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SV670P Series Servo Drive

Function Guide

Industrial Automation

Intelligent Elevator

New Energy Vehicle

Industrial Robot

Rail Transit

Data code 19011866 A02

Preface

Introduction

Thank you for purchasing the SV670P series servo drive developed by Inovance.

The SV670P series servo drive is a high-end servo drive designed based on global-leading standards and high-end application needs. It is featured with high speed, high precision, high performance, and tuning-free Function.

The servo drive covers a power range from 0.05 kW to 7.5 kW and carries Modbus communication interfaces to work with the host controller for a networked operation of multiple servo drives. The drive comes with the ITune function which supports adaptive stiffness level setting, inertia auto-tuning, and vibration suppression for easy use. The servo drive, together with an MS1 series high-response servo motor (with ultra-low, low or medium inertia) equipped with a 23-bit single-turn/multi-turn absolute encoder, serve to deliver a quiet and stable operation and accurate process control through the fully closed-loop function and internal process segment function.

The drive also offers dynamic braking. The drive aims to achieve quick and accurate position control, speed control, and torque control through high-performance solutions for automation equipment in such industries as electronic manufacturing, lithium batteries, manipulators, packaging, 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
SV670P Series Servo Drive Selection Guide	19011852	Provides instructions on product selection, including the list of supporting components, technical data on the drive and motor, and the selection guide of cables.
SV670P Series Servo Drive installation Guide	19011868	Presents installation of the servo drive, including installation steps, , mechanical installation, and electrical installation.
SV670P Series Servo Drive Hardware Guide	19011854	Presents electrical design guidance of the equipment, description of terminals, required certificates and standards and solutions to common EMC problems.
SV670P Series Servo Drive Commissioning Guide	19011856	Presents servo commissioning, parameter descriptions, including the operating panel, commissioning software, commissioning procedure and a parameter list.

Name	Data Code	Description
SV670P Series Servo Drive Function Guide	19011866	Presents functions and parameters, including function overview, basic servo functions, adjustment and parameter list.
SV670P Series Servo Drive Communication Guide	19011871	Presents functions and parameters of the servo drive, including Modbus communication configuration, parameter descriptions, and communication application cases.
SV670P Series Servo Drive Troubleshooting Guide	19011869	Introduces faults and fault levels, the troubleshooting process, warning codes and fault codes.
SV670P Series Servo Drive Maintenance Guide	19011870	Provides instructions on maintenance and repair of the equipment.
SV670P Series Servo Drive Manual Package	PS00005526	Provides information on selection, installation, commissioning, function, troubleshooting and parameters of the equipment.

Revision History

Date of Revision	Version	Description
2022-06	A02	• Deleted information on the built-in brake. • Added application conditions for H18.04. • Modified "Torque limit source (H07.07 = 4)". • Updated description of some parameters. • Updated the schematic diagram of the drive.
2022-06	A01	• Modified the parameters and flow chart related to torque command input. • Modified the description of encoder types supported by SV670. • Added evaluation conditions for torque homing.
2022-03	A00	First release.

Document Acquisition

This manual is not delivered with the product. You can obtain the PDF version by visiting:

- http://www.inovance.com.
- Scan the QR code on the equipment to acquire more.

Table of Contents

General Safety Instructions

Safety Precautions

- This section explains the safety precautions that need to be observed to use this product correctly. Before using this product, please read the instruction manual and correctly understand the relevant information of safety precautions. Failure to comply with the safety precautions may result in death, serious injury, or equipment damage.
- "CAUTION", "WARNING", and "DANGER" items in the guide only indicate some of the precautions that need to be followed; they just supplement the safety precautions.
- Use this equipment according to the designated environment requirements. Damage caused by improper use is not covered by warranty.
- Inovance shall take no responsibility for any personal injuries or property damage caused by improper use.

Safety Levels and Definitions

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

General Safety Instructions

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

Unpacking

⚠ WARNING

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

⚠ CAUTION

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

Storage and Transportation

⚠ WARNING

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

CAUTION

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

Installation

DANGER

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

WARNING

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

CAUTION

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

Wiring

DANGER

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals.
- Before wiring, cut off power connections with all equipment. Residual voltage exists after power cut-off. Therefore, wait at least the time designated on the equipment warning label before further operations. Measure the DC voltage of the main circuit and make sure it is below the safe voltage, otherwise there will be the danger of electric shock.
- Do not perform wiring, remove the equipment cover, or touch the circuit board with power ON. Failure to comply will result in an electric shock.
- Check that the equipment is grounded properly. Failure to comply will result in an electric shock.

WARNING

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

CAUTION

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

Power-on

DANGER
• Before power-on, check that the equipment is installed properly with reliable wiring and the motor can be restarted. • Check that the power supply meets equipment requirements before power-on to prevent equipment damage or a fire. • After power-on, do not open the cabinet door or protective cover of the equipment, touch any terminal, or disassemble any unit or component of the equipment. Failure to comply will result in an electric shock.
WARNING
• Perform a trial run after wiring and parameter setting to ensure the equipment operates safely. Failure to comply may result in personal injuries or equipment damage. • Before power-on, make sure that the rated voltage of the equipment is consistent with that of the power supply. Failure to comply may resulting in a fire. Failure to comply may result in a fire. • Before power-on, check that no one is near the equipment, motor, or machine. Failure to comply may result in death or personal injuries.
Operation
DANGER
• The equipment must be operated only by professionals. Failure to comply will result in death or personal injuries. • Do not touch any connecting terminals or disassemble any unit or component of the equipment during operation. Failure to comply will result in an electric shock.
WARNING
• Do not touch the equipment casing, fan, or resistor with bare hands to feel the temperature. Failure to comply may result in personal injuries. • Prevent metal or other objects from falling into the equipment during operation. Failure to comply may result in a fire or equipment damage.
Maintenance
DANGER
• Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals. • Do not maintain the equipment with power ON. Failure to comply will result in an electric shock. • Before maintenance, cut off all the power supplies of the equipment and wait for at least the time designated on the equipment warning label. • In case of a permanent magnet motor, do not touch the motor terminals immediately after power-off because the motor terminals will generate induced voltage during rotation even after the equipment power supply is off. Failure to comply will result in an electric shock.

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

Additional Precautions

Cautions for the dynamic brake

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

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

Safety Label

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

Safety Label	Description
	• Never fail to connect the protective earth (PE) terminal. Read through the guide and follow the safety instructions before use. • Never fail to connect Protective Earth (PE) terminal. Read the manual and follow the safety instructions before use. • Do not touch terminals within 15 minutes after disconnecting the power supply to prevent the risk of electric shock. • Do not touch terminals with 15 minutes after Disconnect the power. Risk of electrical shock. • Do not touch the heatsink with power ON to prevent the risk of burn. • Do not touch heatsink when power is ON. Risk of burn.

1 Function Overview

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

Function	Description
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 mode	Used to switch between position control and speed control through external input signals.
Speed/Torque control switchover mode	Used to switch between speed control and torque control through external input signals.
Torque/Position control switchover mode	Used to switch between torque control and position control through external input signals.
Torque/Speed/ Position control switchover mode	Used to switch among torque control, speed control and position control through external input signals.
High-resolution encoder	The servo drive is equipped with a high-performance encoder with resolution up to 2^{23} (8388608) PPR.
Electronic gear ratio	Decreasing or increasing the pulse input by: 0.001 x encoder resolution to 4000 x encoder resolution
Position Reference Filter	Used to achieve smooth acceleration and deceleration.
Interrupt positioning	Used to interrupt present position reference and execute the set displacement.
Frequency-Division Output	Used to output the position reference pulses or the position pulses fed back by the encoder in the form of phase A/phase B quadrature pulses.
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	Used to display the drive status through the LED on the keypad.
External I/O display	Used to display ON/ OFF status of external I/O signals.
External regenerative resistor	Used in case of insufficient braking capacity of the built-in regenerative resistor.
Fault log	Used to record the latest twenty faults/warnings, which can also be cleared.

Function	Description
Warning code output	Used to output a four-bit warning code when a warning occurs.
AI, AO	Supports AI and AO.
Position comparison output	Used to output a DO signal with designated pulse width after the drive reaches the preset target position.
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.
STO function	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 keypad without a start signal.
Inovance software tool	Used to set parameters, perform trial run, and check status through a PC.
Mechanical characteristics analysis	Used to analyze the resonance frequency and characteristics of the mechanical system through a PC installed with Inovance software tool.
Gain auto-tuning	Supports three auto-tuning modes: STune, ETune, and ITune.
Gain switchover	Used to apply different gains to different status (operating or stop) of the motor. Gains can also be switched by external terminals during operation.
Torque disturbance observer	Used to estimate the disturbance torque suffered by the system and make corresponding compensation.
Resonance suppression	Used to suppress resonance at high, medium, and low frequencies.
Torque Reference Filter	Used to suppress the mechanical resonance that may be generated when the response speed is excessively high.

2 Basic Functions of the Servo Drive

2.1 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.

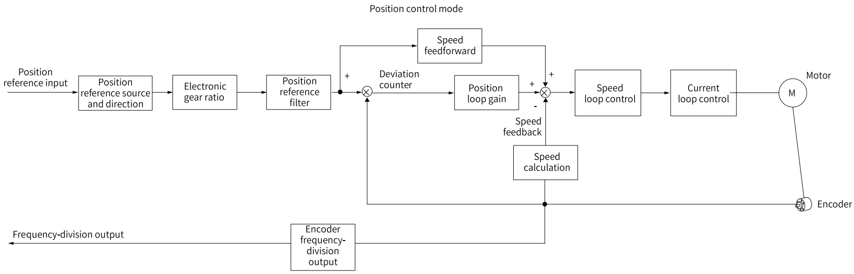


Figure 2-1 Position control diagram

Set H02.00 (Control mode) to 1 (Position control mode) through the keypad or Inovance software tool 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.

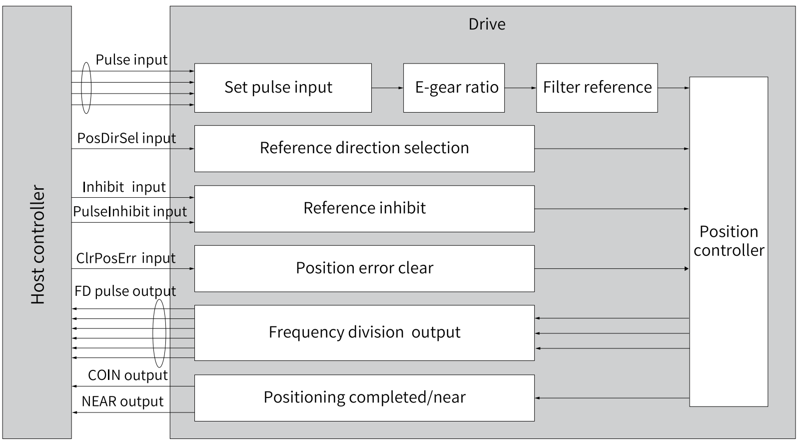


Figure 2-2 Signal exchange between the drive and host controller

2.1.1 Function Block Diagram

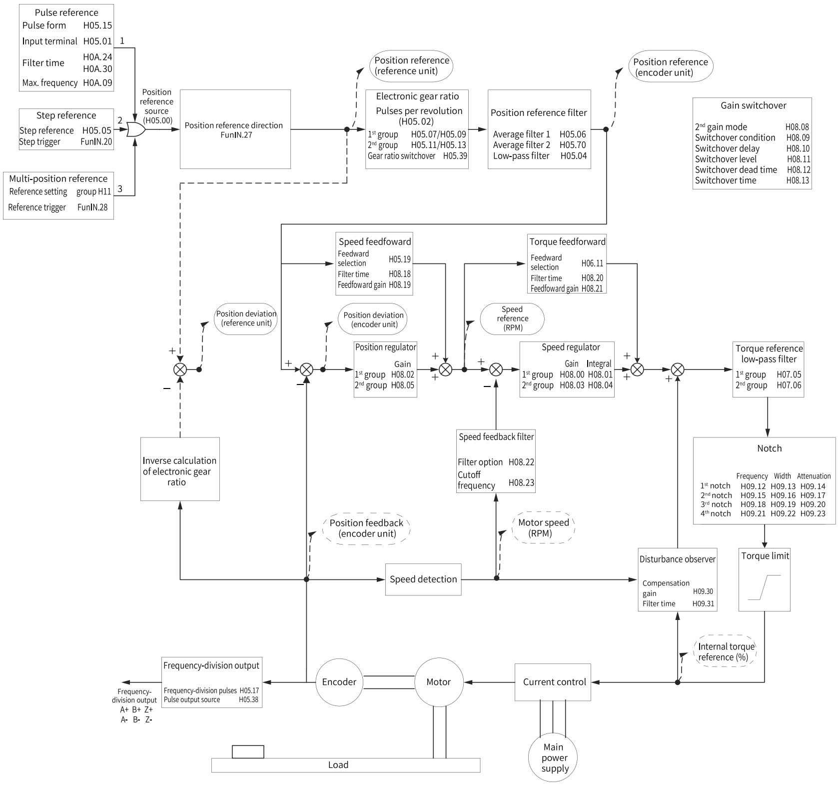


Figure 2-3 Block diagram of position control

2.1.2 Position Reference Input

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

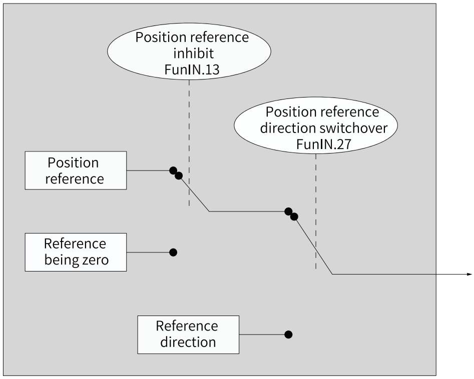


Figure 2-4 Position reference input setting

Position reference source

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

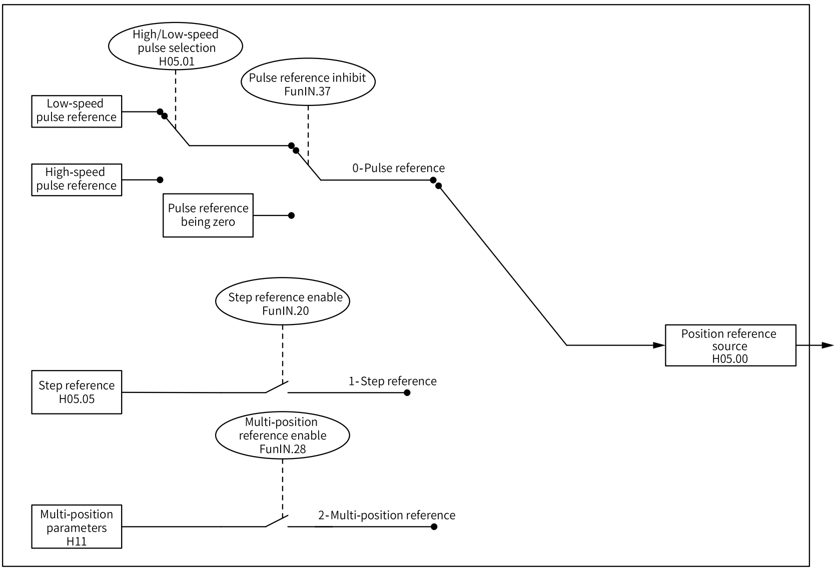


Figure 2-5 Setting the position reference source

☆Related parameters

See *" H05.00" on page 216* for details.

- **Pulse reference as the source (H05.00 = 0)**

  Perform the following operations to obtain the correct pulse reference form.

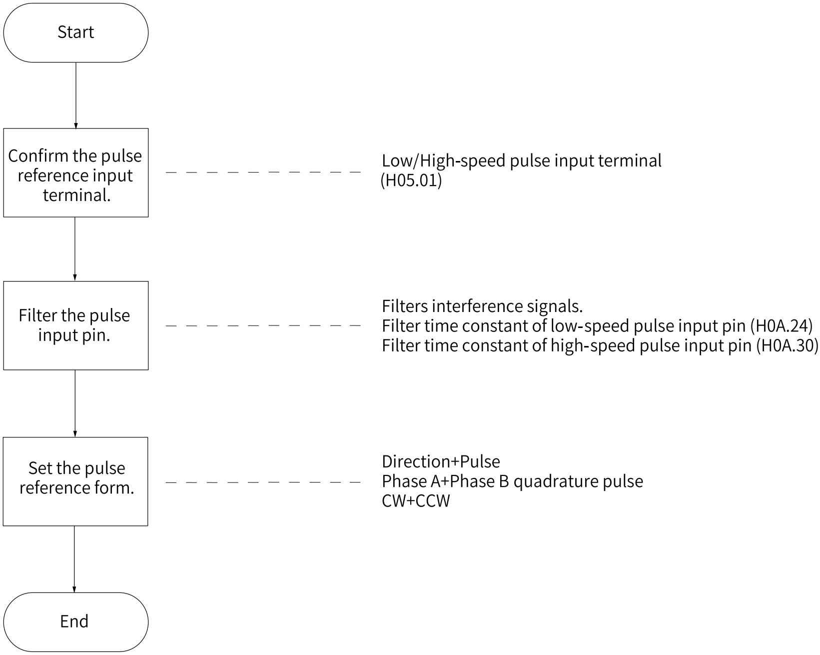
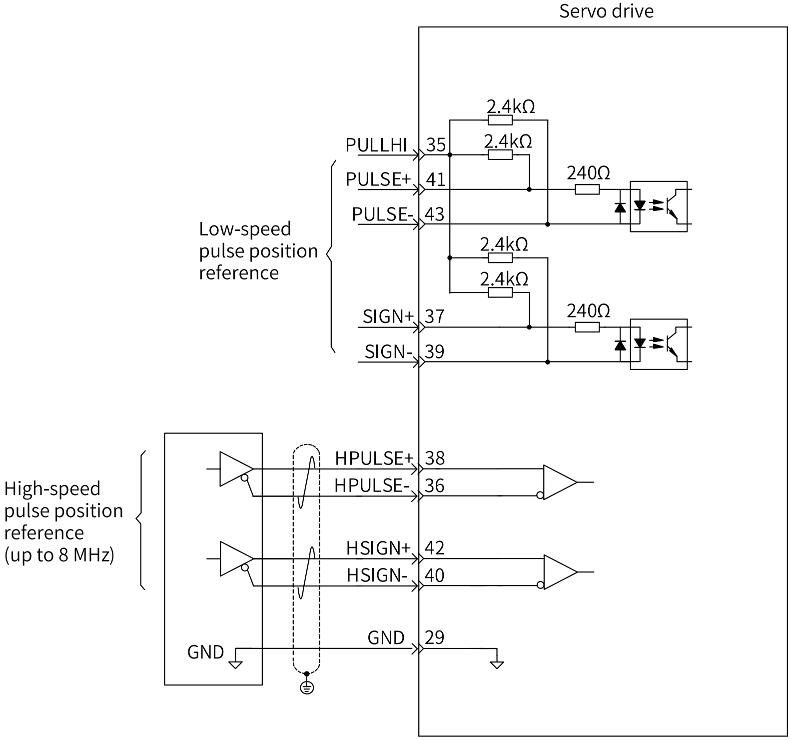


Figure 2-6 Flowchart for setting the pulse reference as the source

- Pulse reference input terminals

  The drive provides two groups of pulse input terminals.



The low-speed pulse input terminals (PULSE+, PULSE-, SIGN+, SIGN-) receive open-collector input (maximum frequency up to 200 kpps).

The high-speed pulse input terminals (HPULSE+, HPULSE-, HSIGN+, HSIGN-) receive differential input (maximum frequency up to 8 Mpps) only.

☆ Related parameters:

See *" H05.01" on page 216* for details.

For details on the interface circuit, see SV670P Series Servo Drive Hardware Guide.

Table 2–1 Specifications of pulse input

Pulse Type		Maximum Input Frequency	Voltage	Forward Current
High-speed pulse	Differential signal	8 Mpps	5 V	<25mA
Low-speed pulse	Open collector signal	200 kpps	24 V	<15mA

- Pulse input pin filter

Set the pin filter time for input terminals of low-speed and high-seed pulses. This is to prevent motor malfunction caused by interference signals.

☆ Related parameters:

See " *H0A.24" on page 294* for details.

See " *H0A.30" on page 296* for details.

If the filter time constant for pulse input pins is t_F, the minimum width of input signals is t_{min}, then the input signals before and after filtering are as follows. The filtered input signals will be delayed for t_F over the unfiltered ones.

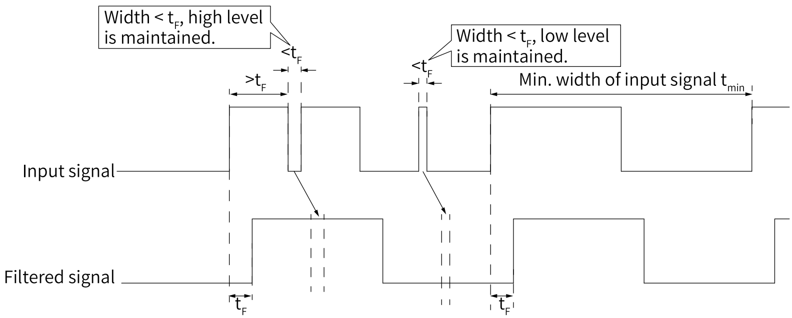


Figure 2-7 Example of filtered signal waveform

The pulse input pin filter time t_F must meet the following requirement: $t_F \leqslant$ (20% to 25%) t_{min}

The following table lists the recommended filter time constant based on the maximum frequency (or minimum pulse width) of input pulses.

Table 2–2 Recommended filter time constant

Pulse Input Terminal	Related Parameters	Maximum Frequency of Input Pulses	Recommended Filter Time Constant (25 ns)
Low-speed pulse input terminal	H0A.24	< 167 kbps	30
		167 kbps to 200 kbps	20
High-speed pulse input terminal	H0A.30	200k~1M	5
		> 1 Mpps	3

For example, if the filter time constant is set to 30, the actual filter time is 30 x 25 = 750 ns.

- Pulse reference form

  The drive supports the following three types of pulse references:

  - Direction + Pulse (positive or negative logic)
  - Phase A + Phase B quadrature pulse, quadrupled frequency

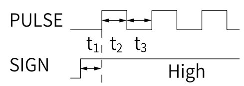
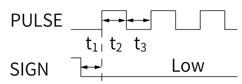
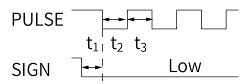
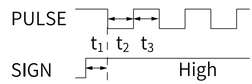
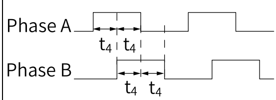
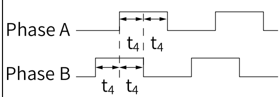
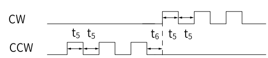
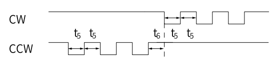
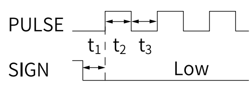
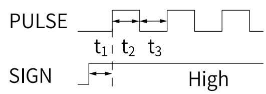
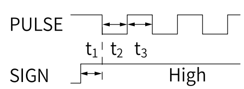
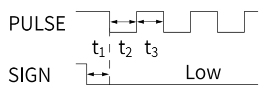
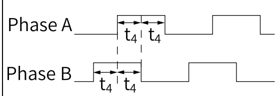
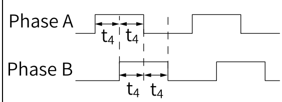
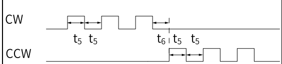
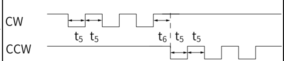
■ CW + CCW

Set the pulse reference form appropriate for the host controller or other pulse generators.

☆ Related parameters:

See " H05.15" on page 219 for details.

Table 2–3 Descriptions of the pulse form

H02.02	H05.15	Pulse form	Signal	Diagram of forward pulses	Diagram of reverse pulses
0	0	Pulse + Direction Positive Logic	PULSE SIGN		
	1	Pulse + Direction Negative Logic	PULSE SIGN		
	2	Phase A + Phase B Quadrature pulse Quadrupled frequency	PULSE (phase A) SIGN (phase B)	Phase A leads phase B by 90°. 	Phase B leads phase A by 90°. 
	3	CW+CCW	PULSE (CW) SIGN (CCW)		
1	0	Pulse + Direction Positive Logic	PULSE SIGN		
	1	Pulse + Direction Negative Logic	PULSE SIGN		
	2	Phase A + Phase B Quadrature pulse Quadrupled frequency	PULSE (phase A) SIGN (phase B)	Phase B leads phase A by 90°. 	Phase A leads phase B by 90°. 
	3	CW+CCW	PULSE (CW) SIGN (CCW)		

The following table describes the maximum frequencies and minimum time widths of position pulse references corresponding to different input terminals.

Table 2–4 Specifications of pulse references

Input Terminal	Maximum Frequency	Minimum Time Width (unit: us)					
		t1	t2	t3	t4	t5	t6
High-speed pulse input terminal	8 Mpps	0.125	0.125	0.125	0.25	0.125	0.125
Low-speed pulse input terminal	200 kpps	2.5	2.5	2.5	5	2.5	2.5

The rising time and falling time of position pulse references must be shorter than 0.1 us.

- Pulse reference frequency
  Set the maximum position pulse frequency in H0A.09.
- EB01.0 (Pulse input error) occurs when the actual input pulse frequency exceeds H0A.09.
  ☆ Related parameters:

  See *" H0A.09" on page 292* for details.

- **Step reference as position reference source (H05.00 = 1)**

Caution

When the S-ON (Servo ON) signal is active, the motor is locked when the step reference is disabled or in the rotational state when the step reference is enabled. After H05.05 (Step reference) is done executing, the motor stays locked when no step reference is triggered again.

The drive supports step operation, which means the drive can operate at a fixed speed until the set displacement is reached. The setting flowchart is as follows.

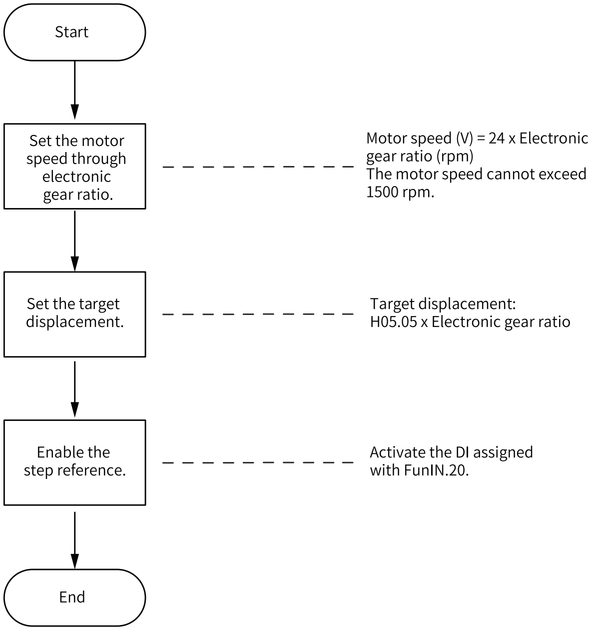


Figure 2-8 Flowchart for setting step reference as the position reference source

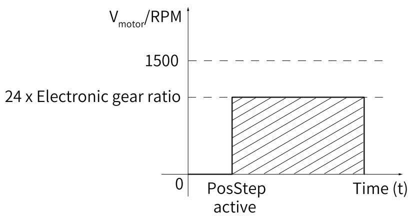


Figure 2-9 Motor operating curve (H05.00 = 1)

The hatched area in the preceding figure indicates the motor displacement: H05.05 x Electronic gear ratio (encoder unit).

- Relationship between the motor speed and electronic gear ratio
  When the step reference is used as the position reference source, the set motor speed will be converted based on the following formula. The motor speed in this case cannot exceed 1500 rpm.

$$V_{motor} = 24 \times \text{Electronic gear ratio (rpm)}$$

- Motor displacement

When the step reference is used as the position reference source, the sum of position references (reference unit) is set in H05.05. The sign of the setpoint of H05.05 determines the motor direction of rotation.

☆ Related parameters:

See *" H05.05" on page 218* for details.

- Step reference enable
  To use the step reference as the position reference source, assign FunIN.20 (PosStep, step reference enable) to a certain DI of the drive, and set the active logic of this DI.

☆Related function No.

No.	Name	Function Name	Function
FunIN.20	PosStep	Step reference enable	S-ON: Active: The position reference defined by H05.05 is input to the servo drive, driving the motor to run. Inactive: The motor stays locked.

FunIN.20 (Step reference enable) is edge-triggered. The motor is locked after the step reference is done executing. When FunIN.20 is triggered again, the motor executes the step reference defined by H05.05 again.

- **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.

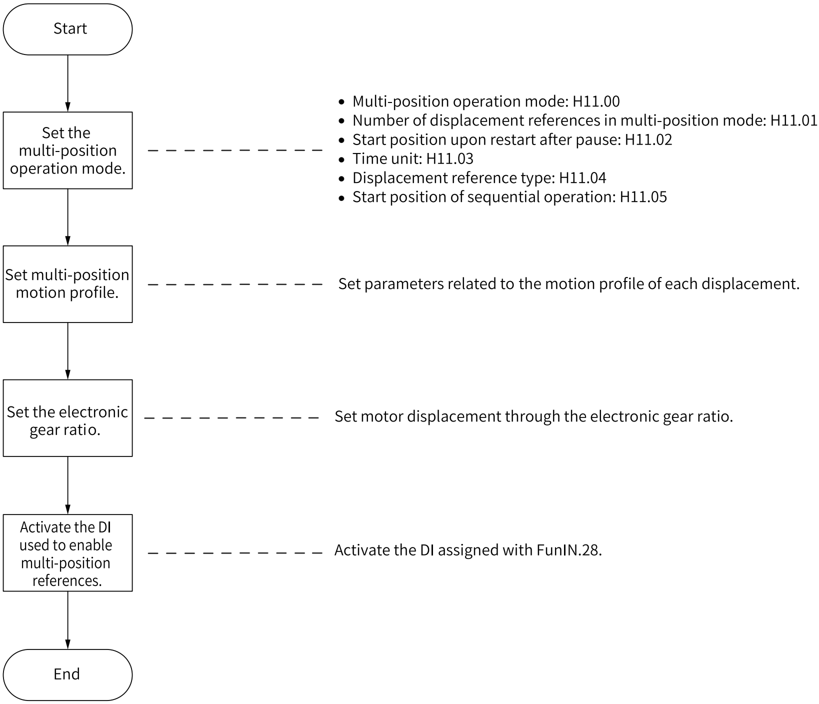


Figure 2-10 Flowchart for setting the multi-position reference as the source

- Setting the multi-position operation mode

☆ Related parameters:

See *" H11.00" on page 336* for details.

See *" H11.01" on page 340* for details.

See *" H11.02" on page 340* for details.

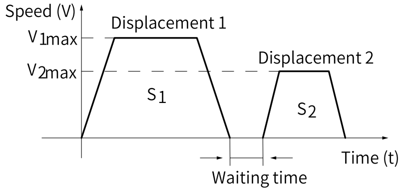
See *" H11.03" on page 341* for details.

See *" H11.04" on page 341* for details.

See *" H11.05" on page 342* for details.

1. **Individual operation (H11.00 = 0)**

Table 2–5 Description of individual operation

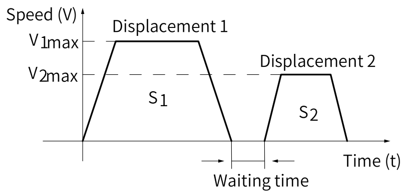
Description	Operating Curve
• The drive stops after one cycle of operation. • The drive switches to the next displacement automatically. • The interval time between displacements can be set as needed. • The PoslnSen (multi-position reference enable) signal is level-triggered.	 V_{1max}, V_{2max}: maximum 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 PoslnSen 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 operation (H11.00 = 1)**

Table 2–6 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 PoslnSen (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 PoslnSen 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 2–7 Descriptions of DI-based operation

Description	Operating Curve
• The displacement to be exected next can be set when the current displacement is in progress. The motor stops after current displacement is done executing. After the PoslnSen (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 PoslnSen (multi-position reference enable) signal 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 • 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 PoslnSen (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 PoslnSen (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.

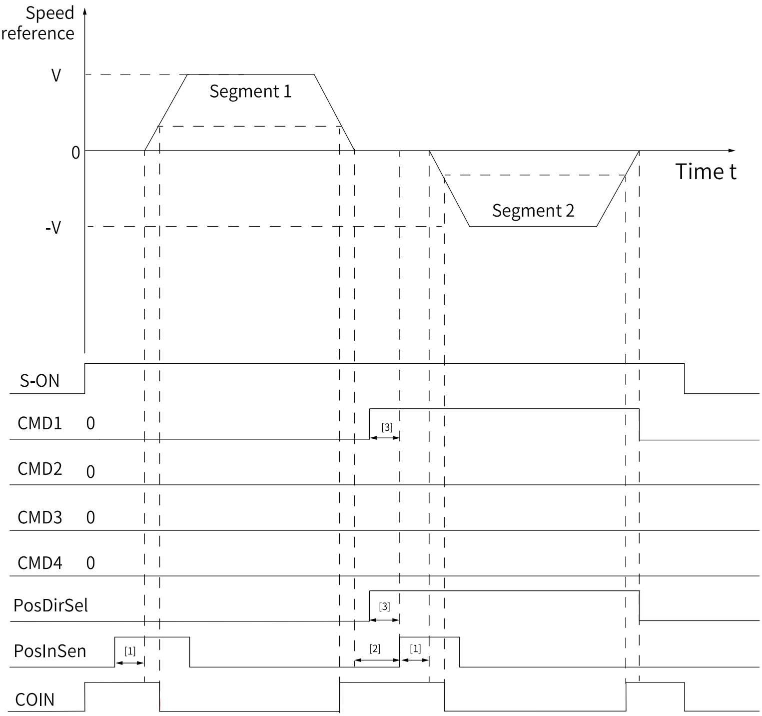


Figure 2-11 Multi-position sequence diagram

Note

- [1] 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.
- [2] Area for switching the displacement No.: Refers to the range 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.
- [3] When a normal DI is used, an effective signal width of 0.125 ms must be kept.

☆ Related function No.

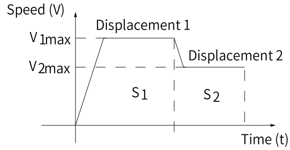
<table>
<tr><th>No.</th><th>Name</th><th>Function Name</th><th>Function</th></tr>
<tr><td>FunIN.6</td><td>CMD1</td><td>Multi-reference switchover 1</td><td rowspan="4">The displacement No. is a 4-bit binary.
The relationship between the displacement No. and CMD1 to CMD4 is shown in "Table 2–8 " on page 31.
The DI logic is level-triggered. The CMD value is 1 upon active level input or 0 upon inactive level input.</td></tr>
<tr><td>FunIN.7</td><td>CMD2</td><td>Multi-reference switchover 2</td></tr>
<tr><td>FunIN.8</td><td>CMD3</td><td>Multi-reference switchover 3</td></tr>
<tr><td>FunIN.9</td><td>CMD4</td><td>Multi-reference switchover 4</td></tr>
</table>

Table 2–8 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 operation (H11.00 = 3)**

Table 2–9 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 PoslnSen (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 PoslnSen 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)**

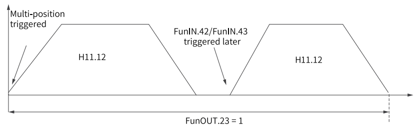
Table 2–10 Description of axis-controlled continuous operation

<table>
<tr><th>Description</th><th>Operating Curve</th></tr>
<tr>
<td>

- The drives executes one displacement only.
- The individual operation mode, sequential operation mode, and interrupted operation mode are included.
- The PoslnSen (multi-position reference enable) signal is level-triggered.

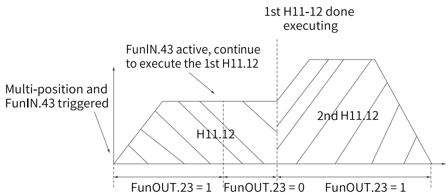
</td>
<td>

- Individual operation



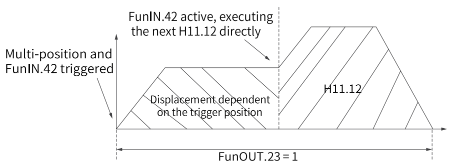
The PoslnSen (multi-position reference enable) signal is triggered only once (FunIN.43/42 triggered later). The drive stops after executing the distance defined by H11.12.

- Sequential operation



The PoslnSen (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 PoslnSen (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.

</td>
</tr>
</table>

☆ Related function No.

No.	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:

  See *" H11.12" on page 343* for details.

  See *" H11.14" on page 343* for details.

  See *" H11.15" on page 343* for details.

  See *" H11.16" on page 344* for details.

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

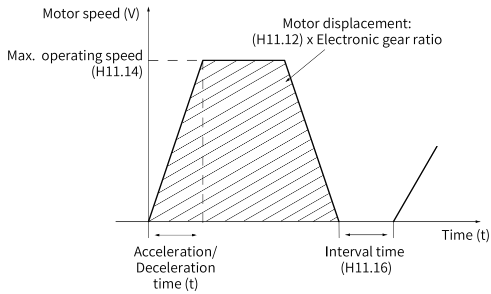


Figure 2-12 Motor operating curve in displacement 1

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.

No.	Name	Function Name	Function
FunIN.28	PosInSen	Multi-position reference enable	Active: The motor executes the multi-position reference. Inactive: The motor stays locked. **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 function No.

No.	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 direction of rotation is related to the setting of H02.02 (Direction of rotation), the sign (+/-) of the position reference value, and FunIN.27.

Table 2–11 Motor direction of rotation

H02.02	Sign of the Position Reference Value	FunIN.27	Actual 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.

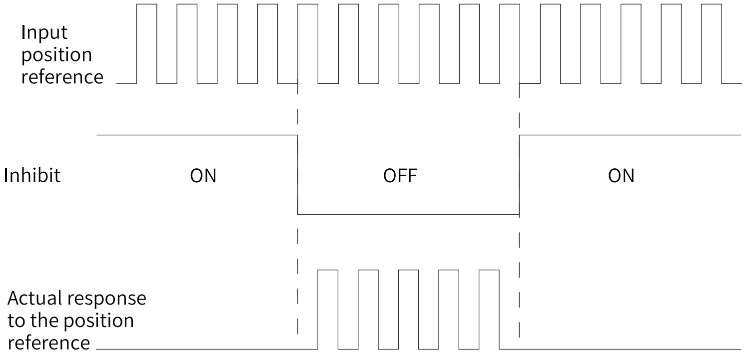


Figure 2-13 Waveform example for position reference inhibited

☆Related function No.

No.	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.

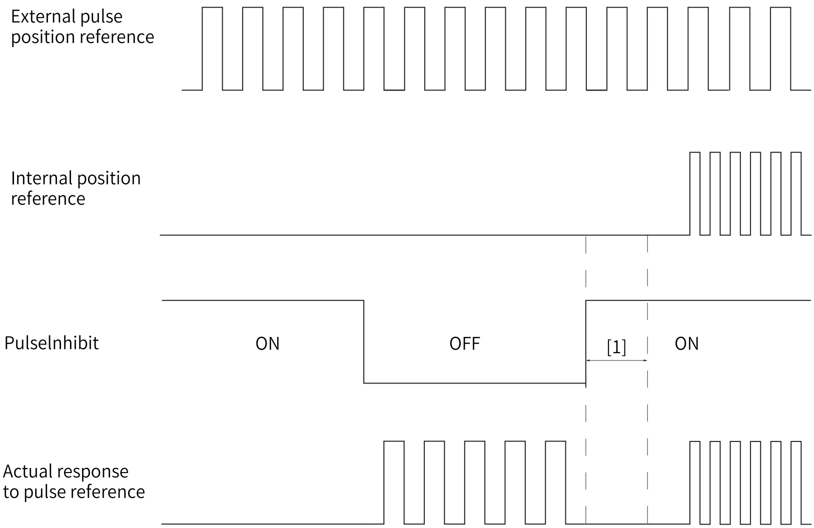


Figure 2-14 Waveform example for pulse reference inhibited

Note

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

☆Related function No.

No.	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.

2.1.3 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.

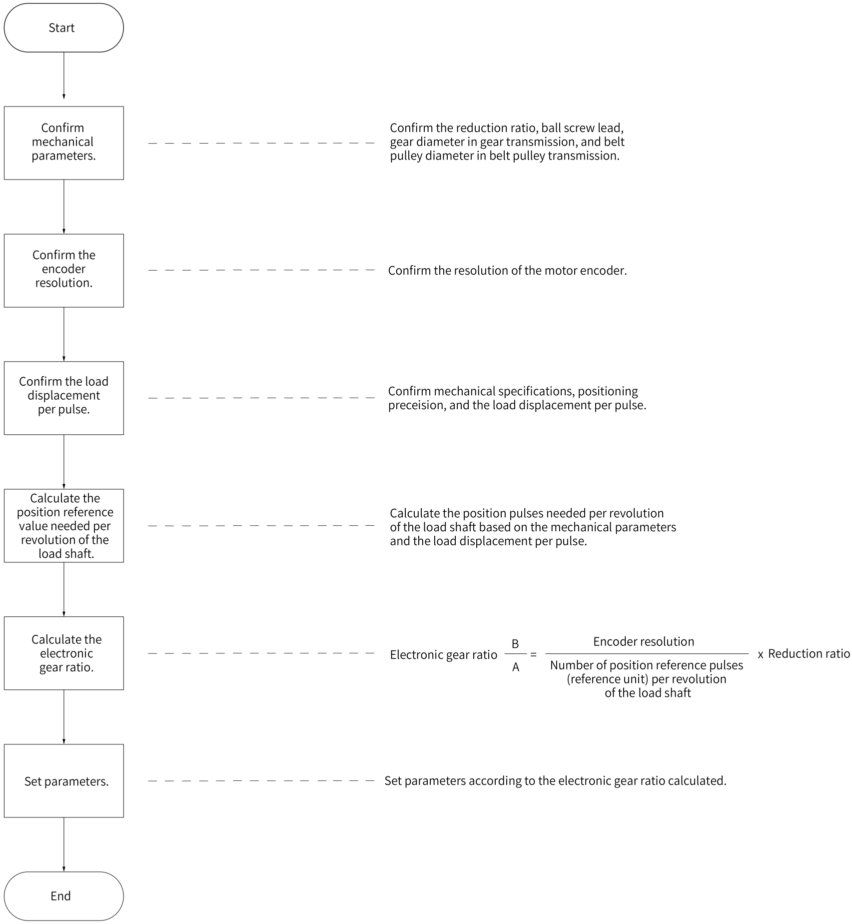


Figure 2-15 Procedure for setting the electronic gear ratio

See the following figure for how to set parameters.

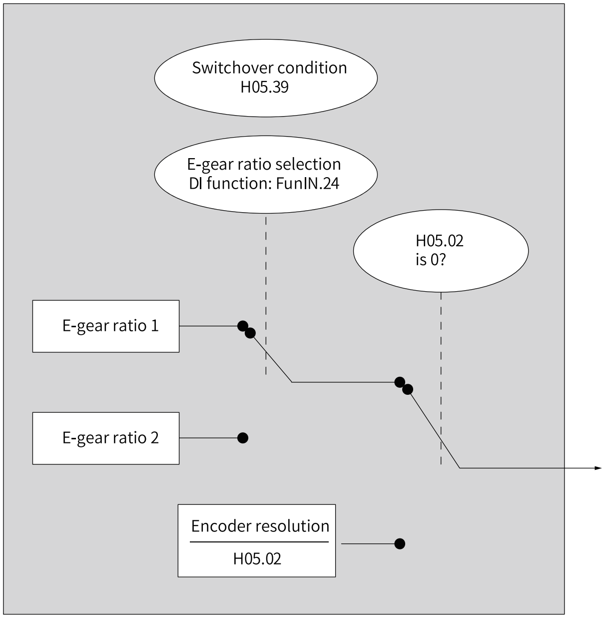


Figure 2-16 Procedure for setting the electronic gear ratio

Note

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

Electronic gear ratio $\frac{B}{A} = \frac{\text{Encoder resolution}}{\text{H05.02}}$. In this case, electronic gear ratios 1 and 2 are invalid.

Related Parameters

- Setting the electronic gear ratio parameters

  ☆ Related parameters:

  See *" H05.02" on page 217* for details.

  See *" H05.07" on page 218* for details.

  See *" H05.09" on page 219* for details.

  See *" H05.11" on page 219* for details.

  See *" H05.13" on page 219* for details.

- 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 position references.

- 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:

See " H05.39" on page 228 for details.

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

☆ Related function No.

No.	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	
		Active	
	1	Inactive	$\frac{H05.07}{H05.09}$
		Active	$\frac{H05.11}{H05.13}$
1 to 1048576	-		-

The resolution of the serial encoder is 2^n PPR, 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.

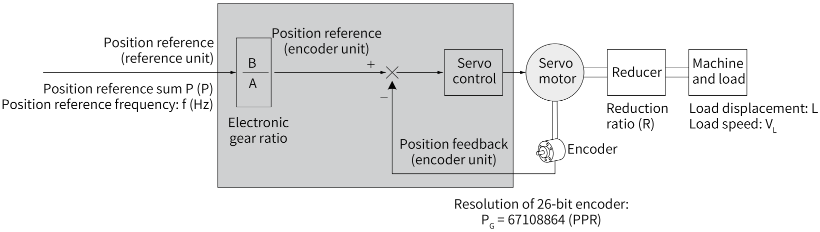


Figure 2-17 Relationship among the position reference (reference unit), load displacement, and electronic gear ratio

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

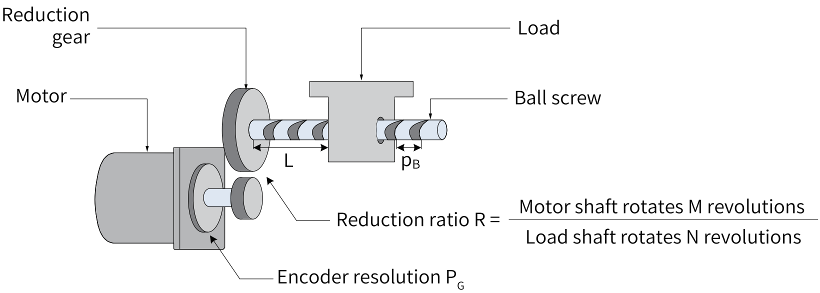


Figure 2-18 Ball screw

- 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 rotating 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:

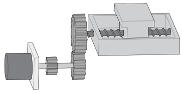
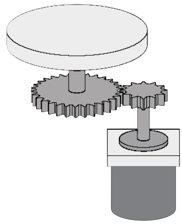
  $$f \times \frac{B}{A} = v_M \times P_G$$

  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 2–12 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	Encoder resolution	23bit=8388608P/r	23bit=8388608P/r	23bit=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

2.1.4 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.

Use this function in the following cases:

- 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:

See " H05.04" on page 217 for details.

See " H05.06" on page 218 for details.

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.

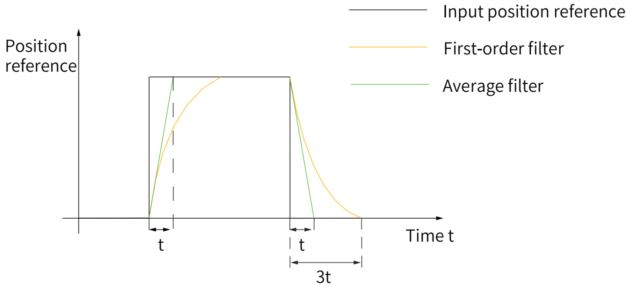


Figure 2-19 First-order filter and moving average filter for rectangular position references

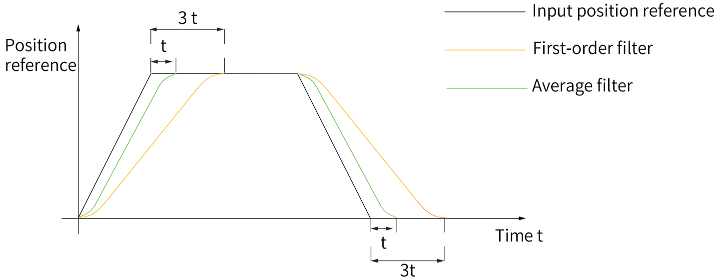


Figure 2-20 First-order filter and moving average filter for trapezoid position references

2.1.5 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:

See *" H05.16" on page 221* for details.

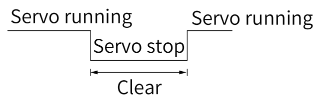
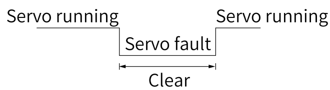
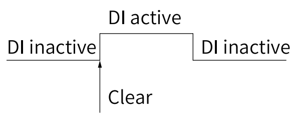
When H05.16 is set to 2, assign FunIN.35 (ClrPosErr, clear position deviation) to a certain DI and set the active logic of this DI. It is recommended to use the high-speed DI (DI7 or DI8) terminal.

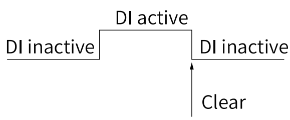
☆ Related function No.

No.	Name	Function Name	Function
FunIN.35	ClrPosErr	Position deviation clear	Active: Position deviation cleared Inactive: Position deviation not cleared

The setting method is shown as follows.

Table 2–13 Position deviation clear

<table>
<tr><th>Setpoint</th><th>Clear Condition</th><th>Clear Time</th></tr>
<tr><td>H05.16 = 0</td><td>Position deviation is cleared upon S-OFF or in the non-operational state.</td><td>
</td></tr>
<tr><td>H05.16 = 1</td><td>Position deviation is cleared upon S-OFF or a fault.</td><td>
</td></tr>
<tr><td rowspan="2">H05.16 = 2</td><td rowspan="2">Position deviation is cleared upon S-OFF or active DI function 35 (ClrPosErr, clear position deviation).</td><td>

(Rising edge-triggered)</td></tr>
<tr><td>

(Falling edge-triggered)</td></tr>
</table>

2.1.6 Frequency-division Output

Caution

It is recommended to use the active edge outputted by Z signal in cases where a high precision frequency-division output of Z signal is required.

Param. No.	Bit	Description
H05.41	Bit 0: Frequency-division Z signal output polarity	0: Positive: Falling edge-triggered 1: Negative: Rising edge-triggered
	Bit 1: OCZ signal output polarity	0: Positive: Falling edge-triggered 1: Negative: Rising edge-triggered

In frequency-division output, the position reference pulses or the position pulses fed back by the encoder is output in phase A/phase B quadrature pulses.

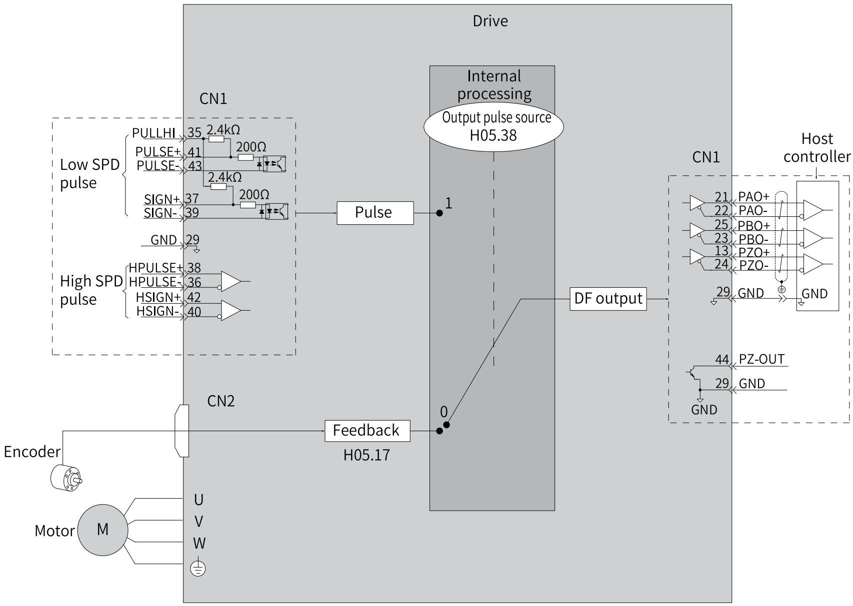


Figure 2-21 Schematic diagram of frequency-division output

It is recommended to use synchronous output (H05.38 = 1) of pulse references in case of synchronous tracing of multi-axis servo pulses. When the host controller is used for closed-loop feedback, it is recommended to use encoder frequency-division output (H05.38 = 0).

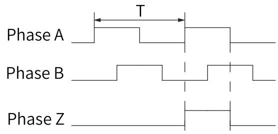
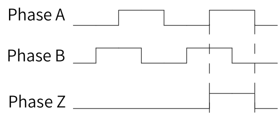
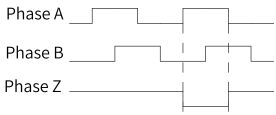
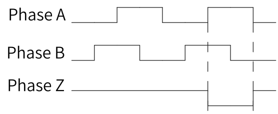
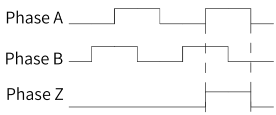
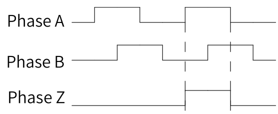
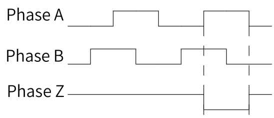
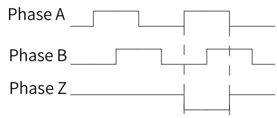
The drive offers one group of frequency-division terminals, as described below:

- Phase A pulses: PAO+ and PAO-, differential output, maximum output pulse frequency: 4 Mpps
- Phase B pulses: PBO+ and PBO-, differential output, maximum output pulse frequency: 4 Mpps
- Phase Z pulses: PZO+ and PZO-, differential output, maximum output pulse frequency: 4 Mpps
- PZ-OUT, GND, open-collector output, maximum output pulse frequency: 100 kpps

Set H05.38 (Pulse output source), H02.03 (Pulse output phase), H05.17 (Encoder frequency-division pulses), and H05.41 (Z pulse output polarity) as needed when using frequency-division output.

When the output source is encoder frequency-division pulse (H05.38 = 0), the motor rotates one revolution and the phase A/B output pulses per motor revolution are determined by H05.17 (Encoder frequency-division pulses). The pulse width (T) of phase A/B is determined by the motor speed. The phase Z, whose width is also T, is synchronized with phase A. Z signal is output once per motor revolution.

Table 2–14 Pulse diagrams of encoder frequency-division output (H05.38 = 0)

H02.03 (Output pulse phase)	H05.41 (Z pulse output polarity)	Pulse Output Diagram of Forward RUN	Pulse Output Diagram of Reverse RUN
0	0	 Phase A leads phase B by 90°.	 Phase B leads phase A by 90°.
	1	 Phase A leads phase B by 90°.	 Phase B leads phase A by 90°.
1	0	 Phase B leads phase A by 90°.	 Phase A leads phase B by 90°.
	1	 Phase B leads phase A by 90°.	 Phase A leads phase B by 90°.

☆ Related parameters:

See *" H02.03" on page 189* for details.

See *" H05.17" on page 221* for details.

See *" H05.38" on page 227* for details.

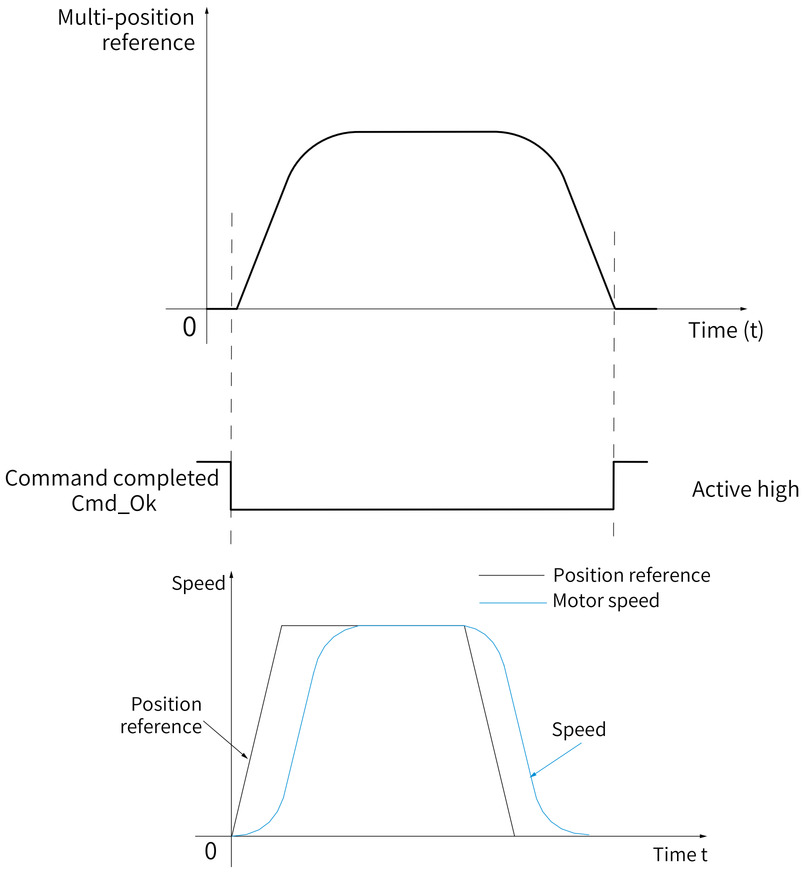
See *" H05.41" on page 229* for details.

2.1.7 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 schematic diagram is shown below.



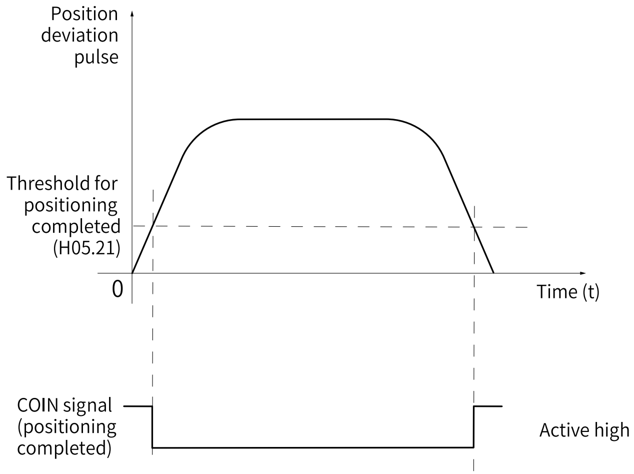


Figure 2-22 Description of positioning completed/proximity functions

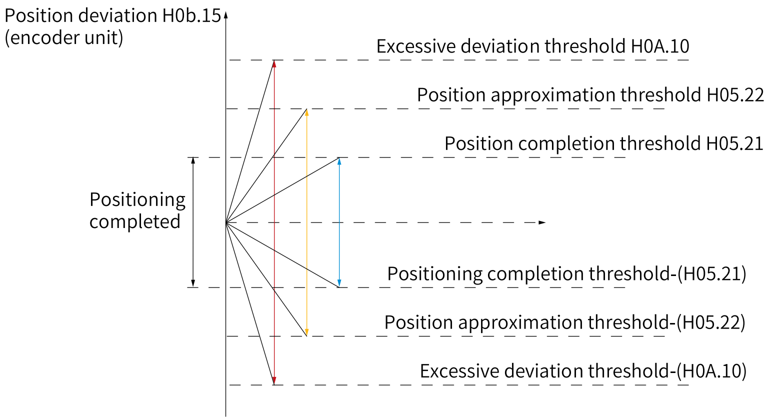


Figure 2-23 Signals related to position deviation

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.

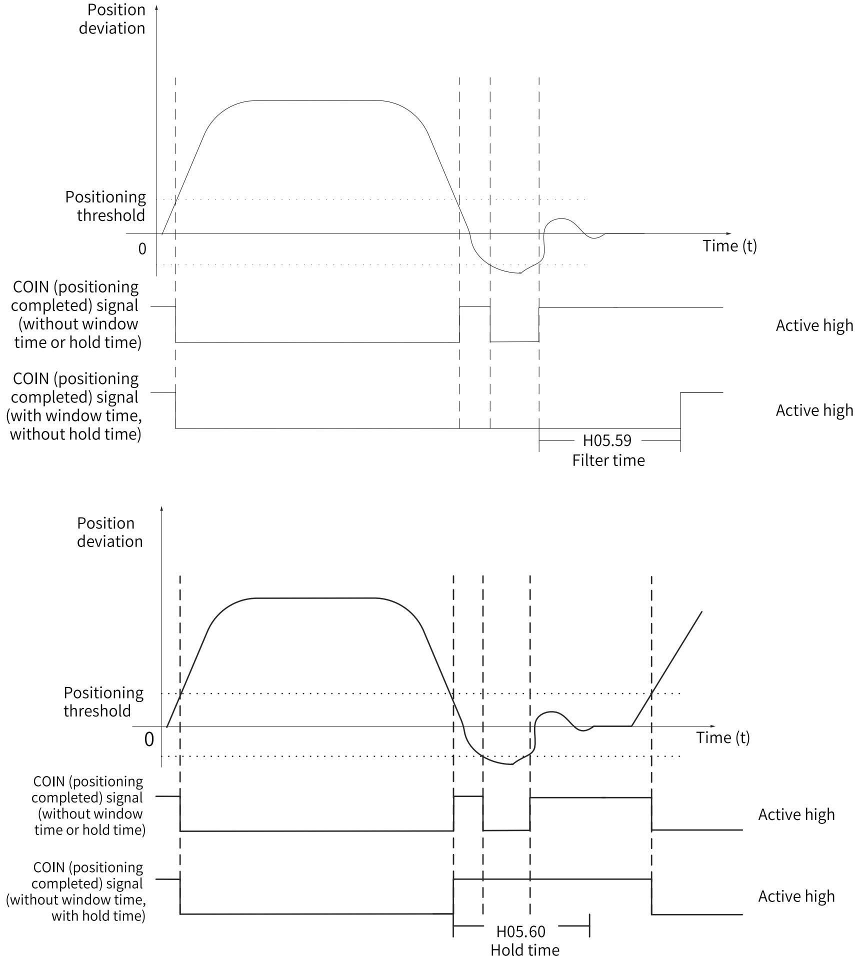


Figure 2-24 Schematic diagram for the window time (H05.59) and hold time (H05.60) of positioning completed signal

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

☆Related parameters

See *" H05.20" on page 222* for details.

See *" H05.21" on page 223* for details.

See *" H05.22" on page 224* for details.

See *" H05.59" on page 233* for details.

See " H05.60" on page 234 for details.

See " H0A.17" on page 293 for details.

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 NEAR (proximity) signal output is not affected by H05.60 (Hold time of positioning completed) or H05.59 (Positioning window time)and requires no detection on the change of position references.

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 function No.

See " H05.60" on page 234 for details.

No.	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 positioning 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.

No.	Name	Function Name	Function
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.

2.1.8 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.

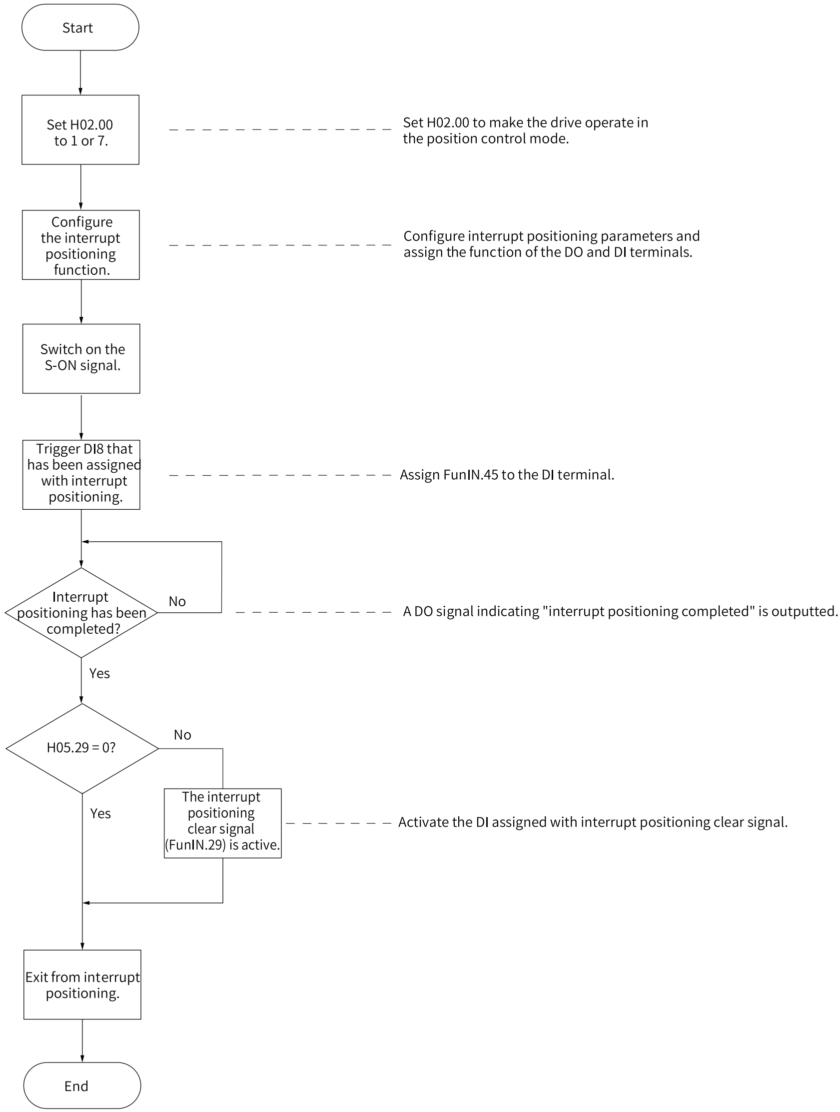


Figure 2-25 Flowchart of interrupt positioning signal

Parameter setting

☆ Related parameters:

See *" H05.24" on page 224* for details.

