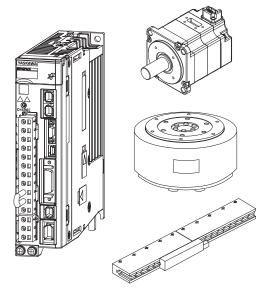
## YASKAWA

 $\Sigma$ -7-Series AC Servo Drive

# $\Sigma$ -7S SERVOPACK with FT/EX Specification for Tracking Application **Product Manual**

Model: SGD7S-000A000000F19, -000A200000F19





Basic Information on **SERVOPACKs** 

SERVOPACK Ratings and Specifications

Less-Deviation Control

Maintenance

Parameter Lists

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## **About this Manual**

This manual describes the tracking application option for  $\Sigma$ -7-Series AC Servo Drive  $\Sigma$ -7S SERVO-PACKs.

Read and understand this manual to ensure correct usage of the  $\Sigma$ -7-Series AC Servo Drives.

Keep this manual in a safe place so that it can be referred to whenever necessary.

## **Outline of Manual**

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

When you use the SERVOPACK, read this manual and the relevant product manual given in the following table.

			$\Sigma$ -7-Series AC Servo Drive $\Sigma$ -73	S SERVOPACK Product Manual
	Item		SERVOPACKs with Analog Voltage/Pulse Train References (Manual No.: SIEP S800001 26)	SERVOPACKs with MECHATROLINK-III Communications References (Manual No.: SIEP S800001 28)
	The $\Sigma$ -7 Series	-	1	.1
	Product Introduction	1.1	-	_
Basic	Interpreting the Name- plates	ı	1	.2
Informa-	Part Names	-	1	.3
tion on	Model Designations	-	1	.4
SERVO- PACKs	Combinations of SERVOPACKs and Servomotors	-	1	.5
	Functions	1.4	-	_
	SigmaWin+	1.5	-	_
	Ratings	2.1	-	_
	SERVOPACK Over- load Protection Char- acteristics	2.2		-
Selecting	Specifications	2.3	-	-
a SERVO-	Block Diagrams	_	2	.2
PACK	External Dimensions	_	2	.3
	Examples of Standard Connections between SERVOPACKs and Peripheral Devices	-	2	.4
SERVOPA	CK Installation	-	Chap	oter 3
Wiring and Connecting SERVO- PACKs		-	Chap	oter 4
Basic Functions That Require Setting before Operation		-	Chap	oter 5
Application	Application Functions		Chap	oter 6
Trial Opera	Trial Operation and Actual Operation		Chap	oter 7
Tuning	_	1	Chap	oter 8
-	·			<u> </u>

Continued from previous page.

			$\Sigma$ -7-Series AC Servo Drive $\Sigma$ -73	S SERVOPACK Product Manual
	Item	This Manual	SERVOPACKs with Analog Voltage/Pulse Train References (Manual No.: SIEP S800001 26)	SERVOPACKs with MECHATROLINK-III Communications References (Manual No.: SIEP S800001 28)
	Monitoring Product Information	_	9	.1
	Monitoring SERVO- PACK Status	_	9	.2
Monitoring	Monitoring Machine Operation Status and Signal Waveforms	3.6	-	-
	Monitoring Product Life	_	9	.4
Fully-Close	d Loop Control	_	Chap	ter 10
Safety Fund	ctions	_	Chap	ter 11
	Introduction	3.1	-	_
	Restrictions	3.2	-	
Less- Deviation	Adjusting Less-Deviation Control 2	3.3	-	-
Control	Adjusting Less-Deviation Control 1	3.4	-	-
	Reference Compensation	3.5	-	-
	Inspections and Part Replacement	_	12	2.1
	Alarm Displays	4.1.1, 4.2.1	-	-
	List of Alarms	4.1.2, 4.2.2	-	-
	Troubleshooting Alarms	4.1.3, 4.2.3	-	-
Mainte-	Warning Displays	4.1.4, 4.2.4	-	-
nance	List of Warnings	4.1.5, 4.2.5	-	_
	Troubleshooting Warnings	4.1.6, 4.2.6	-	-
	Troubleshooting Based on the Operation and Conditions of the Servomotor	4.1.7, 4.2.7	-	-
Panel Displ Procedures	ays and Panel Operator	_	Chapter 13	-
	Interpreting the Parameter Lists	5.1.1, 5.2.1	-	
Parame-	List of Parameters and List of Servo Parame- ters	5.1.2, 5.2.2	-	-
ter Lists	List of MECHATROLINK-III Common Parameters	5.2.3	-	-
	Parameter Recording Table	5.1.3, 5.2.4	-	_
Appendices	3	-	Chapter 15	Chapter 14

## **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.

System Components Servo Drives Machine Controllers (1) Catalogs Machine (3) Controller MP3300  $\Sigma$ -7-Series and Servo Drive Catalog Catalog General Catalog Machine Controllers (5) SERVOPACKs with Built-in Controllers:  $\Sigma$ -7C Built-in Option Function Module User's 7 8 Manuals 4 Manuals Enclosed Σ-7-Series Built-in  $\Sigma$ -7-Series **Documents** Σ-7C Function Σ-7C SERVOPACK SERVOPACK Manuals SERVOPACKs:  $\Sigma$ -7S and  $\Sigma$ -7W Troubleshooting Product Manual Manual Enclosed  $\Sigma$ -7-Series Σ-7-Series Σ-7-Series Option Documents  $\Sigma$ -7S/ $\Sigma$ -7W Σ-7S/Σ-7W Σ-7S/Σ-7W Module SERVOPACK SERVOPACK SERVOPACK Hardware Option FT/EX User's Product Product Manuals Manual Manuals Manuals Product Manuals (such as this manual) Servomotors Enclosed Σ-7-Series Documents Servomotor Product Manuals Other Documents Σ-7-Series Programming  $\Sigma$ -7-Series Distributed Σ-7-Series MECHATROLINK Operation I/O Module Manuals Peripheral Interface Communications Device User's Command Operating Manual Selection Manuals Manuals Manual

Classification	Document Name	Document No.	Description
① Machine Controller and Servo Drive General Catalog	Machine Controller and AC Servo Drive Solutions Catalog	KAEP S800001 22	Describes the features and application examples for combinations of MP3000-Series Machine Controllers and $\Sigma$ -7-Series AC Servo Drives.
② MP3300 Catalog	Machine Controller MP3300	KAEP C880725 03	Provides detailed information on MP3300 Machine Controllers, including features and specifications.
③ Σ-7-Series Catalog	AC Servo Drives Σ-7 Series	KAEP S800001 23	Provides detailed information on $\Sigma$ -7-Series AC Servo Drives, including features and specifications.
④ Built-in Function Manuals	Σ-7-Series AC Servo Drive Σ-7C SERVOPACK Motion Control User's Manual	SIEP S800002 03	Provides detailed information on the specifications, system configuration, and application methods of the Motion Control Function Modules (SVD, SVC4, and SVR4) for Σ-7-Series Σ-7C SERVOPACKs.
	Machine Controller MP3000 Series Communications User's Manual	SIEP C880725 12	Provides detailed information on the specifications, system configuration, and communications connection methods for the Ethernet communications that are used with MP3000-Series Machine Controllers and $\Sigma$ -7-Series $\Sigma$ -7C SERVO-PACKs.
	Machine Controller MP2000 Series Communication Module User's Manual	SIEP C880700 04	
	Machine Controller MP2000 Series 262IF-01 FL-net Communication Module User's Manual	SIEP C880700 36	Provide detailed information on the specifications and communications methods for the Communications Modules that can be mounted to MP3000-Series Machine Controllers and Σ-7-Series Σ-7C
⑤ Option Module User's Manuals	Machine Controller MP2000 Series 263IF-01 EtherNet/IP Communication Module User's Manual	SIEP C880700 39	SERVOPACKs.
	Machine Controller MP2000 Series I/O Module User's Manual	SIEP C880700 34	
	Machine Controller MP2000 Series Analog Input/Analog Output Module Al-01/AO-01 User's Manual	SIEP C880700 26	Provide detailed information on the specifications and communications methods for the I/O Modules that can be mounted to MP3000-Series Machine Controllers and Σ-7-Series Σ-7C SERVOPACKs.
	Machine Controller MP2000 Series Counter Module CNTR-01 User's Manual	SIEP C880700 27	2 . 35.165 2 / 6 5E11V617(618).

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Classification	Document Name	Document No.	Description
Classification	Σ-7-Series AC Servo Drive	Document No.	·
	$\Sigma$ -7S, $\Sigma$ -7W, and $\Sigma$ -7C SER-VOPACK Safety Precautions	TOMP C710828 00	Provides detailed information for the safe usage of Σ-7-Series SERVOPACKs.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Safety Precautions Option Module	TOBP C720829 00	Provides detailed information for the safe usage of Option Modules.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide Command Option Module	TOBP C720829 01	Provides detailed procedures for installing the Command Option Module in a SERVOPACK.
© Enclosed Documents	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide Fully-closed Module	TOBP C720829 03	Provides detailed procedures for installing the Fully-closed Module in a SERVOPACK.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide Safety Module	TOBP C720829 06	Provides detailed procedures for installing the Safety Module in a SERVOPACK.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide INDEXER Module	TOBP C720829 02	Provides detailed procedures for installing the INDEXER Module in a SERVOPACK.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide DeviceNet Module	TOBP C720829 07	Provides detailed procedures for installing the DeviceNet Module in a SERVOPACK.
⑦ Σ-7-Series Σ-7C SERVOPACK Product Manual	Σ-7-Series AC Servo Drive Σ-7C SERVOPACK Product Manual	SIEP S800002 04	Provides detailed information on selecting $\Sigma$ -7-Series $\Sigma$ -7C SERVO-PACKs; installing, connecting, setting, testing in trial operation, and tuning Servo Drives; writing, monitoring, and maintaining programs; and other information.
® Σ-7-Series Σ-7C SERVOPACK Troubleshooting Manual	Σ-7-Series AC Servo Drive Σ-7C SERVOPACK Troubleshooting Manual	SIEP S800002 07	Provides detailed troubleshooting information for $\Sigma$ -7-Series $\Sigma$ -7C SERVOPACKs.

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Classification	Document Name	Document No.	Description
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with MECHATROLINK-4 Communications References Product Manual	SIEP S800002 31	·
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual	SIEP S800001 28	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with MECHATROLINK-II Communications References Product Manual	SIEP S800001 27	Provide detailed information on
<ul><li>⑤</li><li>Σ-7-Series</li><li>Σ-7S/Σ-7W</li><li>SERVOPACK</li><li>Product Manuals</li></ul>	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual	SIEP S800001 26	selecting $\Sigma$ -7-Series $\Sigma$ -7S and $\Sigma$ -7W SERVOPACKs; installing, connecting, setting, testing in trial operation, tuning, monitoring, and maintaining Servo Drives; and other information.
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK Command Option Attachable Type with INDEXER Module Product Manual	SIEP S800001 64	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK Command Option Attachable Type with DeviceNet Module Product Manual	SIEP S800001 70	
	Σ-7-Series AC Servo Drive Σ-7W SERVOPACK with MECHATROLINK-III Communications References Product Manual	SIEP S800001 29	
(0) $\Sigma$ -7-Series $\Sigma$ -7S/ $\Sigma$ -7W SERV/ORACK with	Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifica- tions Dynamic Brake Product Manual	SIEP S800001 73	Provide detailed information on Hardware Options for Σ-7-Series
SERVOPACK with Hardware Option Specifications Product Manuals	Σ-7-Series AC Servo Drive Σ-7W/Σ-7C SERVOPACK with Hardware Option Specifica- tions HWBB Function Product Manual	SIEP S800001 72	SERVOPACKs.

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Classification	Document Name	Document No.	Description
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Index- ing Application Product Manual	SIEP S800001 84	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Track- ing Application Product Manual	This manual (SIEP S800001 89)	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Application with Special Motor, SGM7D Motor Product Manual	SIEP S800001 91	
<sup>(1)</sup> Σ-7-Series Σ-7S/Σ-7W SERVOPACK FT/EX Product Manuals	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Press and Injection Molding Application Product Manual	SIEP S800001 94	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Transfer and Alignment Application Product Manual	SIEP S800001 95	Provide detailed information on the FT/EX Option for Σ-7-Series SERVOPACKs.
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Torque/Force Assistance for Conveyance Application Product Manual	SIEP S800002 09	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Cutting Application Feed Shaft Motor Product Manual	SIEP S800002 10	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Three-Point Latching for Conveyance Application Product Manual	SIEP S800002 17	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Semi-/Fully-Closed Loop Control Online Switching for Conveyance Application Product Manual	SIEP S800002 27	
	Σ-7-Series AC Servo Drive Σ-7W SERVOPACK with FT/EX Specification for Gantry Applications Product Manual	SIEP S800002 29	

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Classification	Document Name	Document No.	Description
Olassilloation	AC Servo Drives	Doddinent No.	Description
© Option Module User's Manual	Σ-V Series/Σ-V Series for Large-Capacity Models/ Σ-7 Series User's Manual Safety Module	SIEP C720829 06	Provides detailed information required for the design and maintenance of a Safety Module.
(8)	AC Servo Drive Rotary Servomotor Safety Precautions	TOBP C230260 00	Provides detailed information for the safe usage of Rotary Servomotors and Direct Drive Servomotors.
Enclosed Documents	AC Servomotor Linear Σ Series Safety Precautions	TOBP C230800 00	Provides detailed information for the safe usage of Linear Servomotors.
	Σ-7-Series AC Servo Drive Rotary Servomotor Product Manual	SIEP S800001 36	
<sup>®</sup> Σ-7-Series Servomotor Product Manuals	Σ-7-Series AC Servo Drive Linear Servomotor Product Manual	SIEP S800001 37	Provide detailed information on selecting, installing, and connecting the $\Sigma$ -7-Series Servomotors.
1 Todact Manuals	Σ-7-Series AC Servo Drive Direct Drive Servomotor Product Manual	SIEP S800001 38	
<sup>®</sup> Σ-7-Series Peripheral Device Selection Manual	Σ-7-Series AC Servo Drive Peripheral Device Selection Manual	SIEP S800001 32	<ul> <li>Provides the following information in detail for Σ-7-Series Servo Systems.</li> <li>Cables: Models, dimensions, wiring materials, connector models, and connection specifications</li> <li>Peripheral devices: Models, specifications, diagrams, and selection (calculation) methods</li> </ul>
	Σ-7-Series AC Servo Drive MECHATROLINK-II Communications Command Manual	SIEP S800001 30	Provides detailed information on the MECHATROLINK-II communications commands that are used for a $\Sigma$ -7-Series Servo System.
® Σ-7-Series MECHATROLINK Communications Command Manuals	Σ-7-Series AC Servo Drive MECHATROLINK-III Communications Standard Servo Profile Command Manual	SIEP S800001 31	Provides detailed information on the MECHATROLINK-III communications standard servo profile commands that are used for a $\Sigma$ -7-Series Servo System.
Sommand Mandalo	Σ-7-Series AC Servo Drive MECHATROLINK-4 Communications Standard Servo Profile Command Manual	SIEP S800002 32	Provides detailed information on the MECHATROLINK-4 communications standard servo profile commands that are used for a $\Sigma$ -7- Series Servo System.
$^{^{\tiny\textcircled{\tiny{1}}}}$	Machine Controller MP3000 Series Ladder Programming Manual	SIEP C880725 13	Provides detailed information on the ladder programming specifications and instructions for MP3000-Series Machine Controllers and $\Sigma$ -7-Series $\Sigma$ -7C SERVOPACKs.
Programming Manuals	Machine Controller MP3000 Series Motion Programming Manual	SIEP C880725 14	Provides detailed information on the motion programming and sequence programming specifications and instructions for MP3000-Series Machine Controllers and Σ-7-Series Σ-7C SERVOPACKs.

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Classification	Document Name	Document No.	Description
	System Integrated Engineering Tool MPE720 Version 7 User's Manual	SIEP C880761 03	Describes in detail how to operate MPE720 version 7.
<ul><li>Σ-7-Series</li><li>Operation Interface</li><li>Operating Manuals</li></ul>	Σ-7-Series AC Servo Drive Digital Operator Operating Manual	SIEP S800001 33	Describes the operating procedures for a Digital Operator for a Σ-7-Series Servo System.
Operating Manuals	AC Servo Drive Engineering Tool SigmaWin+ Operation Manual	SIET S800001 34	Provides detailed operating procedures for the SigmaWin+ Engineering Tool for a Σ-7-Series Servo System.
® Distributed	MECHATROLINK-III Compatible I/O Module User's Manual	SIEP C880781 04	Describes the functions, specifications, operating methods, and MECHATROLINK-III communications for the Remote I/O Modules for MP2000/MP3000-Series Machine Controllers.
I/O Module User's Manual  MECHATROLINK-4 Compatible I/O Module User's Manual		SIEP C880782 01	Describes the functions, specifications, operating methods, and MECHATROLINK-4 communications for the Remote I/O Modules for MP3000-Series Machine Controllers.

## **Using This Manual**

#### ◆ Technical Terms Used in This Manual

The following terms are used in this manual.

Term	Meaning		
Servomotor	A Σ-7-Series Rotary Servomotor, Direct Drive Servomotor, or Linear Servomotor.		
Rotary Servomotor	A generic term used for a $\Sigma$ -7-Series Rotary Servomotor (SGM7M, SGM7J, SGM7A, SGM7P, SGM7G, or SGMMV) or a Direct Drive Servomotor (SGM7E, SGM7F, SGMCV, or SGMCS). The descriptions will specify when Direct Drive Servomotors are excluded.		
Linear Servomotor	A Σ-7-Series Linear Servomotor (SGLG, SGLF, SGLT, or SGLC).		
SERVOPACK	A $\Sigma$ -7-Series $\Sigma$ -7S Servo Amplifier with Analog Voltage/Pulse Train References or MECHATROLINK-III 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 controlle and peripheral devices.		
servo ON	Supplying power to the motor.		
servo OFF	Not supplying power to the motor.		
base block (BB)	Shutting OFF the power supply to the motor by shutting OFF the base current to the power transistor in the SERVOPACK.		
servo lock	A state in which the motor is stopped and is in a position loop with a position reference of 0.		
Main Circuit Cable	One of the cables that connect to the main circuit terminals, including the Main Circuit Power Supply Cable, Control Power Supply Cable, and Servomotor Main Circuit Cable.		
SigmaWin+	The Engineering Tool for setting up and tuning Servo Drives or a computer in which the Engineering Tool is installed.		

#### ◆ 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 Servomotors	Linear Servomotors
torque	force
moment of inertia	mass
rotation	movement
forward rotation and reverse rotation	forward movement and reverse movement
CW and 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 <sup>-1</sup>	unit: mm/s
unit: N·m	unit: N

#### ◆ Notation Used in this Manual

#### ■ 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.

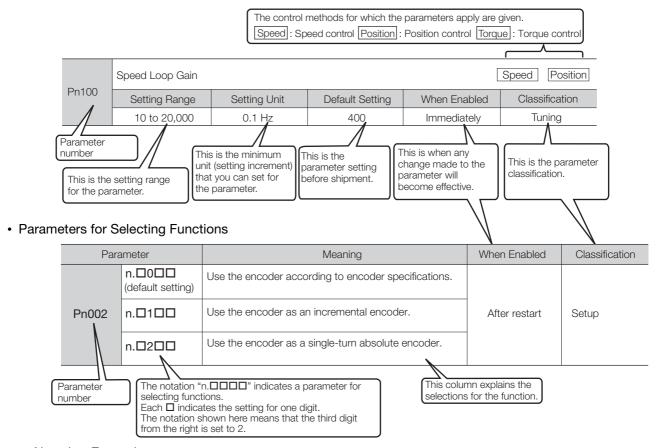
**Notation Example** 

BK is written as /BK.

#### Notation for Parameters

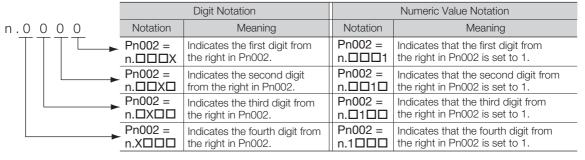
The notation depends on whether the parameter requires a numeric setting (parameter for numeric setting) or requires the selection of a function (parameter for selecting functions).

#### Parameters for Numeric Settings



#### Notation Example

Notation Examples for Pn002



#### ◆ Engineering Tools Used in This Manual

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

#### **♦** Trademarks

- MECHATROLINK 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 the respective company. "TM" and the ® mark do not appear with product or company names in this manual.

#### ◆ Visual Aids

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



Indicates precautions or restrictions that must be observed.

Also indicates alarm displays and other precautions that will not result in machine damage.



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

**Example** Indicates operating or setting examples.

Information Indicates supplemental information to deepen understanding or useful information.

## **Safety Precautions**

#### ◆ 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.

## **A** 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.

#### Safety Precautions That Must Always Be Observed

#### 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  $\Omega$  or less for a SERVOPACK with a 100-VAC or 200-VAC power supply, and 10  $\Omega$  or less for a SERVOPACK with a 400-VAC power supply). 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 burn injury.
- 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 hard wire base block 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 use the product in an environment that is subject to water, corrosive gases, or flammable gases, or near flammable materials.

There is a risk of electric shock or fire.

- 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 supply 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.

#### ■ Storage Precautions

## **CAUTION**

 Do not place an excessive load on the product during storage. (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 ambient 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.

#### ■ Transportation Precautions

## **A** 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 during transportation. (Follow all instructions on the packages.)

There is a risk of injury or damage.

- Do not hold onto the front cover or connectors when you move a SERVOPACK.
   There is a risk of the SERVOPACK falling.
- A 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.
- If disinfectants or insecticides must be used to treat packing materials such as wooden frames, plywood, or pallets, the packing materials must be treated before the product is packaged, and methods other than fumigation must be used.

Example: Heat treatment, where materials are kiln-dried to a core temperature of 56°C for 30 minutes or more.

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.

#### ■ Installation Precautions

## **M** 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.

- 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 ambient 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.
- A 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.

#### Wiring Precautions

#### DANGER

• Do not change any wiring while power is being supplied. There is a risk of electric shock or injury.

## **MARNING**

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

There is a risk of failure or fire.

• If you use a SERVOPACK that supports a Dynamic Brake 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 six minutes after turning OFF the power supply (with a SERVOPACK for a 100-VAC power supply input, wait for at least nine minutes) and then make sure that the CHARGE indicator is not lit before starting wiring or inspection work. Do not touch the power supply terminals while the CHARGE lamp is lit because high voltage may still remain in the SERVOPACK after turning OFF the power supply.

There is a risk of electric shock.

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

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

- Check the wiring to be sure it has been performed correctly.
   Connectors and pin layouts are sometimes different for different models. Always confirm the pin layouts in technical documents for your model before operation.
   There is a risk of failure or malfunction.
- Connect wires to power supply 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 Encoder Cables or Servomotor Main Circuit Cables.
- Observe the following precautions when wiring the SERVOPACK's main circuit terminals.
  - Turn ON the power supply 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 SER-VOPACK 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.

#### Operation Precautions

### **MARNING**

- 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 specifications and settings. The coasting distance will
  change with the moment of inertia of the load and the resistance of the External Dynamic Brake
  Resistor. 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.

## **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 supply 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.
- Always turn OFF the servo before you turn OFF the power supply. If you turn OFF the main circuit power supply or control power supply during operation before you turn OFF the servo, the Servomotor will stop as follows:
  - If you turn OFF the main circuit power supply during operation without turning OFF the servo, the Servomotor will stop abruptly with the dynamic brake.
  - If you turn OFF the control power supply 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. For details, refer to the following manual.
    - $\ \square$   $\Sigma$ -7-Series  $\Sigma$ -7S/ $\Sigma$ -7W SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP S800001 73)
- 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.

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

■ Maintenance and Inspection Precautions

#### **A** DANGER

Do not change any wiring while power is being supplied.
 There is a risk of electric shock or injury.

## **MARNING**

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 six minutes after turning OFF the power supply (with a SERVOPACK for a 100-VAC power supply input, wait for at least nine minutes) and then make sure that the CHARGE indicator is not lit before starting wiring or inspection work. Do not touch the power supply terminals while the CHARGE lamp is lit because high voltage may still remain in the SERVOPACK after turning OFF the power supply.
  - 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 normally, 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.

#### ■ 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.

## **MARNING**

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 supply 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 power supply terminals on the SERVOPACK so that the power supply 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, possibly resulting in fire.
- 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.

#### 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.



#### ■ General Precautions

- Figures provided in this document 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 document are sometimes shown without covers or protective guards. Always replace all covers and protective guards before you use the product.
- If you need a new copy of this document because it has been lost or damaged, contact your nearest Yaskawa representative or one of the offices listed on the back of this document.
- This document is subject to change without notice for product improvements, specifications changes, and improvements to the manual itself.
   We will update the document number of the document 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.

## Warranty

#### Details of Warranty

#### ■ 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.

#### ■ 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

#### ◆ 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.

#### 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.

#### 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.

## Compliance with UL Standards, EU Directives, UK Regulations, 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.

#### North American Safety Standards (UL)



Product	Model	North American Safety Standards (UL File No.)
SERVOPACK	SGD7S	UL 61800-5-1 (E147823) CSA C22.2 No.274

#### ◆ EU Directives



Product	Model	EU Directives	Harmonized Standards
		Machinery Directive 2006/42/EC	EN ISO 13849-1: 2015 EN IEC 62061 EN 61800-5-2
SERVOPACK	SGD7S	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

Note: 1. We declared the CE Marking based on the harmonized standards in the above table.

<sup>2.</sup> These products are for industrial use. In home environments, these products may cause electromagnetic interference and additional noise reduction measures may be necessary.

## ♦ UK Conformity Assessed (UKCA)



Product	Model	UK Regulations	Designated Standards
		Supply of Machinery (Safety) Regulations S.I. 2008/1597	EN ISO 13849-1: 2015 EN IEC 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)
SERVOPACK	SGD7S	Electrical Equipment (Safety) Regulations S.I. 2016/1101	EN 61800-5-1
		Restriction of the Use of Certain Hazardous Sub- stances in Electrical and Electronic Equipment Reg- ulations S.I. 2012/3032	EN IEC 63000

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

#### ◆ Safety Standards

Product	Model	Safety Standards	Standards
		Safety of Machinery	EN ISO 13849-1: 2015 EN 60204-1
SERVOPACK	SGD7S	Functional Safety	EN 61508 series EN IEC 62061 EN 61800-5-2
		Functional Safety EMC	EN 61326-3-1 EN 61000-6-7

#### ■ Safety Parameters

Item	Standards	Performa	nce Level
Safety Integrity Level	EN 61508	SIL3	
Safety integrity Level	EN IEC 62061	maximum SIL 3	
Mission Time	EN 61508	10 years	20 years
Probability of Dangerous Failure per Hour	EN 61508 EN IEC 62061	PFH = $4.04 \times 10^{-9}$ [1/h] (4.04% of SIL3)	PFH = 4.05×10 <sup>-9</sup> [1/h] (4.05% of SIL3)
Performance Level	EN ISO 13849-1	PLe (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 Function	EN 61800-5-2	STO	
Hardware Fault Tolerance	EN 61508	HFT = 1	
Subsystem	EN 61508	В	

## ⟨ Contents ⟩

C R U S W C a	About this Manual
1.1 F	Product Introduction
1.2 N	Model Designations
	.2.1 Interpreting SERVOPACK Model Numbers
1.3 C	Combinations of SERVOPACKs and Servomotors1-4
1.4 F	Functions
•	.4.1 SERVOPACK Functions
1.5 S	SigmaWin+1-9
1.6 0	ombining the SERVOPACKs with MP-Series Machine Controllers and the MPE720 Engineering Tool 1-10
2 SEI	RVOPACK Ratings and Specifications
2.1 F	Ratings
2.2	SERVOPACK Overload Protection Characteristics 2-6
2.3 S	Specifications2-7
_	<ul> <li>.3.1 SERVOPACKs with Analog Voltage/Pulse Train References</li></ul>

Less-Deviation Control

3.	_		
	1 Intro	duction 3-	2
3.	3.2.1 3.2.2 3.2.3 3.2.4	Control Mode Restrictions	-3 -3 -3
3.	3 Adjus	sting Less-Deviation Control 2	4
	3.3.1 3.3.2 3.3.3 3.3.4 3.3.5	Adjustment Procedure	-4 -6 -9
3.4	4 Adjus	sting Less-Deviation Control 1	2
	3.4.1 3.4.2 3.4.3 3.4.4 3.4.5	Adjustment Procedure3-1Adjustment Example3-1Gain Switching Combinations3-1Method to Switch the Gain3-1Settings for Low-speed Feeding3-1	3  4  5
	5 Pofor	rence Compensation	7
3.	5 Helei	choc compensation	
3.		toring Machine Operation Status and Signal Waveforms 3-1	
		toring Machine Operation Status and Signal Waveforms 3-18	
3.	6 Monit	nance OPACKs with Analog Voltage/Pulse Train References 4-2	8
3.	6 Monit	toring Machine Operation Status and Signal Waveforms 3-18	<b>8</b> -2 -2 -9 10 11
3.	Mainte  SERV  4.1.1  4.1.2  4.1.3  4.1.4  4.1.5  4.1.6  4.1.7	rance  /OPACKs with Analog Voltage/Pulse Train References 4- Alarm Displays	<b>2</b> -2 -9 10 11

## 5

## Parameter Lists

5.1	SER\	OPACKs with Analog Voltage/Pulse Train References 5-2
		Interpreting the Parameter Lists
5.2	SERV	OPACKs with MECHATROLINK-III Communications References 5-44
	5.2.1 5.2.2 5.2.3	Interpreting the Parameter Lists

## Index

## **Revision History**

# **Basic Information on SERVOPACKs**

This chapter provides information required to select SERVOPACKs, such as the SERVOPACK models.

1.1	Product Introduction1-2
1.2	Model Designations1-3
	<ul><li>1.2.1 Interpreting SERVOPACK Model Numbers 1-3</li><li>1.2.2 Interpreting Servomotor Model Numbers 1-3</li></ul>
1.3	Combinations of SERVOPACKs and Servomotors1-4
1.4	Functions
	1.4.1SERVOPACK Functions1-51.4.2Functional Restrictions1-8
1.5	SigmaWin+1-9

## 1.1

## **Product Introduction**

The FT19 SERVOPACKs use less-deviation control to perform tracking. There are the following two modes for less-deviation control. Set the mode in Pn195 =  $n.X\square\square\square$  (Less-Deviation Mode Selection).

Less-Deviation Control Mode	Remarks
Less-Deviation Control 1 (Pn195 = n.0□□□)	Use this mode for compatibility with the $\Sigma\textsc{-V-EX-Series}$ EX002 SERVO-PACKs.
Less-Deviation Control 2 (Pn195 = n.2□□□)	This mode reduces the maximum deviation and eliminates overshooting before reference distribution has been completed. Adjustments are possible for higher response than with Less-Deviation Control 1 Mode.

Refer to the following chapter for details on less-deviation control. 

