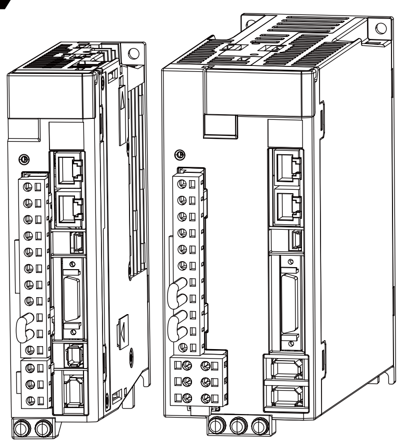
YASKAWA

Σ-X-Series AC Servo Drive

Σ-XS/Σ-XW SERVOPACK with EtherCAT Communications References FT Specification for Gantry Applications

Product Manual

Model: SGDX□-□□□□A0□□□□□70□



MANUAL NO. SIEP C710812 20D

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Preface and General Precautions

i.1 About this Manual

This manual describes the Σ-XS/Σ-XW SERVOPACK with EtherCAT communications references for gantry applications to be used with Σ-X-series AC servo drives.

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 Target Readers

This manual is intended for the following readers who are assumed to possess knowledge about the fundamentals of servo drives and electric/electronic circuits.

- Readers who wish to deepen their knowledge of SERVOPACK products
- Personnel in charge of selecting products for equipment
- Designers of applications for SERVOPACKs and servomotors in various types of equipment
- Personnel who maintain equipment
- Designers of FA systems

i.3 Outline of Manual

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

Read this manual together with the manual shown in the following table when using the Σ-X-series SERVOPACK for gantry applications.

Item		This Manual	Σ-XS SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 02)	Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)
Basic Information on SERVOPACKs	The Σ- X Series	–	1.1	1.1
	Interpreting the Nameplate	–	1.2	1.2
	Part Names	–	1.3	1.3
	Product Introduction	1.1	–	–
	System Configuration Example	1.2	–	–
	Interpreting Model Numbers	1.3	–	–
	Combinations of SERVOPACKs and Servomotors	–	1.5	1.5
	Functions	1.4	–	–
	Restrictions	1.5	–	–
	Precautions When Using This Product	1.6	–	–
	Information on the SigmaWin+	1.7	–	–
Selecting a SERVOPACK	Ratings	2.1	–	–
	SERVOPACK Overload Protection Characteristics	2.2	–	–
	Specifications	2.3	–	–
	Internal Block Diagrams	–	2.2	2.2
	External Dimensions	–	2.3	2.3
	Examples of Standard Connections between SERVOPACKs and Peripheral Devices	–	2.4	2.4
SERVOPACK Installation	Installation Precautions	–	3.1	3.1
	Mounting Types and Orientation	–	3.2	3.2
	Mounting Hole Dimensions	–	3.3	3.3
	Mounting Interval	3.1	–	–
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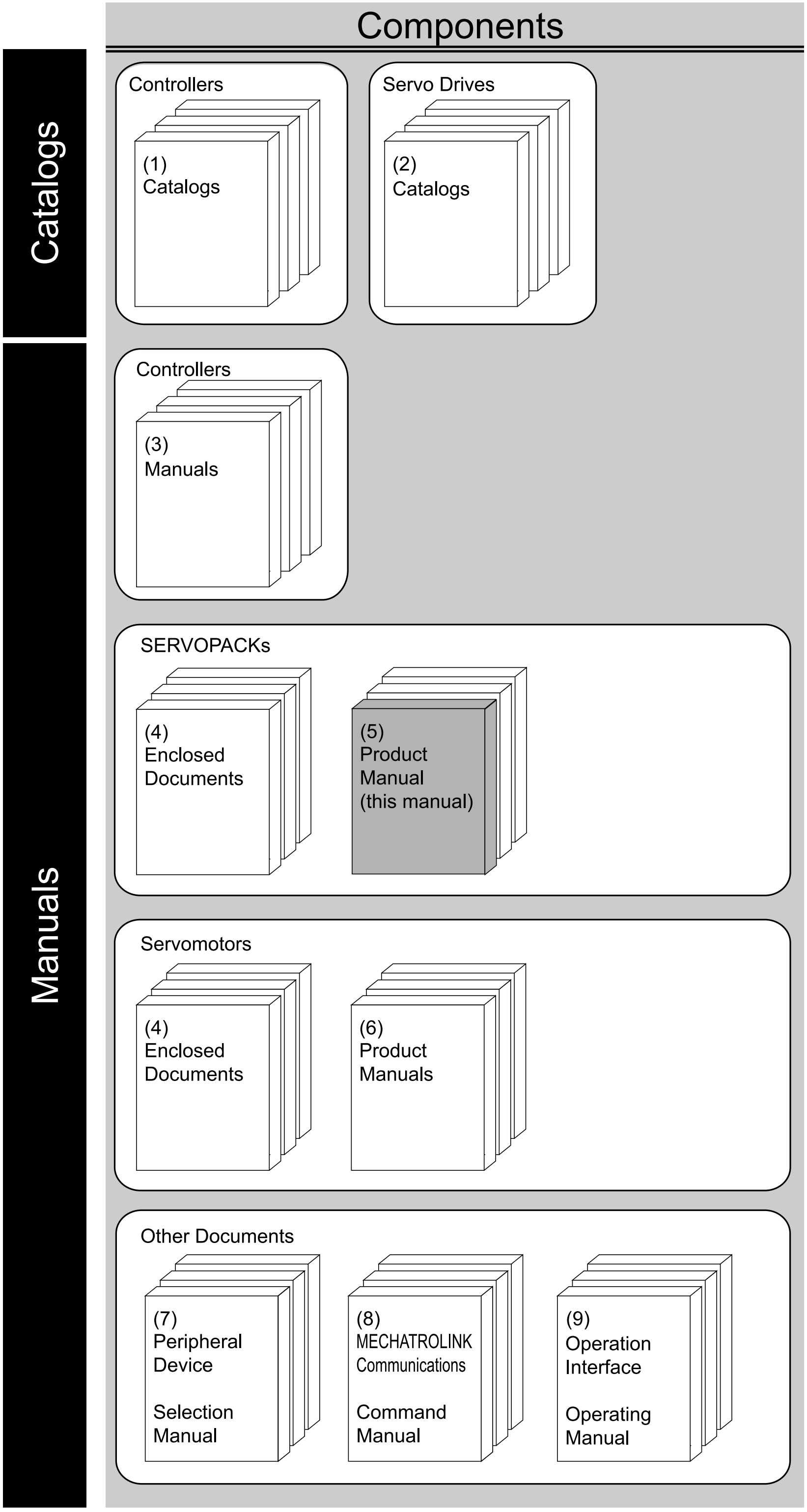
Item		This Manual	Σ-XS SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 02)	Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)
Wiring and Connecting SERVOPACKs	Wiring and Connecting SERVOPACKs	–	4.1	4.1
	Basic Wiring Diagrams	–	4.2	4.2
	Wiring the Power Supply to the SERVOPACK	–	4.3	4.3
	Wiring Servomotors	–	4.4	4.4
	I/O Signal Connections	–	4.5	4.5
	Connecting Safety Function Signals	–	4.6	–
	Connecting EtherCAT Communications Cables	–	4.7	4.6
	Connecting the SigmaWin+	–	4.8	4.7
	Connecting a Digital Operator	–	4.9	4.8
	Using the Analog Monitors	–	4.10	4.9
	Connecting the Communications Cable between Axes (For Σ-XS SERVOPACKs Only)	Chapter 4	–	–
Basic Functions That Require Setting before Operation		–	Chapter 5	Chapter 5
Application functions		–	Chapter 6	Chapter 6
Trial Operation and Actual Operation		–	Chapter 7	Chapter 7
Tuning		–	Chapter 8	Chapter 8
Monitoring		–	Chapter 9	Chapter 9
Fully-Closed Loop Control		–	Chapter 10	Chapter 10
Σ-LINK II		–	Chapter 11	Chapter 11
Safety Function		–	Chapter 12	–
EtherCAT Communications		–	Chapter 13	Chapter 12
CiA402 Drive Profile		–	Chapter 14	Chapter 13
Gantry Applications		Chapter 5	–	–
Torque/Force Assistance		Chapter 6	–	–
Speed synchronization		Chapter 7	–	–
Object Dictionary		Chapter 8 *1	Chapter 15	Chapter 14
Maintenance	Inspections and Part Replacement	–	16.1	15.1
	Alarm Displays	9.1	–	–
	Warning Displays	9.2	–	–
	Troubleshooting Based on the Operation and Conditions of the Servomotor	9.3	–	–
Parameter and Object Lists		Chapter 10	–	–
Appendices	Interpreting LED Displays	–	18.1	17.1
	Interpreting Panel Displays	–	18.2	17.2
	Corresponding SERVOPACK and SigmaWin+ Function Names	–	18.3	17.3

*1 This chapter describes only the objects that are unique to this product.

i.4 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.4.1 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 Communications 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 Communications 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 Communications 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.

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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. • 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 MECHATRO-LINK-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 MECHATRO-LINK-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.

i.5 Using This Manual

i.5.1 Technical Terms Used in This Manual

The following 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 or Σ-7-series rotary servomotor (SGMXJ, SGMXA, SGMXP, 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 EtherCAT communications references. • A Σ-X-series Σ-XW servo amplifier with EtherCAT 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.
Servo ON command (Enable Operation command)	A command that is used to turn ON the servo (i.e., supply power to the motor) when bit 3 of Controlword (6040h) is changed to 1 (ON) while the control power and main circuit power are ON.
Servo OFF command (Disable Operation command)	A command that is used to turn OFF the servo (i.e., power not supplied to the motor) when bit 3 of Controlword (6040h) is changed to 0 (OFF) while the control power and main circuit power are ON.
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.
active alarm axis	The axis on which the alarm is active.
synchronized stopping axis	The axis that is synchronized to and stopped with the axis on which the alarm is active when synchronized stopping is enabled.
absolute rotary encoder	The general term used for absolute encoders with batteries and batteryless absolute encoders. In cases where the general term causes confusion, the term “batteryless absolute encoder” may also be used.
primary axis	In a gantry application, the primary axis is the main axis for parallel control of two axes. In torque/force assistance, this is the drive axis that is operated with speed control, position control, and torque control.
secondary axis	In a gantry application, the secondary axis is the driven axis synchronized to the primary axis. In torque/force assistance, this is the axis that is operated according to the torque reference of the primary axis.

i.5.2 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.5.3 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.

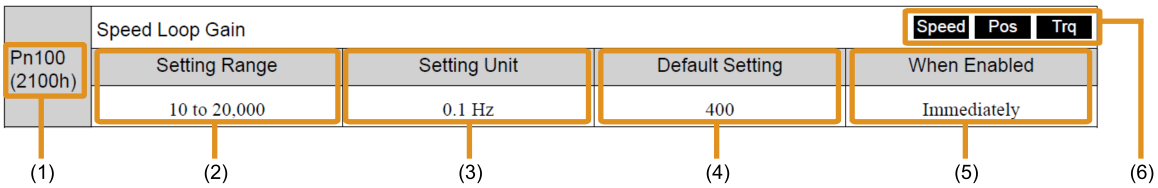
Notation Example

$\overline{\text{BK}}$ is written as /BK.

(2) Notation for Parameters

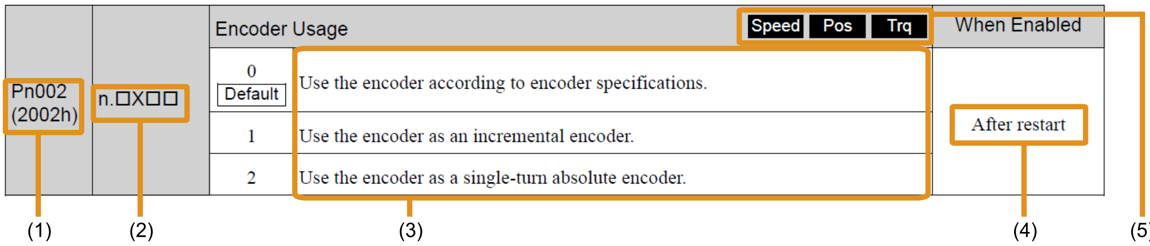
The notation depends on whether the parameter requires a numeric setting (parameter for numeric setting) or requires the selection of a function (parameter for selecting functions).

(a) Parameters for Numeric Settings



No.	Description
(1)	Parameter number and object index number The object index number is used when accessing an object over EtherCAT communications. If Common is given here, the parameter applies to both axes A and B. If you change the setting, the new setting will be applied to both axes.
(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)	The control methods for which the parameters apply are given. Speed: A parameter that can be used in speed control. Pos: A parameter that can be used in position control. Trq: A parameter that can be used in torque control. "Torque" is used even for linear servomotor parameters. Grayed-out icons (Speed, Pos, Trq) indicate parameters that cannot be used in the corresponding control method.

(b) Parameters for Selecting Functions



<table>
<tr><th>No.</th><th>Description</th></tr>
<tr><td>(1)</td><td>Parameter number and object index number
The object index number is used when accessing an object over EtherCAT communications.
If Common is given here, the parameter applies to both axes A and B. If you change the setting, the new setting will be applied to both axes.</td></tr>
<tr><td>(2)</td><td>The notation “n.□□□□” indicates a parameter for selecting functions. The digit shown as "X" is the content being explained in this parameter.
Notation Example
Notation Examples for Pn002
n. 0 0 0 0
<table>
<tr><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>
<tr><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>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>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>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>
</table></td></tr>
<tr><td>(3)</td><td>This column explains the selections for the function.
In the above example, the first line gives an explanation of when Pn002 = n.□0□□ is set.</td></tr>
<tr><td>(4)</td><td>This is when any change made to the parameter will become effective.</td></tr>
<tr><td>(5)</td><td>The control methods for which the parameters apply are given.
Speed: A parameter that can be used in speed control.
Pos: A parameter that can be used in position control.
Trq: A parameter that can be used in torque control. "Torque" is used even for linear servomotor parameters.
Grayed-out icons (Speed, Pos, Trq) indicate parameters that cannot be used in the corresponding control method.</td></tr>
</table>

i.5.4 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.5.5 Trademarks

- EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.
- Σ-LINK is a trademark of the MECHATROLINK Members Association.
- QR code is a trademark of Denso Wave Inc.
- 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.5.6 Visual Aids

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

Important	Indicates precautions or restrictions that must be observed. Also indicates alarm displays and other precautions that will not result in machine damage.

Term	Indicates definitions of difficult terms or terms that have not been previously explained in this manual.

Information Indicates supplemental information to deepen understanding or useful information.

i.6 Safety Precautions

i.6.1 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.6.2 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.

Always use the specified terminals to connect the SERVOPACK and peripheral devices. For the power supply wiring in particular, confirm that the connections are made with the terminals shown below.

- **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.

With this product, set both the primary axis and secondary axis to the same servomotor stopping method for alarms.

There is a risk of damage to the machine if the stopping method for alarms is different.

Set appropriate values for the correction amounts in the position correction table.

The machine may be damaged if the correction amounts are too large.

(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.

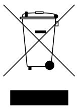
Install a ground fault detector against overloads and short-circuiting or install a molded-case circuit breaker combined with a ground fault detector.

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.7 Warranty

i.7.1 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.7.2 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.7.3 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.7.4 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.8 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.8.1 North American Safety Standards (UL)

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

i.8.2 EU Directives

Product	Model	EU Directives	Harmonized Standards
SERVOPACK	SGDXS	Machinery Directive 2006/42/EC	EN ISO 13849-1 : 2015 EN IEC 62061 EN 61800-5-2
	• SGDXS • SGDXW	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. For the edition of each standard, refer to declaration of conformity.
- These products are for industrial use. In home environments, these products may cause electromagnetic interference and additional noise reduction measures may be necessary.

i.8.3 UK Conformity Assessed (UKCA)

Product	Model	UK Regulations	Designated Standards
SERVOPACKs	• SGDXS • SGDXW	Supply of Machinery (Safety) Regulations S.I. 2008/1597	EN ISO13849-1:2015 EN 62061 EN 61800-5-2
		Electromagnetic Compatibility Regulations S.I. 2016/1091	EN 55011 group 1, class A EN 61000-6-2 EN 61000-6-4 EN 61800-3 (Category C2, Second environment)
		Electrical Equipment (Safety) Regulations S.I. 2016/1101	EN 61800-5-1
		RoHS Directive S.I. 2012/3032	EN IEC 63000

Note:

We declared the UKCA marking based on the designated standards in the above table.

i.8.4 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. For the edition of each standard, refer to declaration of conformity.

- Safety Parameters

Item	Standards	Performance Level
Safety Integrity Level	IEC 61508	SIL3
	EN IEC 62061	maximum SIL3
Mission Time	EN ISO 13849-1	20 years
Probability of Dangerous Failure per Hour	IEC 61508 EN 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	EN 60204-1	Stop category 0
Safety Functions	EN 61800-5-2	STO
Hardware Fault Tolerance	EN 61508	HFT = 1
Subsystem	EN 61508	B

Note:

Mission time is a parameter used for the statistical calculation required by functional safety standards and this is not linked to the warranty/guarantee period.

1

Basic Information on SERVOPACKs

This chapter provides information required to select SERVOPACKs, such as SERVOPACK model numbers.

1.1 Product Introduction

This product is a SERVOPACK that supports functions optimized for gantry applications, torque/force assistance and speed synchronization functions.

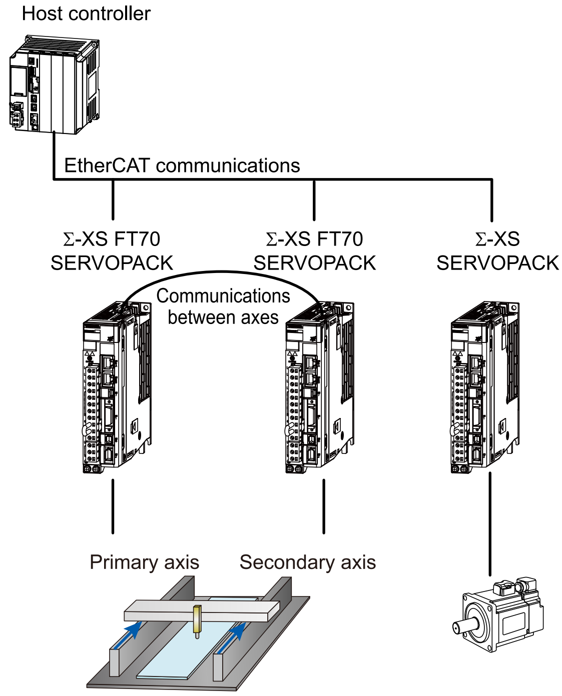
- Functions optimized for gantry applications (gantry application)
  This product features four built-in functions optimized for driving a gantry to provide an optimal solution for problems with gantry mechanisms.
  - Relative position deviation overflow detection (detects twisting of the machine frame to prevent mechanical damage and provide a useful function for preventative maintenance)
  - Synchronized stopping (prevents mechanical damage if alarms occur)
  - Twisting suppression (controls twisting of the machine during operation)
  - Position correction table (minimizes wasted torque produced by mechanical differences to improve cycle times)
- Torque/force assistance
  A function that outputs many times the torque of the primary axis by using the primary axis SERVOPACK and the secondary axis SERVOPACK. This function is convenient for driving workpieces that are difficult to drive with one axis.
- Speed synchronization
  The speed of the secondary axis SERVOPACK is synchronized to the speed of the primary axis SERVOPACK. This can simplify the application programming because the host controller can synchronize speed and control two axes simply by inputting the speed reference to the primary axis.

1.2 System Configuration Example

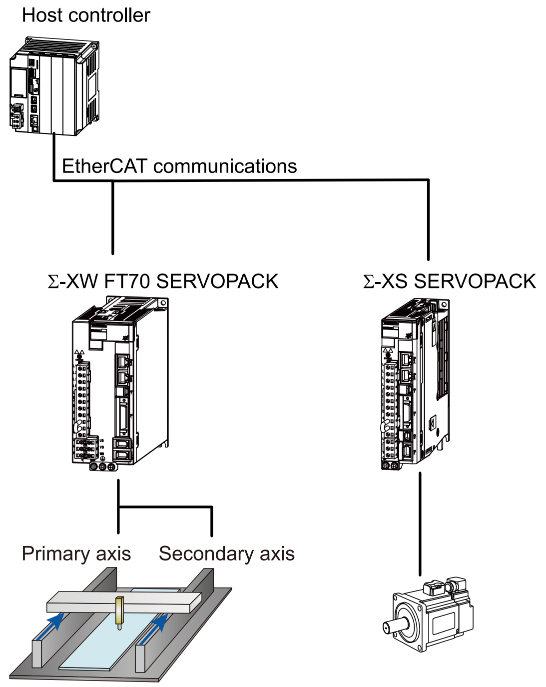
The following sections show examples of system configurations.

1.2.1 Gantry Application Function

- Σ-XS SERVOPACK

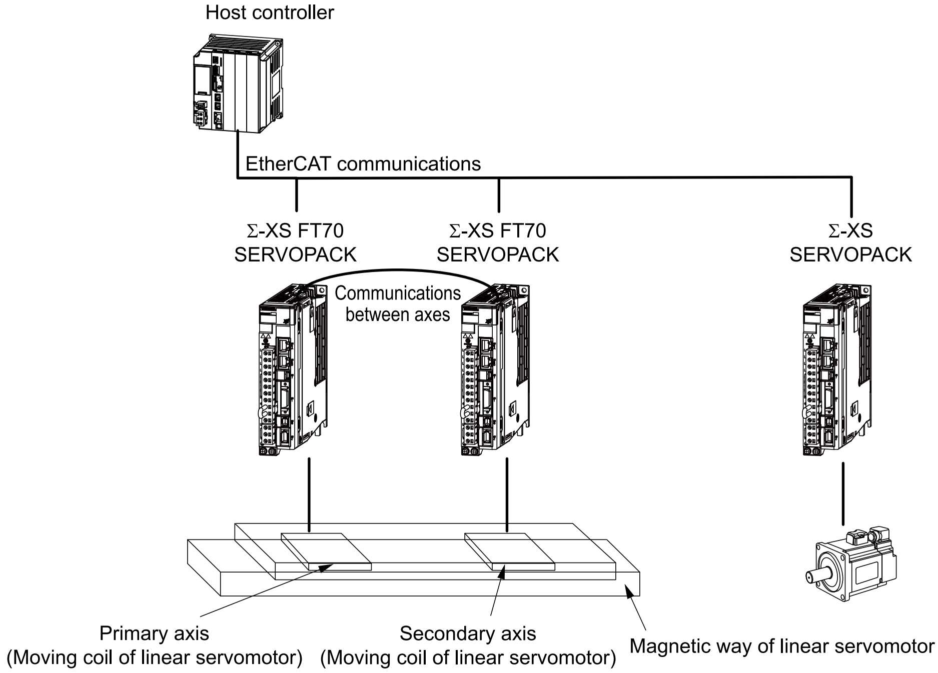


- Σ-XW SERVOPACK

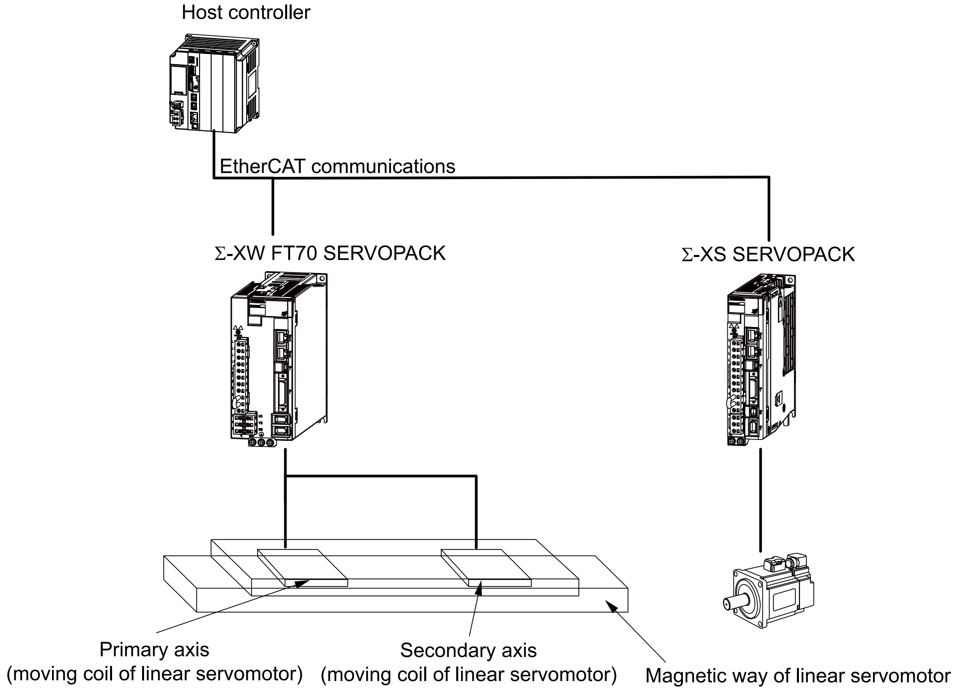


1.2.2 Torque/Force Assistance

- Σ-XS SERVOPACK



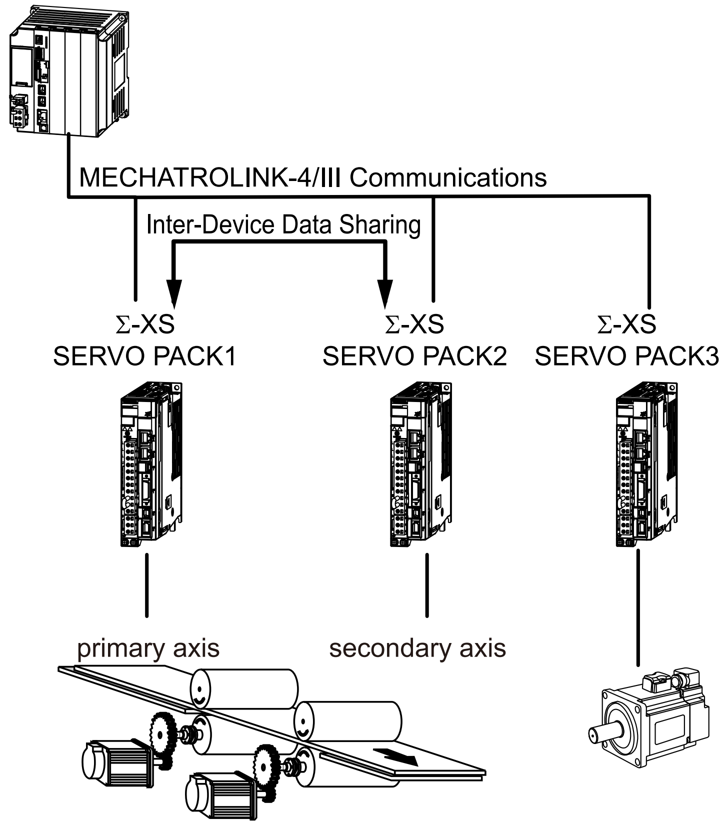
- Σ-XW SERVOPACK



1.2.3 Speed Synchronization

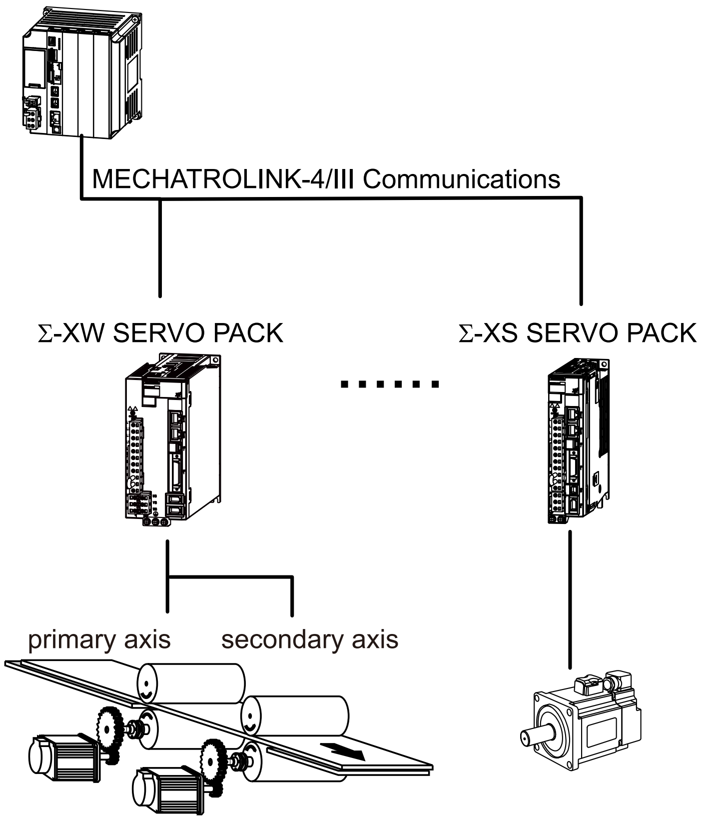
- Σ-XS SERVOPACK

Host controller



- Σ-XW SERVOPACK

Host controller



1.3 Interpreting Model Numbers

1.3.1 Interpreting SERVOPACK Model Numbers

(1) Σ-XS SERVOPACK

SGDXS	-	R70	A	A0	A	4000	70	B
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	14th digit

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
A0	EtherCAT communications reference

7th digit Design Revision Order

A

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

Code	Specification	
4000	Communications between axes	All models
4002	Communications between axes, varnished	All models
4008	Communications between axes, single-phrase, 200-VAC power supply input	SGDXS -120A
4020*4	Communications between axes, no dynamic brake	SGDXS-R70A to -2R8A
	Communications between axes, external dynamic brake resistor	SGDXS-3R8A to -780A

12th+13th digits FT Specification

Code	Specification
70	For gantry applications

14th digit BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

*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-120AA0A4008)
*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.
*4 Refer to the following manual for details.

Σ-X-Series Σ-XS/Σ-XW/Σ-XT SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

(2) Σ-XW SERVOPACK

SGDXW - 1R6 A A0 A 0000 70 B

Σ-X-Series Σ-XW model	1st+2nd+3rd digits	4th digit	5th+6th digits	7th digit	8th+9th+10th+11th digits	12th+13th digits	14th digit

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

Voltage	Code	Specification
Three-Phase, 200 VAC	1R6*1	0.2 kW
	2R8*1	0.4 kW
	5R5*1, *2	0.75 kW
	7R6	1.0 kW

4th digit Voltage

Code	Specification
A	200 VAC

5th+6th digits Interface *3

Code	Specification
A0	EtherCAT communications reference

7th digit Design Revision Order

A

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

Code	Specification	Applicable Models
0000	Without options	All models
0002	Varnished	
0020*4	No dynamic brake	SGDXW-1R6A to -2R8A
	External dynamic brake resistor	SGDXW-5R5A to -7R6A
1000*5	HWBB function	All models

12th+13th digits FT Specification

Code	Specification
70	For gantry applications

14th digit BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

*1 You can use these models with either a single-phase or three-phase input.
*2 If you use the SERVOPACK with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%. ((90% + 40%)/2 = 65%)
*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.
*4 Refer to the following manual for details.
Σ-X-Series Σ-XS/Σ-XW/Σ-XT SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)
*5 For details, refer to the following manual.
Σ-X-Series Σ-XS/Σ-XW SERVOPACK Hardware Option Specifications HWBB Function Product Manual (Manual No.: SIEP C710812 13)

1.3.2 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)

1.4 Functions

This section lists the functions provided by SERVOPACKs. Refer to the following manuals for details on the functions.

Σ-X-Series Σ-XS SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 02)

Σ-X-Series Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)

1.4.1 SERVOPACK Functions

- Functions Related to the Machine

Function
Setting the Power Supply Type for the Main Circuit and Control Circuit
Automatic Detection of Connected Motor
Setting the Motor Direction
Setting the Linear Encoder Pitch
Writing the Linear Servomotor Parameters
Selecting the Phase Sequence for a Linear Servomotor
Setting the Polarity Sensor
Polarity Detection
Overtravel Function and Setting
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
Triggers at Preset Positions
Rotational Coordinate System
Speed Ripple Compensation
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 *1
Touch Probe
Sync Error Count Limit Setting
Synchronized Stopping *2
Relative Position Deviation Overflow Detection *2

*1 A function available in the Σ-XS only.
*2 Functions unique to this product.

- Functions Related to the Host Controller

Function
Setting the Electronic Gear
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 *1
Selecting Torque Limits
Initializing the Vibration Detection Level
Alarm Reset
Replacing the Battery
Setting the Position Deviation Overflow Alarm Level

*1 A function available in the Σ-XS only.

- Functions to Achieve Optimum Motions

Function
Twisting Suppression *1
Position Correction Table *1
Tuning-less Function
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
Low-Frequency Control Function
Compatible Adjustment Functions
Easy FFT

*1 Functions unique to this product.

- 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 EtherCAT Slave Information

You can use an EtherCAT slave information file (XML) to configure the EtherCAT master.

The XML file contains general information on EtherCAT communications settings that are related to the SERVOPACK settings.

The following file is provided for the SERVOPACK. Use the most recent file.

SERVOPACK	File Name
SGDXS-□□□□A0□□□□□70□ SGDXW-□□□□A0□□□□□70□	Yaskawa_SGDXx-xxxxA0xxxxx70.xml

1.6 SigmaWin+

To use the SigmaWin+, a model information file for the SERVOPACK must be added to SigmaWin+ version 7. Contact your Yaskawa representative for the model information file.

2

SERVOPACK Ratings and Specifications

This chapter provides the specifications required to select SERVOPACKs.

2.1 Ratings

This section gives the ratings of SERVOPACKs.

2.1.1 Σ-XS SERVOPACK

(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, 50 Hz/60 Hz										
	Allowable Voltage Fluctuation		-15% to +10%										
	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, 50 Hz/60 Hz										
	Allowable Voltage Fluctuation		-15% to +10%										
	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, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	29	37	54	73
Control	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation	-15% to +10%			
	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 *3	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) 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, 50 Hz/60 Hz					
	Allowable Voltage Fluctuation	-15% to +10%					
	Input Current [Arms] *1	0.8	1.6	2.4	5.0	8.7	16 *2
Control	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz					
	Allowable Voltage Fluctuation	-15% to +10%					
	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

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Model SGDXS-			R70A	R90A	1R6A	2R8A	5R5A	120A
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
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.

(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							
	Allowable Voltage Fluctuation	-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							
	Allowable Voltage Fluctuation	-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

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Model SGDXS-		180A	200A	330A	470A	550A	590A	780A
Main Circuit	Power Supply	270 VDC to 324 VDC						
	Allowable Voltage Fluctuation	-15% to +10%						
	Input Current [Arms] *1	14	20	34	36	48	68	92
Control	Power Supply	270 VDC to 324 VDC						
	Allowable Voltage Fluctuation	-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
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.

2.1.2 Σ-XW SERVOPACK

(1) Three-Phase, 200 VAC

Model SGDXW-			1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity (each axis) [kW]			0.2	0.4	0.75	1.0
Continuous Output Current (each axis) [Arms]			1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current (each axis) [Arms]			5.9	9.3	16.9	17.0
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation		-15% to +10%			
	Input Current [Arms] *1		2.5	4.7	7.8	11
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation		-15% to +10%			
	Input Current [Arms] *1		0.25	0.25	0.25	0.25
Power Supply Capacity [kVA] *1			1.0	1.9	3.2	4.5
Power Loss *1	Main Circuit Power Loss [W]		24.0	43.3	78.9	94.2
	Control Circuit Power Loss [W]		17	17	17	17
	Total Power Loss [W]		41.0	60.3	95.9	111.2
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	35	35	12	12
		Capacity [W]	60	60	70	70
		Allowable Power Consumption [W]	20	20	25	25
	Minimum Allowable External Resistance [Ω]		35	35	12	12
Overvoltage Category			III			

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

(2) Single-Phase, 200 VAC

Model SGDXW-			1R6A	2R8A	5R5A *1
Maximum Applicable Motor Capacity (each axis) [kW]			0.2	0.4	0.75
Continuous Output Current (each axis) [Arms]			1.6	2.8	5.5
Instantaneous Maximum Output Current (each axis) [Arms]			5.9	9.3	16.9
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz		
	Allowable Voltage Fluctuation		-15% to +10%		
	Input Current [Arms] *2		5.5	11	12
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz		
	Allowable Voltage Fluctuation		-15% to +10%		
	Input Current [Arms] *2		0.25	0.25	0.25
Power Supply Capacity [kVA] *2			1.3	2.4	2.7
Power Loss *2	Main Circuit Power Loss [W]		24.1	43.6	54.1
	Control Circuit Power Loss [W]		17	17	17
	Total Power Loss [W]		41.1	60.6	71.1
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	35	35	12
		Capacity [W]	60	60	70
		Allowable Power Consumption [W]	20	20	25
	Minimum Allowable External Resistance [Ω]		35	35	12
Overvoltage Category			III		

*1 If you use the SGDXW-5R5A with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%. ((90% + 40%)/2 = 65%)

*2 This is the net value at the rated load. However, a load ratio of 65% was used for the SGDXW-5R5A.

(3) 270 VDC

Model SGDXW-		1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity (each axis) [kW]		0.2	0.4	0.75	1.0
Continuous Output Current (each axis) [Arms]		1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current (each axis) [Arms]		5.9	9.3	16.9	17.0
Main Circuit	Power Supply	270 VDC to 324 VDC			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	3.0	5.8	9.7	14
Control	Power Supply	270 VDC to 324 VDC			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	0.25	0.25	0.25	0.25
Power Supply Capacity [kVA] *1		1.2	2	3.2	4.6
Power Loss *1	Main Circuit Power Loss [W]	18.7	33.3	58.4	73.7
	Control Circuit Power Loss [W]	17	17	17	17
	Total Power Loss [W]	35.7	50.3	75.4	90.7
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.

Note:

- The following 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.

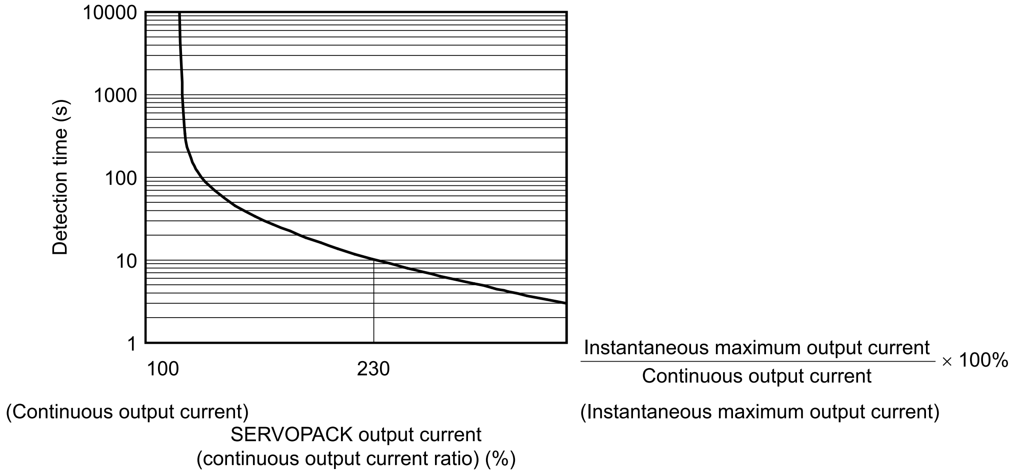

Figure 2.1 SGDXS-R70A, -R90A, -1R6A, -2R8A

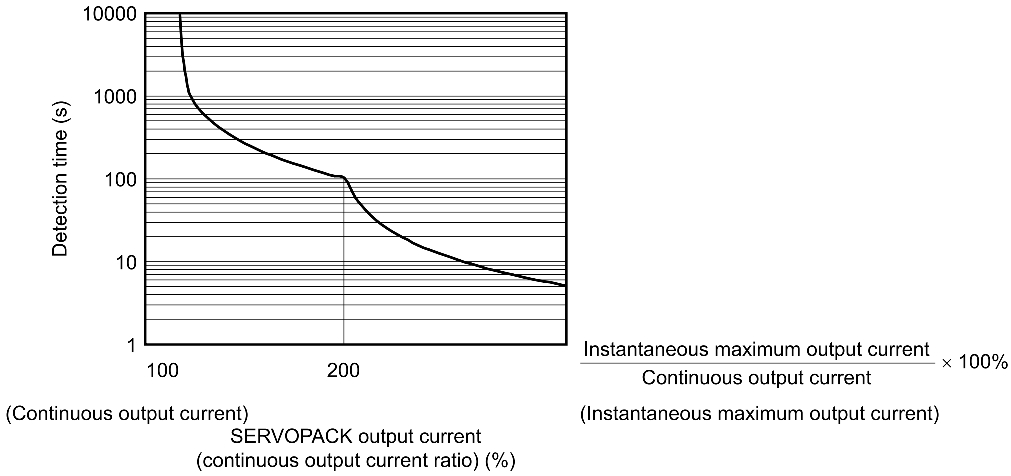

Figure 2.2 SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, -780A

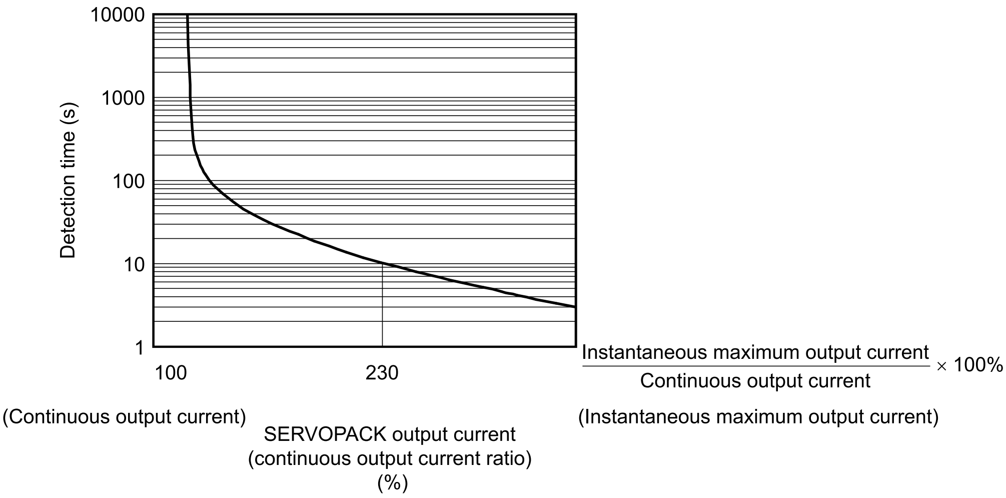

Figure 2.3 SGDXW-1R6, -2R8

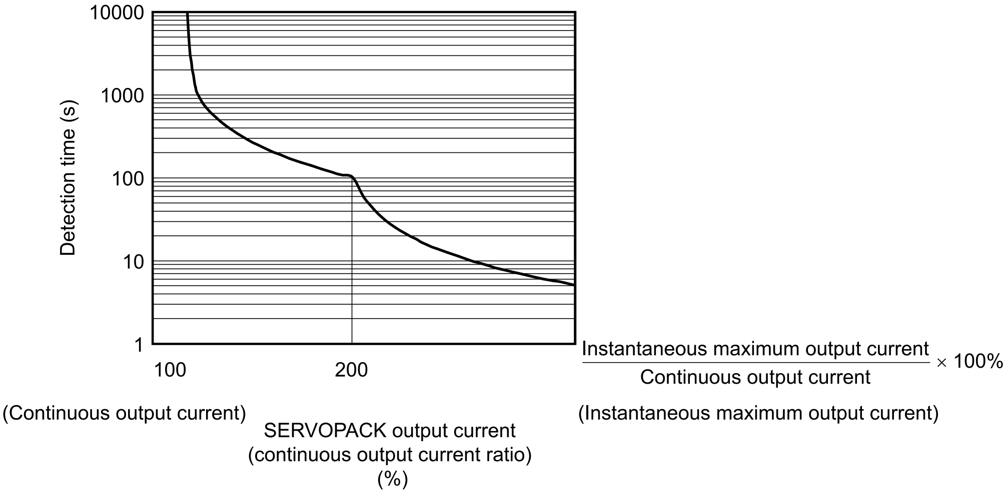

Figure 2.4 SGDXW-5R5, -7R6

2.3 Specification

2.3.1 Environmental Conditions

Item	Specification
Surrounding Air Temperature	-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.)
Storage Temperature *1	-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, SGDXW IP10: Models SGDXS-180A, -200A, -330A, -470A, -550A, -590A, -780A
Pollution Degree	2 • 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 *1	1000 m max. (With derating, usage is possible between 1000 m and 2000 m.)
Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity

*1 If you combine a Σ-XS 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

(1) Σ-XS SERVOPACK

Item	Specification
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
Outputs for Triggers at Preset Positions	Number of output points: 3 (output method: a line driver output) Output signals: High-Speed Output Signal for Triggers at Preset Positions 1 to 3 (HSO1 to 3) **Note:** Normal Output Signal for Triggers at Preset Positions 1 to 3 (/NSO1 to 3) are used by allocating the signals to sequence output signals.

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Item		Specification
Sequence Input Signals	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 7 (input method: sink inputs or source inputs)
		Input signals: • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /Probe1 (Probe 1 Latch Input) signal • /Probe2 (Probe 2 Latch Input) signal • /Home (Home Switch Input) signal • /P-CL (Forward External Torque Limit Input) and /N-CL (Reverse External Torque Limit Input) 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: • /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 • /NSO1 to 3 (Normal Output for Triggers at Preset Positions 1 to 3) signals A signal can be allocated and the positive and negative logic can be changed.

(2) Σ-XW SERVOPACK

Item		Specification
Overheat Protection Input		Number of input points: 2 Input voltage range: 0 V to +5 V
Sequence Input Signals	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 12 (input method: sink inputs or source inputs)
		Input signals: • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /Probe1 (Probe 1 Latch Input) signal • /Probe2 (Probe 2 Latch Input) signal • /Home (Home Switch Input) signal • /P-CL (Forward External Torque Limit Input) and /N-CL (Reverse External Torque Limit Input) signals • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.

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Item		Specification
Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 2 (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: 5 (output method: a photocoupler output (isolated))
		Output signals: • /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 • /NSO1 to 3 (Normal Output for Triggers at Preset Positions 1 to 3) signals A signal can be allocated and the positive and negative logic can be changed.

2.3.3 Function

(1) Σ-XS SERVOPACK

Item			Specification
Communications	USB Communications (CN7)	Interfaces	Personal computer (with SigmaWin+), digital operator (JUSP-OP07A-E)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, RUN, ERR, L/A A, L/A B, and one-digit seven-segment LED x 2
EtherCAT Communications Setting Switches			ID Selector (S1 and S2) positions: 16

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Item		Specification
EtherCAT Communications	Applicable Communications Standards	IEC 61158 Type 12, IEC 61800-7 CiA402 drive profile
	Physical Layer	100BASE-TX (IEEE802.3)
	Communications Connectors	CN6A (RJ45): ETHERCAT IN (EtherCAT input signal side) CN6B (RJ45): ETHERCAT OUT (EtherCAT output signal side)
	Cable	Category 5, 4 shielded twisted pairs The cable is automatically detected with AUTO MDIX.
	SyncManager	SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input
	FMMU	FMMU 0: Mapped in process data output (RxPDO) area. FMMU 1: Mapped in process data input (TxPDO) area. FMMU 2: Mapped to mailbox status.
	EtherCAT Commands (Data Link Layer)	APRD, APWR, APRW, FPRD, FPWR, FPRW, BRD, BWR, BRW, LRD, LWR, LRW, ARMW, FRMW
	Process Data	Assignments can be changed with PDO mapping.
	Mailbox	Emergency messages, SDO requests, SDO responses
	Distributed Clocks	Free-run mode and DC mode (can be switched.) Applicable DC cycles: 62.5 µs to 4 ms in 62.5-µs increments
	Slave Information IF	4 KB
	LED Indicator	During EtherCAT communications: L/A x 2 EtherCAT communications status: RUN x 1 EtherCAT error status: ERR x 1
CiA402 Drive Profile		• Homing Mode • Profile Position Mode • Interpolated Position Mode • Profile Velocity Mode • Profile Torque Mode • Cyclic Synchronous Position Mode • Cyclic Synchronous Velocity Mode • Cyclic Synchronous Torque Mode • Touch Probe Function • Torque Limit Function
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 -780A.)
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). *1
	Applicable Standards *2	ISO13849-1 PLe (Category 3) and IEC61508 SIL3

*1 Whether or not you use the EDM1 signal does not affect the performance level of safety parameters.
*2 Always perform risk assessment for the system and confirm that the safety requirements are met.

(2) Σ-XW SERVOPACK

Item			Specification
Communications	USB Communications (CN7)	Interfaces	Personal computer (with SigmaWin+), digital operator (JUSP-OP07A-E)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, RUN, ERR, L/A A, L/A B, and one-digit seven-segment LED
EtherCAT Communications Setting Switches			ID Selector (S1 and S2) positions: 16
EtherCAT Communications	Applicable Communications Standards		IEC 61158 Type 12, IEC 61800-7 CiA402 drive profile
	Physical Layer		100BASE-TX (IEEE802.3)
	Communications Connectors		CN6A (RJ45): ETHERCAT IN (EtherCAT input signal side) CN6B (RJ45): ETHERCAT OUT (EtherCAT output signal side)
	Cable		Category 5, 4 shielded twisted pairs The cable is automatically detected with AUTO MDIX.
	SyncManager		SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input
	FMMU		FMMU 0: Mapped in process data output (RxPDO) area. FMMU 1: Mapped in process data input (TxPDO) area. FMMU 2: Mapped to mailbox status.
	EtherCAT Commands (Data Link Layer)		APRD, APWR, APRW, FPRD, FPWR, FPRW, BRD, BWR, BRW, LRD, LWR, LRW, ARMW, FRMW
	Process Data		Assignments can be changed with PDO mapping.
	Mailbox		Emergency messages, SDO requests, SDO responses
	Distributed Clocks		Free-run mode and DC mode (can be switched.) Applicable DC cycles: 125 μs to 4 ms in 125-μs increments
	Slave Information IF		4 KB
	LED Indicator		During EtherCAT communications: L/A x 2 EtherCAT communications status: RUN x 1 EtherCAT error status: ERR x 1
CiA402 Drive Profile			• Homing Mode • Profile Position Mode • Interpolated Position Mode • Profile Velocity Mode • Profile Torque Mode • Cyclic Synchronous Position Mode • Cyclic Synchronous Velocity Mode • Cyclic Synchronous Torque Mode • Touch Probe Function • Torque Limit Function
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.

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Item	Specification
Regenerative Processing	Built-in
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.

2.3.4 Option

Item	Specification
Applicable Option Modules	Σ-XS: Fully-closed module Σ-XW: No modules can be mounted.

3

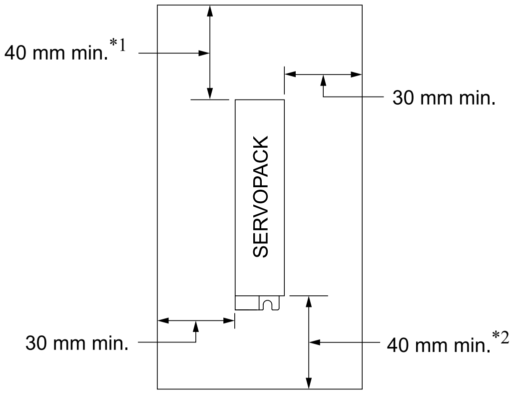
SERVOPACK Installation

This chapter provides information on installing SERVOPACKs in the required locations.

3.1 Mounting Interval

3.1.1 Installing One SERVOPACK in a Control Panel

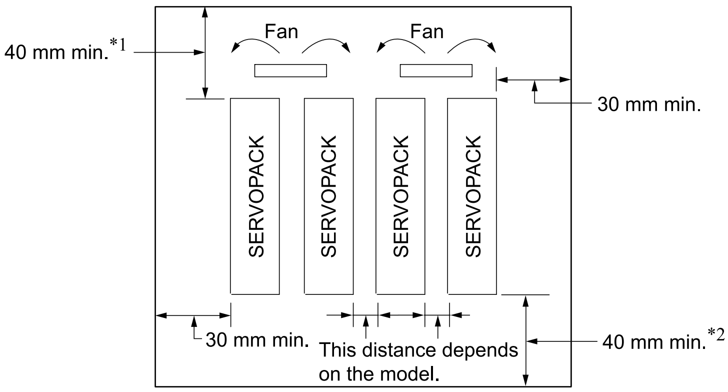
Provide the following spaces around the SERVOPACK.



*1 If you will use Σ-XS SERVOPACKs, we recommend 75 mm or more space to allow the communications cable between axes to be connected and disconnected.
*2 For this dimension, ignore items protruding from the main body of the SERVOPACK.

3.1.2 Installing More Than One SERVOPACK in a Control Panel

When multiple SERVOPACKs are installed close together in a enclosed space, the surrounding temperature of the SERVOPACKs may locally exceed the surrounding air temperature range, and air circulation due to natural convection may be insufficient. In this case, you must take measures to disperse the localized hot spots, such as using fans. When using fans, install them as shown below.



*1 If you will use Σ-XS SERVOPACKs, we recommend 75 mm or more space to allow the communications cable between axes to be connected and disconnected.
*2 For this dimension, ignore items protruding from the main body of the SERVOPACK.

The space required on the right side of a SERVOPACK (when looking at the SERVOPACK from the front) depends on the SERVOPACK models. Refer to the following table.

SERVOPACK Model		Space on Right Side	Cooling Fan Installation Conditions
			10 mm above SERVOPACK's Top Surface
SGDXS-	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	1 mm min.	Air speed: 1.0 m/s min.
	120A, 180A, 200A, 330A, 470A, 550A, 590A, 780A	10 mm min.	Air speed: 1.0 m/s min.
SGDXW-	1R6A, -2R8A, -5R5A, -7R6A	5 mm min.	Air speed: 0.5 m/s min.

Note:

When option modules are mounted on Σ-XS SERVOPACKs, the SERVOPACK installation conditions will depend on the option modules that are mounted. For details, refer to the manual for option module.

3.2 EMC Installation Conditions

This section gives the installation conditions that were used for EMC certification testing.

The EMC installation conditions that are given here are the conditions that were used to pass testing criteria at Yaskawa. The EMC level may change under other conditions, such as the actual installation structure and wiring conditions. These Yaskawa products are designed to be built into equipment. Therefore, you must implement EMC measures and confirm compliance for the final equipment.

The applicable standards are EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, and EN 61800-3 (category C2, second environment).

⚠ WARNING

In a domestic environment, this product may cause radio interference in which case supplementary mitigation measures may be required.

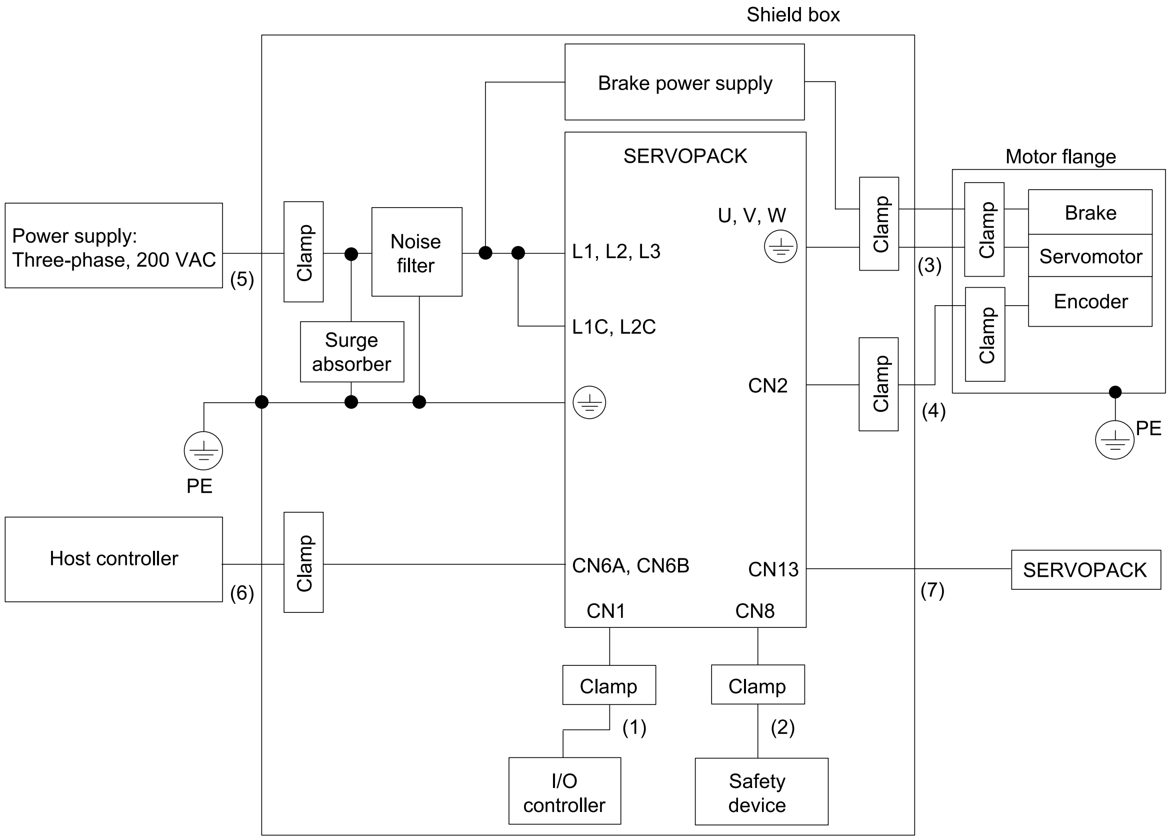
⚠ CAUTION

This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

3.2.1 Three-Phase, 200 VAC

This diagram shows the EMC installation conditions when using a Σ-XS SERVOPACK. Refer to the following manual for a Σ-XW SERVOPACK.

Σ-X-Series Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)

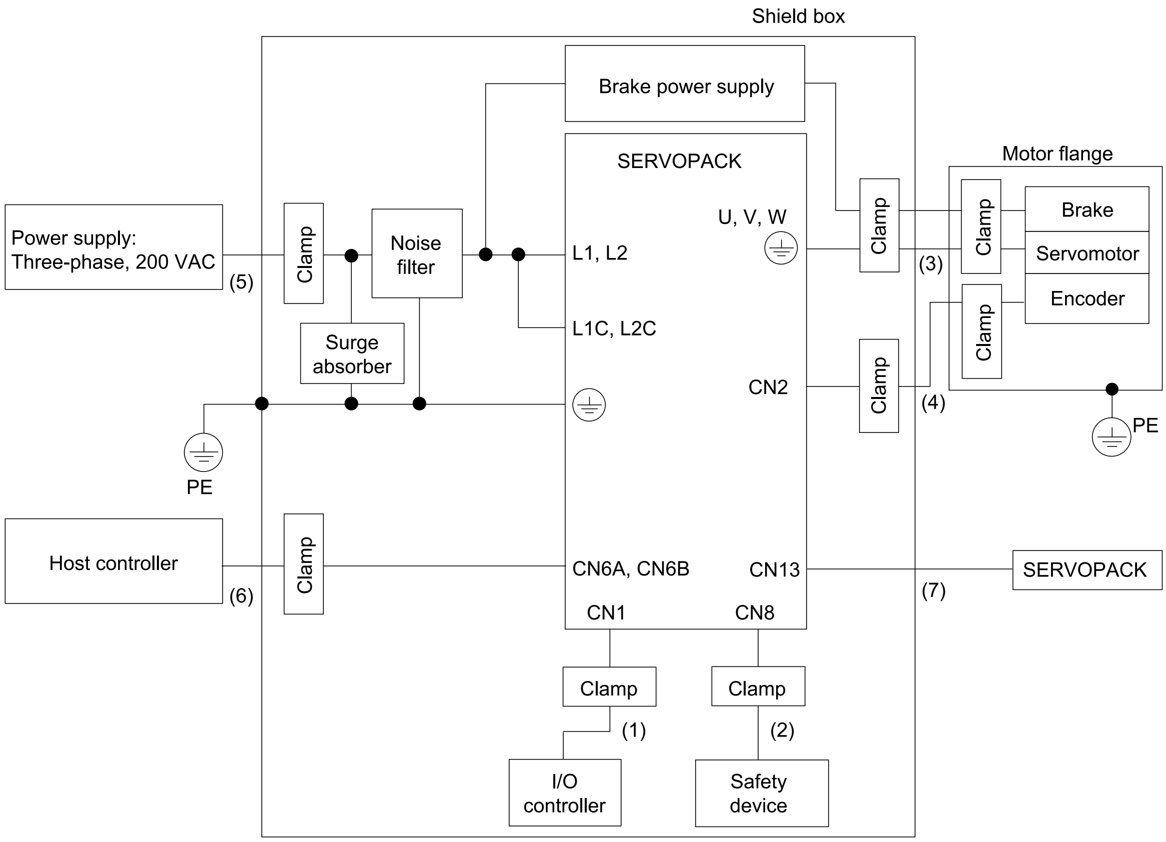


No.	Cable Name	Specification
(1)	I/O signal cable	Shield wire
(2)	Safety function device cable	Shield wire
(3)	Servomotor main circuit cable	Shield wire
(4)	Encoder cable	Shield wire
(5)	Main circuit power cable	Shield wire
(6)	EtherCAT communications cable	Shield wire
(7)	Communications cable between axes	Shield wire

3.2.2 Single-Phase, 200 VAC

This diagram shows the EMC installation conditions when using a Σ-XS SERVOPACK. Refer to the following manual for a Σ-XW SERVOPACK.

Σ-X-Series Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)

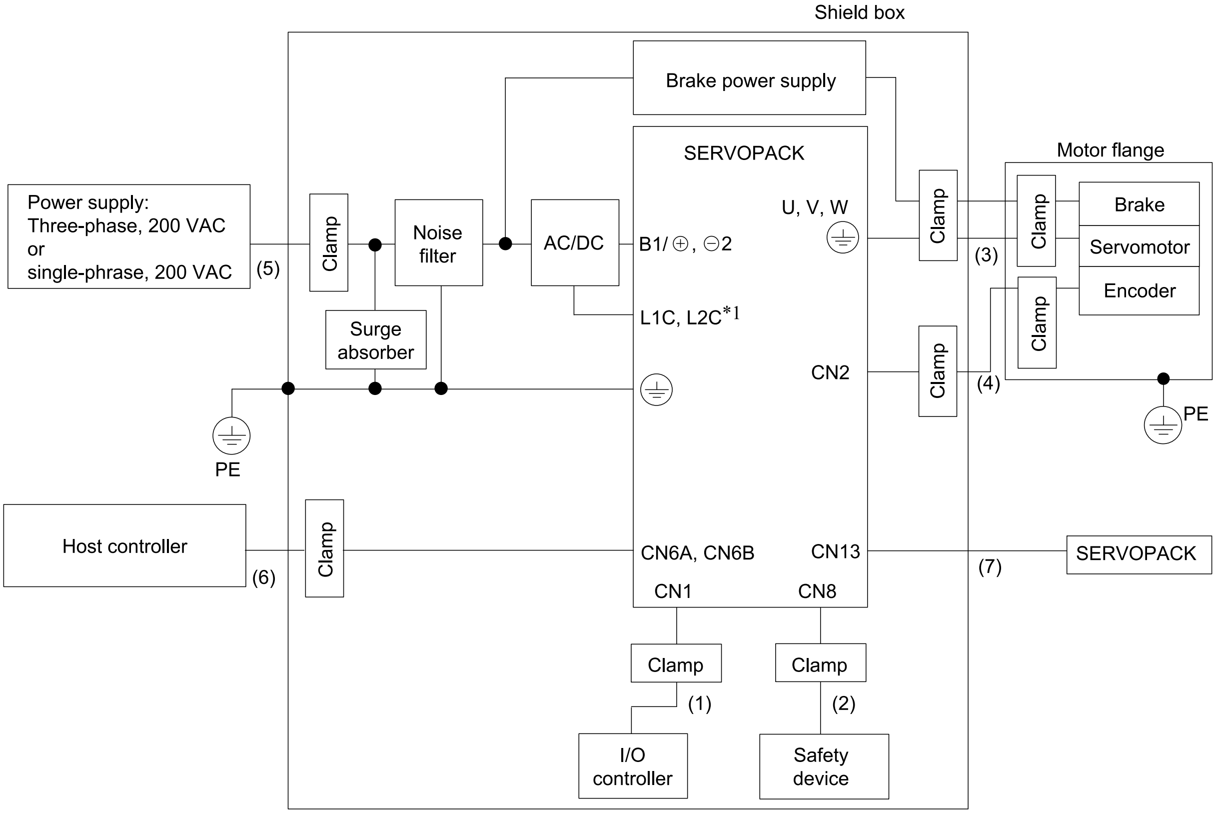


No.	Cable Name	Specification
(1)	I/O signal cable	Shield wire
(2)	Safety function device cable	Shield wire
(3)	Servomotor main circuit cable	Shield wire
(4)	Encoder cable	Shield wire
(5)	Main circuit power cable	Shield wire
(6)	EtherCAT communications cable	Shield wire
(7)	Communications cable between axes	Shield wire

3.2.3 270 VDC

This diagram shows the EMC installation conditions when using a Σ-XS SERVOPACK. Refer to the following manual for a Σ-XW SERVOPACK.

Σ-X-Series Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)



*1 You can also use a single-phase 200-VAC power supply instead of a 270-VDC power supply for input to the L1C and L2C control power supply terminals.

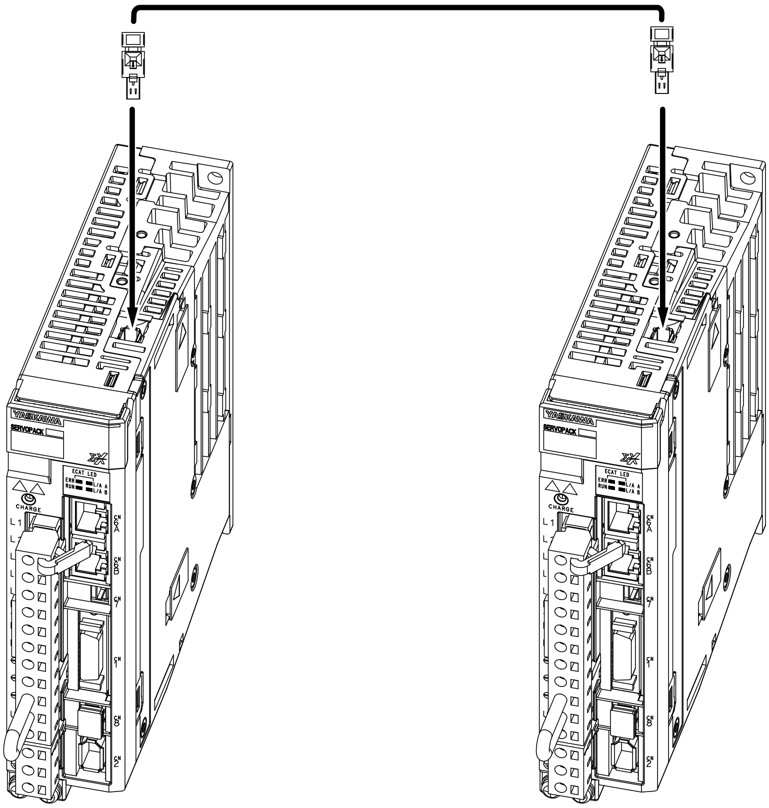
Code	Cable Name	Specification
(1)	I/O signal cable	Shield wire
(2)	Safety function device cable	Shield wire
(3)	Servomotor main circuit cable	Shield wire
(4)	Encoder cable	Shield wire
(5)	Main circuit power cable	Shield wire
(6)	EtherCAT communications cable	Shield wire
(7)	Communications cable between axes	Shield wire

4

Connecting SERVOPACKs

4.1 Connecting the Communications Cable between Axes (For Σ-XS SERVOPACKs Only)

If you will use Σ-XS SERVOPACKs, connect the connectors of the communications cable between axes to CN13.



