



SVD60C Series Servo Drive Function Guide



Industrial
Automation



Intelligent
Elevator



New Energy
Vehicle



Industrial
Robot



Rail
Transit



Data code PS00012214A02

Preface

Introduction

Thank you for purchasing the SVD60C series servo drive developed by Inovance.

The SVD60C series is a general-purpose low-voltage DC servo drive featuring small size, wide input voltage range, high degree of safety, high speed and precision, and readiness to work out of the box.

The servo drive, which covers a power range from 0.2 kW to 075 kW, supports CANopen communication protocol and carries necessary communication interfaces to operate with the host controller for a networked operation of multiple servo drives. The drive comes with latest ease-of-use features including adaptive stiffness level setting, inertia auto-tuning, and vibration suppression tailored for the low voltage servo motor and 23-bit multi-turn absolute encoder.

The compact low-voltage DC servo drive allows for flexible installation methods, including booksize, horizontal, and standard DIN rail mounting. The drive supports an IP67 low-voltage servo motor and offers safety functions including STO (SIL3), 36 VDC safe voltage input, electromagnetic shorting, and built-in brake relay..

With small size, high performance and safe and universal solutions, the drive aims to achieve quick and accurate position control, speed control, and torque control for automation equipment in such industries as logistics, pharmacy, electronic manufacturing, lithium batteries, automobiles, and machine tools.

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

More documents

Name	Data Code	Description
SVD60C Series Servo Drive Selection Guide	PS00012220	Provides instructions on product selection, including the list of supporting components, technical data on the drive and motor, and the selection guide of cables.
SVD60C Series Servo Drive installation Guide	PS00012222	Presents installation of the servo drive, including installation steps, mechanical installation, and electrical installation.
SVD60C Series Servo Drive Hardware Guide	PS00012221	Presents electrical design guidance of the equipment, description of terminals, required certificates and standards and solutions to common EMC problems.
SVD60C Series Servo Drive Commissioning Guide	PS00012216	Presents servo commissioning, parameter descriptions, including the operating panel, commissioning software, commissioning procedure and a parameter list.

Name	Data Code	Description
SVD60C Series Servo Drive Function Guide	PS00012214	Presents functions and parameters, including function overview, basic servo functions, adjustment and parameter list.
SVD60C Series Servo Drive Communication Guide	PS00012215	Presents functions and parameters of the servo drive, including Modbus communication configuration, parameter descriptions, and communication application cases.
SVD60C Series Servo Drive Troubleshooting Guide	PS00012234	Introduces faults and fault levels, the troubleshooting process, warning codes and fault codes.
SVD60C Series Servo Drive Maintenance Guide	PS00012223	Provides instructions on maintenance and repair of the equipment.
SVD60C Series Servo Drive Manual Package	PS00011094	Provides information on selection, installation, commissioning, function, troubleshooting and parameters of the equipment.

Revision History

Date	Version	Description
2024-05	A02	Added information on the 200W model.
2023-11	A01	Added CN3/CN4 and IN/OUT marks on the outline drawing.
2023-09	A00	First release.

Access to the Guide

This guide is not delivered with the product. You can obtain the PDF version in the following way:

- Visit www.inovance.com, go to Support > Download, search by keyword, and then download the PDF file.
- Scan the QR code on the product with your mobile phone.
- Scan the QR code below to install the app, where you can search for and download manuals.



Warranty

Inovance provides warranty service within the warranty period (as specified in your order) for any fault or damage that is not caused by improper operation of the user. You will be charged for any repair work after the warranty period expires.

Within the warranty period, maintenance fee will be charged for the following damage:

- Damage caused by operations not following the instructions in the user guide
- Damage caused by fire, flood, or abnormal voltage
- Damage caused by unintended use of the product
- Damage caused by use beyond the specified scope of application of the product
- Damage or secondary damage caused by force majeure (natural disaster, earthquake, and lightning strike)

The maintenance fee is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail.

For details, see the Product Warranty Card.

Table of Contents

Preface	1
Safety Instructions	8
1 List of Parameters	15
2 Control mode	18
2.1 Conversion Factor	19
2.2 Position Control Mode	20
2.2.1 Function Block Diagram	21
2.2.2 Position Reference Input	22
2.2.3 Reference Frequency Division/Multiplication (Electronic Gear Ratio)	35
2.2.4 Position reference filter	41
2.2.5 Position Deviation Clearance	42
2.2.6 Motion Control Completed, Internal Command Completed, Positioning Completed, Proximity	44
2.2.7 Interrupt Positioning	50
2.2.8 Homing	54
2.3 Speed Control Mode	72
2.3.1 Function Block Diagram	73
2.3.2 Speed Reference Input	74
2.3.3 Ramp Function	84
2.3.4 Zero Clamp	85
2.3.5 Speed Reference Limit	86
2.3.6 Speed-Related DO	87
2.4 Torque Control Mode	92
2.4.1 Function Block Diagram	94
2.4.2 Torque Reference	94
2.4.3 Torque Reference Filter	98
2.4.4 Torque Reference Limit	99
2.4.5 Speed Limit in Torque Control Mode	103
2.4.6 Torque Reach Output	107
2.5 Process Segment Mode	109
2.5.1 Mode Triggering	109
2.5.2 Related Parameters	112
2.5.3 Operation Mode	115
2.5.4 DO and Sequence	127
2.6 Servo State	128
2.6.1 Control Word 6040h	131
2.6.2 Status Word 6041h	133
2.7 Servo mode	134

2.8 Profile position (PP)	135
2.8.1 Function Block Diagram	135
2.8.2 Configuration Block Diagram	136
2.8.3 Recommended Configuration	139
2.8.4 Related Parameters	139
2.8.5 Related Functions	141
2.9 Interpolated Position (IP) Mode	144
2.9.1 Function Block Diagram	145
2.9.2 Configuration Block Diagram	146
2.9.3 Recommended Configuration	146
2.9.4 Related Parameters	146
2.9.5 Related Functions	149
2.10 Profile Velocity (PV) Mode	150
2.10.1 Function Block Diagram	150
2.10.2 Configuration Block Diagram	151
2.10.3 Recommended Configuration	151
2.10.4 Related Parameters	151
2.10.5 Related Functions	153
2.11 Profile Torque (PT) Mode	155
2.11.1 Function Block Diagram	155
2.11.2 Configuration Block Diagram	156
2.11.3 Recommended Configuration	156
2.11.4 Related Parameters	156
2.11.5 Related Functions	158
2.12 Homing Mode (HM)	160
2.12.1 Function Block Diagram	161
2.12.2 Configuration Block Diagram	161
2.12.3 Recommended Configuration	162
2.12.4 Related Parameters	162
2.12.5 Related Functions	164
2.12.6 Homing Operation	166
3 Function Applications	190
3.1 Absolute System	190
3.1.1 Overview	190
3.1.2 Related Parameters	190
3.1.3 Precautions for Using the Battery Box	195
3.2 Software Limit	196
3.3 Software Reset	198
3.4 Motor Protection	199
3.5 DI Filter Time	201
3.6 Communication-forced DO	202

3.7 Drive stops.	203
3.8 Touch Probe	204
4 Safety Function.	208
4.1 General.	208
4.1.1 Terms and Abbreviations.	208
4.1.2 Safety Standards and Parameters	208
4.1.3 Precautions for Use	211
4.2 Safe Torque Off (STO).	215
4.2.1 Function Overview.	215
4.2.2 Function Use and Monitoring	216
4.2.3 STO state reset	217
4.2.4 Safety Function Response Time	219
4.3 Acceptance	219
4.4 Troubleshooting	222
5 Description.	223
5.1 H00 Servo Motor Parameters	223
5.2 H01 Servo Drive Parameters	225
5.3 H02 Basic Control Parameters	230
5.4 H03 Terminal Input Parameters	238
5.5 H04 Terminal Output Parameters	245
5.6 H05 Position Control Parameters	250
5.7 H06 Speed Control Parameters	263
5.8 H07 Torque Control Parameters	281
5.9 H08 Gain Parameters	289
5.10 H09 Auto-tuning Parameters	308
5.11 H0A Fault and Protection Parameters	326
5.12 H0b Monitoring Parameters	341
5.13 H0c electromagnetic shorting	358
5.14 H0d Auxiliary Parameters	359
5.15 H0E Communication Function Parameters	363
5.16 H11 Multi-position.	371
5.17 H12 Multi-Speed	396
5.18 H17 Virtual DI/DO.	416
5.19 H22 Technology Segment Parameters	438
5.20 H23 Technology Segment	452
5.21 H30 Related Variables Read through Communication	461

5.22 H31 Communication Setting.....	462
5.23 H32 low voltage expansion	463
5.24 1000h Object Dictionary.....	464
5.25 6000h Object Dictionary.....	486
6 Parameter List.....	515
6.1 H00 Parameters	515
6.2 H01 Parameters	516
6.3 H02 Parameters	517
6.4 H03 Parameters	521
6.5 H04 Parameters	524
6.6 H05 Parameters	525
6.7 H06 Parameters	533
6.8 H07 Parameters	539
6.9 H08 Parameters	541
6.10 H09 Parameters	546
6.11 H0A Parameters.....	551
6.12 H0b Parameters.....	555
6.13 H0C Parameters.....	561
6.14 H0d Parameters.....	561
6.15 H0E Parameters.....	562
6.16 H11 Parameters.....	565
6.17 H12 Parameters	571
6.18 H17 Parameters.....	577
6.19 H22 Parameters.....	583
6.20 H23 Parameters.....	586
6.21 H30 Parameters.....	589
6.22 H31 Parameters.....	589
6.23 H32 Parameters.....	590
6.24 1000h Parameters	590
6.25 6000h Parameters	595

Safety Instructions

Disclaimer

- 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 precautions may result in death, serious injury, or equipment damage.
- "CAUTION", "WARNING", and "DANGER" items in the guide only indicate some of the precautions that need to be followed; they just supplement the safety precautions.
- Use this equipment according to the designated environment requirements. Damage caused by improper use is not covered by warranty.
- Inovance shall take no responsibility for any personal injuries or property damage caused by improper usage.

Safety Levels and Definitions



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



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



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

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.
- Users must take mechanical precautions to protect personal safety and wear protective equipment, such as anti-smashing shoes, safety clothing, safety glasses, protective gloves, and protective sleeves.

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. Non-professionals are not allowed.

 WARNING

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

**WARNING**

- Do not connect the input power supply to the output end of the equipment. Failure to comply can 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**

- Follow the proper electrostatic discharge (ESD) procedure and wear an anti-static wrist strap to perform wiring. Failure to comply may result in damage to the equipment or to the internal circuit of the product.
- 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.

 WARNING

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

Maintenance

 DANGER

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

 WARNING • Perform routine and periodic inspection and maintenance on the equipment according to maintenance requirements and keep a maintenance record.
Repair
 DANGER • Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals. • Do not repair the equipment with power ON. Failure to comply will result in an electric shock. • Before inspection and repair, cut off all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.
 WARNING • Submit the repair request according to the warranty agreement. • When the fuse is blown or the circuit breaker or earth leakage current breaker (ELCB) trips, wait for at least the time designated on the equipment warning label before power-on or further operations. Failure to comply may result in death, personal injuries or equipment damage. • When the equipment is faulty or damaged, the troubleshooting and repair work must be performed by professionals that follow the repair instructions, with repair records kept properly. • Replace quick-wear parts of the equipment according to the replacement instructions. • Do not use damaged equipment. Failure to comply may result in death, personal injuries, or severe equipment damage. • After the equipment is replaced, check the wiring and set parameters again.
Disposal
 WARNING • Dispose of retired equipment in accordance with local regulations and standards. Failure to comply may result in property damage, personal injuries, or even death. • Recycle retired equipment by observing industry waste disposal standards to avoid environmental pollution.

Safety label

For safe equipment operation and maintenance, comply with the safety labels on the equipment. Do not damage or remove the safety labels. The following table describes the meaning of the safety labels.

Safety label	Description
 危险 DANGER  高压注意 Hazardous Voltage  高温注意 High Temperature	• Never fail to connect the 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 the heatsink with power ON to prevent the risk of burn.

1 List of Parameters

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

Function	Description
Position Control Mode	Used to make the servo drive operate in the position control mode.
Speed Control Mode	Used to make the servo drive operate in the speed control mode.
Torque Control Mode	Used to make the servo drive operate in the torque control mode.
Position/Speed control switchover	Used to switch between position control and speed control through external input signals.
Position/Torque control switchover	Used to switch between speed control and torque control through external input signals.
Torque/Position control switchover	Used to switch between torque control and position control through external input signals.
Torque/Speed/Position control switchover	Used to switch among torque control, speed control and position control through external input signals.
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.
Process Segment Mode	It enables the servo drive to perform positioning control, constant speed control and parameter writing operations according to servo self-planning commands and process segment setting commands.
High-resolution encoder	The servo drive is equipped with a high-performance encoder with resolution up to 2^{23} (8388608) PPR.

Function	Description
Electronic gear ratio	Decreasing or increasing the pulse input by: $0.001\text{--}4000 \times \text{encoder resolution}/10000$.
Position Reference Filter	Used to achieve smooth acceleration and deceleration.
Interrupt positioning	Used to interrupt present position reference and execute the set displacement.
Homing	Used to search for the mechanical home automatically to locate the relative position between the mechanical home and mechanical zero
Zero Clamp	Used to keep the motor speed below a certain value in the speed control mode to lock the position.
DI signal assignment	Used to assign functions such as S-ON 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	Main circuit power indicator, status indicator, and fault indicator indicator the states of the drive.
External I/O display	Used to display ON/OFF status of external I/O signals.
Alarm history	Used to record the latest 20 alarms, which can also be cleared.
Alarm code output	Used to output a four-digit alarm code when an alarm occurs.
Black box	Used to capture 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.
STO ^[1]	The safe torque off (STO) function brings the machine safely into a no-torque state and prevents it from unexpected start.
Trial run mode	Used to enable the motor through the software without a start signal.
Inovance servo commissioning software	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.
Auto Gain 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.
Torque Reference Filter	Used to suppress the mechanical resonance that may be generated when the response speed is excessively high.

Note

[1]: Only-FS models support the STO function.

2 Control mode

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

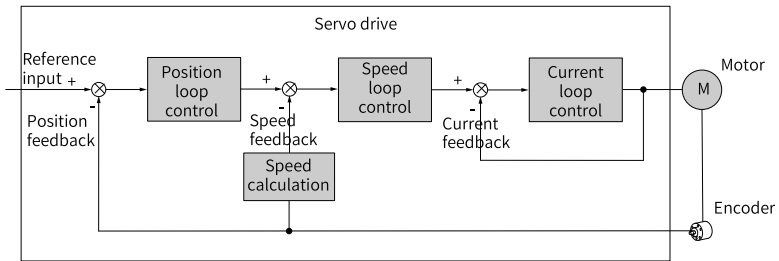


Figure 2-1 Structure of a basic servo system

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

Descriptions of the control modes are as follows:

- **Position control** In the position control mode, the target position of a motor is determined by the sum of position references, and the motor speed is determined by the position reference frequency. The servo drive performs quick and accurate position control and speed control through the feedback encoder installed on the motor. 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. This control mode is mainly applicable to the winding and unwinding devices with strict tension requirements. In these scenarios, the torque always changes with the winding radius so that the tension will not change along with the change of the winding radius.

2.1 Conversion Factor

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

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

Motor displacement = Load shaft displacement x Gear ratio

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

The calculation formula is as follows.

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

☆Related parameters

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
6091.01h	6091-01h	Motor resolution	1-4294967295	1	-	At stop	"6091_en.01h" on page 501
6091.02h	6091-02h	Shaft resolution	1-4294967295	1	-	At stop	"6091_en.02h" on page 501

Take the load ball screw as an example.

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

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

Reduction ratio $n = 5:1$

Resolution of Inovance motor equipped with 23-bit serial-type encoder (P) = 8388608 PPR

The position factor is therefore calculated as follows:

Position factor:

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

Therefore, $6091.01h = 4194304$; $6091.02h = 1$. That means when the load shaft displacement is 1 mm, the motor displacement is 4194304.

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

2.2 Position Control Mode

★ Definition of terms:

- "Reference unit": Refers to the minimum identifiable value input from the host controller to the drive.
- Encoder unit: Refers to the value of the input reference multiplied/divided by the electronic gear ratio.

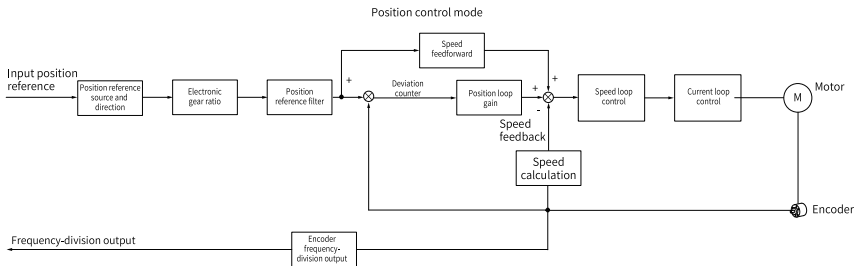


Figure 2-2 Position control diagram

Set H02.00 (Control mode) to 1 (Position control mode) through the Inovance commissioning software to make the drive operate in the position control mode. Set the drive parameters based on the mechanical structure and technical indicators.

The following describes basic parameter settings for the position control mode.

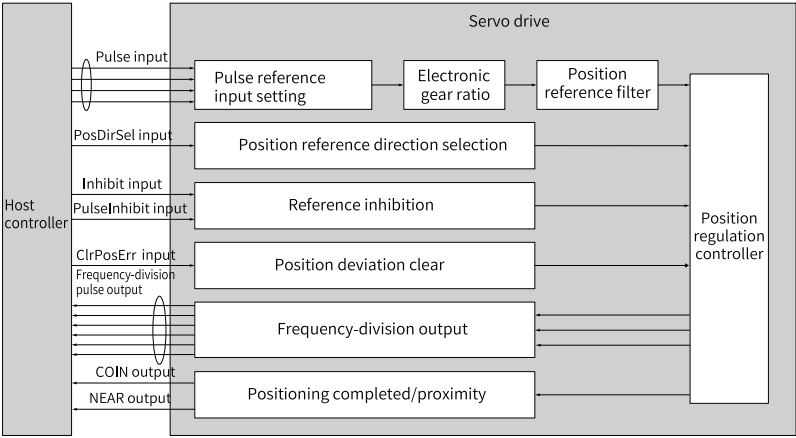


Figure 2-3 Signal exchange between the drive and the host controller

2.2.1 Function Block Diagram

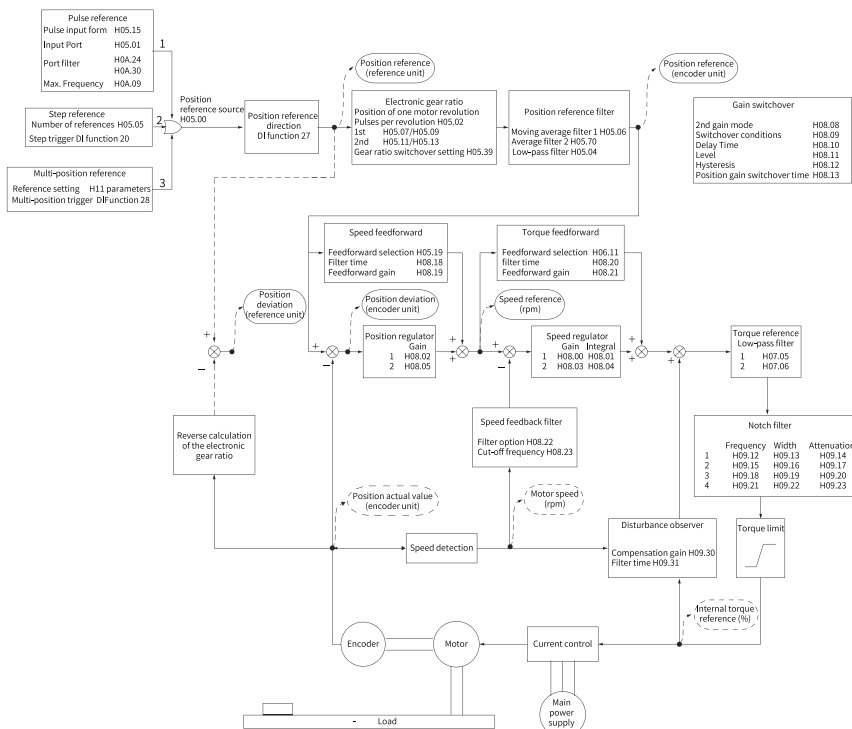


Figure 2-4 Block diagram of position control

2.2.2 Position Reference Input

The position reference input setting includes the position reference source, position reference direction, and FunIN.13 (Position reference inhibited).

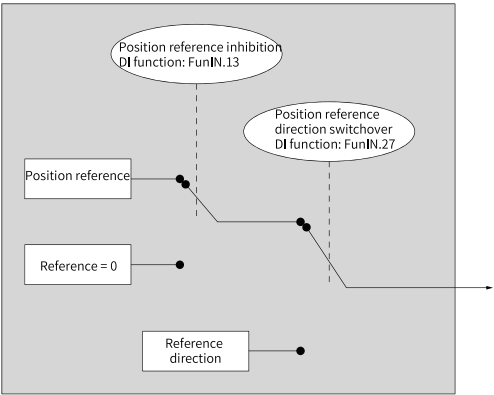


Figure 2-5 Position reference input setting

Position reference source

In the position control mode, set the position reference source in H05.00 first.

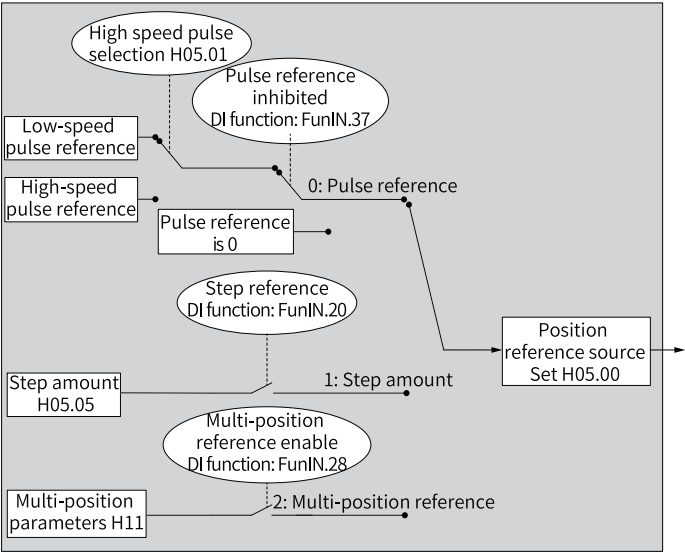


Figure 2-6 Setting the position reference source

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.00	2005-01h	Primary position reference source	2: Multi-position reference	2	-	Real-time	"H05_en.00" on page 250

● **Multi-position reference as the position reference source (H05.00 = 2)**

The servo drive supports multi-position operation. It stores 16 position references; the displacement, maximum running speed, and acceleration/deceleration time of each can be set. The interval time and switchover mode between positions can also be set according to actual requirements. The setting flowchart is as follows.

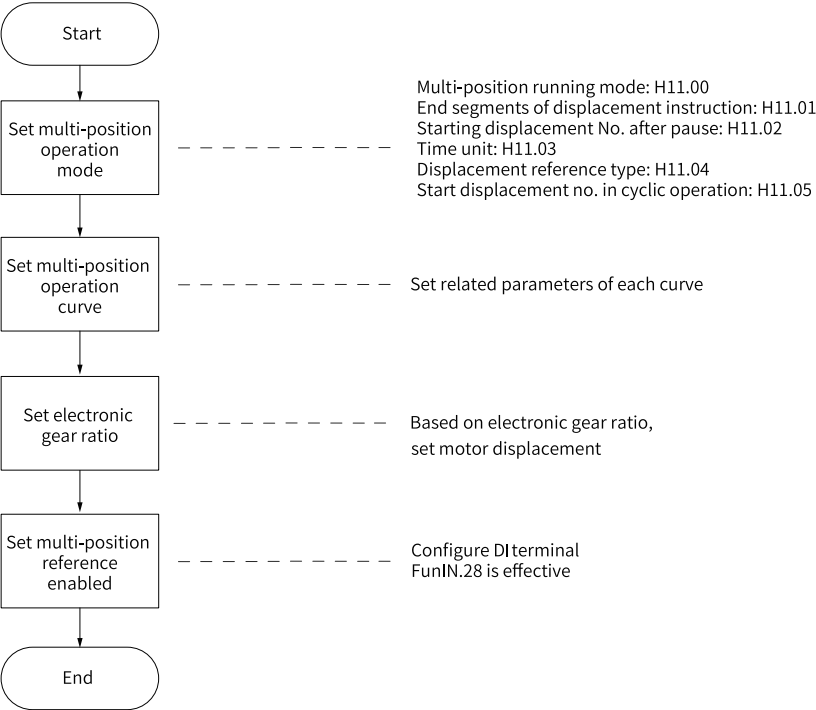


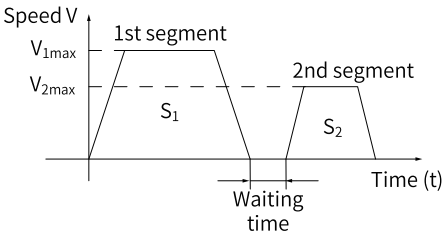
Figure 2-7 Flowchart for setting the multi-position reference as the source

- Setting the multi-position operation mode
 - ☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H11.00	2011-01h	Multi-position running mode	0: Single run (number of displacements selected in H11.01) 1: Cyclic operation (number of displacement selected in H11.01) 2: DI-based operation (selected by DI) 3: Sequential operation 5: Axis-controlled continuous operation	1	-	At stop	"H11_en.00" on page 371
H11.01	2011-02h	Number of displacement references in multi-position mode	1–16	1	-	At stop	"H11_en.01" on page 375
H11.02	2011-03h	Starting displacement No. after pause	0: Continue to execute the unexecuted displacements 1: Start from displacement 1	0	-	At stop	"H11_en.02" on page 375
H11.03	2011-04h	Interval time unit	0: ms 1: s	0	-	At stop	"H11_en.03" on page 376
H11.04	2011-05h	Displacement reference type	0: Relative displacement reference 1: Absolute displacement reference	0	-	Real-time	"H11_en.04" on page 376
H11.05	2011-06h	Starting displacement No. in sequential operation	0–16	0	-	At stop	"H11_en.05" on page 377

1. Individual operation (H11.00 = 0)

Table 2-1 Description of individual operation

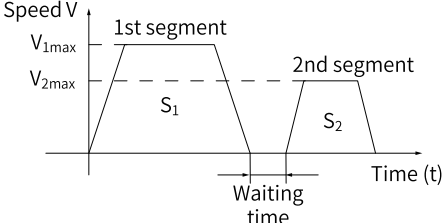
Description	Operating Curve
• The drive stops after one cycle of operation. • The drive switches to the next displacement automatically. • The interval time between displacements can be set as needed. • The PosInSen (multi-position reference enable) signal is level-triggered.	 Speed V 1st segment 2nd segment Waiting time Time (t) V_{1max} V_{2max} S_1 S_2 • V_{1max}, V_{2max} : maximum operating speeds in displacement 1 and displacement 2 • S_1, S_2 : displacement 1 and displacement 2 • The positioning completed signal is active after each displacement is reached. • If the PosInSen signal is switched off during operation, the drive abandons the unfinished displacement and stops. The COIN (positioning completed) signal is activated after the drive stops. • After the PosInSen signal is enabled again, the drive executes the displacement defined by H11.02. • If the S-ON signal is switched off during operation, the motor stops as defined by H02.05 (Stop mode at S-ON OFF). The COIN (positioning completed) signal is deactivated after the motor stops. • When a certain displacement is in progress, the logic change of the DI assigned with FunIN.27 (PosDirSel) does not affect the operating direction in this displacement.

★ Definition of terms:

A complete operation cycle covers all the position references defined by H11.01.

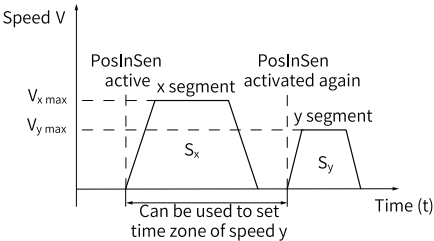
2. **Cyclic running (H11.00 = 1)**

Table 2-2 Descriptions of cyclic operation

Description	Operating Curve
• The drive starts from displacement 1 again after each cycle of operation. • The drive switches to the next displacement automatically. • The interval time between displacements can be set as needed. • The cyclic operation mode is kept when the FunIN.28 (Multi-position reference enable) is active. • The PosInSen (multi-position reference enable) signal is level-triggered.	 V_{1max}, V_{2max} : maximum operating speeds in displacement 1 and displacement 2 S_1, S_2 : displacement 1 and displacement 2 • The positioning completed signal is active after each displacement is reached. • If the PosInSen signal is switched off during operation, the drive abandons the unfinished displacement and stops. The COIN (positioning completed) signal is activated after the drive stops. • After the PosInSen signal is enabled again, the drive executes the displacement defined by H11.02. • If the S-ON signal is switched off during operation, the motor stops as defined by H02.05 (Stop mode at S-ON OFF). The COIN (positioning completed) signal is deactivated after the motor stops. • When a certain displacement is in progress, the logic change of the DI assigned with FunIN.27 (PosDirSel) does not affect the operating direction in this displacement.

3. DI-based operation (H11.00 = 2)

Table 2-3 Descriptions of DI-based operation

Description	Operating Curve
• The displacement to be executed next can be set when the current displacement is in progress. The motor stops after current displacement is done executing. After the PosInSen (position reference enable) signal is enabled again, the present displacement will be executed. • The speed No. is determined by the DI logic. • The interval time between displacements is determined by the command delay of the host controller. • The PosInSen (multi-position reference enable) signal is edge-triggered.	 Speed V PosInSen active x segment PosInSen activated again y segment $V_{x\max}$ $V_{y\max}$ S_x S_y Can be used to set time zone of speed y Time (t) $V_{x\max}$, $V_{y\max}$: maximum operating speeds in displacement x and displacement y S_x, S_y: displacement x and displacement y • The positioning completed signal is active after each displacement is reached. • If the PosInSen (multi-position reference enable) signal is switched off during operation, the drive continues to execute the unfinished displacement and outputs the COIN (positioning completed) signal. • The displacements must be switched in the following sequence: a. Wait until displacement x is done executing before switching the displacement no.. b. When displacement x is in progress or done, switch off the PosInSen (multi-position reference enable) signal first, and then change the displacement No. from x to y (if $x = y$, the drive executes displacement x again). c. After displacement x is done executing, switch on the PosInSen (multi-position reference enable) signal again to make the drive execute displacement y. • If the S-ON signal is switched off during operation, the motor stops as defined by H02.05 (Stop mode at S-ON OFF). The COIN (positioning completed) signal is deactivated after the motor stops. • When a certain displacement is in progress, the logic change of the DI assigned with FunIN.27 (PosDirSel) does not affect the operating direction in this displacement.

In the multi-position operation mode, assign four DIs with FunIN.6 to FunIN.9 respectively, and set the active logic of these DIs.

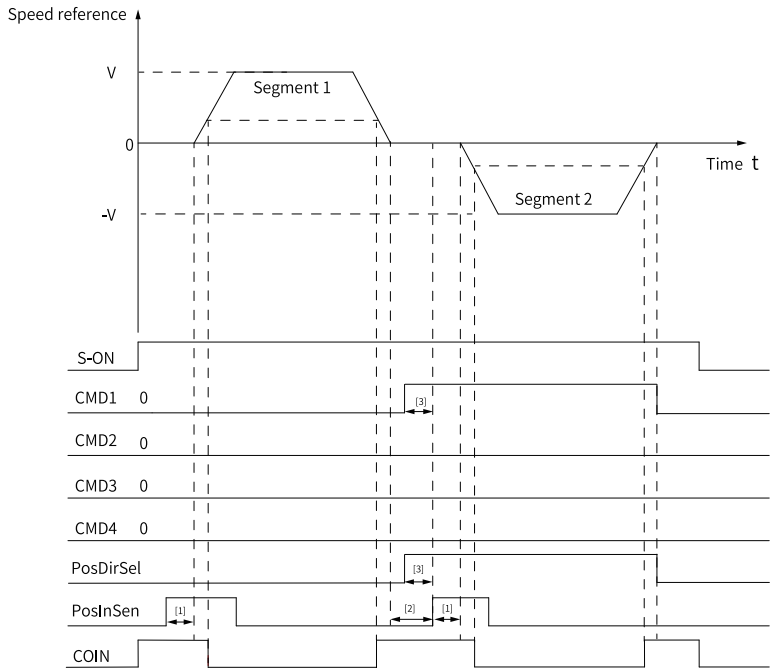


Figure 2-8 Multi-position sequence diagram

Note

- The PosInSen signal is edge-triggered. The minimum signal widths required by the normal DI and high-speed DI are 3 ms and 0.25 ms respectively.
- Area for switching the displacement No.: Refers to the interval that start from the moment the last position reference is done transmitting to the moment the next PosInSen (multi-position reference enable) signal is activated again.
- When a normal DI is used, an effective signal width of 0.125 ms must be kept.

☆ Related parameters:

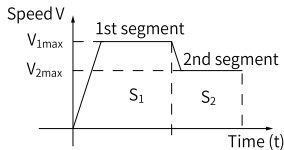
Code	Name	Function Name	Function
FunIN.6	CMD1	Multi-reference switchover 1	The displacement No. is a 4-bit binary. The relationship between the displacement No. and CMD1 to CMD4 is shown in "Table 2-4 " on page 29. The DI logic is level-triggered. The CMD value is 1 upon active level input or 0 upon inactive level input.
FunIN.7	CMD2	Multi-reference switchover 2	
FunIN.8	CMD3	Multi-reference switchover 3	
FunIN.9	CMD4	Multi-reference switchover 4	

Table 2-4 Relationship between the displacement No. and CMD1 to CMD4

CMD4	CMD3	CMD2	CMD1	Segment No.
0	0	0	0	1
0	0	0	1	2
...				
1	1	1	1	16

4. Sequential running (H11.00 = 3)

Table 2-5 Descriptions of sequential operation

Description	Operating Curve
• The drive stops after one cycle of operation. • (H11.05 = 0 or H11.05 > H11.01). • The starting displacement after the first cycle of operation is defined by H11.05. • The drive switches to the next displacement automatically. • There is no interval time between displacements. • The PosInSen (multi-position reference enable) signal is level-triggered.	 Speed V 1st segment 2nd segment V_{1max} V_{2max} S_1 S_2 Time (t) V_{1max}, V_{2max} : maximum operating speeds in displacement 1 and displacement 2 S_1, S_2 : displacement 1 and displacement 2 • The positioning completed signal is active after each displacement is reached. • If the PosInSen signal is switched off during operation, the drive abandons the unfinished displacement and stops. The COIN (positioning completed) signal is activated after the drive stops. • After the PosInSen signal is enabled again, the drive executes the displacement defined by H11.02. • If the S-ON signal is switched off during operation, the motor stops as defined by H02.05 (Stop mode at S-ON OFF). The COIN (positioning completed) signal is deactivated after the motor stops. • When a certain displacement is in progress, the logic change of the DI assigned with FunIN.27 (PosDirSel) does not affect the operating direction in this displacement.

5. Axis-controlled continuous operation (H11.00 = 5)

Table 2-6 Description of axis-controlled continuous operation

Description	Operating Curve
• The drives executes one displacement only. • The individual operation mode, sequential operation mode, and interrupted operation mode are included. • The PosInSen (multi-position reference enable) signal is level-triggered.	• Individual operation The PosInSen (multi-position reference enable) signal is triggered only once (FunIN.43/42 triggered later). The drive stops after executing the distance defined by H11.12. • Sequential operation The PosInSen (multi-position reference enable) signal is triggered only once. Write H11.12 again and activate FunIN.43 when the distance defined by the first H11.12 is still in progress. After receiving the new distance (or speed), which is the second H11.12, the drive continues executing the first H11.12 until the distance defined by the first H11.12 is done. Then it starts to execute the second H11.12 directly. The travel distance therefore is the sum of the first H11.12 and the second H11.12. • Interrupted operation The PosInSen (Multi-position reference enable) signal is triggered only once. Write H11.12 (such as 1000000) again and activate FunIN.42 when the first H11.12 (such as 9000000) is still in progress. After receiving the new distance (or speed), which is the second H11.12, the drive stops executing the first H11.12 and turns to executing the second H11.12.

☆ Related parameters:

Code	Name	Function Name	Function
FunIN.42	AxisCtrlExecImmed	Axis control command executed immediately	Active: Newly written command activated immediately Inactive: Newly written command not activated
FunIN.43	AxisCtrlExecNext	Axis control command not executed immediately	Active: Newly written command activated after current displacement is done executing Inactive: Newly written command not activated
FunOUT.23	WrNextBlockEn	Command input	Active: Next command input allowed Inactive: Next command input inhibited

■ Setting multi-position operating curve

A total of 16 position references can be set during multi-position operation. The displacement, maximum operating speed, acceleration/deceleration time, and interval time between displacements can be set separately. The following takes displacement 1 as an example.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H11.12	2011-0Dh	Displacement 1	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.12" on page 378
H11.14	2011-0Fh	Max. speed of displacement 1	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.14" on page 378
H11.15	2011-10h	Acc/Dec time of displacement 1	0 ms–65535 ms	10	ms	Real-time	"H11_en.15" on page 379
H11.16	2011-11h	Interval time after displacement 1	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.16" on page 379

The actual operating curve of the motor based on preceding settings is shown in the following figure.

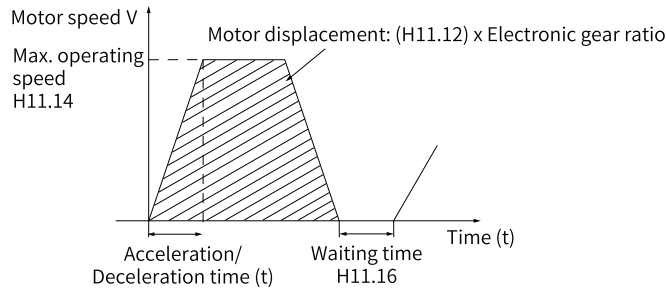


Figure 2-9 Motor operating curve in displacement 1

Actual time (t) taken to accelerate to H11.14:

$$t = \frac{(H11.14)}{1000} \times (H11.15)$$

For parameter settings of other 15 displacements, see Chapter "Parameter List".

- Setting multi-position reference enable mode
To use the multi-position reference as the position reference source, assign FunIN.28 (PosInSen, multi-position reference enable) to a certain DI of the drive, and set the active logic of this DI.

☆Related function No.:

Code	Name	Function Name	Function
FunIN.28	PosInSen	Multi-position reference enable	Active: The motor executes the multi-position reference. Invalid: Servo motor in locked state Note: ● When H11.00 is set to 0, 1, or 3, the logic of the DI assigned with the PosInSen signal is level-triggered. ● When H11.00 is set to 2, the logic of the DI assigned with the PosInSen signal is edge-triggered.

Position reference direction

A DI can be used to change the position reference direction, so as to change the motor direction of rotation. Assign FunIN.27 (PosDirSel, position reference direction) to a DI of the drive, and set the active logic of this DI.

☆ Related parameters:

Code	Name	Function Name	Function
FunIN.27	PosDirSel	Position reference direction	Inactive: Actual position reference direction same as the set direction Active: Actual position reference direction opposite to the set direction

The actual motor direction is related to the rotating direction in H02.02, positive/negative of position reference, position reference direction (FunIN.27).

Table 2-7 Motor direction of rotation

H02.02	Sign of Position Reference	FunIN.27	Direction of Rotation
0	+	Inactive	CCW
0	+	Active	CW
0	-	Inactive	CW
0	-	Active	CCW
1	+	Inactive	CW
1	+	Active	CCW
1	-	Inactive	CCW
1	-	Active	CW

Position reference inhibited

FunIN.13 (Inhibit) and FunIN.37 (PulseInhibit) are used to inhibit position references and pulse references.

- Position reference inhibited

The drive sets all the position references to 0, which means it does not respond to any internal or external position references, and the motor is in the locked state in the position control mode. In this case, the drive can switch to other control modes to continue operating.

To use FunIN.13 (Inhibit, position reference inhibited), assign FunIN.13 to a certain DI and set the active logic of this DI. It is recommended to use the high-speed DI (DI7 or DI8) terminal.

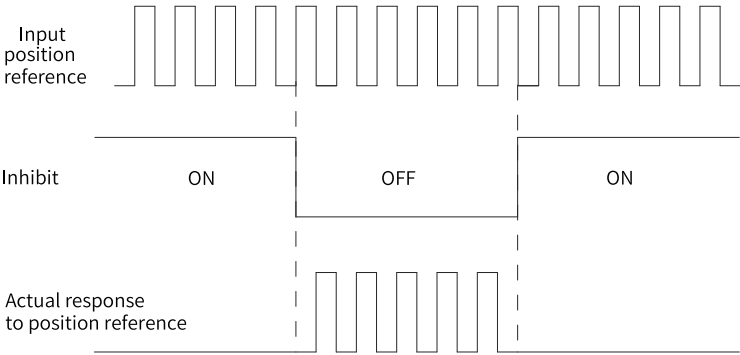


Figure 2-10 Waveform example for position reference inhibited

☆Related function No.:

Code	Name	Function Name	Function
FunIN.13	Inhibit	Position reference inhibited	Inactive: The drive responds to position references in the position control mode. Active: The drive does not respond to any internal or external position references in the position control modes.

- Pulse reference inhibited
The drive sets all the pulse references to 0, which means it does not respond to any pulse references inputted from the pulse input terminal but it can respond to position references in other forms in the position control mode. In this case, the drive can be switched to other control modes to continue operating.

When pulse reference inhibition is activated in the position control mode, no other forms of position references are used and pulse signals are input in the pulse input terminal, the input position reference counter (H0b.13) stops counting.

If position references in other forms are used in the position control mode, the input position reference counter (H0b.13) continues counting the these position references, and these references will be executed.

To use FunIN.37 (PulseInhibit, pulse reference inhibit), assign FunIN.37 to a certain DI and set the active logic of this DI. It is recommended to use the high-speed DI (DI7 or DI8) terminal.

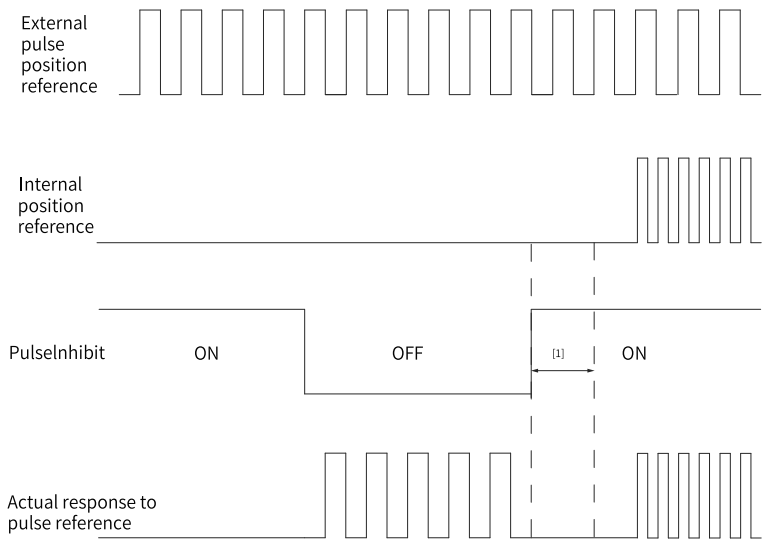


Figure 2-11 Waveform example for pulse reference inhibited

Note

[1] When DI is used, keep an interval of at least 0.5 ms from the moment the DI logic is deactivated to the moment the internal position reference is inputted.

☆Related function No.:

Code	Name	Function Name	Function
FunIN.37	PulseInhibit	Pulse reference inhibited	When the position reference source is pulse reference (H05.00 = 0) in the position control mode: Inactive: The drive responds to pulse references. Active: The drive does not respond to pulse references.

2.2.3 Reference Frequency Division/Multiplication (Electronic Gear Ratio)

Definition of the electronic gear ratio

In the position control mode, the input position reference (reference unit) defines the load displacement; the motor position reference (encoder unit) defines the motor displacement. The electronic gear ratio is used to establish a proportional relationship between the input position reference and motor position reference.

The electronic gear ratio, which allows frequency division (electronic gear ratio < 1) or frequency multiplication (electronic gear ratio > 1), can be used to set the actual displacement corresponding to the input position reference per reference unit, or used to increase the position reference frequency when the motor speed needed cannot be fulfilled due to limited pulse output frequency of the host controller or limited parameter value range.

★ Definition of terms:

- "Reference unit": Refers to the minimum identifiable value input from the host controller to the drive.
- Encoder unit: Refers to the value of the input reference multiplied/divided by the electronic gear ratio.

Procedure for setting the electronic gear ratio

The electronic gear ratio varies with the mechanical structure. Set the electronic gear ratio according to the following flowchart.

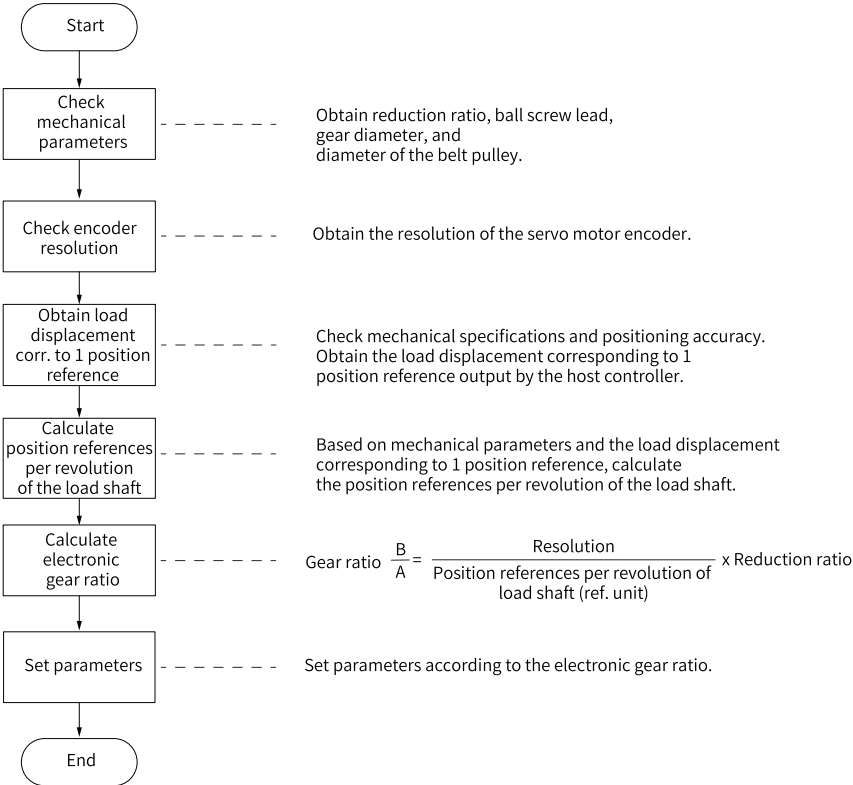


Figure 2-12 Procedure for setting the electronic gear ratio

See the following figure for how to set parameters.

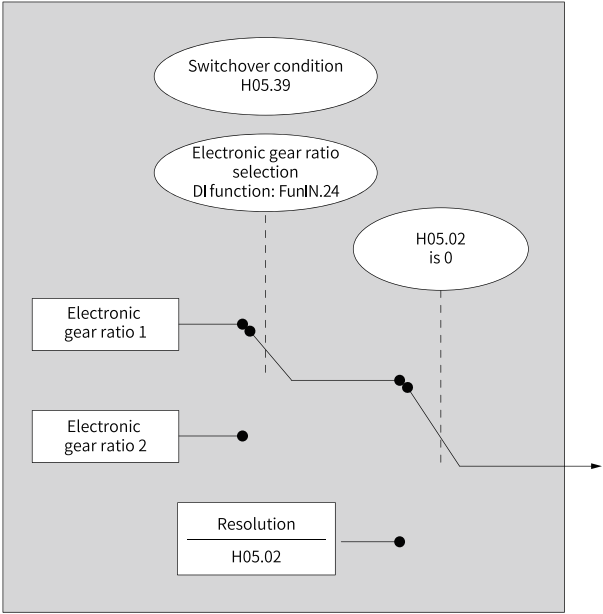


Figure 2-13 Procedure for setting the electronic gear ratio

Note

When the setpoint of H05.02 (Pulses per revolution) is not 0, the following formula applies:

Electronic gear ratio $\frac{B}{A} = \frac{\text{Encoder resolution}}{H05.02}$

. When H05-02 is set to 0, electronic gear ratios 1 and 2 are invalid.

Related parameters

- Setting the electronic gear ratio parameters
- ☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.02	2005-03h	Pulses per revolution	0 PPR to 4294967295 PPR	0	PPR	At stop	"H05_en.02" on page 250
H05.07	2005-08h	Electronic gear ratio 1 (numerator)	1-1073741824	1	-	Real-time	"H05_en.07" on page 252

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.09	2005-0Ah	Electronic gear ratio 1 (denominator)	1-1073741824	1	-	Real-time	"H05_en.09" on page 252
H05.11	2005-0Ch	Electronic gear ratio 2 (numerator)	1-1073741824	1	-	Real-time	"H05_en.11" on page 252
H05.13	2005-0Eh	Electronic gear ratio 2 (denominator)	1-1073741824	1	-	Real-time	"H05_en.13" on page 252

- Switching the electronic gear ratio



Caution

The motor speed may fluctuate significantly if the electronic gear ratio changes sharply in real time or electronic gear ratio 1 differs greatly from electronic gear ratio 2. In this case, set H05.04 (First-order low-pass filter time constant) properly to allow smooth switchover of the position reference.

- The electronic gear ratio can be switched when H05.02 (Pulses per revolution) is set to 0. Determine whether to switch between electronic gear ratios 1 and 2 based on mechanical conditions and set the condition for switching the electronic gear ratio.
- Only one electronic gear ratio is effective at any moment.
- The effective time of real-time change in the electronic gear ratio is also restricted by the switchover condition.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.39	2005-28h	Electronic gear ratio switchover condition	0: Switchover after position reference is kept 0 for 2.5 ms 1: Switched in real time	0	-	At stop	"H05_en.39" on page 259

Assign FunIN.24 (GEAR-SEL, electronic gear ratio selection) to a certain DI and set the active logic of this DI.

☆ Related parameters:

Code	Name	Function Name	Function
FunIN.24	GEAR_SEL	Electronic gear ratio selection	Inactive: Electronic gear ratio 1 used in the position control mode Active: Electronic gear ratio 2 used in the position control mode

See the following table for the electronic gear ratio used by the servo drive.

H05.02	H05.39	Level of the DI Assigned with FunIN.24	Electronic gear ratio
0	0	Inactive	$\frac{H05.07}{H05.09}$
		Active	$\frac{H05.11}{H05.13}$
	1	Inactive	$\frac{H05.07}{H05.09}$
		Active	$\frac{H05.11}{H05.13}$
1-1048576	-	-	-

The resolution of the serial encoder is $2^n(P/r)$, where "n" is the number of bits of the serial encoder.

For example, the resolution of a 23-bit serial encoder is 2^{23} PPR, which is 8388608 PPR.

● Calculating the electronic gear ratio

The following figure shows the relationship among the position reference (reference unit), load displacement, and electronic gear ratio.

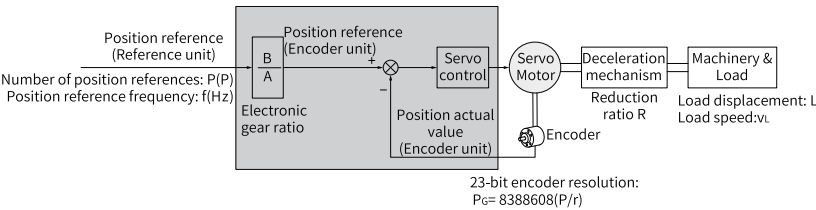


Figure 2-14 Relationship among the position reference (reference unit), load displacement, and electronic gear ratio

Take the ball screw in linear motion as an example, with PB (mm) as the screw lead, PG as the encoder resolution, and R as the reduction ratio of the reducer.

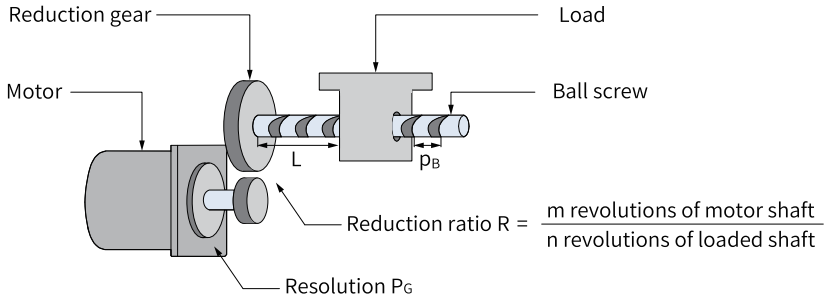


Figure 2-15 Ball screw

- When the load displacement per pulse ΔL (mm) is known:

The load shaft rotates $\frac{\Delta L}{P_B}$ circles and the motor shaft rotates $\frac{\Delta L}{P_B} \times R$ circles when the mechanical displacement is ΔL . Then the following formula applies:

$$1 \times \frac{B}{A} = \frac{\Delta L}{P_B} \times R \times P_G$$

Therefore, the electronic gear ratio is as follows.

$$\frac{B}{A} = \frac{\Delta L}{P_B} \times R \times P_G$$

- When the load displacement L (mm) and position reference sum P (P) are known:

The load shaft rotates $\frac{L}{P_B}$ circles, and the motor shaft rotates $\frac{L}{P_B} \times R$ circles when the mechanical displacement is L . Then the following formula applies:

$$P \times \frac{B}{A} = \frac{L}{P_B} \times R \times P_G$$

Therefore, the electronic gear ratio is as follows.

$$\frac{B}{A} = \frac{L}{P_B} \times R \times P_G \times \frac{1}{P}$$

- When the load moving speed V_L (mm/s) and position reference frequency f (Hz) are known:

Load shaft speed: $\frac{V_L}{P_B}$ (r/s)

Motor speed: $V_M = \frac{V_L}{P_B} \times R$ (r/s)

The relationship among the position reference frequency, electronic gear ratio, and motor speed is as follows:

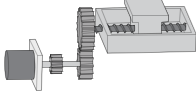
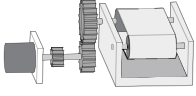
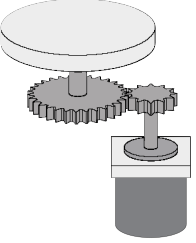
$$f \times \frac{B}{A} = V_M \times P_G$$

Therefore, the electronic gear ratio is as follows.

$$\frac{B}{A} = \frac{V_M \times P_G}{f}$$

- Example for setting the electronic gear ratio

Table 2-8 Example for setting electronic gear ratio

Item	Name	Mechanical Structure		
		Transmission With Ball Screw	Transmission With Belt Pulley	Rotary Load
				
1	Mechanical parameters	Reduction ratio (R): 1/1 Screw lead: 0.01 m	Reduction ratio (R): 5/1 Diameter of belt pulley: 0.2 m (Circumference of belt pulley): 0.628 m	Reduction ratio (R): 10/1 Load angle of rotation per revolution of the load shaft: 360°
2	Resolution	23-bit = 8388608P/r	23-bit = 8388608P/r	23-bit = 8388608P/r
3	Load displacement per position reference (reference unit)	0.0001 m	0.000005 m	0.01°
4	Position references per revolution of the load shaft (reference unit)	$\frac{0.01}{0.0001} = 100$	$\frac{0.628}{0.000005} = 125600$	$\frac{360}{0.01} = 36000$
5	Calculation	$\frac{B}{A} = \frac{8388608}{100} \times \frac{1}{1}$	$\frac{B}{A} = \frac{8388608}{125600} \times \frac{5}{1}$	$\frac{B}{A} = \frac{8388608}{36000} \times \frac{10}{1}$
6	Setting	H05.07 = 8388608 H05.09 = 100	H05.07 = 41943040 H05.09 = 125600	H05.07 = 83886080 H05.09 = 36000

2.2.4 Position reference filter

Position reference filter serves to filter the position references (in encoder unit) multiplied or divided by the electronic gear ratio, which includes first-order low-pass filtering and moving average filtering. It involves the first-order filter and moving average filter.

It is applicable to the following conditions:

- The acceleration/deceleration process is not performed on the position references sent from the host controller.
- The pulse reference frequency is low.
- The electronic gear ratio is larger than 10.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.04	2005-05h	First-order low-pass filter time constant	0.0 ms–6553.5 ms	0.0	ms	At stop	"H05_en.04" on page 250
H05.06	2005-07h	Moving average filter time constant 1	0.0 ms–128.0 ms	30.0	ms	At stop	"H05_en.06" on page 251

Note

This function does not affect the displacement value (position reference sum).

An excessively high setpoint delays the responsiveness, so set a proper filter time constant based on actual conditions.

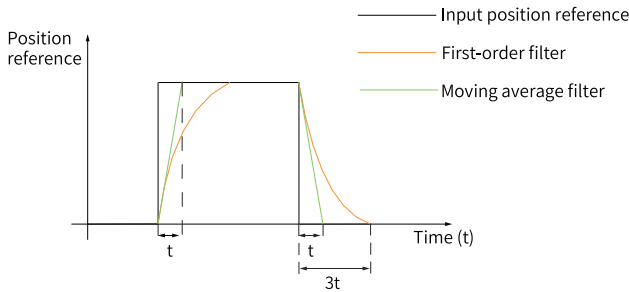


Figure 2-16 First-order filter and moving average filter for rectangular position references

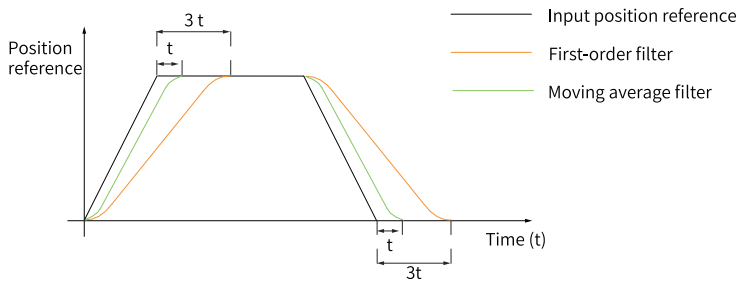


Figure 2-17 First-order filter and moving average filter for trapezoid position references

2.2.5 Position Deviation Clearance

Position deviation = Position reference sum – Position feedback sum

This function serves to clear the position deviation when the condition defined by H05.16 (Clear action selection) is met.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.16	2005-11h	Clear action	0: Position deviation cleared upon S-OFF or non-RUN state 1: Position deviation cleared upon fault or non-RUN state 2: Position deviation cleared upon active DI function 35 or non-RUN state	0	-	At stop	"H05_en.16" on page 253

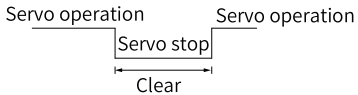
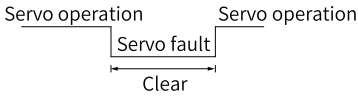
When H05.16 is set to 2, assign FunIN.35 (ClrPosErr, clear position deviation) to a certain DI and set the active logic of this DI. It is recommended to use the high-speed DI (DI7 or DI8) terminal.

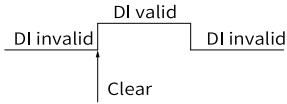
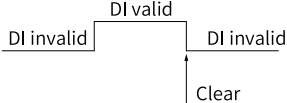
☆ Related parameters:

Code	Name	Function Name	Function
FunIN.35	ClrPosErr	Position deviation cleared	Active: Position deviation cleared Inactive: Position deviation not cleared

The setting method is shown as follows.

Table 2-9 Position deviation clear

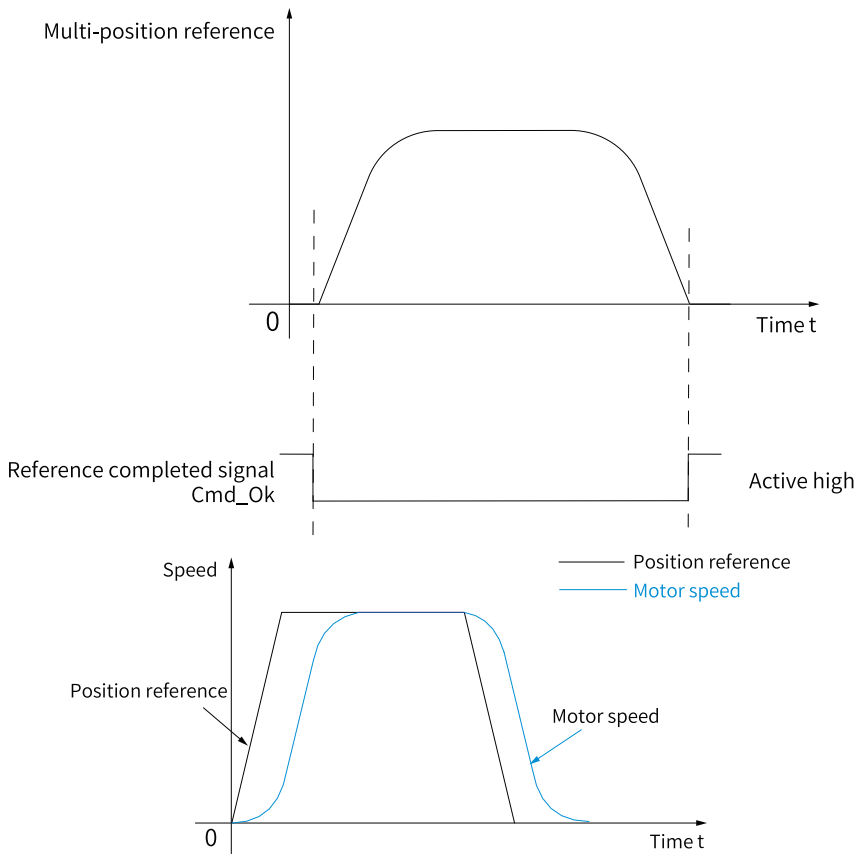
Value	Clear Condition	Clear Time
H05.16 = 0	Position deviation is cleared upon S-OFF or in the non-operational state.	
H05.16 = 1	Position deviation is cleared upon S-OFF or a fault.	

Value	Clear Condition	Clear Time
H05.16 = 2	Position deviation is cleared upon S-OFF or active DI function 35 (ClrPosErr, clear position deviation).	 (Rising edge-triggered)
		 (Falling edge-triggered)

2.2.6 Motion Control Completed, Internal Command Completed, Positioning Completed, Proximity

- "Motion control completed" refers to the completion of command transmission and positioning in the position control mode. In this case, the servo drive outputs a McOK (motion control completed) signal, and the host controller, upon receiving the signal, acknowledges the motion control is done.
- "Internal command completed" refers to the completion of command transmission. In this case, the internal multi-position reference is zero. The servo drive therefore outputs a CmdOk (Internal command completed) signal, and the host controller, upon receiving the signal, acknowledges the internal command transmission is done.
- Positioning completed: When the position deviation fulfills the condition set by users (H05.20), it indicates the positioning in position control mode is completed. Meanwhile, the servo drive outputs positioning completed (COIN) signal, and the host controller, after receiving this signal, confirms the positioning is completed.

The following figure shows the schematic diagram.



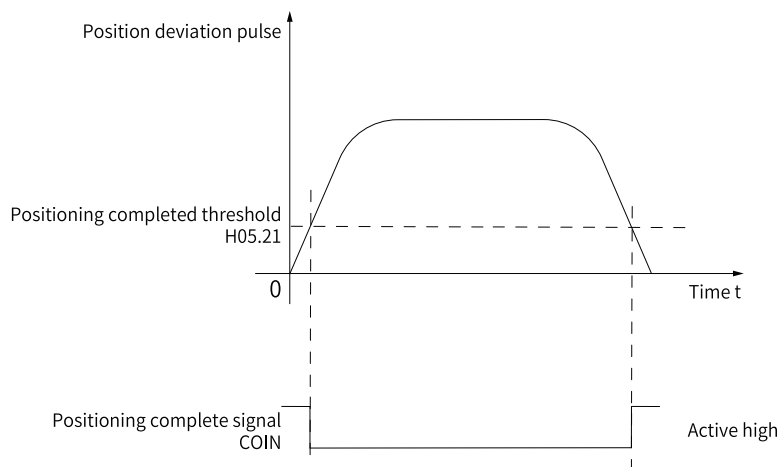


Figure 2-18 Description of positioning completed/proximity functions

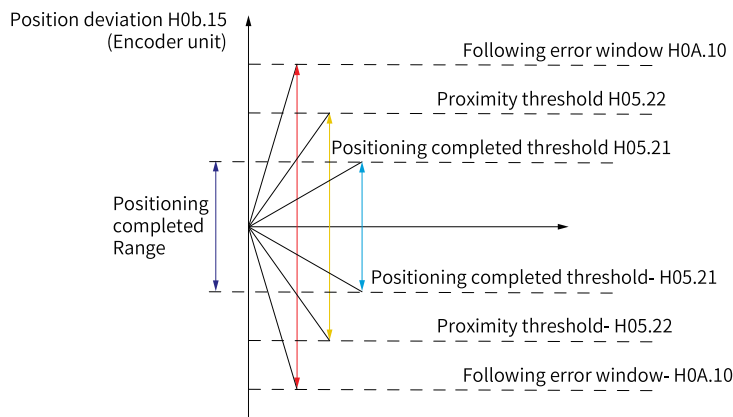


Figure 2-19 Signals related to position deviation

You can set the unit for positioning completed, proximity, and excessive position deviation in H0A.17. When position deviation meets the condition defined by H05.20, the servo drive outputs a NEAR signal to prepare for positioning completed.

Before applying the positioning completed/proximity function, set H05.20, H05.21, H05.22, H05.59, and H05.60 first. The schematic diagram for the window time (H05.59) and hold time (H05.60) of positioning completed signal is as follows.

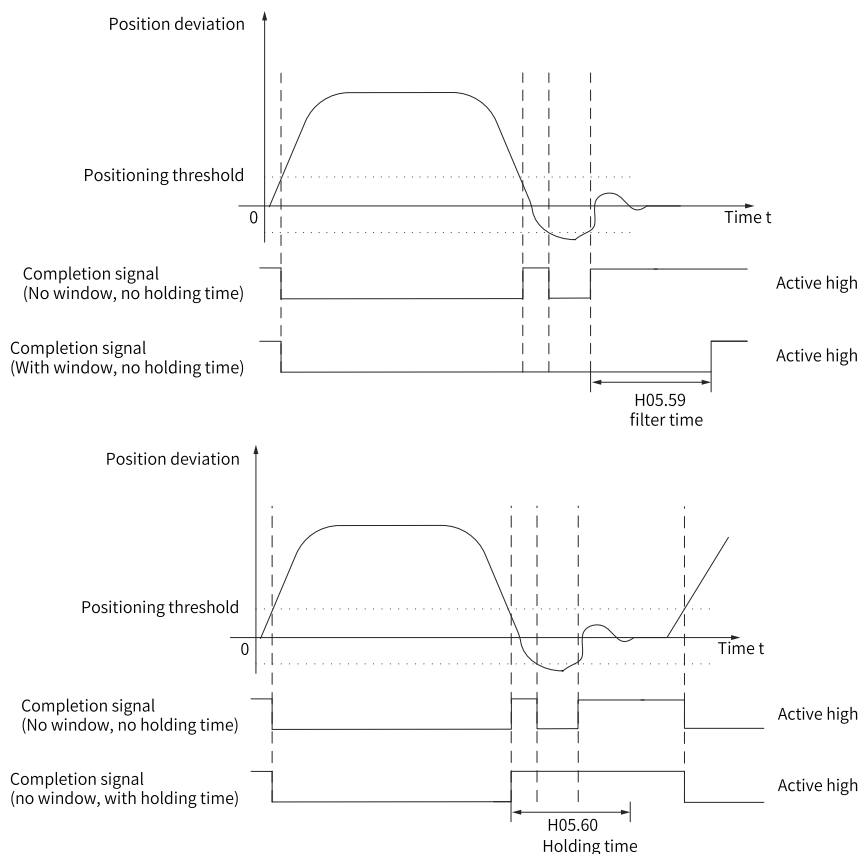


Figure 2-20 Schematic diagram for the window time (H05.59) and hold time (H05.60) of positioning completed signal

When the COIN (positioning completed) signal has a hold time of 0, it remains active until the next position reference is received.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.20	2005-15h	Condition for positioning completed signal output	0: Abs. position deviation below H05.21 1: Abs. position deviation below H05.21, and filtered position reference is 0 2: Abs. position deviation below H05.21, and unfiltered position reference is 0 3: Abs. position deviation is kept below H05.21 within the time defined by H05.60 and filtered position reference is 0 4: Abs. position deviation is kept below H05.21 within the time defined by H05.60 and filtered position reference is 0 5: Abs. position deviation is below H05.21, zero speed signal is active, and unfiltered position reference is 0 6: Abs. position deviation is below H05.21, zero speed signal is active, and filtered position reference is 0 7: COIN signal judged after the position reference is changed from available to unavailable before filtering and is kept active for the period defined by H05.60, unfiltered position reference is 0, and position deviation is smaller than H05.21 8: COIN signal judged after the position reference is changed from available to unavailable after filtering and is kept active for the period defined by H05.60, filtered position reference is 0, and position deviation is smaller than H05.21 9: COIN signal judged after the position reference is changed from available to unavailable before filtering, with the position deviation kept lower than H05.21 for the period defined by H05.60 or unfiltered position reference is 0 10: COIN signal judged after the position reference is changed from available to unavailable after filtering, with the position deviation kept lower than H05.21 for the period defined by H05.60 or filtered position reference being 0	0	-	Real-time	"H05_en.20" on page 253

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.21	2005-16h	Threshold of positioning completed	1 to 65535	5872	Encoder unit	Real-time	"H05_en.21" on page 254
H05.22	2005-17h	Proximity threshold	1 to 65535	65535	Encoder unit	Real-time	"H05_en.22" on page 255
H05.59	2005-3Ch	Positioning window time	0 ms–30000 ms	0	ms	Real-time	"H05_en.59" on page 261
H05.60	2005-3Dh	Hold time of positioning completed	0 ms–30000 ms	0	ms	Real-time	"H05_en.60" on page 262
H0A.17	200A-12h	Reference pulse selection	0: Pulse unit 1: Reference unit	1	-	At stop	"H0A_en.17" on page 328



Caution

- Set H05.22 to a value higher than H05.21 in general cases.
- H05.21 only reflects the absolute threshold when the positioning completed signal is active. It is not related to the positioning precision.
- An excessively high speed feedforward gain (H08.19) or low-speed operation reduces the absolute position deviation. In this case, the COIN (positioning completed) signal may keep active if H05.21 is set to an excessively high value. To improve the positioning accuracy, decrease the value of H05.21.
- When H05.21 is set to a low value along with small position deviation, you can change the condition for outputting the COIN (positioning completed) signal in H05.20.
- An inactive S-ON signal deactivates the COIN (positioning completed) signal and NEAR (proximity) signal output.
- The output of position proximity DO is not affected by H05.60 (positioning completion holding time) or H05.59 (positioning window time) and you need not to evaluate the change of the positioning command.

To use the motion control/internal command/positioning completion/proximity functions, assign FunOUT.24 (McOk, motion control completed), FunOUT.22 (CmdOk, internal command completed), FunOUT.5 (COIN, positioning completed), and FunOUT.6 (NEAR) to four DOs respectively, and set the active logic of these DOs.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.60	2005-3Dh	Hold time of positioning completed	0 ms–30000 ms	0	ms	Real-time	"H05_en.60" on page 262

☆ Related parameters:

Code	Name	Function Name	Function
FunOUT.5	COIN	Positioning completed	Active: The absolute position deviation meets the threshold defined by H05.21 in the position control mode, indicating positioning is done. Inactive: The servo drive is in the process of completion in the position control mode.
FunOUT.6	NEAR	Proximity	Active: The absolute position deviation meets the condition defined by H05.22, indicating the servo drive is close to the target position. Inactive: The servo drive is in the process of proximity in the position control mode.
FunOUT.22	CmdOk	Internal command completed	Active: The transmission of the multi-position reference or interrupt positioning reference is done in the position control mode. Inactive: The transmission of the multi-position reference or interrupt positioning reference is in progress in the position control mode.
FunOUT.24	McOk	Motion control completed	Active: The transmission of the multi-position reference or interrupt positioning reference and the positioning process are done in the position control mode. Inactive: The transmission of the multi-position reference or interrupt positioning reference or positioning is in progress in the position control mode.

2.2.7 Interrupt Positioning



Caution

The interrupt positioning signal cannot be triggered during homing.

Description

If interrupt positioning is triggered in the position control mode, the servo drive halts current operation and turns to executing the pre-set fixed distance. To be specific, when the S-ON signal is active in the position control mode, if this function is enabled, the servo motor runs the position reference for interrupt positioning in the original direction (before the function is triggered).

When interrupt positioning is in progress, the servo drive does not respond to any other internal/external position references (including another interrupt positioning command). In

this case, the input position reference counter (H0B.13) counts the interrupt positioning reference only. After interrupt positioning is done, the servo drive may or may not respond to the position references depending on the setpoint of H05.29 (Interrupt positioning clear signal). The position references received during interrupt positioning are invalid.

After interrupt positioning is done, the servo drive outputs the interrupt positioning completed (FunOUT.15: XintCoin) signal and positioning completed (FunOUT.5: COIN) signal, while the host controller, upon receiving XintCoin signal, acknowledges interrupt positioning is done. The XintCoin signal output is not related to the S-ON signal or the logic of DI8.

Interrupt positioning is effective only when the following conditions are met:

- The motor speed is higher than or equal to 10 rpm before interrupt positioning is triggered, or the setpoints of H05.26 (Constant operating speed in interrupt positioning) and H05.24 (Displacement of interrupt positioning) are not 0.
- The DI assigned with FunIN.33 (Interrupt positioning inhibited) is not used or the logic of this DI is inactive.

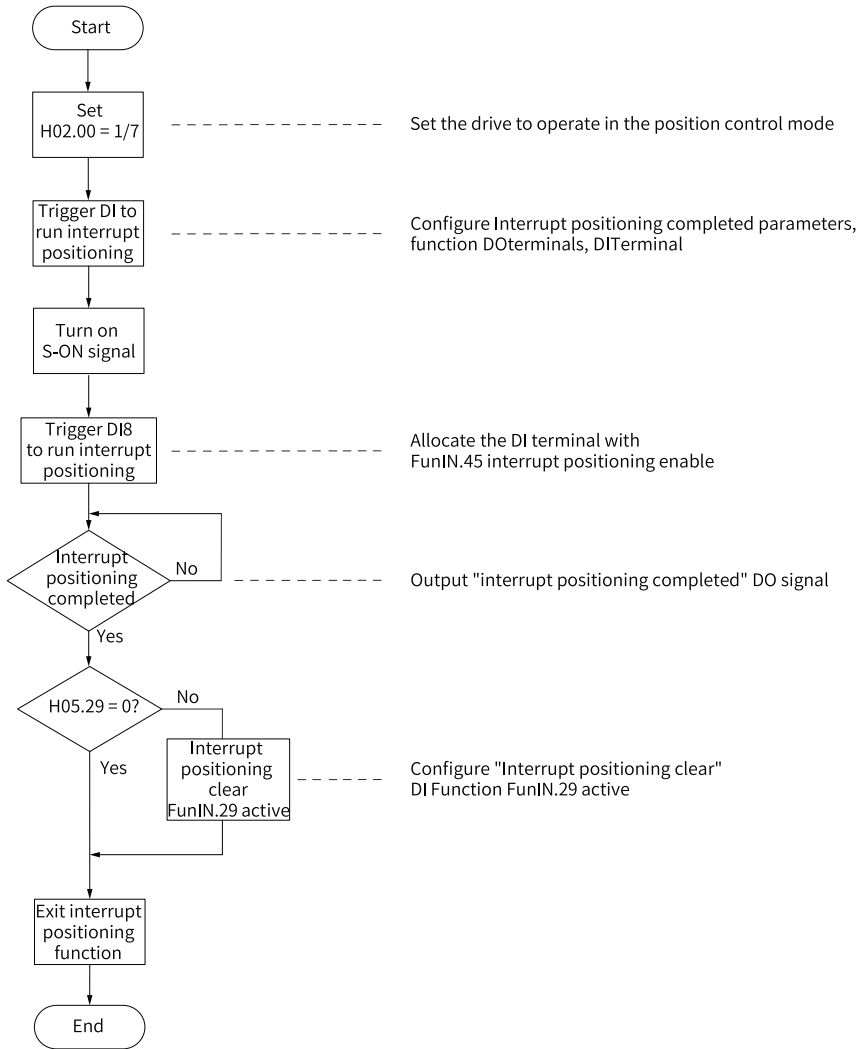


Figure 2-21 Flowchart of interrupt positioning signal

Setting parameters

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.24	2005-19h	Interrupt positioning displacement	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H05_en.24" on page 255
H05.26	2005-1Bh	Constant operating speed in interrupt positioning	0 rpm to 10000 rpm	200	rpm	Real-time	"H05_en.26" on page 255
H05.27	2005-1Ch	Acc./Dec. time of interrupt positioning	0 ms–65535 ms	10	ms	Real-time	"H05_en.27" on page 255
H05.29	2005-1Eh	Interruption fixed length unlock	0: Disabled 1: Enabled	1	-	Real-time	"H05_en.29" on page 256

☆ Related parameters:

Code	Name	Function Name	Function
FunIN.29	XintFree	Interrupt positioning clear	Active: The interrupt positioning state is cleared, which means the servo drive can respond to other position references. Inactive: The interrupt positioning state is locked, which means the servo drive cannot respond to other position references.
FunIN.33	XintInHibit	Interrupt positioning inhibited	Active: Interrupt positioning inhibited Inactive: Interrupt positioning allowed
FunIN.45	XintStart	Interrupt positioning selection	Active: Interrupt positioning enabled Inactive: Interrupt positioning disabled The DI assigned with FunIN.45 (Interrupt positioning enable) is used to trigger interrupt positioning.
FunOut.15	XintCoin	Interrupt positioning completed	Active: Interrupt positioning completed in position control Inactive: Displacement in interrupt positioning not completed in position control

When DI7 is assigned with FunIN.45, the active logic of DI7 is as follows:

Table 2–10 Active logic of DI7 during interrupt positioning

H03.15	Active Logic of DI7
0	Active low
1	Active high

The constant operating speed during interrupt positioning is shown in the following figure.

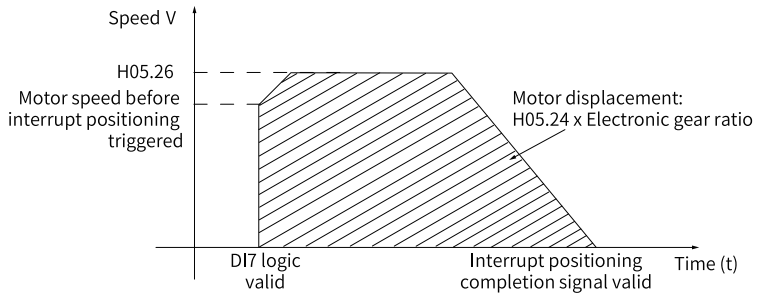


Figure 2-22 Motor operating curve during interrupt positioning

Table 2-11 Motor speed during interrupt positioning

H05.26	Motor Speed (rpm) Before Triggering Interrupt Positioning	Interrupt Positioning	Constant operating speed in interrupt positioning
0	< 10	Inactive	-
	≥ 10	Active	Motor Speed before Triggering Interrupt Positioning
1-6000	-	Active	H05.26

2.2.8 Homing



Caution

- The homing trigger signal is shielded when interrupt positioning or multi-position reference is in progress.
- To use the homing function, ensure H11.00 is not set to 5 as the setpoint 5 indicates enhanced axis control mode, in which the homing function is shielded.
- Do not set H05.30 to 65 or 8 when the motor is operating by commands. Otherwise, speed fluctuation will occur.

Description

- Home (or mechanical home): Indicates the position of the home switch or Z signal depending on the value of H05.31 (Homing mode).
- Zero: positioning target point, represented as home + offset (set in H05.36). When H05.36 (Mechanical home offset) is set to 0, the zero position coincides with the home.

In the position control mode, when homing is triggered after the S-ON signal is activated, the motor starts searching for the zero position.

When homing is in progress, the servo drive does not respond to other position references (including another homing trigger signal) until homing is done.

This function includes two actions:

- Home attaining: After receiving the homing signal, the servo drive proactively locates the relative position between the motor shaft and the preset mechanical home reference point; it finds the home and then moves through the offset from the home reference point to the zero point. The homing mode usually applies in initial searching for the zero position.
- Electrical homing: After determining the absolute zero position through homing, the drive takes current position as the start position to execute a relative displacement.

After the homing function (both homing and electrical homing) is executed, The absolute position of the motor (H0b.07) is consistent with the home offset (H05.36).

The servo drive outputs the homing completed signal (FunOUT.16: HomeAttain) or electrical homing completed signal (FunOUT.17: ElecHomeAttain), and the host controller, upon receiving these two signals, acknowledges the homing function is done executing. HomeAttain or ElecHomeAttain signal is not related to the operation mode or operation state of the servo drive.

Table 2-12 Comparison between homing and electrical homing

Mode	Homing trigger mode (H05.30)	Homing Direction, Deceleration Point, Home	Trigger Signal	Total Motor Displacement
Homing	0	-	-	-
	1	Determined by H05.31	HomingStart signal	Determined by the mechanical home coordinate and offset displacement
	3		Servo ON	
	4		Servo ON	
	6	-	-	-
	8	-	-	-
Electrical homing	2	The homing direction is consistent with the motor displacement sign (+/-). The deceleration point or home signal is not needed.	HomingStart signal	(H05.36 - H0b.07) x Electronic gear ratio
	5		Servo ON	

Homing



- Do not set H05.30 to 6 or 8 when the motor is operating by commands. Otherwise, speed fluctuation will occur.
 - Set mechanical limit switches before enabling the homing function. For homing upon hit-and-stop, set the offset to a value within the travel range to prevent the machine from collision due to high-speed operation during homing.
 - When the motor hits the limit switch during homing, the drive reports E950.0 (Forward overtravel) or E952.0 (Reverse overtravel), and the motor, if H05.40 is set to 0 or 1, stops in the stop mode defined by H02.07.
-

The following part takes an example to describe homing attaining:

- Forward, home switch as deceleration point and home (H05.31 = 0)
- Reverse, home switch as deceleration point and home (H05.31 = 1)
- Forward, Z signal as deceleration point and home (H05.31 = 2)
- Reverse, Z signal as deceleration point and home (H05.31 = 3)
- Forward, home switch as deceleration point and Z signal as home (H05.31 = 4)
- Reverse, home switch as deceleration point and Z signal as home (H05.31 = 5)
- Forward, positive limit switch as deceleration point and home (H05.31 = 6)
- Reverse, negative limit switch as deceleration point and home (H05.31 = 7)
- Forward, positive limit switch as deceleration point and Z signal as home (H05.31 = 8)
- Reverse, negative limit switch as deceleration point and Z signal as home (H05.31 = 9)
- Forward, mechanical limit position as deceleration point and home (H05.31 = 10)
- Reverse, mechanical limit position as deceleration point and home (H05.31 = 11)
- Forward, mechanical limit position as deceleration point and Z signal as home (H05.31 = 12)
- Reverse, mechanical limit position as deceleration point and Z signal as home (H05.31 = 13)
- Forward single-turn homing (H05.31 = 14)
- Reverse single-turn homing (H05.31 = 15)
- Single-turn nearby homing (H05.31 = 16)
- Forward, home switch as deceleration point and home (H05.31 = 0)

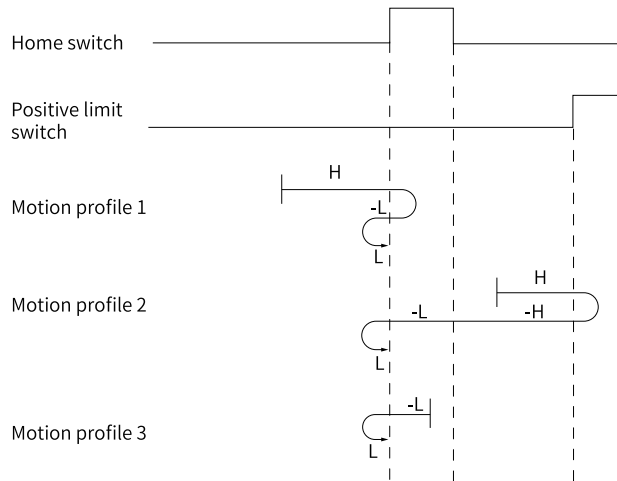


Figure 2-23 Motor running curve and speed in mode 0

- Motion profile 1: The home switch (deceleration point) signal is active when the motor starts running, with the positive limit switch not triggered in the whole process.
- Motion profile 2: The home switch (deceleration point) signal is inactive when the motor starts to run, with the positive limit switch triggered.
- Motion profile 3: The home switch (deceleration point) signal is active when the motor starts running, with the positive limit switch not triggered in the whole process.

Note

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

- Reverse, home switch as deceleration point and home (H05.31 = 1)

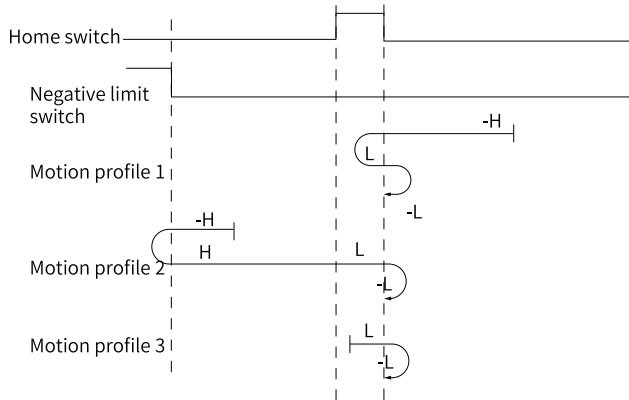


Figure 2-24 Motor running curve and speed in mode 1

- Motion profile 1: The home switch (deceleration point) signal is active when the motor starts running, with the negative limit switch not triggered in the whole process.
 - Motion profile 2: The home switch (deceleration point) signal is inactive when the motor starts running, with the negative limit switch triggered.
 - Motion profile 3: The home switch (deceleration point) signal is active when the motor starts running, with the negative limit switch not triggered in the whole process.
- Forward, Z signal as deceleration point and home (H05.31 = 2)

**Caution**

Note: In Modes 2 and 3 (H05.31 = 2 or 3) where the motor Z signal acts as the home and deceleration point, the actual stop position of the motor may not be on the rising edge on the same side of the motor Z signal. A deviation of ± 1 pulse (in encoder unit) may be present in the stop position.

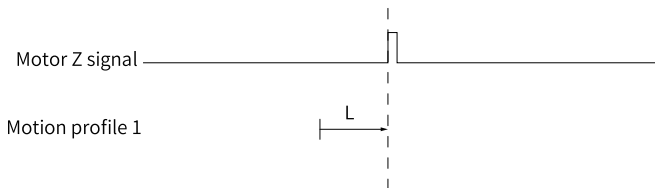


Figure 2-25 Motor running curve and speed in mode 2

- Motion profile 1: The Z signal is inactive when the motor starts running, with the positive limit switch not triggered in the whole process.

