

Σ -X-Series AC Servo Drive

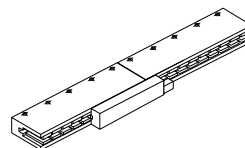
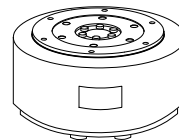
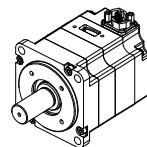
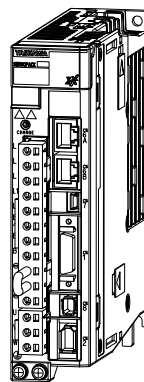
Σ -XS SERVOPACK

with FT Specification

Customized Sensing Data Function
Option (with Custom Motion
Function)

Product Manual

Model: SGDXS-□□□□40A200056



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i.1 About this Manual

This manual provides information about the customized sensing data function for Σ -X-series AC servo drive Σ -XS SERVOPACKs.

Read and understand this manual to ensure correct usage of the Σ -X-series AC servo drives. Keep this manual in a safe place so that it can be referred to whenever necessary.

i.2 Outline of Manual

The contents of the chapters of this manual are described in the following table.

When you use a Σ -X-series SERVOPACK with the customized sensing data function, read this manual together with the product manual given in the following table.

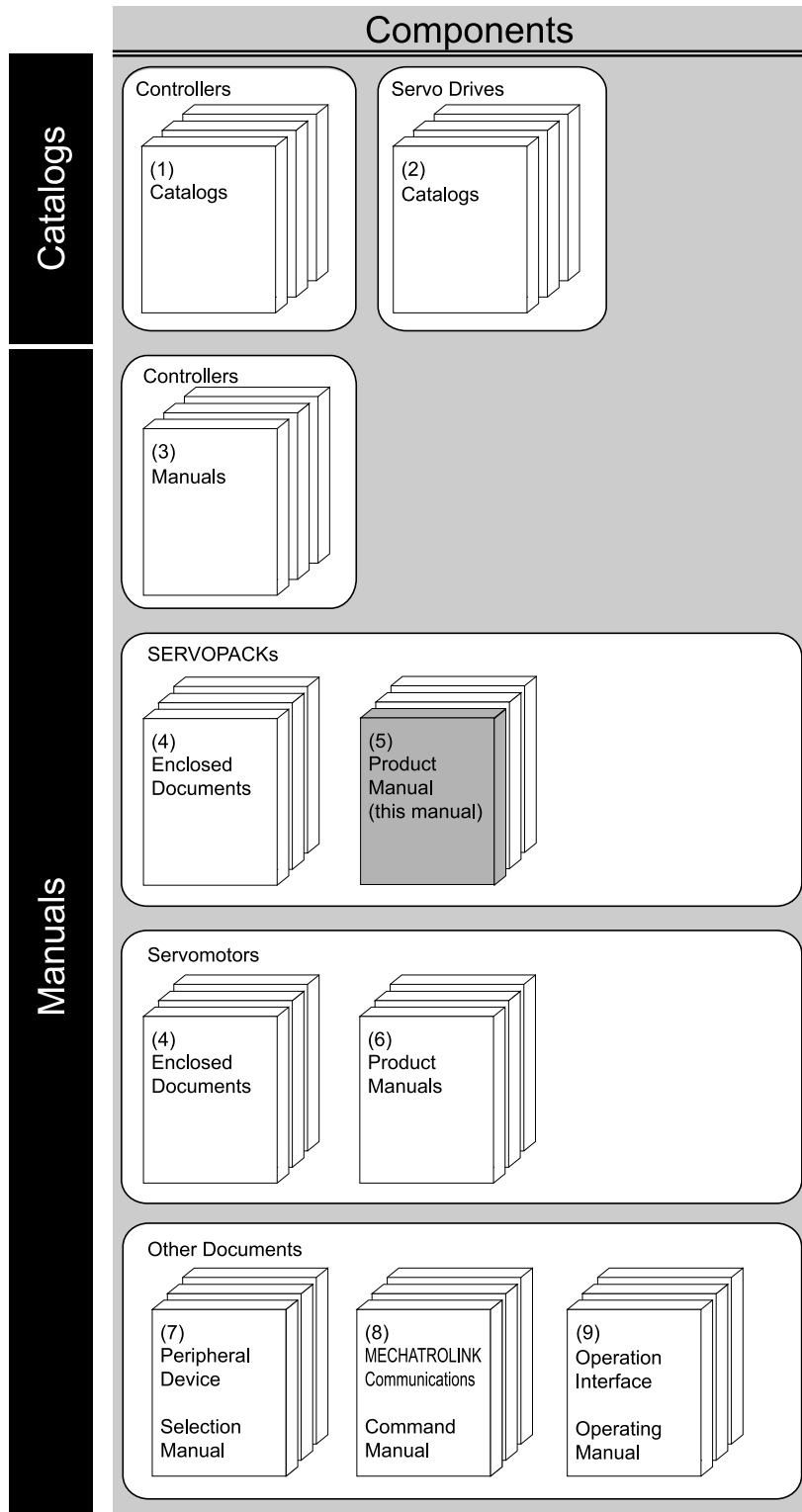
Item		This Manual	Σ -XS SERVOPACK with MECHATRO-LINK-4/III Communications References Product Manuals (Manual No.: SIEP C710812 01)
Basic Information on SERVOPACKs	The Σ -X Series	–	1.1
	Product Overview	1.1	–
	Interpreting the Nameplate	–	1.2
	Part Names	–	1.3
	Interpreting Model Numbers	1.2	–
	Combinations of SERVOPACKs and Servomotors	1.3	–
	Functions	1.4	–
	Restrictions	1.5	–
	Precautions When Using This Product	1.6	–
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	SigmaWin+	1.8	–
	Combinations with MP-Series Machine Controllers	1.9	–
Selecting a SERVOPACK	Ratings	2.1	–
	SERVOPACK Overload Protection Characteristics	2.2	–
	Specifications	2.3	–
	Internal Block Diagrams	–	2.2
	External Dimensions	2.4	–
	Examples of Standard Connections between SERVOPACKs and Peripheral Devices	–	2.4
SERVOPACK Installation		–	Chapter 3
Wiring and Connecting SERVOPACKs	Wiring Precautions	3.1	4.1
	Basic Wiring Diagrams	–	4.2
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	Connecting MECHATROLINK Cables	–	4.7
	Connecting the SigmaWin+	–	4.8
	Connecting a Digital Operator	–	4.9
	Using the Analog Monitors	–	4.10
	System Configuration Example	3.2	–
	Devices and Components That Are Required to Build a System	3.3	–
Basic Functions That Require Setting before Operation		–	Chapter 5
Basic Operations of Customized Sensing Data Function		Chapter 4	–

Continued on next page.

Item		This Manual	Σ -XS SERVOPACK with MECHATRO-LINK-4/III Communications References Product Manuals (Manual No.: SIEP C710812 01)	
Connecting MPE720 and SERVOPACK		Chapter 5	–	
User Application Settings		Chapter 6	–	
User Program Creation		Chapter 7	–	
Customized Sensing Data Function		Chapter 8	–	
Custom Motion Function		Chapter 9	–	
Application Functions		–	Chapter 6	
Trial Operation and Actual Operation		–	Chapter 7	
Tuning		–	Chapter 8	
Monitoring		Chapter 10	Chapter 9	
Fully-Closed Loop Control		–	Chapter 10	
Σ -LINK II Function		–	Chapter 11	
Safety Function		–	Chapter 12	
Maintenance	Inspections and Part Replacement	–	13.1	
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		Troubleshooting Alarms	11.1.2	–
		Alarm Reset	–	13.2.3
		Displaying the Alarm History	–	13.2.4
		Clearing the Alarm History	–	13.2.5
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Parameter Lists		Chapter 12	–	
Appendices	Interpreting LED Displays	–	15.1	
	Interpreting Panel Displays	–	15.2	
	Corresponding SERVOPACK and SigmaWin+ Function Names	–	15.3	
	System Registers	13.1	–	
	Ladder Instruction	13.2	–	
	Specifying Units	13.3	–	
	Alarm Code List	13.4	–	

i.3 Related Documents

The relationships between the documents that are related to the Servo Drives are shown in the following figure. The numbers in the figure correspond to the numbers in the table on the following pages. Refer to these documents as required.



i.3.1 Related Documents

(1) Machine Controllers Catalogs

You can check for products related to YASKAWA machine controllers. Refer to these documents as required.

(2) Servo Drives Catalogs

Document Name	Document No.	Description
AC Servo Drives Sigma-X Series	KAEP C710812 03	Provides detailed information on Σ -X-series AC servo drives, including features and specifications.

(3) Machine Controllers Manuals

The machine controller to use depends on the SERVOPACK that is used. Refer to the manual for the machine controller as required.

(4) Enclosed Documents

Document Name	Document No.	Description
Σ -X-Series AC Servo Drive Σ -XS/ Σ -XW SERVOPACK Safety Precautions	TOMP C710812 00	Provides detailed information for the safe usage of Σ -X-series SERVOPACKs.
Σ -X-Series AC Servo Drive Σ -XT SERVOPACK Safety Precautions	TOMP C710812 16	
Σ -X-Series AC Servo Drive Σ -LINK II Sensor Hub Instructions	TOMP C710812 06	Provides detailed information for the safe usage of the Σ -LINK II sensor hub, as well as specifications, installation, and connection information.
Σ -X-Series AC Servo Drive Σ -LINK II Booster Unit Instructions	TOMP C710812 08	Provides detailed information for the safe usage of the Σ -LINK II booster unit, as well as specifications, installation, and connection information.
Σ -V-Series/ Σ -V-Series for Large-Capacity Models/ Σ -7-Series/ Σ -X-Series Installation Guide Fully-closed Module	TOBP C720829 03	Provides detailed procedures for installing the fully-closed module in a SERVOPACK.
AC Servo Drive Rotary Servomotor Safety Precautions	TOBP C230260 00	Provides detailed information for the safe usage of rotary servomotors and direct drive servomotors.

(5) SERVOPACK Product Manuals

Document Name	Document No.	Description
Σ-X-Series AC Servo Drive Σ-XS SERVOPACK with MECHATROLINK-4/III Communica- tions References Product Manual	SIEP C710812 01	Provide detailed information on selecting Σ-X-series Σ-XS or Σ-XW SERVOPACKs; installing, connecting, setting, testing in trial operation, tuning, monitoring, and maintaining servo drives; and other information.
Σ-X-Series AC Servo Drive Σ-XS SERVOPACK with EtherCAT Communications References Product Manual	SIEP C710812 02	
Σ-X-Series AC Servo Drive Σ-XS SERVOPACK with Analog Voltage/Pulse Train References Product Manual	SIEP C710812 03	
Σ-X-Series AC Servo Drive Σ-XW SERVOPACK with MECHATROLINK-4/III Communica- tions References Product Manual	SIEP C710812 04	
Σ-X-Series AC Servo Drive Σ-XW SERVOPACK with EtherCAT Communications References Product Manual	SIEP C710812 05	
Σ-X-Series AC Servo Drive Σ-XT SERVOPACK with MECHATROLINK-4/III Communica- tions References Product Manual	SIEP C710812 16	Provide detailed information on selecting Σ-X-series Σ-XT SERVOPACKs; installing, connecting, setting, testing in trial operation, tuning, monitoring, and maintaining servo drives; and other information.
Σ-X-Series AC Servo Drive Σ-XT SERVOPACK with EtherCAT Communications References Product Manual	SIEP C710812 17	
Σ-X-Series AC Servo Drive Σ-XW/Σ-XT SERVOPACK Hardware Option Specifications HWBB Function Product Manual	SIEP C710812 13	Provides information on servo drives equipped with the HWBB safety function (SGDXW-□□□□40□1000, SGDXW-□□□□A0□1000, SGDXT-□□□□40□1000, and SGDXT-□□□□A0□1000)). The differences in specifications from SERVOPACKs not equipped with the HWBB are given in this manual.
Σ-X-Series AC Servo Drive Σ-XS/Σ-XW/Σ-XT SERVOPACK Hardware Option Specifications Dynamic Brake Product Manual	SIEP C710812 14	Provides information on Σ-X-series AC servo drives (SGDX□-□□□□□□0020) with the dynamic brake option. The differences in specifications from SERVOPACKs without the dynamic brake option are given in this manual.

Continued on next page.

Document Name	Document No.	Description
Σ -X-Series AC Servo Drive Σ -XS/ Σ -XW SERVOPACK with MECHATROLINK-4/III Communications References FT Specification for Gantry Applications Product Manual	SIEP C710812 19	Provide information on the gantry application function and torque/force assistance in the Σ -X-series Σ -XS/ Σ -XW SERVOPACK.
Σ -X-Series AC Servo Drive Σ -XS/ Σ -XW SERVOPACK with EtherCAT Communications References FT Specification for Gantry Applications Product Manual	SIEP C710812 20	
Σ -X-Series AC Servo Drive Σ -XS SERVOPACK with MECHATROLINK-4/III Communications References FT Specification for Press and Injection Molding Applications Product Manual	SIEP C710812 22	Provide information on the press and injection molding function in the Σ -X-series Σ -XS SERVOPACK.
Σ -X-Series AC Servo Drive Σ -XS SERVOPACK with EtherCAT Communications References FT Specification for Press and Injection Molding Applications Product Manual	SIEP C710812 23	
Σ -X-Series AC Servo Drive Σ -XS SERVOPACK with FT Specification Customized Sensing Data Function Option Product Manual	SIEP C710812 18	Provides information on the customized sensing data function in the Σ -X-series Σ -XS SERVOPACK.
Σ -X-Series AC Servo Drive Σ -XS SERVOPACK with FT Specification Customized Sensing Data Function Option (with Custom Motion Function) Product Manual	SIEP C710812 21	Provides information on the customized sensing data function (with custom motion function) in the Σ -X-series Σ -XS SERVOPACK.

(6) Servomotor Product Manuals

Document Name	Document No.	Description
Σ -X-Series AC Servo Drive Rotary Servomotor Product Manual	SIEP C230210 00	Provides detailed information on selecting, installing, and connecting the Σ -X-series servomotors.

(7) Peripheral Device Selection Manual

Document Name	Document No.	Description
Σ -X-Series AC Servo Drive Peripheral Device Selection Manual	SIEP C710812 12	Provides the following information in detail for Σ -X-series servo systems. <ul style="list-style-type: none"> • Cables: Models, dimensions, wiring materials, connector models, and connection specifications • Peripheral devices: Models, specifications, diagrams, and selection (calculation) methods

(8) MECHATROLINK Communications Command Manuals

Document Name	Document No.	Description
Σ -7/ Σ -X-Series AC Servo Drive MECHATROLINK-III Communications Standard Servo Profile Command Manual	SIEP S800001 31	Provides detailed information on the MECHATROLINK-III communications standard servo profile commands that are used for a Σ -7/ Σ -X-series servo system.
Σ -7/ Σ -X-Series AC Servo Drive MECHATROLINK-4 Communications Standard Servo Profile Command Manual	SIEP S800002 32	Provides detailed information on the MECHATROLINK-4 communications standard servo profile commands that are used for a Σ -7/ Σ -X-series servo system.

(9) Operation Interface Operating Manuals

Document Name	Document No.	Description
System Integrated Engineering Tool MPE720 Ver.7 User's Manual	SIEP C880761 03	Describes in detail how to operate MPE720 version 7.
Σ -7/ Σ -X-Series AC Servo Drive Digital Operator Operating Manual	SIEP S800001 33	Describes the operating procedures for a digital operator for a Σ -7/ Σ -X-series servo system.
AC Servo Drive Engineering Tool SigmaWin+ Operation Manual	SIET S800001 34	Provides detailed operating procedures for the SigmaWin+ engineering tool for a Σ -7/ Σ -X series servo system.
M-4 Configuration Tool Manual	SIEP C880761 07	Provides detailed operating procedures for M-4 Configuration Tool.

i.4 Using This Manual

i.4.1 Basic Terms Used in this Manual

The following basic terms are used in this manual.

Term	Meaning
servomotor	A generic term for a rotary servomotor or linear servomotor that can be driven by this SERVOPACK.
rotary servomotor	A generic term used for a Σ -X-series rotary servomotor (SGMXJ, SGMXA, SGMXG, SGM7M) or a Σ -7-series direct drive servomotor (SGM7D, SGM7E, SGM7F). The descriptions will specify when direct drive servomotors are excluded.
linear servomotor	A generic term used for a Σ -7-series linear servomotor (SGLG, SGLF, SGLT).
SERVOPACK	A Σ -X-series Σ -XS servo amplifier with MECHATROLINK-4 communications references.
servo drive	The combination of a servomotor and SERVOPACK.
servo system	A servo control system that includes the combination of a servo drive with a host controller and peripheral devices.
servo ON	Supplying power to the motor.
servo OFF	Not supplying power to the motor.
base block (BB)	Shutting OFF the power supply to the motor by shutting OFF the base current to the power transistor in the SERVOPACK.
servo lock	A state in which the motor is stopped and is in a position loop with a position reference of 0.
main circuit cable	One of the cables that connect to the main circuit terminals, including the main circuit power supply cable, control power supply cable, and servomotor main circuit cable.
SigmaWin+	The engineering tool for setting up and tuning servo drives or a computer in which the engineering tool is installed.

i.4.2 Differences in Terms for Rotary Servomotors and Linear Servomotors

There are differences in the terms that are used for rotary servomotors and linear servomotors. This manual primarily describes rotary servomotors. If you are using a linear servomotor, you need to interpret the terms as given in the following table.

Rotary Servomotor	Linear Servomotor
torque	force
moment of inertia	mass
rotation	movement
forward rotation and reverse rotation	forward movement and reverse movement
CW + CCW pulse trains	forward and reverse pulse trains
rotary encoder	linear encoder
absolute rotary encoder	absolute linear encoder
incremental rotary encoder	incremental linear encoder
unit: min^{-1}	unit: mm/s
unit: N·m	unit: N

i.4.3 Notation Used in this Manual

(1) Notation for Reverse Signals

The names of reverse signals (i.e., ones that are valid when low) are written with a forward slash (/) before the signal abbreviation.

Notation Example

\overline{BK} is written as /BK.

(2) Notation for Parameters

The notation depends on whether the parameter requires a numeric setting (parameter for numeric setting) or requires the selection of a function (parameter for selecting functions).

(a) Parameters for Numeric Settings

	Speed Loop Gain				Speed Pos Trq
Pn100	Setting Range	Setting Unit	Default Setting	When Enabled	
	10 to 20,000	0.1 Hz	400	Immediately	
(1)	(2)	(3)	(4)	(5)	(6)

No.	Description
(1)	Parameter number
(2)	This is the setting range for the parameter.
(3)	This is the setting unit (setting increment) that you can set for the parameter.
(4)	This is the parameter setting before shipment.
(5)	This is when any change made to the parameter will become effective.
(6)	<p>The control methods for which the parameters apply are given.</p> <p>Speed: A parameter that can be used in speed control.</p> <p>Pos: A parameter that can be used in position control.</p> <p>Trq: A parameter that can be used in torque control. "Torque" is used even for linear servomotor parameters.</p> <p>Grayed-out icons (Speed, Pos, Trq) indicate parameters that cannot be used in the corresponding control method.</p>

(b) Parameters for Selecting Functions

		Encoder Usage	Speed Pos Trq	When Enabled
Pn002	n.X□□□	0 Default		
		1		After restart
		2		
(1)	(2)	(3)	(4)	(5)

No.	Description																													
(1)	Parameter number																													
(2)	<p>The notation "n.□□□□" indicates a parameter for selecting functions. The digit shown as "X" is the content being explained in this parameter.</p> <p>Notation Example</p> <p style="text-align: center;">Notation Examples for Pn002</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">n.</th> <th colspan="2">Digit Notation</th> <th colspan="2">Numeric Value Notation</th> </tr> <tr> <th>Notation</th> <th>Meaning</th> <th>Notation</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Pn002 = n.□□□X</td> <td>Indicates the first digit from the right in Pn002.</td> <td>Pn002 = n.□□□1</td> <td>Indicates that the first digit from the right in Pn002 is set to 1.</td> </tr> <tr> <td>0</td> <td>Pn002 = n.□□X□</td> <td>Indicates the second digit from the right in Pn002.</td> <td>Pn002 = n.□□1□</td> <td>Indicates that the second digit from the right in Pn002 is set to 1.</td> </tr> <tr> <td>0</td> <td>Pn002 = n.□X□□</td> <td>Indicates the third digit from the right in Pn002.</td> <td>Pn002 = n.□1□□</td> <td>Indicates that the third digit from the right in Pn002 is set to 1.</td> </tr> <tr> <td>0</td> <td>Pn002 = n.X□□□</td> <td>Indicates the fourth digit from the right in Pn002.</td> <td>Pn002 = n.1□□□</td> <td>Indicates that the fourth digit from the right in Pn002 is set to 1.</td> </tr> </tbody> </table>	n.	Digit Notation		Numeric Value Notation		Notation	Meaning	Notation	Meaning	0	Pn002 = n.□□□X	Indicates the first digit from the right in Pn002.	Pn002 = n.□□□1	Indicates that the first digit from the right in Pn002 is set to 1.	0	Pn002 = n.□□X□	Indicates the second digit from the right in Pn002.	Pn002 = n.□□1□	Indicates that the second digit from the right in Pn002 is set to 1.	0	Pn002 = n.□X□□	Indicates the third digit from the right in Pn002.	Pn002 = n.□1□□	Indicates that the third digit from the right in Pn002 is set to 1.	0	Pn002 = n.X□□□	Indicates the fourth digit from the right in Pn002.	Pn002 = n.1□□□	Indicates that the fourth digit from the right in Pn002 is set to 1.
n.	Digit Notation		Numeric Value Notation																											
	Notation	Meaning	Notation	Meaning																										
0	Pn002 = n.□□□X	Indicates the first digit from the right in Pn002.	Pn002 = n.□□□1	Indicates that the first digit from the right in Pn002 is set to 1.																										
0	Pn002 = n.□□X□	Indicates the second digit from the right in Pn002.	Pn002 = n.□□1□	Indicates that the second digit from the right in Pn002 is set to 1.																										
0	Pn002 = n.□X□□	Indicates the third digit from the right in Pn002.	Pn002 = n.□1□□	Indicates that the third digit from the right in Pn002 is set to 1.																										
0	Pn002 = n.X□□□	Indicates the fourth digit from the right in Pn002.	Pn002 = n.1□□□	Indicates that the fourth digit from the right in Pn002 is set to 1.																										
(3)	<p>This column explains the selections for the function.</p> <p>In the above example, the first line gives an explanation of when Pn002 = n.□0□□ is set.</p>																													
(4)	This is when any change made to the parameter will become effective.																													
(5)	<p>The control methods for which the parameters apply are given.</p> <p>Speed: A parameter that can be used in speed control.</p> <p>Pos: A parameter that can be used in position control.</p> <p>Trq: A parameter that can be used in torque control. "Torque" is used even for linear servomotor parameters.</p> <p>Grayed-out icons () indicate parameters that cannot be used in the corresponding control method.</p>																													

i.4.4 Engineering Tools Used in This Manual

This manual uses the interfaces of the SigmaWin+ for descriptions.



The interfaces and procedures contained in this manual are currently in development and may differ from the actual specifications.

i.4.5 Trademarks

- QR code is a trademark of Denso Wave Inc.
- MECHATROLINK is a trademark of the MECHATROLINK Members Association.
- Σ-LINK is a trademark of the MECHATROLINK Members Association.
- Other product names and company names are the trademarks or registered trademarks of their respective companies. "TM" and the ® mark do not appear with product or company names in this manual.

i.4.6 Visual Aids

The following aids are used to indicate certain types of information for easier reference.

	<p>Indicates precautions or restrictions that must be observed.</p> <p>Also indicates alarm displays and other precautions that will not result in machine damage.</p> <p>Important</p>
	<p>Indicates definitions of difficult terms or terms that have not been previously explained in this manual.</p> <p>Term</p>

Information Indicates supplemental information to deepen understanding or useful information.

i.5 Safety Precautions

i.5.1 Safety Information

To prevent personal injury and equipment damage in advance, the following signal words are used to indicate safety precautions in this document. The signal words are used to classify the hazards and the degree of damage or injury that may occur if a product is used incorrectly. Information marked as shown below is important for safety. Always read this information and heed the precautions that are provided.



DANGER

Indicates precautions that, if not heeded, are likely to result in loss of life, serious injury, or fire.



WARNING

Indicates precautions that, if not heeded, could result in loss of life, serious injury, or fire.



CAUTION

Indicates precautions that, if not heeded, could result in relatively serious or minor injury, or in fire.

NOTICE

Indicates precautions that, if not heeded, could result in property damage.

i.5.2 Safety Precautions That Must Always Be Observed

(1) General Precautions



DANGER

Read and understand this manual to ensure the safe usage of the product.

Keep this manual in a safe, convenient place so that it can be referred to whenever necessary. Make sure that it is delivered to the final user of the product.

Do not remove covers, cables, connectors, or optional devices while power is being supplied to the SERVOPACK.

There is a risk of electric shock, operational failure of the product, or burning.


WARNING

Use a power supply with specifications (number of phases, voltage, frequency, and AC/DC type) that are appropriate for the product.

There is a risk of burning, electric shock, or fire.

Connect the ground terminals on the SERVOPACK and servomotor to ground poles according to local electrical codes (100 Ω max).

There is a risk of electric shock or fire.

Do not attempt to disassemble, repair, or modify the product.

There is a risk of fire or failure. The warranty is void for the product if you disassemble, repair, or modify it.


CAUTION

The SERVOPACK heat sinks, regenerative resistors, external dynamic brake resistors, servomotors, and other components can be very hot while power is ON or soon after the power is turned OFF. Implement safety measures, such as installing covers, so that hands and parts such as cables do not come into contact with hot components.

There is a risk of burning.

For a 24-VDC power supply, use a power supply device with double insulation or reinforced insulation.

There is a risk of electric shock.

Do not damage, pull on, apply excessive force to, place heavy objects on, or pinch cables.

There is a risk of failure, damage, or electric shock.

The person who designs the system that uses the safety function must have a complete knowledge of the related safety standards and a complete understanding of the instructions in this document.

There is a risk of injury, product damage, or machine damage.

Do not place the product in locations where it is subject to water, corrosive gases, flammable gases, potentially explosive atmospheres, or near flammable materials.

There is a risk of electric shock or fire.

NOTICE

Do not attempt to use a SERVOPACK or servomotor that is damaged or that has missing parts.

Install external emergency stop circuits that shut OFF the power and stops operation immediately when an error occurs.

In locations with poor power supply conditions, install the necessary protective devices (such as AC reactors) to ensure that the input power is supplied within the specified voltage range.

There is a risk of damage to the SERVOPACK.

Use a noise filter to minimize the effects of electromagnetic interference.

Electronic devices used near the SERVOPACK may be affected by electromagnetic interference.

Always use a servomotor and SERVOPACK in one of the specified combinations.

Do not touch a SERVOPACK or servomotor with wet hands.

There is a risk of product failure.

(2) Storage Precautions



CAUTION

Do not place an excessive load on the product. (Follow all instructions on the packages.)

There is a risk of injury or damage.

NOTICE

Do not install or store the product in any of the following locations.

- **Locations that are subject to direct sunlight**
- **Locations that are subject to surrounding temperatures that exceed product specifications**
- **Locations that are subject to relative humidities that exceed product specifications**
- **Locations that are subject to condensation as the result of extreme changes in temperature**
- **Locations that are subject to corrosive or flammable gases**
- **Locations that are near flammable materials**
- **Locations that are subject to dust, salts, or iron powder**
- **Locations that are subject to water, oil, or chemicals**
- **Locations that are subject to vibration or shock that exceeds product specifications**
- **Locations that are subject to radiation**

If you store or install the product in any of the above locations, the product may fail or be damaged.

(3) Transportation Precautions



CAUTION

Transport the product in a way that is suitable to the mass of the product.

Do not use the eyebolts on a SERVOPACK or servomotor to move the machine.

There is a risk of damage or injury.

When you handle a SERVOPACK or servomotor, be careful of sharp parts, such as the corners.

There is a risk of injury.

Do not place an excessive load on the product. (Follow all instructions on the packages.)

There is a risk of injury or damage.

NOTICE

Do not hold onto the front cover or connectors when you move a SERVOPACK.

There is a risk of the SERVOPACK falling.

SERVOPACK or servomotor is a precision device. Do not drop it or subject it to strong shock.

There is a risk of failure or damage.

Do not subject connectors to shock.

There is a risk of faulty connections or damage.

NOTICE

If disinfectants or insecticides must be used to treat packing materials such as wooden frames, plywood, or pallets, use a method other than fumigation. For example, use heat sterilization (core temperature of 56°C or higher for 30 minutes or longer). Treat the packing materials before the product is packaged instead of using a method that treats the entire packaged product.

If the electronic products, which include stand-alone products and products installed in machines, are packed with fumigated wooden materials, the electrical components may be greatly damaged by the gases or fumes resulting from the fumigation process. In particular, disinfectants containing halogen, which includes chlorine, fluorine, bromine, or iodine can contribute to the erosion of the capacitors.

Do not overtighten the eyebolts on a SERVOPACK or servomotor.

If you use a tool to overtighten the eyebolts, the tapped holes may be damaged.

(4) Installation Precautions



CAUTION

Install the servomotor or SERVOPACK in a way that will support the mass given in technical documents.

Install SERVOPACKs, servomotors, regenerative resistors, and external dynamic brake resistors on nonflammable materials.

Installation directly onto or near flammable materials may result in fire.

Provide the specified clearances between the SERVOPACK and the control panel as well as with other devices.

There is a risk of fire or failure.

Install the SERVOPACK in the specified orientation.

There is a risk of fire or failure.

Do not step on or place a heavy object on the product.

There is a risk of failure, damage, or injury.

Do not allow any foreign matter to enter the SERVOPACK or servomotor.

There is a risk of failure or fire.

NOTICE

Do not install or store the product in any of the following locations.

- **Locations that are subject to direct sunlight**
- **Locations that are subject to surrounding temperatures that exceed product specifications**
- **Locations that are subject to relative humidities that exceed product specifications**
- **Locations that are subject to condensation as the result of extreme changes in temperature**
- **Locations that are subject to corrosive or flammable gases**
- **Locations that are near flammable materials**
- **Locations that are subject to dust, salts, or iron powder**
- **Locations that are subject to water, oil, or chemicals**
- **Locations that are subject to vibration or shock that exceeds product specifications**
- **Locations that are subject to radiation**

If you store or install the product in any of the above locations, the product may fail or be damaged.

Use the product in an environment that is appropriate for the product specifications.

If you use the product in an environment that exceeds product specifications, the product may fail or be damaged.

NOTICE

SERVOPACK or servomotor is a precision device. Do not drop it or subject it to strong shock.

There is a risk of failure or damage.

Always install a SERVOPACK in a control panel.

Do not allow any foreign matter to enter a SERVOPACK or a servomotor with a cooling fan and do not cover the outlet from the servomotor's cooling fan.

There is a risk of failure.

(5) Wiring Precautions



DANGER

Do not change any wiring while power is being supplied.

There is a risk of electric shock or injury.



WARNING

Wiring and inspections must be performed only by qualified engineers.

There is a risk of electric shock or product failure.

Check all wiring and power supplies carefully.

Incorrect wiring or incorrect voltage application to the output circuits may cause short-circuit failures. If a short-circuit failure occurs as a result of any of these causes, the holding brake will not work. This could damage the machine or cause an accident that may result in death or injury. There is also a risk that some parts damaged by the short-circuit failure may fall from the SERVOPACK.

Connect the AC or DC power supplies to the specified SERVOPACK terminals.

- **Connect an AC power supply to the L1, L2, and L3 terminals and the L1C and L2C terminals on the SERVOPACK.**
- **Connect a DC power supply to the B1/⊕ and ⊖ 2 terminals and the L1C and L2C terminals on the SERVOPACK.**

There is a risk of failure or fire.

If you use a SERVOPACK with the dynamic brake hardware option, connect an external dynamic brake resistor that is suitable for the machine and equipment specifications to the specified terminals.

There is a risk of unexpected operation, machine damage, burning, or injury when an emergency stop is performed.



CAUTION

Wait for at least 20 minutes (or 100 minutes when using DC power supply input) after turning OFF the power and then make sure that the CHARGE indicator is not lit before starting wiring or inspection work. Do not touch the main circuit terminals while the CHARGE indicator is lit because high voltage may still remain in the SERVOPACK even after turning OFF the power.

There is a risk of electric shock.

Observe the precautions and instructions for wiring and trial operation precisely as described in this document.

Failures caused by incorrect wiring or incorrect voltage application in the brake circuit may cause the SERVOPACK to fail, damage the equipment, or cause an accident resulting in death or injury.



CAUTION

Check the wiring to be sure it has been performed correctly. Connectors and pin layouts are sometimes different for different models. Always confirm the pin layouts in technical documents for your model before operation.

There is a risk of failure or malfunction.

Connect wires to main circuit terminals and motor connection terminals securely with the specified methods and tightening torque.

Insufficient tightening may cause wires and terminal blocks to generate heat due to faulty contact, possibly resulting in fire.

Use shielded twisted-pair cables or screened unshielded multi-twisted-pair cables for I/O signal cables and encoder cables.

The maximum wiring length is 3 m for I/O signal cables and 50 m for servomotor main circuit cables and encoder cables.

Observe the following precautions when wiring the SERVOPACK's main circuit terminals.

- **Turn ON the power to the SERVOPACK only after all wiring, including the main circuit terminals, has been completed.**
- **If a connector is used for the main circuit terminals, remove the main circuit connector from the SERVOPACK before you wire it.**
- **Insert only one wire per insertion hole in the main circuit terminals.**
- **When you insert a wire, make sure that the conductor wire (e.g., whiskers) does not come into contact with adjacent wires and cause a short-circuit.**

Install molded-case circuit breakers and other safety measures to provide protection against short circuits in external wiring.

There is a risk of fire or failure.

NOTICE

Whenever possible, use the cables specified by Yaskawa. If you use any other cables, confirm the rated current and application environment of your model and use the wiring materials specified by Yaskawa or equivalent materials.

Securely tighten connector screws and lock mechanisms.

Insufficient tightening may result in connectors falling off during operation.

Do not bundle power lines (e.g., the main circuit cable) and low-current lines (e.g., the I/O signal cables or encoder cables) together or run them through the same duct. If you do not place power lines and low-current lines in separate ducts, separate them by at least 30 cm.

If the cables are too close to each other, malfunctions may occur due to noise affecting the low-current lines.

Install a battery at either the host controller or on the encoder cable.

If you install batteries both at the host controller and on the encoder cable at the same time, you will create a loop circuit between the batteries, resulting in a risk of damage or burning.

When connecting a battery, connect the polarity correctly.

There is a risk of battery rupture or encoder failure.

(6) Operation Precautions



WARNING

Before starting operation with a machine connected, change the settings of the switches and parameters to match the machine.

Unexpected machine operation, failure, or personal injury may occur if operation is started before appropriate settings are made.

Do not radically change the settings of the parameters.

There is a risk of unstable operation, machine damage, or injury.

Install limit switches or stoppers at the ends of the moving parts of the machine to prevent unexpected accidents.

There is a risk of machine damage or injury.

For trial operation, securely mount the servomotor and disconnect it from the machine.

There is a risk of injury.

Forcing the motor to stop for overtravel is disabled when the Jog, Origin Search, or Easy FFT utility function is executed. Take necessary precautions.

There is a risk of machine damage or injury.

When an alarm occurs, the servomotor will coast to a stop or stop with the dynamic brake according to the SERVOPACK option and settings. The coasting distance will change with the moment of inertia of the load and the external dynamic brake resistance. Check the coasting distance during trial operation and implement suitable safety measures on the machine.

Do not enter the machine's range of motion during operation.

There is a risk of injury.

Do not touch the moving parts of the servomotor or machine during operation.

There is a risk of injury.

Perform the correct operation with the servomotor connected to the machine.

There is a risk of machine damage or personal injury.



CAUTION

Design the system to ensure safety even when problems, such as broken signal lines, occur. For example, the P-OT and N-OT signals are set in the default settings to operate on the safe side if a signal line breaks. Do not change the polarity of this type of signal.

When overtravel occurs, the power to the motor is turned OFF and the brake is released. If you use the servomotor to drive a vertical load, set the servomotor to enter a zero-clamped state after the servomotor stops. Also, install safety devices (such as an external brake or counterweight) to prevent the moving parts of the machine from falling.


CAUTION

Always turn OFF the servo before you turn OFF the power. If you turn OFF the main circuit power or control power during operation before you turn OFF the servo, the servomotor will stop as follows:

- **If you turn OFF the main circuit power during operation without turning OFF the servo, the servomotor will stop abruptly with the dynamic brake.**
- **If you turn OFF the control power without turning OFF the servo, the stopping method that is used by the servomotor depends on the model of the SERVOPACK. For details, refer to the manual for the SERVOPACK.**
- **If you use a SERVOPACK with the dynamic brake hardware option, the servomotor stopping methods will be different from the stopping methods used without the option or with other hardware options.**

Do not use the dynamic brake for any application other than an emergency stop.

There is a risk of failure due to rapid deterioration of elements in the SERVOPACK and the risk of unexpected operation, machine damage, burning, or injury.

NOTICE

When you adjust the gain during system commissioning, use a measuring instrument to monitor the torque waveform and speed waveform and confirm that there is no vibration.

If a high gain causes vibration, the servomotor will be damaged quickly.

Do not frequently turn the power ON and OFF. After you have started actual operation, allow at least one hour between turning the power ON and OFF (as a guideline). Do not use the product in applications that require the power to be turned ON and OFF frequently.

The elements in the SERVOPACK will deteriorate quickly.

An alarm or warning may occur if communications are performed with the host controller while the SigmaWin+ or digital operator is operating.

If an alarm or warning occurs, it may interrupt the current process and stop the system.

After you complete trial operation of the machine and facilities, use the SigmaWin+ to back up the settings of the SERVOPACK parameters. You can use them to reset the parameters after SERVOPACK replacement.

If you do not copy backed up parameter settings, normal operation may not be possible after a faulty SERVOPACK is replaced, possibly resulting in machine or equipment damage.

(7) Maintenance and Inspection Precautions

DANGER

Do not change any wiring while power is being supplied.

There is a risk of electric shock or injury.


WARNING

Wiring and inspections must be performed only by qualified engineers.

There is a risk of electric shock or product failure.

**CAUTION**

Wait for at least 20 minutes (or 100 minutes when using DC power supply input) after turning OFF the power and then make sure that the CHARGE indicator is not lit before starting wiring or inspection work. Do not touch the main circuit terminals while the CHARGE indicator is lit because high voltage may still remain in the SERVOPACK even after turning OFF the power.

There is a risk of electric shock.

Before you replace a SERVOPACK, back up the settings of the SERVOPACK parameters. Copy the backed up parameter settings to the new SERVOPACK and confirm that they were copied correctly.

If you do not copy backed up parameter settings or if the copy operation is not completed correctly, normal operation may not be possible, possibly resulting in machine or equipment damage.

NOTICE

Discharge all static electricity from your body before you operate any of the buttons or switches inside the front cover of the SERVOPACK.

There is a risk of equipment damage.

(8) Troubleshooting Precautions**DANGER**

If the safety device (molded-case circuit breaker or fuse) installed in the power supply line operates, remove the cause before you supply power to the SERVOPACK again. If necessary, repair or replace the SERVOPACK, check the wiring, and remove the factor that caused the safety device to operate.

There is a risk of fire, electric shock, or injury.

**WARNING**

The product may suddenly start to operate when the power supply is recovered after a momentary power interruption. Design the machine to ensure human safety when operation restarts.

There is a risk of injury.

**CAUTION**

When an alarm occurs, remove the cause of the alarm and ensure safety. Then reset the alarm or turn the power OFF and ON again to restart operation.

There is a risk of injury or machine damage.

If the Servo ON signal is input to the SERVOPACK and an alarm is reset, the servomotor may suddenly restart operation. Confirm that the servo is OFF and ensure safety before you reset an alarm.

There is a risk of injury or machine damage.

Always insert a magnetic contactor in the line between the main circuit power supply and the main circuit terminals on the SERVOPACK so that the power can be shut OFF at the main circuit power supply.

If a magnetic contactor is not connected when the SERVOPACK fails, a large current may flow continuously, possibly resulting in fire.



CAUTION

If an alarm occurs, shut OFF the main circuit power supply.

There is a risk of fire due to a regenerative resistor overheating as the result of regenerative transistor failure.

Install a ground fault detector against overloads and short-circuiting or install a molded-case circuit breaker combined with a ground fault detector.

There is a risk of SERVOPACK failure or fire if a ground fault occurs.

The holding brake on a servomotor will not ensure safety if there is the possibility that an external force (including gravity) may move the current position and create a hazardous situation when power is interrupted or an error occurs. If an external force may cause movement, install an external braking mechanism that ensures safety.

(9) Disposal Precautions

- Correctly discard the product as stipulated by regional, local, and municipal laws and regulations. Be sure to include these contents in all labelling and warning notifications on the final product as necessary.



(10) General Precautions

- Figures provided in this manual are typical examples or conceptual representations. There may be differences between them and actual wiring, circuits, and products.
- The products shown in illustrations in this manual are sometimes shown with their covers or protective guards removed to illustrate detail. Always replace all covers and protective guards before you use the product.
- If you need a new copy of this manual because it has been lost or damaged, contact your nearest Yaskawa representative or one of the offices listed on the back of this manual.
- This manual is subject to change without notice for product improvements, specifications changes, and improvements to the manual itself. We will update the manual number of the manual and issue revisions when changes are made.
- Any and all quality guarantees provided by Yaskawa are null and void if the customer modifies the product in any way. Yaskawa disavows any responsibility for damages or losses that are caused by modified products.

i.6 Warranty

i.6.1 Details of Warranty

(1) Warranty Period

The warranty period for a product that was purchased (hereinafter called the “delivered product”) is one year from the time of delivery to the location specified by the customer or 18 months from the time of shipment from the Yaskawa factory, whichever is sooner.

(2) Warranty Scope

Yaskawa shall replace or repair a defective product free of charge if a defect attributable to Yaskawa occurs during the above warranty period. This warranty does not cover defects caused by the delivered product reaching the end of its service life and replacement of parts that require replacement or that have a limited service life.

This warranty does not cover failures that result from any of the following causes.

- Improper handling, abuse, or use in unsuitable conditions or in environments not described in product catalogs or manuals, or in any separately agreed-upon specifications
- Causes not attributable to the delivered product itself
- Modifications or repairs not performed by Yaskawa
- Use of the delivered product in a manner in which it was not originally intended
- Causes that were not foreseeable with the scientific and technological understanding at the time of shipment from Yaskawa
- Events for which Yaskawa is not responsible, such as natural or human-made disasters

i.6.2 Limitations of Liability

- Yaskawa shall in no event be responsible for any damage or loss of opportunity to the customer that arises due to failure of the delivered product.
- Yaskawa shall not be responsible for any programs (including parameter settings) or the results of program execution of the programs provided by the user or by a third party for use with programmable Yaskawa products.
- The information described in product catalogs or manuals is provided for the purpose of the customer purchasing the appropriate product for the intended application. The use thereof does not guarantee that there are no infringements of intellectual property rights or other proprietary rights of Yaskawa or third parties, nor does it construe a license.
- Yaskawa shall not be responsible for any damage arising from infringements of intellectual property rights or other proprietary rights of third parties as a result of using the information described in catalogs or manuals.

i.6.3 Suitability for Use

- It is the customer's responsibility to confirm conformity with any standards, codes, or regulations that apply if the Yaskawa product is used in combination with any other products.
- The customer must confirm that the Yaskawa product is suitable for the systems, machines, and equipment used by the customer.
- Consult with Yaskawa to determine whether use in the following applications is acceptable. If use in the application is acceptable, use the product with extra allowance in ratings and specifications, and provide safety measures to minimize hazards in the event of failure.
 - Outdoor use, use involving potential chemical contamination or electrical interference, or use in conditions or environments not described in product catalogs or manuals
 - Nuclear energy control systems, combustion systems, railroad systems, aviation systems, vehicle systems, medical equipment, amusement machines, and installations subject to separate industry or government regulations
 - Systems, machines, and equipment that may present a risk to life or property
 - Systems that require a high degree of reliability, such as systems that supply gas, water, or electricity, or systems that operate continuously 24 hours a day
 - Other systems that require a similar high degree of safety
- Never use the product for an application involving serious risk to life or property without first ensuring that the system is designed to secure the required level of safety with risk warnings and redundancy, and that the Yaskawa product is properly rated and installed.
- The circuit examples and other application examples described in product catalogs and manuals are for reference. Check the functionality and safety of the actual devices and equipment to be used before using the product.
- Read and understand all use prohibitions and precautions, and operate the Yaskawa product correctly to prevent accidental harm to third parties.

i.6.4 Specifications Change

The names, specifications, appearance, and accessories of products in product catalogs and manuals may be changed at any time based on improvements and other reasons. The next editions of the revised catalogs or manuals will be published with updated code numbers. Consult with your Yaskawa representative to confirm the actual specifications before purchasing a product.

i.7 Compliance with UL Standards, EU Directives, and Other Safety Standards

Certification marks for the standards for which the product has been certified by certification bodies are shown on nameplate. Products that do not have the marks are not certified for the standards.

Refer to the servomotor manual for compliant standards of servomotors.

i.7.1 North American Safety Standards (UL)



Product	Model	North American Safety Standards (UL File No.)
SERVOPACK	SGDXS	UL 61800-5-1 (E147823), CSA C22.2 No.274

i.7.2 EU Directives



Product	Model	EU Directives	Harmonized Standards
SERVOPACK	SGDXS	Machinery Directive 2006/42/EC	EN 62061 EN 61800-5-2
		EMC Directive 2014/30/EU	EN 55011 group 1, class A EN 61000-6-2 EN 61000-6-4 EN 61800-3 (Category C2, Second environment)
		Low Voltage Directive 2014/35/EU	EN 61800-5-1
		RoHS Directive 2011/65/EU (EU)2015/863	EN IEC 63000
		WEEE Directive 2012/19/EU	—

Note:

- We declared the CE Marking based on the harmonized standards in the above table. These products complied with the corresponding IEC standards. Refer to the declaration of conformity for details.
- These products are for industrial use. In home environments, these products may cause electromagnetic interference and additional noise reduction measures may be necessary.

i.7.3 Safety Standards

Product	Model	Standards
SERVOPACK	SGDXS	EN ISO13849-1:2015 EN 62061 EN 61800-5-2 EN 61000-6-7 EN 61326-3-1 EN 61508 series

Note:

These products complied with the corresponding IEC standards. Refer to the declaration of conformity for details.

- Safety Parameters

Item	Standards	Performance Level
Safety Integrity Level	IEC 61508	SIL3
	IEC 62061	SILCL3
Mission Time	EN ISO 13849-1	20 years
Probability of Dangerous Failure per Hour	IEC 61508 IEC 62061	PFH = 8.57×10^{-9} [1/h] (8.57% of SIL3)
Performance Level	EN ISO 13849-1	PL e (Category 3)
Mean Time to Dangerous Failure of Each Channel	EN ISO 13849-1	MTTFd: High
Average Diagnostic Coverage	EN ISO 13849-1	DCavg: Medium
Stop Category	IEC 60204-1	Stop category 0
Safety Function	IEC 61800-5-2	STO
Hardware Fault Tolerance	IEC 61508	HFT = 1
Subsystem	IEC 61508	B

Note:

Mission time is a parameter used in the statistic calculation required by functional safety standards. Mission time is not related to the warranty period.

Basic Information on SERVOPACKs

This chapter provides information required to select SERVOPACKs, such as SERVOPACK model numbers and combinations with servomotors.

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1.1 Product Overview

This product is a SERVOPACK equipped with the customized sensing data function.

The customized sensing data function executes ladder programs in the SERVOPACK, and these ladder programs process and analyze the SERVOPACK's sensing data.

The sensing data that is processed and analyzed in the SERVOPACK can also be collected by the host controller connected by MECHATROLINK.

This product is also equipped with the custom motion function which allows motion control to be performed on the servomotor with the user application written to the SERVOPACK.

The numbers of drawings that can be saved in the SERVOPACK are listed below.

- Startup drawing (DWG.A): 4 drawings maximum (up to two levels)
- High-speed drawing (DWG.H): 10 drawings maximum (up to two levels)
- Low-speed drawing (DWG.L): 10 drawings maximum (up to two levels)

Information A maximum of 64 user functions can be saved in the SERVOPACK.

1.2 Interpreting Model Numbers

1.2.1 Interpreting SERVOPACK Model Numbers

SGDXS - R70 A 40 A 2000 56

Σ-X-Series
Σ-XS model
1st+2nd+3rd
digits
4th
digit
5th+6th
digits
7th
digit
8th+9th+10th+11th
digits
12th+13th
digits

1st+2nd+3rd digits Maximum Applicable Motor Capacity

Voltage	Code	Specification
Three-phase, 200 VAC	R70*1	0.05 kW
	R90*1	0.1 kW
	1R6*1	0.2 kW
	2R8*1	0.4 kW
	3R8	0.5 kW
	5R5*1	0.75 kW
	7R6	1.0 kW
	120*2	1.5 kW
	180	2.0 kW
	200	3.0 kW
	330	5.0 kW
	470	6.0 kW
	550	7.5 kW
590	11 kW	
780	15 kW	

4th digit Voltage

Code	Specification
A	200 VAC

5th+6th digits Interface *3

Code	Specification
40	MECHATROLINK-4 communications reference

7th digit Design Revision Order

A

8th+9th+10th+11th digits Hardware Options Specification

Code	Specification	Applicable Models
2000	Function expansion 1	All models
2008	Function expansion 1, single-phase 200-VAC power supply input specifications	SGDXS-120A

12th+13th digits FT Specification

Code	Specification
56	Customized sensing data function option (with custom motion function)

*1 You can use these models with either a single-phase or three-phase input.

*2 A model with a single-phase, 200-VAC power supply input is available as a hardware option specification. (Model: SGDXS-120A40A200856)

*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.

1.2.2 Interpreting Servomotor Model Numbers

This section outlines the model numbers of servomotors that can be combined with a Σ -X-series SERVOPACK. Refer to the relevant manual in the following list for details.

- 📖 Σ -X-series Rotary Servomotor Product Manual (Manual No.: SIEP C230210 00)
- 📖 Σ -7-series Rotary Servomotor Product Manual (Manual No.: SIEP S800001 36)
- 📖 Σ -7-series Linear Servomotor Product Manual (Manual No.: SIEP S800001 37)
- 📖 Σ -7-Series Direct Drive Servomotor Product Manual (Manual No.: SIEP S800001 38)

(1) Rotary Servomotors



Series

Σ -X Series Servomotors

Code	Specification
SGMXJ	Medium inertia, high speed
SGMXA	Low inertia, high speed
SGMXP	Medium inertia, flat
SGMXG	Medium inertia, low speed, high torque

Σ -7 Series Servomotors

Code	Specification
SGM7M	Low inertia, ultra-small capacity

1st+2nd digits Rated Output

3rd digit Power Supply Voltage

- 200 VAC
- 24 VDC/48 VDC

4th digit Serial Encoder Specification

- 20-bit absolute encoder
- 26-bit batteryless absolute encoder
- 26-bit absolute encoder

5th digit Design Revision Order

6th digit Shaft End Specification

- Straight without key
- Straight with tap
- Straight with key and tap
- Straight with flat seat
- With two flat seats

7th digit Option Specification

- With 24-V holding brake
- With oil seal

8th digit Destination

A

9th digit Ancillary Specification

Code	Specification
1	Standard
2	Σ -7 compatible

(2) Direct Drive Servomotors



Series Σ -7 Series Servomotors

Code	Specification
SGM7D	With core outer rotor
SGM7E	Small capacity, coreless inner rotor
SGM7F	Small capacity, with core inner rotor
	Medium capacity, with core inner rotor

1st+2nd digits Rated Torque

3rd digit Servomotor Outer Diameter

4th digit Serial Encoder Specification

5th digit Design Revision Order

6th digit Flange Specification

- Cable drawn to load side
- Cable drawn to non-load side

7th digit Option Specification

- High mechanical precision

(3) Linear Servomotors

SGL □ □ - 30 A 050 C P □

Series

1st
digit2nd
digit

3rd digit on

Series

Σ-7 Series Servomotors

2nd digit

Moving Coil/Magnetic Way

1st digit

Servomotor Type

Code	Specification
G	Coreless models
F	Models with F-type iron core
T	Models with T-type iron core

Code	Specification
W	Moving coil
W2	
M	Magnetic way
M2	

3rd digit on

The specifications for the 3rd digit on depend on the servomotor type.

1.3 Combinations of SERVOPACKs and Servomotors

1.3.1 Combinations of Rotary Servomotors and SERVOPACKs

Rotary Servomotor Model		Capacity	SERVOPACK Model
			SGDXS-
SGMXJ (Medium Inertia, Small Capacity) 3000 min ⁻¹	SGMXJ-A5A	50 W	R70A
	SGMXJ-01A	100 W	R90A
	SGMXJ-C2A	150 W	1R6A
	SGMXJ-02A	200 W	
	SGMXJ-04A	400 W	2R8A
	SGMXJ-06A	600 W	5R5A
	SGMXJ-08A	750 W	
SGMXA (Low Inertia, Small Capacity) 3000 min ⁻¹	SGMXA-A5A	50 W	R70A
	SGMXA-01A	100 W	R90A
	SGMXA-C2A	150 W	1R6A
	SGMXA-02A	200 W	
	SGMXA-04A	400 W	2R8A
	SGMXA-06A	600 W	5R5A
	SGMXA-08A	750 W	
	SGMXA-10A	1.0 kW	120A
	SGMXA-15A	1.5 kW	
	SGMXA-20A	2.0 kW	180A
	SGMXA-25A	2.5 kW	200A
	SGMXA-30A	3.0 kW	
	SGMXA-40A	4.0 kW	330A
	SGMXA-50A	5.0 kW	
SGMXA-70A	7.0 kW	550A	
SGMXP (Medium Inertia, Flat) 3000 min ⁻¹	SGMXP-01A	100 W	R90A
	SGMXP-02A	200 W	2R8A
	SGMXP-04A	400 W	
	SGMXP-08A	750 W	5R5A
	SGMXP-15A	1.5 kW	120A

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Rotary Servomotor Model		Capacity	SERVOPACK Model
			SGDXS-
SGMXG (Medium Inertia, Medium Capacity) 1500 min ⁻¹	SGMXG-03A	300 W	3R8A
	SGMXG-05A	450 W	
	SGMXG-09A	850 W	7R6A (120A) ^{*1}
	SGMXG-13A	1.3 kW	120A (180A) ^{*1}
	SGMXG-20A	1.8 kW	180A (200A) ^{*1}
	SGMXG-30A	2.9 kW ^{*2}	330A (470A) ^{*1}
	SGMXG-44A	4.4 kW	330A (550A) ^{*1}
	SGMXG-55A	5.5 kW	470A (780A) ^{*1}
	SGMXG-75A	7.5 kW	550A
	SGMXG-1AA	11 kW	590A
	SGMXG-1EA	15 kW	780A
SGM7M (Low Inertia, Ultra-small Capacity) 3000 min ⁻¹	SGM7M-A1A	11 W	R90A
	SGM7M-A2A	22 W	
	SGM7M-A3A	33 W	1R6A

*1 To increase the instantaneous maximum torque, use the SERVOPACK with the model number given inside the parentheses. Refer to the following manual for the instantaneous maximum torque of each SERVOPACK.

☞ Σ-X-Series Rotary Servomotor Product Manual (Manual No.: SIEP C230210 00)

*2 2.4 kW when using the servomotor with a SGDXS-200A SERVOPACK.

1.3.2 Combinations of Direct Drive Servomotors and SERVOPACKs

Direct Drive Servomotor Model		Rated Torque N·m	Instantaneous Maximum Torque N·m	SERVOPACK Model
				SGDXS-
SGM7D (With Core, Outer Rotor)	SGM7D-30F	30.0	50.0	120A
	SGM7D-58F	58.0	100	
	SGM7D-90F	90.0	150	
	SGM7D-1AF	110	200	
	SGM7D-01G	1.30	4.00	2R8A
	SGM7D-05G	5.00	6.00	
	SGM7D-08G	8.00	15.0	120A
	SGM7D-18G	18.0	30.0	
	SGM7D-24G	24.0	45.0	
	SGM7D-34G	34.0	60.0	
	SGM7D-45G	45.0	75.0	
	SGM7D-03H	3.00	4.00	2R8A
SGM7D (With Core, Outer Rotor)	SGM7D-28I	28.0	50.0	120A
	SGM7D-70I	70.0	100	
	SGM7D-1ZI	100	150	
	SGM7D-1CI	130	200	
	SGM7D-2BI	220	300	
	SGM7D-2DI	240	400	
	SGM7D-06J	6.00	8.00	
	SGM7D-09J	9.00	15.0	
	SGM7D-18J	18.0	30.0	
	SGM7D-20J	20.0	45.0	
	SGM7D-38J	38.0	60.0	
	SGM7D-02K	2.06	5.00	2R8A
	SGM7D-06K	6.00	10.0	
	SGM7D-08K	8.00	15.0	
	SGM7D-06L	6.00	10.0	
	SGM7D-12L	12.0	20.0	
	SGM7D-30L	30.0	40.0	120A

Continued on next page.

Continued from previous page.

Direct Drive Servomotor Model		Rated Torque N·m	Instantaneous Maximum Torque N·m	SERVOPACK Model
				SGDXS-
SGM7E (Small Capacity, Coreless, Inner Rotor)	SGM7E-02B	2	6	2R8A
	SGM7E-05B	5	15	
	SGM7E-07B	7	21	
	SGM7E-04C	4	12	
	SGM7E-10C	10	30	
	SGM7E-14C	14	42	
	SGM7E-08D	8	24	
	SGM7E-17D	17	51	
	SGM7E-25D	25	75	
	SGM7E-16E	16	48	5R5A
	SGM7E-35E	35	105	
SGM7F (Small Capacity, With Core, Inner Rotor)	SGM7F-02A	2	6	2R8A
	SGM7F-05A	5	15	
	SGM7F-07A	7	21	
	SGM7F-04B	4	12	
	SGM7F-10B	10	30	
	SGM7F-14B	14	42	5R5A
	SGM7F-08C	8	24	2R8A
	SGM7F-17C	17	51	5R5A
	SGM7F-25C	25	75	7R6A
	SGM7F-16D	16	48	5R5A
	SGM7F-35D	35	105	7R6A ^{*1} , 120A
SGM7F (Medium Capacity, With Core, Inner Rotor)	SGM7F-45M	45	135	7R6A
	SGM7F-80M	80	240	120A
	SGM7F-80N	80	240	
	SGM7F-1AM	110	330	180A
	SGM7F-1EN	150	450	200A
	SGM7F-2ZN	200	600	

*1 For this combination, use the following derated values for the rated output and rated rotation speed.

- Rated output: 1000 W
- Rated rotation speed: 270 min⁻¹

1.3.3 Combinations of Linear Servomotors and SERVOPACKs

Linear Servomotor Model		Rated Force N	Instantaneous Maximum Force N	SERVOPACK Model
				SGDXS-
SGLG (Coreless) Used with Standard-Force Magnetic Way	SGLGW-30A050C	12.5	40	R70A
	SGLGW-30A080C	25	80	R90A
	SGLGW-40A140C	47	140	
	SGLGW-40A253C	93	280	1R6A
	SGLGW-40A365C	140	420	2R8A
	SGLGW-60A140C	70	220	1R6A
	SGLGW-60A253C	140	440	2R8A
	SGLGW-60A365C	210	660	5R5A
	SGLGW-90A200C	325	1300	120A
	SGLGW-90A370C	550	2200	180A
	SGLGW-90A535C	750	3000	200A
SGLG (Coreless) Used with High-Force Magnetic Way	SGLGW-40A140C	57	230	1R6A
	SGLGW-40A253C	114	460	2R8A
	SGLGW-40A365C	171	690	3R8A
	SGLGW-60A140C	85	360	1R6A
	SGLGW-60A253C	170	720	3R8A
	SGLGW-60A365C	255	1080	7R6A
SGLF (With F-type Iron Cores)	SGLFW2-30A070A	45	135	1R6A
	SGLFW2-30A120A	90	270	
	SGLFW2-30A230A <i>*I</i>	180	540	3R8A
		170	500	2R8A
	SGLFW2-45A200A	280	840	5R5A
	SGLFW2-45A380A <i>*I</i>	560	1680	180A
			1500	120A
	SGLFW2-90A200A□1	560	1680	
	SGLFW2-90A200A□L	896	1680	
	SGLFW2-90A380A	1120	3360	200A
	SGLFW2-90A560A	1680	5040	330A
SGLFW2-1DA380A	1680	5040	200A	
SGLFW2-1DA560A	2520	7560	330A	

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Linear Servomotor Model		Rated Force N	Instantaneous Maximum Force N	SERVOPACK Model
				SGDXS-
SGLT (With T-type Iron Cores)	SGLTW-20A170A	130	380	3R8A
	SGLTW-20A320A	250	760	7R6A
	SGLTW-20A460A	380	1140	120A
	SGLTW-35A170A	220	660	5R5A
	SGLTW-35A170H	300	600	
	SGLTW-35A320A	440	1320	120A
	SGLTW-35A320H	600	1200	
	SGLTW-35A460A	670	2000	180A
	SGLTW-40A400B	670	2600	
	SGLTW-40A600B	1000	4000	330A
	SGLTW-50A170H	450	900	5R5A
	SGLTW-50A320H	900	1800	120A
	SGLTW-80A400B	1300	5000	330A
	SGLTW-80A600B	2000	7500	550A

*1 The force depends on the SERVOPACK that is used with the servomotor.

1.4 Functions

This section lists the functions provided by SERVOPACKs with the FT56 specification. Refer to the following manual for details on the functions.

📖 AC Servo Drive Σ -XS SERVOPACK with MECHATROLINK-4/III Communications References Product Manuals (Manual No.: SIEP C710812 01)

The sections of the tables are functions with usage restrictions when you use the customized sensing data function. Refer to the following section for details on the usage restrictions of functions.

📖 [1.5 Restrictions on page 53](#)

- Functions Related to the Machine

Function
Setting the Power Supply Type for the Main Circuit and Control Circuit
Automatic Detection of Connected Motor
Motor Direction Setting
Setting the Linear Encoder Pitch
Writing the Linear Servomotor Parameters
Selecting the Phase Sequence for a Linear Servomotor
Polarity Sensor Setting
Polarity Detection
Overtravel and Related Settings
Holding Brake
Motor Stopping Methods for Servo OFF and Alarms
Resetting the Absolute Encoder
Setting the Origin of the Absolute Encoder
Setting the Regenerative Resistor Capacity
Operation for Momentary Power Interruptions
SEMI F47 Function
Setting the Maximum Motor Speed
Software Limits and Settings
Setting the Multiturn Limit
Adjusting the Motor Current Detection Signal Offset
Forcing the Motor to Stop
Overheat Protection
Selecting the Current Control Mode
Setting the Current Gain Level
Selecting the Speed Detection Method
Fully-Closed Loop Control
Σ -LINK II Function
Safety Function
External Latches
Triggers at Preset Positions

- Functions Related to the Host Controller

Function
MECHATROLINK-4/III Communications Switching
Electronic Gear Settings
Allocating the I/O Signal
ALM (Servo Alarm Output) Signal
/WARN (Warning Output) Signal
/TGON (Rotation Detection Output) Signal
/S-RDY (Servo Ready Output) Signal
/V-CMP (Speed Coincidence Detection Output) Signal
/COIN (Positioning Completion Output) Signal
/NEAR (Near Output) Signal
Speed Limit during Torque Control
/VLT (Speed Limit Detection Output) Signal
Encoder Divided Pulse Output
Selecting Torque Limits
Initializing the Vibration Detection Level
Alarm Reset
Replacing the Battery
Setting the Position Deviation Overflow Alarm Level

- Functions to Achieve Optimum Motions

Function
Tuning-less Function
Autotuning without a Host Reference
Autotuning with a Host Reference
Custom Tuning
Anti-Resonance Control Adjustment
Vibration Suppression
Load Fluctuation Compensation Control
Gain Switching
Friction Compensation
Gravity Compensation
Output Torque Compensation
Backlash Compensation
Model Following Control
Compatible Adjustment Functions
Mechanical Analysis
Easy FFT

- Functions for Trial Operation during Setup

Function
Software Reset
Trial Operation for the Servomotor without a Load
Program JOG Operation
Origin Search
Test without a Motor
Monitoring Machine Operation Status and Signal Waveforms

- Functions for Inspection and Maintenance

Function
Write Prohibition Setting for Parameters
Initializing Parameter Settings
Automatic Detection of Connected Motor
Monitoring Product Information
Monitoring Product Life
Error Detection Setting
Displaying the Alarm History
Alarm Tracing

1.5 Restrictions

This section describes the restrictions when using this product.

1.5.1 MECHATROLINK-4 Function Restrictions

Set the transmission cycle to one of the following settings: 125 μ s, 250 μ s, 500 μ s, 1 ms, 1.5 ms, or 2 ms.

In addition, set the transmission cycle to an integer multiple of the high-speed scan time in the user application.

1.6 Precautions When Using This Product

1.6.1 Precautions on Compatibility with Previous Models

This product is not compatible with Σ -7C SERVOPACKs.

1.6.2 User Application Precautions

Observe the following precautions when you use a user application.

- Only ladder programs are supported for a user application. You cannot use motion programs.
- A user application may use I registers and O registers, but there is no compatibility with the I registers and O registers of motion modules, such as the MP SVC function module.
- An existing MP project file cannot be used or reused.
- The data (e.g., in the M registers of this product) is not backed up. To save the data, you must save the data to flash memory.

Refer to the following section for details on saving data to flash memory.

🔗 [6.5 Save to Flash Memory on page 123](#)

1.7 MPE720

You configure the user application settings and edit ladder programs for this product by using the MPE720 Ver. 7.

The user application settings, ladder programs, and other data for the SERVOPACK are saved in the SERVOPACK's project file.

You must create the SERVOPACK's project file in addition to the host controller's project file. Refer to the following section for details.

☞ [5.4 Creating a Project File on page 97](#)

Refer to the following section for detail on the supported versions.

☞ [3.3 Devices and Components That Are Required to Build a System on page 82](#)

1.8 SigmaWin+

To use this product with the SigmaWin+, you must add the model information file for this product to the SigmaWin+ Ver. 7.

Contact your Yaskawa representative for information on the model information file.

Refer to the following section for details on the supported versions.

 [3.3 Devices and Components That Are Required to Build a System on page 82](#)

1.9 M-4 Configuration Tool

To use this product with the M-4 Configuration Tool, you must add the device information file (MDI file) for this product to the M-4 Configuration Tool.

Contact your Yaskawa representative for information on the device information file.

Refer to the following section for details on the supported versions.

 [3.3 Devices and Components That Are Required to Build a System on page 82](#)

1.10 Combinations with MP-Series Machine Controllers

The following tables give the combinations of SERVOPACKs with the customized sensing data function option specification and Yaskawa MP-series machine controllers.

Name	Model	Supported Versions
MP3200 (CPU-203F)	JEPMC-CP3203T1-E	Ver. 1.65 and later

Refer to the following section for detail on the supported versions.

 [3.3 Devices and Components That Are Required to Build a System on page 82](#)

SERVOPACK Ratings and Specifications

This chapter provides information required to select SERVOPACKs, such as the ratings and specifications.

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2.1 Ratings

2.1.1 Three-Phase, 200 VAC

Model SGDXS-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A	
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0	
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9	
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84	
Main Circuit	Power Supply	200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz											
	Input Current [Arms] ^{*1}	0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25	
Control	Power Supply	200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz											
	Input Current [Arms] ^{*1}	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3	
Power Supply Capacity [kVA] ^{*1}		0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5	
Power Loss ^{*1}	Main Circuit Power Loss [W]	5.0	7.0	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6	
	Control Circuit Power Loss [W]	12	12	12	12	14	14	14	15	16	16	19	
	Total Power Loss [W]	17.0	19.0	23.9	34.5	42.5	52.9	63.2	87.6	120.2	130.2	245.6	
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	35	35	35	20	12	10	6
		Capacity [W]	–	–	–	–	60	60	60	60	60	60	180
		Allowable Power Consumption [W]	–	–	–	–	15	15	15	30	30	30	36
	Minimum Allowable External Resistance [Ω]	40	40	40	40	35	35	35	20	12	10	6	
Overvoltage Category		III											

*1 This is the net value at the rated load.

Model SGDXS-		470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]		6.0	7.5	11	15
Continuous Output Current [Arms]		46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]		110	130	140	170
Main Circuit	Power Supply	200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms] ^{*1}	29	37	54	73
Control	Power Supply	200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms] ^{*1}	0.3	0.3	0.4	0.4
Power Supply Capacity [kVA] ^{*1}		10.7	14.6	21.7	29.6
Power Loss ^{*1}	Main Circuit Power Loss [W]	271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]	21	21	28	28
	Total Power Loss [W]	292.7	347.9	393.3	529.4
External Regenerative Resistor Unit	Resistance [Ω]	5 ^{*2}	3.13 ^{*1}	3.13 ^{*3}	3.13 ^{*3}
	Capacity [W]	880 ^{*2}	1760 ^{*3}	1760 ^{*3}	1760 ^{*3}
	Allowable Power Consumption [W]	180 ^{*2}	350 ^{*3}	350 ^{*3}	350 ^{*3}
	Minimum Allowable External Resistance [Ω]	5	2.9	2.9	2.9
Overvoltage Category		III			

*1 This is the net value at the rated load.

*2 This value is for the optional JUSP-RA29-E regenerative resistor unit.

*3 This value is for the optional JUSP-RA05-E regenerative resistor unit.

2.1.2 Single-Phase, 200 VAC

Model SGDXS-		R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	5.5	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	16.9	28
Main Circuit	Power Supply	200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [Arms] ^{*1}	0.8	1.6	2.4	5.0	8.7	16 ^{*2}
Control	Power Supply	200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [Arms] ^{*1}	0.2	0.2	0.2	0.2	0.2	0.2
Power Supply Capacity [kVA] ^{*1}		0.2	0.3	0.6	1.2	1.9	4.0
Power Loss ^{*1}	Main Circuit Power Loss [W]	5.0	7.1	12.1	23.7	39.2	72.6
	Control Circuit Power Loss [W]	12	12	12	12	14	15
	Total Power Loss [W]	17.0	19.1	24.1	35.7	53.2	87.6

Continued on next page.

2.1 Ratings

Continued from previous page.

Model SGDXS-			R70A	R90A	1R6A	2R8A	5R5A	120A
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	-	-	-	-	35	20
		Capacity [W]	-	-	-	-	60	60
		Allowable Power Consumption [W]	-	-	-	-	15	30
	Minimum Allowable External Resistance [Ω]		40	40	40	40	35	20
Overvoltage Category			III					

*1 This is the net value at the rated load.

*2 Derate to 12 Arms for UL certification.

2.1.3 270 VDC

Model SGDXS-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	11.0	16.9	17.0	28.0
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [Arms] ^{*1}	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [Arms] ^{*1}	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Power Supply Capacity [kVA] ^{*1}		0.2	0.3	0.6	1	1.4	1.6	2.3	3.2
Power Loss ^{*1}	Main Circuit Power Loss [W]	4.4	5.9	9.8	17.5	23.0	30.7	38.7	55.8
	Control Circuit Power Loss [W]	12	12	12	12	14	14	14	15
	Total Power Loss [W]	16.4	17.9	21.8	29.5	37.0	44.7	52.7	70.8
Overvoltage Category		III							

*1 This is the net value at the rated load.

Model SGDXS-		180A	200A	330A	470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]		2.0	3.0	5.0	6.0	7.5	11.0	15.0
Continuous Output Current [Arms]		18.5	19.6	32.9	46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]		42.0	56.0	84.0	110	130	140	170
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%						
	Input Current [Arms] ^{*1}	14	20	34	36	48	68	92
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%						
	Input Current [Arms] ^{*1}	0.25	0.25	0.3	0.3	0.3	0.4	0.4
Power Supply Capacity [kVA] ^{*1}		4.0	5.9	7.5	10.7	14.6	21.7	29.6

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Model SGDXS-		180A	200A	330A	470A	550A	590A	780A
Power Loss ^{*1}	Main Circuit Power Loss [W]	82.7	83.5	146.2	211.6	255.3	243.6	343.4
	Control Circuit Power Loss [W]	16	16	19	21	21	28	28
	Total Power Loss [W]	98.7	99.5	165.2	232.6	276.3	271.6	371.4
Overvoltage Category		III						

*1 This is the net value at the rated load.

2.2 SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

A.710 or A.720 (an overload alarm) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or servomotor that has the lower overload protection characteristics.

In most cases, that will be the overload protection characteristics of the servomotor.

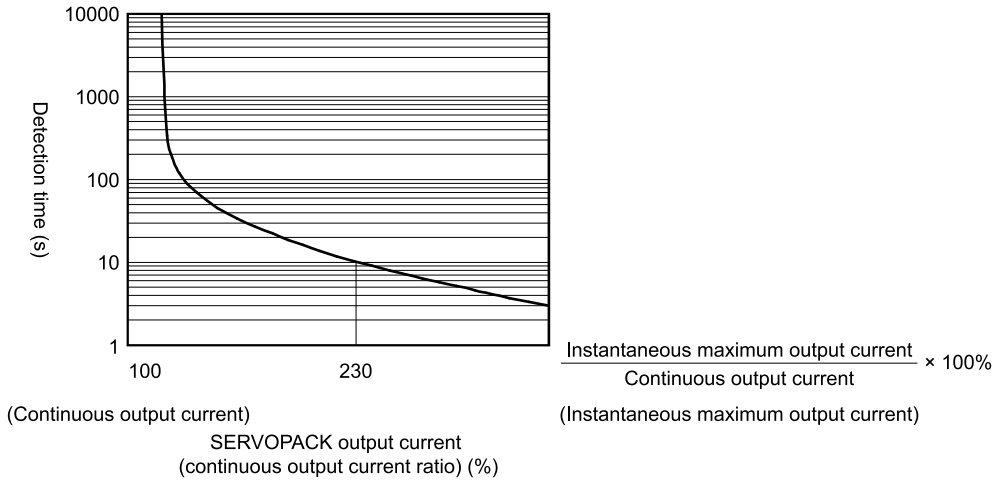


Figure 2.1 SGDXS-R70A, -R90A, -1R6A, -2R8A

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

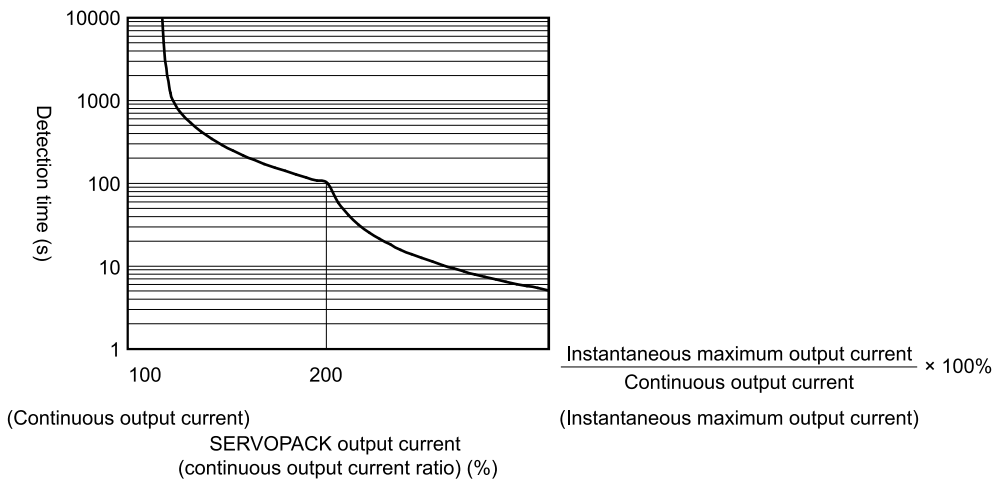


Figure 2.2 SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, -780A

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

2.3 Specifications

2.3.1 Environmental Conditions

Item	Specifications
Surrounding Air Temperature	-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.) Refer to the following manual for derating specifications. ☞ Σ -X-Series Σ -XS SERVOPACK with MECHATROLINK-4/III Communications References Product Manuals (Manual No.: SIEP C710812 01)
Storage Temperature */	-20°C to 85°C
Surrounding Air Humidity	95% relative humidity max. (with no freezing or condensation)
Storage Humidity	95% relative humidity max. (with no freezing or condensation)
Vibration Resistance	When there is continuous vibration: 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s ² (0.6G)
Impact Resistance	19.6 m/s ²
Degree of Protection	IP20: Models SGDXS-R70A, -R90A, -1R6A, -2R8A, -3R8A, -5R5A, -7R6A, -120A IP10: Models SGDXS-180A, -200A, -330A, -470A, -550A
Pollution Degree	2 <ul style="list-style-type: none"> • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
Altitude */	1000 m max. (With derating, usage is possible between 1000 m and 2000 m.) Refer to the following manual for derating specifications. ☞ Σ -X-Series Σ -XS SERVOPACK with MECHATROLINK-4/III Communications References Product Manuals (Manual No.: SIEP C710812 01)
Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electro-magnetic/magnetic fields, or radioactivity

*1 If you combine a Σ -X-series SERVOPACK with a Σ -V-series option module, the following Σ -V-series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1000 m max. Also, the applicable surrounding range cannot be increased by derating.

2.3.2 I/O Signals

Item	Specifications
Encoder Divided Pulse Output	Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
Overheat Protection Input	Number of input points: 1 Input voltage range: 0 V to +5 V
High-Speed Preset Position Output	Line-Driver Output

Continued on next page.

Item		Specifications
Sequence Input Signals	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC \pm 20% Number of input points: 7 (input method: sink inputs or source inputs)
		Input Signals: <ul style="list-style-type: none"> • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /P-CL (Forward External Torque Limit Input) and /N-CL (Reverse External Torque Limit Input) signals • /DEC (Origin Return Deceleration Switch Input) signal • /EXT1 to /EXT3 (External Latch Input 1 to 3) signals • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 (output method: a photocoupler output (isolated)) Output signal: ALM (Servo Alarm Output) signal
	Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (output method: a photocoupler output (isolated)) Output Signals: <ul style="list-style-type: none"> • /COIN (Positioning Completion Output) signal • /V-CMP (Speed Coincidence Detection Output) signal • /TGON (Rotation Detection Output) signal • /S-RDY (Servo Ready Output) signal • /CLT (Torque Limit Detection Output) signal • /VLT (Speed Limit Detection Output) signal • /BK (Brake Output) signal • /WARN (Warning Output) signal • /NEAR (Near Output) signal • High-Speed Preset Position Output 1 to 3 (/HSO1 to 3) signal • Normal Preset Position Output signal A signal can be allocated and the positive and negative logic can be changed.

2.3.3 Function

Item		Specifications
Communications	USB Communications (CN7)	Interfaces Personal computer (with SigmaWin+), digital operator (JUSP-OP07A-E)
		Communications Standard Conforms to USB 2.0 standard (12 Mbps).
Displays/Indicators		CHARGE, PWR, CN, L1, L2, and one-digit seven-segment LED
MECHATROLINK-4 Communications	Communications Protocol	MECHATROLINK-4
	Station Address Settings	01h to FFh (maximum number of slaves: 127) The rotary switches (S1 and S2) are used to set the station address.
	Transmission Speed	100 Mbps
	Transmission Cycle <i>*1</i>	125 μ s, 250 μ s, 500 μ s, 1 ms, 1.5 ms, 2 ms
	Number of Transmission Bytes	16 to 80 bytes/station

Continued from previous page.

Item		Specifications
Reference Methods for MECHATROLINK-4 Communications	Performance	Position, speed, or torque control with MECHATROLINK-4 communications
	Reference Input	MECHATROLINK-4 commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)
	Profile	MECHATROLINK-4 standard servo profile
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ± 10 VDC (effective linearity range: ± 8 V) Resolution: 16 bits Accuracy: ± 20 mV (Typ) Maximum output current: ± 10 mA
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power to the main circuit or servo is OFF.
Regenerative Processing		Built-in (An external resistor must be connected to the SGDXS-470A to -550A.)
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit Input) or N-OT (Reverse Drive Prohibit Input) signal
Protective Functions		Overcurrent, overvoltage, undervoltage, overload, regeneration error, etc.
Utility Functions		Gain tuning, alarm history, jogging operation, origin search, etc.
Safety Functions	Inputs	/HWBB1 and /HWBB2: Base block signals for power modules
	Output	EDM1: Monitors the status of built-in safety circuit (fixed output). *2
	Applicable Standards *3	ISO13849-1 PLe (Category 3) and IEC61508 SIL3

*1 Multiple transmission cycles are supported.

*2 Whether or not you use the EDM1 signal does not affect the performance level of safety parameters.

*3 Always perform risk assessment for the system and confirm that the safety requirements are met.

2.3.4 Option

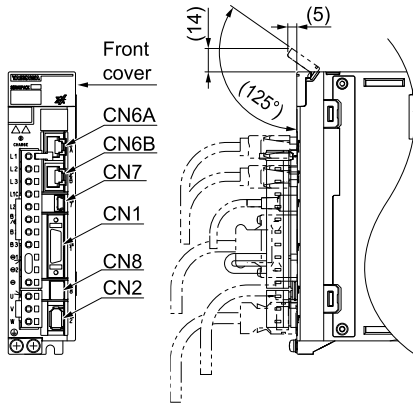
Item	Specifications
Applicable Option Modules	Fully-closed module

2.4 External Dimensions

2.4.1 Front Cover Dimensions and Connector Specifications

The front cover dimensions and panel connector section are the same for all capacities. Refer to the following figures and table.

(1) Front Cover Dimensions



(2) Connector Specifications

Connector No.	Model	Number of Pins	Manufacturer
CN1	10226-59A3MB	26	3M Japan Limited
CN2	53984-0681	6	Molex Japan Co., Ltd.
CN6A/B	3-1734579-4	8	Tyco Electronics Japan G.K.
CN7	2342993-1	5	Tyco Electronics Japan G.K.
CN8	2294415-1	8	Tyco Electronics Japan G.K.

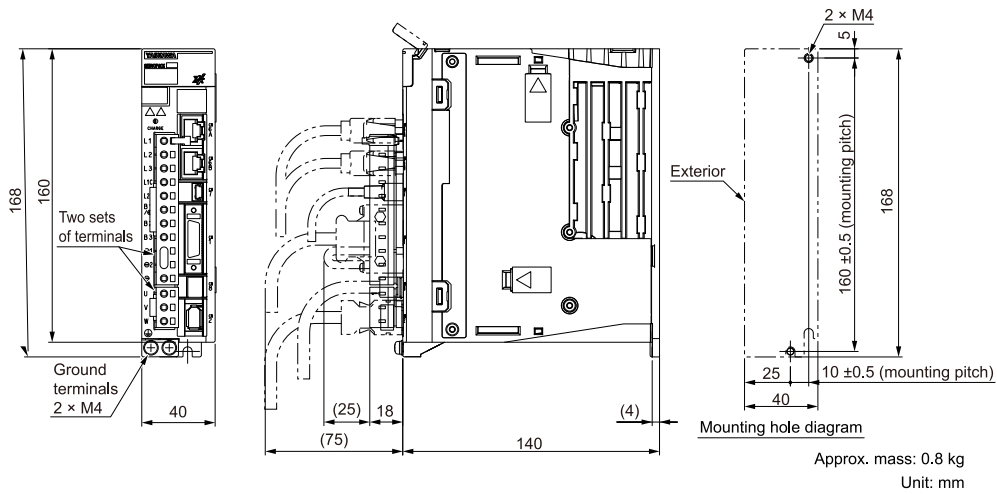
Note:

The above connectors or their equivalents are used for the SERVOPACKs.

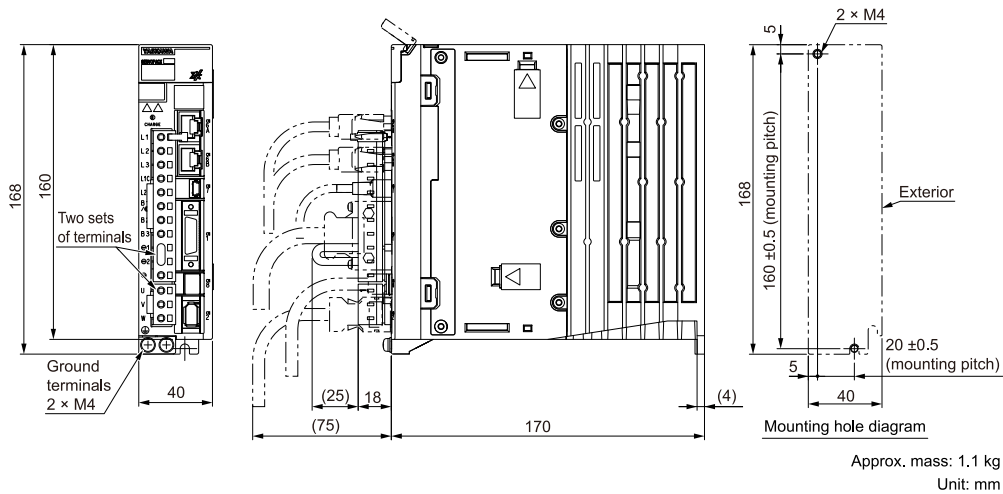
2.4.2 SERVOPACK External Dimensions

(1) Base-mounted SERVOPACKs

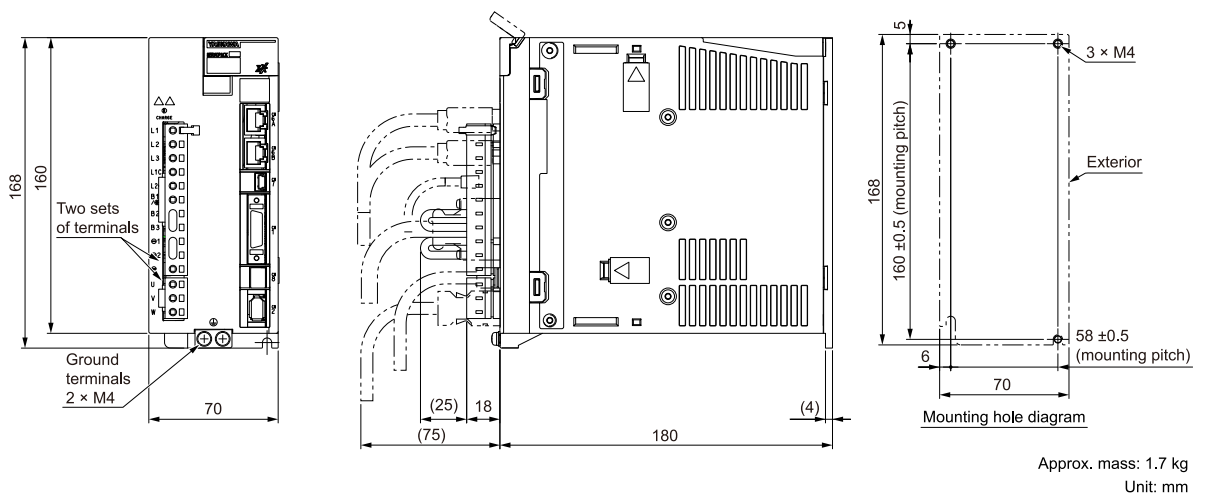
(a) SGDXS-R70A, -R90A, -1R6A



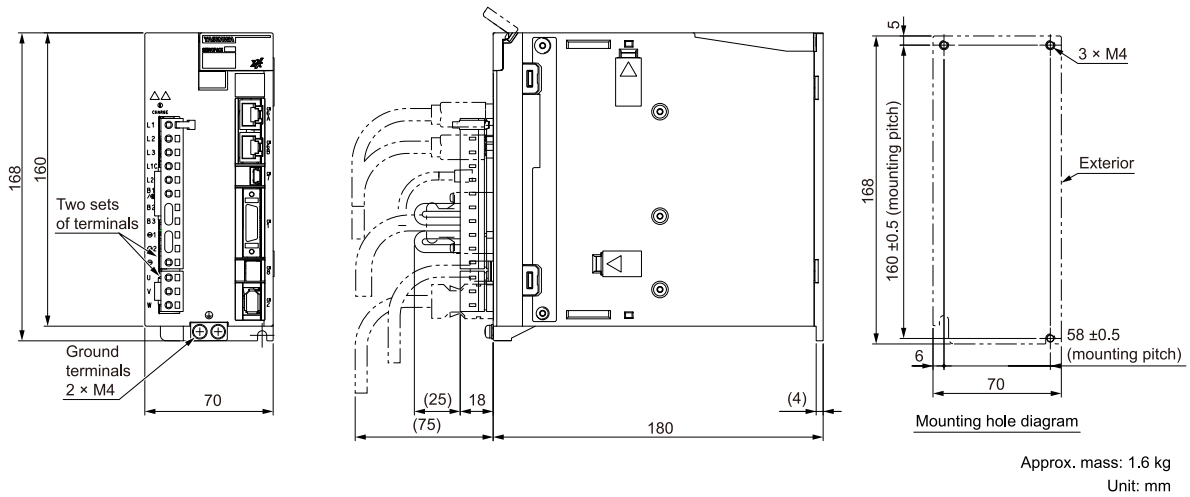
(b) SGDXS-2R8A



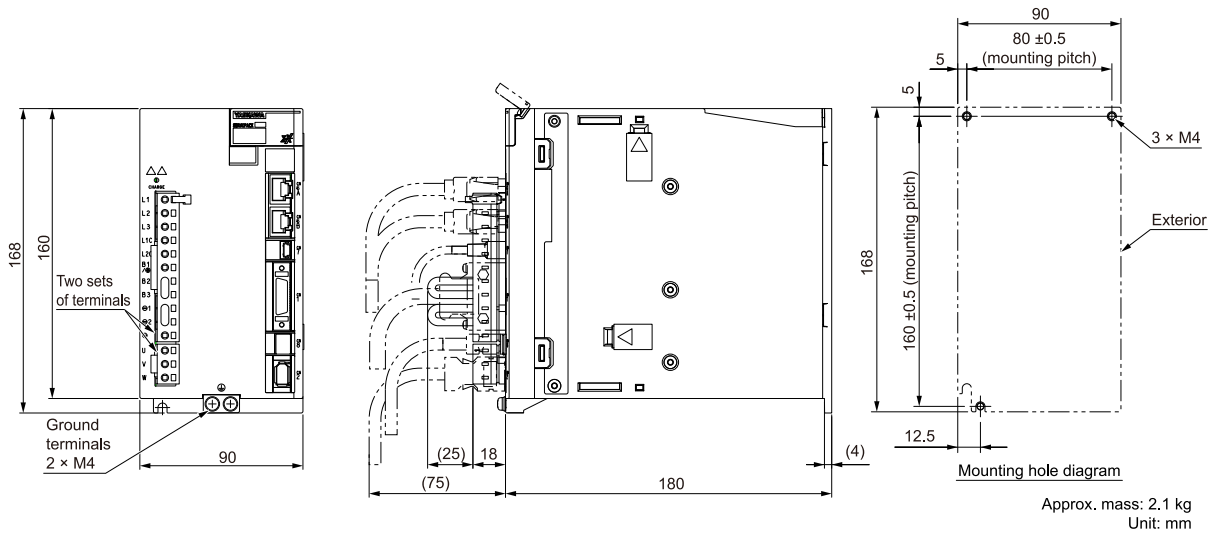
(c) SGDXS-3R8A



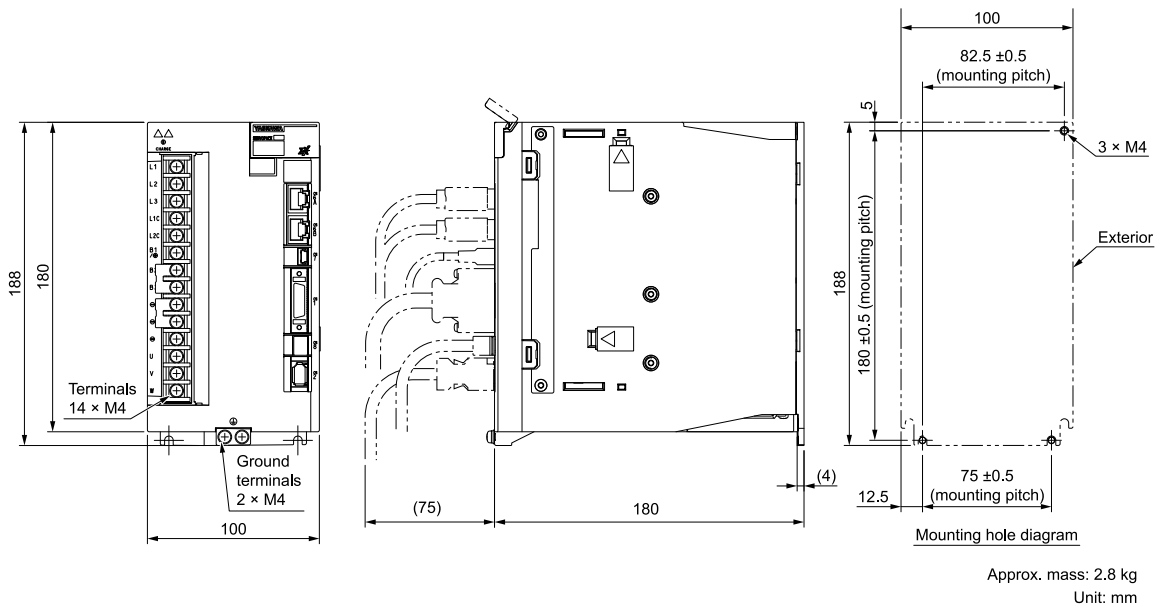
(d) **SGDXS-5R5A, -7R6A**



(e) **SGDXS-120A**



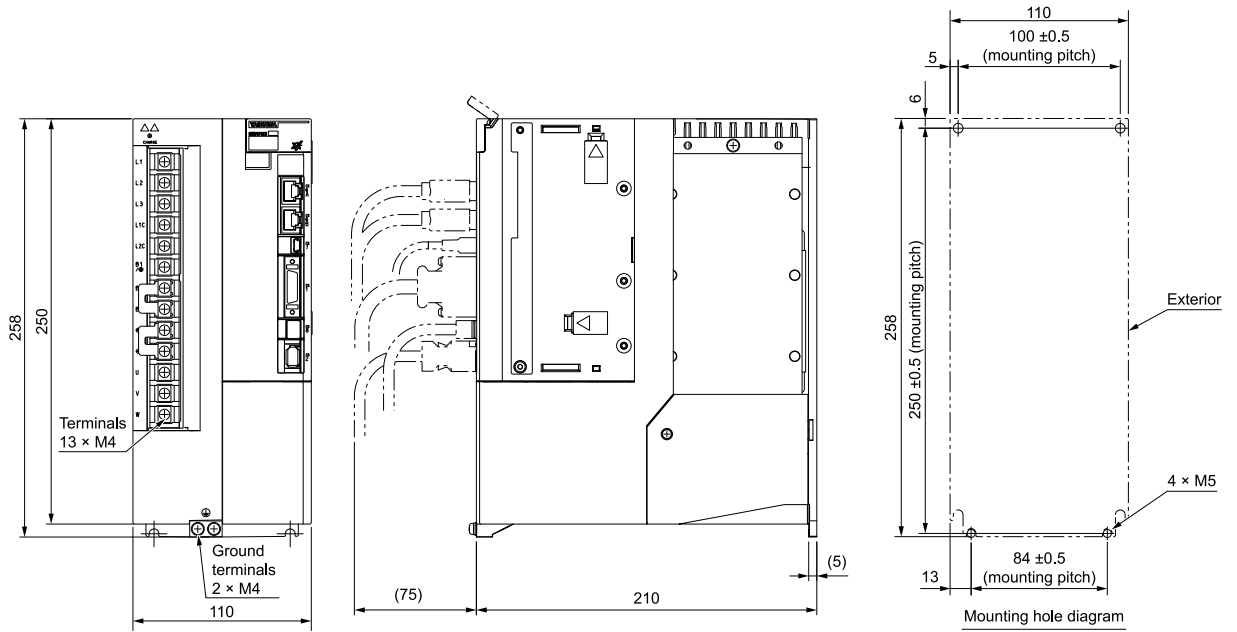
(f) **SGDXS-180A, -200A**



Note:

These drawings show the SERVOPACK with the terminal cover removed.