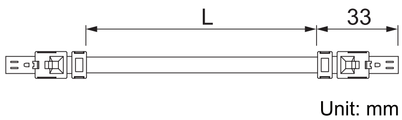
Important
- Use the cable specified by Yaskawa for the communications cable between axes. Operation will not be dependable due to low noise resistance with any other cable.
- Do not connect the shielded wire of the communications cable between axes.
- Do not connect or disconnect the communications cable between axes when the SERVOPACKs are powered.

Type	Length (L)	Model No. *1
Cable with connectors on both ends (no ferrite cores)	0.2 m, 0.5 m, 1 m, 2 m, 3 m	JEPMC-W6012-□□-E (□□: A2/A5/01/02/03)

*1 □□ in the model number stands for the letter and number used to specify the cable length.

Information This cable has the same specifications as the MECHATROLINK-III cable (industrial mini I/O (IMI) connectors on both ends).

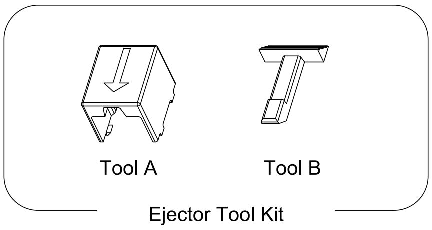
The external dimensions are shown below.



4.1.1 Ejector Tools

The following two models of the Σ-XS SERVOPACK include ejector tools to disconnect the communications cable between axes.

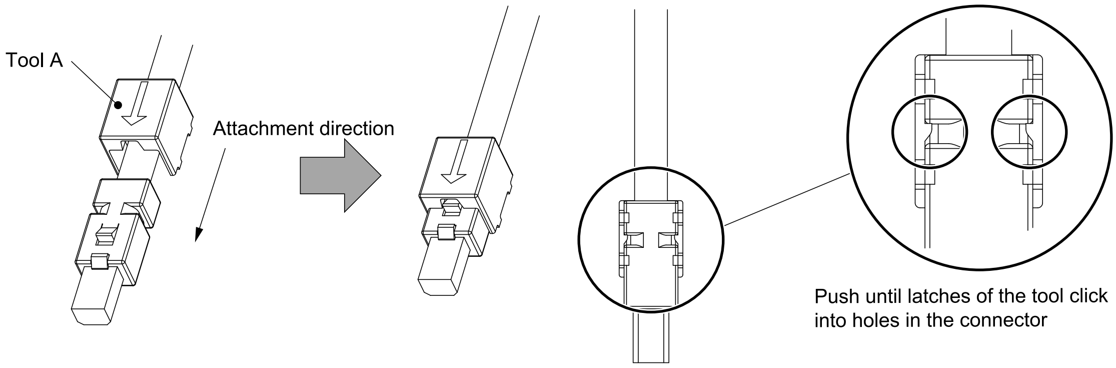
- SGDXS-470AA0A40□□70□
- SGDXS-550AA0A40□□70□



(1) How to Set the Ejector Tools

Before connecting the communications cable between axes, follow the steps below to attach the ejector tools to the cable.

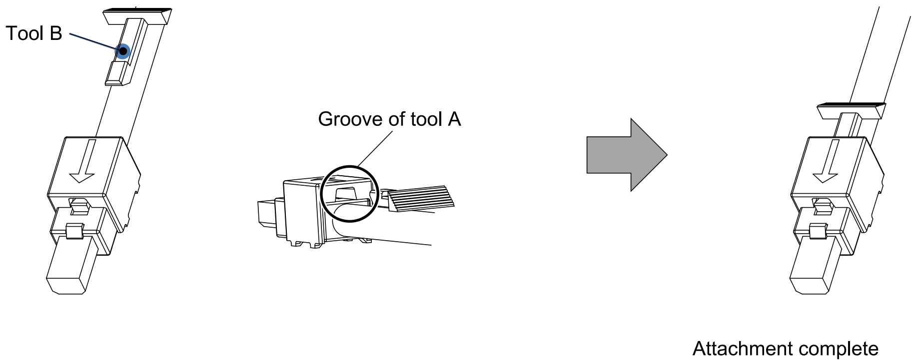
1. **Attach ejector tool A to the communications cable between axes connector as follows.**



Note:

Slide tool A along the connector. Be sure to orient the tool correctly.

2. **Attach ejector tool B as follows.**

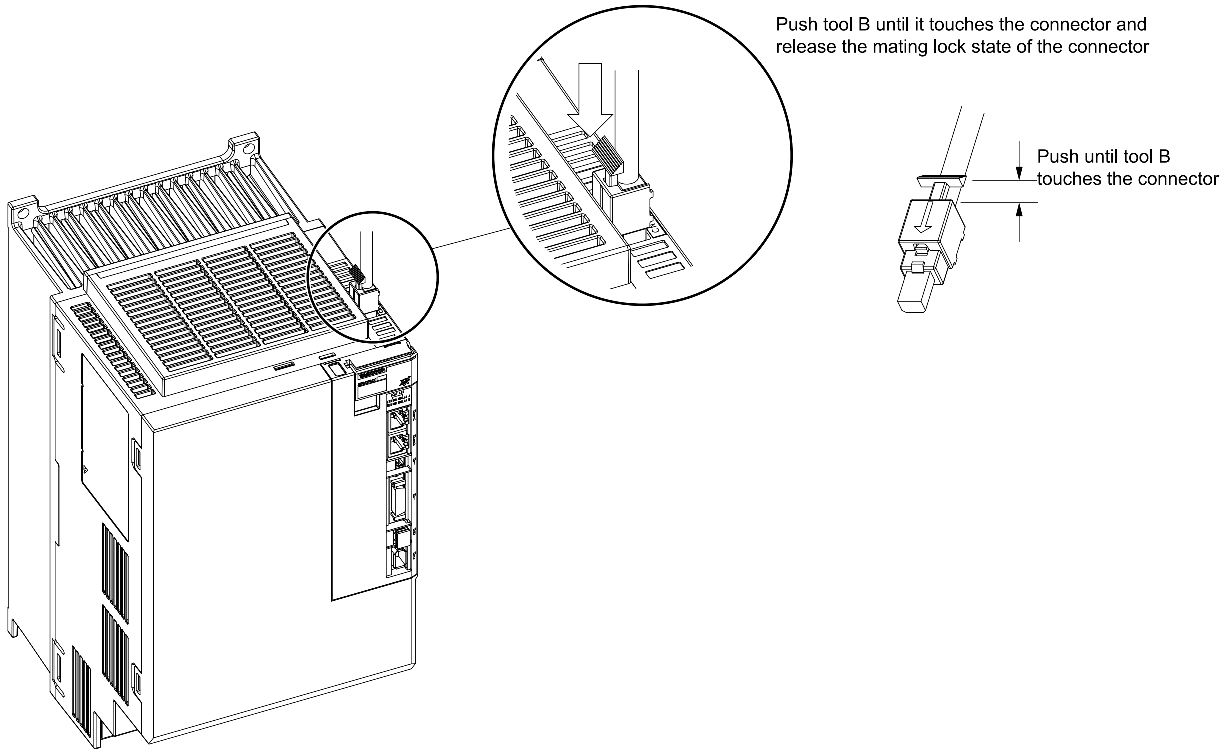


Note:

Insert tool B into the groove of tool A until it clicks.

(2) How to Disconnect the Communications Cable between Axes

When disconnecting the communications cable between axes, use the ejector tools to release the mating lock state and unplug the communications connector between axes.



Note:

Keep the ejector tools attached to the communications cable between axes so that they are not lost. If you lose them, please contact your Yaskawa representative.

5

Gantry Application Function

This chapter provides information on gantry application function.

5.1 Outline

The gantry application function is optimized for driving a gantry.

This product features four built-in functions optimized for driving a gantry to provide an optimal solution for problems with gantry mechanisms.

- Relative position deviation overflow detection (detects twisting of the machine frame to prevent mechanical damage and provide a useful function for preventative maintenance)
- Synchronized stopping (prevents mechanical damage if alarms occur)
- Twisting suppression (controls twisting of the machine during operation)
- Position correction table (minimizes wasted torque produced by mechanical differences to improve cycle times)

The following table gives an outline of the position correction table and twisting suppression as well as the features of each function.

Item		Position Correction Table	Twisting Suppression
Outline		A function for a gantry mechanism with two axes to reduce the difference in the torque reference between two axes by correcting the reference position of one axis based on the position of the other axis so that beam twisting is reduced.	A function for a gantry mechanism with two axes to perform control that reduces the position deviation between two axes. Select mode separation control or relative position deviation compensation.
Features of Applicable Machine		A machine with a large amount deviation between two axes in the position where the scale is applied. Or a machine for which you want to minimize the difference in torque that is output.	A machine with a small amount deviation between two axes in the position where the scale is applied. Or a machine for which you want to minimize relative position deviation on the scale reference and a machine for which you want to control twisting vibration.
Effects	Reducing relative position deviation	Position Actual Value (6064h) after correction is almost 0. The relative position deviation remains if you view Position Actual Value (6064h) before correction.	The reduction effect depends on gain tuning.
	Reducing the difference in the torque reference between two axes	The difference in the torque reference between two axes is made smaller by correcting the reference position so that the beam does not twist.	Since the relative position deviation is minimized on the scale reference, the difference between the torque reference of the two axes may increase depending on the degree of twisting. This can also be reduced by parameter settings.
	Suppressing twisting vibration	There is no suppression effect on twisting vibration because the function corrects the reference position.	Twisting vibration can be suppressed by performing control to reduce the relative position deviation.

Information If both the position correction table and twisting suppression are enabled at the same time, the functions may be less effective due to mutual interaction. Enable one function only.

5.1.1 Function Application Restrictions

The following functional restrictions apply when the SERVOPACKs described in this manual are used.

Function	Restriction
Moment of Inertia Estimation	Cannot be used.
Autotuning without a Host Reference (Fn201)	Cannot be used.
Autotuning with a Host Reference (Fn202)	Cannot be used.
Mechanical Analysis	Cannot be used.
Σ-LINK II	Sensor hubs, sensors, and I/O devices cannot be used.

(1) When Mixing Semi-Closed Loop Control and Fully-Closed Loop Control Axes

You cannot use the following functions: synchronized stopping, relative position deviation overflow detection, position correction cable, and twisting suppression.

(2) Using the Gantry Application Function

The following functional restrictions apply depending on the SERVOPACK model.

Function	SERVOPACK Model	Restriction
Position Correction Table	Σ-XS/Σ-XW	Cannot be used with twisting suppression.
Fully-Closed Loop Control	Σ-XW	Cannot be used.

5.1.2 Precautions When Using This Product

(1) SERVOPACK Models (Maximum Applicable Motor Capacity)

The primary axis SERVOPACK and secondary axis SERVOPACKs must have the same maximum applicable motor capacity.

(2) Motor Stopping Methods for Servo OFF and Group 1 and Group 2 Alarms

Set Motor Stopping Method for Servo OFF and Group 1 Alarms (Pn001 = n.□□□X) and Motor Stopping Method for Group 2 Alarms (Pn00A = n.□□□X and Pn00B = n.□□X□) to the same values in all SERVOPACKs. Stopping by applying the dynamic brake (DB) is recommended, which is the same as the default setting.

(3) Precautions for the Gantry Application Function

When the gantry application function is enabled, use the SERVOPACK under the following conditions.

- If overtravel is detected during mode separation control, mode separation control will be automatically disabled. Position Actual Value (6064h) (feedback position) for the secondary axis will change by a large degree at this time because rotation mode is turned OFF. If the host controller outputs the position reference using this Position Actual Value (6064h) that has changed by a large degree, the function that disables the operation reference will activate inside the SERVOPACK because that position reference will deviate greatly from the previous position reference. For this reason, to cancel this function, update the reference position in the host controller so that the reference position is within the Positioning Completed Width (Pn522) of Position Actual Value (6064h). When canceled, the SERVOPACK will operate with the reference from the host controller.
- If overtravel is detected, twisting suppression will be automatically disabled. Enable twisting suppression again after the overtravel status is cleared.
- When you will use mode separation control while signal synchronization is disabled, send the servo ON command (Enable Operation command) to both axes at the same time.
  Depending on the host controller, Controlword (6040h) for the secondary axis may not automatically change to Shutdown. In this case, the secondary axis will not be synchronized with the primary axis even if the SERVOPACK is set to synchronize /S-ON with Pn0A2 = n.□□1□ (enable signal synchronization) and Pn665 = n.□X□□ (Reference Synchronization Function Individual Selections 1). Set bits 1 and 2 of Controlword for the secondary axis to the Shutdown command with the host controller.
- When you will enable mode separation control, set the origin first.

If the conditions below are not satisfied, A.E95 (Parameter Mismatch) will occur.

- The maximum speed and maximum torque of the servomotors used for the primary axis and secondary axis must be the same.
- The encoder resolution when using rotary servomotors for the primary axis and secondary axis must be the same.
- The linear scale resolution when using linear servomotors for the primary axis and secondary axis must be the same.
- The position correction table cannot be used with triggers at preset positions.

(4) Polarity Detection Precautions

NOTICE

Uncouple the primary axis and secondary axis when performing polarity detection.

If the primary axis and secondary axis are not uncoupled, an alarm may occur and there is a risk of damage to the machine.

Polarity detection is required when using a combination of a linear servomotor without a polarity sensor and an absolute linear encoder.

Information
- Do not use a combination of a linear servomotor without a polarity sensor and an incremental encoder. If this combination is used, whenever the power is turned on, the coupling must be disconnected, and polarity detection must be performed.
- Polarity detection is not required when using a rotary servomotor or a linear servomotor with a polarity sensor.

Always check the following before you execute polarity detection.

- Pn0A1 = n.□□□0 (Disable the gantry application function and torque/force assistance.) or Pn0A1 = n.□□□1 (Enable the gantry application function.) must be set.
- The primary axis and secondary axis must be uncoupled.
- Not using a polarity sensor must be specified (Pn080 = n.□□□1).
- The servo must be OFF.
- The main circuit power must be ON.
- There must be no hard wire base block (HWBB).
- There must be no alarms except for an A.C22 alarm (Phase Information Disagreement).
- The parameters must not be write prohibited. (This item applies only when using the SigmaWin+ or digital operator.)
- The test without a motor function must be disabled (Pn00C = n.□□□0).
- There must be no overtravel.
- If the motor parameters have been written or the origin of the absolute linear encoder has been set, the power to the SERVOPACK must be turned OFF and ON again after completion of the writing or setting operation.

5.2 Setup Procedure

Use the following setup procedure to use the gantry application function.

Step	Item	Reference
1	**Wire and connect the SERVOPACKs to power supplies and peripheral devices.** If you will use Σ-XS SERVOPACKs, turn ON the main circuit power supplies to both SERVOPACKs at the same time.	*4.1 Connecting the Communications Cable between Axes (For Σ-XS SERVOPACKs Only) on page 74* Σ-X-Series Σ-XS SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 02) Σ-X-Series Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)
2	**Select the gantry application function.** Pn0A1 = n.□□□1 (enable the gantry application function)	-
3	**Set the primary axis and secondary axis.** • Pn0A1 = n.□0□□ (For the Σ-XS: set to primary axis. For the Σ-XW: set axis A to the primary axis and set axis B to the secondary axis.) • Pn0A1 = n.□1□□ (For the Σ-XS: set to secondary axis. For the Σ-XW: set axis A to the secondary axis and set axis B to the primary axis.)	-
4	**Set the method to detect relative position deviation.** Pn0A3 = n.□□X□ (Selection of Method to Detect Relative Pos Deviation) Set the primary axis and the secondary axis to the same set value.	*(1) Setting the Method to Detect Relative Position Deviation on page 87*
5	**Set the threshold for detecting relative position deviation overflow.** • Pn669 (Relative Position Deviation Overflow Warning Level) • Pn66A (Relative Position Deviation Overflow Alarm Level)	*(2) Setting the Threshold for Detecting Relative Position Deviation Overflow on page 87*
6	**Set synchronized stopping.** Pn665 = n.□□□X (Synchronized Stopping Selection) Set the primary axis and the secondary axis to the same set value.	*(1) Setting Synchronized Stopping on page 90*
7	**Set the origin.**	-
8	**<When Not Using the Position Correction Table>** **Select the type of twisting suppression.** • Pn0A1 = n.□□0□ (disable twisting suppression. control each axis individually) • Pn0A1 = n.□□1□ (use mode separation control) • Pn0A1 = n.□□2□ (use relative position deviation compensation) Set the primary axis and the secondary axis to the same value.	-
9	**<When Using Mode Separation Control Only>** **Enable or disable the reference input.** Pn0A2 = n.□□□X (Reference Input Selection during Mode Separation Control)	*(2) Enabling or Disabling the Reference Input on page 98*
10	**<When Using the Position Correction Table Only>** **Configure the position correction table.** • Create the position correction table. • Write the position correction table to the SERVOPACK. • Pn2E3 = n.□□□1 (use position correction table)	*5.10.2 Setting Parameters Related to Position Correction Table on page 107*
11	**<When Using Relative Position Deviation Compensation Only>** **Set the parameter adjustment method.** Pn0A2 = n.□X□□ (Params Selection to Compensate Relative Pos Deviation) Set the primary axis and the secondary axis to the same set value.	*(2) Setting the Parameter Adjustment Method on page 103*
12	**Perform trial operation.**	-

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Step	Item	Reference
13	**Perform tuning.**	-
14	**Set the timing to enable twisting suppression (when using twisting suppression only).** Pn0A3 = n.□□□X (Timing to Enable Twisting Suppression Selection)	*(3) Setting the Timing to Enable Twisting Suppression on page 98* *(3) Setting the Timing to Enable Twisting Suppression on page 103*

5.3 Parameters Matching Check Function

The parameters matching check function checks to determine if the parameter settings on the primary axis and the secondary axis match.

Matching is checked for the following parameters on the primary and secondary axes of the gantry application function.

Parameter Number	Parameter Name	Digit	Digit Name
Pn001 (2001h)	Application Function Selections 1	n.□□□X	Motor Stopping Method for Servo OFF and Group 1 Alarms
		n.□□X□	Overtravel Stopping Method
Pn002 (2002h)	Application Function Selections 2	n.X□□□	External Encoder Usage
Pn008 (2008h)	Application Function Selections 8	n.□□X□	Function Selection for Undervoltage
Pn00A (200Ah)	Application Function Selections A	n.□□□X	Motor Stopping Method for Group 2 Alarms
		n.□□X□	Stopping Method for Forced Stops
Pn00B (200Bh)	Application Function Selections B	n.□□X□	Motor Stopping Method for Group 2 Alarms
Pn0A1 (20A1h)	Gantry Application Function Selections 1	n.□□□X	Parameters for Selecting Functions
		n.□□X□	Twisting Suppression Selections
Pn0A2 (20A2h)	Gantry Application Function Selections 2	n.□□□X	Reference Input Selection during Mode Separation Control
		n.□□X□	Signal Synchronization Selection
		n.□X□□	Params Selection to Compensate Relative Pos Deviation
Pn20A (220Ah)	Number of External Encoder Scale Pitches	–	–
Pn20E (220Eh)	Electronic Gear Ratio (Numerator)	–	–
Pn210 (2210h)	Electronic Gear Ratio (Denominator)	–	–
Pn22A (222Ah)	Fully-closed Control Selections	n.X□□□	Fully-closed Control Speed Feedback Selection
Pn282 (2282h)	Linear Encoder Scale Pitch	–	–
Pn665 (2665h)	Synchronized Stopping Function Selections	–	–

If parameters do not match, A.E95 (Parameter Mismatch) will occur.

Information

If the above parameters do not match, the operation of each axis will not be synchronized and may cause damage to the machine. If you must operate the system with the parameters mismatched, such as when commissioning the system, you can mask A.E95 with Pn0A2 = n.X□□□ (Alarm/Warning Mask Setting).

		Alarm/Warning Mask Setting Speed Pos Trq		When Enabled
Pn0A2 (20A2h)	n.X□□□	0 Default	Do not mask A.E93 (Servo ON Command Synchronization Error), A.E95 (Parameter Mismatch), and A.97C (Synchronized Stopping Occurred).	After restart
		1	Mask A.E93.	
		2	Mask A.E95.	
		3	Mask A.E93 and A.E95.	
		4	Mask A.97C.	
		5	Mask A.E93 and A.97C.	
		6	Mask A.E95 and A.97C.	
		7	Mask A.E93, A.E95, and A.97C.	

5.4 Signal Synchronization

Signal synchronization is a function that synchronizes the /S-ON, /ALM-RST, OT and FSTP signals on the primary and secondary axes. You can individually set each signal.

For signal synchronization, the primary axis will reference secondary axis signals.

You can change enable or disable signal synchronization with Pn0A2 = n.□□X□ (Signal Synchronization Selection).

Individually set each signal with Pn665 = n.□X□□ (Reference Synchronization Function Individual Selections 1).

Pn0A2 (20A2h)	n.□□X□	Signal Synchronization Selection Speed Pos Trq		When Enabled
		0	Disable signal synchronization.	After restart
		1 Default	Enable signal synchronization.	
Pn665 (2665h)	n.□X□□	Reference Synchronization Function Individual Selections 1 Speed Pos Trq		When Enabled
		0	Do not synchronize /S-ON, /ALM-RST, OT, and FSTP of secondary axis to primary axis.	After restart
		1	Synchronize /S-ON of secondary axis to primary axis.	
		2	Synchronize /ALM-RST of secondary axis to primary axis.	
		3	Synchronize /S-ON and /ALM-RST of secondary axis to primary axis.	
		4	Synchronize OT of secondary axis to primary axis.	
		5	Synchronize /S-ON and OT of secondary axis to primary axis.	
		6	Synchronize /ALM-RST and OT of secondary axis to primary axis.	
		7	Synchronize /S-ON, /ALM-RST, and OT of secondary axis to primary axis.	
		8	Synchronize FSTP of secondary axis to primary axis.	
		9	Synchronize /S-ON and FSTP of secondary axis to primary axis.	
		A	Synchronize /ALM-RST and FSTP of secondary axis to primary axis.	
		B	Synchronize /S-ON, /ALM-RST, and FSTP of secondary axis to primary axis.	
		C Default	Synchronize OT and FSTP of secondary axis to primary axis.	
		D	Synchronize /S-ON, OT, and FSTP of secondary axis to primary axis.	
		E	Synchronize /ALM-RST, OT, and FSTP of secondary axis to primary axis.	
		F	Synchronize /S-ON, /ALM-RST, OT, and FSTP of secondary axis to primary axis.	

Note:

1. When you will use mode separation control while signal synchronization is disabled, send the servo ON command (Enable Operation command) to both axes at the same time.
2. Depending on the host controller, Controlword (6040h) for the secondary axis may not automatically change to Shutdown. In this case, the secondary axis will not be synchronized with the primary axis even if the SERVOPACK is set to synchronize /S-ON with Pn0A2 = n.□□1□ (enable signal synchronization) and Pn665 = n.□X□□ (Reference Synchronization Function Individual Selections 1). Set bits 1 and 2 of Controlword for the secondary axis to the Shutdown command with the host controller.

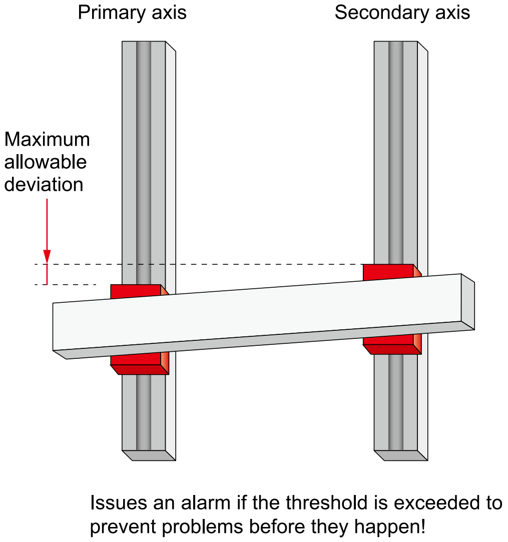
5.5 Relative Position Deviation Overflow Detection

This section provides information on relative position deviation overflow detection.

5.5.1 Outline

When the operation of the primary and secondary axes is not synchronized, the frame of the machine may twist as shown in the below figure, which can damage the machine or impact the quality of products.

Relative position deviation overflow detection detects twisting of the frame of the machine. To do this, the allowable position deviation between both axes is set in advance, and an alarm or warning is generated when the allowable position deviation is exceeded.



5.5.2 Parameters

(1) Setting the Method to Detect Relative Position Deviation

Set the method to detect relative position deviation in Pn0A3 = n.□□X□ (Selection of Method to Detect Relative Pos Deviation). Set the primary axis and the secondary axis to the same set value.

		Selection of Method to Detect Relative Pos Deviation (Speed, Pos, Trq)		When Enabled
Pn0A3 (A:20A3h, B:28A3h)	n.□□X□	0 Default	Calculate with the relative position from the preset position.	Immediately
		1	Calculate with Position Actual Value (6064h).	

Note:

For set value 1:

– If you are using an absolute encoder, calculate the difference for the scale or encoder value.

– If you are using an incremental encoder, the position when the power is turned ON is 0. Calculate the difference for the position between axes based on that position.

(2) Setting the Threshold for Detecting Relative Position Deviation Overflow

If you set the relative position deviation that can be allowed in Pn66A (Relative Position Deviation Overflow Alarm Level), A.50D (Relative Position Deviation Overflow Alarm) will occur when that value is exceeded.

You can also make A.90D (Relative Position Deviation Overflow Warning) occur by setting Pn669 (Relative Position Deviation Overflow Warning Level). A.90D occurs when the value obtained with Pn66A × Pn669/100 is exceeded.

Pn669 (A:2669h, B:2E69h)	Relative Position Deviation Overflow Warning Level			Speed Pos Trq
	Setting Range	Setting Unit	Default Setting	When Enabled
	10 to 100	%	100	Immediately
Pn66A (A:266Ah, B:2E6Ah)	Relative Position Deviation Overflow Alarm Level			Speed Pos Trq
	Setting Range	Setting Unit	Default Setting	When Enabled
	0 to 1073741823	reference unit	5242880	Immediately

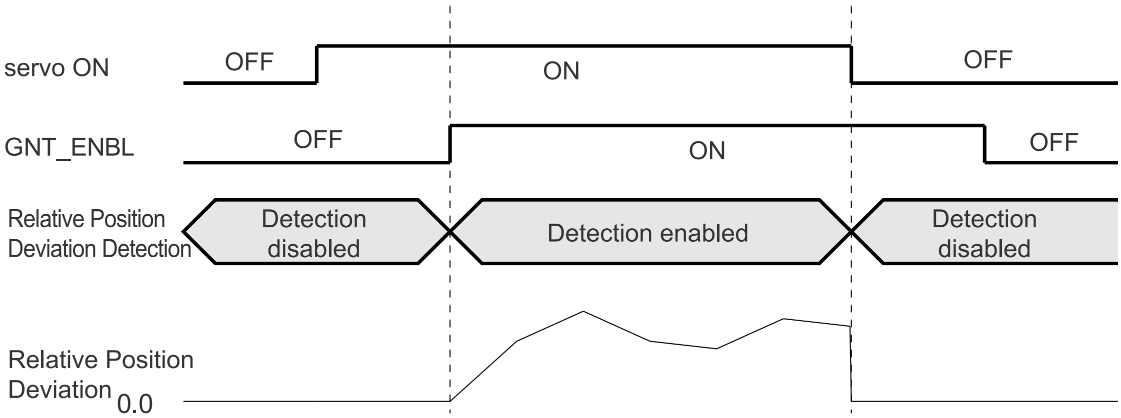
Note:
- If the setting value of Pn66A is 0, the relative position deviation overflow alarm and warning are disabled.
- Adjust the settings of Pn669 and Pn66A after setting the origin of the machine. If the values of Pn669 and Pn66A are decreased before the origin of the machine is set, a warning or alarm may occur when the origin is set.

5.5.3 Timing of Relative Position Deviation Overflow Detection

(1) When Pn0A3 = n.□□0□

Detection of relative position deviation overflow is enabled when the servo is turned ON and GNT_ENBL is turned ON.

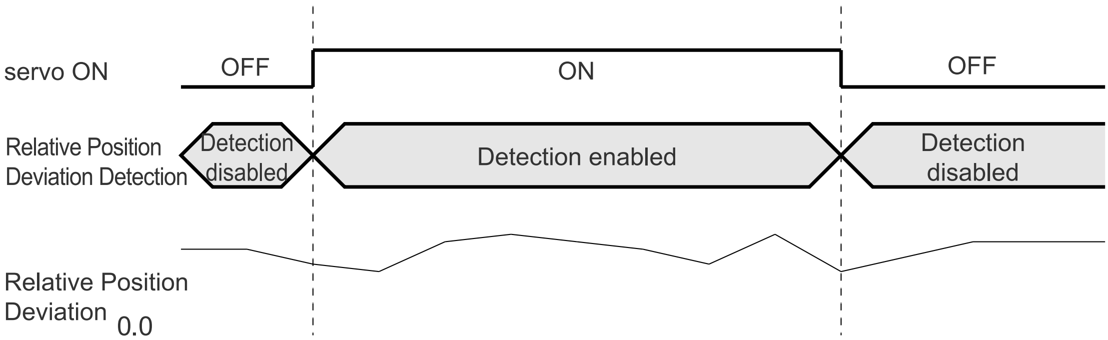
Relative position deviation also starts to be counted at the same time.



(2) When Pn0A3 = n.□□1□

Detection of relative position deviation overflow is enabled when the servo is turned ON.

Relative position deviation is always being counted.



5.5.4 Alarm

The alarm related to relative position deviation overflow detection is given in the following table.

Display	Name	Meaning
50Dh Common	Relative Position Deviation Overflow Alarm	The position deviation between the primary and secondary axes during the servo ON state exceeded the set value of Pn66A (Relative Position Deviation Overflow Alarm Level).

5.5.5 Warning

The warning related to relative position deviation overflow detection is given in the following table.

90Dh (Relative Position Deviation Overflow Warning) occurs when the value obtained with Pn66A × Pn669/100 is exceeded.

Display	Name	Meaning
90Dh Common	Relative Position Deviation Overflow Warning	The position deviation between the primary and secondary axes has exceeded the percentage set with the following equation during the servo ON state. (Pn66A × Pn669/100)

5.5.6 Monitor

Monitoring the relative position deviation can be useful for preventative maintenance.

The primary axis and the secondary axis both show the relative position deviation based on their own axis. For this reason, the relative position deviation will be shown with positive and negative reversed for the primary axis and the secondary axis.

(1) Monitoring with the SigmaWin+

You can monitor the relative position deviation on the motion monitor window.

Button in Menu Dialog Box	Name [Unit]
Motion Monitor	Relative Position Deviation [reference unit]

Refer to the following manual for detailed operating procedures for the SigmaWin+.

Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)

(2) Monitoring with the Digital Operator

Un04E can be used to monitor relative position deviation with the digital operator.

Un No.	Sign	Unit	Name	Description
Un04E	Yes	1 reference unit	Relative Position Deviation	Position deviation between primary axis and secondary axis

Refer to the following manual for monitor data other than that listed above.

Σ-7/Σ-X-Series Digital Operator Operating Manual (Manual No.: SIEP S800001 33)

(3) Monitoring with an Object

You can use 277eh (Relative Position Deviation) to monitor relative position deviation with an object.

Index	Subindex	Name	Data Type	Access	PDO Mapping	Value	Saving to EEPROM
277eh Axis A	0	Relative Position Deviation	DINT	RO	Yes	– [Pos. unit]	No

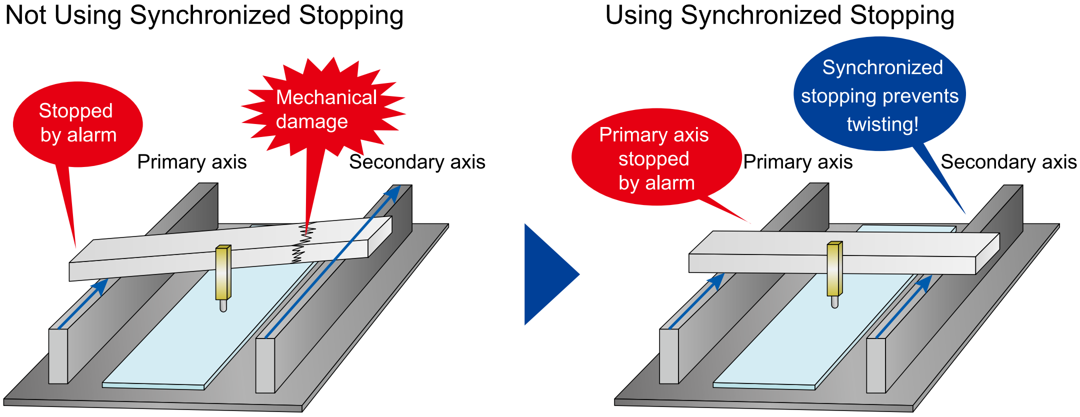
5.6 Synchronized Stopping

This section provides information on synchronized stopping.

5.6.1 Outline

Synchronized stopping is a function that synchronizes the axes and stops the servomotors when an alarm occurs. Specifically, when an alarm occurs on either the primary axis or the secondary axis, the other axis (the synchronized stopping axis) is synchronized to the active alarm axis, and both servomotors are stopped together.

This function can prevent damage to the machine by synchronizing and stopping the primary and secondary axes.



This function has two modes which are selected by parameter.

- Synchronized Stopping Mode 2
  If an alarm occurs on one axis, both axes will be synchronized and stopped in an operation that minimizes relative position deviation. If an alarm occurs, compensation torque will be output from the compensator to minimize the relative position deviation for the axis without an alarm.
  You can use this mode when you are not using torque/force assistance.
- Synchronized Stopping Mode 3
  If an alarm occurs on one axis, the other axis will also be set to the servo OFF state at the same time.

5.6.2 Parameters

(1) Setting Synchronized Stopping

Set the function to stop an axis with an alarm when an alarm occurs on the other axis in Pn665 = n.□□□X (Synchronized Stopping Selection). Set the primary axis and the secondary axis to the same value.

Parameter	Digit	Synchronized Stopping Selection (Speed / Pos / Trq)		When Enabled
Pn665 (2665h)	n.□□□X	0	Disable synchronized stopping.	After restart
		1	Reserved (Do not use.)	
		2	Enable synchronized stopping mode 2.	
		3 Default	Enable synchronized stopping mode 3.	

- Synchronized Stopping Mode 2
  If an alarm occurs on one axis, both axes will be synchronized and stopped in an operation that minimizes relative position deviation. If an alarm occurs, compensation torque will be output from the compensator to minimize the relative position deviation for the axis without an alarm.
  You can use this mode when you are not using torque/force assistance.

Information
- During synchronized stopping, an A.97C alarm (Synchronized Stopping Warning) will occur on the axis that did not have the alarm.
- If the feedback speed of the axis that did not have the alarm falls below Pn666 (Synchronized Stopping End Speed), synchronized stopping will end and an A.E91 alarm (Synchronized Stopping Occurred Alarm) will occur.
- If the axis that did not have the alarm accelerates during synchronized stopping, an A.E91 alarm (Synchronized Stopping Occurred Alarm) will occur and the axis will stop with an alarm instead of synchronized stopping.

- Synchronized Stopping Mode 3
  If an alarm occurs on one axis, the other axis will also be set to the servo OFF state at the same time. If any of the following alarms occur, synchronized stopping mode 3 will be used regardless of the synchronized stopping mode setting.

Alarm Number	Alarm Name	Alarm Meaning
A.810	Encoder Backup Alarm	The power supplies to the encoder all failed and the position data was lost.
A.820	Encoder Checksum Alarm	There is an error in the checksum results for encoder memory.
A.840	Encoder Data Alarm	There is an internal data error in the encoder.
A.850	Encoder Overspeed	The encoder was operating at high speed when the power was turned ON.
A.890	Encoder Scale Error	A failure occurred in the linear encoder.
A.891	Encoder Module Error	An error occurred in the linear encoder.
A.C90	Encoder Communications Error	Communications between the encoder and SERVOPACK is not possible.
A.C91	Encoder Communications Position Data Acceleration Rate Error	An error occurred in calculating the position data of the encoder.
A.C92	Encoder Communications Timer Error	An error occurred in the communications timer between the encoder and SERVOPACK.

(2) Parameters Related to Synchronized Stopping Mode 2

To further reduce the relative position deviation, adjust Pn667 (Synchronized Stopping Response Level) and Pn668 (Synchronized Stopping Moment of Inertia Ratio) to a level at which operation remains stable.

Set Pn668 to a percentage of Pn103 (Moment of Inertia Ratio).

Parameter	Setting Range	Setting Unit	Default Setting	When Enabled
Pn666 (2666h)	Synchronized Stopping End Speed			Speed Pos Trq
	1 to 65535	Rotary: min^{-1} Linear: mm/s	10	Immediately
Pn667 (2667h)	Synchronized Stopping Function Response Level			Speed Pos Trq
	10 to 20000	0.1 Hz	400	Immediately
Pn668 (2668h)	Synchronized Stopping Function Moment of Inertia Ratio			Speed Pos Trq
	1 to 65535	%	100	Immediately

If the feedback speed of the axis that has the alarm is less than Synchronized Stopping End Speed (Pn666), synchronized stopping will end.

Set Pn666 (Synchronized Stopping End Speed) to the speed at which the servomotor is judged to have stopped and synchronized stopping will end.

5.6.3 Alarm

The alarm related to synchronized stopping is given in the following table.

Display	Name	Meaning
E91h	Synchronized Stopping Occurred Alarm	• An alarm occurred on the primary axis or the secondary axis and a synchronized stop was performed. • The feedback speed of the axis performing the synchronized stop has accelerated to twice the speed of the synchronized stopping start speed or faster.

(1) Servomotor Stopping Method for Alarms

Important

- Set both primary axis and secondary axis to the same stopping method for alarms.
- In this product, the default setting of the servomotor stopping method for group 1 and group 2 alarms is stopping by applying the dynamic brake (DB). The servomotor stopping method can be changed by setting the parameter, but stopping by applying the dynamic brake (DB) is recommended.

- The stopping method for alarms functions according to Pn001 = n.□□□X (Motor Stopping Method for Servo OFF and Group 1 Alarms).
- If an alarm occurs during synchronized stopping on the synchronized stopping axis, synchronized stopping is canceled and the servomotor is stopped according to the servomotor stopping method.
- The status after synchronized stopping conforms to the settings of Pn001 = n.□□□X (Motor Stopping Method for Servo OFF and Group 1 Alarms), Pn00A = n.□□□X, and Pn00B = n.□□X□ (Motor Stopping Method for Group 2 Alarms).

5.6.4 Warning

The warning related to synchronized stopping is given in the following table.

Display	Name	Meaning
97Ch	Synchronized Stopping Occurred	An alarm occurred on the primary axis or the secondary axis and a synchronized stop was performed.

5.7 Twisting Suppression

This section provides information on twisting suppression.

5.7.1 Outline

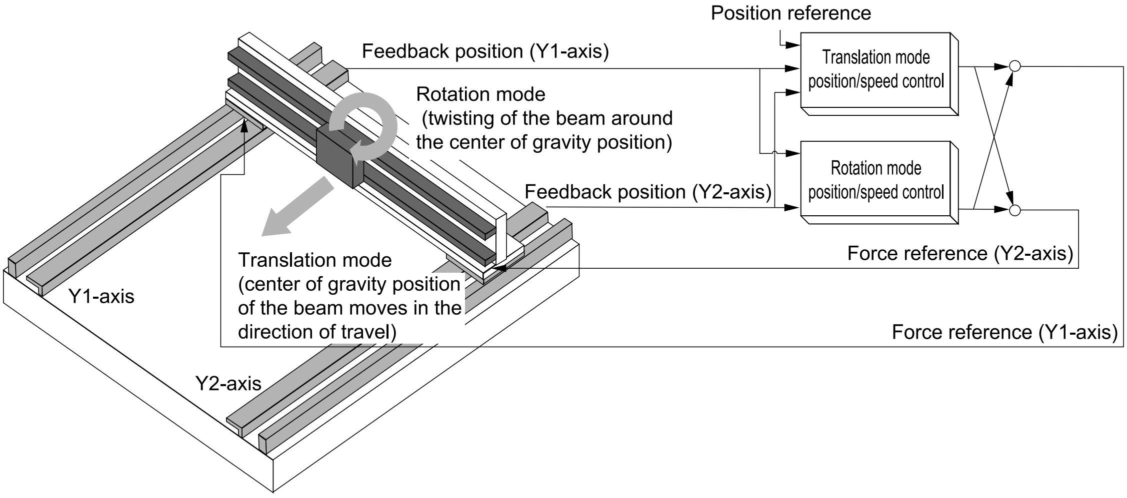
While a gantry mechanism is in operation, an interference force occurs in the two axes during movement due to the effects of parallelism in the guides and scales, and this creates a position error (relative position deviation).

There are two types of twisting suppression: mode separation control and relative position deviation compensation as the functions to reduce this relative position deviation.

Twisting Suppression Type	Mode Separation Control	Relative Position Deviation Compensation
Outline	Twisting suppression is separated into a translation operation and rotation operation and position and speed control are performed independently for each operation.	The torque and force references are compensated to reduce relative position deviation.
Features	The responsiveness of the translation operation and the rotation operation can be adjusted separately.	Relative position deviation during operation can be reduced.
Suitable Applications	• Applications in which the gantry mechanism is controlled from the host controller as a single axis • Applications that vary due to the load on the beam	Applications in which the beam rigidity is high and responsiveness is to be increased
Description	Adjusting the responsiveness of the rotation operation allows the degree of interference force control to be adjusted. According to the application, this can reduce the difference in the torque/force reference between the two axes or reduce the relative position deviation. However, the two cannot be adjusted at the same time. Since the two axes also move by movement commands sent to the primary axis, the operation of the gantry mechanism can be controlled as a single axis from the host controller.	Relative position deviation can be reduced in combination with a conventional controller. However, the difference in the torque/force reference for the two axes increases.

(1) Mode Separation Control Function

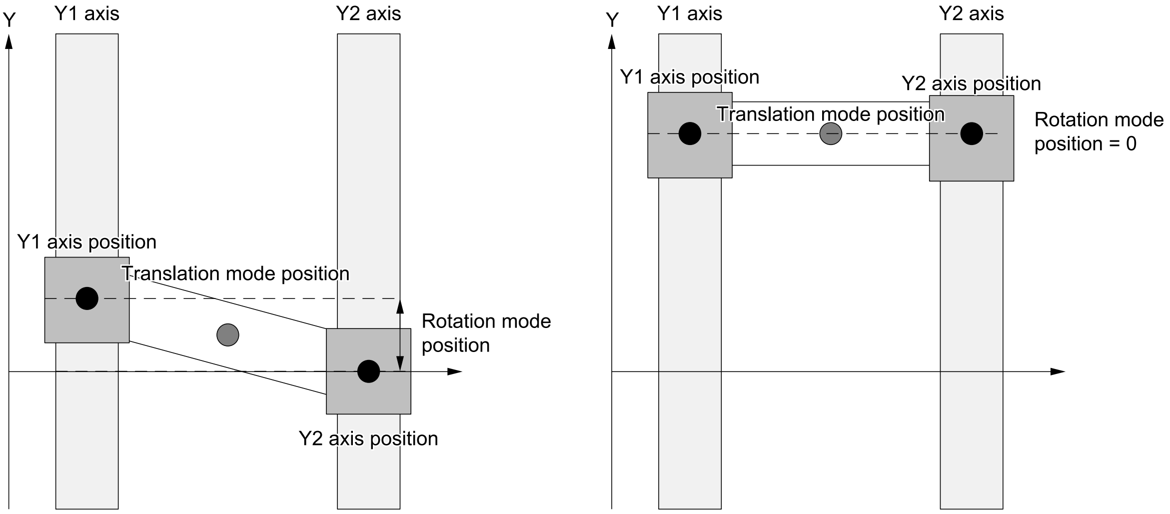
The SERVOPACK controls position and speed separately for translation mode (the center of gravity position of the beam moves in the direction of travel) and rotation mode (twisting of the beam around the center of gravity position) of the gantry mechanism.



(a) Terms

Term	Meaning
mode separation control	In mode separation control, the operation of the gantry mechanism is separated into translation mode and rotation mode, and position control of each mode is independently performed.
translation mode	Mode in which the beam of the gantry mechanism moves in the direction of travel.
rotation mode	Mode in which the beam of the gantry mechanism twists.
translation mode position	The center position of the two axes (Y1 axis, Y2 axis), which are the driving parts of the gantry mechanism. It is in the center of the beam.
rotation mode position	The difference in the position of the two axes (Y1 axis, Y2 axis), which are the driving parts of the gantry mechanism.
translation mode control	In translation mode control, control is performed so that the two axes follow the translation mode position in response to travel commands from the host controller.
rotation mode control	In rotation mode control, control is performed so that the rotation mode position is 0.

(b) Examples



The translation mode position and rotation mode position are calculated by the following formulas.

Translation mode position = (Y1 axis position + Y2 axis position)/2

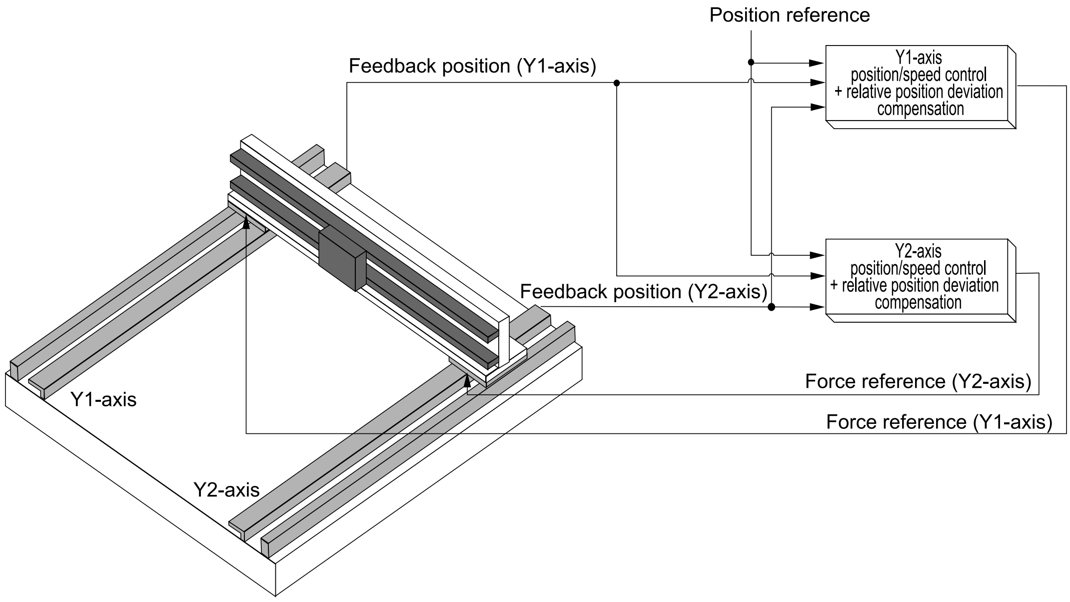
Rotation mode position = (Y1 axis position - Y2 axis position)/2

When mode separation control is enabled, the translation mode position operates to follow the travel command. Because the rotation mode position is controlled to always be 0, when the rotation mode position is 0, the translation mode position = Y1 axis position = Y2 axis position.

	Translation Mode Position	Rotation Mode Position	Y1 Axis Position	Y2 Axis Position
Stopped in an uncontrolled state. (State in the left figure)	100 pulses	100 pulses	200 pulses	0 pulses
Start mode separation control.	100 pulses	0 pulses	100 pulses	100 pulses
Input the travel command as a reference position 500 pulses. (State in the right figure)	500 pulses	0 pulses	500 pulses	500 pulses

(2) Relative Position Deviation Compensation

This function compensates the torque and force references to suppress the relative position deviation in position and speed control of each axis.



(3) Comparison of Twisting Suppression Types

The following table compares mode separation control and relative position deviation compensation.

Item		Mode Separation Control	Relative Position Deviation Compensation
Basic Control	Position Control	P control	P control
	Speed Control	PI control / I-P control	P control / PI control
	Speed Feedback Filter	○	○
	Tuning-less Control	○	○
	Friction Compensation	○	○
	Load Fluctuation Compensation	○	○
	Gain Switching	○	○
	Reference Filters	○	○
	Friction Model Compensation	○	○
	Gravity Compensation	○	○
Vibration Suppression	Notch Filters	5 levels	5 levels
	Anti-resonance Control	○	○
	Vibration Suppression Filter	○	○
Feedforward	Speed Feedforward	○	○
	Torque Feedforward	○	○
	Model Following Control	○	○
Function	Moment of Inertia Estimation	○	×
	Custom Tuning	○	○
	Jog	× *1	×
	Program Jogging	○ *1	×
	Origin Search	× *2	×
	Polarity Detection	× *2	×
	Gain Switching	○	○
	Mode Switch	○	○

*1 This function can be used on only the axis to which the reference is input.

*2 This function can be used only to individually control each axis because the axes must be moved one at a time.

5.8 Using Twisting Suppression - Mode Separation Control

This section describes the procedure to use mode separation control for twisting suppression.

5.8.1 Setup Procedure

Use the following setup procedure to use mode separation control for twisting suppression.

Step	Item	Reference
1	**Set the method to detect relative position deviation.** • Pn0A3 = n.□□0□ (calculate with relative position from reference position) (default setting) • Pn0A3 = n.□□1□ (calculate with Position Actual Value (6064h).)	*(1) Setting the Method to Detect Relative Position Deviation on page 87*
2	**Set the threshold for detecting relative position deviation overflow.** • Pn669 (Relative Position Deviation Overflow Warning Level) • Pn66A (Relative Position Deviation Overflow Alarm Level)	*(2) Setting the Threshold for Detecting Relative Position Deviation Overflow on page 87*
3	**Set synchronized stopping.** • Pn665 = n.□□□0 (disable synchronized stopping) • Pn665 = n.□□□1 (reserved (do not use)) • Pn665 = n.□□□2 (enable synchronized stopping mode 2) • Pn665 = n.□□□3 (enable synchronized stopping mode 3) (default setting)	*(1) Setting Synchronized Stopping on page 90*
4	**Select mode separation control for twisting suppression.** Pn0A1 = n.□□1□ (use mode separation control)	–
5	**Enable or disable the reference input for the secondary axis.** • Pn0A2 = n.□□□0 (enable position reference input to secondary axis) • Pn0A2 = n.□□□1 (disable position reference input to secondary axis) (default setting)	*(2) Enabling or Disabling the Reference Input on page 98*
6	**Set the timing to enable twisting suppression.** • Pn0A3 = n.□□□0 (enable when the first digit of Pn0A1 is not 0 and GNT_ENBL (Controlword_VenderS (2776h) bit 8) is turned ON.) (default setting) • Pn0A3 = n.□□□1 (enable when the first digit of Pn0A1 is not 0)	*(3) Setting the Timing to Enable Twisting Suppression on page 98*

Note:

For the parameter values in this procedure, set the primary and secondary axes to the same values except for the threshold for detecting relative position deviation overflow.

5.8.2 Parameters

The parameters for using mode separation control for twisting suppression are given in the following table.

(1) Selecting Mode Separation Control

Set Pn0A1 = n.□□1□ to use mode separation control.

		Twisting Suppression Selections (Speed Pos Trq)		When Enabled
Pn0A1 (20A1h)	n.□□X□	0 Default	Disable twisting suppression. Control each axis individually.	After restart
		1	Use mode separation control.	
		2	Use relative position deviation compensation.	

(2) Enabling or Disabling the Reference Input

Enable or disable the position reference input to the secondary axis in Pn0A2 = n.□□□X.

We recommend you disable the position reference input for safety unless there is a special application that requires it, such as inputting the rotation direction reference to correct beam twisting.

Pn0A2 (20A2h)	n.□□□X	Reference Input Selection during Mode Separation Control	Speed Pos Trq	When Enabled
		0	Enable position reference input to secondary axis.	After restart
		1 Default	Disable position reference input to secondary axis.	

(3) Setting the Timing to Enable Twisting Suppression

Set Pn0A3 = n.□□□X to the timing to enable twisting suppression.

If this parameter is set to 0, twisting suppression will be enabled when Pn0A1 = n.□□X□ (Twisting Suppression Selections) is set and bit 8 (GNT_ENBL) of 2776h (Controlword_VenderS) is turned ON from the host controller.

If this parameter is set to 1, twisting suppression will be enabled when Pn0A1 = n.□□X□ (Twisting Suppression Selections) is set.

Pn0A3 (A:20A3h, B:28A3h)	n.□□□X	Timing to Enable Twisting Suppression Selection/Timing to Enable Speed synchronization	Speed Pos Trq	When Enabled
		0 Default	Enable when the first digit of Pn0A1 is 1 or 3 and GNT_ENBL (bit 8 of Controlword_VenderS (2776h)) is turned ON.	Immediately
		1	Enable when the first digit of Pn0A1 is 1 or 3 regardless of the setting of GNT_ENBL.	

5.8.3 Alarm

The alarm related to twisting suppression is given in the following table.

Display	Name	Meaning
A.50D Common	Relative Position Deviation Overflow Alarm	The position deviation between primary axis and secondary axis during the servo ON state exceeded the setting value of Pn66A (Relative Position Deviation Overflow Alarm Level).

5.8.4 Warning

The warning related to twisting suppression is given in the following table.

A.90D (Relative Position Deviation Overflow Warning) occurs when the value obtained with Pn66A × Pn669/100 is exceeded.

Display	Name	Meaning
A.90D Common	Relative Position Deviation Overflow Warning	The position deviation between primary axis and secondary axis has exceeded the percentage set with the following equation during the servo ON state. (Pn66A × Pn669/100)

5.8.5 Monitoring

You can check the feedback position of the primary and secondary axes in 277Dh (Position actual value (ordinary)).

Index	Subindex	Name	Data Type	Access	PDO Mapping	Value	Saving to EEPROM
277dh Common	0	Position actual value (ordinary)	DINT	RO	Yes	– [Pos. unit]	No

5.8.6 Operating Procedure for Host Controller

Use the following procedure with the host controller.

Information The following procedure is for after the SERVOPACKs are set up and restarted.

Step	Item	Reference
1	**Return to origin.**	Σ-X-Series Σ-XS SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 02) Σ-X-Series Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)
2	**Enable twisting suppression.** Confirm that no twisting is occurring and then set Controlword_ VenderS (2776h) bit 8 (GNT_ENBL) to 1 (ON).	-
3	**Input the reference.** Send any motion command (e.g., POSING or INTERPOLATE) to the primary axis.	–
4	**Monitor the feedback position.** Position Actual Value (6064h) for the primary axis will be the translation mode position and Position Actual Value (6064h) for the secondary axis will be the rotation mode position. To monitor the feedback position of each axis, monitor Position Actual Value (Ordinary) (277Dh).	-
5	**If an overtravel alarm is detected:** • Twisting suppression will be automatically disabled. If overtravel is detected during mode separation control, mode separation control will be automatically disabled. Position Actual Value (6064h) (feedback position) for the secondary axis will change by a large degree at this time because rotation mode is turned OFF. If the host controller outputs the position reference using this Position Actual Value (6064h) that has changed by a large degree, the function that disables the operation reference will activate inside the SERVOPACK because that position reference will deviate greatly from the previous position reference. For this reason, make the host controller update the reference position so that the reference position is within the Positioning Completed Width (Pn522) of Position Actual Value (6064h) before issuing the position reference. • Pull back the axes. For the pull-back operation, send a travel command to both axes at the same time to travel in the opposite direction of overtravel. When the overtravel status is cleared for both axes, twisting suppression will be enabled again.	–

5.8.7 Tuning Functions

There are two types of tuning functions: autotuning and manual tuning. The tuning methods are shown below.

(1) When Using Autotuning Function (Primary Axis Only)

Use SigmaWin+ to execute autotuning function on the primary axis only. For the secondary axis, use a custom tuning function to adjust the feedback gain level so that the position deviation between the axes is small.

Step	Item	Meaning
1	Preparation	**Follow the setup procedure to enable mode separation control.** Refer to the following section for the setup procedure. ☞ *5.8.1 Setup Procedure on page 97*
2	Connecting to SigmaWin+	**Connect the primary and secondary axes to SigmaWin+.**
3	Setting moment of inertia ratio	**In Pn103, set the desired moment of inertia ratio.** Set the primary axis and the secondary axis to the same value.
4	Setting autotuning function	**Set the autotuning function on the primary axis.** If [Reference input] is selected, proceed to Step 5-1. If [No reference input] is selected, proceed to Step 5-2. Refer to the following manual for the setting method. Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)
5-1	Executing autotuning function with host reference	**Set both axes to the servo ON state and perform autotuning function of the primary axis.** Specify servo ON to both axes from the host controller. Confirm that the servo of both axes have been turned ON and operate only the primary axis in position control mode. Start autotuning function and wait until it is completed.
5-2	Executing autotuning function without host reference	**Set both axes to the servo ON state and perform autotuning function of the primary axis.** For the primary axis, execute servo ON from the autotuning function screen, and for the secondary axis, execute servo ON from the program jogging function. Confirm that the servo of both axes have been turned ON and execute autotuning function. After execution, turn OFF the servo of the primary and secondary axes.
6	Adjusting secondary axis	**Operate with the desired command and adjust the secondary axis so that the position deviation between axes is small.** Start SigmaWin+ custom tuning. Select the desired tuning mode to adjust the feedback gain level so that the position deviation between the axes is small. Changing the feedforward level does not change the operation. Refer to the following manual for the setting method. Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)

(2) When Using Manual Tuning

Use SigmaWin+ system tuning for manual tuning. For the primary axis, adjust the feedforward level and feedback level according to the purpose, such as shortening the settling time. For the secondary axis, adjust the feedback level so that the position deviation between the axes is small.

Step	Item	Meaning
1	Preparation	**Follow the setup procedure to enable mode separation control.** Refer to the following section for the setup procedure. ☞ *5.8.1 Setup Procedure on page 97*
2	Connecting to SigmaWin+	**Connect the primary and secondary axes to SigmaWin+.**
3	Setting moment of inertia ratio	**In Pn103, set the desired moment of inertia ratio.** Set the primary axis and the secondary axis to the same value.

Continued on next page.

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Step	Item	Meaning
4	Starting system tuning	**Start system tuning.** Set the primary axis and the secondary axis as the adjustment axes. Set the tuning mode according to the purpose. It is not necessary to set the same tuning mode. Refer to the following manual for the setting method. Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)
5	Executing system tuning	**Operate with the desired commands and make adjustments.** For the primary axis, check the setting time, etc., and adjust the feedforward level and feedback level. For the secondary axis, adjust the feedback level so that the position deviation between the axes is small. Adjusting the feedforward level on the secondary axis does not change the operation. Refer to the following manual for the setting method. Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)

5.8.8 Precautions When Turning OFF Mode Separation Control

(1) Updating the Reference Position in the Host Controller

When overtravel is detected and the reference position cannot be updated to be within the positioning completed width of Position Actual Value (6064h) (feedback position), send a motion command that is not a position control command (e.g., profile velocity mode), and then send a profile position mode command so that the reference position is within the positioning completed width of the feedback position.

(2) Switching Control Gains

Regardless of whether mode separation control is enabled, the control gains use Pn100 (Speed Loop Gain), Pn101 (Speed Loop Integral Time Constant), and Pn102 (Position Loop Gain).

This means there is a risk of an excessive control gains setting when mode separation control is enabled or disabled.

To set the optimal control gains for when mode separation control is enabled or disabled, change Pn100 (Speed Loop Gain), Pn101 (Speed Loop Integral Time Constant), and Pn102 (Position Loop Gain) to the optimal values from the host controller before you enable or disable mode separation control.

5.8.9 Setting the Origin for Mode Separation Control

When Pn0A2 = n.□□□0 (enable position reference input to secondary axis), the value of Position Actual Value (6064h) (feedback position) for the secondary axis will change when mode separation control is enabled. The position will be the translation mode position for the primary axis and the rotation mode position for the secondary axis. Use the following procedure to set the origin during mode separation control.

1. **Disable mode separation control and perform positioning to the origin.**
2. **Turn on bit 9 (GNT_PSET) in Controlword_VenderS (2776h) for both axes.**
3. **Enable mode separation control for both axes while bit 8 (GNT_ENBL) in Controlword_VenderS (2776h) is turned ON.**

5.9 Using Twisting Suppression - Relative Position Deviation Compensation

This section describes the procedure to use relative position deviation compensation for twisting suppression.

5.9.1 Setup Procedure

Use the following setup procedure to use relative position deviation compensation for twisting suppression.

Step	Item	Reference
1	**Set the method to detect relative position deviation.** • Pn0A3 = n.□□0□ (calculate with relative position from reference position) (default setting) • Pn0A3 = n.□□1□ (calculate with Position Actual Value (6064h).)	*(1) Setting the Method to Detect Relative Position Deviation on page 87*
2	**Set the threshold for detecting relative position deviation overflow.** • Pn669 (Relative Position Deviation Overflow Warning Level) • Pn66A (Relative Position Deviation Overflow Alarm Level)	*(2) Setting the Threshold for Detecting Relative Position Deviation Overflow on page 87*
3	**Set synchronized stopping.** • Pn665 = n.□□□0 (disable synchronized stopping) • Pn665 = n.□□□1 (reserved (do not use)) • Pn665 = n.□□□2 (enable synchronized stopping mode 2) • Pn665 = n.□□□3 (enable synchronized stopping mode 3) (default setting)	*(1) Setting Synchronized Stopping on page 90*
4	**Select relative position deviation compensation for twisting suppression.** Pn0A1 = n.□□2□ (use relative position deviation compensation)	–
5	**Set the parameter adjustment method for relative position deviation compensation.** • Pn0A2 = n.□0□□ (adjust with Pn16E and Pn16F) • Pn0A2 = n.□1□□ (adjust with Pn66B, Pn66C, Pn66D, and Pn66E)	*(2) Setting the Parameter Adjustment Method on page 103*
6	**Set the timing to enable twisting suppression.** • Pn0A3 = n.□□□0 (enable when the first digit of Pn0A1 is not 0 and GNT_ENBL (Controlword_VenderS (2776h) bit 8) is turned ON.) (default setting) • Pn0A3 = n.□□□1 (enable when the first digit of Pn0A1 is not 0)	*(3) Setting the Timing to Enable Twisting Suppression on page 103*

Note:

For the parameter values in this procedure, set the primary and secondary axes to the same values except for the threshold for detecting relative position deviation overflow.

5.9.2 Parameters

The parameters for using relative position deviation compensation for twisting suppression are given in the following table.

(1) Selecting Relative Position Deviation Compensation

Set Pn0A1 = n.□□2□ to use relative position deviation compensation.

Pn0A1 (20A1h)	n.□□X□	Twisting Suppression Selections	Speed Pos Trq	When Enabled
		0 Default	Disable twisting suppression. Control each axis individually.	After restart
		1	Use mode separation control.	
		2	Use relative position deviation compensation.	

(2) Setting the Parameter Adjustment Method

Set the parameter adjustment method with Pn0A2 = n.□X□□. Set the primary axis and the secondary axis to the same set value.

If this parameter is set to 0, adjustments are made in Pn16E (Relative Position Deviation Compensation Gain) and Pn16F (Relative Pos Dev Compensation Moment of Inertia Ratio).

If this parameter is set to 1, adjustments are made in Pn66B (Relative Pos Deviation Compensation Speed Loop Gain), Pn66C (Relative Pos Dev Compensation Spd Loop Integral Time Const), Pn66D (Relative Pos Deviation Compensation Position Loop Gain), and Pn66E (Relative Pos Deviation Compensation Filter Time Constant).

Pn0A2 (20A2h)	n.□X□□	Params Selection to Compensate Relative Pos Deviation	Speed Pos Trq	When Enabled
		0 Default	Adjust with Pn16E and Pn16F.	After restart
		1	Adjust with Pn66B, Pn66C, Pn66D, and Pn66E.	

(3) Setting the Timing to Enable Twisting Suppression

Set Pn0A3 = n.□□□X to the timing to enable twisting suppression.

If this parameter is set to 0, twisting suppression will be enabled when Pn0A1 = n.□□X□ (Twisting Suppression Selections) is set and bit 8 (GNT_ENBL) of 2776h (Controlword_VenderS) is turned ON from the host controller.

If this parameter is set to 1, twisting suppression will be enabled when Pn0A1 = n.□□X□ (Twisting Suppression Selections) is set.

Pn0A3 (A:20A3h, B:28A3h)	n.□□□X	Timing to Enable Twisting Suppression Selection/Timing to Enable Speed synchronization	Speed Pos Trq	When Enabled
		0 Default	Enable when the first digit of Pn0A1 is 1 or 3 and GNT_ENBL (bit 8 of Controlword_VenderS (2776h)) is turned ON.	Immediately
		1	Enable when the first digit of Pn0A1 is 1 or 3 regardless of the setting of GNT_ENBL.	

5.9.3 Alarm

The alarm related to twisting suppression is given in the following table.

Display	Name	Meaning
A.50D Common	Relative Position Deviation Overflow Alarm	The position deviation between primary axis and secondary axis during the servo ON state exceeded the setting value of Pn66A (Relative Position Deviation Overflow Alarm Level).

5.9.4 Warning

The warning related to twisting suppression is given in the following table.

A.90D (Relative Position Deviation Overflow Warning) occurs when the value obtained with Pn66A × Pn669/100 is exceeded.

Display	Name	Meaning
A.90D Common	Relative Position Deviation Overflow Warning	The position deviation between primary axis and secondary axis has exceeded the percentage set with the following equation during the servo ON state. (Pn66A × Pn669/100)

5.9.5 Monitoring

You can check the feedback position of the primary and secondary axes in Position Actual Value (6064h) ([reference unit]).

5.9.6 Operating Procedure for Host Controller

Use the following procedure with the host controller.

Information The following procedure is for after the SERVOPACKs are set up and restarted.

Step	Item	Reference
1	**Return to origin.**	Σ-X-Series Σ-XS SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 02) Σ-X-Series Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)
2	**Enable twisting suppression.** • Confirm that no twisting is occurring and then set Controlword_VenderS (2776h) bit 8 (GNT_ENBL) to 1 (ON).	-
3	**Input the reference.** Set the same motion command with the same settings to the primary and secondary axes.	–
4	**Monitor the feedback position.** Monitor Position Actual Value (6064h) for the primary and secondary axes.	-
5	**If an overtravel alarm is detected:** • Twisting suppression will be automatically disabled. • Pull back the axes. For the pull-back operation, send a travel command to both axes at the same time to travel in the opposite direction of overtravel. When the overtravel status is cleared for both axes, twisting suppression will be enabled again.	–

5.9.7 Tuning Functions

There are two types of tuning functions: multi-axis simultaneous tuning and manual tuning. The tuning methods are shown below.

(1) When Using Multi-Axis Simultaneous Tuning

Adjust using SigmaWin+ multi-axis simultaneous tuning. However, the relative position deviation compensation is not adjusted with this function. For details on relative position deviation compensation, refer to the following section.