- Reverse, Z signal as deceleration point and home (H05.31 = 3)

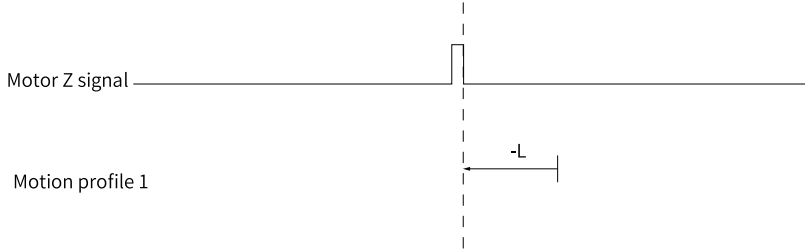


Figure 2-26 Motor running curve and speed in mode 3

- Motion profile 1: The Z signal is inactive when the motor starts running, with the negative limit switch not triggered in the whole process.
- Forward, home switch as deceleration point and Z signal as home (H05.31 = 4)

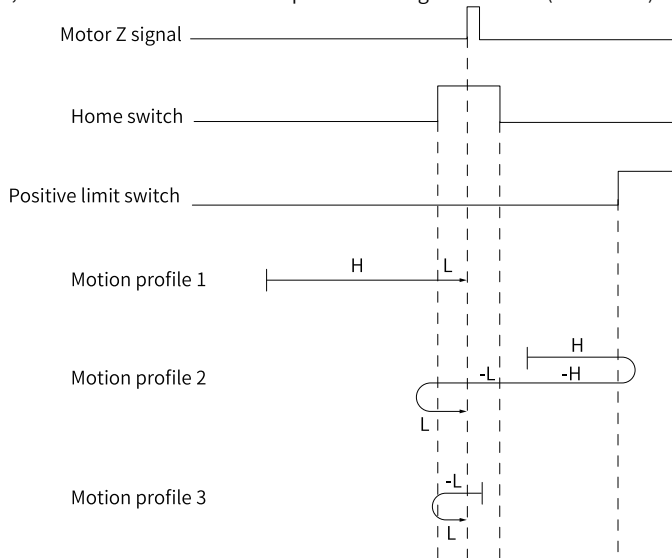


Figure 2-27 Motor running curve and speed in mode 4

- Motion profile 1: The home switch signal is inactive when the motor starts running, with the positive limit switch not triggered in the whole process.
- Motion profile 2: The home switch signal is inactive when the motor starts running, with the positive limit switch triggered.
- Motion profile 3: The home switch signal is active when the motor starts running, with the positive limit switch not triggered in the whole process.
- Reverse, home switch as deceleration point and Z signal as home (H05.31 = 5)

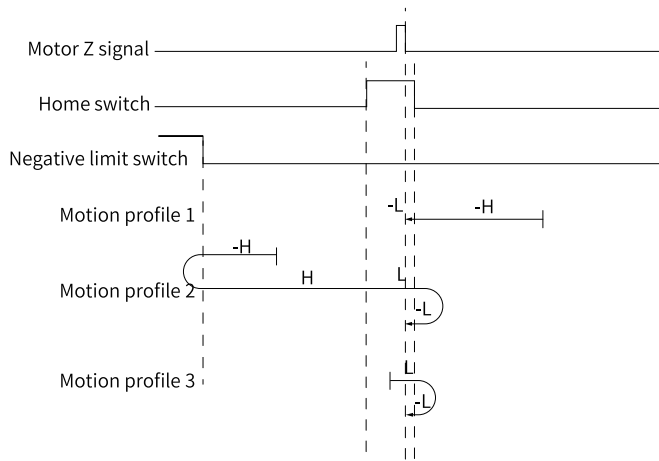


Figure 2-28 Motor running curve and speed in mode 5

- Motion profile 1: The home switch signal is inactive when the motor starts running, with the negative limit switch not triggered in the whole process.
- Motion profile 2: The home switch signal is inactive when the motor starts running, with the negative limit switch triggered.
- Motion profile 3: The home switch signal is active when the motor starts running, with the negative limit switch not triggered in the entire process.
- Forward, positive limit switch as deceleration point and home (H05.31 = 6)

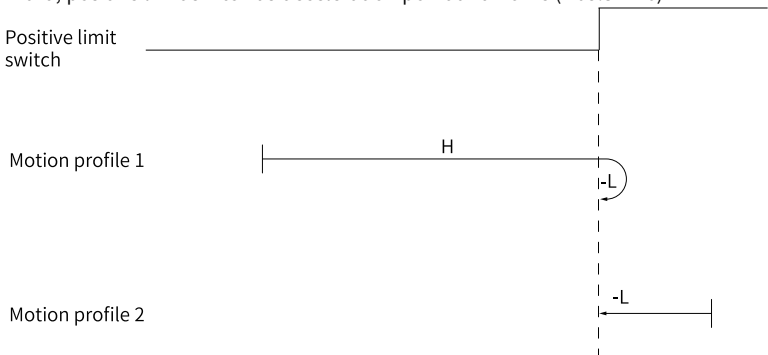


Figure 2-29 Motor running curve and speed in mode 6

- Motion profile 1: The positive limit switch signal is inactive when the motor starts running.
- Motion profile 2: The positive limit switch signal is active when the motor starts running.
- Reverse, negative limit switch as deceleration point and home (H05.31 = 7)

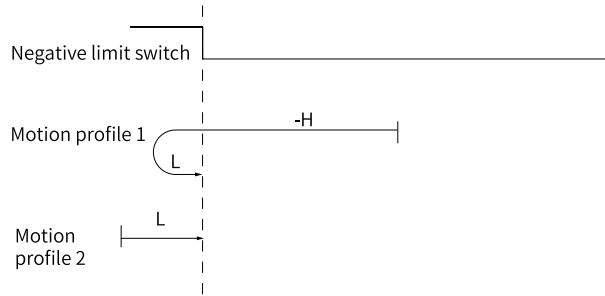


Figure 2-30 Motor running curve and speed in mode 7

- Motion profile 1: The negative limit switch signal is inactive when the motor starts running.
- Motion profile 2: The negative limit switch signal is active when the motor starts running.
- Forward, positive limit switch as deceleration point and Z signal as home (H05.31 = 8)

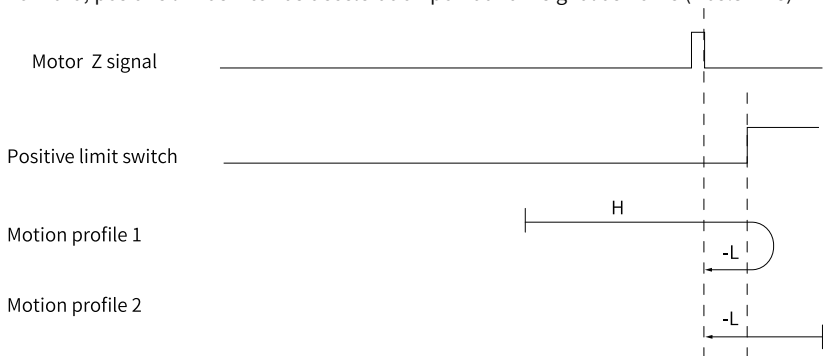


Figure 2-31 Motor running curve and speed in mode 8

- Motion profile 1: The positive limit switch signal is inactive when the motor starts running.
- Motion profile 2: The positive limit switch signal is active when the motor starts running.
- Reverse, negative limit switch as deceleration point and Z signal as home (H05.31 = 9)

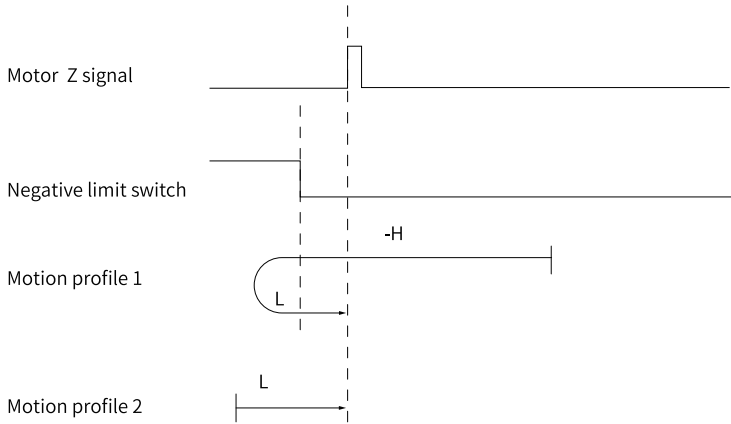


Figure 2-32 Motor running curve and speed in mode 9

- Motion profile 1: The negative limit switch signal is inactive when the motor starts running.
- Motion profile 2: The negative limit switch signal is active when the motor starts running.
- Forward, mechanical limit position as deceleration point and home (H05.31 = 10)

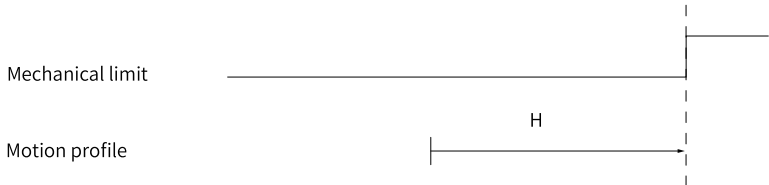


Figure 2-33 Motor running curve and speed in mode 10

- Motion profile: The positive limit switch signal is inactive when the motor starts running.
- Reverse, mechanical limit position as deceleration point and home (H05.31 = 11)

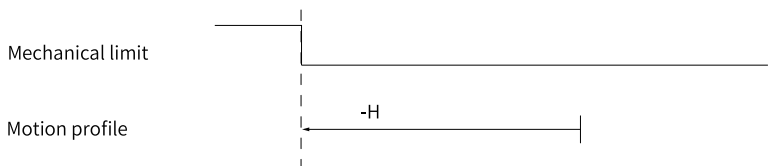


Figure 2-34 Motor running curve and speed in mode 11

- Motion profile: The negative limit switch signal is inactive when the motor starts running.

- Forward, mechanical limit position as deceleration point and Z signal as home (H05.31 = 12)

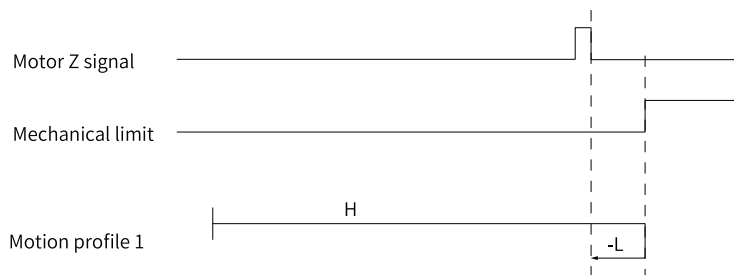


Figure 2-35 Motor running curve and speed in mode 12

- Motion profile 1: The positive limit switch signal is inactive when the motor starts running.
- Reverse, mechanical limit position as deceleration point and Z signal as home (H05.31 = 13)

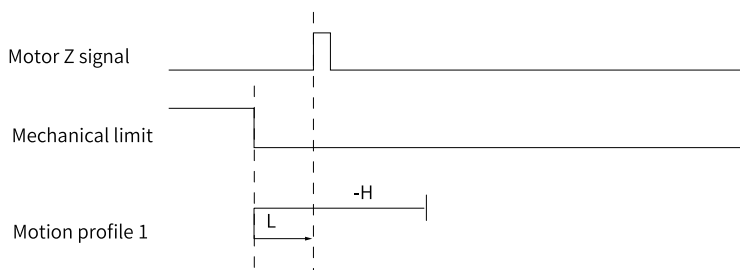


Figure 2-36 Motor running curve and speed in mode 13

- Motion profile 1: The negative limit switch signal is inactive when the motor starts running.
- Forward single-turn homing (H05.31 = 14)

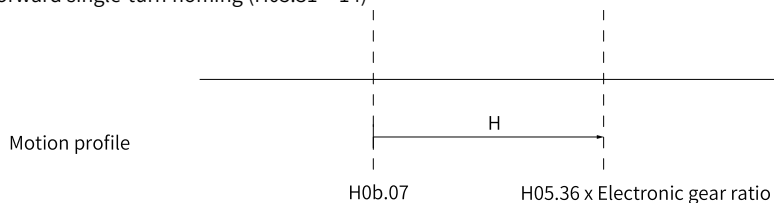


Figure 2-37 Motor running curve and speed in mode 14

- Motion profile: The positive limit switch signal is inactive when the motor starts running.

Note

When H05.31=14/15/16, the single-turn homing is only effective in absolute position single-turn mode (H02.01 = 4).

- Reverse single-turn homing (H05.31 = 15)

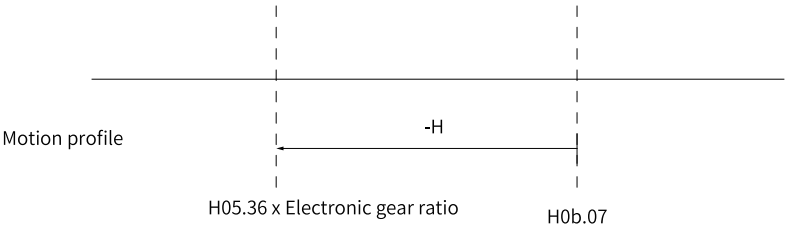


Figure 2-38 Motor running curve and speed in mode 15

- Motion profile: The negative limit switch signal is inactive when the motor starts running.

Note

When H05.31=14/15/16, the single-turn homing is only effective in absolute position single-turn mode (H02.01 = 4).

- Single-turn nearby homing (H05.31 = 16)

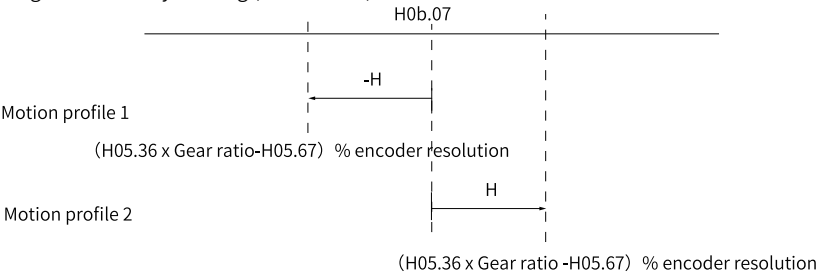


Figure 2-39 Motor running curve and speed in mode 16

- Motion profile 1: The positive limit switch signal is inactive when the motor starts running.
- Motion profile 2: The negative limit switch signal is inactive when the motor starts running.

Note

When $H05.31=14/15/16$, the single-turn homing is only effective in absolute position single-turn mode ($H02.01 = 4$).

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

Electrical homing: starting electrical homing ($H05.30 = 5$)

The mechanical zero position is obtained after homing is done. In this case, you can make the motor move from current position ($H0b.07$) to the designated position ($H05.36$) by setting $H05.36$ (Mechanical home offset).

In the electrical homing mode, the motor runs at the speed defined by $H05.32$ in the direction defined by the sign (+/-) of the displacement value. The total displacement is determined by the difference between $H05.36$ and $H0b.07$. The motor stops immediately after the displacement reference is done executing.

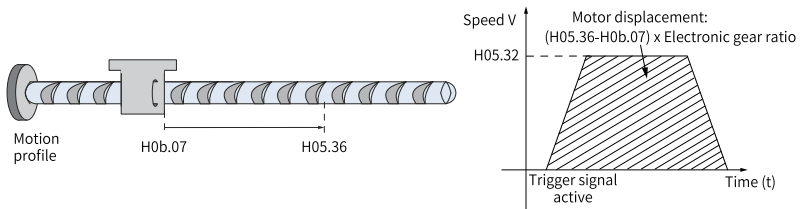
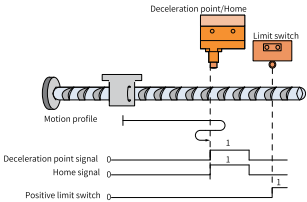
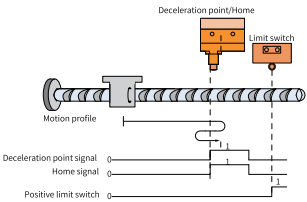
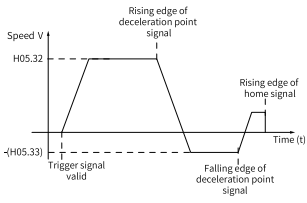
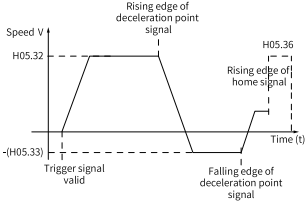


Figure 2-40 Motor running curve and speed in electrical homing

Mechanical home and mechanical zero

The following takes " $H05.30 = 0$ " as example to describe the difference between mechanical home and mechanical zero.

Table 2-13 Description of mechanical home and mechanical zero

Mechanical Zero Different From Mechanical Home Reference Point	Mechanical Zero Same As Mechanical Home Reference Point
If the home offset is present ($H05.36 \neq 0$) and the mechanical home differs from the mechanical zero ($H05.40 = 0$ or 2), the motor stops immediately after reaching the rising edge of the home signal during acceleration or forward operation at constant speed. After stop, the motor absolute position ($H0b.07$) is changed to the setpoint of $H05.36$ (Mechanical home offset) forcibly.	If the home offset is present ($H05.36 \neq 0$) and the mechanical home coincides with the mechanical zero ($H05.40 = 1$ or 3), the motor continues running after reaching the rising edge of the home switch signal during acceleration or forward operation at constant speed until the absolute position ($H0b.07$) reaches the setpoint of $H05.36$ (Mechanical home offset).
	
	

Setting parameters

- Homing mode setting
 - ☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.30	2005-1Fh	Homing enable selection	0: Disabled 1: Homing enabled through the HomingStart signal input from DI 2: Electrical homing enabled through the HomingStart signal input from DI 3: Homing started immediately upon power-on 4: Homing executed immediately 5: Electrical homing started 6: Current position as home 8: D-triggered position as home	0	-	Real-time	"H05_en.30" on page 256

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.31	2005-20h	Homing mode	0: Forward, home switch as deceleration point and home 1: Reverse, home switch as deceleration point and home 2: Forward, Z signal as deceleration point and home 3: Reverse, motor Z signal as deceleration point and home 4: Forward, home switch as deceleration point and Z signal as home 5: Reverse, home switch as deceleration point and Z signal as home 6: Forward, positive limit switch as deceleration point and home 7: Reverse, negative limit switch as deceleration point and home 8: Forward, positive limit switch as deceleration point and Z signal as home 9: Reverse, negative limit switch as deceleration point and Z signal as home 10: Forward, mechanical limit position as deceleration point and home 11: Reverse, mechanical limit position as deceleration point and home 12: Forward, mechanical limit position as deceleration point and Z signal as home 13: Reverse, mechanical limit position as deceleration point and Z signal as home 14: Forward single-turn homing 15: Reverse single-turn homing 16: Nearby single-turn homing	0	-	Real-time	"H05_en.31" on page 256

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.40	2005-29h	Mechanical home offset and action upon overtravel	0: H05.36 as the coordinate after homing, reverse homing applied after homing triggered again on overtravel 1: H05.36 as the relative offset after homing, reverse homing applied after homing triggered again on overtravel 2: H05.36 as the coordinate after homing, reverse homing auto-applied on overtravel 3: H05.36 as the relative offset after homing, reverse homing auto-applied on overtravel	0	-	Real-time	"H05_en.40" on page 259

- Homing curve setting

If the home signal is activated before the deceleration triggered by an active deceleration point signal is fully done executing, the final positioning may be unstable. Take the displacement required by deceleration into account before setting the deceleration point and homing signal input position. The acceleration/deceleration time during homing (H05.34) also affect the positioning stability.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.32	2005-21h	Speed of high-speed search for home switch signal	0 RPM to 3000 RPM	100	rpm	Real-time	"H05_en.32" on page 257
H05.33	2005-22h	Speed of low-speed search for home switch signal	0 rpm to 1000 rpm	10	rpm	Real-time	"H05_en.33" on page 257
H05.34	2005-23h	Acceleration/Deceleration time during homing	0 ms–1000 ms	1000	ms	Real-time	"H05_en.34" on page 258
H05.35	2005-24h	Home search time limit	0–65535	10000	-	Real-time	"H05_en.35" on page 258
H05.36	2005-25h	Mechanical home offset	-2147483648 to 2147483647	0	Reference unit	Real-time	"H05_en.36" on page 258

☆ Related parameters:

Code	Name	Function Name	Function
FunIN.31	HomeSwitch	Home switch	Active: Current position as home Set the logic of the DI assigned with FunIN.31 to "active high" or "active low" based on the output of the host controller. See the following table for details. See the following table for details.
FunIN.32	HomingStart	Homing enable	Active: Homing enabled (The HomingStart signal cannot be triggered repeatedly during homing.) Inactive: Homing inhibited
FunIN.41	HomingRecord	DI-triggered point as the home	The edge-triggered position is taken as the home.
FunOut.16	HomeAttain	Home find	Active: Homing completed in the position control mode Inactive: Homing not completed
FunOut.17	ElecHomeAttain	Electrical homing completed	Active: Electrical homing completed in the position control mode Inactive: Electrical homing not completed

DI Logic Set by HomeSwitch	Actual Active Level
0 (low level)	Low level
1 (high level)	High level

Sequence

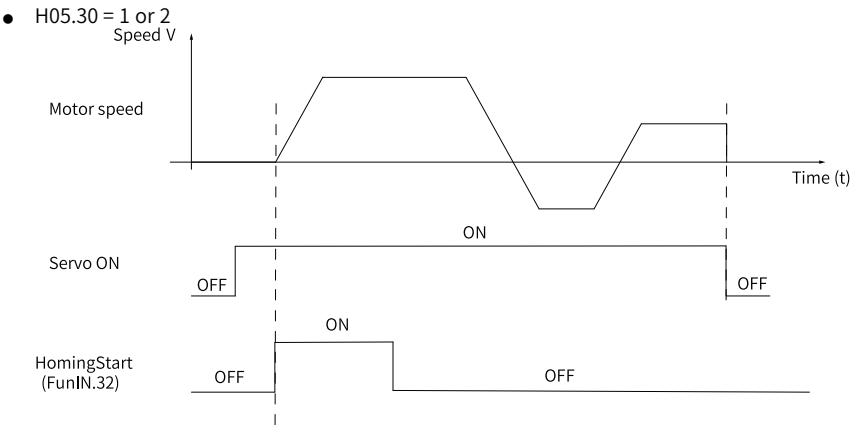


Figure 2-41 Sequence example

- Switch on the S-ON signal first and then the HomingStart signal.
- During homing, the S-ON signal remains active and the change of the HomingStart signal is shielded.

- During homing, the motor stops if the S-ON signal is switched off. To enable homing again, switch on the S-ON signal first and then the HomingStart signal.
- If E601.0 (Homing timeout) occurs, the motor stops, but the S-ON signal remains active. In this case, trigger the HomingStart signal again to reset E601.0, and execute homing again.
- The homing operation can be triggered repeatedly.
- H05.30 = 3
 - The homing operation is executed only when the S-ON signal is switched on for the first time after power-on.
 - The motor stops when E601.0 (Homing timeout) occurs. To reset E601.0, deactivate the S-ON signal.
 - The homing operation can only be triggered again at next power-on.
- H05.30 = 4 or 5
 - The homing operation is executed immediately after the S-ON signal is switched on upon power-on.
 - If the S-ON signal is deactivated during homing, the motor stops immediately. To trigger homing again, activate the S-ON signal again.
 - When E601.0 (Homing timeout) occurs, H05.30 is set to 0 and the motor stops. To reset E601.0, deactivate the S-ON signal. To perform homing again, reset H05.30. After homing is done, H05.30 is set to 0. To perform homing again, set H05.30 again.
- H05.30 = 6
 - To take the current position as the home and achieve home offset ($H05.40 = 0$ or 2 , $H05.36 \neq 0$), set H05.36 and H05.40 first, and then set H05.30 to 6. Failing to do so will cause H0b.07 to keep the previous value of H05.36 rather than the one set currently.
 - After homing is done, H05.30 will be set to 0. To enable homing again, re-write H05.36 and set H05.30 to 6.
- H05.30 = 8
 - To take the DI-triggered position as the home, assign FunIN.41 to a DI first and set the current position as the home.
 - To achieve home offset ($H05.40 = 0$ or 2 , $H05.36 \neq 0$), set H05.36 and H05.40 first, and then set H05.30 to 6. Failing to do so will cause H0b.07 to keep the previous value of H05.36 rather than the one set currently.

2.3 Speed Control Mode

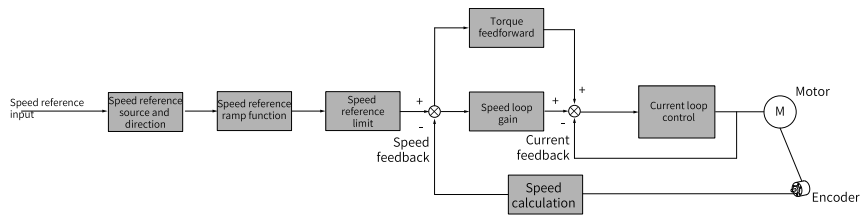


Figure 2-42 Block diagram of speed control

Set H02.00 (Control mode selection) to 0 (Speed control mode) through the Inovance software tool to make the servo drive operate in the speed control mode. Set the drive parameters based on the mechanical structure and technical indicators. The following part uses the basic parameter setting to describe the speed control mode.

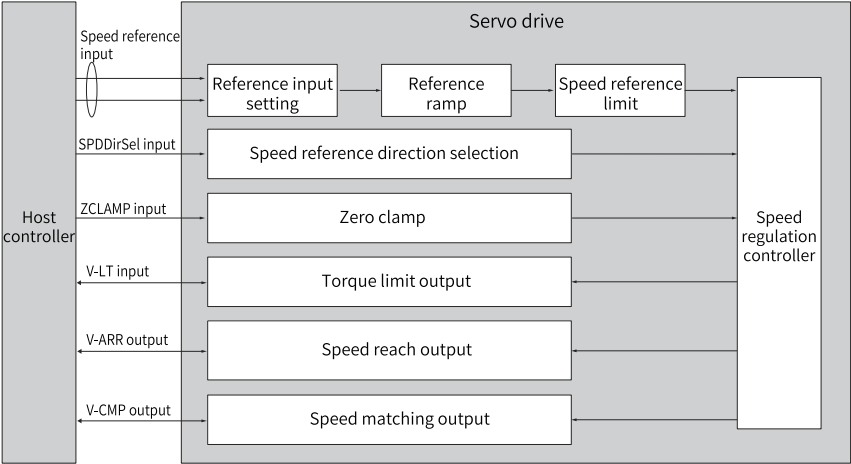


Figure 2-43 Signal exchange between the drive and the host controller

2.3.1 Function Block Diagram

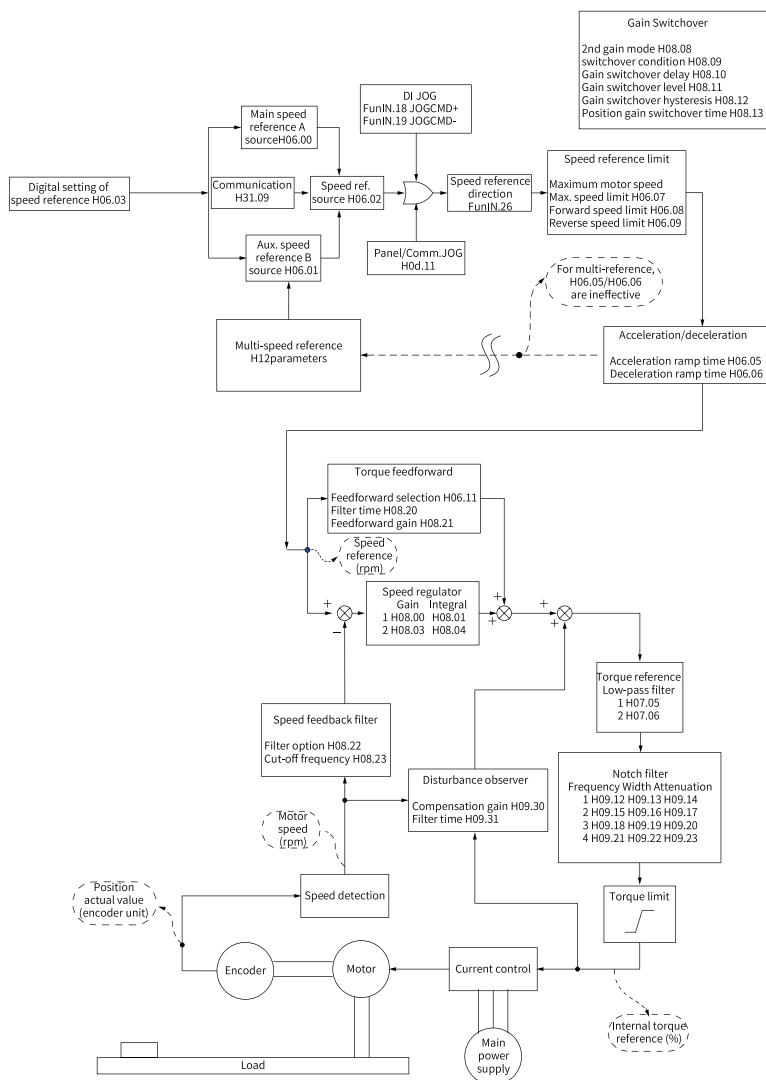


Figure 2-44 Block diagram of speed control parameters

2.3.2 Speed Reference Input

Speed reference source

Five speed reference sources are available in the speed control mode, which can be set in H06.02.

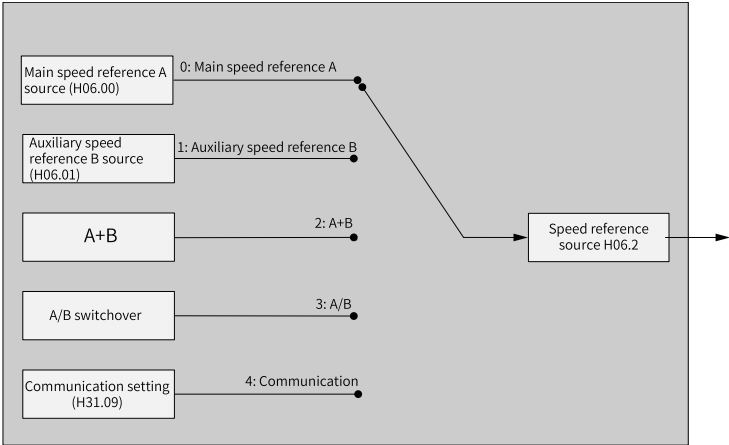


Figure 2-45 Speed reference source

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H06.02	2006-03h	Speed reference source	0: Source of main speed reference A 1: Source of auxiliary speed reference B 2: A+B 3: Switched between A and B 4: Communication	0	-	At stop	"H06_en.02" on page 264

- **Source of main speed reference A**

The sources of main speed reference A include digital setting and analog voltage setting. Digital setting refers to the internal speed reference. Analog voltage setting refers to the external speed reference.

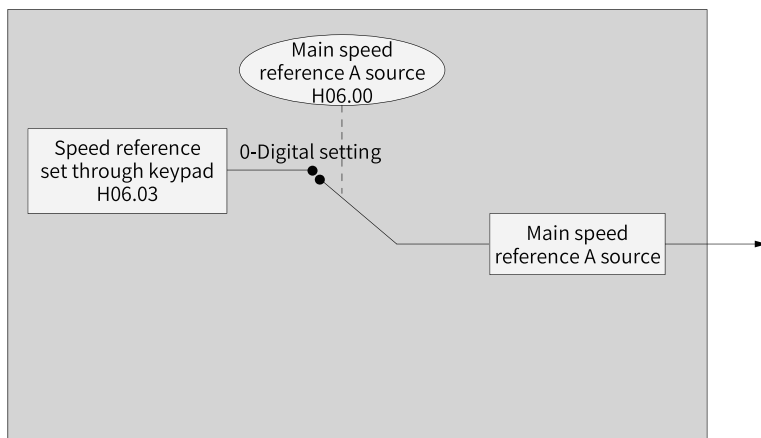


Figure 2-46 Source of main speed reference A

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H06.00	2006-01h	Source of main speed reference A	0: Digital setting (H06.03)	0	-	At stop	"H06_en.00" on page 263

Digital setting

The speed reference is set in H06.03.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H06.03	2006-04h	Speed reference set through keypad	-10000 rpm to +10000 rpm	200	rpm	Real-time	"H06_en.03" on page 265

- **Source of auxiliary speed reference B**

The auxiliary speed reference B sources include digital setting and multi-speed references. Both are internal speed references.

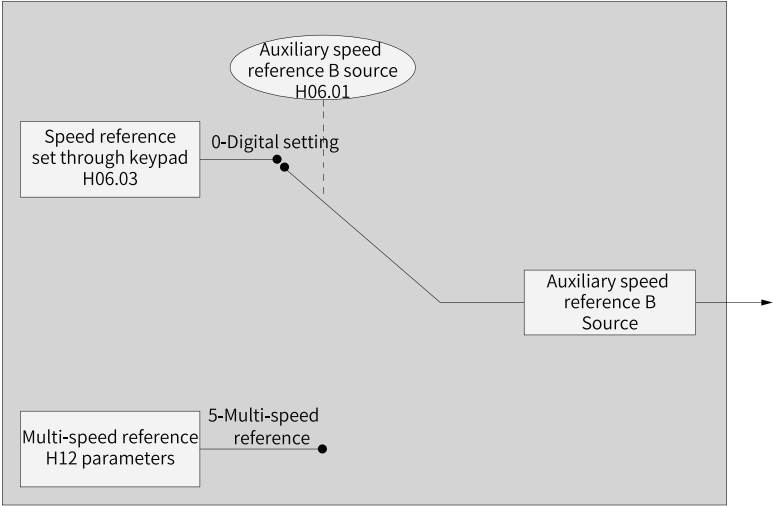


Figure 2-47 Source of auxiliary speed reference B

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H06.01	2006-02h	Source of auxiliary speed reference B	0: Digital setting (H06.03) 5: Multi-speed reference	0	-	At stop	"H06_en.01" on page 263

The digital setting mode is the same as H06.00. The following describes multi-speed references.

The servo drive supports multi-speed operation. The servo drive stores 16 speed references, and the maximum running speed and running time of each can be set. Four groups of acceleration/deceleration time are optional. The setting flowchart is as follows.

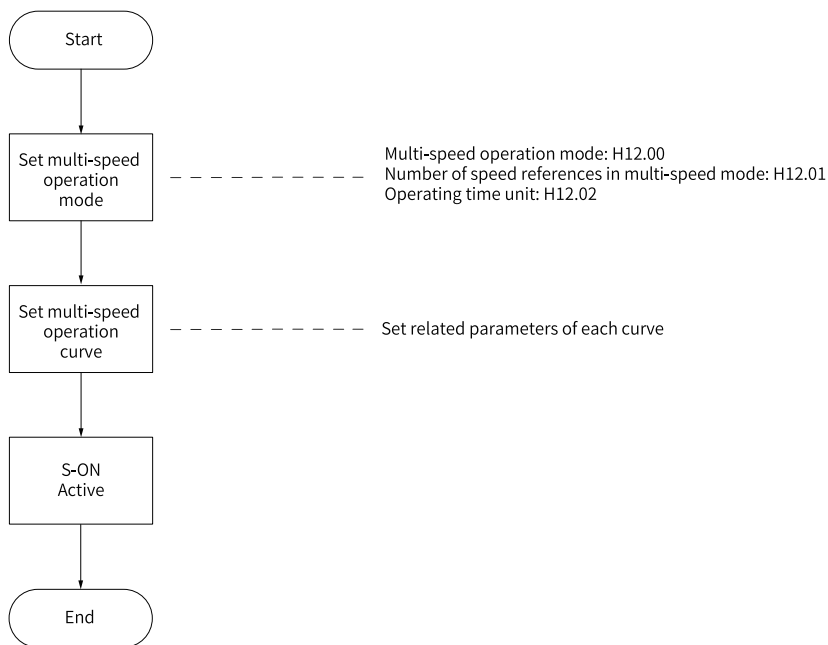


Figure 2-48 Flowchart for setting multi-speed operation

1. Set the multi-speed operation mode.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H12.00	2012-01h	Multi-speed operation mode	0: Individual operation (number of speeds selected in H12.01) 1: Cyclic operation (number of speeds selected in H12.01) 2: DI-based operation	1	-	At stop	"H12_en.00" on page 396
H12.01	2012-02h	Number of speed references in multi-speed mode	1–16	16	-	At stop	"H12_en.01" on page 397
H12.02	2012-03h	Operating time unit	0: s 1: min	0	-	At stop	"H12_en.02" on page 398

You can assign FunIN.5 (DIR- SEL) to an external DI to select the multi-speed reference direction.

☆ Related parameters:

Code	Name	Function Name	Function
FunIN.5	DIR-SEL	Multi-reference direction	Inactive: Reference direction by default Active: Opposite to the reference direction

The following takes "H12.01 = 2" as an example to describe each mode.

■ Individual operation (H12.00 = 0)

Set H12.00 to 0 to select the individual operation mode.

Set H12.01 and H12.02 as needed. Then set the reference value, operating time, and acceleration/deceleration time of each speed. The drive executes multi-speed references in a sequence from speed 1 to speed N. After all the speeds are executed, the drive stops.

Table 2–14 Description of individual operation

Description	Operating Curve
• The drive stops after one cycle of operation. • The drive switches to the next displacement automatically.	Speed V 1st segment 2nd segment V_{1max} V_{2max} t_1 t_2 t_3 t_4 t_5 Time (t) • V_{1max}, V_{2max} : reference values of speed 1 and speed 2 • t_1 : actual acceleration/deceleration time of speed 1 • t_3, t_5 : acceleration/deceleration time of speed 2 • Operating time = Time taken in switching from the last speed to current speed + Duration of constant-speed operation at current speed (For example, the operating time of speed 1 is the sum of t_1 and t_2 ; the operating time of speed 2 is the sum of t_3 and t_4 .) • Do not set the operating time of a certain speed to 0. Otherwise, the drive skips this speed and switches to the next speed directly. • The speed reach signal is activated when the motor speed feedback reaches the maximum operating speed set for this speed. • If the S-ON signal is switched off during operation, the motor stops in the mode defined by H02.05 (Stop mode at S-ON OFF).

★ Definition of terms:

A complete operation cycle covers all the multi-speed references defined by H12.01.

■ Cyclic running (H12.00 = 1)

Set H12.00 to 1 to select the cyclic operation mode.

Set H12.01 and H12.02 based on the number of speeds and the operating time unit. Then set the reference value, operating time and acceleration/deceleration

time for each speed. The drive executes the set speeds in a sequence from speed 1 to speed N (last speed). After all the speeds are executed, the drive jumps to speed 1 and repeats the preceding process.

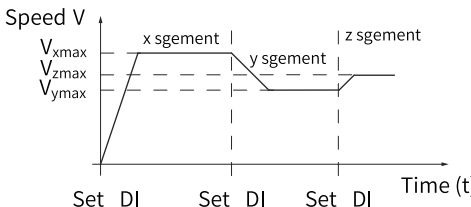
Table 2–15 Descriptions of cyclic operation

Description	Operating Curve
• The drive starts from displacement 1 again after each cycle of operation. • The drive switches to the next displacement automatically. • The cyclic operation state remains active as long as the S-ON signal is active.	Speed V 1st segment 2nd segment 1st segment 2nd segment V_{1max} V_{2max} t_1 t_2 t_3 t_4 t_5 t_6 t_7 Time (t) • V_{1max}, V_{2max} : maximum operating speeds in displacement 1 and displacement 2 • Operating time = Time taken in switching from the last speed to current speed + Duration of constant-speed operation at this speed (For example, the operating time of speed 1 is the sum of t_1 and t_2 ; the operating time of speed 2 is the sum of t_3 and t_4 .) • Do not set the operating time of a certain speed to 0. Otherwise, the drive skips this speed and switches to the next speed directly. • The speed reach signal is activated when the motor speed feedback reaches the maximum operating speed set for this speed. • If the S-ON signal is switched off during operation, the motor stops in the mode defined by H02.05 (Stop mode at S-ON OFF).

- DI-based operation (H12.00 = 2)
Set H12.00 to 2 to select DI-based operation.

Set H12.01 and H12.02 based on the number of speeds to be executed and the operating time unit. Then set the reference value, operating time and acceleration/deceleration time for each speed. The drive executes the speed references according to ON/OFF combination of the external DIs (CMDx).

Table 2-16 Descriptions of DI-based operation

Description	Operating Curve
- The drive operates continuously as long as the S-ON signal is active. - The speed No. is determined by the DI logic. - The operating time of each speed is determined only by the interval time of speed switchover.	 - x, y: speed No. (The relationship between the speed No. and the DI logic is described below.) - The operating time is independent of the parameter setpoint. If the speed No. changes during operation, the drive switches to the new speed No. immediately. - The speed reach signal is activated when the motor speed feedback reaches the maximum operating speed set for this speed. - If the S-ON signal is switched off during operation, the motor stops in the mode defined by H02.05 (Stop mode at S-ON OFF).

When the multi-speed operation mode is DI-based operation, assign DI functions 6...9 (multi-reference switchover) to four DIs and set the active logic of these DIs. In addition, assign FunIN.5 (DIR-SEL, direction selection in DI-based multi-speed operation) to a certain DI to switch the speed reference direction.

☆ Related parameters:

Code	Name	Function Name	Function
FunIN.5	DIR-SEL	Direction switchover through DI in multi-speed mode	Defines the speed reference direction in the DI-based operation mode. Inactive: Reference direction Active: Opposite to the reference direction
FunIN.6	CMD1	Multi-reference switchover 1	The speed No. is a 4-bit binary value. The relationship between the speed no. and CMD1 to CMD4 is shown in "Table 2-17" on page 80. The value of CMD is 1 upon active DI level and 0 upon inactive DI level.
FunIN.7	CMD2	Multi-reference switchover 2	
FunIN.8	CMD3	Multi-reference switchover 3	
FunIN.9	CMD4	Multi-reference switchover 4	

Table 2-17 Relationship between the segment No. and CMD1 to CMD4

CMD4	CMD3	CMD2	CMD1	Segment No.
0	0	0	0	1
0	0	0	1	2
...				
1	1	1	1	16

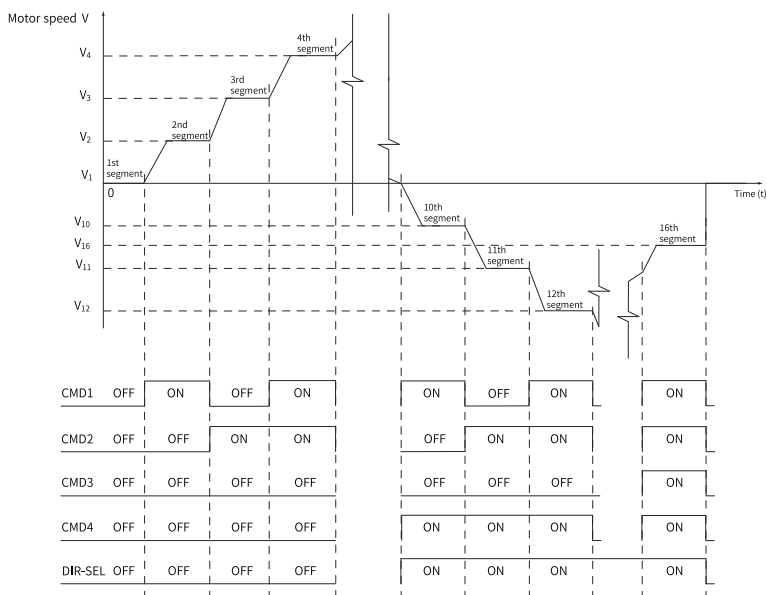


Figure 2-49 Example of multi-speed curve

2. Setting the multi-speed curve

The following takes speed 1 as an example.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H12.03	2012-04h	Acceleration time 1	0 ms–65535 ms	10	ms	Real-time	"H12_en.03" on page 398
H12.04	2012-05h	Deceleration time 1	0 ms–65535 ms	10	ms	Real-time	"H12_en.04" on page 399
H12.09	2012-0Ah	Acceleration time 4	0 ms–65535 ms	150	ms	Real-time	"H12_en.09" on page 400
H12.10	2012-0Bh	Deceleration time 4	0 ms–65535 ms	150	ms	Real-time	"H12_en.10" on page 401
H12.20	2012-15h	1st speed reference	-10000 rpm to +10000 rpm	0	rpm	Real-time	"H12_en.20" on page 401

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H12.21	2012-16h	Operating time of speed 1	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.21" on page 401
H12.22	2012-17h	1st speed rise/drop and curve smoothing parameter time	bit0-bit7: Speed rise and drop time 0: Zero acc and dec time 1: Acc and dec time 1 2: Acc and dec time 2 3: Acc and dec time 3 4: Acc and dec time 4 bit8-bit15: S curve smoothing parameter 1: Smoothing parameter 1 2: Smoothing parameter 2 3: Smoothing parameter 3 4: Smoothing parameter 4 5: Smoothing parameter 5 6: Smoothing parameter 6 7: Smoothing parameter 7 8: Smoothing parameter 8	256	-	Real-time	"H12_en.22" on page 402

For speed references in the multi-speed operation mode, besides the reference value and operating time, four groups of acceleration/deceleration time options are also available. There is no acceleration/deceleration time by default.

The following describes the actual acceleration/deceleration time and the operating time in cases where H12.00 (Multi-speed operation mode) is set to 1 (Individual operation).

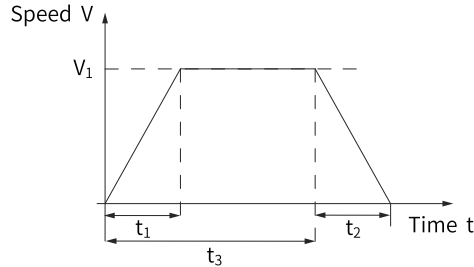


Figure 2-50 Example of multi-speed curve

As shown in the preceding figure, the speed reference is V_1 and the actual acceleration time t_1 is as follows.

$$t_1 = \frac{V_1}{1000} \times \text{Acceleration time set for this speed}$$

The actual deceleration time t_2 is:

$$t_2 = \frac{V_1}{1000} \times \text{Deceleration time set for this speed}$$

Operating time = Time taken in switching from the last speed to present speed + Duration of constant-speed operation at present speed (as shown by t_3 in the preceding figure)

- **Switched between A and B**

When setting H06.02 (speed reference source) to 3 (Switched between A and B), you need to assign FunIN.4 (DI-SEL) to the corresponding DI. The input signal of this DI determines which source (A or B) is active.

☆ Related parameters:

Code	Name	Function Name	Description
FunIN.4	CMD-SEL	Main/Auxiliary reference switchover	Inactive: Current reference being A Active: Current reference being B

- **Communication**

When H06.02 (Speed reference source) is set to 4 (Communication), the speed reference is the setpoint of H31.09. H31.09 is not displayed on the keypad, it can be set through communication only.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H31.09	2031-0Ah	Speed reference set via communication	-9999.000rpm to 9999.000rpm	0.000	rpm	Real-time	"H31_en.09" on page 463

Speed reference direction setting

To switch the speed reference direction through DI, assign FunIN.26 to the corresponding DI. The input signal of this DI determines the speed reference direction.

☆ Related parameters:

Code	Name	Function Name	Description
FunIN.26	SPDDirSel	Speed reference direction	Inactive: Forward Active: Reverse

The actual direction of rotation is related to the setting of H02.02 (Direction of rotation), the sign (+/-) of the speed reference value, and the logic of FunIN.26.

Table 2-18 Actual direction of rotation in the speed control mode

H02.02	Sign of Speed Reference	FunIN.26	Direction of Rotation
0	+	Inactive	CCW
0	+	Active	CW
0	-	Inactive	CW
0	-	Active	CCW
1	+	Inactive	CW
1	+	Active	CCW
1	-	Inactive	CCW
1	-	Active	CW

2.3.3 Ramp Function

The ramp function is used to smooth the acceleration rate of speed references through acceleration/deceleration time setting.

In the speed control mode, a high acceleration rate easily leads to motor jerk or intense vibration. In this case, increasing the acceleration/deceleration time smoothens the motor speed change, preventing mechanical damage caused by jerk or vibration.



- When the speed reference source is digital setting, analog voltage setting or jog speed, the acceleration time and deceleration time are set through parameters H06.05 and H06.06.
- When the speed reference source is multi-speed reference, the acceleration time and deceleration time are set in parameter group H12. For details, see section "Description of Parameters".

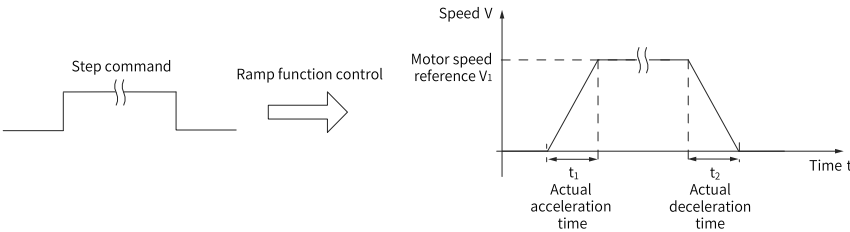


Figure 2-51 Ramp function definition

- 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:

$$\text{Actual acceleration time } t_1 = \frac{\text{Speed reference}}{1000} \times \text{Speed reference acceleration ramp time}$$

$$\text{Actual deceleration time } t_2 = \frac{\text{Speed reference}}{1000} \times \text{Speed reference deceleration ramp time}$$

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H06.05	2006-06h	Acc. ramp time of speed reference	0 ms–65535 ms	0	ms	Real-time	"H06_en.05" on page 265
H06.06	2006-07h	Dec. ramp time of speed reference	0 ms–65535 ms	0	ms	Real-time	"H06_en.06" on page 266

2.3.4 Zero Clamp



Caution

- The zero speed clamp function is used in the system in which the host controller does not construct the position loop in speed control mode.
- If servo motor oscillation occurs in zero speed clamp state, adjust the position loop gain.

In the speed control mode, if FunIN.12 (ZCLAMP) is enabled, and the speed reference amplitude is smaller than or equal to the value of H06.15, the motor enters zero position clamp state. In this case, a position loop is built inside the drive and the speed reference is invalid.

The motor is clamped the minimum quantization error of the encoder. Even if it rotates due to external force, it will return to the zero position and be clamped.

When the speed reference amplitude exceeds the value of H06.15, the motor exits from the zero clamp state and continues running according to the speed reference received. Zero clamp is deactivated when the ZCLAMP (FunIN.12) signal is inactive.

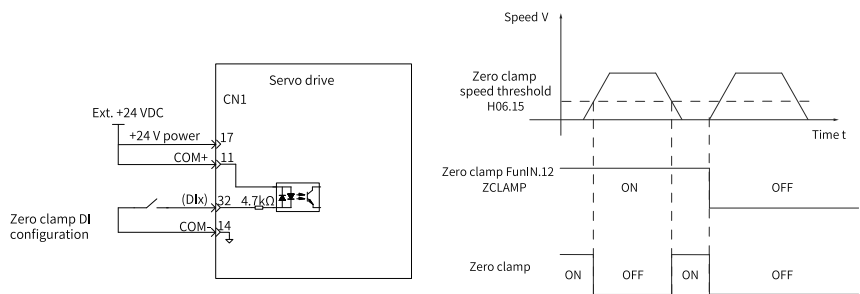


Figure 2-52 Wiring and waveform of zero clamp

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H06.15	2006-10h	Zero clamp speed threshold	0 rpm to 10000 rpm	10	rpm	Real-time	"H06_en.15" on page 268

☆ Related parameters:

Code	Name	Function Name	Description
FunIN.12	ZCLAMP	Zero speed clamp	Inactive: Zero clamp disabled Active: Zero clamp enabled

2.3.5 Speed Reference Limit



When the actual speed of the motor exceeds H0A.08 (Overspeed threshold), E500.0 (Motor overspeed) occurs. For details of H0A.08, see Chapter "Description of Parameters". The speed reference limit must be lower than H0A.08.

In the speed control mode, the sources of speed reference limit include:

- H06.07 (Maximum speed limit): Defines the speed reference limit in both directions. The limit value applies when speed references exceed it.
- H06.08 (Forward speed limit): Defines the speed limit in the forward direction. The limit value applies when forward speed references exceed it.
- H06.09 (Reverse speed limit): Defines the speed limit in the reverse direction. The limit value applies when reverse speed references exceed it.
- Maximum speed of the motor (default threshold): Depends on the motor model.

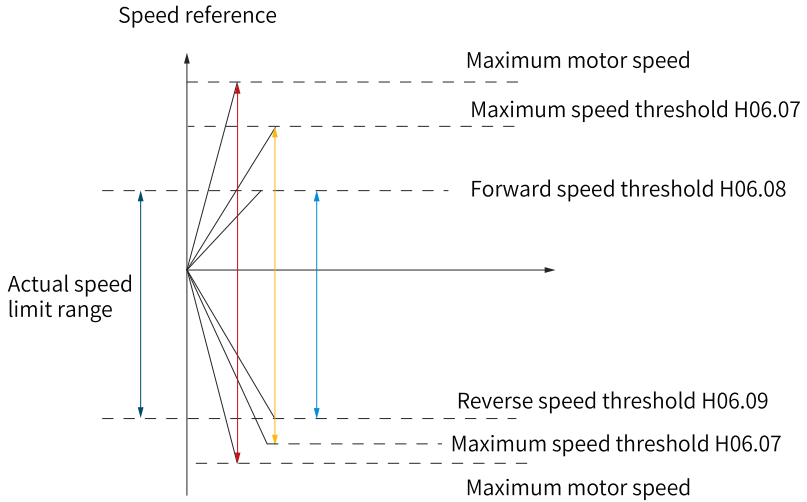


Figure 2-53 Example of speed reference limit

The actual motor speed limit meets the following requirements:

- $|\text{Forward speed limit}| \leq \min \{\text{maximum motor speed, H06.07, H06.08}\}$
- $|\text{Reverse speed limit}| \leq \min \{\text{maximum speed of the motor, H06.07, H06.09}\}$

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H06.07	2006-08h	Maximum speed limit	0 rpm to 10000 rpm	7000	rpm	Real-time	"H06_en.07" on page 266
H06.08	2006-09h	Forward speed threshold	0 rpm to 10000 rpm	7000	rpm	Real-time	"H06_en.08" on page 266
H06.09	2006-0Ah	Reverse speed threshold	0 rpm to 10000 rpm	7000	rpm	Real-time	"H06_en.09" on page 266

2.3.6 Speed-Related DO

The filtered speed feedback can be compared with different thresholds, generating DO signals for use by the host controller. The filter time constant is set in H0A.27 (Speed DO filter time constant).

Motor rotation DO signal

When the absolute value of the filtered actual motor speed reaches the value of H06.16 (Threshold of TGON (motor rotation) signal), the motor is acknowledged to be rotating. In

this case, the drive outputs the motor rotation signal (FunOUT.2: TGON) to acknowledge that the motor is rotating. When the absolute value of the filtered actual motor speed is lower than the value of H06.16, the motor is not rotating.

Judgment on the motor rotation signal (FunOUT.2, TGON) is not affected by the operating state or control mode of the drive.

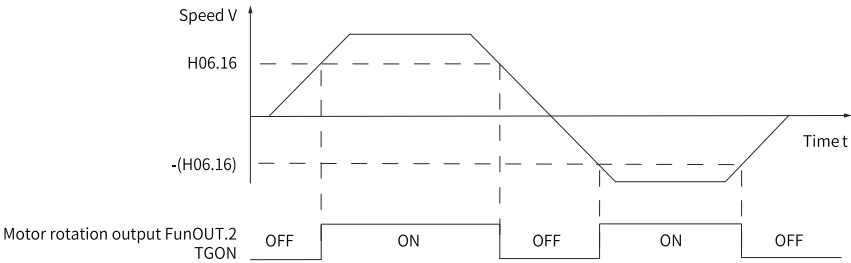


Figure 2-54 Waveform of motor rotation (TGON) signal

Note

In the preceding figure, ON indicates that the motor rotation DO signal is active. OFF indicates that the motor rotation DO signal is inactive.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H06.16	2006-11h	Threshold of TGON (motor rotation) signal	0 rpm to 1000 rpm	20	rpm	Real-time	"H06_en.16" on page 268

To use the TGon signal, assign a DO with FunOUT.2 (TGon, motor rotation) and set the active logic of this DO.

☆ Related parameters:

Code	Name	Function Name	Description
FunOUT.2	TGon	Motor rotation	Inactive: The absolute value of filtered motor speed is lower than the setpoint of H06.16. Active: The absolute value of filtered motor speed reaches the setpoint of H06.16.

Speed matching DO signal

A delay of 10 rpm is present in the speed matching signal.

When the absolute value of the difference between the motor speed after filter and the speed reference satisfies the setting of H06.17, the actual motor speed is considered to reach the speed reference. At this moment, the servo drive outputs the speed matching signal (FunOUT.4: V-CMP). When the absolute value of the difference between the motor speed after filter and the speed reference exceeds the setting of H06.17, the speed matching signal is inactive.

If the drive is not in the operational state or the speed control mode, the speed matching signal (FunOUT.4: V-Cmp) is always inactive.

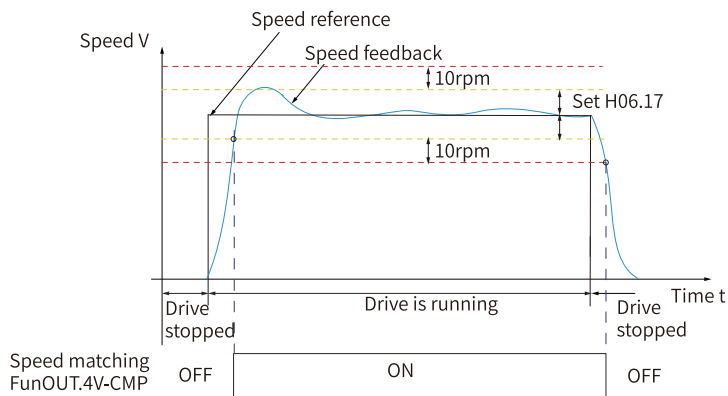


Figure 2-55 Waveform of speed matching (V-Cmp) signal

Note

In the preceding figure, "ON" indicates the the V-Cmp (speed matching) signal is active. "OFF" indicates the V-Cmp signal is inactive.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H06.17	2006-12h	Threshold of V-Cmp (speed matching) signal	0 RPM –100 RPM	10	rpm	Real-time	"H06_en.17" on page 268

To use the V-Cmp (speed matching) signal, assign FunOUT.4 (V-Cmp, speed matching) to a certain DO and set the active logic of this DO.

☆ Related parameters:

Code	Name	Function Name	Description
FunOUT.4	V-Cmp	Speed matching	Inactive: The absolute difference between the filtered actual motor speed and the speed reference is higher than the value of H06.17. Active: The absolute difference between the filtered actual motor speed and the speed reference is lower than or equal to the value of H06.17.

Speed reach DO signal

A delay of 10 rpm is present in the speed reach signal. When the absolute value of the motor speed after filter exceeds $H06.18 + 10 \text{ rpm}$, the motor speed is considered to reach the desired value. At this moment, the servo drive outputs the speed arrival signal (FunOUT.19: V-Arr). On the contrary, when the absolute value of filtered motor speed is lower than $H06.18 - 10 \text{ rpm}$, the speed reach signal is inactive.

Acknowledgment of the speed reach (FunOUT.19: V-Arr) signal is not affected by the operating state or control mode of the drive.

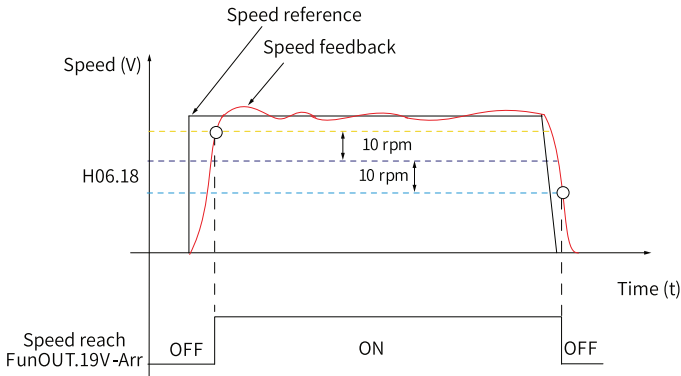


Figure 2-56 Waveform of the speed reach (V-Arr) signal

Note

In the preceding figure, "ON" indicates the V-Arr (speed reached) signal is active. "OFF" indicates the V-Arr (speed reached) signal is inactive.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H06.18	2006-13h	Threshold of speed reach signal	20 rpm to 10000 rpm	1000	rpm	Real-time	"H06_en.18" on page 269

To use the V-Arr signal, assign FunOUT.19 (V-Arr, speed reach) to a DO and set the active logic of this DO.

☆ Related parameters:

Code	Name	Function Name	Description
FunOUT.19	V-Arr	Speed reach	Inactive: The absolute value of filtered motor speed feedback exceeds H06.18. Active: The absolute value of filtered motor speed feedback is lower than or equal to the value of H06.18.

Zero speed DO signal

A delay of 10 rpm is present in the zero speed signal. The drive outputs zero speed (FunOUT.3: V-Zero) signal only when the absolute value of actual motor speed is lower than the threshold defined by H06.19. On the contrary, when the absolute value of actual motor speed is higher than $H06.19 + 10 \text{ rpm}$, the motor is in the rotational state and the V-Zero (zero speed) signal is inactive.

Acknowledgment of the zero speed (FunOUT.3: V-Zero) signal is not affected by the operating state and control mode of the drive.

The interference in the speed feedback can be filtered by the speed feedback DO filter. You can set the corresponding filter time constant in H0A.27.

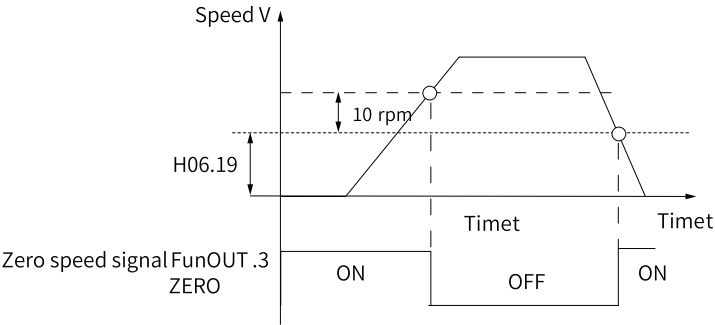


Figure 2-57 Waveform of the zero speed (V-Zero) signal

Note

In the preceding figure, "ON" indicates the V-Zero (zero speed) signal is active. "OFF" indicates the V-Zero (zero speed) signal is inactive.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H06.19	2006-14h	Threshold of zero speed output signal	1 rpm to 10000 rpm	10	rpm	Real-time	"H06_en.19" on page 269

To use the zero speed (V-Zero) signal, assign FunOUT.3 (V-Zero, zero speed) to a DO and set the active logic of this DO.

☆ Related parameters:

Code	Name	Function Name	Description
FunOUT.3	V-Zero	Zero speed signal	Inactive: The difference between motor speed feedback and the reference value is higher than the setpoint of H06.19. Active: The difference between motor speed feedback and the reference value is lower than or equal to the value of H06.19.

2.4 Torque Control Mode

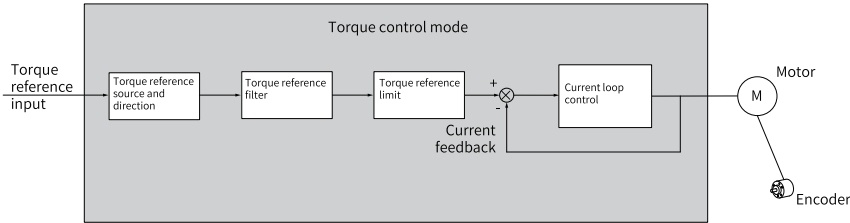


Figure 2-58 Block diagram of torque control mode

Set H02.00 (Control mode selection) to 2 (Torque control mode) through the Inovance software tool to make the drive operate in the torque control mode. Set the drive parameters based on the mechanical structure and technical indicators. The following describes basic parameter settings in the torque control mode.

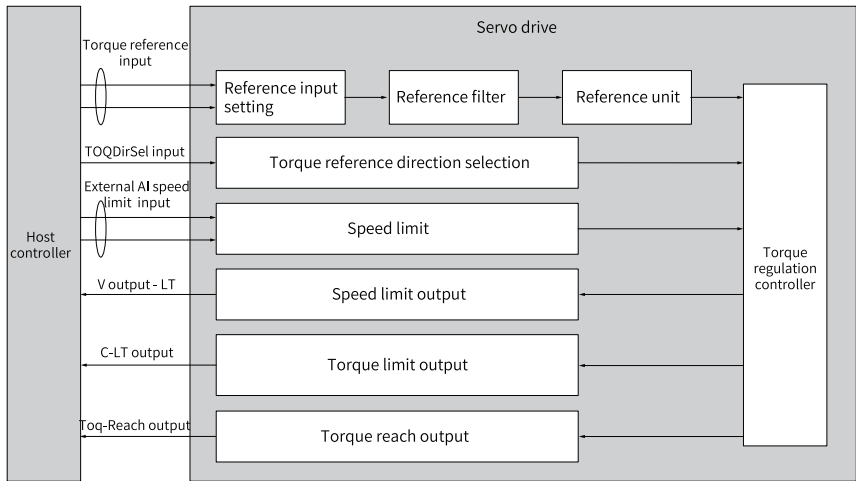


Figure 2-59 Signal exchange between the drive and the host controller

2.4.1 Function Block Diagram

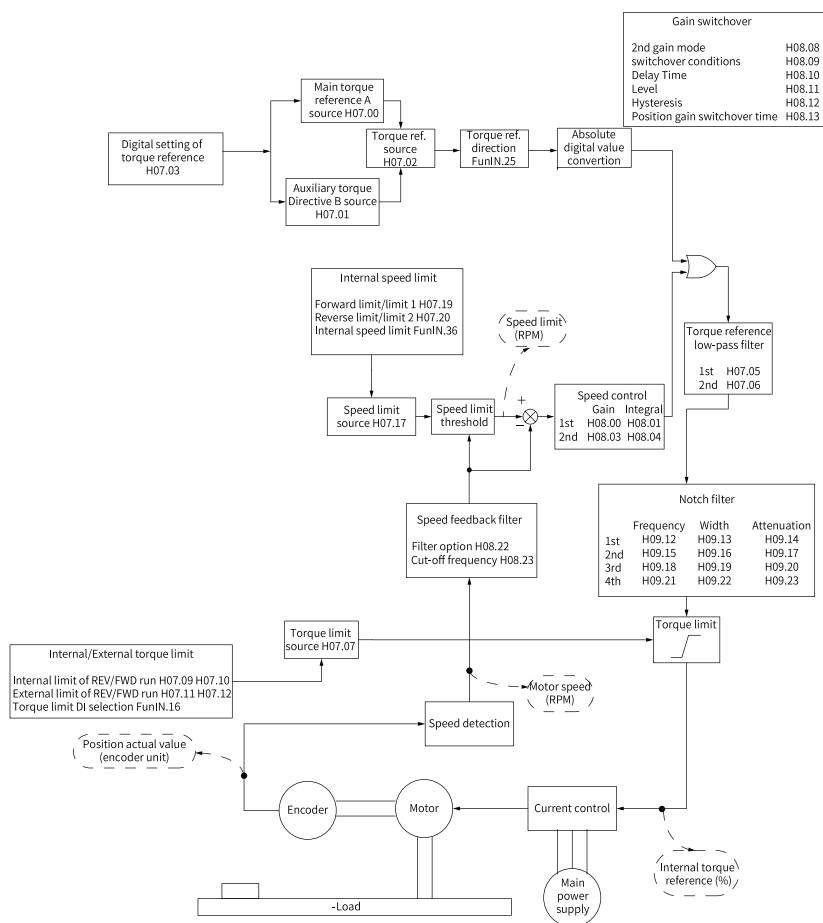


Figure 2-60 Block diagram of torque control

2.4.2 Torque Reference

Torque reference source

Five torque reference sources are available in the torque control mode, which can be set in H07.02.

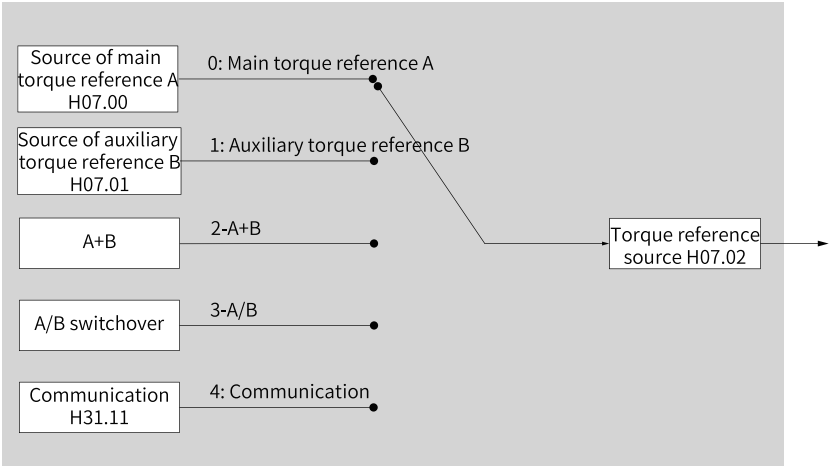


Figure 2-61 Torque reference sources

☆ Related parameters:

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
H07.02	2007-03h	Torque reference source	0: Source of main torque reference A 1: Source of auxiliary torque reference B 2: Source of A+B 3: Switched between A and B 4: Communication	0	-	At stop	"H07_en.02" on page 282

● **Source of main torque reference A**

The main speed reference A is an internal speed reference that can be set through digital setting.

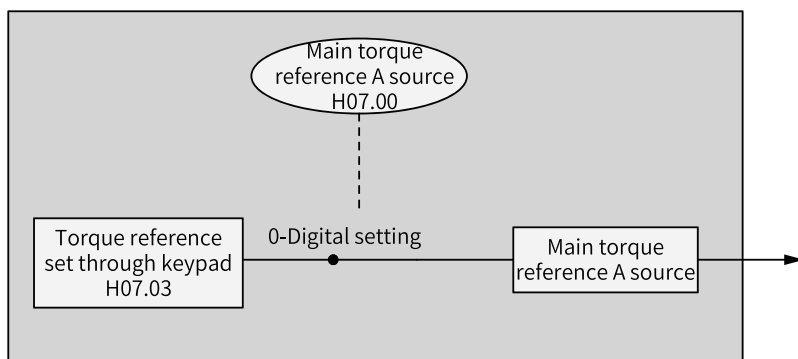


Figure 2-62 Description of source of main torque reference A

☆ Related parameters:

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
H07.00	2007-01h	Source of main torque reference A	0: Keypad (H07.03)	0	-	At stop	"H07_en.00" on page 281

Digital setting

In digital setting, the torque reference is set in H07.03, which defines the percentage of the torque reference to the rated torque of the motor.

☆ Related parameters:

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
H07.03	2007-04h	Torque reference set through keypad	-400.0% to 400.0%	0.0	%	Real-time	"H07_en.03" on page 282

- **Source of auxiliary torque reference B**

The source of auxiliary torque reference B is set in the same way as the main torque reference A. For the descriptions of related parameters, see Chapter "List of Parameters".

- **Switched between A and B**

When setting H07.02 (Torque reference source) to 3 (Switched between A and B), you need to assign FunIN.4 (DI-SEL) to the corresponding DI. The input signal of this DI determines which source (A or B) is active.

☆ Related parameters:

Code	Name	Function Name	Description
FunIN.4	CMD-SEL	Reference switchover	OFF: Active reference being A ON: Active reference being B

- **Communication**

When H07.02 (Torque reference source) is set to 4 (Communication), the torque reference is the value of H31.11. H31.11 is not displayed on the keypad, it can be set through communication only.

☆ Related parameters:

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
H31.11	2031-0Ch	Torque reference set via communication	-100.000% to 100.000%	0.000	%	Real-time	"H31_en.11" on page 463

Torque reference direction

To switch the torque reference direction through DI, assign FunIN.25 (TorDirSel, torque reference direction) to the corresponding DI. The input signal of this DI determines the torque reference direction.

☆ Related parameters:

Code	Name	Function Name	Description
FunIN.25	ToqDirSel	Torque reference direction	Inactive: The actual torque reference direction is the same as the set direction. Active: The actual torque reference direction is opposite to the set direction.

The actual direction of rotation is related to the setting of H02.02 (Direction of rotation), the sign (+/-) of the torque reference value, and the logic of FunIN.25.

Table 2–19 Actual direction of rotation in the torque control mode

H02.02	Sign (+/-) of the Torque Reference Value	FunIN.25	Direction of Rotation
0	+	Inactive	CCW
0	+	Active	CW
0	-	Inactive	CW
0	-	Active	CCW
1	+	Inactive	CW
1	+	Active	CCW
1	-	Inactive	CCW
1	-	Active	CW

2.4.3 Torque Reference Filter



Caution

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

The servo drive smoothenes torque references through the low-pass filter to reduce vibration in all the control modes.

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

The servo drive switches to low-pass filter 2 when gain switchover is enabled ($H08.08 = 1$ and $H08.09 \neq 0$) and the condition defined by $H08.09$ is met.

☆ Related parameters:

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
H07.05	2007-06h	Torque reference filter time constant 1	0.00 ms–30.00 ms	0.50	ms	Real-time	"H07_en.05" on page 283
H07.06	2007-07h	Torque reference filter time constant 2	0.00 ms–30.00 ms	0.27	ms	Real-time	"H07_en.06" on page 283

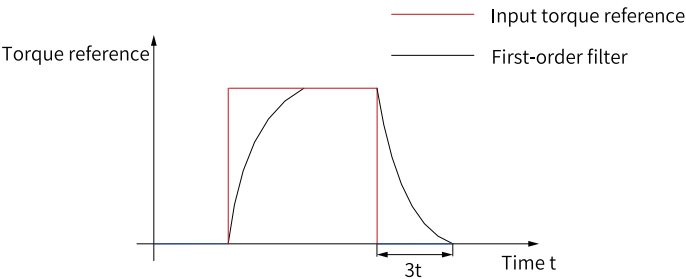


Figure 2-63 First-order filter for rectangular torque references

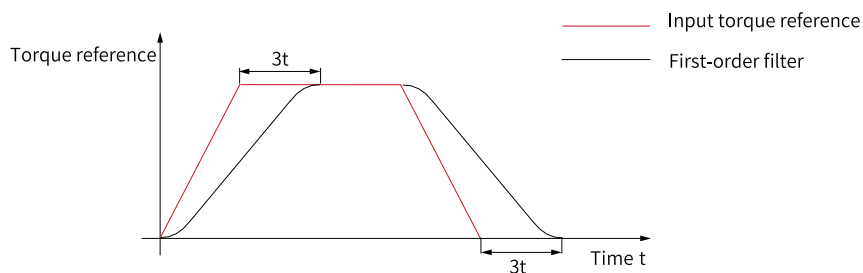


Figure 2-64 First-order filter for trapezoid torque references

2.4.4 Torque Reference Limit



Caution

Torque reference limit is needed and active in all the control modes.

The torque reference limit is used to protect the servo drive and the motor.

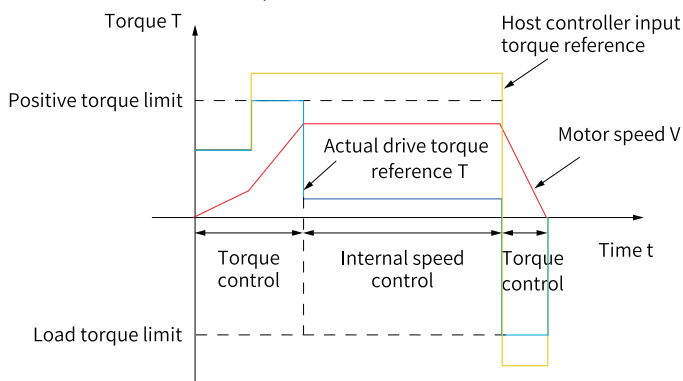


Figure 2-65 Torque reference and torque limit

When the absolute value of the torque reference input from the host controller or output by the speed regulator is higher than the absolute value of the torque reference limit, the actual torque reference of the drive is limited to the torque reference limit. Otherwise, the torque reference input from the host controller or output by the speed regulator is used.

Only one torque reference limit is valid at a moment. The positive/negative torque limit must be lower than or equal to the maximum torques of the drive and the motor.

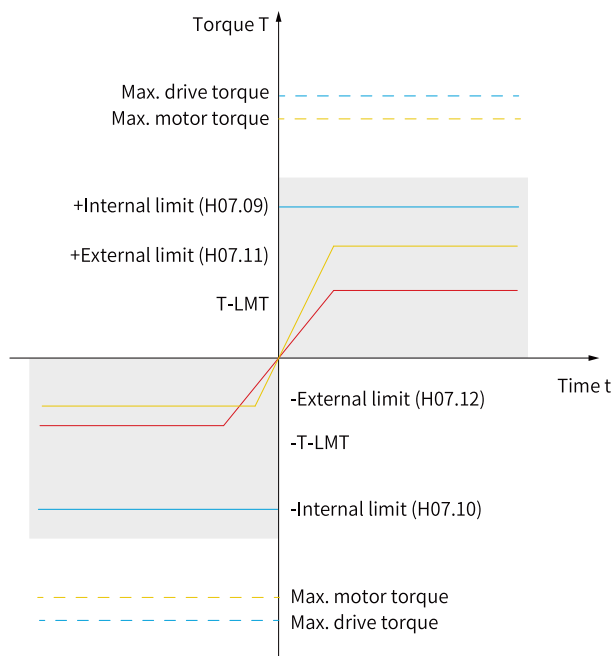


Figure 2-66 Example of torque limit

Torque limit source

You can set the torque limit source in H07.07.

After the torque limit is set, the torque limit applies when the torque reference exceeds the limit. The torque limit must be set according to the load conditions. An excessively low limit may weaken the acceleration/deceleration ability of the motor, causing the actual motor speed to fall below the required value during operating at a constant torque.

☆ Related parameters:

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
H07.07	2007-08h	Torque Limit source	0: Positive/Negative internal torque limit 1: Internal or external limit as selected by DI	0	-	Real-time	"H07_en.07" on page 283

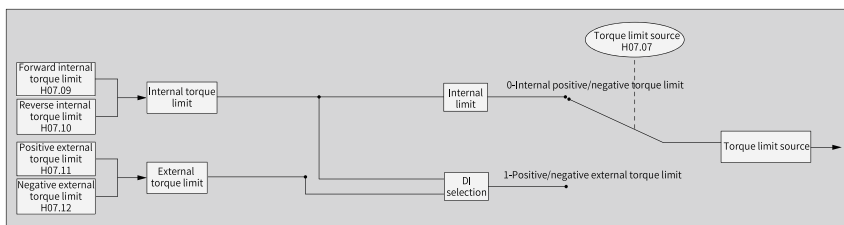


Figure 2-67 Torque Limit source

The following figures show examples in which absolute values of torque references input from the host controller exceed the absolute value of the torque limit in the torque control mode.

- H07.07 = 0 (Positive/Negative internal torque limit)
The torque reference limit is determined only by H07.09 and H07.10.

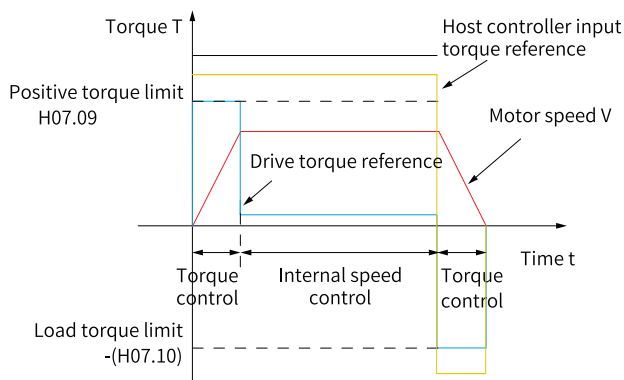


Figure 2-68 Torque limit curve (H07.07 = 0)

- H07.07 = 1 (internal or external limit as defined by DI)
The torque reference limit is determined by the logic of the external DI signal. The positive torque limit is selected between H07.09 (Positive internal torque limit) and H07.11 (Positive external torque limit). The negative torque limit is selected between H07.10 (Negative internal torque limit) and H07.12 (Negative external torque limit).

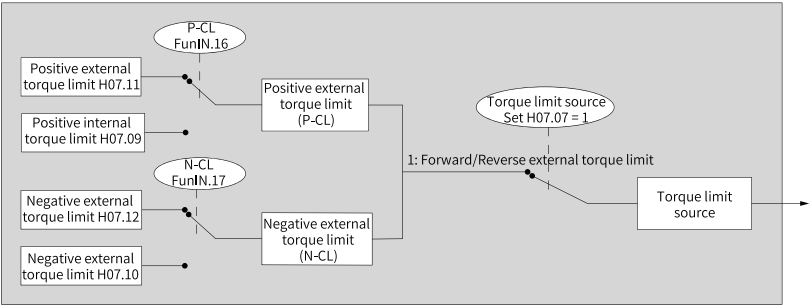


Figure 2-69 Torque limit source (H07.07 = 1)

Table 2-20 Description of H07.07 = 1

DI state		P-CL	
		OFF	ON
N-CL	OFF		
	ON		

Assign FunIN.16 (P-CL: Positive external torque limit) and FunIN.17 (N-CL: Negative external torque limit) to two DI of the drive and set the active logic of these DIs.

☆ Related parameters:

Code	Name	Function Name	Description
FunIN.16	P-CL	Positive external torque limit	The torque limit source is switched based on H07.07 (Torque limit source). H07.07 = 1: Active: Positive external torque limit activated Inactive: Positive internal torque limit activated
FunIN.17	N-CL	Negative external torque limit	The torque limit source is switched based on H07.07 (Torque limit source). H07.07 = 1: Active: Negative external torque limit activated Inactive: Negative internal torque limit activated

☆ Related parameters:

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
H07.09	2007-0Ah	Positive internal torque limit	0.0% to 400.0%	350.0	%	Real-time	"H07_en.09" on page 283
H07.10	2007-0Bh	Negative internal torque limit	0.0% to 400.0%	350.0	%	Real-time	"H07_en.10" on page 284
H07.11	2007-0Ch	Positive external torque limit	0.0% to 400.0%	350.0	%	Real-time	"H07_en.11" on page 284
H07.12	2007-0Dh	Negative external torque limit	0.0% to 400.0%	350.0	%	Real-time	"H07_en.12" on page 284

Setting torque limit DO signal

The drive outputs the C-LT (FunOUT.7: torque limit) signal to the host controller when the torque reference reaches the limit. In this case, assign FunOUT.7 to a DO of the drive and set the active logic of this DO.

☆ Related parameters:

Code	Name	Function Name	Description
FunOUT.7	C-LT	Torque limit signal	Active: The torque reference value reaches the torque limit and is limited by the torque limit. Inactive: The torque reference does not reach the torque limit.

2.4.5 Speed Limit in Torque Control Mode

In the torque control mode, the motor accelerates continuously if the torque reference is higher than the load torque on the machine side, which may lead to overspeed and damage the machine. A speed limit therefore must be set to protect the machine.

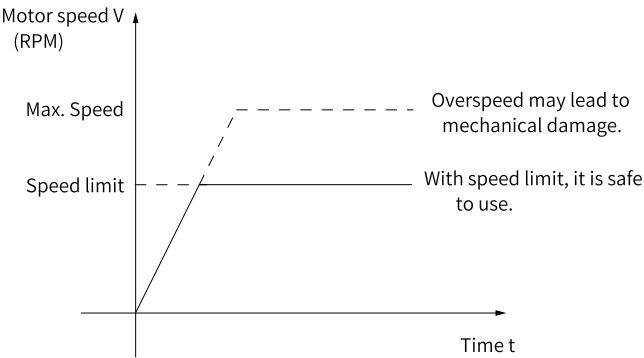


Figure 2-70 Speed limit in the torque control mode

Setting the speed limit source

In the torque control mode, you can set the speed limit source in H07.17. After the speed limit is set, the actual motor speed will be limited. After reaching the speed limit, the motor keeps operating at the speed limit constantly. Set the speed limit based on the operating requirements of the load.

☆ Related parameters:

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
H07.17	2007-12h	Speed limit source	0: Internal speed limit 1: V-LMT 2: H07.19 or H07.20 as defined by DI	0	-	Real-time	"H07_en.17" on page 285

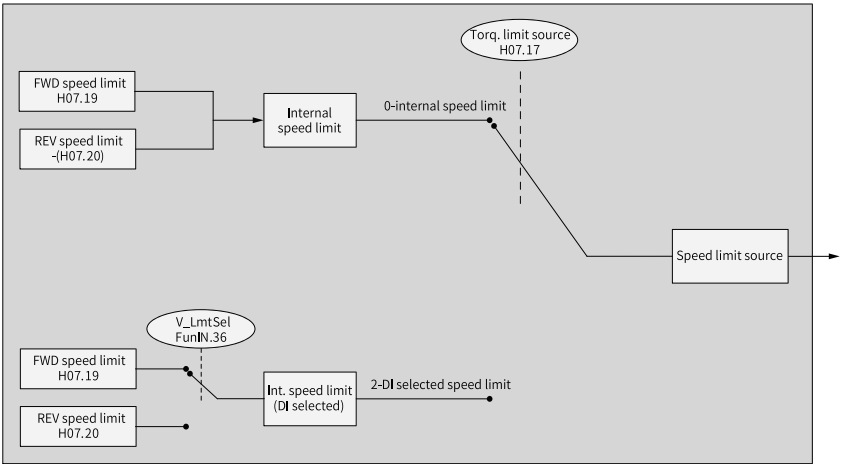


Figure 2-71 Speed limit source

- H07.17 = 0 (Internal speed limit)
The speed limit is determined only by H07.19 (Positive speed limit) and H07.20 (Negative speed limit).

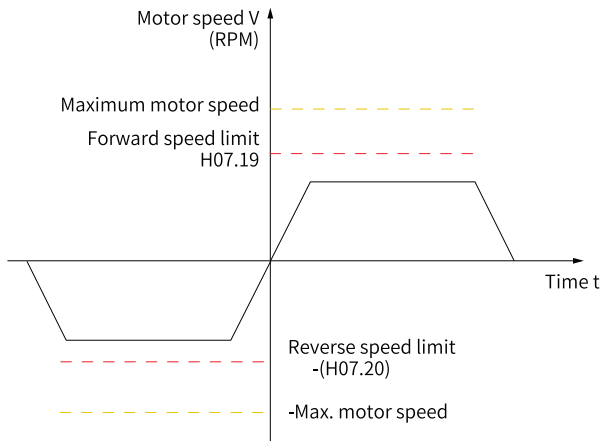


Figure 2-72 Speed limit curve (H07.17 = 0)

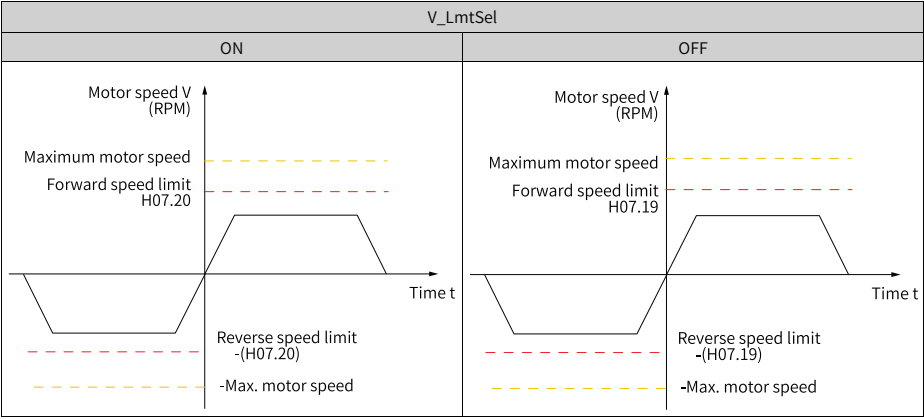
- H07.17 = 2 (H07.19 or H07.20 used as speed limit as defined by DI)
H07.19 or H07.20 is used as the speed limit based on the logic of the DI.

Before setting H107.17 to 2, assign FunIN.36 (V-LmtSel: internal speed limit source) to a DI first, and then set the active logic of this DI.

☆ Related parameters:

Code	Name	Function Name	Description
FunIN.36	V_LmtSel	Internal speed limit source	Inactive: H07.19 used as positive/negative internal speed limit Active: H07.20 used as positive/negative internal speed limit

Table 2–21 Descriptions of speed limit



☆ Related parameters:

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
H07.19	2007-14h	Positive speed limit/ Speed limit 1 in torque control	0 rpm to 10000 rpm	3000	rpm	Real-time	"H07_en.19" on page 285
H07.20	2007-15h	Negative speed limit/ Speed limit 2 in torque control	0 rpm to 10000 rpm	3000	rpm	Real-time	"H07_en.20" on page 285

Speed limit DO signal

In the torque control mode, the servo drive outputs the V- LT (FunOUT.8: speed limit) signal to the host controller when the absolute value of the motor speed keeps exceeding the speed limit in the period defined by H07.40. If either of the preceding two conditions is not satisfied, the speed limit signal will be deactivated.

