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SV680N Series Servo Drive

Function Guide

Industrial Automation

Intelligent Elevator

New Energy Vehicle

Industrial Robot

Rail Transit

Data code 19011538 A00

Preface

Introduction

Thank you for purchasing the SV680N series servo drive developed by Inovance.

The SV680N series servo drive is a high-end servo drive designed based on global-leading standards and high-end application needs. It is featured with high speed, high precision, high performance, and tuning-free function.

Covering a power range from 0.05 kW to 7.5 kW, the SV680N series servo drive carries EtherCAT communication interfaces to work with the host controller for a networked operation of multiple servo drives. It is equipped with the latest ITune function that allows adaptive stiffness level setting, inertia auto-tuning, and vibration suppression for easy control. The SV680N series servo drive, together with an MS1 series high-response servo motor (with ultra-low, low or medium inertia) and a 26-bit single-turn/multi-turn absolute encoder, aims to deliver a quiet and stable operation and accurate process control through the fully closed-loop function and internal process segment function.

In addition, the SV680N series servo drive provides a five-year warranty and carries the functions of safe torque off, dynamic braking, and brake output (external relay not needed) as standard. It supports extension of seven kinds of safety functions and bus functional safety FSoE for continuous safe production. The SV680N series servo drive is applicable to quick and accurate position control, speed control, and torque control of automation equipment in such industries as electronic manufacturing, lithium batteries, manipulators, packaging, and machine tools.

This guide introduces functions and parameters of the servo drive, including function overview, basic servo functions, adjustment, and parameter descriptions.

More Documents

Name	Data Code	Description
SV680N Series Servo Drive Selection Guide	19011540	Presents technical data and dimensions of the servo drive, and specifications and models of optional parts (installation accessories, cables, and periphery electrical parts).
SV680N Series Servo Drive Hardware Guide	19011539	Presents installation and wiring of the servo drive, including preparations before installation, unpacking inspection and transport, wiring, and routine maintenance.
SV680N Series Servo Drive Commissioning Guide	19011536	Presents servo commissioning, parameter descriptions, troubleshooting, including the operating panel, commissioning software, and commissioning process and procedure.

Name	Data Code	Description
SV680N Series Servo Drive Communication Guide	19011537	Presents functions and parameters of the drive, including EtherCAT communication configurations, troubleshooting, parameter descriptions, and communication case.
SV680 Series Servo Drive Safety Guide	19011489	Presents the safety function and related certifications and standards, wiring, commissioning process, troubleshooting, and functions.

Revision History

Date of Revision	Version	Revision
December 2021	A00	First release

Document Acquisition

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

Table of Contents

Fundamental Safety Instructions

Safety Precautions

- This chapter presents essential safety instructions for a proper use of the equipment. Before operating the equipment, read through the guide and comprehend all the safety instructions. Failure to comply with the safety instructions may result in death, severe personal injuries, or equipment damage.
- "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

DANGER	Indicates that failure to comply with the notice will result in death or severe personal injuries.
WARNING	Indicates that failure to comply with the notice may result in death or severe personal injuries.
CAUTION	Indicates that failure to comply with the notice may result in minor or moderate personal injuries or equipment damage.

General Safety Instructions

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

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 must be operated only by professionals with electrical knowledge.

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

WARNING

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

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, check that the rated voltage of the equipment is consistent with that of the power supply. Failure to comply may result in a fire.
- Before power-on, check that no one is near the equipment, motor, or machine. Failure to comply may result in death or personal injuries.

Operation

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.

DANGER

- 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
• 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.

Other Precautions

Dynamic brake

- The dynamic brake can only be used for emergency stop upon fault or power failure. Do not trigger faults or power failure frequently.
- The action interval of the dynamic brake function must be above 5 min during high-speed operation. Failure to comply may damage the internal dynamic braking circuit.
- A motor being driven by the load axis is in the generating state, which is common in rotary mechanical structures during dynamic braking stop. Under such state, a short circuit current will pass through the dynamic brake. If the motor keeps being driven by the load axis, smoke or flame may be generated from the drive, resulting in motor damage.

Safety Labels

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

Safety Label	Description
	• Never fail to connect protective earth (PE) terminal. Read through the guide 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 heatsink with power ON to prevent the 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 servo drive performs homing automatically with the position feedback set to the preset value.
High-resolution encoder	The servo drive is equipped with a high-performance encoder with resolution up to 2^{26} (67108864) PPR.
DI signal assignment	DI functions such as emergency stop can be assigned to corresponding pins.
Forced DO	Used to output signals not related to the drive status forcibly or used to check the wiring of output signals.
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.
External regenerative resistor	Used in case of insufficient braking capacity of the built-in regenerative resistor.
Fault log	Used to record the latest twenty faults/warnings, which can also be cleared.
Warning code output	Used to output a four-bit warning code when a warning occurs.
Second encoder	Supports Inovance communication-type encoders, BiSS encoders, and encoders with quadrature pulse feedback.
Gantry synchronization	Used to achieve synchronization of two axes.

Function	Description
Position comparison output	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.
Built-in brake	Used to monitor the brake status in real time.
Safe torque off (STO)	Used to bring the machine safely into a no-torque state and prevent it from unexpected start.
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.
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	Supports three auto-tuning modes: STune, ETune, and ITune.
Gain switchover	Used to apply different gains to different status (operating or stop) of the motor. Gains can also be switched by external terminals during operation.
Torque disturbance observer	Used to estimate the disturbance torque suffered by the system and make corresponding compensation.
Resonance suppression	Used to suppress resonance at high, medium, and low frequencies.
Touch probe function	The servo drive latches the position information when an external DI signal or motor Z signal changes.
Torque reference filter	Used to suppress the mechanical resonance that may be generated when the response speed is excessively high.
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.

2 Basic Servo Functions

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

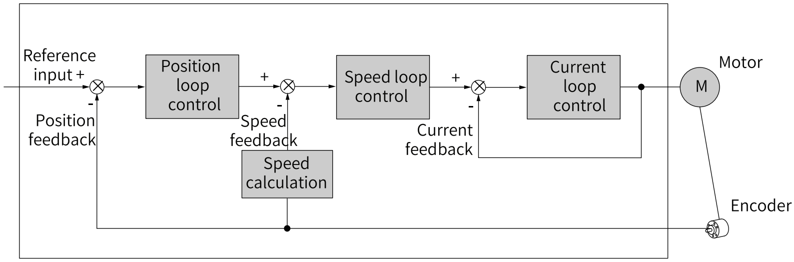


Figure 2-1 Structure of a basic servo system

As the control core of the servo system, the servo drive serves to perform accurate position control, speed control, and torque control on the servo motor through four control modes, which are position control, speed control, torque control, and compound control modes. 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 and speed control through the encoder installed on the motor or an external encoder (full closed-loop control). The position control mode mainly applies to applications requiring positioning control, such as manipulators, SMT machines, engraving and milling machines, and CNC machine tools.
- 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. The torque control mode mainly applies in applications requiring strict tension control. For example, in winding/

unwinding devices, torque references are used to prevent the material from being affected by changes in the winding radius.

2.1 Conversion Factor Setting

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 relationship 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 " *6091.01h" on page 608* for details.

See " *6091.02h" on page 609* for details.

Taking the ball screw as an example:

Minimum reference unit f_c = 1 mm

Screw lead P_B = 10 mm/r

Reduction ratio (n) = 5:1

Resolution of Inovance motor equipped with 26-bit serial-type encoder (P) = 67108864 PPR

The position factor is therefore calculated as follows:

Position factor:

$$\text{Position factor} = \frac{\text{Motor resolution P x n}}{P_B} = \frac{67108864 \times 5}{10} = \frac{335544320}{10} = 33554432$$

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

Reduce the faction (6091.01h/6091.02h) to the lowest terms and take the final value.

2.2 Setting the Servo State

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

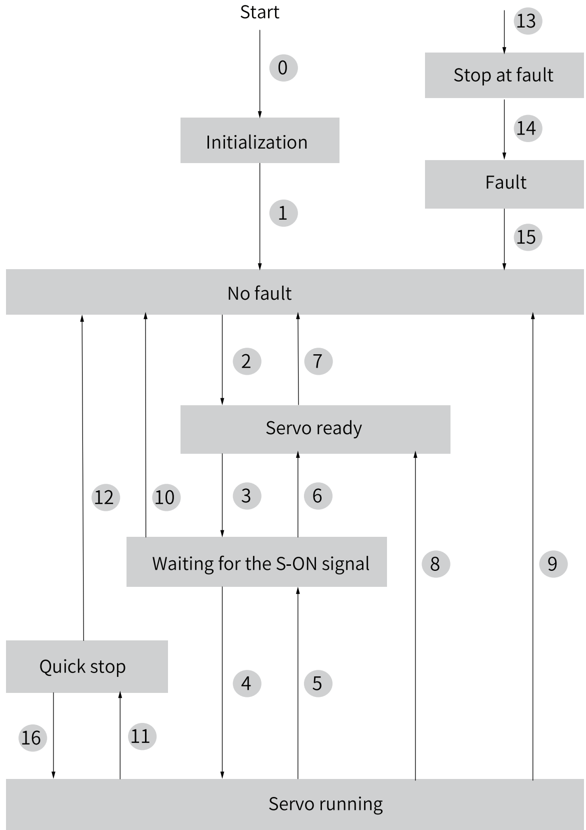


Figure 2-2 Switchover of CiA402 state machine

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 running	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. Parameters changeable during running can be set only.
Quick stop	Quick stop is activated and the servo drive is in the process of quick stop. Parameters changeable during running can be set only.
Stop at fault	A fault occurs and the servo drive is in the process of stop. Parameters changeable during running can be set only.
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	Bit 0 to Bit 9[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

CiA402 Status Switchover		Control Word 6040h	Bit 0 to Bit 9[1] of Status Word 6041h
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
11	Servo running → Quick stop	0x0002	0x0217
12	Quick stop → No fault	Set 605A to a value from 0 to 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 Bit 7 is rising edge-triggered. If bit 7 is kept to 1, other control commands are invalid.	0x0250
16	Quick stop → Servo running	Set 605A to a value from 5 to 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 595* for details.

See *" 6041h" on page 596* for details.

2.3 Setting and Display of the Operation Modes

Introduction to the operation modes

The servo drive supports seven kinds of operation modes. The pre-operational mode of the servo drive can be set in 6060h. The present operation mode of the servo drive can be viewed in 6061h.

☆Related parameters

See *" 6060h" on page 598* for details.

See *" 6061h" on page 599* for details.

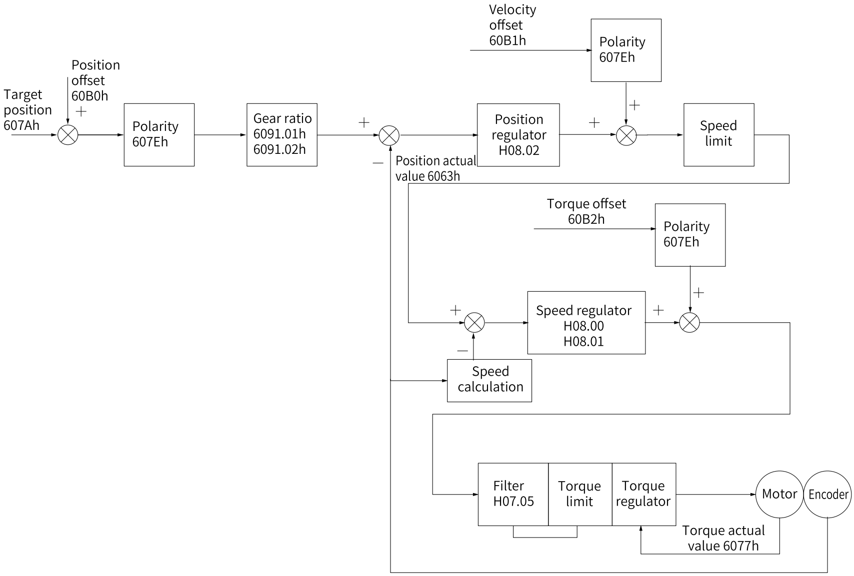
Communication cycle supported by each mode

The 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

CSP mode (6060h = 8)

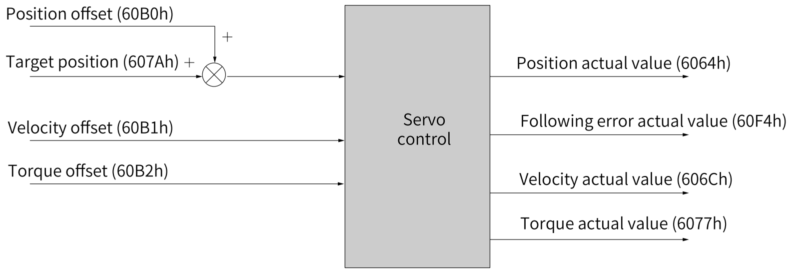


Figure 2-3 Cyclic synchronous position mode

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	Unit:	-
Max.:	65535	Data Type:	Uint16
Default:	-	Change:	At once
Access:	RW	Mapping:	RPDO

Value Range:

0 to 65535

Description:

Used to set the control command.

bit	Name	Description
0	Switch on	1: Active; 0: Inactive
1	Enable voltage	1: Active; 0: Inactive
2	Quick stop	0: Active; 1: Inactive
3	Enable operation	1: Active; 0: Inactive

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: Active; 0: Inactive
1	Switch on	1: Active; 0: Inactive
2	Operation enabled	1: Active; 0: Inactive
3	Fault	1: Active; 0: Inactive
4	Voltage enabled	1: Active; 0: Inactive
5	Quick stop	0: Active, 1: Inactive
6	Switch on disabled	1: Active; 0: Inactive
7	Warning	1: Active; 0: Inactive

bit	Name	Description
8	Manufacturer-specific	Undefined
9	Remote	1: Active, control word activated 0: Inactive
10	Target reached	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 found	0: Home not found 1: Home found

☆Related parameters

See *"6060h" on page 598* for details.

See *"6061h" on page 599* for details.

See *"6064h" on page 600* for details.

See *"6065h" on page 600* for details.

See *"6066h" on page 600* for details.

See *"606Ch" on page 601* for details.

See *"6077h" on page 604* for details.

See *"607Ah" on page 604* for details.

See *"607Eh" on page 606* for details.

See *"60B0h" on page 611* for details.

See *"60B1h" on page 611* for details.

See *"60B2h" on page 611* for details.

See *"60F4h" on page 618* for details.

2.4.5 Related Functions

Position deviation monitoring function

☆Related parameters:

See *"6065h" on page 600* for details.

See *"6066h" on page 600* for details.

Position reference polarity

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

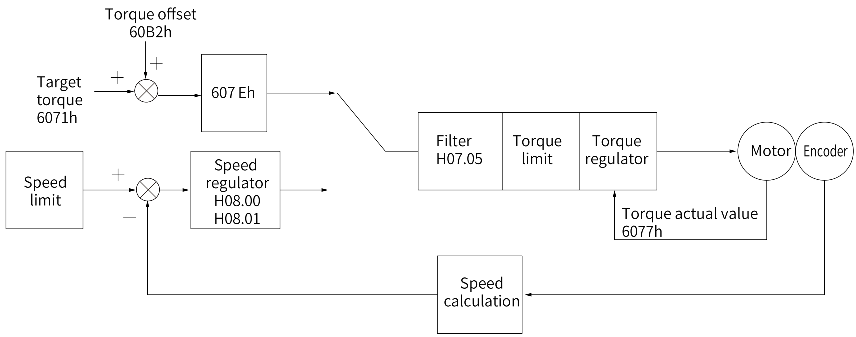
☆Related parameter

See *" 607Eh" on page 606* for details.

2.5 Cyclic Synchronous Torque 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)

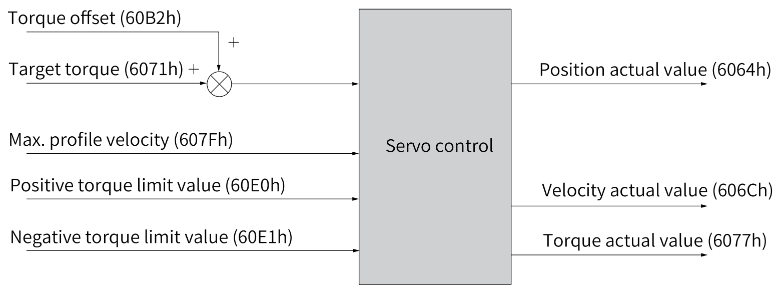


Figure 2-4 CST mode

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 Unit: -

Max.: 65535 Data Type: Uint16

Default: - Change: At once

Access: RW Mapping: RPDO

Value Range:

0 to 65535

Description:

Used to set the control command.

bit	Name	Description
0	Switch on	1: Active; 0: Inactive
1	Enable voltage	1: Active; 0: Inactive
2	Quick stop	0: Active; 1: Inactive
3	Enable operation	1: Active; 0: Inactive

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: Active; 0: Inactive
1	Switch on	1: Active; 0: Inactive
2	Operation enabled	1: Active; 0: Inactive
3	Fault	1: Active; 0: Inactive
4	Voltage enabled	1: Active; 0: Inactive
5	Quick stop	0: Active; 1: Inactive
6	Switch on disabled	1: Active; 0: Inactive
7	Warning	1: Active; 0: Inactive
8	Manufacturer-specific	Undefined
9	Remote	1: Active, control word activated 0: Inactive
10	Target reached	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	-	N/A
14	Manufacturer-specific	Undefined
15	Home found	0: Home not found 1: Home found

☆Related parameters:

See *" 6060h" on page 598* for details.

See *" 6061h" on page 599* for details.

See *" 6071h" on page 603* for details.

See *" 6072h" on page 603* for details.

See *" 6074h" on page 603* for details.

See *" 6077h" on page 604* for details.

See *" 607Eh" on page 606* for details.

See *" 607Fh" on page 606* for details.

See *" 60B2h" on page 611* for details.

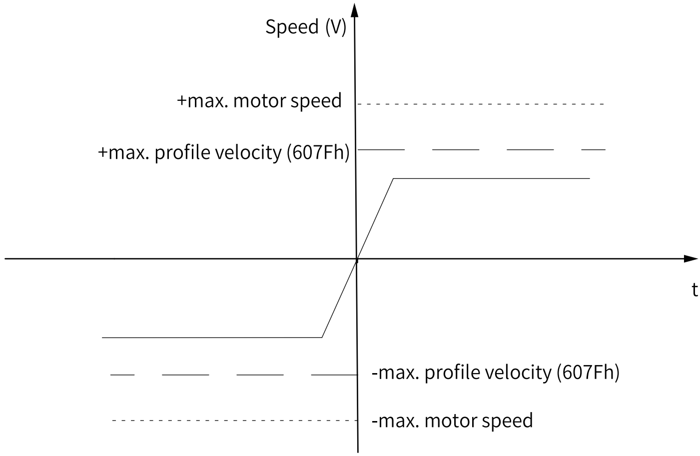
See *" 60E0h" on page 617* for details.

See *" 60E1h" on page 617* 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.

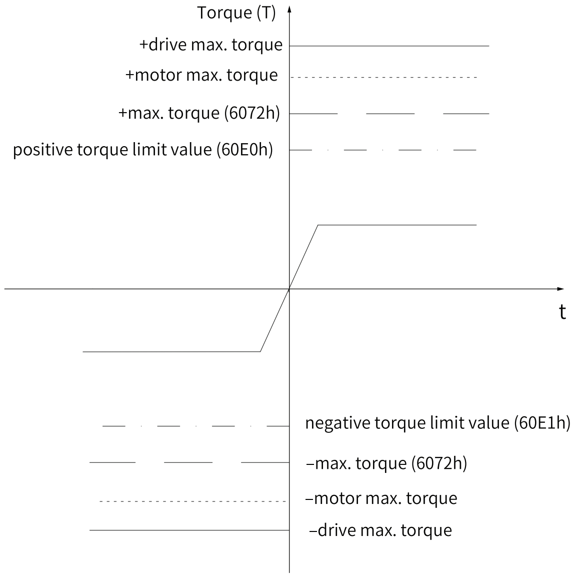


☆Related parameters

See *" 607Fh" on page 606* for details.

Torque limit

To protect the mechanical devices, you can limit torque references of the servo drive in the position control, speed control, and torque control modes by setting 6072h (Max 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 603 for details.

See " 60E0h" on page 617 for details.

See " 60E1h" on page 617 for details.

Torque reference polarity

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

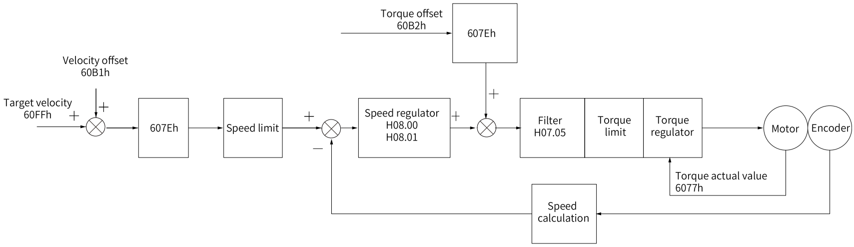
☆Related parameter

See " 607Eh" on page 606 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

CSV mode (6060h = 9)

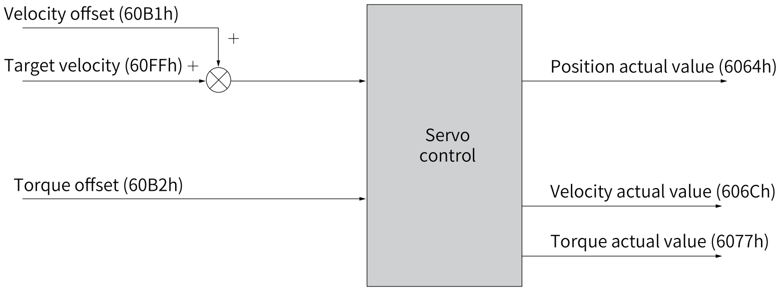


Figure 2-5 CSV mode

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	Unit:	-
Max.:	65535	Data Type:	Uint16
Default:	-	Change:	At once

Access: RW　　Mapping: RPDO

Value Range:

0 to 65535

Description:

Used to set the control command.

bit	Name	Description
0	Switch on	1: Active; 0: Inactive
1	Enable voltage	1: Active; 0: Inactive
2	Quick stop	0: Active; 1: Inactive
3	Enable operation	1: Active; 0: Inactive

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: Active; 0: Inactive
1	Switch on	1: Active; 0: Inactive
2	Operation enabled	1: Active; 0: Inactive
3	Fault	1: Active; 0: Inactive
4	Voltage enabled	1: Active; 0: Inactive
5	Quick stop	0: Active; 1: Inactive
6	Switch on disabled	1: Active; 0: Inactive
7	Warning	1: Active; 0: Inactive
8	Manufacturer-specific	Undefined
9	Remote	1: Active, control word activated 0: Inactive
10	Target reached	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
14	Manufacturer-specific	Undefined
15	Home found	0: Home not found 1: Home found

☆Related parameters

See " 6060h" on page 598 for details.

See " 6061h" on page 599 for details.

See " 6064h" on page 600 for details.

See " 606Ch" on page 601 for details.

See " 6077h" on page 604 for details.

See " 607Eh" on page 606 for details.

See " 60B1h" on page 611 for details.

See " 60B2h" on page 611 for details.

See " 60FFh" on page 619 for details.

2.6.5 Related Functions

Velocity reference polarity

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

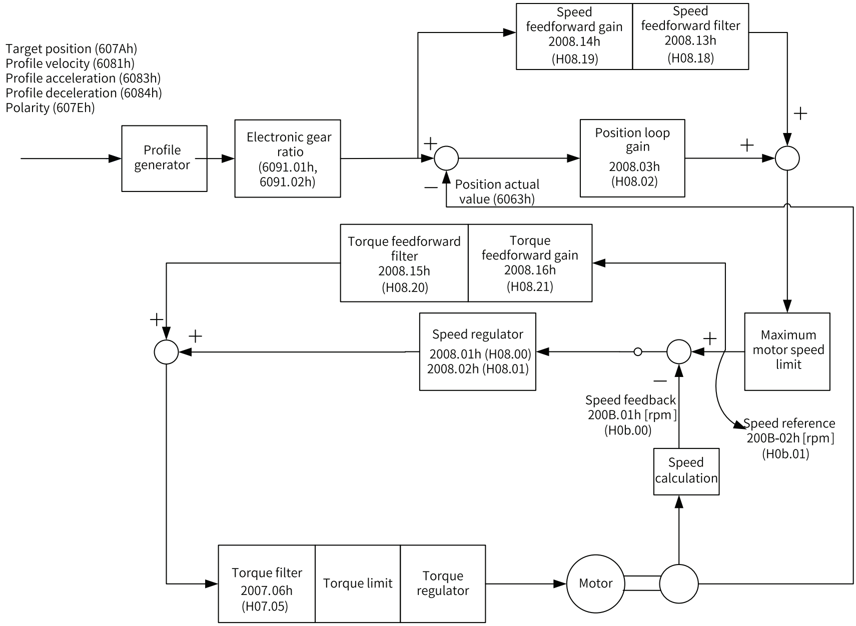
☆Related parameter

See " 607Eh" on page 606 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)

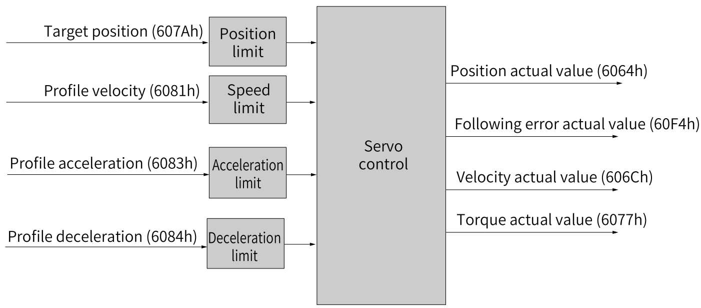


Figure 2-6 PP mode

In PP mode, the target position is triggered and activated based on the time sequence of the new set-point (bit 4 of the control word) and set-point acknowledge (bit 12 of the status word).

The controller sets the New set-point bit (bit 4 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 (bit 12 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.

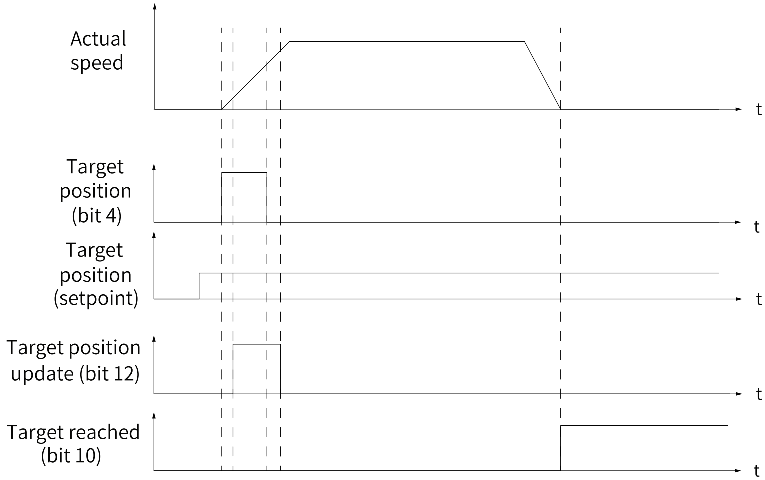


Figure 2-7 Sequence in sequential mode

The linkage mode of position references is determined by bit 5 (Change set immediately) of the control word. When bit 5 is set to 1 (Sequential mode), sequential linkage applies between position references, which is the sequential mode. When bit 5 is set to 0 (Single-point mode), zero-crossing linkage applies to position references, which is the single-point mode.

Sequential mode:

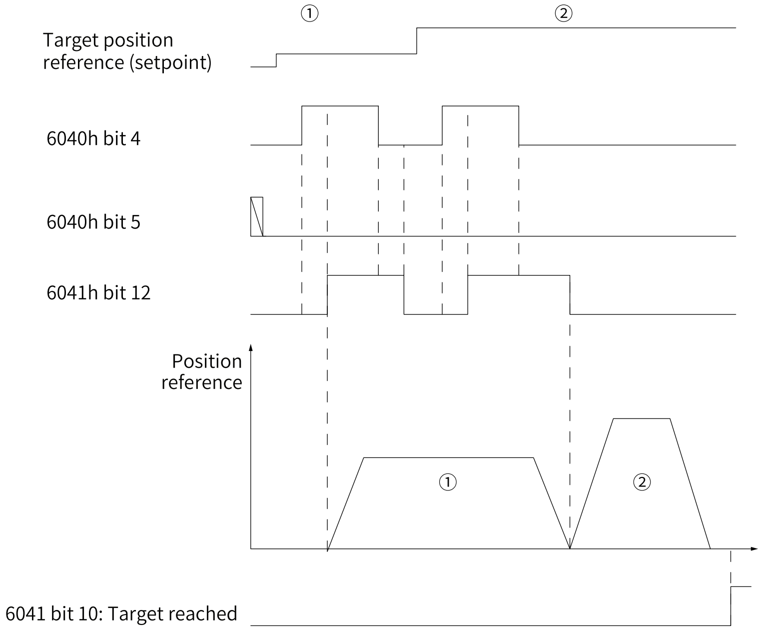
The target position of present segment is in the process of positioning. After the new target position is generated, the controller sets the New set-point bit to 1, and the servo drive performs positioning towards the new target position.

In sequential mode, the sequence diagrams of bit 4 of the control word (New set-point) and bit 12 of the status word (Set-point acknowledge) are as follows.

Single-point mode:

The target position of current 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 after the position reference of current segment is done transmitting.

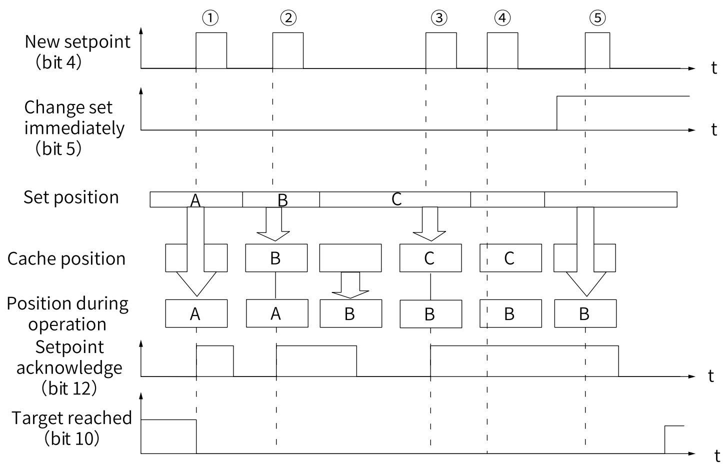
The time sequence diagram of the new set-point (bit 4 of the control word) and the set-point acknowledge (bit 12 of the status word) is as follows.



Note: To modify any parameter of the target position reference (setpoint), send the target position bit (bit 4) again.

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: At once
Mapping: RPDO

Value Range:

0 to 65535

Description:

Used to set the control command.

bit	Name	Description
0	Switch on	1: Active; 0: Inactive
1	Enable voltage	1: Active; 0: Inactive
2	Quick stop	0: Active; 1: Inactive
3	Enable operation	1: Active; 0: Inactive
4	New set-point	0→1: Trigger new target position 1 → 0: Clear bit 12 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: Active; 0: Inactive
1	Switch on	1: Active; 0: Inactive
2	Operation enabled	1: Active; 0: Inactive
3	Fault	1: Active; 0: Inactive
4	Voltage enabled	1: Active; 0: Inactive
5	Quick stop	0: Active; 1: Inactive
6	Switch on disabled	1: Active; 0: Inactive
7	Warning	1: Active; 0: Inactive
8	Manufacturer-specific	Undefined
9	Remote	1: Active, control word activated 0: Inactive
10	Target reached	0: Target position not reached 1: The 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 found	0: Home not found 1: Home found

☆Related parameters:

See *" 6060h" on page 598* for details.

See *" 6061h" on page 599* for details.

See *" 6064h" on page 600* for details.

See *" 6065h" on page 600* for details.

See *" 6066h" on page 600* for details.

See *" 6067h" on page 601* for details.

See *" 6068h" on page 601* for details.

See *" 607Ah" on page 604* for details.

See *" 607Eh" on page 606* for details.

See *" 607Fh" on page 606* for details.

See *" 6081h" on page 606* for details.

See *" 6083h" on page 607* for details.

See *" 6084h" on page 607* 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 bit 10 of the status word, and the host controller, once receives the signal, acknowledges that positioning is done.

☆Related parameters

See *" 6067h" on page 601* for details.

See *" 6068h" on page 601* for details.

Position deviation monitoring function

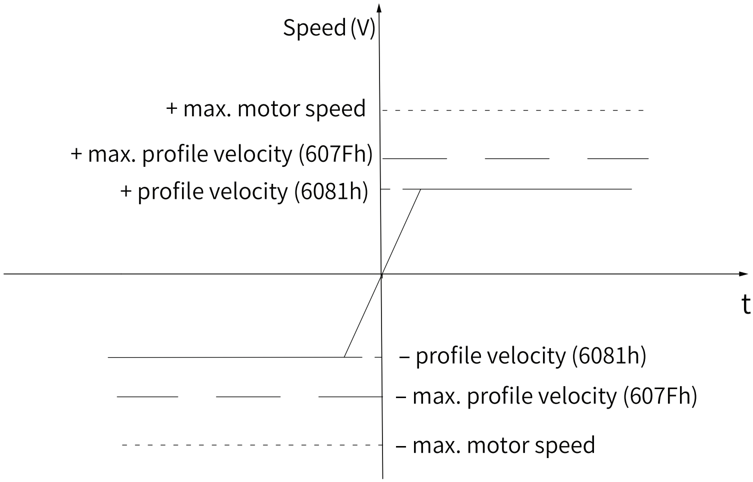
☆Related parameters

See *" 6065h" on page 600* for details.

See *" 6066h" on page 600* 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 parameter

See " 607Fh" on page 606 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 " 60D5h" on page 616 for details.

See " 60D6h" on page 616 for details.

Polarity

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

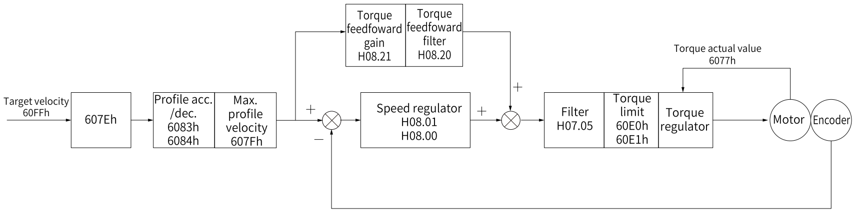
☆Related parameter

See " 607Eh" on page 606 for details.

2.8 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.

2.8.1 Function Block Diagram



2.8.2 Configuration Block Diagram

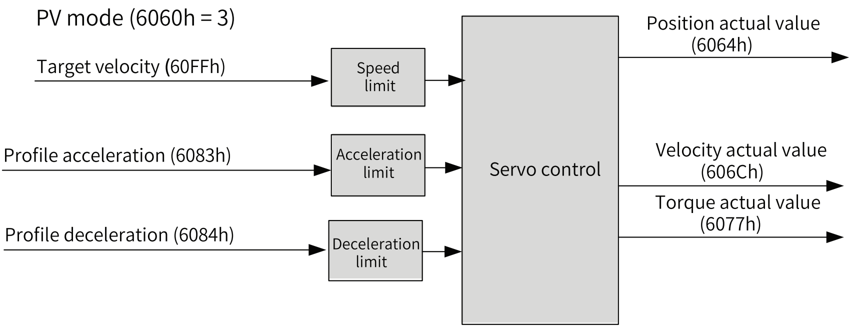


Figure 2-9 PV mode

2.8.3 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

2.8.4 Related Parameters

6040h **Control word**

Address: 0x3502

Min.: 0 Unit: -

Max.: 65535
Data Type: Uint16
Default: -
Change: At once
Access: RW
Mapping: RPDO

Value Range:

0 to 65535

Description:

Used to set the control command.

bit	Name	Description
0	Switch on	1: Active; 0: Inactive
1	Enable voltage	1: Active; 0: Inactive
2	Quick stop	0: Active; 1: Inactive
3	Enable operation	1: Active; 0: Inactive
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: Active; 0: Inactive
1	Switch on	1: Active; 0: Inactive
2	Operation enabled	1: Active; 0: Inactive
3	Fault	1: Active; 0: Inactive
4	Voltage enabled	1: Active; 0: Inactive
5	Quick stop	0: Active; 1: Inactive
6	Switch on disabled	1: Active; 0: Inactive
7	Warning	1: Active; 0: Inactive
8	Manufacturer-specific	Undefined
9	Remote	1: Active, control word activated 0: Inactive
10	Target reached	0: Target velocity not reached 1: Target velocity reached

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

☆Related parameters

See *" 606Ch" on page 601* for details.

See *" 606Dh" on page 602* for details.

See *" 606Eh" on page 602* for details.

See *" 606Fh" on page 602* for details.

See *" 6070h" on page 603* for details.

See *" 607Eh" on page 606* for details.

See *" 607Fh" on page 606* for details.

See *" 6083h" on page 607* for details.

See *" 6084h" on page 607* for details.

See *" 60FFh" on page 619* for details.

2.8.5 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 602* for details.

See *" 606Eh" on page 602* 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 bit 12 of the status word is set to 1.

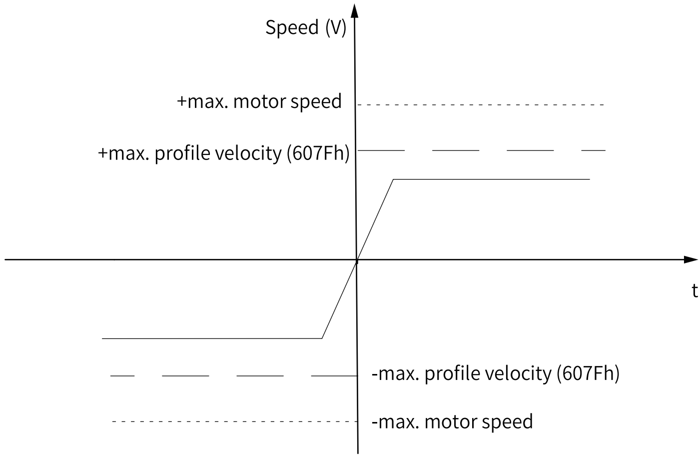
☆Related parameters:

See *" 606Fh" on page 602* for details.

See *" 6070h" on page 603* for details.

Speed limit

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



☆Related parameter

See " 607Fh" on page 606 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 615 for details.

See " 60C6h" on page 615 for details.

Polarity

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

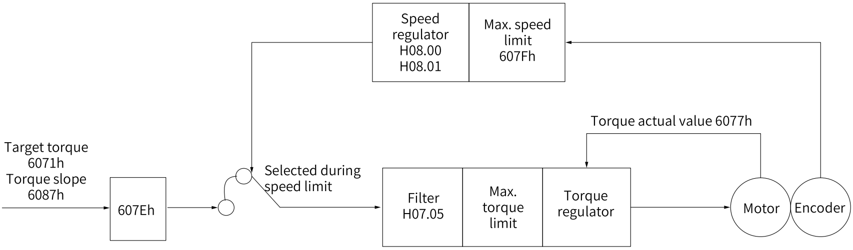
☆Related parameter

See " 607Eh" on page 606 for details.

2.9 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.

2.9.1 Function Block Diagram



2.9.2 Configuration Block Diagram

PT mode (6060h = 4)

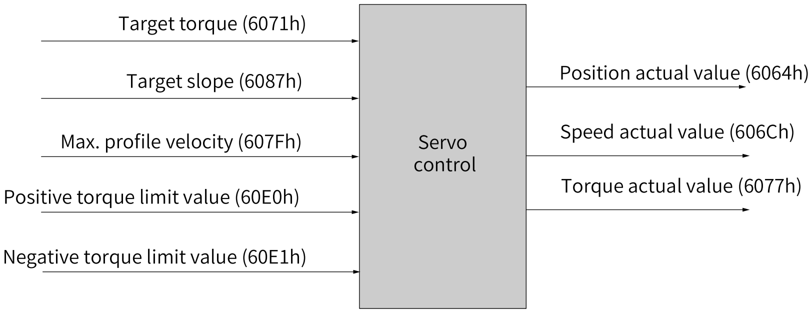


Figure 2-10 PT mode

2.9.3 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

2.9.4 Related Parameters

6040h Control word

Address: 0x3502

Min.:	0	Unit:	-
Max.:	65535	Data Type:	Uint16
Default:	-	Change:	At once
Access:	RW	Mapping:	RPDO

Value Range:

0 to 65535

Description:

Used to set the control command.

bit	Name	Description
0	Switch on	1: Active; 0: Inactive
1	Enable voltage	1: Active; 0: Inactive
2	Quick stop	0: Active; 1: Inactive
3	Enable operation	1: Active; 0: Inactive
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: Active; 0: Inactive
1	Switch on	1: Active; 0: Inactive
2	Operation enabled	1: Active; 0: Inactive
3	Fault	1: Active; 0: Inactive
4	Voltage enabled	1: Active; 0: Inactive
5	Quick stop	0: Active; 1: Inactive
6	Switch on disabled	1: Active; 0: Inactive
7	Warning	1: Active; 0: Inactive
8	Manufacturer-specific	Undefined
9	Remote	1: Active, control word activated 0: Inactive

bit	Name	Description
10	Target reached	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 to 14	No assignment	No assignment, always being 0
15	Home found	0: Home not found 1: Home found

☆Related parameters

See *" H07.17" on page 384* for details.

See *" 6060h" on page 598* for details.

See *" 6061h" on page 599* for details.

See *" 6071h" on page 603* for details.

See *" 6072h" on page 603* for details.

See *" 6074h" on page 603* for details.

See *" 6077h" on page 604* for details.

See *" 6087h" on page 608* for details.

See *" 607Eh" on page 606* for details.

See *" 607Fh" on page 606* for details.

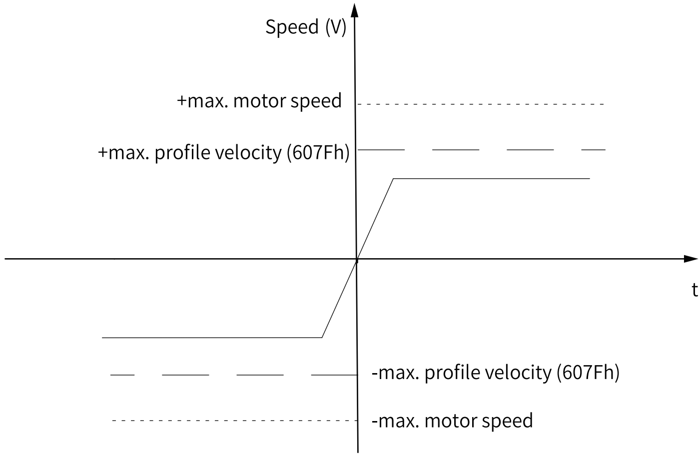
See *" 60E0h" on page 617* for details.

See *" 60E1h" on page 617* for details.

2.9.5 Related Functions

Speed limit in the torque control mode

In the torque control 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.

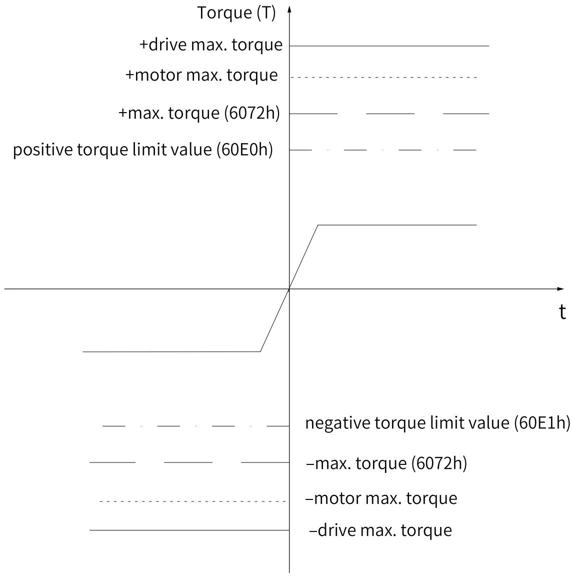


☆Related parameter

See *" 607Fh" on page 606* for details.

Torque limit

To protect the mechanical devices, you can limit torque references of the servo drive in the position control, speed control, and torque control modes by setting 6072h (Max 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 603 for details.

See " 60E0h" on page 617 for details.

See " 60E1h" on page 617 for details.

Torque reference polarity

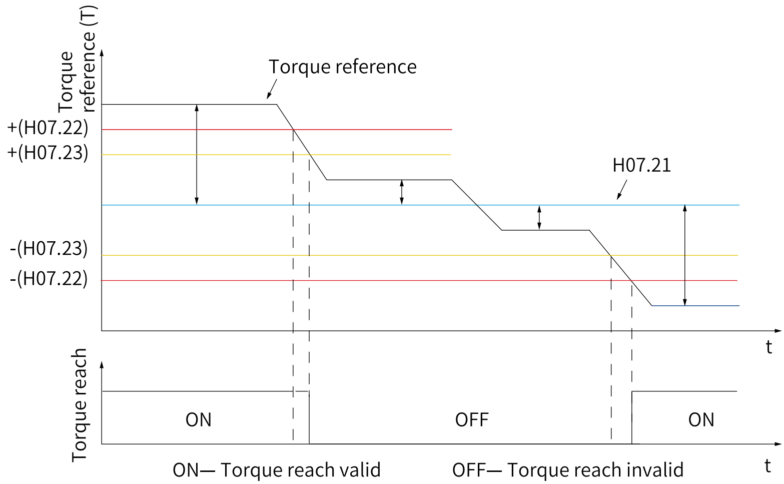
You can change the torque reference direction through setting the torque reference polarity.

☆Related parameter

See " 607Eh" on page 606 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.

2.10 Homing (HM) Mode

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

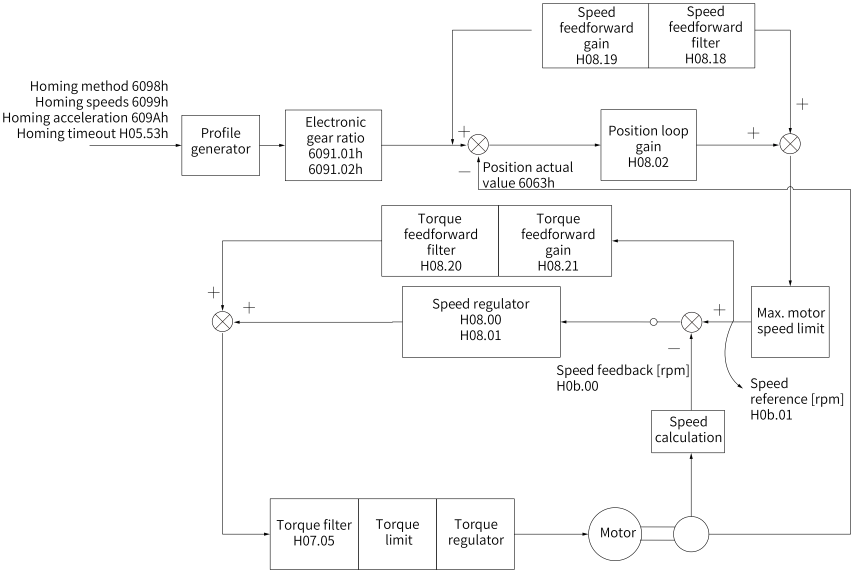
- Mechanical home: a fixed position on the machine, which corresponds to a certain home switch or the motor Z signal.
- Mechanical zero: absolute zero position on the machine

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.

2.10.1Function Block Diagram



2.10.2Configuration Block Diagram

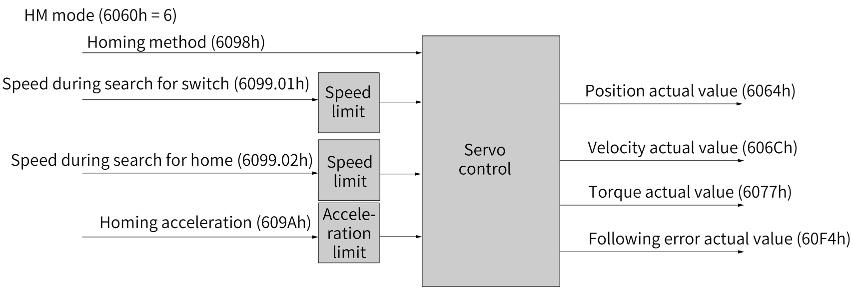


Figure 2-11 HM mode

2.10.3Recommended 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

RPDO	TPDO	Remarks
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 | Unit: -

Max.: 65535 | Data Type: Uint16

Default: - | Change: At once

Access: RW | Mapping: RPDO

Value Range:

0 to 65535

Description:

Used to set the control command.

bit	Name	Description
0	Switch on	1: Active; 0: Inactive
1	Enable voltage	1: Active; 0: Inactive
2	Quick stop	0: Active; 1: Inactive
3	Enable operation	1: Active; 0: Inactive
4	Enable homing	0→1: Homing started; 1→0: Homing interrupted
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: Active; 0: Inactive
1	Switch on	1: Active; 0: Inactive
2	Operation enabled	1: Active; 0: Inactive
3	Fault	1: Active; 0: Inactive
4	Voltage enabled	1: Active; 0: Inactive
5	Quick stop	0: Active; 1: Inactive
6	Switch on disabled	1: Active; 0: Inactive
7	Warning	1: Active; 0: Inactive
8	Manufacturer-specific	Undefined
9	Remote	1: Active, control word activated 0: Inactive
10	Target reached	1: Home located or homing interrupted
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 found	0: Home not found 1: Home found

☆Related parameters:

See *" 6060h" on page 598* for details.

See *" 6061h" on page 599* for details.

See *" 6065h" on page 600* for details.

See *" 6066h" on page 600* for details.

See *" 6098h" on page 609* for details.

See *" 6099.01h" on page 610* for details.

See *" 6099.02h" on page 610* for details.

See *" 609Ah" on page 611* for details.

See *" 607Ch" on page 604* for details.

See *" 607Fh" on page 606* for details.

See *" 60E6h" on page 617* for details.

See *" 60C5h" on page 615* for details.

2.10.5Related Functions

Homing timeout

When the homing duration exceeds the value defined by H05.35, the 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 parameter

See *" H05.35" on page 367* for details.

Actual position calculation method

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

☆Related parameters

See *" 60E6h" on page 617* for details.

See *" 607Ch" on page 604* for details.

Position deviation monitoring function

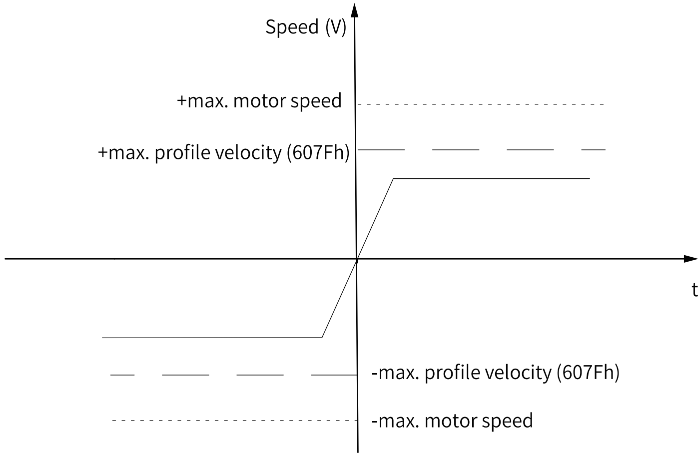
☆Related parameters

See *" 6065h" on page 600* for details.

See *" 6066h" on page 600* 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 parameter

See *" 607Fh" on page 606* for details.

Acceleration limit

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

☆Related parameter

See *" 60C5h" on page 615* for details.

2.10.6Homing Operation

6098h = 1

Mechanical home: Z signal

Deceleration point: negative limit switch

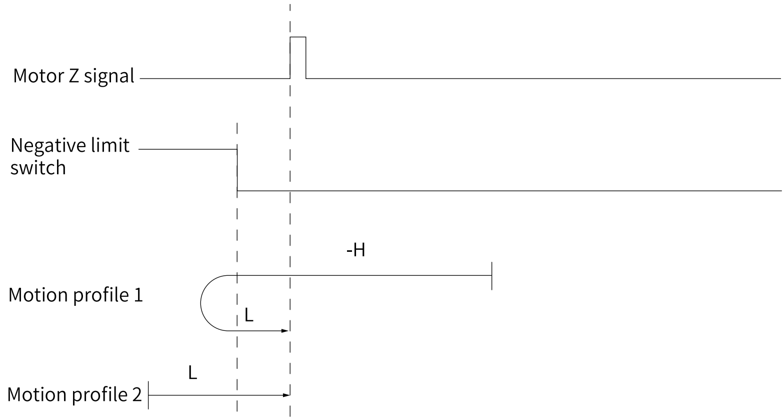


Figure 2-12 Motor running curve and speeds in mode 1

- 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 6099.01h (Speed during search for switch), and "L" represents 6099.02h (Speed during search for zero).

6098h = 2

Home: Z signal

Deceleration point: positive limit switch

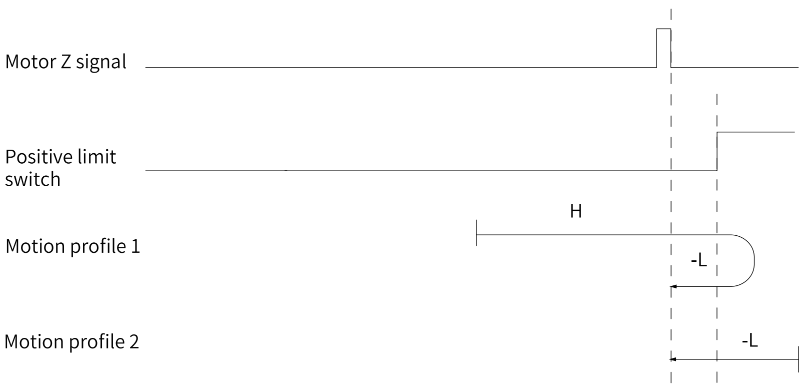


Figure 2-13 Motor running curve and speeds in mode 2

- 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)

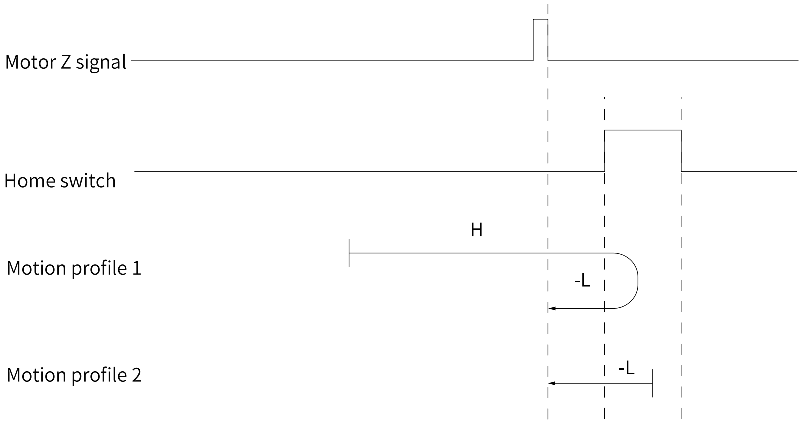


Figure 2-14 Motor running curve and speeds in mode 3

- 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)

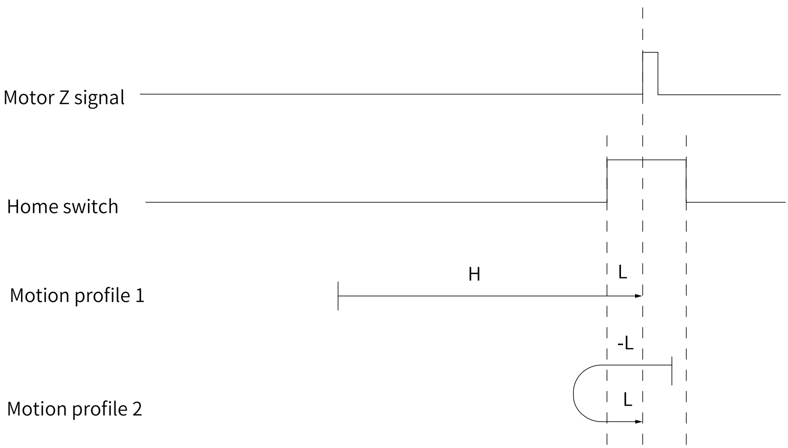


Figure 2-15 Motor running curve and speeds in mode 4

- 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)

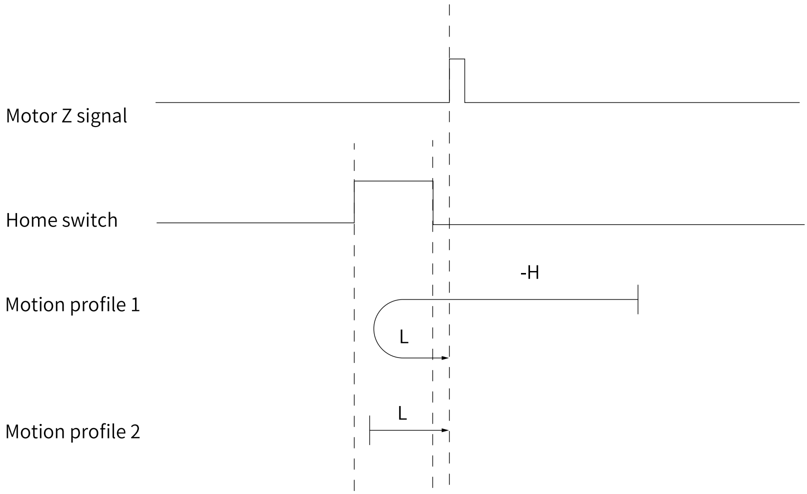


Figure 2-16 Motor running curve and speeds in mode 5

- 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)

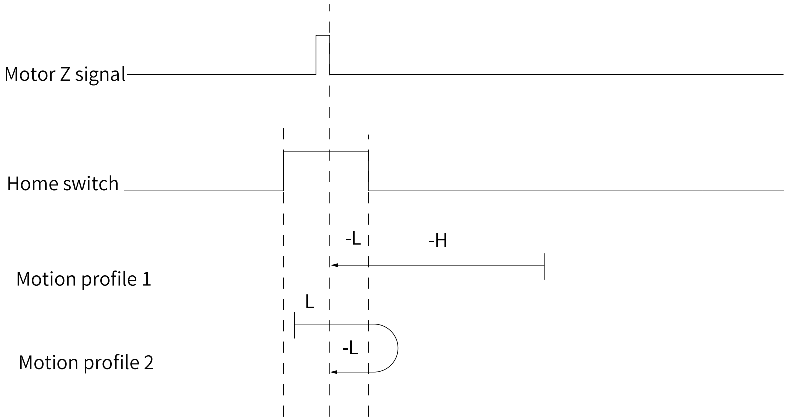


Figure 2-17 Motor running curve and speeds in mode 6

- 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)

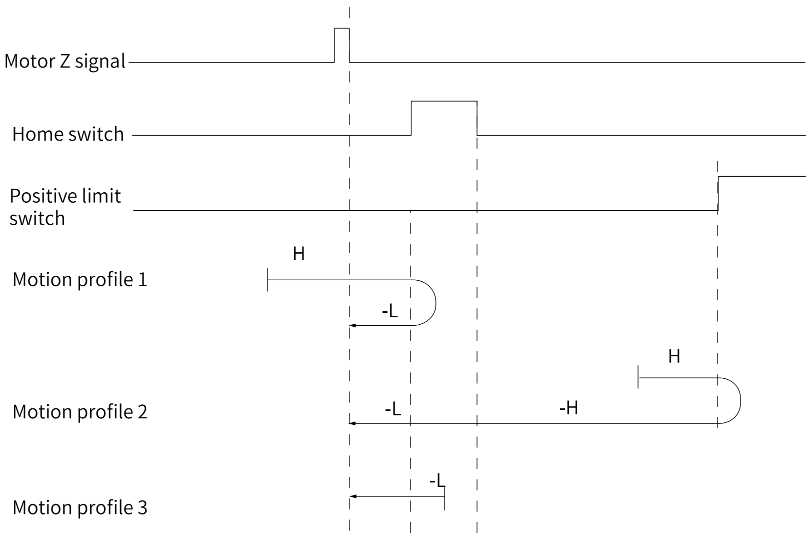


Figure 2-18 Motor running curve and speeds in mode 7

- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch

- Motion profile 2: deceleration point 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)

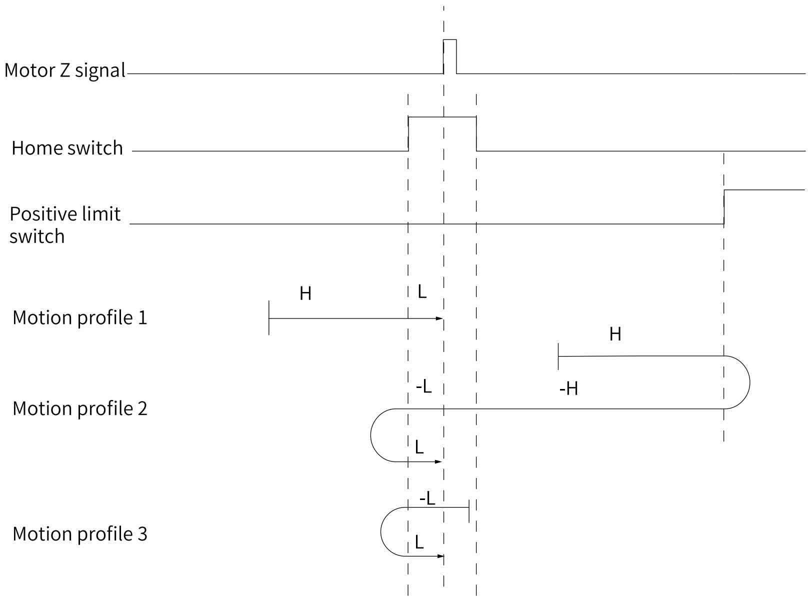


Figure 2-19 Motor running curve and speeds in mode 8

- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch
- Motion profile 2: deceleration point 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)

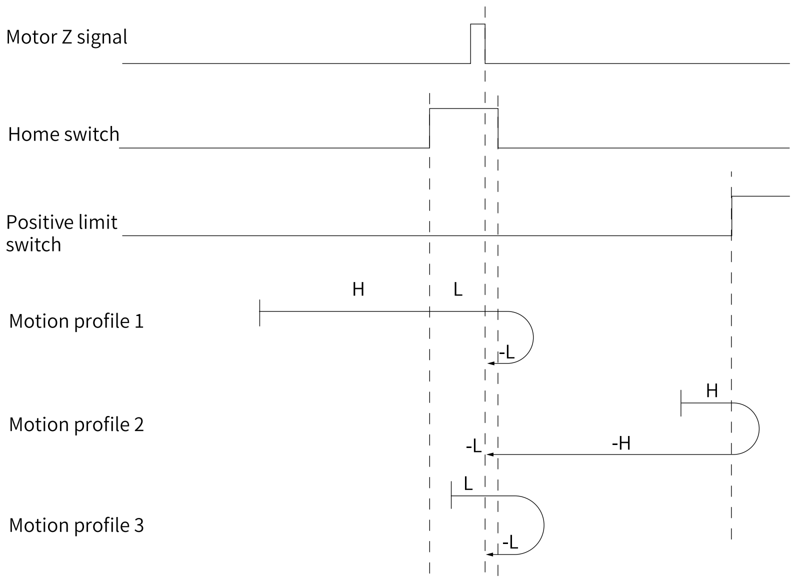


Figure 2-20 Motor running curve and speeds in mode 9

- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch
- Motion profile 2: deceleration point 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)

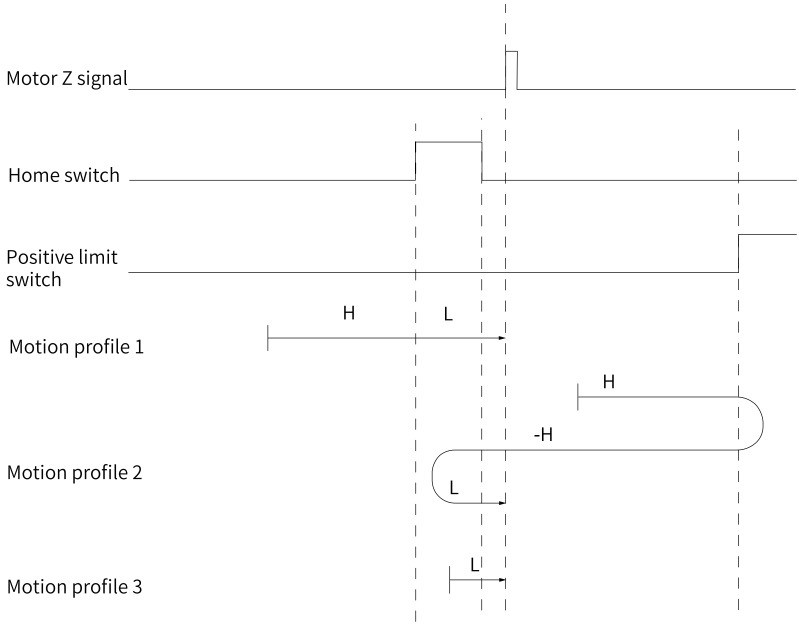


Figure 2-21 Motor running curve and speeds in mode 10

- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch
- Motion profile 2: deceleration point 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)