☞ *(2) When Using Manual Tuning on page 105*

Step	Item	Meaning
1	Preparation	**Follow the setup procedure to enable gantry control.** Refer to the following section for the setup procedure. ☞ *5.9.1 Setup Procedure on page 102* To perform relative position deviation compensation, set Pn0A1 to n.□□2□.
2	Connecting to SigmaWin+	**Connect the primary and secondary axes to SigmaWin+.**

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Step	Item	Meaning
3	Setting moment of inertia ratio	**In Pn103, set the desired moment of inertia ratio.** Set the primary axis and the secondary axis to the same value.
4	Setting multi-axis simultaneous tuning	**Start multi-axis simultaneous tuning.** Set the primary axis and the secondary axis as the adjustment axes. In the mode selection, select [Gantry mechanism]. Refer to the following manual for details on the setting method. Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)
5	Executing multi-axis simultaneous tuning	**Set both axes to the servo ON state and perform autotuning function.** Specify servo ON to both axes from the host controller. Confirm that the servo of both axes have been turned ON. Start autotuning function and wait until it is completed. Refer to the following manual for details on the setting method. Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)

(2) When Using Manual Tuning

Use SigmaWin+ system tuning for manual tuning. Set the primary and secondary axes to the same feedforward level and feedback level in the same tuning mode.

Step	Item	Meaning
1	Preparation	**Follow the setup procedure to enable gantry control.** Refer to the following section for the setup procedure. ☞ *5.9.1 Setup Procedure on page 102* To perform relative position deviation compensation, set Pn0A1 to n.□□2□.
2	Connecting to SigmaWin+	**Connect the primary and secondary axes to SigmaWin+.**
3	Setting moment of inertia ratio	**In Pn103, set the desired moment of inertia ratio.** Set the primary axis and the secondary axis to the same value.
4	Starting system tuning	**Start system tuning.** Select the primary axis and the secondary axis as the adjustment axes. Set the tuning mode according to the purpose. Set the same tuning mode on both axes. Refer to the following manual for the setting method. Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)
5	Executing system tuning	**Operate with the desired commands and make adjustments.** Check the setting time, etc., and adjust the feedforward level and feedback level. Adjust the primary axis and the secondary axis to the same level. Refer to the following manual for the setting method. Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34) If relative position deviation compensation is enabled, proceed to Step 6. If it is disabled, this concludes the procedure.
6	Adjusting relative position deviation compensation	**Adjust the relative position deviation compensation so that the position deviation between axes is small.** If Pn0A2 = n.□0□□, adjust the setting with Pn16E. Gradually set Pn16E higher and stop when vibration occurs. If Pn0A2 = n.□1□□, adjust the settings with Pn66B, Pn66C, Pn66D, and Pn66E. Adjust individually while checking the position deviation between axes. Stop when vibration occurs. **Basically, set the primary axis and secondary axis to the same value.**

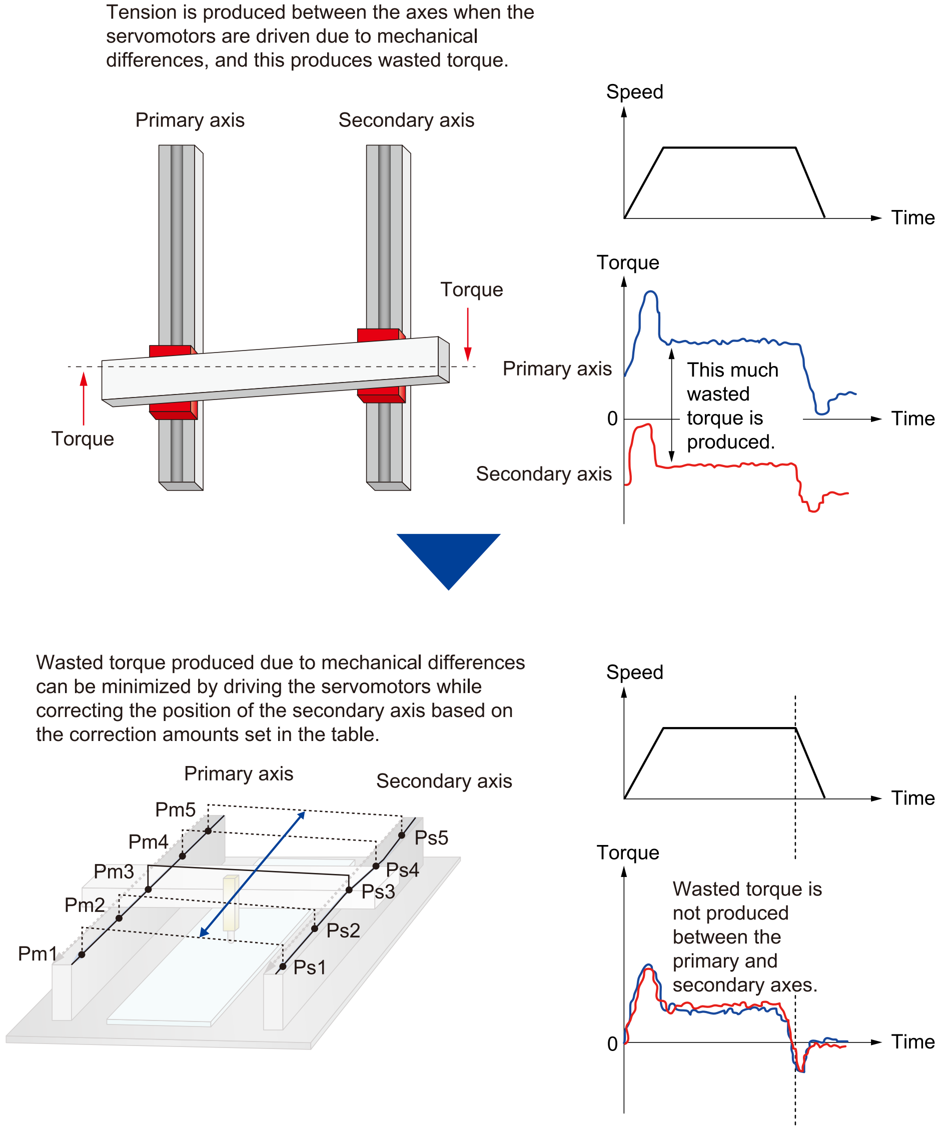
5.10 Position Correction Table

This section describes position correction table.

5.10.1 Outline

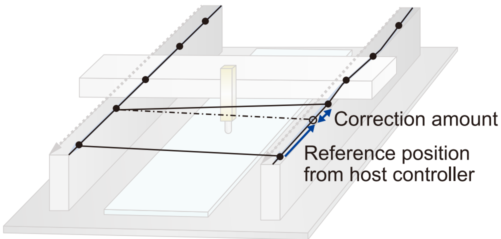
The position correction table is used to drive the servomotors while correcting the position based on the correction amounts set in the table in order to minimize wasted torque produced by mechanical differences in the machine.

Using this function can reduce cycle time because it can drive the servomotors without producing wasted torque between two axes.



Information If the axis to correct is the secondary axis, the SERVOPACK moves the secondary axis by adding the correction amount to the reference position from the host controller.

For this reason, the coordinates position of the secondary axis is offset from the reference position from the host controller by only the correction amount that was added.



This function is enabled after either of the following operations is performed during position control.

- If you are using an absolute encoder, turn ON the Servo Ready Output (/S-RDY) signal (place the SERVOPACK in the ready to accept the Enable Operation command state).
- If you are using an incremental encoder, send the origin return (Homing) command from the host controller.

Information
- Bit 10 in Statusword (6041h) Target reached (positioning completed) will be output based on the position after correction.
- The software limit function uses the uncorrected position.
- This product assumes a system that issues commands for the same target position to the primary axis and secondary axis. To use this product for any other application, contact your Yaskawa representative.

Important
If there is a deviation in the position of the origin, a deviation will occur in the values set in the position correction table, and the function may not work effectively. Configure the system so that the position of the origin does not deviate.

5.10.2 Setting Parameters Related to Position Correction Table

This section describes the parameters required for using the position correction table.

(1) Enabling and Disabling the Position Correction Table

Enable and disable the position correction table with Pn2E3 = n.□□□X (Position Correction Table Selection).

		Position Correction Table Selection (Speed / Pos / Trq)		When Enabled
Pn2E3 (22E3h)	n.□□□X	0 Default	Do not use Position Correction Table.	After restart
		1	Use Position Correction Table.	

(2) Selecting the Position Correction Axis

Select the position correction axis with Pn2E3 = n.X□□□ (Position Correction Axis Selection for Position Correction Table).

		Position Correction Axis Selection for Position Correction Table (Speed / Pos / Trq)		When Enabled
Pn2E3 (22E3h)	n.X□□□	0 Default	Correct the position of axis A.	After restart
		1	Correct the position of axis B.	

Note:

The position correction axis selection is available on the Σ-XW SERVOPACK only.

5.10.3 Alarms Related to Position Correction Table

The alarm related to position correction table is given in the following table.

Display	Name	Meaning
E94h Common	Position Correction Table Setting Error	There is an error in the position correction table settings.

5.10.4 Position Correction Table Settings

Configure the position correction table settings in the following steps.

Information
- You can create the position correction table and write it to the SERVOPACK with the SigmaWin+ or with SERVOPACK Adjusting Command (2710h). Refer to the following sections for details.
  ☞ *(3) Setting with the SigmaWin+ on page 109*
  ☞ *(4) Setting with the SERVOPACK Adjusting Command (2710h) on page 116*
- You cannot write the position correction table (table entries, pre-correction positions, and correction amounts) when the servo is ON. Write the position correction table when the servo is OFF.

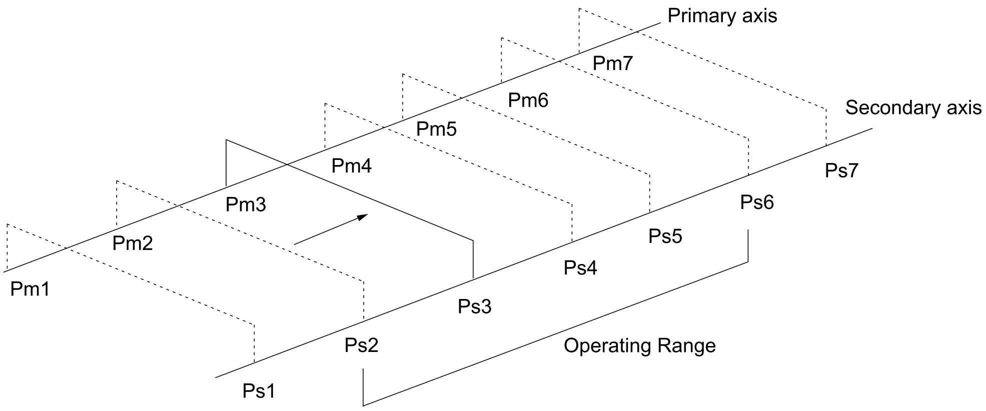
1. **Measure the positions required for the position correction table.**
2. **Create the position correction table.**
3. **Write the position correction table to the SERVOPACK.**
4. **Select Pn2E3 = n.□□□1 (Position Correction Table Selection) to enable the position correction table.**

   For a Σ-XS SERVOPACK, enable the position correction table on one axis only.
5. **Turn the power to the SERVOPACK OFF and ON again.**

(1) Measuring the Positions Required for the Position Correction Table

The following procedure is for when a secondary axis position correction table is set.

Measure positions in order to learn the size of the correction amount necessary for the secondary axis in regard to measured positions along the primary axis.



The measurement method of positions is shown below.

1. **Turn ON the servo.**
2. **When using an incremental encoder, move the gantry to the machine origin. When using an absolute encoder, proceed to the next step.**
3. **Use a movement command and move the gantry to the measurement position.**
4. **Turn OFF the servo.**
5. **Monitor the value of the feedback position (Position Actual Value (6064h)) of each axis.**
6. **Write down the monitored values.**

7. **Repeat steps 1 to 6 for the number of measurements that will be registered to the position correction table.**

(2) Position Correction Table Details

This section gives details on the position correction table when a secondary axis position correction table is set.

Important

- Set the position correction table as shown below.
  If the position correction table is not set as shown below, A.E94 (Position Correction Table Setting Error) will occur.
  – Ensure that the values for consecutive pre-correction positions in the position correction table satisfy the following condition: value of pre-correction position < value of next pre-correction position.
  – Ensure that the values for consecutive correction positions calculated by the position correction table satisfy the following condition: value of correction position < value of next correction position. The correction position is the reference position of the secondary axis after correction (pre-correction position + correction amount in position correction table).
  – Set the correction positions and correction amounts between -2147483648 and 2147483647.
- For a mode other than position control mode (speed control mode or torque control mode), the correction is disabled. When the mode is changed to position control from one of the other modes, the axis may move for an instant because the correction amount will be added to the reference position. Change the control mode while the motors are stopped.

Example: Table entries is 7.

	No. (1)	Pre-correction Positions [Reference unit] (2)	Correction Value [Reference unit] (3)	
(4)	1	-500,000	100	
	2	-400,000	100	Operating Range
	3	-300,000	150	
	4	-200,000	250	
	5	-100,000	100	
	6	0	-50	
(4)	7	100,000	-50	

(1) No.
Up to 128 table entries can be set.

(2) Pre-correction Positions
Enter the value of the feedback position (Position Actual Value (6064h)) of the primary axis.

Note:

For consecutive table numbers, the difference between the pre-correction positions and the difference between the correction amounts cannot exceed 1073741823 [reference unit].

(3) Correction Value
Enter the numeric value which is the result of subtracting the feedback position value of the primary axis from the feedback position value of the secondary axis.

(4) Start and End Table Numbers
Enter a pre-correction position and correction amount for a position that exceeds the operating range.
If the operating range set in the position correction table is exceeded, the correction cannot be applied to the position and unstable operation may occur at the coordinate positions set at both ends of the table.

Information

- If the gantry cannot be moved to a position that exceeds the operating range due to the mechanism, enter a value that exceeds the end of the operating range for the pre-correction position. In the above example, set the same correction amount as table numbers 2 and 6.
- Positions are corrected by performing linear interpolation on the correction amounts of the positions between consecutive table numbers.

NOTICE

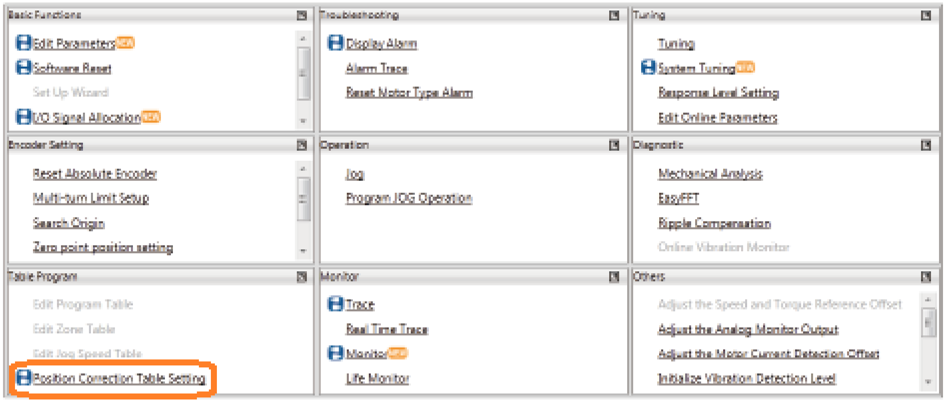
Set appropriate values for the correction amounts in the position correction table.

The machine may be damaged if the correction amounts are too large.

(3) Setting with the SigmaWin+

Use the following procedure to configure the position correction table.

1. **Click the [] button for the servo drive in the workspace of the Main Window of the SigmaWin+.**
2. **Select [Position Correction Table Setting] in the [Menu] dialog box.**

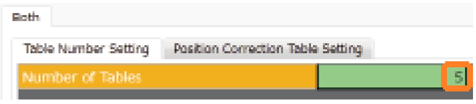


The [Position Correction Table Setting] dialog box will be displayed.

Refer to the following section to initialize the position correction table.

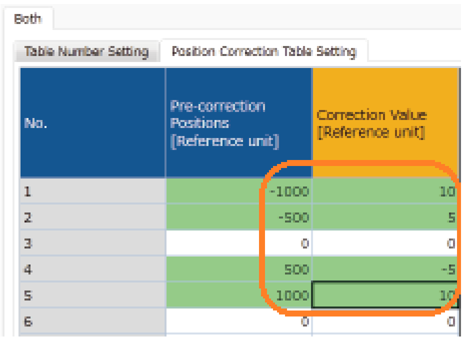
☞ *(a) Initializing the Position Correction Table on page 112*

3. **On the [Table Number Setting] tab, enter the number of table entries.**



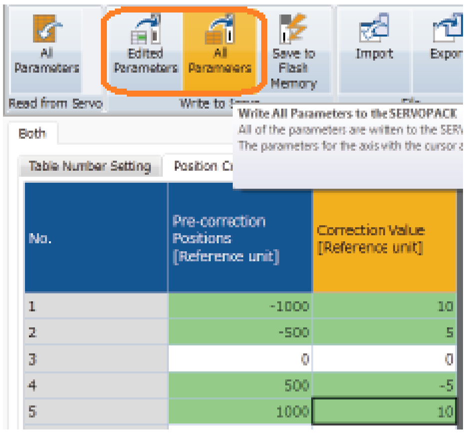
4. **On the [Position Correction Table Setting] tab, enter the pre-correction positions and correction amounts.**

Information You can also copy data in Excel and paste it on the position correction table.

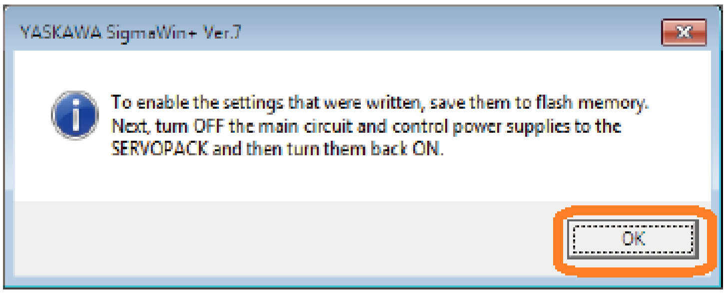


5. **To write only the parts of the position correction table that were edited to the SERVOPACK, click [Edited Parameters] in the [Write to Servo] group. To write the entire position correction table to the SERVOPACK, click [All Parameters] in the [Write to Servo] group.**

Information Parameter will be used in the dialog box, but parameters are not written to the SERVOPACK. The position correction table is written to the SERVOPACK.

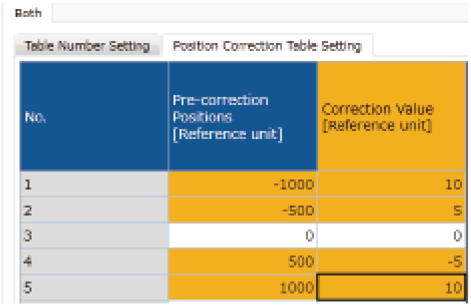


6. **Click the [OK] button.**

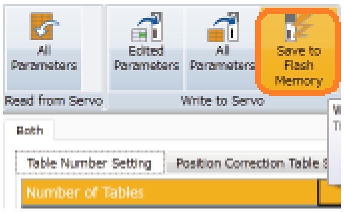


The created position correction table was written to the volatile memory in the SERVOPACK.

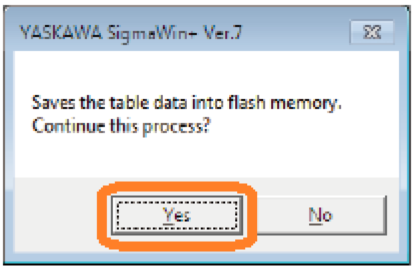
The background of the edited parameter cell will change to orange.



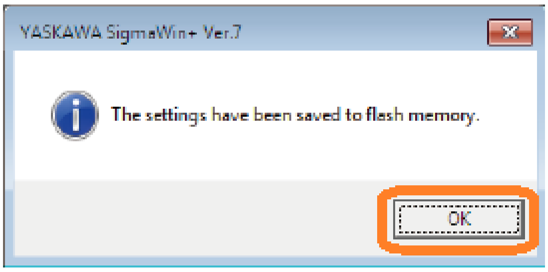
7. **Click [Save to Flash Memory] in the [Write to Servo] group.**



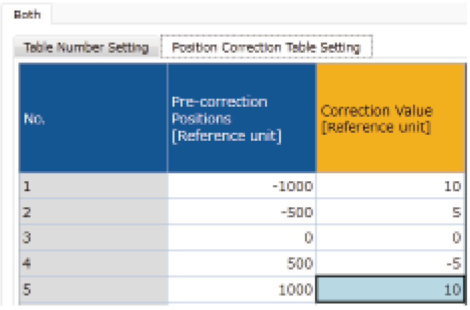
8. **Click the [Yes] button.**



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



Saving to flash memory is completed. The background of the edited parameter cell will change to white.



No.	Pre-correction Positions [Reference unit]	Correction Value [Reference unit]
1	-1000	10
2	-500	5
3	0	0
4	500	-5
5	1000	10

10. **Turn the power to the SERVOPACK OFF and ON again.**

This concludes the procedure to configure the position correction table.

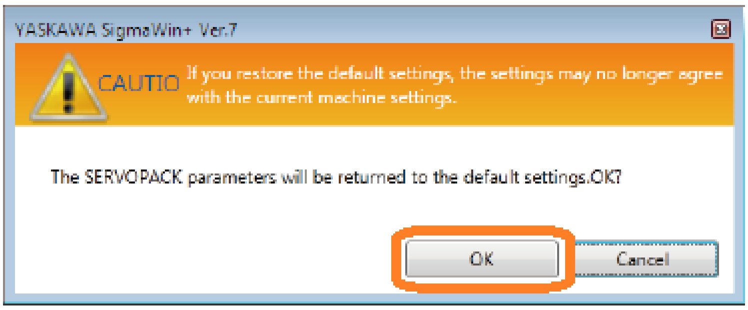
(a) Initializing the Position Correction Table

Use the following procedure to initialize the position correction table.

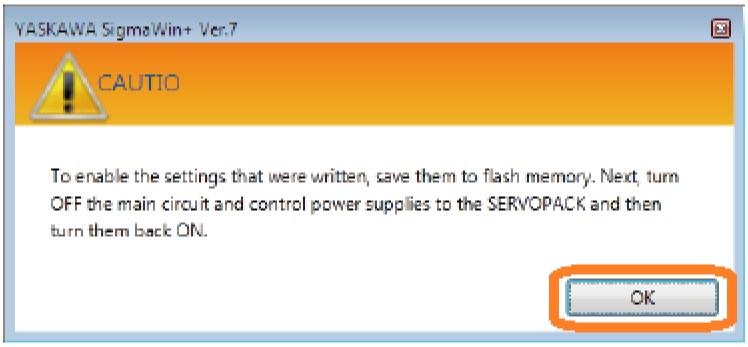
1. **Click [Initialize] in the [Function] group.**

Information When the cursor is positioned on [Initialize] in the window, the “The SERVOPACK parameters are returned to the default settings” message will be displayed, but the parameters will not be initialized. The position correction table will be initialized.

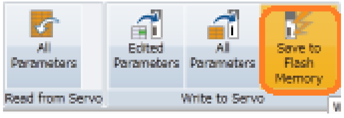
2. **Click the [OK] button.**



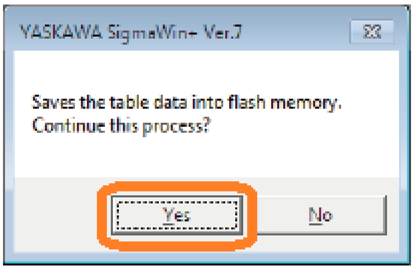
3. **Click the [OK] button.**



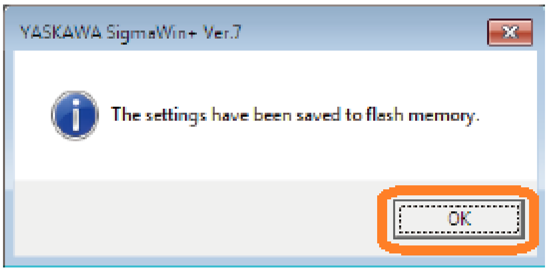
4. **Click [Save to Flash Memory] in the [Write to Servo] group.**



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



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



7. **Turn the power to the SERVOPACK OFF and ON again.**

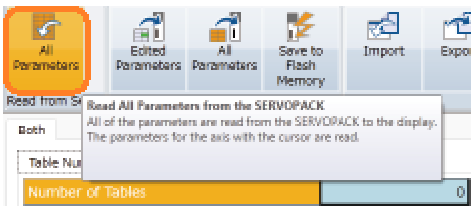
This concludes the procedure to initialize the position correction table.

(b) Reading the Position Correction Table from the SERVOPACK

Use the following procedure to read the position correction table from the SERVOPACK.

1. **Click [All Parameters] in the [Read from Servo] group.**

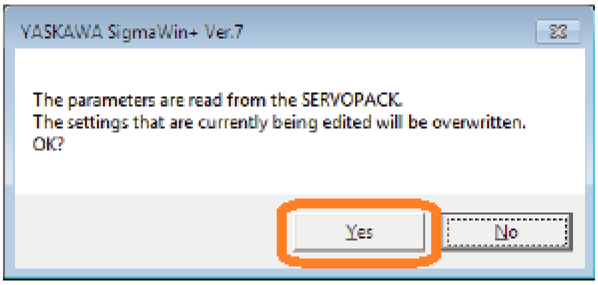
Information Parameter will be used in the dialog box, but parameters are not read from the SERVOPACK. The position correction table is read from the SERVOPACK.



Gantry Application Function

5

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



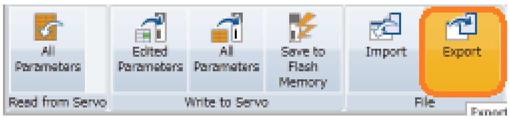
This concludes the procedure to read the position correction table from the SERVOPACK.

(c) Writing the Position Correction Table File

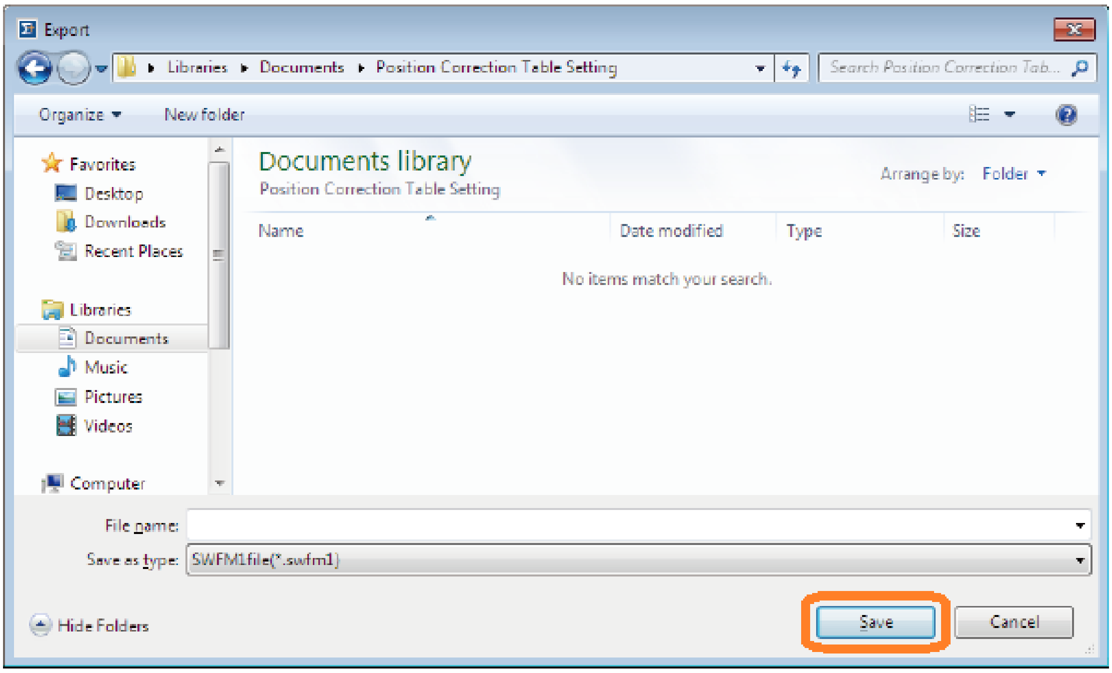
Use the following procedure to write the position correction table to a file.

1. **Click [Export] in the [File] group.**

Information When the cursor is positioned on [Export] in the window, the "The displayed parameters are written to a file" message will be displayed, but the parameters will not be written to the file. The position correction table will be written to the file.



2. **Enter the file name and click the [Save] button.**



This concludes the procedure to write the position correction table to a file.

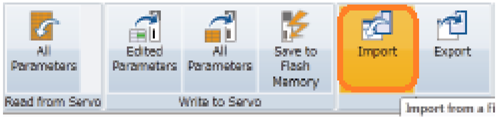
Information You can also copy position correction table data and paste it to a spreadsheet in Excel.

(d) Reading a Position Correction Table File

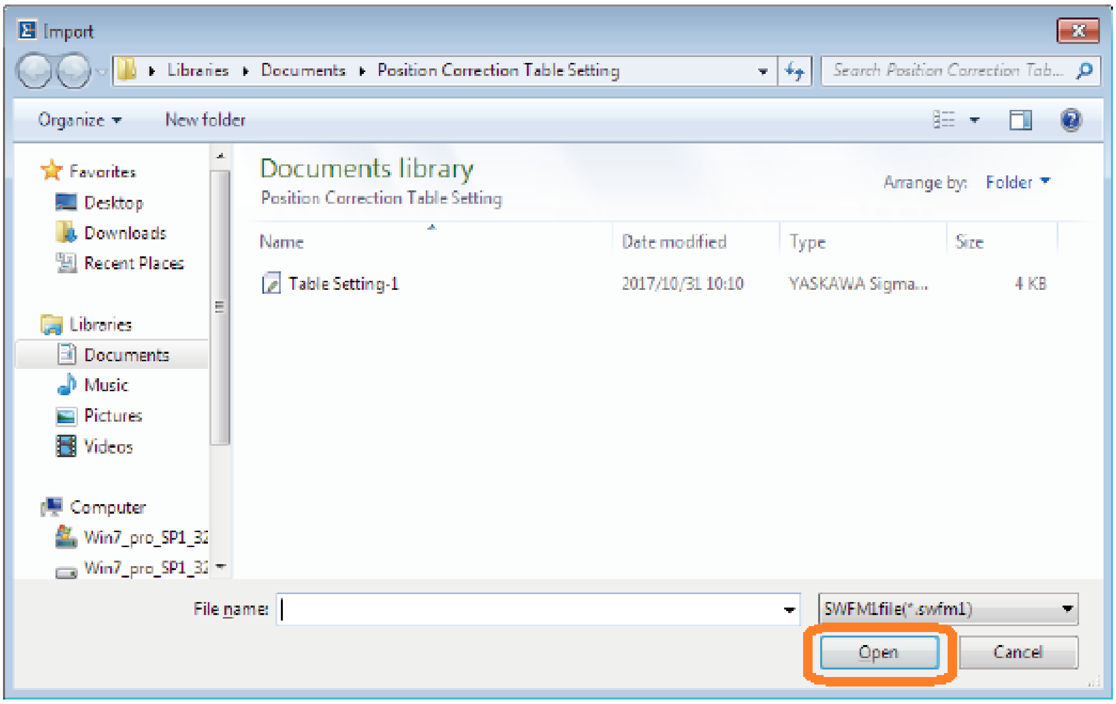
Use the following procedure to read a position correction table.

1. **Click [Import] in the [File] group.**

Information When the cursor is positioned on [Import] in the window, the "The parameter file is read to the display" message will be displayed, but the parameter will not be read. The position correction table is read from the file.



2. **Select the file to read and click the [Open] button.**



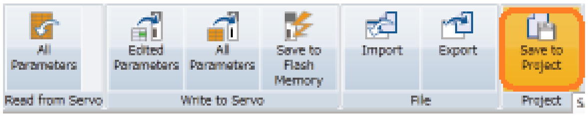
This concludes the procedure to read the position correction table from a file.

(e) Saving the Position Correction Table to a Project File

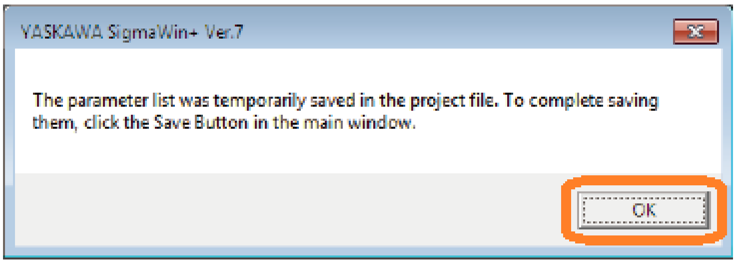
Use the following procedure to save the position correction table to a project file.

1. **Click [Save to Project] in the [Project] group.**

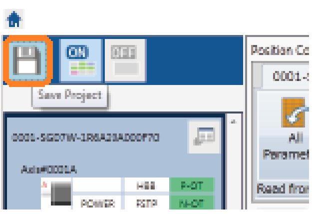
Information When the cursor is positioned on [Save to Project] in the window, the “The parameter settings on the display are saved to a project file” message will be displayed, but the parameter setting values will not be saved to the project file. The position correction table will be saved to the project file.



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



3. **Click the [Save] button in the Main Window.**



This concludes the procedure to save the position correction table to the project file.

(4) Setting with the SERVOPACK Adjusting Command (2710h)

Use the Adjusting Command (2710h) to set the position correction table from the host controller.

(a) Position Correction Table Settings

◆ Writing the Position Correction Table to Volatile Memory

Set the position correction table based on the following table.

Register	Description	Size [No. of Registers]	Setting Range	Unit
0xF0040000	Table entries	2	0 to 128	No. of entries
0xF0040004	Pre-correction position [1]	2	-2147483648 to 2147483647	Reference unit
0xF0040008	Correction amount [1]	2		
0xF004000C	Pre-correction position [2]	2		
0xF0040010	Correction amount [2]	2		
0xF0040014	Pre-correction position [3]	2		
0xF0040018	Correction amount [3]	2		
0xF004001C	Pre-correction position [4]	2		
0xF0040020	Correction amount [4]	2		
. . . .	. . . .	. . . .		
0xF00403E4	Pre-correction position [125]	2		
0xF00403E8	Correction amount [125]	2		
0xF00403EC	Pre-correction position [126]	2		
0xF00403F0	Correction amount [126]	2		
0xF00403F4	Pre-correction position [127]	2		
0xF00403F8	Correction amount [127]	2		
0xF00403FC	Pre-correction position [128]	2		
0xF0040400	Correction amount [128]	2		

◆ Example of Setting Pre-Correction Position [1] in the Position Correction Table to -500000

The follow examples writes a pre-correction position in the position correction table to volatile memory.

CCMD = 0x03h

CSIZE = 0x04h

CADDRESS = 0xF0040004

CDATA = -500000

◆ Saving the Position Correction Table to Nonvolatile Memory

◆ How to Save Position Correction Table Data

Save the current values in volatile memory to nonvolatile memory. Send the commands in the following order.

Step	Description	Setting Example
1	Set the request code for writing to nonvolatile memory.	CCMD = 0x01 CSIZE = 0x02 CADDRESS = 0x00002000 CDATA = 0x2025
2	Execute preparation processing 1 for writing to nonvolatile memory.	CCMD = 0x01 CSIZE = 0x02 CADDRESS = 0x000020F0 CDATA = 0x0000
3	Execute preparation processing 2 for writing to nonvolatile memory.	CCMD = 0x01 CSIZE = 0x04 CADDRESS = 0x000020F2 CDATA = 0xF0040000
4	Execute preparation processing 3 for writing to nonvolatile memory.	CCMD = 0x01 CSIZE = 0x02 CADDRESS = 0x00002001 CDATA = 0x0002
5	Execute writing to nonvolatile memory.	CCMD = 0x01 CSIZE = 0x02 CADDRESS = 0x00002001 CDATA = 0x0001
6	Terminate writing to nonvolatile memory.	CCMD = 0x01 CSIZE = 0x02 CADDRESS = 0x00002000 CDATA = 0x0000

This concludes the procedure to save the position correction table to nonvolatile memory.

(b) Reading the Position Correction Table

◆ Reading Volatile Memory

The follow example reads the position correction table registers.

To read register 0xF0040000 (table entries):

CCMD = 0x02

CSIZE = 0x04

CADDRESS = 0xF0040000

CDATA = 0

(c) Initializing the Position Correction Table

◆ Example of Initializing the Position Correction Table

Initialize the setting values in nonvolatile memory to the default setting values of the settings table. Refer to the following section for details on the settings table.

☞ *(2) Position Correction Table Details on page 109*

Send the commands in the following order.

Step	Description	Setting Example
1	Set the request code for initializing nonvolatile memory.	CCMD = 0x01 CSIZE = 0x02 CADDRESS = 0x00002000 CDATA = 0x2025
2	Execute preparation processing 1 for initializing nonvolatile memory.	CCMD = 0x01 CSIZE = 0x02 CADDRESS = 0x000020F0 CDATA = 0x0003
3	Execute preparation processing 2 for initializing nonvolatile memory.	CCMD = 0x01 CSIZE = 0x04 CADDRESS = 0x000020F2 CDATA = 0xF0040000
4	Execute preparation processing 3 for initializing nonvolatile memory.	CCMD = 0x01 CSIZE = 0x02 CADDRESS = 0x00002001 CDATA = 0x0002
5	Execute initialization of nonvolatile memory.	CCMD = 0x01 CSIZE = 0x02 CADDRESS = 0x00002001 CDATA = 0x0001
6	Terminate initialization of nonvolatile memory.	CCMD = 0x01 CSIZE = 0x02 CADDRESS = 0x00002000 CDATA = 0x0000

This concludes the procedure to initialize the position correction table data.

(d) Reference: SERVOPACK Adjusting Command (2710h)

The following table lists the command data to read and write the position correction table.

Index	Subindex	Name	Data Type	Access	PDO Mapping	Value	Saving to EEPROM
2710h Axis A	0	Number of entries	USINT	RO	No	3	No
	1	Command	STRING	RW	No	0 to 0xFF (default: 0)	No
	2	Status	USINT	RO	No	–	No
	3	Reply	STRING	RO	No	–	No

◆ Command/Response Data Format (Subindex = 1)

Command Data (Service Request Data)		Response Data (Service Response Data)	
Byte	Meaning	Byte	Meaning
0	Reserved	0	Status (same data as subindex 2)
1	Reserved	1	Reserved
2	CCMD (command code) 00: Read request 01: Write request 02 : Extended Read request 03 : Extended Write request	2	RCMD (echoback of CCMD)
3	CSIZE (CDATA data byte size)	3	RSIZE (R_DATA data byte size)
4 to 7	CADDRESS (address)	4 to 7	RADDRESS (echoback of CADDRESS)
8 to 15 *1	CDATA (writing data)	8 to 15 *2	R_DATA (read data)/ERROCODE

*1 This is the size set with CSIZE.
*2 This is the size set with RSIZE.

Refer to the following manuals for details on the commands.

Σ-X-Series Σ-XS SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 02)

Σ-X-Series Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)

(5) Monitoring

(a) Monitoring with the SigmaWin+

You can monitor the current correction amount in the position correction table on the motion monitor window.

Button in Menu Dialog Box	Name [Unit]
Motion Monitor	Current Correction Amount (Reference Correction) in Position Correction Table [reference unit] Current Correction Amount (Feedback Correction) in Position Correction Table [reference unit]

Refer to the following manual for detailed operating procedures for the SigmaWin+.

Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)

(b) EtherCAT Monitor

The EtherCAT monitor data related to position correction table is given in the following table.

Index	Subindex	Name	Description
277Fh Axis A	1	Position Demand Correction Value	Current correction amount (reference correction) in position correction table [reference unit]
	2	Actual Position Correction Value	Current correction amount (feedback correction) in position correction table [reference unit]
6041h Axis A	0	Statusword	Positioning completion After the host controller has completed outputting the reference, this monitor will turn ON (= 1) when position deviation ≤ positioning completed width.
6064h Axis A	0	Position Actual Value	Feedback position [reference unit]
6067h Axis A	0	Position Window	In-position range [reference unit]
607Ah Axis A	0	Target Position	Target position [reference unit]
60F4h Axis A	0	Following Error Actual Value	Position deviation [reference unit] (| Target position - Feedback position |)

Gantry Application Function

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5.11 If Overtravel Is Detected

- If overtravel is detected when twisting suppression is disabled, make the host controller perform the pull-back operation to the position at which the overtravel status of the axes will be cleared.
  We recommend the host controller perform the same pull-back operation for both axes so the beam of the gantry mechanism is not twisted.
- If you are using the position correction table, the position deviation may vary by the correction amount when the overtravel is cleared.

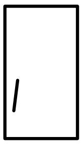
5.12 Monitor

You can monitor the communications status and operating status of gantry application function.

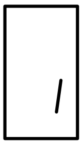
5.12.1 Monitoring the Communications Status of Gantry Application Function

The communications status of gantry application function is displayed on the indicators on the SERVOPACK's panel display.

- Primary Axis SERVOPACKs

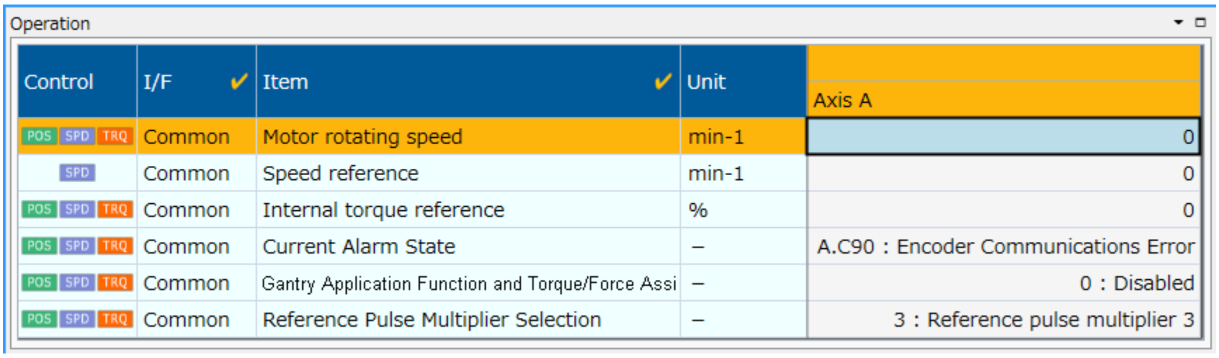


- Secondary Axis SERVOPACKs



5.12.2 Monitoring the Operating Status of Gantry Application Function

You can use the SigmaWin+ to monitor the operating status of gantry application function.


Operation

Control	I/F	Item	Unit	Axis A
POS SPD TRQ	Common	Motor rotating speed	min-1	0
SPD	Common	Speed reference	min-1	0
POS SPD TRQ	Common	Internal torque reference	%	0
POS SPD TRQ	Common	Current Alarm State	–	A.C90 : Encoder Communications Error
POS SPD TRQ	Common	Gantry Application Function and Torque/Force Assi	–	0 : Disabled
POS SPD TRQ	Common	Reference Pulse Multiplier Selection	–	3 : Reference pulse multiplier 3

Refer to the following manual for the operating procedures for the SigmaWin+.

Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)

5.13 Procedures for Starting Gantry Control

This section describes the procedures to start operation of the gantry mechanism.

5.13.1 Operating Conditions

Operation of the gantry mechanism is assumed to be performed with the following prerequisites.

- Both axes use an absolute encoder or an absolute linear encoder.
- The beam is stopped in a position perpendicular to both axes and the workpiece.
- The origin of the absolute encoder or the absolute linear encoder is set for both axes.

Information When using mode separation control (Pn0A1 = n.□□1□), turn OFF GNT_ENBL and set the origin at the position of each axis (not a translation operation or rotation operation position).

5.13.2 When Not Using Mode Separation Control

When not using mode separation control, use the following operating procedure.

1. **When using relative position deviation compensation (Pn0A1 = n.□□2□), turn OFF GNT_ENBL.**
2. **Perform positioning to the origin with the beam perpendicular to the workpiece.**
3. **When using relative position deviation compensation, turn ON GNT_ENBL.**
4. **Input the position reference to both axes so the relative position set in step 2 is maintained.**

5.13.3 When Using Mode Separation Control

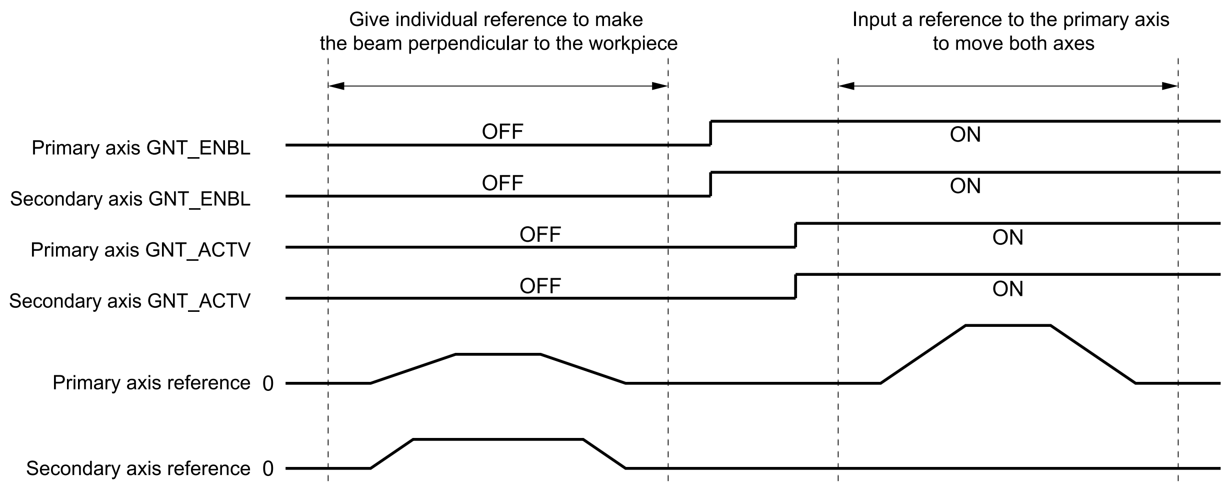
When using mode separation control, use the following operating procedure.

(1) When Pn0A2 = n.□□□1 (Disable Position Reference Input to Secondary Axis)

1. **Turn OFF GNT_ENBL (disable mode separation control).**
2. **Perform positioning to the origin with the beam perpendicular to the workpiece.**
3. **Turn ON GNT_ENBL.**
4. **Confirm that GNT_ACTV is ON for both axes.**
5. **Input the position reference to the primary axis.**

   The axes move while maintaining the relative position set in step 2.

A timing chart for when Pn0A2 = n.□□□1 is provided below.



(2) When Pn0A2 = n.□□□0 (Enable Position Reference Input to Secondary Axis)

1. **Turn OFF GNT_ENBL (disable mode separation control).**
2. **Perform positioning at the origin of the primary axis with the beam perpendicular to the workpiece.**
3. **On the secondary axis, set Pn2E4 (Mode Separation Coordinates Origin Offset) to the current value of Position Actual Value (6064h) for the secondary axis.**
4. **Switch GNT_PSET for both axes from OFF to ON.**
5. **Turn ON GNT_ENBL.**

   At this point in time, GNT_ACTV is OFF and the SERVOPACK is in the standby to switch coordinates state *1.

   *1 Refer to the following section for details on the standby to switch coordinates state.
   ☞ *5.13.5 Follow-Up Processing on page 124*

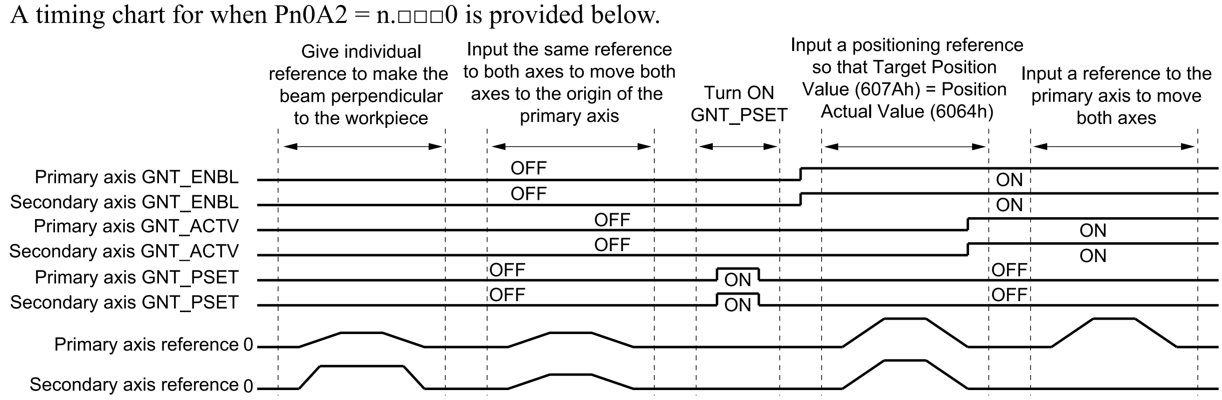
6. **Send the Positioning command to the position of Position Actual Value (6064h) from the host controller to both axes.**

   Target Position (607Ah) (target position) and Position Actual Value (6064h) match and GNT_ACTV turns ON.

7. **Input the position reference to the primary axis.**

   The axes move while maintaining the relative position set in step 2.

A timing chart for when Pn0A2 = n.□□□0 is provided below.



5.13.4 Precautions

When you use mode separation control, the Zero Point Return command (ZRET) and Set Coordinates command (POS_SET) from the host controller will result in an error when all of the following conditions are satisfied. Send these commands after GNT_ENBL is turned OFF.

(1) Conditions

- Pn0A1 = n.□□□1 (enable the gantry applications)
- Pn0A1 = n.□□1□ (use mode separation control)
- Pn0A2 = n.□□□1 (disable position reference input to secondary axis)
- GNT_ENBL is ON for both axes

(2) Command and Alarm

Command	Alarm That Occurs
Origin return (Homing)	Homing error (bit 13) in Statusword (6041h) becomes 1

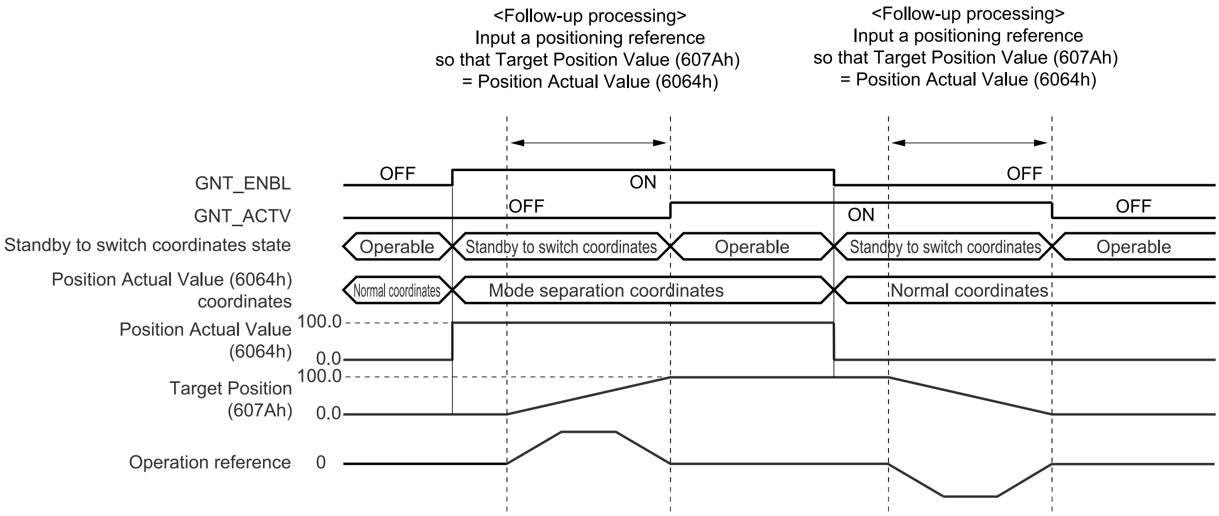
5.13.5 Follow-Up Processing

If the status of GNT_ENBL is changed while using mode separation control (Pn0A1 = n.□□1□), Position Actual Value (6064h) (feedback position) for the secondary axis changes by a large amount. If the operation reference is input at this time, the motor will move by a large amount. To prevent this, the SERVOPACK enters the standby to switch coordinates state if the values of Target Position (607Ah) (target position) and Position Actual Value (6064h) are different when the status of GNT_ENBL is changed. When the operation reference is received in this state, position follow-up is performed but the axis does not move.

To cancel this state, send the Positioning command from the host controller so that Target Position (607Ah) becomes the same value as Position Actual Value (6064h).

In the standby to switch coordinates state, GNT_ENBL and GNT_ACTV do not have the same status. Confirm that GNT_ENBL and GNT_ACTV have the same status when the axis moves due to the operation reference.

A timing chart for follow-up processing is provided below.



6

Torque/Force Assistance

This chapter provides information on torque/force assistance.

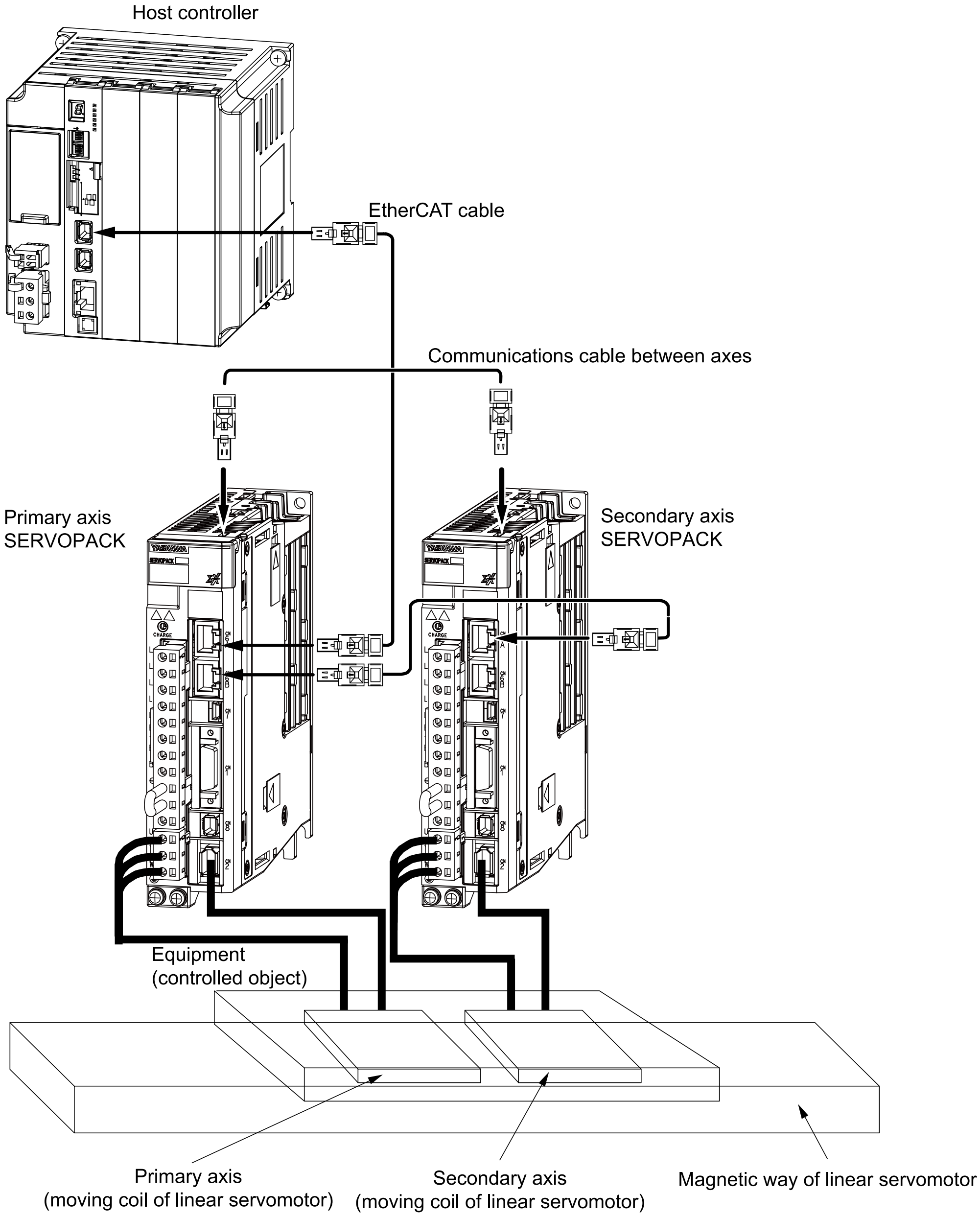
6.1 Outline

Torque/force assistance is used to output the total torque of the primary axis SERVOPACK and the secondary axis SERVOPACK by using the primary axis SERVOPACK and the secondary axis SERVOPACK.

The secondary axis SERVOPACK can receive the torque reference from the primary axis SERVOPACK and output the same torque as the primary axis SERVOPACK.

Important

- Information on any alarms that occur in the primary axis SERVOPACK or a secondary axis SERVOPACK are shared between all of the SERVOPACKs, i.e., if an alarm occurs in any SERVOPACK, it will occur in all of them.
- Do not set Pn001 to n.□□0□ (the same stopping method as Pn001 = n.□□□X) in all SERVOPACKs.
  When the overtravel stopping method for the primary axis SERVOPACK is set to dynamic brake (DB), the overtravel stopping method for a secondary axis SERVOPACK will be to coast to a stop with 0% torque. In this case, the DB for the primary axis SERVOPACK may become overloaded.
- Any stopping method may be set for forced stops (Pn00A = n.□□X□). However, set the same method for all the SERVOPACKs.
- Make sure to set Torque User Unit (2704h) to an appropriate value. In addition, set the primary axis and all secondary axes to the same value.



6.1.1 Usage Restrictions

(1) Control Mode Restrictions

When using torque/force assistance, the secondary axis SERVOPACK (the SERVOPACK set to Pn0A1 = n.□1□□) can be used only in torque control mode. It cannot be used in speed control mode or position control mode.

(2) Function Application Restrictions

The following functional restrictions apply when the SERVOPACKs described in this manual are used.

Function	Restriction
Moment of Inertia Estimation	Cannot be used.
Autotuning without a Host Reference (Fn201)	Cannot be used.
Autotuning with a Host Reference (Fn202)	Cannot be used.
Mechanical Analysis	Cannot be used.
Σ-LINK II	Sensor hubs, sensors, and I/O devices cannot be used.

(3) Restrictions when Using Torque/Force Assistance

The following functional restrictions apply when you use torque/force assistance for the SERVOPACK.

(a) Primary Axis SERVOPACK (The SERVOPACK Set to Pn0A1 = n.□0□□)

Function	Restriction
Torque/Force Assistance Output Polarity Selection	Cannot be used.
Reference Pulse Multiplier Selection	Cannot be used.
Polarity Sensor Setting	Cannot be used.
Polarity Detection	Cannot be used.

(b) Secondary Axis SERVOPACK (The SERVOPACK Set to Pn0A1 = n.□1□□)

Function	Restriction
Reference Pulse Multiplier Selection	Cannot be used.
Polarity Sensor Setting	Cannot be used.
Polarity Detection	Cannot be used.
Fully-Closed Loop Control	Cannot be used.
Speed Control	Cannot be used.
Basic Settings for Speed Control	Cannot be used.
Manually Adjust Speed Reference Offset	Cannot be used.
Speed Reference Filter	Cannot be used.
Zero Clamping	Cannot be used.
/V-CMP (Speed Coincidence Detection Output) Signal	Cannot be used.
Position Control	Cannot be used.
Reference Pulse Form	Cannot be used.
CLR (Position Deviation Clear Input) Signal Function and Settings	Cannot be used.

Continued on next page.

Continued from previous page.

Function	Restriction
Reference Pulse Input Multiplication Switching	Cannot be used.
/COIN (Positioning Completion Output) Signal	Cannot be used.
/NEAR (Near Output) Signal	Cannot be used.
Reference Pulse Inhibition and Settings	Cannot be used.
Vibration Detection Level Initialization	Cannot be used.
Soft Start Settings	Cannot be used.
Smoothing Settings	Cannot be used.
Manually Adjust Torque Reference Offset	Cannot be used.
Autotuning without Host Reference	Cannot be used.
Autotuning with Host Reference	Cannot be used.
Custom Tuning	Cannot be used.
Anti-Resonance Control Adjustment	Cannot be used.
Vibration Suppression	Cannot be used.
Friction Compensation	Cannot be used.
Model Following Control	Cannot be used.
Compatible Adjustment Functions	Cannot be used.
Mechanical Analysis	Cannot be used.
Easy FFT	Cannot be used.
Software Reset	Cannot be used.
Trial Operation for the Servomotor without a Load	Cannot be used.
Program Jogging	Cannot be used.
Origin Search	Cannot be used.
Response Level Setting	Cannot be used.

(4) Restrictions on Specifications

Polarity detection is not possible when torque/force assistance is used.
Select one of the following methods to resolve this issue.

- Using a linear servomotor with a polarity sensor
  In this case, polarity detection is not necessary
- Using a combination of a linear servomotor without a polarity sensor and an absolute linear encoder
  For initial setup, or after the SERVOPACK, linear encoder, or servomotor has been replaced, torque/force assistance must be disabled before executing polarity detection.
  Always check the following before you execute polarity detection.
  - Pn0A1= n.□□□2 (disable the gantry application function and torque/force assistance) or Pn0A1 = n.□□□1 (enable the gantry application function) must be set.
  - The primary axis and secondary axis must be uncoupled.
  - Not using a polarity sensor must be specified (Pn080 = n.□□□1).
  - The servo must be OFF.
  - The main circuit power must be ON.
  - There must be no hard wire base block (HWBB).
  - There must be no alarms except for an A.C22 alarm (Phase Information Disagreement).
  - The parameters must not be write prohibited. (This item applies only when using the SigmaWin+ or digital operator.)
  - The test without a motor function must be disabled (Pn00C = n.□□□0).
  - There must be no overtravel.
  - If the motor constants have been written or the origin of the absolute linear encoder has been set, the power to the SERVOPACK must be turned OFF and ON again after completion of the writing or setting operation.

6.1.2 Precautions When Using This Product

(1) SERVOPACK Models (Maximum Applicable Motor Capacity)

The primary axis SERVOPACK and secondary axis SERVOPACKs must have the same maximum applicable motor capacity.

(2) Motor Stopping Methods for Servo OFF and Group 1 and Group 2 Alarms

Set Motor Stopping Method for Servo OFF and Group 1 Alarms (Pn001 = n.□□□X) and Motor Stopping Method for Group 2 Alarms (Pn00A = n.□□□X and Pn00B = n.□□X□) to the same values in all SERVOPACKs. Stopping by applying the dynamic brake (DB) is recommended, which is the same as the default setting.

6.2 Setup Procedure

Use the following setup procedure to enable torque/force assistance.

Step	Item	Reference
1	**Wire and connect the SERVOPACKs to power supplies and peripheral devices.** If you will use Σ-XS SERVOPACKs, turn ON the main circuit power supplies to both SERVOPACKs at the same time.	*4.1 Connecting the Communications Cable between Axes (For Σ-XS SERVOPACKs Only) on page 74* Σ-X-Series Σ-XS SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 02) Σ-X-Series Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)
2	**Select torque/force assistance.** Pn0A1= n.□□□2 (enable torque/force assistance)	–
3	**Set the primary axis and secondary axis.** • Pn0A1 = n.□0□□ (For the Σ-XS: set to primary axis. For the Σ-XW: set axis A to the primary axis and set axis B to the secondary axis.) • Pn0A1 = n.□1□□ (For the Σ-XS: set to secondary axis. For the Σ-XW: set axis A to the secondary axis and set axis B to the primary axis.)	-
4	**Set the output polarity for the secondary axis.** Pn0D4 = n.□X□□ (Torque/Force Assistance Output Polarity Selection)	*6.6 Setting the Output Polarity for the Secondary Axis on page 136*
5	**Set the multiplier for the secondary axis.** Pn429 (Torque/Force Assistance Multiplier)	*6.7 Setting the Multiplier for the Secondary Axis on page 137*
6	**Perform trial operation.**	-
7	**Perform tuning.**	-

Information You can also use relative position deviation overflow detection. Refer to the following section for details.

☞ *6.5 Relative Position Deviation Overflow Detection on page 133*

6.3 Parameters Matching Check Function

The parameters matching check function checks to determine if the parameter settings on the primary axis and the secondary axis match.

Matching is checked for the following parameters on the primary and secondary axes of torque/force assistance.

Parameter Number	Parameter Name	Digit	Digit Name
Pn001 (2001h)	Application Function Selections 1	n.□□□X	Motor Stopping Method for Servo OFF and Group 1 Alarms
		n.□□X□	Overtravel Stopping Method
Pn008 (2008h)	Application Function Selections 8	n.□□X□	Function Selection for Undervoltage
Pn00A (200Ah)	Application Function Selections A	n.□□□X	Motor Stopping Method for Group 2 Alarms
		n.□□X□	Stopping Method for Forced Stops
Pn00B (200Bh)	Application Function Selections B	n.□□X□	Motor Stopping Method for Group 2 Alarms
Pn0A1 (20A1h)	Gantry Application Function Selections 1	n.□□□X	Parameters for Selecting Functions
Pn0A2 (20A2h)	Gantry Application Function Selections 2	n.□□X□	Signal Synchronization Selection
Pn665 (2665h)	Synchronized Stopping Function Selections	–	–

If parameters do not match, A.E95 (Parameter Mismatch) will occur.

Information: If the above parameters do not match, the operation of each axis will not be synchronized and may cause damage to the machine. If you must operate the system with the parameters mismatched, such as when commissioning the system, you can mask A.E95 with Pn0A2 = n.X□□□ (Alarm/Warning Mask Setting).

		Alarm/Warning Mask Setting (Speed Pos Trq)		When Enabled
Pn0A2 (20A2h)	n.X□□□	0 (Default)	Do not mask A.E93 (Servo ON Command Synchronization Error), A.E95 (Parameter Mismatch), and A.97C (Synchronized Stopping Occurred).	After restart
		1	Mask A.E93.	
		2	Mask A.E95.	
		3	Mask A.E93 and A.E95.	
		4	Mask A.97C.	
		5	Mask A.E93 and A.97C.	
		6	Mask A.E95 and A.97C.	
		7	Mask A.E93, A.E95, and A.97C.	

6.4 Signal Synchronization

Signal synchronization is a function that synchronizes the /S-ON, /ALM-RST, OT and FSTP signals on the primary and secondary axes. You can individually set each signal.

For signal synchronization, the primary axis will reference secondary axis signals.

You can change enable or disable signal synchronization with Pn0A2 = n.□□X□ (Signal Synchronization Selection).

Individually set each signal with Pn665 = n.□X□□ (Reference Synchronization Function Individual Selections 1).