See *" H05.26" on page 224* for details.

See *" H05.27" on page 224* for details.

See " H05.29" on page 225 for details.

☆ Related function No.

No.	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 permitted
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 2–15 Active logic of DI9 during interrupt positioning

H03.14	Active Logic of DI9
0	Active low
1	Active high

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

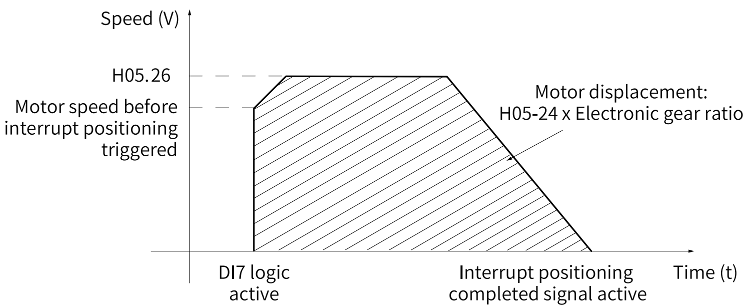


Figure 2-26 Motor operating curve during interrupt positioning

Table 2–16 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 to 6000	-	Active	H05.26

2.1.9 Homing

Caution

- The homing trigger signal is hidden 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 hidden.

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.

The homing function comes in two modes: homing mode and electrical homing mode.

- Homing: The servo drive, upon receiving the homing trigger signal, locates the relative position of the motor shaft and the home based on the pre-set home position first. Then it starts searching for the home and executes the offset distance based on the home, after which it reaches the zero position. 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 2–17 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 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

Caution

- 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 examples are used to describe the homing mode:

- 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)

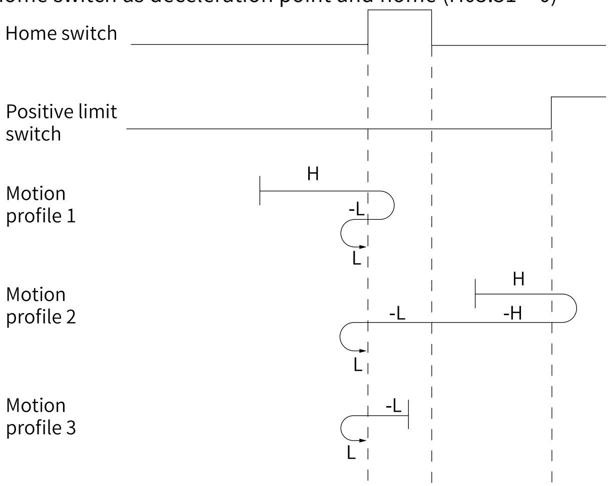


Figure 2-27 Motor running curve and speeds in Mode 0

- 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

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)

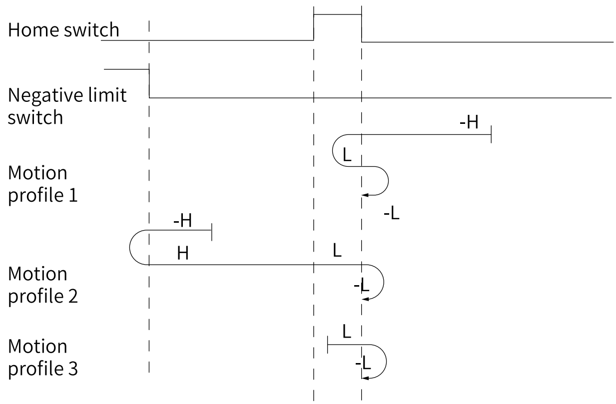


Figure 2-28 Motor running curve and speeds in Mode 1

- 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 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.

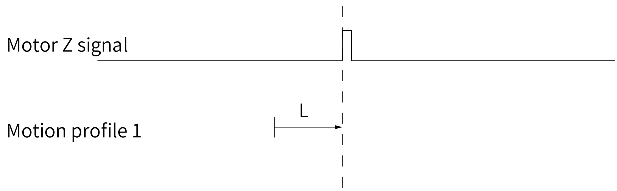


Figure 2-29 Motor running curve and speeds in Mode 2

- 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)

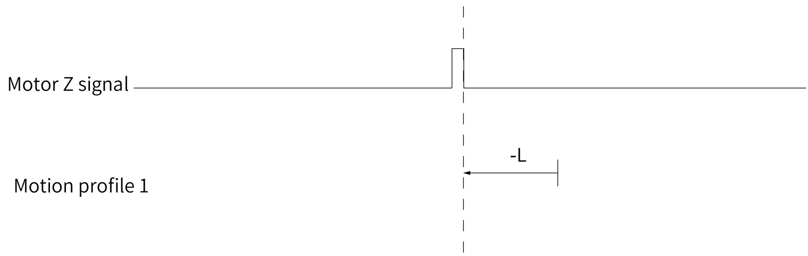


Figure 2-30 Motor running curve and speeds in Mode 3

- 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)

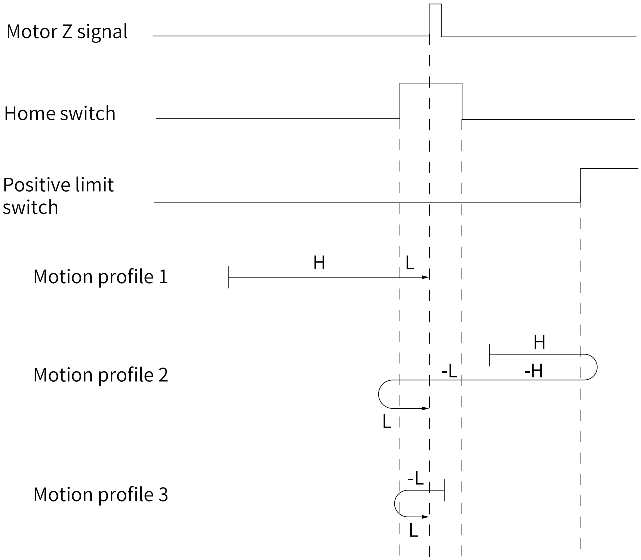


Figure 2-31 Motor running curve and speeds in Mode 4

- 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)

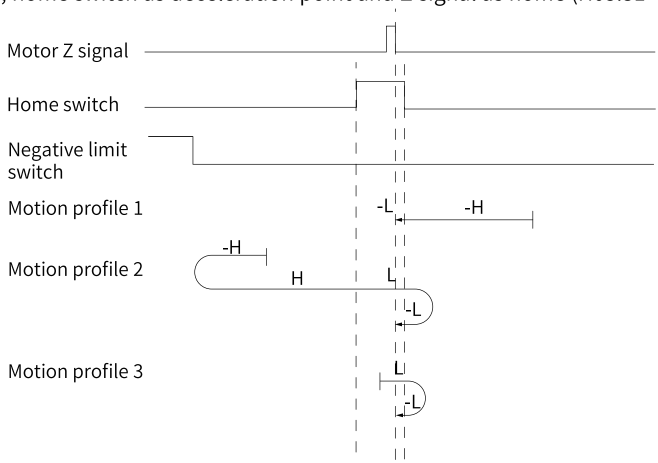


Figure 2-32 Motor running curve and speeds in Mode 5

- ■ 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 negative limit switch not triggered in the entire process.

- Forward, positive limit switch as deceleration point and home (H05.31 = 6)

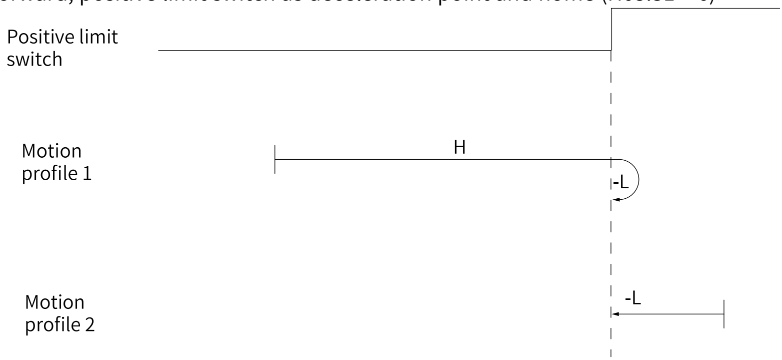


Figure 2-33 Motor running curve and speeds in Mode 6

- ■ 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)

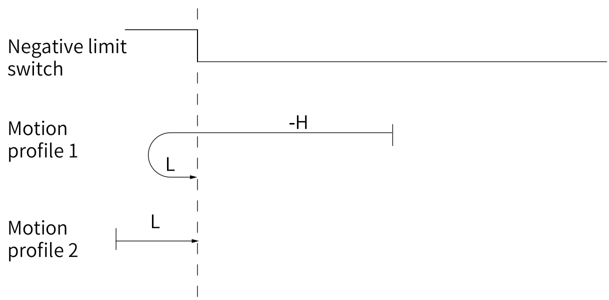


Figure 2-34 Motor running curve and speeds in Mode 7

- ■ 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)

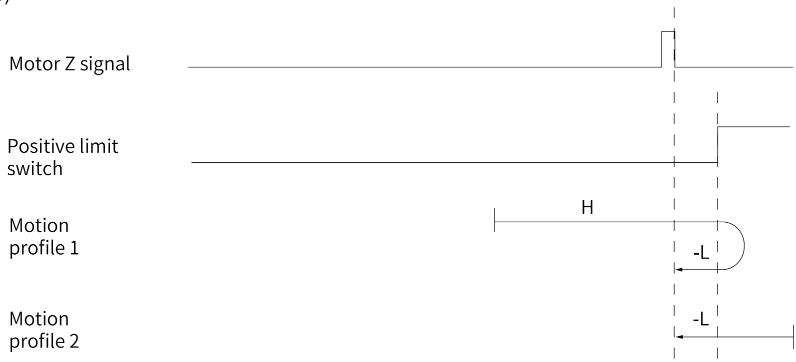


Figure 2-35 Motor running curve and speeds in Mode 8

  - 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)

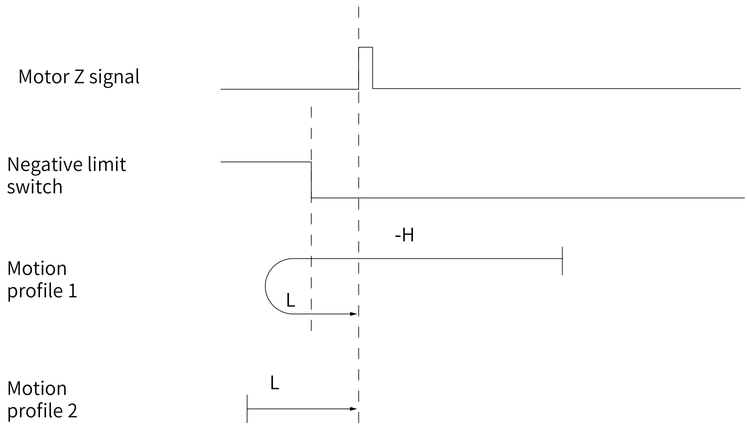


Figure 2-36 Motor running curve and speeds in Mode 9

  - 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)

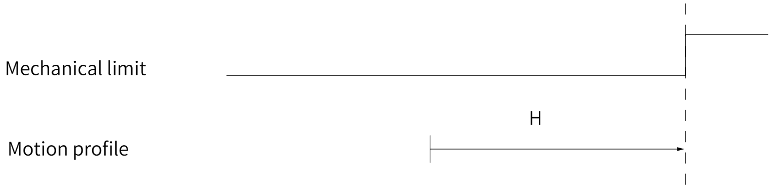


Figure 2-37 Motor running curve and speeds in Mode 10

- 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)

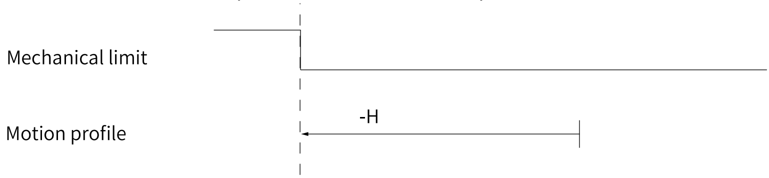


Figure 2-38 Motor running curve and speeds in Mode 11

- 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)

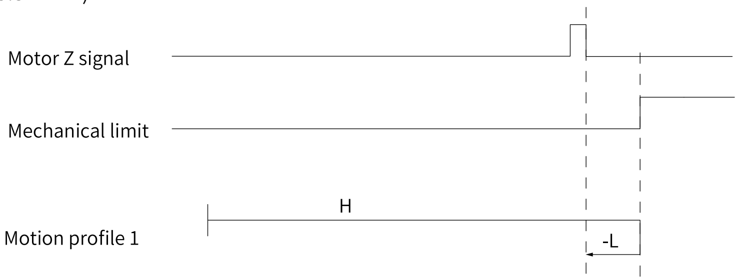


Figure 2-39 Motor running curve and speeds in Mode 12

- 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)

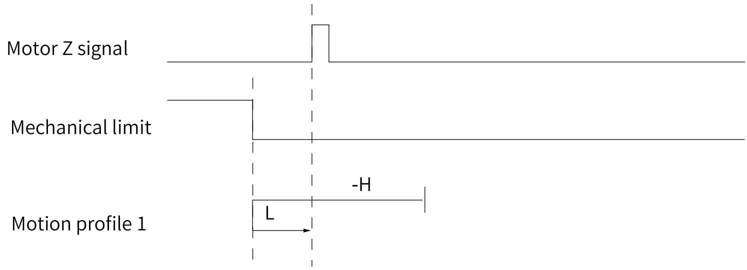


Figure 2-40 Motor running curve and speeds in Mode 13

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

- Forward single-turn homing (H05.31 = 14)

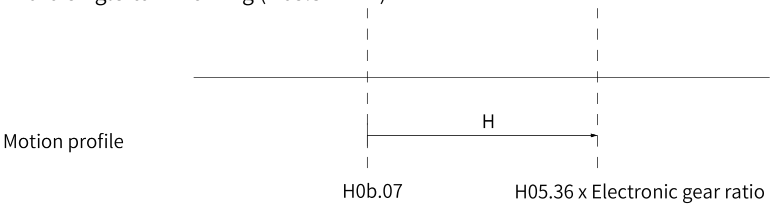


Figure 2-41 Motor running curve and speeds in Mode 14

- 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)

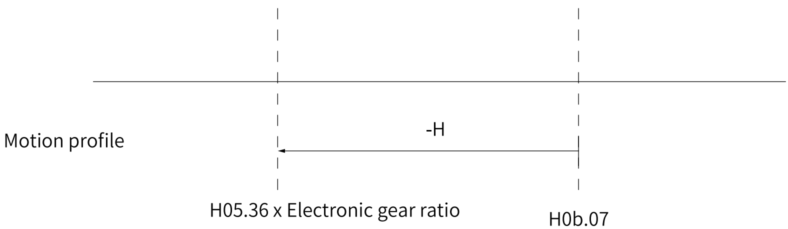


Figure 2-42 Motor running curve and speeds in Mode 15

- 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)

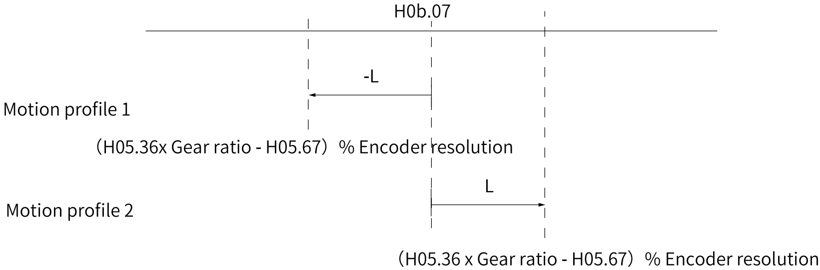


Figure 2-43 Motor running curve and speeds in Mode 16

- 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.

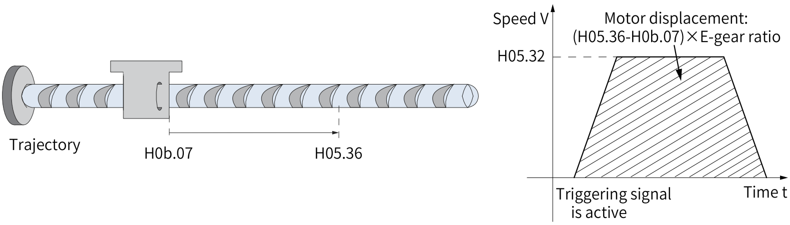
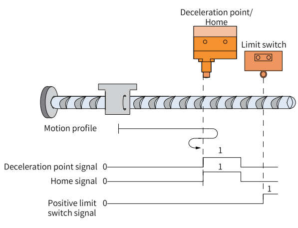
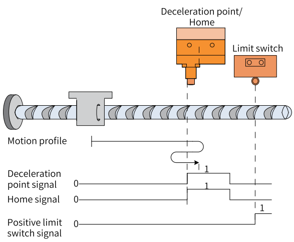
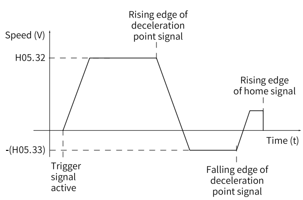
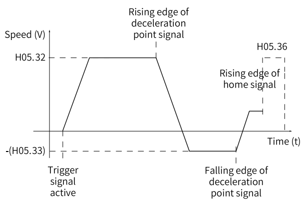


Figure 2-44 Motor running curve and speed in electrical homing

Mechanical home and mechanical zero

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

Table 2–18 Description of mechanical home and mechanical zero

Mechanical Zero Different From Mechanical Home	Mechanical Zero Same As Mechanical Home
If the home offset is present (H05.36 ≠ 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 ≠ 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).
	
	

Parameter setting

- Homing mode setting

  ☆ Related parameters:

  See " H05.30" on page 225 for details.

  See " H05.31" on page 225 for details.

  See " H05.40" on page 228 for details.

- 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:

  See " H05.32" on page 226 for details.

  See " H05.33" on page 226 for details.

  See " H05.34" on page 227 for details.

  See " H05.35" on page 227 for details.

  See " H05.36" on page 227 for details.

  ☆Related function No.

No.	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.

No.	Name	Function Name	Function
FunOut.16	HomeAttain	Homing completed	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

- H05.30 = 1 or 2

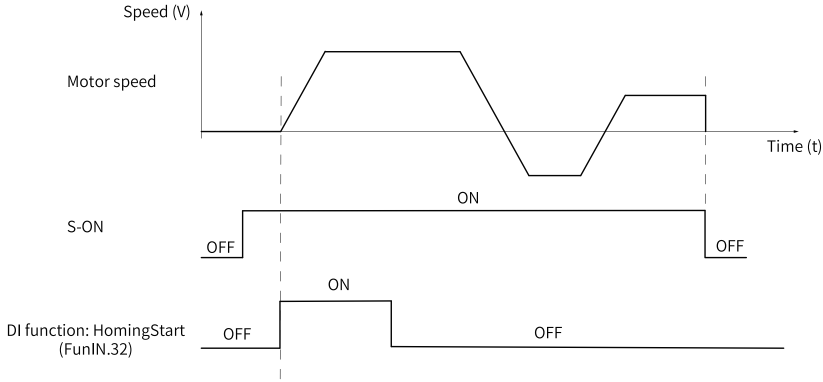


Figure 2-45 Sequence example

  - 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 ≠ 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 ≠ 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.

2.2 Process Segment Mode

Set H02.00 (Control mode) to 7 (Position control mode) through the keypad or 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 the homing mode 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.

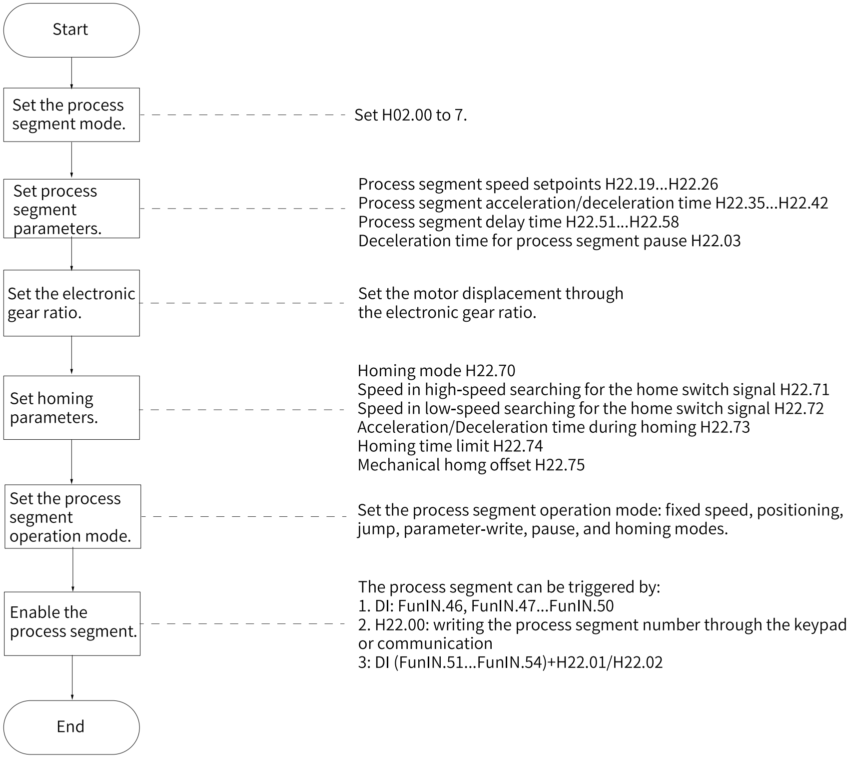


Figure 2-46 Flowchart for setting process segment mode

2.2.1 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.
Parame ter	H22.00	Write the process segment number to H22.00 through the keypad or communication to trigger the process segment. For details, see *"H22.00" on page 431*.

Triggered By	Triggered From	Description
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	DI: FunIN.32 (HomingStart)	Trigger the process segment through the rising edge of FunIN.32.
	H22.00 = 0	Parameter H22.00 = 0.
	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 DIs are used to trigger these signals, the effective signal width of these DIs must be at least 0.125 ms.
- In the process segment mode, FunIN.32 (HomingStart) is used to trigger the process segment homing mode.
- In the position mode, FunIN.32 (HomingStart) is used to trigger the local homing mode.

☆ Related parameters:

See *" H22.00" on page 431* for details.

See *" H22.01" on page 432* for details.

See *" H22.02" on page 432* for details.

See *" H22.03" on page 433* for details.

Table 2–19 Description of function No.

No.	Name	Function Name	Function
FunIN.32	Homi ngStart	Homing enable	Active: Homing enabled (The HomingStart signal cannot be triggered repeatedly during homing.) Inactive: Homing inhibited
FunIN.46	ProceSon	Process 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	Process 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 2–20 " on page 76*. The DI logic is level-triggered. The ProceCmd value is 1 upon active level input or 0 upon inactive level input.
FunIN.48	ProceCmd2	Process segment command switchover 2	
FunIN.49	ProceCmd3	Process segment command switchover 3	
FunIN.50	ProceCmd4	Process segment command switchover 4	
FunIN.51	ProceEvTri1	Event trigger process segment 1	The DI assigned with event trigger process segment is used together with H22.01 and H22.02. See *" H22.01" on page 432 " H22.02" on page 432* for details.
FunIN.52	ProceEvTri2	Event trigger process segment 2	
FunIN.53	ProceEvTri3	Event trigger process segment 3	
FunIN.54	ProceEvTri4	Event trigger process segment 4	
FunIN.55	ProceStop	Process segment pause	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 2–20 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

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

2.2.2 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 H22.51 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:

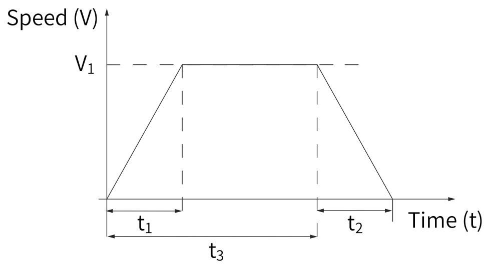


Figure 2-47 Example of the curve in fixed speed mode

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

$$t_1 = \frac{V_1}{1000} \text{ x Acceleration time set for this segment}$$

The actual deceleration time t_2 is:

$$t_2 = \frac{V_1}{1000} \text{ x Deceleration time set for this segment}$$

3. Interval time after completion of process segment (DelayTime) (0 ms to 65535 ms)
   Corresponding to H22.35 to H22.58

☆ Related parameters:

See *" H22.19" on page 434* for details.
See *" H22.20" on page 435* for details.
See *" H22.21" on page 435* for details.
See *" H22.22" on page 435* for details.
See *" H22.23" on page 435* for details.
See *" H22.24" on page 436* for details.
See *" H22.25" on page 436* for details.
See *" H22.26" on page 436* for details.
See *" H22.35" on page 436* for details.
See *" H22.36" on page 437* for details.
See *" H22.37" on page 437* for details.
See *" H22.38" on page 437* for details.
See *" H22.39" on page 437* for details.
See *" H22.40" on page 438* for details.
See *" H22.41" on page 438* for details.
See *" H22.42" on page 438* for details.
See *" H22.51" on page 438* for details.
See *" H22.52" on page 439* for details.
See *" H22.53" on page 439* for details.
See *" H22.54" on page 439* for details.
See *" H22.55" on page 439* for details.
See *" H22.56" on page 440* for details.
See *" H22.57" on page 440* for details.
See *" H22.58" on page 440* for details.

2.2.3 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.

The homing mode is set in process segment 0 and the halt mode is set in process segment 1000. Other modes are set in process segments 1 to 15.

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.

<table>
<tr><th colspan="5">Definition of process segment</th></tr>
<tr><th>bit</th><th>Function</th><th colspan="3">Value</th></tr>
<tr><td rowspan="6">3 to 0</td><td rowspan="6">Mode</td><th>bit3 to bit0</th><th>Process segment mode</th><th>Description of Process Segment</th></tr>
<tr><td>0001</td><td>Constant speed mode</td><td>-</td></tr>
<tr><td>0010</td><td>Positioning mode</td><td>Stopped after positioning is done</td></tr>
<tr><td>0011</td><td>Positioning mode</td><td>Executing the next segment after positioning is done</td></tr>
<tr><td>0111</td><td>Jump mode</td><td>Jumping to the designated process segment</td></tr>
<tr><td>1000</td><td>Parameter-write mode</td><td>Writing specific parameters</td></tr>
<tr><td>7 to 4</td><td>-</td><td colspan="3">-</td></tr>
<tr><td>11 to 8</td><td>-</td><td colspan="3">-</td></tr>
<tr><td>15 to 12</td><td>-</td><td colspan="3">-</td></tr>
<tr><td>19 to 16</td><td>-</td><td colspan="3">-</td></tr>
<tr><td>23 to 20</td><td>-</td><td colspan="3">-</td></tr>
<tr><td>27 to 24</td><td>-</td><td colspan="3">-</td></tr>
<tr><td>31 to 28</td><td>-</td><td colspan="3">-</td></tr>
</table>

Process segment data	
bit	Value
31 to 0	-

Note

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 0 is triggered, the homing function is triggered. See *"2.1.9 Homing" on page 59* 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	Function	Value
3 to 0	-	-
7 to 4	PathNum	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.
8 to 11	-	-
12 to 15	-	-
16 to 19	-	-
20 to 23	DelayTime	0 to 8: Time interval index after process segment is done executing " H22.51" on page 438 " H22.52" on page 439 " H22.53" on page 439 " H22.54" on page 439 " H22.55" on page 439 " H22.56" on page 440 " H22.57" on page 440 " H22.58" on page 440
24 to 27	-	-
28 to 31	-	-

Process segment data	
bit	Value
31 to 0	Process segment data (32-bit) (unused)

Related parameters:

See *" H22.70" on page 440* for details.

See *" H22.71" on page 441* for details.

See *" H22.72" on page 441* for details.

See *" H22.73" on page 441* for details.

See *" H22.74" on page 442* for details.

See *" H22.75" on page 442* for details.

See *" H22.79" on page 442* for details.

☆ Related function No.

No.	Name	Function Name	Function
FunOut.16	HomeAttain	Homing completed	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.

<table>
<tr><th colspan="3">Definition of process segment</th></tr>
<tr><th>bit</th><th>Function</th><th>Value</th></tr>
<tr><td>3 to 0</td><td>Mode</td><td>1</td></tr>
<tr><td>7 to 4</td><td>Func</td><td>
<table>
<tr><th>bit</th><th>Function</th><th>Description</th></tr>
<tr><td>4</td><td>Updated immediately (ImmedUpd)</td><td>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 87特殊模式 for details.</td></tr>
<tr><td>5</td><td>Loading next segment (Auto)</td><td>The next process segment applies after the constant speed is reached and the Delaytime elapses.</td></tr>
<tr><td>6</td><td>Unit</td><td>0: 0.1 rpm
1: PPS (pulses/s) (reference unit)</td></tr>
<tr><td>7</td><td>-</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>11 to 8</td><td>AccTime</td><td rowspan="2">Index of the acceleration/deceleration time
Index " H22.35" on page 436 " H22.36" on page 437 " H22.37" on page 437 " H22.38" on page 437 " H22.39" on page 437 " H22.40" on page 438 " H22.41" on page 438 " H22.42" on page 438</td></tr>
<tr><td>15 to 12</td><td>DecTime</td></tr>
<tr><td>19 to 16</td><td>…</td><td>-</td></tr>
<tr><td>23 to 20</td><td>DelayTime</td><td>Index of the interval time after the process segment is done executing
Index " H22.51" on page 438 " H22.52" on page 439 " H22.53" on page 439 " H22.54" on page 439 " H22.55" on page 439 " H22.56" on page 440 " H22.57" on page 440 " H22.58" on page 440</td></tr>
<tr><td>27 to 24</td><td>-</td><td>-</td></tr>
<tr><td>31 to 28</td><td>-</td><td>-</td></tr>
</table>

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

Steps:

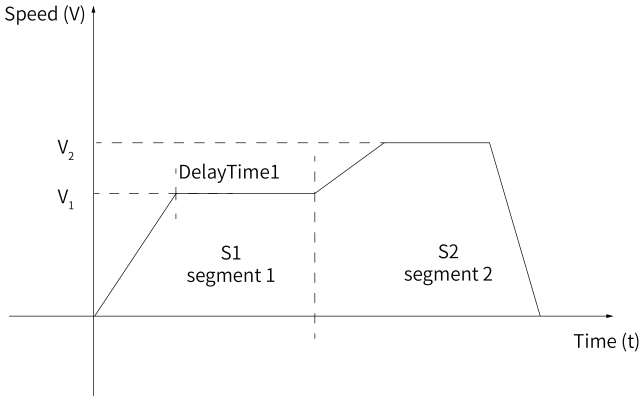


Figure 2-48 Time-Speed curve

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.

<table>
<tr><th colspan="3">Definition of process segment</th></tr>
<tr><th>bit</th><th>Function</th><th>Value</th></tr>
<tr><td>3 to 0</td><td>Mode</td><td>Positioning mode 2: Stopped after positioning is done
Position mode 3: Executing the next segment after positioning is done</td></tr>
<tr><td>7 to 4</td><td>Func</td><td>
<table>
<tr><th>bit</th><th>Function</th><th>Description</th></tr>
<tr><td>4</td><td>Updated immediately (ImmedUpd)</td><td>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 87特殊模式 for details.</td></tr>
<tr><td>5</td><td>Overlap (OverLap)</td><td>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 87特殊模式 for details.</td></tr>
<tr><td>6</td><td rowspan="2">Position reference type (CmdType)</td><td rowspan="2">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)</td></tr>
<tr><td>7</td></tr>
</table>
</td></tr>
<tr><td>11 to 8</td><td>AccTime</td><td rowspan="2">Index of the acceleration/deceleration time
Index " H22.35" on page 436 " H22.36" on page 437 " H22.37" on page 437 " H22.38" on page 437 " H22.39" on page 437 " H22.40" on page 438 " H22.41" on page 438 " H22.42" on page 438</td></tr>
<tr><td>15 to 12</td><td>DecTime</td></tr>
<tr><td>19 to 16</td><td>SpdSet</td><td>Index of the speed setpoint
Index " H22.19" on page 434 " H22.20" on page 435 " H22.21" on page 435 " H22.22" on page 435 " H22.23" on page 435 " H22.24" on page 436 " H22.25" on page 436 " H22.26" on page 436 (accuracy: 0.1 rpm)</td></tr>
<tr><td>23 to 20</td><td>DelayTime</td><td>Index of the interval time after the process segment is done executing
Index " H22.51" on page 438 " H22.52" on page 439 " H22.53" on page 439 " H22.54" on page 439 " H22.55" on page 439 " H22.56" on page 440 " H22.57" on page 440 " H22.58" on page 440</td></tr>
<tr><td>27 to 24</td><td>-</td><td>-</td></tr>
<tr><td>31 to 28</td><td>-</td><td>-</td></tr>
</table>

<table>
<tr><th colspan="2">Process segment data</th></tr>
<tr><th>bit</th><th>Value</th></tr>
<tr><td>31 to 0</td><td>Target position (32-bit) (reference unit)</td></tr>
</table>

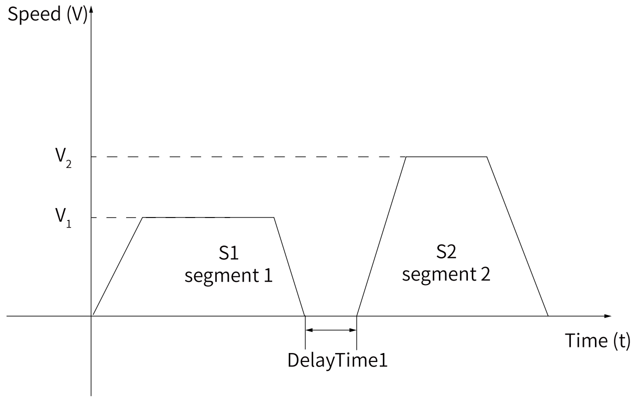


Figure 2-49 Time-Speed curve

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.

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.

<table>
<tr><th colspan="3">Definition of process segment</th></tr>
<tr><th>bit</th><th>Function</th><th>Value</th></tr>
<tr><td>3 to 0</td><td>Mode</td><td>7</td></tr>
<tr><td>7 to 4</td><td>Func</td><td>
<table>
<tr><th>bit</th><th>Function</th><th>Description</th></tr>
<tr><td>4</td><td>Updated immediately (ImmedUpd)</td><td>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 87特殊模式 for details.</td></tr>
<tr><td>5</td><td>-</td><td>-</td></tr>
<tr><td>6</td><td>-</td><td>-</td></tr>
<tr><td>7</td><td>-</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>11 to 8</td><td>-</td><td>-</td></tr>
<tr><td>15 to 12</td><td>-</td><td>-</td></tr>
<tr><td>19 to 16</td><td>-</td><td>-</td></tr>
</table>

Definition of process segment		
bit	Function	Value
23 to 20	DelayTime	Index of the interval time after the process segment is done executing Index *" H22.51" on page 438 " H22.52" on page 439 " H22.53" on page 439 " H22.54" on page 439 " H22.55" on page 439 " H22.56" on page 440 " H22.57" on page 440 " H22.58" on page 440*
27 to 24	-	-
31 to 28	-	-

Process segment data	
bit	Value
31 to 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.

<table>
<tr><th colspan="3">Definition of process segment</th></tr>
<tr><th>bit</th><th>Function</th><th>Value</th></tr>
<tr><td>3 to 0</td><td>Mode</td><td>8</td></tr>
<tr><td>7 to 4</td><td>Func</td><td>
<table>
<tr><th>bit</th><th>Function</th><th>Description</th></tr>
<tr><td>4</td><td>Updated immediately (ImmedUpd)</td><td>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 87特殊模式 for details.</td></tr>
<tr><td>5</td><td>Loading next segment (Auto)</td><td>The next process segment applies after the Delaytime elapses.</td></tr>
<tr><td>6</td><td>Save (Save)</td><td>0: Parameters not saved to e2prom
1: Parameters saved to e2prom</td></tr>
<tr><td>7</td><td>-</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>11 to 8</td><td rowspan="2">Index (H_ Idx)</td><td rowspan="2">Parameter number</td></tr>
<tr><td>15 to 12</td></tr>
<tr><td>19 to 16</td><td rowspan="2">Group number (H_ Grp)</td><td rowspan="2">Parameter group number</td></tr>
<tr><td>23 to 20</td></tr>
</table>

Definition of process segment		
bit	Function	Value
27 to 24	DelayTime	Index of the interval time after the process segment is done executing Index " H22.51" on page 438 " H22.52" on page 439 " H22.53" on page 439 " H22.54" on page 439 " H22.55" on page 439 " H22.56" on page 440 " H22.57" on page 440 " H22.58" on page 440
31 to 28	-	-

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

Halt mode

During operation of the prcess 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 ramps to stop based on the deceleration time defined by H22.03. After stop, the motor keeps enabled and stays at a standstill. When the process segment is triggered again, the motor resumes normal operation.

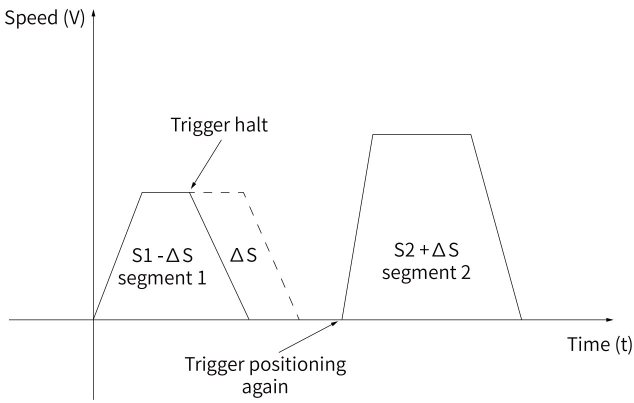


Figure 2-50 Time-Speed curve

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.

Special mode

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

- **Overlap (OverLap)**
  When the ovelap 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.

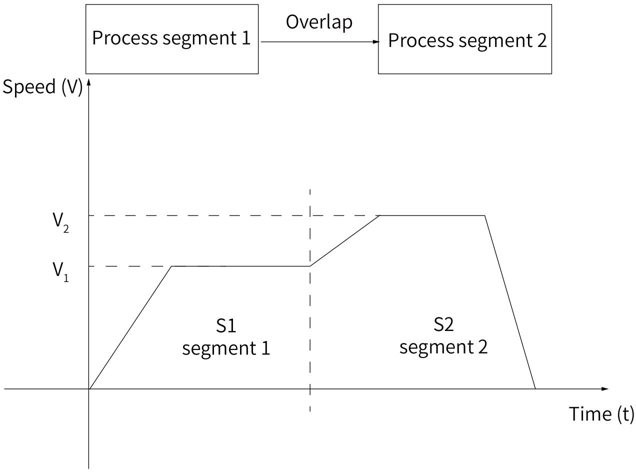


Figure 2-51 Time-Speed curve

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

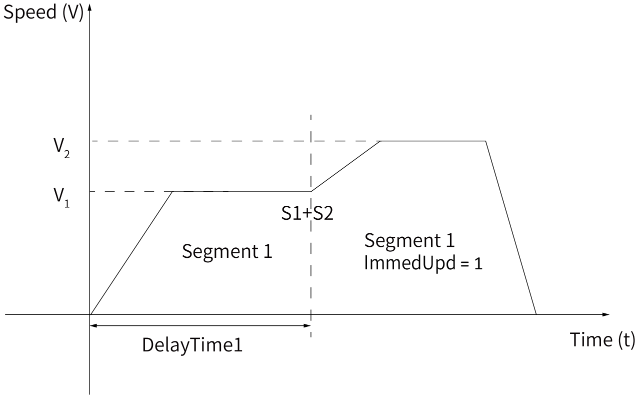


Figure 2-52 Time-Speed curve

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

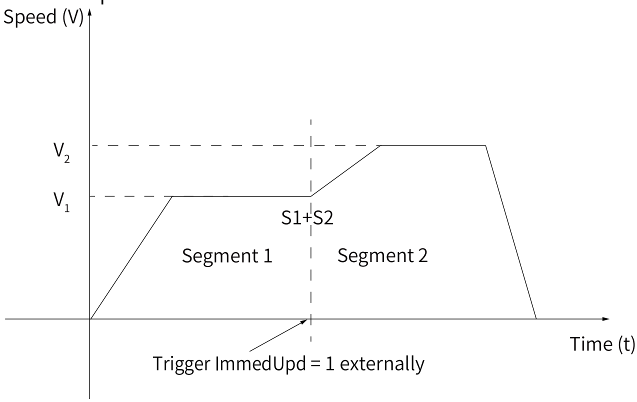


Figure 2-53 Time-Speed curve

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.

2.2.4 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. For details, see *"2.1.7 Motion Control Completed, Internal Command Completed, Positioning Completed, Proximity" on page 50*.

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

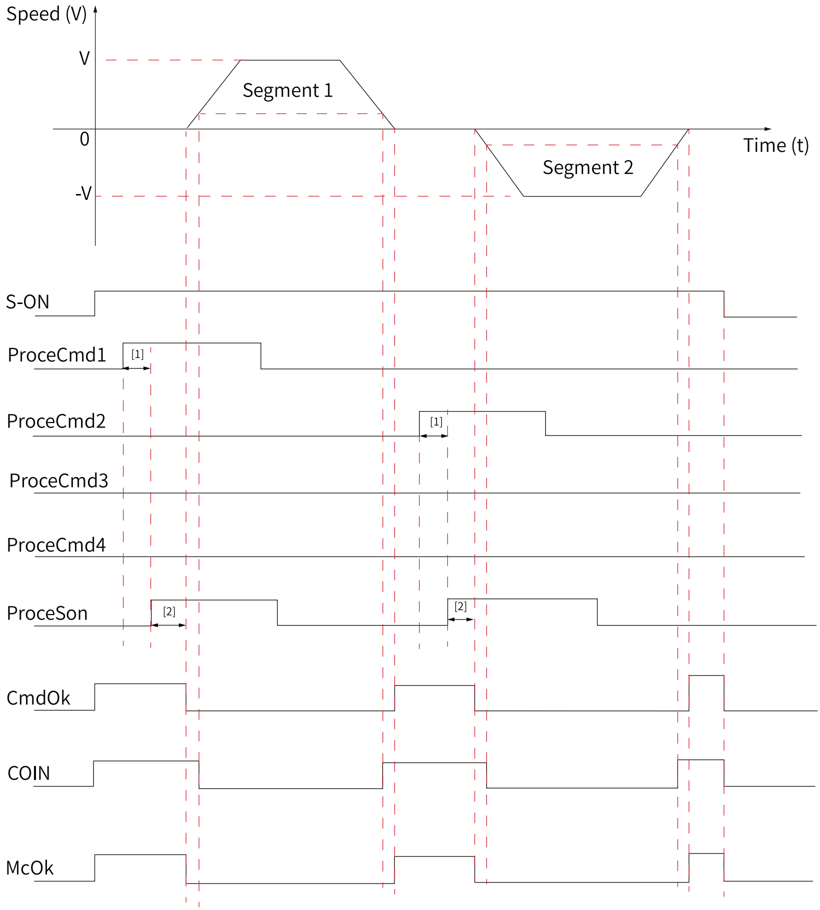


Figure 2-54 Sequence of process segment

Note

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

2.3 Speed Control Mode

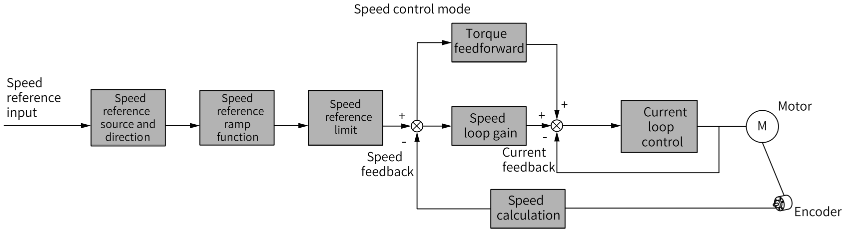


Figure 2-55 Block diagram of speed control

Set H02.00 (Control mode selection) to 0 (Speed control mode) through the keypad or 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 describes basic parameter settings in the speed control mode.

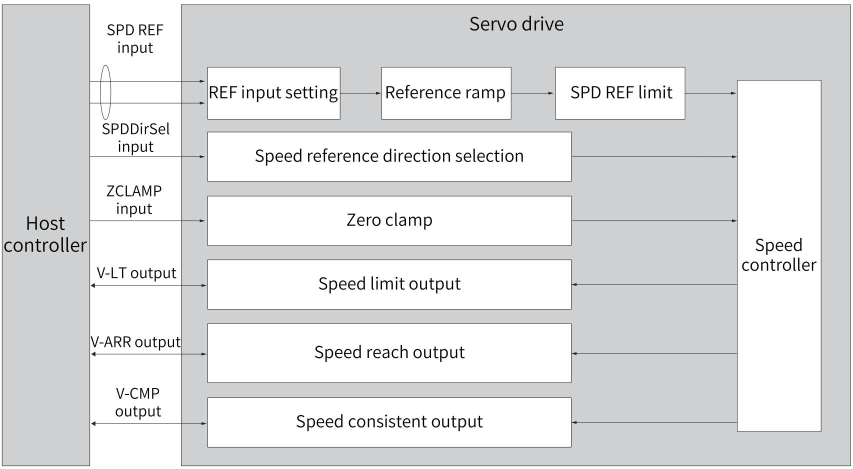


Figure 2-56 Signal exchange between the drive and the host controller

2.3.1 Function Block Diagram

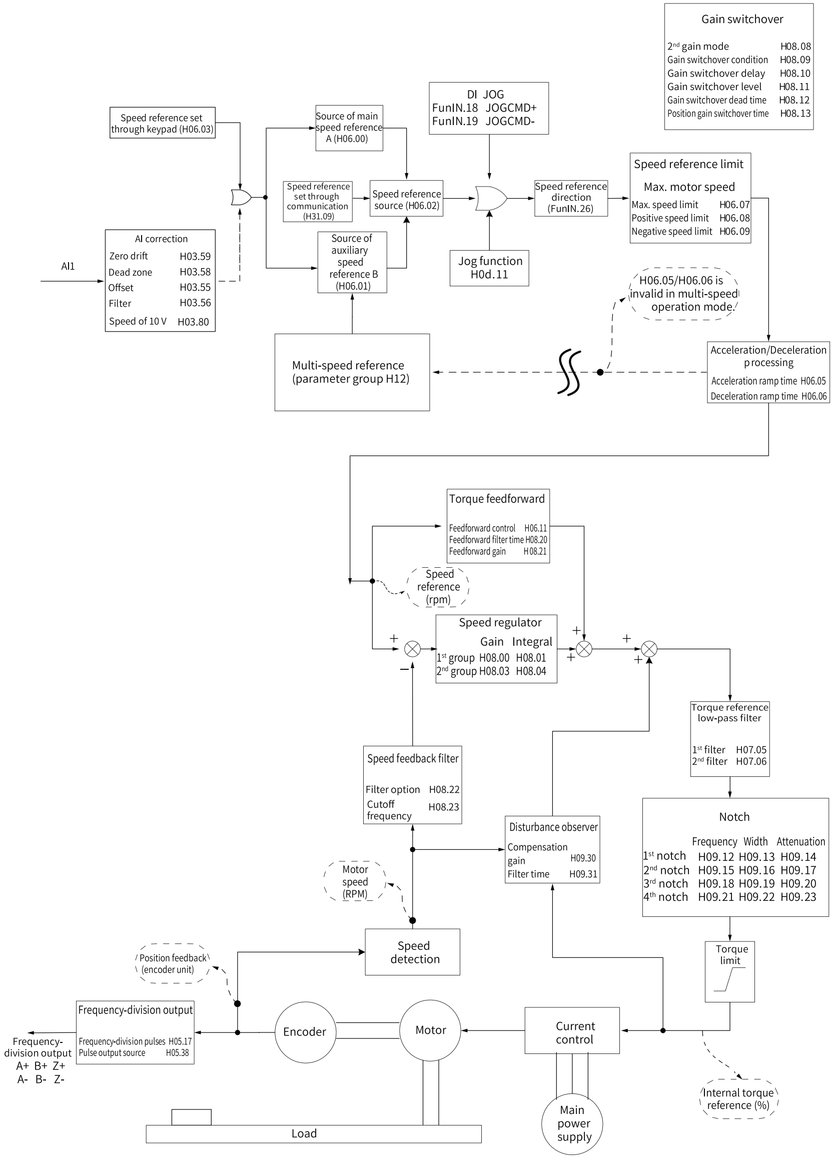


Figure 2-57 Block diagram of speed control parameters

2.3.2 Speed Reference

Speed reference source

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

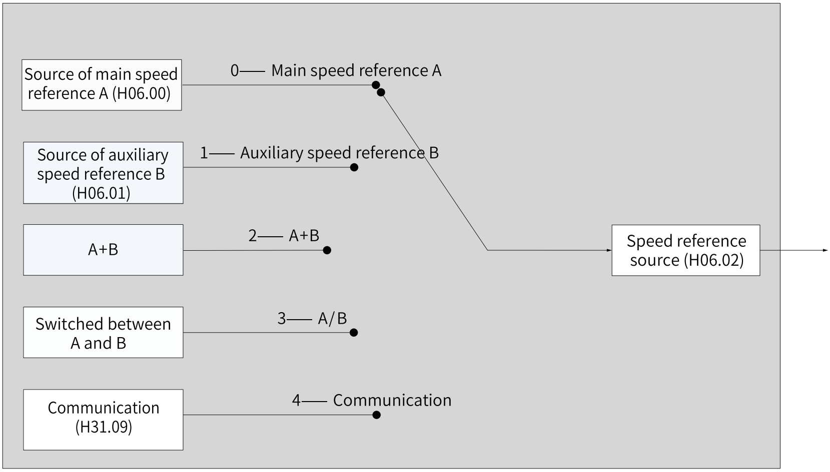


Figure 2-58 Speed reference source

☆Related parameters

See *" H06.02" on page 236* for details.

- **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.

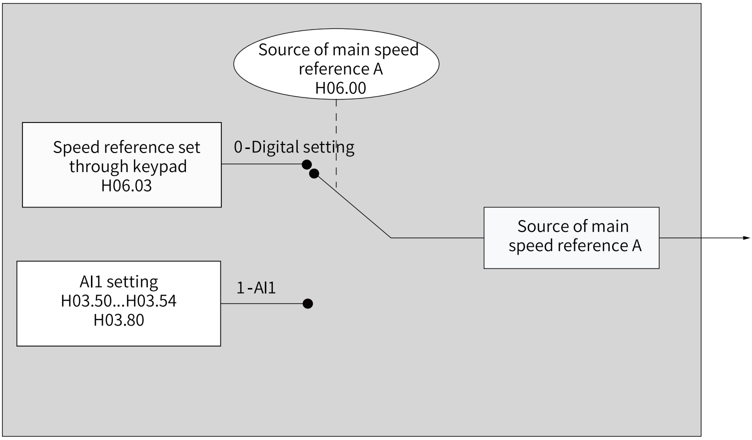


Figure 2-59 Source of main speed reference A

☆Related parameters

See " H06.00" on page 235 for details.

- **Digital setting**

  The speed reference is set in H06.03.

  ☆ Related parameters:

  See " H06.03" on page 237 for details.

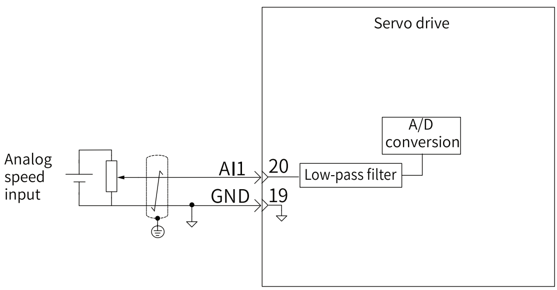
- **Analog voltage setting**

  The analog voltage signal output by the host controller or other devices is used as the speed reference after being processed.

  Analog voltage input terminal:

  AI1 is used for control purpose, with a maximum input voltage of ±12 VDC and an impedance of 10 kΩ.

  Analog input circuit:



Operating procedure:

The following figure takes AI2 as an example to show how to set speed references through analog voltage.

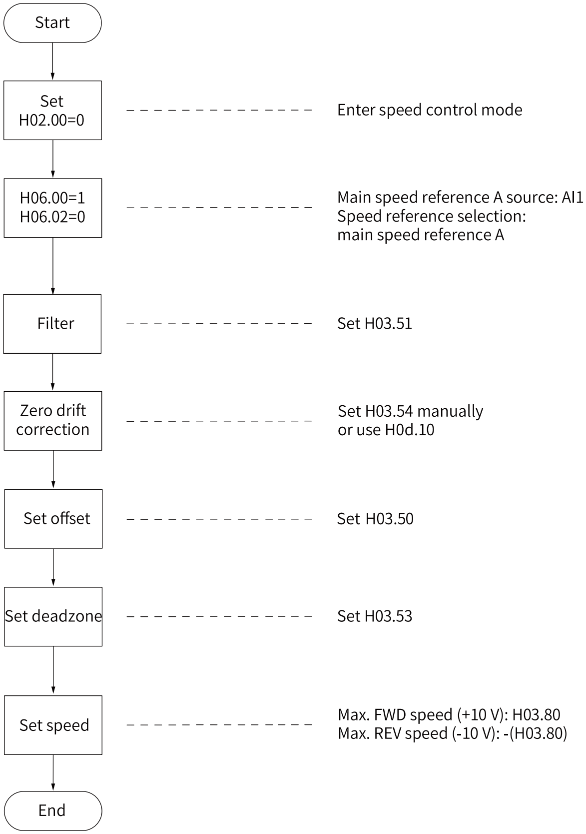


Figure 2-60 Flowchart for setting speed references through analog voltage

Definition of terms:

- Zero drift: Refers to the value of the drive sampling voltage relative to GND upon zero AI voltage.
- Offset: Refers to the AI voltage upon zero sampling voltage after zero drift correction.
- Dead zone: Refers to the AI voltage range upon zero sampling voltage.

In the following figure, y_1 represents the unprocessed AO voltage, y_6 represents the final speed reference after being processed by the servo drive.

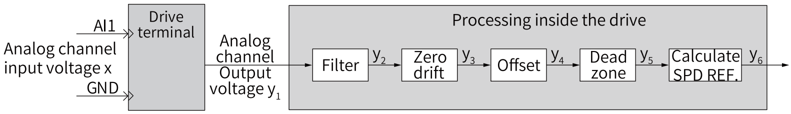


Figure 2-61 AI processing of the servo drive

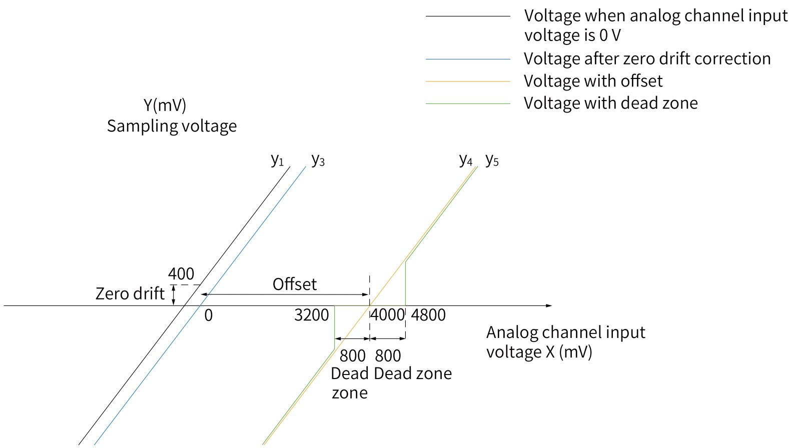


Figure 2-62 Example of the sampling voltage processed by AI

- **Filter:**

  The servo drive provides the analog channel filter function. Setting the filter time constant prevents motor reference fluctuation due to unstable AI voltage and eliminates motor malfunction caused by signal interference. The filter function cannot eliminate or suppress zero drift or dead zone.

- **Zero drift correction**

  Zero drift is used to correct the AO voltage value that deviates from 0 V upon 0 V voltage input.

  In the preceding figure, y_1 represents the AO voltage not processed by the servo drive. If H03.51 is set to 0.00 (ms), the filtered sampling voltage y_2 is the same as y_1.

  Therefore, when the actual input voltage x is 0 and the output voltage y_1 is 400 mV, the zero drift is 400 mV.

  Set H03.54 to 400.0 (mV) manually. The sampling voltage after zero drift correction is shown by y_3. $y_3 = y_1 - 400.0$

  Zero drift can also be corrected automatically through H0d.10.

- **Offset setting**

Offset setting is used to define the actual input voltage corresponding to zero sampling voltage.

As shown in the preceding figure, when the preset sampling voltage y_4 is 0, the actual input voltage x is 4000 mV, therefore, the offset value is 4000 mV.

Set H03.50 to 4000 (mV) manually. The sampling voltage y_4 after offset = x - 4000 = y_3 - 4000.

- **Dead zone correction**

Dead zone correction is used to define the effective voltage input range when the sampling voltage is not 0.

After the offset is set, if the sampling voltage is always 0 when the input voltage x is within 3200 mV to 4800 mV, the dead zone is 800 mV.

Set H03.53 to 800.0. The sampling voltage after dead zone correction is shown by y_5.

$$y_5=\begin{cases}0 & 3200\leqslant x\leqslant 4800\\ y_4 & 4800<x\leqslant 10000 \text{ or } -10000\leqslant x<3200\end{cases}$$

- **Speed reference calculation**

After setting the zero drift, offset, and dead zone, set the speed reference corresponding to 10 V (10000 mV) in H03.80 (Speed corresponding to 10 V) to obtain the actual speed reference y_6:

$$y_6=\frac{y_5}{10000}\times(\text{H03.80})$$

This value is used as the analog speed reference value in the speed control mode.

The left figure below applies when no offset exists. The right figure below applies when offset exists. After proper settings, you can view the AI1 sampling voltage value through H0b.21 in real time or view the speed reference value corresponding to the input analog value through H0b.01.

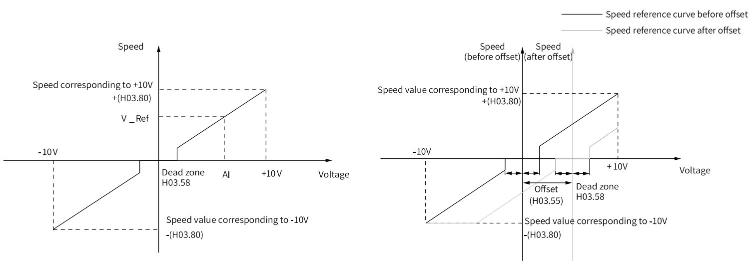


Figure 2-63 AI1 without offset (left) & AI1 after offset (right)

The relationship between the final speed reference y_6 and the input voltage x is as follows:

$$y_6 = \begin{cases} 0 & B\text{-}C \leqslant x \leqslant B+C \\ x-B & B+C < x \leqslant 10000 \text{ or } -10000 \leqslant x < B\text{-}C \end{cases}$$

in which, B represents the offset and C represents the dead zone.

☆ Related parameters:

See " H03.50" on page 206 for details.

See " H03.51" on page 206 for details.

See " H03.53" on page 207 for details.

See " H03.54" on page 207 for details.

See " H03.80" on page 209 for details.

See " H0d.10" on page 324 for details.

- **Source of auxiliary speed reference B**

  The sources of auxiliary speed reference B include digital setting, analog voltage setting, and multi-speed references. Digital setting and multi-speed references are internal speed references. Analog voltage setting refers to external speed references.

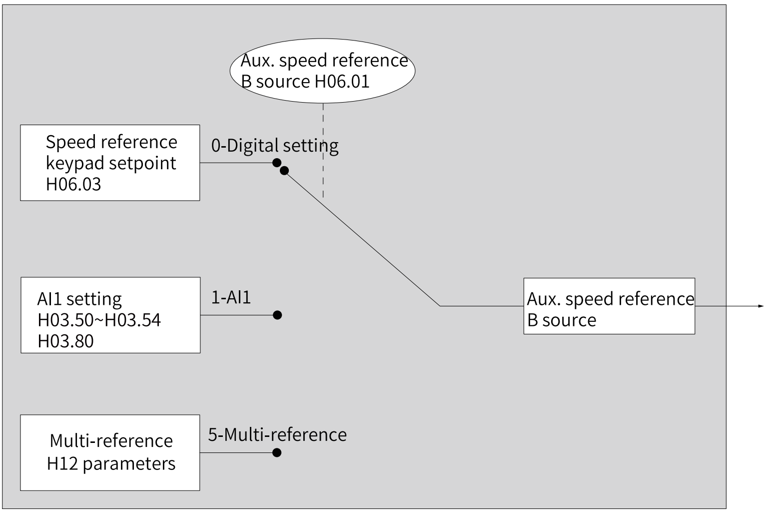


Figure 2-64 Source of auxiliary speed reference B

☆ Related parameters:

See " H06.01" on page 236 for details.

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.

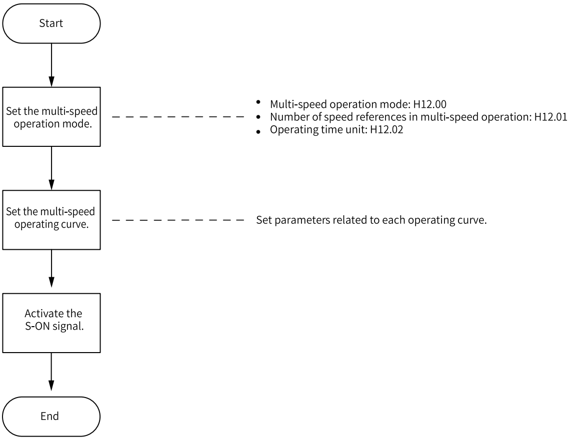


Figure 2-65 Flowchart for setting multi-speed operation

1. Set the multi-speed operation mode.

☆ Related parameters:

See " H12.00" on page 359 for details.

See " H12.01" on page 361 for details.

See " H12.02" on page 362 for details.

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

☆ Related function No.

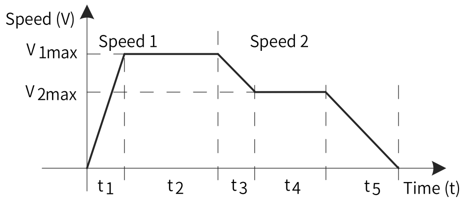
No.	Name	Function Name	Function
FunIN.5	DIR-SEL	Multi-reference direction	Inactive: Reference direction by default Active: Opposite to the reference direction

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 2–21 Description of individual operation

Description	Operating Curve
• The drive stops after one cycle of operation. • The drive switches to the next displacement automatically.	 • 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 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).

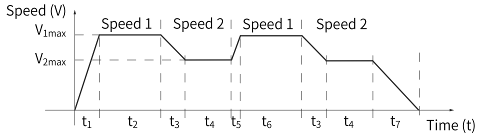
★ Definition of terms:

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

■ Cyclic operation (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.

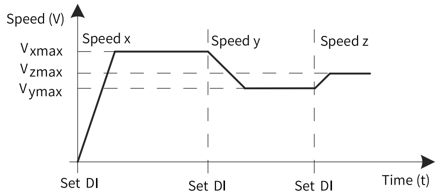
Table 2–22 Descriptions of cyclic operation

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.	 • 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 2–23 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 function No.