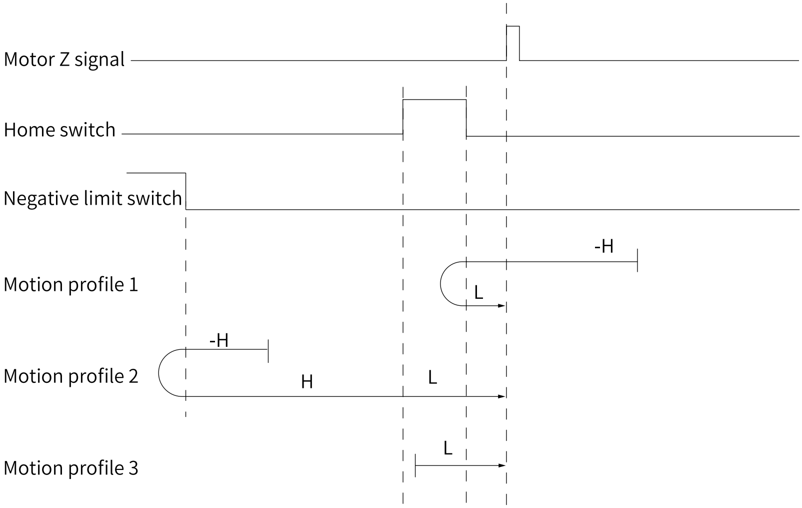


Figure 2-22 Motor running curve and speeds in mode 11

- Motion profile 1: deceleration point signal inactive at start, not hitting the negative limit switch
- Motion profile 2: deceleration point signal inactive at start, hitting the negative limit switch
- Motion profile 3: deceleration point signal active at start

6098h = 12

Home: Z signal

Deceleration point: home switch (HW)

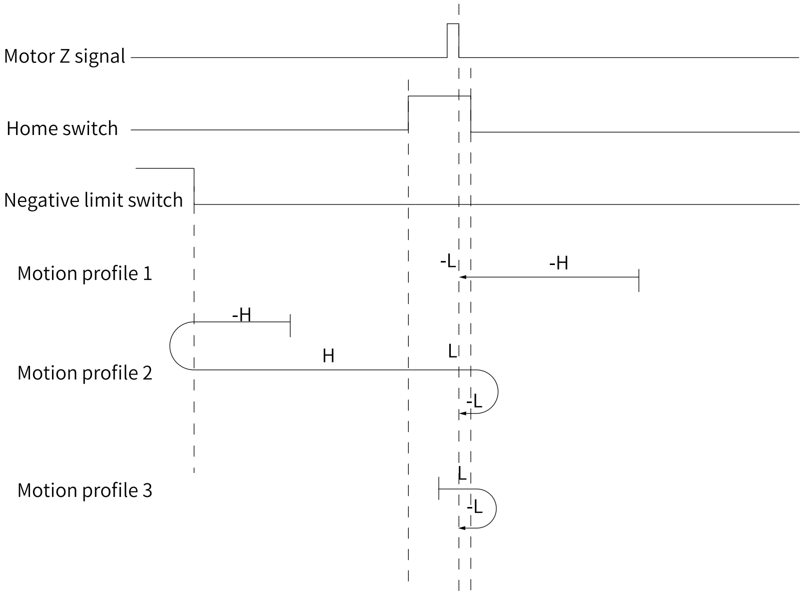


Figure 2-23 Motor running curve and speeds in Mode 12

- Motion profile 1: deceleration point signal inactive at start, not hitting the negative limit switch
- Motion profile 2: deceleration point signal inactive at start, hitting the negative limit switch
- Motion profile 3: deceleration point signal active at start

6098h = 13

Home: Z signal

Deceleration point: home switch (HW)

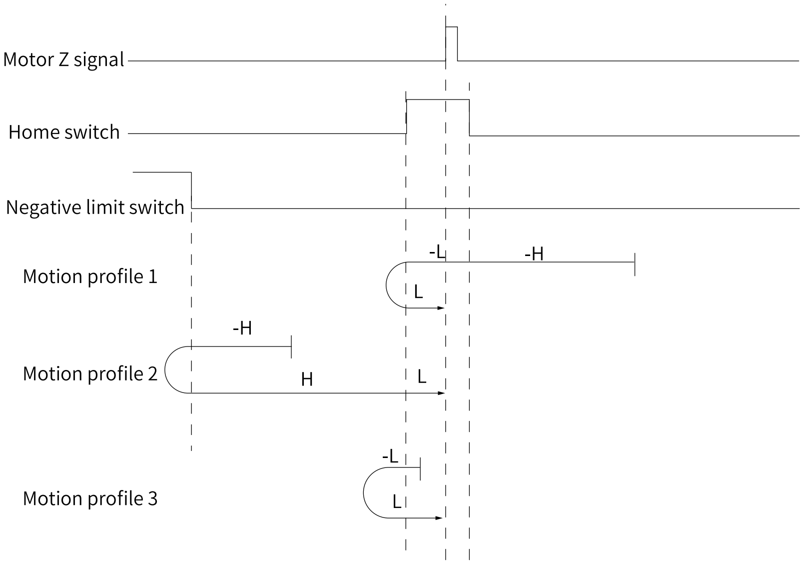


Figure 2-24 Motor running curve and speeds in mode 13

- Motion profile 1: deceleration point signal inactive at start, not hitting the negative limit switch
- Motion profile 2: deceleration point signal inactive at start, hitting the negative limit switch
- Motion profile 3: deceleration point signal active at start

6098h = 14

Home: Z signal

Deceleration point: home switch (HW)

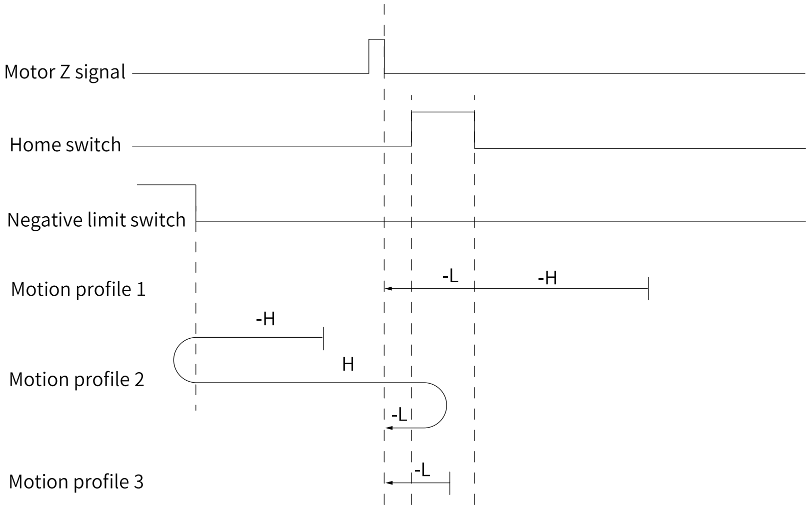


Figure 2-25 Motor running curve and speeds in mode 14

- Motion profile 1: deceleration point signal inactive at start, not hitting the negative limit switch
- Motion profile 2: deceleration point signal inactive at start, hitting the negative limit switch
- Motion profile 3: deceleration point signal active at start

6098h = 17

Home: negative limit switch

Deceleration point: negative limit switch

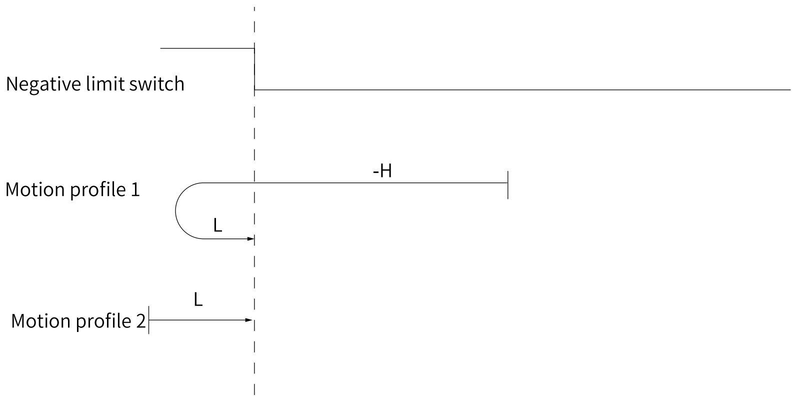


Figure 2-26 Motor running curve and speeds in mode 17

- 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

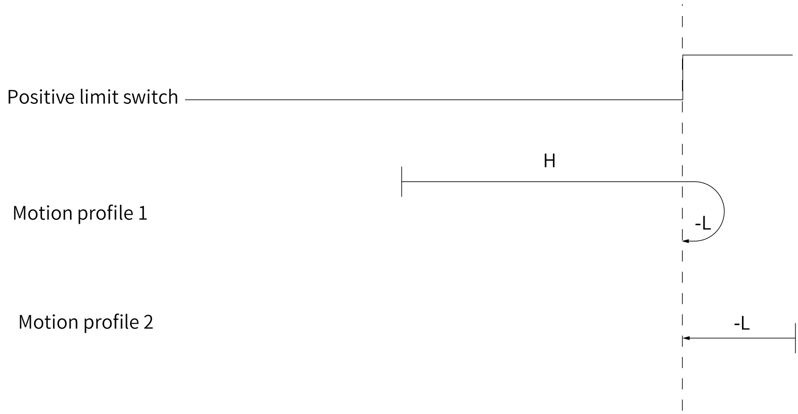


Figure 2-27 Motor running curve and speeds in mode 18

- 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)

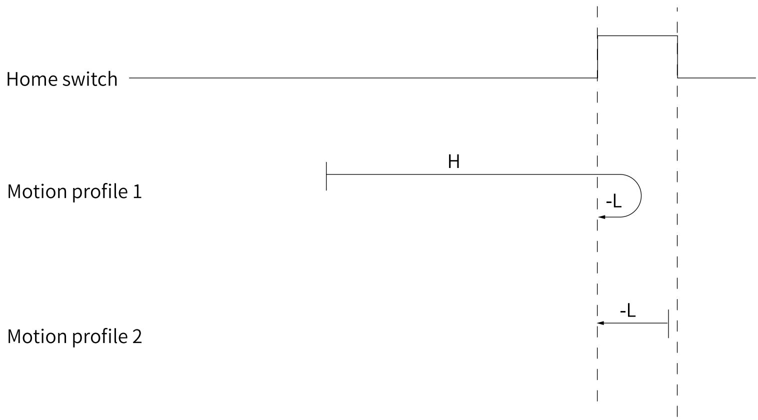


Figure 2-28 Motor running curve and speeds in mode 19

- 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)

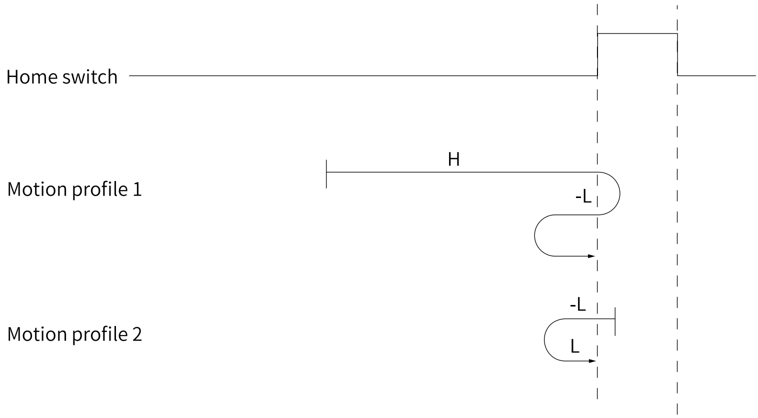


Figure 2-29 Motor running curve and speeds in mode 20

- 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)

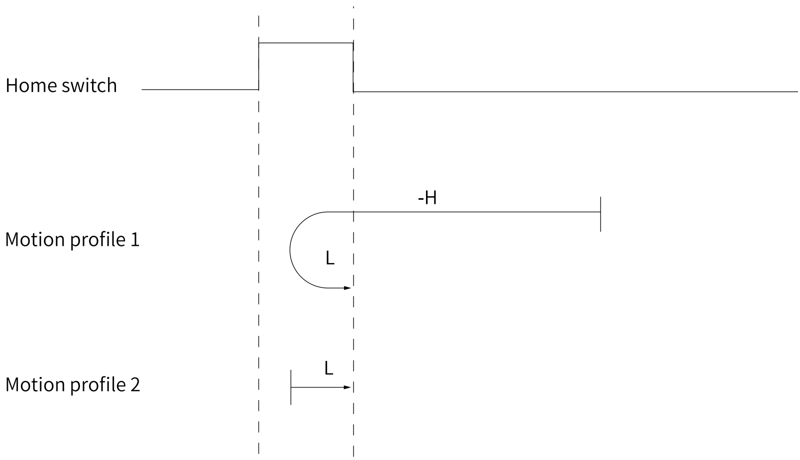


Figure 2-30 Motor running curve and speeds in mode 21

- 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)

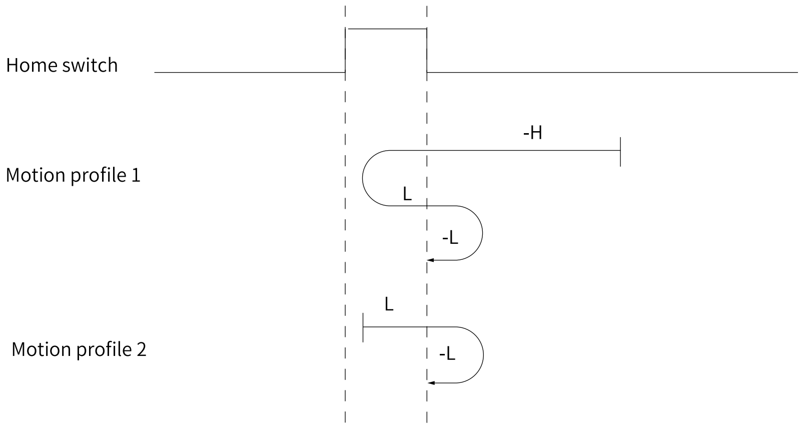


Figure 2-31 Motor running curve and speeds in mode 22

- 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)

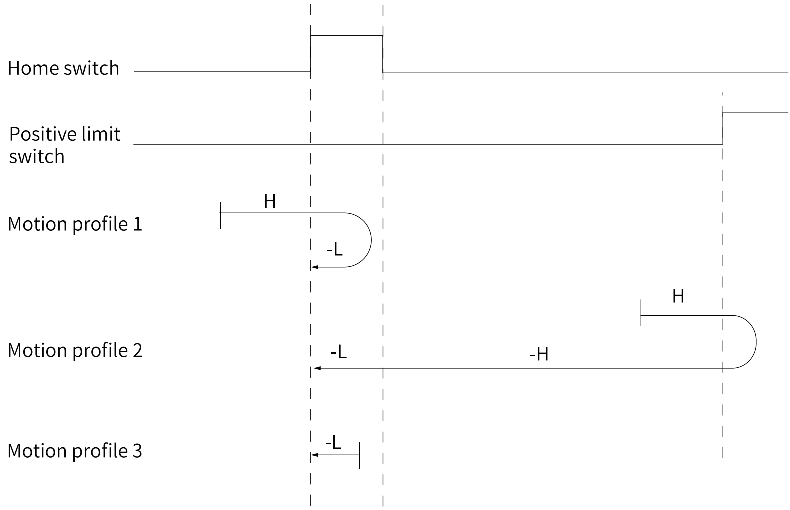


Figure 2-32 Motor running curve and speeds in mode 23

- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch
- Motion profile 2: deceleration point 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)

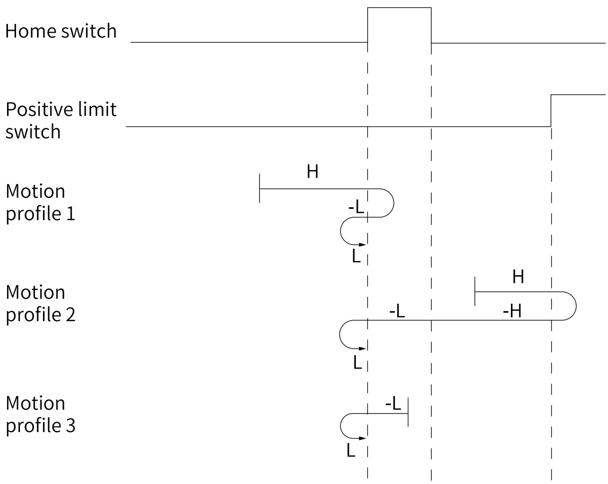


Figure 2-33 Motor running curve and speeds in mode 24

- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch
- Motion profile 2: deceleration point 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)

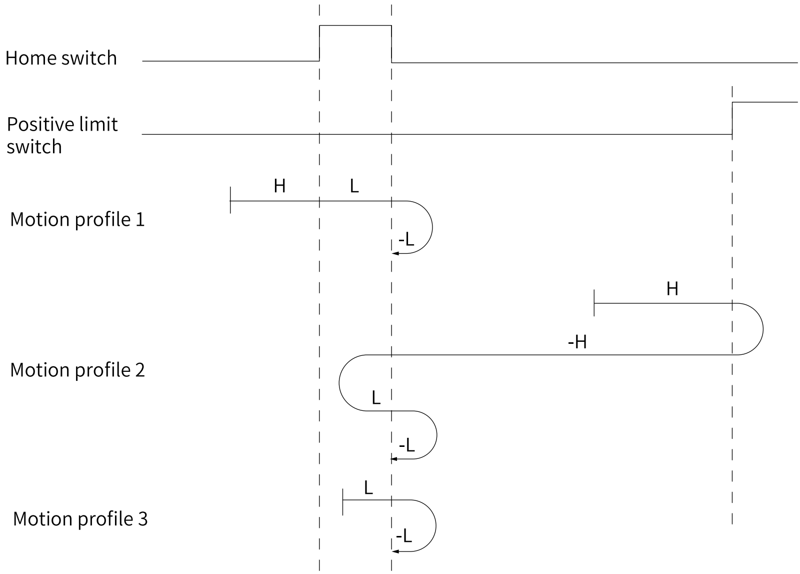


Figure 2-34 Motor running curve and speeds in mode 25

- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch
- Motion profile 2: deceleration point 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)

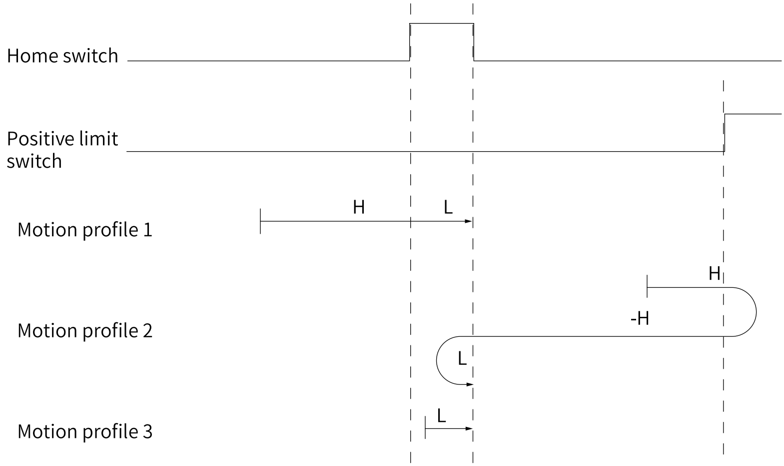


Figure 2-35 Motor running curve and speeds in mode 26

- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch
- Motion profile 2: deceleration point 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)

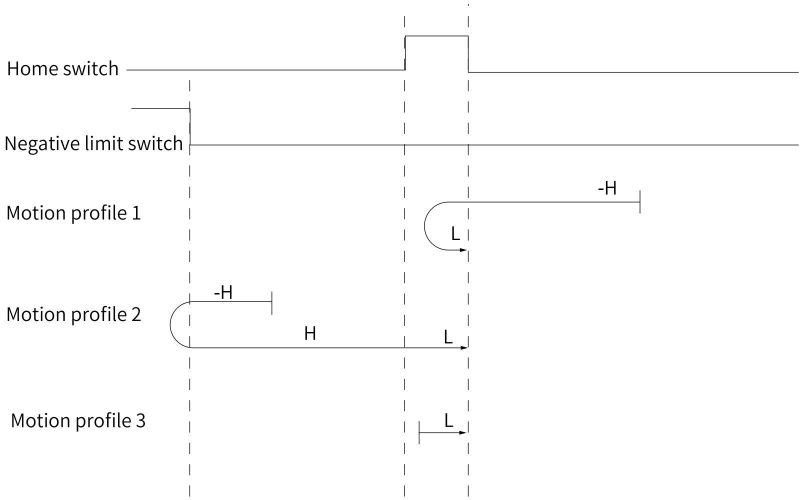


Figure 2-36 Motor running curve and speeds in mode 27

- Motion profile 1: deceleration point signal inactive at start, not hitting the negative limit switch
- Motion profile 2: deceleration point signal inactive at start, hitting the negative limit switch
- Motion profile 3: deceleration point signal active at start

6098h = 28

Home: home switch (HW)

Deceleration point: home switch (HW)

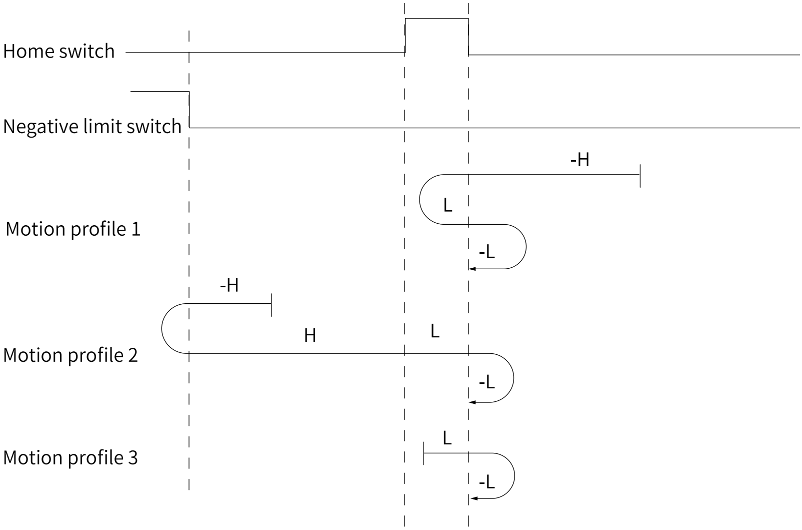


Figure 2-37 Motor running curve and speeds in mode 28

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

6098h = 29

Home: home switch (HW)

Deceleration point: home switch (HW)

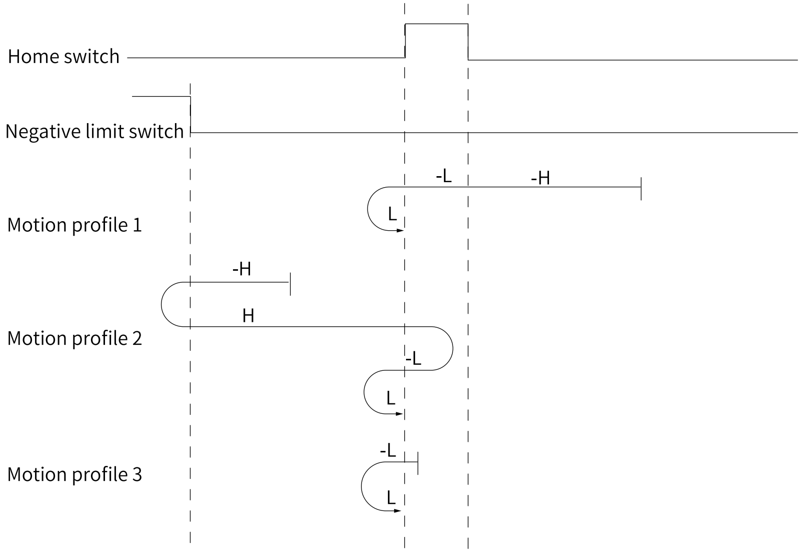


Figure 2-38 Motor running curve and speeds in mode 29

- Motion profile 1: deceleration point signal inactive at start, not hitting the negative limit switch
- Motion profile 2: deceleration point signal inactive at start, hitting the negative limit switch
- Motion profile 3: deceleration point signal active at start

6098h = 30

Home: home switch (HW)

Deceleration point: home switch (HW)

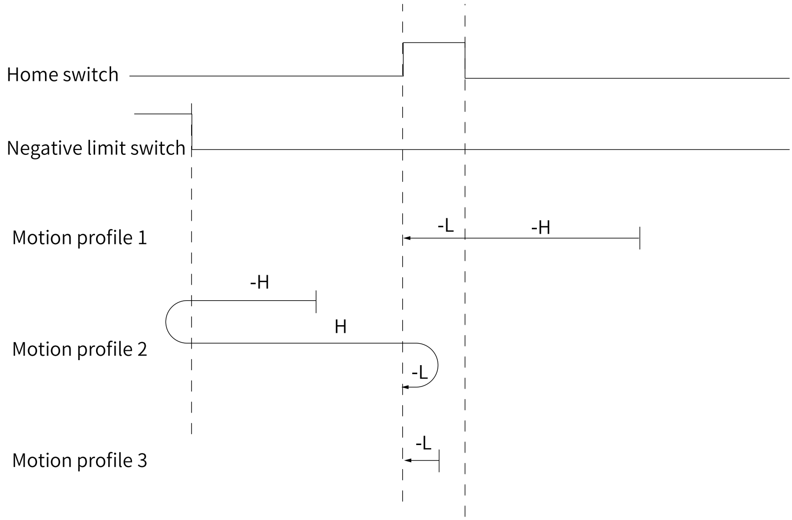


Figure 2-39 Motor running curve and speeds in mode 30

- Motion profile 1: deceleration point signal inactive at start, not hitting the negative limit switch
- Motion profile 2: deceleration point signal inactive at start, hitting the negative 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

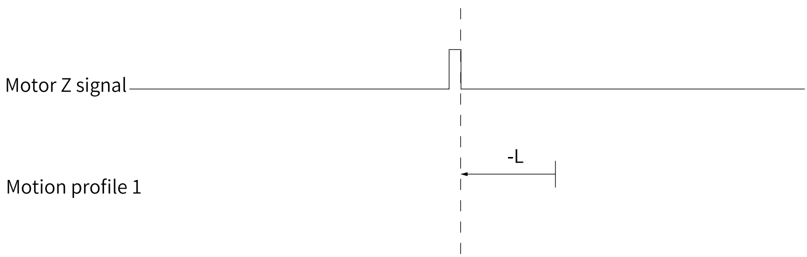


Figure 2-40 Motor running curve and speeds in mode 33

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

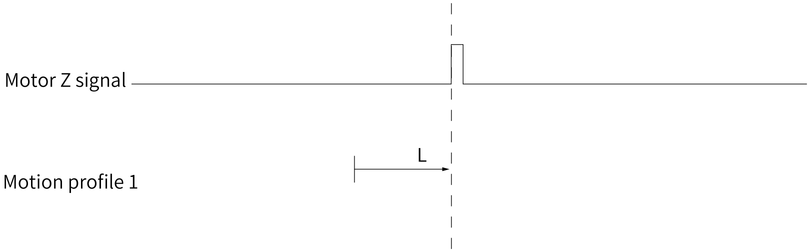


Figure 2-41 Motor running curve and speeds in mode 34

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

6098h = 35

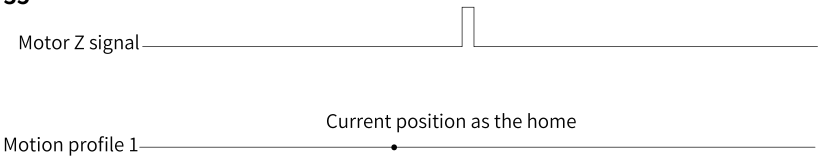


Figure 2-42 Motor running curve and speeds in mode 35

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.

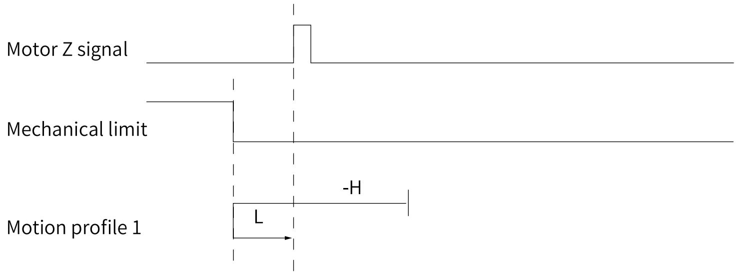


Figure 2-43 Motor running curve and speeds in mode -1

6098h = -2

The servo motor runs in the forward direction at 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 low speed and stops at the first Z signal after reaching the rising edge.

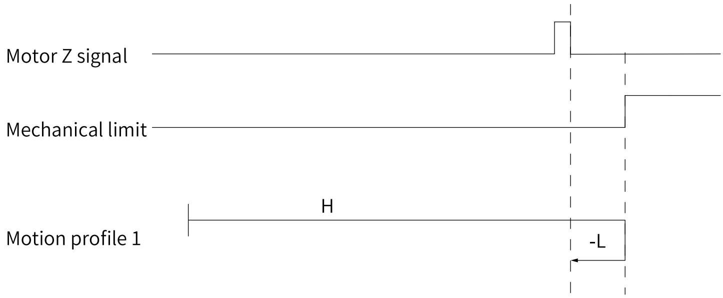


Figure 2-44 Motor running curve and speeds in mode -2

2.11 Absolute Encoder System

2.11.1Overview

The absolute encoder, which features a single-turn resolution of 67108864 (2^{26}), is used to detect the motor position within one turn and count the number of motor revolutions, with 26-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 SV680N series servo drives, set H00.00 (Motor code) to 14102 (Inovance 26-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.

2.11.2Related Parameters

Absolute encoder system settings

Set H00.00 (Motor code) to 14102 (Inovance motor with 26-bit absolute encoder), and select the absolute position mode in H02.01.

See *" H00.00" on page 338* for details.

See *" H00.08" on page 339* for details.

See *" H02.01" on page 344* 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.70" on page 443* for details.

See *" H0b.71" on page 443* for details.

See *" H0b.77" on page 444* for details.

See *" H0b.79" on page 444* for details.

Absolute position linear mode

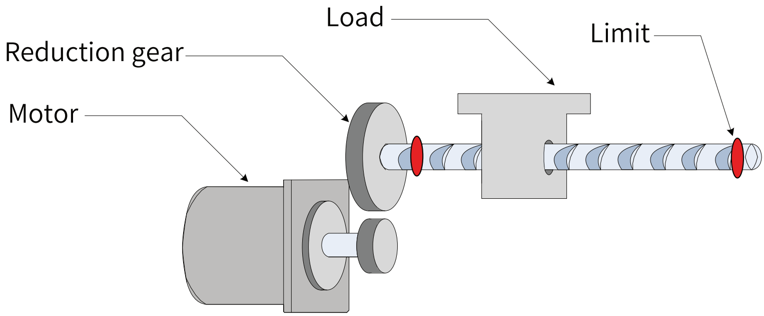


Figure 2-45 Application of the linear mode

Assume the absolute mechanical position (H0b.58 and H0b.60) is P_M, the absolute position recorded by the encoder is P_E, the position offset in the absolute position linear mode (H05.46 and H05.48) is P_O, then the relationship will be: $P_M = P_E - P_O$.

If the electronic gear ratio is B/A, then the following formula applies: H0b.07 (Absolute position counter) = P_M/(B/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 H0A.20 to 2 (Reset multi-turn data), and then perform homing again. In special occasions, you can set H0A.38 to 1 to hide E735.0 or use absolute position linear mode 2.

See *" H05.36" on page 367* for details.

See *" H05.46" on page 369* for details.

See *" H0b.07" on page 432* for details.

See *" H0b.58" on page 442* for details.

See *" H0b.60" on page 442* 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.

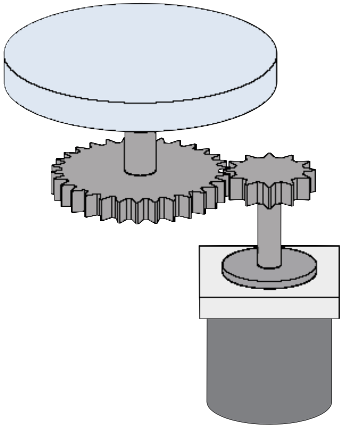
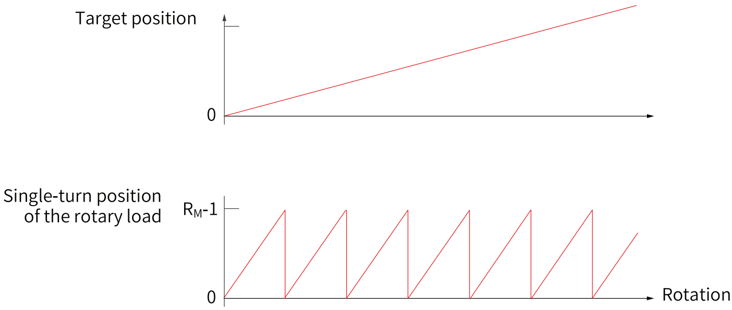
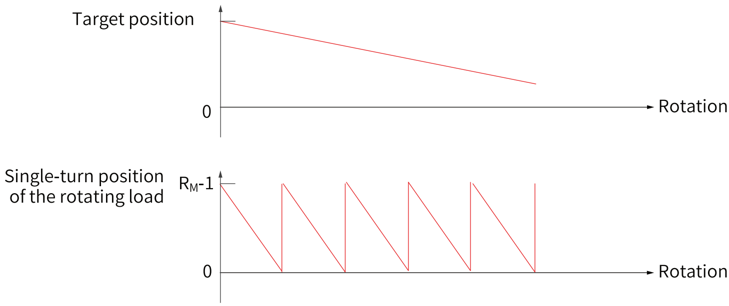


Figure 2-46 Application of the linear mode

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 (Home setting error).

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 *" H05.50" on page 370* for details.

See *" H05.51" on page 370* for details.

See *" H05.52" on page 371* for details.

See *" H05.54" on page 371* for details.

See *" H0b.81" on page 444* for details.

See *" H0b.83" on page 444* for details.

See *" H0b.85" on page 445* 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 26-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:

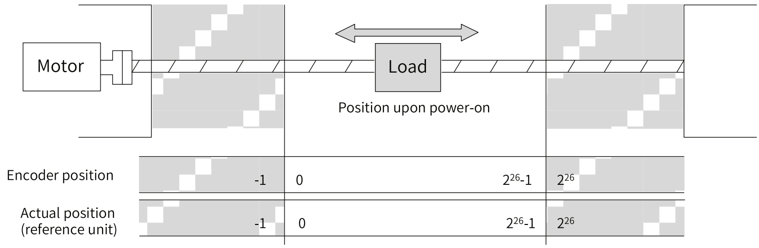
  When H05.36 (Mechanical home offset) is set to 0, the target position range is 0 to (2^{26} - 1).

  After homing is done, the target position range is H05.36 to (2^{26} - 1 + H05.36).

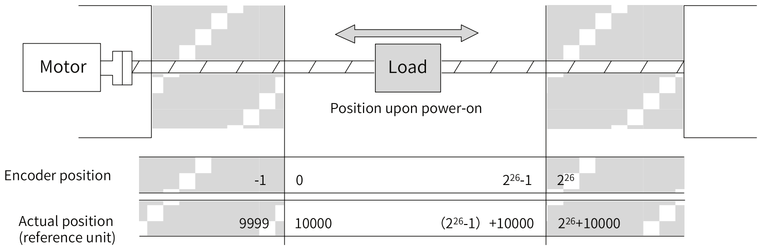
  If the target position is set to a value outside the preceding range, EB01.4 (Target position beyond upper/lower limit) will be reported.

- Example

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



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



2.11.3Precautions for Use of the Battery Box

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.20" on page 449* for details.

Note

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

2.12 Insctructions for Fully Closed Loop Function

2.12.1Fully Closed-loop Parameter Setting

After setting basic gain parameters, check that the servo drive operates properly without overshoot and stops without generating unexpected noise. When basic operating conditions are met, set the closed-loop parameters based on the following procedure.

1. **Set the external encoder feedback type.**
   Set H0F.03 based on the external encoder type.

Note

- The SV680P series servo drive supports three types of encoders, which are encoders with A/B quadrature pulses, Inovance encoders, and BiSS encoders.
- To use the encoder with A/B quadrature pulses or BiSS encoder, set H05.38 to 2 to inhibit frequency-division output. After enabling the fully closed-loop function, enable the JOG function to observe whether the value of H0F.20 (External position pulse feedback display) changes. In case of improper wiring, the value of H0F.20 does not change and a fully closed-loop fault will be reported. In this case, rectify the fault and perform a power cycling until the value of H0F.20 changes without fault alarm.
- If the feedback type of the external encoder is A/B quadrature pulses without Z signal, set H0F.22 to 1 to hide the detection on phase Z.

2. **Confirm the operating direction of the external encoder.**

   Check whether the operating directions of the internal and external encoders are the same, if not, runaway can occur due to positive feedback.

   See *" H0F.00" on page 459* for details.

   The following describes how to confirm the operating direction of the external encoder.

   Enter the JOG mode, and perform jogging at low speed in one direction. Observe the value of H0F.18 (Feedback pulse counter of internal encoder) and H0F.20 (Feedback pulse counter of external encoder), if these two values change in the same way (increase or decrease simultaneously), set H0F.01 to 0; if not, set H0F.01 to 1.

Caution

Perform necessary inspections before motor trial run. See SV680N Series Servo Drive Commissioning Guide for details.

Set H0F.01 properly. If H0F.01 is set improperly, runaway fault may occur.

3. **Determine the resolution of external encoder (external encoder pulses per revolution).**

   Rotate the motor and observe the value of H0F.18 (Feedback pulse counter of internal encoder) to confirm the motor has rotated for a full turn. Then calculate the variation of H0F.20 (Feedback pulse counter of external encoder), and incorporate this value into H0F.04.

   See *" H0F.04" on page 460* for details.

Caution

- Suppose the values of H0F.18 and H0F.20 before the motor rotates are X_1 and Y_1 respectively, and their values change to X_2 and Y_2 after the motor rotates, then the following formula applies:

  $$\text{H0F.04} = \text{Internal encoder pulses per motor revolution} \times \frac{Y_2 - Y_1}{X_2 - X_1}$$

  The calculation result must be a positive value. If it is a negative value, it indicates H0F.01 is set improperly. In this case, check the value of H0F.01 again.
- Set H0F.04 properly. If H0F.04 is set to a wrong value, EB02.0 (Position deviation too large) may occur after operation.

4. **Set the electronic gear ratio of external encoder.**

   If H0F.00 is set to 1, set H05.07/H05.09. If H0F.00 is set to 2, set H05.07/H05.09 for inner loop and H05.11/H05.13 for outer loop.

   See *"2.1 Conversion Factor Setting" on page 17* for how to set the electronic gear ratio. Suppose for a fully closed-loop device, the external mechanical displacement corresponding to each X_1 pulse reference sent by the host controller is Y_1.

   Then perform the following operations:

   a. Step 1: Set the electronic gear ratio to 1:1.

   b. Step 2: Make the host control send X_2 pulses. The external mechanical displacement measured is Y_2, then the electronic gear ratio fulfills the needs.

Note

- To set the fully closed-loop electronic gear ratio in internal/external closed-loop position switchover mode, set the electronic gear switchover switch (Gear_Sel) to the external closed-loop state.
- This method also applies to internal closed-loop mode. In the internal closed-loop mode, ensure the present state is internal closed-loop state.
- Set the electronic gear ratio correctly. Failure to comply will result in mechanical deviation.

5. **Set the alarm threshold.**

   Set H0F.08 and H0F.10 as follows.

   - Set H0F.08 (Excessive deviation in compound control).

     H0F.08 is used to define the allowable tolerance between the present motor position and the present position fed back by external encoder. The unit of H0F.08 is one reference unit (same as one external encoder unit).

See " H0F.08" on page 461 for details.

For example, if H0F.08 is set to 1000, EB02.0 (Position deviation too large in fully closed-loop mode) will be outputted if the deviation between the mechanical displacement driven by the motor and the mechanical displacement (compound deviation) measured by the external encoder exceeds the displacement corresponding to 1000 external encoder pulses.

Note

- If H0F.08 is set to 0, EB02.0 (Position deviation too large in fully closed loop) will not be outputted.
- H0F.08 must be set to a value (such as H0F.04 x H0F.10 x 50%) lower than H0F.04 x H0F.10. Otherwise, EB02.0 cannot be outputted.

- Set H0F.10 (Clear deviation in compound control).
  The value of H0F.10 indicates the number of revolutions to be ran by the motor per deviation clear in the compound control mode.

  See " H0F.10" on page 461 for details.

  If H0F.10 is set to 0, the deviation in compound control will not be cleared.

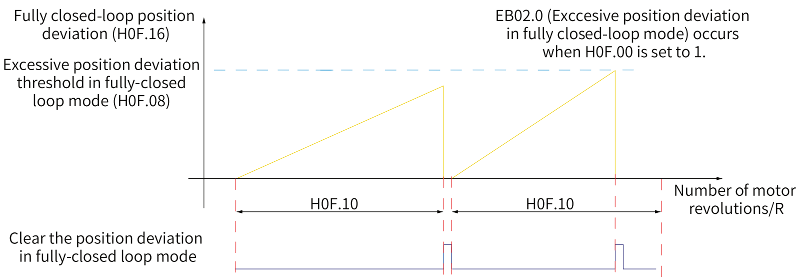


Figure 2-47 Description of position deviation clear in the fully closed-loop mode

The number of revolutions defined by H0F.10 is detected through internal encoder feedback pulses.

For example, if H0F.10 is set to 50, the servo drive detects whether the deviation in compound control exceeds the pulse unit defined by H0F.08 when the motor is in the process of rotating within 50 turns.

If yes, EB02.0 will be reported. If not, the servo drive clears the deviation after the motor rotates for more than 50 turns, and then starts monitoring again.

- Set the first-order low-pass filter for deviation in compound control.
  See " H0F.13" on page 462 for details.

The first-order filter time constant is used to filter vibration of the deviation in compound control, smoothening the speed in fully closed-loop mode.

- Source of touch probe Z signal in fully closed-loop mode
  See " H0F.25" on page 463 for details.

  H0F.25 (Source of touch probe Z signal in fully closed-loop mode) defines the source of Z signal during homing in the fully closed-loop mode. The setpoint 0 indicates Z signal of inner loop of used as the source and the setpoint 1 indicates Z signal of the outer loop is used as the source. When the Z signal of outer loop is used as the source, ensure Z signal is wired correctly. Otherwise, Z signal may fail to be detected.

Caution

- Set H0F.10 properly for clearing deviation in compound control. Given the setpoint of H0F.08, if H0F.10 is set to an excessively low value, protection against excessive deviation in compound control can fail.
- Pay attention to encoder limit setting during use.
- Set this warning properly. Failure to comply may incur physical injuries due to runaway accident.

2.12.2Enabling Fully Closed Loop Function

After setting preceding fully closed loop parameters, observe the internal/external encoder feedback through H0F.18 and H0F.20, and check whether the fully closed loop wiring and the application mode of the external encoder are proper. If yes, enable the fully closed loop function.

Set the following parameters while enabling the fully closed loop function:

See " H03.02" on page 352 for details.

See " H0F.00" on page 459 for details.

3 Auxiliary/Application Functions

The drive offers the following auxiliary functions to ensure a proper operation of the servo system.

- Software position limit
- Software reset
- Motor protection
- DI filter time setting
- Position comparison
- Forced DI/DO function
- Black box

3.1 Software Position Limit

Description

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

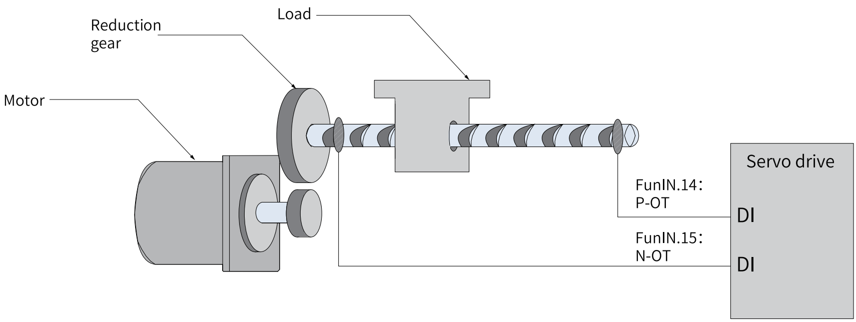


Figure 3-1 Installation of limit switches

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	Limited to linear motion and single-turn rotational motion.	1	Applicable to both the linear motion and rotational motion.
2	Requires an external mechanical limit switch.	2	Removes the need for hardware wiring, preventing malfunction due to poor cable contact.
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.01" on page 417 for details.

See " H0A.41" on page 422 for details.

See " H0A.43" on page 422 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 in the software position limit 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 (H0b.07) 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 (H0b.07) 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.

3.2 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 or a frequency-division output ABZ/OCZ signal. 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	Two DOs or frequency-division output ABZ/OCZ signal
	Logic	The effective level of DO is defined by the DO logic in group H04.
		The effective level of ABZ/OCZ output is defined by H18.06.
	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
	Pulse feedback fully closed-loop (ABZ)	Supported
	Communication-type fully closed-loop	Supported
Comparison value	Number of comparison points	40 points, Int32
Comparison attribute	Attribute of comparison point	Defines the attribute of the comparison point.
		Defines the output terminal for comparison.

Related objects

When position comparison is enabled, you can assign FunOUT.25 (Position comparison) to any one of the two DOs. The DO you select will be used to output the position comparison output signal. You can also use the ABZ/OCZ signal as the position comparison output terminal by setting H18.16.

Position comparison output parameters:

Param. No.	Name	Description
H18: Position comparison output		
H18.00	Position comparison switch	1: Enable
H18.01	Position comparison output feedback source	0: Motor encoder feedback 1: Fully closed-loop feedback
H18.02	Position comparison resolution	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: 19-bit 6: 18-bit 7: 17-bit
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)
H18.05	Position comparison pulse output width	Defines the effective pulse width of the DO when the comparison point is reached. The value range is 0.1 to 204.7 (unit: ms).
H18.06	Position comparison output ABZ polarity	Bit 0: OCZ output polarity Bit 1: Z output polarity Bit 2: A/B output polarity 0: Positive; 1: Negative
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 status of position comparison	0: No comparison; n: Waiting for the comparison point N
H18.10	Real-time position of position comparison	Displays the current comparison position value (Value range: -2^{31} to $(2^{31} - 1)$).
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	Cycles of fixed mode	1 to 65535
H18.16	ABZ output function setting	Bit 0: OCZ function Bit 1: Z function Bit 2: A/B function (0: Frequency-division output; 1: Position comparison)
H18.17	Number of fixed mode cycles	Range: 1 to 65535

Param. No.	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. Bit 0: 1: Output DO active signal if current position changes from "less than" to "more than" the comparison point; 0: Skip this point Bit 1: 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point; 0: Skip this point Bit 2 to Bit 6: N/A Bit 7: Corresponds to DO1 Bit 8: Corresponds to DO2 Bit 9 to Bit 11: N/A Bit 12: Frequency-division A output Bit 13: Frequency-division B output Bit 14: Frequency-division Z output Bit 15: Frequency-division OCZ output
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 the comparison value overflows. 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 level signal can be set in H18.05 (value range: 1 to 2047 x 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.

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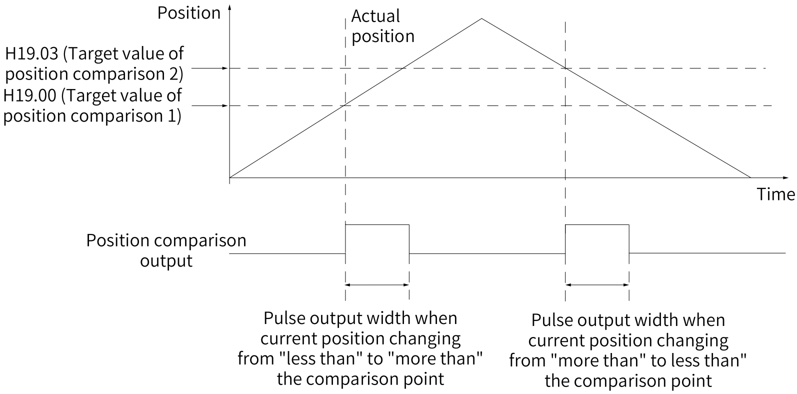
2. Function operation

- 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).

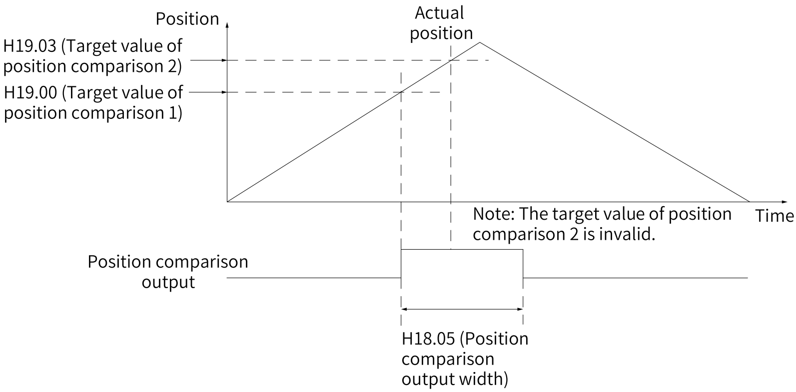


When the attribute of the comparison point is set to "bit0 = 1" (Output DO active signal if current position changes from "less than" to "more than" the comparison point), the DO outputs the position comparison signal when the axis passes the target position comparison point with position changing from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

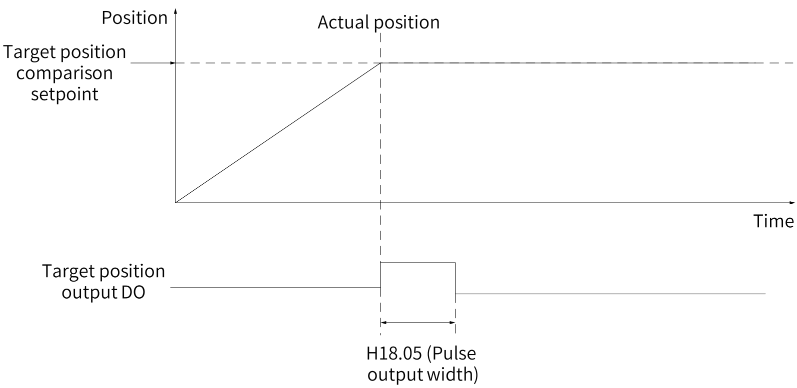
When the attribute of the comparison point is set to "bit1 = 1" (Output DO active signal if current position changing from "more than" to "less than" the comparison point), the DO outputs the position comparison signal when the axis passes the target position comparison point with position changing from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



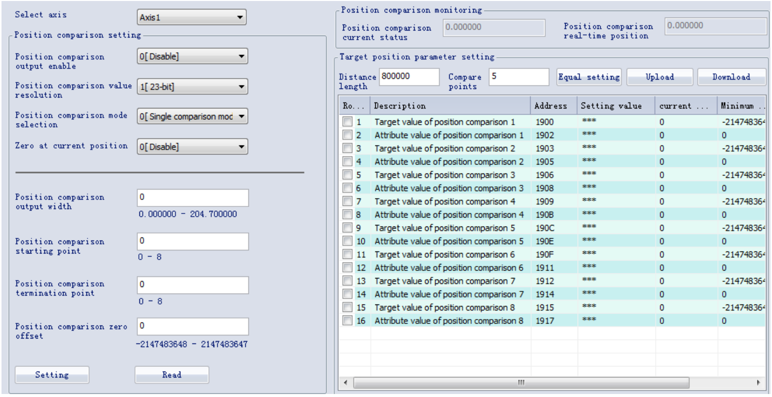
- Pulses will be outputted only once when the stop position is the same with the target value of position comparison, as shown in the following figure.



3. Interface of the software tool

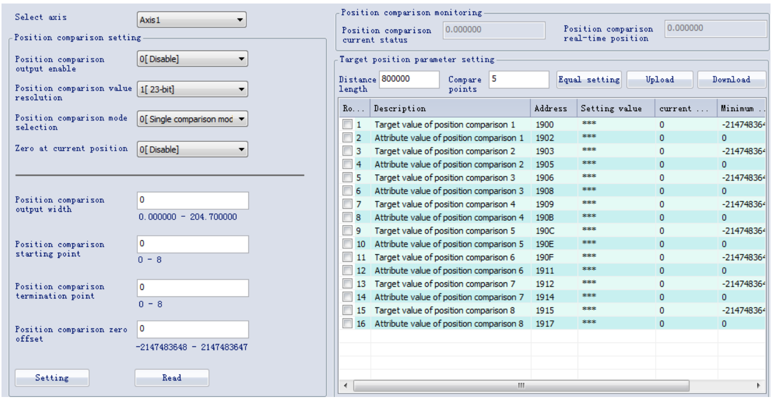
- Individual comparison mode

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



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 length** x N/**Compare points**".



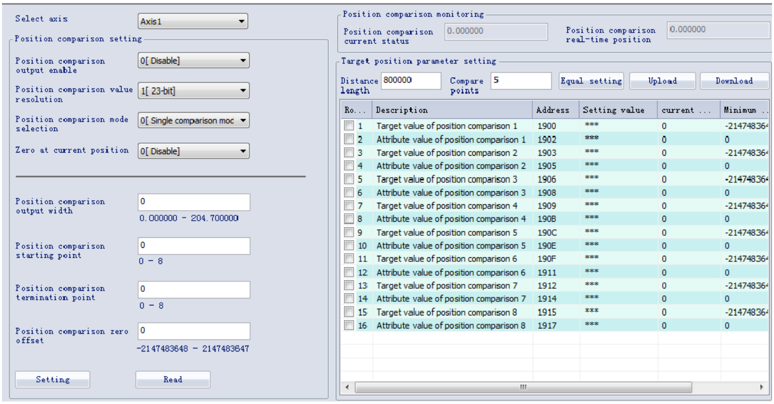
When H18.00 (Position comparison output selection) changes from 0 to 1 (Enable (rising edge-triggered)), H18.09 (Current state of position comparison) changes from 0 to 1 and the first target position value will be compared. When H18.10 (Real-time position feedback) reaches the value of the first target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

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.



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.

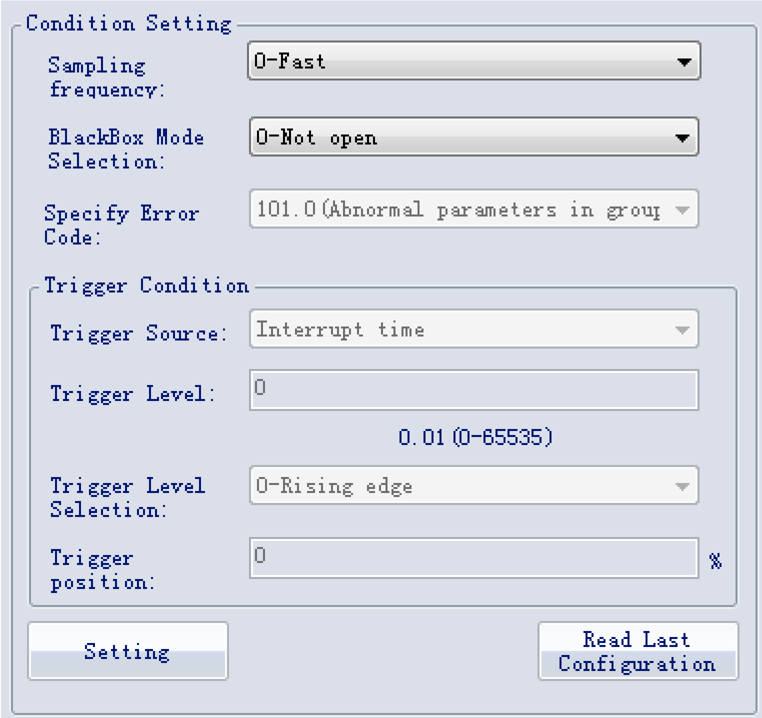
3.3 Black Box

Description

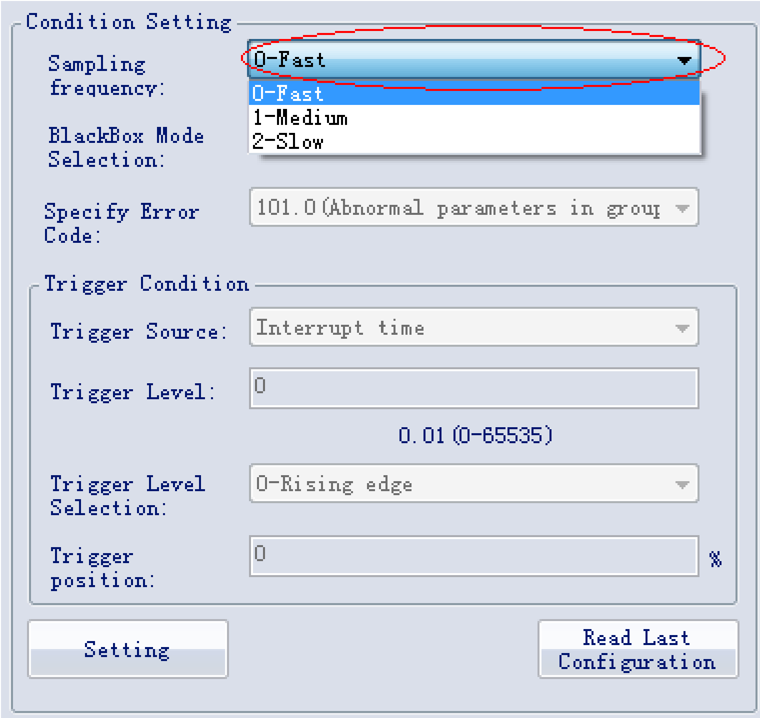
The black box function is used to capture and save the data generated upon occurrence of faults or under designated conditions. Such data can be read and uploaded by users through the software tool to facilitate troubleshooting.

The black box function is enabled by default and triggered upon occurrence of a fault (16 k sampling frequency) The black box function will be turned off automatically after it is being triggered, or turned on automatically upon fault reset or power cycling.

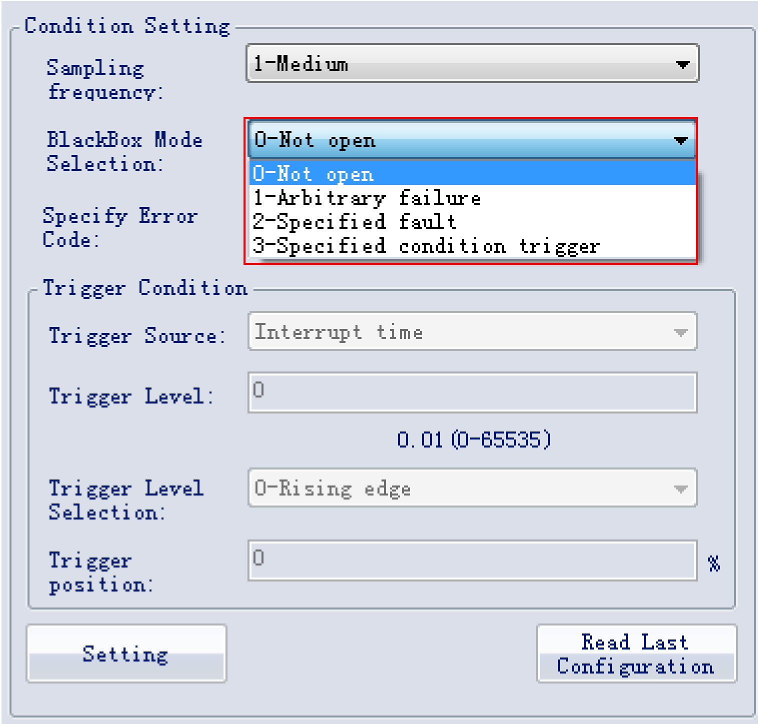
Triggering the black box



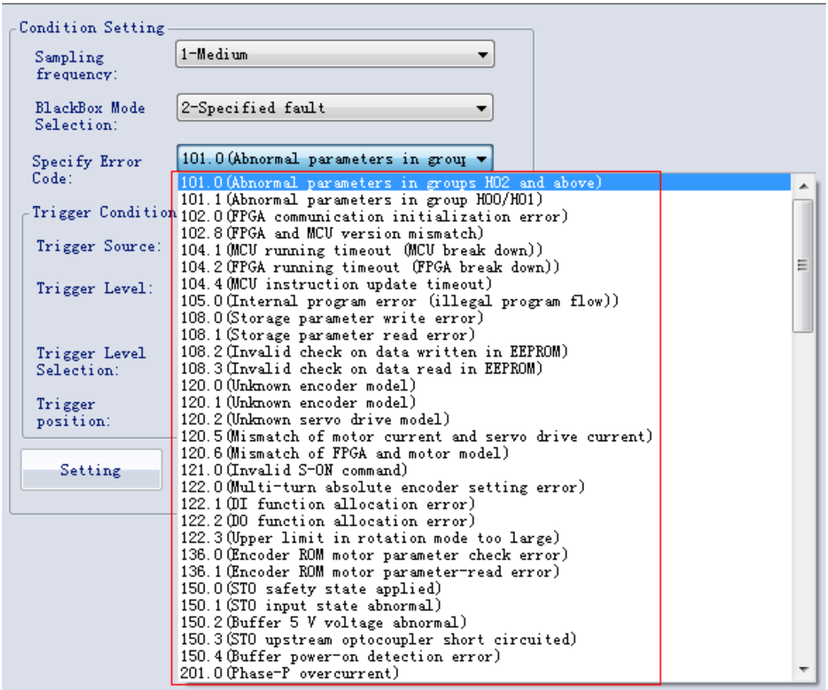
1. Sampling frequency: including three sampling frequencies, namely 16 k (**Fast**), 4 k (**Medium**), and 1 k (**Slow**)



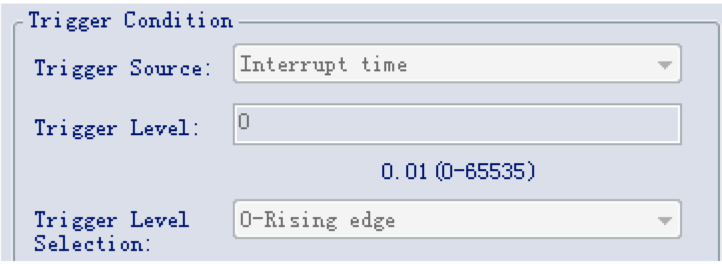
2. Black box mode selection: including three modes, namely **Arbitrary failure**, **Specified fault**, and **Specified condition trigger**.



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



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



5. **Trigger position** is used to set the position of the trigger time in the total sampling time, which is set to 75% by default.
6. 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 **<<**, then click **Save** to save the waveform files.

3.4 Touch probe function

Description

The touch probe function is used to latch the position (reference unit) when a DI signal or Z signal changes. The position feedback sources include motor position feedback and fully closed-loop feedback.

The drive offers two 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 relationship between the DI logic and the touch probe edge is shown in the following table.

Table 3–2 Description of bit 3 of H0A.40

Bit 3 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 in 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.

Param. No.		Description
H0A.40	Bit 1	Touch probe rising edge compensation: 1: Enable; 0: Disable
	Bit 2	Touch probe falling edge compensation: 1: Enable; 0: Disable
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 us, it is recommended to set the touch probe latch through the ON-edge of the DI.

The Z touch probe can be triggered through three sources: motor Z signal, frequency-division output Z signal, and fully closed-loop Z signal, as shown in the following table.

Feedback Source	Param. No.	Description
Motor encoder	H05.41.bit2 = 0: motor Z signal	The Z touch probe is triggered by the motor Z signal.
	H05.41.bit2 = 1: frequency-division output Z signal	The Z touch probe is triggered by the frequency-division output Z signal, including the multi-turn Z signal.
Fully closed-loop feedback	H0F.25 = 0: motor Z signal	When there is no Z signal input in the pulse-type fully closed-loop mode, you can trigger the touch probe through the motor Z signal to latch external position feedback.
	H0F.25 = 1: fully closed-loop Z signal	When there is Z signal input in the pulse-type fully closed-loop mode, you can trigger the touch probe latch function through the fully closed-loop Z signal.