\*\*Gapter 3 Less-Deviation Control\*\* (page 3-1)

## **Model Designations**

#### **Interpreting SERVOPACK Model Numbers** 1.2.1



Voltage	Code	Specification	Code	Specifica
	R70*1	0.05 kW	А	200 VAC
	R90*1	0.1 kW	F	100 VAC
	1R6*1	0.2 kW		
	2R8*1	0.4 kW	5th+6t	th digits Interface*
	3R8	0.5 kW	Code	Specificat
į	5R5*1	0.75 kW	00	Analog voltage/pulse
Three-Pha	7R6	1.0 kW		MECHATROLINK
se, 200	120*2	1.5 kW	20	communications
VACC	180	2.0 kW		
	200	3.0 kW	7th dia	git Design Revision
	330	5.0 kW		Design Nevision
	470	6.0 kW	A	
	550	7.5 kW		
	590	11 kW		
	780	15 kW		
Cin	R70	0.05 kW		
Sin- gle-Phase	R90	0.1 kW		
100 VAC	2R1	0.2 kW		
	2R8	0.4 kW		

Code	Specification
Α	200 VAC
F	100 VAC
5th+6t	h digits Interface*3
5th+6t	0
	h digits Interface*3 Specification Analog voltage/pulse train reference
Code	Specification

	Oode	opecification	Applicable Models
	000	Without options	All models
(	11th+1	12th+13th digits FT/	EX Specification
		0:6	ion
	Code	Specificat	.1011
	Code F19	Tracking application Built-in less-deviation	

8th+9th+10th digits

Hardware Options

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 (model: SGD7S-120A□□A008).
- \*3. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.

#### **Interpreting Servomotor Model Numbers** 1.2.2

Refer to the following manuals for information on interpreting  $\Sigma$ -7-Series Servomotor model numbers.

- Ω Σ-7-Series Rotary Servomotor Product Manual (Manual No.: SIEP S800001 36)
- Σ-7-Series Linear Servomotor Product Manual (Manual No.: SIEP S800001 37)
- Σ-7-Series Direct Drive Servomotor Product Manual (Manual No.: SIEP S800001 38)

## 1.3

## **Combinations of SERVOPACKs and Servomotors**

Refer to the following manuals for information on combinations with  $\Sigma$ -7-Series Servomotors.

- Ω Σ-7-Series Rotary Servomotor Product Manual (Manual No.: SIEP S800001 36)
- Ω Σ-7-Series Linear Servomotor Product Manual (Manual No.: SIEP S800001 37)
- $\square$   $\Sigma$ -7-Series Direct Drive Servomotor Product Manual (Manual No.: SIEP S800001 38)

# 1.4 Functions

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

- Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)
- Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)

Functions given inside bold lines in the functions tables are restricted if less-deviation control is used for SERVOPACKs for tracking applications. Refer to the following section for details on restrictions to these functions.

1.4.2 Functional Restrictions on page 1-8

#### 1.4.1 SERVOPACK Functions

#### · Functions Related to the Machine

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

<sup>\*</sup> These functions can be used with SERVOPACKs with MECHATROLINK-III Communications References.

#### 1.4.1 SERVOPACK Functions

#### • Functions Related to the Host Controller

Function
Extended Address Setting
Electronic Gear Settings
I/O Signal Allocations
ALM (Servo Alarm) Signal
ALO1 to ALO3 (Alarm Code) Signals*
/WARN (Warning) Signal
/TGON (Rotation Detection) Signal
/S-RDY (Servo Ready) Signal
Speed Control*
Basic Settings for Speed Control*
Speed Reference Filter*
Zero Clamping*
/V-CMP (Speed Coincidence Detection) Signal
Position Control*
Reference Pulse Form*
CLR (Position Deviation Clear) Signal Function and Settings*
Reference Pulse Input Multiplication Switching*
/COIN (Positioning Completion) Signal
/NEAR (Near) Signal
Reference Pulse Inhibition and Settings*
Torque Control*
Basic Settings for Torque Control*
Torque Reference Filter Settings*
Speed Limit during Torque Control
/VLT (Speed Limit Detection) Signal
Encoder Divided Pulse Output
Selecting Torque Limits
Vibration Detection Level Initialization
Alarm Reset
Replacing the Battery
Setting the Position Deviation Overflow Alarm Level

 $<sup>\</sup>hbox{* These functions can be used with SERVOPACKs with Analog Voltage/Pulse Train References}.$ 

#### • Functions to Achieve Optimum Motions

Function
Speed Control*1
Soft Start Settings*1
Position Control*1
Smoothing Settings*1
Torque Control*1
Tuning-less Function
Autotuning without a Host Reference
Autotuning with a Host Reference
Custom Tuning
Anti-Resonance Control Adjustment
Vibration Suppression
Gain Selection
Friction Compensation
Gravity Compensation
Backlash Compensation*2
Model Following Control
Compatible Adjustment Functions
Mechanical Analysis
Easy FFT

- \*1. These functions can be used with SERVOPACKs with Analog Voltage/Pulse Train References.
- \*2. These functions can be used with SERVOPACKs with MECHATROLINK-III Communications References.

#### • Functions for Trial Operation during Setup

Function
Software Reset
Trial Operation for the Servomotor without a Load
Program Jogging
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
Alarm History Display
Alarm Tracing

## 1.4.2 Functional Restrictions

There are restrictions to the following functions when less-deviation control is used.

Function	Restriction
Tuning-less Function (Pn170 = n.□□□X)	The tuning-less function is given priority. Less-deviation control will be disabled even if you set the parameter for less-deviation control (Pn190 = n. $\square$ $\square$ $\square$ 1).
Feedforward (Pn109)	This parameter cannot be used. Any parameter setting will be ignored.
Speed Loop Control Method (Pn10B = $n.\Box\Box X\Box$ )	This parameter cannot be used with less-deviation control 2. Any parameter setting will be ignored. This parameter can be used with less-deviation control 1.
Automatic Gain Switching (Pn139 = n.□□□2)	This parameter cannot be used. Do not use it if less-deviation control is enabled.
Model Following Control (Pn140 = n.□□□X)	This parameter cannot be used. Any parameter setting will be ignored and less-deviation control will be given priority.
Reference Pulse Input Multiplier (Pn218) (This parameter is valid only for SERVO-PACKs with Analog Voltage/Pulse Train References.)	This parameter cannot be used. Any parameter setting will be ignored.
Tuning-less Level Setting (Fn200)	This function cannot be used.
Advanced Autotuning without Reference (Fn201)	This function cannot be used.
Advanced Autotuning with Reference (Fn202)	This function cannot be used.
One-Parameter Tuning (Fn203)	For less-deviation control 2, only Tuning Mode 5 can be used. For less-deviation control 1, only Tuning Mode 0 or 1 can be used.
Vibration Suppression (Fn205)	This function cannot be used.

# 1.5 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.

## 1.6

# Combining the SERVOPACKs with MP-Series Machine Controllers and the MPE720 Engineering Tool

If you combine the SERVOPACK with an MP-Series Machine Controller or the MPE720 Engineering Tool, it will be recognized as a SERVOPACK with standard specifications. To use the parameters that have been added or changed for the SERVOPACKs described in this manual, use the SigmaWin+.

# SERVOPACK Ratings and Specifications

2

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

2.1	Ratin	gs2-2
2.2	SERVO	OPACK Overload Protection Characteristics 2-6
2.3	Spec	ifications2-7
	2.3.1	SERVOPACKs with Analog Voltage/ Pulse Train References 2-7
	2.3.2	SERVOPACKs with MECHATROLINK-III Communications References

# 2.1 Ratings

This section gives the ratings of SERVOPACKs.

# Three-Phase, 200 VAC

1	Model SGI	D7S-	R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]		able Motor	0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0
Continu [Arms]	uous Outp	ut Current	0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
	aneous Ma Current [A		2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
	Power St	upply				200 VA	C to 24	40 VAC	, 50 Hz	/60 Hz		•	
Main Circuit	Permitted Fluctuation			-15% to +10%									
Ollouit	Input Cur [Arms]*	rrent	0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
	Power Supply					200 VA	C to 24	40 VAC	, 50 Hz	/60 Hz		•	
Con- trol	Permitted Fluctuation			-15% to +10%									
1101	Input Cur [Arms]*	Input Current [Arms]*		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power [kVA]*	Supply Ca	pacity	0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
	Main Circ Loss [W]	cuit Power	5.0	7.0	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
Power	Control C Power Lo		12	12	12	12	14	14	14	15	16	16	19
Loss*		legenera- stor Power	_	-	-	-	8	8	8	12	12	12	36
	Total Pov	ver Loss [W]	17.0	19.0	23.9	34.5	50.5	60.9	71.2	97.6	136.2	146.2	281.6
Regen	Built-In Regen-	Resistance $[\Omega]$	-	_	_	_	40	40	40	20	12	12	8
era- tive	erative Resistor	Capacity [W]	-	-	-	_	40	40	40	60	60	60	180
Resis- tor	External $[\Omega]$	Allowable Resistance	40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

<sup>\*</sup> This is the net value at the rated load.

	Model SGD7S-	470A	550A	590A	780A				
Maximum Applic	cable Motor Capacity [kW]	6.0	7.5	11	15				
Continuous Out	out Current [Arms]	46.9	54.7	58.6	78.0				
Instantaneous M	laximum Output Current [Arms]	110	130	140	170				
	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz							
Main Circuit	Permitted Voltage Fluctuation		-15% to	+10%					
	Input Current [Arms]*1	29	37	54	73				
	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz							
Control	Permitted Voltage Fluctuation	-15% to +10%							
	Input Current [Arms]*1	0.3	0.3	0.4	0.4				
Power Supply C	apacity [kVA]*1	10.7	14.6	21.7	29.6				
	Main Circuit Power Loss [W]	271.7	326.9	365.3	501.4				
	Control Circuit Power Loss [W]	21	21	28	28				
Power Loss*1	External Regenerative Resistor Unit Power Loss [W]	180*2	350* <sup>3</sup>	350*³	350*³				
	Total Power Loss [W]	292.7	347.9	393.3	529.4				
	Resistance [ $\Omega$ ]	6.25*2	3.13* <sup>3</sup>	3.13* <sup>3</sup>	3.13* <sup>3</sup>				
External Regenerative Resistor Unit	Capacity [W]	880*2	1760 <sup>*3</sup>	1760*3	1760*3				
	Minimum Allowable External Resistance $[\Omega]$	5.8	2.9	2.9	2.9				
Overvoltage Cat	egory		li li	I					

<sup>\*1.</sup> This is the net value at the rated load.

## Single-Phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A	
Maximum Appli	cable Motor Capad	city [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	
Power Supply			200 VAC to 240 VAC, 50 Hz/60 Hz						
Main Circuit	Permitted Voltag	e Fluctuation			-15% to	+10%			
	Input Current [Ar	ms]*	0.8	1.6	2.4	5.0	8.7	16	
	Power Supply			200 VA	C to 240 \	/AC, 50 H	z/60 Hz		
Control	Permitted Voltag	-15% to +10%							
	Input Current [Ar	0.2	0.2	0.2	0.2	0.2	0.25		
Power Supply C	Capacity [kVA]*		0.2	0.3	0.6	1.2	1.9	4.0	
	Main Circuit Power Loss [W]		5.0	7.1	12.1	23.7	39.2	71.8	
	Control Circuit P	12	12	12	12	14	16		
Power Loss*	Built-in Regenera Power Loss [W]	-	_	_	_	8	12		
	Total Power Loss	s [W]	17.0	19.1	24.1	35.7	61.2	103.8	
	Built-In Regen-	Resistance $[\Omega]$	_	_	_	_	40	12	
Regenerative	erative Resistor	Capacity [W]	_	_	_	_	40	60	
Resistor	Minimum Allowa Resistance $[\Omega]$	Minimum Allowable External Resistance $[\Omega]$		40	40	40	40	12	
Overvoltage Ca	tegory					II			

<sup>\*</sup> This is the net value at the rated load.

<sup>\*2.</sup> This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.

<sup>\*3.</sup> This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

### 270 VDC

Model SGD7S-		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 C	utput Current [Arms]	0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	
Instantaneous [Arms]	Maximum Output Current	2.1	3.2	5.9	9.3	11.0	16.9	17.0	28.0	
Power Supply				270	0 VDC t	o 324 V	DC			
Main Circuit	Permitted Voltage Fluctuation		-15% to +10%							
	Input Current [Arms]*1	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11	
	Power Supply	270 VDC to 324 VDC								
Control	Permitted Voltage Fluctuation	-15% to +10%								
	Input Current [Arms]*1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	$0.2^{*2}$	
Power Supply	Capacity [kVA]*1	0.2	0.3	0.6	1	1.4	1.6	2.3	3.2	
Power	Main Circuit Power Loss [W]	4.4	5.9	9.8	17.5	23.0	30.7	38.7	55.8	
Power Loss*1	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					I	II				

<sup>\*1.</sup> This is the net value at the rated load.

<sup>\*2.</sup> The value is 0.25 Arms for the SGD7S-120A00A008.

Model SGD7S-			200A	330A	470A	550A	590A	780A		
Maximum App	2.0	3.0	5.0	6.0	7.5	11.0	15.0			
Continuous C	utput Current [Arms]	18.5	19.6	32.9	46.9	54.7	58.6	78.0		
Instantaneous [Arms]	Maximum Output Current	42.0	56.0	84.0	110	130	140	170		
Power Supply				270 VI	OC to 32	4 VDC				
Main Circuit	Permitted Voltage Fluctuation	-15% to +10%								
	Input Current [Arms]*	14	20	34	36	48	68	92		
	Power Supply	270 VDC to 324 VDC								
Control	Permitted Voltage Fluctuation	-15% to +10%								
	Input Current [Arms]*	0.25	0.25	0.3	0.3	0.3	0.4	0.4		
Power Supply	Capacity [kVA]*	4.0	5.9	7.5	10.7	14.6	21.7	29.6		
	Main Circuit Power Loss [W]	82.7	83.5	146.2	211.6	255.3	243.6	343.4		
Power Loss*	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 C	Category				III					

<sup>\*</sup> This is the net value at the rated load.

# Single-Phase, 100 VAC

	Model SGD7S-	R70F	R90F	2R1F	2R8F	
Maximum App	olicable Motor Capacity [kW]	0.05	0.1	0.2	0.4	
Continuous O	utput Current [Arms]	0.66	0.91	2.1	2.8	
Instantaneous	Maximum Output Current [Arms]	2.1	3.2	6.5	9.3	
	Power Supply	100	) VAC to 120 \	/AC, 50 Hz/60	Hz	
Main Circuit	Permitted Voltage Fluctuation		-15% to	+10%		
	Input Current [Arms]*	1.5	2.5	5	10	
	Power Supply	100 VAC to 120 VAC, 50 Hz/60 Hz				
Control	Permitted Voltage Fluctuation	-15% to +10%				
	Input Current [Arms]*	0.38	0.38	0.38	0.38	
Power Supply	Capacity [kVA]*	0.2	0.3	0.6	1.4	
	Main Circuit Power Loss [W]	5.3	7.8	14.2	26.2	
Power Loss*	Control Circuit Power Loss [W]	12	12	12	12	
	Total Power Loss [W]	17.3	19.8	26.2	38.2	
Regenerative Resistor Minimum Allowable Resistance $[\Omega]$		40	40	40	40	
Overvoltage C	ategory		[	il		

<sup>\*</sup> This is the net value at the rated load.

### 2.2

# **SERVOPACK Overload Protection Characteristics**

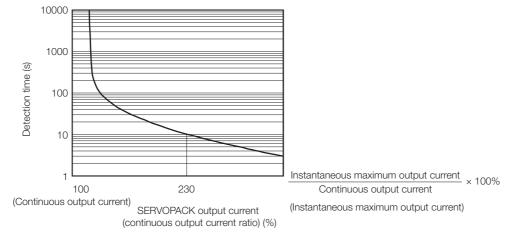
The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) 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.

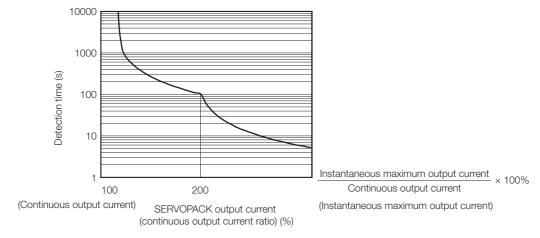
• SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

For a Yaskawa-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.

 SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

For a Yaskawa-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.

# 2.3 Specifications

This section gives the general specifications of SERVOPACKs.

### 2.3.1 SERVOPACKs with Analog Voltage/ Pulse Train References

	Item	Specification				
Control Met	hod	IGBT-based PWM control, sine wave current drive				
Feedback	With Rotary Servomotor	Serial en	20 bits or encoder)	bsolute encoder)  24 bits (incremental encoder/absolute bsolute encoder)		
recuback	With Linear Servomotor	lute line Increm	<ul> <li>Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)</li> <li>Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</li> </ul>			
	Surrounding Air Temperature*1	Refer to Σ-7-	rating, usage is p the following ma Series Σ-7S SERV	possible between 55°C and 60°C.) nual for derating specifications. OPACK with Analog Voltage/Pulse Train Refer- I (Manual No.: SIEP S800001 26)		
	Storage Temperature	-20°C to	85°C			
	Surrounding Air Humidity	95% rela	tive humidity max	x. (with no freezing or condensation)		
	Storage Humidity	95% rela	tive humidity max	x. (with no freezing or condensation)		
	Vibration Resistance	4.9 m/s <sup>2</sup>				
Environ- mental Conditions	Shock Resistance	19.6 m/s <sup>2</sup>				
	Degree of Protection	Degree         SERVOPACK Model: SGD7S-           IP20         R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, R70F, R90F, 2R1F, 2R8F           IP10         120A00A008, 180A, 200A, 330A, 470A, 550A, 590A, 780				
	Pollution Degree	Must b	<ul> <li>Must be no corrosive or flammable gases.</li> <li>Must be no exposure to water, oil, or chemicals.</li> <li>Must be no dust, salts, or iron dust.</li> </ul>			
	Altitude*1	1,000 m max. (With derating, usage is possible between 1,000 2,000 m.)  Refer to the following manual for derating specifications.  \( \subseteq \subseteq \text{-7-Series } \subseteq \text{-7S SERVOPACK with Analog Voltage/Pulse Train Fences Product Manual (Manual No.: SIEP S800001 26)}				
	Others	Do not use the SERVOPACK in the following locations: Location ject to static electricity, noise, strong electromagnetic/magnetic or radioactivity				
Compliant Standards		Refer to the following section for details.  © Compliance with UL Standards, EU Directives, UK Regulations, and Other Safety Standards on page xxvii				
			Mounting	SERVOPACK Model: SGD7S-		
		Base-n	nounted	All Models		
Mounting		Rack-n	nounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F		
		Duct-ve	entilated	470A, 550A, 590A, 780A		

#### 2.3.1 SERVOPACKs with Analog Voltage/Pulse Train References

Continued from previous page.

Item			Specification		
	Speed Con	trol Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)		
			±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)		
	Coefficient		0% of rated speed max. (for a load fluctuation of ±10%)		
Perfor- mance	Fluctuation'	*2	±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)		
	Torque Con sion (Repea		±1%		
	Soft Start T ting	ime Set-	0 s to 10 s (Can be set separately for acceleration and deceleration.)		
	Encoder Div Pulse Outp		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		
		Fixed Input	Allowable voltage range: 5 VDC ±5%  Number of input points: 1  SEN (Absolute Data Request) signal		
I/O Signals	Sequence Input Signals	Input Signals That Can Be Allo- cated	Allowable voltage range: 24 VDC ±20%  Number of input points: 7 (Input method: Sink inputs or source inputs)  Input Signals  • /S-ON (Servo ON) signal  • /P-CON (Proportional Control) signal  • P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals  • /ALM-RST (Alarm Reset) signal  • /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals  • /SPD-D (Motor Direction) signal  • /SPD-A and /SPD-B (Internal Set Speed Selection) signals  • /C-SEL (Control Selection) signal		
			<ul> <li>/C-SEL (Control Selection) signal</li> <li>/ZCLAMP (Zero Clamping) signal</li> <li>/INHIBIT (Reference Pulse Inhibit) signal</li> <li>/G-SEL (Gain Selection) signal</li> <li>/P-DET (Polarity Detection) signal</li> <li>SEN (Absolute Data Request) signal</li> <li>/PSEL (Reference Pulse Input Multiplication Switch) signal</li> <li>FSTP (Forced Stop Input) signal</li> <li>A signal can be allocated and the positive and negative logic can be changed.</li> </ul>		

2.3.1 SERVOPACKs with Analog Voltage/Pulse Train References

Continued from previous page.

	Continued from previous page.		
	Item		Specification
		Fixed Output	Allowable voltage range: 5 VDC to 30 VDC  Number of output points: 1 (A photocoupler output (isolated) is used.)
			Output signal: ALM (Servo Alarm) signal
I/O Signals	Sequence Output Signals	Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 6 (A photocoupler output (isolated) is used for three of the outputs.) (An open-collector output (non-isolated) is used for the other three outputs.)  Output Signals • /COIN (Positioning Completion) signal • /V-CMP (Speed Coincidence Detection) signal • /TGON (Rotation Detection) signal • /S-RDY (Servo Ready) signal • /CLT (Torque Limit Detection) signal • /VLT (Speed Limit Detection) signal • /WARN (Warning) signal • /WARN (Warning) signal • /PSELA (Reference Pulse Input Multiplication Switching Output) signal • ALO1, ALO2, and ALO3 (Alarm Code) signals A signal can be allocated and the positive and negative logic can be changed.
	RS-422A Communi- cations (CN3)	Inter- faces 1:N Commu- nications	Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)  Up to N = 15 stations possible for RS-422A port
Communi- cations		Axis Address Setting	Set with parameters.
	USB	Interface	Personal computer (with SigmaWin+)
	Communications (CN7)	Communica- tions Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Inc	licators		CHARGE indicator and five-digit seven-segment display
Panel Opera			Four push switches
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 Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following catalog for details.  Ω AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)
Overtravel (0	OT) Preventio	n	Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective F	unctions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Funct	ions		Gain adjustment, alarm history, jogging, origin search, etc.
			Operation 1

#### 2.3.1 SERVOPACKs with Analog Voltage/Pulse Train References

Continued from previous page.

	Item			Specification	
		Input	 S		/HWBB1 and /HWBB2: Base block signals for Power Modules
Safe	ety	Outp	ut		EDM1: Monitors the status of built-in safety circuit (fixed output).
Fun	ctions		pliant dards*	3	ISO13849-1 PLe (Category 3) and IEC61508 SIL3
App	licable O	ption I	Module	es	Fully-closed Modules and Safety Modules Note: You cannot use a Fully-closed Module and a Safety Module together.
		Soft S ting	Start T	ime Set-	0 s to 10 s (Can be set separately for acceleration and deceleration.)
				Refer- ence Voltage	<ul> <li>Maximum input voltage: ±12 V (forward motor rotation for positive reference).</li> <li>6 VDC at rated speed (default setting). Input gain setting can be changed.</li> </ul>
		Input Signa		Input Imped- ance	Approx. 14 k $\Omega$
	Speed Con- trol			Circuit Time Con- stant	30 μs
		Internal Set Spec	speed	Rota- tion Direc- tion Selec- tion	With Proportional Control signal
Controls		Cont	101	Speed Selec- tion	With Forward/Reverse External Torque Limit signals (speed 1 to 3 selection). Servomotor stops or another control method is used when both signals are OFF.
Cor		Feedforward Compensatio			0% to 100%
		Output Signal Positioning Completed Width Setting		npleted	0 to 1,073,741,824 reference units
				Refer- ence Pulse Form	One of the following is selected: Sign + pulse train, CW + CCW pulse trains, and two-phase pulse trains with 90° phase differential
	Posi-		Dof	Input Form	Line driver or open collector
	tion Con- trol	In- put Sig- nals	out puls	Maxi- mum Input Fre- quency	<ul> <li>Line Driver Sign + pulse train or CW + CCW pulse trains: 4 Mpps Two-phase pulse trains with 90° phase differential: 1 Mpps</li> <li>Open Collector Sign + pulse train or CW + CCW pulse trains: 200 kpps Two-phase pulse trains with 90° phase differential: 200 kpps</li> </ul>
				Multiplica- tion Switching	1 to 100 times
			Clear	Signal	Position deviation clear Line driver or open collector

Continued from previous page.

	Item			Specification
Slo	Torque		Refer- ence Voltage	<ul> <li>Maximum input voltage: ±12 V (forward torque output for positive reference).</li> <li>3 VDC at rated torque (default setting). Input gain setting can be changed.</li> </ul>
Contro	t Con	Input Signal	Input Imped- ance	Approx. 14 k $\Omega$
			Circuit Time Constant	16 μs

<sup>\*1.</sup> If you combine a  $\Sigma$ -7-Series SERVOPACK with a  $\Sigma$ -V-Series Option Module, the following  $\Sigma$ -V-Series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1,000 m max. Also, the applicable surrounding range cannot be increased by derating.

Coefficient of speed fluctuation = No-load motor speed - Total-load motor speed × 100% Rated motor speed

#### 2.3.2 SERVOPACKs with MECHATROLINK-III Communications References

	Item	Specification			
Control Met	nod	IGBT-based PWM control, sine wave current drive			
- "	With Rotary Servomotor	Serial encoder:  17 bits (absolute encoder)  20 bits or 24 bits (incremental encoder/absolute encoder)  22 bits (absolute encoder)			
Feedback	With Linear Servomotor	<ul> <li>Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)</li> <li>Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</li> </ul>			
	Surrounding Air Temperature*1	-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.) Refer to the following manual for derating specifications.  Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)			
	Storage Temperature	-20°C to 85°C			
	Surrounding Air Humidity	95% relative humidity max. (with no freezing or condensation)			
	Storage Humidity	95% relative humidity max. (with no freezing or condensation)			
Environ-	Vibration Resistance	4.9 m/s <sup>2</sup>			
mental Conditions	Shock Resistance	19.6 m/s <sup>2</sup>			
		Degree SERVOPACK Model: SGD7S-			
	Degree of Protection	IP20 R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, R70F, R90F, 2R1F, 2R8F			
		IP10 120A20A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A			
	Pollution Degree	Must be no corrosive or flammable gases.     Must be no exposure to water, oil, or chemicals.     Must be no dust, salts, or iron dust.  Continued an part page.			

<sup>\*2.</sup> The coefficient of speed fluctuation for load fluctuation is defined as follows:

<sup>\*3.</sup> Always perform risk assessment for the system and confirm that the safety requirements are met.

Continued from previous page.

	Item		Specification		
Environ- mental Conditions	Altitude*1		1,000 m max. (With derating, usage is possible between 1,000 m and 2,000 m.) Refer to the following manual for derating specifications.  Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)		
	Others			CK in the following locations: Locations sub- ise, strong electromagnetic/magnetic fields,	
Compliant S	tandards		Refer to the following sec  Compliance with UL St Other Safety Standards	andards, EU Directives, UK Regulations, and	
			Mounting	SERVOPACK Model: SGD7S-	
			Base-mounted	All Models	
Mounting	Mounting		Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F	
			Duct-ventilated 470A, 550A, 590A, 780A		
	Speed Control Range		1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)		
			±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)		
	Coefficient		0% of rated speed max. (for a load fluctuation of ±10%)		
Perfor- mance	Fluctuation*2		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)		
	Torque Control Precision (Repeatability)		±1%		
	Soft Start Time Setting		0 s to 10 s (Can be set separately for acceleration and deceleration.)		
	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		
			Allowable voltage range: 24 VDC ±20%  Number of input points: 7  (Input method: Sink inputs or source inputs)		
I/O Signals	Sequence Input Signals That Can Be Allocated		Input Signals  • P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals  • /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals  • /DEC (Origin Return Deceleration Switch) signal  • /EXT1 to /EXT3 (External Latch Input 1 to 3) signals  • FSTP (Forced Stop Input) signal  A signal can be allocated and the positive and negative logic can be changed.		

Continued from previous page.

Item			Specification Specification
		Fixed Output	Allowable voltage range: 5 VDC to 30 VDC  Number of output points: 1  (A photocoupler output (isolated) is used.)
		Output	Output signal: ALM (Servo Alarm) signal Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3
I/O Signals	Sequence Output Signals	Output Signals That Can Be Allo- cated	(A photocoupler output (isolated) is used.)  Output Signals  • /COIN (Positioning Completion) signal  • /V-CMP (Speed Coincidence Detection) signal  • /TGON (Rotation Detection) signal  • /S-RDY (Servo Ready) signal  • /CLT (Torque Limit Detection) signal  • /VLT (Speed Limit Detection) signal  • /WLT (Speed Limit Detection) signal  • /BK (Brake) signal  • /WARN (Warning) signal  • /NEAR (Near) signal  A signal can be allocated and the positive and negative logic can be
		Inter-	changed.  Digital Operator (JUSP-OP05A-1-E) and personal computer (with Sig-
		faces	maWin+)
	RS-422A Communi- cations	1:N Commu- nications	Up to N = 15 stations possible for RS-422A port
Communi- cations	(CN3)	Axis Address Setting	03h to EFh (maximum number of slaves: 62) The rotary switches (S1 and S2) are used to set the station address.
	USB	Interface	Personal computer (with SigmaWin+)
	Communi- cations (CN7)	Commu- nications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Ind	icators	ı	CHARGE, PWR, CN, L1, and L2 indicators, and one-digit seven-segment display
	Communications Protocol		MECHATROLINK-III
MECHATR OLINK-III	Station Address Settings Baud Rate		O3h to EFh (maximum number of slaves: 62) The rotary switches (S1 and S2) are used to set the station address.  100 Mbps
Communi- cations	Transmission Cycle		125 μs, 250 μs, 500 μs, 750 μs, 1.0 ms to 4.0 ms (multiples of 0.5 ms)
	Number of sion Bytes	Transmis-	32 or 48 bytes/station A DIP switch (S3) is used to select the number of transmission bytes.
Deference	Performano	e	Position, speed, or torque control with MECHATROLINK-III communications
Reference Method	Reference I	nput	MECHATROLINK-III commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)
	Profile		MECHATROLINK-III standard servo profile
MECHATROLINK-III Communications Setting Switches		munica-	Rotary switch (S1 and S2) positions: 16  Number of DIP switch (S3) pins: 4
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 Settling time (±1%): 1.2 ms (Typ)
Dynamic Bra	ake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.

Continued from previous page.

	Item	Specification		
Regenerative Processing		Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following catalog for details.  AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)		
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal		
Protective F	unctions	Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.		
Utility Funct	ions	Gain adjustment, alarm history, jogging, origin search, etc.		
	Inputs	/HWBB1 and /HWBB2: Base block signals for Power Modules		
Safety	Output	EDM1: Monitors the status of built-in safety circuit (fixed output).		
Functions	Compliant Standards*3	ISO13849-1 PLe (Category 3), IEC61508 SIL3		
Applicable (	Option Modules	Fully-closed Modules and Safety Modules Note: You cannot use a Fully-closed Module and a Safety Module together.		

<sup>\*1.</sup> If you combine a  $\Sigma$ -7-Series SERVOPACK with a  $\Sigma$ -V-Series Option Module, the following  $\Sigma$ -V-Series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1,000 m max. Also, the applicable surrounding range cannot be increased by derating.

 $\begin{tabular}{lll} Coefficient of speed fluctuation = & \hline No-load motor speed - Total-load motor speed & $\times$ 100\% \\ \hline Rated motor speed & $\times$ 100\% \\ \hline \end{tabular}$ 

<sup>\*2.</sup> The coefficient of speed fluctuation for load fluctuation is defined as follows:

<sup>\*3.</sup> Always perform risk assessment for the system and confirm that the safety requirements are met.

