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SV680N Series Servo Drive

Commissioning Guide

Industrial Automation

Intelligent Elevator

New Energy Vehicle

Industrial Robot

Rail Transit

Data code 19011536 A00

Preface

Introduction

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

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

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

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

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

More Documents

Name	Data Code	Description
SV680N Series Servo Drive Selection Guide	19011540	Presents technical data and dimensions of the servo drive, and specifications and models of optional parts (installation accessories, cables, and periphery electrical parts).
SV680N Series Servo Drive Hardware Guide	19011539	Presents installation and wiring of the servo drive, including preparations before installation, unpacking inspection and transport, wiring, and routine maintenance.
SV680N Series Servo Drive Function Guide	19011538	Presents functions and parameters, including function overview, basic servo functions, adjustment and parameter list.

Name	Data Code	Description
SV680N Series Servo Drive Communication Guide	19011535	Presents functions and parameters of the drive, including EtherCAT communication configurations, troubleshooting, parameter descriptions, and communication case.
SV680 Series Servo Drive Safety Guide	19011489	Presents the safety function and related certifications and standards, wiring, commissioning process, troubleshooting, and functions.

Revision History

Date of Revision	Version	Revision
July 2021	A00	First release

Document Acquisition

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

Table of Contents

Fundamental Safety Instructions

Safety Precautions

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

Safety Levels and Definitions

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

General Safety Instructions

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

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

CAUTION

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

Storage and Transportation

WARNING

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

CAUTION

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

Installation

DANGER

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

WARNING

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

CAUTION

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

Wiring

DANGER

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

WARNING

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

CAUTION

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

Power-on

DANGER

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

WARNING

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

Operation

DANGER

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

DANGER

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

Maintenance

DANGER

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

WARNING

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

Repair

DANGER

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals.
- Do not repair the equipment with power ON. Failure to comply will result in an electric shock.
- Before inspection and repair, cut off all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.

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

Other Precautions

Dynamic brake

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

Safety Labels

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

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

1 Commissioning Tool

1.1 Keypad

1.1.1 Introduction to the Keypad

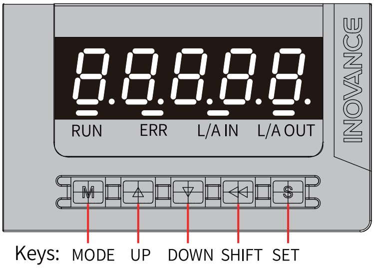


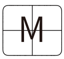
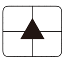
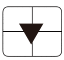
Figure 1-1 Magnified view of the keypad

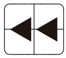
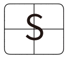
The keypad, which consists of five LEDs and five Indicator, is used for data display, parameter setting, user password setting, and general function execution.

Keys

The following table takes parameter setting as an example to describe the general functions of the keys.

Table 1–1 Descriptions of keys

Name	Symbol	Description
MODE		Used to switch among different modes and return to the previous menu.
UP		Used to increase the value of the blinking bit.
DOWN		Used to decrease the value of the blinking bit.

Name	Symbol	Description
SHIFT		Used to shift the blinking bit and view the high digits of a number consisting of more than 5 digits.
SET		Used to enter the next menu and execute commands such as saving parameter setpoints.

Status indicators

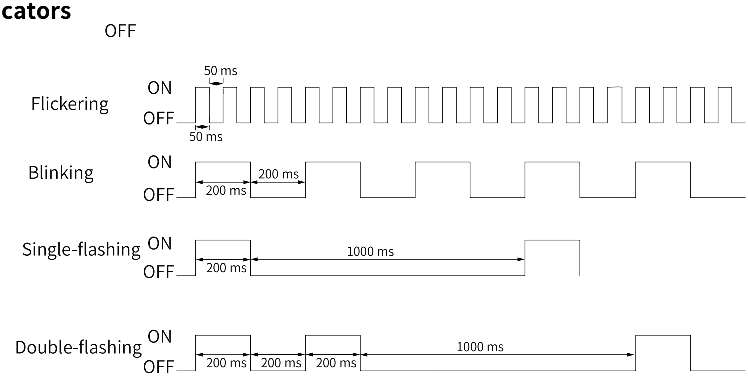


Figure 1-2 Description of state indicators

Table 1–2 Description of state indicators

Indicator	Status	Status Indication
RUN	OFF	Init state
	Blinking (ON for 200 ms/OFF for 200 ms)	Pre-operational
	Single-flashing (ON for 200 ms/OFF for 1000 ms)	Safe-operational
	ON	Operational
ERR	OFF	No network fault
	Blinking (ON for 200 ms/OFF for 200 ms)	Communication setting error
	Single-flashing (ON for 200 ms/OFF for 1000 ms)	Sync event error
	Double-flashing (ON for 200 ms, OFF for 200 ms, ON for 200 ms, and OFF for 1000 ms)	Application program watchdog timeout

Indicator	Status	Status Indication
L/A IN [1] L/A OUT	OFF	Link not established
	Flickering (ON for 50 ms/OFF for 50 ms)	Link established, with data transceiving signal
	ON	Link established, without data transceiving signal

Note

- [1]: L/A IN and L/A OUT indicate the LINK state and action state of the physical layer of each port.
- The ERR indicator lights up red and the other three indicators light up green.

1.1.2 Keypad Display

The keypad can be used to display the servo drive status, parameters, faults, and monitored values.

- Status display: Displays current servo drive status, such as servo ready or servo running.
- Parameter display: Displays parameters and their setpoints
- Fault display: Displays faults and warnings that occurred on the servo drive.
- Monitored value display: Displays values of monitoring parameters.

Mapping relationship between keypad display and object dictionary

The mapping relationship between the parameter displayed on the keypad (in decimal) and the object dictionary operated by the host controller (in hexadecimal, "Index" and "Sub-index") is as follows.

Object dictionary index = 0x2000 + Parameter group No.

Object dictionary sub-index = Offset (in hexadecimal) within the parameter group + 1, for example:

Keypad Display	Object Dictionary Operated by the Host Controller
H02.15	2002.10h

Note

The following section only describes the display and parameter settings on the keypad side (in decimal), which are different from those displayed in the software tool (in hexadecimal). Make necessary value conversions during use.

Display mode switchover

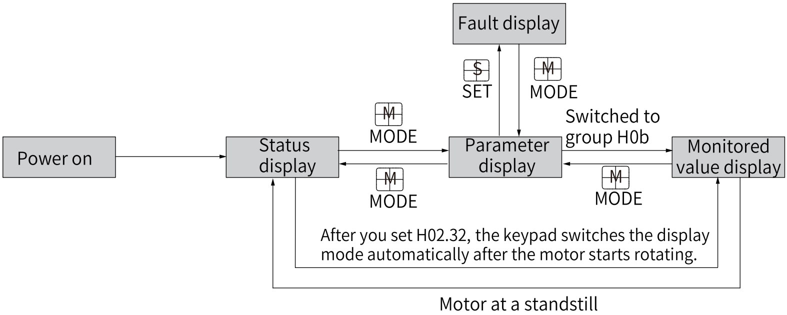


Figure 1-3 Switchover among different display modes

- The keypad enters status display immediately upon power-on.
- Press MODE to switch among different display modes based on the conditions shown in "Figure 1–3 " on page 17 .
- In status display, set H02.32 to select the parameter to be monitored. When the motor rotates, the keypad automatically switches to monitored value display. After the motor stops, the keypad automatically returns to status display.
- In the parameter display mode, after you select the parameter to be monitored in group H0b, the keypad switches to monitored value display.
- Once a fault occurs, the keypad switches to fault display immediately, with all the five LEDs blinking. Press SET to stop the LEDs from blinking, and then press MODE to switch to parameter display.

Status display

Display	Name	Applicable Occasion	Meaning
	81nr.x Servo not ready	The initialization is done, but the servo drive is not ready.	The servo drive is not ready to run because the main circuit is not powered on. For details, see Chapter "Troubleshooting". Meaning of "x" ● 1: Control circuit power input error ● 2: Main circuit power input error ● 3: Bus undervoltage ● 4: Soft start failed ● 5: Encoder initialization not done ● 6: Short circuit to ground failed ● 7: Others
	-88rn Servo running (Run)	The S-ON signal is active.	The servo is running.

Display	Name	Applicable Occasion	Meaning
	-88ry Servo ready (Ready)	The servo drive is ready to run.	The servo drive is ready to run and waits for the S-ON signal.
	1–A: Control modes	-	Displays present operation mode of the servo drive in hexadecimal. 1: Profile position control 3: Profile velocity mode 4: Profile torque mode 6: Homing mode 8: Cyclic synchronous position mode 9: Cyclic synchronous velocity mode A: Cyclic synchronous torque mode
	1–8: Communication status	-	Displays the status of the slave EtherCAT state machine in characters. 1: Initializing 2: Pre-operational 4: Safe-operational 8: Operating
	- CN3 connection indication	The EtherCAT output is connected successfully.	Solid OFF: No communication connection is detected in the physical layer. Solid ON: Communication connection is detected in the physical layer.
	- CN4 connection indication	The EtherCAT input is connected successfully.	

Parameter display

Parameters are divided into 14 groups based on their functions. A parameter can be located quickly based on the parameter group it belongs to. See Chapter "List of Parameters" for details.

- Display of parameter groups

Display	Name	Description
HXX.YY	Parameter group	XX: Parameter group No. (decimal) YY: Offset within the parameter group (in hexadecimal)

For example, "H02.00" is displayed as follows.

Display	Name	Description
	H02.00	02: Parameter group No. 00: Offset within the parameter group

- Display of negative numbers and numbers with different lengths

- Signed number with 4 digits and below or unsigned number with 5 digits and below
  Such numbers are displayed in a single page (five digits). For signed numbers, the highest bit "-" represents the negative symbol.

  For example, "-9999" is displayed as follows.

  For example, "65535" is displayed as follows.

- Signed number with more than 4 digits or unsigned number with more than 5 digits
  Such numbers are displayed from low to high bits in several pages (5 digits per page): current page + values on current page, as shown in the following figure. Hold down SHIFT for more than 2s to switch to the next page.

  For example, "-1073741824" is displayed as follows.

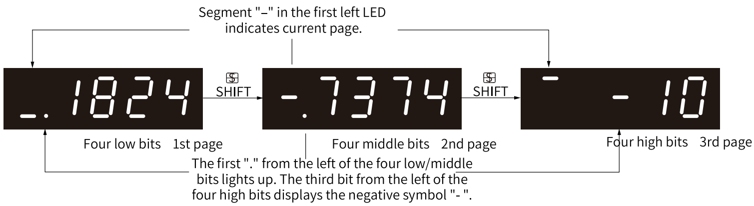


Figure 1-4 Display of "-1073741824"

  Example: "1073741824" is displayed as follows:

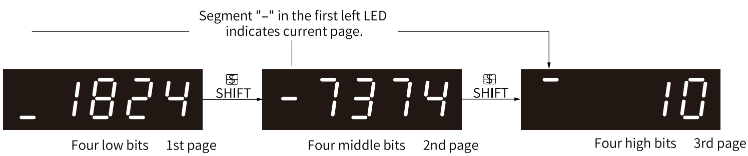


Figure 1-5 Display of "1073741824"

- Display of the decimal point
  The segment "." of the ones indicates the decimal point, which does not blink.

Display	Name	Description
100.0	Decimal point	100.0

- Display of parameter setting status

Display	Name	Applicable Occasion	Meaning
donE	Done (parameter setting done)	The parameter is set successfully.	The parameter is set and saved to the servo drive (Done). The servo drive can execute other operations.
F.InIt	F.InIt (restored to default)	Parameter initialization is in progress (H02.31 = 1).	The servo drive is in the process of parameter initialization. Switch on the control circuit again after initialization is done.
Error	Error (wrong password)	The user password (H02.30) is activated and the password entered is wrong.	A wrong password is entered. You need to enter the password again.
TunE	TunE	Auto-tuning with one-key enabled	The function of auto-tuning with one-key is in progress.
FAIL	FAIL	Auto-tuning with one-key enabled	The function of auto-tuning with one-key fails.

Fault display

- The keypad can be used to display present or previous fault and warning codes. For analysis and solutions to the faults and warnings, see Chapter "Troubleshooting".
- When a fault or warning occurs, the keypad displays the corresponding fault or warning code immediately. When multiple faults or warnings occur, the keypad displays the fault code of the highest fault level.
- You can select the previous fault/warning to be viewed through H0b.33 and view the code of the selected fault/warning in H0b.34.
- You can clear the latest 20 faults or warnings saved in the servo drive by setting H02.31 to 2.

For example, "E941.0" is displayed as follows.

Display	Name	Description
	E941.0 Warning code	E: A fault or warning occurs on the servo drive. 941.0: Warning code

Monitored value display

- Group H0b: Displays parameters used to monitor the operating state of the servo drive.
- Set H02.32 (Default keypad display) properly. After the motor operates normally, the keypad switches from status display to parameter display. The parameter group number is H0b and the offset within the group is the setpoint of H02.32.
- For example, if H02.32 is set to 00 and the motor speed is not 0 rpm, the keypad displays the value of H0b.00.

See the following table for descriptions of H0b.00.

Param. No.	Name	Unit	Meaning	Example of Display
H0b.00	Motor speed actual value	rpm	Displays the actual value of the motor speed after round-off, which can be accurate to 1 rpm.	Display of 3000 rpm:  Display of -3000 rpm: 

Note

For details of parameter group H0b, see *"7.1 Display of Monitoring Parameters" on page 631*

1.1.3 Parameter Setting

Example of parameter setting

You can set parameters through the keypad. For details on parameters, see Chapter "List of Parameters". The following figure shows how to switch from position control mode to speed control mode using the keypad after power-on.

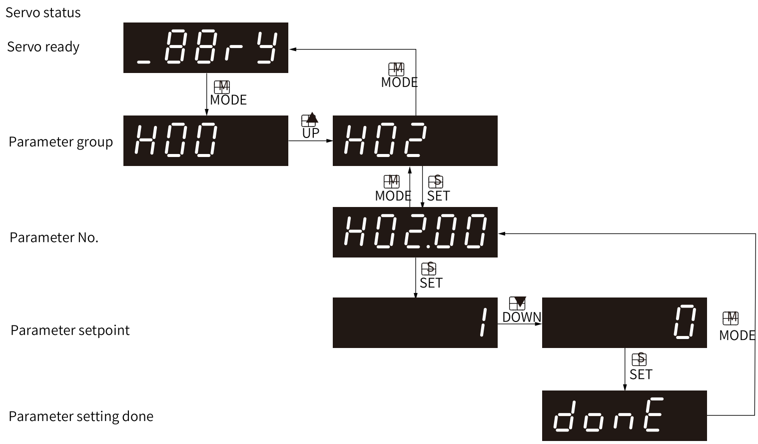


Figure 1-6 Example of parameter setting

- MODE: Used to switch the keypad display mode and return to the previous interface.
- UP/DOWN: Used to increase or decrease the value of the blinking bit.
- SHIFT: Used to shift the blinking bit.
- SET: Used to save the present setpoint or switch to the next interface.

After parameter setting is done, that is, "donE" is displayed on the keypad, press MODE to return to the parameter group interface (interface of "H02.00").

Forced DI/DO signals

There are five DI signals and two DO signals on CN1 of SV680N.

You can assign different functions to DI/DOs by setting parameters in groups H03 and H04 through the keypad (or host controller), so that the host controller can control the servo functions through DI signals or use the DO signals outputted by the servo drive.

The servo drive also provides forced DI/DOs. The forced DIs can be used to test the DI function of the servo drive, and the forced DOs can be used to check the DO signal connection between the host controller and the servo drive.

Forced DI function

When this function is enabled, all DI signal levels are controlled only by H0d.18 (Forced DI value), regardless of external DI signal status.

1. Operating procedure:

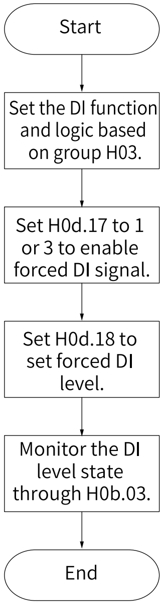


Figure 1-7 Procedure for setting forced DI function

H0d.18 is used to set the forced DI level. The keypad displays the value in hexadecimal. After the hexadecimal value is converted to a binary value, the value "1" indicates high level and "0" indicates low level.

Note

- The DI logic is defined by parameters in group H03.
- H0b.03 is used to monitor the DI level status. The keypad displays the level, and the value of H0b.03 (Monitored DI signal) read in the software tool is a hexadecimal.

Related parameter

See *" H0d.17" on page 458* for details.

2. Example:
   To activate the function assigned to DI1 and deactivate functions assigned to DI2... DI5, set as follows (logic of DI1 to DI5 are "active low". "1" indicates high level and "0" indicates low level.):

   The corresponding binary value and hexadecimal value are "11110" and "1E" respectively. Therefore, set H0d.18 to "1E" through the keypad.

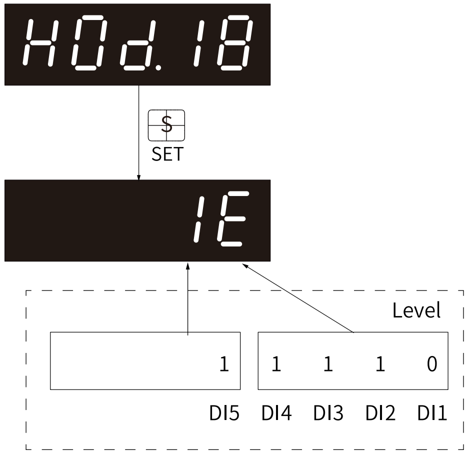


Figure 1-8 Setpoints of H0d.18

Note

- If the DI function is normal, the displayed value of H0b.03 is always the same as that of H0d.18.
- In this case, DI1 is displayed as low level and DI2 to DI5 are displayed as high level on the keypad, and the value of H0b.03 read in the software tool is 1E (hexadecimal).

Monitor the DI level status through H0b.03. The keypad displays as follows:

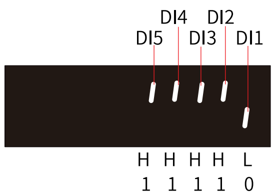


Figure 1-9 DI level status for H0b.03

Note

Upper LED segments ON: high level (indicated by "1") Lower LED segments ON: low level (indicated by "0")

3. Exit

The forced DI function is not retentive upon power-off. Normal DIs apply after restart, or you can set H0d.17 to 0 to return to the normal DI mode.

Forced DO function

After this function is enabled, all DO signal levels are controlled by H0d.19 (Forced DO value), regardless of the internal DO status of the servo drive.

1. Operating process

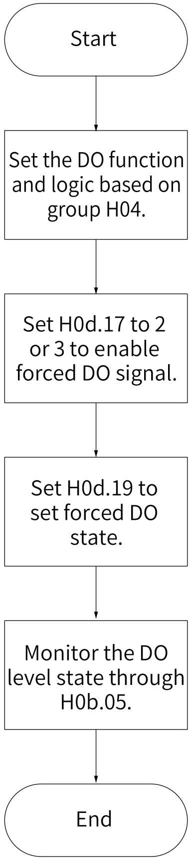


Figure 1-10 Procedure for setting forced DO function

H0d.19 (Forced DO value) is used to set whether the DO function is active. The keypad displays the value in hexadecimal. After the hexadecimal value is converted to a binary value, the value "1" indicates the DO function is active and "0" indicates the DO function is inactive.

Parameters in group H04 are used to set the DO logic. H0b.05 is used to monitor the DO level status. The keypad displays the level, and the value of H0b.05 read in the software tool is a decimal.

2. Example:
   To activate the DO function assigned to DO1 and deactivate DO functions assigned to DO2 and DO3, set as follows:

   As the value "1" indicates the DO function is active and "0" indicates the DO function is inactive, the binary value is "10", which corresponds to the hexadecimal value "2". Therefore, set H0d.19 (Forced DO value) to 2 through the keypad.

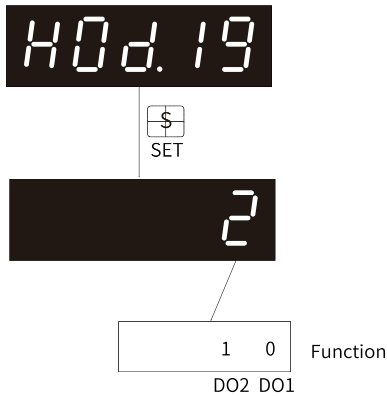


Figure 1-11 Setpoints of H0d.19

Monitoring the DO level status through H0b.05

If the logic of DO1 and DO2 is "active low", then DO1 is high level and DO2 is low level, the corresponding binary number is "01" and the value of H0b.05 read in the software tool is "1" (decimal). The keypad displays as follows:

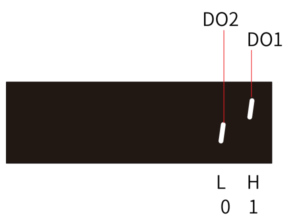


Figure 1-12 Display of H0b.05 when DOs are "active low"

If the logic of DO1 and DO2 is "active high", then DO1 is low level and DO2 is high level, the corresponding binary number is "10" and the value of H0b.05 read in the software tool is "2" (decimal). The keypad displays as follows:

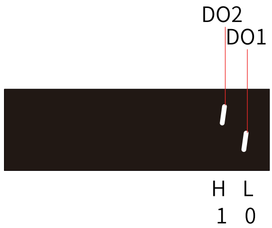


Figure 1-13 Display of H0b.05 when DOs are "active high"

3. Exit

The forced DO function is not retentive upon power-off. Normal DOs apply after restart, or you can set H0d.17 to 0 to return to the normal DO mode.

EtherCAT-forced DO function

Assign FunOUT.31 to the corresponding DO. After this function is enabled, all DO signal levels are controlled only by 60FE.01h (Physical output), regardless of the internal DO status of the servo drive.

1. Operating process

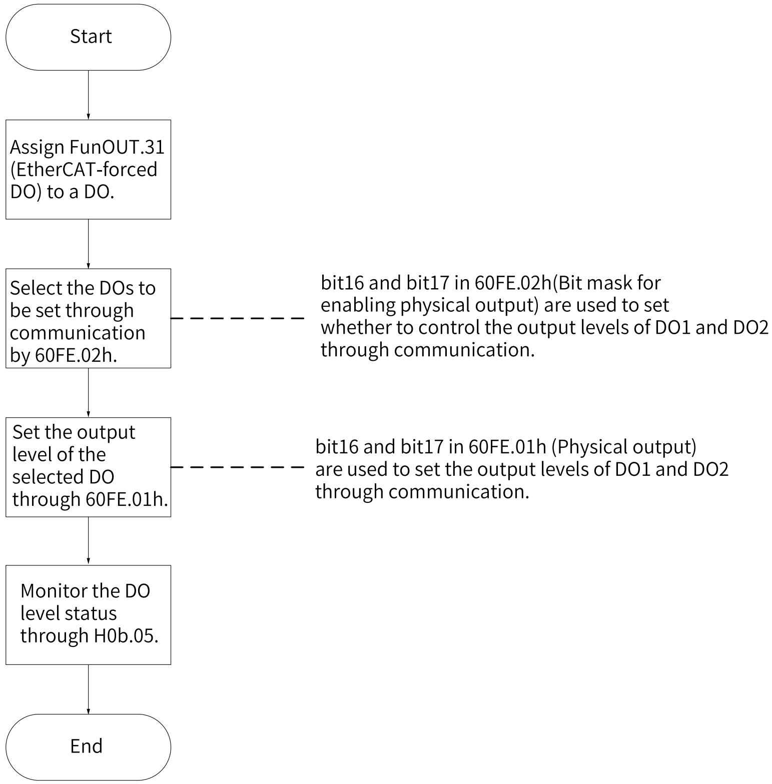


Figure 1-14 Procedure for setting EtherCAT-forced DO function

60FEh (Digital output) can be used to set the DO level through the bus, regardless of the internal DO status of the servo drive.

bit	Related DO	Physical outputs: 60FE.02h	Bitmask: 60FE.01h
16	DO1	1: DO1 forced output enabled	DO1 forced output (0: OFF, 1: ON)
17	DO2	1: DO2 forced output enabled	DO2 forced output (0: OFF, 1: ON)

If bit 16 and bit 17 of 60FE.02h and 60FE.01h are both 1, the corresponding forced DO is ON.

H0b.05 is used to monitor the DO level status. The keypad displays the level, and the value of H0b.05 read in the software tool is a hexadecimal.

Example: To make the output level of DO1 and DO2 be set forcibly by the bus, in which DO1 outputs low level and DO2 outputs high level, set as follows:

Set 66FE.02h to 0x00030000 and 60FE.01h to 0x00020000. The DO level state monitored by H0b.05 is displayed as follows.

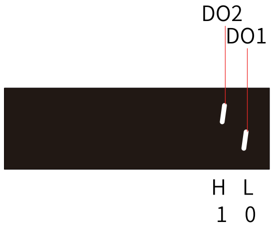


Figure 1-15 Display of H0b.05 when DO signals are controlled by the bus

2. DO logic in the non-operational status

Table 1–3 EtherCAT-forced DO status in the non-operational status (H04.23)

Bit 0	Bit 1	Description
0	0	Status of DO1 and DO2 unchanged in the non-operational status
1	0	No output in DO1 and status of DO2 unchanged in the non-operational status
0	1	No output in DO2 and status of DO1 unchanged in the non-operational status
1	1	No output in DO1 or DO2 in the non-operational status

User password

After the user password (H02.30) is activated, only authorized operators can set parameters.

- Setting the user password
  The following figure shows how to set the user password to "00001".

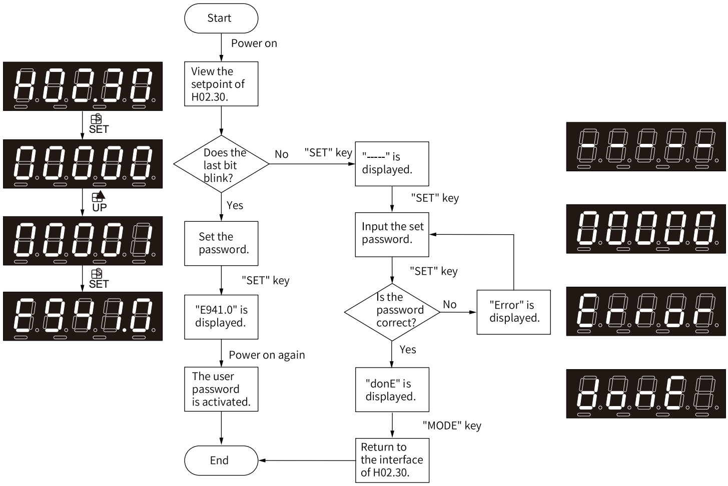


Figure 1-16 Procedure for setting the user password

To change the user password, input current password first to authorize the access to parameter setting. Next, enter H02.30 again to set a new password based on the procedure shown in the preceding figure.

Note

If the last bit does not blink, the access to parameters is password protected. If the last bit blinks, password is not needed or the password entered is correct.

- Canceling the user password
  Enter the set user password, and set H02.30 to "00000" to cancel the user password.

1.2 Software Tool

1.2.1 Installing the Software Tool

Introduction to the Software Tool

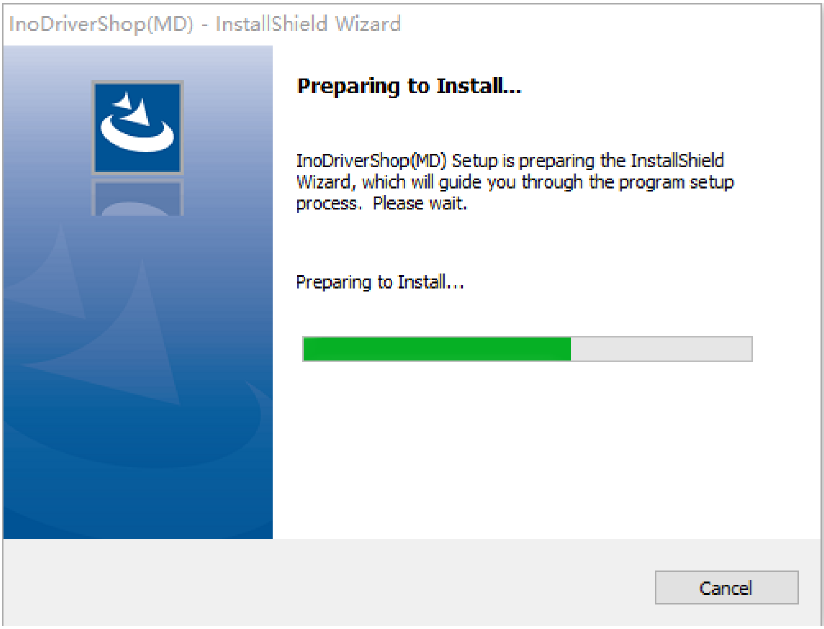
The software tool InoDriverShop can be downloaded from *http://www.inovance.com*.

Use a Type-C communication cable for communication between SV680 series servo drives and the PC.

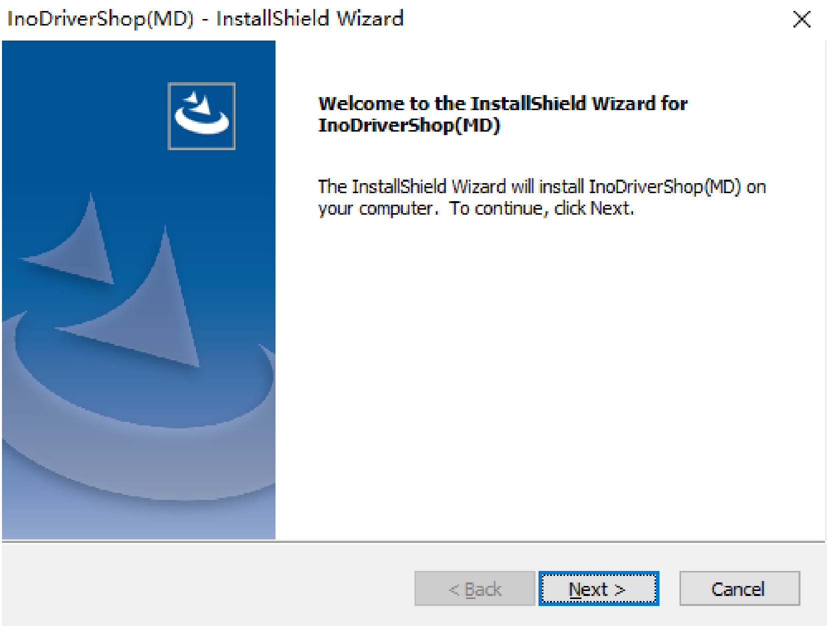
InoDriverShop supports 32-bit/64-bit Windows 7 and 64-bit Windows 10 operating systems. For details on how to use InoDriverShop, see the help file of InoDriverShop.

Installing InoDriverShop

1. Download InoDriverShop.
   a. Visit the official website of Inovance as shown below.
   http://www.inovance.com
   b. Choose **Support** → **Download**, and then type in the keyword InoDriverShop and click **Search**.
   c. Click **Download**.
2. Unzip the package downloaded.
3. Click IDS InoDriverShop.exe to start installing InoDriverShop.

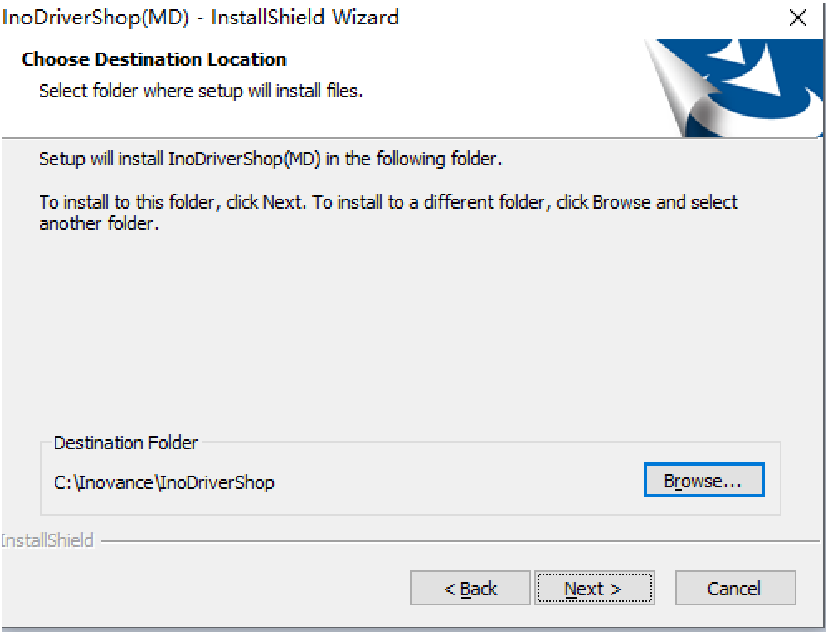


4. Click **Next**.

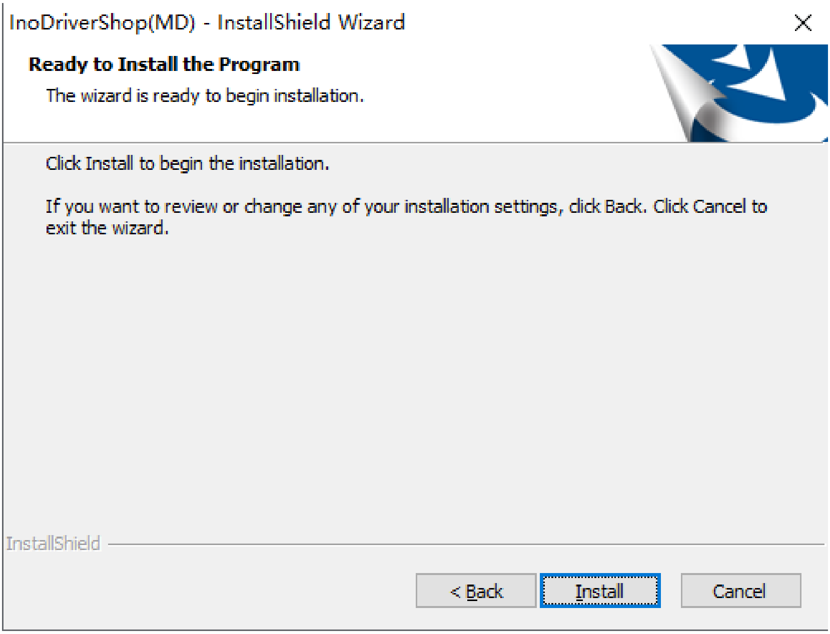


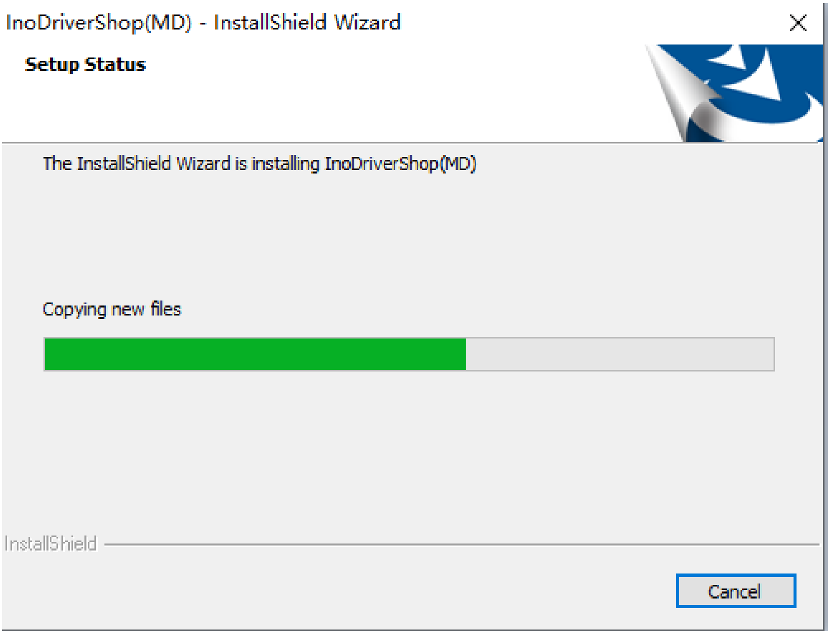
5. You can select the directory for installation as needed through the **Browse** button. The default directory for installation is "C:\Program Files\Inovance\InoDriverShop". In online upgrade, InoDriverShop will be upgraded directly in the original directory.

   After selecting the directory for installation, click **Next**.

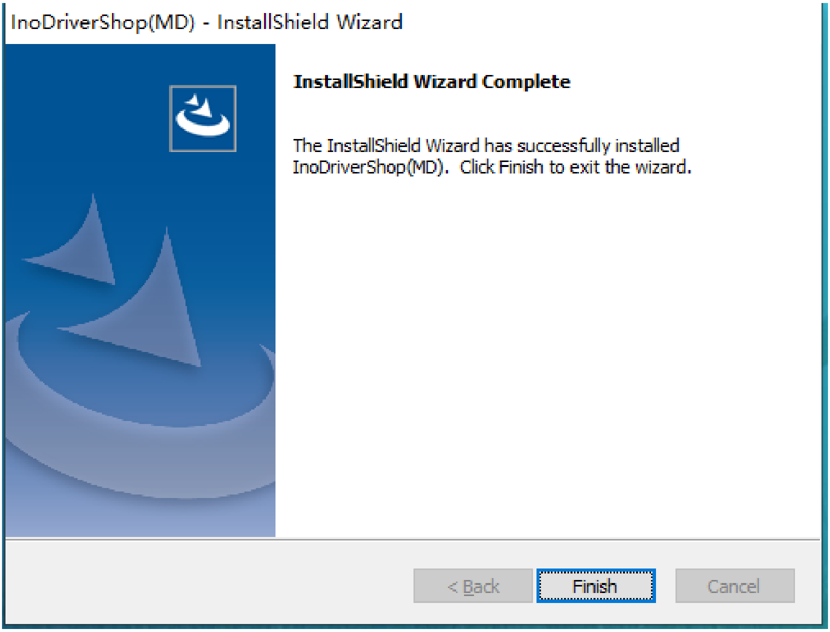


6. Click **Install** to start installation.





7. After installation is done, click **Finish**.



8. A shortcut icon for InoDriverShop will be generated automatically on the desktop.

1.2.2 Connecting the Software Tool

Note

The following procedure takes SV680P series servo drive as an example, which may vary with different servo drive models.

1. Start InoDriverShop.

- Double-click  to start the InoDriverShop.
- If there is no shortcut for InoDriverShop on your desktop, click **Start** and search for **InoDriverShop**.

2. Create a project.

a. Click ① shown in the following figure to create a project.

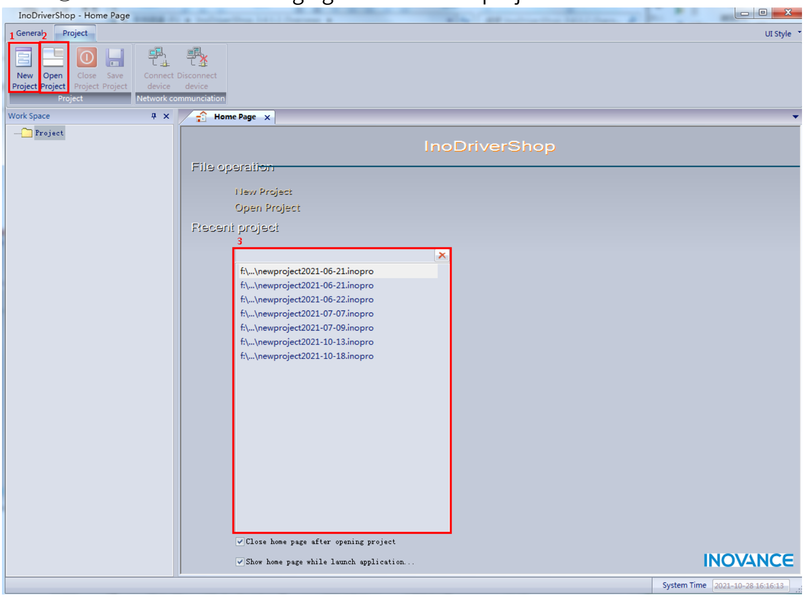


Figure 1-17 **Start interface**

Note

You can click 2 or 3 shown in the preceding figure to open the project saved before.

b. Open the **Project Guide** interface.
Click **Online** or **Offline** in area ①. Next, click the product series in area ②. Finally, load default communication parameters in area ③ based on the product series selected.

Figure 1-18 Project guide interface

c. Click **Next page** to create a project.

- Creating a project for online device brings you to the following interface. The device is scanned automatically. Select the device to be commissioned and click **Finish**.

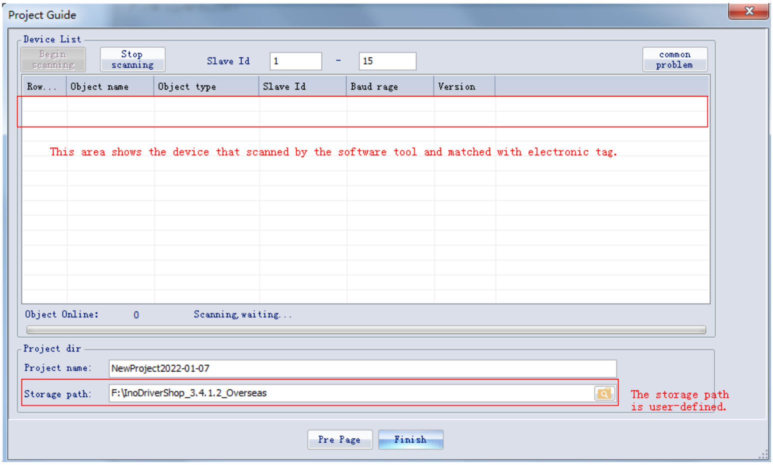


Figure 1-19 Scan interface

- Creating a project for offline device brings you to the following interface. You can select the **Slave ID**, **Object Type**, and **Software Version** as needed and add different standards or customized devices. You can also designate the directory for storage or create multiple offline devices.

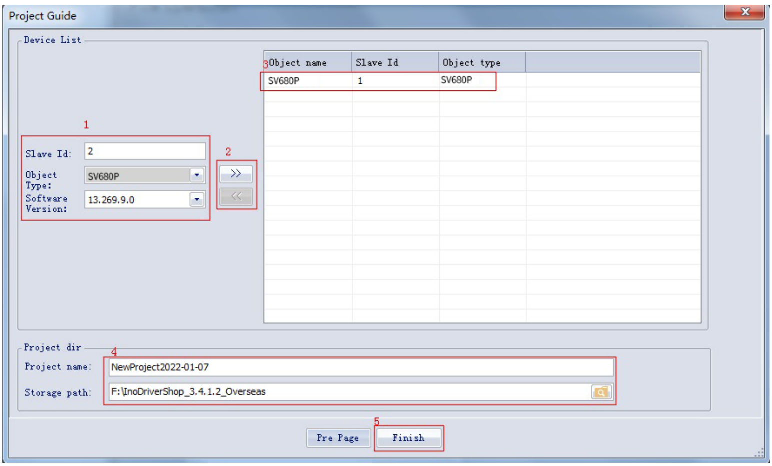


Figure 1-20 Project Guide interface for offline device

Note

① Station No., ④ Project name, and the storage directory can be changed as needed.

d. The project has been created.

3. The main interface is shown as follows.

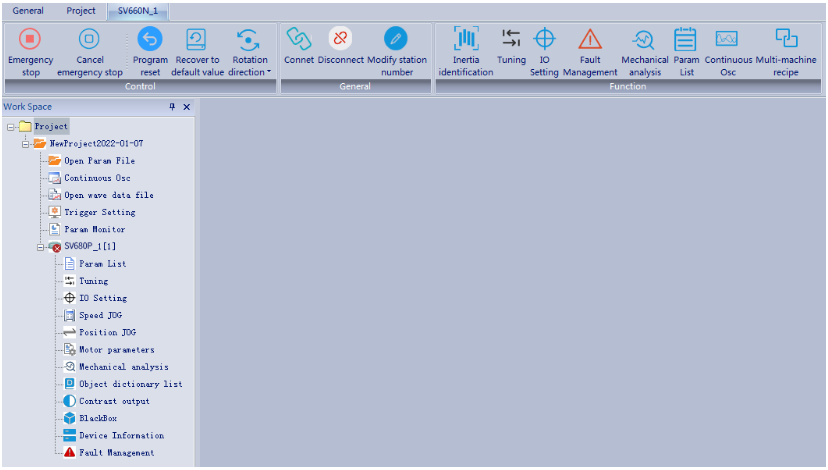
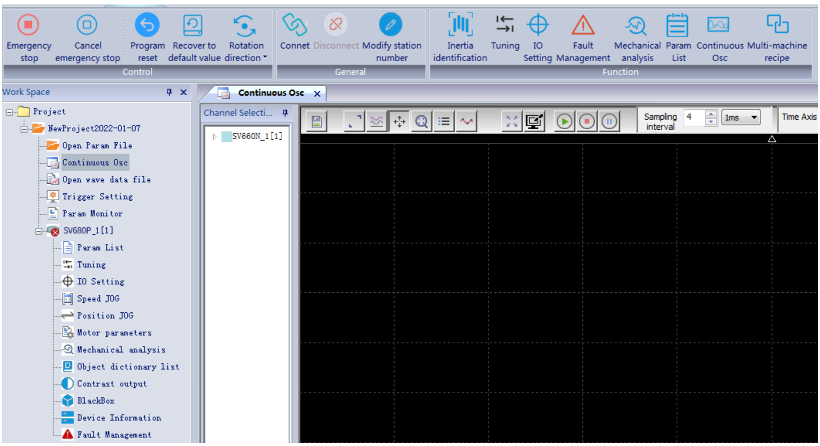


Figure 1-21 Main interface

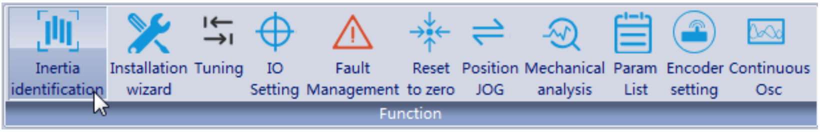
1.2.3 Introduction to the Software Tool

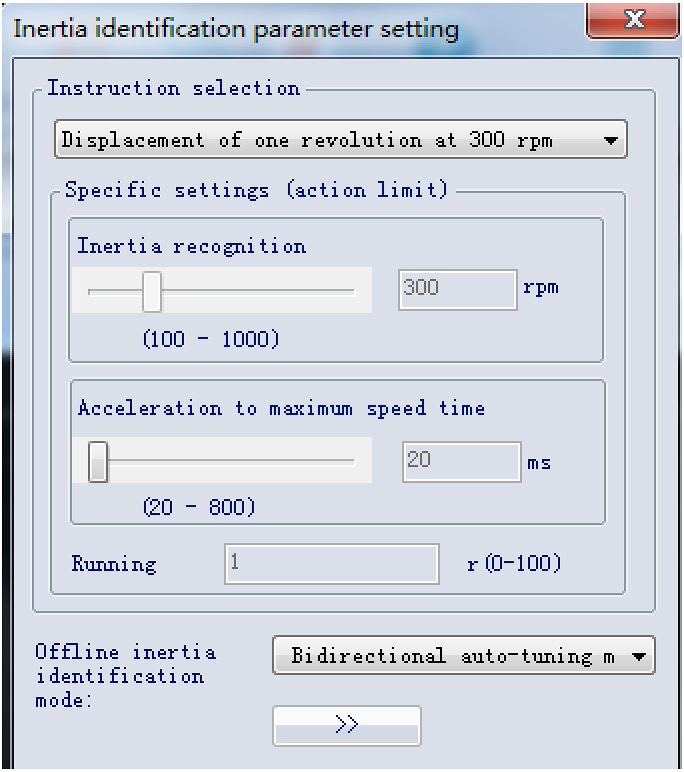
InoDriverShop features the following functions:

- Oscilloscope: Detects and saves the instantaneous data during operation.

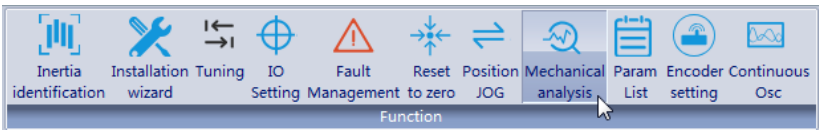


- Parameter management: Reads and downloads parameters in batches.
- Inertia auto-tuning: Generates the load inertia ratio automatically.

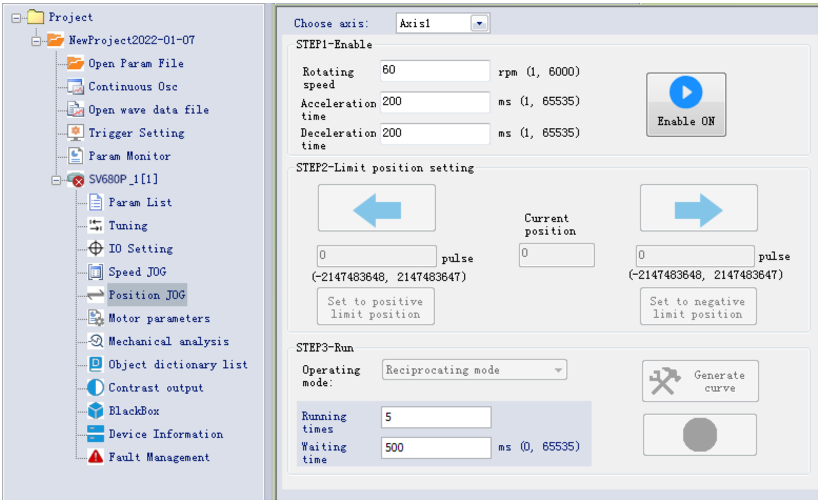




- Mechanical characteristic analysis: Analyzes the resonance frequency of the mechanical system.



- Motion JOG: Generates position references to make the motor reciprocate.



- Gain tuning: Adjusts the stiffness level and monitors the motion data.

2 Commissioning and Operation

2.1 Commissioning Flowchart

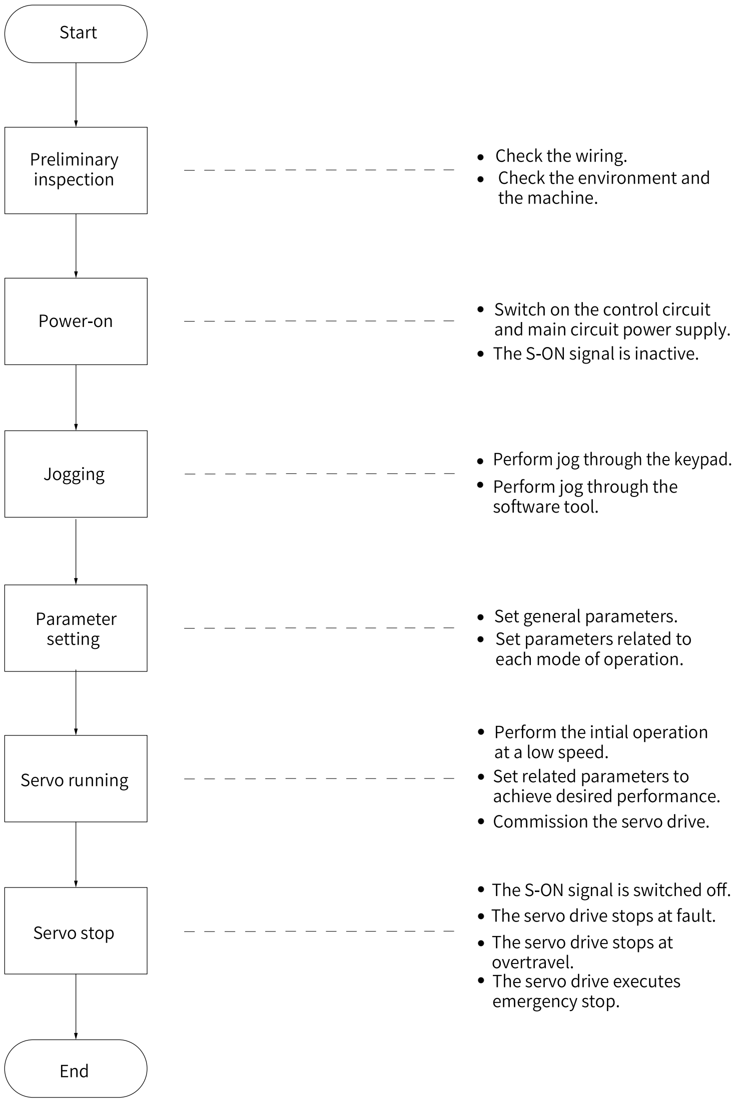


Figure 2-1 Commissioning flowchart of the drive

2.2 Commissioning Procedure

2.2.1 Preliminary Check

Check the following items before operating the servo drive and the servo motor.

Table 2–1 Checklist before operation

Record	No.	Description
Wiring		
☐	1	The power input terminals (L1C, L2C, L1, L2, L3, R, S, T) of the servo drive are connected properly.
☐	2	The main circuit cables (U, V, W) of the motor are connected to the U/V/W terminals of the drive correctly.
☐	3	No short circuit exists in the power input terminals (L1, L2, L3, R, S, T) or main circuit output terminals (U, V, W) of the servo drive.
☐	4	The control signal cables, such as the brake signal cable and overtravel protection signal cable, are connected properly.
☐	5	The servo drive and servo motor are grounded properly.
☐	6	The stress suffered by the cable is within the specified range.
☐	7	All the wiring terminals are insulated properly.
Environment and Mechanical Conditions		
☐	1	No unwanted objects (such as cable terminals and metal chippings) that may cause short circuit are present inside or outside the servo drive.
☐	2	The servo drive and the external regenerative resistor are placed on incombustible objects.
☐	3	The servo motor is installed properly. The motor shaft is connected to the machine securely.
☐	4	The servo motor and the machine it is connected to are in good condition and ready to run.

2.2.2 Power-on

Switching on the input power supply

The power input terminals are L1C/L2C (control circuit power input terminals) and L1/L2/L3 or R/S/T (main circuit power input terminals).

After the power supply is switched on, if the bus voltage indicator is in the normal state and the keypad displays "reset"→"nrd.x"→"rdy" in sequence, the drive is ready to run and waits for the S-ON signal.

Note

- To connect the main circuit to a single-phase 220 VAC power supply, use any two of L1, L2, and L3 terminals.
- If the keypad keeps displaying "nrd.x" or a fault code, rectify the fault according to Chapter "Troubleshooting".

2.2.3 Jog

Caution

When using the jog function, set the S-ON signal to OFF. Otherwise, this function cannot be used.

Start jogging through the keypad (speed control mode or position control mode) or the software tool (speed control mode) to check whether the motor rotates properly without unexpected vibration or noise.

Note

The acceleration and deceleration time constants of speed and position references can be set through H06.12 during jogging.

Using the keypad (speed control mode)

- Commissioning procedure

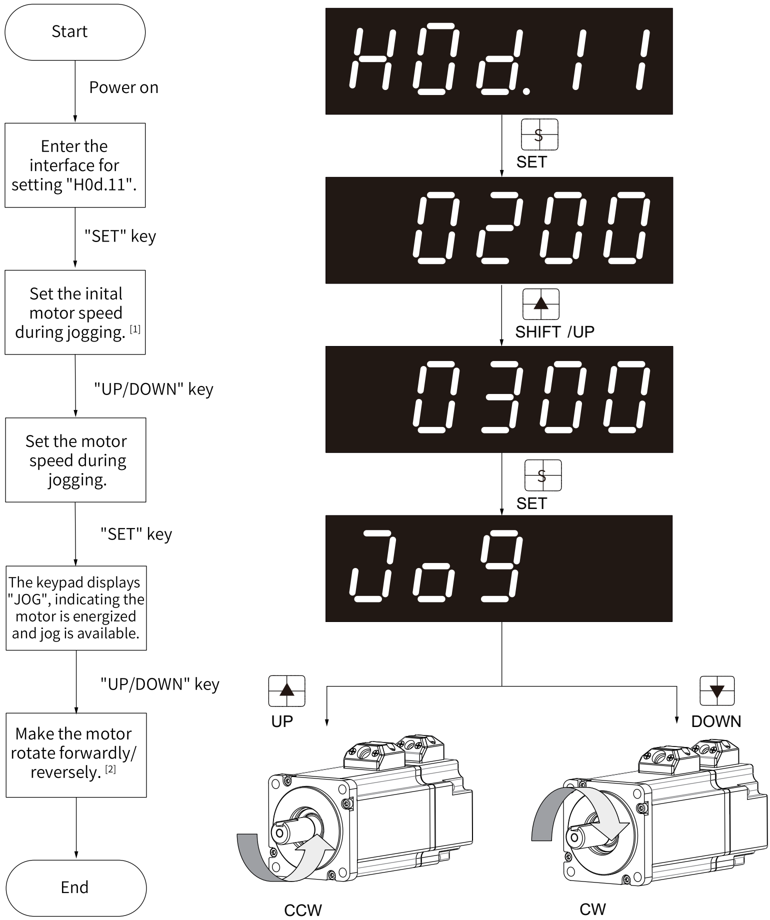


Figure 2-2 Procedure for setting the jog function

Note

- [1]: Press the UP or DOWN key to increase or decrease the jog speed. After exiting from the jog mode, the motor reverts to the initial speed.
- [2]: Press the UP or DOWN key to make the motor rotate forwardly or reversely. After you release the key, the motor stops immediately.

- Procedure:

1. Enter the jog mode by setting H0d.11 through the keypad.

   The keypad displays the default jog speed at this moment.

2. Adjust the jog speed through the UP/DOWN key and press the SET key to enter the jog state.

   The keypad displays "JOG" at this moment, and the motor is energized.
3. Hold the UP/DOWN key down to make the motor jog forwardly or reversely.
4. Press the MODE key to exit from jog and return to the previous menu.

Jogging through the software tool

Procedure:

1. Open the Speed JOG interface in the software tool.
2. Set the jog speed.
3. After switching the servo status to ON, press the forward/reverse arrow displayed on the interface to switch between forward and reverse jog.

Using the keypad (position control mode)

Procedure:

1. Enter the jog mode by setting H0d.08 through the keypad.
   The keypad displays the default jog speed at this moment.
2. Adjust the jog speed through the UP/DOWN key and press the SET key to enter the jog state.
   The keypad displays "JOG-P" at this moment, and the motor is energized.
3. Hold the UP/DOWN key down to make the motor jog forwardly or reversely.
   Press the MODE key to exit from jogging and return to the previous menu.

☆Related parameter

See *" H06.12" on page 387* for details.

2.2.4 General Parameter Setting

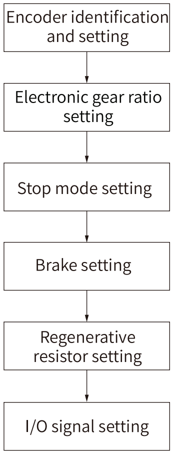


Figure 2-3 Flowchart for general parameter setting

Identifying and setting the encoder

Check whether H00.00 (Motor code) is set to a value that matches the motor used.

Set H02.02 to change the direction of rotation directly.

☆Related parameters

See *" H00.00" on page 348* for details.

See *" H02.02" on page 354* for details.

The change of H02.02 does not affect the pulse output form or the sign (+/-) of monitoring parameter values.

The direction of "forward drive" in overtravel prevention is the same as that defined by H02.02.

Setting the electronic gear ratio

☆Related parameters

See *" 6091.01h" on page 618* for details.

See *" 6091.02h" on page 619* for details.

Stop mode

The stop modes include **Brake setting**, **Servo stop mode at S-ON OFF**, **Stop mode at No.2 fault**, **Stop mode at overtravel**, and **Stop mode at No.1 fault**.

1. Selection of the brake

   ☆Related parameter

   See *" H02.16" on page 357* for details.

2. Selection of the stop mode for stop at S-ON OFF
☆Related parameter

See " H02.05" on page 354 for details.

3. Selection of the stop mode for stop at No. 2 fault
☆Related parameter

See " H02.06" on page 355 for details.

4. Selection of the stop mode for stop at overtravel
☆Related parameter

See " H02.07" on page 355 for details.

5. Selection of the stop mode for stop at No. 1 fault
☆Related parameter

See " H02.08" on page 356 for details.

Brake setting

The brake is used to prevent the motor shaft from moving and lock the position of the motor and the motion part when the drive is in the non-operational status.

Caution

- Use the built-in brake for position-lock purpose only. Do not use this brake for any other purposes (such as braking) other than position lock in the stop state.
- The brake coil has no polarity.
- After the motor stops, switch off the S-ON signal.
- When the motor with brake runs, the brake may generate a click sound, which does not affect its function.
- If instruments such as a magnetic sensor is operating near the motor, flux leakage may occur on the motor shaft end when brake coils are energized (brake released).

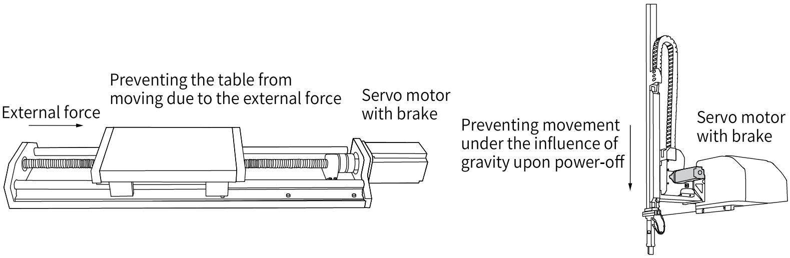


Figure 2-4 Application of the brake

Table 2–2 Brake specifications

<table>
<tr><th>Motor Model</th><th>Holding Torque (N·m)</th><th>Supply Voltage (VDC)±10%</th><th>Coil Resistance (Ω)±7%</th><th>Exciting Current (A)</th><th>Release Time (ms)</th><th>Apply Time (ms)</th><th>Backlash (°)</th></tr>
<tr><td>MS1H1-05B30CB-*632R</td><td rowspan="2">0.32</td><td rowspan="11">24</td><td rowspan="2">94.40</td><td rowspan="2">0.25</td><td rowspan="4">≤ 20</td><td rowspan="2">≤ 40</td><td rowspan="4">≤ 1.5</td></tr>
<tr><td>MS1H1-10B30CB-*632R</td></tr>
<tr><td>MS1H1-20B30CB-*632R</td><td rowspan="2">1.5</td><td rowspan="2">75.79</td><td rowspan="2">0.32</td><td rowspan="4">≤ 60</td></tr>
<tr><td>MS1H1-40B30CB-*632R</td></tr>
<tr><td>MS1H1-75B30CB-*632R</td><td rowspan="2">3.2</td><td rowspan="2">57.60</td><td rowspan="2">0.42</td><td rowspan="2">≤ 40</td><td rowspan="2">≤ 1</td></tr>
<tr><td>MS1H1-10C30CB-*632R</td></tr>
<tr><td>MS1H4-10B30CB-*632R</td><td>0.32</td><td>94.40</td><td>0.25</td><td rowspan="3">≤ 20</td><td>≤ 40</td><td rowspan="3">≤ 1.5</td></tr>
<tr><td>MS1H4-20B30CB-*634R</td><td rowspan="2">1.5</td><td rowspan="2">75.79</td><td rowspan="2">0.32</td><td rowspan="4">≤ 60</td></tr>
<tr><td>MS1H4-40B30CB-*634R</td></tr>
<tr><td>MS1H4-75B30CB-*634R</td><td rowspan="2">3.2</td><td rowspan="2">57.60</td><td rowspan="2">0.42</td><td rowspan="2">≤ 40</td><td rowspan="2">≤ 1</td></tr>
<tr><td>MS1H4-10C30CB-*634R</td></tr>
</table>

Note

The asterisk (*) indicates the encoder type, which can be A6 (26-bit multi-turn absolute encoder) or S6 (functional safety-type 26-bit multi-turn absolute encoder).

- Brake software setting

  For the motor with brake, use BK+/BK- of CN8 on the servo drive and set H02.16 to 1.

  The operating sequences of the brake are different in the normal state and fault state.

  ☆Related parameter

  See *" H02.16" on page 357* for details.

- Brake sequence in normal state

The brake sequence in the normal state is further divided into the following two types:

- Standstill: The actual motor speed is lower than 20 rpm.
- Rotating: The actual motor speed is higher than or equal to 20 rpm.

- Brake sequence for motor at standstill
  Applicable to cases where the motor speed is lower than 20 rpm upon switch-off of the S-ON signal

Caution

- After the brake output signal changes from "OFF" to "ON", do not input a position/speed/torque reference within the time defined by H02.09. Otherwise, reference loss or an operation error may occur.
- When the motor is used to drive a vertical axis, the motion part may move slightly under the influence of gravity or external force. If the S-ON signal is switched off, the brake output is set to "OFF" immediately when the motor is at standstill. However, within the time defined by H02.10, the motor is still energized, preventing the load from moving under the influence of gravity or external force.

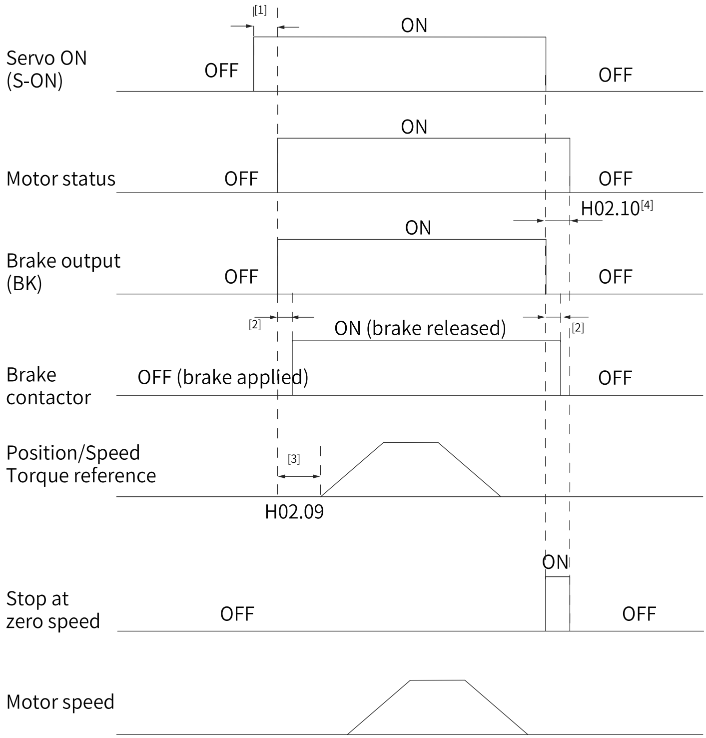


Figure 2-5 Brake sequence for motor at standstill

Note

- [1] When the S-ON signal is switched on, the brake output is set to "ON" at a delay of about 80 ms, with motor being energized at the same time.
- [2] For delay of brake contactor actions, see *"Table 2–2 " on page 48*.
- [3] The interval time, which starts from the moment when brake output is set to "ON" to the moment when a command is input, must be higher than the setpoint of H02.09.
- [4] When the S-ON signal is switched off with motor at standstill (motor speed lower than 20 rpm), the brake output is set to "OFF". You can set in H02.10 the delay of the motor in entering the de-energized state after the brake output is set to "OFF".

