInt16

Default: 215

Change: Immediately

Value Range:

200: [Axis 2]Undefined

201: [Axis 2]Servo enable

202: [Axis 2]Alarm reset signal

214: [Axis 2]Positive limit switch

215: [Axis 2]Negative limit switch

231: [Axis 2]Home switch

234: [Axis 2]Emergency stop

238: [Axis 2]Touch probe 1

239: [Axis 2]Touch probe 2

Description

-

H03.09 DI4 logic selection

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0: Normally open

1: Closed

Description

-

H03.10 DI5 function selection

Address: -

Effective Real time

Time:

Unit: -

Min.: 100

Data Type: UInt16

Max.: 139

Change: Immediately

Default: 131

Value Range:

100: [Axis 1]Undefined

101: [Axis 1]Servo enable

102: [Axis 1]Alarm reset signal

114: [Axis 1]Positive limit switch

115: [Axis 1]Negative limit switch

131: [Axis 1]Home switch

134: [Axis 1]Emergency stop

138: [Axis 1]Touch probe 1

139: [Axis 1]Touch probe 2

Description

-

H03.11 DI5 logic selection

Address: -

Effective Real time

Time:

Unit: -

Min.: 0

Data Type: UInt16

Max.: 1

Change: Immediately

Default: 0

Value Range:

0: Normally open

1: Closed

Description

-

H03.12 DI6 function selection

Address: -

Effective Real time

Time:

Unit: -

Min.: 200

Max.: 239

Default: 231

Data Type: UInt16

Change: Immediately

Value Range:

200: [Axis 2]Undefined

1: [Axis 2]Servo enable

2: [Axis 2]Alarm reset signal

214: [Axis 2]Positive limit switch

215: [Axis 2]Negative limit switch

231: [Axis 2]Home switch

234: [Axis 2]Emergency stop

238: [Axis 2]Touch probe 1

239: [Axis 2]Touch probe 2

Description

-

H03.13 D16 logic selection

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0: Normally open

1: Closed

Description

-

H03.14 D17 function selection

Address: -

Effective Real time

Time:

Min.: 100

Unit: -

Max.: 139

Data Type: UInt16

Default: 138

Change: Immediately

Value Range:

100: [Axis 1]Undefined
 101: [Axis 1]Servo enable
 102: [Axis 1]Alarm reset signal
 114: [Axis 1]Positive limit switch

 115: [Axis 1]Negative limit switch
 131: [Axis 1]Home switch
 134: [Axis 1]Emergency stop
 138: [Axis 1]Touch probe 1
 139: [Axis 1]Touch probe 2

Description

-

H03.15 D17 logic selection

Address: -

Effective Real time

Time:

Min.: 0

Unit:

-

Max.: 1

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0: Normally open

1: Closed

Description

-

H03.16 D18 function selection

Address: -

Effective Real time

Time:

Min.: 200

Unit:

-

Max.: 239

Data Type: UInt16

Default: 238

Change: Immediately

Value Range:

200: [Axis 2]Undefined

201: [Axis 2]Servo enable

202: [Axis 2]Alarm reset signal

214: [Axis 2]Positive limit switch

 215: [Axis 2]Negative limit switch
 231: [Axis 2]Home switch
 234: [Axis 2]Emergency stop
 238: [Axis 2]Touch probe 1
 239: [Axis 2]Touch probe 2

Description

-

H03.17 DI8 logic selection

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0: Normally open

1: Closed

Description

-

H03.50 Voltage-type AI1 offset

Address: -

Effective Real time

Time:

Min.: -5000

Unit: mV

Max.: 5000

Data Type: Int16

Default: 0

Change: Immediately

Value Range:

-5000 mV to 5000 mV

Description

Defines the actual AI1 input voltage when the drive sampling voltage is 0 after zero drift correction.

H03.51 Voltage-type AI1 input filter time constant

Address: -

Effective Real time

Time:

Min.: 0.00

Unit: ms

Max.: 655.35

Data Type: UInt16

Default: 2.00

Change: Immediately

Value Range:

0.00 ms to 655.35 ms

Description

It sets the filter time constant of voltage signal input from AI1.

Set this parameter properly to avoid motor reference fluctuation caused by unstable analog voltage input and reduce motor misoperation caused by interference signals.

The filter function cannot eliminate or suppress zero drift or dead zone.

H03.53 Voltage-type AI1 dead zone

Address:	-	Effective	Real time
Min.:	0.0	Time:	
Max.:	1000.0	Unit:	mV
Default:	10.0	Data Type:	UInt16
		Change:	Immediately

Value Range:

0.0 mV to 1000.0 mV

Description

Defines the AI1 input voltage range when the drive sampling voltage is 0.

H03.54 Voltage-type AI1 zero drift

Address:	-	Effective	Real time
Min.:	-500	Time:	
Max.:	500.0	Unit:	mV
Default:	0.0	Data Type:	Int16
		Change:	Immediately

Value Range:

-500.0 mV to 500.0 mV

Description

Zero drift refers to the value of the drive o sampling voltage relative to GND upon zero AI voltage.

Set H0d.10 (Automatic adjustment of analog channels) to 1 (AI1 adjustment) to perform automatic adjustment on AI1 zero drift. The AI1 zero drift after adjustment will be saved into H03.54.

H03.60 DI1 filter time

Address:	-	Effective	Real time
Min.:	0.00	Time:	
Max.:	500.00	Unit:	ms
Default:	0.50	Data Type:	UInt16
		Change:	Immediately

Value Range:

0.00 ms to 500.00 ms

Description

Defines the filter time of DI1. The DI function is active only after the effective level is kept within the time defined by H03.60.

H03.61 DI2 filter time

Address:	-	Effective	Real time
		Time:	

Min.:	0.00	Unit:	ms
Max.:	500.00	Data Type:	UInt16
Default:	0.50	Change:	Immediately

Value Range:

0.00 ms to 500.00 ms

Description

Defines the filter time of DI2. The DI function is active only after the effective level is kept within the time defined by H03.61.

H03.62 DI3 filter time

Address:	-	Effective	Real time
Min.:	0.00	Time:	
Max.:	500.00	Unit:	ms
Default:	0.50	Data Type:	UInt16
		Change:	Immediately

Value Range:

0.00 ms to 500.00 ms

Description

Defines the filter time of DI3. The DI function is active only after the effective level is kept within the time defined by H03.62.

H03.63 DI4 filter time

Address:	-	Effective	Real time
Min.:	0.00	Time:	
Max.:	500.00	Unit:	ms
Default:	0.50	Data Type:	UInt16
		Change:	Immediately

Value Range:

0.00 ms to 500.00 ms

Description

Defines the filter time of DI4. The DI function is active only after the effective level is kept within the time defined by H03.63.

H03.64 DI5 filter time

Address:	-	Effective	Real time
Min.:	0.00	Time:	
Max.:	500.00	Unit:	ms
Default:	0.50	Data Type:	UInt16
		Change:	Immediately

Value Range:

0.00 ms to 500.00 ms

Description

Defines the filter time of DI5. The DI function is active only after the effective level is kept within the time defined by H03.64.

H03.65 DI6 filter time

Address:	-	Effective	Real time
Min.:	0.00	Time:	
Max.:	500.00	Unit:	ms
Default:	0.50	Data Type:	UInt16
		Change:	Immediately

Value Range:

0.00 ms to 500.00 ms

Description

Defines the filter time of DI3. The DI function is active only after the effective level is kept within the time defined by H03.62.

H03.66 DI7 filter time

Address:	-	Effective	Real time
Min.:	0.00	Time:	
Max.:	500.00	Unit:	ms
Default:	0.50	Data Type:	UInt16
		Change:	Immediately

Value Range:

0.00 ms to 500.00 ms

Description

Defines the filter time of DI4. The DI function is active only after the effective level is kept within the time defined by H03.63.

H03.67 DI8 filter time

Address:	-	Effective	Real time
Min.:	0.00	Time:	
Max.:	500.00	Unit:	ms
Default:	0.50	Data Type:	UInt16
		Change:	Immediately

Value Range:

0.00 ms to 500.00 ms

Description

Defines the filter time of DI5. The DI function is active only after the effective level is kept within the time defined by H03.64.

5.5 H04 Terminal Output Parameters

H04.00 DO1 function selection

Address:	-	Effective	Real time
Min.:	100	Time:	
Max.:	132	Unit:	-
Default:	101	Data Type:	UInt16
		Change:	Immediately

Value Range:

100: [Axis 1]Undefined
101: [Axis 1]Servo ready
102: [Axis 1]Motor rotation signal
109: [Axis 1] Braking output
110: [Axis 1] Warning
111: [Axis 1]Failure
125: [Axis 1]Comparison output
131:[Axis 1]Forced communication DO
132: [Axis 1]EDM output

Description

Defines the function of DO1.

H04.01 DO1 logic selection

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	1	Unit:	-
Default:	0	Data Type:	UInt16
		Change:	Immediately

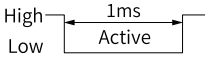
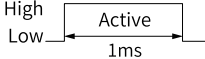
Value Range:

0: Normally open
1: Closed

Description

Defines the level logic of DO1 when the function assigned to DO 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.

Setpoint	DO1 Logic Upon Active DO Function	Transistor Status	Minimum Signal Width
0	Low level	ON	
1	High level	OFF	

Before receiving DO logic changes, view the setpoint of H0d.17 (Forced DI/DO selection) to check whether the DO level is determined by the actual operating status of the drive or by forced DO (H0d.19 or 60FEh).

H04.02 DO2 function selection

Address: -

Effective Real time

Time:

Min.: 200

Unit: -

Max.: 232

Data Type: UInt16

Default: 201

Change: Immediately

Value Range:

200: [Axis 2]Undefined

201: [Axis 2]Servo ready

202: [Axis 2]Motor rotation signal

209: [Axis 2] Braking output

210: [Axis 2] Warning

211: [Axis 2]Failure

225: [Axis 2]Comparison output

231:[Axis 2]Forced communication DO

232: [Axis 2]EDM output

Description

-

H04.03 DO2 logic selection

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0: Normally open

1: Closed

Description

-

H04.04 DO3 function selection

Address: -

Effective Real time

Time:

Unit: -

Data Type: UInt16

Change: Immediately

Min.: 100

Max.: 132

Default: 109

Value Range:

100: [Axis 1]Undefined

101: [Axis 1]Servo ready

102: [Axis 1]Motor rotation signal

109: [Axis 1] Braking output

110: [Axis 1] Warning

111: [Axis 1]Failure

125: [Axis 1]Comparison output

131:[Axis 1]Forced communication DO

132: [Axis 1]EDM output

Description

-

H04.05 DO3 logic selection

Address: -

Effective Real time

Time:

Unit: -

Data Type: UInt16

Change: Immediately

Min.: 0

Max.: 1

Default: 0

Value Range:

0: Normally open

1: Closed

Description

-

H04.06 DO4 function selection

Address: -

Effective Real time

Time:

Unit: -

Data Type: UInt16

Min.: 200

Max.: 232

Default: 209

Change: Immediately

Value Range:

200: [Axis 2]Undefined

201: [Axis 2]Servo ready

202: [Axis 2]Motor rotation signal

209: [Axis 2] Braking output

210: [Axis 2] Warning

211: [Axis 2]Failure

225: [Axis 2]Comparison output

231:[Axis 2]Forced communication DO

232: [Axis 2]EDM output

Description

-

H04.07 DO4 logic selection

Address: -

Effective Real time

Time:

Min.: 0

Unit:

-

Max.: 1

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0: Normally open

1: Closed

Description

-

H04.22 DO source selection

Address: -

Effective Real time

Time:

Min.: 0

Unit:

-

Max.: 3

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

bit0: DO1 output source
0: DO1 function output
1: bit0 of H31.04
bit1: DO2 output source
0: DO2 function output
1: bit1 of H31.04
bit2: DO3 output source
0: DO3 function output
1: bit2 of H31.04
bit3: DO4 output source
0: DO4 function output
1: bit3 of H31.04

Description

Defines whether the logic of a physical DO terminal is defined by the actual state of the drive or by communication.

H04.23 ECAT communication-forced DO logic in non-OP status

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	3	Unit:	-
Default:	0	Data Type:	UInt16
		Change:	Immediately

Value Range:

Bit0: DO1
0: Status unchanged
1: No output
bit1: DO2
0: Status unchanged
1: No output
bit2: DO3
0: Status unchanged
1: No output
bit3: DO4
0: Status unchanged
1: No output

Description

Sets DO state upon ECAT communication failure.

H04.50 AO1 signal selection

Address:	-	Effective	Real time
		Time:	

Min.:	0	Unit:	-
Max.:	10	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

10: Defined by H31.05

Description

Defines the physical value source of AO1.

H04.51 AO1 offset voltage

Address:	-	Effective	Real time
		Time:	
Min.:	-10000	Unit:	mV
Max.:	10000	Data Type:	Int16
Default:	0	Change:	Immediately

Value Range:

-10000 mV to 10000 mV

Description

Defines the actual AO1 output voltage after offset when the output voltage is 0 V in theory.

H04.52 AO1 multiplier

Address:	-	Effective	Real time
		Time:	
Min.:	-99.99	Unit:	-
Max.:	99.99	Data Type:	Int16
Default:	1.00	Change:	Immediately

Value Range:

-99.99–99.99

Description

Defines the actual AO1 output voltage after amplification when the output voltage is 1V in theory.

5.6 H05 Position Control Parameters**H05.02 Pulses per revolution**

Address:	-	Effective	Upon the next power-on
		Time:	
Min.:	0	Unit:	PPR
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At stop

Value Range:

0 PPR to 4294967295 PPR

Description

Defines the number of pulses required per revolution of the motor.

H05.04 First-order low-pass filter time constant

Address: - Effective Real time

Time:

Min.: 0.0

Unit: ms

Max.: 6553.5

Data Type: UInt16

Default: 0.0

Change: At stop

Value Range:

0.0 ms to 6553.5 ms

Description

Defines the first-order low pass filter time constant of position references.

H05.06 Moving average filter time constant 1

Address: - Effective Real time

Time:

Min.: 0.0

Unit: ms

Max.: 128.0

Data Type: UInt16

Default: 0.0

Change: At stop

Value Range:

0.0 ms to 128.0 ms

Description

Defines the moving average filter time constant of position references.

H05.07 Electronic gear ratio 1 (numerator)

Address: - Effective Real time

Time:

Min.: 1

Unit: -

Max.: 1073741824

Data Type: UInt32

Default: 1

Change: Immediately

Value Range:

1–1073741824

Description

Defines the numerator of electronic gear ratio 1.

H05.09 Electronic gear ratio 1 (denominator)

Address: - Effective Real time

Time:

Min.: 1
Max.: 1073741824
Default: 1

Unit: -
Data Type: UInt32
Change: Immediately

Value Range:

1–1073741824

Description

Defines the denominator of electronic gear ratio 1.

H05.16 Clear action

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 2

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0: Position deviation cleared upon S-OFF or non-RUN state

1: Position deviation cleared upon fault or non-RUN state

2: Position deviation cleared upon active DI function 35 or non-RUN state

Description

Defines the condition for clearing the position deviation.

H05.19 Speed feedforward control

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 3

Data Type: UInt16

Default: 1

Change: At stop

Value Range:

0: No speed feedforward

1: Internal speed feedforward

2: 60B1h

3: Zero phase

Description

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	60B1h 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 H08.17 (Zero phase delay) to reduce the position follow-up deviation during startup.

Speed feedforward control parameters include H08.18 (Speed feedforward filter time constant) and H08.19 (Speed feedforward gain). See section "Feedforward Gain" for details.

H05.30 Homing selection

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 6	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0: Disabled,
6: Current position

Description

Defines the homing mode and the trigger signal source.

H05.35 Homing time limit

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	ms
Max.: 65535	Data Type:	UInt16
Default: 10000	Change:	Immediately

Value Range:

0 ms to 65535 ms

Description

Defines the maximum homing time.

H05.36 Mechanical home offset

Address: -	Effective	Real time
	Time:	
Min.: -2147483648	Unit:	Reference unit
Max.: 2147483647	Data Type:	Int32
Default: 0	Change:	Immediately

Value Range:

-2147483648 to 2147483647

Description

Defines the absolute position of the motor after homing.

H05.40 Mechanical home offset and action upon overtravel

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 3	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0: H05.36 as the coordinate after homing, reverse homing applied after homing triggered again upon overtravel

1: H05.36 as the relative offset after homing, reverse homing applied after homing triggered again upon overtravel

2: H05.36 as the coordinate after homing, reverse homing applied automatically upon overtravel

3: H05.36 as the relative offset after homing, reverse homing applied automatically upon overtravel

Description

Defines the offset relationship between the mechanical home and mechanical zero point, as well as the action upon overtravel during homing.

H05.50 Mechanical gear ratio in absolute position rotation mode (numerator)

Address: -	Effective	Real time
	Time:	
Min.: 1	Unit:	-
Max.: 65535	Data Type:	UInt16
Default: 1	Change:	At stop

Value Range:

1–65535

Description

Defines the transmission ratio between the mechanical rotary load and the motor in the absolute position rotation mode.

H05.51 Mechanical gear ratio in absolute position rotation mode (denominator)

Address:	-	Effective	Real time
		Time:	
Min.:	1	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1–65535

Description

Defines the transmission ratio between the mechanical rotary load and the motor in the absolute position rotation mode.

H05.52 Pulses per revolution of the load in absolute position rotation mode (low 32 bits)

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	Encoder unit
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At stop

Value Range:

0 to 4294967295

Description

Defines the number of pulses per revolution of the rotary load in the absolute position rotation mode.

H05.54 Pulses per revolution of the load in absolute position rotation mode (high 32 bits)

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	Encoder unit
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At stop

Value Range:

0 to 4294967295

Description

Defines the number of pulses per revolution of the rotary load in the absolute position rotation mode.

H05.58 Torque threshold in homing upon hit-and-stop

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	%
Max.:	400.0	Data Type:	UInt16
Default:	100.0	Change:	Immediately

Value Range:

0.0% to 400.0%

Description

Defines the maximum positive/negative torque limit in homing upon hit-and-stop.

H05.60 Hold time of positioning completed

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	ms
Max.:	30000	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0 ms to 30000 ms

Description

Defines the hold time of an active positioning completed signal.

H05.66 Homing time unit

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:

0: 1 ms

1: 10 ms

2: 100 ms

DescriptionDefines the homing time unit. The actual timeout time is $H05.35 \times H05.66$ ms.**H05.67 Offset between zero point and single-turn absolute position**

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	Encoder unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At stop

Value Range:

-2147483648 to 2147483647

Description

-

H05.71 Motor Z signal width

Address: -

Effective Real time

Time:

Min.: 1

Unit: ms

Max.: 100

Data Type: UInt16

Default: 4

Change: Immediately

Value Range:

1 ms to 100 ms

Description

Output pulse width when motor Z signal is active.

5.7 H06 Speed Control Parameters

H06.00 Source of main speed reference A

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0: Digital setting (H06.03)

Description

Defines the source of main speed reference A.

H06.01 Source of auxiliary speed reference B

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 5

Data Type: UInt16

Default: 1

Change: At stop

Value Range:

0: Digital setting (H06.03)

Description

Defines the source of auxiliary speed reference B.

H06.02 Speed reference source

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	4	Unit:	-
Default:	0	Data Type:	UInt16
		Change:	At stop

Value Range:

0: Source of main speed reference A

1: Source of auxiliary speed reference B

2: A+B

3: Switched between A and B

4: Communication

Description

Defines the source of speed references.

H06.03 Speed reference set through keypad

Address:	-	Effective	Real time
Min.:	-9999	Time:	
Max.:	9999	Unit:	rpm
Default:	200	Data Type:	Int16
		Change:	Immediately

Value Range:

-9999rpm to 9999rpm

Description

Defines the speed reference value through the keypad.

H06.05 Acceleration ramp time of speed reference

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	65535	Unit:	ms
Default:	0	Data Type:	UInt16
		Change:	Immediately

Value Range:

0 ms to 65535 ms

Description

Defines the source of speed reference acceleration ramp time. The acceleration/ deceleration time constant of multi-speed references are defined only by parameters in group H12.

H06.05 defines the time for the speed reference to change from 0 rpm to 1000 rpm.

H06.06 defines the time for the speed reference to change from 1000 rpm to 0 rpm.

The formulas for calculating the actual acceleration/deceleration time are as follows:

Actual acceleration time $t_1 = \text{Speed reference} \div 1000 \times \text{Acceleration ramp time of speed reference}$

Actual deceleration time $t_2 = \text{Speed reference} \div 1000 \times \text{Deceleration ramp time of speed reference}$

H06.06 Deceleration ramp time of speed reference

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	65535	Unit:	ms
Default:	0	Data Type:	UInt16
		Change:	Immediately

Value Range:

0 ms to 65535 ms

Description

Defines the source of speed reference deceleration ramp time.

H06.07 Maximum speed limit

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	9999	Unit:	rpm
Default:	6000	Data Type:	UInt16
		Change:	Immediately

Value Range:

0rpm–9999rpm

Description

Defines the speed reference source of maximum speed threshold.

H06.08 Forward speed limit

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	9999	Unit:	rpm
Default:	6000	Data Type:	UInt16
		Change:	Immediately

Value Range:

0rpm–9999rpm

Description

Defines the speed reference source of forward speed threshold.

H06.09 Reverse speed limit

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	rpm
Max.: 9999	Data Type:	UInt16
Default: 6000	Change:	Immediately

Value Range:

0rpm–9999rpm

Description

Defines the speed reference source of reverse speed threshold.

H06.10 Deceleration unit in emergency stop

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 2	Data Type:	UInt16
Default: 0	Change:	At stop

Value Range:

0: Multiplied by 1

1: Multiplied by 10

2: Multiplied by 100

Description

Sets the deceleration unit in emergency stop.

H06.11 Torque feedforward control

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 2	Data Type:	UInt16
Default: 1	Change:	Immediately

Value Range:

0: No torque feedforward

1: Internal torque feedforward

2: 60B2h as external torque feedforward

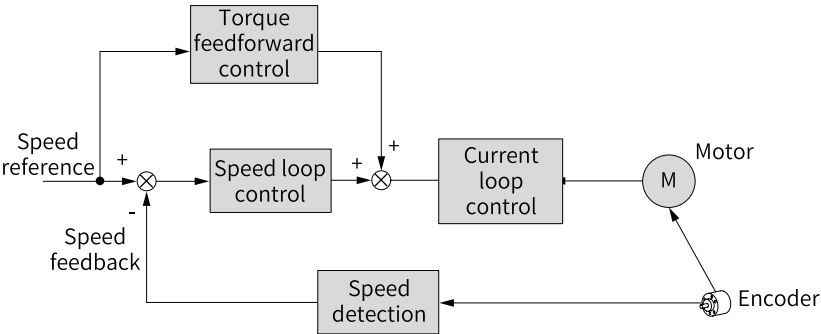
Description

Defines the speed reference source for torque feedforward control.

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 (H08.21) and time constant (H08.20) to achieve the desired performance.

Parameters of the torque feedforward function include H08.21 (Torque feedforward filter time constant) and H08.20 (Torque feedforward gain). For details, see section Feedforward Gain.

The block diagram for torque feedforward control in control modes other than torque control is as follows:



H06.12 Acceleration ramp time of jog speed

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	65535	Unit:	ms
		Data Type:	UInt16

Default: 10

Change: Immediately

Value Range:

0 ms to 65535 ms

Description

Defines the speed reference source for jog speed acceleration ramp time.

H06.13 Speed feedforward smoothing filter

Address: -

Effective Real time

Time:

Min.: 0

Unit: us

Max.: 65535

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0us–65535us

Description

Defines the speed reference source of speed feedforward smoothing filter.

H06.15 Zero clamp speed threshold

Address: -

Effective Real time

Time:

Min.: 0

Unit: rpm

Max.: 9999

Data Type: UInt16

Default: 10

Change: Immediately

Value Range:

0rpm–9999rpm

Description

Defines the speed reference source of zero clamp speed threshold.

H06.16 Threshold of TGON (motor rotation) signal

Address: -

Effective Real time

Time:

Min.: 0

Unit: rpm

Max.: 1000

Data Type: UInt16

Default: 20

Change: Immediately

Value Range:

0rpm–1000rpm

Description

Defines the speed reference source of TGON (motor rotation) signal threshold.

H06.17 Threshold of V-Cmp (speed matching) signal

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	rpm
Max.:	100	Data Type:	UInt16
Default:	10	Change:	Immediately

Value Range:

0rpm–100rpm

Description

Defines the speed reference source of V-Cmp (speed matching) signal threshold.

H06.18 Threshold of speed reach signal

Address:	-	Effective	Real time
		Time:	
Min.:	20	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	1000	Change:	Immediately

Value Range:

20rpm–9999rpm

Description

Defines the speed reference source of speed reach signal threshold.

H06.19 Threshold of zero speed output signal

Address:	-	Effective	Real time
		Time:	
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	10	Change:	Immediately

Value Range:

1rpm–9999rpm

Description

Defines the speed reference source of zero speed output signal threshold.

H06.26 Torque fluctuation auto-tuning enable

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0–1

Description

Sets the speed reference source of torque fluctuation auto-tuning enable.

H06.28 Cogging torque ripple compensation

Address: -	Effective	Upon the next power-on
	Time:	
Min.: 0	Unit:	-
Max.: 1	Data Type:	UInt16
Default: 1	Change:	At stop

Value Range:

0–1

Description

Sets the speed reference source of cogging torque fluctuation compensation enable.

H06.31 Sine reference frequency

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 16000	Data Type:	UInt16
Default: 50	Change:	Immediately

Value Range:

0–16000

Description

Sets the sine reference frequency.

H06.32 Sine reference amplitude

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 30000	Data Type:	UInt16
Default: 30	Change:	Immediately

Value Range:

0–30000

Description

Sets sine reference amplitude.

H06.33 Sine reference enable

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-

Max.: 3	Data Type: UInt16
Default: 0	Change: Immediately
Value Range: 0–3	
Description Enables sine reference.	

H06.34 Sine reference initial phase

Address: -	Effective Real time
	Time:
Min.: 0.0	Unit: -
Max.: 360.0	Data Type: UInt16
Default: 0.0	Change: Immediately
Value Range: 0.0–360.0	
Description Defines the speed reference source of the sine reference initial phase.	

H06.35 Sine reference offset

Address: -	Effective Real time
	Time:
Min.: -9900	Unit: -
Max.: 9900	Data Type: Int16
Default: 0	Change: Immediately
Value Range: -9900–9900	
Description Defines the speed reference source of the sine reference offset.	

H06.50 Speed S-curve enable switch

Address: -	Effective Real time
	Time:
Min.: 0	Unit: -
Max.: 1	Data Type: UInt16
Default: 0	Change: At stop
Value Range: 0: Disabled 1: Enabled	
Description 0: Accelerate/Decelerate at fixed acceleration rate 1: Accelerate/Decelerate based on the S-curve	

H06.51 Increasing acceleration of speed S-curve acceleration segment

Address: -	Effective	Real time
	Time:	
Min.: 0.0	Unit:	%
Max.: 100.0	Data Type:	UInt16
Default: 50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

-

H06.52 Decreasing acceleration of speed S-curve acceleration segment

Address: -	Effective	Real time
	Time:	
Min.: 0.0	Unit:	%
Max.: 100.0	Data Type:	UInt16
Default: 50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

-

H06.53 Decreasing deceleration of speed S-curve deceleration segment

Address: -	Effective	Real time
	Time:	
Min.: 0.0	Unit:	%
Max.: 100.0	Data Type:	UInt16
Default: 50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

-

H06.54 Decreasing acceleration of speed S-curve deceleration segment

Address: -	Effective	Real time
	Time:	
Min.: 0.0	Unit:	%
Max.: 100.0	Data Type:	UInt16
Default: 50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

-

5.8 H07 Torque Control Parameters

H07.00 Source of main torque reference A

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Keypad (H07.03)

Description

Defines the source of the main torque reference A.

H07.01 Source of auxiliary torque reference B

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Keypad (H07.03)

Description

Defines the source of auxiliary torque references.

H07.02 Torque reference source

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Source of main torque reference A

1: Source of auxiliary torque reference B

2: Source of A+B

3: Switched between A and B

4: Communication

Description

Selects the source of torque references.

H07.03 Torque reference set through keypad

Address: -	Effective	Real time
	Time:	
Min.: -400	Unit:	%
Max.: 400.0	Data Type:	Int16
Default: 0.0	Change:	Immediately

Value Range:

-400.0% to 400.0%

Description

Defines the torque reference value that set through the keypad.

H07.05 Torque reference filter time constant 1

Address: -	Effective	Real time
	Time:	
Min.: 0.00	Unit:	ms
Max.: 30.00	Data Type:	UInt16
Default: 0.50	Change:	Immediately

Value Range:

0.00 ms to 30.00 ms

Description

Defines torque reference source of torque reference filter.

H07.06 Torque reference filter time constant 2

Address: -	Effective	Real time
	Time:	
Min.: 0.00	Unit:	ms
Max.: 30.00	Data Type:	UInt16
Default: 0.27	Change:	Immediately

Value Range:

0.00 ms to 30.00 ms

Description

Defines torque reference source of torque reference filter.

H07.07 Torque limit source

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 4	Data Type:	UInt16

Default: 0

Change: Immediately

Value Range:

0: FWD/REV internal torque limit

Description

Defines the torque reference source of torque limit source.

H07.09 Positive internal torque limit

Address: -

Effective Real time

Time:

Unit: %

Min.: 0.0

Max.: 400.0

Data Type: UInt16

Default: 350.0

Change: Immediately

Value Range:

0.0% to 400.0%

Description

Defines the torque reference source of positive internal torque.

H07.10 Negative internal torque limit

Address: -

Effective Real time

Time:

Unit: %

Min.: 0.0

Max.: 400.0

Data Type: UInt16

Default: 350.0

Change: Immediately

Value Range:

0.0% to 400.0%

Description

Defines the torque reference source of negative internal torque.

H07.11 Positive external torque limit

Address: -

Effective Real time

Time:

Unit: %

Min.: 0.0

Max.: 400.0

Data Type: UInt16

Default: 350.0

Change: Immediately

Value Range:

0.0% to 400.0%

Description

Defines the torque reference source of positive external torque limit.

H07.12 Negative external torque limit

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	%
Max.:	400.0	Data Type:	UInt16
Default:	350.0	Change:	Immediately

Value Range:

0.0% to 400.0%

Description

Defines the torque reference source of negative external torque limit.

H07.15 Emergency-stop torque

Address:	-	Effective	At stop
		Time:	
Min.:	0.0	Unit:	%
Max.:	400.0	Data Type:	UInt16
Default:	100.0	Change:	Immediately

Value Range:

0.0% to 400.0%

Description

Set torque command source for emergency stop.

H07.17 Speed limit source

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0: Internal speed limit

Description

Defines the speed reference source of speed limit source.

H07.19 Positive speed limit/Speed limit 1 in torque control

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	3000	Change:	Immediately

Value Range:

0rpm–9999rpm

Description

Defines the positive torque reference source in torque control.

H07.20 Negative speed limit/Speed limit 2 in torque control

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	3000	Change:	Immediately

Value Range:

0rpm–9999rpm

Description

Defines the negative torque reference source in torque control.

H07.21 Base value for torque reach

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	%
Max.:	400.0	Data Type:	UInt16
Default:	0.0	Change:	Immediately

Value Range:

0.0% to 400.0%

Description

Defines the torque reference source of the base value for torque reach.

H07.22 Torque reach valid value

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	%
Max.:	400.0	Data Type:	UInt16
Default:	20.0	Change:	Immediately

Value Range:

0.0% to 400.0%

Description

Defines the torque reference source of torque reach DO.

H07.23 Invalid value for torque reach

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	%
Max.:	400.0	Data Type:	UInt16

Default: 10.0

Change: Immediately

Value Range:

0.0% to 400.0%

Description

Defines the torque reference source of torque reach DO.

H07.24 Field weakening depth

Address: -

Effective Real time

Time:

Min.: 60

Unit: %

Max.: 115

Data Type: UInt16

Default: 115

Change: Immediately

Value Range:

60% to 115%

Description

Defines the torque reference source of flux weakening.

H07.25 Max. permissible demagnetizing current

Address: -

Effective Real time

Time:

Min.: 0

Unit: %

Max.: 300

Data Type: UInt16

Default: 100

Change: Immediately

Value Range:

0% to 300%

Description

Defines the torque reference source of max. permissible demagnetizing current.

H07.26 Field weakening selection

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0: Disabled

1: Enabled

Description

Defines the torque reference source of flux weakening.

H07.27 Flux weakening gain

Address:	-	Effective	Real time
		Time:	
Min.:	0.001	Unit:	Hz
Max.:	1.000	Data Type:	UInt16
Default:	0.030	Change:	Immediately

Value Range:

0.001 Hz to 1.000 Hz

Description

Defines the torque reference source of flux weakening.

H07.28 Speed of flux weakening point

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Defines the torque reference source of flux weakening point.

H07.35 Motor torque output correction enable

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Disabled

1: Enabled

Description

Enables or disables motor torque output correction.

H07.36 Time constant of low-pass filter 2

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	ms
Max.:	10.00	Data Type:	UInt16
Default:	0.00	Change:	Immediately

Value Range:

0.00 ms to 10.00 ms

Description

Defines the torque reference source of low-pass filter 2.

H07.37 Torque reference filter selection

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 1	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0: First-order filter

1: Biquad filter

Description

Defines torque reference source of torque reference filter.

H07.38 Biquad filter attenuation ratio

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 50	Data Type:	UInt16
Default: 16	Change:	At stop

Value Range:

0–50

Description

Defines the torque reference source of the biquad filter.

H07.40 Speed limit window in the torque control mode

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	ms
Max.: 300	Data Type:	UInt16
Default: 10	Change:	Immediately

Value Range:

0 ms to 300 ms

Description

Sets speed limit time window in the torque control mode.

5.9 H08 Gain Parameters

H08.00 Speed loop gain

Address: -	Effective	Real time
	Time:	
Min.: 0.1	Unit:	Hz
Max.: 2000.0	Data Type:	UInt16
Default: 40.0	Change:	Immediately

Value Range:

0.1 Hz to 2000.0 Hz

Description

Defines the responsiveness of the speed loop. The higher the setpoint, the faster the speed loop response is. 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.

H08.01 Speed loop integral time constant

Address: -	Effective	Real time
	Time:	
Min.: 0.15	Unit:	ms
Max.: 512.00	Data Type:	UInt16
Default: 19.89	Change:	Immediately

Value Range:

0.15 ms to 512.00 ms

Description

Defines the integral time constant of the 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 H08.01 is set to 512.00.

H08.02 Position loop gain

Address: -	Effective	Real time
	Time:	
Min.: 0.1	Unit:	Hz
Max.: 2000.0	Data Type:	UInt16
Default: 64.0	Change:	Immediately

Value Range:

0.1 Hz to 2000.0 Hz

Description

Defines the proportional gain of the position loop.

Defines the responsiveness of the position loop. A high setpoint shortens the positioning time. Note that an excessively high setpoint may cause vibration. The 1st group of gain parameters include H08.00 (Speed loop gain), H08.01 (Speed loop integral time constant), H08.02, and H07.05 (Filter time constant of torque reference).