# Less-Deviation Control

3

This chapter describes less-deviation control.

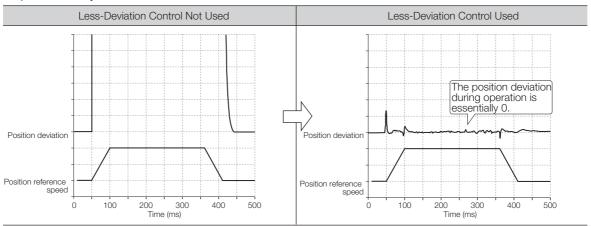
3.1	Introd	luction
3.2	Restri	ictions3-3
	3.2.1 3.2.2 3.2.3 3.2.4	Control Mode Restrictions
3.3	Adjus	ting Less-Deviation Control 23-4
	3.3.1 3.3.2 3.3.3 3.3.4 3.3.5	Adjustment Procedure3-4Adjustment Example3-6Gain Switching Combinations3-9Method to Switch the Gain3-10Settings for Low-speed Feeding3-10
3.4	Adjus	ting Less-Deviation Control 13-12
	3.4.1 3.4.2 3.4.3 3.4.4 3.4.5	Adjustment Procedure3-12Adjustment Example3-13Gain Switching Combinations3-14Method to Switch the Gain3-15Settings for Low-speed Feeding3-15
3.5	Refere	ence Compensation3-17
3.6	Monitori	ng Machine Operation Status and Signal Waveforms3-18

### 3.1

### Introduction

You can use less-deviation control to reduce the deviation during movement and increase the locus tracking performance.

The FT19 SERVOPACKs are used for applications that require reference tracking performance during movement, including the decrease of tracking error and the prevention of interference between the equipment and moving parts, which can be caused by the influences of position response delay.



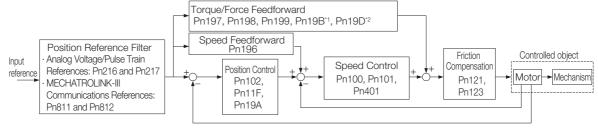
Less-deviation control is enabled or disabled with Pn190 = n.□□□X.

- Pn190 = n.□□□1: Use less-deviation control.
- Pn190 = n.□□□0: Do not use less-deviation control.

Adjusting less-deviation control depends on the less-deviation control mode that you use.

- Less-Deviation Control 1 (Pn195 = n.0□□□): Pn193 and Pn191
- Less-Deviation Control 2 (Pn195 = n.2□□□): Custom Tuning on the SigmaWin+

An outline of the control block diagram for Less-Deviation Control 2 is given below.



- \*1. These parameters are used for adjustments for Rotary Servomotors.
- \*2. These parameters are used for adjustments for Linear Servomotors.



If you use less-deviation control under any of the following conditions, vibration, noise, or over-shooting may occur.

- Condition 1: The machine has low rigidity. (Guideline: There is a large resonance point in the frequency band from 300 Hz and lower.)
- Condition 2: The machine has large variations in the load.
- Condition 3: The resolution of the encoder is low.

If the condition 1 or 2 is met, do not use less-deviation control.

If the condition 3 is met, we recommend using a motor with an encoder that has a resolution of 20 bits or higher.

Also, for fully-closed loop control, we recommend using a linear scale (external encoder) that has a resolution equivalent to the motor encoder.



The optimum feedforward is set inside the SERVOPACK for less-deviation control. A speed feedforward input or torque feedforward input from the host controller is normally not used at the same time as less-deviation control. However, they can be used together with less-deviation control if necessary. If they are used together and an inappropriate feedforward value is input, overshooting may occur.

# 3.2 Restrictions

#### 3.2.1 Control Mode Restrictions

Less-deviation control can be used only in Position Control Mode. It cannot be used in Speed Control Mode or Torque Control Mode.

If you change from Speed Control Mode or Torque Control Mode to Position Control Mode, less-deviation control will be enabled after the motor stops.

#### 3.2.2 Functional Restrictions

Refer to the following section for details on restrictions to these functions.

1.4.2 Functional Restrictions on page 1-8

### 3.2.3 SigmaWin+ Restrictions

Refer to the following section for details on restrictions to the SigmaWin+. 

1.5 SigmaWin+ on page 1-9

# 3.2.4 Combining the SERVOPACKs with MP-Series Machine Controllers and the MPE720 Engineering Tool

Refer to the following section for applications restrictions when the SERVOPACK is combined with an MP-Series Machine Controller or the MPE720 Engineering Tool.

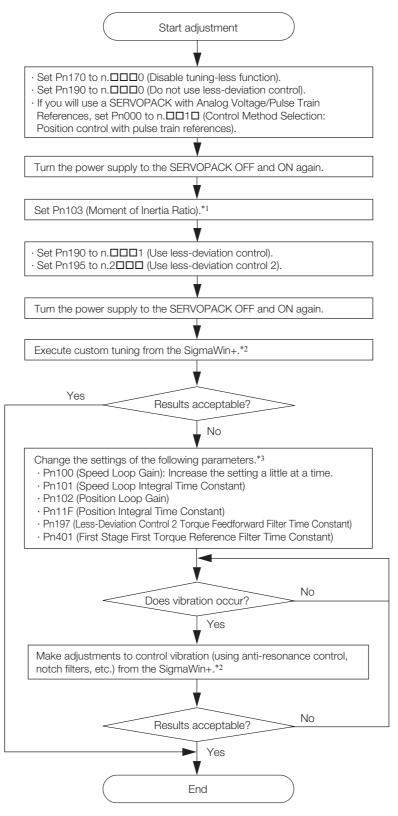
1.6 Combining the SERVOPACKs with MP-Series Machine Controllers and the MPE720 Engineering Tool on page 1-10

### 3.3

# **Adjusting Less-Deviation Control 2**

### 3.3.1 Adjustment Procedure

The basic adjustment flowchart for Less-Deviation Control 2 is given in the following figure. Make suitable adjustments considering the conditions and operating requirements of your machine.



Less-Deviation Control

3

- \*1. Use one of the following calculation methods.

  - Calculate the value manually.
    Use the following SigmaWin+ function: Moment of Inertia Estimation.
- \*2. Refer to one of the following manuals for details.
  - $\ \square$   $\Sigma$ -7-Series  $\Sigma$ -7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)
  - Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)
- \*3. Use the following formulas as guidelines to change the settings.

• Pn101 = 
$$\frac{2000}{2\pi \times Pn100}$$

• Pn197 = 
$$\frac{1000}{2 \times 4 \times 2\pi \times Pn100}$$

• Pn401 = 
$$\frac{1000}{4 \times 2\pi \times \text{Pn100}}$$

The following setting examples are for Pn100 = 40.0 Hz.

• Pn101 = 
$$\frac{2000}{2\pi \times 40.0} \cong 7.96$$

• Pn11F = 
$$\frac{4000}{40.0}$$
 = 100.0

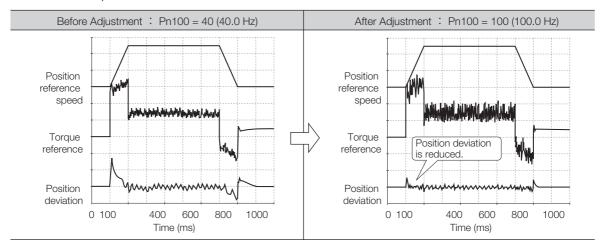
• Pn197 = 
$$\frac{1000}{2 \times 4 \times 2\pi \times 40.0} \cong 0.50$$

• Pn401 = 
$$\frac{1000}{4 \times 2\pi \times 40.0} \approx 0.99$$

### 3.3.2 Adjustment Example

# Adjustment Example for Pn100, Pn101, Pn102, Pn11F, Pn197, and Pn401

The effects of Pn100 (Speed Loop Gain), Pn101 (Speed Loop Integral Time Constant), Pn102 (Position Loop Gain), Pn11F (Position Integral Time Constant), Pn197 (Less-Deviation Control 2 Torque Feedforward Filter Time Constant), and Pn401 (First Stage First Torque Reference Filter Time Constant) are shown below.



# Adjustment Example for Less-Deviation Control 2 Torque Feedforward Gains (Pn198 and Pn199)

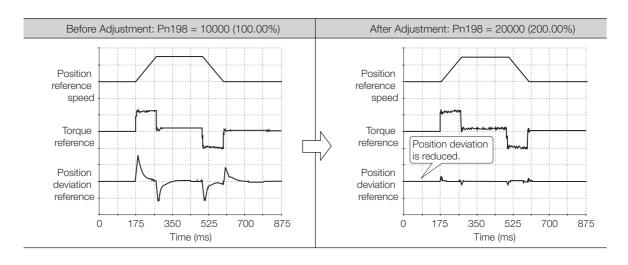
The effects of Pn198 (Less-Deviation Control 2 Forward Torque Feedforward Gain) and Pn199 (Less-Deviation Control 2 Reverse Torque Feedforward Gain) are shown below.

Torque feedforward is used for less-deviation control. The torque feedforward operation takes the differential of the input position reference, converts it to an acceleration rate, and multiplies it by the setting of Pn103 (Moment of Inertia Ratio (Mass Ratio)). Therefore, if the setting of Pn103 is smaller than the actual moment of inertia ratio (mass ratio), the effectiveness of reducing the position deviation will be diminished. On the other hand, if the setting of Pn103 is larger than the actual moment of inertia ratio (mass ratio), the position deviation can easily result in overshooting.

In this type of case, you can change the settings of Pn198 and Pn199 to effectively achieve the same things as changing Pn103 only for torque feedback.



It is best to correctly set Pn103 (Moment of Inertia Ratio) rather than to adjust the settings of Pn198 and Pn199. However, Pn103 will affect the entire control loop, so changing only the torque feedforward amounts (Pn198 and Pn199) after completing gain adjustment is useful for fine-tuning.



# Adjustment Example for Less-Deviation Control 2 Viscous Friction Compensation Coefficients (Pn19B and Pn19D)

For mechanisms that are greatly affected by viscous friction, the effectiveness of torque feed-forward (Pn198 and Pn199) is reduced. To allow for this, set one of the following parameters.

- Less-Deviation Control 2 Rotary Servomotor Viscous Friction Compensation Coefficient (Pn19B)
- Less-Deviation Control 2 Linear Servomotor Viscous Friction Compensation Coefficient (Pn19D)

By setting one of the above parameters, an equivalent viscous friction torque is added to the torque feedforward.

Set Pn19B to the percentage of the rated torque [N·m] that occurs at a motor speed of 100 min<sup>-1</sup>.

The calculations for the setting of Pn19B are given below.

- 1. Operate the motor at a constant speed. In this procedure, 1,000 min<sup>-1</sup> is used.
- 2. Use a tracing operation on the SigmaWin+ or other means to measure the torque at the speed in step 1.

Here, we will assume it was 7.5%.

- 3. Calculate the torque at 100 min<sup>-1</sup>.
  - Formula: Torque at speed in step 1 (%) × 100 min<sup>-1</sup> ÷ Speed in step 1 (min<sup>-1</sup>)

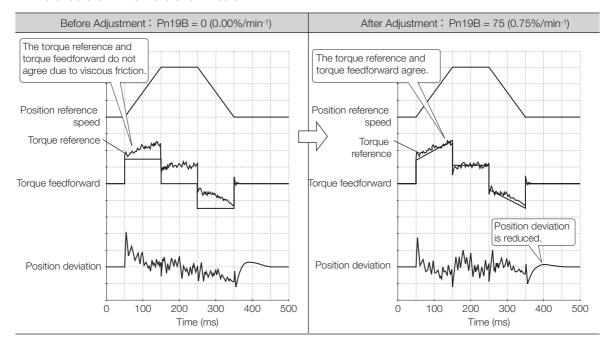
The calculation is as follows for this example:

•  $7.5\% \times 100 \text{ min}^{-1} \div 1000 \text{ min}^{-1} = 0.75\%$ 

Therefore, Pn19B is set to 0.75.

#### 3.3.2 Adjustment Example

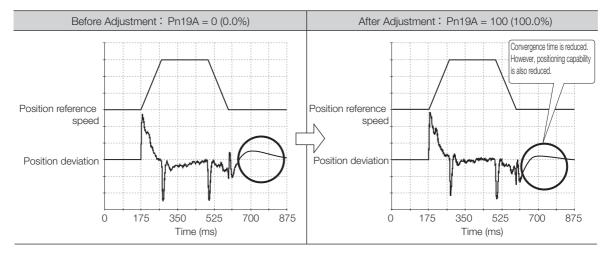
The effects of Pn19B are shown below.



# Adjustment Example for Less-Deviation Control 2 Incomplete Integration Rate (Pn19A)

With less-deviation control, the position integral is used to bring the position deviation close to 0 during constant-speed operation. However, a long period of time is normally required for the position deviation to converge to 0 with only position integration. To reduce that trend, the incomplete integral, for which the integral effect falls off with time, is also used. The default setting of Pn19A is 10,000 (100%). In other words, 100% of the previous output from integrator will be subtracted from the current input to the integrator every control cycle.

Therefore, when the deviation settles, the effectiveness of the position integral is lost. However, you can adjust this parameter to increase positioning capability when stopping if you are willing to accept a somewhat longer settling time. If you set this parameter to 0%, operation will be the same as for a normal integrator.



### **Gain Switching Combinations**

3.3.3

You can use gain switching to shorten the positioning time by increasing the gains during positioning and to suppress vibration by decreasing the gains while stopping.

### SERVOPACKs with Analog Voltage/Pulse Train References

Selected Gains	Speed Loop Gain	Speed Loop Integral Time Constant	Position Loop Gain	Position Integral Time Constant	Torque Reference Filter	Friction Compen- sation Gain	Position Reference Acceleration/ Deceleration Filter Time Constant*
Gain Settings 1	Speed Loop Gain (Pn100)	Speed Loop Integral Time Constant (Pn101)	Position Loop Gain (Pn102)	Position Integral Time Constant (Pn11F)	First Stage First Torque Reference Filter Time Constant (Pn401)	Friction Compen- sation Gain (Pn121)	Position Reference Acceleration/ Deceleration Time Constant (Pn216)
Gain Settings 2	Second Speed Loop Gain (Pn104)	Second Speed Loop Inte- gral Time Constant (Pn105)	Second Position Loop Gain (Pn106)	Less- Deviation Control 2 Second Position Integral Time Constant (Pn13F)	First Stage Second Torque Ref- erence Fil- ter Time Constant (Pn412)	Second Friction Compen- sation Gain (Pn122)	Second Position Reference Acceleration/ Deceleration Time Constant (Pn234)

<sup>\*</sup> This parameter is valid only for SERVOPACKs with Analog Voltage/Pulse Train References. The gains are switched when there is no reference pulse input and reference distribution has been completed (/DEN). The timing for switching other gains and the timing for switching the Position Reference Acceleration/Deceleration Filter Time Constant are not the same.

# SERVOPACKs with MECHATROLINK-III Communications References

Selected Gains	Speed Loop Gain	Speed Loop Integral Time Constant	Position Loop Gain	Position Integral Time Constant	Torque Reference Filter	Friction Compensa- tion Gain
Gain Settings 1	Speed Loop Gain (Pn100)	Speed Loop Integral Time Constant (Pn101)	Position Loop Gain (Pn102)	Position Integral Time Constant (Pn11F)	First Stage First Torque Reference Fil- ter Time Con- stant (Pn401)	Friction Compensa- tion Gain (Pn121)
Gain Settings 2	Second Speed Loop Gain (Pn104)	Second Speed Loop Integral Time Constant (Pn105)	Second Position Loop Gain (Pn106)	Less-Devia- tion Control 2 Second Posi- tion Integral Time Con- stant (Pn13F)	First Stage Second Torque Refer- ence Filter Time Con- stant (Pn412)	Second Friction Compensa- tion Gain (Pn122)

#### 3.3.4 Method to Switch the Gain

#### SERVOPACKs with Analog Voltage/Pulse Train References

First, make sure that Pn139 is set to n. \$\square\$ (manual gain switching).

To switch between gain settings 1 and gain settings 2, use the G\_SEL external input signal.

Classification	Signal Name	Connector Pin	Setting	Meaning	
Input	/G-SEL	Must be assigned with Pn50D = n.□X□□.*	OFF	Changes the gains to gain settings 1.	
			ON	Changes the gains to gain settings 2.	

<sup>\*</sup> Refer to the following manual for details.

# SERVOPACKs with MECHATROLINK-III Communications References

First, make sure that Pn139 is set to n. \(\sigma\) (manual gain switching).

To switch between gain settings 1 and gain settings 2, use G\_SEL in the servo command output signals (SVCMD\_IO).

When the motor is stopped, input the G\_SEL signal and wait 2 ms or more to input a command (e.g., positioning).

Classification	Command Name	Setting	Meaning
Input	G_SEL in the Servo Command Output Signals (SVCMD_IO)	0	Changes the gains to gain settings 1.
		1	Changes the gains to gain settings 2.

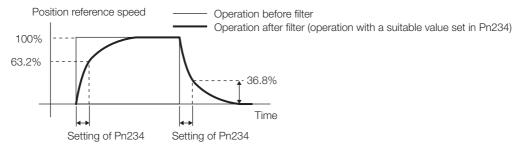
### 3.3.5 Settings for Low-speed Feeding

The tracking performance of less-deviation control is high. Therefore, if the position reference speed input is intermittent during homing or other low-speed operations, the machine may vibrate

If that occurs, perform the following procedure.

#### SERVOPACKs with Analog Voltage/Pulse Train References

- 1. Set Pn234 (Second Position Reference Acceleration/Deceleration Time Constant) to an appropriate value.
- 2. During low-speed feeding, change the gains from gain settings 1 to gain settings 2. The setting of Pn234 is applied, the reference tracking performance decreases, and vibration is reduced.



Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)



- Any change to the setting of Pn216 or Pn234 is not applied while the Servomotor is operating. Changes will be enabled the next time the Servomotor comes to a stop.
- Change the settings while there is no reference pulse input and the Servomotor is stopped.

There are the following two methods.

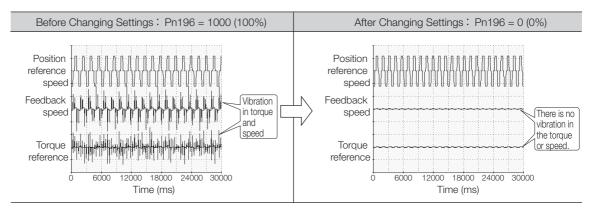
- Weakening reference tracking to reduce vibration
- Smoothing references to reduce vibration

#### Weakening Reference Tracking to Reduce Vibration

During low-speed feeding, the Servo Parameter Write command (SVPRM WR: 41h) is used to reduce the settings of the following three parameters.

- Pn196 (Less-Deviation Control 2 Speed Feedforward Gain)
- Pn198 (Less-Deviation Control 2 Forward Torque Feedforward Gain)
- Pn199 (Less-Deviation Control 2 Reverse Torque Feedforward Gain)

By reducing the settings of Pn196, Pn198, and Pn199, reference tracking is weakened to reduce vibration.



#### Smoothing References to Reduce Vibration

During low-speed feeding, the Servo Parameter Write command (SVPRM\_WR: 41h) is used to increase the settings of the following two parameters.

- Pn811 (Exponential Acceleration/Deceleration Time Constant)
- Pn812 (Movement Average Time)

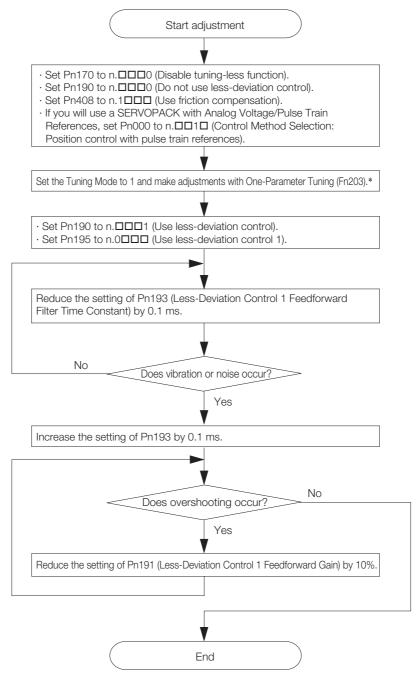
By increasing the settings of Pn811 and Pn812, the reference is smoothed to reduce vibration.

### 3.4

# **Adjusting Less-Deviation Control 1**

#### 3.4.1 Adjustment Procedure

The basic adjustment flowchart for Less-Deviation Control 1 is given in the following flowchart. Make suitable adjustments considering the conditions and operating requirements of your machine.



<sup>\*</sup> Refer to one of the following manuals for details.

Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)

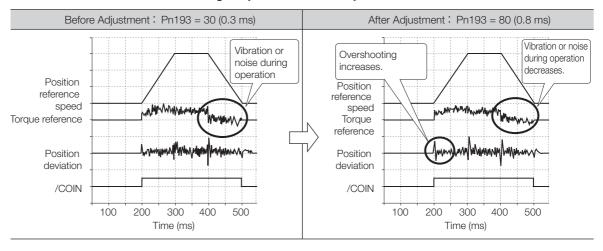
Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)

### 3.4.2 Adjustment Example

#### Pn193 Adjustment Example

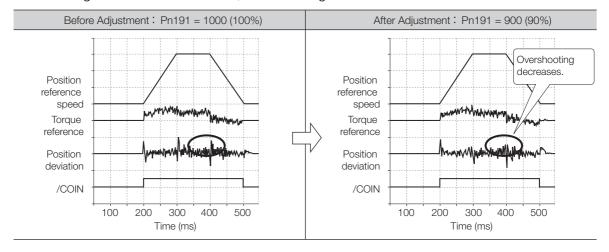
The effects of Pn193 (Less-Deviation Control 1 Feedforward Filter Time Constant) are shown below.

If vibration or noise occurs during operation, increase the setting of Pn193 to reduce vibration and noise. However, overshooting may increase when you do so.



#### Pn191 Adjustment Example

The effects of Pn191 (Less-Deviation Control 1 Feedforward Gain) are shown below. If the setting of Pn191 is decreased, overshooting decreases.



### 3.4.3 Gain Switching Combinations

You can use gain switching to shorten the positioning time by increasing the gains during positioning and to suppress vibration by decreasing the gains while stopping.

#### SERVOPACKs with Analog Voltage/Pulse Train References

Selected Gains	Speed Loop Gain	Speed Loop Integral Time Constant	Position Loop Gain	Torque Reference Filter	Friction Com- pensa- tion Gain	Position Reference Acceleration/ Deceleration Filter Time Constant*	Less- Deviation Control Feedforward Gain
Gain Settings 1	Speed Loop Gain (Pn100)	Speed Loop Inte- gral Time Constant (Pn101)	Position Loop Gain (Pn102)	First Stage First Torque Reference Filter Time Constant (Pn401)	Friction Com- pensa- tion Gain (Pn121)	Position Reference Acceleration/ Deceleration Time Constant (Pn216)	Less-Devia- tion Control 1 Feedforward Gain (Pn191)
Gain Settings 2	Second Speed Loop Gain (Pn104)	Second Speed Loop Inte- gral Time Constant (Pn105)	Second Position Loop Gain (Pn106)	First Stage Second Torque Ref- erence Fil- ter Time Constant (Pn412)	Second Friction Com- pensa- tion Gain (Pn122)	Second Position Ref- erence Acceleration/ Deceleration Time Con- stant (Pn234)	Less-Devia- tion Control 1 Second Feedforward Gain (Pn192)

<sup>\*</sup> This parameter is valid only for SERVOPACKs with Analog Voltage/Pulse Train References. The gains are switched when there is no reference pulse input and reference distribution has been completed (/DEN). The timing for switching other gains and the timing of switching the Position Reference Acceleration/Deceleration Filter Time Constant are not the same.

# SERVOPACKs with MECHATROLINK-III Communications References

Selected Gains	Speed Loop Gain	Speed Loop Integral Time Constant	Position Loop Gain	Torque Reference Filter	Friction Compen- sation Gain	Less-Deviation Control Feedforward Gain
Gain Settings 1	Speed Loop Gain (Pn100)	Speed Loop Integral Time Constant (Pn101)	Position Loop Gain (Pn102)	First Stage First Torque Reference Fil- ter Time Con- stant (Pn401)	Friction Compen- sation Gain (Pn121)	Less-Deviation Control 1 Feed- forward Gain (Pn191)
Gain Settings 2	Second Speed Loop Gain (Pn104)	Second Speed Loop Integral Time Constant (Pn105)	Second Position Loop Gain (Pn106)	First Stage Second Torque Refer- ence Filter Time Con- stant (Pn412)	Second Friction Compen- sation Gain (Pn122)	Less-Deviation Control 1 Sec- ond Feedfor- ward Gain (Pn192)

#### 3.4.4 Method to Switch the Gain

#### SERVOPACKs with Analog Voltage/Pulse Train References

First, make sure that Pn139 is set to n. \$\square\$0 (manual gain switching).

To switch between gain settings 1 and gain settings 2, use the G\_SEL external input signal.

Classification	Signal Name	Connector Pin	Setting	Meaning	
Input	/G-SEL	Must be assigned with Pn50D = n.□X□□.*	OFF	Changes the gains to gain settings 1.	
			ON	Changes the gains to gain settings 2.	

<sup>\*</sup> Refer to the following manual for details.

Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)

# SERVOPACKs with MECHATROLINK-III Communications References

First, make sure that Pn139 is set to n. \(\sigma\) (manual gain switching).

To switch between gain settings 1 and gain settings 2, use G\_SEL in the servo command output signals (SVCMD\_IO).

When the motor is stopped, input the G\_SEL signal and wait 2 ms or more to input a command (e.g., positioning).

Classification	Command Name	Setting	Meaning
Input	G_SEL in the Servo Command Output Signals (SVCMD_IO)	0	Changes the gains to gain settings 1.
		1	Changes the gains to gain settings 2.

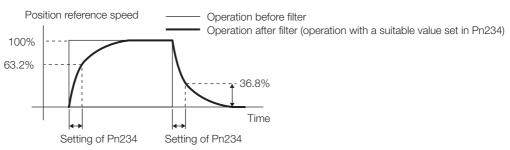
### 3.4.5 Settings for Low-speed Feeding

The tracking performance of less-deviation control is high. Therefore, if the position reference speed input is intermittent during homing or other low-speed operations, the machine may vibrate.

If that occurs, perform the following procedure.

#### SERVOPACKs with Analog Voltage/Pulse Train References

- 1. Set Pn234 (Second Position Reference Acceleration/Deceleration Time Constant) to an appropriate value.
- **2.** During low-speed feeding, change the gains from gain settings 1 to gain settings 2. The setting of Pn234 is applied, the reference tracking performance decreases, and vibration is reduced.



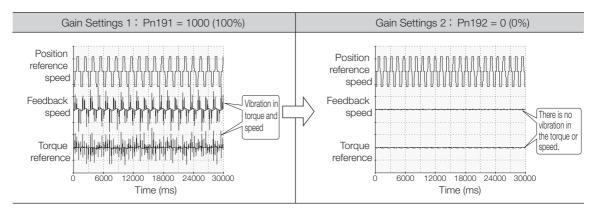
#### 3.4.5 Settings for Low-speed Feeding



- Any change to the setting of Pn216 or Pn234 is not applied while the Servomotor is operating.
   Changes will be enabled the next time the Servomotor comes to a stop.
- · Change the settings while there is no reference pulse input and the Servomotor is stopped.

# SERVOPACKs with MECHATROLINK-III Communications References

- 1. Set Pn192 (Less-Deviation Control 1 Second Feedforward Gain) to 0.
- 2. During low-speed feeding, change the gains from gain settings 1 to gain settings 2. The setting of Pn192 is applied, the reference tracking performance decreases, and vibration is reduced.



# 3.5 Reference Compensation

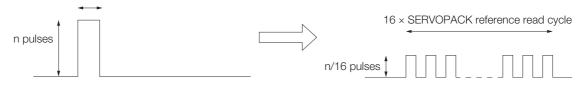
Reference compensation is used when pulse train references are input with SERVOPACKs with Analog Voltage/Pulse Train References.

If less-deviation control is enabled, reference compensation is used by the SERVOPACK to automatically divide the input references to smooth the references. Reference compensation can be used to suppress abnormal noise in motors. However, reference compensation cannot be used for an electronic gear ratio of 16/1 or less (e.g., 4/1 or 1/1).

Also, the division method for the first reference input after the SERVOPACK's control power supply is turned ON is different from the second and later reference inputs, as described below.

First Reference Input after Control Power Supply Is Turned ON
 The input reference pulses are divided by 16 and the input time is multiplied by 16.

SERVOPACK reference read cycle



Second or Later Reference Input after Control Power Supply Is Turned ON
 The input reference pulses are divided by 16 and evenly spread over the difference between
 the last reference input time and this reference input time.



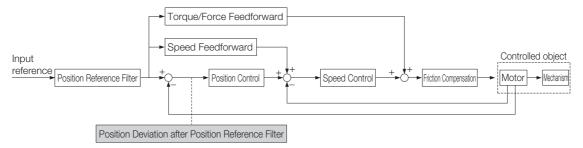
# 3.6

# Monitoring Machine Operation Status and Signal Waveforms

To monitor waveforms, use the SigmaWin+ trace function or a measuring instrument, such as a memory recorder.

The monitoring function that is shaded in the following block diagram was added to SERVO-PACKs for tracking applications.

• Monitoring the Position Deviation after the Position Reference Filter



To use the SigmaWin+ to monitor the position deviation after the position reference filter, select the following signal name on the Data Tab Page in the Trace Setup Dialog Box. To display the Trace Setup Dialog Box, click the Setup Button on the Trace Dialog Box.

Signal Name	Unit
Position Deviation after Position Reference Filter	Reference units

To use a measuring instrument to monitor the position deviation after the position reference filter, set Pn006 or Pn007 (Analog Monitor 1/2 Signal Selection) as given in the following table.

Parameter			Description					
		Monitor Signal	Output Unit	Remarks				
Pn006 Pn007	n.□□25	Position Deviation after Position Reference Filter	0.05 V/Reference unit	_				

Refer to one of the following manuals for details on the monitor items other than the position deviation after the position reference filter.

- $\Sigma$ -7-Series  $\Sigma$ -7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)
- $\Sigma$ -7-Series  $\Sigma$ -7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)

# Maintenance

4

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

4.1 SERVOPACKs with Analog Voltage/Pulse Train References 4-4
4.1.2 List of Alarms
4.2 SERVOPACKs with MECHATROLINK-III Communications References 4-5
4.2.1 Alarm Displays

#### 4.1.1 Alarm Displays

# 4.1

# SERVOPACKs with Analog Voltage/Pulse Train References

# 4.1.1 Alarm Displays

If an error occurs in the SERVOPACK, an alarm number will be displayed on the panel display. However, if only "-" appears on the panel display, this indicates a SERVOPACK system error. Replace the SERVOPACK.



## 4.1.2 List of Alarms

The list of alarms gives the alarm name, alarm meaning, alarm stopping method, alarm reset possibility, and alarm code output in order of the alarm numbers.

# **Servomotor Stopping Method for Alarms**

Refer to the following manual for information on the stopping method for alarms.

Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)

# **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.

### **List of Alarms**

Alarm			Servo- motor	Alarm Reset	Alarm Code Output		
Number	Alarm Name	Alarm Meaning	Stop- ping Method	Possi- ble?	ALO1	ALO2	ALO3
A.020	Parameter Checksum Error	There is an error in the parameter data in the SER-VOPACK.	Gr.1	No	Н	Н	Н
A.021	Parameter Format Error	There is an error in the parameter data format in the SERVOPACK.	Gr.1	No	Н	Н	Н
A.022	System Checksum Error	There is an error in the parameter data in the SER-VOPACK.	Gr.1	No	Н	Н	Н
A.024	System Alarm	An internal program error occurred in the SERVO-PACK.	Gr.1	No	Н	Н	Н
A.025	System Alarm	An internal program error occurred in the SERVO-PACK.	Gr.1	No	Н	Н	Н
A.030	Main Circuit Detector Error	There is an error in the detection data for the main circuit.	Gr.1	Yes	Н	Н	Н
A.040	Parameter Setting Error	A parameter setting is outside of the setting range.	Gr.1	No	Н	Н	Н

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Alarm	Alarm Name	Alarm Meaning	Servo- motor Stop-	Alarm Reset	_	arm Co Output		
Number	, ua , ua	, ua moag	ping Method	Possi- ble?	ALO1	ALO2	ALO3	
A.041	Encoder Output Pulse Setting Error	The setting of Pn212 (Number of Encoder Output Pulses) or Pn281 (Encoder Output Resolution) is outside of the setting range or does not satisfy the setting conditions.	Gr.1	No	Н	Н	Н	
A.042	Parameter Combination Error	The combination of some parameters exceeds the setting range.	Gr.1	No	Н	Н	Н	
A.044	Semi-Closed/Fully-Closed Loop Control Parameter Setting Error	The settings of the Option Module and Pn002 = n.X□□□ (External Encoder Usage) do not match.	Gr.1	No	Н	Н	Н	
A.050	Combination Error	The capacities of the SER-VOPACK and Servomotor do not match.	Gr.1	Yes	Н	Н	Н	
A.051	Unsupported Device Alarm	An unsupported device was connected.	Gr.1	No	Н	Н	Н	
A.070	Motor Type Change Detected	The connected motor is a different type of motor from the previously connected motor.	Gr.1	No	Н	Н	Н	
A.080	Linear Encoder Pitch Setting Error	The setting of Pn282 (Linear Encoder Scale Pitch) has not been changed from the default setting.	Gr.1	No	Н	Н	Н	
A.0b0	Invalid Servo ON Com- mand Alarm	The /S-ON (Servo ON) signal was input from the host controller after a utility function that turns ON the Servomotor was executed.	Gr.1	Yes	Н	Н	Н	
A.100	Overcurrent Detected	An overcurrent flowed through the power transistor or the heat sink overheated.	Gr.1	No	L	Н	Н	
A.101	Motor Overcurrent Detected	The current to the motor exceeded the allowable current.	Gr.1	No	L	Н	Н	
A.300	Regeneration Error	There is an error related to regeneration.	Gr.1	Yes	L	L	Н	
A.320	Regenerative Overload	A regenerative overload occurred.	Gr.2	Yes	L	L	Н	
A.330	Main Circuit Power Supply Wiring Error	<ul> <li>The AC power supply input setting or DC power supply input setting is not correct.</li> <li>The power supply wiring is not correct.</li> </ul>	Gr.1	Yes	L	L	Н	
A.400	Overvoltage	The main circuit DC voltage is too high.	Gr.1	Yes	Н	Н	L	
A.410	Undervoltage	The main circuit DC voltage is too low.	Gr.2	Yes	Н	Н	L	
A.510	Overspeed	The motor exceeded the maximum speed.	Gr.1	Yes	L	Н	L	
		-						

### 4.1.2 List of Alarms

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Alarm	Alarm Name	Alarm Name Alarm Meaning	Servo- motor	Alarm Reset	Outo					
Number			Stop- ping Method	Possi- ble?	ALO1	ALO2	ALO3			
A.511	Encoder Output Pulse Overspeed	<ul> <li>Rotary Servomotor: The pulse output speed for the setting of Pn212 (Number of Encoder Output Pulses) was exceeded.</li> <li>Linear Servomotor: The motor speed upper limit for the setting of Pn281 (Encoder Output Resolution) was exceeded.</li> </ul>	Gr.1	Yes	L	Н	L			
A.520	Vibration Alarm	Abnormal oscillation was detected in the motor speed.	Gr.1	Yes	L	Н	L			
A.521	Autotuning Alarm	Vibration was detected during autotuning for the tuning-less function.	Gr.1	Yes	L	Н	L			
A.550	Maximum Speed Setting Error	The setting of Pn385 (Maximum Motor Speed) is greater than the maximum motor speed.	Gr.1	Yes	L	Н	L			
A.710	Instantaneous Overload	The Servomotor was operating for several seconds to several tens of seconds under a torque that largely exceeded the rating.	Gr.2	Yes	L	L	L			
A.720	Continuous Overload	The Servomotor was operating continuously under a torque that exceeded the rating.	Gr.1	Yes	L	L	L			
A.730 A.731	Dynamic Brake Overload	When the dynamic brake was applied, the rotational or linear kinetic energy exceeded the capacity of the dynamic brake resistor.	Gr.1	Yes	L	L	L			
A.740	Inrush Current Limiting Resistor Overload	The main circuit power supply was frequently turned ON and OFF.	Gr.1	Yes	L	L	L			
A.7A1	Internal Temperature Error 1 (Control Board Tempera- ture Error)	The surrounding temperature of the control PCB is abnormal.	Gr.2	Yes	L	L	L			
A.7A2	Internal Temperature Error 2 (Power Board Tempera- ture Error)	The surrounding temperature of the power PCB is abnormal.	Gr.2	Yes	L	L	L			
A.7A3	Internal Temperature Sensor Error	An error occurred in the temperature sensor circuit.	Gr.2	No	L	L	L			
A.7Ab	SERVOPACK Built-in Fan Stopped	The fan inside the SERVO-PACK stopped.	Gr.1	Yes	L	L	L			
A.810	Encoder Backup Alarm	The power supplies to the encoder all failed and the position data was lost.	Gr.1	No	Н	Н	Н			
A.820	Encoder Checksum Alarm	There is an error in the checksum results for encoder memory.	Gr.1	No	Н	Н	Н			
A.830	Encoder Battery Alarm	The battery voltage was lower than the specified level after the control power supply was turned ON.	Gr.1	Yes	Н	Н	Н			

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Alarm	AL.	Alarm Name Alarm Meaning	Servo- motor	Alarm Reset	m Alarm (		Code	
Number	Alarm Name	Alarm Meaning	Stop- ping Method	Possi- ble?	ALO1	ALO2	ALO3	
A.840	Encoder Data Alarm	There is an internal data error in the encoder.	Gr.1	No	Н	Н	Н	
A.850	Encoder Overspeed	The encoder was operating at high speed when the power was turned ON.	Gr.1	No	Н	Н	Н	
A.860	Encoder Overheated	The internal temperature of the rotary encoder or linear encoder is too high.	Gr.1	No	Н	Н	Н	
A.861	Motor Overheated	The internal temperature of motor is too high.	Gr.1	No	Н	Н	Н	
A.862	Overheat Alarm	The input voltage (temperature) for the overheat protection input (TH) signal exceeded the setting of Pn61B (Overheat Alarm Level).	Gr.1	Yes	Н	Н	Н	
A.890	Encoder Scale Error	A failure occurred in the linear encoder.	Gr.1	No	Н	Н	Н	
A.891	Encoder Module Error	An error occurred in the linear encoder.	Gr.1	No	Н	Н	Н	
A.8A0	External Encoder Error	An error occurred in the external encoder.	Gr.1	Yes	Н	Н	Н	
A.8A1	External Encoder Module Error	An error occurred in the Serial Converter Unit.	Gr.1	Yes	Н	Н	Н	
A.8A2	External Incremental Encoder Sensor Error	An error occurred in the external encoder.	Gr.1	Yes	Н	Н	Н	
A.8A3	External Absolute Encoder Position Error	An error occurred in the position data of the external encoder.	Gr.1	Yes	Н	Н	Н	
A.8A5	External Encoder Over- speed	An overspeed error occurred in the external encoder.	Gr.1	Yes	Н	Н	Н	
A.8A6	External Encoder Over- heated	An overheating error occurred in the external encoder.	Gr.1	Yes	Н	Н	Н	
A.b10	Speed Reference A/D Error	An error occurred in the A/D converter for the speed reference input.	Gr.2	Yes	Н	Н	Н	
A.b11	Speed Reference A/D Data Error	An error occurred in the A/D conversion data for the speed reference.	Gr.2	Yes	Н	Н	Н	
A.b20	Torque Reference A/D Error	An error occurred in the A/D converter for the torque reference input.	Gr.2	Yes	Н	Н	Н	
A.b33	Current Detection Error 3	An error occurred in the current detection circuit.	Gr.1	No	Н	Н	Н	
A.bF0	System Alarm 0	Internal program error 0 occurred in the SERVO-PACK.	Gr.1	No	Н	Н	Н	
A.bF1	System Alarm 1	Internal program error 1 occurred in the SERVO-PACK.	Gr.1	No	Н	Н	Н	
A.bF2	System Alarm 2	Internal program error 2 occurred in the SERVO-PACK.	Gr.1	No	Н	Н	Н	

### 4.1.2 List of Alarms

Continued from previous page.

Alarm	Alarm Name		Servo- motor	Alarm Reset	Alarm Code Output		
Number		Alarm Meaning	Stop- ping Method	Possi- ble?	ALO1	ALO2	ALO3
A.bF3	System Alarm 3	Internal program error 3 occurred in the SERVO-PACK.	Gr.1	No	Н	Н	Н
A.bF4	System Alarm 4	Internal program error 4 occurred in the SERVO-PACK.	Gr.1	No	Н	Н	Н
A.bF5	System Alarm 5	Internal program error 5 occurred in the SERVO-PACK.	Gr.1	No	Н	Н	Н
A.bF6	System Alarm 6	Internal program error 6 occurred in the SERVO-PACK.	Gr.1	No	Н	Н	Н
A.bF7	System Alarm 7	Internal program error 7 occurred in the SERVO-PACK.	Gr.1	No	Н	Н	Н
A.bF8	System Alarm 8	Internal program error 8 occurred in the SERVO-PACK.	Gr.1	No	Н	Н	Н
A.C10	Servomotor Out of Control	The Servomotor ran out of control.	Gr.1	Yes	L	Н	L
A.C20	Phase Detection Error	The detection of the phase is not correct.	Gr.1	No	L	Н	L
A.C21	Polarity Sensor Error	An error occurred in the polarity sensor.	Gr.1	No	L	Н	L
A.C22	Phase Information Disagreement	The phase information does not match.	Gr.1	No	L	Н	L
A.C50	Polarity Detection Failure	The polarity detection failed.	Gr.1	No	L	Н	L
A.C51	Overtravel Detected during Polarity Detection	The overtravel signal was detected during polarity detection.	Gr.1	Yes	L	Н	L
A.C52	Polarity Detection Not Completed	The servo was turned ON before the polarity was detected.	Gr.1	Yes	L	Н	L
A.C53	Out of Range of Motion for Polarity Detection	The travel distance exceeded the setting of Pn48E (Polarity Detection Range).	Gr.1	No	L	Н	L
A.C54	Polarity Detection Failure 2	The polarity detection failed.	Gr.1	No	L	Н	L
A.C80	Encoder Clear Error or Multiturn Limit Setting Error	The multiturn data for the absolute encoder was not correctly cleared or set.	Gr.1	No	L	Н	L
A.C90	Encoder Communications Error	Communications between the encoder and SERVO-PACK is not possible.	Gr.1	No	L	Н	L
A.C91	Encoder Communications Position Data Acceleration Rate Error	An error occurred in calculating the position data of the encoder.	Gr.1	No	L	Н	L
A.C92	Encoder Communications Timer Error	An error occurred in the communications timer between the encoder and SERVO-PACK.	Gr.1	No	L	Н	L
A.CA0	Encoder Parameter Error	The parameters in the encoder are corrupted.	Gr.1	No	L	Н	L

Continued from previous page.

Alarm			Servo- motor	Alarm Reset	Ala	rm Co Outpu	ode
Number	Alarm Name	Alarm Meaning	Stop- ping Method	Possi- ble?	ALO1	ALO2	ALO3
A.Cb0	Encoder Echoback Error	The contents of communications with the encoder are incorrect.	Gr.1	No	L	Н	L
A.CC0	Multiturn Limit Disagree- ment	Different multiturn limits have been set in the encoder and the SERVOPACK.	Gr.1	No	L	Н	L
A.CF1	Reception Failed Error in Feedback Option Module Communications	Receiving data from the Feedback Option Module failed.	Gr.1	No	L	Н	L
A.CF2	Timer Stopped Error in Feedback Option Module Communications	An error occurred in the timer for communications with the Feedback Option Module.	Gr.1	No	L	Н	L
A.d00	Position Deviation Over- flow	The setting of Pn520 (Position Deviation Overflow Alarm Level) was exceeded by the position deviation.	Gr.1	Yes	L	L	Н
A.d01	Position Deviation Over- flow Alarm at Servo ON	The servo was turned ON after the position deviation exceeded the setting of Pn526 (Position Deviation Overflow Alarm Level at Servo ON) while the servo was OFF.	Gr.1	Yes	L	L	Н
A.d02	Position Deviation Over- flow Alarm for Speed Limit at Servo ON	If position deviation remains in the deviation counter, the setting of Pn529 or Pn584 (Speed Limit Level at Servo ON) limits the speed when the servo is turned ON. This alarm occurs if reference pulses are input and the setting of Pn520 (Position Deviation Overflow Alarm Level) is exceeded before the limit is cleared.	Gr.2	Yes	L	L	Н
A.d10	Motor-Load Position Deviation Overflow	There was too much position deviation between the motor and load during fully-closed loop control.	Gr.2	Yes	L	L	Н
A.d30	Position Data Overflow	The position feedback data exceeded ±1,879,048,192.	Gr.1	No	L	L	Н
A.E71	Safety Option Module Detection Failure	Detection of the Safety Option Module failed.	Gr.1	No	Н	L	L
A.E72	Feedback Option Module Detection Failure	Detection of the Feedback Option Module failed.	Gr.1	No	Н	L	L
A.E74	Unsupported Safety Option Module	An unsupported Safety Option Module was con- nected.	Gr.1	No	Н	L	L
A.Eb1	Safety Function Signal Input Timing Error	An error occurred in the input timing of the safety function signal.	Gr.1	No	Н	L	L
A.EC8	Gate Drive Error 1	An error occurred in the gate drive circuit.	Gr.1	No	Н	L	L
A.EC9	Gate Drive Error 2	An error occurred in the gate drive circuit.	Gr.1	No	Н	L	L

### 4.1.2 List of Alarms

Continued from previous page.

Alarm Number			Servo- motor	Alarm Reset	Alarm Code Output		
	Alarm Name	Alarm Meaning	Stop- ping Method	Possi- ble?	ALO1	ALO2	ALO3
A.F10	Power Supply Line Open Phase	The voltage was low for more than one second for phase R, S, or T when the main power supply was ON.	Gr.2	Yes	Н	L	Н
FL-1*		An internal program error occurred in the SERVO-PACK.		No			
FL-2*					Undefined.		
FL-3*	System Alarm		_				
FL-4*	System Alarm						
FL-5*							
FL-6*							
CPF00	Digital Operator Communications Error 1	Communications were not possible between the Digital					
CPF01	Digital Operator Commu- nications Error 2	Operator (model: JUSP- OP05A-1-E) and the SERVO- PACK (e.g., a CPU error occurred).	_	No	Ur	ndefine	ed.

<sup>\*</sup> These alarms are not stored in the alarm history. They are only displayed on the panel display.

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.

Alarm Number: Alarm Name	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.	*1
	The power supply was shut OFF while writing parameter settings.	Check the timing of shutting OFF the power supply.	Initialize the parameter settings and then set the parameters again.	*1
A.020: Parameter	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 SER-VOPACK. Reconsider the method for writing the parameters.	_
Checksum Error (There is an error in the parameter data in the SER- VOPACK.)	A malfunction was caused by noise from the AC power supply, ground, static electricity, or other source.	Turn the power supply to the SERVOPACK OFF and ON again. If the alarm still occurs, noise may be the cause.	Implement countermeasures against noise.	*1
	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 SER-VOPACK.	_
	A failure occurred in the SERVOPACK.	Turn the power supply to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may have failed.	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
A.021: Parameter Format Error (There is an error in the parameter data format in the	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.	*1
SERVOPACK.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
	The power supply voltage suddenly dropped.	Measure the power supply voltage.	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
A.022: System Check- sum Error (There is an error	The power supply was shut OFF while setting a utility function.	Check the timing of shutting OFF the power supply.	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
in the parameter data in the SER- VOPACK.)	A failure occurred in the SERVOPACK.	Turn the power supply to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may have failed.	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_

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Alarm Number:	Possible Cause	Confirmation	Continued from pro	Reference
Alarm Name	Possible Gause	Communion	Correction	Reference
A.024: System Alarm (An internal pro- gram error occurred in the SERVOPACK.)	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
A.025: System Alarm (An internal pro- gram error occurred in the SERVOPACK.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
A.030: Main Circuit Detector Error	The jumper between the DC Reactor terminals (⊝1 and ⊝2) was removed or there is faulty contact.  The cable between	_	Correct the wiring between the DC Reactor	_
	the DC Reactor and SERVOPACK is not wired correctly or there is a faulty con- tact.		terminals.	
	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.	*1
A.040: Parameter Set-	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.	*1
ting Error (A parameter set- ting is outside of	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
the setting range.)	A parameter setting is outside of the setting range.	Check the setting ranges of the parameters that have been changed.	Set the parameters to values within the setting ranges.	-
	The electronic gear ratio is outside of the setting range.	Check the electronic gear ratio. The ratio must be within the following range: 0.001 < (Pn20E/Pn210) < 64,000.	Set the electronic gear ratio in the following range: 0.001 < (Pn20E/Pn210) < 64,000.	*1
A.041: Encoder Output Pulse Setting Error	The setting of Pn212 (Number of Encoder Output Pulses) or Pn281 (Encoder Output Resolution) is outside of the setting range or does not satisfy the setting conditions.	Check the setting of Pn212 or Pn281.	Set Pn212 or Pn281 to an appropriate value.	*1

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The speed of program jogging went below the setting range when the electronic gear ratio (Pn20E/Pn210) or the Servomotor was changed.	Check to see if the detection conditions*2 are satisfied.	Decrease the setting of the electronic gear ratio (Pn20E/Pn210).	*1
A.042: Parameter Com- bination Error	The speed of program jogging went below the setting range when Pn533 or Pn585 (Program Jogging Movement Speed) was changed.	Check to see if the detection conditions*2 are satisfied.	Increase the setting of Pn533 or Pn585.	*1
	The movement speed of advanced autotuning went below the setting range when the electronic gear ratio (Pn20E/ Pn210) or the Servomotor was changed.	Check to see if the detection conditions*3 are satisfied.	Decrease the setting of the electronic gear ratio (Pn20E/Pn210).	*1
A.044: Semi-Closed/ Fully-Closed Loop Control Parameter Setting Error	The setting of the Fully-closed Module does not match the setting of Pn002 = n.XDDD (External Encoder Usage).	Check the setting of Pn002 = n.X□□□.	Make sure that the setting of the Fully-closed Module agrees with the setting of Pn002 = n.X□□□.	*1
A.050: Combination Error	The SERVOPACK and Servomotor capacities do not match each other.	Confirm that the following condition is met: 1/4 ≤ (Servomotor capacity/SERVOPACK capacity) ≤ 4	Select a proper combination of the SERVOPACK and Servomotor capacities.	*1
(The capacities of the SERVOPACK and Servomotor	A failure occurred in the encoder.	Replace the encoder and check to see if the alarm still occurs.	Replace the Servomotor or encoder.	-
do not match.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
A.051: Unsupported Device Alarm	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.	*1
	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.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.070: Motor Type Change Detected (The connected motor is a differ- ent type of motor from the previ- ously connected motor.)	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 supply to the SER- VOPACK OFF and ON again.	*1
	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 supply to the SER- VOPACK OFF and ON again.	*1
A.080: Linear Encoder Pitch Setting Error	The setting of Pn282 (Linear Encoder Scale Pitch) has not been changed from the default setting.	Check the setting of Pn282.	Correct the setting of Pn282.	*1
A.0b0: Invalid Servo ON Command Alarm	The /S-ON (Servo ON) signal was input from the host controller after a utility function that turns ON the Servomotor was executed.	_	Turn the power supply to the SERVOPACK OFF and ON again. Or, execute a software reset.	*1

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The Main Circuit Cable is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	*1
	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 short-circuited. Replace the cable.	*1
	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.	*1
A.100: Overcurrent	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 SER-VOPACK, or between the ground and terminals U, V, or W.	The SERVOPACK may be faulty. Replace the SER-VOPACK.	*1
Detected (An overcurrent flowed through the power tran-	The regenerative resistor is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	*1
sistor or the heat sink overheated.)	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 a DB overload alarm (A.730 or A.731) 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 SigmaWin+ Motion Monitor Tab Page to see how frequently the regenerative resistor is being used.	Recheck the operating conditions and load.	*4
	The SERVOPACK regenerative resistance is too small.	Check the regenerative load ratio in the SigmaWin+ Motion Monitor Tab Page to see how frequently the regenerative resistor is being used.	Change the regenerative resistance to a value larger than the SERVO-PACK minimum allowable resistance.	*4

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	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.100: Overcurrent Detected (An overcurrent flowed through the power transistor or the heat	A malfunction was caused by noise.	Improve the noise envi- ronment, 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 SERVO-PACK's main circuit wire size.	-
sink overheated.)	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The Main Circuit Cable is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	*1
	There is a short-circuit or ground fault in a Main Circuit Cable.	Check for short-circuits across cable phases U, V, and W, or between the ground and cable phases U, V, and W.	The cable may be short-circuited. Replace the cable.	*1
A.101: Motor Overcurrent Detected (The current to the motor exceeded the allowable current.)	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.	*1
	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 SER-VOPACK, or between the ground and terminals U, V, or W.	The SERVOPACK may be faulty. Replace the SER-VOPACK.	*1
	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.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.101: Motor Overcurrent Detected (The current to	A malfunction was caused by noise.	Improve the noise envi- ronment, 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 SERVO-PACK's main circuit wire size.	-
the motor exceeded the allowable current.)	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.300: Regeneration Error	When using the built-in regenerative resistor, the jumper between the regenerative resistor terminals (B2 and B3) was removed from one of the following SERVO-PACKs: SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, or -330A.	Check to see if the jumper is connected between power supply terminals B2 and B3.*5	Correctly connect a jumper.	*1
	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.*5	Correct the wiring of the External Regenerative Resistor or Regenerative Resistor Unit.	*1
	Pn600 (Regenerative Resistor Capacity) is not set to 0 and an External Regenerative Resistor is not con- nected to one of the following SERVO- PACKs: SGD7S- R70A, -R90A,-1R6A, -2R8A, -R70F, -R90F, -2R1F, or -2R8F.	Check to see if an External Regenerative Resistor is connected and check the setting of Pn600.	Connect an External Regenerative Resistor, or set Pn600 (Regenerative Resistor Capacity) to 0 (setting unit: ×10 W) if no Regenerative Resistor is required.	*1
	An External Regenerative Resistor is not connected to one of the following SERVO-PACKs: SGD7S-470A, -550A, -590A, or -780A.	Check to see if an External Regenerative Resistor or a Regenerative Resistor Unit is connected and check the setting of Pn600.	Connect an External Regenerative Resistor and set Pn600 to an appropri- ate value, or connect a Regenerative Resistor Unit and set Pn600 to 0.	*1
	A failure occurred in the SERVOPACK.	_	While the main circuit power supply is OFF, turn the control power supply to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	_

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Alarm Number: Alarm Name	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 using the SigmaJunmaSize+ Capacity Selection Software or other means.	Change the regenerative resistance value or capacity. Reconsider the operating conditions using the SigmaJunmaSize+ Capacity Selection Software or other means.	*4
	There was a continuous regeneration state because a negative load was continuously applied.	Check the load applied to the Servomotor during operation.	Reconsider the system including the servo, machine, and operating conditions.	-
A.320: Regenerative Overload	The setting of Pn600 (Regenerative Resistor Capacity) is smaller than the capacity of the External Regenerative Resistor.	Check to see if a Regenerative Resistor is connected and check the setting of Pn600.	Correct the setting of Pn600.	*1
	The setting of Pn603 (Regenerative Resistance) is smaller than the capacity of the External Regenerative Resistor.	Check to see if a Regenerative Resistor is connected and check the setting of Pn603.	Correct the setting of Pn603.	*1
	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.	*4
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_

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Alarm Number: Alarm Name	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.	-
A 000.	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.	*1
A.330: Main Circuit Power Supply Wiring Error (Detected when the main circuit power supply is turned ON.)	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.	*1
	Pn600 (Regenerative Resistor Capacity) is not set to 0 and an External Regenerative Resistor is not con- nected to one of the following SERVOPACKs: SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, or -2R8F.	Check to see if an External Regenerative Resistor is connected and check the setting of Pn600.	Connect an External Regenerative Resistor, or if an External Regenera- tive Resistor is not required, set Pn600 to 0.	*1
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The power supply voltage exceeded the specified range.	Measure the power supply voltage.	Set the AC/DC power supply voltage within the specified range.	-
	The power supply is not stable or was influenced by a lightning surge.	Measure the power supply voltage.	Improve the power supply conditions, install a surge absorber, and then turn the power supply OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.400: Overvoltage (Detected in the	The voltage for AC power supply was too high during acceleration or deceleration.	Check the power supply voltage and the speed and torque during operation.	Set the AC power supply voltage within the specified range.	-
main circuit power supply section of the SERVOPACK.)	The external regenerative resistance is too high for the operating conditions.	Check the operating conditions and the regenerative resistance.	Select a regenerative resistance value that is appropriate for the operating conditions and load.	*4
	The moment of inertia ratio or mass ratio exceeded the allowable value.	Check to see if the moment of inertia ratio or mass ratio is within the allowable range.	Increase the deceleration time, or reduce the load.	-
	A failure occurred in the SERVOPACK.	_	While the main circuit power supply is OFF, turn the control power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The power supply voltage went below the specified range.	Measure the power supply voltage.	Set the power supply voltage within the specified range.	-
	The power supply voltage dropped during operation.	Measure the power supply voltage.	Increase the power supply capacity.	_
	A momentary power interruption occurred.	Measure the power supply voltage.	If you have changed the setting of Pn509 (Momentary Power Interruption Hold Time), decrease the setting.	*1
A.410:	The SERVOPACK fuse is blown out.	Check the power supply wiring.	Correct the power supply wiring and replace the SERVOPACK.	_
Undervoltage (Detected in the main circuit power supply section of the	The SERVOPACK fuse is blown out.	-	Replace the SERVO- PACK and connect a reactor to the DC reactor terminals (⊝1 and ⊝2) on the SERVOPACK.	-
SERVOPACK.)	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
	The jumper between the DC Reactor terminals (⊝1 and ⊝2) was removed or there is faulty contact.  The cable between the DC Reactor and	_	Correct the wiring between the DC Reactor terminals.	-
	SERVOPACK is not wired correctly or there is a faulty contact.			
	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 Servo- motor is correctly wired.	-
A.510: Overspeed (The motor	A reference value that exceeded the over- speed detection level was input.	Check the input reference.	Reduce the reference value. Or, adjust the gain.	*1
exceeded the maximum speed.)	The motor exceeded the maximum speed.	Check the waveform of the motor speed.	Reduce the speed reference input gain and adjust the servo gain. Or, reconsider the operating conditions.	*1
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
A.511: Encoder Output Pulse Overspeed	The encoder output pulse frequency exceeded the limit.	Check the encoder output pulse setting.	Decrease the setting of Pn212 (Number of Encoder Output Pulses) or Pn281 (Encoder Out- put Resolution).	*1
	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.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	Abnormal oscillation was detected in the motor speed.	Check for abnormal motor noise, and check the speed and torque waveforms during operation.	Reduce the motor speed. Or, reduce the setting of Pn100 (Speed Loop Gain).	*1
A.520: Vibration Alarm	The setting of Pn103 (Moment of Inertia Ratio) is greater than the actual moment of inertia or was greatly changed.	Check the moment of inertia ratio or mass ratio.	Set Pn103 (Moment of Inertia Ratio) to an appropriate value.	*1
	The vibration detection level (Pn312 or Pn384) is not suitable.	Check that the vibration detection level (Pn312 or Pn384) is suitable.	Set a suitable vibration detection level (Pn312 or Pn384).	*1
A.521: Autotuning Alarm (Vibration was detected while executing the custom tuning, Easy FFT, or the tuning-less func- tion.)	The Servomotor vibrated considerably while performing the tuning-less function.	Check the waveform of the motor speed.	Reduce the load so that the moment of inertia ratio is within the allowable value. Or increase the load level or reduce the rigidity level in the tuning- less level settings.	*1
	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.	*1
A.550: Maximum Speed Setting Error	The setting of Pn385 (Maximum Motor Speed) is greater than the maximum speed.	Check the setting of Pn385, and the upper limits of the maximum motor speed setting and the encoder output resolution setting.	Set Pn385 to a value that does not exceed the maximum motor speed.	*1

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Alarm Number: Alarm Name	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 Servo- motor and encoder are correctly wired.	*1
	Operation was per- formed that exceeded the overload protec- tion characteristics.	Check the motor over- load characteristics and Run command.	Reconsider the load and operating conditions. Or, increase the motor capacity.	-
A.710:	An excessive load was applied during operation because the Servomotor was not driven due to mechanical problems.	Check the operation reference and motor speed.	Correct the mechanical problem.	-
Instantaneous Overload A.720: Continuous Overload	Operation was per- formed with a load applied to the shaft of the servomotor that exceeded the allow- able value.	Check the condition of the machine to deter- mine if a load was applied to the shaft of the servomotor that exceeded the allowable value.	Correct the condition of the machine so that the load on the shaft during servomotor operation does not exceed the allowable value.	-
	There is an error in the setting of Pn282 (Linear Encoder Scale Pitch).	Check the setting of Pn282.	Correct the setting of Pn282.	*1
	There is an error in the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection).	Check the setting of Pn080 = n.□□X□.	Set Pn080 = n.□□X□ to an appropriate value.	*1
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
A 720 and	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.	_
A.730 and A.731: Dynamic Brake Overload (An excessive power consumption by the dynamic brake was detected.)	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 SER-VOPACK.	_
A.740: Inrush Current Limiting Resistor Overload (The main circuit power supply	The allowable frequency of the inrush current limiting resistor was exceeded when the main circuit power supply was turned ON and OFF.	_	Reduce the frequency of turning the main circuit power supply ON and OFF.	-
was frequently turned ON and OFF.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_