Pn0A2 (20A2h)	n.□□X□	Signal Synchronization Selection Speed Pos Trq		When Enabled
		0	Disable signal synchronization.	After restart
		1 Default	Enable signal synchronization.	
Pn665 (2665h)	n.□X□□	Reference Synchronization Function Individual Selections 1 Speed Pos Trq		When Enabled
		0	Do not synchronize /S-ON, /ALM-RST, OT, and FSTP of secondary axis to primary axis.	After restart
		1	Synchronize /S-ON of secondary axis to primary axis.	
		2	Synchronize /ALM-RST of secondary axis to primary axis.	
		3	Synchronize /S-ON and /ALM-RST of secondary axis to primary axis.	
		4	Synchronize OT of secondary axis to primary axis.	
		5	Synchronize /S-ON and OT of secondary axis to primary axis.	
		6	Synchronize /ALM-RST and OT of secondary axis to primary axis.	
		7	Synchronize /S-ON, /ALM-RST, and OT of secondary axis to primary axis.	
		8	Synchronize FSTP of secondary axis to primary axis.	
		9	Synchronize /S-ON and FSTP of secondary axis to primary axis.	
		A	Synchronize /ALM-RST and FSTP of secondary axis to primary axis.	
		B	Synchronize /S-ON, /ALM-RST, and FSTP of secondary axis to primary axis.	
		C Default	Synchronize OT and FSTP of secondary axis to primary axis.	
		D	Synchronize /S-ON, OT, and FSTP of secondary axis to primary axis.	
		E	Synchronize /ALM-RST, OT, and FSTP of secondary axis to primary axis.	
		F	Synchronize /S-ON, /ALM-RST, OT, and FSTP of secondary axis to primary axis.	

Note:

1. When you will use mode separation control while signal synchronization is disabled, send the servo ON command (Enable Operation command) to both axes at the same time.
2. Depending on the host controller, Controlword (6040h) for the secondary axis may not automatically change to Shutdown. In this case, the secondary axis will not be synchronized with the primary axis even if the SERVOPACK is set to synchronize /S-ON with Pn0A2 = n.□□1□ (enable signal synchronization) and Pn665 = n.□X□□ (Reference Synchronization Function Individual Selections 1). Set bits 1 and 2 of Controlword for the secondary axis to the Shutdown command with the host controller.

6.5 Relative Position Deviation Overflow Detection

This section provides information on relative position deviation overflow detection.

6.5.1 Parameters

(1) Setting the Method to Detect Relative Position Deviation

Set the method to detect relative position deviation in Pn0A3 = n.□□X□ (Selection of Method to Detect Relative Pos Deviation). Set the primary axis and the secondary axis to the same set value.

Pn0A3 (A:20A3h, B:28A3h)	n.□□X□	Selection of Method to Detect Relative Pos Deviation	Speed Pos Trq	When Enabled
		0 Default	Calculate with the relative position from the preset position.	Immediately
		1	Calculate with Position Actual Value (6064h).	

Note:

For set value 1:

– If you are using an absolute encoder, calculate the difference for the scale or encoder value.

– If you are using an incremental encoder, the position when the power is turned ON is 0. Calculate the difference for the position between axes based on that position.

(2) Setting the Threshold for Detecting Relative Position Deviation Overflow

If you set the relative position deviation that can be allowed in Pn66A (Relative Position Deviation Overflow Alarm Level), A.50D (Relative Position Deviation Overflow Alarm) will occur when that value is exceeded.

You can also make A.90D (Relative Position Deviation Overflow Warning) occur by setting Pn669 (Relative Position Deviation Overflow Warning Level). A.90D occurs when the value obtained with Pn66A × Pn669/100 is exceeded.

Pn669 (A:2669h, B:2E69h)	Relative Position Deviation Overflow Warning Level			Speed Pos Trq
	Setting Range	Setting Unit	Default Setting	When Enabled
	10 to 100	%	100	Immediately
Pn66A (A:266Ah, B:2E6Ah)	Relative Position Deviation Overflow Alarm Level			Speed Pos Trq
	Setting Range	Setting Unit	Default Setting	When Enabled
	0 to 1073741823	reference unit	5242880	Immediately

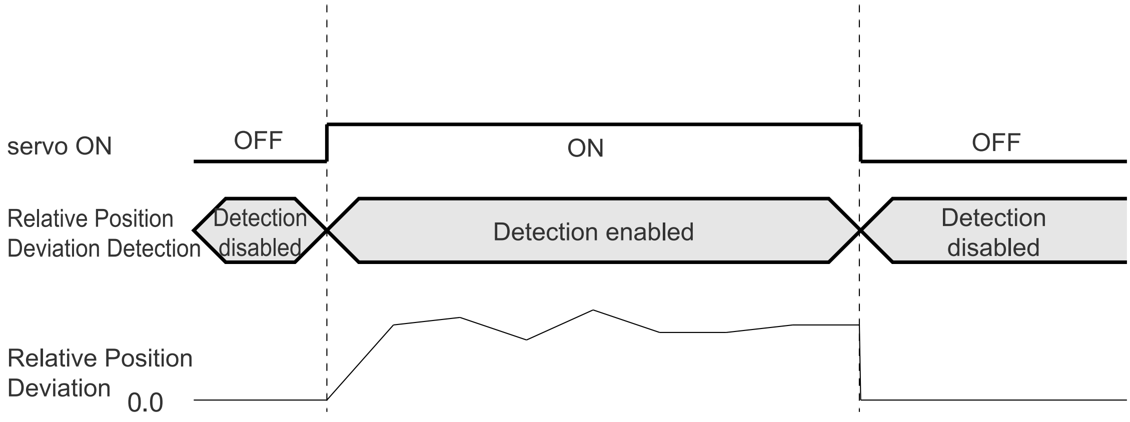
Note:

- If the setting value of Pn66A is 0, the relative position deviation overflow alarm and warning are disabled.
- Adjust the settings of Pn669 and Pn66A after setting the origin of the machine. If the values of Pn669 and Pn66A are decreased before the origin of the machine is set, a warning or alarm may occur when the origin is set.

6.5.2 Timing of Relative Position Deviation Overflow Detection

When Pn0A3 = n.□□0□, detection of relative position deviation overflow is enabled when the servo is turned ON.

Relative position deviation also starts to be counted at the same time.



6.5.3 Alarm

The alarm related to relative position deviation overflow detection is given in the following table.

Display	Name	Meaning
50Dh Common	Relative Position Deviation Overflow Alarm	The position deviation between the primary and secondary axes during the servo ON state exceeded the set value of Pn66A (Relative Position Deviation Overflow Alarm Level).

6.5.4 Warning

The warning related to relative position deviation overflow detection is given in the following table.

90Dh (Relative Position Deviation Overflow Warning) occurs when the value obtained with Pn66A × Pn669/100 is exceeded.

Display	Name	Meaning
90Dh Common	Relative Position Deviation Overflow Warning	The position deviation between the primary and secondary axes has exceeded the percentage set with the following equation during the servo ON state. (Pn66A × Pn669/100)

6.5.5 Monitor

Monitoring the relative position deviation can be useful for preventative maintenance.

The primary axis and the secondary axis both show the relative position deviation based on their own axis. For this reason, the relative position deviation will be shown with positive and negative reversed for the primary axis and the secondary axis.

(1) Monitoring with the SigmaWin+

You can monitor the relative position deviation on the motion monitor window.

Button in Menu Dialog Box	Name [Unit]
Motion Monitor	Relative Position Deviation [reference unit]

Refer to the following manual for detailed operating procedures for the SigmaWin+.

Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)

(2) Monitoring with the Digital Operator

Un04E can be used to monitor relative position deviation with the digital operator.

Un No.	Sign	Unit	Name	Description
Un04E	Yes	1 reference unit	Relative Position Deviation	Position deviation between primary axis and secondary axis

Refer to the following manual for monitor data other than that listed above.

Σ-7/Σ-X-Series Digital Operator Operating Manual (Manual No.: SIEP S800001 33)

(3) Monitoring with an Object

You can use 277eh (Relative Position Deviation) to monitor relative position deviation with an object.

Index	Subindex	Name	Data Type	Access	PDO Mapping	Value	Saving to EEPROM
277eh Axis A	0	Relative Position Deviation	DINT	RO	Yes	– [Pos. unit]	No

6.6 Setting the Output Polarity for the Secondary Axis

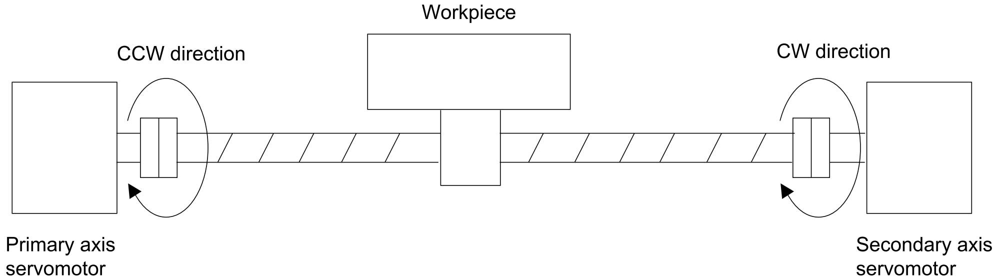
Depending on how the servomotors are used, it may be necessary to reverse the torque/force assistance output polarity.

Use Pn0D4 = n.□X□□ (Torque/Force Assistance Output Polarity Selection) to set the torque/force assistance output polarity.

Pn0D4 (A:20D4h, B:28D4h)	n.□X□□	Torque/Force Assistance Output Polarity Selection Speed Pos Trq		When Enabled
		0 Default	The polarity is not inverted.	After restart
		1	The polarity is inverted.	

Information: If you use servomotors for a primary axis and secondary axes to rotate a ball screw and move a workpiece, the rotation direction will be different for the primary axis and secondary axes.

This can be easily achieved by reversing the polarity of the torque/force assistance output (Pn0D4 = n.□1□□) received by the secondary axis SERVOPACKs.



Important
- The setting of Pn0D4 = n.□X□□ (Torque/Force Assistance Output Polarity Selection) is valid only in the secondary axis SERVOPACKs. The setting in the primary axis SERVOPACK is ignored.
- Set Pn0D4 = n.□X□□ (Torque/Force Assistance Output Polarity Selection) for each secondary axis SERVOPACK appropriate for the machine configuration.

6.7 Setting the Multiplier for the Secondary Axis

The torque output from the secondary axis SERVOPACK can be changed based on the torque output by the primary axis SERVOPACK. Set Pn429 (Torque/Force Assist Multiplier) to the torque/force assistance rate for the torque output from the secondary axis SERVOPACK.

If you use motors on the primary and secondary axes that have a different maximum torque, set Pn429 according to the maximum torque multiplier.

Pn429 (A:2429h, B:2C29h)	Torque/Force Assistance Multiplier			Speed Pos Trq
	Setting Range	Setting Unit	Default Setting	When Enabled
	0 to 65535	%	100	Immediately

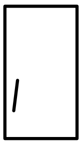
6.8 Monitor

You can monitor the communications status and operating status of torque/force assistance.

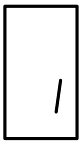
6.8.1 Monitoring the Communications Status of Torque/Force Assistance

The communications status of torque/force assistance is displayed on the indicators on the SERVOPACK's panel display.

• Primary Axis SERVOPACKs

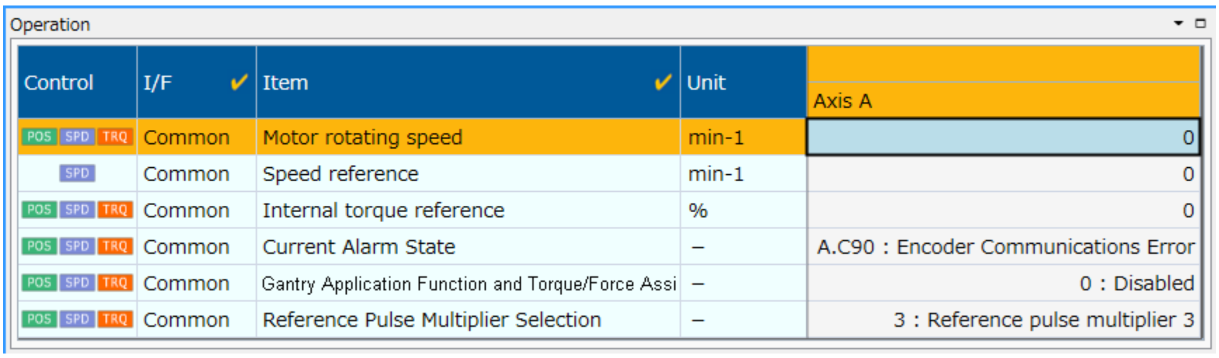


• Secondary Axis SERVOPACKs



6.8.2 Monitoring the Operating Status of Torque/Force Assistance

You can use the SigmaWin+ to monitor the operating status of torque/force assistance.


Operation

Control	I/F	Item	Unit	Axis A
POS SPD TRQ	Common	Motor rotating speed	min-1	0
SPD	Common	Speed reference	min-1	0
POS SPD TRQ	Common	Internal torque reference	%	0
POS SPD TRQ	Common	Current Alarm State	–	A.C90 : Encoder Communications Error
POS SPD TRQ	Common	Gantry Application Function and Torque/Force Assi	–	0 : Disabled
POS SPD TRQ	Common	Reference Pulse Multiplier Selection	–	3 : Reference pulse multiplier 3

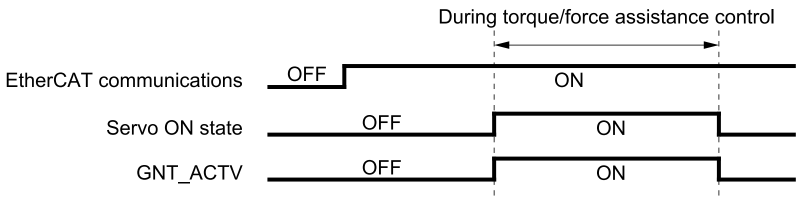
Refer to the following manual for the operating procedures for the SigmaWin+.

Engineering Tool SigmaWin+ Operation Manual (Manual No.: SIET S800001 34)

6.9 Operating Procedure for Host Controller

This section gives the operating procedures using a host controller.

1. **Set both axes (the primary axis and secondary axis SERVOPACKs) to the Operational (OP) state.**
2. **Send the Servo ON command (Enable Operation command) to both axes at the same time to set the servo ON state.**
3. **Send a movement command (e.g., INTERPOLATE or POSING) to the primary axis SERVOPACK and the secondary axis will be operated at the same torque reference as the primary axis.**
4. **Send the Servo OFF command (Disable Operation command) to both axes to set the servo OFF state.**



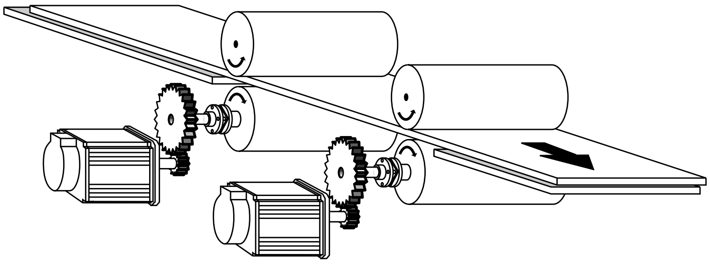
7

Speed Synchronization

This chapter describes the speed synchronization function.

7.1 Outline

Speed synchronization is a function that synchronizes the speed of the secondary axis to the feedback speed of the primary axis. The secondary axis SERVOPACK is controlled to match the feedback speed of the primary axis.



7.1.1 Function Application Restrictions

The following functional restrictions apply when the SERVOPACKs described in this manual are used.

Function	Restriction
Moment of Inertia Estimation	Cannot be used.
Autotuning without a Host Reference (Fn201)	Cannot be used.
Autotuning with a Host Reference (Fn202)	Cannot be used.
Mechanical Analysis	Cannot be used.
Σ-LINK II Function	Sensor hubs, sensors, and I/O devices cannot be used.

(1) When Mixing Semi-Closed Loop Control and Fully-Closed Loop Control Axes

You cannot use the following functions: synchronized stopping and relative position deviation overflow detection.

(2) When Using Speed Synchronization

Fully-closed loop control cannot be used with Σ-XW models.

7.1.2 Precautions When Using This Product

(1) SERVOPACK Models (Maximum Applicable Motor Capacity)

The primary axis SERVOPACK and secondary axis SERVOPACKs must have the same maximum applicable motor capacity.

(2) Motor Stopping Methods for Servo OFF and Group 1 or Group 2 Alarms

Set Motor Stopping Method for Servo OFF and Group 1 Alarms (Pn001 = n.□□□X) and Motor Stopping Method for Group 2 Alarms (Pn00A = n.□□□X and Pn00B = n.□□X□) to the same values in all SERVOPACKs. Stopping by applying the dynamic brake (DB) is recommended, which is the same as the default setting.

(3) Precautions for Speed Synchronization

When the speed synchronization function is enabled, use the SERVOPACK under the following conditions.

- When signal synchronization is disabled, send the servo ON command (Enable Operation command) to both axes at the same time. Depending on the host controller, Controlword (6040h) for the secondary axis may not automatically change to Shutdown. In this case, the secondary axis will not be synchronized with the primary axis even if the SERVOPACK is set to synchronize /S-ON with Pn0A2 = n.□□1□ (enable signal synchronization) and Pn665 = n.□X□□ (Reference Synchronization Function Individual Selections 1). Set bits 1 and 2 of Controlword for the secondary axis to the Shutdown command with the host controller.
- The position correction table cannot be used with triggers at preset positions.

If the conditions below are not satisfied, A.E95 (Parameter Mismatch) will occur.

- The maximum speed and maximum torque of the servomotors used for the primary axis and secondary axis must be the same.
- The encoder resolution when using rotary servomotors for the primary axis and secondary axis must be the same.
- The linear scale resolution when using linear servomotors for the primary axis and secondary axis must be the same.

(4) Precautions on Polarity Detection

NOTICE

Uncouple the primary axis and secondary axis when performing polarity detection.

If the primary axis and secondary axis are not uncoupled, an alarm may occur and there is a risk of damage to the machine.

When using a combination of a linear servomotor without a polarity sensor and an absolute encoder, polarity detection is required.

Information
- Do not use a combination of a linear servomotor without a polarity sensor and an incremental encoder. If this combination is used, whenever the power is turned ON, the coupling must be disconnected, and polarity detection must be performed.
- Polarity detection is not required when using a rotary servomotor or a linear servomotor with a polarity sensor.

Always check the following before you execute polarity detection.

- Pn0A1= n.□□□0 (disable the gantry application, torque/force assistance, and speed synchronization function.) or Pn0A1 = n.□□□3 (enable the speed synchronization function) must be set.
- The primary axis and secondary axis must be uncoupled
- Not using a polarity sensor must be specified (Pn080 = n.□□□1).
- The servo must be OFF.
- The main circuit power must be ON.
- There must be no hard wire base block (HWBB).
- There must be no alarms except for an A.C22 alarm (Phase Information Disagreement).
- The parameters must not be write prohibited. (This item applies only when using the SigmaWin+ or digital operator.)
- The test without a motor function must be disabled (Pn00C = n.□□□0).
- There must be no overtravel.
- If the motor constants have been written or the origin of the absolute linear encoder has been set, the power to the SERVOPACK must be turned OFF and ON again after completion of the writing or setting operation.

7.2 Setup Procedure

Use the following setup procedure to use the speed synchronization function.

Procedure	Item	Reference
1	**Wire and connect the SERVOPACKs to power supplies and peripheral devices.** If you will use Σ-XS SERVOPACKs, turn ON the main circuit power supplies to both SERVOPACKs at the same time.	*4.1 Connecting the Communications Cable between Axes (For Σ-XS SERVOPACKs Only) on page 74* Σ-X-Series Σ-XS SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 02) Σ-X-Series Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)
2	**Select the gantry application.** Pn0A1 = n.□□□3 (enable speed synchronization)	–
3	**Set the primary axis and secondary axis.** • Pn0A1 = n.□0□□ (For the Σ-XS: set to primary axis. For the Σ-XW: set axis A to the primary axis and set axis B to the secondary axis.) • Pn0A1 = n.□1□□ (For the Σ-XS: set to secondary axis. For the Σ-XW: set axis A to the secondary axis and set axis B to the primary axis.)	-
4	**Set the method to detect relative position deviation.** Pn0A3 = n.□□X□ (Selection of Method to Detect Relative Pos Deviation) Set the primary axis and the secondary axis to the same set value.	*(1) Setting the Method to Detect Relative Position Deviation on page 133*
5	**Set the threshold for detecting relative position deviation overflow.** • Pn669 (Relative Position Deviation Overflow Warning Level) • Pn66A (Relative Position Deviation Overflow Alarm Level)	*(2) Setting the Threshold for Detecting Relative Position Deviation Overflow on page 133*
6	**Set synchronized stopping.** Pn665 = n.□□□X (Synchronized Stopping Selection) Set the primary axis and the secondary axis to the same set value.	*(1) Setting Synchronized Stopping on page 90*
7	**Set the origin.**	–
8	**Perform trial operation.**	– *1
9	**Perform tuning.**	–

*1 Use the following procedure for trial operation.

1. When the speed synchronization timing is Pn0A3.0 = 0, set GNT_ENBL (bit 8 in Controlword_VenderS (2776h)) to 1 to enable speed synchronization.
2. Send the servo ON command (Enable Operation command) to both axes and confirm that the servos turned ON.
3. With the host controller, set the position reference for only the primary axis and send the Positioning command.

7.3 Parameters Matching Check Function

The parameters matching check function checks to determine if the parameter settings on the primary axis and the secondary axis match.

Matching is checked for the following parameters on the primary and secondary axes of speed synchronization function.

Parameter Number	Parameter Name	Digit	Digit Name
Pn001 (2001h)	Application Function Selections 1	n.□□□X	Motor Stopping Method for Servo OFF and Group 1 Alarms
		n.□□X□	Overtravel Stopping Method
Pn002 (2002h)	Application Function Selections 2	n.X□□□	External Encoder Usage
Pn008 (2008h)	Application Function Selections 8	n.□□X□	Function Selection for Undervoltage
Pn00A (200Ah)	Application Function Selections A	n.□□□X	Motor Stopping Method for Group 2 Alarms
		n.□□X□	Stopping Method for Forced Stops
Pn00B (200Bh)	Application Function Selections B	n.□□X□	Motor Stopping Method for Group 2 Alarms
Pn0A1 (20A1h)	Gantry Application Function Selections 1	n.□□□X	Parameters for Selecting Functions
		n.□□X□	Twisting Suppression Selections
Pn0A2 (20A2h)	Gantry Application Function Selections 2	n.□□□X	Reference Input Selection during Mode Separation Control
		n.□□X□	Signal Synchronization Selection
		n.□X□□	Params Selection to Compensate Relative Pos Deviation
Pn20A (220Ah)	Number of External Encoder Scale Pitches	–	–
Pn20E (220Eh)	Electronic Gear Ratio (Numerator)	–	–
Pn210 (2210h)	Electronic Gear Ratio (Denominator)	–	–
Pn22A (222Ah)	Fully-closed Control Selections	n.X□□□	Fully-closed Control Speed Feedback Selection
Pn282 (2282h)	Linear Encoder Scale Pitch	–	–
Pn665 (2665h)	Synchronized Stopping Function Selections	–	–

If parameters do not match, A.E95 (Parameter Mismatch) will occur.

Information: If the above parameters do not match, the operation of each axis will not be synchronized and may cause damage to the machine. If you must operate the system with the parameters mismatched, such as when commissioning the system, you can mask A.E95 with Pn0A2 = n.X□□□ (Alarm/Warning Mask Setting).

		Alarm/Warning Mask Setting Speed Pos Trq		When Enabled
Pn0A2 (20A2h)	n.X□□□	0 Default	Do not mask A.E93 (Servo ON Command Synchronization Error), A.E95 (Parameter Mismatch), and A.97C (Synchronized Stopping Occurred).	After restart
		1	Mask A.E93.	
		2	Mask A.E95.	
		3	Mask A.E93 and A.E95.	
		4	Mask A.97C.	
		5	Mask A.E93 and A.97C.	
		6	Mask A.E95 and A.97C.	
		7	Mask A.E93, A.E95, and A.97C.	

7.4 Signal Synchronization

Signal synchronization is a function that synchronizes the /S-ON, /ALM-RST, OT and FSTP signals on the primary and secondary axes. You can individually set each signal.

For signal synchronization, the primary axis will reference secondary axis signals.

You can change enable or disable signal synchronization with Pn0A2 = n.□□X□ (Signal Synchronization Selection).

Individually set each signal with Pn665 = n.□X□□ (Reference Synchronization Function Individual Selections 1).

Pn0A2 (20A2h)	n.□□X□	Signal Synchronization Selection Speed Pos Trq		When Enabled
		0	Disable signal synchronization.	After restart
		1 Default	Enable signal synchronization.	
Pn665 (2665h)	n.□X□□	Reference Synchronization Function Individual Selections 1 Speed Pos Trq		When Enabled
		0	Do not synchronize /S-ON, /ALM-RST, OT, and FSTP of secondary axis to primary axis.	After restart
		1	Synchronize /S-ON of secondary axis to primary axis.	
		2	Synchronize /ALM-RST of secondary axis to primary axis.	
		3	Synchronize /S-ON and /ALM-RST of secondary axis to primary axis.	
		4	Synchronize OT of secondary axis to primary axis.	
		5	Synchronize /S-ON and OT of secondary axis to primary axis.	
		6	Synchronize /ALM-RST and OT of secondary axis to primary axis.	
		7	Synchronize /S-ON, /ALM-RST, and OT of secondary axis to primary axis.	
		8	Synchronize FSTP of secondary axis to primary axis.	
		9	Synchronize /S-ON and FSTP of secondary axis to primary axis.	
		A	Synchronize /ALM-RST and FSTP of secondary axis to primary axis.	
		B	Synchronize /S-ON, /ALM-RST, and FSTP of secondary axis to primary axis.	
		C Default	Synchronize OT and FSTP of secondary axis to primary axis.	
		D	Synchronize /S-ON, OT, and FSTP of secondary axis to primary axis.	
		E	Synchronize /ALM-RST, OT, and FSTP of secondary axis to primary axis.	
		F	Synchronize /S-ON, /ALM-RST, OT, and FSTP of secondary axis to primary axis.	

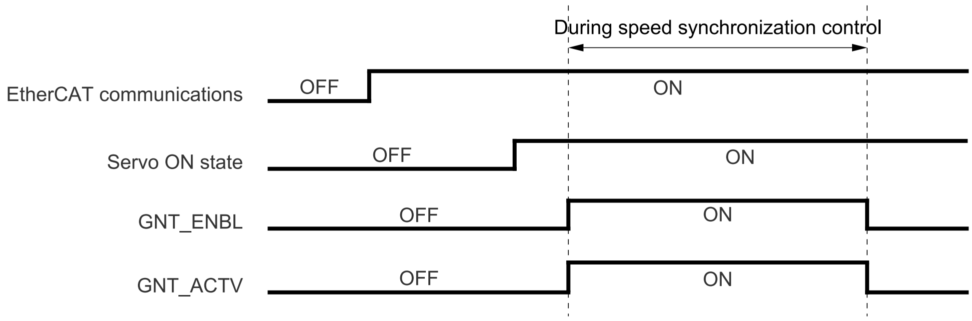
Note:

1. When you will use mode separation control while signal synchronization is disabled, send the servo ON command (Enable Operation command) to both axes at the same time.
2. Depending on the host controller, Controlword (6040h) for the secondary axis may not automatically change to Shutdown. In this case, the secondary axis will not be synchronized with the primary axis even if the SERVOPACK is set to synchronize /S-ON with Pn0A2 = n.□□1□ (enable signal synchronization) and Pn665 = n.□X□□ (Reference Synchronization Function Individual Selections 1). Set bits 1 and 2 of Controlword for the secondary axis to the Shutdown command with the host controller.

7.5 Operating Procedure for Host Controller

This section gives the operating procedures using a host controller.

1. **Set both axes (the primary axis and secondary axis SERVOPACKs) to the Operational (OP) state.**
2. **Send the Servo ON command (Enable Operation command) to both axes at the same time to set the servo ON state.**
3. **Turn ON GNT_ENBL for both axes.**
4. **Confirm that GNT_ACTV is ON for both axes.**
5. **Send a movement command (e.g., INTERPOLATE or POSING) to the primary axis SERVOPACK and the secondary axis will be operated at the same speed as the primary axis.**
6. **Turn OFF GNT_ENBL for both axes and confirm that GNT_ACTV is OFF.**
   Speed synchronization is canceled when GNT_ACTV is turned OFF.



8

Object Dictionary

This chapter describes the objects that are unique to this product.

8.1 Device Control

8.1.1 Controlword_VenderS (A:2776h, B:2F76h)

This object performs vendor-specific device control.

Index	Subindex	Name	Data Type	Access	PDO Mapping	Value	Saving to EEPROM
2776h Axis A	0	Controlword_VenderS	UINT	RW	Yes	0 to 0xFFFF (default: –)	No

(1) Controlword_VenderS Bits

Bit	Function	Description
0	EXT trace	0: EXT trace OFF 1: EXT trace ON Data can be acquired at the preferred timing by setting "EXT Trace" to a data trace trigger in the SigmaWin+ and controlling bit 0 of this object.
1	Preset position forced stop	0: Disable forced stop at preset position. 1: Enable forced stop at preset position.
2 to 7	– (Reserved)	–
8	GNT_ENBL	Enable or disable the gantry application function. 0: Turn OFF gantry control 1: Turn ON gantry control
9	GNT_PSET	Clear mode coordinates during mode separation control. 0: Turn OFF clear mode separation coordinates position 1: Turn ON clear mode separation coordinates position
10 to 15	– (Reserved)	–

8.1.2 Statusword_VenderS (2777h)

This object gives the gantry control status of the servo drive.

Index	Subindex	Name	Data Type	Access	PDO Mapping	Value	Saving to EEPROM
2777h Common	0	Statusword_VenderS	UINT	RO	Yes	0 to 0xFFFF (default: –)	No

(1) Statusword_VenderS Bits

Bit	Function	Description
0 to 7	– (Reserved)	–
8	GNT_ACTV	Gives the gantry control status. 0: Normal control in progress 1: Gantry control in progress
9 to 15	– (Reserved)	–

8.1.3 Disable Operation Option Code (A:605Ch, B:685Ch)

This object defines the operation that is performed if there is a move from Operation Enable state to Switched ON state.

Index	Subindex	Name	Data Type	Access	PDO Mapping	Value	Saving to EEPROM
605Ch Axis A	0	Disable Operation Option Code	INT	RW	No	0 to 1 (default: 0)	Yes

(1) Data Description

Value	Description
0	Disables the servo drive (moves to the Switch ON Disabled state).
1	Decelerates at the deceleration rate for decelerating to a stop and moves to the Switch ON Disabled state. *1, *2

*1 The motor is always stopped according to option code 0 (servo OFF stop) in Profile Torque Mode or Cyclic Torque Mode.
*2 The deceleration rate for decelerating to a stop is defined in the following objects.

- Profile Position/Interpolated Position/Cyclic Position/Cyclic Velocity Mode (6084h)
- Homing Mode (609Ah)

9

Maintenance

This chapter provides information on the meaning of, causes of, and corrections for alarms and warnings.

9.1 Alarm Displays

To check an alarm that occurs in the SERVOPACK, use one of the following methods. However, if no alarm number appears on the panel display, this indicates a SERVOPACK system error. Replace the SERVOPACK.

Panel display on SERVOPACK	If there is an alarm, the code will be displayed one character at a time, as shown below. Example: Alarm A.020 Status Indications → Not lit. → A. → Not lit. → 0 → Not lit. → 2 → Not lit. → 0 → Not lit.
Digital operator	The alarm code will be displayed.
Statusword (6041h)	Bit 3 (fault) in the statusword will change to 1. (Bit 3 is 0 during normal operation.)
Error code (603Fh)	A current alarm code is stored in object 603Fh.
Emergency message	The controller is notified of any alarm that occurs. (Notification may not be possible if EtherCAT communications are unstable.)

9.1.1 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) 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.

(2) Alarms for Both Axes

If Common is given below the alarm number, the alarm applies to both axes of the Σ-XW SERVOPACK. If an alarm occurs for one axis, the same alarm status will occur for the other axis.

(3) List of Alarms

The following table lists the alarms.

Information
- The EtherCAT communications state move to SAFEOP after alarm numbers A10h, E12h, and EA2h are detected.
- Alarm number E75h occurs when the SERVOPACK is equipped with the fully-closed option module.
- Alarm numbers FL-1 to FL-7 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
020h	Parameter Checksum Error	There is an error in the parameter data in the SERVOPACK.	Gr.1	No
021h Common	Parameter Format Error	There is an error in the parameter data in the SERVOPACK.	Gr.1	No
022h Common	System Checksum Error	There is an error in the parameter data in the SERVOPACK.	Gr.1	No
024h	System Alarm	An internal program error occurred in the SERVOPACK.	Gr.1	No
025h	System Alarm	An internal program error occurred in the SERVOPACK.	Gr.1	No
030h Common	Main Circuit Detector Error	There is an error in the detection data for the main circuit.	Gr.1	Yes
040h	Parameter Setting Error	A parameter setting is outside of the setting range.	Gr.1	No

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Alarm Number	Alarm Name	Alarm Meaning	Servomotor Stopping Method	Alarm Reset Possibility
041h	Encoder Output Pulse Setting Error	The setting of Pn212 (2212h) (Number of Encoder Output Pulses) or Pn281 (2281h) (Encoder Output Resolution) is outside of the setting range or does not satisfy the setting conditions.	Gr.1	No
042h	Parameter Combination Error	The combination of some parameters exceeds the setting range.	Gr.1	No
044h	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
046h	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
047h	Encoder with Functional Safety - Safety Mode Setting Error	The SERVOPACK was connected to an encoder with functional safety.	Gr.1	Yes
050h	Combination Error	The capacities of the SERVOPACK and servomotor do not match.	Gr.1	Yes
051h	Unsupported Device Alarm	An unsupported device was connected.	Gr.1	No
070h	Motor Type Change Detected	The connected motor is a different type of motor from the previously connected motor.	Gr.1	No
080h	Linear Encoder Pitch Setting Error	The setting of Pn282 (2282h) (Linear Encoder Scale Pitch) has not been changed from the default setting.	Gr.1	No
100h	Overcurrent Detected	An overcurrent flowed through the power transistor or the heat sink overheated.	Gr.1	No
101h	Motor Overcurrent Detected	The current to the motor exceeded the allowable current.	Gr.1	No
102h	Motor Overcurrent Detected 2	The current to the motor exceeded the allowable current.	Gr.1	No
300h Common	Regeneration Error	There is an error related to regeneration.	Gr.1	Yes
320h Common	Regenerative Overload	A regenerative overload occurred.	Gr.2	Yes
330h Common	Main Circuit Power Supply Wiring Error	• 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
400h Common	Overvoltage	The main circuit DC voltage is too high.	Gr.1	Yes
410h Common	Undervoltage	The main circuit DC voltage is too low.	Gr.2	Yes
50Dh Common	Relative Position Deviation Overflow Alarm	The position deviation between primary axis and secondary axis during the servo ON state exceeded the setting value of Pn66A (Relative Position Deviation Overflow Alarm Level).	Gr.1	Yes
510h	Overspeed	The motor exceeded the maximum speed.	Gr.1	Yes
511h	Encoder Output Pulse Overspeed	• The pulse output speed for the setting of Pn212 (2212h) (Number of Encoder Output Pulses) was exceeded. (rotary servomotor) • The motor speed upper limit for the setting of Pn281 (2281h) (Encoder Output Resolution) was exceeded. (linear servomotor)	Gr.1	Yes
520h	Vibration Alarm	Abnormal oscillation was detected in the motor speed.	Gr.1	Yes
521h	Autotuning Alarm	Vibration was detected during autotuning for the tuning- less function.	Gr.1	Yes
550h	Maximum Motor Speed Setting Error	The setting of Pn385 (2385h) (Maximum Motor Speed) is greater than the maximum motor speed.	Gr.1	Yes

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Alarm Number	Alarm Name	Alarm Meaning	Servomotor Stopping Method	Alarm Reset Possibility
710h	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
720h	Continuous Overload	The servomotor was operating continuously under a torque that exceeded the rating.	Gr.1	Yes
730h	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
731h	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
740h Common	Inrush Current Limiting Resistor Overload	The main circuit power was frequently turned ON and OFF.	Gr.1	Yes
7A1h Common	Internal Temperature Error 1 (Control Board Temperature Error)	The surrounding temperature of the control board is abnormal.	Gr.2	Yes
7A2h Common	Internal Temperature Error 2 (Power Board Temperature Error)	The surrounding temperature of the power board is abnormal.	Gr.2	Yes
7A3h	Internal Temperature Sensor Error	An error occurred in the temperature sensor circuit.	Gr.2	No
7Abh Common	SERVOPACK Built-in Fan Stopped	The fan inside the SERVOPACK stopped.	Gr.1	Yes
810h	Encoder Backup Alarm	The power supplies to the encoder all failed and the position data was lost.	Gr.1	No
820h	Encoder Checksum Alarm	There is an error in the checksum results for encoder memory.	Gr.1	No
830h	Encoder Battery Alarm	The battery voltage was lower than the specified level after the control power was turned ON.	Gr.1	Yes
840h	Encoder Data Alarm	There is an internal data error in the encoder.	Gr.1	No
850h	Encoder Overspeed	The encoder was operating at high speed when the power was turned ON.	Gr.1	No
860h	Encoder Overheated	The internal temperature of encoder is too high.	Gr.1	No
861h	Motor Overheated	The internal temperature of motor is too high.	Gr.1	No
862h	Overheat Alarm	The input voltage (temperature) for the overheat protection input (TH) signal exceeded the setting of Pn61B (261Bh) (Overheat Alarm Level).	Gr.1	Yes
890h	Encoder Scale Error	A failure occurred in the linear encoder.	Gr.1	No
891h	Encoder Module Error	An error occurred in the linear encoder.	Gr.1	No
8A0h	External Encoder Error	An error occurred in the external encoder.	Gr.1	Yes
8A1h	External Encoder Module Error	An error occurred in the serial converter unit.	Gr.1	Yes
8A2h	External Incremental Encoder Sensor Error	An error occurred in the external encoder.	Gr.1	Yes
8A3h	External Absolute Encoder Position Error	An error occurred in the position data of the external encoder.	Gr.1	Yes
8A5h	External Encoder Overspeed	An overspeed error occurred in the external encoder.	Gr.1	Yes
8A6h	External Encoder Overheated	An overheating error occurred in the external encoder.	Gr.1	Yes
A10h	EtherCAT DC Synchronization Error	The SERVOPACK and Sync0 events cannot be synchronized.	Gr.2	Yes
A11h	EtherCAT State Error	The EtherCAT AL does not move to the Operational state when the DS402 drive is in Operation Enabled state.	Gr.2	Yes

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Alarm Number	Alarm Name	Alarm Meaning	Servomotor Stopping Method	Alarm Reset Possibility
A12h	EtherCAT Output Data Synchronization Error	The process data reception events and Sync0 events cannot be synchronized. (Process data communications failed.)	Gr.2	Yes
A20h	Parameter Setting Error	A parameter setting exceeds the setting range.	Gr.1	No
A41h	Communication Device Initialization Error	An error occurred during ESC initialization.	Gr.1	No
A47h	Loading Servo Information Error	Loading SERVOPACK information failed.	Gr.1	No
b00h	Initial Communications between Axes Error (Primary Axis)	An error occurred during initial setup of communications between axes on the primary axis.	Gr.1	No
b01h	Cyclic Communications between Axes Error (Primary Axis)	An error occurred during cyclic communications on the primary axis.	Gr.1	Yes
b03h	Initial Communications between Axes Error (Secondary Axis)	An error occurred during initial setup of communications between axes on the secondary axis.	Gr.1	No
b04h	Cyclic Communications between Axes Error (Secondary Axis)	An error occurred during cyclic communications on the secondary axis.	Gr.1	Yes
b33h	Current Detection Error 3	An error occurred in the current detection circuit.	Gr.1	No
bE2h	Firmware error	A firmware error occurred in the SERVOPACK.	Gr.1	No
bF0h Common	System Alarm 0	Internal program error 0 occurred in the SERVOPACK.	Gr.1	No
bF1h Common	System Alarm 1	Internal program error 1 occurred in the SERVOPACK.	Gr.1	No
bF2h Common	System Alarm 2	Internal program error 2 occurred in the SERVOPACK.	Gr.1	No
bF3h Common	System Alarm 3	Internal program error 3 occurred in the SERVOPACK.	Gr.1	No
bF4h Common	System Alarm 4	Internal program error 4 occurred in the SERVOPACK.	Gr.1	No
bF5h Common	System Alarm 5	Internal program error 5 occurred in the SERVOPACK.	Gr.1	No
bF6h Common	System Alarm 6	Internal program error 6 occurred in the SERVOPACK.	Gr.1	No
bF7h Common	System Alarm 7	Internal program error 7 occurred in the SERVOPACK.	Gr.1	No
bF8h Common	System Alarm 8	Internal program error 8 occurred in the SERVOPACK.	Gr.1	No
bFbh Common	System Alarm B	An internal program error B occurred in the SERVOPACK.	Gr.1	No
bFdh Common	System Alarm D	An internal program error D occurred in the SERVOPACK.	Gr.1	No
C10h	Servomotor Out of Control	The servomotor ran out of control.	Gr.1	Yes
C20h	Phase Detection Error	The detection of the phase is not correct.	Gr.1	No
C21h	Polarity Sensor Error	An error occurred in the polarity sensor.	Gr.1	No
C22h	Phase Information Disagreement	The phase information does not match.	Gr.1	No
C50h	Polarity Detection Failure	The polarity detection failed.	Gr.1	No
C51h	Overtravel Detected during Polarity Detection	The overtravel signal was detected during polarity detection.	Gr.1	Yes
C52h	Polarity Detection Not Completed	The servo was turned ON before the polarity was detected.	Gr.1	Yes

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Alarm Number	Alarm Name	Alarm Meaning	Servomotor Stopping Method	Alarm Reset Possibility
C53h	Out of Range of Motion for Polarity Detection	The travel distance exceeded the setting of Pn48E (248Eh) (Polarity Detection Range).	Gr.1	No
C54h	Polarity Detection Failure 2	The polarity detection failed.	Gr.1	No
C80h	Encoder Clear Error or Multiturn Limit Setting Error	The multiturn data for the absolute encoder was not correctly cleared or set.	Gr.1	No
C90h	Encoder Communications Error	Communications between the encoder and SERVOPACK is not possible.	Gr.1	No
C91h	Encoder Communications Position Data Acceleration Rate Error	An error occurred in calculating the position data of the encoder.	Gr.1	No
C92h	Encoder Communications Timer Error	An error occurred in the communications timer between the encoder and SERVOPACK.	Gr.1	No
CA0h	Encoder Parameter Error	The parameters in the encoder are corrupted.	Gr.1	No
Cb0h	Encoder Echoback Error	The contents of communications with the encoder are incorrect.	Gr.1	No
CC0h	Multiturn Limit Disagreement	Different multiturn limits have been set in the encoder and the SERVOPACK.	Gr.1	No
Cd1h Common	SigmaLINK II Node Configuration Error	A configuration that cannot be connected with SigmaLINK II was detected.	Gr.1	No
Cd2h Common	SigmaLINK II Power Supply Short-Circuit Detected	An error occurred in the power system of the SigmaLINK II connection.	Gr.1	No
Cd3h Common	SigmaLINK II Configuration Data Checksum Error	Saving the configuration data failed.	Gr.1	No
Cd4h Common	SigmaLINK II Node Change Detected	The content saved in the configuration and the content detected in node detection are different.	Gr.1	No
Cd7h Common	SigmaLINK II I/O Device Communications Error	An error occurred in communications with the SigmaLINK II I/O device.	Gr.2	No
Cd8h Common	SigmaLINK II I/O Device Status Error	The SigmaLINK II I/O device detected an error.	Gr.2	No
CF1h	External Encoder Communications Error (Reception Failed)	Communications between the external encoder and SERVOPACK is not possible.	Gr.1	No
CF2h	External Encoder Communications Error (Timer Stopped)	An error occurred in the communications timer between the external encoder and SERVOPACK.	Gr.1	No
d00h	Position Deviation Overflow	The setting of Pn520 (2520h) (Position Deviation Overflow Alarm Level) was exceeded by the position deviation.	Gr.1	Yes
d01h	Position Deviation Overflow Alarm at Servo ON	The servo was turned ON after the position deviation exceeded the setting of Pn526 (2526h) (Position Deviation Overflow Alarm Level at Servo ON) while the servo was OFF.	Gr.1	Yes
d02h	Position Deviation Overflow Alarm for Speed Limit at Servo ON	If position deviation remains in the deviation counter, the setting of Pn529 (2529h) or Pn584 (2584h) (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 (2520h) (Position Deviation Overflow Alarm Level) is exceeded before the limit is cleared.	Gr.2	Yes
d04h	Overtravel Alarm	Overtravel was detected while the servo was ON.	Gr.1	Yes
d10h	Motor-Load Position Deviation Overflow	There was too much position deviation between the motor and load during fully-closed loop control.	Gr.2	Yes
d30h	Position Data Overflow	The position feedback data exceeded ±1879048192.	Gr.1	No
E00h	EtherCAT Initialization Timeout Error 1	Communications initialization failed between the servo control module and the EtherCAT communications module.	Gr.2	Yes

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Alarm Number	Alarm Name	Alarm Meaning	Servomotor Stopping Method	Alarm Reset Possibility
E02h Common	EtherCAT Internal Synchronization Error 1	A synchronization error occurred between the servo control module and the EtherCAT communications module.	Gr.1	Yes
E72h	Feedback Option Module Detection Failure	Detection of the feedback option module failed.	Gr.1	No
E75h	Unsupported Feedback Option Module Alarm	An unsupported feedback option module was connected.	Gr.1	No
E91h	Synchronized Stopping Occurred	An alarm occurred on the primary axis or the secondary axis and a synchronized stop was performed.	Gr.2	Yes
E93h	Unsatisfied Servo ON Command Synchronization Conditions	The servo was not turned ON although the specified time elapsed after the servo ON command synchronization request.	Gr.2	Yes
E94h Common	Position Correction Table Setting Error	There is an error in the position correction table settings.	Gr.1	Yes
E95h	Parameter Mismatch	The set parameters are different on the primary axis and the secondary axis.	Gr.1	No
EA0h	EtherCAT Initialization Timeout Error 2	Communications initialization failed between the servo control module and the EtherCAT communications module.	Gr.1	No
EA2h	EtherCAT Internal Synchronization Error 2	A synchronization error occurred between the servo control module and the EtherCAT communications module.	Gr.1	Yes
Eb1h	Safety Function Signal Input Timing Error	An error occurred in the input timing of the safety function signal.	Gr.1	No
EC8h	Gate Drive Error 1	An error occurred in the gate drive circuit.	Gr.1	No
EC9h	Gate Drive Error 2	An error occurred in the gate drive circuit.	Gr.1	No
F10h Common	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 Common	System Alarm	An internal program error occurred in the SERVOPACK.	-	No
FL-2 Common	System Alarm	An internal program error occurred in the SERVOPACK.	-	No
FL-3 Common	System Alarm	An internal program error occurred in the SERVOPACK.	-	No
FL-4 Common	System Alarm	An internal program error occurred in the SERVOPACK.	-	No
FL-5 Common	System Alarm	An internal program error occurred in the SERVOPACK.	-	No
FL-6 Common	System Alarm	An internal program error occurred in the SERVOPACK.	-	No
FL-7 Common	System Alarm	An internal program error occurred in the SERVOPACK.	-	No
CPF00 Common	Digital Operator Communications Error 1	Communications were not possible between the digital operator and the SERVOPACK.	-	No
CPF01 Common	Digital Operator Communications Error 2	Communications were not possible between the digital operator and the SERVOPACK.	-	No

9.1.2 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.

◆ 020h: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.	–

◆ 021h: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.	–

◆ 022h: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.	–

◆ 024h:System Alarm
025h:System Alarm
030h:Main Circuit Detector Error

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ 040h: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.	–
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.	–
The position unit is outside of the setting range.	Make sure it is within the following range. 0.001 ≤ Position User Unit (2701h: 1)/ Position User Unit (2701h: 2) ≤ 64000	Correct the setting of Position User Unit (2701h).	–
The primary/secondary axis setting is incorrect.	Check Pn0A1 = n.□X□□ (Primary/Secondary Axis Setting).	Change Pn0A1 = n.□X□□ so that only one axis is the primary axis.	–

◆ 041h:Encoder Output Pulse Setting Error

Possible Cause	Confirmation	Correction	Reference
The setting of Pn212 (2212h) (Number of Encoder Output Pulses) or Pn281 (2281h) (Encoder Output Resolution) is outside of the setting range or does not satisfy the setting conditions.	Check the setting of Pn212 (2212h) or Pn281 (2281h).	Set Pn212 (2212h) or Pn281 (2281h) to an appropriate value.	–

◆ 042h:Parameter Combination Error

Possible Cause	Confirmation	Correction	Reference
The speed of program jogging went below the setting range when Pn533 (2533h) or Pn585 (2585h) (Program Jogging Movement Speed) was changed.	Check if the setting of Pn533 (2533h) or Pn585 (2585h) satisfies the conditions given in the preparations for program jogging.	Increase the setting of Pn533 (2533h) or Pn585 (2585h).	–
Triggers at preset positions are enabled, but the allocations of the input signal allocation mode settings are not correct.	Check the settings of Pn660 (2660h) = n.X□□□ (Triggers at Preset Positions Selections) and Pn50A (250Ah) = n.□□□X (Input Signal Allocation Mode).	Set Pn660 (2660h) to n.1□□□ (enable triggers at preset positions), and set Pn50A (250Ah) to n.□□□2 (use Pn590 (2590h) to Pn5BC (25BCh) (Sigma-LINK II input signal allocation mode)).	–

◆ 044h:Semi-Closed/Fully-Closed Loop Control Parameter Setting Error

Possible Cause	Confirmation	Correction	Reference
The node specified by Pn0DA (20DAh) or Pn0DB (20DBh) does not exist.	Check if the setting for Pn0DA (20DAh) or Pn0DB (20DBh) is the node address of the connected device.	Set Pn0DA (20DAh) and Pn0DB (20DBh) to appropriate values.	–
An unsupported serial converter unit, encoder, or external encoder was specified by Pn0DA (20DAh).	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 (20DAh).	Check the node address set in Pn0DA (20DAh).	Set the node address of a servomotor in Pn0DA (20DAh).	–
A servomotor was specified by Pn0DB (20DBh).	Check the node address set in Pn0DB (20DBh).	Set the node address of a serial converter unit, encoder, or external encoder in Pn0DB (20DBh) (a servomotor cannot be used as an external encoder).	–
An I/O device was specified by Pn0DA (20DAh) or Pn0DB (20DBh).	Check the node address set in Pn0DA (20DAh) and Pn0DB (20DBh).	Set the node address of a servomotor in Pn0DA (20DAh), and set the node address of a serial converter unit, encoder, or external encoder in Pn0DB (20DBh).	–
The same node was specified in Pn0DA (20DAh) and Pn0DB (20DBh).	Check if Pn0DA (20DAh) and Pn0DB (20DBh) are the same value.	Set Pn0DA (20DAh) and Pn0DB (20DBh) to different values.	–
The settings of Pn002 (2002h) = n.X□□□ (External Encoder Usage) do not match the installation.	Check the setting of Pn002 (2002h) = n.X□□□.	Make sure that the setting of Pn002 (2002h) = n.X□□□ agrees with the installation.	–

◆ 046h:SigmaLINK II Command/Response Parameter Setting Error

Possible Cause	Confirmation	Correction	Reference
Slave parameters specified by Pn050 to Pn05E and Pn090 to Pn096 (SigmaLINK 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.	–

◆ 047h:Encoder with Functional Safety - Safety Mode Setting Error

Possible Cause	Confirmation	Correction	Reference
The SERVOPACK is connected to a functional safety encoder that is not supported.	Check the encoder model with SigmaWin+.	Replace the servomotor with a servomotor that uses an encoder that is not for functional safety.	–

◆ 050h: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 ≤ (Servomotor capacity/SERVOPACK capacity) ≤ 4 However, the above formula does not apply to the following products. • SGDXW-2R8A SERVOPACK and SGMXJ-A5A servomotor • SGDXW-2R8A SERVOPACK and SGMXA-A5A servomotor	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.	–

◆ 051h: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.	–

◆ 070h: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 (20DAh) was changed from rotary servomotor to linear servomotor.	Check the setting of Pn0DA (20DAh).	Change Pn0DA (20DAh) 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 (20DAh) was changed from linear servomotor to rotary servomotor.	Check the setting of Pn0DA (20DAh).	Change Pn0DA (20DAh) to the setting for a rotary servomotor and reset the motor type alarm. Then, turn the power to the SERVOPACK OFF and ON again.	–

◆ 080h:Linear Encoder Pitch Setting Error

Possible Cause	Confirmation	Correction	Reference
The setting of Pn282 (2282h) (Linear Encoder Scale Pitch) has not been changed from the default setting.	Check the setting of Pn282 (2282h).	Correct the setting of Pn282 (2282h).	–

◆ 100h: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.	–

◆ 101h:Motor Overcurrent Detected 102h: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.	–

◆ 300h: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, -330A or SGDXW.	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 (2600h) (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 (2600h).	Connect an external regenerative resistor, or set Pn600 (2600h) (Regenerative Resistor Capacity) to 0 (setting unit: ×10 W) if no regenerative resistor is required.	–
An external regenerative resistor is not connected to one of the following SERVOPACKs: SGDXS-470A, -550A, -590A, or -780A.	Check to see if an external regenerative resistor or regenerative resistor unit is connected and check the setting of Pn600 (2600h).	Connect an external regenerative resistor and set Pn600 (2600h) to an appropriate value. Or connect a regenerative resistor unit and set Pn600 (2600h) (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.	–

◆ 320h: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 (2600h) (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 (2600h).	Correct the setting of Pn600 (2600h).	–
The setting of Pn603 (2603h) (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 (2603h).	Correct the setting of Pn603 (2603h).	–
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.	–

◆ 330h: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 (2600h) (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 (2600h).	Connect an external regenerative resistor, or if an external regenerative resistor is not required, set Pn600 (2600h) to 0.	–
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ 400h:Overvoltage

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.	–
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.	–
The position unit is outside of the setting range.	Make sure it is within the following range. 0.001 ≤ Position User Unit (2701h: 1)/ Position User Unit (2701h: 2) ≤ 64000	Correct the setting of Position User Unit (2701h).	–
The primary/secondary axis setting is incorrect.	Check Pn0A1 = n.□X□□ (Primary/Secondary Axis Setting).	• Change Pn0A1 = n.□X□□ so that only one axis is the primary axis. • When using torque assistance with 3 or more axes, set Pn0A1 to □0□□ for the primary axis and □1□□ to the secondary axis.	–

◆ 410h: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 (2509h) (Momentary Power Interruption Hold Time), decrease the setting.	–
The SERVOPACK fuse is blown out.	Check the power supply wiring.	Correct the power supply wiring and replace the SERVOPACK.	–
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.	–

◆ 50Dh:Relative Position Deviation Overflow Alarm

Possible Cause	Confirmation	Correction	Reference
Twisting of mechanical parts has occurred between primary axis and secondary axis.	Check the position deviation between the axes.	Resolve the twisting of mechanical parts between the axes.	–
Primary axis and secondary axis are not synchronized with the reference.	Check the reference position for primary axis and secondary axis.	The host controller should command the system to synchronize operation of primary axis and secondary axis.	–
Pn66A (Relative Position Deviation Overflow Alarm Level) is low for the operating conditions.	Check if Pn66A (Relative Position Deviation Overflow Alarm Level) is appropriate.	Set Pn66A to an appropriate value.	–

◆ 510h: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.	Tune the servo gain. Or, reconsider the operating conditions.	–
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ 511h: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 (2212h) (Number of Encoder Output Pulses) or Pn281 (2281h) (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.	–

◆ 520h: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 (2100h) (Speed Loop Gain).	–
The setting of Pn103 (2103h) (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 (2103h) (Moment of Inertia Ratio) to an appropriate value.	–
The setting of Pn312 (2312h) or Pn384 (2384h) (Vibration Detection Level) is not suitable.	Check that the setting of Pn312 (2312h) or Pn384 (2384h) (Vibration Detection Level) is suitable.	Set Pn312 (2312h) or Pn384 (2384h) (Vibration Detection Level) to an appropriate value.	–

◆ 521h: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.	–

◆ 550h:Maximum Motor Speed Setting Error

Possible Cause	Confirmation	Correction	Reference
The setting of Pn385 (2385h) (Maximum Motor Speed) is greater than the maximum speed.	Check the setting of Pn385 (2385h), and the upper limits of the maximum motor speed setting and the encoder output resolution setting.	Set Pn385 (2385h) to a value that does not exceed the maximum motor speed.	–

◆ 710h:Instantaneous Overload 720h: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 (2282h) (Linear Encoder Scale Pitch).	Check the setting of Pn282 (2282h).	Set Pn282 (2282h) to an appropriate value.	–
There is an error in the setting of Pn080 (2080h) = n.□□X□ (Motor Phase Sequence Selection).	Check the setting of Pn080 (2080h) = n.□□X□.	Set Pn080 (2080h) = n.□□X□ to an appropriate value.	–
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ 730h:Dynamic Brake Overload 731h: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: • 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.	–

◆ 740h: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.	–

◆ 7A1h:Internal Temperature Error 1 (Control Board Temperature Error) 7A2h: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.	–

◆ 7A3h:Internal Temperature Sensor Error

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ 7Abh: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.	–

◆ 810h: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.	–

◆ 820h:Encoder Checksum Alarm

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the encoder.	–	• 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 single-turn absolute encoder or incremental encoder – 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.	–

◆ 830h: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.	–

◆ 840h: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.	–

◆ 850h: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.	–

◆ 860h: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.	–

◆ 861h: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.	–

◆ 862h: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 over-heat protection input information on the operation monitor of the SigmaWin+.	Repair the line for the overheat protec-tion 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.	–

◆ 890h: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.	–

◆ 891h: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.	–

◆ 8A0h: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 con-firm that the motor is not moving.	The motor must be stopped while set-ting the origin position.	–
A failure occurred in the external encoder.	–	Replace the external encoder.	–

◆ 8A1h: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 con-verter unit.	–	Replace the serial converter unit.	–

◆ 8A2h:External Incremental Encoder Sensor Error

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the external encoder.	–	Replace the external encoder.	–

◆ 8A3h: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.	–

◆ 8A5h: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.	–

◆ 8A6h:External Encoder Overheated

Possible Cause	Confirmation	Correction	Reference
An overheating error was detected in the external encoder.	–	Replace the external encoder.	–

◆ A10h:EtherCAT DC Synchronization Error

Possible Cause	Confirmation	Correction	Reference
The synchronization timing (Sync0) for EtherCAT communications fluctuated.	–	Turn the power OFF and ON again and re-establish communications.	–

◆ A11h:EtherCAT State Error

Possible Cause	Confirmation	Correction	Reference
The EtherCAT communications state left the Operational state during motor operation.	–	Reset the alarm and then re-establish communications.	–

◆ A12h:EtherCAT Output Data Synchronization Error

Possible Cause	Confirmation	Correction	Reference
Noise caused an error in EtherCAT communications.	–	Check the EtherCAT wiring and implement noise countermeasures.	–
The controller did not update the process data during the fixed cycle.	Check the process data specified by the controller.	Correct the controller so that the process data is updated during the fixed cycle.	–
The EtherCAT communications cable or connector wiring is faulty.	Check the EtherCAT communications cable and connector wiring.	Wire the cable correctly.	–

◆ A20h:Parameter Setting Error

Possible Cause	Confirmation	Correction	Reference
The speed unit is outside of the setting range.	Make sure it is within the following range. 1/256 ≤ Velocity User Unit (2702h:1)/ Velocity User Unit (2702h:2) ≤ 33554432	Correct the setting of Velocity User Unit (2702h).	–
The acceleration unit is outside of the setting range.	Make sure it is within the following range. 1/256 ≤ Acceleration User Unit (2703h:1)/Acceleration User Unit (2703h:2) ≤ 1048576	Correct the setting of Acceleration User Unit (2703h).	–
The settings of the first and last rotational coordinate are outside the valid range.	Confirm that the settings conform to the following equation: Max position range limit (607Bh:2) - Min position range limit (607Bh:1) + 1 ≤ 0x7FFFFFFF	Correct the setting of Position Range Limit (607Bh).	–
When rotational coordinate system is enabled, the offset value between the zero point position of the application and the home position of the machine are outside the setting range.	Make sure it is within the following range. Min position range limit (607Bh:1) ≤ Home Offset (607Ch) ≤ Max position range limit (607Bh:2)	Correct the setting of Home Offset (607Ch).	–

◆ A41h:Communication Device Initialization Error

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.	–

◆ A47h:Loading Servo Information Error

Possible Cause	Confirmation	Correction	Reference
User Parameter Configuration (2700h) was executed while a utility function (Fn***) was being executed from the digital operator or SigmaWin+.	–	Turn the power OFF and ON again.	–
The power was turned ON or User Parameter Configuration (2700h) was executed when an encoder was not connected.	Check the wiring of the encoder.	Turn OFF the power, correct the encoder connection, and then turn the power ON again.	–
The power was turned ON or User Parameter Configuration (2700h) was executed when there was an alarm 040h (Parameter Setting Error).	Check the parameter settings.	Correct the parameter settings and turn the power OFF and ON again.	–
A failure occurred in the SERVOPACK.	–	Replace the SERVOPACK.	–

◆ b00h:Initial Communications between Axes Error (Primary Axis)

Possible Cause	Confirmation	Correction	Reference
The primary/secondary axis setting is incorrect.	Check Pn0A1 = n.□X□□ (Primary/Secondary Axis Setting).	Change Pn0A1 = n.□X□□ so that only one axis is the primary axis.	–
The wiring between axes is not correct.	Check the wiring for communications between axes.	Correct the communications cable wiring between axes.	–
The power ON timing is off from the other axis by 3 seconds or longer.	Check the power ON sequence for the SERVOPACK.	Change the power ON sequence so that the power supply for the other axis for communications between axes is turned ON at the same time.	–
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.	–

◆ b01h:Cyclic Communications between Axes Error (Primary Axis)

Possible Cause	Confirmation	Correction	Reference
A reception error occurred in the communications data between axes due to noise.	–	Implement countermeasures against noise.	–

◆ b03h:Initial Communications between Axes Error (Secondary Axis)

Possible Cause	Confirmation	Correction	Reference
The primary/secondary axis setting is incorrect.	Check Pn0A1 = n.□X□□ (Primary/Secondary Axis Setting).	Change Pn0A1 = n.□X□□ so that only one axis is the primary axis.	–
The wiring between axes is not correct.	Check the wiring for communications between axes.	Correct the communications cable wiring between axes.	–
The power ON timing is off from the other axis by 3 seconds or longer.	Check the power ON sequence for the SERVOPACK.	Change the power ON sequence so that the power supply for the other axis for communications between axes is turned ON at the same time.	–
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.	–

◆ b04h:Cyclic Communications between Axes Error (Secondary Axis)

Possible Cause	Confirmation	Correction	Reference
A reception error occurred in the communications data between axes due to noise.	–	Implement countermeasures against noise.	–

◆ b33h: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.	–

◆ bE2h:Firmware error
bF0h:System Alarm 0
bF1h:System Alarm 1
bF2h:System Alarm 2
bF3h:System Alarm 3
bF4h:System Alarm 4
bF5h:System Alarm 5
bF6h:System Alarm 6
bF7h:System Alarm 7
bF8h:System Alarm 8
bFbh:System Alarm B
bFdh: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.	–

◆ C10h: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 (2080h) = n.□□X□ (Motor Phase Sequence Selection).	Check the setting of Pn080 (2080h) = n.□□X□.	Set Pn080 (2080h) = n.□□X□ to an appropriate value.	–
When using an absolute encoder, the setting of Pn080 (2080h) = 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.	–

◆ C20h: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 (2080h) = n.□□X□ (Motor Phase Sequence Selection). Check the installation orientation for the linear encoder and moving coil.	Check the setting of Pn080 (2080h) = 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 (2282h) (Linear Encoder Scale Pitch) is not correct.	Check the setting of Pn282 (2282h) (Linear Encoder Scale Pitch).	Check the specifications of the linear encoder and set a correct value.	–

◆ C21h: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.	–

◆ C22h:Phase Information Disagreement

Possible Cause	Confirmation	Correction	Reference
The SERVOPACK phase information is different from the linear encoder phase information.	–	Perform polarity detection.	–

◆ C50h: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 (2282h) (Linear Encoder Scale Pitch) and Pn080 (2080h) = 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 (2481h) (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 (2485h) (Polarity Detection Reference Speed). However, increasing the setting of Pn485 (2485h) will increase the servomotor movement range that is required for polarity detection.	–

◆ C51h: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.	–

◆ C52h:Polarity Detection Not Completed

Possible Cause	Confirmation	Correction	Reference
The servo was turned ON when using an absolute linear encoder, Pn587 (2587h) was set to n.□□□0 (do not detect polarity), and the polarity had not been detected.	–	When using an absolute linear encoder, set Pn587 (2587h) to n.□□□1 (detect polarity).	–

◆ C53h:Out of Range of Motion for Polarity Detection

Possible Cause	Confirmation	Correction	Reference
The travel distance exceeded the setting of Pn48E (248Eh) (Polarity Detection Range) in the middle of detection.	–	Increase the setting of Pn48E (248Eh) (Polarity Detection Range). Or, increase the setting of Pn481 (2481h) (Polarity Detection Speed Loop Gain).	–

◆ C54h:Polarity Detection Failure 2

Possible Cause	Confirmation	Correction	Reference
An external force was applied to the servomotor.	–	Increase the setting of Pn495 (2495h) (Polarity Detection Confirmation Force Reference). Increase the setting of Pn498 (2498h) (Polarity Detection Allowable Error Range). Increasing the allowable error will also increase the motor temperature.	–

◆ C80h: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.	–

◆ C90h: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.	–
In the case of Σ-XS： Self-configuration was executed without connecting the encoder cable to CN2 In the case of Σ-XW: Self-configuration was executed without connecting the encoder cable to CN2A and CN2B	Check the content that was saved with self-configuration and the actual device connections.	Execute self-configuration again. Or discard the self-configuration results data.	–
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.	–

◆ C91h: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.	–

◆ C92h: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.	–

◆ CA0h: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.	–

◆ Cb0h: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.	–	• 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.	–

◆ CC0h:Multiturn Limit Disagreement

Possible Cause	Confirmation	Correction	Reference
When using a direct drive servomotor, the setting of Pn205 (2205h) (Multiturn Limit) does not agree with the encoder.	Check the setting of Pn205 (2205h).	Correct the setting of Pn205 (2205h) (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 (2205h) (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.	–

◆ Cd1h:SigmaLINK II Node Configuration Error

Possible Cause	Confirmation	Correction	Reference
For Σ-XS: Nodes that are compatible and incompatible with SigmaLINK II are connected. For Σ-XW: Nodes that are compatible and incompatible with SigmaLINK II are connected on the same transmission path.	For Σ-XS: Check if nodes that are compatible and incompatible with SigmaLINK II are connected. For Σ-XW: Check if nodes that are compatible and incompatible with SigmaLINK II are connected on the same transmission path (on an extension cable with the same connector).	For Σ-XS: Make all of the connected nodes either compatible or incompatible with SigmaLINK II. For Σ-XW: • Connect nodes that are compatible and incompatible with SigmaLINK II on separate transmission paths. • Make all of the connected nodes compatible with SigmaLINK II.	–
For Σ-XS: Four or more nodes are connected. For Σ-XW: Four or more nodes are connected on the same transmission path.	For Σ-XS: Check the number of connected servomotors, external encoders, and I/O devices. For Σ-XW: Check the number of servomotors, external encoders, and I/O devices connected to the same connector.	For Σ-XS: Connect no more than a total of three servomotors, external encoders, and I/O devices. For Σ-XW: Connect no more than a total of three servomotors, external encoders, and I/O devices to the same connector.	–
For Σ-XS: Two or more servomotors are connected. For Σ-XW: Three or more servomotors are connected.	For Σ-XS: Check the number of servomotors that are connected. For Σ-XW: Check the number of servomotors that are connected.	For Σ-XS: Connect one servomotor. For Σ-XW: Connect two servomotors.	–
For Σ-XS: Two or more external encoders are connected. For Σ-XW: Three or more external encoders are connected.	For Σ-XS: Check the number of external encoders that are connected. For Σ-XW: Check the number of external encoders that are connected.	For Σ-XS: Connect one external encoder. For Σ-XW: Connect two external encoders.	–

◆ Cd2h:SigmaLINK II Power Supply Short-Circuit Detected

Possible Cause	Confirmation	Correction	Reference
For Σ-XS: The CN2 power supply is short-circuited. For Σ-XW: The CN2A and CN2B 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.	–

◆ Cd3h: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.	–

◆ Cd4h: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.	–

◆ Cd7h: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.	• 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.	–

◆ Cd8h: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.	–

◆ CF1h:External Encoder Communications Error (Reception Failed)

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.	–
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.	–

◆ CF2h:External Encoder Communications Error (Timer Stopped)

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.	–

◆ d00h: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 an EtherCAT command.	–
The setting of Pn520 (2520h) (Position Deviation Overflow Alarm Level) is too low for the operating conditions.	Check the setting of Pn520 (2520h) (Position Deviation Overflow Alarm Level) to see if it is set to an appropriate value.	Optimize the setting of Pn520 (2520h).	–
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.	–

◆ d01h: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 (2526h) (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 (2526h) (Position Deviation Overflow Alarm Level at Servo ON).	–

◆ d02h:Position Deviation Overflow Alarm for Speed Limit at Servo ON

Possible Cause	Confirmation	Correction	Reference
If position deviation remains in the deviation counter, the setting of Pn529 (2529h) or Pn584 (2584h) (Speed Limit Level at Servo ON) limits the speed when the servo is turned ON. This alarm occurs if a position reference is input and the setting of Pn520 (2520h) (Position Deviation Overflow Alarm Level) is exceeded.	–	Optimize the setting of Pn520 (2520h). Or, set Pn529 (2529h) or Pn584 (2584h) to an appropriate value.	–

◆ d04h:Overtravel Alarm

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.	• 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.	–

◆ d10h:Motor-Load Position Deviation Overflow

Possible Cause	Confirmation	Correction	Reference
The motor direction and external encoder installation orientation are backward.	Check the motor direction and the external encoder installation orientation.	Install the external encoder in the opposite direction, or change the setting of Pn002 (2002h) = n.X□□□ (External Encoder Usage) to reverse the direction.	–
There is an error in the connection between the load (e.g., stage) and external encoder coupling.	Check the coupling of the external encoder.	Check the mechanical coupling.	–

◆ d30h:Position Data Overflow

Possible Cause	Confirmation	Correction	Reference
The position data exceeded ±1879048192.	Check the input reference pulse counter.	Reconsider the operating specifications.	–

◆ E00h:EtherCAT Initialization Timeout Error 1

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the SERVOPACK.	–	Replace the SERVOPACK.	–

◆ E02h:EtherCAT Internal Synchronization Error 1

Possible Cause	Confirmation	Correction	Reference
The EtherCAT transmission cycle fluctuated.	–	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.	–

◆ E72h: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.	–

◆ E75h:Unsupported Feedback Option Module Alarm

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the feedback option module.	–	Replace the safety option module.	–
An unsupported feedback option module was connected.	Refer to the catalog of the connected feedback option module or the manual of the SERVOPACK.	Connect a compatible feedback option module.	–

◆ E91h:Synchronized Stopping Occurred

Possible Cause	Confirmation	Correction	Reference
An alarm occurred on a single axis.	Check the alarm that occurred on the single axis.	Troubleshoot the problem according to the correction methods for the alarm that occurred on the single axis.	–
The servo was turned OFF for the secondary axis only while the signal synchronization function was enabled.	Check the commands sent from the host controller.	Send the servo OFF (Disable Operation) command to the primary axis to turn OFF the servo when the signal synchronization function is enabled.	–

◆ E93h:Unsatisfied Servo ON Command Synchronization Conditions

Possible Cause	Confirmation	Correction	Reference
The servo was not turned ON although the specified time elapsed after the servo ON command synchronization request.	Check the commands sent from the host controller. Check the wiring between axes.	Send usable servo commands. Correct the communications cables.	–

◆ E94h:Position Correction Table Setting Error

Possible Cause	Confirmation	Correction	Reference
The data set in the position correction table (pre-correction positions and correction amounts) is corrupted.	Check the pre-correction positions and correction amounts in the position correction table.	Initialize the position correction table. Restart the SERVOPACK after initialization. If it starts normally, set the position correction table again. If the SERVOPACK does not start normally after initialization, it may be faulty. Replace the SERVOPACK.	–
The position correction table was set with values outside the setting range.	Check if the table entries, pre-correction positions, correction amounts, correction positions (pre-correction positions +correction amounts) have exceeded the setting ranges.	Set the number of position correction table entries between 2 and 128. Set pre-correction positions, correction amounts, and correction positions between -2147483648 and 2147483647. Set the difference between one pre-correction position and the following pre-correction position between -1073741824 and 1073741823. Set the difference between one correction amount and the following correction amount between -1073741824 and 1073741823.	–
The pre-correction positions in the position correction table are not set in ascending order.	Check if the pre-correction positions are set in ascending order.	Set the position correction table so that the pre-correction positions are in ascending order.	–
The correction positions calculated from the pre-correction positions and correction amounts in the position correction table are not in ascending order.	Check if the correction positions (pre-correction positions+correction amounts) are set in ascending order.	Set the position correction table so that the correction positions are in ascending order.	–

◆ E95h:Parameter Mismatch

Possible Cause	Confirmation	Correction	Reference
There are settings that must be the same on the primary axis and the secondary axis, but the parameter set values are different.	Compare the parameter set values on the primary axis and the secondary axis.	Make the parameter set values on the primary axis and the secondary axis the same.	–

◆ EA0h:EtherCAT Initialization Timeout Error 2

Possible Cause	Confirmation	Correction	Reference
A failure occurred in the SERVOPACK.	–	Repair or replace the SERVOPACK.	–

◆ EA2h:EtherCAT Internal Synchronization Error 2

Possible Cause	Confirmation	Correction	Reference
The synchronization timing inside the SERVOPACK fluctuated because the synchronization timing (Sync0) for EtherCAT communications fluctuated.	–	Turn the power OFF and ON again and re-establish communications.	–
A failure occurred in the SERVOPACK.	–	Repair or replace the SERVOPACK.	–

◆ Eb1h: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.	–

◆ EC8h:Gate Drive Error 1
EC9h: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.	–

◆ F10h: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 (200Bh) = 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.	–
Communications were interrupted when the power was turned OFF and ON again or when a utility function was running.	–	Wait for communications with the digital operator to recover. Or disconnect the connector and insert it again.	–

◆ 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.	–
Communications were interrupted when the power was turned OFF and ON again or when a utility function was running.	–	Wait for communications with the digital operator to recover. Or disconnect the connector and insert it again.	–

9.2 Warning Displays

To check a warning that occurs in the SERVOPACK, use one of the following methods. Warnings are displayed to warn you before an alarm occurs.