No.	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 2–24 " on page 103*. 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 2–24 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

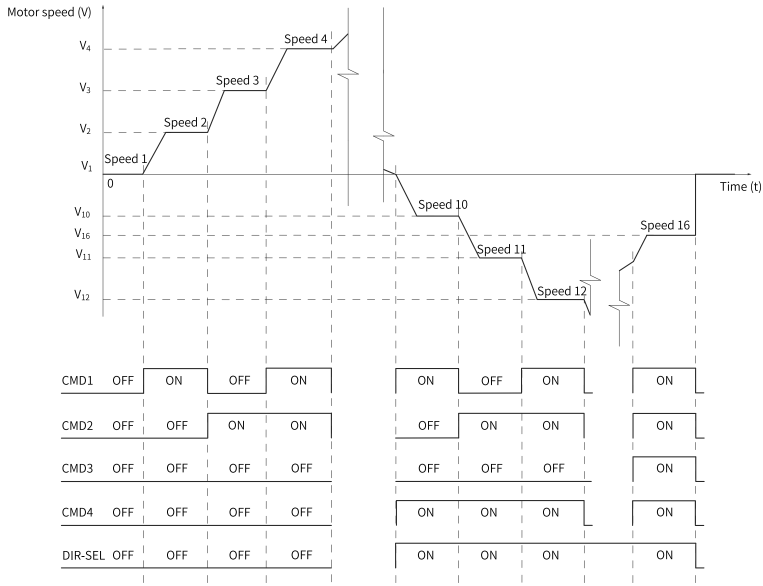


Figure 2-66 Example of multi-speed curve

2. Setting the multi-speed curve

The following takes speed 1 as an example.

☆ Related parameters:

See *" H12.03" on page 362* for details.

See *" H12.04" on page 363* for details.

See *" H12.09" on page 364* for details.

See *" H12.10" on page 365* for details.

See *" H12.20" on page 365* for details.

See *" H12.21" on page 365* for details.

See *" H12.22" on page 366* for details.

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).

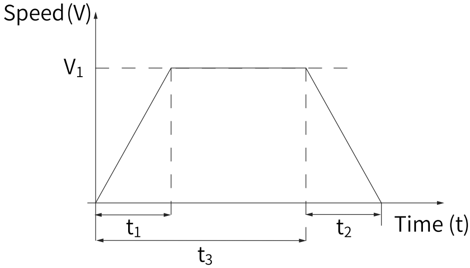


Figure 2-67 Example of multi-speed curve

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 function No.

No.	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:

  See *" H31.09" on page 453* for details.

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 function No.

No.	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 2–25 Actual direction of rotation in the speed control mode

H02.02	Sign of the Speed Reference Value	FunIN.26	Actual 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.

Caution

- When the speed reference source is digital setting or jog speed, the acceleration time and deceleration time are set in 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 Chapter "Description of Parameters".

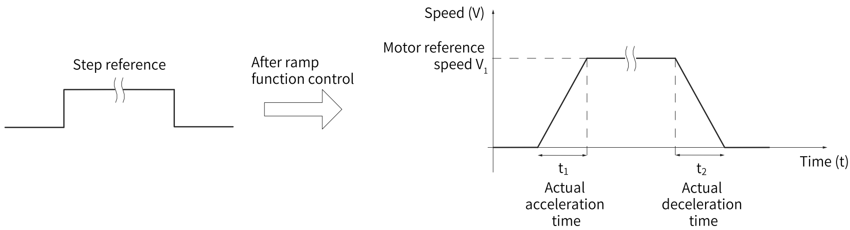


Figure 2-68 Definition of the ramp function

- 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:

See " H06.05" on page 237 for details.

See " H06.06" on page 238 for details.

2.3.4 Zero Clamp

Caution

- Zero clamp is used in systems where position loop is unavailable in the speed control mode.
- If the motor oscillates in the zero 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.

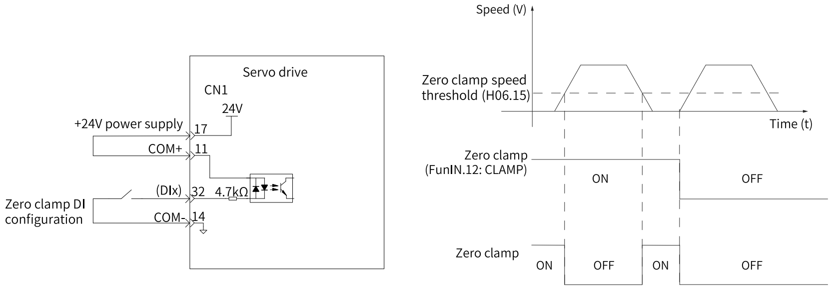


Figure 2-69 Wiring and waveform of zero clamp

☆Related parameters

See " *H06.15" on page 240* for details.

☆ Related function No.

No.	Name	Function Name	Description
FunIN.12	ZCLAMP	Zero clamp	Inactive: Zero clamp disabled Active: Zero clamp enabled

2.3.5 Speed Reference Limit

Caution

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.

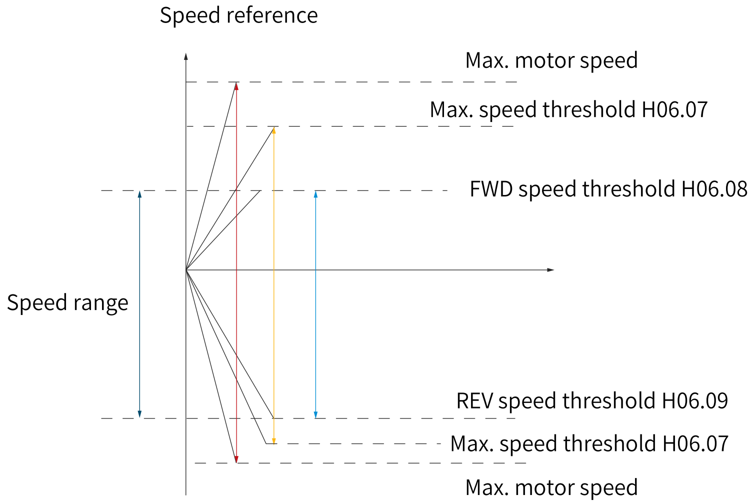


Figure 2-70 Example of speed reference limit

The actual motor speed limit complies with the following range:

- |Forward speed limit| ⩽ min {maximum motor speed, H06.07, H06.08}
- |Reverse speed limit| ⩽ min {maximum motor speed, H06.07, H06.09}

☆ Related parameters:

See " H06.07" on page 238 for details.

See " H06.08" on page 238 for details.

See " H06.09" on page 238 for details.

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.

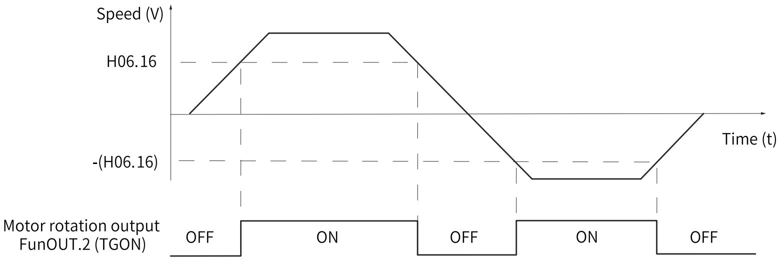


Figure 2-71 Waveform of motor rotation (TGON) signal

Note

In the preceding figure, "ON" indicates the TGON (motor rotation) signal is active. "OFF" indicates the TGON (motor rotation) signal is inactive.

☆Related parameters

See *" H06.16" on page 240* for details.

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

☆ Related function No.

No.	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.

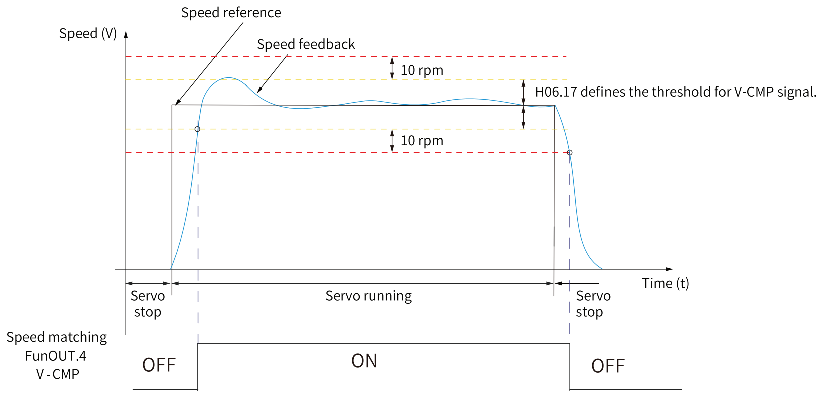


Figure 2-72 Waveform of speed matching (V-Cmp) signal

Note

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

☆Related parameters

See " H06.17" on page 240 for details.

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 function No.

No.	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 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 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.

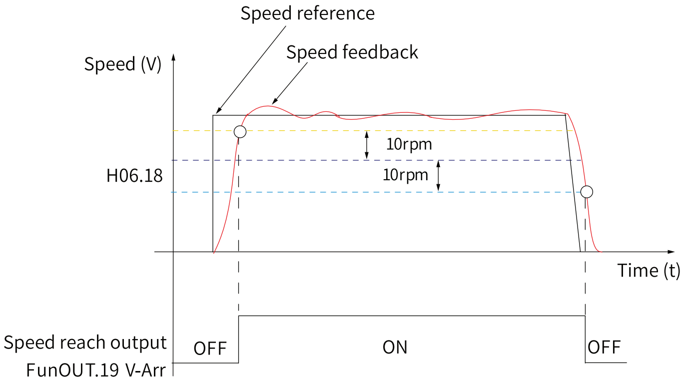


Figure 2-73 Waveform of the speed reach (V-Arr) signal

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

See *" H06.18" on page 240* for details.

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 function No.

No.	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 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 affcted 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.

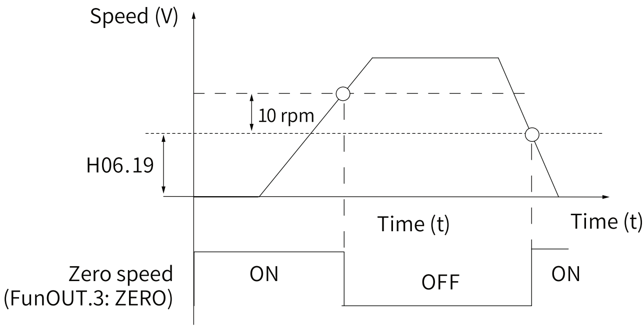


Figure 2-74 Waveform of the zero speed (V-Zero) signal

Note

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

☆Related parameters

See *" H06.19" on page 241* for details.

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 function No.

No.	Name	Function Name	Description
FunOUT.3	V-Zero	Zero speed	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

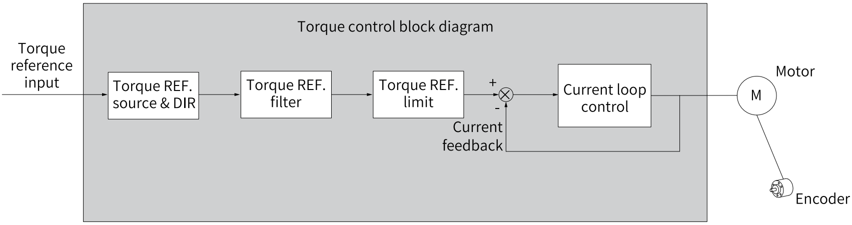


Figure 2-75 Block diagram of torque control mode

Set H02.00 (Control mode selection) to 2 (Torque control mode) through the keypad or 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.

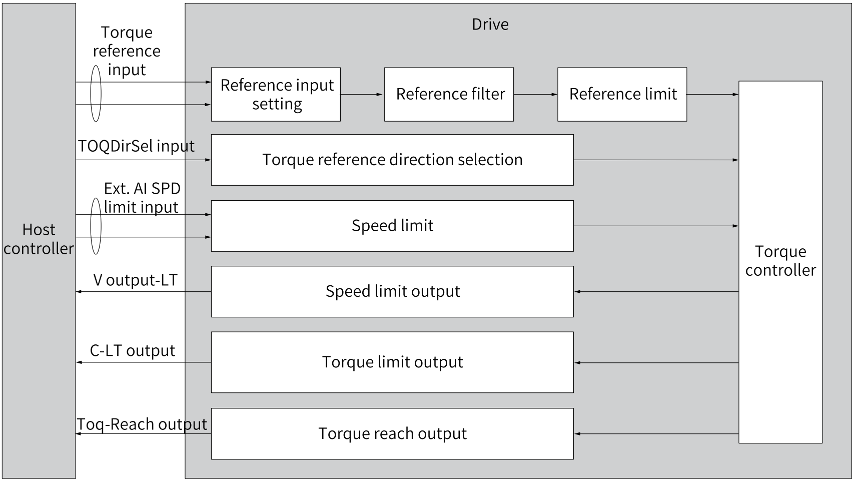


Figure 2-76 Signal exchange between the drive and the host controller

2.4.1 Function Block Diagram

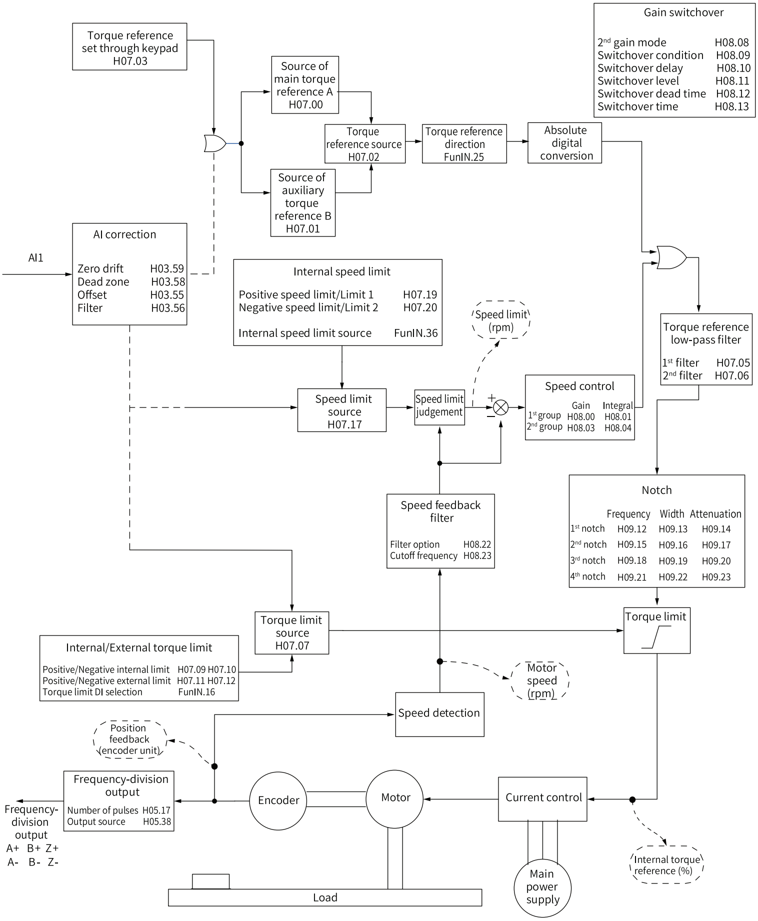


Figure 2-77 Block diagram of torque control

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.

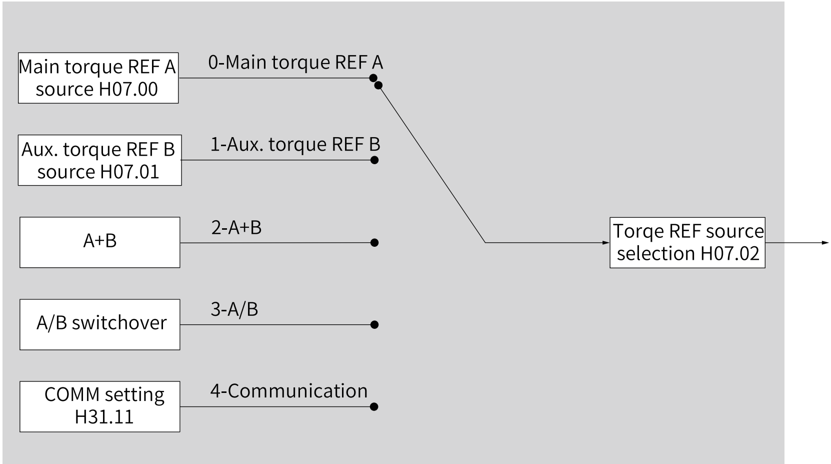


Figure 2-78 Torque reference sources

☆Related parameters

See *" H07.02" on page 253* for details.

- **Source of main torque reference A**

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

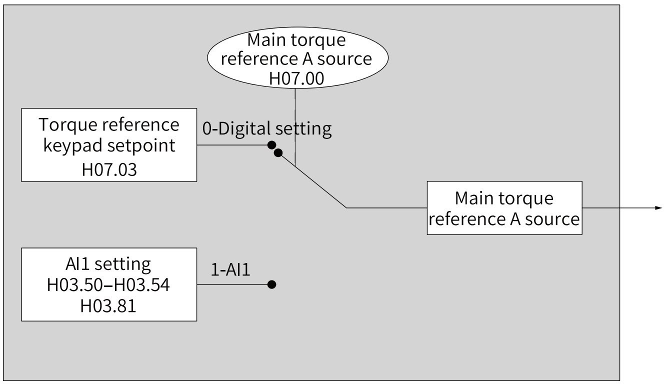


Figure 2-79 Source of main torque reference A

☆Related parameters

See *" H07.00" on page 252* for details.

- **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:

See " H07.03" on page 253 for details.

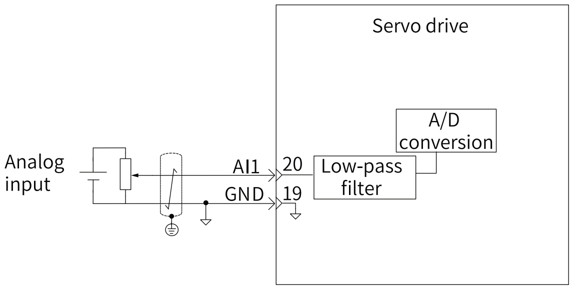
- **Analog voltage setting**

The analog voltage signal output by the host controller or other devices is used as the torque reference after being processed.

Analog voltage input terminal:

The servo drive offers one AI: AI1 is used as the AI channel, with a maximum input voltage of ±12 VDC and an impedance of 22 kΩ.

Analog input circuit:



Operating procedure:

The following table takes AI2 as an example to describe how to set torque references through analog voltage.

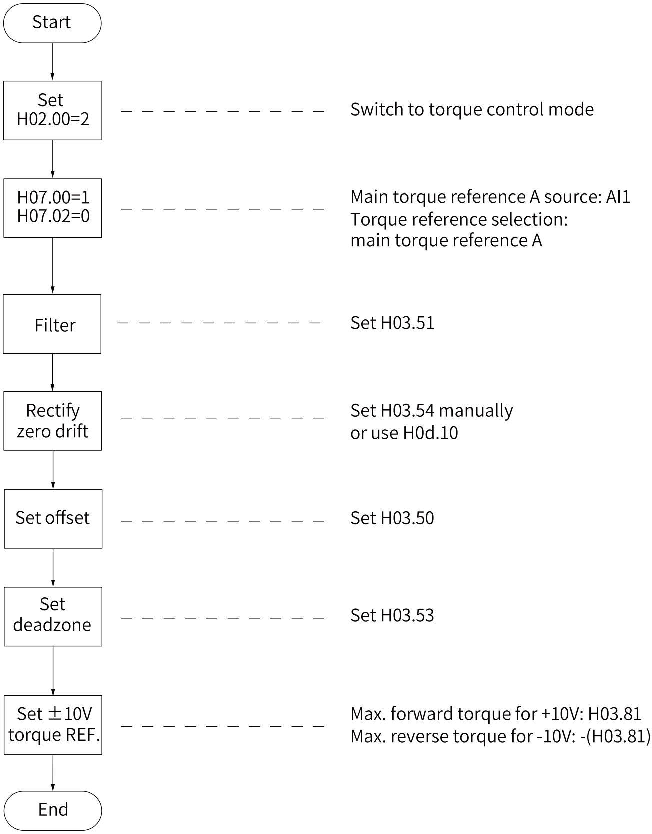


Figure 2-80 Operation flowchart for setting torque references through analog voltage

★ Definition of terms:

- Zero drift: Refers to the value of the drive sampling voltage relative to GND upon zero AI voltage.
- Offset: Refers to the AI voltage upon zero sampling voltage after zero drift correction.
- Dead zone: Refers to the AI voltage range upon zero sampling voltage.

In the following figure, y_1 represents the unprocessed AO voltage, y_6 represents the final torque reference after being processed by the servo drive.

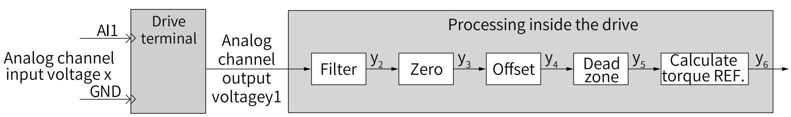


Figure 2-81 AI processing of the servo drive

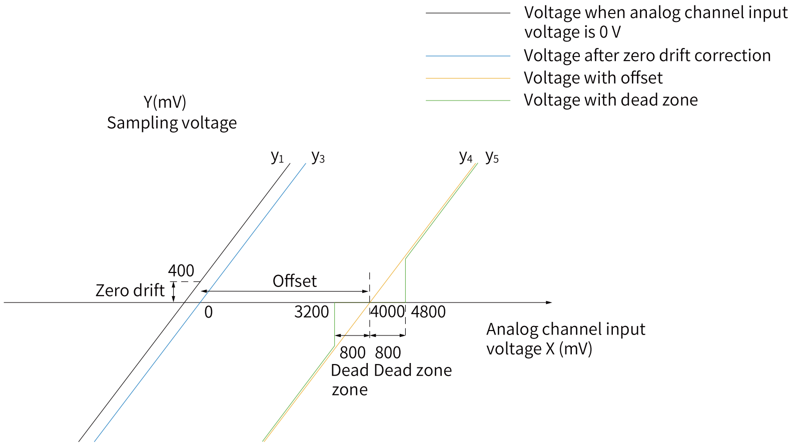


Figure 2-82 Example of the sampling voltage processed by AI

- **Filter:**
  The servo drive provides the analog channel filter function. Setting the filter time constant in H03.56 prevents motor reference fluctuation due to unstable AI voltage and eliminates motor malfunction caused by signal interference. The filter function cannot eliminate or suppress zero drift or dead zone.

- **Zero drift correction**
  Zero drift is used to correct the AO voltage value that deviates from 0 V upon 0 V voltage input.

  In the preceding figure, y_1 represents the AO voltage not processed by the servo drive. If H03.51 is set to 0.00 (ms), the filtered sampling voltage y_2 is the same as y_1.

  Therefore, when the actual input voltage x is 0 and the output voltage y_1 is 400 mV, the zero drift is 400 mV.

  Set H03.54 to 400.0 (mV) manually. The sampling voltage after zero drift correction is shown by y_3. $y_3 = y_1 - 400.0$

  Zero drift can also be corrected automatically through H0d.10 (Automatic adjustment of analog channels).

- **Offset setting**
  Offset setting is used to define the actual input voltage corresponding to zero sampling voltage.

As shown in the preceding figure, when the preset sampling voltage y_4 is 0, the actual input voltage x is 4000 mV, therefore, the offset value is 4000 mV.

Set H03.55 to 4000 (mV) manually. The sampling voltage y_4 after offset = x - 4000 = y_3 - 4000.

- **Dead zone correction**

  Dead zone correction is used to define the effective voltage input range when the sampling voltage is not 0.

  After the offset is set, if the sampling voltage is always 0 when the input voltage x is within 3200 mV to 4800 mV, the dead zone is 800 mV.

  Set H03.58 to 800.0. The sampling voltage after dead zone correction is shown by y_5.

$$y_5 = \begin{cases} 0 & 3200 \leqslant x \leqslant 4800 \\ y_4 & 4800 < x \leqslant 10000 \text{ or } -10000 \leqslant x < 3200 \end{cases}$$

- **Torque reference**

  After setting the zero drift, offset, and dead zone, set the speed reference corresponding to 10 V (10000 mV) in H03.81 (Speed corresponding to 10 V) to obtain the actual torque reference y_6:

$$y_6 = \frac{y_5}{10000} \times (\text{H03.81})$$

This value is used as the torque reference set via analog in the torque control mode.

The left figure below applies when no offset exists. The right figure below applies when offset exists. After proper settings, you can view the AI1 sampling voltage value through H0b.21 in real time or view the torque reference value corresponding to the input analog value through H0b.01.

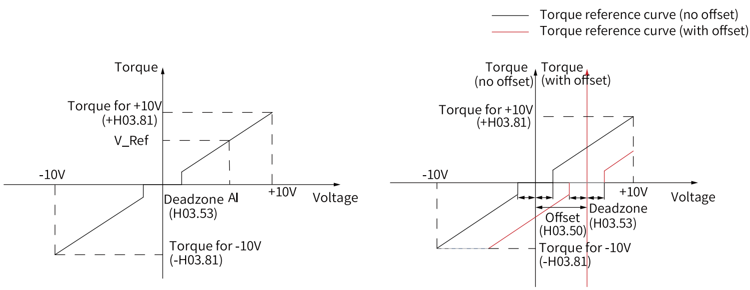


Figure 2-83 AI1 without offset (left) & AI1 after offset (right)

The relationship between the final torque reference y_6 and the input voltage x is as follows:

$$y_6 = \begin{cases} 0 & B\text{-}C \leqslant x \leqslant B\text{+}C \\ x\text{-}B & B\text{+}C < x \leqslant 10000 \text{ or } -10000 \leqslant x < B\text{-}C \end{cases}$$

in which, B represents the offset and C represents the dead zone.

☆ Related parameters:

See *" H03.50" on page 206* for details.

See *" H03.53" on page 207* for details.

See *" H03.54" on page 207* for details.

See *" H03.81" on page 210* for details.

See *" H0d.10" on page 324* for details.

- **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:

No.	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:

  See *" H03.11" on page 203* for details.

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 function No.

No.	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 2–26 Actual direction of rotation in the torque control mode

H02.02	Sign (+/-) of the Torque Reference Value	FunIN.25	Actual 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

If the filter time constant is set to an excessively high value, the responsiveness will be degraded, so pay attention to the responsiveness when setting the filter time constant.

The servo drive smoothens 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 referencnes, 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 ≠ 0) and the condition defined by H08.09 is met.

☆ Related parameters:

See *" H07.05" on page 254* for details.

See *" H07.06" on page 254* for details.

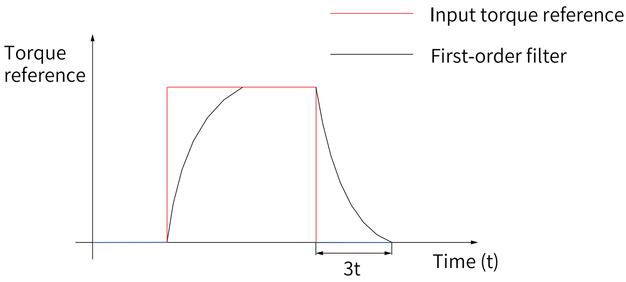


Figure 2-84 First-order filter for rectangular torque references

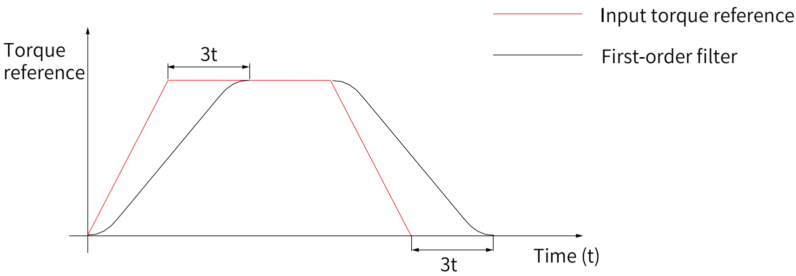


Figure 2-85 First-order filter for trapezoid torque references

2.4.4 Torque Reference Limit

Caution

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

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

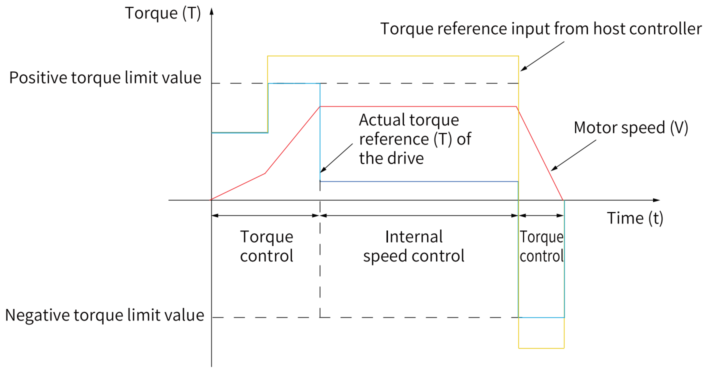


Figure 2-86 Torque reference and torque limit

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 active at any moment. The positive/negative torque limit must be lower than or equal to the maximum torque of the drive and the motor and ±350.0% of the rated torque.

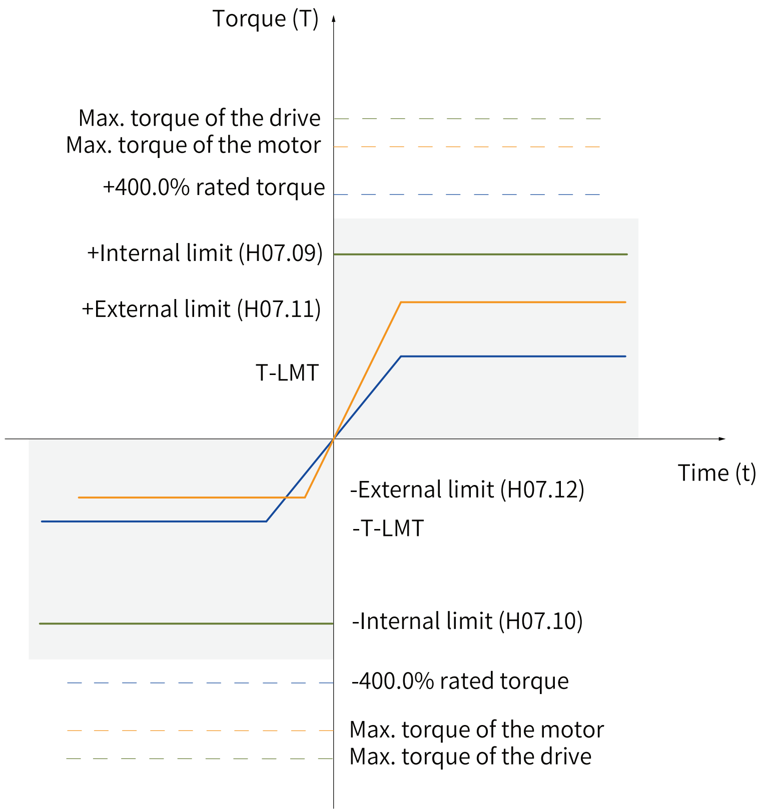


Figure 2-87 Example of torque limit

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. Set the torque limit based on the operating requirements of the load. 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:

See *" H07.07" on page 254* for details.

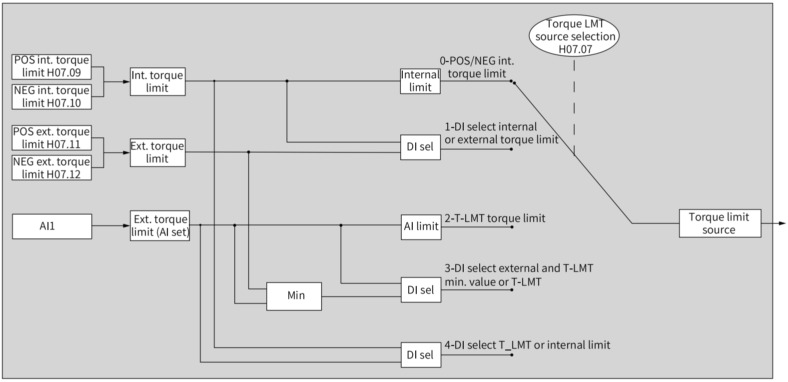


Figure 2-88 Torque limit source

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.

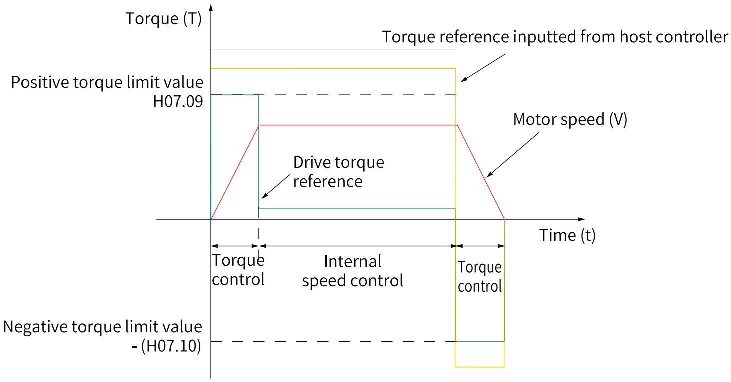


Figure 2-89 Torque limit curve (H07.07 = 0)

- 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).

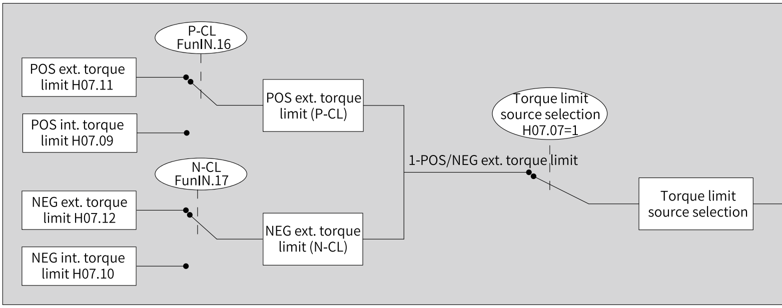
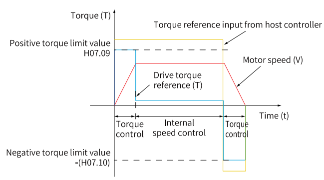
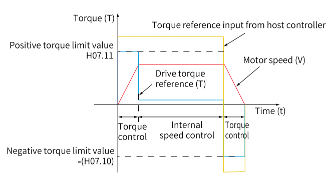
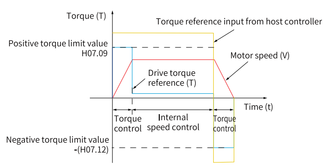
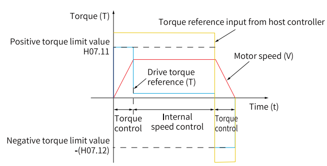


Figure 2-90 Torque limit source (H07.07 = 1)

Table 2–27 Descriptions of H07.07 = 1

DI state		P-CL	
		OFF	ON
N-CL	OFF		
			

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 function No.

No.	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:

See " H07.09" on page 255 for details.

See " H07.10" on page 255 for details.

See " H07.11" on page 255 for details.

See " H07.12" on page 255 for details.

- H07.07 = 2 (T-LMT as torque limit)

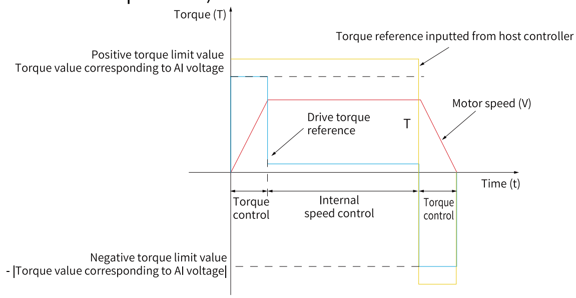


Figure 2-91 AI torque limit curve

- H07.07 = 3: T_LMT or external limit used as torque limit as defined by DI (FunIN.16 or 17)
  When the logic of the external DI signal (P-CL) is inactive, the positive torque limit is defined by the torque value corresponding to the input voltage of external AI. When the logic of the external DI signal (P-CL) is active, the positive torque limit is defined by the minimum of H07.11 and the AI value corresponding to the AI voltage.

  When the logic of the external DI signal (N-CL) is inactive, the negative torque limit is defined by the torque value corresponding to the external AI voltage. When the logic of the external DI signal (N-CL) .is active, the negative torque limit is defined by the minimum of H07.12 and the torque value corresponding to the AI voltage.

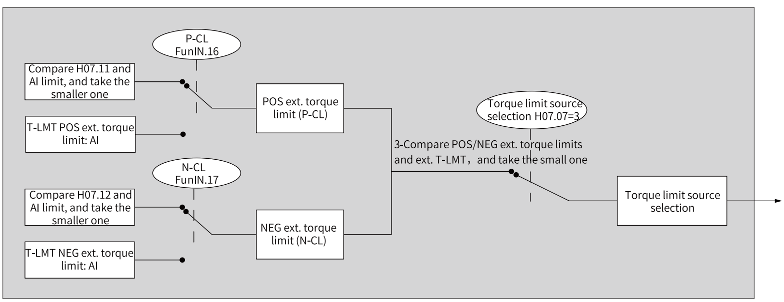
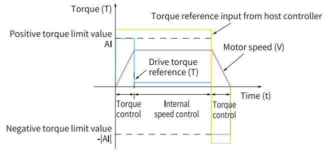
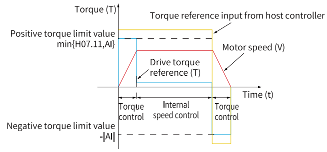
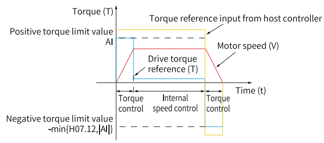
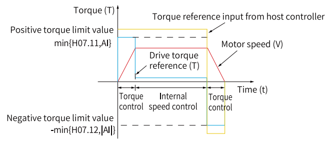


Figure 2-92 Torque limit source (H07.07 = 3)

Table 2–28 Descriptions of H07.07 = 3

<table>
<tr><th colspan="2" rowspan="2">DI state</th><th colspan="2">P-CL</th></tr>
<tr><th>OFF</th><th>ON</th></tr>
<tr><td rowspan="2">N-CL</td><td>OFF</td><td>
</td><td>
</td></tr>
<tr><td>ON</td><td>
</td><td>
</td></tr>
</table>

- H07.07 = 4: T_LMT or internal limit used as torque limit as defined by DI
  When the logic of the external DI signal (P-CL) is inactive, the positive torque limit is defined by H07.09. When the logic of the external DI DI (P-CL) is active, the positive torque limit is defined by the torque value corresponding to the AI voltage.

  When the logic of the external DI signal (N-CL) is inactive, the negative torque limit is defined by H07.10. When the logic of the external DI-CL) is active, the negative torque limit is defined by the torque value corresponding to the AI voltage.

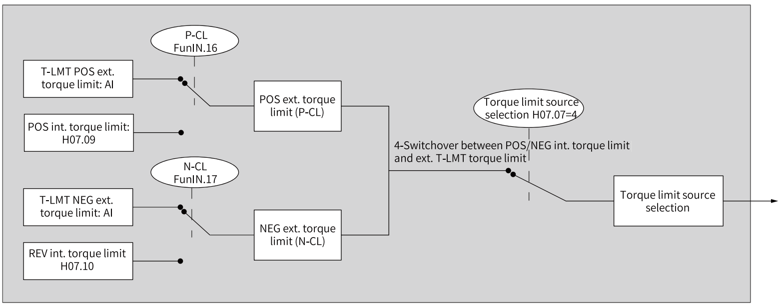
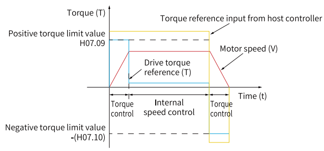
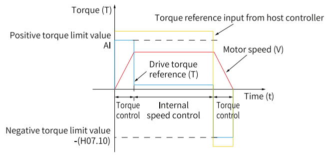
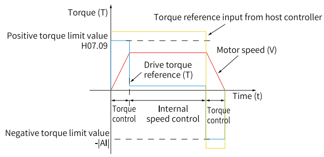
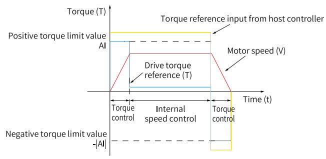


Figure 2-93 Torque limit source (H07.07 = 4)

Table 2–29 Descriptions of H07.07 = 4

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

☆ Related parameters:

See *" H07.09" on page 255* for details.

See *" H07.10" on page 255* for details.

See *" H07.11" on page 255* for details.

See *" H07.12" on page 255* for details.

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 function No.

No.	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 the 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.

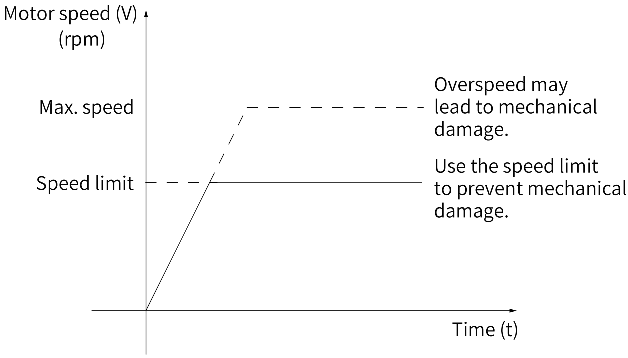


Figure 2-94 Speed limit in the torque control mode

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:

See *" H07.17" on page 256* for details.

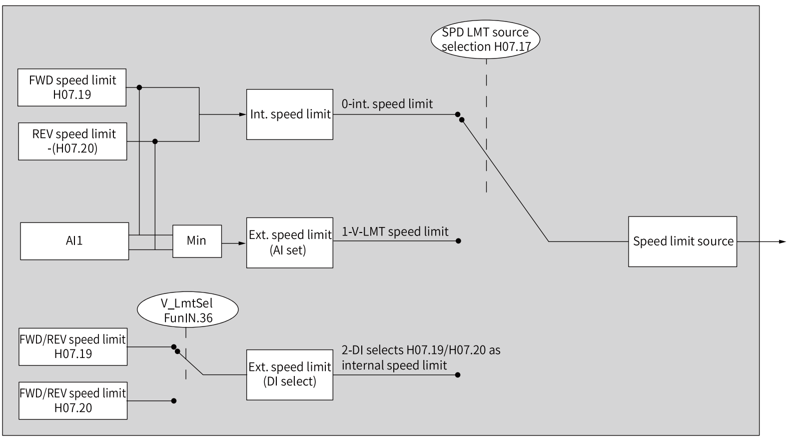


Figure 2-95 Speed limit source

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

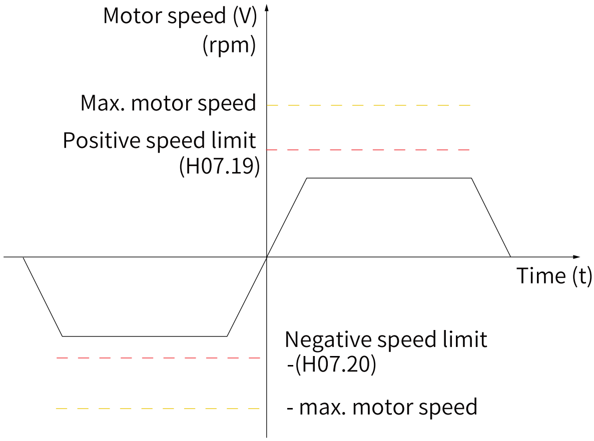


Figure 2-96 Speed limit curve (H07.17 = 0)

- H07.17 = 1 (V- LMT as speed limit)
  When the speed limit defined by AI is lower than the internal speed limit (H07.19/H07.20), the former applies. When the speed limit defined by AI is higher than the internal speed limit (H07.19/H07.20), the latter applies.

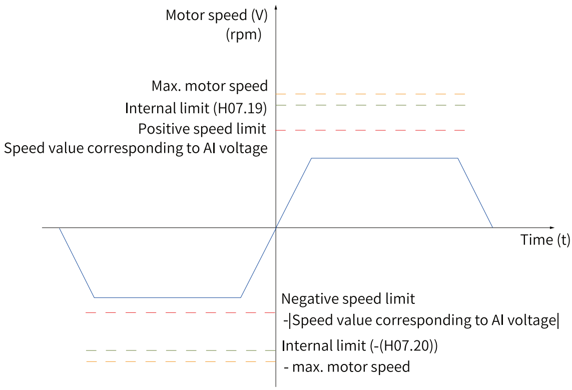


Figure 2-97 Speed limit curve (H07.17 = 1)

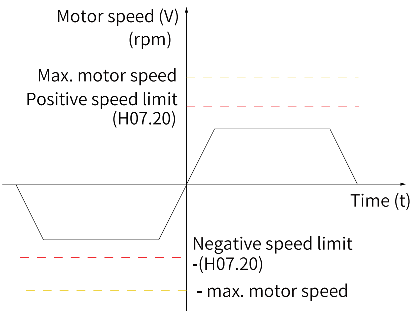
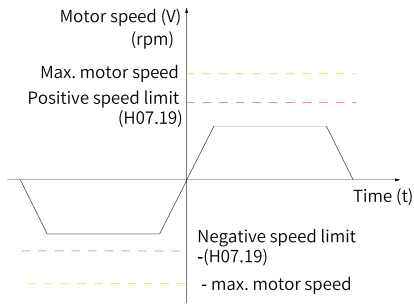
- H07.17 = 2 (H07.19 or H07.20 used as speed limit as defined by DI)
  H07.19 or H07.20 is used as the speed limit based on the logic of the DI.

  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 function No.

No.	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 2–30 Descriptions of speed limit

<table>
<tr><th colspan="2">V_LmtSel</th></tr>
<tr><th>ON</th><th>OFF</th></tr>
<tr><td>
</td><td>
</td></tr>
</table>

☆ Related parameters:

See " *H07.19" on page 256* for details.

See " *H07.20" on page 257* for details.

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.

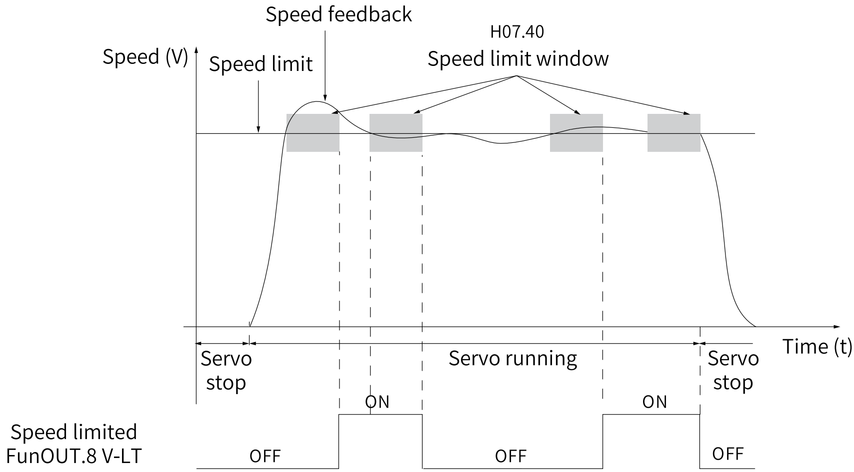


Figure 2-98 Example of speed limit DO waveform

☆ Related function No.

No.	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.

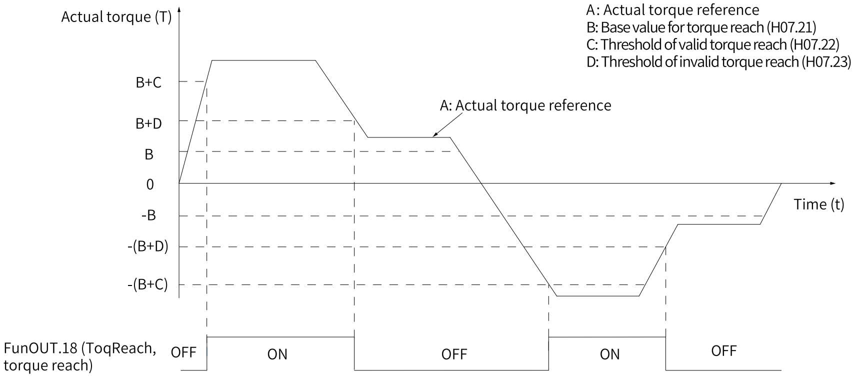


Figure 2-99 Example of TorReach signal waveform

- 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| ⩾ 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 remains signal remains active.

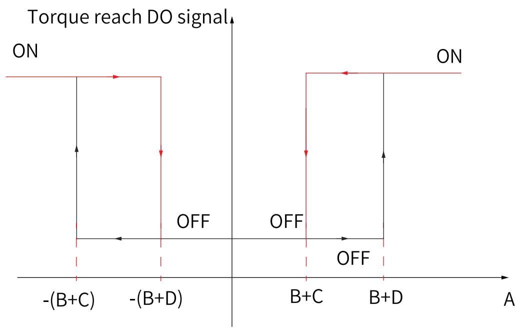


Figure 2-100 Active TorReach signal

☆Related parameters

See " *H07.21" on page 257* for details.

See " *H07.22" on page 257* for details.

See " *H07.23" on page 257* for details.

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 function No.

No.	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 Compound Control Mode

In the compound control mode, the control mode can be switched when the S-ON signal is turned on and the servo drive is in the "run" state. The following four compound control modes are available:

- Torque control mode → Speed control mode
- Speed control mode → Position control mode
- Torque control mode → Position control mode
- Speed control mode → Position control mode → Torque control mode

You can enable the compound control mode by setting H02.00 through the keypad or the software tool.

☆ Related parameters:

See *" H02.00" on page 187* for details.

Set the parameters for different control modes based on the mechanical structure and technical indicators. See description of H02.00 for details.

When H02.00 is set to 3, 4, or 5, assign a DI with FunIN.10 (M1_SEL, mode switchover 1) and set the active logic of this DI. When H02.00 is set to 6, assign two DIs with FunIN.10 (Mode switchover 1) and FunIN.11 (Mode DI 2) and set the active logic of these two DIs.

☆ Related function No.

No.	Name	Function Name	Function
FunIN.10	M1_SEL	Mode switchover 1	Defines the present control mode during compound control when the servo drive is in the "run" state, as shown in *"Table 2–31 " on page 137*.
FunIN.11	M2_SEL	Mode switchover 2	Defines the present control mode during compound control when the servo drive is in the "run" state, as shown in *"Table 2–32 " on page 137*.

Table 2–31 Servo drive control mode

H02.00	M2_SEL terminal logic	Control mode
3	Inactive	Torque control mode
	Active	Speed control mode
4	Inactive	Speed control mode
	Active	Position control mode
5	Inactive	Torque control mode
	Active	Position control mode

Table 2–32 Servo drive control mode

H02.00	M1_SEL terminal logic	M2_SEL terminal logic	Control mode
6	-	Active	Position control mode
	Active	Inactive	Speed control mode
	Inactive	Inactive	Torque control mode

Note

It is recommended to switch from other control modes to the position control mode only in the zero speed state.

3 Applications

3.1 Absolute System

3.1.1 Overview

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

To match the absolute encoder with the SV670P series servo drives, H00.00 (Motor code) to 14101 (Inovance 23-bit absolute encoder). Then set H02.01 (Absolute system selection) based on actual conditions. E731.0 (Encoder battery failure) will occur upon initial power-on of the battery. Set H0d.20 (Absolute encoder reset function) to 1 to reset E731.0 before performing the homing operation.

Note

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

3.1.2 Related Parameters

Absolute encoder system settings

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

See *" H00.00" on page 182* for details.

See *" H00.08" on page 183* for details.

See *" H02.01" on page 188* for details.

Note

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

Encoder feedback data

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

See *" H0b.70" on page 319* for details.

See *" H0b.71" on page 319* for details.

See *" H0b.77" on page 319* for details.

See *" H0b.79" on page 320* for details.

Absolute position linear mode

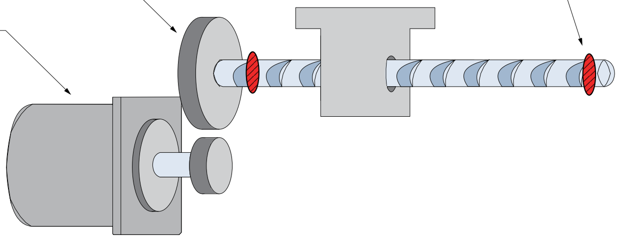


Figure 3-1 Application of the linear mode

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

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

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

See *" H05.46" on page 231* for details.

See *" H0A.36" on page 297* for details.

See *" H0b.07" on page 307* for details.

See *" H0b.58" on page 317* for details.

See *" H0b.60" on page 317* for details.

Absolute position rotation mode

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

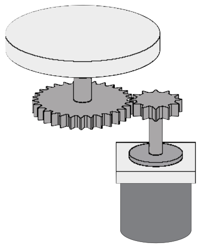
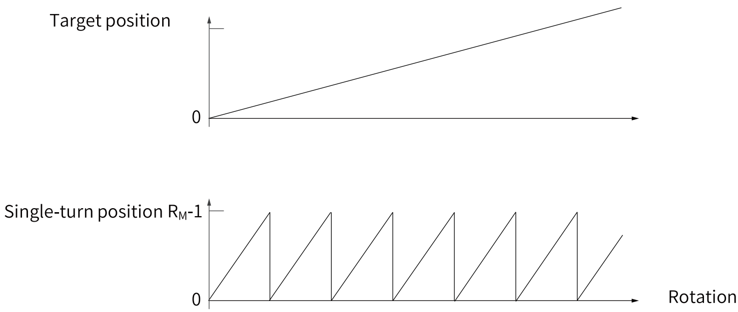
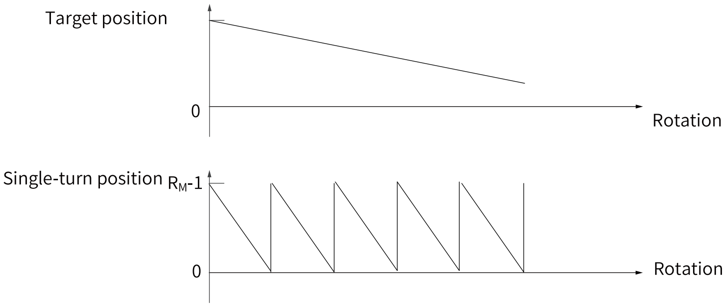


Figure 3-2 Application of the linear mode

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



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



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

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

Related parameters:

See *" H05.50" on page 232* for details.

See *" H05.51" on page 232* for details.

See *" H05.52" on page 232* for details.

See *" H05.54" on page 233* for details.

See *" H0b.81" on page 320* for details.

See *" H0b.83" on page 320* for details.

See *" H0b.85" on page 321* for details.

Single-turn absolute mode

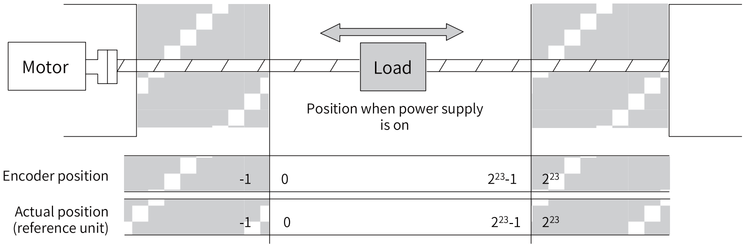
This mode applies to applications where the load travel range is within the single-turn range of the encoder. In this case, the absolute encoder needs no battery as it records the single-turn data only.

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

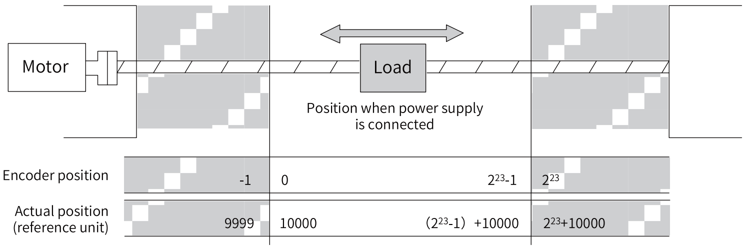
  When H05.36 (Mechanical home offset) is set to 0, the target position range is 0 to (2^{23} - 1).

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

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



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



3.1.3 Precautions for 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 warning) occurs.

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

1. Power on the servo drive and make it stay in the non-operational state.
2. Replace the battery.
3. The servo drive automatically resets Er.730. If there is no other warning, run the servo drive in normal state.

Note

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

See " H0d.20" on page 326 for details.

Note

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

3.2 Fully closed-loop function

3.2.1 Related Parameters

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

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

Note

- SV670 supports only one external encoder type, which is -AB quadrature pulse.
- For N models:
  - To use the encoder with A/B quadrature pulses, set H05.38 to 2 to inhibit frequency-division output. After enabling the fully closed-loop function, enable the JOG function to observe whether the value of H0F.20 (External position pulse feedback display) changes. In the case of improper wiring, the value of H0F.20 does not change and a fully closed-loop fault will be reported. In this case, rectify the fault and perform a power cycling until the value of H0F.20 changes without fault alarm.
  - If the feedback type of the external encoder is AB quadrature pulses without Z signal, set H0F.22 to 1 to hide the detection on phase Z.
- For P models:You can enable both fully closed-loop and frequency-division output.

---

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

   See " H0F.00" on page 330 for details.

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

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

Caution

Perform necessary inspections before motor trial run. See SV680P Series Servo Drive Commissioning Guide for details.

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

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

   See *" H0F.04" on page 332* for details.

Caution

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

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

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

4. **Set the electronic gear ratio of external encoder.**
   If H0F.00 is set to 1, set H05.07/H05.09. If H0F.00 is set to 2, set H05.07/H05.09 for inner loop H05.11/H05.13 for outer loop.

   Suppose for a fully closed-loop device, the external mechanical displacement corresponding to each X_1 pulse reference sent by the host controller is Y_1.

   Then perform the following operations:

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

b. Step 2: Make the host controller send X_2 pulses. The external mechanical displacement measured is Y_2,

then the electronic gear ratio fulfills the needs.

Note

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

5. **Set the alarm threshold.**

Set H0F.08 and H0F.10 as follows.

- Set H0F.08 (Excessive deviation in compound control).
  H0F.08 is used to set the allowable tolerance between the present motor position and the present position fed back by external encoder. The unit of H0F.08 is one reference unit (same as one external encoder unit).

  See *" H0F.08" on page 333* for details.

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

Note

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

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

  See *" H0F.10" on page 333* for details.

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

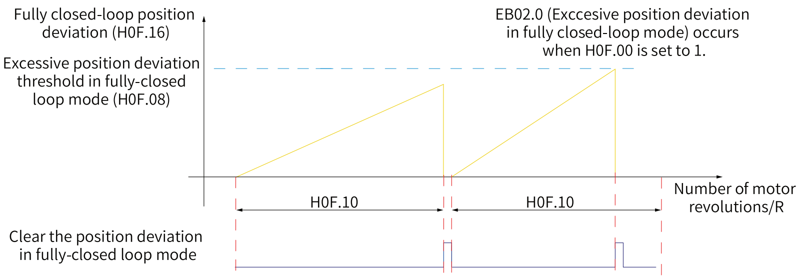


Figure 3-3 Description of position deviation clear in the fully closed-loop mode

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

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

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

- Set the first-order low-pass filter for deviation in compound control.
  See *" H0F.13" on page 333* for details.

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

- Set the source of touch probe Z signal in fully closed-loop mode.
  See *" H0F.25" on page 335* for details.

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

Caution

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

3.2.2 Function Enabling

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

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

See *" H03.02" on page 199* for details.

See *" H0F.00" on page 330* for details.

3.3 Software limit

Description

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

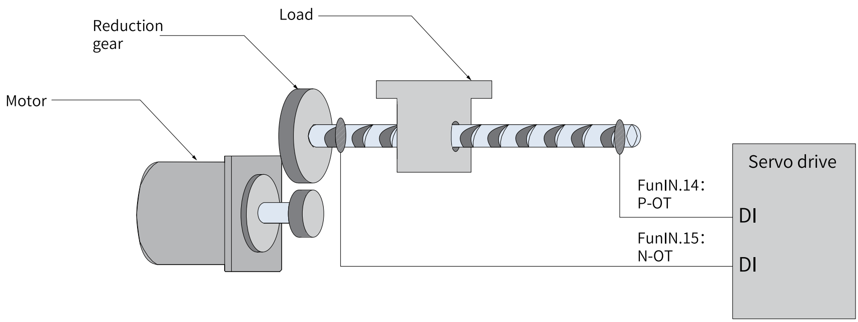


Figure 3-4 Installation of limit switches

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

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

Hardware Position Limit		Software position limit	
1	Restricted to linear motion and single-turn rotational motion.	1	Applicable to both the linear motion and the rotational motion.
2	Requires an external mechanical limit switch.	2	Removes the need for hardware wiring, preventing malfunction due to poor cable contact.
3	Suffered from the risk of mechanical slip.	3	Prevents malfunction due to mechanical slip through internal position comparison.
4	Unable to sense or detect an overtravel fault after power-off.		

Related objects

☆ Related parameters:

See *" H0A.01" on page 291* for details.

See *" H0A.41" on page 297* for details.

See *" H0A.43" on page 298* for details.

- When H0A.01 is set to 0, software position limit is disabled.
- When H0A.01 is set to 1, software position limit is enabled immediately upon power-on. 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.

3.4 Software Reset

Description

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

Related objects

☆ Related parameters:

See *" H0d.00" on page 322* for details.

3.5 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 may 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.

You can adjust the time for reporting E620.0 (Motor overload fault) by setting the motor overload protection gain (H0A.04). 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 motor overload detection as such operation may damage the motor.

☆Related parameters

See *" H0A.04" on page 291* for details.

See *" H0A.26" on page 295* for details.

Motor stall overtemperature protection

The motor is overheated significantly upon stall as the motor speed is nearly 0 rpm under a high current. 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).

Caution

Take caution when disabling motor stall over-temperature protection as such operation may damage the motor.

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

☆ Related parameters:

See " H0A.32" on page 296 for details.

See " H0A.33" on page 296 for details.

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.

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

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:

See *" H0A.08" on page 291* for details.

See *" H0A.12" on page 292* for details.

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.

3.6 DI Filter Time Setting

Description

The drive provides eight physical DI terminals, in which DI1 to DI6 are normal DI terminals, and DI7 to DI8 are high-speed DI terminals. Assign the function of interrupt positioning to DI7 or DI8 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 two high-speed DIs 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:

See *" H03.60" on page 207* for details.

See *" H03.61" on page 207* for details.

See *" H03.62" on page 208* for details.

See *" H03.63" on page 208* for details.

See *" H03.64" on page 208* for details.

See *" H03.65" on page 208* for details.

See *" H03.66" on page 209* for details.

See *" H03.67" on page 209* for details.

See *" H0A.19" on page 293* for details.

See *" H0A.20" on page 294* for details.

3.7 Position Comparison

Description

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

The following table describes the specifications of position comparison output.

<table>
<tr><th colspan="2">Specifications of Position Comparison Output</th><th>Description</th></tr>
<tr><td rowspan="5">Trigger output</td><td>Output terminal</td><td>5 DOs or frequency-division output ABZ/OCZ signals.</td></tr>
<tr><td rowspan="2">Logic</td><td>The effective level of DO is defined by the DO logic in group H04.</td></tr>
<tr><td>The effective level of ABZ/OCZ output is defined by H18.06.</td></tr>
<tr><td>Pulse width</td><td>The pulse output width is defined by H18.05.</td></tr>
<tr><td>Delay compensation</td><td>Defined by H18.14 and used to compensate for hardware output delay.</td></tr>
<tr><td rowspan="2">Comparison source</td><td>Motor encoder feedback</td><td>Supported</td></tr>
<tr><td>Pulse feedback fully closed-loop (ABZ)</td><td>Supported</td></tr>
<tr><td>Comparison value</td><td>Number of comparison points</td><td>40 points, signed 32-bit integer</td></tr>
<tr><td rowspan="2">Comparison attribute</td><td rowspan="2">Attribute of comparison point</td><td>Defines the attribute of the comparion point.</td></tr>
<tr><td>Defines the output terminal for comparison.</td></tr>
</table>

Related objects

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

Position comparison output parameters:

Param. No.	Name	Description
H18: Position comparison output		
H18.00	Position comparison switch	1: Enable
H18.01	Position comparison output feedback source	0- Motor encoder feedback 1- Fully closed-loop feedback
H18.02	Position comparison resolution[1]	Defines the number of pulses per revolution. For example, if H18.02 is set to 1, the number of pulses per revolution is 2^{23}. 0: 24-bit 1: 23-bit 2: 22-bit 3: 21-bit 4: 20-bit 5: 19-bit 6: 18-bit 7: 17-bit
H18.03	Position comparison mode	0: Individual comparison 1: Cyclic comparison 2: Fixed cyclic comparison
H18.04	Current position as zero Note: This function needs to be used when the comparison state is inactive, otherwise the comparison logic may malfunction.	1: Enable (rising edge-triggered)
H18.05	Position comparison pulse output width	Defines the active pulse width of the DO when the comparison point is reached. The value range is 0.1 to 204.7 (in ms).
H18.06	Position comparison output ABZ polarity	bit0: OCZ output polarity bit1: Z output polarity bit2: A/B output polarity 0: Positive; 1: Negative
H18.07	Start point of position comparison	Activated when H18.00 is set to 1 again.
H18.08	End point of position comparison	Activated when H18.00 is set to 1 again.
H18.09	Current status of position comparison	0: No comparison; n: Waiting for the comparison point N
H18.10	Real-time position of position comparison	Displays the current comparison position value Value range: -2^{31} to $(2^{31} - 1)$

H18: Position comparison output		
H18.12	Zero offset of position comparison	Defines the offset value after current position is taken as the zero point Value range: -2^{31} to $+2^{31} - 1$
H18.14	Position comparison output delay compensation	Comparison delay compensation time: -12 us to +12 us The delay caused by hardware output can also be compensated through setting position comparison output delay compensation.
H18.15	Fixed cyclic comparison	1–65535
H18.16	ABZ output function setting	bit 0: OCZ function bit1: Z function bit2: A/B function 0: Frequency-division output; 1: Position comparison
H18.17	Number of fixed mode cycles	Range: 1 to 65535

Param. No.	Name	Description
H19: Target position parameters		
H19.00	Target value of position comparison 1	Defines the target value of position comparison 1. Value range: -2^{31} to $2^{31} - 1$
H19.02	Attribute value of position comparison 1	Defines the attribute value of position comparison 1. bit0: 1: Output DO active signal if current position changes from "less than" to "more than" the comparison point; 0: Skip this point bit1: 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point; 0: Skip this point bit 2: Reserved bit7–bit15: Corresponding to DO1 to DO5, ABZ, and OCZ signals 1: Output current comparison point 0: Not output current comparison point
H19.03	Target value of position comparison 2	Defines the target value of position comparison 2. Value range: -2^{31} to $2^{31} - 1$
H19.05	Attribute value of position comparison 2	Defines the attribute value of position comparison 2. Value range: Same as above
...	...	...
H19.117	Target value of position comparison 40	Defines the target value of position comparison 40. Value range: -2^{31} to $2^{31} - 1$
H19.119	Attribute value of position comparison 40	Defines the attribute value of position comparison 40. Value range: Same as above

Function operation

1. Description

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

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

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

Note

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

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

     The real-time position feedback in the individual comparison mode is an absolute value, which means it is an accumulative value based on preceding comparison points, which cannot be cleared automatically.