H08.03 2nd speed loop gain

Address: -	Effective	Real time
	Time:	
Min.: 0.1	Unit:	Hz
Max.: 2000.0	Data Type:	UInt16
Default: 75.0	Change:	Immediately

Value Range:

0.1 Hz to 2000.0 Hz

Description

-

H08.04 2nd speed loop integral time constant

Address: -	Effective	Real time
	Time:	
Min.: 0.15	Unit:	ms
Max.: 512.00	Data Type:	UInt16
Default: 10.61	Change:	Immediately

Value Range:

0.15 ms to 512.00 ms

Description

-

H08.05 2nd position loop gain

Address: -	Effective	Real time
	Time:	
Min.: 0.1	Unit:	Hz
Max.: 2000.0	Data Type:	UInt16
Default: 120.0	Change:	Immediately

Value Range:

0.1 Hz to 2000.0 Hz

Description

Defines the second gain set of the position loop and speed loop. The 2nd group of gain parameters include H08.03 (Speed loop gain), H08.04 (Speed loop integral time constant), H08.05, and H07.06 (Torque reference filter time constant 2).

H08.08 2nd gain mode setting

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	Immediately

Value Range:

0: Fixed to the 1st gain, switched between P and PI as defined by bit26 of external 60FEh

1: Switched between the 1st and 2nd gain sets as defined by H08.09

Description

Defines the mode for switching to the 2nd gain set.

H08.09 Gain switchover condition

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	10	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0: Fixed to the 1st gain set (PS)

1: Switched as defined by bit26 of 60FEh

2: Torque reference too large (PS)

3: Speed reference too large (PS)

4: Speed reference change rate too large (PS)

5: Speed reference low/high speed threshold (PS)

6: Position deviation too large (P)

7: Position reference available (P)

8: Positioning unfinished (P)

9: Actual speed (P)

10: Position reference + Actual speed (P)

Description

Defines the gain switchover condition.

H08.10 Gain switchover delay

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	ms
Max.:	1000.0	Data Type:	UInt16
Default:	5.0	Change:	Immediately

Value Range:

0.0 ms to 1000.0 ms

Description

Defines the delay when the drive switches from the 2nd gain set to the 1st gain set.

H08.11 Gain switchover level

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 20000	Data Type:	UInt16
Default: 50	Change:	Immediately

Value Range:

0–20000

Description

Defines the gain switchover level.

Gain switchover is affected by both the level and the dead time, as defined by H08.09. The unit of gain switchover level varies with the switchover condition.

H08.12 Gain switchover dead time

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 20000	Data Type:	UInt16
Default: 30	Change:	Immediately

Value Range:

0–20000

Description

Defines the dead time for gain switchover.

Gain switchover is affected by both the level and the dead time, as defined by H08.09. The unit of gain switchover hysteresis varies with the switchover condition.

Note:

Set H08.11 \geq H08.12. Otherwise, the drive forcibly sets H08.11 to the same value as H08.12.

H08.13 Position gain switchover time

Address: -	Effective	Real time
	Time:	
Min.: 0.0	Unit:	ms
Max.: 1000.0	Data Type:	UInt16
Default: 3.0	Change:	Immediately

Value Range:

0.0 ms to 1000.0 ms

Description

In position control, if H08.05 (2nd position loop gain) is much higher than H08.02 (Position loop gain), set the time for switching from H08.02 to H08.05.

This parameter can be used to reduce the impact caused by an increase in the position loop gain.

H08.15 Load moment of inertia ratio

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	-
Max.:	120.00	Data Type:	UInt16
Default:	1.00	Change:	Immediately

Value Range:

0.00–120.00

Description

Defines the mechanical load inertia ratio relative to the motor moment of inertia.

When H08.15 is set to 0, it indicates the motor carries no load; if it is set to 1.00, it indicates the mechanical load inertia is the same as the motor moment of inertia.

H08.16 ITune parameter save

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0–65535

Description

-

H08.17 Zero phase delay

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	ms
Max.:	4.0	Data Type:	UInt16
Default:	0.0	Change:	Immediately

Value Range:

0.0 ms to 4.0 ms

Description

-

H08.18 Speed feedforward filter time constant

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	ms
Max.:	64.00	Data Type:	UInt16
Default:	0.50	Change:	Immediately

Value Range:

0.00 ms to 64.00 ms

Description

Defines the filter time constant of speed feedforward.

H08.19 Speed feedforward gain

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	0.0	Change:	Immediately

Value Range:

0.0% to 100.0%

Description

In position control and full closed-loop control, speed feedforward is the product of speed feedforward signal multiplied by H08.19 and is part of the speed reference.

Increasing the setpoint improves the responsiveness to position references and reduces the position deviation during operation at a constant speed.

Set H08.18 to a fixed value first, and then increase the value of H08.19 gradually from 0 to a certain value at which speed feedforward achieves the desired effect. Adjust H08.18 and H08.19 repeatedly until a balanced performance is achieved.

Note:

For how to enable the speed feedforward function and select the speed feedforward signal, see H05.19 (Speed feedforward control).

H08.20 Torque feedforward filter time constant

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	ms
Max.:	64.00	Data Type:	UInt16
Default:	0.50	Change:	Immediately

Value Range:

0.00 ms to 64.00 ms

Description

Defines the filter time constant of torque feedforward.

H08.21 Torque feedforward gain

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	%
Max.:	300.0	Data Type:	UInt16
Default:	0.0	Change:	Immediately

Value Range:

0.0% to 300.0%

Description

In control modes other than torque control, torque feedforward is the product of torque feedforward signal multiplied by H08.21 and is part of the torque reference. Increasing the setpoint improves the responsiveness to variable speed references. Increasing the setpoint improves the responsiveness to position references and reduces the position deviation during operation at a constant speed.

During parameter adjustment, set H08.20 (Torque feedforward filter time constant) to the default value first, and then increase H08.21 gradually to enhance the effect of torque feedforward. When speed overshoot occurs, keep H08.21 unchanged and increase the value of H08.20. Adjust H08.20 and H08.21 repeatedly until a balanced performance is achieved.

Note:

For how to enable the torque feedforward function and select the torque feedforward signal, see H06.11 (Torque feedforward control).

H08.22 Speed feedback filtering option

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Inhibited

1: 2 times

2: 4 times

3: 8 times

4: 16 times

Description

Defines the moving average filtering times for speed feedback.

The higher the setpoint, the weaker the speed feedback fluctuation, but the longer the feedback delay will be.

H08.23 Cutoff frequency of speed feedback low-pass filter

Address: -	Effective	Real time
	Time:	
Min.: 100	Unit:	Hz
Max.: 8000	Data Type:	UInt16
Default: 8000	Change:	Immediately

Value Range:

100 Hz to 8000 Hz

Description

Defines the cutoff frequency for first-order low-pass filtering on the speed feedback.

Note:

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

Setting this parameter to 4000 Hz negates the filtering effect.

H08.24 PDFF control coefficient

Address: -	Effective	Real time
	Time:	
Min.: 0.0	Unit:	%
Max.: 200.0	Data Type:	UInt16
Default: 100.0	Change:	Immediately

Value Range:

0.0% to 200.0%

Description

Defines the control mode of the speed loop.

When this parameter is set to 100.0, the speed loop adopts PI control (default) with quick dynamic response.

When this parameter is set to 0.0, speed loop integral action is enhanced, which filters out low-frequency interference but also slows down the dynamic response.

H08.24 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 unaffected.

H08.27 Speed observer cutoff frequency

Address: -	Effective	Real time
	Time:	
Min.: 50	Unit:	Hz
Max.: 600	Data Type:	UInt16
Default: 170	Change:	Immediately

Value Range:

50 Hz to 600 Hz

Description

Defines the cutoff frequency of the speed observer. Note that an excessively high setpoint may incur resonance. Decrease the setpoint properly in case of large speed feedback noise.

H08.28 Speed observer inertia correction coefficient

Address:	-	Effective	Real time
		Time:	
Min.:	1	Unit:	%
Max.:	1600	Data Type:	UInt16
Default:	100	Change:	Immediately

Value Range:

1% to 1600%

Description

Defines the speed observer inertia correction coefficient. If H08.15 is set based on the actual inertia, there is no need to adjust this parameter.

H08.29 Speed observer filter time

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	ms
Max.:	10.00	Data Type:	UInt16
Default:	0.80	Change:	Immediately

Value Range:

0.00 ms to 10.00 ms

Description

Defines the speed observer filter time. It is recommended to set this parameter to a value equal to the sum of H07.05 plus 0.2 ms.

H08.30 Disturbance compensation time

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	ms
Max.:	100.00	Data Type:	UInt16
Default:	0.20	Change:	Immediately

Value Range:

0.00 ms to 100.00 ms

Description

Defines the compensation time of the disturbance observer. Increase the setpoint properly in case of large speed feedback noise.

H08.31 Disturbance cutoff frequency

Address: -	Effective	Real time
	Time:	
Min.: 10	Unit:	Hz
Max.: 4000	Data Type:	UInt16
Default: 600	Change:	Immediately

Value Range:

10 Hz to 4000 Hz

Description

Defines the cutoff frequency of the disturbance observer. Increasing the setpoint improves the responsiveness of the disturbance observer and the compensation effect. Note that an excessively high setpoint may incur resonance.

H08.32 Disturbance compensation gain

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	%
Max.: 100	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0% to 100%

Description

Defines the compensation gain of the disturbance observer. The setpoint 100% indicates full compensation.

H08.33 Disturbance observer inertia correction coefficient

Address: -	Effective	Real time
	Time:	
Min.: 1	Unit:	%
Max.: 1600	Data Type:	UInt16
Default: 100	Change:	Immediately

Value Range:

1% to 1600%

Description

Defines the disturbance observer inertia correction coefficient. If H08.15 is set based on the actual inertia, there is no need to adjust this parameter.

H08.37 Phase modulation for medium-frequency jitter suppression 2

Address: -	Effective	Real time
	Time:	
Min.: -90	Unit:	°

Max.: 90	Data Type: Int16
Default: 0	Change: Immediately

Value Range:

-90° to 90°

Description

Defines the compensation phase of medium-frequency jitter suppression 2.

H08.38 Frequency of medium-frequency jitter suppression 2

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	Hz
Max.: 1000	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0 Hz to 1000 Hz

Description

Set this parameter based on actual resonance frequency. The valid suppression frequency range for medium-frequency jitter suppression 2 is 100 Hz to 1000 Hz.

H08.39 Compensation gain of medium-frequency jitter suppression 2

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	%
Max.: 300	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0% to 300%

Description

Defines the compensation gain for medium-frequency jitter suppression 2. Set this parameter to 40%...55% in general cases. Setting this parameter to 0 negates the effect of medium-frequency jitter suppression 2.

H08.40 Speed observer selection

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 1	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0: Disabled

1: Enabled

Description

Used to set the enable bit for speed observer.

H08.42 Model control selection

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 2	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0: Disable

1: Enable

2: Dual-inertia model

Description

Used to enable model tracking control.

H08.43 Model gain

Address: -	Effective	Real time
	Time:	
Min.: 0.1	Unit:	-
Max.: 2000.0	Data Type:	UInt16
Default: 40.0	Change:	Immediately

Value Range:

0.1–2000.0

Description

Defines the single inertia model gain. The higher the gain, the faster the position response. Note that an excessively high setpoint may incur excessive overshoot.

H08.45 Model feedforward position

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 1	Data Type:	UInt16
Default: 1	Change:	Immediately

Value Range:

0–1

Description

Sets the single inertia model feedforward position.

H08.46 Feedforward value

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	-
Max.:	102.4	Data Type:	UInt16
Default:	95.0	Change:	Immediately

Value Range:

0.0–102.4

Description

Defines the speed feedforward gain for single inertia model control. If overshoot occurs, reduce the setpoint properly.

H08.50 Model torque feedforward differential time

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	ms
Max.:	655.35	Data Type:	UInt16
Default:	0.00	Change:	Immediately

Value Range:

0.00 ms to 655.35 ms

Description

Sets the single inertia model control torque feedforward differential time.

H08.51 Model speed feedforward differential time

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	ms
Max.:	20.00	Data Type:	UInt16
Default:	0.00	Change:	Immediately

Value Range:

0.00 ms to 20.00 ms

Description

Sets the single inertia model control speed feedforward differential time.

H08.53 Medium- and low-frequency jitter suppression frequency 3

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	Hz
Max.:	300.0	Data Type:	UInt16
Default:	0.0	Change:	Immediately

Value Range:

0.0 Hz to 300.0 Hz

Description

Set this parameter based on actual resonance frequency. The resonance suppression range is 100 Hz to 300 Hz.

H08.54 Medium- and low-frequency jitter suppression compensation 3

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	%
Max.: 200	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0% to 200%

Description

Defines the compensation gain for medium- and low-frequency suppression compensation 3. The setpoint 200% indicates full compensation.

H08.56 Medium- and low-frequency jitter suppression phase modulation 3

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	%
Max.: 600	Data Type:	UInt16
Default: 100	Change:	Immediately

Value Range:

0% to 600%

Description

Adjust this parameter based on the actual compensation effect.

H08.59 Medium- and low-frequency jitter suppression frequency 4

Address: -	Effective	Real time
	Time:	
Min.: 0.0	Unit:	Hz
Max.: 300.0	Data Type:	UInt16
Default: 0.0	Change:	Immediately

Value Range:

0.0 Hz to 300.0 Hz

Description

Set this parameter based on actual resonance frequency. The resonance suppression range is 100 Hz to 300 Hz.

H08.60 Medium- and low-frequency jitter suppression compensation 4

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	200	Unit:	%
Default:	0	Data Type:	UInt16
		Change:	Immediately

Value Range:

0% to 200%

Description

Defines the compensation gain for medium- and low-frequency suppression compensation 4. The setpoint 200% indicates full compensation.

H08.61 Medium- and low-frequency jitter suppression phase modulation 4

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	600	Unit:	%
Default:	100	Data Type:	UInt16
		Change:	Immediately

Value Range:

0% to 600%

Description

Adjust this parameter based on the actual compensation effect.

H08.62 Position loop integral time constant

Address:	-	Effective	Real time
Min.:	0.15	Time:	
Max.:	512.00	Unit:	-
Default:	512.00	Data Type:	UInt16
		Change:	Immediately

Value Range:

0.15–512.00

Description

Defines the position loop integral time constant.

H08.63 2nd position loop integral time constant

Address:	-	Effective	Real time
Min.:	0.15	Time:	
Max.:	512.00	Unit:	-
Default:	512.00	Data Type:	UInt16
		Change:	Immediately

Value Range:

0.15–512.00

Description

Defines the 2nd position loop integral time constant.

H08.64 Speed observer feedback source

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0: Disabled

1: Enabled

Description

-

H08.65 Zero deviation control selection

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0: Disabled

1: Enabled

Description

Used to enable/disable zero deviation control.

H08.66 Zero deviation control position average filter

Address: -

Effective Real time

Time:

Min.: 0.0

Unit: ms

Max.: 320.0

Data Type: UInt16

Default: 5.0

Change: Immediately

Value Range:

0.0 ms to 320.0 ms

Description

Defines the average filter time of zero deviation control position. It is recommended to increase the setpoint in case of large noise caused by low command resolution.

H08.67 Zero deviation control position low-pass filter

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	us
Max.:	5120.0	Data Type:	UInt16
Default:	190.0	Change:	Immediately

Value Range:

0.0us–5120.0us

Description

Sets the zero deviation control position low-pass filter time.

H08.68 Speed feedforward of zero deviation control

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	100.0	Change:	Immediately

Value Range:

0.0% to 100.0%

Description

Defines the speed feedforward of zero deviation control.

H08.69 Torque feedforward of zero deviation control

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	100.0	Change:	Immediately

Value Range:

0.0% to 100.0%

Description

Defines the torque feedforward of zero deviation control.

H08.71 Zero deviation control encoder delay

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	us
Max.:	512.00	Data Type:	UInt16
Default:	31.25	Change:	Immediately

Value Range:

0.00us–512.00us

Description

Sets zero deviation control encoder delay time.

H08.81 Anti-resonance frequency of dual-inertia model

Address: -	Effective	Real time
	Time:	
Min.: 1.0	Unit:	Hz
Max.: 400.0	Data Type:	UInt16
Default: 20.0	Change:	Immediately

Value Range:

1.0 Hz to 400.0 Hz

Description

Used to set the anti-resonance frequency of dual-inertia model. You can set this parameter based on the frequency sweeping analysis of mechanical characteristics.

H08.82 Resonance frequency of dual-inertia model

Address: -	Effective	Real time
	Time:	
Min.: 0.0	Unit:	Hz
Max.: 6553.5	Data Type:	UInt16
Default: 0.0	Change:	Immediately

Value Range:

0.0 Hz to 6553.5 Hz

Description

Used to set the resonance frequency of dual-inertia model. You can set this parameter based on the frequency sweeping analysis of mechanical characteristics. If accurate resonance frequency is unknown, set H08.84 based on the inertia ratio of the resonance model.

H08.83 Dual-inertia model gain

Address: -	Effective	Real time
	Time:	
Min.: 0.1	Unit:	-
Max.: 300.0	Data Type:	UInt16
Default: 60.0	Change:	Immediately

Value Range:

0.1–300.0

Description

Defines the dual-inertia model gain.

H08.84 Inertia ratio of dual-inertia model

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	-
Max.:	120.00	Data Type:	UInt16
Default:	1.00	Change:	Immediately

Value Range:

0.00–120.00

Description

If the resonance frequency of dual-inertia model is set accurately, there is no need to set this parameter.

H08.88 Speed feedforward value of dual-inertia model

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	100.0	Change:	Immediately

Value Range:

0.0–6553.5

Description

Set this parameter to 100% in general cases.

H08.89 Torque feedforward value of dual-inertia model

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	100.0	Change:	Immediately

Value Range:

0.0–6553.5

Description

Set this parameter to 100% in general cases.

5.10 H09 Auto-tuning Parameters

H09.00 Gain auto-tuning mode

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-

Max.: 7	Data Type: UInt16
Default: 4	Change: Immediately

Value Range:

0: Disabled, manual gain tuning required

1: Enabled, gain parameters generated automatically based on the stiffness level

2: Positioning mode, gain parameters generated 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

Description

Defines different gain tuning modes. Related gain parameters can be set manually or automatically according to the stiffness level.

H09.01 Stiffness level

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 41	Data Type:	UInt16
Default: 15	Change:	Immediately

Value Range:

0–41

Description

Defines the stiffness level of the servo system. The higher the stiffness level, the stronger the gains and the quicker the response will be. But an excessively high stiffness level will cause vibration.

The setpoint 0 indicates the weakest stiffness and 41 indicates the strongest stiffness.

H09.02 Adaptive notch mode

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 4	Data Type:	UInt16
Default: 3	Change:	Immediately

Value Range:

0: Adaptive notch no longer 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 3rd and 4th notches restored to default

Description

Defines the operation mode of the adaptive notch.

H09.03 Online inertia auto-tuning mode

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 3	Data Type:	UInt16
Default: 2	Change:	Immediately

Value Range:

0: Disabled

1: Enabled, changing slowly

2: Enabled, changing normally

3: Enabled, changing quickly

Description

Defines whether to enable online inertia auto-tuning and the inertia ratio update speed during online inertia auto-tuning.

H09.05 Offline inertia auto-tuning mode

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 1	Data Type:	UInt16
Default: 1	Change:	At stop

Value Range:

0: Bi-directional

1: Unidirectional

Description

Defines the offline inertia auto-tuning mode. The offline inertia auto-tuning function can be enabled through H0d.02.

H09.06 Max. speed of inertia auto-tuning

Address: -	Effective	Real time
	Time:	
Min.: 100	Unit:	rpm
Max.: 1000	Data Type:	UInt16
Default: 500	Change:	At stop

Value Range:

100rpm–1000rpm

Description

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

During inertia auto-tuning, the higher the speed, the more accurate the auto-tuned values. Use the default setpoint in general cases.

H09.07 Time constant for accelerating to max. speed during inertia auto-tuning

Address:	-	Effective	Real time
		Time:	
Min.:	20	Unit:	ms
Max.:	800	Data Type:	UInt16
Default:	125	Change:	At stop

Value Range:

20 ms to 800 ms

Description

Defines the time for the motor to accelerate from 0 rpm to the maximum speed of inertia auto-tuning (H09.06) during offline inertia auto-tuning.

H09.08 Interval time after an individual inertia auto-tuning

Address:	-	Effective	Real time
		Time:	
Min.:	50	Unit:	ms
Max.:	10000	Data Type:	UInt16
Default:	800	Change:	At stop

Value Range:

50 ms to 10000 ms

Description

Defines the interval time between two consecutive speed references when H09.05 (Offline inertia auto-tuning mode) is set to 1 (Positive/Negative triangular wave mode).

H09.09 Number of motor revolutions per inertia auto-tuning

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	-
Max.:	100.00	Data Type:	UInt16
Default:	1.00	Change:	Immediately

Value Range:

0.00–100.00

Description

Defines the motor revolutions per inertia auto-tuning when H09.05 (Offline inertia auto-tuning mode) is set to 1 (Positive/Negative triangular wave mode).

Note:

When using the offline inertia auto-tuning function, check that the travel distance of the motor at the stop position is larger than the value of H09.09. If not, decrease the value of H09.06 (Maximum speed for inertia auto-tuning) or H09.07 (Time constant of accelerating to max. speed during inertia auto-tuning) properly until the motor travel distance fulfills the requirement.

H09.11 Vibration threshold

Address: -	Effective	Real time
	Time:	
Min.: 0.0	Unit:	%
Max.: 100.0	Data Type:	UInt16
Default: 5.0	Change:	Immediately

Value Range:

0.0% to 100.0%

Description

Defines the warning threshold for current feedback vibration.

H09.12 Frequency of the 1st notch

Address: -	Effective	Real time
	Time:	
Min.: 50	Unit:	Hz
Max.: 8000	Data Type:	UInt16
Default: 8000	Change:	Immediately

Value Range:

50 Hz to 8000 Hz

Description

Defines the center frequency of the notch, which is the mechanical resonance frequency.

In the torque control mode, setting the notch frequency to 4000 Hz deactivates the notch function.

H09.13 Width level of the 1st notch

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 20	Data Type:	UInt16
Default: 2	Change:	Immediately

Value Range:

0–20

Description

Defines the width level of the notch. Use the default setpoint in general cases.
Width level is the ratio of the notch width to the notch center frequency.

H09.14 Depth level of the 1st notch

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 99

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0–99

Description

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.

H09.15 Frequency of the 2nd notch

Address: -

Effective Real time

Time:

Min.: 50

Unit: Hz

Max.: 8000

Data Type: UInt16

Default: 8000

Change: Immediately

Value Range:

50 Hz to 8000 Hz

Description

-

H09.16 Width level of the 2nd notch

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 20

Data Type: UInt16

Default: 2

Change: Immediately

Value Range:

0–20

Description

-

H09.17 Depth level of the 2nd notch

Address: -

Min.: 0

Max.: 99

Default: 0

Value Range:

0–99

Description

-

Effective Real time
Time:
Unit: -
Data Type: UInt16
Change: Immediately

H09.18 Frequency of the 3rd notch

Address: -

Min.: 50

Max.: 8000

Default: 8000

Value Range:

50 Hz to 8000 Hz

Description

-

Effective Real time
Time:
Unit: Hz
Data Type: UInt16
Change: Immediately

H09.19 Width level of the 3rd notch

Address: -

Min.: 0

Max.: 20

Default: 2

Value Range:

0–20

Description

-

Effective Real time
Time:
Unit: -
Data Type: UInt16
Change: Immediately

H09.20 Depth level of the 3rd notch

Address: -

Min.: 0

Max.: 99

Default: 0

Value Range:

0–99

Effective Real time
Time:
Unit: -
Data Type: UInt16
Change: Immediately

Description

-

H09.21 Frequency of the 4th notch

Address: -

Effective Real time

Time:

Min.: 50

Unit: Hz

Max.: 8000

Data Type: UInt16

Default: 8000

Change: Immediately

Value Range:

50 Hz to 8000 Hz

Description

-

H09.22 Width level of the 4th notch

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 20

Data Type: UInt16

Default: 2

Change: Immediately

Value Range:

0–20

Description

-

H09.23 Depth level of the 4th notch

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 99

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0–99

Description

-

H09.24 Auto-tuned resonance frequency

Address: -

Effective -

Time:

Min.: 0

Unit: Hz

Max.: 5000

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0 Hz to 5000 Hz

Description

When H09.02 (Adaptive notch mode) is set to 3, the current mechanical resonance frequency is displayed.

H09.26 ITune response

Address: -

Effective Real time

Time:

Min.: 50.0

Unit: %

Max.: 500.0

Data Type: UInt16

Default: 100.0

Change: Immediately

Value Range:

50.0% to 500.0%

Description

Defines ITune response capability. Increasing the setpoint improves the responsiveness but may incur resonance.

H09.27 ITune mode

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 2

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0: Disabled

1: ITune mode 1

2: ITune mode 2

Description

Setting H09.27 to 1 enables the ITune function.

Note: ITune mode 2 is manufacturer commissioning mode, which should be used with caution.

H09.28 Minimum inertia ratio of ITune

Address: -

Effective Real time

Time:

Min.: 0.0

Unit: %

Max.: 80.0

Data Type: UInt16

Default: 0.0

Change: Immediately

Value Range:

0.0% to 80.0%

Description

Inertia ratio range for ITune adjustment: The minimum and maximum inertia ratios of ITune are 0.0 and 30.0 by default.

If the actual maximum load inertia ratio is higher than 30.0, increase the value of H09.29 to prevent positioning jitter.

If the actual load inertia change range is small, set H09.28 and H09.29 based on actual conditions to achieve optimal control effect.

H09.29 Maximum inertia ratio of ITune

Address: -	Effective	Real time
	Time:	
Min.: 1.0	Unit:	%
Max.: 120.0	Data Type:	UInt16
Default: 30.0	Change:	Immediately

Value Range:

1.0% to 120.0%

Description

-

H09.32 Gravity compensation value

Address: -	Effective	Real time
	Time:	
Min.: 0.0	Unit:	%
Max.: 100.0	Data Type:	UInt16
Default: 0.0	Change:	Immediately

Value Range:

0.0% to 100.0%

Description

Defines the gravity compensation value. Setting this parameter properly in vertical axis applications can reduce the falling amplitude upon start.

H09.33 Positive friction compensation value

Address: -	Effective	Real time
	Time:	
Min.: 0.0	Unit:	%
Max.: 100.0	Data Type:	UInt16
Default: 0.0	Change:	Immediately

Value Range:

0.0% to 100.0%

Description

Defines the forward friction compensation value.

H09.34 Negative friction compensation value

Address:	-	Effective	Real time
		Time:	
Min.:	-100	Unit:	%
Max.:	0.0	Data Type:	Int16
Default:	0.0	Change:	Immediately

Value Range:

-100.0% to 0.0%

Description

Defines the reverse direction friction compensation value.

H09.35 Friction compensation speed

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	-
Max.:	20.0	Data Type:	UInt16
Default:	2.0	Change:	Immediately

Value Range:

0.0–20.0

Description

Defines the friction compensation speed.

H09.36 Friction compensation speed

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	19	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0: Slow mode+Speed reference

1: Slow mode+Model speed

2: Slow mode+Speed feedback

3: Slow mode+Observe speed

16: Quick mode +Speed reference

17: Quick mode +Model speed

18: Quick mode +Speed feedback

19: Quick mode+Observe speed

Description

-

H09.37 Vibration monitoring time

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	65535	Unit:	-
Default:	600	Data Type:	UInt16
		Change:	Immediately

Value Range:

0–65535

Description

The resonance detection suppression function is turned off automatically after the time defined by this parameter elapses. To suppress the resonance suppression function, set this parameter to 65536.

H09.38 Frequency of low-frequency resonance suppression 1 at the mechanical end

Address:	-	Effective	Real time
Min.:	1.0	Time:	
Max.:	100.0	Unit:	Hz
Default:	100.0	Data Type:	UInt16
		Change:	Immediately

Value Range:

1.0 Hz to 100.0 Hz

Description

Set this parameter based on the actual jitter frequency.

H09.39 Low-frequency resonance suppression 1 at the mechanical end

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	3	Unit:	-
Default:	2	Data Type:	UInt16
		Change:	At stop

Value Range:

0–3

Description

Defines different low-frequency resonance suppression types at the mechanical load. Type 1 features the shortest delay.

H09.41 Frequency of the 5th notch

Address:	-	Effective	Real time
Min.:	50	Time:	
Max.:	8000	Unit:	Hz
		Data Type:	UInt16

Default: 8000

Change: Immediately

Value Range:

50 Hz to 8000 Hz

Description

-

H09.42 Width level of the 5th notch

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 20

Data Type: UInt16

Default: 2

Change: At stop

Value Range:

0–20

Description

-

H09.43 Depth level of the 5th notch

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 99

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0–99

Description

-

H09.44 Frequency of low-frequency resonance suppression 2 at mechanical load end

Address: -

Effective Real time

Time:

Min.: 0.0

Unit: -

Max.: 100.0

Data Type: UInt16

Default: 0.0

Change: Immediately

Value Range:

0.0–100.0

Description

Set this parameter based on the actual jitter frequency.

H09.45 Responsiveness of low-frequency resonance suppression 2 at mechanical load end

Address:	-	Effective	Real time
		Time:	
Min.:	0.01	Unit:	-
Max.:	5.00	Data Type:	UInt16
Default:	1.00	Change:	Immediately

Value Range:

0.01–5.00

Description

Use the default setpoint in general cases. To increase the setpoint, reduce the delay time.

H09.47 Width of low-frequency resonance suppression 2 at mechanical load end

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	-
Max.:	2.00	Data Type:	UInt16
Default:	1.00	Change:	Immediately

Value Range:

0.00–2.00

Description

Use the default setpoint in general cases. To increase the setpoint, increase the delay time.

H09.49 Frequency of low-frequency resonance suppression 3 at mechanical load end

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	-
Max.:	100.0	Data Type:	UInt16
Default:	0.0	Change:	Immediately

Value Range:

0.0–100.0

Description

-

H09.50 Responsiveness of low-frequency resonance suppression 3 at mechanical load end

Address:	-	Effective	Real time
		Time:	
Min.:	0.01	Unit:	-
Max.:	5.00	Data Type:	UInt16

Default: 1.00

Change: Immediately

Value Range:

0.01–5.00

Description

-

H09.52 Width of low-frequency resonance suppression 3 at mechanical load end

Address: -

Effective Real time

Time:

Min.: 0.00

Unit: -

Max.: 2.00

Data Type: UInt16

Default: 1.00

Change: Immediately

Value Range:

0.00–2.00

Description

-

H09.54 Vibration threshold

Address: -

Effective Real time

Time:

Min.: 0.0

Unit: %

Max.: 300.0

Data Type: UInt16

Default: 50.0

Change: Immediately

Value Range:

0.0% to 300.0%

Description

If the torque fluctuation exceeds the setpoint, an error will be reported. Setting this parameter to 0 hides the resonance detection function.

H09.56 Max. overshoot allowed by ETune

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 2936

Change: Immediately

Value Range:

0–65535

Description

Defines the maximum overshoot value allowed during ETune adjustment.

H09.57 STune resonance suppression switchover frequency

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	4000	Unit:	Hz
Default:	900	Data Type:	UInt16
		Change:	Immediately

Value Range:

0 Hz to 4000 Hz

Description

If the resonance frequency is lower than the setpoint, use medium-frequency resonance suppression 2 to suppress resonance. Otherwise, use the notch to suppress resonance.

H09.58 STune resonance suppression reset selection

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	1	Unit:	-
Default:	0	Data Type:	UInt16
		Change:	Immediately

Value Range:

0: Disabled

1: Enabled

Description

Used to enable STune resonance suppression reset to clear parameters related to resonance suppression, medium-frequency resonance suppression 2 and notches 3 and 4.

5.11 H0A Fault and Protection Parameters**H0A.00 Power input phase loss protection**

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	1	Unit:	-
Default:	0	Data Type:	UInt16
		Change:	Immediately

Value Range:

0: Enable

1: Disable

Description

Servo drives supporting single-phase/three-phase 220 V and three-phase 380 V power supplies are available. When voltage fluctuation or phase loss occurs on the power supply, the drive triggers power input phase loss protection based on H0A.00.

H0A.01 Absolute position limit

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	2	Unit:	-
Default:	0	Data Type:	UInt16
		Change:	Immediately

Value Range:

0: Disabled

1: Enabled

2: Enabled after homing

Description

Used to set the activation condition for enabling the software position limit function and the software limit.

H0A.04 Motor overload protection gain

Address:	-	Effective	Real time
Min.:	50	Time:	
Max.:	300	Unit:	-
Default:	100	Data Type:	UInt16
		Change:	Immediately

Value Range:

50–300

Description

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

You can change the setpoint to advance or delay the time when overload protection is triggered based on the motor temperature. The setpoint 50% indicates the time is cut by half; 150% indicates the time is increased by 50%. Set this parameter based on the actual temperature of the motor.

H0A.08 Overspeed threshold

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	20000	Unit:	rpm
		Data Type:	UInt16

Default: 0

Change: Immediately

Value Range:

0rpm–20000rpm

Description

Defines the overspeed threshold of the motor.

H0A.10 Threshold of excessive local position deviation

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 4294967295

Data Type: UInt32

Default: 219895608

Change: Immediately

Value Range:

0–4294967295

Description

Defines the threshold for excessive position deviation in the position control mode.

When the position deviation exceeds this threshold, the drive reports EB00.0 (Position deviation too large).

H0A.12 Runaway protection

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 1

Change: Immediately

Value Range:

0: Disable

1: Enable

Description

Defines whether to enable runaway protection.

0: Disables E234.0 detection when the motor drives a vertical axis or is driven by the load

1: Enables runaway protection

H0A.18 IGBT over-temperature threshold

Address: -

Effective Real time

Time:

Min.: 120

Unit: °C

Max.: 175

Data Type: UInt16

Default: 140

Change: Immediately

Value Range:

120°C to 175°C

Description

Defines the threshold for reporting E640.0 (IGBT overtemperature) and E640.1 (Flywheel diode overtemperature).

H0A.19 Filter time constant of touch probe 1

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	us
Max.:	6.30	Data Type:	UInt16
Default:	2.00	Change:	Immediately

Value Range:

0.00us–6.30us

Description

Defines the filter time of touch probe 1. An active input must last for the time defined by H0A.19.

H0A.20 Filter time constant of touch probe 2

Address:	-	Effective	Real time
		Time:	
Min.:	0.00	Unit:	us
Max.:	6.30	Data Type:	UInt16
Default:	2.00	Change:	Immediately

Value Range:

0.00us–6.30us

Description

Defines the filter time of touch probe 2. An active input must last for the time defined by H0A.20.

H0A.22 Sigma_Delta filter time

Address:	-	Effective	Upon the next power-on
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0–65535

Description

-

H0A.23 TZ signal filter time

Address: -	Effective	Upon the next power-on
	Time:	
Min.: 0	Unit:	25 ns
Max.: 31	Data Type:	UInt16
Default: 15	Change:	At stop

Value Range:

0 ns to 31 ns

Description

-

H0A.25 Speed display DO low-pass filter time

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	ms
Max.: 5000	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0 ms to 5000 ms

Description

Defines the low-pass filter time constant of the speed information for speed feedback and position references.

H0A.26 Motor overload detection

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 1	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0: Show motor overload warning (E909.0) and fault (E620.0)

1: Hide motor overload warning (E909.0) and fault (E620.0)

Description

Defines whether to enable motor overload detection.

H0A.27 Average filter time for speed display DO

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	ms
Max.: 100	Data Type:	UInt16
Default: 50	Change:	Immediately

Value Range:

0 ms to 100 ms

Description

Defines the the average filter time constant of the speed information for speed feedback and position references.