Panel display on SERVOPACK	If there is a warning, the code will be displayed one character at a time, as shown below. Example: Alarm A.910 Status Indications → Not lit. → A. → Not lit. → 9 → Not lit. → 1 → Not lit. → 0 → Not lit.
Digital operator	The warning code is displayed.
Statusword (6041h)	Bit 7 (Warning) in the Statusword will change to 1. (Bit 7 is 0 during normal operation.)
Error code (603Fh)	A current warning code is stored in object 603Fh.
Emergency message	The controller is notified of any warning that occurs. (Notification may not be possible if EtherCAT communications are unstable.)

This section provides a list of warnings and the causes of and corrections for warnings.

9.2.1 Warnings Table

The list of warnings gives the warning name and warning meaning in order of the warning numbers.

If Common is given below the warning number, the warning applies to both axes of the Σ-XW SERVOPACK. If a warning occurs for one axis, the same warning status will occur for the other axis.

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
911h	Pn310 (2310h) = n.□□□X (Vibration Detection Selection)
923h	– (Not affected by the setting of Pn008 (2008h) = n.□X□□.)
930h	Pn008 (2008h) = n.□□□X (Low Battery Voltage Alarm/Warning Selection)
932h	Pn0DD (20DDh) = n.□□□X (SigmaLINK II I/O Device Communications Check Mask)
933h	Pn0DD (20DDh) = n.□X□□ (SigmaLINK II I/O Device Status Check Mask)
971h	Pn008 (2008h) = n.□□X□ (Function Selection for Undervoltage) (Not affected by the setting of Pn008 (2008h) = n.□X□□.)
9A0h	Pn00D (200Dh) = n.X□□□ (Overtravel Warning Detection Selection) (Not affected by the setting of Pn008 (2008h) = n.□X□□.)
9b0h	Pn00F (200Fh) = n.□□□X (SERVOPACK Preventative Maintenance Warning Selection)
9b1h	Pn00F (200Fh) = n.□□X□ (Servomotor Preventative Maintenance Warning Selection)

Warning Number	Warning Name	Warning Meaning
900h	Position Deviation Overflow	The position deviation exceeded the percentage set with the following formula: (Pn520 (2520h) × Pn51E (251Eh)/100)
901h	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 (2526h) × Pn528 (2528h)/100)
905h	Error Detection Warning	An error was detected in error detection.

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Warning Number	Warning Name	Warning Meaning
90Dh	Relative Position Deviation Overflow Warning	The position deviation between primary axis and secondary axis has exceeded the percentage set with the following equation during the servo ON state. (Pn66A × Pn669/100)
910h	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.
911h	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 (2310h) (Vibration Detection Selections).
912h Common	Internal Temperature Warning 1 (Control Board Temperature Error)	The surrounding temperature of the control board is abnormal.
913h Common	Internal Temperature Warning 2 (Power Board Temperature Error)	The surrounding temperature of the power board is abnormal.
920h Common	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.
923h Common	SERVOPACK Built- Fan Stopped	The fan inside the SERVOPACK stopped.
930h	Absolute Encoder Battery Error	This warning occurs when the voltage of absolute encoder's battery is low.
932h Common	SigmaLINK II I/O Device Communications Warning	An error occurred in communications with the SigmaLINK II I/O device.
933h Common	SigmaLINK II I/O Device Status Warning	The SigmaLINK II I/O device detected an error.
93bh	Overheat Warning	The input voltage (temperature) of the overheat protection input (TH) signal exceeded the setting of Pn61C (261Ch) (Overheat Warning Level).
942h	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.
971h Common	Undervoltage	This warning occurs before an A.410 alarm (Undervoltage) occurs. If the warning is ignored and operation is continued, an alarm may occur.
97Ch	Synchronized Stopping Occurred	An alarm occurred on the primary axis or the secondary axis and a synchronized stop was performed.
9A0h	Overtravel	Overtravel was detected while the servo was ON.
9b0h Common	SERVOPACK Preventative Maintenance Warning	One of the consumable parts of the SERVOPACK has reached the end of its service life.
9b1h	Servomotor Preventative Maintenance Warning	One of the consumable parts of the servomotor has reached the time when maintenance is needed.

9.2.2 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.

◆ 900h: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 an EtherCAT command.	–
The excessive position deviation alarm level (Pn520 (2520h) × Pn51E (251Eh) /100) is too low for the operating conditions.	Check excessive position deviation alarm level (Pn520 (2520h) × Pn51E (251Eh) /100) to see if it is set to an appropriate value.	Optimize the setting of Pn520 (2520h) and Pn51E (251Eh).	–
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.	–

◆ 901h: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 (2526h) × Pn528 (2528h)/100)	–	Optimize the setting of Pn528 (2528h) (Position Deviation Overflow Warning Level at Servo ON).	–

◆ 905h: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).	–
The correct sample data is not saved.	Check if the SigmaWin+ is Ver. 7.42 or higher.	First upgrade to the SigmaWin+ Ver. 7.42 or higher, and then create the sample data again.	–

◆ 90Dh:Relative Position Deviation Overflow Warning

Possible Cause	Confirmation	Correction	Reference
Twisting of mechanical parts has occurred between primary axis and secondary axis.	Check the position deviation between the axes.	Resolve the twisting of mechanical parts between the axes.	–
Primary axis and secondary axis are not synchronized with the reference.	Check the reference position for primary axis and secondary axis.	The host controller should command the system to synchronize operation of primary axis and secondary axis.	–
Pn66A (Relative Position Deviation Overflow Alarm Level) is low for the operating conditions.	Check if Pn66A (Relative Position Deviation Overflow Alarm Level) is appropriate.	Set Pn66A to an appropriate value.	–

◆ 910h: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 (252Bh) (Overload Warning Level) is not suitable.	Check that the setting of Pn52B (252Bh) (Overload Warning Level) is suitable.	Set Pn52B (252Bh) (Overload Warning Level) to an appropriate value.	–
A failure occurred in the SERVOPACK.	–	The SERVOPACK may be faulty. Replace the SERVOPACK.	–

◆ 911h: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 (2103h) (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 (2103h) (Moment of Inertia Ratio) to an appropriate value.	–
The setting of Pn312 (2312h) or Pn384 (2384h) (Vibration Detection Level) is not suitable.	Check that the setting of Pn312 (2312h) or Pn384 (2384h) (Vibration Detection Level) is suitable.	Set Pn312 (2312h) or Pn384 (2384h) (Vibration Detection Level) to an appropriate value.	–

◆ 912h:Internal Temperature Warning 1 (Control Board Temperature Error) 913h: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.	–

◆ 920h: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.	–

◆ 923h: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.	–

◆ 930h: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.	–

◆ 932h: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.	–

◆ 933h: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.	–

◆ 93bh: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.	–

◆ 942h: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.	–

◆ 971h: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 (2509h) (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.	–

◆ 97Ch:Synchronized Stopping Occurred

Possible Cause	Confirmation	Correction	Reference
An alarm occurred on a single axis.	Check the alarm that occurred on the single axis.	Troubleshoot the problem according to the correction methods for the alarm that occurred on the single axis.	–
The servo was turned OFF for the secondary axis only while the signal synchronization function was enabled.	Check the commands sent from the host controller.	Send the servo OFF (Disable Operation) command to the primary axis to turn OFF the servo when the signal synchronization function is enabled.	–

◆ 9A0h: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.	Even if an overtravel signal is not shown by the input signal monitor, momentary overtravel may have been detected. Take the following precautions. • Do not specify movements that would cause overtravel from the host controller. • Check the wiring of the overtravel signals. • Implement countermeasures against noise.	–

◆ 9b0h: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.	–

◆ 9b1h: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.	–

9.3 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.

9.3.1 Servomotor Does Not Start

Possible Cause	Confirmation	Correction	Reference
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 (2002h) = n.□X□□ (Encoder Usage).	Check the type of the encoder that is being used and the setting of Pn002 (2002h) = n.□X□□.	Set Pn002 (2002h) = 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 (250Ah), Pn50B (250Bh), Pn511 (2511h), Pn516 (2516h) or • Pn50A (250Ah), Pn590 (2590h) to Pn599 (2599h)	Correctly allocate the input signals.	–
The Servo ON command (Enable Operation command) was not sent.	Make sure the Servo ON command (Enable Operation command) is set to “Operation enabled”.	Set the correct value for the Servo ON command (Enable Operation command).	–
The torque limit reference is too small.	Check the torque limit reference.	Increase the torque limit reference.	–
The Operation Mode is not set.	Check if the Operation Mode (6060h) is set correctly.	Set the Operation Mode (6060h) correctly.	–
A software limit is active.	Check to see if the target position exceeds a software limit.	Specify a target position that is within the software limits.	–
EtherCAT communications are not established.	Check to see if the EtherCAT indicator shows the Operational state.	Place the EtherCAT communications in the Operational state.	–
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.	• Turn ON the FSTP signal. • If you will not use the function to force the motor to stop, set Pn516 (2516h) = 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 (2080h) = n.□□□X (Polarity Sensor Selection).	Correct the parameter setting.	–
	Check the inputs to the Servo ON command (Enable Operation command).	• If you are using an incremental linear encoder, send the Servo ON command (Enable Operation command) from the host controller. • If you are using an absolute linear encoder, execute polarity detection.	–

9.3.2 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 (2282h) (Linear Encoder Scale Pitch) is not correct.	Check the setting of Pn282 (2282h).	Correct the setting of Pn282 (2282h).	–
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 (2080h) = 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 ±10°.	Correct the settings for the polarity detection-related parameters.	–

9.3.3 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.	–

9.3.4 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 (2080h) = 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 ±10°.	Correct the settings for the polarity detection-related parameters.	–

9.3.5 Dynamic Brake (DB) Does Not Operate

Possible Cause	Confirmation	Correction	Reference
The setting of Pn001 (2001h) = n.□□□X (Motor Stopping Method for Servo OFF and Group 1 Alarms) is not suitable.	Check the setting of Pn001 (2001h) = n.□□□X.	Correct the setting of Pn001 (2001h) = 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.	–

9.3.6 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 (2170h) = 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.	–

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Possible Cause	Confirmation	Correction	Reference
The bearings are defective.	Turn OFF the power to the servo system. Check for noise and vibration around the bearings.	Replace the servomotor.	–
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.	• 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.	–

9.3.7 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 (2100h) (Speed Loop Gain) is too high.	Check the setting of Pn100 (2100h) (Speed Loop Gain). The default setting is Kv = 40.0 Hz.	Set Pn100 (2100h) (Speed Loop Gain) to an appropriate value.	–
The setting of Pn102 (2102h) (Position Loop Gain) is too high.	Check the setting of Pn102 (2102h) (Position Loop Gain). The default setting is Kp = 40.0/s.	Set Pn102 (2102h) (Position Loop Gain) to an appropriate value.	–
The setting of Pn101 (2101h) (Speed Loop Integral Time Constant) is not appropriate.	Check the setting of Pn101 (2101h) (Speed Loop Integral Time Constant). The default setting is Ti = 20.0 ms.	Set Pn101 (2101h) (Speed Loop Integral Time Constant) to an appropriate value.	–
The setting of Pn103 (2103h) (Moment of Inertia Ratio) is not appropriate.	Check the setting of Pn103 (2103h) (Moment of Inertia Ratio).	Set Pn103 (2103h) (Moment of Inertia Ratio) to an appropriate value.	–

9.3.8 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 (2100h) (Speed Loop Gain) is too high.	Check the setting of Pn100 (2100h) (Speed Loop Gain). The default setting is Kv = 40.0 Hz.	Set Pn100 (2100h) (Speed Loop Gain) to an appropriate value.	–
The setting of Pn102 (2102h) (Position Loop Gain) is too high.	Check the setting of Pn102 (2102h) (Position Loop Gain). The default setting is Kp = 40.0/s.	Set Pn102 (2102h) (Position Loop Gain) to an appropriate value.	–
The setting of Pn101 (2101h) (Speed Loop Integral Time Constant) is not appropriate.	Check the setting of Pn101 (2101h) (Speed Loop Integral Time Constant). The default setting is Ti = 20.0 ms.	Set Pn101 (2101h) (Speed Loop Integral Time Constant) to an appropriate value.	–
The setting of Pn103 (2103h) (Moment of Inertia Ratio) is not appropriate.	Check the setting of Pn103 (2103h) (Moment of Inertia Ratio).	Set Pn103 (2103h) (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 (2483h) (Forward Force Limit) and Pn484 (2484h) (Reverse Force Limit) are set to the default values.	Force limits: Default settings Pn483 (2483h) = 30% Pn484 (2484h) = 30%	Set Pn483 (2483h) (Forward Force Limit) and Pn484 (2484h) (Reverse Force Limit) to appropriate values.	–

9.3.9 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.	• 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.	–

9.3.10 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 (250Ah)/ Pn50B (250Bh) or Pn590 (2590h)/ Pn50B (250Bh)).	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: • Pn50A (250Ah) = n.□□□1 (use Sigma-7S-compatible I/O signal allocations) and the P-OT signal is allocated to CN1 with Pn50A (250Ah) = n.X□□□. • Pn50A (250Ah) = n.□□□2 (use SigmaLINK II input signal allocation) and the P-OT signal is allocated to CN1 with Pn590 (2590h).	Set the parameters to correct values.	–
	Check if the SERVOPACK is configured in one of the following ways: • Pn50A (250Ah) = n.□□□1 (use Sigma-7S-compatible I/O signal allocations) and the N-OT signal is allocated to CN1 with Pn50B (250Bh) = n.□□□X. • Pn50A (250Ah) = n.□□□2 (use SigmaLINK II input signal allocation) and the N-OT signal is allocated to CN1 with Pn591 (2591h).	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 (2001h) = n.□□□X or Pn001 (2001h) = n.□□X□.	Select a servomotor stopping method other than coasting to a stop.	–
	Check the torque control stopping method set in Pn001 (2001h) = n.□□□X or Pn001 (2001h) = n.□□X□.	Select a servomotor stopping method other than coasting to a stop.	

9.3.11 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.	–

9.3.12 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.	• 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.	–

9.3.13 Servomotor Overheated

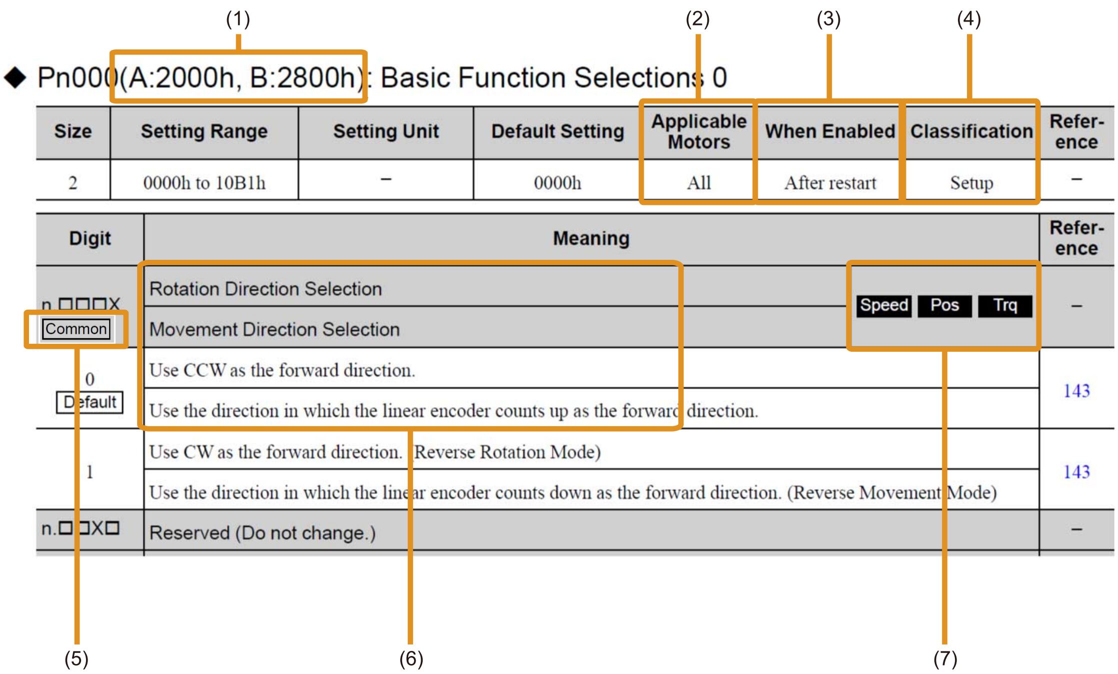
Possible Cause	Confirmation	Correction	Reference
The surrounding temperature is too high.	Measure the surrounding temperature around the servomotor.	Reduce the surrounding temperature to 40°C or less.	–
The surface of the servomotor is dirty.	Turn OFF the power to the servo system. Visually check the 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 ±10°.	Correct the settings for the polarity detection-related parameters.	–

10

Parameter and Object Lists

This chapter provides information on parameters and objects.

10.1 Interpreting the Parameter Lists



No.	Item	Meaning
(1)	Index Numbers	The numbers in parentheses are the index numbers that correspond to the EtherCAT objects. There are index numbers that are assigned to each axis (axis A and axis B) and index numbers that are shared between both axes.
(2)	Applicable Motors	Indicates the types of servomotors to which the parameter applies. • 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. If this item differs by digit, it is added to the digit table. 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 manuals for details. Σ-XS SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 02) Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)
(3)	When Enabled	Indicates when a change to the parameter will be effective. “After restart” indicates parameters that will be effective after one of the following is executed. • The power is turned OFF and ON again. • A software reset is executed. If this item differs by digit, it is added to the digit table.
(4)	Classification	There are the following two classifications. • Setup • Tuning Refer to the following manuals for details. Σ-XS SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 02) Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)
(5)	Common	Indicates that the parameter applies to both axes A and B of the Σ-XW SERVOPACK. If you change the setting, the new setting will be applied to both axes. For parameters for numeric settings and for parameters for selecting functions where all digits are for all axes, this item is added next to the parameter name.

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No.	Item	Meaning
(6)	Digit Name and Setting Description	If there are differences in the parameters for rotary servomotor and linear servomotor, information is provided for both. • Top row: For rotary servomotors • Bottom row: For linear servomotors Only the index number for the axis A is given, even if the index numbers are different for each axis (axis A and axis B) of the Σ-XW SERVOPACK.
(7)	Control Mode	Speed: A parameter that can be used in speed control. Pos: A parameter that can be used in position control. Trq: A parameter that can be used in torque control. "Torque" is used even for linear servomotor parameters. Grayed-out icons (Speed, Pos, Trq) indicate parameters that cannot be used in the corresponding control method. For parameters for numeric settings, this item is added next to the parameter name. For parameters for selecting functions, this item is added to each digit in the table.

10.2 List of Parameters: Σ-XS SERVOPACK

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(2000h): Basic Function Selections 0

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to 10B1h	–	0000h	All	After restart	Setup	–

Digit	Meaning	
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.	
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.□□X□	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(2001h): Application Function Selections 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.
1	Decelerate the motor to a stop using the torque set in Pn406 (2406h) as the maximum torque and then servo-lock the motor.
2	Decelerate the motor to a stop using the torque set in Pn406 (2406h) as the maximum torque and then let the motor coast.
3	Decelerate the motor to a stop using the deceleration time set in Pn30A (230Ah) and then servo-lock the motor.
4	Decelerate the motor to a stop using the deceleration time set in Pn30A (230Ah) 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(2002h): 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	EtherCAT (CoE) Module Torque Limit Command Usage Selection Speed Pos Trq	–
0	Reserved (Do not use.)	All
1 Default	Enable torque limit commands from EtherCAT (CoE).	All
2	Reserved (Do not use.)	All
3	Reserved (Do not use.)	All
n.□□X□	EtherCAT (CoE) Module Speed Limit Command Usage Selection Speed Pos Trq	–
0	Disable speed limit commands from EtherCAT (CoE) during torque control.	All
1 Default	Enable speed limit commands (Max Profile Velocity (607Fh)) from EtherCAT (CoE) during torque control.	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(2006h): Application Function Selections 6

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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 Default	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 12	Reserved (Do not use.)
13	Position deviation after position reference filter (0.05 V/reference unit)
14 to 5F	Reserved (Do not use.)
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn007(2007h): 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 Default	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)
	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(2008h): Application Function Selections 8

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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 (2424h) and Pn425 (2425h) (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(2009h): Application Function Selections 9

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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	• 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(200Ah): 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 (2001h) = n.□□□X).
1 Default	Decelerate the motor to a stop using the torque set in Pn406 (2406h) as the maximum torque. Use the setting of Pn001 (2001h) = n.□□□X for the status after stopping.
2	Decelerate the motor to a stop using the torque set in Pn406 (2406h) as the maximum torque and then let the motor coast.
3	Decelerate the motor to a stop using the deceleration time set in Pn30A (230Ah). Use the setting of Pn001 (2001h) = n.□□□X for the status after stopping.
4	Decelerate the motor to a stop using the deceleration time set in Pn30A (230Ah) 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 (2001h) = n.□□□X).
1	Decelerate the motor to a stop using the torque set in Pn406 (2406h) as the maximum torque. Use the setting of Pn001 (2001h) = n.□□□X for the status after stopping.
2	Decelerate the motor to a stop using the torque set in Pn406 (2406h) as the maximum torque and then let the motor coast.
3	Decelerate the motor to a stop using the deceleration time set in Pn30A (230Ah). Use the setting of Pn001 (2001h) = n.□□□X for the status after stopping.
4	Decelerate the motor to a stop using the deceleration time set in Pn30A (230Ah) and then let the motor coast.
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn00B(200Bh): 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 (2001h) = n.□□□X).
2	Set the stopping method with Pn00A (200Ah) = 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(200Ch): 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(200Dh): Application Function Selections D

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2001h	–	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(200Eh): 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(200Fh): 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(2021h): Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0000h	All	–	–	–

◆ Pn022(2022h): 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(202Fh): 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	• SGDXS-R70A to -200A : Do not perform rapid discharge. • SGDXS-330A to -780A : 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.)

◆ Pn040(2040h): Reserved (Do not change.) Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0000h	–	–	–	–

◆ Pn050(2050h): 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(2052h): SigmaLINK II Response Data Selection 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(2054h): SigmaLINK II Response Data Selection 3

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(2056h): SigmaLINK II Response Data Selection 4

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(2058h): SigmaLINK II Response Data Selection 5

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(205Ah): 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(205Ch): 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(205Eh): 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(2080h): 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(2081h): 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(2090h): SigmaLINK II Command 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.

◆ Pn092(2092h): 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(2094h): 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(2096h): 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.

◆ Pn0A1(20A1h): Gantry Application Function Selections 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0133h	–	0000h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	Parameters for Selecting Functions (Speed Pos Trq)
0 Default	Disable the gantry application function, torque/force assistance and speed synchronization function.
1	Enable the gantry application function.
2	Enable torque/force assistance.
3	Enable speed synchronization.
n.□□X□	Twisting Suppression Selections (Speed Pos Trq)
0 Default	Disable twisting suppression. Control each axis individually.
1	Use mode separation control.
2	Use relative position deviation compensation.
n.□X□□	Primary/Secondary Axis Setting (Speed Pos Trq)
0 Default	Set to primary axis.
1	Set to secondary axis.
n.X□□□	Reserved (Do not change.)

◆ Pn0A2(20A2h): Gantry Application Function Selections 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1121h	–	0011h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	Reference Input Selection during Mode Separation Control (Speed, Pos, Trq)
0	Enable position reference input to secondary axis.
1 (Default)	Disable position reference input to secondary axis.
n.□□X□	Signal Synchronization Selection (Speed, Pos, Trq)
0	Disable signal synchronization.
1 (Default)	Enable signal synchronization.
n.□X□□	Params Selection to Compensate Relative Pos Deviation (Speed, Pos, Trq)
0 (Default)	Adjust with Pn16E and Pn16F.
1	Adjust with Pn66B, Pn66C, Pn66D, and Pn66E.
n.X□□□	Alarm/Warning Mask Setting (Speed, Pos, Trq)
0 (Default)	Do not mask A.E93 (Servo ON Command Synchronization Error), A.E95 (Parameter Mismatch), and A.97C (Synchronized Stopping Occurred).
1	Mask A.E93.
2	Mask A.E95.
3	Mask A.E93 and A.E95.
4	Mask A.97C.
5	Mask A.E93 and A.97C.
6	Mask A.E95 and A.97C.
7	Mask A.E93, A.E95, and A.97C.

◆ Pn0A3(20A3h): Gantry Application Function Selections 3

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0011h	–	0000h	All	Immediately	Setup	–

Digit	Meaning
n.□□□X	Timing to Enable Twisting Suppression Selection/Timing to Enable Speed synchronization (Speed, Pos, Trq)
0 (Default)	Enable when the first digit of Pn0A1 is 1 or 3 and GNT_ENBL (bit 8 of Controlword_VenderS (2776h)) is turned ON.
1	Enable when the first digit of Pn0A1 is 1 or 3 regardless of the setting of GNT_ENBL.
n.□□X□	Selection of Method to Detect Relative Pos Deviation (Speed, Pos, Trq)
0 (Default)	Calculate with the relative position from the preset position.
1	Caluculate with Position Actual Value (6064h).
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn0B1(20B1h): SigmaLINK II Sequence Input Allocation 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(20B2h): SigmaLINK II Sequence Input Allocation 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(20B5h): 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.

◆ Pn0D4(20D4h): Torque/Force Assistance Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000H to 0100h	–	0000h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	Reserved (Do not change.)
n.□□X□	Reserved (Do not change.)
n.□X□□	Torque/Force Assistance Output Polarity Selection Speed Pos Trq
0 Default	The polarity is not inverted.
1	The polarity is inverted.
n.X□□□	Reserved (Do not change.)

◆ Pn0D6(20D6h): Reserved (Do not change.) Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0000h	All	–	–	–

◆ Pn0DA(20DAh): 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(20DBh): SigmaLINK II Fully-closed Encoder Selection

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(20DCh): SigmaLINK II Node Change Detection Condition Selection

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(20DDh): SigmaLINK II I/O Device Error Detection Selection

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to F4F2h	–	0130h	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(2100h): Speed Loop Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1 Hz	400	All	Immediately	Tuning	–

◆ Pn101(2101h): Speed Loop Integral Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	15 to 51200	0.01 ms	2000	All	Immediately	Tuning	–

◆ Pn102(2102h): Position Loop Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1/s	400	All	Immediately	Tuning	–

◆ Pn103(2103h): Moment of Inertia Ratio

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	1%	100	All	Immediately	Tuning	–

◆ Pn104(2104h): Second Speed Loop Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1 Hz	400	All	Immediately	Tuning	–

◆ Pn105(2105h): Second Speed Loop Integral Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	15 to 51200	0.01 ms	2000	All	Immediately	Tuning	–

◆ Pn106(2106h): Second Position Loop Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1/s	400	All	Immediately	Tuning	–

◆ Pn109(2109h): Feedforward

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 100	1%	0	All	Immediately	Tuning	–

◆ Pn10A(210Ah): Feedforward Filter Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 6400	0.01 ms	0	All	Immediately	Tuning	–

◆ Pn10B(210Bh): 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 (210Ch)).	Immediately
1	Use the speed reference as the condition (level setting: Pn10D (210Dh)). Use the speed reference as the condition (level setting: Pn181 (2181h)).	Immediately
2	Use the acceleration reference as the condition (level setting: Pn10E (210Eh)). Use the acceleration reference as the condition (level setting: Pn182 (2182h)).	Immediately
3	Use the position deviation as the condition (level setting: Pn10F (210Fh)).	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(210Ch): 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(210Dh): 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(210Eh): 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(210Fh): 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(211Fh): 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(2121h): Friction Compensation Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 1000	1%	100	All	Immediately	Tuning	–

◆ Pn122(2122h): Second Friction Compensation Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 1000	1%	100	All	Immediately	Tuning	–

◆ Pn123(2123h): Friction Compensation Coefficient

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 100	1%	0	All	Immediately	Tuning	–

◆ Pn124(2124h): Friction Compensation Frequency Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	-10000 to 10000	0.1 Hz	0	All	Immediately	Tuning	–

◆ Pn125(2125h): Friction Compensation Gain Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 1000	1%	100	All	Immediately	Tuning	–

◆ Pn131(2131h): Gain Switching Time 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	1 ms	0	All	Immediately	Tuning	–

◆ Pn132(2132h): Gain Switching Time 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	1 ms	0	All	Immediately	Tuning	–

◆ Pn135(2135h): Gain Switching Waiting Time 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	1 ms	0	All	Immediately	Tuning	–

◆ Pn136(2136h): Gain Switching Waiting Time 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	1 ms	0	All	Immediately	Tuning	–

◆ Pn139(2139h): Automatic Gain Switching Selections 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to 0052h	–	0000h	All	Immediately	Tuning	–

Digit	Meaning
n.□□□X	Gain Switching Selection Speed Pos Trq
0 Default	Disable automatic gain switching.
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(213Dh): Current Gain Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	100 to 2000	1%	2000	All	Immediately	Tuning	–

Parameter and Object Lists

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◆ Pn140(2140h): Model Following Control-Related Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(2141h): Model Following Control Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1/s	500	All	Immediately	Tuning	–

◆ Pn142(2142h): Model Following Control Gain Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	500 to 2000	0.1%	1000	All	Immediately	Tuning	–

◆ Pn143(2143h): Model Following Control Bias in the Forward Direction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	0.1%	1000	All	Immediately	Tuning	–

◆ Pn144(2144h): Model Following Control Bias in the Reverse Direction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	0.1%	1000	All	Immediately	Tuning	–

◆ Pn145(2145h): Vibration Suppression 1 Frequency A

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 2500	0.1 Hz	500	All	Immediately	Tuning	–

◆ Pn146(2146h): Vibration Suppression 1 Frequency B

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 2500	0.1 Hz	700	All	Immediately	Tuning	–

◆ Pn147(2147h): Model Following Control Speed Feedforward Compensation

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	0.1%	1000	All	Immediately	Tuning	–

◆ Pn148(2148h): Second Model Following Control Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1/s	500	All	Immediately	Tuning	–

◆ Pn149(2149h): Second Model Following Control Gain Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	500 to 2000	0.1%	1000	All	Immediately	Tuning	–

◆ Pn14A(214Ah): Vibration Suppression 2 Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 2000	0.1 Hz	800	All	Immediately	Tuning	–

◆ Pn14B(214Bh): Vibration Suppression 2 Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 1000	1%	100	All	Immediately	Tuning	–

◆ Pn14F(214Fh): Control-Related Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(2160h): Anti-Resonance Control-Related Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(2161h): Anti-Resonance Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1 Hz	1000	All	Immediately	Tuning	–

◆ Pn162(2162h): Anti-Resonance Gain Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 1000	1%	100	All	Immediately	Tuning	–

◆ Pn163(2163h): Anti-Resonance Damping Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 300	1%	0	All	Immediately	Tuning	–

◆ Pn164(2164h): Anti-Resonance Filter Time Constant 1 Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	-1000 to 1000	0.01 ms	0	All	Immediately	Tuning	–

◆ Pn165(2165h): Anti-Resonance Filter Time Constant 2 Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	-1000 to 1000	0.01 ms	0	All	Immediately	Tuning	–

◆ Pn166(2166h): Anti-Resonance Damping Gain 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 1000	1%	0	All	Immediately	Tuning	–

◆ Pn16E(216Eh): Relative Position Deviation Compensation 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	–

◆ Pn16F(216Fh): Relative Pos Dev Compensation Moment of Inertia Ratio

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 65535	1%	100	All	Immediately	Tuning	–

◆ Pn170(2170h): 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(2173h): 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(2174h): Load Fluctuation Compensation Control Response Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 20000	0.1	400	All	Immediately	Tuning	–

◆ Pn181(2181h): 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(2182h): 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	–

◆ Pn183(2183h): Low-Frequency Control Function Switch

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	Low-Frequency Control Function Switch Speed Pos Trq
0 Default	Do not use low-frequency control.
1	Use low-frequency control.
n.□□X□	Low-Frequency Control Type Selection Speed Pos Trq
0	Use amplitude reduction type.
1 Default	Use convergence acceleration type.
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn184(2184h): Low-Frequency Control Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1.0 to 100.0	0.1 Hz	10.0	All	Immediately	Tuning	–

◆ Pn185(2185h): Low-Frequency Control Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	-300.0 to 300.0	0.1%	0.0	All	Immediately	Tuning	–

◆ Pn186(2186h): Low-Frequency Control Filter Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	-100 to +100	0.1 Hz	0	All	Immediately	Tuning	–

◆ Pn205(2205h): Multiturn Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	1 rev	65535	Rotary	After restart	Setup	–

◆ Pn207(2207h): Position Control Function Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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 — Speed Pos Trq
0 Default	Output when the absolute value of the position deviation is the same or less than the setting of Pn522 (2522h) (Positioning Completed Width).
1	Output when the absolute value of the position error is the same or less than the setting of Pn522 (2522h) (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 (2522h) (Positioning Completed Width) and the reference input is 0.

◆ Pn20A(220Ah): Number of External Encoder Scale Pitches

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	4 to 1048576	1 scale pitch/ revolution	32768	Rotary	After restart	Setup	–

◆ Pn20E(220Eh): Electronic Gear Ratio (Numerator)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	1 to 1073741824	–	64	All	After restart	Setup	– –

Note:

For the settings related to the electronic gear, use objects 2701h to 2704h. For details, refer to the following manual.

Σ-XS SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 02)

◆ Pn210(2210h): Electronic Gear Ratio (Denominator)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	1 to 1073741824	–	1	All	After restart	Setup	– –

Note:

For the settings related to the electronic gear, use objects 2701h to 2704h. For details, refer to the following section.

Σ-XS SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 02)

◆ Pn212(2212h): Number of Encoder Output Pulses

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	16 to 1073741824	1 P/Rev	2048	Rotary	After restart	Setup	–

◆ Pn21D(221Dh): Encoder Resolution Setting

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(222Ah): Fully-closed Control Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(2230h): 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(2231h): 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(2233h): 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(2281h): 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(2282h): 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	–

◆ Pn2E3(22E3h): Position Correction Table Function Selections

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	Position Correction Table Selection (Speed Pos Trq)
0 Default	Do not use Position Correction Table.
1	Use Position Correction Table.
n.□□X□	Reserved (Do not change.)
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

Parameter and Object Lists

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◆ Pn2E4(22E4h): Mode Separation Coordinates Origin Offset

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-1073741823 to 1073741823	reference unit	0	All	Immediately	Tuning	–

◆ Pn304(2304h): 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(2305h): 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(2306h): 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	–

◆ Pn307(2307h): Speed 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	0	All	Immediately	Setup	–

◆ Pn308(2308h): 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(230Ah): 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(230Ch): 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(2310h): 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(2311h): 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(2312h): 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(2316h): 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(2324h): 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(2383h): 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(2384h): 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(2385h): 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(2401h): First Stage First Torque Reference Filter Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	0.01 ms	100	All	Immediately	Tuning	–

◆ Pn402(2402h): Forward Torque Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 800	1%	800	Rotary	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn403(2403h): Reverse Torque Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 800	1%	800	Rotary	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn404(2404h): Forward External Torque Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 800	1%	100	All	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn405(2405h): Reverse External Torque Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 800	1%	100	All	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn406(2406h): Emergency Stop Torque

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 800	1%	800	All	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn407(2407h): Speed Limit during Torque Control

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 min^{-1}	10000	Rotary	Immediately	Setup	–

◆ Pn408(2408h): Torque-Related Function Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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 (2407h) as the speed limit. Use the smaller of the maximum motor speed and the setting of Pn480 (2480h) as the speed limit.	After restart
1	Use the smaller of the overspeed alarm detection speed and the setting of Pn407 (2407h) as the speed limit. Use the smaller of the overspeed alarm detection speed and the setting of Pn480 (2480h) 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(2409h): First Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn40A(240Ah): First Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn40B(240Bh): First Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn40C(240Ch): Second Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn40D(240Dh): Second Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn40E(240Eh): Second Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn40F(240Fh): Second Stage Second Torque Reference Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	100 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn410(2410h): Second Stage Second Torque Reference Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	50 to 100	0.01	50	All	Immediately	Tuning	–

◆ Pn412(2412h): First Stage Second Torque Reference Filter Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	0.01 ms	100	All	Immediately	Tuning	–

◆ Pn416(2416h): Torque-Related Function Selections 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(2417h): Third Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn418(2418h): Third Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn419(2419h): Third Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn41A(241Ah): Fourth Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn41B(241Bh): Fourth Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn41C(241Ch): Fourth Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn41D(241Dh): Fifth Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn41E(241Eh): Fifth Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn41F(241Fh): Fifth Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn423(2423h): 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.	All	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	All	After restart
1	Motor Speed	All	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(2424h): 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(2425h): 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(2426h): 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(2427h): 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(2428h): 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.)

◆ Pn429(2429h): Torque/Force Assistance Multiplier

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 65535	%	100	All	Immediately	Setup	–

◆ Pn456(2456h): Sweep Torque Reference Amplitude

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1 to 800	1%	15	All	Immediately	Tuning	–

◆ Pn460(2460h): 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(2475h): 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(2476h): 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(2480h): 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(2481h): 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(2482h): 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(2483h): 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(2484h): 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(2485h): 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(2486h): 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(2487h): 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(2488h): 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(248Eh): 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(2490h): 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(2495h): 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(2498h): 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(249Fh): 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	–

◆ Pn501(2501h): Zero Clamping Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 10000	1 min^{-1}	10	Rotary	Immediately	Setup	– –

◆ Pn502(2502h): Rotation Detection Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 10000	1 min^{-1}	20	Rotary	Immediately	Setup	–

◆ Pn503(2503h): Speed Coincidence Detection Signal Output Width

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 100	1 min^{-1}	10	Rotary	Immediately	Setup	–

◆ Pn506(2506h): Brake Reference-Servo OFF Delay Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 50	10 ms	0	All	Immediately	Setup	–

◆ Pn507(2507h): Brake Reference Output Speed Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 min^{-1}	100	Rotary	Immediately	Setup	–

◆ Pn508(2508h): Servo OFF-Brake Command Waiting Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 100	10 ms	50	All	Immediately	Setup	–

◆ Pn509(2509h): Momentary Power Interruption Hold Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	20 to 50000	1 ms	20	All	Immediately	Setup	–

◆ Pn50A(250Ah): 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 Pn516 (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(250Bh): 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(250Eh): Output Signal Selections 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.□□X□	/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(250Fh): Output Signal Selections 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(2510h): 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(2511h): 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	Reserved (Do not change.)
n.□□X□	/Probe1 (Probe 1 Latch Input) 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□□	/Probe2 (Probe 2 Latch Input) Signal Allocation Speed Pos Trq
0 to F	The allocations are the same as the /Probe1 (Probe 1 Latch Input) signal allocations.
n.X□□□	/Home (Home Switch Input) Signal Allocation Speed Pos Trq
0 to F	The allocations are the same as the /Probe1 (Probe 1 Latch Input) signal allocations.

◆ Pn512(2512h): Output Signal Inverse Settings

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(2514h): Output Signal Selections 4

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(2516h): Input Signal Selections 7

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(2518h): Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
–	–	–	–	All	–	–	–

◆ Pn51B(251Bh): Motor-Load Position Deviation Overflow Detection Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	0 to 1073741824	1 reference unit	1000	Rotary	Immediately	Setup	–

◆ Pn51E(251Eh): Position Deviation Overflow Warning Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 100	1%	100	All	Immediately	Setup	–

◆ Pn520(2520h): Position Deviation Overflow Alarm Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	1 to 1073741823	1 reference unit	6116694	All	Immediately	Setup	–

◆ Pn522(2522h): 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(2524h): 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(2526h): 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(2528h): 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(2529h): 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(252Ah): 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(252Bh): 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	Immediately	Setup	–

◆ Pn52C(252Ch): 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(2530h): 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 (2535h) → Forward by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h)
1	(Waiting time in Pn535 (2535h) → Reverse by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h)
2	(Waiting time in Pn535 (2535h) → Forward by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h) (Waiting time in Pn535 (2535h) → Reverse by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h)
3	(Waiting time in Pn535 (2535h) → Reverse by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h) (Waiting time in Pn535 (2535h) → Forward by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h)
4	(Waiting time in Pn535 (2535h) → Forward by travel distance in Pn531 (2531h) → Waiting time in Pn535 (2535h) → Reverse by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h)
5	(Waiting time in Pn535 (2535h) → Reverse by travel distance in Pn531 (2531h) → Waiting time in Pn535 (2535h) → Forward by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h)
n.□□X□	Reserved (Do not change.)
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn531(2531h): 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(2533h): 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(2534h): 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(2535h): 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(2536h): 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(2540h): Maximum Search Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 4000	0.1 Hz	3000	All	Immediately	Tuning	–

◆ Pn550(2550h): Analog Monitor 1 Offset Voltage

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	-10000 to 10000	0.1 V	0	All	Immediately	Setup	–

◆ Pn551(2551h): Analog Monitor 2 Offset Voltage

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	-10000 to 10000	0.1 V	0	All	Immediately	Setup	–

◆ Pn552(2552h): Analog Monitor 1 Magnification

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	-10000 to 10000	× 0.01	100	All	Immediately	Setup	–

◆ Pn553(2553h): Analog Monitor 2 Magnification

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	-10000 to 10000	× 0.01	100	All	Immediately	Setup	–

◆ Pn55A(255Ah): Power Consumption Monitor Unit Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 1440	1 min	1	All	Immediately	Setup	–

◆ Pn560(2560h): Residual Vibration Detection Width

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 3000	0.1%	400	All	Immediately	Setup	–

◆ Pn561(2561h): Overshoot Detection Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 1000	1%	100	All	Immediately	Setup	–

◆ Pn562(2562h): Setting Gain Ratio

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 100	1%	80	All	Immediately	Tuning	–

◆ Pn580(2580h): Zero Clamping Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 mm/s	10	Linear	Immediately	Setup	– –

◆ Pn581(2581h): Zero Speed Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 10000	1 mm/s	20	Linear	Immediately	Setup	–

◆ Pn582(2582h): Speed Coincidence Detection Signal Output Width

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 100	1 mm/s	10	Linear	Immediately	Setup	–

◆ Pn583(2583h): Brake Reference Output Speed Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 mm/s	10	Linear	Immediately	Setup	–

◆ Pn584(2584h): Speed Limit Level at Servo ON

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 mm/s	10000	Linear	Immediately	Setup	–

◆ Pn585(2585h): Program Jogging Movement Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 10000	1 mm/s	50	Linear	Immediately	Setup	–

◆ Pn586(2586h): Motor Running Cooling Ratio

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 100	1% / Maximum Motor Speed	0	Linear	Immediately	Setup	–

◆ Pn587(2587h): Polarity Detection Execution Selection for Absolute Linear Encoder

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(2589h): SigmaLINK II Node Detection Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	100 to 10000	1 ms	1500	All	After restart	Setup	–

◆ Pn590(2590h): 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(2591h): N-OT (Reverse Drive Prohibit Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.

◆ Pn593(2593h): /Probe1 (Probe 1 Latch Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to 2149h	–	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(2594h): /Probe2 (Probe 2 Latch Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to 2149h	–	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(2595h): /Home (Home Switch Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to 2149h	–	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(2597h): FSTP (Forced Stop Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 3049h	–	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(2598h): /P-CL (Forward External Torque Limit Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(2599h): /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(25B0h): /COIN (Positioning Completion Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(25B1h): /V-CMP (Speed Coincidence Detection Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(25B2h): /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(25B3h): /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(25B4h): /CLT (Torque Limit Detection Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(25B5h): /VLT (Speed Limit Detection Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(25B6h): /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(25B7h): /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(25B8h): /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(25BCh): /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(25C3h): 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(25C4h): Error Detection Sample Data Set 1 Warning Level 1 Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	0.01%	2000	All	Immediately	Setup	–

◆ Pn5C5(25C5h): Error Detection Sample Data Set 1 Judgment Level 1 Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	–	1520	All	Immediately	Setup	–

◆ Pn5C6(25C6h): Error Detection Sample Data Set 1 Warning Level 2 Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	0.01%	2000	All	Immediately	Setup	–

◆ Pn5C7(25C7h): Error Detection Sample Data Set 1 Judgment Level 2 Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	–	1520	All	Immediately	Setup	–

◆ Pn5C8(25C8h): Error Detection Sample Data Set 2 Warning Level 1 Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	0.01%	2000	All	Immediately	Setup	–

◆ Pn5C9(25C9h): Error Detection Sample Data Set 2 Judgment Level 1 Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	–	1520	All	Immediately	Setup	–

◆ Pn5CA(25CAh): Error Detection Sample Data Set 2 Warning Level 2 Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	0.01%	2000	All	Immediately	Setup	–

◆ Pn5CB(25CBh): Error Detection Sample Data Set 2 Judgment Level 2 Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	–	1520	All	Immediately	Setup	–

◆ Pn5D7(25D7h): Output Signal Inversion for Triggers at Preset Positions

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000H to 01F7h	–	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(2600h): Regenerative Resistor Capacity

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to SERVOPACK's maximum applicable motor capacity	10 W	0	All	Immediately	Setup	–

◆ Pn601(2601h): Dynamic Brake Resistor Allowable Energy Consumption

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	10 J	0	All	After restart	Setup	–

◆ Pn603(2603h): Regenerative Resistance

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	10 mΩ	0	All	Immediately	Setup	–

◆ Pn604(2604h): 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(261Ah): 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(261Bh): 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(261Ch): 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(261Dh): 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(2621h): Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
–	–	–	–	All	–	–	–

◆ Pn622(2622h): Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
–	–	–	–	All	–	–	–

◆ Pn623(2623h): Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
–	–	–	–	All	–	–	–

◆ Pn624(2624h): Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
–	–	–	–	All	–	–	–

◆ Pn625(2625h): Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
–	–	–	–	All	–	–	–

◆ Pn626(2626h): Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
–	–	–	–	All	–	–	–

◆ Pn627(2627h): Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
–	–	–	–	All	–	–	–

◆ Pn628(2628h): Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
–	–	–	–	All	–	–	–

◆ Pn660(2660h): Triggers at Preset Positions Switch

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2011h	–	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.
2	Reserved (Do not use.)

◆ Pn665(2665h): Synchronized Stopping Function Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to FF13h	–	FC03h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	Synchronized Stopping Selection (Speed Pos Trq)
0	Disable synchronized stopping.
1	Reserved (Do not use.)
2	Enable synchronized stopping mode 2.
3 Default	Enable synchronized stopping mode 3.
n.□□X□	Reserved (Do not change.)
n.□X□□	Reference Synchronization Function Individual Selections 1 (Speed Pos Trq)
0	Do not synchronize /S-ON, /ALM-RST, OT, and FSTP of secondary axis to primary axis.
1	Synchronize /S-ON of secondary axis to primary axis.
2	Synchronize /ALM-RST of secondary axis to primary axis.
3	Synchronize /S-ON and /ALM-RST of secondary axis to primary axis.
4	Synchronize OT of secondary axis to primary axis.
5	Synchronize /S-ON and OT of secondary axis to primary axis.
6	Synchronize /ALM-RST and OT of secondary axis to primary axis.
7	Synchronize /S-ON, /ALM-RST, and OT of secondary axis to primary axis.
8	Synchronize FSTP of secondary axis to primary axis.
9	Synchronize /S-ON and FSTP of secondary axis to primary axis.
A	Synchronize /ALM-RST and FSTP of secondary axis to primary axis.
B	Synchronize /S-ON, /ALM-RST, and FSTP of secondary axis to primary axis.
C Default	Synchronize OT and FSTP of secondary axis to primary axis.
D	Synchronize /S-ON, OT, and FSTP of secondary axis to primary axis.
E	Synchronize /ALM-RST, OT, and FSTP of secondary axis to primary axis.
F	Synchronize /S-ON, /ALM-RST, OT, and FSTP of secondary axis to primary axis.
n.X□□□	Reserved (Do not change.)

◆ Pn666(2666h): Synchronized Stopping End Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 65535	Rotary: min^{-1} Linear: mm/s	10	All	Immediately	Setup	–

◆ Pn667(2667h): Synchronized Stopping Function Response Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1 Hz	400	All	Immediately	Setup	–

◆ Pn668(2668h): Synchronized Stopping Function Moment of Inertia Ratio

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 65535	%	100	All	Immediately	Setup	–

◆ Pn669(2669h): Relative Position Deviation Overflow Warning Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 100	%	100	All	Immediately	Setup	–

◆ Pn66A(266Ah): Relative Position Deviation Overflow Alarm Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	0 to 1073741823	reference unit	5242880	All	Immediately	Setup	–

◆ Pn66B(266Bh): Relative Pos Deviation Compensation Speed Loop Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1 Hz	400	All	Immediately	Tuning	–

◆ Pn66C(266Ch): Relative Pos Dev Compensation Spd Loop Integral Time Const

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	15 to 51200	0.01 ms	2000	All	Immediately	Tuning	–

◆ Pn66D(266Dh): Relative Pos Deviation Compensation Position Loop Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1/s	400	All	Immediately	Tuning	–

◆ Pn66E(266Eh): Relative Pos Deviation Compensation Filter Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	0.01 ms	100	All	Immediately	Tuning	–

10.3 List of Parameters: Σ-XW SERVOPACK

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(A:2000h, B:2800h): Basic Function Selections 0

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to 10B1h	–	0000h	All	After restart	Setup	–

Digit	Meaning	
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.	
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.□□X□	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(A:2001h, B:2801h): 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.
1	Decelerate the motor to a stop using the torque set in Pn406 (2406h) as the maximum torque and then servo-lock the motor.
2	Decelerate the motor to a stop using the torque set in Pn406 (2406h) as the maximum torque and then let the motor coast.
3	Decelerate the motor to a stop using the deceleration time set in Pn30A (230Ah) and then servo-lock the motor.
4	Decelerate the motor to a stop using the deceleration time set in Pn30A (230Ah) and then let the motor coast.
n.□X□□ Common	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(A:2002h, B:2802h): 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	EtherCAT (CoE) Module Torque Limit Command Usage Selection Speed Pos Trq	–
0	Reserved (Do not use.)	All
1 Default	Enable torque limit commands from EtherCAT (CoE).	All
2	Reserved (Do not use.)	All
3	Reserved (Do not use.)	All
n.□□X□	EtherCAT (CoE) Module Speed Limit Command Usage Selection Speed Pos Trq	–
0	Disable speed limit commands from EtherCAT (CoE) during torque control.	All
1 Default	Enable speed limit commands (Max Profile Velocity (607Fh)) from EtherCAT (CoE) during torque control.	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(2006h): Application Function Selections 6

Common

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 Default	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 12	Reserved (Do not use.)
13	Position deviation after position reference filter (0.05 V/reference unit)
14 to 5F	Reserved (Do not use.)
n.□X□□	Reserved (Do not change.)
n.X□□□	Output Axis Selection (Speed, Pos, Trq)
0 Default	Output axis A data.
1	Output axis B data.

Parameter and Object Lists

10

◆ Pn007(2007h): Application Function Selections 7

Common

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 Default	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)
	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□□□	Output Axis Selection (Speed Pos Trq)
0 Default	Output axis A data.
1	Output axis B data.

◆ Pn008(A:2008h, B:2808h): 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 (2424h) and Pn425 (2425h) (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(A:2009h, B:2809h): 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	Use current control mode 1.
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(A:200Ah, B:280Ah): 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 (2001h) = n.□□□X).
1 Default	Decelerate the motor to a stop using the torque set in Pn406 (2406h) as the maximum torque. Use the setting of Pn001 (2001h) = n.□□□X for the status after stopping.
2	Decelerate the motor to a stop using the torque set in Pn406 (2406h) as the maximum torque and then let the motor coast.
3	Decelerate the motor to a stop using the deceleration time set in Pn30A (230Ah). Use the setting of Pn001 (2001h) = n.□□□X for the status after stopping.
4	Decelerate the motor to a stop using the deceleration time set in Pn30A (230Ah) 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 (2001h) = n.□□□X).
1	Decelerate the motor to a stop using the torque set in Pn406 (2406h) as the maximum torque. Use the setting of Pn001 (2001h) = n.□□□X for the status after stopping.
2	Decelerate the motor to a stop using the torque set in Pn406 (2406h) as the maximum torque and then let the motor coast.
3	Decelerate the motor to a stop using the deceleration time set in Pn30A (230Ah). Use the setting of Pn001 (2001h) = n.□□□X for the status after stopping.
4	Decelerate the motor to a stop using the deceleration time set in Pn30A (230Ah) and then let the motor coast.
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn00B(A:200Bh, B:280Bh): 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 (2001h) = n.□□□X).
2	Set the stopping method with Pn00A (200Ah) = n.□□□X.
n.□X□□ Common	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(A:200Ch, B:280Ch): 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(A:200Dh, B:280Dh): Application Function Selections D

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2001h	–	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(A:200Eh, B:280Eh): Application Function Selections E

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(200Fh): Application Function Selections F

Common

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(A:2021h, B:2821h): Reserved (Do not change.)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	–	–	0000h	All	–	–	–

◆ Pn022(A:2022h, B:2822h): Application Function Selections 22

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(202Fh): Application Function Selections 2F

Common

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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	Do not 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.)

◆ Pn040(2040h): Reserved (Do not change.)

Common Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	–	–	0000h	–	–	–	–

◆ Pn050(A:2050h, B:2850h): SigmaLINK II Response Data Selection 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.□X□□□□□□	Master Number (0h: CN2A, 1h: CN2B)
n.X□□□□□□□	Reserved.

◆ Pn052(A:2052h, B:2852h): SigmaLINK II Response Data Selection 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.□X□□□□□□	Master Number (0h: CN2A, 1h: CN2B)
n.X□□□□□□□	Reserved.

◆ Pn054(A:2054h, B:2854h): SigmaLINK II Response Data Selection 3

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.□X□□□□□□	Master Number (0h: CN2A, 1h: CN2B)
n.X□□□□□□□	Reserved.

◆ Pn056(A:2056h, B:2856h): SigmaLINK II Response Data Selection 4

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.□X□□□□□□	Master Number (0h: CN2A, 1h: CN2B)
n.X□□□□□□□	Reserved.

◆ Pn058(A:2058h, B:2858h): SigmaLINK II Response Data Selection 5

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.□X□□□□□□	Master Number (0h: CN2A, 1h: CN2B)
n.X□□□□□□□	Reserved.

◆ Pn05A(A:205Ah, B:285Ah): SigmaLINK II Response Data Selection 6 Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.□X□□□□□□	Master Number (0h: CN2A, 1h: CN2B)
n.X□□□□□□□	Reserved.

◆ Pn05C(A:205Ch, B:285Ch): SigmaLINK II Response Data Selection 7 Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.□X□□□□□□	Master Number (0h: CN2A, 1h: CN2B)
n.X□□□□□□□	Reserved.

◆ Pn05E(A:205Eh, B:285Eh): SigmaLINK II Response Data Selection 8 Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.□X□□□□□□	Master Number (0h: CN2A, 1h: CN2B)
n.X□□□□□□□	Reserved.

◆ Pn080(A:2080h, B:2880h): 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□□□	Reserved (Do not change.)

◆ Pn090(A:2090h, B:2890h): SigmaLINK II Command 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.□X□□□□□□	Master Number (0h: CN2A, 1h: CN2B)
n.X□□□□□□□	Reserved.

◆ Pn092(A:2092h, B:2892h): 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.□X□□□□□□	Master Number (0h: CN2A, 1h: CN2B)
n.X□□□□□□□	Reserved.

◆ Pn094(A:2094h, B:2894h): 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.□X□□□□□□	Master Number (0h: CN2A, 1h: CN2B)
n.X□□□□□□□	Reserved.

◆ Pn096(A:2096h, B:2896h): 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.□X□□□□□□	Master Number (0h: CN2A, 1h: CN2B)
n.X□□□□□□□	Reserved.

◆ Pn0A1(20A1h): Gantry Application Function Selections 1 Common

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0133h	–	0000h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	Parameters for Selecting Functions Speed Pos Trq
0 Default	Disable the gantry application function, torque/force assistance and speed synchronization function.
1	Enable the gantry application function.
2	Enable torque/force assistance.
3	Enable speed synchronization.
n.□□X□	Twisting Suppression Selections Speed Pos Trq
0 Default	Disable twisting suppression. Control each axis individually.
1	Use mode separation control.
2	Use relative position deviation compensation.
n.□X□□	Primary/Secondary Axis Setting Speed Pos Trq
0 Default	Set axis A to the primary axis and set axis B to the secondary axis.
1	Set axis A to the secondary axis and set axis B to the primary axis.
n.X□□□	Reserved (Do not change.)

◆ Pn0A2(20A2h): Gantry Application Function Selections 2

Common

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 1121h	–	0011h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	Reference Input Selection during Mode Separation Control Speed Pos Trq
0	Enable position reference input to secondary axis.
1 Default	Disable position reference input to secondary axis.
n.□□X□	Signal Synchronization Selection Speed Pos Trq
0	Disable signal synchronization.
1 Default	Enable signal synchronization.
n.□X□□	Params Selection to Compensate Relative Pos Deviation Speed Pos Trq
0 Default	Adjust with Pn16E and Pn16F.
1	Adjust with Pn66B, Pn66C, Pn66D, and Pn66E.
n.X□□□	Alarm/Warning Mask Setting Speed Pos Trq
0 Default	Do not mask A.E93 (Servo ON Command Synchronization Error), A.E95 (Parameter Mismatch), and A.97C (Synchronized Stopping Occurred).
1	Mask A.E93.
2	Mask A.E95.
3	Mask A.E93 and A.E95.
4	Mask A.97C.
5	Mask A.E93 and A.97C.
6	Mask A.E95 and A.97C.
7	Mask A.E93, A.E95, and A.97C.

◆ Pn0A3(A:20A3h, B:28A3h): Gantry Application Function Selections 3

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0011h	–	0000h	All	Immediately	Setup	–

Digit	Meaning
n.□□□X	Timing to Enable Twisting Suppression Selection/Timing to Enable Speed synchronization Speed Pos Trq
0 Default	Enable when the first digit of Pn0A1 is 1 or 3 and GNT_ENBL (bit 8 of Controlword_VenderS (2776h)) is turned ON.
1	Enable when the first digit of Pn0A1 is 1 or 3 regardless of the setting of GNT_ENBL.
n.□□X□	Selection of Method to Detect Relative Pos Deviation Speed Pos Trq
0 Default	Calculate with the relative position from the preset position.
1	Calculate with Position Actual Value (6064h).
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn0B1(A:20B1h, B:28B1h): 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(A:20B2h, B:28B2h): 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(A:20B5h, B:28B5h): 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.

◆ Pn0D4(A:20D4h, B:28D4h): Torque/Force Assistance Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 0100h	–	0000h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	Reserved (Do not change.)
n.□□X□	Reserved (Do not change.)
n.□X□□	Torque/Force Assistance Output Polarity Selection Speed Pos Trq
0 Default	The polarity is not inverted.
1	The polarity is inverted.
n.X□□□	Reserved (Do not change.)

◆ Pn0D6(20D6h): Reserved (Do not change.) Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	–	–	0000h	All	–	–	–

◆ Pn0DA(A:20DAh, B:28DAh): 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□□	Master Number Speed Pos Trq
0 Default	Use CN2A.
1	Use CN2B.
n.X□□□	Reserved (Do not change.)

◆ Pn0DB(A:20DBh, B:28DBh): SigmaLINK II Fully-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□□	Master Number (Speed Pos Trq)
0 Default	Use CN2A.
1	Use CN2B.
n.X□□□	Reserved (Do not change.)