   - Cyclic comparison
     In the cyclic comparison mode, position comparison will not be switched off when the comparison end point is reached, and current position comparison value will be reset as the start point for position comparison. After comparison of each point is done, the real-time position feedback (H18.10) will be cleared and counted again for cyclic comparison. In the cyclic comparison mode, the target position is a relative (incremental) value. Each time a comparison point is

reached, the real-time position feedback is cleared and counted again for comparison with the new target.

- Fixed cyclic comparison
  In fixed cyclic comparison mode, the comparison process works in the same way as the cyclic comparison mode. The number of cycles is defined by H18.15. After the set number of cycles are done executing, comparison will be disabled automatically.
- Position comparison output width
  When the position comparison conditions are fulfilled, the servo drive outputs DO active level signal. The width of the active signal can be set in H18.05 (value range: 1 to 2047 x 0.1 ms). 1 to 2047 × 0.1 ms.

  When position comparison DO is active, the comparison logic is suspended and no comparison will be performed. In this case, ensure the operating time between two target points is larger than the output width of DO.
- Target value of position comparison
  There are 40 target values for position comparison. The target value and attribute value of position comparison must be updated to parameters in group H19 in advance.

Note

Set the target position properly. The position comparison mode does not support H18.10 overflow comparison.

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

Note

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

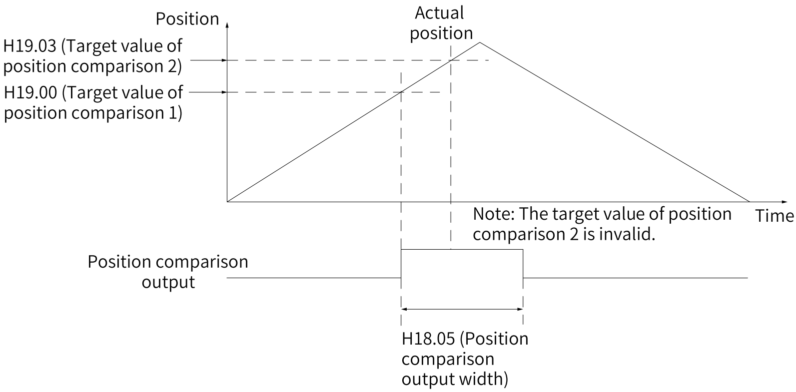
2. Function operation

- When the position feedback of the encoder passes the target position comparison points, the output width of the output terminal is defined by H18.05 (Position comparison output width).
  When the attribute of the comparison point is set to "bit0 = 1" (Output DO active signal if current position changes from "less than" to "more than" the comparison point), the DO outputs the position comparison signal when the axis passes the target position comparison point with position changing from "less than" to "more than" the comparison point position.

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

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

- When multiple position comparison values are set, no comparison will be performed once the position comparison output terminal is active. Therefore, ensure the operating time between two position comparison points is larger than the pulse output width.
  As shown in the following figure, comparison is not performed when the position changing from "more than" to "less than" the comparison point position. This is because the operating time between the two comparison points is lower than the pulse output width.

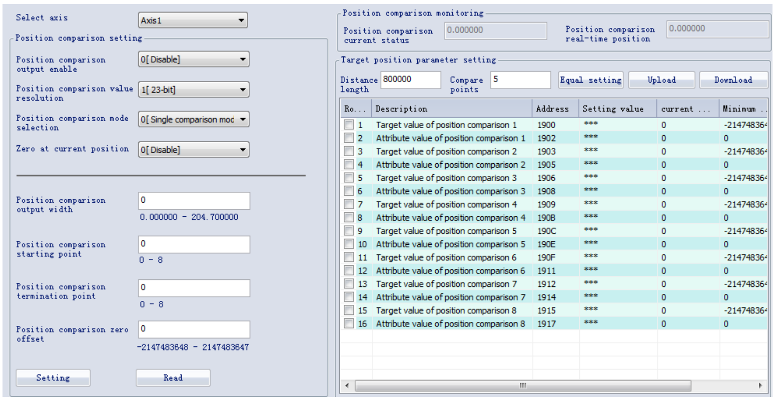


- Only one pulse will be outputted when the stop position is the same with the target value of position comparison. See the following figure.

3. Interface of the software tool

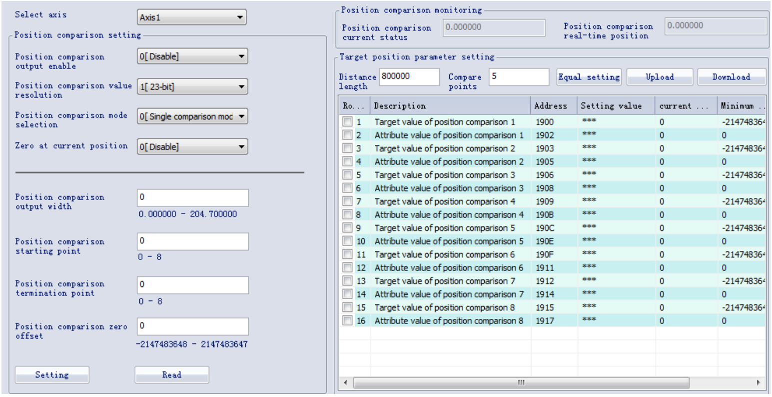
- Individual comparison mode

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



b. **Target position parameter setting**: **Distance length** (total operating distance) and **Compare points**

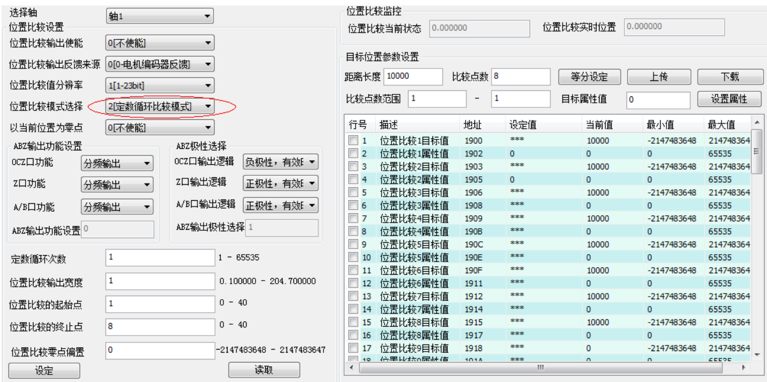
c. After clicking **Equal setting**, the target value of the first point is updated to "**Distance length** x 1/**Compare points**", the target value of the second point is updated to "**Distance length** x 2/**Compare points**", and the target value of the Nth point is updated to: **Distanch** x N/**Compare points**



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

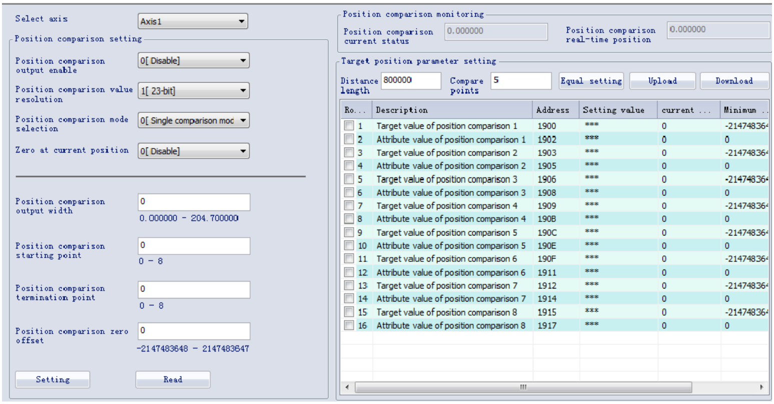
- Cyclic comparison mode/Fixed cyclic comparison mode

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



b. **Target position parameter setting**: **Distance length** (distance between two adjacent points) and **Compare points** (points to be compared cyclically)

c. After clicking **Equal setting**, the target values of the 1st point to the Nth point are updated to equal interval distance values.



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

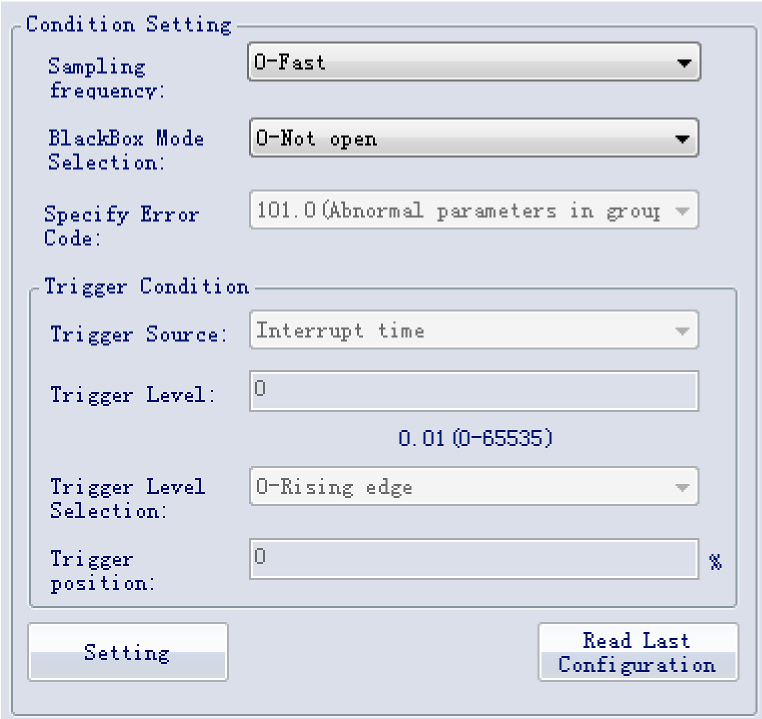
3.8 Black Box

Description

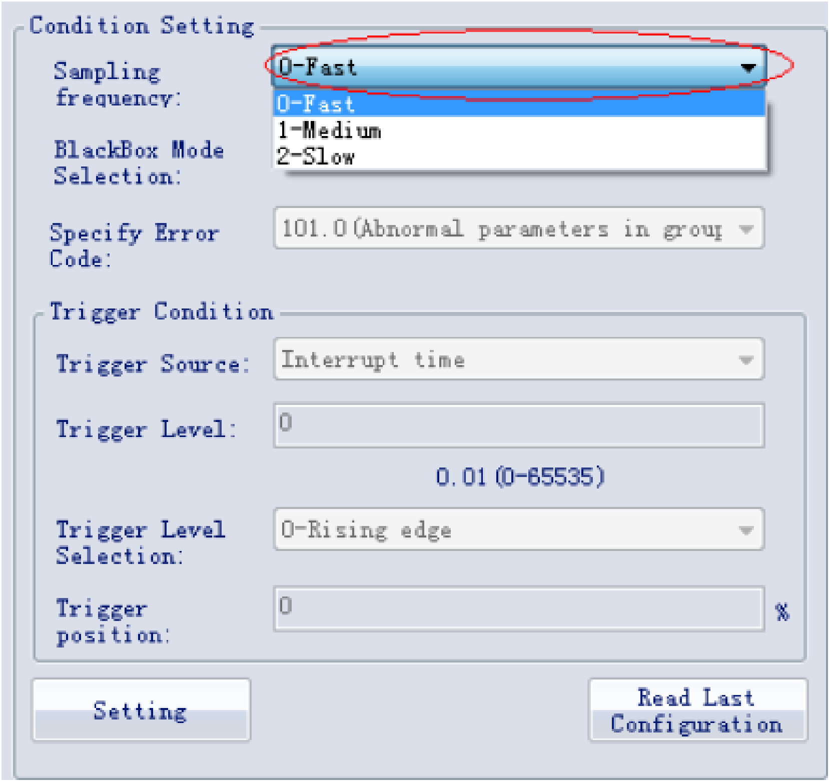
The black box function is used to capture and save the data generated upon occurrence of faults or under designated conditions. Such data can be read and uploaded by users through the software tool to facilitate troubleshooting.

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

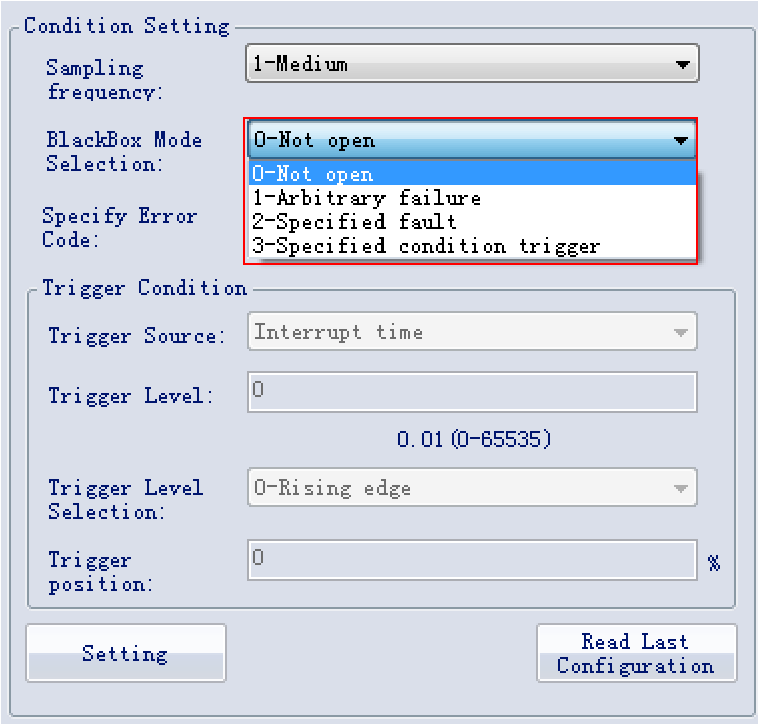
Triggering the black box



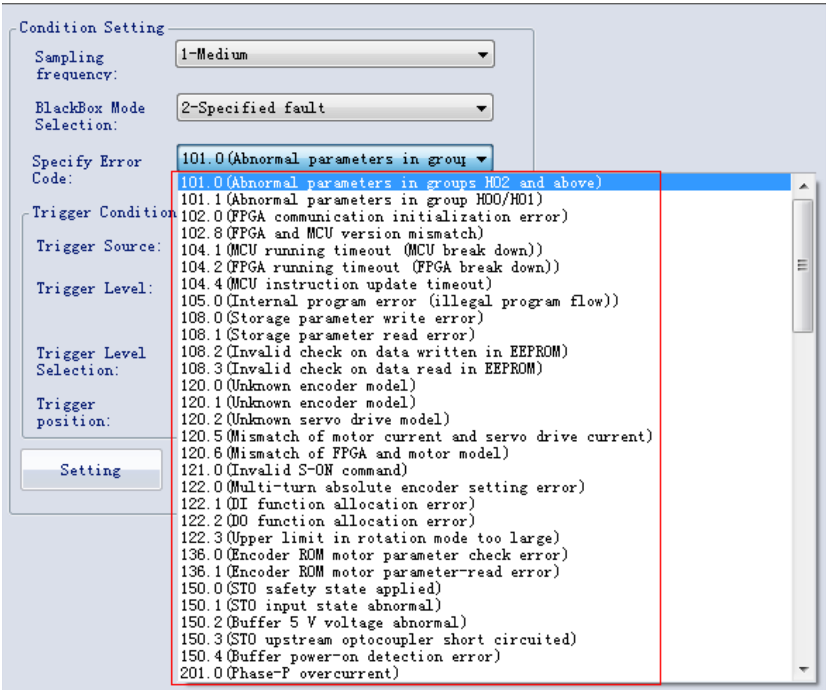
1. Sampling frequency: including three sampling frequencies, namely 16k (**Fast**), 4k (**Medium**), and 1k (**Slow**).



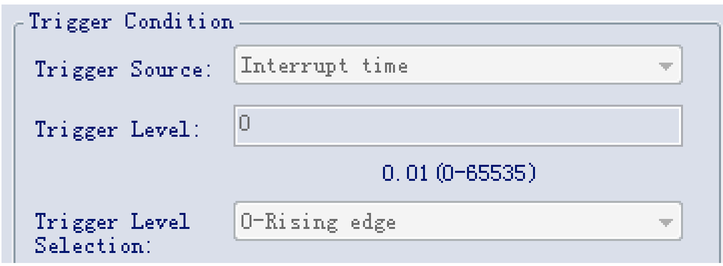
2. Black box mode selection: including three modes, namely **Arbitrary failure**, **Specified fault**, and **Specified condition trigger**.



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



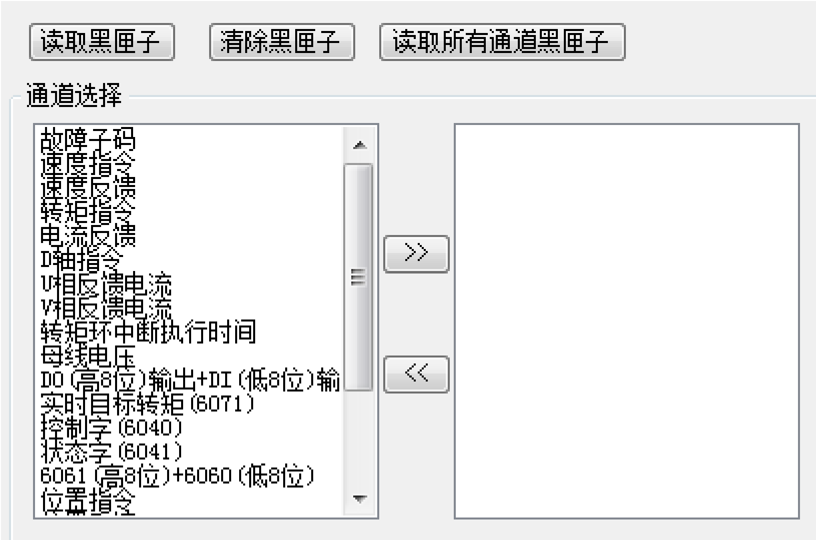
4. The **Trigger Condition** includes **Trigger Source**, **Trigger Level**, and **Trigger Level Selection**, as shown below.



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

Reading black box data

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


读取黑匣子
清除黑匣子
读取所有通道黑匣子
通道选择
故障子码
速度指令
速度反馈
转矩指令
电流反馈
D轴指令
U相反馈电流
V相反馈电流
转矩环中断执行时间
母线电压
DO(高8位)输出+DI(低8位)输
实时目标转矩(6071)
控制字(6040)
状态字(6041)
6061(高8位)+6060(低8位)
位置指令
>>
<<

4 STO

4.1 General

4.1.1 Terms and Abbreviations

Terms and Abbreviations	Description
Cat.	Safety category It includes B, 1, 2, 3, and 4.
CCF	Common cause failure
DCavg	Average diagnostic coverage (%)
DTI	Diagnostic test interval time
SFF	Safe failure fraction
HFT	Hardware fault tolerance
PFH_D	Probability of a dangerous Failure per Hour
PL	Performance Level
SC	Systematic capability
SIL	Safety integrity level
T_1	Test interval
DI	Digital input
DO	Digital output
PCB	Printed circuit board
MCU	Micro computer unit
FPGA	Field programmable gate array
MTTFd	Mean time to dangerous failure
STO	The safe torque off (STO) function brings the machine safely into a no-torque state and prevents it from unexpected start. If the motor is running when STO function is activated, it coasts to 0 RPM.

4.1.2 Safety Standards

Standards compliance

- 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

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

- Safety data

Item	Safety data
SIL	SIL3, IEC61508 Maximum SIL3, EN IEC62061
PFH_D	$PFH_D \leqslant 1.1\times10^{-9}$[1/h] (1.1% of SIL3)
Cat.	3, EN ISO 13849-1
PL	e, EN ISO 13849-1
MTTFd	904 years (high)
DCavg	⩾90% (medium)
T_1	20 years
HFT	1
SC	SC3
λ_S	2.2×10^{-7}/h
λ_{DD}	1.3×10^{-7}/h
λ_{DU}	1.9×10^{-9}/h
MTTR	0 hour
MRT	0 hour

Item	Safety data
Application mode	High demand or continuous mode
Device type	Type B

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

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

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

Note

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

Specifications

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

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

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

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

Item	Description
Applicable servo drives	SV670*S1R6I-FS SV670*S2R8I-FS SV670*S5R5I-FS SV670*S7R6I-FS SV670*S012I-FS SV670*T3R5I-FS SV670*T5R4I-FS SV670*T8R4I-FS SV670*T012I-FS SV670*T017I-FS SV670*T021I-FS SV670*T026I-FS
Position	Integrated on the control board of the drive
Safety function - Inputs	Two channels: STO1/STO2

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

4.1.3 Precautions for Use

General Safety Instructions

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

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

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

Table 4–1 Warnings, Cautions and Notes

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

Caution

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

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

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

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

Safety Precautions

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

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

Note

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

Risk Assessment

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

Note

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

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

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

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

Common residual risks

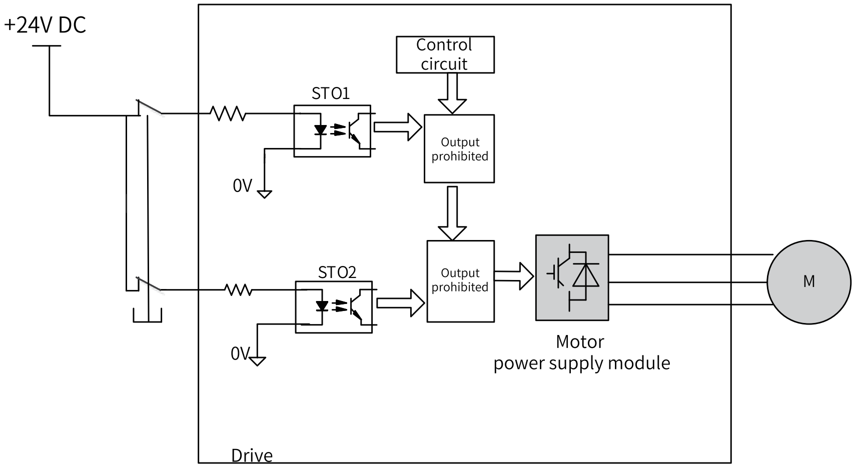
- At the shipment to end-users, check the settings of safety related components with programming tools and monitored/displayed contents on display and record and save the setting data concerning the safety observation function and the programming tools you used. Perform them using a check sheet, etc.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

Safe torque off (STO)

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

4.2 STO

4.2.1 Overview



The motor power is cut off and motor torque output is stopped by turning off the power supply module.

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 SV670 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.
Operating mode	High demand mode or continuous mode

4.2.2 Function Use and Monitoring

Function Use

The keypad displays the STO function state and error information.

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

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

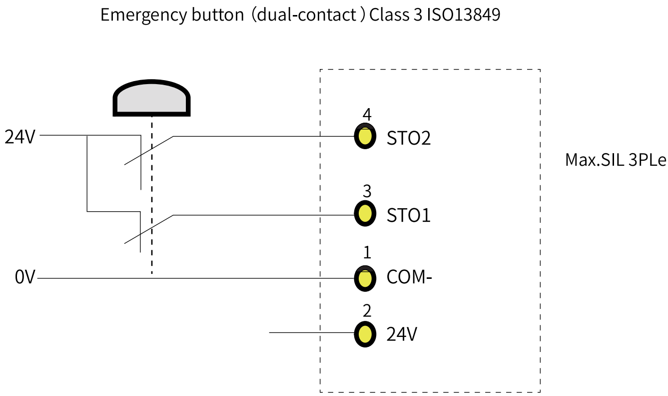
Fault Code	State	Description	Cause	Corrective Action
E150.1	Status of STO1 and STO2 inconsistent	Only one of STO1 and STO2 is in "Low" state, status of STO1 and STO2 are inconsistent.	The input states of STO1 and STO2 are inconsistent.	1. Ensure the requests for disconnecting the voltage of STO1 and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

Note

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

Application Example of Safety Function

Example 1:



4.2.3 Fault Reset

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

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

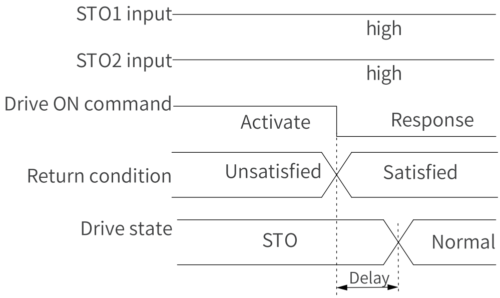


Figure 4-2 Return condition of servo ON/RUN command

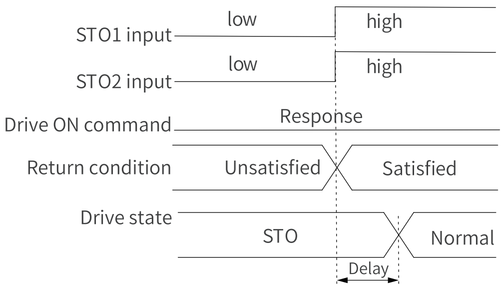


Figure 4-3 Return condition of external STO request state

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

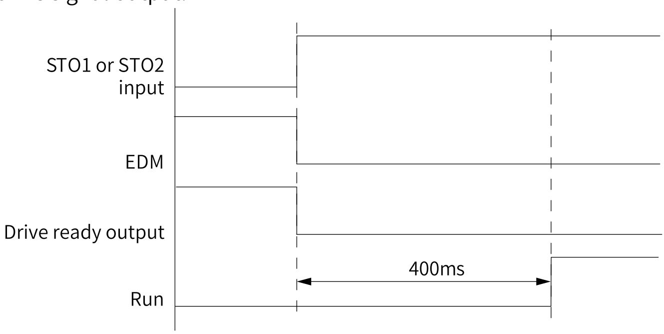
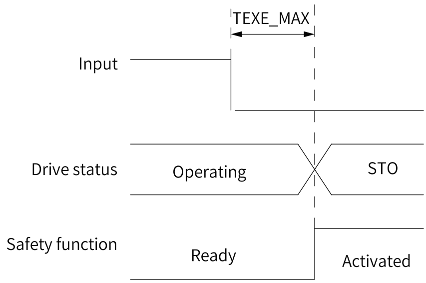


Figure 4-4 Servo drive reset timing diagram

4.2.4 Safety Function Response Time

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

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



4.3 Acceptance

Basic requirements

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

Commissioning Checklist

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

  The acceptance test must be performed:

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

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

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

- Checklist

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

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

Special requirements

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 of Parameters

5.1 H00 Servo Motor Parameters

H00.00 Motor code

Address:	0x0000		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	14101	Change:	At stop

Value Range:

0 to 65535

Description

14000: Inovance motor with 20-bit incremental encoder

14101: Inovance motor with 23-bit absolute encoder

14102: Inovance motor with 26-bit absolute encoder

H00.02 Customized No.

Address:	0x0000		
Min.:	0	Unit:	-
Max.:	2^{32} - 1	Data type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 2^{32} - 1.00

Description

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

H00.04 Encoder version

Address:	0x0004		
Min.:	0	Unit:	-
Max.:	6553.5	Data type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0 to 6553.5

Description

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

H00.05 Serial-type motor code

Address:	0x0005		
Min.:	0	Unit:	-
Max.:	65535	Data type:	UInt16

Default: 0 Change: Unchangeable

Value Range:

0 to 65535

Description

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

H00.06 Customized FPGA No.

Address: 0x0006

Min.: 0 Unit: -

Max.: 655.35 Data type: UInt16

Default: 0 Change: Unchangeable

Value Range:

0.00 to 655.35

Description

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

H00.07 STO version

Address: 0x000

Min.: 0 Unit: -

Max.: 655.35 Data type: UInt16

Default: 0 Change: Unchangeable

Value Range:

0.00 to 655.35

Description

Displays the software version of the STO function.

H00.08 Serial encoder type

Address: 0x0008

Min.: 0 Unit: -

Max.: 65535 Data type: UInt16

Default: 0 Change: At stop

Value Range:

0 to 65535

Description

14100: Multi-turn absolute encoder

Others: Single-turn absolute encoder

5.2 H01 Servo Drive Parameters

H01.00 MCU software version

Address: 0x0100

Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0 to 6553.5

Description

Displays the MCU software version (with one decimal place).

H01.01 FPGA software version

Address: 0x0101

Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0 to 6553.5

Description

Displays the FPGA software version (with one decimal place).

H01.02 Servo drive series No.

Address: 0x0102

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

Value Range:

0 to 65535

Description

Displays the servo drive series No. (without decimal place).

H01.06 Board software version

Address: 0x0106

Min.:	0	Unit:	-
Max.:	6554	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Setpoint

0.0 to 6554

Description

Displays the board software version (with one decimal place).

H01.10 Drive series No.

Address:	0x010A		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	3	Change:	At stop

Value Range:

2: S1R6

3: S2R8

5: S5R5

60005: S6R6

6: S7R6

7: S012

8: S018

9: S022

10: S027

10001: T3R5

10002: T5R4

10003: T8R4

10004: T012

10005: T017

10006: T021

10007: T026

Description

Displays the drive series No. (without decimal place).

H01.11 DC-AC voltage class

Address:	0x010B		
Min.:	0	Unit:	V
Max.:	65535	Data Type:	UInt16
Default:	220	Change:	Unchangeable

Value Range:

0 V to 65535 V

Description

Displays DC-AC voltage class (without decimal place).

H01.12 Rated power of the drive

Address:	0x010C		
Min.:	0	Unit:	kW
Max.:	10737418.24	Data Type:	UInt32
Default:	0.4	Change:	Unchangeable

Value Range:

0.00 to 10737418.24

Description

Displays the rated power of the servo drive (with two decimal places).

H01.14 Max. output power of the drive

Address:	0x010E		
Min.:	0	Unit:	kW
Max.:	10737418.24	Data Type:	UInt32
Default:	0.4	Change:	Unchangeable

Value Range:

0.00 to 10737418.24

Description

Displays the maximum output power of the drive (with two decimal places).

H01.16 Rated output current of the drive

Address:	0x0110		
Min.:	0	Unit:	A
Max.:	10737418.24	Data Type:	UInt32
Default:	2.8	Change:	Unchangeable

Value Range:

0.00 to 10737418.24

Description

Displays the rated output current of the drive (with two decimal places).

H01.18 Max. output current of the drive

Address:	0x0112		
Min.:	0	Unit:	A
Max.:	10737418.24	Data Type:	UInt32
Default:	10.1	Change:	Unchangeable

Value Range:

0.00 to 10737418.24

Description

Displays the maximum output current of the drive (with two decimal places).

H01.40 DC bus overvoltage protection threshold

Address:	0x0128		
Min.:	0	Unit:	V
Max.:	2000	Data Type:	UInt16
Default:	420	Change:	At once

Value Range:

0 to 2000

Description

Displays DC bus overvoltage protection threshold (without decimal place).

H01.75 Current loop amplification factor

Address:	0x014B		
Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 655.35

Description

Displays current loop amplication coefficient (with two decimal places).

H01.89 Junction temperature parameter version

Address:	0x0159		
Min.:	0	Unit:	-
Max.:	65.535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65.535

Description

Displays the junction temperature parameter version.

5.3 H02 Basic Control Parameters

H02.00 Control mode

Address:	0x0200		
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	1	Change:	At stop

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

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

H02.01 Absolute system selection

Address:	0x0201		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Incremental mode

1: Absolute position linear mode 2: Absolute position rotation mode

3: Absolute position linear mode (without encoder overflow warning)

4: Absolute position single-turn mode

Description

Used to set the absolute position function.

H02.02 Direction of rotation

Address:	0x0202		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

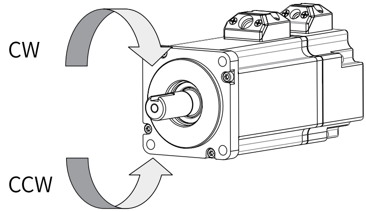
0: Counterclockwise (CCW) as forward direction

1: Clockwise (CW) as forward direction

Description

Defines the forward direction of the motor when viewed from the motor shaft side.

Setpoint	Direction of rotation	Remarks
0	CCW direction as forward direction	When a forward command is input, the motor rotates in CCW direction viewed from the motor shaft side, that is, the motor rotates counterclockwise.
1	CW direction 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.



H02.03 Output pulse phase

Address: 0x0203

Min.: 0 | Unit: -

Max.: 1 | Data Type: UInt16

Default: 0 | Change: At stop

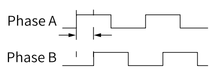
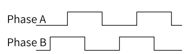
Value Range:

0: Phase A leads phase B

1: Phase A lags behind phase B

Description

Defines the relationship between phase A and phase B on the condition that the motor direction of rotation remains unchanged when pulse output is enabled.

Setpoint	Output pulse phase	Remarks
0	Phase A leads phase B.	Phase A leads phase B by 90° in encoder frequency-division output pulses. 
1	Phase A lags phase B.	Phase A lags behind phase B by 90° in encoder frequency-division output pulses. 

H02.05 Stop mode at S-ON OFF

Address:	0x0205		
Min.:	-4	Unit:	-
Max.:	2	Data Type:	Int16
Default:	0	Change:	Real-time modification

Value Range:

-4: Stop based on ramp 2, keeping dynamic braking state

-3: Stop at zero speed, keeping dynamic braking state

-2: Stop based on ramp 1, keeping dynamic braking state

-1: Dynamic braking stop, keeping dynamic braking state

0: Coast to stop, keeping de-energized state

1: Stop based on ramp 1, keeping de-energized state

2: Dynamic braking stop, keeping de-energized state

Description

Defines the deceleration mode of the motor for stopping rotating upon S-ON OFF and the motor status after stop.

H02.06 Stop mode at No.2 fault

Address:	0x0206		
Min.:	-5	Unit:	-
Max.:	4	Data Type:	Int16
Default:	2	Change:	Real-time modification

Value Range:

-5: Stop at zero speed, keeping dynamic braking state

-4: Stop at emergency stop torque, keeping dynamic braking state

-3: Stop based on ramp 2, keeping dynamic braking state

-2: Stop based on ramp 1, keeping dynamic braking state

-1: Dynamic braking stop, keeping dynamic braking state

0: Coast to stop, keeping de-energized state

1: Stop based on ramp 1, keeping de-energized state

2: Stop based on ramp 2, keeping de-energized state

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

4: Dynamic braking stop, keeping de-energized state

Description

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

H02.07 Stop mode at overtravel

Address:	0x0207		
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Coast to stop, keeping de-energized state
1: Stop at zero speed, keeping position lock state
2: Stop at zero speed, keeping de-energized state
3: Stop based on ramp 2, keeping de-energized state
4: Stop based on ramp 2, keeping position lock state
5: Dynamic braking stop, keeping de-energized state
6: Dynamic braking stop, keeping dynamic braking state
7: Not responding to overtravel

Description

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

H02.08 Stop mode at No.1 fault

Address:	0x0208		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:

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

Description

Defines the deceleration mode of the servo motor for stopping rotating and the servo motor status when a No. 1 fault occurs.
For details, see section "Servo ON" in SV670P Series Servo Drive Commissioning Guide.

H02.09 Delay from brake output ON to command received

Address:	0x0209		
Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	250	Change:	Real-time modification

Value Range:

0 ms to 500 ms

Description

Defines the delay from the moment the brake output signal is ON to the moment the servo drive starts to receive commands after power-on.
For details, see section "Servo ON" in SV670P Series Servo Drive Commissioning Guide.

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

Address: 0x020A

Min.:	50	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	150	Change:	Real-time modification

Value Range:

50 ms to 1000 ms

Description

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

For details, see section "Servo ON" in SV670P Series Servo Drive Commissioning Guide.

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

Address: 0x020B

Min.:	20	Unit:	rpm
Max.:	3000	Data Type:	UInt16
Default:	30	Change:	Real-time modification

Value Range:

20 rpm to 3000 rpm

Description

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

For details, see section "Servo ON" in SV670P Series Servo Drive Commissioning Guide.

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

Address: 0x020C

Min.:	1	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	500	Change:	Real-time modification

Value Range:

1 ms to 65535 ms

Description

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

H02.15 Warning display on the keypad

Address: 0x020F

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Output warning information immediately

1: Not output warning information

Description

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

H02.17 Stop mode upon main circuit power failure

Address:	0x0211		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0: Keep present action

1: Stop upon fault as defined by H02.06

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

3: Stop quickly as defined by H02.18

Description

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

H02.18 Quick stop mode

Address:	0x0212		
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0: Coast to stop, keeping de-energized state

1: Stop based on ramp 1, keeping de-energized state

2: Stop based on ramp 2, keeping de-energized state

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

5: Stop based on ramp 1, keeping position lock state

6: Stop based on 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 regenerative resistor

Address:	0x0215		
Min.:	1	Unit:	Ω
Max.:	1000	Data Type:	UInt16

Default:	40	Change:	Unchangeable

Value Range:

1 Ω to 1000 Ω

Description

-

H02.22 Power of built-in regenerative resistor

Address:	0x0216		
Min.:	0	Unit:	W
Max.:	65535	Data type:	UInt16
Default:	50	Change:	Unchangeable

Value Range:

0 W to 65535 W

Description

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

H02.23 Resistance of built-in regenerative resistor

Address:	0x0217		
Min.:	0	Unit:	Ω
Max.:	65535	Data Type:	UInt16
Default:	50	Change:	Unchangeable

Value Range:

0 Ω to 65535 Ω

Description

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

Table 5–1 Specifications of the regenerative resistor

<table>
<tr><th rowspan="2">Servo Drive Model</th><th colspan="2">Specifications of Built-in Regenerative Resistor</th><th>External regenerative resistor
Min. Allowable Resistance (Ω)
(H02.21)</th></tr>
<tr><th>Resistance (Ω)</th><th>Power (Pr) (W)</th><th></th></tr>
<tr><td>SV670PS1R6I</td><td>-</td><td>-</td><td rowspan="3">40</td></tr>
<tr><td>SV670PS2R8I</td><td>-</td><td>-</td></tr>
<tr><td>SV670PS5R5I</td><td>50</td><td>50</td></tr>
<tr><td>SV670PS7R6I</td><td rowspan="2">25</td><td rowspan="2">80</td><td>20</td></tr>
<tr><td>SV670PS012I</td><td>15</td></tr>
<tr><td>SV670PS018I</td><td rowspan="3">20</td><td rowspan="3">100</td><td rowspan="3">20</td></tr>
<tr><td>SV670PS022I</td></tr>
<tr><td>SV670PS027I</td></tr>
<tr><td>SV670PT3R5I</td><td rowspan="2">100</td><td rowspan="4">80</td><td>80</td></tr>
<tr><td>SV670PT5R4I</td><td>60</td></tr>
<tr><td>SV670PT8R4I</td><td rowspan="2">50</td><td>45</td></tr>
<tr><td>SV670PT012I</td><td>40</td></tr>
<tr><td>SV670PT017I</td><td rowspan="3">35</td><td rowspan="3">100</td><td rowspan="3">25</td></tr>
<tr><td>SV670PT021I</td></tr>
<tr><td>SV670PT026I</td></tr>
</table>

H02.24 Resistor heat dissipation coefficient

Address: 0x0218

Min.: 10 Unit: %

Max.: 100 Data Type: UInt16

Default: 30 Change: Real-time modification

Value Range:

10% to 100%

Description

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

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

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

Recommendations:

Generally, the value of H02.24 cannot exceed 30% for natural cooling.
The value of H02.24 cannot exceed 50% for forced air cooling.

H02.25 Regenerative resistor type

Address:	0x0219		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	3	Change:	Real-time modification

Value Range:

0: Built-in

1: External, natural cooling 2: External, forced air cooling 3: No resistor needed

Description

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

H02.26 Power of external regenerative resistor

Address:	0x021A		
Min.:	1	Unit:	W
Max.:	65535	Data Type:	UInt16
Default:	40	Change:	Real-time modification

Value Range:

1 W–65535 W

Description

Defines the power of external regenerative resistor.

H02.27 Resistance of external regenerative resistor

Address:	0x021B		
Min.:	15	Unit:	Ω
Max.:	1000	Data Type:	UInt16
Default:	50	Change:	Real-time modification

Value Range:

15 Ω to 1000 Ω

Description

Defines the resistance of the external regenerative resistor.

H02.30 User password

Address:	0x021E		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

H02.31 System parameter initialization

Address: 0x021F

Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation

1: Restore default settings

2: Clear fault records

Description

Used to restore default values or clear fault records.

H02.32 Selection of parameters in group H0b

Address: 0x0220

Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0 to 99

Description

Used to set the offset of the parameter to be displayed on the keypad.

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

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

H02.35 Keypad data refresh frequency

Address: 0x0223

Min.:	0	Unit:	Hz
Max.:	20	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 20

Description

-

H02.41 Manufacturer password

Address: 0x0229

Min.: 0 Unit: -
Max.: 65535 Data Type: UInt16
Default: 0 Change: At once

Value Range:

0 to 65535

Description

-

5.4 H03 Terminal Input Parameters

H03.00 DI function allocation 1 (activated upon power-on)

Address: 0x0300
Min.: 0 Unit: -
Max.: 65535 Data Type: UInt16
Default: 0 Change: Real-time modification

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)

Address: 0x0301
Min.: 0 Unit: -

Max.: 65535 | Data Type: UInt16
Default: 0 | Change: Real-time modification

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
16: Corresponding to FunIN.21
32: Corresponding to FunIN.22
64: Corresponding to FunIN.23
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

Address: 0x0302
Min.: 0 | Unit: -
Max.: 55 | Data Type: UInt16
Default: 14 | Change: At once

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
20: Step enable
21: Hand wheel override signal 1
22: Hand wheel override signal 2
23: Hand wheel enable signal
24: Electronic gear ratio selection
25: Torque reference direction
26: Speed reference direction
27: Position reference direction
28: Multi-position reference enable
29: Interrupt positioning cancelled
31: Home switch
32: Homing enable
33: Interrupt positioning inhibited
34: Emergency stop
35: Clear position deviation
36: Internal speed limit source
37: Pulse reference inhibited
38: Touch probe 1
39: Touch probe 2
41: Current position as home
42: Axis control command executed immediately
43: Axis control command not exected 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

Address: 0x0303

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open
1: Closed

Description

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

H03.04 DI2 function selection

Address: 0x0304

Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	15	Change:	Real-time modification

Value Range:

See *" H03.02" on page 199* for details.

Description

Defines the function of DI2.

H03.05 DI2 logic

Address: 0x0305

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open
1: Closed

Description

-

H03.06 DI3 function selection

Address: 0x0306

Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	13	Change:	Real-time modification

Value Range:

See " H03.02" on page 199 for details.

Description

Defines the function of DI3.

H03.07 DI3 logic

Address: 0x0307

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open

1: Closed

Description

-

H03.08 DI4 function selection

Address: 0x0308

Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	2	Change:	Real-time modification

Value Range:

See " H03.02" on page 199 for details.

Description

Defines the function of DI4.

H03.09 DI4 logic

Address: 0x0309

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open

1: Closed

Description

-

H03.10 DI5 function selection

Address: 0x030A

Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	1	Change:	Real-time modification

Value Range:

See *" H03.02" on page 199* for details.

Description

Defines the function of DI5.

H03.11 DI5 logic

Address: 0x030B

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open

1: Closed

Description

-

H03.13 DI6 logic

Address: 0x030D

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open

1: Closed

Description

-

H03.12 DI6 function selection

Address: 0x030C

Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H03.02" on page 199* for details.

Description

Defines the function of DI6.

H03.14 DI7 function selection

Address: 0x030E

Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	45	Change:	Real-time modification

Value Range:

See " H03.02" on page 199 for details.

Description

Defines the function of DI7.

H03.15 DI7 logic

Address: 0x030F

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open

1: Closed

Description

-

H03.16 D8 function selection

Address: 0x0310

Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	31	Change:	Real-time modification

Value Range:

See " H03.02" on page 199 for details.

Description

Defines the function of DI8.

H03.17 DI8 logic

Address: 0x0311

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open

1: Closed

Description

-

H03.34 DI function allocation 3 (activated upon power-on)

Address: 0x0322

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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)

Address: 0x0323

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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.

H03.50 Voltage-type AI1 offset

Address:	0x0332		
Min.:	-5000	Unit:	mV
Max.:	5000	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-5000 to +5000

Description

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

H03.51 Voltage-type AI1 input filter time constant

Address:	0x0333		
Min.:	0	Unit:	ms
Max.:	655.35	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.00 ms to 655.35 ms

Description

Defines the filter time constant of AI1 input current signal.

H03.53 Voltage-type AI1 dead zone

Address:	0x0335		
Min.:	0	Unit:	mV
Max.:	1000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0.0 to 1000.0

Description

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

H03.54 Voltage-type AI1 zero drift

Address:	0x0336		
Min.:	-500	Unit:	mV
Max.:	500	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-500.0 to +500.0

Description

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

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

H03.60 DI1 filter time

Address:	0x033C		
Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	3.00	Change:	Real-time modification

Value Range:

0.00 ms to 500.00 ms

Description

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

H03.61 DI2 filter time

Address:	0x033D		
Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	3.00	Change:	Real-time modification

Value Range:

0.00 ms to 500.00 ms

Description

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

H03.62 DI3 filter time

Address:	0x033E		
Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	3.00	Change:	Real-time modification

Value Range:

0.00 ms to 500.00 ms

Description

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

H03.63 DI4 filter time

Address:	0x033F		
Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	3.00	Change:	Real-time modification

Value Range:

0.00 ms to 500.00 ms

Description

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

H03.64 DI5 filter time

Address:	0x0340		
Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	3.00	Change:	Real-time modification

Value Range:

0.00 ms to 500.00 ms

Description

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

H03.65 DI6 filter time

Address:	0x0341		
Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16

Default: 3.00 | Change: Real-time modification

Value Range:

0.00 ms to 500.00 ms

Description

Defines the filter time of DI6. The DI function is active only after the effective level is kept within the time defined by H03.65.

H03.66 DI7 filter time

Address:	0x0342		
Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	0.00	Change:	Real-time modification

Value Range:

0.00 ms to 500.00 ms

Description

Defines the filter time of DI7. The DI function is active only after the effective level is kept within the time defined by H03.66.

H03.67 DI8 filter time

Address:	0x0343		
Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	3.00	Change:	Real-time modification

Value Range:

0.00 ms to 500.00 ms

Description

Defines the filter time of DI8. The DI function is active only after the effective level is kept within the time defined by H03.67.

H03.80 Speed corresponding to analog 10 V

Address:	0x0350		
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	3000	Change:	At stop

Value Range:

0 rpm to 10000 rpm

Description

Defines the corresponding motor speed when the sampling voltage is 10 V.

Speed reference value = Sampling voltage/10 x H03.80

H03.81 Torque corresponding to analog 10 V

Address:	0x0351		
Min.:	1	Unit:	Multiplier
Max.:	8	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 8

Description

Defines the motor torque corresponding to a sampling voltage of 10 V.

Torque reference value = Sampling voltage/10 x H03.81

5.5 H04 Terminal Output Parameters

H04.00 DO1 function selection

Address:	0x0400		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	Real-time modification

Value Range:

0: No function
1: Servo ready
2: Motor rotation signal
3: Zero speed signal
4: Speed matching signal
5: Positioning completed
6: Positioning near
7: Torque limited signal
8: Speed limited signal
9: Braking
10: Warning
11: Fault
15: Interrupt positioning completed
16: Home found
17: Electrical homing completed
18: Torque reached signal
19: Speed reached signal
21: Enable completed
22: Internal command completed
23: Writing next command allowed

24: Internal motion completed
25: Comparison output
26: Closed loop state
30: Warning or fault output
31: Communication-forced DO
32: EDM output

Description

Defines the function of DO1.

H04.01 DO1 logic

Address:	0x0401		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open
1: Closed

Description

Defines the level logic of DO1 when the function assigned to DO1 is active.

H04.02 DO2 function selection

Address:	0x0402		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	9	Change:	Real-time modification

Value Range:

See *" H04.00" on page 210* for details.

Description

-

H04.03 DO2 logic

Address:	0x0403		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open
1: Closed

Description

-

H04.04 DO3 function selection

Address: 0x0404

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H04.00" on page 210* for details.

Description

-

H04.05 DO3 logic

Address: 0x0405

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open

1: Closed

Description

-

H04.06 DO4 function selection

Address: 0x0406

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	11	Change:	Real-time modification

Value Range:

See *" H04.00" on page 210* for details.

Description

-

H04.07 DO4 logic

Address: 0x0407

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open

1: Closed

Description

-

H04.08 DO5 function selection

Address: 0x0408
Min.: 0 | Unit: -
Max.: 65535 | Data Type: UInt16
Default: 16 | Change: Real-time modification

Value Range:

See " H04.00" on page 210 for details.

Description

-

H04.09 DO5 logic

Address: 0x0409
Min.: 0 | Unit: -
Max.: 1 | Data Type: UInt16
Default: 0 | Change: At once

Value Range:

0: Normally open

1: Closed

Description

-

H04.22 DO source selection

Address: 0x0416
Min.: 0 | Unit: -
Max.: 31 | Data Type: UInt16
Default: 0 | Change: Real-time modification

Value Range:

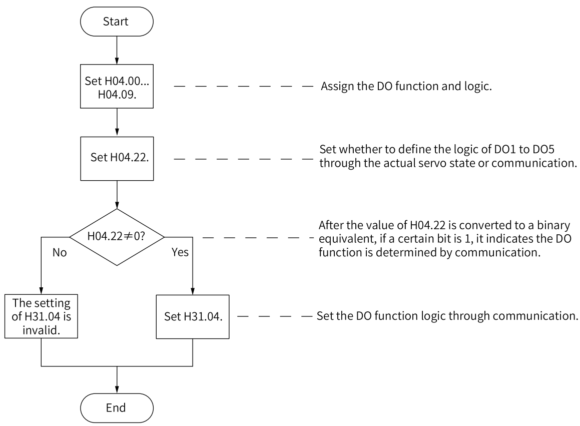
bit	Name	Function
0	DO1	0: DO1 function output
		1: Bit 0 of H31.04 set through communication
1	DO2	0: DO2 function output
		1: Bit 1 of H31.04 set through communication
2	DO3	0: DO3 function output
		1: Bit 2 of H31.04 set through communication
3	DO4	0: DO4 function output
		1: Bit 3 of H31.04 set through communication
4	DO5	0: DO5 function output
		1: Bit 4 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	
	bit4	bit3	bit2	bit1	bit0	Defined by the Drive State	Defined by Communica tion (H31.04)
	DO5	DO4	DO3	DO2	DO1		
0	0	0	0	0	0	DO1 to DO5	/
1	0	0	0	0	1	DO2 to DO5	DO1
...	...	...	...	...	...	...	...
31	1	1	1	1	1	/	DO1 to DO5

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

Address: 0x0417
Min.: 0
Max.: 31
Default: 0
Unit: -
Data Type: UInt16
Change: Real-time modification

Value Range:

bit	Name	Function
0	DO1	0: Status unchanged
		1: No output
1	DO2	0: Status unchanged
		1: No output
2	DO3	0: Status unchanged
		1: No output
3	DO4	0: Status unchanged
		1: No output
4	DO5	0: Status unchanged
		1: No output

Description

-

H04.50 AO1 signal selection

Address:	0x0432		
Min.:	0	Unit:	-
Max.:	10	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Motor speed (1 V/1000 rpm)

1: Speed reference(1 V/1000 rpm)

2: Torque reference (1 V/100 x rated torque)

3: Position deviation (0.5 mV/1 reference unit)

4: Position deviation (0.5 mV/1 encoder unit)

5: Position reference speed (1 V/1000 rpm)

6: Positioning completed

8: AI1 voltage

10: Defined by H31.05

Description

Defines the physical value source of AO1.

H04.51 AO1 offset voltage

Address:	0x0433		
Min.:	-10000	Unit:	mV
Max.:	10000	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-10000 to +10000

Description

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

H04.52 AO1 multiplier

Address:	0x0434		
Min.:	-99.99	Unit:	-
Max.:	99.99	Data Type:	Int16
Default:	1	Change:	At once

Value Range:

-99.99 to +99.99

Description

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

5.6 H05 Position Control Parameters

H05.00 Main position reference source

Address:	0x0500		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Pulse reference

1: Step reference

2: Multi-position reference

Description

Defines the position reference source in position control mode.

H05.01 Position pulse reference input terminal

Address:	0x0501		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Low speed

1: High speed

Description

Used to select the physical input terminal based on the input pulse frequency when the pulse reference acts as the position reference source in the position control mode.

H05.02 Pulses per revolution

Address: 0x0502

Min.:	0	Unit:	PPR
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At stop

Value Range:

0 PPR to 4294967295 PPR

Description

Defines the number of pulses required per revolution of the motor.
When H05.02 is set to 0, electronic gear ratios 1 and 2 (H05.07 to H05.13) and electronic gear ratio switchover condition (H05.39) are active.
When H05.02 is set to a non-zero value, electronic gear ratio B/A = Encoder resolution/H05.02. In this case, electronic gear ratios 1 and 2 are inactive.
The encoder resolution is 67108864 PPR.

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

Address: 0x0504

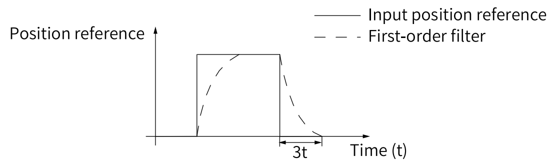
Min.:	0	Unit:	ms
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	At stop

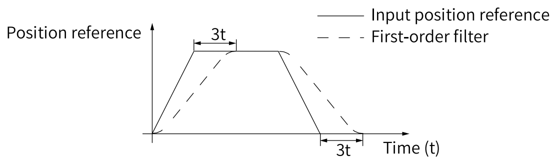
Value Range:

0.0 ms to 6553.5 ms

Description

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

H05.05 Step reference

Address:	0x0505		
Min.:	-9999	Unit:	Reference unit
Max.:	9999	Data Type:	Int16
Default:	50	Change:	At stop

Value Range:

-9999 to +9999

Description

Defines the position reference sum when the step reference acts as the main position reference source.

H05.06 Moving average filter time constant 1

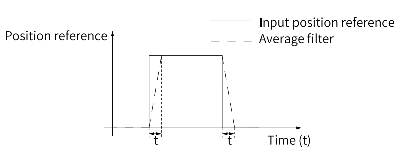
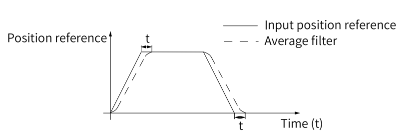
Address:	0x0506		
Min.:	0	Unit:	ms
Max.:	128	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0.0 ms to 128.0 ms

Description

Defines the moving average filter time constant of position references. 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.

Position reference being rectangular wave	Position reference being trapezoidal wave
	

H05.07 Electronic gear ratio 1 (numerator)

Address:	0x0507		
Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	8388608	Change:	Real-time modification

Value Range:

1 to 1073741824

Description

Defines the numerator of electronic gear ratio 1.

H05.09 Electronic gear ratio 1 (denominator)

Address:	0x0509		
Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	10000	Change:	Real-time modification

Value Range:

1 to 1073741824

Description

Defines the denominator of electronic gear ratio 1.

H05.11 Electronic gear ratio 2 (numerator)

Address:	0x050B		
Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	8388608	Change:	Real-time modification

Value Range:

1 to 1073741824

Description

Defines the numerator of electronic gear ratio 2.

H05.13 Electronic gear ratio 2 (denominator)

Address:	0x050D		
Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	10000	Change:	Real-time modification

Value Range:

1 to 1073741824

Description

Defines the denominator of electronic gear ratio 2.

H05.15 Pulse reference form

Address:	0x050F		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At stop

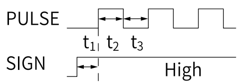
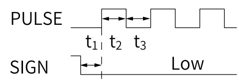
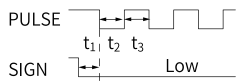
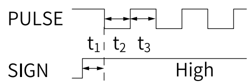
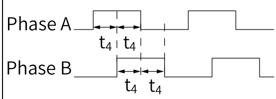
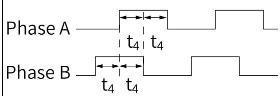
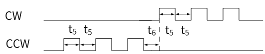
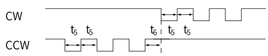
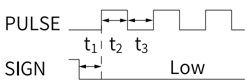
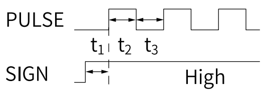
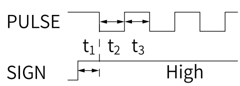
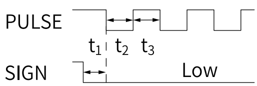
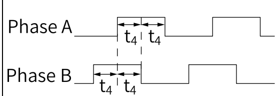
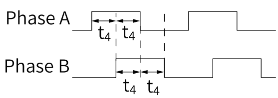
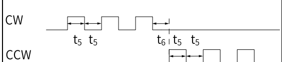
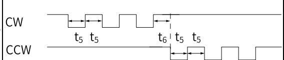
Value Range:

0: Direction + Pulse, positive logic
1: Direction + Pulse, negative logic
2: Phase A + phase B quadrature pulse, quadrupled frequency
3: CW + CCW

Description

Defines the input pulse form when the pulse reference acts as the main position reference source. See details in *"Table 5–2 " on page 220*.

Table 5–2 Descriptions of the pulse form

H02.02	H05.15	Pulse Form	Signal	Diagram of Forward Pulses	Diagram of Reverse Pulses
0	0	Pulse + Direction Positive Logic	PULSE SIGN		
	1	Pulse + Direction Negative Logic	PULSE SIGN		
	2	Phase A + Phase B Quadrature pulse Quadrupled frequency	PULSE (phase A) SIGN (phase B)	Phase A leads phase B by 90°. 	Phase B leads phase A by 90°. 
	3	CW+CCW	PULSE (CW) SIGN (CCW)		
1	0	Pulse + Direction Positive Logic	PULSE SIGN		
	1	Pulse + Direction Negative Logic	PULSE SIGN		
	2	Phase A + Phase B Quadrature pulse Quadrupled frequency	PULSE (phase A) SIGN (phase B)	Phase B leads phase A by 90°. 	Phase A leads phase B by 90°. 
	3	CW+CCW	PULSE (CW) SIGN (CCW)		

Note

The rise time and fall time of position pulse references must be shorter than 0.1 us.

Table 5–3 Specifications of pulse references

Input Terminal	Maximum Frequency	Minimum Time Width (unit: us)					
		t1	t2	t3	t4	t5	t6
High-speed pulse input terminal	8 Mpps	0.125	0.125	0.125	0.25	0.125	0.125
Low-speed pulse input terminal	200 kpps	2.5	2.5	2.5	5	2.5	2.5

H05.16 **Clear action**

Address: 0x0510

Min.: 0 Unit: -

Max.: 2 Data Type: UInt16

Default: 0 Change: At stop

Value Range:

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

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

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

Description

Defines the condition for clearing the position deviation.

H05.17 **Number of encoder frequency-division pulses**

Address: 0x0511

Min.: 0 Unit: PPR

Max.: 4194303 Data Type: UInt32

Default: 2500 Change: At stop

Value Range:

0 PPR to 4194303 PPR

Description

Defines the number of pulses output by PAO or PBO per revolution.

Pulse output resolution per revolution = (H05.17) x 4

H05.19 Speed feedforward control

Address:	0x0513		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: No speed feedforward

1: Internal speed feedforward

2: External speed feedforward

3: Zero phase

Description

Defines the source of the speed loop feedforward signal.

When the external speed feedforward is set, the feedforward source is set by H05.72.

H05.20 Condition for COIN (positioning completed) signal output

Address:	0x0514		
Min.:	0	Unit:	-
Max.:	10	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Absolute value of position deviation lower than H05.21
1: Absolute value of position deviation lower than H05.21 and filtered position reference being 0
2: Absolute value of position deviation lower than H05.21 and unfiltered position reference being 0
3: Absolute position deviation kept lower than H05.21 within the time defined by H05.60 and unfiltered position reference being 0
4: Absolute position deviation kept lower than H05.21 within the time defined by H05.60 and filtered position reference being 0
5: Absolute value of position deviation lower than H05.21, with zero speed signal being active and unfiltered position reference being 0
6: Absolute value of position deviation lower than H05.21, with zero speed signal being active and filtered position reference being 0
7: COIN signal judged after the change (available→unavailable) of the unfiltered position reference kept active for the period defined by H05.60, with unfiltered position reference being 0 and position deviation lower than H05.21
8: COIN signal judged after the change (available→unavailable) of the filtered position reference kept active for the period defined by H05.60, with filtered position reference being 0 and position deviation lower than H05.21
9: COIN signal judged after the change (available→unavailable) of the unfiltered position reference, with the position deviation kept lower than H05.21 for the period defined by H05.60 and unfiltered position reference being 0
10: COIN signal judged after the change (available→unavailable) of the filtered position reference, with the position deviation kept lower than H05.21 for the period defined by H05.60 and 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

Address:	0x0515		
Min.:	1	Unit:	Encoder unit
Max.:	65535	Data Type:	UInt16
Default:	5872	Change:	Real-time modification

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

Address:	0x0516		
Min.:	1	Unit:	Encoder unit
Max.:	65535	Data Type:	UInt16
Default:	65535	Change:	At once

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 Displacement of interrupt positioning

Address:	0x0518		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	Real-time modification

Value Range:

-1073741824 to 1073741824

Description

Defines the position reference value during interrupt positioning.

H05.26 Constant operating speed in interrupt positioning

Address:	0x051A		
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

0 rpm to 10000 rpm

Description

Defines the maximum speed during interrupt positioning.

H05.27 Acceleration/Deceleration time of interrupt positioning

Address:	0x051B		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

Defines the time for the motor to change from 0 rpm to 1000 rpm at a constant speed during interrupt positioning.

H05.29 Interrupt positioning cancel signal

Address:	0x051D		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: Disable

1: Enable

Description

Defines whether to unlock the interrupt positioning signal.

H05.30 Homing selection

Address:	0x051E		
Min.:	0	Unit:	-
Max.:	8	Data Type:	UInt16
Default:	0	Change:	At once

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

Address:	0x051F		
Min.:	0	Unit:	-
Max.:	16	Data Type:	UInt16
Default:	0	Change:	At once

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: Single-turn nearby homing

Description

Defines the default motor direction of rotation, deceleration point, and home during homing.

H05.32 Speed in high-speed searching for the home switch signal

Address: 0x0520

Min.:	0	Unit:	rpm
Max.:	3000	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0 to 3000

Description

Defines the motor speed for searching for the deceleration point signal during homing.

H05.33 Speed in low-speed searching for the home switch signal

Address: 0x0521

Min.:	0	Unit:	rpm
Max.:	1000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 1000

Description

Defines the motor speed for searching for the home signal during homing.

H05.34 Acceleration/Deceleration time during homing

Address:	0x0522		
Min.:	0	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	1000	Change:	At once

Value Range:

0 to 1000

Description

Defines the time for the motor to accelerate from 0 rpm to 1000 rpm at a constant speed during homing.

H05.35 Homing time limit

Address:	0x0523		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10000	Change:	At once

Value Range:

0 to 65535

Description

Defines the maximum homing time.

H05.36 Mechanical home offset

Address:	0x0524		
Min.:	-2147483648	Unit:	Reference unit
Max.:	-2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

Defines the absolute position value of the motor after homing.