H0A.32 Motor stall over-temperature protection time window

Address:	-	Effective	Real time
		Time:	
Min.:	10	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	200	Change:	Immediately

Value Range:

10 ms to 65535 ms

Description

Defines the overtemperature duration before E630.0 (Motor stall) is detected by the servo drive.

H0A.32 can be used to adjust the sensitivity of motor stall overtemperature detection.

H0A.33 Motor stall over-temperature detection

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	Immediately

Value Range:

0: Disabled

1: Enabled

Description

Enables or disables the detection for E630.0 (Motor stall overtemperature protection).

H0A.36 Encoder multi-turn overflow fault selection

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0: Not hide

1: Hide

Description

Defines whether to hide the encoder multi-turn overflow fault in the absolute position linear mode (H02.01 = 1).

H0A.40 Compensation function selection

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 15	Data Type:	UInt16
Default: 6	Change:	At stop

Value Range:

bit0: Overtravel compensation

0: Enabled

1: Disabled

bit1: Touch probe rising edge compensation

0: Disabled

1: Enabled

bit2: Touch probe falling edge compensation

0: Disabled

1: Enabled

bit3: Touch probe solution

0: New solution

1: Old solution (same as SV660N)

Description

-

H0A.41 Forward position of software position limit

Address: -	Effective	Real time
	Time:	
Min.: -2147483648	Unit:	Encoder unit
Max.: 2147483647	Data Type:	Int32
Default: 2147483647	Change:	At stop

Value Range:

-2147483648 to 2147483647

Description

When the absolute position counter (H0b.07) is larger than H0A.41, the servo drive reports E950.0 (Forward limit switch warning) and executes stop at forward limit.

H0A.43 Reverse position of software position limit

Address: -	Effective	Real time
	Time:	

Min.:	-2147483648	Unit:	Encoder unit
Max.:	2147483647	Data Type:	Int32
Default:	-2147483648	Change:	At stop

Value Range:

-2147483648 to 2147483647

Description

When the absolute position counter (H0b.07) is smaller than H0A.43, the servo drive reports warning E952.0 (Reverse limit switch warning) and executes stop at reverse limit.

H0A.49 Regenerative resistor overtemperature threshold

Address:	-	Effective	Real time
		Time:	
Min.:	100	Unit:	°C
Max.:	175	Data Type:	UInt16
Default:	115	Change:	Immediately

Value Range:

100°C to 175°C

Description

Defines the temperature threshold for regenerative resistor overload.

H0A.50 Encoder communication fault tolerance threshold

Address:	-	Effective	Upon the next power-on
		Time:	
Min.:	0	Unit:	-
Max.:	31	Data Type:	UInt16
Default:	5	Change:	Immediately

Value Range:

0–31

Description

When the number of communication failures between the encoder and the drive exceeds H0A.50, the communication between the encoder and the drive fails.

H0A.51 Phase loss detection filter times

Address:	-	Effective	Real time
		Time:	
Min.:	3	Unit:	55 ms
Max.:	36	Data Type:	UInt16
Default:	20	Change:	Immediately

Value Range:

3 ms to 36 ms

Description

Phase loss fault is reported when phase loss keeps active for a period longer than H0A.51.

H0A.52 Encoder temperature protection threshold

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	°C
Max.:	175	Data Type:	UInt16
Default:	105	Change:	Immediately

Value Range:

0°C to 175°C

Description

Defines the temperature threshold for encoder overtemperature protection.

H0A.53 Probe DI ON compensation time

Address:	-	Effective	Real time
		Time:	
Min.:	-3000	Unit:	25 ns
Max.:	3000	Data Type:	Int16
Default:	200	Change:	Immediately

Value Range:

-3000 ns to 3000 ns

Description

Used to compensate for the action time when the touch probe is switched on.

H0A.54 Probe DI OFF compensation time

Address:	-	Effective	Real time
		Time:	
Min.:	-3000	Unit:	25 ns
Max.:	3000	Data Type:	Int16
Default:	1512	Change:	Immediately

Value Range:

-3000 ns to 3000 ns

Description

Used to compensate for the action time when the touch probe is switched off.

H0A.55 Runaway current threshold

Address:	-	Effective	Real time
		Time:	
Min.:	100.0	Unit:	%

Max.: 400.0

Default: 200.0

Value Range:

100.0% to 400.0%

Description

Defines the current threshold for runaway protection detection.

Data Type: UInt16

Change: Immediately

H0A.56 Fault reset delay

Address: -

Effective Real time

Time:

Min.: 0

Unit: ms

Max.: 60000

Data Type: UInt16

Default: 10000

Change: Immediately

Value Range:

0 ms to 60000 ms

Description

-

H0A.57 Runaway speed threshold

Address: -

Effective Real time

Time:

Min.: 1

Unit: rpm

Max.: 1000

Data Type: UInt16

Default: 50

Change: Immediately

Value Range:

1rpm–1000rpm

Description

Defines the overspeed threshold for runaway protection detection.

H0A.58 Runaway speed filter time

Address: -

Effective Upon the next power-on

Time:

Min.: 0.1

Unit: ms

Max.: 100.0

Data Type: UInt16

Default: 2.0

Change: Immediately

Value Range:

0.1 ms to 100.0 ms

Description

Defines the speed feedback filter time for runaway protection detection.

H0A.59 Runaway protection detection time

Address:	-	Effective	Real time
		Time:	
Min.:	10	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	30	Change:	Immediately

Value Range:

10 ms to 1000 ms

Description

The runaway fault will be reported when runaway keeps active for a period longer than H0A.59.

H0A.60 Black box function mode

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	1	Change:	Immediately

Value Range:

0: Disable

1: Any fault

2: Designated fault

3: Triggered based on designated condition

Description

Defines the condition for triggering black box sampling.

H0A.61 Designated fault code

Address:	-	Effective	Real time
		Time:	
Min.:	0.0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0.0	Change:	Immediately

Value Range:

0.0–6553.5

Description

Defines the fault code for triggering the black box function.

H0A.62 Trigger source

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-

Max.:	25	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0–25

Description

Defines the fault code for triggering the black box function through designated channel.

H0A.63 Trigger level

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

Defines the trigger level for triggering the black box function through designated channel.

H0A.65 Trigger level

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0: Rising edge

1: Equal

2: Falling edge

3: Edge-triggered

Description

Defines the trigger mode for triggering the black box function through H0A.63.

H0A.66 Trigger position

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	75	Change:	Immediately

Value Range:

0% to 100%

Description

Defines the pre-trigger position for triggering black box sampling.

H0A.67 Sampling frequency

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	2	Unit:	-
Default:	0	Data Type:	UInt16
		Change:	Immediately

Value Range:

0: Current loop

1: Position loop

2: Main cycle

Description

Defines the frequency sampling mode during black box sampling.

H0A.70 Overspeed threshold 2

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	20000	Unit:	rpm
Default:	0	Data Type:	UInt16
		Change:	Immediately

Value Range:

0rpm–20000rpm

Description

Defines the speed threshold for reporting E500.2 (Position feedback pulse overspeed).

H0A.71 MS1 motor overload curve switchover

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	3	Unit:	-
Default:	2	Data Type:	UInt16
		Change:	Immediately

Value Range:

0–3

Description

Bit 0:

0: New overload curve
 1: Old overload curve
 bit1:
 0: Enable discharging switch upon power failure
 1: Hide discharging switch upon power failure

H0A.72 Maximum stop time in ramp-to-stop

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	ms
Max.: 65535	Data Type:	UInt16
Default: 10000	Change:	At stop

Value Range:

0 ms to 65535 ms

Description

Defines the time for the motor to decelerate from the maximum speed to 0rpm during ramp-to-stop.

H0A.73 STO 24 V disconnection filter time

Address: -	Effective	Real time
	Time:	
Min.: 1	Unit:	ms
Max.: 5	Data Type:	UInt16
Default: 5	Change:	Immediately

Value Range:

1 ms to 5 ms

Description

Defines the delay from the moment when 24V is disconnected to the moment when the STO state applies.

H0A.74 Filter time for two inconsistent STO channels

Address: -	Effective	Real time
	Time:	
Min.: 1	Unit:	ms
Max.: 1000	Data Type:	UInt16
Default: 100	Change:	Immediately

Value Range:

1 ms to 1000 ms

Description

Defines the delay from the moment the inconsistent 24V is input to the drive through two channels to the moment when the STO state applies.

H0A.75 Servo OFF delay after STO triggered

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	25	Unit:	ms
Default:	20	Data Type:	UInt16
		Change:	Immediately

Value Range:

0 ms to 25 ms

Description

Defines the delay from the moment the STO state is triggered to the moment the S-ON signal is switched off.

H0A.81 Enable voltage drop protection

Address:	-	Effective	Upon the next power-on
Min.:	0	Time:	
Max.:	2	Unit:	-
Default:	0	Data Type:	UInt16
		Change:	At stop

Value Range:

0: No operation

1: Host controller executes torque limit

2: Servo executes torque limit

Description

-

H0A.82 Voltage drop torque limit

Address:	-	Effective	Real time
Min.:	0.0	Time:	
Max.:	100.0	Unit:	%
Default:	50.0	Data Type:	UInt16
		Change:	Immediately

Value Range:

0.0% to 100.0%

Description

-

H0A.83 Torque limit cancel time

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	1000	Unit:	ms
		Data Type:	UInt16

Default: 100

Change: Immediately

Value Range:

0 ms to 1000 ms

Description

-

H0A.84 Instantaneous stop holding time

Address: -

Effective Real time

Time:

Min.: 20

Unit: ms

Max.: 50000

Data Type: UInt16

Default: 1000

Change: Immediately

Value Range:

20 ms to 50000 ms

Description

-

H0A.85 Wire breakage torque reference

Address: -

Effective Real time

Time:

Min.: 4.0

Unit: %

Max.: 400.0

Data Type: UInt16

Default: 5.0

Change: At stop

Value Range:

4.0% to 400.0%

Description

-

H0A.86 Wire breakage detection filter time

Address: -

Effective Real time

Time:

Min.: 5

Unit: ms

Max.: 1000

Data Type: UInt16

Default: 30

Change: At stop

Value Range:

5 ms to 1000 ms

Description

-

H0A.90 Moving average filter time for speed display values

Address: -

Effective Real time

Time:

Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0 ms to 100 ms

Description

Defines the moving average filter time constant for speed display values.

H0A.91 Moving average filter time for torque display values

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0 ms to 100 ms

Description

Defines the moving average filter time constant for torque display values.

H0A.92 Moving average filter time for position display values

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0 ms to 100 ms

Description

Defines the moving average filter time constant for position display values.

H0A.93 Low-pass filter time for voltage display values

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	ms
Max.:	250	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0 ms to 250 ms

Description

Defines the low-pass filter time constant for voltage display values.

H0A.94 Low-pass filter time for thermal display values

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	ms
Max.:	250	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0 ms to 250 ms

Description

Defines the filter time constant for thermal display values.

5.12 H0b Monitoring Parameters

H0b.00 Motor speed actual value

Address:	-	Effective	-
		Time:	
Min.:	-32767	Unit:	rpm
Max.:	32767	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-32767rpm to 32767rpm

Description

Indicates the round actual motor speed, which is accurate to 1 rpm.

Set in H0A.25 (Filter time constant of speed feedback display) the filter time constant for H0b.00.

H0b.01 Speed reference

Address:	-	Effective	-
		Time:	
Min.:	-32767	Unit:	rpm
Max.:	32767	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-32767rpm to 32767rpm

Description

Indicates the present speed reference (accurate to 1rpm) of the drive in the position and speed control modes.

H0b.02 Internal torque reference

Address:	-	Effective	-
		Time:	

Min.:	-500	Unit:	%
Max.:	500.0	Data Type:	Int16
Default:	0.0	Change:	Unchangeable

Value Range:

-500.0% to 500.0%

Description

Displays present torque reference (accurate to 0.1%). The value 100.0% corresponds to the rated torque of the motor.

H0b.03 Monitored DI status

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Displays the level status of eight DI terminals without filtering.

Upper LED segments ON: high level (indicated by "1") Lower LED segments ON: low level (indicated by "0")

H0b.05 Monitored DO status

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Displays the level status of 5 DO terminals without filtering.

Upper LED segments ON: high level (indicated by "1") Lower LED segments ON: low level (indicated by "0")

H0b.07 Absolute position counter

Address:	-	Effective	-
		Time:	
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Indicates present absolute position (reference unit) of the motor in the position control mode.

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

H0b.09 Mechanical angle

Address:	-	Effective	-
		Time:	
Min.:	0.0	Unit:	°
Max.:	360.0	Data Type:	UInt16
Default:	0.0	Change:	Unchangeable

Value Range:

0.0° to 360.0°

Description

Displays present mechanical angle (encoder unit) of the motor. The setpoint 0 indicates the mechanical angle is 0°.

Actual mechanical angle = $360^\circ \times \text{H0b.09} / (\text{Maximum value of H0b.09} + 1)$

Maximum value of H0b.09 for an absolute encoder: 65535

H0b.10 Electrical angle

Address:	-	Effective	-
		Time:	
Min.:	0.0	Unit:	°
Max.:	360.0	Data Type:	UInt16
Default:	0.0	Change:	Unchangeable

Value Range:

0.0° to 360.0°

Description

Indicates the present electrical angle of the motor, which is accurate to 0.1°.

The electrical angle variation range is $\pm 360.0^\circ$ during rotation. If the motor has four pairs of poles, each revolution generates four rounds of angle change from 0° to 359°. Similarly, if the motor has five pairs of poles, each revolution generates five rounds of angle change from 0° to 359°.

H0b.12 Average load rate

Address:	-	Effective	-
		Time:	
Min.:	0.0	Unit:	%

Max.: 800.0

Data Type: UInt16

Default: 0.0

Change: Unchangeable

Value Range:

0.0% to 800.0%

Description

Displays the percentage of the average load torque to the rated torque of the motor, which is accurate to 0.1%. The value 100.0% corresponds to the rated torque of the motor.

H0b.15 Position following error (encoder unit)

Address: -

Effective -

Time:

Min.: -2147483648

Unit: p

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Used to count and display the position deviation value after being 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:

H0b.15 can be clear when the condition defined in H05.16 (Clear action) is met.

H0b.17 Feedback pulse counter

Address: -

Effective -

Time:

Min.: -2147483648

Unit: p

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Used to count the position pulses fed back by the encoder in any control mode.

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

H0b.19 Total power-on time

Address: -

Effective -

Time:

Min.: 0.0

Unit: s

Max.: 429496729.5

Data Type: UInt32

Default: 0.0

Change: Unchangeable

Value Range:

0.0s–429496729.5s

Description

Used to record the total operating time of the servo drive.

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

Note:

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

H0b.21 Displayed AI1 voltage

Address: -

Effective -

Time:

Min.: -12

Unit: V

Max.: 12.00

Data Type: Int16

Default: 0.00

Change: Unchangeable

Value Range:

-12.00 V to 12.00 V

Description

Displays the actual sampling voltage of AI1.

H0b.24 RMS value of phase current

Address: -

Effective -

Time:

Min.: 0.0

Unit: A

Max.: 6553.5

Data Type: UInt16

Default: 0.0

Change: Unchangeable

Value Range:

0.0 A to 6553.5 A

Description

Displays the RMS value of the phase current of the motor, accurate to 0.01 A.

H0b.26 Bus voltage

Address: -

Effective -

Time:

Min.: 0.0

Unit: V

Max.: 6553.5

Data Type: UInt16

Default: 0.0

Change: Unchangeable

Value Range:

0.0 V to 6553.5 V

Description

Displays the DC bus voltage of the main circuit input voltage after rectification, which is accurate to 0.01 V.

H0b.27 Module temperature

Address:	-	Effective	-
		Time:	
Min.:	-20	Unit:	°C
Max.:	200	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-20°C to 200°C

Description

Indicates the temperature of the module inside the servo drive, which can be used as a reference for estimating the actual temperature of the drive.

H0b.28 Absolute encoder fault information given by FPGA

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0b.29 Axis status information given by FPGA

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0b.30 Axis fault information given by FPGA

Address:	-	Effective	-
		Time:	

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable
Value Range:			
0–65535			
Description			
-			

H0b.31 Encoder fault information

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable
Value Range:			
0–65535			
Description			
-			

H0b.33 Fault log

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	0	Change:	Immediately
Value Range:			

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
 10: 10th to last fault
 11: 11th to last fault
 12: 12th to last fault
 13: 13th to last fault
 14: 14th to last fault
 15: 15th to last fault
 16: 16th to last fault
 17: 17th to last fault
 18: 18th to last fault
 19: 19th to last fault

Description

Used to view the latest 20 faults of the drive.

H0b.34 Fault code of the selected fault

Address: -	Effective -
	Time:
Min.: 0	Unit: -
Max.: 65535	Data Type: UInt16
Default: 0	Change: Unchangeable

Value Range:

0–65535

Description

-

H0b.35 Time stamp upon occurrence of the selected fault

Address: -	Effective -
	Time:
Min.: 0.0	Unit: s
Max.: 429496729.5	Data Type: UInt32
Default: 0.0	Change: Unchangeable

Value Range:

0.0s–429496729.5s

Description

-

H0b.37 Motor speed upon occurrence of the selected fault

Address:	-	Effective	-
		Time:	
Min.:	-32767	Unit:	rpm
Max.:	32767	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-32767rpm to 32767rpm

Description

-

H0b.38 Motor phase U current upon occurrence of the selected fault

Address:	-	Effective	-
		Time:	
Min.:	-3276.7	Unit:	A
Max.:	3276.7	Data Type:	Int16
Default:	0.0	Change:	Unchangeable

Value Range:

-3276.7 A to 3276.7 A

Description

-

H0b.39 Motor phase V current upon occurrence of the selected fault

Address:	-	Effective	-
		Time:	
Min.:	-3276.7	Unit:	A
Max.:	3276.7	Data Type:	Int16
Default:	0.0	Change:	Unchangeable

Value Range:

-3276.7 A to 3276.7 A

Description

-

H0b.40 Bus voltage upon occurrence of the selected fault

Address:	-	Effective	-
		Time:	
Min.:	0.0	Unit:	V
Max.:	6553.5	Data Type:	UInt16

Default: 0.0

Change: Unchangeable

Value Range:

0.0 V to 6553.5 V

Description

-

H0b.41 DI status upon occurrence of the selected fault

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

-

H0b.43 DO status upon occurrence of the selected fault

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

-

H0b.45 Internal fault code

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

-

H0b.46 Absolute encoder fault information given by FPGA upon occurrence of the selected fault

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable
Value Range:			
0–65535			
Description			
-			

H0b.47 System status information given by FPGA upon occurrence of the selected fault

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable
Value Range:			
0–65535			
Description			
-			

H0b.48 System fault information given by FPGA upon occurrence of the selected fault

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable
Value Range:			
0–65535			
Description			
-			

H0b.49 Encoder fault information upon occurrence of the selected fault

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0b.51 Internal fault code upon occurrence of the selected fault

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

-

H0b.52 FPGA timeout fault standard bit upon occurrence of the selected fault

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

-

H0b.53 Position following error (reference unit)

Address: -

Effective -

Time:

Min.: -2147483648

Unit: p

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

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

Position deviation (reference unit) is the value obtained after encoder position deviation calculation. The precision is compromised during division.

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

H0b.55 Motor speed actual value

Address:	-	Effective	-
		Time:	
Min.:	-2147483648	Unit:	rpm
Max.:	2147483647.0	Data Type:	Int32
Default:	0.0	Change:	Unchangeable

Value Range:

-2147483648.0rpm to 2147483647.0rpm

Description

Indicates the actual value of motor speed, which is accurate to 0.1 rpm.

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

H0A.25 (Filter time constant of speed feedback display) can be used to set the filter time constant of the speed feedback.

H0b.57 Bus voltage of the control circuit

Address:	-	Effective	-
		Time:	
Min.:	0.0	Unit:	V
Max.:	6553.5	Data Type:	UInt16
Default:	0.0	Change:	Unchangeable

Value Range:

0.0 V to 6553.5 V

Description

Displays the bus voltage of the control circuit.

H0b.58 Mechanical absolute position (low 32 bits)

Address:	-	Effective	-
		Time:	
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Displays the low 32-bit value (encoder unit) of the mechanical position feedback when the absolute encoder is used.

H0b.60 Mechanical absolute position (high 32 bits)

Address:	-	Effective	-
		Time:	
Min.:	-2147483648	Unit:	p

Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Displays the high 32-bit value (encoder unit) of the mechanical position feedback when the absolute encoder is used.

H0b.63 NotRdy state

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

- 1: Control circuit error
- 2: Main circuit power input error
- 3: Bus undervoltage
- 4: Soft start failed
- 5: Encoder initialization undone
- 6: Short circuit to ground failed
- 7: Others

Description

Displays the reason for the NRD state.

H0b.66 Encoder temperature

Address:	-	Effective	-
		Time:	
Min.:	-32768	Unit:	°C
Max.:	32767	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-32768°C to 32767°C

Description

-

H0b.67 Load rate of regenerative resistor

Address:	-	Effective	-
		Time:	
Min.:	0.0	Unit:	%
Max.:	200.0	Data Type:	UInt16

Default:	0.0	Change:	Unchangeable
Value Range:			
0.0% to 200.0%			
Description			
-			

H0b.70 Number of absolute encoder revolutions

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	Rev
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable
Value Range:			
0Rev–65535Rev			
Description			
Indicates the number of revolutions of the absolute encoder.			

H0b.71 Single-turn position fed back by the absolute encoder

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	p
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Unchangeable
Value Range:			
0p–2147483647p			
Description			
Displays the position feedback of the absolute encoder within one turn.			

H0b.74 System fault information given by FPGA

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable
Value Range:			
0–65535			
Description			
-			

H0b.77 Encoder position (low 32 bits)

Address:	-	Effective	-
		Time:	

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Displays the low 32-bit value of the position feedback of the absolute encoder.

H0b.79 Encoder position (high 32 bits)

Address:	-	Effective	-
		Time:	
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Displays the high 32-bit value of the position feedback of the absolute encoder.

H0b.81 Single-turn position of the rotary load (low 32 bits)

Address:	-	Effective	-
		Time:	
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Displays the low 32-bit value of the position feedback of the rotary load when the absolute system works in the rotation mode.

H0b.83 Single-turn position of the rotary load (high 32 bits)

Address:	-	Effective	-
		Time:	
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Displays the high 32-bit value of the position feedback of the rotary load when the absolute system works the rotation mode.

H0b.85 Single-turn position of the rotary load (reference unit)

Address:	-	Effective	-
		Time:	
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Displays the high 32-bit value of the position feedback of the rotary load when the absolute system works the rotation mode.

H0b.87 IGBT junction temperature

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	200	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–200

Description

-

H0b.90 Group No. of the abnormal parameter

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0b.91 Offset within the group of the abnormal parameter

Address:	-	Effective	-
		Time:	

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0b.94 Individual power-on time

Address:	-	Effective	-
		Time:	
Min.:	0.0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0.0	Change:	Unchangeable

Value Range:

0.0s–429496729.5s

Description

Display the individual power-on time of the drive.

H0b.96 Individual power-on time upon occurrence of the selected fault

Address:	-	Effective	-
		Time:	
Min.:	0.0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0.0	Change:	Unchangeable

Value Range:

0.0s–429496729.5s

Description

-

5.13 H0d Auxiliary Parameters**H0d.00 Software Reset**

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation

1: Enable

Description

Programs in the drive are reset automatically (similar to the program reset upon power-on) after the software reset function is enabled, without the need for a power cycle.

H0d.01 Fault Reset

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 1	Data Type:	UInt16
Default: 0	Change:	At stop

Value Range:

0: No operation

1: Enable

Description

When a No. 1 or No. 2 resettable fault occurs, you can enable the fault reset function in the non-operational state after rectifying the fault cause, stopping the keypad from displaying the fault and allowing the drive to enter the "rdy" state.

When a No. 3 warning occurs, you can enable the fault reset function directly, regardless of the servo drive status.

H0d.02 Inertia auto-tuning selection

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 65	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0–65

Description

Used to enable offline inertia auto-tuning through the keypad. In the parameter display mode, switch to H0d.02 and press the SET key to enable offline inertia auto-tuning.

H0d.03 Encoder initial angle auto-tuning

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 2	Data Type:	UInt16
Default: 0	Change:	At stop

Value Range:

0: No operation
1: Enabled

Description

-

H0d.04 Read/write in encoder ROM

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 3

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0: No operation

1: Write ROM

2: Read ROM

3: ROM failure

Description

-

H0d.05 Emergency stop

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0: No operation

1: Emergency stop

Description

-

H0d.10 Auto-tuning of analog channel

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0: No operation

1: AI1 adjustment

Description

When automatic adjustment of the analog channel is enabled, the drive automatically corrects the zero drift voltage of the analog channel to improve signal detection accuracy.

H0d.12 Phase U/V current balance correction

Address:	-	Effective Time:	Upon the next power-on
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Disabled

1: Enabled

Description

-

H0d.17 Forced DI/DO enable switch

Address:	-	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Forced DI enable switch

0: Disabled

1: Enabled

bit1: Forced DO enable switch

0: Disabled

1: Enabled

Description

Forced DI/DO selection.

H0d.18 Forced DI value

Address:	-	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	255	Change:	Immediately

Value Range:

0–255

Description

Defines whether the DI functions set in group H03 is active when forced DI is activated (H0d.17 = 1 or 3).

The value of H0d.18 is displayed as a hexadecimal on the keypad. When it is converted to a binary value, "bit(n) = 1" indicates the level logic of DI function is high level; "bit(n) = 0" indicates the level logic of the DI function is low level.

H0d.19 Forced DO value

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 15

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0–15

Description

Defines whether the DO functions assigned in group H04 are active when forced DO is active (H0d.17 = 2 or 3).

The value of H0d.19 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.

H0d.20 Absolute encoder reset selection

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 4

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0: No operation

1 Reset

2: Reset the fault and multi-turn data

Description

You can reset the encoder error or the multi-turn data fed back by the encoder by setting H0d.20.

H0d.23 Torque fluctuation auto-tuning

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0–1

Description

-

5.14 H0E Communication Function Parameters

H0E.00 Node address

Address:	-	Effective	Real time
Min.:	1	Time:	
Max.:	127	Unit:	-
Default:	1	Data Type:	UInt16
		Change:	At stop

Value Range:

1–127

Description

CAN Indicates the slave node address. Ensure this parameter is consistent with the configuration of the host controller.

H0E.01 Save objects written through communication to EEPROM

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	4	Unit:	-
Default:	4	Data Type:	UInt16
		Change:	Immediately

Value Range:

0: Not save

1: Save parameters written through communication to EEPROM

2: Save object dictionaries written through communication to EEPROM

3: Save parameters and object dictionaries written through communication to EEPROM

4: Save object dictionaries written before communication (OP) to EEPROM

Description

You can use this parameter to select a data saving operation when parameters and object dictionaries are written through a serial port or SDO.

H0E.15 Select group 6000 index (last 2 bits)

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	255	Unit:	-
		Data Type:	UInt16

Default: 255

Change: Immediately

Value Range:

0–255

Description

Sets the index.

H0E.16 Select group 6000 sub-index

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 2

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0–2

Description

Sets the sub-index.

H0E.20 EtherCAT slave name

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

-

H0E.21 EtherCAT slave alias

Address: -

Effective Upon the next power-on

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0–65535

Description

-

H0E.22 Number of synchronous loss events allowed by EtherCAT

Address: -

Effective Real time

Time:

Min.:	1	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	8	Change:	Immediately

Value Range:

1–20

Description

-

H0E.24 Number of SYNC loss events

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0E.25 Max. error value and invalid frames of EtherCAT port 0 per unit time

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0E.26 Max. error value and invalid frames of EtherCAT port 1 per unit time

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0E.27 Max. transfer error of EtherCAT port per unit time

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:
0–65535

Description
-

H0E.28 Max. EtherCAT data frame processing unit error per unit time

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:
0–255

Description
-

H0E.29 Max. link loss value of EtherCAT port 0 per unit time

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:
0–65535

Description
-

H0E.31 EtherCAT synchronization mode setting

Address:	-	Effective	Upon the next power-on
		Time:	
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:
0–2

Description

-

H0E.32 EtherCAT synchronization error threshold

Address:	-	Effective	Real time
		Time:	
Min.:	100	Unit:	ns
Max.:	4000	Data Type:	UInt16
Default:	3000	Change:	At stop

Value Range:

100 ns to 4000 ns

Description

-

H0E.33 EtherCAT state machine status and port connection status

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Displays the connection status of the servo state machine and EtherCAT network ports.

bit	Setpoint
0–7	Correspond to EtherCAT state machines: 1/2/4/8
8–15	Correspond to terminal connection state: <ul style="list-style-type: none">• 0: No link• 1: IN port linked• 2: OUT port linked• 3: IN and OUT ports linked

H0E.34 Excessive CSP position command increment count

Address:	-	Effective	Real time
		Time:	
Min.:	1	Unit:	-
Max.:	30	Data Type:	UInt16
Default:	20	Change:	Immediately

Value Range:

1–30

Description

-

H0E.35 AL fault code

Address: -

Effective -

Time:

Unit: -

Min.: 0

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

-

H0E.36 EtherCAT enhanced link selection

Address: -

Effective Upon the next power-on

Time:

Unit: -

Min.: 0

Max.: 1

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0: Disabled

1: Enabled

Description

-

H0E.37 EtherCAT XML reset selection

Address: -

Effective Upon the next power-on

Time:

Unit: -

Min.: 0

Max.: 1

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0: Disabled

1: Enabled

Description

-

H0E.80 Modbus baud rate

Address: -

Effective Real time

Time:

Unit: -

Min.: 0

Max.: 9

Default: 9

Value Range:

0: 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

Description

Defines the communication rate between the servo drive and the host controller.
The baud rate set in the servo drive must be the same as that in the host controller. Otherwise, communication will fail.

Data Type: UInt16

Change: Immediately

H0E.81 Modbus data format

Address: -

Min.: 0

Max.: 3

Default: 3

Value Range:

0: No parity, 2 stop bits (N-2)

1: Even parity, 1 stop bit (E-1)

2: Odd parity, 1 stop bit (O-1)

3: No parity, 1 stop bit (N-1)

Description

Defines the data check mode between the servo drive and the host controller during communication.

0: No parity, 2 stop bits

1: Even parity, 1 stop bit

2: Odd parity, 1 stop bit

3: No parity, 1 stop bit

The data format of the servo drive must be the same as that of the host controller. Otherwise, communication will fail.

Effective Time:

Unit: -

Data Type: UInt16

Change: Immediately

H0E.82 Modbus response delay

Address: -

Effective Time:

Real time

Min.:	0	Unit:	ms
Max.:	20	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0 ms to 20 ms

Description

Defines the delay from the moment when the slave receives a command from the host controller to the moment when the slave returns a response.

H0E.83 Modbus communication timeout

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	ms
Max.:	600	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0 ms to 600 ms

Description

-

H0E.84 Sequence of Modbus communication data bits

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	Immediately

Value Range:

0: High bits before low bits

1: Low bits before high bits

Description

Defines the 32-bit data transmission format of Modbus communication.

0: High 16 bits before low 16 bits

1: Low 16 bits before high 16 bits

H0E.90 ESC version

Address:	-	Effective	-
		Time:	
Min.:	0.00	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0.00	Change:	Unchangeable

Value Range:

0.00–655.35

Description

-

H0E.93 PHY type

Address:	-	Effective	-
		Time:	
Min.:	0.00	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0.00	Change:	Unchangeable

Value Range:

0.00–655.35

Description

-

H0E.96 XML version information

Address:	-	Effective	-
		Time:	
Min.:	0.00	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0.00	Change:	Unchangeable

Value Range:

0.00–655.35

Description

-

5.15 H18 Position Comparison Output

H18.00 Position comparison output selection

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0: Disable

1: Enable (rising edge-triggered)

Description

-

H18.01 Position comparison output feedback source

Address:	-	Effective	Upon the next power-on
Min.:	0	Time:	
Max.:	1	Unit:	-
Default:	0	Data Type:	UInt16
		Change:	Immediately

Value Range:

0: Motor encoder feedback

Description

-

H18.02 Position comparison resolution

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	7	Unit:	-
Default:	1	Data Type:	UInt16
		Change:	Immediately

Value Range:

0: 24-bit

1: 23-bit

2: 22-bit

3: 21-bit

4: 20-bit

5: 19-bit

6: 18-bit

7: 17-bit

Description

-

H18.03 Position comparison mode

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	2	Unit:	-
Default:	0	Data Type:	UInt16
		Change:	Immediately

Value Range:

0: Individual comparison mode

1: Cyclic comparison mode

2: Fixed cyclic comparison mode

Description

-

H18.04 Current position as zero

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0: Disable

1: Enable (rising edge-triggered)

Description

-

H18.05 Position comparison output width

Address:	-	Effective	Real time
		Time:	
Min.:	0.1	Unit:	ms
Max.:	204.7	Data Type:	UInt16
Default:	0.1	Change:	Immediately

Value Range:

0.1 ms to 204.7 ms

Description

Defines the active pulse width of the DO when the comparison point is reached.
The value range is 0 to 204.7 (unit: 1 ms).

H18.07 Start point of position comparison

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0–40

Description

-

H18.08 End point of position comparison

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0–40

Description

-

H18.09 Current state of position comparison

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 1024

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–1024

Description

-

H18.10 Real-time position of position comparison

Address: -

Effective Real time

Time:

Min.: -2147483648

Unit: -

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Unchangeable

Value Range:

-2147483648–2147483647

Description

-

H18.12 Zero offset of position comparison

Address: -

Effective Real time

Time:

Min.: -2147483648

Unit: -

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Immediately

Value Range:

-2147483648–2147483647

Description

-

H18.14 Position comparison output delay compensation

Address: -

Effective Upon the next power-on

Time:

Min.:	-12	Unit:	us
Max.:	12.00	Data Type:	Int16
Default:	0.00	Change:	Immediately

Value Range:

-12.00us to 12.00us

Description

Compensates the delay caused by hardware signal output.

H18.15 Fixed cyclic comparison

Address:	-	Effective	Real time
		Time:	
Min.:	1	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	Immediately

Value Range:

1–65535

Description

-

H18.17 Number of fixed mode cycles

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

5.16 H19 Target Position Parameters

H19.00 Target value of position comparison 1

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.02 Attribute value of position comparison 1

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	65535	Unit:	-
Default:	0	Data Type:	UInt16
		Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

Attribute setting of position comparison point 1

Bit0: Current position changes from "less than" to "more than" the comparison point

Bit1: Current position changes from "more than" to "less than" the comparison point

Bit2 to 6: N/A

Bit7: DO1 output

Bit8: DO2 output

Bit9: DO3 output

Bit10: DO4 output

Bit11: N/A

Bit12: N/A

Bit13: N/A

Bit14: N/A
Bit15: N/A

H19.03 Target value of position comparison 2

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:
-2147483648–2147483647

Description
-

H19.05 Attribute value of position comparison 2

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:
bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A

Description
See H19.02.