◆ Pn0DC(20DCh): SigmaLINK II Node Change Detection Condition Selection Common

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(20DDh): SigmaLINK II I/O Device Error Detection Selection Common

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to F4F2h	–	0130h	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(A:2100h, B:2900h): 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(A:2101h, B:2901h): 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(A:2102h, B:2902h): 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(A:2103h, B:2903h): 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(A:2104h, B:2904h): 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(A:2105h, B:2905h): 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(A:2106h, B:2906h): 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(A:2109h, B:2909h): 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(A:210Ah, B:290Ah): 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(A:210Bh, B:290Bh): 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 (210Ch)).	Immediately
1	Use the speed reference as the condition (level setting: Pn10D (210Dh)). Use the speed reference as the condition (level setting: Pn181 (2181h)).	Immediately
2	Use the acceleration reference as the condition (level setting: Pn10E (210Eh)). Use the acceleration reference as the condition (level setting: Pn182 (2182h)).	Immediately
3	Use the position deviation as the condition (level setting: Pn10F (210Fh)).	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(A:210Ch, B:290Ch): 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(A:210Dh, B:290Dh): 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(A:210Eh, B:290Eh): 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(A:210Fh, B:290Fh): 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(A:211Fh, B:291Fh): 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(A:2121h, B:2921h): Friction Compensation Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 1000	1%	100	All	Immediately	Tuning	–

◆ Pn122(A:2122h, B:2922h): Second Friction Compensation Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 1000	1%	100	All	Immediately	Tuning	–

◆ Pn123(A:2123h, B:2923h): Friction Compensation Coefficient

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 100	1%	0	All	Immediately	Tuning	–

◆ Pn124(A:2124h, B:2924h): Friction Compensation Frequency Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	-10000 to 10000	0.1 Hz	0	All	Immediately	Tuning	–

◆ Pn125(A:2125h, B:2925h): Friction Compensation Gain Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 1000	1%	100	All	Immediately	Tuning	–

◆ Pn131(A:2131h, B:2931h): Gain Switching Time 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	1 ms	0	All	Immediately	Tuning	–

◆ Pn132(A:2132h, B:2932h): Gain Switching Time 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	1 ms	0	All	Immediately	Tuning	–

◆ Pn135(A:2135h, B:2935h): Gain Switching Waiting Time 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	1 ms	0	All	Immediately	Tuning	–

◆ Pn136(A:2136h, B:2936h): Gain Switching Waiting Time 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	1 ms	0	All	Immediately	Tuning	–

◆ Pn139(A:2139h, B:2939h): Automatic Gain Switching Selections 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to 0052h	–	0000h	All	Immediately	Tuning	–

Digit	Meaning
n.□□□X	Gain Switching Selection (Speed Pos Trq)
0 Default	Disable automatic gain switching.
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(A:213Dh, B:293Dh): Current Gain Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	100 to 2000	1%	2000	All	Immediately	Tuning	–

◆ Pn140(A:2140h, B:2940h): 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(A:2141h, B:2941h): 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(A:2142h, B:2942h): 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(A:2143h, B:2943h): 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(A:2144h, B:2944h): 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(A:2145h, B:2945h): 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(A:2146h, B:2946h): Vibration Suppression 1 Frequency B

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 2500	0.1 Hz	700	All	Immediately	Tuning	–

◆ Pn147(A:2147h, B:2947h): Model Following Control Speed Feedforward Compensation

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	0.1%	1000	All	Immediately	Tuning	–

◆ Pn148(A:2148h, B:2948h): Second Model Following Control Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1/s	500	All	Immediately	Tuning	–

◆ Pn149(A:2149h, B:2949h): Second Model Following Control Gain Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	500 to 2000	0.1%	1000	All	Immediately	Tuning	–

◆ Pn14A(A:214Ah, B:294Ah): Vibration Suppression 2 Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 2000	0.1 Hz	800	All	Immediately	Tuning	–

◆ Pn14B(A:214Bh, B:294Bh): Vibration Suppression 2 Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 1000	1%	100	All	Immediately	Tuning	–

◆ Pn14F(A:214Fh, B:294Fh): Control-Related Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(A:2160h, B:2960h): 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(A:2161h, B:2961h): 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(A:2162h, B:2962h): 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(A:2163h, B:2963h): 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(A:2164h, B:2964h): 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(A:2165h, B:2965h): 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(A:2166h, B:2966h): 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	–

◆ Pn16E(216Eh): Relative Position Deviation Compensation Gain Common Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1 Hz	400	All	Immediately	Tuning	–

◆ Pn16F(216Fh): Relative Pos Dev Compensation Moment of Inertia Ratio Common Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 65535	1%	100	All	Immediately	Tuning	–

◆ Pn170(A:2170h, B:2970h): Tuning-less Function-Related Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(A:2173h, B:2973h): 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(A:2174h, B:2974h): Load Fluctuation Compensation Control Response Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	10 to 20000	0.1	400	All	Immediately	Tuning	–

◆ Pn181(A:2181h, B:2981h): 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(A:2182h, B:2982h): 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	–

◆ Pn183(A:2183h, B:2983h): Low-Frequency Control Function Switch

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	Low-Frequency Control Function Switch Speed Pos Trq
0 Default	Do not use low-frequency control.
1	Use low-frequency control.
n.□□X□	Low-Frequency Control Type Selection Speed Pos Trq
0	Use amplitude reduction type.
1 Default	Use convergence acceleration type.
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn184(A:2184h, B:2984h): Low-Frequency Control Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	1.0 to 100.0	0.1 Hz	10.0	All	Immediately	Tuning	–

◆ Pn185(A:2185h, B:2985h): Low-Frequency Control Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	-300.0 to 300.0	0.1%	0.0	All	Immediately	Tuning	–

◆ Pn186(A:2186h, B:2986h): Low-Frequency Control Filter Correction

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	-100 to +100	0.1 Hz	0	All	Immediately	Tuning	–

◆ Pn205(A:2205h, B:2A05h): 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(A:2207h, B:2A07h): 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 Speed Pos Trq
0 Default	Output when the absolute value of the position deviation is the same or less than the setting of Pn522 (2522h) (Positioning Completed Width).
1	Output when the absolute value of the position error is the same or less than the setting of Pn522 (2522h) (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 (2522h) (Positioning Completed Width) and the reference input is 0.

◆ Pn20A(A:220Ah, B:2A0Ah): 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(A:220Eh, B:2A0Eh): 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	–

Note:

For the settings related to the electronic gear, use objects 2701h to 2704h. For details, refer to the following manual.

Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)

◆ Pn210(A:2210h, B:2A10h): 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	–

Note:

For the settings related to the electronic gear, use objects 2701h to 2704h. For details, refer to the following manual.

Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)

◆ Pn21D(A:221Dh, B:2A1Dh): 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(A:222Ah, B:2A2Ah): 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(A:2230h, B:2A30h): Position Control Expansion Function Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(A:2231h, B:2A31h): Backlash Compensation Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	-500000 to 500000	0.1 reference unit	0	All	Immediately	Setup	–

◆ Pn233(A:2233h, B:2A33h): Backlash Compensation Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	0.01 ms	0	All	Immediately	Setup	–

◆ Pn282(A:2282h, B:2A82h): Linear Encoder Scale Pitch

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	0 to 6553600	0.01 μm	0	Linear	After restart	Setup	–

◆ Pn2E3(A:22E3h, B:2AE3h): Position Correction Table Function Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to 1001h	–	0000h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	Position Correction Table Selection (Speed Pos Trq)
0 Default	Do not use Position Correction Table.
1	Use Position Correction Table.
n.□□X□	Reserved (Do not change.)
n.□X□□	Reserved (Do not change.)
n.X□□□	Position Correction Axis Selection for Position Correction Table (Speed Pos Trq)
0 Default	Correct the position of axis A.
1	Correct the position of axis B.

◆ Pn2E4(A:22E4h, B:2AE4h): Mode Separation Coordinates Origin Offset

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
4	-1073741823 to 1073741823	reference unit	0	All	Immediately	Tuning	–

◆ Pn304(A:2304h, B:2B04h): 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(A:2305h, B:2B05h): 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(A:2306h, B:2B06h): 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	–

◆ Pn307(A:2307h, B:2B07h): Speed 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	0	All	Immediately	Setup	–

◆ Pn308(A:2308h, B:2B08h): 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(A:230Ah, B:2B0Ah): 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(A:230Ch, B:2B0Ch): 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(A:2310h, B:2B10h): 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(A:2311h, B:2B11h): 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(A:2312h, B:2B12h): 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(A:2316h, B:2B16h): 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(A:2324h, B:2B24h): 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(A:2383h, B:2B83h): 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(A:2384h, B:2B84h): 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(A:2385h, B:2B85h): 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(A:2401h, B:2C01h): First Stage First Torque Reference Filter Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	0.01 ms	100	All	Immediately	Tuning	–

◆ Pn402(A:2402h, B:2C02h): Forward Torque Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 800	1%	800	Rotary	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn403(A:2403h, B:2C03h): Reverse Torque Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 800	1%	800	Rotary	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn404(A:2404h, B:2C04h): Forward External Torque Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 800	1%	100	All	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn405(A:2405h, B:2C05h): Reverse External Torque Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 800	1%	100	All	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn406(A:2406h, B:2C06h): Emergency Stop Torque

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 800	1%	800	All	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn407(A:2407h, B:2C07h): Speed Limit during Torque Control

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 min^{-1}	10000	Rotary	Immediately	Setup	–

◆ Pn408(A:2408h, B:2C08h): Torque-Related Function Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer- ence
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 (2407h) as the speed limit. Use the smaller of the maximum motor speed and the setting of Pn480 (2480h) as the speed limit.	After restart
1	Use the smaller of the overspeed alarm detection speed and the setting of Pn407 (2407h) as the speed limit. Use the smaller of the overspeed alarm detection speed and the setting of Pn480 (2480h) 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(A:2409h, B:2C09h): First Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer- ence
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn40A(A:240Ah, B:2C0Ah): First Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer- ence
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn40B(A:240Bh, B:2C0Bh): First Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer- ence
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn40C(A:240Ch, B:2C0Ch): Second Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer- ence
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn40D(A:240Dh, B:2C0Dh): Second Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer- ence
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn40E(A:240Eh, B:2C0Eh): Second Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn40F(A:240Fh, B:2C0Fh): Second Stage Second Torque Reference Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	100 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn410(A:2410h, B:2C10h): Second Stage Second Torque Reference Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	50 to 100	0.01	50	All	Immediately	Tuning	–

◆ Pn412(A:2412h, B:2C12h): First Stage Second Torque Reference Filter Time Constant

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	0.01 ms	100	All	Immediately	Tuning	–

◆ Pn416(A:2416h, B:2C16h): Torque-Related Function Selections 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(A:2417h, B:2C17h): Third Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn418(A:2418h, B:2C18h): Third Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn419(A:2419h, B:2C19h): Third Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn41A(A:241Ah, B:2C1Ah): Fourth Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn41B(A:241Bh, B:2C1Bh): Fourth Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn41C(A:241Ch, B:2C1Ch): Fourth Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn41D(A:241Dh, B:2C1Dh): Fifth Stage Notch Filter Frequency

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 5000	1 Hz	5000	All	Immediately	Tuning	–

◆ Pn41E(A:241Eh, B:2C1Eh): Fifth Stage Notch Filter Q Value

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	50 to 1000	0.01	70	All	Immediately	Tuning	–

◆ Pn41F(A:241Fh, B:2C1Fh): Fifth Stage Notch Filter Depth

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 1000	0.001	0	All	Immediately	Tuning	–

◆ Pn423(A:2423h, B:2C23h): Speed Ripple Compensation Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000H to 1112h	–	0002h	–	–	Setup	–

Digit	Meaning	Appli-cable 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.	All	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	All	After restart
1	Motor Speed	All	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(A:2424h, B:2C24h): Torque Limit at Main Circuit Voltage Drop Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 100	1%	50	All	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn425(A:2425h, B:2C25h): 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	Refer-ence
2	0 to 1000	1 ms	100	All	Immediately	Setup	–

◆ Pn426(A:2426h, B:2C26h): Torque Feedforward Average Movement Time Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 5100	0.1 ms	0	All	Immediately	Setup	–

◆ Pn427(A:2427h, B:2C27h): Speed Ripple Compensation Enable Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 min^{-1}	0	Rotary	Immediately	Tuning	–

◆ Pn428(A:2428h, B:2C28h): Output Torque Compensation Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.)

◆ Pn429(A:2429h, B:2C29h): Torque/Force Assistance Multiplier

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	%	100	All	Immediately	Setup	–

◆ Pn456(A:2456h, B:2C56h): Sweep Torque Reference Amplitude

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 800	1%	15	All	Immediately	Tuning	–

◆ Pn460(A:2460h, B:2C60h): Notch Filter Adjustment Selections 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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 auto-tuning 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(A:2475h, B:2C75h): Gravity Compensation-Related Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(A:2476h, B:2C76h): Gravity Compensation Torque

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	-1000 to 1000	0.1%	0	All	Immediately	Tuning	–

◆ Pn480(A:2480h, B:2C80h): Speed Limit during Force Control

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 mm/s	10000	Linear	Immediately	Setup	–

◆ Pn481(A:2481h, B:2C81h): Polarity Detection Speed Loop Gain

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1 Hz	400	Linear	Immediately	Tuning	–

◆ Pn482(A:2482h, B:2C82h): Polarity Detection Speed Loop Integral Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	15 to 51200	0.01 ms	3000	Linear	Immediately	Tuning	–

◆ Pn483(A:2483h, B:2C83h): Forward Force Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 800	1%	30	Linear	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn484(A:2484h, B:2C84h): Reverse Force Limit

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 800	1%	30	Linear	Immediately	Setup	–

Note:

The setting is a percentage of the motor rated torque.

◆ Pn485(A:2485h, B:2C85h): Polarity Detection Reference Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 100	1 mm/s	20	Linear	Immediately	Tuning	–

◆ Pn486(A:2486h, B:2C86h): Polarity Detection Reference Acceleration/ Deceleration Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 100	1 ms	25	Linear	Immediately	Tuning	–

◆ Pn487(A:2487h, B:2C87h): Polarity Detection Constant Speed Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 300	1 ms	0	Linear	Immediately	Tuning	–

◆ Pn488(A:2488h, B:2C88h): Polarity Detection Reference Waiting Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	50 to 500	1 ms	100	Linear	Immediately	Tuning	–

◆ Pn48E(A:248Eh, B:2C8Eh): Polarity Detection Range

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 65535	1 mm	10	Linear	Immediately	Tuning	–

◆ Pn490(A:2490h, B:2C90h): Polarity Detection Load Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 20000	1%	100	Linear	Immediately	Tuning	–

◆ Pn495(A:2495h, B:2C95h): Polarity Detection Confirmation Force Reference

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 200	1%	100	Linear	Immediately	Tuning	–

◆ Pn498(A:2498h, B:2C98h): Polarity Detection Allowable Error Range

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 30	1 deg	10	Linear	Immediately	Tuning	–

◆ Pn49F(A:249Fh, B:2C9Fh): Speed Ripple Compensation Enable Speed (Linear)

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 mm/s	0	Linear	Immediately	Tuning	–

◆ Pn501(A:2501h, B:2D01h): Zero Clamping Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 min^{-1}	10	Rotary	Immediately	Setup	–

◆ Pn502(A:2502h, B:2D02h): Rotation Detection Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 10000	1 min^{-1}	20	Rotary	Immediately	Setup	–

◆ Pn503(A:2503h, B:2D03h): Speed Coincidence Detection Signal Output Width

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 100	1 min^{-1}	10	Rotary	Immediately	Setup	–

◆ Pn506(A:2506h, B:2D06h): Brake Reference-Servo OFF Delay Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 50	10 ms	0	All	Immediately	Setup	–

◆ Pn507(A:2507h, B:2D07h): Brake Reference Output Speed Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 min^{-1}	100	Rotary	Immediately	Setup	–

◆ Pn508(A:2508h, B:2D08h): Servo OFF-Brake Command Waiting Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 100	10 ms	50	All	Immediately	Setup	–

◆ Pn509(2509h): Momentary Power Interruption Hold Time

Common Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	20 to 50000	1 ms	20	All	Immediately	Setup	–

◆ Pn50A(A:250Ah, B:2D0Ah): Input Signal Selections 1

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to FFF2h	–	0881h	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 Pn516 (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 Default	Axis A: Enable forward drive when CN1-3 input signal is ON (closed). Axis B: Enable forward drive when CN1-9 input signal is ON (closed).
1	Axis A: Enable forward drive when CN1-4 input signal is ON (closed). Axis B: Enable forward drive when CN1-10 input signal is ON (closed).
2	Axis A: Enable forward drive when CN1-5 input signal is ON (closed). Axis B: Enable forward drive when CN1-11 input signal is ON (closed).
3	Axis A: Enable forward drive when CN1-6 input signal is ON (closed). Axis B: Enable forward drive when CN1-12 input signal is ON (closed).
4	Axis A: Enable forward drive when CN1-7 input signal is ON (closed). Axis B: Enable forward drive when CN1-13 input signal is ON (closed).
5	Axis A: Enable forward drive when CN1-8 input signal is ON (closed). Axis B: Enable forward drive when CN1-14 input signal is ON (closed).
6	Reserved (Do not use.)
7	Set the signal to always prohibit forward drive.
8	Set the signal to always enable forward drive.
9	Axis A: Enable forward drive when CN1-3 input signal is OFF (open). Axis B: Enable forward drive when CN1-9 input signal is OFF (open).
A	Axis A: Enable forward drive when CN1-4 input signal is OFF (open). Axis B: Enable forward drive when CN1-10 input signal is OFF (open).
B	Axis A: Enable forward drive when CN1-5 input signal is OFF (open). Axis B: Enable forward drive when CN1-11 input signal is OFF (open).
C	Axis A: Enable forward drive when CN1-6 input signal is OFF (open). Axis B: Enable forward drive when CN1-12 input signal is OFF (open).
D	Axis A: Enable forward drive when CN1-7 input signal is OFF (open). Axis B: Enable forward drive when CN1-13 input signal is OFF (open).
E	Axis A: Enable forward drive when CN1-8 input signal is OFF (open). Axis B: Enable forward drive when CN1-14 input signal is OFF (open).
F	Reserved (Do not use.)

◆ Pn50B(A:250Bh, B:2D0Bh): Input Signal Selections 2

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to FFFFh	–	8881h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	N-OT (Reverse Drive Prohibit Input) Signal Allocation Speed Pos Trq
0	Axis A: Enable reverse drive when CN1-3 input signal is ON (closed). Axis B: Enable reverse drive when CN1-9 input signal is ON (closed).
1 Default	Axis A: Enable reverse drive when CN1-4 input signal is ON (closed). Axis B: Enable reverse drive when CN1-10 input signal is ON (closed).
2	Axis A: Enable reverse drive when CN1-5 input signal is ON (closed). Axis B: Enable reverse drive when CN1-11 input signal is ON (closed).
3	Axis A: Enable reverse drive when CN1-6 input signal is ON (closed). Axis B: Enable reverse drive when CN1-12 input signal is ON (closed).
4	Axis A: Enable reverse drive when CN1-7 input signal is ON (closed). Axis B: Enable reverse drive when CN1-13 input signal is ON (closed).
5	Axis A: Enable reverse drive when CN1-8 input signal is ON (closed). Axis B: Enable reverse drive when CN1-14 input signal is ON (closed).
6	Reserved (Do not use.)
7	Set the signal to always prohibit reverse drive.
8	Set the signal to always enable reverse drive.
9	Axis A: Enable reverse drive when CN1-3 input signal is OFF (open). Axis B: Enable reverse drive when CN1-9 input signal is OFF (open).
A	Axis A: Enable reverse drive when CN1-4 input signal is OFF (open). Axis B: Enable reverse drive when CN1-10 input signal is OFF (open).
B	Axis A: Enable reverse drive when CN1-5 input signal is OFF (open). Axis B: Enable reverse drive when CN1-11 input signal is OFF (open).
C	Axis A: Enable reverse drive when CN1-6 input signal is OFF (open). Axis B: Enable reverse drive when CN1-12 input signal is OFF (open).
D	Axis A: Enable reverse drive when CN1-7 input signal is OFF (open). Axis B: Enable reverse drive when CN1-13 input signal is OFF (open).
E	Axis A: Enable reverse drive when CN1-8 input signal is OFF (open). Axis B: Enable reverse drive when CN1-14 input signal is OFF (open).
F	Reserved (Do not use.)
n.□□X□	Reserved (Do not change.)
n.□X□□	/P-CL (Forward External Torque Limit Input) Signal Allocation Speed Pos Trq
0	Axis A: Active when CN1-3 input signal is ON (closed). Axis B: Active when CN1-9 input signal is ON (closed).
1	Axis A: Active when CN1-4 input signal is ON (closed). Axis B: Active when CN1-10 input signal is ON (closed).
2	Axis A: Active when CN1-5 input signal is ON (closed). Axis B: Active when CN1-11 input signal is ON (closed).
3	Axis A: Active when CN1-6 input signal is ON (closed). Axis B: Active when CN1-12 input signal is ON (closed).
4	Axis A: Active when CN1-7 input signal is ON (closed). Axis B: Active when CN1-13 input signal is ON (closed).
5	Axis A: Active when CN1-8 input signal is ON (closed). Axis B: Active when CN1-14 input signal is ON (closed).

Digit	Meaning
6	Reserved (Do not use.)
7	The signal is always active.
8 Default	The signal is always inactive.
9	Axis A: Active when CN1-3 input signal is OFF (open). Axis B: Active when CN1-9 input signal is OFF (open).
A	Axis A: Active when CN1-4 input signal is OFF (open). Axis B: Active when CN1-10 input signal is OFF (open).
B	Axis A: Active when CN1-5 input signal is OFF (open). Axis B: Active when CN1-11 input signal is OFF (open).
C	Axis A: Active when CN1-6 input signal is OFF (open). Axis B: Active when CN1-12 input signal is OFF (open).
D	Axis A: Active when CN1-7 input signal is OFF (open). Axis B: Active when CN1-13 input signal is OFF (open).
E	Axis A: Active when CN1-8 input signal is OFF (open). Axis B: Active when CN1-14 input signal is OFF (open).
F	Reserved (Do not use.)
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(A:250Eh, B:2D0Eh): 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	Axis A: Output the signal from the CN1-23 or CN1-24 output terminal. Axis B: Output the signal from the CN1-25 or CN1-26 output terminal.
2	Axis A: Output the signal from the CN1-27 or CN1-28 output terminal. Axis B: Output the signal from the CN1-29 or CN1-30 output terminal.
3	Reserved (Do not use.)
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□	/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(A:250Fh, B:2D0Fh): 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	Axis A: Output the signal from the CN1-23 or CN1-24 output terminal. Axis B: Output the signal from the CN1-25 or CN1-26 output terminal.
2	Axis A: Output the signal from the CN1-27 or CN1-28 output terminal. Axis B: Output the signal from the CN1-29 or CN1-30 output terminal.
3	Reserved (Do not use.)
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(A:2510h, B:2D10h): 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	Axis A: Output the signal from the CN1-23 or CN1-24 output terminal. Axis B: Output the signal from the CN1-25 or CN1-26 output terminal.
2	Axis A: Output the signal from the CN1-27 or CN1-28 output terminal. Axis B: Output the signal from the CN1-29 or CN1-30 output terminal.
3	Reserved (Do not use.)
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(A:2511h, B:2D11h): Input Signal Selections 5

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to FFFFh	–	5432h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	Reserved (Do not change.)
n.□□X□	/Probe1 (Probe 1 Latch Input) Signal Allocation Speed Pos Trq
0 to 2	The signal is always inactive.
3 Default	Axis A: Active when CN1-6 input signal is ON (closed). Axis B: Active when CN1-12 input signal is ON (closed).
4	Axis A: Active when CN1-7 input signal is ON (closed). Axis B: Active when CN1-13 input signal is ON (closed).
5	Axis A: Active when CN1-8 input signal is ON (closed). Axis B: Active when CN1-14 input signal is ON (closed).
6 to B	The signal is always inactive.
C	Axis A: Active when CN1-6 input signal is OFF (open). Axis B: Active when CN1-12 input signal is OFF (open).
D	Axis A: Active when CN1-7 input signal is OFF (open). Axis B: Active when CN1-13 input signal is OFF (open).
E	Axis A: Active when CN1-8 input signal is OFF (open). Axis B: Active when CN1-14 input signal is OFF (open).
F	The signal is always inactive.
n.□X□□	/Probe2 (Probe 2 Latch Input) Signal Allocation Speed Pos Trq
0 to F	The allocations are the same as the /Probe1 (Probe 1 Latch Input) signal allocations.
n.X□□□	/Home (Home Switch Input) Signal Allocation Speed Pos Trq
0 to F	The allocations are the same as the /Probe1 (Probe 1 Latch Input) signal allocations.

◆ Pn512(A:2512h, B:2D12h): Output Signal Inverse Settings

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to 1111h	–	0000h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	Output Inversion for CN1-23, CN1-24, CN1-25, and CN1-26 Terminals (Axis A: CN1-23 and CN1-24, Axis B: CN1-25 and CN1-26) Speed Pos Trq
0 Default	The signal is not inverted.
1	The signal is inverted.
n.□□X□	Output Inversion for CN1-27, CN1-28, CN1-29, and CN1-30 Terminals (Axis A: CN1-27 and CN1-28, Axis B: CN1-29 and CN1-30) Speed Pos Trq
0 Default	The signal is not inverted.
1	The signal is inverted.
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn514(A:2514h, B:2D14h): 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	Axis A: Output the signal from the CN1-23 or CN1-24 output terminal. Axis B: Output the signal from the CN1-25 or CN1-26 output terminal.
2	Axis A: Output the signal from the CN1-27 or CN1-28 output terminal. Axis B: Output the signal from the CN1-29 or CN1-30 output terminal.
3	Reserved (Do not use.)
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(A:2516h, B:2D16h): Input Signal Selections 7

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to FFFFh	–	8888h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	FSTP (Forced Stop Input) Signal Allocation Speed Pos Trq
0	Axis A: Enable drive when CN1-3 input signal is ON (closed). Axis B: Enable drive when CN1-9 input signal is ON (closed).
1	Axis A: Enable drive when CN1-4 input signal is ON (closed). Axis B: Enable drive when CN1-10 input signal is ON (closed).
2	Axis A: Enable drive when CN1-5 input signal is ON (closed). Axis B: Enable drive when CN1-11 input signal is ON (closed).
3	Axis A: Enable drive when CN1-6 input signal is ON (closed). Axis B: Enable drive when CN1-12 input signal is ON (closed).
4	Axis A: Enable drive when CN1-7 input signal is ON (closed). Axis B: Enable drive when CN1-13 input signal is ON (closed).
5	Axis A: Enable drive when CN1-8 input signal is ON (closed). Axis B: Enable drive when CN1-14 input signal is ON (closed).
6	Reserved (Do not use.)
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	Axis A: Enable drive when CN1-3 input signal is OFF (open). Axis B: Enable drive when CN1-9 input signal is OFF (open).
A	Axis A: Enable drive when CN1-4 input signal is OFF (open). Axis B: Enable drive when CN1-10 input signal is OFF (open).
B	Axis A: Enable drive when CN1-5 input signal is OFF (open). Axis B: Enable drive when CN1-11 input signal is OFF (open).
C	Axis A: Enable drive when CN1-6 input signal is OFF (open). Axis B: Enable drive when CN1-12 input signal is OFF (open).
D	Axis A: Enable drive when CN1-7 input signal is OFF (open). Axis B: Enable drive when CN1-13 input signal is OFF (open).
E	Axis A: Enable drive when CN1-8 input signal is OFF (open). Axis B: Enable drive when CN1-14 input signal is OFF (open).
F	Reserved (Do not use.)
n.□□X□	Reserved (Do not change.)
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn51B(A:251Bh, B:2D1Bh): Motor-Load Position Deviation Overflow Detection Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	0 to 1073741824	1 reference unit	1000	Rotary	Immediately	Setup	–

◆ Pn51E(A:251Eh, B:2D1Eh): Position Deviation Overflow Warning Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 100	1%	100	All	Immediately	Setup	–

◆ Pn520(A:2520h, B:2D20h): Position Deviation Overflow Alarm Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	1 to 1073741823	1 reference unit	6116694	All	Immediately	Setup	–

◆ Pn522(A:2522h, B:2D22h): In-position Range

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	0 to 1073741824	1 reference unit	7	All	Immediately	Setup	–

◆ Pn524(A:2524h, B:2D24h): Near Signal Width

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	1 to 1073741824	1 reference unit	1073741824	All	Immediately	Setup	–

◆ Pn526(A:2526h, B:2D26h): Position Deviation Overflow Alarm Level at Servo ON

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	1 to 1073741823	1 reference unit	6116694	All	Immediately	Setup	–

◆ Pn528(A:2528h, B:2D28h): Position Deviation Overflow Warning Level at Servo ON

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 100	1%	100	All	Immediately	Setup	–

◆ Pn529(A:2529h, B:2D29h): Speed Limit Level at Servo ON

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 min^{-1}	10000	Rotary	Immediately	Setup	–

◆ Pn52A(A:252Ah, B:2D2Ah): Multiplier per Fully-closed Rotation

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 100	1%	20	Rotary	Immediately	Tuning	–

◆ Pn52B(A:252Bh, B:2D2Bh): Overload Warning Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 100	1%	20	All	Immediately	Setup	–

◆ Pn52C(A:252Ch, B:2D2Ch): 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(A:2530h, B:2D30h): 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 (2535h) → Forward by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h)
1	(Waiting time in Pn535 (2535h) → Reverse by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h)
2	(Waiting time in Pn535 (2535h) → Forward by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h) (Waiting time in Pn535 (2535h) → Reverse by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h)
3	(Waiting time in Pn535 (2535h) → Reverse by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h) (Waiting time in Pn535 (2535h) → Forward by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h)
4	(Waiting time in Pn535 (2535h) → Forward by travel distance in Pn531 (2531h) → Waiting time in Pn535 (2535h) → Reverse by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h)
5	(Waiting time in Pn535 (2535h) → Reverse by travel distance in Pn531 (2531h) → Waiting time in Pn535 (2535h) → Forward by travel distance in Pn531 (2531h)) × Number of movements in Pn536 (2536h)
n.□□X□	Reserved (Do not change.)
n.□X□□	Reserved (Do not change.)
n.X□□□	Reserved (Do not change.)

◆ Pn531(A:2531h, B:2D31h): 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(A:2533h, B:2D33h): 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(A:2534h, B:2D34h): 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(A:2535h, B:2D35h): 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(A:2536h, B:2D36h): 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(A:2540h, B:2D40h): 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(2550h): Analog Monitor 1 Offset Voltage

Common 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(2551h): Analog Monitor 2 Offset Voltage

Common 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(2552h): Analog Monitor 1 Magnification

Common 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(2553h): Analog Monitor 2 Magnification

Common 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(255Ah): Power Consumption Monitor Unit Time

Common 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(A:2560h, B:2D60h): 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(A:2561h, B:2D61h): 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(A:2562h, B:2D62h): 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	–

◆ Pn580(A:2580h, B:2D80h): Zero Clamping Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 mm/s	10	Linear	Immediately	Setup	–

◆ Pn581(A:2581h, B:2D81h): Zero Speed Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 10000	1 mm/s	20	Linear	Immediately	Setup	–

◆ Pn582(A:2582h, B:2D82h): Speed Coincidence Detection Signal Output Width

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 100	1 mm/s	10	Linear	Immediately	Setup	–

◆ Pn583(A:2583h, B:2D83h): Brake Reference Output Speed Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 mm/s	10	Linear	Immediately	Setup	–

◆ Pn584(A:2584h, B:2D84h): Speed Limit Level at Servo ON

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	1 mm/s	10000	Linear	Immediately	Setup	–

◆ Pn585(A:2585h, B:2D85h): Program Jogging Movement Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 10000	1 mm/s	50	Linear	Immediately	Setup	–

◆ Pn586(A:2586h, B:2D86h): Motor Running Cooling Ratio

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 100	1% / Maximum Motor Speed	0	Linear	Immediately	Setup	–

◆ Pn587(A:2587h, B:2D87h): Polarity Detection Execution Selection for Absolute Linear Encoder

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.)

Parameter and Object Lists

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◆ Pn589(2589h): SigmaLINK II Node Detection Time

Common Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	100 to 10000	1 ms	1500	All	After restart	Setup	–

◆ Pn590(A:2590h, B:2D90h): P-OT (Forward Drive Prohibit Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to 3149h	–	Axis A: 1003h, Axis B: 1009h	All	After restart	Setup	–

Digit	Meaning
n.□XXX	Allocated Pin Number (Speed Pos Trq)
003 Default	Allocate the signal to CN1-3.
004	Allocate the signal to CN1-4.
005	Allocate the signal to CN1-5.
006	Allocate the signal to CN1-6.
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.
014	Allocate the signal to CN1-14.
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(A:2591h, B:2D91h): 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	–	Axis A: 1004h, Axis B: 1010h	All	After restart	Setup	–

Digit	Meaning
n.□XXX	Allocated Pin Number Speed Pos Trq
003	Allocate the signal to CN1-3.
004 Default	Allocate the signal to CN1-4.
005	Allocate the signal to CN1-5.
006	Allocate the signal to CN1-6.
007	Allocate the signal to CN1-7.
008	Allocate the signal to CN1-8.
009	Allocate the signal to CN1-9.
010 Default	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.
014	Allocate the signal to CN1-14.
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.

◆ Pn593(A:2593h, B:2D93h): /Probe1 (Probe 1 Latch Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2149h	–	Axis A: 1006h, Axis B: 1012h	All	After restart	Setup	–

Digit	Meaning
n.□XXX	Allocated Pin Number Speed Pos Trq
006 Default	Allocate the signal to CN1-6.
007	Allocate the signal to CN1-7.
008	Allocate the signal to CN1-8.
012 Default	Allocate the signal to CN1-12.
013	Allocate the signal to CN1-13.
014	Allocate the signal to CN1-14.
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(A:2594h, B:2D94h): /Probe2 (Probe 2 Latch Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2149h	–	Axis A: 1007h, Axis B: 1013h	All	After restart	Setup	–

Digit	Meaning
n.□XXX	Allocated Pin Number Speed Pos Trq
006	Allocate the signal to CN1-6.
007 Default	Allocate the signal to CN1-7.
008	Allocate the signal to CN1-8.
012	Allocate the signal to CN1-12.
013 Default	Allocate the signal to CN1-13.
014	Allocate the signal to CN1-14.
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(A:2595h, B:2D95h): /Home (Home Switch Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2149h	–	Axis A: 1008h, Axis B: 1014h	All	After restart	Setup	–

Digit	Meaning
n.□XXX	Allocated Pin Number Speed Pos Trq
006	Allocate the signal to CN1-6.
007	Allocate the signal to CN1-7.
008 Default	Allocate the signal to CN1-8.
012	Allocate the signal to CN1-12.
013	Allocate the signal to CN1-13.
014 Default	Allocate the signal to CN1-14.
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(A:2597h, B:2D97h): FSTP (Forced Stop Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 3049h	–	0000h	All	After restart	Setup	–

Digit	Meaning
n.□XXX	Allocated Pin Number (Speed, Pos, Trq)
003	Allocate the signal to CN1-3.
004	Allocate the signal to CN1-4.
005	Allocate the signal to CN1-5.
006	Allocate the signal to CN1-6.
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.
014	Allocate the signal to CN1-14.
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(A:2598h, B:2D98h): /P-CL (Forward External Torque Limit Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.
003	Allocate the signal to CN1-3.
004	Allocate the signal to CN1-4.
005	Allocate the signal to CN1-5.
006	Allocate the signal to CN1-6.
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.
014	Allocate the signal to CN1-14.
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(A:2599h, B:2D99h): /N-CL (Reverse External Torque Limit Input) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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.
003	Allocate the signal to CN1-3.
004	Allocate the signal to CN1-4.
005	Allocate the signal to CN1-5.
006	Allocate the signal to CN1-6.
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.
014	Allocate the signal to CN1-14.
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(A:25B0h, B:2DB0h): /COIN (Positioning Completion Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to 2039h	–	0000h	All	After restart	Setup	–

Digit	Meaning
n.□XXX	Allocated Pin Number Speed Pos Trq
023	Allocate the signal to CN1-23.
025	Allocate the signal to CN1-25.
027	Allocate the signal to CN1-27.
029	Allocate the signal to CN1-29.
031	Allocate the signal to CN1-31.
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(A:25B1h, B:2DB1h): /V-CMP (Speed Coincidence Detection Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to 2039h	–	0000h	All	After restart	Setup	–

Digit	Meaning
n.□XXX	Allocated Pin Number Speed Pos Trq
023	Allocate the signal to CN1-23.
025	Allocate the signal to CN1-25.
027	Allocate the signal to CN1-27.
029	Allocate the signal to CN1-29.
031	Allocate the signal to CN1-31.
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(A:25B2h, B:2DB2h): /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
023	Allocate the signal to CN1-23.
025	Allocate the signal to CN1-25.
027	Allocate the signal to CN1-27.
029	Allocate the signal to CN1-29.
031	Allocate the signal to CN1-31.
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(A:25B3h, B:2DB3h): /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
023	Allocate the signal to CN1-23.
025	Allocate the signal to CN1-25.
027	Allocate the signal to CN1-27.
029	Allocate the signal to CN1-29.
031	Allocate the signal to CN1-31.
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(A:25B4h, B:2DB4h): /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)
023	Allocate the signal to CN1-23.
025	Allocate the signal to CN1-25.
027	Allocate the signal to CN1-27.
029	Allocate the signal to CN1-29.
031	Allocate the signal to CN1-31.
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(A:25B5h, B:2DB5h): /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)
023	Allocate the signal to CN1-23.
025	Allocate the signal to CN1-25.
027	Allocate the signal to CN1-27.
029	Allocate the signal to CN1-29.
031	Allocate the signal to CN1-31.
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(A:25B6h, B:2DB6h): /BK (Brake Output) Signal Allocation

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000h to 2039h	–	Axis A: 1023h, Axis B: 1025h	All	After restart	Setup	–

Digit	Meaning
n.□XXX	Allocated Pin Number (Speed, Pos, Trq)
023 Default	Allocate the signal to CN1-23.
025 Default	Allocate the signal to CN1-25.
027	Allocate the signal to CN1-27.
029	Allocate the signal to CN1-29.
031	Allocate the signal to CN1-31.
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(A:25B7h, B:2DB7h): /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)
023	Allocate the signal to CN1-23.
025	Allocate the signal to CN1-25.
027	Allocate the signal to CN1-27.
029	Allocate the signal to CN1-29.
031	Allocate the signal to CN1-31.
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(A:25B8h, B:2DB8h): /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)
023	Allocate the signal to CN1-23.
025	Allocate the signal to CN1-25.
027	Allocate the signal to CN1-27.
029	Allocate the signal to CN1-29.
031	Allocate the signal to CN1-31.
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(A:25BCh, B:2DBCh): /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)
023	Allocate the signal to CN1-23.
025	Allocate the signal to CN1-25.
027	Allocate the signal to CN1-27.
029	Allocate the signal to CN1-29.
031	Allocate the signal to CN1-31.
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(A:25C3h, B:2DC3h): Error Detection Setting

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(A:25C4h, B:2DC4h): Error Detection Sample Data Set 1 Warning Level 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	0.01%	2000	All	Immediately	Setup	–

◆ Pn5C5(A:25C5h, B:2DC5h): Error Detection Sample Data Set 1 Judgment Level 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	–	1520	All	Immediately	Setup	–

◆ Pn5C6(A:25C6h, B:2DC6h): Error Detection Sample Data Set 1 Warning Level 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	0.01%	2000	All	Immediately	Setup	–

◆ Pn5C7(A:25C7h, B:2DC7h): Error Detection Sample Data Set 1 Judgment Level 2

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	–	1520	All	Immediately	Setup	–

◆ Pn5C8(A:25C8h, B:2DC8h): Error Detection Sample Data Set 2 Warning Level 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	0.01%	2000	All	Immediately	Setup	–

◆ Pn5C9(A:25C9h, B:2DC9h): Error Detection Sample Data Set 2 Judgment Level 1

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 10000	–	1520	All	Immediately	Setup	–

◆ Pn5CA(A:25CAh, B:2DCAh): 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(A:25CBh, B:2DCBh): 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	–	1520	All	Immediately	Setup	–

◆ Pn5D7(25D7h): Output Signal Inversion for Triggers at Preset Positions

Common

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0000H to 01F7h	–	0000h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	Reserved (Do not change.)
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 CN1-23, -24 (SO1) and output it.
2	Invert CN1-25, -26 (SO2) and output it.
3	Invert CN1-23, -24 (SO1) and CN1-25, -26 (SO2) and output them.
4	Invert CN1-27, -28 (SO3) and output it.
5	Invert CN1-23, -24 (SO1) and CN1-27, -28 (SO3) and output them.
6	Invert CN1-25, -26 (SO2) and CN1-27, -28 (SO3) and output them.
7	Invert CN1-23, -24 (SO1), CN1-25, -26 (SO2), and CN1-27, -28 (SO3) and output them.
8	Invert CN1-29, -30 (SO4) and output it.
9	Invert CN1-23, -24 (SO1) and CN1-29, -30 (SO4) and output them.
10	Invert CN1-25, -26 (SO2) and CN1-29, -30 (SO4) and output them.
11	Invert CN1-23, -24 (SO1), CN1-25, -26 (SO2), and CN1-29, -30 (SO4) and output them.
12	Invert CN1-27, -28 (SO3) and CN1-29, -30 (SO4) and output them.
13	Invert CN1-23, -24 (SO1), CN1-27, -28 (SO3), and CN1-29, -30 (SO4) and output them.
14	Invert CN1-25, -26 (SO2), CN1-27, -28 (SO3), and CN1-29, -30 (SO4) and output them.
15	Invert CN1-23, -24 (SO1), CN1-25, -26 (SO2), CN1-27, -28 (SO3), and CN1-29, -30 (SO4) and output them.
n.□X□□	Normal Output Signal Inverse Settings for Triggers at Preset Positions 2 (Speed Pos Trq)
0 Default	The signal is not inverted.
1	Invert CN1-31, -32 (SO5) and output it.
n.X□□□	Reserved (Do not change.)

◆ Pn600(2600h): Regenerative Resistor Capacity

Common Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Reference
2	0 to 2 times the SERVOPACK's maximum applicable motor capacity	10 W	0	All	Immediately	Setup	–

◆ Pn601(A:2601h, B:2E01h): Dynamic Brake Resistor Allowable Energy Consumption

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	10 J	0	All	After restart	Setup	–

◆ Pn603(2603h): Regenerative Resistance

Common Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	10 mΩ	0	All	Immediately	Setup	–

◆ Pn604(A:2604h, B:2E04h): Dynamic Brake Resistance

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	10 mΩ	0	All	After restart	Setup	–

◆ Pn61A(A:261Ah, B:2E1Ah): Overheat Protection Selections

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(A:261Bh, B:2E1Bh): Overheat Alarm Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(A:261Ch, B:2E1Ch): Overheat Warning Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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(A:261Dh, B:2E1Dh): Overheat Alarm Filter Time

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
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).

◆ Pn660(2660h): Triggers at Preset Positions Switch

Common

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to 2011h	–	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.
2	Reserved (Do not use.)

◆ Pn665(2665h): Synchronized Stopping Function Selections

Common

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0000h to FF13h	–	FC03h	All	After restart	Setup	–

Digit	Meaning
n.□□□X	Synchronized Stopping Selection (Speed Pos Trq)
0	Disable synchronized stopping.
1	Reserved (Do not use.)
2	Enable synchronized stopping mode 2.
3 Default	Enable synchronized stopping mode 3.
n.□□X□	Reserved (Do not change.)
n.□X□□	Reference Synchronization Function Individual Selections 1 (Speed Pos Trq)
0	Do not synchronize /S-ON, /ALM-RST, OT, and FSTP of secondary axis to primary axis.
1	Synchronize /S-ON of secondary axis to primary axis.
2	Synchronize /ALM-RST of secondary axis to primary axis.
3	Synchronize /S-ON and /ALM-RST of secondary axis to primary axis.
4	Synchronize OT of secondary axis to primary axis.
5	Synchronize /S-ON and OT of secondary axis to primary axis.
6	Synchronize /ALM-RST and OT of secondary axis to primary axis.
7	Synchronize /S-ON, /ALM-RST, and OT of secondary axis to primary axis.
8	Synchronize FSTP of secondary axis to primary axis.
9	Synchronize /S-ON and FSTP of secondary axis to primary axis.
A	Synchronize /ALM-RST and FSTP of secondary axis to primary axis.
B	Synchronize /S-ON, /ALM-RST, and FSTP of secondary axis to primary axis.
C Default	Synchronize OT and FSTP of secondary axis to primary axis.
D	Synchronize /S-ON, OT, and FSTP of secondary axis to primary axis.
E	Synchronize /ALM-RST, OT, and FSTP of secondary axis to primary axis.
F	Synchronize /S-ON, /ALM-RST, OT, and FSTP of secondary axis to primary axis.
n.X□□□	Reserved (Do not change.)

◆ Pn666(2666h): Synchronized Stopping End Speed

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 65535	Rotary: min^{-1} Linear: mm/s	10	All	Immediately	Setup	–

◆ Pn667(2667h): Synchronized Stopping Function Response Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1 Hz	400	All	Immediately	Setup	–

◆ Pn668(2668h): Synchronized Stopping Function Moment of Inertia Ratio

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	1 to 65535	%	100	All	Immediately	Setup	–

◆ Pn669(A:2669h, B:2E69h): Relative Position Deviation Overflow Warning Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 100	%	100	All	Immediately	Setup	–

◆ Pn66A(A:266Ah, B:2E6Ah): Relative Position Deviation Overflow Alarm Level

Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
4	0 to 1073741823	reference unit	5242880	All	Immediately	Setup	–

◆ Pn66B(266Bh): Relative Pos Deviation Compensation Speed Loop Gain

Common Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1 Hz	400	All	Immediately	Tuning	–

◆ Pn66C(266Ch): Relative Pos Dev Compensation Spd Loop Integral Time Const

Common Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	15 to 51200	0.01 ms	2000	All	Immediately	Tuning	–

◆ Pn66D(266Dh): Relative Pos Deviation Compensation Position Loop Gain

Common Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	10 to 20000	0.1/s	400	All	Immediately	Tuning	–

◆ Pn66E(266Eh): Relative Pos Deviation Compensation Filter Time Constant

Common Speed Pos Trq

Size	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classification	Refer-ence
2	0 to 65535	0.01 ms	100	All	Immediately	Tuning	–

10.4 Object List: Σ-XS SERVOPACK

The following table lists the objects.

Information
- Save the parameter data to object 1010h to save all of the current parameter data to EEPROM.
  If the objects are modified by the digital operator or SigmaWin+, the data will be directly saved in EEPROM.
- The parameter numbers given in the table are the parameter numbers that are used with the digital operator and SigmaWin+.
- Refer to the following manuals for details on Pn000 to Pn6FF.
  Σ-XS SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 02)
  Only the parameters listed in this section are displayed in SigmaWin+ and the digital operator.

Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1000h	0	Device Type	UDINT	RO	No	No	0x00020192	–	–	–	–
1001h	0	Error Register	USINT	RO	No	No	–	–	–	–	–
1008h	0	Manufacturer Device Name	STRING	RO	No	No	–	–	–	–	–
100Ah	0	Manufacturer Software Version	STRING	RO	No	No	–	–	–	–	–
1010h	Store Parameters										
	0	Largest subindex supported	USINT	RO	No	No	4	–	–	–	–
	1	Save all parameters	UDINT	RW	No	No	0x00000001	0x00000000	0xFFFFFFFF	–	PnC00
	2	Reserved	UDINT	RW	No	No	0x00000001	–	–	–	–
	3	Reserved	UDINT	RW	No	No	0x00000001	–	–	–	–
	4	Reserved	UDINT	RW	No	No	0x00000001	–	–	–	–
1011h	Restore Default Parameters										
	0	Largest subindex supported	USINT	RO	No	No	4	–	–	–	–
	1	Restore all default parameters	UDINT	RW	No	No	0x00000001	0x00000000	0xFFFFFFFF	–	PnC08
	2	Reserved	UDINT	RW	No	No	0x00000001	–	–	–	–
	3	Reserved	UDINT	RW	No	No	0x00000001	–	–	–	–
	4	Reserved	UDINT	RW	No	No	0x00000001	–	–	–	–
1018h	Identity Object										
	0	Number of entries	USINT	RO	No	No	4	–	–	–	–
	1	Vendor ID	UDINT	RO	No	No	0x00000539	–	–	–	–
	2	Product code	UDINT	RO	No	No	0x02200901	–	–	–	–
	3	Revision number	UDINT	RO	No	No	–	–	–	–	–
	4	Serial number	UDINT	RO	No	No	0x00000000	–	–	–	–
10F1h	Sync Error Settings										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Reserved (Local Error Reaction)	UDINT	RW	No	No	0	–	–	–	–
	2	Sync error count limit	UINT	RW	No	Yes	9	0	15	–	PnCCC

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1600h	1st Receive PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	8	0	16	–	PnCA0
	1	Mapping entry 1	UDINT	RW	No	Yes	0x60400010	0	0xFFFFFFFF	–	PnC20
	2	Mapping entry 2	UDINT	RW	No	Yes	0x607A0020	0	0xFFFFFFFF	–	PnC22
	3	Mapping entry 3	UDINT	RW	No	Yes	0x60FF0020	0	0xFFFFFFFF	–	PnC24
	4	Mapping entry 4	UDINT	RW	No	Yes	0x60710010	0	0xFFFFFFFF	–	PnC26
	5	Mapping entry 5	UDINT	RW	No	Yes	0x60720010	0	0xFFFFFFFF	–	PnC28
	6	Mapping entry 6	UDINT	RW	No	Yes	0x60600008	0	0xFFFFFFFF	–	PnC2A
	7	Mapping entry 7	UDINT	RW	No	Yes	0x00000008	0	0xFFFFFFFF	–	PnC2C
	8	Mapping entry 8	UDINT	RW	No	Yes	0x60B80010	0	0xFFFFFFFF	–	PnC2E
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC30
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC32
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC34
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC36
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC38
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC3A
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC3C
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC3E
1601h	2nd Receive PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	2	0	16	–	PnCA1
	1	Mapping entry 1	UDINT	RW	No	Yes	0x60400010	0	0xFFFFFFFF	–	PnC40
	2	Mapping entry 2	UDINT	RW	No	Yes	0x607A0020	0	0xFFFFFFFF	–	PnC42
	3	Mapping entry 3	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC44
	4	Mapping entry 4	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC46
	5	Mapping entry 5	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC48
	6	Mapping entry 6	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC4A
	7	Mapping entry 7	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC4C
	8	Mapping entry 8	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC4E
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC50
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC52
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC54
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC56
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC58
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC5A
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC5C
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC5E

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1602h	3rd Receive PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	No	2	0	16	–	–
	1	Mapping entry 1	UDINT	RW	No	No	0x60400010	0	0xFFFFFFFF	–	–
	2	Mapping entry 2	UDINT	RW	No	No	0x60FF0020	0	0xFFFFFFFF	–	–
	3	Mapping entry 3	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	4	Mapping entry 4	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	5	Mapping entry 5	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	6	Mapping entry 6	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	7	Mapping entry 7	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	8	Mapping entry 8	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	9	Mapping entry 9	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	10	Mapping entry 10	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	11	Mapping entry 11	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	12	Mapping entry 12	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	13	Mapping entry 13	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	14	Mapping entry 14	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	15	Mapping entry 15	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	16	Mapping entry 16	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
1603h	4th Receive PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	No	2	0	16	–	–
	1	Mapping entry 1	UDINT	RW	No	No	0x60400010	0	0xFFFFFFFF	–	–
	2	Mapping entry 2	UDINT	RW	No	No	0x60710010	0	0xFFFFFFFF	–	–
	3	Mapping entry 3	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	4	Mapping entry 4	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	5	Mapping entry 5	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	6	Mapping entry 6	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	7	Mapping entry 7	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	8	Mapping entry 8	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	9	Mapping entry 9	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	10	Mapping entry 10	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	11	Mapping entry 11	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	12	Mapping entry 12	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	13	Mapping entry 13	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	14	Mapping entry 14	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	15	Mapping entry 15	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	16	Mapping entry 16	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1A00h	1st Transmit PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	8	0	16	–	PnCA4
	1	Mapping entry 1	UDINT	RW	No	Yes	0x60410010	0	0xFFFFFFFF	–	PnC60
	2	Mapping entry 2	UDINT	RW	No	Yes	0x60640020	0	0xFFFFFFFF	–	PnC62
	3	Mapping entry 3	UDINT	RW	No	Yes	0x60770010	0	0xFFFFFFFF	–	PnC64
	4	Mapping entry 4	UDINT	RW	No	Yes	0x60F40020	0	0xFFFFFFFF	–	PnC66
	5	Mapping entry 5	UDINT	RW	No	Yes	0x60610008	0	0xFFFFFFFF	–	PnC68
	6	Mapping entry 6	UDINT	RW	No	Yes	0x00000008	0	0xFFFFFFFF	–	PnC6A
	7	Mapping entry 7	UDINT	RW	No	Yes	0x60B90010	0	0xFFFFFFFF	–	PnC6C
	8	Mapping entry 8	UDINT	RW	No	Yes	0x60BA0020	0	0xFFFFFFFF	–	PnC6E
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC70
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC72
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC74
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC76
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC78
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC7A
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC7C
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC7E
1A01h	2nd Transmit PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	2	0	16	–	PnCA5
	1	Mapping entry 1	UDINT	RW	No	Yes	0x60410010	0	0xFFFFFFFF	–	PnC80
	2	Mapping entry 2	UDINT	RW	No	Yes	0x60640020	0	0xFFFFFFFF	–	PnC82
	3	Mapping entry 3	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC84
	4	Mapping entry 4	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC86
	5	Mapping entry 5	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC88
	6	Mapping entry 6	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC8A
	7	Mapping entry 7	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC8C
	8	Mapping entry 8	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC8E
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC90
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC92
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC94
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC96
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC98
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC9A
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC9C
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC9E

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Index	Subin-dex	Name	Data Type	Acc-ess	PDO Map-ping	Saving to EEPRO-M	Default Value	Lower Limit	Upper Limit	Unit	Parame-ter No.
1A02h	3rd Transmit PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	No	2	0	16	–	–
	1	Mapping entry 1	UDINT	RW	No	No	0x60410010	0	0xFFFFFFFF	–	–
	2	Mapping entry 2	UDINT	RW	No	No	0x60640020	0	0xFFFFFFFF	–	–
	3	Mapping entry 3	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	4	Mapping entry 4	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	5	Mapping entry 5	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	6	Mapping entry 6	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	7	Mapping entry 7	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	8	Mapping entry 8	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	9	Mapping entry 9	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	10	Mapping entry 10	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	11	Mapping entry 11	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	12	Mapping entry 12	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	13	Mapping entry 13	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	14	Mapping entry 14	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	15	Mapping entry 15	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	16	Mapping entry 16	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
1A03h	4th Transmit PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	No	3	0	16	–	–
	1	Mapping entry 1	UDINT	RW	No	No	0x60410010	0	0xFFFFFFFF	–	–
	2	Mapping entry 2	UDINT	RW	No	No	0x60640020	0	0xFFFFFFFF	–	–
	3	Mapping entry 3	UDINT	RW	No	No	0x60770010	0	0xFFFFFFFF	–	–
	4	Mapping entry 4	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	5	Mapping entry 5	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	6	Mapping entry 6	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	7	Mapping entry 7	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	8	Mapping entry 8	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	9	Mapping entry 9	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	10	Mapping entry 10	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	11	Mapping entry 11	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	12	Mapping entry 12	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	13	Mapping entry 13	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	14	Mapping entry 14	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	15	Mapping entry 15	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	16	Mapping entry 16	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1C00h	Sync Manager Communication Type										
	0	Number of used Sync Manager channels	USINT	RO	No	No	4	–	–	–	–
	1	Communication type sync manager 0	USINT	RO	No	No	1 (mailbox receive (master → slave))	–	–	–	PnCB0
	2	Communication type sync manager 1	USINT	RO	No	No	2 (mailbox send (slave → master))	–	–	–	PnCB1
	3	Communication type sync manager 2	USINT	RO	No	No	3 (process data output (master → slave))	–	–	–	PnCB2
	4	Communication type sync manager 3	USINT	RO	No	No	4 (process data input (slave → master))	–	–	–	PnCB3
1C10h	0	Sync Manager PDO Assignment 0	USINT	RO	No	No	0	–	–	–	–
1C11h	0	Sync Manager PDO Assignment 1	USINT	RO	No	No	0	–	–	–	–
1C12h	Sync Manager PDO Assignment 2										
	0	Number of assigned PDOs	USINT	RO	No	Yes	1	0	2	–	PnCB5
	1	Index of assigned RxPDO 1	UINT	RW	No	Yes	0x1601	0x1600	0x1603	–	PnCB6
	2	Index of assigned RxPDO 2	UINT	RW	No	Yes	0x1600	0x1600	0x1603	–	PnCB7
1C13h	Sync Manager PDO Assignment 3										
	0	Number of assigned PDOs	USINT	RO	No	Yes	1	0	2	–	PnCBB
	1	Index of assigned TxPDO 1	UINT	RW	No	Yes	0x1A01	0x1A00	0x1A03	–	PnCBC
	2	Index of assigned TxPDO 2	UINT	RW	No	Yes	0x1A00	0x1A00	0x1A03	–	PnCBD

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1C32h	Sync Manager 2 (process data output) Synchronization										
	0	Number of synchronization parameters	USINT	RO	No	No	32	–	–	–	–
	1	Synchronization type	UINT	RO	No	No	2	–	–	–	PnCC0
	2	Cycle time	UDINT	RO	No	No	–	–	–	ns	PnCC2
	3	Shift time	UDINT	RW	No	Yes	62500	62500	Sync0 event cycle	ns	PnCC4
	4	Synchronization types supported	UINT	RO	No	No	0x0025	–	–	–	–
	5	Minimum cycle time	UDINT	RO	No	No	62500	–	–	ns	–
	6	Calc and copy time	UDINT	RO	No	No	62500	–	–	ns	–
	7	Reserved (Minimum Delay Time)	UDINT	RO	No	No	0	–	–	–	–
	8	Reserved (Get Cycle Time)	UINT	RO	No	No	0	–	–	–	–
	9	Delay time	UDINT	RO	No	No	0	–	–	ns	–
	10	Sync0 cycle time	UDINT	RO	No	No	–	–	–	–	PnCC6
	11	SM event missed counter	UINT	RO	No	No	–	–	–	–	PnCC8
	12	Reserved (Cycle Time Too Small)	UINT	RO	No	No	0	–	–	–	–
	13	Reserved (Shift Time Too Short)	UINT	RO	No	No	0	–	–	–	–
	14	Reserved (RxPDO Toggle Failed)	UINT	RO	No	No	0	–	–	–	–
	15	Reserved (Minimum Cycle Distance)	UDINT	RO	No	No	0	–	–	–	–
	16	Reserved (Maximum Cycle Distance)	UDINT	RO	No	No	0	–	–	–	–
	17	Minimum SM SYNC distance	UDINT	RO	No	No	–	–	–	–	PnCD8
	18	Maximum SM SYNC distance	UDINT	RO	No	No	–	–	–	–	PnCD6
	32	Sync Error	BOOL	RO	No	No	0	–	–	–	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1C33h	Sync Manager 3 (process data input) Synchronization										
	0	Number of synchronization parameters	USINT	RO	No	No	32	–	–	–	–
	1	Synchronization type	UINT	RO	No	No	–	–	–	–	–
	2	Cycle time	UDINT	RO	No	No	–	–	–	–	–
	3	Shift time	UDINT	RW	No	Yes	0	0	Sync0 event cycle - 62500	ns	PnCCA
	4	Synchronization types supported	UINT	RO	No	No	0x0025	–	–	–	–
	5	Minimum cycle time	UDINT	RO	No	No	62500	–	–	ns	–
	6	Calc and copy time	UDINT	RO	No	No	62500	–	–	ns	–
	7	Reserved (Minimum Delay Time)	UDINT	RO	No	No	0	–	–	–	–
	8	Reserved (Get Cycle Time)	UINT	RO	No	No	0	–	–	–	–
	9	Delay time	UDINT	RO	No	No	0	–	–	–	–
	10	Sync0 cycle time	UDINT	RO	No	No	–	–	–	–	–
	11	SM event missed counter	UINT	RO	No	No	–	–	–	–	–
	12	Reserved (Cycle Time Too Small)	UINT	RO	No	No	0	–	–	–	–
	13	Reserved (Shift Time Too Short)	UINT	RO	No	No	0	–	–	–	–
	14	Reserved (RxPDO Toggle Failed)	UINT	RO	No	No	0	–	–	–	–
	15	Reserved (Minimum Cycle Distance)	UDINT	RO	No	No	0	–	–	–	–
	16	Reserved (Maximum Cycle Distance)	UDINT	RO	No	No	0	–	–	–	–
	17	Minimum SM SYNC distance	UDINT	RO	No	No	–	–	–	–	PnCD8
	18	Maximum SM SYNC distance	UDINT	RO	No	No	–	–	–	–	PnCD6
	32	Sync Error	BOOL	RO	No	No	0	–	–	–	–
2000h to 26FFh	0	SERVOPACK Parameter (Pn000 (2000h) - Pn6FF (26FFh))	–	–	–	–	–	–	–	–	Pn000-Pn6FF
2700h	0	User Parameter Configuration	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	PnB00
2701h	Position User Unit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Numerator	UDINT	RW	No	Yes	64	1	1073741824	–	Pn20E
	2	Denominator	UDINT	RW	No	Yes	1	1	1073741824	–	Pn210

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Index	Subin-dex	Name	Data Type	Acc-ess	PDO Map-ping	Saving to EEPRO-M	Default Value	Lower Limit	Upper Limit	Unit	Parame-ter No.
2702h	Velocity User Unit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Numerator	UDINT	RW	No	Yes	64	1	1073741823	–	PnB06
	2	Denominator	UDINT	RW	No	Yes	1	1	1073741823	–	PnB08
2703h	Acceleration User Unit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Numerator	UDINT	RW	No	Yes	64	1	1073741823	–	PnB0A
	2	Denominator	UDINT	RW	No	Yes	1	1	1073741823	–	PnB0C
2704h	Torque User Unit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Numerator	UDINT	RW	No	Yes	1	1	1073741823	–	PnB94
	2	Denominator	UDINT	RW	No	Yes	10	1	1073741823	–	PnB96
2710h	SERVOPACK Adjusting Command										
	0	Number of entries	USINT	RO	No	No	3	–	–	–	–
	1	Command	STRIN-G	RW	No	No	0	0	0xFF	–	–
	2	Status	USINT	RO	No	No	–	–	–	–	–
	3	Reply	STRIN-G	RO	No	No	–	–	–	–	–
2730h	Interpolation Data Configuration for 1st Profile										
	0	Number of entries	USINT	RO	No	No	9	–	–	–	–
	1	Maximum buffer size	UDINT	RO	No	No	254	–	–	–	–
	2	Actual buffer size	UDINT	RW	No	No	254	–	–	–	–
	3	Buffer organization	USINT	RW	No	No	0	0	1	–	PnCEC
	4	Buffer position	UINT	RW	Yes	No	1	1	254	–	PnCED
	5	Size of data record	USINT	WO	No	No	1	1	1	–	–
	6	Buffer clear	USINT	WO	No	No	0	0	1	–	–
	7	Position data definition	USINT	RW	Yes	No	1	0	1	–	PnCEE
	8	Position data polarity	USINT	RW	Yes	No	0	0	1	–	PnCEF
	9	Behavior after reaching buffer position	USINT	RW	Yes	No	0	0	1	–	PnCF0

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2731h	Interpolation Data Configuration for 2nd Profile										
	0	Number of entries	USINT	RO	No	No	9	–	–	–	–
	1	Maximum buffer size	UDINT	RO	No	No	254	–	–	–	–
	2	Actual buffer size	UDINT	RW	No	No	254	–	–	–	–
	3	Buffer organization	USINT	RW	No	No	0	0	1	–	PnCF1
	4	Buffer position	UINT	RW	Yes	No	1	1	254	–	PnCF2
	5	Size of data record	USINT	WO	No	No	1	1	1	–	–
	6	Buffer clear	USINT	WO	No	No	0	0	1	–	–
	7	Position data definition	USINT	RW	Yes	No	1	0	1	–	PnCF3
	8	Position data polarity	USINT	RW	Yes	No	0	0	1	–	PnCF4
	9	Behavior after reaching buffer position	USINT	RW	Yes	No	0	0	1	–	PnCF5
2732h	0	Interpolation Profile Select	USINT	RW	Yes	No	0	0	1	–	PnCF6
2741h	Interpolation Data Read/Write Pointer Position Monitor										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Interpolation data read pointer Position	UINT	RO	Yes	No	–	1	254	–	PnCF7
	2	Interpolation data write pointer Position	UINT	RO	Yes	No	–	1	254	–	PnCF8

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Index	Subin-dex	Name	Data Type	Acc-ess	PDO Map-ping	Saving to EEPRO-M	Default Value	Lower Limit	Upper Limit	Unit	Parame-ter No.
2770h	Sensing Data Monitor										
	0	Number of entries	USINT	RO	No	No	21	–	–	–	–
	1	Estimated vibration	DINT	RO	Yes	No	–	–	–	Over-speed dete-ction spee-d/ 100-000-0h	–
	2	Estimated external dis-turbance torque	DINT	RO	Yes	No	–	–	–	Max-imu-m tor-que/ 100-000-0h	–
	3	Main circuit DC voltage	INT	RO	Yes	No	–	–	–	V	–
	4	Un009: Accumulated Load Ratio	UINT	RO	No	No	–	–	–	%	–
	5	Un00A: Regenerative Load Ratio	UINT	RO	No	No	–	–	–	%	–
	6	Un078: Maximum Value of Amplitude of Estimated Vibration	INT	RO	No	No	–	–	–	min^{-1}	–
	7	Un07A: Maximum Value of Estimated External Disturbance Torque	INT	RO	No	No	–	–	–	%	–
	8	Un07B: Minimum Value of Estimated External Disturbance Torque	INT	RO	No	No	–	–	–	%	–
	9	Un07C: Identified Moment of Inertia Ratio	UDINT	RO	Yes	No	–	–	–	–	–
	10	Un104: Number of Serial Encoder Commu-nications Errors	UINT	RO	No	No	–	–	–	Time	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2770h	Sensing Data Monitor										
	11	Un105: Settling Time	UINT	RO	No	No	–	–	–	0.1 ms	–
	12	Un106: Amount of Overshoot	UDINT	RO	No	No	–	–	–	Pos. unit	–
	13	Un107: Residual Vibration Frequency	UINT	RO	No	No	–	–	–	0.1 Hz	–
	14	Un108: Maximum Settling Time	UINT	RO	No	No	–	–	–	0.1 ms	–
	15	Un109: Maximum Amount of Overshoot	UDINT	RO	No	No	–	–	–	Pos. unit	–
	16	Un145: Maximum Value of Accumulated Load Ratio	UINT	RO	No	No	–	–	–	%	–
	17	Un14E: Margin until Overload	INT	RO	Yes	No	–	–	–	0.01-%	–
	18	Reserved	UDINT	RO	Yes	No	–	–	–	–	–
	19	Reserved	UDINT	RO	Yes	No	–	–	–	–	–
	20	Error detection trace counter	UDINT	RO	No	No	–	–	–	–	–
	21	Error detection trace error rate	UDINT	RO	No	No	–	–	–	–	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2771h		Sensing Data Monitor (Motor)									
	0	Number of entries	USINT	RO	No	No	13	–	–	–	–
	1	Un174: Temperature Margin until Servomotor Overheats	INT	RO	No	No	–	–	–	°C	–
	2	Un177: Encoder Power Supplied Time	UDINT	RO	No	No	–	–	–	100 ms	–
	3	Reserved	UINT	RO	No	No	–	–	–	–	–
	4	Un17A: Encoder Power Supply Voltage	INT	RO	No	No	–	–	–	0.01 V	–
	5	Un17B: Encoder Battery Voltage	UINT	RO	No	No	–	–	–	0.1 V	–
	6	Un181: Motor Total Number of Rotations	UDINT	RO	No	No	–	–	–	100 rev	–
	7	Un183: Maintenance Prediction Monitor - Bearings	UINT	RO	No	No	–	–	–	0.01%	–
	8	Un184: Maintenance Prediction Monitor - Oil Seal	UINT	RO	No	No	–	–	–	0.01%	–
	9	Un190: Motor Vibration in X-Axis Direction	DINT	RO	Yes	No	–	–	–	0.0001 G	–
	10	Un191: Motor Vibration in Y-Axis Direction	DINT	RO	Yes	No	–	–	–	0.0001 G	–
	11	Un192: Motor Vibration in Z-Axis Direction	DINT	RO	Yes	No	–	–	–	0.0001 G	–
	12	Un193: Motor Vibration XYZ Composite Value	UDINT	RO	Yes	No	–	–	–	0.0001 G	–
	13	Un194: Maximum Motor Vibration	UDINT	RO	No	No	–	–	–	0.0001 G	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2772h	Operation Status Monitor										
	0	Number of entries	USINT	RO	No	No	9	–	–	–	–
	1	Un025: SERVOPACK Installation Environment Monitor	INT	RO	No	No	–	–	–	%	–
	2	Un026: Servomotor Installation Environment Monitor	INT	RO	No	No	–	–	–	%	–
	3	Un027: Built-in Fan Remaining Life Ratio	UINT	RO	No	No	–	–	–	0.01-%	–
	4	Un028: Capacitor Remaining Life Ratio	UINT	RO	No	No	–	–	–	0.01-%	–
	5	Un029: Surge Prevention Circuit Remaining Life Ratio	UINT	RO	No	No	–	–	–	0.01-%	–
	6	Un02A: Dynamic Brake Circuit Remaining Life Ratio	UINT	RO	No	No	–	–	–	0.01-%	–
	7	Un032: Instantaneous Power	INT	RO	No	No	–	–	–	W	–
	8	Un033: Power Consumption	DINT	RO	No	No	–	–	–	0.001 Wh	–
	9	Un034: Cumulative Power Consumption	DINT	RO	No	No	–	–	–	Wh	–
2773h	Σ-LINK II Response Data										
	0	Number of entries	USINT	RO	No	No	11	–	–	–	–
	1	Σ-LINK II response data 1	UDINT	RO	Yes	No	–	–	–	–	–
	2	Σ-LINK II response data 2	UDINT	RO	Yes	No	–	–	–	–	–
	3	Σ-LINK II response data 3	UDINT	RO	Yes	No	–	–	–	–	–
	4	Σ-LINK II response data 4	UDINT	RO	Yes	No	–	–	–	–	–
	5	Σ-LINK II response data 5	UDINT	RO	Yes	No	–	–	–	–	–
	6	Σ-LINK II response data 6	UDINT	RO	Yes	No	–	–	–	–	–
	7	Σ-LINK II response data 7	UDINT	RO	Yes	No	–	–	–	–	–
	8	Σ-LINK II response data 8	UDINT	RO	Yes	No	–	–	–	–	–
	9	Σ-LINK II data status information	UDINT	RO	Yes	No	–	–	–	–	–
	10	Reserved	UDINT	RO	Yes	No	–	–	–	–	–
	11	Reserved	UDINT	RO	Yes	No	–	–	–	–	–