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Alarm Number: Alarm Name	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 SERVO-PACK installation conditions.	*1
A.7A1:	An overload alarm was reset by turning OFF the power supply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	-
Internal Tempera- ture Error 1 (Control Board Temperature Error)	There was an excessive load or operation was performed that exceeded the regenerative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenerative load ratio to check the regenerative processing capacity.	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.	*1
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
	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 SERVO-PACK installation conditions.	*1
A.7A2:	An overload alarm was reset by turning OFF the power supply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	-
Internal Temperature Error 2 (Power Board Temperature Error)	There was an excessive load or operation was performed that exceeded the regenerative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenerative load ratio to check the regenerative processing capacity.	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.	*1
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
A.7A3: Internal Tempera- ture Sensor Error (An error occurred in the temperature sen- sor circuit.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.7Ab: SERVOPACK Built-in Fan Stopped	The fan inside the SERVOPACK stopped.	Check for foreign matter inside the SERVOPACK.	Remove foreign matter from the SERVOPACK. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SER- VOPACK.	-
	The power to the absolute encoder was turned ON for the first time.	Check to see if the power supply was turned ON for the first time.	Set up the encoder.	*1
A.810:	The Encoder Cable was disconnected and then connected again.	Check to see if the power supply was turned ON for the first time.	Check the encoder connection and set up the encoder.	*1
Encoder Backup Alarm (Detected at the encoder, but only when an abso- lute encoder is used.)	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.	*1
	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 SER-VOPACK.	-
A.820: Encoder Check- sum Alarm (Detected at the encoder.)	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 Singleturn Absolute Encoder or Incremental Encoder or Incremental Encoder The Servomotor may be faulty. Replace the Servomotor.  The linear encoder may be faulty. Replace the linear encoder.	*1
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
A.830: Encoder Battery Alarm (The absolute encoder battery voltage was lower than the speci- fied level.)	The battery connection is faulty or a battery is not connected.	Check the battery connection.	Correct the battery connection.	*1
	The battery voltage is lower than the specified value (2.7 V).	Measure the battery voltage.	Replace the battery.	*1
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_

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Alarm Number:			Continued from pro	
Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The encoder malfunctioned.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servo- motor or linear encoder.	-
1.040	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.	-
A.840: Encoder Data Alarm (Detected at the 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 supply.	-
	The encoder malfunctioned due to noise.	_	Correct the wiring around the encoder by separating the Encoder Cable from the Servomotor Main Cir- cuit Cable or by ground- ing 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.	_
	Rotary Servomotor: The Servomotor speed was 200 min <sup>-1</sup> or higher when the control power supply was turned ON.	Check the motor speed when the power supply is turned ON.	Reduce the Servomotor speed to a value less than 200 min <sup>-1</sup> , and turn ON the control power supply.	-
A.850: Encoder Over- speed (Detected at the encoder when the control power supply is turned ON.)	Linear Servomotor: The Servomotor exceeded the speci- fied speed when the control power supply was turned ON.	Check the motor speed when the power supply is turned ON.	Control the motor speed within the range specified by the linear encoder manufacturer and then turn ON the control power supply.	-
	A failure occurred in the encoder.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servo- motor or linear encoder.	-
	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.860:	The surrounding air temperature around the Servomotor is too high.	Measure the surrounding air temperature around the Servomotor.	Reduce the surrounding air temperature of the Servomotor to 40°C or less.	-
Encoder Over- heated (Detected when a Rotary Servomo-	The Servomotor load is greater than the rated load.	Use the accumulated load ratio to check the load.	Operate the Servo Drive so that the motor load remains within the specified range.	*1
tor, Absolute Linear Encoder, or Direct Drive Servomotor is connected. However, this alarm is not detected for SGMCS Servomotors.) (Detected at the encoder.)	A failure occurred in the encoder.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an 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 supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The surrounding temperature around the Servomotor is too high.	Measure the surrounding temperature around the Servomotor.	Reduce the surrounding air temperature of the Servomotor to 40° or less.	-
	The motor load is greater than the rated load.	Check the load with the accumulated load ratio on the Motion Monitor Tab Page on the SigmaWin+.	Operate the Servo Drive so that the motor load remains within the specified range.	*1
A.861: Motor Over- heated	A failure occurred in the Serial Converter Unit.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Serial Con- verter Unit may be faulty. Replace the Serial Con- verter Unit.	-
	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The surrounding temperature is too high.	Check the surrounding temperature using a thermometer.	Lower the surrounding temperature by improving the installation conditions of the Linear Servomotor or the machine.	-
	The overheat protection input signal line is disconnected or short-circuited.	Check the input voltage with the overheat protection input information on the Motion Monitor Tab Page on the SigmaWin+.	Repair the line for the overheat protection input signal.	-
A.862:	An overload alarm was reset by turning OFF the power supply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	-
Overheat Alarm	Operation was performed under an excessive load.	Use the accumulated load ratio to check the load during operation.	Reconsider the load and operating conditions.	-
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The temperature detection circuit in the Linear Servomotor is faulty or the sensor attached to the machine is faulty.	_	The temperature detection circuit in the Linear Servomotor may be faulty or the sensor attached to the machine may be faulty. Replace the Linear Servomotor or repair the sensor attached to the machine.	-
A.890: Encoder Scale Error	A failure occurred in the linear encoder.	-	The linear encoder may be faulty. Replace the linear encoder.	-
A.891: Encoder Module Error	A failure occurred in the linear encoder.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the linear encoder may be faulty. Replace the linear encoder.	-
A.8A0: External Encoder Error	Setting the origin of the absolute linear encoder failed because the motor moved.	Before you set the origin, use the fully-closed feedback pulse counter to confirm that the motor is not moving.	The motor must be stopped while setting the origin position.	*1
_	A failure occurred in the external encoder.	_	Replace the external encoder.	_
A.8A1:	A failure occurred in the external encoder.	_	Replace the external encoder.	_
External Encoder Module Error	A failure occurred in the Serial Converter Unit.	_	Replace the Serial Converter Unit.	_
A.8A2: External Incremental Encoder Sensor Error	A failure occurred in the external encoder.	_	Replace the external encoder.	-
A.8A3: External Absolute Encoder Position Error	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.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.8A5: External Encoder Overspeed	An overspeed error was detected in the external encoder.	Check the maximum speed of the external encoder.	Keep the external encoder below its maximum speed.	_
A.8A6: External Encoder Overheated	An overheating error was detected in the external encoder.	_	Replace the external encoder.	-
A.b10: Speed Reference	A malfunction occurred in the speed reference input section.	_	Reset the alarm and restart operation.	*1
A/D Error (Detected when the servo is turned ON.)	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A ladd.	A malfunction occurred in the speed reference input section.	_	Reset the alarm and restart operation.	*1
A.b11: Speed Reference A/D Data Error	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.b20: Torque Reference A/D Error	A malfunction occurred in the reading section for the torque reference input.	_	Reset the alarm and restart operation.	*1
(Detected when the servo is turned ON.)	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.b33: Current Detection Error 3	A failure occurred in the current detection circuit.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF0: System Alarm 0	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF1: System Alarm 1	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF2: System Alarm 2	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.bF3: System Alarm 3	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF4: System Alarm 4	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF5: System Alarm 5	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF6: System Alarm 6	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF7: System Alarm 7	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF8: System Alarm 8	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The order of phases U, V, and W in the motor wiring is not correct.	Check the Servomotor wiring.	Make sure that the Servo- motor is correctly wired.	_
A.C10:	There is an error in the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection).	Check the setting of Pn080 = n.□□X□.	Set Pn080 = n.□□X□ to an appropriate value.	*1
Servomotor Out of Control (Detected when the servo is turned ON.)	A failure occurred in the encoder.	_	If the motor wiring is correct and an alarm still occurs after turning the power supply 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 supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.C20: Phase Detection Error	The linear encoder signal level is too low.	Check the voltage of the linear encoder signal.	Fine-tune the mounting of the scale head. Or, replace the linear encoder.	-
	The count-up direction of the linear encoder does not match the forward direction of the Moving Coil in the motor.	Check the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection). Check the installation orientation for the linear encoder and Moving Coil.	Change the setting of Pn080 = n.□□X□. Correctly reinstall the linear encoder or Moving Coil.	*1
	The polarity sensor signal is being affected by noise.	_	Correct the FG wiring. Implement countermea- sures against noise for the polarity sensor wiring.	-
	The setting of Pn282 (Linear Encoder Scale Pitch) is not correct.	Check the setting of Pn282 (Linear Encoder Scale Pitch).	Check the specifications of the linear encoder and set a correct value.	*1
A.C21:	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.	-
Polarity Sensor Error	The polarity sensor is not wired correctly.	Check the wiring of the polarity sensor.	Correct the wiring of the polarity sensor.	_
	The polarity sensor failed.	_	Replace the polarity sensor.	_
A.C22: Phase Information Disagreement	The SERVOPACK phase information is different from the linear encoder phase information.	_	Perform polarity detection.	*1

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Alarm Number:			Continued from pro	
Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The parameter settings are not correct.	Check the linear encoder specifications and feedback signal status.	The settings of Pn282 (Linear Encoder Scale Pitch) and Pn080 = n.□□X□ (Motor Phase Sequence Selection) may not match the installation. Set the parameters to correct values.	*1
	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 SER-VOPACK and that the FG terminal on the SER-VOPACK 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.	_
A.C50: Polarity Detection Failure	An external force was applied to the Moving Coil of the motor.	_	The polarity cannot be properly detected if the detection reference is 0 and the speed feedback is not 0 because of an external force, such as cable tension, applied to the Moving Coil. Implement measures to reduce the external force so that the speed feedback goes to 0. If the external force cannot be reduced, increase the setting of Pn481 (Polarity Detection Speed Loop Gain).	-
	The linear encoder resolution is too low.	Check the linear encoder scale pitch to see if it is within 100 µm.	If the linear encoder scale pitch is 100 μm or higher, the SERVOPACK cannot detect the correct speed feedback. Use a linear encoder scale pitch with higher resolution. (We recommend a pitch of 40 μm or less.) Or, increase the setting of Pn485 (Polarity Detection Reference Speed). However, increasing the setting of Pn485 will increase the Servomotor movement range that is required for polarity detection.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.C51: Overtravel Detected during Polarity Detection	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.	*1
A.C52: Polarity Detection Not Completed	The servo was turned ON under the following circumstances.  • Before polarity detection was completed  • Before /P-DET was input	_	Input the /P-DET signal.	*1
A.C53: Out of Range of Motion for Polar- ity Detection	The travel distance exceeded the setting of Pn48E (Polarity Detection Range) in the middle of detection.	_	Increase the setting of Pn48E (Polarity Detection Range). Or, increase the setting of Pn481 (Polarity Detection Speed Loop Gain).	-
A.C54: Polarity Detection Failure 2	An external force was applied to the Servomotor.	_	Increase the setting of Pn495 (Polarity Detection Confirmation Force Reference). Increase the setting of Pn498 (Polarity Detection Allowable Error Range). Increasing the allowable error will also increase the motor temperature.	-
A.C80: Encoder Clear Error or Multiturn Limit Setting Error	A failure occurred in the encoder.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servo- motor or linear encoder.	-
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Continued from pri	Reference
	There is a faulty contact in the connector or the connector is not wired correctly for the encoder.	Check the condition of the encoder connector.	Reconnect the encoder connector and check the encoder wiring.	*1
	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 specifications.	-
A.C90: Encoder Commu-	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 SER-VOPACK.	*1
nications Error	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.	*1
	A failure occurred in the SERVOPACK.	_	Connect the Servomotor to another SERVOPACK, and turn ON the control power supply. If no alarm occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	A failure occurred in the encoder.	_	Connect the Servomotor to another SERVOPACK, and turn ON the control power supply. If the alarm occurs, the Servomotor may be faulty. Replace the Servomotor.	-
A.C91: Encoder Communications Position Data Acceleration Rate Error	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.	*1
	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 influ- ence 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.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	Noise entered on the signal line from the encoder.	_	Implement countermeasures against noise for the encoder wiring.	*1
	Excessive vibration or shock was applied to the encoder.	Check the operating conditions.	Reduce machine vibration. Correctly install the Servomotor or linear encoder.	-
A.C92: Encoder Communications Timer Error	A failure occurred in the encoder.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servo- motor or linear encoder.	-
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.CA0: Encoder Parame- ter Error	A failure occurred in the encoder.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servo- motor or linear encoder.	-
	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Continued from pre	Reference
Alarm Name	The encoder is wired incorrectly or there is faulty contact.	Check the wiring of the encoder.	Make sure that the encoder is correctly wired.	*1
	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 <sup>2</sup> .	-
	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.	-
A.Cb0: Encoder Echo- back Error	There is variation in the FG potential because of the influ- ence 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 supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servo- motor or linear encoder.	-
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	When using a Direct Drive Servomotor, the setting of Pn205 (Mul- titurn Limit) does not agree with the encoder.	Check the setting of Pn205.	Correct the setting of Pn205 (0 to 65,535).	*1
A.CC0: Multiturn Limit Disagreement	The multiturn limit of the encoder is differ- ent from that of the SERVOPACK. Or, the multiturn limit of the SERVOPACK has been changed.	Check the setting of Pn205 in the SERVO-PACK.	Change the setting if the alarm occurs.	*1
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The cable between the Serial Converter Unit and SERVOPACK is not wired correctly or there is a faulty contact.	Check the wiring of the external encoder.	Correctly wire the cable between the Serial Converter Unit and SERVO-PACK.	*1
A.CF1: Reception Failed Error in Feed-	A specified cable is not being used between Serial Con- verter Unit and SER- VOPACK.	Check the wiring specifications of the external encoder.	Use a specified cable.	-
back Option Module Commu- nications	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 SERVO-PACK 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 SERVO-PACK.	-
A.CF2: Timer Stopped Error in Feed- back Option Module Commu- nications	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 SERVO- PACK.	-
A.d00: Position Deviation Overflow (The setting of Pn520 (Position Deviation Overflow Alarm Level) was exceeded by the position deviation while the servo was ON.)	The Servomotor U, V, and W wiring is not correct.	Check the wiring of the Servomotor's Main Circuit Cables.	Make sure that there are no faulty contacts in the wiring for the Servomotor and encoder.	-
	The frequency of the position reference pulse is too high.	Reduce the reference pulse frequency and try operating the SERVO- PACK.	Reduce the position reference pulse frequency or the reference acceleration rate, or reconsider the electronic gear ratio.	*1
	The acceleration of the position reference is too high.	Reduce the reference acceleration and try operating the SERVO- PACK.	Apply smoothing, i.e., by using Pn216 (Position Reference Acceleration/ Deceleration Time Constant).	*1
	The setting of Pn520 (Position Deviation Overflow Alarm Level) is too low for the operating conditions.	Check Pn520 (Position Deviation Overflow Alarm Level) to see if it is set to an appropriate value.	Optimize the setting of Pn520.	*]
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

#### 4.1.3 Troubleshooting Alarms

Continued from previous page.

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.d01: Position Deviation Overflow Alarm at Servo ON	The servo was turned ON after the position deviation exceeded the setting of Pn526 (Position Deviation Overflow Alarm Level at Servo ON) while the servo was OFF.	Check the position deviation while the servo is OFF.	Set the position deviation to be cleared while the servo is OFF. Optimize the setting of Pn526 (Position Deviation Overflow Alarm Level at Servo ON).	*1
A.d02: Position Deviation Overflow Alarm for Speed Limit at Servo ON	If position deviation remains in the deviation counter, the setting of Pn529 or Pn584 (Speed Limit Level at Servo ON) limits the speed when the servo is turned ON. This alarm occurs if reference pulses are input and the setting of Pn520 (Position Deviation Overflow Alarm Level) is exceeded.	_	Set the position deviation to be cleared while the servo is OFF. Optimize the setting of Pn520 (Position Deviation Overflow Alarm Level). Or, adjust the setting of Pn529 or Pn584 (Speed Limit Level at Servo ON).	*1
A.d10:  Motor-Load Position Deviation	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 = n.XDDD (External Encoder Usage) to reverse the direction.	*1
Overflow	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.	_
A.d30: Position Data Overflow	The position data exceeded ±1,879,048,192.	Check the input reference pulse counter.	Reconsider the operating specifications.	-
	There is a faulty connection between the SERVOPACK and the Safety Option Module.	Check the connection between the SERVO- PACK and the Safety Option Module.	Correctly connect the Safety Option Module.	-
A.E71: Safety Option Module Detec- tion Failure	The Safety Option Module was discon- nected.	-	Execute Fn014 (Reset Option Module Configuration Error) from the Digital Operator or SigmaWin+ and then turn the power supply to the SERVO-PACK OFF and ON again.	*1
	A failure occurred in the Safety Option Module.	_	Replace the Safety Option Module.	-
	A failure occurred in the SERVOPACK.	_	Replace the SERVO-PACK.	_

4

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	There is a faulty connection between the SERVOPACK and the Feedback Option Module.	Check the connection between the SERVO-PACK and the Feedback Option Module.	Correctly connect the Feedback Option Module.	-
A.E72: Feedback Option Module Detec- tion Failure	The Feedback Option Module was discon- nected.	_	Reset the Option Module configuration error and turn the power supply to the SERVOPACK OFF and ON again.	*1
	A failure occurred in the Feedback Option Module.	-	Replace the Feedback Option Module.	-
	A failure occurred in the SERVOPACK.	-	Replace the SERVO- PACK.	_
A.E74: Unsupported	A failure occurred in the Safety Option Module.	-	Replace the Safety Option Module.	-
Safety Option Module	An unsupported Safety Option Module was connected.	Refer to the catalog of the connected Safety Option Module.	Connect a compatible Safety Option Module.	-
A.Eb1: Safety Function Signal Input Tim- ing Error	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 SER-VOPACK 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 SERVO- PACK.	_
A.EC8: Gate Drive Error 1 (An error occurred in the gate drive circuit.)  A.EC9: Gate Drive Error 2 (An error occurred in the gate drive circuit.)	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	_

#### 4.1.3 Troubleshooting Alarms

Continued from previous page.

Alarm Number:	5 "1 6	0 " "	Continued from pro	
Alarm Name	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.	*1
A.F10: Power Supply Line Open Phase	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.	-
(The voltage was low for more than one second for phase R, S, or T when the main power supply	A single-phase power supply was input without specifying a signal-phase AC power supply input (Pn00B = n.□1□□).	Check the power supply and the parameter setting.	Match the parameter setting to the power supply.	*1
was ON.)	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
FL-1*6: System Alarm FL-2*6: System Alarm FL-3*6: System Alarm FL-4*6: System Alarm FL-5*6: System Alarm FL-6*6: System Alarm	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	_
CPF00: Digital Operator Communications	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.	-
Error 1	A malfunction was caused by noise.	_	Keep the Digital Operator or the cable away from sources of noise.	_
CPF01: Digital Operator	A failure occurred in the Digital Operator.	_	Disconnect the Digital Operator and then connect it again. If an alarm still occurs, the Digital Operator may be faulty. Replace the Digital Operator.	-
Communications Error 2	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

- \*1. Refer to the following manual for details.
  - Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)
- \*2. Detection Conditions
  - · Rotary Servomotor

If either of the following conditions is detected, an alarm will occur.

• Pn533 [min<sup>-1</sup>] 
$$\times \frac{\text{Encoder resolution}}{6 \times 10^5} \le \frac{\text{Pn20E}}{\text{Pn210}}$$

■ Maximum motor speed [min<sup>-1</sup>] × 
$$\frac{\text{Encoder resolution}}{\text{Approx. } 3.66 \times 10^{12}} \ge \frac{\text{Pn20E}}{\text{Pn210}}$$

· Linear Servomotor

If either of the following conditions is detected, an alarm will occur.

- \*3. Detection Conditions
  - Rotary Servomotor

If either of the following conditions is detected, an alarm will occur.

• Rated motor speed [min<sup>-1</sup>] 
$$\times$$
 1/3  $\times$   $\frac{\text{Encoder resolution}}{6 \times 10^5} \le \frac{\text{Pn20E}}{\text{Pn210}}$ 

• Maximum motor speed [min<sup>-1</sup>] 
$$\times \frac{\text{Encoder resolution}}{\text{Approx. } 3.66 \times 10^{12}} \ge \frac{\text{Pn20E}}{\text{Pn210}}$$

· Linear Servomotor

If either of the following conditions is detected, an alarm will occur.

$$\frac{\text{Rated motor speed [mm/s]} \times 1/3}{\text{Linear encoder pitch [$\mu m$]}} \times \frac{\text{Resolution of Serial Converter Unit}}{10} \leq \frac{\frac{\text{Pn20E}}{\text{Pn210}}}{\frac{\text{Pn385}}{\text{Enear encoder pitch [$\mu m$]}}} \times \frac{\frac{\text{Resolution of Serial Converter Unit}}{\text{Approx. } 6.10 \times 10^5}} \geq \frac{\frac{\text{Pn20E}}{\text{Pn210}}}{\frac{\text{Pn210}}{\text{Pn210}}}$$

- \*4. Refer to the following manual for details.
  - Σ-7-Series Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)
- \*5. The SERVOPACK will fail if the External Regenerative Resistor or Regenerative Resistor Unit is connected while the jumper is connected between the B2 and B3 terminals.
- \*6. These alarms are not stored in the alarm history. They are only displayed on the panel display.

#### **Warning Displays** 4.1.4

If a warning occurs in the SERVOPACK, a warning number will be displayed on the panel display. Warnings are displayed to warn you before an alarm occurs.

# 4.1.5 List of Warnings

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

Warning	Warning Name	Meaning		rning C Output	
Number	_	<u>-</u>	ALO1	ALO2	ALO3
A.900	Position Deviation Overflow	The position deviation exceeded the percentage set with the following formula: (Pn520 × Pn51E/100)	Н	Н	Н
A.901	Position Deviation Overflow Alarm at Servo ON	The position deviation when the servo was turned ON exceeded the percentage set with the following formula: (Pn526 × Pn528/100)	Н	Н	Н
A.910	Overload	This warning occurs before an overload alarm (A.710 or A.720) occurs. If the warning is ignored and operation is continued, an alarm may occur.	L	Н	Н
A.911	Vibration	Abnormal vibration was detected during motor operation. The detection level is the same as A.520. Set whether to output an alarm or a warning by setting Pn310 (Vibration Detection Selections).	L	Н	Н
A.912	Internal Temperature Warning 1 (Control Board Temperature Error)	The surrounding temperature of the control PCB is abnormal.	Н	L	Н
A.913	Internal Temperature Warning 2 (Power Board Temperature Error)	The surrounding temperature of the power PCB is abnormal.	Н	L	Н
A.920	Regenerative Overload	This warning occurs before an A.320 alarm (Regenerative Overload) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Н	L	Н
A.921	Dynamic Brake Over- load	This warning occurs before an A.731 alarm (Dynamic Brake Overload) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Н	L	Н
A.923	SERVOPACK Built-in Fan Stopped	The fan inside the SERVOPACK stopped.	Н	L	Н
A.930	Absolute Encoder Bat- tery Error	This warning occurs when the voltage of absolute encoder's battery is low.	L	L	Н
A.93B	Overheat Warning	The input voltage (temperature) for the overheat protection input (TH) signal exceeded the setting of Pn61C (Overheat Warning Level).	L	L	Н
A.941	Change of Parameters Requires Restart	Parameters have been changed that require the power supply to be turned OFF and ON again.	Н	Н	L
A.942	Speed Ripple Compensation Information Disagreement	The speed ripple compensation information stored in the encoder does not agree with the speed ripple compensation information stored in the SER-VOPACK.	Н	Н	L
A.971	Undervoltage	This warning occurs before an A.410 alarm (Undervoltage) occurs. If the warning is ignored and operation is continued, an alarm may occur.	L	L	L
A.9A0	Overtravel	Overtravel was detected while the servo was ON.	Н	L	L
A.9b0	Preventative Mainte- nance Warning	One of the consumable parts has reached the end of its service life.	Н	L	Н

Note: 1. A warning code is not output unless you set Pn001 to n.1 \(\sigma\) (Output both alarm codes and warning codes).

2. 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	Parameters That Must Be Set to Select Warning Detection
A.911	Pn310 = n.□□□X (Vibration Detection Selection)
A.923	_ (Not affected by the setting of Pn008 = n.□X□□.)
A.930	Pn008 = n.□□□X (Low Battery Voltage Alarm/Warning Selection)
A.942	Pn423 = n.□□X□ (Speed Ripple Compensation Information Disagreement Warning Detection Selection)
A.971	Pn008 = n.□□X□ (Function Selection for Undervoltage) (Not affected by the setting of Pn008 = n.□X□□.)
A.9A0	Pn00D = n.X□□□ (Overtravel Warning Detection Selection) (Not affected by the setting of Pn008 = n.□X□□.)
A.9b0	Pn00F = n.□□□X (Preventative Maintenance Warning Selection)

# 4.1.6 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.

Warning Number: Warning Name	Possible Cause	Confirmation	Correction	Reference
	The Servomotor U, V, and W wiring is not correct.	Check the wiring of the Servomotor's Main Circuit Cables.	Make sure that there are no faulty connections in the wiring for the Servomotor and encoder.	-
	A SERVOPACK gain is too low.	Check the SERVO- PACK gains.	Increase the servo gain, e.g., by using autotuning without a host reference.	*
	The frequency of the position refer- ence pulse is too high.	Reduce the reference pulse frequency and try operating the SERVO- PACK.	Reduce the position reference pulse frequency or the reference acceleration rate, or reconsider the electronic gear ratio.	*
A.900: Position Deviation Overflow	The acceleration of the position reference is too high.	Reduce the reference acceleration and try operating the SERVO-PACK.	Apply smoothing, i.e., by using Pn216 (Position Reference Acceleration/ Deceleration Time Constant).	*
	The excessive position deviation alarm level (Pn520 × Pn51E/100) is too low for the operating conditions.	Check excessive position deviation alarm level (Pn520 × Pn51E/100) to see if it is set to an appropriate value.	Optimize the settings of Pn520 and Pn51E.	*
	A failure occurred in the SERVO-PACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.901: Position Deviation Overflow Alarm at Servo ON	The position deviation when the servo was turned ON exceeded the percentage set with the following formula: (Pn526 × Pn528/100)	_	Set the position deviation to be cleared while the servo is OFF. Optimize the setting of Pn528 (Position Deviation Overflow Warning Level at Servo ON).	*

#### 4.1.6 Troubleshooting Warnings

Continued from previous page.

Warning Number: Warning Name	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 Servo- motor and encoder are cor- rectly wired.	-
	Operation was performed that exceeded the overload protection characteristics.	Check the motor over- load characteristics and Run command.	Reconsider the load and operating conditions. Or, increase the motor capacity.	-
A.910: Overload (warning before an A.710 or A.720 alarm occurs)	An excessive load was applied during operation because the Servomotor was not driven because of mechanical problems.	Check the operation reference and motor speed.	Remove the mechanical problem.	-
	The overload warning level (Pn52B) is not suitable.	Check that the overload warning level (Pn52B) is suitable.	Set a suitable overload warning level (Pn52B).	*
	A failure occurred in the SERVO-PACK.	_	The SERVOPACK may be faulty. Replace the SERVO-PACK.	-
	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.	*
A.911: Vibration	The setting of Pn103 (Moment of Inertia Ratio) is greater than the actual moment of inertia or was greatly changed.	Check the moment of inertia ratio or mass ratio.	Set Pn103 (Moment of Inertia Ratio) to an appropriate value.	*
	The vibration detection level (Pn312 or Pn384) is not suitable.	Check that the vibration detection level (Pn312 or Pn384) is suitable.	Set a suitable vibration detection level (Pn312 or Pn384).	*

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Warning Number:	Possible Cause	Confirmation	Continued from pre	Reference
Warning Name	1 Ussible Gause		Correction	Helefelle
	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 supply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	-
A.912: Internal Tempera- ture Warning 1 (Control Board Tem- perature Error)	There was an excessive load or operation was performed that exceeded the regenerative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenerative load ratio to check the regenerative processing capacity.	Reconsider the load and operating conditions.	-
	The SERVOPACK installation orientation is not correct or there is insufficient space around the SERVOPACK.	Check the SERVO- PACK installation con- ditions.	Install the SERVOPACK according to specifications.	*
	A failure occurred in the SERVO-PACK.	_	The SERVOPACK may be faulty. Replace the SERVO-PACK.	-
	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 supply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	_
A.913: Internal Tempera- ture Warning 2 (Power Board Tem- perature Error)	There was an excessive load or operation was performed that exceeded the regenerative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenerative load ratio to check the regenerative processing capacity.	Reconsider the load and operating conditions.	-
	The SERVOPACK installation orientation is not correct or there is insufficient space around the SERVOPACK.	Check the SERVO- PACK installation con- ditions.	Install the SERVOPACK according to specifications.	*
	A failure occurred in the SERVO-PACK.	-	The SERVOPACK may be faulty. Replace the SERVO-PACK.	_

#### 4.1.6 Troubleshooting Warnings

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Warning Number: Warning Name	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.	-
A.920: Regenerative Overload (warning before an A.320 alarm occurs)	There is insufficient external regenerative resistance, regenerative resistor capacity, or SER-VOPACK capacity, or there has been a continuous regeneration state.	Check the operating conditions or the capacity using the SigmaJunmaSize+ Capacity Selection Software or another means.	Change the regenerative resistance value, regenerative resistance capacity, or SERVOPACK capacity. Reconsider the operating conditions using the Sigma-JunmaSize+ Capacity Selection Software or other means.	-
	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 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.	-
A.921: Dynamic Brake Overload (warning before an A.731 alarm occurs)	When the Servo- motor 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 or mass.  Reduce the frequency of stopping with the dynamic brake.	-
	A failure occurred in the SERVO-PACK.	_	The SERVOPACK may be faulty. Replace the SERVO-PACK.	-
A.923: SERVOPACK Built- in Fan Stopped	The fan inside the SERVOPACK stopped.	Check for foreign matter inside the SERVO-PACK.	Remove foreign matter from the SERVOPACK. If an alarm still occurs, the SER- VOPACK may be faulty. Replace the SERVOPACK.	-
A.930: Absolute Encoder Battery Error (The absolute encoder battery voltage was lower than the spec- ified level.) (Detected only when an abso-	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.	*
lute encoder is connected.)	A failure occurred in the SERVO-PACK.	_	The SERVOPACK may be faulty. Replace the SERVO-PACK.	_

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Warning Number: Warning Name	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.	Use the accumulated load ratio to check the load during operation.	Reconsider the load and operating conditions.	-
A.93B: Overheat Warning	A failure occurred in the SERVO-PACK.	_	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The temperature detection circuit in the Linear Servomotor is faulty or the sensor attached to the machine is faulty.	_	The temperature detection circuit in the Linear Servomotor may be faulty or the sensor attached to the machine may be faulty. Replace the Linear Servomotor or repair the sensor attached to the machine.	-
A.941: Change of Parameters Requires Restart	Parameters have been changed that require the power supply to be turned OFF and ON again.	-	Turn the power supply to the SERVOPACK OFF and ON again.	-
	The speed ripple compensation information stored in the encoder does not agree with the speed ripple compensa-	_	Reset the speed ripple compensation value on the SigmaWin+.	*
A.942: Speed Ripple Compensation Disagreement		_	Set Pn423 to n. \(\Pi\) \(\D\) (Do not detect A.942 alarms). However, changing the setting may increase the speed ripple.	-
tion Disagreement	tion information stored in the SER- VOPACK.	_	Set Pn423 to n. \(\sim \sim \sim \sim \sim \sim \sim \sim	-
	For a 200-V SER- VOPACK, the AC power supply volt- age dropped below 140 V.	Measure the power supply voltage.	Set the power supply voltage within the specified range.	-
	For a 100-V SERVOPACK, the AC power supply voltage dropped below 60 V.	Measure the power supply voltage.	Set the power supply voltage within the specified range.	-
A.971: Undervoltage	The power supply voltage dropped during operation.	Measure the power supply voltage.	Increase the power supply capacity.	_
	A momentary power interruption occurred.	Measure the power supply voltage.	If you have changed the setting of Pn509 (Momentary Power Interruption Hold Time), decrease the setting.	*
	The SERVOPACK fuse is blown out.	-	Replace the SERVOPACK and connect a reactor.	*
	A failure occurred in the SERVO-PACK.	_	The SERVOPACK may be faulty. Replace the SERVO-PACK.	_

#### 4.1.6 Troubleshooting Warnings

Continued from previous page.