H19.06 Target value of position comparison 3

Address: -	Effective	Real time
	Time:	
Min.: -2147483648	Unit:	-
Max.: 2147483647	Data Type:	Int32
Default: 0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.08 Attribute value of position comparison 3

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 65535	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.09 Target value of position comparison 4

Address: -	Effective	Real time
	Time:	

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.11 Attribute value of position comparison 4

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.12 Target value of position comparison 5

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.14 Attribute value of position comparison 5

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 65535	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.15 Target value of position comparison 6

Address: -	Effective	Real time
	Time:	
Min.: -2147483648	Unit:	-
Max.: 2147483647	Data Type:	Int32
Default: 0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.17 Attribute value of position comparison 6

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.18 Target value of position comparison 7

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.20 Attribute value of position comparison 7

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 65535	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.21 Target value of position comparison 8

Address: -	Effective	Real time
	Time:	
Min.: -2147483648	Unit:	-
Max.: 2147483647	Data Type:	Int32
Default: 0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.23 Attribute value of position comparison 8

Address: -	Effective	Real time
	Time:	

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.24 Target value of position comparison 9

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.26 Attribute value of position comparison 9

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.27 Target value of position comparison 10

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.29 Attribute value of position comparison 10

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A

Description

See H19.02.

H19.30 Target value of position comparison 11

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.32 Attribute value of position comparison 11

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.33 Target value of position comparison 12

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.35 Attribute value of position comparison 12

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A

Description

See H19.02.

H19.36 Target value of position comparison 13

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.38 Attribute value of position comparison 13

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.39 Target value of position comparison 14

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.41 Attribute value of position comparison 14

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

- bit0: Current position changes from "less than" to "more than" the comparison point
- bit1: Current position changes from "more than" to "less than" the comparison point
- bit2: N/A
- bit3: N/A
- bit4: N/A
- bit5: N/A
- bit6: N/A
- bit7: DO1 output
- bit8: DO2 output
- bit9: DO3 output
- bit10: DO4 output
- bit11: N/A
- bit12: N/A
- bit13: N/A
- bit14: N/A
- bit15: N/A

Description

See H19.02.

H19.42 Target value of position comparison 15

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.44 Attribute value of position comparison 15

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.45 Target value of position comparison 16

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.47 Attribute value of position comparison 16

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A
Description
See H19.02.

H19.48 Target value of position comparison 17

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:
-2147483648–2147483647
Description
-

H19.50 Attribute value of position comparison 17

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.51 Target value of position comparison 18

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.53 Attribute value of position comparison 18

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A

Description
See H19.02.

H19.54 Target value of position comparison 19

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:
-2147483648–2147483647

Description
-

H19.56 Attribute value of position comparison 19

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.57 Target value of position comparison 20

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.59 Attribute value of position comparison 20

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A
Description
See H19.02.

H19.60 Target value of position comparison 21

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:
-2147483648–2147483647
Description
-

H19.62 Attribute value of position comparison 21

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.63 Target value of position comparison 22

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.65 Attribute value of position comparison 22

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A

Description

See H19.02.

H19.66 Target value of position comparison 23

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.68 Attribute value of position comparison 23

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.69 Target value of position comparison 24

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.71 Attribute value of position comparison 24

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A
Description
See H19.02.

H19.72 Target value of position comparison 25

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:
-2147483648–2147483647
Description
-

H19.74 Attribute value of position comparison 25

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.75 Target value of position comparison 26

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.77 Attribute value of position comparison 26

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A
Description
See H19.02.

H19.78 Target value of position comparison 27

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:
-2147483648–2147483647
Description
-

H19.80 Attribute value of position comparison 27

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.81 Target value of position comparison 28

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.83 Attribute value of position comparison 28

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A
Description
See H19.02.

H19.84 Target value of position comparison 29

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately
Value Range: -2147483648–2147483647			
Description -			

H19.86 Attribute value of position comparison 29

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately
Value Range:			

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.87 Target value of position comparison 30

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.89 Attribute value of position comparison 30

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A
Description
See H19.02.

H19.90 Target value of position comparison 31

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:
-2147483648–2147483647
Description
-

H19.92 Attribute value of position comparison 31

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.93 Target value of position comparison 32

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.95 Attribute value of position comparison 32

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A
Description
See H19.02.

H19.96 Target value of position comparison 33

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:
-2147483648–2147483647
Description
-

H19.98 Attribute value of position comparison 33

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.99 Target value of position comparison 34

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.101 Attribute value of position comparison 34

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0:	Current position changes from "less than" to "more than" the comparison point
bit1:	Current position changes from "more than" to "less than" the comparison point
bit2:	N/A
bit3:	N/A
bit4:	N/A
bit5:	N/A
bit6:	N/A
bit7:	DO1 output
bit8:	DO2 output
bit9:	DO3 output
bit10:	DO4 output
bit11:	N/A
bit12:	N/A
bit13:	N/A
bit14:	N/A
bit15:	N/A
Description	
See H19.02.	

H19.102 Target value of position comparison 35

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately
Value Range:			
-2147483648–2147483647			
Description			
-			

H19.104 Attribute value of position comparison 35

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately
Value Range:			

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.105 Target value of position comparison 36

Address: -	Effective	Real time
	Time:	
Min.: -2147483648	Unit:	-
Max.: 2147483647	Data Type:	Int32
Default: 0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.107 Attribute value of position comparison 36

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 65535	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A
Description
See H19.02.

H19.108 Target value of position comparison 37

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:
-2147483648–2147483647
Description
-

H19.110 Attribute value of position comparison 37

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.111 Target value of position comparison 38

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.113 Attribute value of position comparison 38

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A
Description
See H19.02.

H19.114 Target value of position comparison 39

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:
-2147483648–2147483647
Description
-

H19.116 Attribute value of position comparison 39

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point

bit1: Current position changes from "more than" to "less than" the comparison point

bit2: N/A

bit3: N/A

bit4: N/A

bit5: N/A

bit6: N/A

bit7: DO1 output

bit8: DO2 output

bit9: DO3 output

bit10: DO4 output

bit11: N/A

bit12: N/A

bit13: N/A

bit14: N/A

bit15: N/A

Description

See H19.02.

H19.117 Target value of position comparison 40

Address: -	Effective	Real time
	Time:	
Min.: -2147483648	Unit:	-
Max.: 2147483647	Data Type:	Int32
Default: 0	Change:	Immediately

Value Range:

-2147483648–2147483647

Description

-

H19.119 Attribute value of position comparison 40

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 65535	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

bit0: Current position changes from "less than" to "more than" the comparison point
bit1: Current position changes from "more than" to "less than" the comparison point
bit2: N/A
bit3: N/A
bit4: N/A
bit5: N/A
bit6: N/A
bit7: DO1 output
bit8: DO2 output
bit9: DO3 output
bit10: DO4 output
bit11: N/A
bit12: N/A
bit13: N/A
bit14: N/A
bit15: N/A
Description
See H19.02.

5.17 H1F Software Tool Parameters

H1F.90 DI function state 1 read through communication

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Bit 0 corresponds to DI function 1.
Bit 1 corresponds to DI function 2.
Bit 2 corresponds to DI function 3.
...
By analogy

H1F.91 DI function state 2 read through communication

Address:	-	Effective	Real time
		Time:	

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Bit 0 corresponds to DI function 17.

Bit 1 corresponds to DI function 18.

Bit 2 corresponds to DI function 19.

...

By analogy

H1F.92 DI function state 3 read through communication

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Bit 0 corresponds to DI function 33.

Bit 1 corresponds to DI function 34.

Bit 2 corresponds to DI function 35.

...

By analogy

H1F.93 DI function state 4 read through communication

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Bit 0 corresponds to DI function 49.

Bit 1 corresponds to DI function 50.

Bit 2 corresponds to DI function 51.

...

By analogy

H1F.94 DO function state 1 read through communication

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 65535	Data Type:	UInt16
Default: 0	Change:	Unchangeable

Value Range:

0–65535

Description

Bit 0 corresponds to DO function 1.

Bit 1 corresponds to DO function 2.

Bit 2 corresponds to DO function 3.

...

By analogy

H1F.95 DO function state 2 read through communication

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 65535	Data Type:	UInt16
Default: 0	Change:	Unchangeable

Value Range:

0–65535

Description

Bit 0 corresponds to DO function 17.

Bit 1 corresponds to DO function 18.

Bit 2 corresponds to DO function 19.

...

By analogy

5.18 H30 Related Variables Read through Communication

H30.00 Servo status read through communication

Address: -	Effective	-
	Time:	
Min.: 0	Unit:	-
Max.: 65535	Data Type:	UInt16
Default: 0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H30.01 DO function state 1 read through communication

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Bit 0 corresponds to DO function 1.

Bit 1 corresponds to DO function 2.

Bit 2 corresponds to DO function 3.

...

By analogy

H30.02 DO function state 2 read through communication

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Bit 0 corresponds to DO function 17.

Bit 1 corresponds to DO function 18.

Bit 2 corresponds to DO function 19.

...

By analogy

5.19 H31 Communication Setting**H31.04 DO state set through communication**

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16

Default: 0

Change: Immediately

Value Range:

0–65535

Description

Set H04.22 to define the DO state source by H31.04.

H31.05 AO set through communication

Address: -

Effective Real time

Time:

Min.: -10000

Unit: mV

Max.: 10000

Data Type: Int16

Default: 0

Change: Immediately

Value Range:

-10000 mV to 10000 mV

Description

Set H04.50 to 10 to define AO through H31.05 (in mV).

H31.09 Speed reference set through communication

Address: -

Effective Real time

Time:

Min.: -9999

Unit: rpm

Max.: 9999.000

Data Type: Int32

Default: 0.000

Change: Immediately

Value Range:

-9999.000rpm to 9999.000rpm

Description

Set H06.02 to 4 to define the speed reference in the speed control mode through H31.09 (unit: 0.001 rpm).

H31.11 Torque reference set through communication

Address: -

Effective Real time

Time:

Min.: -100

Unit: %

Max.: 100.000

Data Type: Int32

Default: 0.000

Change: Immediately

Value Range:

-100.000% to 100.000%

Description

Set H07.02 to 4 to define the torque reference in the torque control mode through H31.11 (unit: 0.001%). The setpoint 100.000% corresponds to the rated torque of the motor.

5.20 1000h Object Dictionary

1000.00h Device type

Address:	-	Effective	-
Min.:	0	Time:	
Max.:	65535	Unit:	-
Default:	0	Data Type:	UInt16
Value Range:		Change:	Unchangeable
0–65535			
Description			
-			

1001.00h Error Register

Address:	-	Effective	-
Min.:	0	Time:	
Max.:	255	Unit:	-
Default:	0	Data Type:	UInt16
Value Range:		Change:	Unchangeable
0–255			
Description			
-			

1018.01h Vendor ID

Address:	-	Effective	-
Min.:	0	Time:	
Max.:	65535	Unit:	-
Default:	0	Data Type:	UInt32
Value Range:		Change:	Unchangeable
0–65535			
Description			
-			

1018.02h Product Code

Address:	-	Effective	-
Min.:	0	Time:	
Max.:	65535	Unit:	-
Default:	0	Data Type:	UInt32
Value Range:		Change:	Unchangeable

0–65535

Description

-

1018.03h Revision

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

1600.00h Number of valid mapped objects in RPDO1

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	3	Change:	Immediately

Value Range:

0–20

Description

This object can be modified only when PDO is inactive. When 0 is written, the mapping objects of other sub-indexes are cleared.

1600.01h Mapped object 1 in RPDO1

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1614807040	Change:	Immediately

Value Range:

0–2147483647

Description

The total length of a mapping object cannot exceed 64 bits. Mapping based on bytes instead of bits is supported. The indexes and sub-indexes of mapping objects must exist in the object dictionary list. The attribute of mapping objects is readable and the objects can be mapped.

Sub-indexes are written in the following format:

bit31 to bit16: index

bit15 to bit8: sub-index
bit7 to bit0: object length

1600.02h Mapped object 2 in RPDO1

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 1618608128

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1600.01h.

1600.03h Mapped object 3 in RPDO1

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 1622671360

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1600.01h.

1600.04h Mapped object 4 in RPDO1

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1600.01h.

1600.05h Mapped object 5 in RPDO1

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Value Range:
0–2147483647

Description
Same as 1600.01h.

Change:

Immediately

1600.06h Mapped object 6 in RPDO1

Address: -

Min.: 0

Max.: 2147483647

Default: 0

Value Range:
0–2147483647

Description
Same as 1600.01h.

Effective -

Time:

Unit: -

Data Type: UInt32

Change: Immediately

1600.07h Mapped object 7 in RPDO1

Address: -

Min.: 0

Max.: 2147483647

Default: 0

Value Range:
0–2147483647

Description
Same as 1600.01h.

Effective -

Time:

Unit: -

Data Type: UInt32

Change: Immediately

1600.08h Mapped object 8 in RPDO1

Address: -

Min.: 0

Max.: 2147483647

Default: 0

Value Range:
0–2147483647

Description
Same as 1600.01h.

Effective -

Time:

Unit: -

Data Type: UInt32

Change: Immediately

1600.09h Mapped object 9 in RPDO1

Address: -

Effective -

Time:

Min.: 0
Max.: 2147483647
Default: 0

Unit: -
Data Type: UInt32
Change: Immediately

Value Range:

0–2147483647

Description

Same as 1600.01h.

1600.0Ah Mapped object 10 in RPDO1

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1600.01h.

1600.0Bh Mapped object 11 in RPDO1

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1600.01h.

1600.0Ch Mapped object 12 in RPDO1

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1600.01h.

**1600.0D- Mapped object 13 in RPDO1
h**

Address:	-	Effective	-
Min.:	0	Time:	
Max.:	2147483647	Unit:	-
Default:	0	Data Type:	UInt32
		Change:	Immediately

Value Range:
0–2147483647

Description
Same as 1600.01h.

1600.0Eh Mapped object 14 in RPDO1

Address:	-	Effective	-
Min.:	0	Time:	
Max.:	2147483647	Unit:	-
Default:	0	Data Type:	UInt32
		Change:	Immediately

Value Range:
0–2147483647

Description
Same as 1600.01h.

1600.0Fh Mapped object 15 in RPDO1

Address:	-	Effective	-
Min.:	0	Time:	
Max.:	2147483647	Unit:	-
Default:	0	Data Type:	UInt32
		Change:	Immediately

Value Range:
0–2147483647

Description
Same as 1600.01h.

1600.10h Mapped object 16 in RPDO1

Address:	-	Effective	-
Min.:	0	Time:	
Max.:	2147483647	Unit:	-
Default:	0	Data Type:	UInt32
		Change:	Immediately

Value Range:
0–2147483647

Description

Same as 1600.01h.

1600.11h Mapped object 17 in RPDO1

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1600.01h.

1600.12h Mapped object 18 in RPDO1

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1600.01h.

1600.13h Mapped object 19 in RPDO1

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1600.01h.

1600.14h Mapped object 20 in RPDO1

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1600.01h.

1A00.00h Number of valid mapping objects of TPD01

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 20

Data Type: UInt16

Default: 7

Change: Immediately

Value Range:

0–20

Description

This object can be modified only when PDO is inactive. When 0 is written, the mapping objects of other sub-indexes are cleared.

1A00.01h Mapped object 1 in TPD01

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 1614872576

Change: Immediately

Value Range:

0–2147483647

Description

The total length of a mapping object cannot exceed 64 bits. Mapping based on bytes instead of bits is supported. The indexes and sub-indexes of mapping objects must exist in the object dictionary list. The attribute of mapping objects is readable and the objects can be mapped.

Sub-indexes are written in the following format:

bit31 to bit16: index

bit15 to bit8: sub-index

bit7 to bit0: object length

1A00.02h Mapped object 2 in TPD01

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 1617166336

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.03h Mapped object 3 in TPD01

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 1622736896

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.04h Mapped object 4 in TPD01

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 1622802432

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.05h Mapped object 5 in TPD01

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 1622933504

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.06h Mapped object 6 in TPD01

Address: -

Effective -

Time:

Min.: 0
Max.: 2147483647
Default: 1614741504

Unit: -
Data Type: UInt32
Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.07h Mapped object 7 in TPD01

Address: -

Effective -

Time:

Min.: 0
Max.: 2147483647
Default: 1627193344

Unit: -
Data Type: UInt32
Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.08h Mapped object 8 in TPD01

Address: -

Effective -

Time:

Min.: 0
Max.: 2147483647
Default: 0

Unit: -
Data Type: UInt32
Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.09h Mapped object 9 in TPD01

Address: -

Effective -

Time:

Min.: 0
Max.: 2147483647
Default: 0

Unit: -
Data Type: UInt32
Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.0Ah Mapped object 10 in TPDO1

Address:	-	Effective	-
Min.:	0	Time:	
Max.:	2147483647	Unit:	-
Default:	0	Data Type:	UInt32
Value Range:		Change:	Immediately
0–2147483647			
Description			
Same as 1A00.01h.			

1A00.0Bh Mapped object 11 in TPDO1

Address:	-	Effective	-
Min.:	0	Time:	
Max.:	2147483647	Unit:	-
Default:	0	Data Type:	UInt32
Value Range:		Change:	Immediately
0–2147483647			
Description			
Same as 1A00.01h.			

1A00.0Ch Mapped object 12 in TPDO1

Address:	-	Effective	-
Min.:	0	Time:	
Max.:	2147483647	Unit:	-
Default:	0	Data Type:	UInt32
Value Range:		Change:	Immediately
0–2147483647			
Description			
Same as 1A00.01h.			

1A00.0Dh Mapped object 13 in TPDO1

Address:	-	Effective	-
Min.:	0	Time:	
Max.:	2147483647	Unit:	-
Default:	0	Data Type:	UInt32
		Change:	Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.0Eh Mapped object 14 in TPD01

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.0Fh Mapped object 15 in TPD01

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.10h Mapped object 16 in TPD01

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.11h Mapped object 17 in TPD01

Address: -

Effective -

Time:

Min.: 0
Max.: 2147483647
Default: 0

Unit: -
Data Type: UInt32
Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.12h Mapped object 18 in TPDO1

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.13h Mapped object 19 in TPDO1

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.14h Mapped object 20 in TPDO1

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1C12.00h Number of assigned PDOs

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt8
Default:	1	Change:	Immediately
Value Range:			
0–2			
Description			
-			

1C12.01h PDO mapping object index of assigned RxPDO1

Address:	-	Effective	-
		Time:	
Min.:	5632	Unit:	-
Max.:	5898	Data Type:	UInt16
Default:	0	Change:	Immediately
Value Range:			
5632–5898			
Description			
-			

1C12.02h PDO mapping object index of assigned RxPDO2

Address:	-	Effective	-
		Time:	
Min.:	5632	Unit:	-
Max.:	5898	Data Type:	UInt16
Default:	0	Change:	Immediately
Value Range:			
5632–5898			
Description			
-			

1C13.00h Number of assigned PDOs

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt8
Default:	0	Change:	Immediately
Value Range:			
0–2			

Description

-

1C13.01h PDO mapping object index of assigned TxPDO1

Address:	-	Effective	-
		Time:	
Min.:	6656	Unit:	-
Max.:	6922	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

6656–6922

Description

-

1C13.02h PDO mapping object index of assigned TxPDO1

Address:	-	Effective	-
		Time:	
Min.:	6656	Unit:	-
Max.:	6922	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

6656–6922

Description

-

1C32.01h Sync mode

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0–65535

Description

-

1C32.02h Cycle time

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32

Default: 0

Change: Immediately

Value Range:

0–4294967295

Description

-

1C32.04h Sync modes supported

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0–65535

Description

-

1C32.05h Minimum cycle time

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 4294967295

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–4294967295

Description

-

1C33.01h Sync mode

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0–65535

Description

-

1C33.02h Cycle time

Address: -

Effective -

Time:

Min.: 0
 Max.: 4294967295
 Default: 0

Unit: -
 Data Type: UInt32
 Change: Immediately

Value Range:

0–4294967295

Description

-

1C33.04h Sync modes supported

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Immediately

Value Range:

0–65535

Description

-

1C33.05h Minimum cycle time

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 4294967295

Data Type: UInt32

Default: 0

Change: Immediately

Value Range:

0–4294967295

Description

-

5.21 6000h Object Dictionary

Axis 2 object dictionary requires +0x800 offset.

Example: Axis 2 error code object dictionary: 603Fh + 0x800h = 683Fh

603Fh Error Code

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

When an error described in the DSP402 profile occurs on the servo drive, 603Fh is as described in DSP402.

When an error specified by the user occurs on the servo drive, 603Fh is 0xFF00.

The value of 603Fh is in hexadecimal.

In addition, the object dictionary 203Fh displays auxiliary bytes of fault codes in hexadecimal.

203Fh is a UInt32 value, in which the high 16 bits indicate the internal fault code of the manufacturer, and the low 16 bits indicate the external fault code of the manufacturer.

6040h Control word

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0–65535

Description

For details on the control word, see the Communication Guide.

6041h Status word

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

For details on the control word, see the Communication Guide.

605Ah Quick stop option code

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	7	Data Type:	Int16
Default:	2	Change:	At stop

Value Range:

- 0: Coast to stop, keeping de-energized state
- 1: Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized state
- 2: Ramp to stop as defined by 6085h, keeping de-energized state
- 3: Stop at emergency stop torque, keeping de-energized state
- 5: Ramp to stop as defined by 6084h/609Ah (HM), keeping position lock state
- 6: Ramp to stop as defined by 6085h, keeping position lock state
- 7: Stop at emergency stop torque, keeping position lock state

Description

- 0: Coast to stop, keeping de-energized state
- 1: Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized state
- 2: Ramp to stop as defined by 6085h, keeping de-energized state
- 3: Stop at emergency stop torque, keeping de-energized state
- 5: Ramp to stop as defined by 6084h/609Ah (HM), keeping position lock state
- 6: Ramp to stop as defined by 6085h, keeping position lock state
- 7: Stop at emergency stop torque, keeping position lock state

605Ch Stop mode at S-ON OFF

Address:	-	Effective	Real time
		Time:	
Min.:	-4	Unit:	-
Max.:	2	Data Type:	Int16
Default:	0	Change:	At stop

Value Range:

- 4: Ramp to stop as defined by 6085h, keeping dynamic braking state
- 3: at zero speed, keeping dynamic braking state
- 2: Ramp to stop as defined by 6084h/609Ah (HM), keeping dynamic braking state
- 1: Dynamic braking stop, keeping dynamic braking state
- 0: Coast to stop, keeping de-energized state
- 1: Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized state
- 2: Dynamic braking stop, keeping de-energized state

Description

- 4: Ramp to stop as defined by 6085h, keeping dynamic braking state
- 3: Stop at zero speed, keeping dynamic braking state
- 2: Ramp to stop as defined by 6084h/609Ah (HM), keeping dynamic braking state
- 1: Dynamic braking stop, keeping dynamic braking state
- 0: Coast to stop, keeping de-energized state
- 1: Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized status
- 2: Dynamic braking stop, keeping de-energized state

605Dh Stop option code

Address: -	Effective	Real time
	Time:	
Min.: 1	Unit:	-
Max.: 3	Data Type:	Int16
Default: 1	Change:	At stop

Value Range:

- 1: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping position lock state
- 2: Ramp to stop as defined by 6085h, keeping position lock state
- 3: Stop at emergency stop torque, keeping position lock state

Description

Defines the halt mode.

Defines the deceleration mode of the motor for stopping rotating upon halt and the motor status after stop.

PP/PV/HM mode:

Setpoint	Stop Mode
1	Ramp to stop as defined by 6084h/609Ah (HM), keeping position lock status
2	Ramp to stop as defined by 6085h, keeping position lock status
3	Stop at emergency-stop torque, keeping position lock status

PT mode:

Setpoint	Stop Mode
1/2/3	Ramp to stop as defined by 6087h, keeping position lock status

605Eh Stop mode at No.2 fault

Address: -	Effective	Real time
	Time:	
Min.: -5	Unit:	-
Max.: 4	Data Type:	Int16
Default: 2	Change:	At stop

Value Range:

- 5: Stop at zero speed, keeping dynamic braking state
- 4: Stop at emergency stop torque, keeping dynamic braking state
- 3: Ramp to stop as defined by 6085h, keeping dynamic braking state
- 2: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping dynamic braking state
- 1: Dynamic braking stop, keeping dynamic braking state
- 0: Coast to stop, keeping de-energized state
- 1: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping de-energized state
- 2: Ramp to stop as defined by 6085h, keeping de-energized state
- 3: Stop at emergency stop torque, keeping de-energized state
- 4: Dynamic braking stop, keeping de-energized state

Description

- 5: Stop at zero speed, keeping dynamic braking state
- 4: Stop at emergency stop torque, keeping dynamic braking state
- 3: Ramp to stop as defined by 6085h, keeping dynamic braking state
- 2: Ramp to stop as defined by 6084h/609Ah (HM), keeping dynamic braking state
- 1: Dynamic braking stop, keeping dynamic braking state
- 0: Coast to stop, keeping de-energized state
- 1: Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized state
- 2: Ramp to stop as defined by 6085h, keeping de-energized state
- 3: Stop at emergency stop torque, keeping de-energized state
- 4: Dynamic braking stop, keeping de-energized state

6060h Modes of operation

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	10	Unit:	-
Default:	0	Data Type:	UInt16
		Change:	Immediately

Value Range:

- 1: Profile position (PP) mode
- 3: Profile velocity (PV) mode
- 4: Profile torque (PT) mode
- 6: Homing (HM) mode
- 8: CSP mode
- 9: CSV mode
- 10: CST mode

Description

Defines the servo drive operation mode.

- 1: Profile position (PP) mode
- 3: Profile velocity (PV) mode
- 4: Profile torque (PT) mode
- 6: Homing (HM) mode
- 8: CSP mode
- 9: CSV mode
- 10: CST mode
- Other: N/A

If an unsupported operation mode is selected through an SDO, an SDO error will be returned.

If an unsupported operation mode is selected through a PDO, the change of the operation mode will be invalid.

6061h Operation mode display

Address: -	Effective -
	Time:
Min.: 0	Unit: -
Max.: 10	Data Type: UInt16
Default: 0	Change: Unchangeable

Value Range:

- 1: Profile position (PP) mode
- 3: Profile velocity (PV) mode
- 4: Profile torque (PT) mode
- 6: Homing (HM) mode
- 8: CSP mode
- 9: CSV mode
- 10: CST mode

Description

Indicates the actual operation mode.

- 1: Profile position (PP) mode
- 3: Profile velocity (PV) mode
- 4: Profile torque (PT) mode
- 6: Homing (HM) mode
- 8: CSP mode
- 9: CSV mode
- 10: CST mode

6062h Position reference

Address: -	Effective -
	Time:
Min.: -2147483648	Unit: Reference unit
Max.: 2147483647	Data Type: Int32

Default: 0

Change: Unchangeable

Value Range:

-2147483648 to 2147483647

Description

Indicates the real-time position reference (reference unit).

6063h Position actual value

Address: -

Effective -

Time:

Min.: -2147483648

Unit: Encoder unit

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Unchangeable

Value Range:

-2147483648 to 2147483647

Description

Indicates the absolute position feedback (encoder unit) of the motor in real time.

6064h Position actual value

Address: -

Effective -

Time:

Min.: -2147483648

Unit: Reference unit

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Unchangeable

Value Range:

-2147483648 to 2147483647

Description

Indicates the absolute position feedback (reference unit) in real time.

Position actual value in user-defined unit (6064h) x Gear ratio (6091h) = Position actual value in encoder unit (6063h)

6065h Following error window

Address: -

Effective Real time

Time:

Min.: 0

Unit: Reference unit

Max.: 4294967295

Data Type: UInt32

Default: 219895608

Change: Immediately

Value Range:

0 to 4294967295

Description

Defines the threshold of excessive position deviation (reference unit).
When the difference value between position demand value (6062h) and position actual value (6064h) keeps exceeding $\pm 6065h$ after the time defined by 6066h elapses, B00.0 (Position deviation too large) occurs.

6066h Following error time out

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	ms
Max.: 65535	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0 ms to 65535 ms

Description

Defines the time lapse to trigger excessive position deviation (EB00.0), which must be used together with 6065h.

6067h Position window

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	Reference unit
Max.: 4294967295	Data Type:	UInt32
Default: 46976	Change:	Immediately

Value Range:

0 to 4294967295

Description

Defines the threshold for position reach.

If the difference between 6062h and 6064h is within $\pm 6067h$ and the time reaches 6068h, the position is reached. In this case, bit 10 of 6041h is set to 1 in the profile position mode.

This flag bit is meaningful only when the S-ON signal is active in the profile position mode.

6068h Position window time

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	ms
Max.: 65535	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0 ms to 65535 ms

Description

Defines the window time for position reach, which must be used together with 6067h.

606Ch Actual speed

Address:	-	Effective	-
		Time:	
Min.:	-2147483648	Unit:	Reference unit/s
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Indicates the velocity actual value.

606Dh Velocity window

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	rpm
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	Immediately

Value Range:

0rpm-65535rpm

Description

Defines the threshold for speed reach.

If the difference value between the target speed 60FFh and the actual speed 606Ch is within $\pm 606Dh$ and the time reaches 606Eh, the speed is reached and bit 10 of the status word 6041h is set to 1 in the profile velocity (PV) mode.

This flag bit is meaningful only when the servo drive is enabled in PV mode.

606Eh Velocity window time

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0 ms to 65535 ms

Description

Defines the time window for speed reach, which must be used together with 606Dh.

606Fh Velocity threshold

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	rpm
Max.: 65535	Data Type:	UInt16
Default: 10	Change:	Immediately

Value Range:

0rpm–65535rpm

Description

Defines the threshold for determining whether the user velocity is 0.

When 606Ch is within $\pm 606Fh$ and the time reaches the value set by 6070h, the user velocity is 0. When either condition is not met, the user velocity is not 0.

This flag bit is meaningful only in the profile velocity mode.

This flag bit is unrelated to the enable/disable state of the servo drive.

6070h Velocity threshold time

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	ms
Max.: 65535	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0 ms to 65535 ms

Description

Defines the time window for determining whether the user velocity is 0, which must be used together with 606Fh.

6071h Target torque

Address: -	Effective	Real time
	Time:	
Min.: -4000	Unit:	-
Max.: 4000	Data Type:	Int16
Default: 0	Change:	Immediately

Value Range:

-4000–4000

Description

Defines the target torque of the servo drive in the profile torque mode.

The value 1000 corresponds to the rated torque of the motor.

6072h Max. torque

Address: -	Effective	Real time
	Time:	

Min.:	0	Unit:	-
Max.:	4000	Data Type:	UInt16
Default:	3500	Change:	Immediately

Value Range:

0—4000

Description

Defines the maximum torque reference limit.

The value 1000 corresponds to the rated torque of the motor.

6074h Torque reference

Address:	-	Effective	-
		Time:	
Min.:	-4000	Unit:	-
Max.:	4000	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-4000—4000

Description

Defines the target torque value.

The value 1000 corresponds to the rated torque of the motor.

6077h Torque actual value

Address:	-	Effective	-
		Time:	
Min.:	-4000	Unit:	-
Max.:	4000	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-4000—4000

Description

Indicates the internal torque feedback of the servo drive.

The value 1000 corresponds to the rated torque of the motor.

607Ah Target position

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648 to 2147483647

Description

Defines the target position of the servo drive in the profile position mode.

When bit 6 of 6040h is set to 0, 607Ah indicates the absolute target position of current segment.

After positioning of current segment is done, the value of 6064h will be the same as the value of 607Ah.

When bit 6 of 6040h is set to 1, 607Ah indicates the target increment displacement of current segment.

After positioning of current segment is done, user displacement increment will be the same as the value of 607Ah.

607Ch Home offset

Address:	-	Effective	At stop
		Time:	
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

-2147483648 to 2147483647

Description

Defines the physical location of mechanical zero that deviates from the home of the motor in position control modes (profile position mode, interpolation mode, and homing mode).

The home offset takes effect in the following conditions: The device is powered on, the homing operation is complete, and bit15 of 6041h is set to 1.

After homing is done, the position actual value (6064h) will be the same as the value of 607Ch.

If 607Ch is beyond the value of 607Dh (Software position limit), E09.1 occurs (Home setting error).

**607D.01- Min. position limit
h**

Address:	-	Effective	Real time
		Time:	
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	-2147483648	Change:	Immediately

Value Range:

-2147483648 to 2147483647

Description

Defines the minimum software position limit relative to the mechanical zero point.

Minimum software position limit = (607D.01h)

The software position limit is used to judge the absolute position. When homing is not performed, the internal software position limit is invalid.

The condition for activating the software position limit is set in H0A.01 (object dictionary 0x200A.02h).

607D.02- Max. position limit h

Address: -	Effective	Real time
	Time:	
Min.: -2147483648	Unit:	Reference unit
Max.: 2147483647	Data Type:	Int32
Default: 2147483647	Change:	Immediately

Value Range:

-2147483648 to 2147483647

Description

Defines the maximum software position limit relative to the mechanical zero.

Maximum software position limit = (607D.02h)

607Eh Reference polarity

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	-
Max.: 127	Data Type:	UInt16
Default: 0	Change:	Immediately

Value Range:

0–127

Description

Defines the polarity of position or speed references.

When bit 7 is 1, it indicates the position reference is multiplied by "–1" and the motor direction is reversed in the standard position mode or interpolation mode.

When bit 6 is 1, it indicates the speed reference (60FFh) is multiplied by "–1" and the motor direction is reversed in the speed mode.

When bit 5 is 1, it indicates the torque demand value (6071h) is multiplied by "–1" and the motor direction is reversed in the torque mode.

Other bits are meaningless.

607Fh Max. profile velocity

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	Reference unit/s

Max.: 4294967295

Data Type: UInt32

Default: 4294967295

Change: Immediately

Value Range:

0 to 4294967295

Description

Defines the maximum user running speed.

Set a proper gear ratio (8:1 recommended) when using a 26-bit encoder.

Otherwise, the motor speed will be limited to 3840 RPM.

6081h Profile velocity

Address: -

Effective Real time

Time:

Min.: 0

Unit: Reference unit/s

Max.: 4294967295

Data Type: UInt32

Default: 111848106

Change: Immediately

Value Range:

0 to 4294967295

Description

Defines the constant running speed of the displacement reference in the profile position mode.

The set value takes effect after the slave receives the displacement reference.

6083h Profile acceleration

Address: -

Effective Real time

Time:

Min.: 0

Unit: Reference unit/s²

Max.: 4294967295

Data Type: UInt32

Default: 4294967295

Change: Immediately

Value Range:

0 to 4294967295

Description

Defines the acceleration of the displacement reference in the profile position mode.

The following formula applies if a motor equipped with 23-bit encoder needs to run at 400 RPM (6081h: $400 \times 8388608/60$) with acceleration rate being 400 RPM/s (6083h: $400 \times 8388608/60$) and deceleration rate being 200 RPM/s (6084h: $200 \times 8388608/60$) under a gear ratio of 1:1:

Acceleration time $t_{up} = \Delta 6081h / \Delta 6083h = 1$ (s); Deceleration time $t_{down} = \Delta 6081h / \Delta 6084h = 2$ (s).

For 609Ah, the setpoint 0 will be forcibly changed to 1.

6084h Profile deceleration

Address: -	Effective	Real time
Min.: 0	Time:	
Max.: 4294967295	Unit:	Reference unit/s ²
Default: 4294967295	Data Type:	UInt32
	Change:	Immediately

Value Range:

0 to 4294967295

Description

Defines the deceleration rate in the deceleration stage of the displacement reference in the profile position mode.

The following formula applies if a motor equipped with 23-bit encoder needs to run at 400 RPM (6081h: $400 \times 8388608/60$) with acceleration rate being 400 RPM/s (6083h: $400 \times 8388608/60$) and deceleration rate being 200 RPM/s (6084h: $200 \times 8388608/60$) under a gear ratio of 1:1:

Acceleration time $t_{up} = \Delta 6081h / \Delta 6083h = 1$ (s); Deceleration time $t_{down} = \Delta 6081h / \Delta 6084h = 2$ (s).