(g) SGDXS-330A

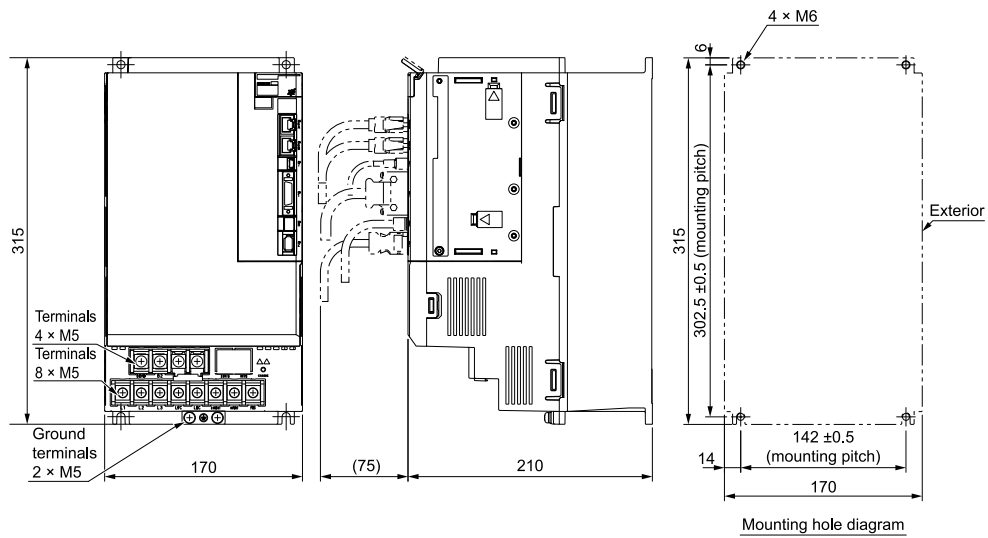


Approx. mass: 4.4 kg
Unit: mm

Note:

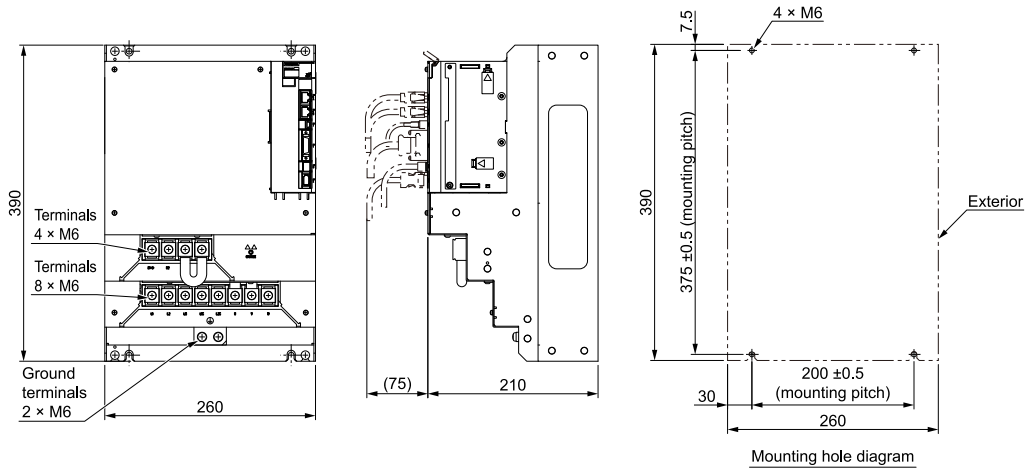
These drawings show the SERVOPACK with the terminal cover removed.

(h) SGDXS-470A, -550A



Approx. mass: 9.0 kg
Unit: mm

(i) **SGDXS-590A, -780A**

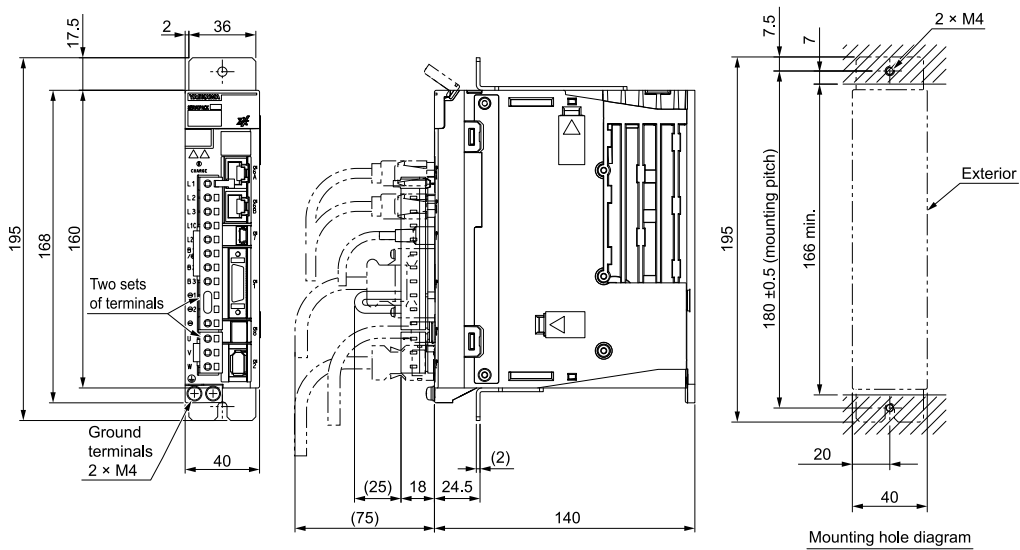


Approx. mass: 16 kg
Unit: mm

(2) **Rack-mounted SERVOPACKS**

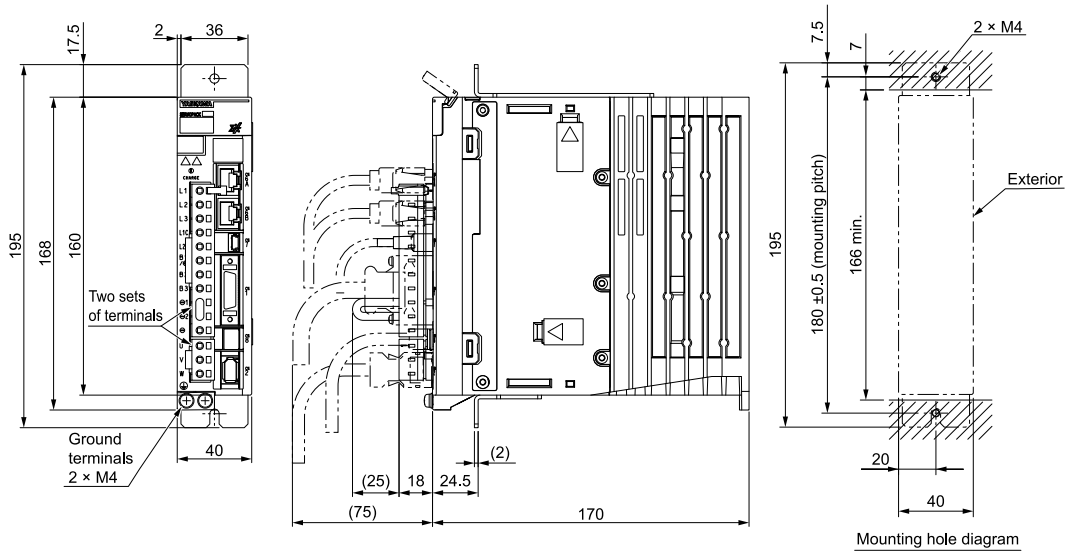
Hardware Option Code: 0001

(a) **SGDXS-R70A, -R90A, -1R6A**



Approx. mass: 0.9 kg
Unit: mm

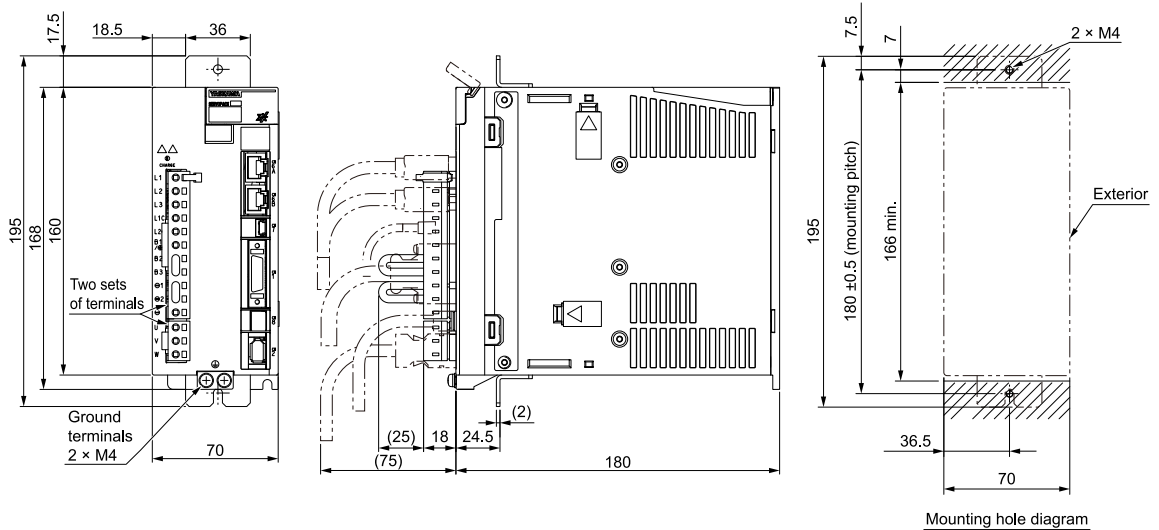
(b) SGDXS-2R8A



Mounting hole diagram

Approx. mass: 1.1 kg
Unit: mm

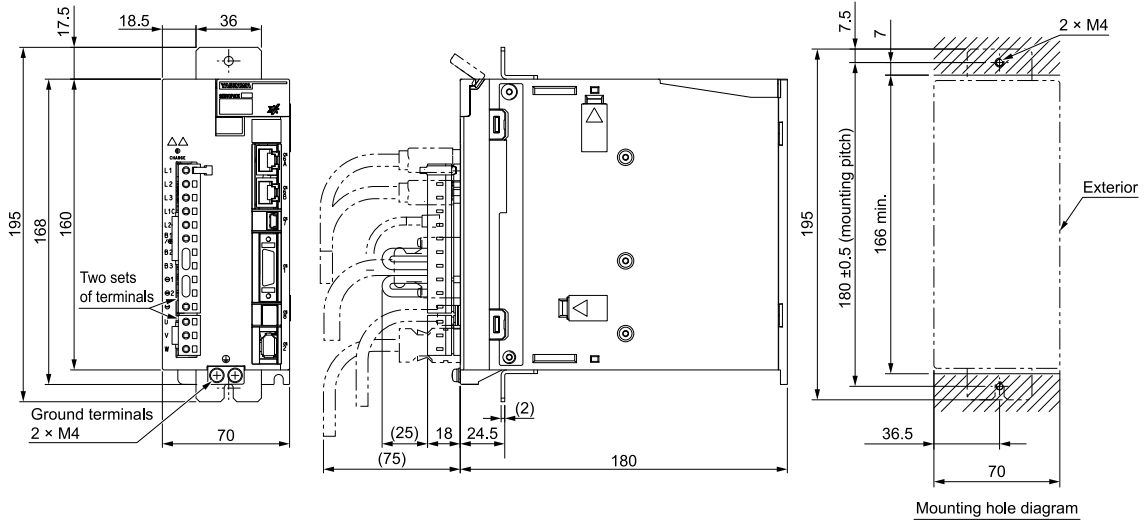
(c) SGDXS-3R8A



Mounting hole diagram

Approx. mass: 1.7 kg
Unit: mm

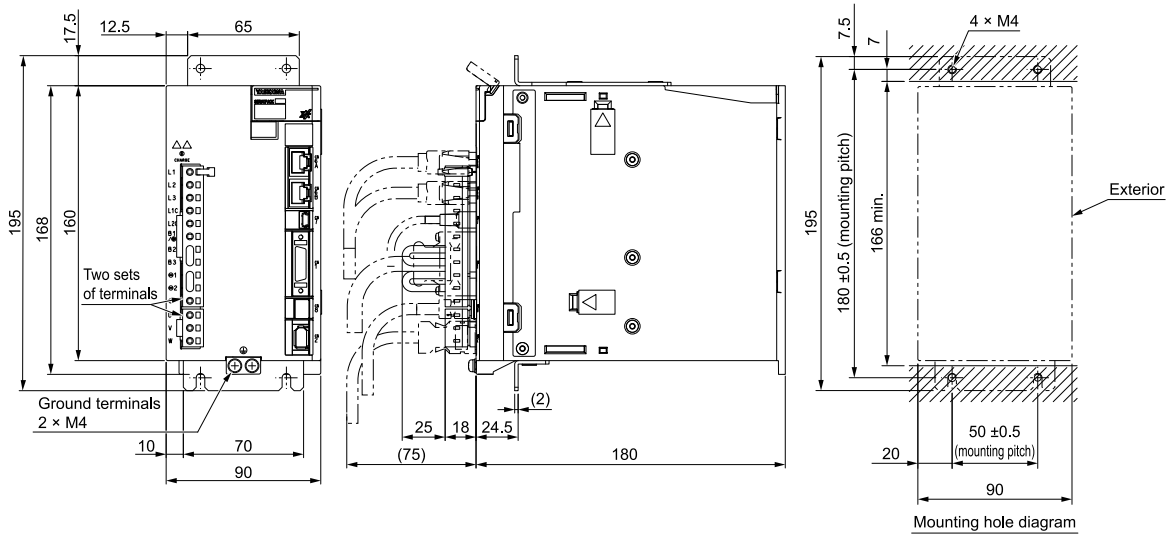
(d) **SGDXS-5R5A, -7R6A**



Mounting hole diagram

Approx. mass: 1.7 kg
Unit: mm

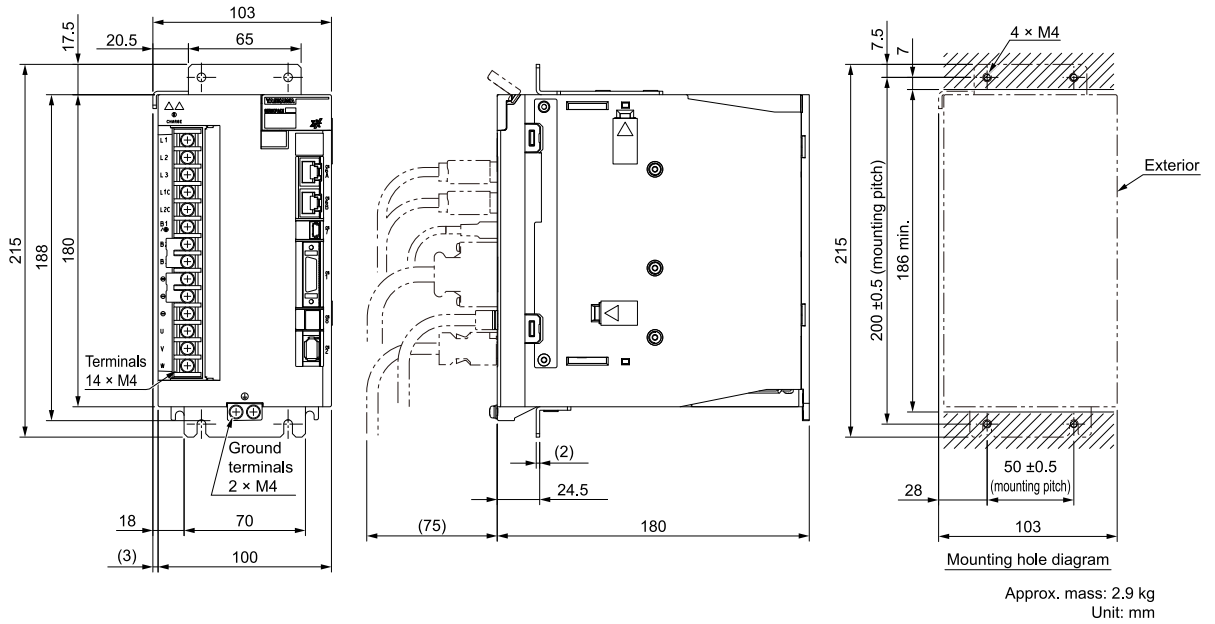
(e) **SGDXS-120A**



Mounting hole diagram

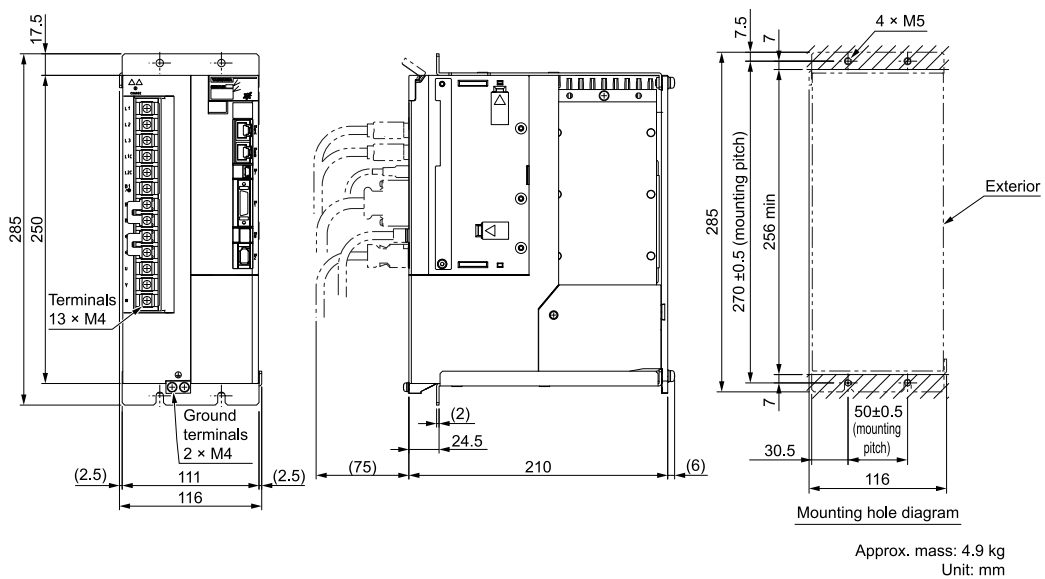
Approx. mass: 2.2 kg
Unit: mm

(f) SGDXS-180A, -200A



Note:
These drawings show the SERVOPACK with the terminal cover removed.

(g) SGDXS-330A

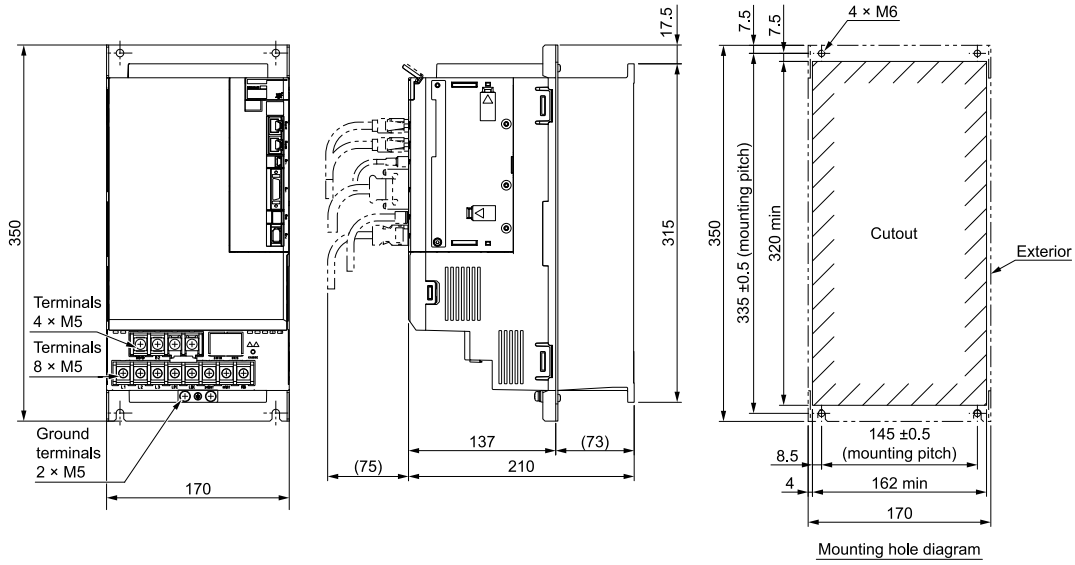


Note:
These drawings show the SERVOPACK with the terminal cover removed.

(3) Duct-ventilated SERVOPACKs

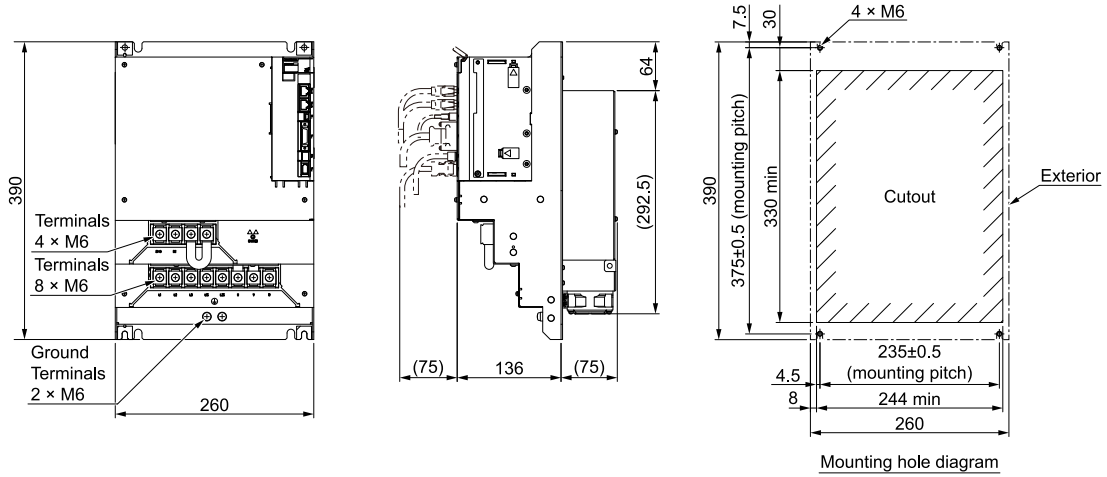
Hardware Option Code: 0001

(a) SGDXS-470A, -550A



Approx. mass: 9.0 kg
Unit: mm

(b) SGDXS-590A, -780A



Approx. mass: 15 kg
Unit: mm

Wiring and Connecting SERVOPACKs

This chapter provides information on wiring and connections when you use the customized sensing data function.

3.1	Wiring Precautions	78
	3.1.1 General Precautions	78
3.2	System Configuration Example	81
3.3	Devices and Components That Are Required to Build a System	82

3.1 Wiring Precautions

3.1.1 General Precautions



DANGER

Do not change any wiring while power is being supplied.

There is a risk of electric shock or injury.



WARNING

Wiring and inspections must be performed only by qualified engineers.

There is a risk of electric shock or product failure.

Check all wiring and power supplies carefully.

Incorrect wiring or incorrect voltage application to the output circuits may cause short-circuit failures. If a short-circuit failure occurs as a result of any of these causes, the holding brake will not work. This could damage the machine or cause an accident that may result in death or injury. There is also a risk that some parts damaged by the short-circuit failure may fall from the SERVOPACK.

Connect the AC or DC power supplies to the specified SERVOPACK terminals.

- **Connect an AC power supply to the L1, L2, and L3 terminals and the L1C and L2C terminals on the SERVOPACK.**
- **Connect a DC power supply to the B1 \oplus and \ominus 2 terminals and the L1C and L2C terminals on the SERVOPACK.**

There is a risk of failure or fire.

If you use a SERVOPACK with the dynamic brake hardware option, connect an external dynamic brake resistor that is suitable for the machine and equipment specifications to the specified terminals.

There is a risk of unexpected operation, machine damage, burning, or injury when an emergency stop is performed.



CAUTION

Wait for at least 20 minutes (or 100 minutes when using DC power supply input) after turning OFF the power and then make sure that the CHARGE indicator is not lit before starting wiring or inspection work. Do not touch the main circuit terminals while the CHARGE indicator is lit because high voltage may still remain in the SERVOPACK even after turning OFF the power.

There is a risk of electric shock.

Observe the precautions and instructions for wiring and trial operation precisely as described in this document.

Failures caused by incorrect wiring or incorrect voltage application in the brake circuit may cause the SERVOPACK to fail, damage the equipment, or cause an accident resulting in death or injury.

Check the wiring to be sure it has been performed correctly. Connectors and pin layouts are sometimes different for different models. Always confirm the pin layouts in technical documents for your model before operation.

There is a risk of failure or malfunction.

Connect wires to main circuit terminals and motor connection terminals securely with the specified methods and tightening torque.

Insufficient tightening may cause wires and terminal blocks to generate heat due to faulty contact, possibly resulting in fire.



CAUTION

Use shielded twisted-pair cables or screened unshielded multi-twisted-pair cables for I/O signal cables and encoder cables.

The maximum wiring length is 3 m for I/O signal cables and 50 m for servomotor main circuit cables and encoder cables.

Observe the following precautions when wiring the SERVOPACK's main circuit terminals.

- Turn ON the power to the SERVOPACK only after all wiring, including the main circuit terminals, has been completed.
- If a connector is used for the main circuit terminals, remove the main circuit connector from the SERVOPACK before you wire it.
- Insert only one wire per insertion hole in the main circuit terminals.
- When you insert a wire, make sure that the conductor wire (e.g., whiskers) does not come into contact with adjacent wires and cause a short-circuit.

Install molded-case circuit breakers and other safety measures to provide protection against short circuits in external wiring.

There is a risk of fire or failure.

NOTICE

Whenever possible, use the cables specified by Yaskawa. If you use any other cables, confirm the rated current and application environment of your model and use the wiring materials specified by Yaskawa or equivalent materials.

Securely tighten connector screws and lock mechanisms.

Insufficient tightening may result in connectors falling off during operation.

Do not bundle power lines (e.g., the main circuit cable) and low-current lines (e.g., the I/O signal cables or encoder cables) together or run them through the same duct. If you do not place power lines and low-current lines in separate ducts, separate them by at least 30 cm.

If the cables are too close to each other, malfunctions may occur due to noise affecting the low-current lines.

Install a battery at either the host controller or on the encoder cable.

If you install batteries both at the host controller and on the encoder cable at the same time, you will create a loop circuit between the batteries, resulting in a risk of damage or burning.

When connecting a battery, connect the polarity correctly.

There is a risk of battery rupture or encoder failure.



Important

- Use a molded-case circuit breaker or fuse to protect the main circuit.
The SERVOPACK connects directly to a commercial power supply; it is not isolated through a transformer or other device. Always use a molded-case circuit breaker or fuse to protect the servo system from accidents involving different power system voltages or other accidents.
- Install an earth leakage circuit breaker.
The SERVOPACK does not have a built-in ground fault protective circuit. To configure a safer system, install a ground fault detector against overloads and short-circuiting, or install a ground fault detector combined with a molded-case circuit breaker.
- Do not turn the power ON and OFF more than necessary.
 - Do not use the SERVOPACK for applications that require the power to be turned ON and OFF frequently. Such applications will cause elements in the SERVOPACK to deteriorate.
 - After you have started actual operation, allow at least one hour between turning the power ON and OFF (as a guideline).

To ensure safe, stable application of the servo system, observe the following precautions when wiring.

3.1 Wiring Precautions

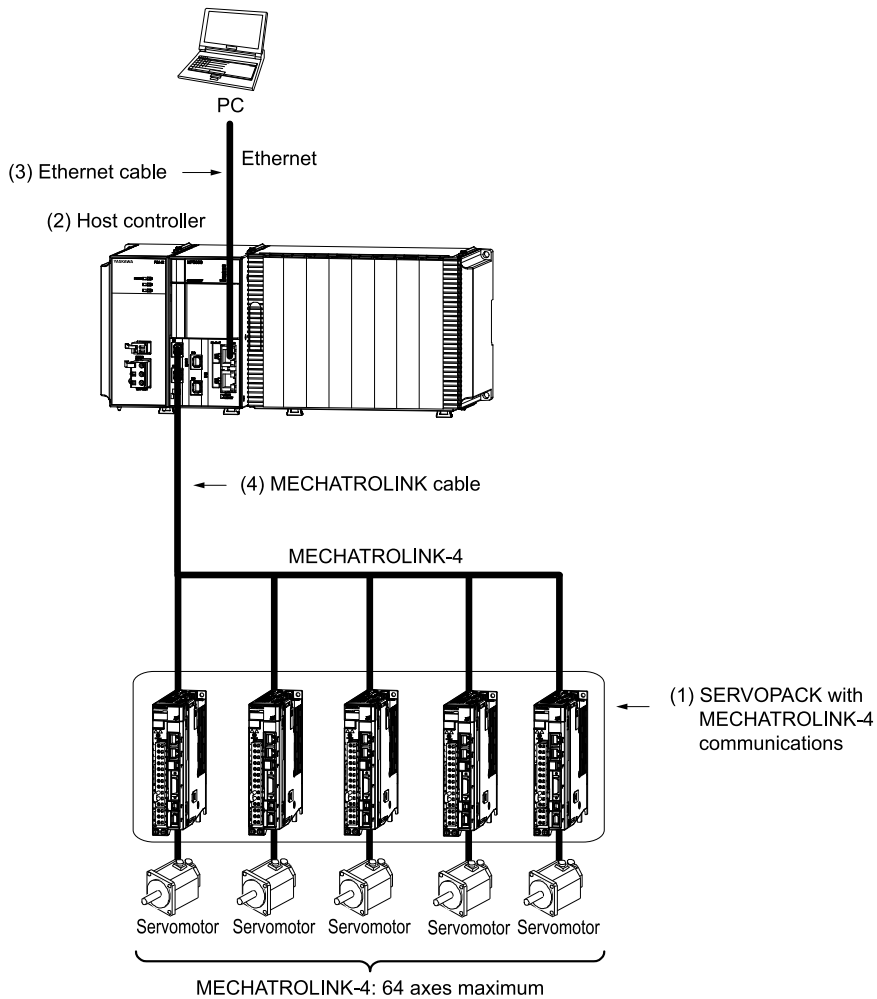
- Use the cables specified by Yaskawa. Design and arrange the system so that each cable is as short as possible. Refer to the following manual or catalog for information on the specified cables.
 - 📖 Σ -X-Series Catalog (Catalog No.: KAEP C710812 03)
 - 📖 Σ -X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)
- The signal cable conductors are as thin as 0.2 mm² or 0.3 mm². Do not subject them to excessive bending stress or tension.

3.2 System Configuration Example

The following figure shows a typical system configuration. Refer to the following section for details on (1) to (6) in the following figure.

☞ [3.3 Devices and Components That Are Required to Build a System on page 82](#)

(5) MPE720 Ver.7, (6) SigmaWin+, or (7) M-4 Configuration Tool



Important

You cannot mix MECHATROLINK-4 communications and MECHATROLINK-III communications in the same system configuration.

3.3 Devices and Components That Are Required to Build a System

The following table lists the devices and components that are required to build the system that is shown in the previous page. The numbers (1) to (7) correspond to the numbers in the figure that is shown in the previous page.

No.	Name	Usage	Model	Remarks	
(1)	SERVOPACK with MECHATROLINK-4 Communications ^{*1}	Used to control servomotors.	SGDXS-□□□□40A200056	–	
(2)	MP3200 (CPU-203F)	Collects motion control and SERVOPACK sensing data.	JEPMC-CP3203T1-E	Supported versions: Ver. 1.65 and later	Refer to the user's manual for the machine controller you are using for details.
(3)	Ethernet Cable	Used to connect the host controller and a personal computer that has the MPE720 installed on it.	Use a commercially available cable that meets the following conditions: <ul style="list-style-type: none"> Ethernet specification: 10Base-T/100Base-TX <ul style="list-style-type: none"> – Category 5 or higher – Twisted-pair cable with RJ-45 connectors Ethernet specification: 1000Base-T <ul style="list-style-type: none"> – Category 5e or higher – Shielded twisted-pair cable with RJ-45 connectors 		
(4)	MECHATROLINK Cable (RJ-45 connectors on both ends)	Connects the SERVOPACK to MECHATROLINK-4 communications devices.	JZSP-CM3RR□0-□□□□-E	Standard cable Length: 0.2 m to 30 m	
			JZSP-CM3RR□1-□□□□-E	Cable with ferrite cores Length: 0.3 m to 50 m	
(5)	System Integrated Engineering Tool MPE720 Ver.7	Used to adjust, maintain, and program AC servo drives and inverters that are connected to the network.	OPMC-MPE780D	Supported in Ver. 7.84 and later only	
(6)	SigmaWin+	Used to set parameters, tune, and perform maintenance on the SERVOPACK.	–	Supported in Ver. 7.41 and later only	
(7)	M-4 Configuration Tool	Used to create a MECHATROLINK network information file (MNI file) for MECHATROLINK-4.	CPMC-NWCF700	Supported versions: All versions	

*1 If you connect the SERVOPACK to a host controller, you must match the MECHATROLINK settings.

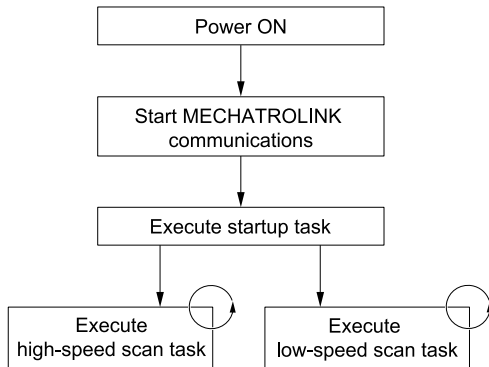
Basic Operations of Customized Sensing Data Function

This chapter describes the basic operations of the customized sensing data function in this product.

4.1	Overview	84
4.2	Execution of User Tasks	85
4.3	Timing Chart	86
4.4	Operation When Scan Exceeded	87
4.5	Memory Management	88
	4.5.1 Memory Structure	88
	4.5.2 Clear Memory/Clear All Memory	88

4.1 Overview

The user application is executed from the start of MECHATROLINK communications with the host controller. The startup task is executed when MECHATROLINK communications starts, and then the high-speed scan task and low-speed scan task are executed repeatedly at the set cycles.



The status is CPU RUN when the user application is being executed and CPU STOP when the user application is stopped.

Status	Description	I/O Input	I/O Output	Remarks
CPU RUN	User Application Execution Status	Executing	Executing	–
CPU STOP	User Application Stop Status	Stopped	Continues	–

CPU RUN and CPU STOP can be set with the MPE720 or the DIP switch (S3) on the SERVOPACK.

Refer to the following section for details.

[6.1 Setting CPU RUN/STOP on page 110](#)

Information

Depending on the amount of data in the user application, the time from when the power supply is turned ON to when the CPU is running (state in which the user application is being executed) will change.

The time from when the power supply is turned ON to when the CPU is running (state in which the user application is being executed) is approximately 50 seconds at maximum.

You can check if the CPU is running (state in which the user application is being executed) with SVCMD_IN over MECHATROLINK-4. Refer to the following section for details.

[10.2 SVCMD_IN on page 213](#)

4.2 Execution of User Tasks

User tasks are tasks that can execute user programs.

There are the following three types of user tasks.

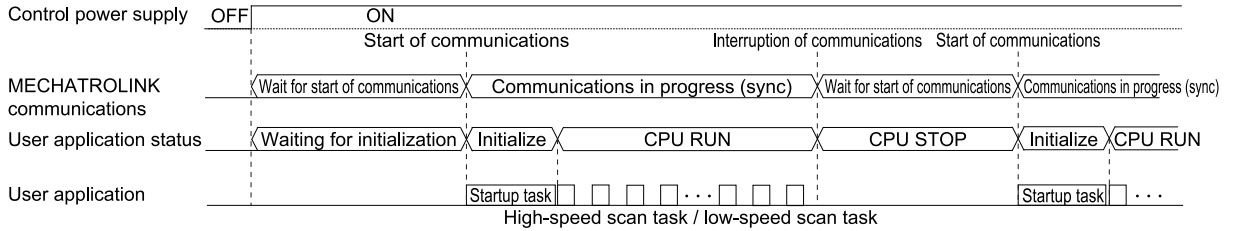
Priority	Task Name	Description
–	Startup task	<ul style="list-style-type: none"> • This task operates only once at CPU RUN after the power is turned ON. • Instructions that take multiple scans cannot be used. • This task is suited to initializing working data.
High	High-speed scan task	<ul style="list-style-type: none"> • This task operates synchronously with the MECHATROLINK communications cycle. • This task operates at the cycle set by the high-speed scan time (which is set from 125 μs, 250 μs, 500 μs, 1 ms, 1.5 ms, and 2 ms). (Set the MECHATROLINK transmission cycle to be an integer multiple of the high-speed scan time.) • This task is suited to high-speed sequence control.
Low	Low-speed scan task	<ul style="list-style-type: none"> • This task operates asynchronously with the MECHATROLINK communications cycle. • This task operates at the cycle set by the low-speed scan time (2 ms to 100 ms in increments of 0.5 ms and an integer multiple of the high-speed scan). • This task is suited to sequence control.

4.3 Timing Chart

The user application is executed synchronized to the start of MECHATROLINK communications.

When MECHATROLINK communications starts, the startup task is executed. Afterward, the high-speed scan task and low-speed scan task are cyclically executed (CPU RUN).

When MECHATROLINK communications is interrupted, the user program is stopped (CPU STOP). When MECHATROLINK communications starts again, the user application is restarted from the startup task (CPU RUN).



4.4 Operation When Scan Exceeded

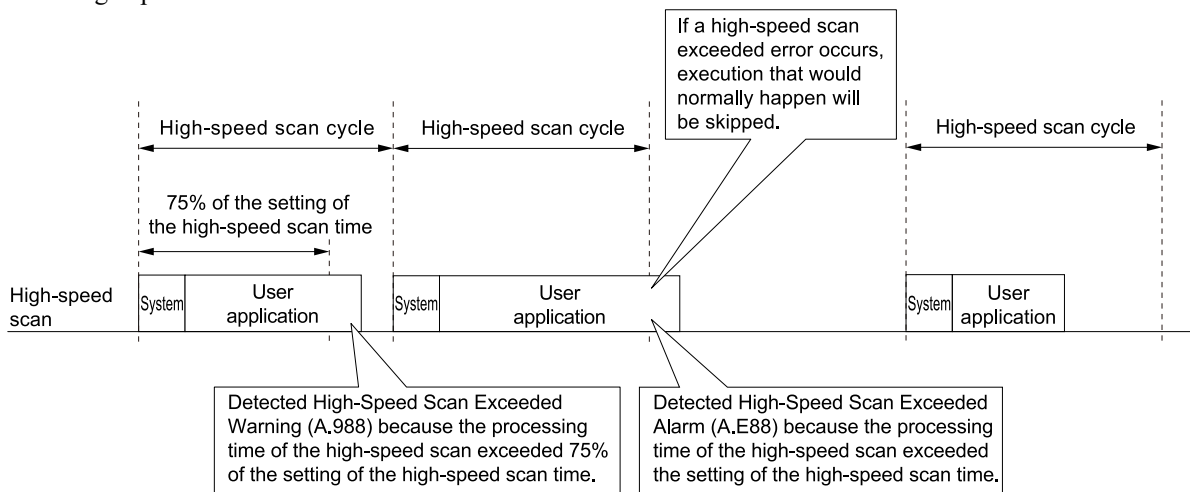
The user application must end processing within the scan cycle because it operates cyclically.

If the processing time for the high-speed scan or low-speed scan exceeds 75% of each scan cycle, High-Speed Scan Exceeded Warning (A.988) or Low-Speed Scan Exceeded Warning (A.989) will be detected.

If the processing time for the high-speed scan or low-speed scan exceeds each scan cycle, High-Speed Scan Exceeded Alarm (A.E88) or Low-Speed Scan Exceeded Alarm (A.E89) will be detected.

If a scan exceeded error occurs, execution of processing that would normally happen will be skipped.

If a scan exceeded warning or alarm is detected, review the settings for the scan cycles or review the processing in the high-speed scan.



• Scan Exceeded Warning

Display	Name	Meaning
A.988	High-Speed Scan Exceeded Warning	The processing time of the high-speed scan exceeded 75% of the setting of the high-speed scan time.
A.989	Low-Speed Scan Exceeded Warning	The processing time of the low-speed scan exceeded 75% of the setting of the low-speed scan time.

• Scan Exceeded Alarm

Display	Name	Meaning
A.E88	High-Speed Scan Exceeded Alarm	The processing time of the high-speed scan exceeded the setting of the high-speed scan time.
A.E89	Low-Speed Scan Exceeded Alarm	The processing time of the low-speed scan exceeded the setting of the low-speed scan time.

Information

- You can also disable the detection of High-Speed Scan Exceeded Warning (A.988) and Low-Speed Scan Exceeded Warning (A.989) with Pn8F0 = n.□□□X (User Customized Function Switch Mask).

Pn8F0	n.□□□X	User customized function switch mask			When Enabled
		Speed	Pos	Trq	
		0 Default	Do not mask.		After restart
		1	A.988 (High-Speed Scan Exceeded Warning) and A.989 (Low-Speed Scan Exceeded Warning) will not be detected.		
		2	Reserved (Do not use.)		

- You can monitor the current values and maximum values of the high-speed scan time and low-speed scan time in the MPE720. Refer to the following section for details.

🔗 [6.2 Scan Time Settings on page 112](#)

4.5 Memory Management

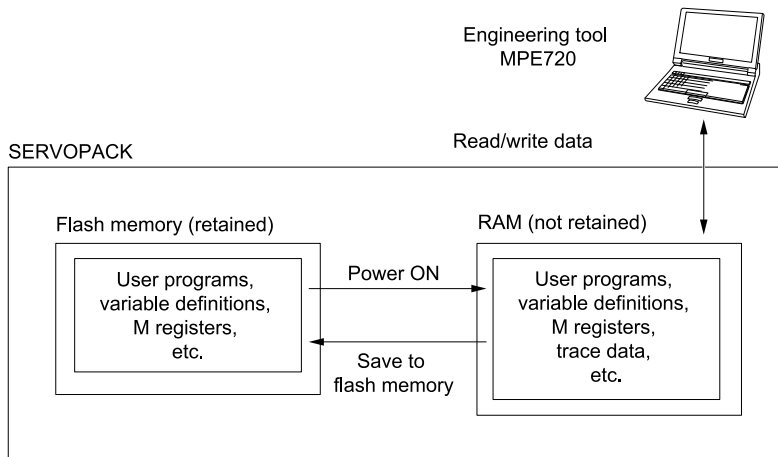
This section describes the memory management performed by the SERVOPACK.

4.5.1 Memory Structure

The SERVOPACK divides the memory according to the data that is stored. The following table shows the types of memory and the data that is stored.

Memory Type	Stored Data	Data Retention When Power OFF
RAM	Data such as the user application that is being executed	Not retained
Flash Memory	Data that is retained when the power is OFF, such as the user application and M registers	Retained

The user application operates according to the user programs and user definitions that were loaded in RAM. This data is stored in flash memory by executing save to flash memory. The data stored in flash memory is loaded in RAM and executed when the power is turned ON again.



4.5.2 Clear Memory/Clear All Memory

Use the MPE720 to perform clear memory/clear all memory.

Refer to the following manual for details on the operating procedure.

System Integrated Engineering Tool MPE720 Ver.7 User's Manual (Manual No.: SIEP C880761 03)

Item	Erasure Target		Description
	RAM	Flash Memory	
Clear memory (normal)	○	—	<ul style="list-style-type: none"> Clear memory is initially executed when batch transferring a project. Memory cannot be cleared when write protection is set.
Clear memory (including backup)	○	—	<ul style="list-style-type: none"> In addition to clear memory (normal), M registers will be cleared. Memory cannot be cleared when write protection is set.
Clear all memory	○	○	<ul style="list-style-type: none"> Can be executed when write protection is set.

Note:

- The clear memory and clear all memory operations cannot be used while saving to flash memory.
- The calendar data (elapsed time after power ON) is not cleared with the clear memory and clear all memory operations.
- The clear all memory operation cannot be used while the servo is ON.
- If the memory is cleared when the CPU is running, the CPU will stop automatically. After the memory is cleared, the CPU will run automatically.

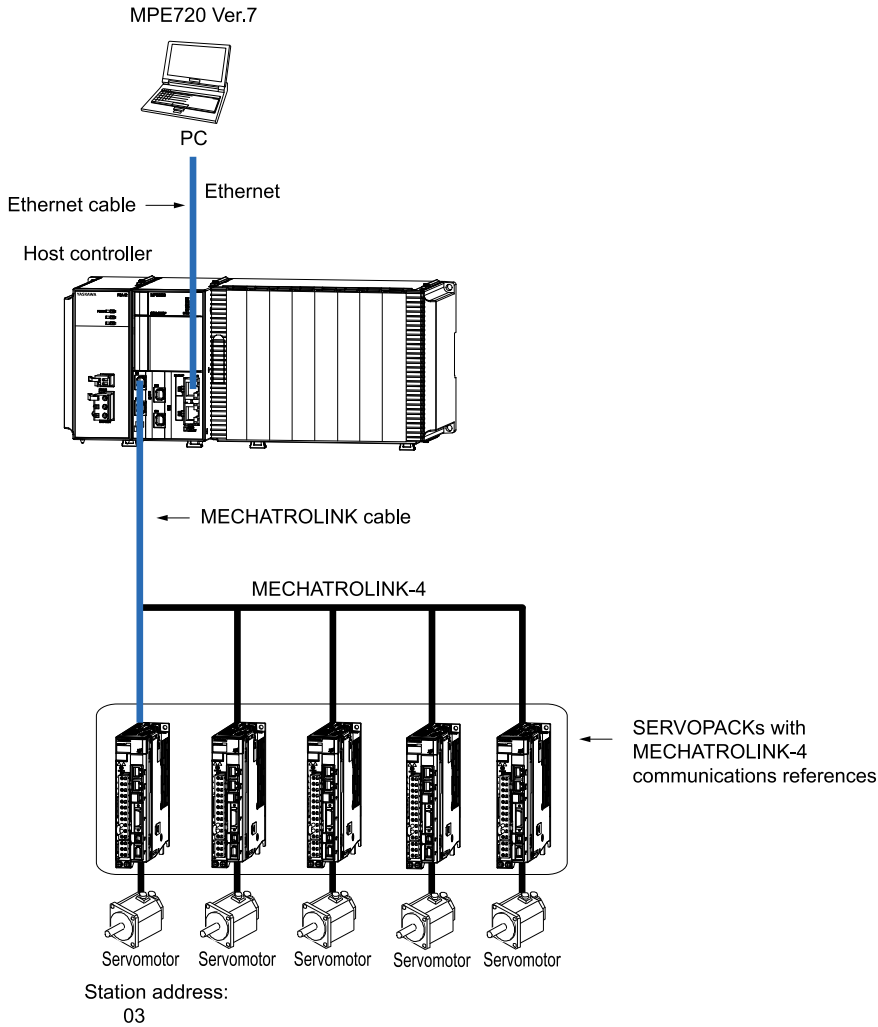
Connecting MPE720 and SERVOPACK


This chapter describes the procedures for establishing an online connection between the MPE720 and SERVOPACK.

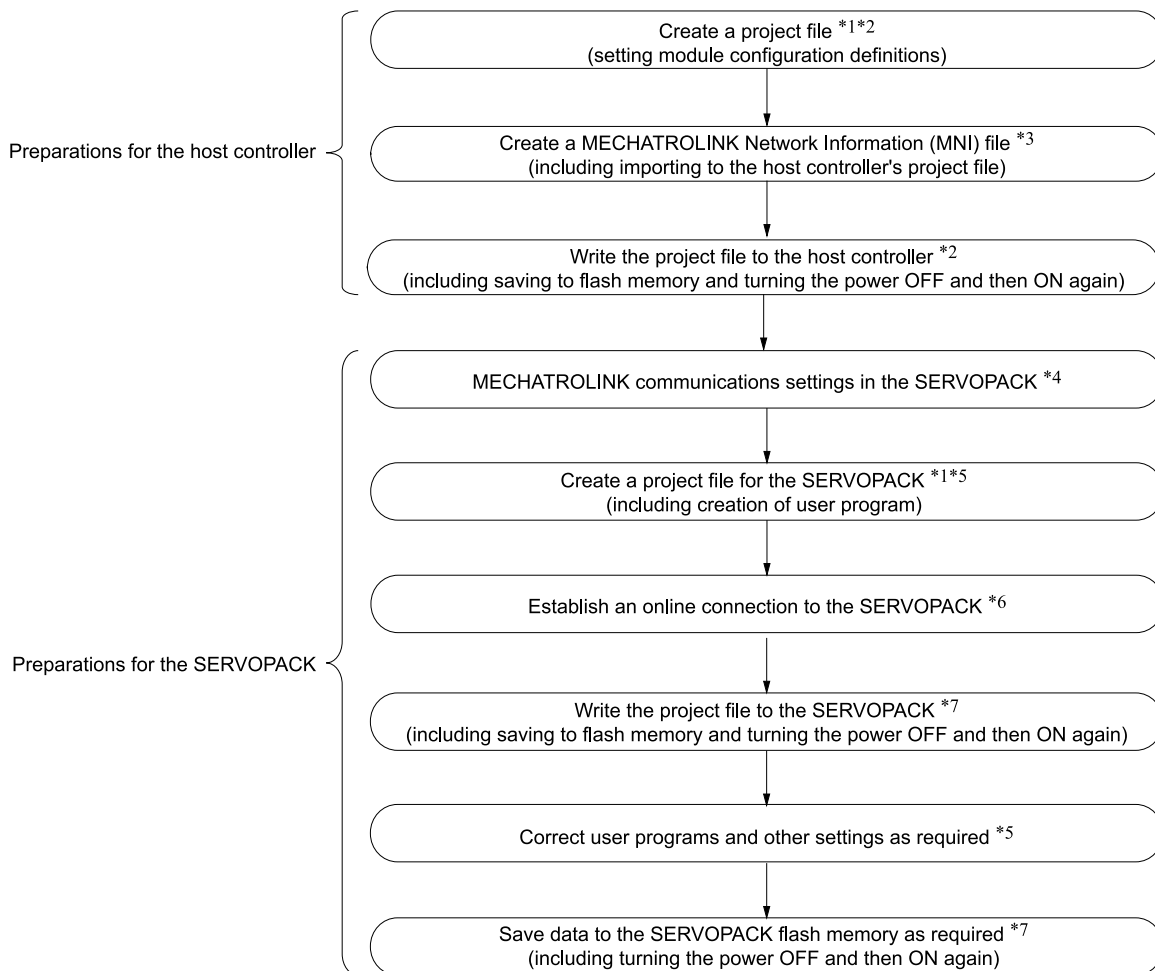
5.1	Flowchart.....	90
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5.1 Flowchart

This section shows the flowchart for using the customized sensing data function with the following system configuration as an example.



 **Important** Allocate this SERVOPACK (SGDXS-□□□□40A200056) to the module configuration definition of the host controller. If you do not allocate the SERVOPACK, you cannot establish an online connection to the SERVOPACK.



*1 You can perform this operation offline or online.

*2 Refer to the user's manual for the host controller you are using for details.

*3 This is a required operation if the SERVOPACK is connected to the MPE720 using MECHATROLINK-4 IP communications and if data sharing is being performed between SERVOPACKs with inter-device data sharing.
Refer to the following section for details.

☞ [5.2 Preparing the MNI File on page 92](#)

*4 Refer to the following section for details.

☞ [5.3 MECHATROLINK Communications Settings on page 95](#)

*5 Refer to the following sections for details.

☞ [5.4 Creating a Project File on page 97](#)

☞ [6 User Application Settings on page 109](#)

☞ [7 User Program Creation on page 125](#)

☞ [8 Customized Sensing Data Function on page 149](#)

*6 Refer to the following section for details.

☞ [5.5 Establishing an Online Connection between the MPE720 and SERVOPACK on page 100](#)

*7 Refer to the following section for details.

☞ [5.6 Transferring a Project File on page 104](#)

5.2 Preparing the MNI File

To use the following functions, you must create a MECHATROLINK network information file (MNI file) for MECHATROLINK-4 communications that configures the settings to enable the functions.

- To connect to the MPE720 by using IP communications in MECHATROLINK-4 communications
- To perform data sharing between SERVOPACKs by using inter-device data sharing

The MNI file must be created with the M-4 Configuration Tool and imported into the project file of the host controller.

Refer to the following manual for details on the MNI file.

📖 MECHATROLINK-4 Specifications for MECHATROLINK Network Information(MNI) file (Manual No.: MMATDEP047A)

Refer to the following manual for details on the procedure to create the MNI file.

📖 M-4 Configuration Tool Manual (Manual No.: SIEP C880761 07)

Refer to the following manual for details on the procedure to import the MNI file.

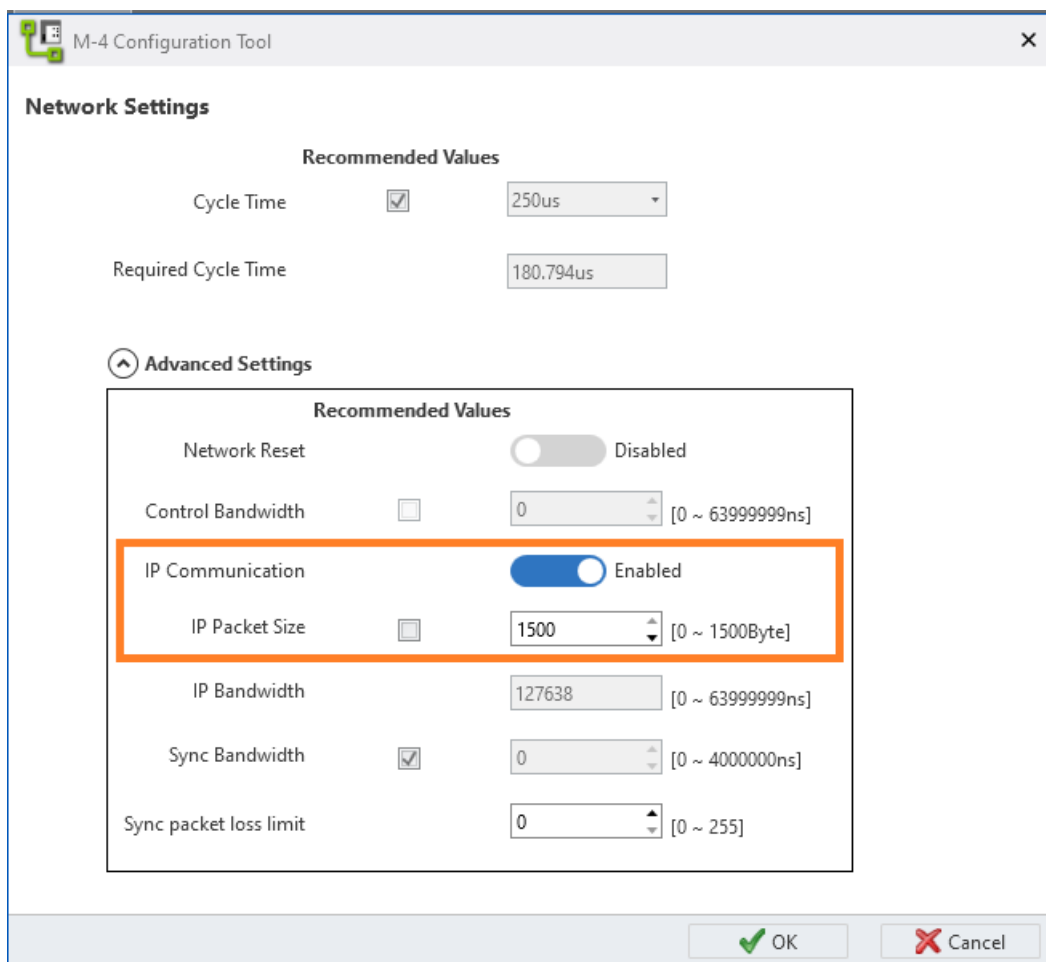
📖 MP3000 Series MP3200 Product Manual (Manual No.: SIEP C880725 10)

The subsequent sections describe the settings for using IP communications in MECHATROLINK-4 communications and the settings for using inter-device data sharing.

5.2.1 Settings for Using IP Communications in MECHATROLINK-4 Communications

When performing Ethernet communications between the MPE720 and a host controller and when making a connection over MECHATROLINK-4 communications between a host controller and a SERVOPACK, the MPE720 can establish an online connection to a SERVOPACK by using IP communications in MECHATROLINK-4 communications.

In the M-4 Configuration Tool, on the [Network Settings] window, set [IP Communication] in MECHATROLINK-4 communications to [Enabled] and set [IP Packet Size].



Refer to the following manual for details on the M-4 Configuration Tool.

📖 M-4 Configuration Tool Manual (Manual No.: SIEP C880761 07)

5.2.2 Settings for Using Inter-Device Data Sharing

To use inter-device data sharing, you must configure the settings for data sharing between SERVOPACKs.

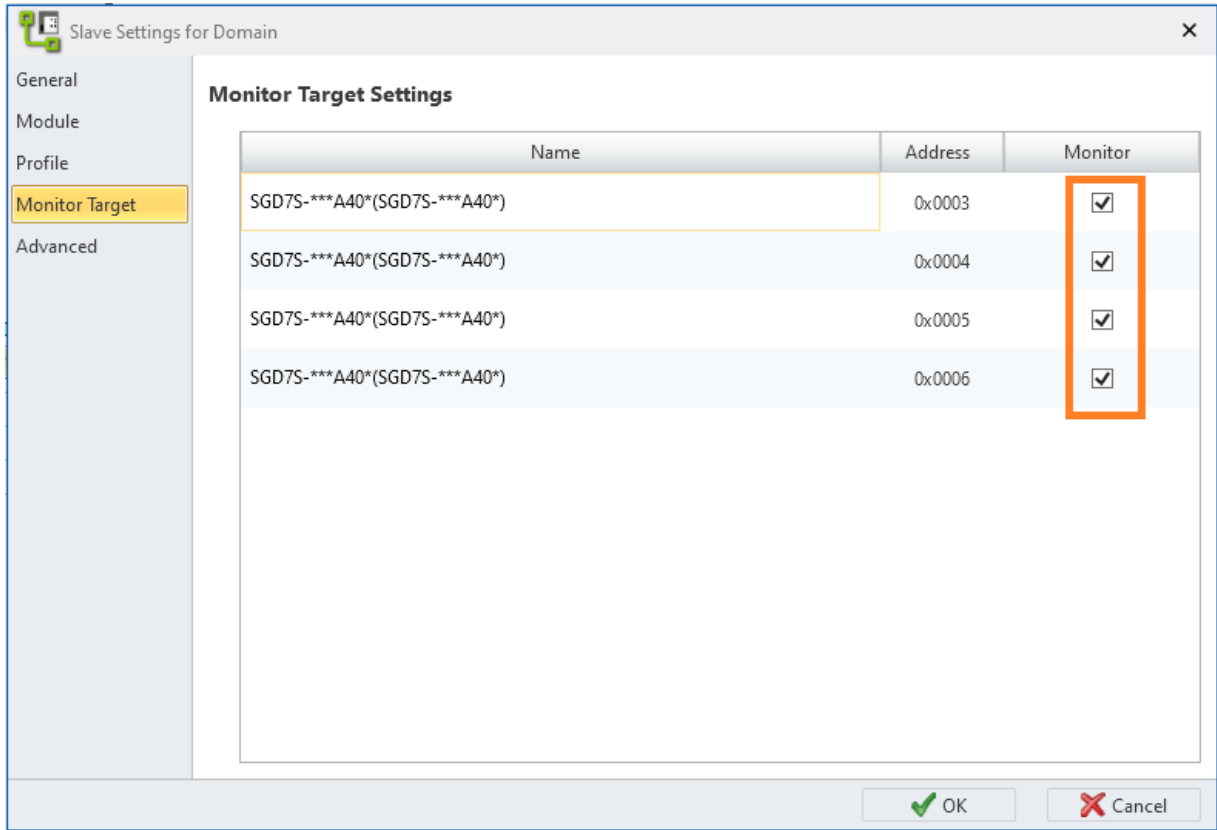
In the M-4 Configuration Tool, on the [Slave Settings for Domain] windows, set which SERVOPACK data to share with each SERVOPACK from the [Monitor Target] menu item.




Important

The data sharing settings must be configured for each SERVOPACK.

To share data between five SERVOPACKs, configure the settings for those five SERVOPACKs in the same manner.



Refer to the following manual for details on the M-4 Configuration Tool.

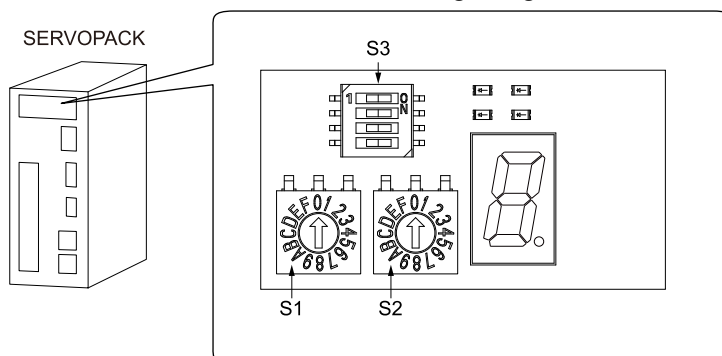
 M-4 Configuration Tool Manual (Manual No.: SIEP C880761 07)

5.3 MECHATROLINK Communications Settings

This SERVOPACK supports MECHATROLINK-4 communications only. MECHATROLINK communications requires the following three types of settings.

Setting Item	Setting Location	Reference
Communications Protocol Setting	- (fixed to MECHATROLINK-4)	☞ 5.3.1 DIP Switch (S3) Settings on page 95
Sets the number of transmission bytes.	Host controller	
Station Address Setting	Rotary switches (S1 and S2)	☞ 5.3.2 Rotary Switch (S1 and S2) Settings on page 95

Details on the switches used for the settings are given next.



5.3.1 DIP Switch (S3) Settings

Confirm that the settings for switches 1, 2, and 3 on the DIP switch (S3) are the default settings.

The SERVOPACK may not operate correctly if the settings are changed.

Pin No.	Default Setting	Function	Setting	Remarks
1	OFF	Reserved for system. (Do not change.)	-	-
2	ON			
3	ON			
4	OFF	CPU STOP	ON: CPU STOP OFF: CPU RUN	-


5.3.2 Rotary Switch (S1 and S2) Settings

Use the rotary switches (S1 and S2) to set the station address.

Station Address	S1	S2
00h to 02h: Disabled (Do not set.)	0	0 to 2
03h Default	0	3
:	:	:
EFh	E	F
F0h to FFh: Disabled (Do not set.)	F	0 to F



Important

- To enable the new setting, turn the power to the SERVOPACK OFF and ON again after you change the rotary switches (S1 and S2) .
- When the power is turned ON, the value of the set station address will be displayed on the panel display. Refer to the following manual for details.
 Σ -X-Series Σ -XS SERVOPACK with MECHATROLINK-4/III Communications References Product Manuals (Manual No.: SIEP C710812 01)

5.4 Creating a Project File

For the user program and other data that will run on the SERVOPACK, you must create a SERVOPACK project file and save the data to flash memory.

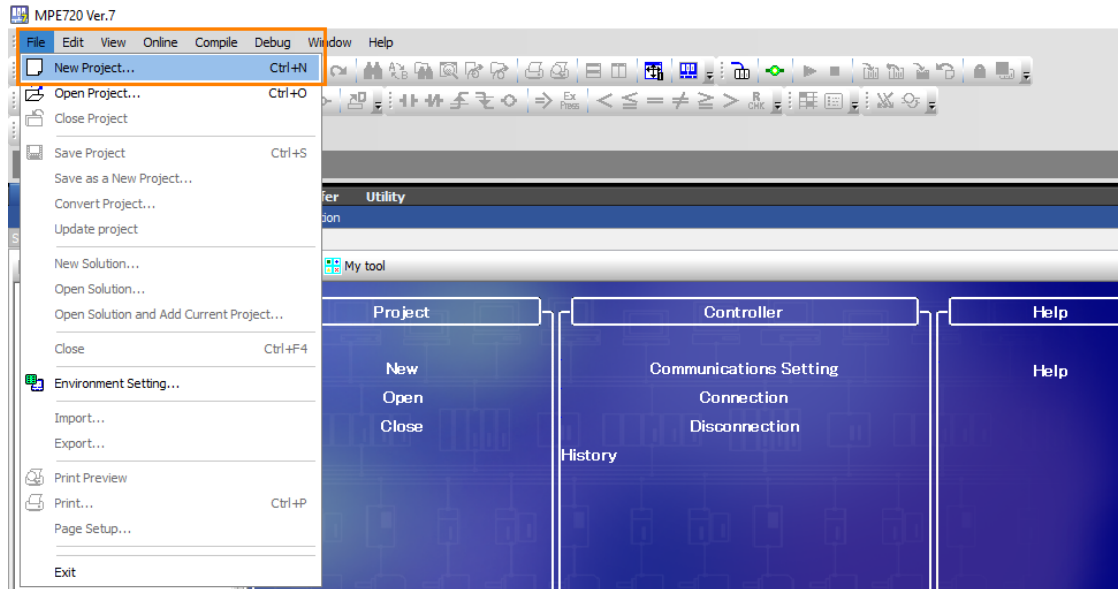
Use the following procedure to create a SERVOPACK project file.



Important

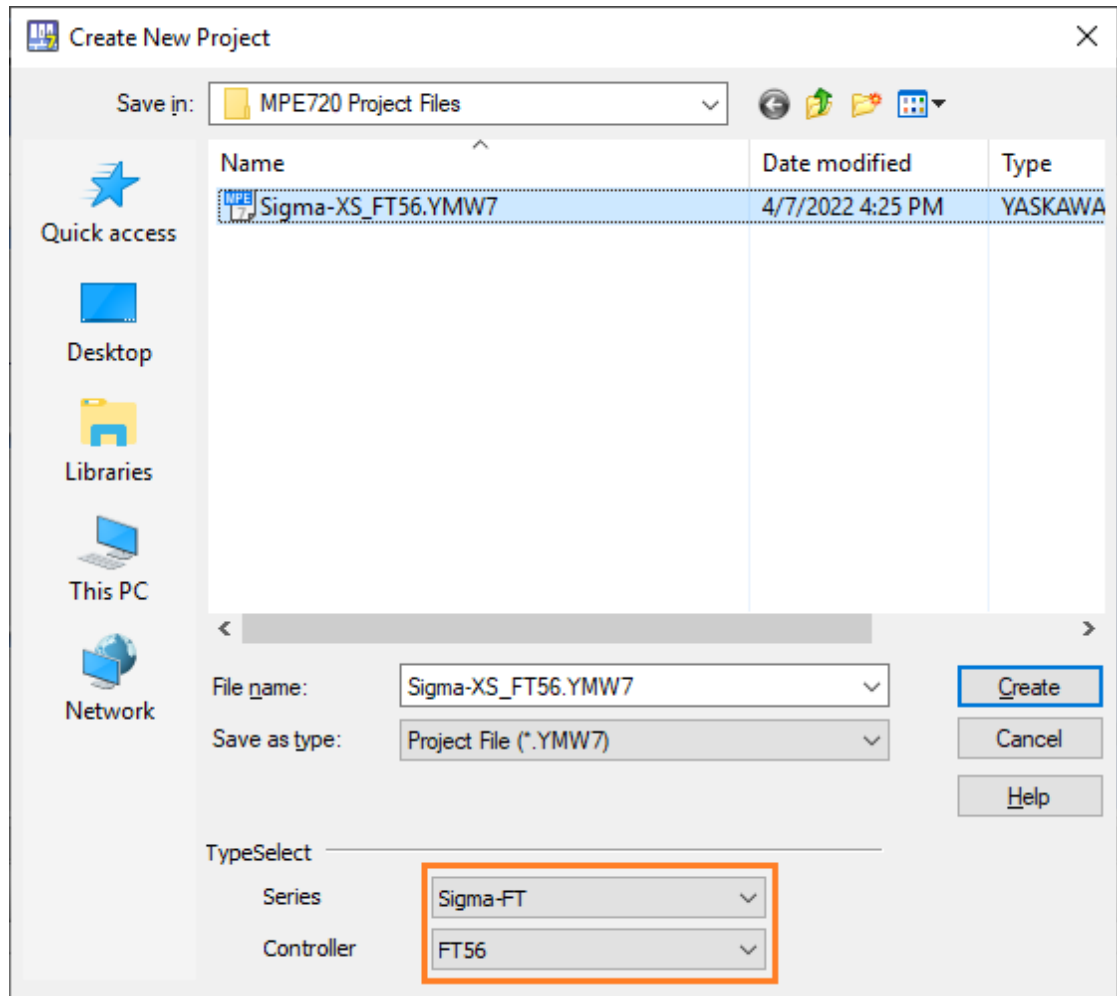
A user program can be written to the SERVOPACK only, but we recommend that you write (transfer) a project file that was saved to a personal computer to the SERVOPACK.

1. **Start MPE720.**
2. **Click [File] - [New Project].**

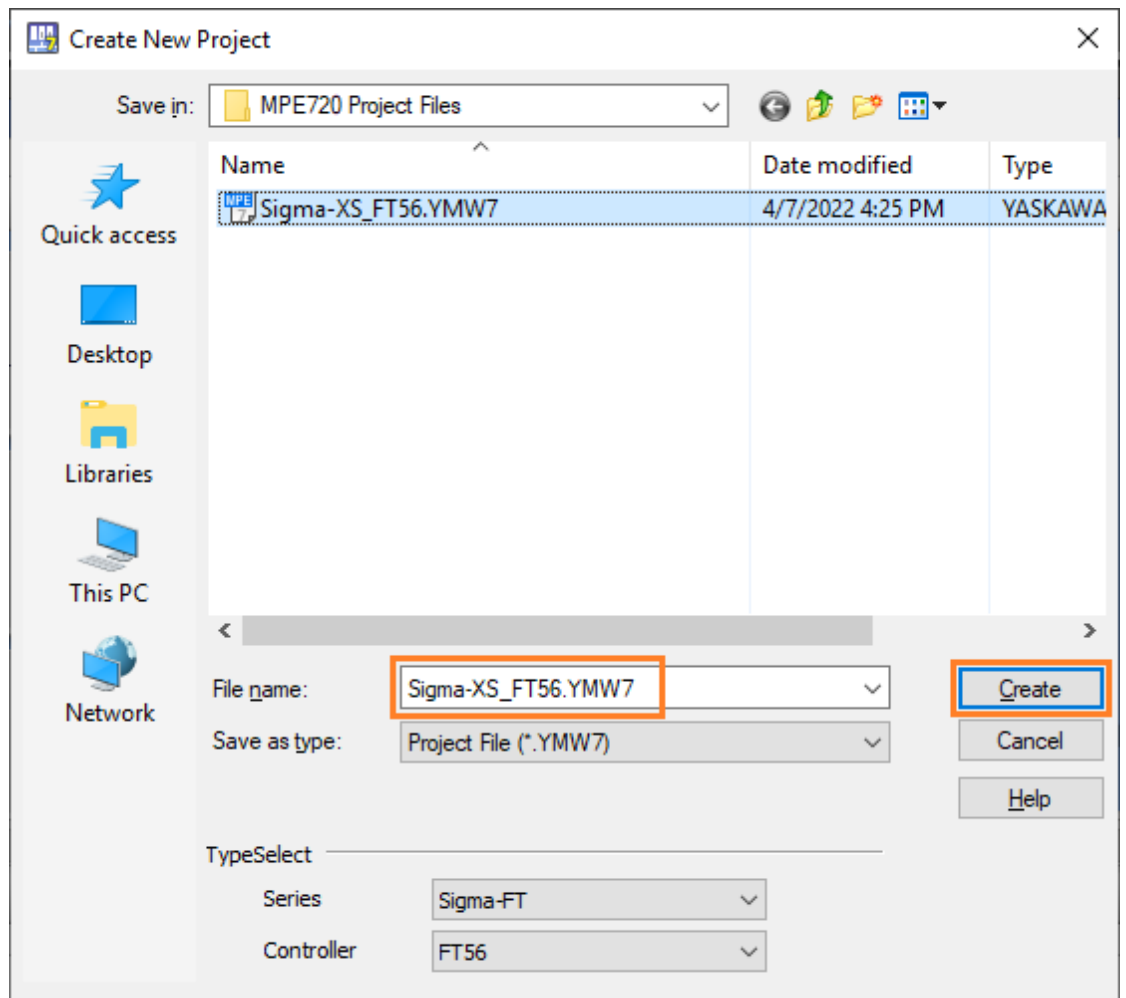


The Create New Project window will be displayed.

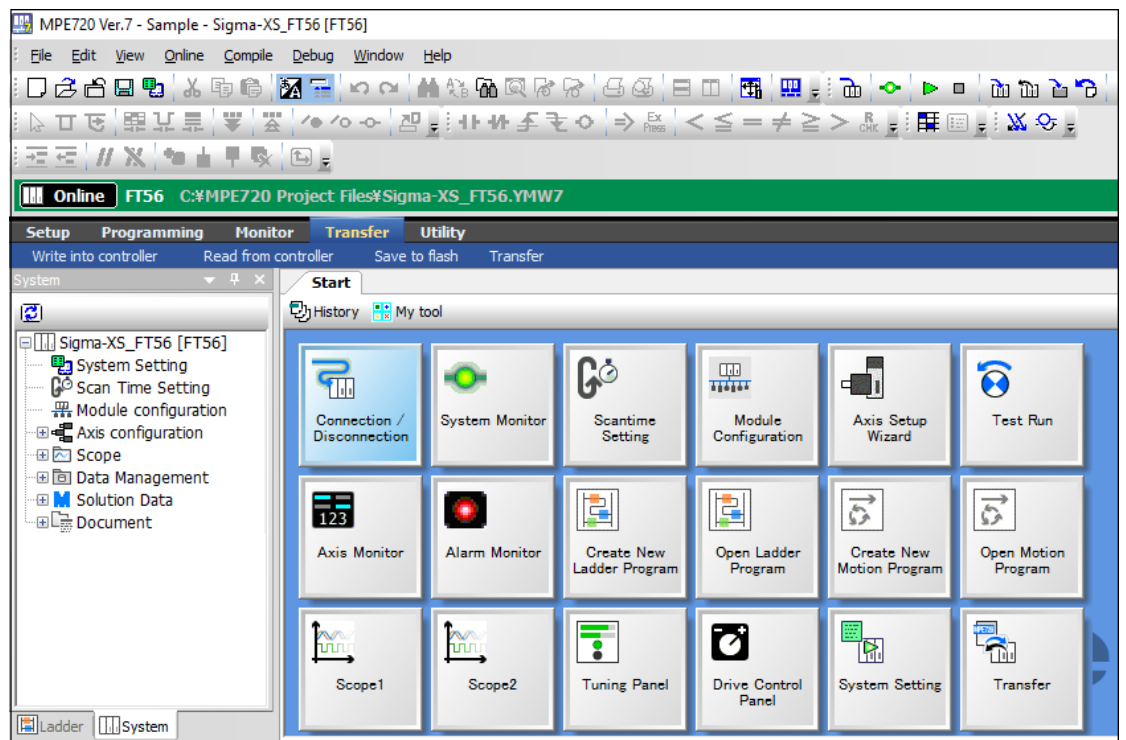
3. Set the series and controller.



4. Set the file name, and click the [Create] button.



The project will be opened offline.

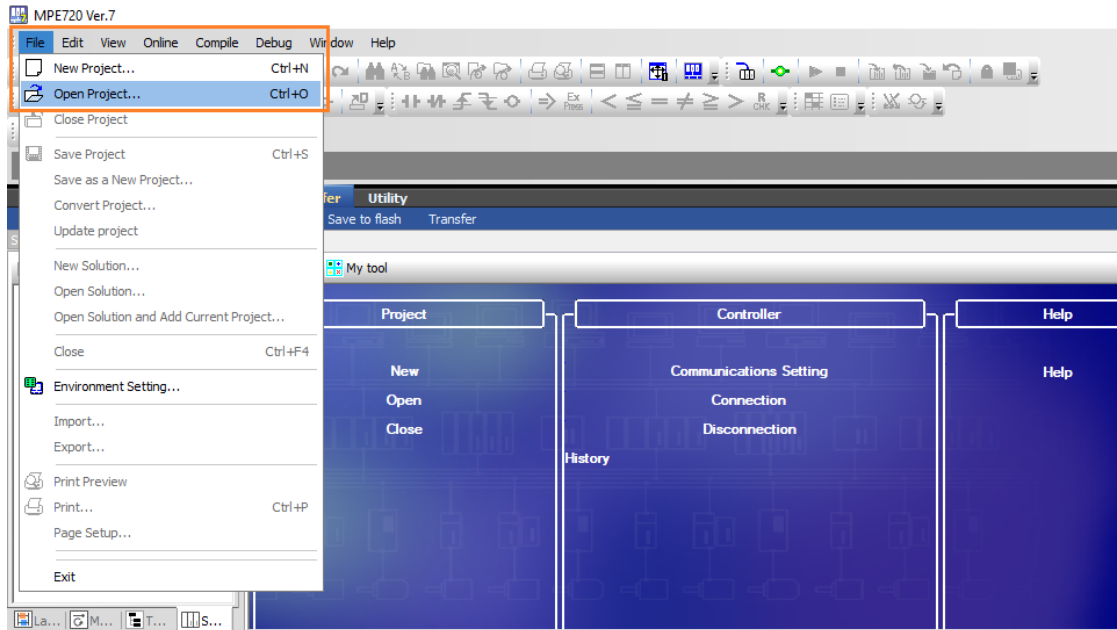


This concludes the procedure.

5.5 Establishing an Online Connection between the MPE720 and SERVOPACK

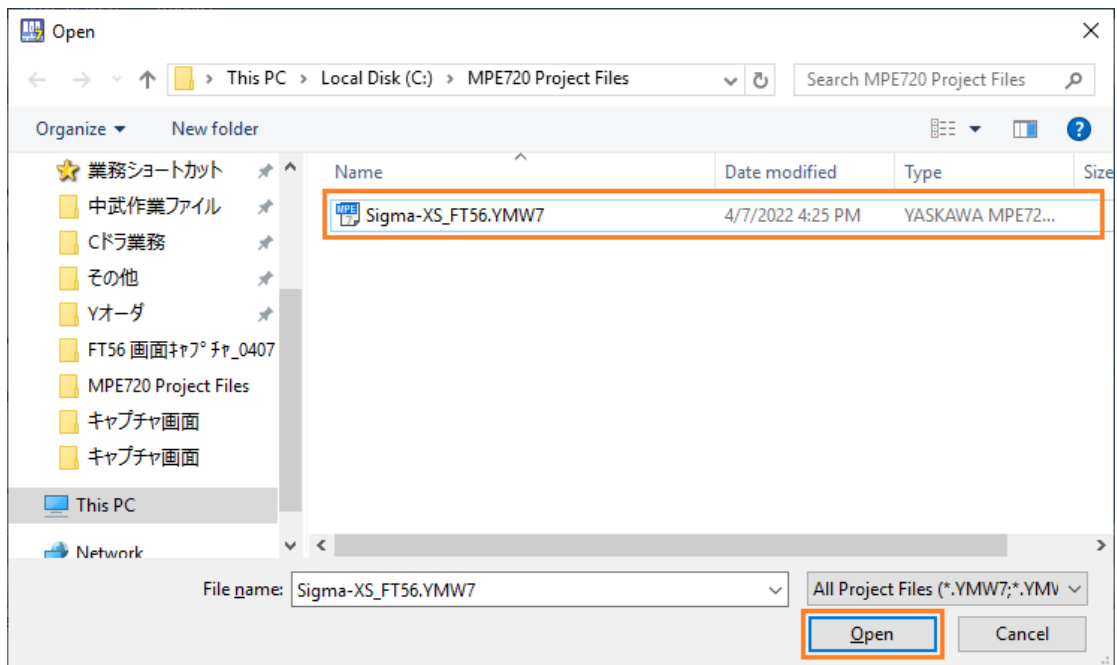
This section describes the procedure to open a project file that was created offline and to establish an online connection to the SERVOPACK that was set in the project file.

1. **Start MPE720.**
2. **Click [File] - [Open Project].**

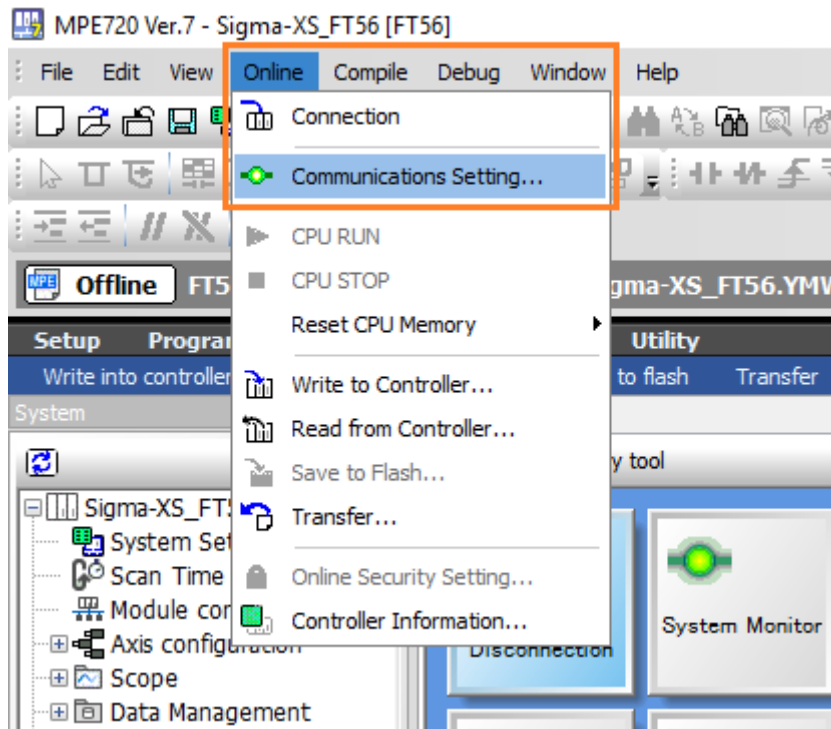


The Open window will be displayed.

3. **Select a SERVOPACK project file that was created, and then click the [Open] button.**

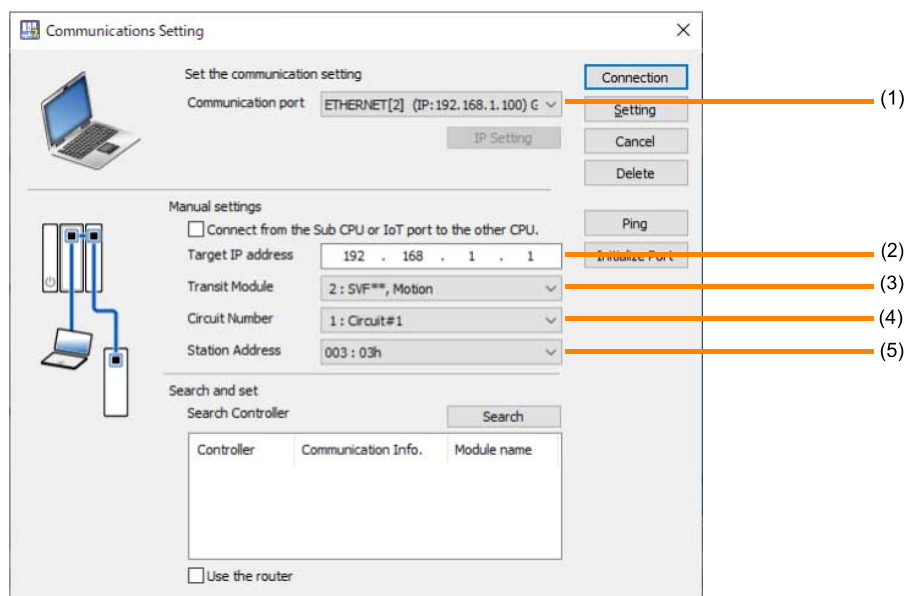


4. Click [Online] - [Communications Setting].



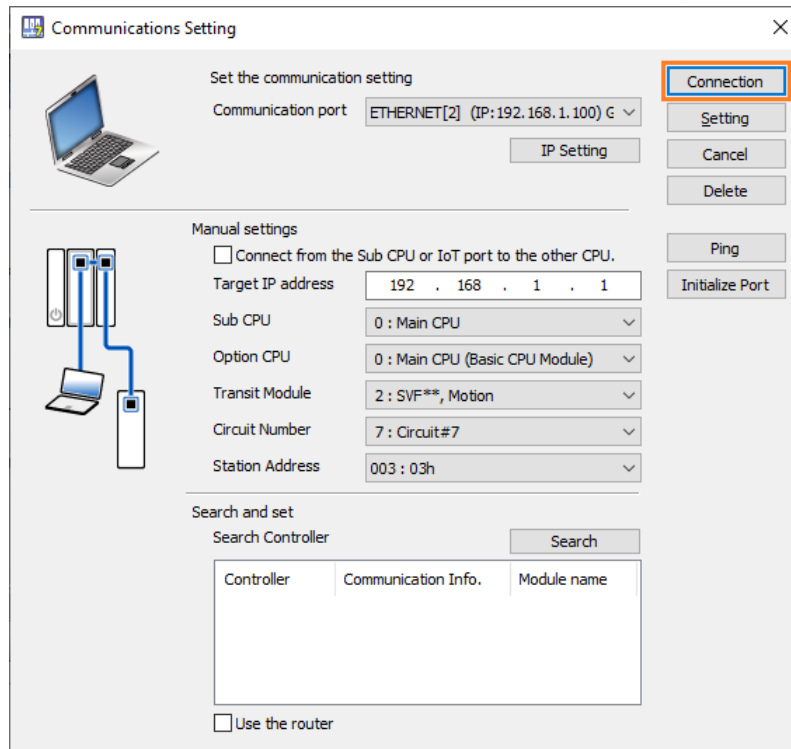
The Communications Setting window will be displayed.

5. Configure the communications settings.

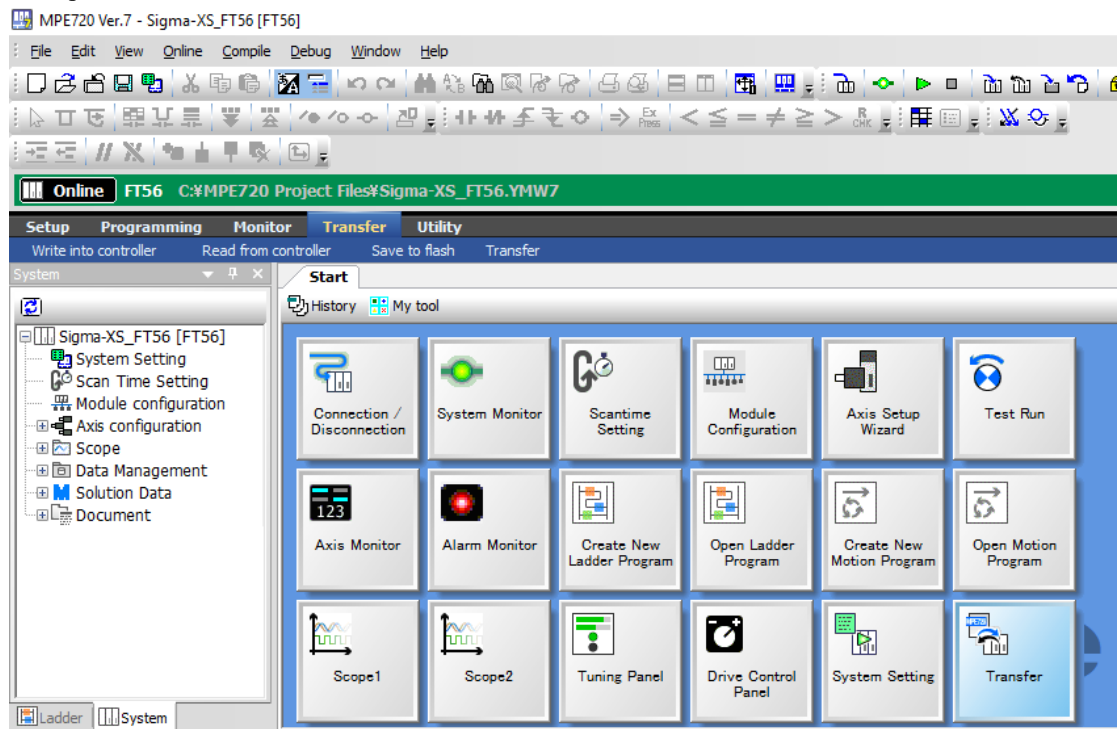


No.	Item	Description
(1)	Communication port	Select the communications port on the computer with the MPE720.
(2)	Target IP address	Set the IP address of the host controller to which the SERVOPACK is connected.
(3)	Transit Module	Select the transit module between the host controller and SERVOPACK.
(4)	Circuit Number	Set the circuit number of the SERVOPACK that is set in the module configuration definition of the host controller.
(5)	Station Address	Set the station address of the SERVOPACK that is set in the module configuration definition of the host controller.

6. Click the [Connection] button.



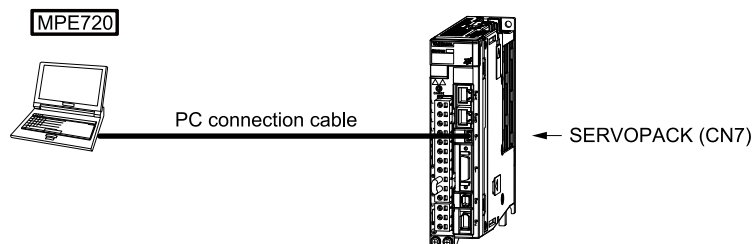
An online connection will be established with the project file opened, and [Online] will be displayed at the top left of the launcher.



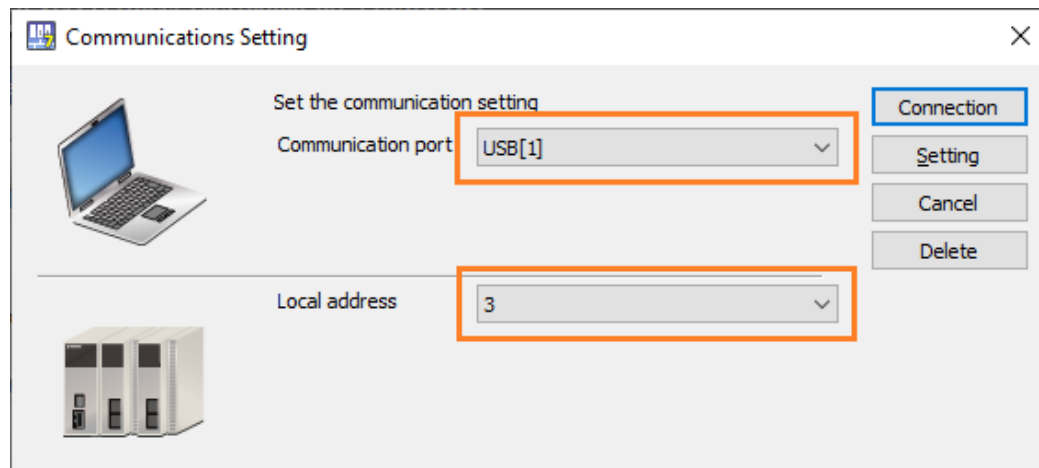
This concludes the procedure.

Information An online connection can also be established by connecting the MPE720 and SERVOPACK (CN7) with the computer cable (USB).

However, an online connection cannot be established from the MPE720 connected over Ethernet and the MPE720 connected over USB at the same time.



In this case, set the communications port to [USB] and the station address to SERVOPACK station address.



Information After you establish an online connection to the SERVOPACK, you can monitor the SERVOPACK's information by displaying the [Module Configuration] tab page for the SERVOPACK.

The screenshot shows the 'Module Configuration' window with a table of modules. The table has columns for Module, Function Module/Slave, Status, Circuit No/Axis Address Start, Dupied circ, Motion Register, Disabled, Register(Input/Output) Start - End, Size, Scan, and Comment.

Module	Function Module/Slave	Status	Circuit No/Axis Address Start	Dupied circ	Motion Register	Disabled	Register(Input/Output) Start - End	Size	Scan	Comment
01 [FT56] ---	01 CPU	Driving	---	---	---	---	---	---	---	---
00 Sigma-X	02 Ethernet	Driving	Circuit No 1	1	---	---	---	---	---	---
	03 SERVO	Driving	Circuit No 1	1	---	---	0000 - 00FF[H]	256	---	---

5.6 Transferring a Project File

A project file (including the user program and other data) that was created when the SERVOPACK and MPE720 were offline (i.e., not connected in online mode) must be written to the SERVOPACK after an online connection is established.



When data is being transferred, do not set CPU RUN/STOP with the SERVOPACK DIP switch.

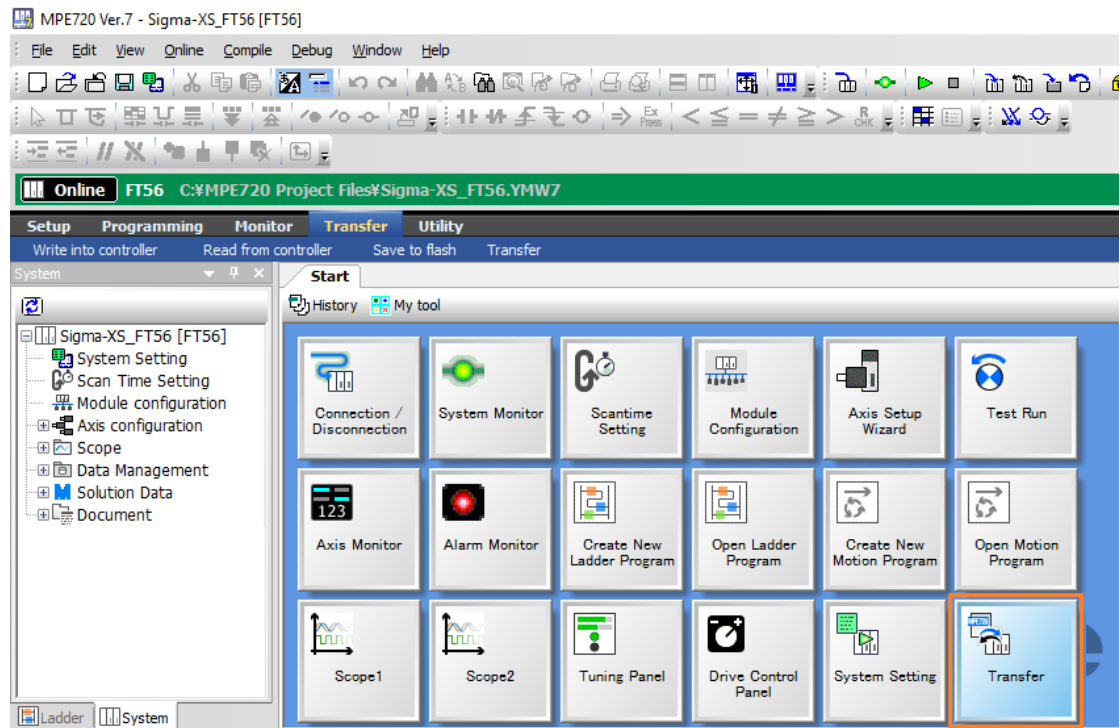
Use this procedure to write the project file to the SERVOPACK.

1. **Establish an online connection to the SERVOPACK.**

Refer to the following section for details.

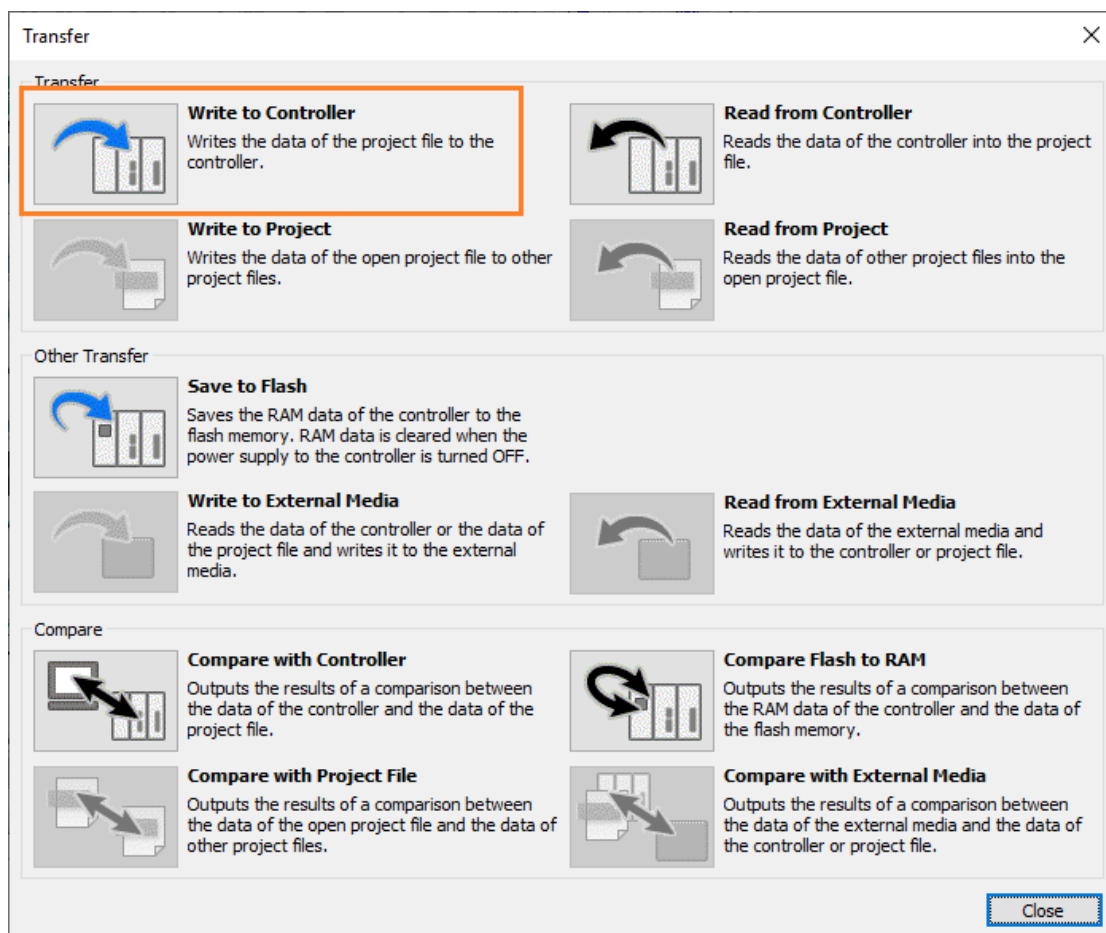
☞ [5.5 Establishing an Online Connection between the MPE720 and SERVOPACK on page 100](#)

2. **Click [Transfer] on the My Tool window.**



The Transfer window will be displayed.