H05.38 Frequency-division output source

Address:	0x0526		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Encoder frequency-division output

1: Pulse reference synchronous output

2: Frequency-division output inhibited

3: Second encoder frequency-division output

Description

Defines the output source of the pulse output terminal.

Setpoint	Output Source	Remarks
0	Encoder frequency-division output	The encoder feedback signal is outputted only after being divided by the value of H05.17 during rotation of the motor. Encoder frequency-division output mode is recommended when the host controller is used for closed-loop feedback.
1	Pulse reference synchronous output	The input pulse references are outputted synchronously only when H05.00 is set to 0. When the pulses of multi-axis servo is tracked synchronously, synchronous output of pulse references is recommended.
2	Frequency-division output inhibited	No output is generated from pulse output terminals. In this case, frequeny-division output terminals act as the input terminals of fully closed-loop external scale signals.
3	Second encoder frequency-division output	The encoder feedback signal is outputted only after being divided by the value of H05.17 during rotation of the motor.

H05.39 Electronic gear ratio switchover condition

Address: 0x0527

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

Value Range:

0: Switched if position reference kept 0 for 2.5 ms

1: Switched in real time

Description

Defines the condition for switching the electronic gear ratio.

H05.40 Mechanical home offset and action upon overtravel

Address: 0x0528

Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: H05.36 as the coordinate after homing, reverse homing applied after homing triggered again upon overtravel
1: H05.36 as the relative offset after homing, reverse homing applied after homing triggered again upon overtravel
2: H05.36 as the coordinate after homing, reverse homing applied automatically upon overtravel
3: H05.36 as the relative offset after homing, reverse homing applied automatically upon overtravel

Description

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

H05.41 Z pulse output polarity

Address: 0x0529

Min.: 0 | Unit: -

Max.: 65535 | Data Type: UInt16

Default: 1 | Change: At stop

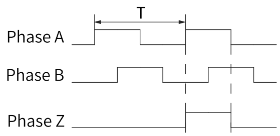
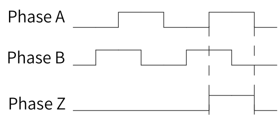
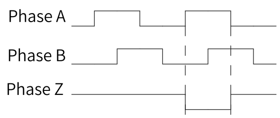
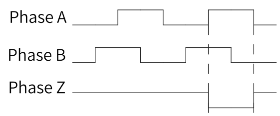
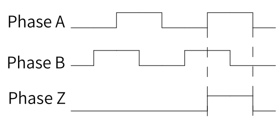
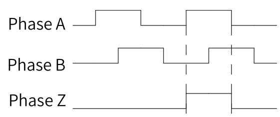
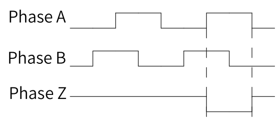
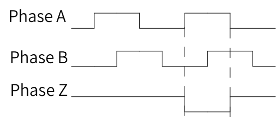
Value Range:

bit	Name	Function
0	Frequency-division Z output polarity	0: Positive (high level upon active Z pulse)
		1: Negative (low level upon active Z pulse)
1	OCZ output polarity	0: Positive (high level upon active Z pulse)
		1: Negative (low level upon active Z pulse)
2	Inner loop probe Z signal source	0: Motor Z signal
		1: Frequency-division output Z signal

Description

Defines the output level when the Z pulse of pulse output terminal is active.

Table 5–4 Pulse diagrams of encoder frequency-division output (H05.38 = 0)

<table>
<tr><th>H02.03
(Output pulse phase)</th><th>H05.41
(Z pulse output polarity)</th><th>Pulse Output Diagram of Forward RUN</th><th>Pulse Output Diagram of Reverse RUN</th></tr>
<tr><td rowspan="2">0</td><td>0</td><td>
Phase A leads phase B by 90°.</td><td>
Phase B leads phase A by 90°.</td></tr>
<tr><td>1</td><td>
Phase A leads phase B by 90°.</td><td>
Phase B leads phase A by 90°.</td></tr>
<tr><td rowspan="2">1</td><td>0</td><td>
Phase B leads phase A by 90°.</td><td>
Phase A leads phase B by 90°.</td></tr>
<tr><td>1</td><td>
Phase B leads phase A by 90°.</td><td>
Phase A leads phase B by 90°.</td></tr>
</table>

It is recommended to use the active edge outputted by Z signal when a high precision frequency-division output of Z signal is required.

Setpoint	Z pulse output polarity
0	Positive (high level upon active Z pulse)
1	Negative (low level upon active Z pulse)

H05.41 = 0: Falling-edge triggered; H05.41 = 1: Rising-edge triggered

H05.43 Position pulse edge

Address: 0x052B

Min.: 0 | Unit: -

Max.: 1 | Data Type: UInt16

Default: 0 | Change: At once

Value Range:

0: Rising edge-triggered

1: Falling edge-triggered

Description

The setpoint 0 indicates calculation starts from the falling edge of pulse input. The setpoint 1 indicates calculation starts from the rising edge of pulse input.

H05.44 Numerator of frequency-division output reduction ratio

Address:	0x052C		
Min.:	1	Unit:	-
Max.:	16383	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 16383

Description

Defines the numerator of frequency-division output reduction ratio.

H05.45 Denominator of frequency-division output reduction ratio

Address:	0x052D		
Min.:	1	Unit:	-
Max.:	8191	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 8191

Description

Defines the denominator of frequency-division output reduction ratio.

H05.46 DI selection of multi-turn frequency-division Z starting point

Address:	0x052E		
Min.:	0	Unit:	-
Max.:	8	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No selection

1: DI1

2: DI2

3: DI3

4: DI4

5: DI5

6: DI6

7: DI7

8: DI8

Description

In the absolute position linear mode, the position offset is the difference between absolute position of current encoder and the mechanical position.

H05.47 Frequency-division Z pulse width

Address: 0x052F

Min.:	0	Unit:	us
Max.:	400	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 us to 400 us

Description

Defines the minimum output width (us) of frequency-division output PZ.

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

Address: 0x0532

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

Value Range:

1 to 65535

Description

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

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

Address: 0x0533

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

Value Range:

1 to 65535

Description

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

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

Address: 0x0534

Min.:	0	Unit:	Encoder unit
Max.:	4294967295	Data Type:	UInt32

Default: 0 | Change: At stop

Value Range:

0 to 4294967295

Description

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

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

Address: 0x0536

Min.:	0	Unit:	Encoder unit
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At stop

Value Range:

0 to 4294967295

Description

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

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

Address: 0x053A

Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0% to 400.0%

Description

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

H05.59 Positioning window time

Address: 0x053B

Min.:	0	Unit:	ms
Max.:	30000	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 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

Address:	0x053C		
Min.:	0	Unit:	ms
Max.:	30000	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 30000 ms

Description

Defines the hold time of an active positioning completed signal.

H05.66 Homing time unit

Address:	0x0542		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:

0: 1 ms

1: 10 ms

2: 100 ms

Description

Defines the homing time unit. The actual timeout time is H05.35 x H05.66 (ms).

H05.67 Offset between zero point and single-turn absolute position

Address:	0x0543		
Min.:	-2147483648	Unit:	Encoder unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At stop

Value Range:

-2147483648 to +2147483647

Description

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

Address:	0x0546		
Min.:	0	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0.0 ms to 1000.0 ms

Description

Defines the moving average filter time constant for the second group of position references.

See *" H05.06" on page 218* for details.

H05.71 Motor Z signal width

Address:	0x0546		
Min.:	1	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	4	Change:	At once

Value Range:

1 ms to 100 ms

Description

Defines the pulse width output upon active motor Z signal.

H05.72 External speed feedforward source selection

Address:	0x0548		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	Real-time modification

Value Range:

0: 60B1

1: AI1

Description

External speed feedforward source selection

5.7 H06 Speed Control Parameters

H06.00 Source of main speed reference A

Address:	0x0600		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Digital setting (H06.03)

1: AI1

Description

Defines the source of main speed reference A.

H06.01 Source of auxiliary speed reference B

Address: 0x0601
Min.: 0 | Unit: -
Max.: 5 | Data Type: UInt16
Default: 1 | Change: At stop

Value Range:

0: Digital setting (H06.03)

1: AI1

5: Multi-speed reference

Description

Defines the source of auxiliary speed reference B.

H06.02 Speed reference source

Address: 0x0602
Min.: 0 | Unit: -
Max.: 4 | Data Type: UInt16
Default: 0 | Change: At stop

Value Range:

0: Source of main speed reference A

1: Source of auxiliary speed reference B

2: A+B

3: Switched between A and B

4: Communication

Description

Defines the source of speed references.

<table>
<tr><th>Setpoint</th><th>Control mode</th><th>Remarks</th></tr>
<tr><td>0</td><td>Source of main speed reference A</td><td>The reference source is defined by H06.00.</td></tr>
<tr><td>1</td><td>Source of auxiliary speed reference B</td><td>The reference source is defined by H06.01.</td></tr>
<tr><td>2</td><td>A+B</td><td>The reference source is the product of A + B (H06.00 + H06.01).</td></tr>
<tr><td>3</td><td>Switched between A and B</td><td>The reference source is switched between A and B as defined by FunIN.4 (Cmd_SEL).
<table>
<tr><th>State of FunIN.4 (Cmd_SEL)</th><th>Reference Source</th></tr>
<tr><td>Inactive</td><td>Source of main speed reference A</td></tr>
<tr><td>Active</td><td>Source of auxiliary speed reference B</td></tr>
</table></td></tr>
<tr><td>4</td><td>Communication</td><td>The speed reference is defined by operating on H31.09 through communication (unit: 0.001 RPM).</td></tr>
</table>

H06.03 Speed reference set through keypad

Address:	0x0603		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	200	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

Defines the speed reference value set through the keypad.

H06.04 DI jog speed reference

Address:	0x0604		
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	150	Change:	Real-time modification

Value Range:

0 rpm to 10000 rpm

Description

Defines the DI jog speed reference.

H06.05 Acceleration ramp time of speed reference

Address:	0x0605		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

Defines the 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 t1 = Speed reference/1000 x Acceleration ramp time of speed reference

Actual deceleration time t2 = Speed reference/1000 x Deceleration ramp time of speed reference

H06.06 Deceleration ramp time of speed reference

Address:	0x0606		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

Defines the deceleration ramp time of speed reference.

H06.07 Maximum speed limit

Address:	0x0607		
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	7000	Change:	Real-time modification

Value Range:

0 rpm to 10000 rpm

Description

Defines the maximum speed limit.

H06.08 Forward speed limit

Address:	0x0608		
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	7000	Change:	Real-time modification

Value Range:

0 rpm to 10000 rpm

Description

Defines the forward speed threshold.

H06.09 Reverse speed limit

Address:	0x0609		
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	7000	Change:	Real-time modification

Value Range:

0 rpm to 10000 rpm

Description

Defines the reverse speed threshold.

H06.10 Deceleration unit in emergency stop

Address:	0x060A		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Multiplied by 1

1: Multiplied by 10

2: Multiplied by 100

Description

Defines the deceleration unit in emergency stop.

H06.11 Torque feedforward control

Address:	0x060B		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: No torque feedforward

1: Internal torque feedforward

Description

Define whether to use torque feedforward control.

H06.12 Jog speed acceleration ramp time

Address:	0x060C		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

Defines the acceleration ramp time of jog speed.

H06.13 Speed feedforward smoothing filter

Address:	0x060D		
Min.:	0	Unit:	us
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 us to 65535 us

Description

Defines the speed feedforward filter time constant.

H06.15 Zero clamp speed threshold

Address:	0x060F		
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	Real-time modification

Value Range:

0 rpm to 10000 rpm

Description

Defines the zero clamp speed threshold.

H06.16 Threshold of TGON (motor rotation) signal

Address:	0x0610		
Min.:	0	Unit:	rpm
Max.:	1000	Data Type:	UInt16
Default:	20	Change:	At once

Value Range:

0 to 1000

Description

Defines the motor rotation speed threshold.

H06.17 Threshold of V-Cmp (speed matching) signal

Address:	0x0611		
Min.:	0	Unit:	rpm
Max.:	100	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 rpm to 100 rpm

Description

Defines the speed threshold at which the V-Cmp (speed matching) signal is active.

H06.18 Threshold of speed reach signal

Address:	0x0612		
Min.:	20	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	1000	Change:	Real-time modification

Value Range:

20 rpm to 10000 rpm

Description

Defines the threshold of speed reached signal.

H06.19 Threshold of zero speed output signal

Address:	0x0613		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

Defines the threshold of zero speed output signal.

H06.40 Deceleration time of ramp 1

Address:	0x0628		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

Defines the deceleration time of ramp 1.

H06.41 Deceleration time of ramp 2

Address:	0x0629		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

Defines the deceleration time of ramp 2.

H06.50 Speed S-curve enable switch

Address:	0x0628		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Disable

1: Enable

Description

0: Accelerate/Decelerate at fixed acceleration rate

1: Accelerate/Decelerate based on the S-curve

H06.51 Increasing acceleration 1 of speed S-curve acceleration segment

Address:	0x0633		
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	50	Change:	At stop

Value Range:

0.0% to 100.0%

Description

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

Address:	0x0634		
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	50	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

Address:	0x0635		
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	50	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

Address:	0x0636		
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	50	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

Address:	0x0637	Effective Time:	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

Address:	0x0638	Effective Time:	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

Address:	0x0639	Effective Time:	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

Address:	0x063A	Effective Time:	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

Address:	0x063B	Effective Time:	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

Address:	0x063C	Effective Time:	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

Address:	0x063D	Effective Time:	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

Address:	0x063E	Effective Time:	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

Address:	0x063F	Effective Time:	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

Address:	0x0640	Effective Time:	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

Address:	0x0641	Effective Time:	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

Address:	0x0642	Effective Time:	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

Address:	0x0643	Effective Time:	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

Address:	0x0644	Effective Time:	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

Address:	0x0645	Effective Time:	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

Address:	0x0646	Effective Time:	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

Address:	0x0647	Effective Time:	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

Address:	0x0648	Effective Time:	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

Address:	0x0649	Effective Time:	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

Address:	0x064A	Effective Time:	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

Address:	0x064B	Effective Time:	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

Address:	0x064C	Effective Time:	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

Address:	0x064D	Effective Time:	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

Address:	0x064E	Effective Time:	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

Address:	0x064F	Effective Time:	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

Address:	0x0650	Effective Time:	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

Address:	0x0651	Effective Time:	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

Address:	0x0652	Effective Time:	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

Address:	0x0700		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Keypad (H07.03)

1: AI1

Description

Defines the source of main torque reference A.

H07.01 Source of auxiliary torque reference B

Address:	0x0701		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Keypad (H07.03)

1: AI1

Description

Defines the source of auxiliary torque references.

H07.02 Torque reference source

Address: 0x0702

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Source of main torque reference A

1: Source of auxiliary torque reference B

2: Source of A+B

3: Switched between A and B

4: Communication

Description

Defines the torque reference source.

<table>
<tr><th>Setpoint</th><th>Control mode</th><th>Remarks</th></tr>
<tr><td>0</td><td>Source of main torque reference A</td><td>The reference source is defined by H07.00.</td></tr>
<tr><td>1</td><td>Source of auxiliary torque reference B</td><td>The reference source is defined by H07.01.</td></tr>
<tr><td>2</td><td>A+B</td><td>The reference source is the product of A+B (H07.00+H07.01).</td></tr>
<tr><td>3</td><td>Switched between A and B</td><td>The reference source is switched between A and B as defined by FunIN.4 (Cmd_SEL).
<table><tr><th>State of FunIN.4 (Cmd_ SEL)</th><th>Reference Source</th></tr><tr><td>Inactive</td><td>Source of main torque reference A</td></tr><tr><td>Active</td><td>Source of auxiliary torque reference B</td></tr></table></td></tr>
<tr><td>4</td><td>Communication</td><td>The torque reference is defined by operating on H31.11 through communication.</td></tr>
</table>

H07.03 Torque reference set through keypad

Address: 0x0703

Min.:	-400	Unit:	%
Max.:	400	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-400.0% to +400.0%

Description

Defines the torque reference value set through keypad

H07.05 Torque reference filter time constant 1

Address:	0x0705		
Min.:	0	Unit:	ms
Max.:	30	Data Type:	UInt16
Default:	0.5	Change:	At once

Value Range:

0.00 ms to 30.00 ms

Description

Defines the torque reference filter time constant 1.

H07.06 Torque reference filter time constant 2

Address:	0x0706		
Min.:	0	Unit:	ms
Max.:	30	Data Type:	UInt16
Default:	0.27	Change:	At once

Value Range:

0.00 ms to 30.00 ms

Description

Defines the torque reference filter time constant 2.

H07.07 Torque limit source

Address:	0x0707		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Positive/Negative internal torque limit

1: Internal or external limit as defined by DI

2: T-LMT

3: T_LMT or external limit as defined by DI (FunIN.16 or FunIN.17)

4: T_LMT or internal limit (FunIN.16 or FunIN.17) as defined by DI

Description

Defines the torque limit source.

H07.08 T-LMT selection

Address:	0x0708	Effective Time:	Real time
Min.:	1	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	Real-time modification

Value Range:

1: AI1

Description

Sets the AI as the torque limit source.

H07.09 Positive internal torque limit

Address:	0x0709		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	350	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the positive internal torque limit.

H07.10 Negative internal torque limit

Address:	0x070A		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	350	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the negative internal torque limit.

H07.11 Positive external torque limit

Address:	0x070B		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	350	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the positive external torque limit.

H07.12 Negative external torque limit

Address:	0x070C		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	350	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the negative external torque limit.

H07.15 Emergency stop torque

Address:	0x070F		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the emergency stop torque.

H07.17 Speed limit source

Address:	0x0711		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Internal speed limit

1: V-LMT

2: H07.19 or H07.20 as defined by DI

Description

Defines the speed limit source.

H07.18 V-LMT selection

Address:	0x0712	Effective Time:	Real time
Min.:	1	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	Real-time modification

Value Range:

1: AI1

Description

Sets the AI as the speed limit source.

H07.19 Positive speed limit/Speed limit 1 in torque control

Address:	0x0713	Effective Time:	Real time
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16

Default:	3000	Change:	Real-time modification

Value Range:

0 rpm to 10000 rpm

Description

Defines the positive speed limit in torque control.

H07.20 Negative speed limit/Speed limit 2 in torque control

Address:	0x0714	Effective Time:	Real time
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	3000	Change:	Real-time modification

Value Range:

0 rpm to 10000 rpm

Description

Defines the negative speed limit in torque control.

H07.21 Base value for torque reach

Address:	0x0715		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the base value for torque reach.

H07.22 Threshold of valid torque reach

Address:	0x0716		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	20	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the threshold of valid torque reach.

H07.23 Threshold of invalid torque reach

Address:	0x0717		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16

Default:	10	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the threshold of invalid torque reach.

H07.24 Field weakening depth

Address:	0x0718		
Min.:	60	Unit:	%
Max.:	115	Data Type:	UInt16
Default:	115	Change:	At once

Value Range:

60% to 115%

Description

Defines the field weakening depth.

H07.25 Max. permissible demagnetizing current

Address:	0x0719		
Min.:	0	Unit:	%
Max.:	3200	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0% to 300%

Description

Defines the maximum permissible demagnetizing current.

H07.26 Field weakening selection

Address:	0x071A		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Disable

1: Enable

Description

Defines whether to enable field weakening.

H07.27 Field weakening gain

Address:	0x071B		
Min.:	0.001	Unit:	Hz
Max.:	1	Data Type:	UInt16

Default: 0.03 Change: At once

Value Range:

0.001 Hz to 1.000 Hz

Description

Defines the field weakening gain.

H07.28 Speed of field weakening point

Address: 0x071C

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

Value Range:

0 to 65535

Description

Defines the speed of the field weakening point.

H07.35 Torque non-standard feature enable

Address: 0x0723

Min.:	0	Unit:	-
Max.:	3	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

Address: 0x0724

Min.:	0	Unit:	ms
Max.:	10	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.00 ms to 10.00 ms

Description

Defines the time constant of low-pass filter 2.

H07.37 Torque reference filter selection

Address: 0x0725

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16

Default: 0 Change: At once

Value Range:

0: First-order filter

1: Biquad filter

Description

Defines the torque reference filter used.

H07.38 Biquad filter attenuation ratio

Address: 0x0726

Min.: 0 Unit: -

Max.: 50 Data Type: UInt16

Default: 16 Change: At stop

Value Range:

0 to 50

Description

Defines the biquad filter attenuation ratio.

H07.40 Speed limit window in the torque control mode

Address: 0x0728

Min.: 0 Unit: ms

Max.: 300 Data Type: UInt16

Default: 10 Change: At once

Value Range:

0 ms to 300 ms

Description

Defines the speed limit window in the torque control mode.

5.9 H08 Gain parameters

H08.00 Speed loop gain

Address: 0x0800

Min.: 0.1 Unit: Hz

Max.: 2000 Data type: UInt16

Default: 40 Change: At once

Value Range:

0.1 Hz to 2000.0 Hz

Description

Defines the responsiveness of the speed loop. The higher the setpoint, the faster the speed loop response is. Note that an excessively high setpoint may cause vibration.
In the position control mode, the position loop gain must be increased together with the speed loop gain.

H08.01 **Speed loop integral time constant**

Address:	0x0801		
Min.:	0.15	Unit:	ms
Max.:	512	Data type:	UInt16
Default:	19.89	Change:	At once

Value Range:
0.15 ms to 512.00 ms
Description
Defines the integral time constant of the speed loop.
The lower the setpoint, the better the integral action, and the quicker will the deviation value be close to 0.
Note:
There is no integral action when H08.01 is set to 512.00.

H08.02 **Position loop gain**

Address:	0x0802		
Min.:	0.1	Unit:	Hz
Max.:	2000	Data type:	UInt16
Default:	64	Change:	At once

Value Range:
0.1 Hz to 2000.0 Hz
Description
Defines the proportional gain of the position loop.
Defines the responsiveness of the position loop. A high setpoint shortens the positioning time. Note that an excessively high setpoint may cause vibration.
The 1st group of gain parameters include H08.00 (Speed loop gain), H08.01 (Speed loop integral time constant), H08.02, and H07.05 (Filter time constant of torque reference).

H08.03 **2nd speed loop gain**

Address:	0x0803		
Min.:	0.1	Unit:	Hz
Max.:	2000	Data type:	UInt16
Default:	75	Change:	At once

Value Range:

0.1 Hz to 2000.0 Hz

Description

-

H08.04 2nd speed loop integral time constant

Address:	0x0804		
Min.:	0.15	Unit:	ms
Max.:	512	Data type:	UInt16
Default:	10.61	Change:	At once

Value Range:

0.15 ms to 512.00 ms

Description

-

H08.05 2nd position loop gain

Address:	0x0805		
Min.:	0.1	Unit:	Hz
Max.:	2000	Data type:	UInt16
Default:	120	Change:	At once

Value Range:

0.1 Hz to 2000.0 Hz

Description

Defines the second gain set of the position loop and speed loop. The 2nd group of gain parameters include H08.03 (Speed loop gain), H08.04 (Speed loop integral time constant), H08.05, and H07.06 (Torque reference filter time constant 2).

H08.08 2nd gain mode setting

Address:	0x0808		
Min.:	0	Unit:	-
Max.:	1	Data type:	UInt16
Default:	1	Change:	At once

Value Range:

0: Fixed to the 1st gain, switched between P and PI as defined by bit26 of external 60FEh

1: Switched between the 1st and 2nd gain sets as defined by H08.09

Description

Defines the mode for switching to the 2nd gain set.

H08.09 Gain switchover condition

Address:	0x0809		
Min.:	0	Unit:	-

Max.: 10
Data type: UInt16
Default: 0
Change: At once

Value Range:

0: Fixed to the 1st gain set (PS)
1: Switched as defined by bit26 of 60FEh
2: Torque reference too large (PS)
3: Speed reference too large (PS)
4: Speed reference change rate too large (PS)
5: Speed reference low/high speed threshold (PS)
6: Position deviation too large (P)
7: Position reference available (P)
8: Positioning unfinished (P)
9: Actual speed (P)
10: Position reference + Actual speed (P)

Description

Used to set the condition for gain switchover.

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 too large	Active in the control modes other than speed control If the absolute value of speed reference change rate 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.

Value	Gain Switchover condition	Remarks
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 position control and full closed-loop control. 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. If the drive is not in position control or full closed-loop control, the 1st gain set always applies.
7	Position reference available	Active only in position control and full closed-loop control. 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. If the drive is not in position control or full closed-loop control, the 1st gain set always applies.
8	Positioning completed	Active only in position control and full closed-loop control. 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. If the drive is not in position control or full closed-loop control, the 1st gain set always applies.
9	Actual speed too high	Active only in position control and full closed-loop control. 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. If the drive is not in position control or full closed-loop control, the 1st gain set always applies.
10	Position reference + Actual speed	Active only in position control and full closed-loop control. 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). If the drive is not in position control or full closed-loop control, the 1st gain set always applies.

H08.10 Gain switchover delay

Address:	0x080A		
Min.:	0	Unit:	ms
Max.:	1000	Data type:	UInt16

Default:	5	Change:	At once

Value Range:

0.0 ms to 1000.0 ms

Description

Defines the delay when the drive switches from the 2nd gain set to the 1st gain set.

H08.11 Gain switchover level

Address:	0x080B		
Min.:	0	Unit:	-
Max.:	20000	Data type:	UInt16
Default:	50	Change:	At once

Value Range:

0 to 20000

Description

Defines the gain switchover level.

Gain switchover is affected by both the level and the dead time, as defined by H08.09. The unit of gain switchover level varies with the switchover condition.

H08.12 Gain switchover dead time

Address:	0x080C		
Min.:	0	Unit:	-
Max.:	20000	Data type:	UInt16
Default:	30	Change:	At once

Value Range:

0 to 20000

Description

Defines the dead time for gain switchover.

Gain switchover is affected by both the level and the dead time, as defined by H08.09. The unit of gain switchover hysteresis varies with the switchover condition.

Note:

Set H08.11 to a value higher than or equal to that of H08.12. Otherwise, the drive forcibly sets H08.11 to the same value as H08.12.

H08.13 Position gain switchover time

Address:	0x080D		
Min.:	0	Unit:	ms
Max.:	1000	Data type:	UInt16
Default:	3	Change:	At once

Value Range:

0.0 ms to 1000.0 ms

Description

In position control, if H08.05 (2nd position loop gain) is much higher than H08.02 (Position loop gain), set the time for switching from H08.02 to H08.05.

This parameter can be used to reduce the impact caused by an increase in the position loop gain.

H08.15 Load moment of inertia ratio

Address:	0x080F		
Min.:	0	Unit:	-
Max.:	120	Data type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 120.00

Description

Defines the mechanical load inertia ratio relative to the motor moment of inertia.

When H08.15 is set to 0, it indicates the motor carries no load; if it is set to 1.00, it indicates the mechanical load inertia is the same as the motor moment of inertia.

H08.17 Zero phase delay

Address:	0x0811		
Min.:	0	Unit:	ms
Max.:	4	Data type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0 ms to 4.0 ms

Description

-

H08.18 Speed feedforward filter time constant

Address:	0x0812		
Min.:	0	Unit:	ms
Max.:	64	Data type:	UInt16
Default:	0.5	Change:	At once

Value Range:

0.00 ms to 64.00 ms

Description

Defines the filter time constant of speed feedforward.

H08.19 Speed feedforward gain

Address: 0x0813

Min.:	0	Unit:	%
Max.:	100	Data type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0% to 100.0%

Description

In position control and full closed-loop control, speed feedforward is the product of speed feedforwad signal multiplied by H08.19 and is part of the speed reference.

Increasing the setpoint improves the responsiveness to position references and reduces the position deviation during operation at a constant speed.

Set H08.18 to a fixed value first, and then increase the value of H08.19 gradually from 0 to a certain value at which speed feedforward achieves the desired effect.

Adjust H08.18 and H08.19 repeatedly until a balanced performance is achieved.

Note:

For how to enable the speed feedforward function and select the speed feedforward signal, see H05.19 (Speed feedforward control).

H08.20 Torque feedforward filter time constant

Address: 0x0814

Min.:	0	Unit:	ms
Max.:	64	Data type:	UInt16
Default:	0.5	Change:	At once

Value Range:

0.00 ms to 64.00 ms

Description

Defines the filter time constant of torque feedforward.

H08.21 Torque feedforward gain

Address: 0x0815

Min.:	0	Unit:	%
Max.:	300	Data type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0% to 300.0%

Description

In control modes other than torque control, torque feedforward is the product of torque feedforwad signal multiplied by H08.21 and is part of the torque reference.

Increasing the setpoint improves the responsiveness to variable speed references and position references and reduces the position deviation during operation at a constant speed.

During parameter adjustment, set H08.20 (Torque feedforward filter time constant) to the default value first, and then increase H08.21 gradually to enhance the effect of torque feedforward. When speed overshoot occurs, keep H08.21 unchanged and increase the value of H08.20. Adjust H08.20 and H08.21 repeatedly until a balanced performance is achieved.
Note:
For how to enable the torque feedforward function and select the torque feedforward signal, see H06.11 (Torque feedforward control).

H08.22 Speed feedback filtering option

Address:	0x0816		
Min.:	0	Unit:	-
Max.:	4	Data type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Inhibited

1: 2 times

2: 4 times

3: 8 times

4: 16 times

Description

Defines the moving average filtering times for speed feedback.

The higher the setpoint, the weaker the speed feedback fluctuation, but the longer the feedback delay will be.

H08.23 Cutoff frequency of speed feedback low-pass filter

Address:	0x0817		
Min.:	100	Unit:	Hz
Max.:	8000	Data type:	UInt16
Default:	8000	Change:	At once

Value Range:

100 Hz to 8000 Hz

Description

Defines the cutoff frequency for first-order low-pass filtering on the speed feedback.
Note:
The lower the setpoint, the weaker the speed feedback fluctuation, and the longer the feedback delay will be.
Setting this parameter to 4000 Hz negates the filtering effect.

H08.24 PDFF control coefficient

Address: 0x0818

Min.:	0	Unit:	%
Max.:	200	Data type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0% to 200.0%

Description

Defines the control mode of the speed loop.

When this parameter is set to 100.0, the speed loop adopts PI control (default) with quick dynamic response.

When this parameter is set to 0.0, speed loop integral action is enhanced, which filters out low-frequency interference but also slows down the dynamic response. H08.24 can be used to keep a good responsiveness of the speed loop, with the anti-interference capacity in low-frequency bands improved and the speed feedback overshoot unaffected.

H08.27 Speed observer cutoff frequency

Address: 0x081B

Min.:	50	Unit:	Hz
Max.:	600	Data type:	UInt16
Default:	170	Change:	At once

Value Range:

50 Hz to 600 Hz

Description

Defines the cutoff frequency of the speed observer. Note that an excessively high setpoint may incur resonance. Decrease the setpoint properly in case of large speed feedback noise.

H08.28 Speed observer inertia correction coefficient

Address: 0x081C

Min.:	1	Unit:	%
Max.:	1600	Data type:	UInt16
Default:	100	Change:	At once

Value Range:

1% to 1600%

Description

Defines the speed observer inertia correction coefficient. If H08.15 is set based on the actual inertia, there is no need to adjust this parameter.

H08.29 Speed observer filter time

Address: 0x081D

Min.:	0	Unit:	ms

Max.:	10	Data type:	UInt16
Default:	0.8	Change:	At once

Value Range:

0.00 ms to 10.00 ms

Description

Defines the speed observer filter time. It is recommended to set this parameter to a value equal to the sum of H07.05 plus 0.2 ms.

H08.31 Disturbance cutoff frequency

Address: 0x081F

Min.:	10	Unit:	Hz
Max.:	4000	Data type:	UInt16
Default:	600	Change:	At once

Value Range:

10 Hz to 4000 Hz

Description

Defines the cutoff frequency of the disturbance observer. Increasing the setpoint improves the responsiveness of the disturbance observer and the compensation effect. Note that an excessively high setpoint may incur resonance.

H08.32 Disturbance compensation gain

Address: 0x0820

Min.:	0	Unit:	%
Max.:	100	Data type:	UInt16
Default:	0	Change:	At once

Value Range:

0% to 100%

Description

Defines the compensation gain of the disturbance observer. The setpoint 100% indicates full compensation.

H08.33 Disturbance observer inertia correction coefficient

Address: 0x0821

Min.:	1	Unit:	%
Max.:	1600	Data type:	UInt16
Default:	100	Change:	At once

Value Range:

1% to 1600%

Description

Defines the disturbance observer inertia correction coefficient. If H08.15 is set based on the actual inertia, there is no need to adjust this parameter.

H08.37 Phase modulation for medium-frequency jitter suppression 2

Address: 0x0825

Min.:	-90	Unit:	°
Max.:	90	Data type:	Int16
Default:	0	Change:	At once

Value Range:

-90° to +90°

Description

Defines the compensation phase of medium-frequency jitter suppression 2.

H08.38 Frequency of medium-frequency jitter suppression 2

Address: 0x0826

Min.:	0	Unit:	Hz
Max.:	1000	Data type:	UInt16
Default:	0	Change:	At once

Value Range:

0 Hz to 1000 Hz

Description

Set this parameter based on actual resonance frequency. The valid suppression frequency range for medium-frequency jitter suppression 2 is 100 Hz to 1000 Hz.

H08.39 Compensation gain of medium-frequency jitter suppression 2

Address: 0x0827

Min.:	0	Unit:	%
Max.:	300	Data type:	UInt16
Default:	0	Change:	At once

Value Range:

0% to 300%

Description

Defines the compensation gain for medium-frequency jitter suppression 2. Set this parameter to 40%...55% in general cases. Setting this parameter to 0 negates the effect of medium-frequency jitter suppression 2.

H08.40 Speed observer selection

Address: 0x0828

Min.:	0	Unit:	-
Max.:	1	Data type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable

Description

Used to set the enable bit for speed observer.

H08.42 Model control selection

Address:	0x082A		
Min.:	0	Unit:	-
Max.:	2	Data type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable1: Enable

2: Dual-inertia model

Description

Used to enable model tracking control.

H08.43 Model gain

Address:	0x082B		
Min.:	0.1	Unit:	-
Max.:	2000	Data type:	UInt16
Default:	40	Change:	At once

Value Range:

0.1 to 2000.0

Description

Defines the single inertia model gain. The higher the gain, the faster the position response. Note that an excessively high setpoint may incur excessive overshoot.

H08.46 Feedforward value

Address:	0x082E		
Min.:	0	Unit:	-
Max.:	102.4	Data type:	UInt16
Default:	95	Change:	At once

Value Range:

0.0 to 102.4

Description

Defines the speed feedforward gain for single inertia model control. If overshoot occurs, reduce the setpoint properly.

H08.53 Medium- and low-frequency jitter suppression frequency 3

Address:	0x0835		
Min.:	0	Unit:	Hz
Max.:	300	Data type:	UInt16
Default:	0	Change:	At once

Value Range:
0.0 Hz to 300.0 Hz
Description
Set this parameter based on actual resonance frequency. The resonance suppression range is 100 Hz to 300 Hz.

H08.54 Medium- and low-frequency jitter suppression compensation 3

Address: 0x0836

Min.:	0	Unit:	%
Max.:	200	Data type:	UInt16
Default:	0	Change:	At once

Value Range:
0% to 200%
Description
Defines the compensation gain for medium- and low-frequency suppression compensation 3. The setpoint 200% indicates full compensation.

H08.56 Medium- and low-frequency jitter suppression phase modulation 3

Address: 0x0838

Min.:	0	Unit:	%
Max.:	600	Data type:	UInt16
Default:	100	Change:	At once

Value Range:
0% to 600%
Description
Adjust this parameter based on the actual compensation effect.

H08.59 Medium- and low-frequency jitter suppression frequency 4

Address: 0x083B

Min.:	0	Unit:	Hz
Max.:	300	Data type:	UInt16
Default:	0	Change:	At once

Value Range:
0.0 Hz to 300.0 Hz
Description
Set this parameter based on actual resonance frequency. The resonance suppression range is 100 Hz to 300 Hz.

H08.60 Medium- and low-frequency jitter suppression compensation 4

Address: 0x083C

Min.:	0	Unit:	%

Max.:	200	Data type:	UInt16
Default:	0	Change:	At once

Value Range:

0% to 200%

Description

Defines the compensation gain for medium- and low-frequency suppression compensation 4. The setpoint 200% indicates full compensation.

H08.61 Medium- and low-frequency jitter suppression phase modulation 4

Address: 0x083D

Min.:	0	Unit:	%
Max.:	600	Data type:	UInt16
Default:	100	Change:	At once

Value Range:

0% to 600%

Description

Adjust this parameter based on the actual compensation effect.

H08.62 Position loop integral time constant

Address: 0x083E

Min.:	0.15	Unit:	-
Max.:	512	Data type:	UInt16
Default:	512	Change:	At once

Value Range:

0.15 to 512.00

Description

Defines the position loop integral time constant.

H08.63 2nd position loop integral time constant

Address: 0x083F

Min.:	0.15	Unit:	-
Max.:	512	Data type:	UInt16
Default:	512	Change:	At once

Value Range:

0.15 to 512.00

Description

Defines the 2nd position loop integral time constant.

H08.64 Speed observer feedback source

Address: 0x0840

Min.:	0	Unit:	-

Max.:	1	Data type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable

Description

-

H08.65 Zero deviation control selection

Address: 0x0841

Min.:	0	Unit:	-
Max.:	1	Data type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable

Description

Used to enable/disable zero deviation control.

H08.66 Zero deviation control position average filter

Address: 0x0842

Min.:	0	Unit:	ms
Max.:	320	Data type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0 ms to 320.0 ms

Description

Defines the 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

Address: 0x0844

Min.:	0	Unit:	%
Max.:	100	Data type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0% to 100.0%

Description

Defines the speed feedforward of zero deviation control.

H08.69 Torque feedforward of zero deviation control

Address: 0x0845

Min.:	0	Unit:	%
Max.:	100	Data type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0% to 100.0%

Description

Defines the torque feedforward of zero deviation control.

H08.81 Anti-resonance frequency of dual-inertia model

Address: 0x0851

Min.:	1	Unit:	Hz
Max.:	400	Data type:	UInt16
Default:	20	Change:	At once

Value Range:

1.0 Hz to 400.0 Hz

Description

Used to set the anti-resonance frequency of dual-inertia model. You can set this parameter based on the frequency sweeping analysis of mechanical characteristics.

H08.82 Resonance frequency of dual-inertia model

Address: 0x0852

Min.:	0	Unit:	Hz
Max.:	6553.5	Data type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0 Hz to 6553.5 Hz

Description

Used to set the resonance frequency of dual-inertia model. You can set this parameter based on the frequency sweeping analysis of mechanical characteristics. If accurate resonance frequency is unknown, set H08.84 based on the inertia ratio of the resonance model.

H08.83 Dual-inertia model gain

Address: 0x0853

Min.:	0.1	Unit:	s_{-1}
Max.:	300	Data type:	UInt16
Default:	60	Change:	At once

Value Range:

$0.1s_{-1}$ to $300.0s_{-1}$

Description

Defines the dual-inertia model gain.

H08.84 Inertia ratio of dual-inertia model

Address:	0x0854		
Min.:	0	Unit:	-
Max.:	120	Data type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 120.00

Description

If the resonance frequency of dual-inertia model is set accurately, there is no need to set this parameter.

H08.88 Speed feedforward value of dual-inertia model

Address:	0x0858		
Min.:	0	Unit:	-
Max.:	6553.5	Data type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0 to 6553.5

Description

Set this parameter to 100% in general cases.

H08.89 Torque feedforward value of dual-inertia model

Address:	0x0859		
Min.:	0	Unit:	-
Max.:	6553.5	Data type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0 to 6553.5

Description

Set this parameter to 100% in general cases.

5.10 H09 Auto-tuning Parameters

H09.00 Gain auto-tuning mode

Address:	0x0900		
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16

Default: 4 | Change: At once

Value Range:

0: Disabled, manual gain tuning required
1: Enabled, gain parameters generated automatically based on the stiffness level
2: Positioning mode, gain parameters generated automatically based on the stiffness level
3: Interpolation mode+Inertia auto-tuning
4: Normal mode+Inertia auto-tuning
6: Quick positioning mode+Inertia auto-tuning

Description

Defines different gain tuning modes. Related gain parameters can be set manually or automatically according to the stiffness level.

H09.01 Stiffness level

Address:	0x0901		
Min.:	0	Unit:	-
Max.:	41	Data type:	UInt16
Default:	15	Change:	At once

Value Range:

0 to 41

Description

Defines the stiffness level of the servo system. The higher the stiffness level, the stronger the gains and the quicker the response will be. But an excessively high stiffness level will cause vibration.
The setpoint 0 indicates the weakest stiffness and 41 indicates the strongest stiffness.

H09.02 Adaptive notch mode

Address:	0x0902		
Min.:	0	Unit:	-
Max.:	4	Data type:	UInt16
Default:	3	Change:	At once

Value Range:

0: Adaptive notch no longer updated;
1: One adaptive notch activated (3rd notch)
2: Two adaptive notches activated (3rd and 4th notches)
3: Resonance point tested only (displayed in H09.24)
4: Adaptive notch cleared, values of 3rd and 4th notches restored to default

Description

Defines the operation mode of the adaptive notch.

H09.03 Online inertia auto-tuning mode

Address:	0x0903		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0: Disabled

1: Enabled, changing slowly

2: Enabled, changing normally

3: Enabled, changing quickly

Description

Defines whether to enable online inertia auto-tuning and the inertia ratio update speed during online inertia auto-tuning.

H09.05 Offline inertia auto-tuning mode

Address:	0x0905		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Bi-directional

1: Unidirectional

Description

Defines the offline inertia auto-tuning mode. The offline inertia auto-tuning function can be enabled through H0d.02.

H09.06 Maximum speed of inertia auto-tuning

Address:	0x0906		
Min.:	100	Unit:	rpm
Max.:	1000	Data Type:	UInt16
Default:	500	Change:	At stop

Value Range:

100 rpm to 1000 rpm

Description

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

During inertia auto-tuning, the higher the speed, the more accurate the auto-tuned values. Use the default setpoint in general cases.

H09.07 Time constant for accelerating to the max. speed during inertia auto-tuning

Address: 0x0907

Min.:	20	Unit:	ms
Max.:	800	Data Type:	UInt16
Default:	125	Change:	At stop

Value Range:

20 ms to 800 ms

Description

Defines the time for the motor to accelerate from 0 rpm to the maximum speed of inertia auto-tuning (H09.06) during offline inertia auto-tuning.

H09.08 Interval time after an individual inertia auto-tuning

Address:	0x0908		
Min.:	50	Unit:	ms
Max.:	10000	Data Type:	UInt16
Default:	800	Change:	At stop

Value Range:

50 ms to 10000 ms

Description

Defines the interval time between two consecutive speed references when H09.05 (Offline inertia auto-tuning mode) is set to 1 (Positive/Negative triangular wave mode).

H09.09 Number of motor revolutions per inertia auto-tuning

Address:	0x0909		
Min.:	0	Unit:	-
Max.:	100	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 100.00

Description

Defines the motor revolutions per inertia auto-tuning when H09.05 (Offline inertia auto-tuning mode) is set to 1 (Positive/Negative triangular wave mode).

Note:

When using the offline inertia auto-tuning function, check that the travel distance of the motor at the stop position is larger than the value of H09.09. If not, decrease the value of H09.06 (Maximum speed for inertia auto-tuning) or H09.07 (Time constant of accelerating to max. speed during inertia auto-tuning) properly until the motor travel distance fulfills the requirement.

H09.11 Vibration threshold

Address:	0x090B		
Min.:	0	Unit:	%

Max.:	100	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0% to 100.0%

Description

Defines the warning threshold for current feedback vibration.

H09.12 Frequency of the 1st notch

Address: 0x090C

Min.:	50	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	At once

Value Range:

50 Hz to 8000 Hz

Description

Defines the center frequency of the notch, which is the mechanical resonance frequency.

In the torque control mode, setting the notch frequency to 4000 Hz deactivates the notch function.

H09.13 Width level of the 1st notch

Address: 0x090D

Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 to 20

Description

Defines the width level of the notch. Use the default setpoint in general cases.

Width level is the ratio of the notch width to the notch center frequency.

H09.14 Depth level of the 1st notch

Address: 0x090E

Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 99

Description

Defines the depth level of the notch.

The depth level of the notch is the ratio between the input to the output at the notch center frequency.
The higher the setpoint, the lower the notch depth and the weaker the mechanical resonance suppression will be. Note that an excessively high setpoint may cause system instability.

H09.15 Frequency of the 2nd notch

Address:	0x090F		
Min.:	50	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	At once

Value Range:

50 Hz to 8000 Hz

Description

-

H09.16 Width level of the 2nd notch

Address:	0x0910		
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 to 20

Description

-

H09.17 Depth level of the 2nd notch

Address:	0x0911		
Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 99

Description

-

H09.18 Frequency of the 3rd notch

Address:	0x0912		
Min.:	50	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	At once

Value Range:

50 Hz to 8000 Hz

Description

-

H09.19 Width level of the 3rd notch

Address:	0x0913		
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 to 20

Description

-

H09.20 Depth level of the 3rd notch

Address:	0x0914		
Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 99

Description

-

H09.21 Frequency of the 4th notch

Address:	0x0915		
Min.:	50	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	At once

Value Range:

50 Hz to 8000 Hz

Description

-

H09.22 Width level of the 4th notch

Address:	0x0916		
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 to 20

Description

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H09.23 Depth level of the 4th notch

Address:	0x0917		
Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 99

Description

-

H09.24 Auto-tuned resonance frequency

Address:	0x0918		
Min.:	0	Unit:	Hz
Max.:	5000	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 Hz to 5000 Hz

Description

When H09.02 (Adaptive notch mode) is set to 3, the current mechanical resonance frequency is displayed.

H09.26 ITune response

Address:	0x091A		
Min.:	50	Unit:	%
Max.:	500	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

50.0% to 500.0%

Description

Defines the ITune response capability. Increasing the setpoint improves the responsiveness but may incur resonance.

H09.27 ITune mode

Address:	0x091B		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable1: 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

Address: 0x091C

Min.:	0	Unit:	%
Max.:	80	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0% to 80.0%

Description

Inertia ratio range for ITune adjustment: The minimum and maximum inertia ratios of ITune are 0.0 and 30.0 by default.

If the actual maximum load inertia ratio is higher than 30.0, increase the value of H09.29 to prevent positioning jitter.

If the actual load inertia change range is small, set H09.28 and H09.29 based on actual conditions to achieve optimal control effect.

H09.29 Maximum inertia ratio of ITune

Address: 0x091D

Min.:	1	Unit:	%
Max.:	120	Data Type:	UInt16
Default:	30	Change:	At once

Value Range:

1.0% to 120.0%

Description

-

H09.32 Gravity compensation value

Address: 0x0920

Min.:	-100	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

-100% to 100.0%

Description

Defines the gravity compensation value. Setting this parameter properly in vertical axis applications can reduce the falling amplitude upon start.

H09.33 Positive friction compensation value

Address:	0x0921		
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0% to 100.0%

Description

Defines the positive friction compensation value.

H09.34 Negative friction compensation value

Address:	0x0922		
Min.:	-100	Unit:	%
Max.:	0	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-100.0% to 0.0%

Description

Defines the negative direction friction compensation value.

H09.35 Friction compensation speed

Address:	0x0923		
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.0 to 20.0

Description

Defines the friction compensation speed.

H09.36 Friction compensation speed

Address:	0x0924		
Min.:	0	Unit:	-
Max.:	19	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Slow speed mode + Speed reference
1: Slow speed mode + Model speed
2: Slow speed mode + Speed feedback
3: Slow speed mode + Observe speed
16: High speed mode + Speed reference
17: High speed mode + Model speed
18: High speed mode + Speed feedback
19: High speed mode + Observe speed

Description

-

H09.37 Vibration monitoring time

Address:	0x0925		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	600	Change:	At once

Value Range:

0 to 65535

Description

The resonance detection suppression function is turned off automatically after the time defined by this parameter elapses. To suppress the resonance suppression function, set this parameter to 65536.

H09.38 Frequency of low-frequency resonance suppression 1 at the mechanical end

Address:	0x0926		
Min.:	1	Unit:	Hz
Max.:	100	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

1.0 Hz to 100.0 Hz

Description

Set this parameter based on the actual jitter frequency.

H09.39 Low-frequency resonance suppression 1 at the mechanical end

Address:	0x0927		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:

0 to 3

Description

Defines different low-frequency resonance suppression types at the mechanical load. Type 1 features the shortest delay.

H09.44 Frequency of low-frequency resonance suppression 2 at mechanical load end

Address:	0x092C		
Min.:	0	Unit:	-
Max.:	100	Data type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0 to 100.0

Description

Set this parameter based on the actual jitter frequency.

H09.45 Responsiveness of low-frequency resonance suppression 2 at mechanical load end

Address:	0x092D		
Min.:	0.01	Unit:	-
Max.:	5	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.01 to 5.00

Description

Use the default setpoint in general cases. Increasing the setpoin shortens the delay time.

H09.47 Width of low-frequency resonance suppression 2 at mechanical load end

Address:	0x092F		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 2.00

Description

Use the default setpoint in general cases. Increase the setpoint prolongs the delay time.

H09.49 Frequency of low-frequency resonance suppression 3 at mechanical load end

Address:	0x0931		
Min.:	0	Unit:	-
Max.:	100	Data Type:	UInt16

Default: 0 Change: At once

Value Range:

0.0 to 100.0

Description

-

H09.50 Responsiveness of low-frequency resonance suppression 3 at mechanical load end

Address: 0x0932

Min.:	0.01	Unit:	-
Max.:	5	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.01 to 5.00

Description

-

H09.52 Width of low-frequency resonance suppression 3 at mechanical load end

Address: 0x0934

Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 2.00

Description

-

H09.54 Vibration threshold

Address: 0x0936

Min.:	0	Unit:	%
Max.:	300	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0.0% to 300.0%

Description

If the torque fluctuation exceeds the setpoint, an error will be reported. Setting this parameter to 0 hides the resonance detection function.

H09.56 Max. overshoot allowed by ETune

Address: 0x0938

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16

Default: 2936 Change: At once

Value Range:

0 to 65535

Description

Defines the maximum overshoot value allowed during ETune adjustment.

H09.57 STune resonance suppression switchover frequency

Address: 0x0939

Min.:	0	Unit:	Hz
Max.:	4000	Data Type:	UInt16
Default:	900	Change:	At once

Value Range:

0 Hz to 4000 Hz

Description

If the resonance frequency is lower than the setpoint, use medium-frequency resonance suppression 2 to suppress resonance. Otherwise, use the notch to suppress resonance.

H09.58 STune resonance suppression reset selection

Address: 0x093A

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable

Description

Used to enable STune resonance suppression reset to clear parameters related to resonance suppression, medium-frequency resonance suppression 2, and notches 3 and 4.

5.11 H0A Fault and Protection Parameters

H0A.00 Power input phase loss protection

Address: 0x0A00

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Enable

1: Disable

Description

Servo drives supporting single-phase/three-phase 220 V and three-phase 380 V power supplies are available. When voltage fluctuation or phase loss occurs on the power supply, the drive triggers power input phase loss protection based on H0A.00.

H0A.01 Absolute position limit

Address:	0x0A01		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disabled

1: Enabled

2: Enabled after homing

Description

Used to set the activation condition for enabling the software position limit.

H0A.04 Motor overload protection gain

Address:	0x0A04		
Min.:	50	Unit:	-
Max.:	300	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

50 to 300

Description

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

You can change the setpoint to advance or delay the time when overload protection is triggered based on the motor temperature. The setpoint 50% indicates the time is cut by half; 150% indicates the time is prolonged by 50%. Set this parameter based on the actual temperature of the motor.

H0A.08 Overspeed threshold

Address:	0x0A08		
Min.:	0	Unit:	rpm
Max.:	20000	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 rpm to 20000 rpm

Description

Defines the overspeed threshold of the motor.

Setpoint	Overspeed 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 to 10000	If H0A-08 ⩾ (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.09 Max. pulse input frequency in position control

Address: 0x0A09

Min.:	100	Unit:	kHz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	At stop

Value Range:

100 kHz to 8000 kHz

Description

Defines the maximum frequency of input pulses when the position reference source is pulse reference (H05.00 = 0) in the position control mode.

When the actual pulse input frequency exceeds the value of H0A.09, the drive reports EB01.0 (Position reference input error).

H0A.10 Threshold of excessive local position deviation

Address: 0x0A0A

Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	27486951	Change:	Real-time modification

Value Range:

0 to 4294967295

Description

Defines the threshold for excessive position deviation in the position control mode.

When the position deviation exceeds this threshold, the drive reports EB00.0 (Position deviation too large).

H0A.12 Runaway protection

Address: 0x0A0C

Min.:	0	Unit:	-

Max.:	1	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: Disable

1: Enable

Description

Defines whether to enable runaway protection.

0: Hide the detection on E234.0 in applications where the motor drives a vertical axis or is driven by the load

1: Enable runaway protection

H0A.17 Reference pulse selection

Address: 0x0A11

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 overtemperature threshold

Address: 0x0A12

Min.:	120	Unit:	°C
Max.:	175	Data Type:	UInt16
Default:	140	Change:	At once

Value Range:

120°C to 175°C

Description

Defines the threshold for reporting E640.0 (IGBT overtemperature) and E640.1 (Flywheel diode overtemperature).

H0A.19 Filter time constant of touch probe 1

Address: 0x0A13

Min.:	0	Unit:	us
Max.:	6.3	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.00 us to 6.30 us

Description

Defines the filter time of touch probe 1. An active input must last for the time defined by H0A.19.

H0A.20 Filter time constant of touch probe 2

Address:	0x0A14		
Min.:	0	Unit:	us
Max.:	6.3	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.00 us to 6.30 us

Description

Defines the filter time of touch probe 2. An active input must last for the time defined by H0A.20.

H0A.23 TZ signal filter time

Address:	0x0A17		
Min.:	0	Unit:	25 ns
Max.:	31	Data Type:	UInt16
Default:	15	Change:	At stop

Value Range:

0 ns to 31 ns

Description

-

H0A.24 Filter time constant of low-speed pulse input pin

Address:	0x0A18		
Min.:	0	Unit:	25 ns
Max.:	255	Data Type:	UInt16
Default:	30	Change:	At stop

Value Range:

0 ns to 255 ns

Description

Defines the filter time constant of low-speed pulse input terminal which is enabled (H05.01 = 0) when the position reference source is pulse input (H05.00 = 0) in the position control mode.

When peak interference exists in the low-speed pulse input terminal, set this parameter to suppress peak interference and prevent motor malfunction due to interference signal inputted to the servo drive.

H0A.25 Speed display DO low-pass filter time

Address: 0x0538

Min.:	0	Unit:	ms
Max.:	5000	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 5000

Description

Defines the low-pass filter time constant of the speed information for speed feedback and position references.

H0A.26 Motor overload detection

Address: 0x0A1A

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Show motor overload warning (E909.0) and fault (E620.0)

1: Hide motor overload warning (E909.0) and fault (E620.0)

Description

Defines whether to enable motor overload detection.

H0A.27 Moving average filter time for speed display DO

Address: 0x0A1B

Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0 ms to 100 ms

Description

Defines the low-pass filter time constant of the speed information for speed feedback and position references.

H0A.29 Fully closed-loop encoder (ABZ) filter time

Address: 0x0A1D

Min.:	0	Unit:	25 ns
Max.:	65535	Data Type:	UInt16
Default:	4111	Change:	At stop

Value Range:

bit0–bit7: Fully closed loop encoder (ABZ) pulse signal filtering time

bit8–bit15: Fully closed loop encoder (ABZ) wire breakage filter time

Description

-

H0A.30 Filter time constant of high-speed pulse input pin

Address:	0x0A1E		
Min.:	0	Unit:	ns
Max.:	255	Data Type:	UInt16
Default:	3	Change:	At stop

Value Range:

0 ns to 255 ns

Description

Defines the filter time constant of high-speed pulse input terminal which is enabled (H05.01 = 1) when the position reference source is pulse reference (H05.00 = 0) in the position control mode.

When peak interference exists in the high-speed pulse input terminal, set this parameter to suppress peak interference and prevent motor malfunction due to interference signal inputted to the servo drive.

H0A.32 Motor stall over-temperature protection time window

Address:	0x0A20		
Min.:	10	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

10 ms to 65535 ms

Description

Defines the overtemperature duration before E630.0 (Motor stall) is detected by the servo drive.

H0A.32 can be used to adjust the sensitivity of motor stall over-temperature detection.

H0A.33 Motor stall overtemperature detection

Address:	0x0A21		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: Hide

1: Enable

Description

Defines whether to enable the detection for E630.0 (Motor stall overtemperature protection).

H0A.36 Encoder multi-turn overflow fault selection

Address: 0x0A24

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Not hide

1: Hide

Description

Defines whether to hide the encoder multi-turn overflow fault in the absolute position linear mode (H02.01 = 1).

H0A.40 Compensation function selection

Address: 0x0A28

Min.:	0	Unit:	-
Max.:	15	Data Type:	UInt16
Default:	6	Change:	At stop

Value Range:

bit	Name	Function
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 solution
		1: Old solution (same as SV660N)

Description

-

H0A.41 Forward position of software position limit

Address: 0x0A29

Min.:	-2147483648	Unit:	Encoder unit
Max.:	2147483647	Data Type:	Int32
Default:	2147483647	Change:	At stop

Value Range:

-2147483648 to +2147483647

Description

When the absolute position counter (H0b.07) is larger than H0A.41, the servo drive reports E950.0 (Forward overtravel) and stops accordinly.

H0A.43 Reverse position of software position limit

Address: 0x0A2B

Min.:	-2147483648	Unit:	Encoder unit
Max.:	2147483647	Data Type:	Int32
Default:	-2147483648	Change:	At stop

Value Range:

-2147483648 to +2147483647

Description

When the absolute position counter (H0b.07) is smaller than H0A.43, the servo drive reports E952.0 (Reverse overtravel) and stops accordingly.

H0A.49 Regenerative resistor overtemperature threshold

Address: 0x0A31

Min.:	100	Unit:	°C
Max.:	175	Data Type:	UInt16
Default:	140	Change:	Real-time modification

Value Range:

100°C to 175°C

Description

Defines the temperature threshold for regenerative resistor overload.

H0A.50 Encoder communication fault tolerance threshold

Address: 0x0A32

Min.:	0	Unit:	-
Max.:	31	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0 to 31

Description

When the numer of communication failures between the encoder and the drive exceeds H0A.50, the communication between the encoder and the drive fails.

H0A.51 Phase loss detection filter times

Address: 0x0A33

Min.:	3	Unit:	55 ms
Max.:	36	Data Type:	UInt16
Default:	20	Change:	At once

Value Range:

3 ms to 36 ms

Description

Phase loss fault is reported when phase loss keeps active for a period longer than that defined by H0A.51.

H0A.52 Encoder temperature protection threshold

Address: 0x0A34

Min.:	0	Unit:	1°C
Max.:	175	Data Type:	UInt16
Default:	125	Change:	Real-time modification

Value Range:

0°C to 175°C

Description

Defines the temperature threshold for encoder overtemperature protection.

H0A.53 Touch probe DI ON-compensation time

Address: 0x0A35

Min.:	-3000	Unit:	25 ns
Max.:	3000	Data Type:	Int16
Default:	200	Change:	At once

Value Range:

-3000 ns to +3000 ns

Description

Used to compensate for the action time when the touch probe is switched on.

H0A.54 Touch probe DI OFF-compensation time

Address: 0x0A36

Min.:	-3000	Unit:	25 ns
Max.:	3000	Data Type:	Int16
Default:	1512	Change:	At once

Value Range:

-3000 ns to +3000 ns

Description

Used to compensate for the action time when the touch probe is switched off.

H0A.55 Runaway current threshold

Address: 0x0A37

Min.:	100	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

100.0% to 400.0%

Description

Defines the current threshold for runaway protection detection.

H0A.56 Fault reset delay

Address: 0x0A38

Min.:	0	Unit:	ms
Max.:	60000	Data Type:	UInt16
Default:	10000	Change:	At once

Value Range:

0 ms to 60000 ms

Description

-

H0A.57 Runaway speed threshold

Address: 0x0A39

Min.:	1	Unit:	rpm
Max.:	1000	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

1 rpm to 1000 rpm

Description

Defines the overspeed threshold for runaway protection detection.

H0A.58 Runaway speed filter time

Address: 0x0A3A

Min.:	0.1	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.1 ms to 100.0 ms

Description

Defines the speed feedback filter time for runaway protection detection.

H0A.59 Runaway protection detection time

Address: 0x0A3B

Min.:	10	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	30	Change:	At once

Value Range:

10 ms to 1000 ms

Description

The runaway fault will be reported when runaway fault keeps active for a period longer than that defined by H0A.59.

H0A.60 Black box function mode

Address: 0x0A3C

Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: Disable

1: Any fault

2: Designated fault

3: Triggered based on designated condition

Description

Defines the condition for triggering black box sampling.

H0A.61 Designated fault code

Address: 0x0A3D

Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0 to 6553.5

Description

Defines the fault code for triggering the black box function.

H0A.62 Trigger source

Address: 0x0A3E

Min.:	0	Unit:	-
Max.:	25	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 25

Description

Defines the fault code for triggering the black box function through designated channel.

H0A.63 Trigger level

Address: 0x0A3F

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

Defines the level for triggering the black box function through designated channel.

H0A.65 Trigger level

Address: 0x0A41

Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Rising edge

1: Equal

2: Falling edge

3: Edge-triggered

Description

Defines the mode for triggering the black box function through H0A.63.

H0A.66 Trigger position

Address: 0x0A42

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	75	Change:	At once

Value Range:

0% to 100%

Description

Defines the pre-trigger position for triggering black box sampling.

H0A.67 Sampling frequency

Address: 0x0A43

Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Current loop
1: Position loop
2: Main cycle
Description
Defines the frequency sampling mode during black box sampling.

H0A.70 Overspeed threshold 2

Address:	0x0A46		
Min.:	0	Unit:	rpm
Max.:	20000	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:
0 rpm to 20000 rpm
Description
Defines the speed threshold for reporting E500.2 (Position feedback pulse overspeed).

H0A.71 MS1 motor overload curve switchover

Address:	0x0A47		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	4098	Change:	Real-time modification

Value Range:
0 to 65535
Description
Bit 0:
0: New overload curve
1: Old overload curve
Bit 1:
0: Enable discharging switch upon power failure
1: Hide discharging switch upon power failure
Bit 12:
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

Address:	0x0A48		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10000	Change:	At stop

Value Range:

0 to 65535

Description

Defines the time for the motor to decelerate from the maximum speed to 0 rpm during ramp-to-stop.

H0A.73 STO 24V disconnection filter time

Address:	0x0A49		
Min.:	1	Unit:	ms
Max.:	5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

1 ms to 5 ms

Description

Defines the delay from the moment when 24 V is disconnected to the moment when the STO state applies.

H0A.74 Filter time for two inconsistent STO channels

Address:	0x0A4A		
Min.:	1	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

1 ms to 1000 ms

Description

Defines the delay from the moment 24 V is inputted to the drive inconsistently through two channels to the moment when the STO state applies.

H0A.75 Servo OFF delay after STO triggered

Address:	0x0A4B		
Min.:	0	Unit:	ms
Max.:	25	Data Type:	UInt16
Default:	20	Change:	At once

Value Range:

0 ms to 25 ms

Description

Defines the delay from the moment the STO state is triggered to the moment the S-ON signal is switched off.

H0A.90 Moving average filter time for speed display values

Address:	0x0A5A		
Min.:	0	Unit:	ms

Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 100 ms

Description

Defines the moving average filter time constant for speed display values.

H0A.91 Moving average filter time for torque display values

Address: 0x0A5B

Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 100 ms

Description

Defines the moving average filter time constant for torque display values.

H0A.92 Moving average filter time for position display values

Address: 0x0A5C

Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 100 ms

Description

Defines the moving average filter time constant for position display values.

H0A.93 Low-pass filter time for voltage display values

Address: 0x0A5D

Min.:	0	Unit:	ms
Max.:	250	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 250 ms

Description

Defines the low-pass filter time constant for voltage display values.

H0A.94 Low-pass filter time for thermal display values

Address: 0x0A5E

Min.:	0	Unit:	ms
Max.:	250	Data Type:	UInt16

Default: 0 Change: At once

Value Range:

0 ms to 250 ms

Description

Defines the filter time constant for thermal display values.

5.12 H0b Monitoring Parameters

H0b.00 Motor speed actual value

Address: 0x0B00

Min.: -32767 Unit: rpm

Max.: 32767 Data Type: Int16

Default: 0 Change: Unchangeable

Value Range:

-32767 rpm to +32767 rpm

Description

Indicates the actual motor speed after round-off, which is accurate to 1 rpm. Set in H0A.25 (Filter time constant of speed feedback display) the filter time constant for H0b.00.

H0b.01 Speed reference

Address: 0x0B01

Min.: -32767 Unit: rpm

Max.: 32767 Data Type: Int16

Default: 0 Change: Unchangeable

Value Range:

-32767 rpm to +32767 rpm

Description

Indicates the present speed reference (accurate to 1 rpm) of the drive in the position and speed control modes.