For 609Ah, the setpoint 0 will be forcibly changed to 1.

6085h Quick stop deceleration

Address: -	Effective	Real time
Min.: 0	Time:	
Max.: 4294967295	Unit:	Reference unit/s ²
Default: 2147483647	Data Type:	UInt32
	Change:	Immediately

Value Range:

0 to 4294967295

Description

Defines the deceleration rate when the quick stop command (6040h = 0x0002) is active and 605Ah (Quick stop option code) is set to 2 or 5.

For 609Ah, the setpoint 0 will be forcibly changed to 1.

6087h Torque slope

Address: -	Effective	Real time
Min.: 0	Time:	
Max.: 4294967295	Unit:	-
Default: 4294967295	Data Type:	UInt32
	Change:	Immediately

Value Range:

0–4294967295

Description

Defines the acceleration (torque increment per second) of the torque reference in profile torque mode, indicating the torque reference increment per second.

In the profile torque mode, if 605Ah is set to 1, 2, 5, or 6, or 605Dh 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.

The setting value 0 will be forcibly changed into 1.

6091.01h Motor revolutions

Address: -	Effective	Real time
	Time:	
Min.: 1	Unit:	-
Max.: 4294967295	Data Type:	UInt32
Default: 1	Change:	At stop

Value Range:

1–4294967295

Description

Defines the numerator of the gear ratio.

Defines the proportional relation between the load shaft displacement designated by the user and the motor shaft displacement.

The relation between motor position feedback (encoder unit) and load shaft position feedback (reference unit) is as follows.

Motor position feedback = Load shaft position feedback x Gear ratio

The relation between the motor speed (RPM) and the load shaft speed (reference unit/s) is as follows.

Motor speed (RPM) = Load shaft speed * 6091h * 60/Encoder resolution

The relation between the motor acceleration (RPM/ms) and the load shaft acceleration (reference unit/s²) is as follows.

Motor acceleration (RPM/ms) = Load shaft acceleration * 6091h * 1000 / Encoder resolution / 60

6091.02h Shaft revolutions

Address: -	Effective	Real time
	Time:	
Min.: 1	Unit:	-
Max.: 4294967295	Data Type:	UInt32
Default: 1	Change:	At stop

Value Range:

1–4294967295

Description

Defines the denominator of the gear ratio.

6098h Homing method

Address: -	Effective	Real time
	Time:	
Min.: -2	Unit:	-
Max.: 35	Data Type:	Int16
Default: 1	Change:	Immediately

Value Range:

-2–35

Description

Defines the homing method.

-2 Forward, positive mechanical limit as deceleration point and Z signal as home.

-1 Reverse, negative mechanical limit as deceleration point and Z signal as home.

1 Reverse, negative limit switch as deceleration point and Z signal as home, falling edge of the negative limit switch signal must be reached before Z signal.

2 Forward, positive limit switch as deceleration point and Z signal as home, falling edge of positive limit switch signal must be reached before Z signal.

3 Forward, home switch as deceleration point and Z signal as home, falling edge on the same side of the home switch signal must be reached before Z signal.

4 Reverse, home switch as deceleration point and Z signal as home, rising edge on the same side of the home switch signal must be reached before Z signal.

5 Reverse, home switch as deceleration point and Z signal as home, falling edge on the same side of the home switch signal must be reached before Z signal.

6 Forward, home switch as deceleration point and Z signal as home, rising edge on the same side of the home switch signal must be reached before Z signal.

7 Forward, home switch as deceleration point and Z signal as home, falling edge on the same side of the home switch signal must be reached before Z signal.

8 Forward, home switch as deceleration point and Z signal as home, rising edge on the same side of the home switch signal must be reached before Z signal.

9 Forward, home switch as deceleration point and Z signal as home, rising edge on the other side of the home switch signal must be reached before Z signal.

10 Forward, home switch as deceleration point and Z signal as home, falling edge on the other side of the home switch signal must be reached before Z signal.

11 Reverse, home switch as deceleration point and Z signal as home, falling edge on the same side of the home switch signal must be reached before Z signal.

12 Reverse, home switch as deceleration point and Z signal as home, rising edge on the same side of the home switch signal must be reached before Z signal.

13 Reverse, home switch as deceleration point and Z signal on the other side of the home switch signal as home,
rising edge on the other side of the home switch signal must be reached before Z signal.

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

17–32 are similar to 1–14 except that the deceleration point coincides with the home.

33 Reverse, Z signal as home.

34 Forward, Z signal as home.

Current position as the home

When 6098h is set to 15, 16, 31 or 32, it is meaningless and the servo drive does not perform the homing operation.

6099.01h Speed during search for switch

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	Reference unit/s
Max.: 4294967295	Data Type:	UInt32
Default: 111848106	Change:	At stop

Value Range:

0 to 4294967295

Description

Defines the speed during search for the deceleration point signal. A large setpoint helps prevent E601.0 (Homing timeout).

6099.02h Speed during search for zero

Address: -	Effective	Real time
	Time:	
Min.: 0	Unit:	Reference unit/s
Max.: 4294967295	Data Type:	UInt32
Default: 11184810	Change:	At stop

Value Range:

0 to 4294967295

Description

Defines the speed in searching for the home signal. Setting this speed to a low value prevents overshoot during stop at high speed, avoiding excessive deviation between the stop position and the set mechanical home.

609Ah Homing acceleration

Address: -

Effective Real time

Time:

Min.: 0

Unit: Reference unit/s²

Max.: 4294967295

Data Type: UInt32

Default: 4294967295

Change: Immediately

Value Range:

0 to 4294967295

Description

Defines the acceleration rate in the homing mode.

60B0h Position offset

Address: -

Effective Real time

Time:

Min.: -2147483648

Unit: Reference unit

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Immediately

Value Range:

-2147483648 to 2147483647

Description

-

60B1h Velocity offset

Address: -

Effective Real time

Time:

Min.: -2147483648

Unit: Reference unit/s

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Immediately

Value Range:

-2147483648 to +2147483647

Description

-

60B2h Torque offset

Address: -

Effective Real time

Time:

Min.: -4000

Unit: -

Max.: 4000

Data Type: Int16

Default: 0

Change: Immediately

Value Range:

-4000—4000

Description

-

60B8h Touch probe function

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Immediately

Value Range:

0–65535

Description

Defines the functions of touch probe 1 and touch probe 2.
For absolute encoders, Z signal refers to the zero point of the single-turn position feedback.
See the following table for descriptions of each bit of 60B8.

bit	Description	Description
0	Touch probe 1 function selection 0: Disabled 1: Enabled	bit0 to bit5: settings related to touch probe 1 When a DI is used to trigger the touch probe function, the DI source is non-modifiable once the touch probe function is enabled. For an absolute encoder, Z signal refers to the zero point of the single-turn position feedback.
1	Touch probe 1 trigger mode: 0: Single trigger mode (Latches the position at the first trigger event.) 1: Continuous trigger mode	
2	Touch probe 1 trigger signal selection: 0: DI input signal 1: Z signal	
3	N/A	
4	Touch probe 1 positive edge 0: Latching at positive edge disabled 1: Latching at positive edge enabled	
5	Touch probe 1 negative edge 0: Latching at negative edge disabled 1: Latching at negative edge enabled	
6–7	N/A	bit8 to bit13: settings related to touch probe 2
8	Touch probe 2 function selection 0: Disabled 1: Enabled	
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: 0: DI input signal 1: Z signal	
11	N/A	
12	Touch probe 2 positive edge: 0: Latching at positive edge disabled 1: Latching at positive edge enabled	
13	Touch probe 2 negative edge: 0: Latching at negative edge disabled 1: Latching at negative edge enabled	
14–15	N/A	-

60B9h Touch probe status

Address: -

Effective -

Time:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

Indicates the status of touch probe 1 and touch probe 2.

bit	Description	Description
0	Touch probe 1 function selection 0: Disabled 1: Enabled	bit0 to bit7: status of touch probe 1
1	Touch probe 1 positive edge value: 0: No positive edge value latched 1: Edge value latched	
2	Touch probe 1 negative edge value: 0: No negative edge value latched 1: Negative edge value latched	
3–5	N/A	-
6–7	When the function of probe 1 is selected as continuous sampling, the total number of times the probe is triggered	When the function of probe 1 is selected as continuous sampling, the total number of times (0–3) the probe is triggered
8	Touch probe 2 function selection 0: Disabled 1: Enabled	bit8 to bit10: status of touch probe 2
9	Touch probe 2 positive edge value: 0: No positive edge value latched 1: Edge value latched	
10	Touch probe 2 negative edge value: 0: No negative edge value latched 1: Negative edge value latched	

bit	Description	Description
11–13	N/A	-
14–15	When the function of probe 2 is selected as continuous sampling, the total number of times the probe is triggered	When the function of probe 2 is selected as continuous sampling, the total number of times (0–3) the probe is triggered

60BAh Touch probe 1 positive edge

Address: -

Effective -

Time:

Min.: -2147483648

Unit: Reference unit

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Unchangeable

Value Range:

-2147483648 to 2147483647

Description

Indicates the position feedback value (reference unit) latched at positive edge of touch probe 1 signal.

60BBh Touch probe 1 negative edge

Address: -

Effective -

Time:

Min.: -2147483648

Unit: Reference unit

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Unchangeable

Value Range:

-2147483648 to 2147483647

Description

Indicates the position feedback value (reference unit) latched at negative edge of touch probe 1 signal.

60BCh Touch probe 2 positive edge

Address: -

Effective -

Time:

Min.: -2147483648

Unit: Reference unit

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Unchangeable

Value Range:

-2147483648 to 2147483647

Description

Indicates the position feedback value (reference unit) latched at positive edge of touch probe 2 signal.

60BDh Touch probe 2 negative edge

Address:	-	Effective	-
		Time:	
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to 2147483647

Description

Indicates the position feedback value (reference unit) latched at negative edge of touch probe 2 signal.

60C5h Max. acceleration

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	Reference unit/s ²
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	Immediately

Value Range:

0 to 4294967295

Description

Defines the maximum permissible deceleration in the profile position mode, profile velocity mode, and homing mode.

For 609Ah, the setpoint 0 will be forcibly changed to 1.

60C6h Max. deceleration

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	Reference unit/s ²
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	Immediately

Value Range:

0 to 4294967295

Description

Defines the maximum permissible deceleration in the profile position mode, profile velocity mode, and homing mode.

For 609Ah, the setpoint 0 will be forcibly changed to 1.

60D5h Touch probe 1 positive edge counter

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

The counting value is added by "1" each time this object is triggered.

60D6h Touch probe 1 negative edge counter

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

The counting value is added by "1" each time this object is triggered.

60D7h Touch probe 2 positive edge counter

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

The counting value is added by "2" each time this object is triggered.

60D8h Touch probe 2 negative edge counter

Address:	-	Effective	-
		Time:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

The counting value is added by "2" each time this object is triggered.

60E0h Positive torque limit value

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	4000	Unit:	-
Default:	3500	Data Type:	UInt16
		Change:	Immediately

Value Range:

0—4000

Description

Defines the maximum torque limit of the servo drive in the forward direction.

60E1h Negative torque limit value

Address:	-	Effective	Real time
Min.:	0	Time:	
Max.:	4000	Unit:	-
Default:	3500	Data Type:	UInt16
		Change:	Immediately

Value Range:

0—4000

Description

Defines the maximum torque limit of the servo drive in the reverse direction.

60F4h Position deviation

Address:	-	Effective	-
Min.:	-2147483648	Time:	
Max.:	2147483647	Unit:	Reference unit
Default:	0	Data Type:	Int32
		Change:	Unchangeable

Value Range:

-2147483648 to 2147483647

Description

Indicates the position deviation (reference unit).

60FCh Position reference

Address:	-	Effective	-
Min.:	-2147483648	Time:	
Max.:	2147483647	Unit:	Encoder unit
		Data Type:	Int32

Default: 0

Change: Unchangeable

Value Range:

-2147483648 to 2147483647

Description

Indicates the position reference (encoder unit).

If no warning is detected when the S-ON signal is active, the relation between the position reference in reference unit and that in encoder unit is as follows:

$$60FCh \text{ (in encoder unit)} = 6062h \text{ (in reference unit)} \times 6091h$$
60FDh Digital inputs

Address: -

Effective Real time

Time:

Min.: 0

Unit: -

Max.: 4294967295

Data Type: UInt32

Default: 0

Change: Unchangeable

Value Range:

0–4294967295

Description

Indicates current DI logic of the drive.

0: Inactive

1: Active

The signal indicated by each bit is described as follows:

Bit signal

0: Reverse overtravel signal active

1: Forward overtravel signal active

2: Home signal active

3–15: N/A

16: DI1 input active

17: DI2 input active

18: DI3 input active

19: DI4 input active

20: DI5 input active

21–26: N/A

27: STO1 signal input

28: STO2 signal input

29: EDM output active

30: Z signal is active

31: N/A

60FFh PV, CSV mode speed reference

Address: -

Effective Real time

Time:

Min.:	-2147483648	Unit:	Reference unit/s
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Immediately

Value Range:

–2147483648 to +2147483647

Description

Defines the target speed in the cyclic synchronous velocity mode/profile velocity mode.

60FE.01h Physical outputs

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Immediately

Value Range:

0–4294967295

Description

Indicates the DO logic.

The signal indicated by each bit is described as follows:

Description of bits

0–15: N/A

16: DO1 forced output (0: off, 1: on), when bit16 of 60FE.02 is set to 1

17: DO2 forced output (0: off, 1: on), when bit17 of 60FE.02 is set to 1

18–25: N/A

26: Gain switching performs P/PI switching, only when bit 26 of 60FE.02 is set to 1

27–31: N/A

60FE.02h Bitmask

Address:	-	Effective	Real time
		Time:	
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Immediately

Value Range:

0–4294967295

Description

0 to 15: N/A

16: Forced DO1 output enable

17: Forced DO2 output enable

18 to 25: N/A

26: P/PI switchover enable

27 to 31: N/A

6 Parameter List

6.1 List of H00 Servo Motor Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H00.00	2000-01h	Motor code	0–14101	14101	-	At stop	"H00_en.00" on page 117
H00.02	2000-03h	Customized No.	0.00 to 4294967295.00	0.00	-	Unchangeable	"H00_en.02" on page 117
H00.04	2000-05h	Encoder version	0.0 to 6553.5	0.0	-	Unchangeable	"H00_en.04" on page 117
H00.05	2000-06h	Serial-type motor code	0 to 65535	0	-	Unchangeable	"H00_en.05" on page 118
H00.06	2000-07h	FPGA customized SN	0.00 to 655.35	0.00	-	Unchangeable	"H00_en.06" on page 118
H00.07	2000-08h	STO version	0.0 to 655.4	0.0	-	Unchangeable	"H00_en.07" on page 118
H00.08	2000-09h	Serial encoder type	0 to 65535	0	-	At stop	"H00_en.08" on page 118
H00.09	2000-0Ah	Rated voltage	0: 220 V 1: 380 V	0	-	At stop	"H00_en.09" on page 119
H00.10	2000-0Bh	Rated power	0.01 kW–655.35 kW	0.75	kW	At stop	"H00_en.10" on page 119
H00.11	2000-0Ch	Rated current	0.01 A to 655.35 A	4.70	A	At stop	"H00_en.11" on page 119
H00.12	2000-0Dh	Rated torque	0.10N·m–655.35N·m	2.39	N·m	At stop	"H00_en.12" on page 120
H00.13	2000-0Eh	Max. torque	0.10N·m–655.35N·m	7.16	N·m	At stop	"H00_en.13" on page 120
H00.14	2000-0Fh	Rated speed	100rpm–9999rpm	3000	rpm	At stop	"H00_en.14" on page 120
H00.15	2000-10h	Maximum speed	100rpm–9999rpm	6000	rpm	At stop	"H00_en.15" on page 120
H00.16	2000-11h	Moment of inertia	0.01 kgcm ² –655.35 kgcm ²	1.30	kgcm ²	At stop	"H00_en.16" on page 121
H00.17	2000-12h	Number of PMSM pole pairs	2 to 65535	5	-	At stop	"H00_en.17" on page 121

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H00.18	2000-13h	Stator resistance	0.001 Ω to 65.535 Ω	0.500	Ω	At stop	"H00_en.18" on page 121
H00.19	2000-14h	Stator inductance Lq	0.01 mH to 655.35 mH	3.27	mH	At stop	"H00_en.19" on page 121
H00.20	2000-15h	Stator inductance Ld	0.01 mH to 655.35 mH	3.87	mH	At stop	"H00_en.20" on page 122
H00.21	2000-16h	Linear back EMF coefficient	0.01 mV/rpm to 655.35 mV/rpm	33.30	mV/rpm	At stop	"H00_en.21" on page 122
H00.22	2000-17h	Torque coefficient Kt	0.01 N·m/Arms to 655.35 N·m/Arms	0.51	N·m/Arms	At stop	"H00_en.22" on page 122
H00.23	2000-18h	Electrical constant Te	0.01 ms to 655.35 ms	6.54	ms	At stop	"H00_en.23" on page 122
H00.24	2000-19h	Mechanical constant Tm	0.01 ms to 655.35 ms	0.24	ms	At stop	"H00_en.24" on page 123
H00.28	2000-1Dh	Absolute encoder position offset	0 to 4294967295	8192	-	At stop	"H00_en.28" on page 123
H00.30	2000-1Fh	Encoder selection (Hex)	19: Inovance encoder	19	-	At stop	"H00_en.30" on page 123
H00.31	2000-20h	Encoder PPR	1P/Rev-1073741824P/Rev	67108864	PPR	At stop	"H00_en.31" on page 124
H00.33	2000-22h	Electrical angle of Z signal	0.0° to 360.0°	180.0	°	At stop	"H00_en.33" on page 124
H00.34	2000-23h	Electrical angle of phase U rising edge	0.0° to 360.0°	180.0	°	At stop	"H00_en.34" on page 124
H00.35	2000-24h	Serial-type motor model	0 to 65535	0	-	At stop	"H00_en.35" on page 125
H00.37	2000-26h	Absolute encoder function setting bit	0 to 65535	0	-	At stop	"H00_en.37" on page 125
H00.60	2000-3Dh	Motor attribute	0 to 65535	0	-	At stop	"H00_en.60" on page 125
H00.61	2000-3Eh	Brake close time	0 ms to 65535 ms	0	ms	At stop	"H00_en.61" on page 125
H00.62	2000-3Fh	Brake release time	0 ms to 65535 ms	0	ms	At stop	"H00_en.62" on page 126
H00.63	2000-40h	Maximum motor current	0.00 A to 65535.00 A	0.00	A	At stop	"H00_en.63" on page 126
H00.65	2000-42h	Rated motor current	0.00 A to 65535.00 A	0.00	A	At stop	"H00_en.65" on page 126

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H00.67	2000-44h	Moment of inertia	0 kgcm ² –42950 kgcm ²	0	kgcm ²	At stop	"H00_en.67" on page 126
H00.69	2000-46h	Linear back EMF coefficient	0.01 mV/rpm to 42949672.95 mV/rpm	0.00	mV/rpm	At stop	"H00_en.69" on page 127
H00.71	2000-48h	Motor carrier frequency	0 Hz–65535 Hz	8000	Hz	At stop	"H00_en.71" on page 127
H00.72	2000-49h	Max. motor allowable demagnetizing current	0%–65535%	0	%	At stop	"H00_en.72" on page 127
H00.73	2000-4Ah	Bit01 of motor SN code	0 to 65535	0	-	At stop	"H00_en.73" on page 128
H00.74	2000-4Bh	Bit23 of motor SN code	0 to 65535	0	-	At stop	"H00_en.74" on page 128
H00.75	2000-4Ch	Bit45 of motor SN code	0 to 65535	0	-	At stop	"H00_en.75" on page 128
H00.76	2000-4Dh	Bit67 of motor SN code	0 to 65535	0	-	At stop	"H00_en.76" on page 128
H00.77	2000-4Eh	Bit89 of motor SN code	0 to 65535	0	-	At stop	"H00_en.77" on page 129
H00.78	2000-4Fh	Bit11 of motor SN code	0 to 65535	0	-	At stop	"H00_en.78" on page 129
H00.79	2000-50h	Bit13 of motor SN code	0 to 65535	0	-	At stop	"H00_en.79" on page 129
H00.80	2000-51h	Bit15 of motor SN code	0 to 65535	0	-	At stop	"H00_en.80" on page 129
H00.98	2000-63h	Motor attribute check	0 to 65535	0	-	At stop	"H00_en.98" on page 130

6.2 List of H01 Drive Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H01.00	2001-01h	MCU software version	0.0 to 6553.5	0.0	-	Unchangeable	"H01_en.00" on page 130
H01.01	2001-02h	FPGA software version	0.0 to 6553.5	0.0	-	Unchangeable	"H01_en.01" on page 130

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H01.02	2001-03h	Servo drive series No.	0 to 65535	0	-	Unchangeable	"H01_en.02" on page 131
H01.07	2001-08h	Software test version	0.00 to 655.35	0.00	-	Unchangeable	"H01_en.07" on page 131
H01.08	2001-09h	Model parameter version	0.0 to 6553.5	0.0	-	Unchangeable	"H01_en.08" on page 131
H01.10	2001-0Bh	Drive series No.	3: S2R8 5: S5R5	3	-	At stop	"H01_en.10" on page 131
H01.11	2001-0Ch	DC-AC voltage class	0 V to 65535 V	220	V	Unchangeable	"H01_en.11" on page 132
H01.12	2001-0Dh	Rated power of the drive	0.00 kW to 10737418.24 kW	0.40	kW	Unchangeable	"H01_en.12" on page 132
H01.14	2001-0Fh	Max. output power of the drive	0.00 kW to 10737418.24 kW	0.40	kW	Unchangeable	"H01_en.14" on page 132
H01.16	2001-11h	Rated output current of the drive	0.00 A to 10737418.24 A	2.80	A	Unchangeable	"H01_en.16" on page 132
H01.18	2001-13h	Max. output current of the drive	0.00 A to 10737418.24 A	10.10	A	Unchangeable	"H01_en.18" on page 133
H01.20	2001-15h	Carrier frequency	4000 Hz to 20000 Hz	8000	Hz	At stop	"H01_en.20" on page 133
H01.21	2001-16h	Dead zone time	2.00us–20.00us	2.00	us	At stop	"H01_en.21" on page 133
H01.22	2001-17h	D-axis coupling voltage compensation coefficient	0.0% to 1000.0%	50.0	%	Immediately	"H01_en.22" on page 134
H01.23	2001-18h	Q-axis back EMF compensation coefficient	0.0% to 1000.0%	50.0	%	Immediately	"H01_en.23" on page 134
H01.24	2001-19h	D-axis current loop gain	0 Hz–20000 Hz	500	Hz	Immediately	"H01_en.24" on page 134
H01.25	2001-1Ah	D-axis current loop integral compensation factor	0.01 to 100.00	1.00	-	Immediately	"H01_en.25" on page 134

Parameter List

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H01.26	2001-1Bh	Sinc3 filter data extraction rate in current sampling	0: Extraction rate 32 1: Extraction rate 64 2: Extraction rate 128 3: Extraction rate 256	0	-	At stop	"H01_en.26" on page 135
H01.27	2001-1Ch	Q-axis current loop gain	0 Hz–20000 Hz	500	Hz	Immediately	"H01_en.27" on page 135
H01.28	2001-1Dh	Q-axis current loop integral compensation factor	0.01 to 100.00	1.00	-	Immediately	"H01_en.28" on page 135
H01.29	2001-1Eh	Q-axis coupling voltage compensation coefficient	0.0% to 1000.0%	50.0	%	Immediately	"H01_en.29" on page 136
H01.30	2001-1Fh	Bus voltage gain tuning	50.0% to 150.0%	100.0	%	At stop	"H01_en.30" on page 136
H01.31	2001-20h	Minimum ON time of bootstrap circuit lower bridge	0.0 us to 20.0 us	0.0	us	At stop	"H01_en.31" on page 136
H01.32	2001-21h	Relative gain of UV sampling	1 to 65535	32768	-	At stop	"H01_en.32" on page 136
H01.34	2001-23h	Drive over-temperature threshold	0°C to 150°C	95	°C	Immediately	"H01_en.34" on page 137
H01.36	2001-25h	Current sensor range	0.00 A to 9999.99 A	21.33	A	At stop	"H01_en.36" on page 137
H01.38	2001-27h	FPGA phase current protection threshold	0.0% to 100.0%	90.0	%	At stop	"H01_en.38" on page 137
H01.39	2001-28h	Current loop version	0 to 65535	0	-	At stop	"H01_en.39" on page 137
H01.40	2001-29h	DC bus overvoltage protection threshold	0 V to 2000 V	420	V	Immediately	"H01_en.40" on page 138
H01.41	2001-2Ah	DC bus voltage discharge threshold	0 V to 2000 V	380	V	Immediately	"H01_en.41" on page 138
H01.42	2001-2Bh	DC bus undervoltage threshold	0 V to 2000 V	200	V	Immediately	"H01_en.42" on page 138

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H01.52	2001-35h	D-axis proportional gain in performance priority mode	0 Hz–20000 Hz	2000	Hz	Immediately	"H01_en.52" on page 139
H01.53	2001-36h	D-axis integral gain in performance priority mode	0.01 to 100.00	1.00	-	Immediately	"H01_en.53" on page 139
H01.54	2001-37h	Q-axis proportional gain in performance priority mode	0 Hz–20000 Hz	2000	Hz	Immediately	"H01_en.54" on page 139
H01.55	2001-38h	Q-axis integral gain in performance priority mode	0.01 to 100.00	1.00	-	Immediately	"H01_en.55" on page 139
H01.56	2001-39h	Current loop low-pass cutoff frequency	0 Hz–65535 Hz	11000	Hz	At stop	"H01_en.56" on page 140
H01.59	2001-3Ch	Serial encoder data transmission compensation time	0.000 us to 10.000 us	0.000	us	At stop	"H01_en.59" on page 140
H01.60	2001-3Dh	FPGA scheduling frequency	2: 8 kHz	2	-	At stop	"H01_en.60" on page 140
H01.61	2001-3Eh	Command scheduling frequency	0: 4 kHz 1: 2 kHz 2: 1 kHz	0	-	At stop	"H01_en.61" on page 141
H01.62	2001-3Fh	Auto-tuning of drive model	0 to 65535	0	-	Unchangeable	"H01_en.62" on page 141
H01.66	2001-43h	Current loop configuration	0 kHz–31 kHz	12	kHz	Immediately	"H01_en.66" on page 141
H01.67	2001-44h	Dead zone compensation coefficient	0.00 to 2.00	1.00	-	Immediately	"H01_en.67" on page 141
H01.68	2001-45h	Current observer cutoff frequency	200 to 5000	2000	-	Immediately	"H01_en.68" on page 142

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H01.69	2001-46h	Current observer correction coefficient	0.00 to 9.00	1.00	-	Immediately	"H01_en.69" on page 142
H01.72	2001-49h	Hide IGBT model identification	0 to 65535	0	-	Immediately	"H01_en.72" on page 142
H01.73	2001-4Ah	Sigma-delta signal phase compensation time	0 us to 65535 us	1	us	At stop	"H01_en.73" on page 142
H01.75	2001-4Ch	Current loop amplification factor	0.00 to 655.35	1.00	-	Immediately	"H01_en.75" on page 143
H01.78	2001-4Fh	Control voltage undervoltage threshold	0 V to 2000 V	200	V	Immediately	"H01_en.78" on page 143
H01.79	2001-50h	Control voltage gain adjustment	50.0% to 150.0%	100.0	%	At stop	"H01_en.79" on page 143
H01.82	2001-53h	Filter time of PL and CPL	0 to 32767	4000	-	At stop	"H01_en.82" on page 144
H01.83	2001-54h	AO zero offset	-500 mV to 500 mV	0	mV	Immediately	"H01_en.83" on page 144
H01.84	2001-55h	AO ratio	0.000 to 2000.000	1000.000	-	Immediately	"H01_en.84" on page 144
H01.89	2001-5Ah	Junction temperature parameter version	0.000 to 65.535	0.000	-	Unchangeable	"H01_en.89" on page 144

6.3 List of H02 Basic Control Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H02.00	2002-01h	Control mode	0: Velocity mode 1: Position mode 2: Torque mode 9: EtherCAT mode	9	-	At stop	"H02_en.00" on page 145
H02.01	2002-02h	Absolute system selection	0: Incremental mode 1: Absolute position linear mode 2: Absolute position rotation mode 3: Absolute position linear mode (without encoder overflow warning) 4: Absolute position single-turn mode	0	-	At stop	"H02_en.01" on page 145
H02.02	2002-03h	Rotation direction selection	0: Counterclockwise (CCW) as forward direction 1: Clockwise (CW) as forward direction	0	-	At stop	"H02_en.02" on page 145
H02.05	2002-06h	Stop mode at S-ON OFF	–4: Ramp to stop as defined by 6085h, keeping dynamic braking state –3: at zero speed, keeping dynamic braking state –2: Ramp to stop as defined by 6084h/609Ah (HM), keeping dynamic braking state –1: Dynamic braking stop, keeping dynamic braking state 0: Coast to stop, keeping de-energized state 1: Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized state 2: Dynamic braking stop, keeping de-energized state	0	-	Immediately	"H02_en.05" on page 146

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H02.06	2002-07h	Stop mode at No.2 fault	<p>–5: Stop at zero speed, keeping dynamic braking state</p> <p>–4: Stop at emergency stop torque, keeping dynamic braking state</p> <p>–3: Ramp to stop as defined by 6085h, keeping dynamic braking state</p> <p>–2: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping dynamic braking state</p> <p>–1: Dynamic braking stop, keeping dynamic braking state</p> <p>0: Coast to stop, keeping de-energized state</p> <p>1: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping de-energized state</p> <p>2: Ramp to stop as defined by 6085h, keeping de-energized state</p> <p>3: Stop at emergency stop torque, keeping de-energized state</p> <p>4: Dynamic braking stop, keeping de-energized state</p>	2	-	Immediately	"H02_en.06" on page 147
H02.07	2002-08h	Stop mode at overtravel	<p>0: Coast to stop, keeping de-energized state</p> <p>1: Stop at zero speed, keeping position lock state</p> <p>2: Stop at zero speed, keeping de-energized state</p> <p>3: Stop based on ramp, keeping de-energized state</p> <p>4: Stop based on ramp, keeping position lock state</p> <p>5: Dynamic braking stop, keeping de-energized state</p> <p>6: Dynamic braking stop, keeping dynamic braking state</p> <p>7: Not responding to overtravel</p>	1	-	At stop	"H02_en.07" on page 148

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H02.08	2002-09h	Stop mode at No.1 fault	0: Coast to stop, keeping de-energized state 1: Dynamic braking stop, keeping de-energized state 2: Dynamic braking stop, keeping dynamic braking state	2	-	At stop	"H02_en.08" on page 148
H02.09	2002-0Ah	Delay from brake output ON to command received	0 ms to 500 ms	250	ms	Immediately	"H02_en.09" on page 148
H02.10	2002-0Bh	Delay from brake output OFF to motor de-energized	50 ms to 1000 ms	150	ms	Immediately	"H02_en.10" on page 149
H02.11	2002-0Ch	Motor speed threshold at brake output OFF in rotation state	20 rpm to 3000 rpm	30	rpm	Immediately	"H02_en.11" on page 149
H02.12	2002-0Dh	Delay from S-ON OFF to brake output OFF in rotation state	1 ms to 65535 ms	500	ms	Immediately	"H02_en.12" on page 149
H02.15	2002-10h	Warning display on the keypad	0: Output warning information immediately 1: Not output warning information	0	-	Immediately	"H02_en.15" on page 150
H02.16	2002-11h	Brake enable switch	0: OFF 1: ON	0	-	Immediately	"H02_en.16" on page 150
H02.17	2002-12h	Stop mode upon main circuit power failure	0: Keep current action 1: Stop upon fault as defined by H02.06 2: Stop at S-ON OFF as defined by H02.05 3: Stop quickly as defined by H02.18	2	-	Immediately	"H02_en.17" on page 150

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H02.18	2002-13h	Quick stop mode	0: Coast to stop, keeping de-energized state 1: Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized state 2: Ramp to stop as defined by 6085h, keeping de-energized state 3: Stop at emergency stop torque, keeping de-energized state 5: Ramp to stop as defined by 6084h/609Ah (HM), keeping position lock state 6: Ramp to stop as defined by 6085h, keeping position lock state 7: Stop at emergency stop torque, keeping position lock state	2	-	Immediately	"H02_en.18" on page 151
H02.20	2002-15h	Dynamic brake relay coil ON delay	10 ms to 30000 ms	30	ms	Immediately	"H02_en.20" on page 151
H02.21	2002-16h	Permissible minimum resistance of regenerative resistor	1 Ω to 1000 Ω	40	Ω	Unchangeable	"H02_en.21" on page 151
H02.22	2002-17h	Power of built-in regenerative resistor	0 W to 65535 W	50	W	Unchangeable	"H02_en.22" on page 152
H02.23	2002-18h	Resistance of built-in regenerative resistor	0 Ω to 65535 Ω	50	Ω	Unchangeable	"H02_en.23" on page 152
H02.24	2002-19h	Resistor heat dissipation coefficient	10%–100%	30	%	Immediately	"H02_en.24" on page 152
H02.25	2002-1Ah	Regenerative resistor type	0: Built-in 1: External, natural cooling 2: External, forced air cooling 3: No resistor needed	3	-	Immediately	"H02_en.25" on page 153
H02.26	2002-1Bh	Power of external regenerative resistor	1 W to 65535 W	40	W	Immediately	"H02_en.26" on page 153

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H02.27	2002-1Ch	Resistance of external regenerative resistor	15 Ω to 1000 Ω	50	Ω	Immediately	"H02_en.27" on page 153
H02.30	2002-1Fh	User password	0–65535	0	-	Immediately	"H02_en.30" on page 154
H02.31	2002-20h	System parameter initialization	0: No operation 1: Restore default settings 2: Clear fault records	0	-	At stop	"H02_en.31" on page 154
H02.32	2002-21h	Selection of parameters in group H0b	0–99	50	-	Immediately	"H02_en.32" on page 154
H02.35	2002-24h	Keypad data update frequency	0 Hz–20 Hz	0	Hz	Immediately	"H02_en.35" on page 155
H02.41	2002-2Ah	Manufacturer password	0–65535	0	-	Immediately	"H02_en.41" on page 155
H02.47	2002-30h	Delayed brake closing time of power cable breakage	0–1000	10	-	Immediately	" " on page 155

6.4 List of H03 Terminal Input Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H03.02	2003-03h	DI1 function	100: [Axis 1]Undefined 101: [Axis 1]Servo enable 102: [Axis 1]Alarm reset signal 114: [Axis 1]Positive limit switch 115: [Axis 1]Negative limit switch 131: [Axis 1]Home switch 134: [Axis 1]Emergency stop 138: [Axis 1]Touch probe 1 139: [Axis 1]Touch probe 2	114	-	Immediately	"H03_en.02" on page 156
H03.03	2003-04h	DI1 logic	0: Normally open 1: Closed	0	-	Immediately	"H03_en.03" on page 156