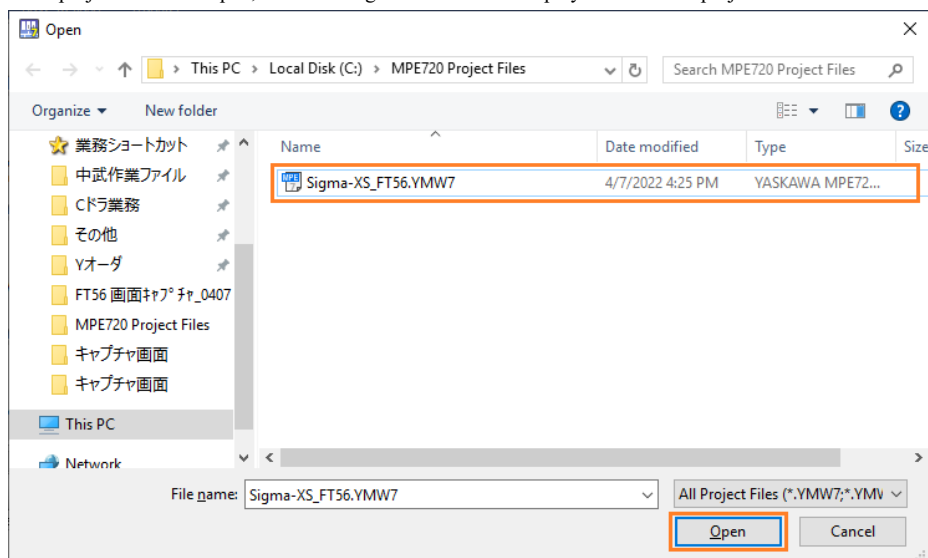
3. Click the [Write to Controller] button.



The Transfer Program window will be displayed.

Information

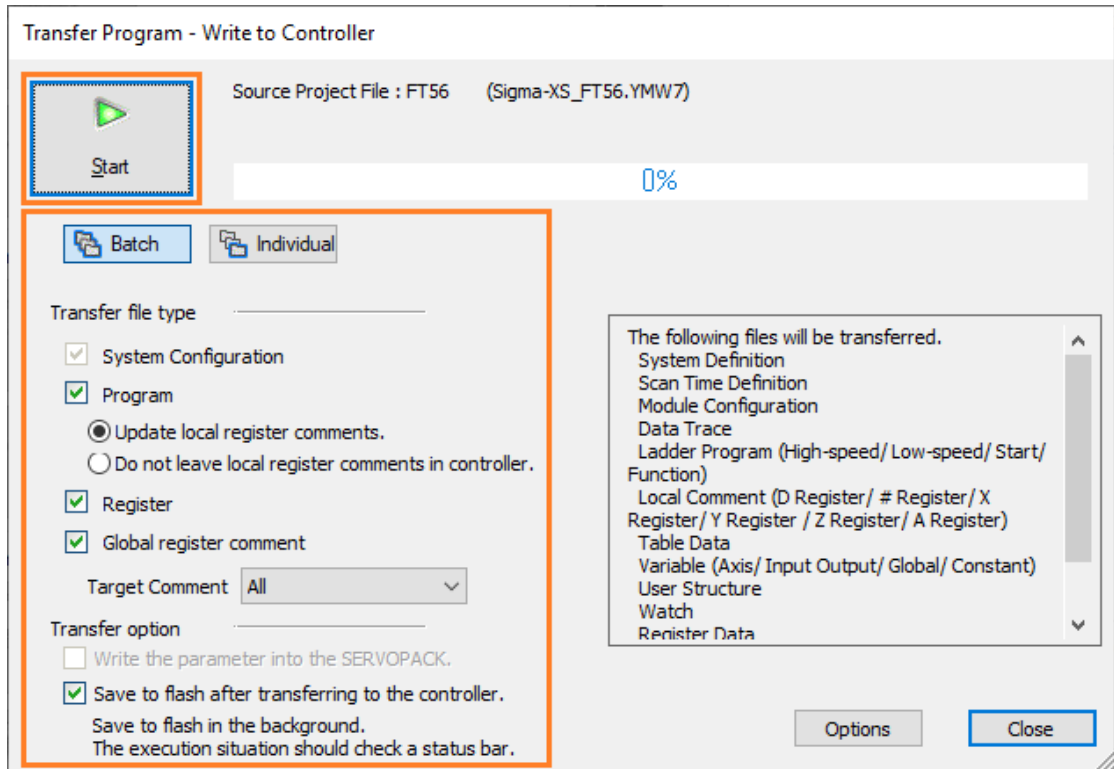
- The project file that is open in the MPE720 will be transferred to the SERVOPACK.
- If the project file is not open, the following window will be displayed. Select the project file to transfer.



4. Specify the transfer settings, and click the [Start] button.

Refer to the following manual for details on settings.

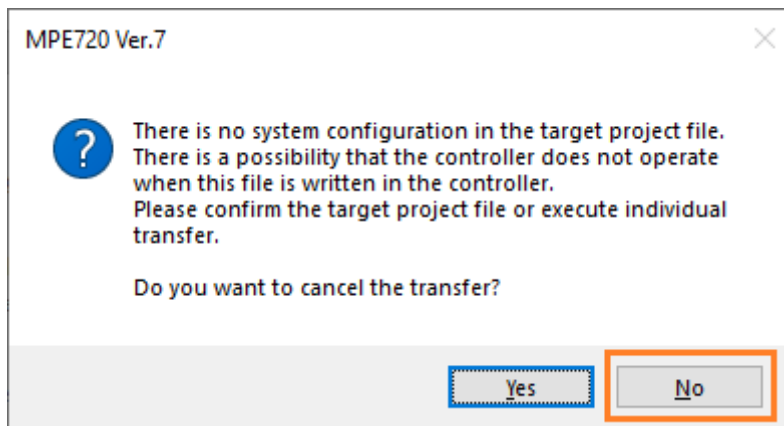
📖 MPE720 User's Manual (Manual No.: SIEP C880761 03)



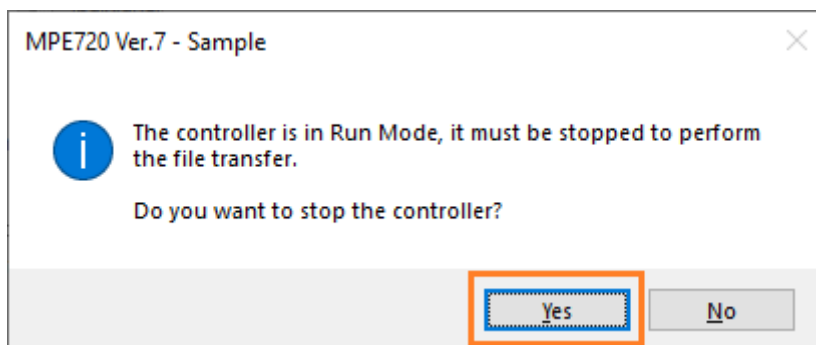
Information The project file that was transferred must be saved to the flash memory in the SERVOPACK. We recommend you select the [Save to flash after transferring to the controller] check box and save the data to flash memory.

A message dialog box will be displayed.

5. **Confirm the contents of the message and click the [No] button.**

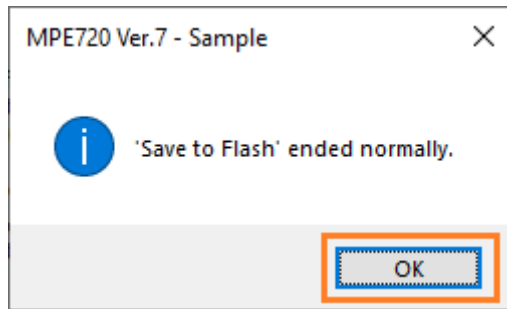


6. **Confirm the contents of the message and click the [Yes] button.**

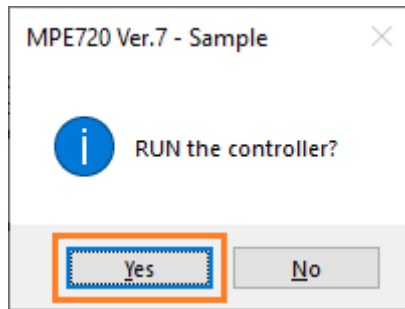


The data transfer will start. When data transfer is completed, a message dialog box will be displayed.

7. Click the [OK] button.



8. Click the [Yes] button.



This concludes the procedure.

User Application Settings

This chapter provides information on settings for using the customized sensing data function.

6.1	Setting CPU RUN/STOP	110
6.1.1	Setting CPU RUN/STOP by Using the MPE720	110
6.1.2	Setting CPU RUN/STOP with the SERVOPACK DIP Switch	110
6.2	Scan Time Settings	112
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6.4	Security Settings	115
6.4.1	Security Settings for Project Files	115
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6.5	Save to Flash Memory	123

6.1 Setting CPU RUN/STOP

There are the following two methods to set CPU RUN/STOP on the SERVOPACK.

- Setting CPU RUN/STOP by Using the MPE720
- Setting CPU RUN/STOP with the SERVOPACK DIP Switch

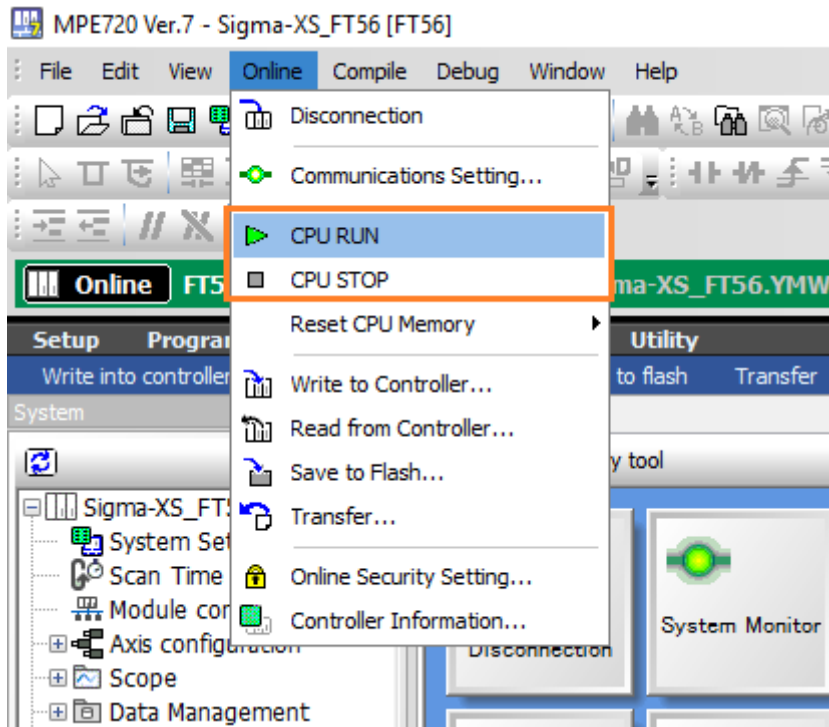
Set the SERVOPACK to CPU RUN for normal use, such as when executing the user application on the SERVOPACK.

- Information**
- The setting of switch 4 of the DIP switch (S3) is given priority over the CPU RUN/STOP status in the MPE720.
 - CPU RUN/STOP can be set from the MPE720 only when switch 4 of the DIP switch (S3) is set to OFF (CPU RUN).

6.1.1 Setting CPU RUN/STOP by Using the MPE720

You can establish an online connection between the MPE720 and SERVOPACK and set CPU RUN/STOP. Use the following procedure to set CPU RUN/STOP.

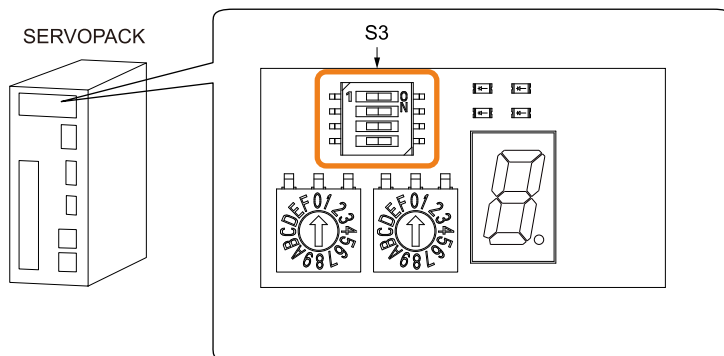
1. **Start MPE720.**
2. **Establish an online connection to the SERVOPACK.**
3. **Select [CPU RUN] or [CPU STOP] from the [Online] menu.**



This concludes the procedure.

6.1.2 Setting CPU RUN/STOP with the SERVOPACK DIP Switch

You can set CPU RUN and CPU STOP with switch 4 of the DIP switch (S3) on the SERVOPACK. The setting takes effect immediately after the DIP switch is set.



Pin No.	Default Setting	Function	Setting	Remarks
4	OFF	CPU STOP	ON: CPU STOP OFF: CPU RUN	-

6.2 Scan Time Settings

Use MPE720 to set the high-speed and low-speed scan times.

1. **Stop the CPU.**
2. **Start MPE720.**
3. **Select [File] - [Environment Setting] from the menu bar. Alternatively, click [System Setting] on the My Tool window.**
The Environment Setting window will be displayed.
4. **Select [Setup] - [Scan Time Setting].**

Environment Setting

System
Security
Setup
 System Setting
 Scan Time Setting
Ladder
Motion
Variable
Monitor
Transfer
Print
Message
Simulation

High-speed Scan

Use an MP2000 option module

Setting Value: 0.1250 ms (0.1250ms-2.0000ms)
*Setting unit: 0.125ms,0.25ms,0.5ms(0.5ms or more)

Current Value: 0.0500 ms 50 us

Maximum Value: 0.0550 ms 55 us

Low-speed Scan

Setting Value: 2.0000 ms (2.0000ms-100.0000ms)
*Setting unit: 0.5ms

Current Value: 0.0000 ms

Maximum Value: 0.0000 ms

1. The operation of the application which depends at the scan time changes when change the setting value.
2. Please do not set setting value smaller than current value. The watchdog error occurs.
3. When high-speed scan setting value is changed on the CPU with built-in SVC, the controller is lost the position information and the zero point return (complete) information.
4. When the high-speed scan time of an YRM controller/MP3000 series/Sigma-7 series (Built-in Controller) machine controller is set to less than 0.5 ms, the attached MP2000 option module will scan at 0.5 ms

OK Cancel Apply

Setting Value: Enter the scan time settings.

Current Value: A value of 0.0 ms is displayed when the MPE720 is offline. Otherwise, the actual processing times for the scans are displayed.

Maximum Value: The maximum processing time for the scan is displayed. The maximum value can be entered. First enter 0, and then the maximum value can be measured.

5. **Enter the set values for the high-speed scan time and low-speed scan time.**

The following table shows the possible set values and default values for each scan time.

Item	Possible Set Values	Default Value
High-Speed Scan Time	0.125 ms, 0.250 ms, 0.5 ms, 1.0 ms, 1.5 ms, 2.0 ms Set the high-speed scan time to be an integer multiple of the MECHATRO-LINK transmission cycle.	0.125 ms
Low-Speed Scan Time	2.0 ms to 100.0 ms in increments of 0.5 ms and an integer multiple of the high-speed scan	2.0 ms

6. **Click the [OK] button.**

The settings will be saved and the Environment Setting window will close.



Important

Observe the following precautions when setting the high-speed scan and low-speed scan times.

1. Set the scan set value so that it is 1.35 times greater than the maximum value.
If the scan set value is too close to the maximum value, the refresh rate of the MPE720 window will noticeably drop and can cause communications timeout errors to occur. If the maximum value exceeds the scan set value, a watchdog error may occur and cause the SERVOPACK CPU to shut down.
2. Do not change the scan set value while the servo is ON. Never change the scan set value while an axis is in motion (i.e., while the motor is rotating). Doing so may cause the motor to rotate out of control.
3. After changing or setting a scan time, always save the data to flash memory.

Information

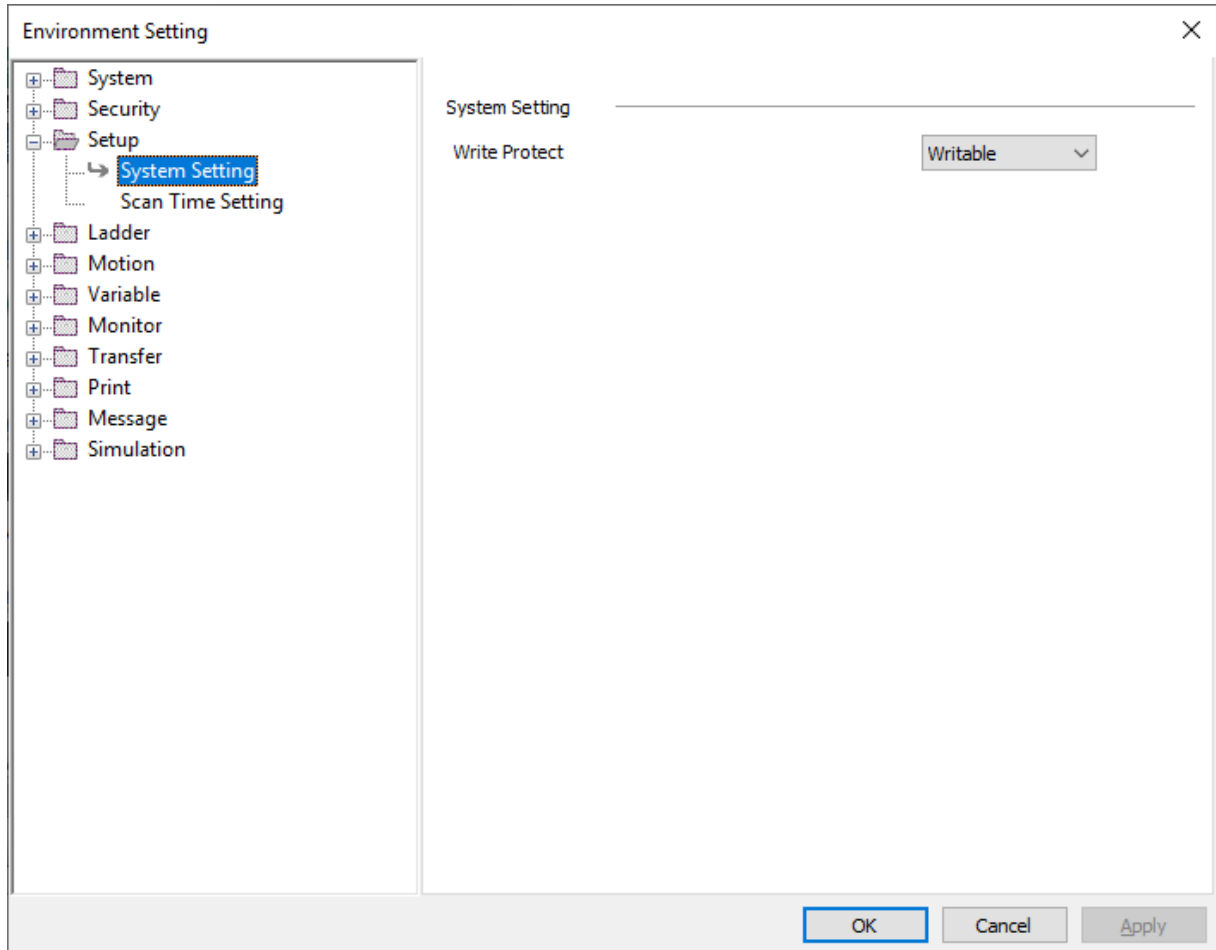
The high-speed scan set values and other information can also be called from system registers. Refer to the following section for details.

 (1) *Shared by All Drawings on page 404*

6.3 System Settings

This section describes the basic system settings for using the customized sensing data function.

The system settings are configured on the Environment Setting window that is displayed by clicking [Environment Setting] from the file menu in MPE720.



6.3.1 Write Protect Setting

The write protect setting allows writing programs and module configuration definitions.



When program write protection is set, you can change the online security settings only. You also cannot use clear memory.

The following table gives details on the write protect setting.

Item	Setting	Default Setting
Write protect setting	<ul style="list-style-type: none"> • Writable • Not writable 	<ul style="list-style-type: none"> • Writable

6.4 Security Settings

You can set security for created project files and user programs.

Security	Description	Remarks	Reference
Security settings for project files	<p>You can set a project password for a project file.</p> <p>Project password input will be required when opening the project file. If the correct project password is not input, the project file cannot be opened.</p> <p>Note:</p> <p>However, if the project password that was set is forgotten, the project file will be locked forever.</p>	<p>The password can be set between 1 and 16 alphanumeric characters.</p> <p>Valid characters: numbers 0 to 9 and uppercase characters A to Z</p>	<p> 6.4.1 Security Settings for Project Files on page 115</p>
Security settings for programs	<p>You can set an individual program password for user programs.</p> <p>The lock mark is displayed for programs that are set with a program password.</p> <p>Program password input is required when editing these programs.</p>	<p>The program password controls editing privileges for the program. It has no effect on program file management (copy, cut, paste, delete, enable/disable setting).</p>	<p> 6.4.2 Security Settings for Programs on page 119</p>

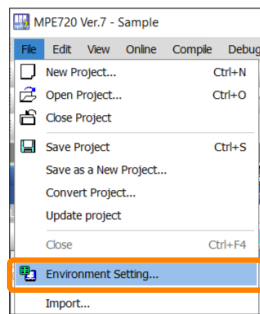
6.4.1 Security Settings for Project Files

This section gives the procedures for managing security settings for project files.

(1) Protecting Project Files with a Password

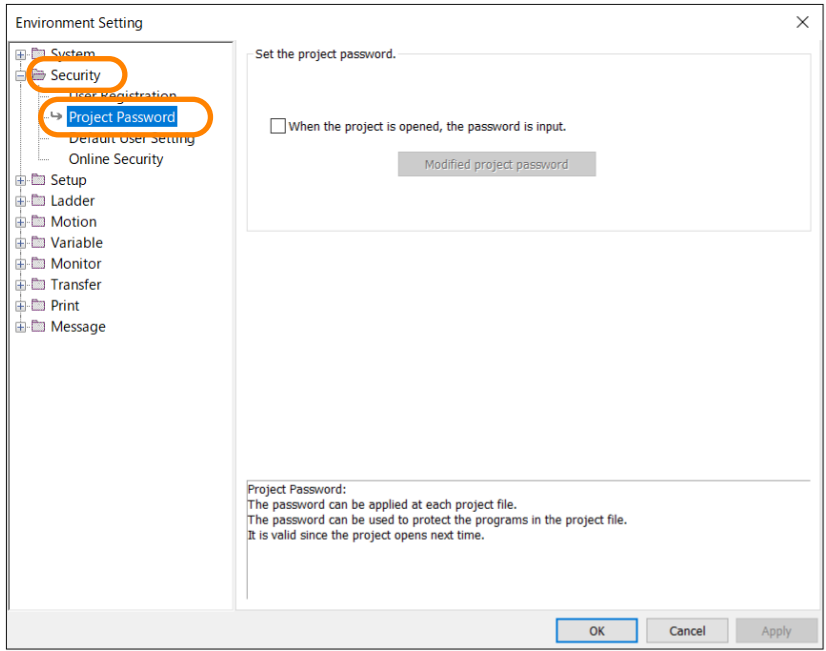
To protect project files with a password, you must first set the password. Use the following procedure.

1. **Open the project file for which to enable password protection.**
2. **Select [Environment Setting] from the [File] menu.**

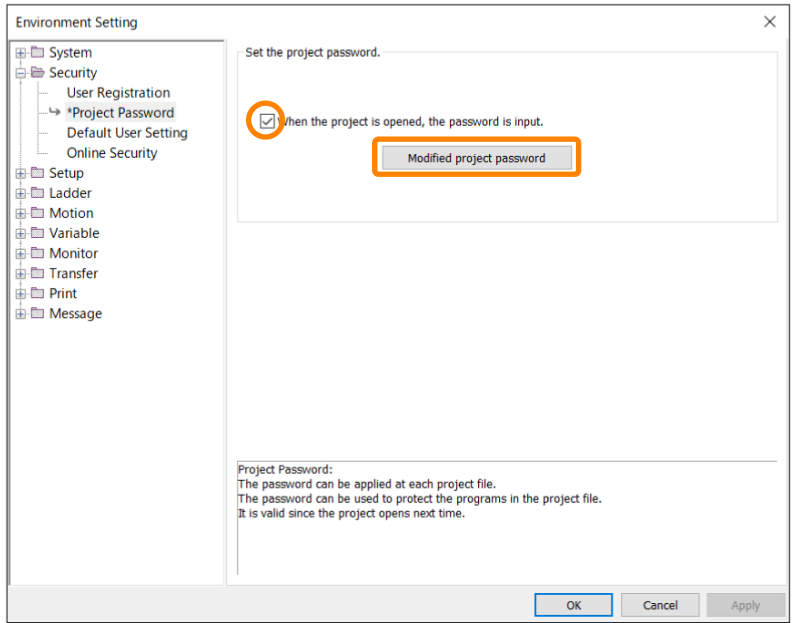


The Environment Setting window will be displayed.

3. Select [Security] – [Project Password].

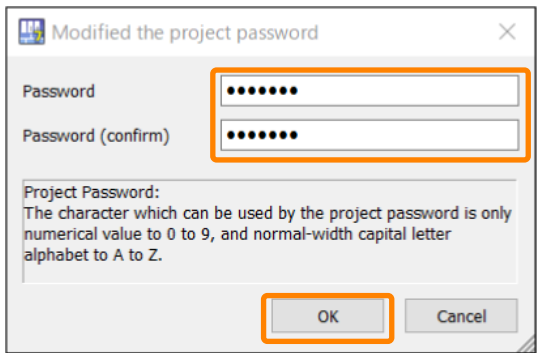


4. Select the [When the project is opened, the password is input] check box, and then click the [Modified project password] button.



The Modified the project password window will be displayed.

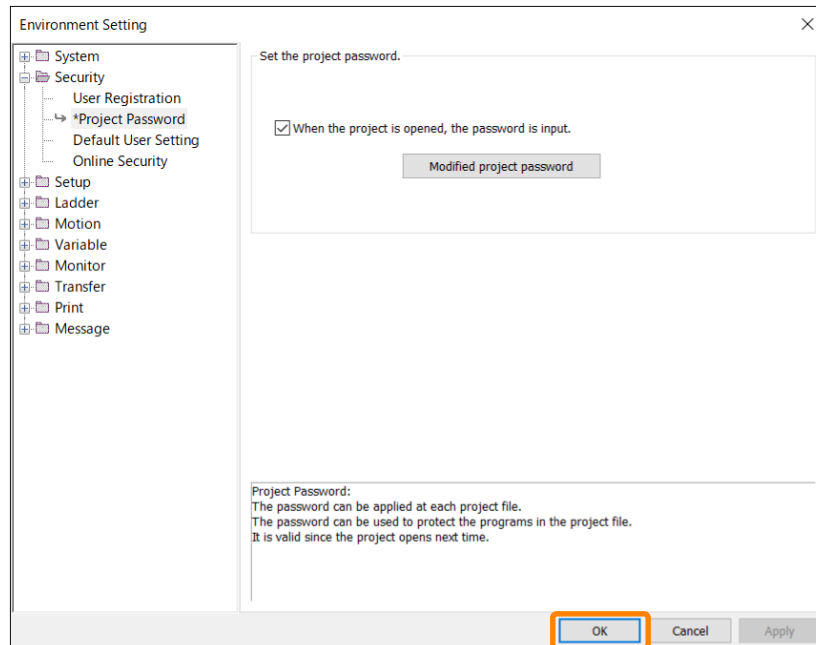
5. Set the following items, and then click the [OK] button.



Item	Description
New Password	Set a password. <Setting Condition> 16 alphanumeric characters maximum.
Password (confirm)	Enter the password that was set in [New Password].

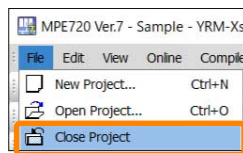
The Modified the project password window will be displayed.

6. **Click the [OK] button.**



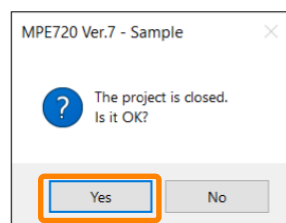
The Environment Setting window will be displayed.

7. **Select [Close Project] from the [File] menu.**



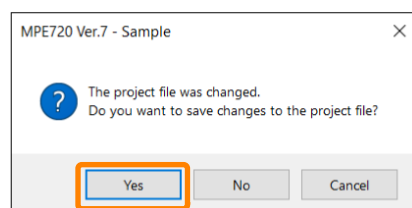
A message dialog box will be displayed.

8. **Click the [Yes] button.**



A message dialog box will be displayed.

9. **Click the [Yes] button.**

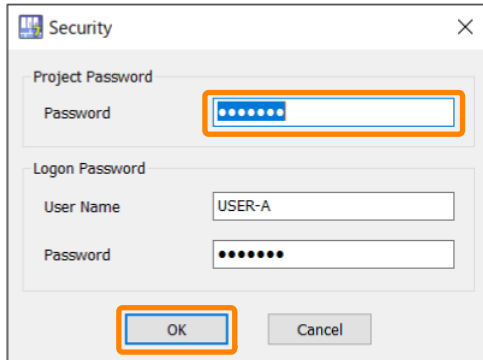


The project file will close, and password protection will be enabled for the project file.

This concludes the procedure.

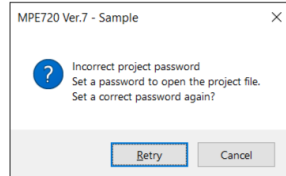
(2) Opening a Password-Protected Project File

1. **Open the project file.**
The Security window will be displayed.
2. **Enter the password that was set previously, and click the [OK] button.**



The project file will be displayed.

Information If the password is incorrect, the following message dialog box will be displayed.



Click the [Retry] button and enter the password again.

This concludes the procedure.

(3) Changing the Project File Password

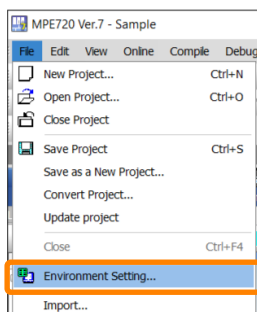
To change the password of a project file, perform the same procedure that you used to protect the project file with a password. Refer to the following section for details.

(1) *Protecting Project Files with a Password on page 115*

(4) Disabling Project File Security

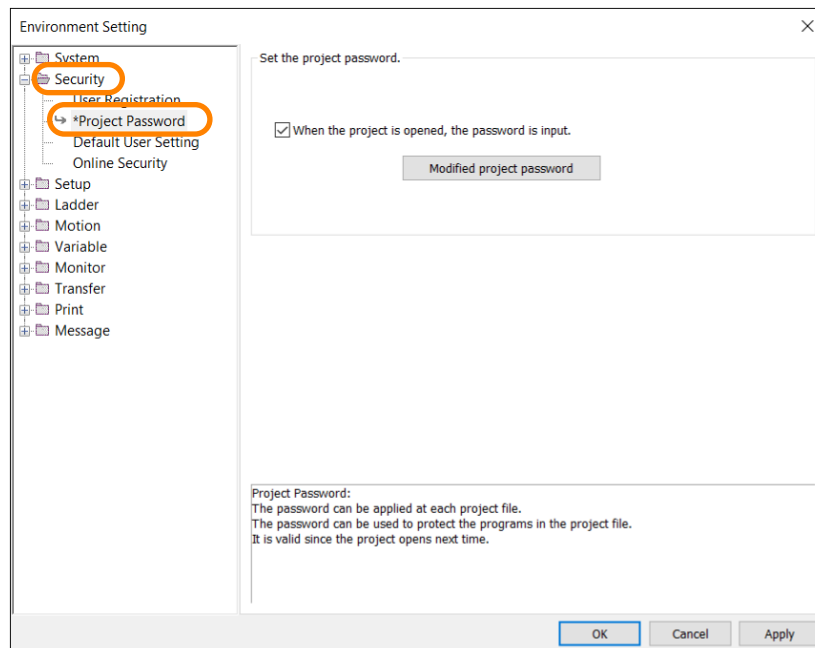
Use the following procedure to disable project file security.

1. **Open the project file for which to disable security.**
2. **Select [Environment Setting] from the [File] menu.**

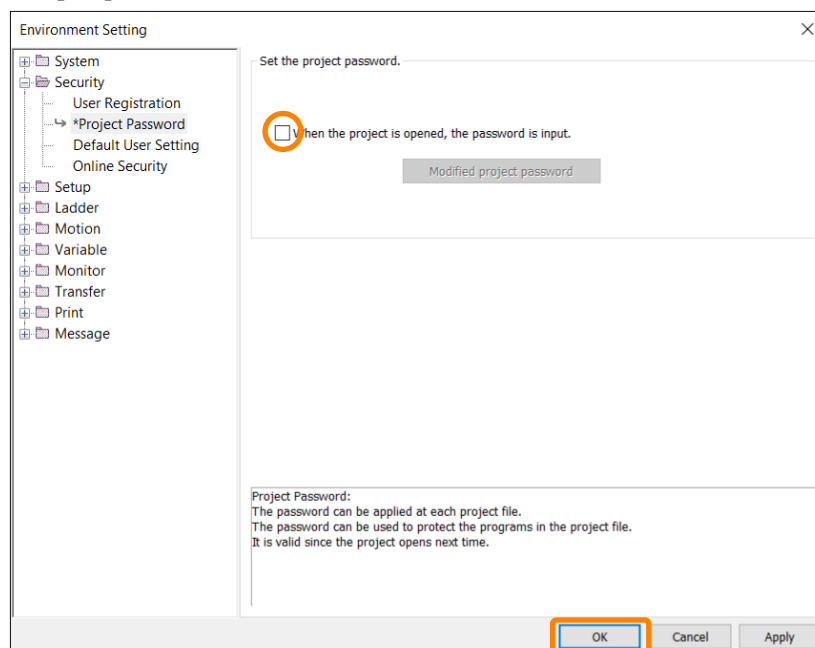


The Environment Setting window will be displayed.

3. Select [Security] – [Project Password].



4. Clear the [When the project is opened, the password is input] check box, and then click the [OK] button.



This concludes the procedure.

6.4.2 Security Settings for Programs

This section gives the procedures for managing security settings for programs.

(1) Protecting Programs with a Password

To protect programs with a password, you must first set a password. Use the following procedure.

1. **Establish an online connection or open a project file.**

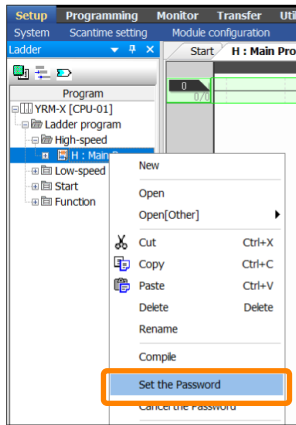
2. In the Ladder window or Motion window, right-click the program for which to set the password, and then select [Set the Password].

Note:

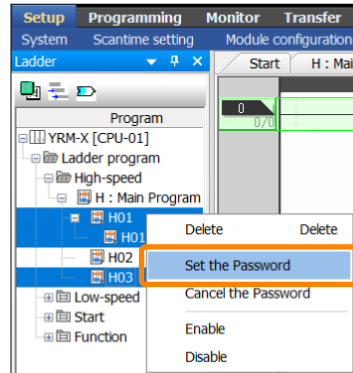
You can select more than one drawing.

- To open a number of consecutive drawings: Select the first drawing in the group of drawings to open, hold down the [Shift] key, and then select the last drawing in the group of drawings to open.
- To open a number of drawings that are not consecutive: Hold down the [Ctrl] key and click the drawings to open.

<If Only One Drawing Is Selected>




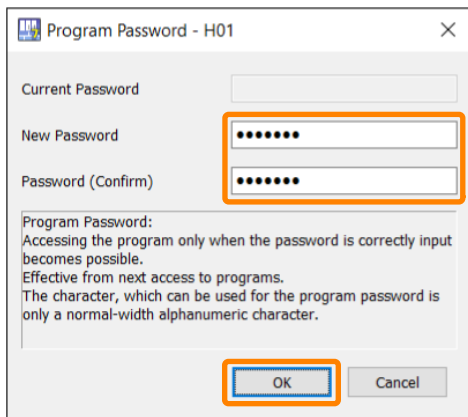
<If More Than One Drawing Is Selected>




The Program Password window will be displayed.

3. Set the following information, and then click the [OK] button.

- Information**
- If you can enter a password into [Current Password], security is already active. Refer to the following section.
 (3) [Changing Program Passwords on page 121](#)
 - If more than one drawing is selected and a password was previously set for one of the drawings, an error will occur.



Item	Description
New Password	Set a password. <Setting Condition> 8 alphanumeric characters maximum.
Password (Confirm)	Enter the password that was set in [New Password].

The password-locked icon  will be displayed next to the icon of the program set with the password.

This concludes the procedure.

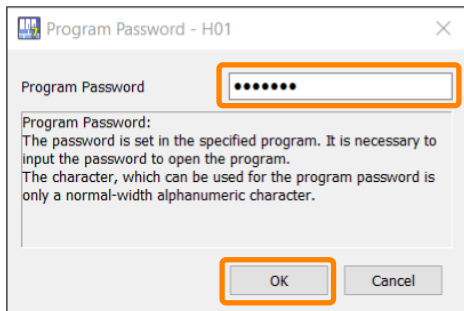
(2) Opening a Password-Protected Program

If you attempt to open a password-protected program, the Program Password window will be displayed.

Information You can open more than one drawing at the same time.

- To open a number of consecutive drawings: Select the first drawing in the group of drawings to open, hold down the [Shift] key, and then select the last drawing in the group of drawings to open.
- To open a number of drawings that are not consecutive: Hold down the [Ctrl] key and click the drawings to open.

Enter the password in the [Program Password], and then click the [OK] button to open the program. If more than one drawing is selected, you can open only the drawings that have the password that was entered.

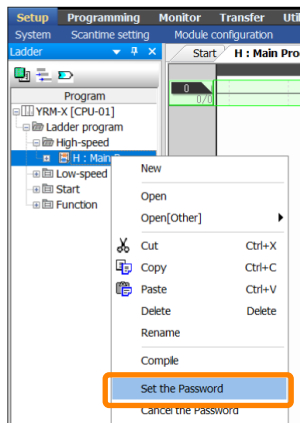


(3) Changing Program Passwords

Use the following procedure to change the password of a program.

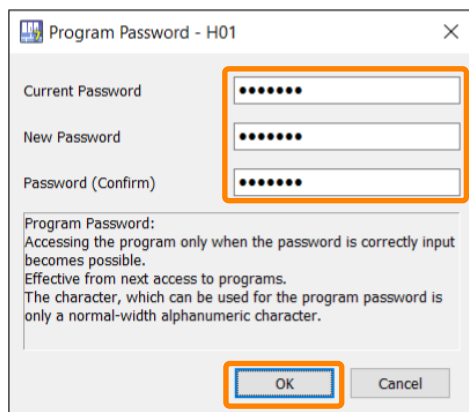
Information You cannot change the password for more than one drawing at the same time. Change the passwords one drawing at a time.

1. **Establish an online connection or open a project file.**
2. **In the Ladder window or Motion window, right-click the program for which to change the password, and then select [Set the Password].**



The Program Password window will be displayed.

3. **Set the following information, and then click the [OK] button.**



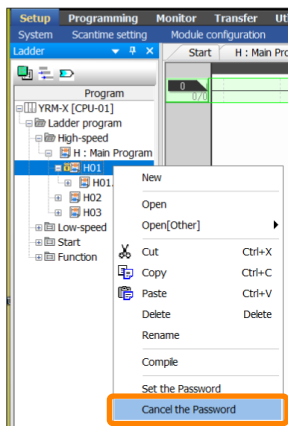
Item	Description
Current Password	Enter the old password. If you enter the wrong password, an error will be displayed after you click the [OK] button.
New Password	Set the new password. <Setting Condition> 8 alphanumeric characters maximum.
Password (Confirm)	Enter the password that was set in [New Password].

This concludes the procedure.

(4) Disabling Program Security

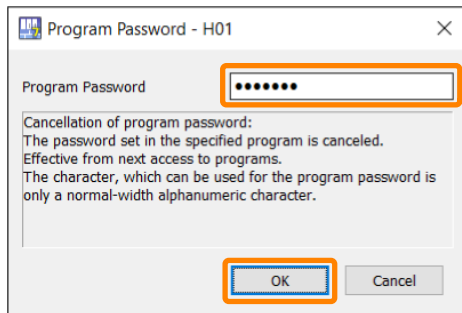
Use the following procedure to disable program security.


1. **Establish an online connection or open a project file.**
2. **In the Ladder window or Motion window, right-click the program for which to disable the password, and then select [Cancel the Password].**



The Program Password window will be displayed.

3. **Enter the password in the [Program Password] box, and then click the [OK] button.**



The password-locked icon  will disappear from the program that was selected in step 2.

This concludes the procedure.

6.5 Save to Flash Memory

Save to flash memory saves the data in the SERVOPACK's RAM to the flash memory.

Use the following procedure to save data to flash memory.



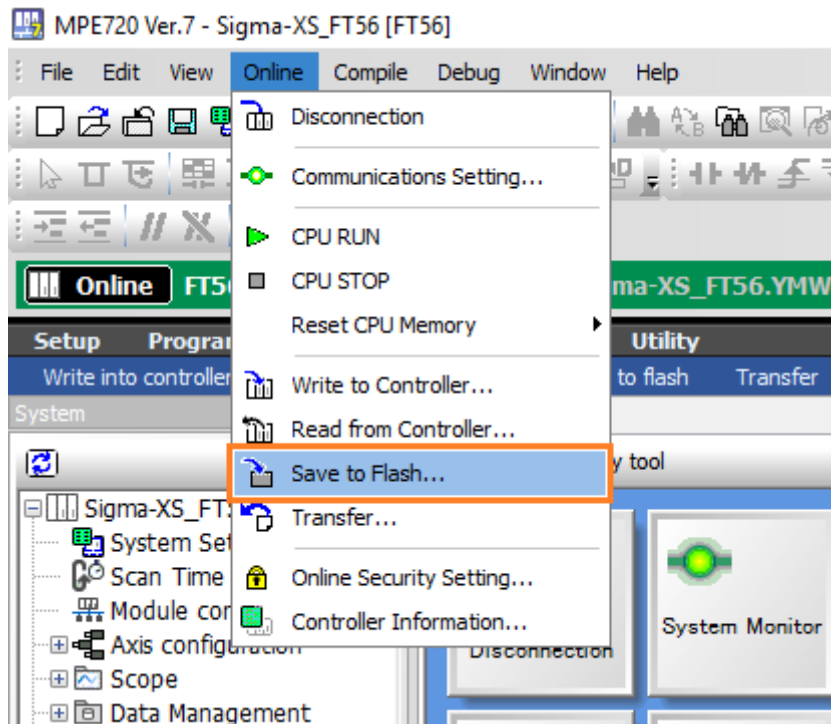
Important

- If the control power supply to the SERVOPACK is turned OFF and ON again without saving data to flash memory, the programs and definition data that were changed will disappear.
- Data cannot be saved to flash memory when the servo is ON.
- When data is being saved to flash, do not set CPU RUN/STOP with the SERVOPACK DIP switch.

Information

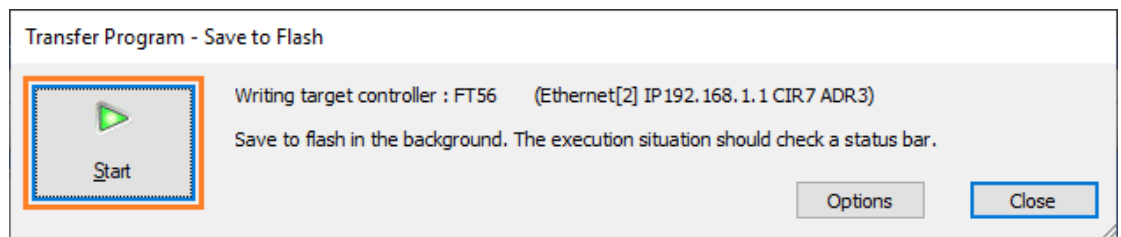
The data that was saved to flash memory will be applied after the control power supply to the SERVOPACK is turned OFF and ON again.

1. **Start MPE720.**
2. **Select [Save to Flash] from the [Online] menu.**



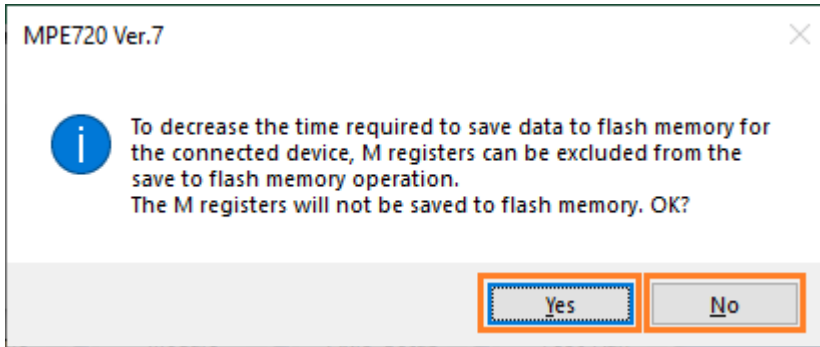
The Transfer Program - Save to Flash window will be displayed.

3. **Click the [Start] button.**

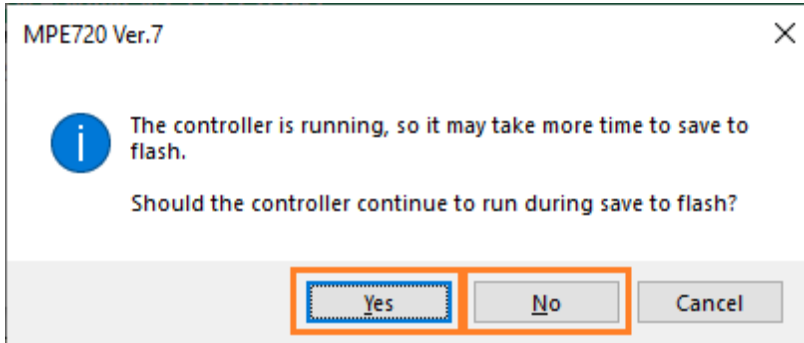


A message dialog box will be displayed.

4. Confirm the contents of the message and click the [Yes] or [No] button.

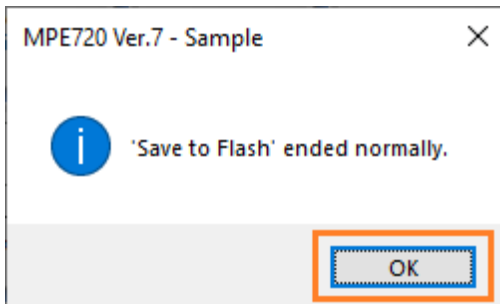


5. Click the [Yes] or [CPU STOP] button.

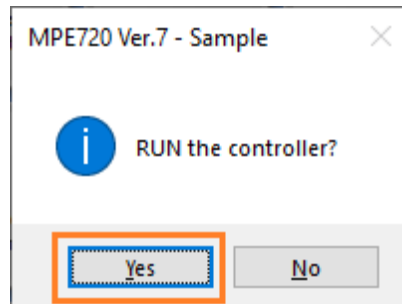


The MPE720 will begin saving the data to flash memory. When data transfer is completed, a message dialog box will be displayed.


6. Click the [OK] button.



Information If you clicked the [No] button in step 5, the following message will be displayed. Click the [Yes] button.



This concludes the procedure.

Important  Do not turn OFF the control power supply to the SERVOPACK until save to flash memory has completed. If the control power supply to the SERVOPACK is turned OFF while data is being saved to flash memory, that data will disappear. If the SERVOPACK power is turned ON again in this state, the SERVOPACK will start in the default state.

User Program Creation

This section describes the information required to create user programs.

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7.1 Overview

Programming refers to the creation of user programs that are processed by the CPU.

Refer to the following manual for creating ladder programs.

 MP3000 Series Ladder Programming Manual (Manual No.: SIEP C880725 13)

7.2 Drawing Types and Hierarchical Configuration

This section describes the types of ladder drawings and their hierarchical configuration.

7.2.1 Types

Ladder drawings are divided into three different types based on their purpose.

- **DWG.A (Startup Drawings)**
These ladder drawings perform system initialization processing before high-speed scan process drawings and low-speed scan process drawings.
- **DWG.H (High-Speed Scan Process Drawings)**
This type of ladder drawing is used to perform motion control or high-speed I/O service.
- **DWG.L (Low-Speed Scan Process Drawings)**
This type of ladder drawing is used for communications with HMIs and external devices as well as for I/O service.

The following table lists the priority, execution conditions, and maximum number of drawings for each type of ladder drawing.

Drawing Type	Priority ^{*1}	Execution Condition	Maximum Number of Drawings
DWG.A (Startup Drawings)	1	Power ON (These drawings are executed once when the power is turned ON.)	4
DWG.H (High-Speed Scan Process Drawings)	2	Started at fixed cycle. (These drawings are executed once every high-speed scan.)	10
DWG.L (Low-Speed Scan Process Drawings)	3	Started at fixed cycle. (These drawings are executed once every low-speed scan.)	10

*1 Drawings with lower numbers have higher priority.



Important

This product does not support DWG.I (Interrupt Drawings) that can be used with MP3000 series.

7.2.2 Hierarchical Configuration

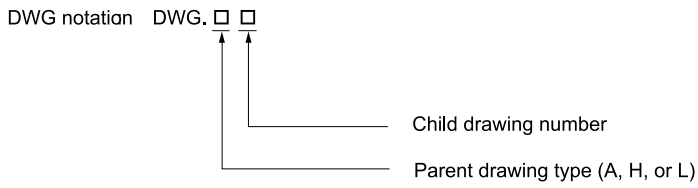
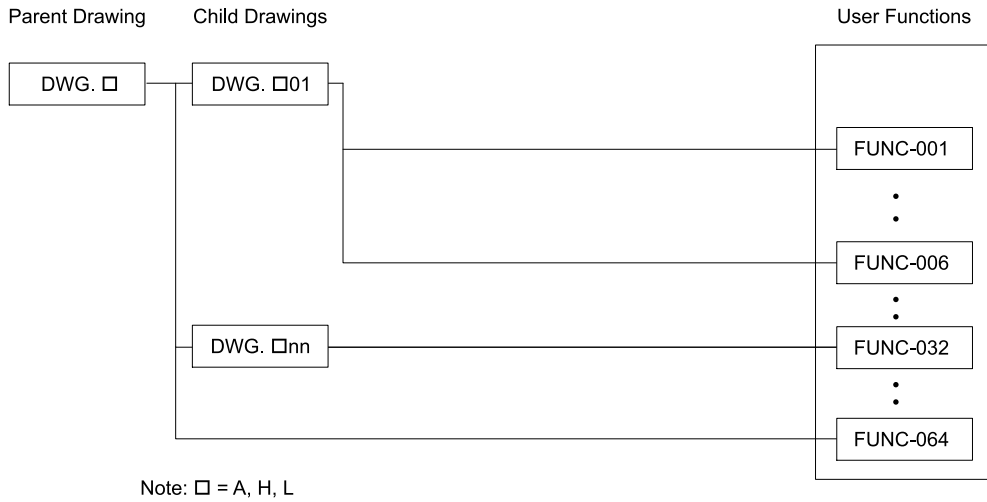
There are three types of ladder drawings: parent drawings, child drawings, and operation error drawings.

- **Parent Drawings**
These drawings are automatically executed by the system program when the execution conditions are met. Refer to the following section for detail on execution conditions.
[📖 7.2.1 Types on page 127](#)
- **Child Drawings**
These drawings are executed when they are called from a parent drawing with a SEE instruction.
- **Operation Error Drawings**
These drawings are automatically executed by the system program when an operation error occurs.

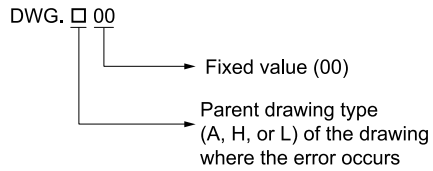
A parent drawing cannot call a child drawing from a different type of drawing. The parent drawing must call the child drawing. This is called the hierarchical configuration of drawings.

The following figure shows the parent-child structure in which a program is created.

7.2 Drawing Types and Hierarchical Configuration



Note: The following notation is used for operation error drawings.



The breakdown of the number of ladder drawings in each category is given in the following table.

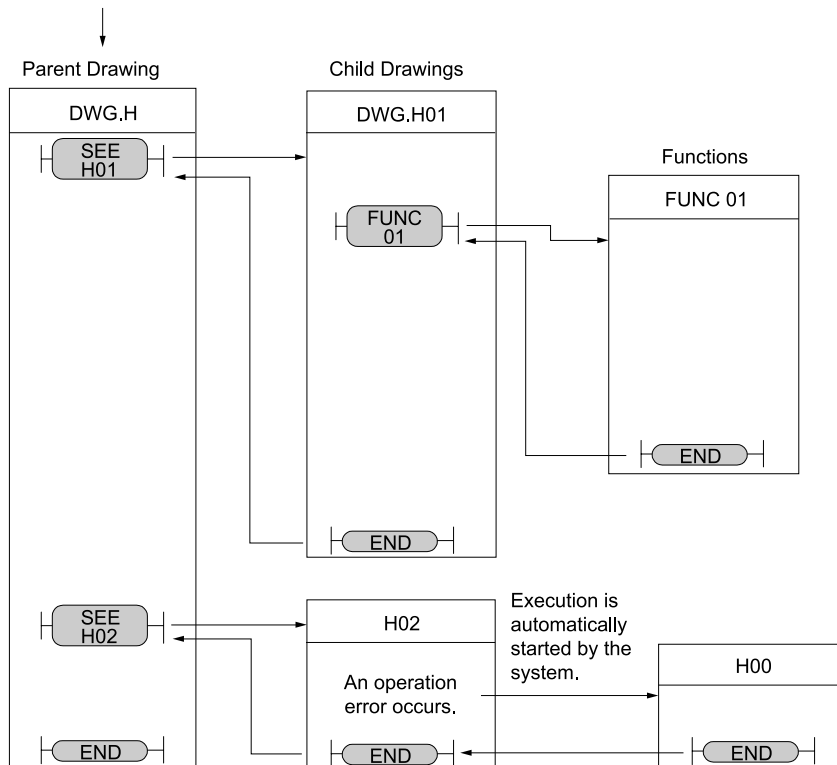
Drawings	Number of Drawings		
	DWG.A	DWG.H	DWG.L
Parent Drawings	1	1	1
Child Drawings	Up to 3	Up to 9	Up to 9
Operation Error Drawings	1	1	1

Information There are separate functions that can be called from the drawings as required. Functions are executed when they are called from a parent or child drawing with the FUNC instruction. You can create up to 64 functions.

7.3 Execution Processing of Drawings

The drawings are executed by calling them from the top to the bottom, following the hierarchy of the drawings. The following figure illustrates the execution processing of a high-speed scan drawing (DWG.H).

Execution is automatically started by the system program.



Note:

1. The parent drawing is automatically called and executed by the system. Child drawings are executed by calling them from a parent drawing using the SEE instruction.
2. You can call functions from any drawing. You can also call functions from other functions.
3. If an operation error occurs, the operation error drawing for the drawing type will be started automatically.
4. Always specify 00 as the drawing number for operation error drawings.

7.4 Function

Functions are executed when they are called from a parent or child drawing with the FUNC instruction.

Functions can be freely called from any drawing. The same function can be called simultaneously from different types of drawings or different levels of drawings. You can also call functions from other functions that you have created.

The use of functions provides the following merits:

- Easy user program modularization
- Easy user program creation and maintenance

You can use standard functions that are provided by the system, and you can define user functions.

7.4.1 Standard System Functions

The following functions for communications and other purposes are provided as standard functions in the system. You cannot change the system functions.

Refer to the following section for information on standard system functions available with the SERVOPACK.

 [13.2.1 Ladder Instruction Lists on page 412](#)

7.4.2 User Functions

You can freely program the body of a user function and program the user function definitions.

A maximum of 64 user function drawings can be defined.

Refer to the following section for details.

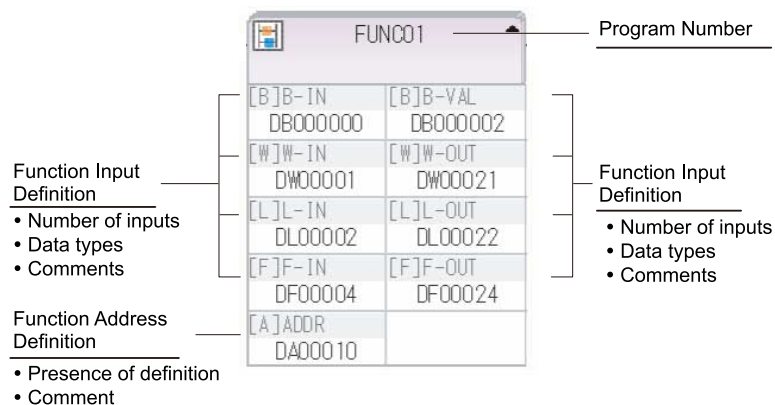
 [7.5 User Functions on page 131](#)

7.5 User Functions

7.5.1 Introduction to User Functions

A user function contains a function definition (program number and I/O definitions) and processing instructions that are defined by the user.

The following figure shows an example of a function definition.



7.5.2 Overview of User Functions

The processing to be performed by a user function is created using a ladder program.

User functions are executed when they are called from a parent or child drawing with the FUNC instruction.

The following user function calls are also allowed.

- User functions can be freely called from any drawing.
- User functions can be called simultaneously from drawings of different types and different hierarchy levels.
- User functions can call other user functions.
- User functions can be called any number of times from different programs.

The use of user functions provides the following advantages.

- Easy user program modularization
- Easy user programming and program maintenance



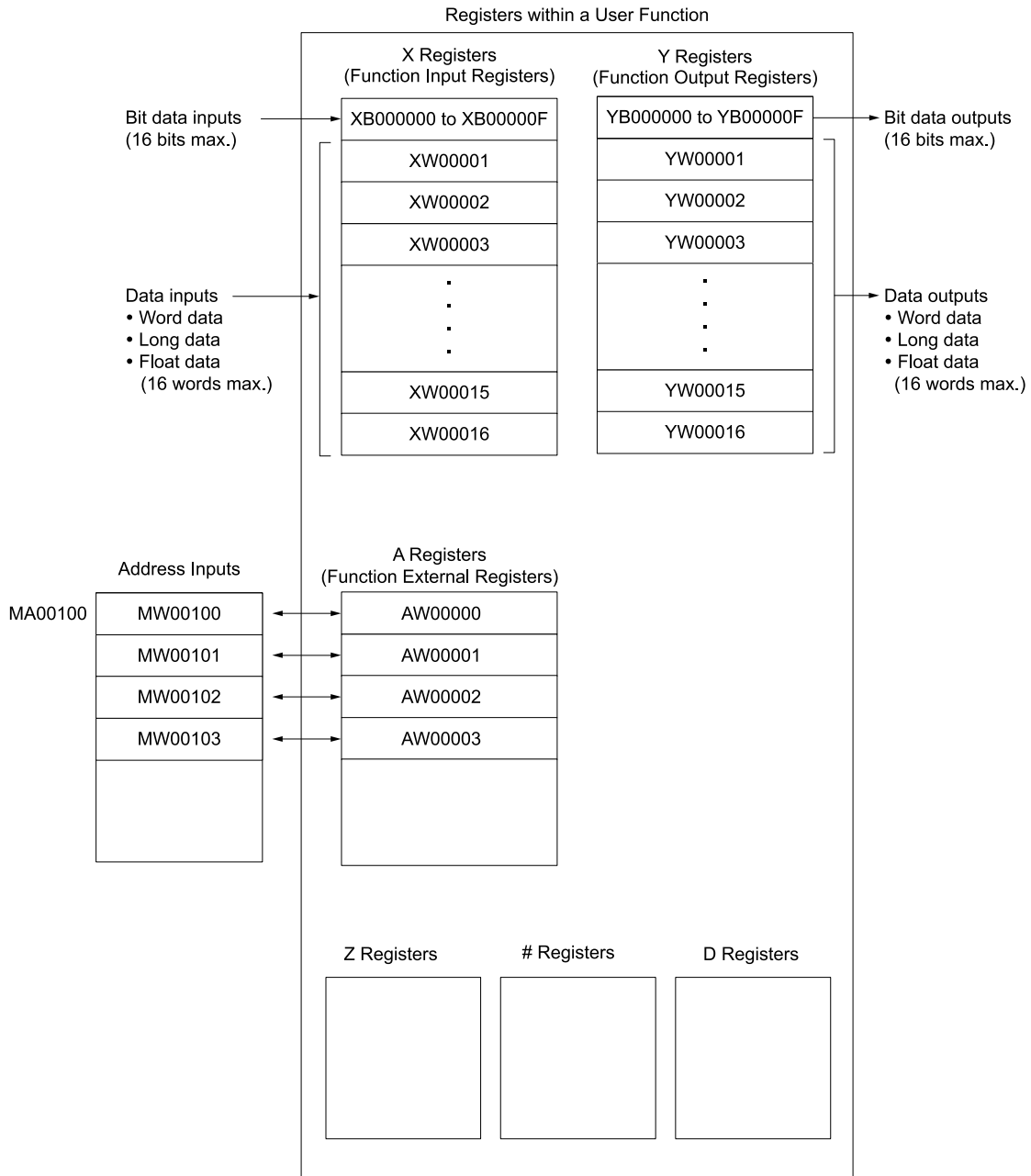
When you call a user function, consider what values could be in the registers in each function, and perform initialization as needed.

Important

Refer to the following manual for details.

MP3000 Series Ladder Programming Manual (Manual No.: SIEP C880725 13)

The following diagram shows the relation between I/O data for a user function and the registers within that user function.



- Information**
- The X, Y, Z, and D registers are initialized to different values when a user function is called. Refer to the following manual for details.
[MP3000 Series Ladder Programming Manual \(Manual No.: SIEP C880725 13\)](#)
 - The S, M, I, O, and C registers can also be accessed from within a function.

7.5.3 Creating User Functions

This section describes how to create a user function that has, as an example, the following specifications.

Function Definition Item	Name	Remarks
Program Number	FUNC01	–
Function Input Value	IN	Integer data
Function Output Value 1	OUT1	Integer data
Function Output Value 2	OUT2	Integer data

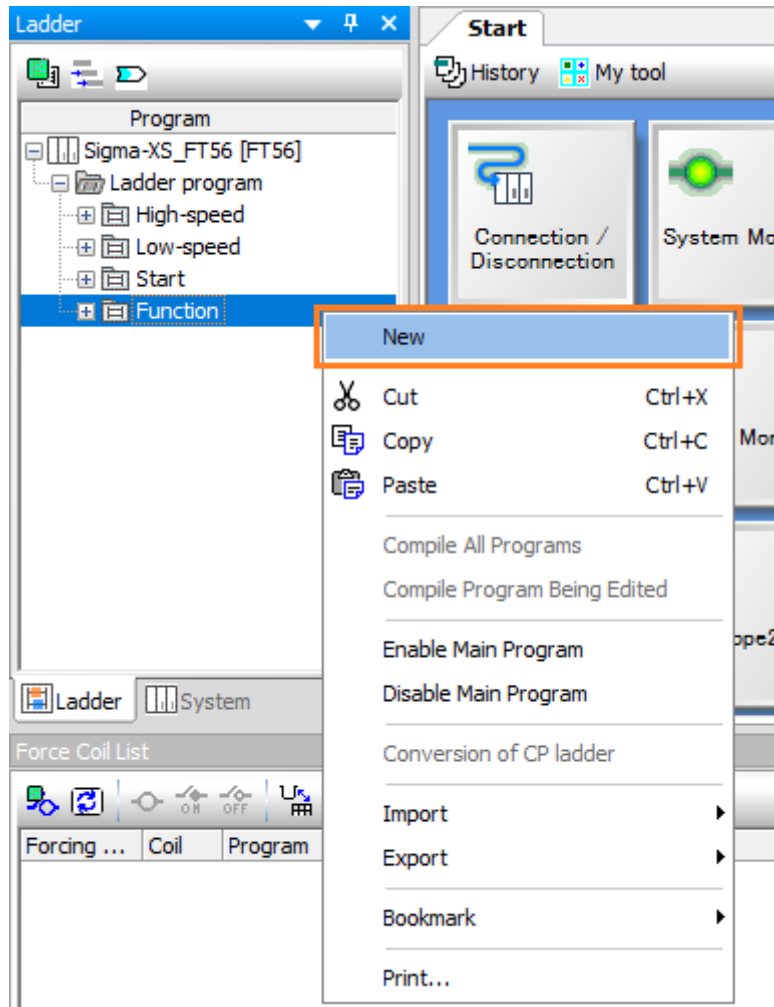
Continued on next page.

Continued from previous page.

Function Definition Item	Name	Remarks
Processing Details		
Multiply the function input value (IN) by 2 and output it to function output value 1 (OUT1).		
Multiply the function input value (IN) by 3 and output it to function output value 2 (OUT2).		

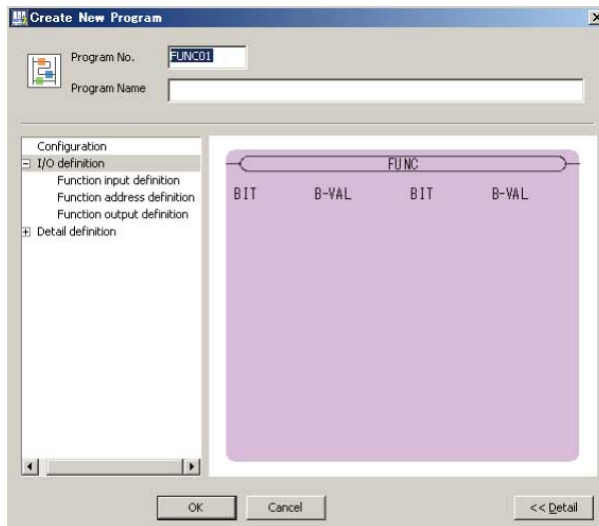
(1) Creation Procedure

1. **Select [Programming] – [Ladder program] from the Launcher.**
The Ladder window will be displayed
2. **Right-click [Function] under [Ladder program], and select [New].**

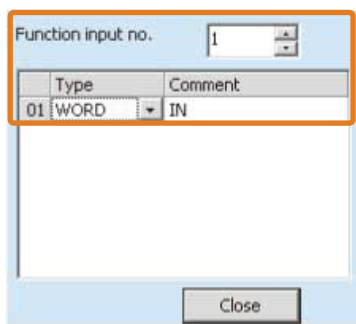


The [Create New Program] dialog box will be displayed.

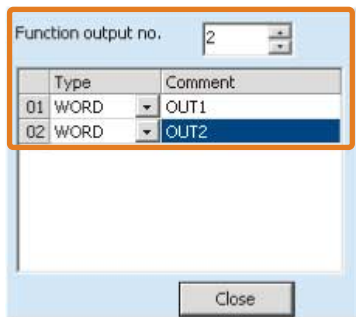
3. Enter "FUNC01" in the [Program No.] box.



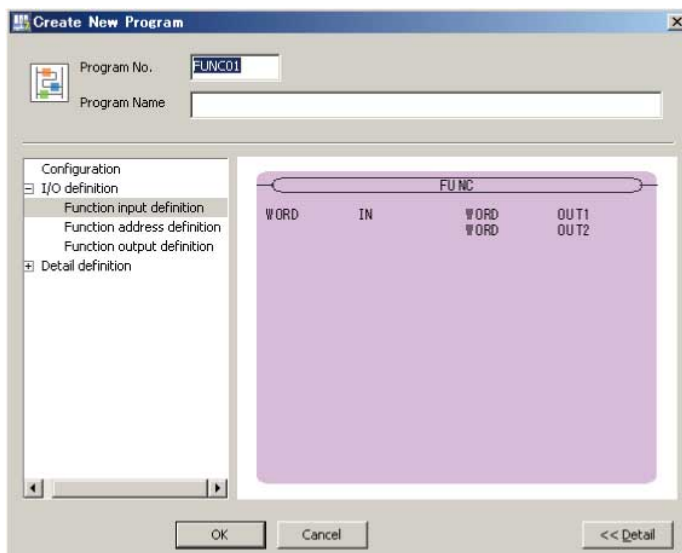
4. Select [Function input definition] under [I/O definition] and enter the following information.



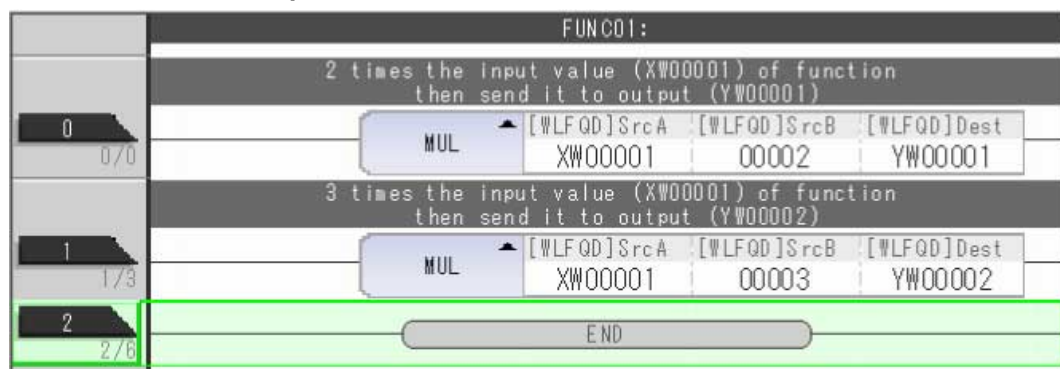
5. Select [Function output definition] under [I/O definition] and enter the following information.



6. Click the [OK] button. This concludes setting the function definition.

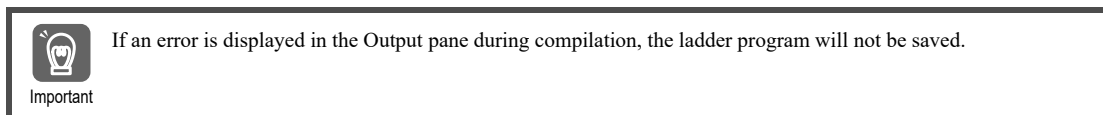


7. Create the following ladder program in the drawing of the FUNC01 sample user function that was created in step 5.



8. While displaying the ladder program, select [Compile] – [Compile] from the menu bar to compile the program.

When the compilation is finished, the ladder program will be saved automatically.



This concludes the creation of the user function.

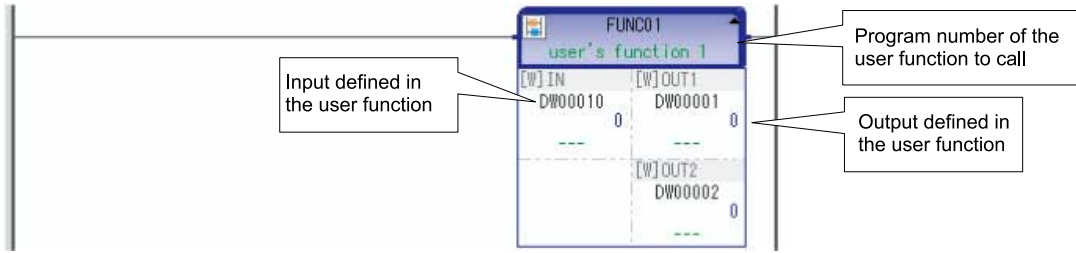
7.5.4 Calling the User Function

The user function is ready to be called by using a FUNC instruction in the ladder drawing.

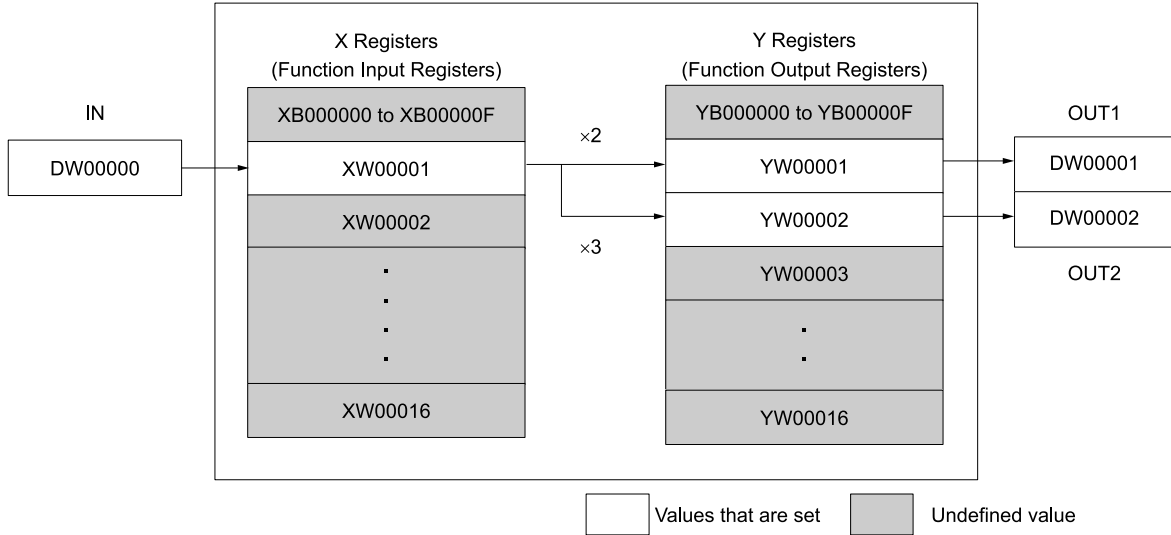
This section describes how to call the sample user function from the high-speed drawing (DWG.H).

(1) Example for Calling the FUNC01 User Function from DWG.H

Program a FUNC instruction in DWG.H as shown below.



This diagram shows a conceptual image of what the programming shown above accomplishes.
Registers within the FUNC01 User Function



When DW00000 in DWG.H is set to 10, DW00001 becomes 20 and DW00002 becomes 30, demonstrating that the sample user function was called correctly.

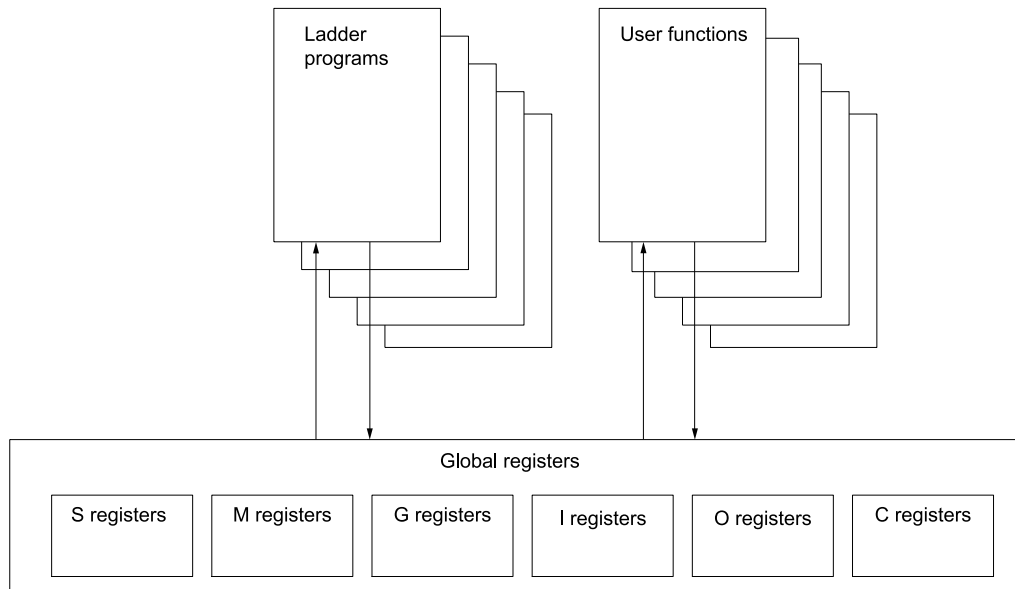


7.6 Registers

Registers are areas that store data within the SERVOPACK. Variables are registers with labels (variable names). There are two kinds of registers: global registers that are shared between all programs, and local registers that are used only by a specific program.

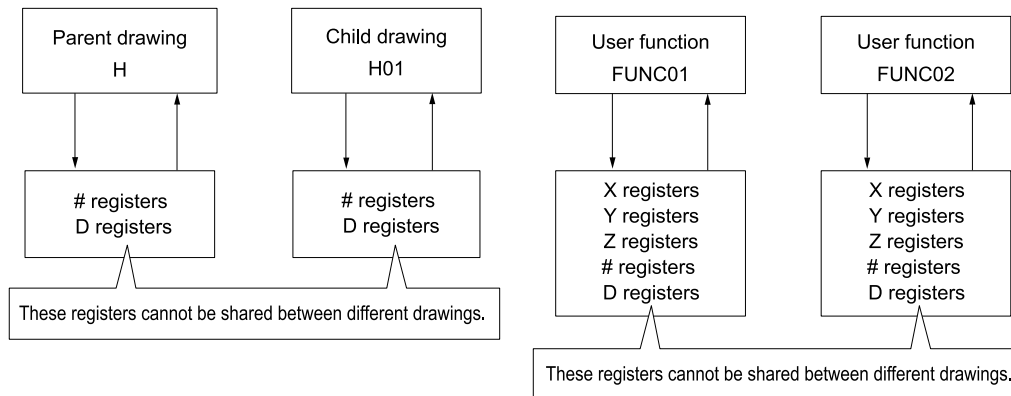
7.6.1 Global Registers

Global registers are registers that can be shared and used from ladder programs and user functions. Memory space for global registers is reserved by the system for each register type.

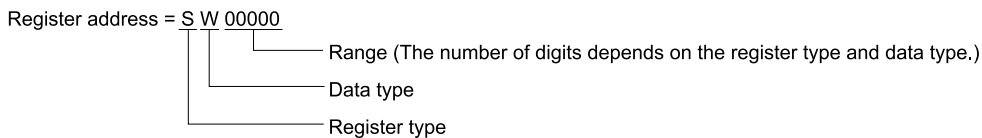


7.6.2 Local Registers

Local registers can be used within each specific drawing. These registers cannot be shared by other drawings. Local registers are stored in the program memory for each drawing.



7.6.3 Structure of Register Addresses



Information You can also use index registers or array registers as variables to address specific registers. Refer to the following sections for details.

[7.6.6 Index Registers \(i, j\) on page 144](#)


[7.6.7 Array Registers \(I\) on page 146](#)

7.6.4 Register Types

This section describes global and local registers.

(1) Global Registers

Global registers are shared by ladder programs and user functions. In other words, the operation results of a ladder program can be used by other ladder programs or user functions.

Type	Name	Designation Method	Usable Range	Description
S	System registers (S registers)	SBnnnnnh, SWnnnnn, SLnnnnn, SQnnnnn, SFnnnnn, SDnnnnn, SAnnnnn	SW00000 to SW65535	These registers are prepared by the system. They report the status of the SERVOPACK and other information. The system clears the registers from SW00000 to SW00049 to 0 at startup. These registers are not backed up when the power is turned OFF.
M	Data registers (M registers)	MBnnnnnnnh, MWnnnnnnn, MLnnnnnnn, MQnnnnnnn, MFnnnnnnn, MDnnnnnnn, MAnnnnnnn	MW0000000 to MW524287	These registers are used as interfaces between programs. These registers are not backed up when the power is turned OFF. The save to flash memory operation is required to save table data to flash memory. Refer to the following section for details on saving data to flash memory.  6.5 Save to Flash Memory on page 123
G	G registers	GBnnnnnnnh, GWnnnnnnn, GLnnnnnnn, GQnnnnnnn, GFnnnnnnn, GDnnnnnnn, GAnnnnnnn	GW0000000 to GW1048575	These registers are used as interfaces between programs. These registers are cleared to 0 when the power is turned OFF.
I	Input registers (I registers)	IBnnnnnnnh, IWhhhhh, ILhhhhh, IQhhhhh, IFhhhhh, IDhhhhh, IAhhhhh	IW00000 to IW000FF	These registers are used for input data.
O	Output registers (O registers)	OBnnnnnnnh, OWhhhhh, OLhhhhh, OQhhhhh, OFhhhhh, ODhhhhh, OAhhhhh	OW00000 to OW000FF	These registers are used for output data.
C	Constant registers (C registers)	CBnnnnnnnh, CWnnnnn, CLnnnnn, CQnnnnn, CFnnnnn, CDnnnnn, CAnnnnn	CW00000 to CW04095	These registers can be called in programs but they cannot be written. The values are set from the MPE720.

Note:

n: decimal digit, h: hexadecimal digit

(2) Local Registers

Local registers are valid within only one specific program. The local registers in other programs cannot be called.

You specify the usable range from the MPE720.

Type	Name	Designation Method	Contents	Characteristics
#	# registers	#Bnnnnnh, #Wnnnnn, #Lnnnnn, #Qnnnnn, #Fnnnnn, #Dnnnnn, #Annnnn	These registers can be called in programs but they cannot be written. The values are set from the MPE720.	Program-specific
D	D registers	DBnnnnnh, DWnnnnn, DLnnnnn, DQnnnnn, DFnnnnn, DDnnnnn, DAnnnnn	These registers can be used for general purposes within a program. By default, 32 words are reserved for each program.	
X	Function input registers	XBnnnnnh, XWnnnnn, XLnnnnn, XQnnnnn, XFnnnnn, XDnnnnn	These registers are used for inputs to functions. <ul style="list-style-type: none"> • Bit inputs: XB000000 to XB00000F • Integer inputs: XW00001 to XW00016 • Double-length integers: XL00001 to XL00015 • Quadruple-length integers: XQ00001 to XQ00013 • Real numbers: XF00001 to XF00015 • Double-precision real numbers: XD00001 to XD00013 	Function-specific
Y	Function output registers	YBnnnnnh, YWnnnnn, YLnnnnn, YQnnnnn, YFnnnnn, YDnnnnn	These registers are used for outputs from functions. <ul style="list-style-type: none"> • Bit outputs: YB000000 to YB00000F • Integer outputs: YW00001 to YW00016 • Double-length integers: YL00001 to YL00015 • Quadruple-length integers: YQ00001 to YQ00013 • Real numbers: YF00001 to YF00015 • Double-precision real numbers: YD00001 to YD00013 	
Z	Function internal registers	ZBnnnnnh, ZWnnnnn, ZLnnnnn, ZQnnnnn, ZFnnnnn, ZDnnnnn	These are internal registers that are unique within each function. You can use them for internal processing in functions. <ul style="list-style-type: none"> • Bit: ZB000000 to ZB00063F • Integer: ZW00000 to ZW00063 • Double-length integers: ZL00000 to ZL00062 • Quadruple-length integers: ZQ00000 to ZQ00060 • Real numbers: ZF00000 to Zf00062 • Double-precision real numbers: ZD00000 to ZD00060 	
A	Function external registers	ABnnnnnh, AWnnnnn, ALnnnnn, AQnnnnn, AFnnnnn, ADnnnnn	These are external registers that use the address input value as the base address. When the address input value of an M or D register is provided by the source of the function call, then the registers of the source of the function call can be accessed from inside the function by using that address as the base.	

Note:

n: decimal digit, h: hexadecimal digit

**Important**

User functions can be called from any programs, any number of times.

(a) Precautions When Using Local Registers within a User Function

When you call a user function, consider what values could be in the local registers, and perform initialization as needed.

Name	Precautions
X Registers (function input registers)	If input values are not set, the values will be uncertain. Do not use X registers that are outside of the range that is specified in the input definitions.
Y Registers (function output registers)	If output values are not set, the values will be uncertain. Always set the values of the range of Y registers that is specified in the output definitions.
Z Registers (function internal registers)	When the function is called, the previously set values will be lost and the values will be uncertain. These registers are not appropriate for instructions if the previous value must be retained. Use them only after initializing them within the function.
# Registers	These are constant registers. Their values cannot be changed.
D Registers	When the function is called, the previously set values are preserved. If a previous value is not necessary, initialize the value, or use a Z register instead. If you call the same function in multiple locations, the D registers reference the same area. To retain the previous values for each location where the same function is called, use A registers (function external registers). D registers retain the data until the power is turned OFF.

7.6.5 Data Types

There are various data types that you can use depending on the purpose of the application: bit, integer, double-length integer, quadruple-length integer, real number, double-precision real number, and address.

Symbol	Data Type	Range of Values	Data Size	Remarks
B	Bit	1 (ON) or 0 (OFF)	–	Used in relay circuits and to determine ON/OFF status.
W	Integer	-32,768 to 32,767 (8000h to 7FFFh)	1 word	Used for numeric operations. The values in parentheses on the left are for logical operations.
L	Double-length integer	-2,147,483,648 to 2,147,483,647 (80000000h to 7FFFFFFFh)	2 words	Used for numeric operations. The values in parentheses on the left are for logical operations.
Q	Quadruple-length integer	-9223372036854775808 to 9223372036854775807 (8000000000000000h to 7FFFFFFFFFFFFFFFh)	4 words	Used for numeric operations. The values in parentheses on the left are for logical operations.
F	Real number	$\pm (1.175E-38 \text{ to } 3.402E+38), 0$	2 words	Used for advanced numeric operations. *1
D	Double-precision real number	$\pm (2.225E-308 \text{ to } 1.798E+308), 0$	4 words	Used for advanced numeric operations. *1
A	Address	0 to 2,097,152	–	Used only as pointers for addressing.

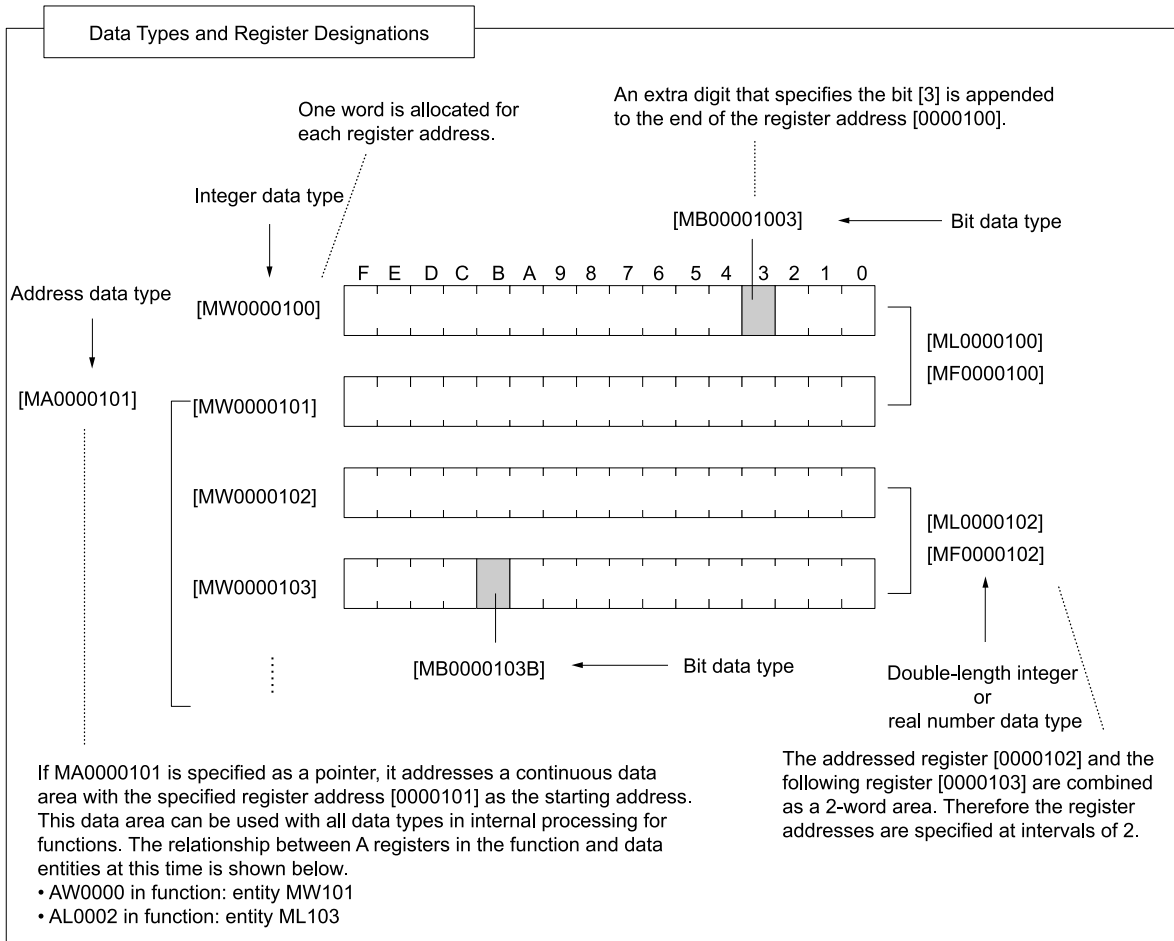
*1 Conforms to IEEE754 standards.



Important

This product does not have separate registers for each data type. As shown in the following figure, the same address will access the same register even if the data type is different.

For example, MB00001003, a bit address, and the MW0000100, an integer address, have different data types, but they both access the same register, MW0000100.



Pointer Designation

Term

When an address is passed to a function as a parameter, this is referred to as pointer designation.

When pointer designation is used, the continuous data area starting from the address of the specified register address can be used in internal processing for functions with all data types.

(1) Precautions for Operations Using Different Data Types

If you perform an operation using different data types, be aware that the results will be different depending on the data type of the storage register, as described below.

- Storing Real Number Data in an Integer Register

MW0000100 = MF0000200; the real number is stored after it is converted to an integer.
 (00001) (1.234)

Note:

There may be rounding error due to storing a real number in an integer register.

Whether numbers are rounded or truncated when converting a real number to an integer can be set in the properties of the drawing.

MW0000100 = MF0000200 + MF0000202; the result of the operation may be different.
 (0124) (123.48) (0.02)
 (0123) (123.49) (0.01)

- Storing Real Number Data in a Double-Length Integer Register

ML0000100 = MF0000200; the real number is stored after it is converted to an integer.
 (65432) (65432.1)

- Storing Double-Length Integer Data in an Integer Register

MW0000100 = ML0000200; the lower 16 bits of the double-length integer are stored without change.
 (-00001) (65535)

- Storing Integer Data in a Double-Length Integer Register

ML0000100 = MW0000200; the integer is stored after it is converted to double-length integer data.
 (0001234) (1234)

(a) Setting for Real Number Casting

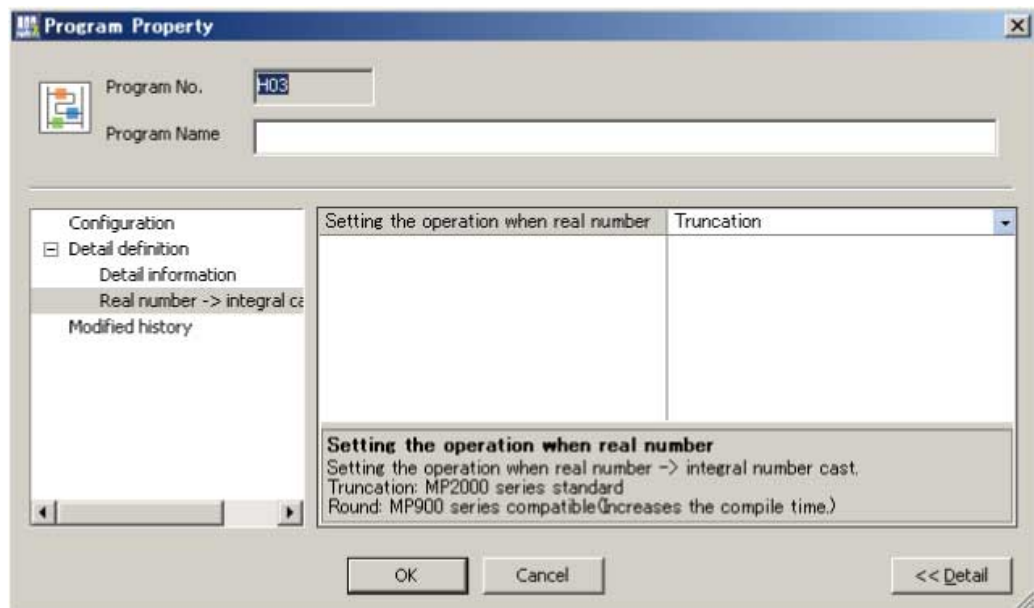
The casting method (truncating or rounding) can be set in the detailed definitions in the Drawing Properties dialog box.

The method to use for real number casting is set for each drawing.

Use the following procedure to display the Program Property window.

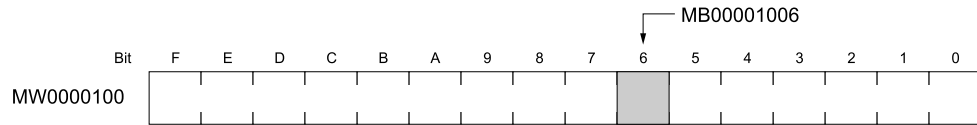
1. In the Ladder window, select the ladder program for which to view the properties.
2. Right-click the selected program and select [Property] from the pop-up menu.

The Program Property window will be displayed.



Information The data is little endian, as shown in the following example.

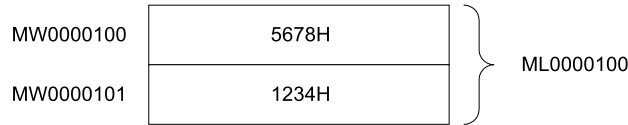
- MB00001006 Connection Example



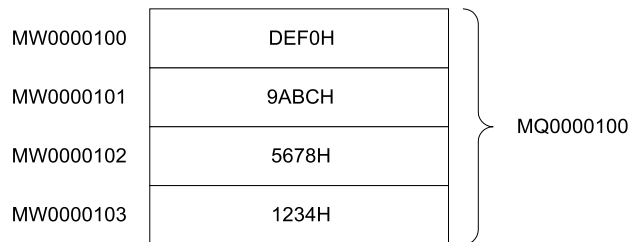
- MW0000100 = 1234h



- ML0000100 = 12345678h



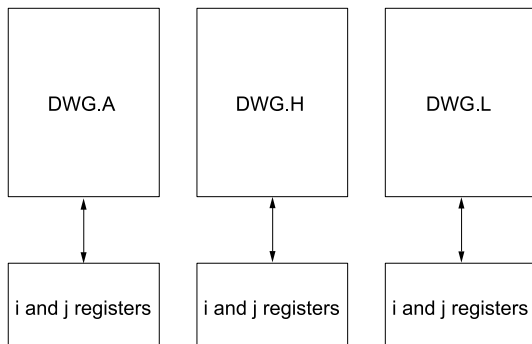
- MQ0000100 = 123456789ABCDEF0h



7.6.6 Index Registers (i, j)

There are two special registers, i and j, that are used to modify relay and register addresses. The functions of i and j are identical. They are used to handle register addresses like variables.

There are subscript registers for each program type, as shown in the following figure.



Note:

Functions call the i and j registers that belong to the calling drawing.

For example, a function called by DWG.H will call the i and j registers for DWG.H.

We will describe this with examples for each register data type.

(1) Attaching an Index to a Bit Register

Using an index is the same as adding the value of i or j to the register address.

For example, if i = 2, MB00000000i is the same as MB00000002.

i = 2;

$$DB000000 = MB00000000i; \quad \xleftrightarrow{\text{Equivalent}} \quad DB000000 = MB00000002;$$

(2) Attaching an Index to an Integer Register

Using an index is the same as adding the value of i or j to the register address.

For example, if j = 30, MW0000001j is the same as MW0000031.

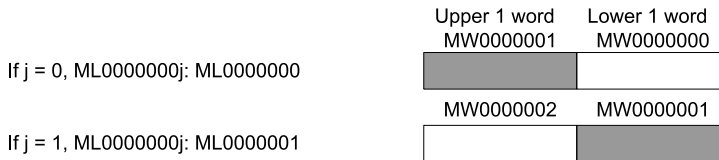
$j = 30;$
 DW00000 = MW0000001j; \longleftrightarrow Equivalent DW00000 = MW0000031;

(3) Attaching an Index to a Double-Length Integer or a Real Number Register

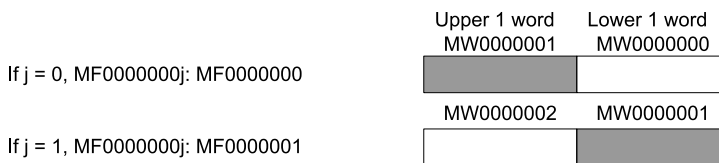
Using an index is the same as adding the value of i or j to the register address.

For example, if $j = 1$, ML0000000j is the same as ML0000001. Similarly, if $j = 1$, MF0000000j is the same as MF0000001.

<Double-Length Integer>



<Real Number>



Important

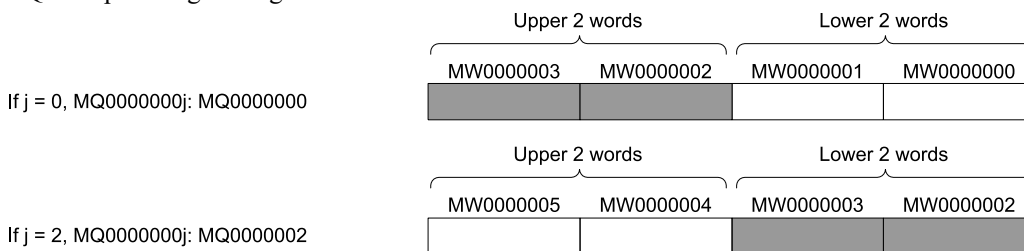
Double-length integers and real numbers use a region that is 2 words in size. For example, when using ML0000000j with both $j = 0$ and $j = 1$, the one-word area of MW0000001 will overlap. Be careful of overlapping areas when indexing double-length integer or real number register addresses.