H0b.02 Internal torque reference

Address: 0x0B02

Min.: -500 Unit: %

Max.: 500 Data Type: Int16

Default: 0 Change: Unchangeable

Value Range:

-500.0% to +500.0%

Description

Displays present torque reference (accurate to 0.1%). The value 100.0% corresponds to the rated torque of the motor.

H0b.03 Monitored DI status

Address: 0x0B03

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

Value Range:

0 to 65535

Description

Displays the level status of eight DIs without filtering.

Upper LED segments ON: high level (indicated by "1") Lower LED segments ON: low level (indicated by "0")

H0b.05 Monitored DO status

Address: 0x0B05

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

Value Range:

0 to 65535

Description

Displays the level status of five DOs without filtering.

Upper LED segments ON: high level (indicated by "1") Lower LED segments ON: low level (indicated by "0")

H0b.07 Absolute position counter

Address: 0x0B07

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Indicates present absolute position (reference unit) of the motor in the position control mode.

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

H0b.09 Mechanical angle

Address: 0x0B09

Min.:	0	Unit:	°
Max.:	360	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0° to 360.0°

Description

Displays present mechanical angle (encoder unit) of the motor. The setpoint 0 indicates the mechanical angle is 0°.

Actual mechanical angle = 360° x H0b.09/(Maximum value of H0b.09 + 1)

Maximum value of H0b.09 for an absolute encoder: 65535

H0b.10 Electrical angle

Address:	0x0B0A		
Min.:	0	Unit:	°
Max.:	360	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0° to 360.0°

Description

Indicates the present electrical angle of the motor, which is accurate to 0.1°.

The electrical angle variation range is ±360.0° during rotation. If the motor has four pairs of poles, each revolution generates four rounds of angle change from 0° to 359°. Similarly, if the motor has five pairs of poles, each revolution generates five rounds of angle change from 0° to 359°.

H0b.12 Average load rate

Address:	0x0B0C		
Min.:	0	Unit:	%
Max.:	800	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0% to 800.0%

Description

Displays the percentage of the average load torque to the rated torque of the motor, which is accurate to 0.1%. The value 100.0% corresponds to the rated torque of the motor.

H0b.13 Input reference counter

Address:	0x0B0D		
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Used to count and display the 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)

Address:	0x0B0F		
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Used to count and display the position deviation value after being divided or multiplied by the electronic gear ratio in the position control mode.

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

Note:

H0b.15 can be cleared when the condition defined in H05.16 (Clear action) is met.

H0b.17 Feedback pulse counter

Address:	0x0B11		
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Used to count the position pulses fed back by the encoder in any control mode.

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

H0b.19 Total power-on time

Address:	0x0B13		
Min.:	0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.0s to 429496729.5s

Description

Used to record the total operating time of the servo drive.

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

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

H0b.21 AI1 voltage display

Address:	0x0B16		
Min.:	-12	Unit:	V
Max.:	12	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-12.000 V to +12.000 V

Description

Displays the actual sampling voltage of AI1.

H0b.24 RMS value of phase current

Address:	0x0B18		
Min.:	0	Unit:	A
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0 A to 6553.5 A

Description

Displays the RMS value of the phase current of the motor, which is accurate to 0.01 A.

H0b.25 Angle obtained upon voltage injection auto-tuning

Address:	0x0B19		
Min.:	0	Unit:	°
Max.:	360	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0° to 360.0°

Description

-

H0b.26 Bus voltage

Address:	0x0B1A		
Min.:	0	Unit:	V
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0 V to 6553.5 V

Description

Displays the DC bus voltage of the main circuit input voltage after rectification, which is accurate to 0.01 V.

H0b.27 Module temperature

Address:	0x0B1B		
Min.:	-20	Unit:	°C
Max.:	200	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-20°C to +200°C

Description

Indicates the temperature of the module inside the servo drive, which can be used as a reference for estimating the actual temperature of the drive.

H0b.28 Absolute encoder fault information given by FPGA

Address:	0x0B1C		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H0b.29 Axis status information given by FPGA

Address:	0x0B1D		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H0b.30 Axis fault information given by FPGA

Address:	0x0B1E		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H0b.31 Encoder fault information

Address:	0x0B1F		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

H0b.33 Fault log

Address:	0x0B21		
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Present fault

1: Last fault

2: 2nd to last fault

3: 3rd to last fault

4: 4th to last fault

5: 5th to last fault 6: 6th to last fault

7: 7th to last fault

8: 8th to last fault

9: 9th to last fault

10: 10th to last fault

11: 11th to last fault

12: 12th to last fault

13: 13th to last fault

14: 14th to last fault

15: 15th to last fault

16: 16th to last fault

17: 17th to last fault

18: 18th to last fault

19: 19th to last fault

Description

Used to view the lastest 20 faults of the drive.

H0b.34 Fault code of the selected fault

Address: 0x0B22

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

Value Range:

0 to 65535

Description

-

H0b.35 Time stamp upon occurrence of the selected fault

Address: 0x0B23

Min.:	0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.0s to 429496729.5s

Description

-

H0b.37 Motor speed upon occurrence of the selected fault

Address: 0x0B25

Min.:	-32767	Unit:	rpm
Max.:	32767	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-32767 rpm to +32767 rpm

Description

-

H0b.38 Motor phase U current upon occurrence of the selected fault

Address: 0x0B26

Min.:	-3276.7	Unit:	A
Max.:	3276.7	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-3276.7 A to +3276.7 A

Description

-

H0b.39 Motor phase V current upon occurrence of the selected fault

Address: 0x0B27

Min.: -3276.7 Unit: A
Max.: 3276.7 Data Type: Int16
Default: 0 Change: Unchangeable

Value Range:

-3276.7 A to +3276.7 A

Description

-

H0b.40 Bus voltage upon occurrence of the selected fault

Address: 0x0B28
Min.: 0 Unit: V
Max.: 6553.5 Data Type: UInt16
Default: 0 Change: Unchangeable

Value Range:

0.0 V to 6553.5 V

Description

-

H0b.41 DI status upon occurrence of the selected fault

Address: 0x0B29
Min.: 0 Unit: -
Max.: 65535 Data Type: UInt16
Default: 0 Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0b.43 DO status upon occurrence of the selected fault

Address: 0x0B2B
Min.: 0 Unit: -
Max.: 65535 Data Type: UInt16
Default: 0 Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0b.45 Internal fault code

Address: 0x0B2D
Min.: 0 Unit: -
Max.: 65535 Data Type: UInt16

Default: 0 Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0b.46 Absolute encoder fault information given by FPGA upon occurrence of the selected fault

Address: 0x0B2E

Min.: 0 Unit: -

Max.: 65535 Data Type: UInt16

Default: 0 Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0b.47 System status information given by FPGA upon occurrence of the selected fault

Address: 0x0B2F

Min.: 0 Unit: -

Max.: 65535 Data Type: UInt16

Default: 0 Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0b.48 System fault information given by FPGA upon occurrence of the selected fault

Address: 0x0B30

Min.: 0 Unit: -

Max.: 65535 Data Type: UInt16

Default: 0 Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0b.49 Encoder fault information upon occurrence of the selected fault

Address: 0x0B31

Min.: 0 Unit: -

Max.: 65535 | Data Type: UInt16
Default: 0 | Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0b.51 Internal fault code upon occurrence of the selected fault

Address: 0x0B33

Min.: 0 | Unit: -
Max.: 65535 | Data Type: UInt16
Default: 0 | Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0b.52 FPGA timeout fault standard bit upon occurrence of the selected fault

Address: 0x0B34

Min.: 0 | Unit: -
Max.: 65535 | Data Type: UInt16
Default: 0 | Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0b.53 Position following error (reference unit)

Address: 0x0B35

Min.: -2147483648 | Unit: p
Max.: 2147483647 | Data Type: Int32
Default: 0 | Change: Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

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

Position deviation (reference unit) is the value obtained after enoder position deviation calculation. The precision is compromised during division.

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

H0b.55 Motor speed actual value

Address: 0x0B37

Min.:	-2147483648	Unit:	rpm
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 rpm to +2147483647 rpm

Description

Indicates the actual value of motor speed, which is accurate to 0.1 rpm.

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

H0A.25 (Filter time constant of speed feedback display) can be used to set the filter time constant of the speed feedback.

H0b.57 Bus voltage of the control circuit

Address: 0x0B39

Min.:	0	Unit:	V
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0 V to 6553.5 V

Description

Displays the bus voltage of the control circuit.

H0b.58 Mechanical absolute position (low 32 bits)

Address: 0x0B3A

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the low 32-bit value (encoder unit) of the mechanical position feedback when the absolute encoder is used.

H0b.60 Mechanical absolute position (high 32 bits)

Address: 0x0B3C

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the high 32-bit value (encoder unit) of the mechanical position feedback when the absolute encoder is used.

H0b.63 NotRdy state

Address:	0x0B3F		
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

1: Control circuit error

2: Main circuit power input error

3: Bus undervoltage

4: Soft start failed

5: Encoder initialization undone

6: Short circuit to ground failed

7: Others

Description

Displays the reason for NotRdy state.

H0b.64 Real-time input position reference counter

Address:	0x0B40		
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

Address:	0x0B42		
Min.:	-32768	Unit:	°C
Max.:	32767	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-32768°C to 32767°C

Description

-

H0b.67 Load rate of regenerative resistor

Address:	0x0B43		
Min.:	0	Unit:	%
Max.:	200	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0% to 200.0%

Description

-

H0b.70 Number of absolute encoder revolutions

Address:	0x0B46		
Min.:	0	Unit:	Rev
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 Rev to 65535 Rev

Description

Indicates the number of revolutions of the absolute encoder.

H0b.71 Single-turn position fed back by the absolute encoder

Address:	0x0B47		
Min.:	2147483648	Unit:	p
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the position feedback of the absolute encoder within one turn.

H0b.74 System fault information given by FPGA

Address:	0x0B4A		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H0b.77 Encoder position (low 32 bits)

Address: 0x0B4D

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the low 32-bit value of the position feedback of the absolute encoder.

H0b.79 Encoder position (high 32 bits)

Address: 0x0B4F

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the high 32-bit value of the position feedback of the absolute encoder.

H0b.81 Single-turn position of the rotary load (low 32 bits)

Address: 0x0B51

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the low 32-bit value of the position feedback of the rotary load when the absolute system works in the rotation mode.

H0b.83 Single-turn position of the rotary load (high 32 bits)

Address: 0x0B53

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the high 32-bit value of the position feedback of the rotary load when the absolute system works the rotation mode.

H0b.85 Single-turn position of the rotary load (reference unit)

Address:	0x0B55		
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the high 32-bit value of the position feedback of the rotary load when the absolute system works the rotation mode.

H0b.87 IGBT junction temperature

Address:	0x0B57		
Min.:	0	Unit:	-
Max.:	200	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 200

Description

-

H0b.90 Group No. of the abnormal parameter

Address:	0x0B5A		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H0b.91 Offset of the abnormal parameter within the group

Address:	0x0B5B		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H0b.93 Closed loop state

Address:	0x0B5D	Effective Time:	-
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0: Half closed loop

1: Fully closed loop

Description

Displays the closed loop state in position control mode.

H0b.94 Individual power-on time

Address:	0x0B5E		
Min.:	0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.0s to 429496729.5s

Description

Display the individual power-on time of the drive.

H0b.96 Individual power-on time upon occurrence of the selected fault

Address:	0x0B60		
Min.:	0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.0s to 429496729.5s

Description

-

5.13 H0d Auxiliary Parameters

H0d.00 Software reset

Address:	0x0D00		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation

1: Enable

Description

Programs in the drive are reset automatically (similar to the program reset upon power-on) after the software reset function is enabled, without the need for a power cycle.

H0d.01 Fault reset

Address:	0x0D01		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation

1: Enable

Description

When a No. 1 or No. 2 resettable fault occurs, you can enable the fault reset function in the non-operational state after rectifying the fault cause, stopping the keypad from displaying the fault and allowing the drive to enter the "rdy" state. When a No. 3 warning occurs, you can enable the fault reset function directly.

H0d.02 Inertia auto-tuning selection

Address:	0x0D02		
Min.:	0	Unit:	-
Max.:	65	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65

Description

Used to enable offline inertia auto-tuning through the keypad. In the parameter display mode, switch to H0d.02 and press the SET key to enable offline inertia auto-tuning.

H0d.04 Read/write in encoder ROM

Address:	0x0D04		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation
1: Write ROM
2: Read ROM
3: ROM failure

Description

-

H0d.05 Emergency stop

Address:	0x0D05		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No operation
1: Emergency stop

Description

-

H0d.10 Auto-tuning of analog channel

Address:	0x0D0A		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation
1: Adjust AI1

Description

When automatic adjustment of the analog channel is enabled, the drive automatically corrects the zero drift voltage of the analog channel to improve signal detection accuracy.

H0d.12 Phase U/V current balance correction

Address:	0x0D0C		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Disable
1: Enable

Description

-

H0d.17 Forced DI/DO enable switch

Address:	0x0D11		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Forced DI enable switch
0: Disable
1: Enable
bit 1: Forced DO enable switch
0: Disable
1: Enable

Description

Defines whether to enable forced DI/DO.

H0d.18 Forced DI value

Address:	0x0D12		
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	255	Change:	At once

Value Range:

0 to 255

Description

Defines the level logic of the DI functions set in group H03 when forced DI is active (H0d.17 = 1 or 3).

The value of H0d.18 is displayed as a hexadecimal on the keypad. When it is converted to a binary value, "bit(n) = 1" indicates the level logic of DI function is high level; "bit(n) = 0" indicates the level logic of the DI function is low level.

H0d.19 Forced DO value

Address:	0x0D13		
Min.:	0	Unit:	-
Max.:	31	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 31

Description

Defines whether the DO functions assigned in group H04 are active when forced DO is active (H0d.17 = 2 or 3).

The value of H0d.19 is displayed as a hexadecimal on the keypad. When it is converted to a binary value, "bit(n) = 1" indicates the DO function is active; "bit(n) = 0" indicates the DO function is inactive.

H0d.20 Absolute encoder reset selection

Address:	0x0D14		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation

1: Reset the fault

2: Reset the fault and multi-turn data

3: Reset Inovance 2nd encoder fault

4: Reset Inovance 2nd encoder fault and multi-turn data

Description

You can reset the encoder fault or the multi-turn data fed back by the encoder by setting H0d.20.

H0d.23 Torque fluctuation auto-tuning

Address:	0x0D17		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 to 1

Description

-

H0d.26 Brake and dynamic brake started forcibly

Address:	0x0D1A		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No forcible operations

1: Dynamic brake deactivated forcibly

2: Brake released forcibly

3: Dynamic brake deactivated and brake released forcibly

Description

-

5.14 H0E Communication Function Parameters

H0E.00 Node address

Address:	0x0E00		
Min.:	1	Unit:	-
Max.:	127	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 127

Description

Indicates the slave node address. Ensure this parameter is consistent with the configuration of the host controller.

H0E.01 Save objects written through communication to EEPROM

Address:	0x0E01		
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	1	Change:	Real-time modification

Value Range:

0: Not save

1: Save parameters

2: Save object dictionaries3: 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

Address:	0x0E03	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	Real-time modification

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)

Address:	0x0E04	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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.80 Modbus baud rate

Address:	0x0E50		
Min.:	0	Unit:	-
Max.:	9	Data Type:	UInt16
Default:	9	Change:	At once

Value Range:

0: 300 bps

1: 600 bps

2: 1200 bps

3: 2400 bps

4: 4800 bps

5: 9600 bps

6: 19200 bps

7: 38400 bps

8: 57600 bps

9: 115200 bps

Description

Defines the communication rate between the servo drive and the host controller. The baud rate set in the servo drive must be the same as that in the host controller. Otherwise, communication will fail.

H0E.81 Modbus data format

Address:	0x0E51		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	3	Change:	At once

Value Range:

0: No parity, 2 stop bits (N-2)
1: Even parity, 1 stop bit (E-1)
2: Odd parity, 1 stop bit (O-1)
3: No parity, 1 stop bit (N-1)

Description

Defines the data check mode between the servo drive and the host controller during communication.
0: No parity, 2 stop bits
1: Even parity, 1 stop bit
2: Odd parity, 1 stop bit
3: No parity, 1 stop bit
The data format of the servo drive must be the same as that of the host controller. Otherwise, communication will fail.

H0E.82 Modbus response delay

Address: 0x0E52

Min.:	0	Unit:	ms
Max.:	20	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 20 ms

Description

Defines the delay from the moment the slave receives a command to the moment the slave returns a response.

H0E.83 Modbus communication timeout

Address: 0x0E53

Min.:	0	Unit:	ms
Max.:	600	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 600 ms

Description

-

H0E.84 Modbus communication data sequence

Address: 0x0E54

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: High bits before low bits
1: Low bits before high bits
Description
Defines the 32-bit data transmission format of Modbus communication.
0: High 16 bits before low 16 bits
1: Low 16 bits before high 16 bits

H0E.90 **Modbus version**

Address:	0x0E5A		
Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:
0.00 to 655.35
Description
-

H0E.97 **Communication monitoring parameter 1**

Address:	0x0E61		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:
0 to 65535
Description
-

H0E.98 **Communication monitoring parameter 2**

Address:	0x0E62		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:
0 to 65535
Description
-

5.15 H0F Fully Closed-Loop Parameters

H0F.00 **Encoder feedback mode**
Address: 0x0F00

Min.: 0 Unit: -
Max.: 2 Data Type: UInt16
Default: 0 Change: At once

Value Range:

0: Internal encoder feedback

1: External encoder feedback

2: Inner/Outer loop switchover

Description

Defines the encoder feedback signal source in fully closed-loop control.

0: Internal encoder feedback: The position feedback signals come from the motor encoder.

1: External encoder feedback: The position feedback signals come from the fully closed-loop external encoder and electronic gear ratio 1 is used.

2: Inner/Outer loop switchover: The DI assigned with FunIN.24 (GEAR_SEL, electronic gear ratio switchover) is switch between inner and outer position closed loops. FunIN.24

: Inactive, internal encoder feedback, with electronic gear ratio 1 used

Active: External encoder feedback, with electronic gear ratio 2 used

H0F.01 External encoder operation mode

Address: 0x0F01
Min.: 0 Unit: -
Max.: 1 Data Type: UInt16
Default: 0 Change: At once

Value Range:

0: Standard operating direction

1: Reverse operating direction

Description

Defines the feedback pulse counting direction of internal and external encoders when the motor rotates in the fully closed-loop mode.

0: Standard operating direction: The pulse feedback counter of the internal encoder (H0F.18) is in the same direction as that of the external encoder (H0F.20) during rotation of the motor.

1: Reverse operating direction: The counting direction of pulse feedback counter of the internal encoder (H0F.18) is opposite to the external encoder (H0F.20) during rotation of the motor.

H0F.02 External encoder mode

Address: 0x0F02
Min.: 0 Unit: -
Max.: 1 Data Type: UInt16

Default: 0 Change: At stop

Value Range:

0: Incremental mode

1: Absolute linear mode

Description

H0F.03 External encoder feedback type

Address:	0x0F03		
Min.:	0	Unit:	-
Max.:	0	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Quadrature pulse

Description

H0F.04 External encoder pulses per revolution

Address:			
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	10000	Change:	At stop

Value Range:

0 to 2147483647

Description

Defines the pulses fed back by the external encoder per revolution of the motor. It defines the quantity relationship between feedback pulses from the external encoder and those from the internal encoder.

Calculate the value of this parameter through analyzing mechanical parameters. When rigid connection is applied between the motor and the external encoder (scale), you can also set this parameter using the following method:

1. Manually rotate the motor and observe H0F.18 (Feedback pulse counter of internal encoder) in the meantime. After ensuring that the motor has rotated for a full turn (H0F.18 = Motor resolution), calculate the change of H0F.20 (Feedback pulse counter of external encoder) and use the absolute value of the change as the value of H0F.04.

2. Assume values of H0F.18 and H0F.20 are X1 and Y1 before the motor rotates and X2 and Y2 after the motor rotates, then the following formula applies: H0F.04 = Motor resolution x (Y2 - Y1)/(X2 - X1) The calculated result must be positive; if not, perform step 1 again.

For non-rigid connection, an error may exist in the calculation result.

Note:
Ensure H0F.04 is set properly. Otherwise, EB02.0 (Position deviation too large in fully closed loop) may occur after the drive operates.

H0F.08 **Excessive deviation threshold in compound control mode**

Address:	0x0F08		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1000	Change:	At once

Value Range:
0 to 2147483647
Description
Defines the position deviation threshold at which the servo drive reports EB02.0 (Position deviation too large in fully closed-loop mode).
When H0F.08 is set to 0, the drive does not detect EB02.0 and always clears the fully closed-loop position deviation.

H0F.10 **Clear deviation in compound control mode**

Address:	0x0F0A		
Min.:	0	Unit:	R
Max.:	100	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:
0 R to 100 R
Description
Defines the number of revolutions rotated by the motor per clear of the fully closed-loop position deviation during operation. The number of revolutions is reflected by H0F.18 (Feedback pulse counter of internal encoder). The number of motor revolutions will not be cleared when the drive is in the non-oeprational state.

H0F.13 **Compound vibration suppression filter time**

Address:	0x0F0D		
Min.:	0	Unit:	ms
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:
0.0 ms to 6553.5 ms
Description
Defines the time constant for compound vibration suppression in fully closed-loop control when external encoder feedback (H0F.00 = 1 or 2) is used.

Increase the setpoint gradually and check the change in the response.
When the stiffness of the transmission mechanism between fully closed loop and internal loop is insufficient, set H0F.13 properly to improve system stability, which is to generate the effect of internal loop temporarily and form a fully closed loop again after the system is stabilized. When the stiffness is sufficient, there is no need to adjust this parameter.

H0F.16 Pulse deviation display in compound control mode

Address: 0x0F10

Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Used to count and display the position deviation absolute value in fully closed loop control.
Pulse deviation in compound control = Absolute position feedback of external encoder - Absolute position feedback conversion value of internal encoder

H0F.18 Internal position pulse feedback display

Address: 0x0F12

Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Used to count and display the number of feedback pulses of the internal encoder (after being divided or multiplied by electronic gear ratio, in internal encoder unit).

H0F.20 External position pulse feedback display

Address: 0x0F14

Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Used to count and display the number of feedback pulses of the external encoder (after being divided or multiplied by electronic gear ratio, in external encoder unit).

H0F.22 External encoder phase Z detection invalid (quadrature pulse feedback)

Address: 0x0F16

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Detected

1: Not detected

Description

H0F.25 Source of touch probe Z signal in fully closed-loop mode

Address: 0x0F19

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Motor Z signal

1: External feedback Z signal

Description

-

H0F.45 Positioning completed/Position deviation threshold in fully closed-loop mode

Address: 0x0F2D

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

Value Range:

0: Threshold scaled to outer loop unit

1: Same threshold used for inner and outer loops

Description

0: H05.21 or 6067h/H0A.10 or 6065h (scaled to outer loop unit)

1: Same threshold used for inner and outer loops

H0F.46 Fully closed-loop speed feedback selection

Address:	0x0F2E	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Internal encoder feedback

1: External encoder feedback

Description

5.16 H11 Multi-position Parameters

H11.00 Multi-position operation mode

Address:	0x1100		
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)

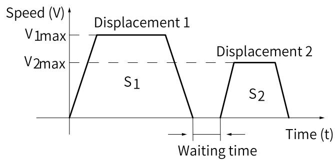
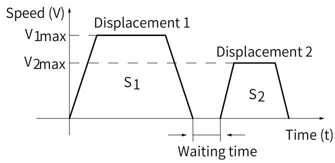
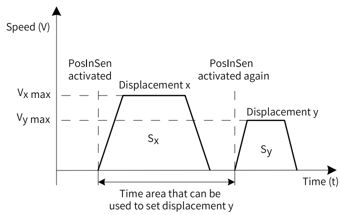
2: DI-based operation (selected by DI)

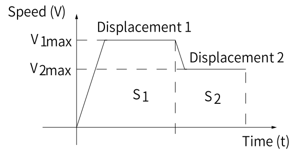
3: Sequential operation

5: Axis-controlled continuous operation

Description

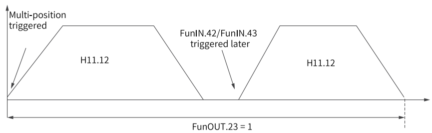
Defines the multi-position operation mode when the main position reference source is multi-position references (H05.00 = 2) in the position control mode.

Set point	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

Set point	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

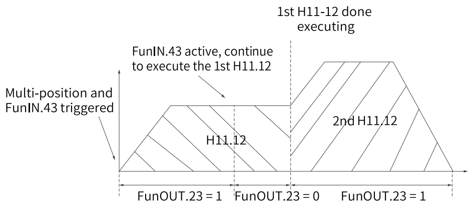
<table>
<tr><th>Set point</th><th>Operation Mode</th><th>Remarks</th><th>Operation Curve</th></tr>
<tr>
<td>5</td>
<td>Axis-controlled continuous operation</td>
<td>The drives executes one displacement only.
The individual operation mode, sequential operation mode, and interrupted operation mode are included.
The PoslnSen (multi-position reference enable) signal is level-triggered.</td>
<td>

- Individual operation



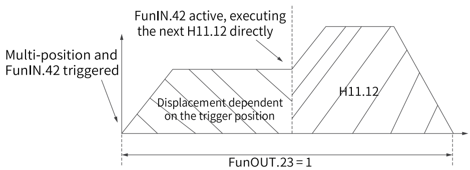
The PoslnSen (multi-position reference enable) signal is triggered only once (FunIN.43/42 triggered later). The drive stops after executing the distance defined by H11.12.

- Sequential operation



The PoslnSen (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 PoslnSen (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.

</td>
</tr>
</table>

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 in 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

Address: 0x1101

Min.:	1	Unit:	-
Max.:	16	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 16

Description

Defines the total number of displacement references in the multi-position mode. You can set different displacements, operating speeds, and acceleration/ deceleration time for each displacement.

H11.00 ≠ 2: Displacements are switched automatically in a sequence from 1, 2... H11.01.

H11.00 = 2: Assign four DIs (hardware DI or VDI) with DI functions 6 to 9 (FunIN.6: CMD1 to FunIN.9: CMD4) and control the DI logic through the host controller to switch between different displacements. The displacement No. is a 4-bit binary value. Bit 0...bit 3 correspond to CMD1...CMD4.

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	Displacemetn 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

Address: 0x1102

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16

Default: 0 Change: At stop

Value Range:

0: Continue to execute the unexecuted displacements

1: Start from displacement 1

Description

Defines the starting displacement No. when the multi-position operation recovers from a pause.

Pause:

① The servo drive switches to another control mode or the interrupt positioning function is enabled during multi-position operation.

② The internal multi-position enable signal (FunIN.28:PosInSen) changes from "active" to "inactive".

0: Continue to execute the unexecuted displacements: For example, if H11.01 is set to 16 and the drive pauses at displacement 2, after the drive recovers from the pause, it will start from displacement 3.

1: Start from displacement 1: For example, if H11.01 is set to 16 and the drive pauses at displacement 2, after the drive recovers from the pause, it will start from displacement 1.

H11.03 Interval time unit

Address: 0x1103

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

Value Range:

0: ms

1: s

Description

Defines the unit of acceleration/deceleration time and the interval time during multi-position operation.

Acceleration/Deceleration time: time for the motor to change from 0 rpm to 1000 rpm at a constant speed.

Interval time: interval time that starts from the end of the last reference to the beginning of the next reference

H11.04 Displacement reference type

Address: 0x1104

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Relative displacement reference
1: Absolute displacement reference
Description
Relative displacement: position increment of the target position relative to the current motor position
Absolute displacement: position increment of the target position relative to the motor home.

H11.05 Starting displacement No. in sequential operation

Address:	0x1105		
Min.:	0	Unit:	-
Max.:	16	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:
0 to 16
Description
Defines whether to perform cyclic operation and the starting displacement No. after the first cycle of operation in the sequential operation mode (H11.00 = 3).
0: The drive executes the displacements defined by H11.01 only once and then stops. The motor is in the locked state.
1–16: The drive operates cyclically, with the starting displacement No. defined by H11.05 after the first cycle of operation. The value of H11.05 should be lower than or equal to H11.01.

H11.09 Deceleration upon axis control OFF

Address:	0x1109		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	65535	Change:	At once

Value Range:
0 ms to 65535 ms
Description
-

H11.10 Starting speed of displacement 1

Address:	0x110A		
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:
0 rpm to 10000 rpm

Description

-

H11.11 Stop speed of displacement 1

Address:	0x110B		
Min.:	0	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0 rpm to 10000 rpm

Description

-

H11.12 Displacement 1

Address:	0x110C		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

Defines displacement 1 (reference unit) in multi-position operation.

H11.14 Maximum speed of displacement 1

Address:	0x110E		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

Defines the maximum speed of displacement 1 in multi-position operation.

The maximum speed is the average operating speed when the motor is not in the acceleration/deceleration process. If H11.12 is set to a too low value, the actual motor speed will be lower than H11.14.

H11.15 Acceleration/Deceleration time of displacement 1

Address:	0x110F		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Defines the time for the motor to change from 0 rpm 1000 rpm at a constant speed during displacement 1.

Actual time needed for accelerating to H11.14 (Max. speed of displacement 1):

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

Note: Ensure the stiffness is proper and the speed loop follows the position reference.

H11.16 Interval time after displacement 1

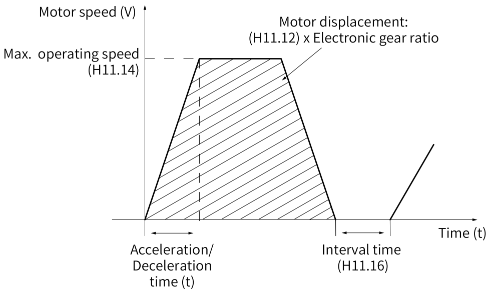
Address:	0x1110		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

Defines the interval time that starts from the end of displacement 1 to the beginning of the next displacement.



H11.17 Displacement 2

Address:	0x1111		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.19 Max. speed of displacement 2

Address:	0x1113		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

H11.20 Acceleration/Deceleration time of displacement 2

Address:	0x1114		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.21 Interval time after displacement 2

Address:	0x1115		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.22 Displacement 3

Address:	0x1116		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.24 Max. speed of displacement 3

Address: 0x1118

Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

-

H11.25 Acceleration/Deceleration time of displacement 3

Address: 0x1119

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.26 Interval time after displacement 3

Address: 0x111A

Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.27 Displacement 4

Address: 0x111B

Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.29 **Max. speed of displacement 4**

Address:	0x111D		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

-

H11.30 **Acceleration/Deceleration time of displacement 4**

Address:	0x111E		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.31 **Interval time after displacement 4**

Address:	0x111F		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.32 **Displacement 5**

Address:	0x1120		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.34 Maximum speed of displacement 5

Address:	0x1122		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

-

H11.35 Acceleration/Deceleration time of displacement 5

Address:	0x1123		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.36 Interval time after displacement 5

Address:	0x1124		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.37 Displacement 6

Address:	0x1125		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.39 Max. speed of displacement 6

Address:	0x1127		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

-

H11.40 Acceleration/Deceleration time of displacement 6

Address:	0x1128		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.41 Interval time after displacement 6

Address:	0x1129		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.42 Displacement 7

Address:	0x112A		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.44 Max. speed of displacement 7

Address:	0x112C		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

-

H11.45 Acceleration/Deceleration time of displacement 7

Address:	0x112D		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.46 Interval time after displacement 7

Address:	0x112E		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.47 Displacement 8

Address:	0x112C		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.49 **Max. speed of displacement 8**

Address:	0x1131		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

-

H11.50 **Acceleration/Deceleration time of displacement 8**

Address:	0x1132		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.51 **Interval time after displacement 8**

Address:	0x1133		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.52 **Displacement 9**

Address:	0x1134		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.54 Max. speed of displacement 9

Address:	0x1136		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

-

H11.55 Acceleration/Deceleration time of displacement 9

Address:	0x1137		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.56 Interval time after displacement 9

Address:	0x1138		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.57 Displacement 10

Address:			
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.59 Max. speed of displacement 10

Address:	0x113B		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

-

H11.60 Acceleration/Deceleration time of displacement 10

Address:	0x113C		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.61 Interval time after displacement 10

Address:	0x113D		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.62 Displacement 11

Address:	0x113E		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.64 Max. speed of displacement 11

Address:	0x1140		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

-

H11.65 Acceleration/Deceleration time of displacement 11

Address:	0x1141		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.66 Interval time after displacement 11

Address:	0x1142		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.67 Displacement 12

Address:	0x1143		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.69 Max. speed of displacement 12

Address:	0x1145		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

-

H11.70 Acceleration/Deceleration time of displacement 12

Address:	0x1146		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.71 Interval time after displacement 12

Address:	0x1147		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.72 Displacement 13

Address:	0x1148		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.74 **Max. speed of displacement 13**

Address:	0x114A		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

-

H11.75 **Acceleration/Deceleration time of displacement 13**

Address:	0x114B		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.76 **Interval time after displacement 13**

Address:	0x114C		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.77 **Displacement 14**

Address:	0x114D		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.79 Max. speed of displacement 14

Address:	0x114F		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

-

H11.80 Acceleration/Deceleration time of displacement 14

Address:	0x1150		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.81 Interval time after displacement 14

Address:	0x1151		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.82 Displacement 15

Address:	0x1152		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.84 Max. speed of displacement 15

Address:	0x1154		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

-

H11.85 Acceleration/Deceleration time of displacement 15

Address:	0x1155		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.86 Interval time after displacement 15

Address:	0x1156		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.87 Displacement 16

Address:	0x1157		
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.89 Max. speed of displacement 16

Address:	0x1159		
Min.:	1	Unit:	rpm
Max.:	10000	Data Type:	UInt16
Default:	200	Change:	Real-time modification

Value Range:

1 rpm to 10000 rpm

Description

-

H11.90 Acceleration/Deceleration time of displacement 16

Address:	0x115A		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 65535

Description

-

H11.91 Interval time after displacement 16

Address:	0x115B		
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

5.17 H12 Multi-Speed Parameters

H12.00 Multi-speed operation mode

Address:	0x1200		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

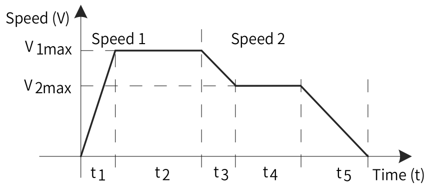
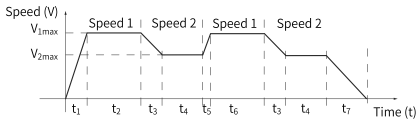
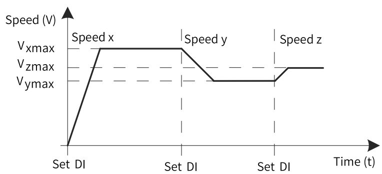
0: Stop after running for one cycle (number of speeds defined by H12.01)

1: Cyclic operation (number of speeds defined by H12.01)

2: DI-based operation

Description

Defines the multi-speed operation mode when the speed reference source is multi-speed reference (H06.01 = 5, H06.02 = 1/2/3) in the speed control mode. 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.

Set point	Operation Mode	Remarks	Operation Curve
0	Individual operation	The drive stops after one cycle of operation. The drive switches to the next displacement automatically.	 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.	 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).	 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

Address: 0x1201

Min.: 1
Max.: 16
Default: 16
Unit: -
Data Type: UInt16
Change: At stop

Value Range:

1 to 16

Description

Defines the total number of speed references in the multi-speed mode. Different speed references, operating time, and acceleration/deceleration time (four groups optional) can be set for each speed.

H12.00 ≠ 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 displacement No. is a 4-bit binary value. Bit 0 to bit 3 correspond to CMD1 to CMD4.

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

The value of CMD(n) is 1 upon active DI logic and 0 upon inactive DI logic.

H12.02 Operating time unit

Address: 0x1202
Min.: 0
Max.: 1
Default: 0
Unit: -
Data Type: UInt16
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

Address: 0x1203
Min.: 0
Max.: 65535
Default: 10
Unit: ms
Data Type: UInt16
Change: Real-time modification

Value Range:
0 ms to 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

Address:	0x1204		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	Real-time modification

Value Range:
0 ms to 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

Address:	0x1205		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	50	Change:	Real-time modification

Value Range:
0 ms to 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

Address:	0x1206		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	50	Change:	Real-time modification

Value Range:
0 ms to 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

Address:	0x1207		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	100	Change:	Real-time modification

Value Range:

0 ms to 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

Address:	0x1208		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	100	Change:	Real-time modification

Value Range:

0 ms to 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

Address:	0x1209		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	150	Change:	Real-time modification

Value Range:

0 ms to 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

Address:	0x120A		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	150	Change:	Real-time modification

Value Range:

0 ms to 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 1st speed reference

Address:	0x1214		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	0	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.21 Operating time of speed 1

Address:	0x1215		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

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

Address:	0x1216	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	256	Change:	Real-time modification

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 5–5 Selects the acceleration/deceleration time of speed 1.

Set point	Meaning	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
2	Acceleration/ Deceleration time 2	Acceleration time: H12.05 Deceleration time: H12.06

Set point	Meaning	Description
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 5–6 S curve smoothing parameter

Set point	Meaning	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

Set point	Meaning	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 Speed reference for speed 2

Address: 0x1217

Min.: -10000 Unit: rpm

Max.: 10000 Data Type: Int16

Default: 100 Change: Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.24 Operating time of speed 2

Address:	0x1218		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.25 2nd speed rise/drop and curve smoothing parameter time

Address:	0x1219	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H12.22" on page 366* for details.

Description

Same as H12.22.

H12.26 3rd speed reference

Address:	0x121A		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	300	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.27 Operating time of speed 3

Address:	0x121B		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.28 3rd speed rise/drop and curve smoothing parameter time

Address:	0x121C	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H12.22" on page 366* for details.

Description

Same as H12.22.

H12.29 Speed reference for speed 4

Address:	0x121D		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	500	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.30 Operating time of speed 4

Address:	0x121E		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.31 4th speed rise/drop and curve smoothing parameter time

Address:	0x121F	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H12.22" on page 366* for details.

Description

Same as H12.22.

H12.32 Speed reference for speed 5

Address:	0x1220		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	700	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.33 Operating time of speed 5

Address:	0x1221		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.34 5th speed rise/drop and curve smoothing parameter time

Address:	0x1222	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H12.22" on page 366* for details.

Description

Same as H12.22.

H12.35 Speed reference for speed 6

Address:	0x123		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	900	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.36 Operating time of speed 6

Address:	0x1224		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.37 6th speed rise/drop and curve smoothing parameter time

Address:	0x1225	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H12.22" on page 366* for details.

Description

Same as H12.22.

H12.38 Speed reference for speed 7

Address:	0x1226		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	600	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.39 Operating time of speed 7

Address:	0x1227		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.40 7th speed rise/drop and curve smoothing parameter time

Address:	0x1228	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H12.22" on page 366* for details.

Description

Same as H12.22.

H12.41 Speed reference for speed 8

Address:	0x1229		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	300	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.42 Operating time of speed 8

Address:	0x122A		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.43 8th speed rise/drop and curve smoothing parameter time

Address:	0x122B	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H12.22" on page 366* for details.

Description

Same as H12.22.

H12.44 Speed reference for speed 9

Address:	0x122C		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	100	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.45 Operating time of speed 9

Address:	0x122D		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.46 9th speed rise/drop and curve smoothing parameter time

Address:	0x122E	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H12.22" on page 366* for details.

Description

Same as H12.22.

H12.47 Speed reference for speed 10

Address:	0x122F		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	-100	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.48 Operating time of speed 10

Address:	0x1230		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.49 10th speed rise/drop and curve smoothing parameter time

Address:	0x1231	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H12.22" on page 366* for details.

Description

Same as H12.22.

H12.50 Speed reference for speed 11

Address:	0x1232		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	-300	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.51 Operating time of speed 11

Address:	0x1233		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.52 **11th speed rise/drop and curve smoothing parameter time**

Address:	0x1234	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H12.22" on page 366 for details.

Description

Same as H12.22.

H12.53 **Speed reference for speed 12**

Address:	0x1235		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	-500	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.54 **Operating time of speed 12**

Address:	0x1236		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.55 **12th speed rise/drop and curve smoothing parameter time**

Address:	0x1237	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H12.22" on page 366 for details.

Description

Same as H12.22.

H12.56 Speed reference for speed 13

Address:	0x1238		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	-700	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.57 Operating time of speed 13

Address:	0x1239		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.58 13th speed rise/drop and curve smoothing parameter time

Address:	0x123A	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H12.22" on page 366* for details.

Description

Same as H12.22.

H12.59 Speed reference for speed 14

Address:	0x123B		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	-900	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.60 Operating time of speed 14

Address:	0x123C		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.61 14th speed rise/drop and curve smoothing parameter time

Address:	0x123D	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H12.22" on page 366* for details.

Description

Same as H12.22.

H12.62 Speed reference for speed 15

Address:	0x123E		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	-600	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.63 Operating time of speed 15

Address:	0x123F		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.64 15th speed rise/drop and curve smoothing parameter time

Address:	0x1240	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H12.22" on page 366* for details.

Description

Same as H12.22.

H12.65 Speed reference for speed 16

Address:	0x1241		
Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int16
Default:	-300	Change:	Real-time modification

Value Range:

–10000 RPM to +10000 RPM

Description

-

H12.66 Operating time of speed 16

Address:	0x1242		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	Real-time modification

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.67 16th speed rise/drop and curve smoothing parameter time

Address:	0x1243	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H12.22" on page 366* for details.

Description

Same as H12.22.

5.18 H17: Virtual DI/DO

H17.90 Communication VDI enabling

Address:	0x175A	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Disable

1: Enable

Description

To use the VDI function:

1. Set H17.90 to enable VDI.
2. Set the default level after power-on 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 upon power-on

Address:	0x175B	Effective Time:	Upon the next power-on
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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 selection

Address:	0x1700	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: No function

1: Servo ON

2: Alarm reset signal

3: Gain switchover switch

4: Main/Auxiliary reference switchover

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

13: Position reference inhibited

14: Positive limit switch

15: Negative limit switch

16: Positive external torque limit

17: Negative external torque limit

18: Forward jog

19: Reverse jog

20: Step enable
21: Hand wheel override signal 1
22: Hand wheel override signal 2
23: Hand wheel enable
24: Electronic gear ratio selection
25: Torque reference direction
26: Speed reference direction
27: Position reference direction
28: Multi-position reference enable
29: Interrupt positioning cancel
31: Home switch
32: Homing enable
33: Interrupt positioning inhibited
34: Emergency stop
35: Clear position deviation
36: Internal speed limit source
37: Pulse reference inhibited
38: Touch probe 1
39: Touch probe 2
41: Current position as the home
42: Axis control command executed immediately
43: Axis control command not executed immediately
44: Positioning and reference completed signal clear
45: Interrupt positioning enable
46: Process segment enable
47: Process segment reference switchover 1
48: Process segment reference switchover 2
49: Process segment reference switchover 3
50: Process segment reference 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

Address:	0x1701	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16

Default: 0 | Change: Real-time modification

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 selection

Address: 0x1702 | Effective Time: Real time

Min.: 0 | Unit: -

Max.: 55 | Data Type: UInt16

Default: 0 | Change: Real-time modification

Value Range:

See *" H17.00" on page 381* for details.

Description

-

H17.03 VDI2 logic level

Address: 0x1703 | Effective Time: Real time

Min.: 0 | Unit: -

Max.: 1 | Data Type: UInt16

Default: 0 | Change: Real-time modification

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 selection

Address: 0x1704 | Effective Time: Real time

Min.: 0 | Unit: -

Max.: 55 | Data Type: UInt16

Default: 0 | Change: Real-time modification

Value Range:

See *" H17.00" on page 381* for details.

Description

-

H17.05 VDI3 logic level

Address:	0x1705	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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 selection

Address:	0x1706	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.00" on page 381* for details.

Description

-

H17.07 VDI4 logic level

Address:	0x1707	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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 selection

Address:	0x1708	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H17.00" on page 381 for details.

Description

-

H17.09 VDI5 logic level

Address:	0x1709	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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 selection

Address:	0x170A	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H17.00" on page 381 for details.

Description

-

H17.11 VDI6 logic level

Address:	0x170B	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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 selection

Address:	0x170C	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.00" on page 381* for details.

Description

-

H17.13 VDI7 logic level

Address:	0x170D	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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 selection

Address:	0x170E	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	45	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.00" on page 381* for details.

Description

-

H17.15 VDI8 logic level

Address:	0x170F	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.16 VDI9 function selection

Address:	0x1710	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H17.00" on page 381 for details.

Description

-

H17.17 VDI9 logic level

Address:	0x1711	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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 selection

Address:	0x1712	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H17.00" on page 381 for details.

Description

-

H17.19 VDI10 logic level

Address:	0x1713	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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 selection

Address:	0x1714	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	45	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.00" on page 381* for details.

Description

-

H17.21 VDI11 logic level

Address:	0x1715	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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 selection

Address:	0x1716	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H17.00" on page 381 for details.

Description

-

H17.23 VDI12 logic level

Address:	0x1717	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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 selection

Address:	0x1718	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H17.00" on page 381 for details.

Description

-

H17.25 VDI13 logic level

Address:	0x1719	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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 selection

Address:	0x171A	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.00" on page 381* for details.

Description

-

H17.27 VDI14 logic level

Address:	0x171B	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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 selection

Address:	0x171C	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.00" on page 381* for details.

Description

-

H17.29 VDI15 logic level

Address:	0x171D	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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 selection

Address:	0x171E	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	55	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.00" on page 381* for details.

Description

-

H17.31 VDI16 logic level

Address:	0x171F	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

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 enabling

Address:	0x175C	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Disable

1: Enable

Description

To use the VDO function:
1. Set H17.92 to enable VDO.
2. Set the default level after power-on 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 upon power-on

Address:	0x175D	Effective Time:	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

Address:	0x1720	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16

Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H17.33 VDO1 function selection

Address:	0x1721	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: No function
1: Servo ready
2: Motor rotation signal
3: Zero speed signal
4: Speed matching signal
5: Positioning completed
6: Positioning near
7: Torque limited signal
8: Speed limited signal
9: Braking
10: Warning
11: Fault
15: Interrupt positioning completed16: Homing completed
17: Electrical homing completed
18: Torque reached signal
19: Speed reached signal
21: Enable completed
22: Internal command completed
23: Writing next command allowed
24: Internal motion completed
25: Comparison output
26: Closed-loop state
30: Warning or fault output
31: Communication-forced DO
32: EDM output

Description

-

H17.34 VDO1 logic level

Address:	0x1722	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.35 VDO2 function selection

Address:	0x1723	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.33" on page 393* for details.

Description

-

H17.36 VDO2 logic level

Address:	0x1724	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.37 VDO3 function selection

Address:	0x1725	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H17.33" on page 393 for details.

Description

-

H17.38 VDO3 logic level

Address:	0x1726	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.39 VDO4 function selection

Address:	0x1727	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H17.33" on page 393 for details.

Description

-

H17.40 VDO4 logic level

Address:	0x1728	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.41 VDO5 function selection

Address:	0x1729	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.33" on page 393* for details.

Description

-

H17.42 VDO5 logic level

Address:	0x172A	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.43 VDO6 function selection

Address:	0x172B	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.33" on page 393* for details.

Description

-

H17.44 VDO6 logic level

Address:	0x172C	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.45 VDO7 function selection

Address:	0x172D	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.33" on page 393* for details.

Description

-

H17.46 VDO7 logic level

Address:	0x172E	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.47 VDO8 function selection

Address:	0x172F	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.33" on page 393* for details.

Description

-

H17.48 VDO8 logic level

Address:	0x1730	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.49 VDO9 function selection

Address:	0x1731	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " *H17.33" on page 393* for details.

Description

-

H17.50 VDO9 logic level

Address:	0x1732	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.51 VDO10 function selection

Address:	0x1733	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H17.33" on page 393 for details.

Description

-

H17.52 VDO10 logic level

Address:	0x1734	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.53 VDO11 function selection

Address:	0x1735	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H17.33" on page 393 for details.

Description

-

H17.54 VDO11 logic level

Address:	0x1736	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.55 VDO12 function selection

Address:	0x1737	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H17.33" on page 393 for details.

Description

-

H17.56 VDO12 logic level

Address:	0x1738	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.57 VDO13 function selection

Address:	0x1739	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H17.33" on page 393 for details.

Description

-

H17.58 VDO13 logic level

Address:	0x173A	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.59 **VDO14 function selection**

Address:	0x173B	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.33" on page 393* for details.

Description

-

H17.60 **VDO14 logic level**

Address:	0x173C	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.61 **VDO15 function selection**

Address:	0x173D	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.33" on page 393* for details.

Description

-

H17.62 VDO15 logic level

Address:	0x173E	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.63 VDO16 function selection

Address:	0x173F	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	33	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H17.33" on page 393* for details.

Description

-

H17.64 VDO16 logic level

Address:	0x1740	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

5.19 H18: Position comparison output

H18.00 Position comparison output selection

Address:	0x1800		
Min.:	0	Unit:	-

Max.: 1 | Data Type: UInt16
Default: 0 | Change: At once

Value Range:

0: Disable

1: Enable (rising edge-triggered)

Description

-

H18.01 Position comparison output feedback source

Address: 0x1801

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Motor encoder feedback

1: Fully closed-loop position feedback

Description

-

H18.02 Position comparison resolution

Address: 0x1802

Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: 24-bit

1: 23-bit

2: 22-bit

3: 21-bit

4: 20-bit

5: 19-bit

6: 18-bit

7: 17-bit

Description

-

H18.03 Position comparison mode

Address: 0x1803

Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Individual comparison mode

1: Cyclic comparison mode

2: Fixed cyclic comparison mode

Description

-

H18.04 Current position as zero

Address:	0x1804		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

0: Disable

1: Enable (rising edge-triggered)

Description

Note: This function needs to be used when the comparison state is inactive, otherwise the comparison logic may malfunction.

H18.05 Position comparison output width

Address:	0x1805		
Min.:	0.1	Unit:	ms
Max.:	204.7	Data Type:	UInt16
Default:	0.1	Change:	At once

Value Range:

0.1 ms to 204.7 ms

Description

Defines the effective pulse width of the DO when the comparison point is reached. The value range is 0 to 204.7 (unit: ms).

H18.06 Position comparison output ABZ port polarity

Address:	0x1806		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

bit	Name	Function
0	OCZ output logic	0: Positive, output high level upon active logic
		1: Negative, output low level upon active logic
1	Z output logic	0: Positive, output high level upon active logic
		1: Negative, output low level upon active logic
2	A/B output logic	0: Positive, output high level upon active logic
		1: Negative, output low level upon active logic

Description

0: Positive, output high level upon active logic

1: Negative, output low level upon active logic

Bit 0: OCZ output logic

Bit 1: Z output logic

bit2: A/B output logic

H18.07 Start point of position comparison

Address: 0x1807

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 40

Description

-

H18.08 End point of position comparison

Address: 0x1808

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 40

Description

-

H18.09 Current status of position comparison

Address: 0x1809

Min.:	0	Unit:	-
Max.:	1024	Data Type:	UInt16

Default: 0 | Change: Unchangeable

Value Range:

0 to 1024

Description

-

H18.10 Real-time position of position comparison

Address: 0x180A

Min.: -2147483648 | Unit: -

Max.: 2147483647 | Data Type: Int32

Default: 0 | Change: Unchangeable

Value Range:

-2147483648 to +2147483647

Description

-

H18.12 Zero offset of position comparison

Address: 0x180C

Min.: -2147483648 | Unit: -

Max.: 2147483647 | Data Type: Int32

Default: 0 | Change: At once

Value Range:

-2147483648 to +2147483647

Description

-

H18.14 Position comparison output delay compensation

Address: 0x180E

Min.: -12 | Unit: us

Max.: 12 | Data Type: Int16

Default: 0 | Change: At once

Value Range:

-12.00 us to +12.00 us

Description

The position comparison output function takes the last motor speed as the reference to generate output after automatic error compensation through serial communication delay of the encoder. The delay caused by hardware output can also be compensated through setting position comparison output delay compensation.

H18.15 Cycles of fixed mode

Address: 0x180F

Min.:	1	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

1 to 65535

Description

-

H18.16 ABZ output function setting

Address: 0x1810

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

bit	Name	Function
0	OCZ output function	0: Frequency-division output
		1: Position comparison
1	Z port output function	0: Frequency-division output
		1: Position comparison
2	A/B port output function	0: Frequency-division output
		1: Position comparison

Description

0: Frequency-division output

1: Position comparison

Bit 0: OCZ port function setting

Bit 1: Z port function setting

Bit 2: A/B function setting

H18.17 Number of fixed modes completed

Address: 0x1811

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

Value Range:

1 to 65535

Description

5.20 H19: Target position parameters

H19.00 Target value of position comparison 1

Address:	0x1900		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.02 Attribute value of position comparison 1

Address:	0x1902		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

bit	Function
0	Output DO active signal if current position changes from "less than" to "more than" the comparison point
1	Output DO active signal if current position changes from "more than" to "less than" the comparison point
2 to 6	Reserved
7	DO1 output
8	DO2 output
9	DO3 output
10	DO4 output
11	DO5 output
12	Frequency-division A output
13	Frequency-division B output
14	Frequency-division Z output
15	Frequency-division OCZ output

Description

-

H19.03 Target value of position comparison 2

Address: 0x1903

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.05 Attribute value of position comparison 2

Address: 0x1905

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.06 Target value of position comparison 3

Address: 0x1906

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.08 Attribute value of position comparison 3

Address: 0x1908

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.09 Target value of position comparison 4

Address: 0x1909

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.11 Attribute value of position comparison 4

Address: 0x190B

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.12 Target value of position comparison 5

Address: 0x190C

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.14 Attribute value of position comparison 5

Address: 0x190E

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.15 Target value of position comparison 6

Address: 0x190F

Min.:	-2147483648	Unit:	-

Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.17 Attribute value of position comparison 6

Address: 0x1911

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.18 Target value of position comparison 7

Address: 0x1912

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.20 Attribute value of position comparison 7

Address: 0x1914

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.21 Target value of position comparison 8

Address: 0x1915

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32

Default: 0 Change: Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.23 Attribute value of position comparison 8

Address: 0x1917

Min.: 0 Unit: -

Max.: 65535 Data Type: UInt16

Default: 0 Change: Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.24 Target value of position comparison 9

Address: 0x1918

Min.: -2147483648 Unit: -

Max.: 2147483647 Data Type: Int32

Default: 0 Change: Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.26 Attribute value of position comparison 9

Address: 0x191A

Min.: 0 Unit: -

Max.: 65535 Data Type: UInt16

Default: 0 Change: Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.27 Target value of position comparison 10

Address: 0x191B

Min.: -2147483648 Unit: -

Max.: 2147483647 Data Type: Int32

Default: 0 Change: Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.29 Attribute value of position comparison 10

Address:	0x191D		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.30 Target value of position comparison 11

Address:	0x191E		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.32 Attribute value of position comparison 11

Address:	0x1920		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.33 Target value of position comparison 12

Address:	0x1921		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.35 Attribute value of position comparison 12

Address: 0x1923

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.36 Target value of position comparison 13

Address: 0x1924

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.38 Attribute value of position comparison 13

Address: 0x1926

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.39 Target value of position comparison 14

Address: 0x1927

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.41 Attribute value of position comparison 14

Address:	0x1929		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.42 Target value of position comparison 15

Address:	0x192A		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.44 Attribute value of position comparison 15

Address:	0x192C		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.45 Target value of position comparison 16

Address:	0x192D		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.47 Attribute value of position comparison 16

Address: 0x192F

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.48 Target value of position comparison 17

Address: 0x1930

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.50 Attribute value of position comparison 17

Address: 0x1932

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.51 Target value of position comparison 18

Address: 0x1933

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.53 Attribute value of position comparison 18

Address:	0x1935		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.54 Target value of position comparison 19

Address:	0x1936		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.56 Attribute value of position comparison 19

Address:	0x1938		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.57 Target value of position comparison 20

Address:	0x1939		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.59 Attribute value of position comparison 20

Address:	0x193B		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H19.02" on page 408 for details.

Description

-

H19.60 Target value of position comparison 21

Address:	0x193C		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.62 Attribute value of position comparison 21

Address:	0x193E		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H19.02" on page 408 for details.

Description

-

H19.63 Target value of position comparison 22

Address:	0x193F		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.65 Attribute value of position comparison 22

Address:	0x1941		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.66 Target value of position comparison 23

Address:	0x1942		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.68 Attribute value of position comparison 23

Address:	0x1944		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.69 Target value of position comparison 24

Address:	0x1945		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.71 Attribute value of position comparison 24

Address:	0x1947		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.72 Target value of position comparison 25

Address:	0x1948		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.74 Attribute value of position comparison 25

Address:	0x194A		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.75 Target value of position comparison 26

Address:	0x194B		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.77 Attribute value of position comparison 26

Address: 0x194D

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.78 Target value of position comparison 27

Address: 0x194E

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.80 Attribute value of position comparison 27

Address: 0x1950

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.81 Target value of position comparison 28

Address: 0x1951

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.83 Attribute value of position comparison 28

Address: 0x1953

Min.: 0 | Unit: -

Max.: 65535 | Data Type: UInt16

Default: 0 | Change: Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.84 Target value of position comparison 29

Address: 0x1954

Min.: -2147483648 | Unit: -

Max.: 2147483647 | Data Type: Int32

Default: 0 | Change: Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.86 Attribute value of position comparison 29

Address: 0x1956

Min.: 0 | Unit: -

Max.: 65535 | Data Type: UInt16

Default: 0 | Change: Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.87 Target value of position comparison 30

Address: 0x1957

Min.: -2147483648 | Unit: -

Max.: 2147483647 | Data Type: Int32

Default: 0 | Change: Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.89 Attribute value of position comparison 30

Address: 0x1959

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.90 Target value of position comparison 31

Address: 0x195A

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.92 Attribute value of position comparison 31

Address: 0x195C

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.93 Target value of position comparison 32

Address: 0x195D

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.95 Attribute value of position comparison 32

Address: 0x195F

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H19.02" on page 408 for details.

Description

-

H19.96 Target value of position comparison 33

Address: 0x1960

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.98 Attribute value of position comparison 33

Address: 0x1962

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H19.02" on page 408 for details.

Description

-

H19.99 Target value of position comparison 34

Address: 0x1963

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.101 Attribute value of position comparison 34

Address:	0x1965		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.102 Target value of position comparison 35

Address:	0x1966		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.104 Attribute value of position comparison 35

Address:	0x1968		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.105 Target value of position comparison 36

Address:	0x1969		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.107 Attribute value of position comparison 36

Address: 0x196B

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H19.02" on page 408 for details.

Description

-

H19.108 Target value of position comparison 37

Address: 0x196C

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.110 Attribute value of position comparison 37

Address: 0x196E

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See " H19.02" on page 408 for details.

Description

-

H19.111 Target value of position comparison 38

Address: 0x196F

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.113 Attribute value of position comparison 38

Address:	0x1971		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.114 Target value of position comparison 39

Address:	0x1972		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.116 Attribute value of position comparison 39

Address:	0x1974		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

H19.117 Target value of position comparison 40

Address:	0x1975		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

-

H19.119 Attribute value of position comparison 40

Address:	0x1977		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Real-time modification

Value Range:

See *" H19.02" on page 408* for details.

Description

-

5.21 H1F Software parameters

H1F.90 DI function state 1 read through communication

Address:	0x1F5A	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DI function 1.

Bit 1 corresponds to DI function 2.

Bit 2 corresponds to DI function 3.

...

By analogy

H1F.91 DI function state 2 read through communication

Address:	0x1F5B	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DI function 17.

Bit 1 corresponds to DI function 18.

Bit 2 corresponds to DI function 19.

…

By analogy

H1F.92 DI function state 3 read through communication

Address:	0x1F5C	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DI function 33.

Bit 1 corresponds to DI function 34.

Bit 2 corresponds to DI function 35.

…

By analogy

H1F.93 DI function state 4 read through communication

Address:	0x1F5D	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DI function 49.

Bit 1 corresponds to DI function 50.

Bit 2 corresponds to DI function 51.

…

By analogy

H1F.94 DO function state 1 read through communication

Address:	0x1F5E	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DO function 1.

Bit 1 corresponds to DO function 2.

Bit 2 corresponds to DO function 3.

…

By analogy

H1F.95 DO function state 2 read through communication

Address:	0x1F5F	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DO function 17.

Bit 1 corresponds to DO function 18.

Bit 2 corresponds to DO function 19.

…

By analogy

H1F.96 DO function state 3 read through communication

Address:	0x1F60	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DO function 33.

Bit 1 corresponds to DO function 34.

Bit 2 corresponds to DO function 35.

…

By analogy

H1F.97 DO function state 4 read through communication

Address:	0x1F61	Effective Time:	Real time
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DO function 49.

Bit 1 corresponds to DO function 50.

Bit 2 corresponds to DO function 51.

…

By analogy

5.22 H22 Technology segment parameters

H22.00 Process segment command trigger

Address:	0x2200		
Min.:	0	Unit:	-
Max.:	1000	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 1000

Description

Used to trigger the process segment and read the state. The process segment can be triggered through the keypad or communication. The process segment state can be read through H22.00.

When triggering the process segment:

The homing function 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.

When reading the state of the process segment:

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.

H22.01 Process segment triggered by the event rising edge

Address:	0x2201		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

DI: ProceEvTri (OFF to ON, rising edge-triggered)

bit	Setpoint	Description
3 to 0	0	Trigger DI: The motor does not act upon rising edge of ProceEvTri1.
	1 to 15	Trigger DI: Process segments 1 to 15 are executed upon rising edge of ProceEvTri1.
7 to 4	0	Trigger DI: The motor does not act upon rising edge of ProceEvTri2.
	1 to 15	Trigger DI: Process segments 1 to 15 are executed upon rising edge of ProceEvTri2.
8 to 11	0	Trigger DI: The motor does not act upon rising edge of ProceEvTri3.
	1 to 15	Trigger DI: Process segments 1 to 15 are executed upon rising edge of ProceEvTri3.
15 to 12	0	Trigger DI: The motor does not act upon rising edge of ProceEvTri4.
	1 to 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

Address:	0x2202		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

DI: ProceEvTri (ON to OFF, falling edge-triggered)

bit	Setpoint	Description
3 to 0	0	Trigger DI: The motor does not act upon falling edge of ProceEvTri1.
	1 to 15	Trigger DI: Process segments 1 to 15 are executed upon falling edge of ProceEvTri1.
7 to 4	0	Trigger DI: The motor does not act upon falling edge of ProceEvTri2.
	1 to 15	Trigger DI: Process segments 1 to 15 are executed upon falling edge of ProceEvTri2.
8 to 11	0	Trigger DI: The motor does not act upon falling edge of ProceEvTri3.
	1 to 15	Trigger DI: Process segments 1 to 15 are executed upon falling edge of ProceEvTri3.
15 to 12	0	Trigger DI: The motor does not act upon falling edge of ProceEvTri4.
	1 to 15	Trigger DI: Process segments 1 to 15 are executed upon falling edge of ProceEvTri4.

H22.03 Acceleration/Deceleration time upon process segment pause

Address: 0x2203

Min.: 0 Unit: -

Max.: 7 Data Type: UInt16

Default: 0 Change: At once

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

Address: 0x2204

Min.: -2147483648 Unit: Reference unit

Max.:	2147483647	Data Type:	Int32
Default:	2147483647	Change:	At once

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

Address:	0x2206		
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	-2147483648	Change:	At once

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

Address:	0x2208		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Indicates the process segment number in progress in the process segment mode.

H22.19 Target speed

Address:	0x2213		
Min.:	0.1	Unit:	rpm
Max.:	6000	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0.1 rpm to 6000.0 rpm

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

Address:	0x2214		
Min.:	0.1	Unit:	rpm
Max.:	6000	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

0.1 rpm to 6000.0 rpm

Description

See *" H22.19" on page 434* for details.

H22.21 Target speed 2

Address:	0x2215		
Min.:	0.1	Unit:	rpm
Max.:	6000	Data Type:	UInt16
Default:	500	Change:	At once

Value Range:

0.1 rpm to 6000.0 rpm

Description

See *" H22.19" on page 434* for details.

H22.22 Target speed 3

Address:	0x2216		
Min.:	0.1	Unit:	rpm
Max.:	6000	Data Type:	UInt16
Default:	1000	Change:	At once

Value Range:

0.1 rpm to 6000.0 rpm

Description

See *" H22.19" on page 434* for details.

H22.23 Target speed 4

Address:	0x2217		
Min.:	0.1	Unit:	rpm
Max.:	6000	Data Type:	UInt16
Default:	1500	Change:	At once

Value Range:

0.1 rpm to 6000.0 rpm

Description

See *" H22.19" on page 434* for details.

H22.24 **Target speed 5**

Address:	0x2218		
Min.:	0.1	Unit:	rpm
Max.:	6000	Data Type:	UInt16
Default:	2000	Change:	At once

Value Range:

0.1 rpm to 6000.0 rpm

Description

See *" H22.19" on page 434* for details.