☆Related parameters

See *" H02.09" on page 356* for details.

See *" H02.10" on page 356* for details.

- Brake sequence for motor in the rotation state
  Applicable to cases where the motor speed is higher than or equal to 20 rpm upon switch-off of the S-ON signal

Caution

- When the S-ON signal is switched on, do not input a position/speed/torque reference within the time defined by H02.09. Otherwise, reference loss or an operation error may occur.
- If the S-ON signal is switched off when the motor is still rotating, the motor enters the "Stop at zero speed" state, but the brake output can be set to "OFF" only when one of the following conditions is met:
  - The motor has decelerated to the value defined by H02.11, but the time defined by H02.12 is not reached.
  - The time defined by H02.12 has been reached, but the motor speed is still higher than the value defined by H02.11.
- The motor is still energized within 50 ms after the brake output changes from "ON" to "OFF". This is to prevent the motion parts from moving under the influence of gravity or external force.

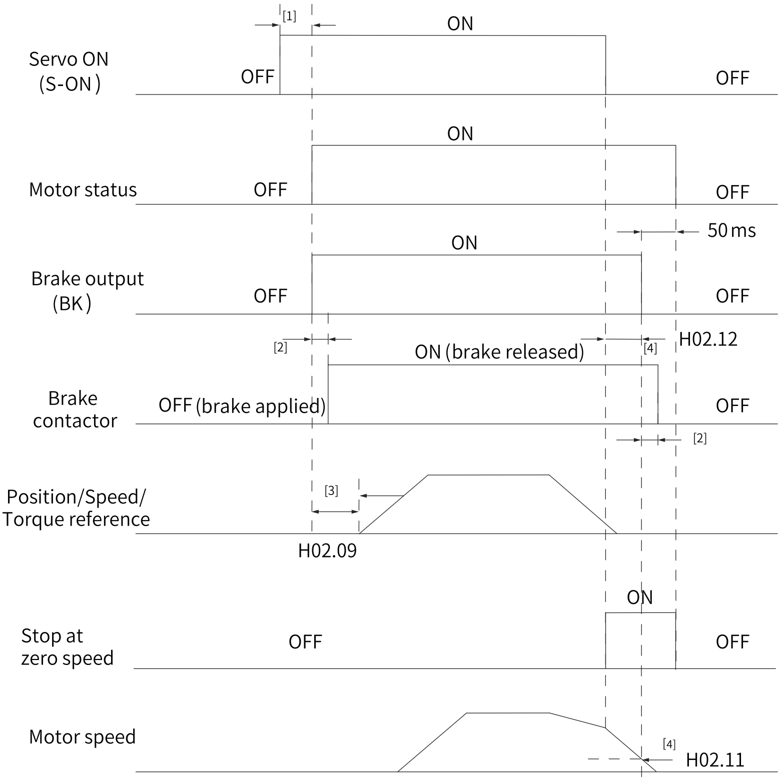


Figure 2-6 Brake sequence for a rotating motor

Note

- [1] When the S-ON signal is switched on, the brake output is set to "ON" at a delay of about 80 ms, with motor being energized at the same time.
- [2] For delay of brake contactor actions, see *"Table 2–2 " on page 48*.
- [3] The interval time, which starts from the moment when brake output is set to "ON" to the moment when a command is input, must be higher than the setpoint of H02.09.
- [4] When the S-ON signal is switched off during rotation of the motor, the motor enters the de-energized state only after the delay defined by H02.12 elapses or the speed feedback is lower than H02.11 after the brake output is off.

☆Related parameters

See *" H02.11" on page 357* for details.

See *" H02.12" on page 357* for details.

- Brake sequence in the fault state
  Servo drive faults can be classified into No. 1 faults and No. 2 faults based on the stop mode, see Chapter "Troubleshooting" for details. The brake sequences in the fault state are further divided into the following two types:
  - In case of No. 1 faults:
    The condition for brake output is the same as the brake sequence for the motor in the rotation state. Which is to say: The brake output can be set to "OFF" only when any one of the following conditions is met:
    - The motor has decelerated to the value defined by H02.11, but the time defined by H02.12 is not reached.
    - The time defined by H02.12 has been reached, but the motor speed is still higher than the value defined by H02.11.
  - In case of No. 2 faults:
    When a No. 2 fault occurs and the brake is enabled, the stop mode is forced to "Stop at zero speed, keeping dynamic braking status".

    In this case, the motor stops at zero speed first. When the actual motor speed is lower than 20 rpm, the brake output changes to "OFF" immediately but the motor is still energized within the time defined by H02.10, which is the same as the brake sequence for the motor at standstill.

Regenerative resistor setting

When the motor torque direction is opposite to the direction of rotation, the energy is fed back to the servo drive from the motor side, leading to bus voltage rise. Once the bus voltage rises to the braking threshold, the excessive energy must be consumed by a regenerative resistor. Otherwise, the servo drive will be damaged. The regenerative resistor can be a built-in or an external one. However, a built-in regenerative resistor cannot be used together with an external one. Specifications of the regenerative resistor are as follows.

Table 2–3 Specifications of the regenerative resistor

<table>
<tr><th rowspan="2">Servo Drive Model</th><th colspan="3">Specifications of Built-in Regenerative Resistor</th><th rowspan="2">Min. Permissible Resistance of External Regenerative Resistor (Ω) (H02.21)</th></tr>
<tr><th>Resistance (Ω)</th><th>Power (Pr) (W)</th><th>Processing Power (Pa) (W)</th></tr>
<tr><td>SV680NS1R6I</td><td>-</td><td>-</td><td>-</td><td rowspan="3">40</td></tr>
<tr><td>SV680NS2R8I</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>SV680NS5R5I</td><td>50</td><td>50</td><td>40</td></tr>
<tr><td>SV680NS7R6I</td><td rowspan="2">25</td><td rowspan="2">80</td><td rowspan="2">64</td><td>20</td></tr>
<tr><td>SV680NS012I</td><td>15</td></tr>
</table>

Servo Drive Model	Specifications of Built-in Regenerative Resistor			Min. Permissible Resistance of External Regenerative Resistor (Ω) (H02.21)
	Resistance (Ω)	Power (Pr) (W)	Processing Power (Pa) (W)	
SV680NS018I	20	100	80	20
SV680NS022I				
SV680NS027I				
SV680NT3R5I	100	80	64	80
SV680NT5R4I				60
SV680NT8R4I	50			45
SV680NT012I				40
SV680NT017I	35	100	80	35
SV680NT021I				25
SV680NT026I				

Note

- The built-in regenerative resistor is not available in standard S1R6 or S2R8 models. You can install an external regenerative resistor as needed or contact Inovance to order customized S1R6 and S2R8 models that carry the built-in regenerative resistor.
- The processing power (P_a) of the built-in regenerative resistor is affected by the ambient temperature and actual load rate of the drive.

- Without external load torque
  The kinetic energy generated upon braking of a reciprocating motor is converted into electric energy that fed back to the bus capacitor. When the bus voltage rises above the braking voltage threshold, the regenerative resistor starts consuming the excessive energy fed back by the motor. The following figure shows the motor speed curve in no-load operation from 3000 rpm to a standstill.

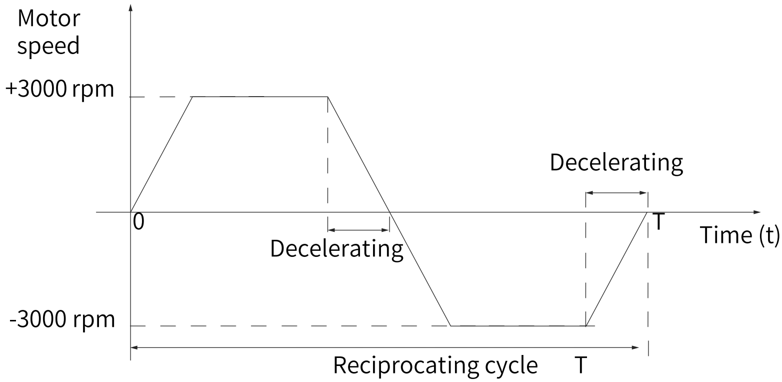


Figure 2-7 Example of motor speed curve (without external load torque)

- Energy calculation
  The built-in regenerative resistor is not available in SV680NS1R6I and SV680NS2R8I models. The energy that can be absorbed by a capacitor is described in section "Wiring and Setting of the Regenerative Resistor" in SV680N Series Servo Drive Hardware Guide. An external regenerative resistor is needed when the rotational energy of the motor and the load exceeds the values listed in the following table.

Servo Drive Model	Regenerative Energy That Can Be Absorbed (W)	Remarks
SV680NS1R6I	13.15	The input voltage of the main circuit power supply is 220 VAC.
SV680NS2R8I	26.29	

The following table shows the energy generated by a 220 V motor in decelerating from the rated speed to a standstill during no-load operation.

Servo Motor Model	Capacity (W) (kW)	Rotor Inertia $J(10^{-4}kgm^2)$	Braking Energy E_O (J) Generated During Operation	Max. Braking Energy Absorbed by the Capacitor E_C (J)
MS1H1-05B30CB-*630R	0.05	0.026 (0.028)	0.129	9.297
MS1H1-10B30CB-*630R	0.1	0.041 (0.043)	0.203	9.297
MS1H1-20B30CB-*630R	0.2	0.0938 (0.106)	1.024	9.297
MS1H1-40B30CB-*630R	0.4	0.145 (0.157)	1.859	18.595
MS1H1-55B30CB-*630R	0.55	0.55	5.242	32.422
MS1H1-75B30CB-*630R	0.75	0.68 (0.71)	6.824	32.422
MS1H1-10C30CB-*630R	1	0.82 (0.87)	8.654	32.422

Servo Motor Model	Capacity (W) (kW)	Rotor Inertia $J(10^{-4}kgm^2)$	Braking Energy E_O (J) Generated During Operation	Max. Braking Energy Absorbed by the Capacitor E_C (J)
MS1H4-10B30CB-*630R	0.1	0.102 (0.104)	0.504	9.297
MS1H4-20B30CB-*631R	0.2	0.22 (0.23)	1.088	9.297
MS1H4-40B30CB-*631R	0.4	0.43 (0.44)	3.249	18.595
MS1H4-55B30CB-*631R	0.55	1.12	5.538	32.422
MS1H4-75B30CB-*631R	0.75	1.46 (1.51)	9.890	32.422
MS1H4-10C30CB-*631R	1	1.87 (1.97)	9.198	32.422

Note

- The asterisk (*) indicates the encoder type, which can be A6 (26-bit multi-turn absolute encoder) or S6 (functional safety-type 26-bit multi-turn absolute encoder).
- Values inside the parentheses "()" are for the motor with brake.

If the total braking time T is known, you can determine whether an external regenerative resistor is needed and the power required using the following flowchart and formula.

- Regenerative resistor selection

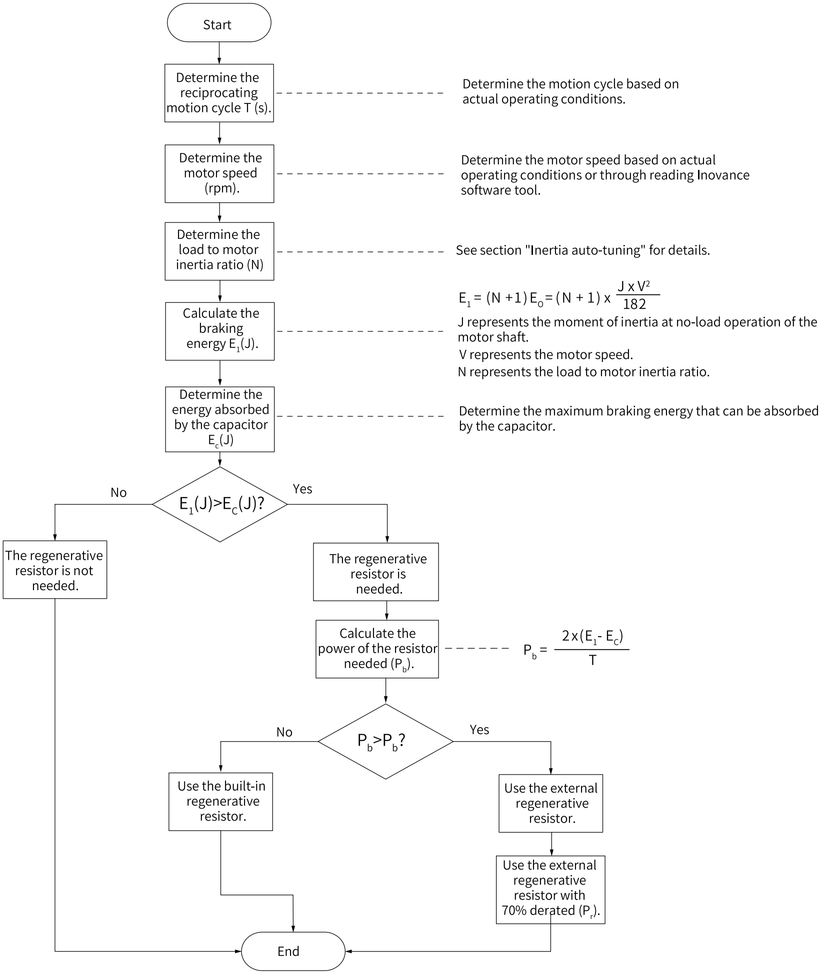


Figure 2-8 Flowchart for selecting the regenerative resistor

Note

- Take the process in which the motor decelerates from 3000 rpm to 0 rpm as an example. Suppose the load inertia is N x motor inertia, then the braking energy is (N+1) x E_O when the motor decelerates from 3000 rpm to 0 rpm, and the energy consumed by the regenerative resistor is (N + 1) x E_O - E_C (E_C represents the energy absorbed by the capacitor). Suppose the reciprocating cycle is T, then the power of the regenerative resistor needed is 2 x [(N + 1) x E_O - E_C]/T. For values of E_O and E_C, see section "Braking Energy Data" in SV680N Series Servo Drive Commissioning Guide.
- Determine whether to use the regenerative resistor according to the preceding figure and select a built-in or an external regenerative resistor as needed. Then, set H02.25 accordingly.
- The resistor with aluminum case is recommended.

Take the H1 series 750 W model as an example. Suppose the reciprocating cycle (T) is 2s, the maximum speed is 3000 rpm, and the load inertia is 4 x motor inertia, then the power of the regenerative resistor required is as follows:

$$P_b = \frac{2 \times [(N+1) \times E_O - E_C]}{T} = \frac{2 \times [(4+1) \times 6.824 - 32.422]}{2} = 1.698W$$

The calculated result is smaller than the processing capacity (P_a = 40 W) of the built-in regenerative resistor, so a built-in regenerative resistor is enough.

If the inertia ratio in the preceding example is changed to 10 x motor inertia, and other conditions remain the same, the power of the regenerative resistor required will be as follows:

$$P_b = \frac{2 \times [(N+1) \times E_O - E_C]}{T} = \frac{2 \times [(10+1) \times 6.824 - 32.422]}{2} = 42.642W$$

The calculated result is larger than the processing capacity (P_a = 40 W) of the built-in regenerative resistor, so an external regenerative resistor is needed. The recommended power of the external regenerative resistor is P_b/(1 – 70%) = 142.14 W.

☆Related parameters

See *" H02.21" on page 358* for details.

See *" H02.24" on page 359* for details.

See *" H02.25" on page 360* for details.

See *" H02.26" on page 360* for details.

See *" H02.27" on page 360* for details.

- Using an external regenerative resistor

  When $P_b > P_a$, an external regenerative resistor is needed. Set H02.25 to 1 or 2 based on the cooling mode of the regenerative resistor.

  Use the external regenerative resistor with 70% derated, that is, $P_r = P_b/(1 - 70\%)$, and ensure the resistance of the regenerative resistor is higher than the minimum permissible resistance allowed by the servo drive. Remove the jumper bar between terminals P⊕ and D, and connect the external regenerative resistor between terminals P⊕ and C.

  See section "Wiring of the Regenerative Resistor" in SV680N Series Servo Drive Hardware Guide for the wiring diagram of the external regenerative resistor and the specifications of the jumper bar. Set H02.25 to 1 or 2 based on the cooling mode of the regenerative resistor and set the following parameters properly.

  ☆Related parameters

  See *" H02.21" on page 358* for details.

  See *" H02.26" on page 360* for details.

  See *" H02.27" on page 360* for details.

Caution

- Set the power (H02.26) and resistance (H02.27) of the external regenerative resistor.
- Ensure the resistance of the external regenerative resistor is higher than or equal to the permissible minimum resistance.
- When the regenerative resistor is used at its rated power rather than the processing power (average value) in environments within the specified temperature range, the temperature of the resistor will rise to above 120°C under continuous braking. To ensure safety, cool the resistor down through forced air cooling, or use the resistor with thermal switch. For the load characteristics of the regenerative resistor, consult with the manufacturer.

Set the heat dissipation coefficient based on the heat dissipation condition of the external regenerative resistor.

☆Related parameter

See *" H02.24" on page 359* for details.

Note

Higher resistor heat dissipation coefficient indicates higher braking efficiency.

- Using the built-in regenerative resistor
  When $P_b < P_a$ and $E_1 > E_C$, use the built-in regenerative resistor. In this case, set H02.25 to 0.

  When using the built-in regenerative resistor, connect terminals P⊕ and D with a jumper bar.

- Regenerative resistor not needed
  When $E_1 < E_C$, the regenerative resistor is not needed because the braking energy can be absorbed by the bus capacitor. In this case, set H02.25 to 3.

- External load torque applied, motor in generating state
  When the motor direction of rotation is the same with the shaft direction of rotation, the motor outputs energy to the outside. In some applications where the motor direction of rotation is opposite to the shaft direction of rotation, the motor is in the generating state and feeds the electric energy back to the servo drive.

  When the load is in the generating state continuously, it is recommended to adopt the common DC bus mode.

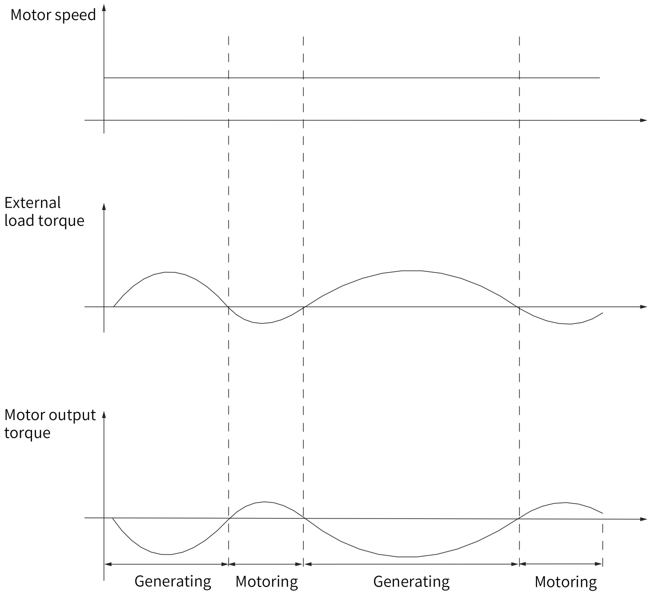


Figure 2-9 Example of the curve with external load torque

Take H1 series 750 W models (rated torque: 2.39 N ·m) as an example. When the external load torque is 60% of the rated torque and the motor speed reaches 1500 rpm, the power fed back to the drive is (60% x 2.39) x (1500 x 2π/60) = 225 W. As the regenerative resistor needs to be derated by 70%, the power of the external regenerative resistor is 225/(1 – 70%) = 750 W, with resistance being 50 Ω.

Input/Output signal setting

The input/output signal setting is the same as "DI/DO setting mode selection".

See *"7.2 DI/DO Function Assignment" on page 640* for details.

2.2.5 Servo ON

When the drive is ready to run, the keypad displays "88rn", but if no reference is inputted at this moment, the motor does not rotate and stays locked until a reference is inputted.

Table 2–4 Operation of the servo drive

Record	No.	Description
☐	1	During initial operation, set a proper reference to make the motor run at low speed and check whether the motor rotates properly.
☐	2	Observe whether the motor rotates in the correct direction. Observe whether the motor rotates in the correct direction. If the direction of rotation is wrong, check the reference signal input and the reference direction setting signal.
☐	3	If the motor rotates in the correct direction, you can view the actual speed in H0b.00 and the average load rate in H0b.12 through the keypad or the software tool.
☐	4	After checking preceding conditions, adjust related parameters to make the motor operate as desired.
☐	5	Commission the drive according to Chapter "Adjustment".

Power-on sequence diagram

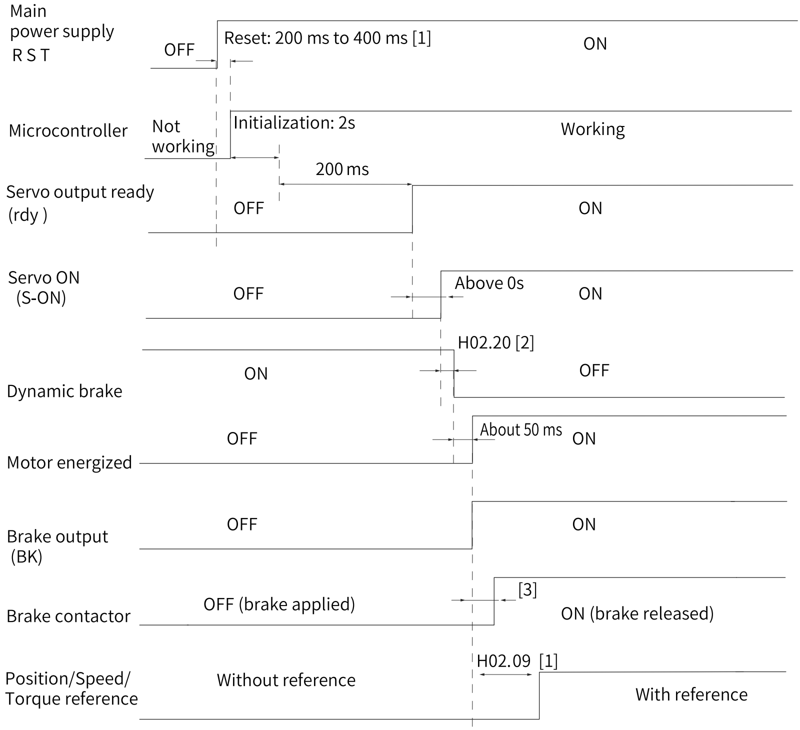


Figure 2-10 Power-on sequence diagram

Note

- [1] The DI signal used for fault reset (FunIN.2: ALM-RST) is edge-triggered.
- [2] The dynamic brake is included in the standard configuration.
- [3] For delay of brake contactor actions, see "Table 2–2 " on page 48.
- [4] If the brake is not used, H02.09 is invalid.

Sequence diagram for stop at warning or fault

- No. 1 fault: Coast to stop, keeping de-energized status

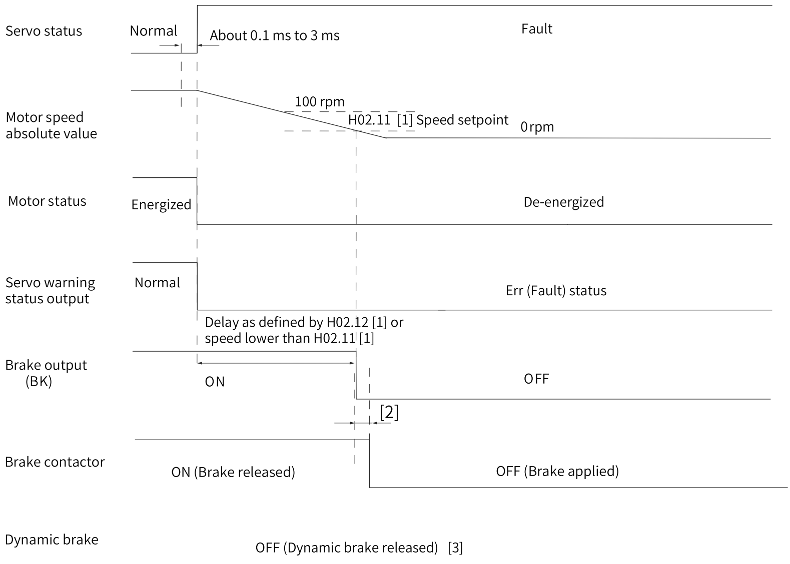


Figure 2-11 Sequence of "Coast to stop, keeping de-energized status" at No. 1 fault

Note

- [1] If the brake is not used, H02.11 and H02.12 are invalid.
- [2] For delay of brake contactor actions, see "Table 2–2 " on page 48.
- [3] The dynamic brake is included in the standard configuration.

- No. 1 fault (without brake): Dynamic braking stop, keeping de-energized status

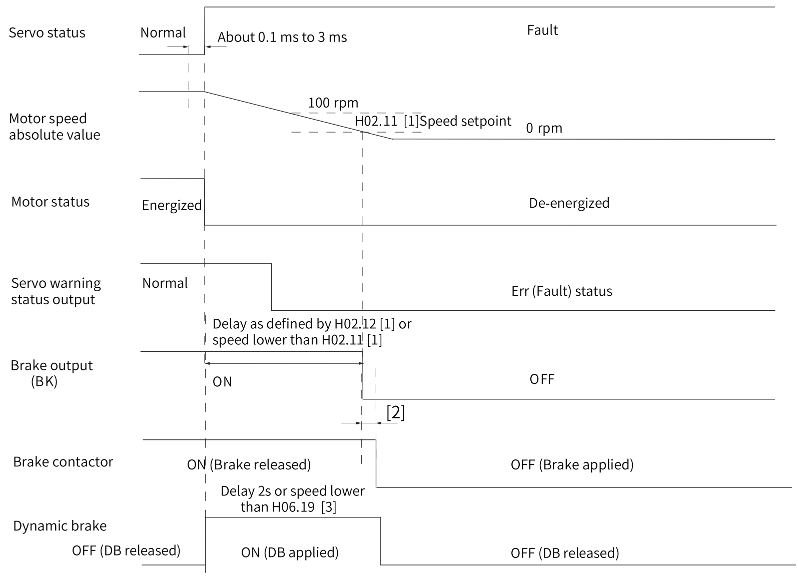


Figure 2-12 Sequence of "Dynamic braking stop, keeping de-energized status" at No. 1 fault

Note

- [1] If the brake is not used, H02.11 and H02.12 are invalid.
- [2] For delay of brake contactor actions, see *"Table 2–2 " on page 48*.
- [3] The dynamic brake is included in the standard configuration.

- No. 1 fault: Dynamic braking stop, keeping dynamic braking status

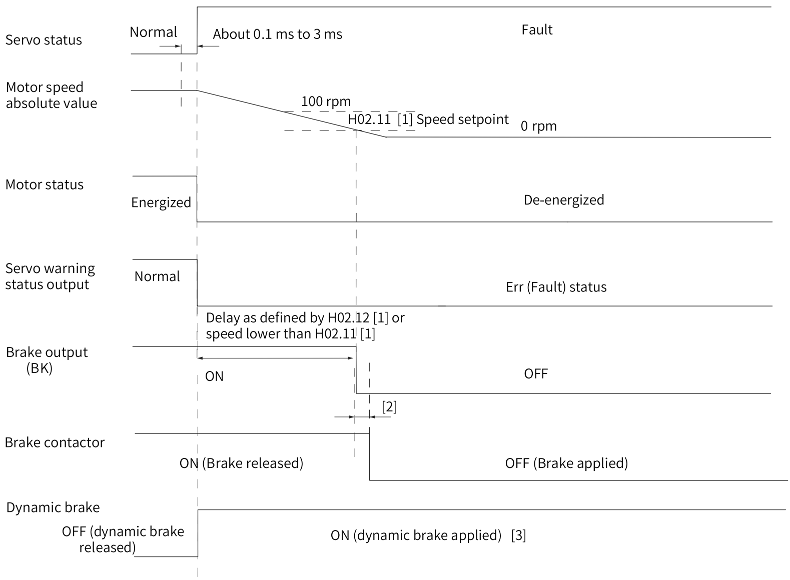


Figure 2-13 Sequence of "Dynamic braking stop, keeping dynamic braking status" at No. 1 fault

Note

- [1] If the brake is not used, H02.11 and H02.12 are invalid.
- [2] For delay of brake contactor actions, see *"Table 2–2 " on page 48*.
- [3] The dynamic brake is included in the standard configuration.

- No. 2 fault (without brake): Coast to stop, keeping de-energized state

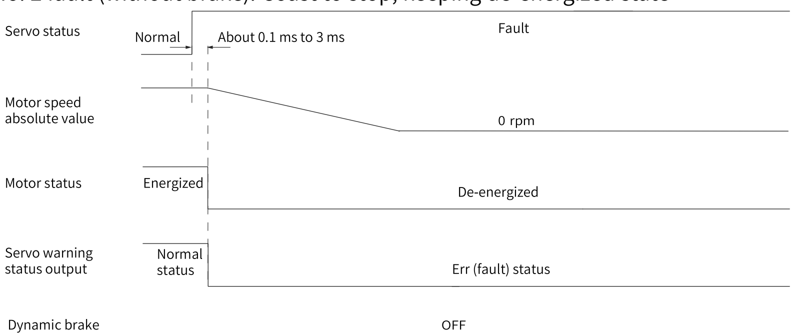


Figure 2-14 Sequence of "Coast to stop, keeping de-energized status" at No. 2 fault

- No. 2 fault (without brake): Stop at zero speed, keeping de-energized status

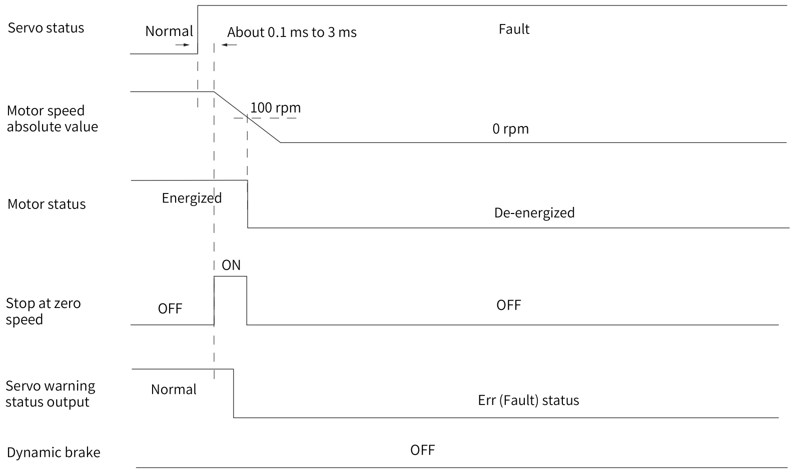


Figure 2-15 Sequence of "Stop at zero speed, keeping de-energized state" at No. 2 fault (without brake)

- No. 2 fault (without brake): Stop at zero speed, keeping dynamic braking status

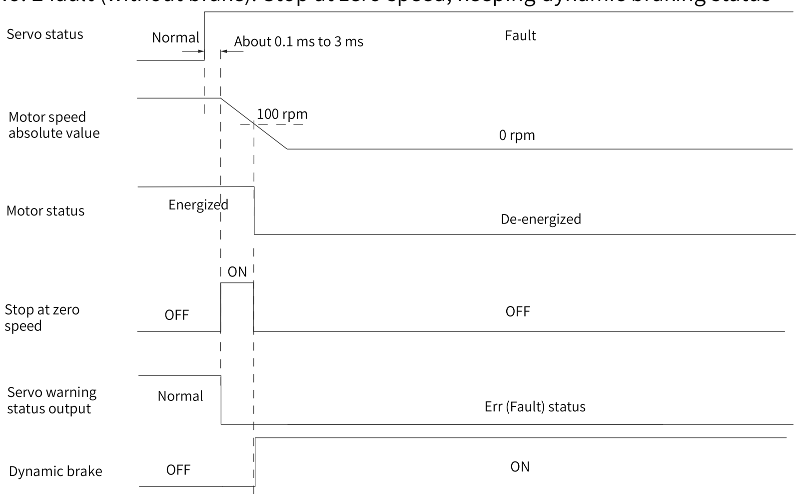


Figure 2-16 Sequence of "Stop at zero speed, keeping dynamic braking status" at No. 2 fault (without brake)

- No. 2 fault (without brake): Dynamic braking stop, keeping dynamic braking status

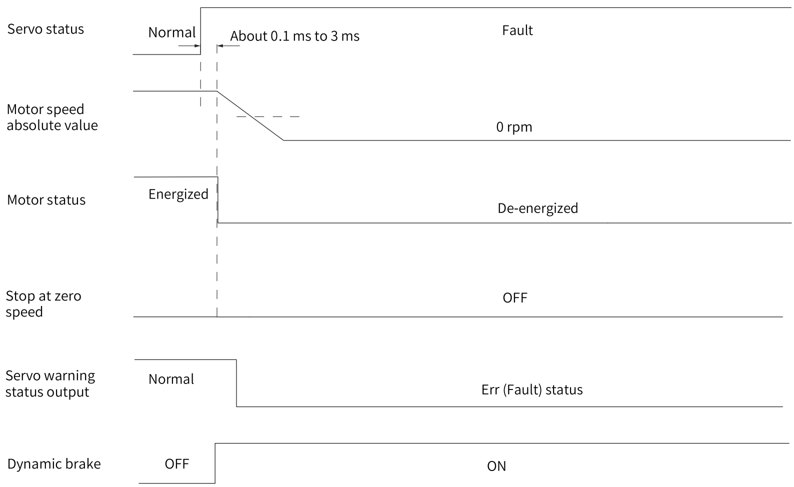


Figure 2-17 Sequence of "Dynamic braking stop, keeping dynamic braking status" at No. 2 fault (without brake)

- No. 2 fault (without brake): Dynamic braking stop, keeping de-energized status

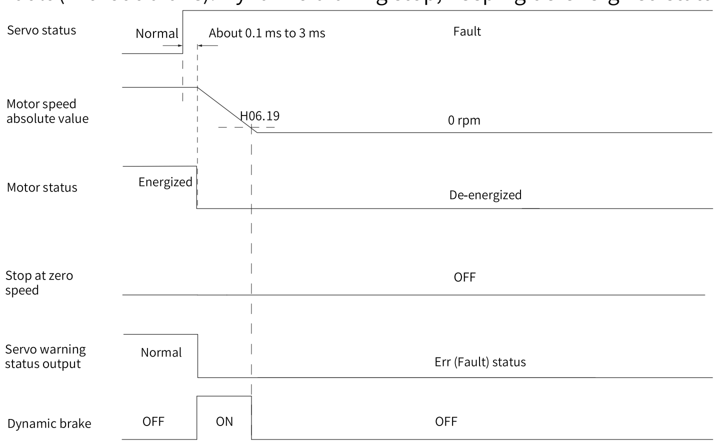


Figure 2-18 Sequence of "Dynamic braking stop, keeping de-energized state" at No. 2 fault (without brake)

- No. 2 fault (with brake): Stop at zero speed, keeping dynamic braking status

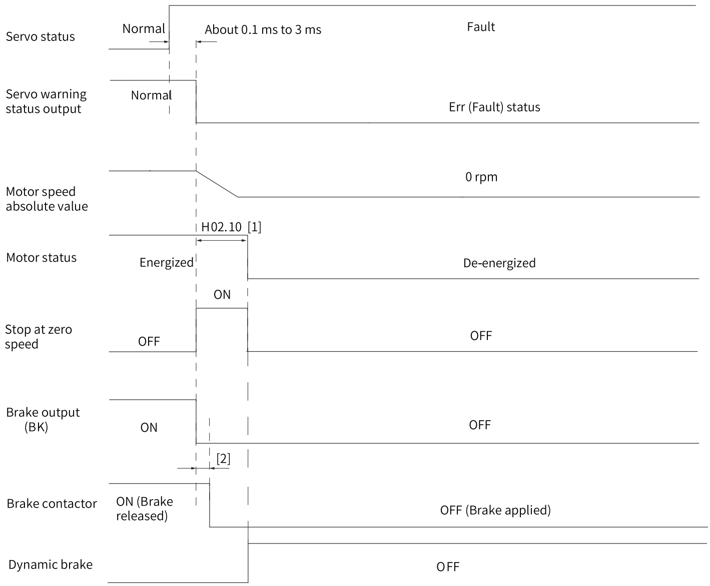


Figure 2-19 Sequence of "Stop at zero speed, keeping dynamic braking status" at No. 2 fault (with brake)

Note

- [1] If the brake is not used, H02.10 is invalid.
- [2] For delay of brake contactor actions, see *"Table 2–2 " on page 48*.

- When a No. 3 warning occurs on the drive, such as E900.0 (DI emergency braking), E950.0 (Positive limit switch warning), and E952.0 (Negative limit switch warning), the drive stops according to *"Figure 2–20 Sequence for warnings that cause stop" on page 69*.
- Warnings that cause stop: Stop at zero speed, keeping position lock status

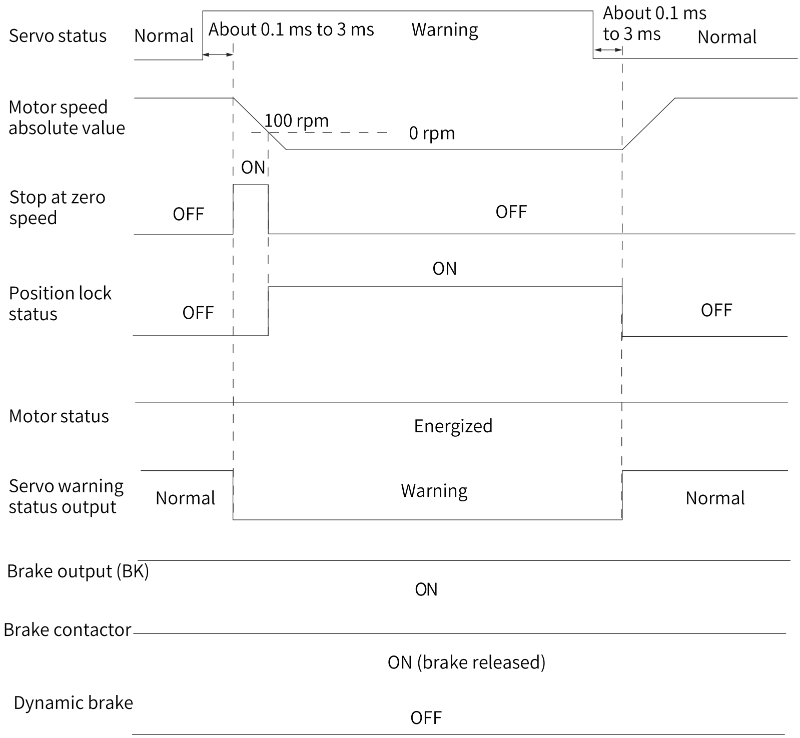


Figure 2-20 Sequence for warnings that cause stop

The other warnings do not affect the operation state of the drive. The sequence diagram for these warnings is shown in *"Figure 2–21 Sequence for warnings that do not cause stop" on page 70*.

- Warnings that do not cause stop

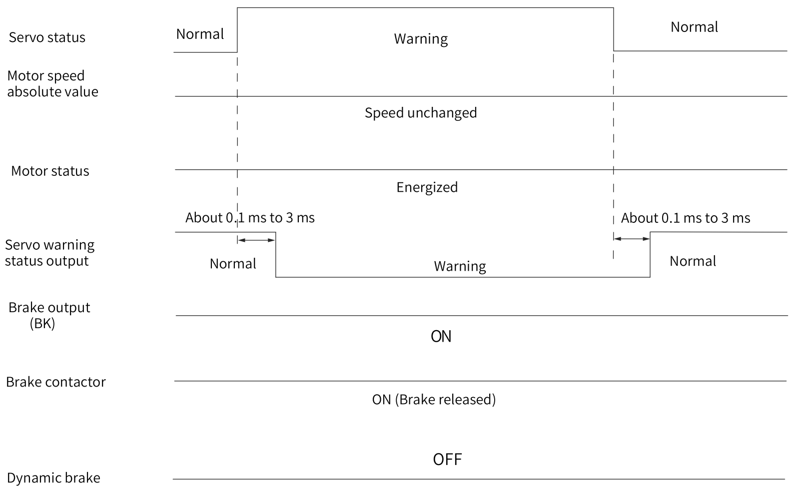


Figure 2-21 Sequence for warnings that do not cause stop

- Fault reset

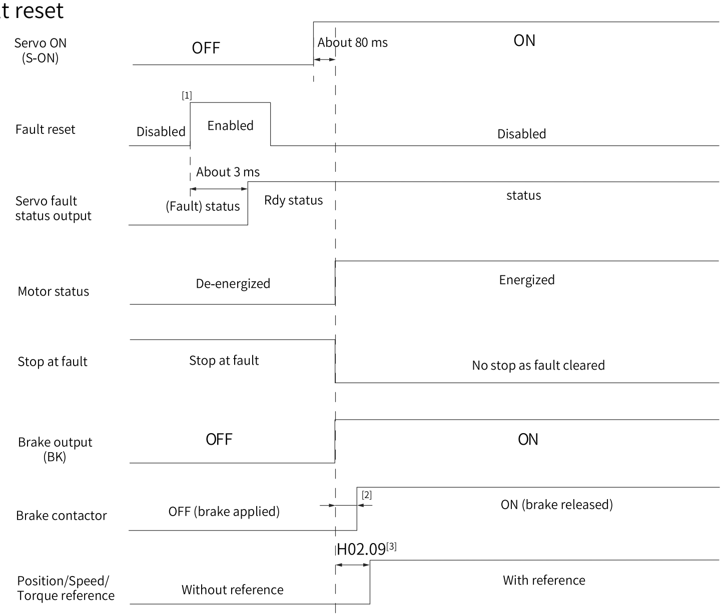


Figure 2-22 Sequence for fault reset

Note

- [1] The DI signal used for fault reset (FunIN.2: ALM-RST) is edge-triggered.
- [2] For delay of brake contactor actions, see *"Table 2–2 " on page 48*.
- [3] If the brake is not used, H02.09 is invalid.

2.2.6 Servo OFF

Five type of stop modes are available for the servo drive: coast to stop, stop at zero speed, ramp to stop, stop at emergency-stop torque, and dynamic braking stop, along with three kinds of stop status: de-energized, position lock, and dynamic braking. See the following table for details.

Table 2–5 Comparison of the stop modes

Stop Mode	Description	Feature
Mode 1: Coast to stop	The motor is de-energized and coasts to 0 rpm. The deceleration time is affected by the mechanical inertia and mechanical friction.	Mode 1 features smooth and slow deceleration with small mechanical shock.
Mode 2: Stop at zero speed	The motor decelerates to 0 rpm immediately and stops.	Mode 2 features quick deceleration with obvious mechanical shock.
Mode 3: Ramp to stop	The motor decelerates to 0 rpm smoothly upon position/speed/torque reference input.	Mode 3 features smooth and controllable deceleration with small mechanical shock.
Mode 4: Stop at emergency-stop torque	The servo drive outputs a reverse braking torque to stop the motor.	Mode 4 features quick deceleration with obvious mechanical shock.
Mode 5: Dynamic braking	The servo motor is in the dynamic braking status.	Mode 5 features quick deceleration with obvious mechanical shock.

Table 2–6 Comparison of the stop status

Stop Status	Description
De-energized	The motor is de-energized and the motor shaft can be rotated freely after the motor stops rotating.
Position Lock	The motor shaft is locked and cannot be rotated freely after the motor stops rotating.
Dynamic Braking	The motor is not energized after it stops rotating, and the motor shaft cannot be rotated freely.

The stop events can be divided into the following types: stop at S-ON OFF, stop at fault, stop at overtravel, emergency stop, quick stop, and halt. See the following descriptions for details.

Stop at S-ON OFF

Deactivate the S-ON signal through communication to make the drive stop according to the stop mode at S-ON OFF.

☆Related parameter

See *" H02.05" on page 354* for details.

Stop at fault

The stop mode varies with the fault type. For fault classification, see *"4.2 List of Fault and Warning Codes" on page 133*.

☆Related parameters

See *" H02.06" on page 355* for details.

See *" H02.08" on page 356* for details.

Stop at overtravel

★Definitions of terms:

- "Overtravel": The mechanical motion exceeds the designed range of safe movement.
- "Stop at overtravel": When a motion part moves beyond the range of safe movement, the limit switch outputs a level change to force the motor to stop.

☆Related parameter

See *" H02.07" on page 355* for details.

When overtravel occurs on a motor used to drive a vertical axis, the workpiece may fall. To prevent the risk of falling, set H02.07 to 1. When the workpiece moves linearly, install limit switches to prevent potential mechanical damage. When overtravel occurs, input a reverse running command to make the motor (workpiece) run in the opposite direction.

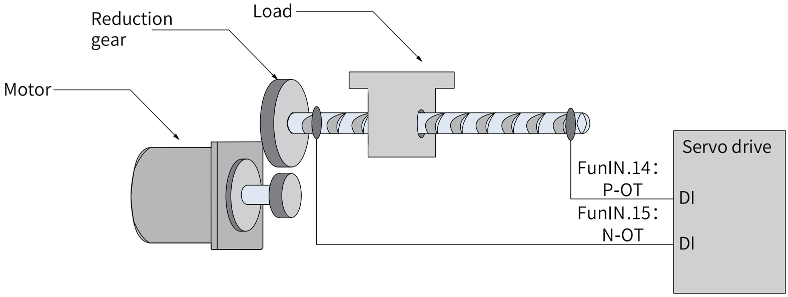


Figure 2-23 Installation of limit switches

To use the limit switch, assign FunIN.14 (P-OT, positive limit switch) and FunIN.15 (N-OT, negative limit switch) to two DIs of the servo drive and set the active logic of these DIs. This is to enable the servo drive to receive the level signals input from the limit switches. The servo drive enables or cancels the stop-at-overtravel status based on the DI level status.

☆ Related function No.

Function No.	Name	Function Name	Function
FunIN.14	P-OT	Positive limit switch	When the machine moves beyond the specified range, overtravel prevention applies. Inactive: Forward drive permitted Active: Forward drive inhibited
FunIN.15	N-OT	Negative limit switch	When the machine moves beyond the specified range, overtravel prevention applies. Inactive: Reverse drive permitted Active: Reverse drive inhibited

Emergency stop

There are two ways to enable emergency stop, as shown below:

- Using DI function 34: FunIN.34 (EmergencyStop)
- Using the auxiliary function: emergency stop (H0d.05)

☆ Related function No.

Function No.	Name	Function Name	Function
FunIN.34	Emergency Stop	Braking	Inactive: Current operating state unaffected Active: Stop quickly as defined by H02.18, keeping position lock status, with E900.0 (DI emergency braking) reported

☆Related parameters

See *" H02.18" on page 358* for details.

See *" H0d.05" on page 458* for details.

Quick stop

Quick stop applies when bit 2 (Quick stop) of the control word 6040h is set to 0 (Active) during operation of the drive. The stop mode is defined by 605Ah.

☆Related parameter

See *" 605Ah" on page 606* for details.

Halt

The halt function applies when bit 8 of the control word 6040h is set to 1 (Halt) during operation of the drive. The halt mode is defined by 605Dh.

☆Related parameter

See *" 605Dh" on page 607* for details.

Danger

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

3 Adjustment

3.1 Overview

The servo drive must drive the motor as quick and accurate as possible to follow the commands from the host controller or internal setting. Gain adjustment needs to be performed to meet such requirement.

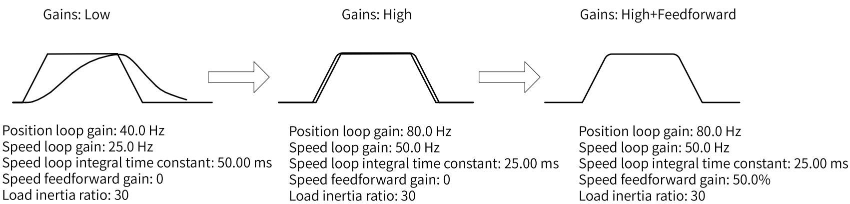


Figure 3-1 Example of gain tuning

The gain is defined by a combination of multiple parameters that affect each other. Such parameters include the position loop gain, speed loop gain, filter and load moment of inertia ratio. The values of these parameters must be balanced against each other during gain tuning.

Note

Before gain tuning, perform a trial run through jogging to ensure the motor operates properly.

The following figure shows the general flowchart for gain tuning.

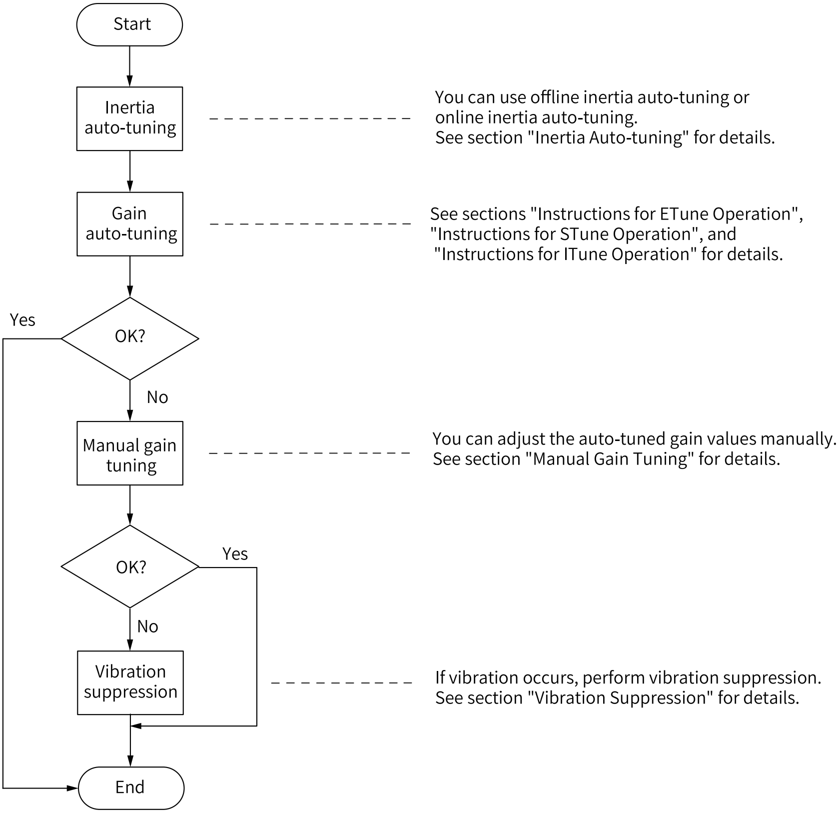


Figure 3-2 Step

Table 3–1 Description of gain tuning

<table>
<tr><th colspan="3">Step</th><th>Function</th><th>Reference</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Inertia auto-tuning</td><td>Offline</td><td>The servo drive calculates the load inertia ratio automatically through inertia auto-tuning.</td><td>"3.2.1 Offline Inertia Auto-tuning" on page 80</td></tr>
<tr><td>Online</td><td>The host controller sends a command to make the motor rotate, and the servo drive calculates the load inertia ratio in real time.</td><td>"3.2.2 Online Inertia Auto-tuning" on page 81</td></tr>
<tr><td>2</td><td colspan="2">Gain auto-tuning</td><td>The servo drive generates a group of gain parameters based on the correct inertia ratio.</td><td>Chapter "Instructions for ETune Operation" and Chapter "Instructions for STune Operations"</td></tr>
<tr><td rowspan="5">3</td><td rowspan="5">Manual gain tuning</td><td>Basic gains</td><td>If the auto-tuned gain values fail to deliver desired performance, fine-tune the gains manually to improve the performance.</td><td>"3.6.1 Basic Parameters" on page 99</td></tr>
<tr><td>Reference filter</td><td>Smoothens the position, speed, and torque references.</td><td>"3.6.3 Position Reference Filter" on page 107</td></tr>
<tr><td>Feedforward gain</td><td>Improves the follow-up behavior.</td><td>"3.6.4 Feedforward Gain" on page 107</td></tr>
<tr><td>Pseudo differential regulator</td><td>Adjusts the speed loop control mode to improve the anti-interference capability at low frequency range.</td><td>"3.6.5 PDFF Control" on page 110</td></tr>
<tr><td>Torque disturbance observer</td><td>Improves the resistance against torque disturbance.</td><td>"3.6.6 Torque Disturbance Observer" on page 112</td></tr>
</table>

Step			Function	Reference
4	Vibration Suppression	Mechanical resonance	Suppresses mechanical resonance through the notch.	*"3.8.2 Mechanical Resonance Suppression" on page 123*
		Low-frequency resonance	Activate the filter used to suppress low-frequency resonance.	*"3.8.1 Low-Frequency Resonance Suppression at the Mechanical End" on page 122*

3.2 Inertia Auto-tuning

The load inertia ratio (H08.15) is calculated through the following formula:

$$\text{Load inertia ratio} = \frac{\text{Total moment of inertia of mechanical load}}{\text{Moment of inertia of the motor}}$$

The load inertia ratio is a critical parameter of the servo system. A correct load inertia ratio facilitates commissioning.

You can set the load inertia ratio manually or get the inertia ratio through inertia auto-tuning.

The following two inertia auto-tuning modes are available:

- Offline inertia auto-tuning
  To enable offline inertia auto-tuning, use H0d.02 (Offline inertia auto-tuning) and make the motor rotate and execute inertia auto-tuning through the keypad. Offline inertia auto-tuning does not involve the host controller.
- Online Inertia Auto-tuning
  Send a command to the servo drive through the host controller to make motor act accordingly to finish inertia auto-tuning. Online inertia auto-tuning involves the host controller.

Note

The following conditions must be fulfilled for an accurate calculation of the load inertia ratio during inertia auto-tuning:

- The actual maximum speed of the motor is higher than 150 rpm.
- The acceleration rate during acceleration/deceleration of the motor is higher than 3000 rpm/s.
- The load torque is stable without dramatic changes.
- The actual inertia ratio does not exceed 120.
- Inertia auto-tuning may fail in case of a large backlash of the transmission mechanism.

3.2.1 Offline Inertia Auto-tuning

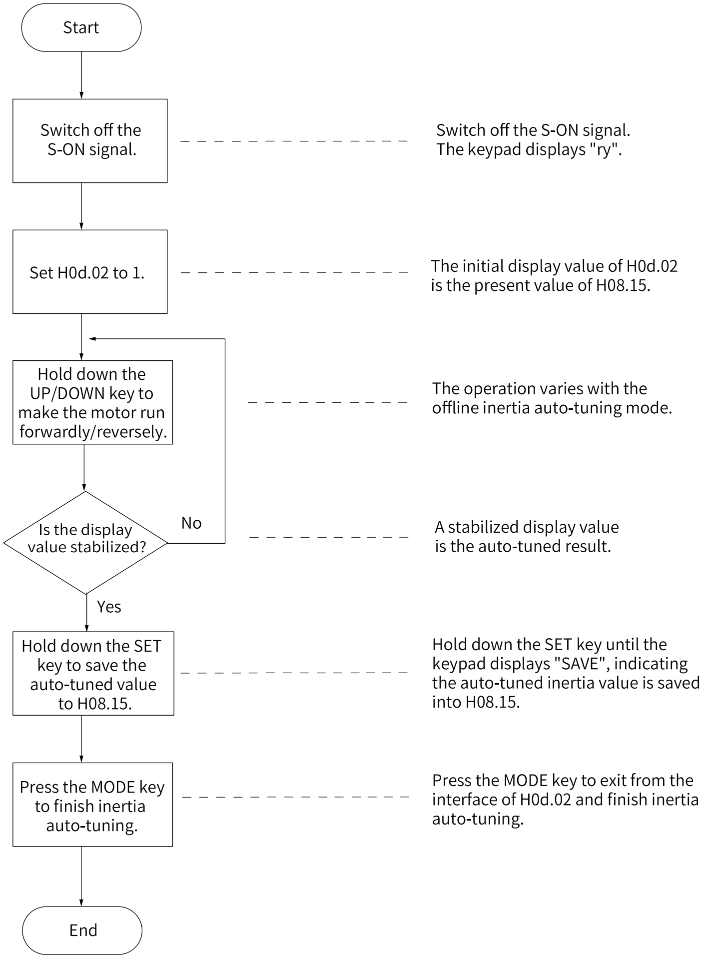


Figure 3-3 Offline inertia auto-tuning flowchart

Check the following before performing offline inertia auto-tuning:

The motor must meet the following requirements:

- A travel distance of more than one revolutions in the forward/reverse direction is available between the mechanical limit switches.
  Ensure limit switches are installed to the machine and a travel distance as described above is reserved to prevent overtravel during inertia auto-tuning.
- The required number of revolutions (H09.09) is fulfilled.

View the values of H09.06 (Maximum speed of inertia auto-tuning), H09.07 (Time constant for accelerating to the maximum speed during inertia auto-tuning), and H09.09 (Number of revolutions per inertia auto-tuning) to ensure the travel distance that starts from the stop position is larger than the value of H09.09. Otherwise, decrease the value of H09.06 or H09.07 until this requirement is met.

Operating procedure:

1. Switch off the S-ON signal.
2. In the parameter display mode, switch to H0d.02 and press the SET key to enable offline inertia auto-tuning.
3. Press the UP/DOWN key to perform offline inertia auto-tuning.
4. To stop the drive, release the UP/DOWN key. To restart auto-tuning, press the UP/DOWN key again.
   The operating direction at start is determined by the UP/DOWN key. For applications requiring unidirectional movement, set H09.05 to 1.
5. Wait until the value displayed on the keypad is stabilized.
6. Hold the SET key down until the keypad displays "SAVE".
7. Press the MODE key to exit.

For applications requiring large load inertia, set H08.15 (Load moment of inertia) to the approximate value, preventing intense system vibration caused by a low initial inertia.

The following figure shows general flowchart for offline inertia auto-tuning.

☆Related parameters

See *" H09.05" on page 415* for details.

See *" H09.06" on page 416* for details.

See *" H09.07" on page 416* for details.

See *" H09.08" on page 416* for details.

See *" H09.09" on page 417* for details.

See *" H0d.02" on page 457* for details.

3.2.2 Online Inertia Auto-tuning

The servo drive supports online inertia auto-tuning. The online inertia auto-tuning flowchart is shown as follows.

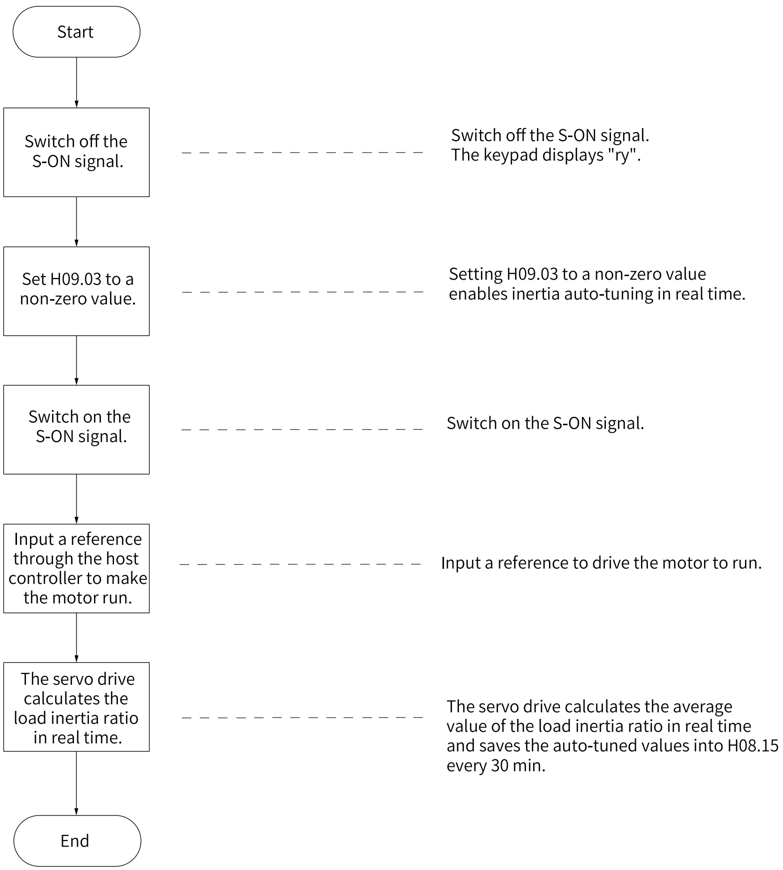


Figure 3-4 Online inertia auto-tuning flowchart

Note

H09.03 defines the real-time updating speed of the load inertia ratio (H08.15).

- H09.03 = 1: Applicable to cases where the actual load inertia ratio rarely changes, such as the machine tool and wood carving machine.
- H09.03 = 2: Applicable to cases where the load inertia ratio changes slowly.
- H09.03 = 3: Applicable to cases where the actual inertia ratio changes rapidly, such as handling manipulators.

☆Related parameter

See *" H09.03" on page 415* for details.

3.3 Instructions for STune Operation

3.3.1 Overview

STune performs gain auto-tuning based on the set stiffness level to fulfill the needs for rapidity and stability.

STune (mode 4) is turned on by default and will be turned off automatically after the drive operates as commanded for 5 min.

STune is intended to be used in applications featuring slight load inertia change. For applications featuring dramatic inertia change or where inertia auto-tuning is unavailable (due to low operating speed or low acceleration rate), turn off STune after initial power-on.

Note

In STune modes 3, 4 and 6, you need to perform load inertia auto-tuning through online inertia auto-tuning and ensure the following conditions are met:

- The load inertia changes quickly.
- The load torque changes quickly.
- The motor is running at a speed lower than 120 r/min.
- Acceleration/Deceleration is slow (lower than 1000 r/min per second).
- The acceleration/deceleration torque is lower than the unbalanced load/viscous friction torque.

If the conditions for online inertia auto-tuning cannot be fulfilled, set the correct inertia ratio manually.

3.3.2 Description of STune Operation

Operation flowchart

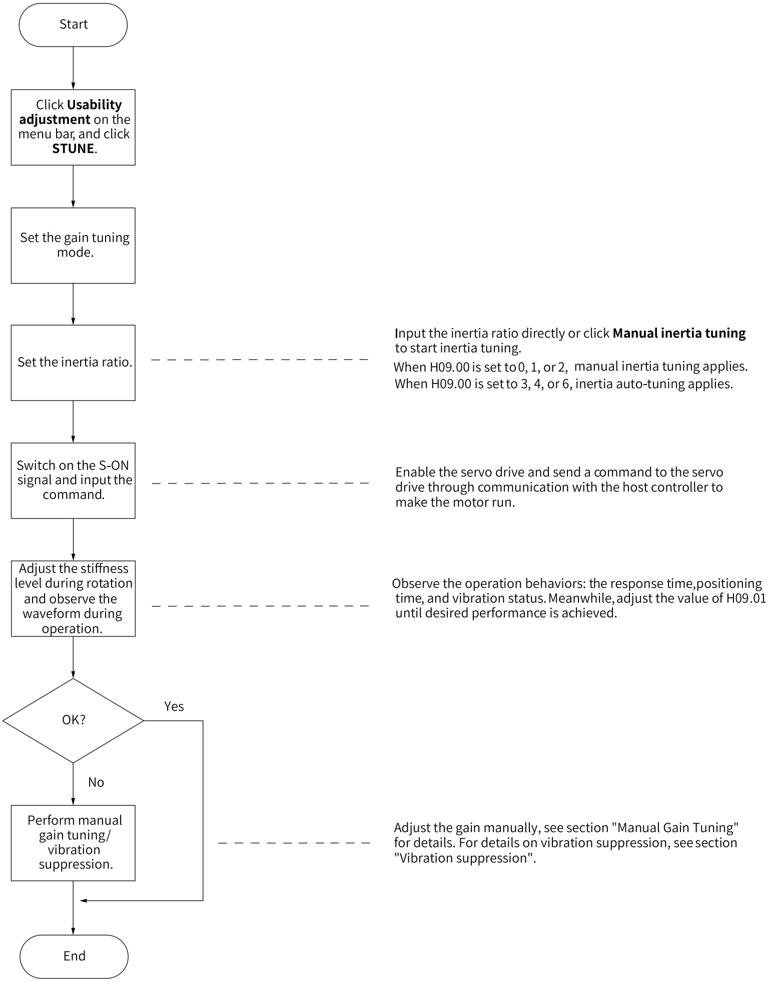


Figure 3-5 Operation flowchart

Description

You can set the gain auto-tuning mode through the keypad or the software tool.

1. Select the gain auto-tuning mode.

- In modes 0, 1 and 2 shown in the following table, you need to set the inertia ratio before stiffness adjustment. If the inertia is unknown, adjust the inertia manually. If vibration occurs on the machine, decrease the stiffness level before adjusting the inertia manually.

- In modes 3, 4, and 6 shown in the following table, you can perform adjustment through the wizard-type interface directly, without the need for setting an inertia ratio.