(4) Attaching an Index to a Quadruple-Length Integer or a Double-Precision Real Number Register

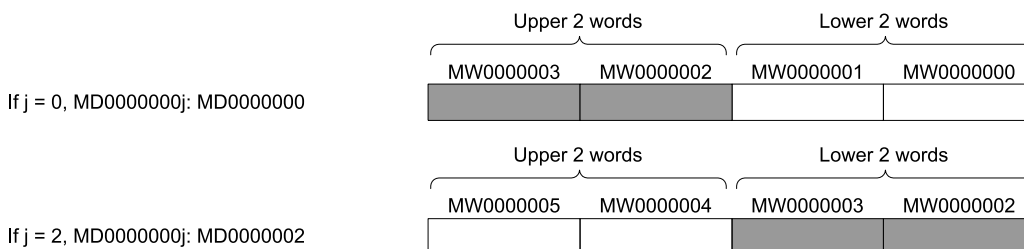
Using an index is the same as adding the value of i or j to the register address.

For example, if $j = 2$, MQ0000000j is the same as MQ0000002. Similarly, if $j = 2$, MD0000000j is the same as MD0000002.

<Quadruple-Length Integer>



<Double-Precision Real Number>



Important

Quadruple-length integers and double-precision real numbers use a region that is 4 words in size. For example, when using MQ0000000j with both $j = 0$ and $j = 2$, the two-word area of MW0000002 and MW0000003 will overlap. Be careful of overlapping areas when indexing quadruple-length integer or double-precision real number register addresses.

7.6.7 Array Registers ([])

Array registers are used to modify register addresses, and are denoted by square brackets [].

These are used to handle register addresses like variables.

Similarly to index registers, an offset is added to the register address.

(1) Attaching an Array Register to a Bit Register

Using an array register is the same as adding the value of the array register to the register address.

For example, if $DW00000 = 2$, $MB00000000[DW00000]$ is the same as $MB00000002$.

$DW00000 = 2$;

$DB000020 = MB00000000[DW00000]$; \longleftrightarrow Equivalent \longleftrightarrow $DB000020 = MB00000002$;

(2) Attaching an Array Register to a Register Other Than a Bit Register

Using an array register is the same as adding the word size of the data type of the array register times the value of the array register to the register address.

For example, if $DW00000 = 30$, $ML0000002[DW00000]$ is the same as $ML0000062$.

$DL00002 = ML00000 (30 \times 2 + 2) = ML0000062$

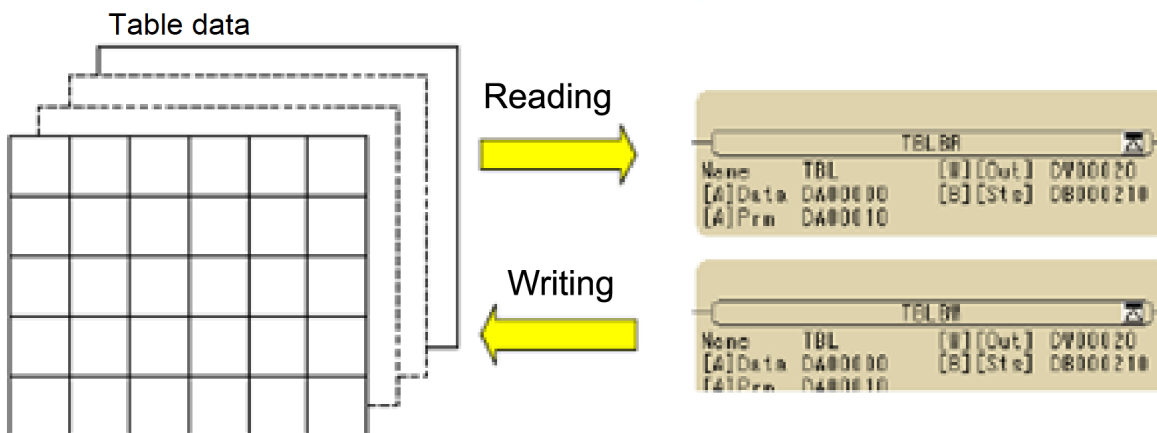
$DW00000 = 30$;

$DL00002 = ML0000002[DW00000]$; \longleftrightarrow Equivalent \longleftrightarrow $DL00002 = ML0000062$;

7.7 Table Data

Table data is data that is managed in tabular form.

You can access table data by using table manipulation instructions such as Write Table Block (TBLBW/TBLBWE) instructions and Read Table Block (TBLBR/TBLBRE) instructions.



The following table lists the table data specifications.

Item		Specifications	Remarks
Maximum characters for name		8 characters	–
Maximum characters for comment		32 characters	–
Table types		<ul style="list-style-type: none"> • Array type: All same data type • Record type: Structure type 	–
Available data types		Basic data types	–
Maximum number of tables		128	–
Maximum number of rows per table		8192	–
Maximum number of columns per table		32	–
Storage location (normal)	Storage location	RAM/flash memory	The save to flash memory operation is required to save table data to flash memory. Refer to the following section for details. 6.5 Save to Flash Memory on page 123
	Maximum capacity	4 MB	–
	Maximum capacity per table	24 kB	–
Storage location (non-volatile memory)	Storage location	Not supported	–
	Maximum capacity	–	–
	Maximum capacity per table	–	–

Customized Sensing Data Function

This chapter describes the customized sensing data function.

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8.1 Overview

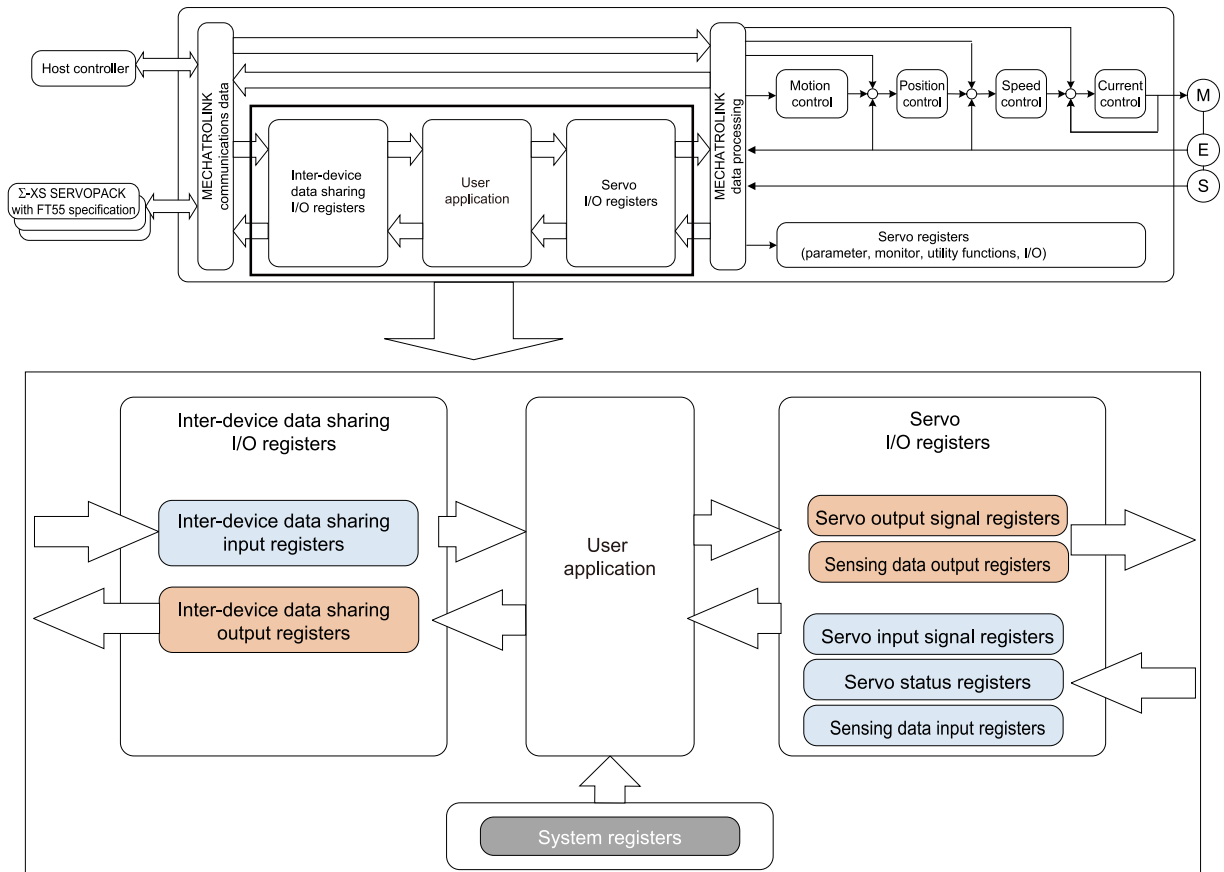
The customized sensing data function allows the sensing data that was input to the SERVOPACK to be customized using the user application registers.

As viewed from the user application, the user application registers are allocated as I registers for data that is input and O registers for data that is output.

There are the following two types of user application registers.

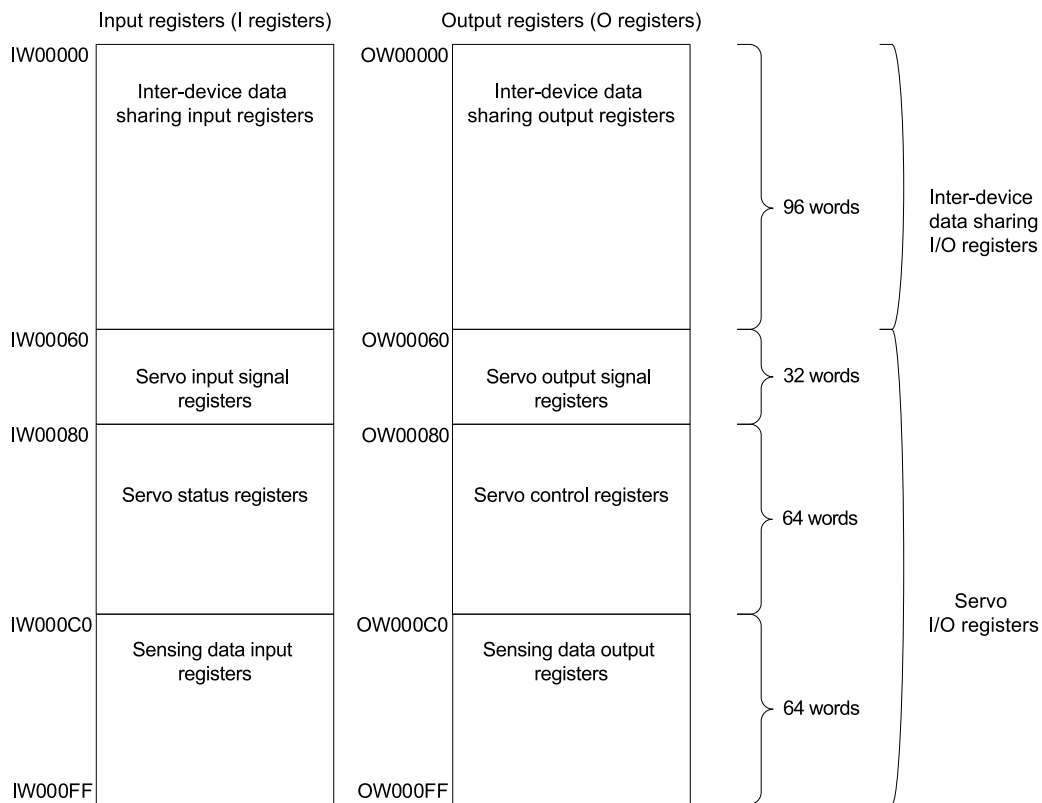
- Inter-device data sharing I/O registers: Registers between the network (MECHATROLINK) and user application
- Servo I/O registers: Registers between the SERVOPACK and application

The following figure shows a block diagram of the user application registers.














Note: O registers: orange, I registers: blue, S registers: gray

The following figure shows the overall structure of user application registers.





The following table gives details on the inter-device data sharing I/O registers and servo I/O registers.

Classification	Item	Data Direction	I/O Registers	Reference
Inter-device data sharing I/O registers	Inter-device data sharing input registers	Data to pass from the network to the user application	I Registers	 8.2.4 Reading and Writing Data with Motion Commands from an MP3000-Series Controller on page 164
	Inter-device data sharing output registers	Data to pass from the user application to the network	O Registers	 8.2.1 Sharing SERVOPACK Data with an MP3000-Series Controller on page 153
Servo I/O registers	Sensing data input registers	Data to pass from the SERVOPACK to the user application	I Registers	 8.5 Sensing Data Monitoring Function on page 167
	Servo status registers			 8.6 Servo Status Monitor on page 170
	Servo input signal registers			 8.3 General-Purpose I/O Control on page 165  8.7 Triggers at Preset Positions on page 172
	Sensing data output registers	Data to pass from the user application to the SERVOPACK	O Registers	 8.5 Sensing Data Monitoring Function on page 167
	Servo output signal registers			 8.3 General-Purpose I/O Control on page 165  8.4 User Application Alarm / Warning Detection Function on page 166  8.7 Triggers at Preset Positions on page 172  8.9 Σ-LINK II Command Function on page 179



8.2 Inter-Device Data Sharing

Inter-device data sharing can perform SERVOPACK data sharing and MP3000-series controller data sharing.

- SERVOPACK Data Sharing

No.	Item	Related Registers	Data Sharing Cycle	Access Method from MP3000-Series Controller	Reference
1-1	Sharing SERVOPACK Data with an MP3000-Series Controller	Inter-device data sharing output registers OL00000 to OL0000E	Fixed cycle	<ul style="list-style-type: none"> Optional monitor 1, option monitor 2 CPRM_SEL_MON3 to CPRM_SEL_MON10 	 8.2.1 Sharing SERVOPACK Data with an MP3000-Series Controller on page 153
1-2	Sharing SERVOPACK Data with Other SERVOPACKs	<ul style="list-style-type: none"> Inter-device data sharing output registers OL00000 to OL0000E Inter-device data sharing input registers IL00000 to IL00050 		CPRM_SEL_MON3 to CPRM_SEL_MON10	 8.2.2 Sharing SERVOPACK Data with Other SERVOPACKs on page 155

- MP3000-Series Controller Data Sharing

No.	Item	Related Registers	Data Sharing Cycle	Access Method from MP3000-Series Controller	Reference
2-1	Sharing MP3000-Series Controller Data with a SERVOPACK	Inter-device data sharing input registers IL00000 to IL00050	Fixed cycle	CM_MOTION	 8.2.3 Sharing MP3000-Series Controller Data with a SERVOPACK on page 162
2-2	Reading and Writing Data with Motion Commands from an MP3000-Series Controller	Inter-device data sharing input registers IL00002 to IL00010	Variable cycle	MEM_RW/MEM_RD	 8.2.4 Reading and Writing Data with Motion Commands from an MP3000-Series Controller on page 164

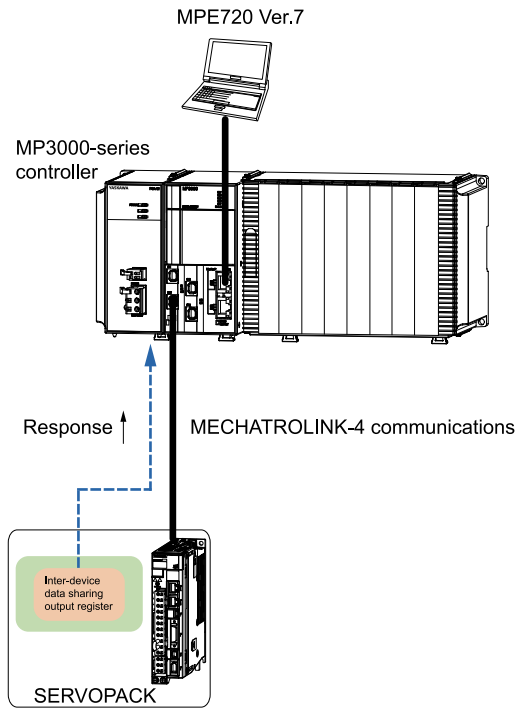
To use inter-device data sharing, set Pn9B0 to n.□□□1 in advance.

Pn9B0	n.□□□X	Inter-Device Data Sharing Function Selection		Speed	Pos	Trq	When Enabled	
		0 Default	Disable inter-device data sharing.					After restart
		1	Enable inter-device data sharing.					

8.2.1 Sharing SERVOPACK Data with an MP3000-Series Controller

Use the inter-device data sharing output registers in the SERVOPACK to share data with an MP3000-series controller from the SERVOPACK.

You can share data with an MP3000-series controller by setting the inter-device data sharing output registers to the relevant values from the user application and allocating those registers to a MECHATROLINK communications option monitor or CPRM_SEL_MON3 to CPRM_SEL_MON10.



The following table lists the inter-device data sharing output registers.

Register Address	Name	Description	Unit
OL00000	Inter-Device Data Sharing Output 1	Set the data to share between devices.	-
OL00002	Inter-Device Data Sharing Output 2		
OL00004	Inter-Device Data Sharing Output 3		
OL00006	Inter-Device Data Sharing Output 4		
OL00008	Inter-Device Data Sharing Output 5		
OL0000A	Inter-Device Data Sharing Output 6		
OL0000C	Inter-Device Data Sharing Output 7		
OL0000E	Inter-Device Data Sharing Output 8		
OL00010 to OL0005E	Reserved for system.		

(1) Setup Procedure

Use the following procedure to configure data sharing.

1. **Store the data to share in Inter-Device Data Sharing Output 1 (OL00000) to Inter-Device Data Sharing Output 8 (OL0000E).**
2. **Establish an online connection between the SERVOPACK and the SigmaWin+.**
3. **To allocate the data to share to option monitor 1 or 2, set the data to share in Pn824 or Pn825.**

Example: To allocate Inter-Device Data Sharing Output 1 (OL00000) to option monitor 1, set Pn824 to 013C.

Parameter	Description	When Enabled	
Option Monitor 1 Selection and Option Monitor 2 Selection Pn824, Pn825	013Ch	Inter-Device Data Sharing Output 1 (OL00000)	Immediately
	013Dh	Inter-Device Data Sharing Output 2 (OL00002)	
	013Eh	Inter-Device Data Sharing Output 3 (OL00004)	
	013Fh	Inter-Device Data Sharing Output 4 (OL00006)	
	0140h	Inter-Device Data Sharing Output 5 (OL00008)	
	0141h	Inter-Device Data Sharing Output 6 (OL0000A)	
	0142h	Inter-Device Data Sharing Output 7 (OL0000C)	
	0143h	Inter-Device Data Sharing Output 8 (OL0000E)	

Information There are also items that can be allocated to option monitor 1 and option monitor 2 other than those listed above. Refer to the following section for details on Pn824 and Pn825.

 [12.4 List of MECHATROLINK Common Parameters : MECHATROLINK-4 Communications References on page 359](#)

- To allocate the data to share to CPRM_SEL_MON3 to CPRM_SEL_MON10, set the data to share in PnBC0 to PnBCE.

Example: To allocate Inter-Device Data Sharing Output 1 (OL00000) to CPRM_SEL_MON3, set PnBC0 to 018C.

Parameter	Description	When Enabled	
CPRM_SEL_MON3 to CPRM_SEL_MON10 Allocation Settings PnBC0 to PnBCE	018Ch	Inter-Device Data Sharing Output 1 (OL00000)	Immediately
	018Dh	Inter-Device Data Sharing Output 2 (OL00002)	
	018Eh	Inter-Device Data Sharing Output 3 (OL00004)	
	018Fh	Inter-Device Data Sharing Output 4 (OL00006)	
	0190h	Inter-Device Data Sharing Output 5 (OL00008)	
	0191h	Inter-Device Data Sharing Output 6 (OL0000A)	
	0192h	Inter-Device Data Sharing Output 7 (OL0000C)	
	0193h	Inter-Device Data Sharing Output 8 (OL0000E)	

Information There are also items that can be allocated to CPRM_SEL_MON3 to CPRM_SEL_MON10 other than those listed above. Refer to the following section for details on PnBC0 to PnBCE.

 [12.4 List of MECHATROLINK Common Parameters : MECHATROLINK-4 Communications References on page 359](#)

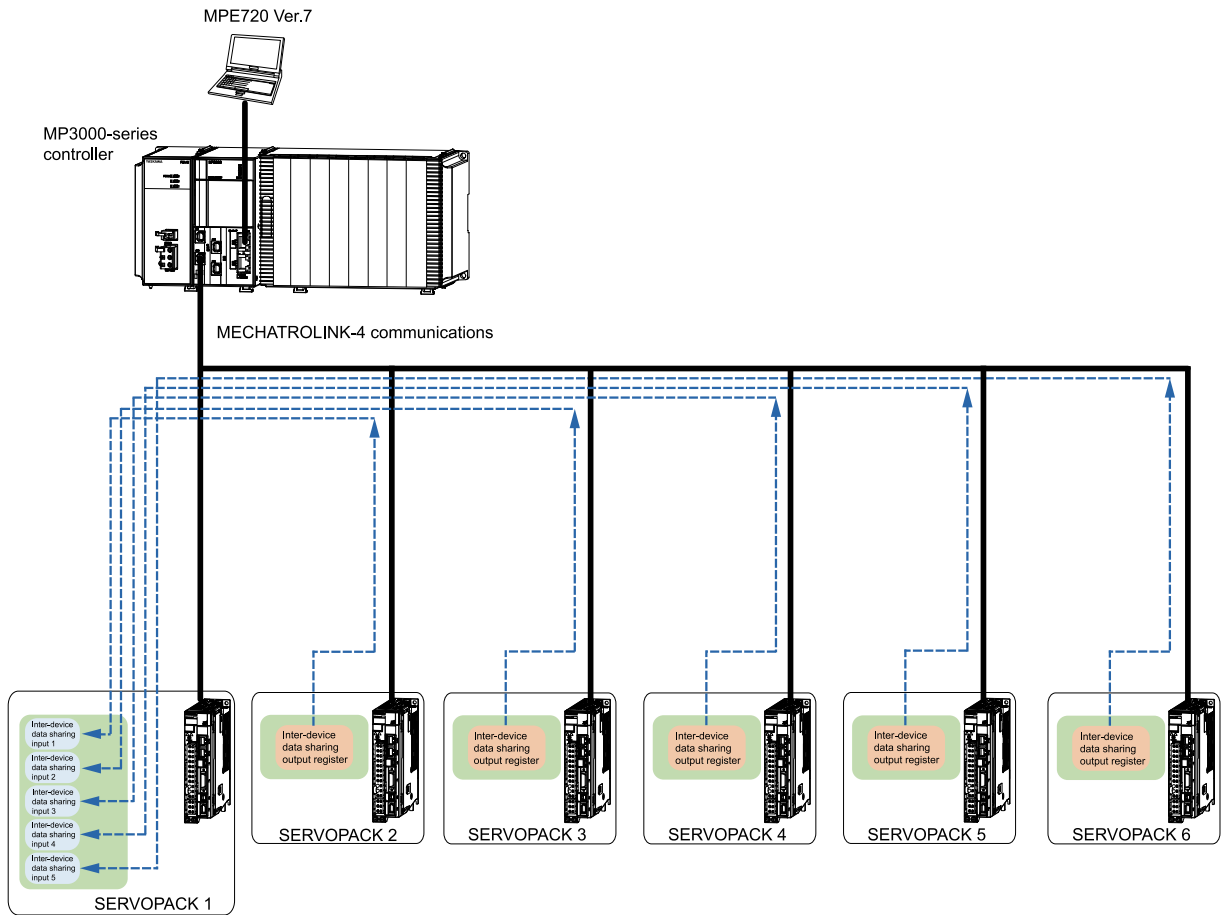
This concludes the procedure.


8.2.2 Sharing SERVOPACK Data with Other SERVOPACKs

Data sharing between SERVOPACKs shares the response data (CPRM_SEL_MON3 to CPRM_SEL_MON10) in MECHATROLINK-4 cyclic communications.

You can share the data of multiple SERVOPACKs (up to five axes) that are connected over MECHATROLINK-4 communications. For example, you can share the data in five SERVOPACKs with one SERVOPACK or you can share the data in one SERVOPACK with five SERVOPACKs.

The following figure shows a conceptual representation when the data in five SERVOPACKs is shared with one SERVOPACK.



 **Important** Data sharing between SERVOPACKs is available in Σ -XS SERVOPACKs with the FT55 specification and Σ -XS SERVO-PACKs with the FT56 specification only. Data cannot be shared with standard models.

The following table lists the inter-device data sharing input registers.




Register Address	Name	Description	Unit
IL00000	Inter-Device Data Sharing Input Status	Indicates the status of whether Inter-Device Data Sharing Input 1 to 5 can be monitored. Bit 0: Inter-Device Data Sharing Input 1 status (0: monitor disabled, 1: monitor enable) Bit 1: Inter-Device Data Sharing Input 2 status (0: monitor disabled, 1: monitor enable) Bit 2: Inter-Device Data Sharing Input 3 status (0: monitor disabled, 1: monitor enable) Bit 3: Inter-Device Data Sharing Input 4 status (0: monitor disabled, 1: monitor enable) Bit 4: Inter-Device Data Sharing Input 5 status (0: monitor disabled, 1: monitor enable) Bit5 to BitF: Reserved for system.	—
IL00002	Inter-Device Data Sharing Input 1 [0]	Stores the SERVOPACK data specified in the Inter-Device Data Sharing Settings (Pn9B1, Pn9B2, and Pn9B3).	—
IL00004	Inter-Device Data Sharing Input 1 [1]		
IL00006	Inter-Device Data Sharing Input 1 [2]		
IL00008	Inter-Device Data Sharing Input 1 [3]		
IL0000A	Inter-Device Data Sharing Input 1 [4]		
IL0000C	Inter-Device Data Sharing Input 1 [5]		
IL0000E	Inter-Device Data Sharing Input 1 [6]		
IL00010	Inter-Device Data Sharing Input 1 [7]		
IL00012	Inter-Device Data Sharing Input 2 [0]	Stores the SERVOPACK data specified in the Inter-Device Data Sharing Settings (Pn9B4, Pn9B5, and Pn9B6).	—
IL00014	Inter-Device Data Sharing Input 2 [1]		
IL00016	Inter-Device Data Sharing Input 2 [2]		
IL00018	Inter-Device Data Sharing Input 2 [3]		
IL0001A	Inter-Device Data Sharing Input 2 [4]		
IL0001C	Inter-Device Data Sharing Input 2 [5]		
IL0001E	Inter-Device Data Sharing Input 2 [6]		
IL00020	Inter-Device Data Sharing Input 2 [7]		

Continued on next page.

Register Address	Name	Description	Unit
IL00022	Inter-Device Data Sharing Input 3 [0]	Stores the SERVOPACK data specified in the Inter-Device Data Sharing Settings (Pn9B7, Pn9B8, and Pn9B9).	-
IL00024	Inter-Device Data Sharing Input 3 [1]		
IL00026	Inter-Device Data Sharing Input 3 [2]		
IL00028	Inter-Device Data Sharing Input 3 [3]		
IL0002A	Inter-Device Data Sharing Input 3 [4]		
IL0002C	Inter-Device Data Sharing Input 3 [5]		
IL0002E	Inter-Device Data Sharing Input 3 [6]		
IL00030	Inter-Device Data Sharing Input 3 [7]		
IL00032	Inter-Device Data Sharing Input 4 [0]	Stores the SERVOPACK data specified in the Inter-Device Data Sharing Settings (Pn9BA, Pn9BB, and Pn9BC).	-
IL00034	Inter-Device Data Sharing Input 4 [1]		
IL00036	Inter-Device Data Sharing Input 4 [2]		
IL00038	Inter-Device Data Sharing Input 4 [3]		
IL0003A	Inter-Device Data Sharing Input 4 [4]		
IL0003C	Inter-Device Data Sharing Input 4 [5]		
IL0003E	Inter-Device Data Sharing Input 4 [6]		
IL00040	Inter-Device Data Sharing Input 4 [7]		
IL00042	Inter-Device Data Sharing Input 5 [0]	Stores the SERVOPACK data specified in the Inter-Device Data Sharing Settings (Pn9BD, Pn9BE, and Pn9BF).	-
IL00044	Inter-Device Data Sharing Input 5 [1]		
IL00046	Inter-Device Data Sharing Input 5 [2]		
IL00048	Inter-Device Data Sharing Input 5 [3]		
IL0004A	Inter-Device Data Sharing Input 5 [4]		
IL0004C	Inter-Device Data Sharing Input 5 [5]		
IL0004E	Inter-Device Data Sharing Input 5 [6]		
IL00050	Inter-Device Data Sharing Input 5 [7]		
IL00052 to IL0005E	Reserved for system.		

(1) Setup Procedure

This section describes the procedure to share the data in SERVOPACK 2 to SERVOPACK 6 with SERVOPACK 1.

No.	Contents	Reference
1	Settings for the MP3000-Series Controller	 (a) <i>Settings for the MP3000-Series Controller on page 159</i>
2	Settings for SERVOPACK 2 to SERVOPACK 6	 (b) <i>Settings for SERVOPACK 2 to SERVOPACK 6 on page 159</i>
3	Settings for SERVOPACK 1	 (c) <i>Settings for SERVOPACK 1 on page 160</i>

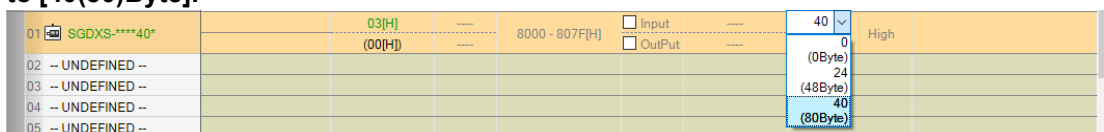
(a) Settings for the MP3000-Series Controller

Data sharing between SERVOPACKs uses the response data in MECHATROLINK-4 cyclic communications.

You must set the MECHATROLINK communications data size for the SERVOPACKs from the project file for the MP3000-series controller.

Use the following setup procedure for the MECHATROLINK communications data size.

1. **Wire the MP3000-series controller to the MPE720 and establish an online connection.**
2. **Click [Module Configuration] on the My Tool window.**
The Module Configuration Window will be displayed.
3. **Click the Expand [+] button for [SVF] to display the module configuration definition for the SERVOPACK as shown below.**
4. **Set the size for the I/O registers ([Input]/[Output]) of the SERVOPACK for data sharing to [40(80)Byte].**



5. **Click the [Save to project] button on the Module Configuration Window.**
The content that was set will be saved in the project file.
6. **Save the data to flash memory.**
7. **Turn the power to the MP3000-series controller OFF and ON again.**
The content in flash memory will be applied.

This concludes the procedure.

(b) Settings for SERVOPACK 2 to SERVOPACK 6

Configure the settings for the data to share with SERVOPACK 1 in SERVOPACK 2 to SERVOPACK 6 that have the data to share.

Information The amount of data that can be shared from one SERVOPACK is the eight items of data (32 bytes) in Inter-Device Data Sharing Output 1 to Inter-Device Data Sharing Output 8 (OL00000 to OL0000E).

Use the following procedure to configure data sharing.

1. **Store the data to share in Inter-Device Data Sharing Output 1 (OL00000) to Inter-Device Data Sharing Output 8 (OL0000E).**
2. **Establish an online connection between the SERVOPACK and the SigmaWin+.**
3. **Allocate the data to share to the MECHATROLINK communications response data by setting the data to share in PnBC0 to PnBCE.**

Example: To allocate Inter-Device Data Sharing Output 1 (OL00000) to CPRM_SEL_MON3, set PnBC0 to 018C.

Parameter		Description	When Enabled
CPRM_SEL_MON3 to CPRM_SEL_MON10 Allocation Settings PnBC0 to PnBCE	018Ch	Inter-Device Data Sharing Output 1 (OL00000)	Immediately
	018Dh	Inter-Device Data Sharing Output 2 (OL00002)	
	018Eh	Inter-Device Data Sharing Output 3 (OL00004)	
	018Fh	Inter-Device Data Sharing Output 4 (OL00006)	
	0190h	Inter-Device Data Sharing Output 5 (OL00008)	
	0191h	Inter-Device Data Sharing Output 6 (OL0000A)	
	0192h	Inter-Device Data Sharing Output 7 (OL0000C)	
	0193h	Inter-Device Data Sharing Output 8 (OL0000E)	


Information There are also items that can be allocated to CPRM_SEL_MON3 to CPRM_SEL_MON10 other than those listed above. Refer to the following section for details on PnBC0 to PnBCE.

 [12.4 List of MECHATROLINK Common Parameters : MECHATROLINK-4 Communications References on page 359](#)

This concludes the procedure.

(c) Settings for SERVOPACK 1

SERVOPACK 1 shares data between SERVOPACKs by obtaining the response data in MECHATROLINK-4 cyclic communications from SERVOPACK 2 to SERVOPACK 6.



Important To share data between multiple SERVOPACKs, you must configure the parameter settings for each SERVOPACK.

Information The maximum amount of data that can be shared with one SERVOPACK is the five sets of data (five axes of data) in Inter-Device Data Sharing Input 1 (IL00002 to IL00010) to Inter-Device Data Sharing Input 5 (IL00042 to IL00050).

You must set the parameters in SERVOPACK 1 to specify which axis of shared data is to be stored in which inter-device data sharing input (registers) of the SERVOPACK.

Use the following procedure to configure the data sharing settings for the SERVOPACK.

1. **Establish an online connection between SERVOPACK 1 and the SigmaWin+.**
2. **Configure the sharing settings for Inter-Device Data Sharing Input 1 (IL00002 to IL00010).**
 1. Set the station address of the SERVOPACK with the data to share in Pn9B1 = n.□□XX. To share the data of SERVOPACK 2 (station address: 04h), set Pn9B1 to= n.□□04.

Pn9B1	n.□□XX	Inter-Device Data Sharing Function Selection			When Enabled	
			Speed	Pos		Trq
		00h Default	Do not specify a device to share data.			After restart
		01h to 02h	Reserved (Do not use.)			
		03h	Set the station address 03h.			
		:	:			
		FFh	Set the station address FFh.			

2. Set Pn9B3 to n.1□□□ (select response data for shared data).

Pn9B3	n.X□□□	Inter-Device Data Sharing Command/Response Selection			When Enabled	
			Speed	Pos		Trq
		0	Select the command data.			After restart
		1 Default	Select the response data.			

3. Configure the sharing settings for Inter-Device Data Sharing Input 2 (IL00012 to IL00020) in the same manner.

1. Set the station address of the SERVOPACK with the data to share in Pn9B4 = n.□□XX. To share the data of SERVOPACK 3 (station address: 05h), set Pn9B4 to n.□□05.

Pn9B4	n.□□XX	Inter-Device Data Sharing Function Selection			Speed	Pos	Trq	When Enabled	
		00h Default	Do not specify a device to share data.				After restart		
		01h to 02h	Reserved (Do not use.)						
		03h	Set the station address 03h.						
		:	:						
		FFh	Set the station address FFh.						

2. Set Pn9B6 to n.1□□□ (select response data for shared data).

Pn9B6	n.X□□□	Inter-Device Data Sharing Command/Response Selection			Speed	Pos	Trq	When Enabled	
		0	Select the command data.				After restart		
		1 Default	Select the response data.						

4. Configure the sharing settings for Inter-Device Data Sharing Input 3 (IL00022 to IL00030) in the same manner.

1. Set the station address of the SERVOPACK with the data to share in Pn9B7 = n.□□XX. To share the data of SERVOPACK 4 (station address: 06h), set Pn9B7 to n.□□06.

Pn9B7	n.□□XX	Inter-Device Data Sharing Function Selection			Speed	Pos	Trq	When Enabled	
		00h Default	Do not specify a device to share data.				After restart		
		01h to 02h	Reserved (Do not use.)						
		03h	Set the station address 03h.						
		:	:						
		FFh	Set the station address FFh.						

2. Set Pn9B9 to n.1□□□ (select response data for shared data).

Pn9B9	n.X□□□	Inter-Device Data Sharing Command/Response Selection			Speed	Pos	Trq	When Enabled	
		0	Select the command data.				After restart		
		1 Default	Select the response data.						

5. Configure the sharing settings for Inter-Device Data Sharing Input 4 (IL00032 to IL00040) in the same manner.

- Set the station address of the SERVOPACK with the data to share in Pn9BA = n.□□XX. To share the data of SERVOPACK 5 (station address: 07h), set Pn9BA to n.□□07.

Pn9BA	n.□□XX	Inter-Device Data Sharing Function Selection			When Enabled	
			Speed	Pos		Trq
		00h Default	Do not specify a device to share data.			After restart
		01h to 02h	Reserved (Do not use.)			
		03h	Set the station address 03h.			
		:	:			
		FFh	Set the station address FFh.			

- Set Pn9BC to n.1□□□ (select response data for shared data).

Pn9BC	n.X□□□	Inter-Device Data Sharing Command/Response Selection			When Enabled	
			Speed	Pos		Trq
		0	Select the command data.			After restart
		1 Default	Select the response data.			

6. Configure the sharing settings for Inter-Device Data Sharing Input 5 (IL00042 to IL00050) in the same manner.

- Set the station address of the SERVOPACK with the data to share in Pn9BD = n.□□XX. To share the data of SERVOPACK 6 (station address: 08h), set Pn9BD to n.□□08.

Pn9BD	n.□□XX	Inter-Device Data Sharing Function Selection			When Enabled	
			Speed	Pos		Trq
		00h Default	Do not specify a device to share data.			After restart
		01h to 02h	Reserved (Do not use.)			
		03h	Set the station address 03h.			
		:	:			
		FFh	Set the station address FFh.			

- Set Pn9BF to n.1□□□ (select response data for shared data).

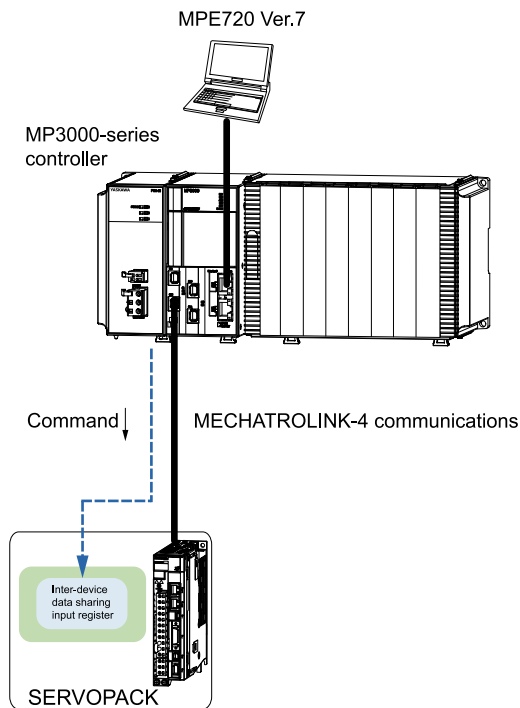
Pn9BF	n.X□□□	Inter-Device Data Sharing Command/Response Selection			When Enabled	
			Speed	Pos		Trq
		0	Select the command data.			After restart
		1 Default	Select the response data.			

This concludes the procedure.

8.2.3 Sharing MP3000-Series Controller Data with a SERVOPACK

To share MP3000-series controller data with a SERVOPACK, use the CM_MOTION (Custom Operation: 40) command.

The MP3000-series controller can use the inter-device data sharing input registers to monitor the data (Custom Reference 1: OL□□□76 to Custom Reference 5: OL□□□7E) that was sent to the SERVOPACK with the CM_MOTION command.



Important

The SERVOPACK can share only the main command of its own axis in MECHATROLINK-4 cyclic communications with the MP3000-series controller. The SERVOPACK cannot share the command data of other SERVOPACKs.

Information

The amount of data that can be shared with one SERVOPACK is the data in CPRM_SEL_CMD1 to CPRM_SEL_CMD8 (32 bytes).

You must use the parameters in each SERVOPACK to set the command data in cyclic communications that is stored in inter-device data sharing inputs (registers).

The setup procedure shown below shares the command data in Inter-Device Data Sharing Input 1 (IL00002 to IL00010) in the SERVOPACK as an example.

Change the parameter numbers that are set to share command data in Inter-Device Data Sharing Input 2 to Inter-Device Data Sharing Input 5. Use this procedure by changing numbers to the appropriate values.

1. Establish an online connection between the SERVOPACK to configure with data sharing settings and the SigmaWin+.
2. Set Pn9B1 = n.□□XX to the station address of the SERVOPACK's own axis. Example: To share the SERVOPACK command data at station address 03h, set Pn9B1 to n.□□03.

Pn9B1	n.□□XX	Inter-Device Data Sharing Function Selection			Speed	Pos	Trq	When Enabled
		00h Default	Do not specify a device to share data.					After restart
		01h to 02h	Reserved (Do not use.)					
		03h	Set the station address 03h.					
		:	:					
		FFh	Set the station address FFh.					

3. Set Pn9B3 to n.050C (reference data, data size 5, and start position 0C).

Pn9B3	n.□□XX	Inter-Device Data Sharing Start Position			Speed	Pos	Trq	When Enabled
		00h to 4Ch	Set the start position of inter-device data sharing for cyclic communications.					After restart

Pn9B3	n.□X□□	Inter-Device Shared Data Size			Speed	Pos	Trq	When Enabled
		0 to 8	Set the size of the shared data.					After restart

Pn9B3	n.X□□□	Inter-Device Data Sharing Command/Response Selection			When Enabled	
			Speed	Pos		Trq
		0	Select the command data.			After restart
		1 Default	Select the response data.			

This concludes the procedure.


8.2.4 Reading and Writing Data with Motion Commands from an MP3000-Series Controller

You can write set values to the inter-device data sharing input registers that correspond to the memory in the SERVOPACK by using the MEM_WR (Write Memory) motion command (OW□□□08 = 36) from an MP3000-series controller.

In the same manner, you can read set values from the inter-device data sharing input registers by using the MEM_RD (Read Memory) motion command (OW□□□08 = 35) from an MP3000-series controller.

Refer to the following manuals for details on the MEM_WR and MEM_RD motion commands.

📖 MP3000 Series Motion Control User's Manual (Manual No.: SIEP C880725 11)



Important

- The registers used in this function are the same registers (IL00002 to IL00010) used by Inter-Device Data Sharing Input 1 when sharing SERVOPACK data with other SERVOPACKs. For this reason, you cannot use this function and data sharing between SERVOPACKs that uses Inter-Device Data Sharing Input 1 at the same time. To use this function, make sure to set Pn9B1 to n.□□00 (do not specify a device to share data).
- Set the following content for the setting parameters when sending the MEM_WR command.
 - OW□□□51 (SERVOPACK Parameter Size): 2
 - OW□□□52 (SERVOPACK Parameter Set Value): Arbitrary set value
 - OL□□□58 (Address Setting): Virtual memory address that corresponds to the following inter-device data sharing input registers in the SERVOPACK
- Set the following content for the setting parameters when sending the MEM_RD command.
 - OW□□□51 (SERVOPACK Parameter Size): 2
 - OL□□□58 (Address Setting): Virtual memory address that corresponds to the following inter-device data sharing input registers in the SERVOPACK

The following table lists the inter-device data sharing input registers.

Virtual Memory Address	Data Size in Words		Register Address	Name	Description
0x80004640	2	↔	IL00002	Inter-Device Data Sharing Input 1 [0]	You can read or write Inter-Device Data Sharing Input 1 [1] to [7] by using the MEM_RD or MEM_WR command from the host controller.
0x80004644	2		IL00004	Inter-Device Data Sharing Input 1 [1]	
0x80004648	2		IL00006	Inter-Device Data Sharing Input 1 [2]	
0x8000464c	2		IL00008	Inter-Device Data Sharing Input 1 [3]	
0x80004650	2		IL0000A	Inter-Device Data Sharing Input 1 [4]	
0x80004654	2		IL0000C	Inter-Device Data Sharing Input 1 [5]	
0x80004658	2		IL0000E	Inter-Device Data Sharing Input 1 [6]	
0x8000465C	2		IL00010	Inter-Device Data Sharing Input 1 [7]	

8.3 General-Purpose I/O Control

You can control the general-purpose output signals of the SERVOPACK from the user application.

You can also monitor the status of the general-purpose input and output signals.

The following tables give information on the servo output signal register used for general-purpose output control and the servo input signal register used for monitoring.

- Servo Output Signal Register

Registers	Name	Unit	Description	
OW00060	Output Signal Control	-	Bit0: Reserved for system.	
			Bit1: SO1	0: OFF 1: ON
			Bit2: SO2	0: OFF 1: ON
			Bit3: SO3	0: OFF 1: ON
			Bit4 to Bit15: Reserved for system.	

- Servo Input Signal Registers

Registers	Name	Unit	Description	
IW00060	Input Signal Status	-	Bit0: SI0	0: Low (closed) 1: High (open)
			Bit1: SI1	0: Low (closed) 1: High (open)
			Bit2: SI2	0: Low (closed) 1: High (open)
			Bit3: SI3	0: Low (closed) 1: High (open)
			Bit4: SI4	0: Low (closed) 1: High (open)
			Bit5: SI5	0: Low (closed) 1: High (open)
			Bit6: SI6	0: Low (closed) 1: High (open)
			Bit7 to Bit15: Reserved for system.	
IW00061	Output Signal Status	-	Bit0: ALM	0: Low (closed) 1: High (open)
			Bit1: SO1	0: Low (closed) 1: High (open)
			Bit2: SO2	0: Low (closed) 1: High (open)
			Bit3: SO3	0: Low (closed) 1: High (open)
			Bit4 to Bit15: Reserved for system.	



Important

Use caution as the logic of OW00060 (Output Signal Control) and IW00061 (Output Signal Status) is different.

Example: If OW00060 bit 0 (SO1) is set to 1 (ON), IW00061 bit 1 (SO1) is 0 (low: closed).

8.4 User Application Alarm / Warning Detection Function

You can detect User Application Alarm (A.E8b) and User Application Warning (A.98b) from the user application at an arbitrary timing.

Set User Application Alarm/Warning detection with the User Application Control Flag register.

The following tables give information on the User Application Control Flag register and the related alarm and warning.

- Servo Output Signal Register

Registers	Name	Unit	Description	
OW00061	User Application Control Flag	-	Bit0: User Application Alarm (A.E8b) detection setting	0: Do not detect 1: Detect
			Bit1: User Application Warning (A.98b) detection setting	0: Do not detect 1: Detect

- Related Alarms

Alarm Number	Alarm Name	Alarm Meaning
A.E8b	User Application Alarm	Bit 0 of OW00061 was set in the user application.

- Related Warnings

Warning Number	Warning Name	Warning Meaning
A.98b	User Application Warning	Bit 1 of OW00061 was set in the user application.

Information User Application Warning will not be automatically cleared even if the cause of the warning is eliminated. Clear this warning from the host controller.

8.5 Sensing Data Monitoring Function

You can monitor the sensing data from the servo drive in the user application.

The sensing data can be monitored in Sensing Data Monitor 1 to Sensing Data Monitor 10 (IL000C0 to IL000D2).

Refer to the following section for details on the items that can be monitored.

☞ [8.5.1 Monitor Items in the Sensing Data Monitor Selections on page 168](#)

The following tables list the registers related to the sensing data monitor function.

- Sensing Data Input Registers

Registers	Name	Unit	Description
IL000C0	Sensing Data Monitor 1		The monitor for the item set in Sensing Data Monitor Selection 1 (OW000C0).
IL000C2	Sensing Data Monitor 2		The monitor for the item set in Sensing Data Monitor Selection 2 (OW000C1).
IL000C4	Sensing Data Monitor 3		The monitor for the item set in Sensing Data Monitor Selection 3 (OW000C2).
IL000C6	Sensing Data Monitor 4		The monitor for the item set in Sensing Data Monitor Selection 4 (OW000C3).
IL000C8	Sensing Data Monitor 5		The monitor for the item set in Sensing Data Monitor Selection 5 (OW000C4).
IL000CA	Sensing Data Monitor 6		The monitor for the item set in Sensing Data Monitor Selection 6 (OW000C5).
IL000CC	Sensing Data Monitor 7		The monitor for the item set in Sensing Data Monitor Selection 7 (OW000C6).
IL000CE	Sensing Data Monitor 8		The monitor for the item set in Sensing Data Monitor Selection 8 (OW000C7).
IL000D0	Sensing Data Monitor 9		The monitor for the item set in Sensing Data Monitor Selection 9 (OW000C8).
IL000D2	Sensing Data Monitor 10		The monitor for the item set in Sensing Data Monitor Selection 10 (OW000C9).

- Sensing Data Output Registers

Registers	Name	Unit	Description
OW000C0	Sensing Data Monitor Selection 1		Sets the item to monitor in Sensing Data Monitor 1 (IL000C0).
OW000C1	Sensing Data Monitor Selection 2		Sets the item to monitor in Sensing Data Monitor 2 (IL000C2).
OW000C2	Sensing Data Monitor Selection 3		Sets the item to monitor in Sensing Data Monitor 3 (IL000C4).
OW000C3	Sensing Data Monitor Selection 4		Sets the item to monitor in Sensing Data Monitor 4 (IL000C6).
OW000C4	Sensing Data Monitor Selection 5		Sets the item to monitor in Sensing Data Monitor 5 (IL000C8).
OW000C5	Sensing Data Monitor Selection 6		Sets the item to monitor in Sensing Data Monitor 6 (IL000CA).
OW000C6	Sensing Data Monitor Selection 7		Sets the item to monitor in Sensing Data Monitor 7 (IL000CC).
OW000C7	Sensing Data Monitor Selection 8		Sets the item to monitor in Sensing Data Monitor 8 (IL000CE).
OW000C8	Sensing Data Monitor Selection 9		Sets the item to monitor in Sensing Data Monitor 9 (IL000D0).
OW000C9	Sensing Data Monitor Selection 10		Sets the item to monitor in Sensing Data Monitor 10 (IL000D2).

8.5.1 Monitor Items in the Sensing Data Monitor Selections

The following table lists the monitor items that can be set in Sensing Data Monitor 1 (OW000C0) to Sensing Data Monitor 10 (OW000C9).

Setting	Description
0003h	LPOS1 [reference units]
0004h	LPOS2 [reference units]
0050h	Motor speed [overspeed detection speed / 1000000h]
0069h	Un009: Accumulated Load Ratio [%]
006Ah	Un00A: Regenerative Load Ratio [%]
006Bh	Un00B: Dynamic Brake Resistor Power Consumption [%]
006Ch	Un00C: Input Reference Pulse Counter [reference units]
006Dh	Un00D: Feedback Pulse Counter [encoder pulses]
006Eh	Un00E: Fully-closed Loop Feedback Pulse Counter [external encoder resolution]
0090h	Un025: SERVOPACK Installation Environment Monitor
0091h	Un026: Servomotor Installation Environment Monitor
0092h	Un027: Built-in Fan Remaining Life Ratio
0093h	Un028: Capacitor Remaining Life Ratio
0094h	Un029: Surge Prevention Circuit Remaining Life Ratio
0095h	Un02A: Dynamic Brake Circuit Remaining Life Ratio
0096h	Un032: Instantaneous Power
0097h	Un033: Power Consumption
0098h	Un034: Cumulative Power Consumption
009Dh	Un173: Temperature Margin until SERVOPACK Overheats
00A5h	Estimated vibration [overspeed detection speed / 1000000h]
00A6h	Estimated external disturbance torque [maximum torque / 1000000h]
00A8h	Un13C: Margin until Regenerative Overload
00AAh	Un13E: Margin until Undervoltage
00ABh	Un13F: Margin until Overvoltage
00B0h	Un023: Main Circuit DC Voltage
00C0h	Un078: Maximum Value of Amplitude of Estimated Vibration [min^{-1}]
00C1h	Un07A: Maximum Value of Estimated External Disturbance Torque [%]
00C2h	Un07B: Minimum Value of Estimated External Disturbance Torque [%]
00C3h	Un147: Number of MECHATROLINK Communications Errors [times]
00C4h	Un104: Number of Serial Encoder Communications Errors [times]
00C5h	Un105: Settling Time [0.1 ms]
00C6h	Un106: Amount of Overshoot [reference units]
00C7h	Un107: Residual Vibration Frequency [0.1 Hz]
00C9h	Un174: Temperature Margin until Servomotor Overheats [$^{\circ}\text{C}$]
00CAh	Un145: Maximum Value of Accumulated Load Ratio [%]
00CBh	Un14E: Margin until Overload [0.01 %]
00CCh	Un07C: Identified Moment of Inertia Ratio

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Setting	Description
00CEh	Un108: Maximum Settling Time [0.1ms]
00CFh	Un109: Maximum Amount of Overshoot [reference units]
00D0h	Previous value of latched feedback position (LPOS1) [reference units]
00D1h	Previous value of latched feedback position (LPOS2) [reference units]
00D4h	Continuous latch status (EX STATUS)
0154h	Un177: Encoder Power Supplied Time
0156h	Un17A: Encoder Power Supply Voltage
0157h	Un17B: Encoder Battery Voltage
015Ch	Un181: Motor Total Number of Rotations
015Dh	Un183: Maintenance Prediction Monitor - Bearings
015Eh	Un184: Maintenance Prediction Monitor - Oil Seal
0176h	Un190: Motor Vibration in X-Axis Direction
0177h	Un191: Motor Vibration in Y-Axis Direction
0178h	Un192: Motor Vibration in Z-Axis Direction
0179h	Un193: Motor Vibration XYZ Composite Value
017Ah	Un194: Maximum Motor Vibration
0250h	Σ-LINK II response data 1
0251h	Σ-LINK II response data 2
0252h	Σ-LINK II response data 3
0253h	Σ-LINK II response data 4
0254h	Σ-LINK II response data 5
0255h	Σ-LINK II response data 6
0256h	Σ-LINK II response data 7
0257h	Σ-LINK II response data 8
0260h	Σ-LINK II command data 1
0261h	Σ-LINK II command data 2
0262h	Σ-LINK II command data 3
0263h	Σ-LINK II command data 4
0290h	Σ-LINK II data status information
Other values	Reserved (Do not use.)

8.6 Servo Status Monitor

The servo status monitor is a function that obtains the status of the SERVOPACK in the user application.

The servo ON state (SVON) and other servo status information is stored in the servo status registers.

The following table lists the servo status registers.

Register Address	Name	Description	Unit
IW00080	Servo Control Command Code Monitor (SVCMD)	Servo control command code for custom motion	—
IW00081	Reserved for system.		
IL00082	Servo Control Status (SVSTS)	Bit0: Servo ON Status (SVON)	0: Servo OFF 1: Servo ON
		Bit1: Reference Stopped Status (HOLD)	0: No stop request 1: Stop command in progress
		Bit2: Reserved for system.	
		Bit3: Servo Warning Status (SV_WRN)	0: No servo warning 1: Servo warning
		Bit4: Servo Alarm Status (SV_ALM)	0: No servo alarm 1: Servo alarm
		Bit5: Main Circuit Power Supply Status (PON)	0: Main circuit power OFF 1: Main circuit power ON
		Bit6: Servo ON Available Status (SV_RDY)	0: Servo ON ready not completed 1: Servo ON ready completed
		Bit7: Position Information Status (POS_RDY)	0: Position information invalid 1: Position information valid
		Bit8: Position Reference Output Status (DEN)	0: Position reference output in progress 1: Position reference output completed
		Bit9: Near Position Status (NEAR)	0: Outside near-position range 1: Inside near-position range
		Bit10: Positioning Completed Status (PSET)	0: Outside positioning completed range 1: Inside positioning completed range
		Bit11: Zero Point Position Status (ZPOINT)	0: Outside zero point position range 1: Inside zero point position range
		Bit12: Speed Coincidence (V_CMP)	0: Speed does not coincide 1: Inside speed coincidence range
		Bit13: Zero Speed Status (ZSPD)	0: Outside zero speed 1: Inside zero speed range
		Bit14: Forward Software Limit Status (P_SOT)	0: Normal status 1: Software limited
		Bit15: Reverse Software Limit Status (N_SOT)	0: Normal status 1: Software limited
		Bit16: Speed Limit Status (V_LIM)	0: No speed limit 1: Speed limited
		Bit17: Torque Limit Status (T_LIM)	0: No torque limit 1: Torque limited
		Bit18 to Bit30: Reserved for system.	
		Bit31: Custom Motion Ready	0: Custom motion cannot be executed 1: Custom motion can be executed

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Register Address	Name	Description	Unit
IW00084	Servo Alarm / Warning Code (SVALM_CODE)	SERVOPACK alarm/warning code	–
IW00085	Servo Control Command Error Code (SVCMD_ERR)	Error code when executing a custom motion	–
IL00086	Target Position Monitor (TPOS)	Target position	Position reference unit
IL00088	Reference Position (After Position Reference Filter) Monitor (CPOS)	Reference position	Position reference unit
IL0008A	Feedback Position Monitor (APOS)	Feedback position (APOS)	Position reference unit
IL0008C, IL0008E	Reserved for system.		
IL00090	Position Reference Speed Monitor (CSPD)	Position command speed	Speed reference unit
IL00092	Position Deviation Monitor (PERR)	Position deviation	Position reference unit
IL00094	Speed Control Reference Monitor (Speed Control Input) (VREF)	Speed reference during speed control	Speed reference unit
IL00096	Feedback Speed Monitor (FSPD)	Feedback speed	Speed reference unit
IL00098	Torque/Force Reference Monitor (TRQ)	Torque reference	Torque reference unit
IL0009A	Reserved for system.		
IL0009C	External Encoder Position Monitor (2ND_PGPOS)	External encoder position	Position reference unit
IL0009E to IL000A8	Reserved for system.		

8.7 Triggers at Preset Positions

Triggers at preset positions are signals that are output when a moving part of a machine passes preset reference positions.

This function is the same as triggers at preset positions in the Σ -XS SERVOPACK with the standard specifications.

With this SERVOPACK, you can change Output Position for Output Setting 1 to Output Setting 6 that were set in the triggers at preset positions table with the SigmaWin+ from the user application.

You can also control triggers at preset positions and monitor the output status of the triggers at preset positions output signals.

The following tables give information on the servo output signal registers used for controlling triggers at preset positions and the servo input signal register used for monitoring.

- Servo Output Signal Registers

Registers	Name	Unit	Description	
OW00061	User Application Control Flag	-	Bit3: Triggers at Preset Positions Selections	0: Specify Position
			Bit4: Selections to Enable Output Positions of Triggers at Preset Positions Table	0: Disabled 1: Enabled
OL0006A	Output Setting 1 Output Position	Reference unit	Set the output position between -2,147,483,648 and 2,147,483,647.	
OL0006C	Output Setting 2 Output Position			
OL0006E	Output Setting 3 Output Position			
OL00070	Output Setting 4 Output Position			
OL00072	Output Setting 5 Output Position			
OL00074	Output Setting 6 Output Position			

- Servo Input Signal Register

Registers	Name	Unit	Description	
IW00063	Preset Position Output Signal Status	-	Bit0: HSO1	0: High-speed output for triggers at preset positions 1 OFF 1: High-speed output for triggers at preset positions 1 ON
			Bit1: HSO2	0: High-speed output for triggers at preset positions 2 OFF 1: High-speed output for triggers at preset positions 2 ON
			Bit2: HSO3	0: High-speed output for triggers at preset positions 3 OFF 1: High-speed output for triggers at preset positions 3 ON
			Bit3: NSO1	0: Normal output for triggers at preset positions 1 OFF 1: Normal output for triggers at preset positions 1 ON
			Bit4: NSO2	0: Normal output for triggers at preset positions 2 OFF 1: Normal output for triggers at preset positions 2 ON
			Bit5: NSO3	0: Normal output for triggers at preset positions 3 OFF 1: Normal output for triggers at preset positions 3 ON
			Bit6 to Bit15: Reserved for system.	

8.7.1 Setup Procedure



You must use the SigmaWin+ to configure the parameters related to triggers at preset positions and the settings for the triggers at preset positions table in advance. Refer to the following manual for details.

Important Σ -X-Series Σ -XS SERVOPACK with MECHATROLINK-4/III Communications References Product Manuals (Manual No.: SIEP C710812 01)

Use the following procedure to configure triggers at preset positions.

1. **Set the positions at which to output triggers in OL0006A to OL00074 (Output Setting 1 Output Position to Output Setting 6 Output Position).**
2. **Set OW00061 bit 3 (Triggers at Preset Positions Selections) to 0 (Specify Position).**
3. **Set OW00061 bit 4 (Selections to Enable Output Positions of Triggers at Preset Positions Table) to 1 (Enabled).**
4. **Change OL0006A to OL00074 as necessary.**
5. **If saving the user application to the SERVOPACK, perform save to flash memory.**
6. **Turn the control power supply to the SERVOPACK OFF and ON again as necessary.**

This concludes the procedure.



Important

- When OW00061 bit 4 = 1 (Selections to Enable Output Positions of Triggers at Preset Positions Table is Enabled), the set values in OL0006A to OL00074 are always enabled.
- If OW00061 bit 4 is changed to 0 (Disabled) after it was set to 1 (Selections to Enable Output Positions of Triggers at Preset Positions Table is Enabled), OL0006A to OL00074 hold the last set values.

8.8 Latch Functions

You can latch the feedback position at the following trigger events by using the latch functions.

- Trigger with External Latch Input 1 (/EXT1 Signal)
- Trigger with External Latch Input 2 (/EXT2 Signal)
- Trigger with External Latch Input 3 (/EXT3 Signal)
- Trigger with encoder zero signal (phase C)

The following three latch functions can be used at the same time.

- External Latch Input 1 Latch
 - Latch Signal 1 Latch Request (LPOS_REQ): OL0007E (bits 0 to 7)
 - Latch Signal 1 Latch Status (LPOS_STS): IL0006A (bits 0 to 7)
 - The latched position is saved to the following registers:
 - Latched Position (Latch Signal 1 Rising Edge) (LPOS1_PEDGE): IL0006C
 - Latched Position (Latch Signal 1 Falling Edge) (LPOS1_NEDGE): IL0006E
 - Trigger signal: Encoder zero signal or /EXT1 signal
- External Latch Input 2 Latch
 - Latch Signal 2 Latch Request (LPOS_REQ): OL0007E (bits 8 to 15)
 - Latch Signal 2 Latch Status (LPOS_STS): IL0006A (bits 8 to 15)
 - The latched position is saved to the following registers:
 - Latched Position (Latch Signal 2 Rising Edge) (LPOS2_PEDGE): IL00070
 - Latched Position (Latch Signal 2 Falling Edge) (LPOS2_NEDGE): IL00072
 - Trigger signal: Encoder zero signal or /EXT2 signal
- External Latch Input 3 Latch
 - Latch Signal 3 Latch Request (LPOS_REQ): OL0007E (bits 16 to 23)
 - Latch Signal 3 Latch Status (LPOS_STS): IL0006A (bits 16 to 23)
 - The latched position is saved to the following registers:
 - Latched Position (Latch Signal 3 Rising Edge) (LPOS3_PEDGE): IL00074
 - Latched Position (Latch Signal 3 Falling Edge) (LPOS3_NEDGE): IL00076
 - Trigger signal: Encoder zero signal or /EXT3 signal

You can change the connector pin assignments and the /EXT1, /EXT2, and /EXT3 signal logic in the following parameters.

- Input Latch Input 1 (/EXT1) Signal Allocation (Pn511 = n.□□X□)
- Input Latch Input 2 (/EXT2) Signal Allocation (Pn511 = n.□X□□)
- Input Latch Input 3 (/EXT3) Signal Allocation (Pn511 = n.X□□□)

Note:

- The latch function MECHATROLINK commands can be used at the same time.
- If Encoder Phase-C Signal is selected in the latch trigger signal selection, Rising Edge Selection and Falling Edge Selection are disabled. The signal is always latched on the rising edge regardless of the setting.

The following tables give information on the servo output signal register used for controlling the latch functions and the servo input signal registers used for monitoring.

• Servo Output Signal Registers

Registers	Name	Unit	Description		
OL0007E	Latch Request (LPOS_REQ)	-	Latch Signal 1 Latch Request (/EXT1)	Bit 0: Latch request	0: Disable latch 1: Enable Latch
				Bit 1: Continuous Trigger Selection	0: Latch with first event trigger 1: Latch with continuous trigger
				Bit 2: Latch Trigger Signal Selection	0: Latch signal (/EXT) 1: Encoder Phase C
				Bit3: Reserved for system.	-
				Bit 4: Rising Edge Selection	0: Disable latch with rising edge of signal 1: Enable latch with rising edge of signal
				Bit 5: Falling Edge Selection	0: Disable latch with falling edge of signal 1: Enable latch with falling edge of signal
				Bit6: Encoder Selection	0: APOS 1: Monitoring an external encoder
				Bit7: Reserved for system.	-
			Latch Signal 2 Latch Request (/EXT2)	Bit 8 to bit 15: Same as bit 0 to bit 7	
			Latch Signal 3 Latch Request (/EXT3)	Bit 16 to bit 23: Same as bit 0 to bit 7	

• Servo Input Signal Registers

Registers	Name	Unit	Description		
IL0006A	Latch Signal Status (LPOS_STS)	-	Latch Signal 1 Latch Status	Bit 0: Latch Request Status	0: Latch disabled 1: Latch enabled
				Bit 1: Rising-Edge Latch Completed Status	0: Latch not completed 1: Latch completed
				Bit 2: Falling-Edge Latch Completed Status	0: Latch not completed 1: Latch completed
				Bit3 to Bit5: Reserved for system.	-
				Bit 6: Rising-Edge Latch Completed Status	Turned ON/OFF each time the latch is completed (toggle switch). Reset to 0 with disable latch.
				Bit 7: Falling-Edge Latch Completed Status	Turned ON/OFF each time the latch is completed (toggle switch). Reset to 0 with disable latch.
			Latch Signal 2 Latch Status	Bit 8 to bit 15: Same as bit 0 to bit 7	
Latch Signal 3 Latch Status	Bit 16 to bit 23: Same as bit 0 to bit 7				
IL0006C	Latched Position (Latch Signal 1 Rising Edge) (LPOS1_PEDGE)	Reference unit	The monitor for the latched position (Latch Signal 1 Rising Edge).		
IL0006E	Latched Position (Latch Signal 1 Falling Edge) (LPOS1_NEDGE)		The monitor for the latched position (Latch Signal 1 Falling Edge).		
IL00070	Latched Position (Latch Signal 2 Rising Edge) (LPOS2_PEDGE)		The monitor for the latched position (Latch Signal 2 Rising Edge).		
IL00072	Latched Position (Latch Signal 2 Falling Edge) (LPOS2_NEDGE)		The monitor for the latched position (Latch Signal 2 Falling Edge).		
IL00074	Latched Position (Latch Signal 3 Rising Edge) (LPOS3_PEDGE)		The monitor for the latched position (Latch Signal 3 Rising Edge).		
IL00076	Latched Position (Latch Signal 3 Falling Edge) (LPOS3_NEDGE)		The monitor for the latched position (Latch Signal 3 Falling Edge).		

8.8.1 Examples of Latch Function Execution

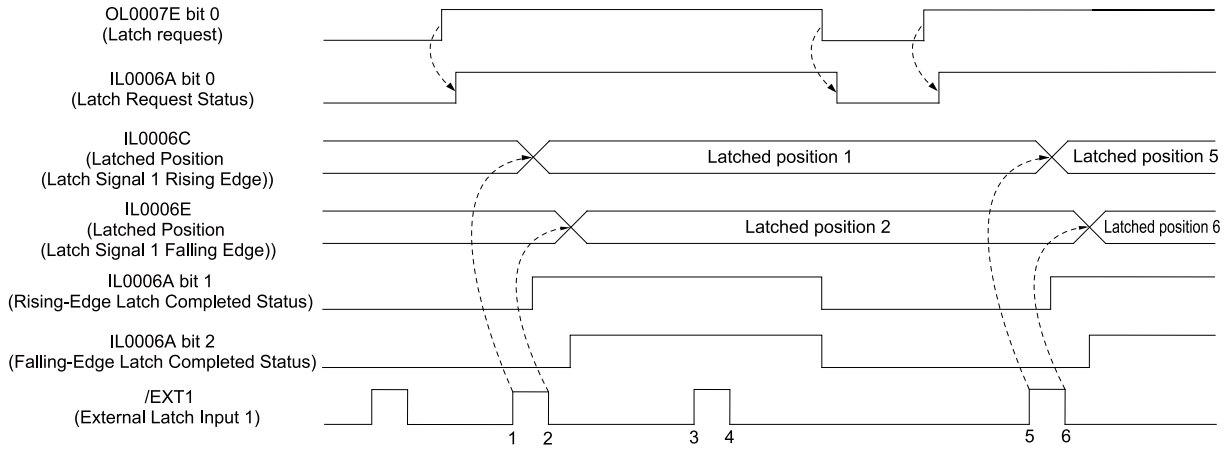
This section shows examples of latch function time charts when using trigger with External Latch Input 1 (/EXT1 signal).

(1) Latch with First Event Trigger

<Latch Request (LPOS_REQ) (OL0007E) Settings>

- Bit 1: Continuous Trigger Selection: 0 (Latch with First Event Trigger)
- Bit 2: Latch Trigger Signal Selection: 0 (Latch Signal (/EXT1))
- Bit 4: Rising Edge Selection: 1 (Enable Latch with Rising Edge of Signal)
- Bit 5: Falling Edge Selection: 1 (Enable Latch with Falling Edge of Signal)

<Latch Sequence>

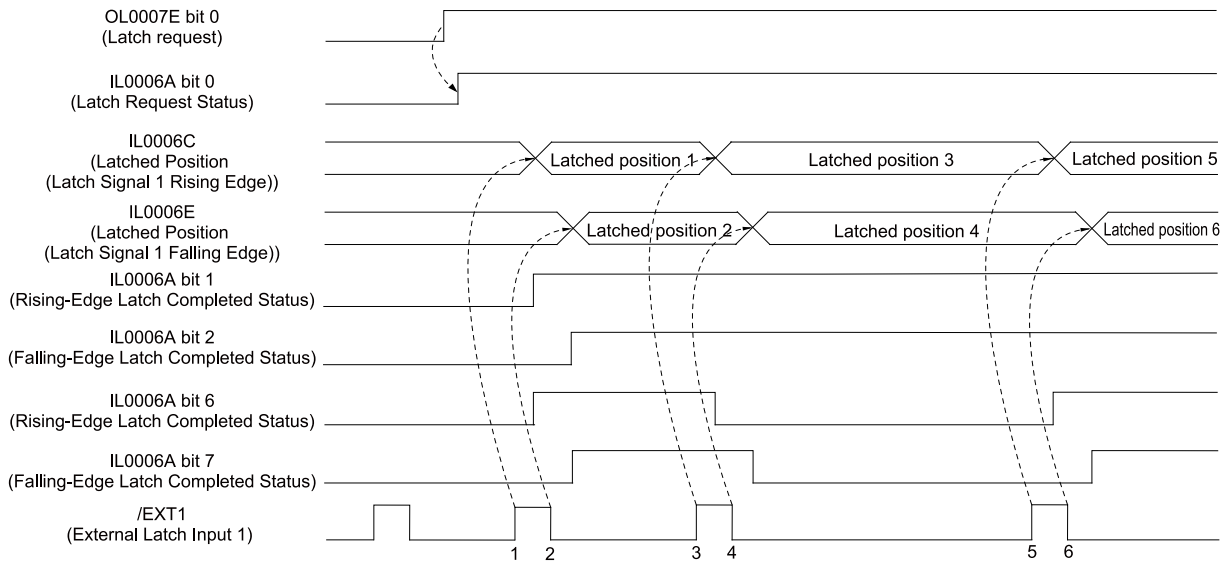


(2) Latch with Continuous Trigger

<Latch Request (LPOS_REQ) (OL0007E) Settings>

- Bit 1: Continuous Trigger Selection: 1 (Latch with Continuous Trigger)
- Bit 2: Latch Trigger Signal Selection: 0 (Latch Signal (/EXT1))
- Bit 4: Rising Edge Selection: 1 (Enable Latch with Rising Edge of Signal)
- Bit 5: Falling Edge Selection: 1 (Enable Latch with Falling Edge of Signal)

<Latch Sequence>




8.9 Σ -LINK II Command Function

The Σ -LINK II command function sends Σ -LINK II commands from the user application to devices connected to the SERVOPACK over Σ -LINK II.

The Σ -LINK II command data stored in the servo output signal registers (OL00062 to OL00068) will be sent to the devices at the Σ -LINK II communications cycle.

This function uses the Σ -LINK II functions in the Σ -XS SERVOPACK with the standard specifications.

Refer to the following manual for details on the Σ -LINK II functions.

 Σ -X-Series Σ -XS SERVOPACK with MECHATROLINK-4/III Communications References Product Manuals (Manual No.: SIEP C710812 01)

The following table lists the servo output signal registers used for the Σ -LINK II command function.


Register Address	Name	Description	
OW00061	User Application Control Flag	Bit2: Selections to Enable Σ -LINK II Command Data	0: Disabled 1: Enabled
OL00062	Σ -LINK II Command Data 1	Sets the commands to send to devices connected over Σ -LINK II.	
OL00064	Σ -LINK II Command Data 2		
OL00066	Σ -LINK II Command Data 3		
OL00068	Σ -LINK II Command Data 4		

8.9.1 Setup Procedure



Important

You must use the SigmaWin+ to configure the communications settings and related parameters for the Σ -LINK II functions in the SERVOPACK in advance. Refer to the following manual for details.

 Σ -X-Series Σ -XS SERVOPACK with MECHATROLINK-4/III Communications References Product Manuals (Manual No.: SIEP C710812 01)

Use the following procedure to configure the Σ -LINK II command function.

1. **Store the Σ -LINK II command data to send to Σ -LINK II-compatible devices in the servo output signal registers (OL00062 to OL00068).**
2. **Set OW00061 bit 2 (Selections to Enable Σ -LINK II Command Data) to 1 (Enabled).**
3. **Change OL00062 to OL00068 as necessary.**
4. **If saving the user application to the SERVOPACK, perform save to flash memory.**
5. **Turn the control power supply to the SERVOPACK OFF and ON again as necessary.**

This concludes the procedure.

The command data stored in the servo output signal registers (OL00062 to OL00068) will be sent to the devices at the Σ -LINK II cycle.

Custom Motion Function

This chapter describes the custom motion function.

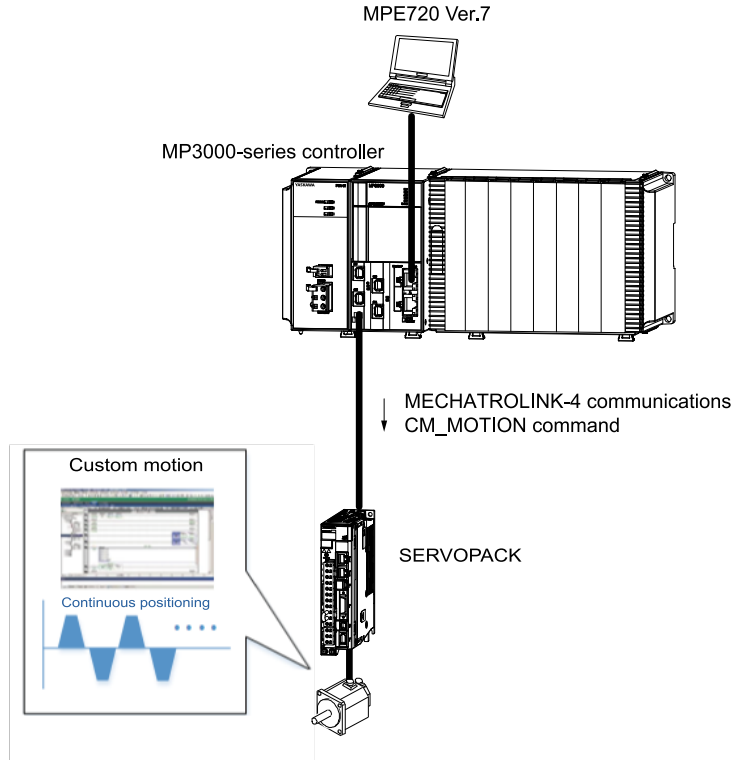
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9.1 Overview

The custom motion function allows motion control to be performed on the servomotor with the user application written to the SERVOPACK.

In addition to normal motion control from an MP3000-series controller, the SERVOPACK can perform its own motion control when the CM_MOTION (Custom Operation: 40) command is received at the desired timing.

The following figure shows a conceptual representation of the custom motion function.





Perform custom motion by specifying a servo control command in the Servo Control Command Code (SVCMD) register (OW00080) with the user application in the SERVOPACK.

The following table lists the servo control commands. Refer to the reference pages for details on the servo control commands.

Setting	Command	Name	Description	Reference
-1	IDLE	Standby	Performs motion control according to commands from an MP3000-series controller.	9.2.1 IDLE (Standby) on page 184
0	NOP	No operation command	Performs no operation. If the user application switches to this command while another command is being executed, the processing of that command will be canceled.	9.2.2 NOP (No Operation Command) on page 184
1	INTERPOLATE	Interpolation position command	Performs interpolation.	9.2.3 INTERPOLATE (Interpolation Position Command) on page 184
2	POSING	Positioning command	Performs positioning to the specified position at the specified acceleration/deceleration time constant and speed.	9.2.4 POSING (Positioning Command) on page 187
3	FEED	Constant speed feed command	Performs a constant speed feed at the specified speed and in the specified direction until the command is canceled.	9.2.5 FEED (Constant Speed Feed Command) on page 190
4 to 7	-	Reserved for system.	-	-

Continued on next page.

Continued from previous page.

Setting	Command	Name	Description	Reference
8	VELCTRL	Velocity control command	Performs velocity control.	 9.2.6 VELCTRL (Velocity Control Command) on page 193
9	TRQCTRL	Torque control command	Performs torque control.	 9.2.7 TRQCTRL (Torque Control Command) on page 195

9.1.1 Allowable Operating Conditions for Custom Motion

Custom motion can be executed only when the CM_MOTION (Custom Operation: 40) command is received from an MP3000-series controller.

You can check whether custom motion can be executed with bit 31 (Custom Motion Ready (CM_RDY)) of the Servo Control Status (SVSTS); register (IL00082) in the user application registers.

Register Address	Name	Description		Unit
IL00082	Servo Control Status (SVSTS)	Bit31: Custom Motion Ready (CM_RDY)	0: Custom motion cannot be executed 1: Custom motion can be executed	—

9.1.2 Priority of Commands

The following table shows the priority of standard servo commands and CM_MOTION commands from the host controller and SERVOPACK custom motion.

Priority ^{*1}	Item	Description	Command Examples
1	Standard servo command	MECHATROLINK-4 standard servo command	Commands such as POSING, INTERPOLATE, VELCTRL, TRQCTRL, and SV_OFF
2	CM_MOTION command	CM_MOTION (Custom Operation: 40) command	CM_MOTION
3	Custom motion command	Custom motion with the user application in the SERVOPACK	Command such as POSING (OW00080 = 2), INTERPOLATE (OW00080 = 1), and NOP (OW00080 = 0)

*1 Lower numbers have higher priority.

9.2 Details on Servo Control Commands

Custom motion in the SERVOPACK is executed by specifying a servo control command in the Servo Control Command Code (SVCMD) register (OW00080).

This section describes the details of each servo control command.


9.2.1 IDLE (Standby)

This command performs motion control according to commands from an MP3000-series controller.

(1) Related Registers

The following table lists the registers related to this command.

Register Address	Name	Description	Unit ^{*1}
OL0009E	Speed Feedforward (VFF)	Sets the speed feedforward. The speed feedforward will be added to the speed feedforward from the controller.	Speed reference unit
OL000A0	Torque Feedforward (TFF)	Sets the torque feedforward. The torque feedforward will be added to the torque feedforward from the controller.	Torque reference unit

*1 The unit of each item of command data is set in a common parameter. Refer to the following section for details.
 [13.3 Specifying Units on page 421](#)


9.2.2 NOP (No Operation Command)

This command executes no operation. If the user application switches to this command while another command is being executed, the processing of that command will be canceled.

(1) Related Registers

The following table lists the registers related to this command.

Register Address	Name	Description	Unit ^{*1}
OW00080	Servo Control Command Code (SVCMD)	When this register is set to 0, the no operation command will be executed.	—
OL0009E	Speed Feedforward (VFF)	Sets the speed feedforward for custom motion.	Speed reference unit
OL000A0	Torque Feedforward (TFF)	Sets the torque feedforward for custom motion.	Torque reference unit

*1 The unit of each item of command data is set in a common parameter. Refer to the following section for details.
 [13.3 Specifying Units on page 421](#)

9.2.3 INTERPOLATE (Interpolation Position Command)

This command executes positioning with target position data that changes synchronized to the high-speed scan. The target position data is generated in the ladder program.

Information


- You can also apply speed feedforward compensation.
- Torque feedforward compensation can also be used with the INTERPOLATE command. Set torque feedforward compensation with the OL000A0 (Torque Feedforward (TFF)) register. If torque feedforward compensation is not required, set OL000A0 to 0.
- The torque can be limited by using the OL00098 (Forward Torque Limit (TLIM_P)) register and the OL0009A (Reverse Torque Limit (TLIM_N)) register. OL00098 and OL0009A can be changed at any time. However, use caution because there is a risk of unexpected operation if the set values are small.

(1) Related Registers

The following table lists the registers related to this command.

Register Address	Name	Description	Unit ^{*1}
OW00080	Servo Control Command Code (SVCMD)	If this register is set to 1, the INTERPOLATE command will be sent.	–
OL00082	Servo Control Settings (SVCTRL)	Bit1: Reference Stopped (HOLD)	0: No stop request 1: Stop according to HOLD MODE
		Bit2: Reference Stopped Selection (HOLD MODE)	0: Decelerate to a stop 1: Quick stop
		Bit8: Speed Loop P/PI Control (V_PPI)	0: PI control 1: P Control
		Bit9: Position Loop P/PI Control (P_PPI)	0: PI control 1: P Control
		Bit12: Gain Selection (G_SEL)	0: Gain 1 1: Gain 2
		Bit13: Position Reference Filter (ACC_FIL)	0: Disable position reference filter 1: Enable position reference filter
		Bit14: Position Reference Filter Selection (ACC_FIL_SEL)	0: Average position reference movement filter 1: Command function position reference filter
		Other than above value: Reserved for system	
OL00084	Target Position (TPOS)	Sets the target position for custom motion.	Position reference unit
OL00098	Forward Torque Limit (TLIM_P)	Sets the forward torque limit for custom motion.	Torque reference unit
OL0009A	Reverse Torque Limit (TLIM_N)	Sets the reverse torque limit for custom motion.	Torque reference unit
OL0009E	Speed Feedforward (VFF)	Sets the speed feedforward for custom motion.	Speed reference unit
OL000A0	Torque Feedforward (TFF)	Sets the torque feedforward for custom motion.	Torque reference unit

*1 The unit of each item of command data is set in a common parameter. Refer to the following section for details.

 [13.3 Specifying Units on page 421](#)

(2) Execution/Operating Procedure

1. Ensure that the following conditions are satisfied.

No.	Execution Condition	Confirmation
1	There must be no alarms.	Bit 3 (Servo Warning Status (SV_WRN)) and bit 4 (Servo Alarm Status (SV_ALM)) of IL00082 (Servo Control Status (SVSTS)) are both 0.
2	The servo must be ON.	Bit 0 (Servo ON Status (SVON)) of IL00082 (Servo Control Status (SVSTS)) is 1.
3	The SERVOPACK must be in the custom motion ready status.	Bit 31 (Custom Motion Ready) of IL00082 (Servo Control Status (SVSTS)) is 1.

2. Set the command data in the following related registers.

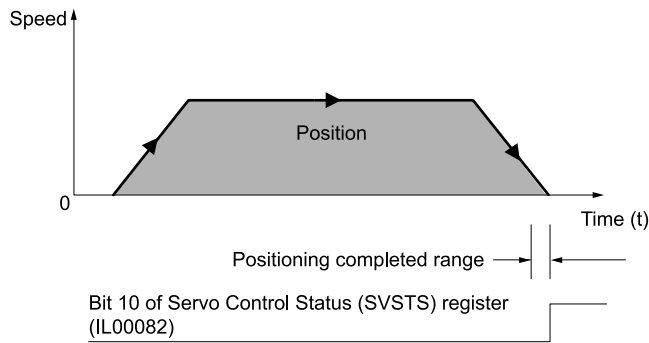
Register Address	Name	Unit	Remarks
OL00082	Servo Control Settings (SVCTRL)	–	
OL00084	Target Position (TPOS)	Position reference unit	
OL00098	Forward Torque Limit (TLIM_P)	Torque reference unit	
OL0009A	Reverse Torque Limit (TLIM_N)	Torque reference unit	
OL0009E	Speed Feedforward (VFF)	Speed reference unit	
OL000A0	Torque Feedforward (TFF)	Torque reference unit	

3. Set the MP3000-series controller setting parameter **OW□□□08 (Motion Command) to 40 to enable the custom motion function.**
CMD_STAT.CMDRDY will change to 1 when the custom motion function is enabled.
4. Set the Servo Control Command Code (SVCMD) register (**OW00080**) in the SERVOPACK to 1 to send the INTERPOLATE command.
SVCMD_IN.CM_STS will change to 1 and SVCMD_IN.DEN will change to 0 during custom motion.
5. The value of Target Position (**OL00084**) will be updated at each high-speed scan.
The amount of change in the target position at each high-speed scan will be the movement speed.
6. Next, to perform the custom motion, set the command code in the Servo Control Command Code (SVCMD) register (**OW00080**).
Refer to the following section for details on switching commands.
[9.4.1 Switching the Servo Control Command During INTERPOLATE Execution on page 199](#)
7. To return to motion control from the host controller (i.e., to end the custom motion), first stop the servomotor, and then set the Servo Control Command Code (SVCMD) register (**OW00080**) to 0 to send the NOP command.
8. Next, set the Servo Control Command Code (SVCMD) register (**OW00080**) in the SERVOPACK to -1 to send the IDLE command.
When the custom motion is ended, the servomotor will be servo-locked at the current position, SVCMD_IN.CM_STS will change to 0, SVCMD_IN.DEN will change to 1, and SVCMD_IN.PSET will change to 1.

This concludes interpolation positioning procedure.

(3) Operation Pattern

The following figure shows the operation pattern when the INTERPOLATE command is executed.



(4) Pause

- To pause axis movement and resume movement later, set bit 1 (Reference Stopped (HOLD)) of the Servo Control Settings (SVCTRL) register (OL00082) to "1: Stop according to HOLD_MODE". HOLD_MODE (deceleration operation) operates according to bit 2 (Reference Stopped Selection (HOLD_MODE)) of the Servo Control Settings (SVCTRL) register (OL00082). When decelerate to a stop is completed, bit 1 (Reference Stopped Status (HOLD)) of the Servo Control Status (SVSTS) register (IL00082) will change to "1: Completed".
- To cancel the paused status, set bit 1 (Reference Stopped (HOLD)) of the Servo Control Settings (SVCTRL) register (OL00082) to "0: No stop request". Use caution as the servomotor may operate in an unintended manner if the target position is updated during the paused status and then paused status is canceled.

(5) Cancel

The axis will stop when there are no more changes in the target position at each high-speed scan.

To stop execution of the interpolation position command, set the Servo Control Command Code (SVCMD) register (OW00080) in the SERVOPACK to 0 to send the NOP command.

Or to return motion control to the MP3000-series controller, set the Servo Control Command Code (SVCMD) register (OW00080) to -1 to send the IDLE command.

9.2.4 POSING (Positioning Command)

The servomotor will be positioned to the target position when the target position and speed are set and the POSING command is executed.

Information The torque can be limited by using the OL00098 (Forward Torque Limit (TLIM_P)) register and the OL0009A (Reverse Torque Limit (TLIM_N)) register.


OL00098 and OL0009A can be changed at any time. However, use caution because there is a risk of unexpected operation if the set values are small.

(1) Related Registers

The following table lists the registers related to this command.

Register Address	Name	Description	Unit ^{*1}
OW00080	Servo Control Command Code (SVCMD)	If this register is set to 2, the POSING command will be sent.	—
OL00082	Servo Control Settings (SVCTRL)	Bit1: Reference Stopped (HOLD)	0: No stop request 1: Stop according to HOLD MODE
		Bit2: Reference Stopped Selection (HOLD MODE)	0: Decelerate to a stop 1: Quick stop
		Bit8: Speed Loop P/PI Control (V_PPI)	0: PI control 1: P Control
		Bit9: Position Loop P/PI Control (P_PPI)	0: PI control 1: P Control
		Bit12: Gain Selection (G_SEL)	0: Gain 1 1: Gain 2
		Bit13: Position Reference Filter (ACC_FIL)	0: Disable position reference filter 1: Enable position reference filter
		Bit14: Position Reference Filter Selection (ACC_FIL_SEL)	0: Average position reference movement filter 1: Command function position reference filter
		Other than above value: Reserved for system	
OL00084	Target Position (TPOS)	Sets the target position for custom motion.	Position reference unit
OL00086	Target Speed (TSPD)	Sets the target speed for custom motion. ^{*2}	Speed reference unit
OL0008C	Acceleration (ACCR)	Sets the acceleration for custom motion.	Acceleration reference unit
OL0008E	Deceleration (DECR)	Sets the deceleration for custom motion.	Acceleration reference unit
OL00090	Jerk (JERK)	Sets the jerk for custom motion. This is the same as Pn846 (POSING Command S-Curve Acceleration/Deceleration Rate).	%
OL00098	Forward Torque Limit (TLIM_P)	Sets the forward torque limit for custom motion.	Torque reference unit
OL0009A	Reverse Torque Limit (TLIM_N)	Sets the reverse torque limit for custom motion.	Torque reference unit

*1 The unit of each item of command data is set in a common parameter. Refer to the following section for details.

 13.3 Specifying Units on page 421

*2 When executing the POSING command, make sure to set a positive value.

(2) Execution/Operating Procedure

1. Ensure that the following conditions are satisfied.

No.	Execution Condition	Confirmation
1	There must be no alarms.	Bit 3 (Servo Warning Status (SV_WRN)) and bit 4 (Servo Alarm Status (SV_ALM)) of IL00082 (Servo Control Status (SVSTS)) are both 0.
2	The servo must be ON.	Bit 0 (Servo ON Status (SVON)) of IL00082 (Servo Control Status (SVSTS)) is 1.
3	The SERVOPACK must be in the custom motion ready status.	Bit 31 (Custom Motion Ready) of IL00082 (Servo Control Status (SVSTS)) is 1.

2. Set the command data in the following related registers.

Register Address	Name	Unit	Remarks
OL00082	Servo Control Settings (SVCTRL)	–	
OL00084	Target Position (TPOS)	Position reference unit	
OL00086	Target Speed (TSPD)	Speed reference unit	
OL0008C	Acceleration (ACCR)	Acceleration reference unit	
OL0008E	Deceleration (DECR)	Acceleration reference unit	
OL00090	Jerk (JERK)	%	
OL00098	Forward Torque Limit (TLIM_P)	Torque reference unit	
OL0009A	Reverse Torque Limit (TLIM_N)	Torque reference unit	

3. Set the MP3000-series controller setting parameter **OW□□□08 (Motion Command)** to **40** to enable the custom motion function.

CMD_STAT.CMDRDY will change to 1 when the custom motion function is enabled.

4. Set the Servo Control Command Code (SVCMD) register (OW00080) in the SERVOPACK to **2** to send the POSING command.

SVCMD_IN.CM_STS will change to 1 and SVCMD_IN.DEN will change to 0 during custom motion.

5. Set the SERVOPACK Target Position (TPOS) (OL00084).

The positioning operation will start. While positioning is being executed, the Servo Control Command Monitor register (IW00080) is 2.

When the servomotor approaches the target, bit 9 (NEAR: Near Position) of the Servo Control Status (SVSTS) register (IL00082) will change to "1: Inside near-position range".

When the servomotor then reaches the target position, bit 10 (PSET: Positioning Completed) of the Servo Control Status (SVSTS) register (IL00082) will change to "1: Inside positioning completed range" and the positioning operation will be complete.

Information

- Target Position (TPOS) (OL00084) can also be changed during the positioning operation.
- If there is insufficient deceleration distance for Target Position (OL00084) that was changed during the positioning operation or if the target position was already passed, the servomotor will first decelerate to a stop and then positioning will be performed to the target position.

6. Next, to perform the custom motion, set the command code in the Servo Control Command Code (SVCMD) register (OW00080).

Refer to the following section for details on switching commands.

[9.4.2 Switching the Servo Control Command During POSING Execution on page 201](#)

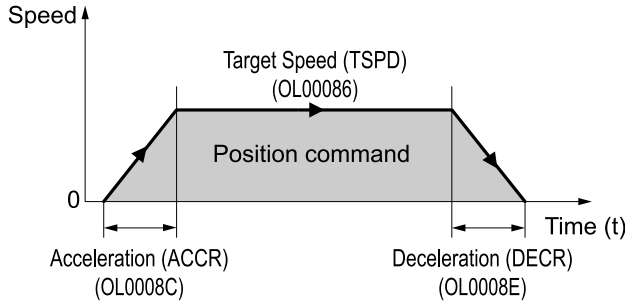
7. To return to motion control from the host controller (i.e., to end the custom motion), first stop the servomotor, and then set the Servo Control Command Code (SVCMD) register (OW00080) to **0** to send the NOP command.8. Next, set the Servo Control Command Code (SVCMD) register (OW00080) in the SERVOPACK to **-1** to send the IDLE command.

When the custom motion is ended, the servomotor will be servo-locked at the current position, SVCMD_IN.CM_STS will change to 0, SVCMD_IN.DEN will change to 1, and SVCMD_IN.PSET will change to 1.

This concludes positioning procedure.

(3) Operation Pattern

The following figure shows the operation pattern when the POSING command is executed.



(4) Pause

- To pause axis movement and resume movement later, set bit 1 (Reference Stopped (HOLD)) of the Servo Control Settings (SVCTRL) register (OL00082) to "1: Stop according to HOLD_MODE". HOLD_MODE (deceleration operation) operates according to bit 2 (Reference Stopped Selection (HOLD MODE)) of the Servo Control Settings (SVCTRL) register (OL00082). When decelerate to a stop is completed, bit 1 (Reference Stopped Status (HOLD)) of the Servo Control Status (SVSTS) register (IL00082) will change to "1: Completed".
- To cancel the paused status, set bit 1 (Reference Stopped (HOLD)) of the Servo Control Settings (SVCTRL) register (OL00082) to "0: No stop request". The paused status will be canceled and the remainder of the positioning operation will be resumed.

(5) Cancel

To stop axis movement and cancel the remaining movement, first pause the axis and then set the Servo Control Command Code (SVCMD) register (OW00080) in the SERVOPACK to 0 to send the NOP command.

Refer to the following section for pausing the axis.

[\(4\) Pause on page 190](#)

9.2.5 FEED (Constant Speed Feed Command)

When the movement speed is specified (the sign is the movement direction) and the FEED command is executed, the movement will start. Send a NOP command to stop movement.

Information The torque can be limited by using the OL00098 (Forward Torque Limit (TLIM_P)) register and the OL0009A (Reverse Torque Limit (TLIM_N)) register.


OL00098 and OL0009A can be changed at any time. However, use caution because there is a risk of unexpected operation if the set values are small.

(1) Related Registers

The following table lists the registers related to this command.

Register Address	Name	Description	Unit ^{*1}
OW00080	Servo Control Command Code (SVCMD)	If this register is set to 3, the FEED command will be sent.	—
OL00082	Servo Control Settings (SVCTRL)	Bit1: Reference Stopped (HOLD)	0: No stop request 1: Stop according to HOLD MODE
		Bit2: Reference Stopped Selection (HOLD MODE)	0: Decelerate to a stop 1: Quick stop
		Bit8: Speed Loop P/PI Control (V_PPI)	0: PI control 1: P Control
		Bit9: Position Loop P/PI Control (P_PPI)	0: PI control 1: P Control
		Bit12: Gain Selection (G_SEL)	0: Gain 1 1: Gain 2
		Bit13: Position Reference Filter (ACC_FIL)	0: Disable position reference filter 1: Enable position reference filter
		Bit14: Position Reference Filter Selection (ACC_FIL_SEL)	0: Average position reference movement filter 1: Command function position reference filter
		Other than above value: Reserved for system	
OL00086	Target Speed (TSPD)	Sets the target speed for custom motion.	Speed reference unit
OL0008C	Acceleration (ACCR)	Sets the acceleration for custom motion.	Acceleration reference unit
OL0008E	Deceleration (DECR)	Sets the deceleration for custom motion.	Acceleration reference unit
OL00098	Forward Torque Limit (TLIM_P)	Sets the forward torque limit for custom motion.	Torque reference unit
OL0009A	Reverse Torque Limit (TLIM_N)	Sets the reverse torque limit for custom motion.	Torque reference unit

*1 The unit of each item of command data is set in a common parameter. Refer to the following section for details.

 13.3 Specifying Units on page 421

(2) Execution/Operating Procedure

1. Ensure that the following conditions are satisfied.

No.	Execution Condition	Confirmation
1	There must be no alarms.	Bit 3 (Servo Warning Status (SV_WRN)) and bit 4 (Servo Alarm Status (SV_ALM)) of IL00082 (Servo Control Status (SVSTS)) are both 0.
2	The servo must be ON.	Bit 0 (Servo ON Status (SVON)) of IL00082 (Servo Control Status (SVSTS)) is 1.
3	The SERVOPACK must be in the custom motion ready status.	Bit 31 (Custom Motion Ready) of IL00082 (Servo Control Status (SVSTS)) is 1.