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Warning Number: Warning Name	Possible Cause	Confirmation	Correction	Reference
A.9A0: Overtravel (Overtravel status was detected.)	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.	*
A.9b0: Preventative Mainte- nance Warning	One of the consumable parts has reached the end of its service life.	_	Replace the part. Contact your Yaskawa representative for replacement.	*

<sup>\*</sup> Refer to the following manual for details.  $\square$   $\Sigma$ -7-Series  $\Sigma$ -7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)

# 4.1.7 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.

Problem	Possible Cause	Confirmation	Correction	Reference
	The control power supply is not turned ON.	Measure the voltage between control power supply terminals.	Turn OFF the power supply to the servo system. Correct the wiring so that the control power supply is turned ON.	-
	The main circuit power supply is not turned ON.	Measure the voltage between the main circuit power input terminals.	Turn OFF the power supply to the servo system. Correct the wiring so that the main circuit power supply is turned ON.	-
	The I/O signal connector (CN1) pins are not wired correctly or are disconnected.	Turn OFF the power supply 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 for the Servomotor Main Circuit Cables or Encoder Cable is disconnected.	Check the wiring conditions.	Turn OFF the power supply to the servo system. Wire the cable correctly.	-
Servomotor Does Not Start	There is an overload on the Servomotor.	Operate the Servomotor with no load and check the load status.	Turn OFF the power supply to the servo system. Reduce the load or replace the Servomotor with a Servomotor with a larger capacity.	-
	The type of encoder that is being used does not agree with the setting of Pn002 = n. \(\sigma \times \sigma \sigma \sigma \sigma \times \sigma	Check the type of the encoder that is being used and the setting of Pn002 = n.□X□□.	Set Pn002 = n. \(\Pi\)X\(\Pi\) according to the type of the encoder that is being used.	*
	No speed or position reference is input.	Turn OFF the power supply to the servo system. Check the allocation status of the input signals.	Allocate an input signal so that the speed and position references are input correctly.	*
	There is a mistake in the input signal allocations (Pn50A to Pn50D, Pn515, and Pn516).	Check the input signal allocations (Pn50A to Pn50D, Pn515, and Pn516).	Correctly allocate the input signals (Pn50A to Pn50D, Pn515, and Pn516).	*
	The /S-ON (Servo ON) signal is OFF.	Check the settings of Pn50A = n.□□□X (Input Signal Allocation Mode) and Pn50A = n.□□X□ (/S-ON (Servo ON) Signal Allocation).	Set Pn50A = n.□□XX correctly and turn ON the /S-ON signal.	*
	The function setting of the / P-CON (Proportional Control) signal is not correct.	Check the setting of $Pn000 = n.\square\square X\square$ (Control Method Selection).	Set the parameter to match the application.	*
	The SEN input is OFF.	Check the ON/OFF status of the SEN input.	If you are using an absolute encoder, turn ON the SEN signal.	*

#### 4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	Possible Cause	Confirmation	Continued from pre	Reference
	The reference pulse mode selection is not correct.	Check the setting of Pn200 =n. DDDX (Reference Pulse Form) and the reference pulse form.	Set Pn200 =n.□□□X so that is agrees with the reference pulse form.	*
	Speed control: The speed reference input is not appropriate.	Check between the speed reference input (V-REF) and signal ground (SG) to see if the control method and the input agree.	Correctly set the control method and input method.	*
	Torque control: The torque reference input is not appropriate.	Check between the torque reference input (T-REF) and signal ground (SG) to see if the control method and the input agree.	Correctly set the control method and input method.	*
	Position control: The reference pulse input is not appropriate.	Check the setting of Pn200 =n. DDDX (Reference Pulse Form) and the sign and pulse signals.	Correctly set the control method and input method.	*
	The /CLR (Position Deviation Clear) input signal has not been turned OFF.	Check the /CLR signal (CN1-14 and CN1-15).	Turn OFF the /CLR signal.	*
	The P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal is still OFF.	Check the P-OT and N-OT signals.	Turn ON the P-OT and N-OT signals.	*
Servomotor Does Not Start	The safety input signals (/HWBB1 or /HWBB2) were not turned ON.	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.	*
	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 = n.□□□X (FSTP (Forced Stop Input) Signal Allocation) to disable the signal.	*
	A failure occurred in the SER-VOPACK.	_	Turn OFF the power supply to the servo system. Replace the SERVO-PACK.	-
		Check the setting of Pn080 =n.□□□X (Polarity Sensor Selection).	Correct the parameter setting.	*
	The polarity detection was not executed.	Check the /S-ON (Servo ON) or /P-DET (Polarity Detection) input signal.	<ul> <li>If you are using an incremental linear encoder, turn ON the /S-ON or /P-DET signal.</li> <li>If you are using an absolute linear encoder, turn OFF the external /S-ON signal and execute polarity detection.</li> </ul>	*

4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

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Problem	Possible Cause	Confirmation	Correction	Reference
	There is a mistake in the Servomotor wiring.	Turn OFF the power supply to the servo system. Check the wiring.	Wire the Servomotor correctly.	-
	There is a mistake in the wiring of the encoder or Serial Converter Unit.	Turn OFF the power supply to the servo system. Check the wiring.	Wire the Serial Converter Unit correctly.	-
Servomotor	There is a mistake in the linear encoder wiring.	Turn OFF the power supply to the servo system. Check the wiring.	Wire the cable correctly.	-
Moves Instanta- neously,	The setting of Pn282 (Linear Encoder Scale Pitch) is not correct.	Check the setting of Pn282.	Correct the setting of Pn282.	*
and Then Stops	The count-up direction of the linear encoder does not match the forward direction of the Moving Coil in the motor.	Check the directions.	Change the setting of Pn080 = n. \$\square\$ (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.	-
Servomotor Speed Is Unstable	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 supply to the servo system. Check the wiring.	Tighten any loose terminals or connectors and correct the wiring.	-

#### 4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	Possible Cause	Confirmation	Continued from pre	Reference
1 TODIGITI	1 OSSIDIO Oduso	Check between the	Correction	ricierence
	Speed control: The speed reference input is not appropriate.	speed reference input (V-REF) and signal ground (SG) to see if the control method and the input agree.	Correctly set the control method and input method.	*
	Torque control: The torque reference input is not appropriate.	Check between the torque reference input (T-REF) and signal ground (SG) to see if the control method and the input agree.	Correctly set the control method and input method.	*
	The speed reference offset is not correct.	The SERVOPACK offset is adjusted incorrectly.	Adjust the SERVO- PACK offset.	*
Servomotor Moves with- out a Refer-	Position control: The reference pulse input is not appropriate.	Check the setting of Pn200 =n. \(\sigma\) \(\sigma\) (Reference Pulse Form) and the sign and pulse signals.	Correctly set the control method and input method.	-
ence Input	A failure occurred in the SER-VOPACK.	_	Turn OFF the power supply to the servo system. Replace the SERVO-PACK.	-
	The count-up direction of the linear encoder does not match the forward direction of the Moving Coil in the motor.	Check the directions.	Change the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection). Match the linear encoder direction and Servomotor direction.	*
	Polarity detection was not performed correctly.	Check to see if electrical angle 2 (electrical angle from polarity origin) at any position is between ±10°.	Correct the settings for the polarity detection-related parameters.	-
Dynamic Brake Does Not Operate	The setting of Pn001 = n.□□□X (Motor Stopping Method for Servo OFF and Group 1 Alarms) is not suitable.	Check the setting of Pn001 = n.□□□X.	Set Pn001 = n.□□□X correctly.	-
	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 resistance may be disconnected.	Turn OFF the power supply to the servo system. Replace the SERVO-PACK. 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 supply to the servo system. Replace the SERVO-PACK.	-

4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	Possible Cause	Confirmation	Correction 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 moment of inertia ratio or mass ratio is within the allowable value, or increase the load level or reduce the rigidity level in the tuning-less level settings. If the situation is not improved, disable the tuning-less function (i.e., set Pn170 to n.□□□□0) and execute autotuning either with or without a host reference.	*
		Turn OFF the power supply to the servo system. Check to see if there are any loose mounting screws.	Tighten the mounting screws.	-
	The machine mounting is not secure.	Turn OFF the power supply to the servo system. Check to see if there is misalignment in the coupling.	Align the coupling.	-
Abnormal Noise from Servomotor		Turn OFF the power supply to the servo system. Check to see if the coupling is balanced.	Balance the coupling.	_
	The bearings are defective.	Turn OFF the power supply 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 supply 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 supply to the servo system. Check the I/O signal cables to see if they satisfy specifications. Use shielded twisted-pair wire cables or screened twisted-pair cables with conductors of at least 0.12 mm <sup>2</sup> .	Use cables that satisfy the specifications.	-
	Noise interference occurred because an I/O signal cable is too long.	Turn OFF the power supply 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.	_

#### 4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	Possible Cause	Confirmation	Continued from pre	Reference
Tiobidiii	Noise interference occurred because of incorrect Encoder Cable specifications.	Turn OFF the power supply to the servo system.  Make sure that the rotary or Linear Encoder Cable satisfies the specifications. Use a shielded twisted-pair wire cable or a screened twisted-pair cable with a conductors of at least 0.12 mm <sup>2</sup> .	Use cables that satisfy the specifications.	-
	Noise interference occurred because the Encoder Cable is too long.	Turn OFF the power supply 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.	-
Abnormal Noise from Servomotor	Noise interference occurred because the Encoder Cable is damaged.	Turn OFF the power supply 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 envi- ronment.	-
	The Encoder Cable was subjected to excessive noise interference.	Turn OFF the power supply to the servo system. Check to see if the Encoder Cable is bundled with a high-current line or installed near a high-current line.	Correct the cable lay- out so that no surge is applied by high-current lines.	-
	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 supply 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 supply 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 supply 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 supply to the servo system. Replace the Servomo- tor.	-

4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	Possible Cause	Confirmation	Correction	Reference
Abnormal Noise from Servomotor	A failure occurred in the Serial Converter Unit.	-	Turn OFF the power supply to the servo system. Replace the Serial Converter Unit.	-
	A failure occurred in the linear encoder.	_	Turn OFF the power supply to the servo system. Replace the linear encoder.	-
	The servo gains are not balanced.	Check to see if the servo gains have been correctly tuned.	Perform autotuning without a host reference.	*
Servomotor	The setting of Pn100 (Speed Loop Gain) is too high.	Check the setting of Pn100. The default setting is Kv = 40.0 Hz.	Set Pn100 to an appropriate value.	-
Vibrates at Frequency of Approx.	The setting of Pn102 (Position Loop Gain) is too high.	Check the setting of Pn102. The default setting is Kp = 40.0/s.	Set Pn102 to an appropriate value.	-
200 Hz to 400 Hz.	The setting of Pn101 (Speed Loop Integral Time Constant) is not appropriate.	Check the setting of Pn101. The default setting is Ti = 20.0 ms.	Set Pn101 to an appropriate value.	_
	The setting of Pn103 (Moment of Inertia Ratio or Mass Ratio) is not appropri- ate.	Check the setting of Pn103.	Set Pn103 to an appropriate value.	-
	The servo gains are not balanced.	Check to see if the servo gains have been correctly tuned.	Perform autotuning without a host reference.	*
	The setting of Pn100 (Speed Loop Gain) is too high.	Check the setting of Pn100. The default setting is Kv = 40.0 Hz.	Set Pn100 to an appropriate value.	_
Large Motor Speed	The setting of Pn102 (Position Loop Gain) is too high.	Check the setting of Pn102. The default setting is Kp = 40.0/s.	Set Pn102 to an appropriate value.	_
Overshoot on Starting and Stop- ping	The setting of Pn101 (Speed Loop Integral Time Constant) is not appropriate.	Check the setting of Pn101. The default setting is Ti = 20.0 ms.	Set Pn101 to an appropriate value.	-
	The setting of Pn103 (Moment of Inertia Ratio or Mass Ratio) is not appropri- ate.	Check the setting of Pn103.	Set Pn103 to an appropriate value.	-
	The torque reference is saturated.	Check the waveform of the torque reference.	Use the mode switch.	
	The force limits (Pn483 and Pn484) are set to the default values.	The default values of the force limits and Pn483 = 30% and Pn484 = 30%.	Set Pn483 and Pn484 to appropriate values.	*

#### 4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Droblem	Dogsible Cours	Confirmation	Continued from pre	
Problem	Possible Cause	Confirmation  Turn OFF the power quantum	Correction	Reference
	Noise interference occurred because of incorrect Encoder Cable specifications.	Turn OFF the power supply 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 <sup>2</sup> .	Use cables that satisfy the specifications.	-
	Noise interference occurred because the Encoder Cable is too long.	Turn OFF the power supply 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.	-
Absolute Encoder Position Deviation Error (The	Noise interference occurred because the Encoder Cable is damaged.	Turn OFF the power supply 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 envi- ronment.	-
position that was saved in the host con- troller when the power	The Encoder Cable was subject to excessive noise interference.	Turn OFF the power supply to the servo system. Check to see if the Encoder Cable is bundled with a high-current line or installed near a high-current line.	Correct the cable lay- out so that no surge is applied by high-current lines.	-
was turned OFF is dif- ferent from the posi- tion when	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 supply 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.	-
the power was next turned ON.)	There is a SERVOPACK pulse counting error due to noise.	Turn OFF the power supply to the servo system. Check to see if there is noise interference on the I/O signal line from the encoder or Serial Converter Unit.	Implement counter- measures against noise for the encoder or Serial Converter Unit wiring.	-
	The encoder was subjected to excessive vibration or shock.	Turn OFF the power supply 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 supply to the servo system. Replace the Servomo- tor or linear encoder.	-

4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	Possible Cause	Confirmation	Continued from pre	Reference
Absolute Encoder Position Deviation	A failure occurred in the SER-VOPACK.	_	Turn OFF the power supply to the servo system. Replace the SERVO-PACK.	-
Error (The position that was saved in the		Check the error detection section of the host controller.	Correct the error detection section of the host controller.	_
host con- troller when the power was turned	Host Controller Multiturn	Check to see if the host controller is executing data parity checks.	Perform parity checks for the multiturn data or absolute encoder posi- tion data.	_
OFF is dif- ferent from the posi- tion when the power was next turned ON.)	Data or Absolute Encoder Position Data Reading Error	Check for noise interference in the cable between the SERVO-PACK and the host controller.	Implement counter- measures against noise and then perform parity checks again for the multiturn data or abso- lute encoder position data.	-
	The P-OT/N-OT (Forward Drive Prohibit or Reverse Drive Prohibit) 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 allocations (Pn50A/Pn50B).	Set the parameters to correct values.	*
Overtravel Occurred	The P-OT/N-OT (Forward Drive Prohibit or Reverse Drive Prohibit) 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.	_
Cocumou		Check to see if the operation of the overtravel limit switches is unstable.	Stabilize the operating condition of the over-travel 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 or N-OT (Forward Drive Prohibit or	Check to see if the P-OT signal is allocated in Pn50A = n.X□□□.	If another signal is allocated in Pn50A =n.X□□□, allocate the P-OT signal instead.	*
	Reverse Drive Prohibit) signal in Pn50A = n.XDDD or Pn50B = n.DDDX.	Check to see if the N-OT signal is allocated in Pn50B = n.□□□X.	If another signal is allocated in Pn50B =n.□□□X, allocate the N-OT signal instead.	*
Overtravel	The selection of the Servo-	Check the servo OFF stopping method set in Pn001 = n.□□□X or Pn001 = n.□□X□.	Select a Servomotor stopping method other than coasting to a stop.	*
Occurred	motor stopping method is not correct.	Check the torque control stopping method set in $Pn001 = n.\square\square\square X$ or $Pn001 = n.\square\square X\square$ .	Select a Servomotor stopping method other than coasting to a stop.	*

#### 4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	Possible Cause	Confirmation	Correction	Reference
Improper Stop Posi- tion for	The limit switch position and dog length are not appropriate.	_	Install the limit switch at the appropriate position.	-
Overtravel (OT) Signal	The overtravel limit switch position is too close for the coasting distance.	_	Install the overtravel limit switch at the appropriate position.	-
	Noise interference occurred because of incorrect Encoder Cable specifications.	Turn OFF the power supply 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 <sup>2</sup> .	Use cables that satisfy the specifications.	-
	Noise interference occurred because the Encoder Cable is too long.	Turn OFF the power supply 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.	-
Deviation (without Alarm)	Noise interference occurred because the Encoder Cable is damaged.	Turn OFF the power supply 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 envi- ronment.	-
	The Encoder Cable was subjected to excessive noise interference.	Turn OFF the power supply to the servo system. Check to see if the Encoder Cable is bundled with a high-current line or installed near a high-current line.	Correct the cable lay- out so that no surge is applied by high-current lines.	-
	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 supply 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 supply to the servo system. Check to see if there is noise interference on the I/O signal line from the encoder or Serial Converter Unit.	Implement counter- measures against noise for the encoder wiring or Serial Converter Unit wiring.	-

4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	Possible Cause	Confirmation	Correction	Reference
	The encoder was subjected to excessive vibration or shock.	Turn OFF the power supply 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 is not suitable.	Turn OFF the power supply 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.	-
Position Deviation (without Alarm)	Noise interference occurred because of incorrect I/O signal cable specifications.	Turn OFF the power supply 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 <sup>2</sup> .	Use cables that satisfy the specifications.	-
Alarm)	If reference pulse input multiplication switching is being used, noise may be causing the I/O signals used for this function (/PSEL and /PSELA) to be falsely detected.	Turn OFF the power supply 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 <sup>2</sup> .	Use cables that satisfy the specifications.	-
	Noise interference occurred because an I/O signal cable is too long.	Turn OFF the power supply 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 supply to the servo system. Replace the Servomotor or linear encoder.	-
	A failure occurred in the SER-VOPACK.	_	Turn OFF the power supply to the servo system. Replace the SERVO-PACK.	-

#### 4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	Possible Cause	Confirmation	Correction	Reference
	The surrounding air temperature is too high.	Measure the surrounding air temperature around the Servomotor.	Reduce the surrounding air temperature to 40°C or less.	-
	The surface of the Servomotor is dirty.	Turn OFF the power supply to the servo system. Visually check the surface for dirt.	Clean dirt, dust, and oil from the surface.	-
Servomotor Overheated	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 Ser- vomotor 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.	-

<sup>\*</sup> Refer to the following manual for details.

Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)

## 4.2.1 Alarm Displays

If an error occurs in the SERVOPACK, an alarm number will be displayed on the panel display. However, if no alarm number appears on the panel display, this indicates a SERVOPACK system error. Replace the SERVOPACK.

SERVOPACKs with MECHATROLINK-III Communications References

If there is an alarm, the display will change in the following order.

Example: Alarm A.E60

Status Not lit. 
$$\longrightarrow$$
 Not lit.  $\longrightarrow$  Not lit.

### 4.2.2 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.

## **Servomotor Stopping Method for Alarms**

Refer to the following manual for information on the stopping method for alarms.

Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)

## **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.

#### **List of Alarms**

Alarm Number	Alarm Name	Alarm Meaning	Servo- motor Stop- ping Method	Alarm Reset Possi- ble?
A.020	Parameter Checksum Error	There is an error in the parameter data in the SERVOPACK.	Gr.1	No
A.021	Parameter Format Error	There is an error in the parameter data format in the SERVOPACK.	Gr.1	No
A.022	System Checksum Error	There is an error in the parameter data in the SERVOPACK.	Gr.1	No
A.024	System Alarm	An internal program error occurred in the SER-VOPACK.	Gr.1	No
A.025	System Alarm	An internal program error occurred in the SER-VOPACK.	Gr.1	No
A.030	Main Circuit Detector Error	There is an error in the detection data for the main circuit.	Gr.1	Yes
A.040	Parameter Setting Error	A parameter setting is outside of the setting range.	Gr.1	No

#### 4.2.2 List of Alarms

Continued from previous page.

Alarm Number	Alarm Name	Alarm Meaning	Servo- motor Stop- ping Method	Alarm Reset Possi- ble?
A.041	Encoder Output Pulse Setting Error	The setting of Pn212 (Number of Encoder Output Pulses) or Pn281 (Encoder Output Resolution) is outside of the setting range or does not satisfy the setting conditions.	Gr.1	No
A.042	Parameter Combination Error	The combination of some parameters exceeds the setting range.	Gr.1	No
A.044	Semi-Closed/Fully-Closed Loop Control Parameter Setting Error	The settings of the Option Module and Pn002 = n.X□□□ (External Encoder Usage) do not match.	Gr.1	No
A.04A	Parameter Setting Error 2	There is an error in the bank members or bank data settings.	Gr.1	No
A.050	Combination Error	The capacities of the SERVOPACK and Servomotor do not match.	Gr.1	Yes
A.051	Unsupported Device Alarm	An unsupported device was connected.	Gr.1	No
A.070	Motor Type Change Detected	The connected motor is a different type of motor from the previously connected motor.	Gr.1	No
A.080	Linear Encoder Pitch Set- ting Error	The setting of Pn282 (Linear Encoder Scale Pitch) has not been changed from the default setting.	Gr.1	No
A.0b0	Invalid Servo ON Com- mand Alarm	The SV_ON (Servo ON) command was sent from the host controller after a utility function that turns ON the Servomotor was executed.	Gr.1	Yes
A.100	Overcurrent Detected	An overcurrent flowed through the power transistor or the heat sink overheated.	Gr.1	No
A.101	Motor Overcurrent Detected	The current to the motor exceeded the allowable current.	Gr.1	No
A.300	Regeneration Error	There is an error related to regeneration.	Gr.1	Yes
A.320	Regenerative Overload	A regenerative overload occurred.	Gr.2	Yes
A.330	Main Circuit Power Supply Wiring Error	<ul> <li>The AC power supply input setting or DC power supply input setting is not correct.</li> <li>The power supply wiring is not correct.</li> </ul>	Gr.1	Yes
A.400	Overvoltage	The main circuit DC voltage is too high.	Gr.1	Yes
A.410	Undervoltage	The main circuit DC voltage is too low.	Gr.2	Yes
A.510	Overspeed	The motor exceeded the maximum speed.	Gr.1	Yes
A.511	Encoder Output Pulse Overspeed	<ul> <li>Rotary Servomotor: The pulse output speed for the setting of Pn212 (Number of Encoder Output Pulses) was exceeded.</li> <li>Linear Servomotor: The motor speed upper limit for the setting of Pn281 (Encoder Output Resolution) was exceeded.</li> </ul>	Gr.1	Yes
A.520	Vibration Alarm	Abnormal oscillation was detected in the motor speed.	Gr.1	Yes
A.521	Autotuning Alarm	Vibration was detected during autotuning for the tuning-less function.	Gr.1	Yes
A.550	Maximum Speed Setting Error	The setting of Pn385 (Maximum Motor Speed) is greater than the maximum motor speed.	Gr.1	Yes
A.710	Instantaneous Overload	The Servomotor was operating for several seconds to several tens of seconds under a torque that largely exceeded the rating.	Gr.2	Yes
A.720	Continuous Overload	The Servomotor was operating continuously under a torque that exceeded the rating.	Gr.1	Yes
A.730	Dynamic Brake Overload	When the dynamic brake was applied, the rotational or linear kinetic energy exceeded the	Gr.1	Yes

Continued from previous page.

Alarm Number	Alarm Name	Alarm Meaning	Servo- motor Stop- ping Method	Alarm Reset Possi- ble?
A.740	Inrush Current Limiting Resistor Overload	The main circuit power supply was frequently turned ON and OFF.	Gr.1	Yes
A.7A1	Internal Temperature Error 1 (Control Board Tempera- ture Error)	The surrounding temperature of the control PCB is abnormal.	Gr.2	Yes
A.7A2	Internal Temperature Error 2 (Power Board Temperature Error)	The surrounding temperature of the power PCB is abnormal.	Gr.2	Yes
A.7A3	Internal Temperature Sensor Error	An error occurred in the temperature sensor circuit.	Gr.2	No
A.7Ab	SERVOPACK Built-in Fan Stopped	The fan inside the SERVOPACK stopped.	Gr.1	Yes
A.810	Encoder Backup Alarm	The power supplies to the encoder all failed and the position data was lost.	Gr.1	No
A.820	Encoder Checksum Alarm	There is an error in the checksum results for encoder memory.	Gr.1	No
A.830	Encoder Battery Alarm	The battery voltage was lower than the specified level after the control power supply was turned ON.	Gr.1	Yes
A.840	Encoder Data Alarm	There is an internal data error in the encoder.	Gr.1	No
A.850	Encoder Overspeed	The encoder was operating at high speed when the power was turned ON.	Gr.1	No
A.860	Encoder Overheated	The internal temperature of encoder is too high.	Gr.1	No
A.861	Motor Overheated	The internal temperature of motor is too high.	Gr.1	No
A.862	Overheat Alarm	The input voltage (temperature) for the overheat protection input (TH) signal exceeded the setting of Pn61B (Overheat Alarm Level).	Gr.1	Yes
A.890	Encoder Scale Error	A failure occurred in the linear encoder.	Gr.1	No
A.891	Encoder Module Error	An error occurred in the linear encoder.	Gr.1	No
A.8A0	External Encoder Error	An error occurred in the external encoder.	Gr.1	Yes
A.8A1	External Encoder Module Error	An error occurred in the Serial Converter Unit.	Gr.1	Yes
A.8A2	External Incremental Encoder Sensor Error	An error occurred in the external encoder.	Gr.1	Yes
A.8A3	External Absolute Encoder Position Error	An error occurred in the position data of the external encoder.	Gr.1	Yes
A.8A5	External Encoder Over- speed	An overspeed error occurred in the external encoder.	Gr.1	Yes
A.8A6	External Encoder Over- heated	An overheating error occurred in the external encoder.	Gr.1	Yes
A.b33	Current Detection Error 3	An error occurred in the current detection circuit.	Gr.1	No
A.b6A	MECHATROLINK Communications ASIC Error 1	ASIC error 1 occurred in MECHATROLINK communications.	Gr.1	No
A.b6b	MECHATROLINK Communications ASIC Error 2	ASIC error 2 occurred in MECHATROLINK communications.	Gr.2	No
A.bF0	System Alarm 0	Internal program error 0 occurred in the SERVO-PACK.	Gr.1	No
A.bF1	System Alarm 1	Internal program error 1 occurred in the SERVO-PACK.	Gr.1	No
A.bF2	System Alarm 2	Internal program error 2 occurred in the SERVO-PACK.	Gr.1	No

#### 4.2.2 List of Alarms

Continued from previous page.

Alarm Number	Alarm Name	Alarm Meaning	Servo- motor Stop- ping	Alarm Reset Possi-
			Method	ble?
A.bF3	System Alarm 3	Internal program error 3 occurred in the SERVO-PACK.	Gr.1	No
A.bF4	System Alarm 4	Internal program error 4 occurred in the SERVO-PACK.	Gr.1	No
A.bF5	System Alarm 5	Internal program error 5 occurred in the SERVO-PACK.	Gr.1	No
A.bF6	System Alarm 6	Internal program error 6 occurred in the SERVO-PACK.	Gr.1	No
A.bF7	System Alarm 7	Internal program error 7 occurred in the SERVO-PACK.	Gr.1	No
A.bF8	System Alarm 8	Internal program error 8 occurred in the SERVO-PACK.	Gr.1	No
A.C10	Servomotor Out of Control	The Servomotor ran out of control.	Gr.1	Yes
A.C20	Phase Detection Error	The detection of the phase is not correct.	Gr.1	No
A.C21	Polarity Sensor Error	An error occurred in the polarity sensor.	Gr.1	No
A.C22	Phase Information Disagreement	The phase information does not match.	Gr.1	No
A.C50	Polarity Detection Failure	The polarity detection failed.	Gr.1	No
A.C51	Overtravel Detected during Polarity Detection	The overtravel signal was detected during polarity detection.	Gr.1	Yes
A.C52	Polarity Detection Not Completed	The servo was turned ON before the polarity was detected.	Gr.1	Yes
A.C53	Out of Range of Motion for Polarity Detection	The travel distance exceeded the setting of Pn48E (Polarity Detection Range).	Gr.1	No
A.C54	Polarity Detection Failure 2	The polarity detection failed.	Gr.1	No
A.C80	Encoder Clear Error or Multiturn Limit Setting Error	The multiturn data for the absolute encoder was not correctly cleared or set.	Gr.1	No
A.C90	Encoder Communications Error	Communications between the encoder and SER-VOPACK is not possible.	Gr.1	No
A.C91	Encoder Communications Position Data Acceleration Rate Error	An error occurred in calculating the position data of the encoder.	Gr.1	No
A.C92	Encoder Communications Timer Error	An error occurred in the communications timer between the encoder and SERVOPACK.	Gr.1	No
A.CA0	Encoder Parameter Error	The parameters in the encoder are corrupted.	Gr.1	No
A.Cb0	Encoder Echoback Error	The contents of communications with the encoder are incorrect.	Gr.1	No
A.CC0	Multiturn Limit Disagree- ment	Different multiturn limits have been set in the encoder and the SERVOPACK.	Gr.1	No
A.CF1	Reception Failed Error in Feedback Option Module Communications	Receiving data from the Feedback Option Module failed.	Gr.1	No
A.CF2	Timer Stopped Error in Feedback Option Module Communications	An error occurred in the timer for communications with the Feedback Option Module.	Gr.1	No
A.d00	Position Deviation Over- flow	The setting of Pn520 (Position Deviation Overflow Alarm Level) was exceeded by the position deviation.	Gr.1	Yes

4

Continued from previous page.