Acknowledgment of the V-LT (Speed limit) signal is executed only during operation in the torque control mode.

To use the V-LT signal, assign FunOUT.8 to a DO of the drive and set DO active logic of this DO.

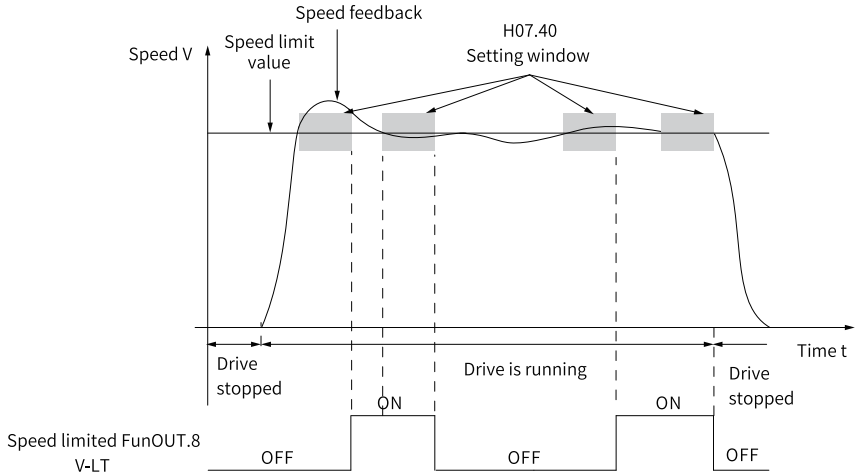


Figure 2-73 Example of speed limit DO waveform

☆ Related parameters:

Code	Name	Function Name	Description
FunOUT.8	V-LT	Speed limit	Inactive: The motor speed does not reach the speed limit. Active: The motor speed reaches the speed limit and a speed loop is built based on this limit.

2.4.6 Torque Reach Output

The torque reach output is used to determine whether the actual torque reference reaches the set range. The drive outputs TorReach (FunOUT.18: torque reach) signal to the host controller when the actual torque reference reaches the torque reference threshold.

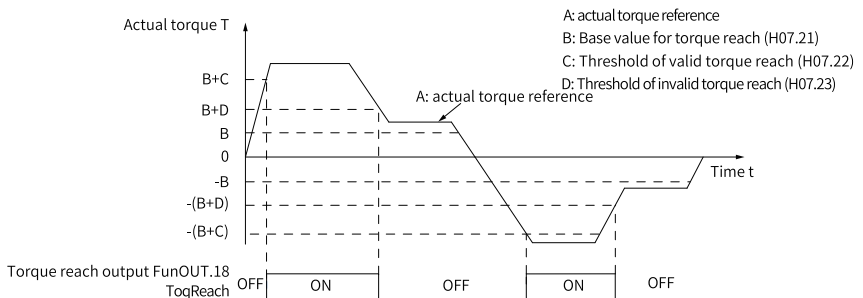


Figure 2-74 Example of TorReach signal waveform

- Actual torque reference (viewed in H0b.02): A
- Base value for torque reach (H07.21): B.

- Threshold of valid torque reach H07.22: C
- Threshold of invalid torque reach (H07.23): D.

C and D are the offset based on B.

The torque reach DO signal can be activated only when the actual torque reference meets the following condition: $|A| \geq B + C$. Otherwise, the torque reach DO signal remains inactive.

The torque reach signal is deactivated only when the actual torque reference meets the following condition: $|A| < B + D$. Otherwise, the torque reach signal remains active.

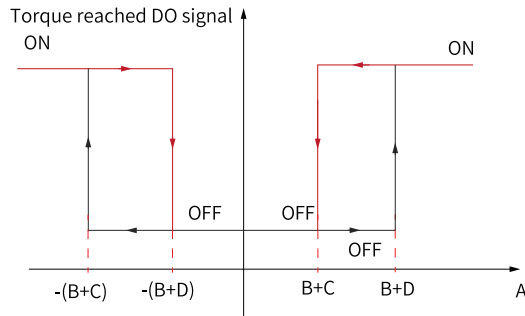


Figure 2-75 Description of torque reach output

☆ Related parameters:

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
H07.21	2007-16h	Torque reach base value	0.0% to 400.0%	0.0	%	Real-time	"H07_en.21" on page 286
H07.22	2007-17h	Torque reach valid value	0.0% to 400.0%	20.0	%	Real-time	"H07_en.22" on page 286
H07.23	2007-18h	Torque reach invalid value	0.0% to 400.0%	10.0	%	Real-time	"H07_en.23" on page 286

To use the TorReach (Torque reach) signal, assign FunOUT.18 (ToqReach, torque reach) to a DO of the drive and set the active logic of this DO.

☆ Related parameters:

Code	Name	Function Name	Description
FunOUT.18	ToqReach	Torque reach	Active: The absolute value of the torque reference reaches the setpoint. Inactive: The absolute value of the torque reference is lower than the setpoint.

2.5 Process Segment Mode

Set H02.00 (Control mode) to 7 (Position control mode) through the Inovance software tool to make the drive operate in the process segment mode. The process segment mode is a multi-function position mode integrated with homing, constant speed control, and positioning control.

16 process segments are available, in which process segment 0 is undefined and process segments 1 to 15 are defined by users. The interval time and linkage mode among process segments can also be selected as needed. The setting flowchart is as follows.

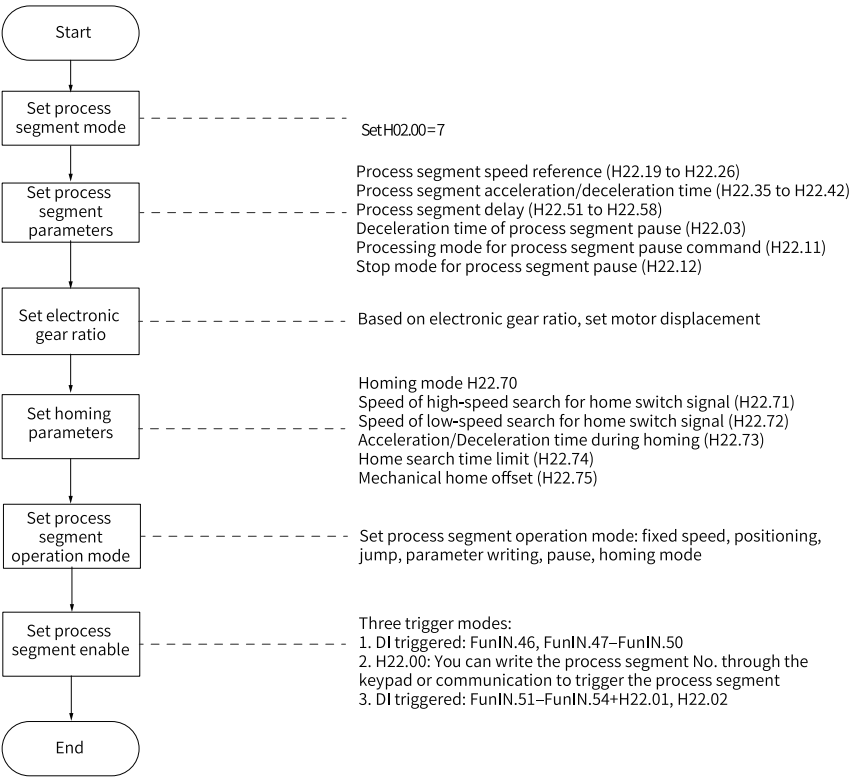


Figure 2-76 Flowchart for setting process segment mode

2.5.1 Mode Triggering

The following table shows how to trigger the process segment mode.

Triggered By	Triggered From	Description
DI triggering	DI: FunIN.46 (ProceSon) + FunIN.47...50 (ProceCmd1...4)	Combine FunIN.47–FunIN.50 to form the process segment number to be triggered. Trigger the process segment through the rising edge of FunIN.46.
Parameter	H22.00	Write the process segment number to H22.00 through communication to trigger the process segment. For details, see " H22_en.00 " on page 438.
DI + parameter triggering	DI: FunIN.51–54 (ProceEvTri1–4) + H22.01/H22.02	Set the process segment number to be triggered through H22.01 and H22.02. H22.01: DI: Triggered by the rising edge of FunIN.51...FunIN.54 H22.02: DI: Triggered by the falling edge of FunIN.51...FunIN.54
Homing	FunIN.46 + FunIN.47...FunIN.50 (combined segment number being 0)	When the process segment is triggered by the rising edge of FunIN.46, the motor executes homing based on the set homing mode and home speed.
Halt	DI: FunIN.55 (ProceStop)	Trigger the process segment through the rising edge of FunIN.55.
	H22.00 = 1000	When H22.00 is set to 1000, the process segment in progress is stopped immediately and the motor ramps to stop based on the deceleration time defined by H22.03. The motor remains enabled after stop.

When a DI is used to trigger the process segment, assign the DI of the servo drive with corresponding function and set the active logic of this DI.

Note

ProceSon, ProceStop, and ProceEvTri1 to ProceEvTri4 signals are edge-triggered. When DI is used, the effective signal width of the DI must be at least 0.125 ms.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H22.00	2022-01h	Process segment command trigger	0–1000	0	-	Real-time	" H22_en.00 " on page 438
H22.01	2022-02h	Process segment triggered by the event rising edge	0–65535	0	-	Real-time	" H22_en.01 " on page 439

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H22.02	2022-03h	Process segment triggered by the event falling edge	0–65535	0	-	Real-time	"H22_en.02" on page 439
H22.03	2022-04h	Acceleration/Deceleration time upon technology segment pause	0: Acceleration/Deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4 5: Acceleration/Deceleration time 5 6: Acceleration/Deceleration time 6 7: Acceleration/Deceleration time 7	0	-	Real-time	"H22_en.03" on page 440

Table 2–22 Description of function No.

Code	Name	Function Name	Function
FunIN.46	ProceSon	Technology segment enable	The process segment can be enabled only when the rising edge of the ProceSon signal is active. Otherwise, the process segment function is ineffective.
FunIN.47	ProceCmd1	Technology segment command switchover 1	The segment number is a 4-bit binary. The relationship between the segment number and ProceCmd1–ProceCmd4 is shown in "Table 2–23" on page 112 . The DI logic is level-triggered. The ProceCmd value is 1 upon active level input or 0 upon inactive level input.
FunIN.48	ProceCmd2	Technology segment command switchover 2	
FunIN.49	ProceCmd3	Technology segment command switchover 3	
FunIN.50	ProceCmd4	Technology segment command switchover 4	
FunIN.51	ProceEvTri1	Event trigger technology segment 1	The DI assigned with event trigger process segment is used together with H22.01 and H22.02. See "H22_en.01" on page 439 "H22_en.02" on page 439 for details.
FunIN.52	ProceEvTri2	Event trigger technology segment 2	
FunIN.53	ProceEvTri3	Event trigger technology segment 3	
FunIN.54	ProceEvTri4	Event trigger technology segment 4	

Code	Name	Function Name	Function
FunIN.55	ProceStop	Process segment suspend	When the rising edge of the ProceStop signal is active, the process segment in progress stops immediately and the motor ramps to stop based on the deceleration time defined by H22.03. The motor remains enabled after stop.

Table 2-23 Relationship between the segment number and CMD1 to CMD4

ProceCmd4	ProceCmd3	ProceCmd2	ProceCmd1	Segment No.
0	0	0	0	0
0	0	0	1	1
...				
1	1	1	1	15

2.5.2 Related Parameters

The speed setpoint (SpdSet) and acceleration/deceleration time (AccTime/DecTime) for each segment in the process segment, and the interval time (DelayTime) upon completion of each process segment are set by three groups of parameters respectively, with each parameter group containing eight parameters.

During operation, you can select one parameters from these three parameter groups respectively to generate the process segment.

- 1. Speed setpoint (SpdSet) (0.1 rpm to 6000.0 rpm)
Corresponding to H22.19 to H22.26 (unit: 0.1 rpm).
- 2. Acceleration/Deceleration time (AccTime/DecTime) (0 ms to 65535 ms)
Corresponding to H22.35 to H22.42.

The acceleration/deceleration time indicates the time for a motor to change from 0 rpm to 1000 rpm. The actual acceleration/deceleration time is therefore as follows:

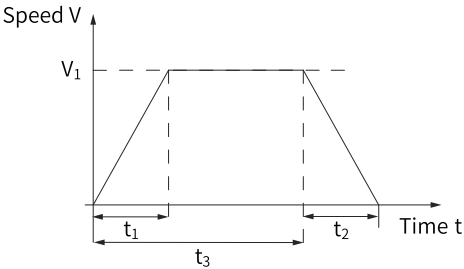


Figure 2-77 Example of the curve in fixed speed mode

As shown in the preceding figure, the speed reference is V_1 and the actual acceleration time t_1 is as follows:

$$t_1 = \frac{V_1}{1000} \times \text{Acceleration time set for this speed}$$

The actual deceleration time t_2 is:

$$t_2 = \frac{V_1}{1000} \times \text{Deceleration time set for this speed}$$

3. Interval time after completion of process segment (DelayTime) (0 ms to 65535 ms)

Corresponding to H22.51 to H22.58.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H22.19	2022-14h	Target speed	0.1 rpm to 6000.0 rpm	50.0	rpm	Real-time	"H22_en.19" on page 443
H22.20	2022-15h	Target speed 1	0.1 rpm to 6000.0 rpm	200.0	rpm	Real-time	"H22_en.20" on page 443
H22.21	2022-16h	Target speed 2	0.1 rpm to 6000.0 rpm	500.0	rpm	Real-time	"H22_en.21" on page 443
H22.22	2022-17h	Target speed 3	0.1 rpm to 6000.0 rpm	1000.0	rpm	Real-time	"H22_en.22" on page 444
H22.23	2022-18h	Target speed 4	0.1 rpm to 6000.0 rpm	1500.0	rpm	Real-time	"H22_en.23" on page 444
H22.24	2022-19h	Target speed 5	0.1 rpm to 6000.0 rpm	2000.0	rpm	Real-time	"H22_en.24" on page 444
H22.25	2022-1Ah	Target speed 6	0.1 rpm to 6000.0 rpm	2500.0	rpm	Real-time	"H22_en.25" on page 444
H22.26	2022-1Bh	Target speed 7	0.1 rpm to 6000.0 rpm	3000.0	rpm	Real-time	"H22_en.26" on page 445
H22.35	2022-24h	Accel/Decel time	0 ms–65535 ms	50	ms	Real-time	"H22_en.35" on page 445
H22.36	2022-25h	Acceleration/Deceleration time 1	0 ms–65535 ms	200	ms	Real-time	"H22_en.36" on page 445
H22.37	2022-26h	Acceleration/Deceleration time 2	0 ms–65535 ms	500	ms	Real-time	"H22_en.37" on page 446
H22.38	2022-27h	Acceleration/Deceleration time 3	0 ms–65535 ms	1000	ms	Real-time	"H22_en.38" on page 446

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H22.39	2022-28h	Acceleration/ Deceleration time 4	0 ms–65535 ms	1500	ms	Real-time	"H22_en.39" on page 446
H22.40	2022-29h	Acceleration/ Deceleration time 5	0 ms–65535 ms	2000	ms	Real-time	"H22_en.40" on page 446
H22.41	2022-2Ah	Acceleration/ Deceleration time 6	0 ms–65535 ms	2500	ms	Real-time	"H22_en.41" on page 447
H22.42	2022-2Bh	Acceleration/ Deceleration time 7	0 ms–65535 ms	3000	ms	Real-time	"H22_en.42" on page 447
H22.51	2022-34h	Delay after completion of the process segment	0 ms–65535 ms	0	ms	Real-time	"H22_en.51" on page 447
H22.52	2022-35h	Delay time 1 after completion of the process segment	0 ms–65535 ms	50	ms	Real-time	"H22_en.52" on page 448
H22.53	2022-36h	Delay time 2 after completion of the process segment	0 ms–65535 ms	200	ms	Real-time	"H22_en.53" on page 448
H22.54	2022-37h	Delay time 3 after completion of the process segment	0 ms–65535 ms	500	ms	Real-time	"H22_en.54" on page 448
H22.55	2022-38h	Delay time 4 after completion of the process segment	0 ms–65535 ms	1000	ms	Real-time	"H22_en.55" on page 448

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H22.56	2022-39h	Delay time 5 after completion of the process segment	0 ms–65535 ms	1500	ms	Real-time	"H22_en.56" on page 449
H22.57	2022-3Ah	Delay time 6 after completion of the process segment	0 ms–65535 ms	2000	ms	Real-time	"H22_en.57" on page 449
H22.58	2022-3Bh	Delay time 7 after completion of the process segment	0 ms–65535 ms	3000	ms	Real-time	"H22_en.58" on page 449

2.5.3 Operation Mode

The process segment mode supports the homing mode, constant speed mode, and positioning mode. Six operation modes are available, which are homing mode, constant speed mode, positioning mode, jump mode, parameter-write mode, and halt mode.

Process segment 0 is undefined, process segment 1000 is in pause mode, and process segments 1 to 15 can select any of the six modes mentioned above.

Each group of process segments is comprised of two parts, process segment definition and process segment data. The process segment parameters are H23.00...H23.62 (16 groups in total), with each parameter group containing two 32-bit parameters.

Definition of process segment				
bit	Description	Value		
3–0	Mode	bit3 to bit0	Process segment mode	Description of Process Segment
		0001	Constant speed mode	-
		0010	Positioning mode	Stopped after positioning is done
		0011	Positioning mode	Executing the next segment after positioning is done
		0111	Jump mode	Jumping to the designated process segment
		1000	Parameter-write mode	Writing specific parameters
		1010	ZRN	Homing
7–4	-	-		
11–8	-	-		
15–12	-	-		
19–16	-	-		
23–20	-	-		
27–24	-	-		
31–28	-	-		

Process segment data	
bit	Value
31–0	-

Note

- Do not change the mode of the current process segment during process segment operation. Failure to comply may result in an unexpected error.
- If segment 15 is the program block loaded automatically to the last, the first segment applies after segment 15 is done executing.

Homing mode

When process segment 10 is triggered, the homing function is triggered. See ["2.2.8 Homing" on page 54](#) for details.

In the process segment mode, the software homing function cannot be enabled.

See the following table for definitions of the homing mode.

Definition of process segment		
bit	Description	Value
3–0	Mode	10
7–4	-	-
8–11	-	-
12–15	-	-
16–19	-	-
20–23	DelayTime	0 to 8: Time interval index after process segment is done executing "H22_en.51" on page 447 "H22_en.52" on page 448 "H22_en.53" on page 448 "H22_en.54" on page 448 "H22_en.55" on page 448 "H22_en.56" on page 449 "H22_en.57" on page 449 "H22_en.58" on page 449.
24–27	-	-
28–31	-	-

Process segment data		
bit	Value	
31–0	PathNum ^[1]	0: The motor stops after homing is done
		1 to 15: After homing is done, the PathNum segment is executed automatically after the DelayTime elapses.

Note

[1]: If PathNum exceeds the process segment range, E126.0 will be reported.

Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H22.70	2022-47h	Homing mode	-32768–32767	-2	-	Real-time	"H22_en.70" on page 449
H22.71	2022-48h	Speed of high-speed search for home switch signal	0 RPM to 3000 RPM	100	rpm	Real-time	"H22_en.71" on page 450
H22.72	2022-49h	Speed of low-speed search for home switch signal	0 rpm to 1000 rpm	10	rpm	Real-time	"H22_en.72" on page 450
H22.73	2022-4Ah	Acceleration/Deceleration time during homing	0 ms–1000 ms	1000	ms	Real-time	"H22_en.73" on page 450

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H22.74	2022-4Bh	Home search time limit	0 ms–65535 ms	10000	ms	Real-time	"H22_en.74" on page 451
H22.75	2022-4Ch	Mechanical home offset	-2147483648 to 2147483647	0	Reference unit	Real-time	"H22_en.75" on page 451
H22.79	2022-50h	Relative/Absolute homing	0–65535	0	-	Real-time	"H22_en.79" on page 451

☆ Related parameters:

Code	Name	Function Name	Function
FunOut.16	HomeAttain	Home find	Active: Homing completed in the process segment mode Inactive: Homing not completed

Constant speed mode

Mode 1 is the constant speed mode. When the constant speed mode is in progress, the motor operates to the set speed based on the set acceleration/deceleration time, and then keeps operating at the set speed.

Definition of process segment				
bit	Description	Value		
3–0	Mode	1		
7–4	Func	bit	Description	Description
		4	Updated immediately (ImmedUpd)	The present segment overrides the previous segment, which means the previous segment will be interrupted so as to execute present segment. See "Special mode" on page 124 Special Modes for details.
		5	Loading next segment (Auto)	The next process segment applies after the constant speed is reached and the DelayTime elapses.
		6	Unit	0: 0.1 rpm 1: PPS (pulses/s) (reference unit)
		7	-	-
11–8	AccTime	Index of the acceleration/deceleration time		
15–12	DecTime	Index "H22_en.35" on page 445 "H22_en.36" on page 445 "H22_en.37" on page 446 "H22_en.38" on page 446 "H22_en.39" on page 446 "H22_en.40" on page 446 "H22_en.41" on page 447 "H22_en.42" on page 447 .		
19–16	...	-		

Definition of process segment		
bit	Description	Value
23–20	DelayTime	Index of the interval time after the process segment is done executing Index "H22_en.51" on page 447 "H22_en.52" on page 448 "H22_en.53" on page 448 "H22_en.54" on page 448 "H22_en.55" on page 448 "H22_en.56" on page 449 "H22_en.57" on page 449 "H22_en.58" on page 449.
27–24	-	-
31–28	-	-

Process segment data	
bit	Value
31–0	Target speed (accurate to 0.1 rpm).

Where:

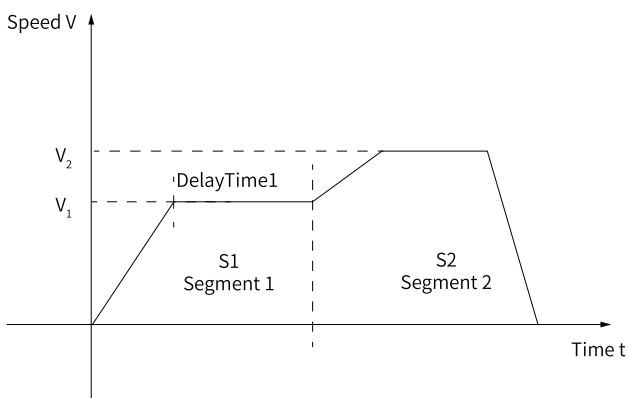


Figure 2-78 Time-Speed curve

Segment 1: Constant speed mode; DelayTime1: Time interval set for the constant speed mode; V_1 : Speed set for the constant speed mode

Segment 2: Positioning mode; V_2 : Speed set for the positioning mode

S1 represents displacement 1 and S2 represents displacement 2.

Positioning mode

Modes 2 and 3 indicate positioning mode. In mode 2, the servo drive stops after positioning is done. In mode 3, the next segment will be executed after positioning is done.

When positioning mode is in progress, the motor accelerates or decelerates at present speed to the set speed based on the set acceleration/deceleration time. After operating at constant speed for a period of time, the motor decelerates to 0 rpm based on the set deceleration time. Finally, the motor stops at the position set by the positioning mode.

Definition of process segment				
bit	Description	Value		
3–0	Mode	Positioning mode 2: Stopped after positioning is done Position mode 3: Executing the next segment after positioning is done		
7–4	Func			
		bit	Description	Description
		4	Updated immediately (ImmedUpd)	The present segment overrides the previous segment, which means the previous segment will be interrupted so as to execute present segment. See " Special mode " on page 124 Special Modes for details.
		5	Overlap (OverLap)	The present segment can overlap with the next segment. During overlapping, the interval time of present segment is set to 0 forcibly. See " Special mode " on page 124 Special Modes for details.
		6 7	Position reference type (CmdType)	Bit6 and bit7 set to 00: Absolute positioning command (Final position = Target position) bit6 and bit7 set to 10: Incremental positioning command (Final position = Previous final position + Target position)
11–8	AccTime	Index of the acceleration/deceleration time		
15–12	DecTime	Index " H22_en.35 " on page 445 " H22_en.36 " on page 445 " H22_en.37 " on page 446 " H22_en.38 " on page 446 " H22_en.39 " on page 446 " H22_en.40 " on page 446 " H22_en.41 " on page 447 " H22_en.42 " on page 447.		
19–16	SpdSet	Index of the speed setpoint Index " H22_en.19 " on page 443 " H22_en.20 " on page 443 " H22_en.21 " on page 443 " H22_en.22 " on page 444 " H22_en.23 " on page 444 " H22_en.24 " on page 444 " H22_en.25 " on page 444 " H22_en.26 " on page 445 (accurate to 0.1 rpm).		
23–20	DelayTime	Index of the interval time after the process segment is done executing Index " H22_en.51 " on page 447 " H22_en.52 " on page 448 " H22_en.53 " on page 448 " H22_en.54 " on page 448 " H22_en.55 " on page 448 " H22_en.56 " on page 449 " H22_en.57 " on page 449 " H22_en.58 " on page 449.		
27–24	-	-		
31–28	-	-		

Process segment data	
bit	Value
31–0	Target position (32-bit) (reference unit)

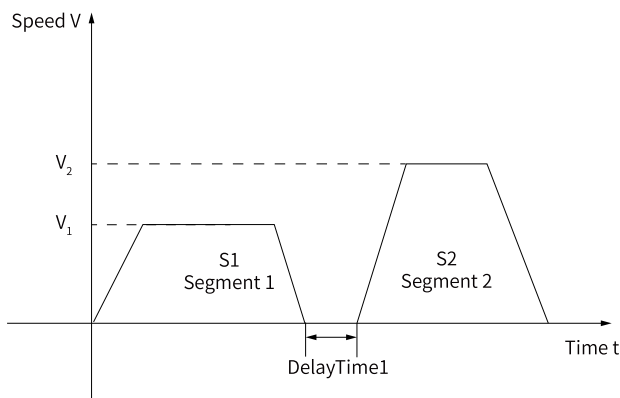


Figure 2-79 Time-Speed curve

Segment 1: positioning mode; Mode = 3; OverLap = 0; Delaytime1: interval time set for the positioning mode; V_1 : speed set for the positioning mode.

Segment 2: positioning mode; Mode = 2; ImmedUpd = 0; V_2 : speed set for the positioning mode.

S1 represents displacement 1 and S2 represents displacement 2.

Note

If the positioning mode is triggered during fixed speed motion, the incremental reference will fail. You can use the absolute position reference or trigger interrupt positioning during fixed speed motion (incremental positioning with high accuracy).

Jump mode

Mode 7 represents the jump mode. When the jump mode is in progress, the servo drive can jump to any process segment. When the target process segment exceeds the process segment range, E126.0 occurs.

Definition of process segment				
bit	Description	Value		
3–0	Mode	7		
7–4	Func	bit	Description	Description
		4	Updated immediately (ImmedUpd)	The present segment overrides the previous segment, which means the previous segment will be interrupted so as to execute present segment. See " <i>Special mode</i> " on page 124 <i>Special Modes</i> for details.
		5	-	-
		6	-	-
		7	-	-
11–8	-	-		
15–12	-	-		
19–16	-	-		
23–20	DelayTime	Index of the interval time after the process segment is done executing Index " <i>H22_en.51</i> " on page 447 " <i>H22_en.52</i> " on page 448 " <i>H22_en.53</i> " on page 448 " <i>H22_en.54</i> " on page 448 " <i>H22_en.55</i> " on page 448 " <i>H22_en.56</i> " on page 449 " <i>H22_en.57</i> " on page 449 " <i>H22_en.58</i> " on page 449.		
27–24	-	-		
31–28	-	-		

Process segment data	
bit	Value
31–0	Process segment number

Parameter-write mode

Mode 8 represents the parameter-write mode. When parameter-write mode is in progress, you can re-write new parameters to the designated parameters and the new parameter can be saved to e2prom as needed.

Definition of process segment				
bit	Description	Value		
3–0	Mode	8		
7–4	Func	bit	Description	Description
		4	Updated immediately (ImmedUpd)	The present segment overrides the previous segment, which means the previous segment will be interrupted so as to execute present segment. See " Special mode " on page 124 Special Modes for details.
		5	Loading next segment (Auto)	The next process segment applies after the DelayTime elapses.
		6	Save (Save)	0: Parameters not saved to e2prom 1: Parameters saved to e2prom
		7	-	-
11–8	Index (H_Idx)	Parameter number		
15–12				
19–16	Group number (H_Grp)	Group		
23–20				
27–24	DelayTime	Index of the interval time after the process segment is done executing Index " H22_en.51 " on page 447 " H22_en.52 " on page 448 " H22_en.53 " on page 448 " H22_en.54 " on page 448 " H22_en.55 " on page 448 " H22_en.56 " on page 449 " H22_en.57 " on page 449 " H22_en.58 " on page 449.		
31–28	-	-		

Process segment data	
bit	Value
31–0	Designated parameter data (32-bit)

Halt mode

During operation of the process segment (positioning mode, constant speed mode, or homing mode), if 1000 is written to H22.00 or FunIN.55 (ProceStop) is triggered, the motor interrupts present operation mode immediately and stops in the mode defined by H22.12.

If the mode is ramp to stop, the motor stops according to the deceleration time defined by H22.03. If it is stop at zero speed^[1], the motor stop quickly.

After stop, the motor will be standstill and enabling is performed continuously to trigger the process segment again, and the motor will run normally.

Note

When the process segment runs in the position control mode, zero speed stop means the position reference changes to 0 directly. The speed reference may be delayed due to loop regulation.

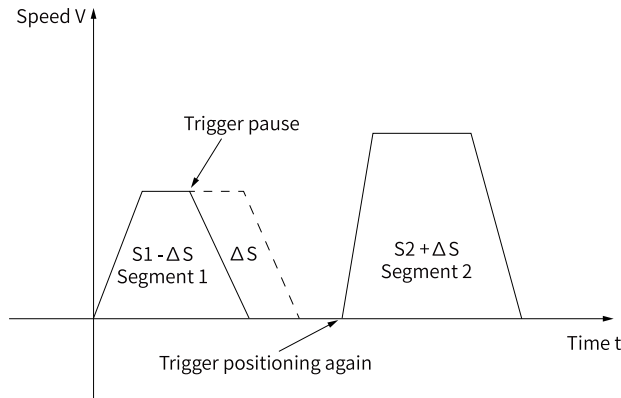


Figure 2-80 Time-Speed curve

Segment 1: positioning mode (The motor ramps to stop when pause is triggered during operation.)

Segment 2: Positioning mode

S1 represents the set displacement 1. S2 represents the set displacement 2. ΔS represents the remaining displacement after stop at specified position.

You can set whether to abort the remaining commands after the pause is set through H22.11. If it is set to abort the commands, then ΔS will not be executed.

Related parameters	Value range	Description
H22.11	0–1	Processing mode for process segment pause command 0: Do not abort the command 1: Abort the command
H22.12	0–1	Stop mode for process segment pause 0: Ramp to stop 1: Stop at zero speed

Special mode

ImmedUpd and OverLap functions are special functions which serve to generate complex process segment paths once triggered.

- **Overlap (OverLap)**

When the overlap function is in progress, the present process segment can overlap with the next process segment. During overlapping, the interval time of present segment is set to 0 forcibly. The overlap function can be used in positioning control only.

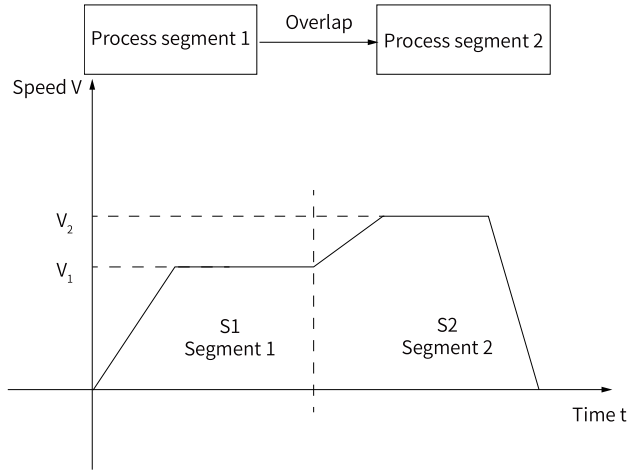


Figure 2-81 Time-Speed curve

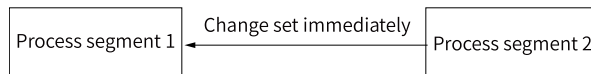
Segment 1: positioning mode; Mode = 3; OverLap = 1; V_1 : speed set for the positioning mode

Segment 2: positioning mode; ImmedUpd = 0; V_2 : speed set for the positioning mode;

S1 represents the displacement for segment 1 and S2 represents the displacement for segment 2.

- **Updated immediately (ImmedUpd)**

When the ImmedUpd mode is in progress, the present segment overrides the previous segment, which means the previous segment will be interrupted so as to execute present segment. The ImmedUpd mode can be used in positioning control and constant speed control.



The ImmedUpd mode can be further divided into internal ImmedUpd mode and external ImmedUpd mode.

- Internal ImmedUpd mode

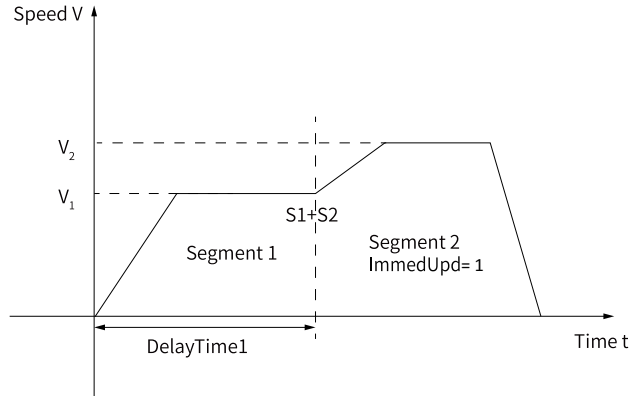


Figure 2-82 Time-Speed curve

Segment 1: positioning mode; Mode = 3; Delaytime1: interval time set for the positioning mode; V_1 : speed set for the positioning mode

Segment 2: ImmedUpd = 1, V_2 : speed set for segment 2

If segment 2 is positioning mode, S1 is the displacement for segment 1, and S2 is the displacement for segment 2, then the final positioning position is the sum of S1 and S2.

■ External ImmedUpd mode

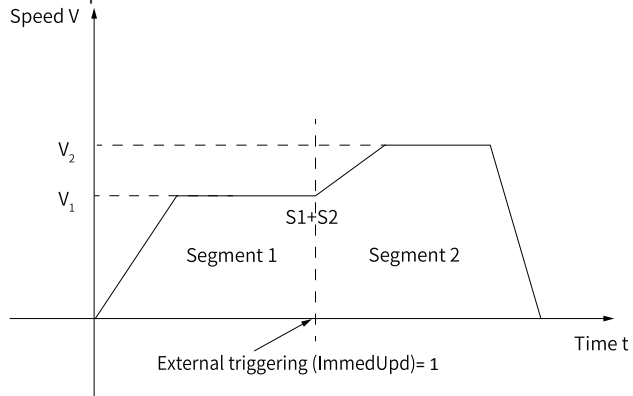


Figure 2-83 Time-Speed curve

Segment 1: positioning mode; V_1 : speed set for the positioning mode

Segment 2: ImmedUpd = 1, V_2 : speed set for segment 2

If segment 2 is positioning mode, S1 is the displacement for segment 1, and S2 is the displacement for segment 2, then the final positioning position is the sum of S1 and S2.

Note

- The ImmedUpd function has higher priority over the overlap function, which means when the overlap function is set for process segment 1 and the ImmedUpd function is set for process segment 2, the ImmedUpd function will be executed immediately when process segments 1 and 2 are in progress.
 - The external ImmedUpd function has higher priority over the internal ImmedUpd function.
-

2.5.4 DO and Sequence

FunOUT.22 (CmdOK, internal command completed) can be used to check whether the process segment command is done transmitting. FunOUT.5 (COIN, positioning completed) can be used to check whether positioning is done. FunOUT.24 (McOk, motion control completed) can be used to check whether motion control is done.

The sequence for process segment is shown as follows (taking positioning mode and H05.20 = 0 as example):

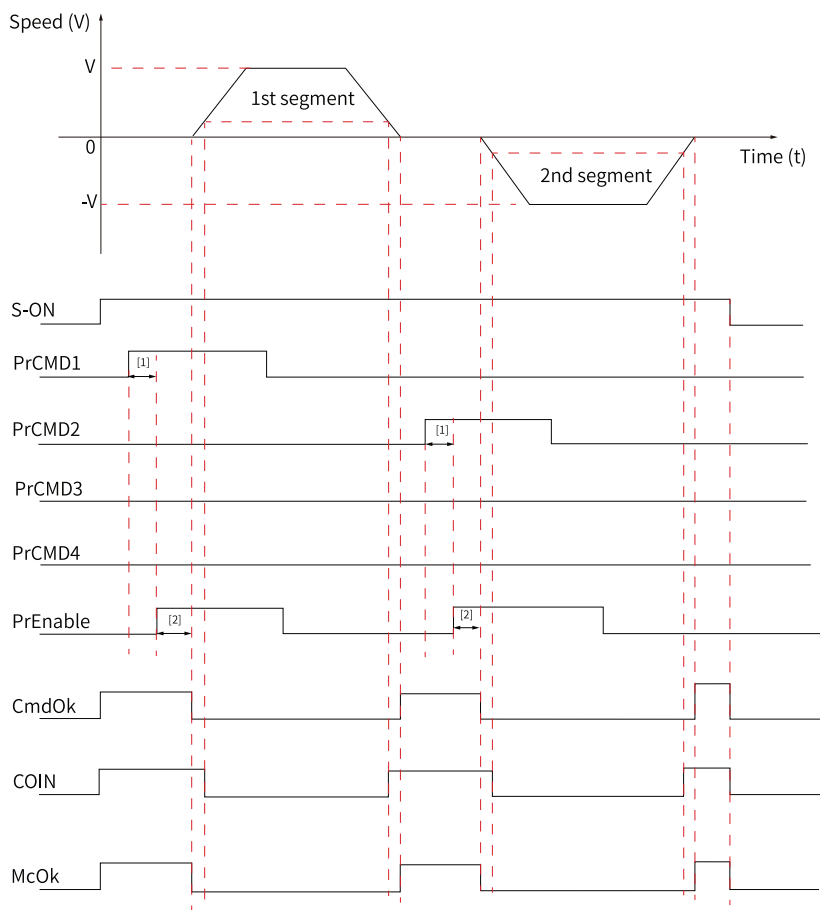


Figure 2-84 Sequence of process segment

Note

- [1] When DI is used, the effective signal width of the DI must be at least 0.125 ms.
- [2] The PrEnable signal is edge-triggered. The effective signal width of the DI must be at least 0.125 ms.

2.6 Servo State

Abide by the process stipulated in the CiA402 protocol when operating the SVD60C servo drive. Otherwise, the servo drive cannot run in the designated status.

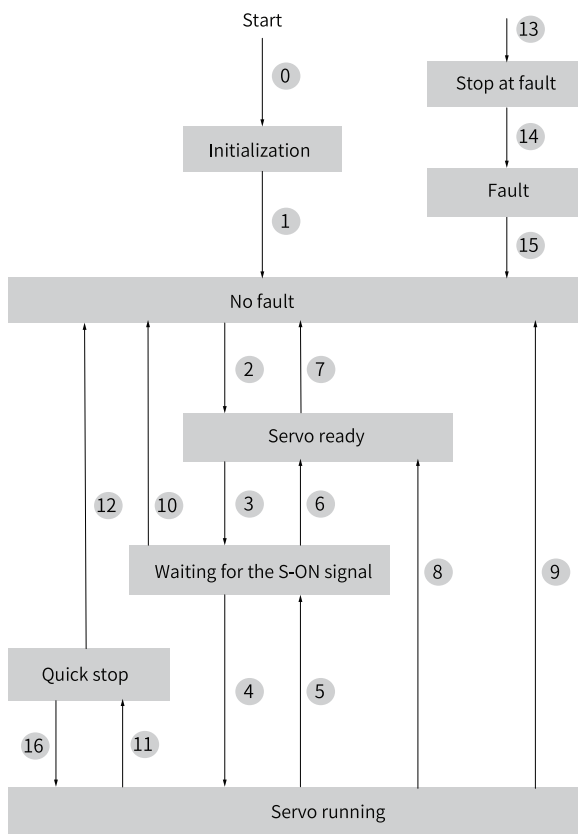


Figure 2-85 Switchover of CiA402 state machine

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.
Ready to switch on	The servo drive is ready to run. Parameters can be set.
Wait for the S-ON signal	The servo drive is waiting for the S-ON signal. Parameters can be set.

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

The following table describes the control commands and status switchover.

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

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

Note

[1]: bit10 to bit15 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.

2.6.1 Control Word 6040h

6040h Control word

Address: -

Min.: 0

Max.: 65535

Unit: -

Data Type: Uint16

Default: -

Change: Running setting

Access: RW

Mapping: At once

Value Range:

0–65535

Description:

Defines the control command.

bit	Name		Description
0	Switch on	Switch on	1: Active, 0: Inactive
1	Enable voltage	Enable voltage	1: Active, 0: Inactive
2	Quick stop	Quick stop	0: Active, 1: Inactive
3	Drive operation	Enable operation	1: Active, 0: Inactive
4–6	Operation mode specific	Operation mode specific	Related to the operation mode of the servo drive.
7	Fault reset	Fault reset	0: Inactive 0→1: Fault reset is available only for faults and alarms that can be reset. 1: Other control commands are ineffective 1→0: Inactive
8	Halt	Halt	1: Active, 0: Inactive
9	Operation mode specific	Operation mode specific	Related to the servo drive operation mode.
10	Reserved	Reverse	Undefined
11–15	Manufacturer-specific	Manufacturer-specific	Manufacturer-specific

Note

- All bits in the control word constitute a control command.
 - The meanings of bit0...bit3 and bit7 are the same in each mode. The servo drive switches to the preset status according to the CiA402 state machine switchover process only when commands are sent in sequence. Each command corresponds to a certain status.
 - bit4–bit6 are related to each mode (see the control commands in different modes for details).
 - bit9 is not defined.
-

2.6.2 Status Word 6041h

6041h Status word

Address: -

Min.: -

Max.: -

Default: -

Access: RO

Unit: -

Data Type: Uint16

Change: -

Mapping: TPDO

Value Range:

-

Description:

Indicates the servo drive status.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
ms	oms	ila	tr	rm	ms	w	sod	qs	ve	f	oe	so	rtso		
MSB														LSB	

Note: ms=manufacturer-specific; oms=operation mode-specific; ila=internal limit active; tr=target reach; rm=remote; w=warning; sod=switch on disabled; qs=quick stop; ve=voltage enabled; f=fault; oe=operation enabled; so=switch on; rtso=ready to switch on

Table 2–24 Description of each bit of 6041h

bit	Name		Description
0	Ready to switch on	Ready to switch on	1: Active, 0: Inactive
1	Switch on	Switch on	1: Active, 0: Inactive
2	Operation enabled	Operation enabled	1: Active, 0: Inactive
3	Fault	Fault	1: Active, 0: Inactive
4	Voltage enabled	Voltage enabled	1: Active, 0: Inactive
5	Quick stop	Quick stop	0: Active, 1: Inactive
6	Switch on disabled	Switch on disabled	1: Active, 0: Inactive
7	Alarm	Alarm	1: Active, 0: Inactive
8	Manufacturer-specific	Manufacturer-specific	Undefined
9	Remote	Remote	1: Active, control word effective 0: Inactive
10	Target reach	Target reach	1: Active, 0: Inactive
11	Internal limit active	Internal limit active	1: Active, 0: Inactive
12–13	Operation mode specific	Operation mode specific	Related to the servo drive operation mode.
14	Manufacturer-specific	Manufacturer-specific	Undefined
15	Home find	Home find	1: Active, 0: Inactive

Table 2-25 Descriptions of setpoints of 6041h

Binary Value	Description
xxxx xxxx x0xx 0000	Not ready to switch on
xxxx xxxx x1xx 0000	Switch on disabled
xxxx xxxx x01x 0001	Ready to switch on
xxxx xxxx x01x 0011	Switched on
xxxx xxxx x01x 0111	Operation enabled
xxxx xxxx x00x 0111	Quick stop active
xxxx xxxx x0xx 1111	Fault reaction active
xxxx xxxx x0xx 1000	Fault

Note

- The meanings of bit0 to bit9 are the same in each mode of the servo drive. After commands in 6040h are sent in sequence, the servo drive returns a feedback on the servo state.
- The meanings of bit12 to bit13 vary with the servo drive modes. For details, see parameters related to each mode.
- The meanings of bit10, bit11, and bit15 are the same in each servo mode. These three bits indicate the servo status after a certain servo mode is executed.

2.7 Servo mode

Introduction to the operation modes

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

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
6060h	6060h	Servo drive mode	1: Profile position mode (pp) 3: Profile velocity mode (pv) 4: Profile torque mode (pt) 6: Homing mode (hm) 7: Interpolation mode (ip)	0	-	Real-time	"6060h" on page 489
6061h	6061h	Operation mode display	1: Profile position mode (pp) 3: Profile velocity mode (pv) 4: Profile torque mode (pt) 6: Homing mode (hm) 7: Interpolation mode (ip)	0	-	Unchangeable	"6061h" on page 490

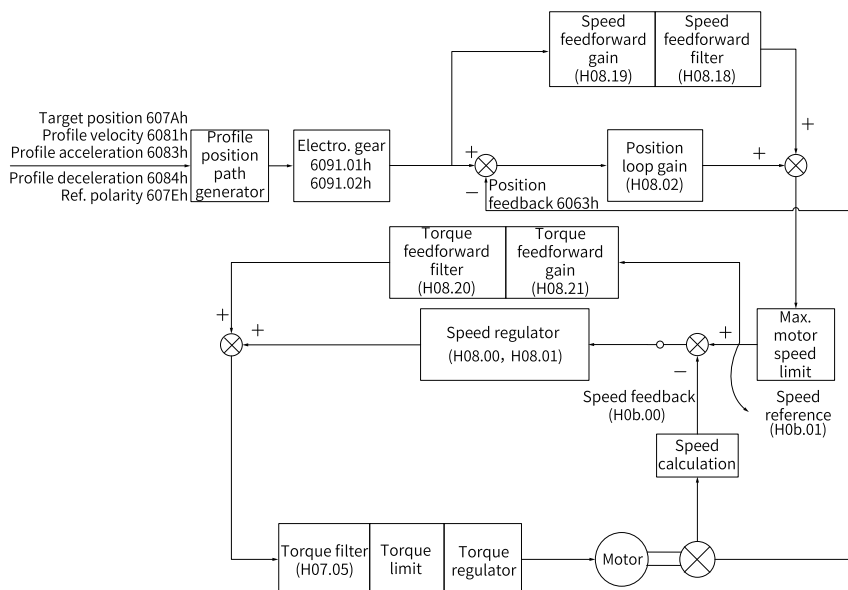
Communication cycle supported by each mode

The drive supports 1ms or an integer multiple of 1 ms. The maximum synchronization period is 20 ms.

2.8 Profile position (PP)

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.

2.8.1 Function Block Diagram



2.8.2 Configuration Block Diagram

Profile position mode (6060h = 1)

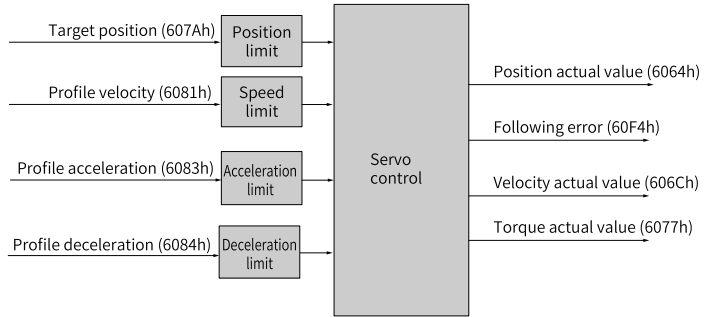


Figure 2-86 PP mode

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

The controller sets the New Set-Point bit (bit4 of the control word) to 1 to inform the servo drive of the new target position. The servo drive, after receiving the new target position, sets the Set-Point Acknowledge bit (bit12 of the status word) to 1. After the controller sets the New set-point to 0, if the servo drive can receive the new target position, the Set-Point Acknowledge bit will be set to 0. Otherwise, it is kept to 1.

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

Sequential mode:

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

In the sequential mode, the sequence of bit4 (New Set-Point) of the control word and bit12 (Set-Point Acknowledge) of the status word is as follows.

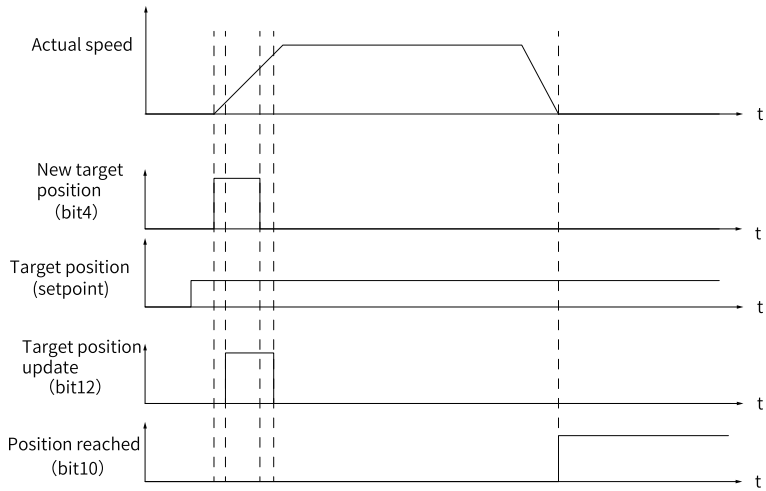
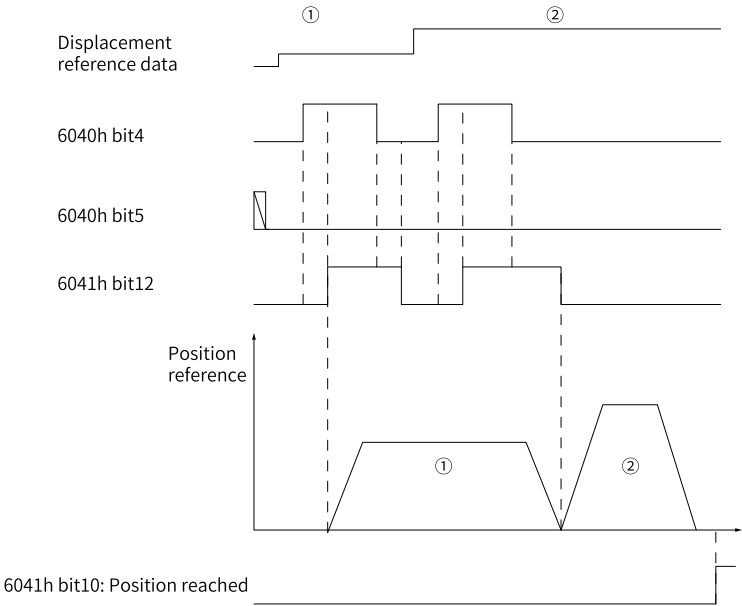


Figure 2-87 Sequence in sequential mode

Single-point mode:

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

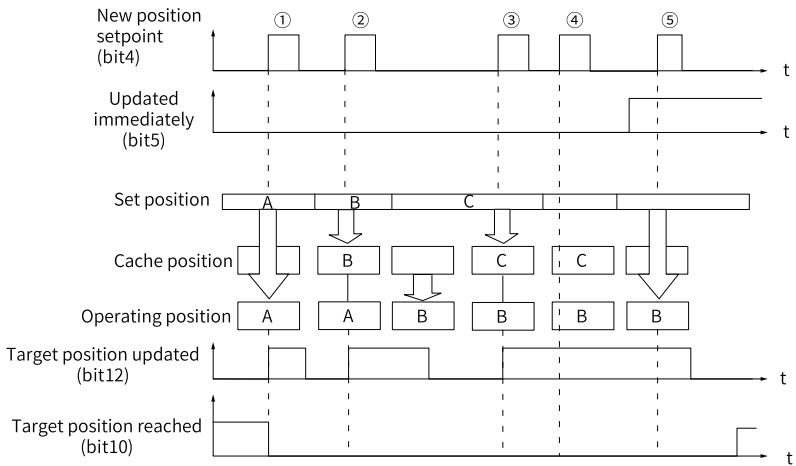
The sequence of bit4 (New Set-Point) of the control word and bit12 (Set-Point Acknowledge) of the status word is as follows.



Note: If you need to change any parameter of the displacement reference, send the trigger signal again.

Figure 2-88 Sequence in the single-point mode

In the single-point mode, the 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 setpoint to 1 to activate the setpoint.

2.8.3 Recommended Configuration

The basic configuration for the 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

2.8.4 Related Parameters

6040h Control word

Address: -

Min.: 0

Max.: 65535

Default: -

Unit: -

Data Type: Uint16

Change: Running setting

At once

Mapping: RPDO

Access: RW

Value Range:

-

Description:

Defines the control command.

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

bit	Name		Description
5	Change set immediately	Change set immediately	0: Not immediately 1: Immediately
6	abs/rel	abs/rel	0: abs 1: rel
7	Halt	Halt	0: Keep running 1: Halt

6041h Status word

Address: -

Min.: -

Max.: -

Default: -

Access: RO

Unit: -

Data Type: Uint16

Change: -

Mapping: TPDO

Setpoint:

-

Description:

Indicates the servo drive status.

bit	Name		Description
0	Ready to switch on	Ready to switch on	1: Active, 0: Inactive
1	Switch on	Switch on	1: Active, 0: Inactive
2	Operation enabled	Enable operation	1: Active, 0: Inactive
3	Fault	Fault	1: Active, 0: Inactive
4	Voltage enabled	Voltage enabled	1: Active, 0: Inactive
5	Quick stop	Quick stop	0: Active, 1: Inactive
6	Switch on disabled	Switch on disabled	1: Active, 0: Inactive
7	Alarm	Alarm	1: Active, 0: Inactive
8	Manufacturer-specific	Manufacturer specific	Undefined
9	Remote	Remote	1: Active, control word effective 0: Inactive
10	Target reach	Target reach	0: The target position is not reached. 1: The target position is reached.
11	Internal limit active	Internal limit active	0: Position reference within the limit 1: Position reference beyond the limit
12	Set-point acknowledge	Set-point acknowledge	0: Acknowledged 1: Not acknowledged

bit	Name		Description
13	Following error	Following error	0: No error 1: Excessive deviation
14	Manufacturer-specific	Manufacturer specific	Undefined
15	Home find	Home find	0: Homing completed 1: Homing done

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
6060h	6060h	Servo drive mode	1: Profile position mode (pp) 3: Profile velocity mode (pv) 4: Profile torque mode (pt) 6: Homing mode (hm) 7: Interpolation mode (ip)	0	-	Real-time	"6060h" on page 489
6064h	6064h	Position actual value	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"6064h" on page 491
607Ah	607Ah	Target position	-2147483648 to 2147483647	0	Reference unit	Real-time	"607Ah" on page 496
6081h	6081h	Profile velocity	0 to 4294967295	13981013	Reference unit/s	Real-time	"6081h" on page 499
6083h	6083h	Profile acceleration	0 to 4294967295	139810133 3	Reference unit/s ²	Real-time	"6083h" on page 499
6084h	6084h	Profile deceleration	0 to 4294967295	139810133 3	Reference unit/s ²	Real-time	"6084h" on page 500

2.8.5 Related Functions

Positioning completed

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

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
6067h	6067h	Position window	0 to 4294967295	5872	Reference unit	Real-time	"6067h" on page 492
6068h	6068h	Position window time	0 ms–65535 ms	0	ms	Real-time	"6068h" on page 492

Note

6067h only reflects the threshold of absolute position deviation when positioning is done. It is not related to the positioning accuracy.

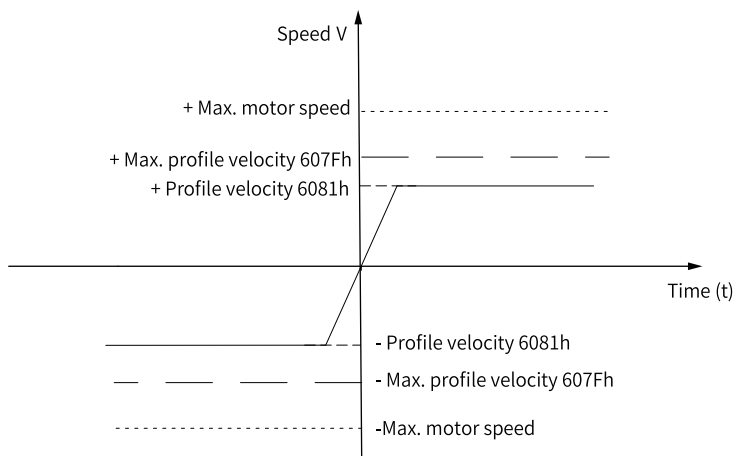
Position deviation monitoring function

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
6065h	6065h	Following error window	0 to 4294967295	27486951	Reference unit	Real-time	"6065h" on page 491
6066h	6066h	Defines the time lapse to trigger excessive position deviation (EB00.0).	0 ms–65535 ms	0	ms	Real-time	"6066h" on page 492

Speed limit

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



☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
607Fh	607Fh	Max. speed	0 to 4294967295	4294967295	Reference unit/s	Real-time	"607Fh" on page 498

Acceleration and deceleration limits

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

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
6083h	6083h	Profile acceleration	0 to 4294967295	1398101333	Reference unit/s ²	Real-time	"6083h" on page 499
6084h	6084h	Profile deceleration	0 to 4294967295	1398101333	Reference unit/s ²	Real-time	"6084h" on page 500

Reference polarity

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

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
607Eh	607Eh	Reference polarity	0-255	0	-	Real-time	"607Eh" on page 498

2.9 Interpolated Position (IP) Mode

The interpolation mode can be used to achieve synchronous operations of multi-axis servo drives or single-axis servo drives. When the servo drive is not enabled, after the host controller sets the interpolation cycle, the displacement curve is planned in advance according to actual application requirements. When the servo drive is running, different absolute position points on the displacement curve are periodically sent to the slave. The slave synchronously receives the displacement reference, subdivides and evenly transmits the displacement reference increment based on the position loop control cycle. The servo drive executes the position control, speed control, and torque control.

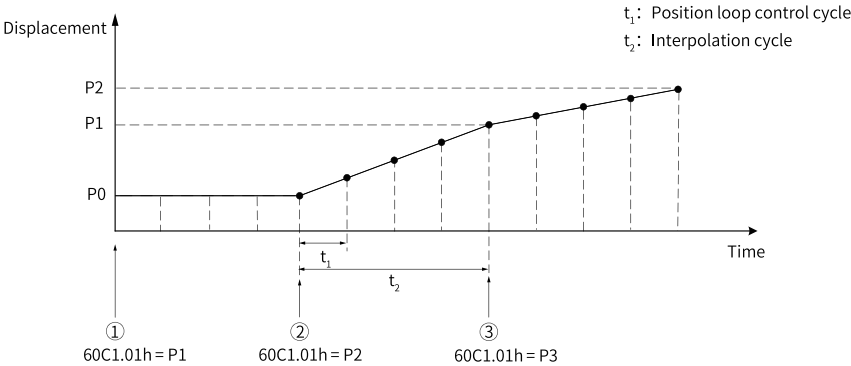
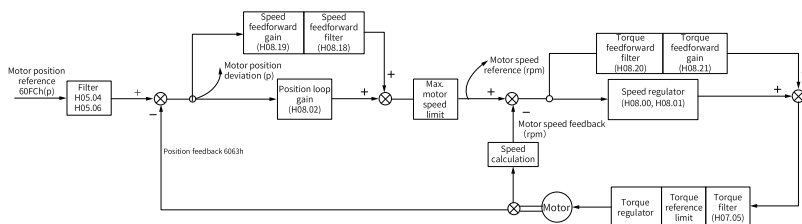


Figure 2-89 Displacement curve of single-axis linear interpolation motor

Note

- 1: The current absolute position of the motor is P0. After receiving the first absolute position reference P1, planning of the first displacement profile starts.
- 2: The current absolute position of the motor is P0. The motor starts to operate towards the first absolute position P1 and receives the second absolute position reference P2 at the same time, after which, planning of the second displacement profile starts.
- 3: After reaching the first absolute position P1, the motor starts to operate towards the second absolute position P2 and receives the 3rd absolute position reference P3 at the same time, after which, planning of the third displacement profile starts.
- t1: Position loop control cycle, which is defined by the servo drive
- t2: Interpolation cycle, which can be defined through the object dictionary 60C2h. The drive supports a synchronization period of 1 ms to 20 ms. Synchronization periods beyond this range will be restricted by this range.
- P0/P1/P2 - absolute position. An absolute position reference is sent through 60C1.1h. The interpolation mode supports absolute position references only.
- The displacement reference increments in each synchronization cycle are P1-P0 and P2-P1.
- When using the interpolation mode, set the position loop period to 1 k.
- The displacement reference increments in each synchronization cycle are P1-P0 and P2-P1.

2.9.1 Function Block Diagram



2.9.2 Configuration Block Diagram

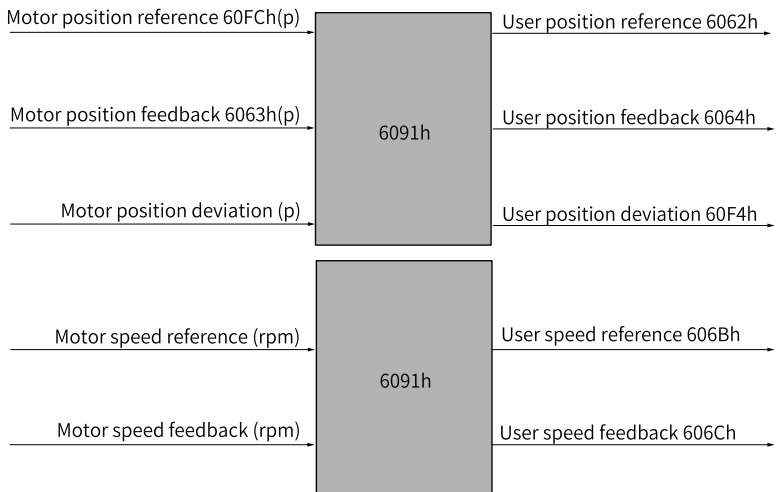


Figure 2-90 IP mode configuration

2.9.3 Recommended Configuration

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

RPDO	TPDO	Remarks
6040h: control word	6041h: status word	Mandatory
60C1.01h: target position	6064h: position actual value	Mandatory
6060h: modes of operation	6061h: modes of operation display	Optional

2.9.4 Related Parameters

The control word 6040h in the IP mode is described as follows:

6040h Control word

Address:	-	Unit:	-
Min.:	0	Data Type:	Uint16
Max.:	65535	Change:	Running setting
Default:	-		At once
Access:	RW	Mapping:	RPDO
Value Range:			
0–65535			

Description:

Defines the control command.

bit	Name	Value	Description
0–3	-	See the relationship between status switching and control commands	See the object dictionary.
4	Interpolation mode enable	-	0: Interpolation interrupted 1: Interpolation enabled bit4 must always be 1 during interpolation. bit12 of 6041h can be used as a feedback indicating whether the interpolation mode is activated.
5–6	N/A	-	-
7–15	-	See the relationship between status switching and control commands	See the object dictionary.

6041h Status word

Address: -

Min.: -

Max.: -

Default: -

Access: RO

Unit: -

Data Type: Uint16

Change: -

Mapping: TPDO

Value Range:

-

Description:

Indicates the servo drive status.

bit	Name	Value	Description
0–9	-	See the relationship between status switching and control commands	See the object dictionary.
10	The target position is reached.	-	0: The target position is not reached. 1: The target position is reached.
11	Software internal setting exceeding limit	-	0: The position actual value does not reach the software internal position limit. 1: The actual position value reaches the software position limit.
12	Interpolation mode activated	-	0: Interpolation is not activated. 1: Interpolation is activated.
13	Position deviation	-	0: Acceptable position deviation 1: Excessive position deviation
14	N/A	-	-
15	Home find	-	0: Homing is not performed or done. 1: Homing is complete.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
6060h	6060h	Servo drive mode	1: Profile position mode (pp) 3: Profile velocity mode (pv) 4: Profile torque mode (pt) 6: Homing mode (hm) 7: Interpolation mode (ip)	0	-	Real-time	"6060h" on page 489
6061h	6061h	Operation mode display	1: Profile position mode (pp) 3: Profile velocity mode (pv) 4: Profile torque mode (pt) 6: Homing mode (hm) 7: Interpolation mode (ip)	0	-	Unchangeable	"6061h" on page 490
6064h	6064h	Position actual value	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"6064h" on page 491
6066h	6066h	Defines the time lapse to trigger excessive position deviation (EB00.0).	0 ms–65535 ms	0	ms	Real-time	"6066h" on page 492

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
607Fh	607Fh	Max. speed	0 to 4294967295	4294967295	Reference unit/s	Real-time	"607Fh" on page 498
60C1.01h	60C1-01h	Interpolation displacement	-2147483648 to 2147483647	0	Reference unit	Real-time	"60C1_en.01h" on page 507
60C2.01h	60C2-01h	Interpolation time period	1–20	1	-	Real-time	"60C2_en.01h" on page 507
6081h	6081h	Profile velocity	0 to 4294967295	13981013	Reference unit/s	Real-time	"6081h" on page 499
6083h	6083h	Profile acceleration	0 to 4294967295	139810133	Reference unit/s ²	Real-time	"6083h" on page 499
6084h	6084h	Profile deceleration	0 to 4294967295	139810133	Reference unit/s ²	Real-time	"6084h" on page 500

2.9.5 Related Functions

Positioning completed

Positioning completed: When position deviation fulfills the set condition, the positioning process is done. In this case, the servo drive sets bit10 of the status word 6041h, and the host controller, once receives the signal, acknowledges that positioning has been completed.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
6067h	6067h	Position window	0 to 4294967295	5872	Reference unit	Real-time	"6067h" on page 492
6068h	6068h	Position window time	0 ms–65535 ms	0	ms	Real-time	"6068h" on page 492

Detection on excessive position deviation

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
6065h	6065h	Following error window	0 to 4294967295	27486951	Reference unit	Real-time	"6065h" on page 491

Reference polarity

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

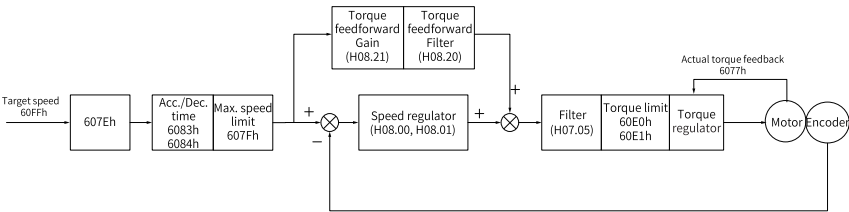
☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
607Eh	607Eh	Reference polarity	0–255	0	-	Real-time	"607Eh" on page 498

2.10 Profile Velocity (PV) Mode

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

2.10.1Function Block Diagram



2.10.2 Configuration Block Diagram

Profile velocity mode (6060h=3)

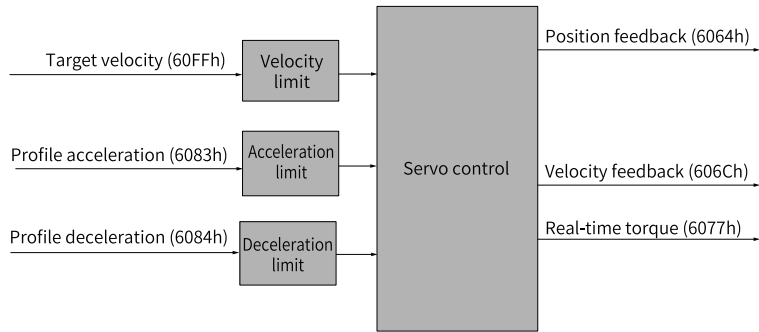


Figure 2-91 PV mode

2.10.3 Recommended Configuration

The basic configuration for the 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

2.10.4 Related Parameters

6040h Control word

Address: -

Min.: 0

Max.: 65535

Default: -

Access: RW

Value Range:

0–65535

Description:

Defines the control command.

Unit: -

Data Type: Uint16

Change: Running setting

At once

Mapping: RPDO

bit	Name		Description
0	Switch on	Switch on	1: Active, 0: Inactive
1	Enable voltage	Enable voltage	1: Active, 0: Inactive
2	Quick stop	Quick stop	0: Active, 1: Inactive
3	Operation enabled	Enable operation	1: Active, 0: Inactive
8	Halt	Halt	0: Keep present operating state, 1: Halt

6041h Status word

Address: -

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	Ready to switch on	1: Active, 0: Inactive
1	Switch on	Switch on	1: Active, 0: Inactive
2	Operation enabled	Enable operation	1: Active, 0: Inactive
3	Fault	Fault	1: Active, 0: Inactive
4	Voltage enabled	Voltage enabled	1: Active, 0: Inactive
5	Quick stop	Quick stop	0: Active, 1: Inactive
6	Switch on disabled	Switch on disabled	1: Active, 0: Inactive
7	Alarm	Alarm	1: Active, 0: Inactive
8	Manufacturer-specific	Manufacturer specific	Undefined
9	Remote	Remote	1: Active, control word effective 0: Inactive
10	Target reach	Target reach	0: The target velocity is not reached. 1: The target velocity is reached.
11	Internal limit active	Internal limit active	0: Position feedback within the limit 1: Position feedback beyond the limit
12	Speed	Speed	0: Speed is not 0 1: Speed is 0

bit	Name		Description
13	-	N/A	N/A
14	Manufacturer-specific	Manufacturer specific	Undefined
15	Home find	Home find	0: Homing completed 1: Homing done

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
6083h	6083h	Profile acceleration	0 to 4294967295	139810133 3	Reference unit/s ²	Real-time	"6083h" on page 499
6084h	6084h	Profile deceleration	0 to 4294967295	139810133 3	Reference unit/s ²	Real-time	"6084h" on page 500
60FFh	60FFh	PV target velocity	-2147483648 to +2147483647	0	Reference unit/s	Real-time	"60FFh" on page 512

2.10.5 Related Functions

Monitoring on speed reach status

This function serves to check whether the speed reference of the servo drive is consistent with the motor speed feedback.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
606Dh	606Dh	Velocity window	0 RPM to 65535 RPM	10	rpm	Real-time	"606Dh" on page 493
606Eh	606Eh	Velocity window time	0 ms–65535 ms	0	ms	Real-time	"606Eh" on page 493

Monitoring on zero speed

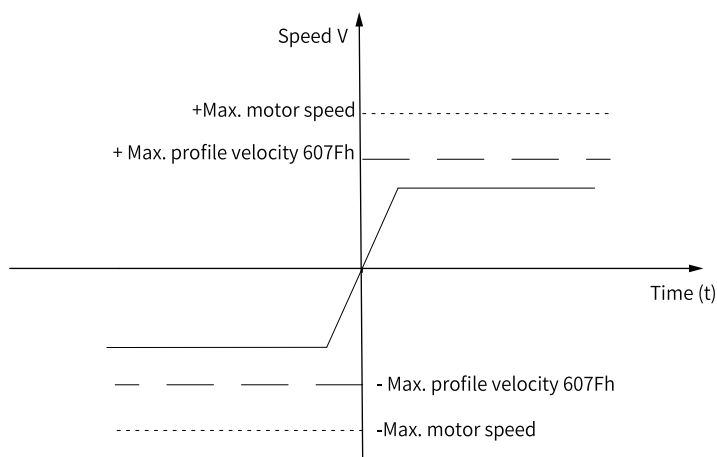
It is used to check whether the absolute value of motor speed feedback is lower than the set threshold. If yes, the motor is considered to be close to standstill (zero speed). Bit12 of 6041h is set to 1.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
606Fh	606Fh	Zero speed signal threshold	0 RPM to 65535 RPM	10	rpm	Real-time	"606Fh" on page 494
6070h	6070h	Velocity threshold time	0 ms–65535 ms	0	ms	Real-time	"6070h" on page 494

Speed limit

In PV mode, 607Fh can be used to limit the maximum speed in forward/reverse running, but its value must not exceed the max. allowable speed of the motor.



☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
607Fh	607Fh	Max. speed	0 to 4294967295	4294967295	Reference unit/s	Real-time	"607Fh" on page 498

Acceleration and deceleration limits

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

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
60C5h	60C5h	Max. acceleration	0 to 4294967295	4294967295	Reference unit/s ²	Real-time	"60C5h" on page 508
60C6h	60C6h	Max. deceleration	0 to 4294967295	4294967295	Reference unit/s ²	Real-time	"60C6h" on page 508

Reference polarity

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

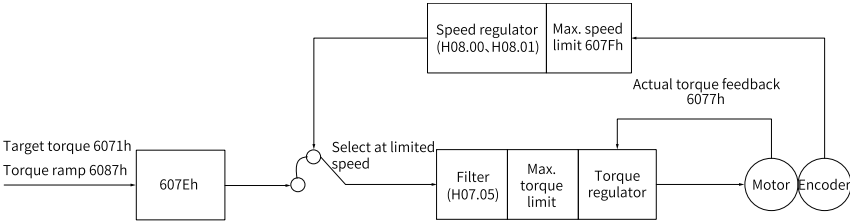
☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
607Eh	607Eh	Reference polarity	0–255	0	-	Real-time	"607Eh" on page 498

2.11 Profile Torque (PT) Mode

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

2.11.1Function Block Diagram



2.11.2 Configuration Block Diagram

Profile torque mode (6060h=4)

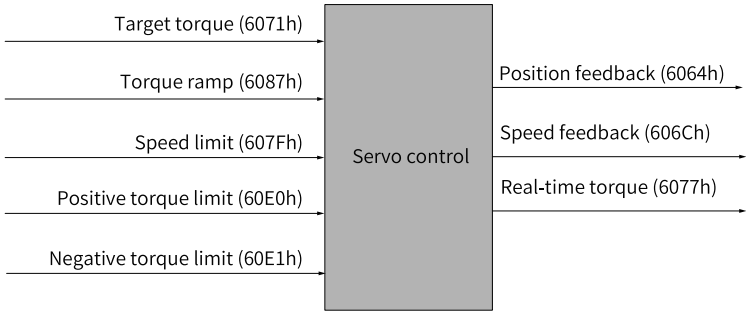


Figure 2-92 PT mode

2.11.3 Recommended Configuration

The basic configuration for the profile torque 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

2.11.4 Related Parameters

6040h Control word

Address: -

Min.: 0

Max.: 65535

Default: -

Access: RW

Value Range:

0–65535

Description:

Defines the control command.

Unit: -

Data Type: Uint16

Change: Running setting

At once

Mapping: RPDO

bit	Name		Description
0	Switch on	Switch on	1: Active, 0: Inactive
1	Enable voltage	Enable voltage	1: Active, 0: Inactive
2	Quick stop	Quick stop	0: Active, 1: Inactive
3	Operation enabled	Enable operation	1: Active, 0: Inactive
8	Halt	Halt	0: Keep present operating state, 1: Halt

6041h Status word

Address: -

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	Ready to switch on	1: Active, 0: Inactive
1	Switch on	Switch on	1: Active, 0: Inactive
2	Operation enabled	Enable operation	1: Active, 0: Inactive
3	Fault	Fault	1: Active, 0: Inactive
4	Voltage enabled	Voltage enabled	1: Active, 0: Inactive
5	Quick stop	Quick stop	0: Active, 1: Inactive
6	Switch on disabled	Switch on disabled	1: Active, 0: Inactive
7	Alarm	Alarm	1: Active, 0: Inactive
8	Manufacturer-specific	Manufacturer specific	Undefined
9	Remote	Remote	1: Active, control word effective 0: Inactive
10	Target reach	Target reach	0: Target torque not reached 1: Target torque reached
11	Internal limit active	Internal limit active	0: Position feedback within the limit 1: Position feedback beyond the limit

bit	Name		Description
12–14	No assignment	N/A	No assignment, always being 0
15	Home find	Home find	0: Homing completed 1: Homing done

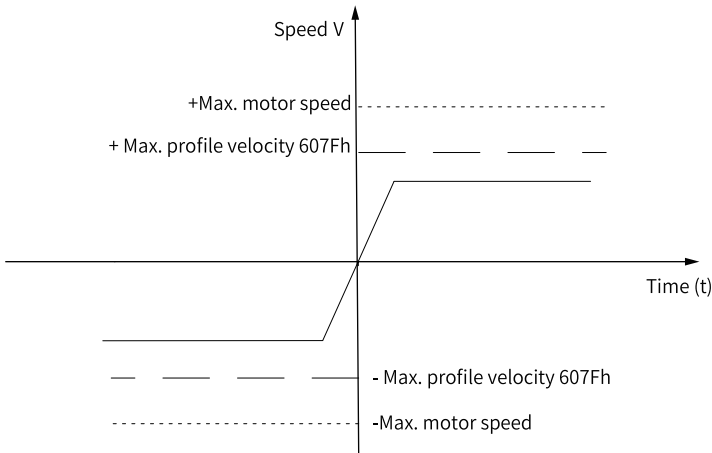
☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
6071h	6071h	Target torque	-4000. to 4000.	0	0.001	Real-time	"6071h" on page 495
6074h	6074h	torque reference	-4000. to 4000.	0	0.001	Unchangeable	"6074h" on page 496
6077h	6077h	Actual torque	-4000. to 4000.	0	0.001	Unchangeable	"6077h" on page 496
6087h	6087h	Torque slope	0.%/s–4294967295.%/s	4294967295	0.1%/s	Real-time	"6087h" on page 500

2.11.5 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 running. Note that the maximum speed cannot exceed the maximum running speed allowed by the motor.

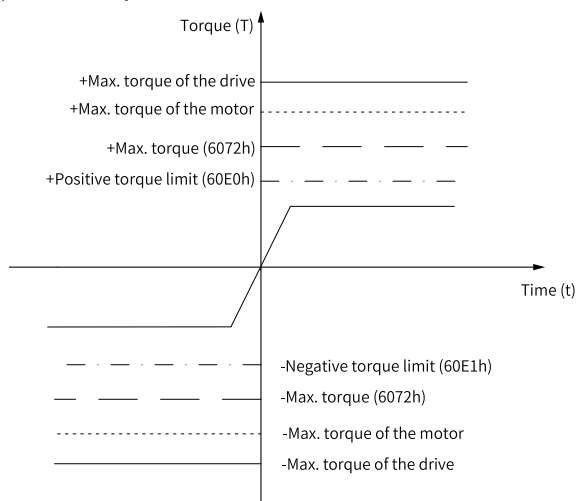


☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
607Fh	607Fh	Max. speed	0 to 4294967295	4294967295	Reference unit/s	Real-time	"607Fh" on page 498

Torque limit

To protect the mechanical devices, you can limit the torque references of the servo drive in the position, speed, 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:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
6072h	6072h	Max. torque reference	0. to 4000.	3500	0.001	Real-time	"6072h" on page 495
60E0h	60E0h	Positive torque limit	0. to 4000.	3500	0.001	Real-time	"60E0h" on page 510
60E1h	60E1h	Negative torque limit	0. to 4000.	3500	0.001	Real-time	"60E1h" on page 510

Torque reference polarity

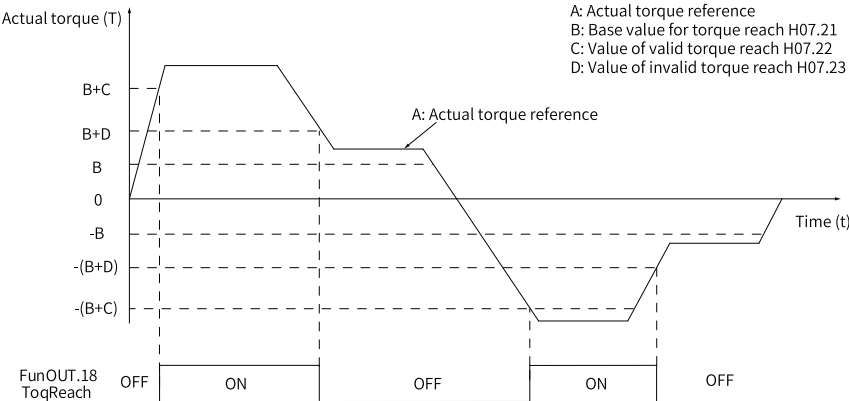
You can change the torque reference direction through setting the torque reference polarity.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
607Eh	607Eh	Reference polarity	0~255	0	-	Real-time	"607Eh" on page 498

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.



- Actual torque reference (viewed in H0b.02): A
- Base value for torque reach (H07.21): B.
- Threshold of valid torque arrival (H07.22): C.
- Threshold of invalid torque reach (H07.23): D.

C and D are the offset based on B.

The torque reach DO signal can be activated only when the actual torque reference meets the following condition: $|A| \geq B + C$. Otherwise, the torque reach DO signal remains inactive.

The torque reach signal is deactivated only when the actual torque reference meets the following condition: $|A| < B + D$. Otherwise, the torque reach signal remains active.

2.12 Homing Mode (HM)

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

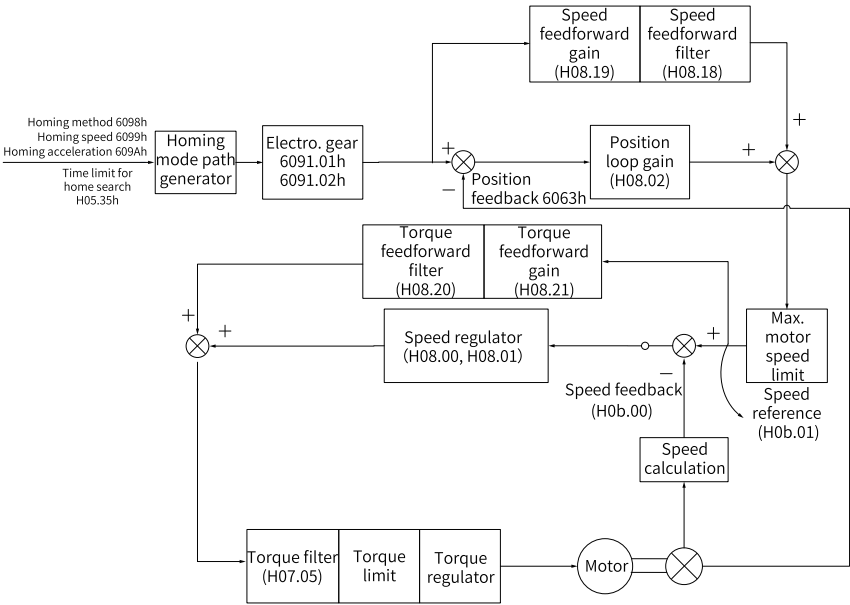
- Home: mechanical home reference point, that is, the motor Z signal.
- Mechanical zero: absolute zero point on the machine

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

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

When 607Ch = 0, the zero is the same as the home.

2.12.1Function Block Diagram



2.12.2Configuration Block Diagram

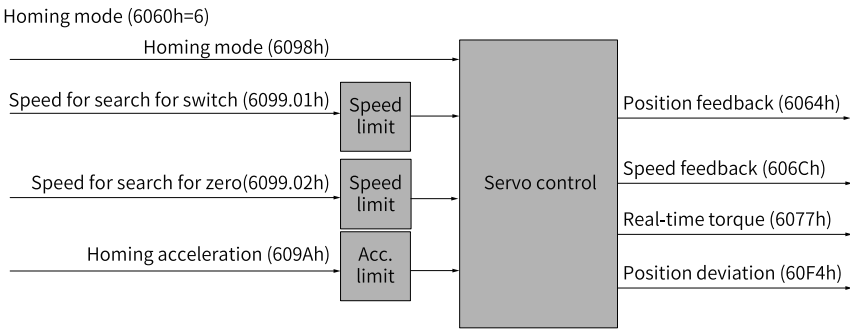


Figure 2-93 HM mode

2.12.3 Recommended Configuration

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

RPDO	TPDO	Remarks
6040h: control word	6041h: status word	Mandatory
6098h: homing method	-	Optional
6099.01h: speed during search for switch	-	Optional
6099.02h: speed during search for zero	-	Optional
609Ah: homing acceleration	-	Optional
-	6064h: position actual value	Optional
6060h: modes of operation	6061h: modes of operation display	Optional

2.12.4 Related Parameters

6040h Control word

Address: -

Min.: 0

Max.: 65535

Default: -

Access: RW

Value Range:

0–65535

Description:

Defines the control command.

Unit: -

Data Type: Uint16

Change: Running setting

At once

Mapping: RPDO

bit	Name		Description
0	Switch on	Switch on	1: Active, 0: Inactive
1	Enable voltage	Enable voltage	1: Active, 0: Inactive
2	Quick stop	Quick stop	0: Active, 1: Inactive
3	Operation enabled	Enable operation	1: Active, 0: Inactive
8	Halt	Halt	0: Keep present operating state, 1: Halt

6041h Status word

Address: -

Min.: -

Max.: -

Unit: -

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	Ready to switch on	1: Active, 0: Inactive
1	Switch on	Switch on	1: Active, 0: Inactive
2	Operation enabled	Enable operation	1: Active, 0: Inactive
3	Fault	Fault	1: Active, 0: Inactive
4	Voltage enabled	Voltage enabled	1: Active, 0: Inactive
5	Quick stop	Quick stop	0: Active, 1: Inactive
6	Switch on disabled	Switch on disabled	1: Active, 0: Inactive
7	Alarm	Alarm	1: Active, 0: Inactive
8	Manufacturer-specific	Manufacturer specific	Undefined
9	Remote	Remote	1: Active, control word effective 0: Inactive
10	Target reach	Target reach	1: Origin is found or homing is interrupted or failed 0: Disabled or origin is not found
11	Internal limit active	Internal limit active	0: Position reference within the limit 1: Position reference beyond the limit
12	Homing attained	Homing attained	0: Homing not attained 1: Homing attained
13	Homing error	Homing error	0: No error 1: Error is present
15	Home find	Home find	0: Homing completed 1: Homing done

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
6098h	6098h	Homing method	-3~35	1	-	Real-time	"6098h" on page 501
6099.01h	6099-01h	Speed during search for switch	0 to 4294967295	13981013	Reference unit/s	At stop	"6099_en.01h" on page 503
6099.02h	6099-02h	Speed during search for zero	0 to 4294967295	1398101	Reference unit/s	At stop	"6099_en.02h" on page 503
609Ah	609Ah	Homing acceleration	0 to 4294967295	139810133 3	Reference unit/s ²	Real-time	"609Ah" on page 503

2.12.5 Related Functions

Homing timeout

When the homing duration exceeds the value defined by H05.35 (Time of home searching), the servo drive reports E601.0 (Homing timeout).