2. Set the command data in the following related registers.

Register Address	Name	Unit	Remarks
OL00082	Servo Control Settings (SVCTRL)	—	
OL00086	Target Speed (TSPD)	Speed reference unit	
OL0008C	Acceleration (ACCR)	Acceleration reference unit	

Continued on next page.

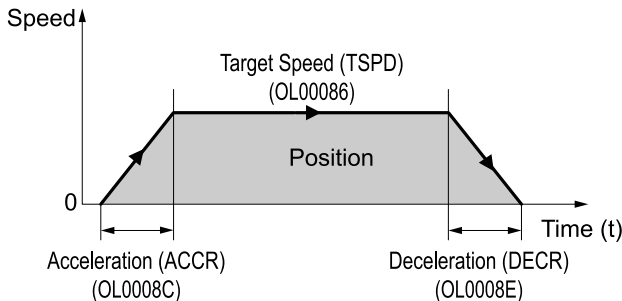
Register Address	Name	Unit	Remarks
OL0008E	Deceleration (DECR)	Acceleration reference unit	
OL00098	Forward Torque Limit (TLIM_P)	Torque reference unit	
OL0009A	Reverse Torque Limit (TLIM_N)	Torque reference unit	

3. **Set the MP3000-series controller setting parameter OW□□□08 (Motion Command) to 40 to enable the custom motion function.**
CMD_STAT.CMDRDY will change to 1 when the custom motion function is enabled.
4. **Set the Servo Control Command Code (SVCMD) register (OW00080) in the SERVOPACK to 3 to send the FEED command.**
SVCMD_IN.CM_STS will change to 1 and SVCMD_IN.DEN will change to 0 during custom motion.
5. **Next, to perform the custom motion, set the command code in the Servo Control Command Code (SVCMD) register (OW00080).**
Refer to the following section for details on switching commands.
[9.4.3 Switching the Motion Control Command During FEED Execution on page 203](#)
6. **To return to motion control from the host controller (i.e., to end the custom motion), first stop the servomotor, and then set the Servo Control Command Code (SVCMD) register (OW00080) to 0 to send the NOP command.**
7. **Next, set the Servo Control Command Code (SVCMD) register (OW00080) in the SERVOPACK to -1 to send the IDLE command.**
When the custom motion is ended, the servomotor will be servo-locked at the current position, SVCMD_IN.CM_STS will change to 0, SVCMD_IN.DEN will change to 1, and SVCMD_IN.PSET will change to 1.

This concludes constant speed feeding procedure.

(3) Operation Pattern

The following figure shows the operation pattern when the FEED command is executed.



(4) Pause

- To pause axis movement and resume movement later, set bit 1 (Reference Stopped (HOLD)) of the Servo Control Settings (SVCTRL) register (OL00082) to "1: Stop according to HOLD_MODE". HOLD_MODE (deceleration operation) operates according to bit 2 (Reference Stopped Selection (HOLD_MODE)) of the Servo Control Settings (SVCTRL) register (OL00082).
When decelerate to a stop is completed, bit 1 (Reference Stopped Status (HOLD)) of the Servo Control Status (SVSTS) register (IL00082) will change to "1: Completed".
- To cancel the paused status, set bit 1 (Reference Stopped (HOLD)) of the Servo Control Settings (SVCTRL) register (OL00082) to "0: No stop request". The paused status will be canceled and the remainder of the positioning operation will be resumed.

(5) Cancel

To stop axis movement and cancel the remaining movement, first pause the axis and then set the Servo Control Command Code (SVCMD) register (OW00080) in the SERVOPACK to 0 to send the NOP command.

Refer to the following section for pausing the axis.

 (4) *Pause on page 192*

9.2.6 VELCTRL (Velocity Control Command)

Execute the VELCTRL command to operate the servomotor in velocity control mode.



Important


1. Torque feedforward compensation can also be used with the VELCTRL command. Set torque feedforward compensation with the Torque Feedforward (TFF) register (OL000A0). If torque feedforward compensation is not required, set OL000A0 to 0.
2. The torque can be limited by using the Forward Torque Limit (TLIM_P) register and the Reverse Torque Limit (TLIM_N) register. The Forward Torque Limit (TLIM_P) register and the Reverse Torque Limit (TLIM_N) register can be changed at any time. However, use caution because there is a risk of unexpected operation if the set values are small.


(1) Related Registers

The following table lists the registers related to this command.

Register Address	Name	Description	Unit ^{*1}
OW00080	Servo Control Command Code (SVCMD)	If this register is set to 8, the VELCTRL command will be sent.	—
OL00082	Servo Control Settings (SVCTRL)	Bit1: Reference Stopped (HOLD)	0: No stop request 1: Stop according to HOLD MODE
		Bit2: Reference Stopped Selection (HOLD MODE)	0: Decelerate to a stop 1: Quick stop
		Bit8: Speed Loop P/PI Control (V_PPI)	0: PI control 1: P Control
		Bit9: Position Loop P/PI Control (P_PPI)	0: PI control 1: P Control
		Bit12: Gain Selection (G_SEL)	0: Gain 1 1: Gain 2
		Bit13: Position Reference Filter (ACC_FIL)	0: Disable position reference filter 1: Enable position reference filter
		Bit14: Position Reference Filter Selection (ACC_FIL_SEL)	0: Average position reference movement filter 1: Command function position reference filter
	Other than above value: Reserved for system		—
OL00088	Speed Reference (VREF)	Sets the speed reference for custom motion.	Speed reference unit
OL0008C ^{*2}	Acceleration (ACCR)	Sets the acceleration for custom motion.	Acceleration reference unit
OL0008E ^{*2}	Deceleration (DECR)	Sets the deceleration for custom motion.	Acceleration reference unit
OL00098	Forward Torque Limit (TLIM_P)	Sets the forward torque limit for custom motion.	Torque reference unit
OL0009A	Reverse Torque Limit (TLIM_N)	Sets the reverse torque limit for custom motion.	Torque reference unit
OL000A0	Torque Feedforward (TFF)	Sets the torque feedforward for custom motion.	Torque reference unit

^{*1} The unit of each item of command data is set in a common parameter. Refer to the following section for details.

 13.3 *Specifying Units on page 421*

- *2 If the set value of OL0008C or OL0008E is small, the servomotor cannot accelerate or decelerate. Refer to the following section for details.
 [13.5 Precautions on the Acceleration/Deceleration Rate during Speed Control on page 424](#)


(2) Execution/Operating Procedure

1. Ensure that the following conditions are satisfied.

No.	Execution Condition	Confirmation
1	There must be no alarms.	Bit 3 (Servo Warning Status (SV_WRN)) and bit 4 (Servo Alarm Status (SV_ALM)) of IL00082 (Servo Control Status (SVSTS)) are both 0.
2	Execution of the motion command for the target axis must be completed.	Bit 31 (Custom Motion Ready) of IL00082 (Servo Control Status (SVSTS)) is 1.

2. Set the command data in the following related registers.

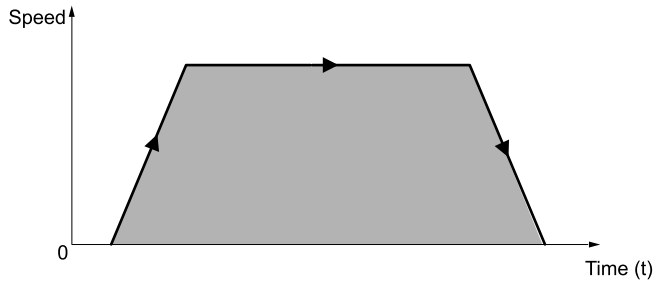
Register Address	Name	Unit	Remarks
OL00082	Servo Control Settings (SVCTRL)	–	
OL00088	Speed Reference (VREF)	Speed reference unit	
OL0008C	Acceleration (ACCR)	Acceleration reference unit	
OL0008E	Deceleration (DECR)	Acceleration reference unit	
OL00098	Forward Torque Limit (TLIM_P)	Torque reference unit	
OL0009A	Reverse Torque Limit (TLIM_N)	Torque reference unit	
OL000A0	Torque Feedforward (TFF)	Torque reference unit	

3. Set the MP3000-series controller setting parameter **OW□□08 (Motion Command) to 40 to enable the custom motion function.**
 CMD_STAT.CMDRDY will change to 1 when the custom motion function is enabled.
4. Set the Servo Control Command Code (SVCMD) register (OW00080) in the SERVOPACK to 8 to send the VELCTRL command.
 SVCMD_IN.CM_STS will change to 1 and SVCMD_IN.DEN will change to 0 during custom motion.
5. Next, to perform the custom motion, set the command code in the Servo Control Command Code (SVCMD) register (OW00080).
 Refer to the following section for details on switching commands.
 [9.4.4 Switching the Servo Control Command During VELCTRL Execution on page 205](#)
6. To return to motion control from the host controller (i.e., to end the custom motion), first stop the servomotor, and then set the Servo Control Command Code (SVCMD) register (OW00080) to 0 to send the NOP command.
7. Next, set the Servo Control Command Code (SVCMD) register (OW00080) in the SERVOPACK to -1 to send the IDLE command.
 When the custom motion is ended, the servomotor will be servo-locked at the current position, SVCMD_IN.CM_STS will change to 0, SVCMD_IN.DEN will change to 1, and SVCMD_IN.PSET will change to 1.

This concludes the speed reference procedure.

(3) Operation Pattern

The following figure shows the operation pattern when the VELCTRL command is executed.



(4) Pause

- To pause axis movement and resume movement later, set bit 1 (Reference Stopped (HOLD)) of the Servo Control Settings (SVCTRL) register (OL00082) to "1: Stop according to HOLD_MODE". HOLD_MODE (deceleration operation) operates according to bit 2 (Reference Stopped Selection (HOLD_MODE)) of the Servo Control Settings (SVCTRL) register (OL00082). When decelerate to a stop is completed, bit 1 (Reference Stopped Status (HOLD)) of the Servo Control Status (SVSTS) register (IL00082) will change to "1: Completed".
- To cancel the paused status, set bit 1 (Reference Stopped (HOLD)) of the Servo Control Settings (SVCTRL) register (OL00082) to "0: No stop request". The paused status will be canceled and the remainder of the positioning operation will be resumed.

(5) Cancel

To stop axis movement and cancel the remaining movement, first pause the axis and then set the Servo Control Command Code (SVCMD) register (OW00080) in the SERVOPACK to 0 to send the NOP command.

Refer to the following section for pausing the axis.

[☞ \(4\) Pause on page 195](#)

9.2.7 TRQCTRL (Torque Control Command)

Execute the TRQCTRL command to operate the servomotor in torque control mode.

(1) Related Registers

The following table lists the registers related to this command.

Register Address	Name	Description	Unit ^{*1}
OW00080	Servo Control Command Code (SVCMD)	If this register is set to 9, the TRQCTRL command will be sent.	–
OL00082	Servo Control Settings (SVCTRL)	Bit1: Reference Stopped (HOLD)	Note: When executing the TRQCTRL command, this setting is inactive.
		Bit2: Reference Stopped Selection (HOLD MODE)	0: Decelerate to a stop 1: Quick stop
		Bit8: Speed Loop P/PI Control (V_PPI)	0: PI control 1: P Control
		Bit9: Position Loop P/PI Control (P_PPI)	0: PI control 1: P Control
		Bit12: Gain Selection (G_SEL)	0: Gain 1 1: Gain 2
		Bit13: Position Reference Filter (ACC_FIL)	0: Disable position reference filter 1: Enable position reference filter
		Bit14: Position Reference Filter Selection (ACC_FIL_SEL)	0: Average position reference movement filter 1: Command function position reference filter
	Other than above value: Reserved for system		
OL0008A	Torque Reference (TREF)	Sets the torque reference for custom motion.	Torque reference unit
OL00098	Forward Torque Limit (TLIM_P)	Sets the forward torque limit for custom motion.	Torque reference unit
OL0009A	Reverse Torque Limit (TLIM_N)	Sets the reverse torque limit for custom motion.	Torque reference unit
OL0009C	Speed Limit during Torque Control (VLIM)	Sets the speed limit during torque control for custom motion.	Speed reference unit

*1 The unit of each item of command data is set in a common parameter. Refer to the following section for details.
 13.3 Specifying Units on page 421

(2) Execution/Operating Procedure

1. Ensure that the following conditions are satisfied.

No.	Execution Condition	Confirmation
1	There must be no alarms.	Bit 3 (Servo Warning Status (SV_WRN)) and bit 4 (Servo Alarm Status (SV_ALM)) of IL00082 (Servo Control Status (SVSTS)) are both 0.
2	Execution of the motion command for the target axis must be completed.	Bit 31 (Custom Motion Ready) of IL00082 (Servo Control Status (SVSTS)) is 1.

2. Set the command data in the following related registers.

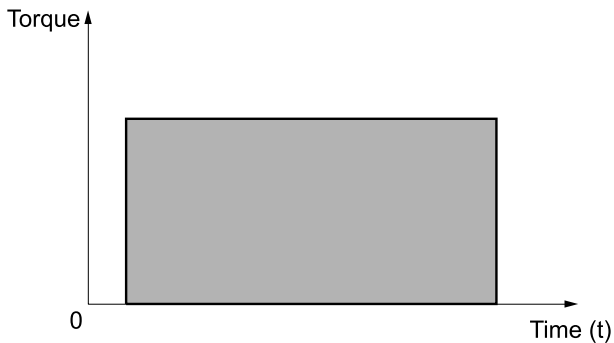
Register Address	Name	Unit	Remarks
OL00082	Servo Control Settings (SVCTRL)	–	
OL0008A	Torque Reference (TREF)	Torque reference unit	
OL00098	Forward Torque Limit (TLIM_P)	Torque reference unit	
OL0009A	Reverse Torque Limit (TLIM_N)	Torque reference unit	
OL0009C	Speed Limit during Torque Control (VLIM)	Speed reference unit	

3. **Set the MP3000-series controller setting parameter OW□□□08 (Motion Command) to 40 to enable the custom motion function.**
CMD_STAT.CMDRDY will change to 1 when the custom motion function is enabled.
4. **Set the Servo Control Command Code (SVCMD) register (OW00080) in the SERVOPACK to 9 to send the TRQCTRL command.**
SVCMD_IN.CM_STS will change to 1 and SVCMD_IN.DEN will change to 0 during custom motion.
5. **Next, to perform the custom motion, set the command code in the Servo Control Command Code (SVCMD) register (OW00080).**
Refer to the following section for details on switching commands.
[9.4.5 Switching the Servo Control Command During TRQCTRL Execution on page 208](#)
6. **To return to motion control from the host controller (i.e., to end the custom motion), first stop the servomotor, and then set the Servo Control Command Code (SVCMD) register (OW00080) to 0 to send the NOP command.**
7. **Next, set the Servo Control Command Code (SVCMD) register (OW00080) in the SERVOPACK to -1 to send the IDLE command.**
When the custom motion is ended, the servomotor will be servo-locked at the current position, SVCMD_IN.CM_STS will change to 0, SVCMD_IN.DEN will change to 1, and SVCMD_IN.PSET will change to 1.

This concludes the torque control procedure.

(3) Operation Pattern

The following figure shows the operation pattern when the TRQCTRL command is executed.



(4) Cancel

The command will be canceled if the motion command code is changed during operation in torque control mode. During torque control mode, bit 1 (Reference Stopped (HOLD)) in the Servo Control Settings (SVCTRL) register (OL00082) is inactive.

There are also restrictions on the commands that can be switched to. Refer to the following section for details.

[9.4.5 Switching the Servo Control Command During TRQCTRL Execution on page 208](#)

9.3 Recovery from Overtravel and Software Limit Statuses

Recover from the overtravel and software limit statuses with commands from the MP3000-series controller. Do not perform recovery in custom motion.

9.4 Switching Servo Control Commands

The following table shows whether the servo control command can be switched to a different command during servo control command execution. The following sections also describe the changes in operation when the servo control command is switched.

Code	Command Being Executed	Command after Switching						
		-1	0	1	2	3	8	9
		IDLE	NOP	INTERPOLATE	POSING	FEED	VELCTRL	TRQCTRL
-1	IDLE	–	○	○	○	○	○	○
0	NOP	○	–	○	○	○	○	○
1	INTERPOLATE	×	○	–	○	○	○	○
2	POSING	×	○	×	–	○	○	○
3	FEED	×	○	×	○	–	○	○
8	VELCTRL	×	○	×	○	○	–	○
9	TRQCTRL	×	○	×	○	○	○	–

Note:

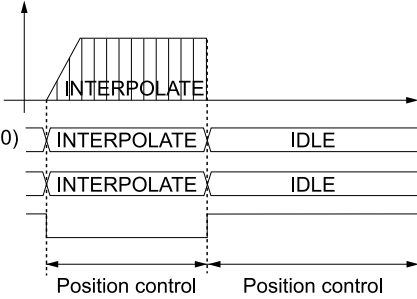
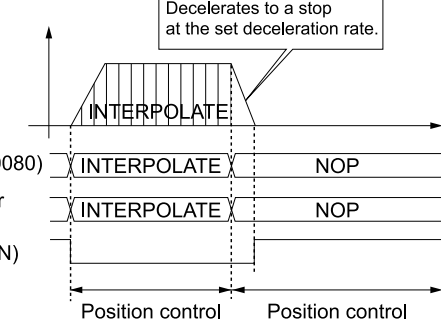
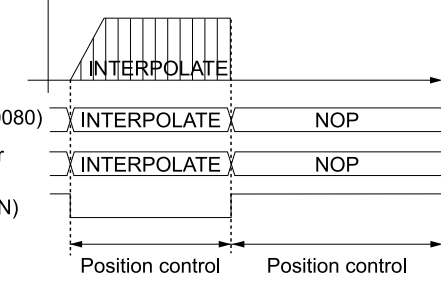
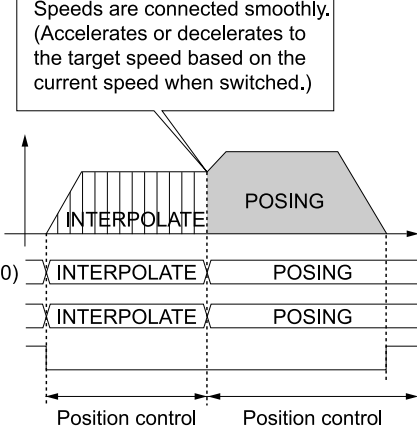
○: Can be executed.

×: Cannot be executed. Do not use this setting.

The following sections give the details on the changes in operation when the servo control command is switched to a different command while the above six commands are being executed.

9.4.1 Switching the Servo Control Command During INTERPOLATE Execution

This section describes the changes in operation when the servo control command is switched to a different command while the INTERPOLATE command being executed.

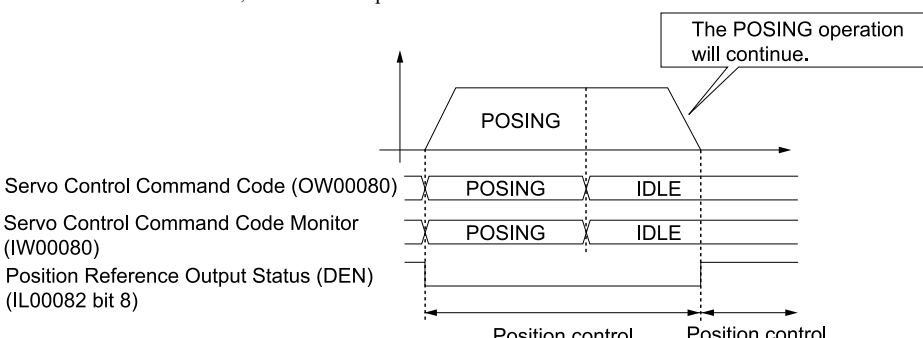
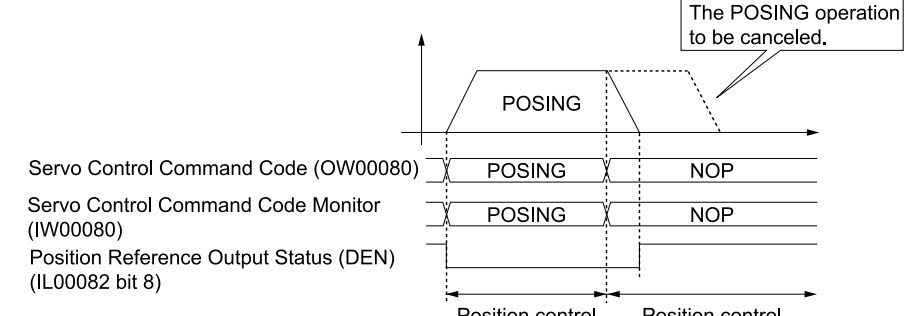
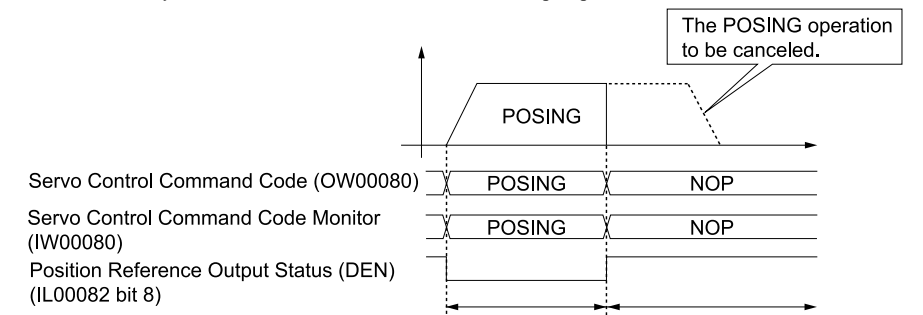
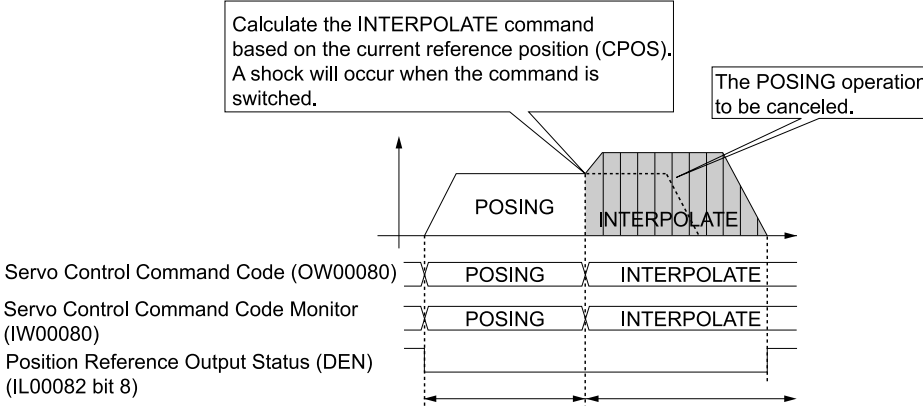
Command after Switching	Description of Operation
IDLE	<p>Do not switch from INTERPOLATE to IDLE. A quick stop will be performed if the command is switched in this manner.</p>  <p>Servo Control Command Code (OW00080) Servo Control Command Code Monitor (IW00080) Position Reference Output Status (DEN) (IL00082 bit 8)</p>
NOP	<ul style="list-style-type: none"> If Reference Stopped Selection (HOLD_MODE) (OL00082 bit 2) is 0 (decelerate to a stop), the servo control command will immediately switch to NOP and the servomotor will stop in position control.  <p>Servo Control Command Code (OW00080) Servo Control Command Code Monitor (IW00080) Position Reference Output Status (DEN) (IL00082 bit 8)</p> <ul style="list-style-type: none"> If Reference Stopped Selection (HOLD_MODE) (OL00082 bit 2) is 1 (quick stop), the servo control command will immediately switch to NOP and the servomotor will stop in position control.  <p>Servo Control Command Code (OW00080) Servo Control Command Code Monitor (IW00080) Position Reference Output Status (DEN) (IL00082 bit 8)</p>
INTERPOLATE	<p>INTERPOLATE operation will continue.</p>
POSING	<p>The servo control command will immediately switch to POSING.</p>  <p>Servo Control Command Code (OW00080) Servo Control Command Code Monitor (IW00080) Position Reference Output Status (DEN) (IL00082 bit 8)</p>

Continued on next page.

Command after Switching	Description of Operation
FEED	<p>The servo control command will immediately switch to FEED.</p> <p>Speeds are connected smoothly. (Accelerates or decelerates to the target speed based on the current speed when switched.)</p> <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Position control Position control</p>
VELCTRL	<p>The servo control command will immediately switch to VELCTRL, and the control mode will switch from position control to speed control.</p> <p>Speeds are connected smoothly. (Accelerates or decelerates to the target speed based on the current speed when switched.)</p> <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Do not reference this bit.</p> <p>Position control Speed control</p>
TRQCTRL	<p>The motion command will immediately switch to TRQCTRL, and the control mode will switch from position control to torque control.</p> <p>The command value of the TRQCTRL command will be output unmodified regardless of the current speed when switched.</p> <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Do not reference this bit.</p> <p>Position control Torque control</p>

9.4.2 Switching the Servo Control Command During POSING Execution

This section describes the changes in operation when the servo control command is switched to a different command while the POSING command being executed.

Command after Switching	Description of Operation
IDLE	<p>Do not switch from POSING to IDLE. If the command is switched, the POSING operation will continue with the switched command.</p>  <p>Servo Control Command Code (OW00080) Servo Control Command Code Monitor (IW00080) Position Reference Output Status (DEN) (IL00082 bit 8)</p>
NOP	<ul style="list-style-type: none"> If Reference Stopped Selection (HOLD_MODE) (OL00082 bit 2) is 0 (decelerate to a stop), the servo control command will immediately switch to NOP and the servomotor will stop in position control.  <p>Servo Control Command Code (OW00080) Servo Control Command Code Monitor (IW00080) Position Reference Output Status (DEN) (IL00082 bit 8)</p> <ul style="list-style-type: none"> If Reference Stopped Selection (HOLD_MODE) (OL00082 bit 2) is 1 (quick stop), the servo control command will immediately switch to NOP and the servomotor will stop in position control.  <p>Servo Control Command Code (OW00080) Servo Control Command Code Monitor (IW00080) Position Reference Output Status (DEN) (IL00082 bit 8)</p>
INTERPOLATE	<p>Do not switch from POSING to INTERPOLATE. When the command is switched, the command will immediately switch to INTERPOLATE and a shock will occur.</p>  <p>Servo Control Command Code (OW00080) Servo Control Command Code Monitor (IW00080) Position Reference Output Status (DEN) (IL00082 bit 8)</p>
POSING	The POSING operation will continue.

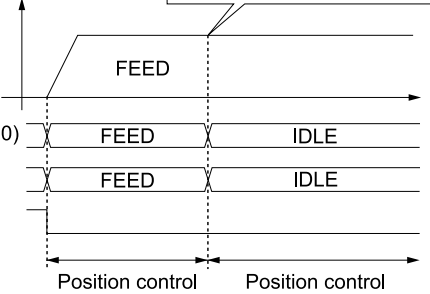
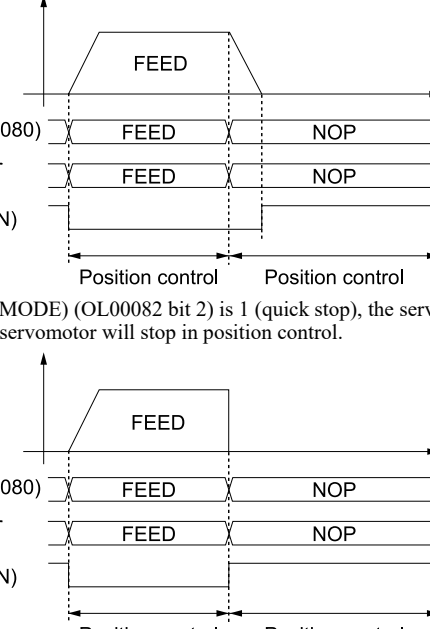
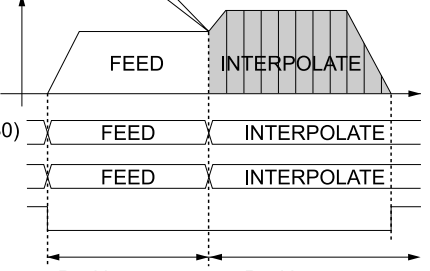
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Command after Switching	Description of Operation
FEED	<p>The servo control command will immediately switch to FEED.</p> <p>Speeds are connected smoothly. (Accelerates or decelerates to the target speed based on the current speed when switched.)</p> <p>The POSING operation to be canceled.</p> <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Position control Position control</p>
VELCTRL	<p>The servo control command will immediately switch to VELCTRL, and the control mode will switch from position control to speed control.</p> <p>Speeds are connected smoothly. (Accelerates or decelerates to the target speed based on the current speed when switched.)</p> <p>The POSING operation to be canceled.</p> <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Position control Speed control</p> <p>Do not reference this bit.</p>
TRQCTRL	<p>The servo control command will immediately switch to TRQCTRL, and the control mode will switch from position control to torque control.</p> <p>The command value of the TRQCTRL command will be output unmodified regardless of the current speed when switched.</p> <p>The POSING operation to be canceled.</p> <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Position control Torque control</p> <p>Do not reference this bit.</p>

9.4.3 Switching the Motion Control Command During FEED Execution

This section describes the changes in operation when the servo control command is switched to a different command while the FEED command being executed.

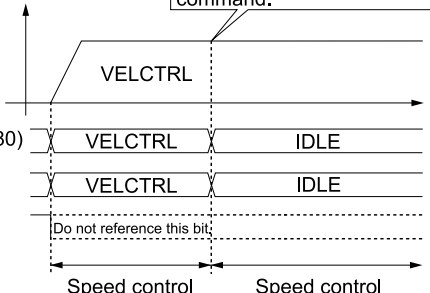
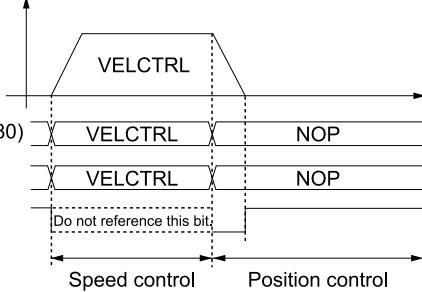
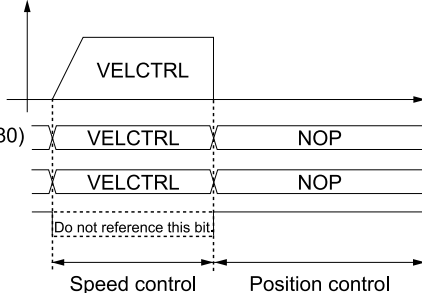
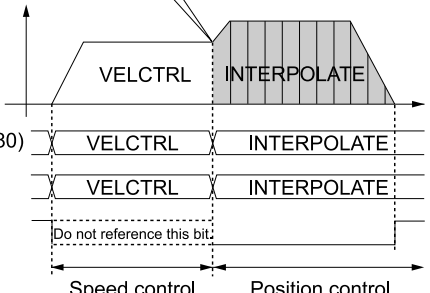
Command after Switching	Description of Operation
IDLE	<p>Do not switch from FEED to IDLE. If the command is switched, the FEED operation will continue with the switched command.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> The FEED operation will continue with the switched command. </div>  <p>Servo Control Command Code (OW00080) Servo Control Command Code Monitor (IW00080) Position Reference Output Status (DEN) (IL00082 bit 8)</p>
NOP	<ul style="list-style-type: none"> If Reference Stopped Selection (HOLD_MODE) (OL00082 bit 2) is 0 (decelerate to a stop), the servo control command will immediately switch to NOP and the servomotor will stop in position control. If Reference Stopped Selection (HOLD_MODE) (OL00082 bit 2) is 1 (quick stop), the servo control command will immediately switch to NOP and the servomotor will stop in position control.  <p>Servo Control Command Code (OW00080) Servo Control Command Code Monitor (IW00080) Position Reference Output Status (DEN) (IL00082 bit 8)</p>
INTERPOLATE	<p>Do not switch from FEED to INTERPOLATE. When the command is switched, the command will immediately switch to INTERPOLATE and a shock will occur.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> Calculate the INTERPOLATE command based on the current reference position (CPOS). A shock will occur when the command is switched. </div>  <p>Servo Control Command Code (OW00080) Servo Control Command Code Monitor (IW00080) Position Reference Output Status (DEN) (IL00082 bit 8)</p>

Continued on next page.

Command after Switching	Description of Operation
POSING	<p>The servo control command will immediately switch to POSING.</p> <p>Speeds are connected smoothly. (Accelerates or decelerates to the target speed based on the current speed when switched.)</p> <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Position control Position control</p>
FEED	<p>The FEED operation will continue.</p>
VELCTRL	<p>The servo control command will immediately switch to VELCTRL, and the control mode will switch from position control to speed control.</p> <p>Speeds are connected smoothly. (Accelerates or decelerates to the target speed based on the current speed when switched.)</p> <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Position control Speed control</p> <p>Do not reference this bit.</p>
TRQCTRL	<p>The motion command will immediately switch to TRQCTRL, and the control mode will switch from position control to torque control.</p> <p>The command value of the TRQCTRL command will be output unmodified regardless of the current speed when switched.</p> <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Position control Torque control</p> <p>Do not reference this bit.</p>

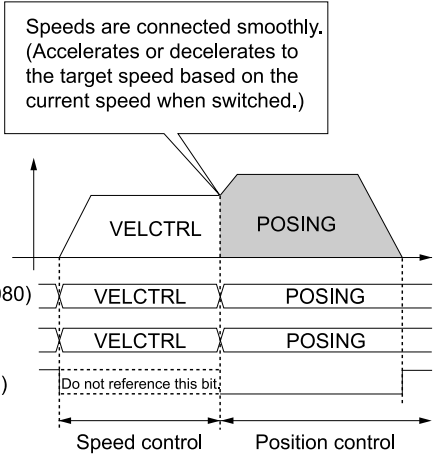
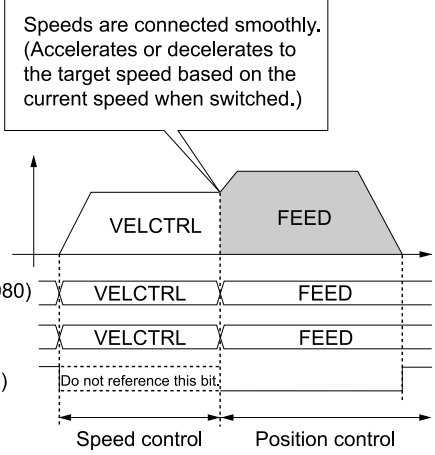
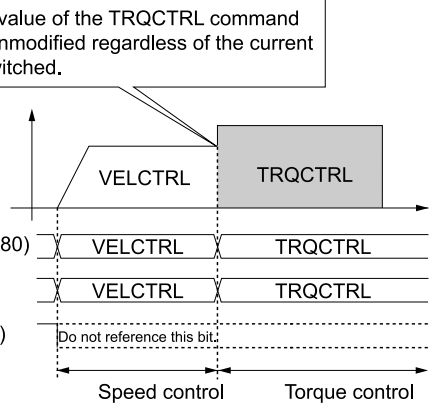
9.4.4 Switching the Servo Control Command During VELCTRL Execution

This section describes the changes in operation when the servo control command is switched to a different command while the VELCTRL command being executed.

Command after Switching	Description of Operation
<p>IDLE</p>	<p>Do not switch from VELCTRL to IDLE. If the command is switched, the VELCTRL operation will continue with the switched command.</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;"> <p>The VELCTRL operation will continue with the switched command.</p> </div>  <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Speed control Position control</p>
<p>NOP</p>	<ul style="list-style-type: none"> If Reference Stopped Selection (HOLD_MODE) (OL00082 bit 2) is 0 (decelerate to a stop), the servo control command will immediately switch to NOP and the servomotor will stop in position control. To reduce the shock when switching the command, stop the servomotor with HOLD.  <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Speed control Position control</p> <ul style="list-style-type: none"> If Reference Stopped Selection (HOLD_MODE) (OL00082 bit 2) is 1 (quick stop), the servo control command will immediately switch to NOP and the servomotor will stop in position control.  <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Speed control Position control</p>
<p>INTERPOLATE</p>	<p>Do not switch from VELCTRL to INTERPOLATE. When the command is switched, the command will immediately switch to INTERPOLATE and a shock will occur.</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;"> <p>Speeds are connected smoothly. (Accelerates or decelerates to the target speed based on the current speed when switched.)</p> </div>  <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Speed control Position control</p>

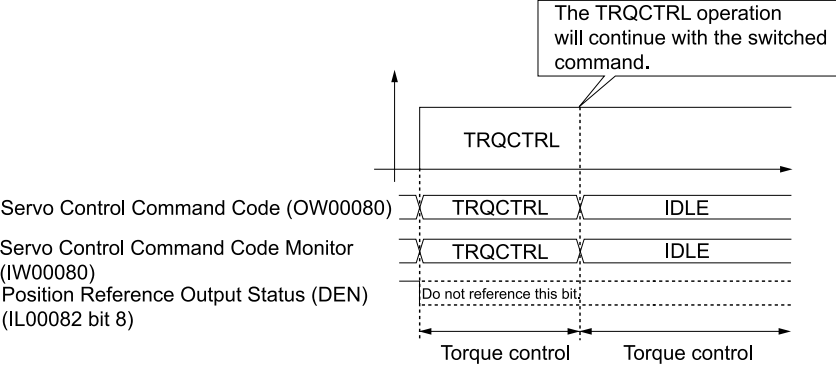
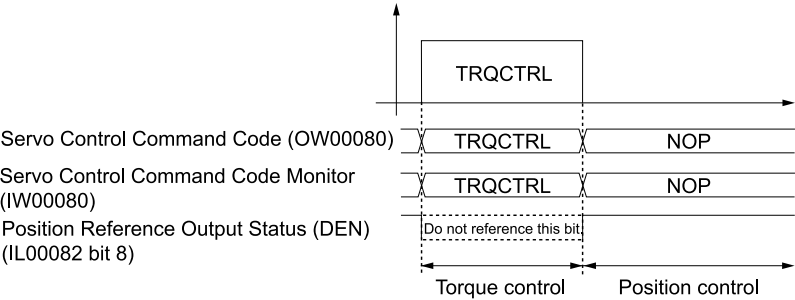
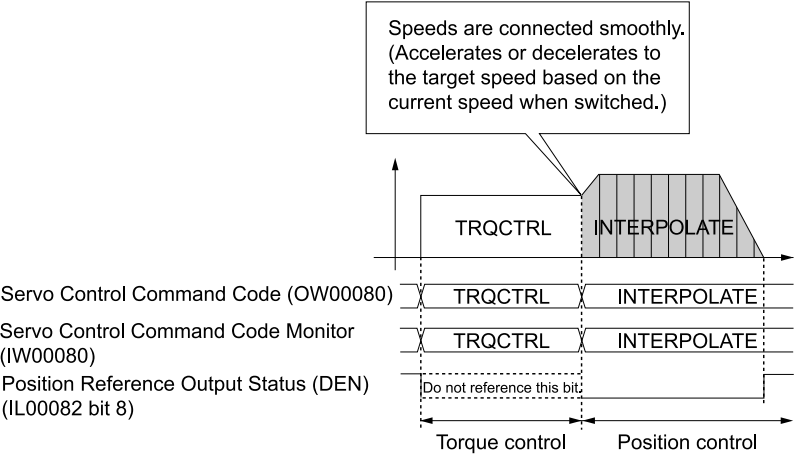
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Command after Switching	Description of Operation
POSING	<p>The servo control command will immediately switch to POSING, and the control mode will switch from speed control to position control.</p> <p>Speeds are connected smoothly. (Accelerates or decelerates to the target speed based on the current speed when switched.)</p>  <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Do not reference this bit.</p> <p>Speed control Position control</p>
FEED	<p>The servo control command will immediately switch to FEED, and the control mode will switch from speed control to position control.</p> <p>Speeds are connected smoothly. (Accelerates or decelerates to the target speed based on the current speed when switched.)</p>  <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Do not reference this bit.</p> <p>Speed control Position control</p>
VELCTRL	<p>The VELCTRL operation will continue.</p>
TRQCTRL	<p>The servo control command will immediately switch to TRQCTRL, and the control mode will switch from speed control to torque control.</p> <p>The command value of the TRQCTRL command will be output unmodified regardless of the current speed when switched.</p>  <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Do not reference this bit.</p> <p>Speed control Torque control</p>

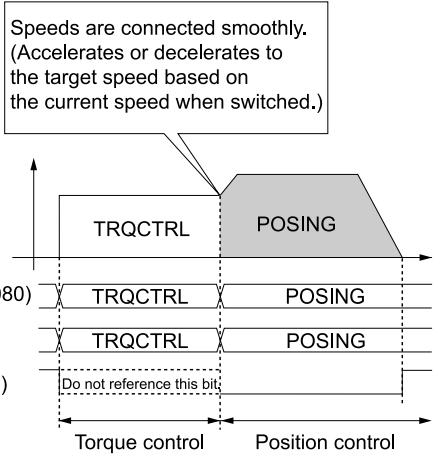
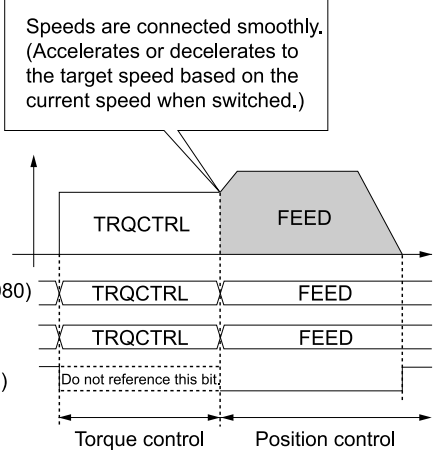
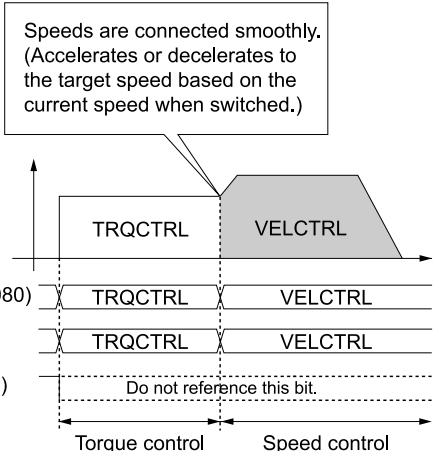
9.4.5 Switching the Servo Control Command During TRQCTRL Execution

This section describes the changes in operation when the servo control command is switched to a different command while the TRQCTRL command being executed.

Command after Switching	Description of Operation
IDLE	<p>Do not switch from TRQCTRL to IDLE. If the command is switched, the TRQCTRL operation will continue with the switched command.</p>  <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Do not reference this bit</p> <p>Torque control</p> <p>Torque control</p>
NOP	<p>The servo control command will immediately switch to NOP and the servomotor will stop in position control. The setting of Reference Stopped Selection (HOLD_MODE) (OL00082 bit 2) will also be inactive.</p>  <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Do not reference this bit</p> <p>Torque control</p> <p>Position control</p>
INTERPOLATE	<p>Do not switch from TRQCTRL to INTERPOLATE. When the command is switched, the command will immediately switch to INTERPOLATE and a shock will occur.</p>  <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Do not reference this bit</p> <p>Torque control</p> <p>Position control</p> <p>Speeds are connected smoothly. (Accelerates or decelerates to the target speed based on the current speed when switched.)</p>

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Command after Switching	Description of Operation
POSING	<p>The servo control command will immediately switch to POSING, and the control mode will switch from torque control to position control.</p> <p>Speeds are connected smoothly. (Accelerates or decelerates to the target speed based on the current speed when switched.)</p>  <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Do not reference this bit.</p> <p>Torque control Position control</p>
FEED	<p>The servo control command will immediately switch to FEED, and the control mode will switch from torque control to position control.</p> <p>Speeds are connected smoothly. (Accelerates or decelerates to the target speed based on the current speed when switched.)</p>  <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Do not reference this bit.</p> <p>Torque control Position control</p>
VELCTRL	<p>The servo control command will immediately switch to VELCTRL, and the control mode will switch from torque control to speed control.</p> <p>Speeds are connected smoothly. (Accelerates or decelerates to the target speed based on the current speed when switched.)</p>  <p>Servo Control Command Code (OW00080)</p> <p>Servo Control Command Code Monitor (IW00080)</p> <p>Position Reference Output Status (DEN) (IL00082 bit 8)</p> <p>Do not reference this bit.</p> <p>Torque control Speed control</p>
TRQCTRL	The TRQCTRL operation will continue.

9.5 Servo Control Command Error Code

If an error occurs when a custom motion is executed, the error code is stored in Servo Control Command Error Code (IW00085).

Code	Possible Cause	Operation When Servo Control Command Error Occurred	Correction
0	No warning	—	—
-1	Command was executed by clamping reference at maximum value.	Operation by clamping.	Correct the reference value of the custom motion.
-2	A command was sent when the SER-VOPACK was not in the servo ON status.	The setting will be ignored and the current operation will continue.	Check the servo ON status.
-3	A value was set that exceeds the limit.	The setting will be ignored and the current operation will continue.	Correct the custom motion set value.

Monitoring

This chapter describes details on the monitoring functions added to the FT56 specification.

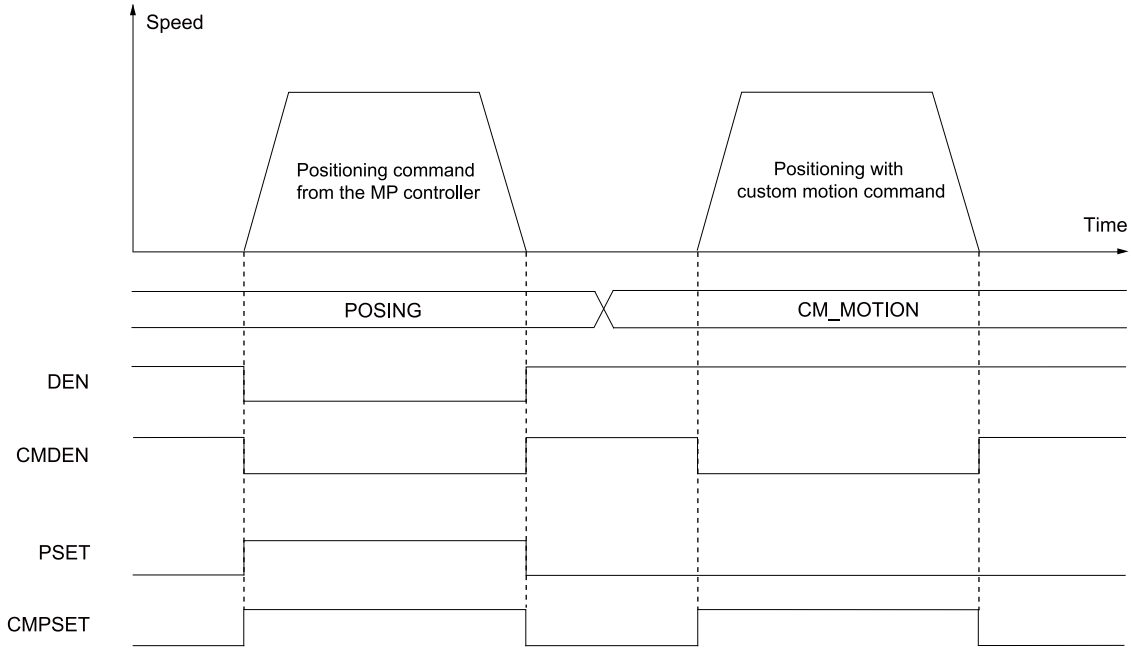
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10.1 Monitors by I/O Tracing in the SigmaWin+

This SERVOPACK can perform the following I/O tracing in addition the standard I/O tracing items.

Signal Name	Selection Data Name	Description
CMDEN (Custom Motion Position Reference Distribution Completed) Signal	CMDEN	H: Position reference output completed L: Custom motion position reference output in progress
CMPSET (Custom Motion Positioning Completion Output) Signal	CMPSET	H: Positioning completion L: During custom motion positioning

The following figure shows the relationship between the DEN (Position Reference Distribution Completed) signal, the PSET (Positioning Completion Output) signal, and the CMPSET (Custom Motion Positioning Completion Output) signal.



DEN	L: Position reference output in progress	H: Position reference output completed
CMDEN	L: Custom motion position reference output in progress	H: Position reference output completed
PSET	L: During positioning	H: Positioning completion
CMPSET	L: During custom motion positioning	H: Positioning completion

10.2 SVCMD_IN

The specifications of SVCMD_IN are given in this section.

Refer to the following manual for details on SVCMD_IN.

☞ Σ-7/Σ-X-Series MECHATROLINK-4 Communications Standard Servo Profile Command Manual (Manual No.: SIEP S800002 32)

- Monitor Region

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
ESTP	EXT3	EXT2	EXT1	N-OT	P-OT	DEC	Reserved (0).
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
ZPOINT	PSET	NEAR	DEN	N-SOT	P-SOT	BRK_ON	Reserved (0).
Bit 23	Bit 22	Bit 21	Bit 20	Bit 19	Bit 18	Bit 17	Bit 16
Reserved (0).				ZSPD	V_CMP	V_LIM	T_LIM
Bit 31	Bit 30	Bit 29	Bit 28	Bit 27	Bit 26	Bit 25	Bit 24
CM_STS <i>*1</i>	CPU_RUN <i>*1</i>	IO_STS6	IO_STS5	IO_STS4	IO_STS3	IO_STS2	IO_STS1

*1 Supported by this SERVOPACK only.

- Monitor Details

Bit	Name	Description	Value	Setting
30	CPU_RUN	User Application Execution Status	0	CPU STOP
			1	CPU RUN
	Determines the execution status of the user application.			
31	CM_STS	Custom Motion Status Monitor	0	Custom motion is not running
			1	Custom motion is running
	Determines the custom motion status.			

Maintenance

This chapter provides information on the meaning of, causes of, and corrections for alarms and warnings.

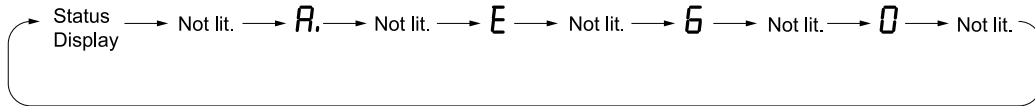
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11.1 Alarm Displays

If an error occurs in the SERVOPACK, an alarm number will be displayed on the panel display. However, if no alarm number appears on the panel display, this indicates a SERVOPACK system error. Replace the SERVOPACK.

If there is an alarm, the display will change in the following order.

Example: Alarm A.E60



This section provides a list of the alarms that may occur and the causes of and corrections for those alarms.

11.1.1 List of Alarms

The list of alarms gives the alarm name, alarm meaning, alarm stopping method, and alarm reset possibility in order of the alarm numbers.

(1) Servomotor Stopping Method for Alarms

Refer to the following manual for information on the stopping method for alarms.

📖 Σ-X-Series Σ-XS SERVOPACK with MECHATROLINK-4/III Communications References Product Manuals (Manual No.: SIEP C710812 01)

(2) Alarm Reset Possibility

Yes: You can use an alarm reset to clear the alarm. However, this assumes that the cause of the alarm has been removed.

No: You cannot clear the alarm.

(3) List of Alarms

The following table lists the alarms.

Information Alarm numbers A.E50, A.E60, and FL-1 to FL-6 are not stored in the alarm history. They are only displayed on the panel display.

Alarm Number	Alarm Name	Alarm Meaning	Servomotor Stopping Method	Alarm Reset Possibility
A.020	Parameter Checksum Error	There is an error in the parameter data in the SERVOPACK.	Gr.1	No
A.021	Parameter Format Error	There is an error in the parameter data in the SERVOPACK.	Gr.1	No
A.022	System Checksum Error	There is an error in the parameter data in the SERVOPACK.	Gr.1	No
A.024	System Alarm	An internal program error occurred in the SERVOPACK.	Gr.1	No
A.025	System Alarm	An internal program error occurred in the SERVOPACK.	Gr.1	No
A.030	Main Circuit Detector Error	There is an error in the detection data for the main circuit.	Gr.1	Yes
A.040	Parameter Setting Error	A parameter setting is outside of the setting range.	Gr.1	No
A.041	Encoder Output Pulse Setting Error	The setting of Pn212 (Number of Encoder Output Pulses) or Pn281 (Encoder Output Resolution) is outside of the setting range or does not satisfy the setting conditions.	Gr.1	No
A.042	Parameter Combination Error	The combination of some parameters exceeds the setting range.	Gr.1	No
A.044	Semi-Closed/Fully-Closed Loop Control Parameter Setting Error	The settings of parameters related to semi-closed/fully-closed loop control do not match.	Gr.1	No

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Alarm Number	Alarm Name	Alarm Meaning	Servomotor Stopping Method	Alarm Reset Possibility
A.046	SigmaLINK II Command/Response Parameter Setting Error	An error was detected in the SigmaLINK II response data or SigmaLINK II command data settings.	Gr.1	No
A.04A	Parameter Setting Error 2	There is an error in the bank members or bank data settings.	Gr.1	No
A.050	Combination Error	The capacities of the SERVOPACK and servomotor do not match.	Gr.1	Yes
A.051	Unsupported Device Alarm	An unsupported device was connected.	Gr.1	No
A.070	Motor Type Change Detected	The connected motor is a different type of motor from the previously connected motor.	Gr.1	No
A.080	Linear Encoder Pitch Setting Error	The setting of Pn282 (Linear Encoder Scale Pitch) has not been changed from the default setting.	Gr.1	No
A.0b0	Invalid Servo ON Command Alarm	The SV_ON (Servo ON) command was sent from the host controller after a utility function that turns ON the servomotor was executed..	Gr.1	Yes
A.100	Overcurrent Detected	An overcurrent flowed through the power transistor or the heat sink overheated.	Gr.1	No
A.101	Motor Overcurrent Detected	The current to the motor exceeded the allowable current.	Gr.1	No
A.102	Motor Overcurrent Detected 2	The current to the motor exceeded the allowable current.	Gr.1	No
A.300	Regeneration Error	There is an error related to regeneration.	Gr.1	Yes
A.320	Regenerative Overload	A regenerative overload occurred.	Gr.2	Yes
A.330	Main Circuit Power Supply Wiring Error	<ul style="list-style-type: none"> The AC power supply input setting or DC power supply input setting is not correct. The power supply wiring is not correct. 	Gr.1	Yes
A.400	Overvoltage	The main circuit DC voltage is too high.	Gr.1	Yes
A.410	Undervoltage	The main circuit DC voltage is too low.	Gr.2	Yes
A.510	Overspeed	The motor exceeded the maximum speed.	Gr.1	Yes
A.511	Encoder Output Pulse Overspeed	<ul style="list-style-type: none"> The pulse output speed for the setting of Pn212 (Number of Encoder Output Pulses) was exceeded. (Rotary Servomotor) The motor speed upper limit for the setting of Pn281 (Encoder Output Resolution) was exceeded. (Linear Servomotor) 	Gr.1	Yes
A.520	Vibration Alarm	Abnormal oscillation was detected in the motor speed.	Gr.1	Yes
A.521	Autotuning Alarm	Vibration was detected during autotuning for the tuning-less function.	Gr.1	Yes
A.550	Maximum Motor Speed Setting Error	The setting of Pn385 (Maximum Motor Speed) is greater than the maximum motor speed.	Gr.1	Yes
A.710	Instantaneous Overload	The servomotor was operating for several seconds to several tens of seconds under a torque that largely exceeded the rating.	Gr.2	Yes
A.720	Continuous Overload	The servomotor was operating continuously under a torque that exceeded the rating.	Gr.1	Yes
A.730	Dynamic Brake Overload	When the dynamic brake was applied, the rotational or linear kinetic energy exceeded the capacity of the dynamic brake resistor.	Gr.1	Yes
A.731	Dynamic Brake Overload	When the dynamic brake was applied, the rotational or linear kinetic energy exceeded the capacity of the dynamic brake resistor.	Gr.1	Yes
A.740	Inrush Current Limiting Resistor Overload	The main circuit power was frequently turned ON and OFF.	Gr.1	Yes

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Alarm Number	Alarm Name	Alarm Meaning	Servomotor Stopping Method	Alarm Reset Possibility
A.7A1	Internal Temperature Error 1 (Control Board Temperature Error)	The surrounding temperature of the control board is abnormal.	Gr.2	Yes
A.7A2	Internal Temperature Error 2 (Power Board Temperature Error)	The surrounding temperature of the power board is abnormal.	Gr.2	Yes
A.7A3	Internal Temperature Sensor Error	An error occurred in the temperature sensor circuit.	Gr.2	No
A.7Ab	SERVOPACK Built-in Fan Stopped	The fan inside the SERVOPACK stopped.	Gr.1	Yes
A.810	Encoder Backup Alarm	The power supplies to the encoder all failed and the position data was lost.	Gr.1	No
A.820	Encoder Checksum Alarm	There is an error in the checksum results for encoder memory.	Gr.1	No
A.830	Encoder Battery Alarm	The battery voltage was lower than the specified level after the control power was turned ON.	Gr.1	Yes
A.840	Encoder Data Alarm	There is an internal data error in the encoder.	Gr.1	No
A.850	Encoder Overspeed	The encoder was operating at high speed when the power was turned ON.	Gr.1	No
A.860	Encoder Overheated	The internal temperature of encoder is too high.	Gr.1	No
A.861	Motor Overheated	The internal temperature of motor is too high.	Gr.1	No
A.862	Overheat Alarm	The input voltage (temperature) for the overheat protection input (TH) signal exceeded the setting of Pn61B (Overheat Alarm Level).	Gr.1	Yes
A.890	Encoder Scale Error	A failure occurred in the linear encoder.	Gr.1	No
A.891	Encoder Module Error	An error occurred in the linear encoder.	Gr.1	No
A.8A0	External Encoder Error	An error occurred in the external encoder.	Gr.1	Yes
A.8A1	External Encoder Module Error	An error occurred in the serial converter unit.	Gr.1	Yes
A.8A2	External Incremental Encoder Sensor Error	An error occurred in the external encoder.	Gr.1	Yes
A.8A3	External Absolute Encoder Position Error	An error occurred in the position data of the external encoder.	Gr.1	Yes
A.8A5	External Encoder Overspeed	An overspeed error occurred in the external encoder.	Gr.1	Yes
A.8A6	External Encoder Overheated	An overheating error occurred in the external encoder.	Gr.1	Yes
A.b33	Current Detection Error 3	An error occurred in the current detection circuit.	Gr.1	No
A.b6A	MECHATROLINK Communications ASIC Error 1	ASIC error 1 occurred in MECHATROLINK communications.	Gr.1	No
A.b6b	MECHATROLINK Communications ASIC Error 2	ASIC error 2 occurred in MECHATROLINK communications.	Gr.2	No
A.bE2	Firmware error	A firmware error occurred in the SERVOPACK.	Gr.1	No
A.bF0	System Alarm 0	Internal program error 0 occurred in the SERVOPACK.	Gr.1	No
A.bF1	System Alarm 1	Internal program error 1 occurred in the SERVOPACK.	Gr.1	No
A.bF2	System Alarm 2	Internal program error 2 occurred in the SERVOPACK.	Gr.1	No
A.bF3	System Alarm 3	Internal program error 3 occurred in the SERVOPACK.	Gr.1	No
A.bF4	System Alarm 4	Internal program error 4 occurred in the SERVOPACK.	Gr.1	No
A.bF5	System Alarm 5	Internal program error 5 occurred in the SERVOPACK.	Gr.1	No
A.bF6	System Alarm 6	Internal program error 6 occurred in the SERVOPACK.	Gr.1	No

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Alarm Number	Alarm Name	Alarm Meaning	Servomotor Stopping Method	Alarm Reset Possibility
A.bF7	System Alarm 7	Internal program error 7 occurred in the SERVOPACK.	Gr.1	No
A.bF8	System Alarm 8	Internal program error 8 occurred in the SERVOPACK.	Gr.1	No
A.bFb	Scan Timeout Alarm	The high-speed or low-speed scan did not end.	Gr.2	No
A.bFd	System Alarm D	An internal program error D occurred in the SERVOPACK.	Gr.1	No
A.C10	Servomotor Out of Control	The servomotor ran out of control.	Gr.1	Yes
A.C20	Phase Detection Error	The detection of the phase is not correct.	Gr.1	No
A.C21	Polarity Sensor Error	An error occurred in the polarity sensor.	Gr.1	No
A.C22	Phase Information Disagreement	The phase information does not match.	Gr.1	No
A.C50	Polarity Detection Failure	The polarity detection failed.	Gr.1	No
A.C51	Overtravel Detected during Polarity Detection	The overtravel signal was detected during polarity detection.	Gr.1	Yes
A.C52	Polarity Detection Not Completed	The servo was turned ON before the polarity was detected.	Gr.1	Yes
A.C53	Out of Range of Motion for Polarity Detection	The travel distance exceeded the setting of Pn48E (Polarity Detection Range).	Gr.1	No
A.C54	Polarity Detection Failure 2	The polarity detection failed.	Gr.1	No
A.C80	Encoder Clear Error or Multiturn Limit Setting Error	The multiturn data for the absolute encoder was not correctly cleared or set.	Gr.1	No
A.C90	Encoder Communications Error	Communications between the encoder and SERVOPACK is not possible.	Gr.1	No
A.C91	Encoder Communications Position Data Acceleration Rate Error	An error occurred in calculating the position data of the encoder.	Gr.1	No
A.C92	Encoder Communications Timer Error	An error occurred in the communications timer between the encoder and SERVOPACK.	Gr.1	No
A.CA0	Encoder Parameter Error	The parameters in the encoder are corrupted.	Gr.1	No
A.Cb0	Encoder Echoback Error	The contents of communications with the encoder are incorrect.	Gr.1	No
A.CC0	Multiturn Limit Disagreement	Different multiturn limits have been set in the encoder and the SERVOPACK.	Gr.1	No
A.Cd1	SigmaLINK II Node Configuration Error	A configuration that cannot be connected with SigmaLINK II was detected.	Gr.1	No
A.Cd2	SigmaLINK II Power Supply Short-Circuit Detected	An error occurred in the power system of the SigmaLINK II connection.	Gr.1	No
A.Cd3	SigmaLINK II Configuration Data Checksum Error	Saving the configuration data failed.	Gr.1	No
A.Cd4	SigmaLINK II Node Change Detected	The content saved in the configuration and the content detected in node detection are different.	Gr.1	No
A.Cd7	SigmaLINK II I/O Device Communications Error	An error occurred in communications with the SigmaLINK II I/O device.	Gr.2	No
A.Cd8	SigmaLINK II I/O Device Status Error	The SigmaLINK II I/O device detected an error.	Gr.2	No
A.CF1	Reception Failed Error in Feedback Option Module Communications	Receiving data from the feedback option module failed.	Gr.1	No

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Alarm Number	Alarm Name	Alarm Meaning	Servo-motor Stopping Method	Alarm Reset Possibility
A.CF2	Timer Stopped Error in Feedback Option Module Communications	An error occurred in the timer for communications with the feedback option module.	Gr.1	No
A.d00	Position Deviation Overflow	The setting of Pn520 (Position Deviation Overflow Alarm Level) was exceeded by the position deviation.	Gr.1	Yes
A.d01	Position Deviation Overflow Alarm at Servo ON	The servo was turned ON after the position deviation exceeded the setting of Pn526 (Position Deviation Overflow Alarm Level at Servo ON) while the servo was OFF.	Gr.1	Yes
A.d02	Position Deviation Overflow Alarm for Speed Limit at Servo ON	If position deviation remains in the deviation counter, the setting of Pn529 or Pn584 (Speed Limit Level at Servo ON) limits the speed when the servo is turned ON. This alarm occurs if position reference is input and the setting of Pn520 (Position Deviation Overflow Alarm Level) is exceeded before the limit is cleared.	Gr.2	Yes
A.d04	Overtravel Alarm	Overtravel was detected while the servo was ON.	Gr.1	Yes
A.d10	Motor-Load Position Deviation Overflow	There was too much position deviation between the motor and load during fully-closed loop control.	Gr.2	Yes
A.d30	Position Data Overflow	The position feedback data exceeded ± 1879048192 .	Gr.1	No
A.E02	MECHATROLINK Internal Synchronization Error 1	A synchronization error occurred during MECHATROLINK communications with the SERVOPACK.	Gr.1	Yes
A.E40	MECHATROLINK Transmission Cycle Setting Error	The setting of the MECHATROLINK communications transmission cycle is not correct.	Gr.2	Yes
A.E41	MECHATROLINK Communications Data Size Setting Error (This alarm can occur when using MECHATROLINK-III communications.)	The setting of the MECHATROLINK communications data size is not correct.	Gr.2	Yes
A.E42	MECHATROLINK Station Address Setting Error(This alarm can occur when using MECHATROLINK-III communications.)	The setting of the MECHATROLINK station address is not correct.	Gr.2	No
A.E43	MECHATROLINK Communications Setting Error(This alarm can occur when using MECHATROLINK-4 communications.)	There is an error in the MECHATROLINK communications settings.	Gr.2	Yes
A.E50	MECHATROLINK Synchronization Error	A synchronization error occurred during MECHATROLINK communications.	Gr.2	Yes
A.E51	MECHATROLINK Synchronization Failed	Synchronization failed during MECHATROLINK communications.	Gr.2	Yes
A.E60	Reception Error in MECHATROLINK Communications	Communications errors occurred continuously during MECHATROLINK communications.	Gr.2	Yes
A.E61	Synchronization Interval Error in MECHATROLINK Transmission Cycle	An error occurred in the transmission cycle during MECHATROLINK communications.	Gr.2	Yes
A.E63	MECHATROLINK Synchronization Frame Not Received	Synchronization frames were continuously not received during MECHATROLINK communications.	Gr.2	Yes
A.E72	Feedback Option Module Detection Failure	Detection of the feedback option module failed.	Gr.1	No
A.E88	High-Speed Scan Exceeded Alarm	The processing time of the high-speed scan exceeded the setting of the high-speed scan time.	Gr.2	Yes
A.E89	Low-Speed Scan Exceeded Alarm	The processing time of the low-speed scan exceeded the setting of the low-speed scan time.	Gr.2	Yes

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Alarm Number	Alarm Name	Alarm Meaning	Servo-motor Stopping Method	Alarm Reset Possibility
A.E8b	User Application Alarm	Bit 0 of OW00061 was set in the user application.	Gr.2	Yes
A.Eb1	Safety Function Signal Input Timing Error	An error occurred in the input timing of the safety function signal.	Gr.1	No
A.EC8	Gate Drive Error 1	An error occurred in the gate drive circuit.	Gr.1	No
A.EC9	Gate Drive Error 2	An error occurred in the gate drive circuit.	Gr.1	No
A.Ed1	Command Execution Timeout	A timeout error occurred for a MECHATROLINK command.	Gr.2	Yes
A.EdA	User Application System Alarm	A system alarm was detected in the user application.	Gr.2	Yes
A.F10	Power Supply Line Open Phase	The voltage was low for more than one second for phase R, S, or T when the main power was ON.	Gr.2	Yes
FL-1	System Alarm	An internal program error occurred in the SERVOPACK.	–	No
FL-2	System Alarm	An internal program error occurred in the SERVOPACK.	–	No
FL-3	System Alarm	An internal program error occurred in the SERVOPACK.	–	No
FL-4	System Alarm	An internal program error occurred in the SERVOPACK.	–	No
FL-5	System Alarm	An internal program error occurred in the SERVOPACK.	–	No
FL-6	System Alarm	An internal program error occurred in the SERVOPACK.	–	No
FL-7	System Alarm	An internal program error occurred in the SERVOPACK.	–	No
CPF00	Digital Operator Communications Error 1	Communications were not possible between the digital operator and the SERVOPACK.	–	No
CPF01	Digital Operator Communications Error 2	Communications were not possible between the digital operator and the SERVOPACK.	–	No

11.1.2 Troubleshooting Alarms

The causes of and corrections for the alarms are given in the following table. Contact your Yaskawa representative if you cannot solve a problem with the correction given in the table.

◆ A.020:Parameter Checksum Error

Possible Cause	Confirmation	Correction	Reference
The power supply voltage suddenly dropped.	Measure the power supply voltage.	Set the power supply voltage within the specified range, and initialize the parameter settings.	–
The power was shut OFF while writing parameter settings.	Check the timing of shutting OFF the power.	Initialize the parameter settings and then set the parameters again.	–
The number of times that parameters were written exceeded the limit.	Check to see if the parameters were frequently changed from the host controller.	The SERVOPACK may be faulty. Replace the SERVOPACK. Reconsider the method for writing the parameters.	–
A malfunction was caused by noise from the AC power supply, ground, static electricity, or other source.	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, noise may be the cause.	Implement countermeasures against noise.	–
Gas, water drops, or cutting oil entered the SERVOPACK and caused failure of the internal components.	Check the installation conditions.	The SERVOPACK may be faulty. Replace the SERVOPACK.	–
A failure occurred in the SERVOPACK.	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may have failed.	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.021:Parameter Format Error

Possible Cause	Confirmation	Correction	Reference
The software version of the SERVOPACK that caused the alarm is older than the software version of the parameters specified to write.	Read the product information to see if the software versions are the same. If they are different, it could be the cause of the alarm.	Write the parameters from another SERVOPACK with the same model and the same software version, and then turn the power OFF and ON again.	—
A failure occurred in the SERVOPACK.	—	The SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.022:System Checksum Error

Possible Cause	Confirmation	Correction	Reference
The power supply voltage suddenly dropped.	Measure the power supply voltage.	The SERVOPACK may be faulty. Replace the SERVOPACK.	—
The power was shut OFF while setting a utility function.	Check the timing of shutting OFF the power.	The SERVOPACK may be faulty. Replace the SERVOPACK.	—
A failure occurred in the SERVOPACK.	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may have failed.	The SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.024:System Alarm

A.025:System Alarm

A.030:Main Circuit Detector Error

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the SERVOPACK.	—	The SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.040:Parameter Setting Error

Possible Cause	Confirmation	Correction	Reference
The SERVOPACK and servomotor capacities do not match each other.	Check the combination of the SERVOPACK and servomotor capacities.	Select a proper combination of SERVOPACK and servomotor capacities.	—
The motor parameter file was not written to the linear encoder. (This applies only when not using a serial converter unit.)	Check to see if the motor parameter file was written to the linear encoder.	Write the motor parameter file to the linear encoder.	—
A failure occurred in the SERVOPACK.	—	The SERVOPACK may be faulty. Replace the SERVOPACK.	—
A parameter setting is outside of the setting range.	Check the setting ranges of the parameters that have been changed.	Set the parameters to values within the setting ranges.	—
The electronic gear ratio is outside of the setting range.	Check the electronic gear ratio. The ratio must be within the following range: $0.001 < (\text{Pn}20\text{E}/\text{Pn}210) < 64000$.	Set the electronic gear ratio in the following range: $0.001 < (\text{Pn}20\text{E}/\text{Pn}210) < 64000$.	—
A pin number or sequence input number that does not exist on the SERVOPACK was allocated in Pn590 to Pn5BC = n.□XXX (Allocated Pin Number). (An alarm will not occur, however, if the signal is disabled.)	Check the setting of Pn590 to Pn5BC = n.□XXX.	Set a pin number or sequence input number that exists in Pn590 to Pn5BC = n.□XXX.	—

◆ A.041:Encoder Output Pulse Setting Error

Possible Cause	Confirmation	Correction	Reference
The setting of Pn212 (Number of Encoder Output Pulses) or Pn281 (Encoder Output Resolution) is outside of the setting range or does not satisfy the setting conditions.	Check the setting of Pn212 or Pn281.	Set Pn212 or Pn281 to an appropriate value.	—

◆ A.042:Parameter Combination Error

Possible Cause	Confirmation	Correction	Reference
The speed of program jogging went below the setting range when the electronic gear ratio (Pn20E/ Pn210) or the servomotor was changed.	Check if the setting of the electronic gear ratio (Pn20E/Pn210) satisfies the conditions given in the preparations for program jogging.	Decrease the setting of the electronic gear ratio (Pn20E/Pn210).	—
The speed of program jogging went below the setting range when Pn533 or Pn585 (Program Jogging Movement Speed) was changed.	Check if the setting of Pn533 or Pn585 satisfies the conditions given in the preparations for program jogging.	Increase the setting of Pn533 or Pn585.	—
The travel speed during autotuning without a host reference went below the setting range when the electronic gear ratio (Pn20E/ Pn210) or the servomotor was changed.	Check if the setting of the electronic gear ratio (Pn20E/Pn210) satisfies the conditions given in the preparations for autotuning without a host reference.	Decrease the setting of the electronic gear ratio (Pn20E/Pn210).	—
Triggers at preset positions are enabled, but the allocations of the input signal allocation mode settings are not correct.	Check the settings of Pn660 = n.X□□□ (Triggers at Preset Positions Selections) and Pn50A = n.□□□X (Input Signal Allocation Mode).	Set Pn660 to n.1□□□ (enable triggers at preset positions), and set Pn50A to n.□□□2 (use Pn590 to Pn5BC (Sigma-LINK II input signal allocation mode)).	—

◆ A.044:Semi-Closed/Fully-Closed Loop Control Parameter Setting Error

Possible Cause	Confirmation	Correction	Reference
The node specified by Pn0DA or Pn0DB does not exist.	Check if the setting for Pn0DA or Pn0DB is the node address of the connected device.	Set Pn0DA and Pn0DB to appropriate values.	—
An unsupported serial converter unit, encoder, or external encoder was specified by Pn0DA.	Check if the connected serial converter unit, encoder, or external encoder is a supported model.	Connect a supported serial converter unit, encoder, or external encoder.	—
A serial converter unit, encoder, or external encoder was specified by Pn0DA.	Check the node address set in Pn0DA.	Set the node address of a servomotor in Pn0DA.	—
A servomotor was specified by Pn0DB.	Check the node address set in Pn0DB.	Set the node address of a serial converter unit, encoder, or external encoder in Pn0DB (a servomotor cannot be used as an external encoder).	—
An I/O device was specified by Pn0DA or Pn0DB.	Check the node address set in Pn0DA and Pn0DB.	Set the node address of a servomotor in Pn0DA, and set the node address of a serial converter unit, encoder, or external encoder in Pn0DB.	—
The same node was specified in Pn0DA and Pn0DB.	Check if Pn0DA and Pn0DB are the same value.	Set Pn0DA and Pn0DB to different values.	—
The settings of the fully-closed module and Pn002 = n.X□□□ (External Encoder Usage) do not match.	Check the setting of Pn002 = n.X□□□.	Make sure that the setting of the fully-closed module agrees with the setting of Pn002 = n.X□□□.	—

◆ A.046:SigmaLINK II Command/Response Parameter Setting Error

Possible Cause	Confirmation	Correction	Reference
Slave parameters specified by Pn050 to Pn05E and Pn090 to Pn096 (Sigma-LINK II Response Data Selection 1 to 8/SigmaLINK II Command Data Selection 1 to 4) do not exist.	Check the parameter numbers set in Pn050 to Pn05E and Pn090 to Pn096.	Refer to the I/O device manual and set the correct values.	—

◆ A.04A:Parameter Setting Error 2

Possible Cause	Confirmation	Correction	Reference
For 4-byte parameter bank members, there are two consecutive members with nothing registered.	—	Change the number of bytes for bank members to an appropriate value.	—
The total amount of bank data exceeds 64 (Pn900 × Pn901 > 64).	—	Reduce the total amount of bank data to 64 or less.	—

◆ A.050:Combination Error

Possible Cause	Confirmation	Correction	Reference
The SERVOPACK and servomotor capacities do not match each other.	Confirm that the following condition is met: $1/4 \leq (\text{Servomotor capacity}/\text{SERVOPACK capacity}) \leq 4$	Select a proper combination of the SERVOPACK and servomotor capacities.	—
A failure occurred in the encoder.	Replace the encoder and check to see if the alarm still occurs.	Replace the servomotor or encoder.	—
A failure occurred in the SERVOPACK.	—	The SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.051:Unsupported Device Alarm

Possible Cause	Confirmation	Correction	Reference
The motor parameter file was not written to the linear encoder. (This applies only when not using a serial converter unit.)	Check to see if the motor parameter file was written to the linear encoder.	Write the motor parameter file to the linear encoder.	—
An unsupported serial converter unit or encoder (e.g., an external encoder) is connected to the SERVOPACK.	Check the product combination specifications.	Change to a correct combination of models.	—

◆ A.070:Motor Type Change Detected

Possible Cause	Confirmation	Correction	Reference
A rotary servomotor was removed and a linear servomotor was connected.	—	Set the parameters for a linear servomotor and reset the motor type alarm. Then, turn the power to the SERVOPACK OFF and ON again.	—
A linear servomotor was removed and a rotary servomotor was connected.	—	Set the parameters for a rotary servomotor and reset the motor type alarm. Then, turn the power to the SERVOPACK OFF and ON again.	—
The node specified by Pn0DA was changed from rotary servomotor to linear servomotor.	Check the setting of Pn0DA.	Change Pn0DA to the setting for a linear servomotor and reset the motor type alarm. Then, turn the power to the SERVOPACK OFF and ON again.	—
The node specified by Pn0DA was changed from linear servomotor to rotary servomotor.	Check the setting of Pn0DA.	Change Pn0DA to the setting for a rotary servomotor and reset the motor type alarm. Then, turn the power to the SERVOPACK OFF and ON again.	—

◆ A.080:Linear Encoder Pitch Setting Error

Possible Cause	Confirmation	Correction	Reference
The setting of Pn282 (Linear Encoder Scale Pitch) has not been changed from the default setting.	Check the setting of Pn282.	Correct the setting of Pn282.	—

◆ A.0b0:Invalid Servo ON Command Alarm

Possible Cause	Confirmation	Correction	Reference
The SV_ON (Servo ON) command was sent from the host controller after a utility function that turns ON the servomotor was executed.	—	Turn the power to the SERVOPACK OFF and ON again. Or, execute a software reset.	—

◆ A.100:Overcurrent Detected

Possible Cause	Confirmation	Correction	Reference
The main circuit cable is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	—
There is a short-circuit or ground fault in a main circuit cable.	Check for short-circuits across servomotor phases U, V, and W, or between the ground and servomotor phases U, V, and W.	The cable may be shortcircuited. Replace the cable.	—
There is a short-circuit or ground fault inside the servomotor.	Check for short-circuits across servomotor phases U, V, and W, or between the ground and servomotor phases U, V, or W.	The servomotor may be faulty. Replace the servomotor.	—
There is a short-circuit or ground fault inside the SERVOPACK.	Check for short-circuits across the servomotor connection terminals U, V, and W on the SERVOPACK, or between the ground and terminals U, V, or W.	The SERVOPACK may be faulty. Replace the SERVOPACK.	—
The regenerative resistor is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	—
The dynamic brake (DB, emergency stop executed from the SERVOPACK) was frequently activated, or a DB overload alarm occurred.	Check the power consumed by the DB resistor to see how frequently the DB is being used. Or, check the alarm display to see if an A.730 or A.731 alarm (Dynamic Brake Overload) has occurred.	Change the SERVOPACK model, operating methods, or the mechanisms so that the dynamic brake does not need to be used so frequently.	—
The regenerative processing capacity was exceeded.	Check the regenerative load ratio in the operation monitor of the SigmaWin+ to see how frequently the regenerative resistor is being used.	Recheck the operating conditions and load.	—
The SERVOPACK regenerative resistance is too small.	Check the regenerative load ratio in the operation monitor of the SigmaWin+ to see how frequently the regenerative resistor is being used.	Change the regenerative resistance to a value larger than the SERVOPACK minimum allowable resistance.	—
A heavy load was applied while the servomotor was stopped or running at a low speed.	Check to see if the operating conditions exceed servo drive specifications.	Reduce the load applied to the servomotor. Or, increase the operating speed.	—
A malfunction was caused by noise.	Improve the noise environment, e.g. by improving the wiring or installation conditions, and check to see if the alarm still occurs.	Implement countermeasures against noise, such as correct wiring of the FG. Use an FG wire size equivalent to the SERVOPACK's main circuit wire size.	—
A failure occurred in the SERVOPACK.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.101:Motor Overcurrent Detected
A.102:Motor Overcurrent Detected 2

Possible Cause	Confirmation	Correction	Reference
The main circuit cable is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	—
There is a short-circuit or ground fault in a main circuit cable.	Check for short-circuits across servomotor phases U, V, and W, or between the ground and servomotor phases U, V, and W.	The cable may be shortcircuited. Replace the cable.	—
There is a short-circuit or ground fault inside the servomotor.	Check for short-circuits across servomotor phases U, V, and W, or between the ground and servomotor phases U, V, or W.	The servomotor may be faulty. Replace the servomotor.	—
There is a short-circuit or ground fault inside the SERVOPACK.	Check for short-circuits across the servomotor connection terminals U, V, and W on the SERVOPACK, or between the ground and terminals U, V, or W.	The SERVOPACK may be faulty. Replace the SERVOPACK.	—
A heavy load was applied while the servomotor was stopped or running at a low speed.	Check to see if the operating conditions exceed servo drive specifications.	Reduce the load applied to the servomotor. Or, increase the operating speed.	—
A malfunction was caused by noise.	Improve the noise environment, e.g. by improving the wiring or installation conditions, and check to see if the alarm still occurs.	Implement countermeasures against noise, such as correct wiring of the FG. Use an FG wire size equivalent to the SERVOPACK's main circuit wire size.	—
A failure occurred in the SERVOPACK.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—
Pn43D (Reserved parameter) is set to anything other than the default setting.	—	Initialize the parameter settings.	—

◆ A.300:Regeneration Error

Possible Cause	Confirmation	Correction	Reference
When using the built-in regenerative resistor, the jumper between the regenerative resistor terminals (B2 and B3) was removed from one of the following SERVOPACKs: SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, or -330A.	Confirm to see if the jumper is connected between main circuit terminals B2 and B3.	Correctly connect a jumper.	—
The external regenerative resistor or regenerative resistor unit is not wired correctly, or was removed or disconnected.	Check the wiring of the external regenerative resistor or regenerative resistor unit.	Remove the jumper between B2 and B3, and correctly wire the external regenerative resistor or regenerative resistor unit.	—
Pn600 (Regenerative Resistor Capacity) is not set to 0 and an external regenerative resistor is not connected to one of the following SERVOPACKs: SGDXS-R70A, -R90A, -1R6A, or -2R8A.	Check to see if an external regenerative resistor is connected and check the setting of Pn600.	Connect an external regenerative resistor, or set Pn600 (Regenerative Resistor Capacity) to 0 (setting unit: $\times 10$ W) if no regenerative resistor is required.	—
An external regenerative resistor is not connected to one of the following SERVOPACKs: SGDXS-470A or -550A.	Check to see if an external regenerative resistor or regenerative resistor unit is connected and check the setting of Pn600.	Connect an external regenerative resistor and set Pn600 to an appropriate value. Or connect a regenerative resistor unit and set Pn600 (Regenerative Resistor Capacity) to 0 (setting unit: 10 W).	—
A failure occurred in the SERVOPACK.	—	While the main circuit power is OFF, turn the control power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.320:Regenerative Overload

Possible Cause	Confirmation	Correction	Reference
The power supply voltage exceeded the specified range.	Measure the power supply voltage.	Set the power supply voltage within the specified range.	–
The external regenerative resistance value or regenerative resistor capacity is too small, or there has been a continuous regeneration state.	Check the operating conditions or the capacity.	Change the regenerative resistance value or capacity. Reconsider the operating conditions.	–
There was a continuous regeneration state because a negative load was continuously applied.	Check the load applied to the servomotor during operation.	Reconsider the system including the servo, machine, and operating conditions.	–
The setting of Pn600 (Regenerative Resistor Capacity) is smaller than the capacity of the external regenerative resistor.	Check to see if a regenerative resistor is connected and check the setting of Pn600.	Correct the setting of Pn600.	–
The setting of Pn603 (Regenerative Resistance) is smaller than the capacity of the external regenerative resistor.	Check to see if a regenerative resistor is connected and check the setting of Pn603.	Correct the setting of Pn603.	–
The external regenerative resistance is too high.	Check the regenerative resistance.	Change the regenerative resistance to a correct value or use an external regenerative resistor of an appropriate capacity.	–
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.330:Main Circuit Power Supply Wiring Error

Possible Cause	Confirmation	Correction	Reference
The regenerative resistor was disconnected when the SERVOPACK power supply voltage was high.	Measure the resistance of the regenerative resistor using a measuring instrument.	If you are using the regenerative resistor built into the SERVOPACK, replace the SERVOPACK. If you are using an external regenerative resistor, replace the external regenerative resistor.	–
DC power was supplied when an AC power supply input was specified in the settings.	Check the power supply to see if it is a DC power supply.	Correct the power supply setting to match the actual power supply.	–
AC power was supplied when a DC power supply input was specified in the settings.	Check the power supply to see if it is an AC power supply.	Correct the power supply setting to match the actual power supply.	–
Pn600 (Regenerative Resistor Capacity) is not set to 0 and an external regenerative resistor is not connected to one of the following SERVOPACKs: SGDXS-R70A, -R90A, -1R6A, or -2R8A.	Check to see if an external regenerative resistor is connected and check the setting of Pn600.	Connect an external regenerative resistor, or if an external regenerative resistor is not required, set Pn600 to 0.	–
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.400:Overvoltage

Possible Cause	Confirmation	Correction	Reference
The power supply voltage exceeded the specified range.	Measure the power supply voltage.	Set the AC/DC power supply voltage within the specified range.	—
The power supply is not stable or was influenced by a lightning surge.	Measure the power supply voltage.	Improve the power supply conditions, install a surge absorber, and then turn the power OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—
The voltage for AC power supply was too high during acceleration or deceleration.	Check the power supply voltage and the speed and torque during operation.	Set the AC power supply voltage within the specified range.	—
The external regenerative resistance is too high for the operating conditions.	Check the operating conditions and the regenerative resistance.	Select a regenerative resistance value that is appropriate for the operating conditions and load.	—
The load moment of inertia ratio or mass ratio exceeded the allowable value.	Check to see if the moment of inertia ratio or mass ratio is within the allowable range.	Increase the deceleration time, or reduce the load.	—
A failure occurred in the SERVOPACK.	—	While the main circuit power is OFF, turn the control power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.410:Undervoltage

Possible Cause	Confirmation	Correction	Reference
The power supply voltage went below the specified range.	Measure the power supply voltage.	Set the power supply voltage within the specified range.	—
The power supply voltage dropped during operation.	Measure the power supply voltage.	Increase the power supply capacity.	—
A momentary power interruption occurred.	Measure the power supply voltage.	If you have changed the setting of Pn509 (Momentary Power Interruption Hold Time), decrease the setting.	—
The SERVOPACK fuse is blown out.	—	Replace the SERVOPACK and connect a reactor to the DC reactor terminals (⊖1, ⊖2) on the SERVOPACK.	—
A failure occurred in the SERVOPACK.	—	The SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.510:Overspeed

Possible Cause	Confirmation	Correction	Reference
The order of phases U, V, and W in the motor wiring is not correct.	Check the wiring of the servomotor.	Make sure that the servomotor is correctly wired.	—
A reference value that exceeded the overspeed detection level was input.	Check the input reference.	Reduce the reference value. Or, adjust the gain.	—
The motor exceeded the maximum speed.	Check the waveform of the motor speed.	Reduce the speed reference input gain and adjust the servo gain. Or, reconsider the operating conditions.	—
A failure occurred in the SERVOPACK.	—	The SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.511:Encoder Output Pulse Overspeed

Possible Cause	Confirmation	Correction	Reference
The encoder output pulse frequency exceeded the limit.	Check the encoder output pulse setting.	Decrease the setting of Pn212 (Number of Encoder Output Pulses) or Pn281 (Encoder Output Resolution).	–
The encoder output pulse frequency exceeded the limit because the motor speed was too high.	Check the encoder output pulse setting and the motor speed.	Reduce the motor speed.	–

◆ A.520:Vibration Alarm

Possible Cause	Confirmation	Correction	Reference
Abnormal oscillation was detected in the motor speed.	Check for abnormal motor noise, and check the speed and torque waveforms during operation.	Reduce the motor speed. Or, reduce the setting of Pn100 (Speed Loop Gain).	–
The setting of Pn103 (Moment of Inertia Ratio) is greater than the actual moment of inertia or was greatly changed.	Check the moment of inertia ratio or mass ratio.	Set Pn103 (Moment of Inertia Ratio) to an appropriate value.	–
The setting of Pn312 or Pn384 (Vibration Detection Level) is not suitable.	Check that the setting of Pn312 or Pn384 (Vibration Detection Level) is suitable.	Set Pn312 or Pn384 (Vibration Detection Level) to an appropriate value.	–

◆ A.521:Autotuning Alarm

Possible Cause	Confirmation	Correction	Reference
The servomotor vibrated considerably while performing the tuning-less function.	Check the waveform of the motor speed.	Reduce the load so that the load moment of inertia ratio is within the allowable value. Or increase the load level or reduce the response level in the tuning-less level settings.	–
The servomotor vibrated considerably while performing custom tuning or Easy FFT.	Check the waveform of the motor speed.	Check the operating procedure of corresponding function and implement corrections.	–

◆ A.550:Maximum Motor Speed Setting Error

Possible Cause	Confirmation	Correction	Reference
The setting of Pn385 (Maximum Motor Speed) is greater than the maximum speed.	Check the setting of Pn385, and the upper limits of the maximum motor speed setting and the encoder output resolution setting.	Set Pn385 to a value that does not exceed the maximum motor speed.	–

◆ A.710:Instantaneous Overload
A.720:Continuous Overload

Possible Cause	Confirmation	Correction	Reference
The wiring is not correct or there is a faulty connection in the motor or encoder wiring.	Check the wiring.	Make sure that the servomotor and encoder are correctly wired.	–
Operation was performed that exceeded the overload protection characteristics.	Check the motor overload characteristics and operation reference.	Reconsider the load and operating conditions. Or, increase the motor capacity.	–
An excessive load was applied during operation because the servomotor was not driven due to mechanical problems.	Check the operation reference and motor speed.	Remove the mechanical problem.	–
There is an error in the setting of Pn282 (Linear Encoder Scale Pitch).	Check the setting of Pn282.	Set Pn282 to an appropriate value.	–
There is an error in the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection).	Check the setting of Pn080 = n.□□X□.	Set Pn080 = n.□□X□ to an appropriate value.	–
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.730:Dynamic Brake Overload
A.731:Dynamic Brake Overload

Possible Cause	Confirmation	Correction	Reference
The servomotor was rotated by an external force.	Check the operation status.	Implement measures to ensure that the motor will not be rotated by an external force.	–
When the servomotor was stopped with the dynamic brake, the rotational or linear kinetic energy exceeded the capacity of the dynamic brake resistor.	Check the power consumed by the DB resistor to see how frequently the DB is being used.	Reconsider the following: <ul style="list-style-type: none"> • Reduce the servomotor command speed. • Decrease the moment of inertia ratio or mass ratio. • Reduce the frequency of stopping with the dynamic brake. 	–
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.740:Inrush Current Limiting Resistor Overload

Possible Cause	Confirmation	Correction	Reference
The allowable frequency of the inrush current limiting resistor was exceeded when the main circuit power was turned ON and OFF.	–	Reduce the frequency of turning the main circuit power ON and OFF.	–
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.7A1:Internal Temperature Error 1 (Control Board Temperature Error)
A.7A2:Internal Temperature Error 2 (Power Board Temperature Error)

Possible Cause	Confirmation	Correction	Reference
The surrounding temperature is too high.	Check the surrounding temperature using a thermometer. Or, check the operating status with the SERVOPACK installation environment monitor.	Decrease the surrounding temperature by improving the SERVOPACK installation conditions.	–
An overload alarm was reset by turning OFF the power too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	–
There was an excessive load or operation was performed that exceeded the regenerative processing capacity.	Check the load during operation with [Cumulative Load] and check the regenerative capacity with [Regenerative Load] on the operation monitor of the SigmaWin+.	Reconsider the load and operating conditions.	–
The SERVOPACK installation orientation is not correct or there is insufficient space around the SERVOPACK.	Check the SERVOPACK installation conditions.	Install the SERVOPACK according to specifications.	–
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.7A3:Internal Temperature Sensor Error

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.7Ab:SERVOPACK Built-in Fan Stopped

Possible Cause	Confirmation	Correction	Reference
The fan inside the SERVOPACK stopped.	Check for foreign matter inside the SERVOPACK.	Remove foreign matter from the SERVOPACK. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.810:Encoder Backup Alarm

Possible Cause	Confirmation	Correction	Reference
The power to the absolute encoder was turned ON for the first time.	Check to see if the power was turned ON for the first time.	Set up the encoder.	–
The encoder cable was disconnected and then connected again.	Check to see if the power was turned ON for the first time.	Check the encoder connection and set up the encoder.	–
Power is not being supplied both from the control power supply (+5 V) from the SERVOPACK and from the battery power supply.	Check the encoder connector battery and the connector status.	Replace the battery or implement similar measures to supply power to the encoder, and set up the encoder.	–
A failure occurred in the absolute encoder.	–	If the alarm still occurs after setting up the encoder again, replace the servomotor.	–
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.820:Encoder Checksum Alarm

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the encoder.	—	<ul style="list-style-type: none"> • When Using an Absolute Encoder Set up the encoder again. If the alarm still occurs, the servomotor may be faulty. Replace the servomotor. • When Using a Singleturn Absolute Encoder or Incremental Encoder <ul style="list-style-type: none"> — The servomotor may be faulty. Replace the servomotor. — The linear encoder may be faulty. Replace the linear encoder. 	—
A failure occurred in the SERVOPACK.	—	The SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.830:Encoder Battery Alarm

Possible Cause	Confirmation	Correction	Reference
The battery connection is faulty or a battery is not connected.	Check the battery connection.	Correct the battery connection.	—
The battery voltage is lower than the specified value (2.7 V).	Measure the battery voltage.	Replace the battery.	—
A failure occurred in the SERVOPACK.	—	The SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.840:Encoder Data Alarm

Possible Cause	Confirmation	Correction	Reference
The encoder malfunctioned.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the servomotor or linear encoder may be faulty. Replace the servomotor or linear encoder.	—
An error occurred in reading data from the linear encoder.	—	The linear encoder is not mounted within an appropriate tolerance. Correct the mounting of the linear encoder.	—
Excessive speed occurred in the linear encoder.	—	Control the motor speed within the range specified by the linear encoder manufacturer and then turn ON the control power.	—
The encoder malfunctioned due to noise.	—	Correct the wiring around the encoder by separating the encoder cable from the servomotor main circuit cable or by grounding the encoder.	—
The polarity sensor is not wired correctly.	Check the wiring of the polarity sensor.	Correct the wiring of the polarity sensor.	—
The polarity sensor failed.	—	Replace the polarity sensor.	—

◆ A.850:Encoder Overspeed

Possible Cause	Confirmation	Correction	Reference
Rotary Servomotor: The servomotor speed was 200 min ⁻¹ or higher when the control power was turned ON.	Check the motor speed when the power is turned ON.	Reduce the servomotor speed to a value less than 200 min ⁻¹ , and turn ON the control power.	–
Linear Servomotor: The servomotor exceeded the specified speed when the control power was turned ON.	Check the motor speed when the power is turned ON.	Control the motor speed within the range specified by the linear encoder manufacturer and then turn ON the control power.	–
A failure occurred in the encoder.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the servomotor or linear encoder may be faulty. Replace the servomotor or linear encoder.	–
A failure occurred in the SERVOPACK.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.860:Encoder Overheated

Possible Cause	Confirmation	Correction	Reference
The surrounding temperature around the servomotor is too high.	Measure the surrounding temperature around the servomotor.	Reduce the surrounding temperature of the servomotor to 40°C or less.	–
The servomotor load is greater than the rated load.	Check the load with the [Cumulative Load] on the operation monitor of the SigmaWin+.	Operate the servo drive so that the motor load remains within the specified range.	–
A failure occurred in the encoder.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the servomotor or absolute linear encoder may be faulty. Replace the servomotor or absolute linear encoder.	–
A failure occurred in the SERVOPACK.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.861:Motor Overheated

Possible Cause	Confirmation	Correction	Reference
The surrounding temperature around the servomotor is too high.	Measure the surrounding temperature around the servomotor.	Reduce the surrounding temperature of the servomotor to 40°C or less.	–
The servomotor load is greater than the rated load.	Check the load with the [Cumulative Load] on the operation monitor of the SigmaWin+.	Operate the servo drive so that the motor load remains within the specified range.	–
A failure occurred in the serial converter unit.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the serial converter unit may be faulty. Replace the serial converter unit.	–
A failure occurred in the SERVOPACK.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.862:Overheat Alarm

Possible Cause	Confirmation	Correction	Reference
The surrounding temperature is too high.	Check the surrounding temperature using a thermometer.	Lower the surrounding temperature by improving the installation conditions of the linear servomotor or the machine.	–
The overheat protection input signal line is disconnected or short-circuited.	Check the input voltage with the overheat protection input information on the operation monitor of the SigmaWin+.	Repair the line for the overheat protection input signal.	–
An overload alarm was reset by turning OFF the power too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	–
Operation was performed under an excessive load.	Check the load with the [Cumulative Load] on the operation monitor of the SigmaWin+.	Reconsider the load and operating conditions.	–
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–
The temperature detection circuit in the linear servomotor is faulty or the sensor attached to the machine is faulty.	–	The temperature detection circuit in the linear servomotor may be faulty or the sensor attached to the machine may be faulty. Replace the linear servomotor or repair the sensor attached to the machine.	–

◆ A.890:Encoder Scale Error

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the linear encoder.	–	The linear encoder may be faulty. Replace the linear encoder.	–

◆ A.891:Encoder Module Error

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the linear encoder.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the linear encoder may be faulty. Replace the linear encoder.	–