Mode	Name	Function
0	Inactive	The gains need to be adjusted manually.
1	Standard mode	Gains are set automatically based on the set stiffness level.
2	Positioning mode	Gains are set automatically based on the set stiffness level. This mode is applicable to occasions requiring quick positioning.
3	Interpolation mode + Inertia auto-tuning	Gains are set automatically based on the set stiffness level. In this mode, inertia is auto-tuned and vibration is suppressed automatically. This mode is applicable to multi-axis interpolation.
4	Normal mode + Inertia auto-tuning	Gains are set automatically based on the set stiffness level. The inertia is auto-tuned and vibration is suppressed automatically.
6	Quick positioning mode + Inertia auto-tuning	Gains are set automatically based on the set stiffness level. Inertia is auto-tuned and vibration is suppressed automatically. This mode is applicable to occasions requiring quick positioning.

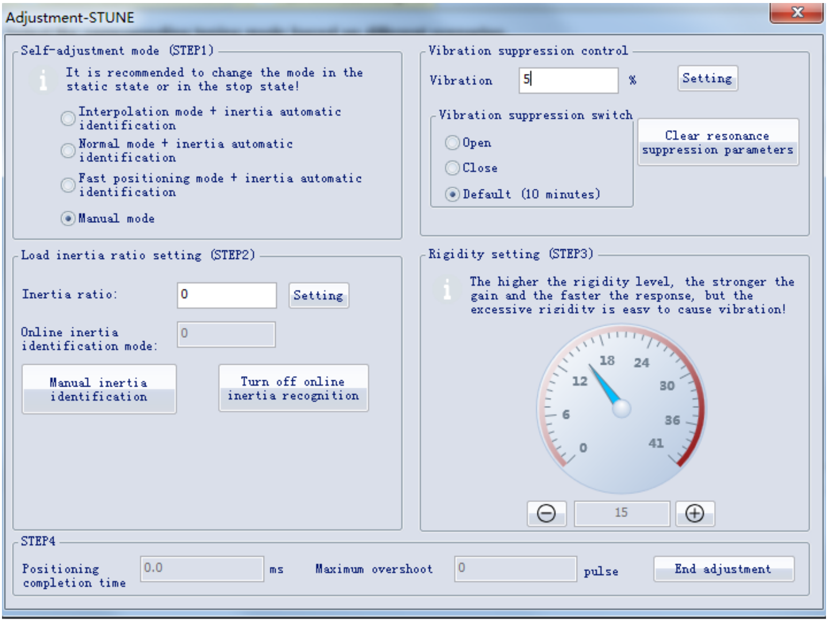
2. Adjust the stiffness level gradually during operation of the load. The present stiffness level value will be written to the drive automatically. Keep monitoring the operating waveform after increasing the stiffness level (increase by one level at a time) until desired performance is achieved.
3. In STune modes 3, 4, and 6, when the speed keeps higher than 100 r/min for more than 5 min, H09.00 returns to 0 automatically. In this case, the drive will exit from the STune mode.
   If commissioning is done, you can set H09.00 to 0 to exit from STune in advance.

   To modify the operating time of STune, set H09.37 (Vibration monitoring time) based on actual applications.

4. In STune modes 3, 4, and 6, resonance will be suppressed automatically. If the performance of automatic resonance suppression is inadequate, set H09.58 to 1 to clear resonance suppression parameters, reduce the stiffness level, and perform STune again.
5. For multi-axis trajectories, perform single-axis commissioning first to determine the highest response of each axis and modify the response of each axis manually to ensure position responses of different axes are consistent.

In STune modes 3 and 4, determine the minimum value of H08.02 (Position loop gain). Then set H09.00 of each axis to 0 and set H08.02 of each axis to the same value.

In STune mode 6, determine the minimum value of H08.43 (Model gain). Then set H09.00 of each axis to 0, and set H08.43 of each axis to the same value.



Note

To ensure a stable operation of STune modes 3 and 4, gain parameters will be adjusted along with the inertia ratio when the inertia ratio is higher than 13. In multi-axis trajectories, responses may be inconsistent under the same stiffness level.

3.3.3 Precautions

The value range of H09.01 (Stiffness level) is 0 to 41. The level 0 indicates the weakest stiffness and lowest gain and level 41 indicates the strongest stiffness and highest gain.

The following table lists the stiffness levels for different load types for your reference.

Table 3–2 Reference of stiffness levels

Recommended Stiffness Level	Load Mechanisms
Level 4 to level 8	Large-scale machineries
Level 8 to level 15	Applications with low stiffness such as the conveyors
Level 15 to level 20	Applications with high stiffness such as the ball screws and direct-connected motors

The following five gain auto-tuning modes are available.

- Standard mode (H09.00 = 1)
  The 1st gain set (H08.00...H08.02, H07.05) are updated and saved automatically according to the stiffness level defined by H09.01.

Table 3–3 Parameters updated automatically in the standard mode

Param. No.	Name
H08.00	Speed loop gain
H08.01	Speed loop integral time constant
H08.02	Position loop gain
H07.05	Filter time constant of torque reference

- Positioning mode (H09.00 = 2)
  On the basis of *"Table 3–3 " on page 87*, the 2nd gain set (H08.03...H08.05, H07.06) are also updated and saved automatically according to the stiffness level defined by H09.01. The position loop gain in the 2nd gain set has a higher stiffness level than that in the 1st gain set.

Table 3–4 Parameters updated automatically in the positioning mode

Param. No.	Name	Description
H08.03	2nd speed loop gain	-
H08.04	2nd speed loop integral time constant	If H08.04 is fixed to 512.00 ms, the 2nd speed loop integral action is invalid and only proportional control is used in the speed loop.
H08.05	2nd position loop gain	-
H07.06	2nd torque reference filter time constant	-

Values of speed feedforward parameters are fixed.

Table 3–5 Parameters with fixed values in the positioning mode

Param. No.	Name
H08.19	Speed feedforward gain
H08.18	Speed feedforward filter time constant

Values of gain switchover parameters are fixed.

Gain switchover is activated automatically in the positioning mode.

Param. No.	Name	Value	Description
H08.08	2nd gain mode setting	1	Switchover between the 1st gain set (H08.00...H08.02, H07.05) and 2nd gain set (H08.03...H08.05, H07.06) is active in the positioning mode. In other modes, the original setting is used.
H08.09	Gain switchover condition	10	The condition for switching the gain is defined by the setpoint 10 of H08.09. In other modes, the original setting is used.
H08.10	Gain switchover delay	5.0 ms	In the positioning mode, the gain switchover delay is 5.0 ms. In other modes, the original setting is used.
H08.11	Gain switchover level	50	In the positioning mode, the gain switchover level is 50. In other modes, the original setting is used.
H08.12	Gain switchover dead time	30	In the positioning mode, the gain switchover dead time is 30. In other modes, the original setting is used.

Note

In the gain auto-tuning mode, parameters updated along with H09.01 and those with fixed setpoints cannot be modified manually. To modify these parameters, set H09.00 (Gain auto-tuning mode) to 0 first.

- In STune mode 3/4/6, resonance suppression will be performed automatically. When the load changes or the mechanical structure is re-installed, the system resonance frequency changes accordingly. Set H09.58 to 1 (Enable) and enable the STune mode again after clearing resonance suppression parameters.

  See *" H08.37" on page 407* for details.

  See *" H08.38" on page 407* for details.

  See *" H08.39" on page 408* for details.

  See *" H09.18" on page 419* for details.

  See *" H09.19" on page 419* for details.

  See *" H09.20" on page 419* for details.

  See *" H09.21" on page 420* for details.

  See *" H09.22" on page 420* for details.

  See *" H09.23" on page 420* for details.

See *" H09.58" on page 426* for details.

Note

- If H09.00 is set to 3, 4, or 6, the drive will suppress vibration and perform inertia auto-tuning automatically within 10 min (or other time defined by H09.37) after power-on or stiffness level setting, and then the drive exits from auto-tuning. If inertia auto-tuning is deactivated automatically, switching to modes 3, 4, or 6 will not activate inertia auto-tuning.
- Do not set H09.00 to 3, 4, or 6 in applications with slow acceleration/deceleration, strong vibration, and unstable mechanical couplings.
- In applications where the inertia does not change, set H09.03 (Online inertia auto-tuning mode) to 1 (Enabled, changing slowly). In applications where the inertia changes quickly, set H09.03 to 3 (Enabled, changing quickly).

3.3.4 Solutions to Common Faults

E661: Gains too low

When the torque fluctuation detected by the drive exceeds the setpoint of H09.11 and cannot be suppressed, the stiffness level will be reduced automatically until reaching level 10 where E661 is reported.

- Vibration cannot be suppressed. Enable vibration suppression manually.
- The current fluctuates. Check whether the current of the machine fluctuates periodically.

See *" H08.37" on page 407* for details.

See *" H08.38" on page 407* for details.

See *" H08.39" on page 408* for details.

See *" H09.58" on page 426* for details.

3.4 Instructions for ETune Operation

3.4.1 Overview

ETune is a wizard-type auto-adjustment function used to guide users to set corresponding curve trajectories and response parameters. After the curve trajectories and response parameters are set, the servo drive performs auto-tuning automatically to generate the optimal gain parameters. The auto-tuned parameters can be saved and exported as a recipe for use in other devices of the same model.

The ETune function is intended to be used in applications featuring slight load inertia change.

3.4.2 Description of ETune Operation

Operation flowchart

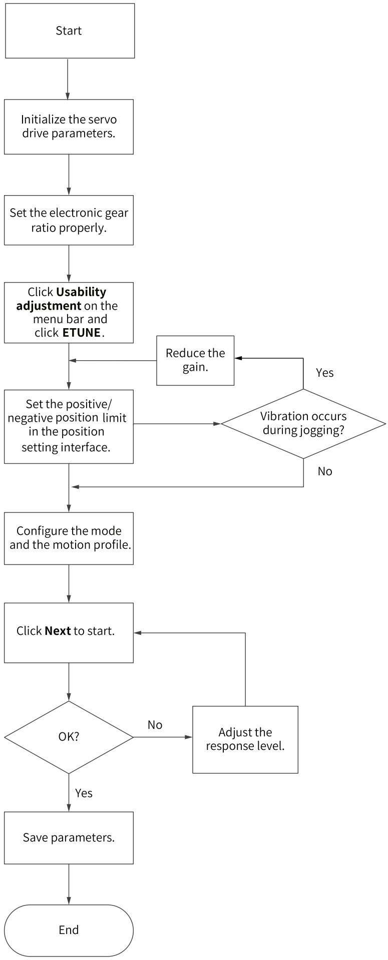
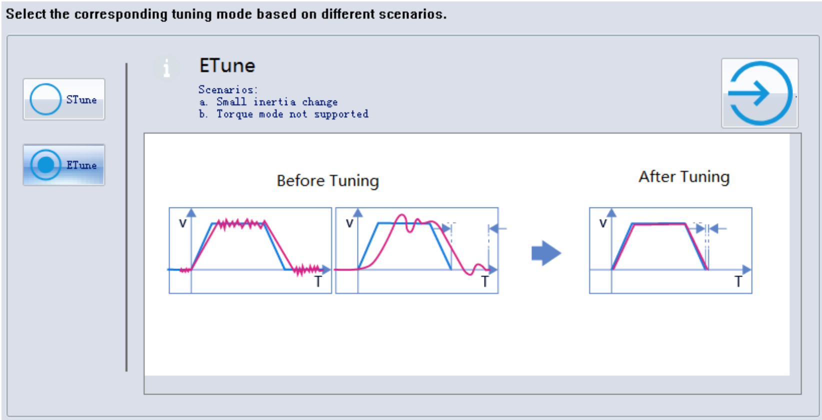


Figure 3-6 Operation flowchart

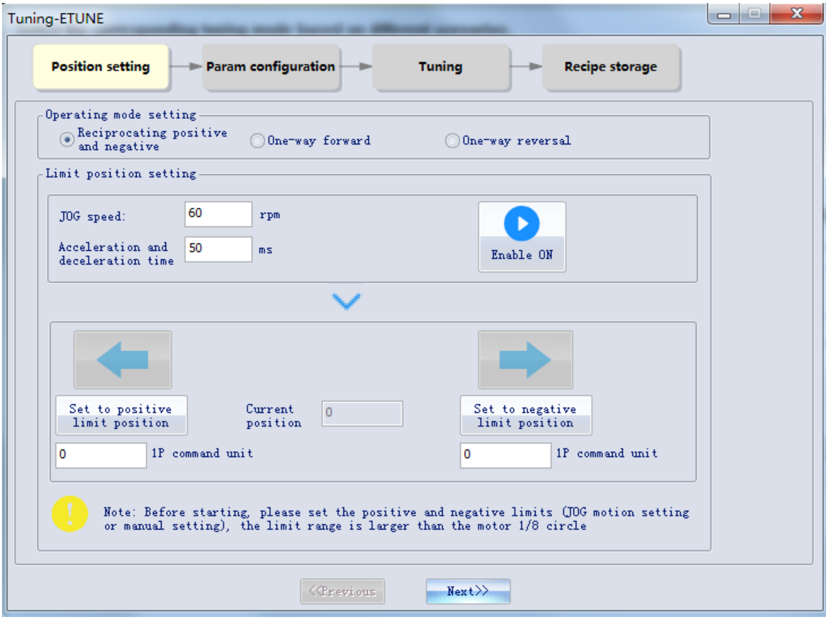
Description

1. Click **Usability adjustment** in the software tool, and then click **ETune**.



2. Select any of the following three operation modes based on the operating direction allowed by the machine.

- In the **Reciprocating po...** mode, the motor keeps reciprocating within the positive and negative position limits.
- In the **One-way forward** mode, the motor takes the difference between the positive and negative position limits as the maximum distance per action and keeps running in the forward direction.
- In the **One-way forward** mode, the motor takes the difference between the positive and negative position limits as the maximum distance per action and keeps running in the reverse direction.



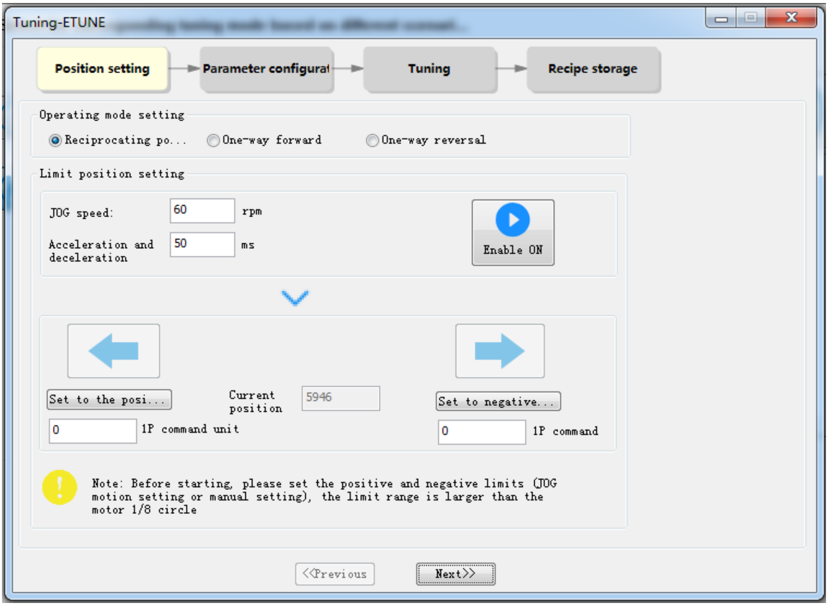
3. Designate the positive and negative limit positions allowed by the motor. The difference between the positive and negative limits defines the position reference pulses for the motor, which is also the value before multiplication/division by the electronic gear ratio.

   You can set the position and negative position limits through the following two methods.

- Method 1: Click **Enable ON**, and then click ⬅ to make the motor move to the positive position limit. Next, click **Set to the posi...**. Follow the same procedure for setting the negative position limit, and click **Enable OFF** (the **Enable ON** button turns to **Enable OFF** after a click).
- Method 2: Input the positive and negative position limits directly.

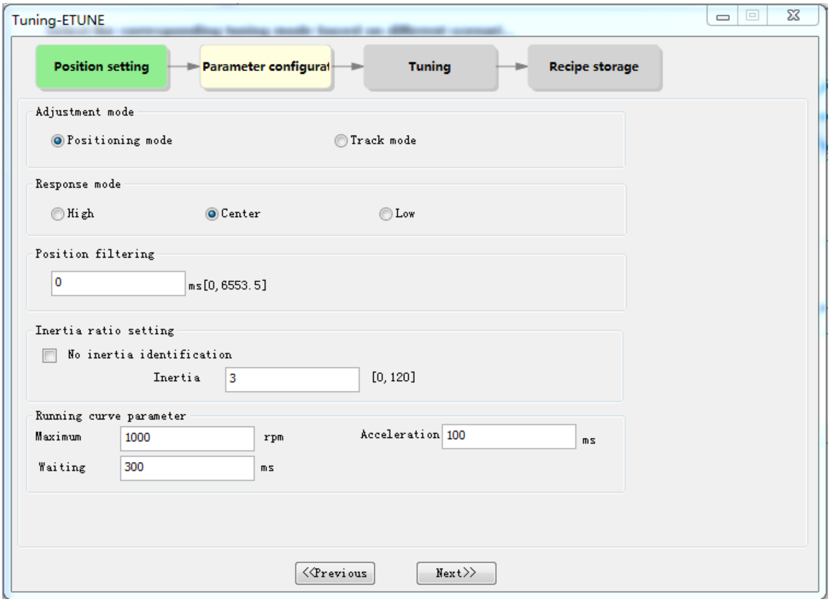
Note

The difference between positive and negative position limits must be larger than 1/8 of one revolution. The larger the limit value, the better the adaptability of auto-tuned parameters, but the longer time will ETune operation take.



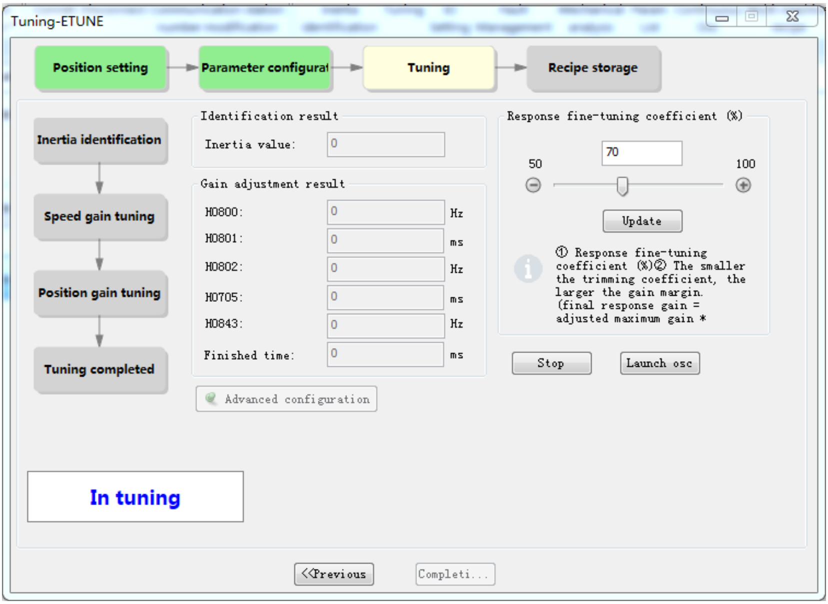
4. Click **Next** to switch to the mode parameter setting interface.
   The adjustment mode is divided into **Positioning mode** and **Track mode**.

   Auto-tuning of the inertia ratio is optional. If you choose not to perform inertia auto-tuning, set the correct inertia ratio (the inertia ratio can be modified directly). You can adjust the response level and position filter time constant based on the responsiveness needed and the position reference noise generated during operation. Then configure the motion profile by setting the maximum speed, acceleration/deceleration time and interval time for auto-tuning.

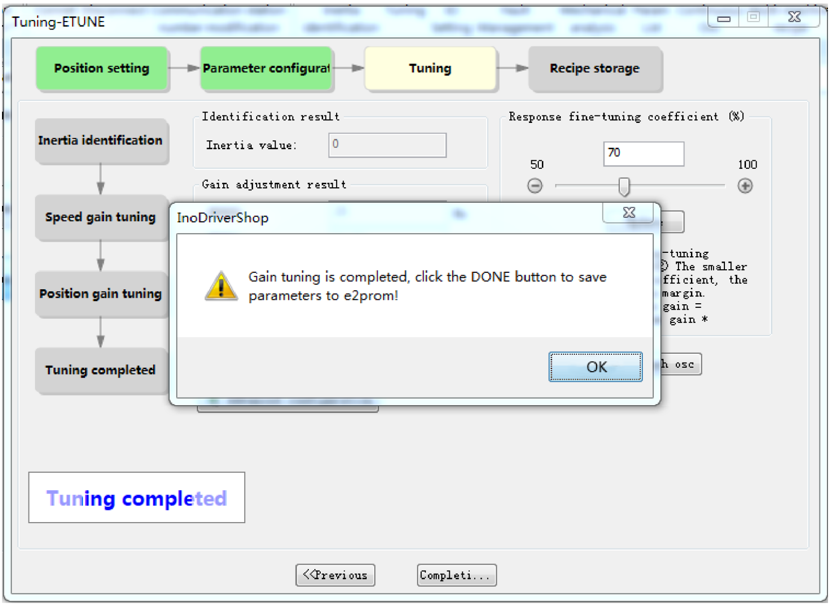


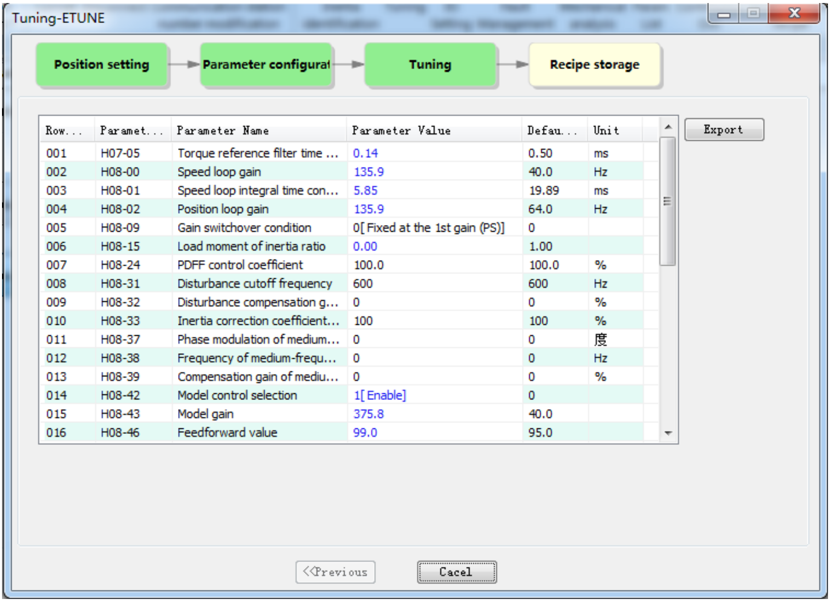
5. Click **"Next"** to start auto-tuning.

- If you choose to perform inertia auto-tuning, the drive starts inertia auto-tuning based on the set motion profile. After inertia auto-tuning is done, the drive starts gain auto-tuning.
- If you choose not to perform inertia auto-tuning on the start page, the drive starts gain auto-tuning directly after start.



6. During gain auto-tuning, if you modify the **Response fine-tuning coefficient** and click **Update**, gain auto-tuning will be continued based on the fine-tuning coefficient entered. After gain auto-tuning is done, you can click **Done** to save parameters to EEPROM and export parameters as a recipe file.





Row...	Paramet...	Parameter Name	Parameter Value	Defau...	Unit
001	H07-05	Torque reference filter time ...	0.14	0.50	ms
002	H08-00	Speed loop gain	135.9	40.0	Hz
003	H08-01	Speed loop integral time con...	5.85	19.89	ms
004	H08-02	Position loop gain	135.9	64.0	Hz
005	H08-09	Gain switchover condition	0[Fixed at the 1st gain (PS)]	0	
006	H08-15	Load moment of inertia ratio	0.00	1.00	
007	H08-24	PDFF control coefficient	100.0	100.0	%
008	H08-31	Disturbance cutoff frequency	600	600	Hz
009	H08-32	Disturbance compensation g...	0	0	%
010	H08-33	Inertia correction coefficient...	100	100	%
011	H08-37	Phase modulation of medium...	0	0	度
012	H08-38	Frequency of medium-frequ...	0	0	Hz
013	H08-39	Compensation gain of mediu...	0	0	%
014	H08-42	Model control selection	1[Enable]	0	
015	H08-43	Model gain	375.8	40.0	
016	H08-46	Feedforward value	99.0	95.0	

3.4.3 Precautions

- You can adjust the maximum speed and acceleration/deceleration time of the motion profile based on actual conditions. The acceleration/deceleration time can be increased properly because positioning will be quickened after auto-tuning.
- If the acceleration/deceleration time is too short, overload may occur. In this case, increase the acceleration/deceleration time properly.
- For vertical axes, take anti-drop measures beforehand and set the stop mode upon fault to "Stop at zero speed".
- For lead screw transmission, shorten the travel distance if the tuning duration is too long.

3.4.4 Solutions to Common Faults

Fault Symptom	Cause	Solution
E662.0: Gains too low	Vibration cannot be suppressed.	Enable vibration suppression manually.
	Excessive overshoot occurs during positioning.	Check whether the positioning threshold is too low. Increase the acceleration/deceleration time and reduce the response level.
	The command suffers from noise.	Modify the electronic gear ratio to improve the command resolution, or increase the command filter time constant in the parameter configuration interface.
	The current fluctuates.	Check whether the current of the machine fluctuates periodically.
E600.0: Inertia auto-tuning failure	Vibration cannot be suppressed.	Enable vibration suppression manually and perform the ETune operation.
	The auto-tuned values fluctuate dramatically.	Increase the maximum operating speed and decrease the acceleration/deceleration time. For the lead screws, shorten the travel distance.
	Mechanical couplings of the load are loose or eccentric.	Rectify the mechanical faults.
	A warning occurs during auto-tuning and causes interruption.	Clear the fault and perform ETune again.
	The position reference filter time is set to an excessively high value.	Decrease the values of H05.04...H05.06 and perform ETune again.

3.5 Instructions

3.5.1 Overview

ITune serves to stabilize responsiveness through auto-tuning based on the device and load types.

ITune is intended to be used in applications featuring slight load inertia change or where inertia auto-tuning is unavailable.

3.5.2 Description of ITune Operation

Step	Para.	Name	Description
1	H09.27	ITune mode	Function: Setting H09.27 to 1 enables the ITune function. Note: ITune mode 2 is manufacturer commissioning mode, which should be used with caution.
2	H09.28 H09.29	Minimum inertia ratio of ITune Maximum inertia ratio of ITune	Function: Used to adjust the inertia ratio range controlled by ITune. Adjustment method: 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.
3	H09.26	ITune response	Function: Used to adjust the response capacity of ITune. Note: If the response capacity of ITune cannot deliver desired effect, increase H08.20 properly. If resonance cannot be suppressed, decrease H08.26 properly.

See *" H09.18" on page 419* for details.

See *" H09.19" on page 419* for details.

See *" H09.20" on page 419* for details.

See *" H09.21" on page 420* for details.

See *" H09.22" on page 420* for details.

See *" H09.23" on page 420* for details.

See *" H09.24" on page 420* for details.

See *" H09.27" on page 421* for details.

See *" H09.28" on page 421* for details.

See *" H09.29" on page 421* for details.

3.5.3 Precautions

After ITune is enabled, inertia auto-tuning and gain switchover will be inhibited.

3.5.4 Solutions to Common Faults

Fault Symptom	Cause	Solution
E663.0: Gains too low	1. Vibration cannot be suppressed.	Enable vibration suppression manually.
	2. The reference is disturbed by noise.	Modify the electronic gear ratio to improve the reference resolution, or increase the reference filter time constant in the parameter configuration interface.
	3. The current fluctuates.	Check whether the current of the machine fluctuates periodically.

3.6 Manual Gain Tuning

3.6.1 Basic Parameters

When gain auto-tuning cannot deliver desired performance, fine-tune the gain manually to optimize the performance.

The servo system consists of three control loops, which are position loop, speed loop, and current loop from external to internal. The basic control diagram is shown in the following figure.

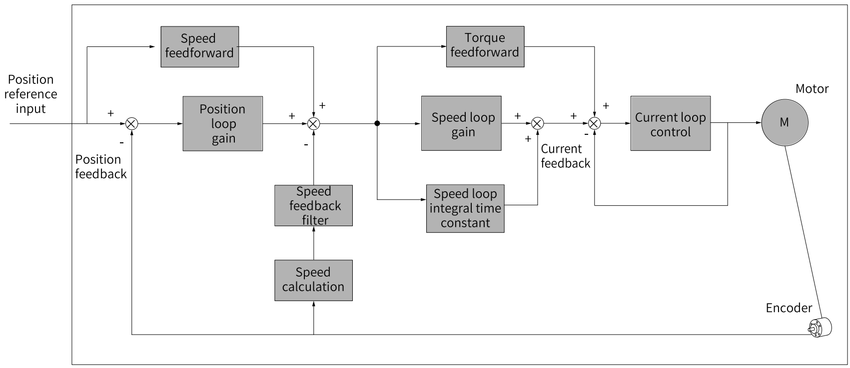


Figure 3-7 Basic control for manual gain tuning

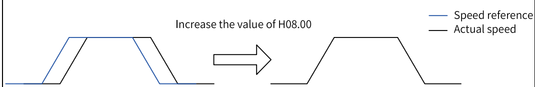
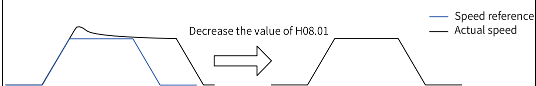
Note

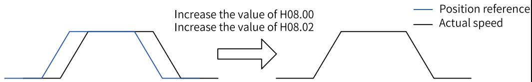
The responsiveness of the inner loop must be higher than that of the outer loop. Otherwise, the system may become unstable.

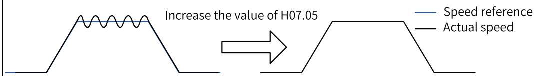
The current loop gain has been set with the highest level of responsiveness by default, avoiding the need for adjustment. you only need to adjust the position loop gain, speed loop gain and other auxiliary gains. For gain tuning in the position control mode, the position loop gain must be increased together with the speed loop gain, and the responsiveness of the former must be lower than the latter.

The following table describes how to adjust the basic gain parameters.

Table 3–6 Adjustment of gain parameters

Step	Param. No.	Name	Description
1	H08.00	Speed loop gain	Function: Determines the maximum frequency of a variable speed reference that can be followed by the speed loop. When H08.15 (Load inertia ratio) is set correctly, the maximum frequency that can be followed by the speed loop is the setpoint of H08.00.  Note: • Increasing the setpoint without incurring extra noise or vibration shortens the positioning time, stabilizes the speed, and improves the follow-up behavior. • If noise occurs, decrease the setpoint. • If mechanical vibration occurs, enable mechanical resonance suppression. For details, see *" Vibration Suppression" on page 121*.
2	H08.01	Speed loop integral time constant	Function: Eliminates the speed loop deviation.  Note: Set H08.01 according to the following formula: 500 ⩽ H08.00 x H08.01 ⩽ 1000 For example, if H08.00 is set to 40.0 Hz, the setpoint of H08.01 must meet the following requirement: 12.50 ms ⩽ H08.01 ⩽ 25.00 ms Decreasing the setpoint strengthens the integral action and shortens the positioning time, but an excessively low setpoint may easily lead to mechanical vibration. An excessively high setpoint prevents the speed loop deviation from being cleared. When H08.01 is set to 512.00 ms, the integral is invalid.

Step	Param. No.	Name	Description
3	H08.02	Position loop gain	Function: Determines the maximum frequency of a variable position reference that can be followed by the position loop. Maximum following frequency of position loop = H08.02  Note: To ensure system stability, the maximum follow-up frequency of the speed loop must be 3 to 5 times higher than that of the position loop. $3 \leqslant \frac{2 \times \pi \times H08.00}{H08.02} \leqslant 5$ For example, when H08.00 is set to 40.0 Hz, H08.02 must meet the following requirement: 50.2 Hz ⩽ H08.02 ⩽ 83.7 Hz Adjust the setpoint based on the positioning time. Increasing the setpoint shortens the positioning time and improves the anti-interference capacity of a motor at standstill. An excessively high setpoint may easily lead to system instability and oscillation.

Step	Param. No.	Name	Description
4	H07.05	Torque reference filter time constant	Function: Eliminates the high-frequency noise and suppresses mechanical resonance.  Note: Ensure the cutoff frequency of the torque reference low-pass filter is 4 times higher than the maximum follow-up frequency of the speed loop, as shown in the following formula: $\frac{1000}{2 \times \pi \times H07.05} \geqslant (H08.00) \times 4$ For example, when H08.00 is set to 40.0 Hz, the setpoint of H07.05 must be lower than or equal to 1.00 ms. If increasing the setpoint of H08.00 incurs vibration, adjust the value of H07.05 to suppress vibration. For details, see *" Vibration Suppression" on page 121*. An excessively high setpoint weakens the responsiveness of the current loop. To suppress vibration upon stop, increase the setpoint of H08.00 and decrease the setpoint of H07.05. If strong vibration occurs upon stop, decrease the setpoint of H07.05.

☆Related parameters

See *" H07.05" on page 392* for details.

See *" H08.00" on page 398* for details.

See *" H08.01" on page 399* for details.

See *" H08.02" on page 399* for details.

3.6.2 Gain Switchover

Gain switchover, which is active in the position control and speed control modes only, can be triggered by the internal servo status or an external DI signal to achieve the following purposes:

- Switching to the lower gain when the motor is at a standstill (servo ON) to suppress vibration
- Switching to the higher gain when the motor is at a standstill to shorten the positioning time
- Switching to the higher gain during operation of the motor to achieve better reference tracking performance

- Switching between different gain settings through an external signal to fit different conditions of the load devices

H08.08 = 0

When H08.08 is set to 0, the 1st gain set (H08.00...H08.02, H07.05) is used, but you can switch between proportional control and proportional integral control through FunIN.3 (GAIN_SEL, gain switchover) for the speed loop.

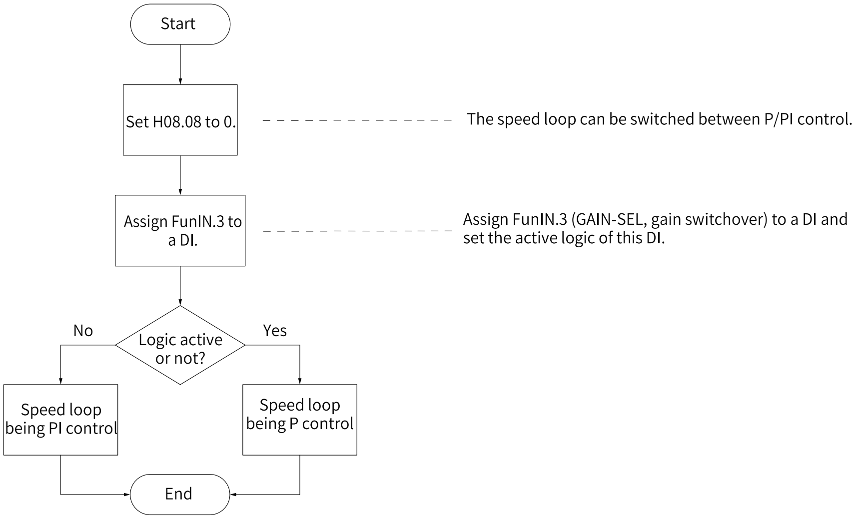


Figure 3-8 Gain switchover flowchart when H08.08 is set to 0

H08.08 = 1

You can switch between the 1st gain set (H08.00...H08.02, H07.05) and 2nd gain set (H08.03...H08.05, H07.06) based on the condition defined by H08.09.

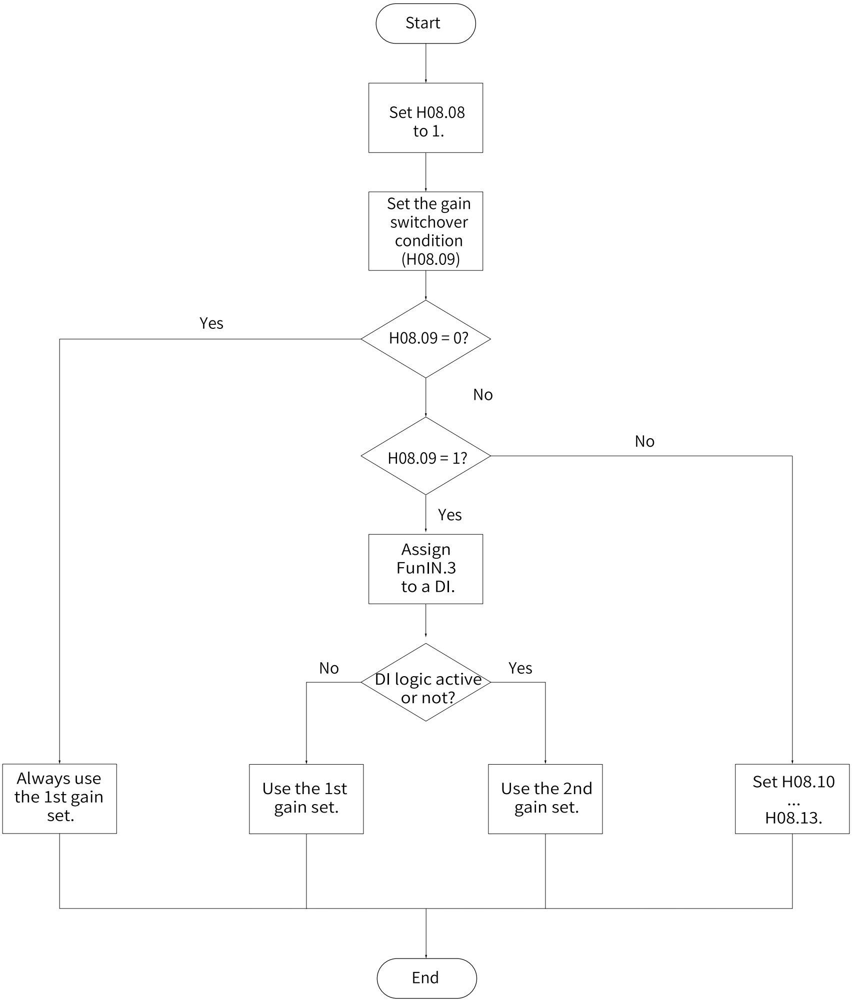
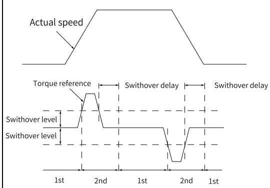
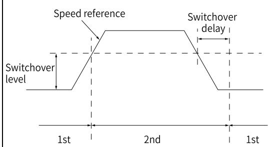
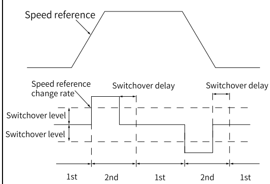
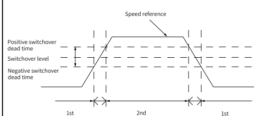
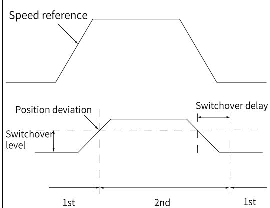
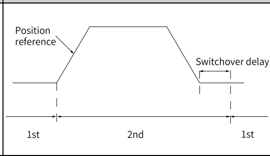
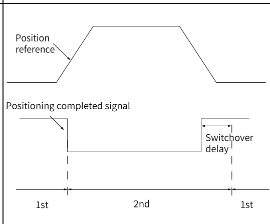
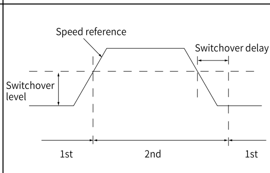


Figure 3-9 Gain switchover flowchart when H08.08 is set to 1

The following table describes the diagrams and parameters related to 11 kinds of gain switchover conditions.

Table 3–7 Conditions for gain switchover

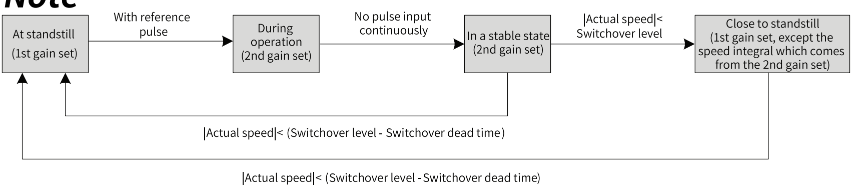
Gain Switchover Condition			Related Parameters		
H08.09 Setpoint	Condition	Diagram	Delay Time (H08.10)	Switchover Level (H08.11)	Switchover Dead Time (H08.12)
0	Fixed to the 1st gain set	-	Inactive	Inactive	Inactive
1	External DI signal	-	Inactive	Inactive	Inactive
2	Torque reference		Active	Active (%)	Active (%)
3	Speed reference		Active	Active	Active
4	Speed reference change rate		Active	Active (10 rpm/s)	Active (10 rpm/s)
5	Speed reference high/ low-speed threshold		Inactive	Active (rpm)	Active (rpm)
6	Position deviation		Active	Active (encoder unit)	Active (encoder unit)

Gain Switchover Condition			Related Parameters		
H08.09 Setpoint	Condition	Diagram	Delay Time (H08.10)	Switchover Level (H08.11)	Switchover Dead Time (H08.12)
7	Position reference		Active	Inactive	Inactive
8	Positioning completed		Active	Inactive	Inactive
9	Actual speed		Active	Active (rpm)	Active (rpm)
10	Position reference + Actual speed	See the following note for details.	Active	Active (rpm)	Active (rpm)

Caution

H08.10 (Gain switchover delay) is valid only during switching to the 1st gain set.

Note



☆Related parameters

See " H08.08" on page 400 for details.

See " H08.09" on page 401 for details.

See " H08.10" on page 401 for details.

See " H08.11" on page 401 for details.

See " H08.12" on page 402 for details.

See " H08.13" on page 402 for details.

3.6.3 Position Reference Filter

Name	Function	Applicable Occasion	Impact of Excessive Filtering
Position reference filter	Filters the position references (encoder unit) divided or multiplied by the electronic gear ratio to smoothen the operation process of the motor and reduce shock to the machine.	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.	The response delay is prolonged.

3.6.4 Feedforward Gain

Speed feedforward

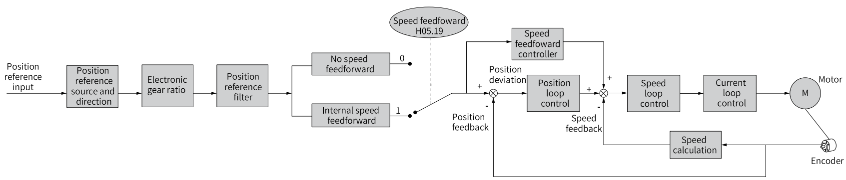


Figure 3-10 Operating procedure for speed feedforward control

Speed feedforward can be applied to the position control mode. When position control or full closed-loop is used, the speed feedforward function can be used to improve the speed reference responsiveness and reduce the position deviation at fixed speed.

Operating procedure for speed feedforward:

1. Set the speed feedforward signal source.

Set H05.19 to a non-zero value to enable the speed feedforward function. The corresponding signal source will be selected as well.

Param. No.	Name	Setpoint	Remarks
H05.19	Speed feedforward control	0: No speed feedforward	-
		1: Internal speed feedforward	Defines the speed corresponding to the position reference (encoder unit) as the speed feedforward signal source.
		2: 60B1h used as speed offset	-
		3: Zero phase control	-

2. Set speed feedforward parameters.

Set the speed feedforward gain (H08.19) and speed feedforward filter time constant (H08.18).

See *" H08.18" on page 403* for details.

See *" H08.19" on page 403* for details.

Zero phase control

Zero phase control is used to compensate for the position deviation generated upon start delay of the position reference, reducing the position deviation upon start/stop in the position control mode.

The loop calculation model is shown in the following figure.

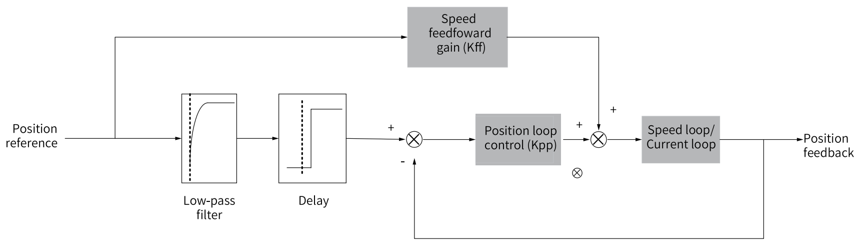


Figure 3-11 Zero phase control

See *" H05.04" on page 374* for details.

See *" H05.19" on page 376* for details.

See *" H08.17" on page 403* for details.

Torque feedforward

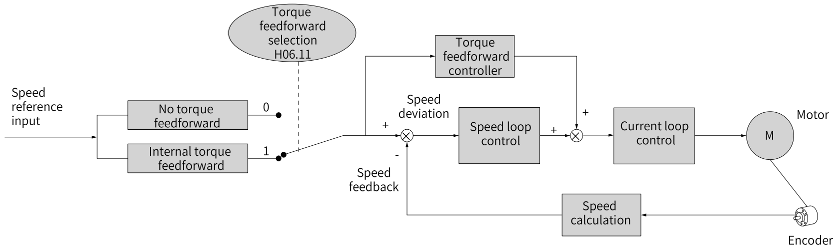


Figure 3-12 Operating procedures for torque feedforward control

In the position control mode, torque feedforward can be used to improve torque reference responsiveness and reduce the position deviation during operation at constant acceleration/deceleration rate.
In the speed control mode, torque feedforward can be used to improve speed reference responsiveness and reduce the speed deviation during operation at constant speed.

The procedure for setting torque feedforward is as follows:

1. Set the torque feedforward signal source.
   Set H06.11 to 1 to enable speed feedforward. The corresponding signal source will be selected as well.

Param. No.	Name	Setpoint	Remarks
H06.11	Torque feedforward control	0: No torque feedforward	-
		1: Internal torque feedforward	Defines the speed reference as the torque feedforward signal source. In the position control mode, the speed reference is outputted from the position controller.

2. Set torque feedforward parameters.

Param. No.	Name	Description
H08.20	Torque feedforward filter time constant	Function: • Increasing the value of H08.21 improves the responsiveness but may cause overshoot during acceleration/deceleration. • Decreasing the value of H08.20 suppresses overshoot during acceleration/deceleration. Increasing the value of H08.20 suppresses the noise. Note: • Keep H08.20 to the default value, and then gradually increase the value of H08.21 from 0 to a certain value at which torque feedforward achieves the desired effect. • Adjust H08.20 and H08.21 repeatedly until a balanced performance is achieved.
H08.21	Torque feedforward gain	See this section for details.

3.6.5 PDFF Control

The pseudo derivative feedback and feedforward (PDFF) control can be used to adjust speed loop control in the non-torque control mode.

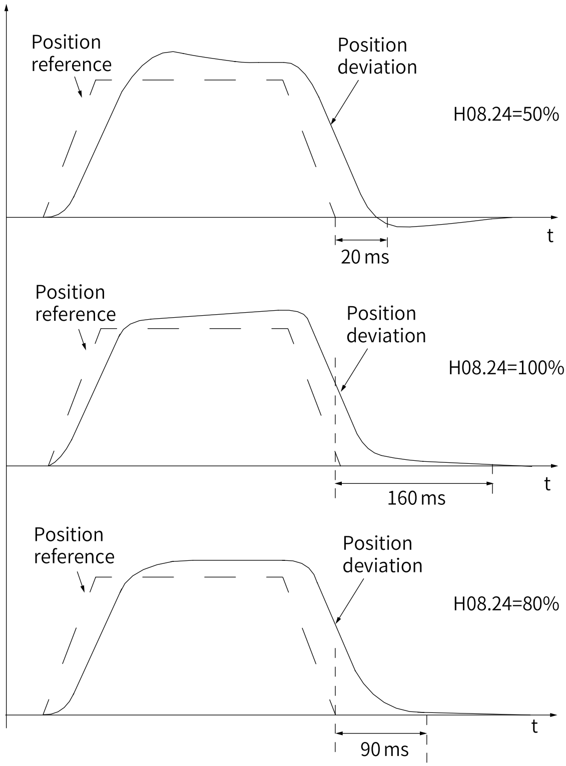


Figure 3-13 Example of PDFF control

Through adjusting the speed loop control method, PDFF control enhances the anti-disturbance capacity of the speed loop and improves the performance in following the speed references.

Param. No.	Name	Description
H08.24	PDFF control coefficient	Function: • Defines the control method of the speed loop in the non-torque control modes. Note: • Setting H08.24 to an excessively low value slows down the responsiveness of the speed loop. • When the speed feedback overshoots, gradually decrease the setpoint of H08.24 from 100.0 to a certain value at which the PDFF control achieves the desired effect. • When H08.24 is set to 100.0, the speed loop control method does not change and the default proportional integral control is used.

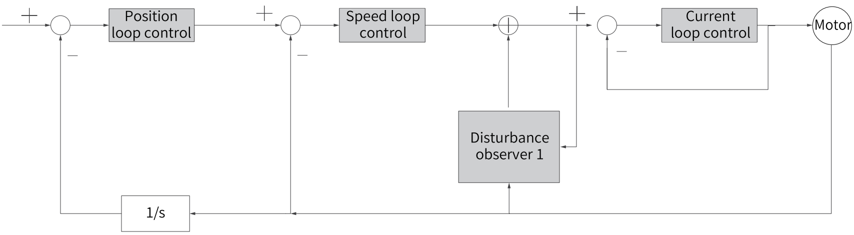
3.6.6 Torque Disturbance Observer

This function is intended to be used in the non-torque control modes.

Disturbance observer

The disturbance observer is used to observe external disturbance. You can set different cutoff frequencies and compensation values to observe and suppress the disturbance within the frequency range.

The following figure depicts the control block diagram for disturbance observer 1.



Note

1/s: Integral element

Param. No.	Name	Description
H08.31	Disturbance observer cutoff frequency	The higher the cutoff frequency, the more easily will vibration occur.
H08.32	Disturbance observer compensation coefficient	Defines the compensation percentage for the observer.
H08.33	Disturbance observer inertia correction	H08.33 needs to be changed only when the inertia ratio does not reflect the actual condition. The acting inertia is the product of the set inertia and H08.33. It is recommended to use the default value of H08.33.

☆Related parameters

See " H08.31" on page 406 for details.

See " H08.32" on page 407 for details.

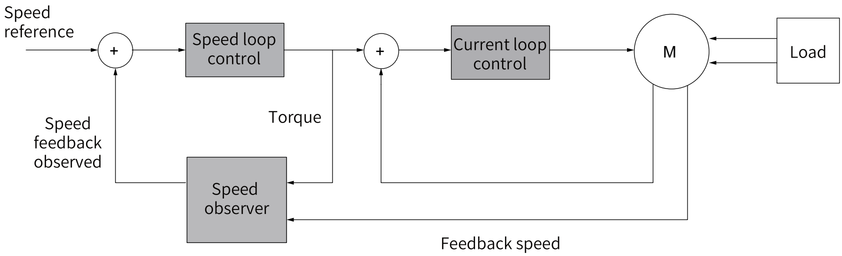
See " H08.33" on page 407 for details.

3.6.7 Speed Observer

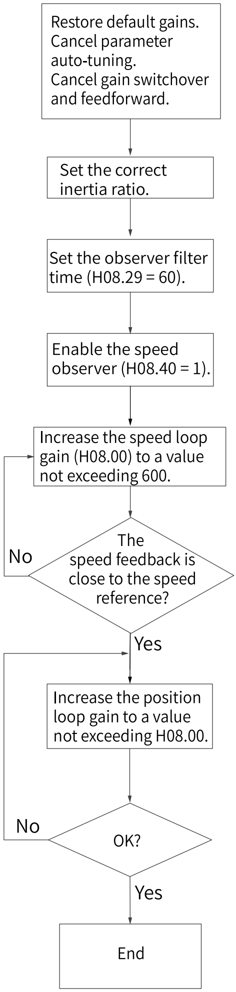
The speed observer, which facilitates quick positioning, applies in applications with slight load characteristic change and constant inertia.

It improves the responsiveness and filters high frequencies automatically, improving the gains and shortening the positioning time without incurring high-frequency vibration.

The block diagram for the speed observer is as follows.



Commissioning procedure



Related parameters

See *" H08.00" on page 398* for details.

See *" H08.27" on page 405* for details.

See *" H08.28" on page 406* for details.

See *" H08.29" on page 406* for details.

See *" H08.40" on page 408* for details.

Note

- Before using the speed observer, set H08.15 (Load inertia ratio) to a proper value or perform inertia auto-tuning. A wrong inertia ratio can cause vibration.
- Setting H08.27, H08.28, or H08.29 to excessively low or high values can result in motor vibration.

3.6.8 Model Tracking

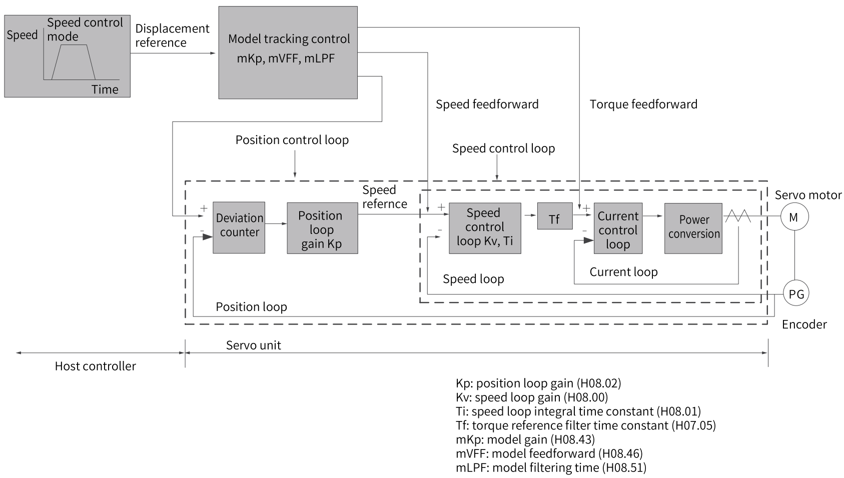
Model tracking control, which is only available in the position control mode, can be used to improve responsiveness and shorten the positioning time.

Parameters used by model tracking are normally set automatically through STune or ETune along with the gain parameters.

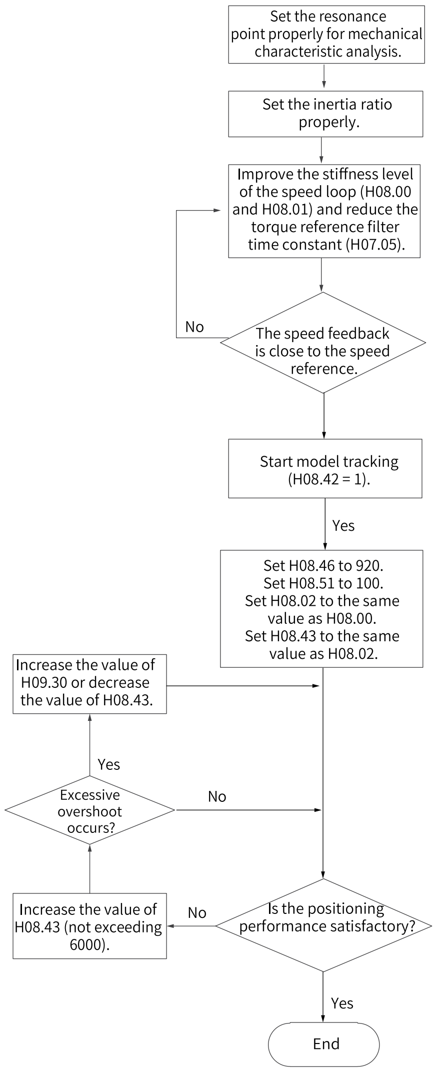
Fine-tune the gains manually when:

- The auto-tuned values cannot deliver desired performance.
- Improving the responsiveness takes priority over the auto-tuned or customized values.
- User-defined gain parameters or model tracking control parameters are needed.

The block diagram for model tracking control is as follows.



Commissioning procedure



Related parameters:

See *" H07.05" on page 392* for details.

See *" H08.00" on page 398* for details.

See *" H08.01" on page 399* for details.

See *" H08.02" on page 399* for details.

See *" H08.42" on page 408* for details.

See " H08.43" on page 408 for details.

See " H08.46" on page 409 for details.

Note

Ensure the set inertia is accurate. Otherwise, motor vibration may occur.

3.6.9 Friction Compensation

Friction compensation is used to reduce the impact of the friction on the operating effect during mechanical transmission. Use different positive/negative compensation values according to the direction of operation.

Note

Friction compensation is active only in the position control mode.

☆Related parameters

See " H09.32" on page 422 for details.

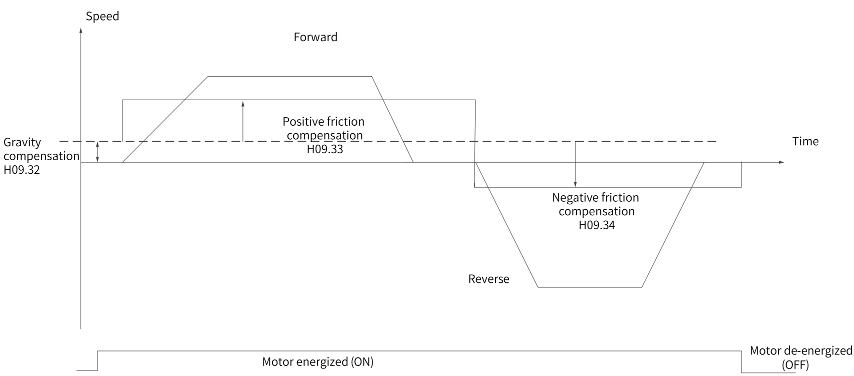
See " H09.33" on page 422 for details.

See " H09.34" on page 422 for details.

See " H09.35" on page 422 for details.

See " H09.36" on page 423 for details.

The diagram for friction compensation is as follows.



Note

When the speed is lower than the speed threshold, static friction applies. When the speed exceeds the speed threshold, dynamic friction applies. The compensation direction is determined by the direction of the position reference. Forward direction requires a positive compensation value. Reverse direction requires a negative compensation value.

3.7 Parameter Adjustment in Different Control Modes

Perform parameter adjustment in the sequence of "Inertia auto-tuning" => "Gain auto-tuning => "Manual gain tuning" in all the control modes.

3.7.1 Parameter Adjustment in the Speed Control Mode

Parameter adjustment in the speed control mode is the same as that in the position control mode, except for the position loop gain (H08.02 and H08.05). For details, see *"3.7.2 Parameter Adjustment in the Position Control Mode" on page 118*.

3.7.2 Parameter Adjustment in the Position Control Mode

Obtain the value of H08.15 (Load inertia ratio) through inertia auto-tuning.

Gain parameters in the position control mode are listed in the following tables.

- 1st gain set:

Param. No.	Name	Function	Default
H07.05	Torque reference filter time constant	Defines the torque reference filter time constant.	0.50 ms
H08.00	Speed loop gain	Defines the speed loop proportional gain.	40.0 Hz
H08.01	Speed loop integral time constant	Defines the integral time constant of the speed loop.	19.89 ms
H08.02	Position loop gain	Defines the position loop proportional gain.	64.0Hz

- 2nd gain set:

Param. No.	Name	Function	Default
H07.06	2nd torque reference filter time constant	Defines the torque reference filter time constant.	0.27 ms
H08.03	2nd speed loop gain	Defines the speed loop proportional gain.	75.0 Hz

Param. No.	Name	Function	Default
H08.04	2nd speed loop integral time constant	Defines the integral time constant of the speed loop.	10.61 ms
H08.05	2nd position loop gain	Defines the position loop proportional gain.	120.0 ms
H08.08	2nd gain mode setting	Defines the mode of the 2nd gain set.	1
H08.09	Gain switchover condition	Defines the gain switchover condition.	0
H08.10	Gain switchover delay	Defines the gain switchover delay.	5.0 ms
H08.11	Gain switchover level	Defines the gain switchover level.	50
H08.12	Gain switchover dead time	Defines the dead time of gain switchover.	30
H08.13	Position gain switchover time	Defines the position loop gain switchover time.	3.0 ms

- Common gain set

Param. No.	Name	Function	Default
H08.18	Speed feedforward filter time constant	Defines the filter time constant of the speed feedforward signal.	0.50 ms
H08.19	Speed feedforward gain	Defines the speed feedforward gain.	0.0%
H08.20	Torque feedforward filter time constant	Defines the filter time constant of the torque feedforward signal.	0.50 ms
H08.21	Torque feedforward gain	Defines the torque feedforward gain.	0.0%
H08.22	Speed feedback filtering option	Defines the speed feedback filtering function.	0
H08.23	Cutoff frequency of speed feedback low-pass filter	Defines the cutoff frequency of the first-order low-pass filter for speed feedback.	8000 Hz
H08.24	PDFF control coefficient	Defines the coefficient of the PDFF controller.	100.0%
H09.30	Torque disturbance compensation gain	Defines the torque disturbance compensation gain.	0.0%

Param. No.	Name	Function	Default
H09.31	Filter time constant of torque disturbance observer	Defines the filter time constant of the disturbance observer.	0.5 ms
H09.04	Low-frequency resonance suppression mode	Defines the low-frequency resonance suppression mode.	0
H09.38	Frequency of low-frequency resonance	Defines the frequency of the low-frequency resonance suppression filter.	100.0 Hz
H09.39	Low-frequency resonance frequency filter setting	Defines the setting of low-frequency resonance suppression filter.	2

Perform gain auto-tuning to get the initial values of the 1st gain set (or 2nd gain set) and the common gain set.

Fine-tune the following gains manually.

Param. No.	Name	Function
H07.05	Torque reference filter time constant	Defines the torque reference filter time constant.
H08.00	Speed loop gain	Defines the speed loop proportional gain.
H08.01	Speed loop integral time constant	Defines the integral time constant of the speed loop.
H08.02	Position loop gain	Defines the position loop proportional gain.
H08.19	Speed feedforward gain	Defines the speed feedforward gain.

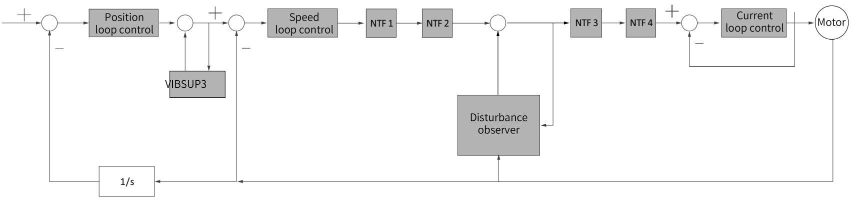
3.7.3 Parameter Adjustment in the Torque Control Mode

Parameter adjustment in the torque control mode are differentiated based on the following conditions:

- If the actual speed reaches the speed limit, the adjustment method is the same as that described in *"3.7.1 Parameter Adjustment in the Speed Control Mode" on page 118*.
- If the actual speed does not reach the speed limit, the adjustment method is the same as that described in *"3.7.1 Parameter Adjustment in the Speed Control Mode" on page 118*, except the position/speed loop gain and speed loop integral time constant.

3.8 Vibration Suppression

The block diagram for vibration suppression is as follows.



In which:

- NTF1–4: 1st notch to 4th notch
- VIBSUP3: medium- and low-frequency vibration suppression, reduction applied at a carrier frequency lower than 8 k under 300 Hz
- 1/s: Integral element

☆Related parameters

See " *H08.53" on page 409* for details.

See " *H08.54" on page 409* for details.

See " *H08.56" on page 409* for details.

Note

- Jitter suppression phase modulation coefficient: Defines synchronous phase adjustment of the compensation value and vibration. It is recommended to use the default value. Adjustment is needed when the phase of the compensation deviates sharply from the phase of the vibration.
- Jitter suppression frequency: Defines the jitter frequency that needs to be suppressed.
- Jitter suppression compensation coefficient: Defines the compensation coefficient for jitter suppression.

3.8.1 Low-Frequency Resonance Suppression at the Mechanical End

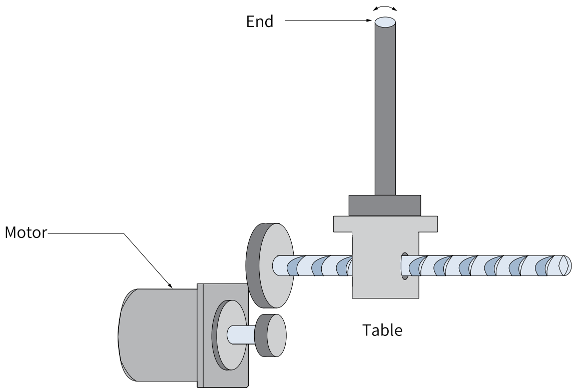


Figure 3-14 Low-frequency vibration at the mechanical end

If the mechanical load end is long and heavy, vibration may easily occur in this part during emergency stop, affecting the positioning effect. Such vibration is called low-frequency resonance as its frequency is generally within 100 Hz, which is lower than the mechanical resonance frequency mentioned in *"3.8.2 Mechanical Resonance Suppression" on page 123*. Use the low-frequency resonance suppression function to reduce such vibration.

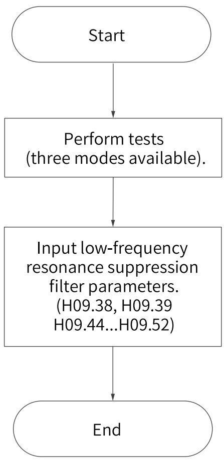


Figure 3-15 Procedure for setting low-frequency resonance suppression filter

First, use the oscilloscope function in the software tool to collect the position deviation waveform of the motor in the positioning state. Then calculate the position deviation fluctuation frequency, which is the low-frequency resonance frequency. Finally, input the value of H09.38 manually and use the default value of H09.39.

Observe the resonance suppression effect after using the low-frequency resonance suppression filter.