E601.0 can be used to determine whether the homing speed, the acceleration setpoint, and connections of the switch signal and homing signal are proper.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.35	2005-24h	Home search time limit	0~65535	10000	-	Real-time	"H05_en.35" on page 258

Actual position calculation method

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

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
607Ch	607Ch	Home offset	-2147483648 to 2147483647	0	Reference unit	Real-time	"607Ch" on page 497

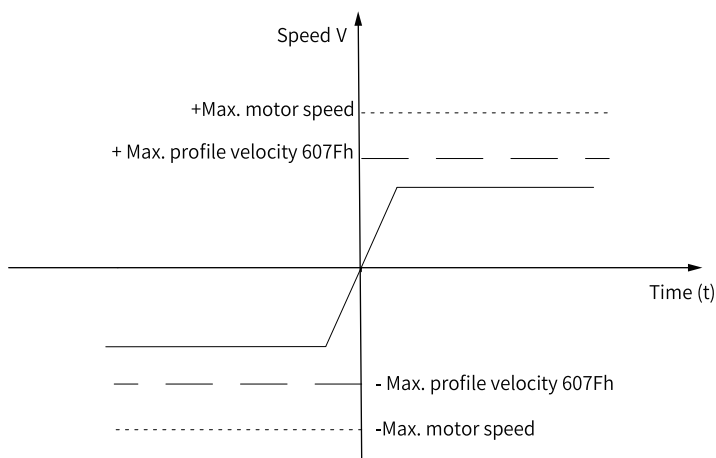
Position deviation monitoring function

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
6065h	6065h	Following error window	0 to 4294967295	27486951	Reference unit	Real-time	"6065h" on page 491
6066h	6066h	Defines the time lapse to trigger excessive position deviation (EB00.0).	0 ms–65535 ms	0	ms	Real-time	"6066h" on page 492

Speed limit

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



☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
607Fh	607Fh	Max. speed	0 to 4294967295	4294967295	Reference unit/s	Real-time	"607Fh" on page 498

Acceleration limit

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

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
60C5h	60C5h	Max. acceleration	0 to 4294967295	4294967295	Reference unit/s ²	Real-time	"60C5h" on page 508

2.12.6 Homing Operation

6098h = 1

Mechanical home: Z signal

Deceleration point: negative limit switch

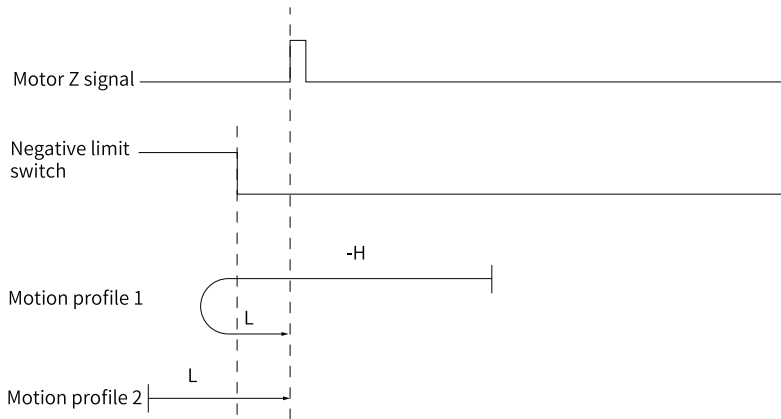


Figure 2-94 Motor running curve and speed in mode 1

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

Note

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

6098h = 2

Home: Z signal

Deceleration point: positive limit switch

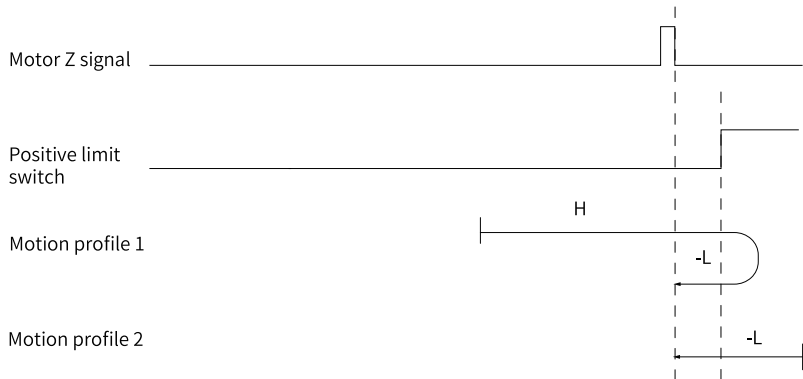


Figure 2-95 Motor running curve and speed in mode 2

- 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)

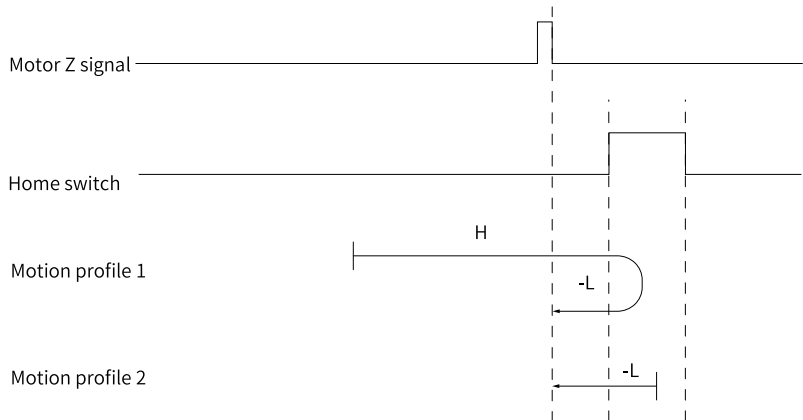


Figure 2-96 Motor running curve and speed in mode 3

- 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)

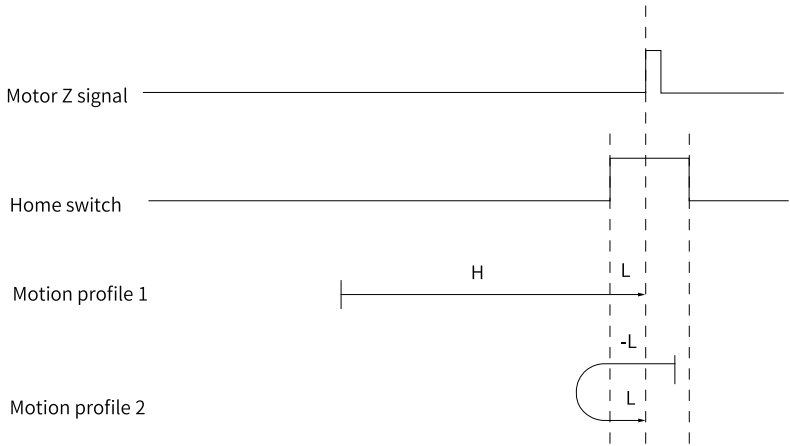


Figure 2-97 Motor running curve and speed in mode 4

- 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)

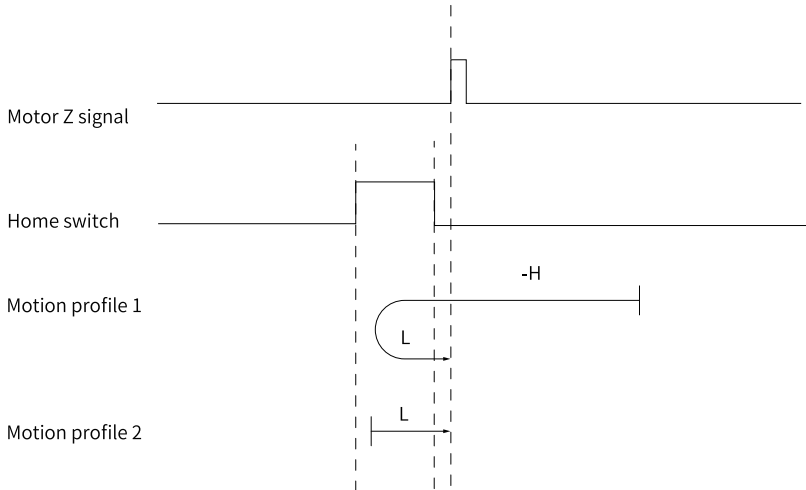


Figure 2-98 Motor running curve and speed in mode 5

- 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)

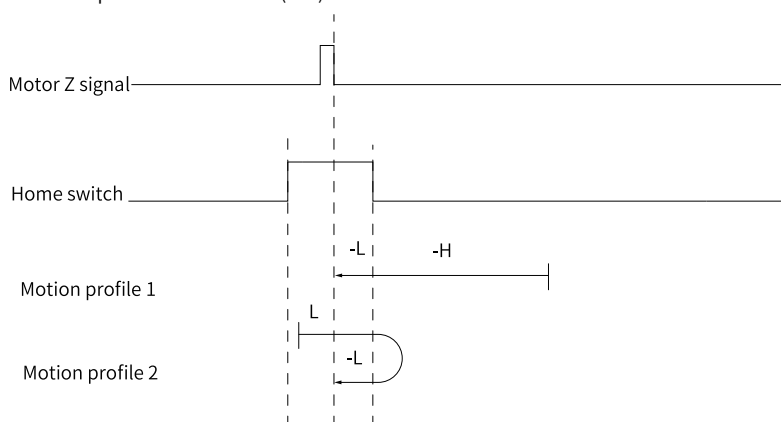


Figure 2-99 Motor running curve and speed in mode 6

- 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)

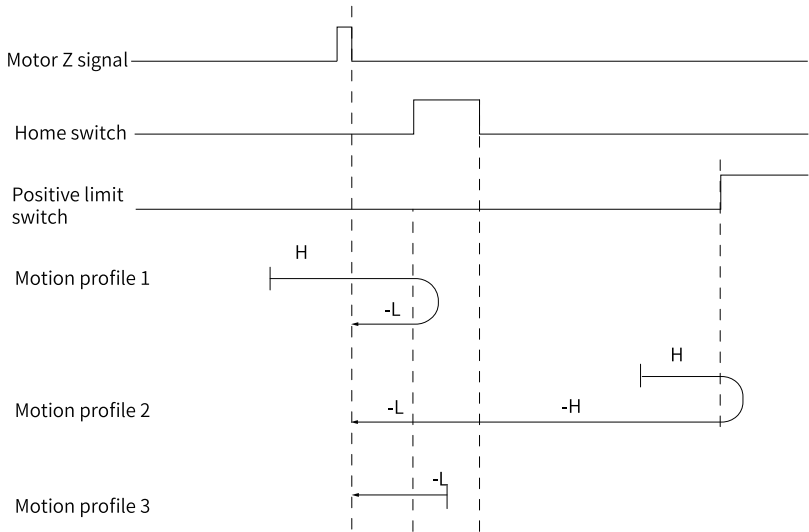


Figure 2-100 Motor running curve and speed in mode 7

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

6098h = 8

Home: Z signal

Deceleration point: home switch (HW)

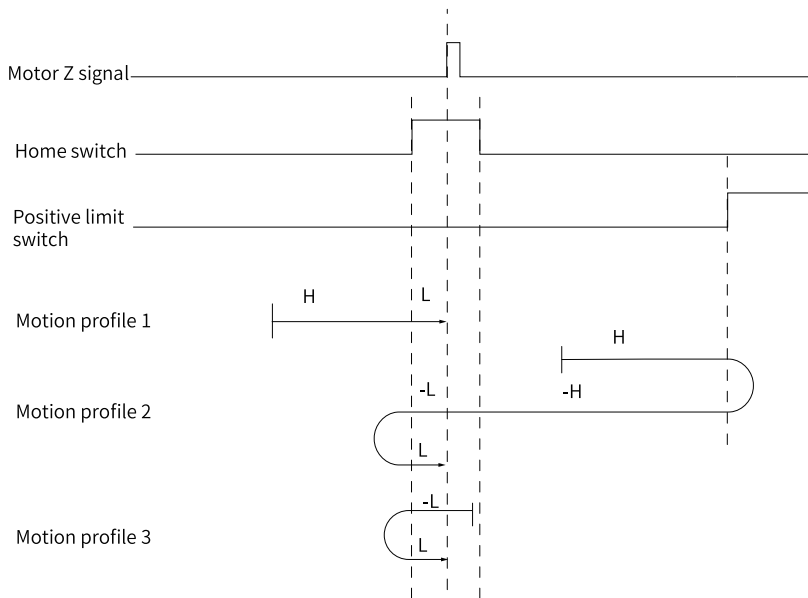


Figure 2-101 Motor running curve and speed in mode 8

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

6098h = 9

Home: Z signal

Deceleration point: home switch (HW)

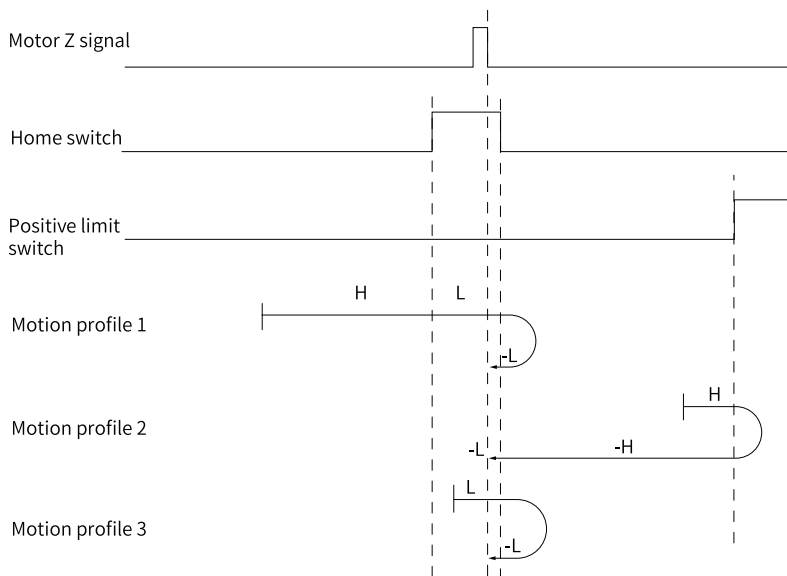


Figure 2-102 Motor running curve and speed in mode 9

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

6098h = 10

Home: Z signal

Deceleration point: home switch (HW)

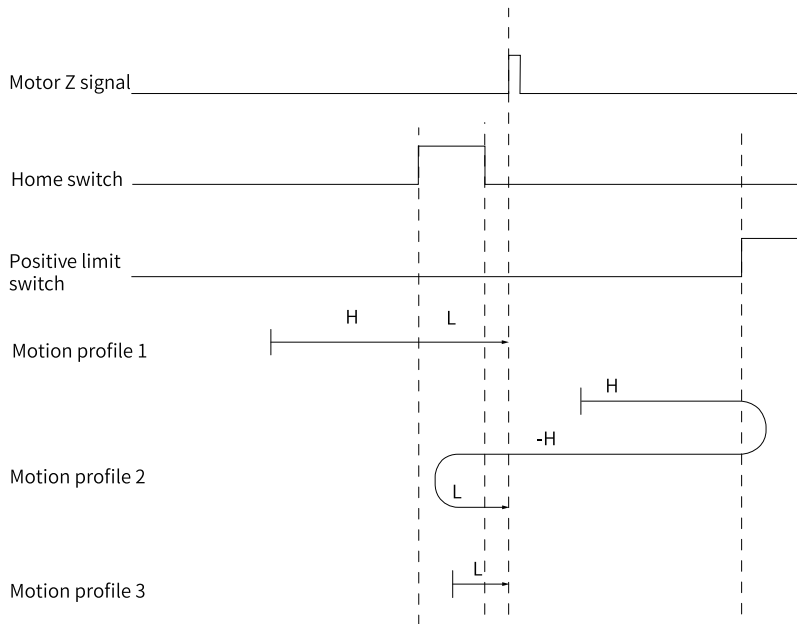


Figure 2-103 Motor running curve and speed in mode 10

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

6098h = 11

Home: Z signal

Deceleration point: home switch (HW)

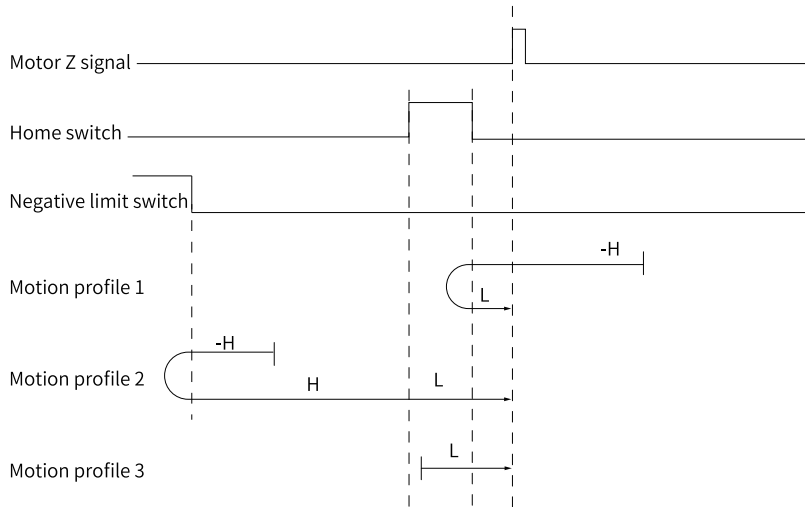


Figure 2-104 Motor running curve and speed in mode 11

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

6098h = 12

Home: Z signal

Deceleration point: home switch (HW)

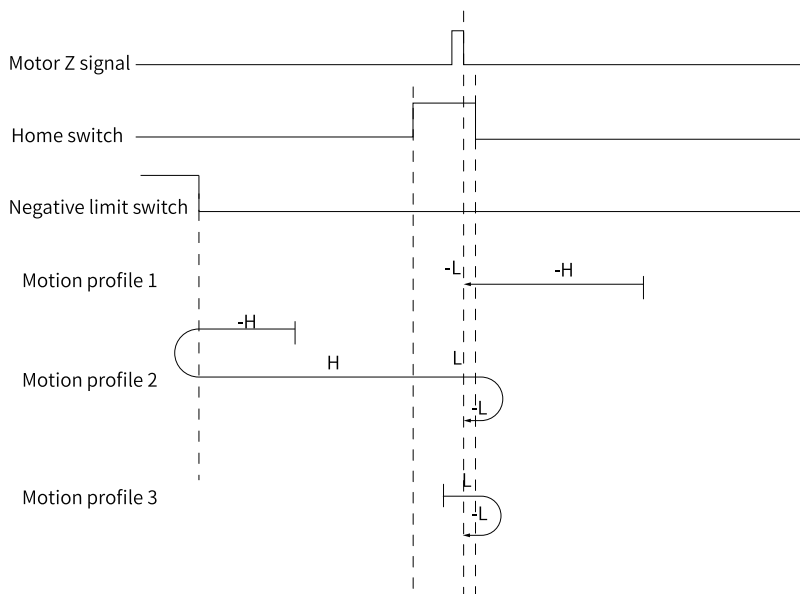


Figure 2-105 Motor running curve and speed in mode 12

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

6098h = 13

Home: Z signal

Deceleration point: home switch (HW)

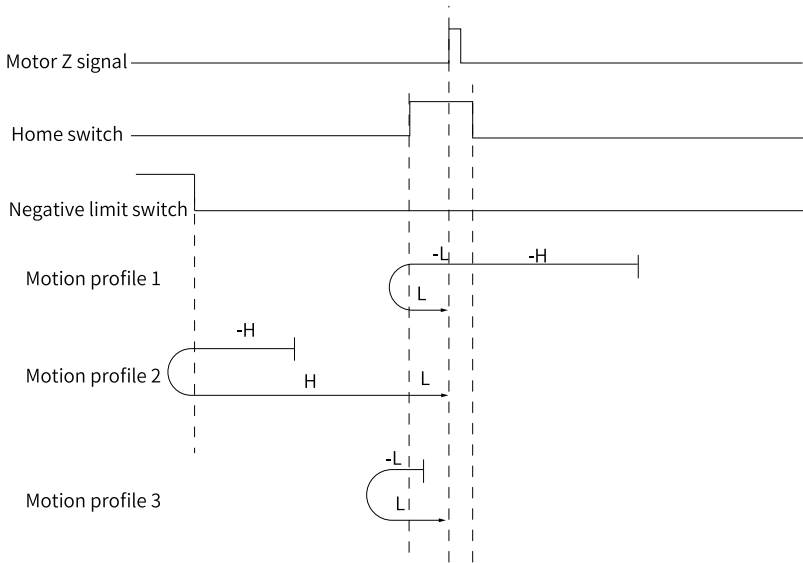


Figure 2-106 Motor running curve and speed in mode 13

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

6098h = 14

Home: Z signal

Deceleration point: home switch (HW)

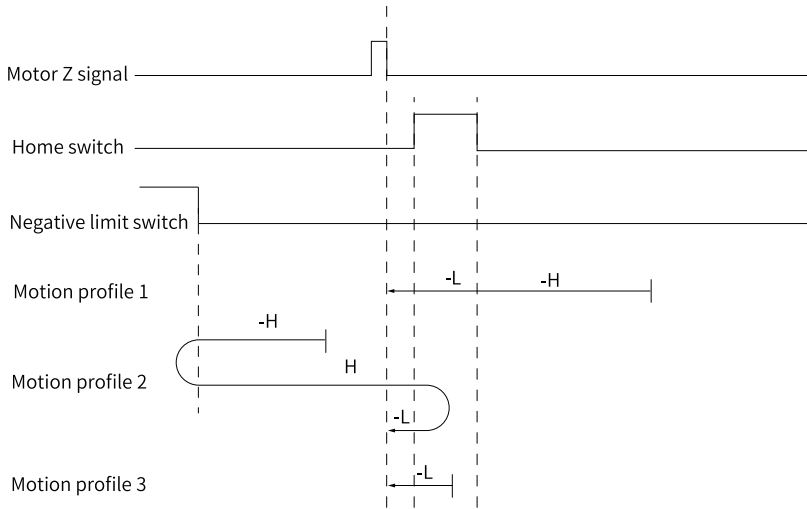


Figure 2-107 Motor running curve and speed in mode 14

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

6098h = 17

Home: negative limit switch

Deceleration point: negative limit switch

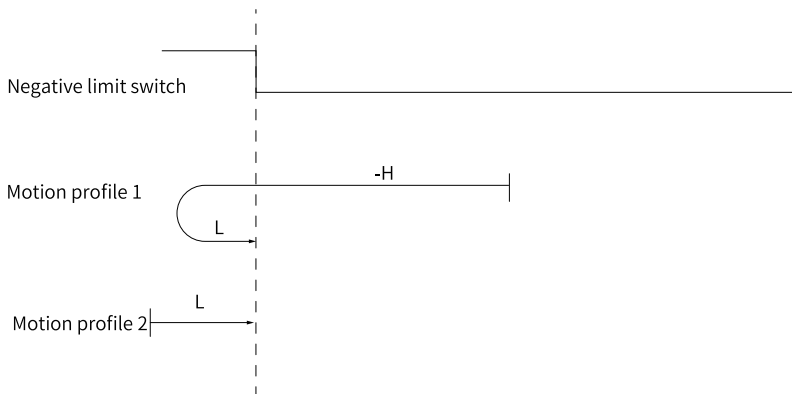


Figure 2-108 Motor running curve and speed in mode 17

- 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

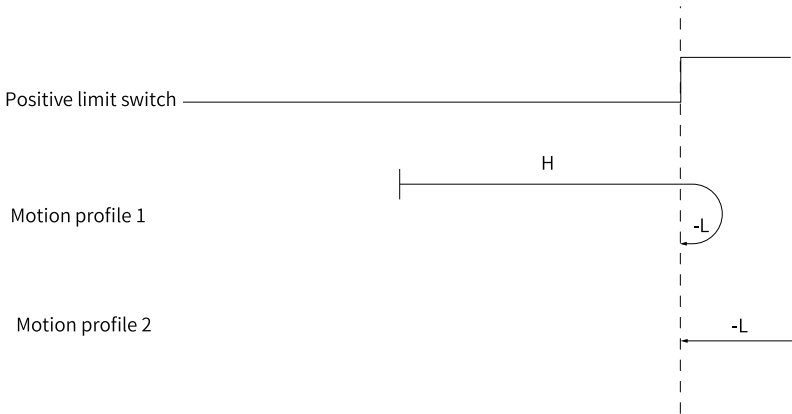


Figure 2-109 Motor running curve and speed in mode 18

- 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)

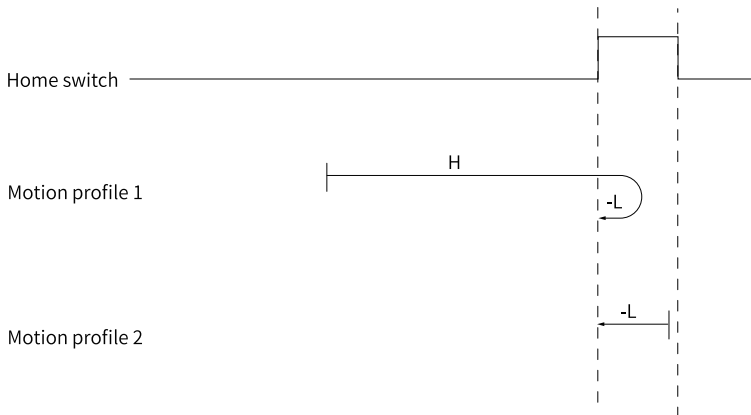


Figure 2-110 Motor running curve and speed in mode 19

- 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)

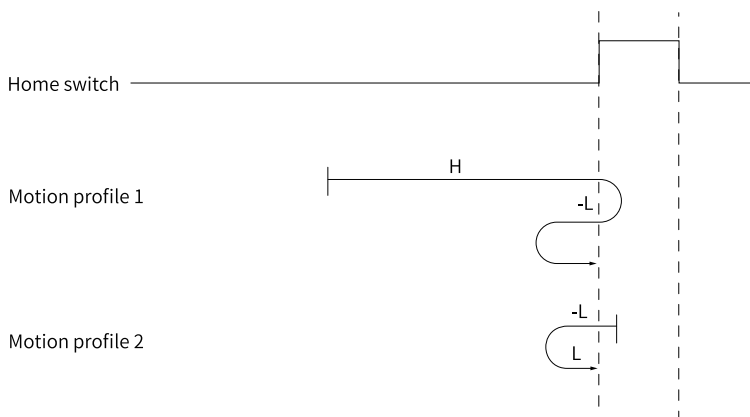


Figure 2-111 Motor running curve and speed in mode 20

- 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)

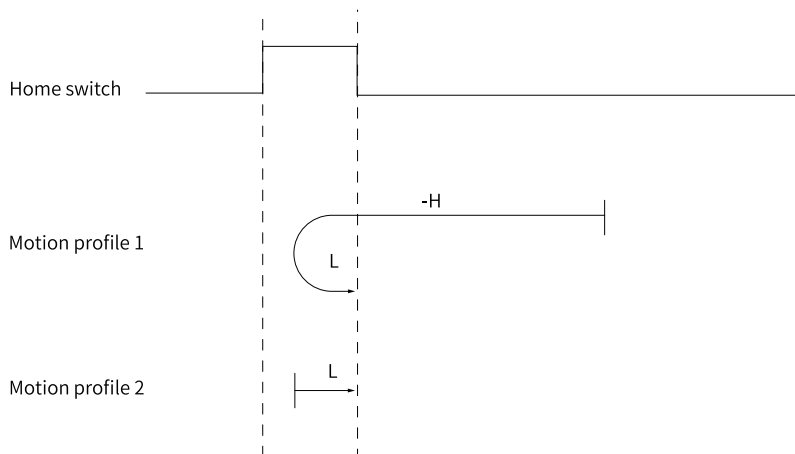


Figure 2-112 Motor running curve and speed in mode 21

- 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)

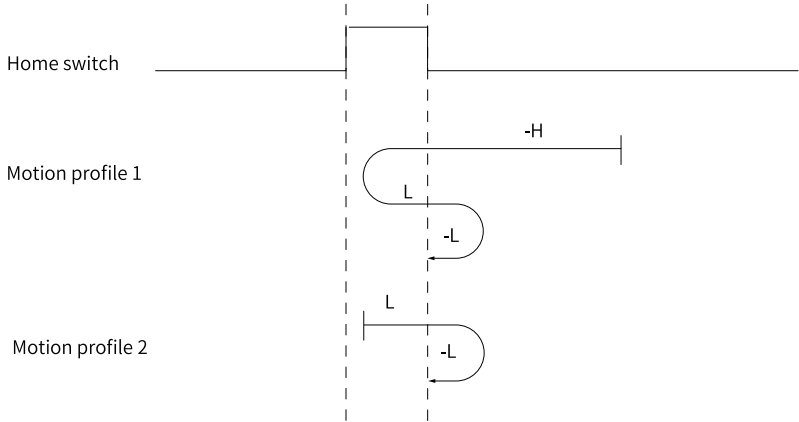


Figure 2-113 Motor running curve and speed in mode 20

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

6098h = 23

Home: home switch (HW)

Deceleration point: home switch (HW)

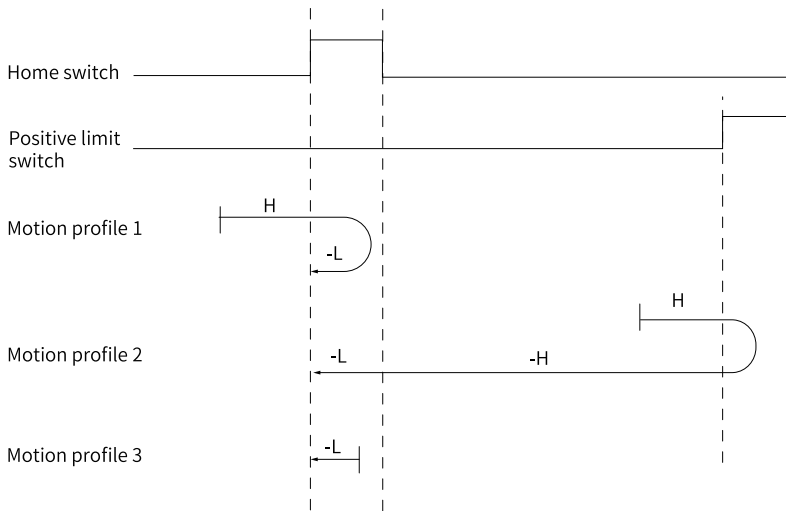


Figure 2-114 Motor running curve and speed in mode 23

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

6098h = 24

Home: home switch (HW)

Deceleration point: home switch (HW)

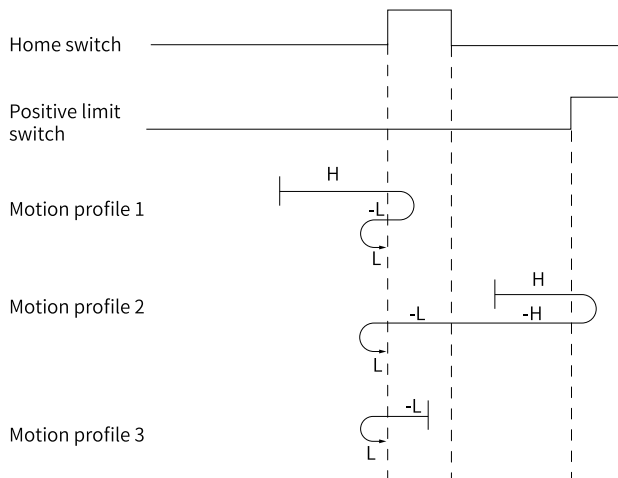


Figure 2-115 Motor running curve and speed in mode 24

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

6098h = 25

Home: home switch (HW)

Deceleration point: home switch (HW)

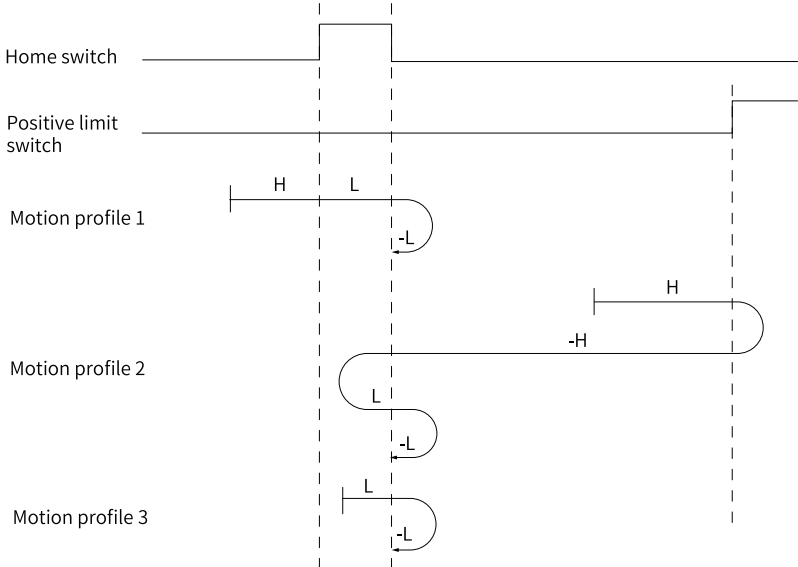


Figure 2-116 Motor running curve and speed in mode 25

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

6098h = 26

Home: home switch (HW)

Deceleration point: home switch (HW)

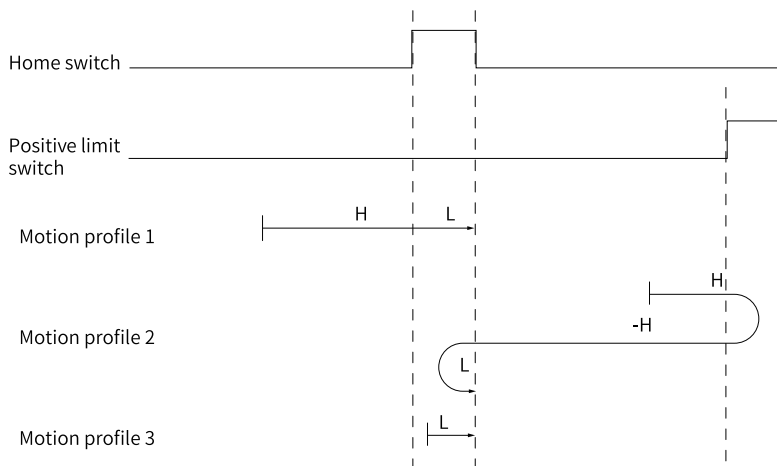


Figure 2-117 Motor running curve and speed in mode 26

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

6098h = 27

Home: home switch (HW)

Deceleration point: home switch (HW)

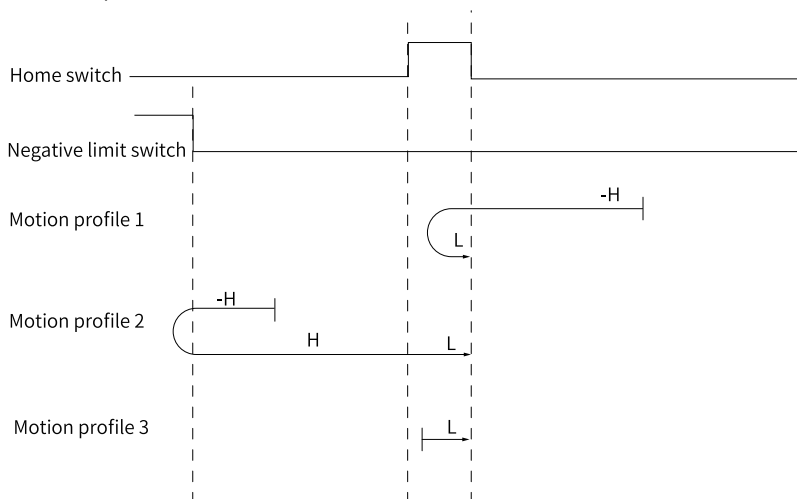


Figure 2-118 Motor running curve and speed in mode 27

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

6098h = 28

Home: home switch (HW)

Deceleration point: home switch (HW)

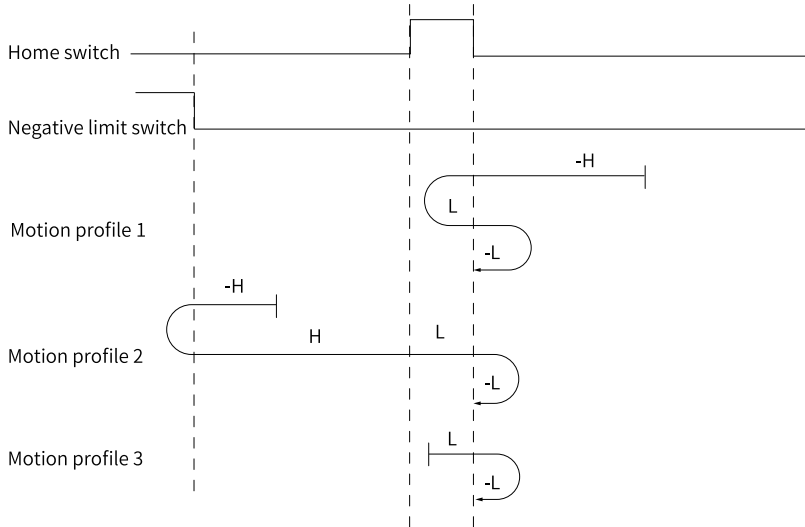


Figure 2-119 Motor running curve and speed in mode 28

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

6098h = 29

Home: home switch (HW)

Deceleration point: home switch (HW)

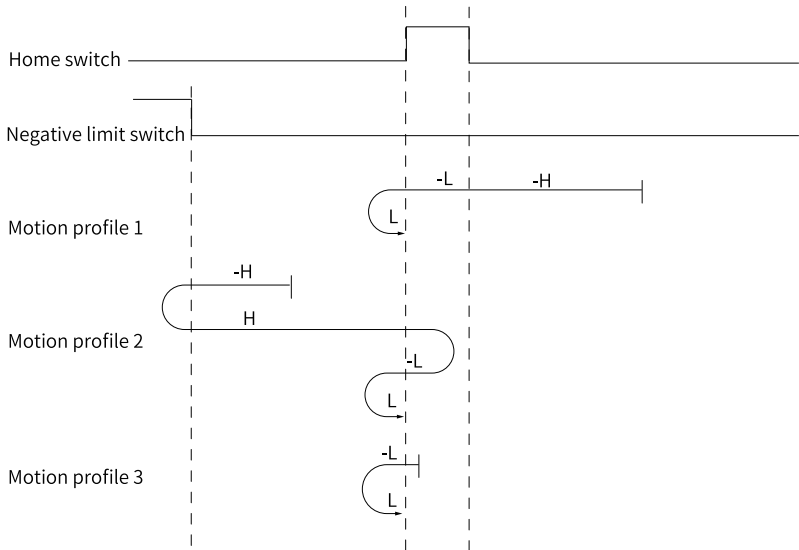


Figure 2-120 Motor running curve and speed in mode 29

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

6098h = 30

Home: home switch (HW)

Deceleration point: home switch (HW)

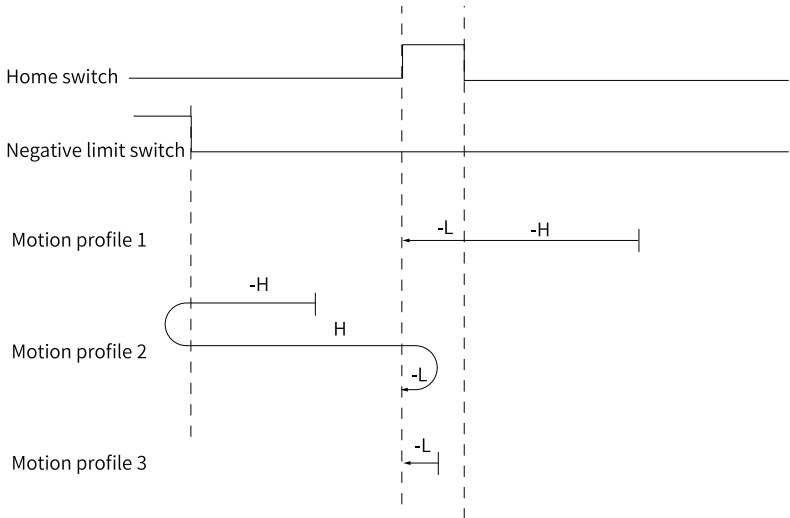


Figure 2-121 Motor running curve and speed in mode 30

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

6098h = 31 and 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

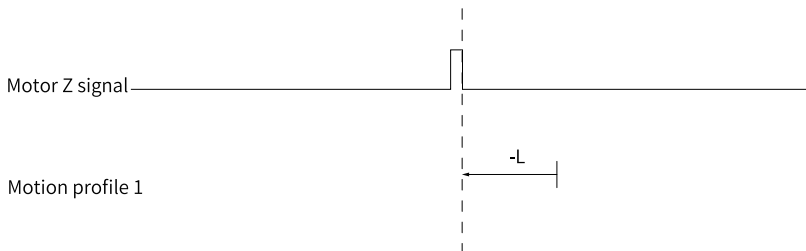


Figure 2-122 Motor running curve and speed in mode 33

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

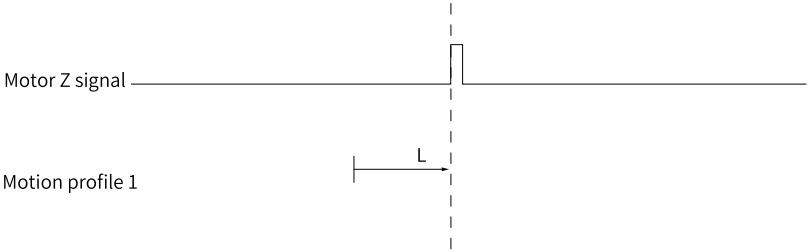


Figure 2-123 Motor running curve and speed in mode 34

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

6098h = 35

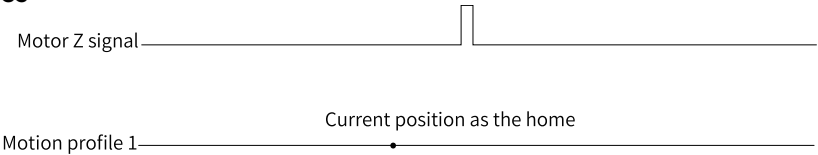


Figure 2-124 Motor running curve and speed in mode 35

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

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.

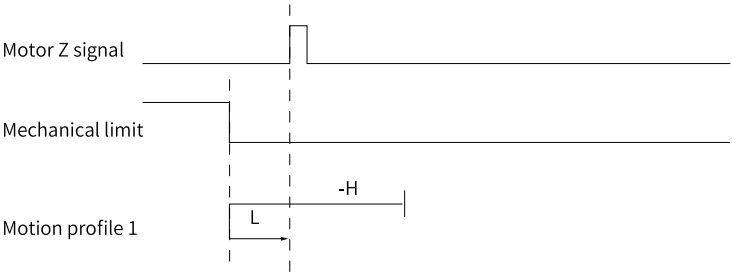


Figure 2-125 Motor running curve and speed in mode -1

6098h = -2

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

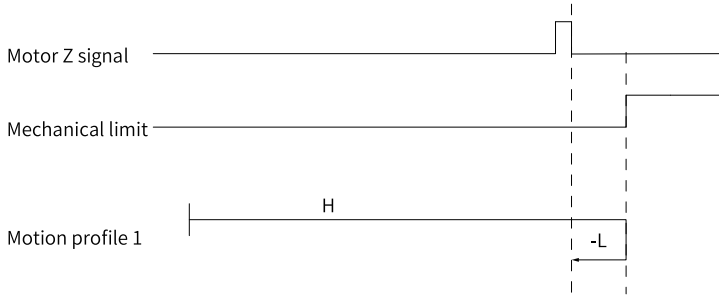


Figure 2-126 Motor running curve and speed in mode -2

6098h = -3

Home: Z signal

Deceleration point: None

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

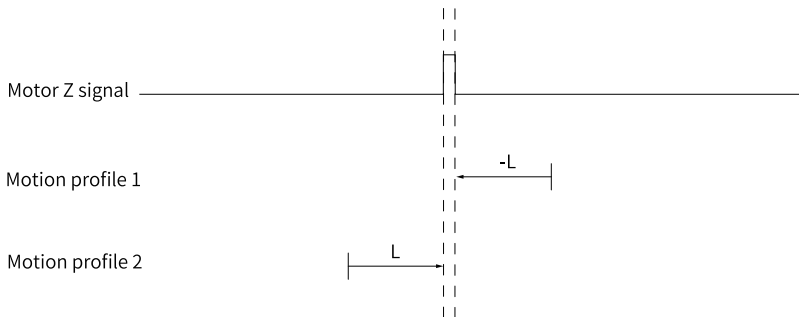


Figure 2-127 Motor running curve and speed in mode -3

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

Note

Evaluation conditions for torque homing:

- When 6098h = -3, after the motor reaches the hard limit, and the torque feedback reaches the limit value defined in H05.58 (mechanical limit homing torque evaluation value), the first Z signal in the reverse direction is searched for and regarded as the home after the motor stops.
 - When 6098h = -2/-1, the limit value is the minimum of H05.58 (mechanical limit homing torque evaluation value), 6072h (maximum torque command), 60E0h (forward torque limit) and 60E1h (reverse torque limit).
-

3 Function Applications

3.1 Absolute System

3.1.1 Overview

The absolute encoder, which features a single-turn resolution of 8388608 (2^{23}), is used to detect the motor position within one turn and count the number of motor revolutions, with 23-bit multi-turn data recorded. The absolute system integrated with the absolute encoder works in absolute position linear mode or absolute position rotating mode. These modes apply to position control, speed control, and torque control modes. The absolute encoder with a battery can back up data when the servo drive is powered off. This enables the servo drive to calculate the absolute mechanical position upon power-on again. Therefore, the homing operation is not required.

To match the absolute encoder with the SVD60C series servo drives, H00.00 (Motor code) to 14101 (Inovance 23-bit absolute encoder). Then set H02.01 (Absolute system selection) based on actual conditions. E731.0 (Encoder battery failure) will occur upon initial power-on of the battery. Set H0d.20 (Absolute encoder reset function) to 1 to reset E731.0 before performing the homing operation.

Note

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

3.1.2 Related Parameters

Absolute encoder system settings

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

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H00.00	2000-01h	Motor SN	0-65535	14101	-	At stop	"H00_en.00" on page 223
H00.08	2000-09h	Bus encoder type	0-65535	0	-	At stop	"H00_en.08" on page 224
H02.01	2002-02h	Absolute system selection	0: Incremental mode 1: Absolute position linear mode 2: Absolute position rotation mode 3: Absolute position linear mode (without encoder overflow alarm) 4: Absolute position single-turn mode	0	-	At stop	"H02_en.01" on page 230

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.

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H0b.70	200b-47h	Number of absolute encoder revolutions	0Rev to 65535Rev	0	Rev	Unchangeable	"H0b_en.70" on page 355
H0b.71	200b-48h	Single-turn position feedback by the absolute encoder	0p to 2147483647p	0	p	Unchangeable	"H0b_en.71" on page 355
H0b.77	200b-4Eh	Encoder position (low 32 bits)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.77" on page 356
H0b.79	200b-50h	Encoder position (high 32 bits)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.79" on page 356

Absolute position linear mode

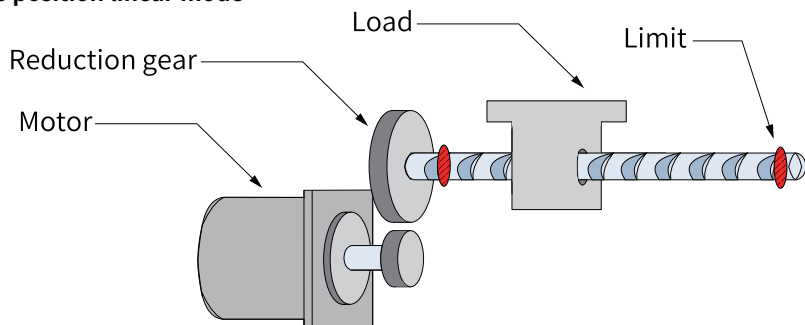


Figure 3-1 Application of the linear mode

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

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

The multi-turn data range in the absolute position linear mode is -32768 to +32767. If the number of forward revolutions is higher than 32767 or the number of reverse revolutions is lower than -32768, E735.0 (Encoder multi-turn counting overflow) occurs. In this case, set H0d.20 to 2 (Reset multi-turn data), and then perform homing again. In special occasions, you can set H0A.36 to 1 to hide E735.0 or use absolute position linear mode 2.

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.36	2005-25h	Mechanical home offset	-2147483648 to 2147483647	0	Reference unit	Real-time	"H05_en.36" on page 258
H0b.07	200b-08h	Absolute position counter	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.07" on page 342
H0b.58	200b-3Bh	Mechanical absolute position (low 32 bits)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.58" on page 353
H0b.60	200b-3Dh	Mechanical absolute position (high 32 bits)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.60" on page 353

Absolute position rotation mode

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

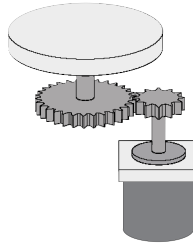
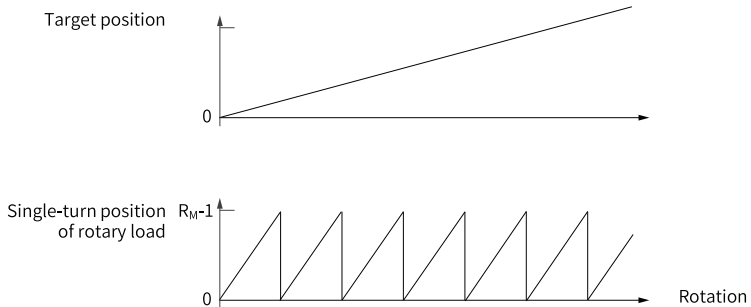
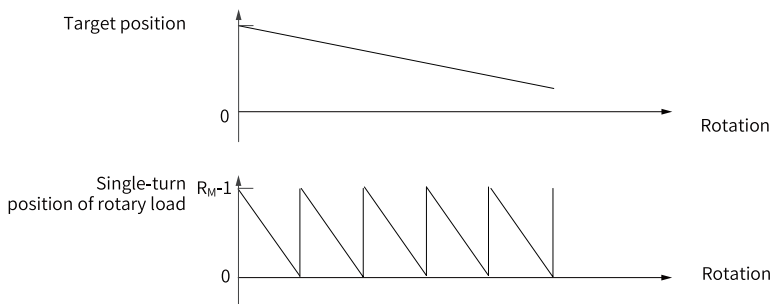


Figure 3-2 Application of the linear mode

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



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



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

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

Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H05.50	2005-33h	Mechanical gear ratio in absolute position rotation mode (numerator)	1-65535	1	-	At stop	"H05_en.50" on page 259
H05.51	2005-34h	Mechanical gear ratio in absolute position rotation mode (denominator)	1-65535	1	-	At stop	"H05_en.51" on page 260
H05.52	2005-35h	Pulses per revolution of the load in absolute position rotation mode (low 32 bits)	0 to 4294967295	0	Encoder unit	At stop	"H05_en.52" on page 260
H05.54	2005-37h	Pulses per revolution of the load in absolute position rotation mode (high 32 bits)	0 to 4294967295	0	Encoder unit	At stop	"H05_en.54" on page 260
H0b.81	200b-52h	Single-turn position of the rotary load (low 32 bits)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.81" on page 356
H0b.83	200b-54h	Single-turn position of the rotary load (high 32 bits)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.83" on page 356
H0b.85	200b-56h	Single-turn position of the rotary load (reference unit)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.85" on page 357

Single-turn absolute mode

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

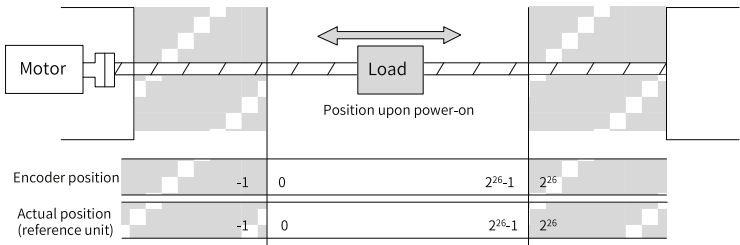
- Target position input range
If a 23-bit absolute encoder is used in the single-turn absolute mode, the drive operates in the position control mode, and the electronic gear ratio 1:1, then:

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

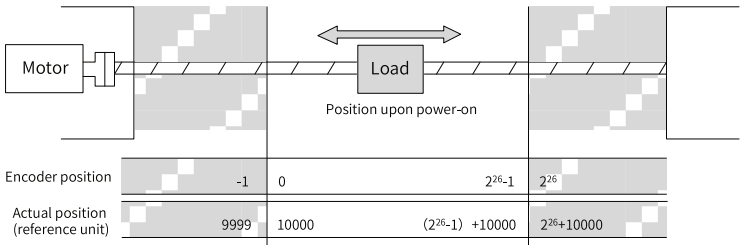
After homing is done, the target position range is H05.36 to ($2^{23} - 1 + H05.36$).

- Example

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



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



3.1.3 Precautions for Using 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 alarm) 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 alarm 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.

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H0d.20	200d-15h	Absolute encoder reset	0: No operation 1: Reset 2: Reset the fault and multi-turn data	0	-	At stop	"H0d_en.20" on page 362

Note

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

3.2 Software Limit

Function

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

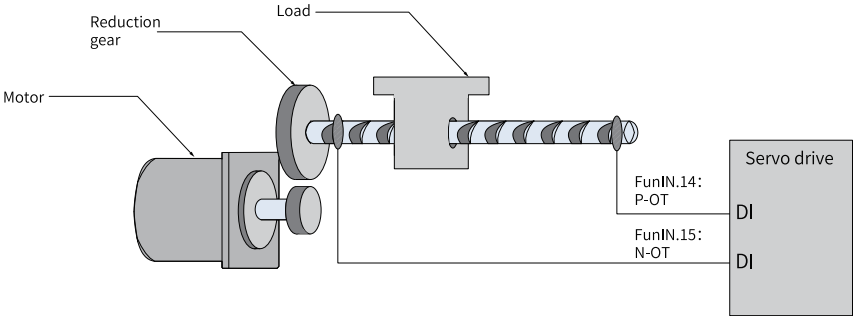


Figure 3-3 Installation of limit switches

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

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

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

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H0A.01	200A-02h	Absolute position limit	0: Disabled 1: Enabled 2: Enabled after homing	0	-	Real-time	"H0A_en.01" on page 326
H0A.41	200A-2Ah	Forward position of software position limit	-2147483648 to 2147483647	2147483647	Encoder unit	At stop	"H0A_en.41" on page 332
H0A.43	200A-2Ch	Reverse position of software position limit	-2147483648 to 2147483647	-2147483648	Encoder unit	At stop	"H0A_en.43" on page 332

- 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. When the value of the absolute position counter (H0b.07) is higher than the value of H0A.41, 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 H0A.43, E952.0 (Reverse overtravel warning) occurs and the drive stops accordingly.
- 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 H0A.41 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 H0A.43 after homing, E952.0 (Reverse overtravel warning) occurs and the drive stops accordingly.

3.3 Software Reset

Function

The software reset function applies when power cycling of the drive is not allowed on the application site.

Related objects

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H0d.00	200d-01h	Software Reset	0: No operation 1: Enable	0	-	At stop	"H0d_en.00" on page 359

3.4 Motor Protection

Motor overload protection

The motor generates heat continuously due to thermal effect of the current after power-on. The heat is then dissipated to the surroundings. When the heat generated exceeds the heat dissipated, the motor temperature will rise to a point that could damage the motor. To prevent such risks, the drive offers the motor overload protection function to prevent the motor from being damaged due to over-temperature.

The motor is compliant with NEC and CEC requirements and equipped with protective functions against overload and overtemperature.

Set the motor overload protection gain (H0A.04) to adjust the report time of fault E620.0. Use the default value of H0A.04 in general conditions, however, in case of one of the following situations, modify H0A.04 based on the actual heating condition.

- The motor works in environments with high temperature.
- The motor is in the cyclic motion featuring short motion cycle and frequent acceleration/deceleration.

You can also hide motor overload detection (H0A.26 = 1) when you are sure that the motor will not be damaged due to overtemperature.



Caution

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

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H0A.04	200A-05h	Motor overload protection gain	10–300	100	-	Real-time	"H0A_en.04" on page 326
H0A.26	200A-1Bh	Motor overload detection	0: Show motor overload alarm (E909.0) and fault (E620.0) 1: Hide motor overload alarm (E909.0) and fault (E620.0)	0	-	Real-time	"H0A_en.26" on page 330

Locked rotor over-temperature protection

When the motor is stalled, the motor speed is nearly 0 RPM while the current is large. In this case, the motor is overheated significantly. The motor is capable of operating upon stall in an allowable period of time, exceeding of which can damage the motor due to

overtemperature. To prevent such risks, the drive offers motor overtemperature protection to protect the motor from being damaged by overtemperature.

You can set the time for reporting E630.0 (Motor stall over-temperature fault) by setting the time threshold for motor overtemperature protection (H0A.32). The motor overtemperature protection function is enabled by default (H0A.33 = 1).



Take caution when hiding motor stall over-temperature protection as it may result in a damage to the motor.

Use the dedicated motor for the SV680P series servo drive. Failure to comply will result in the risk of short circuit due to aging of insulation.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H0A.32	200A-21h	Time threshold for locked motor overheat protection	10 ms–65535 ms	200	ms	Real-time	"H0A_en.32" on page 330
H0A.33	200A-22h	Locked motor overheat protection	0: Disabled 1: Enabled	1	-	Real-time	"H0A_en.33" on page 331

Motor overspeed protection

An excessively high speed may damage the motor or machine. Motor overspeed protection is used to protect the motor in case of overspeed, preventing the motor or machine from being damaged due to overtemperature.

$$\text{Overspeed threshold} = \begin{cases} \text{Max. motor speed} \times 1.2 & \text{H0A.08} = 0 \\ & \text{or H0A.08} > \text{Max. motor speed} \times 1.2 \\ \text{H0A.08} & \text{H0A.08} \neq 0 \\ & \text{and H0A.08} < \text{Max. motor speed} \times 1.2 \end{cases}$$



Caution

- The servo drive also offers motor runaway protection to prevent motor stall caused by lose of control.
- In applications where the motor drives a vertical axis or is driven by load, set H0A.12 to 0 to hide runaway fault detection. Use this function with caution.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H0A.08	200A-09h	Overspeed threshold	0rpm to 20000rpm	0	rpm	Real-time	"H0A_en.08" on page 326
H0A.12	200A-0Dh	Runaway protection enable	0: Disable 1: Enable	1	-	Real-time	"H0A_en.12" on page 327

Besides runaway protection, the drive also allows you to set the speed limit in the speed/torque control mode to protect the motor and the machine.

3.5 DI Filter Time

Function

The drive provides 4 physical DI terminals, in which DI1 to DI3 are normal DI terminals, and DI4 is a high-speed DI terminal. Assign the function of interrupt positioning to DI4 to guarantee precision.

When regular functions (touch probe and interrupt position functions excluded) are assigned to DIs, the filter time of these DIs is set in H03.60...H03.67. Ensure the effective level hold time of the DI assigned with regular function is above 0.5 ms. Otherwise, the DI function may not be responded to.

When a high-speed DI is assigned with the touch probe function, the filter time of this DI is defined by H0A.19 and H0A.20. When a high-speed DI is DI with the interrupt positioning function, the filter time of this DI is defined by H0A.19. Ensure the effective level hold time of the high-speed DI is longer than the filter time.

Related objects

The drive provides one high-speed DI with input signal frequency up to 4 kHz. When the DI signal is being disturbed, set the filter time in H0A.19 and H0A.20.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H03.60	2003-3Dh	DI1 fitter time	0.00 ms–500.00 ms	3.00	ms	Real-time	"H03_en.60" on page 244
H03.61	2003-3Eh	DI2 fitter time	0.00 ms–500.00 ms	3.00	ms	Real-time	"H03_en.61" on page 244
H03.62	2003-3Fh	DI3 fitter time	0.00 ms–500.00 ms	3.00	ms	Real-time	"H03_en.62" on page 245
H03.63	2003-40h	DI4 fitter time	0.00 ms–500.00 ms	3.00	ms	Real-time	"H03_en.63" on page 245
H0A.19	200A-14h	Filter time constant of touch probe 1	0.00us–6.30us	2.00	us	Real-time	"H0A_en.19" on page 328
H0A.20	200A-15h	Filter time constant of touch probe 2	0.00us–6.30us	2.00	us	Real-time	"H0A_en.20" on page 329

3.6 Communication-forced DO

Function

When CANopen switches to the operational (OP) status, the forced DO is determined by 60FE.01h and 60FE.02h. In the non-operational (non-OP) status (including CAN network), the following two DO options are available by default:

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

Related objects

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H04.23	2004-18h	Communication-forced DO logic in non-OP status	Bit0: DO1 0: Status unchanged 1: No output bit1: DO2 0: Status unchanged 1: No output bit2: DO3 0: Status unchanged 1: No output	0	-	Real-time	"H04_en.23" on page 249

Setting method:

1. Assign DO function 31 to the DO to be controlled forcibly by CiA402 protocol, and then set the bit of H04.23 as needed to select the forced DO status in the non-OP status.
2. Configure 60FE.01h/02h as RPDO, and operate on bit16–bit20 to control the DO.

3.7 Drive stops

Quick stop

Quick stop applies when bit2 (Quick stop) in the control word 6040h is set to 0 (Valid). The quick stop mode is defined by 605Ah.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
605Ah	605Ah	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 stop	"605Ah" on page 487

Halt

When the control word 6040h bit8 = 1 in servo drive running state, a halt command is input and the servo drive performs the halt operation in the mode set in 605Dh.

☆ Related parameters:

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
605Dh	605Dh	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	1	-	At stop	"605Dh" on page 488



Caution

Do not set the deceleration time to an excessively low value. An excessively low value will lead to a long stop distance, incurring the risk of collision.

3.8 Touch Probe

The touch probe function is available in the drive that supports CANopen communication.

Function

The touch probe function is the same as the position latch function. Position feedback sources include motor position. This feature latches the position information (in reference unit) when an DI4 signal or Z signal changes.

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 DI4 is used to trigger the touch probe, the relation between the DI4 logic and the touch probe edge is shown in the following table.

Table 3-2 Description of bit3 of H0A.40

Bit3 of H0A.40	Touch Probe Edge	DI4 logic	DI4 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 DI4 is used to trigger the touch probe, you can set the filter window of the touch probe signal through H0A.19 and H0A.20.

The DI4 touch probe supports hardware action delay compensation to compensate for the precision loss incurred by ON/OFF delay of DI4. Related parameters are shown in the following table.

Parameter		Description
H0A.40	bit1	Touch probe rising edge compensation: 1: Enabled, 0: Disabled
	bit2	Touch probe falling edge compensation: 1: Enabled, 0: Disabled
H0A.53		DI4 probe DI4 on compensation time (DI4 switch off→on)
H0A.54		DI4 probe DI4 off compensation time (DI4 switch on→off)

Note: To shorten the hardware delay to about 7 us, it is recommended to set the touch probe latch through the ON-edge of DI4.

The Z touch probe is triggered by the motor Z signal.

Related objects

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
60B8h	60B8h	Touch probe function	0-65535	0	-	Real-time	"60B8h" on page 504
60B9h	60B9h	Touch probe status	0-65535	0	-	Unchangeable	"60B9h" on page 505
60BAh	60BAh	Touch probe 1 positive edge position value	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"60BAh" on page 506
60BBh	60BBh	Touch probe 1 negative edge position value	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"60BBh" on page 506
60BCh	60BCh	Touch probe 2 positive edge position value	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"60BCh" on page 507
60BDh	60BDh	Touch probe 2 negative edge position value	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"60BDh" on page 507
60D5h	60D5h	Touch probe 1 positive edge counter	0-65535	0	-	Unchangeable	"60D5h" on page 509
60D6h	60D6h	Touch probe 1 negative edge counter	0-65535	0	-	Unchangeable	"60D6h" on page 509

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
60D7h	60D7h	Touch probe 2 positive edge counter	0-65535	0	-	Unchangeable	"60D7h" on page 509
60D8h	60D8h	Touch probe 2 negative edge counter	0-65535	0	-	Unchangeable	"60D8h" on page 510

Steps

Example:

Use DI4 to trigger the touch probe. Background: touch probe 1 positive edge, continuous latching

Observe the following steps:

1. Set the function of DI4 (H03.14 = 38). Set the DI4 logic to NO (H03.15 = 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.

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
60B8h	60B8h	Touch probe function	0-65535	0	-	Real-time	"60B8h" on page 504

Set 60B8h to 0x0013 in this example.

3. Read the touch probe status in 60B9h.

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

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
60B9h	60B9h	Touch probe status	0-65535	0	-	Unchangeable	"60B9h" on page 505

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

4. Read latch position of touch probe

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

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

The following figure shows touch probe function settings and status feedback sequence when DI4 is used as the trigger signal in case of latching at positive edge and continuous triggering.

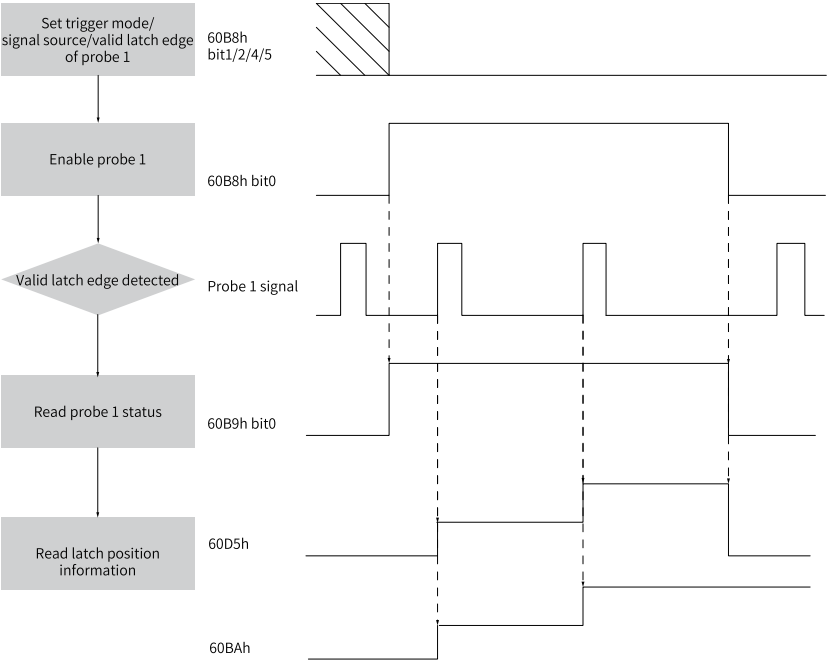


Figure 3-4 Procedure for use of the touch probe

4 Safety Function

4.1 General

4.1.1 Terms and Abbreviations

Terms and Abbreviations	Description
Cat.	Safety category It includes B, 1, 2, 3, and 4.
CCF	Common cause failure
DCavg	Average diagnostic coverage (%)
DTI	Diagnostic test interval time
SFF	Safe failure fraction
HFT	Hardware fault tolerance
PFH _D	Probability of a dangerous Failure per Hour
PL	Performance Level
SC	Systematic capability
SIL	Safety integrity level
T ₁	Test interval
DI	Digital inputs
DO	Digital output
PCB	Printed circuit board
MCU	Micro computer unit
FPGA	Field programmable gate array
MTTF _D	Mean time to dangerous failure
STO	Safe torque off

4.1.2 Safety Standards and Parameters

Standards compliance

- North American standards (UL)
 - UL 61800-5-1
 - CSA C22.2 No. 274
- EC directives and standards
 - Low Voltage Directive 2014/35/EU Standard EN 61800-5-1
 - EMC Directive 2014/30/EU Standard EN 61800-3: 2018
 - Machinery Directive 2006/42/EC (Safety Functions) Standard IEC 61800-5-2

- Safety standard

Note

STO certification is ongoing.

Model	Safety standard	Reference
SVD60*****	Functional safety	IEC 61508: 2010 ISO 13849-1: 2015 ISO 13849-2: 2012 IEC 62061: 2021 IEC 61800-3: 2017 EN 61508: 2010 EN ISO 13849-1: 2015 EN ISO 13849-2: 2012 EN IEC 62061: 2021 EN IEC 61800-3: 2018
	EMC	IEC 61000-6-7:2014 IEC 61326-3-1:2017 IEC 61800-5-2: 2016 IEC 61800-3:2017 EN 61000-6-7:2015 EN 61326-3-1:2017 EN 61800-5-2: 2017 EN IEC 61800-3:2018
	LVD	IEC 61800-5-1:2007/AMD1:2016 EN 61800-5-1:2007/A1:2017

- Safety data

Item	Safety data
SIL	SIL3, IEC61508 Maximum SIL3, EN IEC62061
PFH _D	$PFH_D \leq 0.16 \times 10^{-7} [1/h]$ (16% of SIL3)
Cat.	3, EN ISO 13849-1
PL	e, EN ISO 13849-1
MTTF _d	441.3 years (high)
DCavg	≥90% (medium)
T ₁	10 years
HFT	1
SC	SC3
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.

Item	Description																				
Ambient/Storage temperature	0 to 55°C/-20°C to +70°C																				
Ambient/Storage humidity	20%–95% RH (no condensation)																				
Vibration	<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 is powered on and works normally.</td></tr> <tr> <td>Motion mode</td><td>Sinusoidal</td></tr> <tr> <td>Vibration amplitude/ Acceleration rate</td><td>-</td></tr> <tr> <td>10 Hz ≤ f ≤ 57 Hz</td><td>0.075 mm amplitude</td></tr> <tr> <td>57 Hz < f ≤ 150 Hz</td><td>1 kg</td></tr> <tr> <td>Vibration duration</td><td>10 times on each of the three mutually perpendicular axes</td></tr> <tr> <td>Axis</td><td>X, Y, Z</td></tr> <tr> <td>Installation</td><td>According to the manufacturer's specifications</td></tr> </table>	Item	Test Condition	Test reference	See IEC 60068-2-6 4.6	Condition	EUT is powered on and works normally.	Motion mode	Sinusoidal	Vibration amplitude/ Acceleration rate	-	10 Hz ≤ f ≤ 57 Hz	0.075 mm amplitude	57 Hz < f ≤ 150 Hz	1 kg	Vibration duration	10 times on each of the three mutually perpendicular axes	Axis	X, Y, Z	Installation	According to the manufacturer's specifications
Item	Test Condition																				
Test reference	See IEC 60068-2-6 4.6																				
Condition	EUT is powered on and works normally.																				
Motion mode	Sinusoidal																				
Vibration amplitude/ Acceleration rate	-																				
10 Hz ≤ f ≤ 57 Hz	0.075 mm amplitude																				
57 Hz < f ≤ 150 Hz	1 kg																				
Vibration duration	10 times on each of the three mutually perpendicular axes																				
Axis	X, Y, Z																				
Installation	According to the manufacturer's specifications																				
Shock resistance	<table> <tr> <th>Item</th><th>Test Condition</th></tr> <tr> <td>Test reference</td><td>See IEC 60068-2-27: 2008 Table 17</td></tr> <tr> <td>Condition</td><td>EUT is powered on and works normally.</td></tr> <tr> <td>Motion mode</td><td>Half-sine pulse</td></tr> <tr> <td>Shock amplitude/ Time</td><td>50 m/s² (5 g) 30 ms</td></tr> <tr> <td>Number of shocks</td><td>3 per axis on each of three mutually perpendicular axes</td></tr> <tr> <td>Axis</td><td>±X, ±Y, ±Z</td></tr> <tr> <td>Installation</td><td>According to the manufacturer's specifications</td></tr> </table>	Item	Test Condition	Test reference	See IEC 60068-2-27: 2008 Table 17	Condition	EUT is powered on and works normally.	Motion mode	Half-sine pulse	Shock amplitude/ Time	50 m/s ² (5 g) 30 ms	Number of shocks	3 per axis on each of three mutually perpendicular axes	Axis	±X, ±Y, ±Z	Installation	According to the manufacturer's specifications				
Item	Test Condition																				
Test reference	See IEC 60068-2-27: 2008 Table 17																				
Condition	EUT is powered on and works normally.																				
Motion mode	Half-sine pulse																				
Shock amplitude/ Time	50 m/s ² (5 g) 30 ms																				
Number of shocks	3 per axis on each of three mutually perpendicular axes																				
Axis	±X, ±Y, ±Z																				
Installation	According to the manufacturer's specifications																				
IP rating	IP20																				
Pollution degree (PD)	PD2: free of corrosive or explosive gases; free of exposure to water, oil or chemicals; free of dust, salts or iron dust																				

Item	Description
Altitude	2000 m or below
Cooling method	Dry clean air (natural convection)
Others	Free of static electricity, strong electromagnetic fields, magnetic fields, or exposure to radioactivity

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

Item	Description
Applicable servo drives	SVD60 x 6R5I-FS SVD60 x 012I-FS SVD60 x 023I-FS
Position	Integrated on the control board of the drive
Safety function - Inputs	Two channels: STO1/STO2

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

4.1.3 Precautions for Use

Safety Instructions

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

Any illustrations, photographs, or examples used in this manual are provided as examples only and may not apply to all products to which this manual is applicable.

The products and specifications described in this manual or the content and presentation of the manual may be changed without notice to improve the product and/or the manual.

Table 4–1 Warnings, Cautions and Notes

Icon	Signal word	Description	Consequences in case of disregard
Example:  General hazards  Special hazards e.g. electric shock	DANGER	DANGER	Indicates that failure to comply with the notice will result in death or severe personal injuries
	WARNINGS	Alarm	Indicates that failure to comply with the notice may result in death or severe personal injuries
	CAUTION	Note	Indicates that failure to comply with the notice may result in minor or moderate personal injuries or equipment damage
	STOP	Prohibit	Indicates that failure to comply with the notice will result in equipment or environmental damage

 Caution

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

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

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

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

Safety Precautions

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

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

Note

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

Risk Assessment

- When using the safety functions, perform risk assessment on the servo system in advance. Make sure that the safety integrity level of the standards is met.
- The following residual risks can be present even when the safety functions operate. Therefore, safety must always be given consideration during risk assessment.

- If external forces (such as gravitational force with a vertical axis) are applied when the safety functions are operating, the motor will rotate due to the action of these external forces. Therefore, you must use a separate mechanical brake to secure the motor.

Note

In the case of failure of multiple IGBTs, no matter whether the STO function is enabled, the servo drive can generate an alignment torque. This torque can cause the motor shaft to rotate within a range of up to $180/\text{number of motor pole pairs}$ (for a synchronous reluctance motor, the range is $180/2 \times \text{number of motor pole pairs}$).

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

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

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

Common residual risks

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

Safe torque off (STO)

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

4.2 Safe Torque Off (STO)

4.2.1 Function Overview

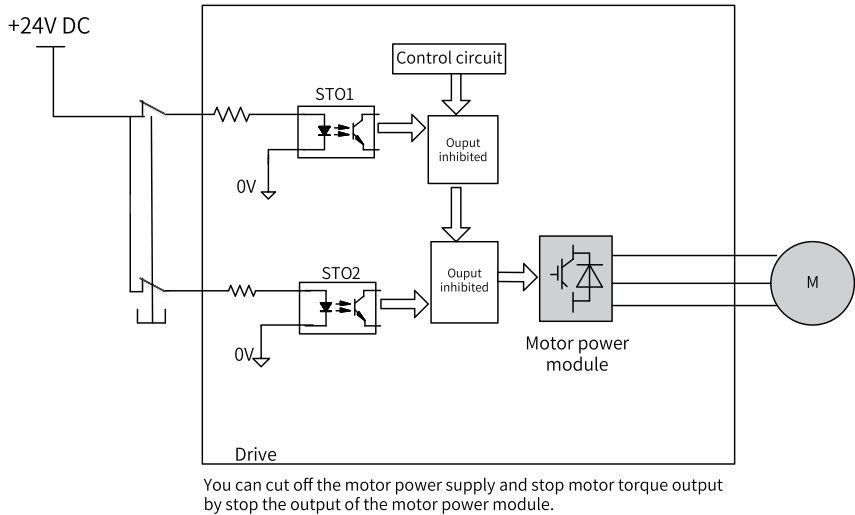


Figure 4-1 Schematics of the STO function

Safe Torque Off (STO) is a safety function that complies with IEC 61800-5-2:2016. It is built into Inovance SVD60 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. STO1 and STO2 input signals must be both active to allow the servo drive to operate normally.

See the following table for the STO function.

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

STO (safe torque)	
Description	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 when STO function is activated, it coasts to stop.
Safe state	Disables the PWM gating signal of the drive.
Operation mode	High demand mode or continuous mode

4.2.2 Function Use and Monitoring

Function Use

The keypad displays the STO function state and error information.

See the following table to identify the cause of a fault and the action to be taken. Contact Inovance technical support if the fault persists after corrective actions listed in the following table are taken.

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

Fault Code	state	Description	Cause	Corrective Action
E150.0	STO is triggered normally	When H0A.21=1, the drive reports an E150.0 error when STO enabling is triggered.	When H0A.21=1, the drive reports an E150.0 error when STO enabling is triggered.	When STO exits, you need not only to cancel both request commands of STO, but also to perform fault reset to clear E150.0.
E150.1	Status of STO1 and STO2 inconsistent	Only one of STO1 and STO2 is in "Low" state, status of STO1 and STO2 are inconsistent.	The input states of STO1 and STO2 are inconsistent.	1. Ensure the requests for disconnecting the voltage of STO1 and STO2 are triggered simultaneously. 2. The input circuit is abnormal and a certain STO input signal is still in the "H" state after the 24 V signal is disconnected. Contact Inovance for technical support.
E150.2	STO activated	OV/UV of the 5V power supply is detected.	OV/UV of the 5V power supply.	Restore the 5 V power supply to normal state. Contact Inovance for technical support.
E150.3	STO activated	The input circuit of STO works improperly.	The input circuit of STO works improperly.	Fix the input circuit fault. Contact Inovance for technical support.
E150.4	STO activated	The buffer circuit of STO works improperly.	The buffer circuit of STO works improperly.	Fix the buffer circuit fault. Contact Inovance for technical support.

Note

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

EDM DO signal

When STO1 and STO2 input 24V voltage are cut off, the EDM DO signal is active, otherwise the EDM DO signal is inactive.

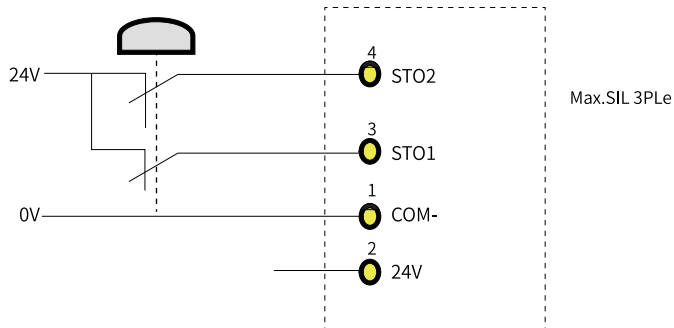
At this time, STO1 and STO2 are filtered signals. When EDM is active, the servo drive blocks the PWM signal.

Signal Name	Mark	Photo coupler logic			
Safety input	STO1	ON	ON	OFF	OFF
	STO2	ON	OFF	ON	OFF
EDM output	EDM	OFF	OFF	OFF	ON

Application Example of Safety Function

Example 1:

Emergency button (dual-contact) Class 3 ISO13849



4.2.3 STO state reset

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

- The PWM buffer is disabled as the enable terminal is pulled up during power-on, so the PWM signal is inhibited.

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

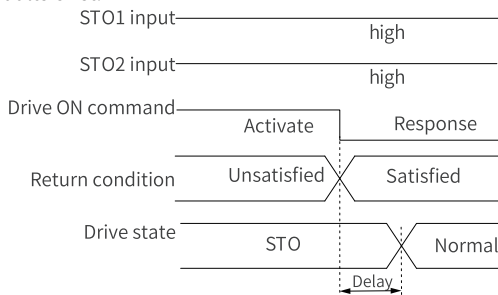


Figure 4-2 Return condition of servo ON/RUN command

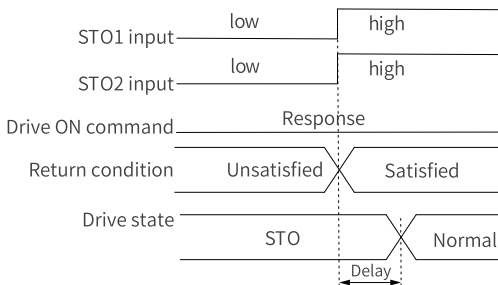


Figure 4-3 Return condition of external STO request state

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

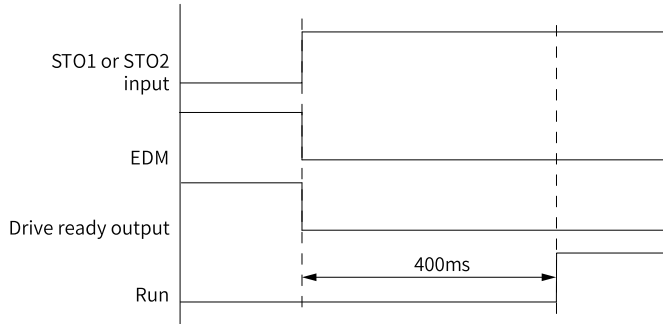
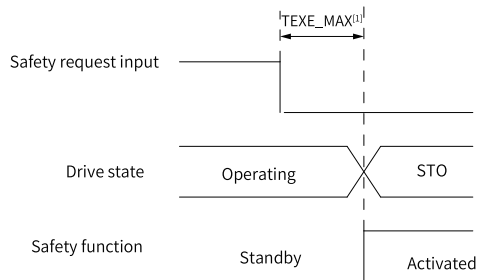


Figure 4-4 Servo drive reset timing diagram

4.2.4 Safety Function Response Time

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

If either or both of them are at low level simultaneously, the PWM signal will be blocked in the next 30 ms.



Note

[1]: The typical response time is 30 ms for a motor with a brake, and 5 ms for a motor without a brake. The maximum response time of electrical components is 100 ms.

4.3 Acceptance

Basic requirements

- Technical staff must be trained to understand the requirements and principles of designing and operating safety-related systems.

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

Commissioning Checklist

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

The acceptance test must be performed:

- at initial start-up of the safety function
- After any changes related to safety functions (wiring, assembly, settings, or other related operations)
- 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, fault reports, and troubleshooting records. Any new acceptance tests performed due to changes or maintenance need to be logged into the logbook.

- Checklist of integrated STO functions

Step	Action	Result
1	Ensure that the drive runs and stops freely during commissioning.	
2	Stop the drive (if running), switch the input power supply off and isolate the drive from the power line by a disconnecter.	
3	Check the STO circuit connections against the circuit diagram.	
4	Check that the shield of the STO input cable is grounded to the drive frame.	
5	Close the disconnecter and switch the power supply on.	

Step	Action	Result
5.1	Test the STO signal #1 when the motor is stopped: 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 is stopped: 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 give a start command for 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.	
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".	

Step	Action	Result
6.4	Set STO2 to "H" and disable the ON/RUN command of the drive. Then, reset the drive automatically and enable ON/RUN command of the drive. Finally, check whether the motor runs normally.	
7	Document and sign the acceptance test report which verifies that the safety function is safe and acceptable for operation.	

Special requirements

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

Note

There are two ways to perform STO diagnosis:

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

You can use either of them.

4.4 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
E150.1	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 24 V 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.

5 Description

5.1 H00 Servo Motor Parameters

H00.00	Motor SN		
	Hex:	2000-01h	Effective mode: Upon the next power-on
	Min.:	0	Unit: -
	Max.:	65535	Data Type: UInt16
	Default:	14101	Change: At stop
	Value Range: 0–65535		
	Description 14000: Inovance 20-bit incremental encoder motor 14101: Inovance 23-bit absolute encoder motor 14102: Inovance 26-bit absolute encoder motor		
H00.02	Customized No.		
	Hex:	2000-03h	Effective mode: -
	Min.:	0.00	Unit: -
	Max.:	42949672.95	Data Type: UInt32
	Default:	0.00	Change: Unchangeable
	Value Range: 0.00–42949672.95		
	Description Differentiates the customized MCU software version, which is not applicable to standard models.		
H00.04	Encoder version		
	Hex:	2000-05h	Effective mode: -
	Min.:	0.0	Unit: -
	Max.:	6553.5	Data Type: UInt16
	Default:	0.0	Change: Unchangeable
	Value Range: 0.0–6553.5		
	Description Saved in the encoder and used to differentiate the encoder software version.		

H00.05 Serial-type motor code

Hex:	2000-06h	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

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

H00.06 FPGA customized SN

Hex:	2000-07h	Effective	-
		mode:	
Min.:	0.00	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0.00	Change:	Unchangeable

Value Range:

0.00–655.35

Description

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

H00.07 STO version

Hex:	2000-08h	Effective	-
		mode:	
Min.:	0.00	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0.00	Change:	Unchangeable

Value Range:

0.00–655.35

Description

Display the software version number of STO function.

H00.08 Bus encoder type

Hex:	2000-09h	Effective	Real time
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0–65535

Description

14100: Multi-turn absolute encoder

Others: Single-turn absolute encoder

5.2 H01 Servo Drive Parameters

H01.00 MCU software version

Hex:	2001-01h	Effective	-
		mode:	
Min.:	0.0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0.0	Change:	Unchangeable

Value Range:

0.0–6553.5

Description

Displays MCU software version (with one decimal place).

H01.01 FPGA software version

Hex:	2001-02h	Effective	-
		mode:	
Min.:	0.0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0.0	Change:	Unchangeable

Value Range:

0.0–6553.5

Description

Displays the FPGA software version, with 1 decimal place.

H01.02 Servo drive series No.

Hex:	2001-03h	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Display servo drive serial number, with 0 decimal place.

H01.06 Board software version

Hex:	2001-07h	Effective mode:	-
Min.:	0.0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0.0	Change:	Unchangeable

Value Range:

0.0–6553.5

Description

Display board software version number, with 1 decimal place.

H01.10 Drive series No.

Hex:	2001-0Bh	Effective mode:	Upon the next power-on
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	106	Change:	At stop

Value Range:

104: 6R5

105: 012

106: 023

Description

Displays the drive series number, with no decimal place.

H01.11 DC-AC voltage class

Hex:	2001-0Ch	Effective mode:	-
Min.:	0	Unit:	V
Max.:	65535	Data Type:	UInt16
Default:	48	Change:	Unchangeable

Value Range:

0 V to 65535 V

Description

Display inverter voltage level, with 0 decimal place.

H01.12 Drive rated power

Hex:	2001-0Dh	Effective mode:	-
Min.:	0.00	Unit:	kW
Max.:	10737418.24	Data Type:	UInt32
Default:	0.75	Change:	Unchangeable

Value Range:

0.00 kW–10737418.24kW

Description

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

H01.14 Max. output power of the drive

Hex:	2001-0Fh	Effective	-
		mode:	
Min.:	0.00	Unit:	kW
Max.:	10737418.24	Data Type:	UInt32
Default:	0.75	Change:	Unchangeable

Value Range:

0.00 kW–10737418.24kW

Description

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

H01.16 Rated output current of the drive

Hex:	2001-11h	Effective	-
		mode:	
Min.:	0.00	Unit:	A
Max.:	10737418.24	Data Type:	UInt32
Default:	23.00	Change:	Unchangeable

Value Range:

0.00A–10737418.24A

Description

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

H01.18 Max. output current of the drive

Hex:	2001-13h	Effective	-
		mode:	
Min.:	0.00	Unit:	A
Max.:	10737418.24	Data Type:	UInt32
Default:	62.00	Change:	Unchangeable

Value Range:

0.00A–10737418.24A

Description

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

H01.40 DC bus overvoltage protection threshold

Hex:	2001-29h	Effective	Real time
		mode:	
Min.:	0	Unit:	V

Max.: 80

Default: 64

Data Type: UInt16

Change: Real-time

Value Range:

0 V to 80 V

Description

Display DC bus overvoltage protection threshold, with 0 decimal place. It must not be lower than the upper limit of the bus voltage establishing range.

Bus voltage establishing range:

24 V voltage class: 20 V–28 V

48 V voltage class: 28 V–55 V

72 V voltage class: 55 V–74 V

H01.43**Power supply unit SN**

Hex: 2001-2Ch

Effective mode: Upon the next power-on

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 102

Change: At stop

Value Range:

101: 24 V

102: 48 V

103: 72 V

Description

Display the serial number of the power supply unit.

H01.63**Drive derating coefficient**

Hex: 2001-40h

Effective mode: Real time

Min.: 0.0

Unit: %

Max.: 200.0

Data Type: UInt16

Default: 100.0

Change: Real-time

Value Range:

0.0% to 200.0%

Description

-

H01.75**Current loop amplification factor**

Hex: 2001-4Ch

Effective mode: Real time

Min.: 0.00

Unit: -

Max.: 655.35

Data Type: UInt16

Default: 1.00

Change: Real-time

Value Range:

0.00–655.35

Description

Displays current loop amplification coefficient, with 2 decimal places.

H01.88 Junction temperature parameter version

Hex: 2001-59h

Effective -

mode:

Min.: 0.0

Unit: -

Max.: 6553.5

Data Type: UInt16

Default: 0.0

Change: Unchangeable

Value Range:

0.0–6553.5

Description

Display the version number of the junction temperature parameter.

H01.89 Junction temperature parameter version 2

Hex: 2001-5Ah

Effective -

mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

Display the version number of the junction temperature parameter.

H01.91 Mask of other motor parameters

Hex: 2001-5Ch

Effective Upon the next power-on

mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0–65535

Description

Set the mask of other motor parameters.