◆ A.8A0:External Encoder Error

Possible Cause	Confirmation	Correction	Reference
Setting the origin of the absolute linear encoder failed because the motor moved.	Before you set the origin, use the fully-closed feedback pulse counter to confirm that the motor is not moving.	The motor must be stopped while setting the origin position.	–
A failure occurred in the external encoder.	–	Replace the external encoder.	–

◆ A.8A1:External Encoder Module Error

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the external encoder.	–	Replace the external encoder.	–
A failure occurred in the serial converter unit.	–	Replace the serial converter unit.	–

◆ A.8A2:External Incremental Encoder Sensor Error

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the external encoder.	–	Replace the external encoder.	–

◆ A.8A3:External Absolute Encoder Position Error

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the external absolute encoder.	—	The external absolute encoder may be faulty. Refer to the encoder manufacturer's instruction manual for corrections.	—

◆ A.8A5:External Encoder Overspeed

Possible Cause	Confirmation	Correction	Reference
An overspeed error was detected in the external encoder.	Check the maximum speed of the external encoder.	Keep the external encoder below its maximum speed.	—

◆ A.8A6:External Encoder Overheated

Possible Cause	Confirmation	Correction	Reference
An overheating error was detected in the external encoder.	—	Replace the external encoder.	—

◆ A.b33:Current Detection Error 3

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the current detection circuit.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.b6A:MECHATROLINK Communications ASIC Error 1

Possible Cause	Confirmation	Correction	Reference
There is a fault in the SERVOPACK MECHATROLINK communications section.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.b6b:MECHATROLINK Communications ASIC Error 2

Possible Cause	Confirmation	Correction	Reference
A malfunction occurred in the MECHATROLINK communications section due to noise.	—	Implement the following countermeasures against noise. <ul style="list-style-type: none"> • Check the MECHATROLINK communications cable and FG wiring. • Attach a ferrite core to the MECHATROLINK communications cable. 	—
There is a fault in the SERVOPACK MECHATROLINK communications section.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

- ◆ A.bE2:Firmware error
- A.bF0:System Alarm 0
- A.bF1:System Alarm 1
- A.bF2:System Alarm 2
- A.bF3:System Alarm 3
- A.bF4:System Alarm 4
- A.bF5:System Alarm 5
- A.bF6:System Alarm 6
- A.bF7:System Alarm 7
- A.bF8:System Alarm 8

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the SERVOPACK.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.bFb:Scan Timeout Alarm

Possible Cause	Confirmation	Correction	Reference
The high-speed or low-speed scan did not end (high-speed scan: 2 ms or longer, low-speed scan: 200 ms or longer).	Check if the processing in the high-speed scan, low-speed scan, or startup drawing is an infinite loop or taking too much time.	Review the processing in the high-speed scan, low-speed scan, or startup drawing.	—
The processing time in the startup drawing exceeded 1 s.	Check if the processing in the startup drawing is an infinite loop or taking too much time.	Review the processing in the startup drawing.	—
The SERVOPACK was started with the high-speed scan cycle set to be greater than the MECHATROLINK transmission cycle.	Check the setting of high-speed scan cycle and MECHATROLINK transmission cycle.	Set the high-speed scan cycle to be less than or equal to the MECHATROLINK transmission cycle.	—

◆ A.bFd:System Alarm D

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the SERVOPACK.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.C10:Servomotor Out of Control

Possible Cause	Confirmation	Correction	Reference
The order of phases U, V, and W in the motor wiring is not correct.	Check the servomotor wiring.	Make sure that the servomotor is correctly wired.	—
There is an error in the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection).	Check the setting of Pn080 = n.□□X□.	Set Pn080 = n.□□X□ to an appropriate value.	—
When using an absolute encoder, the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection) was changed after polarity detection was executed.	—	Execute polarity detection again.	—
A failure occurred in the encoder.	—	If the motor wiring is correct and an alarm still occurs after turning the power OFF and ON again, the servomotor or linear encoder may be faulty. Replace the servomotor or linear encoder.	—
A failure occurred in the SERVOPACK.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.C20:Phase Detection Error

Possible Cause	Confirmation	Correction	Reference
The linear encoder signal level is too low.	Check the voltage of the linear encoder signal.	Fine-tune the mounting of the scale sensor head. Or, replace the linear encoder.	–
The count-up direction of the linear encoder does not match the forward direction of the moving coil in the motor.	Check the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection). Check the installation orientation for the linear encoder and moving coil.	Change the setting of Pn080 = n.□□X□. Correctly reinstall the linear encoder or moving coil.	–
The polarity sensor signal is being affected by noise.	–	Correct the FG wiring. Implement countermeasures against noise for the polarity sensor wiring.	–
The setting of Pn282 (Linear Encoder Scale Pitch) is not correct.	Check the setting of Pn282 (Linear Encoder Scale Pitch).	Check the specifications of the linear encoder and set a correct value.	–

◆ A.C21:Polarity Sensor Error

Possible Cause	Confirmation	Correction	Reference
The polarity sensor is protruding from the magnetic way of the motor.	Check the polarity sensor.	Correctly reinstall the moving coil or magnetic way of the motor.	–
The polarity sensor is not wired correctly.	Check the wiring of the polarity sensor.	Correct the wiring of the polarity sensor.	–
The polarity sensor failed.	–	Replace the polarity sensor.	–

◆ A.C22:Phase Information Disagreement

Possible Cause	Confirmation	Correction	Reference
The SERVOPACK phase information is different from the linear encoder phase information.	–	Perform polarity detection.	–

◆ A.C50:Polarity Detection Failure

Possible Cause	Confirmation	Correction	Reference
The parameter settings are not correct.	Check the linear encoder specifications and feedback signal status.	The settings of Pn282 (Linear Encoder Scale Pitch) and Pn080 = n.□□X□ (Motor Phase Sequence Selection) may not match the installation. Set the parameters to correct values.	–
There is noise on the scale signal.	Check to make sure that the frame grounds of the serial converter unit and servomotor are connected to the FG terminal on the SERVOPACK and that the FG terminal on the SERVOPACK is connected to the frame ground on the power supply. And, confirm that the shield is properly processed on the linear encoder cable. Check to see if the detection reference is repeatedly output in one direction.	Implement appropriate countermeasures against noise for the linear encoder cable.	–
An external force was applied to the moving coil of the motor.	–	The polarity cannot be properly detected if the detection reference is 0 and the speed feedback is not 0 because of an external force, such as cable tension, applied to the moving coil. Implement measures to reduce the external force so that the speed feedback goes to 0. If the external force cannot be reduced, increase the setting of Pn481 (Polarity Detection Speed Loop Gain).	–
The linear encoder resolution is too low.	Check the linear encoder scale pitch to see if it is within 100 μm.	If the linear encoder scale pitch is 100 μm or higher, the SERVOPACK cannot detect the correct speed feedback. Use a linear encoder scale pitch with higher resolution. (We recommend a pitch of 40 μm or less.) Or, increase the setting of Pn485 (Polarity Detection Reference Speed). However, increasing the setting of Pn485 will increase the servomotor movement range that is required for polarity detection.	–

◆ A.C51:Overtravel Detected during Polarity Detection

Possible Cause	Confirmation	Correction	Reference
The overtravel signal was detected during polarity detection.	Check the overtravel position.	Wire the overtravel signals. Execute polarity detection at a position where an overtravel signal would not be detected.	–

◆ A.C52:Polarity Detection Not Completed

Possible Cause	Confirmation	Correction	Reference
The servo was turned ON when using an absolute linear encoder, Pn587 was set to n.□□□0 (do not detect polarity), and the polarity had not been detected.	–	When using an absolute linear encoder, set Pn587 to n.□□□1 (detect polarity).	–

◆ A.C53:Out of Range of Motion for Polarity Detection

Possible Cause	Confirmation	Correction	Reference
The travel distance exceeded the setting of Pn48E (Polarity Detection Range) in the middle of detection.	–	Increase the setting of Pn48E (Polarity Detection Range). Or, increase the setting of Pn481 (Polarity Detection Speed Loop Gain).	–

◆ A.C54:Polarity Detection Failure 2

Possible Cause	Confirmation	Correction	Reference
An external force was applied to the servomotor.	—	Increase the setting of Pn495 (Polarity Detection Confirmation Force Reference). Increase the setting of Pn498 (Polarity Detection Allowable Error Range). Increasing the allowable error will also increase the motor temperature.	—

◆ A.C80:Encoder Clear Error or Multiturn Limit Setting Error

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the encoder.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the servomotor or linear encoder may be faulty. Replace the servomotor or linear encoder.	—
A failure occurred in the SERVOPACK.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.C90:Encoder Communications Error

Possible Cause	Confirmation	Correction	Reference
The content saved in the configuration and the content detected in node detection are different when SigmaLINK II was used.	Check the content that was saved with self-configuration and the actual device connections.	If the actual device configuration is correct, execute self-configuration again. If the content that was saved with self-configuration is correct, change the actual device configuration to match the saved content.	—
There is a faulty contact in the connector or the connector is not wired correctly for the encoder cable.	Check the condition of the connector for encoder cable.	Reconnect the connector for encoder cable and check the encoder wiring.	—
There is a cable disconnection or short-circuit in the encoder. Or, the cable impedance is outside the specified values.	Check the condition of the encoder cable.	Use the encoder cable within the specified specifications.	—
One of the following has occurred: corrosion caused by improper temperature, humidity, or gas, a short-circuit caused by entry of water drops or cutting oil, or faulty contact in connector caused by vibration.	Check the operating environment.	Improve the operating environment, and replace the cable. If the alarm still occurs, replace the SERVOPACK.	—
A malfunction was caused by noise.	—	Correct the wiring around the encoder by separating the encoder cable from the servomotor main circuit cable or by grounding the encoder.	—
A failure occurred in the SERVOPACK.	—	If the alarm does not occur when the servomotor is connected to a different SERVOPACK and the control power is supplied, the SERVOPACK may be faulty. Replace the SERVOPACK.	—
Pn0D8 (Reserved parameter) is set to anything other than the default setting. (This alarm can occur when using MECHATROLINK-III communications.)	—	Initialize the parameter settings.	—

◆ A.C91:Encoder Communications Position Data Acceleration Rate Error

Possible Cause	Confirmation	Correction	Reference
Noise entered on the signal lines because the encoder cable is bent or the sheath is damaged.	Check the condition of the encoder cable and connectors.	Check the encoder cable to see if it is installed correctly.	—
The encoder cable is bundled with a high-current line or installed near a high-current line.	Check the installation condition of the encoder cable.	Confirm that there is no surge voltage on the encoder cable.	—
There is variation in the FG potential because of the influence of machines on the servomotor side, such as a welder.	Check the installation condition of the encoder cable.	Properly ground the machine to separate it from the FG of the encoder.	—

◆ A.C92:Encoder Communications Timer Error

Possible Cause	Confirmation	Correction	Reference
Noise entered on the signal line from the encoder.	—	Implement countermeasures against noise for the encoder wiring.	—
Excessive vibration or shock was applied to the encoder.	Check the operating conditions.	Reduce machine vibration. Correctly install the servomotor or linear encoder.	—
A failure occurred in the encoder.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the servomotor or linear encoder may be faulty. Replace the servomotor or linear encoder.	—
A failure occurred in the SERVOPACK.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.CA0:Encoder Parameter Error

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the encoder.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the servomotor or linear encoder may be faulty. Replace the servomotor or linear encoder.	—
A failure occurred in the SERVOPACK.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.Cb0:Encoder Echoback Error

Possible Cause	Confirmation	Correction	Reference
The encoder is wired incorrectly or there is faulty contact.	Check the wiring of the encoder.	Make sure that the encoder is correctly wired.	–
The specifications of the encoder cable are not correct and noise entered on it.	–	Use a shielded twisted-pair wire cable or a screened twisted-pair cable with conductors of at least 0.12 mm ² .	–
The encoder cable is too long and noise entered on it.	–	<ul style="list-style-type: none"> Rotary Servomotors: The encoder cable wiring distance must be 50 m max. Linear Servomotors: The encoder cable wiring distance must be 20 m max. 	–
There is variation in the FG potential because of the influence of machines on the servomotor side, such as a welder.	Check the condition of the encoder cable and connectors.	Properly ground the machine to separate it from the FG of the encoder.	–
Excessive vibration or shock was applied to the encoder.	Check the operating conditions.	Reduce machine vibration. Correctly install the servomotor or linear encoder.	–
A failure occurred in the encoder.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the servomotor or linear encoder may be faulty. Replace the servomotor or linear encoder.	–
A failure occurred in the SERVOPACK.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.CC0:Multiturn Limit Disagreement

Possible Cause	Confirmation	Correction	Reference
When using a direct drive servomotor, the setting of Pn205 (Multiturn Limit) does not agree with the encoder.	Check the setting of Pn205.	Correct the setting of Pn205 (0 to 65535).	–
The multiturn limit of the encoder is different from that of the SERVOPACK. Or, the multiturn limit of the SERVOPACK has been changed.	Check the setting of Pn205 (Multiturn Limit).	Change the setting if the alarm occurs.	–
A failure occurred in the SERVOPACK.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.Cd1:SigmaLINK II Node Configuration Error

Possible Cause	Confirmation	Correction	Reference
Nodes that are compatible and incompatible with SigmaLINK II are connected.	Check if nodes that are compatible and incompatible with SigmaLINK II are connected.	Make all of the connected nodes either compatible or incompatible with SigmaLINK II.	–
Four or more nodes are connected.	Check the number of connected servomotors, external encoders, and I/O devices.	Connect no more than a total of three servomotors, external encoders, and I/O devices.	–
Two or more servomotors are connected.	Check the number of servomotors that are connected.	Connect one servomotor.	–
Two or more external encoders are connected.	Check the number of external encoders that are connected.	Connect one external encoder.	–

◆ A.Cd2:SigmaLINK II Power Supply Short-Circuit Detected

Possible Cause	Confirmation	Correction	Reference
The CN2 power supply is short-circuited.	Check the condition of the encoder cable.	Disconnect the connected node and check if the alarm occurs. If the alarm occurs even when the connected node is disconnected, replace the encoder cable. If the alarm still occurs, replace the connected node or SERVOPACK.	—

◆ A.Cd3:SigmaLINK II Configuration Data Checksum Error

Possible Cause	Confirmation	Correction	Reference
Saving the configuration data failed.	—	Execute SigmaLINK II self-configuration again and save the settings.	—
The SigmaLINK II configuration data saved in nonvolatile memory is damaged.	—	Execute SigmaLINK II self-configuration again and save the settings.	—

◆ A.Cd4:SigmaLINK II Node Change Detected

Possible Cause	Confirmation	Correction	Reference
The content saved in the configuration and the content detected in node detection are different.	Check the content that was saved with self-configuration and the actual device connections.	If the actual device configuration is correct, execute self-configuration again. If the content that was saved with self-configuration is correct, change the actual device configuration to match the saved content.	—
Detection of the node failed.	—	Execute SigmaLINK II self-configuration again and save the settings.	—

◆ A.Cd7:SigmaLINK II I/O Device Communications Error

Possible Cause	Confirmation	Correction	Reference
There is a faulty contact in the connector or the connector is not wired correctly for the encoder cable.	Check the connection and condition of the encoder cable.	<ul style="list-style-type: none"> Correctly connect the encoder cable. Replace the encoder cable. 	—
There is a cable disconnection or short-circuit in the encoder. Or, the cable impedance is outside the specified values.	Check the condition of the encoder cable.	Use the encoder cable within the specified specifications.	—
One of the following has occurred: corrosion caused by improper temperature, humidity, or gas, a short-circuit caused by entry of water drops or cutting oil, or faulty contact in connector caused by vibration.	Check the operating environment.	Improve the operating environment, and replace the cable. If the alarm still occurs, replace the SERVOPACK.	—
A malfunction was caused by noise.	—	Correct the wiring around the encoder by separating the encoder cable from the servomotor main circuit cable or by grounding the encoder.	—
A failure occurred in the SERVOPACK.	—	If the alarm does not occur when the I/O device is connected to a different SERVOPACK and the control power is supplied, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.Cd8:SigmaLINK II I/O Device Status Error

Possible Cause	Confirmation	Correction	Reference
The I/O device detected a warning.	Check the alarm code by reading the I/O device alarm in the SigmaWin+.	Take corrective action according to the I/O device manual.	—

◆ A.CF1:Reception Failed Error in Feedback Option Module Communications

Possible Cause	Confirmation	Correction	Reference
The cable between the serial converter unit and SERVOPACK is not wired correctly or there is a faulty contact.	Check the wiring of the external encoder.	Correctly wire the cable between the serial converter unit and SERVOPACK.	–
A specified cable is not being used between serial converter unit and SERVOPACK.	Check the wiring specifications of the external encoder.	Use a specified cable.	–
The cable between the serial converter unit and SERVOPACK is too long.	Measure the length of the cable that connects the serial converter unit.	The length of the cable between the serial converter unit and SERVOPACK must be 20 m or less.	–
The sheath on cable between the serial converter unit and SERVOPACK is broken.	Check the cable that connects the serial converter unit.	Replace the cable between the serial converter unit and SERVOPACK.	–

◆ A.CF2:Timer Stopped Error in Feedback Option Module Communications

Possible Cause	Confirmation	Correction	Reference
Noise entered the cable between the serial converter unit and SERVOPACK.	–	Correct the wiring around the serial converter unit, e.g., separate I/O signal lines from the main circuit cables or ground.	–
A failure occurred in the serial converter unit.	–	Replace the serial converter unit.	–
A failure occurred in the SERVOPACK.	–	Replace the SERVOPACK.	–

◆ A.d00:Position Deviation Overflow

Possible Cause	Confirmation	Correction	Reference
The servomotor U, V, and W wiring is not correct.	Check the wiring of the servomotor main circuit cables.	Make sure that there are no faulty contacts in the wiring for the servomotor and encoder.	–
The position reference speed is too fast.	Reduce the position reference speed and try operating the SERVOPACK.	Reduce the position reference speed or the reference acceleration rate, or reconsider the electronic gear ratio.	–
The acceleration of the position reference is too high.	Reduce the reference acceleration and try operating the SERVOPACK.	Reduce the acceleration of the position reference using a MECHATROLINK command. Or, smooth the position reference acceleration by selecting the position reference filter (ACCFIL) using a MECHATROLINK command.	–
The setting of Pn520 (Position Deviation Overflow Alarm Level) is too low for the operating conditions.	Check the setting of Pn520 (Position Deviation Overflow Alarm Level) to see if it is set to an appropriate value.	Optimize the setting of Pn520.	–
A failure occurred in the SERVOPACK.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.d01:Position Deviation Overflow Alarm at Servo ON

Possible Cause	Confirmation	Correction	Reference
The servo was turned ON after the position deviation exceeded the setting of Pn526 (Position Deviation Overflow Alarm Level at Servo ON) while the servo was OFF.	Check the position deviation while the servo is OFF.	Optimize the setting of Pn526 (Position Deviation Overflow Alarm Level at Servo ON).	–

◆ A.d02:Position Deviation Overflow Alarm for Speed Limit at Servo ON

Possible Cause	Confirmation	Correction	Reference
<p>If position deviation remains in the deviation counter, the setting of Pn529 or Pn584 (Speed Limit Level at Servo ON) limits the speed when the servo is turned ON.</p> <p>This alarm occurs if a position reference is input and the setting of Pn520 (Position Deviation Overflow Alarm Level) is exceeded.</p>	–	<p>Optimize the setting of Pn520 (Position Deviation Overflow Alarm Level).</p> <p>Or, set Pn529 or Pn584 (Speed Limit Level at Servo ON) to an appropriate value.</p>	–

◆ A.d04:Overtravel Alarm

Possible Cause	Confirmation	Correction	Reference
<p>Overtravel was detected while the servo was ON.</p>	<p>Check the status of the overtravel signals on the input signal monitor.</p>	<ul style="list-style-type: none"> Review the references from the host controller so that the moving parts of the machine do not exceed the overtravel range and software limits. Check the wiring of the overtravel signals. Implement countermeasures against noise. 	–

◆ A.d10:Motor-Load Position Deviation Overflow

Possible Cause	Confirmation	Correction	Reference
<p>The motor direction and external encoder installation orientation are backward.</p>	<p>Check the motor direction and the external encoder installation orientation.</p>	<p>Install the external encoder in the opposite direction, or change the setting of Pn002 = n.X□□□ (External Encoder Usage) to reverse the direction.</p>	–
<p>There is an error in the connection between the load (e.g., stage) and external encoder coupling.</p>	<p>Check the coupling of the external encoder.</p>	<p>Check the mechanical coupling.</p>	–

◆ A.d30:Position Data Overflow

Possible Cause	Confirmation	Correction	Reference
<p>The position data exceeded ±1879048192.</p>	<p>Check the input reference pulse counter.</p>	<p>Reconsider the operating specifications.</p>	–

◆ A.E02:MECHATROLINK Internal Synchronization Error 1

Possible Cause	Confirmation	Correction	Reference
<p>The MECHATROLINK transmission cycle fluctuated.</p>	–	<p>Remove the cause of transmission cycle fluctuation at the host controller.</p>	–
<p>A failure occurred in the SERVOPACK.</p>	–	<p>Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.</p>	–

◆ A.E40:MECHATROLINK Transmission Cycle Setting Error

Possible Cause	Confirmation	Correction	Reference
<p>The setting of MECHATROLINK transmission cycle is outside of the specified range.</p>	<p>Check the setting of the MECHATROLINK transmission cycle.</p>	<p>Set the MECHATROLINK transmission cycle to an appropriate value.</p>	–

- ◆ A.E41:MECHATROLINK Communications Data Size Setting Error(This alarm can occur when using MECHATROLINK-III communications.)

Possible Cause	Confirmation	Correction	Reference
The number of transmission bytes set on DIP switch S3 is not correct.	Check the MECHATROLINK communications data size of the host controller.	Reset DIP switch S3 to change the number of transmission bytes to an appropriate value.	–

- ◆ A.E42:MECHATROLINK Station Address Setting Error(This alarm can occur when using MECHATROLINK-III communications.)

Possible Cause	Confirmation	Correction	Reference
The station address is outside of the setting range.	Check rotary switches S1 and S2 to see if the station address is between 03 and EF.	Check the setting of the station address of the host controller, and reset rotary switches S1 and S2 to change the address to an appropriate value between 03 and EF.	–
Two or more stations on the communications network have the same address.	Check to see if two or more stations on the communications network have the same address.	Check the setting of the station address of the host controller, and reset rotary switches S1 and S2 to change the address to an appropriate value between 03 and EF.	–

- ◆ A.E43:MECHATROLINK Communications Setting Error(This alarm can occur when using MECHATROLINK-4 communications.)

Possible Cause	Confirmation	Correction	Reference
MECHATROLINK communications settings that were set from the host controller are not correct.	Read the MECHATROLINK communications settings that were set from the host controller.	Reconsider the host controller communications settings.	–

- ◆ A.E50:MECHATROLINK Synchronization Error

Possible Cause	Confirmation	Correction	Reference
The WDT data in the host controller was not updated normally.	Check to see if the WDT data is being updated at the host controller.	Correctly update the WDT data at the host controller.	–
A failure occurred in the SERVOPACK.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

- ◆ A.E51:MECHATROLINK Synchronization Failed

Possible Cause	Confirmation	Correction	Reference
The WDT data at the host controller was not updated correctly at the start of synchronous communications, so synchronous communications could not be started.	Check to see if the WDT data is being updated at the host controller.	Correctly update the WDT data at the host controller.	–
A failure occurred in the SERVOPACK.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.E60:Reception Error in MECHATROLINK Communications

Possible Cause	Confirmation	Correction	Reference
MECHATROLINK wiring is not correct.	Check the MECHATROLINK wiring.	Correct the MECHATROLINK cable wiring.	–
A MECHATROLINK data reception error occurred due to noise.	–	Implement countermeasures against noise. (Check the MECHATROLINK cable and FG wiring, and implement measures such as attaching a ferrite core to the MECHATROLINK cable.)	–
A failure occurred in the SERVOPACK.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.E61:Synchronization Interval Error in MECHATROLINK Transmission Cycle

Possible Cause	Confirmation	Correction	Reference
The MECHATROLINK transmission cycle fluctuated.	Check the setting of the MECHATROLINK transmission cycle.	Remove the cause of transmission cycle fluctuation at the host controller.	–
A failure occurred in the SERVOPACK.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.E63:MECHATROLINK Synchronization Frame Not Received

Possible Cause	Confirmation	Correction	Reference
MECHATROLINK wiring is not correct.	Check the MECHATROLINK wiring.	Correct the MECHATROLINK cable wiring.	–
A MECHATROLINK data reception error occurred due to noise.	–	Implement countermeasures against noise. (Check the MECHATROLINK cable and FG wiring, and implement measures such as attaching a ferrite core to the MECHATROLINK cable.)	–
A failure occurred in the SERVOPACK.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.E72:Feedback Option Module Detection Failure

Possible Cause	Confirmation	Correction	Reference
There is a faulty connection between the SERVOPACK and the feedback option module.	Check the connection between the SERVOPACK and the feedback option module.	Correctly connect the feedback option module.	–
The feedback option module was disconnected.	–	Reset the option module configuration error and turn the power to the SERVOPACK OFF and ON again.	–
A failure occurred in the feedback option module.	–	Replace the feedback option module.	–
A failure occurred in the SERVOPACK.	–	Replace the SERVOPACK.	–

◆ A.E88:High-Speed Scan Exceeded Alarm

Possible Cause	Confirmation	Correction	Reference
The processing time of the high-speed scan exceeded the setting of the high-speed scan time.	Check the maximum value of the high-speed scan and the setting of the high-speed scan time.	<ul style="list-style-type: none"> Set the high-speed scan time to a value larger than the maximum value of the high-speed scan. Review the processing in the high-speed scan. 	87

◆ A.E89:Low-Speed Scan Exceeded Alarm

Possible Cause	Confirmation	Correction	Reference
The processing time of the low-speed scan exceeded the setting of the low-speed scan time.	Check the maximum value of the low-speed scan and the setting of the low-speed scan time.	<ul style="list-style-type: none"> Set the low-speed scan time to a value larger than the maximum value of the low-speed scan. Review the processing in the low-speed scan. 	87

◆ A.E8b:User Application Alarm

Possible Cause	Confirmation	Correction	Reference
Bit 0 of OW00061 was set in the user application.	Check if processing sets bit 0 of OW00061 in the user application.	Review the processing in the user application.	166

◆ A.Eb1:Safety Function Signal Input Timing Error

Possible Cause	Confirmation	Correction	Reference
The delay between activation of the /HWBB1 and /HWBB2 input signals for the HWBB was ten second or longer.	Measure the time delay between the /HWBB1 and /HWBB2 signals.	The output signal circuits or devices for /HWBB1 and /HWBB2 or the SERVOPACK input signal circuits may be faulty. Alternatively, the input signal cables may be disconnected. Check to see if any of these items are faulty or have been disconnected.	–
A failure occurred in the SERVOPACK.	–	Replace the SERVOPACK.	–

◆ A.EC8:Gate Drive Error 1
A.EC9:Gate Drive Error 2

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the SERVOPACK.	–	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.Ed1:Command Execution Timeout

Possible Cause	Confirmation	Correction	Reference
A timeout error occurred for a MECHATROLINK command.	Check the motor status when the command is executed.	Execute the SV_ON (Servo ON) command or SENS_ON (Turn Sensor ON) command only when the motor is not operating.	–
A timeout error occurred for a MECHATROLINK command.	<ul style="list-style-type: none"> For fully-closed loop control, check the status of the external encoder when the command is executed. For other types of control, check the status of the linear encoder when the command is executed. 	Execute the SENS_ON (Turn Sensor ON) command only when an external encoder (e.g., a linear encoder) is connected.	–

◆ A.EdA:User Application System Alarm

Possible Cause	Confirmation	Correction	Reference
A system alarm was detected in the user application.	Check the detailed alarm code.	Review the processing in the high-speed or low-speed scan.	–

◆ A.F10:Power Supply Line Open Phase

Possible Cause	Confirmation	Correction	Reference
The three-phase power supply wiring is not correct.	Check the power supply wiring.	Make sure that the power supply is correctly wired.	—
The three-phase power supply is unbalanced.	Measure the voltage for each phase of the three-phase power supply.	Balance the power supply by changing phases.	—
A single-phase AC power supply was input without specifying Pn00B = n.□1□□ (Single-phase AC Power Supply Input).	Check the power supply and the parameter setting.	Match the parameter setting to the power supply.	—
A failure occurred in the SERVOPACK.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

- ◆ FL-1:System Alarm
- ◆ FL-2:System Alarm
- ◆ FL-3:System Alarm
- ◆ FL-4:System Alarm
- ◆ FL-5:System Alarm
- ◆ FL-6:System Alarm
- ◆ FL-7:System Alarm

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the SERVOPACK.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ CPF00:Digital Operator Communications Error 1

Possible Cause	Confirmation	Correction	Reference
There is a faulty connection between the digital operator and the SERVOPACK.	Check the connector contact.	Disconnect the connector and insert it again. Or, replace the cable.	—
A malfunction was caused by noise.	—	Keep the digital operator or the cable away from sources of noise.	—

◆ CPF01:Digital Operator Communications Error 2

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the digital operator.	—	Disconnect the digital operator and then connect it again. If the alarm still occurs, the digital operator may be faulty. Replace the digital operator.	—
A failure occurred in the SERVOPACK.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—
A malfunction was caused by noise.	—	Keep the digital operator or the cable away from sources of noise.	—

11.2 Warning Displays

If a warning occurs in the SERVOPACK, a warning number will be displayed on the panel display. Warnings are displayed to warn you before an alarm occurs.

Certain warnings are reset with the SigmaWin+ and other warnings are automatically reset when a normal command is received. To reset a warning with the SigmaWin+, first eliminate the cause of the warning and then reset it. The reset procedure is the same as an alarm reset. Refer to the following manual for details on Alarm Reset

☞ Σ-X-Series Σ-XS SERVOPACK with MECHATROLINK-4/III Communications References Product Manuals (Manual No.: SIEP C710812 01)

This section provides a list of warnings and the causes of and corrections for warnings.

11.2.1 List of Warnings

The list of warnings gives the warning name and warning meaning in order of the warning numbers.

Note:

Use Pn008 = n.□X□□ (Warning Detection Selection) to control warning detection. However, the following warnings are not affected by the setting of Pn008 = n.□X□□ and other parameter settings are required in addition to Pn008 = n.□X□□.

Warning Number	Parameters That Must Be Set to Select Warning Detection	Reference
A.911	Pn310 = n.□□X (Vibration Detection Selection)	—
A.923	— (Not affected by the setting of Pn008 = n.□X□□.)	—
A.930	Pn008 = n.□□X (Low Battery Voltage Alarm/Warning Selection)	—
A.932	Pn0DD = n.□□X (SigmaLINK II I/O Device Communications Check Mask)	—
A.933	Pn0DD = n.□X□□ (SigmaLINK II I/O Device Status Check Mask)	—
A.94A to A.960, A.97A to A.97F	Pn800=n.□□X□ (Warning Check Masks)	—
A.971	Pn008 = n.□□X□ (Function Selection for Undervoltage) (Not affected by the setting of Pn008 = n.□X□□.)	—
A.9A0	Pn00D = n.X□□□ (Overtravel Warning Detection Selection) (Not affected by the setting of Pn008 = n.□X□□.)	—
A.9b0	Pn00F = n.□□□X (SERVOPACK Preventative Maintenance Warning Selection)	—
A.9b1	Pn00F = n.□□X□ (Servomotor Preventative Maintenance Warning Selection)	—

Warning Number	Warning Name	Warning Meaning	Resetting
A.900	Position Deviation Overflow	The position deviation exceeded the percentage set with the following formula: (Pn520 × Pn51E/100)	Required.
A.901	Position Deviation Overflow Alarm at Servo ON	The position deviation when the servo was turned ON exceeded the percentage set with the following formula: (Pn526 × Pn528/100)	Required.
A.905	Error Detection Warning	An error was detected in error detection.	Required.
A.910	Overload	This warning occurs before an A.710 or A.720 alarm (overload) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.911	Vibration	Abnormal vibration was detected during motor operation. The detection level is the same as A.520. Set whether to output an alarm or a warning by setting Pn310 (Vibration Detection Selections).	Required.
A.912	Internal Temperature Warning 1 (Control Board Temperature Error)	The surrounding temperature of the control board is abnormal.	Required.

Continued on next page.

Warning Number	Warning Name	Warning Meaning	Resetting
A.913	Internal Temperature Warning 2 (Power Board Temperature Error)	The surrounding temperature of the power board is abnormal.	Required.
A.920	Regenerative Overload	This warning occurs before an A.320 alarm (Regenerative Overload) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.921	Dynamic Brake Overload	This warning occurs before an A.731 alarm (Dynamic Brake Overload) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.923	SERVOPACK Built- Fan Stopped	The fan inside the SERVOPACK stopped.	Required.
A.930	Absolute Encoder Battery Error	This warning occurs when the voltage of absolute encoder's battery is low.	Required.
A.932	SigmaLINK II I/O Device Communications Warning	An error occurred in communications with the SigmaLINK II I/O device.	Required.
A.933	SigmaLINK II I/O Device Status Warning	The SigmaLINK II I/O device detected an error.	Required.
A.93b	Overheat Warning	The input voltage (temperature) of the overheat protection input (TH) signal exceeded the setting of Pn61C (Overheat Warning Level).	Required.
A.942	Speed Ripple Compensation Information Disagreement	The speed ripple compensation information stored in the encoder does not agree with the speed ripple compensation information stored in the SERVOPACK.	Required.
A.94A	Data Setting Warning 1 (Parameter Number Error)	There is an error in the parameter number for a Data Setting Warning 1 (Parameter Number) command.	Automatically reset.
A.94b	Data Setting Warning 2 (Out of Range)	The command data is out of range.	Automatically reset.
A.94C	Data Setting Warning 3 (Calculation Error)	A calculation error was detected.	Automatically reset.
A.94d	Data Setting Warning 4 (Parameter Size)	The data sizes do not match.	Automatically reset.
A.94E	Data Setting Warning 5 (Latch Mode Error)	A latch mode error was detected.	Required.
A.95A	Command Warning 1 (Unsatisfied Command Conditions)	A command was sent when the conditions for sending a command were not satisfied.	Automatically reset.
A.95b	Command Warning 2 (Unsupported Command)	An unsupported command was sent.	Automatically reset.
A.95d	Command Warning 4 (Command Interference)	There was command interference, particularly latch command interference.	Automatically reset.
A.95E	Command Warning 5 (Subcommand Not Possible)	The subcommand and main command interfere with each other.	Automatically reset.
A.95F	Command Warning 6 (Undefined Command)	An undefined command was sent.	Automatically reset.
A.960	MECHATROLINK Communications Warning	A communications error occurred during MECHATROLINK communications.	Required.
A.971	Undervoltage	This warning occurs before an A.410 alarm (Undervoltage) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.97A	Command Warning 7 (Phase Error)	A command that cannot be executed in the current phase was sent.	Automatically reset.
A.97b	Data Clamp Out of Range	The set command data was clamped to the minimum or maximum value of the allowable setting range.	Automatically reset.

Continued from previous page.

Warning Number	Warning Name	Warning Meaning	Resetting
A.97E	MECHATROLINK Communications Settings Not Configured Warning(This alarm can occur when using MECHATROLINK-4 communications.)	The host controller attempted to start communications when the MECHATROLINK communications settings were not configured.	Required.
A.97F	MECHATROLINK Communications Setting Warning(This alarm can occur when using MECHATROLINK-4 communications.)	A MECHATROLINK communications setting does not match the servo profile specifications.	Required.
A.988	High-Speed Scan Exceeded Warning	The processing time of the high-speed scan exceeded 75% of the setting of the high-speed scan time.	Required.
A.989	Low-Speed Scan Exceeded Warning	The processing time of the low-speed scan exceeded 75% of the setting of the low-speed scan time.	Required.
A.98b	User Application Warning	Bit 1 of OW00061 was set in the user application.	Required.
A.9A0	Overtravel	Overtravel was detected while the servo was ON.	Required.
A.9b0	SERVOPACK Preventative Maintenance Warning	One of the consumable parts of the SERVOPACK has reached the end of its service life.	Required.
A.9b1	Servomotor Preventative Maintenance Warning	One of the consumable parts of the servomotor has reached the time when maintenance is needed.	Required.
A.9dA	User Application System Warning	A system warning was detected in the user application.	Required.

11.2.2 Troubleshooting Warnings

The causes of and corrections for the warnings are given in the following table. Contact your Yaskawa representative if you cannot solve a problem with the correction given in the table.

◆ A.900:Position Deviation Overflow

Possible Cause	Confirmation	Correction	Reference
The servomotor U, V, and W wiring is not correct.	Check the wiring of the servomotor main circuit cables.	Make sure that there are no faulty contacts in the wiring for the servomotor and encoder.	—
A SERVOPACK gain is too low.	Check the SERVOPACK gains.	Increase the servo gain, e.g., by using autotuning without a host reference.	—
The acceleration of the position reference is too high.	Reduce the reference acceleration and try operating the SERVOPACK.	Reduce the acceleration of the position reference using a MECHATROLINK command. Or, smooth the position reference acceleration by selecting the position reference filter (ACCFIL) using a MECHATROLINK command.	—
The excessive position deviation alarm level (Pn520 × Pn51E/100) is too low for the operating conditions.	Check excessive position deviation alarm level (Pn520 × Pn51E/100) to see if it is set to an appropriate value.	Optimize the settings of Pn520 and Pn51E.	—
A failure occurred in the SERVOPACK.	—	Turn the power to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.901:Position Deviation Overflow Alarm at Servo ON

Possible Cause	Confirmation	Correction	Reference
The position deviation when the servo was turned ON exceeded the percentage set with the following formula: (Pn526 × Pn528/100)	—	Optimize the setting of Pn528 (Position Deviation Overflow Warning Level at Servo ON).	—

◆ A.905:Error Detection Warning

Possible Cause	Confirmation	Correction	Reference
A behavior was detected that differs greatly from the sample data in error detection tracing.	Check the error detection tracing waveform and error rate.	Check if an error has occurred on the equipment. Reconsider Pn5C4 (Error Detection Sample Data Set 1 Warning Level 1) and Pn5C5 (Error Detection Sample Data Set 1 Judgment Level 1).	—

◆ A.910:Overload

Possible Cause	Confirmation	Correction	Reference
The wiring is not correct or there is a faulty connection in the motor or encoder wiring.	Check the wiring.	Make sure that the servomotor and encoder are correctly wired.	—
Operation was performed that exceeded the overload protection characteristics.	Check the motor overload characteristics and operation reference.	Reconsider the load and operating conditions. Or, increase the motor capacity.	—
An excessive load was applied during operation because the servomotor was not driven due to mechanical problems.	Check the operation reference and motor speed.	Remove the mechanical problem.	—
The setting of Pn52B (Overload Warning Level) is not suitable.	Check that the setting of Pn52B (Overload Warning Level) is suitable.	Set Pn52B (Overload Warning Level) to an appropriate value.	—
A failure occurred in the SERVOPACK.	—	The SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.911:Vibration

Possible Cause	Confirmation	Correction	Reference
Abnormal vibration was detected during motor operation.	Check for abnormal motor noise, and check the speed and torque waveforms during operation.	Reduce the motor speed. Or, reduce the servo gain with custom tuning.	—
The setting of Pn103 (Moment of Inertia Ratio) is greater than the actual moment of inertia or was greatly changed.	Check the moment of inertia ratio or mass ratio.	Set Pn103 (Moment of Inertia Ratio) to an appropriate value.	—
The setting of Pn312 or Pn384 (Vibration Detection Level) is not suitable.	Check that the setting of Pn312 or Pn384 (Vibration Detection Level) is suitable.	Set Pn312 or Pn384 (Vibration Detection Level) to an appropriate value.	—

◆ A.912:Internal Temperature Warning 1 (Control Board Temperature Error)
A.913:Internal Temperature Warning 2 (Power Board Temperature Error)

Possible Cause	Confirmation	Correction	Reference
The surrounding temperature is too high.	Check the surrounding temperature using a thermometer. Or, check the operating status with the SERVOPACK installation environment monitor.	Decrease the surrounding temperature by improving the SERVOPACK installation conditions.	—
An overload alarm was reset by turning OFF the power too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	—
There was an excessive load or operation was performed that exceeded the regenerative processing capacity.	Check the load during operation with [Cumulative Load] and check the regenerative capacity with [Regenerative Load] on the operation monitor of the SigmaWin+.	Reconsider the load and operating conditions.	—
The SERVOPACK installation orientation is not correct or there is insufficient space around the SERVOPACK.	Check the SERVOPACK installation conditions.	Install the SERVOPACK according to specifications.	—
A failure occurred in the SERVOPACK.	—	The SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.920:Regenerative Overload

Possible Cause	Confirmation	Correction	Reference
The power supply voltage exceeded the specified range.	Measure the power supply voltage.	Set the power supply voltage within the specified range.	—
There is insufficient external regenerative resistance, regenerative resistor capacity, or SERVOPACK capacity, or there has been a continuous regeneration state.	Check the operating conditions or the capacity.	Change the regenerative resistance value, regenerative resistance capacity, or SERVOPACK capacity. Reconsider the operating conditions.	—
There was a continuous regeneration state because a negative load was continuously applied.	Check the load applied to the servomotor during operation.	Reconsider the system including the servo, machine, and operating conditions.	—

◆ A.921:Dynamic Brake Overload

Possible Cause	Confirmation	Correction	Reference
The servomotor was rotated by an external force.	Check the operation status.	Implement measures to ensure that the motor will not be rotated by an external force.	—
When the servomotor was stopped with the dynamic brake, the rotational or linear kinetic energy exceeded the capacity of the dynamic brake resistor.	Check the power consumed by the DB resistor to see how frequently the DB is being used.	Reconsider the following: <ul style="list-style-type: none"> • Reduce the servomotor command speed. • Decrease the moment of inertia or mass. • Reduce the frequency of stopping with the dynamic brake. 	—
A failure occurred in the SERVOPACK.	—	The SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.923:SERVOPACK Built- Fan Stopped

Possible Cause	Confirmation	Correction	Reference
The fan inside the SERVOPACK stopped.	Check for foreign matter inside the SERVOPACK.	Remove foreign matter from the SERVOPACK. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.930:Absolute Encoder Battery Error

Possible Cause	Confirmation	Correction	Reference
The battery connection is faulty or a battery is not connected.	Check the battery connection.	Correct the battery connection.	—
The battery voltage is lower than the specified value (2.7 V).	Measure the battery voltage.	Replace the battery.	—
A failure occurred in the SERVOPACK.	—	The SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.932:SigmaLINK II I/O Device Communications Warning

Possible Cause	Confirmation	Correction	Reference
There is a faulty contact in the connector or the connector is not wired correctly for the encoder cable.	Check the condition of the encoder cable.	Replace the encoder cable.	—
There is a cable disconnection or short-circuit in the encoder. Or, the cable impedance is outside the specified values.	Check the condition of the encoder cable.	Use the encoder cable within the specified specifications.	—
One of the following has occurred: corrosion caused by improper temperature, humidity, or gas, a short-circuit caused by entry of water drops or cutting oil, or faulty contact in connector caused by vibration.	Check the operating environment.	Improve the operating environment, and replace the cable. If the alarm still occurs, replace the SERVOPACK.	—
A malfunction was caused by noise.	—	Correct the wiring around the encoder by separating the encoder cable from the servomotor main circuit cable or by grounding the encoder.	—
A failure occurred in the SERVOPACK.	—	If the alarm does not occur when the I/O device is connected to a different SERVOPACK and the control power is supplied, the SERVOPACK may be faulty. Replace the SERVOPACK.	—

◆ A.933:SigmaLINK II I/O Device Status Warning

Possible Cause	Confirmation	Correction	Reference
The I/O device detected a warning.	Check the alarm code by reading the I/O device alarm in the SigmaWin+.	Take corrective action according to the I/O device manual.	—

◆ A.93b:Overheat Warning

Possible Cause	Confirmation	Correction	Reference
The surrounding temperature is too high.	Check the surrounding temperature using a thermometer.	Lower the surrounding temperature by improving the installation conditions of the linear servomotor or the machine.	—
Operation was performed under an excessive load.	Check the load with the [Cumulative Load] on the operation monitor of the SigmaWin+.	Reconsider the load and operating conditions.	—
A failure occurred in the SERVOPACK.	—	The SERVOPACK may be faulty. Replace the SERVOPACK.	—
The temperature detection circuit in the linear servomotor is faulty or the sensor attached to the machine is faulty.	—	The temperature detection circuit in the linear servomotor may be faulty or the sensor attached to the machine may be faulty. Replace the linear servomotor or repair the sensor attached to the machine.	—

◆ A.942:Speed Ripple Compensation Information Disagreement

Possible Cause	Confirmation	Correction	Reference
The speed ripple compensation information stored in the encoder does not agree with the speed ripple compensation information stored in the SERVOPACK.	—	Reset the speed ripple compensation value on the SigmaWin+.	—
The speed ripple compensation information stored in the encoder does not agree with the speed ripple compensation information stored in the SERVOPACK.	—	Set Pn423 to n.□□2 (execute speed ripple compensation using the default adjustment value). However, changing this setting may increase the speed ripple when using a Σ -X rotary servomotor.	—
The speed ripple compensation information stored in the encoder does not agree with the speed ripple compensation information stored in the SERVOPACK.	—	Set Pn423 to n.□□1 (do not detect A.942 alarms) . However, changing this setting may increase the speed ripple.	—
The speed ripple compensation information stored in the encoder does not agree with the speed ripple compensation information stored in the SERVOPACK.	—	Set Pn423 to n.□□0 (disable speed ripple compensation). However, changing this setting may increase the speed ripple.	—

◆ A.94A:Data Setting Warning 1 (Parameter Number Error)

Possible Cause	Confirmation	Correction	Reference
An invalid parameter number was used.	Check the command that caused the warning.	Use the correct parameter number.	—

◆ A.94b:Data Setting Warning 2 (Out of Range)

Possible Cause	Confirmation	Correction	Reference
The set command data was out of the setting range.	Check the command that caused the warning.	Set the parameter within the setting range.	—

◆ A.94C:Data Setting Warning 3 (Calculation Error)

Possible Cause	Confirmation	Correction	Reference
The calculation result of the setting is not correct.	Check the command that caused the warning.	Set the parameter within the setting range.	—

◆ A.94d:Data Setting Warning 4 (Parameter Size)

Possible Cause	Confirmation	Correction	Reference
The parameter size set in the command is not correct.	Check the command that caused the warning.	Set the correct parameter size.	—

◆ A.94E:Data Setting Warning 5 (Latch Mode Error)

Possible Cause	Confirmation	Correction	Reference
A latch mode error was detected.	Check the command that caused the warning.	Change the setting of Pn850 or the LT_MOD data for the LTMOD_ON command sent by the host controller to an appropriate value.	—

◆ A.95A:Command Warning 1 (Unsatisfied Command Conditions)

Possible Cause	Confirmation	Correction	Reference
The command conditions are not satisfied.	Check the command that caused the warning.	Send the command after the command conditions are satisfied.	—

◆ A.95b:Command Warning 2 (Unsupported Command)

Possible Cause	Confirmation	Correction	Reference
An unsupported command was received.	Check the command that caused the warning.	Do not send unsupported commands.	–

◆ A.95d:Command Warning 4 (Command Interference)

Possible Cause	Confirmation	Correction	Reference
The command sending conditions for latch-related commands was not satisfied.	Check the command that caused the warning.	Send the command after the conditions are satisfied.	–

◆ A.95E:Command Warning 5 (Subcommand Not Possible)

Possible Cause	Confirmation	Correction	Reference
The command sending conditions for subcommands was not satisfied.	Check the command that caused the warning.	Send the command after the conditions are satisfied.	–

◆ A.95F:Command Warning 6 (Undefined Command)

Possible Cause	Confirmation	Correction	Reference
An undefined command was sent.	Check the command that caused the warning.	Do not send undefined commands.	–

◆ A.960:MECHATROLINK Communications Warning

Possible Cause	Confirmation	Correction	Reference
The MECHATROLINK cable is not wired correctly.	Check the wiring conditions.	Correct the MECHATROLINK cable wiring.	–
A MECHATROLINK data reception error occurred due to noise.	Check the installation conditions.	Implement the following countermeasures against noise. <ul style="list-style-type: none"> • Check the MECHATROLINK cable and FG wiring and implement countermeasures to prevent noise from entering. • Attach a ferrite core to the MECHATROLINK cable. 	–
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.971:Undervoltage

Possible Cause	Confirmation	Correction	Reference
For a 200-V SERVOPACK, the AC power supply voltage dropped below 140 V.	Measure the power supply voltage.	Set the power supply voltage within the specified range.	–
The power supply voltage dropped during operation.	Measure the power supply voltage.	Increase the power supply capacity.	–
A momentary power interruption occurred.	Measure the power supply voltage.	If you have changed the setting of Pn509 (Momentary Power Interruption Hold Time), decrease the setting.	–
The SERVOPACK fuse is blown out.	–	Replace the SERVOPACK and connect a reactor.	–
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ A.97A:Command Warning 7 (Phase Error)

Possible Cause	Confirmation	Correction	Reference
A command that cannot be executed in the current phase was sent.	—	Send the command after the conditions are satisfied.	—

◆ A.97b:Data Clamp Out of Range

Possible Cause	Confirmation	Correction	Reference
The set command data was out of the setting range.	—	Set the command data within the setting ranges.	—

◆ A.97E:MECHATROLINK Communications Settings Not Configured Warning

Possible Cause	Confirmation	Correction	Reference
The host controller attempted to start communications when the MECHATROLINK communications settings were not configured.	Check if the MECHATROLINK connection configuration settings on the host controller differ from the actual connection configuration.	Configure the MECHATROLINK connection configuration settings on the host controller again. Start the host controller after the power to the SERVOPACK is turned ON and the SERVOPACK has started.	—
The host controller attempted to start communications when the MECHATROLINK communications settings were not configured.	Check if the power to the SERVOPACK is turned ON after MECHATROLINK communications initialization is completed on the host controller.	First turn ON the power to the SERVOPACK, and then execute MECHATROLINK communications initialization on the host controller.	—

◆ A.97F:MECHATROLINK Communications Setting Warning

Possible Cause	Confirmation	Correction	Reference
The setting value for the number of transmission bytes is not a multiple of four.	Check if the number of transmission bytes in the communications settings on the host controller is correct.	Set the number of transmission bytes in the communications settings on the host controller again as a multiple of four.	—
The setting value for the number of transmission bytes is less than 16 bytes or greater than 80 bytes.	Check if the number of transmission bytes in the communications settings on the host controller is correct.	Set the number of transmission bytes in the communications settings on the host controller again to between 16 bytes and 80 bytes.	—
The transmission cycle setting is a setting that is not supported by the product specifications.	Check if the transmission cycle in the communications settings on the host controller is correct.	Set the transmission cycle again to a value within the following setting range from the host controller. 62.5 μ s, 125 μ s, 250 μ s, 500 μ s, 750 μ s, 1.0 ms to 4.0 ms (multiple of 0.5 ms)	—
Reading the MECHATROLINK communications settings failed.	—	Check the address and data size of the MECHATROLINK communications settings to read.	—

◆ A.988:High-Speed Scan Exceeded Warning

Possible Cause	Confirmation	Correction	Reference
The processing time of the high-speed scan exceeded 75% of the setting of the high-speed scan time.	Check the maximum value of the high-speed scan and the setting of the high-speed scan time.	<ul style="list-style-type: none"> Set the high-speed scan time to a value larger than the maximum value of the high-speed scan. Review the processing in the high-speed scan. 	87

◆ A.989:Low-Speed Scan Exceeded Warning

Possible Cause	Confirmation	Correction	Reference
The processing time of the low-speed scan exceeded 75% of the setting of the low-speed scan time.	Check the maximum value of the low-speed scan and the setting of the low-speed scan time.	<ul style="list-style-type: none"> Set the low-speed scan time to a value larger than the maximum value of the low-speed scan. Review the processing in the low-speed scan. 	87

◆ A.98b:User Application Warning

Possible Cause	Confirmation	Correction	Reference
Bit 1 of OW00061 was set in the user application.	Check if processing sets bit 1 of OW00061 in the user application.	Review the processing in the user application.	166

◆ A.9A0:Overtravel

Possible Cause	Confirmation	Correction	Reference
Overtravel was detected while the servo was ON.	Check the status of the overtravel signals on the input signal monitor.	<p>Even if an overtravel signal is not shown by the input signal monitor, momentary overtravel may have been detected. Take the following precautions.</p> <ul style="list-style-type: none"> • Do not specify movements that would cause overtravel from the host controller. • Check the wiring of the overtravel signals. • Implement countermeasures against noise. 	—

◆ A.9b0:SERVOPACK Preventative Maintenance Warning

Possible Cause	Confirmation	Correction	Reference
One of the consumable parts of the SERVOPACK has reached the end of its service life.	—	Replace the part. Contact your Yaskawa representative for replacement.	—

◆ A.9b1:Servomotor Preventative Maintenance Warning

Possible Cause	Confirmation	Correction	Reference
One of the consumable parts of the servomotor has reached the time when maintenance is needed.	—	Replace the part. Contact your Yaskawa representative for replacement.	—

◆ A.9dA:User Application System Warning

Possible Cause	Confirmation	Correction	Reference
A system warning was detected in the user application.	Check the detailed alarm code.	Review the processing in the high-speed or low-speed scan.	—

11.3 Troubleshooting Based on the Operation and Conditions of the Servomotor

This section provides troubleshooting based on the operation and conditions of the servomotor, including causes and corrections.

11.3.1 Servomotor Does Not Start

Possible Cause	Confirmation	Correction	Reference
There is a mistake in the wiring of the MECHATROLINK cable.	Check if the L1 and L2 LED indicators are lit.	Turn OFF the power to the servo system. Correct the MECHATROLINK cable wiring.	—
MECHATROLINK Cyclic Communications Did Not Start	Check if the CN6A LED indicator is lit.	Use the correct procedure to configure the communications settings from the host controller.	—
The control power is not turned ON.	Measure the voltage between control power supply terminals.	Turn OFF the power to the servo system. Correct the wiring so that the control power is turned ON.	—
The main circuit power is not turned ON.	Measure the voltage between the main circuit power input terminals.	Turn OFF the power to the servo system. Correct the wiring so that the main circuit power is turned ON.	—
The I/O signal connector (CN1) pins are not wired correctly or are disconnected.	Turn OFF the power to the servo system. Check the wiring condition of the I/O signal connector (CN1) pins.	Correct the wiring of the I/O signal connector (CN1) pins.	—
The wiring servomotor main circuit cables or encoder cable is disconnected.	Check the wiring conditions.	Turn OFF the power to the servo system. Wire the cable correctly.	—
There is an overload on the servomotor.	Operate the servomotor with no load and check the load status.	Turn OFF the power to the servo system. Reduce the load or replace the servomotor with a servomotor with a larger capacity.	—
The type of encoder that is being used does not agree with the setting of Pn002 = n.□X□□ (Encoder Usage).	Check the type of the encoder that is being used and the setting of Pn002 = n.□X□□.	Set Pn002 = n.□X□□ according to the type of the encoder that is being used.	—
There is a mistake in the input signal allocations.	Check the allocations of the input signals. • Pn50A, Pn50B, Pn511, Pn516 or • Pn50A, Pn590 to Pn599	Correctly allocate the input signals.	—
The SV_ON (Servo ON) command was not sent.	Check the commands sent from the host controller.	Send the SV_ON (Servo ON) command from the host controller.	—
The SENS_ON (Turn Sensor ON) command was not sent.	Check the commands sent from the host controller.	Send the commands to the SERVO-PACK in the correct sequence.	—
The P-OT (Forward Drive Prohibit Input) or N-OT (Reverse Drive Prohibit Input) signal is still OFF.	Check the P-OT and N-OT signals.	Turn ON the P-OT and N-OT signals.	—
The safety input signals (/HWBB1 or /HWBB2) are still OFF.	Check the /HWBB1 and /HWBB2 input signals.	Turn ON the /HWBB1 and /HWBB2 input signals. If you are not using the safety function, connect the safety jumper connector (provided as an accessory) to CN8.	—
		Validate the safety functions.	—

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Possible Cause	Confirmation	Correction	Reference
The FSTP (Forced Stop Input) signal is still OFF.	Check the FSTP signal.	<ul style="list-style-type: none"> Turn ON the FSTP signal. If you will not use the function to force the motor to stop, set Pn516 = n.□□□X (FSTP (Forced Stop Input) Signal Allocation) to disable the signal. 	—
A failure occurred in the SERVOPACK.	—	Turn OFF the power to the servo system. Replace the SERVOPACK.	—
The polarity detection was not executed.	Check the setting of Pn080 = n.□□□X (Polarity Sensor Selection).	Correct the parameter setting.	—
	Check the inputs to the SV_ON (Servo ON) command.	<ul style="list-style-type: none"> If you are using an incremental linear encoder, send the SV_ON (Servo ON) command from the host controller. If you are using an absolute linear encoder, execute polarity detection. 	—

11.3.2 Servomotor Moves Instantaneously, and Then Stops

Possible Cause	Confirmation	Correction	Reference
There is a mistake in the servomotor wiring.	Turn OFF the power to the servo system. Check the wiring.	Wire the cable correctly.	—
There is a mistake in the wiring of the encoder or serial converter unit.	Turn OFF the power to the servo system. Check the wiring.	Wire the cable correctly.	—
There is a mistake in the linear encoder wiring.	Turn OFF the power to the servo system. Check the wiring.	Wire the cable correctly.	—
The setting of Pn282 (Linear Encoder Scale Pitch) is not correct.	Check the setting of Pn282.	Correct the setting of Pn282.	—
The count-up direction of the linear encoder does not match the forward direction of the moving coil in the motor.	Check the directions.	Change the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection). Place the linear encoder and motor in the same direction.	—
Polarity detection was not performed correctly.	Check to see if electrical angle 2 (electrical angle from polarity origin) at any position is between $\pm 10^\circ$.	Correct the settings for the polarity detection-related parameters.	—

11.3.3 Servomotor Speed Is Unstable

Possible Cause	Confirmation	Correction	Reference
There is a faulty connection in the servomotor wiring.	The connector connections for the power line (U, V, and W phases) and the encoder or serial converter unit may be unstable. Turn OFF the power to the servo system. Check the wiring.	Tighten any loose terminals or connectors and correct the wiring.	—

11.3.4 Servomotor Moves without a Reference Input

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the SERVOPACK.	—	Turn OFF the power to the servo system. Replace the SERVOPACK.	—
The count-up direction of the linear encoder does not match the forward direction of the moving coil in the motor.	Check the directions.	Change the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection). Match the linear encoder direction and servomotor direction.	—
Polarity detection was not performed correctly.	Check to see if electrical angle 2 (electrical angle from polarity origin) at any position is between $\pm 10^\circ$.	Correct the settings for the polarity detection-related parameters.	—

11.3.5 Dynamic Brake Does Not Operate

Possible Cause	Confirmation	Correction	Reference
The setting of Pn001 = n.□□□X (Motor Stopping Method for Servo OFF and Group 1 Alarms) is not suitable.	Check the setting of Pn001 = n.□□□X.	Correct the setting of Pn001 = n.□□□X.	—
The dynamic brake resistor is disconnected.	Check the moment of inertia, motor speed, and dynamic brake frequency of use. If the moment of inertia, motor speed, or dynamic brake frequency of use is excessive, the dynamic brake resistor may be disconnected.	Turn OFF the power to the servo system. Replace the SERVOPACK. To prevent disconnection, reduce the load.	—
There was a failure in the dynamic brake drive circuit.	—	There is a defective component in the dynamic brake circuit. Turn OFF the power to the servo system. Replace the SERVOPACK.	—

11.3.6 Abnormal Noise from Servomotor

Possible Cause	Confirmation	Correction	Reference
The servomotor vibrated considerably while performing the tuning-less function with the default settings.	Check the waveform of the motor speed.	Reduce the load so that the load moment of inertia ratio or mass ratio is within the allowable value, or increase the load level or reduce the response level in the tuning-less level settings. If the situation is not improved, set Pn170 = n.□□□0 (disable the tuning-less function) and execute autotuning either with or without a host reference.	—
The machine mounting is not secure.	Turn OFF the power to the servo system. Check the servomotor installation.	Tighten the mounting screws.	—
	Turn OFF the power to the servo system. Check to see if there is misalignment in the coupling.	Align the coupling.	—
	Turn OFF the power to the servo system. Check to see if the coupling is balanced.	Balance the coupling.	—
The bearings are defective.	Turn OFF the power to the servo system. Check for noise and vibration around the bearings.	Replace the servomotor.	—

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Possible Cause	Confirmation	Correction	Reference
There is a vibration source at the driven machine.	Turn OFF the power to the servo system. Check for any foreign matter, damage, or deformation in the machine's moving parts.	Consult with the machine manufacturer.	—
Noise interference occurred because of incorrect I/O signal cable specifications.	Turn OFF the power to the servo system. Check the I/O signal cables to see if they satisfy specifications. Use a shielded twisted-pair wire cable or a screened twisted-pair cable with conductors of at least 0.12 mm ² .	Use cables that satisfy the specifications.	—
Noise interference occurred because an I/O signal cable is too long.	Turn OFF the power to the servo system. Check the lengths of the I/O signal cables.	The I/O signal cables must be no longer than 3 m.	—
Noise interference occurred because of incorrect encoder cable specifications.	Turn OFF the power to the servo system. Check the encoder cable to see if it satisfies specifications. Use a shielded twisted-pair wire cable or a screened twisted-pair cable with conductors of at least 0.12 mm ² .	Use cables that satisfy the specifications.	—
Noise interference occurred because the encoder cable is too long.	Turn OFF the power to the servo system. Check the length of the encoder cable.	<ul style="list-style-type: none"> Rotary servomotors: The encoder cable length must be 50 m max. Linear servomotors: Make sure that the serial converter unit cable is no longer than 20 m and that the linear encoder cable and the sensor cable are no longer than 15 m each. 	—
Noise interference occurred because the encoder cable is damaged.	Turn OFF the power to the servo system. Check the encoder cable to see if it is pinched or the sheath is damaged.	Replace the encoder cable and correct the cable installation environment.	—
The encoder cable was subjected to excessive noise interference.	Turn OFF the power to the servo system. Check to see if the encoder cable is bundled with a power line or installed near a power line.	Correct the cable layout so that no surge is applied by power line.	—
There is variation in the FG potential because of the influence of machines on the servomotor side, such as a welder.	Turn OFF the power to the servo system. Check to see if the machines are correctly grounded.	Properly ground the machines to separate them from the FG of the encoder.	—
There is a SERVOPACK pulse counting error due to noise.	Check to see if there is noise interference on the signal line from the encoder.	Turn OFF the power to the servo system. Implement countermeasures against noise for the encoder wiring.	—
The encoder was subjected to excessive vibration or shock.	Turn OFF the power to the servo system. Check to see if vibration from the machine occurred. Check the servomotor installation (mounting surface precision, securing state, and alignment). Check the linear encoder installation (mounting surface precision and securing method).	Reduce machine vibration. Improve the mounting state of the servomotor or linear encoder.	—
A failure occurred in the encoder.	—	Turn OFF the power to the servo system. Replace the servomotor.	—
A failure occurred in the serial converter unit.	—	Turn OFF the power to the servo system. Replace the serial converter unit.	—
A failure occurred in the linear encoder.	—	Turn OFF the power to the servo system. Replace the linear encoder.	—

11.3.7 Servomotor Vibrates at Frequency of Approx. 200 to 400 Hz.

Possible Cause	Confirmation	Correction	Reference
The servo gains are not balanced.	Check to see if the servo gains have been correctly tuned.	Perform autotuning without a host reference.	—
The setting of Pn100 (Speed Loop Gain) is too high.	Check the setting of Pn100 (Speed Loop Gain). The default setting is $K_v = 40.0$ Hz.	Set Pn100 (Speed Loop Gain) to an appropriate value.	—
The setting of Pn102 (Position Loop Gain) is too high.	Check the setting of Pn102 (Position Loop Gain). The default setting is $K_p = 40.0/s$.	Set Pn102 (Position Loop Gain) to an appropriate value.	—
The setting of Pn101 (Speed Loop Integral Time Constant) is not appropriate.	Check the setting of Pn101 (Speed Loop Integral Time Constant). The default setting is $T_i = 20.0$ ms.	Set Pn101 (Speed Loop Integral Time Constant) to an appropriate value.	—
The setting of Pn103 (Moment of Inertia Ratio) is not appropriate.	Check the setting of Pn103 (Moment of Inertia Ratio).	Set Pn103 (Moment of Inertia Ratio) to an appropriate value.	—

11.3.8 Large Motor Speed on Starting and Stopping

Possible Cause	Confirmation	Correction	Reference
The servo gains are not balanced.	Check to see if the servo gains have been correctly tuned.	Perform autotuning without a host reference.	—
The setting of Pn100 (Speed Loop Gain) is too high.	Check the setting of Pn100 (Speed Loop Gain). The default setting is $K_v = 40.0$ Hz.	Set Pn100 (Speed Loop Gain) to an appropriate value.	—
The setting of Pn102 (Position Loop Gain) is too high.	Check the setting of Pn102 (Position Loop Gain). The default setting is $K_p = 40.0/s$.	Set Pn102 (Position Loop Gain) to an appropriate value.	—
The setting of Pn101 (Speed Loop Integral Time Constant) is not appropriate.	Check the setting of Pn101 (Speed Loop Integral Time Constant). The default setting is $T_i = 20.0$ ms.	Set Pn101 (Speed Loop Integral Time Constant) to an appropriate value.	—
The setting of Pn103 (Moment of Inertia Ratio) is not appropriate.	Check the setting of Pn103 (Moment of Inertia Ratio).	Set Pn103 (Moment of Inertia Ratio) to an appropriate value.	—
The torque reference is saturated.	Check the waveform of the torque reference.	Use the mode switching.	—
Pn483 (Forward Force Limit) and Pn484 (Reverse Force Limit) are set to the default values.	Force limits: Default settings Pn483 = 30% Pn484 = 30%	Set Pn483 (Forward Force Limit) and Pn484 (Reverse Force Limit) to appropriate values.	—

11.3.9 Absolute Encoder Position Deviation Error (The position that was saved in the host controller when the power was turned OFF is different from the position when the power was next turned ON.)

Possible Cause	Confirmation	Correction	Reference
Noise interference occurred because of incorrect encoder cable specifications.	Turn OFF the power to the servo system. Check the encoder cable to see if it satisfies specifications. Use a shielded twisted-pair wire cable or a screened twisted-pair cable with conductors of at least 0.12 mm ² .	Use cables that satisfy the specifications.	—
Noise interference occurred because the encoder cable is too long.	Turn OFF the power to the servo system. Check the length of the encoder cable.	<ul style="list-style-type: none"> Rotary servomotors: The encoder cable length must be 50 m max. Linear servomotors: Make sure that the serial converter unit cable is no longer than 20 m and that the linear encoder cable and the sensor cable are no longer than 15 m each. 	—
Noise interference occurred because the encoder cable is damaged.	Turn OFF the power to the servo system. Check the encoder cable to see if it is pinched or the sheath is damaged.	Replace the encoder cable and correct the cable installation environment.	—
The encoder cable was subjected to excessive noise interference.	Turn OFF the power to the servo system. Check to see if the encoder cable is bundled with a power line or installed near a power line.	Correct the cable layout so that no surge is applied by power line.	—
There is variation in the FG potential because of the influence of machines on the servomotor side, such as a welder.	Turn OFF the power to the servo system. Check to see if the machines are correctly grounded.	Properly ground the machines to separate them from the FG of the encoder.	—
There is a SERVOPACK pulse counting error due to noise.	Turn OFF the power to the servo system. Check to see if there is noise interference on the signal line from the encoder or serial converter unit.	Implement countermeasures against noise for the encoder or serial converter unit wiring.	—
The encoder was subjected to excessive vibration or shock.	Turn OFF the power to the servo system. Check to see if vibration from the machine occurred. Check the servomotor installation (mounting surface precision, securing state, and alignment). Check the linear encoder installation (mounting surface precision and securing method).	Reduce machine vibration. Improve the mounting state of the servomotor or linear encoder.	—
A failure occurred in the encoder.	—	Turn OFF the power to the servo system. Replace the servomotor or linear encoder.	—
A failure occurred in the SERVOPACK.	—	Turn OFF the power to the servo system. Replace the SERVOPACK.	—
Host controller multiturn data or absolute encoder position data reading error	Check the error detection section of the host controller.	Correct the error detection section of the host controller.	—
	Check to see if the host controller is executing data parity checks.	Perform parity checks for the multiturn data or absolute encoder position data.	—
	Check for noise interference in the cable between the SERVOPACK and the host controller.	Implement countermeasures against noise and then perform parity checks again for the multiturn data or absolute encoder position data.	—

11.3.10 Overtravel Occurred

Possible Cause	Confirmation	Correction	Reference
The P-OT/N-OT (Forward Drive Prohibit Input or Reverse Drive Prohibit Input) signal was input.	Check the external power supply (+24 V) voltage for the input signals.	Correct the external power supply (+24 V) voltage for the input signals.	—
	Check the operating condition of the overtravel limit switches.	Make sure that the overtravel limit switches operate correctly.	—
	Check the wiring of the overtravel limit switches.	Correct the wiring of the overtravel limit switches.	—
	Check the settings of the overtravel input signal allocation (Pn50A/Pn50B or Pn590/Pn591).	Set the parameters to correct values.	—
The P-OT/N-OT (Forward Drive Prohibit Input or Reverse Drive Prohibit Input) signal malfunctioned.	Check for fluctuation in the external power supply (+24 V) voltage for the input signals.	Eliminate fluctuation from the external power supply (+24 V) voltage for the input signals.	—
	Check to see if the operation of the overtravel limit switches is unstable.	Stabilize the operating condition of the overtravel limit switches.	—
	Check the wiring of the overtravel limit switches (e.g., check for cable damage and loose screws).	Correct the wiring of the overtravel limit switches.	—
There is a mistake in the allocation of the P-OT/N-OT (Forward Drive Prohibit Input or Reverse Drive Prohibit Input).	Check if the SERVOPACK is configured in one of the following ways: <ul style="list-style-type: none"> Pn50A = n.□□□1 (use Sigma-7S-compatible I/O signal allocation mode) and the P-OT signal is allocated to CN1 with Pn50A = n.X□□□. Pn50A = n.□□□2 (use SigmaLINK II input signal allocation mode) and the P-OT signal is allocated to CN1 with Pn590. 	Set the parameters to correct values.	—
	Check if the SERVOPACK is configured in one of the following ways: <ul style="list-style-type: none"> Pn50A = n.□□□1 (use Sigma-7S-compatible I/O signal allocation mode) and the N-OT signal is allocated to CN1 with Pn50B = n.□□□X. Pn50A = n.□□□2 (use SigmaLINK II input signal allocation mode) and the N-OT signal is allocated to CN1 with Pn591. 	Set the parameters to correct values.	—
The selection of the servomotor stopping method is not correct.	Check the servo OFF stopping method set in Pn001 = n.□□□X or Pn001 = n.□□X□.	Select a servomotor stopping method other than coasting to a stop.	—
	Check the torque control stopping method set in Pn001 = n.□□□X or Pn001 = n.□□X□.	Select a servomotor stopping method other than coasting to a stop.	—

11.3.11 Improper Stop Position for Overtravel (OT) Signal

Possible Cause	Confirmation	Correction	Reference
The limit switch position and dog length are not appropriate.	—	Install the limit switch at the appropriate position.	—
The overtravel limit switch position is too close for the coasting distance.	—	Install the overtravel limit switch at the appropriate position.	—

11.3.12 Position Deviation (without Alarm)

Possible Cause	Confirmation	Correction	Reference
Noise interference occurred because of incorrect encoder cable specifications.	Turn OFF the power to the servo system. Check the encoder cable to see if it satisfies specifications. Use a shielded twisted-pair wire cable or a screened twisted-pair cable with conductors of at least 0.12 mm ² .	Use cables that satisfy the specifications.	—
Noise interference occurred because the encoder cable is too long.	Turn OFF the power to the servo system. Check the length of the encoder cable.	<ul style="list-style-type: none"> Rotary servomotors: The encoder cable length must be 50 m max. Linear servomotors: Make sure that the serial converter unit cable is no longer than 20 m and that the linear encoder cable and the sensor cable are no longer than 15 m each. 	—
Noise interference occurred because the encoder cable is damaged.	Turn OFF the power to the servo system. Check the encoder cable to see if it is pinched or the sheath is damaged.	Replace the encoder cable and correct the cable installation environment.	—
The encoder cable was subjected to excessive noise interference.	Turn OFF the power to the servo system. Check to see if the encoder cable is bundled with a power line or installed near a power line.	Correct the cable layout so that no surge is applied by power line.	—
There is variation in the FG potential because of the influence of machines on the servomotor side, such as a welder.	Turn OFF the power to the servo system. Check to see if the machines are correctly grounded.	Properly ground the machines to separate them from the FG of the encoder.	—
There is a SERVOPACK pulse counting error due to noise.	Turn OFF the power to the servo system. Check to see if there is noise interference on the signal line from the encoder or serial converter unit.	Implement countermeasures against noise for the encoder wiring or serial converter unit wiring.	—
The encoder was subjected to excessive vibration or shock.	Turn OFF the power to the servo system. Check to see if vibration from the machine occurred. Check the servomotor installation (mounting surface precision, securing state, and alignment). Check the linear encoder installation (mounting surface precision and securing method).	Reduce machine vibration. Improve the mounting state of the servomotor or linear encoder.	—
The coupling between the machine and servomotor not suitable.	Turn OFF the power to the servo system. Check to see if position offset occurs at the coupling between machine and servomotor.	Correctly secure the coupling between the machine and servomotor.	—
Noise interference occurred because of incorrect I/O signal cable specifications.	Turn OFF the power to the servo system. Check the I/O signal cables to see if they satisfy specifications. Use a shielded twisted-pair wire cable or a screened twisted-pair cable with conductors of at least 0.12 mm ² .	Use cables that satisfy the specifications.	—
Noise interference occurred because an I/O signal cable is too long.	Turn OFF the power to the servo system. Check the lengths of the I/O signal cables.	The I/O signal cables must be no longer than 3 m.	—
An encoder fault occurred. (The pulse count does not change.)	—	Turn OFF the power to the servo system. Replace the servomotor or linear encoder.	—
A failure occurred in the SERVOPACK.	—	Turn OFF the power to the servo system. Replace the SERVOPACK.	—

11.3.13 Servomotor Overheated

Possible Cause	Confirmation	Correction	Reference
The surrounding temperature is too high.	Measure the surrounding temperature around the servomotor.	Reduce the surrounding temperature to 40°C or less.	—
The surface of the servomotor is dirty.	Turn OFF the power to the servo system. Visually check the surface for dirt.	Clean dirt, dust, and oil from the surface.	—
There is an overload on the servomotor.	Check the load status with a monitor.	If the servomotor is overloaded, reduce the load or replace the servo drive with a SERVOPACK and servomotor with larger capacities.	—
Polarity detection was not performed correctly.	Check to see if electrical angle 2 (electrical angle from polarity origin) at any position is between $\pm 10^\circ$.	Correct the settings for the polarity detection-related parameters.	—

Parameter Lists

Provides information on the parameters.

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12.1 Servo Parameters: Interpreting the Parameter Lists

◆ Pn000: Basic Function Selections 0

Size	Setting Range	Setting Unit	Default Setting	(1) Applicable Motors	(2) When Enabled	(3) Classification	Reference
2	0000h to 10B1h	-	0000h	All	After restart	Setup	-

Digit	Meaning	Reference
n.□□□X	Rotation Direction Selection Movement Direction Selection	Speed Pos Trq -
0 Default	Use CCW as the forward direction. Use the direction in which the linear encoder counts up as the forward direction.	157
1	Use CW as the forward direction. (Reverse Rotation Mode) Use the direction in which the linear encoder counts down as the forward direction. (Reverse Movement Mode)	157
n.□□X□	Control Method Selection	Speed Pos Trq -
0 Default	Speed control with analog references	151

(4) (5)

No.	Item	Meaning
(1)	Applicable Motors	<p>Indicates the types of servomotors to which the parameter applies.</p> <ul style="list-style-type: none"> All: The parameter is used for both rotary servomotors and linear servomotors. Rotary: The parameter is used for only rotary servomotors. Linear: The parameter is used for only linear servomotors. <p>If this item differs by digit, it is added to the digit table.</p> <p>Rotary servomotor terms are used for parameters that are applicable to all servomotors. If you are using a linear servomotor, you need to interpret the terms accordingly. Refer to the following sections for details.</p> <p>i.4.2 Differences in Terms for Rotary Servomotors and Linear Servomotors on page 20</p>
(2)	When Enabled	<p>This is when any change made to the parameter will become effective. "After restart" indicates parameters that will be effective after one of the following is executed.</p> <ul style="list-style-type: none"> The power is turned OFF and ON again. The CONFIG (Device setup request) command is sent. A software reset is executed. <p>If this item differs by digit, it is added to the digit table.</p>
(3)	Classification	<p>There are the following two classifications.</p> <ul style="list-style-type: none"> Setup Tuning <p>Refer to the following manual for details.</p> <p>Σ-X-Series Σ-XS SERVOPACK with MECHATROLINK-4/III Communications References Product Manuals (Manual No.: SIEP C710812 01)</p>
(4)	Digit Name and Setting Description	<p>If there are differences in the parameters for rotary servomotor and linear servomotor, information is provided for both.</p> <ul style="list-style-type: none"> Top row: For rotary servomotors Bottom row: For linear servomotors
(5)	Control Mode	<p>Speed: A parameter that can be used in speed control.</p> <p>Pos: A parameter that can be used in position control.</p> <p>Trq: A parameter that can be used in torque control. "Torque" is used even for linear servomotor parameters.</p> <p>Grayed-out icons (Speed, Speed, Speed) indicate parameters that cannot be used in the corresponding control method.</p> <p>For parameters for numeric settings, this item is added next to the parameter name.</p> <p>For parameters for selecting functions, this item is added to each digit in the table.</p>

12.2 List of Servo Parameters: MECHATROLINK-4 Communications References

The following table lists the parameters.

Note:

Do not change the following parameters from their default settings.

- Reserved parameters
- Parameters not given in this manual
- Parameters that are not valid for the servomotor that you are using, as given in the parameter table

◆ Pn000: Basic Function Selections 0

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to 10B1h	–	0000h	All	After restart	Setup	–	
Digit	Meaning							
n.□□□X	Rotation Direction Selection					Speed	Pos	Trq
	Movement Direction Selection							
0 Default	Use CCW as the forward direction.							
	Use the direction in which the linear encoder counts up as the forward direction.							
1	Use CW as the forward direction. (Reverse Rotation Mode)							
	Use the direction in which the linear encoder counts down as the forward direction. (Reverse Movement Mode)							
n.□□□□	Reserved (Do not change.)							
n.□X□□	Reserved (Do not change.)							
n.X□□□	Rotary/Linear Servomotor Startup Selection When Encoder Is Not Connected					Speed	Pos	Trq
0 Default	When an encoder is not connected, start as SERVOPACK for rotary servomotor.							
1	When an encoder is not connected, start as SERVOPACK for linear servomotor.							

◆ Pn001: Application Function Selections 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1142h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Motor Stopping Method for Servo OFF and Group 1 Alarms						Speed Pos Trq
0 Default	Stop the motor by applying the dynamic brake.						
1	Stop the motor by the applying dynamic brake and then release the dynamic brake.						
2	Coast the motor to a stop without the dynamic brake.						
n.□□X□	Overtravel Stopping Method						Speed Pos Trq
0 Default	Apply the dynamic brake or coast the motor to a stop (use the stopping method set in Pn001 = n.□□X).						
1	Decelerate the motor to a stop using the torque set in Pn406 as the maximum torque and then servo-lock the motor.						
2	Decelerate the motor to a stop using the torque set in Pn406 as the maximum torque and then let the motor coast.						
3	Decelerate the motor to a stop using the deceleration time set in Pn30A and then servo-lock the motor.						
4	Decelerate the motor to a stop using the deceleration time set in Pn30A and then let the motor coast.						
n.□X□□	Main Circuit Power Supply AC/DC Input Selection						Speed Pos Trq
0 Default	Input AC power as the main circuit power supply using the L1, L2, and L3 terminals (do not use shared converter).						
1	Input DC as the main circuit power supply using the B1/⊕, ⊖2 terminals or the B1 and ⊖2 terminals (use an external converter or the shared converter).						
n.X□□□	Reserved (Do not change.)						

◆ Pn002: Application Function Selections 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to 4213h	–	0011h	–	After restart	Setup	–	
Digit	Meaning						Applicable Motors	
n.□□□X	MECHATROLINK Command Position and Speed Control Option						Speed Pos Trq	–
0	Reserved (Do not use.)							All
1 Default	Use TLIM as the torque limit.							All
2	Reserved (Do not use.)							All
3	Reserved (Do not use.)							All
n.□□X□	Torque Control Option						Speed Pos Trq	–
0	Reserved (Do not use.)							All
1 Default	Use the speed limit for torque control (VLIM) as the speed limit.							All
n.□X□□	Encoder Usage						Speed Pos Trq	–
0 Default	Use the encoder according to encoder specifications.							All
1	Use the encoder as an incremental encoder.							All
2	Use the encoder as a single-turn absolute encoder.							Rotary
n.X□□□	External Encoder Usage						Speed Pos Trq	–
0 Default	Do not use an external encoder.							Rotary
1	The external encoder moves in the forward direction for CCW motor rotation.							Rotary
2	Reserved (Do not use.)							Rotary
3	The external encoder moves in the reverse direction for CCW motor rotation.							Rotary
4	Reserved (Do not use.)							Rotary

◆ Pn006: Application Function Selections 6

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 105Fh	–	0002h	All	Immediately	Setup	–
Digit	Meaning						
n.□□XX	Analog Monitor 1 Signal Selection						Speed Pos Trq
00	Motor speed (1 V/1000 min ⁻¹)						
	Motor speed (1 V/1000 mm/s)						
01	Speed reference (1 V/1000 min ⁻¹)						
	Speed reference (1 V/1000 mm/s)						
02	Torque reference (1 V/100% rated torque)						
Default	Force reference (1 V/100% rated force)						
03	Position deviation (0.05 V/reference unit)						
04	Position amplifier deviation (after electronic gear) (0.05 V/encoder pulse unit)						
	Position amplifier deviation (after electronic gear) (0.05 V/linear encoder pulse unit)						
05	Position reference speed (1 V/1000 min ⁻¹)						
	Position reference speed (1 V/1000 mm/s)						
06	Reserved (Do not use.)						
07	Position deviation between motor and load (0.01 V/reference unit)						
08	Positioning completion (positioning completed: 5 V, positioning not completed: 0 V)						
09	Speed feedforward (1 V/1000 min ⁻¹)						
	Speed feedforward (1 V/1000 mm/s)						
0A	Torque feedforward (1 V/100% rated torque)						
	Force feedforward (1 V/100% rated force)						
0B	Active gain (gain 1: 1 V, gain 2: 2 V) 2 V)						
0C	Completion of position reference distribution (completed: 5 V, not completed: 0 V)						
0D	External encoder speed (1 V/1000 min ⁻¹ ; value at the motor shaft)						
0E	Reserved (Do not use.)						
0F	Reserved (Do not use.)						
10	Main circuit DC voltage						
11 to 5F	Reserved (Do not use.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn007: Application Function Selections 7

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 105Fh	–	0000h	All	Immediately	Setup	–
Digit	Meaning						
n.□□XX	Analog Monitor 2 Signal Selection						Speed Pos Trq
00	Motor speed (1 V/1000 min ⁻¹)						
Default	Motor speed (1 V/1000 mm/s)						
01	Speed reference (1 V/1000 min ⁻¹)						
	Speed reference (1 V/1000 mm/s)						
02	Torque reference (1 V/100% rated torque)						
	Force reference (1 V/100% rated force)						
03	Position deviation (0.05 V/reference unit)						
04	Position amplifier deviation (after electronic gear) (0.05 V/encoder pulse unit)						
	Position amplifier deviation (after electronic gear) (0.05 V/linear encoder pulse unit)						
05	Position reference speed (1 V/1000 min ⁻¹)						
	Position reference speed (1 V/1000 mm/s)						
06	Reserved (Do not use.)						
07	Position deviation between motor and load (0.01 V/reference unit)						
08	Positioning completion (positioning completed: 5 V, positioning not completed: 0 V)						
09	Speed feedforward (1 V/1000 min ⁻¹)						
	Speed feedforward (1 V/1000 mm/s)						
0A	Torque feedforward (1 V/100% rated torque)						
	Force feedforward (1 V/100% rated force)						
0B	Active gain (gain 1: 1 V, gain 2: 2 V) 2 V)						
0C	Completion of position reference distribution (completed: 5 V, not completed: 0 V)						
0D	External encoder speed (1 V/1000 min ⁻¹ : value at the motor shaft)						
0E	Reserved (Do not use.)						
0F	Reserved (Do not use.)						
10	Main circuit DC voltage						
11 to 5F	Reserved (Do not use.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn008: Application Function Selections 8

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 7121h	–	4000h	Rotary	After restart	Setup	–
Digit	Meaning						
n.□□□X	Low Battery Voltage Alarm/Warning Selection						Speed Pos Trq
0 Default	Output alarm (A.830) for low battery voltage.						
1	Output warning (A.930) for low battery voltage.						
n.□□X□	Function Selection for Undervoltage						Speed Pos Trq
0 Default	Do not detect undervoltage.						
1	Detect undervoltage warning and limit torque at host controller.						
2	Detect undervoltage warning and limit torque with Pn424 and Pn425 (i.e., only in SERVOPACK).						
n.□X□□	Warning Detection Selection						Speed Pos Trq
0 Default	Detect warnings.						
1	Do not detect warnings except for A.971.						
n.X□□□	Reserved (Do not change.)						

◆ Pn009: Application Function Selections 9

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0141h	–	0040h	All	After restart	Tuning	–
Digit	Meaning						
n.□□□X	Reserved (Do not change.)						
n.□□X□	Current Control Mode Selection						Speed Pos Trq
0	Use current control mode 1.						
1	<ul style="list-style-type: none"> SERVOPACK Models SGDXS-R70A, -R90A, -1R6A, -2R8A, -3R8A, -5R5A, -7R6A: Use current control mode 1. SERVOPACK Models SGDXS-120A, -180A, -200A, -330A, -470A, -550A: Use current control mode 2. (For noise reduction when the motor is stopped) 						
2	Use current control mode 2. (For noise reduction when the motor is stopped)						
3	Use current control mode 3. (For noise reduction when the motor is operating at high speed)						
4 Default	Use current control mode 4. (For noise reduction when the motor is stopped and operating at high speed)						
n.□X□□	Speed Detection Method Selection						Speed Pos Trq
0 Default	Use speed detection 1.						
1	Use speed detection 2.						
n.X□□□	Reserved (Do not change.)						

◆ Pn00A: Application Function Selections A

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1244h	–	0001h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Motor Stopping Method for Group 2 Alarms						Speed Pos Trq
0	Apply the dynamic brake or coast the motor to a stop (use the stopping method set in Pn001 = n.□□□X).						
1 Default	Decelerate the motor to a stop using the torque set in Pn406 as the maximum torque. Use the setting of Pn001 = n.□□□X for the status after stopping.						
2	Decelerate the motor to a stop using the torque set in Pn406 as the maximum torque and then let the motor coast.						
3	Decelerate the motor to a stop using the deceleration time set in Pn30A. Use the setting of Pn001 = n.□□□X for the status after stopping.						
4	Decelerate the motor to a stop using the deceleration time set in Pn30A and then let the motor coast.						
n.□□X□	Stopping Method for Forced Stops						Speed Pos Trq
0 Default	Apply the dynamic brake or coast the motor to a stop (use the stopping method set in Pn001 = n.□□□X).						
1	Decelerate the motor to a stop using the torque set in Pn406 as the maximum torque. Use the setting of Pn001 = n.□□□X for the status after stopping.						
2	Decelerate the motor to a stop using the torque set in Pn406 as the maximum torque and then let the motor coast.						
3	Decelerate the motor to a stop using the deceleration time set in Pn30A. Use the setting of Pn001 = n.□□□X for the status after stopping.						
4	Decelerate the motor to a stop using the deceleration time set in Pn30A and then let the motor coast.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn00B: Application Function Selections B

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1121h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Operator Parameter Display Selection						Speed Pos Trq
0 Default	Display only setup parameters.						
1	Display all parameters.						
n.□□X□	Motor Stopping Method for Group 2 Alarms						Speed Pos Trq
0 Default	Stop the motor by setting the speed reference to 0.						
1	Apply the dynamic brake or coast the motor to a stop (use the stopping method set in Pn001 = n.□□□X).						
2	Set the stopping method with Pn00A = n.□□□X.						
n.□X□□	Power Input Selection for Three-phase SERVOPACK						Speed Pos Trq
0 Default	Use a three-phase power supply input.						
1	Use a three-phase power supply input as a single-phase power supply input.						
n.X□□□	Reserved (Do not change.)						

◆ Pn00C: Application Function Selections C

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to 0141h	–	0040h	–	After restart	Setup	–	
Digit	Meaning						Applicable Motors	
n.□□□X	Function Selection for Test without a Motor						Speed Pos Trq	–
0 Default	Disable tests without a motor.							All
1	Enable tests without a motor.							All
n.□□X□	Encoder Resolution for Tests without a Motor						Speed Pos Trq	–
0	Use 13 bits.							Rotary
1	Use 20 bits.							Rotary
2	Use 22 bits.							Rotary
3	Use 24 bits.							Rotary
4 Default	Use 26 bits.							Rotary
n.□X□□	Encoder Type Selection for Tests without a Motor						Speed Pos Trq	–
0 Default	Use an incremental encoder.							All
1	Use an absolute encoder.							All
n.X□□□	Reserved (Do not change.)							–

◆ Pn00D: Application Function Selections D

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1001h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Reserved (Do not change.)						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Overtravel Warning Detection Selection						Speed Pos Trq
0 Default	Do not detect overtravel warnings.						
1	Detect overtravel warnings.						
2	Detect overtravel alarms.						

◆ Pn00E: Application Function Selections E

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 4001h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Reserved (Do not change.)						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	External Encoder Monitor Usage						Speed Pos Trq
0 Default	Do not use an external encoder monitor.						
1	Use CCW as the forward direction.						
2	Reserved (Do not use.)						
3	Use CW as the forward direction.						
4	Reserved (Do not use.)						

◆ Pn00F: Application Function Selections F

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2021h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	SERVOPACK Preventative Maintenance Warning Selection						Speed Pos Trq
0 Default	Do not detect SERVOPACK preventative maintenance warnings.						
1	Detect SERVOPACK preventative maintenance warnings.						
n.□□X□	Servomotor Preventative Maintenance Warning Selection						Speed Pos Trq
0 Default	Do not detect servomotor preventative maintenance warnings.						
1	Detect servomotor preventative maintenance warnings.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn021: Reserved (Do not change.)

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0000h	All	–	–	–

◆ Pn022: Application Function Selections 22

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0011h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Overtravel Release Method Selection						Speed Pos Trq
0 Default	Overtravel exists while the P-OT or N-OT signal is being input.						
1	Overtravel exists while the P-OT or N-OT signal is input and the current position of the workpiece is separated from the P-OT signal or N-OT signal.						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn02F: Application Function Selections 2F

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0002h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Selection of Capacitor Discharge Mode When Main Circuit Power OFF						Speed Pos Trq
0 Default	<ul style="list-style-type: none"> SGDXS-R70A to -200A : Do not perform rapid discharge. SGDXS-330A to -550A : Perform rapid discharge. 						
1	Perform rapid discharge.						
2	Reserved (Do not use.)						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn030: Ethernet IP Address

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FFFFFFFFh	–	C0A80101h	All	After restart	Setup	–

◆ Pn032: Ethernet Subnet Mask

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FFFFFFFFh	–	FFFFFF00h	All	After restart	Setup	–

◆ Pn034: Ethernet Default Gateway

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FFFFFFFFh	–	00000000h	All	After restart	Setup	–

◆ Pn040: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0000h	All	–	–	–

◆ Pn050: SigmaLINK II Response Data Selection 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FF7EFFFFh	–	00000000h	All	After restart	Setup	–

Digit	Meaning
n.□□□□XXXX	Parameter Number (0000h to FFFFh)
n.□□XX□□□□	Node Address (10h to 1Eh)
n.XX□□□□□□	Reserved.

◆ Pn052: SigmaLINK II Response Data Selection 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FF7EFFFFh	–	00000000h	All	After restart	Setup	–

Digit	Meaning
n.□□□□XXXX	Parameter Number (0000h to FFFFh)
n.□□XX□□□□	Node Address (10h to 1Eh)
n.XX□□□□□□	Reserved.

◆ Pn054: SigmaLINK II Response Data Selection 3

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FF7EFFFFh	–	00000000h	All	After restart	Setup	–

Digit	Meaning
n.□□□□XXXX	Parameter Number (0000h to FFFFh)
n.□□XX□□□□	Node Address (10h to 1Eh)
n.XX□□□□□□	Reserved.

◆ Pn056: SigmaLINK II Response Data Selection 4

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FF7EFFFFh	–	00000000h	All	After restart	Setup	–

Digit	Meaning
n.□□□□XXXX	Parameter Number (0000h to FFFFh)
n.□□XX□□□□	Node Address (10h to 1Eh)
n.XX□□□□□□	Reserved.

◆ Pn058: SigmaLINK II Response Data Selection 5

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FF7EFFFFh	–	00000000h	All	After restart	Setup	–
Digit		Meaning					
n.□□□□XXXX		Parameter Number (0000h to FFFFh)					
n.□□XX□□□□		Node Address (10h to 1Eh)					
n.XX□□□□□□		Reserved.					

◆ Pn05A: SigmaLINK II Response Data Selection 6

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FF7EFFFFh	–	00000000h	All	After restart	Setup	–
Digit		Meaning					
n.□□□□XXXX		Parameter Number (0000h to FFFFh)					
n.□□XX□□□□		Node Address (10h to 1Eh)					
n.XX□□□□□□		Reserved.					

◆ Pn05C: SigmaLINK II Response Data Selection 7

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FF7EFFFFh	–	00000000h	All	After restart	Setup	–
Digit		Meaning					
n.□□□□XXXX		Parameter Number (0000h to FFFFh)					
n.□□XX□□□□		Node Address (10h to 1Eh)					
n.XX□□□□□□		Reserved.					

◆ Pn05E: SigmaLINK II Response Data Selection 8

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FF7EFFFFh	–	00000000h	All	After restart	Setup	–
Digit		Meaning					
n.□□□□XXXX		Parameter Number (0000h to FFFFh)					
n.□□XX□□□□		Node Address (10h to 1Eh)					
n.XX□□□□□□		Reserved.					

◆ Pn080: Application Function Selections 80

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1111h	–	0000h	Linear	After restart	Setup	–
Digit	Meaning						
n.□□□X	Polarity Sensor Selection						Speed Pos Trq
0 Default	Use polarity sensor.						
1	Do not use polarity sensor.						
n.□□X□	Motor Phase Sequence Selection						Speed Pos Trq
0 Default	Set a phase-A lead as a phase sequence of U, V, and W.						
1	Set a phase-B lead as a phase sequence of U, V, and W.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Calculation Method for Maximum Speed or Encoder Output Pulses						Speed Pos Trq
0 Default	Calculate the encoder output pulse setting for a fixed maximum motor speed.						
1	Calculate the maximum motor speed for a fixed encoder output pulse setting.						

◆ Pn081: Application Function Selections 81

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1111h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Phase-C Pulse Output Selection						Speed Pos Trq
0 Default	Output phase-C pulses only in the forward direction.						
1	Output phase-C pulses in both the forward and reverse directions.						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn090: SigmaLINK II Command Data Selection 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FF7EFFFFh	–	00000000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□□XXXX	Parameter Number (0000h to FFFFh)						
n.□□XX□□□□	Node Address (10h to 1Eh)						
n.XX□□□□□□	Reserved.						

◆ Pn092: SigmaLINK II Command Data Selection 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FF7EFFFFh	–	00000000h	All	After restart	Setup	–
Digit		Meaning					
n.□□□□XXXX		Parameter Number (0000h to FFFFh)					
n.□□XX□□□□		Node Address (10h to 1Eh)					
n.XX□□□□□□		Reserved.					

◆ Pn094: SigmaLINK II Command Data Selection 3

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FF7EFFFFh	–	00000000h	All	After restart	Setup	–
Digit		Meaning					
n.□□□□XXXX		Parameter Number (0000h to FFFFh)					
n.□□XX□□□□		Node Address (10h to 1Eh)					
n.XX□□□□□□		Reserved.					

◆ Pn096: SigmaLINK II Command Data Selection 4

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	00000000h to FF7EFFFFh	–	00000000h	All	After restart	Setup	–
Digit		Meaning					
n.□□□□XXXX		Parameter Number (0000h to FFFFh)					
n.□□XX□□□□		Node Address (10h to 1Eh)					
n.XX□□□□□□		Reserved.					

◆ Pn0B1: SigmaLINK II Sequence Input Allocation 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to FFFFh	–	0000h	All	After restart	Setup	–	
Digit	Meaning							
n.□□XX	SigmaLINK II Response Data Selection					Speed	Pos	Trq
00 Default	Disable (data is not set to the SigmaLINK II sequence input).							
01	Allocate SigmaLINK II Response Data 1 to the SigmaLINK II sequence input.							
02	Allocate SigmaLINK II Response Data 2 to the SigmaLINK II sequence input.							
03	Allocate SigmaLINK II Response Data 3 to the SigmaLINK II sequence input.							
04	Allocate SigmaLINK II Response Data 4 to the SigmaLINK II sequence input.							
05	Allocate SigmaLINK II Response Data 5 to the SigmaLINK II sequence input.							
06	Allocate SigmaLINK II Response Data 6 to the SigmaLINK II sequence input.							
07	Allocate SigmaLINK II Response Data 7 to the SigmaLINK II sequence input.							
08	Allocate SigmaLINK II Response Data 8 to the SigmaLINK II sequence input.							
n.XX□□	SigmaLINK II Sequence Input Allocation Start Position Selection					Speed	Pos	Trq
00 to 20	Specify the allocation start bit to the SigmaLINK II sequence input.							