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H03.04	2003-05h	DI2 function	200: [Axis 2]Undefined 201: [Axis 2]Servo enable 202: [Axis 2]Alarm reset signal 214: [Axis 2]Positive limit switch 215: [Axis 2]Negative limit switch 231: [Axis 2]Home switch 234: [Axis 2]Emergency stop 238: [Axis 2]Touch probe 1 239: [Axis 2]Touch probe 2	214	-	Immediately	"H03_en.04" on page 156
H03.05	2003-06h	DI2 logic	0: Normally open 1: Closed	0	-	Immediately	"H03_en.05" on page 157
H03.06	2003-07h	DI3 function	100: [Axis 1]Undefined 101: [Axis 1]Servo enable 102: [Axis 1]Alarm reset signal 114: [Axis 1]Positive limit switch 115: [Axis 1]Negative limit switch 131: [Axis 1]Home switch 134: [Axis 1]Emergency stop 138: [Axis 1]Touch probe 1 139: [Axis 1]Touch probe 2	115	-	Immediately	"H03_en.06" on page 157
H03.07	2003-08h	DI3 logic	0: Normally open 1: Closed	0	-	Immediately	"H03_en.07" on page 158
H03.08	2003-09h	DI4 function	200: [Axis 2]Undefined 201: [Axis 2]Servo enable 202: [Axis 2]Alarm reset signal 214: [Axis 2]Positive limit switch 215: [Axis 2]Negative limit switch 231: [Axis 2]Home switch 234: [Axis 2]Emergency stop 238: [Axis 2]Touch probe 1 239: [Axis 2]Touch probe 2	215	-	Immediately	"H03_en.08" on page 158
H03.09	2003-0Ah	DI4 logic	0: Normally open 1: Closed	0	-	Immediately	"H03_en.09" on page 158

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H03.10	2003-0Bh	DI5 function	100: [Axis 1]Undefined 101: [Axis 1]Servo enable 102: [Axis 1]Alarm reset signal 114: [Axis 1]Positive limit switch 115: [Axis 1]Negative limit switch 131: [Axis 1]Home switch 134: [Axis 1]Emergency stop 138: [Axis 1]Touch probe 1 139: [Axis 1]Touch probe 2	131	-	Immediately	"H03_en.10" on page 159
H03.11	2003-0Ch	DI5 logic	0: Normally open 1: Closed	0	-	Immediately	"H03_en.11" on page 159
H03.12	2003-0Dh	DI6 function	200: [Axis 2]Undefined 201: [Axis 2]Servo enable 202: [Axis 2]Alarm reset signal 214: [Axis 2]Positive limit switch 215: [Axis 2]Negative limit switch 231: [Axis 2]Home switch 234: [Axis 2]Emergency stop 238: [Axis 2]Touch probe 1 239: [Axis 2]Touch probe 2	231	-	Immediately	"H03_en.12" on page 159
H03.13	2003-0Eh	DI6 logic	0: Normally open 1: Closed	0	-	Immediately	"H03_en.13" on page 160
H03.14	2003-0Fh	DI7 function	100: [Axis 1]Undefined 101: [Axis 1]Servo enable 102: [Axis 1]Alarm reset signal 114: [Axis 1]Positive limit switch 115: [Axis 1]Negative limit switch 131: [Axis 1]Home switch 134: [Axis 1]Emergency stop 138: [Axis 1]Touch probe 1 139: [Axis 1]Touch probe 2	138	-	Immediately	"H03_en.14" on page 160
H03.15	2003-10h	DI7 logic	0: Normally open 1: Closed	0	-	Immediately	"H03_en.15" on page 161

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H03.16	2003-11h	DI8 function selection	200: [Axis 2]Undefined 201: [Axis 2]Servo enable 202: [Axis 2]Alarm reset signal 214: [Axis 2]Positive limit switch 215: [Axis 2]Negative limit switch 231: [Axis 2]Home switch 234: [Axis 2]Emergency stop 238: [Axis 2]Touch probe 1 239: [Axis 2]Touch probe 2	238	-	Immediately	"H03_en.16" on page 161
H03.17	2003-12h	DI8 logic selection	0: Normally open 1: Closed	0	-	Immediately	"H03_en.17" on page 162
H03.50	2003-33h	Voltage-type AI1 offset	-5000 mV to 5000 mV	0	mV	Immediately	"H03_en.50" on page 162
H03.51	2003-34h	Voltage-type AI1 input filter time constant	0.00 ms to 655.35 ms	2.00	ms	Immediately	"H03_en.51" on page 162
H03.53	2003-36h	Voltage-type AI1 dead zone	0.0 mV to 1000.0 mV	10.0	mV	Immediately	"H03_en.53" on page 163
H03.54	2003-37h	Voltage-type AI1 zero drift	-500.0 mV to 500.0 mV	0.0	mV	Immediately	"H03_en.54" on page 163
H03.60	2003-3Dh	DI1 filter time	0.00 ms to 500.00 ms	0.50	ms	Immediately	"H03_en.60" on page 163
H03.61	2003-3Eh	DI2 filter time	0.00 ms to 500.00 ms	0.50	ms	Immediately	"H03_en.61" on page 163
H03.62	2003-3Fh	DI3 filter time	0.00 ms to 500.00 ms	0.50	ms	Immediately	"H03_en.62" on page 164
H03.63	2003-40h	DI4 filter time	0.00 ms to 500.00 ms	0.50	ms	Immediately	"H03_en.63" on page 164
H03.64	2003-41h	DI5 filter time	0.00 ms to 500.00 ms	0.50	ms	Immediately	"H03_en.64" on page 164
H03.65	2003-42h	DI6 filter time	0.00 ms to 500.00 ms	0.50	ms	Immediately	"H03_en.65" on page 165
H03.66	2003-43h	DI7 filter time	0.00 ms to 500.00 ms	0.50	ms	Immediately	"H03_en.66" on page 165
H03.67	2003-44h	DI8 filter time	0.00 ms to 500.00 ms	0.50	ms	Immediately	"H03_en.67" on page 165

6.5 List of H04 Terminal Output Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H04.00	2004-01h	DO1 function selection	100: [Axis 1]Undefined 101: [Axis 1]Servo ready 102: [Axis 1]Motor rotation signal 109: [Axis 1] Braking output 110: [Axis 1] Warning 111: [Axis 1]Failure 125: [Axis 1]Comparison output 131:[Axis 1]Forced communication DO 132: [Axis 1]EDM output	101	-	Immediately	"H04_en.00" on page 166
H04.01	2004-02h	DO1 logic selection	0: Normally open 1: Closed	0	-	Immediately	"H04_en.01" on page 166
H04.02	2004-03h	DO2 function selection	200: [Axis 2]Undefined 201: [Axis 2]Servo ready 202: [Axis 2]Motor rotation signal 209: [Axis 2] Braking output 210: [Axis 2] Warning 211: [Axis 2]Failure 225: [Axis 2]Comparison output 231:[Axis 2]Forced communication DO 232: [Axis 2]EDM output	201	-	Immediately	"H04_en.02" on page 167
H04.03	2004-04h	DO2 logic selection	0: Normally open 1: Closed	0	-	Immediately	"H04_en.03" on page 167
H04.04	2004-05h	DO3 function selection	100: [Axis 1]Undefined 101: [Axis 1]Servo ready 102: [Axis 1]Motor rotation signal 109: [Axis 1] Braking output 110: [Axis 1] Warning 111: [Axis 1]Failure 125: [Axis 1]Comparison output 131:[Axis 1]Forced communication DO 132: [Axis 1]EDM output	109	-	Immediately	"H04_en.04" on page 168
H04.05	2004-06h	DO3 logic selection	0: Normally open 1: Closed	0	-	Immediately	"H04_en.05" on page 168

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H04.06	2004-07h	DO4 function selection	200: [Axis 2]Undefined 201: [Axis 2]Servo ready 202: [Axis 2]Motor rotation signal 209: [Axis 2] Braking output 210: [Axis 2] Warning 211: [Axis 2]Failure 225: [Axis 2]Comparison output 231:[Axis 2]Forced communication DO 232: [Axis 2]EDM output	209	-	Immediately	"H04_en.06" on page 168
H04.07	2004-08h	DO4 logic selection	0: Normally open 1: Closed	0	-	Immediately	"H04_en.07" on page 169
H04.22	2004-17h	DO source selection	bit0: DO1 output source 0: DO1 function output 1: bit0 of H31.04 bit1: DO2 output source 0: DO2 function output 1: bit1 of H31.04 bit2: DO3 output source 0: DO3 function output 1: bit2 of H31.04 bit3: DO4 output source 0: DO4 function output 1: bit3 of H31.04	0	-	Immediately	"H04_en.22" on page 169
H04.23	2004-18h	ECAT communication-forced DO logic in non-OP status	Bit0: DO1 0: Status unchanged 1: No output bit1: DO2 0: Status unchanged 1: No output bit2: DO3 0: Status unchanged 1: No output bit3: DO4 0: Status unchanged 1: No output	0	-	Immediately	"H04_en.23" on page 170
H04.50	2004-33h	A01 signal selection	10: Defined by H31.05	0	-	Immediately	"H04_en.50" on page 170
H04.51	2004-34h	A01 offset voltage	-10000 mV to 10000 mV	0	mV	Immediately	"H04_en.51" on page 171
H04.52	2004-35h	A01 multiplier	-99.99 to 99.99	1.00	-	Immediately	"H04_en.52" on page 171

6.6 List of H05 Position Control Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H05.02	2005-03h	Pulses per revolution	0 PPR to 4294967295 PPR	0	PPR	At stop	"H05_en.02" on page 171
H05.04	2005-05h	First-order low-pass filter time constant	0.0 ms to 6553.5 ms	0.0	ms	At stop	"H05_en.04" on page 172
H05.06	2005-07h	Moving average filter time constant 1	0.0 ms to 128.0 ms	0.0	ms	At stop	"H05_en.06" on page 172
H05.07	2005-08h	Electronic gear ratio 1 (numerator)	1–1073741824	1	-	Immediately	"H05_en.07" on page 172
H05.09	2005-0Ah	Electronic gear ratio 1 (denominator)	1–1073741824	1	-	Immediately	"H05_en.09" on page 172
H05.16	2005-11h	Clear action	0: Position deviation cleared upon S-OFF or non-RUN state 1: Position deviation cleared upon fault or non-RUN state 2: Position deviation cleared upon active DI function 35 or non-RUN state	0	-	At stop	"H05_en.16" on page 173
H05.19	2005-14h	Speed feedforward control	0: No speed feedforward 1: Internal speed feedforward 2: 60B1h 3: Zero phase	1	-	At stop	"H05_en.19" on page 173
H05.30	2005-1Fh	Homing selection	0: Disabled, 6: Current position	0	-	Immediately	"H05_en.30" on page 174
H05.35	2005-24h	Homing time limit	0 ms to 65535 ms	10000	ms	Immediately	"H05_en.35" on page 174
H05.36	2005-25h	Mechanical home offset	-2147483648 to 2147483647	0	Reference unit	Immediately	"H05_en.36" on page 175

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H05.40	2005-29h	Mechanical home offset and action upon overtravel	0: H05.36 as the coordinate after homing, reverse homing applied after homing triggered again upon overtravel 1: H05.36 as the relative offset after homing, reverse homing applied after homing triggered again upon overtravel 2: H05.36 as the coordinate after homing, reverse homing applied automatically upon overtravel 3: H05.36 as the relative offset after homing, reverse homing applied automatically upon overtravel	0	-	Immediately	"H05_en.40" on page 175
H05.50	2005-33h	Mechanical gear ratio in absolute position rotation mode (numerator)	1 to 65535	1	-	At stop	"H05_en.50" on page 175
H05.51	2005-34h	Mechanical gear ratio in absolute position rotation mode (denominator)	1 to 65535	1	-	At stop	"H05_en.51" on page 176
H05.52	2005-35h	Pulses per revolution of the load in absolute position rotation mode (low 32 bits)	0 to 4294967295	0	Encoder unit	At stop	"H05_en.52" on page 176
H05.54	2005-37h	Pulses per revolution of the load in absolute position rotation mode (high 32 bits)	0 to 4294967295	0	Encoder unit	At stop	"H05_en.54" on page 176

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H05.58	2005-3Bh	Torque threshold in homing upon hit-and-stop	0.0% to 400.0%	100.0	%	Immediately	"H05_en.58" on page 177
H05.60	2005-3Dh	Hold time of positioning completed	0 ms to 30000 ms	0	ms	Immediately	"H05_en.60" on page 177
H05.66	2005-43h	Homing time unit	0: 1 ms 1: 10 ms 2: 100 ms	2	-	At stop	"H05_en.66" on page 177
H05.67	2005-44h	Offset between zero point and single-turn absolute position	-2147483648 to 2147483647	0	Encoder unit	At stop	"H05_en.67" on page 177
H05.71	2005-48h	Motor Z signal width	1 ms to 100 ms	4	ms	Immediately	"H05_en.71" on page 178

6.7 List of H06 Speed Control Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H06.00	2006-01h	Source of main speed reference A	0: Digital setting (H06.03)	0	-	At stop	"H06_en.00" on page 178
H06.01	2006-02h	Source of auxiliary speed reference B	0: Digital setting (H06.03)	1	-	At stop	"H06_en.01" on page 178
H06.02	2006-03h	Speed reference source	0: Source of main speed reference A 1: Source of auxiliary speed reference B 2: A+B 3: Switched between A and B 4: Communication	0	-	At stop	"H06_en.02" on page 179
H06.03	2006-04h	Speed reference set through keypad	-9999rpm to 9999rpm	200	rpm	Immediately	"H06_en.03" on page 179

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H06.05	2006-06h	Acceleration ramp time of speed reference	0 ms to 65535 ms	0	ms	Immediately	"H06_en.05" on page 179
H06.06	2006-07h	Deceleration ramp time of speed reference	0 ms to 65535 ms	0	ms	Immediately	"H06_en.06" on page 180
H06.07	2006-08h	Maximum speed limit	0rpm-9999rpm	6000	rpm	Immediately	"H06_en.07" on page 180
H06.08	2006-09h	Forward speed limit	0rpm-9999rpm	6000	rpm	Immediately	"H06_en.08" on page 180
H06.09	2006-0Ah	Reverse speed limit	0rpm-9999rpm	6000	rpm	Immediately	"H06_en.09" on page 181
H06.10	2006-0Bh	Deceleration unit in emergency stop	0: Multiplied by 1 1: Multiplied by 10 2: Multiplied by 100	0	-	At stop	"H06_en.10" on page 181
H06.11	2006-0Ch	Torque feedforward control	0: No torque feedforward 1: Internal torque feedforward 2: 60B2h as external torque feedforward	1	-	Immediately	"H06_en.11" on page 181
H06.12	2006-0Dh	Acceleration ramp time of jog speed	0 ms to 65535 ms	10	ms	Immediately	"H06_en.12" on page 182
H06.13	2006-0Eh	Speed feedforward smoothing filter	0 us to 65535 us	0	us	Immediately	"H06_en.13" on page 183
H06.15	2006-10h	Zero clamp speed threshold	0rpm-9999rpm	10	rpm	Immediately	"H06_en.15" on page 183
H06.16	2006-11h	Threshold of TGON (motor rotation) signal	0 rpm to 1000 rpm	20	rpm	Immediately	"H06_en.16" on page 183
H06.17	2006-12h	Threshold of V-Cmp (speed matching) signal	0 rpm to 100 rpm	10	rpm	Immediately	"H06_en.17" on page 184
H06.18	2006-13h	Threshold of speed reach signal	20rpm-9999rpm	1000	rpm	Immediately	"H06_en.18" on page 184

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H06.19	2006-14h	Threshold of zero speed output signal	1rpm–9999rpm	10	rpm	Immediately	"H06_en.19" on page 184
H06.26	2006-1Bh	Torque fluctuation auto-tuning enable	0–1	0	-	Immediately	"H06_en.26" on page 184
H06.28	2006-1Dh	Cogging torque ripple compensation	0–1	1	-	At stop	"H06_en.28" on page 185
H06.31	2006-20h	Sine reference frequency	0–16000	50	-	Immediately	"H06_en.31" on page 185
H06.32	2006-21h	Sine reference amplitude	0–30000	30	-	Immediately	"H06_en.32" on page 185
H06.33	2006-22h	Sine reference enable	0–3	0	-	Immediately	"H06_en.33" on page 185
H06.34	2006-23h	Sine reference initial phase	0.0–360.0	0.0	-	Immediately	"H06_en.34" on page 186
H06.35	2006-24h	Sine reference offset	-9900–9900	0	-	Immediately	"H06_en.35" on page 186
H06.50	2006-33h	Speed S-curve enable switch 0: Disabled 1: Enabled		0	-	At stop	"H06_en.50" on page 186
H06.51	2006-34h	Increasing acceleration of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	"H06_en.51" on page 187
H06.52	2006-35h	Decreasing acceleration of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	"H06_en.52" on page 187
H06.53	2006-36h	Decreasing deceleration of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	"H06_en.53" on page 187
H06.54	2006-37h	Decreasing acceleration of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	"H06_en.54" on page 187

6.8 List of H07 Torque Control Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H07.00	2007-01h	Source of main torque reference A	0: Keypad (H07.03)	0	-	At stop	"H07_en.00" on page 188
H07.01	2007-02h	Source of auxiliary torque reference B	0: Keypad (H07.03)	1	-	At stop	"H07_en.01" on page 188
H07.02	2007-03h	Torque reference source	0: Source of main torque reference A 1: Source of auxiliary torque reference B 2: Source of A+B 3: Switched between A and B 4: Communication	0	-	At stop	"H07_en.02" on page 188
H07.03	2007-04h	Torque reference set through keypad	-400.0% to 400.0%	0.0	%	Immediately	"H07_en.03" on page 189
H07.05	2007-06h	Torque reference filter time constant 1	0.00 ms to 30.00 ms	0.50	ms	Immediately	"H07_en.05" on page 189
H07.06	2007-07h	Torque reference filter time constant 2	0.00 ms to 30.00 ms	0.27	ms	Immediately	"H07_en.06" on page 189
H07.07	2007-08h	Torque limit source	0: FWD/REV internal torque limit	0	-	Immediately	"H07_en.07" on page 189
H07.09	2007-0Ah	Positive internal torque limit	0.0% to 400.0%	350.0	%	Immediately	"H07_en.09" on page 190
H07.10	2007-0Bh	Negative internal torque limit	0.0% to 400.0%	350.0	%	Immediately	"H07_en.10" on page 190
H07.11	2007-0Ch	Positive external torque limit	0.0% to 400.0%	350.0	%	Immediately	"H07_en.11" on page 190
H07.12	2007-0Dh	Negative external torque limit	0.0% to 400.0%	350.0	%	Immediately	"H07_en.12" on page 191
H07.15	2007-10h	Emergency-stop torque	0.0% to 400.0%	100.0	%	Immediately	"H07_en.15" on page 191

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H07.17	2007-12h	Speed limit source	0: Internal speed limit	0	-	Immediately	"H07_en.17" on page 191
H07.19	2007-14h	Positive speed limit/Speed limit 1 in torque control	0rpm-9999rpm	3000	rpm	Immediately	"H07_en.19" on page 191
H07.20	2007-15h	Negative speed limit/Speed limit 2 in torque control	0rpm-9999rpm	3000	rpm	Immediately	"H07_en.20" on page 192
H07.21	2007-16h	Base value for torque reach	0.0% to 400.0%	0.0	%	Immediately	"H07_en.21" on page 192
H07.22	2007-17h	Torque reach valid value	0.0% to 400.0%	20.0	%	Immediately	"H07_en.22" on page 192
H07.23	2007-18h	Torque reach invalid value	0.0% to 400.0%	10.0	%	Immediately	"H07_en.23" on page 192
H07.24	2007-19h	Field weakening depth	60% to 115%	115	%	Immediately	"H07_en.24" on page 193
H07.25	2007-1Ah	Max. permissible demagnetizing current	0% to 300%	100	%	Immediately	"H07_en.25" on page 193
H07.26	2007-1Bh	Field weakening selection	0: Disabled 1: Enabled	0	-	At stop	"H07_en.26" on page 193
H07.27	2007-1Ch	Flux weakening gain	0.001 Hz to 1.000 Hz	0.030	Hz	Immediately	"H07_en.27" on page 194
H07.28	2007-1Dh	Speed of field weakening point	0-65535	0	-	Unchangeable	"H07_en.28" on page 194
H07.35	2007-24h	Motor torque output correction	0: Disabled 1: Enabled	0	-	At stop	"H07_en.35" on page 194
H07.36	2007-25h	Time constant of low-pass filter 2	0.00 ms to 10.00 ms	0.00	ms	Immediately	"H07_en.36" on page 194
H07.37	2007-26h	Torque reference filter selection	0: First-order filter 1: Biquad filter	0	-	Immediately	"H07_en.37" on page 195

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H07.38	2007-27h	Biquad filter attenuation ratio	0–50	16	-	At stop	"H07_en.38" on page 195
H07.40	2007-29h	Speed limit window in the torque control mode	0 ms to 300 ms	10	ms	Immediately	"H07_en.40" on page 195

6.9 List of H08 Gain Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H08.00	2008-01h	Speed loop gain	0.1 Hz to 2000.0 Hz	40.0	Hz	Immediately	"H08_en.00" on page 196
H08.01	2008-02h	Speed loop integral time constant	0.15 ms to 512.00 ms	19.89	ms	Immediately	"H08_en.01" on page 196
H08.02	2008-03h	Position loop gain	0.1 Hz to 2000.0 Hz	64.0	Hz	Immediately	"H08_en.02" on page 196
H08.03	2008-04h	2nd speed loop gain	0.1 Hz to 2000.0 Hz	75.0	Hz	Immediately	"H08_en.03" on page 197
H08.04	2008-05h	2nd speed loop integral time constant	0.15 ms to 512.00 ms	10.61	ms	Immediately	"H08_en.04" on page 197
H08.05	2008-06h	2nd position loop gain	0.1 Hz to 2000.0 Hz	120.0	Hz	Immediately	"H08_en.05" on page 197
H08.08	2008-09h	2nd gain mode setting	0: Fixed to the 1st gain, switched between P and PI as defined by bit26 of external 60FEh 1: Switched between the 1st and 2nd gain sets as defined by H08.09	1	-	Immediately	"H08_en.08" on page 198

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H08.09	2008-0Ah	Gain switchover condition	0: Fixed to the 1st gain set (PS) 1: Switched as defined by bit26 of 60FEh 2: Torque reference too large (PS) 3: Speed reference too large (PS) 4: Speed reference change rate too large (PS) 5: Speed reference low/high speed threshold (PS) 6: Position deviation too large (P) 7: Position reference available (P) 8: Positioning unfinished (P) 9: Actual speed (P) 10: Position reference + Actual speed (P)	0	-	Immediately	"H08_en.09" on page 198
H08.10	2008-0Bh	Gain switchover delay	0.0 ms to 1000.0 ms	5.0	ms	Immediately	"H08_en.10" on page 198
H08.11	2008-0Ch	Gain switchover level	0–20000	50	-	Immediately	"H08_en.11" on page 199
H08.12	2008-0Dh	Gain switchover dead time	0–20000	30	-	Immediately	"H08_en.12" on page 199
H08.13	2008-0Eh	Position gain switchover time	0.0 ms to 1000.0 ms	3.0	ms	Immediately	"H08_en.13" on page 199
H08.15	2008-10h	Load moment of inertia ratio	0.00–120.00	1.00	-	Immediately	"H08_en.15" on page 200
H08.16	2008-11h	ITune parameter save	0–65535	0	-	Immediately	"H08_en.16" on page 200
H08.17	2008-12h	Zero phase delay	0.0 ms to 4.0 ms	0.0	ms	Immediately	"H08_en.17" on page 200
H08.18	2008-13h	Speed feedforward filter time constant	0.00 ms to 64.00 ms	0.50	ms	Immediately	"H08_en.18" on page 201
H08.19	2008-14h	Speed feedforward gain	0.0% to 100.0%	0.0	%	Immediately	"H08_en.19" on page 201

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H08.20	2008-15h	Torque feedforward filter time constant	0.00 ms to 64.00 ms	0.50	ms	Immediately	"H08_en.20" on page 201
H08.21	2008-16h	Torque feedforward gain	0.0% to 300.0%	0.0	%	Immediately	"H08_en.21" on page 202
H08.22	2008-17h	Speed feedback filtering option 0: Inhibited 1: 2 times 2: 4 times 3: 8 times 4: 16 times		0	-	At stop	"H08_en.22" on page 202
H08.23	2008-18h	Cutoff frequency of speed feedback low-pass filter	100 Hz to 8000 Hz	8000	Hz	Immediately	"H08_en.23" on page 203
H08.24	2008-19h	PDF control coefficient	0.0% to 200.0%	100.0	%	Immediately	"H08_en.24" on page 203
H08.27	2008-1Ch	Speed observer cutoff frequency	50 Hz to 600 Hz	170	Hz	Immediately	"H08_en.27" on page 203
H08.28	2008-1Dh	Speed observer inertia correction coefficient	1% to 1600%	100	%	Immediately	"H08_en.28" on page 204
H08.29	2008-1Eh	Speed observer filter time	0.00 ms to 10.00 ms	0.80	ms	Immediately	"H08_en.29" on page 204
H08.30	2008-1Fh	Disturbance compensation time	0.00 ms to 100.00 ms	0.20	ms	Immediately	"H08_en.30" on page 204
H08.31	2008-20h	Disturbance cutoff frequency	10 Hz to 4000 Hz	600	Hz	Immediately	"H08_en.31" on page 205
H08.32	2008-21h	Disturbance compensation gain	0% to 100%	0	%	Immediately	"H08_en.32" on page 205
H08.33	2008-22h	Disturbance observer inertia correction coefficient	1% to 1600%	100	%	Immediately	"H08_en.33" on page 205

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H08.37	2008-26h	Phase modulation for medium-frequency jitter suppression 2	-90° to 90°	0	°	Immediately	"H08_en.37" on page 205
H08.38	2008-27h	Frequency of medium-frequency jitter suppression 2	0 Hz to 1000 Hz	0	Hz	Immediately	"H08_en.38" on page 206
H08.39	2008-28h	Compensation gain of medium-frequency jitter suppression 2	0% to 300%	0	%	Immediately	"H08_en.39" on page 206
H08.40	2008-29h	Speed observer selection	0: Disabled 1: Enabled	0	-	Immediately	"H08_en.40" on page 206
H08.42	2008-2Bh	Model control selection	0: Disable 1: Enable 2: Dual-inertia model	0	-	Immediately	"H08_en.42" on page 207
H08.43	2008-2Ch	Model gain	0.1–2000.0	40.0	-	Immediately	"H08_en.43" on page 207
H08.45	2008-2Eh	Model feedforward position	0–1	1	-	Immediately	"H08_en.45" on page 207
H08.46	2008-2Fh	Feedforward value	0.0–102.4	95.0	-	Immediately	"H08_en.46" on page 208
H08.50	2008-33h	Model torque feedforward differential time	0.00 ms to 655.35 ms	0.00	ms	Immediately	"H08_en.50" on page 208
H08.51	2008-34h	Model speed feedforward differential time	0.00 ms to 20.00 ms	0.00	ms	Immediately	"H08_en.51" on page 208
H08.53	2008-36h	Medium- and low-frequency jitter suppression frequency 3	0.0 Hz to 300.0 Hz	0.0	Hz	Immediately	"H08_en.53" on page 208

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H08.54	2008-37h	Medium- and low-frequency jitter suppression compensation 3	0% to 200%	0	%	Immediately	"H08_en.54" on page 209
H08.56	2008-39h	Medium- and low-frequency jitter suppression phase modulation 3	0% to 600%	100	%	Immediately	"H08_en.56" on page 209
H08.59	2008-3Ch	Medium- and low-frequency jitter suppression frequency 4	0.0 Hz to 300.0 Hz	0.0	Hz	Immediately	"H08_en.59" on page 209
H08.60	2008-3Dh	Medium- and low-frequency jitter suppression compensation 4	0% to 200%	0	%	Immediately	"H08_en.60" on page 210
H08.61	2008-3Eh	Medium- and low-frequency jitter suppression phase modulation 4	0% to 600%	100	%	Immediately	"H08_en.61" on page 210
H08.62	2008-3Fh	Position loop integral time constant	0.15–512.00	512.00	-	Immediately	"H08_en.62" on page 210
H08.63	2008-40h	2nd position loop integral time constant	0.15–512.00	512.00	-	Immediately	"H08_en.63" on page 210
H08.64	2008-41h	Speed observer feedback source	0: Disabled 1: Enabled	0	-	Immediately	"H08_en.64" on page 211
H08.65	2008-42h	Zero deviation control selection	0: Disabled 1: Enabled	0	-	Immediately	"H08_en.65" on page 211
H08.66	2008-43h	Zero deviation control position average filter	0.0 ms to 320.0 ms	5.0	ms	Immediately	"H08_en.66" on page 211

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H08.67	2008-44h	Zero deviation control position low-pass filter	0.0us–5120.0us	190.0	us	Immediately	"H08_en.67" on page 212
H08.68	2008-45h	Speed feedforward of zero deviation control	0.0% to 100.0%	100.0	%	Immediately	"H08_en.68" on page 212
H08.69	2008-46h	Torque feedforward of zero deviation control	0.0% to 100.0%	100.0	%	Immediately	"H08_en.69" on page 212
H08.71	2008-48h	Zero deviation control encoder delay	0.00us–512.00us	31.25	us	Immediately	"H08_en.71" on page 212
H08.81	2008-52h	Anti-resonance frequency of dual-inertia model	1.0 Hz to 400.0 Hz	20.0	Hz	Immediately	"H08_en.81" on page 213
H08.82	2008-53h	Resonance frequency of dual-inertia model	0.0 Hz to 6553.5 Hz	0.0	Hz	Immediately	"H08_en.82" on page 213
H08.83	2008-54h	Dual-inertia model gain	0.1–300.0	60.0	-	Immediately	"H08_en.83" on page 213
H08.84	2008-55h	Inertia ratio of dual-inertia model	0.00–120.00	1.00	-	Immediately	"H08_en.84" on page 214
H08.88	2008-59h	Speed feedforward value of dual-inertia model	0.0–6553.5	100.0	-	Immediately	"H08_en.88" on page 214
H08.89	2008-5Ah	Torque feedforward value of dual-inertia model	0.0–6553.5	100.0	-	Immediately	"H08_en.89" on page 214

6.10 List of H09 Auto-adjust Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H09.00	2009-01h	Gain auto-tuning mode	0: Disabled, manual gain tuning required 1: Enabled, gain parameters generated automatically based on the stiffness level 2: Positioning mode, gain parameters generated 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	4	-	Immediately	"H09_en.00" on page 214
H09.01	2009-02h	Stiffness level	0–41	15	-	Immediately	"H09_en.01" on page 215
H09.02	2009-03h	Adaptive notch mode	0: Adaptive notch no longer 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 3rd and 4th notches restored to default	3	-	Immediately	"H09_en.02" on page 215
H09.03	2009-04h	Online inertia auto-tuning mode	0: Disabled 1: Enabled, changing slowly 2: Enabled, changing normally 3: Enabled, changing quickly	2	-	Immediately	"H09_en.03" on page 216
H09.05	2009-06h	Offline inertia auto-tuning mode	0: Bi-directional 1: Unidirectional	1	-	At stop	"H09_en.05" on page 216
H09.06	2009-07h	Max. speed of inertia auto-tuning	100 rpm to 1000 rpm	500	rpm	At stop	"H09_en.06" on page 216

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H09.07	2009-08h	Time constant for accelerating to max. speed during inertia auto-tuning	20 ms to 800 ms	125	ms	At stop	"H09_en.07" on page 217
H09.08	2009-09h	Interval time after an individual inertia auto-tuning	50 ms to 10000 ms	800	ms	At stop	"H09_en.08" on page 217
H09.09	2009-0Ah	Number of motor revolutions per inertia auto-tuning	0.00–100.00	1.00	-	Immediately	"H09_en.09" on page 217
H09.11	2009-0Ch	Vibration threshold	0.0% to 100.0%	5.0	%	Immediately	"H09_en.11" on page 218
H09.12	2009-0Dh	Frequency of the 1st notch	50 Hz to 8000 Hz	8000	Hz	Immediately	"H09_en.12" on page 218
H09.13	2009-0Eh	Width level of the 1st notch	0–20	2	-	Immediately	"H09_en.13" on page 218
H09.14	2009-0Fh	Depth level of the 1st notch	0–99	0	-	Immediately	"H09_en.14" on page 219
H09.15	2009-10h	Frequency of the 2nd notch	50 Hz to 8000 Hz	8000	Hz	Immediately	"H09_en.15" on page 219
H09.16	2009-11h	Width level of the 2nd notch	0–20	2	-	Immediately	"H09_en.16" on page 219
H09.17	2009-12h	Depth level of the 2nd notch	0–99	0	-	Immediately	"H09_en.17" on page 220
H09.18	2009-13h	Frequency of the 3rd notch	50 Hz to 8000 Hz	8000	Hz	Immediately	"H09_en.18" on page 220
H09.19	2009-14h	Width level of the 3rd notch	0–20	2	-	Immediately	"H09_en.19" on page 220
H09.20	2009-15h	Depth level of the 3rd notch	0–99	0	-	Immediately	"H09_en.20" on page 220
H09.21	2009-16h	Frequency of the 4th notch	50 Hz to 8000 Hz	8000	Hz	Immediately	"H09_en.21" on page 221
H09.22	2009-17h	Width level of the 4th notch	0–20	2	-	Immediately	"H09_en.22" on page 221
H09.23	2009-18h	Depth level of the 4th notch	0–99	0	-	Immediately	"H09_en.23" on page 221

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H09.24	2009-19h	Auto-tuned resonance frequency	0 Hz to 5000 Hz	0	Hz	Unchangeable	"H09_en.24" on page 221
H09.26	2009-1Bh	ITune response	50.0% to 500.0%	100.0	%	Immediately	"H09_en.26" on page 222
H09.27	2009-1Ch	ITune mode	0: Disabled 1: ITune mode 1 2: ITune mode 2	0	-	Immediately	"H09_en.27" on page 222
H09.28	2009-1Dh	Minimum inertia ratio of ITune	0.0% to 80.0%	0.0	%	Immediately	"H09_en.28" on page 222
H09.29	2009-1Eh	Maximum inertia ratio of ITune	1.0% to 120.0%	30.0	%	Immediately	"H09_en.29" on page 223
H09.32	2009-21h	Gravity compensation value	0.0% to 100.0%	0.0	%	Immediately	"H09_en.32" on page 223
H09.33	2009-22h	Positive friction compensation value	0.0% to 100.0%	0.0	%	Immediately	"H09_en.33" on page 223
H09.34	2009-23h	Negative friction compensation value	-100.0% to 0.0%	0.0	%	Immediately	"H09_en.34" on page 224
H09.35	2009-24h	Friction compensation speed	0.0–20.0	2.0	-	Immediately	"H09_en.35" on page 224
H09.36	2009-25h	Friction compensation speed	0: Slow mode+Speed reference 1: Slow mode+Model speed 2: Slow mode+Speed feedback 3: Slow mode+Observe speed 16: Quick mode +Speed reference 17: Quick mode +Model speed 18: Quick mode +Speed feedback 19: Quick mode+Observe speed	0	-	Immediately	"H09_en.36" on page 224
H09.37	2009-26h	Vibration monitoring time	0–65535	600	-	Immediately	"H09_en.37" on page 225