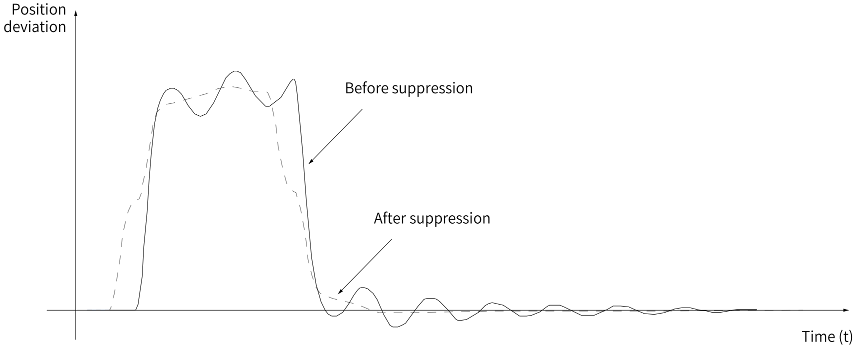


Figure 3-16 Low-frequency resonance suppression effect

☆Related parameters

See " H09.38" on page 423 for details.

See " H09.39" on page 424 for details.

See " H09.44" on page 424 for details.

See " H09.45" on page 424 for details.

See " H09.47" on page 424 for details.

See " H09.49" on page 425 for details.

See " H09.50" on page 425 for details.

See " H09.52" on page 425 for details.

3.8.2 Mechanical Resonance Suppression

Resonance frequency is present in the mechanical system. When the gain of the drive increases, resonance may occur near the resonance frequency, disabling further increase of the gain.

Mechanical resonance can be suppressed in the following two methods:

Torque reference filter (H07.05, H07.06)

To suppress the mechanical resonance, set the filter time constant to enable the torque reference to be attenuated in the frequency range above the cutoff frequency.

Filter cutoff frequency fc (Hz) = 1/[2π x H07.05 (ms) x 0.001]

Notch

The notch reduces the gain at certain frequencies to suppress mechanical resonance. After the vibration is suppressed by the notch, you can continue to increase the gain. The operating principle of the notch is shown in the following figure.

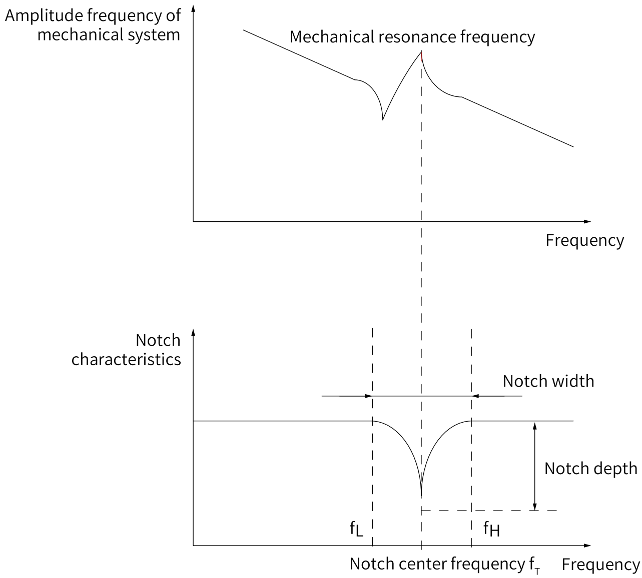


Figure 3-17 Operating principle of the notch

A total of four notches can be used, and each notch is defined by three parameters: frequency, width level, and depth level. The 1st and 2nd notches are manual notches whose parameters needs to be set by the user. Parameters of the 3rd and 4th notches can be either set by the user or set automatically after being configured as an adaptive notch (H09.02 = 1 or 2).

Table 3–8 Description of notch parameters

Item	Manual Notch		Manual/Adaptive Notch	
	1st Notch	2nd Notch	3rd Notch	4th Notch
Frequency	H09.12	H09.15	H09.18	H09.21
Width level	H09.13	H09.16	H09.19	H09.22
Depth level	H09.14	H09.17	H09.20	H09.23

Note

- When the frequency is 8000 Hz (default), the notch is inactive.
- The adaptive notch is preferred for resonance suppression. The manual notch can be used in cases where the adaptive notch cannot deliver desired performance.

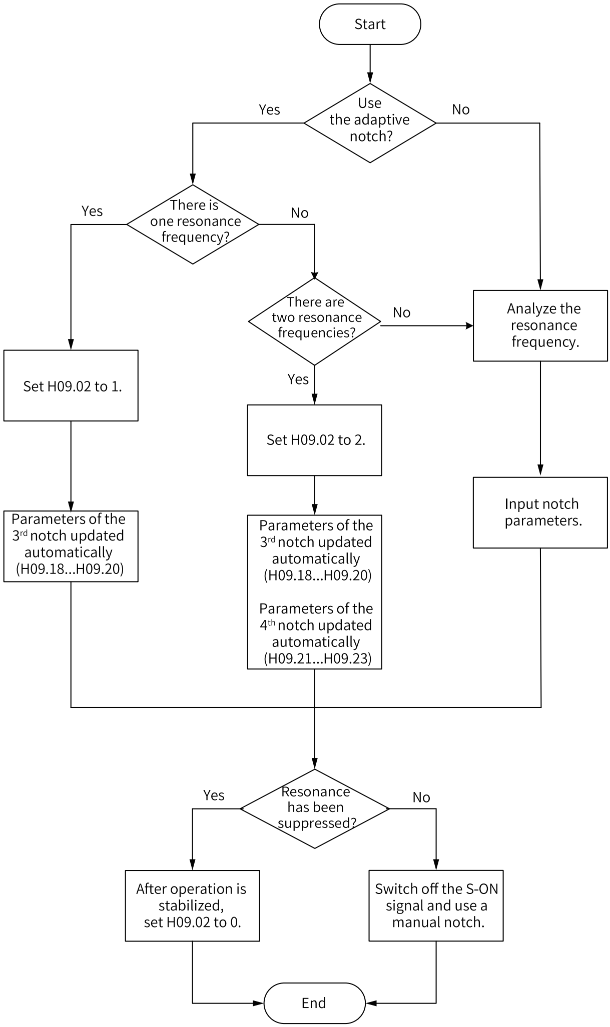


Figure 3-18 Procedure for setting the notch

- Procedure for setting the adaptive notch:

1. Set H09.02 (Adaptive notch mode) to 1 or 2 based on the number of resonance points.
2. When resonance occurs, set H09.02 to 1 first to enable one adaptive notch. If resonance occurs again after gain tuning, set H09.02 to 2 to enable two adaptive notches.
3. Parameters of the 3rd or 4th notches are updated automatically during operation, and parameter values are saved automatically to the corresponding parameters in group H09 every 30 min.
4. If resonance is suppressed, the adaptive notch functions well. After the drive operates stably for a period of time, set H09.02 to 0. Parameters of the adaptive notch are fixed to the values updated the last time.

   This is to prevent notch parameters from being updated to wrong values due to misoperation. Wrong values will intensity resonance.
5. If resonance persists after the notch is working for a period of time, switch off the S-ON signal.
6. If there are more than two resonance frequencies, use both the adaptive notch and the manual notch to suppress resonance or use all the four notches as manual notches (H09.02 = 0).

Note

- When the adaptive notch is used, if the S-ON signal is switched off within 30 min, the notch parameters will not be saved to the corresponding parameters.
- When the resonance frequency is below 300 Hz, the suppression effect of the adaptive notch may be degraded.

- Procedure for setting the manual notch:

1. Analyze the resonance frequency.
2. When using the manual notch, set the notch frequency to same value as the actual resonance frequency obtained in the following ways:
   - Use the "Mechanical characteristic analysis" function in Inovance software tool.
   - Calculate the resonance frequency based on the motor phase current displayed on the oscilloscope interface of the software tool.
   - Set H09.02 (Adaptive notch mode) to 3. The drive detects the resonance frequency and saves the detected value to H09.24 automatically during operation.
3. Input the resonance frequency obtained in step 1 to the parameter of the selected notch, and input the width level and depth level of this notch.
4. If resonance has been suppressed, it indicates the notch functions well and you can continue adjusting the gain. If resonance occurs again, repeat steps 1 and 2.

5. If resonance persists after the notch is working for a period of time, switch off the S-ON signal.

- Width level of the notch
  The width level indicates the ratio of the notch width to the center frequency of the notch.

$$\text{Notch width level} = \frac{f_H - f_L}{f_T}$$

Figure 3-19

In which:

f_T: Center frequency of the notch, which is also the mechanical resonance frequency

$f_H - f_L$: notch width, indicating the frequency width whose amplitude attenuation rate is -3 dB in relative to the notch center frequency

The following figure shows the frequency characteristics of the notch. Use the default value 2 in normal cases.

- Depth level of the notch
  The notch depth level indicates the ratio of the input to the output at the center frequency.

  When the depth level is 0, the input is completely suppressed at the center frequency. When the depth level is 100, the input can be fully passed at the center frequency. Therefore, the lower the depth level is, the higher the notch depth is, and the stronger the suppression effect will be. Note that an excessively low depth level may lead to system oscillation.

Note

If the amplitude-frequency characteristic curve obtained through the mechanical characteristic analysis tool does not have obvious spikes but vibration does occur in actual operations, the gain limit of the servo drive may be reached, which leads to the vibration. Such vibration, which is not a mechanical resonance that normally suppressed by a notch, can be suppressed only by reducing the gains or the torque reference filter time.

The following figure shows the frequency characteristics of the notch.

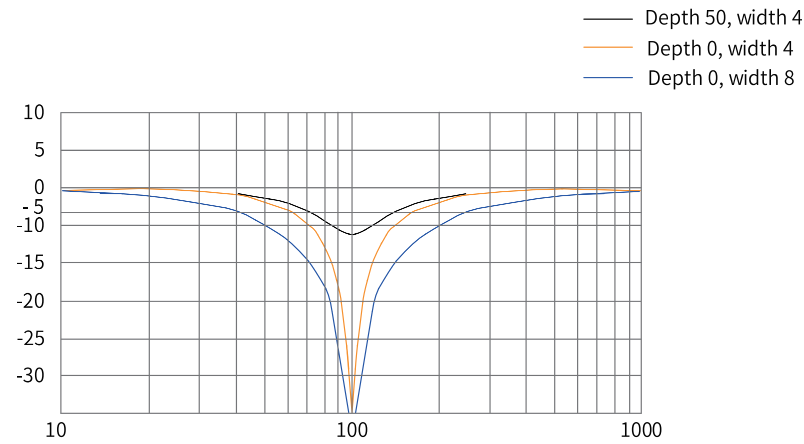


Figure 3-20 Notch frequency characteristics

☆Related parameters

See " H09.02" on page 415 for details.

See " H09.12" on page 417 for details.

See " H09.13" on page 417 for details.

See " H09.14" on page 418 for details.

See " H09.15" on page 418 for details.

See " H09.16" on page 418 for details.

See " H09.17" on page 419 for details.

See " H09.18" on page 419 for details.

See " H09.19" on page 419 for details.

See " H09.20" on page 419 for details.

See " H09.21" on page 420 for details.

See " H09.22" on page 420 for details.

See " H09.23" on page 420 for details.

See " H09.24" on page 420 for details.

3.9 Mechanical Characteristic Analysis

3.9.1 Overview

Mechanical characteristic analysis is used to determine the mechanical resonance point and system bandwidth. Up to 8 kHz response characteristic analysis is available and three modes including mechanical characteristics, speed open loop and speed closed loop are supported.

3.9.2 Operating Procedure

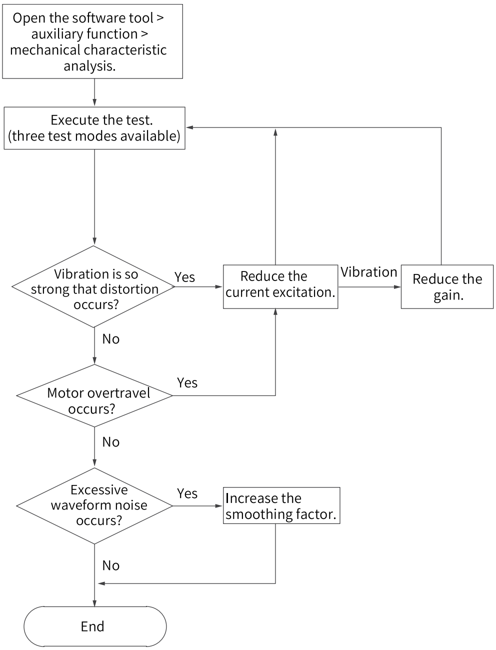


Figure 3-21 Operating procedure for mechanical characteristic analysis

Note

- To avoid strong vibration during testing, set the initial current excitation to 10%.
- The analysis waveform may be distorted if the current excitation is excessively small.
- If vibration generated during testing cannot be suppressed by reducing the current excitation, the causes and solutions may be:
  1. The gain values are too high. In this case, reduce the speed gain or set notch parameters based on the auto-tuned resonance point.
  2. The set inertia ratio is excessively high. In this case, reset the inertia ratio to a proper value.
- In the mechanical characteristic test mode, waveforms before and after notch settings are consistent. In the speed closed loop and speed open loop modes, gain curves in the waveforms are attenuated after notch settings.

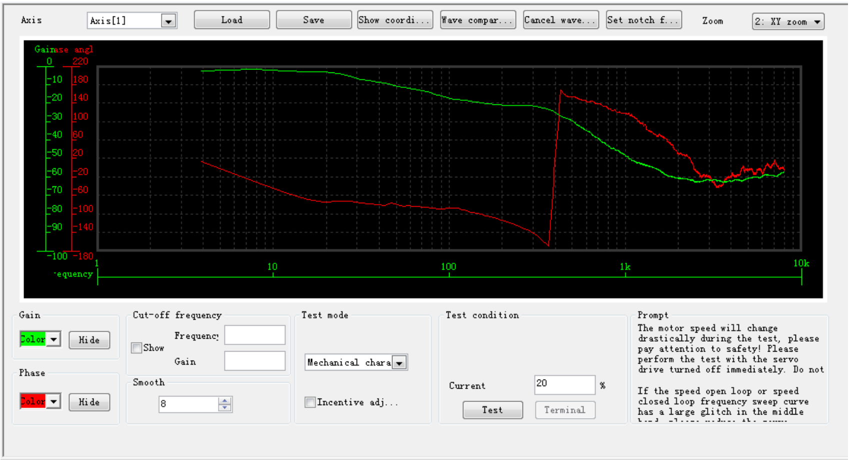


Figure 3-22 Example of the waveform obtained

An example of the waveform obtained with the mechanical characteristic analysis is shown in *"Figure 3–21 Example of the waveform obtained" on page 130*.

4 Troubleshooting

4.1 Fault and Warning Levels

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

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

Note

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

Operating procedure:

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

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

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

Note

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

☆Related parameters

See *" H0d.01" on page 457* for details.

☆Related function No.

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

Fault and warning log

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

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

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

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

4.2 List of Fault and Warning Codes

No. 1 non-resettable faults:

Table 4–1 List of No. 1 non-resettable faults

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

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

No. 1 resettable faults

Table 4–2 List of No. 1 resettable faults

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

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

No. 2 resettable faults

Table 4–3 List of No. 2 resettable faults

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

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

Resettable warnings

Table 4–4 List of resettable warnings

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

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

4.3 Solutions to Faults

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

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

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

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

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

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

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

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

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

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

- E102.0: FPGA communication initialization error
  Cause:

  The software versions of MCU and FPGA do not match.

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

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

  The software versions of MCU and FPGA do not match.

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

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

  The access to MCU times out.

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

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

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

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

- E104.4: MCU command update timeout
  Cause:

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

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

- E120.0: Unknown encoder model
  Cause:

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

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

- E120.1: Unknown motor model
  Cause:

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

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

- E120.2: Unknown drive model
  Cause:

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

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

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

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

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

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

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

- E120.7: Model check error
  Cause:

  The servo drive model parameter cannot be identified.

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

- E120.8: Junction temperature parameter CRC error

  Cause:

  The auto-tuned junction temperature parameter is wrong.

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

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

  Cause:

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

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

- E122.1: DI function assignment fault

  Cause:

  The same function is assigned to different DIs.

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

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

- E122.2: DO function assignment fault

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

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

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

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

- E122.4: VDI function assignment fault
  Cause:

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

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

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

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

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

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

  The motor does not match the absolute mode.

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

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

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

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

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

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

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

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

- E150.0: STO safety state applied
  Cause:

  The STO input protection (safety state) applies.

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

- E150.1: STO input state error
  Cause:

  The single-channel input of STO is invalid.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- E165.3: SLS4 slope beyond the limit

  Cause:

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

- E201.0: Phase-P overcurrent

  Cause:

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

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

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

- E201.1: Phase-U overcurrent
  Cause:

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

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

- E201.2: Phase-V overcurrent
  Cause:

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

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

- E201.4: Phase-N overcurrent

  Cause:

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

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

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

- E201.4: Phase-N overcurrent
  Cause:

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

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

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

- E208.2: Encoder communication timeout
  Cause:

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

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

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

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

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

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

  - The DC bus voltage exceeds the discharge threshold.

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

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

- E234.0: Runaway
  Cause:

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

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

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

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

- E320.0: Regenerative resistor overload

  Cause:

  The regenerative resistor is overloaded.

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

Caution

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

- E400.0: Main circuit overvoltage

  Cause:

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

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

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

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

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

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

- E410.0: Main circuit undervoltage
  Cause:

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

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

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

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

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

  Phase loss occurs on the three-phase servo drive.

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

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

  Phase loss occurs on the three-phase servo drive.

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

- E420.0: Main circuit phase loss

  Cause:

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

- E420.1: Main circuit PL signal detection error

  Cause:

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

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

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

- E500.0: Motor overspeed
  Cause:

  The actual speed of the motor exceeds the overspeed threshold.

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

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

- E500.1: Speed feedback overflow

  Cause:

  The FPGA speed measurement overflows.

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

- E500.2: Speed feedback error 2

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

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

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

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

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

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

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

- E605.0: Bootstrap overspeed
  Cause:

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

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

- E620.0: Motor overload
  Cause:

  The accumulative heat of the motor reaches the fault threshold.

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

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

Note

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

- E625.0: Brake release error

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

- E626.0: Brake apply error

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

- E630.0: Motor stall

  Cause:

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

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

Note

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

- E631.1: 24 V or brake not connected

  Cause:

  The brake circuit is faulty.

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

- E631.2: P-Mos disconnected

  Cause:

  The brake circuit is faulty.

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

- E631.3: N-Mos disconnected

  Cause:

  The brake circuit is faulty.

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

- E631.4: P-Mos short-circuited

  Cause:

  The brake circuit is faulty.

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

- E640.0: IGBT overtemperature

  Cause:

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

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

Note

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

- E640.1: Flywheel diode overtemperature
  Cause:

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

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

Note

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

- E650.0: Heatsink overtemperature
  Cause:

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

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

Note

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

- E660.0: Motor overtemperature
  Cause:

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

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

- E661.0: STune fault

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

- E662.0: ETune failure

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

- E663.0: ITune fault

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

- E664.0: System resonance too strong

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

- E731.0: Encoder battery failure
  Cause:

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

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

- E733.0: Encoder multi-turn counting error

  Cause:

  An encoder multi-turn counting error occurs.

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

- E735.0: Encoder multi-turn counting overflow

  Cause:

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

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

- E740.0: Absolute encoder communication timeout

  Cause:

  Communication timeout occurs on the absolute encoder.

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

- E740.2: Absolute encoder error

  Cause:

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

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

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

  Cause:

  The encoder is faulty.

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

- E740.6: Encoder data write error

  Cause:

  The attempt to write the encoder data fails.

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

- E760.0: Encoder overtemperature
  Cause:

  The temperature of the absolute encoder is too high.

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

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

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

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

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

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

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

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

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

- E770.3: BiSS communication protocol timeout

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

- E770.4: BiSS communication CRC error

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

- E770.5: BiSS response data error

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

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

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

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

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

- E939.0: Motor power cable disconnected

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

- E939.1: Phase-U power cable disconnected

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

- E939.2: Phase-V power cable disconnected

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

- E939.3: Phase-W power cable disconnected

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

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

  Encoder parameters are abnormal.

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

- EB00.0: Position deviation too large
  Cause:

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

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

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

- EB00.1: Position deviation overflow

  Cause:

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

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

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

- EB01.0: Position reference increment too large

  Cause:

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

- EB01.1: Individual position reference increment too large

  Cause:

  The target position increment is too large.

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

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

  The target position increment is too large.

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

- EB01.3: Command overflow
  Cause:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- EE08.1: Network status switchover error
  Cause:

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

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

- EE08.3: Network cable connected improperly
  Cause:

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

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

- EE08.4 Data frame loss protection error

  Cause:

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

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

- EE08.5: Data frame transfer error

  Cause:

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

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

- EE08.6: Data update timeout

  Cause:

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

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

- EE09.0: Software position limit setting error

  Cause:

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

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

- EE09.1: Home setting error

  Cause:

  The home offset exceeds the upper/lower limit.

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

- EE09.2: Gear ratio beyond the limit

  Cause:

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

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

- EE09.3: No synchronization signal
  Cause:

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

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

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

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

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

- EE10.0: Mailbox setting error protection

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

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

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

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

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

- EE10.3: PDO watchdog setting error
  Cause:

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

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

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

- EE11.0: ESI check error
  Cause:

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

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

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

  The EEPROM communication of external EtherCAT devices fails.

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

- EE11.3: ESI and and drive model mismatch

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

- EE12.0: EtherCAT initialization failure
  Cause:

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

- EE13.0: Synchronization cycle setting error
  Cause:

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

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

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

  The synchronization cycle error exceeds the threshold.

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

Note

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

- EE16.0：MCU and ESC communication error

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

4.4 Solutions to Warnings

- E108.0: Parameter write error

  Cause:

  Parameter values cannot be written to EEPROM.

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

- E108.1: Parameter read error

  Cause:

  Parameter values cannot be read in EEPROM.

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

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

  Cause:

  The check on the data written in EEPROM fails.

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

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

  Cause:

  The check on the data read in EEPROM fails.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- E601.0: Homing warning

  Cause:

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

- E601.1: Homing switch error
  Cause:

  The homing switch is set improperly.

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

- E601.2: Homing mode setting error
  Cause:

  The setpoint of homing method exceeds the existing homing method.

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

- E631.4：P-Mos short circuit

  Cause:

  The brake circuit is faulty.

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

- E631.5：N-Mos short circuit

  Cause:

  The brake circuit is faulty.

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

- E730.0: Encoder battery warning

  Cause:

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

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

Note

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

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

  Cause:

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

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

- E831.0: AI1 zero offset too large

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

- E834.2: AI1 overvoltage

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

- E834.2: AI2 input current too high

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

- E900.0: DI emergency braking
  Cause:

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

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

- E902.0: DI setting invalid
  Cause:

  DI function parameters are set to invalid values.

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

- E902.1: DO setting invalid
  Cause:

  DO function parameters are set to invalid values.

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

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

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

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

- E908.0: Model identification failure

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

- E909.0: Motor overload warning
  Cause:

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

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

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

- E910.0: Control circuit overvoltage

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

- E920.0: Regenerative resistor overload

  Cause:

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

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

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

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

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

  Cause:

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

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

- E924.0: Regenerative transistor overtemperature

Cause:

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

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

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

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

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

- E942.0: Parameter saved frequently
  Cause:

  The number of parameters modified at a time exceeds 200.

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

- E950.0: Forward overtravel warning
  Cause:

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

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

- E952.0: Reverse overtravel warning

  Cause:

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

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

- E954.0: Position reference overflow

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

- E971.0: Undervoltage warning of voltage drop protection

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

- E980.0: Encoder algorithm error
  Cause:

  An encoder algorithm error occurs.

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

- EA41.0: Torque fluctuation compensation failure

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

4.5 Internal Faults

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

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

5 List of Parameters

5.1 Parameter Group H00

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H00.00	0x0000	Motor code	0 to 65535	14102	-	At stop	*" H00.00" on page 348*
H00.02	0x0002	Customized No.	0.00 to 4294967295.00	0	-	Unchangeable	*" H00.02" on page 348*
H00.04	0x0004	Encoder version	0.0 to 6553.5	0	-	Unchangeable	*" H00.04" on page 348*
H00.05	0x0005	Serial-type motor code	0 to 65535	0	-	Unchangeable	*" H00.05" on page 348*
H00.06	0x0006	Customized FPGA No.	0.00 to 655.35	0	-	Unchangeable	*" H00.06" on page 349*
H00.07	0x0007	STO version	0.00 to 655.35	0	-	Unchangeable	*" H00.07" on page 349*
H00.08	0x0008	Serial encoder type	0 to 65535	0	-	At stop	*" H00.08" on page 349*

5.2 Parameter Group H01

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H01.00	0x0100	MCU software version	0.0 to 6553.5	0	-	Unchangeable	*" H01.00" on page 350*
H01.01	0x0101	FPGA software version	0.0 to 6553.5	0	-	Unchangeable	*" H01.01" on page 350*
H01.02	0x0102	Servo drive series No.	0 to 65535	0	-	Unchangeable	*" H01.02" on page 350*
H01.06	0x0106	Board software version	0.0 tp 6553.5	0	-	Unchangeable	*" H01.06" on page 350*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H01.10	0x010A	Drive series No.	2: S1R6 3: S2R8 5: S5R5 6: S7R6 7: S012 8: S018 9: S022 10: S027 10001: T3R5 10002: T5R4 10003: T8R4 10004: T012 10005: T017 10006: T021 10007: T026	3	-	At stop	" H01.10" on page 351
H01.11	0x010B	DC-AC voltage class	0 V to 65535 V	220	V	Unchangeable	" H01.11" on page 351
H01.12	0x010C	Rated power of the drive	0.00 kW to 10737418.24 kW	0.4	kW	Unchangeable	" H01.12" on page 351
H01.14	0x010E	Max. output power of the drive	0.00 kW to 10737418.24 kW	0.4	kW	Unchangeable	" H01.14" on page 352
H01.16	0x0110	Rated output current of the drive	0.00 A to 10737418.24 A	2.8	A	Unchangeable	" H01.16" on page 352
H01.18	0x0112	Max. output current of the drive	0.00 A to 10737418.24 A	10.1	A	Unchangeable	" H01.18" on page 352
H01.40	0x0128	DC bus overvoltage protection threshold	0 V to 2000 V	420	V	At once	" H01.40" on page 352
H01.75	0x014B	Current loop amplification factor	0.00 to 655.35	1	-	At once	" H01.75" on page 353
H01.89	0x0159	Junction temperature parameter version	0.00 to 655.35	0	-	Unchangeable	" H01.89" on page 353

5.3 Parameter Group H02

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H02.00	0x0200	Control mode	0: Speed control mode 1: Position control mode 2: Torque control mode 9: EtherCAT mode	9	-	At stop	*" H02.00" on page 353*
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 354*
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 354*
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 354*
H02.05	0x0205	Stop mode at S-ON OFF	-4: Ramp to stop as defined by 6085h, keeping dynamic braking state -3: Stop at zero speed, keeping dynamic braking state -2: Ramp to stop as defined by 6084h/609Ah (HM), keeping dynamic braking state -1: Dynamic braking stop, keeping dynamic braking state 0: Coast to stop, keeping de-energized state 1: Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized state 2: Dynamic braking stop, keeping de-energized state	0	-	At once	*" H02.05" on page 354*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H02.06	0x0206	Stop mode at No. 2 fault	-5: Stop at zero speed, keeping dynamic braking state -4: Stop at emergency stop torque, keeping dynamic braking state -3: Ramp to stop as defined by 6085h, keeping dynamic braking state -2: Ramp to stop as defined by 6084h/609Ah (HM), keeping dynamic braking state -1: Dynamic braking stop, keeping dynamic braking state 0: Coast to stop, keeping de-energized state 1: Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized state 2: Ramp to stop as defined by 6085h, keeping de-energized state 3: Stop at emergency stop torque, keeping de-energized state 4: Dynamic braking stop, keeping de-energized state	2	-	At once	" H02.06" on page 355
H02.07	0x0207	Stop mode at overtravel	0: Coast to stop, keeping de-energized state 1: Stop at zero speed, keeping position lock state 2: Stop at zero speed, keeping de-energized state 3: Ramp to stop as defined by 6085h, keeping de-energized state 4: Ramp to stop as defined by 6085h, keeping position lock state 5: Dynamic braking stop, keeping de-energized state 6: Dynamic braking stop, keeping dynamic braking state 7: Not responding to overtravel	1	-	At stop	" H02.07" on page 355
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 356

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H02.09	0x0209	Delay from brake output ON to command received	0 ms to 500 ms	250	ms	At once	" H02.09" on page 356
H02.10	0x020A	Delay from brake output OFF to motor de-energized	50 ms to 1000 ms	150	ms	At once	" H02.10" on page 356
H02.11	0x020B	Speed threshold at brake output OFF in rotation state	20 rpm to 3000 rpm	30	rpm	At once	" H02.11" on page 357
H02.12	0x020C	Delay from S-ON OFF to brake output OFF in the rotation state	1 ms to 65535 ms	500	ms	At once	" H02.12" on page 357
H02.15	0x020F	Warning display on the keypad	0: Output warning information immediately 1: Not output warning information	0	-	At once	" H02.15" on page 357
H02.16	0x0210	Brake enable switch	0: OFF 1: ON	0	-	At once	" H02.16" on page 357
H02.17	0x0211	Stop mode upon main circuit power failure	0: Keep present action 1: Stop upon fault as defined by H02.06 2: Stop at S-ON OFF as defined by H02.05 3: Stop quickly as defined by H02.18	2	-	At once	" H02.17" on page 358

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H02.18	0x0212	Quick stop mode	0: Coast to stop, keeping de-energized state 1: Ramp to stop as defined by 6084h/609Ah (HM), keeping de-energized state 2: Ramp to stop as defined by 6085h, keeping de-energized state 3: Stop at emergency stop torque, keeping de-energized state 5: Ramp to stop as defined by 6084h/609Ah (HM), keeping position lock state 6: Ramp to stop as defined by 6085h, keeping position lock state 7: Stop at emergency stop torque, keeping position lock state	2	-	At once	" H02.18" on page 358
H02.21	0x0215	Permissible minimum resistance of regenerative resistor	1 Ω to 1000 Ω	40	Ω	Unchangeable	" H02.21" on page 358
H02.22	0x0216	Power of built-in regenerative resistor	0 W to 65535 W	50	W	Unchangeable	" H02.22" on page 359
H02.23	0x0217	Resistance of built-in regenerative resistor	0 Ω to 65535 Ω	50	Ω	Unchangeable	" H02.23" on page 359
H02.24	0x0218	Resistor heat dissipation coefficient	10% to 100%	30	%	At once	" H02.24" on page 359
H02.25	0x0219	Regenerative resistor type	0: Built-in 1: External, natural cooling 2: External, forced air cooling 3: No resistor needed	3	-	At once	" H02.25" on page 360
H02.26	0x021A	Power of external regenerative resistor	1 W to 65535 W	40	W	At once	" H02.26" on page 360
H02.27	0x021B	Resistance of external regenerative resistor	15 Ω to 1000 Ω	50	Ω	At once	" H02.27" on page 360
H02.30	0x021E	User password	0 to 65535	0	-	At once	" H02.30" on page 361

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H02.31	0x021F	System parameter initialization	0: No operation 1: Restore default settings 2: Clear fault records	0	-	At stop	" H02.31" on page 361
H02.32	0x0220	Selection of parameters in group H0b	0 to 99	50	-	At once	" H02.32" on page 361
H02.35	0x0223	Keypad data refresh frequency	0 Hz to 20 Hz	0	Hz	At once	" H02.35" on page 361
H02.41	0x0229	Manufacturer password	0 to 65535	0	-	At once	" H02.41" on page 362

5.4 Parameter Group H03

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H03.02	0x0302	DI1 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jog 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 38: Touch probe 1 39: Touch probe 2 40: Multi-speed enable	14	-	At once	" H03.02" on page 362
H03.03	0x0303	DI1 logic	0: Normally open 1: Closed	0	-	At once	" H03.03" on page 363

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H03.04	0x0304	DI2 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jog 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 38: Touch probe 1 39: Touch probe 2 40: Multi-speed enable	15	-	At once	*" H03.04" on page 363*
H03.05	0x0305	DI2 logic	0: Normally open 1: Closed	0	-	At once	*" H03.05" on page 364*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H03.06	0x0306	DI3 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jog 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 38: Touch probe 1 39: Touch probe 2 40: Multi-speed enable	31	-	At once	*" H03.06" on page 364*
H03.07	0x0307	DI3 logic	0: Normally open 1: Closed	0	-	At once	*" H03.07" on page 364*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H03.08	0x0308	DI4 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jog 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 38: Touch probe 1 39: Touch probe 2 40: Multi-speed enable	34	-	At once	" H03.08" on page 365
H03.09	0x0309	DI4 logic	0: Normally open 1: Closed	0	-	At once	" H03.09" on page 365

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H03.10	0x030A	DI5 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jog 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 38: Touch probe 1 39: Touch probe 2 40: Multi-speed enable	38	-	At once	" H03.10" on page 366
H03.11	0x030B	DI5 logic	0: Normally open 1: Closed	0	-	At once	" H03.11" on page 366
H03.50	0x0332	Voltage-type AI1 offset	-5000 mV to +5000 mV	0	mV	At once	" H03.50" on page 367
H03.51	0x0333	Voltage-type AI1 input filter time constant	0.00 ms to 655.35 ms	2	ms	At once	" H03.51" on page 367
H03.53	0x0335	Voltage-type AI1 dead zone	0.0 mV to 1000.0 mV	10	mV	At once	" H03.53" on page 367
H03.54	0x0336	Voltage-type AI1 zero drift	-500 mV to +500 mV	0	mV	At once	" H03.54" on page 367
H03.56	0x0338	Current-type AI2 input filter time constant	0.00 ms to 655.35 ms	2	ms	At once	" H03.56" on page 368
H03.60	0x033C	DI1 filter time	0.00 ms to 500.00 ms	0.5	ms	At once	" H03.60" on page 368
H03.61	0x033D	DI2 filter time	0.00 ms to 500.00 ms	0.5	ms	At once	" H03.61" on page 368
H03.62	0x033E	DI3 filter time	0.00 ms to 500.00 ms	0.5	ms	At once	" H03.62" on page 369
H03.63	0x033F	DI4 filter time	0.00 ms to 500.00 ms	0.5	ms	At once	" H03.63" on page 369

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H03.64	0x0340	DI5 filter time	0.00 ms to 500.00 ms	0.5	ms	At once	" H03.64" on page 369
H03.78	0x034E	Speed value corresponding to analog 20 mA	0 rpm to 9999 rpm	3000	rpm	At stop	" H03.78" on page 369
H03.79	0x034F	Torque value corresponding to analog 20 mA	1.00 to 8.00	1	Multiplier	At stop	" H03.79" on page 370
H03.80	0x0350	Speed value corresponding to analog 10 V	0 rpm to 9999 rpm	3000	rpm	At stop	" H03.80" on page 370
H03.81	0x0351	Torque value corresponding to analog 10 V	1.00 to 8.00	1	Multiplier	At stop	" H03.81" on page 370

5.5 Parameter Group H04

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H04.00	0x0400	DO1 function	0: No assignment 1: Servo ready 2: Motor rotation signal 10: Warning 11: Fault 25: Comparison output DO 31: Communication-forced DO 32: EDM output	1	-	At once	" H04.00" on page 370
H04.01	0x0401	DO1 logic	0: Normally open 1: Closed	0	-	At once	" H04.01" on page 371
H04.02	0x0402	DO2 function	0: No assignment 1: Servo ready 2: Motor rotation signal 10: Warning 11: Fault 25: Comparison output DO 31: Communication-forced DO 32: EDM output	11	-	At once	" H04.02" on page 371
H04.03	0x0403	DO2 logic	0: Normally open 1: Closed	0	-	At once	" H04.03" on page 372

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H04.22	0x0416	DO source	bit 0: DO1 source 0: DO1 function output 1: bit 0 of H31.04 set through communication bit 1: DO2 source 0: DO2 function output 1: bit 1 of H31.04 set through communication	0	-	At once	" H04.22" on page 372
H04.23	0x0417	EtherCAT-forced DO logic in non-OP status	bit 0: DO1 0: Status unchanged 1: No output bit 1: DO2 0: Status unchanged 1: No output	0	-	At once	" H04.23" on page 372
H04.50	0x0432	AO1 signal selection	0: Motor speed (1 V/1000 rpm) 1: Speed reference (1 V/1000 rpm) 2: Torque reference (1 V/100 x rated torque) 3: Position deviation (0.5 mV/1 reference unit) 4: Position deviation (0.5 mV/1 encoder unit) 5: Position reference speed (1 V/1000 rpm) 6: Positioning completed 8: AI1 voltage 10: Defined by H31.05	0	-	At once	" H04.50" on page 373
H04.51	0x0433	AO1 offset voltage	-10000 mV to +10000 mV	0	mV	At once	" H04.51" on page 373
H04.52	0x0434	AO1 multiplier	-99.99 to +99.99	1	-	At once	" H04.52" on page 373

5.6 Parameter Group H05

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H05.00	0x0500	Main position reference source	0 to 2 (Multi-position reference)	2	-	At once	" H05.00" on page 374
H05.02	0x0502	Pulses per revolution	0 to 4294967295	0	PPR	At stop	" H05.02" on page 374
H05.04	0x0504	First-order low-pass filter time constant	0.0 to 6553.5	0	ms	At stop	" H05.04" on page 374
H05.06	0x0506	Moving average filter time constant 1	0.0 to 128.0	0	ms	At stop	" H05.06" on page 374

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H05.07	0x0507	Electronic gear ratio 1 (numerator)	1 to 1073741824	1	-	At once	" H05.07" on page 375
H05.09	0x0509	Electronic gear ratio 1 (denominator)	1 to 1073741824	1	-	At once	" H05.09" on page 375
H05.11	0x050B	Electronic gear ratio 2 (numerator)	1 to 1073741824	1	-	At once	" H05.11" on page 375
H05.13	0x050D	Electronic gear ratio 2 (denominator)	1 to 1073741824	1	-	At once	" H05.13" on page 375
H05.16	0x0510	Clear action	0: Position deviation cleared upon S-OFF or non-operational state 1: Position deviation cleared upon S-OFF or fault 2: Position deviation cleared in the non-operational state or when FunIN.35 is activated	0	-	At stop	" H05.16" on page 376
H05.17	0x0511	Number of encoder frequency-division pulses	0 to 4194303	2500	PPR	At stop	" H05.17" on page 376
H05.19	0x0513	Speed feedforward control	0: No speed feedforward 1: Internal speed feedforward 2: 60B1h 3: Zero phase	1	-	At stop	" H05.19" on page 376
H05.30	0x051E	Homing selection	0: Disable 6: Current position as the home	0	-	At once	" H05.30" on page 377
H05.35	0x0523	Homing time limit	0 to 65535	10000	ms	At once	" H05.35" on page 377
H05.36	0x0524	Mechanical home offset	-2147483648 to +2147483648	0	Reference unit	At once	" H05.36" on page 377
H05.38	0x0526	Frequency-division output source	0: Encoder frequency-division output 1: Pulse reference synchronous output 2: Frequency-division output inhibited 3: Second encoder frequency-division output	0	-	At once	" H05.38" on page 377
H05.39	0x0527	Electronic gear ratio switchover condition	0: Switched if position reference kept 0 for 2.5 ms 1: Switched in real time	0	-	At stop	" H05.39" on page 378

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H05.40	H05.40	Mechanical home offset and action upon overtravel	0: H05.36 (Mechanical home offset) used as the coordinate after homing, reverse homing applied after homing triggered again upon overtravel 1: H05.36 (Mechanical home offset) used as the relative offset after homing, reverse homing applied after homing triggered again upon overtravel 2: H05.36 (Mechanical home offset) used as the coordinate after homing, reverse homing applied automatically upon overtravel 3: H05-36 (Mechanical home offset) used as the relative offset after homing, reverse homing applied automatically upon overtravel	0	-	At once	" H05.40" on page 378
H05.41	0x0529	Z pulse output polarity	Bit 0: Frequency-division Z output polarity 0: Positive (high level upon active Z pulse) 1: Negative (low level upon active Z pulse) Bit 1: OCZ output polarity 0: Positive (high level upon active Z pulse) 1: Negative (low level upon active Z pulse) Bit 2: Inner loop touch probe Z signal source 0: Motor Z signal 1: Frequency-division output Z signal	1	-	At stop	" H05.41" on page 378
H05.44	0x052C	Numerator of frequency-division output reduction ratio	1 to 16383	1	-	At stop	" H05.44" on page 379
H05.45	0x052D	Denominator of frequency-division output reduction ratio	1 to 8191	1	-	At stop	" H05.45" on page 379

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H05.46	0x052E	DI selection of multi-turn frequency-division Z starting point	0: No selection 1: DI1 2: DI2 3: DI3 4: DI4 5: DI5	0	-	At once	" H05.46" on page 379
H05.47	0x052F	Frequency-division Z pulse width	0 to 400	0	us	At once	" H05.47" on page 380
H05.50	0x0532	Mechanical gear ratio (numerator) in absolute position rotation mode	1 to 65535	1	-	At stop	" H05.50" on page 380
H05.51	0x0533	Mechanical gear ratio (denominator) in absolute position rotation mode	1 to 65535	1	-	At stop	" H05.51" on page 380
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 381
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 381
H05.56	0x0538	Speed threshold in homing upon hit-and-stop	0 to 1000	2	rpm	At once	" H05.56" on page 381
H05.58	0x053A	Torque threshold in homing upon hit-and-stop	0.0% to 400.0%	100	%	At once	" H05.58" on page 381
H05.60	0x053C	Hold time of positioning completed	0 to 30000	0	ms	At once	" H05.60" on page 382
H05.66	0x0542	Homing time unit	0: 1 1: 10 2: 100	2	-	At stop	" H05.66" on page 382

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H05.67	0x0543	Offset between zero point and single-turn absolute position	-2147483648 to +2147483647	0	Encoder unit	At stop	" H05.67" on page 382
H05.69	0x0545	Auxiliary homing function	0: Inhibited 1: Record offset position 2: Clear offset position	0	-	At stop	" H05.69" on page 382
H05.70	0x0546	Moving average filter time constant 2	0.0 to 1000.0	0	ms	At stop	" H05.70" on page 383
H05.71	0x0547	Motor Z signal width	1 to 100	4	ms	At once	" H05.71" on page 383
H05.72	0x0548	Positioning completed/ Position deviation threshold in fully closed-loop mode	0: Threshold scaled to outer loop unit 1: Same threshold used for inner and outer loops	0	-	At stop	" H05.72" on page 383

5.7 Parameter Group H06

Param. No.	Address	Name	Setpoint	Default	Unit	Change Condition	Page
H06.00	0x0600	Source of main speed reference A	0: Digital setting (H06.03) 1: AI1	0	-	At stop	" H06.00" on page 384
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 384
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 384
H06.03	0x0603	Speed reference set through keypad	-9999 rpm to +9999 rpm	200	rpm	At once	" H06.03" on page 384
H06.04	0x0604	DI jog speed reference	0 rpm to 9999 rpm	150	rpm	At once	" H06.04" on page 385
H06.05	0x0605	Acceleration ramp time of speed reference	0 ms to 65535 ms	0	ms	At once	" H06.05" on page 385

Param. No.	Address	Name	Setpoint	Default	Unit	Change Condition	Page
H06.06	0x0606	Deceleration ramp time of speed reference	0 ms to 65535 ms	0	ms	At once	" H06.06" on page 386
H06.07	0x0607	Maximum speed limit	0 rpm to 9999 rpm	6000	rpm	At once	" H06.07" on page 386
H06.08	0x0608	Forward speed threshold	0 rpm to 9999 rpm	6000	rpm	At once	" H06.08" on page 386
H06.09	0x0609	Reverse speed threshold	0 rpm to 9999 rpm	6000	rpm	At once	" H06.09" on page 386
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 387
H06.11	0x060B	Torque feedforward control	0: No torque feedforward 1: Internal torque feedforward 2: 60B2h used as external torque feedforward	1	-	At once	" H06.11" on page 387
H06.12	0x060C	Acceleration ramp time of jog speed	0 ms to 65535 ms	10	ms	At once	" H06.12" on page 387
H06.13	0x060D	Speed feedforward smoothing filter	0 us to 65535 us	0	us	At once	" H06.13" on page 387
H06.15	0x060F	Zero clamp speed threshold	0 rpm to 9999 rpm	10	rpm	At once	" H06.15" on page 388
H06.16	0x0610	Threshold of TGON (motor rotation) signal	0 rpm to 1000 rpm	20	rpm	At once	" H06.16" on page 388
H06.17	0x0611	Threshold of V-Cmp (speed matching) signal	0 rpm to 100 rpm	10	rpm	At once	" H06.17" on page 388
H06.18	0x0612	Threshold of speed reach signal	20 rpm to 9999 rpm	1000	rpm	At once	" H06.18" on page 388
H06.19	0x0613	Threshold of zero speed output signal	1 rpm to 9999 rpm	10	rpm	At once	" H06.19" on page 389
H06.40	0x0628	Deceleration time of ramp 1	0 ms to 65535 ms	0	ms	At stop	" H06.40" on page 389
H06.41	0x0629	Deceleration time of ramp 2	0 ms to 65535 ms	0	ms	At stop	" H06.41" on page 389
H06.50	0x0628	Speed S-curve enable switch	0: Disable 1: Enable	0	-	At stop	" H06.50" on page 389

Param. No.	Address	Name	Setpoint	Default	Unit	Change Condition	Page
H06.51	0x0633	Increasing acceleration of speed S-curve acceleration segment	0.0% to 100.0%	50	%	At stop	" H06.51" on page 390
H06.52	0x0634	Decreasing acceleration of speed S-curve acceleration segment	0.0% to 100.0%	50	%	At stop	" H06.52" on page 390
H06.53	0x0635	Increasing acceleration of speed S-curve deceleration segment	0.0% to 100.0%	50	%	At stop	" H06.53" on page 390
H06.54	0x0636	Decreasing acceleration of speed S-curve deceleration segment	0.0% to 100.0%	50	%	At stop	" H06.54" on page 390

5.8 Parameter Group H07

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H07.00	0x0700	Source of main torque reference A	0: Keypad (H07.03) 1: AI1	0	-	At stop	" H07.00" on page 391
H07.01	0x0701	Source of auxiliary torque reference B	0: Keypad (H07.03) 1: AI1	1	-	At stop	" H07.01" on page 391
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 391
H07.03	0x0703	Torque reference set through keypad	-400.0% to +400.0%	0	%	At once	" H07.03" on page 392
H07.05	0x0705	Torque reference filter time constant 1	0.00 ms to 30.00 ms	0.5	ms	At once	" H07.05" on page 392

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H07.06	0x0706	Torque reference filter time constant 2	0.00 ms to 30.00 ms	0.27	ms	At once	" H07.06" on page 392
H07.07	0x0707	Torque limit source	0: Positive/Negative internal torque limit 1: Internal or external limit as defined by DI 2: T-LMT 3: T_LMT or external limit as defined by DI (FunIN.16 or FunIN.17) 4: T_LMT or internal limit (FunIN.16 or FunIN.17) as defined by DI	0	-	At once	" H07.07" on page 392
H07.08	0x0708	T-LMT selection	1： AI1 2： AI2	1	-	At once	" H07.08" on page 393
H07.09	0x0709	Positive internal torque limit	0.0% to 400.0%	350	%	At once	" H07.09" on page 393
H07.10	0x070A	Negative internal torque limit	0.0% to 400.0%	350	%	At once	" H07.10" on page 393
H07.11	0x070B	Positive external torque limit	0.0% to 400.0%	350	%	At once	" H07.11" on page 393
H07.12	0x070C	Negative external torque limit	0.0% to 400.0%	350	%	At once	" H07.12" on page 394
H07.15	0x070F	Emergency stop torque	0.0% to 400.0%	100	%	At once	" H07.15" on page 394
H07.17	0x0711	Speed limit source	0: Internal speed limit 1: V-LMT 2: H07.19 or H07.20 as defined by DI	0	-	At once	" H07.17" on page 394
H07.18	0x0712	V-LMT selection	1： AI1 2： AI2	1	-	At once	" " on page
H07.19	0x0713	Positive speed limit/Speed limit 1 in torque control	0 rpm to 9999 rpm	3000	rpm	At once	" H07.19" on page 395
H07.20	0x0714	Negative speed limit/Speed limit 2 in torque control	0 rpm to 9999 rpm	3000	rpm	At once	" H07.20" on page 395
H07.21	0x0715	Base value for torque reach	0.0% to 400.0%	0	%	At once	" H07.21" on page 395
H07.22	0x0716	Threshold of valid torque reach	0.0% to 400.0%	20	%	At once	" H07.22" on page 395

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H07.23	0x0717	Threshold of invalid torque reach	0.0% to 400.0%	10	%	At once	" H07.23" on page 396
H07.24	0x0718	Field weakening depth	60% to 115%	115	%	At once	" H07.24" on page 396
H07.25	0x0719	Max. permissible demagnetizing current	0% to 300%	100	%	At once	" H07.25" on page 396
H07.26	0x071A	Field weakening selection	0: Disable 1: Enable	0	-	At stop	" H07.26" on page 396
H07.27	0x071B	Field weakening gain	0.001 Hz to 1.000 Hz	0.03	Hz	At once	" H07.27" on page 397
H07.28	0x071C	Speed of field weakening point	0 to 65535	0	-	Unchangeable	" H07.28" on page 397
H07.35	0x0723	Motor torque output correction	0: Switched off 1: Enabled	0	-	At stop	" " on page
H07.36	0x0724	Time constant of low-pass filter 2	0.00 ms to 10.00 ms	0	ms	At once	" H07.36" on page 397
H07.37	0x0725	Torque reference filter selection	0: First-order filter 1: Biquad filter	0	-	At once	" H07.37" on page 398
H07.38	0x0726	Biquad filter attenuation ratio	0 to 50	16	-	At stop	" H07.38" on page 398
H07.40	0x0728	Speed limit window in the torque control mode	0.0 ms to 300.0 ms	10	ms	At once	" H07.40" on page 398

5.9 Parameter Group H08

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H08.00	0x0800	Speed loop gain	0.1 Hz to 2000.0 Hz	40	Hz	At once	" H08.00" on page 398
H08.01	0x0801	Speed loop integral time constant	0.15 ms to 512.00 ms	19.89	ms	At once	" H08.01" on page 399
H08.02	0x0802	Position loop gain	0.1 Hz to 2000.0 Hz	64	Hz	At once	" H08.02" on page 399
H08.03	0x0803	2nd speed loop gain	0.1 Hz to 2000.0 Hz	75	Hz	At once	" H08.03" on page 399
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 400

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H08.05	0x0805	2nd position loop gain	0.1 Hz to 2000.0 Hz	120	Hz	At once	" H08.05" on page 400
H08.08	0x0808	2nd gain mode setting	0: Fixed to the 1st gain set, switched between P and PI as defined by bit26 of external 60FEh 1: Switched between the 1st and 2nd gain sets as defined by H08.09	1	-	At once	" H08.08" on page 400
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 401
H08.10	0x080A	Gain switchover delay	0.0 ms to 1000.0 ms	5	ms	At once	" H08.10" on page 401
H08.11	0x080B	Gain switchover level	0 to 20000	50	-	At once	" H08.11" on page 401
H08.12	0x080C	Gain switchover dead time	0 to 20000	30	-	At once	" H08.12" on page 402
H08.13	0x080D	Position gain switchover time	0.0 ms to 1000.0 ms	3	ms	At once	" H08.13" on page 402
H08.15	0x080F	Load moment of inertia ratio	0.00 to 120.00	1	-	At once	" H08.15" on page 402
H08.17	0x0811	Zero phase delay	0.0 ms to 4.0 ms	0	ms	At once	" H08.17" on page 403
H08.18	0x0812	Speed feedforward filter time constant	0.00 ms to 64.00 ms	0.5	ms	At once	" H08.18" on page 403
H08.19	0x0813	Speed feedforward gain	0.0% to 100.0%	0	%	At once	" H08.19" on page 403

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H08.20	0x0814	Torque feedforward filter time constant	0.00 ms to 64.00 ms	0.5	ms	At once	" H08.20" on page 403
H08.21	0x0815	Torque feedforward gain	0.0% to 300.0%	0	%	At once	" H08.21" on page 404
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 404
H08.23	0x0817	Cutoff frequency of speed feedback low-pass filter	100 Hz to 8000 Hz	8000	Hz	At once	" H08.23" on page 405
H08.24	0x0818	PDFF control coefficient	0.0% to 200.0%	100	%	At once	" H08.24" on page 405
H08.27	0x081B	Speed observer cutoff frequency	50 Hz to 600 Hz	170	Hz	At once	" H08.27" on page 405
H08.28	0x081C	Speed observer inertia correction coefficient	1% to 1600%	100	%	At once	" H08.28" on page 406
H08.29	0x081D	Speed observer filter time	0.00 ms to 10.00 ms	0.8	ms	At once	" H08.29" on page 406
H08.31	0x081F	Disturbance cutoff frequency	10 Hz to 4000 Hz	600	Hz	At once	" H08.31" on page 406
H08.32	0x0820	Disturbance compensation gain	0% to 100%	0	%	At once	" H08.32" on page 407
H08.33	0x0821	Disturbance observer inertia correction coefficient	1% to 1600%	100	%	At once	" H08.33" on page 407
H08.37	0x0825	Phase modulation for medium-frequency jitter suppression 2	-90° to +90°	0	°	At once	" H08.37" on page 407
H08.38	0x0826	Frequency of medium-frequency jitter suppression 2	0 Hz to 1000 Hz	0	Hz	At once	" H08.38" on page 407
H08.39	0x0827	Compensation gain of medium-frequency jitter suppression 2	0% to 300%	0	%	At once	" H08.39" on page 408

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H08.40	0x0828	Speed observer selection	0: Disable 1: Enable	0	-	At once	" H08.40" on page 408
H08.42	0x082A	Model control selection	0: Disable 1: Enable 2: Dual-inertia model	0	-	At once	" H08.42" on page 408
H08.43	0x082B	Model gain	0.1 to 2000.0	40	-	At once	" H08.43" on page 408
H08.46	0x082E	Feedforward value	0.0 to 102.4	95	-	At once	" H08.46" on page 409
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 409
H08.54	0x0836	Medium- and low-frequency jitter suppression compensation 3	0% to 200%	0	%	At once	" H08.54" on page 409
H08.56	0x0838	Medium- and low-frequency jitter suppression phase modulation 3	0% to 600%	100	%	At once	" H08.56" on page 409
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 410
H08.60	0x083C	Medium- and low-frequency jitter suppression compensation 4	0% to 200%	0	%	At once	" H08.60" on page 410
H08.61	0x083D	Medium- and low-frequency jitter suppression phase modulation 4	0% to 600%	100	%	At once	" H08.61" on page 410
H08.62	0x083E	Position loop integral time constant	0.15 to 512.00	512	-	At once	" H08.62" on page 410
H08.63	0x083F	2nd position loop integral time constant	0.15 to 512.00	512	-	At once	" H08.63" on page 411

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H08.64	0x0840	Speed observer feedback source	0: Disable 1: Enable	0	-	At once	" H08.64" on page 411
H08.65	0x0841	Zero deviation control selection	0: Disable 1: Enable	0	-	At once	" H08.65" on page 411
H08.66	0x0842	Moving average filter for zero deviation control position	0.0 ms to 320.0 ms	5	ms	At once	" H08.66" on page 411
H08.68	0x0844	Speed feedforward of zero deviation control	0.0% to 100.0%	100	%	At once	" H08.68" on page 412
H08.69	0x0845	Torque feedforward of zero deviation control	0.0% to 100.0%	100	%	At once	" H08.69" on page 412
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 412
H08.82	0x0852	Resonance frequency of dual-inertia model	0.0 Hz to 6553.5 Hz	0	Hz	At once	" H08.82" on page 413
H08.83	0x0853	Dual-inertia model gain	$0.1s^{-1}$ to $300.0s^{-1}$	60	-1	At once	" H08.83" on page 413
H08.84	0x0854	Inertia ratio of dual-inertia model	0.00 to 120.00	1	-	At once	" H08.84" on page 413
H08.88	0x0858	Speed feedforward value of dual-inertia model	0.0 to 6553.5	100	-	At once	" H08.88" on page 413
H08.89	0x0859	Torque feedforward value of dual-inertia model	0.0 to 6553.5	100	-	At once	" H08.89" on page 414

5.10 Parameter Group H09

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H09.00	0x0900	Gain auto-tuning mode	0: Disabled, manual gain tuning required 1: Enabled, gain parameters generated automatically based on the stiffness level 2: Positioning mode, gain parameters generated automatically based on the stiffness level 3: Interpolation mode+Inertia auto-tuning 4: Normal mode+Inertia auto-tuning 6: Quick positioning mode+Inertia auto-tuning	4	-	At once	*" H09.00" on page 414*
H09.01	0x0901	Stiffness level	0 to 41	15	-	At once	*" H09.01" on page 414*
H09.02	0x0902	Adaptive notch mode	0: Adaptive notch no longer updated; 1: One adaptive notch activated (3rd notch) 2: Two adaptive notches activated (3rd and 4th notches) 3: Resonance point tested only (displayed in H09.24) 4: Adaptive notch cleared, values of 3rd and 4th notches restored to default	3	-	At once	*" H09.02" on page 415*
H09.03	0x0903	Online inertia auto-tuning mode	0: Disabled 1: Enabled, changing slowly 2: Enabled, changing normally 3: Enabled, changing quickly	2	-	At once	*" H09.03" on page 415*
H09.05	0x0905	Offline inertia auto-tuning mode	0: Bi-directional 1: Unidirectional	1	-	At stop	*" H09.05" on page 415*
H09.06	0x0906	Maximum speed of inertia auto-tuning	100 rpm to 1000 rpm	500	rpm	At stop	*" H09.06" on page 416*
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 416*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H09.08	0x0908	Interval time after an individual inertia auto-tuning	50 ms to 10000 ms	800	ms	At stop	" H09.08" on page 416
H09.09	0x0909	Number of motor revolutions per inertia auto-tuning	0.00 to 100.00	1	-	At once	" H09.09" on page 417
H09.11	0x090B	Vibration threshold	0.0% to 100.0%	5	%	At once	" H09.11" on page 417
H09.12	0x090C	Frequency of the 1st notch	50 Hz to 8000 Hz	8000	Hz	At once	" H09.12" on page 417
H09.13	0x090D	Width level of the 1st notch	0 to 20	2	-	At once	" H09.13" on page 417
H09.14	0x090E	Depth level of the 1st notch	0 to 99	0	-	At once	" H09.14" on page 418
H09.15	0x090F	Frequency of the 2nd notch	50 Hz to 8000 Hz	8000	Hz	At once	" H09.15" on page 418
H09.16	0x0910	Width level of the 2nd notch	0 to 20	2	-	At once	" H09.16" on page 418
H09.17	0x0911	Depth level of the 2nd notch	0 to 99	0	-	At once	" H09.17" on page 419
H09.18	0x0912	Frequency of the 3rd notch	50 Hz to 8000 Hz	8000	Hz	At once	" H09.18" on page 419
H09.19	0x0913	Width level of the 3rd notch	0 to 20	2	-	At once	" H09.19" on page 419
H09.20	0x0914	Depth level of the 3rd notch	0 to 99	0	-	At once	" H09.20" on page 419
H09.21	0x0915	Frequency of the 4th notch	50 Hz to 8000 Hz	8000	Hz	At once	" H09.21" on page 420
H09.22	0x0916	Width level of the 4th notch	0 to 20	2	-	At once	" H09.22" on page 420
H09.23	0x0917	Depth level of the 4th notch	0 to 99	0	-	At once	" H09.23" on page 420
H09.24	0x0918	Auto-tuned resonance frequency	0 Hz to 5000 Hz	0	Hz	At once	" H09.24" on page 420
H09.26	0x091A	ITune response	50.0% to 500.0%	100	%	At once	" H09.26" on page 421
H09.27	0x091B	ITune mode	0: Disable 1: ITune mode 1 2: ITune mode 2	0	-	At once	" H09.27" on page 421
H09.28	0x091C	Minimum inertia ratio of ITune	0.0% to 80.0%	0	%	At once	" H09.28" on page 421

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H09.29	0x091D	Maximum inertia ratio of ITune	1.0% to 120.0%	30	%	At once	" H09.29" on page 421
H09.32	0x0920	Gravity compensation value	0.0% to 100.0%	0	%	At once	" H09.32" on page 422
H09.33	0x0921	Positive friction compensation value	0.0% to 100.0%	0	%	At once	" H09.33" on page 422
H09.34	0x0922	Negative friction compensation value	-100.0% to 0.0%	0	%	At once	" H09.34" on page 422
H09.35	0x0923	Friction compensation speed	0.0 to 20.0	2	-	At once	" H09.35" on page 422
H09.36	0x0924	Friction compensation speed	0x00: Slow mode+Speed reference 0x01: Slow mode+Model speed 0x02: Slow mode+Speed feedback 0x03: Slow mode+Observe speed 0x10: Quick mode +Speed reference 0x11: Quick mode +Model speed 0x12: Quick mode +Speed feedback 0x13: Quick mode+Observe speed	0	-	At once	" H09.36" on page 423
H09.37	0x0925	Vibration monitoring time	0 to 65535	600	-	At once	" H09.37" on page 423
H09.38	0x0926	Frequency of low-frequency resonance suppression 1 at the mechanical end	1.0 Hz to 100.0 Hz	100	Hz	At once	" H09.38" on page 423
H09.39	0x0927	Low-frequency resonance suppression 1 at the mechanical end	0 to 3	2	-	At stop	" H09.39" on page 424
H09.44	0x092C	Frequency of low-frequency resonance suppression 2 at mechanical load end	0.0 to 100.0	0	-	At once	" H09.44" on page 424

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H09.45	0x092D	Responsiveness of low-frequency resonance suppression 2 at mechanical load end	0.01 to 5.00	1	-	At once	" H09.45" on page 424
H09.47	0x092F	Width of low-frequency resonance suppression 2 at mechanical load end	0.00 to 2.00	1	-	At once	" H09.47" on page 424
H09.49	0x0931	Frequency of low-frequency resonance suppression 3 at mechanical load end	0.0 to 100.0	0	-	At once	" H09.49" on page 425
H09.50	0x0932	Responsiveness of low-frequency resonance suppression 3 at mechanical load end	0.01 to 5.00	1	-	At once	" H09.50" on page 425
H09.52	0x0934	Width of low-frequency resonance suppression 3 at mechanical load end	0.00 to 2.00	1	-	At once	" H09.52" on page 425
H09.54	0x0936	Vibration threshold	0.0% to 300.0%	50	%	At once	" H09.54" on page 425
H09.56	0x0938	Max. overshoot allowed by ETune	0 to 65535	2936	-	At once	" H09.56" on page 426
H09.57	0x0939	STune resonance suppression switchover frequency	0 Hz to 4000 Hz	900	Hz	At once	" H09.57" on page 426
H09.58	0x093A	STune resonance suppression reset selection	0: Disable 1: Enable	0	-	At once	" H09.58" on page 426

5.11 Parameter Group H0A

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0A.00	0x0A00	Power input phase loss protection	0: Enable 1: Disable	0	-	At once	" H0A.00" on page 427
H0A.01	0x0A01	Absolute position limit	0: Disabled 1: Enabled 2: Enabled after homing	0	-	At once	" H0A.01" on page 427
H0A.04	0x0A04	Motor overload protection gain	50 to 300	100	-	At once	" H0A.04" on page 427
H0A.08	0x0A08	Overspeed threshold	0 to 20000	0	rpm	At once	" H0A.08" on page 428
H0A.10	0x0A0A	Threshold of excessive local position deviation	0 to 4294967295	219895608	-	At once	" H0A.10" on page 428
H0A.12	0x0A0C	Runaway protection	0: Disable 1: Enable	1	-	At once	" H0A.12" on page 428
H0A.18	0x0A12	IGBT overtemperature threshold	120°C to 175°C	140	°C	At once	" H0A.18" on page 429
H0A.19	0x0A13	Filter time constant of touch probe 1	0.00 to 6.30	2	us	At once	" H0A.19" on page 429
H0A.20	0x0A14	Filter time constant of touch probe 2	0.00 to 6.30	2	us	At once	" H0A.20" on page 429
H0A.23	0x0A17	TZ signal filter time	0 to 31	15	25 ns	At stop	" H0A.23" on page 429
H0A.25	0x0A19	Speed display DO low-pass filter time	0 to 5000	0	ms	At once	" H0A.25" on page 430
H0A.26	0x0A1A	Motor overload detection	0: Show motor overload warning (E909.0) and fault (E620.0) 1: Hide motor overload warning (E909.0) and fault (E620.0)	0	-	At once	" H0A.26" on page 430
H0A.27	0x0A1B	Motor rotation DO speed filter time	0 to 100	50	ms	At once	" H0A.27" on page 430
H0A.29	0x0A1D	Fully closed-loop encoder (ABZ) filter time	0 to 255	15	25 ns	At stop	" H0A.29" on page 430

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0A.32	0x0A20	Motor stall overtemperature protection time window	10 to 65535	200	ms	At once	" H0A.32" on page 431
H0A.33	0x0A21	Motor stall overtemperature detection	0: Hide 1: Enable	1	-	At once	" H0A.33" on page 431
H0A.36	0x0A24	Encoder multi-turn overflow fault selection	0: Not hide 1: Hide	0	-	At once	" H0A.36" on page 431
H0A.40	0x0A28	Compensation function selection	bit0: Overtravel compensation 0: Enable 1: Disable bit1: Touch probe rising edge compensation 0: Disable 1: Enable bit2: Touch probe falling edge compensation 0: Disable 1: Enable bit3: Touch probe solution 0: New solution 1: Old solution (same as SV660N)	6	-	At stop	" H0A.40" on page 432
H0A.41	0x0A29	Forward position of software position limit	-2147483648 to +2147483647	2147483647	Encoder unit	At stop	" H0A.41" on page 432
H0A.43	0x0A2B	Reverse position of software position limit	-2147483648 to +2147483647	-2147483648	Encoder unit	At stop	" H0A.43" on page 432
H0A.49	0x0A31	Regenerative resistor overtemperature threshold	100°C to 175°C	115	°C	At once	" H0A.49" on page 433
H0A.50	0x0A32	Encoder communication fault tolerance threshold	0 to 31	5	-	At once	" H0A.50" on page 433
H0A.51	0x0A33	Phase loss detection filter times	3 to 36	20	55 ms	At once	" H0A.51" on page 433
H0A.52	0x0A34	Encoder temperature protection threshold	0°C to 175°C	125	°C	At once	" H0A.52" on page 433