5.3 H02 Basic Control Parameters

H02.00	Control mode		
	Hex:	2002-01h	Effective mode:
	Min.:	0	Unit:
	Max.:	8	Data Type:
	Default:	8	Change:

Real time

Value Range:

- 0: Speed control mode
- 1: Position control mode
- 2: Torque control mode
- 3: Torque/Speed control mode
- 4: Speed/Position control mode
- 5: Torque/Position control mode
- 6: Torque/Speed/Position compound mode
- 7: Process segment
- 8: CANOpen mode

Description

- 0: Speed control mode
- 1: Position control mode
- 2: Torque control mode
- 3: Torque/Speed control mode
- 4: Speed/Position control mode
- 5: Torque/Position control mode
- 6: Torque/Speed/Position compound mode
- 7: Process segment
- 8: CANopen mode

H02.01	Absolute system selection		
	Hex:	2002-02h	Effective mode:
	Min.:	0	Unit:
	Max.:	4	Data Type:
	Default:	0	Change:

Upon the next power-on

Value Range:

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

Description

Used to set the absolute position function.

H02.02

Rotation direction selection

Hex:	2002-03h	Effective mode:	Upon the next power-on
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

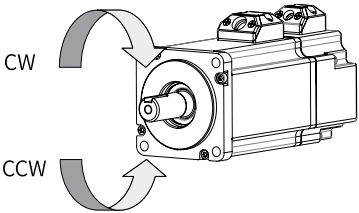
0: Counterclockwise (CCW) as forward direction

1: Clockwise (CW) as forward direction

Description

Defines the forward direction of the motor when viewed from the motor shaft side.

Value	Rotating direction	Remarks
0	Counterclockwise (CCW) as forward direction	Defines the CCW direction as the forward direction when a forward run command is received, indicating the motor rotates in the CCW direction when viewed from the motor shaft side.
1	Counterclockwise (CW) as forward direction	When a forward command is input, the motor rotates in CW direction viewed from the motor shaft side, that is, the motor rotates clockwise.



H02.05

Stop mode at S-ON OFF

Hex:	2002-06h	Effective mode:	At stop
Min.:	0	Unit:	-
Max.:	1	Data Type:	Int16
Default:	1	Change:	Real-time

Value Range:

0: Coast to stop, keeping de-energized state

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

Description

Defines the deceleration mode of the motor for stopping rotating upon S-ON OFF and the motor status after stop. In a non-communication mode, the ramp of 6084h is set by H06.40.

H02.06 Stop mode at No. 2 fault

Hex:	2002-07h	Effective mode:	At stop
Min.:	0	Unit:	-
Max.:	3	Data Type:	Int16
Default:	2	Change:	Real-time

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

Description

Defines the deceleration mode of the servo motor for stopping rotating and the servo motor status when a No. 2 fault occurs. In a non-communication mode, the ramp of 6084h is set by H06.40, and 6085h is set by H06.41.

H02.07 Stop mode at overtravel

Hex:	2002-08h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	4	Change:	At stop

Value Range:

0: Coast to stop, keeping de-energized state

1: Stop at zero speed, keeping position lock state

2: Stop at zero speed, keeping de-energized state

3: Stop based on ramp, keeping de-energized state

4: Stop based on ramp, keeping position lock state

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. In a non-communication mode, the ramp of 6085h is set by H06.41.

H02.08 Stop mode at No.1 fault

Hex:	2002-09h	Effective	Real time
		mode:	
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Coast to stop, keeping the de-energized state

1: Stop upon electromagnetic shorting, keeping the de-energized 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

Hex:	2002-0Ah	Effective	At stop
		mode:	
Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	250	Change:	Real-time

Value Range:

0 ms–500 ms

Description

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

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

Hex:	2002-0Bh	Effective	Real time
		mode:	
Min.:	50	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	150	Change:	Real-time

Value Range:

50 ms–1000 ms

Description

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

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

Hex:	2002-0Ch	Effective	Real time
		mode:	
Min.:	20	Unit:	rpm

Max.:	3000	Data Type:	UInt16
Default:	30	Change:	Real-time

Value Range:

20 rpm to 3000 rpm

Description

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

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

Hex:	2002-0Dh	Effective mode:	Real time
Min.:	1	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	500	Change:	Real-time

Value Range:

1 ms–65535 ms

Description

Sets the delay time from BK OFF to S-ON OFF when the motor is in rotating state. This is counted after command interpolation.

H02.18 Quick stop mode

Hex:	2002-13h	Effective mode:	At stop
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	2	Change:	Real-time

Value Range:

0: Coast to stop, keeping de-energized state
1: Stop by ramp 1, keeping de-energized state
2: Stop by ramp 2, keeping de-energized state
3: Stop at emergency stop torque, keeping de-energized state
5: Stop by ramp 1, keeping position lock state
6: Stop by ramp 2, 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 braking resistor

Hex:	2002-16h	Effective mode:	-

Min.:	1	Unit:	Ω
Max.:	1000	Data Type:	UInt16
Default:	10	Change:	Unchangeable

Value Range:1 Ω to 1000 Ω **Description**

-

H02.24 Resistor heat dissipation coefficient

Hex:	2002-19h	Effective mode:	Real time
Min.:	10	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	30	Change:	Real-time

Value Range:

10% to 100%

Description

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

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

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

Recommendations:

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

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

H02.25 Braking resistor type

Hex:	2002-1Ah	Effective mode:	Real time
Min.:	1	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	3	Change:	Real-time

Value Range:

1: External resistor, naturally ventilated

2: External resistor, forced cooling

3: Internal capacitor

Description

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

H02.26**Power of external braking resistor**

Hex:	2002-1Bh	Effective mode:	Real time
Min.:	1	Unit:	W
Max.:	65535	Data Type:	UInt16
Default:	40	Change:	Real-time

Value Range:

1 W–65535W

Description

Defines the power of external braking resistor.

H02.27**Resistance of external braking resistor**

Hex:	2002-1Ch	Effective mode:	Real time
Min.:	10	Unit:	Ω
Max.:	1000	Data Type:	UInt16
Default:	50	Change:	Real-time

Value Range:10 Ω to 1000 Ω **Description**

Defines the resistance of the external braking resistor.

H02.31**System parameter initialization**

Hex:	2002-20h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation

1: Restore default settings

2: Clear fault records

Description

Used to restore default values or clear fault records.

H02.36**Ramp-to-stop delay**

Hex:	2002-25h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	1000	Change:	At stop

Value Range:

0 ms–65535 ms

Description

-

H02.38 Overload time of external resistor

Hex:	2002-27h	Effective mode:	Upon the next power-on
Min.:	0	Unit:	s
Max.:	200	Data Type:	UInt16
Default:	20	Change:	Real-time

Value Range:

0s to 200s

Description

Set the overload time threshold of the external braking resistor.

H02.41 Manufacturer password

Hex:	2002-2Ah	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0–65535

Description

-

H02.47 Delay time from power cable breakage to brake OFF

Hex:	2002-30h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 ms–1000 ms

Description

Sets the delay time from power cable breakage to brake OFF.

5.4 H03 Terminal Input Parameters

H03.00 DI function allocation 1 (activated upon power-on)

Hex:	2003-01h	Effective mode:	Upon the next power-on
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

- 0: Corresponding to null
- 1: Corresponding to FunIN.1
- 2: Corresponding to FunIN.2
- 4: Corresponding to FunIN.3
- 8: Corresponding to FunIN.4
- 16: Corresponding to FunIN.5
- 32: Corresponding to FunIN.6
- 64: Corresponding to FunIN.7
- 128: Corresponding to FunIN.8
- 256: Corresponding to FunIN.9
- 512: Corresponding to FunIN.10
- 1024: Corresponding to FunIN.11
- 2048: Corresponding to FunIN.12
- 4096: Corresponding to FunIN.13
- 8192: Corresponding to FunIN.14
- 16384: Corresponding to FunIN.15
- 32768: Corresponding to FunIN.16

Description

Used to enable a certain DI function (FunIN.1 to FunIN.16) to be activated immediately at next power-on.

H03.01 DI function allocation 2 (activated upon power-on)

Hex:	2003-02h	Effective mode:	Upon the next power-on
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

- 0: Corresponding to null
- 1: Corresponding to FunIN.17
- 2: Corresponding to FunIN.18
- 4: Corresponding to FunIN.19
- 8: Corresponding to FunIN.20
- 128: Corresponding to FunIN.24
- 256: Corresponding to FunIN.25
- 512: Corresponding to FunIN.26
- 1024: Corresponding to FunIN.27
- 2048: Corresponding to FunIN.28
- 4096: Corresponding to FunIN.29
- 16384: Corresponding to FunIN.31
- 32768: Corresponding to FunIN.32

Description

Used to enable a certain DI function (FunIN.17 to FunIN.32) to be activated immediately at next power-on.

H03.02

DI1 function

Hex:	2003-03h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	14	Change:	Real-time

Value Range:

- 0: No assignment
- 1: S-ON
- 2: Warning reset signal
- 3: Gain switchover switch
- 4: Switchover between main and auxiliary commands
- 5: Multi-reference direction
- 6: Multi-reference switchover CMD1
- 7: Multi-reference switchover CMD2
- 8: Multi-reference switchover CMD3
- 9: Multi-reference switchover CMD4
- 10: Mode switchover M1-SEL
- 11: Mode switchover M2-SEL
- 12: Zero clamp enable signal

- 13: Position reference inhibited
- 14: Positive limit switch
- 15: Reverse limit switch
- 16: Positive external torque limit
- 17: Negative external torque limit
- 18: Forward jog
- 19: Reverse jog
- 24: Electronic gear
- 25: Torque reference direction
- 26: Speed reference direction
- 27: Position reference direction
- 28: Multi-position reference enable
- 29: Interrupt positioning state exit signal
- 31: Home switch
- 32: Homing enable
- 33: Interrupt positioning inhibited
- 34: Emergency stop
- 35: Clear position deviation
- 36: Internal speed limit source
- 38: Touch probe 1
- 39: Touch probe 2
- 40: Multi-speed enable
- 41: Current position as home
- 42: Axis control command executed immediately
- 43: Axis control command not executed immediately
- 44: Positioning and command completed signal clear
- 45: Interrupt positioning enable
- 46: Process segment enable
- 47: Process segment command switchover 1
- 48: Process segment command switchover 2
- 49: Process segment command switchover 3
- 50: Process segment command switchover 4
- 51: Event trigger process segment 1
- 52: Event trigger process segment 2
- 53: Event trigger process segment 3
- 54: Event trigger process segment 4
- 55: Process segment pause

Description

Defines the function of DI1.

H03.03 DI1 logic selection

Hex: 2003-04h

Effective Real time

mode:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0: Normally open

1: Closed

Description

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

H03.04 DI2 function

Hex: 2003-05h

Effective Real time

mode:

Min.: 0

Unit: -

Max.: 55

Data Type: UInt16

Default: 15

Change: Real-time

Value Range:

See H03.02.

Description

-

H03.05 DI2 logic selection

Hex: 2003-06h

Effective Real time

mode:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0: Normally open

1: Closed

Description

-

H03.06 DI3 function

Hex: 2003-07h

Effective Real time

mode:

Min.: 0

Unit: -

Max.: 55

Data Type: UInt16

Default: 13

Change: Real-time

Value Range:

See H03.02.

Description

Defines the function of DI3.

H03.07 DI3 logic selection

Hex: 2003-08h

Effective Real time
mode:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0: Normally open

1: Closed

Description

-

H03.08 DI4 function

Hex: 2003-09h

Effective Real time
mode:

Min.: 0

Unit: -

Max.: 55

Data Type: UInt16

Default: 2

Change: Real-time

Value Range:

See H03.02.

Description

-

H03.09 DI4 logic selection

Hex: 2003-0Ah

Effective Real time
mode:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0: Normally open

1: Closed

Description

-

H03.34 DI function allocation 3 (activated upon power-on)

Hex: 2003-23h

Effective Upon the next power-on
mode:

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Corresponding to null
 1: Corresponding to FunIN.33
 2: Corresponding to FunIN.34
 4: Corresponding to FunIN.35
 8: Corresponding to FunIN.36
 16: Corresponding to FunIN.37
 32: Corresponding to FunIN.38
 64: Corresponding to FunIN.39
 128: Corresponding to FunIN.40
 256: Corresponding to FunIN.41
 512: Corresponding to FunIN.42
 1024: Corresponding to FunIN.43
 2048: Corresponding to FunIN.44
 4096: Corresponding to FunIN.45
 8192: Corresponding to FunIN.46
 16384: Corresponding to FunIN.47
 32768: Corresponding to FunIN.48

Description

Used to enable a certain DI function (FunIN.33 to FunIN.37) to be activated immediately at next power-on.

H03.35 DI function allocation 4 (activated upon power-on)

Hex:	2003-24h	Effective mode:	Upon the next power-on
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

- 0: Corresponding to null
- 1: Corresponding to FunIN.49
- 2: Corresponding to FunIN.50
- 4: Corresponding to FunIN.51
- 8: Corresponding to FunIN.52
- 16: Corresponding to FunIN.53
- 32: Corresponding to FunIN.54
- 64: Corresponding to FunIN.55
- 128: Corresponding to FunIN.56
- 256: Corresponding to FunIN.57
- 512: Corresponding to FunIN.58
- 1024: Corresponding to FunIN.59
- 2048: Corresponding to FunIN.60
- 4096: Corresponding to FunIN.61
- 8192: Corresponding to FunIN.62
- 16384: Corresponding to FunIN.63

Description

Used to enable a certain DI function (FunIN.49 to FunIN.64) to be activated immediately at next power-on.

H03.60

DI1 filter time

Hex:	2003-3Dh	Effective mode:	Real time
Min.:	0.00	Unit:	ms
Max.:	500.00	Data Type:	UInt16
Default:	3.00	Change:	Real-time

Value Range:

0.00 ms–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

Hex:	2003-3Eh	Effective mode:	Real time
Min.:	0.00	Unit:	ms
Max.:	500.00	Data Type:	UInt16
Default:	3.00	Change:	Real-time

Value Range:

0.00 ms–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**

Hex:	2003-3Fh	Effective mode:	Real time
Min.:	0.00	Unit:	ms
Max.:	500.00	Data Type:	UInt16
Default:	3.00	Change:	Real-time

Value Range:

0.00 ms–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**

Hex:	2003-40h	Effective mode:	Real time
Min.:	0.00	Unit:	ms
Max.:	500.00	Data Type:	UInt16
Default:	3.00	Change:	Real-time

Value Range:

0.00 ms–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.

5.5 H04 Terminal Output Parameters

H04.00**DO1 function**

Hex:	2004-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	1	Change:	Real-time

Value Range:

- 0: No assignment
- 1: Servo ready
- 2: Motor rotation
- 3: Zero speed
- 4: Speed matching
- 5: Positioning completed
- 6: Proximity
- 7: Torque limited
- 8: Speed limited
- 10: Warning
- 11: Fault
- 15: Interrupt positioning completed
- 16: Homing completed
- 17: Electrical homing completed
- 18: Torque reach
- 19: Speed reach
- 21: Enable completed
- 22: Internal command completed
- 23: Writing next command allowed
- 24: Internal motion completed
- 30: Alarm or fault output
- 31: Communication forced DO
- 32: EDM output

Description
Defines the function of DO1.

H04.01 DO1 logic selection

Hex:	2004-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:
0: Normally open
1: Closed

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

H04.02 DO2 function

Hex:	2004-03h	Effective mode:	Real time

Min.: 0
 Max.: 32
 Default: 5

Unit: -
 Data Type: UInt16
 Change: Real-time

Value Range:

See H04.00.

Description

-

H04.03

DO2 logic selection

Hex: 2004-04h

Effective mode: Real time

Min.: 0
 Max.: 1
 Default: 0

Unit: -
 Data Type: UInt16
 Change: Real-time

Value Range:

0: Normally open

1: Closed

Description

-

H04.04

DO3 function

Hex: 2004-05h

Effective mode: Real time

Min.: 9
 Max.: 9
 Default: 9

Unit: -
 Data Type: UInt16
 Change: Real-time

Value Range:

9: Braking

Description

-

H04.05

DO3 logic selection

Hex: 2004-06h

Effective mode: Real time

Min.: 0
 Max.: 1
 Default: 0

Unit: -
 Data Type: UInt16
 Change: Real-time

Value Range:

0: Normally open

1: Closed

Description

-

H04.22**DO source selection**

Hex: 2004-17h

Effective Real time
mode:

Min.: 0

Unit: -

Max.: 7

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

bit	Name	Description
0	DO1	0: DO1 function output
		1: Bit 0 of H31.04 set through communication
1	DO2	0: DO2 function output
		1: Bit 1 of H31.04 set through communication
2	DO3	0: DO3 function output
		1: Bit 2 of H31.04 set through communication

Description

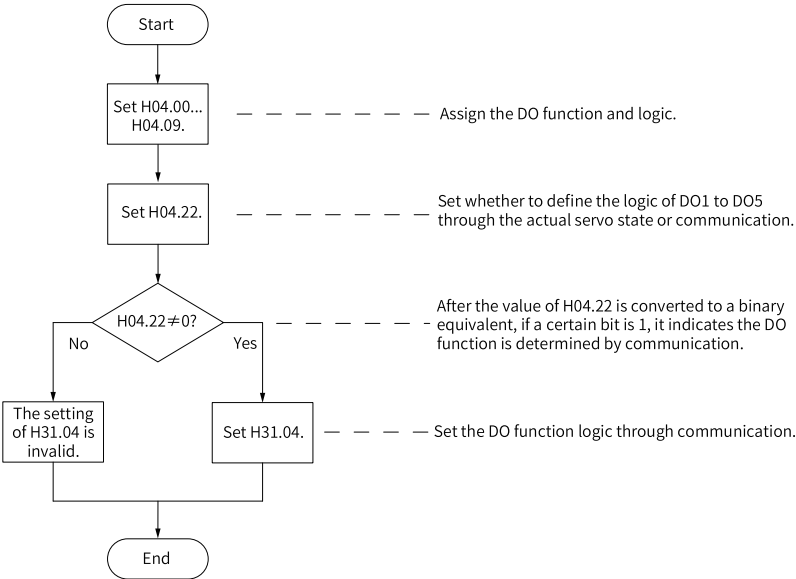
Defines whether the logic of a physical DO terminal is defined by the actual state of the drive or by communication.

The value of H04.22 is displayed in decimal on the keypad. When the value is converted to a binary equivalent: If bit(n) is 0, it indicates the logic of DO(n+1) is defined by the actual state of the drive. If bit(n) is 1, it indicates the logic of DO (n+1) is defined by communication (H31.04).

Setpoint (decimal)	Setpoint (binary)			DO logic	
	bit2	bit1	bit0	Defined by the Drive State	Defined by Communication (H31.04)
	DO3	DO2	DO1		
0	0	0	0	DO1 to DO3	N/A
1	0	0	1	DO2 to DO3	DO1
...	...	...	...	...	...
31	1	1	1	N/A	DO1 to DO3

Set H04.22 to a value listed in the preceding table.

H31.04 is not displayed on the keypad and can only be modified through communication. For H31.04, "bit(n) = 1" indicates the logic of DO(n+1) is active. "bit(n) = 0" indicates the logic of DO(n+1) is inactive.



H04.23 Communication-forced DO logic in non-OP status

Hex:	2004-18h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

bit	Name	Description
0	DO1	0: Status unchanged
		1: No output
1	DO2	0: Status unchanged
		1: No output
2	DO3	0: Status unchanged
		1: No output

Description

-

5.6 H05 Position Control Parameters

H05.00 Primary position reference source

Hex:	2005-01h	Effective mode:	Real time
Min.:	2	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	2	Change:	Real-time

Value Range:

2: Multi-position reference

Description

Defines the position reference source in position control mode.

H05.02 Pulses per revolution

Hex:	2005-03h	Effective mode:	Upon the next power-on
Min.:	0	Unit:	PPR
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At stop

Value Range:

0 PPR to 4294967295 PPR

Description

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

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

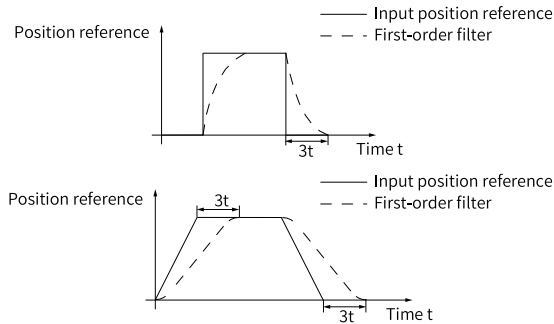
Hex:	2005-05h	Effective mode:	Real time
Min.:	0.0	Unit:	ms
Max.:	6553.5	Data Type:	UInt16
Default:	0.0	Change:	At stop

Value Range:

0.0 ms–6553.5 ms

Description

Defines the first-order low pass filter time constant of position references. If position reference P is rectangular wave or trapezoidal wave, the position reference after first-order low pass filtering is as follows:



This function does not affect the displacement value (position reference sum). An excessively high setpoint delays the responsiveness, so set a proper filter time constant based on actual conditions.

H05.06 Moving average filter time constant 1

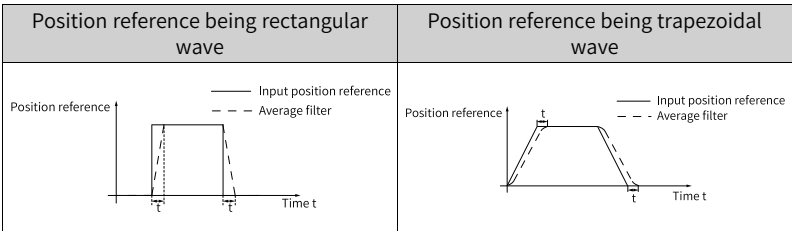
Hex:	2005-07h	Effective mode:	Real time
Min.:	0.0	Unit:	ms
Max.:	128.0	Data Type:	UInt16
Default:	30.0	Change:	At stop

Value Range:

0.0 ms–128.0 ms

Description

Defines the moving average filter time constant of position references. If position reference P is rectangular wave or trapezoidal wave, the position reference after moving average filtering is as follows. This function does not affect the displacement value (position reference sum). An excessively high setpoint delays the responsiveness, so set a proper filter time constant based on actual conditions.



H05.07 Electronic gear ratio 1 (numerator)

Hex:	2005-08h	Effective mode:	Real time
Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	1	Change:	Real-time

Value Range:

1–1073741824

Description

Defines the numerator of electronic gear ratio 1.

H05.09 Electronic gear ratio 1 (denominator)

Hex:	2005-0Ah	Effective mode:	Real time
Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	1	Change:	Real-time

Value Range:

1–1073741824

Description

Defines the denominator of electronic gear ratio 1.

H05.11 Electronic gear ratio 2 (numerator)

Hex:	2005-0Ch	Effective mode:	Real time
Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	1	Change:	Real-time

Value Range:

1–1073741824

Description

Defines the numerator of electronic gear ratio 2.

H05.13 Electronic gear ratio 2 (denominator)

Hex:	2005-0Eh	Effective mode:	Real time
Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	1	Change:	Real-time

Value Range:

1–1073741824

Description

Defines the denominator of electronic gear ratio 2.

H05.16**Clear action**

Hex:	2005-11h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

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

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

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

Description

Defines the condition for clearing the position deviation.

H05.19**Speed feedforward control**

Hex:	2005-14h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: No speed feedforward

1: Internal speed feedforward

3: Zero phase

Description

Defines the source of the speed loop feedforward signal.

H05.20**Condition for positioning completed signal output**

Hex:	2005-15h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	10	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

- 0: Abs. position deviation below H05.21
- 1: Abs. position deviation below H05.21, and filtered position reference is 0
- 2: Abs. position deviation below H05.21, and unfiltered position reference is 0
- 3: Abs. position deviation is kept below H05.21 within the time defined by H05.60 and filtered position reference is 0
- 4: Abs. position deviation is kept below H05.21 within the time defined by H05.60 and filtered position reference is 0
- 5: Abs. position deviation is below H05.21, zero speed signal is active, and unfiltered position reference is 0
- 6: Abs. position deviation is below H05.21, zero speed signal is active, and filtered position reference is 0
- 7: COIN signal judged after the position reference is changed from available to unavailable before filtering and is kept active for the period defined by H05.60, unfiltered position reference is 0, and position deviation is smaller than H05.21
- 8: COIN signal judged after the position reference is changed from available to unavailable after filtering and is kept active for the period defined by H05.60, filtered position reference is 0, and position deviation is smaller than H05.21
- 9: COIN signal judged after the position reference is changed from available to unavailable before filtering, with the position deviation kept lower than H05.21 for the period defined by H05.60 or unfiltered position reference being 0
- 10: COIN signal judged after the position reference is changed from available to unavailable after filtering, with the position deviation kept lower than H05.21 for the period defined by H05.60 or filtered position reference being 0

Description

Defines the condition for outputting positioning completed/proximity signal. In the position control mode, if the absolute value of the position deviation during operation is within the setpoint of H05.21, the drive outputs the positioning completed/proximity signal. You can set the condition for outputting the positioning completed/proximity signal in H05.20.

H05.21 Threshold of positioning completed

Hex:	2005-16h	Effective mode:	Real time
Min.:	1	Unit:	Encoder unit
Max.:	65535	Data Type:	UInt16
Default:	5872	Change:	Real-time

Value Range:

1 to 65535

Description

Defines the threshold of the absolute value of position deviation when the drive outputs the positioning completed signal.

H05.22 Proximity threshold

Hex:	2005-17h	Effective mode:	Real time
Min.:	1	Unit:	Encoder unit
Max.:	65535	Data Type:	UInt16
Default:	65535	Change:	Real-time

Value Range:

1 to 65535

Description

Defines the threshold of the absolute value of position deviation when the drive outputs the proximity signal.

H05.24 Interrupt positioning displacement

Hex:	2005-19h	Effective mode:	Real time
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	Real-time

Value Range:

-1073741824 to 1073741824

Description

Defines the position reference value during interrupt positioning.

H05.26 Constant operating speed in interrupt positioning

Hex:	2005-1Bh	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time

Value Range:

0rpm to 10000rpm

Description

Defines the maximum speed during interrupt positioning.

H05.27 Acc./Dec. time of interrupt positioning

Hex:	2005-1Ch	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Defines the time for the motor to change from 0 rpm to 1000 rpm at a constant speed during interrupt positioning.

H05.29 Interruption fixed length unlock

Hex:	2005-1Eh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	Real-time

Value Range:

0: Disabled

1: Enabled

Description

Defines whether to unlock the interrupt positioning signal.

H05.30 Homing enable selection

Hex:	2005-1Fh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	8	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Disabled

1: Homing enabled through the HomingStart signal input from DI

2: Electrical homing enabled through the HomingStart signal input from DI

3: Homing started immediately upon power-on

4: Homing executed immediately

5: Electrical homing started

6: Current position as home

8: D-triggered position as home

Description

Defines the homing mode and the trigger signal source.

H05.31 Homing mode

Hex:	2005-20h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	16	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

- 0: Forward, home switch as deceleration point and home
- 1: Reverse, home switch as deceleration point and home
- 2: Forward, Z signal as deceleration point and home
- 3: Reverse, motor Z signal as deceleration point and home
- 4: Forward, home switch as deceleration point and Z signal as home
- 5: Reverse, home switch as deceleration point and Z signal as home
- 6: Forward, positive limit switch as deceleration point and home
- 7: Reverse, negative limit switch as deceleration point and home
- 8: Forward, positive limit switch as deceleration point and Z signal as home
- 9: Reverse, negative limit switch as deceleration point and Z signal as home
- 10: Forward, mechanical limit position as deceleration point and home
- 11: Reverse, mechanical limit position as deceleration point and home
- 12: Forward, mechanical limit position as deceleration point and Z signal as home
- 13: Reverse, mechanical limit position as deceleration point and Z signal as home
- 14: Forward single-turn homing
- 15: Reverse single-turn homing
- 16: Nearby single-turn homing

Description

Defines the default motor direction of rotation, deceleration point, and home during homing.

H05.32 Speed of high-speed search for home switch signal

Hex:	2005-21h	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	3000	Data Type:	UInt16
Default:	100	Change:	Real-time

Value Range:

0rpm to 3000rpm

Description

Defines the motor speed for searching for the deceleration point signal during homing.

H05.33 Speed of low-speed search for home switch signal

Hex:	2005-22h	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	1000	Data Type:	UInt16

Default: 10

Change: Real-time

Value Range:

0 rpm to 1000 rpm

Description

Defines the motor speed for searching for the home signal during homing.

H05.34 Acceleration/Deceleration time during homing

Hex: 2005-23h

Effective Real time

mode:

Min.: 0

Unit: ms

Max.: 1000

Data Type: UInt16

Default: 1000

Change: Real-time

Value Range:

0 ms–1000 ms

Description

Defines the time for the motor to accelerate from 0 rpm to 1000 rpm at a constant speed during homing.

H05.35 Home search time limit

Hex: 2005-24h

Effective Real time

mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 10000

Change: Real-time

Value Range:

0–65535

Description

Set the maximum home search time, depending on the setting of H05.66.

H05.36 Mechanical home offset

Hex: 2005-25h

Effective Real time

mode:

Min.: -2147483648

Unit: Reference unit

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Real-time

Value Range:

-2147483648 to 2147483647

Description

Defines the absolute position of the motor after homing.

H05.39 Electronic gear ratio switchover condition

Hex:	2005-28h	Effective	Real time
		mode:	
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Switchover after position reference is 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

Hex:	2005-29h	Effective	Real time
		mode:	
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

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

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

2: H05.36 as the coordinate after homing, reverse homing auto-applied on overtravel

3: H05.36 as the relative offset after homing, reverse homing auto-applied on overtravel

Description

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

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

Hex:	2005-33h	Effective	Real time
		mode:	
Min.:	1	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1–65535

Description

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

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

Hex:	2005-34h	Effective mode:	Real time
Min.:	1	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1–65535

Description

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

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

Hex:	2005-35h	Effective mode:	Real time
Min.:	0	Unit:	Encoder unit
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At stop

Value Range:

0 to 4294967295

Description

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

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

Hex:	2005-37h	Effective mode:	Real time
Min.:	0	Unit:	Encoder unit
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At stop

Value Range:

0 to 4294967295

Description

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

H05.56 Mechanical limit speed threshold

Hex:	2005-39h	Effective mode:	Real time

Min.:	0	Unit:	-
Max.:	1000	Data Type:	UInt16
Default:	2	Change:	Real-time

Value Range:

0–1000

Description

-

H05.57 Mechanical limit times threshold

Hex:	2005-3Ah	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	20	Change:	Real-time

Value Range:

0–65535

Description

-

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

Hex:	2005-3Bh	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	400.0	Data Type:	UInt16
Default:	100.0	Change:	Real-time

Value Range:

0.0% to 400.0%

Description

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

H05.59 Positioning window time

Hex:	2005-3Ch	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	30000	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0 ms–30000 ms

Description

If the positioning deviation is less than the time threshold of positioning completed, the positioning completed signal is active only if the set time threshold is exceeded.

H05.60 Hold time of positioning completed

Hex:	2005-3Dh	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	30000	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0 ms–30000 ms

Description

Defines the hold time of an active positioning completed signal.

H05.66 Homing time unit

Hex:	2005-43h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:

0: 1 ms

1: 10 ms

2: 100 ms

Description

Defines the homing time unit. The actual timeout time is $H05.35 \times H05.66$ ms.

H05.67 Offset between zero point and single-turn absolute position

Hex:	2005-44h	Effective mode:	Real time
Min.:	-2147483648	Unit:	Encoder unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At stop

Value Range:

-2147483648 to 2147483647

Description

Defines the offset position relative to the home when H05.31 is set to 14, 15, and 16.

H05.70 Moving average filter time constant 2

Hex:	2005-47h	Effective	Real time
		mode:	
Min.:	0.0	Unit:	ms
Max.:	1000.0	Data Type:	UInt16
Default:	0.0	Change:	At stop

Value Range:

0.0 ms–1000.0 ms

Description

Defines the moving average filter time constant for the second group of position references.

H05.71 Motor Z signal width

Hex:	2005-48h	Effective	Real time
		mode:	
Min.:	1	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	4	Change:	Real-time

Value Range:

1 ms–100 ms

Description

Output pulse width when motor Z signal is active.

5.7 H06 Speed Control Parameters**H06.00 Source of main speed reference A**

Hex:	2006-01h	Effective	Real time
		mode:	
Min.:	0	Unit:	-
Max.:	0	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Digital setting (H06.03)

Description

Defines the source of main speed reference A.

H06.01 Source of auxiliary speed reference B

Hex:	2006-02h	Effective	Real time
		mode:	
Min.:	0	Unit:	-

Max.: 5

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0: Digital setting (H06.03)

5: Multi-speed reference

Description

Defines the source of auxiliary speed reference B.

H06.02 Speed reference source

Hex: 2006-03h

Effective mode: Real time

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.

Value	Control mode	Remarks	
0	Source of main speed reference A	The reference source is defined by H06.00.	
1	Source of auxiliary speed reference B	The reference source is defined by H06.01.	
2	A+B	The reference source is the product of A + B (H06.00 + H06.01).	
3	Switched between A and B	The reference source is switched between A and B as defined by FunIN.4 (Cmd_SEL).	
		State of FunIN.4 (Cmd_SEL)	Reference Source
		Inactive	Source of main speed reference A
		Active	Source of auxiliary speed reference B
4	Communication	The speed reference is defined by operating on H31.09 through communication (unit: 0.001 RPM).	

H06.03 Speed reference set through keypad

Hex:	2006-04h	Effective mode:	Real time
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	200	Change:	Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

Defines the speed reference value set through the keypad.

H06.04 DI jog speed reference

Hex:	2006-05h	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	150	Change:	Real-time

Value Range:

0rpm to 10000rpm

Description

Defines the DI jog speed reference.

H06.05 Acc. ramp time of speed reference

Hex:	2006-06h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Sets acceleration ramp time of speed reference. The acceleration/deceleration time constant of multi-speed references are defined only by parameters in group H12.

H06.05 defines the time for the speed reference to change from 0 rpm to 1000 rpm.

H06.06 defines the time for the speed reference to change from 1000 rpm to 0 rpm.

The formulas for calculating the actual acceleration/deceleration time are as follows:

Actual acceleration time $t_1 = \text{Speed reference} \div 1000 \times \text{Acceleration ramp time of speed reference}$

Actual deceleration time $t_2 = \text{Speed reference} \div 1000 \times \text{Deceleration ramp time of speed reference}$

H06.06 Dec. ramp time of speed reference

Hex:	2006-07h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Sets deceleration ramp time of speed reference.

H06.07 Maximum speed limit

Hex:	2006-08h	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	7000	Change:	Real-time

Value Range:

0rpm to 10000rpm

Description

Defines the maximum speed limit.

H06.08 Forward speed threshold

Hex:	2006-09h	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	7000	Change:	Real-time

Value Range:

0rpm to 10000rpm

Description

Defines the forward speed threshold.

H06.09 Reverse speed threshold

Hex:	2006-0Ah	Effective mode:	Real time

Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	7000	Change:	Real-time

Value Range:

0rpm to 10000rpm

Description

Defines the reverse speed threshold.

H06.10 Deceleration unit in emergency stop

Hex:	2006-0Bh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Multiplied by 1

1: Multiplied by 10

2: Multiplied by 100

Description

Sets the deceleration unit in emergency stop.

H06.11 Torque feedforward control

Hex:	2006-0Ch	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	Real-time

Value Range:

0: No torque feedforward

1: Internal torque feedforward

Description

Defines the source for torque feedforward control.

H06.12 Acceleration ramp time of jog speed

Hex:	2006-0Dh	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Sets the acceleration ramp time of jog speed.

H06.13 Speed feedforward smoothing filter

Hex:	2006-0Eh	Effective mode:	Real time
Min.:	0	Unit:	us
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0us to 65535us

Description

Defines the speed feedforward smoothing filter time.

H06.15 Zero clamp speed threshold

Hex:	2006-10h	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0rpm to 10000rpm

Description

Defines the zero clamp speed threshold.

H06.16 Threshold of TGON (motor rotation) signal

Hex:	2006-11h	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	1000	Data Type:	UInt16
Default:	20	Change:	Real-time

Value Range:

0 rpm to 1000 rpm

Description

Sets the threshold of TGON (motor rotation) signal.

H06.17 Threshold of V-Cmp (speed matching) signal

Hex:	2006-12h	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	100	Data Type:	UInt16

Default: 10 Change: Real-time

Value Range:

0 RPM –100 RPM

Description

Defines the threshold of speed match signal.

H06.18 Threshold of speed reach signal

Hex: 2006-13h Effective mode: Real time

Min.: 20 Unit: rpm

Max.: 10000 Data Type: UInt16

Default: 1000 Change: Real-time

Value Range:

20rpm to 10000rpm

Description

Defines the threshold of speed reached signal.

H06.19 Threshold of zero speed output signal

Hex: 2006-14h Effective mode: Real time

Min.: 1 Unit: rpm

Max.: 10000 Data Type: UInt16

Default: 10 Change: Real-time

Value Range:

1rpm to 10000rpm

Description

Defines the threshold of zero speed output signal.

H06.20 Number of torque ripple auto-tuning cycles

Hex: 2006-15h Effective mode: Real time

Min.: 1 Unit: -

Max.: 30 Data Type: UInt16

Default: 4 Change: Real-time

Value Range:

1–30

Description

Defines the threshold of zero speed output signal.

H06.40 Ramp 1 deceleration time

Hex:	2006-29h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Defines the ramp 1 deceleration time, which is effective in non-communication modes and corresponds to 6084h in all stop modes.

H06.41 Ramp 2 deceleration time

Hex:	2006-2Ah	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Defines the ramp 2 deceleration time, which is effective in non-communication modes and corresponds to 6085h in all stop modes.

H06.50 Speed S-curve enable switch

Hex:	2006-33h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Disabled

1: Enabled

Description

0: Accelerate/Decelerate at fixed acceleration rate

1: Accelerate/Decelerate based on the S-curve

H06.51 Increasing acceleration 1 of speed S-curve acceleration segment

Hex:	2006-34h	Effective mode:	Real time
Min.:	0.0	Unit:	%

Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Increasing acceleration time at acceleration segment: The percentage of motor increasing acceleration time in the selected acceleration time.

H06.52 Decreasing acceleration 1 of speed S-curve acceleration segment

Hex:	2006-35h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at acceleration segment: The percentage of motor decreasing acceleration time in the selected acceleration time.

H06.53 Decreasing deceleration 1 of speed S-curve deceleration segment

Hex:	2006-36h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at deceleration segment: The percentage of motor decreasing deceleration time in the selected deceleration time.

H06.54 Decreasing acceleration 1 of speed S-curve deceleration segment

Hex:	2006-37h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at deceleration segment: The percentage of motor decreasing acceleration time in the selected deceleration time.

H06.55 Increasing acceleration 2 of speed S-curve acceleration segment

Hex:	2006-38h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Increasing acceleration time at acceleration segment: The percentage of motor increasing acceleration time in the selected acceleration time.

H06.56 Decreasing acceleration 2 of speed S-curve acceleration segment

Hex:	2006-39h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at acceleration segment: The percentage of motor decreasing acceleration time in the selected acceleration time.

H06.57 Decreasing deceleration 2 of speed S-curve deceleration segment

Hex:	2006-3Ah	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
 Decreasing acceleration time at deceleration segment: The percentage of motor decreasing deceleration time in the selected deceleration time.

H06.58 Decreasing acceleration 2 of speed S-curve deceleration segment

Hex:	2006-3Bh	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
 Decreasing acceleration time at deceleration segment: The percentage of motor decreasing acceleration time in the selected deceleration time.

H06.59 Increasing acceleration 3 of speed S-curve acceleration segment

Hex:	2006-3Ch	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
 Increasing acceleration time at acceleration segment: The percentage of motor increasing acceleration time in the selected acceleration time.

H06.60 Decreasing acceleration 3 of speed S-curve acceleration segment

Hex:	2006-3Dh	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at acceleration segment: The percentage of motor decreasing acceleration time in the selected acceleration time.

H06.61 Decreasing deceleration 3 of speed S-curve deceleration segment

Hex:	2006-3Eh	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at deceleration segment: The percentage of motor decreasing deceleration time in the selected deceleration time.

H06.62 Decreasing acceleration 3 of speed S-curve deceleration segment

Hex:	2006-3Fh	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at deceleration segment: The percentage of motor decreasing acceleration time in the selected deceleration time.

H06.63 Increasing acceleration 4 of speed S-curve acceleration segment

Hex:	2006-40h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Increasing acceleration time at acceleration segment: The percentage of motor increasing acceleration time in the selected acceleration time.

H06.64 Decreasing acceleration 4 of speed S-curve acceleration segment

Hex:	2006-41h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at acceleration segment: The percentage of motor decreasing acceleration time in the selected acceleration time.

H06.65 Decreasing deceleration 4 of speed S-curve deceleration segment

Hex:	2006-42h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at deceleration segment: The percentage of motor decreasing deceleration time in the selected deceleration time.

H06.66 Decreasing acceleration 4 of speed S-curve deceleration segment

Hex:	2006-43h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at deceleration segment: The percentage of motor decreasing acceleration time in the selected deceleration time.

H06.67 Increasing acceleration 5 of speed S-curve acceleration segment

Hex:	2006-44h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Increasing acceleration time at acceleration segment: The percentage of motor increasing acceleration time in the selected acceleration time.

H06.68 Decreasing acceleration 5 of speed S-curve acceleration segment

Hex:	2006-45h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at acceleration segment: The percentage of motor decreasing acceleration time in the selected acceleration time.

H06.69 Decreasing deceleration 5 of speed S-curve deceleration segment

Hex:	2006-46h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at deceleration segment: The percentage of motor decreasing deceleration time in the selected deceleration time.

H06.70 Decreasing acceleration 5 of speed S-curve deceleration segment

Hex:	2006-47h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at deceleration segment: The percentage of motor decreasing acceleration time in the selected deceleration time.

H06.71 Increasing acceleration 6 of speed S-curve acceleration segment

Hex:	2006-48h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Increasing acceleration time at acceleration segment: The percentage of motor increasing acceleration time in the selected acceleration time.

H06.72 Decreasing acceleration 6 of speed S-curve acceleration segment

Hex:	2006-49h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at acceleration segment: The percentage of motor decreasing acceleration time in the selected acceleration time.

H06.73 Decreasing deceleration 6 of speed S-curve deceleration segment

Hex:	2006-4Ah	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at deceleration segment: The percentage of motor decreasing deceleration time in the selected deceleration time.

H06.74 Decreasing acceleration 6 of speed S-curve deceleration segment

Hex:	2006-4Bh	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at deceleration segment: The percentage of motor decreasing acceleration time in the selected deceleration time.

H06.75 Increasing acceleration 7 of speed S-curve acceleration segment

Hex:	2006-4Ch	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Increasing acceleration time at acceleration segment: The percentage of motor increasing acceleration time in the selected acceleration time.

H06.76 Decreasing acceleration 7 of speed S-curve acceleration segment

Hex:	2006-4Dh	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at acceleration segment: The percentage of motor decreasing acceleration time in the selected acceleration time.

H06.77 Decreasing deceleration 7 of speed S-curve deceleration segment

Hex:	2006-4Eh	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at deceleration segment: The percentage of motor decreasing deceleration time in the selected deceleration time.

H06.78 Decreasing acceleration 7 of speed S-curve deceleration segment

Hex:	2006-4Fh	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at deceleration segment: The percentage of motor decreasing acceleration time in the selected deceleration time.

H06.79 Increasing acceleration 8 of speed S-curve acceleration segment

Hex:	2006-50h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Increasing acceleration time at acceleration segment: The percentage of motor increasing acceleration time in the selected acceleration time.

H06.80 Decreasing acceleration 8 of speed S-curve acceleration segment

Hex:	2006-51h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at acceleration segment: The percentage of motor decreasing acceleration time in the selected acceleration time.

H06.81 Decreasing deceleration 8 of speed S-curve deceleration segment

Hex:	2006-52h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at deceleration segment: The percentage of motor decreasing deceleration time in the selected deceleration time.

H06.82 Decreasing acceleration 8 of speed S-curve deceleration segment

Hex:	2006-53h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	50.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

8 groups of S curve smoothing parameters can be set for each speed reference.
Decreasing acceleration time at deceleration segment: The percentage of motor decreasing acceleration time in the selected deceleration time.

5.8 H07 Torque Control Parameters

H07.00 Source of main torque reference A

Hex:	2007-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	0	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Keypad (H07.03)

Description

Defines the source of the main torque reference A.

H07.01 Source of auxiliary torque reference B

Hex:	2007-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	0	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Keypad (H07.03)

Description

Defines the source of auxiliary torque references.

H07.02 Torque reference source

Hex:	2007-03h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

- 0: Source of main torque reference A
- 1: Source of auxiliary torque reference B
- 2: Source of A+B
- 3: Switched between A and B
- 4: Communication

Description

Selects torque reference.

Value	Control mode	Remarks	
0	Source of main torque reference A	The reference source is defined by H07.00.	
1	Source of auxiliary torque reference B	The reference source is defined by H07.01.	
2	A+B	The reference source is the product of A+B (H07.00+H07.01).	
3	Switched between A and B	The reference source is switched between A and B as defined by FunIN.4 (Cmd_SEL).	
		State of FunIN.4 (Cmd_SEL)	Reference Source
		Inactive	Source of main torque reference A
		Active	Source of auxiliary torque reference B
4	Communication	The torque reference is defined by operating on H31.11 through communication.	

H07.03 Torque reference set through keypad

Hex:	2007-04h	Effective mode:	Real time
Min.:	-400.0	Unit:	%
Max.:	400.0	Data Type:	Int16
Default:	0.0	Change:	Real-time

Value Range:

-400.0% to 400.0%

Description

Sets torque reference set through keypad.

H07.05 Torque reference filter time constant 1

Hex:	2007-06h	Effective mode:	Real time
Min.:	0.00	Unit:	ms
Max.:	30.00	Data Type:	UInt16
Default:	0.50	Change:	Real-time

Value Range:

0.00 ms–30.00 ms

Description

Defines the torque reference filter time constant 1.

H07.06 Torque reference filter time constant 2

Hex:	2007-07h	Effective mode:	Real time
Min.:	0.00	Unit:	ms
Max.:	30.00	Data Type:	UInt16
Default:	0.27	Change:	Real-time

Value Range:

0.00 ms–30.00 ms

Description

Defines the torque reference filter time constant 2.

H07.07 Torque Limit source

Hex:	2007-08h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Positive/Negative internal torque limit

1: Internal or external limit as selected by DI

Description

Sets the torque limit source.

H07.09 Positive internal torque limit

Hex:	2007-0Ah	Effective mode:	Real time
Min.:	0.0	Unit:	%

Max.:	400.0	Data Type:	UInt16
Default:	350.0	Change:	Real-time

Value Range:
0.0% to 400.0%

Description
Sets the forward run internal torque limit.

H07.10 Negative internal torque limit

Hex:	2007-0Bh	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	400.0	Data Type:	UInt16
Default:	350.0	Change:	Real-time

Value Range:
0.0% to 400.0%

Description
Sets the reverse run internal torque limit.

H07.11 Positive external torque limit

Hex:	2007-0Ch	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	400.0	Data Type:	UInt16
Default:	350.0	Change:	Real-time

Value Range:
0.0% to 400.0%

Description
Sets the positive external torque limit.

H07.12 Negative external torque limit

Hex:	2007-0Dh	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	400.0	Data Type:	UInt16
Default:	350.0	Change:	Real-time

Value Range:
0.0% to 400.0%

Description
Sets the negative external torque limit.

H07.15 Emergency-stop torque

Hex:	2007-10h	Effective mode:	At stop
Min.:	0.0	Unit:	%
Max.:	400.0	Data Type:	UInt16
Default:	100.0	Change:	Real-time

Value Range:

0.0% to 400.0%

Description

Set torque command source for emergency stop.

H07.17 Speed limit source

Hex:	2007-12h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Internal speed limit

1: V-LMT

2: H07.19 or H07.20 as defined by DI

Description

Sets the speed limit source.

H07.19 Positive speed limit/Speed limit 1 in torque control

Hex:	2007-14h	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	3000	Change:	Real-time

Value Range:

0rpm to 10000rpm

Description

Defines the positive speed limit in torque control.

H07.20 Negative speed limit/Speed limit 2 in torque control

Hex:	2007-15h	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	3000	Change:	Real-time

Value Range:

0rpm to 10000rpm

Description

Defines the negative speed limit in torque control.

H07.21 Torque reach base value

Hex:	2007-16h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	400.0	Data Type:	UInt16
Default:	0.0	Change:	Real-time

Value Range:

0.0% to 400.0%

Description

Defines the torque reference of the base value for torque reach.

H07.22 Torque reach valid value

Hex:	2007-17h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	400.0	Data Type:	UInt16
Default:	20.0	Change:	Real-time

Value Range:

0.0% to 400.0%

Description

Defines the torque reference for torque reach DO active.

H07.23 Torque reach invalid value

Hex:	2007-18h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	400.0	Data Type:	UInt16
Default:	10.0	Change:	Real-time

Value Range:

0.0% to 400.0%

Description

Defines the torque reference for torque reach DO inactive.

H07.24 Field weakening depth

Hex:	2007-19h	Effective mode:	Real time

Min.:	60	Unit:	%
Max.:	115	Data Type:	UInt16
Default:	115	Change:	Real-time

Value Range:

60% to 115%

Description

Set the flux weakening depth.

H07.25 Max. permissible demagnetizing current

Hex:	2007-1Ah	Effective mode:	Real time
Min.:	0	Unit:	%
Max.:	300	Data Type:	UInt16
Default:	150	Change:	Real-time

Value Range:

0% to 300%

Description

Set the maximum allowable demagnetization current value.

H07.26 Field weakening selection

Hex:	2007-1Bh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Disabled

1: Enabled

Description

Disable or enable field weakening.

H07.27 Flux weakening gain

Hex:	2007-1Ch	Effective mode:	Real time
Min.:	0.001	Unit:	Hz
Max.:	1.000	Data Type:	UInt16
Default:	0.030	Change:	Real-time

Value Range:

0.001 Hz–1.000 Hz

Description

Set the gain of flux weakening.

H07.28 Speed of flux weakening point

Hex:	2007-1Dh	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Set the speed of flux weakening point.

H07.35 Torque non-standard feature enable

Hex:	2007-24h	Effective	Upon the next power-on
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

bit0: Motor output correction enable

bit1: Shield compensation data enable

Description

Torque non-standard feature enable switch.

H07.36 Time constant of low-pass filter 2

Hex:	2007-25h	Effective	Real time
		mode:	
Min.:	0.00	Unit:	ms
Max.:	10.00	Data Type:	UInt16
Default:	0.00	Change:	Real-time

Value Range:

0.00 ms–10.00 ms

Description

Sets the time constant of low-pass filter 2.

H07.37 Torque reference filter selection

Hex:	2007-26h	Effective	Real time
		mode:	
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: First-order filter

1: Biquad filter

Description

Select torque reference Filter.

H07.38 Biquad filter attenuation ratio

Hex:	2007-27h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	50	Data Type:	UInt16
Default:	16	Change:	Real-time

Value Range:

0–50

Description

Set the attenuation ratio of biquad filter.

H07.40 Speed limit threshold in torque control mode

Hex:	2007-29h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	300	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 ms–300 ms

Description

Sets speed limit window in the torque control mode.

5.9 H08 Gain Parameters

H08.00 Speed loop gain

Hex:	2008-01h	Effective mode:	Real time
Min.:	0.1	Unit:	Hz
Max.:	2000.0	Data Type:	UInt16
Default:	40.0	Change:	Real-time

Value Range:

0.1 Hz–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

Hex:	2008-02h	Effective mode:	Real time
Min.:	0.15	Unit:	ms
Max.:	512.00	Data Type:	UInt16
Default:	19.89	Change:	Real-time

Value Range:

0.15 ms–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

Hex:	2008-03h	Effective mode:	Real time
Min.:	0.1	Unit:	Hz
Max.:	2000.0	Data Type:	UInt16
Default:	64.0	Change:	Real-time

Value Range:

0.1 Hz–2000.0 Hz

Description

Defines the proportional gain of the position loop.

Defines the responsiveness of the position loop. A high setpoint shortens the positioning time. Note that an excessively high setpoint may cause vibration.

The 1st group of gain parameters include H08.00 (Speed loop gain), H08.01 (Speed loop integral time constant), H08.02, and H07.05 (Filter time constant of torque reference).

H08.03 2nd speed loop gain

Hex:	2008-04h	Effective mode:	Real time
Min.:	0.1	Unit:	Hz

Max.:	2000.0	Data Type:	UInt16
Default:	75.0	Change:	Real-time

Value Range:

0.1 Hz–2000.0 Hz

Description

-

H08.04 2nd speed loop integral time constant

Hex:	2008-05h	Effective mode:	Real time
Min.:	0.15	Unit:	ms
Max.:	512.00	Data Type:	UInt16
Default:	10.61	Change:	Real-time

Value Range:

0.15 ms–512.00 ms

Description

-

H08.05 2nd position loop gain

Hex:	2008-06h	Effective mode:	Real time
Min.:	0.1	Unit:	Hz
Max.:	2000.0	Data Type:	UInt16
Default:	120.0	Change:	Real-time

Value Range:

0.1 Hz–2000.0 Hz

Description

Defines the second gain set of the position loop and speed loop. The 2nd group of gain parameters include H08.03 (Speed loop gain), H08.04 (Speed loop integral time constant), H08.05, and H07.06 (Torque reference filter time constant 2).

H08.06 Current gain selection

Hex:	2008-07h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0–3

Description

-

H08.08 2nd gain mode setting

Hex:	2008-09h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	Real-time

Value Range:

0: Fixed to the 1st gain, switched between P and PI as defined by bit26 of external 60FEh

1: Switched between the 1st and 2nd gain sets as defined by H08.09

Description

Defines the mode for switching to the 2nd gain set.

H08.09 Gain switchover condition

Hex:	2008-0Ah	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	10	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Fixed to the 1st gain set (PS)

1: Switched as defined by bit26 of 60FEh

2: Torque reference too large (PS)

3: Speed reference too large (PS)

4: Speed reference change rate too large (PS)

5: Speed reference low/high speed threshold (PS)

6: Position deviation too large (P)

7: Position reference available (P)

8: Positioning unfinished (P)

9: Actual speed (P)

10: Position reference + Actual speed (P)

Description

Defines the gain switchover condition.

Value	Gain switchover condition	Remarks
0	Fixed to the 1st gain set	The 1st gain set applies.
1	Switched as defined by bit26 of 60FEh	-
2	Torque reference too large	If the torque reference absolute value exceeds (Level + Dead time) [%] in the last 1st gain set, the drive switches to the 2nd gain set. If the absolute value of the torque reference is lower than (level – Dead time) [%] and such status lasts within the delay defined by H08.10 (Gain switchover delay) in the 2nd gain, the drive returns to the 1st gain set.
3	Speed reference too large	If the speed reference absolute value exceeds (Level + Dead time) [rpm] in the last 1st gain set, the drive switches to the 2nd gain set. If the absolute value of the speed reference is lower than (level - Dead time) [rpm] and such status lasts within the delay defined by H08.10 (Gain switchover delay) in the 2nd gain, the drive returns to the 1st gain set.
4	Speed reference change rate too large	Active in the control modes other than speed control If the absolute value of the change rate of the speed reference exceeds (Level + Dead time) [10 rpm/s] in the last 1st gain set, the drive switches to the 2nd gain set. If the absolute value of the speed reference change rate is lower than (level – hysteresis) [10 rpm/s] and such status lasts within the delay defined by H08.10 (Gain switchover delay) in the 2nd gain, the drive returns to the 1st gain set. In the speed control mode, the 1st gain set always applies.
5	Speed reference high/low-speed threshold	If the speed reference absolute value exceeds (Level - Dead time) [rpm] in the last 1st gain set, the drive starts to switch to the 2nd gain set, with gains changed gradually. When the speed reference absolute value reaches (Level + Dead time) [rpm], the 2nd gain set applies. If the speed reference absolute value is lower than (Level + Dead time) [rpm] in the last 2nd gain set, the drive starts to return to the 1st gain set, with gains changed gradually. When the speed reference absolute value reaches (Level - Dead time) [rpm], the 1st gain set applies.
6	Position deviation too large	Active only in the position control mode If the position deviation absolute value exceeds (Level + Dead time) [encoder unit] in the last 1st gain set, the drive switches to the 2nd gain set. When the absolute value of the position deviation is lower than (Level - Dead time) [encoder unit] and such status lasts within the delay defined by H08.10 (Gain switchover delay) in the 2nd gain, the drive returns to the 1st gain set. The 1st gain set applies in control modes other than position control.
7	Position reference available	Active only in the position control mode If the position reference is not 0 in the last 1st gain set, the drive switches to the 2nd gain set. When the position reference is 0 and such status lasts within the delay defined by H08.10 (Gain switchover delay) in the 2nd gain, the drive returns to the 1st gain set. The 1st gain set applies in control modes other than position control.
8	Positioning uncompleted	Active only in the position control mode If positioning has not been completed in the last 1st gain set, the drive switches to the 2nd gain set. If positioning is not completed and such status lasts within the delay defined by H08.10 (Gain switchover delay) in the 2nd gain set, the servo drive returns to the 1st gain set. The 1st gain set applies in control modes other than position control.

Value	Gain switchover condition	Remarks
9	Actual speed too high	Active only in the position control mode If the absolute value of actual speed exceeds (Level + Dead time) [rpm] in the last 1st gain set, the drive switches to the 2nd gain set. If the absolute value of actual speed is lower than (Level - Dead time) [rpm] and such status lasts within the delay defined by H08.10 (Gain switchover delay) in the 2nd gain set, the drive returns to the 1st gain set. The 1st gain set applies in control modes other than position control.
10	Position reference + Actual speed	Active only in the position control mode If the position reference is not 0 in the last 1st gain set, the drive switches to the 2nd gain set. If the position reference is 0 and such status lasts within the delay defined by H08.10 (Gain switchover delay) in the 2nd gain set, the 2nd gain set applies. When the position reference is 0 and the delay defined by (H08.10) is reached, if the absolute value of actual speed is lower than (Level) [rpm], the speed loop integral time constant is fixed to the setpoint of H08.04 (2nd speed loop integral time constant), and others return to the 1st gain set; if the absolute value of actual speed does not reach (Level - Dead time) [rpm], the speed integral also returns to the setpoint of H08.01 (Speed loop integral time constant). The 1st gain set applies in control modes other than position control.

H08.10 Gain switchover delay

Hex:	2008-0Bh	Effective mode:	Real time
Min.:	0.0	Unit:	ms
Max.:	1000.0	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0 ms–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

Hex:	2008-0Ch	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	20000	Data Type:	UInt16
Default:	50	Change:	Real-time

Value Range:

0–20000

Description

Defines the gain switchover level.

Gain switchover is affected by both the level and the dead time, as defined by H08.09. The unit of gain switchover level varies with the switchover condition.

H08.12 Gain switchover hysteresis

Hex:	2008-0Dh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	20000	Data Type:	UInt16
Default:	30	Change:	Real-time

Value Range:

0–20000

Description

Defines the dead time for gain switchover.

Gain switchover is affected by both the level and the dead time, as defined by H08.09. The unit of gain switchover hysteresis varies with the switchover condition.

Note:

The set value of H08.11 (Gain switchover level) must be no less than that of H08.12; otherwise, the H08.11 will be set to a value equal to H08.12 automatically.

H08.13 Position gain switchover time

Hex:	2008-0Eh	Effective mode:	Real time
Min.:	0.0	Unit:	ms
Max.:	1000.0	Data Type:	UInt16
Default:	3.0	Change:	Real-time

Value Range:

0.0 ms–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

Hex:	2008-10h	Effective mode:	Real time
Min.:	0.00	Unit:	-
Max.:	120.00	Data Type:	UInt16
Default:	1.00	Change:	Real-time

Value Range:

0.00–120.00

Description

Defines the mechanical load inertia ratio relative to the motor moment of inertia.

When H08.15 is set to 0, it indicates the motor carries no load; if it is set to 1.00, it indicates the mechanical load inertia is the same as the motor moment of inertia.

H08.17 Zero phase delay

Hex:	2008-12h	Effective mode:	Real time
Min.:	0.0	Unit:	ms
Max.:	4.0	Data Type:	UInt16
Default:	0.0	Change:	Real-time

Value Range:

0.0 ms–4.0 ms

Description

-

H08.18 Time constant of speed feedforward filter

Hex:	2008-13h	Effective mode:	Real time
Min.:	0.00	Unit:	ms
Max.:	64.00	Data Type:	UInt16
Default:	0.50	Change:	Real-time

Value Range:

0.00 ms–64.00 ms

Description

Defines the filter time constant of speed feedforward.

H08.19 Speed feedforward gain

Hex:	2008-14h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	0.0	Change:	Real-time

Value Range:

0.0% to 100.0%

Description

In position control and full closed-loop control, speed feedforward is the product of speed feedforward signal multiplied by H08.19 and is part of the speed reference.

Increasing the setpoint improves the responsiveness to position references and reduces the position deviation during operation at a constant speed.

Set H08.18 to a fixed value first, and then increase the value of H08.19 gradually from 0 to a certain value at which speed feedforward achieves the desired effect.

Adjust H08.18 and H08.19 repeatedly until a balanced performance is achieved.

Note:

For how to enable the speed feedforward function and select the speed feedforward signal, see H05.19 (Speed feedforward control).

H08.20 Torque feedforward filter time constant

Hex:	2008-15h	Effective mode:	Real time
Min.:	0.00	Unit:	ms
Max.:	64.00	Data Type:	UInt16
Default:	0.50	Change:	Real-time

Value Range:

0.00 ms–64.00 ms

Description

Defines the filter time constant of torque feedforward.

H08.21 Torque feedforward gain

Hex:	2008-16h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	300.0	Data Type:	UInt16
Default:	0.0	Change:	Real-time

Value Range:

0.0% to 300.0%

Description

In control modes other than torque control, torque feedforward is the product of torque feedforward signal multiplied by H08.21 and is part of the torque reference.

Increasing the setpoint improves the responsiveness to variable speed references.

Increasing the setpoint improves the responsiveness to position references and reduces the position deviation during operation at a constant speed.

During parameter adjustment, set H08.20 (Torque feedforward filter time constant) to the default value first, and then increase H08.21 gradually to enhance the effect of torque feedforward. When speed overshoot occurs, keep H08.21 unchanged and increase the value of H08.20. Adjust H08.20 and H08.21 repeatedly until a balanced performance is achieved.

Note:

For how to enable the torque feedforward function and select the torque feedforward signal, see H06.11 (Torque feedforward control).

H08.22 Speed feedback filtering option

Hex:	2008-17h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Inhibited

1: 2 times

2: 4 times

3: 8 times

4: 16 times

Description

Defines the moving average filtering times for speed feedback.

The higher the setpoint, the weaker the speed feedback fluctuation, but the longer the feedback delay will be.

H08.23 Cutoff frequency of speed feedback low-pass filter

Hex:	2008-18h	Effective mode:	Real time
Min.:	100	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	Real-time

Value Range:

100 Hz–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

Hex:	2008-19h	Effective mode:	Real time
Min.:	0.0	Unit:	%

Max.:	200.0	Data Type:	UInt16
Default:	100.0	Change:	Real-time

Value Range:

0.0% to 200.0%

Description

Defines the control mode of the speed loop.

When this parameter is set to 100.0, the speed loop adopts PI control (default) with quick dynamic response.

When this parameter is set to 0.0, speed loop integral action is enhanced, which filters out low-frequency interference but also slows down the dynamic response.

H08.24 can be used to keep a good responsiveness of the speed loop, with the anti-interference capacity in low-frequency bands improved and the speed feedback overshoot unaffected.

H08.27 Speed observer cutoff frequency

Hex:	2008-1Ch	Effective mode:	Real time
Min.:	50	Unit:	Hz
Max.:	600	Data Type:	UInt16
Default:	170	Change:	Real-time

Value Range:

50 Hz–600 Hz

Description

Defines the cutoff frequency of the speed observer. Note that an excessively high setpoint may incur resonance. Decrease the setpoint properly in case of large speed feedback noise.

H08.28 Speed observer inertia correction coefficient

Hex:	2008-1Dh	Effective mode:	Real time
Min.:	1	Unit:	%
Max.:	1600	Data Type:	UInt16
Default:	100	Change:	Real-time

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

Hex:	2008-1Eh	Effective mode:	Real time
Min.:	0.00	Unit:	ms
Max.:	10.00	Data Type:	UInt16
Default:	0.80	Change:	Real-time

Value Range:

0.00 ms–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

Hex:	2008-20h	Effective mode:	Real time
Min.:	1	Unit:	Hz
Max.:	4000	Data Type:	UInt16
Default:	600	Change:	Real-time

Value Range:

1 Hz–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

Hex:	2008-21h	Effective mode:	Real time
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	0	Change:	Real-time

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

Hex:	2008-22h	Effective mode:	Real time
Min.:	1	Unit:	%

Max.:	1600	Data Type:	UInt16
Default:	100	Change:	Real-time

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

Hex:	2008-26h	Effective	Real time
		mode:	
Min.:	-90	Unit:	°
Max.:	90	Data Type:	Int16
Default:	0	Change:	Real-time

Value Range:

-90° to 90°

Description

Defines the compensation phase of medium-frequency jitter suppression 2.

H08.38 Medium-frequency suppression 2 frequency

Hex:	2008-27h	Effective	Real time
		mode:	
Min.:	0	Unit:	Hz
Max.:	1000	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0 Hz–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

Hex:	2008-28h	Effective	Real time
		mode:	
Min.:	0	Unit:	%
Max.:	300	Data Type:	UInt16
Default:	0	Change:	Real-time

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

Hex:	2008-29h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Disabled

1: Enabled

Description

Used to set the enable bit for speed observer.

H08.42 Model control selection

Hex:	2008-2Bh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Disable

1: Enable

2: Dual-inertia model

Description

Used to enable model tracking control.

H08.43 Model gain

Hex:	2008-2Ch	Effective mode:	Real time
Min.:	0.1	Unit:	-
Max.:	2000.0	Data Type:	UInt16
Default:	40.0	Change:	Real-time

Value Range:

0.1–2000.0

Description

Defines the single inertia model gain. The higher the gain, the faster the position response. Note that an excessively high setpoint may incur excessive overshoot.

H08.46**Feedforward value**

Hex:	2008-2Fh	Effective mode:	Real time
Min.:	0.0	Unit:	-
Max.:	102.4	Data Type:	UInt16
Default:	95.0	Change:	Real-time

Value Range:

0.0–102.4

Description

Defines the speed feedforward gain for single inertia model control. If overshoot occurs, reduce the setpoint properly.

H08.53**Medium- and low-frequency jitter suppression frequency 3**

Hex:	2008-36h	Effective mode:	Real time
Min.:	0.0	Unit:	Hz
Max.:	300.0	Data Type:	UInt16
Default:	0.0	Change:	Real-time

Value Range:

0.0 Hz–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**

Hex:	2008-37h	Effective mode:	Real time
Min.:	0	Unit:	%
Max.:	200	Data Type:	UInt16
Default:	0	Change:	Real-time

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**

Hex:	2008-39h	Effective mode:	Real time
Min.:	0	Unit:	%
Max.:	600	Data Type:	UInt16

Change: Real-time

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

Hex: 2008-3Ch

Effective Real time

mode:

Min.: 0.0

Unit: Hz

Max.: 300.0

Data Type: UInt16

Default: 0.0

Change: Real-time

Value Range:

0.0 Hz–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

Hex: 2008-3Dh

Effective Real time

mode:

Min.: 0

Unit: %

Max.: 200

Data Type: UInt16

Default: 0

Change: Real-time

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

Hex: 2008-3Eh

Effective Real time

mode:

Min.: 0

Unit: %

Max.: 600

Data Type: UInt16

Default: 100

Change: Real-time

Value Range:

0% to 600%

Description

Adjust this parameter based on the actual compensation effect.

H08.62 Position loop integral time constant

Hex:	2008-3Fh	Effective mode:	Real time
Min.:	0.15	Unit:	-
Max.:	512.00	Data Type:	UInt16
Default:	512.00	Change:	Real-time

Value Range:

0.15–512.00

Description

Defines the position loop integral time constant.

H08.63 2nd position loop integral time constant

Hex:	2008-40h	Effective mode:	Real time
Min.:	0.15	Unit:	-
Max.:	512.00	Data Type:	UInt16
Default:	512.00	Change:	Real-time

Value Range:

0.15–512.00

Description

Defines the 2nd position loop integral time constant.

H08.64 Speed observer feedback source

Hex:	2008-41h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Disabled

1: Enabled

Description

-

H08.65 Zero deviation control selection

Hex:	2008-42h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Disabled

1: Enabled

Description

Used to enable/disable zero deviation control.

H08.66 Zero deviation control position average filter

Hex:	2008-43h	Effective mode:	Real time
Min.:	0.0	Unit:	ms
Max.:	320.0	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0 ms–320.0 ms

Description

Defines the average filter time of zero deviation control position. It is recommended to increase the setpoint in case of large noise caused by low command resolution.

H08.68 Speed feedforward of zero deviation control

Hex:	2008-45h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	100.0	Change:	Real-time

Value Range:

0.0% to 100.0%

Description

Defines the speed feedforward of zero deviation control.

H08.69 Torque feedforward of zero deviation control

Hex:	2008-46h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	100.0	Change:	Real-time

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

Hex:	2008-52h	Effective mode:	Real time
Min.:	1.0	Unit:	Hz
Max.:	400.0	Data Type:	UInt16
Default:	20.0	Change:	Real-time

Value Range:

1.0 Hz–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

Hex:	2008-53h	Effective mode:	Real time
Min.:	0.0	Unit:	Hz
Max.:	6553.5	Data Type:	UInt16
Default:	0.0	Change:	Real-time

Value Range:

0.0 Hz–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

Hex:	2008-54h	Effective mode:	Real time
Min.:	0.1	Unit:	1/s
Max.:	300.0	Data Type:	UInt16
Default:	60.0	Change:	Real-time

Value Range:

0.1/s to 300.0/s

Description

Defines the dual-inertia model gain.

H08.84 Inertia ratio of dual-inertia model

Hex:	2008-55h	Effective mode:	Real time
Min.:	0.00	Unit:	-

Max.:	120.00	Data Type:	UInt16
Default:	1.00	Change:	Real-time

Value Range:

0.00–120.00

Description

If the resonance frequency of dual-inertia model is set accurately, there is no need to set this parameter.

H08.88 Speed feedforward value of dual-inertia model

Hex:	2008-59h	Effective mode:	Real time
Min.:	0.0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	100.0	Change:	Real-time

Value Range:

0.0–6553.5

Description

Set this parameter to 100% in general cases.

H08.89 Torque feedforward value of dual-inertia model

Hex:	2008-5Ah	Effective mode:	Real time
Min.:	0.0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	100.0	Change:	Real-time

Value Range:

0.0–6553.5

Description

Set this parameter to 100% in general cases.

5.10 H09 Auto-tuning Parameters

H09.00 Auto-adjustment mode

Hex:	2009-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	4	Change:	Real-time

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 selection

Hex:	2009-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	41	Data Type:	UInt16
Default:	15	Change:	Real-time

Value Range:

0–41

Description

Defines the stiffness level of the servo system. The higher the stiffness level, the stronger the gains and the quicker the response will be. But an excessively high stiffness level will cause vibration.

The setpoint 0 indicates the weakest stiffness and 41 indicates the strongest stiffness.

H09.02 Adaptive notch mode

Hex:	2009-03h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	3	Change:	Real-time

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. When the system runs stably and reaches the time (in seconds) of H09.37, H09.02 will be automatically set to 0.

H09.03 Online inertia auto-tuning mode

Hex:	2009-04h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	2	Change:	Real-time

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

Hex:	2009-06h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

- 0: Bi-directional
- 1: Unidirectional

Description

Defines the offline inertia auto-tuning mode. The offline inertia auto-tuning function can be enabled through H0d.02.

H09.06 Max. speed of inertia auto-tuning

Hex:	2009-07h	Effective mode:	Real time
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 max. speed during inertia auto-tuning

Hex:	2009-08h	Effective mode:	Real time
Min.:	20	Unit:	ms
Max.:	800	Data Type:	UInt16
Default:	125	Change:	At stop

Value Range:

20 ms–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

Hex:	2009-09h	Effective mode:	Real time
Min.:	50	Unit:	ms
Max.:	10000	Data Type:	UInt16
Default:	800	Change:	At stop

Value Range:

50 ms–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

Hex:	2009-0Ah	Effective mode:	Real time
Min.:	0.00	Unit:	-
Max.:	100.00	Data Type:	UInt16
Default:	1.00	Change:	Real-time

Value Range:

0.00–100.00

Description

Defines the motor revolutions per inertia auto-tuning when H09.05 (Offline inertia auto-tuning mode) is set to 1 (Positive/Negative triangular wave mode).

Note:

When using the offline inertia auto-tuning function, check that the travel distance of the motor at the stop position is larger than the value of H09.09. If not, decrease the value of H09.06 (Maximum speed for inertia auto-tuning) or H09.07 (Time constant of accelerating to max. speed during inertia auto-tuning) properly until the motor travel distance fulfills the requirement.

H09.11 Vibration threshold

Hex:	2009-0Ch	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0% to 100.0%

Description

Defines the alarm threshold for current feedback vibration.

H09.12 Frequency of the 1st notch

Hex:	2009-0Dh	Effective mode:	Real time
Min.:	50	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	Real-time

Value Range:

50 Hz–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

Hex:	2009-0Eh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	Real-time

Value Range:

0–20

Description

Defines the width level of the notch. Use the default setpoint in general cases.
Width level is the ratio of the notch width to the notch center frequency.

H09.14 Depth level of the 1st notch

Hex:	2009-0Fh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0–99

Description

Defines the depth level of the notch.

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

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

H09.15 Frequency of the 2nd notch

Hex:	2009-10h	Effective mode:	Real time
Min.:	50	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	Real-time

Value Range:

50 Hz–8000 Hz

Description

-

H09.16 Width level of the 2nd notch

Hex:	2009-11h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	Real-time

Value Range:

0–20

Description

-

H09.17 Depth level of the 2nd notch

Hex:	2009-12h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	0	Change:	Real-time
Value Range:			
0–99			
Description			
-			

H09.18 Frequency of the 3rd notch

Hex:	2009-13h	Effective mode:	Real time
Min.:	50	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	Real-time
Value Range:			
50 Hz–8000 Hz			
Description			
-			

H09.19 Width level of the 3rd notch

Hex:	2009-14h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	Real-time
Value Range:			
0–20			
Description			
-			

H09.20 Depth level of the 3rd notch

Hex:	2009-15h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	0	Change:	Real-time
Value Range:			
0–99			

Description

-

H09.21 Frequency of the 4th notch

Hex: 2009-16h

Effective mode: Real time

Min.: 50

Unit: Hz

Max.: 8000

Data Type: UInt16

Default: 8000

Change: Real-time

Value Range:

50 Hz–8000 Hz

Description

-

H09.22 Width level of the 4th notch

Hex: 2009-17h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 20

Data Type: UInt16

Default: 2

Change: Real-time

Value Range:

0–20

Description

-

H09.23 Depth level of the 4th notch

Hex: 2009-18h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 99

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0–99

Description

-

H09.24 Auto-tuned resonance frequency

Hex: 2009-19h

Effective mode: -

Min.: 0

Unit: Hz

Max.: 5000

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0 Hz–5000 Hz

Description

When H09.02 (Adaptive notch mode) is set to 3, the current mechanical resonance frequency is displayed.

H09.26

ITune response

Hex: 2009-1Bh

Effective mode: Real time

Min.: 30.0

Unit: %

Max.: 600.0

Data Type: UInt16

Default: 100.0

Change: Real-time

Value Range:

30.0% to 600.0%

Description

Defines ITune response capability. Increasing the setpoint improves the responsiveness but may incur resonance.

H09.27

ITune mode

Hex: 2009-1Ch

Effective mode: Real time

Min.: 0

Unit: -

Max.: 2

Data Type: UInt16

Default: 0

Change: At stop

Value Range:

0: Disabled

1: ITune mode 1

2: ITune mode 2

Description

Function: 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

Hex: 2009-1Dh

Effective mode: Real time

Min.: 0.0

Unit: %

Max.: 80.0

Data Type: UInt16

Default: 0.0

Change: Real-time

Value Range:

0.0% to 80.0%

Description

Used to adjust the inertia ratio range controlled by ITune. : Default minimum inertia of ITune is 0.0

Max. inertia of ITune is 30.0.

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

Hex:	2009-1Eh	Effective mode:	Real time
Min.:	1.0	Unit:	%
Max.:	120.0	Data Type:	UInt16
Default:	30.0	Change:	Real-time

Value Range:

1.0% to 120.0%

Description

-

H09.32

Gravity compensation value

Hex:	2009-21h	Effective mode:	Real time
Min.:	-100.0	Unit:	%
Max.:	100.0	Data Type:	Int16
Default:	0.0	Change:	Real-time

Value Range:

-100.0% 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

Hex:	2009-22h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	0.0	Change:	Real-time

Value Range:

0.0% to 100.0%

Description

Defines the forward friction compensation value.

H09.34 Negative friction compensation value

Hex:	2009-23h	Effective mode:	Real time
Min.:	-100.0	Unit:	%
Max.:	0.0	Data Type:	Int16
Default:	0.0	Change:	Real-time

Value Range:

-100.0% to 0.0%

Description

Defines the reverse direction friction compensation value.

H09.35 Friction compensation speed

Hex:	2009-24h	Effective mode:	Real time
Min.:	0.0	Unit:	-
Max.:	20.0	Data Type:	UInt16
Default:	2.0	Change:	Real-time

Value Range:

0.0–20.0

Description

Defines the friction compensation speed.

H09.36 Friction compensation speed

Hex:	2009-25h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	19	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

- 0: Slow mode+Speed reference
- 1: Slow mode+Model speed
- 2: Slow mode+Speed feedback
- 3: Slow mode+Observe speed
- 16: Quick mode +Speed reference
- 17: Quick mode +Model speed
- 18: Quick mode +Speed feedback
- 19: Quick mode+Observe speed

Description

-

H09.37 Vibration monitoring time

Hex:	2009-26h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	300	Change:	Real-time

Value Range:

0–65535

Description

The resonance detection suppression function is turned off automatically after the time defined by this parameter elapses. To suppress the resonance suppression function, set this parameter to 65536.

When adaptive notch (H09.02) is on, and the system runs stably for the time set in H09.37, H09.02 will be automatically set to 0.

H09.38 Frequency of low-frequency resonance suppression 1 at the mechanical end

Hex:	2009-27h	Effective mode:	Real time
Min.:	1.0	Unit:	Hz
Max.:	100.0	Data Type:	UInt16
Default:	100.0	Change:	Real-time

Value Range:

1.0 Hz–100.0 Hz

Description

Set this parameter based on the actual jitter frequency.

H09.39 Low-frequency resonance suppression 1 at the mechanical end

Hex:	2009-28h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:

0–3

Description

Defines different low-frequency resonance suppression types at the mechanical load. Type 1 features the shortest delay.

H09.44 Frequency of low-frequency resonance suppression 2 at mechanical load end

Hex:	2009-2Dh	Effective mode:	Real time
Min.:	0.0	Unit:	-
Max.:	100.0	Data Type:	UInt16
Default:	0.0	Change:	Real-time

Value Range:

0.0–100.0

Description

Set this parameter based on the actual jitter frequency.

H09.45 Responsiveness of low-frequency resonance suppression 2 at mechanical load end

Hex:	2009-2Eh	Effective mode:	Real time
Min.:	0.01	Unit:	-
Max.:	5.00	Data Type:	UInt16
Default:	1.00	Change:	Real-time

Value Range:

0.01–5.00

Description

Use the default setpoint in general cases. To increase the setpoint, reduce the delay time.

H09.47 Width of low-frequency resonance suppression 2 at mechanical load end

Hex:	2009-30h	Effective mode:	Real time
Min.:	0.00	Unit:	-
Max.:	2.00	Data Type:	UInt16
Default:	1.00	Change:	Real-time

Value Range:

0.00–2.00

Description

Use the default setpoint in general cases. To increase the setpoint, increase the delay time.

H09.49 Frequency of low-frequency resonance suppression 3 at mechanical load end

Hex:	2009-32h	Effective mode:	Real time
Min.:	0.0	Unit:	-

Max.:	100.0	Data Type:	UInt16
Default:	0.0	Change:	Real-time

Value Range:

0.0–100.0

Description

-

H09.50 Responsiveness of low-frequency resonance suppression 3 at mechanical load end

Hex:	2009-33h	Effective mode:	Real time
Min.:	0.01	Unit:	-
Max.:	5.00	Data Type:	UInt16
Default:	1.00	Change:	Real-time

Value Range:

0.01–5.00

Description

-

H09.52 Width of low-frequency resonance suppression 3 at mechanical load end

Hex:	2009-35h	Effective mode:	Real time
Min.:	0.00	Unit:	-
Max.:	2.00	Data Type:	UInt16
Default:	1.00	Change:	Real-time

Value Range:

0.00–2.00

Description

-

H09.54 Vibration threshold

Hex:	2009-37h	Effective mode:	Real time
Min.:	0.0	Unit:	%
Max.:	300.0	Data Type:	UInt16
Default:	50.0	Change:	Real-time

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

Hex:	2009-39h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	2936	Change:	Real-time

Value Range:

0–65535

Description

Defines the maximum overshoot value allowed during ETune adjustment.

H09.57 STune resonance suppression switchover frequency

Hex:	2009-3Ah	Effective mode:	Real time
Min.:	0	Unit:	Hz
Max.:	4000	Data Type:	UInt16
Default:	900	Change:	Real-time

Value Range:

0 Hz–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

Hex:	2009-3Bh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Disabled

1: Enabled

Description

Used to enable STune resonance suppression reset to clear parameters related to resonance suppression, medium-frequency resonance suppression 2 and notches 3 and 4.

H09.71 Starting frequency

Hex:	2009-48h	Effective mode:	Real time

Min.: 0
 Max.: 8000
 Default: 15

Unit: Hz
 Data Type: UInt16
 Change: Real-time

Value Range:

0 Hz–8000 Hz

Description

-

H09.72 End frequency

Hex: 2009-49h

Effective mode: Real time

Min.: 0
 Max.: 8000
 Default: 8000

Unit: Hz
 Data Type: UInt16
 Change: Real-time

Value Range:

0 Hz–8000 Hz

Description

-

H09.73 Frequency subdivision

Hex: 2009-4Ah

Effective mode: Real time

Min.: 0
 Max.: 500
 Default: 50

Unit: -
 Data Type: UInt16
 Change: Real-time

Value Range:

0–500

Description

-

H09.74 Excitation amplitude

Hex: 2009-4Bh

Effective mode: Real time

Min.: 0.0
 Max.: 400.0
 Default: 15.0

Unit: %
 Data Type: UInt16
 Change: Real-time

Value Range:

0.0% to 400.0%

Description

-

H09.75

Starting frequency 2

Hex: 2009-4Ch

Effective mode: Real time

Min.: 0

Unit: Hz

Max.: 8000

Data Type: UInt16

Default: 500

Change: Real-time

Value Range:

0 Hz–8000 Hz

Description

-

H09.76

Frequency subdivision 2

Hex: 2009-4Dh

Effective mode: Real time

Min.: 0

Unit: -

Max.: 1000

Data Type: UInt16

Default: 500

Change: Real-time

Value Range:

0–1000

Description

-

H09.77

Biquard1 mode

Hex: 2009-4Eh

Effective mode: Real time

Min.: 0

Unit: -

Max.: 6

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0: Disabled

1: First-order low-pass

2: Second-order low-pass

3: Notch

4: Lead-lag

5: User-defined

Description

Setting H09.27 to 1 enables the ITune function.

Note: ITune mode 2 is manufacturer commissioning mode, which should be used with caution.

H09.78 Biquard1 numerator frequency

Hex:	2009-4Fh	Effective mode:	Real time
Min.:	0	Unit:	Hz
Max.:	16000	Data Type:	UInt16
Default:	8000	Change:	Real-time

Value Range:
0 Hz–16000 Hz

Description
-

H09.79 Biquard1 numerator damping coefficient

Hex:	2009-50h	Effective mode:	Real time
Min.:	0.001	Unit:	-
Max.:	10.000	Data Type:	UInt16
Default:	1.000	Change:	Real-time

Value Range:
0.001–10.000

Description
-

H09.80 Biquard1 dominator frequency

Hex:	2009-51h	Effective mode:	Real time
Min.:	0	Unit:	Hz
Max.:	16000	Data Type:	UInt16
Default:	8000	Change:	Real-time

Value Range:
0 Hz–16000 Hz

Description
-

H09.81 Biquard1 denominator damping coefficient

Hex:	2009-52h	Effective mode:	Real time
Min.:	0.001	Unit:	-
Max.:	10.000	Data Type:	UInt16
Default:	1.000	Change:	Real-time

Value Range:
0.001–10.000

Description

-

5.11 H0A Fault and Protection Parameters

H0A.01 Absolute position limit

Hex:	200A-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

- 0: Disabled
- 1: Enabled
- 2: Enabled after homing

Description

Used to set the activation condition for enabling the software position limit function and the software limit.

H0A.04 Motor overload protection gain

Hex:	200A-05h	Effective mode:	Real time
Min.:	10	Unit:	-
Max.:	300	Data Type:	UInt16
Default:	100	Change:	Real-time

Value Range:

10–300

Description

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

You can change the setpoint to advance or delay the time when overload protection is triggered based on the motor temperature. The setpoint 50% indicates the time is cut by half; 150% indicates the time is increased by 50%. Set this parameter based on the actual temperature of the motor.

H0A.08 Overspeed threshold

Hex:	200A-09h	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	20000	Data Type:	UInt16

Default: 0

Change: Real-time

Value Range:

0rpm to 20000rpm

Description

Defines the overspeed threshold of the motor.

Value	Threshold	Condition for Reporting E500.0
0	Maximum motor speed x 1.2	If the speed feedback exceeds the overspeed threshold several times, the drive reports E500.0 (Motor overspeed).
1–20000	If H0A-08 $\geq$ (Maximum motor speed x 1.2): Overspeed threshold = Maximum motor speed x 1.2	
	If H0A-08 < (Maximum motor speed x 1.2): Overspeed threshold = H0A.08	

H0A.10 Threshold of excessive local position deviation

Hex: 200A-0Bh

Effective Real time

mode:

Min.: 0

Unit: -

Max.: 4294967295

Data Type: UInt32

Default: 27486951

Change: Real-time

Value Range:

0–4294967295

Description

Defines the threshold for excessive position deviation in the position control mode.

When the position deviation exceeds this threshold, the drive reports EB00.0 (Position deviation too large).

H0A.12 Runaway protection enable

Hex: 200A-0Dh

Effective Real time

mode:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 1

Change: Real-time

Value Range:

0: Disable

1: Enable

Description

Defines whether to enable runaway protection.
 0: Disables E234.0 detection when the motor drives a vertical axis or is driven by the load
 1: Enables runaway protection

H0A.17 Reference pulse selection

Hex:	200A-12h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Pulse unit
 1: Reference unit

Description

Defines the unit for the position settings in H05.21, H05.22, and H0A.10.

H0A.18 IGBT over-temperature threshold

Hex:	200A-13h	Effective mode:	Real time
Min.:	120	Unit:	°C
Max.:	175	Data Type:	UInt16
Default:	140	Change:	Real-time

Value Range:

120°C–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

Hex:	200A-14h	Effective mode:	Real time
Min.:	0.00	Unit:	us
Max.:	6.30	Data Type:	UInt16
Default:	2.00	Change:	Real-time

Value Range:

0.00us–6.30us

Description

Defines the filter time of touch probe 1. An active input must last for the time defined by H0A.19.

H0A.20 Filter time constant of touch probe 2

Hex:	200A-15h	Effective mode:	Real time
Min.:	0.00	Unit:	us
Max.:	6.30	Data Type:	UInt16
Default:	2.00	Change:	Real-time

Value Range:

0.00us–6.30us

Description

Defines the filter time of touch probe 2. An active input must last for the time defined by H0A.20.

H0A.21 STO state display

Hex:	200A-16h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0–3

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

Hex:	200A-18h	Effective mode:	Upon the next power-on
Min.:	0	Unit:	25ns
Max.:	31	Data Type:	UInt16
Default:	15	Change:	At stop

Value Range:

0 ns–31 ns

Description

-

H0A.25 Speed display DO low-pass filter time

Hex:	200A-1Ah	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	5000	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 ms–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

Hex:	200A-1Bh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Show motor overload alarm (E909.0) and fault (E620.0)

1: Hide motor overload alarm (E909.0) and fault (E620.0)

Description

Defines whether to enable motor overload detection.

H0A.27 Average filter time for speed display DO

Hex:	200A-1Ch	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	50	Change:	At stop

Value Range:

0 ms–100 ms

Description

Defines the average filter time constant of the speed information for speed feedback and position references.