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H09.38	2009-27h	Frequency of low-frequency resonance suppression 1 at the mechanical end	1.0 Hz to 100.0 Hz	100.0	Hz	Immediately	"H09_en.38" on page 225
H09.39	2009-28h	Low-frequency resonance suppression 1 at the mechanical end	0–3	2	-	At stop	"H09_en.39" on page 225
H09.41	2009-2Ah	Frequency of the 5th notch	50 Hz to 8000 Hz	8000	Hz	Immediately	"H09_en.41" on page 225
H09.42	2009-2Bh	Width level of the 5th notch	0–20	2	-	At stop	"H09_en.42" on page 226
H09.43	2009-2Ch	Depth level of the 5th notch	0–99	0	-	At stop	"H09_en.43" on page 226
H09.44	2009-2Dh	Frequency of low-frequency resonance suppression 2 at mechanical load end	0.0–100.0	0.0	-	Immediately	"H09_en.44" on page 226
H09.45	2009-2Eh	Responsiveness of low-frequency resonance suppression 2 at mechanical load end	0.01–5.00	1.00	-	Immediately	"H09_en.45" on page 227
H09.47	2009-30h	Width of low-frequency resonance suppression 2 at mechanical load end	0.00–2.00	1.00	-	Immediately	"H09_en.47" on page 227
H09.49	2009-32h	Frequency of low-frequency resonance suppression 3 at mechanical load end	0.0–100.0	0.0	-	Immediately	"H09_en.49" on page 227

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H09.50	2009-33h	Responsiveness of low-frequency resonance suppression 3 at mechanical load end	0.01–5.00	1.00	-	Immediately	"H09_en.50" on page 227
H09.52	2009-35h	Width of low-frequency resonance suppression 3 at mechanical load end	0.00–2.00	1.00	-	Immediately	"H09_en.52" on page 228
H09.54	2009-37h	Vibration threshold	0.0% to 300.0%	50.0	%	Immediately	"H09_en.54" on page 228
H09.56	2009-39h	Max. overshoot allowed by ETune	0–65535	2936	-	Immediately	"H09_en.56" on page 228
H09.57	2009-3Ah	STune resonance suppression switchover frequency	0 Hz to 4000 Hz	900	Hz	Immediately	"H09_en.57" on page 229
H09.58	2009-3Bh	STune resonance suppression reset selection	0: Disabled 1: Enabled	0	-	Immediately	"H09_en.58" on page 229

6.11 List of HOA Fault and Protection Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0A.00	200A-01h	Power input phase loss protection	0: Enable 1: Disable	0	-	Immediately	"H0A_en.00" on page 229
H0A.01	200A-02h	Absolute position limit	0: Disabled 1: Enabled 2: Enabled after homing	0	-	Immediately	"H0A_en.01" on page 230
H0A.04	200A-05h	Motor overload protection gain	50–300	100	-	Immediately	"H0A_en.04" on page 230
H0A.08	200A-09h	Overspeed threshold	0 rpm to 20000 rpm	0	rpm	Immediately	"H0A_en.08" on page 230

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0A.10	200A-0Bh	Threshold of excessive local position deviation	0–4294967295	219895608	-	Immediately	"H0A_en.10" on page 231
H0A.12	200A-0Dh	Runaway protection	0: Disable 1: Enable	1	-	Immediately	"H0A_en.12" on page 231
H0A.18	200A-13h	IGBT over-temperature threshold	120°C to 175°C	140	°C	Immediately	"H0A_en.18" on page 231
H0A.19	200A-14h	Filter time constant of touch probe 1	0.00us–6.30us	2.00	us	Immediately	"H0A_en.19" on page 232
H0A.20	200A-15h	Filter time constant of touch probe 2	0.00us–6.30us	2.00	us	Immediately	"H0A_en.20" on page 232
H0A.22	200A-17h	Sigma_Delta filter time	0–65535	1	-	At stop	"H0A_en.22" on page 232
H0A.23	200A-18h	TZ signal filter time	0 ns to 31 ns	15	25 ns	At stop	"H0A_en.23" on page 233
H0A.25	200A-1Ah	Speed display DO low-pass filter time	0 ms to 5000 ms	0	ms	Immediately	"H0A_en.25" on page 233
H0A.26	200A-1Bh	Motor overload detection	0: Show motor overload warning (E909.0) and fault (E620.0) 1: Hide motor overload warning (E909.0) and fault (E620.0)	0	-	Immediately	"H0A_en.26" on page 233
H0A.27	200A-1Ch	Average filter time for speed display DO	0 ms to 100 ms	50	ms	Immediately	"H0A_en.27" on page 233
H0A.32	200A-21h	Motor stall over-temperature protection time window	10 ms to 65535 ms	200	ms	Immediately	"H0A_en.32" on page 234
H0A.33	200A-22h	Motor stall over-temperature detection	0: Hide 1: Enable	1	-	Immediately	"H0A_en.33" on page 234
H0A.36	200A-25h	Encoder multi-turn overflow fault selection	0: Not hide 1: Hide	0	-	Immediately	"H0A_en.36" on page 234

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0A.40	200A-29h	Compensation function selection	bit0: Overtravel compensation 0: Enabled 1: Disabled bit1: Touch probe rising edge compensation 0: Disabled 1: Enabled bit2: Touch probe falling edge compensation 0: Disabled 1: Enabled bit3: Touch probe solution 0: New solution 1: Old solution (same as SV660N)	6	-	At stop	"H0A_en.40" on page 235
H0A.41	200A-2Ah	Forward position of software position limit	-2147483648 to 2147483647	2147483647	Encoder unit	At stop	"H0A_en.41" on page 235
H0A.43	200A-2Ch	Reverse position of software position limit	-2147483648 to 2147483647	-2147483648	Encoder unit	At stop	"H0A_en.43" on page 235
H0A.49	200A-32h	Regenerative resistor overtemperature threshold	100°C to 175°C	115	°C	Immediately	"H0A_en.49" on page 236
H0A.50	200A-33h	Encoder communication fault tolerance threshold	0–31	5	-	Immediately	"H0A_en.50" on page 236
H0A.51	200A-34h	Phase loss detection filter times	3 ms to 36 ms	20	55 ms	Immediately	"H0A_en.51" on page 236
H0A.52	200A-35h	Encoder temperature protection threshold	0°C to 175°C	105	°C	Immediately	"H0A_en.52" on page 237
H0A.53	200A-36h	Probe DI ON compensation time	-3000 ns to 3000 ns	200	25 ns	Immediately	"H0A_en.53" on page 237
H0A.54	200A-37h	Probe DI OFF compensation time	-3000 ns to 3000 ns	1512	25 ns	Immediately	"H0A_en.54" on page 237

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0A.55	200A-38h	Runaway current threshold	100.0% to 400.0%	200.0	%	Immediately	"H0A_en.55" on page 237
H0A.56	200A-39h	Fault reset delay	0 ms to 60000 ms	10000	ms	Immediately	"H0A_en.56" on page 238
H0A.57	200A-3Ah	Runaway speed threshold	1 rpm to 1000 rpm	50	rpm	Immediately	"H0A_en.57" on page 238
H0A.58	200A-3Bh	Runaway speed filter time	0.1 ms to 100.0 ms	2.0	ms	Immediately	"H0A_en.58" on page 238
H0A.59	200A-3Ch	Runaway protection detection time	10 ms to 1000 ms	30	ms	Immediately	"H0A_en.59" on page 239
H0A.60	200A-3Dh	Black box function mode	0: Disable 1: Any fault 2: Designated fault 3: Triggered based on designated condition	1	-	Immediately	"H0A_en.60" on page 239
H0A.61	200A-3Eh	Designated fault code	0.0 to 6553.5	0.0	-	Immediately	"H0A_en.61" on page 239
H0A.62	200A-3Fh	Trigger source	0 to 25	0	-	Immediately	"H0A_en.62" on page 239
H0A.63	200A-40h	Trigger level	-2147483648 to 2147483647	0	-	Immediately	"H0A_en.63" on page 240
H0A.65	200A-42h	Trigger level	0: Rising edge 1: Equal 2: Falling edge 3: Edge-triggered	0	-	Immediately	"H0A_en.65" on page 240
H0A.66	200A-43h	Trigger position	0% to 100%	75	%	Immediately	"H0A_en.66" on page 240
H0A.67	200A-44h	Sampling frequency	0: Current loop 1: Position loop 2: Main cycle	0	-	Immediately	"H0A_en.67" on page 241
H0A.70	200A-47h	Overspeed threshold 2	0 rpm to 20000 rpm	0	rpm	Immediately	"H0A_en.70" on page 241
H0A.71	200A-48h	MS1 motor overload curve switchover	0 to 3	2	-	Immediately	"H0A_en.71" on page 241
H0A.72	200A-49h	Maximum stop time in ramp-to-stop	0 ms to 65535 ms	10000	ms	At stop	"H0A_en.72" on page 242

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0A.73	200A-4Ah	STO 24 V disconnection filter time	1 ms to 5 ms	5	ms	Immediately	"H0A_en.73" on page 242
H0A.74	200A-4Bh	Filter time for two inconsistent STO channels	1 ms to 1000 ms	100	ms	Immediately	"H0A_en.74" on page 242
H0A.75	200A-4Ch	Servo OFF delay after STO triggered	0 ms to 25 ms	20	ms	Immediately	"H0A_en.75" on page 243
H0A.81	200A-52h	Enable voltage drop protection	0: No operation 1: Host controller executes torque limit 2: Servo executes torque limit	0	-	At stop	"H0A_en.81" on page 243
H0A.82	200A-53h	Voltage drop torque limit	0.0% to 100.0%	50.0	%	Immediately	"H0A_en.82" on page 243
H0A.83	200A-54h	Torque limit cancel time	0 ms to 1000 ms	100	ms	Immediately	"H0A_en.83" on page 243
H0A.84	200A-55h	Instantaneous stop holding time	20 ms to 50000 ms	1000	ms	Immediately	"H0A_en.84" on page 244
H0A.85	200A-56h	Wire breakage torque reference	4.0% to 400.0%	5.0	%	At stop	"H0A_en.85" on page 244
H0A.86	200A-57h	Wire breakage detection filter time	5 ms to 1000 ms	30	ms	At stop	"H0A_en.86" on page 244
H0A.90	200A-5Bh	Moving average filter time for speed display values	0 ms to 100 ms	0	ms	Immediately	"H0A_en.90" on page 244
H0A.91	200A-5Ch	Moving average filter time for torque display values	0 ms to 100 ms	0	ms	Immediately	"H0A_en.91" on page 245
H0A.92	200A-5Dh	Moving average filter time for position display values	0 ms to 100 ms	0	ms	Immediately	"H0A_en.92" on page 245

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0A.93	200A-5Eh	Low-pass filter time for voltage display values	0 ms to 250 ms	0	ms	Immediately	"H0A_en.93" on page 245
H0A.94	200A-5Fh	Low-pass filter time for thermal display values	0 ms to 250 ms	0	ms	Immediately	"H0A_en.94" on page 246

6.12 List of H0b Monitoring Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0b.00	200b-01h	Motor speed actual value	-32767 rpm to +32767 rpm	0	rpm	Unchangeable	"H0b_en.00" on page 246
H0b.01	200b-02h	Speed reference	-32767 rpm to +32767 rpm	0	rpm	Unchangeable	"H0b_en.01" on page 246
H0b.02	200b-03h	Internal torque reference	-500.0% to 500.0%	0.0	%	Unchangeable	"H0b_en.02" on page 246
H0b.03	200b-04h	Monitored DI status	0–65535	0	-	Unchangeable	"H0b_en.03" on page 247
H0b.05	200b-06h	Monitored DO status	0–65535	0	-	Unchangeable	"H0b_en.05" on page 247
H0b.07	200b-08h	Absolute position counter	–2147483648 p to +2147483647 p	0	p	Unchangeable	"H0b_en.07" on page 247
H0b.09	200b-0Ah	Mechanical angle	0.0° to 360.0°	0.0	°	Unchangeable	"H0b_en.09" on page 248
H0b.10	200b-0Bh	Electrical angle	0.0° to 360.0°	0.0	°	Unchangeable	"H0b_en.10" on page 248
H0b.12	200b-0Dh	Average load rate	0.0% to 800.0%	0.0	%	Unchangeable	"H0b_en.12" on page 248

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0b.15	200b-10h	Position following error (encoder unit)	-2147483648 p to +2147483647 p	0	p	Unchangeable	"H0b_en.15" on page 249
H0b.17	200b-12h	Feedback pulse counter	-2147483648 p to +2147483647 p	0	p	Unchangeable	"H0b_en.17" on page 249
H0b.19	200b-14h	Total power-on time	0.0s-429496729.5s	0.0	s	Unchangeable	"H0b_en.19" on page 249
H0b.21	200b-16h	Displayed AI1 voltage	-12.00 V to 12.00 V	0.00	V	Unchangeable	"H0b_en.21" on page 250
H0b.24	200b-19h	RMS value of phase current	0.0 A to 6553.5 A	0.0	A	Unchangeable	"H0b_en.24" on page 250
H0b.26	200b-1Bh	Bus voltage	0.0 V to 6553.5 V	0.0	V	Unchangeable	"H0b_en.26" on page 250
H0b.27	200b-1Ch	Module temperature	-20°C to 200°C	0	°C	Unchangeable	"H0b_en.27" on page 251
H0b.28	200b-1Dh	Absolute encoder fault information given by FPGA	0-65535	0	-	Unchangeable	"H0b_en.28" on page 251
H0b.29	200b-1Eh	Axis status information given by FPGA	0-65535	0	-	Unchangeable	"H0b_en.29" on page 251
H0b.30	200b-1Fh	Axis fault information given by FPGA	0-65535	0	-	Unchangeable	"H0b_en.30" on page 251
H0b.31	200b-20h	Encoder fault information	0-65535	0	-	Unchangeable	"H0b_en.31" on page 252

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0b.33	200b-22h	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 10: 10th to last fault 11: 11th to last fault 12: 12th to last fault 13: 13th to last fault 14: 14th to last fault 15: 15th to last fault 16: 16th to last fault 17: 17th to last fault 18: 18th to last fault 19: 19th to last fault	0	-	Immediately	"H0b_en.33" on page 252
H0b.34	200b-23h	Fault code of the selected fault	0–65535	0	-	Unchangeable	"H0b_en.34" on page 253
H0b.35	200b-24h	Time stamp upon occurrence of the selected fault	0.0s–429496729.5s	0.0	s	Unchangeable	"H0b_en.35" on page 253
H0b.37	200b-26h	Motor speed upon occurrence of the selected fault	-32767 rpm to +32767 rpm	0	rpm	Unchangeable	"H0b_en.37" on page 254
H0b.38	200b-27h	Motor phase U current upon occurrence of the selected fault	-3276.7 A to 3276.7 A	0.0	A	Unchangeable	"H0b_en.38" on page 254
H0b.39	200b-28h	Motor phase V current upon occurrence of the selected fault	-3276.7 A to 3276.7 A	0.0	A	Unchangeable	"H0b_en.39" on page 254

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0b.40	200b-29h	Bus voltage upon occurrence of the selected fault	0.0 V to 6553.5 V	0.0	V	Unchangeable	"H0b_en.40" on page 254
H0b.41	200b-2Ah	DI status upon occurrence of the selected fault	0–65535	0	-	Unchangeable	"H0b_en.41" on page 255
H0b.43	200b-2Ch	DO status upon occurrence of the selected fault	0–65535	0	-	Unchangeable	"H0b_en.43" on page 255
H0b.45	200b-2Eh	Internal fault code	0–65535	0	-	Unchangeable	"H0b_en.45" on page 255
H0b.46	200b-2Fh	Absolute encoder fault information given by FPGA upon occurrence of the selected fault	0–65535	0	-	Unchangeable	"H0b_en.46" on page 256
H0b.47	200b-30h	System status information given by FPGA upon occurrence of the selected fault	0–65535	0	-	Unchangeable	"H0b_en.47" on page 256
H0b.48	200b-31h	System fault information given by FPGA upon occurrence of the selected fault	0–65535	0	-	Unchangeable	"H0b_en.48" on page 256
H0b.49	200b-32h	Encoder fault information upon occurrence of the selected fault	0–65535	0	-	Unchangeable	"H0b_en.49" on page 256

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0b.51	200b-34h	Internal fault code upon occurrence of the selected fault	0–65535	0	-	Unchangeable	"H0b_en.51" on page 257
H0b.52	200b-35h	FPGA timeout fault standard bit upon occurrence of the selected fault	0–65535	0	-	Unchangeable	"H0b_en.52" on page 257
H0b.53	200b-36h	Position following error (reference unit)	–2147483648 p to +2147483647 p	0	p	Unchangeable	"H0b_en.53" on page 257
H0b.55	200b-38h	Motor speed actual value	–2147483648.0rpm to 2147483647.0rpm	0.0	rpm	Unchangeable	"H0b_en.55" on page 258
H0b.57	200b-3Ah	Bus voltage of the control circuit	0.0 V to 6553.5 V	0.0	V	Unchangeable	"H0b_en.57" on page 258
H0b.58	200b-3Bh	Mechanical absolute position (low 32 bits)	–2147483648 p to +2147483647 p	0	p	Unchangeable	"H0b_en.58" on page 258
H0b.60	200b-3Dh	Mechanical absolute position (high 32 bits)	–2147483648 p to +2147483647 p	0	p	Unchangeable	"H0b_en.60" on page 258
H0b.63	200b-40h	NotRdy state	1: Control circuit error 2: Main circuit power input error 3: Bus undervoltage 4: Soft start failed 5: Encoder initialization undone 6: Short circuit to ground failed 7: Others	0	-	Unchangeable	"H0b_en.63" on page 259
H0b.66	200b-43h	Encoder temperature	–32768°C to 32767°C	0	°C	Unchangeable	"H0b_en.66" on page 259
H0b.67	200b-44h	Load rate of regenerative resistor	0.0% to 200.0%	0.0	%	Unchangeable	"H0b_en.67" on page 259

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0b.70	200b-47h	Number of absolute encoder revolutions	0 Rev to 65535 Rev	0	Rev	Unchangeable	"H0b_en.70" on page 260
H0b.71	200b-48h	Single-turn position fed back by the absolute encoder	0 p to 2147483647 p	0	p	Unchangeable	"H0b_en.71" on page 260
H0b.74	200b-4Bh	System fault information given by FPGA	0-65535	0	-	Unchangeable	"H0b_en.74" on page 260
H0b.77	200b-4Eh	Encoder position (low 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	"H0b_en.77" on page 260
H0b.79	200b-50h	Encoder position (high 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	"H0b_en.79" on page 261
H0b.81	200b-52h	Single-turn position of the rotary load (low 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	"H0b_en.81" on page 261
H0b.83	200b-54h	Single-turn position of the rotary load (high 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	"H0b_en.83" on page 261
H0b.85	200b-56h	Single-turn position of the rotary load (reference unit)	-2147483648 p to +2147483647 p	0	p	Unchangeable	"H0b_en.85" on page 262
H0b.87	200b-58h	IGBT junction temperature	0-200	0	-	Unchangeable	"H0b_en.87" on page 262
H0b.90	200b-5Bh	Group No. of the abnormal parameter	0-65535	0	-	Unchangeable	"H0b_en.90" on page 262
H0b.91	200b-5Ch	Offset within the group of the abnormal parameter	0-65535	0	-	Unchangeable	"H0b_en.91" on page 262

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0b.94	200b-5Fh	Individual power-on time	0.0s–429496729.5s	0.0	s	Unchangeable	"H0b_en.94" on page 263
H0b.96	200b-61h	Individual power-on time upon occurrence of the selected fault	0.0s–429496729.5s	0.0	s	Unchangeable	"H0b_en.96" on page 263

6.13 List of H0d Auxiliary Function Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0d.00	200d-01h	Software Reset	0: No operation 1: Enable	0	-	At stop	"H0d_en.00" on page 263
H0d.01	200d-02h	Fault Reset	0: No operation 1: Enable	0	-	At stop	"H0d_en.01" on page 264
H0d.02	200d-03h	Inertia auto-tuning selection	0–65	0	-	Immediately	"H0d_en.02" on page 264
H0d.03	200d-04h	Encoder initial angle auto-tuning	0: No operation 1: Enabled	0	-	At stop	"H0d_en.03" on page 264
H0d.04	200d-05h	Read/write in encoder ROM	0: No operation 1: Write ROM 2: Read ROM 3: ROM failure	0	-	At stop	"H0d_en.04" on page 265
H0d.05	200d-06h	Emergency stop	0: No operation 1: Emergency stop	0	-	Immediately	"H0d_en.05" on page 265
H0d.10	200d-0Bh	Auto-tuning of analog channel	0: No operation 1: All adjustment	0	-	At stop	"H0d_en.10" on page 265
H0d.12	200d-0Dh	Phase U/V current balance correction	0: Disabled 1: Enabled	0	-	At stop	"H0d_en.12" on page 266

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0d.17	200d-12h	Forced DI/DO enable switch	bit0: Forced DI enable switch 0: Disabled 1: Enabled bit1: Forced DO enable switch 0: Disabled 1: Enabled	0	-	Immediately	"H0d_en.17" on page 266
H0d.18	200d-13h	Forced DI value	0–255	255	-	Immediately	"H0d_en.18" on page 266
H0d.19	200d-14h	Forced DO value	0–15	0	-	Immediately	"H0d_en.19" on page 267
H0d.20	200d-15h	Absolute encoder reset selection	0: No operation 1 Reset 2: Reset the fault and multi-turn data	0	-	At stop	"H0d_en.20" on page 267
H0d.23	200d-18h	Torque fluctuation auto-tuning	0–1	0	-	At stop	"H0d_en.23" on page 267

6.14 List of H0E Communication Function Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0E.00	200E-01h	Node address	1 to 127	1	-	At stop	"H0E_en.00" on page 268
H0E.01	200E-02h	Save objects written through communication to EEPROM	0: Not save 1: Save parameters written through communication to EEPROM 2: Save object dictionaries written through communication to EEPROM 3: Save parameters and object dictionaries written through communication to EEPROM 4: Save object dictionaries written before communication (OP) to EEPROM	4	-	Immediately	"H0E_en.01" on page 268
H0E.15	200E-10h	Select group 6000 index (last 2 bits)	0 to 255	255	-	Immediately	"H0E_en.15" on page 268

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0E.16	200E-11h	Select group 6000 sub-index	0 to 2	0	-	Immediately	"H0E_en.16" on page 269
H0E.20	200E-15h	EtherCAT slave name	0 to 65535	0	-	Unchangeable	"H0E_en.20" on page 269
H0E.21	200E-16h	EtherCAT slave alias	0 to 65535	0	-	At stop	"H0E_en.21" on page 269
H0E.22	200E-17h	Number of synchronous loss events allowed by EtherCAT	1 to 20	8	-	Immediately	"H0E_en.22" on page 269
H0E.24	200E-19h	Number of SYNC loss events	0 to 65535	0	-	Unchangeable	"H0E_en.24" on page 270
H0E.25	200E-1Ah	Max. error value and invalid frames of EtherCAT port 0 per unit time	0 to 65535	0	-	Unchangeable	"H0E_en.25" on page 270
H0E.26	200E-1Bh	Max. error value and invalid frames of EtherCAT port 1 per unit time	0 to 65535	0	-	Unchangeable	"H0E_en.26" on page 270
H0E.27	200E-1Ch	Max. transfer error of EtherCAT port per unit time	0 to 65535	0	-	Unchangeable	"H0E_en.27" on page 271
H0E.28	200E-1Dh	Max. EtherCAT data frame processing unit error per unit time	0 to 255	0	-	Unchangeable	"H0E_en.28" on page 271
H0E.29	200E-1Eh	Max. link loss value of EtherCAT port 0 per unit time	0 to 65535	0	-	Unchangeable	"H0E_en.29" on page 271
H0E.31	200E-20h	EtherCAT synchronization mode setting	0 to 2	2	-	At stop	"H0E_en.31" on page 271

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0E.32	200E-21h	EtherCAT synchronization error threshold	100 ns to 4000 ns	3000	ns	At stop	"H0E_en.32" on page 272
H0E.33	200E-22h	EtherCAT state machine status and port connection status	0 to 65535	0	-	Unchangeable	"H0E_en.33" on page 272
H0E.34	200E-23h	Number of excessive position reference increment events in CSP mode	1 to 30	20	-	Immediately	"H0E_en.34" on page 272
H0E.35	200E-24h	AL fault code	0 to 65535	0	-	Unchangeable	"H0E_en.35" on page 273
H0E.36	200E-25h	EtherCAT enhanced link selection	0: Disabled 1: Enabled	0	-	Immediately	"H0E_en.36" on page 273
H0E.37	200E-26h	EtherCAT XML reset selection	0: Disabled 1: Enabled	0	-	Immediately	"H0E_en.37" on page 273
H0E.80	200E-51h	Modbus baud rate	0: 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	9	-	Immediately	"H0E_en.80" on page 273
H0E.81	200E-52h	Modbus data format	0: No parity, 2 stop bits (N-2) 1: Even parity, 1 stop bit (E-1) 2: Odd parity, 1 stop bit (O-1) 3: No parity, 1 stop bit (N-1)	3	-	Immediately	"H0E_en.81" on page 274
H0E.82	200E-53h	Modbus response delay	0 ms to 20 ms	0	ms	Immediately	"H0E_en.82" on page 274
H0E.83	200E-54h	Modbus communication timeout	0 ms to 600 ms	0	ms	Immediately	"H0E_en.83" on page 275

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H0E.84	200E-55h	Sequence of Modbus communication data bits	0: High bits before low bits 1: Low bits before high bits	1	-	Immediately	"H0E_en.84" on page 275
H0E.90	200E-5Bh	ESC version	0.00 to 655.35	0.00	-	Unchangeable	"H0E_en.90" on page 275
H0E.93	200E-5Eh	PHY type	0.00 to 655.35	0.00	-	Unchangeable	"H0E_en.93" on page 276
H0E.96	200E-61h	XML version information	0.00 to 655.35	0.00	-	Unchangeable	"H0E_en.96" on page 276

6.15 List of H18 Position Comparison Output Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H18.00	2018-01h	Position comparison output selection	0: Disable 1: Enable (rising edge-triggered)	0	-	Immediately	"H18_en.00" on page 276
H18.01	2018-02h	Position comparison output feedback source	0: Motor encoder feedback	0	-	Immediately	"H18_en.01" on page 277
H18.02	2018-03h	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	-	Immediately	"H18_en.02" on page 277
H18.03	2018-04h	Position comparison mode	0: Individual comparison mode 1: Cyclic comparison mode 2: Fixed cyclic comparison mode	0	-	Immediately	"H18_en.03" on page 277

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H18.04	2018-05h	Current position as zero	0: Disable 1: Enable (rising edge-triggered)	0	-	Immediately	"H18_en.04" on page 278
H18.05	2018-06h	Position comparison output width	0.1 ms to 204.7 ms	0.1	ms	Immediately	"H18_en.05" on page 278
H18.07	2018-08h	Start point of position comparison	0–40	0	-	Immediately	"H18_en.07" on page 278
H18.08	2018-09h	End point of position comparison	0–40	0	-	Immediately	"H18_en.08" on page 278
H18.09	2018-0Ah	Current state of position comparison	0–1024	0	-	Unchangeable	"H18_en.09" on page 279
H18.10	2018-0Bh	Real-time position of position comparison	-2147483648–2147483647	0	-	Unchangeable	"H18_en.10" on page 279
H18.12	2018-0Dh	Zero offset of position comparison	-2147483648–2147483647	0	-	Immediately	"H18_en.12" on page 279
H18.14	2018-0Fh	Position comparison output delay compensation	–12.00 μ s to 12.00 μ s	0.00	us	Immediately	"H18_en.14" on page 279
H18.15	2018-10h	Fixed cyclic comparison	1–65535	1	-	Immediately	"H18_en.15" on page 280
H18.17	2018-12h	Number of fixed mode cycles	0–65535	0	-	Unchangeable	"H18_en.17" on page 280

6.16 List of H19 Target Position Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.00	2019-01h	Target value of position comparison 1	-2147483648 to 2147483647	0	-	Immediately	"H19_en.00" on page 280
H19.02	2019-03h	Attribute value of position comparison 1	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.02" on page 281
H19.03	2019-04h	Target value of position comparison 2	-2147483648 to 2147483647	0	-	Immediately	"H19_en.03" on page 282

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.05	2019-06h	Attribute value of position comparison 2	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.05" on page 282
H19.06	2019-07h	Target value of position comparison 3	-2147483648 to 2147483647	0	-	Immediately	"H19_en.06" on page 283
H19.08	2019-09h	Attribute value of position comparison 3	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.08" on page 283
H19.09	2019-0Ah	Target value of position comparison 4	-2147483648 to 2147483647	0	-	Immediately	"H19_en.09" on page 283

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.11	2019-0Ch	Attribute value of position comparison 4	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.11" on page 284
H19.12	2019-0Dh	Target value of position comparison 5	-2147483648 to 2147483647	0	-	Immediately	"H19_en.12" on page 284
H19.14	2019-0Fh	Attribute value of position comparison 5	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.14" on page 285
H19.15	2019-10h	Target value of position comparison 6	-2147483648 to 2147483647	0	-	Immediately	"H19_en.15" on page 285

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.17	2019-12h	Attribute value of position comparison 6	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.17" on page 286
H19.18	2019-13h	Target value of position comparison 7	-2147483648 to 2147483647	0	-	Immediately	"H19_en.18" on page 286
H19.20	2019-15h	Attribute value of position comparison 7	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.20" on page 287
H19.21	2019-16h	Target value of position comparison 8	-2147483648 to 2147483647	0	-	Immediately	"H19_en.21" on page 287

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.23	2019-18h	Attribute value of position comparison 8	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.23" on page 287
H19.24	2019-19h	Target value of position comparison 9	-2147483648 to 2147483647	0	-	Immediately	"H19_en.24" on page 288
H19.26	2019-1Bh	Attribute value of position comparison 9	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.26" on page 288
H19.27	2019-1Ch	Target value of position comparison 10	-2147483648 to 2147483647	0	-	Immediately	"H19_en.27" on page 289

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.29	2019-1Eh	Attribute value of position comparison 10	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.29" on page 289
H19.30	2019-1Fh	Target value of position comparison 11	-2147483648 to 2147483647	0	-	Immediately	"H19_en.30" on page 290
H19.32	2019-21h	Attribute value of position comparison 11	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.32" on page 290
H19.33	2019-22h	Target value of position comparison 12	-2147483648 to 2147483647	0	-	Immediately	"H19_en.33" on page 291

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.35	2019-24h	Attribute value of position comparison 12	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.35" on page 291
H19.36	2019-25h	Target value of position comparison 13	-2147483648 to 2147483647	0	-	Immediately	"H19_en.36" on page 292
H19.38	2019-27h	Attribute value of position comparison 13	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.38" on page 292
H19.39	2019-28h	Target value of position comparison 14	-2147483648 to 2147483647	0	-	Immediately	"H19_en.39" on page 293

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.41	2019-2Ah	Attribute value of position comparison 14	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.41" on page 293
H19.42	2019-2Bh	Target value of position comparison 15	-2147483648 to 2147483647	0	-	Immediately	"H19_en.42" on page 294
H19.44	2019-2Dh	Attribute value of position comparison 15	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.44" on page 294
H19.45	2019-2Eh	Target value of position comparison 16	-2147483648 to 2147483647	0	-	Immediately	"H19_en.45" on page 295

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.47	2019-30h	Attribute value of position comparison 16	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.47" on page 295
H19.48	2019-31h	Target value of position comparison 17	-2147483648 to 2147483647	0	-	Immediately	"H19_en.48" on page 296
H19.50	2019-33h	Attribute value of position comparison 17	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.50" on page 296
H19.51	2019-34h	Target value of position comparison 18	-2147483648 to 2147483647	0	-	Immediately	"H19_en.51" on page 297

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.53	2019-36h	Attribute value of position comparison 18	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.53" on page 297
H19.54	2019-37h	Target value of position comparison 19	-2147483648 to 2147483647	0	-	Immediately	"H19_en.54" on page 298
H19.56	2019-39h	Attribute value of position comparison 19	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.56" on page 298
H19.57	2019-3Ah	Target value of position comparison 20	-2147483648 to 2147483647	0	-	Immediately	"H19_en.57" on page 299

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.59	2019-3Ch	Attribute value of position comparison 20	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.59" on page 299
H19.60	2019-3Dh	Target value of position comparison 21	-2147483648 to 2147483647	0	-	Immediately	"H19_en.60" on page 300
H19.62	2019-3Fh	Attribute value of position comparison 21	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.62" on page 300
H19.63	2019-40h	Target value of position comparison 22	-2147483648 to 2147483647	0	-	Immediately	"H19_en.63" on page 301

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.65	2019-42h	Attribute value of position comparison 22	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.65" on page 301
H19.66	2019-43h	Target value of position comparison 23	-2147483648 to 2147483647	0	-	Immediately	"H19_en.66" on page 302
H19.68	2019-45h	Attribute value of position comparison 23	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.68" on page 302
H19.69	2019-46h	Target value of position comparison 24	-2147483648 to 2147483647	0	-	Immediately	"H19_en.69" on page 303

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.71	2019-48h	Attribute value of position comparison 24	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.71" on page 303
H19.72	2019-49h	Target value of position comparison 25	-2147483648 to 2147483647	0	-	Immediately	"H19_en.72" on page 304
H19.74	2019-4Bh	Attribute value of position comparison 25	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.74" on page 304
H19.75	2019-4Ch	Target value of position comparison 26	-2147483648 to 2147483647	0	-	Immediately	"H19_en.75" on page 305

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.77	2019-4Eh	Attribute value of position comparison 26	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.77" on page 305
H19.78	2019-4Fh	Target value of position comparison 27	-2147483648 to 2147483647	0	-	Immediately	"H19_en.78" on page 306
H19.80	2019-51h	Attribute value of position comparison 27	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.80" on page 306
H19.81	2019-52h	Target value of position comparison 28	-2147483648 to 2147483647	0	-	Immediately	"H19_en.81" on page 307

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.83	2019-54h	Attribute value of position comparison 28	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.83" on page 307
H19.84	2019-55h	Target value of position comparison 29	-2147483648 to 2147483647	0	-	Immediately	"H19_en.84" on page 308
H19.86	2019-57h	Attribute value of position comparison 29	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.86" on page 308
H19.87	2019-58h	Target value of position comparison 30	-2147483648 to 2147483647	0	-	Immediately	"H19_en.87" on page 309

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.89	2019-5Ah	Attribute value of position comparison 30	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.89" on page 309
H19.90	2019-5Bh	Target value of position comparison 31	-2147483648 to 2147483647	0	-	Immediately	"H19_en.90" on page 310
H19.92	2019-5Dh	Attribute value of position comparison 31	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.92" on page 310
H19.93	2019-5Eh	Target value of position comparison 32	-2147483648 to 2147483647	0	-	Immediately	"H19_en.93" on page 311

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.95	2019-60h	Attribute value of position comparison 32	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.95" on page 311
H19.96	2019-61h	Target value of position comparison 33	-2147483648 to 2147483647	0	-	Immediately	"H19_en.96" on page 312
H19.98	2019-63h	Attribute value of position comparison 33	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.98" on page 312
H19.99	2019-64h	Target value of position comparison 34	-2147483648 to 2147483647	0	-	Immediately	"H19_en.99" on page 313

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.101	2019-66h	Attribute value of position comparison 34	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.101" on page 313
H19.102	2019-67h	Target value of position comparison 35	-2147483648 to 2147483647	0	-	Immediately	"H19_en.102" on page 314
H19.104	2019-69h	Attribute value of position comparison 35	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.104" on page 314
H19.105	2019-6Ah	Target value of position comparison 36	-2147483648 to 2147483647	0	-	Immediately	"H19_en.105" on page 315