Related objects

See *" 60B8h" on page 612* for details.

See *" 60B9h" on page 613* for details.

See *" 60BAh" on page 614* for details.

See *" 60BBh" on page 614* for details.

See *" 60BCh" on page 615* for details.

See *" 60BDh" on page 615* for details.

See *" 60D5h" on page 616* for details.

See *" 60D6h" on page 616* for details.

See *" 60D7h" on page 616* for details.

See *" 60D8h" on page 616* for details.

Operation procedure

Example:

Example: Use DI5 to trigger the touch probe.

Requirement: touch probe 1 positive edge, continuous latching

Observe the following steps:

1. Set the function of DI5 (H03.14 = 38). 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 612* for details.

   In this example, set 60B8h to 0x0013.

3. Read the touch probe status in 60B9h.
   Assignment of each bit of 60B9h is shown in the following table.

   See " 60B9h" on page 613 for details.

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

4. Read the latch position of the touch probe.
   The four position values of the touch probe are saved in 60BAh to 60BDh.

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

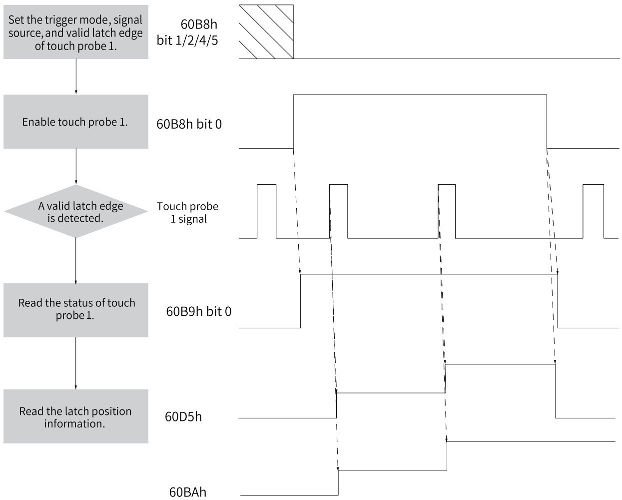


Figure 3-2 Procedure for use of the touch probe

3.5 EtherCAT-forced Output

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 to be used 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 *" H04.23" on page 362* for details.

Descriptions for the setpoints are shown in *"Table 3–3 " on page 107*.

Table 3–3 Description of setpoints

Setpoint	DO Function
0	Status of DO1 and DO2 unchanged in the non-operational status
1	No output in DO1 and status of DO2 unchanged in the non-operational status
2	No output in DO2 and status of DO1 unchanged in the non-operational status
3	No output in DO1 or DO2 in the non-operational status

Setting method:

1. Assign DO function 31 (EtherCAT-forced DO) to the DO controlled forcibly by EtherCAT, and then set the bit of H04.23 as needed to select the forced DO status in the non-operational status.
2. Configure 60FE.01h/60FE.02h as RPDO, and operate on bit 16...bit 18 to control the DO.

4 Safe Torque Off (STO)

4.1 STO Standards and Specifications

Terms and Abbreviations	Description
Cat.	Classification of the safety-related parts of a control system, which are divided into B, 1, 2, 3, and 4 (ISO 13849-1)
CCF	Common cause failure
DC	Diagnostic coverage (%)
DTI	Diagnostic test interval time
SFF	Safe failure fraction
HFT	Hardware fault tolerance
PFH	Probability of dangerous hardware failure per hour
PL	Performance level
SC	Systematic capability
SIL	Safety integrity level
T1	Proof test interval
T2	Diagnostic test interval
DI	Digital input
DO	Digital outputs
PCB	Printed circuit board
MCU	Micro computer unit
FPGA	Field programmable gate array
Safe torque off	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 at the moment the STO function is activated, the motor coasts to stop.
Safe state	Disabling the PWM gating signal of the drive
System reset	Resetting the servo system through resetting the power supply or executing software reset
Proof test	Tests used to detect the failure of safety-related systems
Mission time	Specified cumulative operating time of the safety-related parts of the servo drive during its overall lifetime

Standards Compliance

- North American Standards (UL)
  UL 61800-5-1

  CSA C22.2 No. 274

- European Directives and Standards
  Low Voltage Directive 2014/35/EU Standard EN 61800-5-1

  Electromagnetic Compatibility Directive 2014/30/EU Standard EN 61800-3

  Machinery Directive 2006/42/EC (functional safety) Standard IEC 61800-5-2

- Safety Standard

Model	Safety Standard	Standard
SV680XXXX	Functional Safety	IEC 61800-5-2: 2016 ISO 13849-1: 2015 IEC 60204-1: 2016 (in extract) IEC 61508: 2010, parts 1-7 EN 61800-5-2: 2007 EN 61800-5-2: 2017 EN ISO 13849-1: 2015 EN 62061: 2005 + AC: 2010 + A1: 2013 + A2: 2015 EN 61508: 2010, parts 1-7
	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 61326-3-1:2017I
	LVD	IEC 61800-5-1:2016 EN 61800-5-1:2007+A1: 2017 (in extracts)

- Safety performance

Item	Performance Level
Safety integrity level	SIL3 SILCL3
Probability of Failure Per Hour (PFH)	PFH $\leqslant 0.1 \times 10^{-7}$ [1/h] ($\leqslant$ 10% of SIL3)
Performance level	PLe (Category 3)
Mean time to dangerous failure of each channel	MTTFd: High
Diagnostic coverage	DCave: Medium
Stop category	Stop category 0
Safety function	STO
Mission time	5 years
Hardware fault tolerance	1
Systematic capability	3
Application mode	High demand or continuous mode

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.

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Ambient/Storage temperature</td><td>0°C to 55°C/-20°C to +70°C</td></tr>
<tr><td>Ambient/Storage humidity</td><td>20% to 95% RH (without condensation)</td></tr>
<tr><td>Vibration</td><td>
<table>
<tr><th>Item</th><th>Test Condition</th></tr>
<tr><td>Test reference</td><td>See IEC 60068-2-6 4.6</td></tr>
<tr><td>Condition</td><td>EUT powered on, operating normally</td></tr>
<tr><td>Motion</td><td>Sinusoidal</td></tr>
<tr><td>Vibration amplitude/ Acceleration</td><td>-</td></tr>
<tr><td>$10\ Hz \leqslant f \leqslant 57\ Hz$</td><td>0.075 mm amplitude</td></tr>
<tr><td>$57\ Hz < f \leqslant 150\ Hz$</td><td>1 g</td></tr>
<tr><td>Duration of vibration</td><td>10 sweep cycles 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>
</td></tr>
<tr><td>Shock resistance</td><td>
<table>
<tr><th>Item</th><th>Test Condition</th></tr>
<tr><td>Test reference</td><td>Test Ea of IEC 60068-2-27: 2008 Table 17</td></tr>
<tr><td>Condition</td><td>EUT powered on, operating normally</td></tr>
<tr><td>Motion</td><td>Half-sine pulse</td></tr>
<tr><td>Shock amplitude/ Time</td><td>$50\ m/s^2$ (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>
</td></tr>
<tr><td>IP Rating</td><td>IP20</td></tr>
<tr><td>Pollution degree (PD)</td><td>PD2: free of corrosive or explosive gases; free of exposure to water, oil or chemicals; free of dust, salts or iron dust</td></tr>
<tr><td>Altitude</td><td>2000 m or below</td></tr>
<tr><td>Cooling method</td><td>Dry clean air (natural convection)</td></tr>
<tr><td>Others</td><td>Free of static electricity, strong electromagnetic fields, magnetic fields, or exposure to radioactivity</td></tr>
</table>

- 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	SV680NS1R6I-FS SV680NS2R8I-FS SV680NS5R5I-FS SV680NS7R6I-FS SV680NS012I-FS SV680NT3R5I-FS SV680NT5R4I-FS SV680NT8R4I-FS SV680NT012I-FS SV680NT017I-FS SV680NT021I-FS SV680NT026I-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.

4.2 Commissioning, Operation, and Maintenance Requirements

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 that the final assembler of the machine validates the operation of the safety function with an acceptance test. The acceptance tests for the standard safety functions of the drive are described in the guide. The tests for the optional safety functions are described in the appropriate guide.

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 disconnector.	
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 disconnector 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

To reach SIL 3 PL e (cat3), power cycling must be performed on the servo drive every 3 months for conducting power-on diagnostic.

4.3 Safety Function

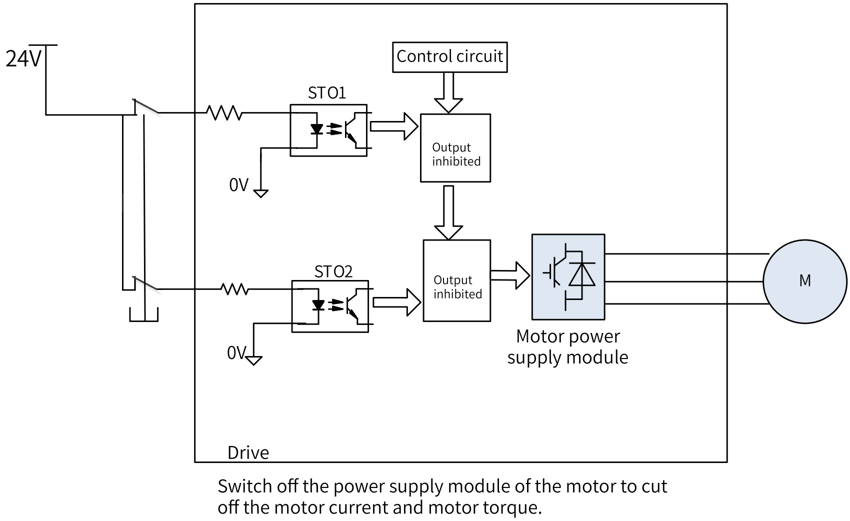


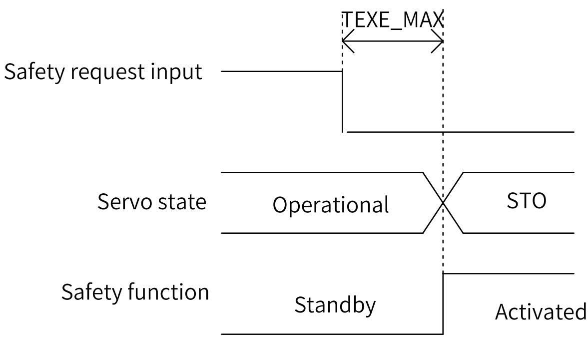
Figure 4-1 Schematics of the STO function

Safe Torque Off (STO) is a safety function that complies with IEC 61800-5-2:2016. It is built into Inovance SV680 series servo drives.

The STO function inhibits the control signal of the power semiconductors on the drive output end, preventing the drive 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 outputted to the power layer of the servo drive. These two +24 VDC signals must be 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.



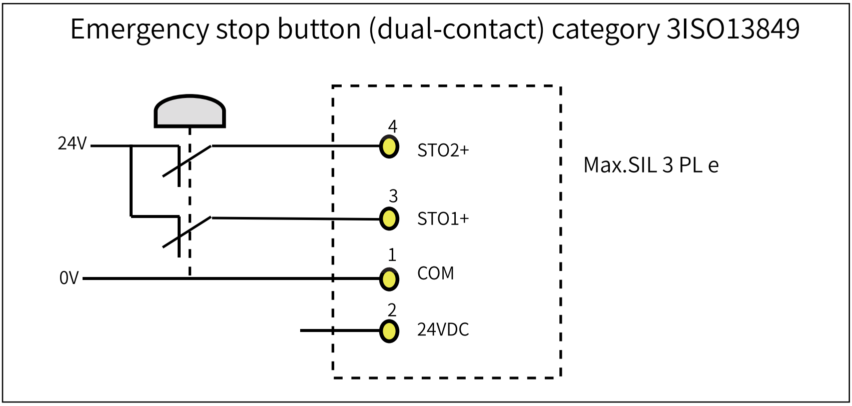
See the following table for the STO function.

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

Safe torque off (STO)	
Assignment	Cuts off the power of the motor.
Description	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 at the moment when the STO function is activated, the motor will coast to stop.
Safe state	Disables the PWM gating signal of the drive.
Operating mode	High demand mode or continuous mode

4.4 Application Example of Safety Function

Example: Direct stop, stop category 0, safe stop: STO



4.5 Monitoring on Safety Function

The keypad displays the STO function state and error information.

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

Fault Code	State	Description
E150.0	External request to activate the STO function	Both STO1 and STO2 in "Low" state, H0A-21 = 1
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.
E150.2	STO activated	OV/UV of 5V power supply is detected.
E150.3	STO activated	The input circuit of STO works improperly.
E150.4	STO activated	The buffer circuit of STO works improperly.

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).
- In the preceding two cases, if the 24V disconnection time difference between STO1 and STO2 is higher than 10 ms, the drive reports E150.1.

4.6 STO State in Exceptional Operations

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.

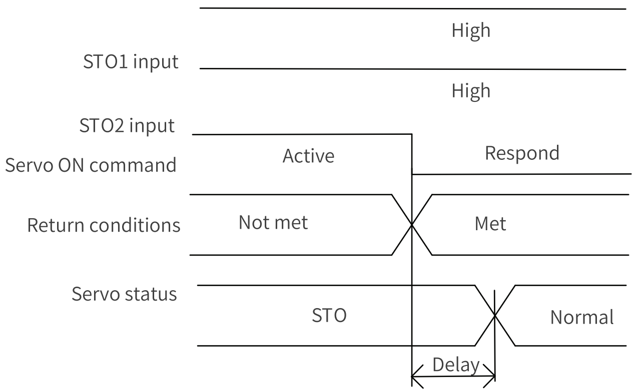


Figure 4-2 Return condition of servo ON/RUN command

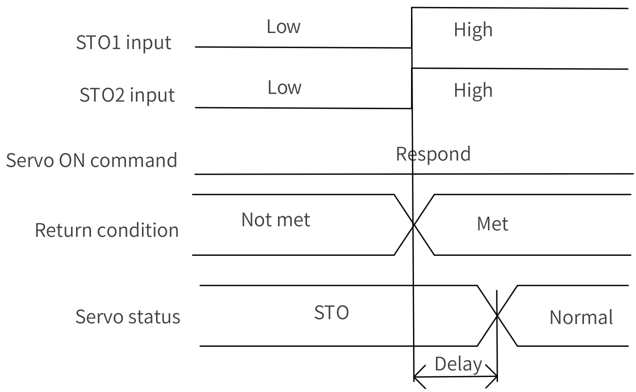


Figure 4-3 Return condition of external STO request state

4.7 Troubleshooting

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.

Error Code	Cause	Corrective Action
E150.0	Neither STO1 nor STO2 is connected to the 24V signal.	Connect STO1 and STO2 to the 24V signal.
E150.1	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 "High" state after the 24V signal is disconnected. Contact Inovance for technical support.
E150.2	OV/UV of the 5V power supply is detected.	Restore the 5 V power supply to normal state. Contact Inovance for technical support.
E150.3	The input circuit of STO works improperly.	Fix the input circuit fault. Contact Inovance for technical support.
E150.4	The buffer circuit of STO works improperly.	Fix the buffer circuit fault. Contact Inovance for technical support.

4.8 Precautions

This section describes the information that is required before starting operation. Read the following safety precautions, risk assessment information, and limitations before starting operation. Use the safety function STO after properly understanding all of this information.

General safety instructions

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

- 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

For use of permanent-magnet motors, reluctance motors, and salient-pole induction motors, in spite of the activation of the STO function, a possible failure mode that causes two power devices in the drive circuit to conduct incorrectly may exist (although highly unlikely). The drive system can produce an alignment torque which maximally rotates the motor shaft by 180° (electrical angle) for a permanent magnetic motor or 90° (electrical angle) for a salient pole induction motor or reluctance motor. This possible failure mode must be allowed for in the machine system design.

$$\text{Max. rotation angle of motor shaft} = \frac{360^\circ \text{ electrical angle}}{\text{Number of motor pole pairs}}$$

- 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 subsystems 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 normal operational mode, 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 STO function, 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 STO function, 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. Provide a separate mechanical brake to secure the motor.
- If the servo drive fails, the motor may operate within a range of 180 electrical degrees. Make sure that safety is ensured even in hazardous situations.
- The number of revolutions and movement distance for each type of motor are listed below.

- Rotational motor: 1/6 rotation max. (rotation angle at motor shaft conversion) (rotation angle of motor shaft)
- Direct drive motor: 1/20 rotation max. (rotation angle at motor shaft conversion) (rotation angle of motor shaft)

Note

Depends on the number of pole pairs of the motor.

- Linear servo motor: 30 mm max.

Note

Depends on pole pitch of the motor.

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5 Troubleshooting

5.1 Fault and Warning Levels

Faults and warnings of the servo drive are divided into three levels based on severity: No. 1 > No. 2 > No. 3, as shown below.

- No. 1 non-resettable fault
- No. 1 resettable fault
- No. 2 resettable fault
- No. 3 resettable warning

Note

"Resettable" means the keypad stops displaying the fault/warning once a "Reset signal" is input.

Operating procedure:

- To stop the keypad from displaying the fault/warning, set H0d.01 to 1 or activate the logic of the DI assigned with FunIN.2 (ALM-RST, fault and warning reset).
- Set the rising edge of bit 7 of the control word 0x6040 through the host controller.

To reset No. 1 and No. 2 resettable faults, switch off the S-ON signal first and then set H0d.01 to 1 or use FunIN.2 (ALM-RST).

To reset No. 3 warnings, set H0d.01 to 1 or use FunIN.2 (ALM-RST).

Note

- Some faults and warnings can be reset only after the fault causes are rectified by modifying the settings. However, a reset operation does not necessarily activate the modifications to settings.
- For modifications activated at next power-on (R, S, T/L1C, L2C powered on again), perform a power cycle.
- For modifications activated after stop, switch off the S-ON signal. The servo drive can operate normally only after modifications are activated.

☆Related parameters

See *" H0d.01" on page 447* for details.

☆Related function No.

Start Process	Fault Symptom	Cause	Confirming Method
FunIN.2	ALM-RST	Fault/Warning reset signal	The servo drive may, depending on the warning types, continue running after warning reset. When FunIN.2 is assigned to a low-speed DI, the effective level change of this DI must be kept for more than 3 ms. Otherwise, fault reset will be inactive. Do not assign FunIN.2 to a high-speed DI. Otherwise, fault/ warning reset will be inactive. • Inactive: Not resetting the fault/ warning • Active: Resetting the fault/ warning

Fault and warning log

The servo drive can record the latest 20 faults and warnings and values of status parameters upon fault/warning. Among the latest 5 faults/warnings, if a fault/warning occurs repetitively, the servo drive records the fault/warning code and the drive status only once.

A fault/warning will still be saved in the fault log after reset. To remove the fault/ warning from the fault log, set H02.31 to 1.

Read the value of H0b.34 to get the fault/warning code. See examples in the following table.

H0b.34 (Hexadecimal)	Description
0101	0: No. 1 non-resettable fault 101: Fault code
2130	2: No. 1 resettable fault 130: Fault code
6121	6: No. 2 resettable fault 121: Fault code
E110	E: No. 3 resettable warning 110: Warning code

5.2 List of Fault and Warning Codes

No. 1 non-resettable faults:

Table 5–1 List of No. 1 non-resettable faults

Fault Code	Display	Fault Name	Fault Type	Resettable
E101	E101.0	Abnormal parameters in groups H02 and above	No. 1	No
	E101.1	Abnormal parameters in group H00/ H01	No. 1	No
	E101.2	Address error in read/write operation after the number of parameters changes	No. 1	No
E102	E102.0	FPGA communication initialization error	No. 1	No
	E102.8	FPGA and MCU version mismatch	No. 1	No
E104	E104.1	MCU operation timeout (MCU crashed)	No. 1	No
	E104.2	FPGA operation timeout (FPGA crashed)	No. 1	No
	E104.4	MCU command update timeout	No. 1	No
E120	E120.0	Unknown encoder model	No. 1	No
	E120.1	Unknown motor model	No. 1	No
	E120.2	Unknown drive model	No. 1	No
	E120.5	Motor and drive current mismatch	No. 1	No
	E120.6	FPGA and motor model mismatch	No. 1	No
	E120.7	Model check error	No. 1	No
	E120.8	Junction temperature parameter check error	No. 1	No
E136	E136.0	Motor parameter check error in encoder ROM	No. 1	No
	E136.1	Motor parameter read error in encoder ROM	No. 1	No
E201	E201.0	Phase-P overcurrent	No. 1	No
	E201.1	Phase-U overcurrent	No. 1	No
	E201.2	Phase-V overcurrent	No. 1	No
	E201.4	Phase-N overcurrent	No. 1	No
E210	E210.0	Output short-circuited to ground	No. 1	No
E234	E234.0	Runaway	No. 1	No
E740	E740.0	Absolute encoder communication timeout	No. 1	No
	E740.2	Absolute encoder error	No. 1	No
	E740.3	Absolute encoder single-turn calculation error	No. 1	No
	E740.6	Encoder write error	No. 1	No

Fault Code	Display	Fault Name	Fault Type	Resettable
E750	E750.0	Master/Slave initial position deviation of safety encoder too large	No. 1	No
	E750.1	Master/Slave position difference of safety encoder too large	No. 1	No
	E750.3	Master/Slave analog deviation of safety encoder too large	No. 1	No
E765	E765.0	Nikon encoder overtemperature or overspeed	No. 1	No
EA33	EA33.0	Encoder read/write check error	No. 1	No
EE12	EE12.0	EtherCAT initialization failure	No. 1	No
EE16	EE16.0	MCU and ESC communication error	No. 1	No

No. 1 resettable faults

Table 5–2 List of No. 1 resettable faults

Fault Code	Fault subcode	Fault Name	Fault Type	Resettable
E150	E150.0	STO safety state applied	No. 1	Yes
	E150.1	STO input state error	No. 1	Yes
	E150.2	Buffer 5 V voltage detection error	No. 1	Yes
	E150.3	STO input circuit hardware diagnosis failure	No. 1	Yes
	E150.4	PWM Buffer hardware diagnosis failure	No. 1	Yes
E208	E208.2	Encoder communication timeout	No. 1	Yes
	E208.4	FPGA current loop operation timeout	No. 1	Yes
E320	E320.0	Regenerative resistor overload	No. 1	Yes
E400	E400.0	Main circuit overvoltage	No. 1	Yes
E410	E410.0	Main circuit undervoltage	No. 1	Yes
	E410.1	Main circuit power-off	No. 1	Yes
E500	E500.0	Motor overspeed	No. 1	Yes
	E500.1	Speed feedback overflow	No. 1	Yes
	E500.2	FPGA position feedback pulse overspeed	No. 1	Yes
E602	E602.0	Angle auto-tuning failure	No. 1	Yes
	E602.2	U/V/W phase sequence reversed	No. 1	Yes
E605	E605.0	Speed too fast upon S-ON	No. 1	Yes
E620	E620.0	Motor overload	No. 1	Yes
E625	E625.0	Brake release error	No. 1	Yes
E626	E626.0	Brake apply error	No. 1	Yes
E630	E630.0	Motor stall overtemperature protection	No. 1	Yes

Fault Code	Fault subcode	Fault Name	Fault Type	Resettable
E631	E631.1	24 V or brake not connected	No. 1	Yes
	E631.2	P-MOS disconnected	No. 1	Yes
	E631.3	N-MOS disconnected	No. 1	Yes
E640	E640.0	IGBT overtemperature	No. 1	Yes
	E640.1	Flywheel diode overtemperature	No. 1	Yes
E650	E650.0	Heatsink overtemperature	No. 1	Yes
E660	E660.0	Motor overtemperature	No. 1	Yes
E770	E770.0	Phase-A input disconnected in fully-closed loop mode	No. 1	Yes
	E770.1	Phase- B input disconnected in fully-closed loop mode	No. 1	Yes
	E770.2	Phase- Z input disconnected in fully-closed loop mode	No. 1	Yes
	E770.3	BiSS communication protocol timeout	No. 1	Yes
	E770.4	BiSS communication CRC error	No. 1	Yes
	E770.5	BISS response data error	No. 1	Yes
	E770.6	2nd encoder initialization communication error in fully closed-loop mode	No. 1	Yes
	E770.7	2nd encoder communication error in fully closed-loop mode	No. 1	Yes
E939	E939.0	Motor power cables disconnected	No. 1	Yes
	E939.1	Phase-U power cable disconnected	No. 1	Yes
	E939.2	Phase-V power cable disconnected	No. 1	Yes
	E939.3	Phase-W power cable disconnected	No. 1	Yes

No. 2 resettable faults

Table 5–3 List of No. 2 resettable faults

Fault Code	Display	Fault Name	Fault Type	Resettable
E122	E122.0	Multi-turn absolute encoder setting error	No. 2	Yes
	E122.1	DI function assignment error	No. 2	Yes
	E122.2	Different DOs assigned with the same function	No. 2	Yes
	E122.3	Upper limit in the rotation mode too high	No. 2	Yes
	E122.4	VDI function assignment fault	No. 2	Yes
	E122.5	VDI and DI assigned with the same function	No. 2	Yes
	E122.6	Absolute function setting fault of the 2nd encoder	No. 2	Yes
	E122.7	Fully closed loop parameter setting error	No. 2	Yes
E420	E420.0	Main circuit phase loss	No. 2	Yes
	E420.1	Main circuit PL signal detection error	No. 2	Yes
E430	E430.0	Control power supply undervoltage	No. 2	Yes
E661	E661.0	STune failure	No. 2	Yes
E662	E662.0	ETune failure	No. 2	Yes
E663	E663.0	ITune failure	No. 2	Yes
E664	E664.0	Resonance too strong	No. 2	Yes
E731	E731.0	Encoder battery failure	No. 2	Yes
E733	E733.0	Encoder multi-turn counting error	No. 2	Yes
E735	E735.0	Encoder multi-turn counting overflow	No. 2	Yes
E760	E760.0	Encoder overtemperature	No. 2	Yes
EB00	EB00.0	Position deviation too large	No. 2	Yes
	EB00.1	Position deviation overflow	No. 2	Yes
EB01	EB01.0	Position reference increment too large	No. 2	Yes
	EB01.1	Individual position reference increment too large	No. 2	Yes
	EB01.3	Reference overflow	No. 2	Yes
EB02	EB02.0	Position deviation too large in fully closed-loop mode	No. 2	Yes
EB03	EB03.0	Electronic gear ratio beyond the limit - H05.02	No. 2	Yes
	EB03.1	Electronic gear ratio beyond the limit - Electronic gear ratio 1	No. 2	Yes
	EB03.2	Electronic gear ratio beyond the limit -Electronic gear ratio 2	No. 2	Yes

Fault Code	Display	Fault Name	Fault Type	Resettable
EE08	EE08.0	Synchronization (SYNC) signal loss	No. 2	Yes
	EE08.1	Status switchover error	No. 2	Yes
	EE08.3	Network cable connected improperly	No. 2	Yes
	EE08.4	Data frame loss protection error	No. 2	Yes
	EE08.5	Data frame transfer error	No. 2	Yes
	EE08.6	Data update timeout	No. 2	Yes
EE09	EE09.0	Software position limit setting error	No. 2	Yes
	EE09.1	Home setting error	No. 2	Yes
	EE09.2	Gear ratio beyond the limit	No. 2	Yes
	EE09.3	Homing method setting error	No. 2	Yes
	EE09.5	PDO mapping beyond the limit	No. 2	Yes
EE10	EE10.0	Mailbox setting error protection (pre-op)	No. 2	Yes
	EE10.1	SM2 configuration error	No. 2	Yes
	EE10.2	SM3 configuration error	No. 2	Yes
	EE10.3	PDO watchdog setting error	No. 2	Yes
	EE10.4	PLL error protection not completed (no sync signal)	No. 2	Yes
EE11	EE11.0	ESI check error	No. 2	Yes
	EE11.1	EEPROM cannot be read by the bus	No. 2	Yes
	EE11.2	EEPROM cannot be updated by the bus	No. 2	Yes
	EE11.3	ESI and drive model mismatch	No. 2	Yes
EE13	EE13.0	Synchronization cycle setting error	No. 2	Yes
EE15	EE15.0	Synchronization cycle error too large	No. 2	Yes

Resettable warnings

Table 5–4 List of resettable warnings

Fault Code	Display	Name	Fault Type	Resettable
E108	E108.0	Storage parameter write error	No. 3	Yes
	E108.1	Storage parameter read error	No. 3	Yes
	E108.2	Check on data written in EEPROM failed	No. 3	Yes
	E108.3	Check on data read in EEPROM failed	No. 3	Yes
E110	E110.0	Frequency-division pulse output setting error	No. 3	Yes
E121	E121.0	Invalid S-ON command	No. 3	Yes
E510	E510.0	Frequency division pulse output overspeed	No. 3	Yes
E600	E600.0	Inertia auto-tuning failure	No. 3	Yes

Fault Code	Display	Name	Fault Type	Resettable
E601	E601.0	Homing warning	No. 3	Yes
	E601.1	Homing switch error	No. 3	Yes
	E601.2	Homing mode setting error	No. 3	Yes
E631	E631.4	P-MOS short circuit	No. 1	Yes
	E631.5	N-MOS short circuit	No. 1	Yes
E730	E730.0	Encoder battery warning	No. 3	Yes
	E730.1	2nd encoder battery voltage too low	No. 3	Yes
E831	E831.0	AI1 zero offset too large	No. 3	Yes
E834	E834.1	AI1 overvoltage	No. 3	Yes
	E834.2	AI2 input current too high	No. 3	Yes
E900	E900.0	DI emergency braking	No. 3	Yes
E902	E902.0	DI setting invalid	No. 3	Yes
	E902.1	DO setting invalid	No. 3	Yes
	E902.2	Torque reach setting invalid	No. 3	Yes
E908	E908.0	Model identification failure	No. 3	Yes
E909	E909.0	Motor overload	No. 3	Yes
E910	E910.0	Control circuit overvoltage	No. 3	Yes
E920	E920.0	Regenerative resistor overload	No. 3	Yes
E922	E922.0	Resistance of the external regenerative resistor too small	No. 3	Yes
E924	E924.0	Regenerative transistor over-temperature	No. 3	Yes
E941	E941.0	Modified parameters activated at next power-on	No. 3	Yes
E942	E942.0	Parameters saved frequently	No. 3	Yes
E950	E950.0	Forward overtravel warning	No. 3	Yes
E952	E952.0	Reverse overtravel warning	No. 3	Yes
E954	E954.0	Position reference overflow	No. 3	Yes
E971	E971.0	Undervoltage warning of voltage drop protection	No. 3	Yes
E980	E980.0	Encoder algorithm error	No. 3	Yes
EA41	EA41.0	Torque ripple compensation failure	No. 3	Yes

5.3 Solutions to Faults

- E101.0: Abnormal parameters in groups H02 and above
  Cause:

  The total number of parameters changes, which generally occurs after software update.

Values of parameters in groups H02 and above exceed the limit, which generally occurs after software update.

Cause	Confirming Method	Solution
1. The voltage of the control circuit power supply drops instantaneously.	1. Check whether the control circuit (L1C, L2C) is in the process of power-off or instantaneous power failure occurs.	1. Restore system parameters to default settings (H02.31 = 1), and write parameters again. 2. Enlarge the power capacity or replace with a power supply of higher capacity, restore system parameters to default settings (H02.31 = 1) and write parameters again.
	2. Measure whether the input voltage of the control circuit cable on the non-drive side is within the following range: 220 V servo drive: Effective value: 220 V to 240 V Allowable deviation: –10% to +10% (198 V to 264 V) 380 V servo drive: Effective value: 380 V to 440 V Allowable deviation: –10% to +10% (342 V to 484 V)	Increase the power supply capacity or replace with a power supply of higher capacity. Restore system parameters to default settings (H02.31 = 1), and write parameters again.
2. Instantaneous power failure occurs when saving parameters.	Check whether instantaneous power failure occurs when saving parameters.	Power on the system again, restore system parameters to default settings (H02.31 = 1), and write parameters again.
3. The number of write operations within a certain period of time exceeds the limit.	1. Check whether instantaneous power failure occurs during parameter-saving. 2. Check whether parameters are updated frequently through the host controller.	1. If the servo drive is faulty, replace it. 2. Change the write mode and write parameters again.
4. The software is updated.	Check whether parameter values in groups H02 and above exceed the upper/lower limit due to software update.	Reset the servo drive model and motor model, and restore system parameters to default settings (H02.31 = 1).
5. The servo drive is faulty.	If the fault persists though parameters are restored to default settings and the servo drive is powered off and on repeatedly, the servo drive is faulty.	Replace the servo drive.

- E101.1: Abnormal parameters in group H00/H01
  Cause:

  The total number of parameters changes, which generally occurs after software update.

  Values of parameters in group H00 or H01 exceed the limit, which generally occurs after software update.

Cause	Confirming Method	Solution
The servo drive detects whether parameter values in groups H00 and H01 exceed the upper/lower limit during initialization upon power-on. If yes, the keypad displays E101.1. Motor parameters in group H00 are read from the encoder. Servo drive parameters in group H01 are mapped based on the servo drive model defined by H01.10.	Check which parameter in group H00 and H01 exceeds the limit. Check whether this parameter is set to an improper value.	Replace the motor or servo drive.

- E101.2: Address error in read/write operation after the number of parameters changes

Cause	Confirming Method	Solution
The total number of parameters changes after software update, leading to address error in read/write operation.	Read H0b.90 and H0b.91 to check the parameter group that the abnormal parameter belongs to.	Set this parameter to a proper value. Restore default settings.

- E102.0: FPGA communication initialization error
  Cause:

  The software versions of MCU and FPGA do not match.

Cause	Confirming Method	Solution
1. The software versions of the FPGA the MCU do not match.	View the MCU software version (H01.00) and FPGA software version (H01.01) through the keypad or the software tool. Check whether the non-zero bits in the most significant bits of these two versions are consistent.	Contact Inovance for technical support. Update the FPGA or MCU software to make them match.
2. The FPGA is faulty.	The fault persists after the servo drive is powered off and on repeatedly.	Replace the servo drive.

- E102.8: FPGA and MCU version mismatch
  Cause:

  The software versions of MCU and FPGA do not match.

Cause	Confirming Method	Solution
The software versions of MCU and FPGA do not match.	1. Check whether the MCU version (H01.00) is 9xx.x (the fourth digit displayed on the keypad is 9). 2. Check whether the FPGA version (H01.01) is 9xx.x (the fourth digit displayed on the keypad is 9).	Contact Inovance for technical support. Update the FPGA or MCU software to make them match.

- E104.1: MCU operation timeout (MCU crashed)
  Cause:

  The access to MCU times out.

Cause	Confirming Method	Solution
1. The FPGA is faulty.	The fault persists after the servo drive is powered off and on repeatedly.	Replace the servo drive.
2. The communication handshake between FPGA and HOST is abnormal.		
3. Access timeout occurs between HOST and the coprocessor.		

- E104.2: FPGA operation timeout (FPGA crashed)
  Cause:

  The MCU torque interrupt scheduling time is abnormal. This fault is reported only during commissioning.

Cause	Confirming Method	Solution
1. The FPGA is faulty.	The fault persists after the servo drive is powered off and on repeatedly.	Replace the servo drive.
2. The communication handshake between FPGA and MCU is abnormal.		

- E104.4: MCU command update timeout
  Cause:

  Take the moment when interrupt starts as the starting time, if the time when commands are written to MCU is longer than the time when position and speed regulators are started by FPGA, a warning will be reported.

Cause	Confirming Method	Solution
The system reports that the encoder communication time is set improperly or the command calculation time is too long.	The fault persists after the servo drive is powered off and on repeatedly.	1. Hide unnecessary functions. 2. Replace the servo drive.

- E120.0: Unknown encoder model
  Cause:

  The servo drive detects the encoder model during initialization upon power-on. If the encoder model does not comply with the requirement, E120.0 occurs.

Cause	Confirming Method	Solution
1. The product (motor or servo drive) code does not exist.	Read the nameplates of the servo drive and motor to check whether SV680N series servo drive and motor with a 26-bit encoder are used. Meanwhile, check whether H00.00 (Motor code) is set to 14102.	If the motor code is unknown, set H00.00 to 14102 when SV680N series servo drive and the motor equipped with a 26-bit encoder are used.
	Check the servo drive model (H01.02) to see whether this model exists.	If the servo drive model is unknown, set the model correctly according to the nameplate.
2. The power rating of the motor does not match that of the servo drive.	Check whether the servo drive model (H01.02) matches the serial-type motor model (H00.05).	Replace the device that does not match.

- E120.1: Unknown motor model
  Cause:

  The servo drive detects the motor model defined by H00.00 during initialization upon power-on. If the motor model does not exist, E120.1 occurs.

Cause	Confirming Method	Solution
The motor model defined by H00.00 is abnormal.	Check whether the motor code (H00.00) matches the model of the motor used.	Set H00.00 to a proper value.

- E120.2: Unknown drive model
  Cause:

  The servo drive detects the servo drive model defined by H01.10 during initialization upon power-on. If the servo drive model does not exist, E120.2 occurs.

Cause	Confirming Method	Solution
The servo drive model (H01.10) is set improperly.	Check whether H01.10 (Servo drive model) is set properly.	Disable servo drive model auto-tuning and set H01.10 to a proper value manually.

- E120.5: Motor and drive current mismatch
  Cause:

  The rated output of the servo drive is far higher than the rated current of the motor. Replace with a servo drive of lower rated output or a motor with higher rated current.

Cause	Confirming Method	Solution
The internal scaling value is abnormal.	Check whether the servo drive model is correct. If the set current sampling coefficient is too large, calculation overflow will occur.	Replace the servo drive.

- E120.6: FPGA and motor model mismatch
  Cause:
  - The motor model is set improperly, causing mismatch and malfunction of the servo drive.
  - The motor model is set properly, but the motor encoder is not supported by the servo drive.

Cause	Confirming Method	Solution
The FPGA software version does not match the motor model defined by H00.00.	Check whether the FPGA software version (H01.01) supports the motor model defined by H00.00.	Update the FPGA software to enable the FPGA to support the motor model defined by H00.00, or replace the motor.

- E120.7: Model check error
  Cause:

  The servo drive model parameter cannot be identified.

Cause	Confirming Method	Solution
The model parameter does not pass CRC.	Check whether the model parameter is not programmed or is lost.	Program the model parameter again.

- E120.8: Junction temperature parameter CRC error

  Cause:

  The auto-tuned junction temperature parameter is wrong.

Cause	Confirming Method	Solution
The CRC on the junction temperature parameter fails.	Check whether the junction parameter is not programmed or is lost.	Program the junction temperature parameter again.

- E122.0: Multi-turn absolute encoder setting error

  Cause:

  The motor does not match the absolute position mode or the motor code is set improperly.

Cause	Confirming Method	Solution
The motor does not match the absolute position mode or the motor code is set incorrectly.	1. Check the motor nameplate to see whether the motor is configured with a multi-turn absolute encoder. 2. Check whether H00.00 (Motor code) is set properly.	Reset H00.00 (Motor code) according to the motor nameplate or replace with a matching motor.

- E122.1: DI function assignment fault

  Cause:

  The same function is assigned to different DIs.

  The DI function No. exceeds the maximum setting number allowed for DI functions.

Cause	Confirming Method	Solution
1. Different DIs are assigned with the same function.	Check whether parameters in groups H03 (H03.02, H03.04...H03.20) and H17 (H17.00, H17.02...H17.30) are assigned with the same non-zero DI function No..	Assign different DI function numbers to parameters in groups H03 or H17, and then restart the control circuit to activate the assignment, or switch off the S-ON signal and send a "RESET" signal to activate the assignment.
2. The DI function No. exceeds the number of DI functions.	Check whether the MCU program is updated.	Restore system parameters to default values (H02.31 = 1) and restart the servo drive.

- E122.2: DO function assignment fault

Cause	Confirming Method	Solution
The DO function No. exceeds the maximum number allowed for DO functions.	Check whether DO function numbers defined by H04.00 and H04.02 are abnormal.	Set the correct DO function No..

- E122.3: Upper limit in the rotation mode invalid
  Cause:

  The upper limit (reference range) of the mechanical single-turn position exceeds 2^{31} in the absolute rotation mode.

Cause	Confirming Method	Solution
The upper limit of the mechanical single-turn position exceeds 2^{31}.	Check the setting of the mechanical gear ratio, the upper limit of mechanical single-turn position, and the electronic gear ratio when the servo drive operates in the absolute rotation mode (H02.01 = 2).	Reset the mechanical gear ratio, the upper limit of mechanical single-turn position, and the electronic gear ratio to ensure the upper limit of the mechanical single-turn position (reference range) does not exceed 2^{31}.

- E122.4: VDI function assignment fault
  Cause:

  The same function is assigned to different VDIs. The VDI function No. exceeds the maximum number allowed for VDI functions.

Cause	Confirming Method	Solution
1. The same function is assigned to different VDIs.	Check whether parameters in groups H03 (H03.02, H03.04...H03.20) and H17 (H17.00, H17.02...H17.30) are assigned with the same non-zero DI function No..	Assign different DI function numbers to parameters in groups H03 or H17, and then restart the control circuit to activate the assignment, or switch off the S-ON signal and send a "RESET" signal to activate the assignment.
2. The VDI function No. exceeds the maximum number allowed for VDI functions.	Check whether the MCU program is updated.	Restore system parameters to default values (H02.31 = 1) and restart the servo drive.

- E122.5: VDI and DI assigned with the same function
  Cause:

  The same function is assigned to different VDIs. The VDI function No. exceeds the maximum number allowed for VDI functions.

Cause	Confirming Method	Solution
At least two DIs/VDIs are assigned with the same function.	Check whether the same DI function No. is set in groups H03 and H17.	Ensure the DI and VDI are set with different function No..

- E122.6: Absolute function setting fault of the 2nd encoder
  Cause:

  The motor does not match the absolute mode.

Cause	Confirming Method	Solution
The motor does not match the absolute mode.	Check the motor nameplate to see whether the motor is configured with a multi-turn absolute encoder.	Set H0F.02 to 0 (Incremental mode).

- E122.7: Fully closed loop parameter setting error
  Cause:

Cause	Confirming Method	Solution
H02.01 is set to 2 (Absolute position rotation mode) when H0F.00 is not 0.	Check the value of H02.01 when using the fully closed loop function.	Set H02.01 to a value other than 2 when using the fully closed loop function.

- E136.0: Motor parameter check error in encoder ROM
  Cause:

  When reading parameters in the encoder ROM, the servo drive detects that no parameters are saved there or parameter values are inconsistent with the setpoints.

Cause	Confirming Method	Solution
1. The motor model does not match the servo drive model.	View the nameplates of the servo drive and motor to check whether the devices used are SV680N series servo drive and motor.	Replace with the mutually-matching servo drive and motor.
2. A parameter check error occurs or no parameter is saved in the ROM of the serial incremental encoder.	1. Check whether the encoder cable provided by Inovance is used. For cable specifications, see "Matching Cables". The cable must be connected securely without scratching, breaking or poor contact. 2. Measure signals PS+, PS-, +5V and GND on both ends of the encoder cable and observe whether signals at both ends are consistent. For signal assignment, see Chapter "Wiring" in SV680N Series Servo Drive Hardware Guide.	1. Use the encoder cable provided by Inovance. Ensure motor terminals and servo drive screws are connected securely. Use a new encoder cable if necessary. 2. Route encoder cables and power cables (R/S/T, U/V/W) through different routes.
3. The servo drive is faulty.	The fault persists after the servo drive is restarted.	Replace the servo drive.

- E136.1: Motor parameter read error in encoder ROM
  Cause:
  - The encoder cable is disconnected.
  - A communication error occurs on the encoder due to interference.

Cause	Confirming Method	Solution
1. The encoder cable is connected improperly or loosely.	Check the encoder cable connection. Check whether ambient vibration is too strong, which loosens the encoder cable and even damages the encoder.	1. Connect the encoder cables according to the correct wiring diagram. 2. Re-connect encoder cables and ensure encoder terminals are connected securely.
2. The servo drive is faulty.	The fault persists after the servo drive is restarted.	Replace the servo drive.

- E150.0: STO safety state applied
  Cause:

  The STO input protection (safety state) applies.

Cause	Confirming Method	Solution
Two 24 V inputs are disconnected simultaneously, triggering the STO function.	1. Check whether the STO function is activated.	There is no need to take any corrective actions. After the STO terminal is back to normal, clear the fault using the fault reset function.
	2. Check whether the STO power supply is normal.	Check whether the 24 V power supply for the STO is stable. Tighten the cables that are loose or disconnected.
	3. The fault persists after preceding causes are rectified.	Replace the servo drive.

- E150.1: STO input state error
  Cause:

  The single-channel input of STO is invalid.

Cause	Confirming Method	Solution
1. The STO power supply is abnormal.	Check whether the STO power supply is normal.	Check whether the 24 V power supply for the STO is stable. Tighten the cables that are loose or disconnected.
2. The STO input resistor is abnormal.	After STO is triggered, only one STO signal is sent to MCU after the 24 V power supply is cut off due to input resistor drift.	Replace the servo drive.
3: The STO function fails.	The fault persists after preceding causes are rectified.	Replace the servo drive.

- E150.2: Buffer 5 V voltage detection error
  Cause:

  The MCU monitors the 5 V power supply of the PWM Buffer to detect whether overvoltage or undervoltage occurs. If the voltage is abnormal, E150.2 occurs.

Cause	Confirming Method	Solution
The 5 V voltage supplied to the STO Buffer is abnormal due to undervoltage or overvoltage.	Check whether the fault can be removed by a restart. If not, the 5 V voltage supplied to the Buffer is abnormal.	Replace the servo drive.

- E150.3: STO input circuit hardware diagnosis failure
  Cause:

  Short circuit occurs on the optocoupler of the upstream hardware circuit of STO.

Cause	Confirming Method	Solution
Short circuit occurs on the upstream optocoupler of STO1 or STO2.	The fault persists and the keypad displays E150.3 after restart.	Replace the servo drive.

- E150.4: PWM buffer hardware detection failure
  Cause:

  An error occurs on the PWM Buffer integrated circuit during initialization detection upon power-on (the PWM signal cannot be blocked).

Cause	Confirming Method	Solution
A STO Buffer error is detected upon power-on.	The fault persists and the keypad displays E150.4 after restart.	Replace the servo drive.

- E165.0: SLS1 slope beyond the limit
  Cause:

Cause	Confirming Method	Solution
The SLS1 deceleration slope monitored exceeds the upper limit.	Check whether the slope in which SLS1 ramp decelerates to the SLS1 limit exceeds the allowable upper limit.	1. Set a proper upper limit of SLS1 deceleration slope. 2. Set a proper SLS1 deceleration slope for stop to ensure the slope in which SLS1 ramps to the limit value is lower than the upper limit.

- E165.1: SLS2 slope beyond the limit
  Cause:

Cause	Confirming Method	Solution
The SLS2 deceleration slope monitored exceeds the upper limit.	Check whether the slope in which SLS2 ramps to the SLS2 limit exceeds the allowable upper limit.	1. Set a proper upper limit of SLS2 deceleration slope. 2. Set a proper SLS2 deceleration slope for stop to ensure the slope in which SLS2 ramps to the limit value is lower than the upper limit.

- E165.2: SLS3 slope beyond the limit
  Cause:

Cause	Confirming Method	Solution
The SLS3 deceleration slope monitored exceeds the upper limit.	Check whether the slope in which SLS3 ramps to the SLS3 limit exceeds the allowable upper limit.	1. Set a proper upper limit of SLS3 deceleration slope. 2. Set a proper SLS3 deceleration slope for stop to ensure the slope in which the SLS3 ramps to the limit value is lower than the upper limit.

- E165.3: SLS4 slope beyond the limit
  Cause:

Cause	Confirming Method	Solution
The SLS4 deceleration slope monitored exceeds the upper limit.	Check whether the slope in which SLS4 ramps to the SLS4 limit exceeds the allowable upper limit.	1. Set a proper upper limit of SLS4 deceleration slope. 2. Set a proper SLS4 deceleration slope for stop to ensure the slope in which SLS4 ramps to the limit value is lower than the upper limit.

- E201.0: Phase-P overcurrent
  Cause:

  An excessively high current flows through the positive pole of the DC-AC circuit.

Cause	Confirming Method	Solution
1. Gains are set improperly, leading to motor oscillation.	Check whether vibration or sharp noise occurs during start and operation of the motor, or view "Current feedback" in the software tool.	1. Motor parameters are set improperly, modify motor parameter values. 2. Current loop parameters are set improperly, modify current loop parameter values. 3. Speed loop parameters are set improperly, leading to motor oscillation. 4. If the servo drive operates improperly, replace it.
2. The encoder is wired improperly, aging, or connected loosely.	Check whether the encoder cable provided by Inovance is used and whether the cable is aging, corroded, or connected loosely. Switch off the S-ON signal and rotate the motor shaft manually. Check whether the value of H0b.17 changes as the motor shaft rotates.	Re-solder, tighten or replace the encoder cable.

Cause	Confirming Method	Solution
3. The servo drive is faulty.	1. Switch off the S-ON signal and rotate the motor shaft manually. Check whether the value of H0b.17 changes as the motor shaft rotates. 2. Disconnect the motor cable and power on the servo drive again, but the fault persists. 3. Check whether resistance of the external regenerative resistor is too small or the regenerative resistor is short-circuited (between terminals P⊕ and C).	1. Replace with a regenerative resistor with matching resistance and perform wiring again. 2. Replace the servo drive.
4. Overcurrent occurs on the regenerative resistor.	Check whether the resistance of the external regenerative resistor is too small or the regenerative resistor is short-circuited (terminals P and C in the main circuit).	Select new resistance value and model of the bleeder resistor. Perform wiring again.

- E201.1: Phase-U overcurrent
  Cause:

  A current higher than the threshold is collected in the phase-U current.

Cause	Confirming Method	Solution
1. Motor cables are in poor contact. 2. Motor cables are grounded. 3. U/V/W cables of the motor are short-circuited.	1. Check whether the servo drive power cables and motor cables on the U, V, and W sides of the servo drive are loose. 2. After confirming the servo drive power cables and motor cables are connected properly, measure whether the insulation resistance between the servo drive U/V/W side and the PE cable is at MΩ level.	1. Tighten the cables that are loose or disconnected. 2. Replace the motor in case of poor insulation.
4. The motor is damaged.	1. Disconnect motor cables and check whether short circuit occurs among motor U/V/W cables and whether burrs exist in the wiring. 2. Disconnect the motor cables and measure whether the resistance among U, V, and W phases of motor cables is balanced.	1. Connect the motor cables correctly. 2. Replace the motor if the resistance is unbalanced.

- E201.2: Phase-V overcurrent
  Cause:

  A current higher than the threshold is collected in the phase-V current.

Cause	Confirming Method	Solution
1. Motor cables are in poor contact. 2. Motor cables are grounded. 3. U/V/W cables of the motor are short-circuited.	1. Check whether the servo drive power cables and motor cables on the U, V, and W sides of the servo drive are loose. 2. After confirming the servo drive power cables and motor cables are connected properly, measure whether the insulation resistance between the servo drive U/V/W side and the PE cable is at MΩ level.	1. Tighten the cables that are loose or disconnected. 2. Replace the motor in case of poor insulation.
4. The motor is damaged.	1. Disconnect motor cables and check whether short circuit occurs among motor U/V/W cables and whether burrs exist in the wiring. 2. Disconnect the motor cables and measure whether the resistance among U, V, and W phases of motor cables is balanced.	1. Connect the motor cables correctly. 2. Replace the motor if the resistance is unbalanced.

- E201.4: Phase-N overcurrent
  Cause:

  An excessively high current flows through the negative pole of the DC-AC circuit.

Cause	Confirming Method	Solution
1. Gains are set improperly, leading to motor oscillation.	Check whether vibration or sharp noise occurs during start and operation of the motor, or view "Current feedback" in the software tool.	Adjust the gains.
2. The encoder is wired improperly, aging, or connected loosely.	Check whether the encoder cable provided by Inovance is used and whether the cable is aging, corroded, or connected loosely.	Re-solder, tighten or replace the encoder cable.

Cause	Confirming Method	Solution
3. Overcurrent occurs on the regenerative resistor.	Check whether resistance of the external regenerative resistor is too small or the regenerative resistor is short-circuited (between terminals P⊕ and C).	Replace with a regenerative resistor of matching resistance. Perform wiring again.
4. The servo drive is faulty.	Switch off the S-ON signal and rotate the motor shaft manually. Check whether the value of H0b.17 (Electrical angle) changes as motor shaft rotates. Disconnect the motor cable but the fault persists after the servo drive is powered off and on again.	Replace the servo drive.

- E201.4: Phase-N overcurrent
  Cause:

  An excessively high current flows through the negative pole of the DC-AC circuit.

Cause	Confirming Method	Solution
1. Gains are set improperly, leading to motor oscillation.	Check whether vibration or sharp noise occurs during start and operation of the motor, or view "Current feedback" in the software tool.	Adjust the gains.
2. The encoder is wired improperly, aging, or connected loosely.	Check whether the encoder cable provided by Inovance is used and whether the cable is aging, corroded, or connected loosely.	Re-solder, tighten or replace the encoder cable.

Cause	Confirming Method	Solution
3. Overcurrent occurs on the regenerative resistor.	Check whether resistance of the external regenerative resistor is too small or the regenerative resistor is short-circuited (between terminals P⊕ and C).	Replace with a regenerative resistor of matching resistance. Perform wiring again.
4. The servo drive is faulty.	Switch off the S-ON signal and rotate the motor shaft manually. Check whether the value of H0b.17 (Electrical angle) changes as motor shaft rotates. Disconnect the motor cable but the fault persists after the servo drive is powered off and on again.	Replace the servo drive.

- E208.2: Encoder communication timeout
  Cause:

Cause	Confirming Method	Solution
The servo drive fails to receive the data fed back by the encoder in three consecutive cycles.	Check bit12 of H0b.30. The encoder is wired incorrectly. The encoder cable is loosened. The encoder cable is too long. The encoder communication suffers from interference. The encoder is faulty.	1. Check whether the motor model is correct. 2. Check whether the encoder cable is proper. 3. Check whether the encoder version (H00.04) is proper. 4. Check whether the servo drive is faulty. If yes, replace it.

- E208.4: FPGA current loop operation timeout
  Cause:

  The operating time of the current loop exceeds the interval threshold.

Cause	Confirming Method	Solution
The FPGA operation times out.	Internal fault code H0b.45 = 4208: Current loop operation timeout	Disable some unnecessary functions to reduce the operating load of the current loop.

- E210.0: Output short-circuited to ground
  Cause:

  An abnormal motor phase current or bus voltage is detected during auto-inspection upon power-on.

  - The DC bus voltage exceeds the discharge threshold.

- Phase-U current of servo drives in size C/D/E exceeds 25% of the setpoint of H01.07.
- Overcurrent occurs on phase-P and phase-N of servo drives in sizes A and B.

Cause	Confirming Method	Solution
1. The servo drive power cables (U/V/W) are short-circuited to ground.	Disconnect the motor cables and measure whether the servo drive power cables (U/V/W) are short-circuited to ground (PE).	Connect cables again or replace the servo drive power cables.
2. The motor is short-circuited to ground.	After confirming the servo drive power cables and motor cables are connected properly, measure whether the insulation resistance between the servo drive U/V/W side and the PE cable is at MΩ level.	Replace the motor.
3. The servo drive is faulty.	Disconnect the power cables from the servo drive, but the fault persists after the servo drive is powered off and on repeatedly.	Replace the servo drive.
4. The motor speed is too high during phase-to-ground detection.	Check whether the motor is in the generating status during power-on.	Reduce the motor speed.

- E234.0: Runaway

  Cause:

  The torque reference direction is opposite to the speed feedback direction in the torque control mode.

  The speed feedback direction is opposite to the speed reference direction in the position or speed control mode.

Cause	Confirming Method	Solution
1. The U/V/W cables are connected in the wrong phase sequence.	Check whether the servo drive power cables are connected in the correct sequence at both ends.	Connect the U/V/W cables in the correct phase sequence.
2. An error occurs on the initial phase detection of the motor rotor due to disturbing signals upon power-on.	The U/V/W phase sequence is correct. But E234.0 occurs when the servo drive is enabled.	Power off and on the servo drive again.

Cause	Confirming Method	Solution
3. The encoder model is wrong or the encoder is wired improperly.	View the nameplates of the servo drive and motor to check whether SV680N series servo drive and the motor equipped with a 26-bit encoder are used.	Replace with a mutually-matching servo drive and motor. For use of SV680N series servo drive and the motor equipped with a 26-bit encoder, set H00.00 to 14102. Check the motor model, encoder type, and encoder cable connection again.
4. The encoder is wired improperly, aging, or connected loosely.	1. Check whether the encoder cable provided by Inovance is used and whether the cable is aging, corroded, or connected loosely. 2. Switch off the S-ON signal and rotate the motor shaft manually. Check whether the value of H0b.10 (Electrical angle) changes as motor shaft rotates.	Re-solder, tighten or replace the encoder cable.
5. The gravity load in vertical axis applications is too large.	Check whether the load of the vertical shaft is too large. Adjust brake parameters H02.09...H02.12 and check whether the fault is cleared.	Reduce the load of the vertical axis, increase the stiffness level, or hide this fault without affecting the safety performance and normal use.
6. Improper parameter settings lead to excessive vibration.	The stiffness level is set to an excessively high value, leading to excessive vibration.	Set a proper stiffness level to avoid excessive vibration.

- E320.0: Regenerative resistor overload
  Cause:

  The regenerative resistor is overloaded.

Cause	Confirming Method	Solution
The accumulative heat of the regenerative resistor exceeds the maximum thermal capacity of the regenerative resistor.	Check whether the value of H0b.67 exceeds 100%.	1. Check whether the bus voltage is too high, leading to excessive high bleeder current. 2. To avoid excessively high bleeder current, take measures to prevent the motor from being driven by external force. 3. Replace the servo drive.

Caution

In applications where the motor drives a vertical axis or is driven by the load, set H0A.12 to 0 to hide the runaway fault.

- E400.0: Main circuit overvoltage

  Cause:

  The DC bus voltage between P⊕ and N⊖ exceeds the overvoltage threshold.

  220 V servo drive: Normal value: 310 V Overvoltage threshold: 420 V

  380 V servo drive: Normal value: 540 V Overvoltage threshold: 760 V

Cause	Confirming Method	Solution
1. The voltage input to the main circuit is too high.	Check the power input specifications of the servo drive and measure whether the voltage input to main circuit cables (R/S/T) on the drive side is within the following range: 220 V servo drive: Effective value: 220 V to 240 V Allowable deviation: –10% to +10% (198 V to 264 V) 380 V servo drive: Effective value: 380 V to 440 V Allowable deviation: –10% to +10% (342 V to 484 V)	Replace or adjust the power supply according to the specified range.
2. The power supply is unstable or affected by lightning.	Check whether the power supply is unstable, affected by lightning, or complies with the preceding range.	Connect a surge protection device and then switch on the main circuit and control circuit power supplies again. If the fault persists, replace the servo drive.

Cause	Confirming Method	Solution
3. The regenerative resistor fails.	If the built-in regenerative resistor is used (H02.25 = 0), check whether terminals P ⊕ and D are jumpered. If yes, measure the resistance between terminals C and D. If an external regenerative resistor is used (H02.25 = 1 or 2), measure the resistance of the external regenerative resistor connected between terminals P ⊕ and C. For details, See table "Specifications of the regenerative resistor" in SV680N Series Servo Drive Commissioning Guide.	1. If the resistance is "∞" (infinite), the regenerative resistor is disconnected internally. 2. If a built-in regenerative resistor is used, change to use an external regenerative resistor (H02.25 = 1 or 2) and remove the jumper between terminals P ⊕ and D. Select an external regenerative resistor of the same resistance and equal or higher power than the built-in one. 3. If an external regenerative resistor is used, replace with a new one and connect it between P⊕ and C. 4. Set H02.26 (Power of external regenerative resistor) and H02.27 (Resistance of external regenerative resistor) to values consistent with the specifications of the external regenerative resistor used.

Cause	Confirming Method	Solution
4. The resistance of the external regenerative resistor is too large, resulting in insufficient energy absorption during braking.	Measure the resistance of the external regenerative resistor connected between terminals P⊕ and C, and compare the measured value with the recommended value.	1. Replace with a new external regenerative resistor that carries the recommended resistance, and connect it between P⊕ and C. 2. Set H02.26 (Power of external regenerative resistor) and H02.27 (Resistance of external regenerative resistor) to values consistent with the specifications of the external regenerative resistor used.
5. The motor is in abrupt acceleration/deceleration status and the maximum braking energy exceeds the energy absorption value.	Confirm the acceleration/ deceleration time during operation and measure whether the DC bus voltage between P⊕ and N⊖ exceeds the overvoltage threshold during deceleration.	After confirming the input voltage of the main circuit is within the specified range, increase the acceleration/ deceleration time if the operating conditions allow.
6. The bus voltage sampling value deviates greatly from the measured value.	Check whether H0b.26 (Bus voltage) is within the following range: 220 V servo drive: H0b.26 ＞ 420 V 380 V servo drive: H0b.26 ＞ 760 V Measure whether the DC bus voltage detected between terminals P⊕ and N⊖ is lower than the value of H0b.26.	Contact Inovance for technical support.
7. The servo drive is faulty.	The fault persists after the main circuit is powered off and on repeatedly.	Replace the servo drive.

- E410.0: Main circuit undervoltage
  Cause:

  The DC bus voltage between P⊕ and N⊖ is lower than the undervoltage threshold.

220 V servo drive: Normal value: 310 V Undervoltage threshold: 200 V (180 V for S5R5 models)

380 V servo drive: Normal value: 540 V Undervoltage threshold: 380 V

Cause	Confirming Method	Solution
1. The power supply of the main circuit is unstable or power failure occurs.	Check the specifications of the power supply. Measure whether the input voltage of the main circuit on the power supply side and the drive side (R/S/T) is within the following range: 220 V servo drive: Effective value: 220 V to 240 V Allowable deviation: –10% to +10% (198 V to 264 V) Measure the voltages of all the three phases.	Increase the capacity of the power supply.
2. Instantaneous power failure occurs.		
3. The power supply voltage drops during operation.	Monitor the power supply voltage and check whether the main circuit power supply is applied to other devices, resulting in insufficient power capacity and voltage drop.	
4. A three-phase servo drive is connected to a single-phase power supply, leading to phase loss.	Check whether the main circuit is wired correctly and whether phase loss detection (H0A.00) is hidden.	Replace the cables and connect the main circuit cables correctly. Three-phase: R, S, T
5. The servo drive is faulty.	Check whether H0b.26 (Bus voltage) is within the following range: 220 V servo drive: H0b.26 < 200 V 380 V servo drive: H0b.26 < 380 V The fault persists after the main circuit is powered off and on repeatedly.	Replace the servo drive.

- E410.1: Main circuit power-off
  Cause:

  Phase loss occurs on the three-phase servo drive.

Cause	Confirming Method	Solution
The power supply is disconnected during operation.	Check the specifications of the power supply. Measure whether the input voltage of the main circuit on the power supply side and the drive side (R/S/T) is within the following range: 220 V servo drive: Effective value: 220 V to 240 V Allowable deviation: -10% to +10% 380 V servo drive: Effective value: 380 V to 440 V Allowable deviation: -10% to +10% Measure the voltages of all the three phases.	Increase the capacity of the power supply.
	Monitor the power supply voltage and check whether the main circuit power supply is applied to other devices, resulting in insufficient power capacity and voltage drop.	
	Check whether 200B.1Bh (Bus voltage) is within the following range: 220 V servo drive: H0b.27 ＜ 200 V; 380 V servo drive: H0b.27 < 380 V The fault persists after the main circuit (RST) is powered off and on several times.	Replace the servo drive.
	Check whether the main circuit is wired correctly.	Replace the cables and connect the main circuit cables correctly. Three-phase: R, S, T Single-phase: L1, L2

- E410.1: Main circuit power-off

  Cause:

  Phase loss occurs on the three-phase servo drive.