H0A.32 Time threshold for locked motor overheat protection

Hex:	200A-21h	Effective mode:	Real time
Min.:	10	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	200	Change:	Real-time

Value Range:

10 ms–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 Locked motor overheat protection

Hex:	200A-22h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	Real-time

Value Range:

0: Disabled

1: Enabled

Description

Enables or disables the detection for E630.0 (Motor stall overtemperature protection).

H0A.36 Encoder multi-turn overflow fault selection

Hex:	200A-25h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

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.38 MCU average filter time

Hex:	200A-27h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	100	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0–100

Description

-

H0A.40 Compensation function selection

Hex:	200A-29h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	15	Data Type:	UInt16
Default:	6	Change:	At stop

Value Range:

bit	Name	Description
0	Overtravel compensation	0: Enabled
		1: Disabled
1	Probe rising edge compensation	0: Disabled
		1: Enabled
2	Probe falling edge compensation	0: Disabled
		1: Enabled
3	Probe solution	0: New scheme
		1: Old scheme (same as SV660N)

Description

-

H0A.41 Forward position of software position limit

Hex:	200A-2Ah	Effective mode:	Real time
Min.:	-2147483648	Unit:	Encoder unit
Max.:	2147483647	Data Type:	Int32
Default:	2147483647	Change:	At stop

Value Range:

-2147483648 to 2147483647

Description

When the absolute position counter (H0b.07) is larger than H0A.41, the servo drive reports E950.0 (Forward limit switch alarm) and executes stop at forward limit.

H0A.43 Reverse position of software position limit

Hex:	200A-2Ch	Effective mode:	Real time
Min.:	-2147483648	Unit:	Encoder unit
Max.:	2147483647	Data Type:	Int32
Default:	-2147483648	Change:	At stop

Value Range:

-2147483648 to 2147483647

Description

When the absolute position counter (H0b.07) is smaller than H0A.43, the servo drive reports alarm E952.0 (Reverse limit switch alarm) and executes stop at reverse limit.

H0A.49 Braking resistor overtemperature threshold

Hex:	200A-32h	Effective mode:	Real time
Min.:	100	Unit:	°C
Max.:	175	Data Type:	UInt16
Default:	140	Change:	Real-time

Value Range:

100°C–175°C

Description

Defines the temperature threshold for braking resistor overload.

H0A.50 Encoder communication fault tolerance threshold

Hex:	200A-33h	Effective mode:	Upon the next power-on
Min.:	0	Unit:	-
Max.:	31	Data Type:	UInt16
Default:	31	Change:	Real-time

Value Range:

0–31

Description

When the number of communication failures between the encoder and the drive exceeds H0A.50, the communication between the encoder and the drive fails.

H0A.52 Encoder temperature protection threshold

Hex:	200A-35h	Effective mode:	Real time
Min.:	0	Unit:	°C
Max.:	175	Data Type:	UInt16
Default:	125	Change:	Real-time

Value Range:

0°C–175°C

Description

Defines the temperature threshold for encoder overtemperature protection.

H0A.53

Probe DI ON compensation time

Hex:	200A-36h	Effective mode:	Real time
Min.:	-3000	Unit:	25ns
Max.:	3000	Data Type:	Int16
Default:	200	Change:	Real-time

Value Range:

-3000 ns–3000 ns

Description

Used to compensate for the action time when the touch probe is switched on.

H0A.54

Probe DI OFF compensation time

Hex:	200A-37h	Effective mode:	Real time
Min.:	-3000	Unit:	25ns
Max.:	3000	Data Type:	Int16
Default:	1512	Change:	Real-time

Value Range:

-3000 ns–3000 ns

Description

Used to compensate for the action time when the touch probe is switched off.

H0A.55

Runaway current threshold

Hex:	200A-38h	Effective mode:	Real time
Min.:	100.0	Unit:	%
Max.:	400.0	Data Type:	UInt16
Default:	200.0	Change:	Real-time

Value Range:

100.0% to 400.0%

Description

Defines the current threshold for runaway protection detection.

H0A.56

Fault reset delay

Hex:	200A-39h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	60000	Data Type:	UInt16
Default:	10000	Change:	Real-time

Value Range:

0 ms–60000 ms

Description

-

H0A.57 Runaway speed threshold

Hex:	200A-3Ah	Effective mode:	Real time
Min.:	1	Unit:	rpm
Max.:	1000	Data Type:	UInt16
Default:	50	Change:	Real-time

Value Range:

1 rpm to 1000 rpm

Description

Defines the overspeed threshold for runaway protection detection.

H0A.58 Runaway speed filter time

Hex:	200A-3Bh	Effective mode:	Upon the next power-on
Min.:	0.1	Unit:	ms
Max.:	100.0	Data Type:	UInt16
Default:	2.0	Change:	Real-time

Value Range:

0.1 ms–100.0 ms

Description

Defines the speed feedback filter time for runaway protection detection.

H0A.59 Runaway protection detection time

Hex:	200A-3Ch	Effective mode:	Real time
Min.:	10	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	30	Change:	Real-time

Value Range:

10 ms–1000 ms

Description

The runaway fault will be reported when runaway keeps active for a period longer than H0A.59.

H0A.60 Black box function mode

Hex:	200A-3Dh	Effective mode:	Real time
Min.:	0	Unit:	-

Max.:	3	Data Type:	UInt16
Default:	1	Change:	Real-time

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

Hex:	200A-3Eh	Effective mode:	Real time
Min.:	0.0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0.0	Change:	Real-time

Value Range:

0.0–6553.5

Description

Defines the fault code for triggering the black box function.

H0A.62 Trigger source

Hex:	200A-3Fh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	25	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0–25

Description

Defines the fault code for triggering the black box function through designated channel.

H0A.63 Trigger level

Hex:	200A-40h	Effective mode:	Real time
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:

-2147483648–2147483647

Description

Defines the trigger level for triggering the black box function through designated channel.

H0A.65**Trigger level**

Hex:	200A-42h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	Real-time

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**

Hex:	200A-43h	Effective mode:	Real time
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	75	Change:	Real-time

Value Range:

0% to 100%

Description

Defines the pre-trigger position for triggering black box sampling.

H0A.67**Sampling frequency**

Hex:	200A-44h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	Real-time

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

Hex:	200A-47h	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	20000	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0rpm to 20000rpm

Description

Defines the speed threshold for reporting E500.2 (Position feedback pulse overspeed).

H0A.71 Function enable switch

Hex:	200A-48h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	4098	Change:	Real-time

Value Range:

0–65535

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

bit12:

0: Homing completed flag bit not retentive upon power failure

1: Homing completed flag bit retentive upon power failure

H0A.72 Maximum stop time in ramp-to-stop

Hex:	200A-49h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10000	Change:	At stop

Value Range:

0 ms–65535 ms

Description

Bit0: Current position changes from "less than" to "more than" the comparison point

H0A.73 STO 24 V disconnection filter time

Hex:	200A-4Ah	Effective mode:	Real time
Min.:	1	Unit:	ms
Max.:	5	Data Type:	UInt16
Default:	5	Change:	Real-time

Value Range:

1 ms–5 ms

Description

Bit1: Current position changes from "more than" to "less than" the comparison point

H0A.74 Filter time for two inconsistent STO channels

Hex:	200A-4Bh	Effective mode:	Real time
Min.:	1	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	100	Change:	Real-time

Value Range:

1 ms–1000 ms

Description

Bit2 to 6: N/A

H0A.75 Servo OFF delay after STO triggered

Hex:	200A-4Ch	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	20	Change:	Real-time

Value Range:

0 ms–100 ms

Description

Bit7: DO1 output

H0A.90 Moving average filter time for speed display values

Hex:	200A-5Bh	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 ms–100 ms

Description

Bit15: Frequency-division OCZ output

H0A.91 Moving average filter time for torque display values

Hex:	200A-5Ch	Effective	Real time
		mode:	
Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 ms–100 ms

Description

Defines the moving average filter time constant for torque display values.

H0A.92 Moving average filter time for position display values

Hex:	200A-5Dh	Effective	Real time
		mode:	
Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 ms–100 ms

Description

Defines the moving average filter time constant for position display values.

H0A.93 Low-pass filter time for voltage display values

Hex:	200A-5Eh	Effective	Real time
		mode:	
Min.:	0	Unit:	ms
Max.:	250	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 ms–250 ms

Description

Defines the low-pass filter time constant for voltage display values.

H0A.94 Low-pass filter time for thermal display values

Hex:	200A-5Fh	Effective	Real time
		mode:	
Min.:	0	Unit:	ms
Max.:	250	Data Type:	UInt16

Default: 0

Change: At stop

Value Range:

0 ms–250 ms

Description

Defines the filter time constant for thermal display values.

5.12 H0b Monitoring Parameters

H0b.00 Motor speed actual value

Hex: 200b-01h

Effective -

mode:

Min.: -32767

Unit: rpm

Max.: 32767

Data Type: Int16

Default: 0

Change: Unchangeable

Value Range:

-32767rpm to 32767rpm

Description

It displays the actual speed of the servo motor after round-off, in unit of 1 RPM.

Set in H0A.25 (Filter time constant of speed feedback display) the filter time constant for H0b.00.

H0b.01 Speed reference

Hex: 200b-02h

Effective -

mode:

Min.: -32767

Unit: rpm

Max.: 32767

Data Type: Int16

Default: 0

Change: Unchangeable

Value Range:

-32767rpm to 32767rpm

Description

Indicates the present speed reference (accurate to 1rpm) of the drive in the position and speed control modes.

H0b.02 Internal torque reference

Hex: 200b-03h

Effective -

mode:

Min.: -500.0

Unit: %

Max.: 500.0

Data Type: Int16

Default: 0.0

Change: Unchangeable

Value Range:

-500.0% to 500.0%

Description

Displays present torque reference (accurate to 0.1%). The value 100.0% corresponds to the rated torque of the motor.

H0b.03 Input (DI) signal monitoring

Hex:	200b-04h	Effective mode:	-
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Displays the level status of eight DI terminals without filtering.

Upper LED segments ON: high level (indicated by "1") Lower LED segments ON: low level (indicated by "0")

H0b.05 Output (DO) signal monitoring

Hex:	200b-06h	Effective mode:	-
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Displays the level status of 5 DO terminals without filtering.

Upper LED segments ON: high level (indicated by "1") Lower LED segments ON: low level (indicated by "0")

H0b.07 Absolute position counter

Hex:	200b-08h	Effective mode:	-
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Indicates present absolute position (reference unit) of the motor in the position control mode.

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

H0b.09 Mechanical angle

Hex:	200b-0Ah	Effective mode:	-
Min.:	0.0	Unit:	°
Max.:	360.0	Data Type:	UInt16
Default:	0.0	Change:	Unchangeable

Value Range:

0.0° to 360.0°

Description

Displays present mechanical angle (encoder unit) of the motor. The setpoint 0 indicates the mechanical angle is 0°.

Actual mechanical angle = $360^\circ \times \text{H0b.09} / (\text{Maximum value of H0b.09} + 1)$

Maximum value of H0b.09 for an absolute encoder is 65535.

H0b.10 Electrical angle

Hex:	200b-0Bh	Effective mode:	-
Min.:	0.0	Unit:	°
Max.:	360.0	Data Type:	UInt16
Default:	0.0	Change:	Unchangeable

Value Range:

0.0° to 360.0°

Description

Indicates the present electrical angle of the motor, which is accurate to 0.1°.

The electrical angle variation range is $\pm 360.0^\circ$ during rotation. If the motor has four pairs of poles, each revolution generates four rounds of angle change from 0° to 359°. Similarly, if the motor has five pairs of poles, each revolution generates five rounds of angle change from 0° to 359°.

H0b.12 Average load ratio

Hex:	200b-0Dh	Effective mode:	-
Min.:	0.0	Unit:	%
Max.:	800.0	Data Type:	UInt16
Default:	0.0	Change:	Unchangeable

Value Range:

0.0% to 800.0%

Description

Displays the percentage of the average load torque to the rated torque of the motor, which is accurate to 0.1%. The value 100.0% corresponds to the rated torque of the motor.

H0b.13 Input reference counter

Hex:	200b-0Eh	Effective mode:	-
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Used to count and display the number of position references not divided or multiplied by the electronic gear ratio during operation.

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

H0b.15 Position following error (encoder unit)

Hex:	200b-10h	Effective mode:	-
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Used to count and display the position deviation value after being divided or multiplied by the electronic gear ratio in the position control mode.

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

Note:

H0b.15 can be clear when the condition defined in H05.16 (Clear action) is met.

H0b.17 Feedback pulse counter

Hex:	200b-12h	Effective mode:	-
Min.:	-2147483648	Unit:	p

Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Used to count the position pulses fed back by the encoder in any control mode.
This parameter is a 32-bit integer, which is displayed as a decimal on the keypad.

H0b.19**Total power-on time**

Hex:	200b-14h	Effective mode:	-
Min.:	0.0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0.0	Change:	Unchangeable

Value Range:

0.0s–429496729.5s

Description

Used to record the total operating time of the servo drive.
This parameter is a 32-bit integer, which is displayed as a decimal on the keypad.

Note:

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

H0b.24**Phase current RMS value**

Hex:	200b-19h	Effective mode:	-
Min.:	0.0	Unit:	A
Max.:	6553.5	Data Type:	UInt16
Default:	0.0	Change:	Unchangeable

Value Range:

0.0A–6553.5A

Description

Displays the RMS value of the phase current of the motor, accurate to 0.01 A.

H0b.26**Bus voltage**

Hex:	200b-1Bh	Effective mode:	-
Min.:	0.0	Unit:	V
Max.:	6553.5	Data Type:	UInt16

Default: 0.0

Change: Unchangeable

Value Range:

0.0 V to 6553.5 V

Description

Displays the DC bus voltage of the main circuit input voltage after rectification, which is accurate to 0.01 V.

H0b.27 Module temperature

Hex: 200b-1Ch

Effective -

mode:

Min.: -20

Unit: °C

Max.: 200

Data Type: Int16

Default: 0

Change: Unchangeable

Value Range:

-20°C–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

Hex: 200b-1Dh

Effective -

mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

-

H0b.29 Axis status information given by FPGA

Hex: 200b-1Eh

Effective -

mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

-

H0b.30 Axis fault information given by FPGA

Hex:	200b-1Fh	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable
Value Range:			
0–65535			
Description			
-			

H0b.31 Encoder fault information

Hex:	200b-20h	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable
Value Range:			
0–65535			
Description			
-			

H0b.33 Fault log

Hex:	200b-22h	Effective	Real time
		mode:	
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	0	Change:	Real-time
Value Range:			

- 0: Present fault
- 1: Last fault
- 2: 2nd to last fault
- 3: 3rd to last fault
- 4: 4th to last fault
- 5: 5th to last fault 6: 6th to last fault
- 7: 7th to last fault
- 8: 8th to last fault
- 9: 9th to last fault
- 10: 10th to last fault
- 11: 11th to last fault
- 12: 12th to last fault
- 13: 13th to last fault
- 14: 14th to last fault
- 15: 15th to last fault
- 16: 16th to last fault
- 17: 17th to last fault
- 18: 18th to last fault
- 19: 19th to last fault

Description

Used to view the latest 20 faults of the drive.

H0b.34 Fault code of the selected fault

Hex:	200b-23h	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0b.35 Timestamp of the selected fault

Hex:	200b-24h	Effective	-
		mode:	
Min.:	0.0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0.0	Change:	Unchangeable

Value Range:

0.0s–429496729.5s

Description

-

H0b.37 Motor speed upon occurrence of the selected fault

Hex:	200b-26h	Effective	-
		mode:	
Min.:	-32767	Unit:	rpm
Max.:	32767	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-32767rpm to 32767rpm

Description

-

H0b.38 Motor phase U current upon occurrence of the selected fault

Hex:	200b-27h	Effective	-
		mode:	
Min.:	-3276.7	Unit:	A
Max.:	3276.7	Data Type:	Int16
Default:	0.0	Change:	Unchangeable

Value Range:

-3276.7 A to 3276.7 A

Description

-

H0b.39 Motor phase V current upon occurrence of the selected fault

Hex:	200b-28h	Effective	-
		mode:	
Min.:	-3276.7	Unit:	A
Max.:	3276.7	Data Type:	Int16
Default:	0.0	Change:	Unchangeable

Value Range:

-3276.7 A to 3276.7 A

Description

-

H0b.40 Bus voltage upon occurrence of the selected fault

Hex:	200b-29h	Effective	-
		mode:	
Min.:	0.0	Unit:	V
Max.:	6553.5	Data Type:	UInt16

Change: Unchangeable

0.0 V to 6553.5 V

—

H0b.41 Input terminal state on selected fault

Effective -

Unit: -

Unit: -

Data Type: UInt16

Change: Unchangeable

0-65535

—

H0b.43 **Output terminal status upon occurrence of the selected fault**

Effective -

Unit: -

Unit: -

Data Type: UInt16

Change: Unchangeable

0-65535

H0b.45 Internal fault code

Effective -

Unit: -

Unit: -

Data Type: UInt16

Change: Unchangeable

0-65535

H0b.46 Absolute encoder fault information given by FPGA upon occurrence of the selected fault

Hex:	200b-2Fh	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0b.47 System status information given by FPGA upon occurrence of the selected fault

Hex:	200b-30h	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0b.48 System fault information given by FPGA upon occurrence of the selected fault

Hex:	200b-31h	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0b.49 Encoder fault information upon occurrence of the selected fault

Hex:	200b-32h	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0b.51 Internal fault code upon occurrence of the selected fault

Hex: 200b-34h

Effective -

mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

-

H0b.52 FPGA timeout fault standard bit upon occurrence of the selected fault

Hex: 200b-35h

Effective -

mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

-

H0b.53 Position following error (reference unit)

Hex: 200b-36h

Effective -

mode:

Min.: -2147483648

Unit: p

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

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

Position deviation (reference unit) is the value obtained after encoder position deviation calculation. The precision is compromised during division.

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

H0b.55 Motor speed actual value

Hex:	200b-38h	Effective	-
		mode:	
Min.:	-2147483648.0	Unit:	rpm
Max.:	2147483647.0	Data Type:	Int32
Default:	0.0	Change:	Unchangeable

Value Range:

-2147483648.0rpm to 2147483647.0rpm

Description

Indicates the actual value of motor speed, which is accurate to 0.1 rpm.

H0A.25 (Filter time constant of speed feedback display) can be used to set the filter time constant of the speed feedback.

H0b.58 Mechanical absolute position (low 32 bits)

Hex:	200b-3Bh	Effective	-
		mode:	
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Displays the low 32-bit value (encoder unit) of the mechanical position feedback when the absolute encoder is used.

H0b.60 Mechanical absolute position (high 32 bits)

Hex:	200b-3Dh	Effective	-
		mode:	
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Displays the high 32-bit value (encoder unit) of the mechanical position feedback when the absolute encoder is used.

H0b.63 NotRdy state

Hex:	200b-40h	Effective	-
		mode:	
Min.:	0	Unit:	-

Max.: 8

Default: 0

Data Type: UInt16

Change: Unchangeable

Value Range:

0: Normal

1: Control circuit error

2: Main circuit power input error

3: Bus undervoltage

4: Soft start failed

5: Encoder initialization undone

6: Short circuit to ground failed

7: Other

8: STO

Description

Displays the reason for the NRD state.

H0b.64**Real-time input position reference counter**

Hex: 200b-41h

Effective -

mode:

Min.: -2147483648

Unit: Reference unit

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Unchangeable

Value Range:

-2147483648 to 2147483647

Description

Displays the value of the pulse reference counter before being divided or multiplied by the electronic gear ratio. This value is independent of the servo drive status and the control mode.

H0b.66**Encoder temperature**

Hex: 200b-43h

Effective -

mode:

Min.: -32768

Unit: °C

Max.: 32767

Data Type: Int16

Default: 0

Change: Unchangeable

Value Range:

-32768°C–32767°C

Description

-

H0b.67 Load rate of braking resistor

Hex:	200b-44h	Effective	-
		mode:	
Min.:	0.0	Unit:	%
Max.:	200.0	Data Type:	UInt16
Default:	0.0	Change:	Unchangeable

Value Range:

0.0% to 200.0%

Description

-

H0b.70 Number of absolute encoder revolutions

Hex:	200b-47h	Effective	-
		mode:	
Min.:	0	Unit:	Rev
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0Rev to 65535Rev

Description

Indicates the number of revolutions of the absolute encoder.

H0b.71 Single-turn position fed back by the absolute encoder

Hex:	200b-48h	Effective	-
		mode:	
Min.:	0	Unit:	p
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0p to 2147483647p

Description

Displays the position feedback of the absolute encoder within one turn.

H0b.74 System fault information given by FPGA

Hex:	200b-4Bh	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0-65535

Description

-

H0b.77 Encoder position (low 32 bits)

Hex:	200b-4Eh	Effective	-
		mode:	
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Displays the low 32-bit value of the position feedback of the absolute encoder.

H0b.79 Encoder position (high 32 bits)

Hex:	200b-50h	Effective	-
		mode:	
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Displays the high 32-bit value of the position feedback of the absolute encoder.

H0b.81 Single-turn position of the rotary load (low 32 bits)

Hex:	200b-52h	Effective	-
		mode:	
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Displays the low 32-bit value of the position feedback of the rotary load when the absolute system works in the rotation mode.

H0b.83 Single-turn position of the rotary load (high 32 bits)

Hex:	200b-54h	Effective	-
		mode:	
Min.:	-2147483648	Unit:	p

Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Displays the high 32-bit value of the position feedback of the rotary load when the absolute system works the rotation mode.

H0b.85 Single-turn position of the rotary load (reference unit)

Hex:	200b-56h	Effective mode:	-
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Displays the high 32-bit value of the position feedback of the rotary load when the absolute system works the rotation mode.

H0b.87 IGBT junction temperature

Hex:	200b-58h	Effective mode:	-
Min.:	0	Unit:	-
Max.:	200	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–200

Description

-

H0b.90 Group No. of the abnormal parameter

Hex:	200b-5Bh	Effective mode:	-
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0b.91 Offset within the group of the abnormal parameter

Hex:	200b-5Ch	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:
0–65535

Description
-

H0b.94 Individual power-on time

Hex:	200b-5Fh	Effective	-
		mode:	
Min.:	0.0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0.0	Change:	Unchangeable

Value Range:
0.0s–429496729.5s

Description
Display the individual power-on time of the drive.

H0b.96 Individual power-on time upon occurrence of the selected fault

Hex:	200b-61h	Effective	-
		mode:	
Min.:	0.0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0.0	Change:	Unchangeable

Value Range:
0.0s–429496729.5s

Description
-

5.13 H0C electromagnetic shorting

H0C.00 Braking overcurrent value upon electromagnetic shorting

Hex:	200C-01h	Effective	Real time
		mode:	
Min.:	0.0	Unit:	%
Max.:	100.0	Data Type:	UInt16
Default:	76.0	Change:	At stop

Value Range:

0.0% to 100.0%

Description

-

5.14 H0d Auxiliary Parameters

H0d.00 Software Reset

Hex:	200d-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation

1: Enable

Description

Programs in the drive are reset automatically (similar to the program reset upon power-on) after the software reset function is enabled, without the need for a power cycle.

H0d.01 Fault reset

Hex:	200d-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation

1: Enable

Description

When a No. 1 or No. 2 resettable fault occurs, you can enable the fault reset function in the non-operational state after rectifying the fault cause, stopping the keypad from displaying the fault and allowing the drive to enter the "rdy" state.

When a No. 3 alarm occurs, you can enable the fault reset function directly, regardless of the servo drive status.

H0d.02 Inertia auto-tuning enable

Hex:	200d-03h	Effective mode:	Real time

Min.: 0
Max.: 65
Default: 0

Unit: -
Data Type: UInt16
Change: Real-time

Value Range:

0–65

Description

Used to enable offline inertia auto-tuning through the keypad. In the parameter display mode, switch to H0d.02 and press the SET key to enable offline inertia auto-tuning.

H0d.04 Read/write in encoder ROM

Hex: 200d-05h

Effective mode: Real time

Min.: 0
Max.: 3
Default: 0

Unit: -
Data Type: UInt16
Change: At stop

Value Range:

0: No operation

1: Write ROM

2: Read ROM

3: ROM failure

Description

-

H0d.05 Emergency stop

Hex: 200d-06h

Effective mode: Real time

Min.: 0
Max.: 1
Default: 0

Unit: -
Data Type: UInt16
Change: Real-time

Value Range:

0: No operation

1: Emergency stop

Description

-

H0d.12 Phase U/V current balance correction

Hex: 200d-0Dh

Effective mode: Real time

Min.: 0
Max.: 1
Default: 0

Unit: -
Data Type: UInt16
Change: At stop

Value Range:

0: Disabled

1: Enabled

Description

-

H0d.17 Forced DI/DO enable switch

Hex: 200d-12h

Effective Real time
mode:

Min.: 0

Unit: -

Max.: 3

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

bit0: Forced DI enable switch

0: Disabled

1: Enabled

bit1: Forced DO enable switch

0: Disabled

1: Enabled

Description

Forced DI/DO selection.

H0d.18 Forced DI value

Hex: 200d-13h

Effective Real time
mode:

Min.: 0

Unit: -

Max.: 15

Data Type: UInt16

Default: 15

Change: Real-time

Value Range:

0–15

Description

Defines whether the DI functions set in group H03 is active when forced DI is activated (H0d.17 = 1 or 3).

The value of H0d.18 is displayed as a hexadecimal on the keypad. When it is converted to a binary value, "bit(n) = 1" indicates the level logic of DI function is high level; "bit(n) = 0" indicates the level logic of the DI function is low level.

Note

For a low voltage drive, high level 1 and low level 0 of this bit, the corresponding H03.OX of this DI is normally open 0 and closed 1.

H0d.19**Forced DO value**

Hex:	200d-14h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0–7

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**

Hex:	200d-15h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation

1: Reset

2: Reset the fault and multi-turn data

Description

You can reset the encoder error or the multi-turn data fed back by the encoder by setting H0d.20.

H0d.22**Display test**

Hex:	200d-17h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: No operation

1: Status indicator and fault indicator steady on

. 2: Status indicator and fault indicator steady off

Description

You can reset the encoder error or the multi-turn data fed back by the encoder by setting H0d.20.

H0d.23 Torque fluctuation auto-tuning

Hex:	200d-18h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop
Value Range:			
0–1			
Description			
-			

H0d.26 Forcibly open brake

Hex:	200d-1Bh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At stop
Value Range:			
0: Disabled			
2: Enabled			
Description			
-			

5.15 H0E Communication Function Parameters**H0E.00 Node address**

Hex:	200E-01h	Effective mode:	Real time
Min.:	1	Unit:	-
Max.:	127	Data Type:	UInt16
Default:	1	Change:	At stop
Value Range:			
1–127			
Description			

CAN Indicates the slave node address. Ensure this parameter is consistent with the configuration of the host controller.

H0E.01 Save objects written through communication to e2prom

Hex:	200E-02h	Effective mode:	Real time
Min.:	0	Unit:	-

Max.:	255	Data Type:	UInt16
Default:	1	Change:	Real-time

Value Range:

0: Not save

1: Save parameters

2: Save object dictionaries

3: Save parameters and object dictionaries

4: Save object dictionaries written before communication (OP)

255: Determine through H0E03 and H0E04

Description

-

H0E.03 Save objects written through software (commissioning protocol) to e2prom

Hex:	200E-04h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	Real-time

Value Range:

0: Do not save

1: Save

Description

Saves objects written through software (commissioning protocol) to e2prom, including the parameter and object dictionary.

H0E.04 Save objects written through communication to e2prom (excluding commissioning protocol)

Hex:	200E-05h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Do not save

1: Save

Description

You can use this parameter to determine whether to save communication written data in e2prom (excluding commissioning protocol) (CANOpen, CANLink, Ethernet COE, ModBus485). The data include the function code and object dictionary

H0E.07 Object dictionary unit selection

Hex:	200E-08h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Reference unit system (p/s, p/s2)

1: User unit system (0.01 RPM, ms)

Description

Servo unit system switching:

0: Use reference unit system. The speed type dictionary unit is p/s, and the acceleration type object dictionary is p/s2.

1: Use the user unit system. The speed type object dictionary unit is 0.01 rpm, and the acceleration type object dictionary unit is the time (ms) taken to change from 0 rpm to 1000 rpm.

H0E.10 CAN selection

Hex:	200E-0Bh	Effective mode:	Upon the next power-on
Min.:	2	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:

0: Pulse/Axis control command

1: Enhanced axis control command

2: CANopen

Description

Indicates the CAN application layer:

0: Pulse/Axis control command

1: Enhanced axis control command

2: CANopen

If you use CiA402, set H02.00 to 8 and H0E.10 to 2.

If you only CANopen communication, set H0E.10 to 2.

H0E.11 CAN baud rate

Hex:	200E-0Ch	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	5	Change:	At stop

Value Range:

- 0: 20 kbps
- 1: 50 kbps
- 2: 100 kbps
- 3: 125 kbps
- 4: 250 kbps
- 5: 500 kbps
- 6: 1 Mbps
- 7: 1 Mbps - non-standard

Description

It sets the CAN (CANlink or CANopen) communication rate between the servo drive and the host controller. The communication rate set in the servo drive must be the same as that in the host controller. Otherwise, communication will fail. If H0E.11 is set to 6, the baud rate is 1 Mbps. 80% sampling points are used to match most PLCs with a 1M standard baud rate. If H0E.11 is set to 7, the baud rate is 1 Mbps. 70% sampling points are used to match most PLCs with a 1M non-standard (deviated) baud rate. Reducing sampling points can also reduce error frames.

H0E.12 Excessive IP position command increment count

Hex:	200E-0Dh	Effective mode:	Real time
Min.:	1	Unit:	-
Max.:	30	Data Type:	UInt16
Default:	20	Change:	Real-time

Value Range:

1–30

Description

-

H0E.13 CANopen sync period error limit

Hex:	200E-0Eh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	5	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

- 0: 1/4
- 1: 1/2
- 2: 3/4
- 3: 1
- 4: 2
- 5: Disabled

Description

SYNC signal error threshold in the IP mode.

H0E.14 CANopen communication state

Hex:	200E-0Fh	Effective mode:	-
Min.:	0	Unit:	-
Max.:	9	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–9

Description

-

H0E.17 Get the count of received NMT frames with incorrect length

Hex:	200E-12h	Effective mode:	-
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0E.18 Get the count of received NMT frames with incorrect command

Hex:	200E-13h	Effective mode:	-
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

-

H0E.19 Get received heartbeat frames of wrong length

Hex:	200E-14h	Effective mode:	-
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16

Default:	0	Change:	Unchangeable
Value Range:			
0–65535			
Description			
-			

H0E.80

Modbus baud rate

Hex:	200E-51h	Effective mode:	Real time
Min.:	4	Unit:	-
Max.:	9	Data Type:	UInt16
Default:	9	Change:	Real-time

Value Range:

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

Hex:	200E-52h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	3	Change:	Real-time

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

Hex:	200E-53h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	20	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0 ms–20 ms

Description

Defines the delay from the moment when the slave receives a command from the host controller to the moment when the slave returns a response.

H0E.83 Modbus communication timeout

Hex:	200E-54h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	600	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0 ms–600 ms

Description

-

H0E.84 Sequence of Modbus communication data bits

Hex:	200E-55h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	Real-time

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

Hex: 200E-5Bh

Effective -

mode:

Min.: 0.00

Unit: -

Max.: 655.35

Data Type: UInt16

Default: 0.00

Change: Unchangeable

Value Range:

0.00–655.35

Description

-

H0E.91

CANopen version number

Hex: 200E-5Ch

Effective -

mode:

Min.: 0.00

Unit: -

Max.: 655.35

Data Type: UInt16

Default: 0.00

Change: Unchangeable

Value Range:

0.00–655.35

Description

-

H0E.92

CANlink version

Hex: 200E-5Dh

Effective -

mode:

Min.: 0.00

Unit: -

Max.: 655.35

Data Type: UInt16

Default: 0.00

Change: Unchangeable

Value Range:

0.00–655.35

Description

-

H0E.97

Communication monitoring parameter 1

Hex: 200E-62h

Effective Real time

mode:

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time
Value Range:			
0–65535			
Description			
-			

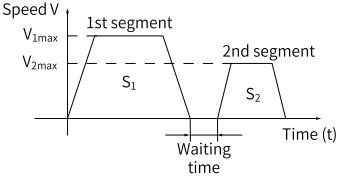
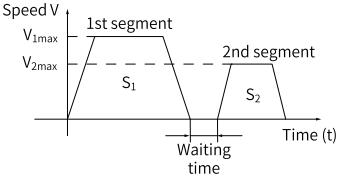
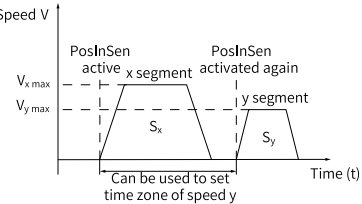
H0E.98 Communication monitoring parameter 2

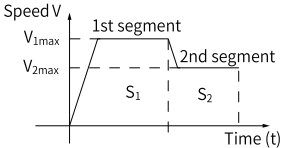
Hex:	200E-63h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time
Value Range:			
0–65535			
Description			
-			

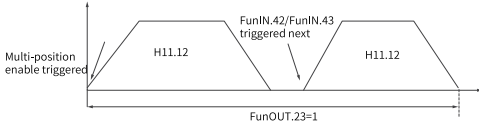
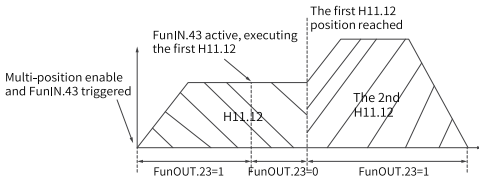
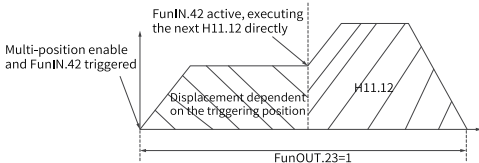
5.16 H11 Multi-position

H11.00 Multi-position running mode

Hex:	2011-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	5	Data Type:	UInt16
Default:	1	Change:	At stop
Value Range:			
0: Single run (number of displacements selected in H11.01)			
1: Cyclic operation (number of displacement selected in H11.01)			
2: DI-based operation (selected by DI)			
3: Sequential operation			
5: Axis-controlled continuous operation			
Description			

Value	Operation Mode	Remarks	Operation Curve
0	Individual operation	The drive stops after one cycle of operation. The drive automatically switches to the next speed. You can set the interval time between displacements. The multi-position reference is level-triggered.	 V_{1max}, V_{2max} : maximum operating speeds in displacement 1 and displacement 2 S_1, S_2 : displacement 1 and displacement 2
1	Cyclic operation	The starting displacement after the first cycle is displacement 1. The drive automatically switches to the next speed. You can set the interval time between displacements. The multi-position reference is level-triggered.	 V_{1max}, V_{2max} : maximum operating speeds in displacement 1 and displacement 2 S_1, S_2 : displacement 1 and displacement 2
2	DI-based operation	The drive continues operating when the displacement No. is updated. The speed 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.	 V_{xmax}, V_{ymax} : maximum operating speeds in displacement x and displacement y S_x, S_y : displacement x and displacement y

Value	Operation Mode	Remarks	Operation Curve
3	Sequential operation	The drive stops after one cycle of operation. The starting displacement after the first cycle is defined by H11.05. The drive automatically switches to the next speed. There is no interval time between displacements. The multi-position reference is level-triggered.	 V_{1max} , V_{2max} : maximum operating speeds in displacement 1 and displacement 2 S_1 , S_2 : displacement 1 and displacement 2

Value	Operation Mode	Remarks	Operation Curve
5	Axis-controlled continuous operation	The drives executes one displacement only. The individual operation mode, sequential operation mode, and interrupted operation mode are included. The PosInSen (multi-position reference enable) signal is level-triggered.	● Individual operation  The PosInSen (multi-position reference enable) signal is triggered only once (FunIN.43/42 triggered later). The drive stops after executing the distance defined by H11.12. ● Sequential operation  The PosInSen (multi-position reference enable) signal is triggered only once. Write H11.12 again and activate FunIN.43 when the distance defined by the first H11.12 is still in progress. After receiving the new distance (or speed), which is the second H11.12, the drive continues executing the first H11.12 until the distance defined by the first H11.12 is done. Then it starts to execute the second H11.12 directly. The travel distance therefore is the sum of the first H11.12 and the second H11.12. ● Interrupted operation  The PosInSen (Multi-position reference enable) signal is triggered only once. Write H11.12 (such as 1000000) again and activate FunIN.42 when the first H11.12 (such as 9000000) is still in progress. After receiving the new distance (or speed), which is the second H11.12, the drive stops executing the first H11.12 and turns to executing the second H11.12.

To use the multi-position function, assign FunIN.28 (PosInSen, multi-position reference enable) to a DI first. See "Group H03: Terminal input parameters" for the setting mode.

The positioning completed (COIN) signal is activated each time upon completion of a displacement. To determine whether a certain displacement is done executing, use

FunOUT.5 (COIN, positioning completed). See "Group H04: Terminal output parameters" for details.

Ensure the S-ON signal is active during operation of each displacement. Otherwise, the drive stops immediately as defined by H02.05 (Stop mode at S-ON OFF) and the positioning completed (COIN) signal is inactive. In modes other than DI-based operation, if the S-ON signal is active but multi-position is disabled during operation of a certain displacement, the drive abandons the unsent displacement reference and stops, with the positioning completed (COIN) signal being active. If the multi-position function is enabled again, the displacement to be executed is defined by H11.02.

H11.01 Number of displacement references in multi-position mode

Hex:	2011-02h	Effective mode:	Real time
Min.:	1	Unit:	-
Max.:	16	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1–16

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 is 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 segment No. is a 4-bit binary value. Bits 0 to 3 correspond to CMD1 to CMD4.

The displacement No. is a 4-bit binary value. The relationship between the displacement numbers and CMD1...CMD4 is shown in the following table.

FunIN.9	FunIN.8	FunIN.7	FunIN.6	Segment No.
CMD4	CMD3	CMD2	CMD1	
0	0	0	0	1
0	0	0	1	2
...				
1	1	1	1	16

H11.02 Starting displacement No. after pause

Hex:	2011-03h	Effective mode:	Real time
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**

Hex: 2011-04h

Effective mode: Real time

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**

Hex: 2011-05h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Real-time

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

Hex:	2011-06h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	16	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0–16

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 to 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

Hex:	2011-0Ah	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	65535	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

-

H11.10 Starting speed of displacement 1

Hex:	2011-0Bh	Effective mode:	Real time
Min.:	0	Unit:	rpm

Max.: 6000 Data Type: UInt16
Default: 0 Change: Real-time

Value Range:

0rpm to 6000rpm

Description

-

H11.11 Stop speed of displacement 1

Hex: 2011-0Ch Effective Real time
mode:

Min.: 0 Unit: rpm

Max.: 6000 Data Type: UInt16

Default: 0 Change: Real-time

Value Range:

0rpm to 6000rpm

Description

-

H11.12 Displacement 1

Hex: 2011-0Dh Effective Real time
mode:

Min.: -1073741824 Unit: Reference unit

Max.: 1073741824 Data Type: Int32

Default: 10000 Change: Real-time

Value Range:

-1073741824 to 1073741824

Description

Defines displacement 1 (reference unit) in multi-position operation.

H11.14 Max. speed of displacement 1

Hex: 2011-0Fh Effective Real time
mode:

Min.: 1 Unit: rpm

Max.: 10000 Data Type: UInt16

Default: 200 Change: Real-time

Value Range:

1rpm to 10000rpm

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 Acc/Dec time of displacement 1

Hex:	2011-10h	Effective	Real time
		mode:	
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Defines the time for the motor to change from 0 rpm 1000 rpm at a constant speed during displacement 1.

Actual time needed for accelerating to H11.14 (Max. speed of displacement 1):

$$t = \frac{(H11.14) \times (H11.15)}{1000}$$

Note: The rigidity must be good, and the speed loop can follow the position command.

H11.16 Interval time after displacement 1

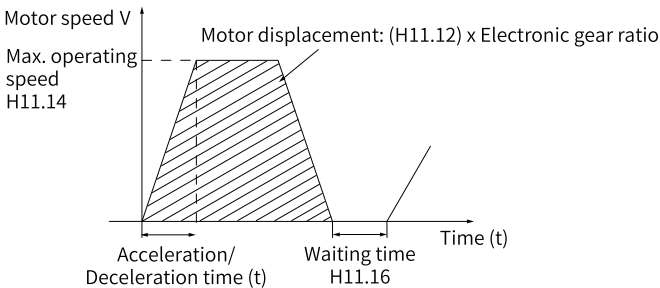
Hex:	2011-11h	Effective	Real time
		mode:	
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	Real-time

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		
	Hex:	2011-12h	Effective mode: Real time
	Min.:	-1073741824	Unit: Reference unit
	Max.:	1073741824	Data Type: Int32
	Default:	10000	Change: Real-time
	Value Range: -1073741824 to 1073741824		
	Description -		
H11.19	Max. speed of displacement 2		
	Hex:	2011-14h	Effective mode: Real time
	Min.:	1	Unit: rpm
	Max.:	10000	Data Type: UInt16
	Default:	200	Change: Real-time
	Value Range: 1rpm to 10000rpm		
	Description -		
H11.20	Acc/Dec time of displacement 2		
	Hex:	2011-15h	Effective mode: Real time
	Min.:	0	Unit: ms
	Max.:	65535	Data Type: UInt16
	Default:	10	Change: Real-time
	Value Range: 0 ms–65535 ms		
	Description -		
H11.21	Interval time after displacement 2		
	Hex:	2011-16h	Effective mode: Real time
	Min.:	0	Unit: ms (s)
	Max.:	10000	Data Type: UInt16
	Default:	10	Change: Real-time
	Value Range: 0 ms(s) to 10000 ms(s)		

Description

-

H11.22**Displacement 3**

Hex: 2011-17h

Effective Real time

mode:

Min.: -1073741824

Unit: Reference unit

Max.: 1073741824

Data Type: Int32

Default: 10000

Change: Real-time

Value Range:

-1073741824 to 1073741824

Description

-

H11.24**Max. speed of displacement 3**

Hex: 2011-19h

Effective Real time

mode:

Min.: 1

Unit: rpm

Max.: 10000

Data Type: UInt16

Default: 200

Change: Real-time

Value Range:

1rpm to 10000rpm

Description

-

H11.25**Acc/Dec time of displacement 3**

Hex: 2011-1Ah

Effective Real time

mode:

Min.: 0

Unit: ms

Max.: 65535

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms–65535 ms

Description

-

H11.26**Interval time after displacement 3**

Hex: 2011-1Bh

Effective Real time

mode:

Min.: 0

Unit: ms (s)

Max.: 10000

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.27 Displacement 4

Hex: 2011-1Ch

Effective mode: Real time

Min.: -1073741824

Unit: Reference unit

Max.: 1073741824

Data Type: Int32

Default: 10000

Change: Real-time

Value Range:

-1073741824 to 1073741824

Description

-

H11.29 Max. speed of displacement 4

Hex: 2011-1Eh

Effective mode: Real time

Min.: 1

Unit: rpm

Max.: 10000

Data Type: UInt16

Default: 200

Change: Real-time

Value Range:

1rpm to 10000rpm

Description

-

H11.30 Acc/Dec time of displacement 4

Hex: 2011-1Fh

Effective mode: Real time

Min.: 0

Unit: ms

Max.: 65535

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms–65535 ms

Description

-

H11.31 Interval time after displacement 4

Hex: 2011-20h

Effective mode: Real time

Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.32 Displacement 5

Hex:	2011-21h	Effective mode:	Real time
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	Real-time

Value Range:

-1073741824 to 1073741824

Description

-

H11.34 Max. speed of displacement 5

Hex:	2011-23h	Effective mode:	Real time
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time

Value Range:

1rpm to 10000rpm

Description

-

H11.35 Acc/Dec time of displacement 5

Hex:	2011-24h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

-

H11.36 Interval time after displacement 5

Hex:	2011-25h	Effective mode:	Real time
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.37 Displacement 6

Hex:	2011-26h	Effective mode:	Real time
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	Real-time

Value Range:

-1073741824 to 1073741824

Description

-

H11.39 Max. speed of displacement 6

Hex:	2011-28h	Effective mode:	Real time
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time

Value Range:

1rpm to 10000rpm

Description

-

H11.40 Acc/Dec time of displacement 6

Hex:	2011-29h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

-

H11.41 Interval time after displacement 6

Hex:	2011-2Ah	Effective mode:	Real time
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.42 Displacement 7

Hex:	2011-2Bh	Effective mode:	Real time
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	Real-time

Value Range:

-1073741824 to 1073741824

Description

-

H11.44 Max. speed of displacement 7

Hex:	2011-2Dh	Effective mode:	Real time
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time

Value Range:

1rpm to 10000rpm

Description

-

H11.45 Acc/Dec time of displacement 7

Hex:	2011-2Eh	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16

Default: 10

Change: Real-time

Value Range:

0 ms–65535 ms

Description

-

H11.46 Interval time after displacement 7

Hex: 2011-2Fh

Effective mode: Real time

Min.: 0

Unit: ms (s)

Max.: 10000

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.47 Displacement 8

Hex: 2011-30h

Effective mode: Real time

Min.: -1073741824

Unit: Reference unit

Max.: 1073741824

Data Type: Int32

Default: 10000

Change: Real-time

Value Range:

-1073741824 to 1073741824

Description

-

H11.49 Max. speed of displacement 8

Hex: 2011-32h

Effective mode: Real time

Min.: 1

Unit: rpm

Max.: 10000

Data Type: UInt16

Default: 200

Change: Real-time

Value Range:

1rpm to 10000rpm

Description

-

H11.50	Acc/Dec time of displacement 8		
	Hex:	2011-33h	Effective mode: Real time
	Min.:	0	Unit: ms
	Max.:	65535	Data Type: UInt16
	Default:	10	Change: Real-time
	Value Range: 0 ms–65535 ms		
	Description -		
H11.51	Interval time after displacement 8		
	Hex:	2011-34h	Effective mode: Real time
	Min.:	0	Unit: ms (s)
	Max.:	10000	Data Type: UInt16
	Default:	10	Change: Real-time
	Value Range: 0 ms(s) to 10000 ms(s)		
	Description -		
H11.52	Displacement 9		
	Hex:	2011-35h	Effective mode: Real time
	Min.:	-1073741824	Unit: Reference unit
	Max.:	1073741824	Data Type: Int32
	Default:	10000	Change: Real-time
	Value Range: -1073741824 to 1073741824		
	Description -		
H11.54	Max. speed of displacement 9		
	Hex:	2011-37h	Effective mode: Real time
	Min.:	1	Unit: rpm
	Max.:	10000	Data Type: UInt16
	Default:	200	Change: Real-time
	Value Range: 1rpm to 10000rpm		

Description

-

H11.55 Acc/Dec time of displacement 9

Hex: 2011-38h

Effective Real time

mode:

Min.: 0

Unit: ms

Max.: 65535

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms–65535 ms

Description

-

H11.56 Interval time after displacement 9

Hex: 2011-39h

Effective Real time

mode:

Min.: 0

Unit: ms (s)

Max.: 10000

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.57 Displacement 10

Hex: 2011-3Ah

Effective Real time

mode:

Min.: -1073741824

Unit: Reference unit

Max.: 1073741824

Data Type: Int32

Default: 10000

Change: Real-time

Value Range:

-1073741824 to 1073741824

Description

-

H11.59 Max. speed of displacement 10

Hex: 2011-3Ch

Effective Real time

mode:

Min.: 1

Unit: rpm

Max.: 10000

Data Type: UInt16

Default: 200

Change: Real-time

Value Range:

1rpm to 10000rpm

Description

-

H11.60 Acc/Dec time of displacement 10

Hex: 2011-3Dh

Effective mode: Real time

Min.: 0

Unit: ms

Max.: 65535

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms–65535 ms

Description

-

H11.61 Interval time after displacement 10

Hex: 2011-3Eh

Effective mode: Real time

Min.: 0

Unit: ms (s)

Max.: 10000

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.62 Displacement 11

Hex: 2011-3Fh

Effective mode: Real time

Min.: -1073741824

Unit: Reference unit

Max.: 1073741824

Data Type: Int32

Default: 10000

Change: Real-time

Value Range:

-1073741824 to 1073741824

Description

-

H11.64 Max. speed of displacement 11

Hex:	2011-41h	Effective mode:	Real time
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time

Value Range:

1rpm to 10000rpm

Description

-

H11.65 Acc/Dec time of displacement 11

Hex:	2011-42h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

-

H11.66 Interval time after displacement 11

Hex:	2011-43h	Effective mode:	Real time
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.67 Displacement 12

Hex:	2011-44h	Effective mode:	Real time
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	Real-time

Value Range:

-1073741824 to 1073741824

Description

-

H11.69**Max. speed of displacement 12**

Hex: 2011-46h

Effective Real time

mode:

Min.: 1

Unit: rpm

Max.: 10000

Data Type: UInt16

Default: 200

Change: Real-time

Value Range:

1rpm to 10000rpm

Description

-

H11.70**Acc/Dec time of displacement 12**

Hex: 2011-47h

Effective Real time

mode:

Min.: 0

Unit: ms

Max.: 65535

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms–65535 ms

Description

-

H11.71**Interval time after displacement 12**

Hex: 2011-48h

Effective Real time

mode:

Min.: 0

Unit: ms (s)

Max.: 10000

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.72**Displacement 13**

Hex: 2011-49h

Effective Real time

mode:

Min.: -1073741824

Unit: Reference unit

Max.: 1073741824

Data Type: Int32

Default: 10000

Change: Real-time

Value Range:

-1073741824 to 1073741824

Description

-

H11.74 Max. speed of displacement 13

Hex: 2011-4Bh

Effective Real time
mode:

Min.: 1

Unit: rpm

Max.: 10000

Data Type: UInt16

Default: 200

Change: Real-time

Value Range:

1rpm to 10000rpm

Description

-

H11.75 Acc/Dec time of displacement 13

Hex: 2011-4Ch

Effective Real time
mode:

Min.: 0

Unit: ms

Max.: 65535

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms–65535 ms

Description

-

H11.76 Interval time after displacement 13

Hex: 2011-4Dh

Effective Real time
mode:

Min.: 0

Unit: ms (s)

Max.: 10000

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.77	Displacement 14		
	Hex:	2011-4Eh	Effective Real time
			mode:
	Min.:	-1073741824	Unit: Reference unit
	Max.:	1073741824	Data Type: Int32
	Default:	10000	Change: Real-time
	Value Range:		
		-1073741824 to 1073741824	
	Description		
	-		
H11.79	Max. speed of displacement 14		
	Hex:	2011-50h	Effective Real time
			mode:
	Min.:	1	Unit: rpm
	Max.:	10000	Data Type: UInt16
	Default:	200	Change: Real-time
	Value Range:		
		1rpm to 10000rpm	
	Description		
	-		
H11.80	Acc/Dec time of displacement 14		
	Hex:	2011-51h	Effective Real time
			mode:
	Min.:	0	Unit: ms
	Max.:	65535	Data Type: UInt16
	Default:	10	Change: Real-time
	Value Range:		
		0 ms–65535 ms	
	Description		
	-		
H11.81	Interval time after displacement 14		
	Hex:	2011-52h	Effective Real time
			mode:
	Min.:	0	Unit: ms (s)
	Max.:	10000	Data Type: UInt16
	Default:	10	Change: Real-time
	Value Range:		
		0 ms(s) to 10000 ms(s)	

Description

-

H11.82**Displacement 15**

Hex: 2011-53h

Effective Real time

mode:

Min.: -1073741824

Unit: Reference unit

Max.: 1073741824

Data Type: Int32

Default: 10000

Change: Real-time

Value Range:

-1073741824 to 1073741824

Description

-

H11.84**Max. speed of displacement 15**

Hex: 2011-55h

Effective Real time

mode:

Min.: 1

Unit: rpm

Max.: 10000

Data Type: UInt16

Default: 200

Change: Real-time

Value Range:

1rpm to 10000rpm

Description

-

H11.85**Acc/Dec time of displacement 15**

Hex: 2011-56h

Effective Real time

mode:

Min.: 0

Unit: ms

Max.: 65535

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms–65535 ms

Description

-

H11.86**Interval time after displacement 15**

Hex: 2011-57h

Effective Real time

mode:

Min.: 0

Unit: ms (s)

Max.: 10000

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.87**Displacement 16**

Hex: 2011-58h

Effective mode: Real time

Min.: -1073741824

Unit: Reference unit

Max.: 1073741824

Data Type: Int32

Default: 10000

Change: Real-time

Value Range:

-1073741824 to 1073741824

Description

-

H11.89**Max. speed of displacement 16**

Hex: 2011-5Ah

Effective mode: Real time

Min.: 1

Unit: rpm

Max.: 10000

Data Type: UInt16

Default: 200

Change: Real-time

Value Range:

1rpm to 10000rpm

Description

-

H11.90**Acc/Dec time of displacement 16**

Hex: 2011-5Bh

Effective mode: Real time

Min.: 0

Unit: ms

Max.: 65535

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 ms–65535 ms

Description

-

H11.91**Interval time after displacement 16**

Hex: 2011-5Ch

Effective mode: Real time

Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	Real-time
Value Range:			
0 ms(s) to 10000 ms(s)			
Description			
-			

5.17 H12 Multi-Speed

H12.00 Multi-speed operation mode

Hex:	2012-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

- 0: Individual operation (number of speeds selected in H12.01)
- 1: Cyclic operation (number of speeds selected in 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. The S-ON signal must be active during operation of each speed. Otherwise, the drive stops immediately as defined by H02.05 (Stop mode at S-ON OFF). The speed reach signal (FunOUT.19: V-Arr) is activated each time when a speed reference value is reached.

Value	Operation Mode	Remarks	Operation Curve
0	Individual operation	The drive stops after one cycle of operation. The drive switches to the next displacement automatically.	Speed V V_{1max}, V_{2max} : reference values of speed 1 and speed 2 t_1 : actual acceleration/deceleration time of speed 1 t_3, t_5 : acceleration/deceleration time of speed 2
1	Cyclic operation	The drive starts from speed 1 after each cycle of operation. The drive automatically switches to the next speed. The cyclic operation state remains active as long as the S-ON signal is active.	Speed V V_{1max}, V_{2max} : maximum operating speeds in displacement 1 and displacement 2
2	External DI signal	The drive operates continuously as long as the S-ON signal is active. The speed No. is determined by the DI logic. The operating time of each speed is determined only by the interval time of speed switchover. The speed reference direction can be switched through FunIN.5 (DIR-SEL).	Speed V V_{xmax}, V_{zmax}, V_{ymin} x, y: speed No. (The relationship between the speed No. and the DI logic is described below.) V_x, V_y: speed references for speeds x and y The speed No. determined by DI does not change, which means the speed reference operates continuously regardless of the reference operating time.

H12.01 Number of speed references in multi-speed mode

Hex: 2012-02h

Min.: 1

Max.: 16

Default: 16

Value Range:

1–16

Effective Real time

mode:

Unit: -

Data Type: UInt16

Change: At stop

Description

Defines the total number of speed references in the multi-speed mode. Different speed references, operating time, and acceleration/deceleration time (four groups optional) can be set for each speed.

H12.00 $\neq$ 2: Speeds are switched automatically in a sequence from 1, 2...

H12.01.

H12.00 is 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 segment No. is a 4-bit binary value. Bits 0 to 3 correspond to CMD1 to CMD4.

FunIN.9 CMD4	FunIN.8 CMD3	FunIN.7 CMD2	FunIN.6 CMD1	Segment No.
0	0	0	0	1
0	0	0	1	2
...				
1	1	1	1	16

The value of CMD(n) is 1 upon active DI logic and 0 upon inactive DI logic.

H12.02 Operating time unit

Hex:	2012-03h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: s

1: min

Description

Defines the time unit of multi-speed operation.

0: s

1: min

H12.03 Acceleration time 1

Hex:	2012-04h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Acceleration time is the time for the motor to accelerate from 0 RPM to 1000 RPM at a constant speed.

H12.04 Deceleration time 1

Hex:	2012-05h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Deceleration time is the time for the motor to decelerate from 1000 RPM to 0 RPM at a constant speed.

H12.05 Acceleration time 2

Hex:	2012-06h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	50	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Acceleration time is the time for the motor to accelerate from 0 RPM to 1000 RPM at a constant speed.

H12.06 Deceleration time 2

Hex:	2012-07h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	50	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Deceleration time is the time for the motor to decelerate from 1000 RPM to 0 RPM at a constant speed.

H12.07 Acceleration time 3

Hex:	2012-08h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	100	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Acceleration time is the time for the motor to accelerate from 0 RPM to 1000 RPM at a constant speed.

H12.08 Deceleration time 3

Hex:	2012-09h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	100	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Deceleration time is the time for the motor to decelerate from 1000 RPM to 0 RPM at a constant speed.

H12.09 Acceleration time 4

Hex:	2012-0Ah	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	150	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Acceleration time is the time for the motor to accelerate from 0 RPM to 1000 RPM at a constant speed.

H12.10 Deceleration time 4

Hex:	2012-0Bh	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	150	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Deceleration time is the time for the motor to decelerate from 1000 RPM to 0 RPM at a constant speed.

H12.20 Speed reference 1

Hex:	2012-15h	Effective mode:	Real time
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	0	Change:	Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.21 Operating time of speed 1

Hex:	2012-16h	Effective mode:	Real time
Min.:	0.0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5.0	Change:	Real-time

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 reference 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 1st speed rise/drop and curve smoothing parameter time

Hex:	2012-17h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	256	Change:	Real-time

Value Range:

bit0-bit7: Speed rise and drop time

0: Zero acc and dec time

1: Acc and dec time 1

2: Acc and dec time 2

3: Acc and dec time 3

4: Acc and dec time 4

bit8-bit15: S curve smoothing parameter

1: Smoothing parameter 1

2: Smoothing parameter 2

3: Smoothing parameter 3

4: Smoothing parameter 4

5: Smoothing parameter 5

6: Smoothing parameter 6

7: Smoothing parameter 7

8: Smoothing parameter 8

Description

Table 5-1 Selects the acceleration/deceleration time of speed 1.

Value	Description	Description
0	Zero acceleration/deceleration time	Acceleration time: 0 Deceleration time: 0
1	Acceleration/Deceleration time 1	Acceleration time: H12.03 Deceleration time: H12.04

Value	Description	Description
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

Table 5-2 S curve smoothing parameter

Value	Description	Description
1	Smoothing parameter 1	Increasing acceleration time at acceleration segment: H06.51 Decreasing acceleration time at acceleration segment: H06.52 Decreasing deceleration time at deceleration segment: H06.53 Decreasing acceleration time at acceleration segment: H06.54
2	Smoothing parameter 2	Increasing acceleration time at acceleration segment: H06.55 Decreasing acceleration time at acceleration segment: H06.56 Decreasing deceleration time at deceleration segment: H06.57 Decreasing acceleration time at acceleration segment: H06.58
3	Smoothing parameter 3	Increasing acceleration time at acceleration segment: H06.59 Decreasing acceleration time at acceleration segment: H06.60 Decreasing deceleration time at deceleration segment: H06.61 Decreasing acceleration time at acceleration segment: H06.62
4	Smoothing parameter 4	Increasing acceleration time at acceleration segment: H06.63 Decreasing acceleration time at acceleration segment: H06.64 Decreasing deceleration time at deceleration segment: H06.65 Decreasing acceleration time at acceleration segment: H06.66

Value	Description	Description
5	Smoothing parameter 5	Increasing acceleration time at acceleration segment: H06.67 Decreasing acceleration time at acceleration segment: H06.68 Decreasing deceleration time at deceleration segment: H06.69 Decreasing acceleration time at acceleration segment: H06.70
6	Smoothing parameter 6	Increasing acceleration time at acceleration segment: H06.71 Decreasing acceleration time at acceleration segment: H06.72 Decreasing deceleration time at deceleration segment: H06.73 Decreasing acceleration time at acceleration segment: H06.74
7	Smoothing parameter 7	Increasing acceleration time at acceleration segment: H06.75 Decreasing acceleration time at acceleration segment: H06.76 Decreasing deceleration time at deceleration segment: H06.77 Decreasing acceleration time at acceleration segment: H06.78
8	Smoothing parameter 8	Increasing acceleration time at acceleration segment: H06.79 Decreasing acceleration time at acceleration segment: H06.80 Decreasing deceleration time at deceleration segment: H06.81 Decreasing acceleration time at acceleration segment: H06.82

H12.23**Reference 2**

Hex: 2012-18h

Effective Real time
mode:

Min.: -10000

Unit: rpm

Max.: 10000

Data Type: Int16

Default: 100

Change: Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.24 Operating time of speed 2

Hex:	2012-19h	Effective mode:	Real time
Min.:	0.0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.25 2nd speed rise/drop time and curve smoothing parameter time

Hex:	2012-1Ah	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	256	Change:	Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

H12.26 Reference 3

Hex:	2012-1Bh	Effective mode:	Real time
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	300	Change:	Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.27 Operating time of speed 3

Hex:	2012-1Ch	Effective mode:	Real time
Min.:	0.0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.28 3rd speed rise/drop time and curve smoothing parameter time

Hex:	2012-1Dh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	256	Change:	Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

H12.29 Reference 4

Hex:	2012-1Eh	Effective mode:	Real time
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	500	Change:	Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.30 Operating time of speed 4

Hex:	2012-1Fh	Effective mode:	Real time
Min.:	0.0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.31 4th speed rise/drop time and curve smoothing parameter time

Hex:	2012-20h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16

Default: 256

Change: Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

H12.32**Reference 5**

Hex: 2012-21h

Effective Real time

mode:

Min.: -10000

Unit: rpm

Max.: 10000

Data Type: Int16

Default: 700

Change: Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.33**Operating time of speed 5**

Hex: 2012-22h

Effective Real time

mode:

Min.: 0.0

Unit: s (m)

Max.: 6553.5

Data Type: UInt16

Default: 5.0

Change: Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.34**5th speed rise/drop time and curve smoothing parameter time**

Hex: 2012-23h

Effective Real time

mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 256

Change: Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

H12.35**Reference 6**

Hex: 2012-24h

Effective Real time

mode:

Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	900	Change:	Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.36 Operating time of speed 6

Hex:	2012-25h	Effective mode:	Real time
Min.:	0.0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.37 6th speed rise/drop time and curve smoothing parameter time

Hex:	2012-26h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	256	Change:	Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

H12.38 Reference 7

Hex:	2012-27h	Effective mode:	Real time
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	600	Change:	Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.39 Operating time of speed 7

Hex:	2012-28h	Effective mode:	Real time
Min.:	0.0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.40 7th speed rise/drop time and curve smoothing parameter time

Hex:	2012-29h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	256	Change:	Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

H12.41 Reference 8

Hex:	2012-2Ah	Effective mode:	Real time
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	300	Change:	Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.42 Operating time of speed 8

Hex:	2012-2Bh	Effective mode:	Real time
Min.:	0.0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.43 8th speed rise/drop time and curve smoothing parameter time

Hex:	2012-2Ch	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	256	Change:	Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

H12.44 Reference 9

Hex:	2012-2Dh	Effective mode:	Real time
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	100	Change:	Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.45 Operating time of speed 9

Hex:	2012-2Eh	Effective mode:	Real time
Min.:	0.0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.46 9th speed rise/drop time and curve smoothing parameter time

Hex:	2012-2Fh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16

Default: 256

Change: Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

H12.47**Reference 10**

Hex: 2012-30h

Effective Real time

mode:

Min.: -10000

Unit: rpm

Max.: 10000

Data Type: Int16

Default: -100

Change: Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.48**Operating time of speed 10**

Hex: 2012-31h

Effective Real time

mode:

Min.: 0.0

Unit: s (m)

Max.: 6553.5

Data Type: UInt16

Default: 5.0

Change: Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.49**10th speed rise/drop time and curve smoothing parameter time**

Hex: 2012-32h

Effective Real time

mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 256

Change: Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

H12.50**Reference 11**

Hex: 2012-33h

Effective Real time

mode:

Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	-300	Change:	Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.51 Operating time of speed 11

Hex:	2012-34h	Effective mode:	Real time
Min.:	0.0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.52 11th speed rise/drop time and curve smoothing parameter time

Hex:	2012-35h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	256	Change:	Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

H12.53 Reference 12

Hex:	2012-36h	Effective mode:	Real time
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	-500	Change:	Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.54 Operating time of speed 12

Hex:	2012-37h	Effective mode:	Real time
Min.:	0.0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.55 12th speed rise/drop time and curve smoothing parameter time

Hex:	2012-38h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	256	Change:	Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

H12.56 Reference 13

Hex:	2012-39h	Effective mode:	Real time
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	-700	Change:	Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.57 Operating time of speed 13

Hex:	2012-3Ah	Effective mode:	Real time
Min.:	0.0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.58 13th speed rise/drop time and curve smoothing parameter time

Hex:	2012-3Bh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	256	Change:	Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

H12.59 Reference 14

Hex:	2012-3Ch	Effective mode:	Real time
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	-900	Change:	Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.60 Operating time of speed 14

Hex:	2012-3Dh	Effective mode:	Real time
Min.:	0.0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.61 14th speed rise/drop time and curve smoothing parameter time

Hex:	2012-3Eh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16

Default: 256

Change: Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

H12.62**Reference 15**

Hex: 2012-3Fh

Effective Real time

mode:

Min.: -10000

Unit: rpm

Max.: 10000

Data Type: Int16

Default: -600

Change: Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.63**Operating time of speed 15**

Hex: 2012-40h

Effective Real time

mode:

Min.: 0.0

Unit: s (m)

Max.: 6553.5

Data Type: UInt16

Default: 5.0

Change: Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.64**15th speed rise/drop time and curve smoothing parameter time**

Hex: 2012-41h

Effective Real time

mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 256

Change: Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

H12.65**Reference 16**

Hex: 2012-42h

Effective Real time

mode:

Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	-300	Change:	Real-time

Value Range:

-10000 rpm to +10000 rpm

Description

-

H12.66 Operating time of speed 16

Hex:	2012-43h	Effective mode:	Real time
Min.:	0.0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5.0	Change:	Real-time

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.67 16th speed rise/drop time and curve smoothing parameter time

Hex:	2012-44h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	256	Change:	Real-time

Value Range:

See H12.22.

Description

Same as H12.22.

5.18 H17 Virtual DI/DO

H17.90 Communication VDI enable

Hex:	2017-5Bh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Disabled

1: Enabled

Description

To use the VDI function:

1. Set H17.90 to enable VDI.
2. Set the default level after power-on through H17.91.
3. Set the DI function of the VDI terminal through parameters in group H17.
4. Set VDI output through H31.00.

H17.91 VDI default value after power-on

Hex:	2017-5Ch	Effective mode:	Upon the next power-on
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: No default
 1: VDI1 default value
 2: VDI2 default value
 4: VDI3 default value
 8: VDI4 default value
 16: VDI5 default value
 32: VDI6 default value
 64: VDI7 default value
 128: VDI8 default value
 256: VDI9 default value
 512: VDI10 default value
 1024: VDI11 default value
 2048: VDI12 default value
 4096: VDI13 default value
 8092: VDI14 default value
 16384: VDI15 default value
 32768: VDI16 default value

Description

Configures the initial value of VDI upon power-on.

Bit 0 corresponds to VDI1.

Bit 1 corresponds to VDI2.

...

Bit 15 corresponds to VDI16.

H17.00 VDI1 function

Hex:	2017-01h	Effective mode:	Real time
Min.:	0	Unit:	-

Max.: 55

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0: No assignment

1: S-ON

2: Warning reset signal

3: Gain switchover switch

4: Switchover between main and auxiliary commands

5: Multi-reference direction

6: Multi-reference switchover CMD1

7: Multi-reference switchover CMD2

8: Multi-reference switchover CMD3

9: Multi-reference switchover CMD4

10: Mode switchover M1-SEL11: Mode switchover M2-SEL

12: Zero clamp enable signal

13: Position reference inhibited

14: Positive limit switch

15: Reverse limit switch

16: Positive external torque limit

17: Negative external torque limit

18: Forward jog

19: Reverse jog

24: Electronic gear

25: Torque reference direction

26: Speed reference direction

27: Position reference direction

28: Multi-position reference enable

29: Interrupt positioning state exit signal

31: Home switch

32: Homing enable

33: Interrupt positioning inhibited

34: Emergency stop

35: Clear position deviation

36: Internal speed limit source

40: Multi-speed enable

41: Current position as home

42: Axis control command executed immediately

43: Axis control command not executed immediately

44: Positioning and command completed signal clear
 45: Interrupt positioning enable
 46: Process segment enable
 47: Process segment command switchover 1
 48: Process segment command switchover 2
 49: Process segment command switchover 3
 50: Process segment command switchover 4
 51: Event trigger process segment 1
 52: Event trigger process segment 2
 53: Event trigger process segment 3
 54: Event trigger process segment 4
 55: Process segment pause

Description

-

H17.01 VDI1 logic level selection

Hex:	2017-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

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

Hex:	2017-03h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.00.

Description

-

H17.03 VDI2 logic level selection

Hex:	2017-04h	Effective mode:	Real time

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

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

Hex:	2017-05h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.00.

Description

-

H17.05 VDI3 logic level selection

Hex:	2017-06h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

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

Hex:	2017-07h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.00.

Description

-

H17.07 VDI4 logic level selection

Hex:	2017-08h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

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

Hex:	2017-09h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.00.

Description

-

H17.09 VDI5 logic level selection

Hex:	2017-0Ah	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

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

Hex:	2017-0Bh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.00.

Description

-

H17.11 VDI6 logic level selection

Hex:	2017-0Ch	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

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

Hex:	2017-0Dh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.00.

Description

-

H17.13 VDI7 logic level selection

Hex:	2017-0Eh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

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

Hex:	2017-0Fh	Effective mode:	Real time

Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.00.

Description

-

H17.15 VD18 logic level selection

Hex:	2017-10h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.16 VD19 function

Hex:	2017-11h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.00.

Description

-

H17.17 VD19 logic level selection

Hex:	2017-12h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

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		
Hex:	2017-13h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time
Value Range:			
See H17.00.			
Description			
-			

H17.19	VDI10 logic level selection		
Hex:	2017-14h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time
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		
Hex:	2017-15h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time
Value Range:			
See H17.00.			
Description			
-			

H17.21	VDI11 logic level selection		
Hex:	2017-16h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time
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

Hex: 2017-17h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 55

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

See H17.00.

Description

-

H17.23

VDI12 logic level selection

Hex: 2017-18h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Real-time

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

Hex: 2017-19h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 55

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

See H17.00.

Description

-

H17.25

VDI13 logic level selection

Hex: 2017-1Ah

Effective mode: Real time

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

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

Hex:	2017-1Bh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.00.

Description

-

H17.27 VDI14 logic level selection

Hex:	2017-1Ch	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

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

Hex:	2017-1Dh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.00.

Description

-

H17.29 VDI15 logic level selection

Hex:	2017-1Eh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

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

Hex:	2017-1Fh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.00.

Description

-

H17.31 VDI16 logic level selection

Hex:	2017-20h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.92 Communication VDO enable

Hex:	2017-5Dh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Disabled

1: Enabled

Description

To use the VDO function:

1. Set H17.92 to enable VDO.
2. Set the default level after power-on through H17.93.
3. Set the DO function of the VDO terminal through parameters in group H17.
4. Read the output level of the VDO in H17.32.

H17.93 VDO default value after power-on

Hex:	2017-5Eh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

- 0: No default
- 1: VDO1 default value
- 2: VDO2 default value
- 4: VDO3 default value
- 8: VDO4 default value
- 16: VDO5 default value
- 32: VDO6 default value
- 64: VDO7 default value
- 128: VDO8 default value
- 256: VDO9 default value
- 512: VDO10 default value
- 1024: VDO11 default value
- 2048: VDO12 default value
- 4096: VDO13 default value
- 8192: VDO14 default value
- 16384: VDO15 default value
- 32768: VDO16 default value

Description

Configures the initial value of VDO upon power-on.

Bit 0 corresponds to VDO1.

Bit 1 corresponds to VDO2.

...

Bit 15 corresponds to VDO16.

H17.32	VDO virtual level		
	Hex: 2017-21h	Effective mode:	-
	Min.: 0	Unit:	-
	Max.: 65535	Data Type:	UInt16
	Default: 0	Change:	Unchangeable
	Value Range:		
	0–65535		
	Description		
	-		
H17.33	VDO1 function		
	Hex: 2017-22h	Effective mode:	Real time
	Min.: 0	Unit:	-
	Max.: 32	Data Type:	UInt16
	Default: 0	Change:	Real-time
	Value Range:		
	0: No assignment		
	1: Servo ready		
	2: Motor rotation		
	3: Zero speed		
	4: Speed matching		
	5: Positioning completed		
	6: Proximity		
	7: Torque limited		
	8: Speed limited		
	10: Warning		
	11: Fault		
	15: Interrupt positioning completed		
	16: Homing completed		
	17: Electrical homing completed		
	18: Torque reach		
	19: Speed reach		
	21: Enable completed		
	22: Internal command completed		
	23: Writing next command allowed		
	24: Internal motion completed		
	30: Alarm or fault output		
	31: Communication forced DO		
	32: EDM output		

Description

-

H17.34 VDO1 logic level selection

Hex:	2017-23h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Output 1 upon active logic
 1: Output 0 upon active logic

Description

-

H17.35 VDO2 function

Hex:	2017-24h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.33.

Description

-

H17.36 VDO2 logic level selection

Hex:	2017-25h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Output 1 upon active logic
 1: Output 0 upon active logic

Description

-

H17.37 VDO3 function

Hex:	2017-26h	Effective mode:	Real time

Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.33.

Description

-

H17.38 VDO3 logic level selection

Hex:	2017-27h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.39 VDO4 function

Hex:	2017-28h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.33.

Description

-

H17.40 VDO4 logic level selection

Hex:	2017-29h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.41 VDO5 function

Hex: 2017-2Ah

Effective mode: Real time

Min.: 0

Unit: -

Max.: 32

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

See H17.33.

Description

-

H17.42 VDO5 logic level selection

Hex: 2017-2Bh

Effective mode: Real time

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.43 VDO6 function

Hex: 2017-2Ch

Effective mode: Real time

Min.: 0

Unit: -

Max.: 32

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

See H17.33.

Description

-

H17.44 VDO6 logic level selection

Hex: 2017-2Dh

Effective mode: Real time

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.45

VDO7 function

Hex: 2017-2Eh

Effective mode: Real time

Min.: 0

Unit: -

Max.: 32

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

See H17.33.

Description

-

H17.46

VDO7 logic level selection

Hex: 2017-2Fh

Effective mode: Real time

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.47

VDO8 function

Hex: 2017-30h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 32

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

See H17.33.

Description

-

H17.48

VDO8 logic level selection

Hex: 2017-31h

Effective mode: Real time

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.49 VDO9 function

Hex:	2017-32h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.33.

Description

-

H17.50 VDO9 logic level selection

Hex:	2017-33h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.51 VDO10 function

Hex:	2017-34h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.33.

Description

-

H17.52 VDO10 logic level selection

Hex:	2017-35h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.53 VDO11 function

Hex:	2017-36h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.33.

Description

-

H17.54 VDO11 logic level selection

Hex:	2017-37h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.55 VDO12 function

Hex:	2017-38h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.33.

Description

-

H17.56 VDO12 logic level selection

Hex: 2017-39h

Effective Real time
mode:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.57 VDO13 function

Hex: 2017-3Ah

Effective Real time
mode:

Min.: 0

Unit: -

Max.: 32

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

See H17.33.

Description

-

H17.58 VDO13 logic level selection

Hex: 2017-3Bh

Effective Real time
mode:

Min.: 0

Unit: -

Max.: 1

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.59 VDO14 function

Hex: 2017-3Ch

Effective Real time
mode:

Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.33.

Description

-

H17.60 VDO14 logic level selection

Hex:	2017-3Dh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.61 VDO15 function

Hex:	2017-3Eh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

See H17.33.

Description

-

H17.62 VDO15 logic level selection

Hex:	2017-3Fh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.63	VDO16 function		
	Hex:	2017-40h	Effective Real time
			mode:
	Min.:	0	Unit: -
	Max.:	32	Data Type: UInt16
	Default:	0	Change: Real-time
	Value Range:		
	See H17.33.		
	Description		
	-		

H17.64	VDO16 logic level selection		
	Hex:	2017-41h	Effective Real time
			mode:
	Min.:	0	Unit: -
	Max.:	1	Data Type: UInt16
	Default:	0	Change: Real-time
	Value Range:		
	0: Output 1 upon active logic		
	1: Output 0 upon active logic		
	Description		
	-		

5.19 H22 Technology Segment Parameters

H22.00	Process segment command trigger		
	Hex:	2022-01h	Effective Real time
			mode:
	Min.:	0	Unit: -
	Max.:	1000	Data Type: UInt16
	Default:	0	Change: Real-time
	Value Range:		
	0–1000		
	Description		
	Used to trigger the process segment. The process segment can be triggered through the software or host controller..		
	No process segment is triggered when 0 is written to H22.00.		
	Process segments 1 to 15 are triggered when 1 to 15 are written to H22.00.		
	The process segment pauses when 1000 is written to H22.00.		
	E126.0 (Process segment number error) will be reported when 16 to 999 are written to H22.00.		

H22.01 Process segment triggered by the event rising edge

Hex: 2022-02h Effective Real time
mode:
Min.: 0 Unit: -
Max.: 65535 Data Type: UInt16
Default: 0 Change: Real-time

Value Range:

0–65535

Description

DI: ProceEvTri (OFF to ON, rising edge-triggered).

bit	Value	Description
3–0	0	Trigger DI: The motor does not act upon rising edge of ProceEvTri1.
	1–15	Trigger DI: Process segments 1 to 15 are executed upon rising edge of ProceEvTri1.
7–4	0	Trigger DI: The motor does not act upon rising edge of ProceEvTri2.
	1–15	Trigger DI: Process segments 1 to 15 are executed upon rising edge of ProceEvTri2.
8–11	0	Trigger DI: The motor does not act upon rising edge of ProceEvTri3.
	1–15	Trigger DI: Process segments 1 to 15 are executed upon rising edge of ProceEvTri3.
15–12	0	Trigger DI: The motor does not act upon rising edge of ProceEvTri4.
	1–15	Trigger DI: Process segments 1 to 15 are executed upon rising edge of ProceEvTri4.

H22.02 Process segment triggered by the event falling edge

Hex: 2022-03h Effective Real time
mode:
Min.: 0 Unit: -
Max.: 65535 Data Type: UInt16
Default: 0 Change: Real-time

Value Range:

0–65535

Description

DI: ProceEvTri (ON to OFF, falling edge-triggered).

bit	Value	Description
3–0	0	Trigger DI: The motor does not act upon falling edge of ProceEvTri1.
	1–15	Trigger DI: Process segments 1 to 15 are executed upon falling edge of ProceEvTri1.
7–4	0	Trigger DI: The motor does not act upon falling edge of ProceEvTri2.
	1–15	Trigger DI: Process segments 1 to 15 are executed upon falling edge of ProceEvTri2.
8–11	0	Trigger DI: The motor does not act upon falling edge of ProceEvTri3.
	1–15	Trigger DI: Process segments 1 to 15 are executed upon falling edge of ProceEvTri3.
15–12	0	Trigger DI: The motor does not act upon falling edge of ProceEvTri4.
	1–15	Trigger DI: Process segments 1 to 15 are executed upon falling edge of ProceEvTri4.

H22.03 Acceleration/Deceleration time upon technology segment pause

Hex:	2022-04h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

- 0: Acceleration/Deceleration time
- 1: Acceleration/Deceleration time 1
- 2: Acceleration/Deceleration time 2
- 3: Acceleration/Deceleration time 3
- 4: Acceleration/Deceleration time 4
- 5: Acceleration/Deceleration time 5
- 6: Acceleration/Deceleration time 6
- 7: Acceleration/Deceleration time 7

Description

When the process segment is paused, the motor ramps to stop based on the deceleration time defined by H22.03. Setpoints 0 to 7 correspond to parameters H22.35 to H22.42.

H22.04 Positive software position limit

Hex:	2022-05h	Effective mode:	Real time
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	2147483647	Change:	Real-time

Value Range:

-2147483648 to 2147483647

Description

E956.0 can occur when the motor operates forwardly with position reference exceeding the setpoint of H22.04 during positioning in the process segment mode.

H22.06 Negative software position limit

Hex:	2022-07h	Effective mode:	Real time
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	-2147483648	Change:	Real-time

Value Range:

-2147483648 to 2147483647

Description

E958.0 can occur when the motor operates reversely with position reference exceeding the setpoint of H22.06 during positioning in the process segment mode.

H22.08 Process segment number

Hex:	2022-09h	Effective mode:	-
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

Indicates the process segment number in progress in the process segment mode.

H22.09 Process segment function switch

Hex:	2022-0Ah	Effective mode:	Real time
Min.:	0	Unit:	-

Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:
0–65535

Description
-

H22.10 Process segment state

Hex:	2022-0Bh	Effective mode:	-
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:
0–65535

Description

Used for process segment state feedback.

The process segment number will be read back when commands in the positioning mode are not done executing.

The process segment number + 10000 will be read back when commands in the positioning mode are done executing.

The process segment number + 20000 will be read back when commands in the positioning mode are done executing and positioning has been completed.

H22.11 Processing mode for process segment pause command

Hex:	2022-0Ch	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Do not abort the command

1: Abort the command

Description

Set whether to abort unexecuted commands during process segment pause in the process segment mode. It is only effective in the positioning mode.

H22.12 Stop mode for process segment pause

Hex:	2022-0Dh	Effective mode:	Real time
Min.:	0	Unit:	-

Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0: Ramp to stop

1: Stop at zero speed

Description

Set the stop mode for process segment pause in the process segment mode.

H22.19**Target speed**

Hex:	2022-14h	Effective mode:	Real time
Min.:	0.1	Unit:	rpm
Max.:	6000.0	Data Type:	UInt16
Default:	50.0	Change:	Real-time

Value Range:

0.1rpm to 6000.0rpm

Description

Eight groups of target speed are available for each process segment command.

Target speed refers to the constant operating speed when the motor is not in the acceleration/deceleration process. If the displacement is too small in the positioning mode, the actual motor speed will be lower than the setpoint of H22.19.

H22.20**Target speed 1**

Hex:	2022-15h	Effective mode:	Real time
Min.:	0.1	Unit:	rpm
Max.:	6000.0	Data Type:	UInt16
Default:	200.0	Change:	Real-time

Value Range:

0.1rpm to 6000.0rpm

Description

See H22.19.

H22.21**Target speed 2**

Hex:	2022-16h	Effective mode:	Real time
Min.:	0.1	Unit:	rpm
Max.:	6000.0	Data Type:	UInt16
Default:	500.0	Change:	Real-time

Value Range:

0.1rpm to 6000.0rpm

Description

See H22.19.

H22.22**Target speed 3**

Hex: 2022-17h

Effective mode: Real time

Min.: 0.1

Unit: rpm

Max.: 6000.0

Data Type: UInt16

Default: 1000.0

Change: Real-time

Value Range:

0.1rpm to 6000.0rpm

Description

See H22.19.

H22.23**Target speed 4**

Hex: 2022-18h

Effective mode: Real time

Min.: 0.1

Unit: rpm

Max.: 6000.0

Data Type: UInt16

Default: 1500.0

Change: Real-time

Value Range:

0.1rpm to 6000.0rpm

Description

See H22.19.

H22.24**Target speed 5**

Hex: 2022-19h

Effective mode: Real time

Min.: 0.1

Unit: rpm

Max.: 6000.0

Data Type: UInt16

Default: 2000.0

Change: Real-time

Value Range:

0.1rpm to 6000.0rpm

Description

See H22.19.

H22.25**Target speed 6**

Hex: 2022-1Ah

Effective mode: Real time

Min.: 0.1

Unit: rpm

Max.:	6000.0	Data Type:	UInt16
Default:	2500.0	Change:	Real-time

Value Range:
0.1rpm to 6000.0rpm

Description
See H22.19.

H22.26 Target speed 7

Hex:	2022-1Bh	Effective mode:	Real time
Min.:	0.1	Unit:	rpm
Max.:	6000.0	Data Type:	UInt16
Default:	3000.0	Change:	Real-time

Value Range:
0.1rpm to 6000.0rpm

Description
See H22.19.

H22.35 Accel/Decel time

Hex:	2022-24h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	50	Change:	Real-time

Value Range:
0 ms–65535 ms

Description

Eight groups of acceleration/deceleration time are available for each process segment command.

Acceleration time is the time for the motor to accelerate from 0 RPM to 1000 RPM at a constant speed.

H22.36 Acceleration/Deceleration time 1

Hex:	2022-25h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	200	Change:	Real-time

Value Range:
0 ms–65535 ms

Description

See H22.35.

H22.37 Acceleration/Deceleration time 2

Hex:	2022-26h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	500	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

See H22.35.

H22.38 Acceleration/Deceleration time 3

Hex:	2022-27h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	1000	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

See H22.35.

H22.39 Acceleration/Deceleration time 4

Hex:	2022-28h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	1500	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

See H22.35.

H22.40 Acceleration/Deceleration time 5

Hex:	2022-29h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16

Change: Real-time

Value Range:

0 ms–65535 ms

Description

See H22.35.

H22.41 Acceleration/Deceleration time 6

Hex: 2022-2Ah

Effective	Real time
mode:	

Min.: 0

Unit: ms

Max.: 65535

Data Type: UInt16

Default: 2500

Change: Real-time

Value Range:

0 ms–65535 ms

Description

See H22.35.

H22.42 Acceleration/Deceleration time 7

Hex: 2022-2Bh

Effective Real time
mode:

Min.: 0

Unit: ms

Max.: 65535

Data Type: UInt16

Default: 3000

Change: Real-time

Value Range:

0 ms–65535 ms

Description

See H22.35.

H22.51 Delay after completion of the process segment

Hex: 2022-34h

Effective Real time
mode:

Min.: 0

Unit: ms

Max.: 65535

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0 ms–65535 ms

Description

Eight groups of delay time are available for each process segment command.

The delay time refers to the delay that starts from the end of current command to the operation of the next command in the process segment. For details, see the section related to the process segment.

H22.52	Delay time 1 after completion of the process segment		
Hex:	2022-35h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	50	Change:	Real-time
Value Range:			
0 ms–65535 ms			
Description			
See H22.51.			

H22.53	Delay time 2 after completion of the process segment		
Hex:	2022-36h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	200	Change:	Real-time
Value Range:			
0 ms–65535 ms			
Description			
See H22.51.			

H22.54	Delay time 3 after completion of the process segment		
Hex:	2022-37h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	500	Change:	Real-time
Value Range:			
0 ms–65535 ms			
Description			
See H22.51.			

H22.55	Delay time 4 after completion of the process segment		
Hex:	2022-38h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	1000	Change:	Real-time
Value Range:			
0 ms–65535 ms			

Description

See H22.51.

H22.56 Delay time 5 after completion of the process segment

Hex:	2022-39h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	1500	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

See H22.51.

H22.57 Delay time 6 after completion of the process segment

Hex:	2022-3Ah	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	2000	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

See H22.51.

H22.58 Delay time 7 after completion of the process segment

Hex:	2022-3Bh	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	3000	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

See H22.51.

H22.70 Homing mode

Hex:	2022-47h	Effective mode:	Real time
Min.:	-32768	Unit:	-
Max.:	32767	Data Type:	Int16

Default: -2

Change: Real-time

Value Range:

-32768–32767

Description

Defines the default motor direction of rotation, deceleration point, and home during homing.

When H22.70 is set to a value from –2 to +35, 402 homing is used (6098h set to a value from –2 to +35). See section "Homing Function" in SV670P Series Servo Drive Communication Guide for details.

When H22.70 is set to a value lower than or equal to –200, local homing is used (H22.70 set to $(-200 + H05.31)$). See section "Homing Function" in the Function Guide for details.

H22.71 Speed of high-speed search for home switch signal

Hex: 2022-48h

Effective Real time

mode:

Min.: 0

Unit: rpm

Max.: 3000

Data Type: UInt16

Default: 100

Change: Real-time

Value Range:

0rpm to 3000rpm

Description

Defines the motor speed for searching for the deceleration point signal during homing.

H22.72 Speed of low-speed search for home switch signal

Hex: 2022-49h

Effective Real time

mode:

Min.: 0

Unit: rpm

Max.: 1000

Data Type: UInt16

Default: 10

Change: Real-time

Value Range:

0 rpm to 1000 rpm

Description

Defines the motor speed for searching for the home signal during homing.