H22.25 **Target speed 6**

Address:	0x2219		
Min.:	0.1	Unit:	rpm
Max.:	6000	Data Type:	UInt16
Default:	2500	Change:	At once

Value Range:

0.1 rpm to 6000.0 rpm

Description

See *" H22.19" on page 434* for details.

H22.26 **Target speed 7**

Address:	0x221A		
Min.:	0.1	Unit:	rpm
Max.:	6000	Data Type:	UInt16
Default:	3000	Change:	At once

Value Range:

0.1 rpm to 6000.0 rpm

Description

See *" H22.19" on page 434* for details.

H22.35 **Acceleration/Deceleration time**

Address:	0x2223		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0 to 65535

Description

Eight groups of acceleration/deceleration time are available for each process segment command.

Acceleration/Deceleration time refers to the time for the motor to change from 0 rpm to 1000 rpm at a constant speed.

H22.36 Acceleration/Deceleration time 1

Address:	0x2224		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

0 to 65535

Description

See *" H22.35" on page 436* for details.

H22.37 Acceleration/Deceleration time 2

Address:	0x2225		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	500	Change:	At once

Value Range:

0 to 65535

Description

See *" H22.35" on page 436* for details.

H22.38 Acceleration/Deceleration time 3

Address:	0x2226		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	1000	Change:	At once

Value Range:

0 to 65535

Description

See *" H22.35" on page 436* for details.

H22.39 Acceleration/Deceleration time 4

Address:	0x2227		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16

Default:	1500	Change:	At once

Value Range:

0 to 65535

Description

See *" H22.35" on page 436* for details.

H22.40 Acceleration/Deceleration time 5

Address:	0x2228		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	2000	Change:	At once

Value Range:

0 to 65535

Description

See *" H22.35" on page 436* for details.

H22.41 Acceleration/Deceleration time 6

Address:	0x2229		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	2500	Change:	At once

Value Range:

0 to 65535

Description

See *" H22.35" on page 436* for details.

H22.42 Acceleration/Deceleration time 7

Address:	0x222A		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	3000	Change:	At once

Value Range:

0 to 65535

Description

See *" H22.35" on page 436* for details.

H22.51 Delay after completion of the process segment

Address:	0x2233		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

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 prcoess segment. See section "Process Segment Mode" in SV680P Series Servo Drive Function Guide for details.

H22.52 Delay time 1 after completion of the process segment

Address:	0x2234		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0 to 65535

Description

See *" H22.51" on page 438* for details.

H22.53 Delay time 2 after completion of the process segment

Address:	0x2235		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

0 to 65535

Description

See *" H22.51" on page 438* for details.

H22.54 Delay time 3 after completion of the process segment

Address:	0x2236		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	500	Change:	At once

Value Range:

0 to 65535

Description

See *" H22.51" on page 438* for details.

H22.55 Delay time 4 after completion of the process segment

Address:	0x2237		
Min.:	0	Unit:	ms

Max.: 65535 Data Type: UInt16
Default: 1000 Change: At once

Value Range:

0 to 65535

Description

See *" H22.51" on page 438* for details.

H22.56 Delay time 5 after completion of the process segment

Address: 0x2238

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	1500	Change:	At once

Value Range:

0 to 65535

Description

See *" H22.51" on page 438* for details.

H22.57 Delay time 6 after completion of the process segment

Address: 0x2239

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	2000	Change:	At once

Value Range:

0 to 65535

Description

See *" H22.51" on page 438* for details.

H22.58 Delay time 7 after completion of the process segment

Address: 0x223A

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	3000	Change:	At once

Value Range:

0 to 65535

Description

See *" H22.51" on page 438* for details.

H22.70 Homing mode

Address: 0x2246

Min.:	-32768	Unit:	-
Max.:	32767	Data Type:	Int16

Default: -2 Change: Real-time modification

Value Range:

-32768 to 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 SV670P Series Servo Drive Function Guide for details.

H22.71 Speed in high-speed searching for the home switch signal

Address: 0x2247

Min.:	0	Unit:	rpm
Max.:	3000	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0 to 3000

Description

Defines the motor speed for searching for the deceleration point signal during homing.

H22.72 Speed in low-speed searching for the home switch signal

Address: 0x2248

Min.:	0	Unit:	rpm
Max.:	1000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 to 1000

Description

Defines the motor speed for searching for the home signal during homing.

H22.73 Acceleration/Deceleration time during homing

Address: 0x2249

Min.:	0	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	1000	Change:	At once

Value Range:

0 to 1000

Description

Defines the time for the motor to accelerate from 0 rpm to 1000 rpm at a constant speed during homing.

H22.74 Homing time limit

Address:	0x224A		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10000	Change:	At once

Value Range:

0 to 65535

Description

Defines the maximum homing time.

H22.75 Mechanical home offset

Address:	0x224B		
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

Defines the absolute position value of the motor after homing.

H22.79 Relative/Absolute homing

Address:	0x224F		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

Defines the offset relationship between the mechanical home and mechanical zero point, as well as 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.

5.23 H23 Technology segment parameters

H23.00 Definition of homing

Address:	0x2300		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time modification

Value Range:

0 to 4294967295

Description

For details of each mode, see section "Process Segment Operation Mode" in SV670P Series Servo Drive Function Guide.

H23.02 Homing data

Address:	0x2302		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Not used.

H23.04 Definition of process segment 1

Address:	0x2304		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time modification

Value Range:

0 to 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.
See section "Process Segment Operation Mode" in SV670P Series Servo Drive Function Guide for details.

H23.06 Data of process segment 1

Address: 0x2306

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Different modes selected in process segment 1 correspond to different process segment data. See section "Process Segment Operation Mode" in SV670P Series Servo Drive Function Guide for details.

H23.08 Definition of process segment 2

Address: 0x2308

Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time modification

Value Range:

0 to 4294967295

Description

Same as *" H23.04" on page 443*.

H23.10 Data of process segment 2

Address: 0x230A

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Same as *" H23.06" on page 444*.

H23.12 Definition of process segment 3

Address: 0x230C

Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time modification

Value Range:

0 to 4294967295

Description

Same as *" H23.04" on page 443*.

H23.14 Data of process segment 3

Address: 0x230E

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Same as " *H23.06" on page 444*.

H23.16 Definition of process segment 4

Address: 0x2310

Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time modification

Value Range:

0 to 4294967295

Description

Same as " *H23.04" on page 443*.

H23.18 Data of process segment 4

Address: 0x2312

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Same as " *H23.06" on page 444*.

H23.20 Definition of process segment 5

Address: 0x2314

Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time modification

Value Range:

0 to 4294967295

Description

Same as " *H23.06" on page 444*.

H23.22 Data of process segment 5

Address: 0x2316

Min.: -2147483648 Unit: -
Max.: 2147483647 Data Type: Int32
Default: 0 Change: Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Same as " *H23.06" on page 444*.

H23.24 Definition of process segment 6

Address: 0x2318
Min.: 0 Unit: -
Max.: 4294967295 Data Type: UInt32
Default: 0 Change: Real-time modification

Value Range:

0 to 4294967295

Description

Same as " *H23.06" on page 444*.

H23.26 Data of process segment 6

Address: 0x231A
Min.: -2147483648 Unit: -
Max.: 2147483647 Data Type: Int32
Default: 0 Change: Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Same as " *H23.06" on page 444*.

H23.28 Definition of process segment 7

Address: 0x231C
Min.: 0 Unit: -
Max.: 4294967295 Data Type: UInt32
Default: 0 Change: Real-time modification

Value Range:

0 to 4294967295

Description

Same as " *H23.06" on page 444*.

H23.30 Data of process segment 7

Address: 0x231E
Min.: -2147483648 Unit: -

Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Same as *" H23.06" on page 444*.

H23.32 Definition of process segment 8

Address: 0x2320

Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time modification

Value Range:

0 to 4294967295

Description

Same as *" H23.06" on page 444*.

H23.34 Data of process segment 8

Address: 0x2322

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Same as *" H23.06" on page 444*.

H23.36 Definition of process segment 9

Address: 0x2324

Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time modification

Value Range:

0 to 4294967295

Description

Same as *" H23.06" on page 444*.

H23.38 Data of process segment 9

Address: 0x2326

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32

Default: 0 Change: Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Same as *" H23.06" on page 444*.

H23.40 Definition of process segment 10

Address: 0x2328

Min.: 0 Unit: -

Max.: 4294967295 Data Type: UInt32

Default: 0 Change: Real-time modification

Value Range:

0 to 4294967295

Description

Same as *" H23.06" on page 444*.

H23.42 Data of process segment 10

Address: 0x232A

Min.: -2147483648 Unit: -

Max.: 2147483647 Data Type: Int32

Default: 0 Change: Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Same as *" H23.06" on page 444*.

H23.44 Definition of process segment 11

Address: 0x232C

Min.: 0 Unit: -

Max.: 4294967295 Data Type: UInt32

Default: 0 Change: Real-time modification

Value Range:

0 to 4294967295

Description

Same as *" H23.06" on page 444*.

H23.46 Data of process segment 11

Address: 0x232E

Min.: -2147483648 Unit: -

Max.: 2147483647 Data Type: Int32

Default: 0 Change: Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Same as *" H23.06" on page 444*.

H23.48 Definition of process segment 12

Address:	0x2330		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time modification

Value Range:

0 to 4294967295

Description

Same as *" H23.06" on page 444*.

H23.50 Data of process segment 12

Address:	0x2332		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Same as *" H23.06" on page 444*.

H23.52 Definition of process segment 13

Address:	0x2334		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time modification

Value Range:

0 to 4294967295

Description

Same as *" H23.06" on page 444*.

H23.54 Data of process segment 13

Address:	0x2336		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Same as *" H23.06" on page 444*.

H23.56 Definition of process segment 14

Address:	0x2338		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time modification

Value Range:

0 to 4294967295

Description

Same as *" H23.06" on page 444*.

H23.58 Data of process segment 14

Address:	0x233A		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Same as *" H23.06" on page 444*.

H23.60 Definition of process segment 15

Address:	0x233C		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Real-time modification

Value Range:

0 to 4294967295

Description

Same as *" H23.06" on page 444*.

H23.62 Data of process segment 15

Address:	0x233E		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

-2147483648 to 2147483647

Description

Same as " *H23.06" on page 444*.

5.24 H30 Related variables read through communication

H30.00 Servo status read through communication

Address: 0x3000

Min.: 0 Unit: -

Max.: 65535 Data type: UInt16

Default: 0 Change: Unchangeable

Value Range:

0 to 65535

Description

-

H30.01 DO function state 1 read through communication

Address: 0x3001

Min.: 0 Unit: -

Max.: 65535 Data type: UInt16

Default: 0 Change: Unchangeable

Value Range:

0 to 65535

Description

Used to read the state of DO functions 1 to 16 through communication. H30.01 is a hexadecimal which is not displayed on the keypad and must be converted to a binary equivalent when it is being read through communication.

bit	DO Function	Remarks
0	DO function 1 (FunOUT.1: S-RDY, servo ready)	0: Servo drive not ready 1: Servo ready
...		
15	DO function 16 (FunOUT.16: HomeAttain, homing output)	0: Home not found 1: Home found

H30.02 DO function state 2 read through communication

Address: 0x3002

Min.: 0 Unit: -

Max.: 65535 Data type: UInt16

Default: 0 Change: Unchangeable

Value Range:

0 to 65535

Description

Used to read the state of DO functions 17 to 20 through communication. H30.02 is a hexadecimal which is not displayed on the keypad and must be converted to a binary equivalent when it is being read through communication.

bit0 corresponds to DO function 17.

bit1 corresponds to DO function 18.

bit2 corresponds to DO function 19.

…

By analogy

bit	DO Function	Remarks
0	DO function 17 (FunOUT.17: S-ElecHomeAttain, electrical homing output)	0: Electrical homing not completed 1: Electrical homing completed
...		
4 to 15	Reserved	-

H30.03 **Input pulse reference sampling value read through communication**

Address: 0x3003

Min.: 0 Unit: -

Max.: 65535 Data type: UInt16

Default: 0 Change: Unchangeable

Value Range:

0 to 65535

Description

-

5.25 H31 Communication setting parameters

H31.00 **VDI virtual level set through communication**

Address: 0x3100

Min.: 0 Unit: -

Max.: 65535 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0 to 65535

Description

When H17.90 is set to 1, the VDI state is defined by H31.00.

The VDI logic is determined by H17.91 (Default VDI virtual level value upon upower-on) upon initial power-on. Thereafter, the VDI logic is determined by H31.00.
"bit(n) = 1" of H31.00 indicates the logic of VDI (n+1) is "1". "bit(n)=0" indicates the logic of VDI (n+1) is "0".

H31.04 DO status set through communication

Address: 0x3104

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

Set H04.22 to define H31.04 as the source of DO state.

H31.05 AO set through communication

Address: 0x3105

Min.:	-10000	Unit:	mV
Max.:	10000	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-10000 mV to +10000 mV

Description

Set H04.50 to 10 to define H31.05 as the source of AO (unit: mV).

H31.09 Speed reference set through communication

Address: 0x3109

Min.:	-10000	Unit:	rpm
Max.:	10000	Data Type:	Int32
Default:	0	Change:	Real-time modification

Value Range:

–10000.000 RPM to +10000.000 RPM

Description

Set H06.02 to 4 to define H31.09 as the source of the speed reference in the speed control mode (unit: RPM).

H31.11 Torque reference set through communication

Address: 0x310B

Min.:	-100	Unit:	%
Max.:	100	Data Type:	Int32

Default: 0 Change: At once

Value Range:

-100.000% to +100.000%

Description

Set H07.02 to 4 to define H31.11 as the source of the torque reference in the torque control mode. The setpoint 100.000% corresponds to the rated torque of the motor.

6 Parameters

6.1 Parameter Group H00

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H00.00	0x0000	Motor code	0 to 65535	14101	-	At stop	" H00.00" on page 182
H00.02	0x0002	Customized No.	0 to 2^{32} - 1	0	-	Unchangeable	" H00.02" on page 182
H00.04	0x0004	Encoder version	0.0 to 6553.5	0	-	Unchangeable	" H00.04" on page 182
H00.05	0x0005	Serial-type motor code	0 to 65535	0	-	Unchangeable	" H00.05" on page 182
H00.06	0x0006	FPGA customized SN	0.00 to 655.35	0	-	Unchangeable	" H00.06" on page 183
H00.07	0x0007	STO version	0.00 to 655.35	0	-	Unchangeable	" H00.07" on page 183
H00.08	0x0008	Serial encoder type	0 to 65535	0	-	At stop	" H00.08" on page 183

6.2 Parameter Group H01

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H01.00	0x0100	MCU software version	0.0 to 6553.5	0	-	Unchangeable	" H01.00" on page 184
H01.01	0x0101	FPGA software version	0.0 to 6553.5	0	-	Unchangeable	" H01.01" on page 184
H01.02	0x0102	Servo drive series No.	0 to 65535	0	-	Unchangeable	" H01.02" on page 184
H01.06	0x0106	Board software version	0 to 6554	0	-	Unchangeable	" H01.06" on page 184

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H01.10	0x010A	Drive series No.	2: S1R6 3: S2R8 5: S5R5 60005: S6R6 6: S7R6 7: S012 8: S018 9: S022 10: S027 10001: T3R5 10002: T5R4 10003: T8R4 10004: T012 10005: T017 10006: T021 10007: T026	3	-	At stop	" H01.10" on page 185
H01.11	0x010B	DC-AC voltage class	0 V to 65535 V	220	V	Un changea ble	" H01.11" on page 185
H01.12	0x010C	Rated power of the drive	0.00 kW–10737418.24 kW	0.4	kW	Un changea ble	" H01.12" on page 185
H01.14	0x010E	Max. output power of the drive	0.00 kW–10737418.24 kW	0.4	kW	Un changea ble	" H01.14" on page 186
H01.16	0x0110	Rated output current of the drive	0.00 A to 10737418.24 A	2.8	A	Un changea ble	" H01.16" on page 186
H01.18	0x0112	Max. output current of the drive	0.00 A to 10737418.24 A	10.1	A	Un changea ble	" H01.18" on page 186
H01.40	0x0128	DC bus overvoltage protection threshold	0 V to 2000 V	420	V	Immedi ately	" H01.40" on page 186
H01.75	0x014B	Current loop amplifica tion factor	0.00 to 655.35	1	-	Immedi ately	" H01.75" on page 187
H01.89	0x0159	Junction temperature parameter version	0 to 65.535	0	-	Un changea ble	" H01.89" on page 187

6.3 Parameter Group H02

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H02.00	0x0200	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	1	-	At stop	" H02.00" on page 187
H02.01	0x0201	Absolute system selection	0: Incremental mode 1: Absolute position linear mode 2: Absolute position rotation mode 3: Absolute position linear mode (without encoder overflow warning) 4: Absolute position single-turn mode	0	-	At stop	" H02.01" on page 188
H02.02	0x0202	Direction of rotation	0: Counterclockwise (CCW) as forward direction 1: Clockwise (CW) as forward direction	0	-	At stop	" H02.02" on page 188
H02.03	0x0203	Output pulse phase	0: Phase A leads phase B 1: Phase A lags behind phase B	0	-	At stop	" H02.03" on page 189
H02.05	0x0205	Stop mode at S-ON OFF	-4: Stop based on ramp 2, keeping dynamic braking state -3: Stop at zero speed, keeping dynamic braking state -2: Stop based on ramp 1, keeping dynamic braking state -1: Dynamic braking stop, keeping dynamic braking state 0: Coast to stop, keeping de-energized state 1: Stop based on ramp 1, keeping de-energized state 2: Dynamic braking stop, keeping de-energized state	0	-	Immediately	" H02.05" on page 190

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H02.06	0x0206	Stop mode at No.2 fault	-5: Stop at zero speed, keeping dynamic braking state -4: Stop at emergency stop torque, keeping dynamic braking state -3: Stop based on ramp 2, keeping dynamic braking state -2: Stop based on ramp 1, keeping dynamic braking state -1: Dynamic braking stop, keeping dynamic braking state 0: Coast to stop, keeping de-energized state 1: Stop based on ramp 1, keeping de-energized state 2: Stop based on ramp 2, keeping de-energized state 3: Stop at emergency stop torque, keeping de-energized state 4: Dynamic braking stop, keeping de-energized state	2	-	Immediately	" H02.06" on page 190
H02.07	0x0207	Stop mode at overtravel	0: Coast to stop, keeping de-energized state 1: Stop at zero speed, keeping position lock state 2: Stop at zero speed, keeping de-energized state 3: Stop based on ramp 2, keeping de-energized state 4: Stop based on ramp 2, keeping position lock state 5: Dynamic braking stop, keeping de-energized state 6: Dynamic braking stop, keeping dynamic braking state 7: Not responding to overtravel	1	-	At stop	" H02.07" on page 190
H02.08	0x0208	Stop mode at No.1 fault	0: Coast to stop, keeping de-energized state 1: Dynamic braking stop, keeping de-energized state 2: Dynamic braking stop, keeping dynamic braking state	2	-	At stop	" H02.08" on page 191
H02.09	0x0209	Delay from brake output ON to command received	0 ms to 500 ms	250	ms	Immediately	" H02.09" on page 191

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H02.10	0x020A	Delay from brake output off to motor de-energized	50 ms to 1000 ms	150	ms	Immediately	" H02.10" on page 192
H02.11	0x020B	Motor speed threshold at brake output OFF in rotation state	20 rpm to 3000 rpm	30	rpm	Immediately	" H02.11" on page 192
H02.12	0x020C	Delay from S-ON OFF to brake output OFF in rotation state	1 ms to 65535 ms	500	ms	Immediately	" H02.12" on page 192
H02.15	0x020F	Warning display on the keypad	0: Output warning information immediately 1: Not output warning information	0	-	Immediately	" H02.15" on page 192
H02.17	0x0211	Stop mode upon main circuit power failure	0: Keep current action 1: Stop upon fault as defined by H02.06 2: Stop at S-ON OFF as defined by H02.05 3: Stop quickly as defined by H02.18	2	-	Immediately	" H02.17" on page 193
H02.18	0x0212	Quick stop mode	0: Coast to stop, keeping de-energized state 1: Stop based on ramp 1, keeping de-energized state 2: Stop based on ramp 2, keeping de-energized state 3: Stop at emergency stop torque, keeping de-energized status 5: Stop based on ramp 1, keeping position lock state 6: Stop based on ramp 2, keeping position lock state 7: Stop at emergency stop torque, keeping position lock state	2	-	Immediately	" H02.18" on page 193
H02.21	0x0215	Permissible minimum resistance of regenerative resistor	1 Ω to 1000 Ω	40	Ω	Unchangeable	" H02.21" on page 193
H02.23	0x0217	Resistance of built-in regenerative resistor	0 Ω to 65535 Ω	50	Ω	Unchangeable	" H02.23" on page 194

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H02.24	0x0218	Resistor heat dissipation coefficient	10% to 100%	30	%	Immediately	" H02.24" on page 195
H02.25	0x0219	Regenerative resistor type	0: Built-in 1: External, natural cooling 2: External, forced air cooling 3: No resistor needed	3	-	Immediately	" H02.25" on page 196
H02.26	0x021A	Power of external regenerative resistor	1 W–65535 W	40	W	Immediately	" H02.26" on page 196
H02.27	0x021B	Resistance of external regenerative resistor	15 Ω to 1000 Ω	50	Ω	Immediately	" H02.27" on page 196
H02.30	0x021E	User password	0 to 65535	0	-	Immediately	" H02.30" on page 196
H02.31	0x021F	System parameter initialization	0: No operation 1: Restore default settings 2: Clear fault records	0	-	At stop	" H02.31" on page 197
H02.32	0x0220	Selection of parameters in group H0b	0 to 99	50	-	Immediately	" H02.32" on page 197
H02.35	0x0223	Keypad data update frequency	0 Hz to 20 Hz	0	Hz	Immediately	" H02.35" on page 197
H02.41	0x0229	Manufacturer password	0 to 65535	0	-	Immediately	" H02.41" on page 197

6.4 Parameter Group H03

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H03.00	0x0300	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	-	Immediately	" H03.00" on page 198
H03.01	0x0301	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 16: Corresponding to FunIN.21 32: Corresponding to FunIN.22 64: Corresponding to FunIN.23 128: 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	-	Immediately	" H03.01" on page 198
H03.02	0x0302	DI1 function selection	See " H03.02" on page 199 for details.	14	-	Immediately	" H03.02" on page 199
H03.03	0x0303	DI1 logic selection	0: Normally open 1: Closed	0	-	Immediately	" H03.03" on page 201
H03.04	0x0304	DI2 function selection	See " H03.02" on page 199 for details.	15	-	Immediately	" H03.04" on page 201
H03.05	0x0305	DI2 logic selection	0: Normally open 1: Closed	0	-	Immediately	" H03.05" on page 201
H03.06	0x0306	DI3 function selection	See " H03.02" on page 199 for details.	13	-	Immediately	" H03.06" on page 201

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H03.07	0x0307	DI3 logic selection	0: Normally open 1: Closed	0	-	Immediately	" H03.07" on page 202
H03.08	0x0308	DI4 function selection	See " H03.02" on page 199 for details.	2	-	Immediately	" H03.08" on page 202
H03.09	0x0309	DI4 logic selection	0: Normally open 1: Closed	0	-	Immediately	" H03.09" on page 202
H03.10	0x030A	DI5 function selection	See " H03.02" on page 199 for details.	1	-	Immediately	" H03.10" on page 202
H03.11	0x030B	DI5 logic selection	0: Normally open 1: Closed	0	-	Immediately	" H03.11" on page 203
H03.12	0x030C	DI6 function selection	See " H03.02" on page 199 for details.	0	-	Immediately	" H03.12" on page 203
H03.13	0x030D	DI6 logic selection	0: Normally open 1: Closed	0	-	Immediately	" H03.13" on page 203
H03.14	0x030E	DI7 function selection	See " H03.02" on page 199 for details.	45	-	Immediately	" H03.14" on page 203
H03.15	0x030F	DI7 logic selection	0: Normally open 1: Closed	0	-	Immediately	" H03.15" on page 204
H03.16	0x0310	DI8 function selection	See " H03.02" on page 199 for details.	31	-	Immediately	" H03.16" on page 204
H03.17	0x0311	DI8 logic selection	0: Normally open 1: Closed	0	-	Immediately	" H03.17" on page 204
H03.34	0x0322	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	-	Immediately	" H03.34" on page 204

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H03.35	0x0323	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	-	Immediately	*" H03.35" on page 205*
H03.50	0x0332	Voltage-type AI1 offset	-5000 mV to 5000 mV	0	mV	Immediately	*" H03.50" on page 206*
H03.51	0x0333	Voltage-type AI1 input filter time constant	0.00 ms to 655.35 ms	2	ms	Immediately	*" H03.51" on page 206*
H03.53	0x0335	Voltage-type AI1 dead zone	0 mV to 1000 mV	10	mV	Immediately	*" H03.53" on page 207*
H03.54	0x0336	Voltage-type AI1 zero drift	-5000 mV to 5000 mV	0	mV	Immediately	*" H03.54" on page 207*
H03.60	0x033C	DI1 filter time	0.00 ms to 500.00 ms	3.00	ms	Immediately	*" H03.60" on page 207*
H03.61	0x033D	DI2 filter time	0.00 ms to 500.00 ms	3.00	ms	Immediately	*" H03.61" on page 207*
H03.62	0x033E	DI3 filter time	0.00 ms to 500.00 ms	3.00	ms	Immediately	*" H03.62" on page 208*
H03.63	0x033F	DI4 filter time	0.00 ms to 500.00 ms	3.00	ms	Immediately	*" H03.63" on page 208*
H03.64	0x0340	DI5 filter time	0.00 ms to 500.00 ms	3.00	ms	Immediately	*" H03.64" on page 208*
H03.65	0x0341	DI6 filter time	0.00 ms to 500.00 ms	3.00	ms	Immediately	*" H03.65" on page 208*
H03.66	0x0342	DI7 filter time	0.00 ms to 500.00 ms	0.00	ms	Immediately	*" H03.66" on page 209*
H03.67	0x0343	DI8 filter time	0.00 ms to 500.00 ms	3.00	ms	Immediately	*" H03.67" on page 209*

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H03.80	0x0350	Speed corresponding to analog 10 V	0 rpm to 10000 rpm	3000	rpm	At stop	" H03.80" on page 209
H03.81	0x0351	Torque corresponding to analog 10 V	1 to 8	1	Multiplier	At stop	" H03.81" on page 210

6.5 Parameter Group H04

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H04.00	0x0400	DO1 function selection	0: No function 1: Servo ready 2: Motor rotation signal 3: Zero speed signal 4: Speed matching signal 5: Positioning completed 6: Positioning near 7: Torque limited signal 8: Speed limited signal 9: Braking 10: Warning 11: Fault 15: Interrupt positioning completed 16: Home found 17: Electrical homing completed 18: Torque reached signal 19: Speed reached signal 21: Enable completed 22: Internal command completed 23: Writing next command allowed 24: Internal motion completed 25: Comparison output 26: Closed loop state 30: Warning or fault output 31: Communication-forced DO 32: EDM output	1	-	Immediately	" H04.00" on page 210
H04.01	0x0401	DO1 logic selection	0: Normally open 1: Closed	0	-	Immediately	" H04.01" on page 211
H04.02	0x0402	DO2 function selection	See " H04.00" on page 210 for details.	9	-	Immediately	" H04.02" on page 211

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H04.03	0x0403	DO2 logic selection	0: Normally open 1: Closed	0	-	Immediately	" H04.03" on page 211
H04.04	0x0404	DO3 function selection	See " H04.00" on page 210 for details.	0	-	Immediately	" H04.04" on page 212
H04.05	0x0405	DO3 logic selection	0: Normally open 1: Closed	0	-	Immediately	" H04.05" on page 212
H04.06	0x0406	DO4 function selection	See " H04.00" on page 210 for details.	11	-	Immediately	" H04.06" on page 212
H04.07	0x0407	DO4 logic selection	0: Normally open 1: Closed	0	-	Immediately	" H04.07" on page 212
H04.08	0x0408	DO5 function selection	See " H04.00" on page 210 for details.	16	-	Immediately	" H04.08" on page 213
H04.09	0x0409	DO5 logic selection	0: Normally open 1: Closed	0	-	Immediately	" H04.09" on page 213
H04.22	0x0416	DO source selection	bit0: DO1 0: DO1 function output 1: Bit 0 of H31.04 set through communication bit1: DO2 0: DO2 function output 1: Bit 1 of H31.04 set through communication bit2: DO3 0: DO3 function output 1: Bit 2 of H31.04 set through communication bit3: DO4 0: DO4 function output 1: Bit 3 of H31.04 set through communication bit4: DO5 0: DO5 function output 1: Bit 4 of H31.04 set through communication	0	-	Immediately	" H04.22" on page 213

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H04.23	0x0417	Communication-forced DO logic in non-OP status	bit0: DO1 0: Status unchanged 1: No output bit1: DO2 0: Status unchanged 1: No output bit2: DO3 0: Status unchanged 1: No output bit3: DO4 0: Status unchanged 1: No output bit4: DO5 0: Status unchanged 1: No output	0	-	Immediately	" H04.23" on page 214
H04.50	0x0432	AO1 signal selection	0: Motor speed (1 V/1000 RPM) 1: Speed reference (1 V/1000 RPM) 2: Torque reference (1 V/100 x Rated torque) 3: Position deviation (0.5 mV/1 reference unit) 4: Position deviation (0.5 mV/1 encoder unit) 5: Position reference speed (1 V/1000 RPM) 6: Positioning completed 8: AI1 voltage 10: Defined by H31.05	0	-	Immediately	" H04.50" on page 215
H04.51	0x0433	AO1 offset voltage	-10000 mV to 10000 mV	0	mV	Immediately	" H04.51" on page 215
H04.52	0x0434	AO1 multiplier	-99.99 to 99.99	1	-	Immediately	" H04.52" on page 216

6.6 Parameter Group H05

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H05.00	0x0500	Main position reference source	0: Pulse reference 1: Step reference 2: Multi-position reference	0	-	Immediately	" H05.00" on page 216
H05.01	0x0501	Position pulse reference input terminal	0: Low speed 1: High speed	0	-	At stop	" H05.01" on page 216

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H05.02	0x0502	Pulses per revolution	0 PPR to 4294967295 PPR	0	PPR	At stop	" H05.02" on page 217
H05.04	0x0504	First-order low-pass filter time constant	0.0 ms to 6553.5 ms	0	ms	At stop	" H05.04" on page 217
H05.05	0x0505	Step reference	-9999 to +9999	50	Reference unit	At stop	" H05.05" on page 218
H05.06	0x0506	Moving average filter time constant 1	0.0 ms to 128.0 ms	0	ms	At stop	" H05.06" on page 218
H05.07	0x0507	Electronic gear ratio 1 (numerator)	1 to 1073741824	8388608	-	Immediately	" H05.07" on page 218
H05.09	0x0509	Electronic gear ratio 1 (denominator)	1 to 1073741824	10000	-	Immediately	" H05.09" on page 219
H05.11	0x050B	Electronic gear ratio 2 (numerator)	1 to 1073741824	8388608	-	Immediately	" H05.11" on page 219
H05.13	0x050D	Electronic gear ratio 2 (denominator)	1 to 1073741824	10000	-	Immediately	" H05.13" on page 219
H05.15	0x050F	Pulse reference form	0: Direction + Pulse, positive logic 1: Direction + Pulse, negative logic 2: Phase A + phase B quadrature pulse, quadrupled frequency 3: CW + CCW	0	-	At stop	" H05.15" on page 219
H05.16	0x0510	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	" H05.16" on page 221
H05.17	0x0511	Number of encoder frequency-division pulses	0 PPR to 4194303 PPR	2500	PPR	At stop	" H05.17" on page 221

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H05.19	0x0513	Speed feedforward control	0: No speed feedforward 1: Internal speed feedforward 2: External speed feedforward 3: Zero phase	1	-	At stop	" H05.19" on page 222
H05.20	0x0514	Condition for COIN (positioning completed) signal output	See " H05.20" on page 222	0	-	Immediately	" H05.20" on page 222
H05.21	0x0515	Threshold of positioning completed	1 to 65535	5872	Encoder unit	Immediately	" H05.21" on page 223
H05.22	0x0516	Proximity threshold	1 to 65535	65535	Encoder unit	Immediately	" H05.22" on page 224
H05.24	0x0518	Displacement of interrupt positioning	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H05.24" on page 224
H05.26	0x051A	Constant operating speed in interrupt positioning	0 rpm to 10000 rpm	200	rpm	Immediately	" H05.26" on page 224
H05.27	0x051B	Acceleration/ Deceleration time of interrupt positioning	0 ms to 65535 ms	10	ms	Immediately	" H05.27" on page 224
H05.29	0x051D	Interrupt positioning cancel signal	0: Disable 1: Enable	1	-	Immediately	" H05.29" on page 225
H05.30	0x051E	Homing 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	-	Immediately	" H05.30" on page 225
H05.31	0x051F	Homing mode	See " H05.31" on page 225	0	-	Immediately	" H05.31" on page 225

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H05.32	0x0520	Speed in high-speed searching for the home switch signal	0 rpm to 3000 rpm	100	rpm	Immediately	" H05.32" on page 226
H05.33	0x0521	Speed in low-speed searching for the home switch signal	0 rpm to 1000 rpm	10	rpm	Immediately	" H05.33" on page 226
H05.34	0x0522	Acceleration/ Deceleration time during homing	0 ms to 1000 ms	1000	ms	Immediately	" H05.34" on page 227
H05.35	0x0523	Homing time limit	0 ms to 65535 ms	10000	ms	Immediately	" H05.35" on page 227
H05.36	0x0524	Mechanical home offset	-2147483648 to 2147483647	0	Reference unit	Immediately	" H05.36" on page 227
H05.38	0x0526	Frequency-division output source	0: Encoder frequency-division output 1: Pulse reference synchronous output 2: Frequency-division output inhibited 3: Second encoder frequency-division output	0	-	Immediately	" H05.38" on page 227
H05.39	0x0527	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	" H05.39" on page 228
H05.40	0x0528	Mechanical home offset and action upon overtravel	0: H05.36 as the coordinate after homing, reverse homing applied after homing triggered again upon overtravel 1: H05.36 as the relative offset after homing, reverse homing applied after homing triggered again upon overtravel 2: H05.36 as the coordinate after homing, reverse homing applied automatically upon overtravel 3: H05.36 as the relative offset after homing, reverse homing applied automatically upon overtravel	0	-	Immediately	" H05.40" on page 228

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H05.41	0x0529	Z pulse output polarity	Bit 0: Frequency-division Z output polarity 0: Positive (high level upon active Z pulse) 1: Negative (low level upon active Z pulse) Bit 1: output polarity 0: Positive (high level upon active Z pulse) 1: Negative (low level upon active Z pulse) bit2: Inner loop probe Z signal source 0: Motor Z signal 1: Frequency-division output Z signal	1	-	At stop	*" H05.41" on page 229*
H05.43	0x052B	Position pulse edge	0: Rising edge-triggered 1: Falling edge-triggered	0	-	Immediately	*" H05.43" on page 230*
H05.44	0x052C	Numerator of frequency-division output reduction ratio	1 to 16383	1	-	At stop	*" H05.44" on page 231*
H05.45	0x052D	Denominator of frequency-division output reduction ratio	1 to 8191	1	-	At stop	*" H05.45" on page 231*
H05.46	0x052E	DI selection of multi-turn frequency-division Z starting point	0: No selection 1: DI1 2: DI2 3: DI3 4: DI4 5: DI5 6: DI6 7: DI7 8: DI8	0	-	Immediately	*" H05.46" on page 231*
H05.47	0x052F	Frequency-division Z pulse width	0 us to 400 us	0	us	Immediately	*" H05.47" on page 232*

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H05.50	0x0532	Mechanical gear ratio in absolute position rotation mode (numerator)	1 to 65535	1	-	At stop	" H05.50" on page 232
H05.51	0x0533	Mechanical gear ratio in absolute position rotation mode (denomina tor)	1 to 65535	1	-	At stop	" H05.51" on page 232
H05.52	0x0534	Pulses per revolution of the load in absolute position rotation mode (low 32 bits)	0 to 4294967295	0	Encoder unit	At stop	" H05.52" on page 232
H05.54	0x0536	Pulses per revolution of the load in absolute position rotation mode (high 32 bits)	0 to 4294967295	0	Encoder unit	At stop	" H05.54" on page 233
H05.58	0x053A	Torque threshold in homing upon hit-and-stop	0.0% to 400.0%	100	%	Immediate ly	" H05.58" on page 233
H05.59	0x053B	Positioning window time	0 ms to 30000 ms	0	ms	Immediate ly	" H05.59" on page 233
H05.60	0x053C	Hold time of positioning completed	0 ms to 30000 ms	0	ms	Immediate ly	" H05.60" on page 234
H05.66	0x0542	Homing time unit	0: 1 ms 1: 10 ms 2: 100 ms	2	-	At stop	" H05.66" on page 234

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H05.67	0x0543	Offset between zero point and single-turn absolute position	-2147483648 to +2147483647	0	1 encoder unit	At stop	" H05.67" on page 234
H05.70	0x0546	Moving average filter time constant 2	0.0 ms to 1000.0 ms	0	ms	At stop	" H05.70" on page 234
H05.71	0x0547	Motor Z signal width	1 ms to 100 ms	4	ms	Immediately	" H05.71" on page 235
H05.72	0x0548	External speed feedforward source selection	0: 60B1 1: AI1	1	-	Immediately	" H05.72" on page 235

6.7 Parameter Group H06

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H06.00	0x0600	Source of main speed reference A	0: Digital setting (H06.03) 1: AI1	0	-	At stop	" H06.00" on page 235
H06.01	0x0601	Source of auxiliary speed reference B	0: Digital setting (H06.03) 1: AI1 5: Multi-speed reference	1	-	At stop	" H06.01" on page 236
H06.02	0x0602	Speed reference source	0: Source of main speed reference A 1: Source of auxiliary speed reference B 2: A+B 3: Switched between A and B 4: Communication	0	-	At stop	" H06.02" on page 236
H06.03	0x0603	Speed reference set through keypad	–10000 RPM to +10000 RPM	200	rpm	Immediately	" H06.03" on page 237
H06.04	0x0604	DI jog speed reference	0 rpm to 10000 rpm	150	rpm	Immediately	" H06.04" on page 237

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H06.05	0x0605	Acceleration ramp time of speed reference	0 ms to 65535 ms	0	ms	Immedi ately	" H06.05" on page 237
H06.06	0x0606	Deceleration ramp time of speed reference	0 ms to 65535 ms	0	ms	Immedi ately	" H06.06" on page 238
H06.07	0x0607	Maximum speed limit	0 rpm to 10000 rpm	7000	rpm	Immedi ately	" H06.07" on page 238
H06.08	0x0608	Forward speed limit	0 rpm to 10000 rpm	7000	rpm	Immedi ately	" H06.08" on page 238
H06.09	0x0609	Reverse speed limit	0 rpm to 10000 rpm	7000	rpm	Immedi ately	" H06.09" on page 238
H06.10	0x060A	Deceleration unit in emergency stop	0: Multiplied by 1 1: Multiplied by 10 2: Multiplied by 100	0	-	At stop	" H06.10" on page 239
H06.11	0x060B	Torque feedforward control	0: No torque feedforward 1: Internal torque feedforward	1	-	Immedi ately	" H06.11" on page 239
H06.12	0x060C	Acceleration ramp time of jog speed	0 ms to 65535 ms	10	ms	Immedi ately	" H06.12" on page 239
H06.13	0x060D	Speed feedforward smoothing filter	0 us to 65535 us	0	us	Immedi ately	" H06.13" on page 239
H06.15	0x060F	Zero clamp speed threshold	0 rpm to 10000 rpm	10	rpm	Immedi ately	" H06.15" on page 240
H06.16	0x0610	Threshold of TGON (motor rotation) signal	0 rpm to 1000 rpm	20	rpm	Immedi ately	" H06.16" on page 240
H06.17	0x0611	Threshold of V-Cmp (speed matching) signal	0 rpm to 100 rpm	10	rpm	Immedi ately	" H06.17" on page 240
H06.18	0x0612	Threshold of speed reach signal	20 rpm to 10000 rpm	1000	rpm	Immedi ately	" H06.18" on page 240

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H06.19	0x0613	Threshold of zero speed output signal	1 rpm to 10000 rpm	10	rpm	Immediately	" H06.19" on page 241
H06.40	0x0628	Deceleration time of ramp 1	0 ms to 65535 ms	0	ms	Immediately	" H06.40" on page 241
H06.41	0x0629	Deceleration time of ramp 2	0 ms to 65535 ms	0	ms	Immediately	" H06.41" on page 241
H06.50	0x0632	Speed S-curve enable switch	0: Disable 1: Enable	1	-	At stop	" H06.50" on page 241
H06.51	0x0633	Increasing acceleration 1 of speed S-curve acceleration segment	0.0% to 100.0%	50	%	At stop	" H06.51" on page 242
H06.52	0x0634	Decreasing acceleration 1 of speed S-curve acceleration segment	0.0% to 100.0%	50	%	At stop	" H06.52" on page 242
H06.53	0x0635	Decreasing deceleration 1 of speed S-curve deceleration segment	0.0% to 100.0%	50	%	At stop	" H06.53" on page 242
H06.54	0x0636	Decreasing acceleration 1 of speed S-curve deceleration segment	0.0% to 100.0%	50	%	At stop	" H06.54" on page 243
H06.55	0x0637	Increasing acceleration 2 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.55" on page 243

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H06.56	0x0638	Decreasing acceleration 2 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.56" on page 243
H06.57	0x0639	Decreasing deceleration 2 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.57" on page 243
H06.58	0x063A	Decreasing acceleration 2 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.58" on page 244
H06.59	0x063B	Increasing acceleration 3 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.59" on page 244
H06.60	0x063C	Decreasing acceleration 3 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.60" on page 244
H06.61	0x063D	Decreasing deceleration 3 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.61" on page 245
H06.62	0x063E	Decreasing acceleration 3 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.62" on page 245

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H06.63	0x063F	Increasing acceleration 4 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.63" on page 245
H06.64	0x0640	Decreasing acceleration 4 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.64" on page 246
H06.65	0x0641	Decreasing deceleration 4 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.65" on page 246
H06.66	0x0642	Decreasing acceleration 4 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.66" on page 246
H06.67	0x0643	Increasing acceleration 5 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.67" on page 247
H06.68	0x0644	Decreasing acceleration 5 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.68" on page 247
H06.69	0x0645	Decreasing deceleration 5 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.69" on page 247

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H06.70	0x0646	Decreasing acceleration 5 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.70" on page 248
H06.71	0x0647	Increasing acceleration 6 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.71" on page 248
H06.72	0x0648	Decreasing acceleration 6 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.72" on page 248
H06.73	0x0649	Decreasing deceleration 6 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.73" on page 249
H06.74	0x064A	Decreasing acceleration 6 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.74" on page 249
H06.75	0x064B	Increasing acceleration 7 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.75" on page 249
H06.76	0x064C	Decreasing acceleration 7 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.76" on page 250

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H06.77	0x064D	Decreasing deceleration 7 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.77" on page 250
H06.78	0x064E	Decreasing acceleration 7 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.78" on page 250
H06.79	0x064F	Increasing acceleration 8 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.79" on page 251
H06.80	0x0650	Decreasing acceleration 8 of speed S-curve acceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.80" on page 251
H06.81	0x0651	Decreasing deceleration 8 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.81" on page 251
H06.82	0x0652	Decreasing acceleration 8 of speed S-curve deceleration segment	0.0% to 100.0%	50.0	%	At stop	" H06.82" on page 252

6.8 Parameter Group H07

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H07.00	0x0700	Source of main torque reference A	0: Keypad (H07.03) 1: AI1	0	-	At stop	" H07.00" on page 252
H07.01	0x0701	Source of auxiliary torque reference B	0: Keypad (H07.03) 1: AI1	1	-	At stop	" H07.01" on page 252
H07.02	0x0702	Torque reference source	0: Source of main torque reference A 1: Source of auxiliary torque reference B 2: Source of A+B 3: Switched between A and B 4: Communication	0	-	At stop	" H07.02" on page 253
H07.03	0x0703	Torque reference set through keypad	-400.0% to 400.0%	0	%	Immediately	" H07.03" on page 253
H07.05	0x0705	Torque reference filter time constant 1	0.00 ms to 30.00 ms	0.5	ms	Immediately	" H07.05" on page 254
H07.06	0x0706	Torque reference filter time constant 2	0.00 ms to 30.00 ms	0.27	ms	Immediately	" H07.06" on page 254
H07.07	0x0707	Torque limit source	0: Positive/Negative internal torque limit 1: Internal or external limit as defined by DI 2: T_LMT 3: T_LMT or external limit as defined by DI (FunIN.16 or FunIN.17) 4: T_LMT or internal limit (FunIN.16 or FunIN.17) as defined by DI	0	-	Immediately	" H07.07" on page 254
H07.08	0x0708	T-LMT selection	1: AI1	1	-	Immediately	" H07.08" on page 254
H07.09	0x0709	Positive internal torque limit	0.0% to 400.0%	350	%	Immediately	" H07.09" on page 255
H07.10	0x070A	Negative internal torque limit	0.0% to 400.0%	350	%	Immediately	" H07.10" on page 255

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H07.11	0x070B	Positive external torque limit	0.0% to 400.0%	350	%	Immediately	" H07.11" on page 255
H07.12	0x070C	Negative external torque limit	0.0% to 400.0%	350	%	Immediately	" H07.12" on page 255
H07.15	0x070F	Emergency-stop torque	0.0% to 400.0%	100	%	Immediately	" H07.15" on page 256
H07.17	0x0711	Speed limit source	0: Internal speed limit 1: V-LMT 2: H07.19 or H07.20 as defined by DI	0	-	Immediately	" H07.17" on page 256
H07.18	0x0712	V-LMT selection	1: AI1	1	-	Immediately	" H07.18" on page 256
H07.19	0x0713	Positive speed limit/Speed limit 1 in torque control	0 rpm to 10000 rpm	3000	rpm	Immediately	" H07.19" on page 256
H07.20	0x0714	Negative speed limit/ Speed limit 2 in torque control	0 rpm to 10000 rpm	3000	rpm	Immediately	" H07.20" on page 257
H07.21	0x0715	Base value for torque reach	0.0% to 400.0%	0	%	Immediately	" H07.21" on page 257
H07.22	0x0716	Threshold of valid torque reach	0.0% to 400.0%	20	%	Immediately	" H07.22" on page 257
H07.23	0x0717	Threshold of invalid torque reach	0.0% to 400.0%	10	%	Immediately	" H07.23" on page 257
H07.24	0x0718	Field weakening depth	60% to 115%	115	%	Immediately	" H07.24" on page 258
H07.25	0x0719	Max. permissible demagnetizing current	0% to 300%	100	%	Immediately	" H07.25" on page 258
H07.26	0x071A	Field weakening selection	0: Disable 1: Enable	1	-	At stop	" H07.26" on page 258
H07.27	0x071B	Field weakening gain	0.001 Hz to 1.000 Hz	0.03	Hz	Immediately	" H07.27" on page 258

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H07.28	0x071C	Speed of field weakening point	0 to 65535	0	-	Unchangeable	" H07.28" on page 259
H07.35	0x0723	Torque non-standard feature enable	bit0: Motor output correction enable bit1: Shield compensation data enable	0	-	At stop	" H07.35" on page 259
H07.36	0x0724	Time constant of low-pass filter 2	0.00 ms to 10.00 ms	0	ms	Immediately	" H07.36" on page 259
H07.37	0x0725	Torque reference filter selection	0: First-order filter 1: Biquad filter	0	-	Immediately	" H07.37" on page 259
H07.38	0x0726	Biquad filter attenuation ratio	0 to 50	16	-	At stop	" H07.38" on page 260
H07.40	0x0728	Speed limit window in the torque control mode	0 ms to 300 ms	10	ms	Immediately	" H07.40" on page 260

6.9 Parameter Group H08

Param. No.	Comm. Address	Name	Setpoint	Default	Unit	Change	Page
H08.00	0x0800	Speed loop gain	0.1 Hz to 2000.0 Hz	40	Hz	At once	" H08.00" on page 260
H08.01	0x0801	Speed loop integral time constant	0.15 ms to 512.00 ms	19.89	ms	At once	" H08.01" on page 261
H08.02	0x0802	Position loop gain	0.1 Hz to 2000.0 Hz	64	Hz	At once	" H08.02" on page 261
H08.03	0x0803	2nd speed loop gain	0.1 Hz to 2000.0 Hz	75	Hz	At once	" H08.03" on page 261
H08.04	0x0804	2nd speed loop integral time constant	0.15 ms to 512.00 ms	10.61	ms	At once	" H08.04" on page 262
H08.05	0x0805	2nd position loop gain	0.1 Hz to 2000.0 Hz	120	Hz	At once	" H08.05" on page 262
H08.08	0x0808	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	-	At once	" H08.08" on page 262

Param. No.	Comm. Address	Name	Setpoint	Default	Unit	Change	Page
H08.09	0x0809	Gain switchover condition	0: Fixed to the 1st gain set (PS) 1: Switched as defined by bit26 of 60FEh 2: Torque reference too large (PS) 3: Speed reference too large (PS) 4: Speed reference change rate too large (PS) 5: Speed reference low/high speed threshold (PS) 6: Position deviation too large (P) 7: Position reference available (P) 8: Positioning unfinished (P) 9: Actual speed (P) 10: Position reference + Actual speed (P)	0	-	At once	*" H08.09" on page 262*
H08.10	0x080A	Gain switchover delay	0.0 ms to 1000.0 ms	5	ms	At once	*" H08.10" on page 264*
H08.11	0x080B	Gain switchover level	0 to 20000	50	-	At once	*" H08.11" on page 265*
H08.12	0x080C	Gain switchover dead time	0 to 20000	30	-	At once	*" H08.12" on page 265*
H08.13	0x080D	Position gain switchover time	0.0 ms to 1000.0 ms	3	ms	At once	*" H08.13" on page 265*
H08.15	0x080F	Load moment of inertia ratio	0.00 to 120.00	1	-	At once	*" H08.15" on page 266*
H08.17	0x0811	Zero phase delay	0.0 ms to 4.0 ms	0	ms	At once	*" H08.17" on page 266*
H08.18	0x0812	Speed feedforward filter time constant	0.00 ms to 64.00 ms	0.5	ms	At once	*" H08.18" on page 266*
H08.19	0x0813	Speed feedforward gain	0.0% to 100.0%	0	%	At once	*" H08.19" on page 266*
H08.20	0x0814	Torque feedforward filter time constant	0.00 ms to 64.00 ms	0.5	ms	At once	*" H08.20" on page 267*
H08.21	0x0815	Torque feedforward gain	0.0% to 300.0%	0	%	At once	*" H08.21" on page 267*

Param. No.	Comm. Address	Name	Setpoint	Default	Unit	Change	Page
H08.22	0x0816	Speed feedback filtering option	0: Inhibited 1: 2 times 2: 4 times 3: 8 times 4: 16 times	0	-	At stop	*" H08.22" on page 268*
H08.23	0x0817	Cutoff frequency of speed feedback low-pass filter	100 Hz to 8000 Hz	8000	Hz	At once	*" H08.23" on page 268*
H08.24	0x0818	PDFF control coefficient	0.0% to 200.0%	100	%	At once	*" H08.24" on page 268*
H08.27	0x081B	Speed observer cutoff frequency	50 Hz to 600 Hz	170	Hz	At once	*" H08.27" on page 269*
H08.28	0x081C	Speed observer inertia correction coefficient	1% to 1600%	100	%	At once	*" H08.28" on page 269*
H08.29	0x081D	Speed observer filter time	0.00 ms to 10.00 ms	0.8	ms	At once	*" H08.29" on page 269*
H08.31	0x081F	Disturbance cutoff frequency	10 Hz to 4000 Hz	600	Hz	At once	*" H08.31" on page 270*
H08.32	0x0820	Disturbance compensation gain	0% to 100%	0	%	At once	*" H08.32" on page 270*
H08.33	0x0821	Disturbance observer inertia correction coefficient	1% to 1600%	100	%	At once	*" H08.33" on page 270*
H08.37	0x0825	Phase modulation for medium-frequency jitter suppression 2	-90° to 90°	0	°	At once	*" H08.37" on page 271*
H08.38	0x0826	Frequency of medium-frequency jitter suppression 2	0 Hz to 1000 Hz	0	Hz	At once	*" H08.38" on page 271*

Param. No.	Comm. Address	Name	Setpoint	Default	Unit	Change	Page
H08.39	0x0827	Compensation gain of medium-frequency jitter suppression 2	0% to 300%	0	%	At once	" H08.39" on page 271
H08.40	0x0828	Speed observer selection	0: Disable 1: Enable	0	-	At once	" H08.40" on page 271
H08.42	0x082A	Model control selection	0: Disable 1: Enable 2: Dual-inertia model	0	-	At once	" H08.42" on page 272
H08.43	0x082B	Model gain	0.1 to 2000.0	40	-	At once	" H08.43" on page 272
H08.46	0x082E	Feedforward value	0.0 to 102.4	95	-	At once	" H08.46" on page 272
H08.53	0x0835	Medium- and low-frequency jitter suppression frequency 3	0.0 Hz to 300.0 Hz	0	Hz	At once	" H08.53" on page 272
H08.54	0x0836	Medium- and low-frequency jitter suppression compensation 3	0% to 200%	0	%	At once	" H08.54" on page 273
H08.56	0x0838	Medium- and low-frequency jitter suppression phase modulation 3	0% to 600%	100	%	At once	" H08.56" on page 273
H08.59	0x083B	Medium- and low-frequency jitter suppression frequency 4	0.0 Hz to 300.0 Hz	0	Hz	At once	" H08.59" on page 273
H08.60	0x083C	Medium- and low-frequency jitter suppression compensation 4	0% to 200%	0	%	At once	" H08.60" on page 273

Param. No.	Comm. Address	Name	Setpoint	Default	Unit	Change	Page
H08.61	0x083D	Medium- and low-frequency jitter suppression phase modulation 4	0% to 600%	100	%	At once	" H08.61" on page 274
H08.62	0x083E	Position loop integral time constant	0.15 to 512.00	512	-	At once	" H08.62" on page 274
H08.63	0x083F	2nd position loop integral time constant	0.15 to 512.00	512	-	At once	" H08.63" on page 274
H08.64	0x0840	Speed observer feedback source	0: Disable 1: Enable	0	-	At once	" H08.64" on page 274
H08.65	0x0841	Zero deviation control selection	0: Disable 1: Enable	0	-	At once	" H08.65" on page 275
H08.66	0x0842	Zero deviation control position average filter	0.0 ms to 320.0 ms	5	ms	At once	" H08.66" on page 275
H08.68	0x0844	Speed feedforward of zero deviation control	0.0% to 100.0%	100	%	At once	" H08.68" on page 275
H08.69	0x0845	Torque feedforward of zero deviation control	0.0% to 100.0%	100	%	At once	" H08.69" on page 276
H08.81	0x0851	Anti-resonance frequency of dual-inertia model	1.0 Hz to 400.0 Hz	20	Hz	At once	" H08.81" on page 276
H08.82	0x0852	Resonance frequency of dual-inertia model	0.0 Hz to 6553.5 Hz	0	Hz	At once	" H08.82" on page 276
H08.83	0x0853	Dual-inertia model gain	0.1/s to 300.0/s	60	1/s	At once	" H08.83" on page 276
H08.84	0x0854	Inertia ratio of dual-inertia model	0.00 to 120.00	1	-	At once	" H08.84" on page 277

Param. No.	Comm. Address	Name	Setpoint	Default	Unit	Change	Page
H08.88	0x0858	Speed feedforward value of dual-inertia model	0.0 to 6553.5	100	-	At once	" H08.88" on page 277
H08.89	0x0859	Torque feedforward value of dual-inertia model	0.0 to 6553.5	100	-	At once	" H08.89" on page 277

6.10 Parameter Group H09

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H09.00	0x0900	Gain auto-tuning mode	0: Disabled, manual gain tuning required 1: Enabled, gain parameters generated automatically based on the stiffness level 2: Positioning mode, gain parameters generated automatically based on the stiffness level 3: Interpolation mode+Inertia auto-tuning 4: Normal mode+Inertia auto-tuning 6: Quick positioning mode+Inertia auto-tuning	4	-	Immediately	" H09.00" on page 277
H09.01	0x0901	Stiffness level	0 to 41	15	-	Immediately	" H09.01" on page 278
H09.02	0x0902	Adaptive notch mode	0: Adaptive notch no longer updated; 1: One adaptive notch activated (3rd notch) 2: Two adaptive notches activated (3rd and 4th notches) 3: Resonance point tested only (displayed in H09.24) 4: Adaptive notch cleared, values of 3rd and 4th notches restored to default	3	-	Immediately	" H09.02" on page 278
H09.03	0x0903	Online inertia auto-tuning mode	0: Disabled 1: Enabled, changing slowly 2: Enabled, changing normally 3: Enabled, changing quickly	2	-	Immediately	" H09.03" on page 279

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H09.05	0x0905	Offline inertia auto-tuning mode	0: Bi-directional 1: Unidirectional	1	-	At stop	" H09.05" on page 279
H09.06	0x0906	Maximum speed of inertia auto-tuning	100 rpm to 1000 rpm	500	rpm	At stop	" H09.06" on page 279
H09.07	0x0907	Time constant for accelerating to the max. speed during inertia auto-tuning	20 ms to 800 ms	125	ms	At stop	" H09.07" on page 279
H09.08	0x0908	Interval time after an individual inertia auto-tuning	50 ms to 10000 ms	800	ms	At stop	" H09.08" on page 280
H09.09	0x0909	Number of motor revolutions per inertia auto-tuning	0.00 to 100.00	1	-	Immediately	" H09.09" on page 280
H09.11	0x090B	Vibration threshold	0.0% to 100.0%	5	%	Immediately	" H09.11" on page 280
H09.12	0x090C	Frequency of the 1st notch	50 Hz to 8000 Hz	8000	Hz	Immediately	" H09.12" on page 281
H09.13	0x090D	Width level of the 1st notch	0 to 20	2	-	Immediately	" H09.13" on page 281
H09.14	0x090E	Depth level of the 1st notch	0 to 99	0	-	Immediately	" H09.14" on page 281
H09.15	0x090F	Frequency of the 2nd notch	50 Hz to 8000 Hz	8000	Hz	Immediately	" H09.15" on page 282
H09.16	0x0910	Width level of the 2nd notch	0 to 20	2	-	Immediately	" H09.16" on page 282
H09.17	0x0911	Depth level of the 2nd notch	0 to 99	0	-	Immediately	" H09.17" on page 282
H09.18	0x0912	Frequency of the 3rd notch	50 Hz to 8000 Hz	8000	Hz	Immediately	" H09.18" on page 282
H09.19	0x0913	Width level of the 3rd notch	0 to 20	2	-	Immediately	" H09.19" on page 283
H09.20	0x0914	Depth level of the 3rd notch	0 to 99	0	-	Immediately	" H09.20" on page 283

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H09.21	0x0915	Frequency of the 4th notch	50 Hz to 8000 Hz	8000	Hz	Immediately	" H09.21" on page 283
H09.22	0x0916	Width level of the 4th notch	0 to 20	2	-	Immediately	" H09.22" on page 283
H09.23	0x0917	Depth level of the 4th notch	0 to 99	0	-	Immediately	" H09.23" on page 284
H09.24	0x0918	Auto-tuned resonance frequency	0 Hz to 5000 Hz	0	Hz	Unchangeable	" H09.24" on page 284
H09.26	0x091A	ITune response	50.0% to 500.0%	100	%	Immediately	" H09.26" on page 284
H09.27	0x091B	ITune mode	0: Disabled 1: ITune mode 1 2: ITune mode 2	0	-	Immediately	" H09.27" on page 284
H09.28	0x091C	Minimum inertia ratio of ITune	0.0% to 80.0%	0	%	Immediately	" H09.28" on page 285
H09.29	0x091D	Maximum inertia ratio of ITune	1.0% to 120.0%	30	%	Immediately	" H09.29" on page 285
H09.32	0x0920	Gravity compensation value	-100% to 100.0%	0	%	Immediately	" H09.32" on page 285
H09.33	0x0921	Positive friction compensation value	0.0% to 100.0%	0	%	Immediately	" H09.33" on page 286
H09.34	0x0922	Negative friction compensation value	-100.0% to 0.0%	0	%	Immediately	" H09.34" on page 286
H09.35	0x0923	Friction compensation speed	0.0 to 20.0	2	-	Immediately	" H09.35" on page 286

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H09.36	0x0924	Friction compensation speed	0: Slow speed mode + Speed reference 1: Slow speed mode + Model speed 2: Slow speed mode + Speed feedback 3: Slow speed mode + Observe speed 16: High speed mode + Speed reference 17: High speed mode + Model speed 18: High speed mode + Speed feedback 19: High speed mode + Observe speed	0	-	Immediately	" H09.36" on page 286
H09.37	0x0925	Vibration monitoring time	0 to 65535	600	-	Immediately	" H09.37" on page 287
H09.38	0x0926	Frequency of low-frequency resonance suppression 1 at the mechanical end	1.0 Hz to 100.0 Hz	100	Hz	Immediately	" H09.38" on page 287
H09.39	0x0927	Low-frequency resonance suppression 1 at the mechanical end	0 to 3	2	-	At stop	" H09.39" on page 287
H09.44	0x092C	Frequency of low-frequency resonance suppression 2 at mechanical load end	0.0 to 100.0	0	-	Immediately	" H09.44" on page 288
H09.45	0x092D	Responsiveness of low-frequency resonance suppression 2 at mechanical load end	0.01 to 5.00	1	-	Immediately	" H09.45" on page 288

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H09.47	0x092F	Width of low-frequency resonance suppression 2 at mechanical load end	0.00 to 2.00	1	-	Immediately	" H09.47" on page 288
H09.49	0x0931	Frequency of low-frequency resonance suppression 3 at mechanical load end	0.0 to 100.0	0	-	Immediately	" H09.49" on page 288
H09.50	0x0932	Responsiveness of low-frequency resonance suppression 3 at mechanical load end	0.01 to 5.00	1	-	Immediately	" H09.50" on page 289
H09.52	0x0934	Width of low-frequency resonance suppression 3 at mechanical load end	0.00 to 2.00	1	-	Immediately	" H09.52" on page 289
H09.54	0x0936	Vibration threshold	0.0% to 300.0%	50	%	Immediately	" H09.54" on page 289
H09.56	0x0938	Max. overshoot allowed by ETune	0 to 65535	2936	-	Immediately	" H09.56" on page 289
H09.57	0x0939	STune resonance suppression switchover frequency	0 Hz to 4000 Hz	900	Hz	Immediately	" H09.57" on page 290
H09.58	0x093A	STune resonance suppression reset selection	0: Disable 1: Enable	0	-	Immediately	" H09.58" on page 290

6.11 Parameter Group H0A

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H0A.00	0x0A00	Power input phase loss protection	0: Enable 1: Disable	0	-	Immediately	" H0A.00" on page 290
H0A.01	0x0A01	Absolute position limit	0: Disabled 1: Enabled 2: Enabled after homing	0	-	Immediately	" H0A.01" on page 291
H0A.04	0x0A04	Motor overload protection gain	50 to 300	100	-	Immediately	" H0A.04" on page 291
H0A.08	0x0A08	Overspeed threshold	0 rpm to 20000 rpm	0	rpm	Immediately	" H0A.08" on page 291
H0A.09	0x0A09	Max. pulse input frequency in position control	100 kHz to 8000 kHz	8000	kHz	At stop	" H0A.09" on page 292
H0A.10	0x0A0A	Threshold of excessive local position deviation	0 to 4294967295	27486951	-	Immediately	" H0A.10" on page 292
H0A.12	0x0A0C	Runaway protection	0: Disable 1: Enable	1	-	Immediately	" H0A.12" on page 292
H0A.17	0x0A11	Reference pulse selection	0: Pulse unit 1: Reference unit	1	-	At stop	" H0A.17" on page 293
H0A.18	0x0A12	IGBT over-temperature threshold	120°C to 175°C	140	°C	Immediately	" H0A.18" on page 293
H0A.19	0x0A13	Filter time constant of touch probe 1	0.00 us to 6.30 us	2	us	Immediately	" H0A.19" on page 293
H0A.20	0x0A14	Filter time constant of touch probe 2	0.00 us to 6.30 us	2	us	Immediately	" H0A.20" on page 294
H0A.23	0x0A17	TZ signal filter time	0 ns to 31 ns	15	25 ns	At stop	" H0A.23" on page 294
H0A.24	0x0A18	Filter time constant of low-speed pulse input pin	0 ns to 255 ns	30	25 ns	At stop	" H0A.24" on page 294