Alarm Number	Alarm Name	Alarm Meaning	Servo- motor Stop- ping Method	Alarm Reset Possi- ble?
A.d01	Position Deviation Over- flow Alarm at Servo ON	The servo was turned ON after the position deviation exceeded the setting of Pn526 (Position Deviation Overflow Alarm Level at Servo ON) while the servo was OFF.	Gr.1	Yes
A.d02	Position Deviation Over- flow Alarm for Speed Limit at Servo ON	If position deviation remains in the deviation counter, the setting of Pn529 or Pn584 (Speed Limit Level at Servo ON) limits the speed when the servo is turned ON. This alarm occurs if a position reference is input and the setting of Pn520 (Position Deviation Overflow Alarm Level) is exceeded before the limit is cleared.	Gr.2	Yes
A.d10	Motor-Load Position Deviation Overflow	There was too much position deviation between the motor and load during fully-closed loop control.	Gr.2	Yes
A.d30	Position Data Overflow	The position feedback data exceeded ±1,879,048,192.	Gr.1	No
A.E02	MECHATROLINK Internal Synchronization Error 1	A synchronization error occurred during MECHATROLINK communications with the SER-VOPACK.	Gr.1	Yes
A.E40	MECHATROLINK Trans- mission Cycle Setting Error	The setting of the MECHATROLINK communications transmission cycle is not correct.	Gr.2	Yes
A.E41	MECHATROLINK Commu- nications Data Size Set- ting Error	The setting of the MECHATROLINK communications data size is not correct.	Gr.2	Yes
A.E42	MECHATROLINK Station Address Setting Error	The setting of the MECHATROLINK station address is not correct.	Gr.2	No
A.E50*	MECHATROLINK Syn- chronization Error	A synchronization error occurred during MECHATROLINK communications.	Gr.2	Yes
A.E51	MECHATROLINK Syn- chronization Failed	Synchronization failed during MECHATROLINK communications.	Gr.2	Yes
A.E60*	Reception Error in MECHATROLINK Commu- nications	Communications errors occurred continuously during MECHATROLINK communications.	Gr.2	Yes
A.E61	Synchronization Interval Error in MECHATROLINK Transmission Cycle	An error occurred in the transmission cycle during MECHATROLINK communications.	Gr.2	Yes
A.E63	MECHATROLINK Syn- chronization Frame Not Received	Synchronization frames were continuously not received during MECHATROLINK communications.	Gr.2	Yes
A.E71	Safety Option Module Detection Failure	Detection of the Safety Option Module failed.	Gr.1	No
A.E72	Feedback Option Module Detection Failure	Detection of the Feedback Option Module failed.	Gr.1	No
A.E74	Unsupported Safety Option Module	An unsupported Safety Option Module was connected.	Gr.1	No
A.Eb1	Safety Function Signal Input Timing Error	An error occurred in the input timing of the safety function signal.	Gr.1	No
A.EC8	Gate Drive Error 1	An error occurred in the gate drive circuit.	Gr.1	No
A.EC9	Gate Drive Error 2	An error occurred in the gate drive circuit.	Gr.1	No
A.Ed1	Command Execution Tim- eout	A timeout error occurred for a MECHATROLINK command.	Gr.2	Yes

#### 4.2.2 List of Alarms

Continued from previous page.

Alarm Number	Alarm Name	Alarm Meaning	Servo- motor Stop- ping Method	Alarm Reset Possi- ble?
A.F10	Power Supply Line Open Phase	The voltage was low for more than one second for phase R, S, or T when the main power supply was ON.	Gr.2	Yes
FL-1*				
FL-2*				
FL-3*	System Alarm	An internal program error occurred in the SER-	_	No
FL-4*	System Alami	VOPACK.	_	INO
FL-5*				
FL-6*				
CPF00	Digital Operator Communications Error 1	Communications were not possible between the Digital Operator (model: JUSP-OP05A-1-E) and		No
CPF01	Digital Operator Communications Error 2	the SERVOPACK (e.g., a CPU error occurred).	_	INO

<sup>\*</sup> These alarms are not stored in the alarm history. They are only displayed on the panel display.

Note: The A.Eb0, A.Eb2 to A.Eb9, and A.EC0 to A.EC2 alarms can occur when a Safety Module is connected. Refer to the following manual for details.

AC Servo Drive Σ-V-Series/Σ-V-Series for Large-Capacity Models/Σ-7-Series User's Manual Safety Module (Manual No.: SIEP C720829 06)

# **Troubleshooting Alarms**

4.2.3

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.

Alarm Number: Alarm Name	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.	*1
	The power supply was shut OFF while writing parameter settings.	Check the timing of shutting OFF the power supply.	Initialize the parameter settings and then set the parameters again.	*1
A.020: Parameter	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 SER-VOPACK. Reconsider the method for writing the parameters.	-
Checksum Error (There is an error in the parameter data in the SER- VOPACK.)	A malfunction was caused by noise from the AC power supply, ground, static electricity, or other source.	Turn the power supply to the SERVOPACK OFF and ON again. If the alarm still occurs, noise may be the cause.	Implement countermea- sures against noise.	*1
	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 SER-VOPACK.	_
	A failure occurred in the SERVOPACK.	Turn the power supply to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may have failed.	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
A.021: Parameter Format Error (There is an error in the parameter data format in the	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.	*1
SERVOPACK.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
	The power supply voltage suddenly dropped.	Measure the power supply voltage.	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
A.022: System Check- sum Error (There is an error in the parameter data in the SER- VOPACK.)	The power supply was shut OFF while setting a utility function.	Check the timing of shutting OFF the power supply.	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
	A failure occurred in the SERVOPACK.	Turn the power supply to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may have failed.	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-

#### 4.2.3 Troubleshooting Alarms

Continued from previous page.

Alarm Number:	Donaible Carras	Confirmation	Continued from pre	
Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.024: System Alarm (An internal pro- gram error occurred in the SERVOPACK.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
A.025: System Alarm (An internal pro- gram error occurred in the SERVOPACK.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
A.030: Main Circuit Detector Error	The jumper between the DC Reactor terminals (⊝1 and ⊝2) was removed or there is faulty contact.  The cable between	_	Correct the wiring between the DC Reactor	_
	the DC Reactor and SERVOPACK is not wired correctly or there is a faulty con- tact.		terminals.	
	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.	*1
A.040:	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.	*1
Parameter Setting Error (A parameter set- ting is outside of	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
the setting range.)	A parameter setting is outside of the setting range.	Check the setting ranges of the parameters that have been changed.	Set the parameters to values within the setting ranges.	_
	The electronic gear ratio is outside of the setting range.	Check the electronic gear ratio. The ratio must be within the following range: 0.001 < (Pn20E/Pn210) < 64,000.	Set the electronic gear ratio in the following range: 0.001 < (Pn20E/Pn210) < 64,000.	*1
A.041: Encoder Output Pulse Setting Error	The setting of Pn212 (Number of Encoder Output Pulses) or Pn281 (Encoder Output Resolution) is outside of the setting range or does not satisfy the setting conditions.	Check the setting of Pn212 or Pn281.	Set Pn212 or Pn281 to an appropriate value.	*1

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The speed of program jogging went below the setting range when the electronic gear ratio (Pn20E/Pn210) or the Servomotor was changed.	Check to see if the detection conditions*2 are satisfied.	Decrease the setting of the electronic gear ratio (Pn20E/Pn210).	*1
A.042: Parameter Combination Error	The speed of program jogging went below the setting range when Pn533 or Pn585 (Program Jogging Movement Speed) was changed.	Check to see if the detection conditions*2 are satisfied.	Increase the setting of Pn533 or Pn585.	*1
	The movement speed of advanced autotuning went below the setting range when the electronic gear ratio (Pn20E/ Pn210) or the Servomotor was changed.	Check to see if the detection conditions*3 are satisfied.	Decrease the setting of the electronic gear ratio (Pn20E/Pn210).	*1
A.044: Semi-Closed/ Fully-Closed Loop Control Parame- ter Setting Error	The setting of the Fully-closed Module does not match the setting of Pn002 = n.XDDD (External Encoder Usage).	Check the setting of Pn002 = n.X□□□.	Make sure that the setting of the Fully-closed Module agrees with the setting of Pn002 = n.X□□□.	*1
A.04A: Parameter Setting	For 4-byte parameter bank members, there are two consecutive members with nothing registered.	_	Change the number of bytes for bank members to an appropriate value.	-
Error 2	The total amount of bank data exceeds 64 (Pn900 × Pn901 > 64).	_	Reduce the total amount of bank data to 64 or less.	-
A.050: Combination Error	The SERVOPACK and Servomotor capacities do not match each other.	Confirm that the follow- ing condition is met: 1/4 ≤ (Servomotor capacity/SERVOPACK capacity) ≤ 4	Select a proper combination of the SERVOPACK and Servomotor capacities.	*1
(The capacities of the SERVOPACK and Servomotor	A failure occurred in the encoder.	Replace the encoder and check to see if the alarm still occurs.	Replace the Servomotor or encoder.	_
do not match.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
A.051: Unsupported	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.	*1
Device Alarm	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.	-

#### 4.2.3 Troubleshooting Alarms

Continued from previous page.

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.070: Motor Type Change Detected (The connected motor is a differ- ent type of motor from the previ- ously connected motor.)	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 supply to the SER- VOPACK OFF and ON again.	*1
	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 supply to the SER- VOPACK OFF and ON again.	*1
A.080: Linear Encoder Pitch Setting Error	The setting of Pn282 (Linear Encoder Scale Pitch) has not been changed from the default setting.	Check the setting of Pn282.	Correct the setting of Pn282.	*1
A.0b0: Invalid Servo ON Command Alarm	The SV_ON (Servo ON) command was sent from the host controller after a utility function that turns ON the Servomotor was executed.	_	Turn the power supply to the SERVOPACK OFF and ON again. Or, execute a software reset.	*1

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.100: Overcurrent Detected (An overcurrent flowed through the power transis- tor or the heat sink overheated.)	The Main Circuit Cable is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	*1
	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 short-circuited. Replace the cable.	*1
	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.	*1
	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 SER-VOPACK, or between the ground and terminals U, V, or W.	The SERVOPACK may be faulty. Replace the SER-VOPACK.	*1
	The regenerative resistor is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	*1
	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 a DB overload alarm (A.730 or A.731) 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 SigmaWin+ Motion Monitor Tab Page to see how frequently the regenerative resistor is being used.	Recheck the operating conditions and load.	*4
	The SERVOPACK regenerative resistance is too small.	Check the regenerative load ratio in the SigmaWin+ Motion Monitor Tab Page to see how frequently the regenerative resistor is being used.	Change the regenerative resistance to a value larger than the SERVO-PACK minimum allowable resistance.	*4

#### 4.2.3 Troubleshooting Alarms

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Alama N	Continued from previous page.				
Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference	
A.100: Overcurrent Detected (An overcurrent flowed through the power transistor or the heat sink overheated.)	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 SERVO-PACK's main circuit wire size.	-	
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-	
A.101: Motor Overcurrent Detected (The current to the motor exceeded the allowable current.)	The Main Circuit Cable is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	*1	
	There is a short-circuit or ground fault in a Main Circuit Cable.	Check for short-circuits across cable phases U, V, and W, or between the ground and cable phases U, V, and W.	The cable may be short-circuited. Replace the cable.	*1	
	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.	*1	
	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 SER-VOPACK, or between the ground and terminals U, V, or W.	The SERVOPACK may be faulty. Replace the SER-VOPACK.	*1	
	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 envi- ronment, 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 SERVO-PACK's main circuit wire size.	-	
	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-	

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.300: Regeneration Error	When using the built-in regenerative resistor, the jumper between the regenerative resistor terminals (B2 and B3) was removed from one of the following SERVO-PACKs: SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, or -330A.	Check to see if the jumper is connected between power supply terminals B2 and B3.*5	Correctly connect a jumper.	*1
	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.*5	Correct the wiring of the External Regenerative Resistor or Regenerative Resistor Unit.	*1
	Pn600 (Regenerative Resistor Capacity) is not set to 0 and an External Regenerative Resistor is not con- nected to one of the following SERVO- PACKs: SGD7S- R70A, -R90A,-1R6A, -2R8A, -R70F, -R90F, -2R1F, or -2R8F.	Check to see if an External Regenerative Resistor is connected and check the setting of Pn600.	Connect an External Regenerative Resistor, or set Pn600 (Regenerative Resistor Capacity) to 0 (setting unit: ×10 W) if no Regenerative Resistor is required.	*1
	An External Regenerative Resistor is not connected to one of the following SERVO-PACKs: SGD7S-470A, -550A, -590A, or -780A.	Check to see if an External Regenerative Resistor or a Regenerative Resistor Unit is connected and check the setting of Pn600.	Connect an External Regenerative Resistor and set Pn600 to an appropri- ate value, or connect a Regenerative Resistor Unit and set Pn600 to 0.	*1
	A failure occurred in the SERVOPACK.	_	While the main circuit power supply is OFF, turn the control power supply to the SERVOPACK OFF and ON again. If the alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	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 using the SigmaJunmaSize+ Capacity Selection Software or other means.	Change the regenerative resistance value or capacity. Reconsider the operating conditions using the SigmaJunmaSize+ Capacity Selection Software or other means.	*4
	There was a continuous regeneration state because a negative load was continuously applied.	Check the load applied to the Servomotor during operation.	Reconsider the system including the servo, machine, and operating conditions.	-
A.320: Regenerative Overload	The setting of Pn600 (Regenerative Resistor Capacity) is smaller than the capacity of the External Regenerative Resistor.	Check to see if a Regenerative Resistor is connected and check the setting of Pn600.	Correct the setting of Pn600.	*1
	The setting of Pn603 (Regenerative Resistance) is smaller than the capacity of the External Regenerative Resistor.	Check to see if a Regenerative Resistor is connected and check the setting of Pn603.	Correct the setting of Pn603.	*1
	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.	*4
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_

Continued from previous page.

Alarm Number: Alarm Name	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.	-
4.000	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.	*1
A.330: Main Circuit Power Supply Wiring Error (Detected when the main circuit power supply is turned ON.)	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.	*1
	Pn600 (Regenerative Resistor Capacity) is not set to 0 and an External Regenerative Resistor is not con- nected to one of the following SERVOPACKs: SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, or -2R8F.	Check to see if an External Regenerative Resistor is connected and check the setting of Pn600.	Connect an External Regenerative Resistor, or if an External Regenera- tive Resistor is not required, set Pn600 to 0.	*1
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_

Continued from previous page.

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.400: Overvoltage (Detected in the	The power supply voltage exceeded the specified range.	Measure the power supply voltage.	Set the AC/DC power supply voltage within the specified range.	-
	The power supply is not stable or was influenced by a lightning surge.	Measure the power supply voltage.	Improve the power supply conditions, install a surge absorber, and then turn the power supply OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The voltage for AC power supply was too high during acceleration or deceleration.	Check the power supply voltage and the speed and torque during operation.	Set the AC power supply voltage within the specified range.	-
main circuit power supply section of the SERVOPACK.)	The external regenerative resistance is too high for the operating conditions.	Check the operating conditions and the regenerative resistance.	Select a regenerative resistance value that is appropriate for the operating conditions and load.	*4
	The moment of inertia ratio or mass ratio exceeded the allowable value.	Check to see if the moment of inertia ratio or mass ratio is within the allowable range.	Increase the deceleration time, or reduce the load.	-
	A failure occurred in the SERVOPACK.	_	While the main circuit power supply is OFF, turn the control power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The power supply voltage went below the specified range.	Measure the power supply voltage.	Set the power supply voltage within the specified range.	-
	The power supply voltage dropped during operation.	Measure the power supply voltage.	Increase the power supply capacity.	-
	A momentary power interruption occurred.	Measure the power supply voltage.	If you have changed the setting of Pn509 (Momentary Power Interruption Hold Time), decrease the setting.	*1
A.410: Undervoltage (Detected in the main circuit power supply	The SERVOPACK fuse is blown out.	_	Replace the SERVO- PACK and connect a reactor to the DC reactor terminals (⊝1 and ⊝2) on the SERVOPACK.	-
section of the SERVOPACK.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
	The jumper between the DC Reactor terminals (⊝1 and ⊝2) was removed or there is faulty contact.		Correct the wiring	
	The cable between the DC Reactor and SERVOPACK is not wired correctly or there is a faulty contact.	_	between the DC Reactor terminals.	_
	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 Servo- motor is correctly wired.	_
A.510: Overspeed	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.)	The motor exceeded the maximum speed.	Check the waveform of the motor speed.	Reduce the speed reference input gain and adjust the servo gain. Or, reconsider the operating conditions.	_
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
A.511:	The encoder output pulse frequency exceeded the limit.	Check the encoder output pulse setting.	Decrease the setting of Pn212 (Number of Encoder Output Pulses) or Pn281 (Encoder Out- put Resolution).	*1
Encoder Output Pulse Overspeed	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.  Continued or	-

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Alarm Number:	D 2		Continued from pre	
Alarm Name	Possible Cause	Confirmation	Correction	Reference
	Abnormal oscillation was detected in the motor speed.	Check for abnormal motor noise, and check the speed and torque waveforms during operation.	Reduce the motor speed. Or, reduce the setting of Pn100 (Speed Loop Gain).	*1
A.520: Vibration Alarm	The setting of Pn103 (Moment of Inertia Ratio) is greater than the actual moment of inertia or was greatly changed.	Check the moment of inertia ratio or mass ratio.	Set Pn103 (Moment of Inertia Ratio) to an appropriate value.	*1
	The vibration detection level (Pn312 or Pn384) is not suitable.	Check that the vibration detection level (Pn312 or Pn384) is suitable.	Set a suitable vibration detection level (Pn312 or Pn384).	*1
A.521: Autotuning Alarm (Vibration was detected while executing the custom tuning,	The Servomotor vibrated considerably while performing the tuning-less function.	Check the waveform of the motor speed.	Reduce the load so that the moment of inertia ratio is within the allowable value. Or increase the load level or reduce the rigidity level in the tuning- less level settings.	*1
Easy FFT, or the tuning-less function.)	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.	*1
A.550: Maximum Speed Setting Error	The setting of Pn385 (Maximum Motor Speed) is greater than the maximum speed.	Check the setting of Pn385, and the upper limits of the maximum motor speed setting and the encoder output resolution setting.	Set Pn385 to a value that does not exceed the maximum motor speed.	*1
	The wiring is not cor- rect or there is a faulty connection in the motor or encoder wir- ing.	Check the wiring.	Make sure that the Servo- motor and encoder are correctly wired.	*1
	Operation was performed that exceeded the overload protection characteristics.	Check the motor over- load characteristics and Run command.	Reconsider the load and operating conditions. Or, increase the motor capacity.	-
A.710: Instantaneous Overload A.720: Continuous Overload	An excessive load was applied during operation because the Servomotor was not driven due to mechanical problems.	Check the operation reference and motor speed.	Correct the mechanical problem.	-
	There is an error in the setting of Pn282 (Linear Encoder Scale Pitch).	Check the setting of Pn282.	Correct the setting of Pn282.	*1
	There is an error in the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection).	Check the setting of Pn080 = n.□□X□.	Set Pn080 = n.□□X□ to an appropriate value.	*1
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	- novt nago

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.730 and	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.	-
A.731: Dynamic Brake Overload (An excessive power consumption by the dynamic brake was detected.)	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 SER-VOPACK.	-
A.740: Inrush Current Limiting Resistor Overload (The main circuit power supply was	The allowable frequency of the inrush current limiting resistor was exceeded when the main circuit power supply was turned ON and OFF.	-	Reduce the frequency of turning the main circuit power supply ON and OFF.	-
frequently turned ON and OFF.)	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
	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 SERVO-PACK installation conditions.	*1
A 7A4.	An overload alarm was reset by turning OFF the power supply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	_
A.7A1: Internal Temperature Error 1 (Control Board Temperature Error)	There was an excessive load or operation was performed that exceeded the regenerative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenerative load ratio to check the regenerative processing capacity.	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.	*1
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-

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Alarm Number: Alarm Name	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 SERVO-PACK installation conditions.	*1
	An overload alarm was reset by turning OFF the power supply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	-
A.7A2: Internal Tempera- ture Error 2 (Power Board Temperature Error)	There was an excessive load or operation was performed that exceeded the regenerative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenerative load ratio to check the regenerative processing capacity.	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.	*1
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
A.7A3: Internal Temperature Sensor Error (An error occurred in the temperature sensor circuit.)	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
A.7Ab: SERVOPACK Built-in Fan Stopped	The fan inside the SERVOPACK stopped.	Check for foreign matter inside the SERVOPACK.	Remove foreign matter from the SERVOPACK. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The power to the absolute encoder was turned ON for the first time.	Check to see if the power supply was turned ON for the first time.	Set up the encoder.	*1
A.810: Encoder Backup Alarm (Detected at the encoder, but only when an abso- lute encoder is used.)	The Encoder Cable was disconnected and then connected again.	Check to see if the power supply was turned ON for the first time.	Check the encoder connection and set up the encoder.	*1
	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.	*1
	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 SER-VOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.820: Encoder Check- sum Alarm (Detected at the encoder.)	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 Singleturn Absolute Encoder or Incremental Encoder • The Servomotor may be faulty. Replace the Servomotor. • The linear encoder may be faulty. Replace the linear encoder.	*1
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
A.830: Encoder Battery	The battery connection is faulty or a battery is not connected.	Check the battery connection.	Correct the battery connection.	*1
Alarm (The absolute encoder battery voltage was lower	The battery voltage is lower than the specified value (2.7 V).	Measure the battery voltage.	Replace the battery.	*1
than the speci- fied level.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
	The encoder malfunctioned.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servo- motor 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.	-
A.840: Encoder Data Alarm (Detected at the 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 supply.	-
	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.	_

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	Rotary Servomotor: The Servomotor speed was 200 min <sup>-1</sup> or higher when the control power supply was turned ON.	Check the motor speed when the power supply is turned ON.	Reduce the Servomotor speed to a value less than 200 min <sup>-1</sup> , and turn ON the control power supply.	-
A.850: Encoder Over- speed (Detected at the	Linear Servomotor: The Servomotor exceeded the speci- fied speed when the control power supply was turned ON.	Check the motor speed when the power supply is turned ON.	Control the motor speed within the range specified by the linear encoder manufacturer and then turn ON the control power supply.	-
encoder when the control power supply is turned ON.)	A failure occurred in the encoder.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servo- motor or linear encoder.	-
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.860: Encoder Over-	The surrounding air temperature around the Servomotor is too high.	Measure the surrounding air temperature around the Servomotor.	Reduce the surrounding air temperature of the Servomotor to 40°C or less.	-
heated (Detected when a Rotary Servomo- tor, Absolute Lin-	The Servomotor load is greater than the rated load.	Use the accumulated load ratio to check the load.	Operate the Servo Drive so that the motor load remains within the specified range.	*1
ear Encoder, or Direct Drive Ser- vomotor is con- nected. However, this alarm is not detected for SGMCS Servomotors with Incremental Encoders.) (Detected at the encoder.)	A failure occurred in the encoder.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an 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 supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The surrounding temperature around the Servomotor is too high.	Measure the surrounding temperature around the Servomotor.	Reduce the surrounding air temperature of the Servomotor to 40° or less.	-
	The motor load is greater than the rated load.	Check the load with the accumulated load ratio on the Motion Monitor Tab Page on the SigmaWin+.	Operate the Servo Drive so that the motor load remains within the specified range.	*1
A.861: Motor Over- heated	A failure occurred in the Serial Converter Unit.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Serial Con- verter Unit may be faulty. Replace the Serial Con- verter Unit.	-
	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	_
	The surrounding temperature is too high.	Check the surrounding temperature using a thermometer.	Lower the surrounding temperature by improving the installation conditions of the Linear Servomotor or the machine.	-
	The overheat protection input signal line is disconnected or short-circuited.	Check the input voltage with the overheat protection input information on the Motion Monitor Tab Page on the SigmaWin+.	Repair the line for the overheat protection input signal.	-
A.862:	An overload alarm was reset by turning OFF the power supply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	_
Overheat Alarm	Operation was performed under an excessive load.	Use the accumulated load ratio to check the load during operation.	Reconsider the load and operating conditions.	_
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The temperature detection circuit in the Linear Servomotor is faulty or the sensor attached to the machine is faulty.	_	The temperature detection circuit in the Linear Servomotor may be faulty or the sensor attached to the machine may be faulty. Replace the Linear Servomotor or repair the sensor attached to the machine.	-
A.890: Encoder Scale Error	A failure occurred in the linear encoder.	_	The linear encoder may be faulty. Replace the linear encoder.	-
A.891: Encoder Module Error	A failure occurred in the linear encoder.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the linear encoder may be faulty. Replace the linear encoder.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.8A0: External Encoder Error	Setting the origin of the absolute linear encoder failed because the motor moved.	Before you set the ori- gin, use the fully-closed feedback pulse counter to confirm that the motor is not moving.	The motor must be stopped while setting the origin position.	*1
	A failure occurred in the external encoder.	-	Replace the external encoder.	_
A.8A1:	A failure occurred in the external encoder.	_	Replace the external encoder.	_
External Encoder Module Error	A failure occurred in the Serial Converter Unit.	_	Replace the Serial Converter Unit.	-
A.8A2: External Incremental Encoder Sensor Error	A failure occurred in the external encoder.	_	Replace the external encoder.	-
A.8A3: External Absolute Encoder Position Error	A failure occurred in the external absolute encoder.	_	The external absolute encoder may be faulty. Refer to the encoder manufacturer's instruction manual for corrections.	-
A.8A5: External Encoder Overspeed	An overspeed error was detected in the external encoder.	Check the maximum speed of the external encoder.	Keep the external encoder below its maximum speed.	-
A.8A6: External Encoder Overheated	An overheating error was detected in the external encoder.	_	Replace the external encoder.	-
A.b33: Current Detection Error 3	A failure occurred in the current detection circuit.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.b6A: MECHATROLINK Communications ASIC Error 1	There is a fault in the SERVOPACK MECHATROLINK communications section.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.b6b: MECHATROLINK Communications ASIC Error 2	A malfunction occurred in the MECHATROLINK communications section due to noise.	_	Implement the following countermeasures against noise.  • Check the MECHATROLINK Communications Cable and FG wiring.  • Attach a ferrite core to the MECHATROLINK Communications Cable.	-
	There is a fault in the SERVOPACK MECHATROLINK communications section.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.bF0: System Alarm 0	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF1: System Alarm 1	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF2: System Alarm 2	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF3: System Alarm 3	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF4: System Alarm 4	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF5: System Alarm 5	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF6: System Alarm 6	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF7: System Alarm 7	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	_
A.bF8: System Alarm 8	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	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 Servo- motor is correctly wired.	-
A.C10:	There is an error in the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection).	Check the setting of Pn080 = n.□□X□.	Set Pn080 = n.□□X□ to an appropriate value.	*1
Servomotor Out of Control (Detected when the servo is turned ON.)	A failure occurred in the encoder.	_	If the motor wiring is correct and an alarm still occurs after turning the power supply 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 supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The linear encoder signal level is too low.	Check the voltage of the linear encoder sig- nal.	Fine-tune the mounting of the scale head. Or, replace the linear encoder.	-
A.C20: Phase Detection Error	The count-up direction of the linear encoder does not match the forward direction of the Moving Coil in the motor.	Check the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection). Check the installation orientation for the linear encoder and Moving Coil.	Change the setting of Pn080 = n.□□X□. Correctly reinstall the linear encoder or Moving Coil.	*1
	The polarity sensor signal is being affected by noise.	_	Correct the FG wiring. Implement countermea- sures against noise for the polarity sensor wiring.	-
7	The setting of Pn282 (Linear Encoder Scale Pitch) is not correct.	Check the setting of Pn282 (Linear Encoder Scale Pitch).	Check the specifications of the linear encoder and set a correct value.	*1
A.C21: Polarity Sensor Error	The polarity sensor is protruding from the Magnetic Way of the motor.	Check the polarity sensor.	Correctly reinstall the Moving Coil or Magnetic Way of the motor.	_
	The polarity sensor is not wired correctly.	Check the wiring of the polarity sensor.	Correct the wiring of the polarity sensor.	_
	The polarity sensor failed.	_	Replace the polarity sensor.	_
A.C22: Phase Information Disagreement	The SERVOPACK phase information is different from the linear encoder phase information.	_	Perform polarity detection.	*1

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.C50: Polarity Detection Failure	The parameter settings are not correct.	Check the linear encoder specifications and feedback signal status.	The settings of Pn282 (Linear Encoder Scale Pitch) and Pn080 = n.□□X□ (Motor Phase Sequence Selection) may not match the installation. Set the parameters to correct values.	*1
	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 SER-VOPACK and that the FG terminal on the SER-VOPACK is connected to the frame ground on the power supply. And, confirm that the shield is properly processed on the Linear Encoder Cable. Check to see if the detection reference is repeatedly output in one direction.	Implement appropriate countermeasures against noise for the Linear Encoder Cable.	_
	An external force was applied to the Moving Coil of the motor.	_	The polarity cannot be properly detected if the detection reference is 0 and the speed feedback is not 0 because of an external force, such as cable tension, applied to the Moving Coil. Implement measures to reduce the external force so that the speed feedback goes to 0. If the external force cannot be reduced, increase the setting of Pn481 (Polarity Detection Speed Loop Gain).	-
	The linear encoder resolution is too low.	Check the linear encoder scale pitch to see if it is within 100 µm.	If the linear encoder scale pitch is 100 $\mu m$ 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 $\mu m$ or less.) Or, increase the setting of Pn485 (Polarity Detection Reference Speed). However, increasing the setting of Pn485 will increase the Servomotor movement range that is required for polarity detection.	_

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.C51: Overtravel Detected during Polarity Detection	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.	*1
A.C52: Polarity Detection Not Completed	The servo was turned ON when using an absolute linear encoder, Pn587 was set to n.□□□0 (Do not detect polarity), and the polarity had not been detected.	_	When using an absolute linear encoder, set Pn587 to n. \$\square\$ (Detect polarity).	-
A.C53: Out of Range of Motion for Polarity Detection	The travel distance exceeded the setting of Pn48E (Polarity Detection Range) in the middle of detection.	_	Increase the setting of Pn48E (Polarity Detection Range). Or, increase the setting of Pn481 (Polarity Detection Speed Loop Gain).	_
A.C54: Polarity Detection Failure 2	An external force was applied to the Servomotor.	_	Increase the setting of Pn495 (Polarity Detection Confirmation Force Reference). Increase the setting of Pn498 (Polarity Detection Allowable Error Range). Increasing the allowable error will also increase the motor temperature.	_
A.C80: Encoder Clear	A failure occurred in the encoder.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servo- motor or linear encoder.	-
Error or Multiturn Limit Setting Error	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	There is a faulty contact in the connector or the connector is not wired correctly for the encoder.	Check the condition of the encoder connector.	Reconnect the encoder connector and check the encoder wiring.	*1
	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.	-
A.C90: Encoder Commu-	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 SER-VOPACK.	*1
nications Error	A malfunction was caused by noise.	-	Correct the wiring around the encoder by separating the Encoder Cable from the Servomotor Main Cir- cuit Cable or by ground- ing the encoder.	*1
	A failure occurred in the SERVOPACK.	_	Connect the Servomotor to another SERVOPACK, and turn ON the control power supply. If no alarm occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	A failure occurred in the encoder.	_	Connect the Servomotor to another SERVOPACK, and turn ON the control power supply. If the alarm occurs, the Servomotor may be faulty. Replace the Servomotor.	-
A.C91: Encoder Communications Position Data Acceleration Rate Error	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.	*1
	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.	_

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	Noise entered on the signal line from the encoder.	_	Implement countermeasures against noise for the encoder wiring.	*1
	Excessive vibration or shock was applied to the encoder.	Check the operating conditions.	Reduce machine vibration. Correctly install the Servomotor or linear encoder.	-
A.C92: Encoder Communications Timer Error	A failure occurred in the encoder.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servo- motor or linear encoder.	-
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.CA0: Encoder Parameter Error	A failure occurred in the encoder.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servo- motor or linear encoder.	_
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	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.	*1
	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 <sup>2</sup> .	-
	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.	-
A.Cb0: Encoder Echo- back Error	There is variation in the FG potential because of the influ- ence 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 supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor or linear encoder may be faulty. Replace the Servo- motor or linear encoder.	-
	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.CC0: Multiturn Limit Disagreement	When using a Direct Drive Servomotor, the setting of Pn205 (Mul- titurn Limit) does not agree with the encoder.	Check the setting of Pn205.	Correct the setting of Pn205 (0 to 65,535).	*1
	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 in the SERVO-PACK.	Change the setting if the alarm occurs.	*1
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.  Continued or	-