H22.73 Acceleration/Deceleration time during homing

Hex: 2022-4Ah

Effective Real time

mode:

Min.: 0

Unit: ms

Max.: 1000

Data Type: UInt16

Default: 1000

Change: Real-time

Value Range:

0 ms–1000 ms

Description

Defines the time for the motor to accelerate from 0 rpm to 1000 rpm at a constant speed during homing.

H22.74 Home search time limit

Hex: 2022-4Bh

Effective mode: Real time

Min.: 0

Unit: ms

Max.: 65535

Data Type: UInt16

Default: 10000

Change: Real-time

Value Range:

0 ms–65535 ms

Description

Defines the maximum homing time.

H22.75 Mechanical home offset

Hex: 2022-4Ch

Effective mode: Real time

Min.: -2147483648

Unit: Reference unit

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Real-time

Value Range:

-2147483648 to 2147483647

Description

Defines the absolute position of the motor after homing.

H22.79 Relative/Absolute homing

Hex: 2022-50h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0–65535

Description

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

When H22.79 is set to 0, the value of H05.40 is 2.
 When H22.79 is set to 1, the value of H05.40 is 3.

5.20 H23 Technology Segment

H23.00 Definition of homing

Hex:	2023-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

For details about this parameter, see section Homing Mode in SVD60C Series Servo Drive Function Guide.

H23.02 Homing data

Hex:	2023-03h	Effective mode:	Real time
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:

-2147483648–2147483647

Description

Not used.

H23.04 Definition of process segment 1

Hex:	2023-05h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

bit0 to bit3: Mode (process segment operation mode option)

Mode = 1: The fixed speed mode applies. Mode = 2: The positioning mode applies, which stops after positioning is done. Mode = 3: The next segment is executed automatically after positioning is done. Mode = 7: The jump mode applies, which is used to jump to the designated process segment. Mode = 8: The parameter-write mode applies, which allows you to write specific parameters.

Mode 10 represents the homing mode.

For details on each mode, see the Function Guide.

H23.06 Data of process segment 1

Hex:	2023-07h	Effective mode:	Real time
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:

-2147483648–2147483647

Description

Different modes selected in process segment 1 correspond to different process segment data. For details on each mode, see the description of each mode in the function guide.

H23.08 Definition of process segment 2

Hex:	2023-09h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

See definition of technology segment 1.

H23.10 Data of process segment 2

Hex:	2023-0Bh	Effective mode:	Real time
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:

-2147483648–2147483647

Description

See that of technology segment 1.

H23.12 Definition of process segment 3

Hex:	2023-0Dh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

See definition of technology segment 1.

H23.14 Data of process segment 3

Hex:	2023-0Fh	Effective mode:	Real time
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:

-2147483648–2147483647

Description

See that of technology segment 1.

H23.16 Definition of process segment 4

Hex:	2023-11h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

See definition of technology segment 1.

H23.18 Data of process segment 4

Hex:	2023-13h	Effective mode:	Real time
Min.:	-2147483648	Unit:	-

Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:
-2147483648–2147483647

Description
See that of technology segment 1.

H23.20 Definition of process segment 5

Hex:	2023-15h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:
0–4294967295

Description
See definition of technology segment 1.

H23.22 Data of process segment 5

Hex:	2023-17h	Effective mode:	Real time
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:
-2147483648–2147483647

Description
See that of technology segment 1.

H23.24 Definition of process segment 6

Hex:	2023-19h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:
0–4294967295

Description
See definition of technology segment 1.

H23.26 Data of process segment 6

Hex:	2023-1Bh	Effective mode:	Real time
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:

-2147483648–2147483647

Description

See that of technology segment 1.

H23.28 Definition of process segment 7

Hex:	2023-1Dh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

See definition of technology segment 1.

H23.30 Data of process segment 7

Hex:	2023-1Fh	Effective mode:	Real time
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:

-2147483648–2147483647

Description

See that of technology segment 1.

H23.32 Definition of process segment 8

Hex:	2023-21h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

See definition of technology segment 1.

H23.34 Data of process segment 8

Hex:	2023-23h	Effective mode:	Real time
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:

-2147483648–2147483647

Description

See that of technology segment 1.

H23.36 Definition of process segment 9

Hex:	2023-25h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

See definition of technology segment 1.

H23.38 Data of process segment 9

Hex:	2023-27h	Effective mode:	Real time
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:

-2147483648–2147483647

Description

See that of technology segment 1.

H23.40 Definition of process segment 10

Hex:	2023-29h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32

Change: Real-time

Value Range:

0-4294967295

Description

See definition of technology segment 1.

H23.42 Data of process segment 10

Hex: 2023-2Bh

Effective	Real time
mode:	

Min.: -2147483648

Unit: -

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Real-time

Value Range:

-2147483648-2147483647

Description

See that of technology segment 1.

H23.44 Definition of process segment 11

Hex: 2023-2Dh

Effective mode:	Real time

Min.: 0

Unit: -

Max.: 4294967295

Data Type: UInt32

Default: 0

Change: Real-time

Value Range:

0-4294967295

Description

See definition of technology segment 1.

H23.46 Data of process segment 11

Hex: 2023-2Fh

Effective Real time
mode:

Min.: -2147483648

Unit: -

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Real-time

Value Range:

-2147483648-2147483647

Description

See that of technology segment 1.

H23.48 Definition of process segment 12

Hex:	2023-31h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

See definition of technology segment 1.

H23.50 Data of process segment 12

Hex:	2023-33h	Effective mode:	Real time
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:

-2147483648–2147483647

Description

See that of technology segment 1.

H23.52 Definition of process segment 13

Hex:	2023-35h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

See definition of technology segment 1.

H23.54 Data of process segment 13

Hex:	2023-37h	Effective mode:	Real time
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:

-2147483648–2147483647

Description

See that of technology segment 1.

H23.56 Definition of process segment 14

Hex:	2023-39h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

See definition of technology segment 1.

H23.58 Data of process segment 14

Hex:	2023-3Bh	Effective mode:	Real time
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:

-2147483648–2147483647

Description

See that of technology segment 1.

H23.60 Definition of process segment 15

Hex:	2023-3Dh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

See definition of technology segment 1.

H23.62 Data of process segment 15

Hex:	2023-3Fh	Effective mode:	Real time
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32

Default: 0

Change: Real-time

Value Range:

-2147483648–2147483647

Description

See that of technology segment 1.

5.21 H30 Related Variables Read through Communication

H30.00 Servo state read by communication

Hex: 2030-01h

Effective -

mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

-

H30.01 DO function state 1 read through communication

Hex: 2030-02h

Effective -

mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

Description

Bit 0 corresponds to DO function 1.

Bit 1 corresponds to DO function 2.

Bit 2 corresponds to DO function 3.

...

By analogy

H30.02 DO function state 2 read through communication

Hex: 2030-03h

Effective -

mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:
0–65535

Description
Bit 0 corresponds to DO function 17.
Bit 1 corresponds to DO function 18.
Bit 2 corresponds to DO function 19.
...
By analogy

H30.03 Input pulse reference sampling read via communication

Hex:	2030-04h	Effective mode:	-
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:
0–65535

Description
-

5.22 H31 Communication Setting

H31.00 VDI virtual level set through communication

Hex:	2031-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:
0–65535

Description
When H17.90 is set to 1, the VDI state is defined by this parameter.
The VDI logic is determined by H17.91 (Default VDI virtual level value upon power-on) upon initial power-on. Then, H31.00 is determined by the VDI logic.
"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 state set through communication

Hex:	2031-05h	Effective mode:	Real time

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0–65535

Description

Sets DO output status.

H31.09 Speed reference set via communication

Hex:	2031-0Ah	Effective mode:	Real time
Min.:	-9999.000	Unit:	rpm
Max.:	9999.000	Data Type:	Int32
Default:	0.000	Change:	Real-time

Value Range:

-9999.000rpm to 9999.000rpm

Description

Set H06.02 to 4 to define the speed reference in the speed control mode through H31.09 (unit: 0.001 rpm).

H31.11 Torque reference set via communication

Hex:	2031-0Ch	Effective mode:	Real time
Min.:	-100.000	Unit:	%
Max.:	100.000	Data Type:	Int32
Default:	0.000	Change:	Real-time

Value Range:

-100.000% to 100.000%

Description

Set H07.02 to 4 to define the torque reference in the torque control mode through this parameter (unit: 0.001%). The setpoint 100.000% corresponds to the rated torque of the motor.

5.23 H32 low voltage expansion**H32.49 Oscilloscope internal observation function**

Hex:	2032-32h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16

Default:	0	Change:	Real-time
Value Range:			
0–65535			
Description			
-			

5.24 1000h Object Dictionary

1005h	SYNC message COB-ID		
	Hex:	1005h	Effective mode: Real time
	Min.:	128	Unit: -
	Max.:	4294967295	Data Type: UInt32
	Default:	128	Change: Real-time
	Value Range:		
	128–4294967295		
	Description		
	Only 0x80h and 0x40000080h can be written to the SYNC message.		
	If 0x80h is written, the sync generator does not work.		
	If 0x40000080h is written, the sync generator is activated.		
	To activate the sync generator, you must set 1006h to a non-zero value.		
1006h	Synchronization cycle		
	Hex:	1006h	Effective mode: Real time
	Min.:	0	Unit: us
	Max.:	2147483647	Data Type: UInt32
	Default:	0	Change: Real-time
	Value Range:		
	0us to 2147483647us		
	Description		
	Applicable to the synchronization generator only (unit: us).		
100Ch	Node guarding time		
	Hex:	100Ch	Effective mode: Real time
	Min.:	0	Unit: ms
	Max.:	65535	Data Type: UInt16
	Default:	0	Change: Real-time
	Value Range:		

0 ms–65535 ms

Description

Defines the node daemon running time, in ms.

100dh

Life factor

Hex:	100dh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0–255

Description

This parameter must be used together with the node daemon function and must be set to a value greater than 1.

1014h

Emergency message COB-ID

Hex:	1014h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

The most significant bit indicates whether to disable the emergency message of the device. Only the data "0x80+Node_ID" can be written for the bit to enable the emergency message of the device.

If the data "0x80000080+Node_ID" is written, the emergency message is disabled.

When the emergency message is enabled, the COB-ID must be the same as that of the object.

1016.01h

Consumer heartbeat time 1

Hex:	1016-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–2147483647

Description

Parameters include the address of the monitored node and actual consumer time, which must be longer than the heartbeat producer time (unit: ms) of the corresponding node. Two different consumer time cannot be set for one node.
 Bits 0 to 15: Monitoring time
 Bits 16 to 23: The monitored address
 Bits 24 to 31: Reserved (0)

1016.02h Consumer heartbeat time 2

Hex:	1016-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:
 0–2147483647

Description
 Same as 1016.01h.

1016.03h Consumer heartbeat time 3

Hex:	1016-03h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:
 0–2147483647

Description
 Same as 1016.01h.

1016.04h Consumer heartbeat time 4

Hex:	1016-04h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:
 0–2147483647

Description
 Same as 1016.01h.

1016.05h Consumer heartbeat time 5

Hex:	1016-05h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–2147483647

Description

Same as 1016.01h.

1017h Producer heartbeat time

Hex:	1017h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Defines the heartbeat production time of the slave, in ms.

1400.01h COB-ID of RPDO1

Hex:	1400-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	512	Change:	Real-time

Value Range:

0–4294967295

Description

Only the most significant bit can be modified. When the most significant bit is 0, the PDO is active. When the most significant bit is 1, the PDO is inactive.

The factory settings are as follows:

1400h: 0x00000200 + Node_ID

1401h: 0x80000300 + Node_ID

1402h: 0x80000400 + Node_ID

1403h: 0x80000500 + Node_ID

1400.02h Transmission type of RPDO1

Hex:	1400-02h	Effective mode:	Real time

Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	255	Change:	Real-time

Value Range:

0–255

Description

This parameter can be modified only when PDO is inactive.

Different values correspond to different PDO transmission types, as follows:

0: Not circle synchronous data

1 to 240: Circle synchronous data

254 and 255: Not circle asynchronous data

1401.01h COB-ID of RPDO2

Hex:	1401-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

Same as 1400.01h.

1401.02h Transmission type of RPDO2

Hex:	1401-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	255	Change:	Real-time

Value Range:

0–255

Description

Same as 1400.02h.

1402.01h COB-ID of RPDO3

Hex:	1402-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

Same as 1400.01h.

1402.02h Transmission type of RPDO3

Hex:	1402-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	255	Change:	Real-time

Value Range:

0–255

Description

Same as 1400.02h.

1403.01h COB-ID of RPDO4

Hex:	1403-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

Same as 1400.01h.

1403.02h Transmission type of RPDO4

Hex:	1403-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	255	Change:	Real-time

Value Range:

0–255

Description

Same as 1400.02h.

1600.00h Number of valid mapped objects in RPDO1

Hex:	1600-00h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16

Default: 1

Change: Real-time

Value Range:

0–4

Description

This object can be modified only when PDO is inactive. When 0 is written, the mapping objects of other sub-indexes are cleared.

1600.01h Mapped object 1 in RPDO1

Hex: 1600-01h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 1614807056

Change: Real-time

Value Range:

0–2147483647

Description

The total length of a mapping object cannot exceed 64 bits. Mapping based on bytes instead of bits is supported. The indexes and sub-indexes of mapping objects must exist in the object dictionary list. The attribute of mapping objects is readable and the objects can be mapped.

Sub-indexes are written in the following format:

Bit 16 to bit 31: Index

Bit 8 to bit 15: Sub-index

Bit 0 to bit 7: Object length

1600.02h Mapped object 2 in RPDO1

Hex: 1600-02h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Real-time

Value Range:

0–2147483647

Description

Same as 1600.01h.

1600.03h Mapped object 3 in RPDO1

Hex: 1600-03h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default:	0	Change:	Real-time
Value Range:			
0–2147483647			
Description			
Same as 1600.01h.			

1600.04h Mapped object 4 in RPDO1

Hex:	1600-04h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time
Value Range:			
0–2147483647			
Description			
Same as 1600.01h.			

1601.00h Number of valid mapped objects in RPDO2

Hex:	1601-00h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	2	Change:	Real-time
Value Range:			
0–4			
Description			
This object can be modified only when PDO is inactive. When 0 is written, the mapping objects of other sub-indexes are cleared.			

1601.01h Mapped object 1 in RPDO2

Hex:	1601-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1614807056	Change:	Real-time
Value Range:			
0–2147483647			
Description			
The total length of a mapping object cannot exceed 64 bits. Mapping based on bytes instead of bits is supported. The indexes and sub-indexes of mapping objects must exist in the object dictionary list. The attribute of mapping objects is readable and the objects can be mapped.			

Sub-indexes are written in the following format:

Bit 16 to bit 31: Index

Bit 8 to bit 15: Sub-index

Bit 0 to bit 7: Object length

1601.02h Mapped object 2 in RPDO2

Hex:	1601-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1616904200	Change:	Real-time

Value Range:
0–2147483647

Description
Same as 1601.01h.

1601.03h Mapped object 3 in RPDO2

Hex:	1601-03h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:
0–2147483647

Description
Same as 1601.01h.

1601.04h Mapped object 4 in RPDO2

Hex:	1601-04h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:
0–2147483647

Description
Same as 1601.01h.

1602.00h Number of valid mapped objects in RPDO3

Hex:	1602-00h	Effective mode:	Real time

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	2	Change:	Real-time

Value Range:

0–4

Description

This object can be modified only when PDO is inactive. When 0 is written, the mapping objects of other sub-indexes are cleared.

1602.01h Mapped object 1 in RPDO3

Hex:	1602-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1614807056	Change:	Real-time

Value Range:

0–2147483647

Description

The total length of a mapping object cannot exceed 64 bits. Mapping based on bytes instead of bits is supported. The indexes and sub-indexes of mapping objects must exist in the object dictionary list. The attribute of mapping objects is readable and the objects can be mapped.

Sub-indexes are written in the following format:

Bit 16 to bit 31: Index

Bit 8 to bit 15: Sub-index

Bit 0 to bit 7: Object length

1602.02h Mapped object 2 in RPDO3

Hex:	1602-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1618608160	Change:	Real-time

Value Range:

0–2147483647

Description

Same as 1602.01h.

1602.03h Mapped object 3 in RPDO3

Hex:	1602-03h	Effective mode:	Real time

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–2147483647

Description

Same as 1602.01h.

1602.04h Mapped object 4 in RPDO3

Hex:	1602-04h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–2147483647

Description

Same as 1602.01h.

1603.00h Number of valid mapped objects in RPDO4

Hex:	1603-00h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	2	Change:	Real-time

Value Range:

0–4

Description

This object can be modified only when PDO is inactive. When 0 is written, the mapping objects of other sub-indexes are cleared.

1603.01h Mapped object 1 in RPDO4

Hex:	1603-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1614807056	Change:	Real-time

Value Range:

0–2147483647

Description

The total length of a mapping object cannot exceed 64 bits. Mapping based on bytes instead of bits is supported. The indexes and sub-indexes of mapping objects must exist in the object dictionary list. The attribute of mapping objects is readable and the objects can be mapped.

Sub-indexes are written in the following format:

Bit 16 to bit 31: Index

Bit 8 to bit 15: Sub-index

Bit 0 to bit 7: Object length

1603.02h Mapped object 2 in RPDO4

Hex:	1603-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1627324448	Change:	Real-time

Value Range:

0–2147483647

Description

Same as 1603.01h.

1603.03h Mapped object 3 in RPDO4

Hex:	1603-03h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–2147483647

Description

Same as 1603.01h.

1603.04h Mapped object 4 in RPDO4

Hex:	1603-04h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–2147483647

Description

Same as 1603.01h.

1800.01h COB-ID of TPDO1

Hex:	1800-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

Only the MSB and the second MSB can be modified.

When the most significant bit is 0, the PDO is active. When the most significant bit is 1, the PDO is inactive.

The second most significant bit defines whether the PDO can be triggered by a remote frame. You are recommended to set this bit to 1 to disable the remote frame to trigger the PDO.

The factory settings are as follows:

1800h: 0x40000180 + Node_ID

1801h: 0xC0000280 + Node_ID

1802h: 0xC0000380 + Node_ID

1803h: 0xC0000480 + Node_ID

1800.02h Transmission type of TPDO1

Hex:	1800-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	255	Change:	Real-time

Value Range:

0–255

Description

This parameter can be modified only when PDO is inactive. Different values correspond to different PDO transmission types, as follows:

0: Not circle synchronous data

1 to 240: Circle synchronous data

254 and 255: Not circle asynchronous data

1800.03h Inhibit time of TPDO1

Hex:	1800-03h	Effective mode:	Real time
Min.:	0	Unit:	100us
Max.:	65535	Data Type:	UInt16
Default:	500	Change:	Real-time

Value Range:

0us to 65535us

Description

This parameter can be modified only when PDO is inactive.

The unit is 100 μ s. The value 0 indicates that the inhibit time is invalid.

1800.05h Event counter of TPDO1

Hex:	1800-05h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

This parameter can be modified only when PDO is inactive.

When the unit is ms, the value 0 indicates that the event counter is inactive.

1801.01h COB-ID of TPDO2

Hex:	1801-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–4294967295

Description

Same as 1800.01h.

1801.02h Transmission type of TPDO2

Hex:	1801-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	255	Change:	Real-time

Value Range:

0–255

Description

Same as 1800.02h.

1801.03h Inhibit time of TPDO2

Hex:	1801-03h	Effective mode:	Real time
Min.:	0	Unit:	100us
Max.:	65535	Data Type:	UInt16
Default:	500	Change:	Real-time
Value Range:			
0us to 65535us			
Description			
Same as 1800.03h.			

1801.05h Event counter of TPDO2

Hex:	1801-05h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time
Value Range:			
0 ms–65535 ms			
Description			
Same as 1800.05h.			

1802.01h COB-ID of TPDO3

Hex:	1802-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time
Value Range:			
0–4294967295			
Description			
Same as 1800.01h.			

1802.02h Transmission type of TPDO3

Hex:	1802-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	255	Change:	Real-time
Value Range:			
0–255			

Description

Same as 1800.02h.

1802.03h Inhibit time of TPD03

Hex: 1802-03h

Effective Real time

mode:

Min.: 0

Unit: 100us

Max.: 65535

Data Type: UInt16

Default: 500

Change: Real-time

Value Range:

0us to 65535us

Description

Same as 1800.03h.

1802.05h Event counter of TPD03

Hex: 1802-05h

Effective Real time

mode:

Min.: 0

Unit: ms

Max.: 65535

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0 ms–65535 ms

Description

Same as 1800.05h.

1803.01h COB-ID of TPD04

Hex: 1803-01h

Effective Real time

mode:

Min.: 0

Unit: -

Max.: 4294967295

Data Type: UInt32

Default: 0

Change: Real-time

Value Range:

0–4294967295

Description

Same as 1800.01h.

1803.02h Transmission type of TPD04

Hex: 1803-02h

Effective Real time

mode:

Min.: 0

Unit: -

Max.: 255

Data Type: UInt16

Default: 255

Change: Real-time

Value Range:

0–255

Description

Same as 1800.02h.

1803.03h Inhibit time of TPDO4

Hex: 1803-03h

Effective mode: Real time

Min.: 0

Unit: 100us

Max.: 65535

Data Type: UInt16

Default: 500

Change: Real-time

Value Range:

0us to 65535us

Description

Same as 1800.03h.

1803.05h Event counter of TPDO4

Hex: 1803-05h

Effective mode: Real time

Min.: 0

Unit: ms

Max.: 65535

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0 ms–65535 ms

Description

Same as 1800.05h.

1A00.00h Number of valid mapped objects in TPDO1

Hex: 1A00-00h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 4

Data Type: UInt16

Default: 1

Change: Real-time

Value Range:

0–4

Description

This object can be modified only when PDO is inactive. When 0 is written, the mapping objects of other sub-indexes are cleared.

1A00.01h Mapped object 1 in TPDO1

Hex: 1A00-01h

Effective mode: Real time

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1614872592	Change:	Real-time

Value Range:

0–2147483647

Description

The total length of a mapping object cannot exceed 64 bits. Mapping based on bytes instead of bits is supported. The indexes and sub-indexes of mapping objects must exist in the object dictionary list. The attribute of mapping objects is readable and the objects can be mapped.

Sub-indexes are written in the following format:

Bit 16 to bit 31: Index

Bit 8 to bit 15: Sub-index

Bit 0 to bit 7: Object length

1A00.02h Mapped object 2 in TPDO1

Hex:	1A00-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.03h Mapped object 3 in TPDO1

Hex:	1A00-03h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–2147483647

Description

Same as 1A00.01h.

1A00.04h Mapped object 4 in TPDO1

Hex:	1A00-04h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32

Hex:	1A01-00h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	2	Change:	Real-time

This object can be modified only when PDO is inactive. When 0 is written, the mapping objects of other sub-indexes are cleared.

Hex:	1A01-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1614872592	Change:	Real-time

Bit 0 to bit 7: Object length

Hex:	1A01-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32

Default: 1616969736

Change: Real-time

Value Range:

0–2147483647

Description

Same as 1A01.01h.

1A01.03h Mapped object 3 in TPDO2

Hex: 1A01-03h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Real-time

Value Range:

0–2147483647

Description

Same as 1A01.01h.

1A01.04h Mapped object 4 in TPDO2

Hex: 1A01-04h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 2147483647

Data Type: UInt32

Default: 0

Change: Real-time

Value Range:

0–2147483647

Description

Same as 1A01.01h.

1A02.00h Number of valid mapped objects in TPDO3

Hex: 1A02-00h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 4

Data Type: UInt16

Default: 2

Change: Real-time

Value Range:

0–4

Description

This object can be modified only when PDO is inactive. When 0 is written, the mapping objects of other sub-indexes are cleared.

1A02.01h Mapped object 1 in TPDO3

Hex:	1A02-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1614872592	Change:	Real-time

Value Range:

0–2147483647

Description

The total length of a mapping object cannot exceed 64 bits. Mapping based on bytes instead of bits is supported. The indexes and sub-indexes of mapping objects must exist in the object dictionary list. The attribute of mapping objects is readable and the objects can be mapped.

Sub-indexes are written in the following format:

Bit 16 to bit 31: Index

Bit 8 to bit 15: Sub-index

Bit 0 to bit 7: Object length

1A02.02h Mapped object 2 in TPDO3

Hex:	1A02-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1617166368	Change:	Real-time

Value Range:

0–2147483647

Description

Same as 1A02.01h.

1A02.03h Mapped object 3 in TPDO3

Hex:	1A02-03h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–2147483647

Description

Same as 1A02.01h.

1A02.04h Mapped object 4 in TPDO3

Hex:	1A02-04h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time

Value Range:

0–2147483647

Description

Same as 1A02.01h.

1A03.00h Number of valid mapped objects in TPDO4

Hex:	1A03-00h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	2	Change:	Real-time

Value Range:

0–4

Description

This object can be modified only when PDO is inactive. When 0 is written, the mapping objects of other sub-indexes are cleared.

1A03.01h Mapped object 1 in TPDO4

Hex:	1A03-01h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1614872592	Change:	Real-time

Value Range:

0–2147483647

Description

The total length of a mapping object cannot exceed 64 bits. Mapping based on bytes instead of bits is supported. The indexes and sub-indexes of mapping objects must exist in the object dictionary list. The attribute of mapping objects is readable and the objects can be mapped.

Sub-indexes are written in the following format:

Bit 16 to bit 31: Index

Bit 8 to bit 15: Sub-index

Bit 0 to bit 7: Object length

1A03.02h	Mapped object 2 in TPDO4		
Hex:	1A03-02h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1617690656	Change:	Real-time
Value Range:			
0–2147483647			
Description			
Same as 1A03.01h.			

1A03.03h	Mapped object 3 in TPDO4		
Hex:	1A03-03h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time
Value Range:			
0–2147483647			
Description			
Same as 1A03.01h.			

1A03.04h	Mapped object 4 in TPDO4		
Hex:	1A03-04h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Real-time
Value Range:			
0–2147483647			
Description			
Same as 1A03.01h.			

5.25 6000h Object Dictionary

603Fh	Error code		
Hex:	603Fh	Effective mode:	-
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

When an error described in the DSP402 profile occurs on the servo drive, 603Fh is as described in DSP402.

When an error specified by the user occurs on the servo drive, 603Fh is 0xFF00.

The value of 603Fh is in hexadecimal.

In addition, the object dictionary 203Fh displays auxiliary bytes of fault codes in hexadecimal.

203Fh is a Uint 32 value, in which the high 16 bits indicate the manufacturer internal fault code, and the low 16 bits indicate the manufacturer external fault code.

6040h**Control word**

Hex:	6040h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0–65535

Description

For details, see section Basic Functions of the function guide.

6041h**Status word**

Hex:	6041h	Effective mode:	-
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

For description of status words, see section Basic Functions of the function guide.

605Ah**Quick stop mode**

Hex:	605Ah	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	7	Data Type:	Int16
Default:	2	Change:	At stop

Value Range:

- 0: Coast to stop, keeping de-energized state
- 1: Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized state
- 2: Ramp to stop as defined by 6085h, keeping de-energized state
- 3: Stop at emergency stop torque, keeping de-energized state
- 5: Ramp to stop as defined by 6084h/609Ah (HM), keeping position lock state
- 6: Ramp to stop as defined by 6085h, keeping position lock state
- 7: Stop at emergency stop torque, keeping position lock state

Description

Defines the quick stop mode.

Coast to stop, keep de-energized state

- 1: 6084h/609Ah(HM) ramp stop, keep de-energized state
- 2: 6085h ramp stop, keep de-energized state
- 3: Emergency stop torque stop, keep de-energized state
- 4: N/A
- 5: 6084h/609Ah(HM) ramp stop, keep position locked state
- 6: 6085h ramp stop, keep position locked state
- 7: Emergency stop torque stop, keep position locked state

605Ch**Stop mode at S-OFF**

Hex:	605Ch	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	Int16
Default:	1	Change:	At stop

Value Range:

- 0: Coast to stop, keeping de-energized state
- 1: Ramp to stop as defined by 6084h/609Ah, keeping de-energized state

Description

Sets the stop mode at S-ON OFF.

- 0: Coast to stop, keeping de-energized state
- 1: Ramp to stop as defined by 6084h/609Ah, keeping de-energized state

605Dh**Halt mode**

Hex:	605Dh	Effective mode:	Real time
Min.:	1	Unit:	-
Max.:	3	Data Type:	Int16
Default:	1	Change:	At stop

Value Range:

- 1: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping position lock state
- 2: Ramp to stop as defined by 6085h, keeping position lock state
- 3: Stop at emergency stop torque, keeping position lock state

Description

Defines the halt mode.

- 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**Stop mode at No. 2 fault**

Hex:	605Eh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	3	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 stat
- 3: Stop at emergency stop torque, keeping de-energized state

Description

Defines the stop mode at No.2 fault.

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

6060h**Servo drive mode**

Hex:	6060h	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	10	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

- 1: Profile position mode (pp)
- 3: Profile velocity mode (pv)
- 4: Profile torque mode (pt)
- 6: Homing mode (hm)
- 7: Interpolation mode (ip)

Description

It defines the operation mode of the servo drive.

0: N/A (internally forced to pp)
1: Profile position mode (pp)
3: Profile velocity mode (pv)
4: Profile torque mode (pt)
6: Homing mode (hm)
7: Interpolation mode (ip)
Other: N/A

If an unsupported operation mode is selected through an SDO, an SDO error will be returned.

If an unsupported operation mode is selected through a PDO, the change of the operation mode will be invalid.

6061h **Operation mode display**

Hex:	6061h	Effective mode:	-
Min.:	0	Unit:	-
Max.:	10	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

1: Profile position mode (pp)
3: Profile velocity mode (pv)
4: Profile torque mode (pt)
6: Homing mode (hm)
7: Interpolation mode (ip)

Description

Indicates the actual operation mode.

0: Profile position mode (pp)
1: Profile position mode (pp)
3: Profile velocity mode (pv)
4: Profile torque mode (pt)
6: Homing mode (hm)
7: Interpolation mode (ip)

6062h **Position reference**

Hex:	6062h	Effective mode:	-
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**

Hex:	6063h	Effective mode:	-
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**

Hex:	6064h	Effective mode:	-
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**

Hex:	6065h	Effective mode:	Real time
Min.:	0	Unit:	Reference unit
Max.:	4294967295	Data Type:	UInt32
Default:	27486951	Change:	Real-time

Value Range:

0 to 4294967295

Description

Defines the threshold of excessive position deviation (reference unit).

When the difference value between position demand value (6062h) and position actual value (6064h) keeps exceeding $\pm 6065h$ after the time defined by 6066h elapses, B00.0 (Position deviation too large) occurs.

6066h Defines the time lapse to trigger excessive position deviation (EB00.0).

Hex:	6066h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Defines the time lapse to trigger excessive position deviation (EB00.0), which must be used together with 6065h.

6067h Position window

Hex:	6067h	Effective mode:	Real time
Min.:	0	Unit:	Reference unit
Max.:	4294967295	Data Type:	UInt32
Default:	5872	Change:	Real-time

Value Range:

0 to 4294967295

Description

Defines the threshold for position reach.

If the difference between 6062h and 6064h is within $\pm 6067h$ and the time reaches 6068h, the position is reached. In this case, bit 10 of 6041h is set to 1 in the profile position mode.

This flag bit is valid only when the S-ON signal is valid in profile position control mode.

6068h Position window time

Hex:	6068h	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0 ms–65535 ms

Description

Defines the window time for position reach, which must be used together with 6067h.

606Ch**Actual speed**

Hex:	606Ch	Effective mode:	-
Min.:	-2147483648	Unit:	Reference unit/s
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

It indicates the velocity actual value.

606Dh**Velocity window**

Hex:	606Dh	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 RPM to 65535 RPM

Description

Defines the threshold for speed reach.

If the difference value between the target speed 60FFh and the actual speed 606Ch is within $\pm 606Dh$ and the time reaches 606Eh, the speed is reached and bit 10 of the status word 6041h is set to 1 in the profile velocity (PV) mode.

This flag bit is meaningful only when the servo drive is enabled in PV mode.

606Eh**Velocity window time**

Hex:	606Eh	Effective mode:	Real time
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

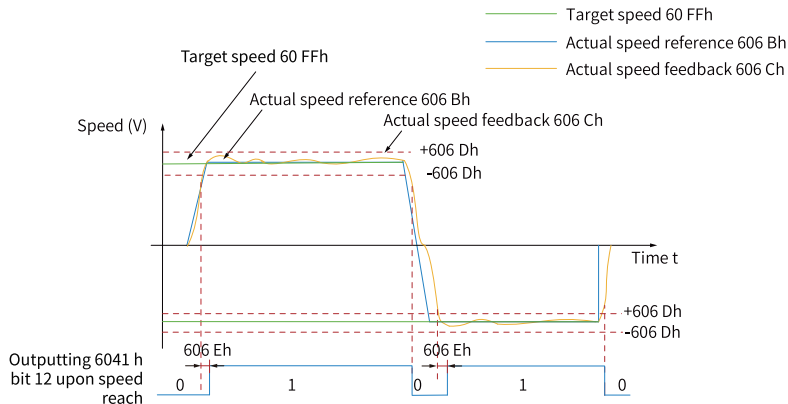
0 ms-65535 ms

Description

Defines the time window for speed reach, which must be used together with 606Dh.

Defines the time window for speed arrival. If the difference value between the target speed 60FFh and the actual speed 606Ch is within $\pm 606Dh$ and the time reaches 606Eh, the speed is reached and bit 10 of the status word 6041h is set to 1 in the profile velocity (PV) mode.

This flag bit is meaningful only when the servo drive is enabled in PV mode.



606Fh

Zero speed signal threshold

Hex:	606Fh	Effective mode:	Real time
Min.:	0	Unit:	rpm
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	Real-time

Value Range:

0 RPM to 65535 RPM

Description

Defines the threshold for determining whether the user velocity is 0. When 606Ch is within $\pm 606Fh$ and the time reaches the value set by 6070h, the user velocity is 0. When either condition is not met, the user velocity is not 0. This flag bit is valid only in PV mode. This flag bit is unrelated to the enable/disable state of the servo drive.

6070h

Velocity threshold time

Hex:	6070h	Effective mode:	Real time

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0 ms–65535 ms

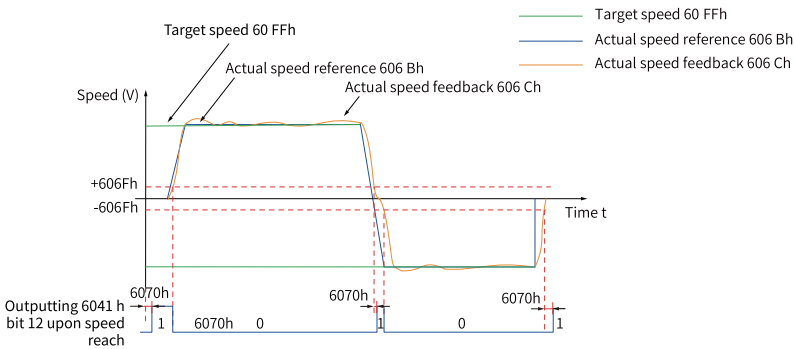
Description

Defines the time window for determining whether the user velocity is 0, which must be used together with 606Fh.

When 606Ch is within $\pm 606Fh$ and the time reaches the value set by 6070h, the user velocity is 0. When either condition is not met, the user velocity is not 0.

This flag bit is valid only in PV mode.

This flag bit is unrelated to the enable/disable state of the servo drive.



6071h

Target torque

Hex:	6071h	Effective mode:	Real time
Min.:	-4000	Unit:	0.001
Max.:	4000	Data Type:	Int16
Default:	0	Change:	Real-time

Value Range:

-4000. to 4000.

Description

Defines the target torque of the servo drive in the profile torque mode.

The value 1000 corresponds to the rated torque of the motor.

6072h

Max. torque reference

Hex:	6072h	Effective mode:	Real time
Min.:	0	Unit:	0.001
Max.:	4000	Data Type:	UInt16

Default: 3500

Change: Real-time

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 reference**

Hex: 6074h

Effective mode: -

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**Actual torque**

Hex: 6077h

Effective mode: -

Min.: -4000

Unit: 0.001

Max.: 4000

Data Type: Int16

Default: 0

Change: Unchangeable

Value Range:

-4000. to 4000.

Description

It displays the internal actual torque of the servo drive.

The value 1000 corresponds to the rated torque of the motor.

607Ah**Target position**

Hex: 607Ah

Effective mode: Real time

Min.: -2147483648

Unit: Reference unit

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Real-time

Value Range:

-2147483648 to 2147483647

Description

Defines the target position of the servo drive in the profile position mode.

When bit 6 of 6040h is set to 0, 607Ah indicates the absolute target position of current segment.

After positioning of current segment is done, the value of 6064h will be the same as the value of 607Ah.

When bit 6 of 6040h is set to 1, 607Ah indicates the target increment displacement of current segment.

After positioning of current segment is done, user displacement increment will be the same as the value of 607Ah.

607Ch**Home offset**

Hex:	607Ch	Effective mode:	At stop
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:

-2147483648 to 2147483647

Description

Defines the physical location of mechanical zero that deviates from the home of the motor in position control modes (profile position mode, interpolation mode, and homing mode).

The home offset takes effect in the following conditions: The device is powered on, the homing operation is complete, and bit15 of 6041h is set to 1.

After homing is done, the position actual value (6064h) will be the same as the value of 607Ch.

If 607Ch is outside the value of 607Dh (Software position limit), E09.1 (Home setting error) will occur.

607D.01h**Min. position limit**

Hex:	607D-01h	Effective mode:	Real time
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	-2147483648	Change:	Real-time

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

Hex:	607D-02h	Effective mode:	Real time
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	2147483647	Change:	Real-time

Value Range:

-2147483648 to 2147483647

Description

Defines the maximum software position limit relative to the mechanical zero.

Maximum software position limit = (607D.02h)

607Eh Reference polarity

Hex:	607Eh	Effective mode:	Real time
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	0	Change:	Real-time

Value Range:

0–255

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 speed mode.

When bit 5 is 1, it indicates the torque demand value (6071h) is multiplied by "–1" and the motor direction is reversed in the torque mode.

Other bits are meaningless.

607Fh Max. speed

Hex:	607Fh	Effective mode:	Real time
Min.:	0	Unit:	Reference unit/s
Max.:	4294967295	Data Type:	UInt32

Default: 4294967295

Change: Real-time

Value Range:

0 to 4294967295

Description

Defines the maximum user running speed.

Set a proper gear ratio (8:1 recommended) when using a 26-bit encoder.

Otherwise, the motor speed will be limited to 3840 RPM.

6081h**Profile velocity**

Hex: 6081h

Effective Real time

mode:

Min.: 0

Unit: Reference unit/s

Max.: 4294967295

Data Type: UInt32

Default: 13981013

Change: Real-time

Value Range:

0 to 4294967295

Description

It sets the average velocity normally attained at the end of the acceleration ramp during a profiled motion.

The setpoint takes effect after the slave receives the displacement reference.

6083h**Profile acceleration**

Hex: 6083h

Effective Real time

mode:

Min.: 0

Unit: Reference unit/s²

Max.: 4294967295

Data Type: UInt32

Default: 1398101333

Change: Real-time

Value Range:

0 to 4294967295

Description

Defines the acceleration rate in the acceleration stage of the displacement reference in the profile position mode.

The following formula applies if a motor equipped with 23-bit encoder needs to run at 400 RPM (6081h: $400 \times 8388608/60$) with acceleration rate being 400 RPM/s (6083h: $400 \times 8388608/60$) and deceleration rate being 200 RPM/s (6084h: $200 \times 8388608/60$) under a gear ratio of 1:1:

Acceleration time $t_{up} = \Delta 6081h / \Delta 6083h = 1$ (s); Deceleration time $t_{down} = \Delta 6081h / \Delta 6084h = 2$ (s).

6084h**Profile deceleration**

Hex:	6084h	Effective mode:	Real time
Min.:	0	Unit:	Reference unit/s ²
Max.:	4294967295	Data Type:	UInt32
Default:	1398101333	Change:	Real-time

Value Range:

0 to 4294967295

Description

Defines the deceleration rate in the deceleration stage of the displacement reference in the profile position mode.

The following formula applies if a motor equipped with 23-bit encoder needs to run at 400 RPM (6081h: $400 \times 8388608/60$) with acceleration rate being 400 RPM/s (6083h: $400 \times 8388608/60$) and deceleration rate being 200 RPM/s (6084h: $200 \times 8388608/60$) under a gear ratio of 1:1:

Acceleration time $t_{up} = \Delta 6081h / \Delta 6083h = 1$ (s); Deceleration time $t_{down} = \Delta 6081h / \Delta 6084h = 2$ (s).

6085h**Quick stop deceleration**

Hex:	6085h	Effective mode:	Real time
Min.:	0	Unit:	Reference unit/s ²
Max.:	4294967295	Data Type:	UInt32
Default:	2147483647	Change:	Real-time

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.

6087h**Torque slope**

Hex:	6087h	Effective mode:	Real time
Min.:	0	Unit:	0.1%/s
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	Real-time

Value Range:

0.%/s—4294967295.%/s

Description

It sets the rate of change of torque in profile torque mode, in unit of torque increment per second.

In the profile torque mode, if 605Ah is set to 1, 2, 5, or 6, or 605Dh is set to 1 or 2, the servo drive decelerates to stop as defined by 6087h.

If the value exceeds the torque reference limit, the servo drive runs at the limit.

6091.01h Motor resolution

Hex:	6091-01h	Effective mode:	Real time
Min.:	1	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	1	Change:	At stop

Value Range:

1–4294967295

Description

Defines the numerator of the gear ratio.

Defines the proportional relation between the load shaft displacement designated by the user and the motor shaft displacement.

The relation between motor position feedback (encoder unit) and load shaft position feedback (reference unit) is as follows.

Motor position feedback = Load shaft position feedback x Gear ratio

The relation between the motor speed (RPM) and the load shaft speed (reference unit/s) is as follows:

Motor speed (RPM) = Load shaft speed * 6091h * 60/Encoder resolution

The motor acceleration (RPM/ms) and the load shaft acceleration (reference unit/s²) is in the following relationship:

Motor acceleration (RPM/ms) = Load shaft acceleration * 6091h * 1000 / Encoder resolution / 60

6091.02h Shaft resolution

Hex:	6091-02h	Effective mode:	Real time
Min.:	1	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	1	Change:	At stop

Value Range:

1–4294967295

Description

Defines the denominator of the gear ratio.

6098h Homing method

Hex:	6098h	Effective mode:	Real time

Min.: -3
 Max.: 35
 Default: 1

Unit: -
 Data Type: Int16
 Change: Real-time

Value Range:

-3–35

Description

It selects the homing method.

Table 5–3 Description of homing method

Value	Description
-3	Nearby, Z signal as home
-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
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

Value	Description
14	Reverse, home switch as deceleration point and Z signal on the other side of the home switch signal as home, falling edge on the other side of the home switch signal must be reached before Z signal
17–32	Similar to setpoints 1...14 except that the deceleration point coincide with the home
33	Reverse, Z signal as home
34	Forward, Z signal as home
35	Current position as home
When 6098h is set to 15, 16, 31 or 32, it is meaningless and the servo drive does not perform the homing operation.	

6099.01h Speed during search for switch

Hex:	6099-01h	Effective mode:	Real time
Min.:	0	Unit:	Reference unit/s
Max.:	4294967295	Data Type:	UInt32
Default:	13981013	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

Hex:	6099-02h	Effective mode:	Real time
Min.:	0	Unit:	Reference unit/s
Max.:	4294967295	Data Type:	UInt32
Default:	1398101	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

Hex:	609Ah	Effective mode:	Real time
Min.:	0	Unit:	Reference unit/s ²

Max.: 4294967295

Data Type: UInt32

Default: 1398101333

Change: Real-time

Value Range:

0 to 4294967295

Description

It sets the acceleration during the homing operation.

60B8h**Touch probe function**

Hex: 60B8h

Effective Real time
mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Real-time

Value Range:

0–65535

Description

See the following table for descriptions of each bit of 60B8h.

bit	Name	Description
0	Touch probe 1 function selection 0: Probe 1 disabled 1: Probe 1 enabled	Bit0 to bit5: settings related to 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 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: Latching at positive edge disabled 1: Latching at positive edge enabled	
5	Touch probe 1 negative edge 0: Latching at negative edge disabled 1: Latching at negative edge enabled	
6–7	N/A	-

bit	Name	Description
8	Touch probe 2 function selection 0: Probe 2 disabled 1: Probe 2 enabled	Bit8 to bit13: settings related to 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: Latching at positive edge disabled 1: Latching at positive edge enabled	
13	Touch probe 2 negative edge 0: Latching at negative edge disabled 1: Latching at negative edge enabled	
14–15	N/A	-

60B9h Touch probe status

Hex: 60B9h

Effective -

mode:

Min.: 0

Unit: -

Max.: 65535

Data Type: UInt16

Default: 0

Change: Unchangeable

Value Range:

0–65535

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: Probe 1 disabled 1: Probe 1 enabled	Bit0 to bit2: Status of probe 1
1	Touch probe 1 positive edge value 0: No positive edge value latched 1: Edge value latched	
2	Touch probe 1 negative edge value 0: No negative edge value latched 1: Negative edge value latched	
3–5	N/A	-

bit	Name	Description
6–7	When the function of probe 1 is selected as continuous sampling, the total number of times the probe is triggered	When the function of probe 1 is selected as continuous sampling, the total number of times (0–3) the probe is triggered
8	Probe 2 enable: 0: Probe 2 disabled 1: Probe 2 enabled	Bit8 to bit10: Status of probe 2
9	Touch probe 2 positive edge value 0: No positive edge value latched 1: Edge value latched	
10	Touch probe 2 negative edge value 0: No negative edge value latched 1: Negative edge value latched	
11–13	N/A	-
14–15	When the function of probe 2 is selected as continuous sampling, the total number of times the probe is triggered	When the function of probe 2 is selected as continuous sampling, the total number of times (0–3) the probe is triggered

60BAh**Touch probe 1 positive edge position value**

Hex: 60BAh Effective -
mode:
Min.: -2147483648 Unit: Reference unit
Max.: 2147483647 Data Type: Int32
Default: 0 Change: Unchangeable

Value Range:

-2147483648 to 2147483647

Description

Indicates the position feedback value (reference unit) latched at positive edge of touch probe 1 signal.

60BBh**Touch probe 1 negative edge position value**

Hex: 60BBh Effective -
mode:
Min.: -2147483648 Unit: Reference unit
Max.: 2147483647 Data Type: Int32
Default: 0 Change: Unchangeable

Value Range:

-2147483648 to 2147483647

Description

Indicates the position feedback value (reference unit) latched at negative edge of touch probe 1 signal.

60BCh**Touch probe 2 positive edge position value**

Hex:	60BCh	Effective	-
		mode:	
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to 2147483647

Description

Indicates the position feedback value (reference unit) latched at positive edge of touch probe 2 signal.

60BDh**Touch probe 2 negative edge position value**

Hex:	60BDh	Effective	-
		mode:	
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to 2147483647

Description

Indicates the position feedback value (reference unit) latched at negative edge of touch probe 2 signal.

60C1.01h**Interpolation displacement**

Hex:	60C1-01h	Effective	Real time
		mode:	
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time

Value Range:

-2147483648 to 2147483647

Description

Defines the displacement reference in the interpolation mode.

In interpolation mode, 60C1.01h must be set to synchronize PDO and the transmission type must be set to 1.

The host controller will send a displacement reference to the slave upon every synchronization cycle.

60C2.01h**Interpolation time period**

Hex:	60C2-01h	Effective	Real time
		mode:	

Min.:	1	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	1	Change:	Real-time

Value Range:

1–20

Description

Defines the interpolation time units.

The allowed sync period range is 1 ms to 20 ms. When a value beyond this range is set, the setpoint is used as the sync period.

The synchronization cycle must be set after the servo drive stops running.

60C2.02h Interpolation time units

Hex:	60C2-02h	Effective mode:	Real time
Min.:	-3	Unit:	-
Max.:	-3	Data Type:	Int16
Default:	-3	Change:	Real-time

Value Range:

-3—3

Description

Defines the interpolation period time unit.

The value "-3" indicates the unit ms. Therefore, the actual interpolation period (ms) is the value of 60C2.01h.

60C5h Max. acceleration

Hex:	60C5h	Effective mode:	Real time
Min.:	0	Unit:	Reference unit/s ²
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	Real-time

Value Range:

0 to 4294967295

Description

Defines the maximum permissible acceleration rate of the acceleration segment in the profile position mode, profile velocity mode, and homing mode.

The setpoint 0 will be forcibly changed to 1.

60C6h Max. deceleration

Hex:	60C6h	Effective mode:	Real time
Min.:	0	Unit:	Reference unit/s ²

Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	Real-time

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.

60D5h Touch probe 1 positive edge counter

Hex:	60D5h	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

The counting value is added by "1" each time this object is triggered.

60D6h Touch probe 1 negative edge counter

Hex:	60D6h	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

The counting value is added by "1" each time this object is triggered.

60D7h Touch probe 2 positive edge counter

Hex:	60D7h	Effective	-
		mode:	
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0–65535

Description

The counting value is added by "2" each time this object is triggered.

60D8h	Touch probe 2 negative edge counter		
	Hex:	60D8h	Effective mode: -
	Min.:	0	Unit: -
	Max.:	65535	Data Type: UInt16
	Default:	0	Change: Unchangeable
	Value Range: 0–65535		
60E0h	Positive torque limit		
	Hex:	60E0h	Effective mode: Real time
	Min.:	0	Unit: 0.001
	Max.:	4000	Data Type: UInt16
	Default:	3500	Change: Real-time
	Value Range: 0. to 4000.		
60E1h	Negative torque limit		
	Hex:	60E1h	Effective mode: Real time
	Min.:	0	Unit: 0.001
	Max.:	4000	Data Type: UInt16
	Default:	3500	Change: Real-time
	Value Range: 0. to 4000.		
60F4h	Position deviation		
	Hex:	60F4h	Effective mode: -
	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 reference**

Hex:	60FCh	Effective mode:	-
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648p to 2147483647p

Description

Indicates the position reference (encoder unit).

If no alarm is detected when the S-ON signal is active, the relation between the position reference in reference unit and that in encoder unit is as follows:

$60FCh \text{ (in encoder unit)} = 6062h \text{ (in reference unit)} \times 6091h$

60FDh**DI state**

Hex:	60FDh	Effective mode:	-
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0–4294967295

Description

Indicates current DI logic of the drive.

0: Inactive

1: Active

The signal indicated by each bit is described as follows:

bit	Function
0	Negative limit switch
1	Positive limit switch
2	Home switch
3–15	N/A
16	DI1 Input
17	DI2 Input
18	DI3 Input
19	DI4 Input
20	DI5 Input
21	DI6 Input
22	DI7 Input
23	DI8 Input
24–26	N/A
27	STO1 signal input
28	STO2 signal input
29	EDM output active
30	Z signal active
31	N/A

60FFh

PV target velocity

Hex: 60FFh

Effective Real time

mode:

Min.: -2147483648

Unit: Reference unit/s

Max.: 2147483647

Data Type: Int32

Default: 0

Change: Real-time

Value Range:

–2147483648 to +2147483647

Description

Defines the target speed in the profile velocity mode.

60FE.01h Physical output

Hex: 60FE-01h

Effective Real time

mode:

Min.: 0

Unit: -

Max.: 4294967295

Data Type: UInt32

Default: 0

Change: Real-time

Value Range:

0–4294967295

Description

Indicates the DO logic.

The signal indicated by each bit is described as follows:

bit	Description
0–15	N/A
16	Forced DO1 output (0: OFF; 1: ON) only when function 31 is assigned to DO and bit 16 of 60FE.02h is set to 1
17	Forced DO2 output (0: OFF; 1: ON) only when function 31 is assigned to DO and bit 17 of 60FE.02h is set to 1
18	Forced DO3 output (0: OFF; 1: ON) only when function 31 is assigned to DO and bit 18 of 60FE.02h is set to 1
19	Forced DO4 output (0: OFF; 1: ON) only when function 31 is assigned to DO and bit 19 of 60FE.02h is set to 1
20	Forced DO5 output (0: OFF; 1: ON) only when function 31 is assigned to DO and bit 20 of 60FE.02h is set to 1
21–25	N/A
26	Switched between P and PI for gain switchover only when bit 26 of 60FE.02h is set to 1
27–31	N/A

60FE.02h Bitmask

Hex: 60FE-02h

Effective mode: Real time

Min.: 0

Unit: -

Max.: 4294967295

Data Type: UInt32

Default: 0

Change: Real-time

Value Range:

0–4294967295

Description

bit	Description
0–15	N/A
16	DO1 forced output enabled
17	DO2 forced output enabled
18	DO3 forced output enabled
19	DO4 forced output enabled
20	DO5 forced output enabled
21–25	N/A
26	Switchover between P and PI (gain switchover) enabled
27–31	N/A

6 Parameter List

The mapping relation between the parameter displayed in the software (in decimal) and the object dictionary operated by the host controller (in hexadecimal, "Index" and "Sub-index") is as follows.

Object dictionary index = 0x2000 + Parameter group number

Object dictionary sub-index = Hexadecimal offset within the parameter group + 1
For example:

Panel Display	Object dictionary operated by the host controller
H02.15	2002.10h

Note

The following section only describes the display and parameter settings in the software (in decimal), which are different from those displayed in the software of the host controller (in hexadecimal). Make necessary value conversions during use.

6.1 H00 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H00.00	2000-01h	Motor SN	0–65535	14101	-	At stop	"H00_en.00" on page 223
H00.02	2000-03h	Customized No.	0.00–42949672.95	0.00	-	Unchangeable	"H00_en.02" on page 223
H00.04	2000-05h	Encoder version	0.0–6553.5	0.0	-	Unchangeable	"H00_en.04" on page 223
H00.05	2000-06h	Serial-type motor code	0–65535	0	-	Unchangeable	"H00_en.05" on page 224
H00.06	2000-07h	FPGA customized SN	0.00–655.35	0.00	-	Unchangeable	"H00_en.06" on page 224
H00.07	2000-08h	STO version	0.00–655.35	0.00	-	Unchangeable	"H00_en.07" on page 224
H00.08	2000-09h	Bus encoder type	0–65535	0	-	At stop	"H00_en.08" on page 224

6.2 H01 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H01.00	2001-01h	MCU software version	0.0–6553.5	0.0	-	Unchangeable	"H01_en.00" on page 225
H01.01	2001-02h	FPGA software version	0.0–6553.5	0.0	-	Unchangeable	"H01_en.01" on page 225
H01.02	2001-03h	Servo drive series No.	0–65535	0	-	Unchangeable	"H01_en.02" on page 225
H01.06	2001-07h	Board software version	0.0–6553.5	0.0	-	Unchangeable	"H01_en.06" on page 226
H01.10	2001-0Bh	Drive series No.	104: 6R5 105: 012 106: 023	106	-	At stop	"H01_en.10" on page 226
H01.11	2001-0Ch	DC-AC voltage class	0 V to 65535 V	48	V	Unchangeable	"H01_en.11" on page 226
H01.12	2001-0Dh	Drive rated power	0.00 kW–10737418.24kW	0.75	kW	Unchangeable	"H01_en.12" on page 226
H01.14	2001-0Fh	Max. output power of the drive	0.00 kW–10737418.24kW	0.75	kW	Unchangeable	"H01_en.14" on page 227
H01.16	2001-11h	Rated output current of the drive	0.00A–10737418.24A	23.00	A	Unchangeable	"H01_en.16" on page 227
H01.18	2001-13h	Max. output current of the drive	0.00A–10737418.24A	62.00	A	Unchangeable	"H01_en.18" on page 227
H01.40	2001-29h	DC bus overvoltage protection threshold	0 V to 80 V	64	V	Real-time	"H01_en.40" on page 227
H01.43	2001-2Ch	Power supply unit SN	101: 24 V 102: 48 V 103: 72 V	102	-	At stop	"H01_en.43" on page 228
H01.63	2001-40h	Drive derating coefficient	0.0% to 200.0%	100.0	%	Real-time	"H01_en.63" on page 228
H01.75	2001-4Ch	Current loop amplification factor	0.00–655.35	1.00	-	Real-time	"H01_en.75" on page 228

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H01.88	2001-59h	Junction temperature parameter version	0.0–6553.5	0.0	-	Unchangeable	"H01_en.88" on page 229
H01.89	2001-5Ah	Junction temperature parameter version 2	0–65535	0	-	Unchangeable	"H01_en.89" on page 229
H01.91	2001-5Ch	Mask of other motor parameters	0–65535	0	-	At stop	"H01_en.91" on page 229

6.3 H02 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H02.00	2002-01h	Control mode	0: Speed control mode 1: Position control mode 2: Torque control mode 3: Torque/Speed control mode 4: Speed/Position control mode 5: Torque/Position control mode 6: Torque/Speed/Position compound mode 7: Process segment 8: CANOpen mode	8	-	At stop	"H02_en.00" on page 230
H02.01	2002-02h	Absolute system selection	0: Incremental mode 1: Absolute position linear mode 2: Absolute position rotation mode 3: Absolute position linear mode (without encoder overflow alarm) 4: Absolute position single-turn mode	0	-	At stop	"H02_en.01" on page 230
H02.02	2002-03h	Rotation direction selection	0: Counterclockwise (CCW) as forward direction 1: Clockwise (CW) as forward direction	0	-	At stop	"H02_en.02" on page 231

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H02.05	2002-06h	Stop mode at S-ON OFF	0: Coast to stop, keeping de-energized state 1: (HM) Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized status	1	-	Real-time	"H02_en.05" on page 231
H02.06	2002-07h	Stop mode at No. 2 fault	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	2	-	Real-time	"H02_en.06" on page 232
H02.07	2002-08h	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: Stop based on ramp, keeping de-energized state 4: Stop based on ramp, keeping position lock state 7: Not responding to overtravel	4	-	At stop	"H02_en.07" on page 232
H02.08	2002-09h	Stop mode at No.1 fault	0: Coast to stop, keeping the de-energized state 1: Stop upon electromagnetic shorting, keeping the de-energized state	1	-	At stop	"H02_en.08" on page 233
H02.09	2002-0Ah	Delay from brake output ON to command received	0 ms–500 ms	250	ms	Real-time	"H02_en.09" on page 233
H02.10	2002-0Bh	Delay from brake output OFF to motor de-energized	50 ms–1000 ms	150	ms	Real-time	"H02_en.10" on page 233
H02.11	2002-0Ch	Motor speed threshold at brake output OFF in rotation state	20 rpm to 3000 rpm	30	rpm	Real-time	"H02_en.11" on page 233

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H02.12	2002-0Dh	Delay from S-ON OFF to brake output OFF in rotation state	1 ms–65535 ms	500	ms	Real-time	"H02_en.12" on page 234
H02.18	2002-13h	Quick stop mode	0: Coast to stop, keeping de-energized state 1: Stop by ramp 1, keeping de-energized state 2: Stop by ramp 2, keeping de-energized state 3: Stop at emergency stop torque, keeping de-energized state 5: Stop by ramp 1, keeping position lock state 6: Stop by ramp 2, keeping position lock state 7: Stop at emergency stop torque, keeping position lock state	2	-	Real-time	"H02_en.18" on page 234
H02.21	2002-16h	Permissible minimum resistance of braking resistor	1Ω to 1000Ω	10	Ω	Unchangeable	"H02_en.21" on page 234
H02.24	2002-19h	Resistor heat dissipation coefficient	10% to 100%	30	%	Real-time	"H02_en.24" on page 235
H02.25	2002-1Ah	Braking resistor type	1: External resistor, naturally ventilated 2: External resistor, forced cooling 3: Internal capacitor	3	-	Real-time	"H02_en.25" on page 235
H02.26	2002-1Bh	Power of external braking resistor	1 W–65535W	40	W	Real-time	"H02_en.26" on page 236
H02.27	2002-1Ch	Resistance of external braking resistor	10Ω to 1000Ω	50	Ω	Real-time	"H02_en.27" on page 236
H02.31	2002-20h	System parameter initialization	0: No operation 1: Restore default settings 2: Clear fault records	0	-	At stop	"H02_en.31" on page 236
H02.36	2002-25h	Ramp-to-stop delay	0 ms–65535 ms	1000	ms	At stop	"H02_en.36" on page 236

Parameter List

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H02.38	2002-27h	Overload time of external resistor	0s to 200s	20	s	Real-time	"H02_en.38" on page 237
H02.41	2002-2Ah	Manufacturer password	0–65535	0	-	Real-time	"H02_en.41" on page 237
H02.47	2002-30h	Delay time from power cable breakage to brake OFF	0 ms–1000 ms	10	ms	Real-time	"H02_en.47" on page 237

6.4 H03 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H03.00	2003-01h	DI function allocation 1 (activated upon power-on)	0: Corresponding to null 1: Corresponding to FunIN.1 2: Corresponding to FunIN.2 4: Corresponding to FunIN.3 8: Corresponding to FunIN.4 16: Corresponding to FunIN.5 32: Corresponding to FunIN.6 64: Corresponding to FunIN.7 128: Corresponding to FunIN.8 256: Corresponding to FunIN.9 512: Corresponding to FunIN.10 1024: Corresponding to FunIN.11 2048: Corresponding to FunIN.12 4096: Corresponding to FunIN.13 8192: Corresponding to FunIN.14 16384: Corresponding to FunIN.15 32768: Corresponding to FunIN.16	0	-	Real-time	"H03_en.00" on page 238
H03.01	2003-02h	DI function allocation 2 (activated upon power-on)	0: Corresponding to null 1: Corresponding to FunIN.17 2: Corresponding to FunIN.18 4: Corresponding to FunIN.19 8: Corresponding to FunIN.20 128: Corresponding to FunIN.24 256: Corresponding to FunIN.25 512: Corresponding to FunIN.26 1024: Corresponding to FunIN.27 2048: Corresponding to FunIN.28 4096: Corresponding to FunIN.29 16384: Corresponding to FunIN.31 32768: Corresponding to FunIN.32	0	-	Real-time	"H03_en.01" on page 238

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H03.02	2003-03h	DI1 function	See " H03_en.02 " on page 239 for details.	14	-	Real-time	" H03_en.02 " on page 239
H03.03	2003-04h	DI1 logic selection	0: Normally open 1: Closed	0	-	Real-time	" H03_en.03 " on page 241
H03.04	2003-05h	DI2 function	See H03.02.	15	-	Real-time	" H03_en.04 " on page 241
H03.05	2003-06h	DI2 logic selection	0: Normally open 1: Closed	0	-	Real-time	" H03_en.05 " on page 241
H03.06	2003-07h	DI3 function	See H03.02.	13	-	Real-time	" H03_en.06 " on page 241
H03.07	2003-08h	DI3 logic selection	0: Normally open 1: Closed	0	-	Real-time	" H03_en.07 " on page 242
H03.08	2003-09h	DI4 function	See H03.02.	2	-	Real-time	" H03_en.08 " on page 242
H03.09	2003-0Ah	DI4 logic selection	0: Normally open 1: Closed	0	-	Real-time	" H03_en.09 " on page 242
H03.34	2003-23h	DI function allocation 3 (activated upon power-on)	0: Corresponding to null 1: Corresponding to FunIN.33 2: Corresponding to FunIN.34 4: Corresponding to FunIN.35 8: Corresponding to FunIN.36 16: Corresponding to FunIN.37 32: Corresponding to FunIN.38 64: Corresponding to FunIN.39 128: Corresponding to FunIN.40 256: Corresponding to FunIN.41 512: Corresponding to FunIN.42 1024: Corresponding to FunIN.43 2048: Corresponding to FunIN.44 4096: Corresponding to FunIN.45 8192: Corresponding to FunIN.46 16384: Corresponding to FunIN.47 32768: Corresponding to FunIN.48	0	-	Real-time	" H03_en.34 " on page 242

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H03.35	2003-24h	DI function allocation 4 (activated upon power-on)	0: Corresponding to null 1: Corresponding to FunIN.49 2: Corresponding to FunIN.50 4: Corresponding to FunIN.51 8: Corresponding to FunIN.52 16: Corresponding to FunIN.53 32: Corresponding to FunIN.54 64: Corresponding to FunIN.55 128: Corresponding to FunIN.56 256: Corresponding to FunIN.57 512: Corresponding to FunIN.58 1024: Corresponding to FunIN.59 2048: Corresponding to FunIN.60 4096: Corresponding to FunIN.61 8192: Corresponding to FunIN.62 16384: Corresponding to FunIN.63	0	-	Real-time	"H03_en.35" on page 243
H03.60	2003-3Dh	DI1 fitter time	0.00 ms–500.00 ms	3.00	ms	Real-time	"H03_en.60" on page 244
H03.61	2003-3Eh	DI2 fitter time	0.00 ms–500.00 ms	3.00	ms	Real-time	"H03_en.61" on page 244
H03.62	2003-3Fh	DI3 fitter time	0.00 ms–500.00 ms	3.00	ms	Real-time	"H03_en.62" on page 245
H03.63	2003-40h	DI4 fitter time	0.00 ms–500.00 ms	3.00	ms	Real-time	"H03_en.63" on page 245

6.5 H04 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H04.00	2004-01h	DO1 function	0: No assignment 1: Servo ready 2: Motor rotation 3: Zero speed 4: Speed matching 5: Positioning completed 6: Proximity 7: Torque limited 8: Speed limited 10: Warning 11: Fault 15: Interrupt positioning completed 16: Homing completed 17: Electrical homing completed 18: Torque reach 19: Speed reach 21: Enable completed 22: Internal command completed 23: Writing next command allowed 24: Internal motion completed 30: Alarm or fault output 31: Communication forced DO 32: EDM output	1	-	Real-time	"H04_en.00" on page 245
H04.01	2004-02h	DO1 logic selection	0: Normally open 1: Closed	0	-	Real-time	"H04_en.01" on page 246
H04.02	2004-03h	DO2 function	See H04.00.	5	-	Real-time	"H04_en.02" on page 246
H04.03	2004-04h	DO2 logic selection	0: Normally open 1: Closed	0	-	Real-time	"H04_en.03" on page 247
H04.04	2004-05h	DO3 function	9: Braking	9	-	Real-time	"H04_en.04" on page 247
H04.05	2004-06h	DO3 logic selection	0: Normally open 1: Closed	0	-	Real-time	"H04_en.05" on page 247

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H04.22	2004-17h	DO source selection	bit0: DO1 0: DO1 function output 1: Communication bit1: DO2 0: DO2 function output 1: Communication bit2: DO3 0: DO3 function output 1: Communication	0	-	Real-time	"H04_en.22" on page 248
H04.23	2004-18h	Communication-forced DO logic in non-OP status	Bit0: DO1 0: Status unchanged 1: No output bit1: DO2 0: Status unchanged 1: No output bit2: DO3 0: Status unchanged 1: No output	0	-	Real-time	"H04_en.23" on page 249

6.6 H05 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H05.00	2005-01h	Primary position reference source	2: Multi-position reference	2	-	Real-time	"H05_en.00" on page 250
H05.02	2005-03h	Pulses per revolution	0 PPR to 4294967295 PPR	0	PPR	At stop	"H05_en.02" on page 250
H05.04	2005-05h	First-order low-pass filter time constant	0.0 ms–6553.5 ms	0.0	ms	At stop	"H05_en.04" on page 250
H05.06	2005-07h	Moving average filter time constant 1	0.0 ms–128.0 ms	30.0	ms	At stop	"H05_en.06" on page 251
H05.07	2005-08h	Electronic gear ratio 1 (numerator)	1–1073741824	1	-	Real-time	"H05_en.07" on page 252
H05.09	2005-0Ah	Electronic gear ratio 1 (denominator)	1–1073741824	1	-	Real-time	"H05_en.09" on page 252

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H05.11	2005-0Ch	Electronic gear ratio 2 (numerator)	1–1073741824	1	-	Real-time	"H05_en.11" on page 252
H05.13	2005-0Eh	Electronic gear ratio 2 (denominator)	1–1073741824	1	-	Real-time	"H05_en.13" on page 252
H05.16	2005-11h	Clear action	0: Position deviation cleared upon S-OFF or non-RUN state 1: Position deviation cleared upon fault or non-RUN state 2: Position deviation cleared upon active DI function 35 or non-RUN state	0	-	At stop	"H05_en.16" on page 253
H05.19	2005-14h	Speed feedforward control	0: No speed feedforward 1: Internal speed feedforward 3: Zero phase	1	-	At stop	"H05_en.19" on page 253

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H05.20	2005-15h	Condition for positioning completed signal output	0: Abs. position deviation below H05.21 1: Abs. position deviation below H05.21, and filtered position reference is 0 2: Abs. position deviation below H05.21, and unfiltered position reference is 0 3: Abs. position deviation is kept below H05.21 within the time defined by H05.60 and filtered position reference is 0 4: Abs. position deviation is kept below H05.21 within the time defined by H05.60 and filtered position reference is 0 5: Abs. position deviation is below H05.21, zero speed signal is active, and unfiltered position reference is 0 6: Abs. position deviation is below H05.21, zero speed signal is active, and filtered position reference is 0 7: COIN signal judged after the position reference is changed from available to unavailable before filtering and is kept active for the period defined by H05.60, unfiltered position reference is 0, and position deviation is smaller than H05.21 8: COIN signal judged after the position reference is changed from available to unavailable after filtering and is kept active for the period defined by H05.60, filtered position reference is 0, and position deviation is smaller than H05.21	0	-	Real-time	"H05_en.20" on page 253

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H05.20	2005-15h	Condition for positioning completed signal output	9: COIN signal judged after the position reference is changed from available to unavailable before filtering, with the position deviation kept lower than H05.21 for the period defined by H05.60 or unfiltered position reference being 0 10: COIN signal judged after the position reference is changed from available to unavailable after filtering, with the position deviation kept lower than H05.21 for the period defined by H05.60 or filtered position reference being 0	0	-	Real-time	"H05_en.20" on page 253
H05.21	2005-16h	Threshold of positioning completed	1 to 65535	5872	Encoder unit	Real-time	"H05_en.21" on page 254
H05.22	2005-17h	Proximity threshold	1 to 65535	65535	Encoder unit	Real-time	"H05_en.22" on page 255
H05.24	2005-19h	Interrupt positioning displacement	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H05_en.24" on page 255
H05.26	2005-1Bh	Constant operating speed in interrupt positioning	0 rpm to 10000 rpm	200	rpm	Real-time	"H05_en.26" on page 255
H05.27	2005-1Ch	Acc./Dec. time of interrupt positioning	0 ms–65535 ms	10	ms	Real-time	"H05_en.27" on page 255
H05.29	2005-1Eh	Interruption fixed length unlock	0: Disabled 1: Enabled	1	-	Real-time	"H05_en.29" on page 256

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H05.30	2005-1Fh	Homing enable selection	0: Disabled 1: Homing enabled through the HomingStart signal input from DI 2: Electrical homing enabled through the HomingStart signal input from DI 3: Homing started immediately upon power-on 4: Homing executed immediately 5: Electrical homing started 6: Current position as home 8: D-triggered position as home	0	-	Real-time	"H05_en.30" on page 256

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H05.31	2005-20h	Homing mode	0: Forward, home switch as deceleration point and home 1: Reverse, home switch as deceleration point and home 2: Forward, Z signal as deceleration point and home 3: Reverse, motor Z signal as deceleration point and home 4: Forward, home switch as deceleration point and Z signal as home 5: Reverse, home switch as deceleration point and Z signal as home 6: Forward, positive limit switch as deceleration point and home 7: Reverse, negative limit switch as deceleration point and home 8: Forward, positive limit switch as deceleration point and Z signal as home 9: Reverse, negative limit switch as deceleration point and Z signal as home 10: Forward, mechanical limit position as deceleration point and home 11: Reverse, mechanical limit position as deceleration point and home 12: Forward, mechanical limit position as deceleration point and Z signal as home 13: Reverse, mechanical limit position as deceleration point and Z signal as home 14: Forward single-turn homing 15: Reverse single-turn homing 16: Nearby single-turn homing	0	-	Real-time	"H05_en.31" on page 256
H05.32	2005-21h	Speed of high-speed search for home switch signal	0 RPM to 3000 RPM	100	rpm	Real-time	"H05_en.32" on page 257

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H05.33	2005-22h	Speed of low-speed search for home switch signal	0 rpm to 1000 rpm	10	rpm	Real-time	"H05_en.33" on page 257
H05.34	2005-23h	Acceleration/Deceleration time during homing	0 ms–1000 ms	1000	ms	Real-time	"H05_en.34" on page 258
H05.35	2005-24h	Home search time limit	0–65535	10000	-	Real-time	"H05_en.35" on page 258
H05.36	2005-25h	Mechanical home offset	-2147483648 to 2147483647	0	Reference unit	Real-time	"H05_en.36" on page 258
H05.39	2005-28h	Electronic gear ratio switchover condition	0: Switchover after position reference is kept 0 for 2.5 ms 1: Switched in real time	0	-	At stop	"H05_en.39" on page 259
H05.40	2005-29h	Mechanical home offset and action upon overtravel	0: H05.36 as the coordinate after homing, reverse homing applied after homing triggered again on overtravel 1: H05.36 as the relative offset after homing, reverse homing applied after homing triggered again on overtravel 2: H05.36 as the coordinate after homing, reverse homing auto-applied on overtravel 3: H05.36 as the relative offset after homing, reverse homing auto-applied on overtravel	0	-	Real-time	"H05_en.40" on page 259
H05.50	2005-33h	Mechanical gear ratio in absolute position rotation mode (numerator)	1–65535	1	-	At stop	"H05_en.50" on page 259
H05.51	2005-34h	Mechanical gear ratio in absolute position rotation mode (denominator)	1–65535	1	-	At stop	"H05_en.51" on page 260

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H05.52	2005-35h	Pulses per revolution of the load in absolute position rotation mode (low 32 bits)	0 to 4294967295	0	Encoder unit	At stop	"H05_en.52" on page 260
H05.54	2005-37h	Pulses per revolution of the load in absolute position rotation mode (high 32 bits)	0 to 4294967295	0	Encoder unit	At stop	"H05_en.54" on page 260
H05.56	2005-39h	Mechanical limit speed threshold	0–1000	2	-	Real-time	"H05_en.56" on page 260
H05.57	2005-3Ah	Mechanical limit times threshold	0–65535	20	-	Real-time	"H05_en.57" on page 261
H05.58	2005-3Bh	Torque threshold in homing upon hit-and-stop	0.0% to 400.0%	100.0	%	Real-time	"H05_en.58" on page 261
H05.59	2005-3Ch	Positioning window time	0 ms–30000 ms	0	ms	Real-time	"H05_en.59" on page 261
H05.60	2005-3Dh	Hold time of positioning completed	0 ms–30000 ms	0	ms	Real-time	"H05_en.60" on page 262
H05.66	2005-43h	Homing time unit	0: 1 ms 1: 10 ms 2: 100 ms	2	-	At stop	"H05_en.66" on page 262
H05.67	2005-44h	Offset between zero point and single-turn absolute position	-2147483648 to 2147483647	0	Encoder unit	At stop	"H05_en.67" on page 262
H05.70	2005-47h	Moving average filter time constant 2	0.0 ms–1000.0 ms	0.0	ms	At stop	"H05_en.70" on page 263
H05.71	2005-48h	Motor Z signal width	1 ms–100 ms	4	ms	Real-time	"H05_en.71" on page 263

6.7 H06 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H06.00	2006-01h	Source of main speed reference A	0: Digital setting (H06.03)	0	-	At stop	"H06_en.00" on page 263
H06.01	2006-02h	Source of auxiliary speed reference B	0: Digital setting (H06.03) 5: Multi-speed reference	0	-	At stop	"H06_en.01" on page 263
H06.02	2006-03h	Speed reference source	0: Source of main speed reference A 1: Source of auxiliary speed reference B 2: A+B 3: Switched between A and B 4: Communication	0	-	At stop	"H06_en.02" on page 264
H06.03	2006-04h	Speed reference set through keypad	-10000 rpm to +10000 rpm	200	rpm	Real-time	"H06_en.03" on page 265
H06.04	2006-05h	DI jog speed reference	0 rpm to 10000 rpm	150	rpm	Real-time	"H06_en.04" on page 265
H06.05	2006-06h	Acc. ramp time of speed reference	0 ms–65535 ms	0	ms	Real-time	"H06_en.05" on page 265
H06.06	2006-07h	Dec. ramp time of speed reference	0 ms–65535 ms	0	ms	Real-time	"H06_en.06" on page 266
H06.07	2006-08h	Maximum speed limit	0 rpm to 10000 rpm	7000	rpm	Real-time	"H06_en.07" on page 266
H06.08	2006-09h	Forward speed threshold	0 rpm to 10000 rpm	7000	rpm	Real-time	"H06_en.08" on page 266
H06.09	2006-0Ah	Reverse speed threshold	0 rpm to 10000 rpm	7000	rpm	Real-time	"H06_en.09" on page 266
H06.10	2006-0Bh	Deceleration unit in emergency stop	0: Multiplied by 1 1: Multiplied by 10 2: Multiplied by 100	0	-	At stop	"H06_en.10" on page 267
H06.11	2006-0Ch	Torque feedforward control	0: No torque feedforward 1: Internal torque feedforward	1	-	Real-time	"H06_en.11" on page 267
H06.12	2006-0Dh	Acceleration ramp time of jog speed	0 ms–65535 ms	10	ms	Real-time	"H06_en.12" on page 267

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H06.13	2006-0Eh	Speed feedforward smoothing filter	0us to 65535us	0	us	Real-time	"H06_en.13" on page 268
H06.15	2006-10h	Zero clamp speed threshold	0 rpm to 10000 rpm	10	rpm	Real-time	"H06_en.15" on page 268
H06.16	2006-11h	Threshold of TGON (motor rotation) signal	0 rpm to 1000 rpm	20	rpm	Real-time	"H06_en.16" on page 268
H06.17	2006-12h	Threshold of V-Cmp (speed matching) signal	0 RPM –100 RPM	10	rpm	Real-time	"H06_en.17" on page 268
H06.18	2006-13h	Threshold of speed reach signal	20 rpm to 10000 rpm	1000	rpm	Real-time	"H06_en.18" on page 269
H06.19	2006-14h	Threshold of zero speed output signal	1 rpm to 10000 rpm	10	rpm	Real-time	"H06_en.19" on page 269
H06.20	2006-15h	Number of torque ripple auto-tuning cycles	1–30	4	-	Real-time	"H06_en.20" on page 269
H06.40	2006-29h	Ramp 1 deceleration time	0 ms–65535 ms	0	ms	Real-time	"H06_en.40" on page 270
H06.41	2006-2Ah	Ramp 2 deceleration time	0 ms–65535 ms	0	ms	Real-time	"H06_en.41" on page 270
H06.50	2006-33h	Speed S-curve enable switch	0: Disabled 1: Enabled	1	-	At stop	"H06_en.50" on page 270
H06.51	2006-34h	Increasing acceleration 1 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	"H06_en.51" on page 270
H06.52	2006-35h	Decreasing acceleration 1 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	"H06_en.52" on page 271

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H06.53	2006-36h	Decreasing deceleration 1 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.53" on page 271
H06.54	2006-37h	Decreasing acceleration 1 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.54" on page 271
H06.55	2006-38h	Increasing acceleration 2 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.55" on page 272
H06.56	2006-39h	Decreasing acceleration 2 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.56" on page 272
H06.57	2006-3Ah	Decreasing deceleration 2 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.57" on page 272
H06.58	2006-3Bh	Decreasing acceleration 2 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.58" on page 273
H06.59	2006-3Ch	Increasing acceleration 3 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.59" on page 273

Parameter List

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H06.60	2006-3Dh	Decreasing acceleration 3 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.60" on page 273
H06.61	2006-3Eh	Decreasing deceleration 3 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.61" on page 274
H06.62	2006-3Fh	Decreasing acceleration 3 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.62" on page 274
H06.63	2006-40h	Increasing acceleration 4 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.63" on page 274
H06.64	2006-41h	Decreasing acceleration 4 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.64" on page 275
H06.65	2006-42h	Decreasing deceleration 4 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.65" on page 275
H06.66	2006-43h	Decreasing acceleration 4 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.66" on page 275

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H06.67	2006-44h	Increasing acceleration 5 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.67" on page 276
H06.68	2006-45h	Decreasing acceleration 5 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.68" on page 276
H06.69	2006-46h	Decreasing deceleration 5 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.69" on page 276
H06.70	2006-47h	Decreasing acceleration 5 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.70" on page 277
H06.71	2006-48h	Increasing acceleration 6 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.71" on page 277
H06.72	2006-49h	Decreasing acceleration 6 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.72" on page 277
H06.73	2006-4Ah	Decreasing deceleration 6 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.73" on page 278

Parameter List

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H06.74	2006-4Bh	Decreasing acceleration 6 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.74" on page 278
H06.75	2006-4Ch	Increasing acceleration 7 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.75" on page 278
H06.76	2006-4Dh	Decreasing acceleration 7 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.76" on page 279
H06.77	2006-4Eh	Decreasing deceleration 7 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.77" on page 279
H06.78	2006-4Fh	Decreasing acceleration 7 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.78" on page 279
H06.79	2006-50h	Increasing acceleration 8 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.79" on page 280
H06.80	2006-51h	Decreasing acceleration 8 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06_en.80" on page 280

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H06.81	2006-52h	Decreasing deceleration 8 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	"H06_en.81" on page 280
H06.82	2006-53h	Decreasing acceleration 8 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	"H06_en.82" on page 281

6.8 H07 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H07.00	2007-01h	Source of main torque reference A	0: Keypad (H07.03)	0	-	At stop	"H07_en.00" on page 281
H07.01	2007-02h	Source of auxiliary torque reference B	0: Keypad (H07.03)	0	-	At stop	"H07_en.01" on page 281
H07.02	2007-03h	Torque reference source	0: Source of main torque reference A 1: Source of auxiliary torque reference B 2: Source of A+B 3: Switched between A and B 4: Communication	0	-	At stop	"H07_en.02" on page 282
H07.03	2007-04h	Torque reference set through keypad	-400.0% to 400.0%	0.0	%	Real-time	"H07_en.03" on page 282
H07.05	2007-06h	Torque reference filter time constant 1	0.00 ms–30.00 ms	0.50	ms	Real-time	"H07_en.05" on page 283
H07.06	2007-07h	Torque reference filter time constant 2	0.00 ms–30.00 ms	0.27	ms	Real-time	"H07_en.06" on page 283

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H07.07	2007-08h	Torque Limit source	0: Positive/Negative internal torque limit 1: Internal or external limit as selected by DI	0	-	Real-time	"H07_en.07" on page 283
H07.09	2007-0Ah	Positive internal torque limit	0.0% to 400.0%	350.0	%	Real-time	"H07_en.09" on page 283
H07.10	2007-0Bh	Negative internal torque limit	0.0% to 400.0%	350.0	%	Real-time	"H07_en.10" on page 284
H07.11	2007-0Ch	Positive external torque limit	0.0% to 400.0%	350.0	%	Real-time	"H07_en.11" on page 284
H07.12	2007-0Dh	Negative external torque limit	0.0% to 400.0%	350.0	%	Real-time	"H07_en.12" on page 284
H07.15	2007-10h	Emergency-stop torque	0.0% to 400.0%	100.0	%	Real-time	"H07_en.15" on page 285
H07.17	2007-12h	Speed limit source	0: Internal speed limit 1: V-LMT 2: H07.19 or H07.20 as defined by DI	0	-	Real-time	"H07_en.17" on page 285
H07.19	2007-14h	Positive speed limit/Speed limit 1 in torque control	0 rpm to 10000 rpm	3000	rpm	Real-time	"H07_en.19" on page 285
H07.20	2007-15h	Negative speed limit/Speed limit 2 in torque control	0 rpm to 10000 rpm	3000	rpm	Real-time	"H07_en.20" on page 285
H07.21	2007-16h	Torque reach base value	0.0% to 400.0%	0.0	%	Real-time	"H07_en.21" on page 286
H07.22	2007-17h	Torque reach valid value	0.0% to 400.0%	20.0	%	Real-time	"H07_en.22" on page 286
H07.23	2007-18h	Torque reach invalid value	0.0% to 400.0%	10.0	%	Real-time	"H07_en.23" on page 286
H07.24	2007-19h	Field weakening depth	60% to 115%	115	%	Real-time	"H07_en.24" on page 286
H07.25	2007-1Ah	Max. permissible demagnetizing current	0% to 300%	150	%	Real-time	"H07_en.25" on page 287

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H07.26	2007-1Bh	Field weakening selection	0: Disabled 1: Enabled	1	-	At stop	"H07_en.26" on page 287
H07.27	2007-1Ch	Flux weakening gain	0.001 Hz–1.000 Hz	0.030	Hz	Real-time	"H07_en.27" on page 287
H07.28	2007-1Dh	Speed of flux weakening point	0–65535	0	-	Unchangeable	"H07_en.28" on page 288
H07.35	2007-24h	Torque non-standard feature enable	bit0: Motor output correction enable bit1: Shield compensation data enable	0	-	At stop	"H07_en.35" on page 288
H07.36	2007-25h	Time constant of low-pass filter 2	0.00 ms–10.00 ms	0.00	ms	Real-time	"H07_en.36" on page 288
H07.37	2007-26h	Torque reference filter selection	0: First-order filter 1: Biquad filter	0	-	Real-time	"H07_en.37" on page 288
H07.38	2007-27h	Biquad filter attenuation ratio	0–50	16	-	Real-time	"H07_en.38" on page 289
H07.40	2007-29h	Speed limit threshold in torque control mode	0 ms–300 ms	10	ms	Real-time	"H07_en.40" on page 289

6.9 H08 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H08.00	2008-01h	Speed loop gain	0.1 Hz–2000.0 Hz	40.0	Hz	Real-time	"H08_en.00" on page 289
H08.01	2008-02h	Speed loop integral time constant	0.15 ms–512.00 ms	19.89	ms	Real-time	"H08_en.01" on page 290
H08.02	2008-03h	Position loop gain	0.1 Hz–2000.0 Hz	64.0	Hz	Real-time	"H08_en.02" on page 290
H08.03	2008-04h	2nd speed loop gain	0.1 Hz–2000.0 Hz	75.0	Hz	Real-time	"H08_en.03" on page 290
H08.04	2008-05h	2nd speed loop integral time constant	0.15 ms–512.00 ms	10.61	ms	Real-time	"H08_en.04" on page 291

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H08.05	2008-06h	2nd position loop gain	0.1 Hz–2000.0 Hz	120.0	Hz	Real-time	"H08_en.05" on page 291
H08.06	2008-07h	Current gain selection	0–3	0	-	At stop	"H08_en.06" on page 291
H08.08	2008-09h	2nd gain mode setting	0: Fixed to the 1st gain, switched between P and PI as defined by bit26 of external 60FEh 1: Switched between the 1st and 2nd gain sets as defined by H08.09	1	-	Real-time	"H08_en.08" on page 292
H08.09	2008-0Ah	Gain switchover condition	0: Fixed to the 1st gain set (PS) 1: Switched as defined by bit26 of 60FEh 2: Torque reference too large (PS) 3: Speed reference too large (PS) 4: Speed reference change rate too large (PS) 5: Speed reference low/high speed threshold (PS) 6: Position deviation too large (P) 7: Position reference available (P) 8: Positioning unfinished (P) 9: Actual speed (P) 10: Position reference + Actual speed (P)	0	-	Real-time	"H08_en.09" on page 292
H08.10	2008-0Bh	Gain switchover delay	0.0 ms–1000.0 ms	5.0	ms	Real-time	"H08_en.10" on page 294
H08.11	2008-0Ch	Gain switchover level	0–20000	50	-	Real-time	"H08_en.11" on page 294
H08.12	2008-0Dh	Gain switchover hysteresis	0–20000	30	-	Real-time	"H08_en.12" on page 295
H08.13	2008-0Eh	Position gain switchover time	0.0 ms–1000.0 ms	3.0	ms	Real-time	"H08_en.13" on page 295
H08.15	2008-10h	Load moment of inertia ratio	0.00–120.00	1.00	-	Real-time	"H08_en.15" on page 295
H08.17	2008-12h	Zero phase delay	0.0 ms–4.0 ms	0.0	ms	Real-time	"H08_en.17" on page 296