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.107	2019-6Ch	Attribute value of position comparison 36	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.107" on page 315
H19.108	2019-6Dh	Target value of position comparison 37	-2147483648 to 2147483647	0	-	Immediately	"H19_en.108" on page 316
H19.110	2019-6Fh	Attribute value of position comparison 37	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.110" on page 316
H19.111	2019-70h	Target value of position comparison 38	-2147483648 to 2147483647	0	-	Immediately	"H19_en.111" on page 317

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.113	2019-72h	Attribute value of position comparison 38	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.113" on page 317
H19.114	2019-73h	Target value of position comparison 39	-2147483648 to 2147483647	0	-	Immediately	"H19_en.114" on page 318
H19.116	2019-75h	Attribute value of position comparison 39	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.116" on page 318

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H19.117	2019-76h	Target value of position comparison 40	-2147483648 to 2147483647	0	-	Immediately	"H19_en.117" on page 319
H19.119	2019-78h	Attribute value of position comparison 40	bit0: Current position changes from "less than" to "more than" the comparison point bit1: Current position changes from "more than" to "less than" the comparison point bit2: N/A bit3: N/A bit4: N/A bit5: N/A bit6: N/A bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: N/A bit12: N/A bit13: N/A bit14: N/A bit15: N/A	0	-	Immediately	"H19_en.119" on page 319

6.17 List of H1F Software Tool Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H1F.90	201F-5Bh	DI function state 1 read through communication	0-65535	0	-	Unchangeable	"H1F_en.90" on page 320
H1F.91	201F-5Ch	DI function state 2 read through communication	0-65535	0	-	Unchangeable	"H1F_en.91" on page 320

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H1F.92	201F-5Dh	DI function state 3 read through communication	0-65535	0	-	Unchangeable	"H1F_en.92" on page 321
H1F.93	201F-5Eh	DI function state 4 read through communication	0-65535	0	-	Unchangeable	"H1F_en.93" on page 321
H1F.94	201F-5Fh	DO function state 1 read through communication	0-65535	0	-	Unchangeable	"H1F_en.94" on page 322
H1F.95	201F-60h	DO function state 2 read through communication	0-65535	0	-	Unchangeable	"H1F_en.95" on page 322

6.18 List of H30 Communication Read Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H30.00	2030-01h	Servo status read through communication	0-65535	0	-	Unchangeable	"H30_en.00" on page 322
H30.01	2030-02h	DO function state 1 read through communication	0-65535	0	-	Unchangeable	"H30_en.01" on page 323
H30.02	2030-03h	DO function state 2 read through communication	0-65535	0	-	Unchangeable	"H30_en.02" on page 323

6.19 List of H31 Communication Set Parameters

Parameter	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H31.04	2031-05h	DO state set through communication	0–65535	0	-	Immediately	"H31_en.04" on page 323
H31.05	2031-06h	AO set through communication	-10000 mV to 10000 mV	0	mV	Immediately	"H31_en.05" on page 324
H31.09	2031-0Ah	Speed reference set through communication	-9999.000rpm to 9999.000rpm	0.000	rpm	Immediately	"H31_en.09" on page 324
H31.11	2031-0Ch	Torque reference set through communication	-100.000% to 100.000%	0.000	%	Immediately	"H31_en.11" on page 324

6.20 List of 1000h Object Dictionary

Parameter	Name	Setpoint	Default	Unit	Change Method	Page
1000.00h	Device type	0–65535	0	-	Unchangeable	"1000_en.00h" on page 325
1001.00h	Error Register	0–255	0	-	Unchangeable	"1001_en.00h" on page 325
1018.01h	Vendor ID	0–65535	0	-	Unchangeable	"1018_en.01h" on page 325
1018.02h	Product Code	0–65535	0	-	Unchangeable	"1018_en.02h" on page 325
1018.03h	Revision	0–65535	0	-	Unchangeable	"1018_en.03h" on page 326
1600.00h	Number of valid mapped objects in RPDO1	0–20	3	-	Immediately	"1600_en.00h" on page 326
1600.01h	Mapped object 1 in RPDO1	0–2147483647	1614807040	-	Immediately	"1600_en.01h" on page 326
1600.02h	Mapped object 2 in RPDO1	0–2147483647	1618608128	-	Immediately	"1600_en.02h" on page 327

Parameter List

Parameter	Name	Setpoint	Default	Unit	Change Method	Page
1600.03h	Mapped object 3 in RPDO1	0–2147483647	1622671360	-	Immediately	"1600_en.03h" on page 327
1600.04h	Mapped object 4 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.04h" on page 327
1600.05h	Mapped object 5 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.05h" on page 327
1600.06h	Mapped object 6 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.06h" on page 328
1600.07h	Mapped object 7 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.07h" on page 328
1600.08h	Mapped object 8 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.08h" on page 328
1600.09h	Mapped object 9 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.09h" on page 328
1600.0Ah	Mapped object 10 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.0Ah" on page 329
1600.0Bh	Mapped object 11 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.0Bh" on page 329
1600.0Ch	Mapped object 12 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.0Ch" on page 329
1600.0Dh	Mapped object 13 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.0Dh" on page 330
1600.0Eh	Mapped object 14 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.0Eh" on page 330
1600.0Fh	Mapped object 15 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.0Fh" on page 330
1600.10h	Mapped object 16 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.10h" on page 330
1600.11h	Mapped object 17 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.11h" on page 331
1600.12h	Mapped object 18 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.12h" on page 331
1600.13h	Mapped object 19 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.13h" on page 331
1600.14h	Mapped object 20 in RPDO1	0–2147483647	0	-	Immediately	"1600_en.14h" on page 331
1A00.00h	Number of valid mapping objects of TPDO1	0–20	7	-	Immediately	"1A00_en.00h" on page 332
1A00.01h	Mapped object 1 in TPDO1	0–2147483647	1614872576	-	Immediately	"1A00_en.01h" on page 332
1A00.02h	Mapped object 2 in TPDO1	0–2147483647	1617166336	-	Immediately	"1A00_en.02h" on page 332

Parameter	Name	Setpoint	Default	Unit	Change Method	Page
1A00.03h	Mapped object 3 in TPDO1	0–2147483647	1622736896	-	Immediately	"1A00_en.03h" on page 333
1A00.04h	Mapped object 4 in TPDO1	0–2147483647	1622802432	-	Immediately	"1A00_en.04h" on page 333
1A00.05h	Mapped object 5 in TPDO1	0–2147483647	1622933504	-	Immediately	"1A00_en.05h" on page 333
1A00.06h	Mapped object 6 in TPDO1	0–2147483647	1614741504	-	Immediately	"1A00_en.06h" on page 333
1A00.07h	Mapped object 7 in TPDO1	0–2147483647	1627193344	-	Immediately	"1A00_en.07h" on page 334
1A00.08h	Mapped object 8 in TPDO1	0–2147483647	0	-	Immediately	"1A00_en.08h" on page 334
1A00.09h	Mapped object 9 in TPDO1	0–2147483647	0	-	Immediately	"1A00_en.09h" on page 334
1A00.0Ah	Mapped object 10 in TPDO1	0–2147483647	0	-	Immediately	"1A00_en.0Ah" on page 335
1A00.0Bh	Mapped object 11 in TPDO1	0–2147483647	0	-	Immediately	"1A00_en.0Bh" on page 335
1A00.0Ch	Mapped object 12 in TPDO1	0–2147483647	0	-	Immediately	"1A00_en.0Ch" on page 335
1A00.0Dh	Mapped object 13 in TPDO1	0–2147483647	0	-	Immediately	"1A00_en.0Dh" on page 335
1A00.0Eh	Mapped object 14 in TPDO1	0–2147483647	0	-	Immediately	"1A00_en.0Eh" on page 336
1A00.0Fh	Mapped object 15 in TPDO1	0–2147483647	0	-	Immediately	"1A00_en.0Fh" on page 336
1A00.10h	Mapped object 16 in TPDO1	0–2147483647	0	-	Immediately	"1A00_en.10h" on page 336
1A00.11h	Mapped object 17 in TPDO1	0–2147483647	0	-	Immediately	"1A00_en.11h" on page 336
1A00.12h	Mapped object 18 in TPDO1	0–2147483647	0	-	Immediately	"1A00_en.12h" on page 337
1A00.13h	Mapped object 19 in TPDO1	0–2147483647	0	-	Immediately	"1A00_en.13h" on page 337
1A00.14h	Mapped object 20 in TPDO1	0–2147483647	0	-	Immediately	"1A00_en.14h" on page 337
1C12.00h	Number of assigned PDOs	0–2	1	-	Immediately	"1C12_en.00h" on page 338
1C12.01h	PDO mapping object index of assigned RxPDO1	5632 to 5898	0	-	Immediately	"1C12_en.01h" on page 338
1C12.02h	PDO mapping object index of assigned RxPDO2	5632 to 5898	0	-	Immediately	"1C12_en.02h" on page 338

Parameter	Name	Setpoint	Default	Unit	Change Method	Page
1C13.00h	Number of assigned PDOs	0 to 2	0	-	Immediately	"1C13_en.00h" on page 338
1C13.01h	PDO mapping object index of assigned TxPDO1	6656 to 6922	0	-	Immediately	"1C13_en.01h" on page 339
1C13.02h	PDO mapping object index of assigned TxPDO1	6656 to 6922	0	-	Immediately	"1C13_en.02h" on page 339
1C32.01h	Sync mode	0 to 65535	0	-	Immediately	"1C32_en.01h" on page 339
1C32.02h	Cycle time	0 to 4294967295	0	-	Immediately	"1C32_en.02h" on page 339
1C32.04h	Sync modes supported	0 to 65535	0	-	Immediately	"1C32_en.04h" on page 340
1C32.05h	Minimum cycle time	0 to 4294967295	0	-	Immediately	"1C32_en.05h" on page 340
1C33.01h	Sync mode	0 to 65535	0	-	Immediately	"1C33_en.01h" on page 340
1C33.02h	Cycle time	0 to 4294967295	0	-	Immediately	"1C33_en.02h" on page 340
1C33.04h	Sync modes supported	0 to 65535	0	-	Immediately	"1C33_en.04h" on page 341
1C33.05h	Minimum cycle time	0 to 4294967295	0	-	Immediately	"1C33_en.05h" on page 341

6.21 List of 6000h Object Dictionary

Axis 2 object dictionary requires +0x800 offset.

Example: Axis 2 error code object dictionary: 603Fh + 0x800h = 683Fh

Parameter	Name	Setpoint	Default	Unit	Change Method	Page
603Fh	Error Code	0–65535	0	-	Unchangeable	"603Fh" on page 341
6040h	Control word	0–65535	0	-	Immediately	"6040h" on page 342
6041h	Status word	0–65535	0	-	Unchangeable	"6041h" on page 342

Parameter	Name	Setpoint	Default	Unit	Change Method	Page
605Ah	Quick stop option code	0: Coast to stop, keeping de-energized state 1: Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized state 2: Ramp to stop as defined by 6085h, keeping de-energized state 3: Stop at emergency stop torque, keeping de-energized state 5: Ramp to stop as defined by 6084h/609Ah (HM), keeping position lock state 6: Ramp to stop as defined by 6085h, keeping position lock state 7: Stop at emergency stop torque, keeping position lock state	2	-	At stop	"605Ah" on page 342
605Ch	Stop mode at S-ON OFF	–4: Ramp to stop as defined by 6085h, keeping dynamic braking state –3: at zero speed, keeping dynamic braking state –2: Ramp to stop as defined by 6084h/609Ah (HM), keeping dynamic braking state –1: Dynamic braking stop, keeping dynamic braking state 0: Coast to stop, keeping de-energized state 1: Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized state 2: Dynamic braking stop, keeping de-energized state	0	-	At stop	"605Ch" on page 343
605Dh	Stop option code	1: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping position lock state 2: Ramp to stop as defined by 6085h, keeping position lock state. 3: Stop at emergency stop torque, keeping position lock state	1	-	At stop	"605Dh" on page 344

Parameter	Name	Setpoint	Default	Unit	Change Method	Page
605Eh	Stop mode at No.2 fault	-5: Stop at zero speed, keeping dynamic braking state -4: Stop at emergency stop torque, keeping dynamic braking state -3: Ramp to stop as defined by 6085h, keeping dynamic braking state -2: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping dynamic braking state -1: Dynamic braking stop, keeping dynamic braking state 0: Coast to stop, keeping de-energized state 1: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping de-energized state 2: Ramp to stop as defined by 6085h, keeping de-energized state 3: Stop at emergency stop torque, keeping de-energized state 4: Dynamic braking stop, keeping de-energized state	2	-	At stop	"605Eh" on page 344
6060h	Modes of operation	1: Profile position (PP) mode 3: Profile velocity (PV) mode 4: Profile torque (PT) mode 6: Homing (HM) mode 8: CSP mode 9: CSV mode 10: CST mode	0	-	Immediately	"6060h" on page 345
6061h	Operation mode display	1: Profile position (PP) mode 3: Profile velocity (PV) mode 4: Profile torque (PT) mode 6: Homing (HM) mode 8: CSP mode 9: CSV mode 10: CST mode	0	-	Unchangeable	"6061h" on page 346
6062h	Position reference	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"6062h" on page 346
6063h	Position actual value	-2147483648 to 2147483647	0	Encoder unit	Unchangeable	"6063h" on page 347
6064h	Position actual value	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"6064h" on page 347
6065h	Following error window	0 to 4294967295	219895608	Reference unit	Immediately	"6065h" on page 347
6066h	Following error time out	0 ms to 65535 ms	0	ms	Immediately	"6066h" on page 348

Parameter	Name	Setpoint	Default	Unit	Change Method	Page
6067h	Position window	0 to 4294967295	46976	Reference unit	Immediately	"6067h" on page 348
6068h	Position window time	0 ms to 65535 ms	0	ms	Immediately	"6068h" on page 348
606Ch	Actual speed	-2147483648 to +2147483647	0	Reference unit/s	Unchangeable	"606Ch" on page 349
606Dh	Velocity window	0rpm-65535rpm	10	rpm	Immediately	"606Dh" on page 349
606Eh	Velocity window time	0 ms to 65535 ms	0	ms	Immediately	"606Eh" on page 349
606Fh	Velocity threshold	0rpm-65535rpm	10	rpm	Immediately	"606Fh" on page 350
6070h	Velocity threshold time	0 ms to 65535 ms	0	ms	Immediately	"6070h" on page 350
6071h	Target torque	-4000 to 4000	0	-	Immediately	"6071h" on page 350
6072h	Max. torque	0 to 4000	3500	-	Immediately	"6072h" on page 350
6074h	Torque reference	-4000 to 4000	0	-	Unchangeable	"6074h" on page 351
6077h	Torque actual value	-4000 to 4000	0	-	Unchangeable	"6077h" on page 351
607Ah	Target position	-2147483648 to 2147483647	0	Reference unit	Immediately	"607Ah" on page 351
607Ch	Home offset	-2147483648 to 2147483647	0	Reference unit	Immediately	"607Ch" on page 352
607D.01h	Min. position limit	-2147483648 to 2147483647	-2147483648	Reference unit	Immediately	"607D_en.01h" on page 352
607D.02h	Max. position limit	-2147483648 to 2147483647	2147483647	Reference unit	Immediately	"607D_en.02h" on page 353
607Eh	Reference polarity	0 to 127	0	-	Immediately	"607Eh" on page 353
607Fh	Max. profile velocity	0 to 4294967295	4294967295	Reference unit/s	Immediately	"607Fh" on page 353
6081h	Profile velocity	0 to 4294967295	111848106	Reference unit/s	Immediately	"6081h" on page 354
6083h	Profile acceleration	0 to 4294967295	4294967295	Reference unit/s ²	Immediately	"6083h" on page 354
6084h	Profile deceleration	0 to 4294967295	4294967295	Reference unit/s ²	Immediately	"6084h" on page 355
6085h	Quick stop deceleration	0 to 4294967295	2147483647	Reference unit/s ²	Immediately	"6085h" on page 355
6087h	Torque slope	0 to 4294967295	4294967295	-	Immediately	"6087h" on page 355

Parameter List

Parameter	Name	Setpoint	Default	Unit	Change Method	Page
6091.01h	Motor revolutions	1 to 4294967295	1	-	At stop	"6091_en.01h" on page 356
6091.02h	Shaft revolutions	1 to 4294967295	1	-	At stop	"6091_en.02h" on page 356
6098h	Homing method	-2 to 35	1	-	Immediately	"6098h" on page 357
6099.01h	Speed during search for switch	0 to 4294967295	111848106	Reference unit/s	At stop	"6099_en.01h" on page 358
6099.02h	Speed during search for zero	0 to 4294967295	11184810	Reference unit/s	At stop	"6099_en.02h" on page 358
609Ah	Homing acceleration	0 to 4294967295	4294967295	Reference unit/s ²	Immediately	"609Ah" on page 359
60B0h	Position offset	-2147483648 to 2147483647	0	Reference unit	Immediately	"60B0h" on page 359
60B1h	Velocity offset	-2147483648 to +2147483647	0	Reference unit/s	Immediately	"60B1h" on page 359
60B2h	Torque offset	-4000 to 4000	0	-	Immediately	"60B2h" on page 359
60B8h	Touch probe function	0 to 65535	0	-	Immediately	"60B8h" on page 360
60B9h	Touch probe status	0 to 65535	0	-	Unchangeable	"60B9h" on page 361
60BAh	Touch probe 1 positive edge	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"60BAh" on page 363
60BBh	Touch probe 1 negative edge	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"60BBh" on page 363
60BCh	Touch probe 2 positive edge	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"60BCh" on page 363
60BDh	Touch probe 2 negative edge	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"60BDh" on page 364
60C5h	Max. acceleration	0 to 4294967295	4294967295	Reference unit/s ²	Immediately	"60C5h" on page 364
60C6h	Max. deceleration	0 to 4294967295	4294967295	Reference unit/s ²	Immediately	"60C6h" on page 364
60D5h	Touch probe 1 positive edge counter	0 to 65535	0	-	Unchangeable	"60D5h" on page 365
60D6h	Touch probe 1 negative edge counter	0 to 65535	0	-	Unchangeable	"60D6h" on page 365
60D7h	Touch probe 2 positive edge counter	0 to 65535	0	-	Unchangeable	"60D7h" on page 365







Parameter	Name	Setpoint	Default	Unit	Change Method	Page
60D8h	Touch probe 2 negative edge counter	0 to 65535	0	-	Unchangeable	"60D8h" on page 365
60E0h	Positive torque limit value	0 to 4000	3500	-	Immediately	"60E0h" on page 366
60E1h	Negative torque limit value	0 to 4000	3500	-	Immediately	"60E1h" on page 366
60F4h	Position deviation	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"60F4h" on page 366
60FCh	Position reference	-2147483648 to 2147483647	0	Encoder unit	Unchangeable	"60FCh" on page 366
60FDh	Digital inputs	0 to 4294967295	0	-	Unchangeable	"60FDh" on page 367
60FFh	PV, CSV mode speed reference	-2147483648 to +2147483647	0	Reference unit/s	Immediately	"60FFh" on page 367
60FE.01h	Physical outputs	0 to 4294967295	0	-	Immediately	"60FE_en.01h" on page 368
60FE.02h	Bitmask	0 to 4294967295	0	-	Immediately	"60FE_en.02h" on page 368

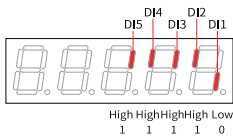
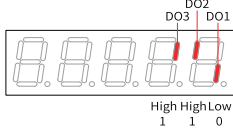
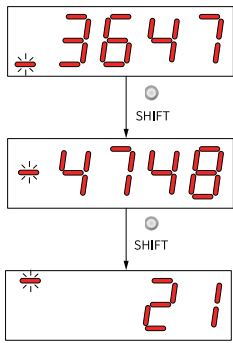

7 Appendix






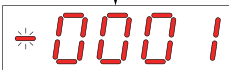

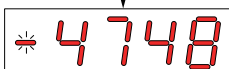
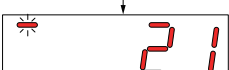
7.1 Display of Monitoring Parameters


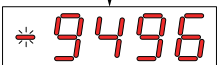
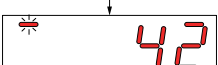
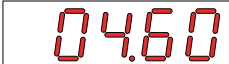
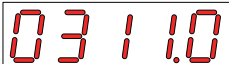


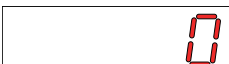

- Group H0b (200b): Displays parameters used to monitor the operating state of the servo drive.
- Set H02.32(2002.21h) (Default keypad display) properly. After the motor operates normally, the keypad switches from status display to parameter display. The parameter group number is H0b(200b) and the offset within the group is the setpoint of H02.32(2002.21h).
- For example, if H02.32 (2002.21h) is set to 00 and the motor speed is not 0 RPM, the keypad displays the value of H0b.00 (200b- 00h).

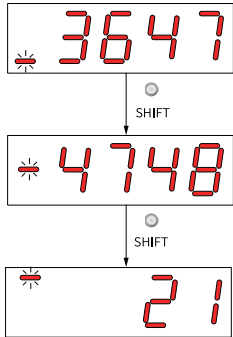


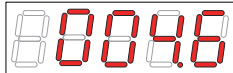
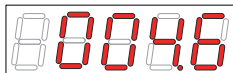
The following table describes the monitoring parameters in group H0b.

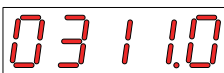
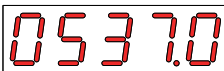
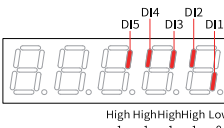
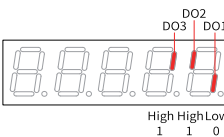
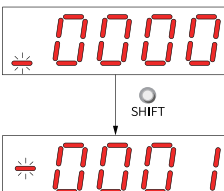
Parameter	Name	Unit	Meaning	Example of Display
H0b.00	Motor speed actual value	rpm	Displays the actual value of the motor speed after round-off, which can be accurate to 1 rpm.	Display of 3000 rpm:  -3000 rpm: 
H0b.01	Speed reference	rpm	Displays the present speed reference of the servo drive.	Display of 3000 rpm:  -3000 rpm: 
H0b.02	Internal torque reference	%	Displays the ratio of actual torque output of the motor to the rated torque of the motor.	Display of 100.0%:  Display of -100.0%: 







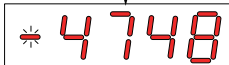



Parameter	Name	Unit	Meaning	Example of Display
H0b.03	Monitored DI status	-	Indicates level status of DI1 to DI5: Upper LED segments ON: high level (indicated by "1") Lower LED segments ON: low level (indicated by "0") The value of H0b.03 read in the software tool is a decimal.	For example, if DI1 is low level and DI2 to DI5 are high level, The corresponding binary value is "11110", and the value of H0b.03 read in the software tool is 0x001E. The keypad displays as follows: 
H0b.05	Monitored DO status	-	Indicates level status of DO1 to DO3: Upper LED segments ON: high level (indicated by "1") Lower LED segments ON: low level (indicated by "0") The value of H0b.05 read in the software tool is a decimal.	For example, if DO1 is low level and DO2 to DO3 are high level, then, the binary value is "110". The value of H0b.05 read in the software tool is 0x0006. The keypad displays as follows: 
H0b.07	Absolute position counter (32-bit decimal)	Reference unit	Displays current absolute position of the motor (reference unit).	Display of 1073741824 in reference unit: 
H0b.09	Mechanical angle	°	Displays current mechanical angle of the motor.	Display of 360.0°: 



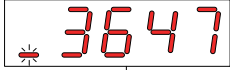
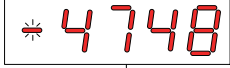



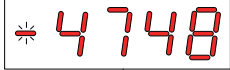

Parameter	Name	Unit	Meaning	Example of Display
H0b.10	Rotation angle (electrical angle)	°	Displays current electrical angle of the motor.	Display of 360.0°: 
H0b.11	Speed corresponding to the input position reference	rpm	Displays the speed corresponding to the position reference per control cycle of the servo drive.	Display of 3000 rpm:  -3000 rpm: 
H0b.12	Average load rate	%	Displays the ratio of the average load torque to the rated torque of the motor.	Display of 100.0%: 
H0b.15	Encoder position deviation counter (32-bit decimal)	Encoder unit	Encoder position deviation = Sum of input position references (encoder unit) – Sum of pulses fed back by the encoder (encoder unit)	Display of 10000 in encoder unit:  SHIFT 
H0b.17	Feedback pulse counter (32-bit decimal)	Encoder unit	Counts and displays the number of pulses fed back by the encoder (encoder unit). Note When the motor used is equipped with an absolute encoder, H0b.17 only reflects values of the low 32 bits of the motor position feedback. To get the actual motor position feedback, view H0b.77 (Encoder position (low 32 bits) and H0b.79 (Encoder position (high 32 bits)).	Display of 1073741824 in encoder unit:  SHIFT  SHIFT 

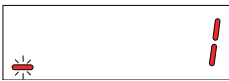
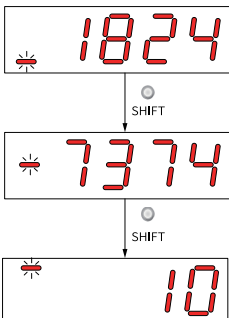
Parameter	Name	Unit	Meaning	Example of Display
H0b.19	Total power-on time (32-bit decimal)	s	Counts and displays the total power-on time of the servo drive.	Display of 429496729.5s:  Press and hold SHIFT  Press and hold SHIFT 
H0b.24	RMS value of phase current	A	Displays the RMS value of the phase current of the servo motor.	Display of 4.60 A: 
H0b.26	Bus voltage	V	Indicates the DC bus voltage of the main circuit, namely the voltage between terminals P⊕ and N ⊖.	Display of 311.0 V rectified from 220 VAC:  Display of 537.0 V rectified from 380 VAC: 
H0b.27	Module temperature	°C	Displays the temperature of the power module inside the servo drive.	Display of 27°C: 
H0b.33	Fault log	-	Used to select the previous fault to be viewed. 0: Present fault 1: Last fault 2: 2nd to last fault ... 9: 9th to last fault	0: Display of present fault: 
H0b.34	Fault code of the selected fault	-	Displays the code of the fault selected in H0b.33. When no fault occurs, the value of H0b.34 is 0.	If H0b.33 is 0, and H0b.34 is E941.0, the current fault code is 941.0. Corresponding display: 

Parameter	Name	Unit	Meaning	Example of Display
H0b.35	Time stamp upon occurrence of the selected fault	s	Displays the total operating time of the servo drive when the fault displayed in H0b.34 occurred. When no fault occurs, the value of H0b.35 is 0.	<p>If H0b.34 is E941.0 and H0b.35 is 107374182.4, the current fault code is 941.0 and the total operating time of the servo drive is 107374182.4s when the fault occurs.</p> 
H0b.37	Motor speed upon occurrence of the selected fault	rpm	Displays the servo motor speed when the fault displayed in H0b.34 occurred. When no fault occurs, the value of H0b.37 is 0.	<p>Display of 3000 rpm:</p>  <p>-3000 rpm:</p> 
H0b.38	Motor phase U current upon occurrence of the selected fault	A	Displays the RMS value of motor phase U winding current when the fault displayed in H0b.34 occurred. When no fault occurs, the value of H0b.38 is 0.	<p>Display of 4.60 A:</p> 
H0b.39	Motor phase V current upon occurrence of the selected fault	A	Displays the RMS value of motor phase V winding current when the fault displayed in H0b.34 occurred. When no fault occurs, the value of H0b.39 is 0.	<p>Display of 4.60 A:</p> 

Parameter	Name	Unit	Meaning	Example of Display
H0b.40	Bus voltage upon occurrence of the selected fault	V	Displays the DC bus voltage of the main circuit when the fault displayed in H0b.34 occurred. When no fault occurs, the value of H0b.40 is 0.	<p>Display of 311.0 V rectified from 220 VAC:</p>  <p>Display of 537.0 V rectified from 380 VAC:</p> 
H0b.41	DI status upon occurrence of the selected fault	-	Displays the high/low level status of DI1 to DI5 when the fault displayed in H0b.34 occurred. The method for determining the DI level status is the same as that of H0b.03. When no fault occurs, all DIs are displayed as low level in H0b.41 (indicated by the decimal value 0).	<p>For example, when the value of H0B-41 read in the software tool is 0x0001, the corresponding binary code will be 0000 0000 0000 0001.</p> 
H0b.43	DO status upon occurrence of the selected fault	-	Displays the high/low level status of DO1 to DO3 when the fault displayed in H0b.34 occurred. The method for determining the DO level status is the same as that of H0b.05. When no fault occurs, all DOs are displayed as low level in H0b.42 (indicated by the decimal value 0).	<p>Display of H0b.43 = 0x0003:</p> 
H0b.53	Position deviation counter (32-bit decimal)	Reference unit	Position deviation = Sum of input position references (reference unit) - Sum of pulses fed back by the encoder (reference unit)	<p>Display of 10000 in reference unit:</p> 

Parameter	Name	Unit	Meaning	Example of Display
H0b.55	Motor speed actual value	0.1 rpm	Displays the actual value of the motor speed, which can be accurate to 0.1 RPM.	<p>Display of 3000.0rpm:</p>  <p>SHIFT</p>  <p>Display of -3000.0 RPM:</p>  <p>SHIFT</p> 
H0b.57	Control circuit voltage	V	Displays the DC voltage of the control circuit.	<p>Display of 12.0 V:</p> 
H0b.58	Mechanical absolute position (low 32 bits)	Encoder unit	Displays the mechanical absolute position (low 32 bits) when an absolute encoder is used.	<p>Display of 2147483647 in encoder unit:</p>  <p>SHIFT</p>  <p>SHIFT</p> 
H0b.60	Mechanical absolute position (high 32 bits)	Encoder unit	Displays the mechanical absolute position (high 32 bits) when an absolute encoder is used.	<p>Display of 32767:</p> 
H0b.70	Number of absolute encoder revolutions	Rev	Displays the present number of revolutions of the absolute encoder.	<p>Display of 32767:</p> 

Parameter	Name	Unit	Meaning	Example of Display
H0b.71	Single-turn position feedback of an absolute encoder	Encoder unit	Displays the single-turn position feedback of the absolute encoder.	<p>Display of 8388607 in encoder unit:</p>  <p>SHIFT</p> 
H0b.77	Absolute encoder position (low 32 bits)	Encoder unit	Displays the absolute position (low 32 bits) of the motor when the absolute encoder is used.	<p>Display of 2147483647 in encoder unit:</p>  <p>SHIFT</p>  <p>SHIFT</p> 
H0b.79	Absolute encoder position (high 32 bits)	Encoder unit	Displays the absolute position (high 32 bits) of the motor when the absolute encoder is used.	<p>Display of -1 in encoder unit:</p> 
H0b.81	Single-turn position feedback of the load in rotation mode (low 32 bits)	Encoder unit	Displays the position feedback (low 32 bits) of the mechanical load when the absolute system works in the rotation mode.	<p>Display of 2147483647 in encoder unit:</p>  <p>SHIFT</p>  <p>SHIFT</p> 

Parameter	Name	Unit	Meaning	Example of Display
H0b.83	Single-turn position feedback of the load in rotation mode (high 32 bits)	Encoder unit	Displays the position feedback (high 32 bits) of the mechanical load when the absolute system works in the rotation mode.	Display of 1 in encoder unit: 
H0b.85	Single-turn position of the load in rotation mode	Reference unit	Displays the mechanical absolute position when the absolute system works in the rotation mode.	Display of 1073741824 in reference unit: 

7.2 DI/DO Function Definitions

No.	Name	Function Name	Description	Remarks
Description of DI Signals				
FunIN.1	S-ON	Servo ON	Disabled: Servo motor disabled Enabled: Servo motor enabled	The corresponding terminal logic must be level-triggered. The change of the corresponding DI/VDI or terminal logic is activated at next power-on.
FunIN.2	ALM-RST	Alarm reset signal	Inactive: Disabled Active: Enabled	Edge-triggered will be applied even if level-triggered is selected. To reset No. 1 and NO.2 resettable faults, switch off the S-ON signal first. The servo drive may, depending on the alarm type, continue running after reset.
FunIN.14	P-OT	Positive limit switch	Enabled: Forward drive inhibited Disabled: Forward drive permitted	Overtravel prevention applies when the machine moves beyond the limit. It is recommended that the corresponding terminal logic is level-triggered.

No.	Name	Function Name	Description	Remarks
FunIN.15	N-OT	Negative limit switch	Overtravel prevention applies when the load moves beyond the limit. Active: Reverse drive inhibited Inactive: Reverse drive allowed	The corresponding terminal logic is recommended to be level-triggered.
FunIN.31	HomeSwitch	Home switch	Disabled: The switch is not triggered. Enabled: The switch is triggered.	The corresponding terminal logic must be level-triggered. It is recommended to assign this function to a high-speed DI terminal. If the logic is set to 2 (rising edge valid), the servo drive forcibly changes it to 1 (active high). If the logic is set to 3 (falling edge valid), the servo drive forcibly changes it to 0 (active low). If the logic is set to 4 (both rising edge and falling edge valid), the servo drive forcibly changes it to 0 (low level valid).
FunIN.34	Emergence Stop	Emergency stop	Enabled: Position lock is applied after stop at zero speed. Disabled: Current operating state is unaffected.	The corresponding terminal logic is recommended to be level-triggered.
FunIN.38	TouchProbe1	Touch probe 1	Disabled - Touch probe is not triggered. Enabled - Touch probe is triggerable.	The touch probe logic is only related to the touch probe function (60B8h).
FunIN.39	TouchProbe2	Touch probe 2	Disabled - Touch probe is not triggered. Enabled - Touch probe is triggerable.	The touch probe logic is only related to the touch probe function (60B8h).
Description of DO Signals				
FunOUT.1	S-RDY	Servo ready	The servo drive is ready to receive the S-ON signal. Enabled: The servo drive is ready. Disabled: The servo drive not ready.	-
FunOUT.2	TGON	Motor rotation signal	Inactive. Absolute value of filtered motor speed is lower than the setpoint of H06.16. Active. Absolute value of filtered motor speed reaches the setpoint of H06.16.	-

No.	Name	Function Name	Description	Remarks
FunOUT.9	BK	Brake output	Inactive: The brake power supply is switched off and the brake applies. In this case, the motor is locked. Active: The brake power supply is switched on and the brake is released. In this case, the motor can rotate.	-
FunOUT.10	WARN	Warning	Enabled: The servo drive issued a warning. Disabled: The servo drive issued no warning or the warning has been reset.	-
FunOUT.11	ALM	Fault	The servo drive is faulty. Disabled - No fault occurred on the servo drive or the fault has been reset	-
FunOUT.25	CMP	Comparison output	Enabled: The servo drive passed the target position comparison point. Inactive: The servo drive did not pass the target position comparison point.	-
FunOUT.31	EtherCAT forced DO in non-operational status		See "Table 7-1 Description for EtherCAT forced DO in non-operational status" on page 462	-
FunOUT.32	EDM	EDM output	Enabled - STO is triggered Disabled - STO is not triggered	The EDM outputs active signals only when both the 24 V input voltages for STO1 and STO2 are disconnected.

Table 7-1 Description for EtherCAT forced DO in non-operational status

Bit of H04.23	Description
0	1: No output in DO1 in the non-OP status
1	1: No output in DO2 in the non-OP status
2	1: No output in DO3 in the non-OP status
3	1: No output in DO4 in the non-OP status

This table describes the setpoints of H04.23 (ECAT communication forced DO logic in non-OP status).



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