◆ Pn0B2: SigmaLINK II Sequence Input Allocation 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to FFFFh	–	0000h	All	After restart	Setup	–	
Digit	Meaning							
n.□□XX	SigmaLINK II Response Data Selection					Speed	Pos	Trq
00 Default	Disable (data is not set to the SigmaLINK II sequence input).							
01	Allocate SigmaLINK II Response Data 1 to the SigmaLINK II sequence input.							
02	Allocate SigmaLINK II Response Data 2 to the SigmaLINK II sequence input.							
03	Allocate SigmaLINK II Response Data 3 to the SigmaLINK II sequence input.							
04	Allocate SigmaLINK II Response Data 4 to the SigmaLINK II sequence input.							
05	Allocate SigmaLINK II Response Data 5 to the SigmaLINK II sequence input.							
06	Allocate SigmaLINK II Response Data 6 to the SigmaLINK II sequence input.							
07	Allocate SigmaLINK II Response Data 7 to the SigmaLINK II sequence input.							
08	Allocate SigmaLINK II Response Data 8 to the SigmaLINK II sequence input.							
n.XX□□	SigmaLINK II Sequence Input Allocation Start Position Selection					Speed	Pos	Trq
00 to 20	Specify the allocation start bit to the SigmaLINK II sequence input.							

◆ Pn0B5: SigmaLINK II Sequence Output Allocation 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to FFFFh	–	0000h	All	After restart	Setup	–	
Digit	Meaning							
n.□□XX	SigmaLINK II Command Data Selection					Speed	Pos	Trq
00 Default	Disable (data is not set to the SigmaLINK II sequence output).							
01	Allocate SigmaLINK II Command Data 1 to the SigmaLINK II sequence output.							
02	Allocate SigmaLINK II Command Data 2 to the SigmaLINK II sequence output.							
03	Allocate SigmaLINK II Command Data 3 to the SigmaLINK II sequence output.							
04	Allocate SigmaLINK II Command Data 4 to the SigmaLINK II sequence output.							
n.XX□□	SigmaLINK II Sequence Output Allocation Start Position Selection					Speed	Pos	Trq
00 to 20	Specify the allocation start bit to the SigmaLINK II sequence output.							

◆ Pn0DA: SigmaLINK II Semi-closed Encoder Selection

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to 011Eh	–	0000h	All	After restart	Setup	–	
Digit	Meaning							
n.□□XX	Node Address					Speed	Pos	Trq
00 to 1E	Select an encoder with a node address between 00h and 1Eh.							
n.□X□□	Reserved (Do not change.)							
n.X□□□	Reserved (Do not change.)							

◆ Pn0DB: SigmaLINK II Fully-closed Encoder Selection

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to 011Eh	–	0101h	All	After restart	Setup	–	
Digit	Meaning							
n.□□XX	Node Address					Speed	Pos	Trq
00 to 1E	Select an encoder with a node address between 00h and 1Eh.							
n.□X□□	Reserved (Do not change.)							
n.X□□□	Reserved (Do not change.)							

◆ Pn0DC: SigmaLINK II Node Change Detection Condition Selection

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0003h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Connected Node Change Detection Condition						Speed Pos Trq
0 Default	Set vendor ID and product ID as conditions.						
1	Set vendor ID, product ID, and serial number as conditions.						
2	Set vendor ID, product ID, and product version as conditions.						
3	Set vendor ID, product ID, product version, and serial number as conditions.						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn0DD: SigmaLINK II I/O Device Error Detection Selection

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to F4F2h	–	0110h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	SigmaLINK II I/O Device Communications Check Mask						Speed Pos Trq
0 Default	Set SigmaLINK II slave communications error as an alarm (A.Cd7).						
1	Set SigmaLINK II slave communications error as a warning (A.932).						
2	Do not detect the SigmaLINK II slave communications error.						
n.□□X□	Reserved (Do not change.)						
n.□X□□	SigmaLINK II I/O Device Status Check Mask						Speed Pos Trq
0	A.Cd8 occurs when the alarm or warning signal is received from the SigmaLINK II slave.						
1 Default	A.Cd8 occurs when the alarm signal is received from the SigmaLINK II slave and A.933 occurs when the warning signal is received.						
2	A.933 occurs when the alarm or warning signal is received from the SigmaLINK II slave.						
3	Do not detect the SigmaLINK II slave status error.						
n.X□□□	Reserved (Do not change.)						

◆ Pn100: Speed Loop Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 20000	0.1 Hz	400	All	Immediately	Tuning	–

◆ Pn101: Speed Loop Integral Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	15 to 51200	0.01 ms	2000	All	Immediately	Tuning	–

◆ Pn102: Position Loop Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 20000	0.1/s	400	All	Immediately	Tuning	–

◆ Pn103: Moment of Inertia Ratio

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	1%	100	All	Immediately	Tuning	–

◆ Pn104: Second Speed Loop Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 20000	0.1 Hz	400	All	Immediately	Tuning	–

◆ Pn105: Second Speed Loop Integral Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	15 to 51200	0.01 ms	2000	All	Immediately	Tuning	–

◆ Pn106: Second Position Loop Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 20000	0.1/s	400	All	Immediately	Tuning	–

◆ Pn109: Feedforward

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 100	1%	0	All	Immediately	Tuning	–

◆ Pn10A: Feedforward Filter Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 6400	0.01 ms	0	All	Immediately	Tuning	–

◆ Pn10B: Gain Application Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to 5334h	–	0000h	All	–	Setup	–	
Digit	Meaning						When Enabled	
n.□□□X	Mode Switching Selection						Speed Pos Trq	–
0 Default	Use the internal torque reference as the condition (level setting: Pn10C).							Immediately
1	Use the speed reference as the condition (level setting: Pn10D).							Immediately
	Use the speed reference as the condition (level setting: Pn181).							
2	Use the acceleration reference as the condition (level setting: Pn10E).							Immediately
	Use the acceleration reference as the condition (level setting: Pn182).							
3	Use the position deviation as the condition (level setting: Pn10F).							Immediately
4	Do not use mode switching.							Immediately
n.□□X□	Speed Loop Control Method						Speed Pos Trq	–
0 Default	PI control							After restart
1	I-P control							After restart
2, 3	Reserved (Do not use.)							After restart
n.□X□□	Reserved (Do not change.)							–
n.X□□□	Reserved (Do not change.)							–

◆ Pn10C: Mode Switching Level for Torque Reference

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 800	1%	200	All	Immediately	Tuning	–

◆ Pn10D: Mode Switching Level for Speed Reference

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	1 min ⁻¹	0	Rotary	Immediately	Tuning	–

◆ Pn10E: Mode Switching Level for Acceleration

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 30000	1 min ⁻¹ /s	0	Rotary	Immediately	Tuning	–

◆ Pn10F: Mode Switching Level for Position Deviation

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	1 reference unit	0	All	Immediately	Tuning	–

◆ Pn11F: Position Integral Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 50000	0.1 ms	0	All	Immediately	Tuning	–

◆ Pn121: Friction Compensation Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 1000	1%	100	All	Immediately	Tuning	–

◆ Pn122: Second Friction Compensation Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 1000	1%	100	All	Immediately	Tuning	–

◆ Pn123: Friction Compensation Coefficient

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 100	1%	0	All	Immediately	Tuning	–

◆ Pn124: Friction Compensation Frequency Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	-10000 to 10000	0.1 Hz	0	All	Immediately	Tuning	–

◆ Pn125: Friction Compensation Gain Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 1000	1%	100	All	Immediately	Tuning	–

◆ Pn131: Gain Switching Time 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	1 ms	0	All	Immediately	Tuning	–

◆ Pn132: Gain Switching Time 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	1 ms	0	All	Immediately	Tuning	–

◆ Pn135: Gain Switching Waiting Time 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	1 ms	0	All	Immediately	Tuning	–

◆ Pn136: Gain Switching Waiting Time 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	1 ms	0	All	Immediately	Tuning	–

◆ Pn139: Automatic Gain Switching Selections 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0052h	–	0000h	All	Immediately	Tuning	–
Digit	Meaning						
n.□□□X	Gain Switching Selection						Speed Pos Trq
0 Default	Manual Gain Switching The gain is switched manually with G-SEL in SVCMD_IO.						
1	Reserved (Do not use.)						
2	Use automatic gain switching pattern 1. The gain settings 1 switch automatically to 2 when switching condition A is satisfied. The gain settings 2 switch automatically to 1 when switching condition A is not satisfied.						
n.□□X□	Gain Switching Condition A						Speed Pos Trq
0 Default	/COIN (Positioning Completion Output) signal turns ON.						
1	/COIN (Positioning Completion Output) signal turns OFF.						
2	/NEAR (Near Output) signal turns ON.						
3	/NEAR (Near Output) signal turns OFF.						
4	Position reference filter output is 0 and position reference input is OFF.						
5	Position reference input is ON.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn13D: Current Gain Level

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	100 to 2000	1%	2000	All	Immediately	Tuning	–

◆ Pn140: Model Following Control-Related Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1121h	–	0100h	All	Immediately	Tuning	–
Digit	Meaning						
n.□□□X	Model Following Control Selection						Speed Pos Trq
0 Default	Do not use model following control.						
1	Use model following control.						
n.□□X□	Vibration Suppression Selection						Speed Pos Trq
0 Default	Do not perform vibration suppression.						
1	Perform vibration suppression for a specific frequency.						
2	Perform vibration suppression for two specific frequencies.						
n.□X□□	Vibration Suppression Adjustment Selection						Speed Pos Trq
0	Do not adjust vibration suppression automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning.						
1 Default	Adjust vibration suppression automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning.						
n.X□□□	Speed Feedforward (VFF)/Torque Feedforward (TFF) Selection						Speed Pos Trq
0 Default	Do not use model following control and speed/torque feedforward together.						
1	Use model following control and speed/torque feedforward together.						

◆ Pn141: Model Following Control Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 20000	0.1/s	500	All	Immediately	Tuning	–

◆ Pn142: Model Following Control Gain Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	500 to 2000	0.1%	1000	All	Immediately	Tuning	–

◆ Pn143: Model Following Control Bias in the Forward Direction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	0.1%	1000	All	Immediately	Tuning	–

◆ Pn144: Model Following Control Bias in the Reverse Direction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	0.1%	1000	All	Immediately	Tuning	–

◆ Pn145: Vibration Suppression 1 Frequency A

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 2500	0.1 Hz	500	All	Immediately	Tuning	–

◆ Pn146: Vibration Suppression 1 Frequency B

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 2500	0.1 Hz	700	All	Immediately	Tuning	–

◆ Pn147: Model Following Control Speed Feedforward Compensation

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	0.1%	1000	All	Immediately	Tuning	–

◆ Pn148: Second Model Following Control Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 20000	0.1/s	500	All	Immediately	Tuning	–

◆ Pn149: Second Model Following Control Gain Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	500 to 2000	0.1%	1000	All	Immediately	Tuning	–

◆ Pn14A: Vibration Suppression 2 Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 2000	0.1 Hz	800	All	Immediately	Tuning	–

◆ Pn14B: Vibration Suppression 2 Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 1000	1%	100	All	Immediately	Tuning	–

◆ Pn14F: Control-Related Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0031h	–	0030h	All	After restart	Tuning	–

Digit	Meaning	
n.□□□X	Model Following Control Type Selection	Speed Pos Trq
0 Default	Use overshoot control type for model following control.	
1	Use response emphasis type for model following control.	
n.□□X□	Tuning-less Type Selection	Speed Pos Trq
0	Use tuning-less type 1.	
1	Use tuning-less type 2.	
2	Use tuning-less type 3.	
3 Default	Use tuning-less type 4.	
n.□X□□	Reserved (Do not change.)	
n.X□□□	Reserved (Do not change.)	

◆ Pn160: Anti-Resonance Control-Related Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0011h	–	0010h	All	Immediately	Tuning	–
Digit	Meaning						
n.□□□X	Anti-Resonance Control Selection						Speed Pos Trq
0 Default	Do not use anti-resonance control.						
1	Use anti-resonance control.						
n.□□X□	Anti-Resonance Control Adjustment Selection						Speed Pos Trq
0	Do not adjust anti-resonance control automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning.						
1 Default	Adjust anti-resonance control automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn161: Anti-Resonance Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 20000	0.1 Hz	1000	All	Immediately	Tuning	–

◆ Pn162: Anti-Resonance Gain Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 1000	1%	100	All	Immediately	Tuning	–

◆ Pn163: Anti-Resonance Damping Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 300	1%	0	All	Immediately	Tuning	–

◆ Pn164: Anti-Resonance Filter Time Constant 1 Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	-1000 to 1000	0.01 ms	0	All	Immediately	Tuning	–

◆ Pn165: Anti-Resonance Filter Time Constant 2 Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	-1000 to 1000	0.01 ms	0	All	Immediately	Tuning	–

◆ Pn166: Anti-Resonance Damping Gain 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 1000	1%	0	All	Immediately	Tuning	–

◆ Pn170: Tuning-less Function-Related Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to 2711h	–	1401h	All	–	Setup	–	
Digit	Meaning						When Enabled	
n.□□□X	Tuning-less Selection						Speed Pos Trq	–
0	Disable tuning-less function.							After restart
1 Default	Enable tuning-less function.							After restart
n.□□X□	Speed Control Method						Speed Pos Trq	–
0 Default	Use for speed control.							After restart
1	Use for speed control and use host controller for position control.							After restart
n.□X□□	Tuning-less Level						Speed Pos Trq	–
0	Set the tuning-less level to 0.							Immediately
1	Set the tuning-less level to 1.							Immediately
2	Set the tuning-less level to 2.							Immediately
3	Set the tuning-less level to 3.							Immediately
4 Default	Set the tuning-less level to 4.							Immediately
5	Set the tuning-less level to 5.							Immediately
6	Set the tuning-less level to 6.							Immediately
7	Set the tuning-less level to 7.							Immediately
n.X□□□	Tuning-less Load Level						Speed Pos Trq	–
0	Set the tuning-less load level to 0.							Immediately
1 Default	Set the tuning-less load level to 1.							Immediately
2	Set the tuning-less load level to 2.							Immediately

◆ Pn173: Load Fluctuation Compensation Control-Related Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to 0001h	–	0000h	All	Immediately	Setup	–	
Digit	Meaning							
n.□□□X	Load Fluctuation Compensation Control Selection						Speed Pos Trq	
0 Default	Do not use load fluctuation compensation control.							
1	Use load fluctuation compensation control.							
n.□□X□	Reserved (Do not change.)							
n.□X□□	Reserved (Do not change.)							
n.X□□□	Reserved (Do not change.)							

◆ Pn174: Load Fluctuation Compensation Control Response Level

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 20000	0.1	400	All	Immediately	Tuning	–

◆ Pn181: Mode Switching Level for Speed Reference

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	1 mm/s	0	Linear	Immediately	Tuning	–

◆ Pn182: Mode Switching Level for Acceleration

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 30000	1 mm/s ²	0	Linear	Immediately	Tuning	–

◆ Pn205: Multiturn Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	1 rev	65535	Rotary	After restart	Setup	–

◆ Pn207: Position Control Function Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2210h	–	0010h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	Reserved (Do not change.)
n.□□X□	Reserved (Do not change.)
n.□X□□	Reserved (Do not change.)
n.X□□□	/COIN (Positioning Completion Output) Signal Output Timing
0 Default	Output when the absolute value of the position deviation is the same or less than the setting of Pn522 (Positioning Completed Width).
1	Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference after the position reference filter is 0.
2	Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.

◆ Pn20A: Number of External Encoder Scale Pitches

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	4 to 1048576	1 scale pitch/ revolution	32768	Rotary	After restart	Setup	–

◆ Pn20E: Electronic Gear Ratio (Numerator)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1 to 1073741824	–	64	All	After restart	Setup	–

◆ Pn210: Electronic Gear Ratio (Denominator)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1 to 1073741824	–	1	All	After restart	Setup	–

◆ Pn212: Number of Encoder Output Pulses

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	16 to 1073741824	1 P/Rev	2048	Rotary	After restart	Setup	–

◆ Pn21D: Encoder Resolution Setting

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 00A1h	–	0080h	Rotary	After restart	Setup	–

Digit	Meaning						
n.□□□X	Encoder Resolution Compatibility Selection						Speed Pos Trq
0 Default	Disable encoder resolution compatibility.						
1	Enable encoder resolution compatibility.						
n.□□X□	Encoder Resolution Compatibility: Resolution Selection						Speed Pos Trq
4	Operate as 20-bit encoder.						
6	Operate as 22-bit encoder.						
8 Default	Operate as 24-bit encoder.						
A	Operate as 26-bit encoder.						
Other values	Reserved (Do not use.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn22A: Fully-closed Control Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1003h	–	0000h	Rotary	After restart	Setup	–

Digit	Meaning						
n.□□□X	Reserved (Do not change.)						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Fully-closed Control Speed Feedback Selection						Speed Pos Trq
0 Default	Use motor encoder speed.						
1	Use external encoder speed.						

◆ Pn230: Position Control Expansion Function Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0001h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Backlash Compensation Direction						Speed Pos Trq
0 Default	Compensate forward references.						
1	Compensate reverse references.						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn231: Backlash Compensation Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-500000 to 500000	0.1 reference unit	0	All	Immediately	Setup	–

◆ Pn233: Backlash Compensation Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	0.01 ms	0	All	Immediately	Setup	–

◆ Pn281: Encoder Output Resolution

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 4096	1 edge/pitch	20	All	After restart	Setup	–

◆ Pn282: Linear Encoder Scale Pitch

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 6553600	0.01 μm	0	Linear	After restart	Setup	–

◆ Pn304: Jogging Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	Rotary: 1 min ⁻¹ Direct Drive: 0.1 min ⁻¹	500	Rotary	Immediately	Setup	–

◆ Pn305: Soft Start Acceleration Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 12000	1 ms	0	All	Immediately	Setup	–

◆ Pn306: Soft Start Deceleration Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 12000	1 ms	0	All	Immediately	Setup	–

◆ Pn308: Speed Feedback Filter Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	0.01 ms	0	All	Immediately	Setup	–

◆ Pn30A: Deceleration Time for Servo OFF and Forced Stops

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 12000	1 ms	0	All	Immediately	Setup	–

◆ Pn30C: Speed Feedforward Average Movement Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 5100	0.1 ms	0	All	Immediately	Setup	–

◆ Pn310: Vibration Detection Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0002h	–	0000h	All	Immediately	Setup	–

Digit	Meaning
n.□□□X	Vibration Detection Selection Speed Pos Trq
0 Default	Do not detect vibration.
1	Output a warning (A.911) if vibration is detected.
2	Output an alarm (A.520) if vibration is detected.
n.□□X□	Reserved (Do not change.)
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn311: Vibration Detection Sensitivity

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	50 to 500	1%	100	All	Immediately	Tuning	–

◆ Pn312: Vibration Detection Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 5000	1 min ⁻¹	50	Rotary	Immediately	Tuning	–

◆ Pn316: Maximum Motor Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	1 min ⁻¹	10000	Rotary	After restart	Setup	–

◆ Pn324: Moment of Inertia Calculation Starting Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 20000	1%	300	All	Immediately	Setup	–

◆ Pn383: Jogging Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	1 mm/s	50	Linear	Immediately	Setup	–

◆ Pn384: Vibration Detection Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 5000	1 mm/s	10	Linear	Immediately	Tuning	–

◆ Pn385: Maximum Motor Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 100	100 mm/s	50	Linear	After restart	Setup	–

◆ Pn401: First Stage First Torque Reference Filter Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	0.01 ms	100	All	Immediately	Tuning	–

◆ Pn402: Forward Torque Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 800	1%	800	Rotary	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn403: Reverse Torque Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 800	1%	800	Rotary	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn404: Forward External Torque Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 800	1%	100	All	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn405: Reverse External Torque Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 800	1%	100	All	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn406: Emergency Stop Torque

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 800	1%	800	All	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn407: Speed Limit during Torque Control

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	1 min ⁻¹	10000	Rotary	Immediately	Setup	–

◆ Pn408: Torque-Related Function Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1111h	–	0000h	All	–	Setup	–

Digit	Meaning	When Enabled
n.□□□X	Notch Filter Selection 1	Speed Pos Trq
0 Default	Disable first stage notch filter.	Immediately
1	Enable first stage notch filter.	Immediately
n.□□X□	Speed Limit Selection	Speed Pos Trq
0 Default	Use the smaller of the maximum motor speed and the setting of Pn407 as the speed limit. Use the smaller of the maximum motor speed and the setting of Pn480 as the speed limit.	After restart
1	Use the smaller of the overspeed alarm detection speed and the setting of Pn407 as the speed limit. Use the smaller of the overspeed alarm detection speed and the setting of Pn480 as the speed limit.	After restart
n.□X□□	Notch Filter Selection 2	Speed Pos Trq
0 Default	Disable second stage notch filter.	Immediately
1	Enable second stage notch filter.	Immediately
n.X□□□	Friction Compensation Function Selection	Speed Pos Trq
0 Default	Disable friction compensation.	Immediately
1	Enable friction compensation.	Immediately

◆ Pn409: First Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn40A: First Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn40B: First Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn40C: Second Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn40D: Second Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn40E: Second Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn40F: Second Stage Second Torque Reference Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	100 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn410: Second Stage Second Torque Reference Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	50 to 100	0.01	50	All	Immediately	Tuning	–

◆ Pn412: First Stage Second Torque Reference Filter Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	0.01 ms	100	All	Immediately	Tuning	–

◆ Pn416: Torque-Related Function Selections 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1111h	–	0000h	All	Immediately	Setup	–

Digit	Meaning						
n.□□□X	Notch Filter Selection 3 Speed Pos Trq						
0 Default	Disable third stage notch filter.						
1	Enable third stage notch filter.						
n.□□X□	Notch Filter Selection 4 Speed Pos Trq						
0 Default	Disable fourth stage notch filter.						
1	Enable fourth stage notch filter.						
n.□X□□	Notch Filter Selection 5 Speed Pos Trq						
0 Default	Disable fifth stage notch filter.						
1	Enable fifth stage notch filter.						
n.X□□□	Reserved (Do not change.)						

◆ Pn417: Third Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn418: Third Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn419: Third Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn41A: Fourth Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn41B: Fourth Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn41C: Fourth Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn41D: Fifth Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn41E: Fifth Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn41F: Fifth Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn423: Speed Ripple Compensation Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1112h	–	0002h	–	–	Setup	–
Digit	Meaning					Applicable Motors	When Enabled
n.□□□X	Speed Ripple Compensation Function Selection					Speed Pos Trq	–
0	Do not execute speed ripple compensation.					Rotary	Immediately
1	Execute speed ripple compensation using the value adjusted by the user.					Rotary	Immediately
2 Default	Execute speed ripple compensation using the default adjustment value.					Rotary	Immediately
n.□□X□	Speed Ripple Compensation Information Disagreement Warning Detection Selection					Speed Pos Trq	–
0 Default	Detect A.942 alarms.					Rotary	After restart
1	Do not detect A.942 alarms.					Rotary	After restart
n.□X□□	Speed Ripple Compensation Enable Condition Selection					Speed Pos Trq	–
0 Default	Speed Reference					Rotary	After restart
1	Motor Speed					Rotary	After restart
n.X□□□	Speed Ripple Compensation Function Operation Mode Selection					Speed Pos Trq	–
0 Default	Execute speed ripple compensation in normal mode.					All	After restart
1	Execute speed ripple compensation in press operation mode.					All	After restart
2	Reserved (Do not use.)					All	After restart
3	Reserved (Do not use.)					All	After restart

◆ Pn424: Torque Limit at Main Circuit Voltage Drop

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 100	1%	50	All	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn425: Release Time for Torque Limit at Main Circuit Voltage Drop

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 1000	1 ms	100	All	Immediately	Setup	–

◆ Pn426: Torque Feedforward Average Movement Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 5100	0.1 ms	0	All	Immediately	Setup	–

◆ Pn427: Speed Ripple Compensation Enable Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	1 min ⁻¹	0	Rotary	Immediately	Tuning	–

◆ Pn428: Output Torque Compensation Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0001h	–	0001h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Output Torque Compensation Function Selection						Speed Pos Trq
0	Disable output torque compensation.						
1 Default	Enable output torque compensation.						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn43D: Reserved (Do not change.)

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	10000	All	–	–	–

◆ Pn456: Sweep Torque Reference Amplitude

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 800	1%	15	All	Immediately	Tuning	–

◆ Pn460: Notch Filter Adjustment Selections 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0101h	–	0101h	All	Immediately	Tuning	–
Digit	Meaning						
n.□□□X	Notch Filter Adjustment Selection 1						Speed Pos Trq
0	Do not adjust the first stage notch filter automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning.						
1 Default	Adjust the first stage notch filter automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning.						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Notch Filter Adjustment Selection 2						Speed Pos Trq
0	Do not adjust the second stage notch filter automatically when the tuning-less function is enabled or during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning.						
1 Default	Adjust the second stage notch filter automatically when the tuning-less function is enabled or during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning.						
n.X□□□	Reserved (Do not change.)						

◆ Pn475: Gravity Compensation-Related Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0001h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Gravity Compensation Selection						Speed Pos Trq
0 Default	Disable gravity compensation.						
1	Enable gravity compensation.						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn476: Gravity Compensation Torque

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	-1000 to 1000	0.1%	0	All	Immediately	Tuning	–

◆ Pn480: Speed Limit during Force Control

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	1 mm/s	10000	Linear	Immediately	Setup	–

◆ Pn481: Polarity Detection Speed Loop Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 20000	0.1 Hz	400	Linear	Immediately	Tuning	–

◆ Pn482: Polarity Detection Speed Loop Integral Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	15 to 51200	0.01 ms	3000	Linear	Immediately	Tuning	–

◆ Pn483: Forward Force Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 800	1%	30	Linear	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn484: Reverse Force Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 800	1%	30	Linear	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn485: Polarity Detection Reference Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 100	1 mm/s	20	Linear	Immediately	Tuning	–

◆ Pn486: Polarity Detection Reference Acceleration/Deceleration Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 100	1 ms	25	Linear	Immediately	Tuning	–

◆ Pn487: Polarity Detection Constant Speed Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 300	1 ms	0	Linear	Immediately	Tuning	–

◆ Pn488: Polarity Detection Reference Waiting Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	50 to 500	1 ms	100	Linear	Immediately	Tuning	–

◆ Pn48E: Polarity Detection Range

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 65535	1 mm	10	Linear	Immediately	Tuning	–

◆ Pn490: Polarity Detection Load Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 20000	1%	100	Linear	Immediately	Tuning	–

◆ Pn495: Polarity Detection Confirmation Force Reference

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 200	1%	100	Linear	Immediately	Tuning	–

◆ Pn498: Polarity Detection Allowable Error Range

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 30	1 deg	10	Linear	Immediately	Tuning	–

◆ Pn49F: Speed Ripple Compensation Enable Speed (Linear)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	1 mm/s	0	Linear	Immediately	Tuning	–

◆ Pn502: Rotation Detection Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 10000	1 min ⁻¹	20	Rotary	Immediately	Setup	–

◆ Pn503: Speed Coincidence Detection Signal Output Width

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 100	1 min ⁻¹	10	Rotary	Immediately	Setup	–

◆ Pn506: Brake Reference-Servo OFF Delay Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 50	10 ms	0	All	Immediately	Setup	–

◆ Pn507: Brake Reference Output Speed Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	1 min ⁻¹	100	Rotary	Immediately	Setup	–

◆ Pn508: Servo OFF-Brake Command Waiting Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 100	10 ms	50	All	Immediately	Setup	–

◆ Pn509: Momentary Power Interruption Hold Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	20 to 50000	1 ms	20	All	Immediately	Setup	–

◆ Pn50A: Input Signal Selections 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to FFF2h	–	1881h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Input Signal Allocation Mode						Speed Pos Trq
0	Reserved (Do not use.)						
¹ Default	Use Pn50A to Pn517 (Sigma-7S-compatible I/O signal allocation mode).						
2	Use Pn590 to Pn5BC (SigmaLINK II input signal allocation mode).						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	P-OT (Forward Drive Prohibit Input) Signal Allocation						Speed Pos Trq
0	Enable forward drive when CN1-13 input signal is ON (closed).						
¹ Default	Enable forward drive when CN1-7 input signal is ON (closed).						
2	Enable forward drive when CN1-8 input signal is ON (closed).						
3	Enable forward drive when CN1-9 input signal is ON (closed).						
4	Enable forward drive when CN1-10 input signal is ON (closed).						
5	Enable forward drive when CN1-11 input signal is ON (closed).						
6	Enable forward drive when CN1-12 input signal is ON (closed).						
7	Set the signal to always prohibit forward drive.						
8	Set the signal to always enable forward drive.						
9	Enable forward drive when CN1-13 input signal is OFF (open).						
A	Enable forward drive when CN1-7 input signal is OFF (open).						
B	Enable forward drive when CN1-8 input signal is OFF (open).						
C	Enable forward drive when CN1-9 input signal is OFF (open).						
D	Enable forward drive when CN1-10 input signal is OFF (open).						
E	Enable forward drive when CN1-11 input signal is OFF (open).						
F	Enable forward drive when CN1-12 input signal is OFF (open).						

◆ Pn50B: Input Signal Selections 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to FFFFh	–	8882h	All	After restart	Setup	–	
Digit	Meaning							
n.□□□X	N-OT (Reverse Drive Prohibit Input) Signal Allocation					Speed	Pos	Trq
0	Enable reverse drive when CN1-13 input signal is ON (closed).							
1	Enable reverse drive when CN1-7 input signal is ON (closed).							
2 Default	Enable reverse drive when CN1-8 input signal is ON (closed).							
3	Enable reverse drive when CN1-9 input signal is ON (closed).							
4	Enable reverse drive when CN1-10 input signal is ON (closed).							
5	Enable reverse drive when CN1-11 input signal is ON (closed).							
6	Enable reverse drive when CN1-12 input signal is ON (closed).							
7	Set the signal to always prohibit reverse drive.							
8	Set the signal to always enable reverse drive.							
9	Enable reverse drive when CN1-13 input signal is OFF (open).							
A	Enable reverse drive when CN1-7 input signal is OFF (open).							
B	Enable reverse drive when CN1-8 input signal is OFF (open).							
C	Enable reverse drive when CN1-9 input signal is OFF (open).							
D	Enable reverse drive when CN1-10 input signal is OFF (open).							
E	Enable reverse drive when CN1-11 input signal is OFF (open).							
F	Enable reverse drive when CN1-12 input signal is OFF (open).							
n.□□X□	Reserved (Do not change.)							
n.□X□□	/P-CL (Forward External Torque Limit Input) Signal Allocation					Speed	Pos	Trq
0	Active when CN1-13 input signal is ON (closed).							
1	Active when CN1-7 input signal is ON (closed).							
2	Active when CN1-8 input signal is ON (closed).							
3	Active when CN1-9 input signal is ON (closed).							
4	Active when CN1-10 input signal is ON (closed).							
5	Active when CN1-11 input signal is ON (closed).							
6	Active when CN1-12 input signal is ON (closed).							
7	The signal is always active.							
8 Default	The signal is always inactive.							
9	Active when CN1-13 input signal is OFF (open).							
A	Active when CN1-7 input signal is OFF (open).							
B	Active when CN1-8 input signal is OFF (open).							
C	Active when CN1-9 input signal is OFF (open).							
D	Active when CN1-10 input signal is OFF (open).							
E	Active when CN1-11 input signal is OFF (open).							
F	Active when CN1-12 input signal is OFF (open).							
n.X□□□	/N-CL (Reverse External Torque Limit Input) Signal Allocation					Speed	Pos	Trq
0 to F	The allocations are the same as the /P-CL (Forward External Torque Limit Input) signal allocations.							

◆ Pn50E: Output Signal Selections 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 6666h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	/COIN (Positioning Completion Output) Signal Allocation						Speed Pos Trq
0 Default	Disabled (the above signal output is not used).						
1	Output the signal from the CN1-1 or CN1-2 output terminal.						
2	Output the signal from the CN1-23 or CN1-24 output terminal.						
3	Output the signal from the CN1-25 or CN1-26 output terminal.						
4	Reserved (Do not use.)						
5	Reserved (Do not use.)						
6	Reserved (Do not use.)						
Other values	Disabled (the above signal output is not used).						
n.□□□□	/V-CMP (Speed Coincidence Detection Output) Signal Allocation						Speed Pos Trq
0 to 6	The allocations are the same as the /COIN (Positioning Completion Output) signal allocations.						
n.□X□□	/TGON (Rotation Detection Output) Signal Allocation						Speed Pos Trq
0 to 6	The allocations are the same as the /COIN (Positioning Completion Output) signal allocations.						
n.X□□□	/S-RDY (Servo Ready Output) Signal Allocation						Speed Pos Trq
0 to 6	The allocations are the same as the /COIN (Positioning Completion Output) signal allocations.						

◆ Pn50F: Output Signal Selections 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 6666h	–	0100h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	/CLT (Torque Limit Detection Output) Signal Allocation						Speed Pos Trq
0 Default	Disabled (the above signal output is not used).						
1	Output the signal from the CN1-1 or CN1-2 output terminal.						
2	Output the signal from the CN1-23 or CN1-24 output terminal.						
3	Output the signal from the CN1-25 or CN1-26 output terminal.						
4	Reserved (Do not use.)						
5	Reserved (Do not use.)						
6	Reserved (Do not use.)						
Other values	Disabled (the above signal output is not used).						
n.□□X□	/VLT (Speed Limit Detection Output) Signal Allocation						Speed Pos Trq
0 to 6	The allocations are the same as the /CLT (Torque Limit Detection Output) signal allocations.						
n.□X□□	/BK (Brake Output) Signal Allocation						Speed Pos Trq
0 to 6	The allocations are the same as the /CLT (Torque Limit Detection Output) signal allocations.						
n.X□□□	/WARN (Warning Output) Signal Allocation						Speed Pos Trq
0 to 6	The allocations are the same as the /CLT (Torque Limit Detection Output) signal allocations.						

◆ Pn510: Output Signal Selections 3

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0666h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	/NEAR (Near Output) Signal Allocation						Speed Pos Trq
0 Default	Disabled (the above signal output is not used).						
1	Output the signal from the CN1-1 or CN1-2 output terminal.						
2	Output the signal from the CN1-23 or CN1-24 output terminal.						
3	Output the signal from the CN1-25 or CN1-26 output terminal.						
4	Reserved (Do not use.)						
5	Reserved (Do not use.)						
6	Reserved (Do not use.)						
Other values	Disabled (the above signal output is not used).						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn511: Input Signal Selections 5

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to FFFFh	–	6543h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	/DEC (Origin Return Deceleration Switch Input) Signal Allocation						Speed Pos Trq
0	Active when CN1-13 input signal is ON (closed).						
1	Active when CN1-7 input signal is ON (closed).						
2	Active when CN1-8 input signal is ON (closed).						
3 Default	Active when CN1-9 input signal is ON (closed).						
4	Active when CN1-10 input signal is ON (closed).						
5	Active when CN1-11 input signal is ON (closed).						
6	Active when CN1-12 input signal is ON (closed).						
7	The signal is always active.						
8	The signal is always inactive.						
9	Active when CN1-13 input signal is OFF (open).						
A	Active when CN1-7 input signal is OFF (open).						
B	Active when CN1-8 input signal is OFF (open).						
C	Active when CN1-9 input signal is OFF (open).						
D	Active when CN1-10 input signal is OFF (open).						
E	Active when CN1-11 input signal is OFF (open).						
F	Active when CN1-12 input signal is OFF (open).						
n.□□□□	/EXT1 (External Latch Input 1) Signal Allocation						Speed Pos Trq
0 to 3	The signal is always inactive.						
4 Default	Active when CN1-10 input signal is ON (closed).						
5	Active when CN1-11 input signal is ON (closed).						
6	Active when CN1-12 input signal is ON (closed).						
7 to C	The signal is always inactive.						
D	Active when CN1-10 input signal is OFF (open).						
E	Active when CN1-11 input signal is OFF (open).						
F	Active when CN1-12 input signal is OFF (open).						
n.□X□□	/EXT2 (External Latch Input 2) Signal Allocation						Speed Pos Trq
0 to F	The allocations are the same as the /EXT1 (External Latch Input 1) signal allocations.						
n.X□□□	/EXT3 (External Latch Input 3) Signal Allocation						Speed Pos Trq
0 to F	The allocations are the same as the /EXT1 (External Latch Input 1) signal allocations.						

◆ Pn512: Output Signal Inverse Settings

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1111h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Output Signal Inversion for CN1-1 and CN1-2 Terminals						Speed Pos Trq
0 Default	The signal is not inverted.						
1	The signal is inverted.						
n.□□X□	Output Signal Inversion for CN1-23 and CN1-24 Terminals						Speed Pos Trq
0 Default	The signal is not inverted.						
1	The signal is inverted.						
n.□X□□	Output Signal Inversion for CN1-25 and CN1-26 Terminals						Speed Pos Trq
0 Default	The signal is not inverted.						
1	The signal is inverted.						
n.X□□□	Reserved (Do not change.)						

◆ Pn514: Output Signal Selections 4

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0666h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Reserved (Do not change.)						
n.□□X□	Reserved (Do not change.)						
n.□X□□	/PM (Preventative Maintenance Output) Signal Allocation						Speed Pos Trq
0 Default	Disabled (the above signal output is not used).						
1	Output the signal from the CN1-1 or CN1-2 output terminal.						
2	Output the signal from the CN1-23 or CN1-24 output terminal.						
3	Output the signal from the CN1-25 or CN1-26 output terminal.						
4	Reserved (Do not use.)						
5	Reserved (Do not use.)						
6	Reserved (Do not use.)						
Other values	Disabled (the above signal output is not used).						
n.X□□□	Reserved (Do not change.)						

◆ Pn516: Input Signal Selections 7

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to FFFFh	–	8888h	All	After restart	Setup	–	
Digit	Meaning							
n.□□□X	FSTP (Forced Stop Input) Signal Allocation					Speed	Pos	Trq
0	Enable drive when CN1-13 input signal is ON (closed).							
1	Enable drive when CN1-7 input signal is ON (closed).							
2	Enable drive when CN1-8 input signal is ON (closed).							
3	Enable drive when CN1-9 input signal is ON (closed).							
4	Enable drive when CN1-10 input signal is ON (closed).							
5	Enable drive when CN1-11 input signal is ON (closed).							
6	Enable drive when CN1-12 input signal is ON (closed).							
7	Set the signal to always prohibit drive (always force the motor to stop).							
8 Default	Set the signal to always enable drive (always disable forcing the motor to stop).							
9	Enable drive when CN1-13 input signal is OFF (open).							
A	Enable drive when CN1-7 input signal is OFF (open).							
B	Enable drive when CN1-8 input signal is OFF (open).							
C	Enable drive when CN1-9 input signal is OFF (open).							
D	Enable drive when CN1-10 input signal is OFF (open).							
E	Enable drive when CN1-11 input signal is OFF (open).							
F	Enable drive when CN1-12 input signal is OFF (open).							
n.□□X□	Reserved (Do not change.)							
n.□X□□	Reserved (Do not change.)							
n.X□□□	Reserved (Do not change.)							

◆ Pn518: Reserved (Do not change.)

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
–	–	–	–	All	–	–	–

◆ Pn51B: Motor-Load Position Deviation Overflow Detection Level

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 1073741824	1 reference unit	1000	Rotary	Immediately	Setup	–

◆ Pn51E: Position Deviation Overflow Warning Level

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 100	1%	100	All	Immediately	Setup	–

◆ Pn520: Position Deviation Overflow Alarm Level

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1 to 1073741823	1 reference unit	6116694	All	Immediately	Setup	–

◆ Pn522: In-position Range

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 1073741824	1 reference unit	7	All	Immediately	Setup	–

◆ Pn524: Near Signal Width

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1 to 1073741824	1 reference unit	1073741824	All	Immediately	Setup	–

◆ Pn526: Position Deviation Overflow Alarm Level at Servo ON

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1 to 1073741823	1 reference unit	6116694	All	Immediately	Setup	–

◆ Pn528: Position Deviation Overflow Warning Level at Servo ON

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 100	1%	100	All	Immediately	Setup	–

◆ Pn529: Speed Limit Level at Servo ON

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	1 min ⁻¹	10000	Rotary	Immediately	Setup	–

◆ Pn52A: Multiplier per Fully-closed Rotation

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 100	1%	20	Rotary	Immediately	Tuning	–

◆ Pn52B: Overload Warning Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 100	1%	20	All	After restart	Setup	–

◆ Pn52C: Base Current Derating at Motor Overload Detection

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 100	1%	100	All	After restart	Setup	–

◆ Pn530: Program Jogging-Related Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0005h	–	0000h	All	Immediately	Setup	–
Digit	Meaning						
n.□□□X	Program Jogging Operation Pattern						Speed Pos Trq
0 Default	(Waiting time in Pn535 → Forward by travel distance in Pn531) × Number of movements in Pn536						
1	(Waiting time in Pn535 → Reverse by travel distance in Pn531) × Number of movements in Pn536						
2	(Waiting time in Pn535 → Forward by travel distance in Pn531) × Number of movements in Pn536 (Waiting time in Pn535 → Reverse by travel distance in Pn531) × Number of movements in Pn536						
3	(Waiting time in Pn535 → Reverse by travel distance in Pn531) × Number of movements in Pn536 (Waiting time in Pn535 → Forward by travel distance in Pn531) × Number of movements in Pn536						
4	(Waiting time in Pn535 → Forward by travel distance in Pn531 → Waiting time in Pn535 → Reverse by travel distance in Pn531) × Number of movements in Pn536						
5	(Waiting time in Pn535 → Reverse by travel distance in Pn531 → Waiting time in Pn535 → Forward by travel distance in Pn531) × Number of movements in Pn536						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn531: Program Jogging Travel Distance

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1 to 1073741824	1 reference unit	32768	All	Immediately	Setup	–

◆ Pn533: Program Jogging Movement Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 10000	Rotary: 1 min ⁻¹ Direct Drive: 0.1 min ⁻¹	500	Rotary	Immediately	Setup	–

◆ Pn534: Program Jogging Acceleration/Deceleration Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	2 to 10000	1 ms	100	All	Immediately	Setup	–

◆ Pn535: Program Jogging Waiting Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	1 ms	100	All	Immediately	Setup	–

◆ Pn536: Program Jogging Number of Movements

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 1000	1 time	1	All	Immediately	Setup	–

◆ Pn540: Maximum Search Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 4000	0.1 Hz	3000	All	Immediately	Tuning	–

◆ Pn550: Analog Monitor 1 Offset Voltage

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	-10000 to 10000	0.1 V	0	All	Immediately	Setup	–

◆ Pn551: Analog Monitor 2 Offset Voltage

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	-10000 to 10000	0.1 V	0	All	Immediately	Setup	–

◆ Pn552: Analog Monitor 1 Magnification

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	-10000 to 10000	× 0.01	100	All	Immediately	Setup	–

◆ Pn553: Analog Monitor 2 Magnification

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	-10000 to 10000	× 0.01	100	All	Immediately	Setup	–

◆ Pn55A: Power Consumption Monitor Unit Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 1440	1 min	1	All	Immediately	Setup	–

◆ Pn560: Residual Vibration Detection Width

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 3000	0.1%	400	All	Immediately	Setup	–

◆ Pn561: Overshoot Detection Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 1000	1%	100	All	Immediately	Setup	–

◆ Pn562: Setting Gain Ratio

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 100	1%	80	All	Immediately	Tuning	–

◆ Pn56A: Output Signal Reference Method Selections 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2222h	–	1111h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	SO1 Output Signal Reference Method Selection						Speed Pos Trq
0	Reserved (Do not use.)						
<input type="checkbox"/> 1 Default	Output OR of parameter-assigned SO1 signal and signal set by SVCMD_OUT.						
2	Output signal set by SCVMD_OUT to SLO1.						
n.□□X□	SO2 Output Signal Reference Method Selection						Speed Pos Trq
0	Reserved (Do not use.)						
<input type="checkbox"/> 1 Default	Output OR of parameter-assigned SO2 signal and signal set by SVCMD_OUT.						
2	Output signal set by SCVMD_OUT to SLO2.						
n.□X□□	SO3 Output Signal Reference Method Selection						Speed Pos Trq
0	Reserved (Do not use.)						
<input type="checkbox"/> 1 Default	Output OR of parameter-assigned SO3 signal and signal set by SVCMD_OUT.						
2	Output signal set by SCVMD_OUT to SLO3.						
n.X□□□	SLO4 Output Signal Reference Method Selection						Speed Pos Trq
0	Reserved (Do not use.)						
<input type="checkbox"/> 1 Default	Do not output signal to SLO4.						
2	Output signal set by SCVMD_OUT to SLO4.						

◆ Pn56B: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0001h	All	–	–	–

◆ Pn581: Zero Speed Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 10000	1 mm/s	20	Linear	Immediately	Setup	–

◆ Pn582: Speed Coincidence Detection Signal Output Width

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 100	1 mm/s	10	Linear	Immediately	Setup	–

◆ Pn583: Brake Reference Output Speed Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	1 mm/s	10	Linear	Immediately	Setup	–

◆ Pn584: Speed Limit Level at Servo ON

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	1 mm/s	10000	Linear	Immediately	Setup	–

◆ Pn585: Program Jogging Movement Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 10000	1 mm/s	50	Linear	Immediately	Setup	–

◆ Pn586: Motor Running Cooling Ratio

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 100	1% / Maximum Motor Speed	0	Linear	Immediately	Setup	–

◆ Pn587: Polarity Detection Execution Selection for Absolute Linear Encoder

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0001h	–	0000h	Linear	Immediately	Setup	–

Digit	Meaning
n.□□□X	Polarity Detection Selection for Absolute Linear Encoder Speed Pos Trq
0 Default	Do not detect polarity.
1	Detect polarity.
n.□□X□	Reserved (Do not change.)
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn589: SigmaLINK II Node Detection Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	100 to 10000	1 ms	1500	All	After restart	Setup	–

◆ Pn590: P-OT (Forward Drive Prohibit Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 3149h	–	1007h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
007 Default	Allocate the signal to CN1-7.						
008	Allocate the signal to CN1-8.						
009	Allocate the signal to CN1-9.						
010	Allocate the signal to CN1-10.						
011	Allocate the signal to CN1-11.						
012	Allocate the signal to CN1-12.						
013	Allocate the signal to CN1-13.						
100	Allocate the signal to SigmaLINK II Sequence Input 0.						
101	Allocate the signal to SigmaLINK II Sequence Input 1.						
102	Allocate the signal to SigmaLINK II Sequence Input 2.						
103	Allocate the signal to SigmaLINK II Sequence Input 3.						
104	Allocate the signal to SigmaLINK II Sequence Input 4.						
105	Allocate the signal to SigmaLINK II Sequence Input 5.						
106	Allocate the signal to SigmaLINK II Sequence Input 6.						
107	Allocate the signal to SigmaLINK II Sequence Input 7.						
Other values	Set the signal to always enable forward drive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0	Set the signal to always enable forward drive.						
1 Default	Active when input signal is ON (closed).						
2	Active when input signal is OFF (open).						
3	Set the signal to always prohibit forward drive.						

◆ Pn591: N-OT (Reverse Drive Prohibit Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 3149h	–	1008h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
007	Allocate the signal to CN1-7.						
008 Default	Allocate the signal to CN1-8.						
009	Allocate the signal to CN1-9.						
010	Allocate the signal to CN1-10.						
011	Allocate the signal to CN1-11.						
012	Allocate the signal to CN1-12.						
013	Allocate the signal to CN1-13.						
100	Allocate the signal to SigmaLINK II Sequence Input 0.						
101	Allocate the signal to SigmaLINK II Sequence Input 1.						
102	Allocate the signal to SigmaLINK II Sequence Input 2.						
103	Allocate the signal to SigmaLINK II Sequence Input 3.						
104	Allocate the signal to SigmaLINK II Sequence Input 4.						
105	Allocate the signal to SigmaLINK II Sequence Input 5.						
106	Allocate the signal to SigmaLINK II Sequence Input 6.						
107	Allocate the signal to SigmaLINK II Sequence Input 7.						
Other values	Set the signal to always enable reverse drive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0	Set the signal to always enable reverse drive.						
1 Default	Active when input signal is ON (closed).						
2	Active when input signal is OFF (open).						
3	Set the signal to always prohibit reverse drive.						

◆ Pn592: /DEC (Origin Return Deceleration Switch Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 3119h	–	1009h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
007	Allocate the signal to CN1-7.						
008	Allocate the signal to CN1-8.						
009 Default	Allocate the signal to CN1-9.						
010	Allocate the signal to CN1-10.						
011	Allocate the signal to CN1-11.						
012	Allocate the signal to CN1-12.						
013	Allocate the signal to CN1-13.						
100	Allocate the signal to SigmaLINK II Sequence Input 0.						
101	Allocate the signal to SigmaLINK II Sequence Input 1.						
102	Allocate the signal to SigmaLINK II Sequence Input 2.						
103	Allocate the signal to SigmaLINK II Sequence Input 3.						
104	Allocate the signal to SigmaLINK II Sequence Input 4.						
105	Allocate the signal to SigmaLINK II Sequence Input 5.						
106	Allocate the signal to SigmaLINK II Sequence Input 6.						
107	Allocate the signal to SigmaLINK II Sequence Input 7.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0	The signal is always inactive.						
1 Default	Active when input signal is ON (closed).						
2	Active when input signal is OFF (open).						
3	The signal is always active.						

◆ Pn593: /EXT1 (External Latch Input 1) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2119h	–	1010h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
010 Default	Allocate the signal to CN1-10.						
011	Allocate the signal to CN1-11.						
012	Allocate the signal to CN1-12.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0	The signal is always inactive.						
1 Default	Active when input signal is ON (closed).						
2	Active when input signal is OFF (open).						

◆ Pn594: /EXT2 (External Latch Input 2) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2119h	–	1011h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
010	Allocate the signal to CN1-10.						
011 Default	Allocate the signal to CN1-11.						
012	Allocate the signal to CN1-12.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0	The signal is always inactive.						
1 Default	Active when input signal is ON (closed).						
2	Active when input signal is OFF (open).						

◆ Pn595: /EXT3 (External Latch Input 3) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2119h	–	1012h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
010	Allocate the signal to CN1-10.						
011	Allocate the signal to CN1-11.						
012 Default	Allocate the signal to CN1-12.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0	The signal is always inactive.						
1 Default	Active when input signal is ON (closed).						
2	Active when input signal is OFF (open).						

◆ Pn597: FSTP (Forced Stop Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 3019h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
007	Allocate the signal to CN1-7.						
008	Allocate the signal to CN1-8.						
009	Allocate the signal to CN1-9.						
010	Allocate the signal to CN1-10.						
011	Allocate the signal to CN1-11.						
012	Allocate the signal to CN1-12.						
013	Allocate the signal to CN1-13.						
Other values	Set the signal to always enable drive (always disable forcing the motor to stop).						
n.X□□□	Polarity Selection						Speed Pos Trq
0 Default	Set the signal to always enable drive (always disable forcing the motor to stop).						
1	Enable drive when the input signal is ON (closed).						
2	Enable drive when the input signal is OFF (open).						
3	Set the signal to always prohibit drive (always force the motor to stop).						

◆ Pn598: /P-CL (Forward External Torque Limit Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 3149h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
000 Default	The signal is always inactive.						
007	Allocate the signal to CN1-7.						
008	Allocate the signal to CN1-8.						
009	Allocate the signal to CN1-9.						
010	Allocate the signal to CN1-10.						
011	Allocate the signal to CN1-11.						
012	Allocate the signal to CN1-12.						
013	Allocate the signal to CN1-13.						
100	Allocate the signal to SigmaLINK II Sequence Input 0.						
101	Allocate the signal to SigmaLINK II Sequence Input 1.						
102	Allocate the signal to SigmaLINK II Sequence Input 2.						
103	Allocate the signal to SigmaLINK II Sequence Input 3.						
104	Allocate the signal to SigmaLINK II Sequence Input 4.						
105	Allocate the signal to SigmaLINK II Sequence Input 5.						
106	Allocate the signal to SigmaLINK II Sequence Input 6.						
107	Allocate the signal to SigmaLINK II Sequence Input 7.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0 Default	The signal is always inactive.						
1	Active when input signal is ON (closed).						
2	Active when input signal is OFF (open).						
3	The signal is always active.						

◆ Pn599: /N-CL (Reverse External Torque Limit Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 3149h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
000 Default	The signal is always inactive.						
007	Allocate the signal to CN1-7.						
008	Allocate the signal to CN1-8.						
009	Allocate the signal to CN1-9.						
010	Allocate the signal to CN1-10.						
011	Allocate the signal to CN1-11.						
012	Allocate the signal to CN1-12.						
013	Allocate the signal to CN1-13.						
100	Allocate the signal to SigmaLINK II Sequence Input 0.						
101	Allocate the signal to SigmaLINK II Sequence Input 1.						
102	Allocate the signal to SigmaLINK II Sequence Input 2.						
103	Allocate the signal to SigmaLINK II Sequence Input 3.						
104	Allocate the signal to SigmaLINK II Sequence Input 4.						
105	Allocate the signal to SigmaLINK II Sequence Input 5.						
106	Allocate the signal to SigmaLINK II Sequence Input 6.						
107	Allocate the signal to SigmaLINK II Sequence Input 7.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0 Default	The signal is always inactive.						
1	Active when input signal is ON (closed).						
2	Active when input signal is OFF (open).						
3	The signal is always active.						

◆ Pn5B0: /COIN (Positioning Completion Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2039h	—	0000h	All	After restart	Setup	—
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
001	Allocate the signal to CN1-1.						
023	Allocate the signal to CN1-23.						
025	Allocate the signal to CN1-25.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0 Default	The signal is always inactive.						
1	Output the above signal.						
2	Invert the above signal and output it.						

◆ Pn5B1: /V-CMP (Speed Coincidence Detection Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2039h	—	0000h	All	After restart	Setup	—
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
001	Allocate the signal to CN1-1.						
023	Allocate the signal to CN1-23.						
025	Allocate the signal to CN1-25.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0 Default	The signal is always inactive.						
1	Output the above signal.						
2	Invert the above signal and output it.						

◆ Pn5B2: /TGON (Rotation Detection Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2039h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
001	Allocate the signal to CN1-1.						
023	Allocate the signal to CN1-23.						
025	Allocate the signal to CN1-25.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0 Default	The signal is always inactive.						
1	Output the above signal.						
2	Invert the above signal and output it.						

◆ Pn5B3: /S-RDY (Servo Ready Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2039h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
001	Allocate the signal to CN1-1.						
023	Allocate the signal to CN1-23.						
025	Allocate the signal to CN1-25.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0 Default	The signal is always inactive.						
1	Output the above signal.						
2	Invert the above signal and output it.						

◆ Pn5B4: /CLT (Torque Limit Detection Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2039h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
001	Allocate the signal to CN1-1.						
023	Allocate the signal to CN1-23.						
025	Allocate the signal to CN1-25.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0 Default	The signal is always inactive.						
1	Output the above signal.						
2	Invert the above signal and output it.						

◆ Pn5B5: /VLT (Speed Limit Detection Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2039h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
001	Allocate the signal to CN1-1.						
023	Allocate the signal to CN1-23.						
025	Allocate the signal to CN1-25.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0 Default	The signal is always inactive.						
1	Output the above signal.						
2	Invert the above signal and output it.						

◆ Pn5B6: /BK (Brake Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2039h	–	1001h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
001 Default	Allocate the signal to CN1-1.						
023	Allocate the signal to CN1-23.						
025	Allocate the signal to CN1-25.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0	The signal is always inactive.						
1 Default	Output the above signal.						
2	Invert the above signal and output it.						

◆ Pn5B7: /WARN (Warning Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2039h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
001	Allocate the signal to CN1-1.						
023	Allocate the signal to CN1-23.						
025	Allocate the signal to CN1-25.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0 Default	The signal is always inactive.						
1	Output the above signal.						
2	Invert the above signal and output it.						

◆ Pn5B8: /NEAR (Near Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2039h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
001	Allocate the signal to CN1-1.						
023	Allocate the signal to CN1-23.						
025	Allocate the signal to CN1-25.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0 Default	The signal is always inactive.						
1	Output the above signal.						
2	Invert the above signal and output it.						

◆ Pn5BC: /PM (Preventative Maintenance Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2039h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□XXX	Allocated Pin Number						Speed Pos Trq
001	Allocate the signal to CN1-1.						
023	Allocate the signal to CN1-23.						
025	Allocate the signal to CN1-25.						
Other values	The signal is always inactive.						
n.X□□□	Polarity Selection						Speed Pos Trq
0 Default	The signal is always inactive.						
1	Output the above signal.						
2	Invert the above signal and output it.						

◆ Pn5C3: Error Detection Setting

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0011h	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	Error Detection Selections						Speed Pos Trq
0 Default	Disable error detection.						
1	Enable error detection.						
n.□□X□	Execution Selection when Error Detection Warning						Speed Pos Trq
0 Default	Stop error detection when A.905 (Error Detection Warning) occurs.						
1	Do not stop error detection when A.905 (Error Detection Warning) occurs.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn5C4: Error Detection Sample Data Set 1 Warning Level 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	0.01%	2000	All	Immediately	Setup	–

◆ Pn5C5: Error Detection Sample Data Set 1 Judgment Level 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	0.01%	1520	All	Immediately	Setup	–

◆ Pn5C6: Error Detection Sample Data Set 1 Warning Level 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	0.01%	2000	All	Immediately	Setup	–

◆ Pn5C7: Error Detection Sample Data Set 1 Judgment Level 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	0.01%	1520	All	Immediately	Setup	–

◆ Pn5C8: Error Detection Sample Data Set 2 Warning Level 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	0.01%	2000	All	Immediately	Setup	–

◆ Pn5C9: Error Detection Sample Data Set 2 Judgment Level 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	0.01%	1520	All	Immediately	Setup	–

◆ Pn5CA: Error Detection Sample Data Set 2 Warning Level 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	0.01%	2000	All	Immediately	Setup	–

◆ Pn5CB: Error Detection Sample Data Set 2 Judgment Level 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	0.01%	1520	All	Immediately	Setup	–

◆ Pn5D7: Output Signal Inversion for Triggers at Preset Positions

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to FFFFh	–	0000h	All	After restart	Setup	–
Digit	Meaning						
n.□□□X	High-Speed Output Signal Inverse Settings for Triggers at Preset Positions						Speed Pos Trq
0 Default	The signal is not inverted.						
1	Invert CN1-17, -18 (PAO) and output it.						
2	Invert CN1-19, -20 (PBO) and output it.						
3	Invert CN1-17, -18 (PAO) and CN1-19, -20 (PBO) and output them.						
4	Invert CN1-21, -22 (PCO) and output it.						
5	Invert CN1-17, -18 (PAO) and CN1-21, -22 (PCO) and output them.						
6	Invert CN1-19, -20 (PBO) and CN1-21, -22 (PCO) and output them.						
7	Invert CN1-17, -18 (PAO), CN1-19, -20 (PBO), and CN1-21, -22 (PCO) and output them.						
n.□□X□	Normal Output Signal Inverse Settings for Triggers at Preset Positions 1						Speed Pos Trq
0 Default	The signal is not inverted.						
1	Invert CN1-1, -2 (SO1) and output it.						
2	Invert CN1-23, -24 (SO2) and output it.						
3	Invert CN1-1, -2 (SO1) and CN1-23, -24 (SO2) and output them.						
4	Invert CN1-25, -26 (SO3) and output it.						
5	Invert CN1-1, -2 (SO1) and CN1-25, -26 (SO3) and output them.						
6	Invert CN1-23, -24 (SO2) and CN1-25, -26 (SO3) and output them.						
7	Invert CN1-1, -2 (SO1), CN1-23, -24 (SO2), and CN1-25, -26 (SO3) and output them.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn600: Regenerative Resistor Capacity

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to SERVOPACK's maximum applicable motor capacity	10 W	0	All	Immediately	Setup	–

◆ Pn601: Dynamic Brake Resistor Allowable Energy Consumption

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	10 J	0	All	After restart	Setup	–

◆ Pn603: Regenerative Resistance

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	10 mΩ	0	All	Immediately	Setup	–

◆ Pn604: Dynamic Brake Resistance

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	10 mΩ	0	All	After restart	Setup	–

◆ Pn61A: Overheat Protection Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0003h	–	0000h	Linear	After restart	Setup	–

Digit	Meaning
n.□□□X	Overheat Protection Selections Speed Pos Trq
0 Default	Disable overheat protection.
1	Use overheat protection in the Yaskawa linear servomotor.
2	Monitor a negative voltage input from a sensor attached to the machine and use overheat protection.
3	Monitor a positive voltage input from a sensor attached to the machine and use overheat protection.
n.□□X□	Reserved (Do not change.)
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn61B: Overheat Alarm Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 500	0.01 V	250	All	Immediately	Setup	–

Note:

Valid only when Pn61A is set to n.□□□2 or n.□□□3 (enable overheat protection).

◆ Pn61C: Overheat Warning Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 100	1%	100	All	Immediately	Setup	–

Note:

Valid only when Pn61A is set to n.□□□2 or n.□□□3 (enable overheat protection).

◆ Pn61D: Overheat Alarm Filter Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	1 s	0	All	Immediately	Setup	–

Note:

Valid only when Pn61A is set to n.□□□2 or n.□□□3 (enable overheat protection).

◆ Pn621: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
–	–	–	–	All	–	–	–

◆ Pn622: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
–	–	–	–	All	–	–	–

◆ Pn623: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
-	-	-	-	All	-	-	-

◆ Pn624: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
-	-	-	-	All	-	-	-

◆ Pn625: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
-	-	-	-	All	-	-	-

◆ Pn626: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
-	-	-	-	All	-	-	-

◆ Pn627: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
-	-	-	-	All	-	-	-

◆ Pn628: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
-	-	-	-	All	-	-	-

◆ Pn660: Triggers at Preset Positions Switch

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1011h	-	0000h	All	After restart	Setup	-

Digit	Meaning
n.□□□X	Output Unit Setting Speed Pos Trq
0 Default	Set the signal output width as a time [μs].
1	Set the signal output width as a distance [reference units].
n.□□X□	Reserved (Do not change.)
n.□X□□	Reserved (Do not change.)
n.X□□□	Triggers at Preset Positions Selections Speed Pos Trq
0 Default	Disable triggers at preset positions.
1	Enable triggers at preset positions.

◆ Pn800: Communications Controls

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1FF3h	–	1040h	All	Immediately	Setup	–
Digit	Meaning						
n.□□□X	MECHATROLINK Communications Check Mask for Debugging						Speed Pos Trq
0 Default	Do not mask.						
1	Ignore A.E60 (MECHATROLINK communications error).						
2	Ignore A.E50 (WDT errors).						
3	Ignore both A.E60 (MECHATROLINK communications errors) and A.E50 (WDT errors).						
n.□□X□	Warning Check Masks						Speed Pos Trq
0	Do not mask.						
1	Ignore A.94□ (data setting warnings).						
2	Ignore A.95□ (command warnings).						
3	Ignore both A.94□ and A.95□ warnings.						
4 Default	Ignore A.96□ (communications warnings).						
5	Ignore both A.94□ and A.96□ warnings.						
6	Ignore both A.95□ and A.96□ warnings.						
7	Ignore A.94□, A.95□, and A.96□ warnings.						
8	Ignore A.97□ (data setting warnings).						
9	Ignore both A.94□ and A.97□ warnings.						
A	Ignore both A.95□ and A.97□ warnings.						
B	Ignore A.94□, A.95□, and A.97□ warnings.						
C	Ignore both A.96□ and A.97□ warnings.						
D	Ignore A.94□, A.96□, and A.97□ warnings.						
E	Ignore A.95□, A.96□, and A.97□ warnings.						
F	Ignore A.94□, A.95□, A.96□, and A.97□ warnings.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Automatic Warning Clear Selection for Debugging						Speed Pos Trq
0	Retain warnings for debugging.						
1 Default	Automatically clear warnings (MECHATROLINK-4 specification).						

◆ Pn801: Application Function Selections 6 (Software Limits)

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0103h	–	0003h	All	Immediately	Setup	–
Digit	Meaning						
n.□□□X	Software Limits						Speed Pos Trq
0	Enable both forward and reverse software limits.						
1	Disable forward software limit.						
2	Disable reverse software limit.						
3 Default	Disable both forward and reverse software limits.						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Software Limit Check for References						Speed Pos Trq
0 Default	Do not perform software limit checks for references.						
1	Perform software limit checks for references.						
n.X□□□	Reserved (Do not change.)						

◆ Pn803: Origin Range

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 250	1 reference unit	10	All	Immediately	Setup	–

◆ Pn804: Forward Software Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-1073741823 to 1073741823	1 reference unit	1073741823	All	Immediately	Setup	–

◆ Pn806: Reverse Software Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-1073741823 to 1073741823	1 reference unit	-1073741823	All	Immediately	Setup	–

◆ Pn808: Absolute Encoder Origin Offset

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-1073741823 to 1073741823	1 reference unit	0	All	Immediately	Setup	–

Note:

Enabled after SENS_ON command execution is completed.

◆ Pn80A: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	100	All	–	–	–

◆ Pn80B: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	100	All	–	–	–

◆ Pn80C: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0	All	–	–	–

◆ Pn80D: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	100	All	–	–	–

◆ Pn80E: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	100	All	–	–	–

◆ Pn80F: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0	All	–	–	–

◆ Pn810: Exponential Acceleration/ Deceleration Bias

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	100 reference units/s	0	All	Immediately	Setup	–

Note:

The value is updated only when the reference is stopped (DEN = 1).

◆ Pn811: Exponential Acceleration/Deceleration Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 5100	0.1 ms	0	All	Immediately	Setup	–

Note:

The value is updated only when the reference is stopped (DEN = 1).

◆ Pn812: Movement Average Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 5100	0.1 ms	0	All	Immediately	Setup	–

Note:

The value is updated only when the reference is stopped (DEN = 1).

◆ Pn814: External Positioning Final Travel Distance

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-1073741823 to 1073741823	1 reference unit	100	All	Immediately	Setup	–

◆ Pn816: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0000h	All	–	–	–

◆ Pn817: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0	All	–	–	–

◆ Pn818: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0	All	–	–	–

◆ Pn819: Final Travel Distance for Origin Return

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-1073741823 to 1073741823	1 reference unit	100	All	Immediately	Setup	–

◆ Pn81E: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0000h	All	–	–	–

◆ Pn81F: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0010h	All	–	–	–

◆ Pn820: Forward Latching Area

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-2147483648 to 2147483647	1 reference unit	0	All	Immediately	Setup	–

◆ Pn822: Reverse Latching Area

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-2147483648 to 2147483647	1 reference unit	0	All	Immediately	Setup	–

◆ Pn824: Option Monitor 1 Selection

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to FFFFh	—	0000h	—	Immediately	Setup	154

• High-Speed Monitor Region

Set Value	Meaning	Applicable Motors
0000h Default	Motor speed [overspeed detection speed / 1000000h]	All
0001h	Speed reference [overspeed detection speed / 1000000h]	All
0002h	Torque [maximum torque] / 1000000h]	All
0003h	Position deviation (lower 32 bits) [reference units]	All
0004h	Position deviation (upper 32 bits) [reference units]	All
000Ah	PG count (lower 32 bits) [reference units]	All
000Bh	PG count (upper 32 bits) [reference units]	All
000Ch	FPG count (lower 32 bits) [reference units]	All
000Dh	FPG count (upper 32 bits) [reference units]	All
0055h	Estimated Vibration [overspeed detection speed / 1000000h]	All
0056h	Estimated External Disturbance Torque [maximum torque / 1000000h]	All
0113h	File Upload Counter	All
0114h	File Upload Data	All
0115h	Error Detection Trace Counter	All
0116h	Error Detection Trace Error Rate	All
013C	Inter-Device Data Sharing Output 1 (OL00000)	All
013D	Inter-Device Data Sharing Output 2 (OL00002)	All
013E	Inter-Device Data Sharing Output 3 (OL00004)	All
013F	Inter-Device Data Sharing Output 4 (OL00006)	All
0140	Inter-Device Data Sharing Output 5 (OL00008)	All
0141	Inter-Device Data Sharing Output 6 (OL0000A)	All
0142	Inter-Device Data Sharing Output 7 (OL0000C)	All
0143	Inter-Device Data Sharing Output 8 (OL0000E)	All
0200h	SigmaLINK II Response Data 1	All
0201h	SigmaLINK II Response Data 2	All
0202h	SigmaLINK II Response Data 3	All
0203h	SigmaLINK II Response Data 4	All
0204h	SigmaLINK II Response Data 5	All
0205h	SigmaLINK II Response Data 6	All
0206h	SigmaLINK II Response Data 7	All
0207h	SigmaLINK II Response Data 8	All
0210h	SigmaLINK II Command Data 1	All
0211h	SigmaLINK II Command Data 2	All
0212h	SigmaLINK II Command Data 3	All
0213h	SigmaLINK II Command Data 4	All
0240h	Σ-LINK II Data Status Information	All

12.2 List of Servo Parameters: MECHATROLINK-4 Communications References

- Low-Speed Monitor Region

Set Value	Meaning	Applicable Motors
0010h	Un000: Motor Speed [min ⁻¹]	All
0011h	Un001: Speed Reference [min ⁻¹]	All
0012h	Un002: Torque Reference [%]	All
0013h	Un003: Rotational Angle 1 [encoder pulses] Number of encoder pulses from origin within one encoder rotation displayed in decimal	All
	Un003: Electrical Angle 1 [linear encoder pulses] Linear encoder pulses from the polarity origin displayed in decimal	
0014h	Un004: Rotational Angle 2 [deg] Electrical angle from polarity origin	All
	Un004: Electrical Angle 2 [deg] Electrical angle from polarity origin	
0015h	Un005: Input Signal Monitor	All
0016h	Un006: Output Signal Monitor	All
0017h	Un007: Input Reference Pulse Speed [min ⁻¹]	All
0018h	Un008: Position Deviation [reference units]	All
0019h	Un009: Accumulated Load Ratio [%]	All
001Ah	Un00A: Regenerative Load Ratio [%]	All
001Bh	Un00B: Dynamic Brake Resistor Power Consumption [%]	All
001Ch	Un00C: Input Reference Pulse Counter [reference units]	All
001Dh	Un00D: Feedback Pulse Counter [encoder pulses]	All
001Eh	Un00E: Fully-closed Loop Feedback Pulse Counter [external encoder resolution]	Rotary
0025h	Initial absolute position data (lower 32 bits) [pulses]	Linear
0026h	Initial absolute position data (upper 32 bits) [pulses]	Linear
0040h	Un025: SERVOPACK Installation Environment Monitor	All
0041h	Un026: Servomotor Installation Environment Monitor	All
0042h	Un027: Built-in Fan Remaining Life Ratio	All
0043h	Un028: Capacitor Remaining Life Ratio	All
0044h	Un029: Surge Prevention Circuit Remaining Life Ratio	All
0045h	Un02A: Dynamic Brake Circuit Remaining Life Ratio	All
0046h	Un032: Instantaneous Power	All
0047h	Un033: Power Consumption	All
0048h	Un034: Cumulative Power Consumption	All
004Dh	Un173: Temperature Margin until SERVOPACK Overheats	All
0058h	Un13C: Margin until Regenerative Overload	All
005Ah	Un13E: Margin until Undervoltage	All
005Bh	Un13F: Margin until Overvoltage	All
0060h	Un023: Main Circuit DC Voltage	All
0070h	Un078: Maximum Value of Amplitude of Estimated Vibration [min ⁻¹]	All
0071h	Un07A: Maximum Value of Estimated External Disturbance Torque [%]	All
0072h	Un07B: Minimum Value of Estimated External Disturbance Torque [%]	All
0073h	Un147: Number of MECHATROLINK Communications Errors [times]	All
0074h	Un104: Number of Serial Encoder Communications Errors [times]	All

Set Value	Meaning	Applicable Motors
0075h	Un105: Settling Time [0.1 ms]	All
0076h	Un106: Amount of Overshoot [reference units]	All
0077h	Un107: Residual Vibration Frequency [0.1 Hz]	All
0079h	Un174: Temperature Margin until Servomotor Overheats [°C]	All
007Ah	Un145: Maximum Value of Accumulated Load Ratio [%]	All
007Bh	Un14E: Margin until Overload [0.01 %]	All
007Ch	Un07C: Identified Moment of Inertia Ratio	All
007Eh	Un108: Maximum Settling Time [0.1ms]	All
007Fh	Un109: Maximum Amount of Overshoot [reference units]	All
0104h	Un177: Encoder Power Supplied Time	Rotary
0106h	Un17A: Encoder Power Supply Voltage	Rotary
0107h	Un17B: Encoder Battery Voltage	Rotary
010Ch	Un181: Motor Total Number of Rotations	Rotary
010Dh	Un183: Maintenance Prediction Monitor - Bearings	Rotary
010Eh	Un184: Maintenance Prediction Monitor - Oil Seal	Rotary
0126h	Un190: Motor Vibration in X-Axis Direction	Rotary
0127h	Un191: Motor Vibration in Y-Axis Direction	Rotary
0128h	Un192: Motor Vibration in Z-Axis Direction	Rotary
0129h	Un193: Motor Vibration XYZ Composite Value	Rotary
012Ah	Un194: Maximum Motor Vibration	Rotary

• Low-Speed Monitor Region (Communications Module Only)

Set Value	Meaning	Applicable Motors
0080h	Previous value of latched feedback position (LPOS1) [reference units]	All
0081h	Previous value of latched feedback position (LPOS2) [reference units]	All
0084h	Continuous Latch Status (EX STATUS)	All

• All Areas

Set Value	Meaning	Applicable Motors
Other values	Reserved (Do not use.)	All

◆ Pn825: Option Monitor 2 Selection

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to FFFFh	—	0000h	—	Immediately	Setup	154
Set Value	Meaning						
0000h to FFFFh	The settings are the same as those for the Option Monitor 1 Selection.						

◆ Pn827: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	—	—	100	All	—	—	—

◆ Pn829: SVOFF Waiting Time (for SVOFF at Deceleration to Stop)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	10 ms	0	All	Immediately	Setup	–

Note:

Change the setting when the reference is stopped (while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

◆ Pn82A: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	1813h	All	–	–	–

◆ Pn82B: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	1D1Ch	All	–	–	–

◆ Pn82C: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	1F1Eh	All	–	–	–

◆ Pn82D: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0000h	All	–	–	–

◆ Pn82E: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0000h	All	–	–	–

◆ Pn833: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0001h	All	–	–	–

◆ Pn834: First Stage Linear Acceleration Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1 to 4294967295	10000 reference units/s ²	100	All	Immediately	Setup	–

Note:

Change the setting when the reference is stopped (while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

◆ Pn836: Second Stage Linear Acceleration Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1 to 4294967295	10000 reference units/s ²	100	All	Immediately	Setup	–

Note:

Change the setting when the reference is stopped (while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

◆ Pn838: Acceleration Constant Switching Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 2097152000	1 reference unit/s	0	All	Immediately	Setup	–

Note:

Change the setting when the reference is stopped (while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

◆ Pn83A: First Stage Linear Deceleration Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1 to 4294967295	10000 reference units/s ²	100	All	Immediately	Setup	–

Note:

Change the setting when the reference is stopped (while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

◆ Pn83C: Second Stage Linear Deceleration Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1 to 4294967295	10000 reference units/s ²	100	All	Immediately	Setup	–

Note:

Change the setting when the reference is stopped (while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

◆ Pn83E: Deceleration Constant Switching Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 2097152000	1 reference unit/s	0	All	Immediately	Setup	–

Note:

Change the setting when the reference is stopped (while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

◆ Pn840: Linear Deceleration Constant for Stopping

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1 to 4294967295	10000 reference units/s ²	100	All	Immediately	Setup	–

Note:

Change the setting when the reference is stopped (while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

◆ Pn842: Origin Approach Speed 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 20971520	100 reference units/s	50	All	Immediately	Setup	–

Note:

Change the setting when the reference is stopped (while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

◆ Pn844: Origin Approach Speed 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 20971520	100 reference units/s	5	All	Immediately	Setup	–

Note:

Change the setting when the reference is stopped (while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

◆ Pn846: POSING Command S-curve Acceleration/Deceleration Rate

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 50	1%	0	All	Immediately	Setup	–

Note:

Change the setting when the reference is stopped (while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

◆ Pn850: Number of Latch Sequences

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 8	–	0	All	Immediately	Setup	–

◆ Pn851: Continuous Latch Sequence Count

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 255	–	0	All	Immediately	Setup	–

◆ Pn852: Latch Sequence 1 to 4 Settings

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 3333h	–	0000h	All	Immediately	Setup	–

Digit	Meaning		
n.□□□X	Latch Sequence 1 Signal Selection		
0	Phase C		
Default			
1	EXT1 signal		
2	EXT2 signal		
3	EXT3 signal		
n.□□X□	Latch Sequence 2 Signal Selection		
0 to 3	The settings are the same as those for the Latch Sequence 1 Signal Selection.		
n.□X□□	Latch Sequence 3 Signal Selection		
0 to 3	The settings are the same as those for the Latch Sequence 1 Signal Selection.		
n.X□□□	Latch Sequence 4 Signal Selection		
0 to 3	The settings are the same as those for the Latch Sequence 1 Signal Selection.		

◆ Pn853: Latch Sequence 5 to 8 Settings

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to 3333h	–	0000h	All	Immediately	Setup	–	
Digit	Meaning							
n.□□□X	Latch Sequence 5 Signal Selection					Speed	Pos	Trq
0 Default	Phase C							
1	EXT1 signal							
2	EXT2 signal							
3	EXT3 signal							
n.□□X□	Latch Sequence 6 Signal Selection					Speed	Pos	Trq
0 to 3	The settings are the same as those for the Latch Sequence 5 Signal Selection.							
n.□X□□	Latch Sequence 7 Signal Selection					Speed	Pos	Trq
0 to 3	The settings are the same as those for the Latch Sequence 5 Signal Selection.							
n.X□□□	Latch Sequence 8 Signal Selection					Speed	Pos	Trq
0 to 3	The settings are the same as those for the Latch Sequence 5 Signal Selection.							

◆ Pn860: SVCMD_IN Input Signal Monitor Allocations 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to 1717h	–	0000h	All	Immediately	Setup	–	
Digit	Meaning							
n.□□□X	Input Signal Monitor Allocation for CN1-13 (SVCMD_IN)					Speed	Pos	Trq
0 Default	Allocate bit 24 (IO_STS1) to CN1-13 input signal monitor.							
1	Allocate bit 25 (IO_STS2) to CN1-13 input signal monitor.							
2	Allocate bit 26 (IO_STS3) to CN1-13 input signal monitor.							
3	Allocate bit 27 (IO_STS4) to CN1-13 input signal monitor.							
4	Allocate bit 28 (IO_STS5) to CN1-13 input signal monitor.							
5	Allocate bit 29 (IO_STS6) to CN1-13 input signal monitor.							
6	Allocate bit 30 (IO_STS7) to CN1-13 input signal monitor.							
7	Allocate bit 31 (IO_STS8) to CN1-13 input signal monitor.							
n.□□X□	CN1-13 Input Signal Monitor Enable/Disable Selection					Speed	Pos	Trq
0 Default	Disable allocation for CN1-13 input signal monitor.							
1	Enable allocation for CN1-13 input signal monitor.							
n.□X□□	Input Signal Monitor Allocation for CN1-7 (SVCMD_IN)					Speed	Pos	Trq
0 to 7	The settings are the same as the CN1-13 allocations.							
n.X□□□	CN1-7 Input Signal Monitor Enable/Disable Selection					Speed	Pos	Trq
0 Default	Disable allocation for CN1-7 input signal monitor.							
1	Enable allocation for CN1-7 input signal monitor.							

◆ Pn861: SVCMD_IN Input Signal Monitor Allocations 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1717h	–	0000h	All	Immediately	Setup	–
Digit	Meaning						
n.□□□X	Input Signal Monitor Allocation for CN1-8 (SVCMD_IN)						Speed Pos Trq
0 to 7	The settings are the same as the CN1-13 allocations.						
n.□□X□	CN1-8 Input Signal Monitor Enable/Disable Selection						Speed Pos Trq
0	Disable allocation for CN1-8 input signal monitor.						
<input type="checkbox"/> Default							
1	Enable allocation for CN1-8 input signal monitor.						
n.□X□□	Input Signal Monitor Allocation for CN1-9 (SVCMD_IN)						Speed Pos Trq
0 to 7	The settings are the same as the CN1-13 allocations.						
n.X□□□	CN1-9 Input Signal Monitor Enable/Disable Selection						Speed Pos Trq
0	Disable allocation for CN1-9 input signal monitor.						
<input type="checkbox"/> Default							
1	Enable allocation for CN1-9 input signal monitor.						

◆ Pn862: SVCMD_IN Input Signal Monitor Allocations 3

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1717h	–	0000h	All	Immediately	Setup	–
Digit	Meaning						
n.□□□X	Input Signal Monitor Allocation for CN1-10 (SVCMD_IN)						Speed Pos Trq
0 to 7	The settings are the same as the CN1-13 allocations.						
n.□□X□	CN1-10 Input Signal Monitor Enable/Disable Selection						Speed Pos Trq
0	Disable allocation for CN1-10 input signal monitor.						
<input type="checkbox"/> Default							
1	Enable allocation for CN1-10 input signal monitor.						
n.□X□□	Input Signal Monitor Allocation for CN1-11 (SVCMD_IN)						Speed Pos Trq
0 to 7	The settings are the same as the CN1-13 allocations.						
n.X□□□	CN1-11 Input Signal Monitor Enable/Disable Selection						Speed Pos Trq
0	Disable allocation for CN1-11 input signal monitor.						
<input type="checkbox"/> Default							
1	Enable allocation for CN1-11 input signal monitor.						

◆ Pn863: SVCMD_IN Input Signal Monitor Allocations 4

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1717h	–	0000h	All	Immediately	Setup	–
Digit	Meaning						
n.□□□X	Input Signal Monitor Allocation for CN1-12 (SVCMD_IN)						Speed Pos Trq
0 to 7	The settings are the same as the CN1-13 allocations.						
n.□□X□	CN1-12 Input Signal Monitor Enable/Disable Selection						Speed Pos Trq
0 Default	Disable allocation for CN1-12 input signal monitor.						
1	Enable allocation for CN1-12 input signal monitor.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn868: SVCMD_IN Output Signal Monitor Allocations 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1717h	–	0000h	All	Immediately	Setup	–
Digit	Meaning						
n.□□□X	Output Signal Monitor Allocation for CN1-1 and CN1-2 (SVCMD_IN)						Speed Pos Trq
0 Default	Allocate bit 24 (IO_STS1) to CN1-1/CN1-2 output signal monitor.						
1	Allocate bit 25 (IO_STS2) to CN1-1/CN1-2 output signal monitor.						
2	Allocate bit 26 (IO_STS3) to CN1-1/CN1-2 output signal monitor.						
3	Allocate bit 27 (IO_STS4) to CN1-1/CN1-2 output signal monitor.						
4	Allocate bit 28 (IO_STS5) to CN1-1/CN1-2 output signal monitor.						
5	Allocate bit 29 (IO_STS6) to CN1-1/CN1-2 output signal monitor.						
6	Allocate bit 30 (IO_STS7) to CN1-1/CN1-2 output signal monitor.						
7	Allocate bit 31 (IO_STS8) to CN1-1/CN1-2 output signal monitor.						
n.□□X□	CN1-1/CN1-2 Output Signal Monitor Enable/Disable Selection						Speed Pos Trq
0 Default	Disable allocation for CN1-1/CN1-2 output signal monitor.						
1	Enable allocation for CN1-1/CN1-2 output signal monitor.						
n.□X□□	Output Signal Monitor Allocation for CN1-23 and CN1-24 (SVCMD_IN)						Speed Pos Trq
0 to 7	The settings are the same as the CN1-1/CN1-2 allocations.						
n.X□□□	CN1-23/CN1-24 Output Signal Monitor Enable/Disable Selection						Speed Pos Trq
0 Default	Disable allocation for CN1-23/CN1-24 output signal monitor.						
1	Enable allocation for CN1-23/CN1-24 output signal monitor.						

◆ Pn869: SVCMD_IN Output Signal Monitor Allocations 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1717h	–	0000h	All	Immediately	Setup	–
Digit	Meaning						
n.□□□X	Output Signal Monitor Allocation for CN1-25 and CN1-26 (SVCMD_IN)						Speed Pos Trq
0 to 7	The settings are the same as the CN1-1/CN1-2 allocations.						
n.□□X□	CN1-25/CN1-26 Output Signal Monitor Enable/Disable Selection						Speed Pos Trq
0 Default	Disable allocation for CN1-25/CN1-26 output signal monitor.						
1	Enable allocation for CN1-25/CN1-26 output signal monitor.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn880: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	–	All	–	–	–

◆ Pn881: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	–	All	–	–	–

◆ Pn882: Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	–	All	–	–	–

◆ Pn883: Communications Cycle Setting Monitor [transmission cycles] (for maintenance, read only)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 32	–	–	All	–	Setup	–

◆ Pn884: Communications Controls 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0001h	–	0000h	All	Immediately	Setup	–
Digit	Meaning						
n.□□□X	MECHATROLINK Communications Error Holding Brake Signal Setting						Speed Pos Trq
0 Default	Maintain the status set by the BRK_ON or BRK_OFF command when a MECHATROLINK communications error occurs.						
1	Apply the holding brake when a MECHATROLINK communications error occurs.						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn885: Reserved (Do not change.)

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0000h	All	–	–	–

◆ Pn886: S-curve Maximum Acceleration/Deceleration Rate

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1h to FFFFFFFFh	–	FFFFFFFh	All	Immediately	Setup	–

◆ Pn88A: MECHATROLINK Receive Error Counter Monitor (for maintenance, read only)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	–	0	All	–	Setup	–

◆ Pn8F0: User Customized Function Switch

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2012h	–	0000h	All	After restart	Setup	87

Digit	Meaning
n.□□□X	User customized function switch mask Speed Pos Trq
0 Default	Do not mask.
1	A.988 (High-Speed Scan Exceeded Warning) and A.989 (Low-Speed Scan Exceeded Warning) will not be detected.
2	Reserved (Do not use.)
n.□□X□	Reserved (Do not change.)
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn900: Number of Parameter Banks

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 16	–	0	All	After restart	Setup	–

◆ Pn901: Number of Parameter Bank Members

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 15	–	0	All	After restart	Setup	–

◆ Pn902to Pn910: Parameter Bank Member Definition

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 08FFh	–	0000h	All	After restart	Setup	–

◆ Pn920to Pn95F: Parameter Bank Data (Not saved in nonvolatile memory.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to FFFFh	–	0000h	All	Immediately	Setup	–

◆ Pn9B0: Inter-Device Data Sharing Function Switch

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0011h	–	0000h	All	After restart	Setup	153
Digit	Meaning						
n.□□□X	Inter-Device Data Sharing Function Selection						Speed Pos Trq
0 Default	Disable inter-device data sharing.						
1	Enable inter-device data sharing.						
n.□□X□	Reserved (Do not change.)						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn9B1: Inter-Device Data Sharing Target Selection 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 02FFh	–	0000h	All	After restart	Setup	160, 162
Digit	Meaning						
n.□□XX	Inter-Device Data Sharing Function Selection						Speed Pos Trq
00h Default	Do not specify a device to share data.						
01h to 02h	Reserved (Do not use.)						
03h	Set the station address 03h.						
:	:						
FFh	Set the station address FFh.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn9B2: Settings of Inter-Device Shared Data Size for Transmission 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 5050h	–	3050h	All	After restart	Setup	160, 162
Digit	Meaning						
n.□□XX	Inter-Device Shared Data Size for Transmission (response)						Speed Pos Trq
00 to 50	Set the transmission size of response data to be shared.						
n.XX□□	Inter-Device Shared Data Size for Transmission (command)						Speed Pos Trq
00 to 50	Set the transmission size of command data to be shared.						

◆ Pn9B3: Inter-Device Data Sharing Settings 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 184Ch	–	1820h	All	After restart	Setup	160, 162
Digit	Meaning						
n.□□XX	Inter-Device Data Sharing Start Position						Speed Pos Trq
00h to 4Ch	Set the start position of inter-device data sharing for cyclic communications.						
n.□X□□	Inter-Device Shared Data Size						Speed Pos Trq
0 to 8	Set the size of the shared data.						
n.X□□□	Inter-Device Data Sharing Command/Response Selection						Speed Pos Trq
0	Select the command data.						
<u>1</u> Default	Select the response data.						

◆ Pn9B4: Inter-Device Data Sharing Target Selection 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 02FFh	–	0000h	All	After restart	Setup	160, 162
Digit	Meaning						
n.□□XX	Inter-Device Data Sharing Function Selection						Speed Pos Trq
<u>00h</u> Default	Do not specify a device to share data.						
01h to 02h	Reserved (Do not use.)						
03h	Set the station address 03h.						
:	:						
FFh	Set the station address FFh.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn9B5: Settings of Inter-Device Shared Data Size for Transmission 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 5050h	–	3050h	All	After restart	Setup	160, 162
Digit	Meaning						
n.□□XX	Inter-Device Shared Data Size for Transmission (response)						Speed Pos Trq
00 to 50	Set the transmission size of response data to be shared.						
n.XX□□	Inter-Device Shared Data Size for Transmission (command)						Speed Pos Trq
00 to 50	Set the transmission size of command data to be shared.						

◆ Pn9B6: Inter-Device Data Sharing Settings 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 184Ch	–	1820h	All	After restart	Setup	160, 162
Digit	Meaning						
n.□□XX	Inter-Device Data Sharing Start Position						Speed Pos Trq
00h to 4Ch	Set the start position of inter-device data sharing for cyclic communications.						
n.□X□□	Inter-Device Shared Data Size						Speed Pos Trq
0 to 8	Set the size of the shared data.						
n.X□□□	Inter-Device Data Sharing Command/Response Selection						Speed Pos Trq
0	Select the command data.						
<u>1</u> Default	Select the response data.						

◆ Pn9B7: Inter-Device Data Sharing Target Selection 3

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 02FFh	–	0000h	All	After restart	Setup	160, 162
Digit	Meaning						
n.□□XX	Inter-Device Data Sharing Function Selection						Speed Pos Trq
<u>00h</u> Default	Do not specify a device to share data.						
01h to 02h	Reserved (Do not use.)						
03h	Set the station address 03h.						
:	:						
FFh	Set the station address FFh.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn9B8: Settings of Inter-Device Shared Data Size for Transmission 3

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 5050h	–	3050h	All	After restart	Setup	160, 162
Digit	Meaning						
n.□□XX	Inter-Device Shared Data Size for Transmission (response)						Speed Pos Trq
00 to 50	Set the transmission size of response data to be shared.						
n.XX□□	Inter-Device Shared Data Size for Transmission (command)						Speed Pos Trq
00 to 50	Set the transmission size of command data to be shared.						

◆ Pn9B9: Inter-Device Data Sharing Settings 3

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 184Ch	–	1820h	All	After restart	Setup	160, 162
Digit	Meaning						
n.□□XX	Inter-Device Data Sharing Start Position						Speed Pos Trq
00h to 4Ch	Set the start position of inter-device data sharing for cyclic communications.						
n.□X□□	Inter-Device Shared Data Size						Speed Pos Trq
0 to 8	Set the size of the shared data.						
n.X□□□	Inter-Device Data Sharing Command/Response Selection						Speed Pos Trq
0	Select the command data.						
¹ □ Default	Select the response data.						

◆ Pn9BA: Inter-Device Data Sharing Target Selection 4

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 02FFh	–	0000h	All	After restart	Setup	160, 162
Digit	Meaning						
n.□□XX	Inter-Device Data Sharing Function Selection						Speed Pos Trq
00h □ Default	Do not specify a device to share data.						
01h to 02h	Reserved (Do not use.)						
03h	Set the station address 03h.						
:	:						
FFh	Set the station address FFh.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn9BB: Settings of Inter-Device Shared Data Size for Transmission 4

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 5050h	–	3050h	All	After restart	Setup	160, 162
Digit	Meaning						
n.□□XX	Inter-Device Shared Data Size for Transmission (response)						Speed Pos Trq
00 to 50	Set the transmission size of response data to be shared.						
n.XX□□	Inter-Device Shared Data Size for Transmission (command)						Speed Pos Trq
00 to 50	Set the transmission size of command data to be shared.						

◆ Pn9BC: Inter-Device Data Sharing Settings 4

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 184Ch	–	1820h	All	After restart	Setup	160, 162
Digit	Meaning						
n.□□XX	Inter-Device Data Sharing Start Position						Speed Pos Trq
00h to 4Ch	Set the start position of inter-device data sharing for cyclic communications.						
n.□X□□	Inter-Device Shared Data Size						Speed Pos Trq
0 to 8	Set the size of the shared data.						
n.X□□□	Inter-Device Data Sharing Command/Response Selection						Speed Pos Trq
0	Select the command data.						
<u>1</u> Default	Select the response data.						

◆ Pn9BD: Inter-Device Data Sharing Target Selection 5

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 02FFh	–	0000h	All	After restart	Setup	160, 162
Digit	Meaning						
n.□□XX	Inter-Device Data Sharing Function Selection						Speed Pos Trq
<u>00h</u> Default	Do not specify a device to share data.						
01h to 02h	Reserved (Do not use.)						
03h	Set the station address 03h.						
:	:						
FFh	Set the station address FFh.						
n.□X□□	Reserved (Do not change.)						
n.X□□□	Reserved (Do not change.)						

◆ Pn9BE: Settings of Inter-Device Shared Data Size for Transmission 5

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 5050h	–	3050h	All	After restart	Setup	160, 162
Digit	Meaning						
n.□□XX	Inter-Device Shared Data Size for Transmission (response)						Speed Pos Trq
00 to 50	Set the transmission size of response data to be shared.						
n.XX□□	Inter-Device Shared Data Size for Transmission (command)						Speed Pos Trq
00 to 50	Set the transmission size of command data to be shared.						

◆ Pn9BF: Inter-Device Data Sharing Settings 5

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference	
2	0000h to 184Ch	–	1820h	All	After restart	Setup	160, 162	
Digit	Meaning							
n.□□XX	Inter-Device Data Sharing Start Position					Speed	Pos	Trq
00h to 4Ch	Set the start position of inter-device data sharing for cyclic communications.							
n.□X□□	Inter-Device Shared Data Size					Speed	Pos	Trq
0 to 8	Set the size of the shared data.							
n.X□□□	Inter-Device Data Sharing Command/Response Selection					Speed	Pos	Trq
0	Select the command data.							
1	Select the response data.							
Default								

12.3 MECHATROLINK Common Parameters: Interpreting the Parameter Lists

◆61 PnAC2: Speed Loop Gain

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled
4	1000 to 2000000	0.001 Hz [0.1 Hz]	40000	All	Immediately

Speed Pos Trq

(1)
(2)
(3)
(4)

No.	Item	Meaning
(1)	Setting Unit	You can set the parameter in increments of the setting unit. However, if a unit is given in square brackets, the setting is automatically converted to the resolution given in the square brackets.
(2)	Applicable Motors	<p>Indicates the types of servomotors to which the parameter applies.</p> <ul style="list-style-type: none"> • All: The parameter is used for both rotary servomotors and linear servomotors. • Rotary: The parameter is used for only rotary servomotors. • Linear: The parameter is used for only linear servomotors. <p>Rotary servomotor terms are used for parameters that are applicable to all servomotors. If you are using a linear servomotor, you need to interpret the terms accordingly. Refer to the following sections for details.</p> <p> i.4.2 Differences in Terms for Rotary Servomotors and Linear Servomotors on page 20</p>
(3)	When Enabled	<p>This is when any change made to the parameter will become effective. "After restart" indicates parameters that will be effective after one of the following is executed.</p> <ul style="list-style-type: none"> • The power is turned OFF and ON again. • The CONFIG command is sent. • A software reset is executed.
(4)	Control Mode	<p>Speed: A parameter that can be used in speed control.</p> <p>Pos: A parameter that can be used in position control.</p> <p>Trq: A parameter that can be used in torque control. "Torque" is used even for linear servomotor parameters.</p> <p>Grayed-out icons (Speed, Speed, Speed) indicate parameters that cannot be used in the corresponding control method.</p>

12.4 List of MECHATROLINK Common Parameters : MECHATROLINK-4 Communications References

The following table lists the common MECHATROLINK-4 parameters. These common parameters are used to make settings from the host controller via MECHATROLINK communications. Do not change the settings with the digital operator or any other device.