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H08.18	2008-13h	Time constant of speed feedforward filter	0.00 ms–64.00 ms	0.50	ms	Real-time	"H08_en.18" on page 296
H08.19	2008-14h	Speed feedforward gain	0.0% to 100.0%	0.0	%	Real-time	"H08_en.19" on page 296
H08.20	2008-15h	Torque feedforward filter time constant	0.00 ms–64.00 ms	0.50	ms	Real-time	"H08_en.20" on page 297
H08.21	2008-16h	Torque feedforward gain	0.0% to 300.0%	0.0	%	Real-time	"H08_en.21" on page 297
H08.22	2008-17h	Speed feedback filtering option	0: Inhibited 1: 2 times 2: 4 times 3: 8 times 4: 16 times	0	-	At stop	"H08_en.22" on page 298
H08.23	2008-18h	Cutoff frequency of speed feedback low-pass filter	100 Hz–8000 Hz	8000	Hz	Real-time	"H08_en.23" on page 298
H08.24	2008-19h	PDFF control coefficient	0.0% to 200.0%	100.0	%	Real-time	"H08_en.24" on page 298
H08.27	2008-1Ch	Speed observer cutoff frequency	50 Hz–600 Hz	170	Hz	Real-time	"H08_en.27" on page 299
H08.28	2008-1Dh	Speed observer inertia correction coefficient	1% to 1600%	100	%	Real-time	"H08_en.28" on page 299
H08.29	2008-1Eh	Speed observer filter time	0.00 ms–10.00 ms	0.80	ms	Real-time	"H08_en.29" on page 300
H08.31	2008-20h	Disturbance cutoff frequency	1 Hz–4000 Hz	600	Hz	Real-time	"H08_en.31" on page 300
H08.32	2008-21h	Disturbance compensation gain	0% to 100%	0	%	Real-time	"H08_en.32" on page 300
H08.33	2008-22h	Disturbance observer inertia correction coefficient	1% to 1600%	100	%	Real-time	"H08_en.33" on page 300

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H08.37	2008-26h	Phase modulation for medium-frequency jitter suppression 2	-90° to 90°	0	°	Real-time	"H08_en.37" on page 301
H08.38	2008-27h	Medium-frequency suppression 2 frequency	0 Hz–1000 Hz	0	Hz	Real-time	"H08_en.38" on page 301
H08.39	2008-28h	Compensation gain of medium-frequency jitter suppression 2	0% to 300%	0	%	Real-time	"H08_en.39" on page 301
H08.40	2008-29h	Speed observer selection	0: Disabled 1: Enabled	0	-	Real-time	"H08_en.40" on page 302
H08.42	2008-2Bh	Model control selection	0: Disable 1: Enable 2: Dual-inertia model	0	-	Real-time	"H08_en.42" on page 302
H08.43	2008-2Ch	Model gain	0.1–2000.0	40.0	-	Real-time	"H08_en.43" on page 302
H08.46	2008-2Fh	Feedforward value	0.0–102.4	95.0	-	Real-time	"H08_en.46" on page 303
H08.53	2008-36h	Medium- and low-frequency jitter suppression frequency 3	0.0 Hz–300.0 Hz	0.0	Hz	Real-time	"H08_en.53" on page 303
H08.54	2008-37h	Medium- and low-frequency jitter suppression compensation 3	0% to 200%	0	%	Real-time	"H08_en.54" on page 303
H08.56	2008-39h	Medium- and low-frequency jitter suppression phase modulation 3	0% to 600%	100	%	Real-time	"H08_en.56" on page 303
H08.59	2008-3Ch	Medium- and low-frequency jitter suppression frequency 4	0.0 Hz–300.0 Hz	0.0	Hz	Real-time	"H08_en.59" on page 304

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H08.60	2008-3Dh	Medium- and low-frequency jitter suppression compensation 4	0% to 200%	0	%	Real-time	"H08_en.60" on page 304
H08.61	2008-3Eh	Medium- and low-frequency jitter suppression phase modulation 4	0% to 600%	100	%	Real-time	"H08_en.61" on page 304
H08.62	2008-3Fh	Position loop integral time constant	0.15–512.00	512.00	-	Real-time	"H08_en.62" on page 305
H08.63	2008-40h	2nd position loop integral time constant	0.15–512.00	512.00	-	Real-time	"H08_en.63" on page 305
H08.64	2008-41h	Speed observer feedback source	0: Disabled 1: Enabled	0	-	Real-time	"H08_en.64" on page 305
H08.65	2008-42h	Zero deviation control selection	0: Disabled 1: Enabled	0	-	Real-time	"H08_en.65" on page 305
H08.66	2008-43h	Zero deviation control position average filter	0.0 ms–320.0 ms	5.0	ms	Real-time	"H08_en.66" on page 306
H08.68	2008-45h	Speed feedforward of zero deviation control	0.0% to 100.0%	100.0	%	Real-time	"H08_en.68" on page 306
H08.69	2008-46h	Torque feedforward of zero deviation control	0.0% to 100.0%	100.0	%	Real-time	"H08_en.69" on page 306
H08.81	2008-52h	Anti-resonance frequency of dual-inertia model	1.0 Hz–400.0 Hz	20.0	Hz	Real-time	"H08_en.81" on page 307
H08.82	2008-53h	Resonance frequency of dual-inertia model	0.0 Hz–6553.5 Hz	0.0	Hz	Real-time	"H08_en.82" on page 307
H08.83	2008-54h	Dual-inertia model gain	0.1/s to 300.0/s	60.0	1/s	Real-time	"H08_en.83" on page 307

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H08.84	2008-55h	Inertia ratio of dual-inertia model	0.00–120.00	1.00	-	Real-time	"H08_en.84" on page 307
H08.88	2008-59h	Speed feedforward value of dual-inertia model	0.0–6553.5	100.0	-	Real-time	"H08_en.88" on page 308
H08.89	2008-5Ah	Torque feedforward value of dual-inertia model	0.0–6553.5	100.0	-	Real-time	"H08_en.89" on page 308

6.10 H09 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H09.00	2009-01h	Auto-adjustment 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	-	Real-time	"H09_en.00" on page 308
H09.01	2009-02h	Stiffness level selection	0–41	15	-	Real-time	"H09_en.01" on page 309

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H09.02	2009-03h	Adaptive notch mode	0: Adaptive notch no longer updated; 1: One adaptive notch activated (3rd notch) 2: Two adaptive notches activated (3rd and 4th notches) 3: Resonance point tested only (displayed in H09.24) 4: Adaptive notch cleared, values of 3rd and 4th notches restored to default	3	-	Real-time	"H09_en.02" on page 309
H09.03	2009-04h	Online inertia auto-tuning mode	0: Disabled 1: Enabled, changing slowly 2: Enabled, changing normally 3: Enabled, changing quickly	2	-	Real-time	"H09_en.03" on page 310
H09.05	2009-06h	Offline inertia auto-tuning mode	0: Bi-directional 1: Unidirectional	0	-	At stop	"H09_en.05" on page 310
H09.06	2009-07h	Max. speed of inertia auto-tuning	100 RPM to 1000 RPM	500	rpm	At stop	"H09_en.06" on page 310
H09.07	2009-08h	Time constant for accelerating to max. speed during inertia auto-tuning	20 ms–800 ms	125	ms	At stop	"H09_en.07" on page 311
H09.08	2009-09h	Interval time after an individual inertia auto-tuning	50 ms–10000 ms	800	ms	At stop	"H09_en.08" on page 311
H09.09	2009-0Ah	Number of motor revolutions per inertia auto-tuning	0.00–100.00	1.00	-	Real-time	"H09_en.09" on page 311
H09.11	2009-0Ch	Vibration threshold	0.0% to 100.0%	5.0	%	Real-time	"H09_en.11" on page 312
H09.12	2009-0Dh	Frequency of the 1st notch	50 Hz–8000 Hz	8000	Hz	Real-time	"H09_en.12" on page 312
H09.13	2009-0Eh	Width level of the 1st notch	0–20	2	-	Real-time	"H09_en.13" on page 312
H09.14	2009-0Fh	Depth level of the 1st notch	0–99	0	-	Real-time	"H09_en.14" on page 313

Parameter List

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H09.15	2009-10h	Frequency of the 2nd notch	50 Hz–8000 Hz	8000	Hz	Real-time	"H09_en.15" on page 313
H09.16	2009-11h	Width level of the 2nd notch	0–20	2	-	Real-time	"H09_en.16" on page 313
H09.17	2009-12h	Depth level of the 2nd notch	0–99	0	-	Real-time	"H09_en.17" on page 314
H09.18	2009-13h	Frequency of the 3rd notch	50 Hz–8000 Hz	8000	Hz	Real-time	"H09_en.18" on page 314
H09.19	2009-14h	Width level of the 3rd notch	0–20	2	-	Real-time	"H09_en.19" on page 314
H09.20	2009-15h	Depth level of the 3rd notch	0–99	0	-	Real-time	"H09_en.20" on page 314
H09.21	2009-16h	Frequency of the 4th notch	50 Hz–8000 Hz	8000	Hz	Real-time	"H09_en.21" on page 315
H09.22	2009-17h	Width level of the 4th notch	0–20	2	-	Real-time	"H09_en.22" on page 315
H09.23	2009-18h	Depth level of the 4th notch	0–99	0	-	Real-time	"H09_en.23" on page 315
H09.24	2009-19h	Auto-tuned resonance frequency	0 Hz–5000 Hz	0	Hz	Unchangeable	"H09_en.24" on page 315
H09.26	2009-1Bh	ITune response	30.0% to 600.0%	100.0	%	Real-time	"H09_en.26" on page 316
H09.27	2009-1Ch	ITune mode	0: Disabled 1: ITune mode 1 2: ITune mode 2	0	-	At stop	"H09_en.27" on page 316
H09.28	2009-1Dh	Minimum inertia ratio of ITune	0.0% to 80.0%	0.0	%	Real-time	"H09_en.28" on page 316
H09.29	2009-1Eh	Maximum inertia ratio of ITune	1.0% to 120.0%	30.0	%	Real-time	"H09_en.29" on page 317
H09.32	2009-21h	Gravity compensation value	-100.0% to 100.0%	0.0	%	Real-time	"H09_en.32" on page 317
H09.33	2009-22h	Positive friction compensation value	0.0% to 100.0%	0.0	%	Real-time	"H09_en.33" on page 317
H09.34	2009-23h	Negative friction compensation value	-100.0% to 0.0%	0.0	%	Real-time	"H09_en.34" on page 318

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H09.35	2009-24h	Friction compensation speed	0.0–20.0	2.0	-	Real-time	"H09_en.35" on page 318
H09.36	2009-25h	Friction compensation speed	0: Slow mode+Speed reference 1: Slow mode+Model speed 2: Slow mode+Speed feedback 3: Slow mode+Observe speed 16: Quick mode +Speed reference 17: Quick mode +Model speed 18: Quick mode +Speed feedback 19: Quick mode+Observe speed	0	-	Real-time	"H09_en.36" on page 318
H09.37	2009-26h	Vibration monitoring time	0–65535	300	-	Real-time	"H09_en.37" on page 319
H09.38	2009-27h	Frequency of low-frequency resonance suppression 1 at the mechanical end	1.0 Hz–100.0 Hz	100.0	Hz	Real-time	"H09_en.38" on page 319
H09.39	2009-28h	Low-frequency resonance suppression 1 at the mechanical end	0–3	2	-	At stop	"H09_en.39" on page 319
H09.44	2009-2Dh	Frequency of low-frequency resonance suppression 2 at mechanical load end	0.0–100.0	0.0	-	Real-time	"H09_en.44" on page 320
H09.45	2009-2Eh	Responsiveness of low-frequency resonance suppression 2 at mechanical load end	0.01–5.00	1.00	-	Real-time	"H09_en.45" on page 320

Parameter List

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H09.47	2009-30h	Width of low-frequency resonance suppression 2 at mechanical load end	0.00–2.00	1.00	-	Real-time	"H09_en.47" on page 320
H09.49	2009-32h	Frequency of low-frequency resonance suppression 3 at mechanical load end	0.0–100.0	0.0	-	Real-time	"H09_en.49" on page 320
H09.50	2009-33h	Responsiveness of low-frequency resonance suppression 3 at mechanical load end	0.01–5.00	1.00	-	Real-time	"H09_en.50" on page 321
H09.52	2009-35h	Width of low-frequency resonance suppression 3 at mechanical load end	0.00–2.00	1.00	-	Real-time	"H09_en.52" on page 321
H09.54	2009-37h	Vibration threshold	0.0% to 300.0%	50.0	%	Real-time	"H09_en.54" on page 321
H09.56	2009-39h	Max. overshoot allowed by ETune	0–65535	2936	-	Real-time	"H09_en.56" on page 322
H09.57	2009-3Ah	STune resonance suppression switchover frequency	0 Hz–4000 Hz	900	Hz	Real-time	"H09_en.57" on page 322
H09.58	2009-3Bh	STune resonance suppression reset selection	0: Disabled 1: Enabled	0	-	Real-time	"H09_en.58" on page 322
H09.71	2009-48h	Starting frequency	0 Hz–8000 Hz	15	Hz	Real-time	"H09_en.71" on page 322
H09.72	2009-49h	End frequency	0 Hz–8000 Hz	8000	Hz	Real-time	"H09_en.72" on page 323
H09.73	2009-4Ah	Frequency subdivision	0–500	50	-	Real-time	"H09_en.73" on page 323

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H09.74	2009-4Bh	Excitation amplitude	0.0% to 400.0%	15.0	%	Real-time	"H09_en.74" on page 323
H09.75	2009-4Ch	Starting frequency 2	0 Hz–8000 Hz	500	Hz	Real-time	"H09_en.75" on page 324
H09.76	2009-4Dh	Frequency subdivision 2	0–1000	500	-	Real-time	"H09_en.76" on page 324
H09.77	2009-4Eh	Biquard1 mode	0: Disabled 1: First-order low-pass 2: Second-order low-pass 3: Notch 4: Lead-lag 5: User-defined	0	-	Real-time	"H09_en.77" on page 324
H09.78	2009-4Fh	Biquard1 numerator frequency	0 Hz–16000 Hz	8000	Hz	Real-time	"H09_en.78" on page 325
H09.79	2009-50h	Biquard1 numerator damping coefficient	0.001–10.000	1.000	-	Real-time	"H09_en.79" on page 325
H09.80	2009-51h	Biquard1 dominator frequency	0 Hz–16000 Hz	8000	Hz	Real-time	"H09_en.80" on page 325
H09.81	2009-52h	Biquard1 denominator damping coefficient	0.001–10.000	1.000	-	Real-time	"H09_en.81" on page 325

6.11 H0A Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0A.01	200A-02h	Absolute position limit	0: Disabled 1: Enabled 2: Enabled after homing	0	-	Real-time	"H0A_en.01" on page 326
H0A.04	200A-05h	Motor overload protection gain	10–300	100	-	Real-time	"H0A_en.04" on page 326
H0A.08	200A-09h	Overspeed threshold	0rpm to 20000rpm	0	rpm	Real-time	"H0A_en.08" on page 326
H0A.10	200A-0Bh	Threshold of excessive local position deviation	0–4294967295	27486951	-	Real-time	"H0A_en.10" on page 327

Parameter List

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0A.12	200A-0Dh	Runaway protection enable	0: Disable 1: Enable	1	-	Real-time	"H0A_en.12" on page 327
H0A.17	200A-12h	Reference pulse selection	0: Pulse unit 1: Reference unit	1	-	At stop	"H0A_en.17" on page 328
H0A.18	200A-13h	IGBT over-temperature threshold	120°C–175°C	140	°C	Real-time	"H0A_en.18" on page 328
H0A.19	200A-14h	Filter time constant of touch probe 1	0.00us–6.30us	2.00	us	Real-time	"H0A_en.19" on page 328
H0A.20	200A-15h	Filter time constant of touch probe 2	0.00us–6.30us	2.00	us	Real-time	"H0A_en.20" on page 329
H0A.21	200A-16h	STO state display	0–3	0	-	Real-time	"H0A_en.21" on page 329
H0A.23	200A-18h	TZ signal filter time	0 ns–31 ns	15	25ns	At stop	"H0A_en.23" on page 329
H0A.25	200A-1Ah	Speed display DO low-pass filter time	0 ms–5000 ms	0	ms	At stop	"H0A_en.25" on page 329
H0A.26	200A-1Bh	Motor overload detection	0: Show motor overload alarm (E909.0) and fault (E620.0) 1: Hide motor overload alarm (E909.0) and fault (E620.0)	0	-	Real-time	"H0A_en.26" on page 330
H0A.27	200A-1Ch	Average filter time for speed display DO	0 ms–100 ms	50	ms	At stop	"H0A_en.27" on page 330
H0A.32	200A-21h	Time threshold for locked motor overheat protection	10 ms–65535 ms	200	ms	Real-time	"H0A_en.32" on page 330
H0A.33	200A-22h	Locked motor overheat protection	0: Disabled 1: Enabled	1	-	Real-time	"H0A_en.33" on page 331
H0A.36	200A-25h	Encoder multi-turn overflow fault selection	0: Not hide 1: Hide	0	-	Real-time	"H0A_en.36" on page 331
H0A.38	200A-27h	MCU average filter time	0–100	1	-	At stop	"H0A_en.38" on page 331

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0A.40	200A-29h	Compensation function selection	bit0: Overtravel compensation 0: Enabled 1: Disabled bit1: Touch probe rising edge compensation 0: Disabled 1: Enabled bit2: Touch probe falling edge compensation 0: Disabled 1: Enabled bit3: Touch probe edge solution 0: New solution 1: Old solution (same as SV660N)	6	-	At stop	"H0A_en.40" on page 332
H0A.41	200A-2Ah	Forward position of software position limit	-2147483648 to 2147483647	2147483647	Encoder unit	At stop	"H0A_en.41" on page 332
H0A.43	200A-2Ch	Reverse position of software position limit	-2147483648 to 2147483647	-2147483648	Encoder unit	At stop	"H0A_en.43" on page 332
H0A.49	200A-32h	Braking resistor overtemperature threshold	100°C–175°C	140	°C	Real-time	"H0A_en.49" on page 333
H0A.50	200A-33h	Encoder communication fault tolerance threshold	0–31	31	-	Real-time	"H0A_en.50" on page 333
H0A.52	200A-35h	Encoder temperature protection threshold	0°C–175°C	125	°C	Real-time	"H0A_en.52" on page 333
H0A.53	200A-36h	Probe DI ON compensation time	-3000 ns–3000 ns	200	25ns	Real-time	"H0A_en.53" on page 334
H0A.54	200A-37h	Probe DI OFF compensation time	-3000 ns–3000 ns	1512	25ns	Real-time	"H0A_en.54" on page 334
H0A.55	200A-38h	Runaway current threshold	100.0% to 400.0%	200.0	%	Real-time	"H0A_en.55" on page 334
H0A.56	200A-39h	Fault reset delay	0 ms–60000 ms	10000	ms	Real-time	"H0A_en.56" on page 334

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0A.57	200A-3Ah	Runaway speed threshold	1 rpm to 1000 rpm	50	rpm	Real-time	"H0A_en.57" on page 335
H0A.58	200A-3Bh	Runaway speed filter time	0.1 ms–100.0 ms	2.0	ms	Real-time	"H0A_en.58" on page 335
H0A.59	200A-3Ch	Runaway protection detection time	10 ms–1000 ms	30	ms	Real-time	"H0A_en.59" on page 335
H0A.60	200A-3Dh	Black box function mode	0: Disable 1: Any fault 2: Designated fault 3: Triggered based on designated condition	1	-	Real-time	"H0A_en.60" on page 335
H0A.61	200A-3Eh	Designated fault code	0.0–6553.5	0.0	-	Real-time	"H0A_en.61" on page 336
H0A.62	200A-3Fh	Trigger source	0–25	0	-	Real-time	"H0A_en.62" on page 336
H0A.63	200A-40h	Trigger level	-2147483648–2147483647	0	-	Real-time	"H0A_en.63" on page 336
H0A.65	200A-42h	Trigger level	0: Rising edge 1: Equal 2: Falling edge 3: Edge-triggered	0	-	Real-time	"H0A_en.65" on page 337
H0A.66	200A-43h	Trigger position	0% to 100%	75	%	Real-time	"H0A_en.66" on page 337
H0A.67	200A-44h	Sampling frequency	0: Current loop 1: Position loop 2: Main cycle	0	-	Real-time	"H0A_en.67" on page 337
H0A.70	200A-47h	Overspeed threshold 2	0rpm to 20000rpm	0	rpm	Real-time	"H0A_en.70" on page 338
H0A.71	200A-48h	Function enable switch	0–65535	4098	-	Real-time	"H0A_en.71" on page 338
H0A.72	200A-49h	Maximum stop time in ramp-to-stop	0 ms–65535 ms	10000	ms	At stop	"H0A_en.72" on page 338
H0A.73	200A-4Ah	STO 24 V disconnection filter time	1 ms–5 ms	5	ms	Real-time	"H0A_en.73" on page 339
H0A.74	200A-4Bh	Filter time for two inconsistent STO channels	1 ms–1000 ms	100	ms	Real-time	"H0A_en.74" on page 339
H0A.75	200A-4Ch	Servo OFF delay after STO triggered	0 ms–100 ms	20	ms	Real-time	"H0A_en.75" on page 339

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0A.90	200A-5Bh	Moving average filter time for speed display values	0 ms–100 ms	0	ms	At stop	"H0A_en.90" on page 339
H0A.91	200A-5Ch	Moving average filter time for torque display values	0 ms–100 ms	0	ms	At stop	"H0A_en.91" on page 340
H0A.92	200A-5Dh	Moving average filter time for position display values	0 ms–100 ms	0	ms	At stop	"H0A_en.92" on page 340
H0A.93	200A-5Eh	Low-pass filter time for voltage display values	0 ms–250 ms	0	ms	At stop	"H0A_en.93" on page 340
H0A.94	200A-5Fh	Low-pass filter time for thermal display values	0 ms–250 ms	0	ms	At stop	"H0A_en.94" on page 340

6.12 H0b Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0b.00	200b-01h	Motor speed actual value	-32767rpm to 32767rpm	0	rpm	Unchangeable	"H0b_en.00" on page 341
H0b.01	200b-02h	Speed reference	-32767rpm to 32767rpm	0	rpm	Unchangeable	"H0b_en.01" on page 341
H0b.02	200b-03h	Internal torque reference	-500.0% to 500.0%	0.0	%	Unchangeable	"H0b_en.02" on page 341
H0b.03	200b-04h	Input (DI) signal monitoring	0–65535	0	-	Unchangeable	"H0b_en.03" on page 342
H0b.05	200b-06h	Output (DO) signal monitoring	0–65535	0	-	Unchangeable	"H0b_en.05" on page 342
H0b.07	200b-08h	Absolute position counter	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.07" on page 342

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0b.09	200b-0Ah	Mechanical angle	0.0° to 360.0°	0.0	°	Unchangeable	"H0b_en.09" on page 343
H0b.10	200b-0Bh	Electrical angle	0.0° to 360.0°	0.0	°	Unchangeable	"H0b_en.10" on page 343
H0b.12	200b-0Dh	Average load ratio	0.0% to 800.0%	0.0	%	Unchangeable	"H0b_en.12" on page 343
H0b.13	200b-0Eh	Input reference counter	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.13" on page 344
H0b.15	200b-10h	Position following error (encoder unit)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.15" on page 344
H0b.17	200b-12h	Feedback pulse counter	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.17" on page 344
H0b.19	200b-14h	Total power-on time	0.0s–429496729.5s	0.0	s	Unchangeable	"H0b_en.19" on page 345
H0b.24	200b-19h	Phase current RMS value	0.0 A to 6553.5 A	0.0	A	Unchangeable	"H0b_en.24" on page 345
H0b.26	200b-1Bh	Bus voltage	0.0 V to 6553.5 V	0.0	V	Unchangeable	"H0b_en.26" on page 345
H0b.27	200b-1Ch	Module temperature	-20°C–200°C	0	°C	Unchangeable	"H0b_en.27" on page 346
H0b.28	200b-1Dh	Absolute encoder fault information given by FPGA	0–65535	0	-	Unchangeable	"H0b_en.28" on page 346
H0b.29	200b-1Eh	Axis status information given by FPGA	0–65535	0	-	Unchangeable	"H0b_en.29" on page 346
H0b.30	200b-1Fh	Axis fault information given by FPGA	0–65535	0	-	Unchangeable	"H0b_en.30" on page 347
H0b.31	200b-20h	Encoder fault information	0–65535	0	-	Unchangeable	"H0b_en.31" on page 347

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0b.33	200b-22h	Fault log	0: Present fault 1: Last fault 2: 2nd to last fault 3: 3rd to last fault 4: 4th to last fault 5: 5th to last fault 6: 6th to last fault 7: 7th to last fault 8: 8th to last fault 9: 9th to last fault 10: 10th to last fault 11: 11th to last fault 12: 12th to last fault 13: 13th to last fault 14: 14th to last fault 15: 15th to last fault 16: 16th to last fault 17: 17th to last fault 18: 18th to last fault 19: 19th to last fault	0	-	Real-time	"H0b_en.33" on page 347
H0b.34	200b-23h	Fault code of the selected fault	0–65535	0	-	Unchangeable	"H0b_en.34" on page 348
H0b.35	200b-24h	Timestamp of the selected fault	0.0s–429496729.5s	0.0	s	Unchangeable	"H0b_en.35" on page 348
H0b.37	200b-26h	Motor speed upon occurrence of the selected fault	-32767rpm to 32767rpm	0	rpm	Unchangeable	"H0b_en.37" on page 349
H0b.38	200b-27h	Motor phase U current upon occurrence of the selected fault	-3276.7 A to 3276.7 A	0.0	A	Unchangeable	"H0b_en.38" on page 349
H0b.39	200b-28h	Motor phase V current upon occurrence of the selected fault	-3276.7 A to 3276.7 A	0.0	A	Unchangeable	"H0b_en.39" on page 349
H0b.40	200b-29h	Bus voltage upon occurrence of the selected fault	0.0 V to 6553.5 V	0.0	V	Unchangeable	"H0b_en.40" on page 349

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0b.41	200b-2Ah	Input terminal state on selected fault	0-65535	0	-	Unchangeable	"H0b_en.41" on page 350
H0b.43	200b-2Ch	Output terminal status upon occurrence of the selected fault	0-65535	0	-	Unchangeable	"H0b_en.43" on page 350
H0b.45	200b-2Eh	Internal fault code	0-65535	0	-	Unchangeable	"H0b_en.45" on page 350
H0b.46	200b-2Fh	Absolute encoder fault information given by FPGA upon occurrence of the selected fault	0-65535	0	-	Unchangeable	"H0b_en.46" on page 351
H0b.47	200b-30h	System status information given by FPGA upon occurrence of the selected fault	0-65535	0	-	Unchangeable	"H0b_en.47" on page 351
H0b.48	200b-31h	System fault information given by FPGA upon occurrence of the selected fault	0-65535	0	-	Unchangeable	"H0b_en.48" on page 351
H0b.49	200b-32h	Encoder fault information upon occurrence of the selected fault	0-65535	0	-	Unchangeable	"H0b_en.49" on page 351
H0b.51	200b-34h	Internal fault code upon occurrence of the selected fault	0-65535	0	-	Unchangeable	"H0b_en.51" on page 352

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0b.52	200b-35h	FPGA timeout fault standard bit upon occurrence of the selected fault	0–65535	0	-	Unchangeable	"H0b_en.52" on page 352
H0b.53	200b-36h	Position following error (reference unit)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.53" on page 352
H0b.55	200b-38h	Motor speed actual value	-2147483648.0rpm to 2147483647.0rpm	0.0	rpm	Unchangeable	"H0b_en.55" on page 353
H0b.58	200b-3Bh	Mechanical absolute position (low 32 bits)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.58" on page 353
H0b.60	200b-3Dh	Mechanical absolute position (high 32 bits)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.60" on page 353
H0b.63	200b-40h	NotRdy state	0: Normal 1: Control circuit error 2: Main circuit power input error 3: Bus undervoltage 4: Soft start failed 5: Encoder initialization undone 6: Short circuit to ground failed 7: Other 8: STO	0	-	Unchangeable	"H0b_en.63" on page 353
H0b.64	200b-41h	Real-time input position reference counter	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"H0b_en.64" on page 354
H0b.66	200b-43h	Encoder temperature	-32768°C–32767°C	0	°C	Unchangeable	"H0b_en.66" on page 354
H0b.67	200b-44h	Load rate of braking resistor	0.0% to 200.0%	0.0	%	Unchangeable	"H0b_en.67" on page 355

Parameter List

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0b.70	200b-47h	Number of absolute encoder revolutions	0Rev to 65535Rev	0	Rev	Unchangeable	"H0b_en.70" on page 355
H0b.71	200b-48h	Single-turn position feedback by the absolute encoder	0p to 2147483647p	0	p	Unchangeable	"H0b_en.71" on page 355
H0b.74	200b-4Bh	System fault information given by FPGA	0-65535	0	-	Unchangeable	"H0b_en.74" on page 355
H0b.77	200b-4Eh	Encoder position (low 32 bits)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.77" on page 356
H0b.79	200b-50h	Encoder position (high 32 bits)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.79" on page 356
H0b.81	200b-52h	Single-turn position of the rotary load (low 32 bits)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.81" on page 356
H0b.83	200b-54h	Single-turn position of the rotary load (high 32 bits)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.83" on page 356
H0b.85	200b-56h	Single-turn position of the rotary load (reference unit)	-2147483648p to 2147483647p	0	p	Unchangeable	"H0b_en.85" on page 357
H0b.87	200b-58h	IGBT junction temperature	0-200	0	-	Unchangeable	"H0b_en.87" on page 357
H0b.90	200b-5Bh	Group No. of the abnormal parameter	0-65535	0	-	Unchangeable	"H0b_en.90" on page 357
H0b.91	200b-5Ch	Offset within the group of the abnormal parameter	0-65535	0	-	Unchangeable	"H0b_en.91" on page 358

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0b.94	200b-5Fh	Individual power-on time	0.0s–429496729.5s	0.0	s	Unchangeable	"H0b_en.94" on page 358
H0b.96	200b-61h	Individual power-on time upon occurrence of the selected fault	0.0s–429496729.5s	0.0	s	Unchangeable	"H0b_en.96" on page 358

6.13 H0C Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0C.00	200C-01h	Braking overcurrent value upon electromagnetic shorting	0.0% to 100.0%	76.0	%	At stop	"H0C_en.00" on page 358

6.14 H0d Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0d.00	200d-01h	Software Reset	0: No operation 1: Enable	0	-	At stop	"H0d_en.00" on page 359
H0d.01	200d-02h	Fault reset	0: No operation 1: Enable	0	-	At stop	"H0d_en.01" on page 359
H0d.02	200d-03h	Inertia auto-tuning enable	0–65	0	-	Real-time	"H0d_en.02" on page 359
H0d.04	200d-05h	Read/write in encoder ROM	0: No operation 1: Write ROM 2: Read ROM 3: ROM failure	0	-	At stop	"H0d_en.04" on page 360
H0d.05	200d-06h	Emergency stop	0: No operation 1: Emergency stop	0	-	Real-time	"H0d_en.05" on page 360
H0d.12	200d-0Dh	Phase U/V current balance correction	0: Disabled 1: Enabled	0	-	At stop	"H0d_en.12" on page 360

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0d.17	200d-12h	Forced DI/DO enable switch	bit0: Forced DI enable switch 0: Disabled 1: Enabled bit1: Forced DO enable switch 0: Disabled 1: Enabled	0	-	Real-time	"H0d_en.17" on page 361
H0d.18	200d-13h	Forced DI value	0–15	15	-	Real-time	"H0d_en.18" on page 361
H0d.19	200d-14h	Forced DO value	0–7	0	-	Real-time	"H0d_en.19" on page 362
H0d.20	200d-15h	Absolute encoder reset	0: No operation 1: Reset 2: Reset the fault and multi-turn data	0	-	At stop	"H0d_en.20" on page 362
H0d.22	200d-17h	Display test	0: No operation 1: Status indicator and fault indicator steady on 2: Status indicator and fault indicator steady off	0	-	Real-time	"H0d_en.22" on page 362
H0d.23	200d-18h	Torque fluctuation auto-tuning	0–1	0	-	At stop	"H0d_en.23" on page 363
H0d.26	200d-1Bh	Forcibly open brake	0: Disabled 2: Enabled	0	-	At stop	"H0d_en.26" on page 363

6.15 H0E Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0E.00	200E-01h	Node address	1–127	1	-	At stop	"H0E_en.00" on page 363
H0E.01	200E-02h	Save objects written through communication to e2prom	0: Not save 1: Save parameters 2: Save object dictionaries 3: Save parameters and object dictionaries 4: Save object dictionaries written before communication (OP) 255: Determine through H0E03 and H0E04	1	-	Real-time	"H0E_en.01" on page 363

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0E.03	200E-04h	Save objects written through software (commissioning protocol) to e2prom	0: Do not save 1: Save	1	-	Real-time	"H0E_en.03" on page 364
H0E.04	200E-05h	Save objects written through communication to e2prom (excluding commissioning protocol)	0: Do not save 1: Save	0	-	Real-time	"H0E_en.04" on page 364
H0E.07	200E-08h	Object dictionary unit selection	0: Reference unit system (p/s, p/s ²) 1: User unit system (0.01 RPM, ms)	0	-	At stop	"H0E_en.07" on page 365
H0E.10	200E-0Bh	CAN selection	0: Pulse/Axis control command 1: Enhanced axis control command 2: CANopen	2	-	At stop	"H0E_en.10" on page 365
H0E.11	200E-0Ch	CAN baud rate	0: 20 kbps 1: 50 kbps 2: 100 kbps 3: 125 kbps 4: 250 kbps 5: 500 kbps 6: 1 Mbps 7: 1 Mbps - non-standard	5	-	At stop	"H0E_en.11" on page 365
H0E.12	200E-0Dh	Excessive IP position command increment count	1–30	20	-	Real-time	"H0E_en.12" on page 366
H0E.13	200E-0Eh	CANopen sync period error limit	0: 1/4 1: 1/2 2: 3/4 3: 1 4: 2 5: Disabled	0	-	At stop	"H0E_en.13" on page 366
H0E.14	200E-0Fh	CANopen communication state	0–9	0	-	Unchangeable	"H0E_en.14" on page 367

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0E.17	200E-12h	Get the count of received NMT frames with incorrect length	0–65535	0	-	Unchangeable	"H0E_en.17" on page 367
H0E.18	200E-13h	Get the count of received NMT frames with incorrect command	0–65535	0	-	Unchangeable	"H0E_en.18" on page 367
H0E.19	200E-14h	Get received heartbeat frames of wrong length	0–65535	0	-	Unchangeable	"H0E_en.19" on page 367
H0E.80	200E-51h	Modbus baud rate	4: 4800 bps 5: 9600 bps 6: 19200 bps 7: 38400 bps 8: 57600 bps 9: 115200 bps	9	-	Real-time	"H0E_en.80" on page 368
H0E.81	200E-52h	Modbus data format	0: No parity, 2 stop bits (N-2) 1: Even parity, 1 stop bit (E-1) 2: Odd parity, 1 stop bit (O-1) 3: No parity, 1 stop bit (N-1)	3	-	Real-time	"H0E_en.81" on page 368
H0E.82	200E-53h	Modbus response delay	0 ms–20 ms	0	ms	Real-time	"H0E_en.82" on page 369
H0E.83	200E-54h	Modbus communication timeout	0 ms–600 ms	0	ms	Real-time	"H0E_en.83" on page 369
H0E.84	200E-55h	Sequence of Modbus communication data bits	0: High bits before low bits 1: Low bits before high bits	1	-	Real-time	"H0E_en.84" on page 369
H0E.90	200E-5Bh	Modbus version	0.00–655.35	0.00	-	Unchangeable	"H0E_en.90" on page 370
H0E.91	200E-5Ch	CANopen version number	0.00–655.35	0.00	-	Unchangeable	"H0E_en.91" on page 370
H0E.92	200E-5Dh	CANlink version	0.00–655.35	0.00	-	Unchangeable	"H0E_en.92" on page 370

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H0E.97	200E-62h	Communication monitoring parameter 1	0–65535	0	-	Real-time	"H0E_en.97" on page 370
H0E.98	200E-63h	Communication monitoring parameter 2	0–65535	0	-	Real-time	"H0E_en.98" on page 371

6.16 H11 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H11.00	2011-01h	Multi-position running mode	0: Single run (number of displacements selected in H11.01) 1: Cyclic operation (number of displacement selected in H11.01) 2: DI-based operation (selected by DI) 3: Sequential operation 5: Axis-controlled continuous operation	1	-	At stop	"H11_en.00" on page 371
H11.01	2011-02h	Number of displacement references in multi-position mode	1–16	1	-	At stop	"H11_en.01" on page 375
H11.02	2011-03h	Starting displacement No. after pause	0: Continue to execute the unexecuted displacements 1: Start from displacement 1	0	-	At stop	"H11_en.02" on page 375
H11.03	2011-04h	Interval time unit	0: ms 1: s	0	-	At stop	"H11_en.03" on page 376
H11.04	2011-05h	Displacement reference type	0: Relative displacement reference 1: Absolute displacement reference	0	-	Real-time	"H11_en.04" on page 376
H11.05	2011-06h	Starting displacement No. in sequential operation	0–16	0	-	At stop	"H11_en.05" on page 377

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H11.09	2011-0Ah	Deceleration upon axis control OFF	0 ms–65535 ms	65535	ms	Real-time	"H11_en.09" on page 377
H11.10	2011-0Bh	Starting speed of displacement 1	0 RPM to 6000 RPM	0	rpm	Real-time	"H11_en.10" on page 377
H11.11	2011-0Ch	Stop speed of displacement 1	0 RPM to 6000 RPM	0	rpm	Real-time	"H11_en.11" on page 378
H11.12	2011-0Dh	Displacement 1	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.12" on page 378
H11.14	2011-0Fh	Max. speed of displacement 1	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.14" on page 378
H11.15	2011-10h	Acc/Dec time of displacement 1	0 ms–65535 ms	10	ms	Real-time	"H11_en.15" on page 379
H11.16	2011-11h	Interval time after displacement 1	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.16" on page 379
H11.17	2011-12h	Displacement 2	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.17" on page 380
H11.19	2011-14h	Max. speed of displacement 2	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.19" on page 380
H11.20	2011-15h	Acc/Dec time of displacement 2	0 ms–65535 ms	10	ms	Real-time	"H11_en.20" on page 380
H11.21	2011-16h	Interval time after displacement 2	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.21" on page 380
H11.22	2011-17h	Displacement 3	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.22" on page 381

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H11.24	2011-19h	Max. speed of displacement 3	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.24" on page 381
H11.25	2011-1Ah	Acc/Dec time of displacement 3	0 ms–65535 ms	10	ms	Real-time	"H11_en.25" on page 381
H11.26	2011-1Bh	Interval time after displacement 3	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.26" on page 381
H11.27	2011-1Ch	Displacement 4	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.27" on page 382
H11.29	2011-1Eh	Max. speed of displacement 4	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.29" on page 382
H11.30	2011-1Fh	Acc/Dec time of displacement 4	0 ms–65535 ms	10	ms	Real-time	"H11_en.30" on page 382
H11.31	2011-20h	Interval time after displacement 4	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.31" on page 382
H11.32	2011-21h	Displacement 5	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.32" on page 383
H11.34	2011-23h	Max. speed of displacement 5	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.34" on page 383
H11.35	2011-24h	Acc/Dec time of displacement 5	0 ms–65535 ms	10	ms	Real-time	"H11_en.35" on page 383
H11.36	2011-25h	Interval time after displacement 5	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.36" on page 384
H11.37	2011-26h	Displacement 6	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.37" on page 384

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H11.39	2011-28h	Max. speed of displacement 6	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.39" on page 384
H11.40	2011-29h	Acc/Dec time of displacement 6	0 ms–65535 ms	10	ms	Real-time	"H11_en.40" on page 384
H11.41	2011-2Ah	Interval time after displacement 6	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.41" on page 385
H11.42	2011-2Bh	Displacement 7	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.42" on page 385
H11.44	2011-2Dh	Max. speed of displacement 7	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.44" on page 385
H11.45	2011-2Eh	Acc/Dec time of displacement 7	0 ms–65535 ms	10	ms	Real-time	"H11_en.45" on page 385
H11.46	2011-2Fh	Interval time after displacement 7	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.46" on page 386
H11.47	2011-30h	Displacement 8	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.47" on page 386
H11.49	2011-32h	Max. speed of displacement 8	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.49" on page 386
H11.50	2011-33h	Acc/Dec time of displacement 8	0 ms–65535 ms	10	ms	Real-time	"H11_en.50" on page 387
H11.51	2011-34h	Interval time after displacement 8	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.51" on page 387
H11.52	2011-35h	Displacement 9	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.52" on page 387

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H11.54	2011-37h	Max. speed of displacement 9	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.54" on page 387
H11.55	2011-38h	Acc/Dec time of displacement 9	0 ms–65535 ms	10	ms	Real-time	"H11_en.55" on page 388
H11.56	2011-39h	Interval time after displacement 9	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.56" on page 388
H11.57	2011-3Ah	Displacement 10	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.57" on page 388
H11.59	2011-3Ch	Max. speed of displacement 10	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.59" on page 388
H11.60	2011-3Dh	Acc/Dec time of displacement 10	0 ms–65535 ms	10	ms	Real-time	"H11_en.60" on page 389
H11.61	2011-3Eh	Interval time after displacement 10	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.61" on page 389
H11.62	2011-3Fh	Displacement 11	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.62" on page 389
H11.64	2011-41h	Max. speed of displacement 11	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.64" on page 390
H11.65	2011-42h	Acc/Dec time of displacement 11	0 ms–65535 ms	10	ms	Real-time	"H11_en.65" on page 390
H11.66	2011-43h	Interval time after displacement 11	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.66" on page 390
H11.67	2011-44h	Displacement 12	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.67" on page 390

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H11.69	2011-46h	Max. speed of displacement 12	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.69" on page 391
H11.70	2011-47h	Acc/Dec time of displacement 12	0 ms–65535 ms	10	ms	Real-time	"H11_en.70" on page 391
H11.71	2011-48h	Interval time after displacement 12	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.71" on page 391
H11.72	2011-49h	Displacement 13	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.72" on page 391
H11.74	2011-4Bh	Max. speed of displacement 13	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.74" on page 392
H11.75	2011-4Ch	Acc/Dec time of displacement 13	0 ms–65535 ms	10	ms	Real-time	"H11_en.75" on page 392
H11.76	2011-4Dh	Interval time after displacement 13	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.76" on page 392
H11.77	2011-4Eh	Displacement 14	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.77" on page 393
H11.79	2011-50h	Max. speed of displacement 14	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.79" on page 393
H11.80	2011-51h	Acc/Dec time of displacement 14	0 ms–65535 ms	10	ms	Real-time	"H11_en.80" on page 393
H11.81	2011-52h	Interval time after displacement 14	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.81" on page 393
H11.82	2011-53h	Displacement 15	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.82" on page 394

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H11.84	2011-55h	Max. speed of displacement 15	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.84" on page 394
H11.85	2011-56h	Acc/Dec time of displacement 15	0 ms–65535 ms	10	ms	Real-time	"H11_en.85" on page 394
H11.86	2011-57h	Interval time after displacement 15	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.86" on page 394
H11.87	2011-58h	Displacement 16	-1073741824 to 1073741824	10000	Reference unit	Real-time	"H11_en.87" on page 395
H11.89	2011-5Ah	Max. speed of displacement 16	1 rpm to 10000 rpm	200	rpm	Real-time	"H11_en.89" on page 395
H11.90	2011-5Bh	Acc/Dec time of displacement 16	0 ms–65535 ms	10	ms	Real-time	"H11_en.90" on page 395
H11.91	2011-5Ch	Interval time after displacement 16	0 ms(s) to 10000 ms(s)	10	ms (s)	Real-time	"H11_en.91" on page 395

6.17 H12 Parameters

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H12.00	2012-01h	Multi-speed operation mode	0: Individual operation (number of speeds selected in H12.01) 1: Cyclic operation (number of speeds selected in H12.01) 2: DI-based operation	1	-	At stop	"H12_en.00" on page 396
H12.01	2012-02h	Number of speed references in multi-speed mode	1–16	16	-	At stop	"H12_en.01" on page 397
H12.02	2012-03h	Operating time unit	0: s 1: min	0	-	At stop	"H12_en.02" on page 398

Parameter List

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H12.03	2012-04h	Acceleration time 1	0 ms–65535 ms	10	ms	Real-time	"H12_en.03" on page 398
H12.04	2012-05h	Deceleration time 1	0 ms–65535 ms	10	ms	Real-time	"H12_en.04" on page 399
H12.05	2012-06h	Acceleration time 2	0 ms–65535 ms	50	ms	Real-time	"H12_en.05" on page 399
H12.06	2012-07h	Deceleration time 2	0 ms–65535 ms	50	ms	Real-time	"H12_en.06" on page 399
H12.07	2012-08h	Acceleration time 3	0 ms–65535 ms	100	ms	Real-time	"H12_en.07" on page 400
H12.08	2012-09h	Deceleration time 3	0 ms–65535 ms	100	ms	Real-time	"H12_en.08" on page 400
H12.09	2012-0Ah	Acceleration time 4	0 ms–65535 ms	150	ms	Real-time	"H12_en.09" on page 400
H12.10	2012-0Bh	Deceleration time 4	0 ms–65535 ms	150	ms	Real-time	"H12_en.10" on page 401
H12.20	2012-15h	1st speed reference	-10000 rpm to +10000 rpm	0	rpm	Real-time	"H12_en.20" on page 401
H12.21	2012-16h	Operating time of speed 1	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.21" on page 401
H12.22	2012-17h	1st speed rise/drop and curve smoothing parameter time	bit0-bit7: Speed rise and drop time 0: Zero acc and dec time 1: Acc and dec time 1 2: Acc and dec time 2 3: Acc and dec time 3 4: Acc and dec time 4 bit8-bit15: S curve smoothing parameter 1: Smoothing parameter 1 2: Smoothing parameter 2 3: Smoothing parameter 3 4: Smoothing parameter 4 5: Smoothing parameter 5 6: Smoothing parameter 6 7: Smoothing parameter 7 8: Smoothing parameter 8	256	-	Real-time	"H12_en.22" on page 402
H12.23	2012-18h	Reference 2	-10000 rpm to +10000 rpm	100	rpm	Real-time	"H12_en.23" on page 404
H12.24	2012-19h	Operating time of speed 2	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.24" on page 405

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H12.25	2012-1Ah	2nd speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.25" on page 405
H12.26	2012-1Bh	Reference 3	-10000 rpm to +10000 rpm	300	rpm	Real-time	"H12_en.26" on page 405
H12.27	2012-1Ch	Operating time of speed 3	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.27" on page 405
H12.28	2012-1Dh	3rd speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.28" on page 406
H12.29	2012-1Eh	Reference 4	-10000 rpm to +10000 rpm	500	rpm	Real-time	"H12_en.29" on page 406
H12.30	2012-1Fh	Operating time of speed 4	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.30" on page 406
H12.31	2012-20h	4th speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.31" on page 406
H12.32	2012-21h	Reference 5	-10000 rpm to +10000 rpm	700	rpm	Real-time	"H12_en.32" on page 407
H12.33	2012-22h	Operating time of speed 5	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.33" on page 407
H12.34	2012-23h	5th speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.34" on page 407
H12.35	2012-24h	Reference 6	-10000 rpm to +10000 rpm	900	rpm	Real-time	"H12_en.35" on page 407

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H12.36	2012-25h	Operating time of speed 6	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.36" on page 408
H12.37	2012-26h	6th speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.37" on page 408
H12.38	2012-27h	Reference 7	-10000 rpm to +10000 rpm	600	rpm	Real-time	"H12_en.38" on page 408
H12.39	2012-28h	Operating time of speed 7	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.39" on page 409
H12.40	2012-29h	7th speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.40" on page 409
H12.41	2012-2Ah	Reference 8	-10000 rpm to +10000 rpm	300	rpm	Real-time	"H12_en.41" on page 409
H12.42	2012-2Bh	Operating time of speed 8	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.42" on page 409
H12.43	2012-2Ch	8th speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.43" on page 410
H12.44	2012-2Dh	Reference 9	-10000 rpm to +10000 rpm	100	rpm	Real-time	"H12_en.44" on page 410
H12.45	2012-2Eh	Operating time of speed 9	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.45" on page 410
H12.46	2012-2Fh	9th speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.46" on page 410

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H12.47	2012-30h	Reference 10	-10000 rpm to +10000 rpm	-100	rpm	Real-time	"H12_en.47" on page 411
H12.48	2012-31h	Operating time of speed 10	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.48" on page 411
H12.49	2012-32h	10th speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.49" on page 411
H12.50	2012-33h	Reference 11	-10000 rpm to +10000 rpm	-300	rpm	Real-time	"H12_en.50" on page 411
H12.51	2012-34h	Operating time of speed 11	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.51" on page 412
H12.52	2012-35h	11th speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.52" on page 412
H12.53	2012-36h	Reference 12	-10000 rpm to +10000 rpm	-500	rpm	Real-time	"H12_en.53" on page 412
H12.54	2012-37h	Operating time of speed 12	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.54" on page 413
H12.55	2012-38h	12th speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.55" on page 413
H12.56	2012-39h	Reference 13	-10000 rpm to +10000 rpm	-700	rpm	Real-time	"H12_en.56" on page 413
H12.57	2012-3Ah	Operating time of speed 13	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.57" on page 413

Parameter	Hex	Name	Value	Default	Unit	Change Mode	Page
H12.58	2012-3Bh	13th speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.58" on page 414
H12.59	2012-3Ch	Reference 14	-10000 rpm to +10000 rpm	-900	rpm	Real-time	"H12_en.59" on page 414
H12.60	2012-3Dh	Operating time of speed 14	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.60" on page 414
H12.61	2012-3Eh	14th speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.61" on page 414
H12.62	2012-3Fh	Reference 15	-10000 rpm to +10000 rpm	-600	rpm	Real-time	"H12_en.62" on page 415
H12.63	2012-40h	Operating time of speed 15	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.63" on page 415
H12.64	2012-41h	15th speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.64" on page 415
H12.65	2012-42h	Reference 16	-10000 rpm to +10000 rpm	-300	rpm	Real-time	"H12_en.65" on page 415
H12.66	2012-43h	Operating time of speed 16	0.0s(m) to 6553.5s(m)	5.0	s (m)	Real-time	"H12_en.66" on page 416
H12.67	2012-44h	16th speed rise/drop time and curve smoothing parameter time	See H12.22.	256	-	Real-time	"H12_en.67" on page 416

6.18 H17 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H17.90	2017-5Bh	Communication VDI enable	0: Disabled 1: Enabled	0	-	At stop	"H17_en.90" on page 416
H17.91	2017-5Ch	VDI default value after power-on	0: No default 1: VDI1 default value 2: VDI2 default value 4: VDI3 default value 8: VDI4 default value 16: VDI5 default value 32: VDI6 default value 64: VDI7 default value 128: VDI8 default value 256: VDI9 default value 512: VDI10 default value 1024: VDI11 default value 2048: VDI12 default value 4096: VDI13 default value 8092: VDI14 default value 16384: VDI15 default value 32768: VDI16 default value	0	-	Real-time	"H17_en.91" on page 417
H17.00	2017-01h	VDI1 function	See "H17_en.00" on page 417 for details.	0	-	Real-time	"H17_en.00" on page 417
H17.01	2017-02h	VDI1 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.01" on page 419
H17.02	2017-03h	VDI2 function	See H17.00.	0	-	Real-time	"H17_en.02" on page 419
H17.03	2017-04h	VDI2 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.03" on page 419
H17.04	2017-05h	VDI3 function	See H17.00.	0	-	Real-time	"H17_en.04" on page 420
H17.05	2017-06h	VDI3 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.05" on page 420
H17.06	2017-07h	VDI4 function	See H17.00.	0	-	Real-time	"H17_en.06" on page 420
H17.07	2017-08h	VDI4 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.07" on page 421

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H17.08	2017-09h	VDI5 function	See H17.00.	0	-	Real-time	"H17_en.08" on page 421
H17.09	2017-0Ah	VDI5 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.09" on page 421
H17.10	2017-0Bh	VDI6 function	See H17.00.	0	-	Real-time	"H17_en.10" on page 421
H17.11	2017-0Ch	VDI6 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.11" on page 422
H17.12	2017-0Dh	VDI7 function	See H17.00.	0	-	Real-time	"H17_en.12" on page 422
H17.13	2017-0Eh	VDI7 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.13" on page 422
H17.14	2017-0Fh	VDI8 function	See H17.00.	0	-	Real-time	"H17_en.14" on page 422
H17.15	2017-10h	VDI8 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.15" on page 423
H17.16	2017-11h	VDI9 function	See H17.00.	0	-	Real-time	"H17_en.16" on page 423
H17.17	2017-12h	VDI9 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.17" on page 423
H17.18	2017-13h	VDI10 function	See H17.00.	0	-	Real-time	"H17_en.18" on page 424
H17.19	2017-14h	VDI10 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.19" on page 424
H17.20	2017-15h	VDI11 function	See H17.00.	0	-	Real-time	"H17_en.20" on page 424
H17.21	2017-16h	VDI11 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.21" on page 424
H17.22	2017-17h	VDI12 function	See H17.00.	0	-	Real-time	"H17_en.22" on page 425

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H17.23	2017-18h	VDI12 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.23" on page 425
H17.24	2017-19h	VDI13 function	See H17.00.	0	-	Real-time	"H17_en.24" on page 425
H17.25	2017-1Ah	VDI13 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.25" on page 425
H17.26	2017-1Bh	VDI14 function	See H17.00.	0	-	Real-time	"H17_en.26" on page 426
H17.27	2017-1Ch	VDI14 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.27" on page 426
H17.28	2017-1Dh	VDI15 function	See H17.00.	0	-	Real-time	"H17_en.28" on page 426
H17.29	2017-1Eh	VDI15 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.29" on page 427
H17.30	2017-1Fh	VDI16 function	See H17.00.	0	-	Real-time	"H17_en.30" on page 427
H17.31	2017-20h	VDI16 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Real-time	"H17_en.31" on page 427
H17.92	2017-5Dh	Communication VDO enable	0: Disabled 1: Enabled	0	-	At stop	"H17_en.92" on page 427

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H17.93	2017-5Eh	VDO default value after power-on	0: No default 1: VDO1 default value 2: VDO2 default value 4: VDO3 default value 8: VDO4 default value 16: VDO5 default value 32: VDO6 default value 64: VDO7 default value 128: VDO8 default value 256: VDO9 default value 512: VDO10 default value 1024: VDO11 default value 2048: VDO12 default value 4096: VDO13 default value 8192: VDO14 default value 16384: VDO15 default value 32768: VDO16 default value	0	-	At stop	"H17_en.93" on page 428
H17.32	2017-21h	VDO virtual level	0–65535	0	-	Unchangeable	"H17_en.32" on page 429

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H17.33	2017-22h	VDO1 function	0: No assignment 1: Servo ready 2: Motor rotation 3: Zero speed 4: Speed matching 5: Positioning completed 6: Proximity 7: Torque limited 8: Speed limited 10: Warning 11: Fault 15: Interrupt positioning completed 16: Homing completed 17: Electrical homing completed 18: Torque reach 19: Speed reach 21: Enable completed 22: Internal command completed 23: Writing next command allowed 24: Internal motion completed 30: Alarm or fault output 31: Communication forced DO 32: EDM output	0	-	Real-time	"H17_en.33" on page 429
H17.34	2017-23h	VDO1 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.34" on page 430
H17.35	2017-24h	VDO2 function	See H17.33.	0	-	Real-time	"H17_en.35" on page 430
H17.36	2017-25h	VDO2 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.36" on page 430
H17.37	2017-26h	VDO3 function	See H17.33.	0	-	Real-time	"H17_en.37" on page 430
H17.38	2017-27h	VDO3 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.38" on page 431
H17.39	2017-28h	VDO4 function	See H17.33.	0	-	Real-time	"H17_en.39" on page 431
H17.40	2017-29h	VDO4 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.40" on page 431
H17.41	2017-2Ah	VDO5 function	See H17.33.	0	-	Real-time	"H17_en.41" on page 432

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H17.42	2017-2Bh	VDO5 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.42" on page 432
H17.43	2017-2Ch	VDO6 function	See H17.33.	0	-	Real-time	"H17_en.43" on page 432
H17.44	2017-2Dh	VDO6 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.44" on page 432
H17.45	2017-2Eh	VDO7 function	See H17.33.	0	-	Real-time	"H17_en.45" on page 433
H17.46	2017-2Fh	VDO7 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.46" on page 433
H17.47	2017-30h	VDO8 function	See H17.33.	0	-	Real-time	"H17_en.47" on page 433
H17.48	2017-31h	VDO8 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.48" on page 433
H17.49	2017-32h	VDO9 function	See H17.33.	0	-	Real-time	"H17_en.49" on page 434
H17.50	2017-33h	VDO9 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.50" on page 434
H17.51	2017-34h	VDO10 function	See H17.33.	0	-	Real-time	"H17_en.51" on page 434
H17.52	2017-35h	VDO10 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.52" on page 435
H17.53	2017-36h	VDO11 function	See H17.33.	0	-	Real-time	"H17_en.53" on page 435
H17.54	2017-37h	VDO11 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.54" on page 435
H17.55	2017-38h	VDO12 function	See H17.33.	0	-	Real-time	"H17_en.55" on page 435
H17.56	2017-39h	VDO12 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.56" on page 436
H17.57	2017-3Ah	VDO13 function	See H17.33.	0	-	Real-time	"H17_en.57" on page 436
H17.58	2017-3Bh	VDO13 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.58" on page 436
H17.59	2017-3Ch	VDO14 function	See H17.33.	0	-	Real-time	"H17_en.59" on page 436
H17.60	2017-3Dh	VDO14 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.60" on page 437
H17.61	2017-3Eh	VDO15 function	See H17.33.	0	-	Real-time	"H17_en.61" on page 437
H17.62	2017-3Fh	VDO15 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.62" on page 437

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H17.63	2017-40h	VDO16 function	See H17.33.	0	-	Real-time	"H17_en.63" on page 438
H17.64	2017-41h	VDO16 logic level selection	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Real-time	"H17_en.64" on page 438

6.19 H22 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H22.00	2022-01h	Process segment command trigger	0–1000	0	-	Real-time	"H22_en.00" on page 438
H22.01	2022-02h	Process segment triggered by the event rising edge	0–65535	0	-	Real-time	"H22_en.01" on page 439
H22.02	2022-03h	Process segment triggered by the event falling edge	0–65535	0	-	Real-time	"H22_en.02" on page 439
H22.03	2022-04h	Acceleration/Deceleration time upon technology segment pause	0: Acceleration/Deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4 5: Acceleration/Deceleration time 5 6: Acceleration/Deceleration time 6 7: Acceleration/Deceleration time 7	0	-	Real-time	"H22_en.03" on page 440
H22.04	2022-05h	Positive software position limit	-2147483648 to 2147483647	2147483647	Reference unit	Real-time	"H22_en.04" on page 441

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H22.06	2022-07h	Negative software position limit	-2147483648 to 2147483647	-2147483648	Reference unit	Real-time	"H22_en.06" on page 441
H22.08	2022-09h	Process segment number	0–65535	0	-	Unchangeable	"H22_en.08" on page 441
H22.09	2022-0Ah	Process segment function switch	0–65535	0	-	At stop	"H22_en.09" on page 441
H22.10	2022-0Bh	Process segment state	0–65535	0	-	Unchangeable	"H22_en.10" on page 442
H22.11	2022-0Ch	Processing mode for process segment pause command	0: Do not abort the command 1: Abort the command	0	-	At stop	"H22_en.11" on page 442
H22.12	2022-0Dh	Stop mode for process segment pause	0: Ramp to stop 1: Stop at zero speed	0	-	Real-time	"H22_en.12" on page 442
H22.19	2022-14h	Target speed	0.1 rpm to 6000.0 rpm	50.0	rpm	Real-time	"H22_en.19" on page 443
H22.20	2022-15h	Target speed 1	0.1 rpm to 6000.0 rpm	200.0	rpm	Real-time	"H22_en.20" on page 443
H22.21	2022-16h	Target speed 2	0.1 rpm to 6000.0 rpm	500.0	rpm	Real-time	"H22_en.21" on page 443
H22.22	2022-17h	Target speed 3	0.1 rpm to 6000.0 rpm	1000.0	rpm	Real-time	"H22_en.22" on page 444
H22.23	2022-18h	Target speed 4	0.1 rpm to 6000.0 rpm	1500.0	rpm	Real-time	"H22_en.23" on page 444
H22.24	2022-19h	Target speed 5	0.1 rpm to 6000.0 rpm	2000.0	rpm	Real-time	"H22_en.24" on page 444
H22.25	2022-1Ah	Target speed 6	0.1 rpm to 6000.0 rpm	2500.0	rpm	Real-time	"H22_en.25" on page 444
H22.26	2022-1Bh	Target speed 7	0.1 rpm to 6000.0 rpm	3000.0	rpm	Real-time	"H22_en.26" on page 445
H22.35	2022-24h	Accel/Decel time	0 ms–65535 ms	50	ms	Real-time	"H22_en.35" on page 445
H22.36	2022-25h	Acceleration/Deceleration time 1	0 ms–65535 ms	200	ms	Real-time	"H22_en.36" on page 445
H22.37	2022-26h	Acceleration/Deceleration time 2	0 ms–65535 ms	500	ms	Real-time	"H22_en.37" on page 446

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H22.38	2022-27h	Acceleration/ Deceleration time 3	0 ms–65535 ms	1000	ms	Real-time	"H22_en.38" on page 446
H22.39	2022-28h	Acceleration/ Deceleration time 4	0 ms–65535 ms	1500	ms	Real-time	"H22_en.39" on page 446
H22.40	2022-29h	Acceleration/ Deceleration time 5	0 ms–65535 ms	2000	ms	Real-time	"H22_en.40" on page 446
H22.41	2022-2Ah	Acceleration/ Deceleration time 6	0 ms–65535 ms	2500	ms	Real-time	"H22_en.41" on page 447
H22.42	2022-2Bh	Acceleration/ Deceleration time 7	0 ms–65535 ms	3000	ms	Real-time	"H22_en.42" on page 447
H22.51	2022-34h	Delay after completion of the process segment	0 ms–65535 ms	0	ms	Real-time	"H22_en.51" on page 447
H22.52	2022-35h	Delay time 1 after completion of the process segment	0 ms–65535 ms	50	ms	Real-time	"H22_en.52" on page 448
H22.53	2022-36h	Delay time 2 after completion of the process segment	0 ms–65535 ms	200	ms	Real-time	"H22_en.53" on page 448
H22.54	2022-37h	Delay time 3 after completion of the process segment	0 ms–65535 ms	500	ms	Real-time	"H22_en.54" on page 448
H22.55	2022-38h	Delay time 4 after completion of the process segment	0 ms–65535 ms	1000	ms	Real-time	"H22_en.55" on page 448
H22.56	2022-39h	Delay time 5 after completion of the process segment	0 ms–65535 ms	1500	ms	Real-time	"H22_en.56" on page 449

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H22.57	2022-3Ah	Delay time 6 after completion of the process segment	0 ms–65535 ms	2000	ms	Real-time	"H22_en.57" on page 449
H22.58	2022-3Bh	Delay time 7 after completion of the process segment	0 ms–65535 ms	3000	ms	Real-time	"H22_en.58" on page 449
H22.70	2022-47h	Homing mode	-32768–32767	-2	-	Real-time	"H22_en.70" on page 449
H22.71	2022-48h	Speed of high-speed search for home switch signal	0 RPM to 3000 RPM	100	rpm	Real-time	"H22_en.71" on page 450
H22.72	2022-49h	Speed of low-speed search for home switch signal	0 rpm to 1000 rpm	10	rpm	Real-time	"H22_en.72" on page 450
H22.73	2022-4Ah	Acceleration/Deceleration time during homing	0 ms–1000 ms	1000	ms	Real-time	"H22_en.73" on page 450
H22.74	2022-4Bh	Home search time limit	0 ms–65535 ms	10000	ms	Real-time	"H22_en.74" on page 451
H22.75	2022-4Ch	Mechanical home offset	-2147483648 to 2147483647	0	Reference unit	Real-time	"H22_en.75" on page 451
H22.79	2022-50h	Relative/Absolute homing	0–65535	0	-	Real-time	"H22_en.79" on page 451

6.20 H23 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H23.00	2023-01h	Definition of homing	0–4294967295	0	-	Real-time	"H23_en.00" on page 452
H23.02	2023-03h	Homing data	-2147483648–2147483647	0	-	Real-time	"H23_en.02" on page 452

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H23.04	2023-05h	Definition of process segment 1	0–4294967295	0	-	Real-time	"H23_en.04" on page 452
H23.06	2023-07h	Data of process segment 1	-2147483648–2147483647	0	-	Real-time	"H23_en.06" on page 453
H23.08	2023-09h	Definition of process segment 2	0–4294967295	0	-	Real-time	"H23_en.08" on page 453
H23.10	2023-0Bh	Data of process segment 2	-2147483648–2147483647	0	-	Real-time	"H23_en.10" on page 453
H23.12	2023-0Dh	Definition of process segment 3	0–4294967295	0	-	Real-time	"H23_en.12" on page 454
H23.14	2023-0Fh	Data of process segment 3	-2147483648–2147483647	0	-	Real-time	"H23_en.14" on page 454
H23.16	2023-11h	Definition of process segment 4	0–4294967295	0	-	Real-time	"H23_en.16" on page 454
H23.18	2023-13h	Data of process segment 4	-2147483648–2147483647	0	-	Real-time	"H23_en.18" on page 454
H23.20	2023-15h	Definition of process segment 5	0–4294967295	0	-	Real-time	"H23_en.20" on page 455
H23.22	2023-17h	Data of process segment 5	-2147483648–2147483647	0	-	Real-time	"H23_en.22" on page 455
H23.24	2023-19h	Definition of process segment 6	0–4294967295	0	-	Real-time	"H23_en.24" on page 455
H23.26	2023-1Bh	Data of process segment 6	-2147483648–2147483647	0	-	Real-time	"H23_en.26" on page 456
H23.28	2023-1Dh	Definition of process segment 7	0–4294967295	0	-	Real-time	"H23_en.28" on page 456
H23.30	2023-1Fh	Data of process segment 7	-2147483648–2147483647	0	-	Real-time	"H23_en.30" on page 456
H23.32	2023-21h	Definition of process segment 8	0–4294967295	0	-	Real-time	"H23_en.32" on page 456
H23.34	2023-23h	Data of process segment 8	-2147483648–2147483647	0	-	Real-time	"H23_en.34" on page 457
H23.36	2023-25h	Definition of process segment 9	0–4294967295	0	-	Real-time	"H23_en.36" on page 457

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H23.38	2023-27h	Data of process segment 9	-2147483648–2147483647	0	-	Real-time	"H23_en.38" on page 457
H23.40	2023-29h	Definition of process segment 10	0–4294967295	0	-	Real-time	"H23_en.40" on page 457
H23.42	2023-2Bh	Data of process segment 10	-2147483648–2147483647	0	-	Real-time	"H23_en.42" on page 458
H23.44	2023-2Dh	Definition of process segment 11	0–4294967295	0	-	Real-time	"H23_en.44" on page 458
H23.46	2023-2Fh	Data of process segment 11	-2147483648–2147483647	0	-	Real-time	"H23_en.46" on page 458
H23.48	2023-31h	Definition of process segment 12	0–4294967295	0	-	Real-time	"H23_en.48" on page 459
H23.50	2023-33h	Data of process segment 12	-2147483648–2147483647	0	-	Real-time	"H23_en.50" on page 459
H23.52	2023-35h	Definition of process segment 13	0–4294967295	0	-	Real-time	"H23_en.52" on page 459
H23.54	2023-37h	Data of process segment 13	-2147483648–2147483647	0	-	Real-time	"H23_en.54" on page 459
H23.56	2023-39h	Definition of process segment 14	0–4294967295	0	-	Real-time	"H23_en.56" on page 460
H23.58	2023-3Bh	Data of process segment 14	-2147483648–2147483647	0	-	Real-time	"H23_en.58" on page 460
H23.60	2023-3Dh	Definition of process segment 15	0–4294967295	0	-	Real-time	"H23_en.60" on page 460
H23.62	2023-3Fh	Data of process segment 15	-2147483648–2147483647	0	-	Real-time	"H23_en.62" on page 460

6.21 H30 Parameters

H30.00	2030-01h	Servo state read by communication	0–65535	0	-	Unchangeable	"H30_en.00" on page 461
H30.01	2030-02h	DO function state 1 read through communication	0–65535	0	-	Unchangeable	"H30_en.01" on page 461
H30.02	2030-03h	DO function state 2 read through communication	0–65535	0	-	Unchangeable	"H30_en.02" on page 461
H30.03	2030-04h	Input pulse reference sampling read via communication	0–65535	0	-	Unchangeable	"H30_en.03" on page 462

6.22 H31 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H31.00	2031-01h	VDI virtual level set through communication	0–65535	0	-	Real-time	"H31_en.00" on page 462
H31.04	2031-05h	DO state set through communication	0–65535	0	-	Real-time	"H31_en.04" on page 462
H31.09	2031-0Ah	Speed reference set via communication	-9999.000rpm to 9999.000rpm	0.000	rpm	Real-time	"H31_en.09" on page 463
H31.11	2031-0Ch	Torque reference set via communication	-100.000% to 100.000%	0.000	%	Real-time	"H31_en.11" on page 463

6.23 H32 Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
H32.49	2032-32h	Oscilloscope internal observation function	0–65535	0	-	Real-time	"H32_en.49" on page 463

6.24 1000h Parameters

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
1005h	1005h	SYNC message COB-ID	128–4294967295	128	-	Real-time	"1005h" on page 464
1006h	1006h	Synchronization cycle	0us to 2147483647us	0	us	Real-time	"1006h" on page 464
100Ch	100Ch	Node guarding time	0 ms–65535 ms	0	ms	Real-time	"100Ch" on page 464
100dh	100dh	Life factor	0–255	0	-	Real-time	"100dh" on page 465
1014h	1014h	Emergency message COB-ID	0–4294967295	0	-	Real-time	"1014h" on page 465
1016.01h	1016-01h	Consumer heartbeat time 1	0–2147483647	0	-	Real-time	"1016_en.01h" on page 465
1016.02h	1016-02h	Consumer heartbeat time 2	0–2147483647	0	-	Real-time	"1016_en.02h" on page 466
1016.03h	1016-03h	Consumer heartbeat time 3	0–2147483647	0	-	Real-time	"1016_en.03h" on page 466
1016.04h	1016-04h	Consumer heartbeat time 4	0–2147483647	0	-	Real-time	"1016_en.04h" on page 466
1016.05h	1016-05h	Consumer heartbeat time 5	0–2147483647	0	-	Real-time	"1016_en.05h" on page 467
1017h	1017h	Producer heartbeat time	0 ms–65535 ms	0	ms	Real-time	"1017h" on page 467

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
1400.01h	1400-01h	COB-ID of RPDO1	0-4294967295	512	-	Real-time	"1400_en.01h" on page 467
1400.02h	1400-02h	Transmission type of RPDO1	0-255	255	-	Real-time	"1400_en.02h" on page 467
1401.01h	1401-01h	COB-ID of RPDO2	0-4294967295	0	-	Real-time	"1401_en.01h" on page 468
1401.02h	1401-02h	Transmission type of RPDO2	0-255	255	-	Real-time	"1401_en.02h" on page 468
1402.01h	1402-01h	COB-ID of RPDO3	0-4294967295	0	-	Real-time	"1402_en.01h" on page 468
1402.02h	1402-02h	Transmission type of RPDO3	0-255	255	-	Real-time	"1402_en.02h" on page 469
1403.01h	1403-01h	COB-ID of RPDO4	0-4294967295	0	-	Real-time	"1403_en.01h" on page 469
1403.02h	1403-02h	Transmission type of RPDO4	0-255	255	-	Real-time	"1403_en.02h" on page 469
1600.00h	1600-00h	Number of valid mapped objects in RPDO1	0-4	1	-	Real-time	"1600_en.00h" on page 469
1600.01h	1600-01h	Mapped object 1 in RPDO1	0-2147483647	1614807056	-	Real-time	"1600_en.01h" on page 470
1600.02h	1600-02h	Mapped object 2 in RPDO1	0-2147483647	0	-	Real-time	"1600_en.02h" on page 470
1600.03h	1600-03h	Mapped object 3 in RPDO1	0-2147483647	0	-	Real-time	"1600_en.03h" on page 470
1600.04h	1600-04h	Mapped object 4 in RPDO1	0-2147483647	0	-	Real-time	"1600_en.04h" on page 471
1601.00h	1601-00h	Number of valid mapped objects in RPDO2	0-4	2	-	Real-time	"1601_en.00h" on page 471

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
1601.01h	1601-01h	Mapped object 1 in RPDO2	0–2147483647	1614807056	-	Real-time	"1601_en.01h" on page 471
1601.02h	1601-02h	Mapped object 2 in RPDO2	0–2147483647	1616904200	-	Real-time	"1601_en.02h" on page 472
1601.03h	1601-03h	Mapped object 3 in RPDO2	0–2147483647	0	-	Real-time	"1601_en.03h" on page 472
1601.04h	1601-04h	Mapped object 4 in RPDO2	0–2147483647	0	-	Real-time	"1601_en.04h" on page 472
1602.00h	1602-00h	Number of valid mapped objects in RPDO3	0–4	2	-	Real-time	"1602_en.00h" on page 472
1602.01h	1602-01h	Mapped object 1 in RPDO3	0–2147483647	1614807056	-	Real-time	"1602_en.01h" on page 473
1602.02h	1602-02h	Mapped object 2 in RPDO3	0–2147483647	1618608160	-	Real-time	"1602_en.02h" on page 473
1602.03h	1602-03h	Mapped object 3 in RPDO3	0–2147483647	0	-	Real-time	"1602_en.03h" on page 473
1602.04h	1602-04h	Mapped object 4 in RPDO3	0–2147483647	0	-	Real-time	"1602_en.04h" on page 474
1603.00h	1603-00h	Number of valid mapped objects in RPDO4	0–4	2	-	Real-time	"1603_en.00h" on page 474
1603.01h	1603-01h	Mapped object 1 in RPDO4	0–2147483647	1614807056	-	Real-time	"1603_en.01h" on page 474
1603.02h	1603-02h	Mapped object 2 in RPDO4	0–2147483647	1627324448	-	Real-time	"1603_en.02h" on page 475
1603.03h	1603-03h	Mapped object 3 in RPDO4	0–2147483647	0	-	Real-time	"1603_en.03h" on page 475
1603.04h	1603-04h	Mapped object 4 in RPDO4	0–2147483647	0	-	Real-time	"1603_en.04h" on page 475

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
1800.01h	1800-01h	COB-ID of TPDO1	0–4294967295	0	-	Real-time	"1800_en.01h" on page 476
1800.02h	1800-02h	Transmission type of TPDO1	0–255	255	-	Real-time	"1800_en.02h" on page 476
1800.03h	1800-03h	Inhibit time of TPDO1	0us to 65535us	500	100us	Real-time	"1800_en.03h" on page 476
1800.05h	1800-05h	Event counter of TPDO1	0 ms–65535 ms	0	ms	Real-time	"1800_en.05h" on page 477
1801.01h	1801-01h	COB-ID of TPDO2	0–4294967295	0	-	Real-time	"1801_en.01h" on page 477
1801.02h	1801-02h	Transmission type of TPDO2	0–255	255	-	Real-time	"1801_en.02h" on page 477
1801.03h	1801-03h	Inhibit time of TPDO2	0us to 65535us	500	100us	Real-time	"1801_en.03h" on page 478
1801.05h	1801-05h	Event counter of TPDO2	0 ms–65535 ms	0	ms	Real-time	"1801_en.05h" on page 478
1802.01h	1802-01h	COB-ID of TPDO3	0–4294967295	0	-	Real-time	"1802_en.01h" on page 478
1802.02h	1802-02h	Transmission type of TPDO3	0–255	255	-	Real-time	"1802_en.02h" on page 478
1802.03h	1802-03h	Inhibit time of TPDO3	0us to 65535us	500	100us	Real-time	"1802_en.03h" on page 479
1802.05h	1802-05h	Event counter of TPDO3	0 ms–65535 ms	0	ms	Real-time	"1802_en.05h" on page 479
1803.01h	1803-01h	COB-ID of TPDO4	0–4294967295	0	-	Real-time	"1803_en.01h" on page 479
1803.02h	1803-02h	Transmission type of TPDO4	0–255	255	-	Real-time	"1803_en.02h" on page 479

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
1803.03h	1803-03h	Inhibit time of TPDO4	0us to 65535us	500	100us	Real-time	"1803_en.03h" on page 480
1803.05h	1803-05h	Event counter of TPDO4	0 ms–65535 ms	0	ms	Real-time	"1803_en.05h" on page 480
1A00.00h	1A00-00h	Number of valid mapped objects in TPDO1	0–4	1	-	Real-time	"1A00_en.00h" on page 480
1A00.01h	1A00-01h	Mapped object 1 in TPDO1	0–2147483647	1614872592	-	Real-time	"1A00_en.01h" on page 480
1A00.02h	1A00-02h	Mapped object 2 in TPDO1	0–2147483647	0	-	Real-time	"1A00_en.02h" on page 481
1A00.03h	1A00-03h	Mapped object 3 in TPDO1	0–2147483647	0	-	Real-time	"1A00_en.03h" on page 481
1A00.04h	1A00-04h	Mapped object 4 in TPDO1	0–2147483647	0	-	Real-time	"1A00_en.04h" on page 481
1A01.00h	1A01-00h	Number of valid mapped objects in TPDO2	0–4	2	-	Real-time	"1A01_en.00h" on page 482
1A01.01h	1A01-01h	Mapped object 1 in TPDO2	0–2147483647	1614872592	-	Real-time	"1A01_en.01h" on page 482
1A01.02h	1A01-02h	Mapped object 2 in TPDO2	0–2147483647	1616969736	-	Real-time	"1A01_en.02h" on page 482
1A01.03h	1A01-03h	Mapped object 3 in TPDO2	0–2147483647	0	-	Real-time	"1A01_en.03h" on page 483
1A01.04h	1A01-04h	Mapped object 4 in TPDO2	0–2147483647	0	-	Real-time	"1A01_en.04h" on page 483
1A02.00h	1A02-00h	Number of valid mapped objects in TPDO3	0–4	2	-	Real-time	"1A02_en.00h" on page 483
1A02.01h	1A02-01h	Mapped object 1 in TPDO3	0–2147483647	1614872592	-	Real-time	"1A02_en.01h" on page 484

Parameter	Object Dictionary	Name	Value	Default	Unit	Change Mode	Page
1A02.02h	1A02-02h	Mapped object 2 in TPDO3	0–2147483647	1617166368	-	Real-time	"1A02_en.02h" on page 484
1A02.03h	1A02-03h	Mapped object 3 in TPDO3	0–2147483647	0	-	Real-time	"1A02_en.03h" on page 484
1A02.04h	1A02-04h	Mapped object 4 in TPDO3	0–2147483647	0	-	Real-time	"1A02_en.04h" on page 485
1A03.00h	1A03-00h	Number of valid mapped objects in TPDO4	0–4	2	-	Real-time	"1A03_en.00h" on page 485
1A03.01h	1A03-01h	Mapped object 1 in TPDO4	0–2147483647	1614872592	-	Real-time	"1A03_en.01h" on page 485
1A03.02h	1A03-02h	Mapped object 2 in TPDO4	0–2147483647	1617690656	-	Real-time	"1A03_en.02h" on page 486
1A03.03h	1A03-03h	Mapped object 3 in TPDO4	0–2147483647	0	-	Real-time	"1A03_en.03h" on page 486
1A03.04h	1A03-04h	Mapped object 4 in TPDO4	0–2147483647	0	-	Real-time	"1A03_en.04h" on page 486

6.25 6000h Parameters

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
603Fh	603Fh	Error code	0–65535	0	-	Unchangeable	"603Fh" on page 486
6040h	6040h	Control word	0–65535	0	-	Real-time	"6040h" on page 487
6041h	6041h	Status word	0–65535	0	-	Unchangeable	"6041h" on page 487

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
605Ah	605Ah	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 stop	"605Ah" on page 487
605Ch	605Ch	Stop mode at S-OFF	0: Coast to stop, keeping de-energized state 1: Ramp to stop as defined by 6084h/609Ah, keeping de-energized state	1	-	At stop	"605Ch" on page 488
605Dh	605Dh	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	1	-	At stop	"605Dh" on page 488
605Eh	605Eh	Stop mode at No. 2 fault	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	2	-	At stop	"605Eh" on page 489

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
6060h	6060h	Servo drive mode	1: Profile position mode (pp) 3: Profile velocity mode (pv) 4: Profile torque mode (pt) 6: Homing mode (hm) 7: Interpolation mode (ip)	0	-	Real-time	"6060h" on page 489
6061h	6061h	Operation mode display	1: Profile position mode (pp) 3: Profile velocity mode (pv) 4: Profile torque mode (pt) 6: Homing mode (hm) 7: Interpolation mode (ip)	0	-	Unchangeable	"6061h" on page 490
6062h	6062h	Position reference	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"6062h" on page 490
6063h	6063h	Position actual value	-2147483648 to +2147483647	0	Pulse	Unchangeable	"6063h" on page 491
6064h	6064h	Position actual value	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"6064h" on page 491
6065h	6065h	Following error window	0 to 4294967295	27486951	Reference unit	Real-time	"6065h" on page 491
6066h	6066h	Defines the time lapse to trigger excessive position deviation (EB00.0).	0 ms–65535 ms	0	ms	Real-time	"6066h" on page 492
6067h	6067h	Position window	0 to 4294967295	5872	Reference unit	Real-time	"6067h" on page 492
6068h	6068h	Position window time	0 ms–65535 ms	0	ms	Real-time	"6068h" on page 492
606Ch	606Ch	Actual speed	-2147483648 to +2147483647	0	Reference unit/s	Unchangeable	"606Ch" on page 493
606Dh	606Dh	Velocity window	0 RPM to 65535 RPM	10	rpm	Real-time	"606Dh" on page 493
606Eh	606Eh	Velocity window time	0 ms–65535 ms	0	ms	Real-time	"606Eh" on page 493
606Fh	606Fh	Zero speed signal threshold	0 RPM to 65535 RPM	10	rpm	Real-time	"606Fh" on page 494
6070h	6070h	Velocity threshold time	0 ms–65535 ms	0	ms	Real-time	"6070h" on page 494

Parameter List

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
6071h	6071h	Target torque	-4000. to 4000.	0	0.001	Real-time	"6071h" on page 495
6072h	6072h	Max. torque reference	0. to 4000.	3500	0.001	Real-time	"6072h" on page 495
6074h	6074h	torque reference	-4000. to 4000.	0	0.001	Unchangeable	"6074h" on page 496
6077h	6077h	Actual torque	-4000. to 4000.	0	0.001	Unchangeable	"6077h" on page 496
607Ah	607Ah	Target position	-2147483648 to 2147483647	0	Reference unit	Real-time	"607Ah" on page 496
607Ch	607Ch	Home offset	-2147483648 to 2147483647	0	Reference unit	Real-time	"607Ch" on page 497
607D.01h	607D-01h	Min. position limit	-2147483648 to 2147483647	-2147483648	Reference unit	Real-time	"607D_en.01h" on page 497
607D.02h	607D-02h	Max. position limit	-2147483648 to 2147483647	2147483647	Reference unit	Real-time	"607D_en.02h" on page 498
607Eh	607Eh	Reference polarity	0–255	0	-	Real-time	"607Eh" on page 498
607Fh	607Fh	Max. speed	0 to 4294967295	4294967295	Reference unit/s	Real-time	"607Fh" on page 498
6081h	6081h	Profile velocity	0 to 4294967295	13981013	Reference unit/s	Real-time	"6081h" on page 499
6083h	6083h	Profile acceleration	0 to 4294967295	1398101333	Reference unit/s ²	Real-time	"6083h" on page 499
6084h	6084h	Profile deceleration	0 to 4294967295	1398101333	Reference unit/s ²	Real-time	"6084h" on page 500
6085h	6085h	Quick stop deceleration	0 to 4294967295	2147483647	Reference unit/s ²	Real-time	"6085h" on page 500
6087h	6087h	Torque slope	0.%/s–4294967295.%/s	4294967295	0.1%/s	Real-time	"6087h" on page 500
6091.01h	6091-01h	Motor resolution	1–4294967295	1	-	At stop	"6091_en.01h" on page 501

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
6091.02h	6091-02h	Shaft resolution	1–4294967295	1	-	At stop	"6091_en.02h" on page 501
6098h	6098h	Homing method	-3–35	1	-	Real-time	"6098h" on page 501
6099.01h	6099-01h	Speed during search for switch	0 to 4294967295	13981013	Reference unit/s	At stop	"6099_en.01h" on page 503
6099.02h	6099-02h	Speed during search for zero	0 to 4294967295	1398101	Reference unit/s	At stop	"6099_en.02h" on page 503
609Ah	609Ah	Homing acceleration	0 to 4294967295	139810133	Reference unit/s ²	Real-time	"609Ah" on page 503
60B8h	60B8h	Touch probe function	0–65535	0	-	Real-time	"60B8h" on page 504
60B9h	60B9h	Touch probe status	0–65535	0	-	Unchangeable	"60B9h" on page 505
60BAh	60BAh	Touch probe 1 positive edge position value	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"60BAh" on page 506
60BBh	60BBh	Touch probe 1 negative edge position value	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"60BBh" on page 506
60BCh	60BCh	Touch probe 2 positive edge position value	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"60BCh" on page 507
60BDh	60BDh	Touch probe 2 negative edge position value	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"60BDh" on page 507
60C1.01h	60C1-01h	Interpolation displacement	-2147483648 to 2147483647	0	Reference unit	Real-time	"60C1_en.01h" on page 507
60C2.01h	60C2-01h	Interpolation time period	1–20	1	-	Real-time	"60C2_en.01h" on page 507
60C2.02h	60C2-02h	Interpolation time units	-3–3	-3	-	Real-time	"60C2_en.02h" on page 508
60C5h	60C5h	Max. acceleration	0 to 4294967295	4294967295	Reference unit/s ²	Real-time	"60C5h" on page 508

Parameter List

Parameter	Comm. Add.	Name	Value	Default	Unit	Change Mode	Page
60C6h	60C6h	Max. deceleration	0 to 4294967295	4294967295	Reference unit/s ²	Real-time	"60C6h" on page 508
60D5h	60D5h	Touch probe 1 positive edge counter	0–65535	0	-	Unchangeable	"60D5h" on page 509
60D6h	60D6h	Touch probe 1 negative edge counter	0–65535	0	-	Unchangeable	"60D6h" on page 509
60D7h	60D7h	Touch probe 2 positive edge counter	0–65535	0	-	Unchangeable	"60D7h" on page 509
60D8h	60D8h	Touch probe 2 negative edge counter	0–65535	0	-	Unchangeable	"60D8h" on page 510
60E0h	60E0h	Positive torque limit	0. to 4000.	3500	0.001	Real-time	"60E0h" on page 510
60E1h	60E1h	Negative torque limit	0. to 4000.	3500	0.001	Real-time	"60E1h" on page 510
60F4h	60F4h	Position deviation	-2147483648 to 2147483647	0	Reference unit	Unchangeable	"60F4h" on page 510
60FCh	60FCh	Position reference	-2147483648p to 2147483647p	0	p	Unchangeable	"60FCh" on page 511
60FDh	60FDh	DI state	0–4294967295	0	-	Unchangeable	"60FDh" on page 511
60FFh	60FFh	PV target velocity	–2147483648 to +2147483647	0	Reference unit/s	Real-time	"60FFh" on page 512
60FE.01h	60FE-01h	Physical output	0–4294967295	0	-	Real-time	"60FE_01h" on page 512
60FE.02h	60FE-02h	Bitmask	0–4294967295	0	-	Real-time	"60FE_02h" on page 513



Copyright © Shenzhen Inovance Technology Co., Ltd.

PS00012214A02

Shenzhen Inovance Technology Co., Ltd.

www.inovance.com

Suzhou Inovance Technology Co., Ltd.

www.inovance.com

Add.: Inovance Headquarters Tower, High-tech Industrial Park,
Guanlan Street, Longhua New District,
Shenzhen 518000, P.R. China

Tel: (0755) 2979 9595

Fax: (0755) 2961 9897

Add.: No.52, Tian'e Dang Road, Wuzhong District,
Suzhou 215104, P.R. China

Tel: (0512) 6637 6666

Fax: (0512) 6285 6720