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Index	Subin-dex	Name	Data Type	Acc-ess	PDO Map-ping	Saving to EEPRO-M	Default Value	Lower Limit	Upper Limit	Unit	Parame-ter No.
2774h		Σ-LINK II Command Data									
	0	Number of entries	USINT	RO	No	No	4	–	–	–	–
	1	Σ-LINK II command data 1	UDINT	RW	Yes	No	–	0h	FFFFFFFFh	–	–
	2	Σ-LINK II command data 2	UDINT	RW	Yes	No	–	0h	FFFFFFFFh	–	–
	3	Σ-LINK II command data 3	UDINT	RW	Yes	No	–	0h	FFFFFFFFh	–	–
	4	Σ-LINK II command data 4	UDINT	RW	Yes	No	–	0h	FFFFFFFFh	–	–
2775h		Position Reference Filter									
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Movement Average Time	UINT	RW	No	Yes	0	0	5100	0.1 ms	PnBC4
	2	Reserved	UINT	RW	No	Yes	–	–	–	–	–
2776h	0	Controlword_VenderS	UINT	RW	Yes	No	–	0	0xFFFF	–	–
2777h	0	Statusword_VenderS	UINT	RO	Yes	No	–	0	0xFFFF	–	–
277dh	0	Position actual value (ordinary)	DINT	RO	Yes	No	–	–	–	Pos. unit	–
277eh	0	Relative Position Deviation	DINT	RO	Yes	No	–	–	–	Pos. unit	–
277Fh		Position Correction Table Current Correction Value									
	0	Number of entries	USINT	RO	No	No	–	–	–	–	–
	1	Position Demand Cor-rection Value	DINT	RO	Yes	No	–	–	–	Pos. unit	–
	2	Actual Position Correc-tion Value	DINT	RO	Yes	No	–	–	–	Pos. unit	–
27C0h		Interpolation Data Record for 1st Profile									
	0	Number of entries	USINT	RO	No	No	254	–	–	–	–
	1 to 254	1st set-point to 254 set-point	DINT	RW	No	No	0	-2147483648	2147483647	–	–
27C1h		Interpolation Data Record for 2nd Profile									
	0	Number of entries	USINT	RO	No	No	254	–	–	–	–
	1 to 254	1st set-point to 254 set-point	DINT	RW	No	No	0	-2147483648	2147483647	–	–
27E0h	–	Diag.Mode	UINT	RW	No	No	0	0	0xFFFF	–	PnCFE
27E4h	–	Absolute Encoder Ori-gin Offset	DINT	RW	No	Yes	0	-2147483648	2147483647	–	PnB76
603Fh	0	Error Code	UINT	RO	Yes	No	–	–	–	–	PnB10
6040h	0	Controlword	UINT	RW	Yes	No	0	0	0xFFFF	–	PnB11
6041h	0	Statusword	UINT	RO	Yes	No	–	–	–	–	PnB12
605Ah	0	Quick Stop Option Code	INT	RW	No	Yes	0	0	4	–	PnB13
605Bh	0	Shutdown Option Code	INT	RW	No	Yes	0	0	1	–	PnB14

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Index	Subin-dex	Name	Data Type	Acc-ess	PDO Map-ping	Saving to EEPRO-M	Default Value	Lower Limit	Upper Limit	Unit	Parame-ter No.
605Ch	0	Disable Operation Option Code	INT	RW	No	Yes	0	0	1	–	PnB15
605Dh	0	Halt Option Code	INT	RW	No	Yes	1	-3	3	–	PnB16
605Eh	0	Fault Reaction Option Code	INT	RW	No	Yes	0	0	0	–	PnB17
6060h	0	Modes of Operation	SINT	RW	Yes	Yes	0	0	10	–	PnB18
6061h	0	Modes of Operation Display	SINT	RO	Yes	No	0	–	–	–	PnB19
6062h	0	Position Demand Value	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB20
6063h	0	Position Actual Internal Value	DINT	RO	Yes	No	–	–	–	Inc	PnB22
6064h	0	Position Actual Value	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB24
6065h	0	Following Error Window	UDINT	RW	No	Yes	5242880	0	1073741823	Pos. unit	PnB26
6066h	0	Following Error Time Out	UINT	RW	No	Yes	0	0	65535	ms	PnB28
6067h	0	Position Window	UDINT	RW	No	Yes	30	0	1073741823	Pos. unit	PnB2A
6068h	0	Position Window Time	UINT	RW	No	Yes	0	0	65535	ms	PnB2C
606Bh	0	Velocity Demand Value	DINT	RO	Yes	No	–	–	–	Vel. unit	PnB2E
606Ch	0	Velocity Actual Value	DINT	RO	Yes	No	–	–	–	Vel. unit	PnB30
606Dh	0	Velocity Window	UINT	RW	No	Yes	20000	0	65535	Vel. unit	PnB32
606Eh	0	Velocity Window Time	UINT	RW	No	Yes	0	0	65535	ms	PnB34
6071h	0	Target Torque	INT	RW	Yes	No	0	-32768	32767	Trq. unit	PnB36
6072h	0	Max Torque	UINT	RW	Yes	No	Motor max torque	0	65535	Trq. unit	PnB38
6074h	0	Torque Demand Value	INT	RO	Yes	No	–	–	–	Trq. unit	PnB3A
6076h	0	Motor Rated Torque	UDINT	RO	No	No	–	–	–	mN-m, mN	PnB3C
6077h	0	Torque Actual Value	INT	RO	Yes	No	–	–	–	Trq. unit	PnB3E
6078h	0	Current Actual Value	INT	RO	Yes	No	–	–	–	1/1000 of rated cur-rent	–
607Ah	0	Target Position	DINT	RW	Yes	No	0	-2147483648	2147483647	Pos. unit	PnB40

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Index	Subin-dex	Name	Data Type	Acc-ess	PDO Map-ping	Saving to EEPRO-M	Default Value	Lower Limit	Upper Limit	Unit	Parame-ter No.
607Bh	Position Range Limit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Min position range limit	DINT	RW	Yes	Yes	0	-2147483648	0	Pos. unit	PnBBE
	2	Max position range limit	DINT	RW	Yes	Yes	0	0	2147483647	Pos. unit	PnBC0
607Ch	–	Home Offset	DINT	RW	No	Yes	0	-536870912	536870911	Pos. unit	PnB46
607Dh	Software Position Limit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Min position limit	DINT	RW	No	Yes	0	-536870912	536870911	Pos. unit	PnB48
	2	Max position limit	DINT	RW	No	Yes	0	-536870912	536870911	Pos. unit	PnB4A
607Fh	0	Max Profile Velocity	UDINT	RW	Yes	Yes	2147483647	0	4294967295	Vel. unit	PnB4C
6081h	0	Profile Velocity	UDINT	RW	Yes	Yes	0	0	4294967295	Vel. unit	PnB4E
6082h	0	End Velocity	UDINT	RW	Yes	No	0	0	4294967295	Vel. unit	–
6083h	0	Profile Acceleration	UDINT	RW	Yes	Yes	1000	0	4294967295	Acc. unit	PnB50
6084h	0	Profile Deceleration	UDINT	RW	Yes	Yes	1000	0	4294967295	Acc. unit	PnB52
6085h	0	Quick Stop Deceleration	UDINT	RW	Yes	Yes	1000	0	4294967295	Acc. unit	PnB54
6086h	0	Motion Profile Type	INT	RW	Yes	Yes	0	-32768	32767	–	PnB98
6087h	0	Torque Slope	UDINT	RW	Yes	Yes	1000	0	4294967295	Trq. unit/s	PnB56
6098h	0	Homing Method	SINT	RW	Yes	No	37	0	37	–	PnB58
6099h	Homing Speeds										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Speed during search for switch	UDINT	RW	Yes	Yes	500000	0	4294967295	Vel. unit	PnB5A
	2	Speed during search for zero	UDINT	RW	Yes	Yes	100000	0	4294967295	Vel. unit	PnB5C
609Ah	0	Homing Acceleration	UDINT	RW	Yes	Yes	1000	0	4294967295	Acc. unit	PnB5E
60A4h	Profile Jerk										
	0	Number of entries	USINT	RO	No	No	1	–	–	–	–
	1	Profile jerk1	UDINT	RW	No	Yes	25	0	50	%	PnB9A
60B0h	0	Position Offset	DINT	RW	Yes	No	0	-2147483648	2147483647	Pos. Unit	–
60B1h	0	Velocity Offset	DINT	RW	Yes	No	0	-2147483648	2147483647	Vel. unit	PnB60
60B2h	0	Torque Offset	INT	RW	Yes	No	0	-32768	32767	Trq. unit	PnB62

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
60B8h	0	Touch probe function	UINT	RW	Yes	No	0	0	0xFFFF	–	PnB64
60B9h	0	Touch Probe Status	UINT	RO	Yes	No	–	–	–	–	PnB66
60BAh	0	Touch Probe 1 Positive Edge	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB68
60BBh	0	Touch Probe 1 Negative Edge	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB72
60BCh	0	Touch Probe 2 Positive Edge	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB6A
60BDh	0	Touch Probe 2 Negative Edge	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB74
60C0h	0	Interpolation Sub Mode Select	INT	RW	No	No	0	-3	0	–	PnB92
60C1h	Interpolation Data Record										
	0	Number of entries	USINT	RO	No	No	1	–	–	–	–
	1	Interpolation data record	DINT	RW	Yes	No	0	-2147483648	2147483647	Pos. unit	PnB70
60C2h	Interpolation Time Period										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Interpolation time period value	USINT	RW	No	No	125	1	250	–	PnB6E
	2	Interpolation time index	SINT	RW	No	No	-6	-6	-3	–	PnB6F
60E0h	0	Positive Torque Limit Value	UINT	RW	Yes	Yes	8000	0	65535	Trq. unit	PnB80
60E1h	0	Negative Torque Limit Value	UINT	RW	Yes	Yes	8000	0	65535	Trq. unit	PnB82
60E4h	Additional Position Actual Value										
	0	Number of entries	USINT	RO	No	No	1	–	–	–	–
	1	External encoder position	DINT	RO	Yes	Yes	0	–	–	Pos. unit	–
60F2h	0	Position Option Code	UINT	RW	Yes	No	0	0	0xFFFF	–	PnBC2
60F4h	0	Following Error Actual Value	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB84
60FCh	0	Position Demand Internal Value	DINT	RO	Yes	No	–	–	–	Inc	PnB86
60FDh	0	Digital Inputs	UDINT	RO	Yes	No	–	–	–	–	PnB88
60FEh	Digital Outputs										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Physical outputs	UDINT	RW	Yes	No	0	0	0xFFFFFFFF	–	PnB8A
	2	Bit mask	UDINT	RW	No	Yes	0x000C0000	0	0xFFFFFFFF	–	PnB8C
60FFh	0	Target Velocity	DINT	RW	Yes	No	0	-2147483648	2147483647	Vel. unit	PnB8E
6403h	0	Motor Catalogue Number	STRING	RO	No	No	–	–	–	–	–
6502h	0	Supported Drive Modes	UDINT	RO	No	No	0x03ED	–	–	–	PnB90

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Index	Subin-dex	Name	Data Type	Acc-ess	PDO Map-ping	Saving to EEPRO-M	Default Value	Lower Limit	Upper Limit	Unit	Parame-ter No.
687Bh	Position Range Limit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Min position range limit	DINT	RW	No	Yes	0	-2147483648	0	Pos. unit	PnBBE
	2	Max position range limit	DINT	RW	No	Yes	0	0	2147483647	Pos. unit	PnBC0
F9F0h	0	Manufacturer Serial Number	STRIN-G	RO	No	No	–	–	–	–	–

10.5 Object List: Σ-XW SERVOPACK

The following table lists the objects.

Information
- Save the parameter data to object 1010h to save all of the current parameter data to EEPROM.
  If the objects are modified by the digital operator or SigmaWin+, the data will be directly saved in EEPROM.
- The parameter numbers given in the table are the parameter numbers that are used with the digital operator and Sigma-Win+.
- Refer to the following manuals for details on Pn000 to Pn6FF.
  Σ-XW SERVOPACK with EtherCAT Communications References Product Manual (Manual No.: SIEP C710812 05)
  Only the parameters listed in this section are displayed in SigmaWin+ and the digital operator.

Index	Subin-dex	Name	Data Type	Acc-ess	PDO Map-ping	Saving to EEPRO-M	Default Value	Lower Limit	Upper Limit	Unit	Parame-ter No.
1000h Common	0	Device Type	UDINT	RO	No	No	0x00020192	–	–	–	–
1001h Common	0	Error Register	USINT	RO	No	No	–	–	–	–	–
1008h Common	0	Manufacturer Device Name	STRIN-G	RO	No	No	–	–	–	–	–
100Ah Common	0	Manufacturer Software Version	STRIN-G	RO	No	No	–	–	–	–	–
1010h Common	Store Parameters										
	0	Largest subindex supported	USINT	RO	No	No	4	–	–	–	–
	1	Save all parameters	UDINT	RW	No	No	0x00000001	0x00000000	0xFFFFFFFF	–	PnC00
	2	Reserved	UDINT	RW	No	No	0x00000001	–	–	–	–
	3	Reserved	UDINT	RW	No	No	0x00000001	–	–	–	–
	4	Reserved	UDINT	RW	No	No	0x00000001	–	–	–	–
1011h Common	Restore Default Parameters										
	0	Largest subindex supported	USINT	RO	No	No	4	–	–	–	–
	1	Restore all default parameters	UDINT	RW	No	No	0x00000001	0x00000000	0xFFFFFFFF	–	PnC08
	2	Reserved	UDINT	RW	No	No	0x00000001	–	–	–	–
	3	Reserved	UDINT	RW	No	No	0x00000001	–	–	–	–
	4	Reserved	UDINT	RW	No	No	0x00000001	–	–	–	–
1018h Common	Identity Object										
	0	Number of entries	USINT	RO	No	No	4	–	–	–	–
	1	Vendor ID	UDINT	RO	No	No	0x00000539	–	–	–	–
	2	Product code	UDINT	RO	No	No	0x02200902	–	–	–	–
	3	Revision number	UDINT	RO	No	No	–	–	–	–	–
	4	Serial number	UDINT	RO	No	No	0x00000000	–	–	–	–
10F1h Common	Sync Error Settings										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Reserved (Local Error Reaction)	UDINT	RW	No	No	0	–	–	–	–
	2	Sync error count limit	UINT	RW	No	Yes	9	0	15	–	PnCCC

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1600h Axis A	1st Receive PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	8	0	16	–	PnCA0
	1	Mapping entry 1	UDINT	RW	No	Yes	0x60400010	0	0xFFFFFFFF	–	PnC20
	2	Mapping entry 2	UDINT	RW	No	Yes	0x607A0020	0	0xFFFFFFFF	–	PnC22
	3	Mapping entry 3	UDINT	RW	No	Yes	0x60FF0020	0	0xFFFFFFFF	–	PnC24
	4	Mapping entry 4	UDINT	RW	No	Yes	0x60710010	0	0xFFFFFFFF	–	PnC26
	5	Mapping entry 5	UDINT	RW	No	Yes	0x60720010	0	0xFFFFFFFF	–	PnC28
	6	Mapping entry 6	UDINT	RW	No	Yes	0x60600008	0	0xFFFFFFFF	–	PnC2A
	7	Mapping entry 7	UDINT	RW	No	Yes	0x00000008	0	0xFFFFFFFF	–	PnC2C
	8	Mapping entry 8	UDINT	RW	No	Yes	0x60B80010	0	0xFFFFFFFF	–	PnC2E
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC30
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC32
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC34
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC36
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC38
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC3A
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC3C
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC3E
1601h Axis A	2nd Receive PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	2	0	16	–	PnCA1
	1	Mapping entry 1	UDINT	RW	No	Yes	0x60400010	0	0xFFFFFFFF	–	PnC40
	2	Mapping entry 2	UDINT	RW	No	Yes	0x607A0020	0	0xFFFFFFFF	–	PnC42
	3	Mapping entry 3	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC44
	4	Mapping entry 4	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC46
	5	Mapping entry 5	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC48
	6	Mapping entry 6	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC4A
	7	Mapping entry 7	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC4C
	8	Mapping entry 8	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC4E
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC50
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC52
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC54
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC56
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC58
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC5A
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC5C
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC5E

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Index	Subin-dex	Name	Data Type	Acc-ess	PDO Map-ping	Saving to EEPRO-M	Default Value	Lower Limit	Upper Limit	Unit	Parame-ter No.
1602h Axis A	3rd Receive PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	No	2	0	16	–	–
	1	Mapping entry 1	UDINT	RW	No	No	0x60400010	0	0xFFFFFFFF	–	–
	2	Mapping entry 2	UDINT	RW	No	No	0x60FF0020	0	0xFFFFFFFF	–	–
	3	Mapping entry 3	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	4	Mapping entry 4	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	5	Mapping entry 5	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	6	Mapping entry 6	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	7	Mapping entry 7	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	8	Mapping entry 8	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	9	Mapping entry 9	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	10	Mapping entry 10	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	11	Mapping entry 11	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	12	Mapping entry 12	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	13	Mapping entry 13	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	14	Mapping entry 14	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	15	Mapping entry 15	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	16	Mapping entry 16	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
1603h Axis A	4th Receive PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	No	2	0	16	–	–
	1	Mapping entry 1	UDINT	RW	No	No	0x60400010	0	0xFFFFFFFF	–	–
	2	Mapping entry 2	UDINT	RW	No	No	0x60710010	0	0xFFFFFFFF	–	–
	3	Mapping entry 3	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	4	Mapping entry 4	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	5	Mapping entry 5	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	6	Mapping entry 6	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	7	Mapping entry 7	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	8	Mapping entry 8	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	9	Mapping entry 9	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	10	Mapping entry 10	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	11	Mapping entry 11	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	12	Mapping entry 12	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	13	Mapping entry 13	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	14	Mapping entry 14	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	15	Mapping entry 15	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	16	Mapping entry 16	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1610h Axis B	1st Receive PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	8	0	16	–	PnCA0
	1	Mapping entry 1	UDINT	RW	No	Yes	0x68400010	0	0xFFFFFFFF	–	PnC20
	2	Mapping entry 2	UDINT	RW	No	Yes	0x687A0020	0	0xFFFFFFFF	–	PnC22
	3	Mapping entry 3	UDINT	RW	No	Yes	0x68FF0020	0	0xFFFFFFFF	–	PnC24
	4	Mapping entry 4	UDINT	RW	No	Yes	0x68710010	0	0xFFFFFFFF	–	PnC26
	5	Mapping entry 5	UDINT	RW	No	Yes	0x68720010	0	0xFFFFFFFF	–	PnC28
	6	Mapping entry 6	UDINT	RW	No	Yes	0x68600008	0	0xFFFFFFFF	–	PnC2A
	7	Mapping entry 7	UDINT	RW	No	Yes	0x00000008	0	0xFFFFFFFF	–	PnC2C
	8	Mapping entry 8	UDINT	RW	No	Yes	0x68B80010	0	0xFFFFFFFF	–	PnC2E
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC30
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC32
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC34
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC36
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC38
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC3A
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC3C
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC3E
1611h Axis B	2nd Receive PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	2	0	16	–	PnCA1
	1	Mapping entry 1	UDINT	RW	No	Yes	0x68400010	0	0xFFFFFFFF	–	PnC40
	2	Mapping entry 2	UDINT	RW	No	Yes	0x687A0020	0	0xFFFFFFFF	–	PnC42
	3	Mapping entry 3	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC44
	4	Mapping entry 4	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC46
	5	Mapping entry 5	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC48
	6	Mapping entry 6	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC4A
	7	Mapping entry 7	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC4C
	8	Mapping entry 8	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC4E
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC50
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC52
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC54
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC56
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC58
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC5A
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC5C
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC5E

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1612h Axis B	3rd Receive PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	2	0	16	–	–
	1	Mapping entry 1	UDINT	RW	No	Yes	0x68400010	0	0xFFFFFFFF	–	–
	2	Mapping entry 2	UDINT	RW	No	Yes	0x68FF0020	0	0xFFFFFFFF	–	–
	3	Mapping entry 3	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	4	Mapping entry 4	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	5	Mapping entry 5	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	6	Mapping entry 6	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	7	Mapping entry 7	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	8	Mapping entry 8	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
1613h Axis B	4th Receive PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	2	0	16	–	–
	1	Mapping entry 1	UDINT	RW	No	Yes	0x68400010	0	0xFFFFFFFF	–	–
	2	Mapping entry 2	UDINT	RW	No	Yes	0x68710010	0	0xFFFFFFFF	–	–
	3	Mapping entry 3	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	4	Mapping entry 4	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	5	Mapping entry 5	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	6	Mapping entry 6	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	7	Mapping entry 7	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	8	Mapping entry 8	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1A00h Axis A	1st Transmit PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	8	0	16	–	PnCA4
	1	Mapping entry 1	UDINT	RW	No	Yes	0x60410010	0	0xFFFFFFFF	–	PnC60
	2	Mapping entry 2	UDINT	RW	No	Yes	0x60640020	0	0xFFFFFFFF	–	PnC62
	3	Mapping entry 3	UDINT	RW	No	Yes	0x60770010	0	0xFFFFFFFF	–	PnC64
	4	Mapping entry 4	UDINT	RW	No	Yes	0x60F40020	0	0xFFFFFFFF	–	PnC66
	5	Mapping entry 5	UDINT	RW	No	Yes	0x60610008	0	0xFFFFFFFF	–	PnC68
	6	Mapping entry 6	UDINT	RW	No	Yes	0x00000008	0	0xFFFFFFFF	–	PnC6A
	7	Mapping entry 7	UDINT	RW	No	Yes	0x60B90010	0	0xFFFFFFFF	–	PnC6C
	8	Mapping entry 8	UDINT	RW	No	Yes	0x60BA0020	0	0xFFFFFFFF	–	PnC6E
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC70
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC72
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC74
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC76
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC78
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC7A
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC7C
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC7E
1A01h Axis A	2nd Transmit PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	2	0	16	–	PnCA5
	1	Mapping entry 1	UDINT	RW	No	Yes	0x60410010	0	0xFFFFFFFF	–	PnC80
	2	Mapping entry 2	UDINT	RW	No	Yes	0x60640020	0	0xFFFFFFFF	–	PnC82
	3	Mapping entry 3	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC84
	4	Mapping entry 4	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC86
	5	Mapping entry 5	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC88
	6	Mapping entry 6	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC8A
	7	Mapping entry 7	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC8C
	8	Mapping entry 8	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC8E
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC90
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC92
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC94
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC96
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC98
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC9A
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC9C
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC9E

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Index	Subin-dex	Name	Data Type	Acc-ess	PDO Map-ping	Saving to EEPRO-M	Default Value	Lower Limit	Upper Limit	Unit	Parame-ter No.
1A02h Axis A	3rd Transmit PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	No	2	0	16	–	–
	1	Mapping entry 1	UDINT	RW	No	No	0x60410010	0	0xFFFFFFFF	–	–
	2	Mapping entry 2	UDINT	RW	No	No	0x60640020	0	0xFFFFFFFF	–	–
	3	Mapping entry 3	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	4	Mapping entry 4	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	5	Mapping entry 5	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	6	Mapping entry 6	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	7	Mapping entry 7	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	8	Mapping entry 8	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	9	Mapping entry 9	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	10	Mapping entry 10	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	11	Mapping entry 11	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	12	Mapping entry 12	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	13	Mapping entry 13	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	14	Mapping entry 14	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	15	Mapping entry 15	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	16	Mapping entry 16	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
1A03h Axis A	4th Transmit PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	No	3	0	16	–	–
	1	Mapping entry 1	UDINT	RW	No	No	0x60410010	0	0xFFFFFFFF	–	–
	2	Mapping entry 2	UDINT	RW	No	No	0x60640020	0	0xFFFFFFFF	–	–
	3	Mapping entry 3	UDINT	RW	No	No	0x60770010	0	0xFFFFFFFF	–	–
	4	Mapping entry 4	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	5	Mapping entry 5	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	6	Mapping entry 6	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	7	Mapping entry 7	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	8	Mapping entry 8	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	9	Mapping entry 9	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	10	Mapping entry 10	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	11	Mapping entry 11	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	12	Mapping entry 12	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	13	Mapping entry 13	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	14	Mapping entry 14	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	15	Mapping entry 15	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–
	16	Mapping entry 16	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1A10h Axis B	1st Transmit PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	8	0	16	–	PnCA4
	1	Mapping entry 1	UDINT	RW	No	Yes	0x68410010	0	0xFFFFFFFF	–	PnC60
	2	Mapping entry 2	UDINT	RW	No	Yes	0x68640020	0	0xFFFFFFFF	–	PnC62
	3	Mapping entry 3	UDINT	RW	No	Yes	0x68770010	0	0xFFFFFFFF	–	PnC64
	4	Mapping entry 4	UDINT	RW	No	Yes	0x68F40020	0	0xFFFFFFFF	–	PnC66
	5	Mapping entry 5	UDINT	RW	No	Yes	0x68610008	0	0xFFFFFFFF	–	PnC68
	6	Mapping entry 6	UDINT	RW	No	Yes	0x00000008	0	0xFFFFFFFF	–	PnC6A
	7	Mapping entry 7	UDINT	RW	No	Yes	0x68B90010	0	0xFFFFFFFF	–	PnC6C
	8	Mapping entry 8	UDINT	RW	No	Yes	0x68BA0020	0	0xFFFFFFFF	–	PnC6E
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC70
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC72
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC74
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC76
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC78
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC7A
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC7C
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC7E
1A11h Axis B	2nd Transmit PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	2	0	16	–	PnCA5
	1	Mapping entry 1	UDINT	RW	No	Yes	0x68410010	0	0xFFFFFFFF	–	PnC80
	2	Mapping entry 2	UDINT	RW	No	Yes	0x68640020	0	0xFFFFFFFF	–	PnC82
	3	Mapping entry 3	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC84
	4	Mapping entry 4	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC86
	5	Mapping entry 5	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC88
	6	Mapping entry 6	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC8A
	7	Mapping entry 7	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC8C
	8	Mapping entry 8	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC8E
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC90
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC92
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC94
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC96
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC98
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC9A
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC9C
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	PnC9E

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1A12h Axis B	3rd Transmit PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	2	0	16	–	–
	1	Mapping entry 1	UDINT	RW	No	Yes	0x68410010	0	0xFFFFFFFF	–	–
	2	Mapping entry 2	UDINT	RW	No	Yes	0x68640020	0	0xFFFFFFFF	–	–
	3	Mapping entry 3	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	4	Mapping entry 4	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	5	Mapping entry 5	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	6	Mapping entry 6	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	7	Mapping entry 7	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	8	Mapping entry 8	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
1A13h Axis B	4th Transmit PDO Mapping										
	0	Number of objects in this PDO	USINT	RW	No	Yes	3	0	16	–	–
	1	Mapping entry 1	UDINT	RW	No	Yes	0x68410010	0	0xFFFFFFFF	–	–
	2	Mapping entry 2	UDINT	RW	No	Yes	0x68640020	0	0xFFFFFFFF	–	–
	3	Mapping entry 3	UDINT	RW	No	Yes	0x68770010	0	0xFFFFFFFF	–	–
	4	Mapping entry 4	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	5	Mapping entry 5	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	6	Mapping entry 6	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	7	Mapping entry 7	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	8	Mapping entry 8	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	9	Mapping entry 9	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	10	Mapping entry 10	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	11	Mapping entry 11	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	12	Mapping entry 12	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	13	Mapping entry 13	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	14	Mapping entry 14	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	15	Mapping entry 15	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–
	16	Mapping entry 16	UDINT	RW	No	Yes	0	0	0xFFFFFFFF	–	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1C00h Common	Sync Manager Communication Type										
	0	Number of used Sync Manager channels	USINT	RO	No	No	4	–	–	–	–
	1	Communication type sync manager 0	USINT	RO	No	No	1 (mailbox receive (master → slave))	–	–	–	PnCB0
	2	Communication type sync manager 1	USINT	RO	No	No	2 (mailbox send (slave → master))	–	–	–	PnCB1
	3	Communication type sync manager 2	USINT	RO	No	No	3 (process data output (master → slave))	–	–	–	PnCB2
	4	Communication type sync manager 3	USINT	RO	No	No	4 (process data input (slave → master))	–	–	–	PnCB3
1C10h Common	0	Sync Manager PDO Assignment 0	USINT	RO	No	No	0	–	–	–	–
1C11h Common	0	Sync Manager PDO Assignment 1	USINT	RO	No	No	0	–	–	–	–
1C12h Common	Sync Manager PDO Assignment 2										
	0	Number of assigned PDOs	USINT	RO	No	Yes	2	0	2	–	PnCB5
	1	Index of assigned RxPDO 1	UINT	RW	No	Yes	0x1601	0x1600	0x1603, 0x1610 to 0x1613	–	PnCB6
	2	Index of assigned RxPDO 2	UINT	RW	No	Yes	0x1611	0x1600	0x1603, 0x1610 to 0x1613	–	PnCB7
1C13h Common	Sync Manager PDO Assignment 3										
	0	Number of assigned PDOs	USINT	RO	No	Yes	2	0	2	–	PnCBB
	1	Index of assigned TxPDO 1	UINT	RW	No	Yes	0x1A01	0x1A00	0x1A03, 0x1A10 to 0x1A13	–	PnCBC
	2	Index of assigned TxPDO 2	UINT	RW	No	Yes	0x1A11	0x1A00	0x1A03, 0x1A10 to 0x1A13	–	PnCBD

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1C32h Common	Sync Manager 2 (process data output) Synchronization										
	0	Number of synchronization parameters	USINT	RO	No	No	32	–	–	–	–
	1	Synchronization type	UINT	RO	No	No	2	–	–	–	PnCC0
	2	Cycle time	UDINT	RO	No	No	–	–	–	ns	PnCC2
	3	Shift time	UDINT	RW	No	Yes	125000	125000	Sync0 event cycle	ns	PnCC4
	4	Synchronization types supported	UINT	RO	No	No	0x0025	–	–	–	–
	5	Minimum cycle time	UDINT	RO	No	No	125000	–	–	ns	–
	6	Calc and copy time	UDINT	RO	No	No	125000	–	–	ns	–
	7	Reserved (Minimum Delay Time)	UDINT	RO	No	No	0	–	–	–	–
	8	Reserved (Get Cycle Time)	UINT	RO	No	No	0	–	–	–	–
	9	Delay time	UDINT	RO	No	No	0	–	–	ns	–
	10	Sync0 cycle time	UDINT	RO	No	No	–	–	–	–	PnCC6
	11	SM event missed counter	UINT	RO	No	No	–	–	–	–	PnCC8
	12	Reserved (Cycle Time Too Small)	UINT	RO	No	No	0	–	–	–	–
	13	Reserved (Shift Time Too Short)	UINT	RO	No	No	0	–	–	–	–
	14	Reserved (RxPDO Toggle Failed)	UINT	RO	No	No	0	–	–	–	–
	15	Reserved (Minimum Cycle Distance)	UDINT	RO	No	No	0	–	–	–	–
	16	Reserved (Maximum Cycle Distance)	UDINT	RO	No	No	0	–	–	–	–
	17	Minimum SM SYNC distance	UDINT	RO	No	No	–	–	–	–	PnCD8
	18	Maximum SM SYNC distance	UDINT	RO	No	No	–	–	–	–	PnCD6
	32	Sync Error	BOOL	RO	No	No	0	–	–	–	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
1C33h Common	Sync Manager 3 (process data input) Synchronization										
	0	Number of synchronization parameters	USINT	RO	No	No	32	–	–	–	–
	1	Synchronization type	UINT	RO	No	No	–	–	–	–	–
	2	Cycle time	UDINT	RO	No	No	–	–	–	–	–
	3	Shift time	UDINT	RW	No	Yes	0	0	Sync0 event cycle - 125000	ns	PnCCA
	4	Synchronization types supported	UINT	RO	No	No	0x0025	–	–	–	–
	5	Minimum cycle time	UDINT	RO	No	No	125000	–	–	ns	–
	6	Calc and copy time	UDINT	RO	No	No	125000	–	–	ns	–
	7	Reserved (Minimum Delay Time)	UDINT	RO	No	No	0	–	–	–	–
	8	Reserved (Get Cycle Time)	UINT	RO	No	No	0	–	–	–	–
	9	Delay time	UDINT	RO	No	No	0	–	–	–	–
	10	Sync0 cycle time	UDINT	RO	No	No	–	–	–	–	–
	11	SM event missed counter	UINT	RO	No	No	–	–	–	–	–
	12	Reserved (Cycle Time Too Small)	UINT	RO	No	No	0	–	–	–	–
	13	Reserved (Shift Time Too Short)	UINT	RO	No	No	0	–	–	–	–
	14	Reserved (RxPDO Toggle Failed)	UINT	RO	No	No	0	–	–	–	–
	15	Reserved (Minimum Cycle Distance)	UDINT	RO	No	No	0	–	–	–	–
	16	Reserved (Maximum Cycle Distance)	UDINT	RO	No	No	0	–	–	–	–
	17	Minimum SM SYNC distance	UDINT	RO	No	No	–	–	–	–	PnCD8
	18	Maximum SM SYNC distance	UDINT	RO	No	No	–	–	–	–	PnCD6
	32	Sync Error	BOOL	RO	No	No	0	–	–	–	–
2000h to 26FFh Axis A	0	SERVOPACK Parameter (Pn000 (2000h) - Pn6FF (26FFh))	–	–	–	–	–	–	–	–	Pn000-Pn6FF
2700h Axis A	0	User Parameter Configuration	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	PnB00
2701h Axis A	Position User Unit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Numerator	UDINT	RW	No	Yes	64	1	1073741824	–	Pn20E
	2	Denominator	UDINT	RW	No	Yes	1	1	1073741824	–	Pn210

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2702h Axis A	Velocity User Unit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Numerator	UDINT	RW	No	Yes	64	1	1073741823	–	PnB06
	2	Denominator	UDINT	RW	No	Yes	1	1	1073741823	–	PnB08
2703h Axis A	Acceleration User Unit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Numerator	UDINT	RW	No	Yes	64	1	1073741823	–	PnB0A
	2	Denominator	UDINT	RW	No	Yes	1	1	1073741823	–	PnB0C
2704h Axis A	Torque User Unit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Numerator	UDINT	RW	No	Yes	1	1	1073741823	–	PnB94
	2	Denominator	UDINT	RW	No	Yes	10	1	1073741823	–	PnB96
2710h Axis A	SERVOPACK Adjusting Command										
	0	Number of entries	USINT	RO	No	No	3	–	–	–	–
	1	Command	STRING	RW	No	No	0	0	0xFF	–	–
	2	Status	USINT	RO	No	No	–	–	–	–	–
	3	Reply	STRING	RO	No	No	–	–	–	–	–
2730h Axis A	Interpolation Data Configuration for 1st Profile										
	0	Number of entries	USINT	RO	No	No	9	–	–	–	–
	1	Maximum buffer size	UDINT	RO	No	No	254	–	–	–	–
	2	Actual buffer size	UDINT	RW	No	No	254	–	–	–	–
	3	Buffer organization	USINT	RW	No	No	0	0	1	–	PnCEC
	4	Buffer position	UINT	RW	Yes	No	1	1	254	–	PnCED
	5	Size of data record	USINT	WO	No	No	1	1	1	–	–
	6	Buffer clear	USINT	WO	No	No	0	0	1	–	–
	7	Position data definition	USINT	RW	Yes	No	1	0	1	–	PnCEE
	8	Position data polarity	USINT	RW	Yes	No	0	0	1	–	PnCEF
	9	Behavior after reaching buffer position	USINT	RW	Yes	No	0	0	1	–	PnCF0

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Index	Subin-dex	Name	Data Type	Acc-ess	PDO Map-ping	Saving to EEPRO-M	Default Value	Lower Limit	Upper Limit	Unit	Parame-ter No.
2731h Axis A	Interpolation Data Configuration for 2nd Profile										
	0	Number of entries	USINT	RO	No	No	9	–	–	–	–
	1	Maximum buffer size	UDINT	RO	No	No	254	–	–	–	–
	2	Actual buffer size	UDINT	RW	No	No	254	–	–	–	–
	3	Buffer organization	USINT	RW	No	No	0	0	1	–	PnCF1
	4	Buffer position	UINT	RW	Yes	No	1	1	254	–	PnCF2
	5	Size of data record	USINT	WO	No	No	1	1	1	–	–
	6	Buffer clear	USINT	WO	No	No	0	0	1	–	–
	7	Position data definition	USINT	RW	Yes	No	1	0	1	–	PnCF3
	8	Position data polarity	USINT	RW	Yes	No	0	0	1	–	PnCF4
	9	Behavior after reaching buffer position	USINT	RW	Yes	No	0	0	1	–	PnCF5
2732h Axis A	0	Interpolation Profile Select	USINT	RW	Yes	No	0	0	1	–	PnCF6
2741h Axis A	Interpolation Data Read/Write Pointer Position Monitor										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Interpolation data read pointer Position	UINT	RO	Yes	No	–	1	254	–	PnCF7
	2	Interpolation data write pointer Position	UINT	RO	Yes	No	–	1	254	–	PnCF8

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2770h Axis A	Sensing Data Monitor										
	0	Number of entries	USINT	RO	No	No	21	–	–	–	–
	1	Estimated vibration	INT	RO	Yes	No	–	–	–	Overspeed detection speed/1000000h	–
	2	Estimated external disturbance torque	INT	RO	Yes	No	–	–	–	Maximum torque/1000000h	–
	3	Main circuit DC voltage	INT	RO	Yes	No	–	–	–	V	–
	4	Un009: Accumulated Load Ratio	UINT	RO	No	No	–	–	–	%	–
	5	Un00A: Regenerative Load Ratio	UINT	RO	No	No	–	–	–	%	–
	6	Un078: Maximum Value of Amplitude of Estimated Vibration	INT	RO	No	No	–	–	–	min^{-1}	–
	7	Un07A: Maximum Value of Estimated External Disturbance Torque	INT	RO	No	No	–	–	–	%	–
	8	Un07B: Minimum Value of Estimated External Disturbance Torque	INT	RO	No	No	–	–	–	%	–
	9	Un07C: Identified Moment of Inertia Ratio	UDINT	RO	Yes	No	–	–	–	–	–
	10	Un104: Number of Serial Encoder Communications Errors	UINT	RO	No	No	–	–	–	Time	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2770h Axis A	Sensing Data Monitor										
	11	Un105: Settling Time	UINT	RO	No	No	–	–	–	0.1 ms	–
	12	Un106: Amount of Overshoot	UDINT	RO	No	No	–	–	–	Pos. unit	–
	13	Un107: Residual Vibration Frequency	UINT	RO	No	No	–	–	–	0.1 Hz	–
	14	Un108: Maximum Settling Time	UINT	RO	No	No	–	–	–	0.1 ms	–
	15	Un109: Maximum Amount of Overshoot	UDINT	RO	No	No	–	–	–	Pos. unit	–
	16	Un145: Maximum Value of Accumulated Load Ratio	UINT	RO	No	No	–	–	–	%	–
	17	Un14E: Margin until Overload	INT	RO	Yes	No	–	–	–	0.01-%	–
	18	Reserved	UDINT	RO	Yes	No	–	–	–	–	–
	19	Reserved	UDINT	RO	Yes	No	–	–	–	–	–
	20	Error detection trace counter	UDINT	RO	No	No	–	–	–	–	–
	21	Error detection trace error rate	UDINT	RO	No	No	–	–	–	–	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2771h Axis A	Sensing Data Monitor (Motor)										
	0	Number of entries	USINT	RO	No	No	13	–	–	–	–
	1	Un174: Temperature Margin until Servomotor Overheats	INT	RO	No	No	–	–	–	°C	–
	2	Un177: Encoder Power Supplied Time	UDINT	RO	No	No	–	–	–	min	–
	3	Reserved	UINT	RO	No	No	–	–	–	–	–
	4	Un17A: Encoder Power Supply Voltage	INT	RO	No	No	–	–	–	0.01 V	–
	5	Un17B: Encoder Battery Voltage	UINT	RO	No	No	–	–	–	0.1 V	–
	6	Un181: Motor Total Number of Rotations	UDINT	RO	No	No	–	–	–	100 rev	–
	7	Un183: Maintenance Prediction Monitor - Bearings	UINT	RO	No	No	–	–	–	0.01%	–
	8	Un184: Maintenance Prediction Monitor - Oil Seal	UINT	RO	No	No	–	–	–	0.01%	–
	9	Un190: Motor Vibration in X-Axis Direction	INT	RO	Yes	No	–	–	–	0.0001 G	–
	10	Un191: Motor Vibration in Y-Axis Direction	INT	RO	Yes	No	–	–	–	0.0001 G	–
	11	Un192: Motor Vibration in Z-Axis Direction	INT	RO	Yes	No	–	–	–	0.0001 G	–
	12	Un193: Motor Vibration XYZ Composite Value	UINT	RO	Yes	No	–	–	–	0.0001 G	–
	13	Un194: Maximum Motor Vibration	UINT	RO	No	No	–	–	–	0.0001 G	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2772h Axis A		Operation Status Monitor									
	0	Number of entries	USINT	RO	No	No	9	–	–	–	–
	1	Un025: SERVOPACK Installation Environment Monitor	INT	RO	No	No	–	–	–	%	–
	2	Un026: Servomotor Installation Environment Monitor	INT	RO	No	No	–	–	–	%	–
	3	Un027: Built-in Fan Remaining Life Ratio	UINT	RO	No	No	–	–	–	0.01-%	–
	4	Un028: Capacitor Remaining Life Ratio	UINT	RO	No	No	–	–	–	0.01-%	–
	5	Un029: Surge Prevention Circuit Remaining Life Ratio	UINT	RO	No	No	–	–	–	0.01-%	–
	6	Un02A: Dynamic Brake Circuit Remaining Life Ratio	UINT	RO	No	No	–	–	–	0.01-%	–
	7	Un032: Instantaneous Power	INT	RO	No	No	–	–	–	W	–
	8	Un033: Power Consumption	DINT	RO	No	No	–	–	–	0.001 Wh	–
	9	Un034: Cumulative Power Consumption	DINT	RO	No	No	–	–	–	Wh	–
2773h Axis A		Σ-LINK II Response Data									
	0	Number of entries	USINT	RO	No	No	11	–	–	–	–
	1	Σ-LINK II response data 1	UDINT	RO	Yes	No	–	–	–	–	–
	2	Σ-LINK II response data 2	UDINT	RO	Yes	No	–	–	–	–	–
	3	Σ-LINK II response data 3	UDINT	RO	Yes	No	–	–	–	–	–
	4	Σ-LINK II response data 4	UDINT	RO	Yes	No	–	–	–	–	–
	5	Σ-LINK II response data 5	UDINT	RO	Yes	No	–	–	–	–	–
	6	Σ-LINK II response data 6	UDINT	RO	Yes	No	–	–	–	–	–
	7	Σ-LINK II response data 7	UDINT	RO	Yes	No	–	–	–	–	–
	8	Σ-LINK II response data 8	UDINT	RO	Yes	No	–	–	–	–	–
	9	Σ-LINK II data status information	UDINT	RO	Yes	No	–	–	–	–	–
	10	Reserved	UDINT	RO	Yes	No	–	–	–	–	–
	11	Reserved	UDINT	RO	Yes	No	–	–	–	–	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2774h Axis A	Σ-LINK II Command Data										
	0	Number of entries	USINT	RO	No	No	4	–	–	–	–
	1	Σ-LINK II command data 1	UDINT	RW	Yes	No	–	0h	FFFFFFFFh	–	–
	2	Σ-LINK II command data 2	UDINT	RW	Yes	No	–	0h	FFFFFFFFh	–	–
	3	Σ-LINK II command data 3	UDINT	RW	Yes	No	–	0h	FFFFFFFFh	–	–
	4	Σ-LINK II command data 4	UDINT	RW	Yes	No	–	0h	FFFFFFFFh	–	–
2775h Axis A	Position Reference Filter										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Movement Average Time	UINT	RW	No	Yes	0	0	5100	0.1 ms	PnBC4
	2	Reserved	UINT	RW	No	Yes	–	–	–	–	–
2776h Axis A	0	Controlword_VenderS	UINT	RW	Yes	No	–	0	0xFFFF	–	–
2777h Common	0	Statusword_VenderS	UINT	RO	Yes	No	–	0	0xFFFF	–	–
277dh Common	0	Position actual value (ordinary)	DINT	RO	Yes	No	–	–	–	Pos. unit	–
277eh Axis A	0	Relative Position Deviation	DINT	RO	Yes	No	–	–	–	Pos. unit	–
277Fh Axis A	Position Correction Table Current Correction Value										
	0	Number of entries	USINT	RO	No	No	–	–	–	–	–
	1	Position Demand Correction Value	DINT	RO	Yes	No	–	–	–	Pos. unit	–
	2	Actual Position Correction Value	DINT	RO	Yes	No	–	–	–	Pos. unit	–
27C0h Axis A	Interpolation Data Record for 1st Profile										
	0	Number of entries	USINT	RO	No	No	254	–	–	–	–
	1 to 254	1st set-point to 254 set-point	DINT	RW	No	No	0	-2147483648	2147483647	–	–
27C1h Axis A	Interpolation Data Record for 2nd Profile										
	0	Number of entries	USINT	RO	No	No	254	–	–	–	–
	1 to 254	1st set-point to 254 set-point	DINT	RW	No	No	0	-2147483648	2147483647	–	–
27E0h Axis A	–	Diag.Mode	UINT	RW	No	No	0	0	0xFFFF	–	PnCFE
27E4h Axis A	–	Absolute Encoder Origin Offset	DINT	RW	No	Yes	0	-2147483648	2147483647	–	PnB76
2800h to 2EFFh Axis B	0	SERVOPACK Parameter (Pn000 (2800h) - Pn6FF (2EFFh))	–	–	–	–	–	–	–	–	Pn000-Pn6FF

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Index	Subin-dex	Name	Data Type	Acc-ess	PDO Map-ping	Saving to EEPRO-M	Default Value	Lower Limit	Upper Limit	Unit	Parame-ter No.
2F00h Axis B	0	User Parameter Configuration	UDINT	RW	No	No	0	0	0xFFFFFFFF	–	PnB00
2F01h Axis B	Position User Unit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Numerator	UDINT	RW	No	Yes	64	1	1073741824	–	Pn20E
	2	Denominator	UDINT	RW	No	Yes	1	1	1073741824	–	Pn210
2F02h Axis B	Velocity User Unit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Numerator	UDINT	RW	No	Yes	64	1	1073741823	–	PnB06
	2	Denominator	UDINT	RW	No	Yes	1	1	1073741823	–	PnB08
2F03h Axis B	Acceleration User Unit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Numerator	UDINT	RW	No	Yes	64	1	1073741823	–	PnB0A
	2	Denominator	UDINT	RW	No	Yes	1	1	1073741823	–	PnB0C
2F04h Axis B	Torque User Unit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Numerator	UDINT	RW	No	Yes	1	1	1073741823	–	PnB94
	2	Denominator	UDINT	RW	No	Yes	10	1	1073741823	–	PnB96
2F10h Axis B	SERVOPACK Adjusting Command										
	0	Number of entries	USINT	RO	No	No	3	–	–	–	–
	1	Command	STRIN-G	RW	No	No	0	0	0xFF	–	–
	2	Status	USINT	RO	No	No	–	–	–	–	–
	3	Reply	STRIN-G	RO	No	No	–	–	–	–	–
2F30h Axis B	Interpolation Data Configuration for 1st Profile										
	0	Number of entries	USINT	RO	No	No	9	–	–	–	–
	1	Maximum buffer size	UDINT	RO	No	No	254	–	–	–	–
	2	Actual buffer size	UDINT	RW	No	No	254	–	–	–	–
	3	Buffer organization	USINT	RW	No	No	0	0	1	–	PnCEC
	4	Buffer position	UINT	RW	Yes	No	1	1	254	–	PnCED
	5	Size of data record	USINT	WO	No	No	1	1	1	–	–
	6	Buffer clear	USINT	WO	No	No	0	0	1	–	–
	7	Position data definition	USINT	RW	Yes	No	1	0	1	–	PnCEE
	8	Position data polarity	USINT	RW	Yes	No	0	0	1	–	PnCEF
	9	Behavior after reaching buffer position	USINT	RW	Yes	No	0	0	1	–	PnCF0

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Index	Subin-dex	Name	Data Type	Acc-ess	PDO Map-ping	Saving to EEPRO-M	Default Value	Lower Limit	Upper Limit	Unit	Parame-ter No.
2F31h Axis B	Interpolation Data Configuration for 2nd Profile										
	0	Number of entries	USINT	RO	No	No	9	–	–	–	–
	1	Maximum buffer size	UDINT	RO	No	No	254	–	–	–	–
	2	Actual buffer size	UDINT	RW	No	No	254	–	–	–	–
	3	Buffer organization	USINT	RW	No	No	0	0	1	–	PnCF1
	4	Buffer position	UINT	RW	Yes	No	1	1	254	–	PnCF2
	5	Size of data record	USINT	WO	No	No	1	1	1	–	–
	6	Buffer clear	USINT	WO	No	No	0	0	1	–	–
	7	Position data definition	USINT	RW	Yes	No	1	0	1	–	PnCF3
	8	Position data polarity	USINT	RW	Yes	No	0	0	1	–	PnCF4
	9	Behavior after reaching buffer position	USINT	RW	Yes	No	0	0	1	–	PnCF5
2F32h Axis B	0	Interpolation Profile Select	USINT	RW	Yes	No	0	0	1	–	PnCF6
2F41h Axis B	Interpolation Data Read/Write Pointer Position Monitor										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Interpolation data read pointer Position	UINT	RO	Yes	No	–	1	254	–	PnCF7
	2	Interpolation data write pointer Position	UINT	RO	Yes	No	–	1	254	–	PnCF8

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2F70h Axis B	Sensing Data Monitor										
	0	Number of entries	USINT	RO	No	No	21	–	–	–	–
	1	Estimated vibration	DINT	RO	Yes	No	–	–	–	Overspeed detection speed/1000000h	–
	2	Estimated external disturbance torque	DINT	RO	Yes	No	–	–	–	Maximum torque/1000000h	–
	3	Main circuit DC voltage	INT	RO	Yes	No	–	–	–	V	–
	4	Un009: Accumulated Load Ratio	UINT	RO	No	No	–	–	–	%	–
	5	Un00A: Regenerative Load Ratio	UINT	RO	No	No	–	–	–	%	–
	6	Un078: Maximum Value of Amplitude of Estimated Vibration	INT	RO	No	No	–	–	–	min^{-1}	–
	7	Un07A: Maximum Value of Estimated External Disturbance Torque	INT	RO	No	No	–	–	–	%	–
	8	Un07B: Minimum Value of Estimated External Disturbance Torque	INT	RO	No	No	–	–	–	%	–
	9	Un07C: Identified Moment of Inertia Ratio	UDINT	RO	Yes	No	–	–	–	–	–
	10	Un104: Number of Serial Encoder Communications Errors	UINT	RO	No	No	–	–	–	Time	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2F70h Axis B	Sensing Data Monitor										
	11	Un105: Settling Time	UINT	RO	No	No	–	–	–	0.1 ms	–
	12	Un106: Amount of Overshoot	UDINT	RO	No	No	–	–	–	Pos. unit	–
	13	Un107: Residual Vibration Frequency	UINT	RO	No	No	–	–	–	0.1 Hz	–
	14	Un108: Maximum Settling Time	UINT	RO	No	No	–	–	–	0.1 ms	–
	15	Un109: Maximum Amount of Overshoot	UDINT	RO	No	No	–	–	–	Pos. unit	–
	16	Un145: Maximum Value of Accumulated Load Ratio	UINT	RO	No	No	–	–	–	%	–
	17	Un14E: Margin until Overload	INT	RO	Yes	No	–	–	–	0.01-%	–
	18	Reserved	UDINT	RO	Yes	No	–	–	–	–	–
	19	Reserved	UDINT	RO	Yes	No	–	–	–	–	–
	20	Error detection trace counter	UDINT	RO	No	No	–	–	–	–	–
	21	Error detection trace error rate	UDINT	RO	No	No	–	–	–	–	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2F71h Axis B		Sensing Data Monitor (Motor)									
	0	Number of entries	USINT	RO	No	No	13	–	–	–	–
	1	Un174: Temperature Margin until Servomotor Overheats	INT	RO	No	No	–	–	–	°C	–
	2	Un177: Encoder Power Supplied Time	UDINT	RO	No	No	–	–	–	100 ms	–
	3	Reserved	UINT	RO	No	No	–	–	–	–	–
	4	Un17A: Encoder Power Supply Voltage	INT	RO	No	No	–	–	–	0.01 V	–
	5	Un17B: Encoder Battery Voltage	UINT	RO	No	No	–	–	–	0.1 V	–
	6	Un181: Motor Total Number of Rotations	UDINT	RO	No	No	–	–	–	100 rev	–
	7	Un183: Maintenance Prediction Monitor - Bearings	UINT	RO	No	No	–	–	–	0.01%	–
	8	Un184: Maintenance Prediction Monitor - Oil Seal	UINT	RO	No	No	–	–	–	0.01%	–
	9	Un190: Motor Vibration in X-Axis Direction	DINT	RO	Yes	No	–	–	–	0.0001 G	–
	10	Un191: Motor Vibration in Y-Axis Direction	DINT	RO	Yes	No	–	–	–	0.0001 G	–
	11	Un192: Motor Vibration in Z-Axis Direction	DINT	RO	Yes	No	–	–	–	0.0001 G	–
	12	Un193: Motor Vibration XYZ Composite Value	UDINT	RO	Yes	No	–	–	–	0.0001 G	–
	13	Un194: Maximum Motor Vibration	UDINT	RO	No	No	–	–	–	0.0001 G	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2F72h Axis B		Operation Status Monitor									
	0	Number of entries	USINT	RO	No	No	9	–	–	–	–
	1	Un025: SERVOPACK Installation Environment Monitor	INT	RO	No	No	–	–	–	%	–
	2	Un026: Servomotor Installation Environment Monitor	INT	RO	No	No	–	–	–	%	–
	3	Un027: Built-in Fan Remaining Life Ratio	UINT	RO	No	No	–	–	–	0.01-%	–
	4	Un028: Capacitor Remaining Life Ratio	UINT	RO	No	No	–	–	–	0.01-%	–
	5	Un029: Surge Prevention Circuit Remaining Life Ratio	UINT	RO	No	No	–	–	–	0.01-%	–
	6	Un02A: Dynamic Brake Circuit Remaining Life Ratio	UINT	RO	No	No	–	–	–	0.01-%	–
	7	Un032: Instantaneous Power	INT	RO	No	No	–	–	–	W	–
	8	Un033: Power Consumption	DINT	RO	No	No	–	–	–	0.001 Wh	–
	9	Un034: Cumulative Power Consumption	DINT	RO	No	No	–	–	–	Wh	–
2F73h Axis B		Σ-LINK II Response Data									
	0	Number of entries	USINT	RO	No	No	11	–	–	–	–
	1	Σ-LINK II response data 1	UDINT	RO	Yes	No	–	–	–	–	–
	2	Σ-LINK II response data 2	UDINT	RO	Yes	No	–	–	–	–	–
	3	Σ-LINK II response data 3	UDINT	RO	Yes	No	–	–	–	–	–
	4	Σ-LINK II response data 4	UDINT	RO	Yes	No	–	–	–	–	–
	5	Σ-LINK II response data 5	UDINT	RO	Yes	No	–	–	–	–	–
	6	Σ-LINK II response data 6	UDINT	RO	Yes	No	–	–	–	–	–
	7	Σ-LINK II response data 7	UDINT	RO	Yes	No	–	–	–	–	–
	8	Σ-LINK II response data 8	UDINT	RO	Yes	No	–	–	–	–	–
	9	Σ-LINK II data status information	UDINT	RO	Yes	No	–	–	–	–	–
	10	Reserved	UDINT	RO	Yes	No	–	–	–	–	–
	11	Reserved	UDINT	RO	Yes	No	–	–	–	–	–

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
2F74h Axis B	Σ-LINK II Command Data										
	0	Number of entries	USINT	RO	No	No	4	–	–	–	–
	1	Σ-LINK II command data 1	UDINT	RW	Yes	No	–	0h	FFFFFFFFh	–	–
	2	Σ-LINK II command data 2	UDINT	RW	Yes	No	–	0h	FFFFFFFFh	–	–
	3	Σ-LINK II command data 3	UDINT	RW	Yes	No	–	0h	FFFFFFFFh	–	–
	4	Σ-LINK II command data 4	UDINT	RW	Yes	No	–	0h	FFFFFFFFh	–	–
2F75h Axis B	Position Reference Filter										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Movement Average Time	UINT	RW	No	Yes	0	0	5100	0.1 ms	PnBC4
	2	Reserved	UINT	RW	No	Yes	–	–	–	–	–
2F76h Axis B	0	Controlword_VenderS	UINT	RW	Yes	No	–	0	0xFFFF	–	–
2F7eh Axis B	0	Relative Position Deviation	DINT	RO	Yes	No	–	–	–	Pos. unit	–
2F7Fh Axis B	Position Correction Table Current Correction Value										
	0	Number of entries	USINT	RO	No	No	–	–	–	–	–
	1	Position Demand Correction Value	DINT	RO	Yes	No	–	–	–	Pos. unit	–
	2	Actual Position Correction Value	DINT	RO	Yes	No	–	–	–	Pos. unit	–
2FC0h Axis B	Interpolation Data Record for 1st Profile										
	0	Number of entries	USINT	RO	No	No	254	–	–	–	–
	1 to 254	1st set-point to 254 set-point	DINT	RW	No	No	0	-2147483648	2147483647	–	–
2FC1h Axis B	Interpolation Data Record for 2nd Profile										
	0	Number of entries	USINT	RO	No	No	254	–	–	–	–
	1 to 254	1st set-point to 254 set-point	DINT	RW	No	No	0	-2147483648	2147483647	–	–
2FE0h Axis B	–	Diag.Mode	UINT	RW	No	No	0	0	0xFFFF	–	PnCFE
2FE4h Axis B	–	Absolute Encoder Origin Offset	DINT	RW	No	Yes	0	-2147483648	2147483647	–	PnB76
603Fh Axis A	0	Error Code	UINT	RO	Yes	No	–	–	–	–	PnB10
6040h Axis A	0	Controlword	UINT	RW	Yes	No	0	0	0xFFFF	–	PnB11
6041h Axis A	0	Statusword	UINT	RO	Yes	No	–	–	–	–	PnB12
605Ah Axis A	0	Quick Stop Option Code	INT	RW	No	Yes	0	0	4	–	PnB13

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
605Bh Axis A	0	Shutdown Option Code	INT	RW	No	Yes	0	0	1	–	PnB14
605Ch Axis A	0	Disable Operation Option Code	INT	RW	No	Yes	0	0	1	–	PnB15
605Dh Axis A	0	Halt Option Code	INT	RW	No	Yes	1	-3	3	–	PnB16
605Eh Axis A	0	Fault Reaction Option Code	INT	RW	No	Yes	0	0	0	–	PnB17
6060h Axis A	0	Modes of Operation	SINT	RW	Yes	Yes	0	0	10	–	PnB18
6061h Axis A	0	Modes of Operation Display	SINT	RO	Yes	No	0	–	–	–	PnB19
6062h Axis A	0	Position Demand Value	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB20
6063h Axis A	0	Position Actual Internal Value	DINT	RO	Yes	No	–	–	–	Inc	PnB22
6064h Axis A	0	Position Actual Value	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB24
6065h Axis A	0	Following Error Window	UDINT	RW	No	Yes	5242880	0	1073741823	Pos. unit	PnB26
6066h Axis A	0	Following Error Time Out	UINT	RW	No	Yes	0	0	65535	ms	PnB28
6067h Axis A	0	Position Window	UDINT	RW	No	Yes	30	0	1073741823	Pos. unit	PnB2A
6068h Axis A	0	Position Window Time	UINT	RW	No	Yes	0	0	65535	ms	PnB2C
606Bh Axis A	0	Velocity Demand Value	DINT	RO	Yes	No	–	–	–	Vel. unit	PnB2E
606Ch Axis A	0	Velocity Actual Value	DINT	RO	Yes	No	–	–	–	Vel. unit	PnB30
606Dh Axis A	0	Velocity Window	UINT	RW	No	Yes	20000	0	65535	Vel. unit	PnB32
606Eh Axis A	0	Velocity Window Time	UINT	RW	No	Yes	0	0	65535	ms	PnB34
6071h Axis A	0	Target Torque	INT	RW	Yes	No	0	-32768	32767	Trq. unit	PnB36
6072h Axis A	0	Max Torque	UINT	RW	Yes	No	Motor max torque	0	65535	Trq. unit	PnB38
6074h Axis A	0	Torque Demand Value	INT	RO	Yes	No	–	–	–	Trq. unit	PnB3A
6076h Axis A	0	Motor Rated Torque	UDINT	RO	No	No	–	–	–	mN-m, mN	PnB3C
6077h Axis A	0	Torque Actual Value	INT	RO	Yes	No	–	–	–	Trq. unit	PnB3E

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
6078h Axis A	0	Current Actual Value	INT	RO	Yes	No	–	–	–	1/1000 of rated current	–
607Ah Axis A	0	Target Position	DINT	RW	Yes	No	0	-2147483648	2147483647	Pos. unit	PnB40
607Bh Axis A	Position Range Limit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Min position range limit	DINT	RW	Yes	Yes	0	-2147483648	0	Pos. unit	PnBBE
	2	Max position range limit	DINT	RW	Yes	Yes	0	0	2147483647	Pos. unit	PnBC0
607Ch Axis A	–	Home Offset	DINT	RW	No	Yes	0	-536870912	536870911	Pos. unit	PnB46
607Dh Axis A	Software Position Limit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Min position limit	DINT	RW	No	Yes	0	-536870912	536870911	Pos. unit	PnB48
	2	Max position limit	DINT	RW	No	Yes	0	-536870912	536870911	Pos. unit	PnB4A
607Fh Axis A	0	Max Profile Velocity	UDINT	RW	Yes	Yes	2147483647	0	4294967295	Vel. unit	PnB4C
6081h Axis A	0	Profile Velocity	UDINT	RW	Yes	Yes	0	0	4294967295	Vel. unit	PnB4E
6082h Axis A	0	End Velocity	UDINT	RW	Yes	No	0	0	4294967295	Vel. unit	–
6083h Axis A	0	Profile Acceleration	UDINT	RW	Yes	Yes	1000	0	4294967295	Acc. unit	PnB50
6084h Axis A	0	Profile Deceleration	UDINT	RW	Yes	Yes	1000	0	4294967295	Acc. unit	PnB52
6085h Axis A	0	Quick Stop Deceleration	UDINT	RW	Yes	Yes	1000	0	4294967295	Acc. unit	PnB54
6086h Axis A	0	Motion Profile Type	INT	RW	Yes	Yes	0	-32768	32767	–	PnB98
6087h Axis A	0	Torque Slope	UDINT	RW	Yes	Yes	1000	0	4294967295	Trq. unit/s	PnB56
6098h Axis A	0	Homing Method	SINT	RW	Yes	No	37	0	37	–	PnB58
6099h Axis A	Homing Speeds										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Speed during search for switch	UDINT	RW	Yes	Yes	500000	0	4294967295	Vel. unit	PnB5A
	2	Speed during search for zero	UDINT	RW	Yes	Yes	100000	0	4294967295	Vel. unit	PnB5C

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
609Ah Axis A	0	Homing Acceleration	UDINT	RW	Yes	Yes	1000	0	4294967295	Acc. unit	PnB5E
60A4h Axis A	Profile Jerk										
	0	Number of entries	USINT	RO	No	No	1	–	–	–	–
	1	Profile jerk1	UDINT	RW	No	Yes	25	0	50	%	PnB9A
60B0h Axis A	0	Position Offset	DINT	RW	Yes	No	0	-2147483648	2147483647	Pos. Unit	–
60B1h Axis A	0	Velocity Offset	DINT	RW	Yes	No	0	-2147483648	2147483647	Vel. unit	PnB60
60B2h Axis A	0	Torque Offset	INT	RW	Yes	No	0	-32768	32767	Trq. unit	PnB62
60B8h Axis A	0	Touch probe function	UINT	RW	Yes	No	0	0	0xFFFF	–	PnB64
60B9h Axis A	0	Touch Probe Status	UINT	RO	Yes	No	–	–	–	–	PnB66
60BAh Axis A	0	Touch Probe 1 Positive Edge	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB68
60BBh Axis A	0	Touch Probe 1 Negative Edge	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB72
60BCh Axis A	0	Touch Probe 2 Positive Edge	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB6A
60BDh Axis A	0	Touch Probe 2 Negative Edge	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB74
60C0h Axis A	0	Interpolation Sub Mode Select	INT	RW	No	No	0	-3	0	–	PnB92
60C1h Axis A	Interpolation Data Record										
	0	Number of entries	USINT	RO	No	No	1	–	–	–	–
	1	Interpolation data record	DINT	RW	Yes	No	0	-2147483648	2147483647	Pos. unit	PnB70
60C2h Axis A	Interpolation Time Period										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Interpolation time period value	USINT	RW	No	No	125	1	250	–	PnB6E
	2	Interpolation time index	SINT	RW	No	No	-6	-6	-3	–	PnB6F
60E0h Axis A	0	Positive Torque Limit Value	UINT	RW	Yes	Yes	8000	0	65535	Trq. unit	PnB80
60E1h Axis A	0	Negative Torque Limit Value	UINT	RW	Yes	Yes	8000	0	65535	Trq. unit	PnB82
60E4h Axis A	Additional Position Actual Value										
	0	Number of entries	USINT	RO	No	No	1	–	–	–	–
	1	External encoder position	DINT	RO	Yes	Yes	0	–	–	Pos. unit	–
60F2h Axis A	0	Position Option Code	UINT	RW	Yes	No	0	0	0xFFFF	–	PnBC2