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0A.53	0x0A35	Touch probe DI ON-compensation time	-3000 to +3000	200	25 ns	At once	" H0A.53" on page 434
H0A.54	0x0A36	Touch probe DI OFF-compensation time	-3000 to +3000	1512	25 ns	At once	" H0A.54" on page 434
H0A.55	0x0A37	Runaway current threshold	100.0% to 400.0%	200	%	At once	" H0A.55" on page 434
H0A.56	0x0A38	Fault reset delay	0 to 60000	10000	ms	At once	" H0A.56" on page 434
H0A.57	0x0A39	Runaway speed threshold	1 to 1000	50	rpm	At once	" H0A.57" on page 434
H0A.58	0x0A3A	Runaway speed filter time	0.1 to 100.0	2	ms	At once	" H0A.58" on page 435
H0A.59	0x0A3B	Runaway protection detection time	10 to 1000	30	ms	At once	" H0A.59" on page 435
H0A.60	0x0A3C	Black box function mode	0: Disable 1: Any fault 2: Designated fault 3: Triggered by designated condition	1	-	At once	" H0A.60" on page 435
H0A.61	0x0A3D	Designated fault code	0.0 to 6553.5	0	-	At once	" H0A.61" on page 436
H0A.62	0x0A3E	Trigger source	0 to 25	0	-	At once	" H0A.62" on page 436
H0A.63	0x0A3F	Trigger level	-2147483648 to +2147483647	0	-	At once	" H0A.63" on page 436
H0A.65	0x0A41	Trigger level	0: Rising edge 1: Equal 2: Falling edge 3: Edge-triggered	0	-	At once	" H0A.65" on page 436
H0A.66	0x0A42	Trigger position	0% to 100%	75	%	At once	" H0A.66" on page 437
H0A.67	0x0A43	Sampling frequency	0: Current loop 1: Position loop 2: Main cycle	0	-	At once	" H0A.67" on page 437
H0A.70	0x0A46	Overspeed threshold 2	0 to 20000	0	rpm	At once	" H0A.70" on page 437
H0A.71	0x0A47	MS1 motor overload curve switchover	0 to 3	2	-	At once	" H0A.71" on page 437

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0A.72	0x0A48	Maximum stop time in ramp-to-stop	0 to 65535	10000	ms	At stop	" H0A.72" on page 438
H0A.73	0x0A49	STO 24 V disconnection filter time	1 to 5	5	ms	At once	" H0A.73" on page 438
H0A.74	0x0A4A	Filter time for two inconsistent STO channels	1 to 1000	10	ms	At once	" H0A.74" on page 438
H0A.75	0x0A4B	Servo OFF delay after STO triggered	0 to 25	20	ms	At once	" H0A.75" on page 439
H0A.90	0x0A5A	Moving average filter time constant for speed display values	0 to 100	0	ms	At once	" H0A.90" on page 439
H0A.91	0x0A5B	Moving average filter time constant for torque display values	0 to 100	0	ms	At once	" H0A.91" on page 439
H0A.92	0x0A5C	Moving average filter time constant for position display values	0 to 100	0	ms	At once	" H0A.92" on page 439
H0A.93	0x0A5D	Low-pass filter time constant for voltage display values	0 to 250	0	ms	At once	" H0A.93" on page 440
H0A.94	0x0A5E	Low-pass filter time constant for thermal display values	0 to 250	0	ms	At once	" H0A.94" on page 440

5.12 Parameter Group H0b

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0b.00	0x0B00	Motor speed actual value	-32767 rpm to +32767 rpm	0	rpm	Unchangeable	" H0b.00" on page 440
H0b.01	0x0B01	Speed reference	-32767 rpm to +32767 rpm	0	rpm	Unchangeable	" H0b.01" on page 440
H0b.02	0x0B02	Internal torque reference	-500.0% to +500.0%	0	%	Unchangeable	" H0b.02" on page 441

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0b.03	0x0B03	Monitored DI status	0 to 65535	0	-	Unchangeable	" H0b.03" on page 441
H0b.05	0x0B05	Monitored DO status	0 to 65535	0	-	Unchangeable	" H0b.05" on page 441
H0b.07	0x0B07	Absolute position counter	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.07" on page 442
H0b.09	0x0B09	Mechanical angle	0.0° to 360.0°	0	°	Unchangeable	" H0b.09" on page 442
H0b.10	0x0B0A	Electrical angle	0.0° to 360.0°	0	°	Unchangeable	" H0b.10" on page 442
H0b.12	0x0B0C	Average load rate	0.0% to 800.0%	0	%	Unchangeable	" H0b.12" on page 442
H0b.15	0x0B0F	Position following error (encoder unit)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.15" on page 443
H0b.17	0x0B11	Feedback pulse counter	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.17" on page 443
H0b.19	0x0B13	Total power-on time	0.0s to 429496729.5s	0	s	Unchangeable	" H0b.19" on page 443
H0b.21	0x0B15	AI1 voltage display	-12.000 V to +12.000 V	0	V	Unchangeable	" H0b.21" on page 444
H0b.22	0x0B16	AI2 current display	0.000 mA to 21.000 mA	0	mA	Unchangeable	" H0b.22" on page 444
H0b.24	0x0B18	RMS value of phase current	0.0 A to 6553.5 A	0	A	Unchangeable	" H0b.24" on page 444
H0b.25	0x0B19	Angle obtained upon voltage injection auto-tuning	0.0° to 360.0°	0	°	Unchangeable	" H0b.25" on page 444
H0b.26	0x0B1A	Bus voltage	0.0 V to 6553.5 V	0	V	Unchangeable	" H0b.26" on page 445
H0b.27	0x0B1B	Module temperature	-20°C to +200°C	0	°C	Unchangeable	" H0b.27" on page 445
H0b.28	0x0B1C	Absolute encoder fault information given by FPGA	0 to 65535	0	-	Unchangeable	" H0b.28" on page 445
H0b.29	0x0B1D	Axis status information given by FPGA	0 to 65535	0	-	Unchangeable	" H0b.29" on page 445
H0b.30	0x0B1E	Axis fault information given by FPGA	0 to 65535	0	-	Unchangeable	" H0b.30" on page 446
H0b.31	0x0B1F	Encoder fault information	0 to 65535	0	-	Unchangeable	" H0b.31" on page 446

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0b.33	0x0B21	Fault log	0: Present fault 1: Last fault 2: 2nd to last fault 3: 3rd to last fault 4: 4th to last fault 5: 5th to last fault 6: 6th to last fault 7: 7th to last fault 8: 8th to last fault 9: 9th to last fault 10: 10th to last fault 11: 11th to last fault 12: 12th to last fault 13: 13th to last fault 14: 14th to last fault 15: 15th to last fault 16: 16th to last fault 17: 17th to last fault 18: 18th to last fault 19: 19th to last fault	0	-	At once	" H0b.33" on page 446
H0b.34	0x0B22	Fault code of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.34" on page 447
H0b.35	0x0B23	Time stamp upon occurrence of the selected fault	0.0s to 429496729.5s	0	s	Unchangeable	" H0b.35" on page 447
H0b.37	0x0B25	Motor speed upon occurrence of the selected fault	-32767 rpm to +32767 rpm	0	rpm	Unchangeable	" H0b.37" on page 448
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 448
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 448
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 448
H0b.41	0x0B29	DI status upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.41" on page 448

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0b.43	0x0B2B	DO status upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.43" on page 449
H0b.45	0x0B2D	Internal fault code	0 to 65535	0	-	Unchangeable	" H0b.45" on page 449
H0b.46	0x0B2E	Absolute encoder fault information given by FPGA upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.46" on page 449
H0b.47	0x0B2F	System status information given by FPGA upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.47" on page 449
H0b.48	0x0B30	System fault information given by FPGA upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.48" on page 450
H0b.49	0x0B31	Encoder fault information upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.49" on page 450
H0b.51	0x0B33	Internal fault code upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.51" on page 450
H0b.52	0x0B34	FPGA timeout fault standard bit upon occurrence of the selected fault	0 to 65535	0	-	Unchangeable	" H0b.52" on page 450
H0b.53	0x0B35	Position following error (reference unit)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.53" on page 451
H0b.55	0x0B37	Motor speed actual value	-2147483648 rpm to +2147483647 rpm	0	rpm	Unchangeable	" H0b.55" on page 451

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0b.57	0x0B39	Bus voltage of the control circuit	0.0 V to 6553.5 V	0	V	Unchangeable	" H0b.57" on page 451
H0b.58	0x0B3A	Mechanical absolute position (low 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.58" on page 452
H0b.60	0x0B3C	Mechanical absolute position (high 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.60" on page 452
H0b.63	0x0B3F	NotRdy state	1: Control circuit power input error 2: Main circuit power input error 3: Undervoltage 4: Soft start failed 5: Encoder initialization not completed 6: Short circuit to ground failed 7: Others	0	-	Unchangeable	" H0b.63" on page 452
H0b.66	0x0B42	Encoder temperature	-32768°C to +32767°C	0	°C	Unchangeable	" H0b.66" on page 453
H0b.67	0x0B43	Load rate of regenerative resistor	0.0% to 200.0%	0	%	Unchangeable	" H0b.67" on page 453
H0b.70	0x0B46	Number of absolute encoder revolutions	0 Rev to 65535 Rev	0	Rev	Unchangeable	" H0b.70" on page 453
H0b.71	0x0B47	Single-turn position fed back by the absolute encoder	0 p to +2147483647 p	0	p	Unchangeable	" H0b.71" on page 453
H0b.74	0x0B4A	System fault information given by FPGA	0 to 65535	0	-	Unchangeable	" H0b.74" on page 453
H0b.77	0x0B4D	Encoder position (low 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.77" on page 454
H0b.79	0x0B4F	Encoder position (high 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.79" on page 454
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 454

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0b.83	0x0B53	Single-turn position of the rotary load (high 32 bits)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.83" on page 454
H0b.85	0x0B55	Single-turn position of the rotary load (reference unit)	-2147483648 p to +2147483647 p	0	p	Unchangeable	" H0b.85" on page 455
H0b.87	0x0B57	IGBT junction temperature	0 to 200	0	-	Unchangeable	" H0b.87" on page 455
H0b.90	0x0B5A	Group No. of the abnormal parameter	0 to 65535	0	-	At once	" H0b.90" on page 455
H0b.91	0x0B5B	Offset of the abnormal parameter within the group	0 to 65535	0	-	At once	" H0b.91" on page 456
H0b.94	0x0B5E	Individual power-on time	0.0s to 429496729.5s	0	s	Unchangeable	" H0b.94" on page 456
H0b.96	0x0B60	Individual power-on time upon occurrence of the selected fault	0.0s to 429496729.5s	0	s	Unchangeable	" H0b.96" on page 456

5.13 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 456
H0d.01	0x0D01	Fault reset	0: No operation 1: Enable	0	-	At stop	" H0d.01" on page 457
H0d.02	0x0D02	Inertia auto-tuning selection	0 to 65	0	-	At once	" H0d.02" on page 457
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 457
H0d.05	0x0D05	Emergency stop	0: No operation 1: Enable	0	-	At once	" H0d.05" on page 458
H0d.10	0x0D0A	Auto-tuning of analog channel	0: No operation 1: Adjust AI1	0	-	At stop	" H0d.10" on page 458
H0d.12	0x0D0C	Phase U/V current balance correction	0: Disable 1: Enable	0	-	At stop	" H0d.12" on page 458

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 458
H0d.18	0x0D12	Forced DI value	0 to 31	31	-	At once	" H0d.18" on page 459
H0d.19	0x0D13	Forced DO value	0 to 3	0	-	At once	" H0d.19" on page 459
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 459
H0d.23	0x0D17	Torque fluctuation auto-tuning	0 to 1	0	-	At stop	" H0d.23" on page 460
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 460

5.14 Parameter Group H0E

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0E.00	0x0E00	Node address	1 to 127	1	-	At stop	" H0E.00" on page 460
H0E.01	0x0E01	Save objects written through communication to EEPROM	0: Not save 1: Save parameters written through communication to EEPROM 2: Save object dictionaries written through communication to EEPROM 3: Save parameters and object dictionaries written through communication to EEPROM 4: Save object dictionaries written before communication (OP) to EEPROM	4	-	At once	" H0E.01" on page 461

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0E.07	0x0E07	Object dictionary unit	0: Reference unit system (p/s, p/s^2) 1: User unit system (0.01 rpm, ms)	0	-	At stop	" H0E.07" on page 461
H0E.15	0x0E0F	Index of group 6000 (the last two bits)	0 to 255	255	-	At once	" H0E.15" on page 462
H0E.16	0x0E10	Sub-index of group 6000	0 to 2	0	-	At once	" H0E.16" on page 462
H0E.20	0x0E14	EtherCAT slave name	0 to 65535	0	-	Unchangeable	" H0E.20" on page 462
H0E.21	0x0E15	EtherCAT slave alias	0 to 65535	0	-	At stop	" H0E.21" on page 462
H0E.22	0x0E16	Number of SYNC loss events allowed by EtherCAT	1 to 20	8	-	At once	" H0E.22" on page 463
H0E.24	0x0E18	Number of SYNC loss events	0 to 65535	0	-	Unchangeable	" H0E.24" on page 463
H0E.25	0x0E19	Max. error value and invalid frames of EtherCAT port 0 per unit time	0 to 65535	0	-	Unchangeable	" H0E.25" on page 463
H0E.26	0x0E1A	Max. error value and invalid frames of EtherCAT port 1 per unit time	0 to 65535	0	-	Unchangeable	" H0E.26" on page 463
H0E.27	0x0E1B	Max. transfer error of EtherCAT port per unit time	0 to 65535	0	-	Unchangeable	" H0E.27" on page 463
H0E.28	0x0E1C	Max. EtherCAT data frame processing unit error per unit time	0 to 255	0	-	Unchangeable	" H0E.28" on page 464
H0E.29	0x0E1D	Max. link loss value of EtherCAT port 0 per unit time	0 to 65535	0	-	Unchangeable	" H0E.29" on page 464
H0E.31	0x0E1F	EtherCAT synchronization mode setting	0 to 2	2	-	At stop	" H0E.31" on page 464

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0E.32	0x0E20	EtherCAT synchronization error threshold	100 ns to 4000 ns	3000	ns	At stop	" H0E.32" on page 464
H0E.33	0x0E21	EtherCAT state machine state and port connection state	0 to 65535	0	-	Unchangeable	" H0E.33" on page 465
H0E.34	0x0E22	Number of excessive position reference increment events in CSP mode	1 to 30	20	-	At once	" H0E.34" on page 465
H0E.35	0x0E23	AL fault code	0 to 65535	0	-	Unchangeable	" H0E.35" on page 465
H0E.36	0x0E24	EtherCAT enhanced link selection	0: Disable 1: Enable	0	-	At once	" H0E.36" on page 465
H0E.37	0x0E25	EtherCAT XML reset selection	0: Disable 1: Enable	0	-	At once	" H0E.37" on page 466
H0E.80	0x0E50	Modbus baud rate	0: 300 bps 1: 600 bps 2: 1200 bps 3: 2400 bps 4: 4800 bps 5: 9600 bps 6: 19200 bps 7: 38400 bps 8: 57600 bps 9: 115200 bps	9	-	At once	" H0E.80" on page 466
H0E.81	0x0E51	Modbus data format	0: No parity, 2 stop bits (N-2) 1: Even parity, 1 stop bit (E-1) 2: Odd parity, 1 stop bit (O-1) 3: No parity, 1 stop bit (N-1)	3	-	At once	" H0E.81" on page 466
H0E.82	0x0E52	Modbus response delay	0 ms to 20 ms	0	ms	At once	" H0E.82" on page 467
H0E.83	0x0E53	Modbus communication timeout	0 ms to 600 ms	500	ms	At once	" H0E.83" on page 467
H0E.84	0x0E54	Modbus communication data sequence	0: High bits before low bits 1: Low bits before high bits	1	-	At once	" H0E.84" on page 467
H0E.90	0x0E5A	Modbus version	0.00 to 655.35	0	-	Unchangeable	" H0E.90" on page 468

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0E.93	0x0E5D	EtherCAT COE version	0.00 to 655.35	0	-	Unchangeable	" H0E.93" on page 468
H0E.96	0x0E60	XML version information	0.00 to 655.35	0	-	Unchangeable	" H0E.96" on page 468

5.15 Parameter Group H0F

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0F.00	0x0F00	Encoder feedback mode	0: Internal encoder feedback 1: External encoder feedback 2: Inner/Outer loop switchover	0	-	At once	" H0F.00" on page 469
H0F.01	0x0F01	External encoder operation mode	0: Standard operating direction 1: Reverse operating direction	0	-	At once	" H0F.01" on page 469
H0F.02	0x0F02	External encoder mode	0: Incremental mode 1: Absolute linear mode	0	-	At stop	" H0F.02" on page 470
H0F.03	0x0F03	External encoder feedback type	0: Quadrature pulse 1: Inovance 2: BiSS	0	-	At stop	" H0F.03" on page 470
H0F.04	0x0F04	External encoder pulses per revolution	0 to 2147483647	10000	-	At stop	" H0F.04" on page 470
H0F.08	0x0F08	Excessive deviation threshold in compound control mode	0 to 2147483647	1000	-	At once	" H0F.08" on page 471
H0F.10	0x0F0A	Clear deviation in compound control mode	0 to 100	1	R	At once	" H0F.10" on page 471
H0F.13	0x0F0D	Compound vibration suppression filter time	0.0 ms to 6553.5 ms	0	ms	At stop	" H0F.13" on page 472
H0F.16	0x0F10	Pulse deviation display in compound control mode	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" H0F.16" on page 472
H0F.18	0x0F12	Internal position pulse feedback display	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" H0F.18" on page 472
H0F.20	0x0F14	External position pulse feedback display	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" H0F.20" on page 473

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H0F.22	0x0F16	External encoder phase Z detection invalid (quadrature pulse feedback)	0: Detected 1: Not detected	0	-	At once	" H0F.22" on page 473
H0F.23	0x0F17	BiSS absolute homing offset	-2147483648 to +2147483647	0	-	At once	" H0F.23" on page 473
H0F.25	0x0F19	Source of touch probe Z signal in fully closed-loop mode	0: Motor Z signal 1: External feedback Z signal	0	-	At once	" H0F.25" on page 473
H0F.26	0x0F1A	BiSS absolute feedback offset	-2147483648 to +2147483647	0	-	At once	" H0F.26" on page 474
H0F.28	0x0F1C	Index value of BiSS communication warning	0 to 65535	0	-	Unchangeable	" H0F.28" on page 474
H0F.29	0x0F1D	CRC of BiSS fully closed-loop feedback	0: Positive 1: Negative	1	-	At once	" H0F.29" on page 474
H0F.30	0x0F1E	Valid bit of BiSS communication position feedback	0 to 127	29	-	At stop	" H0F.30" on page 474
H0F.31	0x0F1F	Valid bit of BiSS communication warning index	0 to 31	2	-	At stop	" H0F.31" on page 475
H0F.40	0x0F28	Inovance fully closed-loop encoder communication error register	0 to 65535	0	-	Unchangeable	" H0F.40" on page 475
H0F.41	0x0F29	Inovance fully closed-loop encoder version	0.0 to 6553.5	0	-	Unchangeable	" H0F.41" on page 475
H0F.42	0x0F2A	Inovance fully closed-loop encoder resolution	0 to 4294967295	0	-	Unchangeable	" H0F.42" on page 475

5.16 Parameter Group H11

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H11.00	0x1100	Multi-position operation mode	0: Individual operation (number of displacements defined by H11.01) 1: Cyclic operation (number of displacement defined by H11.01) 2: DI-based operation (defined by DI) 3: Sequential operation 5: Axis-controlled continuous operation	1	-	At stop	" H11.00" on page 476
H11.01	0x1101	Number of displacement references in multi-position mode	1 to 16	1	-	At stop	" H11.01" on page 477
H11.02	0x1102	Starting displacement No. after pause	0: Continue to execute the unexecuted displacements 1: Start from displacement 1	0	-	At stop	" H11.02" on page 477
H11.03	0x1103	Interval time unit	0: ms 1: s	0	-	At stop	" H11.03" on page 478
H11.04	0x1104	Displacement reference type	0: Relative displacement reference 1: Absolute displacement reference	0	-	At once	" H11.04" on page 478
H11.05	0x1105	Starting displacement No. in sequential operation	0 to 16	0	-	At stop	" H11.05" on page 478
H11.09	0x1109	Deceleration upon axis control OFF	0 ms to 65535 ms	65535	ms	At once	" H11.09" on page 479
H11.10	0x110A	Starting speed of displacement 1	0 rpm to 9999 rpm	0	rpm	At once	" H11.10" on page 479
H11.11	0x110B	Stop speed of displacement 1	0 rpm to 9999 rpm	0	rpm	At once	" H11.11" on page 479
H11.12	0x110C	Displacement 1	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.12" on page 479
H11.14	0x110E	Maximum speed of displacement 1	1 rpm to 9999 rpm	200	rpm	At once	" H11.14" on page 480

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H11.15	0x110F	Acceleration/ Deceleration time of displacement 1	0 ms to 65535 ms	10	ms	At once	" H11.15" on page 480
H11.16	0x1110	Interval time after displacement 1	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.16" on page 480
H11.17	0x1111	Displacement 2	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.17" on page 481
H11.19	0x1113	Maximum speed of displacement 2	1 rpm to 9999 rpm	200	rpm	At once	" H11.19" on page 481
H11.20	0x1114	Acceleration/ Deceleration time of displacement 2	0 ms to 65535 ms	10	ms	At once	" H11.20" on page 481
H11.21	0x1115	Interval time after displacement 2	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.21" on page 481
H11.22	0x1116	Displacement 3	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.22" on page 482
H11.24	0x1118	Maximum speed of displacement 3	1 rpm to 9999 rpm	200	rpm	At once	" H11.24" on page 482
H11.25	0x1119	Acceleration/ Deceleration time of displacement 3	0 ms to 65535 ms	10	ms	At once	" H11.25" on page 482
H11.26	0x111A	Interval time after displacement 3	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.26" on page 482
H11.27	0x111B	Displacement 4	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.27" on page 483
H11.29	0x111D	Maximum speed of displacement 4	1 rpm to 9999 rpm	200	rpm	At once	" H11.29" on page 483
H11.30	0x111E	Acceleration/ Deceleration time of displacement 4	0 ms to 65535 ms	10	ms	At once	" H11.30" on page 483
H11.31	0x111F	Interval time after displacement 4	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.31" on page 483

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H11.32	0x1120	Displacement 5	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.32" on page 484
H11.34	0x1122	Maximum speed of displacement 5	1 rpm to 9999 rpm	200	rpm	At once	" H11.34" on page 484
H11.35	0x1123	Acceleration/ Deceleration time of displacement 5	0 ms to 65535 ms	10	ms	At once	" H11.35" on page 484
H11.36	0x1124	Interval time after displacement 5	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.36" on page 484
H11.37	0x1125	Displacement 6	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.37" on page 485
H11.39	0x1127	Maximum speed of displacement 6	1 rpm to 9999 rpm	200	rpm	At once	" H11.39" on page 485
H11.40	0x1128	Acceleration/ Deceleration time of displacement 6	0 ms to 65535 ms	10	ms	At once	" H11.40" on page 485
H11.41	0x1129	Interval time after displacement 6	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.41" on page 485
H11.42	0x112A	Displacement 7	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.42" on page 486
H11.44	0x112C	Maximum speed of displacement 7	1 rpm to 9999 rpm	200	rpm	At once	" H11.44" on page 486
H11.45	0x112D	Acceleration/ Deceleration time of displacement 7	0 ms to 65535 ms	10	ms	At once	" H11.45" on page 486
H11.46	0x112E	Interval time after displacement 7	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.46" on page 486
H11.47	0x112F	Displacement 8	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.47" on page 487
H11.49	0x1131	Maximum speed of displacement 8	1 rpm to 9999 rpm	200	rpm	At once	" H11.49" on page 487

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H11.50	0x1132	Acceleration/ Deceleration time of displacement 8	0 ms to 65535 ms	10	ms	At once	" H11.50" on page 487
H11.51	0x1133	Interval time after displacement 8	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.51" on page 487
H11.52	0x1134	Displacement 9	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.52" on page 488
H11.54	0x1136	Maximum speed of displacement 9	1 rpm to 9999 rpm	200	rpm	At once	" H11.54" on page 488
H11.55	0x1137	Acceleration/ Deceleration time of displacement 9	0 ms to 65535 ms	10	ms	At once	" H11.55" on page 488
H11.56	0x1138	Interval time after displacement 9	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.56" on page 488
H11.57	0x1139	Displacement 10	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.57" on page 489
H11.59	0x113B	Maximum speed of displacement 10	1 rpm to 9999 rpm	200	rpm	At once	" H11.59" on page 489
H11.60	0x113C	Acceleration/ Deceleration time of displacement 10	0 ms to 65535 ms	10	ms	At once	" H11.60" on page 489
H11.61	0x113D	Interval time after displacement 10	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.61" on page 489
H11.62	0x113E	Displacement 11	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.62" on page 490
H11.64	0x1140	Maximum speed of displacement 11	1 rpm to 9999 rpm	200	rpm	At once	" H11.64" on page 490
H11.65	0x1141	Acceleration/ Deceleration time of displacement 11	0 ms to 65535 ms	10	ms	At once	" H11.65" on page 490
H11.66	0x1142	Interval time after displacement 11	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.66" on page 490

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H11.67	0x1143	Displacement 12	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.67" on page 491
H11.69	0x1145	Maximum speed of displacement 12	1 rpm to 9999 rpm	200	rpm	At once	" H11.69" on page 491
H11.70	0x1146	Acceleration/ Deceleration time of displacement 12	0 ms to 65535 ms	10	ms	At once	" H11.70" on page 491
H11.71	0x1147	Interval time after displacement 12	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.71" on page 491
H11.72	0x1148	Displacement 13	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.72" on page 492
H11.74	0x114A	Maximum speed of displacement 13	1 rpm to 9999 rpm	200	rpm	At once	" H11.74" on page 492
H11.75	0x114B	Acceleration/ Deceleration time of displacement 13	0 ms to 65535 ms	10	ms	At once	" H11.75" on page 492
H11.76	0x114C	Interval time after displacement 13	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.76" on page 492
H11.77	0x114D	Displacement 14	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.77" on page 493
H11.79	0x114F	Maximum speed of displacement 14	1 rpm to 9999 rpm	200	rpm	At once	" H11.79" on page 493
H11.80	0x1150	Acceleration/ Deceleration time of displacement 14	0 ms to 65535 ms	10	ms	At once	" H11.80" on page 493
H11.81	0x1151	Interval time after displacement 14	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.81" on page 493
H11.82	0x1152	Displacement 15	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.82" on page 494
H11.84	0x1154	Maximum speed of displacement 15	1 rpm to 9999 rpm	200	rpm	At once	" H11.84" on page 494

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H11.85	0x1155	Acceleration/ Deceleration time of displacement 15	0 ms to 65535 ms	10	ms	At once	" H11.85" on page 494
H11.86	0x1156	Interval time after displacement 15	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.86" on page 494
H11.87	0x1157	Displacement 16	-1073741824 to +1073741824	10000	Reference unit	At once	" H11.87" on page 495
H11.89	0x1159	Maximum speed of displacement 16	1 rpm to 9999 rpm	200	rpm	At once	" H11.89" on page 495
H11.90	0x115A	Acceleration/ Deceleration time of displacement 16	0 ms to 65535 ms	10	ms	At once	" H11.90" on page 495
H11.91	0x115B	Interval time after displacement 16	0 ms(s) to 10000 ms(s)	10	ms (s)	At once	" H11.91" on page 495

5.17 Parameter Group H12

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H12.00	0x1200	Multi-speed operation mode	0: Individual operation (number of speeds defined by H12.01) 1: Cyclic operation (number of speeds defined by H12.01) 2: DI-based operation	1	-	At stop	" H12.00" on page 496
H12.01	0x1201	Number of speed references in multi-speed mode	1 to 16	16	-	At stop	" H12.01" on page 496
H12.02	0x1202	Operating time unit	0: s 1: min	0	-	At stop	" H12.02" on page 497
H12.03	0x1203	Acceleration time 1	0 ms to 65535 ms	10	ms	At once	" H12.03" on page 497
H12.04	0x1204	Deceleration time 1	0 ms to 65535 ms	10	ms	At once	" H12.04" on page 497
H12.05	0x1205	Acceleration time 2	0 ms to 65535 ms	50	ms	At once	" H12.05" on page 497
H12.06	0x1206	Deceleration time 2	0 ms to 65535 ms	50	ms	At once	" H12.06" on page 498

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H12.07	0x1207	Acceleration time 3	0 ms to 65535 ms	100	ms	At once	" H12.07" on page 498
H12.08	0x1208	Deceleration time 3	0 ms to 65535 ms	100	ms	At once	" H12.08" on page 498
H12.09	0x1209	Acceleration time 4	0 ms to 65535 ms	150	ms	At once	" H12.09" on page 499
H12.10	0x120A	Deceleration time 4	0 ms to 65535 ms	150	ms	At once	" H12.10" on page 499
H12.20	0x1214	Speed reference for speed 1	-9999 to +9999	0	rpm	At once	" H12.20" on page 499
H12.21	0x1215	Operating time of speed 1	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.21" on page 500
H12.22	0x1216	Acceleration/ Deceleration time of speed 1	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.22" on page 500
H12.23	0x1217	Speed reference for speed 2	-9999 to +9999	100	rpm	At once	" H12.23" on page 501
H12.24	0x1218	Operating time of speed 2	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.24" on page 501
H12.25	0x1219	Acceleration/ Deceleration time of speed 2	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.25" on page 501
H12.26	0x121A	Speed reference for speed 3	-9999 to +9999	300	rpm	At once	" H12.26" on page 501
H12.27	0x121B	Operating time of speed 3	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.27" on page 502

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H12.28	0x121C	Acceleration/ Deceleration time of speed 3	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.28" on page 502
H12.29	0x121D	Speed reference for speed 4	-9999 to +9999	500	rpm	At once	" H12.29" on page 502
H12.30	0x121E	Operating time of speed 4	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.30" on page 502
H12.31	0x121F	Acceleration/ Deceleration time of speed 4	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.31" on page 503
H12.32	0x1220	Speed reference for speed 5	-9999 to +9999	700	rpm	At once	" H12.32" on page 503
H12.33	0x1221	Operating time of speed 5	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.33" on page 503
H12.34	0x1222	Acceleration/ Deceleration time of speed 5	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.34" on page 504
H12.35	0x1223	Speed reference for speed 6	-9999 to +9999	900	rpm	At once	" H12.35" on page 504
H12.36	0x1224	Operating time of speed 6	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.36" on page 504

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H12.37	0x1225	Acceleration/ Deceleration time of speed 6	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.37" on page 504
H12.38	0x1226	Speed reference for speed 7	-9999 to +9999	600	rpm	At once	" H12.38" on page 505
H12.39	0x1227	Operating time of speed 7	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.39" on page 505
H12.40	0x1228	Acceleration/ Deceleration time of speed 7	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.40" on page 505
H12.41	0x1229	Speed reference for speed 8	-9999 to +9999	300	rpm	At once	" H12.41" on page 506
H12.42	0x122A	Operating time of speed 8	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.42" on page 506
H12.43	0x122B	Acceleration/ Deceleration time of speed 8	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.43" on page 506
H12.44	0x122C	Speed reference for speed 9	-9999 to +9999	100	rpm	At once	" H12.44" on page 506
H12.45	0x122D	Operating time of speed 9	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.45" on page 507

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H12.46	0x122E	Acceleration/ Deceleration time of speed 9	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.46" on page 507
H12.47	0x122F	Speed reference for speed 10	-9999 to +9999	-100	rpm	At once	" H12.47" on page 507
H12.48	0x1230	Operating time of speed 10	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.48" on page 507
H12.49	0x1231	Acceleration/ Deceleration time of speed 10	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.49" on page 508
H12.50	0x1232	Speed reference for speed 11	-9999 to +9999	-300	rpm	At once	" H12.50" on page 508
H12.51	0x1233	Operating time of speed 11	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.51" on page 508
H12.52	0x1234	Acceleration/ Deceleration time of speed 11	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.52" on page 509
H12.53	0x1235	Speed reference for speed 12	-9999 to +9999	-500	rpm	At once	" H12.53" on page 509
H12.54	0x1236	Operating time of speed 12	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.54" on page 509

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H12.55	0x1237	Acceleration/ Deceleration time of speed 12	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.55" on page 509
H12.56	0x1238	Speed reference for speed 13	-9999 to +9999	-700	rpm	At once	" H12.56" on page 510
H12.57	0x1239	Operating time of speed 13	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.57" on page 510
H12.58	0x123A	Acceleration/ Deceleration time of speed 13	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.58" on page 510
H12.59	0x123B	Speed reference for speed 14	-9999 to +9999	-900	rpm	At once	" H12.59" on page 511
H12.60	0x123C	Operating time of speed 14	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.60" on page 511
H12.61	0x123D	Acceleration/ Deceleration time of speed 14	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	" H12.61" on page 511
H12.62	0x123E	Speed reference for speed 15	-9999 to +9999	-600	rpm	At once	" H12.62" on page 511
H12.63	0x123F	Operating time of speed 15	0.0s(m) to 6553.5s(m)	5	s (m)	At once	" H12.63" on page 512

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H12.64	0x1240	Acceleration/ Deceleration time of speed 15	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	*" H12.64" on page 512*
H12.65	0x1241	Speed reference for speed 16	-9999 to +9999	-300	rpm	At once	*" H12.65" on page 512*
H12.66	0x1242	Operating time of speed 16	0.0s(m) to 6553.5s(m)	5	s (m)	At once	*" H12.66" on page 512*
H12.67	0x1243	Acceleration/ Deceleration time of speed 16	0: Zero acceleration/ deceleration time 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	-	At once	*" H12.67" on page 513*

5.18 Parameter Group H17

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.90	0x175A	Communication VDI enable	0: Disable 1: Enable	0	-	At stop	" H17.90" on page 513
H17.91	0x175B	VDI default value upon power-on	0: 0x0: No default 1: 0x01: VDI1 default value 2: 0x02: VDI2 default value 4: 0x04: VDI3 default value 8: 0x08: VDI4 default value 16: 0x10: VDI5 default value 32: 0x20: VDI6 default value 64: 0x40:VDI7 default value 128: 0x80: VDI8 default value 256: 0x100: VDI9 default value 512: 0x200: VDI10 default value 1024: 0x400: VDI11 default value 2048: 0x800: VDI12 default value 4096: 0x1000: VDI13 default value 8092: 0x2000: VDI14 default value 16384: 0x4000: VDI15 default value 32768: 0x8000: VDI16 default value	0	-	At once	" H17.91" on page 513

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.00	0x1700	VDI1 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.00" on page 514*
H17.01	0x1701	VDI1 logic level	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.01" on page 515*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.02	0x1702	VDI2 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.02" on page 515*
H17.03	0x1703	VDI2 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.03" on page 516*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.04	0x1704	VDI3 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.04" on page 516*
H17.05	0x1705	VDI3 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.05" on page 517*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.06	0x1706	VDI4 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.06" on page 517*
H17.07	0x1707	VDI4 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.07" on page 518*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.08	0x1708	VDI5 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.08" on page 518*
H17.09	0x1709	VDI5 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.09" on page 519*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.10	0x170A	VDI6 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.10" on page 519*
H17.11	0x170B	VDI6 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.11" on page 520*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.12	0x170C	VDI7 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.12" on page 520*
H17.13	0x170D	VDI7 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.13" on page 520*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.14	0x170E	VDI8 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.14" on page 521*
H17.15	0x170F	VDI8 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.15" on page 521*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.16	0x1710	VDI9 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.16" on page 522*
H17.17	0x1711	VDI9 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.17" on page 522*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.18	0x1712	VDI10 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.18" on page 522*
H17.19	0x1713	VDI10 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.19" on page 523*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.20	0x1714	VDI11 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	" H17.20" on page 523
H17.21	0x1715	VDI11 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	" H17.21" on page 523

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.22	0x1716	VDI12 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.22" on page 524*
H17.23	0x1717	VDI12 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.23" on page 524*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.24	0x1718	VDI13 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.24" on page 525*
H17.25	0x1719	VDI13 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.25" on page 525*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.26	0x171A	VDI14 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	" H17.26" on page 525
H17.27	0x171B	VDI14 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	" H17.27" on page 526

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.28	0x171C	VDI15 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	*" H17.28" on page 526*
H17.29	0x171D	VDI15 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	*" H17.29" on page 527*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.30	0x171E	VDI16 function	0: No assignment 1: Servo ON 2: Alarm reset signal 5: Multi-reference direction 6: Multi-reference switchover CMD1 7: Multi-reference switchover CMD2 8: Multi-reference switchover CMD3 9: Multi-reference switchover CMD4 14: Positive limit switch 15: Negative limit switch 18: Forward jog 19: Reverse jot 24: Electronic gear ratio selection 28: Multi-position reference enable 31: Home switch 34: Emergency stop 40: Multi-speed enable	0	-	At once	" H17.30" on page 527
H17.31	0x171F	VDI16 logic level selection	0: Active when the written value is 1 1: Active when the written value changes from 0 to 1	0	-	At stop	" H17.31" on page 528
H17.92	0x175C	Communication VDO enable	0: Disable 1: Enable	0	-	At stop	" H17.92" on page 528

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.93	0x175D	VDO default value after power-on	0: 0x0: No default 1: 0x01: VDI1 default value 2: 0x02: VDI2 default value 4: 0x04: VDI3 default value 8: 0x08: VDI4 default value 16: 0x10: VDI5 default value 32: 0x20: VDI6 default value 64: 0x40:VDI7 default value 128: 0x80: VDI8 default value 256: 0x100: VDI9 default value 512: 0x200: VDI10 default value 1024: 0x400: VDI11 default value 2048: 0x800: VDI12 default value 4096: 0x1000: VDI13 default value 8192: 0x2000: VDI14 default value 16384: 0x4000: VDI15 default value 32768: 0x8000: VDI16 default value	0	-	At stop	" H17.93" on page 528
H17.32	0x1720	VDO virtual level	0 to 65535	0	-	At once	" H17.32" on page 529
H17.33	0x1721	VDO1 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.33" on page 529
H17.34	0x1722	VDO1 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.34" on page 530
H17.35	0x1723	VDO2 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.35" on page 530
H17.36	0x1724	VDO2 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.36" on page 530

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.37	0x1725	VDO3 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.37" on page 531
H17.38	0x1726	VDO3 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.38" on page 531
H17.39	0x1727	VDO4 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.39" on page 531
H17.40	0x1728	VDO4 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.40" on page 532
H17.41	0x1729	VDO5 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.41" on page 532
H17.42	0x172A	VDO5 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.42" on page 532
H17.43	0x172B	VDO6 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.43" on page 533
H17.44	0x172C	VDO6 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.44" on page 533
H17.45	0x172D	VDO7 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.45" on page 533
H17.46	0x172E	VDO7 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.46" on page 534

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.47	0x172F	VDO8 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.47" on page 534
H17.48	0x1730	VDO8 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.48" on page 534
H17.49	0x1731	VDO9 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.49" on page 535
H17.50	0x1732	VDO9 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.50" on page 535
H17.51	0x1733	VDO10 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.51" on page 535
H17.52	0x1734	VDO10 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.52" on page 536
H17.53	0x1735	VDO11 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.53" on page 536
H17.54	0x1736	VDO11 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.54" on page 536
H17.55	0x1737	VDO12 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	" H17.55" on page 537
H17.56	0x1738	VDO12 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	" H17.56" on page 537

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H17.57	0x1739	VDO13 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	*" H17.57" on page 537*
H17.58	0x173A	VDO13 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	*" H17.58" on page 538*
H17.59	0x173B	VDO14 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	*" H17.59" on page 538*
H17.60	0x173C	VDO14 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	*" H17.60" on page 538*
H17.61	0x173D	VDO15 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	*" H17.61" on page 539*
H17.62	0x173E	VDO15 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	*" H17.62" on page 539*
H17.63	0x173F	VDO16 function	0: No assignment 1: Servo ready 2: Motor rotating 10: Warning 11: Fault 31: Communication-forced DO 32: EDM output	0	-	At once	*" H17.63" on page 539*
H17.64	0x1740	VDO16 logic level	0: Output 1 upon active logic 1: Output 0 upon active logic	0	-	At once	*" H17.64" on page 540*

5.19 Parameter Group H18

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H18.00	0x1800	Position comparison output selection	0: Disable 1: Enable (rising edge-triggered)	0	-	At once	" H18.00" on page 540
H18.01	0x1801	Position comparison output feedback source	0: Motor encoder feedback 1: Fully closed-loop position feedback	0	-	At once	" H18.01" on page 540
H18.02	0x1802	Position comparison resolution	0: 24-bit 1: 23-bit 2: 22-bit 3: 21-bit 4: 20-bit 5: 19-bit 6: 18-bit 7: 17-bit	1	-	At once	" H18.02" on page 541
H18.03	0x1803	Position comparison mode	0: Individual comparison mode 1: Cyclic comparison mode 2: Fixed cyclic comparison mode	0	-	At once	" H18.03" on page 541
H18.04	0x1804	Current position as zero	0: Disable 1: Enable (rising edge-triggered)	0	-	At once	" H18.04" on page 541
H18.05	0x1805	Position comparison output width	0.1 ms to 204.7 ms	0.1	ms	At once	" H18.05" on page 542
H18.06	0x1806	Position comparison output ABZ port polarity	bit 0: OCZ output logic 0: Positive, output high level upon active logic 1: Negative, output low level upon active logic bit 1: Z port output logic 0: Positive, output high level upon active logic 1: Negative, output low level upon active logic bit 2: A/B output logic 0: Positive, output high level upon active logic 1: Negative, output low level upon active logic	0	-	At once	" H18.06" on page 542
H18.07	0x1807	Start point of position comparison	0 to 40	0	-	At once	" H18.07" on page 542
H18.08	0x1808	End point of position comparison	0 to 40	0	-	At once	" H18.08" on page 543

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H18.09	0x1809	Current status of position comparison	0 to 1024	0	-	Unchangeable	" H18.09" on page 543
H18.10	0x180A	Real-time position of position comparison	-2147483648 to +2147483647	0	-	Unchangeable	" H18.10" on page 543
H18.12	0x180C	Zero offset of position comparison	-2147483648 to +2147483647	0	-	At once	" H18.12" on page 543
H18.14	0x180E	Position comparison output delay compensation	-12.00 us to +12.00 us	0	us	At once	" H18.14" on page 544
H18.15	0x180F	Cycles of fixed mode	1 to 65535	1	-	At once	" H18.15" on page 544
H18.16	0x1810	ABZ output function setting	bit 0: OCZ output function 0: Frequency-division output 1: Position comparison bit 1: Z port output function 0: Frequency-division output 1: Position comparison bit 2: A/B port output function 0: Frequency-division output 1: Position comparison	0	-	At once	" H18.16" on page 544
H18.17	0x1811	Number of fixed modes completed	0 to 65535	0	-	Unchangeable	" H18.17" on page 545

5.20 Parameter Group H19

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.00	0x1900	Target value of position comparison 1	-2147483648 to +2147483647	0	-	At once	" H19.00" on page 545
H19.02	0x1902	Attribute value of position comparison 1	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.02" on page 545
H19.03	0x1903	Target value of position comparison 2	-2147483648 to +2147483647	0	-	At once	" H19.03" on page 546

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.05	0x1905	Attribute value of position comparison 2	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.05" on page 547*
H19.06	0x1906	Target value of position comparison 3	-2147483648 to +2147483647	0	-	At once	*" H19.06" on page 547*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.08	0x1908	Attribute value of position comparison 3	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.08" on page 547*
H19.09	0x1909	Target value of position comparison 4	-2147483648 to +2147483647	0	-	At once	*" H19.09" on page 548*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.11	0x190B	Attribute value of position comparison 4	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.11" on page 548*
H19.12	0x190C	Target value of position comparison 5	-2147483648 to +2147483647	0	-	At once	*" H19.12" on page 549*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.14	0x190E	Attribute value of position comparison 5	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.14" on page 549
H19.15	0x190F	Target value of position comparison 6	-2147483648 to +2147483647	0	-	At once	" H19.15" on page 550

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.17	0x1911	Attribute value of position comparison 6	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.17" on page 550*
H19.18	0x1912	Target value of position comparison 7	-2147483648 to +2147483647	0	-	At once	*" H19.18" on page 551*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.20	0x1914	Attribute value of position comparison 7	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.20" on page 551*
H19.21	0x1915	Target value of position comparison 8	-2147483648 to +2147483647	0	-	At once	*" H19.21" on page 552*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.23	0x1917	Attribute value of position comparison 8	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.23" on page 552
H19.24	0x1918	Target value of position comparison 9	-2147483648 to +2147483647	0	-	At once	" H19.24" on page 553

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.26	0x191A	Attribute value of position comparison 9	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.26" on page 553*
H19.27	0x191B	Target value of position comparison 10	-2147483648 to +2147483647	0	-	At once	*" H19.27" on page 554*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.29	0x191D	Attribute value of position comparison 10	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.29" on page 554
H19.30	0x191E	Target value of position comparison 11	-2147483648 to +2147483647	0	-	At once	" H19.30" on page 555

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.32	0x1920	Attribute value of position comparison 11	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.32" on page 555*
H19.33	0x1921	Target value of position comparison 12	-2147483648 to +2147483647	0	-	At once	*" H19.33" on page 556*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.35	0x1923	Attribute value of position comparison 12	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.35" on page 556*
H19.36	0x1924	Target value of position comparison 13	-2147483648 to +2147483647	0	-	At once	*" H19.36" on page 557*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.38	0x1926	Attribute value of position comparison 13	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.38" on page 557*
H19.39	0x1927	Target value of position comparison 14	-2147483648 to +2147483647	0	-	At once	*" H19.39" on page 558*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.41	0x1929	Attribute value of position comparison 14	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.41" on page 558
H19.42	0x192A	Target value of position comparison 15	-2147483648 to +2147483647	0	-	At once	" H19.42" on page 559

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.44	0x192C	Attribute value of position comparison 15	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.44" on page 559
H19.45	0x192D	Target value of position comparison 16	-2147483648 to +2147483647	0	-	At once	" H19.45" on page 560

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.47	0x192F	Attribute value of position comparison 16	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.47" on page 560
H19.48	0x1930	Target value of position comparison 17	-2147483648 to +2147483647	0	-	At once	" H19.48" on page 561

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.50	0x1932	Attribute value of position comparison 17	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.50" on page 561
H19.51	0x1933	Target value of position comparison 18	-2147483648 to +2147483647	0	-	At once	" H19.51" on page 562

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.53	0x1935	Attribute value of position comparison 18	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.53" on page 562*
H19.54	0x1936	Target value of position comparison 19	-2147483648 to +2147483647	0	-	At once	*" H19.54" on page 563*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.56	0x1938	Attribute value of position comparison 19	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.56" on page 563*
H19.57	0x1939	Target value of position comparison 20	-2147483648 to +2147483647	0	-	At once	*" H19.57" on page 564*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.59	0x193B	Attribute value of position comparison 20	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.59" on page 564*
H19.60	0x193C	Target value of position comparison 21	-2147483648 to +2147483647	0	-	At once	*" H19.60" on page 565*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.62	0x193E	Attribute value of position comparison 21	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.62" on page 565*
H19.63	0x193F	Target value of position comparison 22	-2147483648 to +2147483647	0	-	At once	*" H19.63" on page 566*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.65	0x1941	Attribute value of position comparison 22	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.65" on page 566*
H19.66	0x1942	Target value of position comparison 23	-2147483648 to +2147483647	0	-	At once	*" H19.66" on page 567*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.68	0x1944	Attribute value of position comparison 23	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.68" on page 567*
H19.69	0x1945	Target value of position comparison 24	-2147483648 to +2147483647	0	-	At once	*" H19.69" on page 568*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.71	0x1947	Attribute value of position comparison 24	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.71" on page 568
H19.72	0x1948	Target value of position comparison 25	-2147483648 to +2147483647	0	-	At once	" H19.72" on page 569

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.74	0x194A	Attribute value of position comparison 25	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.74" on page 569*
H19.75	0x194B	Target value of position comparison 26	-2147483648 to +2147483647	0	-	At once	*" H19.75" on page 570*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.77	0x194D	Attribute value of position comparison 26	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.77" on page 570*
H19.78	0x194E	Target value of position comparison 27	-2147483648 to +2147483647	0	-	At once	*" H19.78" on page 571*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.80	0x1950	Attribute value of position comparison 27	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.80" on page 571*
H19.81	0x1951	Target value of position comparison 28	-2147483648 to +2147483647	0	-	At once	*" H19.81" on page 572*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.83	0x1953	Attribute value of position comparison 28	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.83" on page 572*
H19.84	0x1954	Target value of position comparison 29	-2147483648 to +2147483647	0	-	At once	*" H19.84" on page 573*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.86	0x1956	Attribute value of position comparison 29	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.86" on page 573
H19.87	0x1957	Target value of position comparison 30	-2147483648 to +2147483647	0	-	At once	" H19.87" on page 574

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.89	0x1959	Attribute value of position comparison 30	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.89" on page 574*
H19.90	0x195A	Target value of position comparison 31	-2147483648 to +2147483647	0	-	At once	*" H19.90" on page 575*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.92	0x195C	Attribute value of position comparison 31	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.92" on page 575*
H19.93	0x195D	Target value of position comparison 32	-2147483648 to +2147483647	0	-	At once	*" H19.93" on page 576*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.95	0x195F	Attribute value of position comparison 32	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.95" on page 576
H19.96	0x1960	Target value of position comparison 33	-2147483648 to +2147483647	0	-	At once	" H19.96" on page 577

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.98	0x1962	Attribute value of position comparison 33	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.98" on page 577*
H19.99	0x1963	Target value of position comparison 34	-2147483648 to +2147483647	0	-	At once	*" H19.99" on page 578*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.101	0x1965	Attribute value of position comparison 34	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.101" on page 578
H19.102	0x1966	Target value of position comparison 35	-2147483648 to +2147483647	0	-	At once	" H19.102" on page 579

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.104	0x1968	Attribute value of position comparison 35	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.104" on page 579
H19.105	0x1969	Target value of position comparison 36	-2147483648 to +2147483647	0	-	At once	" H19.105" on page 580

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.107	0x196B	Attribute value of position comparison 36	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.107" on page 580*
H19.108	0x196C	Target value of position comparison 37	-2147483648 to +2147483647	0	-	At once	*" H19.108" on page 581*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.110	0x196E	Attribute value of position comparison 37	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.110" on page 581
H19.111	0x196F	Target value of position comparison 38	-2147483648 to +2147483647	0	-	At once	" H19.111" on page 582

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.113	0x1971	Attribute value of position comparison 38	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	*" H19.113" on page 582*
H19.114	0x1972	Target value of position comparison 39	-2147483648 to +2147483647	0	-	At once	*" H19.114" on page 583*

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.116	0x1974	Attribute value of position comparison 39	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.116" on page 583
H19.117	0x1975	Target value of position comparison 40	-2147483648 to +2147483647	0	-	At once	" H19.117" on page 584

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H19.119	0x1977	Attribute value of position comparison 40	bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point bit 2: N/A bit 3: N/A bit 4: N/A bit 5: N/A bit 6: N/A bit 7: DO1 output bit 8: DO2 output bit 9: N/A bit 10: N/A bit 11: N/A bit 12: Frequency-division A output bit 13: Frequency-division B output bit 14: Frequency-division Z output bit 15: Frequency-division OCZ output	0	-	At once	" H19.119" on page 584

5.21 Parameter Group H1F

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H1F.90	0x1F5A	DI function state 1 read through communication	0 to 65535	0	-	Unchangeable	" H1F.90" on page 585
H1F.91	0x1F5B	DI function state 2 read through communication	0 to 65535	0	-	Unchangeable	" H1F.91" on page 585
H1F.92	0x1F5C	DI function state 3 read through communication	0 to 65535	0	-	Unchangeable	" H1F.92" on page 586
H1F.93	0x1F5D	DI function state 4 read through communication	0 to 65535	0	-	Unchangeable	" H1F.93" on page 586

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H1F.94	0x1F5E	DO function state 1 read through communication	0 to 65535	0	-	Unchangeable	" H1F.94" on page 586
H1F.95	0x1F5F	DO function state 2 read through communication	0 to 65535	0	-	Unchangeable	" H1F.95" on page 587

5.22 Parameter Group H30

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H30.00	0x3000	Servo status read through communication	0 to 65535	0	-	Unchangeable	" H30.00" on page 587
H30.01	0x3001	DO function state 1 read through communication	0 to 65535	0	-	Unchangeable	" H30.01" on page 587
H30.02	0x3002	DO function state 2 read through communication	0 to 65535	0	-	Unchangeable	" H30.02" on page 588

5.23 Parameter Group H31

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
H31.00	0x3100	VDI virtual level set through communication	0 to 65535	0	-	At once	" H31.00" on page 588
H31.04	0x3104	DO status set through communication	0 to 65535	0	-	At once	" H31.04" on page 589
H31.05	0x3105	AO set through communication	-10000 mV to +10000 mV	0	mV	At once	" H31.05" on page 589
H31.09	0x3109	Speed reference set through communication	-9999.000 rpm to +9999.000 rpm	0	rpm	At once	" H31.09" on page 589
H31.11	0x310B	Torque reference set through communication	-100.000% to +100.000%	0	%	At once	" H31.11" on page 589

5.24 Parameter Group 1000h

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
1000.00h	0x5405	Device type	0 to 65535	0	-	Unchangeable	" 1000.00h" on page 590
1001.00h	0x5406	Error register	0 to 255	0	-	Unchangeable	" 1001.00h" on page 590
1018.01h	0x5401	Vendor ID	0 to 65535	0	-	Unchangeable	" 1018.01h" on page 590
1018.02h	0x5402	Product code	0 to 65535	0	-	Unchangeable	" 1018.02h" on page 590
1018.03h	0x5403	Revision number	0 to 65535	0	-	Unchangeable	" 1018.03h" on page 591
1600.00h	0x3900	Number of valid mapped objects in RPDO1	0 to 20	3	-	At once	" 1600.00h" on page 591
1600.01h	0x3901	1st mapped object in RPDO1	0 to 2147483647	1614807040	-	At once	" 1600.01h" on page 591
1600.02h	0x3902	2nd mapped object in RPDO1	0 to 2147483647	1618608128	-	At once	" 1600.02h" on page 591
1600.03h	0x3903	3rd mapped object in RPDO1	0 to 2147483647	1622671360	-	At once	" 1600.03h" on page 592
1600.04h	0x3904	4th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.04h" on page 592
1600.05h	0x3905	5th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.05h" on page 592
1600.06h	0x3906	6th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.06h" on page 592
1600.07h	0x3907	7th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.07h" on page 593
1600.08h	0x3908	8th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.08h" on page 593
1600.09h	0x3909	9th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.09h" on page 593
1600.0Ah	0x390A	10th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.0Ah" on page 593
1600.0Bh	0x390B	11th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.0Bh" on page 594
1600.0Ch	0x390C	12th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.0Ch" on page 594
1600.0Dh	0x390D	13th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.0Dh" on page 594
1600.0Eh	0x390E	14th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.0Eh" on page 594

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
1600.0Fh	0x390F	15th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.0Fh" on page 595
1600.10h	0x3910	16th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.10h" on page 595
1600.11h	0x3911	17th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.11h" on page 595
1600.12h	0x3912	18th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.12h" on page 595
1600.13h	0x3913	19th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.13h" on page 596
1600.14h	0x3914	20th mapped object in RPDO1	0 to 2147483647	0	-	At once	" 1600.14h" on page 596
1A00.00h	0x4000	Number of valid mapped objects in TPDO1	0 to 20	7	-	At once	" 1A00.00h" on page 596
1A00.01h	0x4001	1st mapped object in TPDO1	0 to 2147483647	1614872576	-	At once	" 1A00.01h" on page 596
1A00.02h	0x4002	2nd mapped object in TPDO1	0 to 2147483647	1617166336	-	At once	" 1A00.02h" on page 597
1A00.03h	0x4003	3rd mapped object in TPDO1	0 to 2147483647	1622736896	-	At once	" 1A00.03h" on page 597
1A00.04h	0x4004	4th mapped object in TPDO1	0 to 2147483647	1622802432	-	At once	" 1A00.04h" on page 597
1A00.05h	0x4005	5th mapped object in TPDO1	0 to 2147483647	1622933504	-	At once	" 1A00.05h" on page 597
1A00.06h	0x4006	6th mapped object in TPDO1	0 to 2147483647	1614741504	-	At once	" 1A00.06h" on page 598
1A00.07h	0x4007	7th mapped object in TPDO1	0 to 2147483647	1627193344	-	At once	" 1A00.07h" on page 598
1A00.08h	0x4008	8th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.08h" on page 598
1A00.09h	0x4009	9th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.09h" on page 598
1A00.0Ah	0x400A	10th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.0Ah" on page 599
1A00.0Bh	0x400B	11th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.0Bh" on page 599
1A00.0Ch	0x400C	12th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.0Ch" on page 599
1A00.0Dh	0x400D	13th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.0Dh" on page 599
1A00.0Eh	0x400E	14th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.0Eh" on page 600
1A00.0Fh	0x400F	15th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.0Fh" on page 600

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
1A00.10h	0x4010	16th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.10h" on page 600
1A00.11h	0x4011	17th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.11h" on page 600
1A00.12h	0x4012	18th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.12h" on page 601
1A00.13h	0x4013	19th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.13h" on page 601
1A00.14h	0x4014	20th mapped object in TPDO1	0 to 2147483647	0	-	At once	" 1A00.14h" on page 601
1C12.00h	0x5000	Number of assigned PDOs	0 to 2	1	-	At once	" 1C12.00h" on page 601
1C12.01h	0x5001	Index of assigned RPDO1	5632 to 5898	0	-	At once	" 1C12.01h" on page 602
1C12.02h	0x5002	Index of assigned RPDO2	5632 to 5898	0	-	At once	" 1C12.02h" on page 602
1C13.00h	0x5100	Number of assigned PDOs	0 to 2	0	-	At once	" 1C13.00h" on page 602
1C13.01h	0x5101	Index of assigned TPDO1	6656 to 6922	0	-	At once	" 1C13.01h" on page 602
1C13.02h	0x5102	Index of assigned TPDO2	6656 to 6922	0	-	At once	" 1C13.02h" on page 603
1C32.01h	0x5201	Synchronization type	0 to 65535	0	-	At once	" 1C32.01h" on page 603
1C32.02h	0x5202	Cycle time	0 to 4294967295	0	-	At once	" 1C32.02h" on page 603
1C32.04h	0x5204	Synchronization types supported	0 to 65535	0	-	At once	" 1C32.04h" on page 603
1C32.05h	0x5205	Minimum cycle time	0 to 4294967295	0	-	At once	" 1C32.05h" on page 604
1C33.01h	0x5301	Synchronization type	0 to 65535	0	-	At once	" 1C33.01h" on page 604
1C33.02h	0x5302	Cycle time	0 to 4294967295	0	-	At once	" 1C33.02h" on page 604
1C33.04h	0x5304	Synchronization types supported	0 to 65535	0	-	At once	" 1C33.04h" on page 604
1C33.05h	0x5305	Minimum cycle time	0 to 4294967295	0	-	At once	" 1C33.05h" on page 605

5.25 Parameter Group 6000h

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
603Fh	0x3500	Error Code	0 to 65535	0	-	Unchangeable	" 603Fh" on page 605
6040h	0x3502	Control word	0 to 65535	0	-	At once	" 6040h" on page 605
6041h	0x3504	Status word	0 to 65535	0	-	Unchangeable	" 6041h" on page 606
605Ah	0x3536	Quick stop option code	0: Coast to stop, keeping de-energized state 1: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping de-energized state 2: Ramp to stop as defined by 6085h, keeping de-energized state 3: Stop at emergency stop torque, keeping de-energized state 5: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping position lock state 6: Ramp to stop as defined by 6085h, keeping position lock state 7: Stop at emergency stop torque, keeping position lock state	2	-	At stop	" 605Ah" on page 606

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
605Ch	0x353A	Disable operation option code	-4: Ramp to stop as defined by 6085h, keeping dynamic braking state -3: Stop at zero speed, keeping dynamic braking state -2: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping dynamic braking state -1: Dynamic braking stop, keeping dynamic braking state 0: Coast to stop, keeping de-energized state 1: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping de-energized state 2: Dynamic braking stop, keeping de-energized state	0	-	At stop	" 605Ch" on page 606
605Dh	0x353C	Stop option code	1: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping position lock state 2: Ramp to stop as defined by 6085h, keeping position lock state 3: Stop at emergency stop torque, keeping position lock state	1	-	At stop	" 605Dh" on page 607

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
605Eh	0x353E	Fault reaction option code	-5: Stop at zero speed, keeping dynamic braking state -4: Stop at emergency stop torque, keeping dynamic braking state -3: Ramp to stop as defined by 6085h, keeping dynamic braking state -2: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping dynamic braking state -1: Dynamic braking stop, keeping dynamic braking state 0: Coast to stop, keeping de-energized state 1: Ramp to stop as defined by 6084h/ 609Ah (HM), keeping de-energized state 2: Ramp to stop as defined by 6085h, keeping de-energized state 3: Stop at emergency stop torque, keeping de-energized state 4: Dynamic braking stop, keeping de-energized state	2	-	At stop	" 605Eh" on page 607

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
6060h	0x3542	Modes of operation	1: Profile position (PP) mode 3: Profile velocity (PV) mode 4: Profile torque (PT) mode 6: Homing (HM) mode 8: Cyclic synchronous position (CSP) mode 9: Cyclic synchronous velocity (CSV) mode 10: Cyclic synchronous torque (CST) mode	0	-	At once	" 6060h" on page 608
6061h	0x3544	Modes of operation display	1: Profile position (PP) mode 3: Profile velocity (PV) mode 4: Profile torque (PT) mode 6: Homing (HM) mode 8: Cyclic synchronous position (CSP) mode 9: Cyclic synchronous velocity (CSV) mode 10: Cyclic synchronous torque (CST) mode	0	-	Unchangeable	" 6061h" on page 609
6062h	0x3546	Position demand value	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" 6062h" on page 609
6063h	0x3548	Position actual value	-2147483648 to +2147483647	0	Pulse	Unchangeable	" 6063h" on page 610
6064h	0x354A	Position actual value	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" 6064h" on page 610
6065h	0x354C	Following error window	0 to 4294967295	219895608	Reference unit	At once	" 6065h" on page 610
6066h	0x354E	Following error time out	0 ms to 65535 ms	0	ms	At once	" 6066h" on page 610
6067h	0x3550	Position window	0 to 4294967295	46976	Reference unit	At once	" 6067h" on page 611

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
6068h	0x3552	Position window time	0 ms to 65535 ms	0	ms	At once	" 6068h" on page 611
606Ch	0x355A	Velocity actual value	-2147483648 to +2147483647	0	Reference unit/s	Unchangeable	" 606Ch" on page 611
606Dh	0x355C	Velocity window	0 rpm to 65535 rpm	10	rpm	At once	" 606Dh" on page 612
606Eh	0x355E	Velocity window time	0 ms to 65535 ms	0	ms	At once	" 606Eh" on page 612
606Fh	0x3560	Velocity threshold	0 rpm to 65535 rpm	10	rpm	At once	" 606Fh" on page 612
6070h	0x3562	Velocity threshold time	0 ms to 65535 ms	0	ms	At once	" 6070h" on page 613
6071h	0x3564	Target torque	-4000 to +4000	0	0.001	At once	" 6071h" on page 613
6072h	0x3566	Max. torque value	0 to 4000	3500	0.001	At once	" 6072h" on page 613
6074h	0x356A	Torque demand value	-4000 to +4000	0	0.001	Unchangeable	" 6074h" on page 613
6077h	0x3570	Torque actual value	-4000 to +4000	0	0.001	Unchangeable	" 6077h" on page 614
607Ah	0x3576	Target position	-2147483648 to +2147483647	0	Reference unit	At once	" 607Ah" on page 614
607Ch	0x357A	Home offset	-2147483648 to +2147483647	0	Reference unit	At once	" 607Ch" on page 614
607D.01h	0x3700	Min. position limit	-2147483648 to +2147483647	-2147483648	Reference unit	At once	" 607D.01h" on page 615
607D.02h	0x3800	Max. position limit	-2147483648 to +2147483647	2147483647	Reference unit	At once	" 607D.02h" on page 615
607Eh	0x357E	Polarity	0 to 127	0	-	At once	" 607Eh" on page 616
607Fh	0x3580	Max. profile velocity	0 to 4294967295	4294967295	Reference unit/s	At once	" 607Fh" on page 616
6081h	0x3584	Profile velocity	0 to 4294967295	111848106	Reference unit/s	At once	" 6081h" on page 616
6083h	0x3588	Profile acceleration	0 to 4294967295	4294967295	Reference unit/s^2	At once	" 6083h" on page 617
6084h	0x358A	Profile deceleration	0 to 4294967295	4294967295	Reference unit/s^2	At once	" 6084h" on page 617
6085h	0x358C	Quick stop deceleration	0 to 4294967295	2147483648	Reference unit/s^2	At once	" 6085h" on page 617
6087h	0x3590	Torque slope	0 to 4294967295	4294967295	0.1%/s	At once	" 6087h" on page 618
6091.01h	0x3714	Motor revolutions	1 to 4294967295	1	-	At stop	" 6091.01h" on page 618

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
6091.02h	0x3814	Shaft revolutions	1 to 4294967295	1	-	At stop	" 6091.02h" on page 619
6098h	0x35B2	Homing method	-2 to +35	1	-	At once	" 6098h" on page 619
6099.01h	0x371C	Speed during search for switch	0 to 4294967295	111848106	Reference unit/s	At stop	" 6099.01h" on page 620
6099.02h	0x381C	Speed during search for zero	0 to 4294967295	11184810	Reference unit/s	At stop	" 6099.02h" on page 620
609Ah	0x35B6	Homing acceleration	0 to 4294967295	4294967295	Reference unit/s^2	At once	" 609Ah" on page 621
60B0h	0x35E2	Position offset	-2147483648 to +2147483647	0	Reference unit	At once	" 60B0h" on page 621
60B1h	0x35E4	Velocity offset	-2147483648 to +2147483647	0	Reference unit/s	At once	" 60B1h" on page 621
60B2h	0x35E6	Torque offset	-4000 to +4000	0	0.001	At once	" 60B2h" on page 621
60B8h	0x35F2	Touch probe function	0 to 65535	0	-	At once	" 60B8h" on page 622
60B9h	0x35F4	Touch probe status	0 to 65535	0	-	Unchangeable	" 60B9h" on page 623
60BAh	0x35F6	Touch probe 1 positive edge	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" 60BAh" on page 624
60BBh	0x35F8	Touch probe 1 negative edge	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" 60BBh" on page 624
60BCh	0x35FA	Touch probe 2 positive edge	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" 60BCh" on page 625
60BDh	0x35FC	Touch probe 2 negative edge	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" 60BDh" on page 625
60C5h	0x360C	Max. acceleration	0 to 4294967295	4294967295	Reference unit/s^2	At once	" 60C5h" on page 625
60C6h	0x360E	Max. deceleration	0 to 4294967295	4294967295	Reference unit/s^2	At once	" 60C6h" on page 625
60D5h	0x362C	Touch probe 1 positive edge counter	0 to 65535	0	-	Unchangeable	" 60D5h" on page 626
60D6h	0x362E	Touch probe 1 negative edge counter	0 to 65535	0	-	Unchangeable	" 60D6h" on page 626
60D7h	0x3630	Touch probe 2 positive edge counter	0 to 65535	0	-	Unchangeable	" 60D7h" on page 626
60D8h	0x3632	Touch probe 2 negative edge counter	0 to 65535	0	-	Unchangeable	" 60D8h" on page 626

Param. No.	Address	Name	Setpoint	Default	Unit	Change	Page
60E0h	0x3642	Positive torque limit value	0 to 4000	3500	0.001	At once	" 60E0h" on page 627
60E1h	0x3644	Negative torque limit value	0 to 4000	3500	0.001	At once	" 60E1h" on page 627
60E6h	0x364E	Actual position calculation method	0 to 1	0	-	At once	" 60E6h" on page 627
60F4h	0x366A	Following error actual value	-2147483648 to +2147483647	0	Reference unit	Unchangeable	" 60F4h" on page 628
60FCh	0x367A	Position demand value	-2147483648 to +2147483647	0	pulse	Unchangeable	" 60FCh" on page 628
60FDh	0x367C	Digital inputs	0 to 4294967295	0	-	Unchangeable	" 60FDh" on page 628
60FFh	0x3680	Target velocity	-2147483648 to +2147483647	0	Reference unit/s	At once	" 60FFh" on page 629
60FE.01h	0x3781	Physical outputs	0 to 4294967295	0	-	At once	" 60FE.01h" on page 629
60FE.02h	0x3881	Bitmask	0 to 4294967295	0	-	At once	" 60FE.02h" on page 630

6 Parameter Descriptions

6.1 H00: Servo Motor Parameters

H00.00 Motor code

Address:	0x0000		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	14102	Change:	At stop

Value Range:

0 to 65535

Description

14000: Inovance motor with 20-bit incremental encoder

14101: Inovance motor with 23-bit absolute encoder

14102: Inovance motor with 26-bit absolute encoder

H00.02 Customized No.