Cause	Confirming Method	Solution
The power supply is disconnected during operation.	Check the specifications of the power supply. Measure whether the input voltage of the main circuit on the power supply side and the drive side (R/S/T) is within the following range: 220 V servo drive: Effective value: 220 V to 240 V Allowable deviation: -10% to +10% 380 V servo drive: Effective value: 380 V to 440 V Allowable deviation: -10% to +10% Measure the voltages of all the three phases.	Increase the capacity of the power supply.
	Monitor the power supply voltage and check whether the main circuit power supply is applied to other devices, resulting in insufficient power capacity and voltage drop.	
	Check whether 200B.1Bh (Bus voltage) is within the following range: 220 V servo drive: H0b.27 ＜ 200 V; 380 V servo drive: H0b.27 < 380 V The fault persists after the main circuit (RST) is powered off and on several times.	Replace the servo drive.
	Check whether the main circuit is wired correctly.	Replace the cables and connect the main circuit cables correctly. Three-phase: R, S, T Single-phase: L1, L2

- E420.0: Main circuit phase loss

  Cause:

<table>
<tr><th>Cause</th><th>Confirming Method</th><th>Solution</th></tr>
<tr><td>1. The three-phase input cables are connected improperly.</td><td>Check whether RST cables on the drive side and non-drive side are in good condition and connected properly.</td><td>Replace the cables and connect the main circuit cables properly.</td></tr>
<tr><td>2. A single-phase power supply is used for a three-phase servo drive.</td><td rowspan="2">Check the specifications of the power supply and measure whether the voltage input to the main circuit is within the following range:
220 V servo drive:
Effective value: 220 V to 240 V
Allowable deviation: –10% to +10% (198 V to 264 V)
380 V servo drive:
Effective value: 380 V to 440 V
Allowable deviation: –10% to +10% (342 V to 484 V)
Measure the voltages of all the three phases.</td><td rowspan="2">Servo drives of 0.75 kW (H01.10 = 5) can be supplied by single-phase power supplies.
If the input voltage complies with the specifications, set H0A.00 (Power input phase loss protection) to 2 (Inhibit phase loss faults and warnings).
If the input voltage is outside the specified range, replace or adjust the power supply.</td></tr>
<tr><td>3. The three-phase power supply is unbalanced or the voltages of the three phases are too low.</td></tr>
</table>

- E420.1: Main circuit PL signal detection error
  Cause:

Cause	Confirming Method	Solution
1. The three-phase input cables are connected improperly.	Check whether RST cables on the drive side and non-drive side are in good condition and connected properly.	Power off and on the servo drive again. If unexpected power failure occurs, ensure the power supply is stable.
2. A single-phase power supply is used for a three-phase servo drive.	Check the specifications of the power supply and measure whether the voltage input to the main circuit is within the following range: 220 V servo drive: Effective value: 220 V to 240 V Allowable deviation: –10% to +10% (198 V to 264 V) 380 V servo drive: Effective value: 380 V to 440 V Allowable deviation: –10% to +10% (342 V to 484 V) Measure the voltages of all the three phases.	Replace or adjust the power supply according to the specified range.
3. The three-phase power supply is unbalanced or the voltages of the three phases are too low.		

- E430.0: Control circuit power supply undervoltage
  Cause:

Cause	Confirming Method	Solution
1. The control circuit power supply of servo drives in size C/D/E is unstable or fails.	Check the specifications of the power supply and measure whether the voltage input to the main circuit is within the following range: 220 V servo drive: Effective value: 220 V to 240 V Allowable deviation: –10% to +10% (198 V to 264 V) 380 V servo drive: Effective value: 380 V to 440 V Allowable deviation: –10% to +10% (342 V to 484 V) Measure the voltages of all the three phases.	Increase the capacity of the power supply.
2. The control circuit power supply of servo drives in size C/D/E is unstable or fails.	Check whether control circuit cables are connected properly and whether the voltage of control circuit cables (L1C, L2C) is within the specified range.	Re-connect or replace the control cables.

- E500.0: Motor overspeed

  Cause:

  The actual speed of the motor exceeds the overspeed threshold.

Cause	Confirming Method	Solution
1. The U/V/W phase sequence of motor cables is wrong.	Check whether the servo drive power cables are connected in the correct sequence at both ends.	Connect the U/V/W cables in the correct phase sequence.
2. H0A.08 (Overspeed threshold) is set improperly.	Check whether the overspeed threshold is lower than the maximum speed needed: Overspeed threshold = 1.2 x Maximum motor speed (H0A.08 = 0) Overspeed threshold = H0A.08 (when H0A.08 ≠ 0, and H0A-08 < 1.2 x maximum motor speed)	Reset the overspeed threshold according to the mechanical requirements.

Cause	Confirming Method	Solution
3. The input reference exceeds the overspeed threshold.	Check whether the motor speed corresponding to the input reference exceeds the overspeed threshold. • Position control mode:In CSP mode, view the gear ratio 6091.01h/6091.02h to determine the position reference increment for an individual synchronization cycle and convert it to the speed information.In PP mode, view the gear ratio 6091.01h/6091.02h and determine the value of 6081h (Profile velocity).In HM mode, view the gear ratio 6091.01h/6091.02h, and determine the values 6099.01h 6099.02h. • Speed control mode:View the gear ratio (6091h), target velocity (60FFh), speed limits (H06.06 to H06.09), and the maximum profile velocity (607Fh). • Torque control mode:View the speed limit defined by H07.17 in the torque control mode and check the corresponding speed limit.	• Position control mode:CSP: Decrease the position reference increment for an individual synchronization cycle. The host controller should handle the position ramp when generating references.PP: Decrease the value of 6081h or increase the acceleration/deceleration ramp (6083h, 6084h).HM: Decrease the values 6099.01h and 6099.02h or increase the acceleration/deceleration ramp (609Ah).Decrease the gear ratio according to actual conditions. • Speed control mode: Decrease the target velocity, speed limit, and gear ratio. In PV mode, increase the speed ramp (6083h and 6084h). In CSV mode, the host controller should cover the speed ramp. • Torque control mode:Set the speed limit to a value lower than the overspeed threshold.
4. The motor speed overshoots.	Check in the software tool whether the speed feedback exceeds the overspeed threshold.	Adjust the gains or mechanical operating conditions.
5. The servo drive is faulty.	The fault persists after the servo drive is powered off and on again.	Replace the servo drive.

- E500.1: Speed feedback overflow
  Cause:

  The FPGA speed measurement overflows.

Cause	Confirming Method	Solution
1. The FPGA internal speed overflows.	Check whether the servo drive power cables are connected in the correct sequence at both ends.	Connect the U/V/W cables in the correct phase sequence.
2. The motor speed overshoots.	Check in the software tool whether the speed feedback exceeds the overspeed threshold.	Adjust the gains or mechanical operating conditions.

- E500.2: Speed feedback error 2

Cause	Confirming Method	Solution
The board-to-board communication of the servo drive is abnormal.	The fault persists even though the servo drive is powered off and on again.	Replace the servo drive.

- E602.0: Angle auto-tuning error
  Cause:

  Unusual jitter occurs on the encoder feedback during angle auto-tuning.

Cause	Confirming Method	Solution
The data fed back by the encoder is abnormal.	Check if the encoder communication is being disturbed.	Check the wiring of the encoder.

- E602.2: U/V/W phase sequence reversed
  Cause:

  A wrong U/V/W phase sequence is detected during angle auto-tuning.

Cause	Confirming Method	Solution
A wrong U/V/W phase sequence is detected during angle auto-tuning.	Check whether U/V/W phases are wired correctly.	Exchange cables of any two phases among U/V/W and perform auto-tuning again.

- E605.0: Bootstrap overspeed
  Cause:

  The motor speed exceeds the rated speed when the servo drive in size A/B is enabled.

Cause	Confirming Method	Solution
The motor speed exceeds the rated speed when the servo drive is enabled.	Check whether the drive is enabled when the motor is in the generating state.	Enable the drive when the motor is at standstill.

- E620.0: Motor overload
  Cause:

  The accumulative heat of the motor reaches the fault threshold.

Cause	Confirming Method	Solution
1. The motor and encoder cables are connected improperly or in poor contact.	Check the wiring among the servo drive, motor and encoder according to the correct wiring diagram.	Connect cables according to the correct wiring diagram. It is recommended to use the cables provided by Inovance. When customized cables are used, prepare and connect the customized cables according to the wiring instructions.
2. The load is so heavy that the effective torque outputted by the motor keeps exceeding the rated torque.	Confirm the overload characteristics of the servo drive or motor. Check whether the average load rate (H0b.12) of the servo drive keeps exceeding 100.0%.	Replace with a servo drive of higher capacity and a matching servo motor, or reduce the load and increase the acceleration/ deceleration time.
3. Acceleration/deceleration is too frequent or the load inertia is too large.	Calculate the mechanical inertia ratio or perform inertia auto-tuning. View the value of H08.00 (Load inertia ratio). Confirm the individual operation cycle when the servo motor operates cyclically.	Increase the acceleration/ deceleration time in an individual operation cycle.
4. The gains are improper or the stiffness level is too high.	Check whether the motor vibrates and generates unusual noise during operation.	Adjust the gains again.
5. The model of the servo drive or motor is set improperly.	View the motor model (H0d.05) saved in the serial-type encoder and the servo drive model (H01.10).	View the servo drive nameplate and set the servo drive model (H01.10) and motor model properly according to section "Servo Drive Model and Nameplate" in SV680N Series Servo Drive Hardware Guide.

Cause	Confirming Method	Solution
6. The motor is stalled due to mechanical factors, resulting in overload during operation.	Check the reference and motor speed (H0b.00) through the software tool or keypad. • References in the position control mode: H0b.13 (Input position reference counter) • References in the speed control mode: H0b.01 (Speed reference) • References in the torque control mode: H0b.02 (Internal torque reference) Check whether the reference value is not 0 but the motor speed is 0 rpm in the corresponding mode.	Eliminate the mechanical factors.
7. The servo drive is faulty.	The fault persists after the servo drive is powered off and on again.	Replace the servo drive.

Note

When E620.0 occurs, stop the servo drive for at least 30s before further operations.

- E625.0: Brake release error

Cause	Confirming Method	Solution
The brake malfunctions when it is released.	Check whether the motor shaft end is locked by the brake when the brake release signal is activated.	1. Check the wiring of the brake. 2. Replace with a new motor with brake.

- E626.0: Brake apply error

Cause	Confirming Method	Solution
The brake malfunctions when it is applied.	Check whether the motor shaft end is not locked or is locked loosely by the brake when the brake apply signal is activated.	1. Check the wiring of the brake. 2. Replace with a new motor with brake.

- E630.0: Motor stall

  Cause:

The actual motor speed is lower than 10 rpm but the torque reference reaches the limit, and such status lasts for the time defined by H0A.32.

Cause	Confirming Method	Solution
1. U/V/W phase loss, disconnection, or incorrect phase sequence occurs on the servo drive.	Perform motor trial run without load and check cable connections and the phase sequence.	Connect cables again according to the correct wiring diagram or replace the cables.
2. The motor parameters (especially the number of pole pairs) are set improperly and motor angle auto-tuning is not performed.	View parameters in group H00 to check whether the number of pole pairs are set properly. Perform angle auto-tuning on the motor several times and check whether the value of H00.28 is consistent during angle auto-tuning.	Modify the motor parameter values.
3. The communication commands are being disturbed.	Check whether jitter occurs on the commands sent from the host controller and whether EtherCAT communication is being disturbed.	Check whether the communication line between the host controller and the servo drive is being disturbed.
4. The motor is stalled due to mechanical factors.	Check the reference and motor speed (H0b.00) through the software tool or keypad. • References in the position control mode: H0b.13 (Input position reference counter) • References in the speed control mode: H0b.01 (Speed reference) • References in the torque control mode: H0b.02 (Internal torque reference) Check whether the reference value is not 0 but the motor speed is 0 rpm in the corresponding mode. Check the current feedback (torque reference) waveform.	Check whether any mechanical part gets stuck or eccentric.

Note

When E620.0 occurs, stop the servo drive for at least 30s before further operations.

- E631.1: 24 V or brake not connected

  Cause:

  The brake circuit is faulty.

Cause	Confirming Method	Solution
The brake or 24 V is not connected when the brake function applies.	Check whether 24 V power supply or the brake is not connected when H02.16 is set to 1.	1. Set H02.16 to 0. 2. Replace the motor. 3. Switch on the motor brake cable and 24 V power supply cable.

- E631.2: P-Mos disconnected

  Cause:

  The brake circuit is faulty.

Cause	Confirming Method	Solution
P-MOS of the brake circuit is disconnected when the brake function applies.	Ensure the brake cable is connected properly. Check whether the fault persists after the servo drive is powered off and on again.	1. Replace the servo drive. 2. Switch off the brake switch (H02.16).

- E631.3: N-Mos disconnected

  Cause:

  The brake circuit is faulty.

Cause	Confirming Method	Solution
N-MOS of the brake circuit is disconnected when the brake function applies.	Ensure the brake cable is connected properly. Check whether the fault persists after the servo drive is powered off and on again.	1. Replace the servo drive. 2. Switch off the brake switch (H02.16).

- E631.4: P-Mos short-circuited

  Cause:

  The brake circuit is faulty.

Cause	Confirming Method	Solution
P-MOS of the brake circuit is short-circuited when the brake function applies.	Ensure the brake cable is connected properly. Check whether the fault persists after the servo drive is powered off and on again.	1. Replace the servo drive. 2. Switch off the brake switch (H02.16).

- E640.0: IGBT overtemperature

  Cause:

The IGBT temperature reaches the fault threshold defined by H0A.18.

Cause	Confirming Method	Solution
1. The ambient temperature is too high. 2. The servo drive is restarted repeatedly to reset the overload fault.	Measure the ambient temperature and view the fault records (set H0b.33 and view H0b.34) to check whether an overload fault/ warning is reported (E620.0, E630.0, E650.0, E909.0, E920.0, E922.0).	• Improve the cooling conditions of the servo drive to lower down the ambient temperature. • Change the fault reset method. After overload occurs, wait for 30s before reset. Increase the capacities of the servo drive and motor. Increase the acceleration/ deceleration time and reduce the load.
3. The fan is damaged.	Check whether the fan works properly during operation.	Replace the servo drive.
4. The servo drive is installed in a wrong direction and the clearance between servo drives is improper.	Check whether the servo drive is installed properly.	Install the servo drive according to the installation requirements.
5. The servo drive is faulty.	The fault persists even though the servo drive is restarted five minutes after power-off.	Replace the servo drive.

Note

When E620.0 occurs, stop the servo drive for at least 30s before further operations.

- E640.1: Flywheel diode overtemperature
  Cause:

  The temperature of the flywheel diode reaches the fault threshold defined by H0A.18.

Cause	Confirming Method	Solution
1. The ambient temperature is too high. 2. The servo drive is restarted repeatedly to reset the overload fault.	Measure the ambient temperature and view the fault records (set H0b.33 and view H0b.34) to check whether an overload fault/ warning is reported (E620.0, E630.0, E650.0, E909.0, E920.0, E922.0).	• Improve the cooling conditions of the servo drive to lower down the ambient temperature. • Change the fault reset method. After overload occurs, wait for 30s before reset. Increase the capacities of the servo drive and motor. Increase the acceleration/ deceleration time and reduce the load.
3. The fan is damaged.	Check whether the fan works properly during operation.	Replace the servo drive.
4. The servo drive is installed in a wrong direction and the clearance between servo drives is improper.	Check whether the servo drive is installed properly.	Install the servo drive according to the installation requirements.
5. The servo drive is faulty.	The fault persists even though the servo drive is restarted five minutes after power-off.	Replace the servo drive.

Note

When E620.0 occurs, stop the servo drive for at least 30s before further operations.

- E650.0: Heatsink overtemperature
  Cause:

  The temperature of the servo drive power module exceeds the overtemperature threshold.

Cause	Confirming Method	Solution
1. The ambient temperature is too high.	Measure the ambient temperature.	Improve the cooling conditions of the servo drive to lower down the ambient temperature.
2. The servo drive is restarted repeatedly to reset the overload fault.	View the fault log (set H0b.33 and view H0b.34). Check whether an overload fault or warning (E620.0, E630.0, E650.5, E909.0, E920.0, E922.0) occurs.	Change the fault reset method. After overload occurs, wait for 30s before reset. Increase the capacities of the servo drive and motor. Increase the acceleration/deceleration time and reduce the load.
3. The fan is damaged.	Check whether the fan works properly during operation.	Replace the servo drive.
4. The servo drive is installed in a wrong direction and the clearance between servo drives is improper.	Check whether the servo drive is installed properly.	Install the servo drive according to the installation requirements.
5. The servo drive is faulty.	The fault persists even though the servo drive is restarted five minutes after power-off.	Replace the servo drive.

Note

When E620.0 occurs, stop the servo drive for at least 30s before further operations.

- E660.0: Motor overtemperature
  Cause:

  The temperature of the air-cooled motor is too high.

Cause	Confirming Method	Solution
The temperature of the air-cooled motor is too high.	Measure whether the temperature of the air-cooled motor is too high.	Cool the motor down.

- E661.0: STune fault

Cause	Confirming Method	Solution
The gain values fall below the lower limit during ETune operation. Position loop gain < 5 Speed loop gain < 5 Model loop gain < 10	Check whether resonance in the system is not suppressed. The torque resonance amplitude exceeds the setpoint of H09.11.	1. Set the notch manually. 2. Modify the electronic gear ratio to improve the reference resolution, and increase the reference filter time constant in the parameter configuration interface. 3. Check whether the machine suffers from periodic fluctuation. 4. Set H09.58 to 1 to clear resonance suppression parameters, and perform STune again.

- E662.0: ETune failure

Cause	Confirming Method	Solution
Check whether resonance that occurred during ETune operation cannot be suppressed.	Check whether unusual noise or torque fluctuation occurs during operation.	1. Set the notch manually when vibration cannot be suppressed automatically. 2. Modify the electronic gear ratio to improve the reference resolution, increase the reference filter time constant in the parameter configuration interface. 3. Increase the vibration threshold defined by H09.11 properly. 4. Check whether the machine suffers from periodic fluctuation. 5. Check whether the positioning threshold is too low. Increase the reference acceleration/ deceleration time.

- E663.0: ITune fault

Cause	Confirming Method	Solution
Check whether resonance that occurred during ITune operation cannot be suppressed.	Check whether unusual noise or torque fluctuation occurs during operation.	1. Set the notch manually when vibration cannot be suppressed automatically. 2. Modify the electronic gear ratio to improve the reference resolution, and increase the reference filter time constant in the parameter configuration interface. 3. Check whether the machine suffers from periodic fluctuation. 4. Increase the vibration threshold defined by H09.11 properly.

- E664.0: System resonance too strong

Cause	Confirming Method	Solution
Resonance occurs on the servo system and the torque fluctuation amplitude is higher than the value of H09.54.	Check whether unusual noise or torque fluctuation occurs during operation.	1. Check whether the inertia ratio or loop gain parameters are set properly. 2. Check whether resonance parameters are set properly. 3. Increase the value of H09.54 or set H09.54 to 0 to hide this function.

- E731.0: Encoder battery failure
  Cause:

  The voltage of the absolute encoder battery is lower than 2.8 V.

Cause	Confirming Method	Solution
1. The battery is not connected during power-off.	Check whether the battery is connected during power-off.	Set H0d.20 to 1 to clear the fault.
2. The encoder battery voltage is too low.	Measure the battery voltage.	Use a new battery with the matching voltage.

- E733.0: Encoder multi-turn counting error
  Cause:

  An encoder multi-turn counting error occurs.

Cause	Confirming Method	Solution
The encoder is faulty.	Set H0d.20 to 2 to clear the fault, but E733.0 persists after restart.	Replace the motor.

- E735.0: Encoder multi-turn counting overflow
  Cause:

  A multi-turn counting overflow occurs on the absolute encoder.

Cause	Confirming Method	Solution
The number of forward revolutions exceeds 32767 or the number of reverse revolutions exceeds 32768.	Check whether the value of H0b.70 (Number of absolute encoder revolutions) is 32767 or 32768 when the servo drive works in the absolute linear mode (H02.01 = 1).	Set H0d.20 to 2 to power on again. Perform homing if necessary.

- E740.0: Absolute encoder communication timeout
  Cause:

  Communication timeout occurs on the absolute encoder.

Cause	Confirming Method	Solution
The communication between the servo drive and the encoder times out.	Check the wiring of the encoder and power on the servo drive again.	1. Check whether the encoder version (H00.04) is set properly. 2. Check whether the servo drive software version (H01.00) is set properly. 3. Check the encoder cable connections. 4. Replace the servo motor.

- E740.2: Absolute encoder error
  Cause:

  A communication error occurs on the RX end of the encoder.

Cause	Confirming Method	Solution
An error occurs on the communication between the servo drive and the encoder.	Check whether the value of H0b.28 is not 0.	1. Check whether H00.00 (Motor code) is set properly. 2. Check whether the encoder cable is connected properly. 3. Check whether the servo drive and motor are grounded properly. You can wind a magnetic ring around the encoder cable to reduce interference.

- E740.3: Absolute encoder single-turn calculation error

  Cause:

  The encoder is faulty.

Cause	Confirming Method	Solution
An encoder fault occurs.	Check whether bit7 of H0b.28 is set to 1.	1. Check whether the encoder version (H00.04) is proper. 2. Check whether the encoder cable is proper. 3. Replace the motor.

- E740.6: Encoder data write error

  Cause:

  The attempt to write the encoder data fails.

Cause	Confirming Method	Solution
An error occurs when writing the position offset after angle auto-tuning.	Replace with a new encoder cable. If the fault no longer occurs after cable replacement, it indicates the original encoder cable is damaged. Keep the motor in a certain position, power on the system repeatedly and observe the change of H0b.17 (Electrical angle). The electrical angle deviation should be within ±30° when the motor position does not change.	Replace with a new encoder cable. If the fault persists after the encoder cable is replaced, the encoder may be faulty. In this case, replace the servo motor.

- E760.0: Encoder overtemperature
  Cause:

  The temperature of the absolute encoder is too high.

Cause	Confirming Method	Solution
The temperature of the absolute encoder is too high.	Measure the encoder or motor temperature.	Switch off the S-ON signal to wait for the encoder to cool down.

- E765.0: Nikon encoder overtemperature or overspeed
  Cause:

Cause	Confirming Method	Solution
The motor temperature is too high.	Check whether the ambient temperature or average load rate is too high, leading to motor overtemperature.	Switch off the S-ON signal to wait for the encoder to cool down.

- E770.0: Phase-A input disconnected in fully-closed loop mode

Cause	Confirming Method	Solution
The phase-A input differential voltage is disconnected in the fully closed-loop mode.	Measure whether the differential voltage of phase A/B is lower than 2.5 V.	Adjust the phase-A input voltage in the fully closed-loop mode.

- E770.1: Phase- B input disconnected in fully-closed loop mode

Cause	Confirming Method	Solution
The phase- B input differential voltage is disconnected in the fully closed-loop mode.	Measure whether the differential voltage of phase-B is lower than 2.5 V.	Adjust the phase- B input voltage in the fully closed-loop mode.

- E770.2: Phase-Z input disconnected in fully-closed loop mode

Cause	Confirming Method	Solution
The phase-Z input differential voltage is disconnected in the fully closed-loop mode.	Measure whether the differential voltage of phase-Z is lower than 2.5 V.	Adjust the phase-Z input voltage in the fully closed-loop mode.

- E770.3: BiSS communication protocol timeout

Cause	Confirming Method	Solution
Communication timeout occurs on the BiSS encoder in the outer loop in the fully closed-loop mode.	• Check whether the wiring is correct. • Check whether H0F.28, H0F.29, and H0F.30 are set correctly.	• Check whether the wiring is correct. • Set H0F.28, H0F.29, and H0F.30 based on the BiSS encoder specifications.

- E770.4: BiSS communication CRC error

Cause	Confirming Method	Solution
Communication CRC error occurs on the BiSS encoder in the outer loop in the fully closed-loop mode.	Check whether the data cable is being disturbed.	Use shielded twisted pair cable as the data cable and connect the cable again.

- E770.5: BiSS response data error

Cause	Confirming Method	Solution
Response data error occurs on the BiSS encoder in the outer loop in the fully closed-loop mode.	Check whether the data cable is being disturbed.	Use shielded twisted pair cable as the data cable and connect the cable again.

- E770.6: 2nd encoder initialization communication error in fully closed-loop mode

Cause	Confirming Method	Solution
1. The encoder is wired improperly. 2. The encoder cable is loose.	Check the wiring of the encoder. Check whether vibration on site is too strong, which loosens the encoder cable and even damages the encoder. Replace with a new encoder cable. If the fault no longer occurs after cable replacement, it indicates the original encoder cable is damaged.	Connect the cables again according to the correct wiring diagram and ensure encoder terminals are connected securely. Preferably use cables provided by Inovance. If a customized encoder cable is used, check whether this cable is a shielded twisted pair cable complying with the specifications. Route the motor cables and encoder cables through different routes. Ensure the servo motor and servo drive are grounded properly. Check whether the connectors at both ends of the encoder are in good contact and whether any pin retracts. Replace with a new encoder cable. If the fault persists after the encoder cable is replaced, the encoder may be faulty. In this case, replace the servo motor.
3. The encoder Z signal is being disturbed.	Check whether ambient devices are generating interference and whether multiple interference sources are present in the cabinet. Make the servo drive stay in "Rdy" status and rotate motor shaft counterclockwise (CCW) manually. Observe whether H0b.10 (Electrical angle) increases/decreases smoothly and turning one circle corresponds to five 0-360° (for Z series motor). For X series motors, turning one circle should correspond to four 0-360°. If H0b.10 changes abnormally when you rotate the motor shaft manually, the encoder is faulty. If no warning is reported during rotation but the servo drive reports a warning during operation, disturbance may be present.	
4. The encoder is faulty.	Keep the motor in a certain position, power on the system several times and observe the change of H0b.10 (Electrical angle). The electrical angle deviation should be within ±30° when the motor position does not change.	

- E770.7: 2nd encoder communication error in fully closed-loop mode

Cause	Confirming Method	Solution
1. The encoder is wired improperly. 2. The encoder cable is loose.	Check the wiring of the encoder. Check whether vibration on site is too strong, which loosens the encoder cable and even damages the encoder. Replace with a new encoder cable. If the fault no longer occurs after cable replacement, it indicates the original encoder cable is damaged.	Connect the cables again according to the correct wiring diagram and ensure encoder terminals are connected securely. Preferably use cables provided by Inovance. If a customized encoder cable is used, check whether this cable is a shielded twisted pair cable complying with the specifications. Route the motor cables and encoder cables through different routes. Ensure the servo motor and servo drive are grounded properly. Check whether the connectors at both ends of the encoder are in good contact and whether any pin retracts. Replace with a new encoder cable. If the fault persists after the encoder cable is replaced, the encoder may be faulty. In this case, replace the servo motor.
3. The encoder Z signal is being disturbed.	Check whether ambient devices are generating interference and whether multiple interference sources are present in the cabinet. Make the servo drive stay in "Rdy" status and rotate motor shaft counterclockwise (CCW) manually. Observe whether H0b.10 (Electrical angle) increases/decreases smoothly and turning one circle corresponds to five 0-360° (for Z series motor). For X series motors, turning one circle should correspond to four 0-360°. If H0b.10 changes abnormally when you rotate the motor shaft manually, the encoder is faulty. If no warning is reported during rotation but the servo drive reports a warning during operation, disturbance may be present.	
4. The encoder is faulty.	Keep the motor in a certain position, power on the system several times and observe the change of H0b.10 (Electrical angle). The electrical angle deviation should be within ±30° when the motor position does not change.	

- E939.0: Motor power cable disconnected

Cause	Confirming Method	Solution
The power cables of all the three phases of the motor are disconnected.	Check the wiring of U/V/W power cables.	1. Check whether the power cables are disconnected or in poor contact. Re-connect the power cables. 2. Replace the servo motor.

- E939.1: Phase-U power cable disconnected

Cause	Confirming Method	Solution
The phase-U power cable of the motor is disconnected.	Check the wiring of the phase-U power cable.	1. Check whether the power cables are disconnected or in poor contact. Re-connect the power cables. 2. Replace the servo motor.

- E939.2: Phase-V power cable disconnected

Cause	Confirming Method	Solution
The phase-V power cable of the motor is disconnected.	Check the wiring of the phase-V power cable.	1. Check whether the power cables are disconnected or in poor contact. Re-connect the power cables. 2. Replace the servo motor.

- E939.3: Phase-W power cable disconnected

Cause	Confirming Method	Solution
The phase-W power cable of the motor is disconnected.	Check the wiring of the phase-W power cable.	1. Check whether the power cables are disconnected or in poor contact. Re-connect the power cables. 2. Replace the servo motor.

- EA33.0: Encoder read/write check error
  Cause:

  Encoder parameters are abnormal.

Cause	Confirming Method	Solution
1. The serial incremental encoder cable is disconnected or loose.	Check the wiring.	Check for wrong connection, disconnection and poor contact of the encoder cable. Route the motor cable and encoder cable through different routes.
2. An error occurs when reading/writing the serial incremental encoder parameters.	If the fault persists after the servo drive is powered off and on repeatedly, the encoder is faulty.	Replace the servo motor.

- EB00.0: Position deviation too large

  Cause:

  The position deviation exceeds the setpoint of 6065h in the position control mode.

Cause	Confirming Method	Solution
1. U/V/W phase loss or incorrect phase sequence occurs on the servo drive.	Perform a no-load trial run on the motor and check the wiring.	Connect cables again according to the correct wiring diagram or replace the cables.
2. The servo drive U/V/W cables or the encoder cable is disconnected.	Check the wiring.	Connect the cables again. The servo drive power cables must be connected in the correct sequence at both ends. Replace with new cables if necessary and ensure cables are connected properly.
3. The motor is stalled due to mechanical factors.	Check the reference and motor speed (H0b.00) through the software tool or keypad. • References in the position control mode: H0b.13 (Input position reference counter) • References in the speed control mode: H0b.01 (Speed reference) • References in the torque control mode: H0b.02 (Internal torque reference) Check whether the reference value is not 0 but the motor speed is 0 rpm in the corresponding mode.	Eliminate the mechanical factors.

Cause	Confirming Method	Solution
4. The gain values are too low.	Check the position loop gain and speed loop gain of the servo drive. 1st gain set: H08.00...H08.02 2nd gain set: H08.03...H08.05	Adjust the gain values manually or perform gain auto-tuning.
5. The position reference increment is too large.	Position control mode: • In CSP mode, view the gear ratio 6091.01h/6091.02h to determine the position reference increment for an individual synchronization cycle and convert it to the speed information. • In PP mode, view the gear ratio 6091.01h/6091.02h and determine the value of 6081h (Profile velocity). • In HM mode, view the gear ratio 6091.01h/6091.02h, and determine the values of 6099.01h and 6099.02h.	• CSP: Decrease the position reference increment for an individual synchronization cycle. The host controller should handle the position ramp when generating references. • PP: Decrease the value of 6081h or increase the acceleration/deceleration ramp (6083h, 6084h). • HM: Decrease the values of 6099.01h and 6099.02h or increase the acceleration/ deceleration ramp (609Ah). • Decrease the gear ratio according to actual conditions.
6. Given the operating condition, the value of 6065h (Following error window) is too low.	Check whether the setpoint of 6065h is too low.	Increase the setpoint of 6065h.
7. The servo drive/motor is faulty.	Monitor the operating waveforms using the oscilloscope function in the software tool: position reference, position feedback, speed reference, torque reference	If the position reference is not 0 but the position feedback is always 0, replace the servo drive or motor.

- EB00.1: Position deviation overflow
  Cause:

  Deviation of the position calculated by the servo drive is too large.

Cause	Confirming Method	Solution
1. U/V/W phase loss or incorrect phase sequence occurs on the servo drive.	Perform a no-load trial run on the motor and check the wiring.	Connect cables again according to the correct wiring diagram or replace the cables.
2. The servo drive U/V/W cables or the encoder cable is disconnected.	Check the wiring.	Connect the cables again. The servo drive power cables must be connected in the correct sequence at both ends. Replace with new cables if necessary and ensure cables are connected properly.
3. The motor is stalled due to mechanical factors.	Check the reference and motor speed (H0b.00) through the software tool or keypad. • References in the position control mode: H0b.13 (Input position reference counter) • References in the speed control mode: H0b.01 (Speed reference) • References in the torque control mode: H0b.02 (Internal torque reference) Check whether the reference value is not 0 but the motor speed is 0 rpm in the corresponding mode.	Eliminate the mechanical factors.
4. The gain values are too low.	Check the position loop gain and speed loop gain of the servo drive. • 1st gain set: H08.00... H08.02 • 2nd gain set: H08.03... H08.05	Adjust the gain values manually or perform gain auto-tuning.

Cause	Confirming Method	Solution
5. The position reference increment is too large.	Position control mode: • In CSP mode, view the gear ratio 6091.01h/6091.02h to determine the position reference increment for an individual synchronization cycle and convert it to the speed information. • In PP mode, view the gear ratio 6091.01h/6091.02h and determine the value of 6081h (Profile velocity). • In HM mode, view the gear ratio 6091.01h/6091.02h, and determine the values of 6099.01h and 6099.02h.	• CSP: Decrease the position reference increment for an individual synchronization cycle. The host controller should handle the position ramp when generating references. • PP: Decrease the value of 6081h or increase the acceleration/deceleration ramp (6083h, 6084h). • HM: Decrease the values of 6099.01h and 6099.02h or increase the acceleration/deceleration ramp (609Ah). Decrease the gear ratio according to actual conditions.
6. The servo drive/motor is faulty.	Monitor the operation waveform through the oscilloscope function in the software tool: position references, position feedback, speed references, and torque references.	If the position reference is not 0 but the position feedback is always 0, replace the servo drive or motor.

- EB01.0: Position reference increment too large

  Cause:

Cause	Confirming Method	Solution
The pulse reference increment exceeds the excessive reference threshold three times consecutively.	Check whether the baud rate of pulse reference input exceeds H0A.09.	1. Increase the value of H0A.09. 2. Reduce the baud rate of pulse input.

- EB01.1: Individual position reference increment too large

  Cause:

  The target position increment is too large.

Cause	Confirming Method	Solution
The target position increment is too large.	Check the variation between two adjacent target positions using the software tool.	1. Check whether the maximum speed of the motor fulfills the application requirement. If yes, reduce the target position reference increment, which is to lower the profile reference speed. If not, replace the servo motor. 2. Before switching the mode or enabling the servo drive, check whether the target position is aligned with current position feedback. 3. The communication sequence of the host controller is abnormal, leading to slave data error. Check the communication sequence of the host controller.

- EB01.2: Position reference increment too large continuously
  Cause:

  The target position increment is too large.

Cause	Confirming Method	Solution
The target position increment is too large.	Check the variation between two adjacent target positions using the software tool.	1. Check whether the maximum speed of the motor fulfills the application requirement. If yes, reduce the target position reference increment, which is to lower the profile reference speed. If not, replace the servo motor. 2. Before switching the mode or enabling the servo drive, check whether the target position is aligned with current position feedback. 3. The communication sequence of the host controller is abnormal, leading to slave data error. Check the communication sequence of the host controller.

- EB01.3: Command overflow
  Cause:

  The target position is still in the process of transmission when the servo limit or software position limit signal is activated and the 32-bit upper/lower limit is reached.

Cause	Confirming Method	Solution
The target position is still in the process of transmission when the servo limit or software position limit signal is activated and the 32-bit upper/lower limit is reached.	Check whether the host controller continues sending commands after overtravel warning is reported by the servo drive.	1. Detect the servo limit signal (bit0 and bit1 of 60FDh recommended) through the host controller. 2. Stop sending limit direction commands when an active servo limit signal is detected by the host controller.

- EB01.4: Max. value of single-turn position exceeded in rotation mode
  Cause:

  The target position exceeds the upper/lower limit of the unit position in the single-turn absolute mode.

Cause	Confirming Method	Solution
The target position exceeds the upper/lower limit of the unit position in the single-turn absolute mode.	Check whether the set target position is within the single-turn upper/lower limit.	Set the target position to a value within the upper/lower limit.

- EB02.0: Excessive position deviation in fully closed-loop mode
  Cause:

  The absolute value of position deviation in fully closed-loop mode exceeds the value of H0F.08 (Excessive position deviation threshold in fully closed-loop mode).

Cause	Confirming Method	Solution
1. U/V/W phase loss or incorrect phase sequence occurs on the servo drive.	Perform a no-load trial run on the motor and check the wiring.	Connect cables again according to the correct wiring diagram or replace the cables.
2. The servo drive UVW cables or the internal/external encoder cable is disconnected.	Check the wiring.	Connect the cables again. The servo drive power cables must be connected in the correct sequence at both ends. Replace with new cables if necessary and ensure cables are connected properly.
3. The motor is stalled due to mechanical factors.	Check the reference and motor speed (H0b.00) through the software tool or keypad. References in the position control mode: H0b.13 (Input position reference counter) References in the speed control mode: H0b.01 (Speed reference) References in the torque control mode: H0b.02 (Internal torque reference) Check whether the reference value is not 0 but the motor speed is 0 rpm in the corresponding mode.	Eliminate the mechanical factors.

Cause	Confirming Method	Solution
4. The gain values are too low.	Check the position loop gain and speed loop gain of the servo drive. 1st gain set: H08.00...H08.02 2nd gain set: H08.03...H08.05	Adjust the gain values manually or use gain auto-tuning.
5. The input pulse frequency is high.	When the position reference source is pulse reference, check whether the input pulse frequency is too high or whether the acceleration/deceleration time is set to 0 or an excessively low value.	Reduce the position reference frequency or the electronic gear ratio. If position pulses are outputted through the host controller, you can set the acceleration/deceleration time through the host controller directly. If not, increase the values of H05.04 and H05.06.
6. The value of H0F.08 (Threshold of excessive position deviation) is too low under current operating conditions.	Check whether the value of H0F.08 is too low.	Increase the setpoint of H0F.08.
7. The servo drive/motor is faulty.	Monitor the operation waveform through the oscilloscope function in the software tool: position references, position feedback, speed references, and torque references.	If the position reference is not 0 but the position feedback is always 0, replace the servo drive or motor.

- EB03.0: Electronic gear ratio beyond the limit - H05.02
  Cause:

  The electronic gear ratio (H05.02) exceeds the following limit: (0.001 x Encoder resolution/10000, 4000 x Encoder resolution/10000).

Cause	Confirming Method	Solution
The electronic gear ratio converted by H05.02 is higher than the maximum value of the gear ratio or is lower than the minimum value of the gear ratio.	Check whether the electronic gear ratio converted by H05.02 is within the range of 0.001 to 4000 x Encoder resolution/10000.	Adjust the value of H05.02.

- EB03.1: Electronic gear ratio beyond the limit - Electronic gear ratio 1
  Cause:

  The electronic gear ratio 1 exceeds the following limit: (0.001 x Encoder resolution/10000, 4000 x Encoder resolution/10000).

Cause	Confirming Method	Solution
The electronic gear ratio 1 is higher than the maximum value of the gear ratio or is lower than the minimum value of the gear ratio.	Check whether the electronic gear ratio 1 is within the range of 0.001 to 4000 x Encoder resolution/ 10000.	Adjust electronic gear ratio 1 (H05.07/H05.09).

- EB03.2: Electronic gear ratio beyond the limit - Electronic gear ratio 2
  Cause:

  The electronic gear ratio 2 exceeds the following limit: (0.001 x Encoder resolution/ 10000, 4000 x Encoder resolution/10000).

Cause	Confirming Method	Solution
The electronic gear ratio 2 is higher than the maximum value of the gear ratio or is lower than the minimum value of the gear ratio.	Check whether the electronic gear ratio 2 is within the range of 0.001 to 4000 x Encoder resolution/ 10000.	Adjust electronic gear ratio 2(H05.11/H05.13).

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

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

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

- EE08.1: Network status switchover error
  Cause:

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

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

- EE08.3: Network cable connected improperly
  Cause:

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

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

- EE08.4 Data frame loss protection error
  Cause:

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

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

- EE08.5: Data frame transfer error
  Cause:

  The upstream slave detects that the data frame has been corrupted and marked, which is then transferred to the downstream slave, leading to a warning event.

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

- EE08.6: Data update timeout
  Cause:

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

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

- EE09.0: Software position limit setting error
  Cause:

  The lower limit of the software limit is equal to or larger than the upper limit.

Cause	Confirming Method	Solution
The lower limit of the software position limit is equal to or larger than the upper limit.	Check the values of 607D.01h and 607D.02h.	Reset the values of 607D-01h and 607D-02h and ensure the former is lower than the latter.

- EE09.1: Home setting error
  Cause:

  The home offset exceeds the upper/lower limit.

Cause	Confirming Method	Solution
1. The home offset is outside the software position limit.	The home offset is outside the software position limit when the encoder works in the incremental mode, absolute linear mode, and single-turn absolute mode.	Set the home offset to a value within the software position limit.
2. The home offset is beyond the upper/lower limit in the rotation mode.	The home offset is outside the mechanical single-turn upper/lower limit when the encoder works in the rotation mode.	Set the home offset to a value within the mechanical single-turn upper/lower limit.

- EE09.2: Gear ratio beyond the limit
  Cause:

  The electronic gear ratio exceeds the limit: (0.001, 4000 x Encoder resolution/ 10000).

Cause	Confirming Method	Solution
The set electronic gear ratio exceeds the preceding range.	Check whether the ratio of 6091.01h to 6091.02h exceeds the preceding range.	Set the gear ratio according to the preceding range.

- EE09.3: No synchronization signal
  Cause:

  The MCU does not receive the synchronization signal when the servo communication is switched to OP status.

Cause	Confirming Method	Solution
1. The communication synchronization clock is configured improperly.	Replace with another master (such as Beckhoff or Omron PLC) and perform tests to compare between different masters.	Rectify improper configurations.
2. The IN/OUT port of EtherCAT communication is connected reversely.	Check whether the IN/OUT port is connected reversely.	Connect the IN and OUT ports in the correct sequence.
3. The slave controller integrated circuit is damaged.	If the fault persists after the master is replaced, measure the synchronization signal generated by the slave controller integrated circuit with an oscilloscope. If there is no signal, the slave controller integrated circuit is damaged.	Contact Inovance for replacing the slave controller integrated circuit.
4. The MCU pins are damaged.	Test the synchronization signal generated by the slave controller integrated circuit with an oscilloscope. If there is a signal, the pins of the MCU integrated circuit are damaged.	Contact Inovance for replacing the MCU integrated circuit.

- EE09.5: PDO mapping beyond the limit
  Cause:

  The number of the mapping objects in TPDO or RPDO exceeds 10.

Cause	Confirming Method	Solution
The number of mapping objects in TPDO or RPDO exceeds 10.	Check the number of self-indexes configured in 1600h or 1A00h.	The number of mapping objects in TPDO or RPDO cannot exceed 10.

- EE10.0: Mailbox setting error protection

Cause	Confirming Method	Solution
1. The master is configured improperly. 2. The XML file of the slave is wrong.	The keypad displays the fault code.	Ensure SM0 and SM1 are configured properly.

- EE10.1: SM2 configuration error
  Cause:
  - The index of the object dictionary mapped by PDO exceeds the maximum value (0x1600-0x170A).
  - The length of SM and RxPDO is not 0 when SM2 is not enabled.
  - The length of RxPDO does not match.
  - SM2 is configured as the read direction.
  - The address of RxPDO in the pre-operational state is not in the set address field (maximum address, minimum address) or the address of SM2 is the same as the starting address of RxPDO when the pre-operational state does not apply.
  - The memory of SM2 overlaps with adjacent SM1 or SM3.

Cause	Confirming Method	Solution
1. The master is configured improperly. 2. The XML file of the slave is wrong.	Check whether SM2 channel is configured improperly. Check whether the index of the object dictionary mapped by RxPDO exceeds the limit (maximum index being 0x0A).	Ensure SM2 channel is configured correctly. Ensure the index of the object dictionary mapped by RxPDO is correct.

- EE10.2: SM3 configuration error
  Cause:
  - The index of the object dictionary mapped by PDO exceeds the maximum value (0x1A00-0x1B0A).
  - The length of SM and TxPDO is not 0 when SM3 is not enabled.
  - The length of TxPDO does not match.
  - SM2 is configured as the write direction.
  - The address of TxPDO in the pre-operational state is not in the set address field (maximum address, minimum address) or the address of SM3 is the same as the starting address of TxPDO when the pre-operational state does not apply.
  - The buffer is beyond the limit (The memory of SM2 overlaps with SM3, SM0, or SM1).

Cause	Confirming Method	Solution
1. The master is configured improperly. 2. The XML file of the slave is wrong.	Check whether SM3 channel is configured improperly. Check whether the index of the object dictionary mapped by TxPDO exceeds the limit (maximum index being 0x1A).	Ensure SM3 channel is configured correctly. Ensure the index of the object dictionary mapped by TxPDO is correct.

- EE10.3: PDO watchdog setting error
  Cause:

Cause	Confirming Method	Solution
1. The watchdog is enabled but the counting value is 0. 2. The watchdog is not enabled but the counting value is not 0.	The master is configured improperly.	Ensure the watchdog is configured properly.

- EE10.4: PLL error protection not completed (no sync signal)
  Cause:

Cause	Confirming Method	Solution
The distributed clock is enabled but not operating during SAFEOP_2_OP.	The master is configured improperly.	Ensure the sync0 signal is generated.

- EE11.0: ESI check error
  Cause:

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

Cause	Confirming Method	Solution
1. The XML file is not programmed in the EEPROM. 2. The XML file in the EEPROM is modified unexpectedly.	Check whether the XML version displayed in H0E.96 is normal.	Program the XML file.

- EE11.1: EEPROM cannot be read by the bus
  Cause:

  The EEPROM communication of external EtherCAT devices fails.

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

- EE11.3: ESI and and drive model mismatch

Cause	Confirming Method	Solution
1. The XML file programmed does not match the drive model. 2. The servo drive is faulty and the XML file is modified unexpectedly.	Check whether the XML version displayed in H0E.96 is correct.	Program the XML file.

- EE12.0: EtherCAT initialization failure
  Cause:

Cause	Confirming Method	Solution
1. The device configuration file is not programmed.	The slave ID is null when the host controller scans the slave.	Program the device configuration file.
2. The servo drive is faulty.	The servo drive is faulty.	Replace the servo drive.

- EE13.0: Synchronization cycle setting error
  Cause:

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

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

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

  The synchronization cycle error exceeds the threshold.

Cause	Confirming Method	Solution
The synchronization cycle error of the controller is too large.	• Measure the synchronization cycle of the controller. • Measure the synchronization cycle of the controller using a digital oscilloscope or the oscilloscope function in the software tool. •	Increase the value of H0E.32.

Note

You can clear the fault or restart the power supply 30s after overload occurs.

- EE16.0：MCU and ESC communication error

Cause	Confirming Method	Solution
Communication between MCU and ESC times out.	The fault persists after the servo drive is powered off and on several times.	Replace the servo drive.

5.4 Solutions to Warnings

- E108.0: Parameter write error
  Cause:

  Parameter values cannot be written to EEPROM.

Cause	Confirming Method	Solution
An error occurs during parameter-writing.	Modify a certain parameter, power off and on the servo drive again and check whether the modification is saved.	If the modification is not saved and the fault persists after the servo drive is powered off and on repeatedly, replace the servo drive.

- E108.1: Parameter read error
  Cause:

  Parameter values cannot be read in EEPROM.

Cause	Confirming Method	Solution
The parameter-read operation is abnormal, and the system indicates an EEPROM read failure.	Modify a certain parameter, power off and on the servo drive again and check whether the modification is saved.	If the modification is not saved and the fault persists after the servo drive is powered off and on repeatedly, replace the servo drive.

- E108.2: Check on data written in EEPROM failed
  Cause:

  The check on the data written in EEPROM fails.

Cause	Confirming Method	Solution
An error occurs during parameter-writing.	Modify a certain parameter, power off and on the servo drive again and check whether the modification is saved.	If the modification is not saved and the fault persists after the servo drive is powered off and on repeatedly, replace the servo drive.

- E108.3: Check on data read in EEPROM failed
  Cause:

  The check on the data read in EEPROM fails.

Cause	Confirming Method	Solution
An error occurs during parameter-reading.	Modify a certain parameter, power off and on the servo drive again and check whether the modification is saved.	If the modification is not saved and the fault persists after the servo drive is powered off and on repeatedly, replace the servo drive.

- E110.0: Frequency-division pulse output setting error

Cause	Confirming Method	Solution
The number of frequency-division pulses (frequency quadrupled) exceeds the motor resolution.	Check the setpoint of H05.17.	Adjust the setpoint of H05.17 based on the motor resolution.

- E121.0: Invalid S-ON command
  Cause:

  A redundant S-ON signal is sent when some auxiliary functions are used.

Cause	Confirming Method	Solution
The external S-ON signal is active when servo drive is enabled internally.	Check whether the following auxiliary functions are used: Check whether auxiliary functions (H0d.02, H0d.03, and H0d.12) are used and whether FunIN.1 (S-ON signal) is active.	Deactivate the DI assigned with FunIN.1 (both hardware DI and virtual DI).

- E510.0: Frequency-division output overspeed
  Cause:

  The output pulse frequency exceeds the frequency upper limit allowed by the hardware (8 MHz) when pulse output is used (H05.38 = 0 or 1).

Cause	Confirming Method	Solution
The MCU detects excessive pulse increment fed back by FPGA.	When H05.38 is set to 0 (Encoder frequency-division output), check whether the output pulse frequency corresponding to the motor speed upon fault exceeds the limit. Output pulse frequency (Hz) = Motor speed (rpm)/60 x H05.17	Decrease the value of H05.17 (Encoder frequency-division pulses) to allow the output pulse frequency, within the speed range required by the machine, to drop below the frequency upper limit allowed by the hardware.
	The input pulse frequency exceeds 2 MHz or interference exists in the pulse input pins when H05.38 is set to 1 (Reference pulse synchronous output). • Low-speed pulse input pins:open-collector input terminals: PULLHI, PULSE+, PULSE-, SIGN+, SIGN-; maximum pulse frequency: 200 kpps • High-speed pulse input pins: differential input terminals: HPULSE+, HPULSE-, HSIGN+, HSIGN-; maximum pulse frequency: 8 Mpps	Decrease the input pulse frequency to a value within the frequency upper limit allowed by hardware. **Note:** In this case, if you do not modify the electronic gear ratio, the motor speed will be reduced. If the input pulse frequency is high but is still within the frequency upper limit allowed by the hardware, take anti-interference measures (use STP cable for pulse input and set pin filter parameter H0A.24 or H0A.30). This is to prevent false warnings caused by interference pulses superimposed to actual pulse references.

- E600.0: Inertia auto-tuning failure
  Cause:

  Vibration cannot be suppressed. You can set notch parameters (H09.12...H09.23) manually to suppress vibration.

  The auto-tuned values fluctuate dramatically. Increase the maximum operating speed, reduce the acceleration/deceleration time, and shorten the stroke of the lead screw during ETune operation.

  Mechanical couplings of the load are loose or eccentric. Rectify the mechanical faults.

  A warning occurs during auto-tuning and causes interruption. Rectify the fault causes and perform inertia auto-tuning again.

The vibration cannot be suppressed if the load carries a large inertia. In this case, increase the acceleration/deceleration time first to ensure the motor current is unsaturated.

Cause	Confirming Method	Solution
1. Continuous vibration occurs during auto-tuning. 2. The auto-tuned values fluctuate dramatically. 3. Mechanical couplings of the load are loose or eccentric. 4. A warning occurs during auto-tuning and causes interruption. 5. The vibration cannot be suppressed if the load carries a large inertia. In this case, increase the acceleration/deceleration time first to ensure the motor current is unsaturated.	1. Perform internal inspection to check whether the torque jitters upon stop (not FFT). Check whether Three times more than the last auto-tuned value for variation less than 5 times; 0.5 times more than last auto-tuned value for variation above 5 times	1. Rectify the fault and perform inertia auto-tuning again. 2. For vibration that cannot be suppressed, enable vibration suppression. 3. Ensure mechanical couplings are connected securely. 4. Increase the maximum operating speed, reduce the acceleration/ deceleration time, and shorten the stroke of the lead screw during ETune operation.

- E601.0: Homing warning
  Cause:

Cause	Confirming Method	Solution
1. The home switch is faulty.	There is only high-speed searching but no low-speed searching during homing. After high-speed searching, low-speed searching in the reverse direction applies.	If a hardware DI is used, check whether the corresponding DI function is allocated to a certain DI in group 2003h and check the wiring of this DI. Change the DI logic manually and observe the value of H0b.03 to monitor whether the servo drive receives corresponding DI level changes. If the home signal is Z signal and the home signal cannot be found, check the condition of the Z signal.
2. The time limit for homing is too short.	Check whether the value of H05.35 (Homing time limit) is too small.	Increase the value of H05.35.
3. The speed in high-speed searching for the home switch signal is too low.	Check the distance between the initial position of homing and the home switch. Then check whether the value defined by 6099.01h is too small, resulting in a long homing process.	Increase the value of 6099.01h.

- E601.1: Homing switch error
  Cause:

  The homing switch is set improperly.

Cause	Confirming Method	Solution
The home switch is set improperly.	Check whether the limit signals at both sides are activated. Check whether the limit signal and the deceleration point signal/home signal are both activated. Check whether the positive and negative position limits are activated successively.	Set the position of the physical switch properly.

- E601.2: Homing mode setting error
  Cause:

  The setpoint of homing method exceeds the existing homing method.

Cause	Confirming Method	Solution
The setpoint of homing method exceeds the existing homing method.	Check the setpoint of 6098h.	Adjust the setpoint of 6098h.

- E631.4：P-Mos short circuit

  Cause:

  The brake circuit is faulty.

Cause	Confirming Method	Solution
The brake circuit P-MOS is short-circuited when the brake function is used.	The brake is wired properly but the fault persists after the servo drive is powered off and on again.	1. Replace the servo drive. 2. Turn off the brake switch (H02.16).

- E631.5：N-Mos short circuit

  Cause:

  The brake circuit is faulty.

原因	确认方法	处理措施
The brake circuit N-MOS is short-circuited when the brake function is used.	The brake is wired properly but the fault persists after the servo drive is powered off and on again.	1. Replace the servo drive. 2. Turn off the brake switch (H02.16).

- E730.0: Encoder battery warning

  Cause:

  The voltage of the absolute encoder battery is lower than 3.0V.

Cause	Confirming Method	Solution
The voltage of the absolute encoder battery is lower than 3.0 V.	Measure the battery voltage.	Use a new battery with the matching voltage.

Note

E731.0 and E733.0 can trigger E730.0. See E731.0 and E733.0 for other solutions.

- E730.1: 2nd encoder battery voltage too low

  Cause:

  The battery voltage of Inovance 2nd encoder is lower than 3.0 V.

Cause	Confirming Method	Solution
The battery voltage of Inovance 2nd encoder is too low.	Measure the battery voltage.	Replace with a new battery of matching voltage.

- E831.0: AI1 zero offset too large

Cause	Confirming Method	Solution
1. The wiring is incorrect or interference exists.	Check the wiring according to the correct wiring diagram.	Use shielded twisted pairs and shorten the circuit length. Increase AI1 input filter time.
2. The servo drive is faulty.	Disconnect AI1 and measure whether the actual terminal voltage exceeds 0.5 V.	If not, replace the servo drive.

- E834.2: AI1 overvoltage

Cause	Confirming Method	Solution
1. The wiring is incorrect or interference exists.	Check the wiring according to the correct wiring diagram	Use shielded twisted pairs and shorten the circuit length. Increase AI1 input filter time.
2. The input voltage is too high.	Measure whether the actual terminal voltage exceeds 11.5 V.	Adjust the input voltage to a value lower than 11.5 V.

- E834.2: AI2 input current too high

Cause	Confirming Method	Solution
1. The wiring is incorrect or interference exists.	Check the wiring according to the correct wiring diagram	Use shielded twisted pairs and shorten the circuit length. Increase AI2 input filter time.
2. The input current is too high.	View the current value displayed in H0b.22.	Adjust the input current to a value lower than 21 mA.

- E900.0: DI emergency braking
  Cause:

  The logic of the DI (hardware DI or virtual DI) assigned with FunIN.34 (EmergencyStop) is active.

Cause	Confirming Method	Solution
FunIN.34 (EmergencyStop) is triggered.	Check whether the logic of the DI assigned with FunIN.34 (EmergencyStop) is active.	Check the operation mode and clear the active DI braking signal without affecting the safety performance.

- E902.0: DI setting invalid
  Cause:

  DI function parameters are set to invalid values.

Cause	Confirming Method	Solution
DI (DI1...DI5) function parameters are set to invalid values.	Check whether H03.02, H03.04, H03.06, H03.08, and H03.10 are set to invalid values.	Set DI function parameters to valid values.

- E902.1: DO setting invalid
  Cause:

  DO function parameters are set to invalid values.

Cause	Confirming Method	Solution
DO (DO1 and DO2) function parameters are set to invalid values.	Check whether H04.00 and H04.02 are set to invalid values.	Set DO function parameters to valid values.

- E902.2: Invalid setting for torque reach
  Cause:

  The DO parameters set for torque reach in the torque control mode are invalid.

Cause	Confirming Method	Solution
The DO parameters set for torque reach in the torque control mode are invalid.	Check whether the value of H07.22 is lower than or equal to the value of H07.23 (unit: 0.1%).	Set H07.22 to a value higher than that of H07.23.

- E908.0: Model identification failure

Cause	Confirming Method	Solution
1. The model identification check word saved in EEPROM is wrong.	1. Check whether the warning persists after restart.	Set H01.72 to 1 to hide model identification temporarily.
2. The model parameters are not programmed before delivery.	2. Check whether parameters can be saved to EEPROM properly.	

- E909.0: Motor overload warning
  Cause:

  The accumulative heat of the motor reaches the warning threshold (90% of the maximum allowable heat).

Cause	Confirming Method	Solution
1. The motor cables and encoder cable are connected improperly or in poor contact.	Check the wiring among the servo drive, servo motor and the encoder according to the correct wiring diagram.	Connect cables according to the correct wiring diagram. It is recommended to use the cables provided by Inovance. When customized cables are used, prepare and connect the customized cables according to the wiring instructions.
2. The load is so heavy that the effective torque outputted by the motor keeps exceeding the rated torque.	Confirm the overload characteristics of the servo drive or motor. Check whether the average load rate (H0b.12) keeps exceeding 100.0%.	Replace with a servo drive of higher capacity and a matching servo motor. Reduce the load and increase the acceleration/ deceleration time.
3. Acceleration/Deceleration is too frequent or the load inertia is too large.	Check the mechanical inertia ratio or perform inertia auto-tuning. View the value of H08.15 (Load moment of inertia ratio). Confirm the individual operation cycle when the servo motor operates cyclically.	Increase the acceleration/ deceleration time.
4. The gain values are improper or the stiffness level is too high.	Check whether the motor vibrates and generates unusual noise during operation.	Adjust the gains again.
5. The model of the servo drive or motor is set improperly.	View the model of the motor equipped with a serial-type encoder in H00.05 and the servo drive model in H01.10.	Read the servo drive nameplate and set the servo drive model (H01.10) and motor model properly according to section "Servo Drive Model and Nameplate" in SV680N Series Servo Drive Selection Guide.

Cause	Confirming Method	Solution
6. The motor is stalled due to mechanical factors, resulting in overload during operation.	Check the reference and the motor speed (H0b.00) through the software tool or the keypad. • References in the position control mode: H0b.13 (Input position reference counter) • References in the speed control mode: H0b.01 (Speed reference) • References in the torque control mode: H0b.02 (Internal torque reference) Check whether the reference value is not 0 or is very large but the motor speed is 0 RPM in the corresponding mode.	Eliminate the mechanical factors.
7. The servo drive is faulty.	Power off and on the servo drive again.	Replace the servo drive if the fault persists after the servo drive is powered off and on again.

- E910.0: Control circuit overvoltage

Cause	Confirming Method	Solution
The voltage of the control circuit in the servo drive exceeds the overvoltage threshold.	1. Measure whether the input voltage on the control circuit side is within the following range: 220 V servo drive: Effective value: 220 V to 240 V Allowable deviation: –10% to +10% (198 V to 264 V) 380 V servo drive: Effective value: 380 V to 440 V Allowable deviation: –10% to +10% (342 V to 484 V) 2. Check whether control circuit cables are connected properly and whether the voltage of control circuit cables (L1C, L2C) is within the specified range.	Re-connect or replace the cables.

- E920.0: Regenerative resistor overload
  Cause:

  The accumulative heat of the regenerative resistor exceeds the set value.

Cause	Confirming Method	Solution
1. The external regenerative resistor is connected improperly or disconnected.	Remove the external regenerative resistor and measure whether its resistance is "∞" (infinite). Measure whether the resistance between terminals P⊕ and C is "∞" (infinite).	Replace with a new external regenerative resistor. After confirming the resistance measured is the same as the nominal value, connect it between terminals P⊕ and C.
		Connect the external regenerative resistor between terminals P⊕ and C with a proper cable.
2. The jumper between terminals P⊕ and D is shorted or disconnected when the built-in regenerative resistor is used.	Measure whether the resistance between terminals P⊕ and D is "∞" (infinite).	Ensure terminals P⊕ and D are jumpered.

Cause	Confirming Method	Solution
3. H02.25 (Regenerative resistor type) is set improperly when an external regenerative resistor is used.	• View the setpoint of H02.25. • Measure the resistance of the external regenerative resistor connected between P⊕ and C. Check whether the resistance measured is too large by comparing it with the value listed in Table "Specifications of the regenerative resistor". • Check whether the value of H02.27 is larger than the resistance of the external regenerative resistor connected between terminals P⊕ and C.	Set H02.25 according to section "Wiring and Setting of Regenerative Resistor" in SV680N Series Servo Drive Hardware Guide. H02.25 = 1 (external, naturally ventilated) H02.25 = 2 (external, forced-air cooling)
4. The resistance of the external regenerative resistor is too large.	• View the setpoint of H02.25. • Measure the resistance of the external regenerative resistor connected between P⊕ and C. Check whether the resistance measured is too large by comparing it with the value listed in Table "Specifications of the regenerative resistor". • Check whether the value of H02.27 is larger than the resistance of the external regenerative resistor connected between terminals P⊕ and C.	Select a proper regenerative resistor according to section "Specifications of the Regenerative Resistor" in SV680N Series Servo Drive Commissioning Guide.
5. The setpoint of H02.27 (Resistance of external regenerative resistor) is higher than the resistance of the external regenerative resistor used.	• View the setpoint of H02.25. • Measure the resistance of the external regenerative resistor connected between P⊕ and C. Check whether the resistance measured is too large by comparing it with the value listed in Table "Specifications of the regenerative resistor". • Check whether the value of H02.27 is larger than the resistance of the external regenerative resistor connected between terminals P⊕ and C.	Set H02.27 according to the resistance of the external regenerative resistor used.
6. The input voltage of the main circuit is beyond the specified range.	Check whether the input voltage of the main circuit cable on the drive side is within the following range: • 220 V servo drive:Effective value: 220 V to 240 VAllowable deviation: –10% to +10% (198 V to 264 V) • 380 V servo drive: Effective value: 380 V to 440 VAllowable deviation: –10% to +10% (342 V to 484 V)	Replace or adjust the power supply according to the specified range.

Cause	Confirming Method	Solution
7. The load moment of inertia ratio is too large.	Perform moment of inertia auto-tuning according to section "Inertia auto-tuning" in SV680N Series Servo Drive Function Guide or calculate the total mechanical inertia based on mechanical parameters. Check whether the actual load inertia ratio exceeds 30.	• Select an external regenerative resistor with large capacity and set H02.26 to a value consistent with the actual power. • Select a servo drive with large capacity. • Reduce the load if allowed. • Increase the acceleration/ deceleration time if allowed. • Increase the motor operation cycle if allowed.
8. The motor speed is excessively high and deceleration is not done within the set time. The motor is in the continuous deceleration status during cyclic operation.	View the motor speed curve during cyclic operation and check whether the motor is in the deceleration status continuously.	
9. The capacity of the servo drive or the regenerative resistor is insufficient.	View the motor speed curve in an individual cycle and calculate whether the maximum braking energy can be absorbed completely.	
10. The servo drive is faulty.	-	Replace with a new servo drive.

- E922.0: Resistance of the external regenerative resistor too small

  Cause:

  The value of H02.27 (Resistance of external regenerative resistor) is lower than the value of H02.21 (Permissible minimum resistance of external regenerative resistor).

Cause	Confirming Method	Solution
When an external regenerative resistor is used (H02.25 = 1 or 2), the resistance of this resistor is lower than the minimum resistance allowed by the servo drive.	Measure whether the resistance of the external regenerative resistor between terminals P⊕ and C is lower than the value of H02.21 (Permissible minimum resistance of regenerative resistor).	• If yes, replace with an external regenerative resistor that matches the servo drive, then set H02.27 according to the resistance of the resistor used. Finally, connect the new resistor between P⊕ and C. • If not, set H02.27 to a value consistent with the resistance of the external regenerative resistor used.

- E924.0: Regenerative transistor overtemperature

Cause:

The estimated temperature of the regenerative transistor is higher than H0A.18 (IGBT overtemperature threshold).

Cause	Confirming Method	Solution
1. The junction temperature of the regenerative transistor is too high. 2. The regenerative transistor will be turned off automatically after overload occurs.	The regenerative transistor temperature exceeds the threshold defined by H0A.49.	Control the working conditions and usage of the regenerative transistor.

- E941.0: Parameter modifications activated at next power-on
  Cause:

  The parameters modified are those whose "Effective time" is "Next power-on".

Cause	Confirming Method	Solution
The parameters modified are those whose "Effective time" is "Next power-on".	Check whether parameters you modified are those whose "Effective Time" is "Next power-on".	Power off and on the servo drive again.