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
60F4h Axis A	0	Following Error Actual Value	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB84
60FCh Axis A	0	Position Demand Internal Value	DINT	RO	Yes	No	–	–	–	Inc	PnB86
60FDh Axis A	0	Digital Inputs	UDINT	RO	Yes	No	–	–	–	–	PnB88
60FEh Axis A	Digital Outputs										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Physical outputs	UDINT	RW	Yes	No	0	0	0xFFFFFFFF	–	PnB8A
	2	Bit mask	UDINT	RW	No	Yes	0x003C0000	0	0xFFFFFFFF	–	PnB8C
60FFh Axis A	0	Target Velocity	DINT	RW	Yes	No	0	-2147483648	2147483647	Vel. unit	PnB8E
6403h Axis A	0	Motor Catalogue Number	STRING	RO	No	No	–	–	–	–	–
6502h Axis A	0	Supported Drive Modes	UDINT	RO	No	No	0x03ED	–	–	–	PnB90
683Fh Axis B	0	Error Code	UINT	RO	Yes	No	–	–	–	–	PnB10
6840h Axis B	0	Controlword	UINT	RW	Yes	No	0	0	0xFFFF	–	PnB11
6841h Axis B	0	Statusword	UINT	RO	Yes	No	–	–	–	–	PnB12
685Ah Axis B	0	Quick Stop Option Code	INT	RW	No	Yes	0	0	4	–	PnB13
685Bh Axis B	0	Shutdown Option Code	INT	RW	No	Yes	0	0	1	–	PnB14
685Ch Axis B	0	Disable Operation Option Code	INT	RW	No	Yes	0	0	1	–	PnB15
685Dh Axis B	0	Halt Option Code	INT	RW	No	Yes	1	-3	3	–	PnB16
685Eh Axis B	0	Fault Reaction Option Code	INT	RW	No	Yes	0	0	0	–	PnB17
6860h Axis B	0	Modes of Operation	SINT	RW	Yes	Yes	0	0	10	–	PnB18
6861h Axis B	0	Modes of Operation Display	SINT	RO	Yes	No	0	–	–	–	PnB19
6862h Axis B	0	Position Demand Value	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB20
6863h Axis B	0	Position Actual Internal Value	DINT	RO	Yes	No	–	–	–	Inc	PnB22
6864h Axis B	0	Position Actual Value	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB24
6865h Axis B	0	Following Error Window	UDINT	RW	No	Yes	5242880	0	1073741823	Pos. unit	PnB26

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Index	Subin-dex	Name	Data Type	Acc-ess	PDO Map-ping	Saving to EEPRO-M	Default Value	Lower Limit	Upper Limit	Unit	Parame-ter No.
6866h Axis B	0	Following Error Time Out	UINT	RW	No	Yes	0	0	65535	ms	PnB28
6867h Axis B	0	Position Window	UDINT	RW	No	Yes	30	0	1073741823	Pos. unit	PnB2A
6868h Axis B	0	Position Window Time	UINT	RW	No	Yes	0	0	65535	ms	PnB2C
686Bh Axis B	0	Velocity Demand Value	DINT	RO	Yes	No	–	–	–	Vel. unit	PnB2E
686Ch Axis B	0	Velocity Actual Value	DINT	RO	Yes	No	–	–	–	Vel. unit	PnB30
686Dh Axis B	0	Velocity Window	UINT	RW	No	Yes	20000	0	65535	Vel. unit	PnB32
686Eh Axis B	0	Velocity Window Time	UINT	RW	No	Yes	0	0	65535	ms	PnB34
6871h Axis B	0	Target Torque	INT	RW	Yes	No	0	-32768	32767	Trq. unit	PnB36
6872h Axis B	0	Max Torque	UINT	RW	Yes	No	Motor max torque	0	65535	Trq. unit	PnB38
6874h Axis B	0	Torque Demand Value	INT	RO	Yes	No	–	–	–	Trq. unit	PnB3A
6876h Axis B	0	Motor Rated Torque	UDINT	RO	No	No	–	–	–	mN-m, mN	PnB3C
6877h Axis B	0	Torque Actual Value	INT	RO	Yes	No	–	–	–	Trq. unit	PnB3E
6878h Axis B	0	Current Actual Value	INT	RO	Yes	No	–	–	–	1/1000 of rated cur-rent	–
687Ah Axis B	0	Target Position	DINT	RW	Yes	No	0	-2147483648	2147483647	Pos. unit	PnB40
687Bh Axis B	Position Range Limit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Min position range limit	DINT	RW	No	Yes	0	-2147483648	0	Pos. unit	PnBBE
	2	Max position range limit	DINT	RW	No	Yes	0	0	2147483647	Pos. unit	PnBC0
687Ch Axis B	–	Home Offset	DINT	RW	No	Yes	0	-536870912	536870911	Pos. unit	PnB46
687Dh Axis B	Software Position Limit										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Min position limit	DINT	RW	No	Yes	0	-536870912	536870911	Pos. unit	PnB48
	2	Max position limit	DINT	RW	No	Yes	0	-536870912	536870911	Pos. unit	PnB4A

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
687Fh Axis B	0	Max Profile Velocity	UDINT	RW	Yes	Yes	2147483647	0	4294967295	Vel. unit	PnB4C
6881h Axis B	0	Profile Velocity	UDINT	RW	Yes	Yes	0	0	4294967295	Vel. unit	PnB4E
6882h Axis B	0	End Velocity	UDINT	RW	Yes	No	0	0	4294967295	Vel. unit	–
6883h Axis B	0	Profile Acceleration	UDINT	RW	Yes	Yes	1000	0	4294967295	Acc. unit	PnB50
6884h Axis B	0	Profile Deceleration	UDINT	RW	Yes	Yes	1000	0	4294967295	Acc. unit	PnB52
6885h Axis B	0	Quick Stop Deceleration	UDINT	RW	Yes	Yes	1000	0	4294967295	Acc. unit	PnB54
6886h Axis B	0	Motion Profile Type	INT	RW	Yes	Yes	0	-32768	32767	–	PnB98
6887h Axis B	0	Torque Slope	UDINT	RW	Yes	Yes	1000	0	4294967295	Trq. unit/s	PnB56
6898h Axis B	0	Homing Method	SINT	RW	Yes	No	37	0	37	–	PnB58
6899h Axis B	Homing Speeds										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Speed during search for switch	UDINT	RW	Yes	Yes	500000	0	4294967295	Vel. unit	PnB5A
	2	Speed during search for zero	UDINT	RW	Yes	Yes	100000	0	4294967295	Vel. unit	PnB5C
689Ah Axis B	0	Homing Acceleration	UDINT	RW	Yes	Yes	1000	0	4294967295	Acc. unit	PnB5E
68A4h Axis B	Profile Jerk										
	0	Number of entries	USINT	RO	No	No	1	–	–	–	–
	1	Profile jerk1	UDINT	RW	No	Yes	25	0	50	%	PnB9A
68B0h Axis B	0	Position Offset	DINT	RW	Yes	No	0	-2147483648	2147483647	Pos. Unit	–
68B1h Axis B	0	Velocity Offset	DINT	RW	Yes	No	0	-2147483648	2147483647	Vel. unit	PnB60
68B2h Axis B	0	Torque Offset	INT	RW	Yes	No	0	-32768	32767	Trq. unit	PnB62
68B8h Axis B	0	Touch probe function	UINT	RW	Yes	No	0	0	0xFFFF	–	PnB64
68B9h Axis B	0	Touch Probe Status	UINT	RO	Yes	No	–	–	–	–	PnB66
68BAh Axis B	0	Touch Probe 1 Positive Edge	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB68
68BBh Axis B	0	Touch Probe 1 Negative Edge	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB72
68BCh Axis B	0	Touch Probe 2 Positive Edge	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB6A

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Index	Subindex	Name	Data Type	Access	PDO Mapping	Saving to EEPROM	Default Value	Lower Limit	Upper Limit	Unit	Parameter No.
68BDh Axis B	0	Touch Probe 2 Negative Edge	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB74
68C0h Axis B	0	Interpolation Sub Mode Select	INT	RW	No	No	0	-3	0	–	PnB92
68C1h Axis B	Interpolation Data Record										
	0	Number of entries	USINT	RO	No	No	1	–	–	–	–
	1	Interpolation data record	DINT	RW	Yes	No	0	-2147483648	2147483647	Pos. unit	PnB70
68C2h Axis B	Interpolation Time Period										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Interpolation time period value	USINT	RW	No	No	125	1	250	–	PnB6E
	2	Interpolation time index	SINT	RW	No	No	-6	-6	-3	–	PnB6F
68E0h Axis B	0	Positive Torque Limit Value	UINT	RW	Yes	Yes	8000	0	65535	Trq. unit	PnB80
68E1h Axis B	0	Negative Torque Limit Value	UINT	RW	Yes	Yes	8000	0	65535	Trq. unit	PnB82
68E4h Axis B	Additional Position Actual Value										
	0	Number of entries	USINT	RO	No	No	1	–	–	–	–
	1	External encoder position	DINT	RO	Yes	Yes	0	–	–	Pos. unit	–
68F2h Axis B	0	Position Option Code	UINT	RW	Yes	No	0	0	0xFFFF	–	PnBC2
68F4h Axis B	0	Following Error Actual Value	DINT	RO	Yes	No	–	–	–	Pos. unit	PnB84
68FCh Axis B	0	Position Demand Internal Value	DINT	RO	Yes	No	–	–	–	Inc	PnB86
68FDh Axis B	0	Digital Inputs	UDINT	RO	Yes	No	–	–	–	–	PnB88
68FEh Axis B	Digital Outputs										
	0	Number of entries	USINT	RO	No	No	2	–	–	–	–
	1	Physical outputs	UDINT	RW	Yes	No	0	0	0xFFFFFFFF	–	PnB8A
	2	Bit mask	UDINT	RW	No	Yes	0x003C0000	0	0xFFFFFFFF	–	PnB8C
68FFh Axis B	0	Target Velocity	DINT	RW	Yes	No	0	-2147483648	2147483647	Vel. unit	PnB8E
6C03h Axis B	0	Motor Catalogue Number	STRING	RO	No	No	–	–	–	–	–
6D02h Axis B	0	Supported Drive Modes	UDINT	RO	No	No	0x03ED	–	–	–	PnB90
F9F0h Common	0	Manufacturer Serial Number	STRING	RO	No	No	–	–	–	–	–

10.6 SDO Abort Code List

The following table gives the SDO abort codes for SDO communications errors.

Value	Description
0x05 03 00 00	Toggle bit did not change.
0x05 04 00 00	SDO protocol timeout
0x05 04 00 01	Client/server command specifier is not valid or is unknown.
0x05 04 00 05	Out of memory
0x06 01 00 00	Unsupported access to an object
0x06 01 00 01	Attempt to read to a write-only object
0x06 01 00 02	Attempt to write to a read-only object
0x06 01 00 03	The entry was not written because the subindex was a value other than 0
0x06 01 00 04	The object cannot be accessed through complete access
0x06 02 00 00	The object does not exist in the object directory.
0x06 04 00 41	The object cannot be mapped to the PDO.
0x06 04 00 42	The number and length of the objects to be mapped would exceed the PDO length.
0x06 04 00 43	General parameter incompatibility
0x06 04 00 47	General internal incompatibility in the device
0x06 06 00 00	Access failed due to a hardware error.
0x06 07 00 10	Data type does not match: length of service parameter does not match.
0x06 07 00 12	Data type does not match: service parameter too long.
0x06 07 00 13	Data type does not match: service parameter too short.
0x06 09 00 11	Subindex does not exist.
0x06 09 00 30	Value range of parameter was exceeded (only for write access).
0x06 09 00 31	Value of parameter that was written is too high.
0x06 09 00 32	Value of parameter that was written is too low.
0x06 09 00 36	The maximum value is less than the minimum value.
0x08 00 00 00	General error
0x08 00 00 20	Data cannot be transferred or stored to the application.
0x08 00 00 21	Data cannot be transferred or stored to the application because of local control.
0x08 00 00 22	Data cannot be transferred or stored to the application because of the present device state.
0x08 00 00 23	The object does not exist in the object directory.

10.7 Parameter Recording Table: Σ-XS SERVOPACK

Use the following table to record the settings of the parameters.

Parameter No.	Default Setting						Name	When Enabled
Pn000 (2000h)	0000h						Basic Function Selections 0	After restart
Pn001 (2001h)	0000h						Application Function Selections 1	After restart
Pn002 (2002h)	0011h						Application Function Selections 2	After restart
Pn006 (2006h)	0002h						Application Function Selections 6	Immediately
Pn007 (2007h)	0000h						Application Function Selections 7	Immediately
Pn008 (2008h)	4000h						Application Function Selections 8	After restart
Pn009 (2009h)	0040h						Application Function Selections 9	After restart
Pn00A (200Ah)	0001h						Application Function Selections A	After restart
Pn00B (200Bh)	0000h						Application Function Selections B	After restart
Pn00C (200Ch)	0040h						Application Function Selections C	After restart
Pn00D (200Dh)	0000h						Application Function Selections D	After restart
Pn00E (200Eh)	0000h						Application Function Selections E	After restart
Pn00F (200Fh)	0000h						Application Function Selections F	After restart
Pn021 (2021h)	0000h						Reserved (Do not change.)	–
Pn022 (2022h)	0000h						Application Function Selections 22	After restart
Pn02F (202Fh)	0000h						Application Function Selections 2F	After restart
Pn040 (2040h)	0000h						Reserved (Do not change.)	–
Pn050 (2050h)	00000000h						SigmaLINK II Response Data Selection 1	After restart
Pn052 (2052h)	00000000h						SigmaLINK II Response Data Selection 2	After restart
Pn054 (2054h)	00000000h						SigmaLINK II Response Data Selection 3	After restart
Pn056 (2056h)	00000000h						SigmaLINK II Response Data Selection 4	After restart
Pn058 (2058h)	00000000h						SigmaLINK II Response Data Selection 5	After restart
Pn05A (205Ah)	00000000h						SigmaLINK II Response Data Selection 6	After restart
Pn05C (205Ch)	00000000h						SigmaLINK II Response Data Selection 7	After restart

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Parameter No.	Default Setting						Name	When Enabled
Pn05E (205Eh)	00000000h						SigmaLINK II Response Data Selection 8	After restart
Pn080 (2080h)	0000h						Application Function Selections 80	After restart
Pn081 (2081h)	0000h						Application Function Selections 81	After restart
Pn090 (2090h)	00000000h						SigmaLINK II Command Data Selection 1	After restart
Pn092 (2092h)	00000000h						SigmaLINK II Command Data Selection 2	After restart
Pn094 (2094h)	00000000h						SigmaLINK II Command Data Selection 3	After restart
Pn096 (2096h)	00000000h						SigmaLINK II Command Data Selection 4	After restart
Pn0A1 (20A1h)	0000h						Gantry Application Function Selections 1	After restart
Pn0A2 (20A2h)	0011h						Gantry Application Function Selections 2	After restart
Pn0A3 (20A3h)	0000h						Gantry Application Function Selections 3	Immediately
Pn0B1 (20B1h)	0000h						SigmaLINK II Sequence Input Allocation 1	After restart
Pn0B2 (20B2h)	0000h						SigmaLINK II Sequence Input Allocation 2	After restart
Pn0B5 (20B5h)	0000h						SigmaLINK II Sequence Output Allocation 1	After restart
Pn0D4 (20D4h)	0000h						Torque/Force Assistance Selections	After restart
Pn0D6 (20D6h)	0000h						Reserved (Do not change.)	–
Pn0DA (20DAh)	0000h						SigmaLINK II Semi-closed Encoder Selection	After restart
Pn0DB (20DBh)	0101h						SigmaLINK II Fully-closed Encoder Selection	After restart
Pn0DC (20DCh)	0000h						SigmaLINK II Node Change Detection Condition Selection	After restart
Pn0DD (20DDh)	0130h						SigmaLINK II I/O Device Error Detection Selection	After restart
Pn100 (2100h)	400						Speed Loop Gain	Immediately
Pn101 (2101h)	2000						Speed Loop Integral Time Constant	Immediately
Pn102 (2102h)	400						Position Loop Gain	Immediately
Pn103 (2103h)	100						Moment of Inertia Ratio	Immediately
Pn104 (2104h)	400						Second Speed Loop Gain	Immediately
Pn105 (2105h)	2000						Second Speed Loop Integral Time Constant	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn106 (2106h)	400						Second Position Loop Gain	Immediately
Pn109 (2109h)	0						Feedforward	Immediately
Pn10A (210Ah)	0						Feedforward Filter Time Constant	Immediately
Pn10B (210Bh)	0000h						Gain Application Selections	–
Pn10C (210Ch)	200						Mode Switching Level for Torque Reference	Immediately
Pn10D (210Dh)	0						Mode Switching Level for Speed Reference	Immediately
Pn10E (210Eh)	0						Mode Switching Level for Acceleration	Immediately
Pn10F (210Fh)	0						Mode Switching Level for Position Deviation	Immediately
Pn11F (211Fh)	0						Position Integral Time Constant	Immediately
Pn121 (2121h)	100						Friction Compensation Gain	Immediately
Pn122 (2122h)	100						Second Friction Compensation Gain	Immediately
Pn123 (2123h)	0						Friction Compensation Coefficient	Immediately
Pn124 (2124h)	0						Friction Compensation Frequency Correction	Immediately
Pn125 (2125h)	100						Friction Compensation Gain Correction	Immediately
Pn131 (2131h)	0						Gain Switching Time 1	Immediately
Pn132 (2132h)	0						Gain Switching Time 2	Immediately
Pn135 (2135h)	0						Gain Switching Waiting Time 1	Immediately
Pn136 (2136h)	0						Gain Switching Waiting Time 2	Immediately
Pn139 (2139h)	0000h						Automatic Gain Switching Selections 1	Immediately
Pn13D (213Dh)	2000						Current Gain Level	Immediately
Pn140 (2140h)	0100h						Model Following Control-Related Selections	Immediately
Pn141 (2141h)	500						Model Following Control Gain	Immediately
Pn142 (2142h)	1000						Model Following Control Gain Correction	Immediately
Pn143 (2143h)	1000						Model Following Control Bias in the Forward Direction	Immediately
Pn144 (2144h)	1000						Model Following Control Bias in the Reverse Direction	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn145 (2145h)	500						Vibration Suppression 1 Frequency A	Immediately
Pn146 (2146h)	700						Vibration Suppression 1 Frequency B	Immediately
Pn147 (2147h)	1000						Model Following Control Speed Feedforward Compensation	Immediately
Pn148 (2148h)	500						Second Model Following Control Gain	Immediately
Pn149 (2149h)	1000						Second Model Following Control Gain Correction	Immediately
Pn14A (214Ah)	800						Vibration Suppression 2 Frequency	Immediately
Pn14B (214Bh)	100						Vibration Suppression 2 Correction	Immediately
Pn14F (214Fh)	0030h						Control-Related Selections	After restart
Pn160 (2160h)	0010h						Anti-Resonance Control-Related Selections	Immediately
Pn161 (2161h)	1000						Anti-Resonance Frequency	Immediately
Pn162 (2162h)	100						Anti-Resonance Gain Correction	Immediately
Pn163 (2163h)	0						Anti-Resonance Damping Gain	Immediately
Pn164 (2164h)	0						Anti-Resonance Filter Time Constant 1 Correction	Immediately
Pn165 (2165h)	0						Anti-Resonance Filter Time Constant 2 Correction	Immediately
Pn166 (2166h)	0						Anti-Resonance Damping Gain 2	Immediately
Pn16E (216Eh)	400						Relative Position Deviation Compensation Gain	Immediately
Pn16F (216Fh)	100						Relative Pos Dev Compensation Moment of Inertia Ratio	Immediately
Pn170 (2170h)	1401h						Tuning-less Function-Related Selections	–
Pn173 (2173h)	0000h						Load Fluctuation Compensation Control-Related Selections	Immediately
Pn174 (2174h)	400						Load Fluctuation Compensation Control Response Level	Immediately
Pn181 (2181h)	0						Mode Switching Level for Speed Reference	Immediately
Pn182 (2182h)	0						Mode Switching Level for Acceleration	Immediately
Pn183 (2183h)	0010h						Low-Frequency Control Function Switch	–
Pn184 (2184h)	10.0						Low-Frequency Control Frequency	Immediately
Pn185 (2185h)	0.0						Low-Frequency Control Gain	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn186 (2186h)	0						Low-Frequency Control Filter Correction	Immediately
Pn205 (2205h)	65535						Multiturn Limit	After restart
Pn207 (2207h)	0010h						Position Control Function Selections	After restart
Pn20A (220Ah)	32768						Number of External Encoder Scale Pitches	After restart
Pn20E (220Eh)	64						Electronic Gear Ratio (Numerator)	After restart
Pn210 (2210h)	1						Electronic Gear Ratio (Denominator)	After restart
Pn212 (2212h)	2048						Number of Encoder Output Pulses	After restart
Pn21D (221Dh)	0080h						Encoder Resolution Setting	After restart
Pn22A (222Ah)	0000h						Fully-closed Control Selections	After restart
Pn230 (2230h)	0000h						Position Control Expansion Function Selections	After restart
Pn231 (2231h)	0						Backlash Compensation Value	Immediately
Pn233 (2233h)	0						Backlash Compensation Time Constant	Immediately
Pn281 (2281h)	20						Encoder Output Resolution	After restart
Pn282 (2282h)	0						Linear Encoder Scale Pitch	After restart
Pn2E3 (22E3h)	0000h						Position Correction Table Function Selections	After restart
Pn2E4 (22E4h)	0						Mode Separation Coordinates Origin Offset	Immediately
Pn304 (2304h)	500						Jogging Speed	Immediately
Pn305 (2305h)	0						Soft Start Acceleration Time	Immediately
Pn306 (2306h)	0						Soft Start Deceleration Time	Immediately
Pn307 (2307h)	0						Speed Reference Filter Time Constant	Immediately
Pn308 (2308h)	0						Speed Feedback Filter Time Constant	Immediately
Pn30A (230Ah)	0						Deceleration Time for Servo OFF and Forced Stops	Immediately
Pn30C (230Ch)	0						Speed Feedforward Average Movement Time	Immediately
Pn310 (2310h)	0000h						Vibration Detection Selections	Immediately
Pn311 (2311h)	100						Vibration Detection Sensitivity	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn312 (2312h)	50						Vibration Detection Level	Immediately
Pn316 (2316h)	10000						Maximum Motor Speed	After restart
Pn324 (2324h)	300						Moment of Inertia Calculation Starting Level	Immediately
Pn383 (2383h)	50						Jogging Speed	Immediately
Pn384 (2384h)	10						Vibration Detection Level	Immediately
Pn385 (2385h)	50						Maximum Motor Speed	After restart
Pn401 (2401h)	100						First Stage First Torque Reference Filter Time Constant	Immediately
Pn402 (2402h)	800						Forward Torque Limit	Immediately
Pn403 (2403h)	800						Reverse Torque Limit	Immediately
Pn404 (2404h)	100						Forward External Torque Limit	Immediately
Pn405 (2405h)	100						Reverse External Torque Limit	Immediately
Pn406 (2406h)	800						Emergency Stop Torque	Immediately
Pn407 (2407h)	10000						Speed Limit during Torque Control	Immediately
Pn408 (2408h)	0000h						Torque-Related Function Selections	–
Pn409 (2409h)	5000						First Stage Notch Filter Frequency	Immediately
Pn40A (240Ah)	70						First Stage Notch Filter Q Value	Immediately
Pn40B (240Bh)	0						First Stage Notch Filter Depth	Immediately
Pn40C (240Ch)	5000						Second Stage Notch Filter Frequency	Immediately
Pn40D (240Dh)	70						Second Stage Notch Filter Q Value	Immediately
Pn40E (240Eh)	0						Second Stage Notch Filter Depth	Immediately
Pn40F (240Fh)	5000						Second Stage Second Torque Reference Filter Frequency	Immediately
Pn410 (2410h)	50						Second Stage Second Torque Reference Filter Q Value	Immediately
Pn412 (2412h)	100						First Stage Second Torque Reference Filter Time Constant	Immediately
Pn416 (2416h)	0000h						Torque-Related Function Selections 2	Immediately
Pn417 (2417h)	5000						Third Stage Notch Filter Frequency	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn418 (2418h)	70						Third Stage Notch Filter Q Value	Immediately
Pn419 (2419h)	0						Third Stage Notch Filter Depth	Immediately
Pn41A (241Ah)	5000						Fourth Stage Notch Filter Frequency	Immediately
Pn41B (241Bh)	70						Fourth Stage Notch Filter Q Value	Immediately
Pn41C (241Ch)	0						Fourth Stage Notch Filter Depth	Immediately
Pn41D (241Dh)	5000						Fifth Stage Notch Filter Frequency	Immediately
Pn41E (241Eh)	70						Fifth Stage Notch Filter Q Value	Immediately
Pn41F (241Fh)	0						Fifth Stage Notch Filter Depth	Immediately
Pn423 (2423h)	0002h						Speed Ripple Compensation Selections	–
Pn424 (2424h)	50						Torque Limit at Main Circuit Voltage Drop	Immediately
Pn425 (2425h)	100						Release Time for Torque Limit at Main Circuit Voltage Drop	Immediately
Pn426 (2426h)	0						Torque Feedforward Average Movement Time	Immediately
Pn427 (2427h)	0						Speed Ripple Compensation Enable Speed	Immediately
Pn428 (2428h)	0001h						Output Torque Compensation Selections	After restart
Pn429 (2429h)	100						Torque/Force Assistance Multiplier	Immediately
Pn456 (2456h)	15						Sweep Torque Reference Amplitude	Immediately
Pn460 (2460h)	0101h						Notch Filter Adjustment Selections 1	Immediately
Pn475 (2475h)	0000h						Gravity Compensation-Related Selections	After restart
Pn476 (2476h)	0						Gravity Compensation Torque	Immediately
Pn480 (2480h)	10000						Speed Limit during Force Control	Immediately
Pn481 (2481h)	400						Polarity Detection Speed Loop Gain	Immediately
Pn482 (2482h)	3000						Polarity Detection Speed Loop Integral Time	Immediately
Pn483 (2483h)	30						Forward Force Limit	Immediately
Pn484 (2484h)	30						Reverse Force Limit	Immediately
Pn485 (2485h)	20						Polarity Detection Reference Speed	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn486 (2486h)	25						Polarity Detection Reference Acceleration/Deceleration Time	Immediately
Pn487 (2487h)	0						Polarity Detection Constant Speed Time	Immediately
Pn488 (2488h)	100						Polarity Detection Reference Waiting Time	Immediately
Pn48E (248Eh)	10						Polarity Detection Range	Immediately
Pn490 (2490h)	100						Polarity Detection Load Level	Immediately
Pn495 (2495h)	100						Polarity Detection Confirmation Force Reference	Immediately
Pn498 (2498h)	10						Polarity Detection Allowable Error Range	Immediately
Pn49F (249Fh)	0						Speed Ripple Compensation Enable Speed (Linear)	Immediately
Pn501 (2501h)	10						Zero Clamping Level	Immediately
Pn502 (2502h)	20						Rotation Detection Level	Immediately
Pn503 (2503h)	10						Speed Coincidence Detection Signal Output Width	Immediately
Pn506 (2506h)	0						Brake Reference-Servo OFF Delay Time	Immediately
Pn507 (2507h)	100						Brake Reference Output Speed Level	Immediately
Pn508 (2508h)	50						Servo OFF-Brake Command Waiting Time	Immediately
Pn509 (2509h)	20						Momentary Power Interruption Hold Time	Immediately
Pn50A (250Ah)	1881h						Input Signal Selections 1	After restart
Pn50B (250Bh)	8882h						Input Signal Selections 2	After restart
Pn50E (250Eh)	0000h						Output Signal Selections 1	After restart
Pn50F (250Fh)	0100h						Output Signal Selections 2	After restart
Pn510 (2510h)	0000h						Output Signal Selections 3	After restart
Pn511 (2511h)	6543h						Input Signal Selections 5	After restart
Pn512 (2512h)	0000h						Output Signal Inverse Settings	After restart
Pn514 (2514h)	0000h						Output Signal Selections 4	After restart
Pn516 (2516h)	8888h						Input Signal Selections 7	After restart
Pn518 (2518h)	–						Reserved (Do not change.)	–

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Parameter No.	Default Setting						Name	When Enabled
Pn51B (251Bh)	1000						Motor-Load Position Deviation Overflow Detection Level	Immediately
Pn51E (251Eh)	100						Position Deviation Overflow Warning Level	Immediately
Pn520 (2520h)	6116694						Position Deviation Overflow Alarm Level	Immediately
Pn522 (2522h)	7						In-position Range	Immediately
Pn524 (2524h)	10737418-24						Near Signal Width	Immediately
Pn526 (2526h)	6116694						Position Deviation Overflow Alarm Level at Servo ON	Immediately
Pn528 (2528h)	100						Position Deviation Overflow Warning Level at Servo ON	Immediately
Pn529 (2529h)	10000						Speed Limit Level at Servo ON	Immediately
Pn52A (252Ah)	20						Multiplier per Fully-closed Rotation	Immediately
Pn52B (252Bh)	20						Overload Warning Level	Immediately
Pn52C (252Ch)	100						Base Current Derating at Motor Overload Detection	After restart
Pn530 (2530h)	0000h						Program Jogging-Related Selections	Immediately
Pn531 (2531h)	32768						Program Jogging Travel Distance	Immediately
Pn533 (2533h)	500						Program Jogging Movement Speed	Immediately
Pn534 (2534h)	100						Program Jogging Acceleration/Deceleration Time	Immediately
Pn535 (2535h)	100						Program Jogging Waiting Time	Immediately
Pn536 (2536h)	1						Program Jogging Number of Movements	Immediately
Pn540 (2540h)	3000						Maximum Search Gain	Immediately
Pn550 (2550h)	0						Analog Monitor 1 Offset Voltage	Immediately
Pn551 (2551h)	0						Analog Monitor 2 Offset Voltage	Immediately
Pn552 (2552h)	100						Analog Monitor 1 Magnification	Immediately
Pn553 (2553h)	100						Analog Monitor 2 Magnification	Immediately
Pn55A (255Ah)	1						Power Consumption Monitor Unit Time	Immediately
Pn560 (2560h)	400						Residual Vibration Detection Width	Immediately
Pn561 (2561h)	100						Overshoot Detection Level	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn562 (2562h)	80						Setting Gain Ratio	Immediately
Pn580 (2580h)	10						Zero Clamping Level	Immediately
Pn581 (2581h)	20						Zero Speed Level	Immediately
Pn582 (2582h)	10						Speed Coincidence Detection Signal Output Width	Immediately
Pn583 (2583h)	10						Brake Reference Output Speed Level	Immediately
Pn584 (2584h)	10000						Speed Limit Level at Servo ON	Immediately
Pn585 (2585h)	50						Program Jogging Movement Speed	Immediately
Pn586 (2586h)	0						Motor Running Cooling Ratio	Immediately
Pn587 (2587h)	0000h						Polarity Detection Execution Selection for Absolute Linear Encoder	Immediately
Pn589 (2589h)	1500						SigmaLINK II Node Detection Time	After restart
Pn590 (2590h)	1007h						P-OT (Forward Drive Prohibit Input) Signal Allocation	After restart
Pn591 (2591h)	1008h						N-OT (Reverse Drive Prohibit Input) Signal Allocation	After restart
Pn593 (2593h)	1010h						/Probe1 (Probe 1 Latch Input) Signal Allocation	After restart
Pn594 (2594h)	1011h						/Probe2 (Probe 2 Latch Input) Signal Allocation	After restart
Pn595 (2595h)	1012h						/Home (Home Switch Input) Signal Allocation	After restart
Pn597 (2597h)	0000h						FSTP (Forced Stop Input) Signal Allocation	After restart
Pn598 (2598h)	0000h						/P-CL (Forward External Torque Limit Input) Signal Allocation	After restart
Pn599 (2599h)	0000h						/N-CL (Reverse External Torque Limit Input) Signal Allocation	After restart
Pn5B0 (25B0h)	0000h						/COIN (Positioning Completion Output) Signal Allocation	After restart
Pn5B1 (25B1h)	0000h						/V-CMP (Speed Coincidence Detection Output) Signal Allocation	After restart
Pn5B2 (25B2h)	0000h						/TGON (Rotation Detection Output) Signal Allocation	After restart
Pn5B3 (25B3h)	0000h						/S-RDY (Servo Ready Output) Signal Allocation	After restart
Pn5B4 (25B4h)	0000h						/CLT (Torque Limit Detection Output) Signal Allocation	After restart
Pn5B5 (25B5h)	0000h						/VLT (Speed Limit Detection Output) Signal Allocation	After restart
Pn5B6 (25B6h)	1001h						/BK (Brake Output) Signal Allocation	After restart

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Parameter No.	Default Setting						Name	When Enabled
Pn5B7 (25B7h)	0000h						/WARN (Warning Output) Signal Allocation	After restart
Pn5B8 (25B8h)	0000h						/NEAR (Near Output) Signal Allocation	After restart
Pn5BC (25BCh)	0000h						/PM (Preventative Maintenance Output) Signal Allocation	After restart
Pn5C3 (25C3h)	0000h						Error Detection Setting	After restart
Pn5C4 (25C4h)	2000						Error Detection Sample Data Set 1 Warning Level 1	Immediately
Pn5C5 (25C5h)	1520						Error Detection Sample Data Set 1 Judgment Level 1	Immediately
Pn5C6 (25C6h)	2000						Error Detection Sample Data Set 1 Warning Level 2	Immediately
Pn5C7 (25C7h)	1520						Error Detection Sample Data Set 1 Judgment Level 2	Immediately
Pn5C8 (25C8h)	2000						Error Detection Sample Data Set 2 Warning Level 1	Immediately
Pn5C9 (25C9h)	1520						Error Detection Sample Data Set 2 Judgment Level 1	Immediately
Pn5CA (25CAh)	2000						Error Detection Sample Data Set 2 Warning Level 2	Immediately
Pn5CB (25CBh)	1520						Error Detection Sample Data Set 2 Judgment Level 2	Immediately
Pn5D7 (25D7h)	0000h						Output Signal Inversion for Triggers at Preset Positions	After restart
Pn600 (2600h)	0						Regenerative Resistor Capacity	Immediately
Pn601 (2601h)	0						Dynamic Brake Resistor Allowable Energy Consumption	After restart
Pn603 (2603h)	0						Regenerative Resistance	Immediately
Pn604 (2604h)	0						Dynamic Brake Resistance	After restart
Pn61A (261Ah)	0000h						Overheat Protection Selections	After restart
Pn61B (261Bh)	250						Overheat Alarm Level	Immediately
Pn61C (261Ch)	100						Overheat Warning Level	Immediately
Pn61D (261Dh)	0						Overheat Alarm Filter Time	Immediately
Pn621 (2621h)	–						Reserved (Do not change.)	–
Pn622 (2622h)	–						Reserved (Do not change.)	–
Pn623 (2623h)	–						Reserved (Do not change.)	–
Pn624 (2624h)	–						Reserved (Do not change.)	–

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Parameter No.	Default Setting						Name	When Enabled
Pn625 (2625h)	–						Reserved (Do not change.)	–
Pn626 (2626h)	–						Reserved (Do not change.)	–
Pn627 (2627h)	–						Reserved (Do not change.)	–
Pn628 (2628h)	–						Reserved (Do not change.)	–
Pn660 (2660h)	0000h						Triggers at Preset Positions Switch	After restart
Pn665 (2665h)	FC03h						Synchronized Stopping Function Selections	After restart
Pn666 (2666h)	10						Synchronized Stopping End Speed	Immediately
Pn667 (2667h)	400						Synchronized Stopping Function Response Level	Immediately
Pn668 (2668h)	100						Synchronized Stopping Function Moment of Inertia Ratio	Immediately
Pn669 (2669h)	100						Relative Position Deviation Overflow Warning Level	Immediately
Pn66A (266Ah)	5242880						Relative Position Deviation Overflow Alarm Level	Immediately
Pn66B (266Bh)	400						Relative Pos Deviation Compensation Speed Loop Gain	Immediately
Pn66C (266Ch)	2000						Relative Pos Dev Compensation Spd Loop Integral Time Const	Immediately
Pn66D (266Dh)	400						Relative Pos Deviation Compensation Position Loop Gain	Immediately
Pn66E (266Eh)	100						Relative Pos Deviation Compensation Filter Time Constant	Immediately

10.8 Parameter Recording Table: Σ-XW SERVOPACK

Use the following table to record the settings of the parameters.

Parameter No.	Default Setting						Name	When Enabled
Pn000 (A:2000h, B:2800h)	0000h						Basic Function Selections 0	After restart
Pn001 (A:2001h, B:2801h)	0000h						Application Function Selections 1	After restart
Pn002 (A:2002h, B:2802h)	0011h						Application Function Selections 2	After restart
Pn006 (2006h)	0002h						Application Function Selections 6	Immediately
Pn007 (2007h)	0000h						Application Function Selections 7	Immediately
Pn008 (A:2008h, B:2808h)	4000h						Application Function Selections 8	After restart
Pn009 (A:2009h, B:2809h)	0040h						Application Function Selections 9	After restart
Pn00A (A:200Ah, B:280Ah)	0001h						Application Function Selections A	After restart
Pn00B (A:200Bh, B:280Bh)	0000h						Application Function Selections B	After restart
Pn00C (A:200Ch, B:280Ch)	0040h						Application Function Selections C	After restart
Pn00D (A:200Dh, B:280Dh)	0000h						Application Function Selections D	After restart
Pn00E (A:200Eh, B:280Eh)	0000h						Application Function Selections E	After restart
Pn00F (200Fh)	0000h						Application Function Selections F	After restart
Pn021 (A:2021h, B:2821h)	0000h						Reserved (Do not change.)	–
Pn022 (A:2022h, B:2822h)	0000h						Application Function Selections 22	After restart
Pn02F (202Fh)	0000h						Application Function Selections 2F	After restart
Pn040 (2040h)	0000h						Reserved (Do not change.)	–
Pn050 (A:2050h, B:2850h)	00000000h						SigmaLINK II Response Data Selection 1	After restart
Pn052 (A:2052h, B:2852h)	00000000h						SigmaLINK II Response Data Selection 2	After restart

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Parameter No.	Default Setting						Name	When Enabled
Pn054 (A:2054h, B:2854h)	00000000h						SigmaLINK II Response Data Selection 3	After restart
Pn056 (A:2056h, B:2856h)	00000000h						SigmaLINK II Response Data Selection 4	After restart
Pn058 (A:2058h, B:2858h)	00000000h						SigmaLINK II Response Data Selection 5	After restart
Pn05A (A:205Ah, B:285Ah)	00000000h						SigmaLINK II Response Data Selection 6	After restart
Pn05C (A:205Ch, B:285Ch)	00000000h						SigmaLINK II Response Data Selection 7	After restart
Pn05E (A:205Eh, B:285Eh)	00000000h						SigmaLINK II Response Data Selection 8	After restart
Pn080 (A:2080h, B:2880h)	0000h						Application Function Selections 80	After restart
Pn090 (A:2090h, B:2890h)	00000000h						SigmaLINK II Command Data Selection 1	After restart
Pn092 (A:2092h, B:2892h)	00000000h						SigmaLINK II Command Data Selection 2	After restart
Pn094 (A:2094h, B:2894h)	00000000h						SigmaLINK II Command Data Selection 3	After restart
Pn096 (A:2096h, B:2896h)	00000000h						SigmaLINK II Command Data Selection 4	After restart
Pn0A1 (20A1h)	0000h						Gantry Application Function Selections 1	After restart
Pn0A2 (20A2h)	0011h						Gantry Application Function Selections 2	After restart
Pn0A3 (A:20A3h, B:28A3h)	0000h						Gantry Application Function Selections 3	Immediately
Pn0B1 (A:20B1h, B:28B1h)	0000h						SigmaLINK II Sequence Input Allocation 1	After restart
Pn0B2 (A:20B2h, B:28B2h)	0000h						SigmaLINK II Sequence Input Allocation 2	After restart
Pn0B5 (A:20B5h, B:28B5h)	0000h						SigmaLINK II Sequence Output Allocation 1	After restart
Pn0D4 (A:20D4h, B:28D4h)	0000h						Torque/Force Assistance Selections	After restart
Pn0D6 (20D6h)	0000h						Reserved (Do not change.)	–

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Parameter No.	Default Setting						Name	When Enabled
Pn0DA (A:20DAh, B:28DAh)	0000h						SigmaLINK II Semi-closed Encoder Selection	After restart
Pn0DB (A:20DBh, B:28DBh)	0000h						SigmaLINK II Fully-closed Encoder Selection	After restart
Pn0DC (20DCh)	0000h						SigmaLINK II Node Change Detection Condition Selection	After restart
Pn0DD (20DDh)	0130h						SigmaLINK II I/O Device Error Detection Selection	After restart
Pn100 (A:2100h, B:2900h)	400						Speed Loop Gain	Immediately
Pn101 (A:2101h, B:2901h)	2000						Speed Loop Integral Time Constant	Immediately
Pn102 (A:2102h, B:2902h)	400						Position Loop Gain	Immediately
Pn103 (A:2103h, B:2903h)	100						Moment of Inertia Ratio	Immediately
Pn104 (A:2104h, B:2904h)	400						Second Speed Loop Gain	Immediately
Pn105 (A:2105h, B:2905h)	2000						Second Speed Loop Integral Time Constant	Immediately
Pn106 (A:2106h, B:2906h)	400						Second Position Loop Gain	Immediately
Pn109 (A:2109h, B:2909h)	0						Feedforward	Immediately
Pn10A (A:210Ah, B:290Ah)	0						Feedforward Filter Time Constant	Immediately
Pn10B (A:210Bh, B:290Bh)	0000h						Gain Application Selections	–
Pn10C (A:210Ch, B:290Ch)	200						Mode Switching Level for Torque Reference	Immediately
Pn10D (A:210Dh, B:290Dh)	0						Mode Switching Level for Speed Reference	Immediately
Pn10E (A:210Eh, B:290Eh)	0						Mode Switching Level for Acceleration	Immediately
Pn10F (A:210Fh, B:290Fh)	0						Mode Switching Level for Position Deviation	Immediately
Pn11F (A:211Fh, B:291Fh)	0						Position Integral Time Constant	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn121 (A:2121h, B:2921h)	100						Friction Compensation Gain	Immediately
Pn122 (A:2122h, B:2922h)	100						Second Friction Compensation Gain	Immediately
Pn123 (A:2123h, B:2923h)	0						Friction Compensation Coefficient	Immediately
Pn124 (A:2124h, B:2924h)	0						Friction Compensation Frequency Correction	Immediately
Pn125 (A:2125h, B:2925h)	100						Friction Compensation Gain Correction	Immediately
Pn131 (A:2131h, B:2931h)	0						Gain Switching Time 1	Immediately
Pn132 (A:2132h, B:2932h)	0						Gain Switching Time 2	Immediately
Pn135 (A:2135h, B:2935h)	0						Gain Switching Waiting Time 1	Immediately
Pn136 (A:2136h, B:2936h)	0						Gain Switching Waiting Time 2	Immediately
Pn139 (A:2139h, B:2939h)	0000h						Automatic Gain Switching Selections 1	Immediately
Pn13D (A:213Dh, B:293Dh)	2000						Current Gain Level	Immediately
Pn140 (A:2140h, B:2940h)	0100h						Model Following Control-Related Selections	Immediately
Pn141 (A:2141h, B:2941h)	500						Model Following Control Gain	Immediately
Pn142 (A:2142h, B:2942h)	1000						Model Following Control Gain Correction	Immediately
Pn143 (A:2143h, B:2943h)	1000						Model Following Control Bias in the Forward Direction	Immediately
Pn144 (A:2144h, B:2944h)	1000						Model Following Control Bias in the Reverse Direction	Immediately
Pn145 (A:2145h, B:2945h)	500						Vibration Suppression 1 Frequency A	Immediately
Pn146 (A:2146h, B:2946h)	700						Vibration Suppression 1 Frequency B	Immediately
Pn147 (A:2147h, B:2947h)	1000						Model Following Control Speed Feedforward Compensation	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn148 (A:2148h, B:2948h)	500						Second Model Following Control Gain	Immediately
Pn149 (A:2149h, B:2949h)	1000						Second Model Following Control Gain Correction	Immediately
Pn14A (A:214Ah, B:294Ah)	800						Vibration Suppression 2 Frequency	Immediately
Pn14B (A:214Bh, B:294Bh)	100						Vibration Suppression 2 Correction	Immediately
Pn14F (A:214Fh, B:294Fh)	0030h						Control-Related Selections	After restart
Pn160 (A:2160h, B:2960h)	0010h						Anti-Resonance Control-Related Selections	Immediately
Pn161 (A:2161h, B:2961h)	1000						Anti-Resonance Frequency	Immediately
Pn162 (A:2162h, B:2962h)	100						Anti-Resonance Gain Correction	Immediately
Pn163 (A:2163h, B:2963h)	0						Anti-Resonance Damping Gain	Immediately
Pn164 (A:2164h, B:2964h)	0						Anti-Resonance Filter Time Constant 1 Correction	Immediately
Pn165 (A:2165h, B:2965h)	0						Anti-Resonance Filter Time Constant 2 Correction	Immediately
Pn166 (A:2166h, B:2966h)	0						Anti-Resonance Damping Gain 2	Immediately
Pn16E (216Eh)	400						Relative Position Deviation Compensation Gain	Immediately
Pn16F (216Fh)	100						Relative Pos Dev Compensation Moment of Inertia Ratio	Immediately
Pn170 (A:2170h, B:2970h)	1401h						Tuning-less Function-Related Selections	–
Pn173 (A:2173h, B:2973h)	0000h						Load Fluctuation Compensation Control-Related Selections	Immediately
Pn174 (A:2174h, B:2974h)	400						Load Fluctuation Compensation Control Response Level	Immediately
Pn181 (A:2181h, B:2981h)	0						Mode Switching Level for Speed Reference	Immediately
Pn182 (A:2182h, B:2982h)	0						Mode Switching Level for Acceleration	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn183 (A:2183h, B:2983h)	0010h						Low-Frequency Control Function Switch	–
Pn184 (A:2184h, B:2984h)	10.0						Low-Frequency Control Frequency	Immediately
Pn185 (A:2185h, B:2985h)	0.0						Low-Frequency Control Gain	Immediately
Pn186 (A:2186h, B:2986h)	0						Low-Frequency Control Filter Correction	Immediately
Pn205 (A:2205h, B:2A05h)	65535						Multiturn Limit	After restart
Pn207 (A:2207h, B:2A07h)	0010h						Position Control Function Selections	After restart
Pn20A (A:220Ah, B:2A0Ah)	32768						Number of External Encoder Scale Pitches	After restart
Pn20E (A:220Eh, B:2A0Eh)	64						Electronic Gear Ratio (Numerator)	After restart
Pn210 (A:2210h, B:2A10h)	1						Electronic Gear Ratio (Denominator)	After restart
Pn21D (A:221Dh, B:2A1Dh)	0080h						Encoder Resolution Setting	After restart
Pn22A (A:222Ah, B:2A2Ah)	0000h						Fully-closed Control Selections	After restart
Pn230 (A:2230h, B:2A30h)	0000h						Position Control Expansion Function Selections	After restart
Pn231 (A:2231h, B:2A31h)	0						Backlash Compensation Value	Immediately
Pn233 (A:2233h, B:2A33h)	0						Backlash Compensation Time Constant	Immediately
Pn282 (A:2282h, B:2A82h)	0						Linear Encoder Scale Pitch	After restart
Pn2E3 (A:22E3h, B:2AE3h)	0000h						Position Correction Table Function Selections	After restart
Pn2E4 (A:22E4h, B:2AE4h)	0						Mode Separation Coordinates Origin Offset	Immediately
Pn304 (A:2304h, B:2B04h)	500						Jogging Speed	Immediately
Pn305 (A:2305h, B:2B05h)	0						Soft Start Acceleration Time	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn306 (A:2306h, B:2B06h)	0						Soft Start Deceleration Time	Immediately
Pn307 (A:2307h, B:2B07h)	0						Speed Reference Filter Time Constant	Immediately
Pn308 (A:2308h, B:2B08h)	0						Speed Feedback Filter Time Constant	Immediately
Pn30A (A:230Ah, B:2B0Ah)	0						Deceleration Time for Servo OFF and Forced Stops	Immediately
Pn30C (A:230Ch, B:2B0Ch)	0						Speed Feedforward Average Movement Time	Immediately
Pn310 (A:2310h, B:2B10h)	0000h						Vibration Detection Selections	Immediately
Pn311 (A:2311h, B:2B11h)	100						Vibration Detection Sensitivity	Immediately
Pn312 (A:2312h, B:2B12h)	50						Vibration Detection Level	Immediately
Pn316 (A:2316h, B:2B16h)	10000						Maximum Motor Speed	After restart
Pn324 (A:2324h, B:2B24h)	300						Moment of Inertia Calculation Starting Level	Immediately
Pn383 (A:2383h, B:2B83h)	50						Jogging Speed	Immediately
Pn384 (A:2384h, B:2B84h)	10						Vibration Detection Level	Immediately
Pn385 (A:2385h, B:2B85h)	50						Maximum Motor Speed	After restart
Pn401 (A:2401h, B:2C01h)	100						First Stage First Torque Reference Filter Time Constant	Immediately
Pn402 (A:2402h, B:2C02h)	800						Forward Torque Limit	Immediately
Pn403 (A:2403h, B:2C03h)	800						Reverse Torque Limit	Immediately
Pn404 (A:2404h, B:2C04h)	100						Forward External Torque Limit	Immediately
Pn405 (A:2405h, B:2C05h)	100						Reverse External Torque Limit	Immediately
Pn406 (A:2406h, B:2C06h)	800						Emergency Stop Torque	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn407 (A:2407h, B:2C07h)	10000						Speed Limit during Torque Control	Immediately
Pn408 (A:2408h, B:2C08h)	0000h						Torque-Related Function Selections	–
Pn409 (A:2409h, B:2C09h)	5000						First Stage Notch Filter Frequency	Immediately
Pn40A (A:240Ah, B:2C0Ah)	70						First Stage Notch Filter Q Value	Immediately
Pn40B (A:240Bh, B:2C0Bh)	0						First Stage Notch Filter Depth	Immediately
Pn40C (A:240Ch, B:2C0Ch)	5000						Second Stage Notch Filter Frequency	Immediately
Pn40D (A:240Dh, B:2C0Dh)	70						Second Stage Notch Filter Q Value	Immediately
Pn40E (A:240Eh, B:2C0Eh)	0						Second Stage Notch Filter Depth	Immediately
Pn40F (A:240Fh, B:2C0Fh)	5000						Second Stage Second Torque Reference Filter Frequency	Immediately
Pn410 (A:2410h, B:2C10h)	50						Second Stage Second Torque Reference Filter Q Value	Immediately
Pn412 (A:2412h, B:2C12h)	100						First Stage Second Torque Reference Filter Time Constant	Immediately
Pn416 (A:2416h, B:2C16h)	0000h						Torque-Related Function Selections 2	Immediately
Pn417 (A:2417h, B:2C17h)	5000						Third Stage Notch Filter Frequency	Immediately
Pn418 (A:2418h, B:2C18h)	70						Third Stage Notch Filter Q Value	Immediately
Pn419 (A:2419h, B:2C19h)	0						Third Stage Notch Filter Depth	Immediately
Pn41A (A:241Ah, B:2C1Ah)	5000						Fourth Stage Notch Filter Frequency	Immediately
Pn41B (A:241Bh, B:2C1Bh)	70						Fourth Stage Notch Filter Q Value	Immediately
Pn41C (A:241Ch, B:2C1Ch)	0						Fourth Stage Notch Filter Depth	Immediately
Pn41D (A:241Dh, B:2C1Dh)	5000						Fifth Stage Notch Filter Frequency	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn41E (A:241Eh, B:2C1Eh)	70						Fifth Stage Notch Filter Q Value	Immediately
Pn41F (A:241Fh, B:2C1Fh)	0						Fifth Stage Notch Filter Depth	Immediately
Pn423 (A:2423h, B:2C23h)	0002h						Speed Ripple Compensation Selections	–
Pn424 (A:2424h, B:2C24h)	50						Torque Limit at Main Circuit Voltage Drop	Immediately
Pn425 (A:2425h, B:2C25h)	100						Release Time for Torque Limit at Main Circuit Voltage Drop	Immediately
Pn426 (A:2426h, B:2C26h)	0						Torque Feedforward Average Movement Time	Immediately
Pn427 (A:2427h, B:2C27h)	0						Speed Ripple Compensation Enable Speed	Immediately
Pn428 (A:2428h, B:2C28h)	0001h						Output Torque Compensation Selections	After restart
Pn429 (A:2429h, B:2C29h)	100						Torque/Force Assistance Multiplier	Immediately
Pn456 (A:2456h, B:2C56h)	15						Sweep Torque Reference Amplitude	Immediately
Pn460 (A:2460h, B:2C60h)	0101h						Notch Filter Adjustment Selections 1	Immediately
Pn475 (A:2475h, B:2C75h)	0000h						Gravity Compensation-Related Selections	After restart
Pn476 (A:2476h, B:2C76h)	0						Gravity Compensation Torque	Immediately
Pn480 (A:2480h, B:2C80h)	10000						Speed Limit during Force Control	Immediately
Pn481 (A:2481h, B:2C81h)	400						Polarity Detection Speed Loop Gain	Immediately
Pn482 (A:2482h, B:2C82h)	3000						Polarity Detection Speed Loop Integral Time	Immediately
Pn483 (A:2483h, B:2C83h)	30						Forward Force Limit	Immediately
Pn484 (A:2484h, B:2C84h)	30						Reverse Force Limit	Immediately
Pn485 (A:2485h, B:2C85h)	20						Polarity Detection Reference Speed	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn486 (A:2486h, B:2C86h)	25						Polarity Detection Reference Acceleration/Deceleration Time	Immediately
Pn487 (A:2487h, B:2C87h)	0						Polarity Detection Constant Speed Time	Immediately
Pn488 (A:2488h, B:2C88h)	100						Polarity Detection Reference Waiting Time	Immediately
Pn48E (A:248Eh, B:2C8Eh)	10						Polarity Detection Range	Immediately
Pn490 (A:2490h, B:2C90h)	100						Polarity Detection Load Level	Immediately
Pn495 (A:2495h, B:2C95h)	100						Polarity Detection Confirmation Force Reference	Immediately
Pn498 (A:2498h, B:2C98h)	10						Polarity Detection Allowable Error Range	Immediately
Pn49F (A:249Fh, B:2C9Fh)	0						Speed Ripple Compensation Enable Speed (Linear)	Immediately
Pn501 (A:2501h, B:2D01h)	10						Zero Clamping Level	Immediately
Pn502 (A:2502h, B:2D02h)	20						Rotation Detection Level	Immediately
Pn503 (A:2503h, B:2D03h)	10						Speed Coincidence Detection Signal Output Width	Immediately
Pn506 (A:2506h, B:2D06h)	0						Brake Reference-Servo OFF Delay Time	Immediately
Pn507 (A:2507h, B:2D07h)	100						Brake Reference Output Speed Level	Immediately
Pn508 (A:2508h, B:2D08h)	50						Servo OFF-Brake Command Waiting Time	Immediately
Pn509 (2509h)	20						Momentary Power Interruption Hold Time	Immediately
Pn50A (A:250Ah, B:2D0Ah)	0881h						Input Signal Selections 1	After restart
Pn50B (A:250Bh, B:2D0Bh)	8881h						Input Signal Selections 2	After restart
Pn50E (A:250Eh, B:2D0Eh)	0000h						Output Signal Selections 1	After restart
Pn50F (A:250Fh, B:2D0Fh)	0100h						Output Signal Selections 2	After restart

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Parameter No.	Default Setting						Name	When Enabled
Pn510 (A:2510h, B:2D10h)	0000h						Output Signal Selections 3	After restart
Pn511 (A:2511h, B:2D11h)	5432h						Input Signal Selections 5	After restart
Pn512 (A:2512h, B:2D12h)	0000h						Output Signal Inverse Settings	After restart
Pn514 (A:2514h, B:2D14h)	0000h						Output Signal Selections 4	After restart
Pn516 (A:2516h, B:2D16h)	8888h						Input Signal Selections 7	After restart
Pn51B (A:251Bh, B:2D1Bh)	1000						Motor-Load Position Deviation Overflow Detection Level	Immediately
Pn51E (A:251Eh, B:2D1Eh)	100						Position Deviation Overflow Warning Level	Immediately
Pn520 (A:2520h, B:2D20h)	6116694						Position Deviation Overflow Alarm Level	Immediately
Pn522 (A:2522h, B:2D22h)	7						In-position Range	Immediately
Pn524 (A:2524h, B:2D24h)	10737418-24						Near Signal Width	Immediately
Pn526 (A:2526h, B:2D26h)	6116694						Position Deviation Overflow Alarm Level at Servo ON	Immediately
Pn528 (A:2528h, B:2D28h)	100						Position Deviation Overflow Warning Level at Servo ON	Immediately
Pn529 (A:2529h, B:2D29h)	10000						Speed Limit Level at Servo ON	Immediately
Pn52A (A:252Ah, B:2D2Ah)	20						Multiplier per Fully-closed Rotation	Immediately
Pn52B (A:252Bh, B:2D2Bh)	20						Overload Warning Level	Immediately
Pn52C (A:252Ch, B:2D2Ch)	100						Base Current Derating at Motor Overload Detection	After restart
Pn530 (A:2530h, B:2D30h)	0000h						Program Jogging-Related Selections	Immediately
Pn531 (A:2531h, B:2D31h)	32768						Program Jogging Travel Distance	Immediately
Pn533 (A:2533h, B:2D33h)	500						Program Jogging Movement Speed	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn534 (A:2534h, B:2D34h)	100						Program Jogging Acceleration/Deceleration Time	Immediately
Pn535 (A:2535h, B:2D35h)	100						Program Jogging Waiting Time	Immediately
Pn536 (A:2536h, B:2D36h)	1						Program Jogging Number of Movements	Immediately
Pn540 (A:2540h, B:2D40h)	3000						Maximum Search Gain	Immediately
Pn550 (2550h)	0						Analog Monitor 1 Offset Voltage	Immediately
Pn551 (2551h)	0						Analog Monitor 2 Offset Voltage	Immediately
Pn552 (2552h)	100						Analog Monitor 1 Magnification	Immediately
Pn553 (2553h)	100						Analog Monitor 2 Magnification	Immediately
Pn55A (255Ah)	1						Power Consumption Monitor Unit Time	Immediately
Pn560 (A:2560h, B:2D60h)	400						Residual Vibration Detection Width	Immediately
Pn561 (A:2561h, B:2D61h)	100						Overshoot Detection Level	Immediately
Pn562 (A:2562h, B:2D62h)	80						Setting Gain Ratio	Immediately
Pn580 (A:2580h, B:2D80h)	10						Zero Clamping Level	Immediately
Pn581 (A:2581h, B:2D81h)	20						Zero Speed Level	Immediately
Pn582 (A:2582h, B:2D82h)	10						Speed Coincidence Detection Signal Output Width	Immediately
Pn583 (A:2583h, B:2D83h)	10						Brake Reference Output Speed Level	Immediately
Pn584 (A:2584h, B:2D84h)	10000						Speed Limit Level at Servo ON	Immediately
Pn585 (A:2585h, B:2D85h)	50						Program Jogging Movement Speed	Immediately
Pn586 (A:2586h, B:2D86h)	0						Motor Running Cooling Ratio	Immediately
Pn587 (A:2587h, B:2D87h)	0000h						Polarity Detection Execution Selection for Absolute Linear Encoder	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn589 (2589h)	1500						SigmaLINK II Node Detection Time	After restart
Pn590 (A:2590h, B:2D90h)	Axis A: 1003h, Axis B: 1009h						P-OT (Forward Drive Prohibit Input) Signal Allocation	After restart
Pn591 (A:2591h, B:2D91h)	Axis A: 1004h, Axis B: 1010h						N-OT (Reverse Drive Prohibit Input) Signal Allocation	After restart
Pn593 (A:2593h, B:2D93h)	Axis A: 1006h, Axis B: 1012h						/Probe1 (Probe 1 Latch Input) Signal Allocation	After restart
Pn594 (A:2594h, B:2D94h)	Axis A: 1007h, Axis B: 1013h						/Probe2 (Probe 2 Latch Input) Signal Allocation	After restart
Pn595 (A:2595h, B:2D95h)	Axis A: 1008h, Axis B: 1014h						/Home (Home Switch Input) Signal Allocation	After restart
Pn597 (A:2597h, B:2D97h)	0000h						FSTP (Forced Stop Input) Signal Allocation	After restart
Pn598 (A:2598h, B:2D98h)	0000h						/P-CL (Forward External Torque Limit Input) Signal Allocation	After restart
Pn599 (A:2599h, B:2D99h)	0000h						/N-CL (Reverse External Torque Limit Input) Signal Allocation	After restart
Pn5B0 (A:25B0h, B:2DB0h)	0000h						/COIN (Positioning Completion Output) Signal Allocation	After restart
Pn5B1 (A:25B1h, B:2DB1h)	0000h						/V-CMP (Speed Coincidence Detection Output) Signal Allocation	After restart
Pn5B2 (A:25B2h, B:2DB2h)	0000h						/TGON (Rotation Detection Output) Signal Allocation	After restart
Pn5B3 (A:25B3h, B:2DB3h)	0000h						/S-RDY (Servo Ready Output) Signal Allocation	After restart
Pn5B4 (A:25B4h, B:2DB4h)	0000h						/CLT (Torque Limit Detection Output) Signal Allocation	After restart
Pn5B5 (A:25B5h, B:2DB5h)	0000h						/VLT (Speed Limit Detection Output) Signal Allocation	After restart
Pn5B6 (A:25B6h, B:2DB6h)	Axis A: 1023h, Axis B: 1025h						/BK (Brake Output) Signal Allocation	After restart
Pn5B7 (A:25B7h, B:2DB7h)	0000h						/WARN (Warning Output) Signal Allocation	After restart

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Parameter No.	Default Setting						Name	When Enabled
Pn5B8 (A:25B8h, B:2DB8h)	0000h						/NEAR (Near Output) Signal Allocation	After restart
Pn5BC (A:25BCh, B:2DBCh)	0000h						/PM (Preventative Maintenance Output) Signal Allocation	After restart
Pn5C3 (A:25C3h, B:2DC3h)	0000h						Error Detection Setting	After restart
Pn5C4 (A:25C4h, B:2DC4h)	2000						Error Detection Sample Data Set 1 Warning Level 1	Immediately
Pn5C5 (A:25C5h, B:2DC5h)	1520						Error Detection Sample Data Set 1 Judgment Level 1	Immediately
Pn5C6 (A:25C6h, B:2DC6h)	2000						Error Detection Sample Data Set 1 Warning Level 2	Immediately
Pn5C7 (A:25C7h, B:2DC7h)	1520						Error Detection Sample Data Set 1 Judgment Level 2	Immediately
Pn5C8 (A:25C8h, B:2DC8h)	2000						Error Detection Sample Data Set 2 Warning Level 1	Immediately
Pn5C9 (A:25C9h, B:2DC9h)	1520						Error Detection Sample Data Set 2 Judgment Level 1	Immediately
Pn5CA (A:25CAh, B:2DCAh)	2000						Error Detection Sample Data Set 2 Warning Level 2	Immediately
Pn5CB (A:25CBh, B:2DCBh)	1520						Error Detection Sample Data Set 2 Judgment Level 2	Immediately
Pn5D7 (25D7h)	0000h						Output Signal Inversion for Triggers at Preset Positions	After restart
Pn600 (2600h)	0						Regenerative Resistor Capacity	Immediately
Pn601 (A:2601h, B:2E01h)	0						Dynamic Brake Resistor Allowable Energy Consumption	After restart
Pn603 (2603h)	0						Regenerative Resistance	Immediately
Pn604 (A:2604h, B:2E04h)	0						Dynamic Brake Resistance	After restart
Pn61A (A:261Ah, B:2E1Ah)	0000h						Overheat Protection Selections	After restart
Pn61B (A:261Bh, B:2E1Bh)	250						Overheat Alarm Level	Immediately
Pn61C (A:261Ch, B:2E1Ch)	100						Overheat Warning Level	Immediately

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Parameter No.	Default Setting						Name	When Enabled
Pn61D (A:261Dh, B:2E1Dh)	0						Overheat Alarm Filter Time	Immediately
Pn660 (2660h)	0000h						Triggers at Preset Positions Switch	After restart
Pn665 (2665h)	FC03h						Synchronized Stopping Function Selections	–
Pn666 (2666h)	10						Synchronized Stopping End Speed	Immediately
Pn667 (2667h)	400						Synchronized Stopping Function Response Level	Immediately
Pn668 (2668h)	100						Synchronized Stopping Function Moment of Inertia Ratio	Immediately
Pn669 (A:2669h, B:2E69h)	100						Relative Position Deviation Overflow Warning Level	Immediately
Pn66A (A:266Ah, B:2E6Ah)	5242880						Relative Position Deviation Overflow Alarm Level	Immediately
Pn66B (266Bh)	400						Relative Pos Deviation Compensa-tion Speed Loop Gain	Immediately
Pn66C (266Ch)	2000						Relative Pos Dev Compensation Spd Loop Integral Time Const	Immediately
Pn66D (266Dh)	400						Relative Pos Deviation Compensa-tion Position Loop Gain	Immediately
Pn66E (266Eh)	100						Relative Pos Deviation Compensa-tion Filter Time Constant	Immediately

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Revision History

The date of publication, revision code, revision number, and web revision number are given at the bottom right of the back cover. Refer to the following example.

Revision number

Revision code — Web revision number

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Date of Publication	Rev. Code	Rev. No.	Web Rev. No.	Section	Revised Contents
September 2024	D	<3>	0	5.5.3	Addition: Timing of relative position deviation overflow detection
				5.13	Addition: Procedures for starting gantry control
				6.5	Addition: Relative position deviation overflow detection
				6.9	Addition: Operating Procedure for Host Controller
				Chapter 7	Addition: Speed synchronization
				All chapters	Partly revised.
October 2023	C	<2>	0	i.7.3	Revision: Safety Standards
				1.5	Addition: EtherCAT Slave Information
				4.1.1	Addition: Ejector Tools
				5.7.1	Addition: Mode separation control terminology and examples
				5.8.7, 5.9.7	Addition: Twisting suppression adjustment procedure
				All chapters	Addition: Information on fully-closed loop control
					Partly revised.
				Back cover	Revision: Address
December 2022	B	<1>	0	–	• Addition: Information on Σ-XS • Addition: Information on position correction table
October 2022	A	<0>	0	–	First edition

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Σ-XS/Σ-XW SERVOPACK with EtherCAT Communications References FT Specification for Gantry Applications

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In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the “Foreign Exchange and Foreign Trade Act”. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.

Specifications are subject to change without notice for ongoing product modifications and improvements.

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