Address:	0x0002		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 4294967295.00

Description

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

H00.04 Encoder version

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

Value Range:

0.0 to 6553.5

Description

Saved in the encoder to differentiate the encoder software version.

H00.05 Serial-type motor code

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

Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

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

H00.06 Customized FPGA No.

Address:	0x0006		
Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 655.35

Description

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

H00.07 STO version

Address:	0x0007		
Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 655.35

Description

Displays the software version of the STO function.

H00.08 Serial encoder type

Address:	0x0008		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 to 65535

Description

14100: Multi-turn absolute encoder

Others: Single-turn absolute encoder

6.2 H01: Servo Drive Parameters

H01.00 MCU software version

Address:	0x0100		
Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0 to 6553.5

Description

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

H01.01 FPGA software version

Address:	0x0101		
Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0 to 6553.5

Description

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

H01.02 Servo drive series No.

Address:	0x0102		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

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

H01.06 Board software version

Address:	0x0106		
Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Setpoint

0.0 to 6553.5

Description

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

H01.10 Drive series No.

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

Value Range:

2: S1R6
3: S2R8
5: S5R5
6: S7R6
7: S012
8: S018
9: S022
10: S027
10001: T3R5
10002: T5R4
10003: T8R4
10004: T012
10005: T017
10006: T021
10007: T026

Description

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

H01.11 DC-AC voltage class

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

Value Range:

0 V to 65535 V

Description

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

H01.12 Rated power of the drive

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

Value Range:

0.00 kW to 10737418.24 kW

Description

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

H01.14 Max. output power of the drive

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

Value Range:

0.00 kW to 10737418.24 kW

Description

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

H01.16 Rated output current of the drive

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

Value Range:

0.00 A to 10737418.24 A

Description

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

H01.18 Max. output current of the drive

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

Value Range:

0.00 A to 10737418.24 A

Description

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

H01.40 DC bus overvoltage protection threshold

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

Value Range:

0 V to 2000 V

Description

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

H01.75 Current loop amplification factor

Address: 0x014B

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

Value Range:

0.00 to 655.35

Description

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

H01.89 Junction temperature parameter version

Address: 0x0159

Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 655.35

Description

Displays the junction temperature parameter version.

6.3 H02: Basic Control Parameters

H02.00 Control mode

Address: 0x0200

Min.:	0	Unit:	-
Max.:	9	Data Type:	UInt16
Default:	9	Change:	At stop

Value Range:

0: Speed control mode

1: Position control mode

2: Torque control mode

9: EtherCAT mode

Description

0: Speed control mode

1: Position control mode

2: Torque control mode

9: EtherCAT mode

H02.01 Absolute system selection

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

Value Range:

0: Incremental mode

1: Absolute position linear mode

2: Absolute position rotation mode

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

4: Absolute position single-turn mode

Description

Used to set the absolute position function.

H02.02 Direction of rotation

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

Value Range:

0: Counterclockwise (CCW) as forward direction

1: Clockwise (CW) as forward direction

Description

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

H02.03 Output pulse phase

Address:	0x0203		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Phase A leads phase B

1: Phase A lags behind phase B

Description

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

H02.05 Stop mode at S-ON OFF

Address:	0x0205		
Min.:	-4	Unit:	-

Max.: 2 Data Type: Int16
Default: 0 Change: At once

Value Range:

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

Description

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

H02.06 Stop mode at No. 2 fault

Address: 0x0206
Min.: -5 Unit: -
Max.: 4 Data Type: Int16
Default: 2 Change: At once

Value Range:

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

Description

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

H02.07 Stop mode at overtravel

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

Value Range:

0: Coast to stop, keeping de-energized state
1: Stop at zero speed, keeping position lock state
2: Stop at zero speed, keeping de-energized state
3: Ramp to stop as defined by 6085h, keeping de-energized state
4: Ramp to stop as defined by 6085h, keeping position lock state
5: Dynamic braking stop, keeping de-energized state
6: Dynamic braking stop, keeping dynamic braking state
7: Not responding to overtravel

Description

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

H02.08 Stop mode at No. 1 fault

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

Value Range:

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

Description

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

H02.09 Delay from brake output ON to command received

Address:	0x0209		
Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	250	Change:	At once

Value Range:

0 ms to 500 ms

Description

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

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

Address:	0x020A		
Min.:	50	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	150	Change:	At once

Value Range:

50 ms to 1000 ms

Description

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

H02.11 Speed threshold at brake output OFF in rotation state

Address:	0x020B		
Min.:	20	Unit:	rpm
Max.:	3000	Data Type:	UInt16
Default:	30	Change:	At once

Value Range:

20 rpm to 3000 rpm

Description

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

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

Address:	0x020C		
Min.:	1	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	500	Change:	At once

Value Range:

1 ms to 65535 ms

Description

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

H02.15 Warning display on the keypad

Address:	0x020F		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Output warning information immediately

1: Not output warning information

Description

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

H02.16 Brake enable switch

Address: 0x0210

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

Value Range:

0: OFF

1: ON

Description

Used to turn on or off the brake function.

H02.17 Stop mode upon main circuit power failure

Address: 0x0211

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

Value Range:

0: Keep present action

1: Stop upon fault as defined by H02.06

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

3: Stop quickly as defined by H02.18

Description

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

H02.18 Quick stop mode

Address: 0x0212

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

Value Range:

0: Coast to stop, keeping de-energized state

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

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

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

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

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

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

Description

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

H02.21 Permissible minimum resistance of regenerative resistor

Address: 0x0215

Min.: 1 | Unit: Ω
Max.: 1000 | Data Type: UInt16
Default: 40 | Change: Unchangeable

Value Range:

1 Ω to 1000 Ω

Description

-

H02.22 Power of built-in regenerative resistor

Address: 0x0216

Min.: 0 | Unit: W
Max.: 65535 | Data Type: UInt16
Default: 50 | Change: Unchangeable

Value Range:

0 W to 65535 W

Description

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

H02.23 Resistance of built-in regenerative resistor

Address: 0x0217

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

Value Range:

0 Ω to 65535 Ω

Description

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

H02.24 Resistor heat dissipation coefficient

Address: 0x0218

Min.: 10 | Unit: %
Max.: 100 | Data Type: UInt16
Default: 30 | Change: At once

Value Range:

10% to 100%

Description

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

Set this parameter properly according to actual heat dissipation conditions of the resistor.
Recommendations:
Generally, the value of H02.24 cannot exceed 30% for natural cooling or 50% for forced air cooling.

H02.25 Regenerative resistor type

Address:	0x0219		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	3	Change:	At once

Value Range:

0: Built-in
1: External, natural cooling
2: External, forced air cooling
3: No resistor needed

Description

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

H02.26 Power of external regenerative resistor

Address:	0x021A		
Min.:	1	Unit:	W
Max.:	65535	Data Type:	UInt16
Default:	40	Change:	At once

Value Range:

1 W to 65535 W

Description

Defines the power of external regenerative resistor.

H02.27 Resistance of external regenerative resistor

Address:	0x021B		
Min.:	15	Unit:	Ω
Max.:	1000	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

15 Ω to 1000 Ω

Description

Defines the resistance of the external regenerative resistor.

H02.30 User password

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

Value Range:

0 to 65535

Description

-

H02.31 System parameter initialization

Address:	0x021F		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation

1: Restore default settings

2: Clear fault records

Description

Used to restore default values or clear fault records.

H02.32 Selection of parameters in group H0b

Address:	0x0220		
Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0 to 99

Description

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

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

The setpoint 1 indicates the value of H0b.01 (Speed reference) is displayed on the keypad.

H02.35 Keypad data refresh frequency

Address:	0x0223		
Min.:	0	Unit:	Hz
Max.:	20	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 Hz to 20 Hz

Description

-

H02.41 Manufacturer password

Address: 0x0229

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

Value Range:

0 to 65535

Description

-

6.4 H03: Terminal Input Parameters

H03.02 DI1 function

Address: 0x0302

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	14	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jog
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
38: Touch probe 1
39: Touch probe 2
40: Multi-speed enable

Description

Defines the function of DI1.

H03.03 DI1 logic

Address: 0x0303

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

Value Range:

0: Normally open

1: Closed

Description

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

H03.04 DI2 function

Address: 0x0304

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	15	Change:	At once

Value Range:

0: No assignment

1: Servo ON

2: Alarm reset signal

5: Multi-reference direction

6: Multi-reference switchover CMD1

7: Multi-reference switchover CMD2

8: Multi-reference switchover CMD3

9: Multi-reference switchover CMD4

14: Positive limit switch

15: Negative limit switch

18: Forward jog

19: Reverse jog

24: Electronic gear ratio selection

28: Multi-position reference enable

31: Home switch

34: Emergency stop

38: Touch probe 1

39: Touch probe 2

40: Multi-speed enable

Description

-

H03.05 **DI2 logic**

Address: 0x0305

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

Value Range:

0: Normally open

1: Closed

Description

-

H03.06 **DI3 function**

Address: 0x0306

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	31	Change:	At once

Value Range:

0: No assignment

1: Servo ON

2: Alarm reset signal

5: Multi-reference direction

6: Multi-reference switchover CMD1

7: Multi-reference switchover CMD2

8: Multi-reference switchover CMD3

9: Multi-reference switchover CMD4

14: Positive limit switch

15: Negative limit switch

18: Forward jog

19: Reverse jog

24: Electronic gear ratio selection

28: Multi-position reference enable

31: Home switch

34: Emergency stop

38: Touch probe 1

39: Touch probe 2

40: Multi-speed enable

Description

Defines the function of DI3.

H03.07 **DI3 logic**

Address: 0x0307

Min.:	0	Unit:	-

Max.: 1 | Data Type: UInt16
Default: 0 | Change: At once

Value Range:

0: Normally open

1: Closed

Description

-

H03.08 DI4 function

Address: 0x0308
Min.: 0 | Unit: -
Max.: 40 | Data Type: UInt16
Default: 34 | Change: At once

Value Range:

0: No assignment

1: Servo ON

2: Alarm reset signal

5: Multi-reference direction

6: Multi-reference switchover CMD1

7: Multi-reference switchover CMD2

8: Multi-reference switchover CMD3

9: Multi-reference switchover CMD4

14: Positive limit switch

15: Negative limit switch

18: Forward jog

19: Reverse jog

24: Electronic gear ratio selection

28: Multi-position reference enable

31: Home switch

34: Emergency stop

38: Touch probe 1

39: Touch probe 2

40: Multi-speed enable

Description

-

H03.09 DI4 logic

Address: 0x0309
Min.: 0 | Unit: -
Max.: 1 | Data Type: UInt16
Default: 0 | Change: At once

Value Range:

0: Normally open
1: Closed

Description

-

H03.10 DI5 function

Address:	0x030A		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	38	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jog
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
38: Touch probe 1
39: Touch probe 2
40: Multi-speed enable

Description

-

H03.11 DI5 logic

Address:	0x030B		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Normally open
1: Closed

Description

-

H03.50 Voltage-type AI1 offset

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

Value Range:

-5000 mV to +5000 mV

Description

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

H03.51 Voltage-type AI1 input filter time constant

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

Value Range:

0.00 ms to 655.35 ms

Description

Defines the filter time constant of AI1 input current signal.

H03.53 Voltage-type AI1 dead zone

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

Value Range:

0.0 mV to 1000.0 mV

Description

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

H03.54 Voltage-type AI1 zero drift

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

Value Range:

-500.0 mV to +500.0 mV

Description

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

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

H03.56 Current-type AI2 input filter time constant

Address:	0x0338		
Min.:	0	Unit:	ms
Max.:	655.35	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.00 ms to 655.35 ms

Description

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

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

H03.60 DI1 filter time

Address:	0x033C		
Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	0.5	Change:	At once

Value Range:

0.00 ms to 500.00 ms

Description

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

H03.61 DI2 filter time

Address:	0x033D		
Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	0.5	Change:	At once

Value Range:

0.00 ms to 500.00 ms

Description

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

H03.62 **DI3 filter time**

Address: 0x033E

Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	0.5	Change:	At once

Value Range:

0.00 ms to 500.00 ms

Description

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

H03.63 **DI4 filter time**

Address: 0x033F

Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	0.5	Change:	At once

Value Range:

0.00 ms to 500.00 ms

Description

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

H03.64 **DI5 filter time**

Address: 0x0340

Min.:	0	Unit:	ms
Max.:	500	Data Type:	UInt16
Default:	0.5	Change:	At once

Value Range:

0.00 ms to 500.00 ms

Description

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

H03.78 **Speed value corresponding to analog 20 mA**

Address: 0x034E

Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	3000	Change:	At stop

Value Range:

0 rpm to 9999 rpm

Description

Defines the motor speed corresponding to AI2 sampling current of 20 mA.
Speed limit value in the torque control mode = Sampling current/20 x H03.78

H03.79 **Torque value corresponding to analog 20 mA**

Address: 0x034F

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

Value Range:

1.00 to 8.00

Description

Defines the motor torque value corresponding to AI2 sampling current of 20 mA.
Torque reference value = Sampling voltage/20 x H03.79

H03.80 **Speed corresponding to analog 10 V**

Address: 0x0350

Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	3000	Change:	At stop

Value Range:

0 rpm to 9999 rpm

Description

Defines the corresponding motor speed when sampling the voltage is 10 V.
Speed reference value = Sampling voltage/10 x H03.80

H03.81 **Torque corresponding to analog 10 V**

Address: 0x0351

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

Value Range:

1.00 to 8.00

Description

Defines the motor torque corresponding to a sampling voltage of 10 V.
Torque reference value = Sampling voltage/10 x H03.81

6.5 H04: Terminal Output Parameters

H04.00 **DO1 function**

Address: 0x0400

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotation signal
10: Warning
11: Fault
25: Comparison output DO
31: Communication-forced DO
32: EDM output

Description

Defines the function of DO1.

H04.01 DO1 logic

Address: 0x0401

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

Value Range:

0: Normally open
1: Closed

Description

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

H04.02 DO2 function

Address: 0x0402

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	11	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotation signal
10: Warning
11: Fault
25: Comparison output DO
31: Communication-forced DO
32: EDM output

Description

-

H04.03 **DO2 logic**

Address: 0x0403

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

Value Range:

0: Normally open

1: Closed

Description

-

H04.22 **DO source**

Address: 0x0416

Min.:	0	Unit:	-
Max.:	3 p	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: DO1 source

0: DO1 function output

1: bit 0 of H31.04 set through communication

bit 1: DO2 source

0: DO2 function output

1: bit 1 of H31.04 set through communication

Description

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

H04.23 **EtherCAT-forced DO logic in non-operational status**

Address: 0x0417

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

Value Range:

bit 0: DO1

0: Status unchanged

1: No output

bit 1: DO2

0: Status unchanged

1: No output

Description

Defines the DO status when EtherCAT communication is disconnected.

H04.50 AO1 signal selection

Address: 0x0432

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

Value Range:

0: Motor speed (1 V/1000 rpm)
1: Speed reference (1 V/1000 rpm)
2: Torque reference (1 V/100 x rated torque)
3: Position deviation (0.5 mV/1 reference unit)
4: Position deviation (0.5 mV/1 encoder unit)
5: Position reference speed (1 V/1000 rpm)
6: Positioning completed
8: AI1 voltage
10: Defined by H31.05

Description

Defines the physical value source of AO1.

H04.51 AO1 offset voltage

Address: 0x0433

Min.:	-10000	Unit:	mV
Max.:	10000	Data Type:	Int16
Default:	5000	Change:	At once

Value Range:

-10000 mV to +10000 mV

Description

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

H04.52 AO1 multiplier

Address: 0x0434

Min.:	-99.99	Unit:	-
Max.:	99.99	Data Type:	Int16
Default:	1	Change:	At once

Value Range:

-99.99 to +99.99

Description

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

6.6 H05: Position Control Parameters

H05.00 Main position reference source

Address:	0x0500		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 to 2 (Multi-position reference)

Description

Defines the position reference source in the position control mode.

H05.02 Pulses per revolution

Address:	0x0502		
Min.:	0	Unit:	PPR
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At stop

Value Range:

0 to 4294967295

Description

Defines the number of pulses required per revolution of the motor in the local mode and communication mode.

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

Address:	0x0504		
Min.:	0	Unit:	ms
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0.0 ms to 6553.5 ms

Description

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

H05.06 Moving average filter time constant 1

Address:	0x0506		
Min.:	0	Unit:	ms
Max.:	128	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0.0 ms to 128.0 ms

Description

Defines the moving average filter time constant of position references.

H05.07 Electronic gear ratio 1 (numerator)

Address: 0x0507

Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	1	Change:	At once

Value Range:

1 to 1073741824

Description

Defines the numerator of electronic gear ratio 1.

H05.09 Electronic gear ratio 1 (denominator)

Address: 0x0509

Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	1	Change:	At once

Value Range:

1 to 1073741824

Description

Defines the denominator of electronic gear ratio 1.

H05.11 Electronic gear ratio 2 (numerator)

Address: 0x050B

Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	1	Change:	At once

Value Range:

1 to 1073741824

Description

Defines the numerator of electronic gear ratio 2.

H05.13 Electronic gear ratio 2 (denominator)

Address: 0x050D

Min.:	1	Unit:	-
Max.:	1073741824	Data Type:	UInt32
Default:	1	Change:	At once

Value Range:

1 to 1073741824

Description

Defines the denominator of electronic gear ratio 2.

H05.16 Clear action

Address: 0x0510

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

Value Range:

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

1: Position deviation cleared upon S-OFF or fault

2: Position deviation cleared in the non-operational state or when FunIN.35 is activated

Description

Defines the condition for clearing the position deviation.

H05.17 Number of encoder frequency-division pulses

Address: 0x0511

Min.:	0	Unit:	PPR
Max.:	4194303	Data Type:	UInt32
Default:	2500	Change:	At stop

Value Range:

0 PPR to 4194303 PPR

Description

Defines the number of pulses outputted by PAO or PBO per revolution.

Pulse output resolution per revolution = (H05.17) x 4

H05.19 Speed feedforward control

Address: 0x0513

Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: No speed feedforward

1: Internal speed feedforward

2: 60B1h

3: Zero phase

Description

Defines the source of the speed loop feedforward signal.

H05.30 Homing selection

Address:	0x051E		
Min.:	0	Unit:	-
Max.:	6	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

6: Current position as the home

Description

Defines the homing mode and the trigger signal source.

H05.35 Homing time limit

Address:	0x0523		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10000	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Defines the maximum homing time.

H05.36 Mechanical home offset

Address:	0x0524		
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

Defines the absolute position value of the motor after homing.

H05.38 Frequency-division output source

Address:	0x0526		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Encoder frequency-division output

1: Pulse reference synchronous output

2: Frequency-division output inhibited

3: Second encoder frequency-division output

Description

Defines the output source of the pulse output terminal.

H05.39 Electronic gear ratio switchover condition

Address: 0x0527

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

Value Range:

0: Switched if position reference kept 0 for 2.5 ms

1: Switched in real time

Description

Defines the condition for switching the electronic gear ratio.

H05.40 Mechanical home offset and action upon overtravel

Address: 0x0528

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

Value Range:

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

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

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

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

Description

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

H05.41 Z pulse output polarity

Address: 0x0529

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

Value Range:

bit 0: Frequency-division Z output polarity
0: Positive (high level upon active Z pulse)
1: Negative (low level upon active Z pulse)
bit 1: OCZ output polarity
0: Positive (high level upon active Z pulse)
1: Negative (low level upon active Z pulse)
bit 2: Inner loop probe Z signal source
0: Motor Z signal
1: Frequency-division output Z signal

Description

Defines the output level when the Z pulse of pulse output terminal is active.

H05.44 Numerator of frequency-division output reduction ratio

Address:	0x052C		
Min.:	1	Unit:	-
Max.:	16383	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 16383

Description

Defines the numerator of frequency-division output reduction ratio.

H05.45 Denominator of frequency-division output reduction ratio

Address:	0x052D		
Min.:	1	Unit:	-
Max.:	8191	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 8191

Description

Defines the denominator of frequency-division output reduction ratio.

H05.46 DI selection of multi-turn frequency-division Z starting point

Address:	0x052E		
Min.:	0	Unit:	-
Max.:	5	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No selection
1: DI1
2: DI2
3: DI3
4: DI4
5: DI5

Description

In the absolute position linear mode, the position offset is the difference between absolute position of current encoder and the mechanical position.

H05.47 Frequency-division Z pulse width

Address:	0x052F		
Min.:	0	Unit:	us
Max.:	400	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 us to 400 us

Description

Defines the minimum output width (us) of frequency-division output PZ.

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

Address:	0x0532		
Min.:	1	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 65535

Description

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

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

Address:	0x0533		
Min.:	1	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 65535

Description

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

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

Address:			
Min.:	0	Unit:	Encoder unit
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At stop

Value Range:

0 to 4294967295

Description

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

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

Address:	0x0536		
Min.:	0	Unit:	Encoder unit
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At stop

Value Range:

0 to 4294967295

Description

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

H05.56 Speed threshold in homing upon hit-and-stop

Address:	0x0538		
Min.:	0	Unit:	rpm
Max.:	1000	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 rpm to 1000 rpm

Description

Defines the speed threshold for judging whether the load reaches the mechanical position during homing upon hit-and-stop.

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

Address:	0x053A		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0% to 400.0%

Description

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

H05.60 Hold time of positioning completed

Address:	0x053C		
Min.:	0	Unit:	ms
Max.:	30000	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 30000 ms

Description

Defines the hold time of an active positioning completed signal.

H05.66 Homing time unit

Address:	0x0542		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:

0: 1 ms

1: 10 ms

2: 100 ms

Description

Defines the homing time unit. The actual timeout time is H05.35 x H05.66 (ms).

H05.67 Offset between zero point and single-turn absolute position

Address:	0x0543		
Min.:	-2147483648	Unit:	Encoder unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At stop

Value Range:

-2147483648 to +2147483647

Description

-

H05.69 Auxiliary homing function

Address:	0x0545		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16

Default:	0	Change:	At stop

Value Range:

0: Inhibited

1: Record offset position

2: Clear offset position

Description

Used to set the operation mode of H05.67.

H05.70 Moving average filter time constant 2

Address:	0x0546		
Min.:	0	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0.0 ms to 1000.0 ms

Description

Defines the moving average filter time constant for the second group of position references.

H05.71 Motor Z signal width

Address:	0x0547		
Min.:	1	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	4	Change:	At once

Value Range:

1 ms to 100 ms

Description

Defines the pulse width output upon active motor Z signal.

H05.72 Positioning completed/Position deviation threshold in fully closed-loop mode

Address:	0x0548		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Threshold scaled to outer loop unit

1: Same threshold used for inner and outer loops

Description

0: 6067h/6065h (scaled to outer loop unit)

1: Same threshold used for inner and outer loops

6.7 H06: Speed Control Parameters

H06.00 Source of main speed reference A

Address:	0x0600		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Digital setting (H06.03)

1: AI1

Description

Defines the source of main speed reference A.

H06.01 Source of auxiliary speed reference B

Address:	0x0601		
Min.:	0	Unit:	-
Max.:	5	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Digital setting (H06.03)

1: AI1

5: Multi-speed reference

Description

Defines the source of auxiliary speed reference B.

H06.02 Speed reference source

Address:	0x0602		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Source of main speed reference A

1: Source of auxiliary speed reference B

2: A+B

3: Switched between A and B

4: Communication

Description

Defines the source of speed references.

H06.03 Speed reference set through keypad

Address: 0x0603

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	200	Change:	At once

Value Range:

-9999 rpm to +9999 rpm

Description

Defines the speed reference value through the keypad.

H06.04 DI jog speed reference

Address: 0x0604

Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	150	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

Defines the DI jog speed reference.

H06.05 Acceleration ramp time of speed reference

Address: 0x0605

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

Value Range:

0 ms to 65535 ms

Description

Defines the speed reference acceleration ramp time. The acceleration/ deceleration time constant of multi-speed references are defined only by parameters in group H12.

H06.05 defines the time for the speed reference to change from 0 rpm to 1000 rpm.

H06.06 defines the time for the speed reference to change from 1000 rpm to 0 rpm.

The formulas for calculating the actual acceleration/deceleration time are as follows:

Actual acceleration time t1 = Speed reference/1000 x Speed reference acceleration ramp time

Actual deceleration time t2 = Speed reference/1000 x Speed reference deceleration ramp time

H06.06 Deceleration ramp time of speed reference

Address:	0x0606		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Defines speed reference deceleration ramp time.

H06.07 Maximum speed limit

Address:	0x0607		
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	6000	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

Defines the maximum speed limit.

H06.08 Forward speed threshold

Address:	0x0608		
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	6000	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

Defines the forward speed threshold.

H06.09 Reverse speed threshold

Address:	0x0609		
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	6000	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

Defines the reverse speed threshold.

H06.10 Deceleration unit in emergency stop

Address: 0x060A

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

Value Range:

0: Multiplied by 1

1: Multiplied by 10

2: Multiplied by 100

Description

Defines the deceleration unit in emergency stop.

H06.11 Torque feedforward control

Address: 0x060B

Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: No torque feedforward

1: Internal torque feedforward

2: 60B2h used as external torque feedforward

Description

Defines the speed reference source for torque feedforward control.

H06.12 Acceleration ramp time of jog speed

Address: 0x060C

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Defines the acceleration ramp time of jog speed.

H06.13 Speed feedforward smoothing filter

Address: 0x060D

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

Value Range:

0 us to 65535 us

Description

Defines the speed feedforward smoothing filter time.

H06.15 Zero clamp speed threshold

Address:	0x060F		
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

Defines zero clamp speed threshold.

H06.16 Threshold of TGON (motor rotation) signal

Address:	0x0610		
Min.:	0	Unit:	rpm
Max.:	1000	Data Type:	UInt16
Default:	20	Change:	At once

Value Range:

0 rpm to 1000 rpm

Description

Defines the threshold of TGON (motor rotation) signal.

H06.17 Threshold of V-Cmp (speed matching) signal

Address:	0x0611		
Min.:	0	Unit:	rpm
Max.:	100	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 rpm to 100 rpm

Description

Defines the threshold of V-Cmp (speed matching) signal.

H06.18 Threshold of speed reach signal

Address:	0x0612		
Min.:	20	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	1000	Change:	At once

Value Range:

20 rpm to 9999 rpm

Description

Defines the threshold of speed reach signal.

H06.19 Threshold of zero speed output signal

Address:	0x0613		
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

Defines the threshold of zero speed output signal.

H06.40 Deceleration time of ramp 1

Address:	0x0628		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 ms to 65535 ms

Description

Defines the speed reference source of deceleration time of ramp 1.

H06.41 Deceleration time of ramp 2

Address:	0x0629		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 ms to 65535 ms

Description

Defines the speed reference source of deceleration time of ramp 2.

H06.50 Speed S-curve enable switch

Address:	0x0628		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Disable

1: Enable

Description

0: Accelerate/Decelerate at fixed acceleration rate

1: Accelerate/Decelerate based on the S-curve

H06.51 Increasing acceleration of speed S-curve acceleration segment

Address: 0x0633

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	50	Change:	At stop

Value Range:

0.0% to 100.0%

Description

-

H06.52 Decreasing acceleration of speed S-curve acceleration segment

Address: 0x0634

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	50	Change:	At stop

Value Range:

0.0% to 100.0%

Description

-

H06.53 Increasing acceleration of speed S-curve deceleration segment

Address: 0x0635

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	50	Change:	At stop

Value Range:

0.0% to 100.0%

Description

-

H06.54 Decreasing acceleration of speed S-curve deceleration segment

Address: 0x0636

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	50	Change:	At stop

Value Range:

0.0% to 100.0%

Description

-

6.8 H07: Torque Control Parameters

H07.00 Source of main torque reference A

Address:	0x0700		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Keypad (H07.03)

1: AI1

Description

Defines the source of main torque reference A.

H07.01 Source of auxiliary torque reference B

Address:	0x0701		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Keypad (H07.03)

1: AI1

Description

Defines the source of auxiliary torque references.

H07.02 Torque reference source

Address:	0x0702		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Source of main torque reference A

1: Source of auxiliary torque reference B

2: Source of A+B

3: Switched between A and B

4: Communication

Description

Defines the source of torque references.

H07.03 Torque reference set through keypad

Address:	0x0703		
Min.:	-400	Unit:	%
Max.:	400	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-400.0% to +400.0%

Description

Defines the torque reference value set through the keypad.

H07.05 Torque reference filter time constant 1

Address:	0x0705		
Min.:	0	Unit:	ms
Max.:	30	Data Type:	UInt16
Default:	0.5	Change:	At once

Value Range:

0.00 ms to 30.00 ms

Description

Defines the torque reference filter time constant 1.

H07.06 Torque reference filter time constant 2

Address:	0x0706		
Min.:	0	Unit:	ms
Max.:	30	Data Type:	UInt16
Default:	0.27	Change:	At once

Value Range:

0.00 ms to 30.00 ms

Description

Defines torque reference filter time constant 2.

H07.07 Torque limit source

Address:	0x0707		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Positive/Negative internal torque limit

1: Internal or external limit as defined by DI

2: T-LMT

3: T_LMT or external limit as defined by DI (FunIN.16 or FunIN.17)

4: T_LMT or internal limit (FunIN.16 or FunIN.17) as defined by DI

Description

Defines the source of torque limit.

H07.08 T-LMT selection

Address: 0x0708

Min.:	1	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

1: AI1

2: AI2

Description

Defines the torque limit source.

H07.09 Positive internal torque limit

Address: 0x0709

Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	350	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the positive internal torque limit.

H07.10 Negative internal torque limit

Address: 0x070A

Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	350	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the negative internal torque limit.

H07.11 Positive external torque limit

Address: 0x070B

Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	350	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines positive external torque limit.

H07.12 Negative external torque limit

Address:	0x070C		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	350	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines negative external torque limit.

H07.15 Emergency stop torque

Address:	0x070F		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the emergency stop torque.

H07.17 Speed limit source

Address:	0x0711		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Internal speed limit

1: V-LMT

2: H07.19 or H07.20 as defined by DI

Description

Defines the source of speed limit.

H07.18 V-LMT selection

Address:	0x0712		
Min.:	1	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

1: AI1

2: AI2

Description

Defines the speed limit source.

H07.19 Positive speed limit/Speed limit 1 in torque control

Address: 0x0713

Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	3000	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

Defines the positive speed limit in torque control.

H07.20 Negative speed limit/Speed limit 2 in torque control

Address: 0x0714

Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	3000	Change:	At once

Value Range:

0 rpm to 9999 rpm

Description

Defines the negative speed limit in torque control.

H07.21 Base value for torque reach

Address: 0x0715

Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the base value for torque reach.

H07.22 Threshold of valid torque reach

Address: 0x0716

Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	20	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the threshold of valid torque reach.

H07.23 Threshold of invalid torque reach

Address:	0x0717		
Min.:	0	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0.0% to 400.0%

Description

Defines the threshold of invalid torque reach.

H07.24 Field weakening depth

Address:	0x0718		
Min.:	60	Unit:	%
Max.:	115	Data Type:	UInt16
Default:	115	Change:	At once

Value Range:

60% to 115%

Description

Defines the field weakening depth.

H07.25 Max. permissible demagnetizing current

Address:	0x0719		
Min.:	0	Unit:	%
Max.:	300	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0% to 300%

Description

Defines the max. permissible demagnetizing current.

H07.26 Field weakening selection

Address:	0x071A		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Disable

1: Enable

Description

Defines whether to enable field weakening.

H07.27 Field weakening gain

Address:	0x071B		
Min.:	0.001	Unit:	Hz
Max.:	1	Data Type:	UInt16
Default:	0.03	Change:	At once

Value Range:

0.001 Hz to 1.000 Hz

Description

Defines the field weakening gain.

H07.28 Speed of field weakening point

Address:	0x071C		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Defines the speed of field weakening point.

H07.35 Motor torque output correction

Address:	0x0723		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Switched off

1: Enabled

Description

Defines whether to enable motor torque output correction.

H07.36 Time constant of low-pass filter 2

Address:	0x0724		
Min.:	0	Unit:	ms
Max.:	10	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:
0.00 ms to 10.00 ms
Description
Defines the time constant of low-pass filter 2.

H07.37 Torque reference filter selection

Address: 0x0725

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

Value Range:
0: First-order filter
1: Biquad filter
Description
Used to select the torque reference filter.

H07.38 Biquad filter attenuation ratio

Address: 0x0726

Min.:	0	Unit:	-
Max.:	50	Data Type:	UInt16
Default:	16	Change:	At stop

Value Range:
0 to 50
Description
Defines the biquad filter attenuation ratio.

H07.40 Speed limit window in the torque control mode

Address: 0x0728

Min.:	0	Unit:	ms
Max.:	300	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:
0.0 ms to 300.0 ms
Description
Defines the speed limit window in the torque control mode.

6.9 H08: Gain Parameters

H08.00 Speed loop gain

Address: 0x0800

Min.: 0.1 | Unit: Hz
Max.: 2000 | Data Type: UInt16
Default: 40 | Change: At once

Value Range:

0.1 Hz to 2000.0 Hz

Description

Defines the responsiveness of the speed loop. The higher the setpoint, the faster the speed loop response is. Note that an excessively high setpoint may cause vibration.

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

H08.01 Speed loop integral time constant

Address: 0x0801

Min.: 0.15 | Unit: ms
Max.: 512 | Data Type: UInt16
Default: 19.89 | Change: At once

Value Range:

0.15 ms to 512.00 ms

Description

Defines the integral time constant of the speed loop.

The lower the setpoint, the better the integral action, and the quicker will the deviation value be close to 0.

Note:

There is no integral action when H08.01 is set to 512.00.

H08.02 Position loop gain

Address: 0x0802

Min.: 0.1 | Unit: Hz
Max.: 2000 | Data Type: UInt16
Default: 64 | Change: At once

Value Range:

0.1 Hz to 2000.0 Hz

Description

Defines the proportional gain of the position loop.

Defines the responsiveness of the position loop. A high setpoint shortens the positioning time. Note that an excessively high setpoint may cause vibration.

The 1st gain set include H08.00 (Speed loop gain), H08.01 (Speed loop integral time constant), H08.02, and H07.05 (Filter time constant of torque reference).

H08.03 2nd speed loop gain

Address: 0x0803

Min.:	0.1	Unit:	Hz
Max.:	2000	Data Type:	UInt16
Default:	75	Change:	At once

Value Range:

0.1 Hz to 2000.0 Hz

Description

-

H08.04 2nd speed loop integral time constant

Address: 0x0804

Min.:	0.15	Unit:	ms
Max.:	512	Data Type:	UInt16
Default:	10.61	Change:	At once

Value Range:

0.15 ms to 512.00 ms

Description

-

H08.05 2nd position loop gain

Address: 0x0805

Min.:	0.1	Unit:	Hz
Max.:	2000	Data Type:	UInt16
Default:	120	Change:	At once

Value Range:

0.1 Hz to 2000.0 Hz

Description

Defines the second gain set of the position loop and speed loop. The 2nd gain set include H08.03 (Speed loop gain), H08.04 (Speed loop integral time constant), H08.05, and H07.06 (2nd torque reference filter time constant).

H08.08 2nd gain mode setting

Address: 0x0808

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

Value Range:

0: Fixed to the 1st gain set, switched between P and PI as defined by bit26 of external 60FEh

1: Switched between the 1st and 2nd gain sets as defined by H08.09

Description

Defines the mode for switching to the 2nd gain set.

H08.09 Gain switchover condition

Address:	0x0809		
Min.:	0	Unit:	-
Max.:	10	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Fixed to the 1st gain set (PS)
1: Switched as defined by bit26 of 60FEh
2: Torque reference too large (PS)
3: Speed reference too large (PS)
4: Speed reference change rate too large (PS)
5: Speed reference low/high speed threshold (PS)
6: Position deviation too large (P)
7: Position reference available (P)
8: Positioning unfinished (P)
9: Actual speed (P)
10: Position reference + Actual speed (P)

Description

Used to set the condition for gain switchover.

H08.10 Gain switchover delay

Address:	0x080A		
Min.:	0	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0 ms to 1000.0 ms

Description

Defines the delay when the drive switches from the 2nd gain set to the 1st gain set.

H08.11 Gain switchover level

Address:	0x080B		
Min.:	0	Unit:	-
Max.:	20000	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0 to 20000

Description

Defines the gain switchover level.

Gain switchover is affected by both the level and the dead time, as defined by H08.09. The unit of gain switchover level varies with the switchover condition.

H08.12 Gain switchover dead time

Address: 0x080C

Min.:	0	Unit:	-
Max.:	20000	Data Type:	UInt16
Default:	30	Change:	At once

Value Range:

0 to 20000

Description

Defines the dead time for gain switchover.

Gain switchover is affected by both the level and the dead time, as defined by H08.09. The unit of gain switchover dead time varies with the switchover condition.

Note:

Set H08.11 to a value higher than or equal to H08.12. Otherwise, the drive forcibly sets H08.11 to the same value as H08.12.

H08.13 Position gain switchover time

Address: 0x080D

Min.:	0	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	3	Change:	At once

Value Range:

0.0 ms to 1000.0 ms

Description

In position control, if H08.05 (2nd position loop gain) is much higher than H08.02 (Position loop gain), set the time for switching from H08.02 to H08.05.

This parameter can be used to reduce the impact caused by an increase in the position loop gain.

H08.15 Load moment of inertia ratio

Address: 0x080F

Min.:	0	Unit:	-
Max.:	120	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 120.00

Description

Defines the mechanical load inertia ratio relative to the motor moment of inertia. When H08.15 is set to 0, it indicates the motor carries no load; if it is set to 1.00, it indicates the mechanical load inertia is the same as the motor moment of inertia.

H08.17 **Zero phase delay**

Address: 0x0811

Min.:	0	Unit:	ms
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0 ms to 4.0 ms

Description

-

H08.18 **Speed feedforward filter time constant**

Address: 0x0812

Min.:	0	Unit:	ms
Max.:	64	Data Type:	UInt16
Default:	0.5	Change:	At once

Value Range:

0.00 ms to 64.00 ms

Description

Defines the filter time constant of speed feedforward.

H08.19 **Speed feedforward gain**

Address: 0x0813

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0% to 100.0%

Description

In position control and full closed-loop control, speed feedforward is the product of speed feedforwad signal multiplied by H08.19 and is part of the speed reference.

Increasing the setpoint improves the responsiveness to position references and reduces the position deviation during operation at a constant speed.

Set H08.18 to a fixed value first, and then increase the value of H08.19 gradually from 0 to a certain value at which speed feedforward achieves the desired effect.

Adjust H08.18 and H08.19 repeatedly until a balanced performance is achieved.

Note:

For how to enable the speed feedforward function and select the speed feedforward signal, see H05.19 (Speed feedforward control).

H08.20 **Torque feedforward filter time constant**

Address: 0x0814

Min.:	0	Unit:	ms
Max.:	64	Data Type:	UInt16
Default:	0.5	Change:	At once

Value Range:

0.00 ms to 64.00 ms

Description

Defines the filter time constant of torque feedforward.

H08.21 Torque feedforward gain

Address: 0x0815

Min.:	0	Unit:	%
Max.:	300	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0% to 300.0%

Description

In control modes other than torque control, torque feedforward is the product of torque feedforwad signal multiplied by H08.21 and is part of the torque reference.

Increasing the setpoint improves the responsiveness to variable speed references.

Increasing the setpoint improves the responsiveness to position references and reduces the position deviation during operation at a constant speed.

During parameter adjustment, set H08.20 (Torque feedforward filter time constant) to the default value first, and then increase H08.21 gradually to enhance the effect of torque feedforward. When speed overshoot occurs, keep H08.21 unchanged and increase the value of H08.20. Adjust H08.20 and H08.21 repeatedly until a balanced performance is achieved.

Note:

For how to enable the torque feedforward function and select the torque feedforward signal, see H06.11 (Torque feedforward control).

H08.22 Speed feedback filtering option

Address: 0x0816

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

Value Range:

0: Inhibited

1: 2 times

2: 4 times

3: 8 times

4: 16 times

Description

Defines the moving average filtering times for speed feedback.
The higher the setpoint, the weaker the speed feedback fluctuation, but the longer the feedback delay will be.

H08.23 Cutoff frequency of speed feedback low-pass filter

Address:	0x0817		
Min.:	100	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	At once

Value Range:

100 Hz to 8000 Hz

Description

Defines the cutoff frequency for first-order low-pass filtering on the speed feedback.
Note:
The lower the setpoint, the weaker the speed feedback fluctuation, and the longer the feedback delay will be.
Setting this parameter to 4000 Hz negates the filtering effect.

H08.24 PDFF control coefficient

Address:	0x0818		
Min.:	0	Unit:	%
Max.:	200	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0% to 200.0%

Description

Defines the control mode of the speed loop.
When the setpoint is 100.0, PI control (default control mode of the speed loop) is applied to the speed loop, which features fast dynamic response.
When the setpoint is 0.0, speed loop integral action is enhanced, which filters out low-frequency interference but also slows down the dynamic response.
H08.24 can be used to keep a good responsiveness of the speed loop, with anti-interference capacity in low-frequency bands improved and speed feedback overshoot unaffected.

H08.27 Speed observer cutoff frequency

Address:	0x081B		
Min.:	50	Unit:	Hz
Max.:	600	Data Type:	UInt16
Default:	170	Change:	At once

Value Range:

50 Hz to 600 Hz

Description

Defines the cutoff frequency of the speed observer. Note that an excessively high setpoint may incur resonance. Decrease the setpoint properly in case of loud speed feedback noise.

H08.28 Speed observer inertia correction coefficient

Address: 0x081C

Min.:	1	Unit:	%
Max.:	1600	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

1% to 1600%

Description

Defines the speed observer inertia correction coefficient. If H08.15 is set based on the actual inertia, there is no need to adjust this parameter.

H08.29 Speed observer filter time

Address: 0x081D

Min.:	0	Unit:	ms
Max.:	10	Data Type:	UInt16
Default:	0.8	Change:	At once

Value Range:

0.00 ms to 10.00 ms

Description

Defines the speed observer filter time. It is recommended to set this parameter to a value equal to the sum of H07.05 plus 0.2 ms.

H08.31 Disturbance cutoff frequency

Address: 0x081F

Min.:	10	Unit:	Hz
Max.:	4000	Data Type:	UInt16
Default:	600	Change:	At once

Value Range:

10 Hz to 4000 Hz

Description

Defines the cutoff frequency of the disturbance observer. Increasing the setpoint improves the responsiveness of the disturbance observer and the compensation effect. Note that an excessively high setpoint may incur resonance.

H08.32 Disturbance compensation gain

Address:	0x0820		
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0% to 100%

Description

Defines the compensation gain of the disturbance observer. The setpoint 100% indicates full compensation.

H08.33 Disturbance observer inertia correction coefficient

Address:	0x0821		
Min.:	1	Unit:	%
Max.:	1600	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

1% to 1600%

Description

Defines the disturbance observer inertia correction coefficient. If H08.15 is set based on the actual inertia, there is no need to adjust this parameter.

H08.37 Phase modulation for medium-frequency jitter suppression 2

Address:	0x0825		
Min.:	-90	Unit:	°
Max.:	90	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-90° to +90°

Description

Defines the compensation phase of medium-frequency jitter suppression 2.

H08.38 Frequency of medium-frequency jitter suppression 2

Address:	0x0826		
Min.:	0	Unit:	Hz
Max.:	1000	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 Hz to 1000 Hz

Description

Set this parameter based on actual resonance frequency. The valid suppression frequency range for medium-frequency jitter suppression 2 is 100 Hz to 1000 Hz.

H08.39 Compensation gain of medium-frequency jitter suppression 2

Address:	0x0827		
Min.:	0	Unit:	%
Max.:	300	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0% to 300%

Description

Defines the compensation gain for medium-frequency jitter suppression 2. Set this parameter to 40%...55% in general cases. Setting this parameter to 0 negates the effect of medium-frequency jitter suppression 2.

H08.40 Speed observer selection

Address:	0x0828		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable

Description

Used to set the enable bit for speed observer.

H08.42 Model control selection

Address:	0x082A		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable

2: Dual-inertia model

Description

Used to enable model tracking control.

H08.43 Model gain

Address:	0x082B		
Min.:	0.1	Unit:	-
Max.:	2000	Data Type:	UInt16
Default:	40	Change:	At once

Value Range:

0.1 to 2000.0

Description

Defines the single inertia model gain. The higher the gain, the faster the position response. Note that an excessively high setpoint may incur excessive overshoot.

H08.46 Feedforward value

Address:	0x082E		
Min.:	0	Unit:	-
Max.:	102.4	Data Type:	UInt16
Default:	95	Change:	At once

Value Range:

0.0 to 102.4

Description

Defines the speed feedforward gain for single inertia model control. If overshoot occurs, reduce the setpoint properly.

H08.53 Medium- and low-frequency jitter suppression frequency 3

Address:	0x0835		
Min.:	0	Unit:	Hz
Max.:	300	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0 Hz to 300.0 Hz

Description

Set this parameter based on actual resonance frequency. The resonance suppression range is 100 Hz to 300 Hz.

H08.54 Medium- and low-frequency jitter suppression compensation 3

Address:	0x0836		
Min.:	0	Unit:	%
Max.:	200	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0% to 200%

Description

Defines the compensation gain for medium- and low-frequency suppression compensation 3. The setpoint 200% indicates full compensation.

H08.56 Medium- and low-frequency jitter suppression phase modulation 3

Address:	0x0838		
Min.:	0	Unit:	%
Max.:	600	Data Type:	UInt16

Default: 100 Change: At once

Value Range:

0% to 600%

Description

Adjust this parameter based on the actual compensation effect.

H08.59 Medium- and low-frequency jitter suppression frequency 4

Address: 0x083B

Min.: 0 Unit: Hz

Max.: 300 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0.0 Hz to 300.0 Hz

Description

Set this parameter based on actual resonance frequency. The resonance suppression range is 100 Hz to 300 Hz.

H08.60 Medium- and low-frequency jitter suppression compensation 4

Address: 0x083C

Min.: 0 Unit: %

Max.: 200 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0% to 200%

Description

Defines the compensation gain for medium- and low-frequency suppression compensation 4. The setpoint 200% indicates full compensation.

H08.61 Medium- and low-frequency jitter suppression phase modulation 4

Address: 0x083D

Min.: 0 Unit: %

Max.: 600 Data Type: UInt16

Default: 100 Change: At once

Value Range:

0% to 600%

Description

Adjust this parameter based on the actual compensation effect.

H08.62 Position loop integral time constant

Address: 0x083E

Min.: 0.15 Unit: -

Max.: 512 | Data Type: UInt16
Default: 512 | Change: At once

Value Range:

0.15 to 512.00

Description

Defines the position loop integral time constant.

H08.63 2nd position loop integral time constant

Address: 0x083F
Min.: 0.15 | Unit: -
Max.: 512 | Data Type: UInt16
Default: 512 | Change: At once

Value Range:

0.15 to 512.00

Description

Defines the 2nd position loop integral time constant.

H08.64 Speed observer feedback source

Address: 0x0840
Min.: 0 | Unit: -
Max.: 1 | Data Type: UInt16
Default: 0 | Change: At once

Value Range:

0: Disable

1: Enable

Description

-

H08.65 Zero deviation control selection

Address: 0x0841
Min.: 0 | Unit: -
Max.: 1 | Data Type: UInt16
Default: 0 | Change: At once

Value Range:

0: Disable

1: Enable

Description

Used to enable/disable zero deviation control.

H08.66 Moving average filter for zero deviation control position

Address: 0x0842

Min.:	0	Unit:	ms
Max.:	320	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0 ms to 320.0 ms

Description

Defines the moving average filter time of zero deviation control position. It is recommended to increase the setpoint in case of loud noise caused by low command resolution.

H08.68 Speed feedforward of zero deviation control

Address:	0x0844		
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0% to 100.0%

Description

Defines the speed feedforward of zero deviation control.

H08.69 Torque feedforward of zero deviation control

Address:	0x0845		
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0% to 100.0%

Description

Defines the torque feedforward of zero deviation control.

H08.81 Anti-resonance frequency of dual-inertia model

Address:	0x0851		
Min.:	1	Unit:	Hz
Max.:	400	Data Type:	UInt16
Default:	20	Change:	At once

Value Range:

1.0 Hz to 400.0 Hz

Description

Used to set the anti-resonance frequency of dual-inertia model. You can set this parameter based on the frequency sweeping analysis of mechanical characteristics.

H08.82 Resonance frequency of dual-inertia model

Address:	0x0852		
Min.:	0	Unit:	Hz
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0 Hz to 6553.5 Hz

Description

Used to set the resonance frequency of dual-inertia model. You can set this parameter based on the frequency sweeping analysis of mechanical characteristics. If accurate resonance frequency is unknown, set H08.84 based on the inertia ratio of the resonance model.

H08.83 Dual-inertia model gain

Address:	0x0853		
Min.:	0.1	Unit:	s^{-1}
Max.:	300	Data Type:	UInt16
Default:	60	Change:	At once

Value Range:

$0.1s^{-1}$ to $300.0s^{-1}$

Description

Defines the dual-inertia model gain.

H08.84 Inertia ratio of dual-inertia model

Address:	0x0854		
Min.:	0	Unit:	-
Max.:	120	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 120.00

Description

If the resonance frequency of dual-inertia model is set accurately, there is no need to set this parameter.

H08.88 Speed feedforward value of dual-inertia model

Address:	0x0858		
Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0 to 6553.5

Description

Set this parameter to 100% in general cases.

H08.89 **Torque feedforward value of dual-inertia model**

Address:	0x0859		
Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0.0 to 6553.5

Description

Set this parameter to 100% in general cases.

6.10 H09: Gain Auto-tuning Parameters

H09.00 **Gain auto-tuning mode**

Address:	0x0900		
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	4	Change:	At once

Value Range:

0: Disabled, manual gain tuning required

1: Enabled, gain parameters generated automatically based on the stiffness level

2: Positioning mode, gain parameters generated automatically based on the stiffness level

3: Interpolation mode+Inertia auto-tuning

4: Normal mode+Inertia auto-tuning

6: Quick positioning mode+Inertia auto-tuning

Description

Defines different gain tuning modes. Related gain parameters can be set manually or automatically according to the stiffness level.

H09.01 **Stiffness level**

Address:	0x0901		
Min.:	0	Unit:	-
Max.:	41	Data Type:	UInt16
Default:	15	Change:	At once

Value Range:

0 to 41

Description

Defines the stiffness level of the servo system. The higher the stiffness level, the stronger the gains and the quicker the response will be. But an excessively high stiffness level will cause vibration.
The setpoint 0 indicates the lowest stiffness and 41 indicates the highest stiffness.

H09.02 Adaptive notch mode

Address: 0x0902

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	3	Change:	At once

Value Range:

0: Adaptive notch no longer updated;

1: One adaptive notch activated (3rd notch)

2: Two adaptive notches activated (3rd and 4th notches)

3: Resonance point tested only (displayed in H09.24)

4: Adaptive notch cleared, values of 3rd and 4th notches restored to default

Description

Defines the operation mode of the adaptive notch.

H09.03 Online inertia auto-tuning mode

Address: 0x0903

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

Value Range:

0: Disabled

1: Enabled, changing slowly

2: Enabled, changing normally

3: Enabled, changing quickly

Description

Defines whether to enable online inertia auto-tuning and the inertia ratio update speed during online inertia auto-tuning.

H09.05 Offline inertia auto-tuning mode

Address: 0x0905

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

Value Range:

0: Bi-directional

1: Unidirectional

Description

Defines the offline inertia auto-tuning mode. The offline inertia auto-tuning function can be enabled through H0d.02.

H09.06 Maximum speed of inertia auto-tuning

Address:	0x0906		
Min.:	100	Unit:	rpm
Max.:	1000	Data Type:	UInt16
Default:	500	Change:	At stop

Value Range:

100 rpm to 1000 rpm

Description

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

During inertia auto-tuning, the higher the speed, the more accurate the auto-tuned values. Use the default setpoint in general cases.

H09.07 Time constant for accelerating to the max. speed during inertia auto-tuning

Address:	0x0907		
Min.:	20	Unit:	ms
Max.:	800	Data Type:	UInt16
Default:	125	Change:	At stop

Value Range:

20 ms to 800 ms

Description

Defines the time for the motor to accelerate from 0 rpm to the maximum speed of inertia auto-tuning (H09.06) during offline inertia auto-tuning.

H09.08 Interval time after an individual inertia auto-tuning

Address:	0x0908		
Min.:	50	Unit:	ms
Max.:	10000	Data Type:	UInt16
Default:	800	Change:	At stop

Value Range:

50 ms to 10000 ms

Description

Defines the interval time between two consecutive speed references when H09.05 (Offline inertia auto-tuning mode) is set to 1 (Positive/Negative triangular wave mode).

H09.09 Number of motor revolutions per inertia auto-tuning

Address:	0x0909		
Min.:	0	Unit:	-
Max.:	100	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 100.00

Description

Defines the motor revolutions per inertia auto-tuning when H09.05 (Offline inertia auto-tuning mode) is set to 1 (Positive/Negative triangular wave mode).

Note:

When using the offline inertia auto-tuning function, check that the travel distance of the motor at the stop position is larger than the value of H09.09. If not, decrease the value of H09.06 (Maximum speed for inertia auto-tuning) or H09.07 (Time constant of accelerating to max. speed during inertia auto-tuning) properly until the motor travel distance fulfills the requirement.

H09.11 Vibration threshold

Address:	0x090B		
Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0% to 100.0%

Description

Defines the warning threshold for current feedback vibration.

H09.12 Frequency of the 1st notch

Address:	0x090C		
Min.:	50	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	At once

Value Range:

50 Hz to 8000 Hz

Description

Defines the center frequency of the notch, which is the mechanical resonance frequency.

In the torque control mode, setting the notch frequency to 4000 Hz deactivates the notch function.

H09.13 Width level of the 1st notch

Address: 0x090D

Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 to 20

Description

Defines the width level of the notch. Use the default setpoint in general cases. Width level is the ratio of the notch width to the notch center frequency.

H09.14 Depth level of the 1st notch

Address: 0x090E

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

Value Range:

0 to 99

Description

Defines the depth level of the notch.

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

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

H09.15 Frequency of the 2nd notch

Address: 0x090F

Min.:	50	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	At once

Value Range:

50 Hz to 8000 Hz

Description

-

H09.16 Width level of the 2nd notch

Address: 0x0910

Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 to 20

Description

-

H09.17 Depth level of the 2nd notch

Address:	0x0911		
Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 99

Description

-

H09.18 Frequency of the 3rd notch

Address:	0x0912		
Min.:	50	Unit:	Hz
Max.:	8000	Data Type:	UInt16
Default:	8000	Change:	At once

Value Range:

50 Hz to 8000 Hz

Description

-

H09.19 Width level of the 3rd notch

Address:	0x0913		
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0 to 20

Description

-

H09.20 Depth level of the 3rd notch

Address:	0x0914		
Min.:	0	Unit:	-
Max.:	99	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 99

Description

-

H09.21 Frequency of the 4th notch

Address: 0x0915
Min.: 50 | Unit: Hz
Max.: 8000 | Data Type: UInt16
Default: 8000 | Change: At once

Value Range:

50 Hz to 8000 Hz

Description

-

H09.22 Width level of the 4th notch

Address: 0x0916
Min.: 0 | Unit: -
Max.: 20 | Data Type: UInt16
Default: 2 | Change: At once

Value Range:

0 to 20

Description

-

H09.23 Depth level of the 4th notch

Address: 0x0917
Min.: 0 | Unit: -
Max.: 99 | Data Type: UInt16
Default: 0 | Change: At once

Value Range:

0 to 99

Description

-

H09.24 Auto-tuned resonance frequency

Address: 0x0918
Min.: 0 | Unit: Hz
Max.: 5000 | Data Type: UInt16
Default: 0 | Change: At once

Value Range:

0 Hz to 5000 Hz

Description

When H09.02 (Adaptive notch mode) is set to 3, the current mechanical resonance frequency is displayed.

H09.26 ITune response

Address: 0x091A

Min.:	50	Unit:	%
Max.:	500	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

50.0% to 500.0%

Description

Defines the ITune response capability. Increasing the setpoint improves the responsiveness but may incur resonance.

H09.27 ITune mode

Address: 0x091B

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

Value Range:

0: Disable

1: ITune mode 1

2: ITune mode 2

Description

Setting H09.27 to 1 enables the ITune function.

Note: ITune mode 2 is manufacturer commissioning mode, which should be used with caution.

H09.28 Minimum inertia ratio of ITune

Address: 0x091C

Min.:	0	Unit:	%
Max.:	80	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0% to 80.0%

Description

Inertia ratio range for ITune adjustment: The minimum and maximum inertia ratios of ITune are 0.0 and 30.0 by default.

If the actual maximum load inertia ratio is higher than 30.0, increase the value of H09.29 to prevent positioning jitter.

If the actual load inertia change range is small, set H09.28 and H09.29 based on actual conditions to achieve optimal control effect.

H09.29 Maximum inertia ratio of ITune

Address: 0x091D

Min.: 1 | Unit: %
Max.: 120 | Data Type: UInt16
Default: 30 | Change: At once

Value Range:

1.0% to 120.0%

Description

-

H09.32 Gravity compensation value

Address: 0x0920

Min.: 0 | Unit: %
Max.: 100 | Data Type: UInt16
Default: 0 | Change: At once

Value Range:

0.0% to 100.0%

Description

Defines the gravity compensation value. Setting this parameter properly in vertical axis applications can reduce the falling amplitude upon start.

H09.33 Positive friction compensation value

Address: 0x0921

Min.: 0 | Unit: %
Max.: 100 | Data Type: UInt16
Default: 0 | Change: At once

Value Range:

0.0% to 100.0%

Description

Defines the positive friction compensation value.

H09.34 Negative friction compensation value

Address: 0x0922

Min.: -100 | Unit: %
Max.: 0 | Data Type: Int16
Default: 0 | Change: At once

Value Range:

-100.0% to 0.0%

Description

Defines the negative direction friction compensation value.

H09.35 Friction compensation speed

Address: 0x0923

Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.0 to 20.0

Description

Defines the friction compensation speed.

H09.36 Friction compensation speed

Address: 0x0924

Min.:	0	Unit:	-
Max.:	19	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0x00: Slow mode+Speed reference
0x01: Slow mode+Model speed
0x02: Slow mode+Speed feedback
0x03: Slow mode+Observe speed
0x10: Quick mode+Speed reference
0x11: Quick mode+Model speed
0x12: Quick mode+Speed feedback
0x13: Quick mode+Observe speed

Description

-

H09.37 Vibration monitoring time

Address: 0x0925

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	600	Change:	At once

Value Range:

0 to 65535

Description

The resonance detection suppression function is turned off automatically after the time defined by this parameter elapses. To suppress the resonance suppression function, set this parameter to 65536.

H09.38 Frequency of low-frequency resonance suppression 1 at the mechanical end

Address: 0x0926

Min.:	1	Unit:	Hz
Max.:	100	Data Type:	UInt16

Default: 100 Change: At once

Value Range:

1.0 Hz to 100.0 Hz

Description

Set this parameter based on the actual jitter frequency.

H09.39 Low-frequency resonance suppression 1 at the mechanical end

Address: 0x0927

Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:

0 to 3

Description

Defines different low-frequency resonance suppression types at the mechanical load. Type 1 features the shortest delay.

H09.44 Frequency of low-frequency resonance suppression 2 at mechanical load end

Address: 0x092C

Min.:	0	Unit:	-
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0 to 100.0

Description

Set this parameter based on the actual jitter frequency.

H09.45 Responsiveness of low-frequency resonance suppression 2 at mechanical load end

Address: 0x092D

Min.:	0.01	Unit:	-
Max.:	5	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.01 to 5.00

Description

Use the default setpoint in general cases. To increase the setpoint, reduce the delay time.

H09.47 Width of low-frequency resonance suppression 2 at mechanical load end

Address: 0x092F

Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 2.00

Description

Use the default setpoint in general cases. To increase the setpoint, increase the delay time.

H09.49 Frequency of low-frequency resonance suppression 3 at mechanical load end

Address: 0x0931

Min.:	0	Unit:	-
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0 to 100.0

Description

-

H09.50 Responsiveness of low-frequency resonance suppression 3 at mechanical load end

Address: 0x0932

Min.:	0.01	Unit:	-
Max.:	5	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.01 to 5.00

Description

-

H09.52 Width of low-frequency resonance suppression 3 at mechanical load end

Address: 0x0934

Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0.00 to 2.00

Description

-

H09.54 Vibration threshold

Address: 0x0936

Min.:	0	Unit:	%
Max.:	300	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0.0% to 300.0%

Description

If the torque fluctuation exceeds the setpoint, an error will be reported. Setting this parameter to 0 hides the resonance detection function.

H09.56 Max. overshoot allowed by ETune

Address: 0x0938

Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	2936	Change:	At once

Value Range:

0 to 65535

Description

Defines the maximum overshoot value allowed during ETune adjustment.

H09.57 STune resonance suppression switchover frequency

Address: 0x0939

Min.:	0	Unit:	Hz
Max.:	4000	Data Type:	UInt16
Default:	900	Change:	At once

Value Range:

0 Hz to 4000 Hz

Description

If the resonance frequency is lower than the setpoint, use medium-frequency resonance suppression 2 to suppress resonance. Otherwise, use the notch to suppress resonance.

H09.58 STune resonance suppression reset selection

Address: 0x093A

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

Value Range:

0: Disable

1: Enable

Description

Used to enable STune resonance suppression reset to clear parameters related to resonance suppression, medium-frequency resonance suppression 2, and notches 3 and 4.

6.11 H0A: Fault and Protection Parameters

H0A.00 Power input phase loss protection

Address:	0x0A00		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Enable

1: Disable

Description

Servo drives supporting single-phase/three-phase 220 V and three-phase 380 V power supplies are available. When voltage fluctuation or phase loss occurs on the power supply, the drive triggers power input phase loss protection based on H0A.00.

H0A.01 Absolute position limit

Address:	0x0A01		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disabled

1: Enabled

2: Enabled after homing

Description

Used to set the activation condition for enabling the software position limit.

H0A.04 Motor overload protection gain

Address:	0x0A04		
Min.:	50	Unit:	-
Max.:	300	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

50 to 300

Description

Determines the motor overload duration before E620.0 (Motor overload) is reported.
You can change the setpoint to advance or delay the time when overload protection is triggered based on the motor temperature. The setpoint 50% indicates the time is cut by half; 150% indicates the time is prolonged by 50%. Set this parameter based on the actual temperature of the motor.