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H0A.25	0x0A19	Speed display DO low-pass filter time	0 ms to 5000 ms	0	ms	Immediate ly	" H0A.25" on page 295
H0A.26	0x0A1A	Motor overload detection	0: Show motor overload warning (E909.0) and fault (E620.0) 1: Hide motor overload warning (E909.0) and fault (E620.0)	0	-	Immediate ly	" H0A.26" on page 295
H0A.27	0x0A1B	Average filter time for speed display DO	0 ms to 100 ms	50	ms	Immediate ly	" H0A.27" on page 295
H0A.29	0x0A1D	Fully closed-loop encoder (ABZ) filter time	bit0–bit7: Fully closed loop encoder (ABZ) pulse signal filtering time bit8–bit15: Fully closed loop encoder (ABZ) wire breakage filter time	4111	25 ns	At stop	" H0A.29" on page 295
H0A.30	0x0A1E	Filter time constant of high-speed pulse input pin	0 ns to 255 ns	3	ns	At stop	" H0A.30" on page 296
H0A.32	0x0A20	Motor stall over-temperature protection time window	10 ms to 65535 ms	200	ms	Immediate ly	" H0A.32" on page 296
H0A.33	0x0A21	Motor stall over-temperature detection	0: Hide 1: Enable	1	-	Immediate ly	" H0A.33" on page 296
H0A.36	0x0A24	Encoder multi-turn overflow fault selection	0: Not hide 1: Hide	0	-	Immediate ly	" H0A.36" on page 297
H0A.40	0x0A28	Compensa tion function selection	bit00: Overtravel compensation 0: Enabled 1: Disabled bit01: Touch probe rising edge compensation 0: Disabled 1: Enabled bit02: Touch probe falling edge compensation 0: Disabled 1: Enabled bit03: Touch probe edge solution 0: New solution 1: Old solution (same as SV660N)	6	-	At stop	" H0A.40" on page 297

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H0A.41	0x0A29	Forward position of software position limit	-2147483648 to 2147483647	2147483647	Encoder unit	At stop	" H0A.41" on page 297
H0A.43	0x0A2B	Reverse position of software position limit	-2147483648 to 2147483647	-2147483648	Encoder unit	At stop	" H0A.43" on page 298
H0A.49	0x0A31	Regenerative resistor overtemperature threshold	100°C to 175°C	140	°C	Immediately	" H0A.49" on page 298
H0A.50	0x0A32	Encoder communication fault tolerance threshold	0 to 31	5	-	Immediately	" H0A.50" on page 298
H0A.51	0x0A33	Phase loss detection filter times	3 ms to 36 ms	20	55 ms	Immediately	" H0A.51" on page 299
H0A.52	0x0A34	Encoder temperature protection threshold	0°C to 175°C	125	°C	Immediately	" H0A.52" on page 299
H0A.53	0x0A35	Touch probe DI ON compensation time	–3000 ns to 3000 ns	200	25 ns	Immediately	" H0A.53" on page 299
H0A.54	0x0A36	Touch probe DI OFF compensation time	–3000 ns to 3000 ns	1512	25 ns	Immediately	" H0A.54" on page 299
H0A.55	0x0A37	Runaway current threshold	100.0% to 400.0%	200	%	Immediately	" H0A.55" on page 300
H0A.56	0x0A38	Fault reset delay	0 ms to 60000 ms	10000	ms	Immediately	" H0A.56" on page 300
H0A.57	0x0A39	Runaway speed threshold	1 rpm to 1000 rpm	50	rpm	Immediately	" H0A.57" on page 300
H0A.58	0x0A3A	Runaway speed filter time	0.1 ms to 100.0 ms	2	ms	Immediately	" H0A.58" on page 300

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H0A.59	0x0A3B	Runaway protection detection time	10 ms to 1000 ms	30	ms	Immediately	" H0A.59" on page 300
H0A.60	0x0A3C	Black box function mode	0: Disable 1: Any fault 2: Designated fault 3: Triggered based on designated condition	1	-	Immediately	" H0A.60" on page 301
H0A.61	0x0A3D	Designated fault code	0.0 to 6553.5	0	-	Immediately	" H0A.61" on page 301
H0A.62	0x0A3E	Trigger source	0 to 25	0	-	Immediately	" H0A.62" on page 301
H0A.63	0x0A3F	Trigger level	-2147483648 to 2147483647	0	-	Immediately	" H0A.63" on page 302
H0A.65	0x0A41	Trigger level	0: Rising edge 1: Equal 2: Falling edge 3: Edge-triggered	0	-	Immediately	" H0A.65" on page 302
H0A.66	0x0A42	Trigger position	0% to 100%	75	%	Immediately	" H0A.66" on page 302
H0A.67	0x0A43	Sampling frequency	0: Current loop 1: Position loop 2: Main cycle	0	-	Immediately	" H0A.67" on page 302
H0A.70	0x0A46	Overspeed threshold 2	0 rpm to 20000 rpm	0	rpm	Immediately	" H0A.70" on page 303
H0A.71	0x0A47	MS1 motor overload curve switchover	0 to 65535	4098	-	Immediately	" H0A.71" on page 303
H0A.72	0x0A48	Maximum stop time in ramp-to-stop	0 ms to 65535 ms	10000	ms	At stop	" H0A.72" on page 303
H0A.73	0x0A49	STO 24 V disconnection filter time	1 ms to 5 ms	5	ms	Immediately	" H0A.73" on page 304
H0A.74	0x0A4A	Filter time for two inconsistent STO channels	1 ms to 1000 ms	100	ms	Immediately	" H0A.74" on page 304
H0A.75	0x0A4B	Servo OFF delay after STO triggered	0 ms to 25 ms	20	ms	Immediately	" H0A.75" on page 304

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H0A.90	0x0A5A	Moving average filter time for speed display values	0 ms to 100 ms	0	ms	Immediately	" H0A.90" on page 304
H0A.91	0x0A5B	Moving average filter time for torque display values	0 ms to 100 ms	0	ms	Immediately	" H0A.91" on page 305
H0A.92	0x0A5C	Moving average filter time for position display values	0 ms to 100 ms	0	ms	Immediately	" H0A.92" on page 305
H0A.93	0x0A5D	Low-pass filter time for voltage display values	0 ms to 250 ms	0	ms	Immediately	" H0A.93" on page 305
H0A.94	0x0A5E	Low-pass filter time for thermal display values	0 ms to 250 ms	0	ms	Immediately	" H0A.94" on page 305

6.12 Parameter Group H0b

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H0b.00	0x0B00	Motor speed actual value	–32767 RPM to +32767 RPM	0	rpm	Unchangeable	" H0b.00" on page 306
H0b.01	0x0B01	Speed reference	–32767 RPM to +32767 RPM	0	rpm	Unchangeable	" H0b.01" on page 306
H0b.02	0x0B02	Internal torque reference	-500.0% to 500.0%	0	%	Unchangeable	" H0b.02" on page 306
H0b.03	0x0B03	Monitored DI status	0 to 65535	0	-	Unchangeable	" H0b.03" on page 307
H0b.05	0x0B05	Monitored DO status	0 to 65535	0	-	Unchangeable	" H0b.05" on page 307

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H0b.07	0x0B07	Absolute position counter	–2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.07" on page 307
H0b.09	0x0B09	Mechanical angle	0.0° to 360.0°	0	°	Unchangeable	" H0b.09" on page 307
H0b.10	0x0B0A	Electrical angle	0.0° to 360.0°	0	°	Unchangeable	" H0b.10" on page 308
H0b.12	0x0B0C	Average load rate	0.0% to 800.0%	0	%	Unchangeable	" H0b.12" on page 308
H0b.13	0x0B0D	Input reference counter	–2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.13" on page 308
H0b.15	0x0B0F	Position following error (encoder unit)	–2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.15" on page 309
H0b.17	0x0B11	Feedback pulse counter	–2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.17" on page 309
H0b.19	0x0B13	Total power-on time	0.0s to 429496729.5s	0	s	Unchangeable	" H0b.19" on page 309
H0b.21	0x0B16	Displayed AI1 voltage	-12.000 V to 12.000 V	0	V	Unchangeable	" H0b.21" on page 310
H0b.24	0x0B18	RMS value of phase current	0.0 A to 6553.5 A	0	A	Unchangeable	" H0b.24" on page 310
H0b.25	0x0B19	Angle obtained upon voltage injection auto-tuning	0.0° to 360.0°	0	°	Unchangeable	" H0b.25" on page 310
H0b.26	0x0B1A	Bus voltage	0.0 V to 6553.5 V	0	V	Unchangeable	" H0b.26" on page 310
H0b.27	0x0B1B	Module temperature	-20°C to 200°C	0	°C	Unchangeable	" H0b.27" on page 311

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H0b.28	0x0B1C	Absolute encoder fault information given by FPGA	0 to 65535	0	-	Un changea ble	" H0b.28" on page 311
H0b.29	0x0B1D	Axis status information given by FPGA	0 to 65535	0	-	Un changea ble	" H0b.29" on page 311
H0b.30	0x0B1E	Axis fault information given by FPGA	0 to 65535	0	-	Un changea ble	" H0b.30" on page 311
H0b.31	0x0B1F	Encoder fault information	0 to 65535	0	-	Immedi ately	" H0b.31" on page 312
H0b.33	0x0B21	Fault log	0: Present fault 1: Last fault 2: 2nd to last fault 3: 3rd to last fault 4: 4th to last fault 5: 5th to last fault 6: 6th to last fault 7: 7th to last fault 8: 8th to last fault 9: 9th to last fault 10: 10th to last fault 11: 11th to last fault 12: 12th to last fault 13: 13th to last fault 14: 14th to last fault 15: 15th to last fault 16: 16th to last fault 17: 17th to last fault 18: 18th to last fault 19: 19th to last fault	0	-	Immedi ately	" H0b.33" on page 312
H0b.34	0x0B22	Fault code of the selected fault	0 to 65535	0	-	Un changea ble	" H0b.34" on page 313
H0b.35	0x0B23	Time stamp upon occurrence of the selected fault	0.0s to 429496729.5s	0	s	Un changea ble	" H0b.35" on page 313

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H0b.37	0x0B25	Motor speed upon occurrence of the selected fault	–32767 RPM to +32767 RPM	0	rpm	Unchangeable	" H0b.37" on page 313
H0b.38	0x0B26	Motor phase U current upon occurrence of the selected fault	-3276.7 A to 3276.7 A	0	A	Unchangeable	" H0b.38" on page 313
H0b.39	0x0B27	Motor phase V current upon occurrence of the selected fault	-3276.7 A to 3276.7 A	0	A	Unchangeable	" H0b.39" on page 313
H0b.40	0x0B28	Bus voltage upon occurrence of the selected fault	0.0 V to 6553.5 V	0	V	Unchangeable	" H0b.40" on page 314
H0b.41	0x0B29	DI status upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.41" on page 314
H0b.43	0x0B2B	DO status upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.43" on page 314
H0b.45	0x0B2D	Internal fault code	0 to 65535	0	-	Unchangeable	" H0b.45" on page 314

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H0b.46	0x0B2E	Absolute encoder error information given by FPGA upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.46" on page 315
H0b.47	0x0B2F	System status information given by FPGA upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.47" on page 315
H0b.48	0x0B30	System fault information given by FPGA upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.48" on page 315
H0b.49	0x0B31	Encoder fault information upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.49" on page 315
H0b.51	0x0B33	Internal fault code upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.51" on page 316

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H0b.52	0x0B34	FPGA timeout fault standard bit upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.52" on page 316
H0b.53	0x0B35	Position following error (reference unit)	–2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.53" on page 316
H0b.55	0x0B37	Motor speed actual value	–2147483648 RPM to +2147483647 RPM	0	rpm	Unchangeable	" H0b.55" on page 317
H0b.57	0x0B39	Bus voltage of the control circuit	0.0 V to 6553.5 V	0	V	Unchangeable	" H0b.57" on page 317
H0b.58	0x0B3A	Mechanical absolute position (low 32 bits)	–2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.58" on page 317
H0b.60	0x0B3C	Mechanical absolute position (high 32 bits)	–2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.60" on page 317
H0b.63	0x0B3F	NotRdy state	1: Control circuit error 2: Main circuit power input error 3: Bus undervoltage 4: Soft start failed 5: Encoder initialization undone 6: Short circuit to ground failed 7: Others	0	-	Unchangeable	" H0b.63" on page 318
H0b.64	0x0B40	Real-time input position reference counter	-2147483648 to 2147483647	0	Reference unit	Unchangeable	" H0b.64" on page 318
H0b.66	0x0B42	Encoder temperature	-32768°C to 32767°C	0	°C	Unchangeable	" H0b.66" on page 318
H0b.67	0x0B43	Load rate of regenerative resistor	0.0% to 200.0%	0	%	Unchangeable	" H0b.67" on page 319

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H0b.70	0x0B46	Number of absolute encoder revolutions	0 Rev to 65535 Rev	0	Rev	Unchangeable	" H0b.70" on page 319
H0b.71	0x0B47	Single-turn position fed back by the absolute encoder	0 p to 2147483647 p	0	p	Unchangeable	" H0b.71" on page 319
H0b.74	0x0B4A	System fault information given by FPGA	0 to 65535	0	-	Unchangeable	" H0b.74" on page 319
H0b.77	0x0B4D	Encoder position (low 32 bits)	–2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.77" on page 319
H0b.79	0x0B4F	Encoder position (high 32 bits)	–2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.79" on page 320
H0b.81	0x0B51	Single-turn position of the rotary load (low 32 bits)	–2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.81" on page 320
H0b.83	0x0B53	Single-turn position of the rotary load (high 32 bits)	–2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.83" on page 320
H0b.85	0x0B55	Single-turn position of the rotary load (reference unit)	–2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.85" on page 321
H0b.87	0x0B57	IGBT junction temperature	0 to 200	0	-	Unchangeable	" H0b.87" on page 321
H0b.90	0x0B5A	Group No. of the abnormal parameter	0 to 65535	0	-	Unchangeable	" H0b.90" on page 321

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H0b.91	0x0B5B	Offset within the group of the abnormal parameter	0 to 65535	0	-	Un changea ble	" H0b.91" on page 321
H0b.93	0x0B5D	Closed loop state	0: Half closed loop 1: Fully closed loop	0	-	Un changea ble	" H0b.93" on page 322
H0b.94	0x0B5E	Individual power-on time	0.0s to 429496729.5s	0	s	Un changea ble	" H0b.94" on page 322
H0b.96	0x0B60	Individual power-on time upon occurrence of the selected fault	0.0s to 429496729.5s	0	s	Un changea ble	" H0b.96" on page 322

6.13 Parameter Group H0d

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0d.00	0x0D00	Software reset	0: No operation 1: Enable	0	-	At stop	" H0d.00" on page 322
H0d.01	0x0D01	Fault reset	0: No operation 1: Enable	0	-	At stop	" H0d.01" on page 323
H0d.02	0x0D02	Inertia auto-tuning selection	0 to 65	0	-	At once	" H0d.02" on page 323
H0d.04	0x0D04	Read/write in encoder ROM	0: No operation 1: Write ROM 2: Read ROM 3: ROM failure	0	-	At stop	" H0d.04" on page 323
H0d.05	0x0D05	Emergency stop	0: No operation 1: Enable	0	-	At once	" H0d.05" on page 324
H0d.10	0x0D0A	Auto-tuning of analog channel	0: No operation 1: Adjust AI1	0	-	At stop	" H0d.10" on page 324
H0d.12	0x0D0C	Phase U/V current balance correction	0: Disable 1: Enable	0	-	At stop	" H0d.12" on page 324

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0d.17	0x0D11	Forced DI/DO enable switch	bit 0: Forced DI enable switch 0: Disable 1: Enable bit 1: Forced DO enable switch 0: Disable 1: Enable	0	-	At once	" H0d.17" on page 325
H0d.18	0x0D12	Forced DI value	0 to 255	255	-	At once	" H0d.18" on page 325
H0d.19	0x0D13	Forced DO value	0 to 31	0	-	At once	" H0d.19" on page 325
H0d.20	0x0D14	Absolute encoder reset selection	0: No operation 1: Reset the fault 2: Reset the fault and multi-turn data 3: Reset Inovance 2nd encoder fault 4: Reset Inovance 2nd encoder fault and multi-turn data	0	-	At stop	" H0d.20" on page 326
H0d.23	0x0D17	Torque fluctuation auto-tuning	0 to 1	0	-	At stop	" H0d.23" on page 326
H0d.26	0x0D1A	Brake and dynamic brake started forcibly	0: Disable 1: Dynamic brake deactivated forcibly 2: Brake released forcibly 3: Dynamic brake deactivated and brake released forcibly	0	-	At stop	" H0d.26" on page 326

6.14 Parameter Group H0E

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H0E.00	0x0E00	Node address	1 to 127	1	-	At stop	" H0E.00" on page 327
H0E.01	0x0E01	Save objects written through communication to EEPROM	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	-	Immediately	" H0E.01" on page 327

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H0E.03	0x0E03	Save objects written through software (commissioning protocol) to e2prom	0: Do not save 1: Save	1	-	Immediately	" H0E.03" on page 327
H0E.04	0x0E04	Save objects written through communication to e2prom (excluding commissioning protocol)	0: Do not save 1: Save	0	-	Immediately	" H0E.04" on page 328
H0E.80	0x0E50	Modbus baud rate	0: 300 bps 1: 600 bps 2: 1200 bps 3: 2400 bps 4: 4800 bps 5: 9600 bps 6: 19200 bps 7: 38400 bps 8: 57600 bps 9: 115200 bps	9	-	Immediately	" H0E.80" on page 328
H0E.81	0x0E51	Modbus data format	0: No parity, 2 stop bits (N-2) 1: Even parity, 1 stop bit (E-1) 2: Odd parity, 1 stop bit (O-1) 3: No parity, 1 stop bit (N-1)	3	-	Immediately	" H0E.81" on page 328
H0E.82	0x0E52	Modbus response delay	0 ms to 20 ms	0	ms	Immediately	" H0E.82" on page 329
H0E.83	0x0E53	Modbus communication timeout	0 ms to 600 ms	0	ms	Immediately	" H0E.83" on page 329
H0E.84	0x0E54	Sequence of Modbus communication data bits	0: High bits before low bits 1: Low bits before high bits	1	-	Immediately	" H0E.84" on page 329
H0E.90	0x0E5A	Modbus version	0.00 to 655.35	0	-	Unchangeable	" H0E.90" on page 330

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H0E.97	0x0E61	Communication monitoring parameter 1	0 to 65535	0	-	Immediately	" H0E.97" on page 330
H0E.98	0x0E62	Communication monitoring parameter 2	0 to 65535	0	-	Immediately	" H0E.98" on page 330

6.15 Parameter Group H0F

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H0F.00	0x0F00	Encoder feedback mode	0: Internal encoder feedback 1: External encoder feedback 2: Inner/Outer loop switchover	0	-	Immediately	" H0F.00" on page 330
H0F.01	0x0F01	External encoder usage mode	0: Standard operating direction 1: Reverse operating direction	0	-	Immediately	" H0F.01" on page 331
H0F.02	0x0F02	External encoder absolute value	0: Incremental mode 1: Absolute linear mode	0	-	At stop	" H0F.02" on page 331
H0F.03	0x0F03	External encoder feedback type	0: Quadrature pulse	0	-	At stop	" H0F.03" on page 332
H0F.04	0x0F04	External encoder pulses per revolution	0 to 2147483647	10000	-	At stop	" H0F.04" on page 332
H0F.08	0x0F08	Excessive deviation threshold in compound control mode	0 to 2147483647	1000	-	Immediately	" H0F.08" on page 333
H0F.10	0x0F0A	Clear deviation in compound control mode	0 R to 100 R	1	R	Immediately	" H0F.10" on page 333

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H0F.13	0x0F0D	Compound vibration suppression filter time	0.0 ms to 6553.5 ms	0	ms	At stop	" H0F.13" on page 333
H0F.16	0x0F10	Pulse deviation display in compound control mode	-2147483648 to 2147483647	0	Reference unit	Unchangeable	" H0F.16" on page 334
H0F.18	0x0F12	Internal position pulse feedback display	-2147483648 to 2147483647	0	Reference unit	Unchangeable	" H0F.18" on page 334
H0F.20	0x0F14	External position pulse feedback display	-2147483648 to 2147483647	0	Reference unit	Unchangeable	" H0F.20" on page 334
H0F.22	0x0F16	External encoder phase Z detection invalid (quadrature pulse feedback)	0: Detected 1: Not detected	0	-	Immediately	" H0F.22" on page 335
H0F.25	0x0F19	Set the source of touch probe Z signal in fully closed-loop mode.	0: Motor Z signal 1: External feedback Z signal	0	-	Immediately	" H0F.25" on page 335
H0F.45	0x0F2D	Positioning completed/ Position deviation threshold in fully closed-loop mode	0: Threshold scaled to outer loop unit 1: Same threshold used for inner and outer loops	0	-	At stop	" H0F.45" on page 335
H0F.46	0x0F2E	Fully closed-loop speed feedback selection	0: Internal encoder feedback 1: External encoder feedback	0	-	At stop	" H0F.46" on page 336

6.16 Parameter Group H11

Param. No.	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H11.00	2011.01h	Multi-position operation 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	" H11.00" on page 336
H11.01	2011.02h	Number of displacement references in multi-position mode	1 to 16	1	-	At stop	" H11.01" on page 340
H11.02	2011.03h	Starting displacement No. after pause	0: Continue to execute the unexecuted displacements 1: Start from displacement 1	0	-	At stop	" H11.02" on page 340
H11.03	2011.04h	Interval time unit	0: ms 1: s	0	-	At stop	" H11.03" on page 341
H11.04	2011.05h	Displacement reference type	0: Relative displacement reference 1: Absolute displacement reference	0	-	Immediately	" H11.04" on page 341
H11.05	2011.06h	Starting displacement No. in sequential operation	0 to 16	0	-	At stop	" H11.05" on page 342
H11.09	2011.0Ah	Deceleration upon axis control OFF	0 ms to 65535 ms	65535	ms	Immediately	" H11.09" on page 342
H11.10	2011.0Bh	Starting speed of displacement 1	0 rpm to 10000 rpm	0	rpm	Immediately	" H11.10" on page 342
H11.11	2011.0Ch	Stop speed of displacement 1	0 rpm to 10000 rpm	0	rpm	Immediately	" H11.11" on page 343

Param. No.	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H11.12	2011.0Dh	Displacement 1	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.12" on page 343
H11.14	2011.0Fh	Max. speed of displacement 1	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.14" on page 343
H11.15	2011.10h	Acc/Dec time of displacement 1	0 ms to 65535 ms	10	ms	Immediately	" H11.15" on page 343
H11.16	2011.11h	Interval time after displacement 1	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.16" on page 344
H11.17	2011.12h	Displacement 2	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.17" on page 344
H11.19	2011.14h	Max. speed of displacement 2	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.19" on page 345
H11.20	2011.15h	Acc/Dec time of displacement 2	0 ms to 65535 ms	10	ms	Immediately	" H11.20" on page 345
H11.21	2011.16h	Interval time after displacement 2	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.21" on page 345
H11.22	2011.17h	Displacement 3	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.22" on page 345
H11.24	2011.19h	Max. speed of displacement 3	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.24" on page 346
H11.25	2011.1Ah	Acc/Dec time of displacement 3	0 ms to 65535 ms	10	ms	Immediately	" H11.25" on page 346
H11.26	2011.1Bh	Interval time after displacement 3	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.26" on page 346

Param. No.	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H11.27	2011.1Ch	Displacement 4	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.27" on page 346
H11.29	2011.1Eh	Max. speed of displacement 4	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.29" on page 347
H11.30	2011.1Fh	Acc/Dec time of displacement 4	0 ms to 65535 ms	10	ms	Immediately	" H11.30" on page 347
H11.31	2011.20h	Interval time after displacement 4	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.31" on page 347
H11.32	2011.21h	Displacement 5	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.32" on page 347
H11.34	2011.23h	Max. speed of displacement 5	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.34" on page 348
H11.35	2011.24h	Acc/Dec time of displacement 5	0 ms to 65535 ms	10	ms	Immediately	" H11.35" on page 348
H11.36	2011.25h	Interval time after displacement 5	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.36" on page 348
H11.37	2011.26h	Displacement 6	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.37" on page 348
H11.39	2011.28h	Max. speed of displacement 6	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.39" on page 349
H11.40	2011.29h	Acc/Dec time of displacement 6	0 ms to 65535 ms	10	ms	Immediately	" H11.40" on page 349
H11.41	2011.2Ah	Interval time after displacement 6	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.41" on page 349

Param. No.	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H11.42	2011.2Bh	Displacement 7	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.42" on page 349
H11.44	2011.2Dh	Max. speed of displacement 7	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.44" on page 350
H11.45	2011.2Eh	Acc/Dec time of displacement 7	0 ms to 65535 ms	10	ms	Immediately	" H11.45" on page 350
H11.46	2011.2Fh	Interval time after displacement 7	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.46" on page 350
H11.47	2011.30h	Displacement 8	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.47" on page 350
H11.49	2011.32h	Max. speed of displacement 8	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.49" on page 351
H11.50	2011.33h	Acc/Dec time of displacement 8	0 ms to 65535 ms	10	ms	Immediately	" H11.50" on page 351
H11.51	2011.34h	Interval time after displacement 8	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.51" on page 351
H11.52	2011.35h	Displacement 9	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.52" on page 351
H11.54	2011.37h	Max. speed of displacement 9	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.54" on page 352
H11.55	2011.38h	Acc/Dec time of displacement 9	0 ms to 65535 ms	10	ms	Immediately	" H11.55" on page 352
H11.56	2011.39h	Interval time after displacement 9	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.56" on page 352

Param. No.	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H11.57	2011.3Ah	Displacement 10	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.57" on page 352
H11.59	2011.3Ch	Max. speed of displacement 10	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.59" on page 353
H11.60	2011.3Dh	Acc/Dec time of displacement 10	0 ms to 65535 ms	10	ms	Immediately	" H11.60" on page 353
H11.61	2011.3Eh	Interval time after displacement 10	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.61" on page 353
H11.62	2011.3Fh	Displacement 11	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.62" on page 353
H11.64	2011.41h	Max. speed of displacement 11	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.64" on page 354
H11.65	2011.42h	Acc/Dec time of displacement 11	0 ms to 65535 ms	10	ms	Immediately	" H11.65" on page 354
H11.66	2011.43h	Interval time after displacement 11	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.66" on page 354
H11.67	2011.44h	Displacement 12	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.67" on page 354
H11.69	2011.46h	Max. speed of displacement 12	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.69" on page 355
H11.70	2011.47h	Acc/Dec time of displacement 12	0 ms to 65535 ms	10	ms	Immediately	" H11.70" on page 355
H11.71	2011.48h	Interval time after displacement 12	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.71" on page 355

Param. No.	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H11.72	2011.49h	Displacement 13	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.72" on page 355
H11.74	2011.4Bh	Max. speed of displacement 13	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.74" on page 356
H11.75	2011.4Ch	Acc/Dec time of displacement 13	0 ms to 65535 ms	10	ms	Immediately	" H11.75" on page 356
H11.76	2011.4Dh	Interval time after displacement 13	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.76" on page 356
H11.77	2011.4Eh	Displacement 14	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.77" on page 356
H11.79	2011.50h	Max. speed of displacement 14	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.79" on page 357
H11.80	2011.51h	Acc/Dec time of displacement 14	0 ms to 65535 ms	10	ms	Immediately	" H11.80" on page 357
H11.81	2011.52h	Interval time after displacement 14	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.81" on page 357
H11.82	2011.53h	Displacement 15	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.82" on page 357
H11.84	2011.55h	Max. speed of displacement 15	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.84" on page 358
H11.85	2011.56h	Acc/Dec time of displacement 15	0 ms to 65535 ms	10	ms	Immediately	" H11.85" on page 358
H11.86	2011.57h	Interval time after displacement 15	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.86" on page 358

Param. No.	Hexadecimal Parameters	Parameter Name	Setpoint	Default	Unit	Change Method	Page
H11.87	2011.58h	Displacement 16	-1073741824 to 1073741824	10000	Reference unit	Immediately	" H11.87" on page 358
H11.89	2011.5Ah	Max. speed of displacement 16	1 rpm to 10000 rpm	200	rpm	Immediately	" H11.89" on page 359
H11.90	2011.5Bh	Acc/Dec time of displacement 16	0 ms to 65535 ms	10	ms	Immediately	" H11.90" on page 359
H11.91	2011.5Ch	Interval time after displacement 16	0 ms (s)–10000 ms (s)	10	ms (s)	Immediately	" H11.91" on page 359

6.17 Parameter Group H12

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H12.00	0x1200	Multi-speed operation mode	0: Stop after running for one cycle (number of speeds defined by H12.01) 1: Cyclic operation (number of speeds defined by H12.01) 2: DI-based operation	1	-	At stop	" H12.00" on page 359
H12.01	0x1201	Number of speed references in multi-speed mode	1 to 16	16	-	At stop	" H12.01" on page 361
H12.02	0x1202	Operating time unit	0: s 1: min	0	-	At stop	" H12.02" on page 362
H12.03	0x1203	Acceleration time 1	0 ms to 65535 ms	10	ms	Immediately	" H12.03" on page 362
H12.04	0x1204	Deceleration time 1	0 ms to 65535 ms	10	ms	Immediately	" H12.04" on page 363
H12.05	0x1205	Acceleration time 2	0 ms to 65535 ms	50	ms	Immediately	" H12.05" on page 363
H12.06	0x1206	Deceleration time 2	0 ms to 65535 ms	50	ms	Immediately	" H12.06" on page 363

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H12.07	0x1207	Acceleration time 3	0 ms to 65535 ms	100	ms	Immediately	" H12.07" on page 364
H12.08	0x1208	Deceleration time 3	0 ms to 65535 ms	100	ms	Immediately	" H12.08" on page 364
H12.09	0x1209	Acceleration time 4	0 ms to 65535 ms	150	ms	Immediately	" H12.09" on page 364
H12.10	0x120A	Deceleration time 4	0 ms to 65535 ms	150	ms	Immediately	" H12.10" on page 365
H12.20	0x1214	1st speed reference	–10000 RPM to +10000 RPM	0	rpm	Immediately	" H12.20" on page 365
H12.21	0x1215	Operating time of speed 1	0.0s(m) to 6553.5s(m)	5	s (m)	Immediately	" H12.21" on page 365
H12.22	0x1216	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	-	Immediately	" H12.22" on page 366
H12.23	0x1217	Speed reference for speed 2	–10000 RPM to +10000 RPM	100	rpm	Immediately	" H12.23" on page 368
H12.24	0x1218	Operating time of speed 2	0.0s(m) to 6553.5s(m)	5	s (m)	Immediately	" H12.24" on page 369
H12.25	0x1219	2nd speed rise/drop and curve smoothing parameter time	See " H12.22" on page 366 for details.	0	-	Immediately	" H12.25" on page 369
H12.26	0x121A	3rd speed reference	–10000 RPM to +10000 RPM	300	rpm	Immediately	" H12.26" on page 369

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H12.27	0x121B	Operating time of speed 3	0.0s(m) to 6553.5s(m)	5	s (m)	Immedi ately	" H12.27" on page 369
H12.28	0x121C	3rd speed rise/drop and curve smoothing parameter time	See " H12.22" on page 366 for details.	0	-	Immedi ately	" H12.28" on page 370
H12.29	0x121D	Speed reference for speed 4	–10000 RPM to +10000 RPM	500	rpm	Immedi ately	" H12.29" on page 370
H12.30	0x121E	Operating time of speed 4	0.0s(m) to 6553.5s(m)	5	s (m)	Immedi ately	" H12.30" on page 370
H12.31	0x121F	4th speed rise/drop and curve smoothing parameter time	See " H12.22" on page 366 for details.	0	-	Immedi ately	" H12.31" on page 370
H12.32	0x1220	Speed reference for speed 5	–10000 RPM to +10000 RPM	700	rpm	Immedi ately	" H12.32" on page 371
H12.33	0x1221	Operating time of speed 5	0.0s(m) to 6553.5s(m)	5	s (m)	Immedi ately	" H12.33" on page 371
H12.34	0x1222	5th speed rise/drop and curve smoothing parameter time	See " H12.22" on page 366 for details.	0	-	Immedi ately	" H12.34" on page 371
H12.35	0x1223	Speed reference for speed 6	–10000 RPM to +10000 RPM	900	rpm	Immedi ately	" H12.35" on page 371
H12.36	0x1224	Operating time of speed 6	0.0s(m) to 6553.5s(m)	5	s (m)	Immedi ately	" H12.36" on page 372
H12.37	0x1225	6th speed rise/drop and curve smoothing parameter time	See " H12.22" on page 366 for details.	0	-	Immedi ately	" H12.37" on page 372

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H12.38	0x1226	Speed reference for speed 7	–10000 RPM to +10000 RPM	600	rpm	Immedi ately	" H12.38" on page 372
H12.39	0x1227	Operating time of speed 7	0.0s(m) to 6553.5s(m)	5	s (m)	Immedi ately	" H12.39" on page 372
H12.40	0x1228	7th speed rise/drop and curve smoothing parameter time	See " H12.22" on page 366 for details.	0	-	Immedi ately	" H12.40" on page 373
H12.41	0x1229	Speed reference for speed 8	–10000 RPM to +10000 RPM	300	rpm	Immedi ately	" H12.41" on page 373
H12.42	0x122A	8th speed rise/drop and curve smoothing parameter time	0.0s(m) to 6553.5s(m)	5	s (m)	Immedi ately	" H12.42" on page 373
H12.43	0x122B	Accelera tion/ Deceleration time of speed 8	See " H12.22" on page 366 for details.	0	-	Immedi ately	" H12.43" on page 373
H12.44	0x122C	Speed reference for speed 9	–10000 RPM to +10000 RPM	100	rpm	Immedi ately	" H12.44" on page 374
H12.45	0x122D	Operating time of speed 9	0.0s(m) to 6553.5s(m)	5	s (m)	Immedi ately	" H12.45" on page 374
H12.46	0x122E	9th speed rise/drop and curve smoothing parameter time	See " H12.22" on page 366 for details.	0	-	Immedi ately	" H12.46" on page 374
H12.47	0x122F	Speed reference for speed 10	–10000 RPM to +10000 RPM	-100	rpm	Immedi ately	" H12.47" on page 374
H12.48	0x1230	Operating time of speed 10	0.0s(m) to 6553.5s(m)	5	s (m)	Immedi ately	" H12.48" on page 375

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H12.49	0x1231	10th speed rise/drop and curve smoothing parameter time	See " H12.22" on page 366 for details.	0	-	Immediately	" H12.49" on page 375
H12.50	0x1232	Speed reference for speed 11	–10000 RPM to +10000 RPM	-300	rpm	Immediately	" H12.50" on page 375
H12.51	0x1233	Operating time of speed 11	0.0s(m) to 6553.5s(m)	5	s (m)	Immediately	" H12.51" on page 375
H12.52	0x1234	11th speed rise/drop and curve smoothing parameter time	See " H12.22" on page 366 for details.	0	-	Immediately	" H12.52" on page 376
H12.53	0x1235	Speed reference for speed 12	–10000 RPM to +10000 RPM	-500	rpm	Immediately	" H12.53" on page 376
H12.54	0x1236	Operating time of speed 12	0.0s(m) to 6553.5s(m)	5	s (m)	Immediately	" H12.54" on page 376
H12.55	0x1237	12th speed rise/drop and curve smoothing parameter time	See " H12.22" on page 366 for details.	0	-	Immediately	" H12.55" on page 376
H12.56	0x1238	Speed reference for speed 13	–10000 RPM to +10000 RPM	-700	rpm	Immediately	" H12.56" on page 377
H12.57	0x1239	Operating time of speed 13	0.0s(m) to 6553.5s(m)	5	s (m)	Immediately	" H12.57" on page 377
H12.58	0x123A	13th speed rise/drop and curve smoothing parameter time	See " H12.22" on page 366 for details.	0	-	Immediately	" H12.58" on page 377
H12.59	0x123B	Speed reference for speed 14	–10000 RPM to +10000 RPM	-900	rpm	Immediately	" H12.59" on page 377

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H12.60	0x123C	Operating time of speed 14	0.0s(m) to 6553.5s(m)	5	s (m)	Immedi ately	" H12.60" on page 378
H12.61	0x123D	14th speed rise/drop and curve smoothing parameter time	See " H12.22" on page 366 for details.	0	-	Immedi ately	" H12.61" on page 378
H12.62	0x123E	Speed reference for speed 15	–10000 RPM to +10000 RPM	-600	rpm	Immedi ately	" H12.62" on page 378
H12.63	0x123F	Operating time of speed 15	0.0s(m) to 6553.5s(m)	5	s (m)	Immedi ately	" H12.63" on page 378
H12.64	0x1240	15th speed rise/drop and curve smoothing parameter time	See " H12.22" on page 366 for details.	0	-	Immedi ately	" H12.64" on page 379
H12.65	0x1241	Speed reference for speed 16	–10000 RPM to +10000 RPM	-300	rpm	Immedi ately	" H12.65" on page 379
H12.66	0x1242	Operating time of speed 16	0.0s(m) to 6553.5s(m)	5	s (m)	Immedi ately	" H12.66" on page 379
H12.67	0x1243	16th speed rise/drop and curve smoothing parameter time	See " H12.22" on page 366 for details.	0	-	Immedi ately	" H12.67" on page 379

6.18 Parameter Group H17

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H17.90	0x175A	Communication VDI enabling	0: Disable 1: Enable	0	-	At stop	" H17.90" on page 380
H17.91	0x175B	VDI default value upon 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	-	Immediately	" H17.91" on page 380
H17.00	0x1700	VDI1 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.00" on page 381
H17.01	0x1701	VDI1 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.01" on page 382
H17.02	0x1702	VDI2 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.02" on page 383
H17.03	0x1703	VDI2 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.03" on page 383
H17.04	0x1704	VDI3 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.04" on page 383
H17.05	0x1705	VDI3 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.05" on page 384
H17.06	0x1706	VDI4 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.06" on page 384
H17.07	0x1707	VDI4 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.07" on page 384
H17.08	0x1708	VDI5 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.08" on page 384

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H17.09	0x1709	VDI5 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.09" on page 385
H17.10	0x170A	VDI6 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.10" on page 385
H17.11	0x170B	VDI6 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.11" on page 385
H17.12	0x170C	VDI7 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.12" on page 386
H17.13	0x170D	VDI7 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.13" on page 386
H17.14	0x170E	VDI8 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.14" on page 386
H17.15	0x170F	VDI8 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.15" on page 386
H17.16	0x1710	VDI9 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.16" on page 387
H17.17	0x1711	VDI9 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.17" on page 387
H17.18	0x1712	VDI10 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.18" on page 387
H17.19	0x1713	VDI10 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.19" on page 388
H17.20	0x1714	VDI11 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.20" on page 388
H17.21	0x1715	VDI11 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.21" on page 388
H17.22	0x1716	VDI12 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.22" on page 388
H17.23	0x1717	VDI12 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.23" on page 389
H17.24	0x1718	VDI13 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.24" on page 389

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H17.25	0x1719	VDI13 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.25" on page 389
H17.26	0x171A	VDI14 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.26" on page 390
H17.27	0x171B	VDI14 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.27" on page 390
H17.28	0x171C	VDI15 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.28" on page 390
H17.29	0x171D	VDI15 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.29" on page 390
H17.30	0x171E	VDI16 function selection	See " H17.00" on page 381 for details.	0	-	Immediately	" H17.30" on page 391
H17.31	0x171F	VDI16 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	Immediately	" H17.31" on page 391
H17.92	0x175C	Communication VDO enabling	0: Disable 1: Enable	0	-	At stop	" H17.92" on page 391
H17.93	0x175D	VDO default value upon 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	" H17.93" on page 392
H17.32	0x1720	VDO virtual level	0 to 65535	0	-	Unchangeable	" H17.32" on page 392
H17.33	0x1721	VDO1 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.33" on page 393

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H17.34	0x1722	VDO1 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.34" on page 394
H17.35	0x1723	VDO2 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.35" on page 394
H17.36	0x1724	VDO2 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.36" on page 394
H17.37	0x1725	VDO3 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.37" on page 394
H17.38	0x1726	VDO3 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.38" on page 395
H17.39	0x1727	VDO4 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.39" on page 395
H17.40	0x1728	VDO4 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.40" on page 395
H17.41	0x1729	VDO5 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.41" on page 396
H17.42	0x172A	VDO5 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.42" on page 396
H17.43	0x172B	VDO6 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.43" on page 396
H17.44	0x172C	VDO6 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.44" on page 396
H17.45	0x172D	VDO7 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.45" on page 397
H17.46	0x172E	VDO7 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.46" on page 397
H17.47	0x172F	VDO8 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.47" on page 397
H17.48	0x1730	VDO8 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.48" on page 398
H17.49	0x1731	VDO9 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.49" on page 398
H17.50	0x1732	VDO9 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.50" on page 398
H17.51	0x1733	VDO10 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.51" on page 398

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H17.52	0x1734	VDO10 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.52" on page 399
H17.53	0x1735	VDO11 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.53" on page 399
H17.54	0x1736	VDO11 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.54" on page 399
H17.55	0x1737	VDO12 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.55" on page 400
H17.56	0x1738	VDO12 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.56" on page 400
H17.57	0x1739	VDO13 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.57" on page 400
H17.58	0x173A	VDO13 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.58" on page 400
H17.59	0x173B	VDO14 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.59" on page 401
H17.60	0x173C	VDO14 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.60" on page 401
H17.61	0x173D	VDO15 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.61" on page 401
H17.62	0x173E	VDO15 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.62" on page 402
H17.63	0x173F	VDO16 function selection	See " H17.33" on page 393 for details.	0	-	Immediately	" H17.63" on page 402
H17.64	0x1740	VDO16 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	Immediately	" H17.64" on page 402

6.19 Parameter Group H18

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H18.00	0x1800	Position comparison output selection	0: Disable 1: Enable (rising edge-triggered)	0	-	Immediately	" H18.00" on page 402
H18.01	0x1801	Position comparison output feedback source	0: Motor encoder feedback 1: Fully closed-loop position feedback	0	-	Immediately	" H18.01" on page 403
H18.02	0x1802	Position comparison resolution	0: 24-bit 1: 23-bit 2: 22-bit 3: 21-bit 4: 20-bit 5: 19-bit 6: 18-bit 7: 17-bit	0	-	Immediately	" H18.02" on page 403
H18.03	0x1803	Position comparison mode	0: Individual comparison mode 1: Cyclic comparison mode 2: Fixed cyclic comparison mode	0	-	Immediately	" H18.03" on page 403
H18.04	0x1804	Current position as zero	0: Disable 1: Enable (rising edge-triggered) Note: This function needs to be used when the comparison state is inactive, otherwise the comparison logic may malfunction.	0	-	Immediately	" H18.04" on page 404
H18.05	0x1805	Position comparison output width	0.1 ms to 204.7 ms	0.1	ms	Immediately	" H18.05" on page 404
H18.06	0x1806	Position comparison output ABZ port polarity	Bit 0: OCZ output logic 0: Positive, output high level upon active logic 1: Negative, output low level upon active logic Bit 1: Z port output logic 0: Positive, output high level upon active logic 1: Negative, output low level upon active logic bit2: A/B output logic 0: Positive, output high level upon active logic 1: Negative, output low level upon active logic	0	-	Immediately	" H18.06" on page 404

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H18.07	0x1807	Start point of position comparison	0 to 40	0	-	Immedi ately	" H18.07" on page 405
H18.08	0x1808	End point of position comparison	0 to 40	0	-	Immedi ately	" H18.08" on page 405
H18.09	0x1809	Current status of position comparison	0 to 1024	0	-	Unchange able	" H18.09" on page 405
H18.10	0x180A	Real-time position of position comparison	-2147483648 to 2147483647	0	-	Unchange able	" H18.10" on page 406
H18.12	0x180C	Zero offset of position comparison	-2147483648 to 2147483647	0	-	Immedi ately	" H18.12" on page 406
H18.14	0x180E	Position comparison output delay compensa tion	–12.00 µs to +12.00 µs	0	us	Immedi ately	" H18.14" on page 406
H18.15	0x180F	Fixed cyclic comparison	1 to 65535	1	-	Immedi ately	" H18.15" on page 406
H18.16	0x1810	ABZ output function setting	Bit 0: OCZ output function 0: Frequency-division output 1: Position comparison Bit 1: Z port output function 0: Frequency-division output 1: Position comparison bit2: A/B port output function 0: Frequency-division output 1: Position comparison	0	-	Immedi ately	" H18.16" on page 407
H18.17	0x1811	Number of fixed mode cycles	0 to 65535	1	-	Unchange able	" H18.17" on page 407

6.20 Parameter Group H19

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H19.00	0x1900	Target value of position comparison 1	-2147483648 to 2147483647	0	-	Immediately	" H19.00" on page 408
H19.02	0x1902	Attribute value of position comparison 1	Bit 0: Current position changes from "less than" to "more than" the comparison point Bit 1: Current position changes from "more than" to "less than" the comparison point bit2 to bit6: Reserved bit7: DO1 output bit8: DO2 output bit9: DO3 output bit10: DO4 output bit11: DO5 output bit12: Frequency-division A output bit13: Frequency-division B output bit14: Frequency-division Z output bit15: Frequency-division OCZ output	0	-	Immediately	" H19.02" on page 408
H19.03	0x1903	Target value of position comparison 2	-2147483648 to 2147483647	0	-	Immediately	" H19.03" on page 409
H19.05	0x1905	Attribute value of position comparison 2	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.05" on page 409
H19.06	0x1906	Target value of position comparison 3	-2147483648 to 2147483647	0	-	Immediately	" H19.06" on page 409
H19.08	0x1908	Attribute value of position comparison 3	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.08" on page 409
H19.09	0x1909	Target value of position comparison 4	-2147483648 to 2147483647	0	-	Immediately	" H19.09" on page 409
H19.11	0x190B	Attribute value of position comparison 4	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.11" on page 410

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H19.12	0x190C	Target value of position comparison 5	-2147483648 to 2147483647	0	-	Immediately	" H19.12" on page 410
H19.14	0x190E	Attribute value of position comparison 5	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.14" on page 410
H19.15	0x190F	Target value of position comparison 6	-2147483648 to 2147483647	0	-	Immediately	" H19.15" on page 410
H19.17	0x1911	Attribute value of position comparison 6	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.17" on page 411
H19.18	0x1912	Target value of position comparison 7	-2147483648 to 2147483647	0	-	Immediately	" H19.18" on page 411
H19.20	0x1914	Attribute value of position comparison 7	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.20" on page 411
H19.21	0x1915	Target value of position comparison 8	-2147483648 to 2147483647	0	-	Immediately	" H19.21" on page 411
H19.23	0x1917	Attribute value of position comparison 8	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.23" on page 412
H19.24	0x1918	Target value of position comparison 9	-2147483648 to 2147483647	0	-	Immediately	" H19.24" on page 412
H19.26	0x191A	Attribute value of position comparison 9	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.26" on page 412
H19.27	0x191B	Target value of position comparison 10	-2147483648 to 2147483647	0	-	Immediately	" H19.27" on page 412
H19.29	0x191D	Attribute value of position comparison 10	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.29" on page 413

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H19.30	0x191E	Target value of position comparison 11	-2147483648 to 2147483647	0	-	Immediately	" H19.30" on page 413
H19.32	0x1920	Attribute value of position comparison 11	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.32" on page 413
H19.33	0x1921	Target value of position comparison 12	-2147483648 to 2147483647	0	-	Immediately	" H19.33" on page 413
H19.35	0x1923	Attribute value of position comparison 12	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.35" on page 414
H19.36	0x1924	Target value of position comparison 13	-2147483648 to 2147483647	0	-	Immediately	" H19.36" on page 414
H19.38	0x1926	Attribute value of position comparison 13	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.38" on page 414
H19.39	0x1927	Target value of position comparison 14	-2147483648 to 2147483647	0	-	Immediately	" H19.39" on page 414
H19.41	0x1929	Attribute value of position comparison 14	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.41" on page 415
H19.42	0x192A	Target value of position comparison 15	-2147483648 to 2147483647	0	-	Immediately	" H19.42" on page 415
H19.44	0x192C	Attribute value of position comparison 15	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.44" on page 415

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H19.45	0x192D	Target value of position comparison 16	-2147483648 to 2147483647	0	-	Immediately	" H19.45" on page 415
H19.47	0x192F	Attribute value of position comparison 16	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.47" on page 416
H19.48	0x1930	Target value of position comparison 17	-2147483648 to 2147483647	0	-	Immediately	" H19.48" on page 416
H19.50	0x1932	Attribute value of position comparison 17	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.50" on page 416
H19.51	0x1933	Target value of position comparison 18	-2147483648 to 2147483647	0	-	Immediately	" H19.51" on page 416
H19.53	0x1935	Attribute value of position comparison 18	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.53" on page 417
H19.54	0x1936	Target value of position comparison 19	-2147483648 to 2147483647	0	-	Immediately	" H19.54" on page 417
H19.56	0x1938	Attribute value of position comparison 19	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.56" on page 417
H19.57	0x1939	Target value of position comparison 20	-2147483648 to 2147483647	0	-	Immediately	" H19.57" on page 417
H19.59	0x193B	Attribute value of position comparison 20	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.59" on page 418

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H19.60	0x193C	Target value of position comparison 21	-2147483648 to 2147483647	0	-	Immediately	" H19.60" on page 418
H19.62	0x193E	Attribute value of position comparison 21	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.62" on page 418
H19.63	0x193F	Target value of position comparison 22	-2147483648 to 2147483647	0	-	Immediately	" H19.63" on page 418
H19.65	0x1941	Attribute value of position comparison 22	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.65" on page 419
H19.66	0x1942	Target value of position comparison 23	-2147483648 to 2147483647	0	-	Immediately	" H19.66" on page 419
H19.68	0x1944	Attribute value of position comparison 23	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.68" on page 419
H19.69	0x1945	Target value of position comparison 24	-2147483648 to 2147483647	0	-	Immediately	" H19.69" on page 419
H19.71	0x1947	Attribute value of position comparison 24	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.71" on page 420
H19.72	0x1948	Target value of position comparison 25	-2147483648 to 2147483647	0	-	Immediately	" H19.72" on page 420
H19.74	0x194A	Attribute value of position comparison 25	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.74" on page 420

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H19.75	0x194B	Target value of position comparison 26	-2147483648 to 2147483647	0	-	Immediately	" H19.75" on page 420
H19.77	0x194D	Attribute value of position comparison 26	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.77" on page 421
H19.78	0x194E	Target value of position comparison 27	-2147483648 to 2147483647	0	-	Immediately	" H19.78" on page 421
H19.80	0x1950	Attribute value of position comparison 27	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.80" on page 421
H19.81	0x1951	Target value of position comparison 28	-2147483648 to 2147483647	0	-	Immediately	" H19.81" on page 421
H19.83	0x1953	Attribute value of position comparison 28	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.83" on page 422
H19.84	0x1954	Target value of position comparison 29	-2147483648 to 2147483647	0	-	Immediately	" H19.84" on page 422
H19.86	0x1956	Attribute value of position comparison 29	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.86" on page 422
H19.87	0x1957	Target value of position comparison 30	-2147483648 to 2147483647	0	-	Immediately	" H19.87" on page 422
H19.89	0x1959	Attribute value of position comparison 30	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.89" on page 423

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H19.90	0x195A	Target value of position comparison 31	-2147483648 to 2147483647	0	-	Immediately	" H19.90" on page 423
H19.92	0x195C	Attribute value of position comparison 31	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.92" on page 423
H19.93	0x195D	Target value of position comparison 32	-2147483648 to 2147483647	0	-	Immediately	" H19.93" on page 423
H19.95	0x195F	Attribute value of position comparison 32	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.95" on page 424
H19.96	0x1960	Target value of position comparison 33	-2147483648 to 2147483647	0	-	Immediately	" H19.96" on page 424
H19.98	0x1962	Attribute value of position comparison 33	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.98" on page 424
H19.99	0x1963	Target value of position comparison 34	-2147483648 to 2147483647	0	-	Immediately	" H19.99" on page 424
H19.101	0x1965	Attribute value of position comparison 34	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.101" on page 425
H19.102	0x1966	Target value of position comparison 35	-2147483648 to 2147483647	0	-	Immediately	" H19.102" on page 425
H19.104	0x1968	Attribute value of position comparison 35	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.104" on page 425

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H19.105	0x1969	Target value of position comparison 36	-2147483648 to 2147483647	0	-	Immediately	" H19.105" on page 425
H19.107	0x196B	Attribute value of position comparison 36	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.107" on page 426
H19.108	0x196C	Target value of position comparison 37	-2147483648 to 2147483647	0	-	Immediately	" H19.108" on page 426
H19.110	0x196E	Attribute value of position comparison 37	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.110" on page 426
H19.111	0x196F	Target value of position comparison 38	-2147483648 to 2147483647	0	-	Immediately	" H19.111" on page 426
H19.113	0x1971	Attribute value of position comparison 38	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.113" on page 427
H19.114	0x1972	Target value of position comparison 39	-2147483648 to 2147483647	0	-	Immediately	" H19.114" on page 427
H19.116	0x1974	Attribute value of position comparison 39	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.116" on page 427
H19.117	0x1975	Target value of position comparison 40	-2147483648 to 2147483647	0	-	Immediately	" H19.117" on page 427
H19.119	0x1977	Attribute value of position comparison 40	See " H19.02" on page 408 for details.	0	-	Immediately	" H19.119" on page 428

6.21 Parameter Group H1F

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H1F.90	0x1F5A	DI function state 1 read through communication	0 to 65535	0	-	Unchangeable	" H1F.90" on page 428
H1F.91	0x1F5B	DI function state 2 read through communication	0 to 65535	0	-	Unchangeable	" H1F.91" on page 428
H1F.92	0x1F5C	DI function state 3 read through communication	0 to 65535	0	-	Unchangeable	" H1F.92" on page 429
H1F.93	0x1F5D	DI function state 4 read through communication	0 to 65535	0	-	Unchangeable	" H1F.93" on page 429
H1F.94	0x1F5E	DO function state 1 read through communication	0 to 65535	0	-	Unchangeable	" H1F.94" on page 429
H1F.95	0x1F5F	DO function state 2 read through communication	0 to 65535	0	-	Unchangeable	" H1F.95" on page 430
H1F.96	0x1F60	DO function state 3 read through communication	0 to 65535	0	-	Unchangeable	" H1F.96" on page 430
H1F.97	0x1F61	DO function state 4 read through communication	0 to 65535	0	-	Unchangeable	" H1F.97" on page 431

6.22 Parameter Group H22

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H22.00	0x2200	Process segment command trigger	0 to 1000	0	-	Immediately	" H22.00" on page 431
H22.01	0x2201	Process segment triggered by the event rising edge	0 to 65535	0	-	Immediately	" H22.01" on page 432
H22.02	0x2202	Process segment triggered by the event falling edge	0 to 65535	0	-	Immediately	" H22.02" on page 432
H22.03	0x2203	Acceleration/ Deceleration time upon process 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	-	Immediately	" H22.03" on page 433
H22.04	0x2204	Positive software position limit	-2147483648 to 2147483647	2147483647	Reference unit	Immediately	" H22.04" on page 433
H22.06	0x2206	Negative software position limit	-2147483648 to 2147483647	-2147483648	Reference unit	Immediately	" H22.06" on page 434
H22.08	0x2208	Process segment number	0 to 65535	0	-	Unchangeable	" H22.08" on page 434
H22.19	0x2213	Target speed	0.1 rpm to 6000.0 rpm	50	rpm	Immediately	" H22.19" on page 434
H22.20	0x2214	Target speed 1	0.1 rpm to 6000.0 rpm	200	rpm	Immediately	" H22.20" on page 435
H22.21	0x2215	Target speed 2	0.1 rpm to 6000.0 rpm	500	rpm	Immediately	" H22.21" on page 435
H22.22	0x2216	Target speed 3	0.1 rpm to 6000.0 rpm	1000	rpm	Immediately	" H22.22" on page 435
H22.23	0x2217	Target speed 4	0.1 rpm to 6000.0 rpm	1500	rpm	Immediately	" H22.23" on page 435

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H22.24	0x2218	Target speed 5	0.1 rpm to 6000.0 rpm	2000	rpm	Immediately	" H22.24" on page 436
H22.25	0x2219	Target speed 6	0.1 rpm to 6000.0 rpm	2500	rpm	Immediately	" H22.25" on page 436
H22.26	0x221A	Target speed 7	0.1 rpm to 6000.0 rpm	3000	rpm	Immediately	" H22.26" on page 436
H22.35	0x2223	Acceleration/ Deceleration time	0 ms to 65535 ms	50	ms	Immediately	" H22.35" on page 436
H22.36	0x2224	Acceleration/ Deceleration time 1	0 ms to 65535 ms	200	ms	Immediately	" H22.36" on page 437
H22.37	0x2225	Acceleration/ Deceleration time 2	0 ms to 65535 ms	500	ms	Immediately	" H22.37" on page 437
H22.38	0x2226	Acceleration/ Deceleration time 3	0 ms to 65535 ms	1000	ms	Immediately	" H22.38" on page 437
H22.39	0x2227	Acceleration/ Deceleration time 4	0 ms to 65535 ms	1500	ms	Immediately	" H22.39" on page 437
H22.40	0x2228	Acceleration/ Deceleration time 5	0 ms to 65535 ms	2000	ms	Immediately	" H22.40" on page 438
H22.41	0x2229	Acceleration/ Deceleration time 6	0 ms to 65535 ms	2500	ms	Immediately	" H22.41" on page 438
H22.42	0x222A	Acceleration/ Deceleration time 7	0 ms to 65535 ms	3000	ms	Immediately	" H22.42" on page 438
H22.51	0x2233	Delay after completion of the process segment	0 ms to 65535 ms	0	ms	Immediately	" H22.51" on page 438
H22.52	0x2234	Delay time 1 after completion of the process segment	0 ms to 65535 ms	50	ms	Immediately	" H22.52" on page 439
H22.53	0x2235	Delay time 2 after completion of the process segment	0 ms to 65535 ms	200	ms	Immediately	" H22.53" on page 439

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H22.54	0x2236	Delay time 3 after completion of the process segment	0 ms to 65535 ms	500	ms	Immediately	" H22.54" on page 439
H22.55	0x2237	Delay time 4 after completion of the process segment	0 ms to 65535 ms	1000	ms	Immediately	" H22.55" on page 439
H22.56	0x2238	Delay time 5 after completion of the process segment	0 ms to 65535 ms	1500	ms	Immediately	" H22.56" on page 440
H22.57	0x2239	Delay time 6 after completion of the process segment	0 ms to 65535 ms	2000	ms	Immediately	" H22.57" on page 440
H22.58	0x223A	Delay time 7 after completion of the process segment	0 ms to 65535 ms	3000	ms	Immediately	" H22.58" on page 440
H22.70	0x2246	Homing mode	-32768 to 32767	-2	-	Immediately	" H22.70" on page 440
H22.71	0x2247	Speed in high-speed searching for the home switch signal	0 rpm to 3000 rpm	100	rpm	Immediately	" H22.71" on page 441
H22.72	0x2248	Speed in low-speed searching for the home switch signal	0 rpm to 1000 rpm	10	rpm	Immediately	" H22.72" on page 441
H22.73	0x2249	Acceleration/ Deceleration time during homing	0 ms to 1000 ms	1000	ms	Immediately	" H22.73" on page 441
H22.74	0x224A	Homing time limit	0 ms to 65535 ms	10000	ms	Immediately	" H22.74" on page 442

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H22.75	0x224B	Mechanical home offset	–2147483648 to +2147483647	0	Reference unit	Immediately	" H22.75" on page 442
H22.79	0x224F	Relative/ Absolute homing	0 to 65535	0	-	Immediately	" H22.79" on page 442

6.23 Parameter Group H23

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H23.00	0x2300	Definition of homing	0 to 4294967295	0	-	Immediately	" H23.00" on page 443
H23.02	0x2302	Homing data	-2147483648 to 2147483647	0	-	Immediately	" H23.02" on page 443
H23.04	0x2304	Definition of process segment 1	0 to 4294967295	0	-	Immediately	" H23.04" on page 443
H23.06	0x2306	Data of process segment 1	-2147483648 to 2147483647	0	-	Immediately	" H23.06" on page 444
H23.08	0x2308	Definition of process segment 2	0 to 4294967295	0	-	Immediately	" H23.08" on page 444
H23.10	0x230A	Data of process segment 2	-2147483648 to 2147483647	0	-	Immediately	" H23.10" on page 444
H23.12	0x230C	Definition of process segment 3	0 to 4294967295	0	-	Immediately	" H23.12" on page 444
H23.14	0x230E	Data of process segment 3	-2147483648 to 2147483647	0	-	Immediately	" H23.14" on page 445
H23.16	0x2310	Definition of process segment 4	0 to 4294967295	0	-	Immediately	" H23.16" on page 445
H23.18	0x2312	Data of process segment 4	-2147483648 to 2147483647	0	-	Immediately	" H23.18" on page 445
H23.20	0x2314	Definition of process segment 5	0 to 4294967295	0	-	Immediately	" H23.20" on page 445

Param. No.	Communi cation Address	Name	Setpoint	Default	Unit	Change Method	Page
H23.22	0x2316	Data of process segment 5	-2147483648 to 2147483647	0	-	Immediately	" H23.22" on page 445
H23.24	0x2318	Definition of process segment 6	0 to 4294967295	0	-	Immediately	" H23.24" on page 446
H23.26	0x231A	Data of process segment 6	-2147483648 to 2147483647	0	-	Immediately	" H23.26" on page 446
H23.28	0x231C	Definition of process segment 7	0 to 4294967295	0	-	Immediately	" H23.28" on page 446
H23.30	0x231E	Data of process segment 7	-2147483648 to 2147483647	0	-	Immediately	" H23.30" on page 446
H23.32	0x2320	Definition of process segment 8	0 to 4294967295	0	-	Immediately	" H23.32" on page 447
H23.34	0x2322	Data of process segment 8	-2147483648 to 2147483647	0	-	Immediately	" H23.34" on page 447
H23.36	0x2324	Definition of process segment 9	0 to 4294967295	0	-	Immediately	" H23.36" on page 447
H23.38	0x2326	Data of process segment 9	-2147483648 to 2147483647	0	-	Immediately	" H23.38" on page 447
H23.40	0x2328	Definition of process segment 10	0 to 4294967295	0	-	Immediately	" H23.40" on page 448
H23.42	0x232A	Data of process segment 10	-2147483648 to 2147483647	0	-	Immediately	" H23.42" on page 448
H23.44	0x232C	Definition of process segment 11	0 to 4294967295	0	-	Immediately	" H23.44" on page 448
H23.46	0x232E	Data of process segment 11	-2147483648 to 2147483647	0	-	Immediately	" H23.46" on page 448
H23.48	0x2330	Definition of process segment 12	0 to 4294967295	0	-	Immediately	" H23.48" on page 449

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H23.50	0x2332	Data of process segment 12	-2147483648 to 2147483647	0	-	Immediately	" H23.50" on page 449
H23.52	0x2334	Definition of process segment 13	0 to 4294967295	0	-	Immediately	" H23.52" on page 449
H23.54	0x2336	Data of process segment 13	-2147483648 to 2147483647	0	-	Immediately	" H23.54" on page 449
H23.56	0x2338	Definition of process segment 14	0 to 4294967295	0	-	Immediately	" H23.56" on page 450
H23.58	0x233A	Data of process segment 14	-2147483648 to 2147483647	0	-	Immediately	" H23.58" on page 450
H23.60	0x233C	Definition of process segment 15	0 to 4294967295	0	-	Immediately	" H23.60" on page 450
H23.62	0x233E	Data of process segment 15	-2147483648 to 2147483647	0	-	Immediately	" H23.62" on page 450

6.24 Parameter Group H30

Param. No.	Comm. Address	Name	Setpoint	Default	Unit	Change	Page
H30.00	0x3000	Servo status read through communication	0 to 65535	0	-	Unchangeable	" H30.00" on page 451
H30.01	0x3001	DO function state 1 read through communication	0 to 65535	0	-	Unchangeable	" H30.01" on page 451
H30.02	0x3002	DO function state 2 read through communication	0 to 65535	0	-	Unchangeable	" H30.02" on page 451
H30.03	0x3003	Input pulse reference sampling value read through communication	0 to 65535	0	-	Unchangeable	" H30.03" on page 452

6.25 Parameter Group H31

Param. No.	Communication Address	Name	Setpoint	Default	Unit	Change Method	Page
H31.00	0x3100	VDI virtual level set through communication	0 to 65535	0	-	Immediately	" H31.00" on page 452
H31.04	0x3104	DO state set through communication	0 to 65535	0	-	Immediately	" H31.04" on page 453
H31.05	0x3105	AO set through communication	-10000 mV to 10000 mV	0	mV	Immediately	" H31.05" on page 453
H31.09	0x3109	Speed reference set through communication	–10000 RPM to +10000 RPM	0	rpm	Immediately	" H31.09" on page 453
H31.11	0x310B	Torque reference set through communication	-100.000% to 100.000%	0	%	Immediately	" H31.11" on page 453

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