◆ 01 PnA02: Encoder Type (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h, 1h	–	–	All	–	Device information	–
Set Value	Meaning						
0000h	Absolute encoder						
0001h	Incremental encoder						

◆ 02 PnA04: Motor Type (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h, 1h	–	–	All	–	Device information	–
Set Value	Meaning						
0000h	Rotary servomotor						
0001h	Linear servomotor						

◆ 03 PnA06: Semi-closed/Fully-closed Type (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h, 1h	–	–	All	–	Device information	–
Set Value	Meaning						
0000h	Semi-closed						
0001h	Fully-closed						

◆ 04 PnA08: Rated Speed (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h to FFFFFFFFh	1 min ⁻¹	–	All	–	Device information	–

◆ 05 PnA0A: Maximum Output Speed (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h to FFFFFFFFh	1 min ⁻¹	–	All	–	Device information	–

◆ 06 PnA0C: Speed Multiplier (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-1073741823 to 1073741823	–	–	All	–	Device information	–

◆ 07 PnA0E: Rated Torque (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h to FFFFFFFFh	1 N·m	–	All	–	Device information	–

◆ 08 PnA10: Maximum Output Torque (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h to FFFFFFFFh	1 N·m	–	All	–	Device information	–

◆ 09 PnA12: Torque Multiplier (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-1073741823 to 1073741823	–	–	All	–	Device information	–

◆ 0A PnA14: Resolution (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h to FFFFFFFFh	1 pulse/rev	–	Rotary	–	Device information	–

◆ 0B PnA16: Linear Scale Pitch

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 65536000	1 nm [0.01 μm]	0	Linear	After restart	Device information	–

◆ 0C PnA18: Pulses per Scale Pitch (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h to FFFFFFFFh	1 pulse/ pitch	–	Linear	–	Device information	–

◆ 21 PnA42: Electronic Gear Ratio (Numerator)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1 to 1073741824	–	64	All	After restart	Machine specifications	–

◆ 22 PnA44: Electronic Gear Ratio (Denominator)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1 to 1073741824	–	1	All	After restart	Machine specifications	–

◆ 23 PnA46: Absolute Encoder Origin Offset

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-1073741823 to 1073741823	1 reference unit	0	All	Immediately	Machine specifications	–

Note:

The parameter setting is enabled after SENS_ON command execution is completed.

◆ 24 PnA48: Multiturn Limit

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 65,535	1 Rev	65535	Rotary	After restart	Machine specifications	–

◆ 25 PnA4A: Limit Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h to 33h	–	0000h	All	After restart	Machine specifications	–

Bit	Meaning
Bit 0	P-OT (0: Enabled, 1: Disabled)
Bit 1	N-OT (0: Enabled, 1: Disabled)
Bit 2	Reserved.
Bit 3	Reserved.
Bit 4	P-SOT (0: Disabled, 1: Enabled)
Bit 5	N-SOT (0: Disabled, 1: Enabled)
Bits 6 to 31	Reserved.

◆ 26 PnA4C: Forward Software Limit

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-1073741823 to 1073741823	1 reference unit	1073741823	All	Immediately	Machine specifications	–

◆ 27 PnA4E: Reserved by System

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	–	–	0	All	Immediately	Machine specifications	–

◆ 28 PnA50: Reverse Software Limit

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-1073741823 to 1073741823	1 reference unit	-1073741823	All	Immediately	Machine specifications	–

◆ 29 PnA52: Reserved by System

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	–	–	0	All	Immediately	Machine specifications	–

◆ 41 PnA82: Speed Unit

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h to 4h	–	0h	All	After restart	Unit settings	421
Set Value	Meaning						
0000h	Reference units/s						
0001h	Reference units/min						
0002h	Percentage (%) of rated speed						
0003h	min ⁻¹						
0004h	Maximum motor speed/40000000h						

Note:

- When using fully-closed loop control, set 0000h: reference units/s.
- If you set this parameter to either 0002h or 0003h, set the common parameter 42 PnA84 (Speed Base Unit) to a number between -3 and 0.
- If you set this parameter to 0004h, set the common parameter 42 PnA84 (Speed Base Unit) to 0.

◆ 42 PnA84: Speed Base Unit (Set the value of n from the following formula: Speed unit (41 PnA82) × is 10ⁿ.)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-3 to 3	–	0	All	After restart	Unit settings	421

Note:

- If you set common parameter 41 PnA82 (Speed Unit) to either 0002h or 0003h, set this parameter to a number between -3 and 0.
- If you set common parameter 41 PnA82 (Speed Unit) to 0004h, set this parameter to 0.

◆ 43 PnA86: Position Unit

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h	–	0h	All	After restart	Unit settings	421
Set Value	Meaning						
0000h	Reference units						

◆ 44 PnA88: Position Base Unit (Set the value of n from the following formula: Position unit (43 PnA86) × is 10ⁿ)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0	–	0	All	After restart	Unit settings	421

◆ 45 PnA8A: Acceleration Unit

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h	–	0h	All	After restart	Unit settings	421
Set Value	Meaning						
0000h	Reference unit/s ²						

◆ 46 PnA8C: Acceleration Base Unit (Set the value of n from the following formula: Acceleration unit (45 PnA8A) × 10ⁿ.)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	4 to 6	–	4	All	After restart	Unit settings	421

◆ 47 PnA8E: Torque Unit

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1h, 2h	–	1h	All	After restart	Unit settings	421

Set Value	Meaning
0001h	Percentage (%) of rated torque
0002h	Maximum torque/40000000h

Note:

If you set this parameter to 0002h, set the common parameter 48 PnA90 (Torque Base Unit) to 0.

◆ 48 PnA90: Torque Base Unit (Set the value of n from the following formula: Torque unit (47 PnA8E) × is 10ⁿ.)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-5 to 0	–	0	All	After restart	Unit settings	421

Note:

If you set common parameter 47 PnA8E (Torque Unit) to 0002h, set this parameter to 0.

◆ 49 PnA92: Supported Unit (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	–	–	0601011Fh	All	–	Unit settings	–

Bit	Meaning
Speed Units	
Bit 0	Reference units/s (1: Enabled)
Bit 1	Reference units/min (1: Enabled)
Bit 2	Percentage (%) of rated speed (1: Enabled)
Bit 3	min ⁻¹ (rpm) (1: Enabled)
Bit 4	Maximum motor speed/4000000h (1: Enabled)
Bits 5 to 7	Reserved (0: Disabled).
Position Units	
Bit 8	Reference units (1: Enabled)
Bits 9 to 15	Reserved (0: Disabled).
Acceleration Units	
Bit 16	Reference unit/s ² (1: Enabled)
Bit 17	ms (acceleration time required to reach rated speed) (0: Disabled)
Bits 18 to 23	Reserved (0: Disabled).
Torque Units	
Bit 24	N·m (0: Disabled)
Bit 25	Percentage (%) of rated torque (1: Enabled)
Bit 26	Maximum torque/40000000h (1: Enabled)
Bits 27 to 31	Reserved (0: Disabled).

◆ 61 PnAC2: Speed Loop Gain

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1000 to 2000000	0.001 Hz [0.1 Hz]	40000	All	Immediately	Tuning	–

◆ 62 PnAC4: Speed Loop Integral Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	150 to 512000	1 μ s [0.01 ms]	20000	All	Immediately	Tuning	–

◆ 63 PnAC6: Position Loop Gain

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1000 to 2000000	0.001/s [0.1/s]	40000	All	Immediately	Tuning	–

◆ 64 PnAC8: Feed Forward Compensation

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 100	1%	0	All	Immediately	Tuning	–

◆ 65 PnACA: Position Loop Integral Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 5000000	1 μ s [0.1 ms]	0	All	Immediately	Tuning	–

◆ 66 PnACC: In-position Range

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 1073741824	1 reference unit	7	All	Immediately	Tuning	–

◆ 67 PnACE: Near-position Range

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1 to 1073741824	1 reference unit	1073741824	All	Immediately	Tuning	–

◆ 81 PnB02: Exponential Function Acceleration/Deceleration Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 510000	1 μ s [0.1 ms]	0	All	Immediately	Command-related parameters	–

Note:

Change the setting when the reference is stopped (while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

◆ 82 PnB04: Movement Average Time

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 510000	1 μ s [0.1 ms]	0	All	Immediately	Command-related parameters	–

Note:

Change the setting when the reference is stopped (while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

◆ 83 PnB06: Final Travel for External Input Positioning

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-1073741823 to 1073741823	1 reference unit	100	All	Immediately	Command-related parameters	–

◆ 84 PnB08: Zero Point Return Approach Speed

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h to 3FFFFFFFh	10^{-3} min^{-1}	$\times 5000\text{h}$ reference units/s converted to 10^{-3} min^{-1}	All	Immediately	Command-related parameters	–

◆ 85 PnB0A: Zero Point Return Creep Speed

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h to 3FFFFFFFh	10^{-3} min^{-1}	$\times 500\text{h}$ reference units/s converted to 10^{-3} min^{-1}	All	Immediately	Command-related parameters	–

◆ 86 PnB0C: Final Travel for Zero Point Return

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-1073741823 to 1073741823	1 reference unit	100	All	Immediately	Command-related parameters	–

◆ 87 PnB0E: Monitor Select 1

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0001h	All	Immediately	Command-related parameters	–

Set Value	Meaning
0000h	APOS
0001h Default	CPOS
0002h	PERR
0003h	LPOS1
0004h	LPOS2
0005h	FSPD
0006h	CSPD
0007h	TRQ
0008h	ALARM
0009h	MPOS
000Ah	Reserved (undefined value).
000Bh	Reserved (undefined value).
000Ch	CMN1 (common monitor 1)
000Dh	CMN2 (common monitor 2)
000Eh	OMN1 (optional monitor 1)
000Fh	OMN2 (optional monitor 2)
0010h	TPOS
0011h	IPOS
0012h	POS_OFST
0013h	TSPD
0014h	SPD_LIM
0015h	TRQ_LIM
0016h	SV_STAT
0018h	INIT_PGPOS (Low)
0019h	INIT_PGPOS (High)
001Ah	ERR_STS
0050h	Motor speed [overspeed detection speed / 1000000h]
0051h	Speed reference [overspeed detection speed / 1000000h]
0052h	Torque [maximum torque] / 1000000h]
0053h	Position deviation (lower 32 bits) [reference units]
0054h	Position deviation (upper 32 bits) [reference units]
005Ah	PG count (lower 32 bits) [reference units]
005Bh	PG count (upper 32 bits) [reference units]
005Ch	FPG count (lower 32 bits) [reference units]
005Dh	FPG count (upper 32 bits) [reference units]
0060h	Un000: Motor Speed [min ⁻¹]

Set Value	Meaning
0061h	Un001: Speed Reference [min^{-1}]
0062h	Un002: Torque Reference [%]
0063h	Un003: Rotational Angle 1 [encoder pulses] Number of encoder pulses from origin within one encoder rotation displayed in decimal
	Un003: Electrical Angle 1 [linear encoder pulses] Linear encoder pulses from the polarity origin displayed in decimal
0064h	Un004: Rotational Angle 2 [deg] Electrical angle from polarity origin
	Un004: Electrical Angle 2 [deg] Electrical angle from polarity origin
0065h	Un005: Input Signal Monitor
0066h	Un006: Output Signal Monitor
0067h	Un007: Input Reference Pulse Speed [min^{-1}]
0068h	Un008: Position Deviation [reference units]
0069h	Un009: Accumulated Load Ratio [%]
006Ah	Un00A: Regenerative Load Ratio [%]
006Bh	Un00B: Dynamic Brake Resistor Power Consumption [%]
006Ch	Un00C: Input Reference Pulse Counter [reference units]
006Dh	Un00D: Feedback Pulse Counter [encoder pulses]
006Eh	Un00E: Fully-closed Loop Feedback Pulse Counter [external encoder resolution]
0073h	Initial multiturn data [Rev]
0074h	Initial incremental data [pulses]
0075h	Initial absolute position data (lower 32 bits) [pulses]
0076h	Initial absolute position data (upper 32 bits) [pulses]
0090h	Un025: SERVOPACK Installation Environment Monitor
0091h	Un026: Servomotor Installation Environment Monitor
0092h	Un027: Built-in Fan Remaining Life Ratio
0093h	Un028: Capacitor Remaining Life Ratio
0094h	Un029: Surge Prevention Circuit Remaining Life Ratio
0095h	Un02A: Dynamic Brake Circuit Remaining Life Ratio
0096h	Un032: Instantaneous Power
0097h	Un033: Power Consumption
0098h	Un034: Cumulative Power Consumption
009Dh	Un173: Temperature Margin until SERVOPACK Overheats
00A5h	Estimated Vibration [overspeed detection speed / 1000000h]
00A6h	Estimated External Disturbance Torque [maximum torque / 1000000h]
00A8h	Un13C: Margin until Regenerative Overload
00AAh	Un13E: Margin until Undervoltage
00ABh	Un13F: Margin until Overvoltage
00B0h	Un023: Main Circuit DC Voltage
00C0h	Un078: Maximum Value of Amplitude of Estimated Vibration [min^{-1}]
00C1h	Un07A: Maximum Value of Estimated External Disturbance Torque [%]
00C2h	Un07B: Minimum Value of Estimated External Disturbance Torque [%]

12.4 List of MECHATROLINK Common Parameters : MECHATROLINK-4 Communications References

Set Value	Meaning
00C3h	Un147: Number of MECHATROLINK Communications Errors [times]
00C4h	Un104: Number of Serial Encoder Communications Errors [times]
00C5h	Un105: Settling Time [0.1 ms]
00C6h	Un106: Amount of Overshoot [reference units]
00C7h	Un107: Residual Vibration Frequency [0.1 Hz]
00C9h	Un174: Temperature Margin until Servomotor Overheats [°C]
00CAh	Un145: Maximum Value of Accumulated Load Ratio [%]
00CBh	Un14E: Margin until Overload [0.01 %]
00CCh	Un07C: Identified Moment of Inertia Ratio
00CEh	Un108: Maximum Settling Time
00CFh	Un109: Maximum Amount of Overshoot
00D0h	Previous value of latched feedback position (LPOS1) [reference units]
00D1h	Previous value of latched feedback position (LPOS2) [reference units]
00D4h	Continuous Latch Status (EX STATUS)
0154h	Un177: Encoder Power Supplied Time
0156h	Un17A: Encoder Power Supply Voltage
0157h	Un17B: Encoder Battery Voltage
015Ch	Un181: Motor Total Number of Rotations
015Dh	Un183: Maintenance Prediction Monitor - Bearings
015Eh	Un184: Maintenance Prediction Monitor - Oil Seal
0163h	File Upload Counter
0164h	File Upload Data
0165h	Error Detection Trace Counter
0166h	Error Detection Trace Error Rate
0176h	Un190: Motor Vibration in X-Axis Direction
0177h	Un191: Motor Vibration in Y-Axis Direction
0178h	Un192: Motor Vibration in Z-Axis Direction
0179h	Un193: Motor Vibration XYZ Composite Value
017Ah	Un194: Maximum Motor Vibration
0250h	SigmaLINK II Response Data 1
0251h	SigmaLINK II Response Data 2
0252h	SigmaLINK II Response Data 3
0253h	SigmaLINK II Response Data 4
0254h	SigmaLINK II Response Data 5
0255h	SigmaLINK II Response Data 6
0256h	SigmaLINK II Response Data 7
0257h	SigmaLINK II Response Data 8
0260h	SigmaLINK II Command Data 1
0261h	SigmaLINK II Command Data 2
0262h	SigmaLINK II Command Data 3
0263h	SigmaLINK II Command Data 4

Set Value	Meaning
0290h	SigmaLINK II Data Status Information
Other values	Reserved (Do not use.)

◆ 88 PnB10: Monitor Select 2

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	—	0000h	All	Immediately	Command-related parameters	—

Set Value	Meaning
0000h to FFFFh	The settings are the same as those for Monitor Select 1.

◆ 89 PnB12: Monitor Select for SEL_MON1 (CMN1)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h to Ah	–	0h	All	Immediately	Command-related parameters	–

Set Value	Meaning
0000h	TPOS (target position in reference coordinate system)
0001h	IPOS (reference position in reference coordinate system)
0002h	POS_OFFSET (offset set in POS_SET (Set Coordinate System) command)
0003h	TSPD (target speed)
0004h	SPD_LIM (speed limit)
0005h	TRQ_LIM (torque limit)
0006h	SV_STAT (servo actual operating status) Monitor Description <ul style="list-style-type: none"> • Byte 1: Current communications phase <ul style="list-style-type: none"> – 00h: Phase 0 – 01h: Phase 1 – 02h: Phase 2 – 03h: Phase 3 • Byte 2: Current control mode <ul style="list-style-type: none"> – 00h: Position control mode – 01h: Speed control mode – 02h: Torque control mode • Byte 3: Reserved • Byte 4: Expansion signal monitor <ul style="list-style-type: none"> – Bit 0: LT_RDY1: Processing status for latch detection for LT_REQ1 in SVCMD_CTRL region (0: Latch detection not yet processed. 1: Processing latch detection in progress.) – Bit 1: LT_RDY1: Processing status for latch detection for LT_REQ2 in SVCMD_CTRL region (0: Latch detection not yet processed. 1: Processing latch detection in progress.) – Bits 2 and 3: LT_SEL1R: Latch signal (0: Phase C, 1: External input signal 1, 2: External input signal 2, external input signal 3) – Bits 4 and 5: LT_SEL2R: Latch signal (0: Phase C, 1: External input signal 1, 2: External input signal 2, external input signal 3) – Bit 6: Reserved (0).
0007h	Reserved.
0008h	INIT_PGPOS (Low) Lower 32 bits of initial encoder position converted to 64-bit position reference data
0009h	INIT_PGPOS (High) Upper 32 bits of initial encoder position converted to 64-bit position reference data
000Ah	ERR_STS Error status read from communications ASIC

◆ 8A PnB14: Monitor Select for SEL_MON2 (CMN2)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0h to Ah	–	0h	All	Immediately	Command-related parameters	–
Set Value	Meaning						
0000h to 000Ah	The settings are the same as those for SEL_MON Monitor Selection 1.						

◆ 8B PnB16: Zero Point Detection Range

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 250	1 reference unit	10	All	Immediately	Command-related parameters	–

◆ 8C PnB18: Forward Torque Limit

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 800	1%	100	All	Immediately	Command-related parameters	–

◆ 8D PnB1A: Reverse Torque Limit

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 800	1%	100	All	Immediately	Command-related parameters	–

◆ 8E PnB1C: Zero Speed Detection Range

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	1000 to 10000000	10^{-3} min^{-1}	20000	All	Immediately	Command-related parameters	–

◆ 8F PnB1E: Speed Match Signal Detection Range

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0 to 100000	10^{-3} min^{-1}	10000	All	Immediately	Command-related parameters	–

◆ 90 PnB20: SVCMD_CTRL bit Enabled/Disabled (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	–	–	FFFF3F3Fh	All	–	Command-related parameters	–

Bit	Meaning
Bit 0	CMD_PAUSE (1: Enabled)
Bit 1	CMD_CANCEL (1: Enabled)
Bits 2, 3	STOP_MODE (1: Enabled)
Bits 4, 5	ACCFIL (1: Enabled)
Bits 6, 7	Reserved (0: Disabled).
Bit 8	LT_REQ1 (1: Enabled)
Bit 9	LT_REQ2 (1: Enabled)
Bits 10, 11	LT_SEL1 (1: Enabled)
Bits 12, 13	LT_SEL2 (1: Enabled)
Bits 14, 15	Reserved (0: Disabled).
Bits 16 to 19	SEL_MON1 (1: Enabled)
Bits 20 to 23	SEL_MON2 (1: Enabled)
Bits 24 to 31	SEL_MON3 (1: Enabled)

◆ 91 PnB22: SVCMD_STAT bit Enabled/Disabled (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	–	–	FFFF3F33h	All	–	Command-related parameters	–

Bit	Meaning
Bit 0	CMD_PAUSE_CMP (1: Enabled)
Bit 1	CMD_CANCEL_CMP (1: Enabled)
Bits 2, 3	Reserved (0: Disabled).
Bits 4, 5	ACCFIL (1: Enabled)
Bits 6, 7	Reserved (0: Disabled).
Bit 8	L_CMP1 (1: Enabled)
Bit 9	L_CMP2 (1: Enabled)
Bit 10	POS_RDY (1: Enabled)
Bit 11	PON (1: Enabled)
Bit 12	M_RDY (1: Enabled)
Bit 13	SV_ON (1: Enabled)
Bits 14, 15	Reserved (0: Disabled).
Bits 16 to 19	SEL_MON1 (1: Enabled)
Bits 20 to 23	SEL_MON2 (1: Enabled)
Bits 24 to 31	SEL_MON3 (1: Enabled)

◆ 92 PnB24: I/O Bit Enabled/Disabled (Output) (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	–	–	88FF01F0h	All	–	Command-related parameters	–

Bit	Meaning
Bits 0 to 3	Reserved (0: Disabled).
Bit 4	V_PPI (1: Enabled)
Bit 5	P_PPI (1: Enabled)
Bit 6	P_CL (1: Enabled)
Bit 7	N_CL (1: Enabled)
Bit 8	G_SEL (1: Enabled)
Bits 9 to 11	G_SEL (0: Disabled)
Bits 12 to 15	Reserved (0: Disabled).
Bits 16 to 19	BANK_SEL (1: Enabled)
Bits 20 to 22	SO1 to SO3 (1: Enabled)
Bits 23 to 30	Reserved (0: Disabled).
Bit 31	EXT_TRC (1: Enabled)

◆ 93 PnB26: I/O Bit Enabled/Disabled (Input) (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	–	–	FF0FFEFeh	All	–	Command-related parameters	–

Bit	Meaning
Bit 0	Reserved (0: Disabled).
Bit 1	DEC (1: Enabled)
Bit 2	P-OT (1: Enabled)
Bit 3	N-OT (1: Enabled)
Bit 4	EXT1 (1: Enabled)
Bit 5	EXT2 (1: Enabled)
Bit 6	EXT3 (1: Enabled)
Bit 7	ESTP (1: Enabled)
Bit 8	Reserved (0: Disabled).
Bit 9	BRK_ON (1: Enabled)
Bit 10	P-SOT (1: Enabled)
Bit 11	N-SOT (1: Enabled)
Bit 12	DEN (1: Enabled)
Bit 13	NEAR (1: Enabled)
Bit 14	PSET (1: Enabled)
Bit 15	ZPOINT (1: Enabled)
Bit 16	T_LIM (1: Enabled)
Bit 17	V_LIM (1: Enabled)
Bit 18	V_CMP (1: Enabled)
Bit 19	ZSPD (1: Enabled)
Bits 20 to 23	Reserved (0: Disabled).
Bits 24 to 31	IO_STS1 to IO_STS8 (1: Enabled)

◆ 94 PnB28: Selectable Command Values (read only)

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	–	–	7Eh	All	–	Command-related parameters	–

Bit	Meaning
Bit 0	Reserved (0: Disabled).
Bit 1	ACCR (1: Supported)
Bit 2	DECR (1: Supported)
Bit 3	VFF (1: Supported)
Bit 4	TFF (1: Supported)
Bit 5	VLIM (1: Supported)
Bit 6	TLIM (1: Supported)
Bits 7 to 31	Reserved (0).

◆ A0 PnB40: CPRM_SEL_CMDP1 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	—	0000h	All	After restart	Command-related parameters	—
Set Value	Meaning						
0000h	Disabled (no allocation setting)						
0001h	ACCR						
0002h	DECR						
0003h	VFF						
0004h	TFF						
0005h	VLIM						
0006h	TLIM						
0007h to 008Fh	Reserved.						
0090h	Triggers at Preset Positions Table 1 Output Position Settings						
0091h	Triggers at Preset Positions Table 2 Output Position Settings						
0092h	Triggers at Preset Positions Table 3 Output Position Settings						
0093h	Triggers at Preset Positions Table 4 Output Position Settings						
0094h	Triggers at Preset Positions Table 5 Output Position Settings						
0095h	Triggers at Preset Positions Table 6 Output Position Settings						
0096h to 025Fh	Reserved.						
0260h	SigmaLINK II Command Data 1						
0261h	SigmaLINK II Command Data 2						
0262h	SigmaLINK II Command Data 3						
0263h	SigmaLINK II Command Data 4						
0264h to FFFFh	Reserved.						

◆ A1 PnB42: CPRM_SEL_CMDP2 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	—	0000h	All	After restart	Command-related parameters	—
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ A2 PnB44: CPRM_SEL_CMDP3 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ A3 PnB46: CPRM_SEL_CMDP4 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ A4 PnB48: CPRM_SEL_CMDP5 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ A5 PnB4A: CPRM_SEL_CMDP6 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ A6 PnB4C: CPRM_SEL_CMDP7 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ A7 PnB4E: CPRM_SEL_CMDP8 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ A8 PnB50: CPRM_SEL_CMDP9 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ A9 PnB52: CPRM_SEL_CMDP10 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ AA PnB54: CPRM_SEL_CMDP11 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ AB PnB56: CPRM_SEL_CMDP12 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ B0 PnB60: CPRM_SEL_CMDV1 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ B1 PnB62: CPRM_SEL_CMDV2 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ B2 PnB64: CPRM_SEL_CMDV3 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ B3 PnB66: CPRM_SEL_CMDV4 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ B4 PnB68: CPRM_SEL_CMDV5 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ B5 PnB6A: CPRM_SEL_CMDV6 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ B6 PnB6C: CPRM_SEL_CMDV7 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ B7 PnB6E: CPRM_SEL_CMDV8 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ B8 PnB70: CPRM_SEL_CMDV9 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ B9 PnB72: CPRM_SEL_CMDV10 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ BA PnB74: CPRM_SEL_CMDV11 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ BB PnB76: CPRM_SEL_CMDV12 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ C0 PnB80: CPRM_SEL_CMDT1 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ C1 PnB82: CPRM_SEL_CMDT2 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ C2 PnB84: CPRM_SEL_CMDT3 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ C3 PnB86: CPRM_SEL_CMDT4 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ C4 PnB88: CPRM_SEL_CMDT5 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ C5 PnB8A: CPRM_SEL_CMDT6 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ C6 PnB8C: CPRM_SEL_CMDT7 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ C7 PnB8E: CPRM_SEL_CMDT8 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ C8 PnB90: CPRM_SEL_CMDT9 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ C9 PnB92: CPRM_SEL_CMDT10 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ CA PnB94: CPRM_SEL_CMDT11 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ CB PnB96: CPRM_SEL_CMDT12 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ D0 PnBA0: CPRM_SEL_CMD1 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ D1 PnBA2: CPRM_SEL_CMD2 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ D2 PnBA4: CPRM_SEL_CMD3 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ D3 PnBA6: CPRM_SEL_CMD4 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ D4 PnBA8: CPRM_SEL_CMD5 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ D5 PnBAA: CPRM_SEL_CMD6 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–
Set Value	Meaning						
0000h to FFFFh	Same as common parameter A0 PnB40.						

◆ D6 PnBAC: CPRM_SEL_CMD7 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–

Set Value	Meaning
0000h to FFFFh	Same as common parameter A0 PnB40.

◆ D7 PnBAE: CPRM_SEL_CMD8 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	After restart	Command-related parameters	–

Set Value	Meaning
0000h to FFFFh	Same as common parameter A0 PnB40.

◆ E0 PnBC0: CPRM_SEL_MON3 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	—	0000h	All	Immediately	Command-related parameters	154, 159

Set Value	Meaning
0000h	APOS
0001h Default	CPOS
0002h	PERR
0003h	LPOS1
0004h	LPOS2
0005h	FSPD
0006h	CSPD
0007h	TRQ
0008h	ALARM
0009h	MPOS
000Ah	Reserved (undefined value).
000Bh	Reserved (undefined value).
000Ch	CMN1 (common monitor 1)
000Dh	CMN2 (common monitor 2)
000Eh	OMN1 (optional monitor 1)
000Fh	OMN2 (optional monitor 2)
0010h	TPOS
0011h	IPOS
0012h	POS_OFST
0013h	TSPD
0014h	SPD_LIM
0015h	TRQ_LIM
0016h	SV_STAT
0018h	INIT_PGPOS (Low)
0019h	INIT_PGPOS (High)
001Ah	ERR_STS
0050h	Motor speed [overspeed detection speed / 1000000h]
0051h	Speed reference [overspeed detection speed / 1000000h]
0052h	Torque [maximum torque] / 1000000h]
0053h	Position deviation (lower 32 bits) [reference units]
0054h	Position deviation (upper 32 bits) [reference units]
005Ah	PG count (lower 32 bits) [reference units]
005Bh	PG count (upper 32 bits) [reference units]
005Ch	FPG count (lower 32 bits) [reference units]
005Dh	FPG count (upper 32 bits) [reference units]
0060h	Un000: Motor Speed [min ⁻¹]

12.4 List of MECHATROLINK Common Parameters : MECHATROLINK-4 Communications References

Set Value	Meaning
0061h	Un001: Speed Reference [min^{-1}]
0062h	Un002: Torque Reference [%]
0063h	Un003: Rotational Angle 1 [encoder pulses] Number of encoder pulses from origin within one encoder rotation displayed in decimal
	Un003: Electrical Angle 1 [linear encoder pulses] Linear encoder pulses from the polarity origin displayed in decimal
0064h	Un004: Rotational Angle 2 [deg] Electrical angle from polarity origin
	Un004: Electrical Angle 2 [deg] Electrical angle from polarity origin
0065h	Un005: Input Signal Monitor
0066h	Un006: Output Signal Monitor
0067h	Un007: Input Reference Pulse Speed [min^{-1}]
0068h	Un008: Position Deviation [reference units]
0069h	Un009: Accumulated Load Ratio [%]
006Ah	Un00A: Regenerative Load Ratio [%]
006Bh	Un00B: Dynamic Brake Resistor Power Consumption [%]
006Ch	Un00C: Input Reference Pulse Counter [reference units]
006Dh	Un00D: Feedback Pulse Counter [encoder pulses]
006Eh	Un00E: Fully-closed Loop Feedback Pulse Counter [external encoder resolution]
0073h	Initial multiturn data [Rev]
0074h	Initial incremental data [pulses]
0075h	Initial absolute position data (lower 32 bits) [pulses]
0076h	Initial absolute position data (upper 32 bits) [pulses]
0090h	Un025: SERVOPACK Installation Environment Monitor
0091h	Un026: Servomotor Installation Environment Monitor
0092h	Un027: Built-in Fan Remaining Life Ratio
0093h	Un028: Capacitor Remaining Life Ratio
0094h	Un029: Surge Prevention Circuit Remaining Life Ratio
0095h	Un02A: Dynamic Brake Circuit Remaining Life Ratio
0096h	Un032: Instantaneous Power
0097h	Un033: Power Consumption
0098h	Un034: Cumulative Power Consumption
009Dh	Un173: Temperature Margin until SERVOPACK Overheats
00A5h	Estimated Vibration [overspeed detection speed / 1000000h]
00A6h	Estimated External Disturbance Torque [maximum torque / 1000000h]
00A8h	Un13C: Margin until Regenerative Overload
00AAh	Un13E: Margin until Undervoltage
00ABh	Un13F: Margin until Overvoltage
00B0h	Un023: Main Circuit DC Voltage
00C0h	Un078: Maximum Value of Amplitude of Estimated Vibration [min^{-1}]
00C1h	Un07A: Maximum Value of Estimated External Disturbance Torque [%]
00C2h	Un07B: Minimum Value of Estimated External Disturbance Torque [%]

Set Value	Meaning
00C3h	Un147: Number of MECHATROLINK Communications Errors [times]
00C4h	Un104: Number of Serial Encoder Communications Errors [times]
00C5h	Un105: Settling Time [0.1 ms]
00C6h	Un106: Amount of Overshoot [reference units]
00C7h	Un107: Residual Vibration Frequency [0.1 Hz]
00C9h	Un174: Temperature Margin until Servomotor Overheats [°C]
00CAh	Un145: Maximum Value of Accumulated Load Ratio [%]
00CBh	Un14E: Margin until Overload [0.01 %]
00CCh	Un07C: Identified Moment of Inertia Ratio
00CEh	Un108: Maximum Settling Time
00CFh	Un109: Maximum Amount of Overshoot
00D0h	Previous value of latched feedback position (LPOS1) [reference units]
00D1h	Previous value of latched feedback position (LPOS2) [reference units]
00D4h	Continuous Latch Status (EX STATUS)
0154h	Un177: Encoder Power Supplied Time
0156h	Un17A: Encoder Power Supply Voltage
0157h	Un17B: Encoder Battery Voltage
015Ch	Un181: Motor Total Number of Rotations
015Dh	Un183: Maintenance Prediction Monitor - Bearings
015Eh	Un184: Maintenance Prediction Monitor - Oil Seal
0163h	File Upload Counter
0164h	File Upload Data
0165h	Error Detection Trace Counter
0166h	Error Detection Trace Error Rate
0176h	Un190: Motor Vibration in X-Axis Direction
0177h	Un191: Motor Vibration in Y-Axis Direction
0178h	Un192: Motor Vibration in Z-Axis Direction
0179h	Un193: Motor Vibration XYZ Composite Value
017Ah	Un194: Maximum Motor Vibration
018Ch	Inter-Device Data Sharing Output 1 (OL00000)
018Dh	Inter-Device Data Sharing Output 2 (OL00002)
018Eh	Inter-Device Data Sharing Output 3 (OL00004)
018Fh	Inter-Device Data Sharing Output 4 (OL00006)
0190h	Inter-Device Data Sharing Output 5 (OL00008)
0191h	Inter-Device Data Sharing Output 6 (OL0000A)
0192h	Inter-Device Data Sharing Output 7 (OL0000C)
0193h	Inter-Device Data Sharing Output 8 (OL0000E)
0250h	SigmaLINK II Response Data 1
0251h	SigmaLINK II Response Data 2
0252h	SigmaLINK II Response Data 3
0253h	SigmaLINK II Response Data 4
0254h	SigmaLINK II Response Data 5

Set Value	Meaning
0255h	SigmaLINK II Response Data 6
0256h	SigmaLINK II Response Data 7
0257h	SigmaLINK II Response Data 8
0260h	SigmaLINK II Command Data 1
0261h	SigmaLINK II Command Data 2
0262h	SigmaLINK II Command Data 3
0263h	SigmaLINK II Command Data 4
0290h	SigmaLINK II Data Status Information
Other values	Reserved (Do not change.)

◆ E1 PnBC2: CPRM_SEL_MON4 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	Immediately	Command-related parameters	154, 159

Set Value	Meaning
0000h to FFFFh	Same as common parameter E0 PnBC0.

◆ E2 PnBC4: CPRM_SEL_MON5 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	Immediately	Command-related parameters	154, 159

Set Value	Meaning
0000h to FFFFh	Same as common parameter E0 PnBC0.

◆ E3 PnBC6: CPRM_SEL_MON6 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	Immediately	Command-related parameters	154, 159

Set Value	Meaning
0000h to FFFFh	Same as common parameter E0 PnBC0.

◆ E4 PnBC8: CPRM_SEL_MON7 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	Immediately	Command-related parameters	154, 159

Set Value	Meaning
0000h to FFFFh	Same as common parameter E0 PnBC0.

◆ E5 PnBCA: CPRM_SEL_MON8 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	Immediately	Command-related parameters	154, 159
Set Value	Meaning						
0000h to FFFFh	Same as common parameter E0 PnBC0.						

◆ E6 PnBCC: CPRM_SEL_MON9 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	Immediately	Command-related parameters	154, 159
Set Value	Meaning						
0000h to FFFFh	Same as common parameter E0 PnBC0.						

◆ E7 PnBCE: CPRM_SEL_MON10 Allocation Setting

Speed Pos Trq

Size	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	0000h to FFFFh	–	0000h	All	Immediately	Command-related parameters	154, 159
Set Value	Meaning						
0000h to FFFFh	Same as common parameter E0 PnBC0.						

12.5 Parameter Recording Table: MECHATROLINK-4 Communications References

Use the following table to record the settings of the parameters.

Parameter No.	Default Setting					Name	When Enabled
Pn000	0000h					Basic Function Selections 0	After restart
Pn001	0000h					Application Function Selections 1	After restart
Pn002	0011h					Application Function Selections 2	After restart
Pn006	0002h					Application Function Selections 6	Immediately
Pn007	0000h					Application Function Selections 7	Immediately
Pn008	4000h					Application Function Selections 8	After restart
Pn009	0040h					Application Function Selections 9	After restart
Pn00A	0001h					Application Function Selections A	After restart
Pn00B	0000h					Application Function Selections B	After restart
Pn00C	0040h					Application Function Selections C	After restart
Pn00D	0000h					Application Function Selections D	After restart
Pn00E	0000h					Application Function Selections E	After restart
Pn00F	0000h					Application Function Selections F	After restart
Pn021	0000h					Reserved (Do not change.)	–
Pn022	0000h					Application Function Selections 22	After restart
Pn02F	0000h					Application Function Selections 2F	After restart
Pn030	C0A80101-h					Ethernet IP Address	After restart
Pn032	FFFFFF00-h					Ethernet Subnet Mask	After restart
Pn034	00000000h					Ethernet Default Gateway	After restart
Pn040	0000h					Reserved (Do not change.)	–
Pn050	00000000h					SigmaLINK II Response Data Selection 1	After restart
Pn052	00000000h					SigmaLINK II Response Data Selection 2	After restart
Pn054	00000000h					SigmaLINK II Response Data Selection 3	After restart
Pn056	00000000h					SigmaLINK II Response Data Selection 4	After restart
Pn058	00000000h					SigmaLINK II Response Data Selection 5	After restart
Pn05A	00000000h					SigmaLINK II Response Data Selection 6	After restart
Pn05C	00000000h					SigmaLINK II Response Data Selection 7	After restart
Pn05E	00000000h					SigmaLINK II Response Data Selection 8	After restart
Pn080	0000h					Application Function Selections 80	After restart
Pn081	0000h					Application Function Selections 81	After restart

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Parameter No.	Default Setting						Name	When Enabled
Pn090	00000000h						SigmaLINK II Command Data Selection 1	After restart
Pn092	00000000h						SigmaLINK II Command Data Selection 2	After restart
Pn094	00000000h						SigmaLINK II Command Data Selection 3	After restart
Pn096	00000000h						SigmaLINK II Command Data Selection 4	After restart
Pn0B1	0000h						SigmaLINK II Sequence Input Allocation 1	After restart
Pn0B2	0000h						SigmaLINK II Sequence Input Allocation 2	After restart
Pn0B5	0000h						SigmaLINK II Sequence Output Allocation 1	After restart
Pn0DA	0000h						SigmaLINK II Semi-closed Encoder Selection	After restart
Pn0DB	0101h						SigmaLINK II Fully-closed Encoder Selection	After restart
Pn0DC	0000h						SigmaLINK II Node Change Detection Condition Selection	After restart
Pn0DD	0110h						SigmaLINK II I/O Device Error Detection Selection	After restart
Pn100	400						Speed Loop Gain	Immediately
Pn101	2000						Speed Loop Integral Time Constant	Immediately
Pn102	400						Position Loop Gain	Immediately
Pn103	100						Moment of Inertia Ratio	Immediately
Pn104	400						Second Speed Loop Gain	Immediately
Pn105	2000						Second Speed Loop Integral Time Constant	Immediately
Pn106	400						Second Position Loop Gain	Immediately
Pn109	0						Feedforward	Immediately
Pn10A	0						Feedforward Filter Time Constant	Immediately
Pn10B	0000h						Gain Application Selections	–
Pn10C	200						Mode Switching Level for Torque Reference	Immediately
Pn10D	0						Mode Switching Level for Speed Reference	Immediately
Pn10E	0						Mode Switching Level for Acceleration	Immediately
Pn10F	0						Mode Switching Level for Position Deviation	Immediately
Pn11F	0						Position Integral Time Constant	Immediately
Pn121	100						Friction Compensation Gain	Immediately
Pn122	100						Second Friction Compensation Gain	Immediately
Pn123	0						Friction Compensation Coefficient	Immediately
Pn124	0						Friction Compensation Frequency Correction	Immediately

Continued on next page.

Continued from previous page.

Parameter No.	Default Setting						Name	When Enabled
Pn125	100						Friction Compensation Gain Correction	Immediately
Pn131	0						Gain Switching Time 1	Immediately
Pn132	0						Gain Switching Time 2	Immediately
Pn135	0						Gain Switching Waiting Time 1	Immediately
Pn136	0						Gain Switching Waiting Time 2	Immediately
Pn139	0000h						Automatic Gain Switching Selections 1	Immediately
Pn13D	2000						Current Gain Level	Immediately
Pn140	0100h						Model Following Control-Related Selections	Immediately
Pn141	500						Model Following Control Gain	Immediately
Pn142	1000						Model Following Control Gain Correction	Immediately
Pn143	1000						Model Following Control Bias in the Forward Direction	Immediately
Pn144	1000						Model Following Control Bias in the Reverse Direction	Immediately
Pn145	500						Vibration Suppression 1 Frequency A	Immediately
Pn146	700						Vibration Suppression 1 Frequency B	Immediately
Pn147	1000						Model Following Control Speed Feedforward Compensation	Immediately
Pn148	500						Second Model Following Control Gain	Immediately
Pn149	1000						Second Model Following Control Gain Correction	Immediately
Pn14A	800						Vibration Suppression 2 Frequency	Immediately
Pn14B	100						Vibration Suppression 2 Correction	Immediately
Pn14F	0030h						Control-Related Selections	After restart
Pn160	0010h						Anti-Resonance Control-Related Selections	Immediately
Pn161	1000						Anti-Resonance Frequency	Immediately
Pn162	100						Anti-Resonance Gain Correction	Immediately
Pn163	0						Anti-Resonance Damping Gain	Immediately
Pn164	0						Anti-Resonance Filter Time Constant 1 Correction	Immediately
Pn165	0						Anti-Resonance Filter Time Constant 2 Correction	Immediately
Pn166	0						Anti-Resonance Damping Gain 2	Immediately
Pn170	1401h						Tuning-less Function-Related Selections	–
Pn173	0000h						Load Fluctuation Compensation Control-Related Selections	Immediately
Pn174	400						Load Fluctuation Compensation Control Response Level	Immediately
Pn181	0						Mode Switching Level for Speed Reference	Immediately

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Continued from previous page.

Parameter No.	Default Setting						Name	When Enabled
Pn182	0						Mode Switching Level for Acceleration	Immediately
Pn205	65535						Multiturn Limit	After restart
Pn207	0010h						Position Control Function Selections	After restart
Pn20A	32768						Number of External Encoder Scale Pitches	After restart
Pn20E	64						Electronic Gear Ratio (Numerator)	After restart
Pn210	1						Electronic Gear Ratio (Denominator)	After restart
Pn212	2048						Number of Encoder Output Pulses	After restart
Pn21D	0080h						Encoder Resolution Setting	After restart
Pn22A	0000h						Fully-closed Control Selections	After restart
Pn230	0000h						Position Control Expansion Function Selections	After restart
Pn231	0						Backlash Compensation Value	Immediately
Pn233	0						Backlash Compensation Time Constant	Immediately
Pn281	20						Encoder Output Resolution	After restart
Pn282	0						Linear Encoder Scale Pitch	After restart
Pn304	500						Jogging Speed	Immediately
Pn305	0						Soft Start Acceleration Time	Immediately
Pn306	0						Soft Start Deceleration Time	Immediately
Pn308	0						Speed Feedback Filter Time Constant	Immediately
Pn30A	0						Deceleration Time for Servo OFF and Forced Stops	Immediately
Pn30C	0						Speed Feedforward Average Movement Time	Immediately
Pn310	0000h						Vibration Detection Selections	Immediately
Pn311	100						Vibration Detection Sensitivity	Immediately
Pn312	50						Vibration Detection Level	Immediately
Pn316	10000						Maximum Motor Speed	After restart
Pn324	300						Moment of Inertia Calculation Starting Level	Immediately
Pn383	50						Jogging Speed	Immediately
Pn384	10						Vibration Detection Level	Immediately
Pn385	50						Maximum Motor Speed	After restart
Pn401	100						First Stage First Torque Reference Filter Time Constant	Immediately
Pn402	800						Forward Torque Limit	Immediately
Pn403	800						Reverse Torque Limit	Immediately
Pn404	100						Forward External Torque Limit	Immediately
Pn405	100						Reverse External Torque Limit	Immediately
Pn406	800						Emergency Stop Torque	Immediately
Pn407	10000						Speed Limit during Torque Control	Immediately
Pn408	0000h						Torque-Related Function Selections	—

Continued on next page.

12.5 Parameter Recording Table: MECHATROLINK-4 Communications References

Continued from previous page.

Parameter No.	Default Setting					Name	When Enabled
Pn409	5000					First Stage Notch Filter Frequency	Immediately
Pn40A	70					First Stage Notch Filter Q Value	Immediately
Pn40B	0					First Stage Notch Filter Depth	Immediately
Pn40C	5000					Second Stage Notch Filter Frequency	Immediately
Pn40D	70					Second Stage Notch Filter Q Value	Immediately
Pn40E	0					Second Stage Notch Filter Depth	Immediately
Pn40F	5000					Second Stage Second Torque Reference Filter Frequency	Immediately
Pn410	50					Second Stage Second Torque Reference Filter Q Value	Immediately
Pn412	100					First Stage Second Torque Reference Filter Time Constant	Immediately
Pn416	0000h					Torque-Related Function Selections 2	Immediately
Pn417	5000					Third Stage Notch Filter Frequency	Immediately
Pn418	70					Third Stage Notch Filter Q Value	Immediately
Pn419	0					Third Stage Notch Filter Depth	Immediately
Pn41A	5000					Fourth Stage Notch Filter Frequency	Immediately
Pn41B	70					Fourth Stage Notch Filter Q Value	Immediately
Pn41C	0					Fourth Stage Notch Filter Depth	Immediately
Pn41D	5000					Fifth Stage Notch Filter Frequency	Immediately
Pn41E	70					Fifth Stage Notch Filter Q Value	Immediately
Pn41F	0					Fifth Stage Notch Filter Depth	Immediately
Pn423	0002h					Speed Ripple Compensation Selections	–
Pn424	50					Torque Limit at Main Circuit Voltage Drop	Immediately
Pn425	100					Release Time for Torque Limit at Main Circuit Voltage Drop	Immediately
Pn426	0					Torque Feedforward Average Movement Time	Immediately
Pn427	0					Speed Ripple Compensation Enable Speed	Immediately
Pn428	0001h					Output Torque Compensation Selections	After restart
Pn43D	10000					Reserved (Do not change.)	–
Pn456	15					Sweep Torque Reference Amplitude	Immediately
Pn460	0101h					Notch Filter Adjustment Selections 1	Immediately
Pn475	0000h					Gravity Compensation-Related Selections	After restart
Pn476	0					Gravity Compensation Torque	Immediately
Pn480	10000					Speed Limit during Force Control	Immediately
Pn481	400					Polarity Detection Speed Loop Gain	Immediately
Pn482	3000					Polarity Detection Speed Loop Integral Time	Immediately
Pn483	30					Forward Force Limit	Immediately

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Continued from previous page.

Parameter No.	Default Setting						Name	When Enabled
Pn484	30						Reverse Force Limit	Immediately
Pn485	20						Polarity Detection Reference Speed	Immediately
Pn486	25						Polarity Detection Reference Acceleration/Deceleration Time	Immediately
Pn487	0						Polarity Detection Constant Speed Time	Immediately
Pn488	100						Polarity Detection Reference Waiting Time	Immediately
Pn48E	10						Polarity Detection Range	Immediately
Pn490	100						Polarity Detection Load Level	Immediately
Pn495	100						Polarity Detection Confirmation Force Reference	Immediately
Pn498	10						Polarity Detection Allowable Error Range	Immediately
Pn49F	0						Speed Ripple Compensation Enable Speed (Linear)	Immediately
Pn502	20						Rotation Detection Level	Immediately
Pn503	10						Speed Coincidence Detection Signal Output Width	Immediately
Pn506	0						Brake Reference-Servo OFF Delay Time	Immediately
Pn507	100						Brake Reference Output Speed Level	Immediately
Pn508	50						Servo OFF-Brake Command Waiting Time	Immediately
Pn509	20						Momentary Power Interruption Hold Time	Immediately
Pn50A	1881h						Input Signal Selections 1	After restart
Pn50B	8882h						Input Signal Selections 2	After restart
Pn50E	0000h						Output Signal Selections 1	After restart
Pn50F	0100h						Output Signal Selections 2	After restart
Pn510	0000h						Output Signal Selections 3	After restart
Pn511	6543h						Input Signal Selections 5	After restart
Pn512	0000h						Output Signal Inverse Settings	After restart
Pn514	0000h						Output Signal Selections 4	After restart
Pn516	8888h						Input Signal Selections 7	After restart
Pn518	–						Reserved (Do not change.)	–
Pn51B	1000						Motor-Load Position Deviation Overflow Detection Level	Immediately
Pn51E	100						Position Deviation Overflow Warning Level	Immediately
Pn520	6116694						Position Deviation Overflow Alarm Level	Immediately
Pn522	7						In-position Range	Immediately
Pn524	10737418-24						Near Signal Width	Immediately
Pn526	6116694						Position Deviation Overflow Alarm Level at Servo ON	Immediately

Continued on next page.

12.5 Parameter Recording Table: MECHATROLINK-4 Communications References

Continued from previous page.

Parameter No.	Default Setting						Name	When Enabled
Pn528	100						Position Deviation Overflow Warning Level at Servo ON	Immediately
Pn529	10000						Speed Limit Level at Servo ON	Immediately
Pn52A	20						Multiplier per Fully-closed Rotation	Immediately
Pn52B	20						Overload Warning Level	After restart
Pn52C	100						Base Current Derating at Motor Overload Detection	After restart
Pn530	0000h						Program Jogging-Related Selections	Immediately
Pn531	32768						Program Jogging Travel Distance	Immediately
Pn533	500						Program Jogging Movement Speed	Immediately
Pn534	100						Program Jogging Acceleration/Deceleration Time	Immediately
Pn535	100						Program Jogging Waiting Time	Immediately
Pn536	1						Program Jogging Number of Movements	Immediately
Pn540	3000						Maximum Search Gain	Immediately
Pn550	0						Analog Monitor 1 Offset Voltage	Immediately
Pn551	0						Analog Monitor 2 Offset Voltage	Immediately
Pn552	100						Analog Monitor 1 Magnification	Immediately
Pn553	100						Analog Monitor 2 Magnification	Immediately
Pn55A	1						Power Consumption Monitor Unit Time	Immediately
Pn560	400						Residual Vibration Detection Width	Immediately
Pn561	100						Overshoot Detection Level	Immediately
Pn562	80						Setting Gain Ratio	Immediately
Pn56A	1111h						Output Signal Reference Method Selections 1	After restart
Pn56B	0001h						Reserved (Do not change.)	—
Pn581	20						Zero Speed Level	Immediately
Pn582	10						Speed Coincidence Detection Signal Output Width	Immediately
Pn583	10						Brake Reference Output Speed Level	Immediately
Pn584	10000						Speed Limit Level at Servo ON	Immediately
Pn585	50						Program Jogging Movement Speed	Immediately
Pn586	0						Motor Running Cooling Ratio	Immediately
Pn587	0000h						Polarity Detection Execution Selection for Absolute Linear Encoder	Immediately
Pn589	1500						SigmaLINK II Node Detection Time	After restart
Pn590	1007h						P-OT (Forward Drive Prohibit Input) Signal Allocation	After restart
Pn591	1008h						N-OT (Reverse Drive Prohibit Input) Signal Allocation	After restart
Pn592	1009h						/DEC (Origin Return Deceleration Switch Input) Signal Allocation	After restart

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Parameter No.	Default Setting						Name	When Enabled
Pn593	1010h						/EXT1 (External Latch Input 1) Signal Allocation	After restart
Pn594	1011h						/EXT2 (External Latch Input 2) Signal Allocation	After restart
Pn595	1012h						/EXT3 (External Latch Input 3) Signal Allocation	After restart
Pn597	0000h						FSTP (Forced Stop Input) Signal Allocation	After restart
Pn598	0000h						/P-CL (Forward External Torque Limit Input) Signal Allocation	After restart
Pn599	0000h						/N-CL (Reverse External Torque Limit Input) Signal Allocation	After restart
Pn5B0	0000h						/COIN (Positioning Completion Output) Signal Allocation	After restart
Pn5B1	0000h						/V-CMP (Speed Coincidence Detection Output) Signal Allocation	After restart
Pn5B2	0000h						/TGON (Rotation Detection Output) Signal Allocation	After restart
Pn5B3	0000h						/S-RDY (Servo Ready Output) Signal Allocation	After restart
Pn5B4	0000h						/CLT (Torque Limit Detection Output) Signal Allocation	After restart
Pn5B5	0000h						/VLT (Speed Limit Detection Output) Signal Allocation	After restart
Pn5B6	1001h						/BK (Brake Output) Signal Allocation	After restart
Pn5B7	0000h						/WARN (Warning Output) Signal Allocation	After restart
Pn5B8	0000h						/NEAR (Near Output) Signal Allocation	After restart
Pn5BC	0000h						/PM (Preventative Maintenance Output) Signal Allocation	After restart
Pn5C3	0000h						Error Detection Setting	After restart
Pn5C4	2000						Error Detection Sample Data Set 1 Warning Level 1	Immediately
Pn5C5	1520						Error Detection Sample Data Set 1 Judgment Level 1	Immediately
Pn5C6	2000						Error Detection Sample Data Set 1 Warning Level 2	Immediately
Pn5C7	1520						Error Detection Sample Data Set 1 Judgment Level 2	Immediately
Pn5C8	2000						Error Detection Sample Data Set 2 Warning Level 1	Immediately
Pn5C9	1520						Error Detection Sample Data Set 2 Judgment Level 1	Immediately
Pn5CA	2000						Error Detection Sample Data Set 2 Warning Level 2	Immediately
Pn5CB	1520						Error Detection Sample Data Set 2 Judgment Level 2	Immediately
Pn5D7	0000h						Output Signal Inversion for Triggers at Preset Positions	After restart

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12.5 Parameter Recording Table: MECHATROLINK-4 Communications References

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Parameter No.	Default Setting					Name	When Enabled
Pn600	0					Regenerative Resistor Capacity	Immediately
Pn601	0					Dynamic Brake Resistor Allowable Energy Consumption	After restart
Pn603	0					Regenerative Resistance	Immediately
Pn604	0					Dynamic Brake Resistance	After restart
Pn61A	0000h					Overheat Protection Selections	After restart
Pn61B	250					Overheat Alarm Level	Immediately
Pn61C	100					Overheat Warning Level	Immediately
Pn61D	0					Overheat Alarm Filter Time	Immediately
Pn621	–					Reserved (Do not change.)	–
Pn622	–					Reserved (Do not change.)	–
Pn623	–					Reserved (Do not change.)	–
Pn624	–					Reserved (Do not change.)	–
Pn625	–					Reserved (Do not change.)	–
Pn626	–					Reserved (Do not change.)	–
Pn627	–					Reserved (Do not change.)	–
Pn628	–					Reserved (Do not change.)	–
Pn660	0000h					Triggers at Preset Positions Switch	After restart
Pn800	1040h					Communications Controls	Immediately
Pn801	0003h					Application Function Selections 6 (Software Limits)	Immediately
Pn803	10					Origin Range	Immediately
Pn804	10737418-23					Forward Software Limit	Immediately
Pn806	-10737418-23					Reverse Software Limit	Immediately
Pn808	0					Absolute Encoder Origin Offset	Immediately
Pn80A	100					Reserved (Do not change.)	–
Pn80B	100					Reserved (Do not change.)	–
Pn80C	0					Reserved (Do not change.)	–
Pn80D	100					Reserved (Do not change.)	–
Pn80E	100					Reserved (Do not change.)	–
Pn80F	0					Reserved (Do not change.)	–
Pn810	0					Exponential Acceleration/ Deceleration Bias	Immediately
Pn811	0					Exponential Acceleration/Deceleration Time Constant	Immediately
Pn812	0					Movement Average Time	Immediately
Pn814	100					External Positioning Final Travel Distance	Immediately
Pn816	0000h					Reserved (Do not change.)	–
Pn817	0					Reserved (Do not change.)	–
Pn818	0					Reserved (Do not change.)	–

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Parameter No.	Default Setting						Name	When Enabled
Pn819	100						Final Travel Distance for Origin Return	Immediately
Pn81E	0000h						Reserved (Do not change.)	–
Pn81F	0010h						Reserved (Do not change.)	–
Pn820	0						Forward Latching Area	Immediately
Pn822	0						Reverse Latching Area	Immediately
Pn824	0000h						Option Monitor 1 Selection	Immediately
Pn825	0000h						Option Monitor 2 Selection	Immediately
Pn827	100						Reserved (Do not change.)	–
Pn829	0						SVOFF Waiting Time (for SVOFF at Deceleration to Stop)	Immediately
Pn82A	1813h						Reserved (Do not change.)	–
Pn82B	1D1Ch						Reserved (Do not change.)	–
Pn82C	1F1Eh						Reserved (Do not change.)	–
Pn82D	0000h						Reserved (Do not change.)	–
Pn82E	0000h						Reserved (Do not change.)	–
Pn833	0001h						Reserved (Do not change.)	–
Pn834	100						First Stage Linear Acceleration Constant	Immediately
Pn836	100						Second Stage Linear Acceleration Constant	Immediately
Pn838	0						Acceleration Constant Switching Speed	Immediately
Pn83A	100						First Stage Linear Deceleration Constant	Immediately
Pn83C	100						Second Stage Linear Deceleration Constant	Immediately
Pn83E	0						Deceleration Constant Switching Speed	Immediately
Pn840	100						Linear Deceleration Constant for Stopping	Immediately
Pn842	50						Origin Approach Speed 1	Immediately
Pn844	5						Origin Approach Speed 2	Immediately
Pn846	0						POSING Command S-curve Acceleration/Deceleration Rate	Immediately
Pn850	0						Number of Latch Sequences	Immediately
Pn851	0						Continuous Latch Sequence Count	Immediately
Pn852	0000h						Latch Sequence 1 to 4 Settings	Immediately
Pn853	0000h						Latch Sequence 5 to 8 Settings	Immediately
Pn860	0000h						SVCMD_IN Input Signal Monitor Allocations 1	Immediately
Pn861	0000h						SVCMD_IN Input Signal Monitor Allocations 2	Immediately
Pn862	0000h						SVCMD_IN Input Signal Monitor Allocations 3	Immediately

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12.5 Parameter Recording Table: MECHATROLINK-4 Communications References

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Parameter No.	Default Setting						Name	When Enabled
Pn863	0000h						SVCMD_IN Input Signal Monitor Allocations 4	Immediately
Pn868	0000h						SVCMD_IN Output Signal Monitor Allocations 1	Immediately
Pn869	0000h						SVCMD_IN Output Signal Monitor Allocations 2	Immediately
Pn880	–						Reserved (Do not change.)	–
Pn881	–						Reserved (Do not change.)	–
Pn882	–						Reserved (Do not change.)	–
Pn883	–						Communications Cycle Setting Monitor [transmission cycles] (for maintenance, read only)	–
Pn884	0000h						Communications Controls 2	Immediately
Pn885	0000h						Reserved (Do not change.)	–
Pn886	FFFFFFFFh						S-curve Maximum Acceleration/Deceleration Rate	Immediately
Pn88A	0						MECHATROLINK Receive Error Counter Monitor (for maintenance, read only)	–
Pn8F0	0000h						User Customized Function Switch	–
Pn900	0						Number of Parameter Banks	After restart
Pn901	0						Number of Parameter Bank Members	After restart
Pn902to Pn910	0000h						Parameter Bank Member Definition	After restart
Pn920to Pn95F	0000h						Parameter Bank Data (Not saved in nonvolatile memory.)	Immediately
Pn9B0	0000h						Inter-Device Data Sharing Function Switch	After restart
Pn9B1	0000h						Inter-Device Data Sharing Target Selection 1	After restart
Pn9B2	3050h						Settings of Inter-Device Shared Data Size for Transmission 1	After restart
Pn9B3	1820h						Inter-Device Data Sharing Settings 1	After restart
Pn9B4	0000h						Inter-Device Data Sharing Target Selection 2	After restart
Pn9B5	3050h						Settings of Inter-Device Shared Data Size for Transmission 2	After restart
Pn9B6	1820h						Inter-Device Data Sharing Settings 2	After restart
Pn9B7	0000h						Inter-Device Data Sharing Target Selection 3	After restart
Pn9B8	3050h						Settings of Inter-Device Shared Data Size for Transmission 3	After restart
Pn9B9	1820h						Inter-Device Data Sharing Settings 3	After restart
Pn9BA	0000h						Inter-Device Data Sharing Target Selection 4	After restart
Pn9BB	3050h						Settings of Inter-Device Shared Data Size for Transmission 4	After restart
Pn9BC	1820h						Inter-Device Data Sharing Settings 4	After restart

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Parameter No.	Default Setting						Name	When Enabled
Pn9BD	0000h						Inter-Device Data Sharing Target Selection 5	After restart
Pn9BE	3050h						Settings of Inter-Device Shared Data Size for Transmission 5	After restart
Pn9BF	1820h						Inter-Device Data Sharing Settings 5	After restart

Appendices

The appendices provide information on system registers and the ladder instructions that can be used in ladder programs.

13.1	System Registers	404
	13.1.1 System Service Registers	404
	13.1.2 CPU System Status	407
	13.1.3 User Operation Error Status in Ladder Programs	408
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13.1 System Registers



Important

Do not use the registers reserved for the system.

The following table shows the overall configuration of the system registers.

You can read error information and the operating status of the system by specifying the system register address.

Register Address	Description	Details
SW00000 to SW00029	System Service Registers	13.1.1 System Service Registers on page 404
SW00030 to SW00049	System Status	13.1.2 CPU System Status on page 407
SW00050 to SW00079	Reserved for system.	–
SW00080 to SW00089	User Operation Error Status	13.1.3 User Operation Error Status in Ladder Programs on page 408
SW00090 to SW00109	Reserved for system.	–
SW00110 to SW00189	Detailed User Operation Error Status	13.1.3 User Operation Error Status in Ladder Programs on page 408
SW00190 to SW65535	Reserved for system.	–

13.1.1 System Service Registers

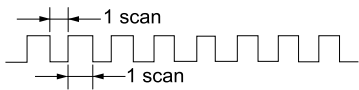
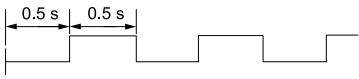
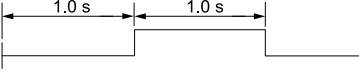
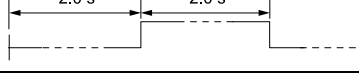
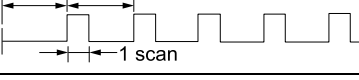
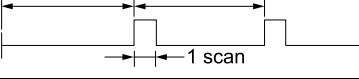
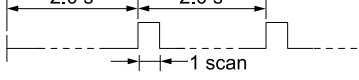
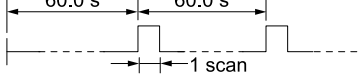


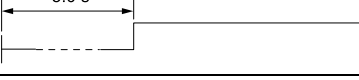
The execution status and specifications of the programs are stored in these registers. The system service registers are reset to zero when the system is started.

(1) Shared by All Drawings

Register Address	Name	Remarks	
SW00000	SB000000	Reserved for system.	
	SB000001	High-Speed Scan	Only ON for one scan when the high-speed scan starts after the power is turned ON.
	SB000002	Reserved for system.	–
	SB000003	Low-Speed Scan	Only ON for one scan when the low-speed scan starts after the power is turned ON.
	SB000004	Always ON	Always ON (set to 1.)
	SB000005	High-Speed Scan 2	Only ON for one scan when the high-speed scan starts after the CPU unit is changed to RUN Mode.
	SB000006	Low-Speed Scan 2	Only ON for one scan when the low-speed scan starts after the CPU unit is changed to RUN Mode.
	SB000007	High-Speed Scan in Progress	1: High-speed scan in progress
	SB000008 to SB00000F	Reserved for system.	–

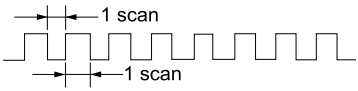

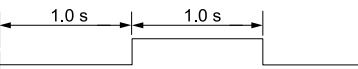
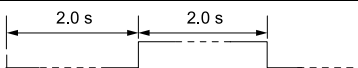
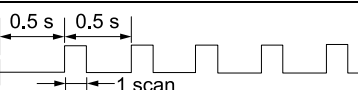
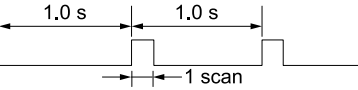
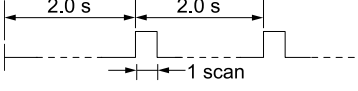
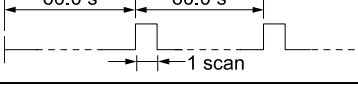
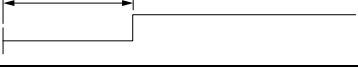
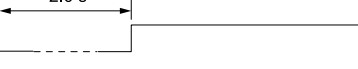
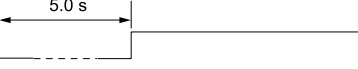
(2) DWG.H Only

Operation starts when the high-speed scan starts.

Register Address	Name	Remarks
SW00001	SB000010	1-Scan Flicker Relay 
	SB000011	0.5-s Flicker Relay 
	SB000012	1.0-s Flicker Relay 
	SB000013	2.0-s Flicker Relay 
	SB000014	0.5-s Sampling Relay 
	SB000015	1.0-s Sampling Relay 
	SB000016	2.0-s Sampling Relay 
	SB000017	60.0-s Sampling Relay 
	SB000018	1.0 s After Start of Scan Process 
	SB000019	2.0 s After Start of Scan Process 
	SB00001A	5.0 s After Start of Scan Process 
	SB00001B to SB00001F	Reserved for system.
SW00002	Reserved for system.	—

(3) DWG.L Only

Operation starts when the low-speed scan starts.

Register Address	Name	Remarks
SW00003	SB000030	1-Scan Flicker Relay 
	SB000031	0.5-s Flicker Relay 
	SB000032	1.0-s Flicker Relay 
	SB000033	2.0-s Flicker Relay 
	SB000034	0.5-s Sampling Relay 
	SB000035	1.0-s Sampling Relay 
	SB000036	2.0-s Sampling Relay 
	SB000037	60.0-s Sampling Relay 
	SB000038	1.0 s After Start of Scan Process 
	SB000039	2.0 s After Start of Scan Process 
	SB00003A	5.0 s After Start of Scan Process 
	SB00003B to SB00003F	Reserved for system.

(4) System Execution Status

Register Address	Name	Remarks
SW00004	High-Speed Scan Set Value	High-speed scan set value (0.1 ms)
SW00005	Current High-Speed Scan Time	Current high-speed scan time (0.1 ms)
SW00006	Maximum High-Speed Scan Time	Maximum high-speed scan time (0.1 ms)
SW00007	High-Speed Scan Set Value 2	High-speed scan set value (μs)
SW00008	Current High-Speed Scan Time 2	Current high-speed scan time (μs)
SW00009	Maximum High-Speed Scan Time 2	Maximum high-speed scan time (μs)
SW00010	Low-Speed Scan Set Value	Low-speed scan set value (0.1 ms)
SW00011	Current Low-Speed Scan Time	Current low-speed scan time (0.1 ms)
SW00012	Maximum Low-Speed Scan Time	Maximum low-speed scan time (0.1 ms)
SW00013	Reserved for system.	—
SW00014	Current Scan Time	Scan time of currently executing scan (0.1 ms)
SW00015 to SW00019	Reserved for system.	—

(5) System Program Software Version

Register Address	Name	Remarks
SW00020	System Program Software Version	Ver.□□.□□ (□□□□ is given in BCD format.)
SW00021 to SW00025	Reserved for system.	—

(6) Remaining Program Memory Capacity

Register Address	Name	Remarks
SL00026	Remaining Program Memory Capacity	Bytes
SL00028	Total Memory Capacity	Bytes

13.1.2 CPU System Status

The operating status or error status of the system is stored in the following system registers. You can check these system registers to determine whether the cause of the error is hardware or software related. The system status registers are reset to zero when the system is started.

Register Address		Name	Description	
SW00030	SB000300	MECHATROLINK Interrupt Status	Interrupt Transmission Cycle Timing	0: No interrupt 1: Interrupt
	SB000301		Interrupt Communications Cycle Timing	0: No interrupt 1: Interrupt
	SB000302 to SB00030F		Reserved for system.	—
SW00031 to SW00039		Reserved for system.	—	
SW00040	SB000400	CPU Status	Reserved for system.	—
	SB000401		RUN	0: Stopped 1: Operating
	SB000402		ALARM	0: Normal 1: An alarm occurred.
	SB000403		ERROR	0: Normal 1: An error occurred.
	SB000404, SB000405		Reserved for system.	—
	SB000406		FLASH	0: No startup app in flash memory 1: There is a startup app in flash memory.
	SB000407		WEN	0: Writing disabled 1: Writing enabled
	SB000408, SB000409		Reserved for system.	—
	SB00040A		Flash Save Request from MPE720	0: Not saving data to flash memory 1: Saving data to flash memory
	SB00040B to SB00040F		Reserved for system.	—

Continued on next page.

Register Address		Name	Description	
SW00041	SB000410	CPU Error Status	Serious Failure	0: Normal 1: Serious failure
	SB000411		Memory Error	0: Normal 1: An error occurred.
	SB000412 to SB000417		Reserved for system.	–
	SB000418		User Operation Error	0: Normal 1: User operation error
	SB000419 to SB00041F		Reserved for system.	–
SW00044		High-Speed Scan Exceeded Counter	High-speed scan exceeded count	
SW00046		Low-Speed Scan Exceeded Counter	Low-speed scan exceeded count	
SW00047		Reserved for system.	–	
SW00048	SB000480 to SB000484	Hardware Configuration Status	Reserved for system.	–
	SB000485		STOP	DIP switch setting status 0: OFF 1: ON
	SB000486 to SB00048F		Reserved for system.	–
SW00049		Reserved for system.	–	

13.1.3 User Operation Error Status in Ladder Programs

The user operation error status shows operation errors in the ladder programs. The data is stored in the following system registers.

Refer to the following section for details on the user operation error status.

 (3) *Detailed User Operation Error Status on page 410*

Register Address	Name	Description
SW00080	DWG.A Error Count	<ul style="list-style-type: none"> • Error Count Gives the number of errors that have occurred. • Error Code Gives the details of the error. 0□□□h: Operation error x□□□h (x = 1, 2, 3): Index error
SW00081	DWG.A Error Code	
SW00082, SW00083	Reserved for system.	
SW00084	DWG.H Error Count	
SW00085	DWG.H Error Code	
SW00086, SW00087	Reserved for system.	
SW00088	DWG.L Error Count	
SW00089	DWG.L Error Code	

(1) User Operation Error Code –1: Operation Errors

	Error Code	Error Description	Operation When an Error Occurs *1		
Integer Operations	0001h	Integer operation underflow	[-32768]		
	0002h	Integer operation overflow	[32767]		
	0003h	Integer operation division error	[The A register stays the same.]		
	0009h	Double-length integer operation underflow	[-2147483648]		
	000Ah	Double-length integer operation overflow	[2147483647]		
	000Bh	Double-length integer operation division error	[The A register stays the same.]		
	000Ch	Quadruple-length integer operation underflow	[-9223372036854775808]		
	000Dh	Quadruple-length integer operation overflow	[9223372036854775807]		
	000Eh	Quadruple-length integer operation division error	[The A register stays the same.]		
	0101h to 010Eh	Integer operation error in Operation Error Drawing	[The A register stays the same.]		
Real Number Operations	0010h	Non-numerical integer storage error	Data is not stored. [00000]		
	0011h	Integer storage underflow	Data is not stored. [-32768]		
	0012h	Integer storage overflow	Data is not stored. [+32767]		
	0021h	Real number storage underflow	Data is not stored. [-1.0E+38]		
	0022h	Real number storage overflow	Data is not stored. [-1.0E+38]		
	0023h	Real number operation division by zero error	Data is not stored. [The F register stays the same.]		
	0030h	Invalid real number operation (non-numeric)	Data is not stored.		
	0031h	Real number operation exponent underflow	0.0		
	0032h	Real number operation exponent overflow	Maximum value		
	0033h	Real number operation division error (0/0)	Operation is not executed.		
	0034h	Real number storage exponent underflow	Stores 0.0.		
	0040h to 0059h	Real number operation error in standard system function		Operation is aborted and output is set to 0.0.	
		0040h: SQRT	0047h: EXP	004Eh: PD	0055H: SLAU
		0041h: SIN	0048h: LN	004Fh: PID	0056H: REM
0042h: COS		0049h: LOG	0050h: LAG	0057H: RCHK	
0043h: TAN		004Ah: DZA	0051h: LLAG	0058H: BSRCH	
0044h: ASIN		004Bh: DZB	0052h: FGN	0059H: SORT	
0045h: ACOS		004Ch: LIM	0053h: IFGN	-	
0046h: ATAN		004Dh: PI	0054h: LAU		

*1 The numeric values given in brackets [] are set by the system in the changed A register or changed F register before the operation error drawing is executed.

(2) User Operation Error Code –2: Index Errors

	Error Code	Error Description	Operation When an Error Occurs			
Integer and Real Number Operations	1000h	Index error in drawing	Re-executed as if i and j were set to 0. (Both i and j registers stay the same.)			
	2000h	Index error in function	Re-executed as if i and j were set to 0. (Both i and j registers stay the same.)			
Real Number Operations	x040h to x059h (X = 1, 2, 3)	Real number operation error in standard system function	Operation is aborted and output is set to 0.0.			
		x040H: SQRT	x047H: EXP	x04EH: PD	0055H: SLAU	
		x041H: SIN	x048H: LN	x04FH: PID	0056H: REM	
		x042H: COS	x049H: LOG	x050H: LAG	0057H: RCHK	
		x043H: TAN	x04AH: DZA	x051H: LLAG	0058H: BSRCH	
		x044H: ASIN	x04BH: DZB	x052H: FGN	0059H: SORT	
		x045H: ACOS	x04CH: LIM	x053H: IFGN	-	
		x046H: ATAN	x04DH: PI	x054H: LAU	-	
Integer Operations	x060h to x0C9h (X = 1, 2, 3)	Integer operation error in standard system function	Operation is aborted and output is set to input. (The A register stays the same.)			
		x06DH: PI	x091H: ROTR	x0A0H: BEXTEND	x0B1H: SPEND	
		x06EH: PD	x092H: MOVVB	x0A1H: BPRESS	x0C0H: TBLBR	
		x06FH: PID	x093H: MOVW	x0A2H: SORT	x0C1H: TBLBW	
		x070H: LAG	x094H: SETW	x0A4H: SORT	x0C2H: TBL SRL	
		x071H: LLAG	x095H: XCHG	x0A6H: RCHK	x0C3H: TBL SRC	
		x072H: FGN	x096H: LIMIT	x0A7H: RCHK	x0C4H: TBL CL	
		x073h: IFGN	x097h: LIMIT	x0A8h: COPYW	x0C5h: TBL MW	
		x074h: LAU	x098h: DZA	x0A9h: ASCII	x0C6h: QTBLR	
		x075h: SLAU	x099h: DZA	x0AAh: BINASC	x0C7h: QTBLRI	
		x076h: FGN	x09Ah: DZB	x0ABh: ASCBIN	x0C8h: QTBLW	
		x077h: IFGN	x09Bh: DZB	x0ACh: BSRCH	x0C9h: QTBLWI	
		x08Eh: INS	x09Ch: PWM	x0ADh: BSRCH	-	
		x08Fh: OUTS	x09Eh: SHFTL	x0AEh: TIMEADD		
		x090h: ROTL	x09Fh: SHFTR	x0AFh: TIMSUB		

(3) Detailed User Operation Error Status

Details when a user operation error occurs in a user program are stored in the following system registers.

Name	Register Address			Remarks
	DWG.A	DWG.H	DWG.L	
Error Count	SW00110	SW00142	SW00174	<ul style="list-style-type: none"> Error Drawing No. FFFFh: Parent drawing □□00h: Child drawing (H□□: Child drawing No.) 8000h: Function Calling Drawing No. Number of the calling drawing in which the operation error occurred Calling Drawing Step No. Step number in the calling drawing in which the operation error occurred This number is set to 0 if the error occurs in the parent drawing. Error Step No. Step number when the operation error occurred
Error Code	SW00111	SW00143	SW00175	
Error A Registers	SW00112	SW00144	SW00176	
	SW00113	SW00145	SW00177	
Changed A Registers	SW00114	SW00146	SW00178	
	SW00115	SW00147	SW00179	
Error F Registers	SW00116	SW00148	SW00180	
	SW00117	SW00149	SW00181	
Changed F Registers	SW00118	SW00150	SW00182	
	SW00119	SW00151	SW00183	
Address Where Error Occurred	SW00120	SW00152	SW00184	
	SW00121	SW00153	SW00185	
Error Drawing No.	SW00122	SW00154	SW00186	
Calling Drawing No.	SW00123	SW00155	SW00187	
Calling Drawing Step No.	SW00124	SW00156	SW00188	
Error Step No.	SW00125	SW00157	SW00189	

13.2 Ladder Instructions

This section shows the ladder instructions that can be used in ladder programs.

13.2.1 Ladder Instruction Lists

The following table lists the ladder instructions.

The ladder instructions that can be used in ladder programming for this SERVOPACK are those instructions listed as supported.

Refer to the following manual for details on the ladder instruction.

📖 [MP3000 Series Ladder Programming Manual \(Manual No.: SIEP C880725 13\)](#)

Types	Ladder Instruction	Meaning	Supported/Not Supported
Relay Circuit Instructions	NOC	NO contact	Supported
	ONP-NOC	Rising-edge NO contact	Supported
	OFFP-NOC	Falling-edge NO contact	Supported
	NCC	NC contact	Supported
	ONP-NCC	Rising-edge NC contact	Supported
	OFFP-NCC	Falling-edge NC contact	Supported
	TON (1 ms)	1-ms ON-delay timer	Supported
	TOFF (1 ms)	1-ms OFF-delay timer	Supported
	TON (10 ms)	10-ms ON-delay timer	Supported
	TOFF (10 ms)	10-ms OFF-delay timer	Supported
	TON (1 s)	1-s ON-delay timer	Supported
	TOFF (1 s)	1-s OFF-delay timer	Supported
	ON-PLS	Rising-edge pulses	Supported
	OFF-PLS	Falling-edge pulses	Supported
	COIL	Coil	Supported
	REV-COIL	Reverse coil	Supported
	ONP-COIL	Rising-edge detection coil	Supported
	OFFP-COIL	Falling-edge detection coil	Supported
	S-COIL	Set coil	Supported
R-COIL	Reset coil	Supported	

Continued on next page.

Types	Ladder Instruction	Meaning	Supported/Not Supported
Numeric Operation Instructions	STORE	Store	Supported
	ADD (+)	Add	Supported
	ADDX (+ +)	Extended add	Supported
	SUB (-)	Subtract	Supported
	SUBX (- -)	Extended subtract	Supported
	MUL (×)	Multiply	Supported
	DIV (÷)	Divide	Supported
	MOD	Integer remainder	Supported
	REM	Real remainder	Supported
	INC	Increment	Supported
	DEC	Decrement	Supported
	TMADD	Add time	Not supported
	TMSUB	Subtract time	Not supported
	SPEND	Spend time	Not supported
	INV	Invert sign	Supported
	COM	One's complement	Supported
	ABS	Absolute value	Supported
	BIN	Binary conversion	Supported
	BCD	BCD conversion	Not supported
	PARITY	Parity conversion	Not supported
ASCII	ASCII conversion 1	Not supported	
BINASC	ASCII conversion 2	Not supported	
ASCBIN	ASCII conversion 3	Not supported	
Logical Operation Instructions	AND	Inclusive AND	Supported
	OR	Inclusive OR	Supported
	XOR	Exclusive OR	Supported
	<	Comparison	Supported
	≤	Comparison	Supported
	=	Comparison	Supported
	≠	Comparison	Supported
	≥	Comparison	Supported
	>	Comparison	Supported
	RCHK	Range check	Supported

Continued on next page.

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Types	Ladder Instruction	Meaning	Supported/Not Supported
Program Control Instructions	SEE	Call sequence program	Supported
	MSEE	Call motion program	Not supported
	FUNC	Call user function	Supported
	INS	Direct input string	Supported
	OUTS	Direct output string	Supported
	XCALL	Call extended program	Not supported
	WHILEEND_WHILE	WHILE construct	Supported
	FOR/END_FOR	FOR construct	Supported
	IF/END_IF	IF construct	Supported
	IF/ELSE/END_IF	IF-ELSE construct	Supported
	EXPRESSION	Expression	Supported
Basic Function Instructions	SQRT	Square root	Supported
	SIN	Sine	Supported
	COS	Cosine	Supported
	TAN	Tangent	Supported
	ASIN	Arc sine	Supported
	ACOS	Arc cosine	Supported
	ATAN	Arc tangent	Supported
	EXP	Exponential	Supported
	LN	Natural logarithm	Supported
	LOG	Common logarithm	Supported
Data Shift Instructions	ROTL	Bit rotate left	Supported
	ROTR	Bit rotate right	Supported
	MOVB	Move bit	Supported
	MOVW	Move word	Supported
	XCHG	Exchange	Supported
	SETW	Table initialization	Supported
	BEXTD	Byte-to-word expansion	Supported
	BPRESS	Word-to-byte compression	Supported
	BSRCH	Binary search	Supported
	SORT	Sort	Supported
	SHFTL	Bit shift left	Supported
	SHFTR	Bit shift right	Supported
	COPYW	Copy word	Supported
BSWAP	Bytes swap	Supported	

Continued on next page.


Types	Ladder Instruction	Meaning	Supported/Not Supported
DDC Instructions	DZA	Dead zone A	Supported
	DZB	Dead zone B	Supported
	LIMIT	Upper/lower limit	Supported
	PI	PI control	Supported
	PD	PD control	Supported
	PID	PID control	Supported
	LAG	First-order lag	Supported
	LLAG	Phase lead lag	Supported
	FGN	Function generator	Supported
	IFGN	Inverse function generator	Supported
	LAU	Linear accelerator/decelerator 1	Supported
	SLAU	Linear accelerator/decelerator 2	Supported
	PWM	Pulse width modulation	Not supported
Table Manipulation Instructions	TBLBR	Read table block	Supported
	TBLBW	Write table block	Supported
	TBLSRL	Search for table row	Supported
	TBLSRC	Search for table column	Supported
	TBLCL	Clear table block	Supported
	TBLMV	Move table block	Supported
	QTBLR	Read queue table	Supported
	QTBLRI	Read queue table with pointer increment	Supported
	QTBLW	Write queue table	Supported
	QTBLWI	Write queue table with pointer increment	Supported
	QTBLCL	Clear queue table pointer	Supported

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Types	Ladder Instruction	Meaning	Supported/Not Supported
Standard System Function Instructions	COUNTER	Counter	Supported
	FINFOUT	First-in first-out	Supported
	TRACE	Trace	Supported
	DTRC-RD/DTRC-RDE	Read data trace	Supported
	MSG-SND	Send message	Not supported
	MSG-SNDE	Send message (extended)	Not supported
	MSG-RCV	Receive message	Not supported
	MSG-RCVE	Receive message (extended)	Not supported
	MLNK-SVW	Write SERVOPACK parameter	Not supported
	MLNK-SVR	Read SERVOPACK parameter	Not supported
	FLASH-OP	Flash operation	Not supported
	MOTREG-W	Write motion register	Not supported
	MOTREG-R	Read motion register	Not supported
	IMPORT/IMPORTL/ IMPORTLE	Import	Not supported
	EXPORT/EXPORTL/ EXPORTLE	Export	Not supported
SVREG_W	Write to SERVOPACK register	Supported <i>*1</i>	
SVREG_R	Read SERVOPACK register	Supported <i>*1</i>	



*1 A special ladder instruction for this SERVOPACK. Refer to the following section for details.

 13.2.2 *Special Ladder Instructions for This SERVOPACK on page 417*

13.2.2 Special Ladder Instructions for This SERVOPACK

There are the two special ladder instructions for this SERVOPACK.

Refer to the references in the following table for details.

Types	Ladder Instruction	Meaning	Reference
Standard System Function Instructions	SVREG_W	Write to SERVOPACK register	 (1) <i>Write to SERVOPACK Register (SVREG_W) on page 417</i>
	SVREG_R	Read SERVOPACK register	 (2) <i>Read SERVOPACK Register (SVREG_R) on page 419</i>

(1) Write to SERVOPACK Register (SVREG_W)

This instruction writes a value to the register in the specified SERVOPACK.

Specify the SERVOPACK in [Axis-inf] and specify the register in [Reg-No].

The data to write to the SERVOPACK is specified in [Mode] and [WrData].

The processing for this instruction requires several scans. When the SVRREG_W instruction is being processed, a different SVREG_W instruction or SVREG_R instruction cannot be executed at the same time.

(a) Format

The format is shown below.

SVREG_W	
[B] Execute	[B] (Busy)
DB000000	---
[W] Axis-Inf	[B] Complete
DW000001	DB000001
[L] Reg-No	[B] (Error)
DL000002	---
[W] Mode	
DW000004	
[L] WR-Data	
DL000005	
[A] Param	
DA000010	

I/O Item	Available Data Types								
	B	W	L	Q	F	D	A	Index	Con- stants
Execute	○ *1	×	×	×	×	×	×	×	×
Axis-Inf	×	○	×	×	×	×	×	×	○
Reg-No	×	×	○	×	×	×	×	×	○
Mode	×	○	×	×	×	×	×	×	○
WR-Data	×	×	○	×	×	×	×	×	○
Param	×	×	×	×	×	×	○ *2	×	×
Busy *3	○ *1	×	×	×	×	×	×	×	×
Complete	○ *1	×	×	×	×	×	×	×	×
Error *3	○ *1	×	×	×	×	×	×	×	×

*1 C and # registers cannot be used.

*2 M, G, and D registers only.

*3 Optional.

(b) Details on I/O Items

I/O Item	Name	I/O	Description
Execute	Execute command	Input	Processing is executed on the rising edge when this bit is turned ON. The processing itself is executed even if this bit is turned OFF afterward.
Axis-Inf	Axis information	Input	Specify the circuit number and axis number. Upper byte: Set 0 for the circuit number. Lower byte: Set 0 or 1 for the axis number.
Reg-No	Register Address	Input	Set the register address of the SERVOPACK from 00000000h to FFFFFFFFh.
Mode	Mode	Input	Specify the access type and access size. Upper byte: Set 0 (write WR-Data to specified register) for the access type. Lower byte: Set 0 (word (2 bytes)) or 1 (long (4 bytes)) for the access size.
WR-Data	Data to be written	Input	The data to be written. The specification depends on the destination register.
Param	Parameter	I/O	The first address of function workspace. The system will use 4 words of registers from the specified register.

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I/O Item	Name	I/O	Description
Busy	Processing	Output	This bit is turned ON while the processing is being executed. This bit is turned OFF when Execute is OFF.
Complete	Process completion	Output	This bit is turned ON when processing execution is completed. This bit is turned OFF when Execute is OFF.
Error	Error	Output	This bit is turned ON if an error occurs during processing execution. This bit is turned OFF when Execute is OFF. There are the following five types of error causes: <ul style="list-style-type: none"> • Exceeded the number of simultaneously executed instructions • Cannot access Reg-No register address • WR-Data data to be written is outside the specified range • Param register address is outside the specified range • Another I/O register address is outside the specified range

Note:

1. If Execute is turned OFF while this instruction is being executed, the processing result cannot be obtained because the output data of the instruction is cleared.
2. Note the following precautions when specifying the registers used in Param. The function cannot be correctly processed if registers overlap.
 - Make sure the registers do not overlap those of another instruction.
 - Make sure the registers do not overlap when the same instruction is used in different locations.

(2) Read SERVOPACK Register (SVREG_R)

This instruction reads the value of a register in the specified SERVOPACK.

Specify the SERVOPACK in [Axis-Inf] and specify the register in [Reg-No].

The data to read from the SERVOPACK is specified in [Mode] and [RD-Data].

The processing for this instruction requires several scans. When the SVREG_R instruction is being processed, a different SVREG_R instruction or SVREG_W instruction cannot be executed at the same time.

(a) Format

The format is shown below.

SVREG_R	
[B] Execute	[B] (Busy)
DB000000	—
[W] Axis-Inf	[B] Complete
DW000001	DB000001
[L] Reg-No	[B] (Error)
DL000002	—
[W] Mode	[L] WR-Data
DW000004	DL000005
[A] Param	
DA000010	

I/O Item	Available Data Types								
	B	W	L	Q	F	D	A	Index	Con-constants
Execute	○ */	×	×	×	×	×	×	×	×
Axis-Inf	×	○	×	×	×	×	×	×	○
Reg-No	×	×	○	×	×	×	×	×	○

Continued on next page.

I/O Item	Available Data Types								
	B	W	L	Q	F	D	A	Index	Con- stants
Mode	x	o	x	x	x	x	x	x	o
Param	x	x	x	x	x	x	o *2	x	x
Busy *3	o *1	x	x	x	x	x	x	x	x
Complete	o *1	x	x	x	x	x	x	x	x
Error *3	o *1	x	x	x	x	x	x	x	x
RD-Data	x	x	o *2	x	x	x	x	x	o

*1 C and # registers cannot be used.

*2 M, G, and D registers only.

*3 Optional.

(b) Details on I/O Items

I/O Item	Name	I/O	Description
Execute	Execute command	Input	Processing is executed on the rising edge when this bit is turned ON. The processing itself is executed even if this bit is turned OFF afterward.
Axis-Inf	Axis information	Input	Specify the circuit number and axis number. Upper byte: Set 0 for the circuit number. Lower byte: Set 0 or 1 for the axis number.
Reg-No	Register Address	Input	Set the register address of the SERVOPACK from 00000000h to FFFFFFFFh.
Mode	Mode	Input	Specify the access type and access size. Upper byte: Set 0 (read specified register to RD-Data) for the access type. Lower byte: Set 0 (word (2 bytes)) or 1 (long (4 bytes)) for the access size.
Param	Parameter	I/O	The first address of function workspace. The system will use 4 words of registers from the specified register.
Busy	Processing	Output	This bit is turned ON while the processing is being executed. This bit is turned OFF when Execute is OFF.
Complete	Process completion	Output	This bit is turned ON when processing execution is completed. This bit is turned OFF when Execute is OFF.
Error	Error	Output	This bit is turned ON if an error occurs during processing execution. This bit is turned OFF when Execute is OFF. There are the following four types of error causes: <ul style="list-style-type: none"> Exceeded the number of simultaneously executed instructions Cannot access Reg-No register address Param register address is outside the specified range Another I/O register address is outside the specified range
RD-Data	Data to be read	Input	The data to be read.

Note:

- If Execute is turned OFF while this instruction is being executed, the processing result cannot be obtained because the output data of the instruction is cleared.
- Note the following precautions when specifying the registers used in Param. The function cannot be correctly processed if registers overlap.
 - Make sure the registers do not overlap those of another instruction.
 - Make sure the registers do not overlap when the same instruction is used in different locations.

13.3 Specifying Units

You can select the unit for each item of command data in the servo control command.

Set the unit systems in the common parameters from the MP3000-series controller. Refer to the following section for the common parameters.

☞ [12.4 List of MECHATROLINK Common Parameters : MECHATROLINK-4 Communications References on page 359](#)

13.3.1 Speed Reference Unit

You can select the following units.

Use common parameter 41 PnA82 (Speed Unit) and 42 PnA84 (Speed Base Unit) for the settings.

Unit	Remarks
Reference unit/sec (default)	$\times 10^n$ [reference unit/sec] can be set
Reference unit/min	$\times 10^n$ [reference unit/min] can be set
Percentage (%) of rated speed	$\times 10^n$ [%] can be set
min ⁻¹	$\times 10^n$ [min ⁻¹] can be set
Maximum motor speed/4000000h	Set common parameter 42 PnA84 to 0.

13.3.2 Position Reference Unit

You can select the following units.

Use common parameter 43 PnA86 (Position Unit) and 44 PnA88 (Position Base Unit) for the settings.

Unit	Remarks
Reference unit (default)	Fixed to [reference unit] Set common parameter 44 PnA88 to 0.

13.3.3 Acceleration Reference Unit

You can select the following units.

Use common parameter 45 PnA8A (Acceleration Unit) and 46 PnA8C (Acceleration Base Unit) for the settings.

Unit	Remarks
Reference unit/s ² (default)	$\times 10^n$ [reference unit/s ²] can be set

13.3.4 Torque Reference Unit

You can select the following units.

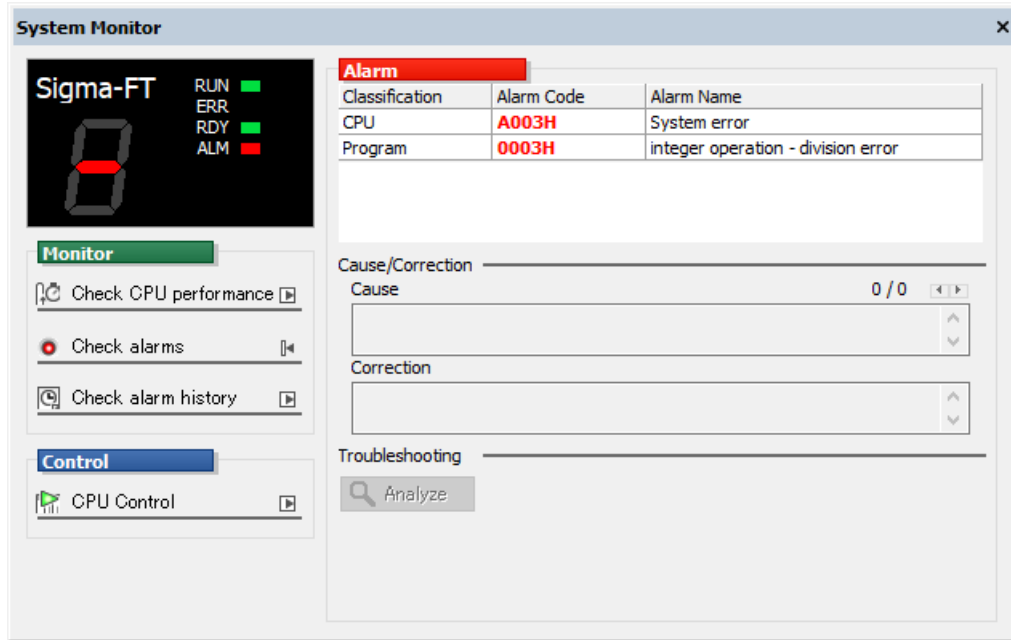
Use common parameter 47 PnA8E (Torque Unit) and 48 PnA90 (Torque Base Unit) for the settings.

Unit	Remarks
Percentage (%) of rated torque (default)	$\times 10^n$ [%] can be set
Maximum torque/4000000h	Set common parameter 48 PnA90 to 0.

13.4 Alarm Code List

You can check detailed information on alarms by establishing an online connection to the SERVOPACK with the MPE720 when the SERVOPACK detects the following alarms and warnings.


- A.EdA (User Application System Alarm)
- A.bFb (Scan Timeout Alarm)
- A.9dA (User Application System Warning)



Alarm Code	Alarm Name	Possible Cause	Correction
E001	Over Processing Time	The high-speed or low-speed scan did not end (high-speed scan: 2 ms or longer, low-speed scan: 200 ms or longer).	Review if there is processing in the high-speed scan, low-speed scan, or startup drawing that is an infinite loop or taking too much time.
		The processing time in the startup drawing exceeded 1 s.	Review if there is processing in the startup drawing that is an infinite loop or taking too much time.
		The SERVOPACK was started with the high-speed scan cycle set to be greater than the MECHATROLINK transmission cycle.	Set the high-speed scan cycle to be less than or equal to the MECHATROLINK transmission cycle.
A001	Operation Error (Startup Drawing)	An operation error occurred in the startup drawing.	Review the processing in the startup drawing.
A003	Operation Error (High-Speed Scan)	An operation error occurred in the high-speed scan.	Review the processing in the high-speed scan.
A005	Operation Error (Low-Speed Scan)	An operation error occurred in the low-speed scan.	Review the processing in the low-speed scan.
A304	User Memory Code Check Error	The user application saved in the SERVOPACK is corrupt.	Transfer the user application to the SERVOPACK and save it to flash again.
A310	User Memory Data Corruption Error	A memory error was detected when writing the user application.	Transfer the user application to the SERVOPACK and save it to flash again.

Continued on next page.

Continued from previous page.

Alarm Code	Alarm Name	Possible Cause	Correction
A406	Custom Motion Error	The CPU was stopped during custom motion (when SVCMD was set to a command other than IDLE).	Set SVCMD to IDLE and then stop the CPU.
A407	Custom Motion Command Error	The items of reference data for the custom motion are out of range or the execution conditions are not satisfied.	<p>Correct the items of reference data for the custom motion.</p> <p>The error code is also stored in Servo Control Command Error Code (IW00085). Refer to the following section for details.</p> <p> 9.5 Servo Control Command Error Code on page 210</p>

13.5 Precautions on the Acceleration/Deceleration Rate during Speed Control

If the set value of the acceleration/deceleration rate reference (OL0008C or OL0008E) is small, the servomotor cannot accelerate or decelerate.

Set the acceleration/deceleration rate reference (OL0008C or OL0008E) so that the output acceleration/deceleration rate reference is 1 or more. The output acceleration/deceleration rate reference is rounded to an integer.

$$\frac{\text{Output acceleration/deceleration rate reference}}{\text{Acceleration/deceleration rate reference (OL0008C or OL0008E)}} = \frac{\text{Acceleration/deceleration rate reference}}{\text{Acceleration/deceleration rate resolution}}$$

The resolution of the acceleration/deceleration rate depends on the parameter settings and the connected servomotor.

$$\text{Acceleration/deceleration rate resolution} = \frac{\text{Pn20E}}{\text{Pn210}} \times 10^{\text{PnA8C}} \times \frac{125829.12}{\text{Encoder resolution [pulse]} \times \text{Maximum motor speed [min}^{-1}] \times 1.1}$$

Example: The acceleration/deceleration rate resolution is 0.156 for the parameters listed below.

For this reason, you must set the acceleration/deceleration rate reference (OL0008C or OL0008E) to 4 or more.

- Pn20E (Electronic Gear Ratio (Numerator)) = 64
- Pn210 (Electronic Gear Ratio (Denominator)) = 1
- PnA8C (Acceleration Base Unit) = 4
- Connected servomotor: SMGXJ-A5AUA21A1 (encoder resolution: 26 bits and maximum motor speed: 7000 min⁻¹)

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Σ-XS SERVOPACK

with FT Specification

Customized Sensing Data Function Option

(with Custom Motion Function)

Product Manual

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