- E942.0: Parameter saved frequently
  Cause:

  The number of parameters modified at a time exceeds 200.

Cause	Confirming Method	Solution
Too many parameters are modified and saved to EEPROM (H0C.13 = 1) at a brief interval.	Check whether parameters are modified through the host controller at a brief interval.	Check the operation mode. For parameters that need not be saved to EEPROM, set H0C.13 to 0.

- E950.0: Forward overtravel warning
  Cause:

  The logic of DI assigned with FunIN.14 (P-OT, positive limit switch) is active.

Cause	Confirming Method	Solution
1. The logic of the DI assigned with FunIN.14 (P-OT, positive limit switch) is active.	• Check whether a certain DI in group H03 is assigned with FunIN.14. • Check whether the logic of DI corresponding to the bit of H0b.03 (Monitored DI status) is active.	Check the operation mode and on the prerequisite of ensuring safety, send a reverse run command or rotate the motor to deactivate the logic of the DI assigned with FunIN.14.
2. The servo drive position feedback reaches the positive software position limit.	Check whether the position feedback (H0b.17) is close to the value of H0A.41 (Forward overtravel). Check whether the software position limit is set in H0A.40.	Ensure the servo drive references are proper, allowing the load travel range to be within the software position limit.

- E952.0: Reverse overtravel warning

  Cause:

  The logic of the DI assigned with FunIN.15 (N-OT, negative limit switch) is active.

Cause	Confirming Method	Solution
1. The logic of the DI assigned with FunIN.15 (N-OT, negative limit switch) is active	• Check whether a certain DI in group H03 is assigned with FunIN.15. • Check whether the logic of DI corresponding to the bit of H0b.03 (Monitored DI status) is active.	Check the operation mode. On the prerequisite of ensuring safety, send a forward run command or rotate the motor to deactivate the logic of DI assigned with FunIN.15.
2. The servo drive position feedback reaches the negative software position limit	Check whether the position feedback (H0b.17) is close to the value of H0A.43 (Reverse overtravel). Check whether the software position limit is set in H0A.40.	Ensure the servo drive references are proper, allowing the load travel range to be within the software position limit.

- E954.0: Position reference overflow

Cause	Confirming Method	Solution
The position reference exceeds the limit in the PR mode.	1. Check the set position reference. 2. Check the set limit value.	Modify the position reference and limit value.

- E971.0: Undervoltage warning of voltage drop protection

Cause	Confirming Method	Solution
The bus voltage is lower than the undervoltage threshold when voltage drop protection is enabled.	Check the bus voltage.	Check the quality of the mains power supply.

- E980.0: Encoder algorithm error
  Cause:

  An encoder algorithm error occurs.

Cause	Confirming Method	Solution
An encoder fault occurs.	If the servo drive is powered off and on several times but the warning is still reported, it indicates that the encoder is faulty.	Replace the servo motor.

- EA41.0: Torque fluctuation compensation failure

Cause	Confirming Method	Solution
The torque compensation fails.	-	Turn off the torque fluctuation compensation function.

5.5 Internal Faults

When any one of the following fault occurs, contact Inovance for technical support.

- E111.0: Internal parameter error
- E602.0: Angle auto-tuning failure
- E220.0: Phase sequence incorrect
- EA40.0: Parameter auto-tuning failure

6 List of Parameters

6.1 Parameter Group H00

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H00.00	0x0000	Motor code	0 to 65535	14102	-	At stop	" H00.00" on page 338
H00.02	0x0002	Customized No.	0.00 to 4294967295.00	0	-	Unchangeable	" H00.02" on page 338
H00.04	0x0004	Encoder version	0.0 to 6553.5	0	-	Unchangeable	" H00.04" on page 338
H00.05	0x0005	Serial-type motor code	0 to 65535	0	-	Unchangeable	" H00.05" on page 338
H00.06	0x0006	Customized FPGA No.	0.00 to 655.35	0	-	Unchangeable	" H00.06" on page 339
H00.07	0x0007	STO version	0.00 to 655.35	0	-	Unchangeable	" H00.07" on page 339
H00.08	0x0008	Serial encoder type	0 to 65535	0	-	At stop	" H00.08" on page 339

6.2 Parameter Group H01

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H01.00	0x0100	MCU software version	0.0 to 6553.5	0	-	Unchangeable	" H01.00" on page 340
H01.01	0x0101	FPGA software version	0.0 to 6553.5	0	-	Unchangeable	" H01.01" on page 340
H01.02	0x0102	Servo drive series No.	0 to 65535	0	-	Unchangeable	" H01.02" on page 340
H01.06	0x0106	Board software version	0.0 tp 6553.5	0	-	Unchangeable	" H01.06" on page 340

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H01.10	0x010A	Drive series No.	2: S1R6 3: S2R8 5: S5R5 6: S7R6 7: S012 8: S018 9: S022 10: S027 10001: T3R5 10002: T5R4 10003: T8R4 10004: T012 10005: T017 10006: T021 10007: T026	3	-	At stop	" H01.10" on page 341
H01.11	0x010B	DC-AC voltage class	0 V to 65535 V	220	V	Unchangeable	" H01.11" on page 341
H01.12	0x010C	Rated power of the drive	0.00 kW to 10737418.24 kW	0.4	kW	Unchangeable	" H01.12" on page 341
H01.14	0x010E	Max. output power of the drive	0.00 kW to 10737418.24 kW	0.4	kW	Unchangeable	" H01.14" on page 342
H01.16	0x0110	Rated output current of the drive	0.00 A to 10737418.24 A	2.8	A	Unchangeable	" H01.16" on page 342
H01.18	0x0112	Max. output current of the drive	0.00 A to 10737418.24 A	10.1	A	Unchangeable	" H01.18" on page 342
H01.40	0x0128	DC bus overvoltage protection threshold	0 V to 2000 V	420	V	At once	" H01.40" on page 342
H01.75	0x014B	Current loop amplification factor	0.00 to 655.35	1	-	At once	" H01.75" on page 343
H01.89	0x0159	Junction temperature parameter version	0.00 to 655.35	0	-	Unchangeable	" H01.89" on page 343

6.3 Parameter Group H02

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H02.00	0x0200	Control mode	0: Speed control mode 1: Position control mode 2: Torque control mode 9: EtherCAT mode	9	-	At stop	" H02.00" on page 343
H02.01	0x0201	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	" H02.01" on page 344
H02.02	0x0202	Direction of rotation	0: Counterclockwise (CCW) as forward direction 1: Clockwise (CW) as forward direction	0	-	At stop	" H02.02" on page 344
H02.03	0x0203	Output pulse phase	0: Phase A leads phase B 1: Phase A lags behind phase B	0	-	At stop	" H02.03" on page 344
H02.05	0x0205	Stop mode at S-ON OFF	-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 state 2: Dynamic braking stop, keeping de-energized state	0	-	At once	" H02.05" on page 344

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H02.06	0x0206	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 once	*" H02.06" on page 345*
H02.07	0x0207	Stop mode at overtravel	0: Coast to stop, keeping de-energized state 1: Stop at zero speed, keeping position lock state 2: Stop at zero speed, keeping de-energized state 3: Ramp to stop as defined by 6085h, keeping de-energized state 4: Ramp to stop as defined by 6085h, 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	1	-	At stop	*" H02.07" on page 345*
H02.08	0x0208	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	*" H02.08" on page 346*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H02.09	0x0209	Delay from brake output ON to command received	0 ms to 500 ms	250	ms	At once	" H02.09" on page 346
H02.10	0x020A	Delay from brake output OFF to motor de-energized	50 ms to 1000 ms	150	ms	At once	" H02.10" on page 346
H02.11	0x020B	Speed threshold at brake output OFF in rotation state	20 rpm to 3000 rpm	30	rpm	At once	" H02.11" on page 347
H02.12	0x020C	Delay from S-ON OFF to brake output OFF in the rotation state	1 ms to 65535 ms	500	ms	At once	" H02.12" on page 347
H02.15	0x020F	Warning display on the keypad	0: Output warning information immediately 1: Not output warning information	0	-	At once	" H02.15" on page 347
H02.16	0x0210	Brake enable switch	0: OFF 1: ON	0	-	At once	" H02.16" on page 347
H02.17	0x0211	Stop mode upon main circuit power failure	0: Keep present 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	-	At once	" H02.17" on page 348

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H02.18	0x0212	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	-	At once	" H02.18" on page 348
H02.21	0x0215	Permissible minimum resistance of regenerative resistor	1 Ω to 1000 Ω	40	Ω	Unchangeable	" H02.21" on page 348
H02.22	0x0216	Power of built-in regenerative resistor	0 W to 65535 W	50	W	Unchangeable	" H02.22" on page 349
H02.23	0x0217	Resistance of built-in regenerative resistor	0 Ω to 65535 Ω	50	Ω	Unchangeable	" H02.23" on page 349
H02.24	0x0218	Resistor heat dissipation coefficient	10% to 100%	30	%	At once	" H02.24" on page 349
H02.25	0x0219	Regenerative resistor type	0: Built-in 1: External, natural cooling 2: External, forced air cooling 3: No resistor needed	3	-	At once	" H02.25" on page 350
H02.26	0x021A	Power of external regenerative resistor	1 W to 65535 W	40	W	At once	" H02.26" on page 350
H02.27	0x021B	Resistance of external regenerative resistor	15 Ω to 1000 Ω	50	Ω	At once	" H02.27" on page 350
H02.30	0x021E	User password	0 to 65535	0	-	At once	" H02.30" on page 351

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H02.31	0x021F	System parameter initialization	0: No operation 1: Restore default settings 2: Clear fault records	0	-	At stop	" H02.31" on page 351
H02.32	0x0220	Selection of parameters in group H0b	0 to 99	50	-	At once	" H02.32" on page 351
H02.35	0x0223	Keypad data refresh frequency	0 Hz to 20 Hz	0	Hz	At once	" H02.35" on page 351
H02.41	0x0229	Manufacturer password	0 to 65535	0	-	At once	" H02.41" on page 352

6.4 Parameter Group H03

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H03.02	0x0302	DI1 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jog 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 38: Touch probe 1 39: Touch probe 2 40: Multi-speed enable	14	-	At once	" H03.02" on page 352
H03.03	0x0303	DI1 logic	0: Normally open 1: Closed	0	-	At once	" H03.03" on page 353

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H03.04	0x0304	DI2 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jog 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 38: Touch probe 1 39: Touch probe 2 40: Multi-speed enable	15	-	At once	*" H03.04" on page 353*
H03.05	0x0305	DI2 logic	0: Normally open 1: Closed	0	-	At once	*" H03.05" on page 354*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H03.06	0x0306	DI3 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jog 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 38: Touch probe 1 39: Touch probe 2 40: Multi-speed enable	31	-	At once	" H03.06" on page 354
H03.07	0x0307	DI3 logic	0: Normally open 1: Closed	0	-	At once	" H03.07" on page 354

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H03.08	0x0308	DI4 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jog 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 38: Touch probe 1 39: Touch probe 2 40: Multi-speed enable	34	-	At once	*" H03.08" on page 355*
H03.09	0x0309	DI4 logic	0: Normally open 1: Closed	0	-	At once	*" H03.09" on page 355*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H03.10	0x030A	DI5 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jog 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 38: Touch probe 1 39: Touch probe 2 40: Multi-speed enable	38	-	At once	" H03.10" on page 356
H03.11	0x030B	DI5 logic	0: Normally open 1: Closed	0	-	At once	" H03.11" on page 356
H03.50	0x0332	Voltage-type AI1 offset	-5000 mV to +5000 mV	0	mV	At once	" H03.50" on page 357
H03.51	0x0333	Voltage-type AI1 input filter time constant	0.00 ms to 655.35 ms	2	ms	At once	" H03.51" on page 357
H03.53	0x0335	Voltage-type AI1 dead zone	0.0 mV to 1000.0 mV	10	mV	At once	" H03.53" on page 357
H03.54	0x0336	Voltage-type AI1 zero drift	-500 mV to +500 mV	0	mV	At once	" H03.54" on page 357
H03.56	0x0338	Current-type AI2 input filter time constant	0.00 ms to 655.35 ms	2	ms	At once	" H03.56" on page 358
H03.60	0x033C	DI1 filter time	0.00 ms to 500.00 ms	0.5	ms	At once	" H03.60" on page 358
H03.61	0x033D	DI2 filter time	0.00 ms to 500.00 ms	0.5	ms	At once	" H03.61" on page 358
H03.62	0x033E	DI3 filter time	0.00 ms to 500.00 ms	0.5	ms	At once	" H03.62" on page 359
H03.63	0x033F	DI4 filter time	0.00 ms to 500.00 ms	0.5	ms	At once	" H03.63" on page 359

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H03.64	0x0340	DI5 filter time	0.00 ms to 500.00 ms	0.5	ms	At once	" H03.64" on page 359
H03.78	0x034E	Speed value corresponding to analog 20 mA	0 rpm to 9999 rpm	3000	rpm	At stop	" H03.78" on page 359
H03.79	0x034F	Torque value corresponding to analog 20 mA	1.00 to 8.00	1	Multiplier	At stop	" H03.79" on page 360
H03.80	0x0350	Speed value corresponding to analog 10 V	0 rpm to 9999 rpm	3000	rpm	At stop	" H03.80" on page 360
H03.81	0x0351	Torque value corresponding to analog 10 V	1.00 to 8.00	1	Multiplier	At stop	" H03.81" on page 360

6.5 Parameter Group H04

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H04.00	0x0400	DO1 function	0: No assignment 1: Servo ready 2: Motor rotation signal 10: Warning 11: Fault 25: Comparison output DO 31: Communication-forced DO 32: EDM output	1	-	At once	" H04.00" on page 360
H04.01	0x0401	DO1 logic	0: Normally open 1: Closed	0	-	At once	" H04.01" on page 361
H04.02	0x0402	DO2 function	0: No assignment 1: Servo ready 2: Motor rotation signal 10: Warning 11: Fault 25: Comparison output DO 31: Communication-forced DO 32: EDM output	11	-	At once	" H04.02" on page 361
H04.03	0x0403	DO2 logic	0: Normally open 1: Closed	0	-	At once	" H04.03" on page 362

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H04.22	0x0416	DO source	bit 0: DO1 source 0: DO1 function output 1: bit 0 of H31.04 set through communication bit 1: DO2 source 0: DO2 function output 1: bit 1 of H31.04 set through communication	0	-	At once	" H04.22" on page 362
H04.23	0x0417	EtherCAT-forced DO logic in non-OP status	bit 0: DO1 0: Status unchanged 1: No output bit 1: DO2 0: Status unchanged 1: No output	0	-	At once	" H04.23" on page 362
H04.50	0x0432	AO1 signal selection	0: Motor speed (1 V/1000 rpm) 1: Speed reference (1 V/1000 rpm) 2: Torque reference (1 V/100 x rated torque) 3: Position deviation (0.5 mV/1 reference unit) 4: Position deviation (0.5 mV/1 encoder unit) 5: Position reference speed (1 V/1000 rpm) 6: Positioning completed 8: AI1 voltage 10: Defined by H31.05	0	-	At once	" H04.50" on page 363
H04.51	0x0433	AO1 offset voltage	-10000 mV to +10000 mV	0	mV	At once	" H04.51" on page 363
H04.52	0x0434	AO1 multiplier	-99.99 to +99.99	1	-	At once	" H04.52" on page 363

6.6 Parameter Group H05

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H05.00	0x0500	Main position reference source	0 to 2 (Multi-position reference)	2	-	At once	" H05.00" on page 364
H05.02	0x0502	Pulses per revolution	0 to 4294967295	0	PPR	At stop	" H05.02" on page 364
H05.04	0x0504	First-order low-pass filter time constant	0.0 to 6553.5	0	ms	At stop	" H05.04" on page 364
H05.06	0x0506	Moving average filter time constant 1	0.0 to 128.0	0	ms	At stop	" H05.06" on page 364

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H05.07	0x0507	Electronic gear ratio 1 (numerator)	1 to 1073741824	1	-	At once	" H05.07" on page 365
H05.09	0x0509	Electronic gear ratio 1 (denominator)	1 to 1073741824	1	-	At once	" H05.09" on page 365
H05.11	0x050B	Electronic gear ratio 2 (numerator)	1 to 1073741824	1	-	At once	" H05.11" on page 365
H05.13	0x050D	Electronic gear ratio 2 (denominator)	1 to 1073741824	1	-	At once	" H05.13" on page 365
H05.16	0x0510	Clear action	0: Position deviation cleared upon S-OFF or non-operational state 1: Position deviation cleared upon S-OFF or fault 2: Position deviation cleared in the non-operational state or when FunIN.35 is activated	0	-	At stop	" H05.16" on page 366
H05.17	0x0511	Number of encoder frequency-division pulses	0 to 4194303	2500	PPR	At stop	" H05.17" on page 366
H05.19	0x0513	Speed feedforward control	0: No speed feedforward 1: Internal speed feedforward 2: 60B1h 3: Zero phase	1	-	At stop	" H05.19" on page 366
H05.30	0x051E	Homing selection	0: Disable 6: Current position as the home	0	-	At once	" H05.30" on page 367
H05.35	0x0523	Homing time limit	0 to 65535	10000	ms	At once	" H05.35" on page 367
H05.36	0x0524	Mechanical home offset	-2147483648 to +2147483648	0	Reference unit	At once	" H05.36" on page 367
H05.38	0x0526	Frequency-division output source	0: Encoder frequency-division output 1: Pulse reference synchronous output 2: Frequency-division output inhibited 3: Second encoder frequency-division output	0	-	At once	" H05.38" on page 367
H05.39	0x0527	Electronic gear ratio switchover condition	0: Switched if position reference kept 0 for 2.5 ms 1: Switched in real time	0	-	At stop	" H05.39" on page 368

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H05.40	H05.40	Mechanical home offset and action upon overtravel	0: H05.36 (Mechanical home offset) used as the coordinate after homing, reverse homing applied after homing triggered again upon overtravel 1: H05.36 (Mechanical home offset) used as the relative offset after homing, reverse homing applied after homing triggered again upon overtravel 2: H05.36 (Mechanical home offset) used as the coordinate after homing, reverse homing applied automatically upon overtravel 3: H05-36 (Mechanical home offset) used as the relative offset after homing, reverse homing applied automatically upon overtravel	0	-	At once	" H05.40" on page 368
H05.41	0x0529	Z pulse output polarity	Bit 0: Frequency-division Z output polarity 0: Positive (high level upon active Z pulse) 1: Negative (low level upon active Z pulse) Bit 1: OCZ output polarity 0: Positive (high level upon active Z pulse) 1: Negative (low level upon active Z pulse) Bit 2: Inner loop touch probe Z signal source 0: Motor Z signal 1: Frequency-division output Z signal	1	-	At stop	" H05.41" on page 368
H05.44	0x052C	Numerator of frequency-division output reduction ratio	1 to 16383	1	-	At stop	" H05.44" on page 369
H05.45	0x052D	Denominator of frequency-division output reduction ratio	1 to 8191	1	-	At stop	" H05.45" on page 369

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H05.46	0x052E	DI selection of multi-turn frequency-division Z starting point	0: No selection 1: DI1 2: DI2 3: DI3 4: DI4 5: DI5	0	-	At once	" H05.46" on page 369
H05.47	0x052F	Frequency-division Z pulse width	0 to 400	0	us	At once	" H05.47" on page 370
H05.50	0x0532	Mechanical gear ratio (numerator) in absolute position rotation mode	1 to 65535	1	-	At stop	" H05.50" on page 370
H05.51	0x0533	Mechanical gear ratio (denominator) in absolute position rotation mode	1 to 65535	1	-	At stop	" H05.51" on page 370
H05.52	0x0534	Pulses per revolution of the load in absolute position rotation mode (low 32 bits)	0 to 4294967295	0	Encoder unit	At stop	" H05.52" on page 371
H05.54	0x0536	Pulses per revolution of the load in absolute position rotation mode (high 32 bits)	0 to 4294967295	0	Encoder unit	At stop	" H05.54" on page 371
H05.56	0x0538	Speed threshold in homing upon hit-and-stop	0 to 1000	2	rpm	At once	" H05.56" on page 371
H05.58	0x053A	Torque threshold in homing upon hit-and-stop	0.0% to 400.0%	100	%	At once	" H05.58" on page 371
H05.60	0x053C	Hold time of positioning completed	0 to 30000	0	ms	At once	" H05.60" on page 372
H05.66	0x0542	Homing time unit	0: 1 1: 10 2: 100	2	-	At stop	" H05.66" on page 372

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H05.67	0x0543	Offset between zero point and single-turn absolute position	-2147483648 to +2147483647	0	Encoder unit	At stop	" H05.67" on page 372
H05.69	0x0545	Auxiliary homing function	0: Inhibited 1: Record offset position 2: Clear offset position	0	-	At stop	" H05.69" on page 372
H05.70	0x0546	Moving average filter time constant 2	0.0 to 1000.0	0	ms	At stop	" H05.70" on page 373
H05.71	0x0547	Motor Z signal width	1 to 100	4	ms	At once	" H05.71" on page 373
H05.72	0x0548	Positioning completed/ Position deviation threshold in fully closed-loop mode	0: Threshold scaled to outer loop unit 1: Same threshold used for inner and outer loops	0	-	At stop	" H05.72" on page 373

6.7 Parameter Group H06

Param. No.	Address	Name	Setpoint	Default	Unit	Change Condition	Page
H06.00	0x0600	Source of main speed reference A	0: Digital setting (H06.03) 1: AI1	0	-	At stop	" H06.00" on page 374
H06.01	0x0601	Source of auxiliary speed reference B	0: Digital setting (H06.03) 1: AI1 5: Multi-speed reference	1	-	At stop	" H06.01" on page 374
H06.02	0x0602	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	" H06.02" on page 374
H06.03	0x0603	Speed reference set through keypad	-9999 rpm to +9999 rpm	200	rpm	At once	" H06.03" on page 374
H06.04	0x0604	DI jog speed reference	0 rpm to 9999 rpm	150	rpm	At once	" H06.04" on page 375
H06.05	0x0605	Acceleration ramp time of speed reference	0 ms to 65535 ms	0	ms	At once	" H06.05" on page 375

Param. No.	Address	Name	Setpoint	Default	Unit	Change Condition	Page
H06.06	0x0606	Deceleration ramp time of speed reference	0 ms to 65535 ms	0	ms	At once	" H06.06" on page 376
H06.07	0x0607	Maximum speed limit	0 rpm to 9999 rpm	6000	rpm	At once	" H06.07" on page 376
H06.08	0x0608	Forward speed threshold	0 rpm to 9999 rpm	6000	rpm	At once	" H06.08" on page 376
H06.09	0x0609	Reverse speed threshold	0 rpm to 9999 rpm	6000	rpm	At once	" H06.09" on page 376
H06.10	0x060A	Deceleration unit in emergency stop	0: Multiplied by 1 1: Multiplied by 10 2: Multiplied by 100	0	-	At stop	" H06.10" on page 377
H06.11	0x060B	Torque feedforward control	0: No torque feedforward 1: Internal torque feedforward 2: 60B2h used as external torque feedforward	1	-	At once	" H06.11" on page 377
H06.12	0x060C	Acceleration ramp time of jog speed	0 ms to 65535 ms	10	ms	At once	" H06.12" on page 377
H06.13	0x060D	Speed feedforward smoothing filter	0 us to 65535 us	0	us	At once	" H06.13" on page 377
H06.15	0x060F	Zero clamp speed threshold	0 rpm to 9999 rpm	10	rpm	At once	" H06.15" on page 378
H06.16	0x0610	Threshold of TGON (motor rotation) signal	0 rpm to 1000 rpm	20	rpm	At once	" H06.16" on page 378
H06.17	0x0611	Threshold of V-Cmp (speed matching) signal	0 rpm to 100 rpm	10	rpm	At once	" H06.17" on page 378
H06.18	0x0612	Threshold of speed reach signal	20 rpm to 9999 rpm	1000	rpm	At once	" H06.18" on page 378
H06.19	0x0613	Threshold of zero speed output signal	1 rpm to 9999 rpm	10	rpm	At once	" H06.19" on page 379
H06.40	0x0628	Deceleration time of ramp 1	0 ms to 65535 ms	0	ms	At stop	" H06.40" on page 379
H06.41	0x0629	Deceleration time of ramp 2	0 ms to 65535 ms	0	ms	At stop	" H06.41" on page 379
H06.50	0x0628	Speed S-curve enable switch	0: Disable 1: Enable	0	-	At stop	" H06.50" on page 379

Param. No.	Address	Name	Setpoint	Default	Unit	Change Condition	Page
H06.51	0x0633	Increasing acceleration of speed S-curve acceleration segment	0.0% to 100.0%	50	%	At stop	" H06.51" on page 380
H06.52	0x0634	Decreasing acceleration of speed S-curve acceleration segment	0.0% to 100.0%	50	%	At stop	" H06.52" on page 380
H06.53	0x0635	Increasing acceleration of speed S-curve deceleration segment	0.0% to 100.0%	50	%	At stop	" H06.53" on page 380
H06.54	0x0636	Decreasing acceleration of speed S-curve deceleration segment	0.0% to 100.0%	50	%	At stop	" H06.54" on page 380

6.8 Parameter Group H07

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H07.00	0x0700	Source of main torque reference A	0: Keypad (H07.03) 1: AI1	0	-	At stop	" H07.00" on page 381
H07.01	0x0701	Source of auxiliary torque reference B	0: Keypad (H07.03) 1: AI1	1	-	At stop	" H07.01" on page 381
H07.02	0x0702	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	" H07.02" on page 381
H07.03	0x0703	Torque reference set through keypad	-400.0% to +400.0%	0	%	At once	" H07.03" on page 382
H07.05	0x0705	Torque reference filter time constant 1	0.00 ms to 30.00 ms	0.5	ms	At once	" H07.05" on page 382

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H07.06	0x0706	Torque reference filter time constant 2	0.00 ms to 30.00 ms	0.27	ms	At once	" H07.06" on page 382
H07.07	0x0707	Torque limit source	0: Positive/Negative internal torque limit 1: Internal or external limit as defined by DI 2: T-LMT 3: T_LMT or external limit as defined by DI (FunIN.16 or FunIN.17) 4: T_LMT or internal limit (FunIN.16 or FunIN.17) as defined by DI	0	-	At once	" H07.07" on page 382
H07.08	0x0708	T-LMT selection	1：AI1 2：AI2	1	-	At once	" H07.08" on page 383
H07.09	0x0709	Positive internal torque limit	0.0% to 400.0%	350	%	At once	" H07.09" on page 383
H07.10	0x070A	Negative internal torque limit	0.0% to 400.0%	350	%	At once	" H07.10" on page 383
H07.11	0x070B	Positive external torque limit	0.0% to 400.0%	350	%	At once	" H07.11" on page 383
H07.12	0x070C	Negative external torque limit	0.0% to 400.0%	350	%	At once	" H07.12" on page 384
H07.15	0x070F	Emergency stop torque	0.0% to 400.0%	100	%	At once	" H07.15" on page 384
H07.17	0x0711	Speed limit source	0: Internal speed limit 1: V-LMT 2: H07.19 or H07.20 as defined by DI	0	-	At once	" H07.17" on page 384
H07.18	0x0712	V-LMT selection	1：AI1 2：AI2	1	-	At once	" " on page
H07.19	0x0713	Positive speed limit/Speed limit 1 in torque control	0 rpm to 9999 rpm	3000	rpm	At once	" H07.19" on page 385
H07.20	0x0714	Negative speed limit/Speed limit 2 in torque control	0 rpm to 9999 rpm	3000	rpm	At once	" H07.20" on page 385
H07.21	0x0715	Base value for torque reach	0.0% to 400.0%	0	%	At once	" H07.21" on page 385
H07.22	0x0716	Threshold of valid torque reach	0.0% to 400.0%	20	%	At once	" H07.22" on page 385

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H07.23	0x0717	Threshold of invalid torque reach	0.0% to 400.0%	10	%	At once	" H07.23" on page 386
H07.24	0x0718	Field weakening depth	60% to 115%	115	%	At once	" H07.24" on page 386
H07.25	0x0719	Max. permissible demagnetizing current	0% to 300%	100	%	At once	" H07.25" on page 386
H07.26	0x071A	Field weakening selection	0: Disable 1: Enable	0	-	At stop	" H07.26" on page 386
H07.27	0x071B	Field weakening gain	0.001 Hz to 1.000 Hz	0.03	Hz	At once	" H07.27" on page 387
H07.28	0x071C	Speed of field weakening point	0 to 65535	0	-	Unchangeable	" H07.28" on page 387
H07.35	0x0723	Motor torque output correction	0: Switched off 1: Enabled	0	-	At stop	" " on page
H07.36	0x0724	Time constant of low-pass filter 2	0.00 ms to 10.00 ms	0	ms	At once	" H07.36" on page 387
H07.37	0x0725	Torque reference filter selection	0: First-order filter 1: Biquad filter	0	-	At once	" H07.37" on page 388
H07.38	0x0726	Biquad filter attenuation ratio	0 to 50	16	-	At stop	" H07.38" on page 388
H07.40	0x0728	Speed limit window in the torque control mode	0.0 ms to 300.0 ms	10	ms	At once	" H07.40" on page 388

6.9 Parameter Group H08

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H08.00	0x0800	Speed loop gain	0.1 Hz to 2000.0 Hz	40	Hz	At once	" H08.00" on page 388
H08.01	0x0801	Speed loop integral time constant	0.15 ms to 512.00 ms	19.89	ms	At once	" H08.01" on page 389
H08.02	0x0802	Position loop gain	0.1 Hz to 2000.0 Hz	64	Hz	At once	" H08.02" on page 389
H08.03	0x0803	2nd speed loop gain	0.1 Hz to 2000.0 Hz	75	Hz	At once	" H08.03" on page 389
H08.04	0x0804	2nd speed loop integral time constant	0.15 ms to 512.00 ms	10.61	ms	At once	" H08.04" on page 390

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H08.05	0x0805	2nd position loop gain	0.1 Hz to 2000.0 Hz	120	Hz	At once	" H08.05" on page 390
H08.08	0x0808	2nd gain mode setting	0: Fixed to the 1st gain set, 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	-	At once	" H08.08" on page 390
H08.09	0x0809	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	-	At once	" H08.09" on page 391
H08.10	0x080A	Gain switchover delay	0.0 ms to 1000.0 ms	5	ms	At once	" H08.10" on page 391
H08.11	0x080B	Gain switchover level	0 to 20000	50	-	At once	" H08.11" on page 391
H08.12	0x080C	Gain switchover dead time	0 to 20000	30	-	At once	" H08.12" on page 392
H08.13	0x080D	Position gain switchover time	0.0 ms to 1000.0 ms	3	ms	At once	" H08.13" on page 392
H08.15	0x080F	Load moment of inertia ratio	0.00 to 120.00	1	-	At once	" H08.15" on page 392
H08.17	0x0811	Zero phase delay	0.0 ms to 4.0 ms	0	ms	At once	" H08.17" on page 393
H08.18	0x0812	Speed feedforward filter time constant	0.00 ms to 64.00 ms	0.5	ms	At once	" H08.18" on page 393
H08.19	0x0813	Speed feedforward gain	0.0% to 100.0%	0	%	At once	" H08.19" on page 393

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H08.20	0x0814	Torque feedforward filter time constant	0.00 ms to 64.00 ms	0.5	ms	At once	" H08.20" on page 393
H08.21	0x0815	Torque feedforward gain	0.0% to 300.0%	0	%	At once	" H08.21" on page 394
H08.22	0x0816	Speed feedback filtering option	0: Inhibited 1: 2 times 2: 4 times 3: 8 times 4: 16 times	0	-	At stop	" H08.22" on page 394
H08.23	0x0817	Cutoff frequency of speed feedback low-pass filter	100 Hz to 8000 Hz	8000	Hz	At once	" H08.23" on page 395
H08.24	0x0818	PDFF control coefficient	0.0% to 200.0%	100	%	At once	" H08.24" on page 395
H08.27	0x081B	Speed observer cutoff frequency	50 Hz to 600 Hz	170	Hz	At once	" H08.27" on page 395
H08.28	0x081C	Speed observer inertia correction coefficient	1% to 1600%	100	%	At once	" H08.28" on page 396
H08.29	0x081D	Speed observer filter time	0.00 ms to 10.00 ms	0.8	ms	At once	" H08.29" on page 396
H08.31	0x081F	Disturbance cutoff frequency	10 Hz to 4000 Hz	600	Hz	At once	" H08.31" on page 396
H08.32	0x0820	Disturbance compensation gain	0% to 100%	0	%	At once	" H08.32" on page 397
H08.33	0x0821	Disturbance observer inertia correction coefficient	1% to 1600%	100	%	At once	" H08.33" on page 397
H08.37	0x0825	Phase modulation for medium-frequency jitter suppression 2	-90° to +90°	0	°	At once	" H08.37" on page 397
H08.38	0x0826	Frequency of medium-frequency jitter suppression 2	0 Hz to 1000 Hz	0	Hz	At once	" H08.38" on page 397
H08.39	0x0827	Compensation gain of medium-frequency jitter suppression 2	0% to 300%	0	%	At once	" H08.39" on page 398

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H08.40	0x0828	Speed observer selection	0: Disable 1: Enable	0	-	At once	" H08.40" on page 398
H08.42	0x082A	Model control selection	0: Disable 1: Enable 2: Dual-inertia model	0	-	At once	" H08.42" on page 398
H08.43	0x082B	Model gain	0.1 to 2000.0	40	-	At once	" H08.43" on page 398
H08.46	0x082E	Feedforward value	0.0 to 102.4	95	-	At once	" H08.46" on page 399
H08.53	0x0835	Medium- and low-frequency jitter suppression frequency 3	0.0 Hz to 300.0 Hz	0	Hz	At once	" H08.53" on page 399
H08.54	0x0836	Medium- and low-frequency jitter suppression compensation 3	0% to 200%	0	%	At once	" H08.54" on page 399
H08.56	0x0838	Medium- and low-frequency jitter suppression phase modulation 3	0% to 600%	100	%	At once	" H08.56" on page 399
H08.59	0x083B	Medium- and low-frequency jitter suppression frequency 4	0.0 Hz to 300.0 Hz	0	Hz	At once	" H08.59" on page 400
H08.60	0x083C	Medium- and low-frequency jitter suppression compensation 4	0% to 200%	0	%	At once	" H08.60" on page 400
H08.61	0x083D	Medium- and low-frequency jitter suppression phase modulation 4	0% to 600%	100	%	At once	" H08.61" on page 400
H08.62	0x083E	Position loop integral time constant	0.15 to 512.00	512	-	At once	" H08.62" on page 400
H08.63	0x083F	2nd position loop integral time constant	0.15 to 512.00	512	-	At once	" H08.63" on page 401

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H08.64	0x0840	Speed observer feedback source	0: Disable 1: Enable	0	-	At once	" H08.64" on page 401
H08.65	0x0841	Zero deviation control selection	0: Disable 1: Enable	0	-	At once	" H08.65" on page 401
H08.66	0x0842	Moving average filter for zero deviation control position	0.0 ms to 320.0 ms	5	ms	At once	" H08.66" on page 401
H08.68	0x0844	Speed feedforward of zero deviation control	0.0% to 100.0%	100	%	At once	" H08.68" on page 402
H08.69	0x0845	Torque feedforward of zero deviation control	0.0% to 100.0%	100	%	At once	" H08.69" on page 402
H08.81	0x0851	Anti-resonance frequency of dual-inertia model	1.0 Hz to 400.0 Hz	20	Hz	At once	" H08.81" on page 402
H08.82	0x0852	Resonance frequency of dual-inertia model	0.0 Hz to 6553.5 Hz	0	Hz	At once	" H08.82" on page 403
H08.83	0x0853	Dual-inertia model gain	$0.1s^{-1}$ to $300.0s^{-1}$	60	$^{-1}$	At once	" H08.83" on page 403
H08.84	0x0854	Inertia ratio of dual-inertia model	0.00 to 120.00	1	-	At once	" H08.84" on page 403
H08.88	0x0858	Speed feedforward value of dual-inertia model	0.0 to 6553.5	100	-	At once	" H08.88" on page 403
H08.89	0x0859	Torque feedforward value of dual-inertia model	0.0 to 6553.5	100	-	At once	" H08.89" on page 404

6.10 Parameter Group H09

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H09.00	0x0900	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	-	At once	" H09.00" on page 404
H09.01	0x0901	Stiffness level	0 to 41	15	-	At once	" H09.01" on page 404
H09.02	0x0902	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	-	At once	" H09.02" on page 405
H09.03	0x0903	Online inertia auto-tuning mode	0: Disabled 1: Enabled, changing slowly 2: Enabled, changing normally 3: Enabled, changing quickly	2	-	At once	" H09.03" on page 405
H09.05	0x0905	Offline inertia auto-tuning mode	0: Bi-directional 1: Unidirectional	1	-	At stop	" H09.05" on page 405
H09.06	0x0906	Maximum speed of inertia auto-tuning	100 rpm to 1000 rpm	500	rpm	At stop	" H09.06" on page 406
H09.07	0x0907	Time constant for accelerating to the max. speed during inertia auto-tuning	20 ms to 800 ms	125	ms	At stop	" H09.07" on page 406

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H09.08	0x0908	Interval time after an individual inertia auto-tuning	50 ms to 10000 ms	800	ms	At stop	" H09.08" on page 406
H09.09	0x0909	Number of motor revolutions per inertia auto-tuning	0.00 to 100.00	1	-	At once	" H09.09" on page 407
H09.11	0x090B	Vibration threshold	0.0% to 100.0%	5	%	At once	" H09.11" on page 407
H09.12	0x090C	Frequency of the 1st notch	50 Hz to 8000 Hz	8000	Hz	At once	" H09.12" on page 407
H09.13	0x090D	Width level of the 1st notch	0 to 20	2	-	At once	" H09.13" on page 407
H09.14	0x090E	Depth level of the 1st notch	0 to 99	0	-	At once	" H09.14" on page 408
H09.15	0x090F	Frequency of the 2nd notch	50 Hz to 8000 Hz	8000	Hz	At once	" H09.15" on page 408
H09.16	0x0910	Width level of the 2nd notch	0 to 20	2	-	At once	" H09.16" on page 408
H09.17	0x0911	Depth level of the 2nd notch	0 to 99	0	-	At once	" H09.17" on page 409
H09.18	0x0912	Frequency of the 3rd notch	50 Hz to 8000 Hz	8000	Hz	At once	" H09.18" on page 409
H09.19	0x0913	Width level of the 3rd notch	0 to 20	2	-	At once	" H09.19" on page 409
H09.20	0x0914	Depth level of the 3rd notch	0 to 99	0	-	At once	" H09.20" on page 409
H09.21	0x0915	Frequency of the 4th notch	50 Hz to 8000 Hz	8000	Hz	At once	" H09.21" on page 410
H09.22	0x0916	Width level of the 4th notch	0 to 20	2	-	At once	" H09.22" on page 410
H09.23	0x0917	Depth level of the 4th notch	0 to 99	0	-	At once	" H09.23" on page 410
H09.24	0x0918	Auto-tuned resonance frequency	0 Hz to 5000 Hz	0	Hz	At once	" H09.24" on page 410
H09.26	0x091A	ITune response	50.0% to 500.0%	100	%	At once	" H09.26" on page 411
H09.27	0x091B	ITune mode	0: Disable 1: ITune mode 1 2: ITune mode 2	0	-	At once	" H09.27" on page 411
H09.28	0x091C	Minimum inertia ratio of ITune	0.0% to 80.0%	0	%	At once	" H09.28" on page 411

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H09.29	0x091D	Maximum inertia ratio of ITune	1.0% to 120.0%	30	%	At once	" H09.29" on page 411
H09.32	0x0920	Gravity compensation value	0.0% to 100.0%	0	%	At once	" H09.32" on page 412
H09.33	0x0921	Positive friction compensation value	0.0% to 100.0%	0	%	At once	" H09.33" on page 412
H09.34	0x0922	Negative friction compensation value	-100.0% to 0.0%	0	%	At once	" H09.34" on page 412
H09.35	0x0923	Friction compensation speed	0.0 to 20.0	2	-	At once	" H09.35" on page 412
H09.36	0x0924	Friction compensation speed	0x00: Slow mode+Speed reference 0x01: Slow mode+Model speed 0x02: Slow mode+Speed feedback 0x03: Slow mode+Observe speed 0x10: Quick mode +Speed reference 0x11: Quick mode +Model speed 0x12: Quick mode +Speed feedback 0x13: Quick mode+Observe speed	0	-	At once	" H09.36" on page 413
H09.37	0x0925	Vibration monitoring time	0 to 65535	600	-	At once	" H09.37" on page 413
H09.38	0x0926	Frequency of low-frequency resonance suppression 1 at the mechanical end	1.0 Hz to 100.0 Hz	100	Hz	At once	" H09.38" on page 413
H09.39	0x0927	Low-frequency resonance suppression 1 at the mechanical end	0 to 3	2	-	At stop	" H09.39" on page 414
H09.44	0x092C	Frequency of low-frequency resonance suppression 2 at mechanical load end	0.0 to 100.0	0	-	At once	" H09.44" on page 414

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H09.45	0x092D	Responsiveness of low-frequency resonance suppression 2 at mechanical load end	0.01 to 5.00	1	-	At once	" H09.45" on page 414
H09.47	0x092F	Width of low-frequency resonance suppression 2 at mechanical load end	0.00 to 2.00	1	-	At once	" H09.47" on page 414
H09.49	0x0931	Frequency of low-frequency resonance suppression 3 at mechanical load end	0.0 to 100.0	0	-	At once	" H09.49" on page 415
H09.50	0x0932	Responsiveness of low-frequency resonance suppression 3 at mechanical load end	0.01 to 5.00	1	-	At once	" H09.50" on page 415
H09.52	0x0934	Width of low-frequency resonance suppression 3 at mechanical load end	0.00 to 2.00	1	-	At once	" H09.52" on page 415
H09.54	0x0936	Vibration threshold	0.0% to 300.0%	50	%	At once	" H09.54" on page 415
H09.56	0x0938	Max. overshoot allowed by ETune	0 to 65535	2936	-	At once	" H09.56" on page 416
H09.57	0x0939	STune resonance suppression switchover frequency	0 Hz to 4000 Hz	900	Hz	At once	" H09.57" on page 416
H09.58	0x093A	STune resonance suppression reset selection	0: Disable 1: Enable	0	-	At once	" H09.58" on page 416

6.11 Parameter Group H0A

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0A.00	0x0A00	Power input phase loss protection	0: Enable 1: Disable	0	-	At once	" H0A.00" on page 417
H0A.01	0x0A01	Absolute position limit	0: Disabled 1: Enabled 2: Enabled after homing	0	-	At once	" H0A.01" on page 417
H0A.04	0x0A04	Motor overload protection gain	50 to 300	100	-	At once	" H0A.04" on page 417
H0A.08	0x0A08	Overspeed threshold	0 to 20000	0	rpm	At once	" H0A.08" on page 418
H0A.10	0x0A0A	Threshold of excessive local position deviation	0 to 4294967295	219895608	-	At once	" H0A.10" on page 418
H0A.12	0x0A0C	Runaway protection	0: Disable 1: Enable	1	-	At once	" H0A.12" on page 418
H0A.18	0x0A12	IGBT overtemperature threshold	120°C to 175°C	140	°C	At once	" H0A.18" on page 419
H0A.19	0x0A13	Filter time constant of touch probe 1	0.00 to 6.30	2	us	At once	" H0A.19" on page 419
H0A.20	0x0A14	Filter time constant of touch probe 2	0.00 to 6.30	2	us	At once	" H0A.20" on page 419
H0A.23	0x0A17	TZ signal filter time	0 to 31	15	25 ns	At stop	" H0A.23" on page 419
H0A.25	0x0A19	Speed display DO low-pass filter time	0 to 5000	0	ms	At once	" H0A.25" on page 420
H0A.26	0x0A1A	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	-	At once	" H0A.26" on page 420
H0A.27	0x0A1B	Motor rotation DO speed filter time	0 to 100	50	ms	At once	" H0A.27" on page 420
H0A.29	0x0A1D	Fully closed-loop encoder (ABZ) filter time	0 to 255	15	25 ns	At stop	" H0A.29" on page 420

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0A.32	0x0A20	Motor stall overtemperature protection time window	10 to 65535	200	ms	At once	" H0A.32" on page 421
H0A.33	0x0A21	Motor stall overtemperature detection	0: Hide 1: Enable	1	-	At once	" H0A.33" on page 421
H0A.36	0x0A24	Encoder multi-turn overflow fault selection	0: Not hide 1: Hide	0	-	At once	" H0A.36" on page 421
H0A.40	0x0A28	Compensation function selection	bit0: Overtravel compensation 0: Enable 1: Disable bit1: Touch probe rising edge compensation 0: Disable 1: Enable bit2: Touch probe falling edge compensation 0: Disable 1: Enable bit3: Touch probe solution 0: New solution 1: Old solution (same as SV660N)	6	-	At stop	" H0A.40" on page 422
H0A.41	0x0A29	Forward position of software position limit	-2147483648 to +2147483647	2147483647	Encoder unit	At stop	" H0A.41" on page 422
H0A.43	0x0A2B	Reverse position of software position limit	-2147483648 to +2147483647	-2147483648	Encoder unit	At stop	" H0A.43" on page 422
H0A.49	0x0A31	Regenerative resistor overtemperature threshold	100°C to 175°C	115	°C	At once	" H0A.49" on page 423
H0A.50	0x0A32	Encoder communication fault tolerance threshold	0 to 31	5	-	At once	" H0A.50" on page 423
H0A.51	0x0A33	Phase loss detection filter times	3 to 36	20	55 ms	At once	" H0A.51" on page 423
H0A.52	0x0A34	Encoder temperature protection threshold	0°C to 175°C	125	°C	At once	" H0A.52" on page 423

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0A.53	0x0A35	Touch probe DI ON-compensation time	-3000 to +3000	200	25 ns	At once	" H0A.53" on page 424
H0A.54	0x0A36	Touch probe DI OFF-compensation time	-3000 to +3000	1512	25 ns	At once	" H0A.54" on page 424
H0A.55	0x0A37	Runaway current threshold	100.0% to 400.0%	200	%	At once	" H0A.55" on page 424
H0A.56	0x0A38	Fault reset delay	0 to 60000	10000	ms	At once	" H0A.56" on page 424
H0A.57	0x0A39	Runaway speed threshold	1 to 1000	50	rpm	At once	" H0A.57" on page 424
H0A.58	0x0A3A	Runaway speed filter time	0.1 to 100.0	2	ms	At once	" H0A.58" on page 425
H0A.59	0x0A3B	Runaway protection detection time	10 to 1000	30	ms	At once	" H0A.59" on page 425
H0A.60	0x0A3C	Black box function mode	0: Disable 1: Any fault 2: Designated fault 3: Triggered by designated condition	1	-	At once	" H0A.60" on page 425
H0A.61	0x0A3D	Designated fault code	0.0 to 6553.5	0	-	At once	" H0A.61" on page 426
H0A.62	0x0A3E	Trigger source	0 to 25	0	-	At once	" H0A.62" on page 426
H0A.63	0x0A3F	Trigger level	-2147483648 to +2147483647	0	-	At once	" H0A.63" on page 426
H0A.65	0x0A41	Trigger level	0: Rising edge 1: Equal 2: Falling edge 3: Edge-triggered	0	-	At once	" H0A.65" on page 426
H0A.66	0x0A42	Trigger position	0% to 100%	75	%	At once	" H0A.66" on page 427
H0A.67	0x0A43	Sampling frequency	0: Current loop 1: Position loop 2: Main cycle	0	-	At once	" H0A.67" on page 427
H0A.70	0x0A46	Overspeed threshold 2	0 to 20000	0	rpm	At once	" H0A.70" on page 427
H0A.71	0x0A47	MS1 motor overload curve switchover	0 to 3	2	-	At once	" H0A.71" on page 427

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0A.72	0x0A48	Maximum stop time in ramp-to-stop	0 to 65535	10000	ms	At stop	" H0A.72" on page 428
H0A.73	0x0A49	STO 24 V disconnection filter time	1 to 5	5	ms	At once	" H0A.73" on page 428
H0A.74	0x0A4A	Filter time for two inconsistent STO channels	1 to 1000	10	ms	At once	" H0A.74" on page 428
H0A.75	0x0A4B	Servo OFF delay after STO triggered	0 to 25	20	ms	At once	" H0A.75" on page 429
H0A.90	0x0A5A	Moving average filter time constant for speed display values	0 to 100	0	ms	At once	" H0A.90" on page 429
H0A.91	0x0A5B	Moving average filter time constant for torque display values	0 to 100	0	ms	At once	" H0A.91" on page 429
H0A.92	0x0A5C	Moving average filter time constant for position display values	0 to 100	0	ms	At once	" H0A.92" on page 429
H0A.93	0x0A5D	Low-pass filter time constant for voltage display values	0 to 250	0	ms	At once	" H0A.93" on page 430
H0A.94	0x0A5E	Low-pass filter time constant for thermal display values	0 to 250	0	ms	At once	" H0A.94" on page 430

6.12 Parameter Group H0b

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0b.00	0x0B00	Motor speed actual value	-32767 rpm to +32767 rpm	0	rpm	Unchangeable	" H0b.00" on page 430
H0b.01	0x0B01	Speed reference	-32767 rpm to +32767 rpm	0	rpm	Unchangeable	" H0b.01" on page 430
H0b.02	0x0B02	Internal torque reference	-500.0% to +500.0%	0	%	Unchangeable	" H0b.02" on page 431

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0b.03	0x0B03	Monitored DI status	0 to 65535	0	-	Unchangeable	" H0b.03" on page 431
H0b.05	0x0B05	Monitored DO status	0 to 65535	0	-	Unchangeable	" H0b.05" on page 431
H0b.07	0x0B07	Absolute position counter	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.07" on page 432
H0b.09	0x0B09	Mechanical angle	0.0° to 360.0°	0	°	Unchangeable	" H0b.09" on page 432
H0b.10	0x0B0A	Electrical angle	0.0° to 360.0°	0	°	Unchangeable	" H0b.10" on page 432
H0b.12	0x0B0C	Average load rate	0.0% to 800.0%	0	%	Unchangeable	" H0b.12" on page 432
H0b.15	0x0B0F	Position following error (encoder unit)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.15" on page 433
H0b.17	0x0B11	Feedback pulse counter	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.17" on page 433
H0b.19	0x0B13	Total power-on time	0.0s to 429496729.5s	0	s	Unchangeable	" H0b.19" on page 433
H0b.21	0x0B15	AI1 voltage display	-12.000 V to +12.000 V	0	V	Unchangeable	" H0b.21" on page 434
H0b.22	0x0B16	AI2 current display	0.000 mA to 21.000 mA	0	mA	Unchangeable	" H0b.22" on page 434
H0b.24	0x0B18	RMS value of phase current	0.0 A to 6553.5 A	0	A	Unchangeable	" H0b.24" on page 434
H0b.25	0x0B19	Angle obtained upon voltage injection auto-tuning	0.0° to 360.0°	0	°	Unchangeable	" H0b.25" on page 434
H0b.26	0x0B1A	Bus voltage	0.0 V to 6553.5 V	0	V	Unchangeable	" H0b.26" on page 435
H0b.27	0x0B1B	Module temperature	-20°C to +200°C	0	°C	Unchangeable	" H0b.27" on page 435
H0b.28	0x0B1C	Absolute encoder fault information given by FPGA	0 to 65535	0	-	Unchangeable	" H0b.28" on page 435
H0b.29	0x0B1D	Axis status information given by FPGA	0 to 65535	0	-	Unchangeable	" H0b.29" on page 435
H0b.30	0x0B1E	Axis fault information given by FPGA	0 to 65535	0	-	Unchangeable	" H0b.30" on page 436
H0b.31	0x0B1F	Encoder fault information	0 to 65535	0	-	Unchangeable	" H0b.31" on page 436

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0b.33	0x0B21	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	-	At once	*" H0b.33" on page 436*
H0b.34	0x0B22	Fault code of the selected fault	0 to 65535	0	-	Unchangeable	*" H0b.34" on page 437*
H0b.35	0x0B23	Time stamp upon occurrence of the selected fault	0.0s to 429496729.5s	0	s	Unchangeable	*" H0b.35" on page 437*
H0b.37	0x0B25	Motor speed upon occurrence of the selected fault	-32767 rpm to +32767 rpm	0	rpm	Unchangeable	*" H0b.37" on page 438*
H0b.38	0x0B26	Motor phase U current upon occurrence of the selected fault	-3276.7 A to +3276.7 A	0	A	Unchangeable	*" H0b.38" on page 438*
H0b.39	0x0B27	Motor phase V current upon occurrence of the selected fault	-3276.7 A to +3276.7 A	0	A	Unchangeable	*" H0b.39" on page 438*
H0b.40	0x0B28	Bus voltage upon occurrence of the selected fault	0.0 V to 6553.5 V	0	V	Unchangeable	*" H0b.40" on page 438*
H0b.41	0x0B29	DI status upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	*" H0b.41" on page 438*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0b.43	0x0B2B	DO status upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.43" on page 439
H0b.45	0x0B2D	Internal fault code	0 to 65535	0	-	Unchangeable	" H0b.45" on page 439
H0b.46	0x0B2E	Absolute encoder fault information given by FPGA upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.46" on page 439
H0b.47	0x0B2F	System status information given by FPGA upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.47" on page 439
H0b.48	0x0B30	System fault information given by FPGA upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.48" on page 440
H0b.49	0x0B31	Encoder fault information upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.49" on page 440
H0b.51	0x0B33	Internal fault code upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.51" on page 440
H0b.52	0x0B34	FPGA timeout fault standard bit upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.52" on page 440
H0b.53	0x0B35	Position following error (reference unit)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.53" on page 441
H0b.55	0x0B37	Motor speed actual value	-2147483648 rpm to +2147483647 rpm	0	rpm	Unchangeable	" H0b.55" on page 441

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0b.57	0x0B39	Bus voltage of the control circuit	0.0 V to 6553.5 V	0	V	Unchangeable	" H0b.57" on page 441
H0b.58	0x0B3A	Mechanical absolute position (low 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.58" on page 442
H0b.60	0x0B3C	Mechanical absolute position (high 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.60" on page 442
H0b.63	0x0B3F	NotRdy state	1: Control circuit power input error 2: Main circuit power input error 3: Undervoltage 4: Soft start failed 5: Encoder initialization not completed 6: Short circuit to ground failed 7: Others	0	-	Unchangeable	" H0b.63" on page 442
H0b.66	0x0B42	Encoder temperature	-32768°C to +32767°C	0	°C	Unchangeable	" H0b.66" on page 443
H0b.67	0x0B43	Load rate of regenerative resistor	0.0% to 200.0%	0	%	Unchangeable	" H0b.67" on page 443
H0b.70	0x0B46	Number of absolute encoder revolutions	0 Rev to 65535 Rev	0	Rev	Unchangeable	" H0b.70" on page 443
H0b.71	0x0B47	Single-turn position fed back by the absolute encoder	0 p to +2147483647 p	0	p	Unchangeable	" H0b.71" on page 443
H0b.74	0x0B4A	System fault information given by FPGA	0 to 65535	0	-	Unchangeable	" H0b.74" on page 443
H0b.77	0x0B4D	Encoder position (low 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.77" on page 444
H0b.79	0x0B4F	Encoder position (high 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.79" on page 444
H0b.81	0x0B51	Single-turn position of the rotary load (low 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.81" on page 444

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0b.83	0x0B53	Single-turn position of the rotary load (high 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.83" on page 444
H0b.85	0x0B55	Single-turn position of the rotary load (reference unit)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.85" on page 445
H0b.87	0x0B57	IGBT junction temperature	0 to 200	0	-	Unchangeable	" H0b.87" on page 445
H0b.90	0x0B5A	Group No. of the abnormal parameter	0 to 65535	0	-	At once	" H0b.90" on page 445
H0b.91	0x0B5B	Offset of the abnormal parameter within the group	0 to 65535	0	-	At once	" H0b.91" on page 446
H0b.94	0x0B5E	Individual power-on time	0.0s to 429496729.5s	0	s	Unchangeable	" H0b.94" on page 446
H0b.96	0x0B60	Individual power-on time upon occurrence of the selected fault	0.0s to 429496729.5s	0	s	Unchangeable	" H0b.96" on page 446

6.13 Parameter Group H0d

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0d.00	0x0D00	Software reset	0: No operation 1: Enable	0	-	At stop	" H0d.00" on page 446
H0d.01	0x0D01	Fault reset	0: No operation 1: Enable	0	-	At stop	" H0d.01" on page 447
H0d.02	0x0D02	Inertia auto-tuning selection	0 to 65	0	-	At once	" H0d.02" on page 447
H0d.04	0x0D04	Read/write in encoder ROM	0: No operation 1: Write ROM 2: Read ROM 3: ROM failure	0	-	At stop	" H0d.04" on page 447
H0d.05	0x0D05	Emergency stop	0: No operation 1: Enable	0	-	At once	" H0d.05" on page 448
H0d.10	0x0D0A	Auto-tuning of analog channel	0: No operation 1: Adjust AI1	0	-	At stop	" H0d.10" on page 448
H0d.12	0x0D0C	Phase U/V current balance correction	0: Disable 1: Enable	0	-	At stop	" H0d.12" on page 448

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0d.17	0x0D11	Forced DI/DO enable switch	bit 0: Forced DI enable switch 0: Disable 1: Enable bit 1: Forced DO enable switch 0: Disable 1: Enable	0	-	At once	" H0d.17" on page 448
H0d.18	0x0D12	Forced DI value	0 to 31	31	-	At once	" H0d.18" on page 449
H0d.19	0x0D13	Forced DO value	0 to 3	0	-	At once	" H0d.19" on page 449
H0d.20	0x0D14	Absolute encoder reset selection	0: No operation 1: Reset the fault 2: Reset the fault and multi-turn data 3: Reset Inovance 2nd encoder fault 4: Reset Inovance 2nd encoder fault and multi-turn data	0	-	At stop	" H0d.20" on page 449
H0d.23	0x0D17	Torque fluctuation auto-tuning	0 to 1	0	-	At stop	" H0d.23" on page 450
H0d.26	0x0D1A	Brake and dynamic brake started forcibly	0: Disable 1: Dynamic brake deactivated forcibly 2: Brake released forcibly 3: Dynamic brake deactivated and brake released forcibly	0	-	At stop	" H0d.26" on page 450

6.14 Parameter Group H0E

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0E.00	0x0E00	Node address	1 to 127	1	-	At stop	" H0E.00" on page 450
H0E.01	0x0E01	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	-	At once	" H0E.01" on page 451

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0E.07	0x0E07	Object dictionary unit	0: Reference unit system (p/s, p/s^2) 1: User unit system (0.01 rpm, ms)	0	-	At stop	" H0E.07" on page 451
H0E.15	0x0E0F	Index of group 6000 (the last two bits)	0 to 255	255	-	At once	" H0E.15" on page 452
H0E.16	0x0E10	Sub-index of group 6000	0 to 2	0	-	At once	" H0E.16" on page 452
H0E.20	0x0E14	EtherCAT slave name	0 to 65535	0	-	Unchangeable	" H0E.20" on page 452
H0E.21	0x0E15	EtherCAT slave alias	0 to 65535	0	-	At stop	" H0E.21" on page 452
H0E.22	0x0E16	Number of SYNC loss events allowed by EtherCAT	1 to 20	8	-	At once	" H0E.22" on page 453
H0E.24	0x0E18	Number of SYNC loss events	0 to 65535	0	-	Unchangeable	" H0E.24" on page 453
H0E.25	0x0E19	Max. error value and invalid frames of EtherCAT port 0 per unit time	0 to 65535	0	-	Unchangeable	" H0E.25" on page 453
H0E.26	0x0E1A	Max. error value and invalid frames of EtherCAT port 1 per unit time	0 to 65535	0	-	Unchangeable	" H0E.26" on page 453
H0E.27	0x0E1B	Max. transfer error of EtherCAT port per unit time	0 to 65535	0	-	Unchangeable	" H0E.27" on page 453
H0E.28	0x0E1C	Max. EtherCAT data frame processing unit error per unit time	0 to 255	0	-	Unchangeable	" H0E.28" on page 454
H0E.29	0x0E1D	Max. link loss value of EtherCAT port 0 per unit time	0 to 65535	0	-	Unchangeable	" H0E.29" on page 454
H0E.31	0x0E1F	EtherCAT synchronization mode setting	0 to 2	2	-	At stop	" H0E.31" on page 454

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0E.32	0x0E20	EtherCAT synchronization error threshold	100 ns to 4000 ns	3000	ns	At stop	" H0E.32" on page 454
H0E.33	0x0E21	EtherCAT state machine state and port connection state	0 to 65535	0	-	Unchangeable	" H0E.33" on page 455
H0E.34	0x0E22	Number of excessive position reference increment events in CSP mode	1 to 30	20	-	At once	" H0E.34" on page 455
H0E.35	0x0E23	AL fault code	0 to 65535	0	-	Unchangeable	" H0E.35" on page 455
H0E.36	0x0E24	EtherCAT enhanced link selection	0: Disable 1: Enable	0	-	At once	" H0E.36" on page 455
H0E.37	0x0E25	EtherCAT XML reset selection	0: Disable 1: Enable	0	-	At once	" H0E.37" on page 456
H0E.80	0x0E50	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	-	At once	" H0E.80" on page 456
H0E.81	0x0E51	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	-	At once	" H0E.81" on page 456
H0E.82	0x0E52	Modbus response delay	0 ms to 20 ms	0	ms	At once	" H0E.82" on page 457
H0E.83	0x0E53	Modbus communication timeout	0 ms to 600 ms	500	ms	At once	" H0E.83" on page 457
H0E.84	0x0E54	Modbus communication data sequence	0: High bits before low bits 1: Low bits before high bits	1	-	At once	" H0E.84" on page 457
H0E.90	0x0E5A	Modbus version	0.00 to 655.35	0	-	Unchangeable	" H0E.90" on page 458

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0E.93	0x0E5D	EtherCAT COE version	0.00 to 655.35	0	-	Unchangeable	" H0E.93" on page 458
H0E.96	0x0E60	XML version information	0.00 to 655.35	0	-	Unchangeable	" H0E.96" on page 458

6.15 Parameter Group H0F

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0F.00	0x0F00	Encoder feedback mode	0: Internal encoder feedback 1: External encoder feedback 2: Inner/Outer loop switchover	0	-	At once	" H0F.00" on page 459
H0F.01	0x0F01	External encoder operation mode	0: Standard operating direction 1: Reverse operating direction	0	-	At once	" H0F.01" on page 459
H0F.02	0x0F02	External encoder mode	0: Incremental mode 1: Absolute linear mode	0	-	At stop	" H0F.02" on page 460
H0F.03	0x0F03	External encoder feedback type	0: Quadrature pulse 1: Inovance 2: BiSS	0	-	At stop	" H0F.03" on page 460
H0F.04	0x0F04	External encoder pulses per revolution	0 to 2147483647	10000	-	At stop	" H0F.04" on page 460
H0F.08	0x0F08	Excessive deviation threshold in compound control mode	0 to 2147483647	1000	-	At once	" H0F.08" on page 461
H0F.10	0x0F0A	Clear deviation in compound control mode	0 to 100	1	R	At once	" H0F.10" on page 461
H0F.13	0x0F0D	Compound vibration suppression filter time	0.0 ms to 6553.5 ms	0	ms	At stop	" H0F.13" on page 462
H0F.16	0x0F10	Pulse deviation display in compound control mode	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" H0F.16" on page 462
H0F.18	0x0F12	Internal position pulse feedback display	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" H0F.18" on page 462
H0F.20	0x0F14	External position pulse feedback display	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" H0F.20" on page 463

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0F.22	0x0F16	External encoder phase Z detection invalid (quadrature pulse feedback)	0: Detected 1: Not detected	0	-	At once	" H0F.22" on page 463
H0F.23	0x0F17	BiSS absolute homing offset	-2147483648 to +2147483647	0	-	At once	" H0F.23" on page 463
H0F.25	0x0F19	Source of touch probe Z signal in fully closed-loop mode	0: Motor Z signal 1: External feedback Z signal	0	-	At once	" H0F.25" on page 463
H0F.26	0x0F1A	BiSS absolute feedback offset	-2147483648 to +2147483647	0	-	At once	" H0F.26" on page 464
H0F.28	0x0F1C	Index value of BiSS communication warning	0 to 65535	0	-	Unchangeable	" H0F.28" on page 464
H0F.29	0x0F1D	CRC of BiSS fully closed-loop feedback	0: Positive 1: Negative	1	-	At once	" H0F.29" on page 464
H0F.30	0x0F1E	Valid bit of BiSS communication position feedback	0 to 127	29	-	At stop	" H0F.30" on page 464
H0F.31	0x0F1F	Valid bit of BiSS communication warning index	0 to 31	2	-	At stop	" H0F.31" on page 465
H0F.40	0x0F28	Inovance fully closed-loop encoder communication error register	0 to 65535	0	-	Unchangeable	" H0F.40" on page 465
H0F.41	0x0F29	Inovance fully closed-loop encoder version	0.0 to 6553.5	0	-	Unchangeable	" H0F.41" on page 465
H0F.42	0x0F2A	Inovance fully closed-loop encoder resolution	0 to 4294967295	0	-	Unchangeable	" H0F.42" on page 465