H0A.08 Overspeed threshold

Address: 0x0A08

Min.:	0	Unit:	rpm
Max.:	20000	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 rpm to 20000 rpm

Description

Defines the overspeed threshold of the motor.

H0A.10 Threshold of excessive local position deviation

Address: 0x0A0A

Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	219895608	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the threshold for excessive position deviation in the position control mode.
When the position deviation exceeds this threshold, the drive reports EB00.0 (Position deviation too large).

H0A.12 Runaway protection

Address: 0x0A0C

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

Value Range:

0: Disable

1: Enable

Description

Defines whether to enable runaway protection.

0: Hide E234.0 when the motor drives a vertial axis or is driven by the load

1: Enable runway protection

H0A.18 IGBT overtemperature threshold

Address:	0x0A12		
Min.:	120	Unit:	°C
Max.:	175	Data Type:	UInt16
Default:	140	Change:	At once

Value Range:

120°C to 175°C

Description

Defines the threshold for reporting E640.0 (IGBT overtemperature) and E640.1 (Flywheel diode overtemperature).

H0A.19 Filter time constant of touch probe 1

Address:	0x0A13		
Min.:	0	Unit:	us
Max.:	6.3	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.00 us to 6.30 us

Description

Defines the filter time of touch probe 1. An active input must last for the time defined by H0A.19.

H0A.20 Filter time constant of touch probe 2

Address:	0x0A14		
Min.:	0	Unit:	us
Max.:	6.3	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.00 us to 6.30 us

Description

Defines the filter time of touch probe 2. An active input must last for the time defined by H0A.20.

H0A.23 TZ signal filter time

Address:	0x0A17		
Min.:	0	Unit:	25 ns
Max.:	31	Data Type:	UInt16
Default:	15	Change:	At stop

Value Range:

0 ns to 31 ns

Description

-

H0A.25 Speed display DO low-pass filter time

Address:	0x0A19		
Min.:	0	Unit:	-
Max.:	5000	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 5000 ms

Description

Defines the low-pass filter time constant of the speed information for speed feedback and position references.

H0A.26 Motor overload detection

Address:	0x0A1A		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Show motor overload warning (E909.0) and fault (E620.0)

1: Hide motor overload warning (E909.0) and fault (E620.0)

Description

Defines whether to enable motor overload detection.

H0A.27 Motor rotation DO speed filter time

Address:	0x0A1B		
Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0 ms to 100 ms

Description

Defines the low-pass filter time constant of the speed information for speed feedback and position references.

H0A.29 Fully closed-loop encoder (ABZ) filter time

Address:	0x0A1D		
Min.:	0	Unit:	25 ns
Max.:	255	Data Type:	UInt16
Default:	15	Change:	At stop

Value Range:

0 ns to 255 ns

Description

-

H0A.32 Motor stall overtemperature protection time window

Address:	0x0A20		
Min.:	10	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

10 ms to 65535 ms

Description

Defines the overtemperature duration before E630.0 (Motor stall) is detected by the servo drive.

H0A.32 can be used to adjust the sensitivity of motor stall overtemperature detection.

H0A.33 Motor stall overtemperature detection

Address:	0x0A21		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: Hide

1: Enable

Description

Defines whether to enable the detection for E630.0 (Motor stall overtemperature protection).

H0A.36 Encoder multi-turn overflow fault selection

Address:	0x0A24		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Not hide

1: Hide

Description

Defines whether to hide the encoder multi-turn overflow fault in the absolute position linear mode (H02.01 = 1).

H0A.40 Compensation function selection

Address: 0x0A28

Min.:	0	Unit:	-
Max.:	15	Data Type:	UInt16
Default:	6	Change:	At stop

Value Range:

bit 0: Overtravel compensation
0: Enable
1: Disable
bit 1: Touch probe rising edge compensation
0: Disable
1: Enable
bit 2: Touch probe falling edge compensation
0: Disable
1: Enable
bit 3: Touch probe solution
0: New solution
1: Old solution (same as SV660N)

Description

-

H0A.41 Forward position of software position limit

Address: 0x0A29

Min.:	-2147483648	Unit:	Encoder unit
Max.:	2147483647	Data Type:	Int32
Default:	2147483647	Change:	At stop

Value Range:

-2147483648 to +2147483647

Description

When the absolute position counter (H0b.07) is larger than H0A.41, the servo drive reports E950.0 (Forward overtravel) and stops 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:	115	Change:	At once

Value Range:

100°C to 175°C

Description

Defines the temperature threshold for regenerative resistor overload.

H0A.50 Encoder communication fault tolerance threshold

Address:	0x0A32		
Min.:	0	Unit:	-
Max.:	31	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0 to 31

Description

When the numer of communication failures between the encoder and the drive exceeds H0A.50, the communication between the encoder and the drive fails.

H0A.51 Phase loss detection filter times

Address:	0x0A33		
Min.:	3	Unit:	55 ms
Max.:	36	Data Type:	UInt16
Default:	20	Change:	At once

Value Range:

3 ms to 36 ms

Description

Phase loss fault is reported when phase loss keeps active for a period longer than that defined by H0A.51.

H0A.52 Encoder temperature protection threshold

Address:	0x0A34		
Min.:	0	Unit:	°C
Max.:	175	Data Type:	UInt16
Default:	125	Change:	At once

Value Range:

0°C to 175°C

Description

Defines the temperature threshold for encoder overtemperature protection.

H0A.53 Touch probe DI ON-compensation time

Address: 0x0A35

Min.:	-3000	Unit:	25 ns
Max.:	3000	Data Type:	Int16
Default:	200	Change:	At once

Value Range:

-3000 ns to +3000 ns

Description

Used to compensate for the action time when the touch probe is switched on.

H0A.54 Touch probe DI OFF-compensation time

Address: 0x0A36

Min.:	-3000	Unit:	25 ns
Max.:	3000	Data Type:	Int16
Default:	1512	Change:	At once

Value Range:

-3000 ns to +3000 ns

Description

Used to compensate for the action time when the touch probe is switched off.

H0A.55 Runaway current threshold

Address: 0x0A37

Min.:	100	Unit:	%
Max.:	400	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

100.0% to 400.0%

Description

Defines the current threshold for runaway protection detection.

H0A.56 Fault reset delay

Address: 0x0A38

Min.:	0	Unit:	ms
Max.:	60000	Data Type:	UInt16
Default:	10000	Change:	At once

Value Range:

0 ms to 60000 ms

Description

-

H0A.57 Runaway speed threshold

Address: 0x0A39

Min.:	1	Unit:	rpm
Max.:	1000	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

1 rpm to 1000 rpm

Description

Defines the overspeed threshold for runaway protection detection.

H0A.58 Runaway speed filter time

Address: 0x0A3A

Min.:	0.1	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	2	Change:	At once

Value Range:

0.1 ms to 100.0 ms

Description

Defines the speed feedback filter time for runaway protection detection.

H0A.59 Runaway protection detection time

Address: 0x0A3B

Min.:	10	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	30	Change:	At once

Value Range:

10 ms to 1000 ms

Description

The runaway fault will be reported when runaway fault keeps active for a period longer than that defined by H0A.59.

H0A.60 Black box function mode

Address: 0x0A3C

Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: Disable

1: Any fault

2: Designated fault

3: Triggered based on designated condition

Description

Defines the condition for triggering black box sampling.

H0A.61 Designated fault code

Address:	0x0A3D		
Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0.0 to 6553.5

Description

Defines the fault code for triggering the black box function.

H0A.62 Trigger source

Address:	0x0A3E		
Min.:	0	Unit:	-
Max.:	25	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 25

Description

Defines the fault code for triggering the black box function through designated channel.

H0A.63 Trigger level

Address:	0x0A3F		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

Defines the trigger level for triggering the black box function through designated channel.

H0A.65 Trigger level

Address:	0x0A41		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Rising edge

1: Equal

2: Falling edge

3: Edge-triggered

Description

Defines the trigger mode for triggering the black box function through H0A.63.

H0A.66 Trigger position

Address: 0x0A42

Min.:	0	Unit:	%
Max.:	100	Data Type:	UInt16
Default:	75	Change:	At once

Value Range:

0% to 100%

Description

Defines the pre-trigger position for triggering black box sampling.

H0A.67 Sampling frequency

Address: 0x0A43

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

Value Range:

0: Current loop

1: Position loop

2: Main cycle

Description

Defines the frequency sampling mode during black box sampling.

H0A.70 Overspeed threshold 2

Address: 0x0A46

Min.:	0	Unit:	rpm
Max.:	20000	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 rpm to 20000 rpm

Description

Defines the speed threshold for reporting E500.2 (Position feedback pulse overspeed).

H0A.71 MS1 motor overload curve switchover

Address: 0x0A47

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

Value Range:
0 to 3
Description
bit0:
0: New overload curve
1: Old overload curve
bit1:
0: Enable discharging switch upon power failure
1: Hide discharging switch upon power failure

H0A.72 Maximum stop time in ramp-to-stop

Address:	0x0A48		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10000	Change:	At stop

Value Range:
0 ms to 65535 ms
Description
Defines the time for the motor to decelerate from the maximum speed to 0 rpm during ramp-to-stop.

H0A.73 STO 24 V disconnection filter time

Address:	0x0A49		
Min.:	1	Unit:	ms
Max.:	5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:
1 ms to 5 ms
Description
Defines the delay from the moment when 24 V is disconnected to the moment when the STO state applies.

H0A.74 Filter time for two inconsistent STO channels

Address:	0x0A4A		
Min.:	0	Unit:	ms
Max.:	1000	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:
1 ms to 1000 ms
Description
Defines the delay from the moment 24 V is inputted to the drive inconsistently through two channels to the moment when the STO state applies.

H0A.75 Servo OFF delay after STO triggered

Address: 0x0A4B

Min.:	0	Unit:	ms
Max.:	25	Data Type:	UInt16
Default:	20	Change:	At once

Value Range:

0 ms to 25 ms

Description

Defines the delay from the moment the STO state is triggered to the moment the S-ON signal is switched off.

H0A.90 Moving average filter time constant for speed display values

Address: 0x0A5A

Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 100 ms

Description

Defines the moving average filter time constant for speed display values.

H0A.91 Moving average filter time constant for torque display values

Address: 0x0A5B

Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 100 ms

Description

Defines the moving average filter time constant for torque display values.

H0A.92 Moving average filter time constant for position display values

Address: 0x0A5C

Min.:	0	Unit:	ms
Max.:	100	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 100 ms

Description

Defines the moving average filter time constant for position display values.

H0A.93 Low-pass filter time constant for voltage display values

Address:	0x0A5D		
Min.:	0	Unit:	ms
Max.:	250	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 250 ms

Description

Defines the low-pass filter time constant for voltage display values.

H0A.94 Low-pass filter time constant for thermal display values

Address:	0x0A5E		
Min.:	0	Unit:	ms
Max.:	250	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 250 ms

Description

Defines the filter time constant for thermal display values.

6.12 H0b: Monitoring Parameters

H0b.00 Motor speed actual value

Address:	0x0B00		
Min.:	-32767	Unit:	rpm
Max.:	32767	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-32767 rpm to +32767 rpm

Description

Indicates the actual motor speed after round-off, which is accurate to 1 rpm. Set in H0A.25 (Filter time constant of speed feedback display) the filter time constant for H0b.00.

H0b.01 Speed reference

Address:	0x0B01		
Min.:	-32767	Unit:	rpm
Max.:	32767	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-32767 rpm to +32767 rpm

Description

Indicates the present speed reference (accurate to 1 rpm) of the drive in the position and speed control modes.

H0b.02 Internal torque reference

Address:	0x0B02		
Min.:	-500	Unit:	%
Max.:	500	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-500.0% to +500.0%

Description

Displays present torque reference (accurate to 0.1%). The value 100.0% corresponds to the rated torque of the motor.

H0b.03 Monitored DI status

Address:	0x0B03		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Displays the level status of eight DIs without filtering.

Upper LED segments ON: high level (indicated by "1") Lower LED segments ON: low level (indicated by "0")

H0b.05 Monitored DO status

Address:	0x0B05		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Displays the level status of five DOs without filtering.

Upper LED segments ON: high level (indicated by "1") Lower LED segments ON: low level (indicated by "0")

H0b.07 Absolute position counter

Address:	0x0B07		
Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Indicates present absolute position (reference unit) of the motor in the position control mode.

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

H0b.09 Mechanical angle

Address:	0x0B09		
Min.:	0	Unit:	°
Max.:	360	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0° to 360.0°

Description

Displays present mechanical angle (encoder unit) of the motor. The setpoint 0 indicates the mechanical angle is 0°.

Actual mechanical angle = 360° x H0b.09/(Maximum value of H0b.09 + 1)

Maximum value of H0b.09 for an absolute encoder: 65535

H0b.10 Electrical angle

Address:	0x0B0A		
Min.:	0	Unit:	°
Max.:	360	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0° to 360.0°

Description

Indicates the present electrical angle of the motor, which is accurate to 0.1°.

The electrical angle variation range is ±360.0° during rotation. If the motor has four pairs of poles, each revolution generates four rounds of angle change from 0° to 359°. Similarly, if the motor has five pairs of poles, each revolution generates five rounds of angle change from 0° to 359°.

H0b.12 Average load rate

Address: 0x0B0C

Min.:	0	Unit:	%
Max.:	800	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0% to 800.0%

Description

Displays the percentage of the average load torque to the rated torque of the motor, which is accurate to 0.1%. The value 100.0% corresponds to the rated torque of the motor.

H0b.15 Position following error (encoder unit)

Address:

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Used to count and display the position deviation value after being divided or multiplied by the electronic gear ratio in the position control mode.

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

Note:

H0b.15 can be cleared when the condition defined in H05.16 (Clear action) is met.

H0b.17 Feedback pulse counter

Address: 0x0B11

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Used to count the position pulses fed back by the encoder in any control mode.

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

H0b.19 Total power-on time

Address: 0x0B13

Min.:	0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.0s to 429496729.5s

Description

Used to record the total operating time of the servo drive.

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

Note:

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

H0b.21 AI1 voltage display

Address: 0x0B15

Min.:	-12	Unit:	V
Max.:	12	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-12.000 V to +12.000 V

Description

Displays the actual sampling voltage of AI1.

H0b.22 AI2 current display

Address: 0x0B16

Min.:	0	Unit:	mA
Max.:	21	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

0.000 mA to 21.000 mA

Description

Displays the actual sampling current of AI2.

H0b.24 RMS value of phase current

Address: 0x0B18

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

Value Range:

0.0 A to 6553.5 A

Description

Displays the RMS value of the phase current of the motor, which is accurate to 0.01 A.

H0b.25 Angle obtained upon voltage injection auto-tuning

Address: 0x0B19

Min.: 0 | Unit: °
Max.: 360 | Data Type: UInt16
Default: 0 | Change: Unchangeable

Value Range:

0.0° to 360.0°

Description

-

H0b.26 Bus voltage

Address: 0x0B1A
Min.: 0 | Unit: V
Max.: 6553.5 | Data Type: UInt16
Default: 0 | Change: Unchangeable

Value Range:

0.0 V to 6553.5 V

Description

Displays the DC bus voltage of the main circuit input voltage after rectification, which is accurate to 0.01 V.

H0b.27 Module temperature

Address: 0x0B1B
Min.: -20 | Unit: °C
Max.: 200 | Data Type: Int16
Default: 0 | Change: Unchangeable

Value Range:

-20°C to +200°C

Description

Indicates the temperature of the module inside the servo drive, which can be used as a reference for estimating the actual temperature of the drive.

H0b.28 Absolute encoder fault information given by FPGA

Address: 0x0B1C
Min.: 0 | Unit: -
Max.: 65535 | Data Type: UInt16
Default: 0 | Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0b.29 Axis status information given by FPGA

Address: 0x0B1D

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

Value Range:

0 to 65535

Description

-

H0b.30 Axis fault information given by FPGA

Address: 0x0B1E

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

Value Range:

0 to 65535

Description

-

H0b.31 Encoder fault information

Address: 0x0B1F

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

Value Range:

0 to 65535

Description

-

H0b.33 Fault log

Address: 0x0B21

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

Value Range:

0: Present fault
1: Last fault
2: 2nd to last fault
3: 3rd to last fault
4: 4th to last fault
5: 5th to last fault
6: 6th to last fault
7: 7th to last fault
8: 8th to last fault
9: 9th to last fault
10: 10th to last fault
11: 11th to last fault
12: 12th to last fault
13: 13th to last fault
14: 14th to last fault
15: 15th to last fault
16: 16th to last fault
17: 17th to last fault
18: 18th to last fault
19: 19th to last fault

Description

Used to view the lastest 20 faults of the drive.

H0b.34 Fault code of the selected fault

Address:	0x0B22		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H0b.35 Time stamp upon occurrence of the selected fault

Address:	0x0B23		
Min.:	0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.0s to 429496729.5s

Description

-

H0b.37 Motor speed upon occurrence of the selected fault

Address: 0x0B25

Min.:	-32767	Unit:	rpm
Max.:	32767	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-32767 rpm to +32767 rpm

Description

-

H0b.38 Motor phase U current upon occurrence of the selected fault

Address: 0x0B26

Min.:	-3276.7	Unit:	A
Max.:	3276.7	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-3276.7 A to +3276.7 A

Description

-

H0b.39 Motor phase V current upon occurrence of the selected fault

Address: 0x0B27

Min.:	-3276.7	Unit:	A
Max.:	3276.7	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-3276.7 A to +3276.7 A

Description

-

H0b.40 Bus voltage upon occurrence of the selected fault

Address: 0x0B28

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

Value Range:

0.0 V to 6553.5 V

Description

-

H0b.41 DI status upon occurrence of the selected fault

Address: 0x0B29

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

Value Range:

0 to 65535

Description

-

H0b.43 DO status upon occurrence of the selected fault

Address: 0x0B2B

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

Value Range:

0 to 65535

Description

-

H0b.45 Internal fault code

Address: 0x0B2D

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

Value Range:

0 to 65535

Description

-

H0b.46 Absolute encoder fault information given by FPGA upon occurrence of the selected fault

Address: 0x0B2E

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

Value Range:

0 to 65535

Description

-

H0b.47 System status information given by FPGA upon occurrence of the selected fault

Address: 0x0B2F

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

Value Range:

0 to 65535

Description

-

H0b.48 System fault information given by FPGA upon occurrence of the selected fault

Address: 0x0B30

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

Value Range:

0 to 65535

Description

-

H0b.49 Encoder fault information upon occurrence of the selected fault

Address: 0x0B31

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

Value Range:

0 to 65535

Description

-

H0b.51 Internal fault code upon occurrence of the selected fault

Address: 0x0B33

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

Value Range:

0 to 65535

Description

-

H0b.52 FPGA timeout fault standard bit upon occurrence of the selected fault

Address: 0x0B34

Min.:	0	Unit:	-

Max.: 65535 | Data Type: UInt16
Default: 0 | Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0b.53 Position following error (reference unit)

Address: 0x0B35
Min.: -2147483648 | Unit: p
Max.: 2147483647 | Data Type: Int32
Default: 0 | Change: Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

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

Position deviation (reference unit) is the value obtained after enoder position deviation calculation. The precision is compromised during division.

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

H0b.55 Motor speed actual value

Address: 0x0B37
Min.: -2147483648 | Unit: rpm
Max.: 2147483647 | Data Type: Int32
Default: 0 | Change: Unchangeable

Value Range:

-2147483648 rpm to +2147483647 rpm

Description

Indicates the actual value of motor speed, which is accurate to 0.1 rpm.

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

H0A.25 (Filter time constant of speed feedback display) can be used to set the filter time constant of the speed feedback.

H0b.57 Bus voltage of the control circuit

Address: 0x0B39
Min.: 0 | Unit: V
Max.: 6553.5 | Data Type: UInt16
Default: 0 | Change: Unchangeable

Value Range:

0.0 V to 6553.5 V

Description

Displays the bus voltage of the control circuit.

H0b.58 Mechanical absolute position (low 32 bits)

Address: 0x0B3A

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the low 32-bit value (encoder unit) of the mechanical position feedback when the absolute encoder is used.

H0b.60 Mechanical absolute position (high 32 bits)

Address:

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the high 32-bit value (encoder unit) of the mechanical position feedback when the absolute encoder is used.

H0b.63 NotRdy state

Address: 0x0B3F

Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

1: Control circuit power input error

2: Main circuit power input error

3: Undervoltage

4: Soft start failed

5: Encoder initialization not completed

6: Short circuit to ground failed

7: Others

Description

Displays the reason for NotRdy state.

H0b.66 Encoder temperature

Address: 0x0B42

Min.:	-32768	Unit:	°C
Max.:	32767	Data Type:	Int16
Default:	0	Change:	Unchangeable

Value Range:

-32768°C to +32767°C

Description

-

H0b.67 Load rate of regenerative resistor

Address: 0x0B43

Min.:	0	Unit:	%
Max.:	200	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0% to 200.0%

Description

-

H0b.70 Number of absolute encoder revolutions

Address: 0x0B46

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

Value Range:

0 Rev to 65535 Rev

Description

Indicates the number of revolutions of the absolute encoder.

H0b.71 Single-turn position fed back by the absolute encoder

Address: 0x0B47

Min.:	0	Unit:	p
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0 p to +2147483647 p

Description

Displays the position feedback of the absolute encoder within one turn.

H0b.74 System fault information given by FPGA

Address: 0x0B4A

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

Value Range:

0 to 65535

Description

-

H0b.77 Encoder position (low 32 bits)

Address: 0x0B4D

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the low 32-bit value of the position feedback of the absolute encoder.

H0b.79 Encoder position (high 32 bits)

Address:

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the high 32-bit value of the position feedback of the absolute encoder.

H0b.81 Single-turn position of the rotary load (low 32 bits)

Address: 0x0B51

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the low 32-bit value of the position feedback of the rotaty load when the absolute system works in the rotation mode.

H0b.83 Single-turn position of the rotary load (high 32 bits)

Address: 0x0B53

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the high 32-bit value of the position feedback of the rotary load when the absolute system works the rotation mode.

H0b.85 Single-turn position of the rotary load (reference unit)

Address: 0x0B55

Min.:	-2147483648	Unit:	p
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 p to +2147483647 p

Description

Displays the high 32-bit value of the position feedback of the rotary load when the absolute system works the rotation mode.

H0b.87 IGBT junction temperature

Address: 0x0B57

Min.:	0	Unit:	-
Max.:	200	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 200

Description

-

H0b.90 Group No. of the abnormal parameter

Address: 0x0B5A

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

Value Range:

0 to 65535

Description

-

H0b.91 Offset of the abnormal parameter within the group

Address: 0x0B5B

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

Value Range:

0 to 65535

Description

-

H0b.94 Individual power-on time

Address: 0x0B5E

Min.:	0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.0s to 429496729.5s

Description

Display the individual power-on time of the drive.

H0b.96 Individual power-on time upon occurrence of the selected fault

Address: 0x0B60

Min.:	0	Unit:	s
Max.:	429496729.5	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0.0s to 429496729.5s

Description

-

6.13 H0d: Auxiliary Function Parameters

H0d.00 Software reset

Address: 0x0D00

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

Value Range:

0: No operation

1: Enable

Description

Programs in the drive are reset automatically (similar to the program reset upon power-on) after the software reset function is enabled, without the need for a power cycle.

H0d.01 Fault reset

Address:	0x0D01		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation

1: Enable

Description

When a No. 1 or No. 2 resettable fault occurs, you can enable the fault reset function in the non-operational state after rectifying the fault cause, stopping the keypad from displaying the fault and allowing the drive to enter the "rdy" state. When a No. 3 warning occurs, you can enable the fault reset function directly.

H0d.02 Inertia auto-tuning selection

Address:	0x0D02		
Min.:	0	Unit:	-
Max.:	65	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65

Description

Used to enable offline inertia auto-tuning through the keypad. In the parameter display mode, switch to H0d.02 and press the SET key to enable offline inertia auto-tuning.

H0d.04 Read/write in encoder ROM

Address:	0x0D04		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: No operation

1: Write ROM

2: Read ROM

3: ROM failure

Description

-

H0d.05 Emergency stop

Address: 0x0D05

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

Value Range:

0: No operation

1: Enable

Description

-

H0d.10 Auto-tuning of analog channel

Address: 0x0D0A

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

Value Range:

0: No operation

1: Adjust AI1

Description

When automatic adjustment of the analog channel is enabled, the drive automatically corrects the zero drift voltage of the analog channel to improve signal detection accuracy.

H0d.12 Phase U/V current balance correction

Address: 0x0D0C

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

Value Range:

0: Disable

1: Enable

Description

-

H0d.17 Forced DI/DO enable switch

Address: 0x0D11

Min.:	0	Unit:	-

Max.:	3	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit0: Forced DI enable switch
0: Disable
1: Enable
bit1: Forced DO enable switch
0: Disable
1: Enable

Description

Defines whether to enable forced DI/DO.

H0d.18 Forced DI value

Address: 0x0D12

Min.:	0	Unit:	-
Max.:	31	Data Type:	UInt16
Default:	31	Change:	At once

Value Range:

0 to 31

Description

Defines the level logic of the DI functions set in group H03 when forced DI is active (H0d.17 = 1 or 3).

The value of H0d.18 is displayed as a hexadecimal on the keypad. When it is converted to a binary value, "bit(n) = 1" indicates the level logic of DI function is high level; "bit(n) = 0" indicates the level logic of the DI function is low level.

H0d.19 Forced DO value

Address: 0x0D13

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

Value Range:

0 to 3

Description

Defines whether the DO functions assigned in group H04 are active when forced DO is active (H0d.17 = 2 or 3).

The value of H0d.19 is displayed as a hexadecimal on the keypad. When it is converted to a binary value, "bit(n) = 1" indicates the DO function is active; "bit(n) = 0" indicates the DO function is inactive.

H0d.20 Absolute encoder reset selection

Address: 0x0D14

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

Value Range:

0: No operation

1: Reset the fault

2: Reset the fault and multi-turn data

3: Reset Inovance 2nd encoder fault

4: Reset Inovance 2nd encoder fault and multi-turn data

Description

You can reset the encoder fault or the multi-turn data fed back by the encoder through H0d.20.

H0d.23 Torque fluctuation auto-tuning

Address: 0x0D17

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

Value Range:

0 to 1

Description

-

H0d.26 Brake and dynamic brake started forcibly

Address: 0x0D1A

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

Value Range:

0: Disable

1: Dynamic brake deactivated forcibly

2: Brake released forcibly

3: Dynamic brake deactivated and brake released forcibly

Description

-

6.14 H0E: Communication Function Parameters

H0E.00 Node address

Address: 0x0E00

Min.: 1
Max.: 127
Default: 1
Unit: -
Data Type: UInt16
Change: At stop

Value Range:

1 to 127

Description

Indicates the CAN slave node address. Ensure this parameter is consistent with the configuration of the host controller.

H0E.01 Save objects written through communication to EEPROM

Address: 0x0E01
Min.: 0
Max.: 4
Default: 4
Unit: -
Data Type: UInt16
Change: At once

Value Range:

0: Not save

1: Save parameters written through communication to EEPROM

2: Save object dictionaries written through communication to EEPROM

3: Save parameters and object dictionaries written through communication to EEPROM

4: Save object dictionaries written before communication (OP) to EEPROM

Description

Used to set whether to save parameters and object dictionaries written through the serial port or SDO communicaiton.

H0E.07 Object dictionary unit

Address: 0x0E07
Min.: 0
Max.: 1
Default: 0
Unit: -
Data Type: UInt16
Change: At stop

Value Range:

0: Reference unit system (p/s, p/s^2)

1: User unit system (0.01 rpm, ms)

Description

Defines the object dictionary unit.

0: Reference unit system, p/s for speed type object dictionaries and p/s^2 for acceleration type object dictionaries

1: User unit system, 0.01 rpm for speed type object dictionaries and ms (time taken for changing from 0 rpm to 1000 rpm) for acceleration type object dictionaries

H0E.15 Index of group 6000 (the last two bits)

Address: 0x0E0F

Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	255	Change:	At once

Value Range:

0 to 255

Description

Defines the index of the object dictionary displayed by the oscilloscope channel.

H0E.16 Sub-index of group 6000

Address: 0x0E10

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

Value Range:

0 to 2

Description

Defines the sub-index of the object dictionary displayed by the oscilloscope channel.

H0E.20 EtherCAT slave name

Address: 0x0E14

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

Value Range:

0 to 65535

Description

-

H0E.21 EtherCAT slave alias

Address: 0x0E15

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

Value Range:

0 to 65535

Description

-

H0E.22 Number of SYNC loss events allowed by EtherCAT

Address: 0x0E16

Min.:	1	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	8	Change:	At once

Value Range:

1 to 20

Description

-

H0E.24 Number of SYNC loss events

Address: 0x0E18

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

Value Range:

0 to 65535

Description

-

H0E.25 Max. error value and invalid frames of EtherCAT port 0 per unit time

Address: 0x0E19

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

Value Range:

0 to 65535

Description

-

H0E.26 Max. error value and invalid frames of EtherCAT port 1 per unit time

Address: 0x0E1A

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

Value Range:

0 to 65535

Description

-

H0E.27 Max. transfer error of EtherCAT port per unit time

Address: 0x0E1B

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

Value Range:

0 to 65535

Description

-

H0E.28 Max. EtherCAT data frame processing unit error per unit time

Address: 0x0E1C

Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 255

Description

-

H0E.29 Max. link loss value of EtherCAT port 0 per unit time

Address: 0x0E1D

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

Value Range:

0 to 65535

Description

-

H0E.31 EtherCAT synchronization mode setting

Address: 0x0E1F

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

Value Range:

0 to 2

Description

-

H0E.32 EtherCAT synchronization error threshold

Address: 0x0E20

Min.:	100	Unit:	ns
Max.:	4000	Data Type:	UInt16

Default: 3000 | Change: At stop

Value Range:

100 ns to 4000 ns

Description

-

H0E.33 EtherCAT state machine state and port connection state

Address: 0x0E21

Min.: 0 | Unit: -

Max.: 65535 | Data Type: UInt16

Default: 0 | Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0E.34 Number of excessive position reference increment events in CSP mode

Address: 0x0E22

Min.: 1 | Unit: -

Max.: 30 | Data Type: UInt16

Default: 20 | Change: At once

Value Range:

1 to 30

Description

-

H0E.35 AL fault code

Address: 0x0E23

Min.: 0 | Unit: -

Max.: 65535 | Data Type: UInt16

Default: 0 | Change: Unchangeable

Value Range:

0 to 65535

Description

-

H0E.36 EtherCAT enhanced link selection

Address: 0x0E24

Min.: 0 | Unit: -

Max.: 1 | Data Type: UInt16

Default: 0 | Change: At once

Value Range:

0: Disable

1: Enable

Description

-

H0E.37 **EtherCAT XML reset selection**

Address:	0x0E25		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable

Description

-

H0E.80 **Modbus baud rate**

Address:	0x0E50		
Min.:	0	Unit:	-
Max.:	9	Data Type:	UInt16
Default:	9	Change:	At once

Value Range:

0: 300 bps

1: 600 bps

2: 1200 bps

3: 2400 bps

4: 4800 bps

5: 9600 bps

6: 19200 bps

7: 38400 bps

8: 57600 bps

9: 115200 bps

Description

Defines the communication rate between the servo drive and the host controller. The baud rate set in the servo drive must be the same as that in the host controller. Otherwise, communication will fail.

H0E.81 **Modbus data format**

Address:	0x0E51		
Min.:	0	Unit:	-
Max.:	3	Data Type:	UInt16
Default:	3	Change:	At once

Value Range:

0: No parity, 2 stop bits (N-2)
1: Even parity, 1 stop bit (E-1)
2: Odd parity, 1 stop bit (O-1)
3: No parity, 1 stop bit (N-1)

Description

Defines the data check mode between the servo drive and the host controller during communication.

0: No parity, 2 stop bits
1: Even parity, 1 stop bit
2: Odd parity, 1 stop bit
3: No parity, 1 stop bit

The data format of the servo drive must be the same as that of the host controller. Otherwise, communication will fail.

H0E.82 Modbus response delay

Address:	0x0E52		
Min.:	0	Unit:	ms
Max.:	20	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 20 ms

Description

Defines the delay from the moment the slave receives a command to the moment the slave returns a response.

H0E.83 Modbus communication timeout

Address:	0x0E53		
Min.:	0	Unit:	ms
Max.:	600	Data Type:	UInt16
Default:	500	Change:	At once

Value Range:

0 ms to 600 ms

Description

-

H0E.84 Modbus communication data sequence

Address:	0x0E54		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: High bits before low bits

1: Low bits before high bits

Description

Defines the 32-bit data transmission format of Modbus communication.

0: High 16 bits before low 16 bits

1: Low 16 bits before high 16 bits

H0E.90 Modbus version

Address:	0x0E5A		
Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 655.35

Description

-

H0E.93 EtherCAT COE version

Address:	0x0E5D		
Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 655.35

Description

-

H0E.96 XML version information

Address:	0x0E60		
Min.:	0	Unit:	-
Max.:	655.35	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.00 to 655.35

Description

-

6.15 H0F: Fully Closed Loop Parameters

H0F.00 **Encoder feedback mode**

Address:	0x0F00		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Internal encoder feedback

1: External encoder feedback

2: Inner/Outer loop switchover

Description

Defines the encoder feedback signal source in fully closed-loop control.

0: Internal encoder feedback: The position feedback signals come from the motor encoder.

1: External encoder feedback: The position feedback signals come from the fully closed-loop external encoder.

Electronic gear ratio 1 is used.

2: Inner/Outer loop switchover: The DI assigned with FunIN.24 (GEAR_SEL, electronic gear ratio switchover) is used to switch between inner and outer closed position loops.

(FunIN.24: Inactive, internal encoder feedback, with electronic gear ratio 1 used)

Active: External encoder feedback, with electronic gear ratio 2 used

H0F.01 **External encoder operation mode**

Address:	0x0F01		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Standard operating direction

1: Reverse operating direction

Description

Defines the feedback pulse counting direction of internal and external encoders when the motor rotates in the fully closed-loop mode.

0: Standard operating direction: The pulse feedback counter of the internal encoder (H0F.18) is in the same direction as that of the external encoder (H0F.20) during rotation of the motor.

1: Reverse operating direction: The counting direction of pulse feedback counter of the internal encoder (H0F.18) is opposite to the external encoder (H0F.20) during rotation of the motor.

H0F.02 **External encoder mode**

Address:	0x0F02		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Incremental mode

1: Absolute linear mode

Description

-

H0F.03 **External encoder feedback type**

Address:	0x0F03		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Quadrature pulse

1: Inovance

2: BiSS

Description

-

H0F.04 **External encoder pulses per revolution**

Address:	0x0F04		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	10000	Change:	At stop

Value Range:

0 to 2147483647

Description

Defines the pulses fed back by the external encoder per revolution of the motor. It defines the quantity relationship between feedback pulses from the external encoder and those from the internal encoder.

Calculate the value of this parameter through analyzing mechanical parameters. When rigid connection is applied between the motor and the external encoder (scale), you can also set this parameter using the following method:

1. Manually rotate the motor and observe H0F.18 (Feedback pulse counter of internal encoder) in the meantime. After ensuring that the motor has rotated for a full turn (H0F.18 = Motor resolution), calculate the change of H0F.20 (Feedback pulse counter of external encoder) and use the absolute value of the change as the value of H0F.04.
2. Assume values of H0F.18 and H0F.20 are X_1 and Y_1 before the motor rotates and X_2 and Y_2 after the motor rotates, then the following formula applies: H0F.04 = Motor resolution x $(Y_2 - Y_1)/(X_2 - X_1)$ The calculated result must be positive; if not, perform step 1 again.
For non-rigid connection, an error may exist in the calculation result.
Note:
Ensure H0F.04 is set properly. Otherwise, EB02.0 (Position deviation too large in fully closed loop) may occur after the drive operates.

H0F.08 Excessive deviation threshold in compound control mode

Address:	0x0F08		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1000	Change:	At once

Value Range:
0 to 2147483647
Description
Defines the position deviation threshold at which the servo drive reports EB02.0 (Position deviation too large in fully closed-loop mode).
When H0F.08 is set to 0, the drive does not detect EB02.0 and always clears the fully closed-loop position deviation.

H0F.10 Clear deviation in compound control mode

Address:	0x0F0A		
Min.:	0	Unit:	R
Max.:	100	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:
0 to 100
Description
Defines the number of revolutions rotated by the motor per clear of the fully closed-loop position deviation during operation. The number of revolutions is reflected by H0F.18 (Feedback pulse counter of internal encoder). The number of motor revolutions will not be cleared when the drive is in the non-oeprational state.

H0F.13 **Compound vibration suppression filter time**

Address:

Min.:	0	Unit:	ms
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0.0 ms to 6553.5 ms

Description

Defines the time constant for compound vibration suppression in fully closed-loop control when external encoder feedback (H0F.00 = 1 or 2) is used.

Increase the setpoint gradually and check the change in the response.

When the stiffness of the transmission mechanism between fully closed loop and internal loop is insufficient, set H0F.13 properly to improve system stability, which is to generate the effect of internal loop temporarily and form a fully closed loop again after the system is stabilized. When the stiffness is sufficient, there is no need to adjust this parameter.

H0F.16 **Pulse deviation display in compound control mode**

Address: 0x0F10

Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-1073741824 to +2147483647

Des-2147483648cription

Used to count and display the position deviation absolute value in fully closed loop control.

Pulse deviation in compound control = Absolute position feedback of external encoder - Absolute position feedback conversion value of internal encoder

H0F.18 **Internal position pulse feedback display**

Address: 0x0F12

Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Used to count and display the number of feedback pulses of the internal encoder (after being divided or multiplied by electronic gear ratio, in internal encoder unit).

H0F.20 External position pulse feedback display

Address:	0x0F14		
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Used to count and display the number of feedback pulses of the external encoder (after being divided or multiplied by electronic gear ratio, in external encoder unit).

H0F.22 External encoder phase Z detection invalid (quadrature pulse feedback)

Address:	0x0F16		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Detected

1: Not detected

Description

-

H0F.23 BiSS absolute homing offset

Address:	0x0F17		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H0F.25 Source of touch probe Z signal in fully closed-loop mode

Address:	0x0F19		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Motor Z signal

1: External feedback Z signal

Description

-

H0F.26 BiSS absolute feedback offset

Address:	0x0F1A		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H0F.28 Index value of BiSS communication warning

Address:	0x0F1C		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H0F.29 CRC of BiSS fully closed-loop feedback

Address:	0x0F1D		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: Positive

1: Negative

Description

-

H0F.30 Valid bit of BiSS communication position feedback

Address:	0x0F1E		
Min.:	0	Unit:	-
Max.:	127	Data Type:	UInt16
Default:	29	Change:	At stop

Value Range:

0 to 127

Description

-

H0F.31 Valid bit of BiSS communication warning index

Address:	0x0F1F		
Min.:	0	Unit:	-
Max.:	31	Data Type:	UInt16
Default:	2	Change:	At stop

Value Range:

0 to 31

Description

-

H0F.40 Inovance fully closed-loop encoder communication error register

Address:	0x0F28		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H0F.41 Inovance fully closed-loop encoder version

Address:	0x0F29		
Min.:	0	Unit:	-
Max.:	6553.5	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0.0 to 6553.5

Description

-

H0F.42 Inovance fully closed-loop encoder resolution

Address:	0x0F2A		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0 to 4294967295

Description

-

6.16 H11: Multi-position Parameters

H11.00 Multi-position operation mode

Address:	0x1100	Effective:	At once
Min.:	0	Unit:	-
Max.:	5	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Individual operation (number of displacements defined by H11.01)

1: Cyclic operation (number of displacement defined by H11.01)

2: DI-based operation (defined by DI)

3: Sequential operation

5: Axis-controlled continuous operation

Description

Defines the multi-position operation mode when the main position reference source is multi-position references (H05.00 = 2) in the position control mode.

0: Individual operation (stop after one cycle of operation)

Switching to the next displacement automatically

You can set the interval time between displacements.

The multi-position reference is level-triggered.

1: Cyclic operation (start from displacement 1 again at next operation)

Switching to the next displacement automatically

You can set the interval time between displacements.

The multi-position reference is level-triggered.

2: DI-based operation (continue if displacement No. updated)

The displacement No is determined by the DI logic.

The interval time between displacements is determined by the command delay of the host controller.

The multi-position reference is edge-triggered.

3: Sequential operation (stop after one cycle of operation); cyclic operation available (starting displacement No. defined by H11.05 after the 1st cycle of operation)

Switching to the next displacement automatically

There is no interval time between displacements.

The multi-position reference is level-triggered.

5: Axis-controlled continuous operation (used together with CANlink)

H11.01 Number of displacement references in multi-position mode

Address:	0x1101	Effective:	At cone
Min.:	1	Unit:	-
Max.:	16	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

1 to 16

Description

Defines the total number of displacement references in the multi-position mode. You can set different displacements, operating speeds, and acceleration/ deceleration time for each displacement.

H11.00 ≠ 2: Displacements are switched automatically in a sequence from 1, 2... H11.01.

H11.00 = 2: Assign four DIs (hardware DI or VDI) with DI functions 6 to 9 (FunIN.6: CMD1 to FunIN.9: CMD4) and control the DI logic through the host controller to switch between different displacements. The displacement No. is a 4-bit binary value. Bit 0...bit 3 correspond to CMD1...CMD4.

H11.02 Starting displacement No. after pause

Address:	0x1102	Effective:	At once
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Continue to execute the unexecuted displacements

1: Start from displacement 1

Description

Defines the starting displacement No. when the multi-position operation recovers from a pause.

Pause:

① The servo drive switches to another control mode or the interrupt positioning function is enabled during multi-position operation.

② The internal multi-position enable signal (FunIN.28:PosInSen) changes from "active" to "inactive".

0: Continue to execute the unexecuted displacements: For example, if H11.01 is set to 16 and the drive pauses at displacement 2, after the drive recovers from the pause, it will start from displacement 3.

1: Start from displacement 1: For example, if H11.01 is set to 16 and the drive pauses at displacement 2, after the drive recovers from the pause, it will start from displacement 1.

H11.03 Interval time unit

Address:	0x1103	Effective:	At once
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: ms

1: s

Description

Defines the unit of acceleration/deceleration time and the interval time during multi-position operation.

Acceleration/Deceleration time: time for the motor to change from 0 rpm to 1000 rpm at a constant speed.

Interval time: interval time that starts from the end of the last reference to the beginning of the next reference

H11.04 Displacement reference type

Address:	0x1104	Effective:	At once
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Relative displacement reference

1: Absolute displacement reference

Description

Relative displacement: position increment of the target position relative to the current motor position

Absolute displacement: position increment of the target position relative to the motor home.

H11.05 Starting displacement No. in sequential operation

Address:	0x1105	Effective:	At once
Min.:	0	Unit:	-
Max.:	16	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0 to 16

Description

Defines whether to perform cyclic operation and the starting displacement No. after the first cycle of operation in the sequential operation mode (H11.00 = 3).
0: The drive executes the displacements defined by H11.01 only once and then stops. The motor is in the locked state.
1–16: The drive operates cyclically, with the starting displacement No. defined by H11.05 after the first cycle of operation. The value of H11.05 should be lower than or equal to H11.01.

H11.09 Deceleration upon axis control OFF

Address:	0x1109	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	65535	Change:	At once

Value Range:
0 ms to 65535 ms
Description
-

H11.10 Starting speed of displacement 1

Address:	0x110A	Effective:	At once
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:
0 rpm to 9999 rpm
Description
-

H11.11 Stop speed of displacement 1

Address:	0x110B	Effective:	At once
Min.:	0	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:
0 rpm to 9999 rpm
Description
-

H11.12 Displacement 1

Address:	0x110C	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit

Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

Defines displacement 1 (reference unit) in multi-position operation.

H11.14 Maximum speed of displacement 1

Address:	0x110E	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

Defines the maximum speed of displacement 1 in multi-position operation.
The maximum speed is the average operating speed when the motor is not in the acceleration/deceleration process. If H11.12 is set to a too low value, the actual motor speed will be lower than H11.14.

H11.15 Acceleration/Deceleration time of displacement 1

Address:	0x110F	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Defines the time for the motor to change from 0 rpm 1000 rpm at a constant speed during displacement 1.

H11.16 Interval time after displacement 1

Address:	0x1110	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

Defines the interval time that starts from the end of displacement 1 to the beginning of the next displacement.

H11.17 Displacement 2

Address:	0x1111	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.19 Maximum speed of displacement 2

Address:	0x1113	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

H11.20 Acceleration/Deceleration time of displacement 2

Address:	0x1114	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.21 Interval time after displacement 2

Address:	0x1115	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.22 Displacement 3

Address:	0x1116	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.24 Maximum speed of displacement 3

Address:	0x1118	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.25 Acceleration/Deceleration time of displacement 3

Address:	0x1119	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.26 Interval time after displacement 3

Address:	0x111A	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.27 Displacement 4

Address:	0x111B	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.29 Maximum speed of displacement 4

Address:	0x111D	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.30 Acceleration/Deceleration time of displacement 4

Address:	0x111E	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.31 Interval time after displacement 4

Address:	0x111F	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.32 Displacement 5

Address:	0x1120	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.34 Maximum speed of displacement 5

Address:	0x1122	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.35 Acceleration/Deceleration time of displacement 5

Address:	0x1123	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.36 Interval time after displacement 5

Address:	0x1124	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.37 Displacement 6

Address:	0x1125	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.39 Maximum speed of displacement 6

Address:	0x1127	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.40 Acceleration/Deceleration time of displacement 6

Address:	0x1128	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.41 Interval time after displacement 6

Address:	0x1129	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.42 Displacement 7

Address:	0x112A	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.44 Maximum speed of displacement 7

Address:	0x112C	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.45 Acceleration/Deceleration time of displacement 7

Address:	0x112D	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.46 Interval time after displacement 7

Address:	0x112E	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.47 Displacement 8

Address:	0x112F	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.49 Maximum speed of displacement 8

Address:	0x1131	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.50 Acceleration/Deceleration time of displacement 8

Address:	0x1132	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.51 Interval time after displacement 8

Address:	0x1133	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.52 Displacement 9

Address:	0x1134	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.54 Maximum speed of displacement 9

Address:	0x1136	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.55 Acceleration/Deceleration time of displacement 9

Address:	0x1137	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.56 Interval time after displacement 9

Address:	0x1138	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.57 Displacement 10

Address:	0x1139	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.59 Maximum speed of displacement 10

Address:	0x113B	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.60 Acceleration/Deceleration time of displacement 10

Address:	0x113C	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.61 Interval time after displacement 10

Address:	0x113D	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.62 Displacement 11

Address:	0x113E	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.64 Maximum speed of displacement 11

Address:	0x1140	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.65 Acceleration/Deceleration time of displacement 11

Address:	0x1141	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.66 Interval time after displacement 11

Address:	0x1142	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.67 Displacement 12

Address:	0x1143	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.69 Maximum speed of displacement 12

Address:	0x1145	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.70 Acceleration/Deceleration time of displacement 12

Address:	0x1146	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.71 Interval time after displacement 12

Address:	0x1147	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.72 Displacement 13

Address:	0x1148	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.74 Maximum speed of displacement 13

Address:	0x114A	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.75 Acceleration/Deceleration time of displacement 13

Address:	0x114B	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.76 Interval time after displacement 13

Address:	0x114C	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.77 Displacement 14

Address:	0x114D	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.79 Maximum speed of displacement 14

Address:	0x114F	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.80 Acceleration/Deceleration time of displacement 14

Address:	0x1150	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.81 Interval time after displacement 14

Address:	0x1151	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.82 Displacement 15

Address:	0x1152	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.84 Maximum speed of displacement 15

Address:	0x1154	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.85 Acceleration/Deceleration time of displacement 15

Address:	0x1155	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.86 Interval time after displacement 15

Address:	0x1156	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

H11.87 Displacement 16

Address:	0x1157	Effective:	At once
Min.:	-1073741824	Unit:	Reference unit
Max.:	1073741824	Data Type:	Int32
Default:	10000	Change:	At once

Value Range:

-1073741824 to +1073741824

Description

-

H11.89 Maximum speed of displacement 16

Address:	0x1159	Effective:	At once
Min.:	1	Unit:	rpm
Max.:	9999	Data Type:	UInt16
Default:	200	Change:	At once

Value Range:

1 rpm to 9999 rpm

Description

-

H11.90 Acceleration/Deceleration time of displacement 16

Address:	0x115A	Effective:	At once
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

-

H11.91 Interval time after displacement 16

Address:	0x115B	Effective:	At once
Min.:	0	Unit:	ms (s)
Max.:	10000	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms(s) to 10000 ms(s)

Description

-

6.17 H12: Multi-speed Parameters

H12.00 Multi-speed operation mode

Address:	0x1200		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	1	Change:	At stop

Value Range:

0: Individual operation (number of speeds defined by H12.01)

1: Cyclic operation (number of speeds defined by H12.01)

2: DI-based operation

Description

Defines the multi-speed operation mode when the speed reference source is multi-speed reference (H06.01 = 5, H06.02 = 1/2/3) in the speed control mode.

0: The drive stops after one cycle of operation and switches to the next speed automatically.

1: The drive operates cyclically as long as the S-ON signal is active. In cyclic operation, the drive starts from speed 1 again after each cycle of operation.

2: The drive operates continuously as long as the S-ON signal is active. The operating time of each speed is determined only by the time interval of speed switchover. The operating direction can be switched by FunIN.5 (DIR-SEL).

The S-ON signal must remain active during operation of each speed. Otherwise, the drive stops immediately based on the stop mode defined by H02.05.

Speed arrival (FunOUT.19: V-Arr) signal is activated every time a certain speed reaches the set value.

H12.01 Number of speed references in multi-speed mode

Address:	0x1201		
Min.:	1	Unit:	-
Max.:	16	Data Type:	UInt16
Default:	16	Change:	At stop

Value Range:

1 to 16

Description

Defines the total number of speed references in the multi-speed mode. Different speed references, operating time, and acceleration/deceleration time (four groups available) can be set for each speed.

H12.00 ≠ 2: Speeds are switched automatically in a sequence from 1, 2...H12.01.

H12.00 = 2: Assign four DIs (hardware DI or VDI) with DI functions 6 to 9 (FunIN.6: CMD1 to FunIN.9: CMD4) and control the DI logic through the host controller to switch between different speeds. The displacement No. is a 4-bit binary value. Bit 0...bit 3 correspond to CMD1...CMD4.

H12.02 Operating time unit

Address: 0x1202

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

Value Range:

0: s

1: min

Description

Defines the time unit in multi-speed operation.

0: s

1: min

H12.03 Acceleration time 1

Address: 0x1203

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Acceleration time: time for the motor to accelerate from 0 rpm to 1000 rpm at a constant speed

H12.04 Deceleration time 1

Address: 0x1204

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Deceleration time: time for the motor to decelerate from 1000 rpm to 0 rpm at a constant speed

H12.05 Acceleration time 2

Address: 0x1205

Min.:	0	Unit:	ms

Max.:	65535	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Acceleration time: time for the motor to accelerate from 0 rpm to 1000 rpm at a constant speed

H12.06 Deceleration time 2

Address: 0x1206

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	50	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Deceleration time: time for the motor to decelerate from 1000 rpm to 0 rpm at a constant speed

H12.07 Acceleration time 3

Address: 0x1207

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Acceleration time: time for the motor to accelerate from 0 rpm to 1000 rpm at a constant speed

H12.08 Deceleration time 3

Address: 0x1208

Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	100	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Deceleration time: time for the motor to decelerate from 1000 rpm to 0 rpm at a constant speed

H12.09 Acceleration time 4

Address:	0x1209		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	150	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Acceleration time: time for the motor to accelerate from 0 rpm to 1000 rpm at a constant speed

H12.10 Deceleration time 4

Address:	0x120A		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	150	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Four groups of acceleration/deceleration time can be set for each speed reference.

Deceleration time: time for the motor to decelerate from 1000 rpm to 0 rpm at a constant speed

H12.20 Speed reference for speed 1

Address:	0x1214		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.21 Operating time of speed 1

Address: 0x1215

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

Defines the operating time of speed 1.

The operating time is the sum of the speed variation time from previous speed reference to present speed reference plus the average operating time of present speed reference.

If the operating time is set to 0, the drive skips this speed automatically.

As long as H12.00 (Multi-speed operation mode) is set to 2 (DI-based operation) and the speed No. determined by the external DI does not change, the drive continues operating at the speed defined by this speed reference, without being affected by the reference operating time.

H12.22 Acceleration/Deceleration time of speed 1

Address: 0x1216

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Defines the acceleration/deceleration time of speed 1.

0: Zero acceleration/deceleration time (acceleration time: 0; deceleration time: 0)

1: Acceleration/Deceleration time 1 (acceleration time: H12.03; deceleration time: H12.04)

2: Acceleration/Deceleration time 2 (acceleration time: H12.05; deceleration time: H12.06)

3: Acceleration/Deceleration time 3 (acceleration time: H12.07; deceleration time: H12.08

4: Acceleration/Deceleration time 4 (acceleration time: H12.09; deceleration time (H12.10)

H12.23 Speed reference for speed 2

Address: 0x1217

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	100	Change:	At once

Value Range:

-9999 to 9999

Description

-

H12.24 Operating time of speed 2

Address: 0x1218

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.25 Acceleration/Deceleration time of speed 2

Address: 0x1219

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.26 Speed reference for speed 3

Address: 0x121A

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	300	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.27 Operating time of speed 3

Address: 0x121B

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.28 Acceleration/Deceleration time of speed 3

Address: 0x121C

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.29 Speed reference for speed 4

Address: 0x121D

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	500	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.30 Operating time of speed 4

Address: 0x121E

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16

Default: 5 | Change: At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.31 Acceleration/Deceleration time of speed 4

Address: 0x121F

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.32 Speed reference for speed 5

Address: 0x1220

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	700	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.33 Operating time of speed 5

Address: 0x1221

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.34 Acceleration/Deceleration time of speed 5

Address:	0x1222		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.35 Speed reference for speed 6

Address:	0x1223		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	900	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.36 Operating time of speed 6

Address:	0x1224		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.37 Acceleration/Deceleration time of speed 6

Address:	0x1225		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time
1: Acceleration/Deceleration time 1
2: Acceleration/Deceleration time 2
3: Acceleration/Deceleration time 3
4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.38 Speed reference for speed 7

Address:	0x1226		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	600	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.39 Operating time of speed 7

Address:	0x1227		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.40 Acceleration/Deceleration time of speed 7

Address:	0x1228		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time
1: Acceleration/Deceleration time 1
2: Acceleration/Deceleration time 2
3: Acceleration/Deceleration time 3
4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.41 Speed reference for speed 8

Address: 0x1229

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	300	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.42 Operating time of speed 8

Address: 0x122A

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.43 Acceleration/Deceleration time of speed 8

Address: 0x122B

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.44 Speed reference for speed 9

Address: 0x122C

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	100	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.45 Operating time of speed 9

Address: 0x122D

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.46 Acceleration/Deceleration time of speed 9

Address: 0x122E

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.47 Speed reference for speed 10

Address: 0x122F

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	-100	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.48 Operating time of speed 10

Address: 0x1230

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16

Default: 5 | Change: At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.49 Acceleration/Deceleration time of speed 10

Address: 0x1231

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.50 Speed reference for speed 11

Address: 0x1232

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	-300	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.51 Operating time of speed 11

Address: 0x1233

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.52 **Acceleration/Deceleration time of speed 11**

Address: 0x1234

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.53 **Speed reference for speed 12**

Address: 0x1235

Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	-500	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.54 **Operating time of speed 12**

Address: 0x1236

Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.55 **Acceleration/Deceleration time of speed 12**

Address: 0x1237

Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time
1: Acceleration/Deceleration time 1
2: Acceleration/Deceleration time 2
3: Acceleration/Deceleration time 3
4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.56 **Speed reference for speed 13**

Address:	0x1238		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	-700	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.57 **Operating time of speed 13**

Address:	0x1239		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.58 **Acceleration/Deceleration time of speed 13**

Address:	0x123A		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time
1: Acceleration/Deceleration time 1
2: Acceleration/Deceleration time 2
3: Acceleration/Deceleration time 3
4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.59 Speed reference for speed 14

Address:	0x123B		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	-900	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.60 Operating time of speed 14

Address:	0x123C		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.61 Acceleration/Deceleration time of speed 14

Address:	0x123D		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.62 Speed reference for speed 15

Address:	0x123E		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	-600	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.63 Operating time of speed 15

Address:	0x123F		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16
Default:	5	Change:	At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.64 Acceleration/Deceleration time of speed 15

Address:	0x1240		
Min.:	0	Unit:	-
Max.:	4	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

H12.65 Speed reference for speed 16

Address:	0x1241		
Min.:	-9999	Unit:	rpm
Max.:	9999	Data Type:	Int16
Default:	-300	Change:	At once

Value Range:

-9999 to +9999

Description

-

H12.66 Operating time of speed 16

Address:	0x1242		
Min.:	0	Unit:	s (m)
Max.:	6553.5	Data Type:	UInt16

Default: 5 | Change: At once

Value Range:

0.0s(m) to 6553.5s(m)

Description

-

H12.67 Acceleration/Deceleration time of speed 16

Address: 0x1243

Min.: 0 | Unit: -

Max.: 4 | Data Type: UInt16

Default: 0 | Change: At once

Value Range:

0: Zero acceleration/deceleration time

1: Acceleration/Deceleration time 1

2: Acceleration/Deceleration time 2

3: Acceleration/Deceleration time 3

4: Acceleration/Deceleration time 4

Description

Same as H12.22

6.18 H17: VDI/VDO Parameters

H17.90 Communication VDI enable

Address: 0x175A

Min.: 0 | Unit: -

Max.: 1 | Data Type: UInt16

Default: 0 | Change: At stop

Value Range:

0: Disable

1: Enable

Description

To use the VDI function:

1. Set H17.90 to enable VDI.
2. Set the default level after power-on in H17.91.
3. Set the DI function of the VDI through parameters in group H17.
4. Set the VDI output in H31.00.

H17.91 VDI default value upon power-on

Address: 0x175B

Min.: 0 | Unit: -

Max.: 65535 | Data Type: UInt16

Default:	0	Change:	At once

Value Range:

0: 0x0: No default
1: 0x01: VDI1 default value
2: 0x02: VDI2 default value
4: 0x04: VDI3 default value
8: 0x08: VDI4 default value
16: 0x10: VDI5 default value
32: 0x20: VDI6 default value
64: 0x40:VDI7 default value
128: 0x80: VDI8 default value
256: 0x100: VDI9 default value
512: 0x200: VDI10 default value
1024: 0x400: VDI11 default value
2048: 0x800: VDI12 default value
4096: 0x1000: VDI13 default value
8092: 0x2000: VDI14 default value
16384: 0x4000: VDI15 default value
32768: 0x8000: VDI16 default value

Description

Used to configure the initial values of VDI upon power-on.

Bit 0 corresponds to VDI1.

Bit 1 corresponds to VDI2.

…

Bit15 corresponds to VDI16.

H17.00 VDI1 function

Address:	0x1700		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.01 VDI1 logic level

Address:	0x1701		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.02 VDI2 function

Address:	0x1702		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.03 VDI2 logic level selection

Address:	0x1703		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.04 VDI3 function

Address:	0x1704		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.05 VDI3 logic level selection

Address:	0x1705		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.06 VDI4 function

Address:	0x1706		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.07 VDI4 logic level selection

Address: 0x1707

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

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.08 VDI5 function

Address: 0x1708

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.09 VDI5 logic level selection

Address: 0x1709

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

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.10 VDI6 function

Address: 0x170A

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ON2: Alarm reset signal5: Multi-reference direction6: Multi-reference switchover CMD17: Multi-reference switchover CMD28: Multi-reference switchover CMD39: Multi-reference switchover CMD414: Positive limit switch15: Negative limit switch18: Forward jog19: Reverse jot24: Electronic gear ratio selection28: Multi-position reference enable31: Home switch34: Emergency stop40: Multi-speed enable

Description

-

H17.11 VDI6 logic level selection

Address: 0x170B

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

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.12 VDI7 function

Address: 0x170C

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ON2: Alarm reset signal5: Multi-reference direction6: Multi-reference switchover CMD17: Multi-reference switchover CMD28: Multi-reference switchover CMD39: Multi-reference switchover CMD414: Positive limit switch15: Negative limit switch18: Forward jog19: Reverse jot24: Electronic gear ratio selection28: Multi-position reference enable31: Home switch34: Emergency stop40: Multi-speed enable

Description

-

H17.13 VDI7 logic level selection

Address: 0x170D

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

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.14 VDI8 function

Address:	0x170E		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ON

2: Alarm reset signal

5: Multi-reference direction

6: Multi-reference switchover CMD1

7: Multi-reference switchover CMD2

8: Multi-reference switchover CMD3

9: Multi-reference switchover CMD4

14: Positive limit switch

15: Negative limit switch

18: Forward jog

19: Reverse jot

24: Electronic gear ratio selection

28: Multi-position reference enable

31: Home switch

34: Emergency stop

40: Multi-speed enable

Description

-

H17.15 VDI8 logic level selection

Address:	0x170F		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.16 **VDI9 function**

Address: 0x1710

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ON2: Alarm reset signal5: Multi-reference direction6: Multi-reference switchover CMD17: Multi-reference switchover CMD28: Multi-reference switchover CMD39: Multi-reference switchover CMD414: Positive limit switch15: Negative limit switch18: Forward jog19: Reverse jot24: Electronic gear ratio selection28: Multi-position reference enable31: Home switch34: Emergency stop40: Multi-speed enable

Description

-

H17.17 **VDI9 logic level selection**

Address: 0x1711

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

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.18 **VDI10 function**

Address: 0x1712

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ON2: Alarm reset signal5: Multi-reference direction6: Multi-reference switchover CMD17: Multi-reference switchover CMD28: Multi-reference switchover CMD39: Multi-reference switchover CMD414: Positive limit switch15: Negative limit switch18: Forward jog19: Reverse jot24: Electronic gear ratio selection28: Multi-position reference enable31: Home switch34: Emergency stop40: Multi-speed enable

Description

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H17.19 VDI10 logic level selection

Address: 0x1713

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

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.20 VDI11 function

Address: 0x1714

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ON

2: Alarm reset signal

5: Multi-reference direction

6: Multi-reference switchover CMD1

7: Multi-reference switchover CMD2

8: Multi-reference switchover CMD3

9: Multi-reference switchover CMD4

14: Positive limit switch

15: Negative limit switch

18: Forward jog

19: Reverse jot

24: Electronic gear ratio selection

28: Multi-position reference enable

31: Home switch

34: Emergency stop

40: Multi-speed enable

Description

-

H17.21 VDI11 logic level selection

Address: 0x1715

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

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.22 VDI12 function

Address:	0x1716		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ON

2: Alarm reset signal

5: Multi-reference direction

6: Multi-reference switchover CMD1

7: Multi-reference switchover CMD2

8: Multi-reference switchover CMD3

9: Multi-reference switchover CMD4

14: Positive limit switch

15: Negative limit switch

18: Forward jog

19: Reverse jot

24: Electronic gear ratio selection

28: Multi-position reference enable

31: Home switch

34: Emergency stop

40: Multi-speed enable

Description

-

H17.23 VDI12 logic level selection

Address:	0x1717		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1

1: Active when the written value changes from 0 to 1

Description

-

H17.24 VDI13 function

Address: 0x1718

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.25 VDI13 logic level selection

Address: 0x1719

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

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.26 VDI14 function

Address: 0x171A

Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.27 VDI14 logic level selection

Address:	0x171B		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.28 VDI15 function

Address:	0x171C		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ON
2: Alarm reset signal
5: Multi-reference direction
6: Multi-reference switchover CMD1
7: Multi-reference switchover CMD2
8: Multi-reference switchover CMD3
9: Multi-reference switchover CMD4
14: Positive limit switch
15: Negative limit switch
18: Forward jog
19: Reverse jot
24: Electronic gear ratio selection
28: Multi-position reference enable
31: Home switch
34: Emergency stop
40: Multi-speed enable

Description

-

H17.29 VDI15 logic level selection

Address:	0x171D		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At stop

Value Range:

0: Active when the written value is 1
1: Active when the written value changes from 0 to 1

Description

-

H17.30 VDI16 function

Address:	0x171E		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment

1: Servo ON2: Alarm reset signal5: Multi-reference direction6: Multi-reference switchover CMD17: Multi-reference switchover CMD28: Multi-reference switchover CMD39: Multi-reference switchover CMD414: Positive limit switch15: Negative limit switch18: Forward jog19: Reverse jot24: Electronic gear ratio selection28: Multi-position reference enable31: Home switch34: Emergency stop40: Multi-speed enable

Description

-

H17.31 VDI16 logic level selection

Address: 0x171F

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

Value Range:

0: Active when the written value is 11: Active when the written value changes from 0 to 1

Description

-

H17.92 Communication VDO enable

Address: 0x175C

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

Value Range:

0: Disable

1: Enable

Description

To use the VDO function:

1. Set H17.92 to enable VDO.
2. Set the default level after power-on in H17.93.
3. Set the DO function of the VDO through parameters in group H17.

4: Read the output level of the VDO in H17.32.

H17.93 VDO default value after power-on

Address: 0x175D

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

Value Range:

0: 0x0: No default
1: 0x01: VDI1 default value
2: 0x02: VDI2 default value
4: 0x04: VDI3 default value
8: 0x08: VDI4 default value
16: 0x10: VDI5 default value
32: 0x20: VDI6 default value
64: 0x40:VDI7 default value
128: 0x80: VDI8 default value
256: 0x100: VDI9 default value
512: 0x200: VDI10 default value
1024: 0x400: VDI11 default value
2048: 0x800: VDI12 default value
4096: 0x1000: VDI13 default value
8192: 0x2000: VDI14 default value
16384: 0x4000: VDI15 default value
32768: 0x8000: VDI16 default value

Description

Used to configure the initial value of VDO upon power-on.
Bit 0 corresponds to VDO1.
Bit 1 corresponds to VDO2.
…
Bit15 corresponds to VDO16.