6.16 Parameter Group H11

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H11.00	0x1100	Multi-position operation mode	0: Individual operation (number of displacements defined by H11.01) 1: Cyclic operation (number of displacement defined by H11.01) 2: DI-based operation (defined by DI) 3: Sequential operation 5: Axis-controlled continuous operation	1	-	At stop	" H11.00" on page 466
H11.01	0x1101	Number of displacement references in multi-position mode	1 to 16	1	-	At stop	" H11.01" on page 467
H11.02	0x1102	Starting displacement No. after pause	0: Continue to execute the unexecuted displacements 1: Start from displacement 1	0	-	At stop	" H11.02" on page 467
H11.03	0x1103	Interval time unit	0: ms 1: s	0	-	At stop	" H11.03" on page 468
H11.04	0x1104	Displacement reference type	0: Relative displacement reference 1: Absolute displacement reference	0	-	At once	" H11.04" on page 468
H11.05	0x1105	Starting displacement No. in sequential operation	0 to 16	0	-	At stop	" H11.05" on page 468
H11.09	0x1109	Deceleration upon axis control OFF	0 ms to 65535 ms	65535	ms	At once	" H11.09" on page 469
H11.10	0x110A	Starting speed of displacement 1	0 rpm to 9999 rpm	0	rpm	At once	" H11.10" on page 469
H11.11	0x110B	Stop speed of displacement 1	0 rpm to 9999 rpm	0	rpm	At once	" H11.11" on page 469
H11.12	0x110C	Displacement 1	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.12" on page 469
H11.14	0x110E	Maximum speed of displacement 1	1 rpm to 9999 rpm	200	rpm	At once	" H11.14" on page 470

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H11.15	0x110F	Acceleration/ Deceleration time of displacement 1	0 ms to 65535 ms	10	ms	At once	" H11.15" on page 470
H11.16	0x1110	Interval time after displacement 1	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.16" on page 470
H11.17	0x1111	Displacement 2	-1073741824 to +1073741824	10000	Refer ence unit	At once	" H11.17" on page 471
H11.19	0x1113	Maximum speed of displacement 2	1 rpm to 9999 rpm	200	rpm	At once	" H11.19" on page 471
H11.20	0x1114	Acceleration/ Deceleration time of displacement 2	0 ms to 65535 ms	10	ms	At once	" H11.20" on page 471
H11.21	0x1115	Interval time after displacement 2	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.21" on page 471
H11.22	0x1116	Displacement 3	-1073741824 to +1073741824	10000	Refer ence unit	At once	" H11.22" on page 472
H11.24	0x1118	Maximum speed of displacement 3	1 rpm to 9999 rpm	200	rpm	At once	" H11.24" on page 472
H11.25	0x1119	Acceleration/ Deceleration time of displacement 3	0 ms to 65535 ms	10	ms	At once	" H11.25" on page 472
H11.26	0x111A	Interval time after displacement 3	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.26" on page 472
H11.27	0x111B	Displacement 4	-1073741824 to +1073741824	10000	Refer ence unit	At once	" H11.27" on page 473
H11.29	0x111D	Maximum speed of displacement 4	1 rpm to 9999 rpm	200	rpm	At once	" H11.29" on page 473
H11.30	0x111E	Acceleration/ Deceleration time of displacement 4	0 ms to 65535 ms	10	ms	At once	" H11.30" on page 473
H11.31	0x111F	Interval time after displacement 4	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.31" on page 473

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H11.32	0x1120	Displacement 5	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.32" on page 474
H11.34	0x1122	Maximum speed of displacement 5	1 rpm to 9999 rpm	200	rpm	At once	" H11.34" on page 474
H11.35	0x1123	Acceleration/ Deceleration time of displacement 5	0 ms to 65535 ms	10	ms	At once	" H11.35" on page 474
H11.36	0x1124	Interval time after displacement 5	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.36" on page 474
H11.37	0x1125	Displacement 6	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.37" on page 475
H11.39	0x1127	Maximum speed of displacement 6	1 rpm to 9999 rpm	200	rpm	At once	" H11.39" on page 475
H11.40	0x1128	Acceleration/ Deceleration time of displacement 6	0 ms to 65535 ms	10	ms	At once	" H11.40" on page 475
H11.41	0x1129	Interval time after displacement 6	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.41" on page 475
H11.42	0x112A	Displacement 7	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.42" on page 476
H11.44	0x112C	Maximum speed of displacement 7	1 rpm to 9999 rpm	200	rpm	At once	" H11.44" on page 476
H11.45	0x112D	Acceleration/ Deceleration time of displacement 7	0 ms to 65535 ms	10	ms	At once	" H11.45" on page 476
H11.46	0x112E	Interval time after displacement 7	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.46" on page 476
H11.47	0x112F	Displacement 8	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.47" on page 477
H11.49	0x1131	Maximum speed of displacement 8	1 rpm to 9999 rpm	200	rpm	At once	" H11.49" on page 477

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H11.50	0x1132	Acceleration/ Deceleration time of displacement 8	0 ms to 65535 ms	10	ms	At once	" H11.50" on page 477
H11.51	0x1133	Interval time after displacement 8	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.51" on page 477
H11.52	0x1134	Displacement 9	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.52" on page 478
H11.54	0x1136	Maximum speed of displacement 9	1 rpm to 9999 rpm	200	rpm	At once	" H11.54" on page 478
H11.55	0x1137	Acceleration/ Deceleration time of displacement 9	0 ms to 65535 ms	10	ms	At once	" H11.55" on page 478
H11.56	0x1138	Interval time after displacement 9	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.56" on page 478
H11.57	0x1139	Displacement 10	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.57" on page 479
H11.59	0x113B	Maximum speed of displacement 10	1 rpm to 9999 rpm	200	rpm	At once	" H11.59" on page 479
H11.60	0x113C	Acceleration/ Deceleration time of displacement 10	0 ms to 65535 ms	10	ms	At once	" H11.60" on page 479
H11.61	0x113D	Interval time after displacement 10	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.61" on page 479
H11.62	0x113E	Displacement 11	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.62" on page 480
H11.64	0x1140	Maximum speed of displacement 11	1 rpm to 9999 rpm	200	rpm	At once	" H11.64" on page 480
H11.65	0x1141	Acceleration/ Deceleration time of displacement 11	0 ms to 65535 ms	10	ms	At once	" H11.65" on page 480
H11.66	0x1142	Interval time after displacement 11	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.66" on page 480

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H11.67	0x1143	Displacement 12	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.67" on page 481
H11.69	0x1145	Maximum speed of displacement 12	1 rpm to 9999 rpm	200	rpm	At once	" H11.69" on page 481
H11.70	0x1146	Acceleration/ Deceleration time of displacement 12	0 ms to 65535 ms	10	ms	At once	" H11.70" on page 481
H11.71	0x1147	Interval time after displacement 12	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.71" on page 481
H11.72	0x1148	Displacement 13	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.72" on page 482
H11.74	0x114A	Maximum speed of displacement 13	1 rpm to 9999 rpm	200	rpm	At once	" H11.74" on page 482
H11.75	0x114B	Acceleration/ Deceleration time of displacement 13	0 ms to 65535 ms	10	ms	At once	" H11.75" on page 482
H11.76	0x114C	Interval time after displacement 13	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.76" on page 482
H11.77	0x114D	Displacement 14	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.77" on page 483
H11.79	0x114F	Maximum speed of displacement 14	1 rpm to 9999 rpm	200	rpm	At once	" H11.79" on page 483
H11.80	0x1150	Acceleration/ Deceleration time of displacement 14	0 ms to 65535 ms	10	ms	At once	" H11.80" on page 483
H11.81	0x1151	Interval time after displacement 14	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.81" on page 483
H11.82	0x1152	Displacement 15	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.82" on page 484
H11.84	0x1154	Maximum speed of displacement 15	1 rpm to 9999 rpm	200	rpm	At once	" H11.84" on page 484

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H11.85	0x1155	Acceleration/ Deceleration time of displacement 15	0 ms to 65535 ms	10	ms	At once	" H11.85" on page 484
H11.86	0x1156	Interval time after displacement 15	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.86" on page 484
H11.87	0x1157	Displacement 16	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.87" on page 485
H11.89	0x1159	Maximum speed of displacement 16	1 rpm to 9999 rpm	200	rpm	At once	" H11.89" on page 485
H11.90	0x115A	Acceleration/ Deceleration time of displacement 16	0 ms to 65535 ms	10	ms	At once	" H11.90" on page 485
H11.91	0x115B	Interval time after displacement 16	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.91" on page 485

6.17 Parameter Group H12

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H12.00	0x1200	Multi-speed operation mode	0: Individual operation (number of speeds defined by H12.01) 1: Cyclic operation (number of speeds defined by H12.01) 2: DI-based operation	1	-	At stop	" H12.00" on page 486
H12.01	0x1201	Number of speed references in multi-speed mode	1 to 16	16	-	At stop	" H12.01" on page 486
H12.02	0x1202	Operating time unit	0: s 1: min	0	-	At stop	" H12.02" on page 487
H12.03	0x1203	Acceleration time 1	0 ms to 65535 ms	10	ms	At once	" H12.03" on page 487
H12.04	0x1204	Deceleration time 1	0 ms to 65535 ms	10	ms	At once	" H12.04" on page 487
H12.05	0x1205	Acceleration time 2	0 ms to 65535 ms	50	ms	At once	" H12.05" on page 487
H12.06	0x1206	Deceleration time 2	0 ms to 65535 ms	50	ms	At once	" H12.06" on page 488

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H12.07	0x1207	Acceleration time 3	0 ms to 65535 ms	100	ms	At once	" H12.07" on page 488
H12.08	0x1208	Deceleration time 3	0 ms to 65535 ms	100	ms	At once	" H12.08" on page 488
H12.09	0x1209	Acceleration time 4	0 ms to 65535 ms	150	ms	At once	" H12.09" on page 489
H12.10	0x120A	Deceleration time 4	0 ms to 65535 ms	150	ms	At once	" H12.10" on page 489
H12.20	0x1214	Speed reference for speed 1	-9999 to +9999	0	rpm	At once	" H12.20" on page 489
H12.21	0x1215	Operating time of speed 1	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.21" on page 490
H12.22	0x1216	Acceleration/ Deceleration time of speed 1	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.22" on page 490
H12.23	0x1217	Speed reference for speed 2	-9999 to +9999	100	rpm	At once	" H12.23" on page 491
H12.24	0x1218	Operating time of speed 2	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.24" on page 491
H12.25	0x1219	Acceleration/ Deceleration time of speed 2	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.25" on page 491
H12.26	0x121A	Speed reference for speed 3	-9999 to +9999	300	rpm	At once	" H12.26" on page 491
H12.27	0x121B	Operating time of speed 3	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.27" on page 492

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H12.28	0x121C	Acceleration/ Deceleration time of speed 3	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	*" H12.28" on page 492*
H12.29	0x121D	Speed reference for speed 4	-9999 to +9999	500	rpm	At once	*" H12.29" on page 492*
H12.30	0x121E	Operating time of speed 4	0.0s(m) to 6553.5s(m)	5	s (m)	At once	*" H12.30" on page 492*
H12.31	0x121F	Acceleration/ Deceleration time of speed 4	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	*" H12.31" on page 493*
H12.32	0x1220	Speed reference for speed 5	-9999 to +9999	700	rpm	At once	*" H12.32" on page 493*
H12.33	0x1221	Operating time of speed 5	0.0s(m) to 6553.5s(m)	5	s (m)	At once	*" H12.33" on page 493*
H12.34	0x1222	Acceleration/ Deceleration time of speed 5	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	*" H12.34" on page 494*
H12.35	0x1223	Speed reference for speed 6	-9999 to +9999	900	rpm	At once	*" H12.35" on page 494*
H12.36	0x1224	Operating time of speed 6	0.0s(m) to 6553.5s(m)	5	s (m)	At once	*" H12.36" on page 494*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H12.37	0x1225	Acceleration/ Deceleration time of speed 6	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.37" on page 494
H12.38	0x1226	Speed reference for speed 7	-9999 to +9999	600	rpm	At once	" H12.38" on page 495
H12.39	0x1227	Operating time of speed 7	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.39" on page 495
H12.40	0x1228	Acceleration/ Deceleration time of speed 7	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.40" on page 495
H12.41	0x1229	Speed reference for speed 8	-9999 to +9999	300	rpm	At once	" H12.41" on page 496
H12.42	0x122A	Operating time of speed 8	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.42" on page 496
H12.43	0x122B	Acceleration/ Deceleration time of speed 8	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.43" on page 496
H12.44	0x122C	Speed reference for speed 9	-9999 to +9999	100	rpm	At once	" H12.44" on page 496
H12.45	0x122D	Operating time of speed 9	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.45" on page 497

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H12.46	0x122E	Acceleration/ Deceleration time of speed 9	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.46" on page 497
H12.47	0x122F	Speed reference for speed 10	-9999 to +9999	-100	rpm	At once	" H12.47" on page 497
H12.48	0x1230	Operating time of speed 10	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.48" on page 497
H12.49	0x1231	Acceleration/ Deceleration time of speed 10	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.49" on page 498
H12.50	0x1232	Speed reference for speed 11	-9999 to +9999	-300	rpm	At once	" H12.50" on page 498
H12.51	0x1233	Operating time of speed 11	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.51" on page 498
H12.52	0x1234	Acceleration/ Deceleration time of speed 11	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.52" on page 499
H12.53	0x1235	Speed reference for speed 12	-9999 to +9999	-500	rpm	At once	" H12.53" on page 499
H12.54	0x1236	Operating time of speed 12	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.54" on page 499

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H12.55	0x1237	Acceleration/ Deceleration time of speed 12	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	*" H12.55" on page 499*
H12.56	0x1238	Speed reference for speed 13	-9999 to +9999	-700	rpm	At once	*" H12.56" on page 500*
H12.57	0x1239	Operating time of speed 13	0.0s(m) to 6553.5s(m)	5	s (m)	At once	*" H12.57" on page 500*
H12.58	0x123A	Acceleration/ Deceleration time of speed 13	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	*" H12.58" on page 500*
H12.59	0x123B	Speed reference for speed 14	-9999 to +9999	-900	rpm	At once	*" H12.59" on page 501*
H12.60	0x123C	Operating time of speed 14	0.0s(m) to 6553.5s(m)	5	s (m)	At once	*" H12.60" on page 501*
H12.61	0x123D	Acceleration/ Deceleration time of speed 14	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	*" H12.61" on page 501*
H12.62	0x123E	Speed reference for speed 15	-9999 to +9999	-600	rpm	At once	*" H12.62" on page 501*
H12.63	0x123F	Operating time of speed 15	0.0s(m) to 6553.5s(m)	5	s (m)	At once	*" H12.63" on page 502*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H12.64	0x1240	Acceleration/ Deceleration time of speed 15	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.64" on page 502
H12.65	0x1241	Speed reference for speed 16	-9999 to +9999	-300	rpm	At once	" H12.65" on page 502
H12.66	0x1242	Operating time of speed 16	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.66" on page 502
H12.67	0x1243	Acceleration/ Deceleration time of speed 16	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.67" on page 503

6.18 Parameter Group H17

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.90	0x175A	Communication VDI enable	0: Disable 1: Enable	0	-	At stop	" H17.90" on page 503
H17.91	0x175B	VDI default value upon power-on	0: 0x0: No default 1: 0x01: VDI1 default value 2: 0x02: VDI2 default value 4: 0x04: VDI3 default value 8: 0x08: VDI4 default value 16: 0x10: VDI5 default value 32: 0x20: VDI6 default value 64: 0x40:VDI7 default value 128: 0x80: VDI8 default value 256: 0x100: VDI9 default value 512: 0x200: VDI10 default value 1024: 0x400: VDI11 default value 2048: 0x800: VDI12 default value 4096: 0x1000: VDI13 default value 8092: 0x2000: VDI14 default value 16384: 0x4000: VDI15 default value 32768: 0x8000: VDI16 default value	0	-	At once	" H17.91" on page 503

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.00	0x1700	VDI1 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.00" on page 504*
H17.01	0x1701	VDI1 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.01" on page 505*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.02	0x1702	VDI2 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.02" on page 505*
H17.03	0x1703	VDI2 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.03" on page 506*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.04	0x1704	VDI3 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	" H17.04" on page 506
H17.05	0x1705	VDI3 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	" H17.05" on page 507

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.06	0x1706	VDI4 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.06" on page 507*
H17.07	0x1707	VDI4 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.07" on page 508*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.08	0x1708	VDI5 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.08" on page 508*
H17.09	0x1709	VDI5 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.09" on page 509*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.10	0x170A	VDI6 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.10" on page 509*
H17.11	0x170B	VDI6 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.11" on page 510*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.12	0x170C	VDI7 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.12" on page 510*
H17.13	0x170D	VDI7 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.13" on page 510*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.14	0x170E	VDI8 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.14" on page 511*
H17.15	0x170F	VDI8 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.15" on page 511*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.16	0x1710	VDI9 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.16" on page 512*
H17.17	0x1711	VDI9 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.17" on page 512*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.18	0x1712	VDI10 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	" H17.18" on page 512
H17.19	0x1713	VDI10 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	" H17.19" on page 513

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.20	0x1714	VDI11 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.20" on page 513*
H17.21	0x1715	VDI11 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.21" on page 513*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.22	0x1716	VDI12 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.22" on page 514*
H17.23	0x1717	VDI12 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.23" on page 514*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.24	0x1718	VDI13 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.24" on page 515*
H17.25	0x1719	VDI13 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.25" on page 515*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.26	0x171A	VDI14 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	" H17.26" on page 515
H17.27	0x171B	VDI14 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	" H17.27" on page 516

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.28	0x171C	VDI15 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	" H17.28" on page 516
H17.29	0x171D	VDI15 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	" H17.29" on page 517

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.30	0x171E	VDI16 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	" H17.30" on page 517
H17.31	0x171F	VDI16 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	" H17.31" on page 518
H17.92	0x175C	Communication VDO enable	0: Disable 1: Enable	0	-	At stop	" H17.92" on page 518

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.93	0x175D	VDO default value after power-on	0: 0x0: No default 1: 0x01: VDI1 default value 2: 0x02: VDI2 default value 4: 0x04: VDI3 default value 8: 0x08: VDI4 default value 16: 0x10: VDI5 default value 32: 0x20: VDI6 default value 64: 0x40:VDI7 default value 128: 0x80: VDI8 default value 256: 0x100: VDI9 default value 512: 0x200: VDI10 default value 1024: 0x400: VDI11 default value 2048: 0x800: VDI12 default value 4096: 0x1000: VDI13 default value 8192: 0x2000: VDI14 default value 16384: 0x4000: VDI15 default value 32768: 0x8000: VDI16 default value	0	-	At stop	" H17.93" on page 518
H17.32	0x1720	VDO virtual level	0 to 65535	0	-	At once	" H17.32" on page 519
H17.33	0x1721	VDO1 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.33" on page 519
H17.34	0x1722	VDO1 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.34" on page 520
H17.35	0x1723	VDO2 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.35" on page 520
H17.36	0x1724	VDO2 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.36" on page 520

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.37	0x1725	VDO3 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	*" H17.37" on page 521*
H17.38	0x1726	VDO3 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	*" H17.38" on page 521*
H17.39	0x1727	VDO4 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	*" H17.39" on page 521*
H17.40	0x1728	VDO4 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	*" H17.40" on page 522*
H17.41	0x1729	VDO5 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	*" H17.41" on page 522*
H17.42	0x172A	VDO5 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	*" H17.42" on page 522*
H17.43	0x172B	VDO6 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	*" H17.43" on page 523*
H17.44	0x172C	VDO6 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	*" H17.44" on page 523*
H17.45	0x172D	VDO7 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	*" H17.45" on page 523*
H17.46	0x172E	VDO7 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	*" H17.46" on page 524*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.47	0x172F	VDO8 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.47" on page 524
H17.48	0x1730	VDO8 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.48" on page 524
H17.49	0x1731	VDO9 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.49" on page 525
H17.50	0x1732	VDO9 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.50" on page 525
H17.51	0x1733	VDO10 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.51" on page 525
H17.52	0x1734	VDO10 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.52" on page 526
H17.53	0x1735	VDO11 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.53" on page 526
H17.54	0x1736	VDO11 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.54" on page 526
H17.55	0x1737	VDO12 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.55" on page 527
H17.56	0x1738	VDO12 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.56" on page 527

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.57	0x1739	VDO13 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.57" on page 527
H17.58	0x173A	VDO13 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.58" on page 528
H17.59	0x173B	VDO14 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.59" on page 528
H17.60	0x173C	VDO14 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.60" on page 528
H17.61	0x173D	VDO15 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.61" on page 529
H17.62	0x173E	VDO15 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.62" on page 529
H17.63	0x173F	VDO16 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.63" on page 529
H17.64	0x1740	VDO16 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.64" on page 530

6.19 Parameter Group H18

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H18.00	0x1800	Position comparison output selection	0: Disable 1: Enable (rising edge-triggered)	0	-	At once	" H18.00" on page 530
H18.01	0x1801	Position comparison output feedback source	0: Motor encoder feedback 1: Fully closed-loop position feedback	0	-	At once	" H18.01" on page 530
H18.02	0x1802	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	-	At once	" H18.02" on page 531
H18.03	0x1803	Position comparison mode	0: Individual comparison mode 1: Cyclic comparison mode 2: Fixed cyclic comparison mode	0	-	At once	" H18.03" on page 531
H18.04	0x1804	Current position as zero	0: Disable 1: Enable (rising edge-triggered)	0	-	At once	" H18.04" on page 531
H18.05	0x1805	Position comparison output width	0.1 ms to 204.7 ms	0.1	ms	At once	" H18.05" on page 532
H18.06	0x1806	Position comparison output ABZ port polarity	bit 0: OCZ output logic 0: Positive, output high level upon active logic 1: Negative, output low level upon active logic bit 1: Z port output logic 0: Positive, output high level upon active logic 1: Negative, output low level upon active logic bit 2: A/B output logic 0: Positive, output high level upon active logic 1: Negative, output low level upon active logic	0	-	At once	" H18.06" on page 532
H18.07	0x1807	Start point of position comparison	0 to 40	0	-	At once	" H18.07" on page 532
H18.08	0x1808	End point of position comparison	0 to 40	0	-	At once	" H18.08" on page 533

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H18.09	0x1809	Current status of position comparison	0 to 1024	0	-	Unchangeable	" H18.09" on page 533
H18.10	0x180A	Real-time position of position comparison	-2147483648 to +2147483647	0	-	Unchangeable	" H18.10" on page 533
H18.12	0x180C	Zero offset of position comparison	-2147483648 to +2147483647	0	-	At once	" H18.12" on page 533
H18.14	0x180E	Position comparison output delay compensation	-12.00 us to +12.00 us	0	us	At once	" H18.14" on page 534
H18.15	0x180F	Cycles of fixed mode	1 to 65535	1	-	At once	" H18.15" on page 534
H18.16	0x1810	ABZ output function setting	bit 0: OCZ output function 0: Frequency-division output 1: Position comparison bit 1: Z port output function 0: Frequency-division output 1: Position comparison bit 2: A/B port output function 0: Frequency-division output 1: Position comparison	0	-	At once	" H18.16" on page 534
H18.17	0x1811	Number of fixed modes completed	0 to 65535	0	-	Unchangeable	" H18.17" on page 535

6.20 Parameter Group H19

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.00	0x1900	Target value of position comparison 1	-2147483648 to +2147483647	0	-	At once	" H19.00" on page 535
H19.02	0x1902	Attribute value of position comparison 1	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.02" on page 535
H19.03	0x1903	Target value of position comparison 2	-2147483648 to +2147483647	0	-	At once	" H19.03" on page 536

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.05	0x1905	Attribute value of position comparison 2	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.05" on page 537*
H19.06	0x1906	Target value of position comparison 3	-2147483648 to +2147483647	0	-	At once	*" H19.06" on page 537*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.08	0x1908	Attribute value of position comparison 3	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.08" on page 537
H19.09	0x1909	Target value of position comparison 4	-2147483648 to +2147483647	0	-	At once	" H19.09" on page 538

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.11	0x190B	Attribute value of position comparison 4	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.11" on page 538*
H19.12	0x190C	Target value of position comparison 5	-2147483648 to +2147483647	0	-	At once	*" H19.12" on page 539*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.14	0x190E	Attribute value of position comparison 5	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.14" on page 539*
H19.15	0x190F	Target value of position comparison 6	-2147483648 to +2147483647	0	-	At once	*" H19.15" on page 540*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.17	0x1911	Attribute value of position comparison 6	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.17" on page 540*
H19.18	0x1912	Target value of position comparison 7	-2147483648 to +2147483647	0	-	At once	*" H19.18" on page 541*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.20	0x1914	Attribute value of position comparison 7	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.20" on page 541
H19.21	0x1915	Target value of position comparison 8	-2147483648 to +2147483647	0	-	At once	" H19.21" on page 542

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.23	0x1917	Attribute value of position comparison 8	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.23" on page 542*
H19.24	0x1918	Target value of position comparison 9	-2147483648 to +2147483647	0	-	At once	*" H19.24" on page 543*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.26	0x191A	Attribute value of position comparison 9	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.26" on page 543
H19.27	0x191B	Target value of position comparison 10	-2147483648 to +2147483647	0	-	At once	" H19.27" on page 544

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.29	0x191D	Attribute value of position comparison 10	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.29" on page 544*
H19.30	0x191E	Target value of position comparison 11	-2147483648 to +2147483647	0	-	At once	*" H19.30" on page 545*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.32	0x1920	Attribute value of position comparison 11	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.32" on page 545*
H19.33	0x1921	Target value of position comparison 12	-2147483648 to +2147483647	0	-	At once	*" H19.33" on page 546*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.35	0x1923	Attribute value of position comparison 12	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.35" on page 546*
H19.36	0x1924	Target value of position comparison 13	-2147483648 to +2147483647	0	-	At once	*" H19.36" on page 547*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.38	0x1926	Attribute value of position comparison 13	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.38" on page 547*
H19.39	0x1927	Target value of position comparison 14	-2147483648 to +2147483647	0	-	At once	*" H19.39" on page 548*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.41	0x1929	Attribute value of position comparison 14	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.41" on page 548
H19.42	0x192A	Target value of position comparison 15	-2147483648 to +2147483647	0	-	At once	" H19.42" on page 549

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.44	0x192C	Attribute value of position comparison 15	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.44" on page 549*
H19.45	0x192D	Target value of position comparison 16	-2147483648 to +2147483647	0	-	At once	*" H19.45" on page 550*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.47	0x192F	Attribute value of position comparison 16	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.47" on page 550
H19.48	0x1930	Target value of position comparison 17	-2147483648 to +2147483647	0	-	At once	" H19.48" on page 551

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.50	0x1932	Attribute value of position comparison 17	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.50" on page 551*
H19.51	0x1933	Target value of position comparison 18	-2147483648 to +2147483647	0	-	At once	*" H19.51" on page 552*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.53	0x1935	Attribute value of position comparison 18	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.53" on page 552*
H19.54	0x1936	Target value of position comparison 19	-2147483648 to +2147483647	0	-	At once	*" H19.54" on page 553*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.56	0x1938	Attribute value of position comparison 19	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.56" on page 553*
H19.57	0x1939	Target value of position comparison 20	-2147483648 to +2147483647	0	-	At once	*" H19.57" on page 554*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.59	0x193B	Attribute value of position comparison 20	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.59" on page 554
H19.60	0x193C	Target value of position comparison 21	-2147483648 to +2147483647	0	-	At once	" H19.60" on page 555

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.62	0x193E	Attribute value of position comparison 21	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.62" on page 555*
H19.63	0x193F	Target value of position comparison 22	-2147483648 to +2147483647	0	-	At once	*" H19.63" on page 556*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.65	0x1941	Attribute value of position comparison 22	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.65" on page 556*
H19.66	0x1942	Target value of position comparison 23	-2147483648 to +2147483647	0	-	At once	*" H19.66" on page 557*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.68	0x1944	Attribute value of position comparison 23	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.68" on page 557*
H19.69	0x1945	Target value of position comparison 24	-2147483648 to +2147483647	0	-	At once	*" H19.69" on page 558*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.71	0x1947	Attribute value of position comparison 24	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.71" on page 558*
H19.72	0x1948	Target value of position comparison 25	-2147483648 to +2147483647	0	-	At once	*" H19.72" on page 559*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.74	0x194A	Attribute value of position comparison 25	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.74" on page 559*
H19.75	0x194B	Target value of position comparison 26	-2147483648 to +2147483647	0	-	At once	*" H19.75" on page 560*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.77	0x194D	Attribute value of position comparison 26	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.77" on page 560*
H19.78	0x194E	Target value of position comparison 27	-2147483648 to +2147483647	0	-	At once	*" H19.78" on page 561*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.80	0x1950	Attribute value of position comparison 27	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.80" on page 561*
H19.81	0x1951	Target value of position comparison 28	-2147483648 to +2147483647	0	-	At once	*" H19.81" on page 562*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.83	0x1953	Attribute value of position comparison 28	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.83" on page 562*
H19.84	0x1954	Target value of position comparison 29	-2147483648 to +2147483647	0	-	At once	*" H19.84" on page 563*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.86	0x1956	Attribute value of position comparison 29	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.86" on page 563
H19.87	0x1957	Target value of position comparison 30	-2147483648 to +2147483647	0	-	At once	" H19.87" on page 564

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.89	0x1959	Attribute value of position comparison 30	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.89" on page 564*
H19.90	0x195A	Target value of position comparison 31	-2147483648 to +2147483647	0	-	At once	*" H19.90" on page 565*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.92	0x195C	Attribute value of position comparison 31	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.92" on page 565*
H19.93	0x195D	Target value of position comparison 32	-2147483648 to +2147483647	0	-	At once	*" H19.93" on page 566*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.95	0x195F	Attribute value of position comparison 32	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.95" on page 566
H19.96	0x1960	Target value of position comparison 33	-2147483648 to +2147483647	0	-	At once	" H19.96" on page 567

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.98	0x1962	Attribute value of position comparison 33	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.98" on page 567*
H19.99	0x1963	Target value of position comparison 34	-2147483648 to +2147483647	0	-	At once	*" H19.99" on page 568*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.101	0x1965	Attribute value of position comparison 34	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.101" on page 568
H19.102	0x1966	Target value of position comparison 35	-2147483648 to +2147483647	0	-	At once	" H19.102" on page 569

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.104	0x1968	Attribute value of position comparison 35	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.104" on page 569
H19.105	0x1969	Target value of position comparison 36	-2147483648 to +2147483647	0	-	At once	" H19.105" on page 570

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.107	0x196B	Attribute value of position comparison 36	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.107" on page 570*
H19.108	0x196C	Target value of position comparison 37	-2147483648 to +2147483647	0	-	At once	*" H19.108" on page 571*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.110	0x196E	Attribute value of position comparison 37	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.110" on page 571*
H19.111	0x196F	Target value of position comparison 38	-2147483648 to +2147483647	0	-	At once	*" H19.111" on page 572*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.113	0x1971	Attribute value of position comparison 38	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.113" on page 572
H19.114	0x1972	Target value of position comparison 39	-2147483648 to +2147483647	0	-	At once	" H19.114" on page 573

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.116	0x1974	Attribute value of position comparison 39	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.116" on page 573*
H19.117	0x1975	Target value of position comparison 40	-2147483648 to +2147483647	0	-	At once	*" H19.117" on page 574*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.119	0x1977	Attribute value of position comparison 40	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.119" on page 574

6.21 Parameter Group H1F

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H1F.90	0x1F5A	DI function state 1 read through communication	0 to 65535	0	-	Unchangeable	" H1F.90" on page 575
H1F.91	0x1F5B	DI function state 2 read through communication	0 to 65535	0	-	Unchangeable	" H1F.91" on page 575
H1F.92	0x1F5C	DI function state 3 read through communication	0 to 65535	0	-	Unchangeable	" H1F.92" on page 576
H1F.93	0x1F5D	DI function state 4 read through communication	0 to 65535	0	-	Unchangeable	" H1F.93" on page 576

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H1F.94	0x1F5E	DO function state 1 read through communication	0 to 65535	0	-	Unchangeable	" H1F.94" on page 576
H1F.95	0x1F5F	DO function state 2 read through communication	0 to 65535	0	-	Unchangeable	" H1F.95" on page 577

6.22 Parameter Group H30

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H30.00	0x3000	Servo status read through communication	0 to 65535	0	-	Unchangeable	" H30.00" on page 577
H30.01	0x3001	DO function state 1 read through communication	0 to 65535	0	-	Unchangeable	" H30.01" on page 577
H30.02	0x3002	DO function state 2 read through communication	0 to 65535	0	-	Unchangeable	" H30.02" on page 578

6.23 Parameter Group H31

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H31.00	0x3100	VDI virtual level set through communication	0 to 65535	0	-	At once	" H31.00" on page 578
H31.04	0x3104	DO status set through communication	0 to 65535	0	-	At once	" H31.04" on page 579
H31.05	0x3105	AO set through communication	-10000 mV to +10000 mV	0	mV	At once	" H31.05" on page 579
H31.09	0x3109	Speed reference set through communication	-9999.000 rpm to +9999.000 rpm	0	rpm	At once	" H31.09" on page 579
H31.11	0x310B	Torque reference set through communication	-100.000% to +100.000%	0	%	At once	" H31.11" on page 579

6.24 Parameter Group 1000h

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
1000.00h	0x5405	Device type	0 to 65535	0	-	Unchangeable	" 1000.00h" on page 580
1001.00h	0x5406	Error register	0 to 255	0	-	Unchangeable	" 1001.00h" on page 580
1018.01h	0x5401	Vendor ID	0 to 65535	0	-	Unchangeable	" 1018.01h" on page 580
1018.02h	0x5402	Product code	0 to 65535	0	-	Unchangeable	" 1018.02h" on page 580
1018.03h	0x5403	Revision number	0 to 65535	0	-	Unchangeable	" 1018.03h" on page 581
1600.00h	0x3900	Number of valid mapped objects in RPDO1	0 to 20	3	-	At once	" 1600.00h" on page 581
1600.01h	0x3901	1st mapped object in RPDO1	0 to 2147483647	1614807040	-	At once	" 1600.01h" on page 581
1600.02h	0x3902	2nd mapped object in RPDO1	0 to 2147483647	1618608128	-	At once	" 1600.02h" on page 581
1600.03h	0x3903	3rd mapped object in RPDO1	0 to 2147483647	1622671360	-	At once	" 1600.03h" on page 582
1600.04h	0x3904	4th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.04h" on page 582
1600.05h	0x3905	5th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.05h" on page 582
1600.06h	0x3906	6th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.06h" on page 582
1600.07h	0x3907	7th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.07h" on page 583
1600.08h	0x3908	8th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.08h" on page 583
1600.09h	0x3909	9th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.09h" on page 583
1600.0Ah	0x390A	10th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.0Ah" on page 583
1600.0Bh	0x390B	11th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.0Bh" on page 584
1600.0Ch	0x390C	12th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.0Ch" on page 584
1600.0Dh	0x390D	13th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.0Dh" on page 584
1600.0Eh	0x390E	14th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.0Eh" on page 584

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
1600.0Fh	0x390F	15th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.0Fh" on page 585
1600.10h	0x3910	16th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.10h" on page 585
1600.11h	0x3911	17th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.11h" on page 585
1600.12h	0x3912	18th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.12h" on page 585
1600.13h	0x3913	19th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.13h" on page 586
1600.14h	0x3914	20th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.14h" on page 586
1A00.00h	0x4000	Number of valid mapped objects in TPDO1	0 to 20	7	-	At once	" 1A00.00h" on page 586
1A00.01h	0x4001	1st mapped object in TPDO1	0 to 2147483647	1614872576	-	At once	" 1A00.01h" on page 586
1A00.02h	0x4002	2nd mapped object in TPDO1	0 to 2147483647	1617166336	-	At once	" 1A00.02h" on page 587
1A00.03h	0x4003	3rd mapped object in TPDO1	0 to 2147483647	1622736896	-	At once	" 1A00.03h" on page 587
1A00.04h	0x4004	4th mapped object in TPDO1	0 to 2147483647	1622802432	-	At once	" 1A00.04h" on page 587
1A00.05h	0x4005	5th mapped object in TPDO1	0 to 2147483647	1622933504	-	At once	" 1A00.05h" on page 587
1A00.06h	0x4006	6th mapped object in TPDO1	0 to 2147483647	1614741504	-	At once	" 1A00.06h" on page 588
1A00.07h	0x4007	7th mapped object in TPDO1	0 to 2147483647	1627193344	-	At once	" 1A00.07h" on page 588
1A00.08h	0x4008	8th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.08h" on page 588
1A00.09h	0x4009	9th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.09h" on page 588
1A00.0Ah	0x400A	10th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.0Ah" on page 589
1A00.0Bh	0x400B	11th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.0Bh" on page 589
1A00.0Ch	0x400C	12th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.0Ch" on page 589
1A00.0Dh	0x400D	13th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.0Dh" on page 589
1A00.0Eh	0x400E	14th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.0Eh" on page 590
1A00.0Fh	0x400F	15th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.0Fh" on page 590

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
1A00.10h	0x4010	16th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.10h" on page 590
1A00.11h	0x4011	17th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.11h" on page 590
1A00.12h	0x4012	18th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.12h" on page 591
1A00.13h	0x4013	19th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.13h" on page 591
1A00.14h	0x4014	20th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.14h" on page 591
1C12.00h	0x5000	Number of assigned PDOs	0 to 2	1	-	At once	" 1C12.00h" on page 591
1C12.01h	0x5001	Index of assigned RPDO1	5632 to 5898	0	-	At once	" 1C12.01h" on page 592
1C12.02h	0x5002	Index of assigned RPDO2	5632 to 5898	0	-	At once	" 1C12.02h" on page 592
1C13.00h	0x5100	Number of assigned PDOs	0 to 2	0	-	At once	" 1C13.00h" on page 592
1C13.01h	0x5101	Index of assigned TPDO1	6656 to 6922	0	-	At once	" 1C13.01h" on page 592
1C13.02h	0x5102	Index of assigned TPDO2	6656 to 6922	0	-	At once	" 1C13.02h" on page 593
1C32.01h	0x5201	Synchronization type	0 to 65535	0	-	At once	" 1C32.01h" on page 593
1C32.02h	0x5202	Cycle time	0 to 4294967295	0	-	At once	" 1C32.02h" on page 593
1C32.04h	0x5204	Synchronization types supported	0 to 65535	0	-	At once	" 1C32.04h" on page 593
1C32.05h	0x5205	Minimum cycle time	0 to 4294967295	0	-	At once	" 1C32.05h" on page 594
1C33.01h	0x5301	Synchronization type	0 to 65535	0	-	At once	" 1C33.01h" on page 594
1C33.02h	0x5302	Cycle time	0 to 4294967295	0	-	At once	" 1C33.02h" on page 594
1C33.04h	0x5304	Synchronization types supported	0 to 65535	0	-	At once	" 1C33.04h" on page 594
1C33.05h	0x5305	Minimum cycle time	0 to 4294967295	0	-	At once	" 1C33.05h" on page 595

6.25 Parameter Group 6000h

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
603Fh	0x3500	Error Code	0 to 65535	0	-	Unchangeable	" 603Fh" on page 595
6040h	0x3502	Control word	0 to 65535	0	-	At once	" 6040h" on page 595
6041h	0x3504	Status word	0 to 65535	0	-	Unchangeable	" 6041h" on page 596
605Ah	0x3536	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 596

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
605Ch	0x353A	Disable operation option code	-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 state 2: Dynamic braking stop, keeping de-energized state	0	-	At stop	" 605Ch" on page 596
605Dh	0x353C	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 597

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
605Eh	0x353E	Fault reaction option code	-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 597*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
6060h	0x3542	Modes of operation	1: Profile position (PP) mode 3: Profile velocity (PV) mode 4: Profile torque (PT) mode 6: Homing (HM) mode 8: Cyclic synchronous position (CSP) mode 9: Cyclic synchronous velocity (CSV) mode 10: Cyclic synchronous torque (CST) mode	0	-	At once	*" 6060h" on page 598*
6061h	0x3544	Modes of operation display	1: Profile position (PP) mode 3: Profile velocity (PV) mode 4: Profile torque (PT) mode 6: Homing (HM) mode 8: Cyclic synchronous position (CSP) mode 9: Cyclic synchronous velocity (CSV) mode 10: Cyclic synchronous torque (CST) mode	0	-	Unchangeable	*" 6061h" on page 599*
6062h	0x3546	Position demand value	-2147483648 to +2147483647	0	Reference unit	Unchangeable	*" 6062h" on page 599*
6063h	0x3548	Position actual value	-2147483648 to +2147483647	0	Pulse	Unchangeable	*" 6063h" on page 600*
6064h	0x354A	Position actual value	-2147483648 to +2147483647	0	Reference unit	Unchangeable	*" 6064h" on page 600*
6065h	0x354C	Following error window	0 to 4294967295	219895608	Reference unit	At once	*" 6065h" on page 600*
6066h	0x354E	Following error time out	0 ms to 65535 ms	0	ms	At once	*" 6066h" on page 600*
6067h	0x3550	Position window	0 to 4294967295	46976	Reference unit	At once	*" 6067h" on page 601*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
6068h	0x3552	Position window time	0 ms to 65535 ms	0	ms	At once	" 6068h" on page 601
606Ch	0x355A	Velocity actual value	-2147483648 to +2147483647	0	Reference unit/s	Unchangeable	" 606Ch" on page 601
606Dh	0x355C	Velocity window	0 rpm to 65535 rpm	10	rpm	At once	" 606Dh" on page 602
606Eh	0x355E	Velocity window time	0 ms to 65535 ms	0	ms	At once	" 606Eh" on page 602
606Fh	0x3560	Velocity threshold	0 rpm to 65535 rpm	10	rpm	At once	" 606Fh" on page 602
6070h	0x3562	Velocity threshold time	0 ms to 65535 ms	0	ms	At once	" 6070h" on page 603
6071h	0x3564	Target torque	-4000 to +4000	0	0.001	At once	" 6071h" on page 603
6072h	0x3566	Max. torque value	0 to 4000	3500	0.001	At once	" 6072h" on page 603
6074h	0x356A	Torque demand value	-4000 to +4000	0	0.001	Unchangeable	" 6074h" on page 603
6077h	0x3570	Torque actual value	-4000 to +4000	0	0.001	Unchangeable	" 6077h" on page 604
607Ah	0x3576	Target position	-2147483648 to +2147483647	0	Reference unit	At once	" 607Ah" on page 604
607Ch	0x357A	Home offset	-2147483648 to +2147483647	0	Reference unit	At once	" 607Ch" on page 604
607D.01h	0x3700	Min. position limit	-2147483648 to +2147483647	-2147483648	Reference unit	At once	" 607D.01h" on page 605
607D.02h	0x3800	Max. position limit	-2147483648 to +2147483647	2147483647	Reference unit	At once	" 607D.02h" on page 605
607Eh	0x357E	Polarity	0 to 127	0	-	At once	" 607Eh" on page 606
607Fh	0x3580	Max. profile velocity	0 to 4294967295	4294967295	Reference unit/s	At once	" 607Fh" on page 606
6081h	0x3584	Profile velocity	0 to 4294967295	111848106	Reference unit/s	At once	" 6081h" on page 606
6083h	0x3588	Profile acceleration	0 to 4294967295	4294967295	Reference unit/s^2	At once	" 6083h" on page 607
6084h	0x358A	Profile deceleration	0 to 4294967295	4294967295	Reference unit/s^2	At once	" 6084h" on page 607
6085h	0x358C	Quick stop deceleration	0 to 4294967295	2147483648	Reference unit/s^2	At once	" 6085h" on page 607
6087h	0x3590	Torque slope	0 to 4294967295	4294967295	0.1%/s	At once	" 6087h" on page 608
6091.01h	0x3714	Motor revolutions	1 to 4294967295	1	-	At stop	" 6091.01h" on page 608

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
6091.02h	0x3814	Shaft revolutions	1 to 4294967295	1	-	At stop	" 6091.02h" on page 609
6098h	0x35B2	Homing method	-2 to +35	1	-	At once	" 6098h" on page 609
6099.01h	0x371C	Speed during search for switch	0 to 4294967295	111848106	Reference unit/s	At stop	" 6099.01h" on page 610
6099.02h	0x381C	Speed during search for zero	0 to 4294967295	11184810	Reference unit/s	At stop	" 6099.02h" on page 610
609Ah	0x35B6	Homing acceleration	0 to 4294967295	4294967295	Reference unit/s^2	At once	" 609Ah" on page 611
60B0h	0x35E2	Position offset	-2147483648 to +2147483647	0	Reference unit	At once	" 60B0h" on page 611
60B1h	0x35E4	Velocity offset	-2147483648 to +2147483647	0	Reference unit/s	At once	" 60B1h" on page 611
60B2h	0x35E6	Torque offset	-4000 to +4000	0	0.001	At once	" 60B2h" on page 611
60B8h	0x35F2	Touch probe function	0 to 65535	0	-	At once	" 60B8h" on page 612
60B9h	0x35F4	Touch probe status	0 to 65535	0	-	Unchangeable	" 60B9h" on page 613
60BAh	0x35F6	Touch probe 1 positive edge	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" 60BAh" on page 614
60BBh	0x35F8	Touch probe 1 negative edge	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" 60BBh" on page 614
60BCh	0x35FA	Touch probe 2 positive edge	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" 60BCh" on page 615
60BDh	0x35FC	Touch probe 2 negative edge	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" 60BDh" on page 615
60C5h	0x360C	Max. acceleration	0 to 4294967295	4294967295	Reference unit/s^2	At once	" 60C5h" on page 615
60C6h	0x360E	Max. deceleration	0 to 4294967295	4294967295	Reference unit/s^2	At once	" 60C6h" on page 615
60D5h	0x362C	Touch probe 1 positive edge counter	0 to 65535	0	-	Unchangeable	" 60D5h" on page 616
60D6h	0x362E	Touch probe 1 negative edge counter	0 to 65535	0	-	Unchangeable	" 60D6h" on page 616
60D7h	0x3630	Touch probe 2 positive edge counter	0 to 65535	0	-	Unchangeable	" 60D7h" on page 616
60D8h	0x3632	Touch probe 2 negative edge counter	0 to 65535	0	-	Unchangeable	" 60D8h" on page 616

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
60E0h	0x3642	Positive torque limit value	0 to 4000	3500	0.001	At once	" 60E0h" on page 617
60E1h	0x3644	Negative torque limit value	0 to 4000	3500	0.001	At once	" 60E1h" on page 617
60E6h	0x364E	Actual position calculation method	0 to 1	0	-	At once	" 60E6h" on page 617
60F4h	0x366A	Following error actual value	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" 60F4h" on page 618
60FCh	0x367A	Position demand value	-2147483648 to +2147483647	0	pulse	Unchangeable	" 60FCh" on page 618
60FDh	0x367C	Digital inputs	0 to 4294967295	0	-	Unchangeable	" 60FDh" on page 618
60FFh	0x3680	Target velocity	-2147483648 to +2147483647	0	Reference unit/s	At once	" 60FFh" on page 619
60FE.01h	0x3781	Physical outputs	0 to 4294967295	0	-	At once	" 60FE.01h" on page 619
60FE.02h	0x3881	Bitmask	0 to 4294967295	0	-	At once	" 60FE.02h" on page 620

7 Parameter Descriptions

7.1 H00: Servo Motor Parameters

H00.00 Motor code

Address:	0x0000		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	14102	Change:	At stop

Value Range:

0 to 65535

Description

14000: Inovance motor with 20-bit incremental encoder

14101: Inovance motor with 23-bit absolute encoder

14102: Inovance motor with 26-bit absolute encoder

H00.02 Customized No.

Address:	0x0002		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 4294967295.00

Description

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

H00.04 Encoder version

Address:	0x0004		
Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0 to 6553.5

Description

Saved in the encoder to differentiate the encoder software version.

H00.05 Serial-type motor code

Address:	0x0005		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16

Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

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

H00.06 Customized FPGA No.

Address:	0x0006		
Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 655.35

Description

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

H00.07 STO version

Address:	0x0007		
Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 655.35

Description

Displays the software version of the STO function.

H00.08 Serial encoder type

Address:	0x0008		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 to 65535

Description

14100: Multi-turn absolute encoder

Others: Single-turn absolute encoder

7.2 H01: Servo Drive Parameters

H01.00 MCU software version

Address: 0x0100

Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0 to 6553.5

Description

Displays the MCU software version (with one decimal place).

H01.01 FPGA software version

Address: 0x0101

Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0 to 6553.5

Description

Displays the FPGA software version (with one decimal place).

H01.02 Servo drive series No.

Address: 0x0102

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

Value Range:

0 to 65535

Description

Displays the servo drive series No. (without decimal place).

H01.06 Board software version

Address: 0x0106

Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Setpoint

0.0 to 6553.5

Description

Displays the board software version (with one decimal place).

H01.10 **Drive series No.**

Address:	0x010A		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	3	Change:	At stop

Value Range:

2: S1R6

3: S2R8

5: S5R5

6: S7R6

7: S012

8: S018

9: S022

10: S027

10001: T3R5

10002: T5R4

10003: T8R4

10004: T012

10005: T017

10006: T021

10007: T026

Description

Displays the drive series No. (without decimal place).

H01.11 **DC-AC voltage class**

Address:	0x010B		
Min.:	0	Unit:	V
Max.:	65535	Data Type:	UInt16
Default:	220	Change:	Unchangeable

Value Range:

0 V to 65535 V

Description

Displays DC-AC voltage class (without decimal place).

H01.12 **Rated power of the drive**

Address:	0x010C		
Min.:	0	Unit:	kW
Max.:	10737418.24	Data Type:	UInt32
Default:	0.4	Change:	Unchangeable

Value Range:

0.00 kW to 10737418.24 kW

Description

Displays the rated power of the servo drive (with two decimal places).

H01.14 Max. output power of the drive

Address:	0x010E		
Min.:	0	Unit:	kW
Max.:	10737418.24	Data Type:	UInt32
Default:	0.4	Change:	Unchangeable

Value Range:

0.00 kW to 10737418.24 kW

Description

Displays the maximum output power of the drive (with two decimal places).

H01.16 Rated output current of the drive

Address:	0x0110		
Min.:	0	Unit:	A
Max.:	10737418.24	Data Type:	UInt32
Default:	2.8	Change:	Unchangeable

Value Range:

0.00 A to 10737418.24 A

Description

Displays the rated output current of the drive (with two decimal places).

H01.18 Max. output current of the drive

Address:	0x0112		
Min.:	0	Unit:	A
Max.:	10737418.24	Data Type:	UInt32
Default:	10.1	Change:	Unchangeable

Value Range:

0.00 A to 10737418.24 A

Description

Displays the maximum output current of the drive (with two decimal places).

H01.40 DC bus overvoltage protection threshold

Address:	0x0128		
Min.:	0	Unit:	V
Max.:	2000	Data Type:	UInt16
Default:	420	Change:	At once

Value Range:

0 V to 2000 V

Description

Displays DC bus overvoltage protection threshold (without decimal place).

H01.75 Current loop amplification factor

Address: 0x014B

Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 655.35

Description

Displays current loop amplication coefficient (with two decimal places).

H01.89 Junction temperature parameter version

Address: 0x0159

Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 655.35

Description

Displays the junction temperature parameter version.

7.3 H02: Basic Control Parameters

H02.00 Control mode

Address: 0x0200

Min.:	0	Unit:	-
Max.:	9	Data Type:	UInt16
Default:	9	Change:	At stop

Value Range:

0: Speed control mode

1: Position control mode

2: Torque control mode

9: EtherCAT mode

Description

0: Speed control mode

1: Position control mode

2: Torque control mode

9: EtherCAT mode

H02.01 Absolute system selection

Address:	0x0201		
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 Direction of rotation

Address:	0x0202		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Counterclockwise (CCW) as forward direction

1: Clockwise (CW) as forward direction

Description

Defines the forward direction of the motor when viewed from the motor shaft side.

H02.03 Output pulse phase

Address:	0x0203		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Phase A leads phase B

1: Phase A lags behind phase B

Description

Defines the relationship between phase A and phase B on the condition that the motor direction of rotation remains unchanged when pulse output is enabled.

H02.05 Stop mode at S-ON OFF

Address:	0x0205		
Min.:	-4	Unit:	-

Max.: 2 Data Type: Int16
Default: 0 Change: At once

Value Range:

-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 based on 6084h/609Ah (HM), keeping de-energized state
2: Dynamic braking stop, keeping de-energized state

Description

Defines the deceleration mode of the motor for stopping rotating upon S-ON OFF and the motor status after stop.

H02.06 Stop mode at No. 2 fault

Address: 0x0206
Min.: -5 Unit: -
Max.: 4 Data Type: Int16
Default: 2 Change: At once

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: 0x0207
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: Ramp to stop as defined by 6085h, keeping de-energized state
4: Ramp to stop as defined by 6085h, 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:	0x0208		
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:	0x0209		
Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	250	Change:	At once

Value Range:

0 ms to 500 ms

Description

Defines the delay from the moment the brake (BK) 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:	0x020A		
Min.:	50	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	150	Change:	At once

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 Speed threshold at brake output OFF in rotation state

Address:	0x020B		
Min.:	20	Unit:	rpm
Max.:	3000	Data Type:	UInt16
Default:	30	Change:	At once

Value Range:

20 rpm to 3000 rpm

Description

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

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

Address:	0x020C		
Min.:	1	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	500	Change:	At once

Value Range:

1 ms to 65535 ms

Description

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

H02.15 Warning display on the keypad

Address:	0x020F		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

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: 0x0210

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: OFF

1: ON

Description

Used to turn on or off the brake function.

H02.17 Stop mode upon main circuit power failure

Address: 0x0211

Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0: Keep present 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: 0x0212

Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	2	Change:	At once

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.

H02.21 Permissible minimum resistance of regenerative resistor

Address: 0x0215

Min.: 1 Unit: Ω
Max.: 1000 Data Type: UInt16
Default: 40 Change: Unchangeable

Value Range:

1 Ω to 1000 Ω

Description

-

H02.22 Power of built-in regenerative resistor

Address: 0x0216
Min.: 0 Unit: W
Max.: 65535 Data Type: UInt16
Default: 50 Change: Unchangeable

Value Range:

0 W to 65535 W

Description

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

H02.23 Resistance of built-in regenerative resistor

Address: 0x0217
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 unchangeable.

H02.24 Resistor heat dissipation coefficient

Address: 0x0218
Min.: 10 Unit: %
Max.: 100 Data Type: UInt16
Default: 30 Change: At once

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.

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 or 50% for forced air cooling.

H02.25 Regenerative resistor type

Address:	0x0219		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	3	Change:	At once

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:	0x021A		
Min.:	1	Unit:	W
Max.:	65535	Data Type:	UInt16
Default:	40	Change:	At once

Value Range:

1 W to 65535 W

Description

Defines the power of external regenerative resistor.

H02.27 Resistance of external regenerative resistor

Address:	0x021B		
Min.:	15	Unit:	Ω
Max.:	1000	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

15 Ω to 1000 Ω

Description

Defines the resistance of the external regenerative resistor.

H02.30 **User password**

Address:	0x021E		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

H02.31 **System parameter initialization**

Address:	0x021F		
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:	0x0220		
Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0 to 99

Description

Used to set the offset of the parameter to be displayed on the keypad.

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 (Speed reference) is displayed on the keypad.

H02.35 **Keypad data refresh frequency**

Address:	0x0223		
Min.:	0	Unit:	Hz
Max.:	20	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 Hz to 20 Hz

Description

-

H02.41 Manufacturer password

Address:	0x0229		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

7.4 H03: Terminal Input Parameters

H03.02 DI1 function

Address:	0x0302		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	14	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jog
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
38: Touch probe 1
39: Touch probe 2
40: Multi-speed enable

Description

Defines the function of DI1.

H03.03 DI1 logic

Address:	0x0303		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open

1: Closed

Description

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

H03.04 DI2 function

Address:	0x0304		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	15	Change:	At once

Value Range:

0: No assignment

1: Servo ON

2: Alarm reset signal

5: Multi-reference direction

6: Multi-reference switchover CMD1

7: Multi-reference switchover CMD2

8: Multi-reference switchover CMD3

9: Multi-reference switchover CMD4

14: Positive limit switch

15: Negative limit switch

18: Forward jog

19: Reverse jog

24: Electronic gear ratio selection

28: Multi-position reference enable

31: Home switch

34: Emergency stop

38: Touch probe 1

39: Touch probe 2

40: Multi-speed enable

Description

-

H03.05 DI2 logic

Address: 0x0305

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open

1: Closed

Description

-

H03.06 DI3 function

Address: 0x0306

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	31	Change:	At once

Value Range:

0: No assignment

1: Servo ON

2: Alarm reset signal

5: Multi-reference direction

6: Multi-reference switchover CMD1

7: Multi-reference switchover CMD2

8: Multi-reference switchover CMD3

9: Multi-reference switchover CMD4

14: Positive limit switch

15: Negative limit switch

18: Forward jog

19: Reverse jog

24: Electronic gear ratio selection

28: Multi-position reference enable

31: Home switch

34: Emergency stop

38: Touch probe 1

39: Touch probe 2

40: Multi-speed enable

Description

Defines the function of DI3.

H03.07 DI3 logic

Address: 0x0307

Min.:	0	Unit:	-

Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open

1: Closed

Description

-

H03.08 DI4 function

Address:	0x0308		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	34	Change:	At once

Value Range:

0: No assignment

1: Servo ON

2: Alarm reset signal

5: Multi-reference direction

6: Multi-reference switchover CMD1

7: Multi-reference switchover CMD2

8: Multi-reference switchover CMD3

9: Multi-reference switchover CMD4

14: Positive limit switch

15: Negative limit switch

18: Forward jog

19: Reverse jog

24: Electronic gear ratio selection

28: Multi-position reference enable

31: Home switch

34: Emergency stop

38: Touch probe 1

39: Touch probe 2

40: Multi-speed enable

Description

-

H03.09 DI4 logic

Address:	0x0309		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open
1: Closed

Description

-

H03.10 DI5 function

Address: 0x030A

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	38	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jog
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
38: Touch probe 1
39: Touch probe 2
40: Multi-speed enable

Description

-

H03.11 DI5 logic

Address: 0x030B

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open
1: Closed

Description

-

H03.50 Voltage-type AI1 offset

Address:	0x0332		
Min.:	-5000	Unit:	mV
Max.:	5000	Data Type:	Int16
Default:	0	Change:	At once

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:	0x0333		
Min.:	0	Unit:	ms
Max.:	655.35	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.00 ms to 655.35 ms

Description

Defines the filter time constant of AI1 input current signal.

H03.53 Voltage-type AI1 dead zone

Address:	0x0335		
Min.:	0	Unit:	mV
Max.:	1000	Data Type:	UInt16
Default:	10	Change:	At once

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:	0x0336		
Min.:	-500	Unit:	mV
Max.:	500	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-500.0 mV to +500.0 mV

Description

Zero drift indicates the value of the drive 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 adjusted will be saved into H03.54.

H03.56 Current-type AI2 input filter time constant

Address: 0x0338

Min.:	0	Unit:	ms
Max.:	655.35	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.00 ms to 655.35 ms

Description

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

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

H03.60 DI1 filter time

Address: 0x033C

Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	0.5	Change:	At once

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: 0x033D

Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	0.5	Change:	At once

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: 0x033E

Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	0.5	Change:	At once

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: 0x033F

Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	0.5	Change:	At once

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: 0x0340

Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	0.5	Change:	At once

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.

H03.78 **Speed value corresponding to analog 20 mA**

Address: 0x034E

Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	3000	Change:	At stop

Value Range:

0 rpm to 9999 rpm

Description

Defines the motor speed corresponding to AI2 sampling current of 20 mA.
Speed limit value in the torque control mode = Sampling current/20 x H03.78

H03.79 Torque value corresponding to analog 20 mA

Address: 0x034F

Min.:	1	Unit:	Multiplier
Max.:	8	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:
1.00 to 8.00

Description
Defines the motor torque value corresponding to AI2 sampling current of 20 mA.
Torque reference value = Sampling voltage/20 x H03.79

H03.80 Speed corresponding to analog 10 V

Address: 0x0350

Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	3000	Change:	At stop

Value Range:
0 rpm to 9999 rpm

Description
Defines the corresponding motor speed when sampling the voltage is 10 V.
Speed reference value = Sampling voltage/10 x H03.80

H03.81 Torque corresponding to analog 10 V

Address: 0x0351

Min.:	1	Unit:	Multiplier
Max.:	8	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:
1.00 to 8.00

Description
Defines the motor torque corresponding to a sampling voltage of 10 V.
Torque reference value = Sampling voltage/10 x H03.81

7.5 H04: Terminal Output Parameters

H04.00 DO1 function

Address: 0x0400

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: No assignment

1: Servo ready

2: Motor rotation signal

10: Warning

11: Fault

25: Comparison output DO

31: Communication-forced DO

32: EDM output

Description

Defines the function of DO1.

H04.01 DO1 logic

Address: 0x0401

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open

1: Closed

Description

Defines the level logic of DO1 when the function assigned to DO1 is active.

H04.02 DO2 function

Address: 0x0402

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	11	Change:	At once

Value Range:

0: No assignment

1: Servo ready

2: Motor rotation signal

10: Warning

11: Fault

25: Comparison output DO

31: Communication-forced DO

32: EDM output

Description

-

H04.03 DO2 logic

Address: 0x0403

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open

1: Closed

Description

-

H04.22 DO source

Address: 0x0416

Min.:	0	Unit:	-
Max.:	3 p	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: DO1 source

0: DO1 function output

1: bit 0 of H31.04 set through communication

bit 1: DO2 source

0: DO2 function output

1: bit 1 of H31.04 set through communication

Description

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

H04.23 EtherCAT-forced DO logic in non-operational status

Address: 0x0417

Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: DO1

0: Status unchanged

1: No output

bit 1: DO2

0: Status unchanged

1: No output

Description

Defines the DO status when EtherCAT communication is disconnected.

H04.50 AO1 signal selection

Address:	0x0432		
Min.:	0	Unit:	-
Max.:	10	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Motor speed (1 V/1000 rpm)
1: Speed reference (1 V/1000 rpm)
2: Torque reference (1 V/100 x rated torque)
3: Position deviation (0.5 mV/1 reference unit)
4: Position deviation (0.5 mV/1 encoder unit)
5: Position reference speed (1 V/1000 rpm)
6: Positioning completed
8: AI1 voltage
10: Defined by H31.05

Description

Defines the physical value source of AO1.

H04.51 AO1 offset voltage

Address:	0x0433		
Min.:	-10000	Unit:	mV
Max.:	10000	Data Type:	Int16
Default:	5000	Change:	At once

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:	0x0434		
Min.:	-99.99	Unit:	-
Max.:	99.99	Data Type:	Int16
Default:	1	Change:	At once

Value Range:

-99.99 to +99.99

Description

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

7.6 H05: Position Control Parameters

H05.00 Main position reference source

Address:	0x0500		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 to 2 (Multi-position reference)

Description

Defines the position reference source in the position control mode.

H05.02 Pulses per revolution

Address:	0x0502		
Min.:	0	Unit:	PPR
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At stop

Value Range:

0 to 4294967295

Description

Defines the number of pulses required per revolution of the motor in the local mode and communication mode.

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

Address:	0x0504		
Min.:	0	Unit:	ms
Max.:	6553.5	Data Type:	UInt16
Default:	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:	0x0506		
Min.:	0	Unit:	ms
Max.:	128	Data Type:	UInt16
Default:	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:	0x0507		
Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	1	Change:	At once

Value Range:

1 to 1073741824

Description

Defines the numerator of electronic gear ratio 1.

H05.09 Electronic gear ratio 1 (denominator)

Address:	0x0509		
Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	1	Change:	At once

Value Range:

1 to 1073741824

Description

Defines the denominator of electronic gear ratio 1.

H05.11 Electronic gear ratio 2 (numerator)

Address:	0x050B		
Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	1	Change:	At once

Value Range:

1 to 1073741824

Description

Defines the numerator of electronic gear ratio 2.

H05.13 Electronic gear ratio 2 (denominator)

Address:	0x050D		
Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	1	Change:	At once

Value Range:

1 to 1073741824

Description

Defines the denominator of electronic gear ratio 2.

H05.16 Clear action

Address: 0x0510

Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

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

1: Position deviation cleared upon S-OFF or fault

2: Position deviation cleared in the non-operational state or when FunIN.35 is activated

Description

Defines the condition for clearing the position deviation.

H05.17 Number of encoder frequency-division pulses

Address: 0x0511

Min.:	0	Unit:	PPR
Max.:	4194303	Data Type:	UInt32
Default:	2500	Change:	At stop

Value Range:

0 PPR to 4194303 PPR

Description

Defines the number of pulses outputted by PAO or PBO per revolution.

Pulse output resolution per revolution = (H05.17) x 4

H05.19 Speed feedforward control

Address: 0x0513

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.

H05.30 Homing selection

Address:	0x051E		
Min.:	0	Unit:	-
Max.:	6	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

6: Current position as the home

Description

Defines the homing mode and the trigger signal source.

H05.35 Homing time limit

Address:	0x0523		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10000	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Defines the maximum homing time.

H05.36 Mechanical home offset

Address:	0x0524		
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

Defines the absolute position value of the motor after homing.

H05.38 Frequency-division output source

Address:	0x0526		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Encoder frequency-division output

1: Pulse reference synchronous output

2: Frequency-division output inhibited

3: Second encoder frequency-division output

Description

Defines the output source of the pulse output terminal.

H05.39 Electronic gear ratio switchover condition

Address:	0x0527		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Switched if position reference kept 0 for 2.5 ms

1: Switched in real time

Description

Defines the condition for switching the electronic gear ratio.

H05.40 Mechanical home offset and action upon overtravel

Address:	0x0528		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At once

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.

H05.41 Z pulse output polarity

Address:	0x0529		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

bit 0: Frequency-division Z output polarity
0: Positive (high level upon active Z pulse)
1: Negative (low level upon active Z pulse)
bit 1: OCZ output polarity
0: Positive (high level upon active Z pulse)
1: Negative (low level upon active Z pulse)
bit 2: Inner loop probe Z signal source
0: Motor Z signal
1: Frequency-division output Z signal

Description

Defines the output level when the Z pulse of pulse output terminal is active.

H05.44 Numerator of frequency-division output reduction ratio

Address:	0x052C		
Min.:	1	Unit:	-
Max.:	16383	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 16383

Description

Defines the numerator of frequency-division output reduction ratio.

H05.45 Denominator of frequency-division output reduction ratio

Address:	0x052D		
Min.:	1	Unit:	-
Max.:	8191	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 8191

Description

Defines the denominator of frequency-division output reduction ratio.

H05.46 DI selection of multi-turn frequency-division Z starting point

Address:	0x052E		
Min.:	0	Unit:	-
Max.:	5	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No selection
1: DI1
2: DI2
3: DI3
4: DI4
5: DI5

Description

In the absolute position linear mode, the position offset is the difference between absolute position of current encoder and the mechanical position.

H05.47 Frequency-division Z pulse width

Address:	0x052F		
Min.:	0	Unit:	us
Max.:	400	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 us to 400 us

Description

Defines the minimum output width (us) of frequency-division output PZ.

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

Address:	0x0532		
Min.:	1	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 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 (denominator) in absolute position rotation mode

Address:	0x0533		
Min.:	1	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 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:			
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:	0x0536		
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.

H05.56 **Speed threshold in homing upon hit-and-stop**

Address:	0x0538		
Min.:	0	Unit:	rpm
Max.:	1000	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 rpm to 1000 rpm

Description

Defines the speed threshold for judging whether the load reaches the mechanical position during homing upon hit-and-stop.

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

Address:	0x053A		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0% to 400.0%

Description

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

H05.60 Hold time of positioning completed

Address:	0x053C		
Min.:	0	Unit:	ms
Max.:	30000	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 30000 ms

Description

Defines the hold time of an active positioning completed signal.

H05.66 Homing time unit

Address:	0x0542		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:

0: 1 ms

1: 10 ms

2: 100 ms

Description

Defines the homing time unit. The actual timeout time is H05.35 x H05.66 (ms).

H05.67 Offset between zero point and single-turn absolute position

Address:	0x0543		
Min.:	-2147483648	Unit:	Encoder unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At stop

Value Range:

-2147483648 to +2147483647

Description

-

H05.69 Auxiliary homing function

Address:	0x0545		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16

Default:	0	Change:	At stop

Value Range:

0: Inhibited

1: Record offset position

2: Clear offset position

Description

Used to set the operation mode of H05.67.

H05.70 Moving average filter time constant 2

Address:	0x0546		
Min.:	0	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0.0 ms to 1000.0 ms

Description

Defines the moving average filter time constant for the second group of position references.

H05.71 Motor Z signal width

Address:	0x0547		
Min.:	1	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	4	Change:	At once

Value Range:

1 ms to 100 ms

Description

Defines the pulse width output upon active motor Z signal.

H05.72 Positioning completed/Position deviation threshold in fully closed-loop mode

Address:	0x0548		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Threshold scaled to outer loop unit

1: Same threshold used for inner and outer loops

Description

0: 6067h/6065h (scaled to outer loop unit)

1: Same threshold used for inner and outer loops

7.7 H06: Speed Control Parameters

H06.00 Source of main speed reference A

Address:	0x0600		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Digital setting (H06.03)

1: AI1

Description

Defines the source of main speed reference A.

H06.01 Source of auxiliary speed reference B

Address:	0x0601		
Min.:	0	Unit:	-
Max.:	5	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Digital setting (H06.03)

1: AI1

5: Multi-speed reference

Description

Defines the source of auxiliary speed reference B.

H06.02 Speed reference source

Address:	0x0602		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	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: 0x0603

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	200	Change:	At once

Value Range:

-9999 rpm to +9999 rpm

Description

Defines the speed reference value through the keypad.

H06.04 DI jog speed reference

Address:	0x0604		
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	150	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

Defines the DI jog speed reference.

H06.05 Acceleration ramp time of speed reference

Address:	0x0605		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Defines the 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 t1 = Speed reference/1000 x Speed reference acceleration ramp time

Actual deceleration time t2 = Speed reference/1000 x Speed reference deceleration ramp time

H06.06 Deceleration ramp time of speed reference

Address:	0x0606		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Defines speed reference deceleration ramp time.

H06.07 Maximum speed limit

Address:	0x0607		
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	6000	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

Defines the maximum speed limit.

H06.08 Forward speed threshold

Address:	0x0608		
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	6000	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

Defines the forward speed threshold.

H06.09 Reverse speed threshold

Address:	0x0609		
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	6000	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

Defines the reverse speed threshold.

H06.10 Deceleration unit in emergency stop

Address: 0x060A

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

Defines the deceleration unit in emergency stop.

H06.11 Torque feedforward control

Address: 0x060B

Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: No torque feedforward

1: Internal torque feedforward

2: 60B2h used as external torque feedforward

Description

Defines the speed reference source for torque feedforward control.

H06.12 Acceleration ramp time of jog speed

Address: 0x060C

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Defines the acceleration ramp time of jog speed.

H06.13 Speed feedforward smoothing filter

Address: 0x060D

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

Value Range:

0 us to 65535 us

Description

Defines the speed feedforward smoothing filter time.

H06.15 Zero clamp speed threshold

Address:	0x060F		
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

Defines zero clamp speed threshold.

H06.16 Threshold of TGON (motor rotation) signal

Address:	0x0610		
Min.:	0	Unit:	rpm
Max.:	1000	Data Type:	UInt16
Default:	20	Change:	At once

Value Range:

0 rpm to 1000 rpm

Description

Defines the threshold of TGON (motor rotation) signal.

H06.17 Threshold of V-Cmp (speed matching) signal

Address:	0x0611		
Min.:	0	Unit:	rpm
Max.:	100	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 rpm to 100 rpm

Description

Defines the threshold of V-Cmp (speed matching) signal.

H06.18 Threshold of speed reach signal

Address:	0x0612		
Min.:	20	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	1000	Change:	At once

Value Range:

20 rpm to 9999 rpm

Description

Defines the threshold of speed reach signal.

H06.19 Threshold of zero speed output signal

Address:	0x0613		
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

Defines the threshold of zero speed output signal.

H06.40 Deceleration time of ramp 1

Address:	0x0628		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 ms to 65535 ms

Description

Defines the speed reference source of deceleration time of ramp 1.

H06.41 Deceleration time of ramp 2

Address:	0x0629		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 ms to 65535 ms

Description

Defines the speed reference source of deceleration time of ramp 2.

H06.50 Speed S-curve enable switch

Address:	0x0628		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Disable

1: Enable

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: 0x0633

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	50	Change:	At stop

Value Range:

0.0% to 100.0%

Description

-

H06.52 Decreasing acceleration of speed S-curve acceleration segment

Address: 0x0634

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	50	Change:	At stop

Value Range:

0.0% to 100.0%

Description

-

H06.53 Increasing acceleration of speed S-curve deceleration segment

Address: 0x0635

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	50	Change:	At stop

Value Range:

0.0% to 100.0%

Description

-

H06.54 Decreasing acceleration of speed S-curve deceleration segment

Address: 0x0636

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	50	Change:	At stop

Value Range:

0.0% to 100.0%

Description

-

7.8 H07: Torque Control Parameters

H07.00 Source of main torque reference A

Address:	0x0700		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Keypad (H07.03)

1: AI1

Description

Defines the source of main torque reference A.

H07.01 Source of auxiliary torque reference B

Address:	0x0701		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Keypad (H07.03)

1: AI1

Description

Defines the source of auxiliary torque references.

H07.02 Torque reference source

Address:	0x0702		
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

Defines the source of torque references.

H07.03 Torque reference set through keypad

Address: 0x0703

Min.:	-400	Unit:	%
Max.:	400	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-400.0% to +400.0%

Description

Defines the torque reference value set through the keypad.

H07.05 Torque reference filter time constant 1

Address: 0x0705

Min.:	0	Unit:	ms
Max.:	30	Data Type:	UInt16
Default:	0.5	Change:	At once

Value Range:

0.00 ms to 30.00 ms

Description

Defines the torque reference filter time constant 1.

H07.06 Torque reference filter time constant 2

Address: 0x0706

Min.:	0	Unit:	ms
Max.:	30	Data Type:	UInt16
Default:	0.27	Change:	At once

Value Range:

0.00 ms to 30.00 ms

Description

Defines torque reference filter time constant 2.

H07.07 Torque limit source

Address: 0x0707

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Positive/Negative internal torque limit

1: Internal or external limit as defined by DI

2: T-LMT

3: T_LMT or external limit as defined by DI (FunIN.16 or FunIN.17)

4: T_LMT or internal limit (FunIN.16 or FunIN.17) as defined by DI

Description

Defines the source of torque limit.

H07.08 T-LMT selection

Address:	0x0708		
Min.:	1	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

1: AI1

2: AI2

Description

Defines the torque limit source.

H07.09 Positive internal torque limit

Address:	0x0709		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	350	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the positive internal torque limit.

H07.10 Negative internal torque limit

Address:	0x070A		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	350	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the negative internal torque limit.

H07.11 Positive external torque limit

Address:	0x070B		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	350	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines positive external torque limit.

H07.12 Negative external torque limit

Address:	0x070C		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	350	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines negative external torque limit.

H07.15 Emergency stop torque

Address:	0x070F		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the emergency stop torque.

H07.17 Speed limit source

Address:	0x0711		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Internal speed limit

1: V-LMT

2: H07.19 or H07.20 as defined by DI

Description

Defines the source of speed limit.

H07.18 V-LMT selection

Address:	0x0712		
Min.:	1	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

1: AI1

2: AI2

Description

Defines the speed limit source.

H07.19 Positive speed limit/Speed limit 1 in torque control

Address:	0x0713		
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	3000	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

Defines the positive speed limit in torque control.

H07.20 Negative speed limit/Speed limit 2 in torque control

Address:	0x0714		
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	3000	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

Defines the negative speed limit in torque control.

H07.21 Base value for torque reach

Address:	0x0715		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the base value for torque reach.

H07.22 Threshold of valid torque reach

Address:	0x0716		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	20	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the threshold of valid torque reach.

H07.23 Threshold of invalid torque reach

Address:	0x0717		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the threshold of invalid torque reach.

H07.24 Field weakening depth

Address:	0x0718		
Min.:	60	Unit:	%
Max.:	115	Data Type:	UInt16
Default:	115	Change:	At once

Value Range:

60% to 115%

Description

Defines the field weakening depth.

H07.25 Max. permissible demagnetizing current

Address:	0x0719		
Min.:	0	Unit:	%
Max.:	300	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0% to 300%

Description

Defines the max. permissible demagnetizing current.

H07.26 Field weakening selection

Address:	0x071A		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Disable

1: Enable

Description

Defines whether to enable field weakening.

H07.27 Field weakening gain

Address:	0x071B		
Min.:	0.001	Unit:	Hz
Max.:	1	Data Type:	UInt16
Default:	0.03	Change:	At once

Value Range:

0.001 Hz to 1.000 Hz

Description

Defines the field weakening gain.

H07.28 Speed of field weakening point

Address:	0x071C		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Defines the speed of field weakening point.

H07.35 Motor torque output correction

Address:	0x0723		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Switched off

1: Enabled

Description

Defines whether to enable motor torque output correction.

H07.36 Time constant of low-pass filter 2

Address:	0x0724		
Min.:	0	Unit:	ms
Max.:	10	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.00 ms to 10.00 ms

Description

Defines the time constant of low-pass filter 2.

H07.37 Torque reference filter selection

Address:	0x0725		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: First-order filter

1: Biquad filter

Description

Used to select the torque reference filter.

H07.38 Biquad filter attenuation ratio

Address:	0x0726		
Min.:	0	Unit:	-
Max.:	50	Data Type:	UInt16
Default:	16	Change:	At stop

Value Range:

0 to 50

Description

Defines the biquad filter attenuation ratio.

H07.40 Speed limit window in the torque control mode

Address:	0x0728		
Min.:	0	Unit:	ms
Max.:	300	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0.0 ms to 300.0 ms

Description

Defines the speed limit window in the torque control mode.

7.9 H08: Gain Parameters

H08.00 Speed loop gain

Address: 0x0800

Min.:	0.1	Unit:	Hz
Max.:	2000	Data Type:	UInt16
Default:	40	Change:	At once

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: 0x0801

Min.:	0.15	Unit:	ms
Max.:	512	Data Type:	UInt16
Default:	19.89	Change:	At once

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: 0x0802

Min.:	0.1	Unit:	Hz
Max.:	2000	Data Type:	UInt16
Default:	64	Change:	At once

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 gain set 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: 0x0803

Min.:	0.1	Unit:	Hz
Max.:	2000	Data Type:	UInt16
Default:	75	Change:	At once

Value Range:

0.1 Hz to 2000.0 Hz

Description

-

H08.04 2nd speed loop integral time constant

Address: 0x0804

Min.:	0.15	Unit:	ms
Max.:	512	Data Type:	UInt16
Default:	10.61	Change:	At once

Value Range:

0.15 ms to 512.00 ms

Description

-

H08.05 2nd position loop gain

Address: 0x0805

Min.:	0.1	Unit:	Hz
Max.:	2000	Data Type:	UInt16
Default:	120	Change:	At once

Value Range:

0.1 Hz to 2000.0 Hz

Description

Defines the second gain set of the position loop and speed loop. The 2nd gain set include H08.03 (Speed loop gain), H08.04 (Speed loop integral time constant), H08.05, and H07.06 (2nd torque reference filter time constant).

H08.08 2nd gain mode setting

Address: 0x0808

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: Fixed to the 1st gain set, 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:	0x0809		
Min.:	0	Unit:	-
Max.:	10	Data Type:	UInt16
Default:	0	Change:	At once

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

Used to set the condition for gain switchover.

H08.10 Gain switchover delay

Address:	0x080A		
Min.:	0	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	5	Change:	At once

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:	0x080B		
Min.:	0	Unit:	-
Max.:	20000	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0 to 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:	0x080C		
Min.:	0	Unit:	-
Max.:	20000	Data Type:	UInt16
Default:	30	Change:	At once

Value Range:

0 to 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 dead time varies with the switchover condition.

Note:

Set H08.11 to a value higher than or equal to H08.12. Otherwise, the drive forcibly sets H08.11 to the same value as H08.12.

H08.13 Position gain switchover time

Address:	0x080D		
Min.:	0	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	3	Change:	At once

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:	0x080F		
Min.:	0	Unit:	-
Max.:	120	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 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.

H08.17 Zero phase delay

Address: 0x0811

Min.:	0	Unit:	ms
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0 ms to 4.0 ms

Description

-

H08.18 Speed feedforward filter time constant

Address: 0x0812

Min.:	0	Unit:	ms
Max.:	64	Data Type:	UInt16
Default:	0.5	Change:	At once

Value Range:

0.00 ms to 64.00 ms

Description

Defines the filter time constant of speed feedforward.

H08.19 Speed feedforward gain

Address: 0x0813

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0% to 100.0%

Description

In position control and full closed-loop control, speed feedforward is the product of speed feedforwad 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: 0x0814

Min.: 0 | Unit: ms
Max.: 64 | Data Type: UInt16
Default: 0.5 | Change: At once

Value Range:

0.00 ms to 64.00 ms

Description

Defines the filter time constant of torque feedforward.

H08.21 Torque feedforward gain

Address: 0x0815

Min.: 0 | Unit: %
Max.: 300 | Data Type: UInt16
Default: 0 | Change: At once

Value Range:

0.0% to 300.0%

Description

In control modes other than torque control, torque feedforward is the product of torque feedforwad 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: 0x0816

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:	0x0817		
Min.:	100	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	At once

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:	0x0818		
Min.:	0	Unit:	%
Max.:	200	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0% to 200.0%

Description

Defines the control mode of the speed loop.
When the setpoint is 100.0, PI control (default control mode of the speed loop) is applied to the speed loop, which features fast dynamic response.
When the setpoint is 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 anti-interference capacity in low-frequency bands improved and speed feedback overshoot unaffected.

H08.27 Speed observer cutoff frequency

Address:	0x081B		
Min.:	50	Unit:	Hz
Max.:	600	Data Type:	UInt16
Default:	170	Change:	At once

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 loud speed feedback noise.

H08.28 Speed observer inertia correction coefficient

Address:	0x081C		
Min.:	1	Unit:	%
Max.:	1600	Data Type:	UInt16
Default:	100	Change:	At once

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:	0x081D		
Min.:	0	Unit:	ms
Max.:	10	Data Type:	UInt16
Default:	0.8	Change:	At once

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.

H08.31 Disturbance cutoff frequency

Address:	0x081F		
Min.:	10	Unit:	Hz
Max.:	4000	Data Type:	UInt16
Default:	600	Change:	At once

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:	0x0820		
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

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:	0x0821		
Min.:	1	Unit:	%
Max.:	1600	Data Type:	UInt16
Default:	100	Change:	At once

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:	0x0825		
Min.:	-90	Unit:	°
Max.:	90	Data Type:	Int16
Default:	0	Change:	At once

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:	0x0826		
Min.:	0	Unit:	Hz
Max.:	1000	Data Type:	UInt16
Default:	0	Change:	At once

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: 0x0827

Min.:	0	Unit:	%
Max.:	300	Data Type:	UInt16
Default:	0	Change:	At once

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: 0x0828

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable

Description

Used to set the enable bit for speed observer.

H08.42 Model control selection

Address: 0x082A

Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable

2: Dual-inertia model

Description

Used to enable model tracking control.

H08.43 Model gain

Address: 0x082B

Min.:	0.1	Unit:	-
Max.:	2000	Data Type:	UInt16
Default:	40	Change:	At once

Value Range:

0.1 to 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.

H08.46 Feedforward value

Address:	0x082E		
Min.:	0	Unit:	-
Max.:	102.4	Data Type:	UInt16
Default:	95	Change:	At once

Value Range:

0.0 to 102.4

Description

Defines the speed feedforward gain for single inertia model control. If overshoot occurs, reduce the setpoint properly.

H08.53 Medium- and low-frequency jitter suppression frequency 3

Address:	0x0835		
Min.:	0	Unit:	Hz
Max.:	300	Data Type:	UInt16
Default:	0	Change:	At once

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:	0x0836		
Min.:	0	Unit:	%
Max.:	200	Data Type:	UInt16
Default:	0	Change:	At once

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:	0x0838		
Min.:	0	Unit:	%
Max.:	600	Data Type:	UInt16

Default:	100	Change:	At once

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: 0x083B

Min.:	0	Unit:	Hz
Max.:	300	Data Type:	UInt16
Default:	0	Change:	At once

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: 0x083C

Min.:	0	Unit:	%
Max.:	200	Data Type:	UInt16
Default:	0	Change:	At once

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: 0x083D

Min.:	0	Unit:	%
Max.:	600	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0% to 600%

Description

Adjust this parameter based on the actual compensation effect.

H08.62 Position loop integral time constant

Address: 0x083E

Min.:	0.15	Unit:	-

Max.:	512	Data Type:	UInt16
Default:	512	Change:	At once

Value Range:

0.15 to 512.00

Description

Defines the position loop integral time constant.

H08.63 2nd position loop integral time constant

Address: 0x083F

Min.:	0.15	Unit:	-
Max.:	512	Data Type:	UInt16
Default:	512	Change:	At once

Value Range:

0.15 to 512.00

Description

Defines the 2nd position loop integral time constant.

H08.64 Speed observer feedback source

Address: 0x0840

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable

Description

-

H08.65 Zero deviation control selection

Address: 0x0841

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable

Description

Used to enable/disable zero deviation control.

H08.66 Moving average filter for zero deviation control position

Address: 0x0842

Min.:	0	Unit:	ms
Max.:	320	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0 ms to 320.0 ms

Description

Defines the moving average filter time of zero deviation control position. It is recommended to increase the setpoint in case of loud noise caused by low command resolution.

H08.68 Speed feedforward of zero deviation control

Address: 0x0844

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	100	Change:	At once

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: 0x0845

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0% to 100.0%

Description

Defines the torque feedforward of zero deviation control.

H08.81 Anti-resonance frequency of dual-inertia model

Address: 0x0851

Min.:	1	Unit:	Hz
Max.:	400	Data Type:	UInt16
Default:	20	Change:	At once

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:	0x0852		
Min.:	0	Unit:	Hz
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	At once

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:	0x0853		
Min.:	0.1	Unit:	s^{-1}
Max.:	300	Data Type:	UInt16
Default:	60	Change:	At once

Value Range:

$0.1s^{-1}$ to $300.0s^{-1}$

Description

Defines the dual-inertia model gain.

H08.84 Inertia ratio of dual-inertia model

Address:	0x0854		
Min.:	0	Unit:	-
Max.:	120	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 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:	0x0858		
Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0 to 6553.5

Description

Set this parameter to 100% in general cases.

H08.89 Torque feedforward value of dual-inertia model

Address:	0x0859		
Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0 to 6553.5

Description

Set this parameter to 100% in general cases.

7.10 H09: Gain Auto-tuning Parameters

H09.00 Gain auto-tuning mode

Address:	0x0900		
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	4	Change:	At once

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:	0x0901		
Min.:	0	Unit:	-
Max.:	41	Data Type:	UInt16
Default:	15	Change:	At once

Value Range:

0 to 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 lowest stiffness and 41 indicates the highest stiffness.

H09.02 Adaptive notch mode

Address: 0x0902

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	3	Change:	At once

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: 0x0903

Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	2	Change:	At once

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: 0x0905

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 Maximum speed of inertia auto-tuning

Address:	0x0906		
Min.:	100	Unit:	rpm
Max.:	1000	Data Type:	UInt16
Default:	500	Change:	At stop

Value Range:

100 rpm to 1000 rpm

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 the max. speed during inertia auto-tuning

Address:	0x0907		
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:	0x0908		
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:	0x0909		
Min.:	0	Unit:	-
Max.:	100	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 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:	0x090B		
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0% to 100.0%

Description

Defines the warning threshold for current feedback vibration.

H09.12 Frequency of the 1st notch

Address:	0x090C		
Min.:	50	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	At once

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: 0x090D

Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 to 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: 0x090E

Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 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: 0x090F

Min.:	50	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	At once

Value Range:

50 Hz to 8000 Hz

Description

-

H09.16 Width level of the 2nd notch

Address: 0x0910

Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 to 20

Description

-

H09.17 Depth level of the 2nd notch

Address:	0x0911		
Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 99

Description

-

H09.18 Frequency of the 3rd notch

Address:	0x0912		
Min.:	50	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	At once

Value Range:

50 Hz to 8000 Hz

Description

-

H09.19 Width level of the 3rd notch

Address:	0x0913		
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 to 20

Description

-

H09.20 Depth level of the 3rd notch

Address:	0x0914		
Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 99

Description

-

H09.21 Frequency of the 4th notch

Address:	0x0915		
Min.:	50	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	At once

Value Range:

50 Hz to 8000 Hz

Description

-

H09.22 Width level of the 4th notch

Address:	0x0916		
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 to 20

Description

-

H09.23 Depth level of the 4th notch

Address:	0x0917		
Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 99

Description

-

H09.24 Auto-tuned resonance frequency

Address:	0x0918		
Min.:	0	Unit:	Hz
Max.:	5000	Data Type:	UInt16
Default:	0	Change:	At once

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:	0x091A		
Min.:	50	Unit:	%
Max.:	500	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

50.0% to 500.0%

Description

Defines the ITune response capability. Increasing the setpoint improves the responsiveness but may incur resonance.

H09.27 ITune mode

Address:	0x091B		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

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:	0x091C		
Min.:	0	Unit:	%
Max.:	80	Data Type:	UInt16
Default:	0	Change:	At once

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: 0x091D

Min.:	1	Unit:	%
Max.:	120	Data Type:	UInt16
Default:	30	Change:	At once

Value Range:

1.0% to 120.0%

Description

-

H09.32 Gravity compensation value

Address: 0x0920

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

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: 0x0921

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0% to 100.0%

Description

Defines the positive friction compensation value.

H09.34 Negative friction compensation value

Address: 0x0922

Min.:	-100	Unit:	%
Max.:	0	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-100.0% to 0.0%

Description

Defines the negative direction friction compensation value.

H09.35 Friction compensation speed

Address: 0x0923

Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.0 to 20.0

Description

Defines the friction compensation speed.

H09.36 Friction compensation speed

Address: 0x0924

Min.:	0	Unit:	-
Max.:	19	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0x00: Slow mode+Speed reference
0x01: Slow mode+Model speed
0x02: Slow mode+Speed feedback
0x03: Slow mode+Observe speed
0x10: Quick mode+Speed reference
0x11: Quick mode+Model speed
0x12: Quick mode+Speed feedback
0x13: Quick mode+Observe speed

Description

-

H09.37 Vibration monitoring time

Address: 0x0925

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	600	Change:	At once

Value Range:

0 to 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: 0x0926

Min.:	1	Unit:	Hz
Max.:	100	Data Type:	UInt16

Default:	100	Change:	At once

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: 0x0927

Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:

0 to 3

Description

Defines different low-frequency resonance suppression types at the mechanical load. Type 1 features the shortest delay.

H09.44 Frequency of low-frequency resonance suppression 2 at mechanical load end

Address: 0x092C

Min.:	0	Unit:	-
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0 to 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: 0x092D

Min.:	0.01	Unit:	-
Max.:	5	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.01 to 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: 0x092F

Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 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: 0x0931

Min.:	0	Unit:	-
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0 to 100.0

Description

-

H09.50 Responsiveness of low-frequency resonance suppression 3 at mechanical load end

Address: 0x0932

Min.:	0.01	Unit:	-
Max.:	5	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.01 to 5.00

Description

-

H09.52 Width of low-frequency resonance suppression 3 at mechanical load end

Address: 0x0934

Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 2.00

Description

-

H09.54 Vibration threshold

Address: 0x0936

Min.:	0	Unit:	%
Max.:	300	Data Type:	UInt16
Default:	50	Change:	At once

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: 0x0938

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	2936	Change:	At once

Value Range:

0 to 65535

Description

Defines the maximum overshoot value allowed during ETune adjustment.

H09.57 STune resonance suppression switchover frequency

Address: 0x0939

Min.:	0	Unit:	Hz
Max.:	4000	Data Type:	UInt16
Default:	900	Change:	At once

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: 0x093A

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable

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.

7.11 H0A: Fault and Protection Parameters

H0A.00 Power input phase loss protection

Address:	0x0A00		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

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:	0x0A01		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disabled

1: Enabled

2: Enabled after homing

Description

Used to set the activation condition for enabling the software position limit.

H0A.04 Motor overload protection gain

Address:	0x0A04		
Min.:	50	Unit:	-
Max.:	300	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

50 to 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 prolonged by 50%. Set this parameter based on the actual temperature of the motor.

H0A.08 Overspeed threshold

Address: 0x0A08

Min.:	0	Unit:	rpm
Max.:	20000	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 rpm to 20000 rpm

Description

Defines the overspeed threshold of the motor.

H0A.10 Threshold of excessive local position deviation

Address: 0x0A0A

Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	219895608	Change:	At once

Value Range:

0 to 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: 0x0A0C

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: Disable

1: Enable

Description

Defines whether to enable runaway protection.

0: Hide E234.0 when the motor drives a vertial axis or is driven by the load

1: Enable runway protection

H0A.18 IGBT overtemperature threshold

Address:	0x0A12		
Min.:	120	Unit:	°C
Max.:	175	Data Type:	UInt16
Default:	140	Change:	At once

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:	0x0A13		
Min.:	0	Unit:	us
Max.:	6.3	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.00 us to 6.30 us

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:	0x0A14		
Min.:	0	Unit:	us
Max.:	6.3	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.00 us to 6.30 us

Description

Defines the filter time of touch probe 2. An active input must last for the time defined by H0A.20.

H0A.23 TZ signal filter time

Address:	0x0A17		
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:	0x0A19		
Min.:	0	Unit:	-
Max.:	5000	Data Type:	UInt16
Default:	0	Change:	At once

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:	0x0A1A		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

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 Motor rotation DO speed filter time

Address:	0x0A1B		
Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0 ms to 100 ms

Description

Defines the low-pass filter time constant of the speed information for speed feedback and position references.

H0A.29 Fully closed-loop encoder (ABZ) filter time

Address:	0x0A1D		
Min.:	0	Unit:	25 ns
Max.:	255	Data Type:	UInt16
Default:	15	Change:	At stop

Value Range:

0 ns to 255 ns

Description

-

H0A.32 Motor stall overtemperature protection time window

Address:	0x0A20		
Min.:	10	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	200	Change:	At once

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 overtemperature detection

Address:	0x0A21		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: Hide

1: Enable

Description

Defines whether to enable the detection for E630.0 (Motor stall overtemperature protection).

H0A.36 Encoder multi-turn overflow fault selection

Address:	0x0A24		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

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:	0x0A28		
Min.:	0	Unit:	-
Max.:	15	Data Type:	UInt16
Default:	6	Change:	At stop

Value Range:

bit 0: Overtravel compensation
0: Enable
1: Disable
bit 1: Touch probe rising edge compensation
0: Disable
1: Enable
bit 2: Touch probe falling edge compensation
0: Disable
1: Enable
bit 3: Touch probe solution
0: New solution
1: Old solution (same as SV660N)

Description

-

H0A.41 Forward position of software position limit

Address:	0x0A29		
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 overtravel) and stops accordingly.

H0A.43 Reverse position of software position limit

Address:	0x0A2B		
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 E952.0 (Reverse overtravel) and stops accordingly.

H0A.49 Regenerative resistor overtemperature threshold

Address:	0x0A31		
Min.:	100	Unit:	°C
Max.:	175	Data Type:	UInt16
Default:	115	Change:	At once

Value Range:

100°C to 175°C

Description

Defines the temperature threshold for regenerative resistor overload.

H0A.50 Encoder communication fault tolerance threshold

Address:	0x0A32		
Min.:	0	Unit:	-
Max.:	31	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0 to 31

Description

When the numer 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:	0x0A33		
Min.:	3	Unit:	55 ms
Max.:	36	Data Type:	UInt16
Default:	20	Change:	At once

Value Range:

3 ms to 36 ms

Description

Phase loss fault is reported when phase loss keeps active for a period longer than that defined by H0A.51.

H0A.52 Encoder temperature protection threshold

Address:	0x0A34		
Min.:	0	Unit:	°C
Max.:	175	Data Type:	UInt16
Default:	125	Change:	At once

Value Range:

0°C to 175°C

Description

Defines the temperature threshold for encoder overtemperature protection.

H0A.53 Touch probe DI ON-compensation time

Address:	0x0A35		
Min.:	-3000	Unit:	25 ns
Max.:	3000	Data Type:	Int16
Default:	200	Change:	At once

Value Range:

-3000 ns to +3000 ns

Description

Used to compensate for the action time when the touch probe is switched on.

H0A.54 Touch probe DI OFF-compensation time

Address:	0x0A36		
Min.:	-3000	Unit:	25 ns
Max.:	3000	Data Type:	Int16
Default:	1512	Change:	At once

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:	0x0A37		
Min.:	100	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

100.0% to 400.0%

Description

Defines the current threshold for runaway protection detection.

H0A.56 Fault reset delay

Address:	0x0A38		
Min.:	0	Unit:	ms
Max.:	60000	Data Type:	UInt16
Default:	10000	Change:	At once

Value Range:

0 ms to 60000 ms

Description

-

H0A.57 Runaway speed threshold

Address: 0x0A39

Min.: 1 | Unit: rpm
Max.: 1000 | Data Type: UInt16
Default: 50 | Change: At once

Value Range:

1 rpm to 1000 rpm

Description

Defines the overspeed threshold for runaway protection detection.

H0A.58 Runaway speed filter time

Address: 0x0A3A

Min.:	0.1	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	2	Change:	At once

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: 0x0A3B

Min.:	10	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	30	Change:	At once

Value Range:

10 ms to 1000 ms

Description

The runaway fault will be reported when runaway fault keeps active for a period longer than that defined by H0A.59.

H0A.60 Black box function mode

Address: 0x0A3C

Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	1	Change:	At once

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: 0x0A3D

Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0 to 6553.5

Description

Defines the fault code for triggering the black box function.

H0A.62 Trigger source

Address: 0x0A3E

Min.:	0	Unit:	-
Max.:	25	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 25

Description

Defines the fault code for triggering the black box function through designated channel.

H0A.63 Trigger level

Address: 0x0A3F

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

Defines the trigger level for triggering the black box function through designated channel.

H0A.65 Trigger level

Address: 0x0A41

Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At once

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:	0x0A42		
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	75	Change:	At once

Value Range:

0% to 100%

Description

Defines the pre-trigger position for triggering black box sampling.

H0A.67 Sampling frequency

Address:	0x0A43		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

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:	0x0A46		
Min.:	0	Unit:	rpm
Max.:	20000	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 rpm to 20000 rpm

Description

Defines the speed threshold for reporting E500.2 (Position feedback pulse overspeed).

H0A.71 MS1 motor overload curve switchover

Address:	0x0A47		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 to 3

Description

bit0:

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:	0x0A48		
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 0 rpm during ramp-to-stop.

H0A.73 STO 24 V disconnection filter time

Address:	0x0A49		
Min.:	1	Unit:	ms
Max.:	5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

1 ms to 5 ms

Description

Defines the delay from the moment when 24 V is disconnected to the moment when the STO state applies.

H0A.74 Filter time for two inconsistent STO channels

Address:	0x0A4A		
Min.:	0	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

1 ms to 1000 ms

Description

Defines the delay from the moment 24 V is inputted to the drive inconsistently through two channels to the moment when the STO state applies.

H0A.75 Servo OFF delay after STO triggered

Address:	0x0A4B		
Min.:	0	Unit:	ms
Max.:	25	Data Type:	UInt16
Default:	20	Change:	At once

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.90 Moving average filter time constant for speed display values

Address:	0x0A5A		
Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

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 constant for torque display values

Address:	0x0A5B		
Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

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 constant for position display values

Address:	0x0A5C		
Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

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 constant for voltage display values

Address:	0x0A5D		
Min.:	0	Unit:	ms
Max.:	250	Data Type:	UInt16
Default:	0	Change:	At once

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 constant for thermal display values

Address:	0x0A5E		
Min.:	0	Unit:	ms
Max.:	250	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 250 ms

Description

Defines the filter time constant for thermal display values.

7.12 H0b: Monitoring Parameters

H0b.00 Motor speed actual value

Address:	0x0B00		
Min.:	-32767	Unit:	rpm
Max.:	32767	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-32767 rpm to +32767 rpm

Description

Indicates the actual motor speed after round-off, 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:	0x0B01		
Min.:	-32767	Unit:	rpm
Max.:	32767	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-32767 rpm to +32767 rpm

Description

Indicates the present speed reference (accurate to 1 rpm) of the drive in the position and speed control modes.

H0b.02 Internal torque reference

Address:	0x0B02		
Min.:	-500	Unit:	%
Max.:	500	Data Type:	Int16
Default:	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:	0x0B03		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Displays the level status of eight DIs 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:	0x0B05		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Displays the level status of five DOs 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: 0x0B07

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

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: 0x0B09

Min.:	0	Unit:	°
Max.:	360	Data Type:	UInt16
Default:	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° x H0b.09/(Maximum value of H0b.09 + 1)

Maximum value of H0b.09 for an absolute encoder: 65535

H0b.10 Electrical angle

Address: 0x0B0A

Min.:	0	Unit:	°
Max.:	360	Data Type:	UInt16
Default:	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 ±360.0° 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: 0x0B0C

Min.:	0	Unit:	%
Max.:	800	Data Type:	UInt16
Default:	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:

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

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 cleared when the condition defined in H05.16 (Clear action) is met.

H0b.17 Feedback pulse counter

Address: 0x0B11

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

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: 0x0B13

Min.:	0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.0s to 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 AI1 voltage display

Address:	0x0B15		
Min.:	-12	Unit:	V
Max.:	12	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-12.000 V to +12.000 V

Description

Displays the actual sampling voltage of AI1.

H0b.22 AI2 current display

Address:	0x0B16		
Min.:	0	Unit:	mA
Max.:	21	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

0.000 mA to 21.000 mA

Description

Displays the actual sampling current of AI2.

H0b.24 RMS value of phase current

Address:	0x0B18		
Min.:	0	Unit:	A
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0 A to 6553.5 A

Description

Displays the RMS value of the phase current of the motor, which is accurate to 0.01 A.

H0b.25 Angle obtained upon voltage injection auto-tuning

Address: 0x0B19

Min.:	0	Unit:	°
Max.:	360	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0° to 360.0°

Description

-

H0b.26 Bus voltage

Address: 0x0B1A

Min.:	0	Unit:	V
Max.:	6553.5	Data Type:	UInt16
Default:	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: 0x0B1B

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: 0x0B1C

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

Value Range:

0 to 65535

Description

-

H0b.29 Axis status information given by FPGA

Address: 0x0B1D

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

Value Range:

0 to 65535

Description

-

H0b.30 Axis fault information given by FPGA

Address: 0x0B1E

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

Value Range:

0 to 65535

Description

-

H0b.31 Encoder fault information

Address: 0x0B1F

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

Value Range:

0 to 65535

Description

-

H0b.33 Fault log

Address: 0x0B21

Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	0	Change:	At once

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 lastest 20 faults of the drive.

H0b.34 Fault code of the selected fault

Address:	0x0B22		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H0b.35 Time stamp upon occurrence of the selected fault

Address:	0x0B23		
Min.:	0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.0s to 429496729.5s

Description

-

H0b.37 Motor speed upon occurrence of the selected fault

Address: 0x0B25
Min.: -32767 | Unit: rpm
Max.: 32767 | Data Type: Int16
Default: 0 | Change: Unchangeable

Value Range:

-32767 rpm to +32767 rpm

Description

-

H0b.38 Motor phase U current upon occurrence of the selected fault

Address: 0x0B26
Min.: -3276.7 | Unit: A
Max.: 3276.7 | Data Type: Int16
Default: 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: 0x0B27
Min.: -3276.7 | Unit: A
Max.: 3276.7 | Data Type: Int16
Default: 0 | Change: Unchangeable

Value Range:

-3276.7 A to +3276.7 A

Description

-

H0b.40 Bus voltage upon occurrence of the selected fault

Address: 0x0B28
Min.: 0 | Unit: V
Max.: 6553.5 | Data Type: UInt16
Default: 0 | Change: Unchangeable

Value Range:

0.0 V to 6553.5 V

Description

-

H0b.41 DI status upon occurrence of the selected fault

Address: 0x0B29

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

Value Range:

0 to 65535

Description

-

H0b.43 DO status upon occurrence of the selected fault

Address: 0x0B2B
Min.: 0
Unit: -
Max.: 65535
Data Type: UInt16
Default: 0
Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0b.45 Internal fault code

Address: 0x0B2D
Min.: 0
Unit: -
Max.: 65535
Data Type: UInt16
Default: 0
Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0b.46 Absolute encoder fault information given by FPGA upon occurrence of the selected fault

Address: 0x0B2E
Min.: 0
Unit: -
Max.: 65535
Data Type: UInt16
Default: 0
Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0b.47 System status information given by FPGA upon occurrence of the selected fault

Address: 0x0B2F

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

Value Range:

0 to 65535

Description

-

H0b.48 System fault information given by FPGA upon occurrence of the selected fault

Address: 0x0B30

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

Value Range:

0 to 65535

Description

-

H0b.49 Encoder fault information upon occurrence of the selected fault

Address: 0x0B31

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

Value Range:

0 to 65535

Description

-

H0b.51 Internal fault code upon occurrence of the selected fault

Address: 0x0B33

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

Value Range:

0 to 65535

Description

-

H0b.52 FPGA timeout fault standard bit upon occurrence of the selected fault

Address: 0x0B34

Min.:	0	Unit:	-

Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H0b.53 Position following error (reference unit)

Address:	0x0B35		
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

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 enoder 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:	0x0B37		
Min.:	-2147483648	Unit:	rpm
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 rpm to +2147483647 rpm

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:	0x0B39		
Min.:	0	Unit:	V
Max.:	6553.5	Data Type:	UInt16
Default:	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: 0x0B3A

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

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:

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

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: 0x0B3F

Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

1: Control circuit power input error

2: Main circuit power input error

3: Undervoltage

4: Soft start failed

5: Encoder initialization not completed

6: Short circuit to ground failed

7: Others

Description

Displays the reason for NotRdy state.

H0b.66 Encoder temperature

Address: 0x0B42

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: 0x0B43

Min.:	0	Unit:	%
Max.:	200	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0% to 200.0%

Description

-

H0b.70 Number of absolute encoder revolutions

Address: 0x0B46

Min.:	0	Unit:	Rev
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 Rev to 65535 Rev

Description

Indicates the number of revolutions of the absolute encoder.

H0b.71 Single-turn position fed back by the absolute encoder

Address: 0x0B47

Min.:	0	Unit:	p
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0 p to +2147483647 p

Description

Displays the position feedback of the absolute encoder within one turn.

H0b.74 System fault information given by FPGA

Address: 0x0B4A

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

Value Range:

0 to 65535

Description

-

H0b.77 Encoder position (low 32 bits)

Address: 0x0B4D

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the low 32-bit value of the position feedback of the absolute encoder.

H0b.79 Encoder position (high 32 bits)

Address:

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

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: 0x0B51

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the low 32-bit value of the position feedback of the rotaty load when the absolute system works in the rotation mode.

H0b.83 Single-turn position of the rotary load (high 32 bits)

Address: 0x0B53

Min.: -2147483648 | Unit: p
Max.: 2147483647 | Data Type: Int32
Default: 0 | Change: Unchangeable

Value Range:

-2147483648 p to +2147483647 p

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: 0x0B55
Min.: -2147483648 | Unit: p
Max.: 2147483647 | Data Type: Int32
Default: 0 | Change: Unchangeable

Value Range:

-2147483648 p to +2147483647 p

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: 0x0B57
Min.: 0 | Unit: -
Max.: 200 | Data Type: UInt16
Default: 0 | Change: Unchangeable

Value Range:

0 to 200

Description

-

H0b.90 Group No. of the abnormal parameter

Address: 0x0B5A
Min.: 0 | Unit: -
Max.: 65535 | Data Type: UInt16
Default: 0 | Change: At once

Value Range:

0 to 65535

Description

-

H0b.91 Offset of the abnormal parameter within the group

Address: 0x0B5B

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

H0b.94 Individual power-on time

Address: 0x0B5E

Min.:	0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.0s to 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: 0x0B60

Min.:	0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.0s to 429496729.5s

Description

-

7.13 H0d: Auxiliary Function Parameters

H0d.00 Software reset

Address: 0x0D00

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:	0x0D01		
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.

H0d.02 Inertia auto-tuning selection

Address:	0x0D02		
Min.:	0	Unit:	-
Max.:	65	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 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.04 Read/write in encoder ROM

Address:	0x0D04		
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:	0x0D05		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No operation

1: Enable

Description

-

H0d.10 Auto-tuning of analog channel

Address:	0x0D0A		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation

1: Adjust AI1

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:	0x0D0C		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Disable

1: Enable

Description

-

H0d.17 Forced DI/DO enable switch

Address:	0x0D11		
Min.:	0	Unit:	-

Max.: 3 Data Type: UInt16
Default: 0 Change: At once

Value Range:

bit0: Forced DI enable switch
0: Disable
1: Enable
bit1: Forced DO enable switch
0: Disable
1: Enable

Description

Defines whether to enable forced DI/DO.

H0d.18 Forced DI value

Address: 0x0D12
Min.: 0 Unit: -
Max.: 31 Data Type: UInt16
Default: 31 Change: At once

Value Range:

0 to 31

Description

Defines the level logic of the DI functions set in group H03 when forced DI is active (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: 0x0D13
Min.: 0 Unit: -
Max.: 3 Data Type: UInt16
Default: 0 Change: At once

Value Range:

0 to 3

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: 0x0D14

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation

1: Reset the fault

2: Reset the fault and multi-turn data

3: Reset Inovance 2nd encoder fault

4: Reset Inovance 2nd encoder fault and multi-turn data

Description

You can reset the encoder fault or the multi-turn data fed back by the encoder through H0d.20.

H0d.23 Torque fluctuation auto-tuning

Address: 0x0D17

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

Value Range:

0 to 1

Description

-

H0d.26 Brake and dynamic brake started forcibly

Address: 0x0D1A

Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Disable

1: Dynamic brake deactivated forcibly

2: Brake released forcibly

3: Dynamic brake deactivated and brake released forcibly

Description

-

7.14 H0E: Communication Function Parameters

H0E.00 Node address

Address: 0x0E00

Min.:	1	Unit:	-
Max.:	127	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 127

Description

Indicates the CAN 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: 0x0E01

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	4	Change:	At once

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

Used to set whether to save parameters and object dictionaries written through the serial port or SDO communicaiton.

H0E.07 Object dictionary unit

Address: 0x0E07

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

Value Range:

0: Reference unit system (p/s, p/s^2)

1: User unit system (0.01 rpm, ms)

Description

Defines the object dictionary unit.

0: Reference unit system, p/s for speed type object dictionaries and p/s^2 for acceleration type object dictionaries

1: User unit system, 0.01 rpm for speed type object dictionaries and ms (time taken for changing from 0 rpm to 1000 rpm) for acceleration type object dictionaries

H0E.15 Index of group 6000 (the last two bits)

Address:	0x0E0F		
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	255	Change:	At once

Value Range:

0 to 255

Description

Defines the index of the object dictionary displayed by the oscilloscope channel.

H0E.16 Sub-index of group 6000

Address:	0x0E10		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 2

Description

Defines the sub-index of the object dictionary displayed by the oscilloscope channel.

H0E.20 EtherCAT slave name

Address:	0x0E14		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H0E.21 EtherCAT slave alias

Address:	0x0E15		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 to 65535

Description

-

H0E.22 Number of SYNC loss events allowed by EtherCAT

Address: 0x0E16

Min.:	1	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	8	Change:	At once

Value Range:

1 to 20

Description

-

H0E.24 Number of SYNC loss events

Address: 0x0E18

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

Value Range:

0 to 65535

Description

-

H0E.25 Max. error value and invalid frames of EtherCAT port 0 per unit time

Address: 0x0E19

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

Value Range:

0 to 65535

Description

-

H0E.26 Max. error value and invalid frames of EtherCAT port 1 per unit time

Address: 0x0E1A

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

Value Range:

0 to 65535

Description

-

H0E.27 Max. transfer error of EtherCAT port per unit time

Address: 0x0E1B

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

Value Range:

0 to 65535

Description

-

H0E.28 Max. EtherCAT data frame processing unit error per unit time

Address: 0x0E1C

Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 255

Description

-

H0E.29 Max. link loss value of EtherCAT port 0 per unit time

Address: 0x0E1D

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

Value Range:

0 to 65535

Description

-

H0E.31 EtherCAT synchronization mode setting

Address: 0x0E1F

Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:

0 to 2

Description

-

H0E.32 EtherCAT synchronization error threshold

Address: 0x0E20

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 state and port connection state

Address: 0x0E21

Min.: 0 Unit: -

Max.: 65535 Data Type: UInt16

Default: 0 Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0E.34 Number of excessive position reference increment events in CSP mode

Address: 0x0E22

Min.: 1 Unit: -

Max.: 30 Data Type: UInt16

Default: 20 Change: At once

Value Range:

1 to 30

Description

-

H0E.35 AL fault code

Address: 0x0E23

Min.: 0 Unit: -

Max.: 65535 Data Type: UInt16

Default: 0 Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0E.36 EtherCAT enhanced link selection

Address: 0x0E24

Min.: 0 Unit: -

Max.: 1 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: Disable

1: Enable

Description

-

H0E.37 **EtherCAT XML reset selection**

Address:	0x0E25		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable

Description

-

H0E.80 **Modbus baud rate**

Address:	0x0E50		
Min.:	0	Unit:	-
Max.:	9	Data Type:	UInt16
Default:	9	Change:	At once

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.

H0E.81 **Modbus data format**

Address:	0x0E51		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	3	Change:	At once

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.

H0E.82 Modbus response delay

Address:	0x0E52		
Min.:	0	Unit:	ms
Max.:	20	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:
0 ms to 20 ms

Description

Defines the delay from the moment the slave receives a command to the moment the slave returns a response.

H0E.83 Modbus communication timeout

Address:	0x0E53		
Min.:	0	Unit:	ms
Max.:	600	Data Type:	UInt16
Default:	500	Change:	At once

Value Range:
0 ms to 600 ms

Description

-

H0E.84 Modbus communication data sequence

Address:	0x0E54		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At once

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 Modbus version

Address:	0x0E5A		
Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 655.35

Description

-

H0E.93 EtherCAT COE version

Address:	0x0E5D		
Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 655.35

Description

-

H0E.96 XML version information

Address:	0x0E60		
Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 655.35

Description

-

7.15 H0F: Fully Closed Loop Parameters

H0F.00 Encoder feedback mode

Address:	0x0F00		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Internal encoder feedback

1: External encoder feedback

2: Inner/Outer loop switchover

Description

Defines the encoder feedback signal source in fully closed-loop control.

0: Internal encoder feedback: The position feedback signals come from the motor encoder.

1: External encoder feedback: The position feedback signals come from the fully closed-loop external encoder.

Electronic gear ratio 1 is used.

2: Inner/Outer loop switchover: The DI assigned with FunIN.24 (GEAR_SEL, electronic gear ratio switchover) is used to switch between inner and outer closed position loops.

(FunIN.24: Inactive, internal encoder feedback, with electronic gear ratio 1 used)

Active: External encoder feedback, with electronic gear ratio 2 used

H0F.01 External encoder operation mode

Address:	0x0F01		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Standard operating direction

1: Reverse operating direction

Description

Defines the feedback pulse counting direction of internal and external encoders when the motor rotates in the fully closed-loop mode.

0: Standard operating direction: The pulse feedback counter of the internal encoder (H0F.18) is in the same direction as that of the external encoder (H0F.20) during rotation of the motor.

1: Reverse operating direction: The counting direction of pulse feedback counter of the internal encoder (H0F.18) is opposite to the external encoder (H0F.20) during rotation of the motor.

H0F.02 External encoder mode

Address:	0x0F02		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Incremental mode

1: Absolute linear mode

Description

-

H0F.03 External encoder feedback type

Address:	0x0F03		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Quadrature pulse

1: Inovance

2: BiSS

Description

-

H0F.04 External encoder pulses per revolution

Address:	0x0F04		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	10000	Change:	At stop

Value Range:

0 to 2147483647

Description

Defines the pulses fed back by the external encoder per revolution of the motor. It defines the quantity relationship between feedback pulses from the external encoder and those from the internal encoder.

Calculate the value of this parameter through analyzing mechanical parameters. When rigid connection is applied between the motor and the external encoder (scale), you can also set this parameter using the following method:

1. Manually rotate the motor and observe H0F.18 (Feedback pulse counter of internal encoder) in the meantime. After ensuring that the motor has rotated for a full turn (H0F.18 = Motor resolution), calculate the change of H0F.20 (Feedback pulse counter of external encoder) and use the absolute value of the change as the value of H0F.04.
2. Assume values of H0F.18 and H0F.20 are X_1 and Y_1 before the motor rotates and X_2 and Y_2 after the motor rotates, then the following formula applies: H0F.04 = Motor resolution x $(Y_2 - Y_1)/(X_2 - X_1)$ The calculated result must be positive; if not, perform step 1 again.
For non-rigid connection, an error may exist in the calculation result.
Note:
Ensure H0F.04 is set properly. Otherwise, EB02.0 (Position deviation too large in fully closed loop) may occur after the drive operates.

H0F.08 Excessive deviation threshold in compound control mode

Address:	0x0F08		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1000	Change:	At once

Value Range:
0 to 2147483647
Description
Defines the position deviation threshold at which the servo drive reports EB02.0 (Position deviation too large in fully closed-loop mode).
When H0F.08 is set to 0, the drive does not detect EB02.0 and always clears the fully closed-loop position deviation.

H0F.10 Clear deviation in compound control mode

Address:	0x0F0A		
Min.:	0	Unit:	R
Max.:	100	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:
0 to 100
Description
Defines the number of revolutions rotated by the motor per clear of the fully closed-loop position deviation during operation. The number of revolutions is reflected by H0F.18 (Feedback pulse counter of internal encoder). The number of motor revolutions will not be cleared when the drive is in the non-oeprational state.

H0F.13 Compound vibration suppression filter time

Address:

Min.:	0	Unit:	ms
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0.0 ms to 6553.5 ms

Description

Defines the time constant for compound vibration suppression in fully closed-loop control when external encoder feedback (H0F.00 = 1 or 2) is used.

Increase the setpoint gradually and check the change in the response.

When the stiffness of the transmission mechanism between fully closed loop and internal loop is insufficient, set H0F.13 properly to improve system stability, which is to generate the effect of internal loop temporarily and form a fully closed loop again after the system is stabilized. When the stiffness is sufficient, there is no need to adjust this parameter.

H0F.16 Pulse deviation display in compound control mode

Address: 0x0F10

Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-1073741824 to +2147483647

Des-2147483648cription

Used to count and display the position deviation absolute value in fully closed loop control.

Pulse deviation in compound control = Absolute position feedback of external encoder - Absolute position feedback conversion value of internal encoder

H0F.18 Internal position pulse feedback display

Address: 0x0F12

Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Used to count and display the number of feedback pulses of the internal encoder (after being divided or multiplied by electronic gear ratio, in internal encoder unit).

H0F.20 External position pulse feedback display

Address:	0x0F14		
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Used to count and display the number of feedback pulses of the external encoder (after being divided or multiplied by electronic gear ratio, in external encoder unit).

H0F.22 External encoder phase Z detection invalid (quadrature pulse feedback)

Address:	0x0F16		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Detected

1: Not detected

Description

-

H0F.23 BiSS absolute homing offset

Address:	0x0F17		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H0F.25 Source of touch probe Z signal in fully closed-loop mode

Address:	0x0F19		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Motor Z signal

1: External feedback Z signal

Description

-

H0F.26 BiSS absolute feedback offset

Address:	0x0F1A		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H0F.28 Index value of BiSS communication warning

Address:	0x0F1C		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H0F.29 CRC of BiSS fully closed-loop feedback

Address:	0x0F1D		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: Positive

1: Negative

Description

-

H0F.30 Valid bit of BiSS communication position feedback

Address:	0x0F1E		
Min.:	0	Unit:	-
Max.:	127	Data Type:	UInt16
Default:	29	Change:	At stop

Value Range:

0 to 127

Description

-

H0F.31 Valid bit of BiSS communication warning index

Address:	0x0F1F		
Min.:	0	Unit:	-
Max.:	31	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:

0 to 31

Description

-

H0F.40 Inovance fully closed-loop encoder communication error register

Address:	0x0F28		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H0F.41 Inovance fully closed-loop encoder version

Address:	0x0F29		
Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0 to 6553.5

Description

-

H0F.42 Inovance fully closed-loop encoder resolution

Address:	0x0F2A		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0 to 4294967295

Description

-

7.16 H11: Multi-position Parameters

H11.00 Multi-position operation mode

Address:	0x1100	Effective:	At once
Min.:	0	Unit:	-
Max.:	5	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Individual operation (number of displacements defined by H11.01)

1: Cyclic operation (number of displacement defined by H11.01)

2: DI-based operation (defined by DI)

3: Sequential operation

5: Axis-controlled continuous operation

Description

Defines the multi-position operation mode when the main position reference source is multi-position references (H05.00 = 2) in the position control mode.

0: Individual operation (stop after one cycle of operation)

Switching to the next displacement automatically

You can set the interval time between displacements.

The multi-position reference is level-triggered.

1: Cyclic operation (start from displacement 1 again at next operation)

Switching to the next displacement automatically

You can set the interval time between displacements.

The multi-position reference is level-triggered.

2: DI-based operation (continue if displacement No. updated)

The displacement No is determined by the DI logic.

The interval time between displacements is determined by the command delay of the host controller.

The multi-position reference is edge-triggered.

3: Sequential operation (stop after one cycle of operation); cyclic operation available (starting displacement No. defined by H11.05 after the 1st cycle of operation)

Switching to the next displacement automatically

There is no interval time between displacements.

The multi-position reference is level-triggered.

5: Axis-controlled continuous operation (used together with CANlink)

H11.01 **Number of displacement references in multi-position mode**

Address:	0x1101	Effective:	At cone
Min.:	1	Unit:	-
Max.:	16	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 16

Description

Defines the total number of displacement references in the multi-position mode. You can set different displacements, operating speeds, and acceleration/deceleration time for each displacement.

H11.00 ≠ 2: Displacements are switched automatically in a sequence from 1, 2... H11.01.

H11.00 = 2: Assign four DIs (hardware DI or VDI) with DI functions 6 to 9 (FunIN.6: CMD1 to FunIN.9: CMD4) and control the DI logic through the host controller to switch between different displacements. The displacement No. is a 4-bit binary value. Bit 0...bit 3 correspond to CMD1...CMD4.

H11.02 **Starting displacement No. after pause**

Address:	0x1102	Effective:	At once
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Continue to execute the unexecuted displacements

1: Start from displacement 1

Description

Defines the starting displacement No. when the multi-position operation recovers from a pause.

Pause:

① The servo drive switches to another control mode or the interrupt positioning function is enabled during multi-position operation.

② The internal multi-position enable signal (FunIN.28:PosInSen) changes from "active" to "inactive".

0: Continue to execute the unexecuted displacements: For example, if H11.01 is set to 16 and the drive pauses at displacement 2, after the drive recovers from the pause, it will start from displacement 3.

1: Start from displacement 1: For example, if H11.01 is set to 16 and the drive pauses at displacement 2, after the drive recovers from the pause, it will start from displacement 1.

H11.03 Interval time unit

Address:	0x1103	Effective:	At once
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: ms

1: s

Description

Defines the unit of acceleration/deceleration time and the interval time during multi-position operation.

Acceleration/Deceleration time: time for the motor to change from 0 rpm to 1000 rpm at a constant speed.

Interval time: interval time that starts from the end of the last reference to the beginning of the next reference

H11.04 Displacement reference type

Address:	0x1104	Effective:	At once
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Relative displacement reference

1: Absolute displacement reference

Description

Relative displacement: position increment of the target position relative to the current motor position

Absolute displacement: position increment of the target position relative to the motor home.

H11.05 Starting displacement No. in sequential operation

Address:	0x1105	Effective:	At once
Min.:	0	Unit:	-
Max.:	16	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 to 16

Description

Defines whether to perform cyclic operation and the starting displacement No. after the first cycle of operation in the sequential operation mode (H11.00 = 3).
0: The drive executes the displacements defined by H11.01 only once and then stops. The motor is in the locked state.
1–16: The drive operates cyclically, with the starting displacement No. defined by H11.05 after the first cycle of operation. The value of H11.05 should be lower than or equal to H11.01.

H11.09 Deceleration upon axis control OFF

Address:	0x1109	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	65535	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.10 Starting speed of displacement 1

Address:	0x110A	Effective:	At once
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

-

H11.11 Stop speed of displacement 1

Address:	0x110B	Effective:	At once
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

-

H11.12 Displacement 1

Address:	0x110C	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit

Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

Defines displacement 1 (reference unit) in multi-position operation.

H11.14 Maximum speed of displacement 1

Address:	0x110E	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

Defines the maximum speed of displacement 1 in multi-position operation.

The maximum speed is the average operating speed when the motor is not in the acceleration/deceleration process. If H11.12 is set to a too low value, the actual motor speed will be lower than H11.14.

H11.15 Acceleration/Deceleration time of displacement 1

Address:	0x110F	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Defines the time for the motor to change from 0 rpm 1000 rpm at a constant speed during displacement 1.

H11.16 Interval time after displacement 1

Address:	0x1110	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

Defines the interval time that starts from the end of displacement 1 to the beginning of the next displacement.

H11.17 Displacement 2

Address:	0x1111	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.19 Maximum speed of displacement 2

Address:	0x1113	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

H11.20 Acceleration/Deceleration time of displacement 2

Address:	0x1114	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.21 Interval time after displacement 2

Address:	0x1115	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.22 Displacement 3

Address:	0x1116	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.24 Maximum speed of displacement 3

Address:	0x1118	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.25 Acceleration/Deceleration time of displacement 3

Address:	0x1119	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.26 Interval time after displacement 3

Address:	0x111A	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.27 Displacement 4

Address:	0x111B	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.29 Maximum speed of displacement 4

Address:	0x111D	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.30 Acceleration/Deceleration time of displacement 4

Address:	0x111E	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.31 Interval time after displacement 4

Address:	0x111F	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.32 Displacement 5

Address:	0x1120	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.34 Maximum speed of displacement 5

Address:	0x1122	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.35 Acceleration/Deceleration time of displacement 5

Address:	0x1123	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.36 Interval time after displacement 5

Address:	0x1124	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.37 Displacement 6

Address:	0x1125	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.39 Maximum speed of displacement 6

Address:	0x1127	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.40 Acceleration/Deceleration time of displacement 6

Address:	0x1128	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.41 Interval time after displacement 6

Address:	0x1129	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.42 Displacement 7

Address:	0x112A	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.44 Maximum speed of displacement 7

Address:	0x112C	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.45 Acceleration/Deceleration time of displacement 7

Address:	0x112D	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.46 Interval time after displacement 7

Address:	0x112E	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.47 Displacement 8

Address:	0x112F	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.49 Maximum speed of displacement 8

Address:	0x1131	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.50 Acceleration/Deceleration time of displacement 8

Address:	0x1132	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.51 Interval time after displacement 8

Address:	0x1133	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.52 Displacement 9

Address:	0x1134	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.54 Maximum speed of displacement 9

Address:	0x1136	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.55 Acceleration/Deceleration time of displacement 9

Address:	0x1137	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.56 Interval time after displacement 9

Address:	0x1138	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.57 Displacement 10

Address:	0x1139	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.59 Maximum speed of displacement 10

Address:	0x113B	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.60 Acceleration/Deceleration time of displacement 10

Address:	0x113C	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.61 Interval time after displacement 10

Address:	0x113D	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.62 Displacement 11

Address:	0x113E	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.64 Maximum speed of displacement 11

Address:	0x1140	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.65 Acceleration/Deceleration time of displacement 11

Address:	0x1141	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.66 Interval time after displacement 11

Address:	0x1142	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.67 Displacement 12

Address:	0x1143	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.69 Maximum speed of displacement 12

Address:	0x1145	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.70 Acceleration/Deceleration time of displacement 12

Address:	0x1146	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.71 Interval time after displacement 12

Address:	0x1147	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.72 Displacement 13

Address:	0x1148	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.74 Maximum speed of displacement 13

Address:	0x114A	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.75 Acceleration/Deceleration time of displacement 13

Address:	0x114B	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.76 Interval time after displacement 13

Address:	0x114C	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.77 Displacement 14

Address:	0x114D	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.79 Maximum speed of displacement 14

Address:	0x114F	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.80 Acceleration/Deceleration time of displacement 14

Address:	0x1150	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.81 Interval time after displacement 14

Address:	0x1151	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.82 Displacement 15

Address:	0x1152	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.84 Maximum speed of displacement 15

Address:	0x1154	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.85 Acceleration/Deceleration time of displacement 15

Address:	0x1155	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.86 Interval time after displacement 15

Address:	0x1156	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.87 Displacement 16

Address:	0x1157	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.89 Maximum speed of displacement 16

Address:	0x1159	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.90 Acceleration/Deceleration time of displacement 16

Address:	0x115A	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.91 Interval time after displacement 16

Address:	0x115B	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

7.17 H12: Multi-speed Parameters

H12.00 Multi-speed operation mode

Address:	0x1200		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Individual operation (number of speeds defined by H12.01)

1: Cyclic operation (number of speeds defined by H12.01)

2: DI-based operation

Description

Defines the multi-speed operation mode when the speed reference source is multi-speed reference (H06.01 = 5, H06.02 = 1/2/3) in the speed control mode.