H17.32 VDO virtual level

Address:	0x1720		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

H17.33 VDO1 function

Address:	0x1721		
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.34 VDO1 logic level

Address:	0x1722		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Output 1 upon active logic
1: Output 0 upon active logic

Description

-

H17.35 VDO2 function

Address:	0x1723		
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.36 VDO2 logic level

Address:	0x1724		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16

Default: 0 | Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.37 VDO3 function

Address: 0x1725

Min.: 0 | Unit: -

Max.: 32 | Data Type: UInt16

Default: 0 | Change: At once

Value Range:

0: No assignment

1: Servo ready

2: Motor rotating

10: Warning

11: Fault

31: Communication-forced DO

32: EDM output

Description

-

H17.38 VDO3 logic level

Address: 0x1726

Min.: 0 | Unit: -

Max.: 1 | Data Type: UInt16

Default: 0 | Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.39 VDO4 function

Address: 0x1727

Min.: 0 | Unit: -

Max.: 32 | Data Type: UInt16

Default: 0 | Change: At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.40 VDO4 logic level

Address:	0x1728		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Output 1 upon active logic
1: Output 0 upon active logic

Description

-

H17.41 VDO5 function

Address:	0x1729		
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.42 VDO5 logic level

Address:	0x172A		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16

Default: 0 Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.43 VDO6 function

Address: 0x172B

Min.: 0 Unit: -

Max.: 32 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: No assignment

1: Servo ready

2: Motor rotating

10: Warning

11: Fault

31: Communication-forced DO

32: EDM output

Description

-

H17.44 VDO6 logic level

Address: 0x172C

Min.: 0 Unit: -

Max.: 1 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.45 VDO7 function

Address: 0x172D

Min.: 0 Unit: -

Max.: 32 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.46 VDO7 logic level

Address:	0x172E		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Output 1 upon active logic
1: Output 0 upon active logic

Description

-

H17.47 VDO8 function

Address:	0x172F		
Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.48 VDO8 logic level

Address:	0x1730		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16

Default: 0 | Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.49 VDO9 function

Address: 0x1731

Min.: 0 | Unit: -

Max.: 32 | Data Type: UInt16

Default: 0 | Change: At once

Value Range:

0: No assignment

1: Servo ready

2: Motor rotating

10: Warning

11: Fault

31: Communication-forced DO

32: EDM output

Description

-

H17.50 VDO9 logic level

Address: 0x1732

Min.: 0 | Unit: -

Max.: 1 | Data Type: UInt16

Default: 0 | Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.51 VDO10 function

Address: 0x1733

Min.: 0 | Unit: -

Max.: 32 | Data Type: UInt16

Default: 0 | Change: At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.52 **VDO10 logic level**

Address: 0x1734

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

Value Range:

0: Output 1 upon active logic
1: Output 0 upon active logic

Description

-

H17.53 **VDO11 function**

Address: 0x1735

Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.54 **VDO11 logic level**

Address: 0x1736

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16

Default: 0 Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.55 VDO12 function

Address: 0x1737

Min.: 0 Unit: -

Max.: 32 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: No assignment

1: Servo ready

2: Motor rotating

10: Warning

11: Fault

31: Communication-forced DO

32: EDM output

Description

-

H17.56 VDO12 logic level

Address: 0x1738

Min.: 0 Unit: -

Max.: 1 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.57 VDO13 function

Address: 0x1739

Min.: 0 Unit: -

Max.: 32 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.58 VDO13 logic level

Address: 0x173A

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

Value Range:

0: Output 1 upon active logic
1: Output 0 upon active logic

Description

-

H17.59 VDO14 function

Address: 0x173B

Min.:	0	Unit:	-
Max.:	32	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.60 VDO14 logic level

Address: 0x173C

Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16

Default: 0 Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.61 VDO15 function

Address: 0x173D

Min.: 0 Unit: -

Max.: 32 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: No assignment

1: Servo ready

2: Motor rotating

10: Warning

11: Fault

31: Communication-forced DO

32: EDM output

Description

-

H17.62 VDO15 logic level

Address: 0x173E

Min.: 0 Unit: -

Max.: 1 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: Output 1 upon active logic

1: Output 0 upon active logic

Description

-

H17.63 VDO16 function

Address: 0x173F

Min.: 0 Unit: -

Max.: 32 Data Type: UInt16

Default: 0 Change: At once

Value Range:

0: No assignment
1: Servo ready
2: Motor rotating
10: Warning
11: Fault
31: Communication-forced DO
32: EDM output

Description

-

H17.64 VDO16 logic level

Address:	0x1740		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Output 1 upon active logic
1: Output 0 upon active logic

Description

-

6.19 H18: Position Comparison Output Parameters

H18.00 Position comparison output selection

Address:	0x1800		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable
1: Enable (rising edge-triggered)

Description

-

H18.01 Position comparison output feedback source

Address:	0x1801		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Motor encoder feedback

1: Fully closed-loop position feedback

Description

-

H18.02 Position comparison resolution

Address:	0x1802		
Min.:	0	Unit:	-
Max.:	7	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

0: 24-bit

1: 23-bit

2: 22-bit

3: 21-bit

4: 20-bit

5: 19-bit

6: 18-bit

7: 17-bit

Description

-

H18.03 Position comparison mode

Address:	0x1803		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Individual comparison mode

1: Cyclic comparison mode

2: Fixed cyclic comparison mode

Description

-

H18.04 Current position as zero

Address:	0x1804		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0: Disable

1: Enable (rising edge-triggered)

Description

-

H18.05 Position comparison output width

Address:	0x1805		
Min.:	0.1	Unit:	ms
Max.:	204.7	Data Type:	UInt16
Default:	0.1	Change:	At once

Value Range:

0.1 ms to 204.7 ms

Description

Defines the effective pulse width of the DO when the comparison point is reached. The value range is 0 to 204.7 (unit: 0.1 ms).

H18.06 Position comparison output ABZ port polarity

Address:	0x1806		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: OCZ output logic
0: Positive, output high level upon active logic
1: Negative, output low level upon active logic
bit 1: Z port output logic
0: Positive, output high level upon active logic
1: Negative, output low level upon active logic
bit 2: A/B output logic
0: Positive, output high level upon active logic
1: Negative, output low level upon active logic

Description

0: Positive, output high level upon active logic; 1: Negative, output low level upon active logic

bit 0: OCZ output logic
bit 1: Z port output logic
bit 2: A/B output logic

H18.07 Start point of position comparison

Address:	0x1807		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 40

Description

-

H18.08 End point of position comparison

Address:	0x1808		
Min.:	0	Unit:	-
Max.:	40	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 40

Description

-

H18.09 Current status of position comparison

Address:	0x1809		
Min.:	0	Unit:	-
Max.:	1024	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 1024

Description

-

H18.10 Real-time position of position comparison

Address:	0x180A		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

-

H18.12 Zero offset of position comparison

Address:	0x180C		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H18.14 Position comparison output delay compensation

Address:	0x180E		
Min.:	-12	Unit:	us
Max.:	12	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-12.00 us to +12.00 us

Description

Used to compensate for the delay caused by hardware signal output.

H18.15 Cycles of fixed mode

Address:	0x180F		
Min.:	1	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	1	Change:	At once

Value Range:

1 to 65535

Description

-

H18.16 ABZ output function setting

Address:	0x1810		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: OCZ output function0: Frequency-division output

1: Position comparison

bit 1: Z port output function

0: Frequency-division output

1: Position comparison

bit 2: A/B port output function

0: Frequency-division output

1: Position comparison

Description

0: Frequency-division output; 1: Position comparison

bit 0: OCZ port function setting

bit 1: Z port function setting
bit 2: A/B function setting

H18.17 Number of fixed modes completed

Address:	0x1811		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

6.20 H19: Target Position Parameters

H19.00 Target value of position comparison 1

Address:	0x1900		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.02 Attribute value of position comparison 1

Address:	0x1902		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Attribute of position comparison point 1
bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2 to bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9 to bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

H19.03 Target value of position comparison 2

Address: 0x1903

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.05 Attribute value of position comparison 2

Address:	0x1905		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.06 Target value of position comparison 3

Address:	0x1906		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.08 Attribute value of position comparison 3

Address: 0x1908

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

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.09 Target value of position comparison 4

Address: 0x1909

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.11 Attribute value of position comparison 4

Address: 0x190B

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

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.12 Target value of position comparison 5

Address:	0x190C		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.14 Attribute value of position comparison 5

Address:	0x190E		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.15 Target value of position comparison 6

Address: 0x190F

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.17 Attribute value of position comparison 6

Address: 0x1911

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

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.18 Target value of position comparison 7

Address: 0x1911

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.20 Attribute value of position comparison 7

Address: 0x1914

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

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.21 Target value of position comparison 8

Address: 0x1915

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.23 Attribute value of position comparison 8

Address: 0x1917

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

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.24 Target value of position comparison 9

Address:	0x1918		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.26 Attribute value of position comparison 9

Address:	0x191A		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.27 Target value of position comparison 10

Address:	0x191B		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.29 Attribute value of position comparison 10

Address:	0x191D		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.30 Target value of position comparison 11

Address:	0x191E		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.32 Attribute value of position comparison 11

Address:	0x1920		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.33 Target value of position comparison 12

Address:	0x1921		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.35 Attribute value of position comparison 12

Address:	0x1923		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.36 Target value of position comparison 13

Address: 0x1924

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.38 Attribute value of position comparison 13

Address: 0x1926

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

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.39 Target value of position comparison 14

Address:	0x1927		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.41 Attribute value of position comparison 14

Address:	0x1929		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.42 Target value of position comparison 15

Address:	0x192A		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.44 Attribute value of position comparison 15

Address:	0x192C		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.45 Target value of position comparison 16

Address:	0x192D		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.47 Attribute value of position comparison 16

Address:	0x192F		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.48 Target value of position comparison 17

Address:	0x1930		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.50 Attribute value of position comparison 17

Address:	0x1932		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.51 Target value of position comparison 18

Address: 0x1933

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.53 Attribute value of position comparison 18

Address: 0x1935

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

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.54 Target value of position comparison 19

Address:	0x1936		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.56 Attribute value of position comparison 19

Address:	0x1938		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.57 Target value of position comparison 20

Address: 0x1939

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.59 Attribute value of position comparison 20

Address: 0x193B

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

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.60 Target value of position comparison 21

Address:	0x193C		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.62 Attribute value of position comparison 21

Address:	0x193E		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.63 Target value of position comparison 22

Address:	0x193F		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.65 Attribute value of position comparison 22

Address:	0x1941		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.66 Target value of position comparison 23

Address:	0x1942		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.68 Attribute value of position comparison 23

Address:	0x1944		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.69 Target value of position comparison 24

Address:	0x1945		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.71 Attribute value of position comparison 24

Address:	0x1947		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.72 Target value of position comparison 25

Address:	0x1948		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.74 Attribute value of position comparison 25

Address:	0x194A		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.75 Target value of position comparison 26

Address:	0x194B		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.77 Attribute value of position comparison 26

Address:	0x194D		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.78 Target value of position comparison 27

Address:	0x194E		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.80 Attribute value of position comparison 27

Address:	0x1950		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.81 Target value of position comparison 28

Address:	0x1951		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.83 Attribute value of position comparison 28

Address:	0x1953		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.84 Target value of position comparison 29

Address: 0x1954

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.86 Attribute value of position comparison 29

Address: 0x1956

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

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.87 Target value of position comparison 30

Address:	0x1957		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.89 Attribute value of position comparison 30

Address:	0x1959		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.90 Target value of position comparison 31

Address: 0x195A

Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.92 Attribute value of position comparison 31

Address: 0x195C

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

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.93 Target value of position comparison 32

Address:	0x195D		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.95 Attribute value of position comparison 32

Address:	0x195F		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.96 Target value of position comparison 33

Address:	0x1960		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.98 Attribute value of position comparison 33

Address:	0x1962		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.99 Target value of position comparison 34

Address:	0x1963		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.101 Attribute value of position comparison 34

Address:	0x1965		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.102 Target value of position comparison 35

Address:	0x1966		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.104 Attribute value of position comparison 35

Address:	0x1968		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.105 Target value of position comparison 36

Address:	0x1969		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.107 Attribute value of position comparison 36

Address:	0x196B		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.108 Target value of position comparison 37

Address:	0x196C		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.110 Attribute value of position comparison 37

Address:	0x196E		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.111 Target value of position comparison 38

Address:	0x196F		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.113 Attribute value of position comparison 38

Address:	0x1971		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.114 Target value of position comparison 39

Address:	0x1972		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.116 Attribute value of position comparison 39

Address:	0x1974		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

H19.117 Target value of position comparison 40

Address:	0x1975		
Min.:	-2147483648	Unit:	-
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

H19.119 Attribute value of position comparison 40

Address:	0x1977		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

bit 0: Output DO active signal if current position changes from "less than" to "more than" the comparison point
bit 1: Output DO active signal if current position changes from "more than" to "less than" the comparison point
bit 2: N/A
bit 3: N/A
bit 4: N/A
bit 5: N/A
bit 6: N/A
bit 7: DO1 output
bit 8: DO2 output
bit 9: N/A
bit 10: N/A
bit 11: N/A
bit 12: Frequency-division A output
bit 13: Frequency-division B output
bit 14: Frequency-division Z output
bit 15: Frequency-division OCZ output

Description

Same as H19.02

6.21 H1F: Software Tool Parameters

H1F.90 DI function state 1 read through communication

Address:	0x1F5A	Effective:	At once
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DI function 1.
Bit 1 corresponds to DI function 2.
Bit 2 corresponds to DI function 3.
…
By analogy

H1F.91 DI function state 2 read through communication

Address:	0x1F5B	Effective:	At once
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16

Default: 0 Change: Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DI function 17.

Bit 1 corresponds to DI function 18.

Bit 2 corresponds to DI function 19.

…

By analogy

H1F.92 DI function state 3 read through communication

Address:	0x1F5C	Effective:	At once
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DI function 33.

Bit 1 corresponds to DI function 34.

Bit 2 corresponds to DI function 35.

…

By analogy

H1F.93 DI function state 4 read through communication

Address:	0x1F5D	Effective:	At once
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DI function 49.

Bit 1 corresponds to DI function 50.

Bit 2 corresponds to DI function 51.

…

By analogy

H1F.94 DO function state 1 read through communication

Address:	0x1F5E	Effective:	At once
Min.:	0	Unit:	-

Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DO function 1.

Bit 1 corresponds to DO function 2.

Bit 2 corresponds to DO function 3.

…

By analogy

H1F.95 DO function state 2 read through communication

Address:	0x1F5F	Effective:	At once
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DO function 17.

Bit 1 corresponds to DO function 18.

Bit 2 corresponds to DO function 19.

…

By analogy

6.22 H30: Variables Read Through Communication

H30.00 Servo status read through communication

Address:	0x3000		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

H30.01 DO function state 1 read through communication

Address:	0x3001		
Min.:	0	Unit:	-

Max.: 65535 | Data Type: UInt16
Default: 0 | Change: Unchangeable

Value Range:

0 to 65535

Description

Bit 0 corresponds to DO function 1.

Bit 1 corresponds to DO function 2.

Bit 2 corresponds to DO function 3.

…

By analogy

H30.02 DO function state 2 read through communication

Address: 0x3002

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

Value Range:

0 to 65535

Description

Bit 0 corresponds to DO function 17.

Bit 1 corresponds to DO function 18.

Bit 2 corresponds to DO function 19.

…

By analogy

6.23 H31: Communication Setting

H31.00 VDI virtual level set through communication

Address: 0x3100

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

Value Range:

0 to 65535

Description

When H17.90 is set to 1, the VDI state is defined by H31.00.

The VDI logic is determined by H17.91 (Default VDI virtual level value upon upower-on) upon initial power-on. Thereafter, the VDI logic is determined by H31.00.

"bit(n) = 1" of H31.00 indicates the logic of VDI (n+1) is "1". "bit(n)=0" indicates the logic of VDI (n+1) is "0".

H31.04 DO status set through communication

Address: 0x3104

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

Value Range:

0 to 65535

Description

Set H04.22 to define H31.04 as the source of DO state.

H31.05 AO set through communication

Address: 0x3105

Min.:	-10000	Unit:	mV
Max.:	10000	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-10000 mV to +10000 mV

Description

Set H04.50 to 10 to define H31.05 as the source of AO (unit: mV).

H31.09 Speed reference set through communication

Address: 0x3109

Min.:	-9999.000	Unit:	rpm
Max.:	9999.000	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-9999.000 to +9999.000

Description

Set H06.02 to 4 to define H31.09 as the source of the speed reference in the speed control mode (unit: rpm).

H31.11 Torque reference set through communication

Address: 0x310B

Min.:	-100	Unit:	%
Max.:	100	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-100.000% to +100.000%

Description

Set H07.02 to 4 to define H31.11 as the source of the torque reference in the torque control mode. The setpoint 100.000% corresponds to the rated torque of the motor.

6.24 1000h Object Dictionaries

1000.00h Device type

Address:	0x5405		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

1001.00h Error register

Address:	0x5406		
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 255

Description

-

1018.01h Vendor ID

Address:	0x5401		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

1018.02h Product code

Address:	0x5402		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

1018.03h Revision number

Address:	0x5403		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

1600.00h Number of valid mapped objects in RPDO1

Address:	0x3900		
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	3	Change:	At once

Value Range:

0 to 20

Description

The object can be modified only when the PDO is invalid. When 0 is written, the mapped objects of other sub-indexes are cleared.

1600.01h 1st mapped object in RPDO1

Address:	0x3901		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1614807040	Change:	At once

Value Range:

0 to 2147483647

Description

The total length of a mapped object cannot exceed 64 bits. Mapping based on bytes instead of bits is supported. The indexes and sub-indexes of mapped objects must exist in the object dictionary list and are readable and mappable. Sub-indexes are written in the following format:

bit 0 to bit 7: Object length

bit 8 to bit 15: Sub-index

bit 16 to bit 31: Index

1600.02h 2nd mapped object in RPDO1

Address:	0x3902		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1618608128	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1600.01h

1600.03h 3rd mapped object in RPDO1

Address:	0x3903		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1622671360	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1600.01h

1600.04h 4th mapped object in RPDO1

Address:	0x3904		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1600.01h

1600.05h 5th mapped object in RPDO1

Address:	0x3905		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1600.01h

1600.06h 6th mapped object in RPDO1

Address:	0x3906		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.07h 7th mapped object in RPDO1

Address: 0x3907

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.08h 8th mapped object in RPDO1

Address: 0x3908

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.09h 9th mapped object in RPDO1

Address: 0x3909

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.0Ah 10th mapped object in RPDO1

Address: 0x390A

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.0Bh 11th mapped object in RPDO1

Address:	0x390B		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.0Ch 12th mapped object in RPDO1

Address:	0x390C		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.0Dh 13th mapped object in RPDO1

Address:	0x390D		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.0Eh 14th mapped object in RPDO1

Address:	0x390E		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.0Fh 15th mapped object in RPDO1

Address:	0x390F		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.10h 16th mapped object in RPDO1

Address:	0x3910		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.11h 17th mapped object in RPDO1

Address:	0x3911		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.12h 18th mapped object in RPDO1

Address:	0x3912		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.13h 19th mapped object in RPDO1

Address:	0x3913		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1600.14h 20th mapped object in RPDO1

Address:	0x3914		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1600.01h

1A00.00h Number of valid mapped objects in TPDO1

Address:	0x4000		
Min.:	0	Unit:	-
Max.:	20	Data Type:	UInt16
Default:	7	Change:	At once

Value Range:

0 to 20

Description

The object can be modified only when the PDO is invalid. When 0 is written, the mapped objects of other sub-indexes are cleared.

1A00.01h 1st mapped object in TPDO1

Address:	0x4001		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1614872576	Change:	At once

Value Range:

0 to 2147483647

Description

The total length of a mapped object cannot exceed 64 bits. Mapping based on bytes instead of bits is supported. The indexes and sub-indexes of mapped objects must exist in the object dictionary list and are readable and mappable.

Sub-indexes are written in the following format:

bit 0 to bit 7: Object length

bit 8 to bit 15: Sub-index

bit 16 to bit 31: Index

1A00.02h 2nd mapped object in TPDO1

Address: 0x4002

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1617166336	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.03h 3rd mapped object in TPDO1

Address: 0x4003

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1622736896	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.04h 4th mapped object in TPDO1

Address: 0x4004

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1622802432	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.05h 5th mapped object in TPDO1

Address: 0x4005

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1622933504	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.06h 6th mapped object in TPDO1

Address: 0x4006

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1614741504	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.07h 7th mapped object in TPDO1

Address: 0x4007

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	1627193344	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.08h 8th mapped object in TPDO1

Address: 0x4008

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.09h 9th mapped object in TPDO1

Address: 0x4009

Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32

Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1A00.01h

1A00.0Ah 10th mapped object in TPDO1

Address:	0x400A		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1A00.01h

1A00.0Bh 11th mapped object in TPDO1

Address:	0x400B		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1A00.01h

1A00.0Ch 12th mapped object in TPDO1

Address:	0x400C		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1A00.01h

1A00.0Dh 13th mapped object in TPDO1

Address:	0x400D		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1A00.01h

1A00.0Eh 14th mapped object in TPDO1

Address:	0x400E		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1A00.01h

1A00.0Fh 15th mapped object in TPDO1

Address:	0x400F		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1A00.01h

1A00.10h 16th mapped object in TPDO1

Address:	0x4010		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:
0 to 2147483647
Description
Same as 1A00.01h

1A00.11h 17th mapped object in TPDO1

Address:	0x4011		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.12h 18th mapped object in TPDO1

Address:	0x4012		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.13h 19th mapped object in TPDO1

Address:	0x4013		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1A00.14h 20th mapped object in TPDO1

Address:	0x4014		
Min.:	0	Unit:	-
Max.:	2147483647	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 2147483647

Description

Same as 1A00.01h

1C12.00h Number of assigned PDOs

Address:	0x5000		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt8
Default:	1	Change:	At once

Value Range:

0 to 2

Description

-

1C12.01h Index of assigned RPDO1

Address:	0x5001		
Min.:	5632	Unit:	-
Max.:	5898	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

5632 to 5898

Description

-

1C12.02h Index of assigned RPDO2

Address:	0x5002		
Min.:	5632	Unit:	-
Max.:	5898	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

5632 to 5898

Description

-

1C13.00h Number of assigned PDOs

Address:	0x5100		
Min.:	0	Unit:	-
Max.:	2	Data Type:	UInt8
Default:	0	Change:	At once

Value Range:

0 to 2

Description

-

1C13.01h Index of assigned TPDO1

Address:	0x5101		
Min.:	6656	Unit:	-
Max.:	6922	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

6656 to 6922

Description

-

1C13.02h Index of assigned TPDO2

Address:	0x5102		
Min.:	6656	Unit:	-
Max.:	6922	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

6656 to 6922

Description

-

1C32.01h Synchronization type

Address:	0x5201		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

1C32.02h Cycle time

Address:	0x5202		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 4294967295

Description

-

1C32.04h Synchronization types supported

Address:	0x5204		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

1C32.05h Minimum cycle time

Address:	0x5205		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 4294967295

Description

-

1C33.01h Synchronization type

Address:	0x5301		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

1C33.02h Cycle time

Address:	0x5302		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 4294967295

Description

-

1C33.04h Synchronization types supported

Address:	0x5304		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

1C33.05h Minimum cycle time

Address:	0x5305		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 4294967295

Description

-

6.25 6000h Object Dictionaries

603Fh Error code

Address:	0x3500		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

When an error described in the DSP402 profile occurs on the servo drive, 603Fh is as described in DSP402.

When an error specified by the user occurs on the servo drive, 603Fh is 0xFF00.

The value of 603Fh is in hexadecimal.

In addition, the object dictionary 203Fh displays auxiliary bytes of fault codes in hexadecimal.

203Fh is a UInt32 value, in which the high 16 bits indicate the internal fault code of the manufacturer, and the low 16 bits indicate the external fault code of the manufacturer.

6040h Control word

Address:	0x3502		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 65535

Description

-

6041h Status word

Address:	0x3504		
Min.:	0	Unit:	-
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

0 to 65535

Description

-

605Ah Quick stop option code

Address:	0x3536		
Min.:	0	Unit:	-
Max.:	7	Data Type:	Int16
Default:	2	Change:	At stop

Value Range:

0: Coast to stop, keeping de-energized state

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

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

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

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

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

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

Description

0: Coast to stop, keeping de-energized state

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

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

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

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

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

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

605Ch Disable operation option code

Address:	0x353A		
Min.:	-4	Unit:	-
Max.:	2	Data Type:	Int16
Default:	0	Change:	At stop

Value Range:

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

Description

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

605Dh Stop option code

Address: 0x353C

Min.:	1	Unit:	-
Max.:	3	Data Type:	Int16
Default:	1	Change:	At stop

Value Range:

1: Ramp to stop as defined by 6084h/609Ah (HM), keeping position lock state
2: Ramp to stop as defined by 6085h, keeping position lock state
3: Stop at emergency stop torque, keeping position lock state

Description

Defines the halt mode.
1: Ramp to stop as defined by 6084h/609Ah (HM), keeping position lock state
2: Ramp to stop as defined by 6085h, keeping position lock state
3: Stop at emergency stop torque, keeping position lock state

605Eh Fault reaction option code

Address: 0x353C

Min.:	-5	Unit:	-
Max.:	4	Data Type:	Int16
Default:	2	Change:	At stop

Value Range:

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

Description

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

6060h Modes of operation

Address:	0x353E		
Min.:	0	Unit:	-
Max.:	10	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

1: Profile position (PP) mode
3: Profile velocity (PV) mode
4: Profile torque (PT) mode
6: Homing (HM) mode
8: Cyclic synchronous position (CSP) mode
9: Cyclic synchronous velocity (CSV) mode
10: Cyclic synchronous torque (CST) mode

Description

Defines the servo drive operation mode.

1: Profile position (PP) mode
3: Profile velocity (PV) mode
4: Profile torque (PT) mode
6: Homing (HM) mode
8: Cyclic synchronous position (CSP) mode
9: Cyclic synchronous velocity (CSV) mode
10: Cyclic synchronous torque (CST) mode
Others: N/A
If an unsupported operation mode is selected through an SDO, an SDO error will be returned.
If an unsupported operation mode is selected through a PDO, the change of the operation mode will be invalid.

6061h Modes of operation display

Address:	0x3544		
Min.:	0	Unit:	-
Max.:	10	Data Type:	UInt16
Default:	0	Change:	Unchangeable

Value Range:

1: Profile position (PP) mode
3: Profile velocity (PV) mode
4: Profile torque (PT) mode
6: Homing (HM) mode
8: Cyclic synchronous position (CSP) mode
9: Cyclic synchronous velocity (CSV) mode
10: Cyclic synchronous torque (CST) mode

Description

Indicates the actual operation mode.
1: Profile position (PP) mode
3: Profile velocity (PV) mode
4: Profile torque (PT) mode
6: Homing (HM) mode
8: Cyclic synchronous position (CSP) mode
9: Cyclic synchronous velocity (CSV) mode
10: Cyclic synchronous torque (CST) mode

6062h Position demand value

Address:	0x3546		
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Indicates the real-time position reference (reference unit).

6063h Position actual value*

Address:	0x3548		
Min.:	-2147483648	Unit:	Pulse
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Indicates the absolute position feedback (encoder unit) of the motor in real time.

6064h Position actual value

Address:	0x354A		
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Indicates the absolute position feedback (reference unit) in real time.

Position actual value in user-defined unit (6064h) x Gear ratio (6091h) = Position actual value in encoder unit (6063h)

6065h Following error window

Address:	0x354C		
Min.:	0	Unit:	Reference unit
Max.:	4294967295	Data Type:	UInt32
Default:	219895608	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the threshold of excessive position deviation (reference unit).

When the difference value between position demand value (6062h) and position actual value (6064h) keeps exceeding ±6065h after the time defined by 6066h elapses, EB00.0 (Position deviation too large) occurs.

6066h Following error time out

Address: 0x354E

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

Value Range:

0 ms to 65535 ms

Description

Defines the time lapse to trigger excessive position deviation (EB00.0), which must be used together with 6065h.

6067h Position window

Address: 0x3550

Min.:	0	Unit:	Reference unit
Max.:	4294967295	Data Type:	UInt32
Default:	46976	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the threshold for position reach.

If the difference value between 6062h and 6064h is within ±6067h and the time reaches 6068h, the position is reached. In this case, bit10 of 6041h is set to 1 in the profile position mode.

This flag bit is meaningful only when the S-ON signal is active in the profile position mode.

6068h Position window time

Address: 0x3552

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

Value Range:

0 ms to 65535 ms

Description

Defines the window time for position reach, which must be used together with 6067h.

606Ch Velocity actual value

Address: 0x355A

Min.:	-2147483648	Unit:	Reference unit/s
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Indicates the actual speed feedback in user-defined unit.

606Dh Velocity window

Address:	0x355C		
Min.:	0	Unit:	rpm
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 rpm to 65535 rpm

Description

Defines the threshold for speed reach.

If the difference value between 60FFh and 606Ch is within ±606Dh and the time reaches 606Eh, the speed is reached and bit10 of 6041h is set to 1 in the profile velocity mode.

This flag bit is meaningful only when the S-ON signal is active in the PV mode.

606Eh Velocity window time

Address:	0x355E		
Min.:	0	Unit:	ms
Max.:	65535	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 ms to 65535 ms

Description

Defines the time window for speed reach, which must be used together with 606Dh.

606Fh Velocity threshold

Address:	0x3560		
Min.:	0	Unit:	rpm
Max.:	65535	Data Type:	UInt16
Default:	10	Change:	At once

Value Range:

0 rpm to 65535 rpm

Description

Defines the threshold for determining whether the user velocity is 0.

When 606Ch is within ±606Fh and the time reaches the value set by 6070h, the user velocity is 0. When either condition is not met, the user velocity is not 0.

This flag bit is meaningful only in the profile velocity mode is not related to the S-ON state.

6070h Velocity threshold time

Address: 0x3562

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

Value Range:

0 ms to 65535 ms

Description

Defines the time window for determining whether the user velocity is 0, which must be used together with 606Fh.

6071h Target torque

Address: 0x3564

Min.:	-4000	Unit:	0.001
Max.:	4000	Data Type:	Int16
Default:	0	Change:	At once

Value Range:

-4000 to +4000

Description

Defines the target torque in the profile torque mode.

The value 1000 corresponds to the rated torque of the motor.

6072h Max. torque value

Address: 0x3566

Min.:	0	Unit:	0.001
Max.:	4000	Data Type:	UInt16
Default:	3500	Change:	At once

Value Range:

0 to 4000

Description

Defines the maximum torque reference limit.

The value 1000 corresponds to the rated torque of the motor.

6074h Torque demand value

Address: 0x356A

Min.:	-4000	Unit:	0.001
Max.:	4000	Data Type:	Int16

Default: 0 Change: Unchangeable

Value Range:

-4000 to +4000

Description

Defines the target torque value.

The value 1000 corresponds to the rated torque of the motor.

6077h Torque actual value

Address: 0x3570

Min.: -4000 Unit: 0.001

Max.: 4000 Data Type: Int16

Default: 0 Change: Unchangeable

Value Range:

-4000 to +4000

Description

Indicates the internal torque feedback of the servo drive.

The value 1000 corresponds to the rated torque of the motor.

607Ah Target position

Address: 0x3576

Min.: -2147483648 Unit: Reference unit

Max.: 2147483647 Data Type: Int32

Default: 0 Change: At once

Value Range:

-2147483648 to +2147483647

Description

Defines the target position of the servo drive in the profile position mode.

Table 6–1 Description of bit 6 of 6040h

Value of Bit 6	Description	Remarks
0	607Ah indicates the absolute target position of current segment.	After positioning of current segment is done, the value of 6064h will be the same as the value of 607Ah.
1	607Ah indicates the target increment displacement of current segment.	After positioning of current segment is done, user displacement increment will be the same as the value of 607Ah.

607Ch Home offset

Address: 0x357A

Min.: -2147483648 Unit: Reference unit

Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

Defines the physical location of mechanical zero that deviates from the home of the motor in position control modes (profile position mode, interpolation mode, and homing mode).

The home offset in active under the following conditions: The device is powered on, the homing operation is complete, and bit 15 of 6041h is set to 1.

After homing is done, the position actual value (6064h) will be the same as the value of 607Ch.

If 607Ch is outside the value of 607Dh (Software position limit), EE09.1 occurs (Home setting error).

607D.01h Min. position limit

Address:	0x3700		
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	-2147483648	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

Defines the minimum software position limit relative to the mechanical zero point.

Minimum software position limit = (607D.01h)

The software position limit is used to judge the absolute position. When homing is not performed, the internal software position limit is invalid.

The condition for activating the software position limit is set in H0A.01 (object dictionary 0x200A.02h).

607D.02h Max. position limit

Address:	0x3800		
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	2147483647	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

Defines the maximum software position limit relative to the mechanical zero.

Maximum software position limit = (607D.02h)

607Eh **Polarity**

Address:	0x357E		
Min.:	0	Unit:	-
Max.:	255	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 255

Description

Defines the polarity of position or speed references.

When bit 7 is 1, it indicates the position reference is multiplied by "-1" and the motor direction is reversed in the standard position mode or interpolation mode.

When bit 6 is 1, it indicates the speed reference (60FFh) is multiplied by "-1" and the motor direction is reversed in the velocity mode.

When bit 5 is 1, it indicates the torque demand value (6071h) is multiplied by "-1" and the motor direction is reversed in the torque mode.

Other bits are meaningless.

607Fh **Max. profile velocity**

Address:	0x3580		
Min.:	0	Unit:	Reference unit/s
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the maximum operating speed in user-defined unit.

Set a proper gear ratio (8/1 recommended) when using a 26-bit encoder. Otherwise, the motor speed will be limited to 3840 rpm.

6081h **Profile velocity**

Address:	0x3584		
Min.:	0	Unit:	Reference unit/s
Max.:	4294967295	Data Type:	UInt32
Default:	111848106	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the constant running speed of the displacement reference in the profile position mode.

The setpoint takes effect after the slave receives the displacement reference.

6083h **Profile acceleration**

Address: 0x3588

Min.:	0	Unit:	Reference unit/s^2
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the acceleration of the displacement reference in the profile position mode.

The following formula applies if a motor equipped with 23-bit encoder needs to run at 400 rpm (6081h: 400 x 8388608/60) with acceleration rate being 400 rpm/s (6083h: 400 x 8388608/60) and deceleration rate being 200 rpm/s (6084h: 200 x 8388608/60) under a gear ratio of 1:1:

Acceleration time t_{up} = Δ6081h/Δ6083h =1 (s); Deceleration time t_{down} = Δ6081h/Δ6084h =2 (s)

The setpoint 0 will be forcibly changed to 1.

6084h **Profile deceleration**

Address: 0x358A

Min.:	0	Unit:	Reference unit/s^2
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the deceleration rate in the deceleration stage of the displacement reference in the profile position mode.

The following formula applies if a motor equipped with 23-bit encoder needs to run at 400 rpm (6081h: 400 x 8388608/60) with acceleration rate being 400 rpm/s (6083h: 400 x 8388608/60) and deceleration rate being 200 rpm/s (6084h: 200 x 8388608/60) under a gear ratio of 1:1:

Acceleration time t_{up} = Δ6081h/Δ6083h =1 (s); Deceleration time t_{down} = Δ6081h/Δ6084h =2 (s)

The setpoint 0 will be forcibly changed to 1.

6085h **Quick stop deceleration**

Address:

Min.:	0	Unit:	Reference unit/s^2
Max.:	4294967295	Data Type:	UInt32
Default:	2147483648	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the deceleration rate when the quick stop command (6040h = 0x0002) is active and 605Ah (Quick stop option code) is set to 2 or 5.

The setpoint 0 will be forcibly changed to 1.

6087h Torque slope

Address:	0x3590		
Min.:	0	Unit:	0.1%/s
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the acceleration rate (torque increment per second) of the torque reference in profile torque mode, indicating the torque reference increment per second.

In the profile torque mode, if 605Ah is set to 1, 2, 5, or 6, or 605Dh is set to 1 or 2, the servo drive decelerates to stop as defined by 6087h.

If the setpoint exceeds the torque reference limit, the limit value will be used.

The setpoint 0 will be forcibly changed to 1.

6091.01h Motor revolutions

Address:	0x3714		
Min.:	1	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	1	Change:	At stop

Value Range:

1 to 4294967295

Description

Defines the numerator of the gear ratio.

The gear ratio is used to establish the proportional relationship between the load shaft displacement designated by the user and the motor shaft displacement.

The relationship between motor position feedback (encoder unit) and load shaft position feedback (reference unit) is as follows.

Motor position feedback = Load shaft position feedback x Gear ratio

The relationship between the motor speed (rpm) and the load shaft speed (reference unit/s) is as follows.

Motor speed (rpm) = Load shaft speed x 6091h x 60/Encoder resolution

The relationship between the motor acceleration (rpm/ms) and the load shaft acceleration (reference unit/s^2) is as follows.
Motor acceleration (rpm/ms) = Load shaft acceleration x 6091h x 1000/Encoder resolution/60

6091.02h Shaft revolutions

Address:	0x3814		
Min.:	1	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	1	Change:	At stop

Value Range:

1 to 4294967295

Description

Defines the denominator of the gear ratio.

6098h Homing method

Address:	0x35B2		
Min.:	-2	Unit:	-
Max.:	35	Data Type:	Int16
Default:	1	Change:	At once

Value Range:

-2 to +35

Description

Table 6–2 Defines the homing method.

Setpoint	Description
-2	Forward, positive mechanical limit as deceleration point and Z signal as home
-1	Reverse, negative mechanical limit as deceleration point and Z signal as home
1	Reverse, negative limit switch as deceleration point and Z signal as home, falling edge of the negative limit switch signal must be reached before Z signal
2	Forward, positive limit switch as deceleration point and Z signal as home, falling edge of positive limit switch signal must be reached before Z signal
3	Forward, home switch as deceleration point and Z signal as home, falling edge on the same side of the home switch signal must be reached before Z signal
4	Forward, home switch as deceleration point and Z signal as home, rising edge on the same side of the home switch signal must be reached before Z signal
5	Reverse, home switch as deceleration point and Z signal as home, falling edge on the same side of the home switch signal must be reached before Z signal
6	Reverse, home switch as deceleration point and Z signal as home, rising edge on the same side of the home switch signal must be reached before Z signal

Setpoint	Description
7	Forward, home switch as deceleration point and Z signal as home, falling edge on the same side of the home switch signal must be reached before Z signal
8	Forward, home switch as deceleration point and Z signal as home, rising edge on the same side of the home switch signal must be reached before Z signal
9	Forward, home switch as deceleration point and Z signal as home, rising edge on the other side of the home switch signal must be reached before Z signal
10	Forward, home switch as deceleration point and Z signal as home, falling edge on the other side of the home switch signal must be reached before Z signal
11	Reverse, home switch as deceleration point and Z signal as home, falling edge on the same side of the home switch signal must be reached before Z signal
12	Reverse, home switch as deceleration point and Z signal as home, rising edge on the same side of the home switch signal must be reached before Z signal
13	Reverse, home switch as deceleration point and Z signal on the other side of the home switch signal as home, rising edge on the other side of the home switch signal must be reached before Z signal
14	Reverse, home switch as deceleration point and Z signal on the other side of the home switch signal as home, falling edge on the other side of the home switch signal must be reached before Z signal
15 to 16	The servo drive does not perform the homing operation.
17 to 30	Similar to setpoints 1...14 except that the deceleration point coincide with the home
31 to 32	The servo drive does not perform the homing operation.
33	Reverse, Z signal as home
34	Forward, Z signal as home
35	Current position as home

6099.01h Speed during search for switch

Address:	0x371C		
Min.:	0	Unit:	Reference unit/s
Max.:	4294967295	Data Type:	UInt32
Default:	111848106	Change:	At stop

Value Range:

0 to 4294967295

Description

Defines the speed during search for the deceleration point signal. A large setpoint helps prevent E601.0 (Homing timeout).

6099.02h Speed during search for zero

Address:	0x381C		
Min.:	0	Unit:	Reference unit/s

Max.:	4294967295	Data Type:	UInt32
Default:	11184810	Change:	At stop

Value Range:

0 to 4294967295

Description

Defines the speed in searching for the home signal. Setting this speed to a low value prevents overshoot during stop at high speed, avoiding excessive deviation between the stop position and the set mechanical home.

609Ah Homing acceleration

Address: 0x35B6

Min.:	0	Unit:	Reference unit/s^2
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the acceleration rate in the homing mode.

60B0h Position offset

Address: 0x35E2

Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

60B1h Velocity offset

Address: 0x35E4

Min.:	-2147483648	Unit:	Reference unit/s
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

-

60B2h Torque offset

Address: 0x35E6

Min.: -4000 | Unit: 0.001
Max.: 4000 | Data Type: Int16
Default: 0 | Change: At once

Value Range:

-4000 to +4000

Description

-

60B8h Touch probe function

Address: 0x35F2

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

Value Range:

0 to 65535

Description

See the following table for descriptions of each bit of 60B8h.

bit	Name	Description
0	Touch probe 1 function selection 0: Disable touch probe 1 1: Enable touch probe 1	bit 0 to bit 5: settings related to touch probe 1 When a DI is used to trigger the touch probe function, the DI source cannot be changed once the touch probe function is enabled. For absolute encoders, Z signal refers to the zero point of the single-turn motor position feedback.
1	Touch probe 1 trigger mode 0: Single trigger mode (Latches the position at the first trigger event.) 1: Continuous trigger mode	
2	Touch probe 1 trigger signal selection 0: DI signal 1: Z signal	
3	N/A	
4	Touch probe 1 positive edge 0: Switch off latching at positive edge 1: Enable latching at positive edge	
5	Touch probe 1 negative edge 0: Switch off latching at negative edge 1: Enable latching at negative edge	
6 to 7	N/A	-

bit	Name	Description
8	Touch probe 2 function selection 0: Disable touch probe 2 1: Enable touch probe 2	bit 8 to bit 13: settings related to touch probe 2
9	Touch probe 2 trigger mode 0: Single trigger mode (Latches the position at the first trigger event.) 1: Continuous trigger mode	
10	Touch probe 2 trigger signal selection 0: DI signal 1: Z signal	
11	N/A	
12	Touch probe 2 positive edge 0: Switch off latching at positive edge 1: Enable latching at positive edge	
13	Touch probe 2 negative edge 0: Switch off latching at negative edge 1: Enable latching at negative edge	
14 to 15	N/A	-

60B9h **Touch probe status**

Address: 0x35F4

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

Value Range:

0 to 65535

Description

Defines the functions of touch probe 1 and touch probe 2.

See the following table for descriptions of each bit of 60B9h.

bit	Name	Description
0	Touch probe 1 function selection 0: Disable touch probe 1 1: Enable touch probe 1	bit 0 to bit 2: status of touch probe 1
1	Touch probe 1 positive edge value 0: No positive edge value latched 1: Positive edge value latched	
2	Touch probe 1 negative edge value 0: No negative edge value latched 1: Negative edge value latched	
3 to 5	N/A	-

bit	Name	Description
6 to 7	Number of touch probe trigger events when touch probe 1 is assigned with the function of continuous sampling	Indicates the number of touch probe trigger events (0 to 3) when touch probe 1 is assigned with the function of continuous sampling.
8	Touch probe 2 function selection 0: Disable touch probe 2 1: Enable touch probe 2	bit 8 to bit 10: status of touch probe 2
9	Touch probe 2 positive edge value 0: No positive edge value latched 1: Positive edge value latched	
10	Touch probe 2 negative edge value 0: No negative edge value latched 1: Negative edge value latched	
11 to 13	N/A	-
14 to 15	Number of touch probe trigger events when touch probe 2 is assigned with the function of continuous sampling	Indicates the number of touch probe trigger events (0 to 3) when touch probe 2 is assigned with the function of continuous sampling.

60BAh Touch probe 1 positive edge

Address: 0x35F4

Min.: -2147483648 Unit: Reference unit

Max.: 2147483647 Data Type: Int32

Default: 0 Change: Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Indicates the position feedback value (reference unit) latched at positive edge of touch proble 1 signal.

60BBh Touch probe 1 negative edge

Address: 0x35F8

Min.: -2147483648 Unit: Reference unit

Max.: 2147483647 Data Type: Int32

Default: 0 Change: Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Indicates the position feedback value (reference unit) latched at negative edge of touch proble 1 signal.

60BCh **Touch probe 2 positive edge**

Address:	0x35FA		
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Indicates the position feedback value (reference unit) latched at positive edge of touch proble 2 signal.

60BDh **Touch probe 2 negative edge**

Address:			
Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Indicates the position feedback value (reference unit) latched at negative edge of touch proble 2 signal.

60C5h **Max. acceleration**

Address:	0x360C		
Min.:	0	Unit:	Reference unit/s^2
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the maximum permissible deceleration in the profile position mode, profile velocity mode, and homing mode.

The setpoint 0 will be forcibly changed to 1.

60C6h **Max. deceleration**

Address:	0x360E		
Min.:	0	Unit:	Reference unit/s^2
Max.:	4294967295	Data Type:	UInt32
Default:	4294967295	Change:	At once

Value Range:

0 to 4294967295

Description

Defines the maximum allowable deceleration in the profile position mode, profile velocity mode, and homing mode.

The setpoint 0 will be forcibly changed to 1.

60D5h Touch probe 1 positive edge counter

Address: 0x362C

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

Value Range:

0 to 65535

Description

The counting value is added by "1" each time this object is triggered.

60D6h Touch probe 1 negative edge counter

Address: 0x362E

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

Value Range:

0 to 65535

Description

The counting value is added by "1" each time this object is triggered.

60D7h Touch probe 2 positive edge counter

Address: 0x3630

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

Value Range:

0 to 65535

Description

The counting value is added by "1" each time this object is triggered.

60D8h Touch probe 2 negative edge counter

Address: 0x3632

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

Value Range:

0 to 65535

Description

The counting value is added by "1" each time this object is triggered.

60E0h Positive torque limit value

Address:	0x3642		
Min.:	0	Unit:	0.001
Max.:	4000	Data Type:	UInt16
Default:	3500	Change:	At once

Value Range:

0 to 4000

Description

Defines the maximum torque limit of the servo drive in the forward direction.

60E1h Negative torque limit value

Address:	0x3644		
Min.:	0	Unit:	0.001
Max.:	4000	Data Type:	UInt16
Default:	3500	Change:	At once

Value Range:

0 to 4000

Description

Defines the maximum torque limit of the servo drive in the reverse direction.

60E6h Actual position calculation method

Address:	0x364E		
Min.:	0	Unit:	-
Max.:	1	Data Type:	UInt16
Default:	0	Change:	At once

Value Range:

0 to 1

Description

Defines the method for calculating the mechanical position after homing is done.

0: Absolute homing

After homing is done, the value of position feedback (6064h) will be the same as the value of home offset (607Ch).

1: Relative homing

After homing is done, the value of position feedback (6064h) will be the sum of current position feedback plus the position offset (607Ch).

60F4h Following error actual value

Address: 0x366A

Min.:	-2147483648	Unit:	Reference unit
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Indicates the position deviation (reference unit).

60FCh Position demand value*

Address:

Min.:	-2147483648	Unit:	pulse
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	Unchangeable

Value Range:

-2147483648 to +2147483647

Description

Indicates the position reference (encoder unit).

If no warning is detected when the S-ON signal is active, the relationship between the position reference in reference unit and that in encoder unit is as follows:

60FCh (in encoder unit) = 6062h (in reference unit) x 6091h

60FDh Digital inputs

Address: 0x367C

Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	Unchangeable

Value Range:

0 to 4294967295

Description

Indicates current DI logic of the drive.

0: Inactive

1: Active

Table 6–3 The DI signal indicated by each bit is described as follows:

bit	Description
0	Reverse overtravel active
1	Forward overtravel active
2	Home signal active
3 to 15	N/A
16	DI1 input active
17	DI2 input active
18	DI3 input active
19	DI4 input active
20	DI5 input active
21 to 26	N/A
27	STO1 signal input
28	STO2 signal input
29	EDM output active
30	Z signal active
31	N/A

60FFh Target velocity

Address:			
Min.:	-2147483648	Unit:	Reference unit/s
Max.:	2147483647	Data Type:	Int32
Default:	0	Change:	At once

Value Range:

-2147483648 to +2147483647

Description

Defines the target velocity in the cyclic synchronous velocity mode and profile velocity mode.

60FE.01h Physical outputs

Address:	0x3781		
Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 4294967295

Description

Indicates the DO logic.

The signal indicated by each bit is described as follows:

bit	Description
0 to 15	N/A
16	Forced DO1 output (0: OFF; 1: ON) when bit 16 of 60FE.02 = 1
17	Forced DO2 output (0: OFF; 1: ON) when bit 17 of 60FE.02 = 1
18 to 25	N/A
26	Switched between P and PI for gain switchover when bit 26 of 60FE.02 = 1
27 to 31	N/A

60FE.02h Bitmask

Address:

Min.:	0	Unit:	-
Max.:	4294967295	Data Type:	UInt32
Default:	0	Change:	At once

Value Range:

0 to 4294967295

Description

0 to 15: N/A

16: Forced DO1 output enable

17: Forced DO2 output enable

18 to 25: N/A

26: P/PI switchover enable

27 to 31: N/A

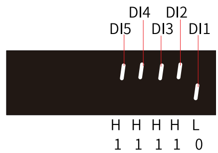
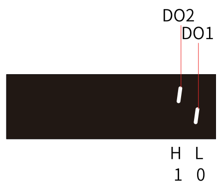
7 Appendix

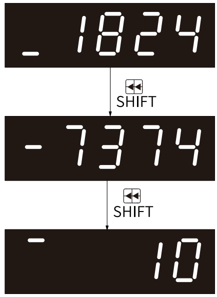
7.1 Display of Monitoring Parameters

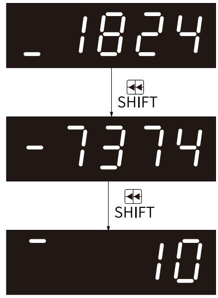
- Group H0b: Displays parameters used to monitor the operating state of the servo drive.
- Set H02.32 (Default keypad display) properly. After the motor operates normally, the keypad switches from status display to parameter display. The parameter group number is H0b and the offset within the group is the setpoint of H02.32.
- For example, if H02.32 is set to 00 and the motor speed is not 0 rpm, the keypad displays the value of H0b.00.

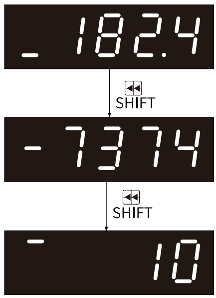
The following table describes the monitoring parameters in group H0b.

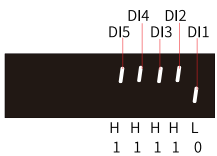
Param. No.	Name	Unit	Meaning	Example of Display
H0b.00	Motor speed actual value	rpm	Displays the actual value of the motor speed after round-off, which can be accurate to 1 rpm.	Display of 3000 rpm:  Display of -3000 rpm: 
H0b.01	Speed reference	rpm	Displays the present speed reference of the servo drive.	Display of 3000 rpm:  Display of -3000 rpm: 
H0b.02	Internal torque reference	%	Displays the ratio of actual torque output of the motor to the rated torque of the motor.	Display of 100.0%:  Display of -100.0%: 

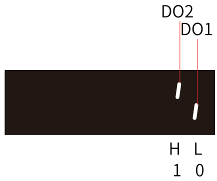
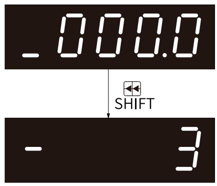
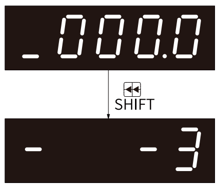
Param. No.	Name	Unit	Meaning	Example of Display
H0b.03	Monitored DI status	-	Indicates level status of DI1 to DI5: Upper LED segments ON: high level (indicated by "1") Lower LED segments ON: low level (indicated by "0") The value of H0b.03 read in the software tool is a decimal.	For example, if DI1 is low level and DI2 to DI5 are high level, The corresponding binary value is "11110", and the value of H0b.03 read in the software tool is 0x001E. The keypad displays as follows: 
H0b.05	Monitored DO status	-	Indicates level status of two DOs: Upper LED segments ON: high level (indicated by "1") Lower LED segments ON: low level (indicated by "0") The value of H0b.05 read in the software tool is a decimal.	For example, if DO1 is low level and DO2 is high level, then, the binary value is "10", and the value of H0b.05 read in the software tool is 0x0004. The keypad displays as follows: 

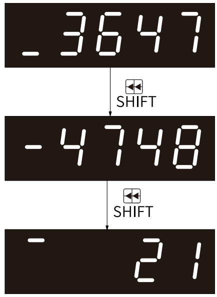
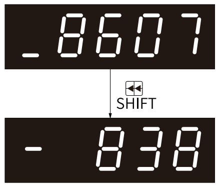
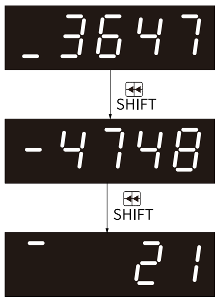
Param. No.	Name	Unit	Meaning	Example of Display
H0b.07	Absolute position counter (32-bit decimal)	Reference unit	Displays current absolute position of the motor (reference unit).	Display of 1073741824 in reference unit: 
H0b.09	Mechanical angle	°	Displays current mechanical angle of the motor.	Display of 360.0°: 
H0b.10	Rotation angle (electrical angle)	°	Displays current electrical angle of the motor.	Display of 360.0°: 
H0b.11	Speed correspond ing to the input position reference	rpm	Displays the speed corresponding to the position reference per control cycle of the servo drive.	Display of 3000 rpm:  Display of -3000 rpm: 
H0b.12	Average load rate	%	Displays the ratio of the average load torque to the rated torque of the motor.	Display of 100.0%: 
H0b.15	Encoder position deviation counter (32-bit decimal)	Encoder unit	Encoder position deviation = Sum of input position references (encoder unit) – Sum of pulses fed back by the encoder (encoder unit)	Display of 10000 in encoder unit: 

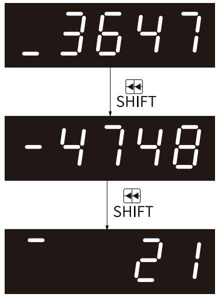
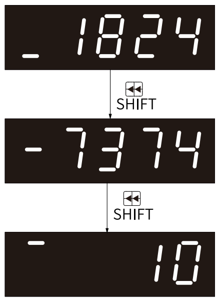
Param. No.	Name	Unit	Meaning	Example of Display
H0b.17	Feedback pulse counter (32-bit decimal)	Encoder unit	Counts and displays the number of pulses fed back by the encoder (encoder unit). ***Note*** When the motor used is equipped with an absolute encoder, H0b.17 only reflects values of the low 32 bits of the motor position feedback. To get the actual motor position feedback, view H0b.77 (Encoder position (low 32 bits) and H0b.79 (Encoder position (high 32 bits).	Display of 1073741824 in encoder unit: 
H0b.19	Total power-on time (32-bit decimal)	s	Counts and displays the total power-on time of the servo drive.	Display of 429496729.5s: 
H0b.24	RMS value of phase current	A	Displays the RMS value of the phase current of the servo motor.	Display of 4.60 A: 
H0b.26	Bus voltage	V	Indicates the DC bus voltage of the main circuit, namely the voltage between terminals P⊕ and N⊖.	Display of 311.0 V rectified from 220 VAC:  Display of 537.0 V rectified from 380 VAC: 

Param. No.	Name	Unit	Meaning	Example of Display
H0b.27	Power module temperature	°C	Displays the temperature of the power module inside the servo drive.	Display of 27°C: 
H0b.33	Fault log	-	Used to select the previous fault to be viewed. 0: Present fault 1: Last fault 2: 2nd to last fault ... 9: 9th to last fault	0: Display of present fault: 
H0b.34	Fault code of the selected fault	-	Displays the fault code of the fault selected in H0b.33. When no fault occurs, the value of H0b.34 is 0.	If H0b.33 = 0, H0b.34 = E941.0, the present fault code is 941.0. Corresponding display: 
H0b.35	Time stamp upon occurrence of the selected fault	s	Displays the total operating time of the servo drive when the fault displayed in H0b.34 occurred. When no fault occurs, the value of H0b.35 is 0.	If H0b.34 = E941.0 and H0b.35 = 107374182.4, the present fault code is 941.0 and the total operating time of the servo drive is 107374182.4s when the fault occurs. 
H0b.37	Motor speed upon occurrence of the selected fault	rpm	Displays the servo motor speed when the fault displayed in H0b.34 occurred. When no fault occurs, the value of H0b.37 is 0.	Display of 3000 rpm:  Display of -3000 rpm: 

Param. No.	Name	Unit	Meaning	Example of Display
H0b.38	Motor phase U current upon occurrence of the selected fault	A	Displays the RMS value of motor phase U winding current when the fault displayed in H0b.34 occurred. When no fault occurs, the value of H0b.38 is 0.	Display of 4.60 A: 
H0b.39	Motor phase V current upon occurrence of the selected fault	A	Displays the RMS value of motor phase V winding current when the fault displayed in H0b.34 occurred. When no fault occurs, the value of H0b.39 is 0.	Display of 4.60 A: 
H0b.40	Bus voltage upon occurrence of the selected fault	V	Displays the DC bus voltage of the main circuit when the fault displayed in H0b.34 occurred. When no fault occurs, the value of H0b.40 is 0.	Display of 311.0 V rectified from 220 VAC:  Display of 537.0 V rectified from 380 VAC: 
H0b.41	DI status upon occurrence of the selected fault	-	Displays the high/low level status of the five DIs when the fault displayed in H0b.34 occurred. The method for determining the DI level status is the same as that of H0b.03. When no fault occurs, all DIs are displayed as low level in H0b.41 (indicated by the decimal value 0).	For example, when the value of H0b.41 read in the software tool is 0x0001, the corresponding binary code will be 0000 0000 0000 0001. 

Param. No.	Name	Unit	Meaning	Example of Display
H0b.43	DO status upon occurrence of the selected fault	-	Displays the high/low level state of DO1 and DO2 when the fault displayed in H0b.34 occurs. The method for determining the DO level status is the same as that of H0b.05. When no fault occurs, all DOs are displayed as low level in H0b.42 (indicated by the decimal value 0).	Display of H0b.43 = 0x0002: 
H0b.53	Position deviation counter (32-bit decimal)	Reference unit	Position deviation = Sum of input position references (reference unit) - Sum of pulses fed back by the encoder (reference unit)	Display of 10000 in reference unit: 
H0b.55	Motor speed actual value	0.1 rpm	Displays actual value of the motor speed, which can be accurate to 0.1 rpm.	Display of 3000.0 rpm:  Display of -3000.0 rpm: 
H0b.57	Control circuit voltage	V	Displays the DC voltage of the control circuit.	Display of 12.0 V: 

Param. No.	Name	Unit	Meaning	Example of Display
H0b.58	Mechanical absolute position (low 32 bits)	Encoder unit	Displays the mechanical absolute position (low 32 bits) when an absolute encoder is used.	Display of 2147483647 in encoder unit: 
H0b.60	Mechanical absolute position (high 32 bits)	Encoder unit	Displays the mechanical absolute position (high 32 bits) when an absolute encoder is used.	Display of 32767: 
H0b.70	Number of absolute encoder revolutions	Rev	Displays the present number of revolutions of the absolute encoder.	Display of 32767: 
H0b.71	Single-turn position feedback of absolute encoder	Encoder unit	Displays the single-turn position feedback of the absolute encoder.	Display of 8388607 in encoder unit: 
H0b.77	Absolute encoder position (low 32 bits)	Encoder unit	Displays the absolute position (low 32 bits) of the motor when the absolute encoder is used.	Display of 2147483647 in encoder unit: 

Param. No.	Name	Unit	Meaning	Example of Display
H0b.79	Absolute encoder position (high 32 bits)	Encoder unit	Displays the absolute position (high 32 bits) of the motor when the absolute encoder is used.	Display of -1 in encoder unit: 
H0b.81	Single-turn position feedback of the load in rotation mode (low 32 bits)	Encoder unit	Displays the position feedback (low 32 bits) of the mechanical load when the absolute system works in the rotation mode.	Display of 2147483647 in encoder unit: 
H0b.83	Single-turn position feedback of the load in rotation mode (high 32 bits)	Encoder unit	Displays the position feedback (high 32 bits) of the mechanical load when the absolute system works in the rotation mode.	Display of 1 in encoder unit: 
H0b.85	Single-turn position of the rotary load	Reference unit	Displays the mechanical absolute position when the absolute system works in the rotation mode.	Display of 1073741824 in reference unit: 

7.2 DI/DO Function Assignment

Function No.	Name	Function Name	Description	Remarks
Description of DI Signals				
FunIN.1	S-ON	Servo ON	Inactive: Servo motor disabled Active: Servo motor enabled upon power-on	The corresponding terminal logic must be level-triggered. The change of the corresponding DI/VDI or terminal logic is activated at next power-on.
FunIN.2	ALM-RST	Alarm reset signal	Inactive: Inhibited Active: Enabled	If the alarm reset signal is set to "level-triggered", the servo drive will treat it as edge-triggered. To reset No. 1 and No. 2 resettable faults, switch off the S-ON signal first. The servo drive may, depending on the warning types, continue running after warning reset.
FunIN.5	DIR-SEL	Multi-reference direction	Inactive: Reference direction by default Active: Opposite to the reference direction	The corresponding terminal logic is recommended to be level-triggered.
FunIN.6	CMD1	Multi-reference switchover 1	Used to select a reference from 16 references.	The corresponding terminal logic is recommended to be level-triggered.
FunIN.7	CMD2	Multi-reference switchover 2	Used to select a reference from 16 references.	The corresponding terminal logic is recommended to be level-triggered.
FunIN.8	CMD3	Multi-reference switchover 3	Used to select a reference from 16 references.	The corresponding terminal logic is recommended to be level-triggered.
FunIN.9	CMD4	Multi-reference switchover 4	Used to select a reference from 16 references.	The corresponding terminal logic is recommended to be level-triggered.
FunIN.14	P-OT	Positive limit switch	Active: Forward drive inhibited Inactive: Forward drive permitted	Overtravel prevention applies when the machine moves beyond the limit. It is recommended that the corresponding terminal logic is level-triggered.
FunIN.15	N-OT	Negative limit switch	Overtravel prevention applies when the load moves beyond the limit. Active: Reverse drive inhibited Inactive: Reverse drive allowed	The corresponding terminal logic is recommended to be level-triggered.

Function No.	Name	Function Name	Description	Remarks
FunIN.18	JOGCMD+	Forward jog	Active: Inputted based on reference Inactive: Reference input stopped	The corresponding terminal logic is recommended to be level-triggered.
FunIN.19	JOGCMD-	Reverse jog	Active: Inputted in reverse to the reference Inactive: Reference input stopped	The corresponding terminal logic is recommended to be level-triggered.
FunIN.24	GEAR_SEL	Electronic gear ratio switchover	Inactive: Electronic gear ratio 1 Active: Electronic gear ratio 2	The corresponding terminal logic is recommended to be level-triggered.
FunIN.28	PosInSen	Multi-position reference enable	Inactive: Internal multi-reference ignored Active: Internal multi-reference started	The corresponding terminal logic is recommended to be level-triggered.
FunIN.31	HomeSwitch	Home switch	Inactive: Not triggered Valid: Triggered	The corresponding terminal logic must be level-triggered. Assign this function to a high-speed DI. If the logic is set to 2 (rising edge-triggered), the servo drive forcibly changes it to 1 (active high). If the logic is set to 3 (falling edge-triggered), the servo drive forcibly changes it to 0 (active low). If the logic is set to 4 (rising/falling edge-triggered), the servo drive forcibly changes it to 0 (active low).
FunIN.34	Emergency Stop	Emergency stop	Active: Position lock applied after stop at zero speed Inactive: Current operating state unaffected	The corresponding terminal logic is recommended to be level-triggered.
FunIN.38	TouchProbe1	Touch probe 1	Inactive - Touch probe not triggered Active - Touch probe triggerable	The touch probe logic is only related to the touch probe function (60B8h).
FunIN.39	TouchProbe2	Touch probe 2	Inactive - Touch probe not triggered Active - Touch probe triggerable	The touch probe logic is only related to the touch probe function (60B8h).
FunIN.40	Multi-speed	Multi-speed enable	Inactive: Internal multi-speed reference ignored Valid: Internal multi-speed reference started	The corresponding terminal logic is recommended to be level-triggered.
Description of DO Signals				
FunOUT.1	S-RDY	Servo ready	The servo drive is ready to receive the S-ON signal. Active - Servo ready Inactive: Servo not ready	-

Function No.	Name	Function Name	Description	Remarks
FunOUT.2	TGON	Motor rotation signal	Inactive: Absolute value of filtered motor speed lower than the setpoint of H06.16 Active - Absolute value of filtered motor speed reaching the setpoint of H06.16	-
FunOUT.10	WARN	Warning	Active - Warning occurred on the servo drive Inactive - No warning occurred on the servo drive or the warning has been reset	-
FunOUT.11	ALM	Fault	Active - Fault occurred on the servo drive Inactive - No fault occurred on the servo drive or the fault has been reset	-
FunOUT.25	CMP	Position comparison	Active: Servo drive passing the target position comparison point Inactive: Servo drive not passing the target position comparison point	-
FunOUT.31	EtherCAT-forced DO in non-operational status		See *"Table 7–1 Description of EtherCAT-forced DO in non-operational status (H04.23)" on page 642*	-
FunOUT.32	EDM	EDM output	Active - STO function triggered Inactive - STO function not triggered	The EDM outputs active signals only when the 24 V input voltages for STO1 and STO2 are disconnected simultaneously.

Table 7–1 Description of EtherCAT-forced DO in non-operational status (H04.23)

Bit 0	Bit 1	Description
0	0	Status of DO1 and DO2 unchanged in the non-operational status
1	0	No output in DO1 and status of DO2 unchanged in the non-operational status
0	1	No output in DO2 and status of DO1 unchanged in the non-operational status
1	1	No output in DO1 or DO2 in the non-operational status

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