0: The drive stops after one cycle of operation and switches to the next speed automatically.

1: The drive operates cyclically as long as the S-ON signal is active. In cyclic operation, the drive starts from speed 1 again after each cycle of operation.

2: The drive operates continuously as long as the S-ON signal is active. The operating time of each speed is determined only by the time interval of speed switchover. The operating direction can be switched by FunIN.5 (DIR-SEL).

The S-ON signal must remain active during operation of each speed. Otherwise, the drive stops immediately based on the stop mode defined by H02.05.

Speed arrival (FunOUT.19: V-Arr) signal is activated every time a certain speed reaches the set value.

H12.01 Number of speed references in multi-speed mode

Address:	0x1201		
Min.:	1	Unit:	-
Max.:	16	Data Type:	UInt16
Default:	16	Change:	At stop

Value Range:

1 to 16

Description

Defines the total number of speed references in the multi-speed mode. Different speed references, operating time, and acceleration/deceleration time (four groups available) can be set for each speed.

H12.00 ≠ 2: Speeds are switched automatically in a sequence from 1, 2...H12.01.

H12.00 = 2: Assign four DIs (hardware DI or VDI) with DI functions 6 to 9 (FunIN.6: CMD1 to FunIN.9: CMD4) and control the DI logic through the host controller to switch between different speeds. The displacement No. is a 4-bit binary value. Bit 0...bit 3 correspond to CMD1...CMD4.

H12.02 Operating time unit

Address: 0x1202

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

Value Range:

0: s

1: min

Description

Defines the time unit in multi-speed operation.

0: s

1: min

H12.03 Acceleration time 1

Address: 0x1203

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Acceleration time: time for the motor to accelerate from 0 rpm to 1000 rpm at a constant speed

H12.04 Deceleration time 1

Address: 0x1204

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Deceleration time: time for the motor to decelerate from 1000 rpm to 0 rpm at a constant speed

H12.05 Acceleration time 2

Address: 0x1205

Min.:	0	Unit:	ms

Max.:	65535	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Acceleration time: time for the motor to accelerate from 0 rpm to 1000 rpm at a constant speed

H12.06 Deceleration time 2

Address: 0x1206

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Deceleration time: time for the motor to decelerate from 1000 rpm to 0 rpm at a constant speed

H12.07 Acceleration time 3

Address: 0x1207

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Acceleration time: time for the motor to accelerate from 0 rpm to 1000 rpm at a constant speed

H12.08 Deceleration time 3

Address: 0x1208

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Deceleration time: time for the motor to decelerate from 1000 rpm to 0 rpm at a constant speed

H12.09 Acceleration time 4

Address:	0x1209		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	150	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Acceleration time: time for the motor to accelerate from 0 rpm to 1000 rpm at a constant speed

H12.10 Deceleration time 4

Address:	0x120A		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	150	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Deceleration time: time for the motor to decelerate from 1000 rpm to 0 rpm at a constant speed

H12.20 Speed reference for speed 1

Address:	0x1214		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.21 Operating time of speed 1

Address:	0x1215		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

Defines the operating time of speed 1.

The operating time is the sum of the speed variation time from previous speed reference to present speed reference plus the average operating time of present speed reference.

If the operating time is set to 0, the drive skips this speed automatically.

As long as H12.00 (Multi-speed operation mode) is set to 2 (DI-based operation) and the speed No. determined by the external DI does not change, the drive continues operating at the speed defined by this speed reference, without being affected by the reference operating time.

H12.22 Acceleration/Deceleration time of speed 1

Address:	0x1216		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Defines the acceleration/deceleration time of speed 1.

0: Zero acceleration/deceleration time (acceleration time: 0; deceleration time: 0)

1: Acceleration/Deceleration time 1 (acceleration time: H12.03; deceleration time: H12.04)

2: Acceleration/Deceleration time 2 (acceleration time: H12.05; deceleration time: H12.06)

3: Acceleration/Deceleration time 3 (acceleration time: H12.07; deceleration time: H12.08

4: Acceleration/Deceleration time 4 (acceleration time: H12.09; deceleration time (H12.10)

H12.23 Speed reference for speed 2

Address: 0x1217

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	100	Change:	At once

Value Range:

-9999 to 9999

Description

-

H12.24 Operating time of speed 2

Address: 0x1218

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.25 Acceleration/Deceleration time of speed 2

Address: 0x1219

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.26 Speed reference for speed 3

Address: 0x121A

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	300	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.27 Operating time of speed 3

Address: 0x121B

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.28 Acceleration/Deceleration time of speed 3

Address: 0x121C

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.29 Speed reference for speed 4

Address: 0x121D

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	500	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.30 Operating time of speed 4

Address: 0x121E

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16

Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.31 Acceleration/Deceleration time of speed 4

Address:	0x121F		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.32 Speed reference for speed 5

Address:	0x1220		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	700	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.33 Operating time of speed 5

Address:	0x1221		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.34 Acceleration/Deceleration time of speed 5

Address:	0x1222		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.35 Speed reference for speed 6

Address:	0x1223		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	900	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.36 Operating time of speed 6

Address:	0x1224		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.37 Acceleration/Deceleration time of speed 6

Address:	0x1225		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time
1: Acceleration/Deceleration time 1
2: Acceleration/Deceleration time 2
3: Acceleration/Deceleration time 3
4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.38 Speed reference for speed 7

Address: 0x1226

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	600	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.39 Operating time of speed 7

Address: 0x1227

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.40 Acceleration/Deceleration time of speed 7

Address: 0x1228

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time
1: Acceleration/Deceleration time 1
2: Acceleration/Deceleration time 2
3: Acceleration/Deceleration time 3
4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.41 Speed reference for speed 8

Address:	0x1229		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	300	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.42 Operating time of speed 8

Address:	0x122A		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.43 Acceleration/Deceleration time of speed 8

Address:	0x122B		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.44 Speed reference for speed 9

Address:	0x122C		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	100	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.45 Operating time of speed 9

Address:	0x122D		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.46 Acceleration/Deceleration time of speed 9

Address:	0x122E		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.47 Speed reference for speed 10

Address:	0x122F		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	-100	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.48 Operating time of speed 10

Address:	0x1230		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16

Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.49 Acceleration/Deceleration time of speed 10

Address:	0x1231		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.50 Speed reference for speed 11

Address:	0x1232		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	-300	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.51 Operating time of speed 11

Address:	0x1233		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.52 Acceleration/Deceleration time of speed 11

Address: 0x1234

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.53 Speed reference for speed 12

Address: 0x1235

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	-500	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.54 Operating time of speed 12

Address: 0x1236

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.55 Acceleration/Deceleration time of speed 12

Address: 0x1237

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time
1: Acceleration/Deceleration time 1
2: Acceleration/Deceleration time 2
3: Acceleration/Deceleration time 3
4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.56 Speed reference for speed 13

Address:	0x1238		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	-700	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.57 Operating time of speed 13

Address:	0x1239		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.58 Acceleration/Deceleration time of speed 13

Address:	0x123A		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time
1: Acceleration/Deceleration time 1
2: Acceleration/Deceleration time 2
3: Acceleration/Deceleration time 3
4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.59 Speed reference for speed 14

Address:	0x123B		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	-900	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.60 Operating time of speed 14

Address:	0x123C		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.61 Acceleration/Deceleration time of speed 14

Address:	0x123D		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.62 Speed reference for speed 15

Address:	0x123E		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	-600	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.63 Operating time of speed 15

Address:	0x123F		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.64 Acceleration/Deceleration time of speed 15

Address:	0x1240		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.65 Speed reference for speed 16

Address:	0x1241		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	-300	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.66 Operating time of speed 16

Address:	0x1242		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16

Default: 5 Change: At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.67 Acceleration/Deceleration time of speed 16

Address: 0x1243

Min.: 0 Unit: -

Max.: 4 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

7.18 H17 VDI/VDO Parameters

H17.90 Communication VDI enable

Address: 0x175A

Min.: 0 Unit: -

Max.: 1 Data Type: UInt16

Default: 0 Change: At stop

Value Range:

0: Disable

1: Enable

Description

To use the VDI function:

1. Set H17.90 to enable VDI.
2. Set the default level after power-on in H17.91.
3. Set the DI function of the VDI through parameters in group H17.
4. Set the VDI output in H31.00.

H17.91 VDI default value upon power-on

Address: 0x175B

Min.: 0 Unit: -

Max.: 65535 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: 0x0: No default
1: 0x01: VDI1 default value
2: 0x02: VDI2 default value
4: 0x04: VDI3 default value
8: 0x08: VDI4 default value
16: 0x10: VDI5 default value
32: 0x20: VDI6 default value
64: 0x40:VDI7 default value
128: 0x80: VDI8 default value
256: 0x100: VDI9 default value
512: 0x200: VDI10 default value
1024: 0x400: VDI11 default value
2048: 0x800: VDI12 default value
4096: 0x1000: VDI13 default value
8092: 0x2000: VDI14 default value
16384: 0x4000: VDI15 default value
32768: 0x8000: VDI16 default value

Description

Used to configure the initial values of VDI upon power-on.
Bit 0 corresponds to VDI1.
Bit 1 corresponds to VDI2.
…
Bit15 corresponds to VDI16.

H17.00 VDI1 function

Address: 0x1700
Min.: 0 Unit: -
Max.: 40 Data Type: UInt16
Default: 0 Change: At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.01 VDI1 logic level

Address: 0x1701

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

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.02 VDI2 function

Address: 0x1702

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.03 VDI2 logic level selection

Address:	0x1703		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.04 VDI3 function

Address:	0x1704		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.05 VDI3 logic level selection

Address:	0x1705		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.06 VDI4 function

Address:	0x1706		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.07 VDI4 logic level selection

Address:	0x1707		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.08 VDI5 function

Address:	0x1708		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.09 VDI5 logic level selection

Address:	0x1709		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.10 VDI6 function

Address:	0x170A		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ON2: Alarm reset signal5: Multi-reference direction6: Multi-reference switchover CMD17: Multi-reference switchover CMD28: Multi-reference switchover CMD39: Multi-reference switchover CMD414: Positive limit switch15: Negative limit switch18: Forward jog19: Reverse jot24: Electronic gear ratio selection28: Multi-position reference enable31: Home switch34: Emergency stop40: Multi-speed enable

Description

-

H17.11 VDI6 logic level selection

Address:	0x170B		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.12 VDI7 function

Address:	0x170C		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ON2: Alarm reset signal5: Multi-reference direction6: Multi-reference switchover CMD17: Multi-reference switchover CMD28: Multi-reference switchover CMD39: Multi-reference switchover CMD414: Positive limit switch15: Negative limit switch18: Forward jog19: Reverse jot24: Electronic gear ratio selection28: Multi-position reference enable31: Home switch34: Emergency stop40: Multi-speed enable

Description

-

H17.13 VDI7 logic level selection

Address:	0x170D		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.14 VDI8 function

Address:	0x170E		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ON

2: Alarm reset signal

5: Multi-reference direction

6: Multi-reference switchover CMD1

7: Multi-reference switchover CMD2

8: Multi-reference switchover CMD3

9: Multi-reference switchover CMD4

14: Positive limit switch

15: Negative limit switch

18: Forward jog

19: Reverse jot

24: Electronic gear ratio selection

28: Multi-position reference enable

31: Home switch

34: Emergency stop

40: Multi-speed enable

Description

-

H17.15 VDI8 logic level selection

Address:	0x170F		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.16 VDI9 function

Address: 0x1710

Min.: 0 | Unit: -

Max.: 40 | Data Type: UInt16

Default: 0 | Change: At once

Value Range:

0: No assignment

1: Servo ON2: Alarm reset signal5: Multi-reference direction6: Multi-reference switchover CMD17: Multi-reference switchover CMD28: Multi-reference switchover CMD39: Multi-reference switchover CMD414: Positive limit switch15: Negative limit switch18: Forward jog19: Reverse jot24: Electronic gear ratio selection28: Multi-position reference enable31: Home switch34: Emergency stop40: Multi-speed enable

Description

-

H17.17 VDI9 logic level selection

Address: 0x1711

Min.: 0 | Unit: -

Max.: 1 | Data Type: UInt16

Default: 0 | Change: At stop

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.18 VDI10 function

Address: 0x1712

Min.: 0 | Unit: -

Max.: 40 | Data Type: UInt16

Default: 0 | Change: At once

Value Range:

0: No assignment

1: Servo ON2: Alarm reset signal5: Multi-reference direction6: Multi-reference switchover CMD17: Multi-reference switchover CMD28: Multi-reference switchover CMD39: Multi-reference switchover CMD414: Positive limit switch15: Negative limit switch18: Forward jog19: Reverse jot24: Electronic gear ratio selection28: Multi-position reference enable31: Home switch34: Emergency stop40: Multi-speed enable

Description

-

H17.19 VDI10 logic level selection

Address:	0x1713		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.20 VDI11 function

Address:	0x1714		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ON

2: Alarm reset signal

5: Multi-reference direction

6: Multi-reference switchover CMD1

7: Multi-reference switchover CMD2

8: Multi-reference switchover CMD3

9: Multi-reference switchover CMD4

14: Positive limit switch

15: Negative limit switch

18: Forward jog

19: Reverse jot

24: Electronic gear ratio selection

28: Multi-position reference enable

31: Home switch

34: Emergency stop

40: Multi-speed enable

Description

-

H17.21 VDI11 logic level selection

Address:	0x1715		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.22 VDI12 function

Address:	0x1716		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ON

2: Alarm reset signal

5: Multi-reference direction

6: Multi-reference switchover CMD1

7: Multi-reference switchover CMD2

8: Multi-reference switchover CMD3

9: Multi-reference switchover CMD4

14: Positive limit switch

15: Negative limit switch

18: Forward jog

19: Reverse jot

24: Electronic gear ratio selection

28: Multi-position reference enable

31: Home switch

34: Emergency stop

40: Multi-speed enable

Description

-

H17.23 VDI12 logic level selection

Address:	0x1717		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.24 VDI13 function

Address: 0x1718

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.25 VDI13 logic level selection

Address: 0x1719

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

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.26 VDI14 function

Address: 0x171A

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.27 VDI14 logic level selection

Address:	0x171B		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.28 VDI15 function

Address:	0x171C		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.29 VDI15 logic level selection

Address: 0x171D

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

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.30 VDI16 function

Address: 0x171E

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ON2: Alarm reset signal5: Multi-reference direction6: Multi-reference switchover CMD17: Multi-reference switchover CMD28: Multi-reference switchover CMD39: Multi-reference switchover CMD414: Positive limit switch15: Negative limit switch18: Forward jog19: Reverse jot24: Electronic gear ratio selection28: Multi-position reference enable31: Home switch34: Emergency stop40: Multi-speed enable

Description

-

H17.31 VDI16 logic level selection

Address: 0x171F

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

Value Range:

0: Active when the written value is 11: Active when the written value changes from 0 to 1

Description

-

H17.92 Communication VDO enable

Address: 0x175C

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

Value Range:

0: Disable

1: Enable

Description

To use the VDO function:

1. Set H17.92 to enable VDO.
2. Set the default level after power-on in H17.93.
3. Set the DO function of the VDO through parameters in group H17.

4: Read the output level of the VDO in H17.32.

H17.93 VDO default value after power-on

Address: 0x175D

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

Value Range:

0: 0x0: No default
1: 0x01: VDI1 default value
2: 0x02: VDI2 default value
4: 0x04: VDI3 default value
8: 0x08: VDI4 default value
16: 0x10: VDI5 default value
32: 0x20: VDI6 default value
64: 0x40:VDI7 default value
128: 0x80: VDI8 default value
256: 0x100: VDI9 default value
512: 0x200: VDI10 default value
1024: 0x400: VDI11 default value
2048: 0x800: VDI12 default value
4096: 0x1000: VDI13 default value
8192: 0x2000: VDI14 default value
16384: 0x4000: VDI15 default value
32768: 0x8000: VDI16 default value

Description

Used to configure the initial value of VDO upon power-on.

Bit 0 corresponds to VDO1.

Bit 1 corresponds to VDO2.

…

Bit15 corresponds to VDO16.

H17.32 VDO virtual level

Address: 0x1720

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

H17.33 VDO1 function

Address: 0x1721

Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.34 VDO1 logic level

Address:	0x1722		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Output 1 upon active logic
1: Output 0 upon active logic

Description

-

H17.35 VDO2 function

Address:	0x1723		
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.36 VDO2 logic level

Address:	0x1724		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16

Default:	0	Change:	At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.37 VDO3 function

Address:	0x1725		
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ready

2: Motor rotating

10: Warning

11: Fault

31: Communication-forced DO

32: EDM output

Description

-

H17.38 VDO3 logic level

Address:	0x1726		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.39 VDO4 function

Address:	0x1727		
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.40 VDO4 logic level

Address:	0x1728		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Output 1 upon active logic
1: Output 0 upon active logic

Description

-

H17.41 VDO5 function

Address:	0x1729		
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.42 VDO5 logic level

Address:	0x172A		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16

Default: 0 Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.43 VDO6 function

Address: 0x172B

Min.: 0 Unit: -

Max.: 32 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: No assignment

1: Servo ready

2: Motor rotating

10: Warning

11: Fault

31: Communication-forced DO

32: EDM output

Description

-

H17.44 VDO6 logic level

Address: 0x172C

Min.: 0 Unit: -

Max.: 1 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.45 VDO7 function

Address: 0x172D

Min.: 0 Unit: -

Max.: 32 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.46 VDO7 logic level

Address:	0x172E		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Output 1 upon active logic
1: Output 0 upon active logic

Description

-

H17.47 VDO8 function

Address:	0x172F		
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.48 VDO8 logic level

Address:	0x1730		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16

Default: 0 | Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.49 VDO9 function

Address: 0x1731

Min.: 0 | Unit: -

Max.: 32 | Data Type: UInt16

Default: 0 | Change: At once

Value Range:

0: No assignment

1: Servo ready

2: Motor rotating

10: Warning

11: Fault

31: Communication-forced DO

32: EDM output

Description

-

H17.50 VDO9 logic level

Address: 0x1732

Min.: 0 | Unit: -

Max.: 1 | Data Type: UInt16

Default: 0 | Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.51 VDO10 function

Address: 0x1733

Min.: 0 | Unit: -

Max.: 32 | Data Type: UInt16

Default: 0 | Change: At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.52 VDO10 logic level

Address:	0x1734		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Output 1 upon active logic
1: Output 0 upon active logic

Description

-

H17.53 VDO11 function

Address:	0x1735		
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.54 VDO11 logic level

Address:	0x1736		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16

Default:	0	Change:	At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.55 VDO12 function

Address:	0x1737		
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ready

2: Motor rotating

10: Warning

11: Fault

31: Communication-forced DO

32: EDM output

Description

-

H17.56 VDO12 logic level

Address:	0x1738		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.57 VDO13 function

Address:	0x1739		
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.58 VDO13 logic level

Address:	0x173A		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Output 1 upon active logic
1: Output 0 upon active logic

Description

-

H17.59 VDO14 function

Address:	0x173B		
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.60 VDO14 logic level

Address:	0x173C		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16

Default: 0 Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.61 VDO15 function

Address: 0x173D

Min.: 0 Unit: -

Max.: 32 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: No assignment

1: Servo ready

2: Motor rotating

10: Warning

11: Fault

31: Communication-forced DO

32: EDM output

Description

-

H17.62 VDO15 logic level

Address: 0x173E

Min.: 0 Unit: -

Max.: 1 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.63 VDO16 function

Address: 0x173F

Min.: 0 Unit: -

Max.: 32 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.64 VDO16 logic level

Address:	0x1740		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Output 1 upon active logic
1: Output 0 upon active logic

Description

-

7.19 H18 Position Comparison Output Parameters

H18.00 Position comparison output selection

Address:	0x1800		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable
1: Enable (rising edge-triggered)

Description

-

H18.01 Position comparison output feedback source

Address:	0x1801		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Motor encoder feedback

1: Fully closed-loop position feedback

Description

-

H18.02 Position comparison resolution

Address:	0x1802		
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	1	Change:	At once

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:	0x1803		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Individual comparison mode

1: Cyclic comparison mode

2: Fixed cyclic comparison mode

Description

-

H18.04 Current position as zero

Address:	0x1804		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable (rising edge-triggered)

Description

-

H18.05 Position comparison output width

Address: 0x1805

Min.: 0 Unit: ms

Min.:	0.1	Unit:	ms
Max.:	204.7	Data Type:	UInt16
Default:	0.1	Change:	At once

Value Range:

0.1 ms to 204.7 ms

Description

Defines the effective pulse width of the DO when the comparison point is reached. The value range is 0 to 204.7 (unit: 0.1 ms).

H18.06 Position comparison output ABZ port polarity

Address: 0x1806

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: OCZ output logic

0: Positive, output high level upon active logic

1: Negative, output low level upon active logic

bit 1: Z port output logic

0: Positive, output high level upon active logic

1: Negative, output low level upon active logic

bit 2: A/B output logic

0: Positive, output high level upon active logic

1: Negative, output low level upon active logic

Description

0: Positive, output high level upon active logic; 1: Negative, output low level upon active logic

bit 0: OCZ output logic

bit 1: Z port output logic

bit 2: A/B output logic

H18.07 Start point of position comparison

Address: 0x1807

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:
0 to 40
Description
-

H18.08 End point of position comparison

Address:	0x1808		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:
0 to 40
Description
-

H18.09 Current status of position comparison

Address:	0x1809		
Min.:	0	Unit:	-
Max.:	1024	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:
0 to 1024
Description
-

H18.10 Real-time position of position comparison

Address:	0x180A		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:
-2147483648 to +2147483647
Description
-

H18.12 Zero offset of position comparison

Address:	0x180C		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H18.14 Position comparison output delay compensation

Address: 0x180E

Min.:	-12	Unit:	us
Max.:	12	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-12.00 us to +12.00 us

Description

Used to compensate for the delay caused by hardware signal output.

H18.15 Cycles of fixed mode

Address: 0x180F

Min.:	1	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

1 to 65535

Description

-

H18.16 ABZ output function setting

Address: 0x1810

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: OCZ output function0: Frequency-division output

1: Position comparison

bit 1: Z port output function

0: Frequency-division output

1: Position comparison

bit 2: A/B port output function

0: Frequency-division output

1: Position comparison

Description

0: Frequency-division output; 1: Position comparison

bit 0: OCZ port function setting

bit 1: Z port function setting

bit 2: A/B function setting

H18.17 Number of fixed modes completed

Address:	0x1811		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

7.20 H19: Target Position Parameters

H19.00 Target value of position comparison 1

Address:	0x1900		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.02 Attribute value of position comparison 1

Address:	0x1902		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Attribute of position comparison point 1
bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2 to bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9 to bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

H19.03 Target value of position comparison 2

Address: 0x1903

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.05 Attribute value of position comparison 2

Address:	0x1905		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.06 Target value of position comparison 3

Address:	0x1906		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.08 Attribute value of position comparison 3

Address: 0x1908

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.09 Target value of position comparison 4

Address: 0x1909

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.11 Attribute value of position comparison 4

Address: 0x190B

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.12 Target value of position comparison 5

Address:	0x190C		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.14 Attribute value of position comparison 5

Address:	0x190E		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.15 Target value of position comparison 6

Address: 0x190F

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.17 Attribute value of position comparison 6

Address: 0x1911

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.18 Target value of position comparison 7

Address:	0x1911		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.20 Attribute value of position comparison 7

Address:	0x1914		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.21 Target value of position comparison 8

Address:	0x1915		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.23 Attribute value of position comparison 8

Address:	0x1917		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.24 Target value of position comparison 9

Address:	0x1918		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.26 Attribute value of position comparison 9

Address:	0x191A		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.27 Target value of position comparison 10

Address:	0x191B		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.29 Attribute value of position comparison 10

Address:	0x191D		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.30 Target value of position comparison 11

Address:	0x191E		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.32 Attribute value of position comparison 11

Address:	0x1920		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.33 Target value of position comparison 12

Address:	0x1921		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.35 Attribute value of position comparison 12

Address:	0x1923		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.36 Target value of position comparison 13

Address:	0x1924		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.38 Attribute value of position comparison 13

Address:	0x1926		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.39 Target value of position comparison 14

Address: 0x1927

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.41 Attribute value of position comparison 14

Address: 0x1929

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.42 Target value of position comparison 15

Address:	0x192A		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.44 Attribute value of position comparison 15

Address:	0x192C		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.45 Target value of position comparison 16

Address:	0x192D		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.47 Attribute value of position comparison 16

Address:	0x192F		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.48 Target value of position comparison 17

Address:	0x1930		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.50 Attribute value of position comparison 17

Address:	0x1932		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.51 Target value of position comparison 18

Address:	0x1933		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.53 Attribute value of position comparison 18

Address:	0x1935		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.54 Target value of position comparison 19

Address:	0x1936		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.56 Attribute value of position comparison 19

Address:	0x1938		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.57 Target value of position comparison 20

Address:	0x1939		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.59 Attribute value of position comparison 20

Address:	0x193B		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.60 Target value of position comparison 21

Address:	0x193C		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.62 Attribute value of position comparison 21

Address:	0x193E		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.63 Target value of position comparison 22

Address:	0x193F		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.65 Attribute value of position comparison 22

Address:	0x1941		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.66 Target value of position comparison 23

Address:	0x1942		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.68 Attribute value of position comparison 23

Address:	0x1944		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.69 Target value of position comparison 24

Address:	0x1945		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.71 Attribute value of position comparison 24

Address:	0x1947		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.72 Target value of position comparison 25

Address:	0x1948		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.74 Attribute value of position comparison 25

Address:	0x194A		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.75 Target value of position comparison 26

Address:	0x194B		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.77 Attribute value of position comparison 26

Address:	0x194D		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.78 Target value of position comparison 27

Address:	0x194E		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.80 Attribute value of position comparison 27

Address:	0x1950		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.81 Target value of position comparison 28

Address:	0x1951		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.83 Attribute value of position comparison 28

Address:	0x1953		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.84 Target value of position comparison 29

Address:	0x1954		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.86 Attribute value of position comparison 29

Address:	0x1956		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.87 Target value of position comparison 30

Address:	0x1957		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.89 Attribute value of position comparison 30

Address:	0x1959		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.90 Target value of position comparison 31

Address:	0x195A		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.92 Attribute value of position comparison 31

Address:	0x195C		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.93 Target value of position comparison 32

Address:	0x195D		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.95 Attribute value of position comparison 32

Address:	0x195F		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.96 Target value of position comparison 33

Address:	0x1960		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.98 Attribute value of position comparison 33

Address:	0x1962		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.99 Target value of position comparison 34

Address:	0x1963		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.101 Attribute value of position comparison 34

Address:	0x1965		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.102 Target value of position comparison 35

Address:	0x1966		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.104 Attribute value of position comparison 35

Address:	0x1968		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.105 Target value of position comparison 36

Address:	0x1969		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.107 Attribute value of position comparison 36

Address:	0x196B		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.108 Target value of position comparison 37

Address:	0x196C		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.110 Attribute value of position comparison 37

Address:	0x196E		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.111 Target value of position comparison 38

Address:	0x196F		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.113 Attribute value of position comparison 38

Address:	0x1971		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.114 Target value of position comparison 39

Address:	0x1972		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.116 Attribute value of position comparison 39

Address:	0x1974		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.117 Target value of position comparison 40

Address:	0x1975		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.119 Attribute value of position comparison 40

Address:	0x1977		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

7.21 H1F: Software Tool Parameters

H1F.90 DI function state 1 read through communication

Address:	0x1F5A	Effective:	At once
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 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:	0x1F5B	Effective:	At once
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16

Default:	0	Change:	Unchangeable

Value Range:

0 to 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:	0x1F5C	Effective:	At once
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 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:	0x1F5D	Effective:	At once
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 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:	0x1F5E	Effective:	At once
Min.:	0	Unit:	-

Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 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:	0x1F5F	Effective:	At once
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 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

7.22 H30: Variables Read Through Communication

H30.00 Servo status read through communication

Address:	0x3000		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H30.01 DO function state 1 read through communication

Address:	0x3001		
Min.:	0	Unit:	-

Max.: 65535 | Data Type: UInt16
Default: 0 | Change: Unchangeable

Value Range:

0 to 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: 0x3002

Min.: 0 | Unit: -
Max.: 65535 | Data Type: UInt16
Default: 0 | Change: Unchangeable

Value Range:

0 to 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

7.23 H31: Communication Setting

H31.00 VDI virtual level set through communication

Address: 0x3100

Min.: 0 | Unit: -
Max.: 65535 | Data Type: UInt16
Default: 0 | Change: At once

Value Range:

0 to 65535

Description

When H17.90 is set to 1, the VDI state is defined by H31.00.

The VDI logic is determined by H17.91 (Default VDI virtual level value upon upower-on) upon initial power-on. Thereafter, the VDI logic is determined by H31.00.

"bit(n) = 1" of H31.00 indicates the logic of VDI (n+1) is "1". "bit(n)=0" indicates the logic of VDI (n+1) is "0".

H31.04 DO status set through communication

Address:	0x3104		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

Set H04.22 to define H31.04 as the source of DO state.

H31.05 AO set through communication

Address:	0x3105		
Min.:	-10000	Unit:	mV
Max.:	10000	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-10000 mV to +10000 mV

Description

Set H04.50 to 10 to define H31.05 as the source of AO (unit: mV).

H31.09 Speed reference set through communication

Address:	0x3109		
Min.:	-9999.000	Unit:	rpm
Max.:	9999.000	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-9999.000 to +9999.000

Description

Set H06.02 to 4 to define H31.09 as the source of the speed reference in the speed control mode (unit: rpm).

H31.11 Torque reference set through communication

Address:	0x310B		
Min.:	-100	Unit:	%
Max.:	100	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-100.000% to +100.000%

Description

Set H07.02 to 4 to define H31.11 as the source of the torque reference in the torque control mode. The setpoint 100.000% corresponds to the rated torque of the motor.

7.24 1000h Object Dictionaries

1000.00h Device type

Address:	0x5405		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

1001.00h Error register

Address:	0x5406		
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 255

Description

-

1018.01h Vendor ID

Address:	0x5401		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

1018.02h Product code

Address:	0x5402		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

1018.03h Revision number

Address:	0x5403		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

1600.00h Number of valid mapped objects in RPDO1

Address:	0x3900		
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	3	Change:	At once

Value Range:

0 to 20

Description

The object can be modified only when the PDO is invalid. When 0 is written, the mapped objects of other sub-indexes are cleared.

1600.01h 1st mapped object in RPDO1

Address:	0x3901		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1614807040	Change:	At once

Value Range:

0 to 2147483647

Description

The total length of a mapped object cannot exceed 64 bits. Mapping based on bytes instead of bits is supported. The indexes and sub-indexes of mapped objects must exist in the object dictionary list and are readable and mappable. Sub-indexes are written in the following format:

bit 0 to bit 7: Object length

bit 8 to bit 15: Sub-index

bit 16 to bit 31: Index

1600.02h 2nd mapped object in RPDO1

Address:	0x3902		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1618608128	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1600.01h

1600.03h 3rd mapped object in RPDO1

Address:	0x3903		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1622671360	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1600.01h

1600.04h 4th mapped object in RPDO1

Address:	0x3904		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1600.01h

1600.05h 5th mapped object in RPDO1

Address:	0x3905		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1600.01h

1600.06h 6th mapped object in RPDO1

Address:	0x3906		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.07h 7th mapped object in RPDO1

Address:	0x3907		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.08h 8th mapped object in RPDO1

Address:	0x3908		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.09h 9th mapped object in RPDO1

Address:	0x3909		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.0Ah 10th mapped object in RPDO1

Address:	0x390A		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.0Bh 11th mapped object in RPDO1

Address:	0x390B		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.0Ch 12th mapped object in RPDO1

Address:	0x390C		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.0Dh 13th mapped object in RPDO1

Address:	0x390D		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.0Eh 14th mapped object in RPDO1

Address:	0x390E		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.0Fh 15th mapped object in RPDO1

Address:	0x390F		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.10h 16th mapped object in RPDO1

Address:	0x3910		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.11h 17th mapped object in RPDO1

Address:	0x3911		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.12h 18th mapped object in RPDO1

Address:	0x3912		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.13h 19th mapped object in RPDO1

Address:	0x3913		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.14h 20th mapped object in RPDO1

Address:	0x3914		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1A00.00h Number of valid mapped objects in TPDO1

Address:	0x4000		
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	7	Change:	At once

Value Range:

0 to 20

Description

The object can be modified only when the PDO is invalid. When 0 is written, the mapped objects of other sub-indexes are cleared.

1A00.01h 1st mapped object in TPDO1

Address:	0x4001		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1614872576	Change:	At once

Value Range:

0 to 2147483647

Description

The total length of a mapped object cannot exceed 64 bits. Mapping based on bytes instead of bits is supported. The indexes and sub-indexes of mapped objects must exist in the object dictionary list and are readable and mappable.

Sub-indexes are written in the following format:

bit 0 to bit 7: Object length

bit 8 to bit 15: Sub-index

bit 16 to bit 31: Index

1A00.02h 2nd mapped object in TPDO1

Address: 0x4002

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1617166336	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.03h 3rd mapped object in TPDO1

Address: 0x4003

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1622736896	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.04h 4th mapped object in TPDO1

Address: 0x4004

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1622802432	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.05h 5th mapped object in TPDO1

Address: 0x4005

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1622933504	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.06h 6th mapped object in TPDO1

Address: 0x4006

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1614741504	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.07h 7th mapped object in TPDO1

Address: 0x4007

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1627193344	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.08h 8th mapped object in TPDO1

Address: 0x4008

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.09h 9th mapped object in TPDO1

Address: 0x4009

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32

Default: 0 Change: At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.0Ah 10th mapped object in TPDO1

Address:	0x400A		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.0Bh 11th mapped object in TPDO1

Address:	0x400B		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.0Ch 12th mapped object in TPDO1

Address:	0x400C		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.0Dh 13th mapped object in TPDO1

Address:	0x400D		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1A00.01h

1A00.0Eh 14th mapped object in TPDO1

Address:	0x400E		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1A00.01h

1A00.0Fh 15th mapped object in TPDO1

Address:	0x400F		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1A00.01h

1A00.10h 16th mapped object in TPDO1

Address:	0x4010		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1A00.01h

1A00.11h 17th mapped object in TPDO1

Address:	0x4011		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.12h 18th mapped object in TPDO1

Address:	0x4012		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.13h 19th mapped object in TPDO1

Address:	0x4013		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.14h 20th mapped object in TPDO1

Address:	0x4014		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1C12.00h Number of assigned PDOs

Address:	0x5000		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt8
Default:	1	Change:	At once

Value Range:

0 to 2

Description

-

1C12.01h Index of assigned RPDO1

Address:	0x5001		
Min.:	5632	Unit:	-
Max.:	5898	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

5632 to 5898

Description

-

1C12.02h Index of assigned RPDO2

Address:	0x5002		
Min.:	5632	Unit:	-
Max.:	5898	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

5632 to 5898

Description

-

1C13.00h Number of assigned PDOs

Address:	0x5100		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt8
Default:	0	Change:	At once

Value Range:

0 to 2

Description

-

1C13.01h Index of assigned TPDO1

Address:	0x5101		
Min.:	6656	Unit:	-
Max.:	6922	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

6656 to 6922

Description

-

1C13.02h Index of assigned TPDO2

Address:	0x5102		
Min.:	6656	Unit:	-
Max.:	6922	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

6656 to 6922

Description

-

1C32.01h Synchronization type

Address:	0x5201		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

1C32.02h Cycle time

Address:	0x5202		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 4294967295

Description

-

1C32.04h Synchronization types supported

Address:	0x5204		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

1C32.05h Minimum cycle time

Address:	0x5205		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 4294967295

Description

-

1C33.01h Synchronization type

Address:	0x5301		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

1C33.02h Cycle time

Address:	0x5302		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 4294967295

Description

-

1C33.04h Synchronization types supported

Address:	0x5304		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

1C33.05h Minimum cycle time

Address:	0x5305		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 4294967295

Description

-

7.25 6000h Object Dictionaries

603Fh Error code

Address:	0x3500		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 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:	0x3502		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

6041h Status word

Address: 0x3504

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

Value Range:

0 to 65535

Description

-

605Ah Quick stop option code

Address: 0x3536

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 Disable operation option code

Address: 0x353A

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: 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 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: 0x353C

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.
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

605Eh Fault reaction option code

Address: 0x353C

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 the 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:	0x353E		
Min.:	0	Unit:	-
Max.:	10	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

1: Profile position (PP) mode
3: Profile velocity (PV) mode
4: Profile torque (PT) mode
6: Homing (HM) mode
8: Cyclic synchronous position (CSP) mode
9: Cyclic synchronous velocity (CSV) mode
10: Cyclic synchronous torque (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: Cyclic synchronous position (CSP) mode
9: Cyclic synchronous velocity (CSV) mode
10: Cyclic synchronous torque (CST) mode
Others: 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 **Modes of operation display**

Address:	0x3544		
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: Cyclic synchronous position (CSP) mode
9: Cyclic synchronous velocity (CSV) mode
10: Cyclic synchronous torque (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: Cyclic synchronous position (CSP) mode
9: Cyclic synchronous velocity (CSV) mode
10: Cyclic synchronous torque (CST) mode

6062h **Position demand value**

Address:	0x3546		
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:	0x3548		
Min.:	-2147483648	Unit:	Pulse
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:	0x354A		
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:	0x354C		
Min.:	0	Unit:	Reference unit
Max.:	4294967295	Data Type:	UInt32
Default:	219895608	Change:	At once

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 ±6065h after the time defined by 6066h elapses, EB00.0 (Position deviation too large) occurs.

6066h **Following error time out**

Address: 0x354E

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

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:	0x3550		
Min.:	0	Unit:	Reference unit
Max.:	4294967295	Data Type:	UInt32
Default:	46976	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the threshold for position reach.

If the difference value between 6062h and 6064h is within ±6067h and the time reaches 6068h, the position is reached. In this case, bit10 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:	0x3552		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Defines the window time for position reach, which must be used together with 6067h.

606Ch Velocity actual value

Address:	0x355A		
Min.:	-2147483648	Unit:	Reference unit/s
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Indicates the actual speed feedback in user-defined unit.

606Dh Velocity window

Address:	0x355C		
Min.:	0	Unit:	rpm
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 rpm to 65535 rpm

Description

Defines the threshold for speed reach.

If the difference value between 60FFh and 606Ch is within ±606Dh and the time reaches 606Eh, the speed is reached and bit10 of 6041h is set to 1 in the profile velocity mode.

This flag bit is meaningful only when the S-ON signal is active in the PV mode.

606Eh Velocity window time

Address:	0x355E		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

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:	0x3560		
Min.:	0	Unit:	rpm
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 rpm to 65535 rpm

Description

Defines the threshold for determining whether the user velocity is 0.

When 606Ch is within ±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 is not related to the S-ON state.

6070h **Velocity threshold time**

Address:	0x3562		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

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:	0x3564		
Min.:	-4000	Unit:	0.001
Max.:	4000	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-4000 to +4000

Description

Defines the target torque in the profile torque mode.

The value 1000 corresponds to the rated torque of the motor.

6072h **Max. torque value**

Address:	0x3566		
Min.:	0	Unit:	0.001
Max.:	4000	Data Type:	UInt16
Default:	3500	Change:	At once

Value Range:

0 to 4000

Description

Defines the maximum torque reference limit.

The value 1000 corresponds to the rated torque of the motor.

6074h **Torque demand value**

Address:	0x356A		
Min.:	-4000	Unit:	0.001
Max.:	4000	Data Type:	Int16

Default: 0 Change: Unchangeable

Value Range:

-4000 to +4000

Description

Defines the target torque value.

The value 1000 corresponds to the rated torque of the motor.

6077h Torque actual value

Address: 0x3570

Min.: -4000 Unit: 0.001

Max.: 4000 Data Type: Int16

Default: 0 Change: Unchangeable

Value Range:

-4000 to +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: 0x3576

Min.: -2147483648 Unit: Reference unit

Max.: 2147483647 Data Type: Int32

Default: 0 Change: At once

Value Range:

-2147483648 to +2147483647

Description

Defines the target position of the servo drive in the profile position mode.

Table 7–1 Description of bit 6 of 6040h

Value of Bit 6	Description	Remarks
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.
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: 0x357A

Min.: -2147483648 Unit: Reference unit

Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

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 in active under the following conditions: The device is powered on, the homing operation is complete, and bit 15 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 outside the value of 607Dh (Software position limit), EE09.1 occurs (Home setting error).

607D.01h Min. position limit

Address: 0x3700

Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	-2147483648	Change:	At once

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.02h Max. position limit

Address: 0x3800

Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	2147483647	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

Defines the maximum software position limit relative to the mechanical zero.

Maximum software position limit = (607D.02h)

607Eh Polarity

Address:	0x357E		
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 255

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 velocity 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:	0x3580		
Min.:	0	Unit:	Reference unit/s
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the maximum operating speed in user-defined unit.

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:	0x3584		
Min.:	0	Unit:	Reference unit/s
Max.:	4294967295	Data Type:	UInt32
Default:	111848106	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the constant running speed of the displacement reference in the profile position mode.

The setpoint takes effect after the slave receives the displacement reference.

6083h **Profile acceleration**

Address:	0x3588		
Min.:	0	Unit:	Reference unit/s^2
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	At once

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 x 8388608/60) with acceleration rate being 400 rpm/s (6083h: 400 x 8388608/60) and deceleration rate being 200 rpm/s (6084h: 200 x 8388608/60) under a gear ratio of 1:1:

Acceleration time t_{up} = Δ6081h/Δ6083h =1 (s); Deceleration time t_{down} = Δ6081h/Δ6084h =2 (s)

The setpoint 0 will be forcibly changed to 1.

6084h **Profile deceleration**

Address:	0x358A		
Min.:	0	Unit:	Reference unit/s^2
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	At once

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 x 8388608/60) with acceleration rate being 400 rpm/s (6083h: 400 x 8388608/60) and deceleration rate being 200 rpm/s (6084h: 200 x 8388608/60) under a gear ratio of 1:1:

Acceleration time t_{up} = Δ6081h/Δ6083h =1 (s); Deceleration time t_{down} = Δ6081h/Δ6084h =2 (s)

The setpoint 0 will be forcibly changed to 1.

6085h **Quick stop deceleration**

Address:			
Min.:	0	Unit:	Reference unit/s^2
Max.:	4294967295	Data Type:	UInt32
Default:	2147483648	Change:	At once

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.
The setpoint 0 will be forcibly changed to 1.

6087h Torque slope

Address:	0x3590		
Min.:	0	Unit:	0.1%/s
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the acceleration rate (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 setpoint exceeds the torque reference limit, the limit value will be used.
The setpoint 0 will be forcibly changed to 1.

6091.01h Motor revolutions

Address:	0x3714		
Min.:	1	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	1	Change:	At stop

Value Range:

1 to 4294967295

Description

Defines the numerator of the gear ratio.
The gear ratio is used to establish the proportional relationship between the load shaft displacement designated by the user and the motor shaft displacement.
The relationship 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 relationship between the motor speed (rpm) and the load shaft speed (reference unit/s) is as follows.
Motor speed (rpm) = Load shaft speed x 6091h x 60/Encoder resolution

The relationship between the motor acceleration (rpm/ms) and the load shaft acceleration (reference unit/s^2) is as follows.
Motor acceleration (rpm/ms) = Load shaft acceleration x 6091h x 1000/Encoder resolution/60

6091.02h Shaft revolutions

Address: 0x3814

Min.:	1	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	1	Change:	At stop

Value Range:

1 to 4294967295

Description

Defines the denominator of the gear ratio.

6098h Homing method

Address: 0x35B2

Min.:	-2	Unit:	-
Max.:	35	Data Type:	Int16
Default:	1	Change:	At once

Value Range:

-2 to +35

Description

Table 7–2 Defines the homing method.

Setpoint	Description
-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	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
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	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

Setpoint	Description
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
15 to 16	The servo drive does not perform the homing operation.
17 to 30	Similar to setpoints 1...14 except that the deceleration point coincide with the home
31 to 32	The servo drive does not perform the homing operation.
33	Reverse, Z signal as home
34	Forward, Z signal as home
35	Current position as home

6099.01h Speed during search for switch

Address:	0x371C		
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:	0x381C		
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: 0x35B6
Min.: 0 | Unit: Reference unit/s^2
Max.: 4294967295 | Data Type: UInt32
Default: 4294967295 | Change: At once

Value Range:

0 to 4294967295

Description

Defines the acceleration rate in the homing mode.

60B0h Position offset

Address: 0x35E2
Min.: -2147483648 | Unit: Reference unit
Max.: 2147483647 | Data Type: Int32
Default: 0 | Change: At once

Value Range:

-2147483648 to +2147483647

Description

-

60B1h Velocity offset

Address: 0x35E4
Min.: -2147483648 | Unit: Reference unit/s
Max.: 2147483647 | Data Type: Int32
Default: 0 | Change: At once

Value Range:

-2147483648 to +2147483647

Description

-

60B2h Torque offset

Address: 0x35E6

Min.: -4000 Unit: 0.001
Max.: 4000 Data Type: Int16
Default: 0 Change: At once

Value Range:

-4000 to +4000

Description

-

60B8h Touch probe function

Address: 0x35F2
Min.: 0 Unit: -
Max.: 65535 Data Type: UInt16
Default: 0 Change: At once

Value Range:

0 to 65535

Description

See the following table for descriptions of each bit of 60B8h.

bit	Name	Description
0	Touch probe 1 function selection 0: Disable touch probe 1 1: Enable touch probe 1	bit 0 to bit 5: settings related to touch probe 1 When a DI is used to trigger the touch probe function, the DI source cannot be changed once the touch probe function is enabled. For absolute encoders, Z signal refers to the zero point of the single-turn motor 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 signal 1: Z signal	
3	N/A	
4	Touch probe 1 positive edge 0: Switch off latching at positive edge 1: Enable latching at positive edge	
5	Touch probe 1 negative edge 0: Switch off latching at negative edge 1: Enable latching at negative edge	
6 to 7	N/A	-

bit	Name	Description
8	Touch probe 2 function selection 0: Disable touch probe 2 1: Enable touch probe 2	bit 8 to bit 13: settings related to touch probe 2
9	Touch probe 2 trigger mode 0: Single trigger mode (Latches the position at the first trigger event.) 1: Continuous trigger mode	
10	Touch probe 2 trigger signal selection 0: DI signal 1: Z signal	
11	N/A	
12	Touch probe 2 positive edge 0: Switch off latching at positive edge 1: Enable latching at positive edge	
13	Touch probe 2 negative edge 0: Switch off latching at negative edge 1: Enable latching at negative edge	
14 to 15	N/A	-

60B9h Touch probe status

Address: 0x35F4

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

Value Range:

0 to 65535

Description

Defines the functions of touch probe 1 and touch probe 2.

See the following table for descriptions of each bit of 60B9h.

bit	Name	Description
0	Touch probe 1 function selection 0: Disable touch probe 1 1: Enable touch probe 1	bit 0 to bit 2: status of touch probe 1
1	Touch probe 1 positive edge value 0: No positive edge value latched 1: Positive edge value latched	
2	Touch probe 1 negative edge value 0: No negative edge value latched 1: Negative edge value latched	
3 to 5	N/A	-

bit	Name	Description
6 to 7	Number of touch probe trigger events when touch probe 1 is assigned with the function of continuous sampling	Indicates the number of touch probe trigger events (0 to 3) when touch probe 1 is assigned with the function of continuous sampling.
8	Touch probe 2 function selection 0: Disable touch probe 2 1: Enable touch probe 2	bit 8 to bit 10: status of touch probe 2
9	Touch probe 2 positive edge value 0: No positive edge value latched 1: Positive edge value latched	
10	Touch probe 2 negative edge value 0: No negative edge value latched 1: Negative edge value latched	
11 to 13	N/A	-
14 to 15	Number of touch probe trigger events when touch probe 2 is assigned with the function of continuous sampling	Indicates the number of touch probe trigger events (0 to 3) when touch probe 2 is assigned with the function of continuous sampling.

60BAh Touch probe 1 positive edge

Address:	0x35F4		
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 proble 1 signal.

60BBh Touch probe 1 negative edge

Address:	0x35F8		
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 proble 1 signal.

60BCh **Touch probe 2 positive edge**

Address:	0x35FA		
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 proble 2 signal.

60BDh **Touch probe 2 negative edge**

Address:			
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 proble 2 signal.

60C5h **Max. acceleration**

Address:	0x360C		
Min.:	0	Unit:	Reference unit/s^2
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the maximum permissible deceleration in the profile position mode, profile velocity mode, and homing mode.

The setpoint 0 will be forcibly changed to 1.

60C6h **Max. deceleration**

Address:	0x360E		
Min.:	0	Unit:	Reference unit/s^2
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the maximum allowable deceleration in the profile position mode, profile velocity mode, and homing mode.

The setpoint 0 will be forcibly changed to 1.

60D5h Touch probe 1 positive edge counter

Address: 0x362C

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

Value Range:

0 to 65535

Description

The counting value is added by "1" each time this object is triggered.

60D6h Touch probe 1 negative edge counter

Address: 0x362E

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

Value Range:

0 to 65535

Description

The counting value is added by "1" each time this object is triggered.

60D7h Touch probe 2 positive edge counter

Address: 0x3630

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

Value Range:

0 to 65535

Description

The counting value is added by "1" each time this object is triggered.

60D8h Touch probe 2 negative edge counter

Address: 0x3632

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

Value Range:

0 to 65535

Description

The counting value is added by "1" each time this object is triggered.

60E0h **Positive torque limit value**

Address:	0x3642		
Min.:	0	Unit:	0.001
Max.:	4000	Data Type:	UInt16
Default:	3500	Change:	At once

Value Range:

0 to 4000

Description

Defines the maximum torque limit of the servo drive in the forward direction.

60E1h **Negative torque limit value**

Address:	0x3644		
Min.:	0	Unit:	0.001
Max.:	4000	Data Type:	UInt16
Default:	3500	Change:	At once

Value Range:

0 to 4000

Description

Defines the maximum torque limit of the servo drive in the reverse direction.

60E6h **Actual position calculation method**

Address:	0x364E		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 1

Description

Defines the method for calculating the mechanical position after homing is done.

0: Absolute homing

After homing is done, the value of position feedback (6064h) will be the same as the value of home offset (607Ch).

1: Relative homing

After homing is done, the value of position feedback (6064h) will be the sum of current position feedback plus the position offset (607Ch).

60F4h Following error actual value

Address:	0x366A		
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Indicates the position deviation (reference unit).

60FCh Position demand value*

Address:			
Min.:	-2147483648	Unit:	pulse
Max.:	2147483647	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 relationship between the position reference in reference unit and that in encoder unit is as follows:

60FCh (in encoder unit) = 6062h (in reference unit) x 6091h

60FDh Digital inputs

Address:	0x367C		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0 to 4294967295

Description

Indicates current DI logic of the drive.

0: Inactive

1: Active

Table 7–3 The DI signal indicated by each bit is described as follows:

bit	Description
0	Reverse overtravel active
1	Forward overtravel active
2	Home signal active
3 to 15	N/A
16	DI1 input active
17	DI2 input active
18	DI3 input active
19	DI4 input active
20	DI5 input active
21 to 26	N/A
27	STO1 signal input
28	STO2 signal input
29	EDM output active
30	Z signal active
31	N/A

60FFh Target velocity

Address:

Min.:	-2147483648	Unit:	Reference unit/s
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

Defines the target velocity in the cyclic synchronous velocity mode and profile velocity mode.

60FE.01h Physical outputs

Address: 0x3781

Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 4294967295

Description

Indicates the DO logic.

The signal indicated by each bit is described as follows:

bit	Description
0 to 15	N/A
16	Forced DO1 output (0: OFF; 1: ON) when bit 16 of 60FE.02 = 1
17	Forced DO2 output (0: OFF; 1: ON) when bit 17 of 60FE.02 = 1
18 to 25	N/A
26	Switched between P and PI for gain switchover when bit 26 of 60FE.02 = 1
27 to 31	N/A

60FE.02h Bitmask

Address:

Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 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

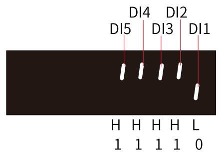
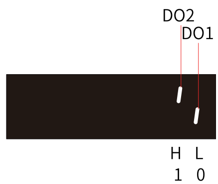
8 Appendix

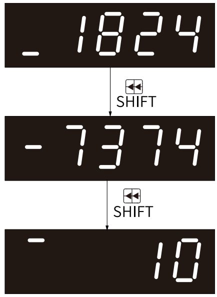
8.1 Display of Monitoring Parameters

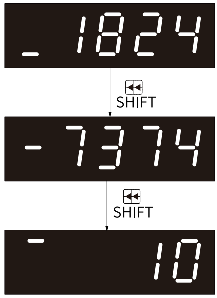
- Group H0b: Displays parameters used to monitor the operating state of the servo drive.
- Set H02.32 (Default keypad display) properly. After the motor operates normally, the keypad switches from status display to parameter display. The parameter group number is H0b and the offset within the group is the setpoint of H02.32.
- For example, if H02.32 is set to 00 and the motor speed is not 0 rpm, the keypad displays the value of H0b.00.

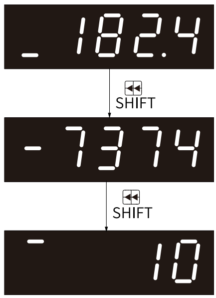
The following table describes the monitoring parameters in group H0b.

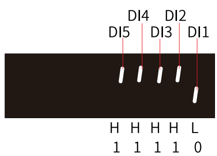
Param. No.	Name	Unit	Meaning	Example of Display
H0b.00	Motor speed actual value	rpm	Displays the actual value of the motor speed after round-off, which can be accurate to 1 rpm.	Display of 3000 rpm:  Display of -3000 rpm: 
H0b.01	Speed reference	rpm	Displays the present speed reference of the servo drive.	Display of 3000 rpm:  Display of -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%: 

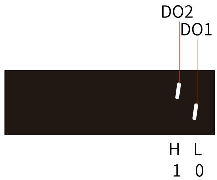
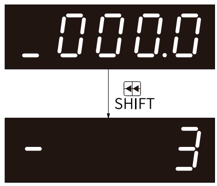
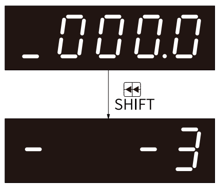
Param. No.	Name	Unit	Meaning	Example of Display
H0b.03	Monitored DI status	-	Indicates level status of DI1 to DI5: Upper LED segments ON: high level (indicated by "1") Lower LED segments ON: low level (indicated by "0") The value of H0b.03 read in the software tool is a decimal.	For example, if DI1 is 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 two DOs: 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 is high level, then, the binary value is "10", and the value of H0b.05 read in the software tool is 0x0004. The keypad displays as follows: 

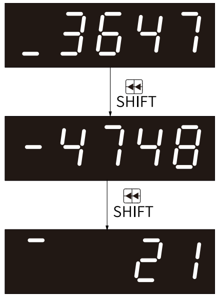
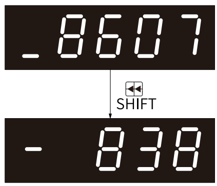
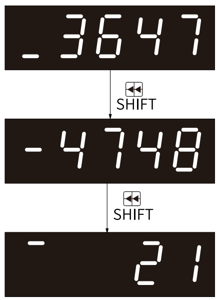
Param. No.	Name	Unit	Meaning	Example of Display
H0b.07	Absolute position counter (32-bit decimal)	Reference unit	Displays current absolute position of the motor (reference unit).	Display of 1073741824 in reference unit: 
H0b.09	Mechanical angle	°	Displays current mechanical angle of the motor.	Display of 360.0°: 
H0b.10	Rotation angle (electrical angle)	°	Displays current electrical angle of the motor.	Display of 360.0°: 
H0b.11	Speed correspond ing 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:  Display of -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: 

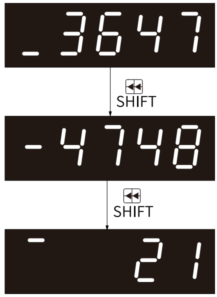
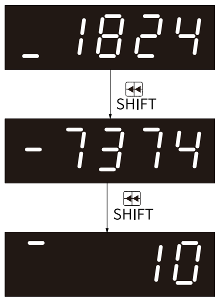
Param. No.	Name	Unit	Meaning	Example of Display
H0b.17	Feedback pulse counter (32-bit decimal)	Encoder unit	Counts and displays the number of pulses fed back by the encoder (encoder unit). ***Note*** When the motor used is equipped with an absolute encoder, H0b.17 only reflects values of the low 32 bits 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: 
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: 
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: 

Param. No.	Name	Unit	Meaning	Example of Display
H0b.27	Power 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 fault code of the fault selected in H0b.33. When no fault occurs, the value of H0b.34 is 0.	If H0b.33 = 0, H0b.34 = E941.0, the present fault code is 941.0. Corresponding 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.	If H0b.34 = E941.0 and H0b.35 = 107374182.4, the present fault code is 941.0 and the total operating time of the servo drive is 107374182.4s when the fault occurs. 
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.	Display of 3000 rpm:  Display of -3000 rpm: 

Param. No.	Name	Unit	Meaning	Example of Display
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.	Display of 4.60 A: 
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.	Display of 4.60 A: 
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.	Display of 311.0 V rectified from 220 VAC:  Display of 537.0 V rectified from 380 VAC: 
H0b.41	DI status upon occurrence of the selected fault	-	Displays the high/low level status of the five DIs 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).	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. 

Param. No.	Name	Unit	Meaning	Example of Display
H0b.43	DO status upon occurrence of the selected fault	-	Displays the high/low level state of DO1 and DO2 when the fault displayed in H0b.34 occurs. 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).	Display of H0b.43 = 0x0002: 
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)	Display of 10000 in reference unit: 
H0b.55	Motor speed actual value	0.1 rpm	Displays actual value of the motor speed, which can be accurate to 0.1 rpm.	Display of 3000.0 rpm:  Display of -3000.0 rpm: 
H0b.57	Control circuit voltage	V	Displays the DC voltage of the control circuit.	Display of 12.0 V: 

Param. No.	Name	Unit	Meaning	Example of Display
H0b.58	Mechanical absolute position (low 32 bits)	Encoder unit	Displays the mechanical absolute position (low 32 bits) when an absolute encoder is used.	Display of 2147483647 in encoder unit: 
H0b.60	Mechanical absolute position (high 32 bits)	Encoder unit	Displays the mechanical absolute position (high 32 bits) when an absolute encoder is used.	Display of 32767: 
H0b.70	Number of absolute encoder revolutions	Rev	Displays the present number of revolutions of the absolute encoder.	Display of 32767: 
H0b.71	Single-turn position feedback of absolute encoder	Encoder unit	Displays the single-turn position feedback of the absolute encoder.	Display of 8388607 in encoder unit: 
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.	Display of 2147483647 in encoder unit: 

Param. No.	Name	Unit	Meaning	Example of Display
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.	Display of -1 in encoder unit: 
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.	Display of 2147483647 in encoder unit: 
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 rotary load	Reference unit	Displays the mechanical absolute position when the absolute system works in the rotation mode.	Display of 1073741824 in reference unit: 

8.2 DI/DO Function Assignment

Function No.	Name	Function Name	Description	Remarks
Description of DI Signals				
FunIN.1	S-ON	Servo ON	Inactive: Servo motor disabled Active: Servo motor enabled upon power-on	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: Inhibited Active: Enabled	If the alarm reset signal is set to "level-triggered", the servo drive will treat it as edge-triggered. To reset No. 1 and No. 2 resettable faults, switch off the S-ON signal first. The servo drive may, depending on the warning types, continue running after warning reset.
FunIN.5	DIR-SEL	Multi-reference direction	Inactive: Reference direction by default Active: Opposite to the reference direction	The corresponding terminal logic is recommended to be level-triggered.
FunIN.6	CMD1	Multi-reference switchover 1	Used to select a reference from 16 references.	The corresponding terminal logic is recommended to be level-triggered.
FunIN.7	CMD2	Multi-reference switchover 2	Used to select a reference from 16 references.	The corresponding terminal logic is recommended to be level-triggered.
FunIN.8	CMD3	Multi-reference switchover 3	Used to select a reference from 16 references.	The corresponding terminal logic is recommended to be level-triggered.
FunIN.9	CMD4	Multi-reference switchover 4	Used to select a reference from 16 references.	The corresponding terminal logic is recommended to be level-triggered.
FunIN.14	P-OT	Positive limit switch	Active: Forward drive inhibited Inactive: Forward drive permitted	Overtravel prevention applies when the machine moves beyond the limit. It is recommended that the corresponding terminal logic is level-triggered.
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.

Function No.	Name	Function Name	Description	Remarks
FunIN.18	JOGCMD+	Forward jog	Active: Inputted based on reference Inactive: Reference input stopped	The corresponding terminal logic is recommended to be level-triggered.
FunIN.19	JOGCMD-	Reverse jog	Active: Inputted in reverse to the reference Inactive: Reference input stopped	The corresponding terminal logic is recommended to be level-triggered.
FunIN.24	GEAR_SEL	Electronic gear ratio switchover	Inactive: Electronic gear ratio 1 Active: Electronic gear ratio 2	The corresponding terminal logic is recommended to be level-triggered.
FunIN.28	PosInSen	Multi-position reference enable	Inactive: Internal multi-reference ignored Active: Internal multi-reference started	The corresponding terminal logic is recommended to be level-triggered.
FunIN.31	HomeSwitch	Home switch	Inactive: Not triggered Valid: Triggered	The corresponding terminal logic must be level-triggered. Assign this function to a high-speed DI. If the logic is set to 2 (rising edge-triggered), the servo drive forcibly changes it to 1 (active high). If the logic is set to 3 (falling edge-triggered), the servo drive forcibly changes it to 0 (active low). If the logic is set to 4 (rising/falling edge-triggered), the servo drive forcibly changes it to 0 (active low).
FunIN.34	Emergency Stop	Emergency stop	Active: Position lock applied after stop at zero speed Inactive: Current operating state unaffected	The corresponding terminal logic is recommended to be level-triggered.
FunIN.38	TouchProbe1	Touch probe 1	Inactive - Touch probe not triggered Active - Touch probe triggerable	The touch probe logic is only related to the touch probe function (60B8h).
FunIN.39	TouchProbe2	Touch probe 2	Inactive - Touch probe not triggered Active - Touch probe triggerable	The touch probe logic is only related to the touch probe function (60B8h).
FunIN.40	Multi-speed	Multi-speed enable	Inactive: Internal multi-speed reference ignored Valid: Internal multi-speed reference started	The corresponding terminal logic is recommended to be level-triggered.
Description of DO Signals				
FunOUT.1	S-RDY	Servo ready	The servo drive is ready to receive the S-ON signal. Active - Servo ready Inactive: Servo not ready	-

Function No.	Name	Function Name	Description	Remarks
FunOUT.2	TGON	Motor rotation signal	Inactive: Absolute value of filtered motor speed lower than the setpoint of H06.16 Active - Absolute value of filtered motor speed reaching the setpoint of H06.16	-
FunOUT.10	WARN	Warning	Active - Warning occurred on the servo drive Inactive - No warning occurred on the servo drive or the warning has been reset	-
FunOUT.11	ALM	Fault	Active - Fault occurred on the servo drive Inactive - No fault occurred on the servo drive or the fault has been reset	-
FunOUT.25	CMP	Position comparison	Active: Servo drive passing the target position comparison point Inactive: Servo drive not passing the target position comparison point	-
FunOUT.31	EtherCAT-forced DO in non-operational status		See *"Table 8–1 Description of EtherCAT-forced DO in non-operational status (H04.23)" on page 632*	-
FunOUT.32	EDM	EDM output	Active - STO function triggered Inactive - STO function not triggered	The EDM outputs active signals only when the 24 V input voltages for STO1 and STO2 are disconnected simultaneously.

Table 8–1 Description of EtherCAT-forced DO in non-operational status (H04.23)

Bit 0	Bit 1	Description
0	0	Status of DO1 and DO2 unchanged in the non-operational status
1	0	No output in DO1 and status of DO2 unchanged in the non-operational status
0	1	No output in DO2 and status of DO1 unchanged in the non-operational status
1	1	No output in DO1 or DO2 in the non-operational status

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Shenzhen Inovance Technology Co., Ltd.

www.inovance.com

Add.: Inovance Headquarters Tower, High-tech Industrial Park, Guanlan Street, Longhua New District, Shenzhen

Tel: (0755) 2979 9595 Fax: (0755) 2961 9897

Suzhou Inovance Technology Co., Ltd.

www.inovance.com

Add.: No. 16 Youxiang Road, Yuexi Town, Wuzhong District, Suzhou 215104, P.R. China

Tel: (0512) 6637 6666 Fax: (0512) 6285 6720