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Alarm Number:	Possible Cause	Confirmation	Continued from pre	Reference
Alarm Name		Committation	Consolion	Holorence
	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 SERVO-PACK.	*1
A.CF1: Reception Failed Error in Feed-	A specified cable is not being used between Serial Con- verter Unit and SER- VOPACK.	Check the wiring specifications of the external encoder.	Use a specified cable.	-
back Option Module Commu- nications	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 SERVO-PACK 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 SERVO-PACK.	-
A.CF2: Timer Stopped Error in Feed-	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.	-
back Option Module Commu- nications	A failure occurred in the Serial Converter Unit.	-	Replace the Serial Converter Unit.	-
	A failure occurred in the SERVOPACK.	_	Replace the SERVO-PACK.	_
	The Servomotor U, V, and W wiring is not correct.	Check the wiring of the Servomotor's Main Circuit Cables.	Make sure that there are no faulty contacts in the wiring for the Servomotor and encoder.	-
	The position command speed is too fast.	Reduce the position command speed and try operating the SER-VOPACK.	Reduce the position reference speed or the reference acceleration rate, or reconsider the electronic gear ratio.	*1
A.d00: Position Deviation Overflow (The setting of Pn520 (Position Deviation Overflow Alarm Level) was exceeded by the position deviation while the servo was ON.)	The acceleration of the position reference is too high.	Reduce the reference acceleration and try operating the SERVO-PACK.	Reduce the acceleration of the position reference using a MECHATROLINK command. Or, smooth the position reference acceleration by selecting the position reference filter (ACCFIL) using a MECHATROLINK command.	-
	The setting of Pn520 (Position Deviation Overflow Alarm Level) is too low for the operating conditions.	Check Pn520 (Position Deviation Overflow Alarm Level) to see if it is set to an appropriate value.	Optimize the setting of Pn520.	*1
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.d01: Position Deviation Overflow Alarm at Servo ON	The servo was turned ON after the position deviation exceeded the setting of Pn526 (Position Deviation Overflow Alarm Level at Servo ON) while the servo was OFF.	Check the position deviation while the servo is OFF.	Optimize the setting of Pn526 (Position Deviation Overflow Alarm Level at Servo ON).	*1
A.d02: Position Deviation Overflow Alarm for Speed Limit at Servo ON	If position deviation remains in the deviation counter, the setting of Pn529 or Pn584 (Speed Limit Level at Servo ON) limits the speed when the servo is turned ON. This alarm occurs if a position reference is input and the setting of Pn520 (Position Deviation Overflow Alarm Level) is exceeded.	_	Optimize the setting of Pn520 (Position Deviation Overflow Alarm Level). Or, adjust the setting of Pn529 or Pn584 (Speed Limit Level at Servo ON).	*1
A.d10:  Motor-Load Position Deviation	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 = n.X□□□ (External Encoder Usage) to reverse the direction.	*1
Overflow	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.	-
A.d30: Position Data Overflow	The position data exceeded ±1,879,048,192.	Check the input reference pulse counter.	Reconsider the operating specifications.	-
A.E02:	The MECHATROLINK transmission cycle fluctuated.	-	Remove the cause of transmission cycle fluctuation at the host controller.	-
MECHATROLINK Internal Synchro- nization Error 1	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.E40: MECHATROLINK Transmission Cycle Setting Error	The setting of MECHATROLINK transmission cycle is outside of the specified range.	Check the setting of the MECHATROLINK transmission cycle.	Set the MECHATROLINK transmission cycle to an appropriate value.	-
A.E41: MECHATROLINK Communications Data Size Setting Error	The number of transmission bytes set on DIP switch S3 is not correct.	Check the MECHATROLINK communications data size of the host controller.	Reset DIP switch S3 to change the number of transmission bytes to an appropriate value.	*1

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.E42: MECHATROLINK	The station address is outside of the setting range.	Check rotary switches S1 and S2 to see if the station address is between 03 and EF.	Check the setting of the station address of the host controller, and reset rotary switches S1 and S2 to change the address to an appropriate value between 03 and EF.	*1
Station Address Setting Error	Two or more stations on the communications network have the same address.	Check to see if two or more stations on the communications network have the same address.	Check the setting of the station address of the host controller, and reset rotary switches S1 and S2 to change the address to an appropriate value between 03 and EF.	*1
Δ F50*4·	The WDT data in the host controller was not updated normally.	Check to see if the WDT data is being updated at the host controller.	Correctly update the WDT data at the host controller.	_
A.E50*4: MECHATROLINK Synchronization Error	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.E51: MECHATROLINK Synchronization	The WDT data at the host controller was not updated correctly at the start of synchronous communications, so synchronous communications could not be started.	Check to see if the WDT data is being updated in the host controller.	Correctly update the WDT data at the host controller.	-
Failed	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	MECHATROLINK wiring is not correct.	Check the MECHATROLINK wiring.	Correct the MECHATROLINK Communications Cable wiring.	_
A.E60*4: Reception Error in MECHATROLINK Communications	A MECHATROLINK data reception error occurred due to noise.	_	Implement countermeasures against noise. (Check the MECHATROLINK Communications Cable and FG wiring, and implement measures such as attaching a ferrite core to the MECHATROLINK Communications Cable.)	-
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	_

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.E61: Synchronization	The MECHATROLINK transmission cycle fluctuated.	Check the setting of the MECHATROLINK transmission cycle.	Remove the cause of transmission cycle fluctuation at the host controller.	-
Interval Error in MECHATROLINK Transmission Cycle	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	MECHATROLINK wiring is not correct.	Check the Servomotor wiring.	Correct the MECHATROLINK Communications Cable wiring.	_
A.E63: MECHATROLINK Synchronization Frame Not Received	A MECHATROLINK data reception error occurred due to noise.	_	Implement countermeasures against noise. (Check the MECHATROLINK Communications Cable and FG wiring, and implement measures such as attaching a ferrite core to the MECHATROLINK Communications Cable.)	-
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	There is a faulty connection between the SERVOPACK and the Safety Option Module.	Check the connection between the SERVO- PACK and the Safety Option Module.	Correctly connect the Safety Option Module.	-
A.E71: Safety Option Module Detec- tion Failure	The Safety Option Module was discon- nected.	_	Execute Fn014 (Reset Option Module Configuration Error) from the Digital Operator or SigmaWin+ and then turn the power supply to the SERVO-PACK OFF and ON again.	*1
	A failure occurred in the Safety Option Module.	_	Replace the Safety Option Module.	-
	A failure occurred in the SERVOPACK.	_	Replace the SERVO- PACK.	-
A.E72: Feedback Option Module Detec- tion Failure	There is a faulty connection between the SERVOPACK and the Feedback Option Module.	Check the connection between the SERVO- PACK and the Feed- back Option Module.	Correctly connect the Feedback Option Module.	-
	The Feedback Option Module was discon- nected.	-	Reset the Option Module configuration error and turn the power supply to the SERVOPACK OFF and ON again.	*1
	A failure occurred in the Feedback Option Module.	_	Replace the Feedback Option Module.	-
	A failure occurred in the SERVOPACK.	_	Replace the SERVO-PACK.	

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.E74: Unsupported	A failure occurred in the Safety Option Module.	-	Replace the Safety Option Module.	-
Safety Option Module	An unsupported Safety Option Module was connected.	Refer to the catalog of the connected Safety Option Module.	Connect a compatible Safety Option Module.	-
A.Eb1: Safety Function Signal Input Tim- ing Error	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 SER-VOPACK 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 SERVO- PACK.	-
A.EC8: Gate Drive Error 1 (An error occurred in the gate drive circuit.)  A.EC9: Gate Drive Error 2 (An error occurred in the gate drive circuit.)	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
		Check the motor status when the command is executed.	Execute the SV_ON or SENS_ON command only when the motor is not operating.	-
A.Ed1: Command Execution Timeout	A timeout error occurred for a MECHATROLINK command.	For fully-closed loop control, check the status of the external encoder when the command is executed.     For other types of control, check the status of the linear encoder when the command is executed.	Execute the SENS_ON command only when an external encoder (e.g., a linear encoder) is connected.	_

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Alarm Number: Alarm Name	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.	*1
A.F10: Power Supply Line Open Phase	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.	-
(The voltage was low for more than one second for phase R, S, or T when the main power supply was	A single-phase power supply was input without specifying a signal-phase AC power supply input (Pn00B = n.□1□□).	Check the power supply and the parameter setting.	Match the parameter setting to the power supply.	*1
ON.)	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
FL-1*6: System Alarm FL-2*6: System Alarm FL-3*6: System Alarm FL-4*6: System Alarm FL-5*6: System Alarm FL-5*6: System Alarm	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
CPF00: Digital Operator	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.	-
Communications Error 1	A malfunction was caused by noise.	_	Keep the Digital Operator or the cable away from sources of noise.	-
CPF01: Digital Operator Communications Error 2	A failure occurred in the Digital Operator.	_	Disconnect the Digital Operator and then con- nect it again. If an alarm still occurs, the Digital Operator may be faulty. Replace the Digital Oper- ator.	-
	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

#### 4.2.4 Warning Displays

\*1. Refer to the following manual for details.

Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)

\*2. Detection Conditions

Rotary Servomotor

If either of the following conditions is detected, an alarm will occur.

• Pn533 [min<sup>-1</sup>] 
$$\times$$
 Encoder resolution  $\leq$  Pn20E Pn210

• Maximum motor speed [min<sup>-1</sup>] 
$$\times$$
 Encoder resolution
Approx.  $3.66 \times 10^{12}$   $\geq$  Pn20E
Pn210

Linear Servomotor

If either of the following conditions is detected, an alarm will occur.

\*3. Detection Conditions

Rotary Servomotor

If either of the following conditions is detected, an alarm will occur.

• Rated motor speed [min<sup>-1</sup>] 
$$\times$$
 1/3  $\times$   $\frac{Encoder resolution}{6 \times 10^5} \le \frac{Pn20E}{Pn210}$ 

• Maximum motor speed [min<sup>-1</sup>] 
$$\times \frac{\text{Encoder resolution}}{\text{Approx. } 3.66 \times 10^{12}} \ge \frac{\text{Pn20E}}{\text{Pn210}}$$

· Linear Servomotor

If either of the following conditions is detected, an alarm will occur.

\*4. Refer to the following manual for details.

Σ-7-Series Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

- \*5. The SERVOPACK will fail if the External Regenerative Resistor or Regenerative Resistor Unit is connected while the jumper is connected between the B2 and B3 terminals.
- \*6. These alarms are not stored in the alarm history. They are only displayed on the panel display.

# 4.2.4 Warning Displays

If a warning occurs in the SERVOPACK, a warning number will be displayed on the panel display. Warnings are displayed to warn you before an alarm occurs.

# List of Warnings

4.2.5

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

Warning Number	Warning Name	Meaning	Resetting
A.900	Position Deviation Overflow	The position deviation exceeded the percentage set with the following formula: (Pn520 × Pn51E/100)	Required.
A.901	Position Deviation Overflow Alarm at Servo ON	The position deviation when the servo was turned ON exceeded the percentage set with the following formula: (Pn526 × Pn528/100)	Required.
A.910	Overload	This warning occurs before an overload alarm (A.710 or A.720) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.911	Vibration	Abnormal vibration was detected during motor operation. The detection level is the same as A.520. Set whether to output an alarm or a warning by setting Pn310 (Vibration Detection Selections).	Required.
A.912	Internal Temperature Warning 1 (Control Board Temperature Error)	The surrounding temperature of the control PCB is abnormal.	Required.
A.913	Internal Temperature Warning 2 (Power Board Temperature Error)	The surrounding temperature of the power PCB is abnormal.	Required.
A.920	Regenerative Overload	This warning occurs before an A.320 alarm (Regenerative Overload) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.921	Dynamic Brake Over- load	This warning occurs before an A.731 alarm (Dynamic Brake Overload) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.923	SERVOPACK Built-in Fan Stopped	The fan inside the SERVOPACK stopped.	Required.
A.930	Absolute Encoder Bat- tery Error	This warning occurs when the voltage of absolute encoder's battery is low.	Required.
A.93B	Overheat Warning	The input voltage (temperature) for the overheat protection input (TH) signal exceeded the setting of Pn61C (Overheat Warning Level).	Required.
A.942	Speed Ripple Compensation Information Disagreement	The speed ripple compensation information stored in the encoder does not agree with the speed ripple compensation information stored in the SERVOPACK.	Required.
A.94A	Data Setting Warning 1 (Parameter Number Error)	There is an error in the parameter number for a Data Setting Warning 1 (Parameter Number) command.	Automatically reset.*
A.94b	Data Setting Warning 2 (Out of Range)	The command data is out of range.	Automatically reset.*
A.94C	Data Setting Warning 3 (Calculation Error)	A calculation error was detected.	Automatically reset.*
A.94d	Data Setting Warning 4 (Parameter Size)	The data sizes do not match.	Automatically reset.*
A.94E	Data Setting Warning 5 (Latch Mode Error)	A latch mode error was detected.	Required.
A.95A	Command Warning 1 (Unsatisfied Command Conditions)	A command was sent when the conditions for sending a command were not satisfied.	Automatically reset.*

#### 4.2.5 List of Warnings

Continued from previous page.

Warning Number	Warning Name	Meaning	Resetting
A.95b	Command Warning 2 (Unsupported Com- mand)	An unsupported command was sent.	Automatically reset.*
A.95d	Command Warning 4 (Command Interference)	There was command interference, particularly latch command interference.	Automatically reset.*
A.95E	Command Warning 5 (Subcommand Not Possible)	The subcommand and main command interfere with each other.	Automatically reset.*
A.95F	Command Warning 6 (Undefined Command)	An undefined command was sent.	Automatically reset.*
A.960	MECHATROLINK Communications Warning	A communications error occurred during MECHATROLINK communications.	Required.
A.971	Undervoltage	This warning occurs before an A.410 alarm (Undervoltage) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.97A	Command Warning 7 (Phase Error)	A command that cannot be executed in the current phase was sent.	Automatically reset.*
A.97b	Data Clamp Out of Range	The set command data was clamped to the minimum or maximum value of the allowable setting range.	Automatically reset.*
A.9A0	Overtravel	Overtravel was detected while the servo was ON.	Required.
A.9b0	Preventative Mainte- nance Warning	One of the consumable parts has reached the end of its service life.	Required.

<sup>\*</sup> The warning will automatically be cleared after the correct command is received.

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	Parameters That Must Be Set to Select Warning Detection
A.911	Pn310 = n.□□□X (Vibration Detection Selection)
A.923	_ (Not affected by the setting of Pn008 = n.□X□□.)
A.930	Pn008 = n.□□□X (Low Battery Voltage Alarm/Warning Selection)
A.942	Pn423 = n.□□X□ (Speed Ripple Compensation Information Disagreement Warning Detection Selection)
A.94A to A.960 and A.97A to A.97b	Pn800=n.□□X□ (Warning Check Masks)
A.971	Pn008 = n.□□□X (Low Battery Voltage Alarm/Warning Selection) (Not affected by the setting of Pn008 = n.□X□□.)
A.9A0	Pn00D = n.X□□□ (Overtravel Warning Detection Selection) (Not affected by the setting of Pn008 = n.□X□□.)
A.9b0	Pn00F = n.□□□X (Preventative Maintenance Warning Selection)

# 4.2.6 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.

Warning Number: Warning Name	Possible Cause	Confirmation	Correction	Reference
	The Servomotor U, V, and W wiring is not correct.	Check the wiring of the Servomotor's Main Circuit Cables.	Make sure that there are no faulty connections in the wiring for the Servomotor and encoder.	-
	A SERVOPACK gain is too low.	Check the SERVO- PACK gains.	Increase the servo gain, e.g., by using autotuning without a host reference.	*
A.900: Position Deviation Overflow	The acceleration of the position reference is too high.	Reduce the reference acceleration and try operating the SERVO-PACK.	Reduce the acceleration of the position reference using a MECHATROLINK com- mand. Or, smooth the posi- tion reference acceleration by selecting the position reference filter (ACCFIL) using a MECHATROLINK command.	-
	The excessive position deviation alarm level (Pn520 × Pn51E/100) is too low for the operating conditions.	Check excessive position deviation alarm level (Pn520 × Pn51E/100) to see if it is set to an appropriate value.	Optimize the settings of Pn520 and Pn51E.	*
	A failure occurred in the SERVO-PACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.901: Position Deviation Overflow Alarm at Servo ON	The position deviation when the servo was turned ON exceeded the percentage set with the following formula: (Pn526 × Pn528/100)	_	Optimize the setting of Pn528 (Position Deviation Overflow Warning Level at Servo ON).	-

# 4.2.6 Troubleshooting Warnings

Continued from previous page.

Warning Number: Warning Name	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 Servo- motor and encoder are cor- rectly wired.	-
	Operation was performed that exceeded the overload protection characteristics.	Check the motor over- load characteristics and Run command.	Reconsider the load and operating conditions. Or, increase the motor capacity.	-
A.910: Overload (warning before an A.710 or A.720 alarm occurs)	An excessive load was applied during operation because the Servomotor was not driven because of mechanical problems.	Check the operation reference and motor speed.	Remove the mechanical problem.	-
	The overload warning level (Pn52B) is not suitable.	Check that the overload warning level (Pn52B) is suitable.	Set a suitable overload warning level (Pn52B).	*
	A failure occurred in the SERVO-PACK.	_	The SERVOPACK may be faulty. Replace the SERVO-PACK.	-
A.911: Vibration	Abnormal vibration was detected during motor operation.	Check for abnormal motor noise, and check the speed and torque waveforms during operation.	Reduce the motor speed. Or, reduce the servo gain with custom tuning.	*
	The setting of Pn103 (Moment of Inertia Ratio) is greater than the actual moment of inertia or was greatly changed.	Check the moment of inertia ratio or mass ratio.	Set Pn103 (Moment of Inertia Ratio) to an appropriate value.	*
	The vibration detection level (Pn312 or Pn384) is not suitable.	Check that the vibration detection level (Pn312 or Pn384) is suitable.	Set a suitable vibration detection level (Pn312 or Pn384).	*

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Warning Number:	B "11 6	<b>0</b> "	Continued from pre	
Warning Name	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 supply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	-
A.912: Internal Tempera- ture Warning 1 (Control Board Tem- perature Error)	There was an excessive load or operation was performed that exceeded the regenerative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenerative load ratio to check the regenerative processing capacity.	Reconsider the load and operating conditions.	-
	The SERVOPACK installation orientation is not correct or there is insufficient space around the SERVOPACK.	Check the SERVO- PACK installation con- ditions.	Install the SERVOPACK according to specifications.	*
	A failure occurred in the SERVO-PACK.	-	The SERVOPACK may be faulty. Replace the SERVO-PACK.	-
	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 supply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	-
A.913: Internal Tempera- ture Warning 2 (Power Board Tem- perature Error)	There was an excessive load or operation was performed that exceeded the regenerative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenerative load ratio to check the regenerative processing capacity.	Reconsider the load and operating conditions.	-
	The SERVOPACK installation orientation is not correct or there is insufficient space around the SERVOPACK.	Check the SERVO- PACK installation con- ditions.	Install the SERVOPACK according to specifications.	*
	A failure occurred in the SERVO-PACK.	-	The SERVOPACK may be faulty. Replace the SERVO-PACK.	-

# 4.2.6 Troubleshooting Warnings

Continued from previous page.

Warning Number: Warning Name	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.	-
A.920: Regenerative Overload (warning before an A.320 alarm occurs)	There is insufficient external regenerative resistance, regenerative resistor capacity, or SER-VOPACK capacity, or there has been a continuous regeneration state.	Check the operating conditions or the capacity using the SigmaJunmaSize+ Capacity Selection Software or another means.	Change the regenerative resistance value, regenerative resistance capacity, or SERVOPACK capacity. Reconsider the operating conditions using the Sigma-JunmaSize+ Capacity Selection Software or other means.	-
	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 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.	-
A.921: Dynamic Brake Overload (warning before an A.731 alarm occurs)	When the Servo- motor 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 or mass.  Reduce the frequency of stopping with the dynamic brake.	-
	A failure occurred in the SERVO-PACK.	_	The SERVOPACK may be faulty. Replace the SERVO-PACK.	-
A.923: SERVOPACK Built- in Fan Stopped	The fan inside the SERVOPACK stopped.	Check for foreign matter inside the SERVO-PACK.	Remove foreign matter from the SERVOPACK. If an alarm still occurs, the SER- VOPACK may be faulty. Replace the SERVOPACK.	-
A.930: Absolute Encoder Battery Error (The absolute encoder battery voltage was lower than the spec- ified level.) (Detected only when an abso-	The battery con- nection 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.	*
lute encoder is connected.)	A failure occurred in the SERVO-PACK.	_	The SERVOPACK may be faulty. Replace the SERVO-PACK.	_

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Warning Number: Warning Name	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.	Use the accumulated load ratio to check the load during operation.	Reconsider the load and operating conditions.	-
A.93B: Overheat Warning	A failure occurred in the SERVO-PACK.	_	The SERVOPACK may be faulty. Replace the SERVO-PACK.	-
	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.	-
	The speed ripple	-	Reset the speed ripple compensation value on the SigmaWin+.	*
A.942: Speed Ripple Compensation Information Discorrection	compensation information stored in the encoder does not agree with the speed	-	Set Pn423 to n. $\Box\Box\Box\Box\Box\Box\Box$ (Do not detect A.942 alarms). However, changing the setting may increase the speed ripple.	-
tion Disagreement	ripple compensa- tion information stored in the SER- VOPACK.	_	Set Pn423 to n.□□□0 (Disable speed ripple compensation). However, changing the setting may increase the speed ripple.	-
A.94A: Data Setting Warning 1 (Parameter Number Error)	An invalid parameter number was used.	Check the command that caused the warning.	Use the correct parameter number.	*
A.94b: Data Setting Warning 2 (Out of Range)	The set command data was clamped to the minimum or maximum value of the setting range.	Check the command that caused the warning.	Set the parameter within the setting range.	*
A.94C: Data Setting Warning 3 (Calculation Error)	The calculation result of the setting is not correct.	Check the command that caused the warning.	Set the parameter within the setting range.	*
A.94d: Data Setting Warning 4 (Parameter Size)	The parameter size set in the command is not correct.	Check the command that caused the warning.	Set the correct parameter size.	*
A.94E: Data Setting Warning 5 (Latch Mode Error)	A latch mode error was detected.	Check the command that caused the warning.	Change the setting of Pn850 or the LT_MOD data for the LTMOD_ON command sent by the host controller to an appropriate value.	*
A.95A: Command Warning 1 (Unsatisfied Command Conditions)	The command conditions are not satisfied.	Check the command that caused the warning.	Send the command after the command conditions are satisfied.	*

#### 4.2.6 Troubleshooting Warnings

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Warning Number: Warning Name	Possible Cause	Confirmation	Correction	Reference
A.95b: Command Warning 2 (Unsupported Command)	An unsupported command was received.	Check the command that caused the warning.	Do not send unsupported commands.	*
A.95d: Command Warning 4 (Command Inter- ference)	The command sending conditions for latchrelated commands was not satisfied.	Check the command that caused the warning.	Send the command after the command conditions are satisfied.	*
A.95E: Command Warning 5 (Subcommand Not Possible)	The command sending conditions for subcommands was not satisfied.	Check the command that caused the warning.	Send the command after the conditions are satisfied.	*
A.95F: Command Warning 6 (Undefined Com- mand)	An undefined command was sent.	Check the command that caused the warning.	Do not send undefined commands.	*
	The MECHATROLINK Communications Cable is not wired correctly.	Check the wiring conditions.	Correct the MECHATROLINK communications cable wiring.	*
A.960: MECHATROLINK Communications Warning	A MECHATROLINK data reception error occurred due to noise.	Confirm the installation conditions.	Implement the following countermeasures against noise.  • Check the MECHATROLINK Communications Cable and FG wiring and implement countermeasures to prevent noise from entering.  • Attach a ferrite core to the MECHATROLINK Communications Cable.	-
	A failure occurred in the SERVO-PACK.	-	The SERVOPACK may be faulty. Replace the SERVO-PACK.	-
	For a 200-V SER- VOPACK, the AC power supply volt- age dropped below 140 V.	Measure the power supply voltage.	Set the power supply voltage within the specified range.	-
	For a 100-V SERVOPACK, the AC power supply voltage dropped below 60 V.	Measure the power supply voltage.	Set the power supply voltage within the specified range.	-
A.971: Undervoltage	The power supply voltage dropped during operation.	Measure the power supply voltage.	Increase the power supply capacity.	_
	A momentary power interruption occurred.	Measure the power supply voltage.	If you have changed the setting of Pn509 (Momentary Power Interruption Hold Time), decrease the setting.	*
	The SERVOPACK fuse is blown out.	-	Replace the SERVOPACK and connect a reactor.	*
	A failure occurred in the SERVO-PACK.	_	The SERVOPACK may be faulty. Replace the SERVO-PACK.	_

Maintenance

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Warning Number: Warning Name	Possible Cause	Confirmation	Correction	Reference
A.97A: Command Warning 7 (Phase Error)	A command that cannot be executed in the current phase was sent.	_	Send the command after the command conditions are satisfied.	-
A.97b: Data Clamp Out of Range	The set command data was clamped to the minimum or maximum value of the setting range.	_	Set the command data within the setting ranges.	-
A.9A0: Overtravel (Over- travel status was detected.)	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.	*
A.9b0: Preventative Mainte- nance Warning	One of the consumable parts has reached the end of its service life.	-	Replace the part. Contact your Yaskawa representative for replacement.	*

<sup>\*</sup> Refer to the following manual for details.

Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)

4.2.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

# 4.2.7 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.

Problem	Possible Cause	Confirmation	Correction	Reference
Servomotor Does Not Start	The control power supply is not turned ON.	Measure the voltage between control power supply terminals.	Turn OFF the power supply to the servo system. Correct the wiring so that the control power supply is turned ON.	-
	The main circuit power supply is not turned ON.	Measure the voltage across the main circuit power input terminals.	Turn OFF the power supply to the servo system. Correct the wiring so that the main circuit power supply is turned ON.	-
	The I/O signal connector (CN1) pins are not wired correctly or are disconnected.	Turn OFF the power supply 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 for the Servomotor Main Circuit Cables or Encoder Cable is disconnected.	Check the wiring conditions.	Turn OFF the power supply 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 supply to the servo system. Reduce the load or replace the Servomotor with a Servomotor with a larger capacity.	-
	The type of encoder that is being used does not agree with the setting of Pn002 = n.□X□□ (Encoder Usage).	Check the type of the encoder that is being used and the setting of Pn002 = n.□X□□.	Set Pn002 = n.□X□□ according to the type of the encoder that is being used.	*
	There is a mistake in the input signal allocations (Pn50A, Pn50B, Pn511, and Pn516).	Check the input signal allocations (Pn50A, Pn50B, Pn511, and Pn516).	Correctly allocate the input signals (Pn50A, Pn50B, Pn511, and Pn516).	*
	The SV_ON command was not sent.	Check the commands sent from the host controller.	Send the SV_ON command from the host controller.	-
	The SENS_ON (Turn ON Sensor) command was not sent.	Check the commands sent from the host controller.	Send the commands to the SERVOPACK in the correct sequence.	_
	The P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) 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) were not turned ON.	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.	*

4.2.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

	Continued from previous page					
Problem	Possible Cause	Confirmation	Correction	Reference		
Servomotor	The FSTP (Forced Stop Input) signal is still OFF.  A failure occurred in the SER-VOPACK.	Check the FSTP signal.	Turn ON the FSTP signal.     If you will not use the function to force the motor to stop, set Pn516 = n.□□□X (FSTP (Forced Stop Input) Signal Allocation) to disable the signal.  Turn OFF the power supply to the servo system.	*		
Does Not Start		Check the setting of Pn080 =n.□□□X (Polar-ity Separate Sciential)	Replace the SERVO-PACK.  Correct the parameter setting.	*		
	The polarity detection was not executed.	ity Sensor Selection).  Check the inputs to the SV_ON (Servo ON) command.	If you are using an incremental linear encoder, send the SV_ON command from the host controller.  If you are using an absolute linear encoder, execute polarity detection.	*		
	There is a mistake in the Servomotor wiring.	Turn OFF the power supply to the servo system. Check the wiring.	Wire the Servomotor correctly.	_		
	There is a mistake in the wiring of the encoder or Serial Converter Unit.	Turn OFF the power supply to the servo system. Check the wiring.	Wire the Serial Converter Unit correctly.	-		
Servomotor	There is a mistake in the linear encoder wiring.	Turn OFF the power supply to the servo system. Check the wiring.	Wire the cable correctly.	_		
Moves Instanta- neously,	The setting of Pn282 (Linear Encoder Scale Pitch) is not correct.	Check the setting of Pn282.	Correct the setting of Pn282.	*		
and Then Stops	The count-up direction of the linear encoder does not match the forward direction of the Moving Coil in the motor.	Check the directions.	Change the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection). Place the linear encoder and motor in the same direction.	*		
	Polarity detection was not performed correctly.	Check to see if electrical angle 2 (electrical angle from polarity origin) at any position is between ±10°.	Correct the settings for the polarity detection-related parameters.	_		
Servomotor Speed Is Unstable	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 supply to the servo system. Check the wiring.	Tighten any loose terminals or connectors and correct the wiring.	_		

Continued from previous page.

Problem	Possible Cause	Confirmation	Reference	
	A failure occurred in the SER-VOPACK.	_	Correction  Turn OFF the power supply to the servo system.  Replace the SERVO-PACK.	-
Servomotor Moves with- out a Refer- ence Input	The count-up direction of the linear encoder does not match the forward direction of the Moving Coil in the motor.	Check the directions.	Change the setting of Pn080 = n.□□X□ (Motor Phase Sequence Selection). Match the linear encoder direction and Servomotor direction.	*
	Polarity detection was not performed correctly.	Check to see if electrical angle 2 (electrical angle from polarity origin) at any position is between ±10°.	Correct the settings for the polarity detection-related parameters.	-
Dynamic Brake Does Not Operate	The setting of Pn001 = n.□□□X (Motor Stopping Method for Servo OFF and Group 1 Alarms) is not suitable.	Check the setting of Pn001 = n.□□□X.	Set Pn001 = n.□□□X correctly.	-
	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 resistance may be disconnected.	Turn OFF the power supply to the servo system. Replace the SERVO-PACK. 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 supply to the servo system. Replace the SERVO-PACK.	-
Abnormal Noise from Servomotor	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 moment of inertia ratio or mass ratio is within the allowable value, or increase the load level or reduce the rigidity level in the tuning-less level settings. If the situation is not improved, disable the tuning-less function (i.e., set Pn170 to n.□□□0) and execute autotuning either with or without a host reference.	*

4.2.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

D 1.	Continued from previous page  Confirmation Correction Reference					
Problem	Possible Cause	Confirmation	Correction	Reference		
		Turn OFF the power supply to the servo system. Check to see if there are any loose mounting screws.	Tighten the mounting screws.	-		
	The machine mounting is not secure.	Turn OFF the power supply to the servo system. Check to see if there is misalignment in the coupling.	Align the coupling.	-		
		Turn OFF the power supply to the servo system. Check to see if the coupling is balanced.	Balance the coupling.	_		
	The bearings are defective.	Turn OFF the power supply to the servo system. Check for noise and vibration around the bearings.	Replace the Servomotor.	-		
Abnormal Noise from Servomotor	There is a vibration source at the driven machine.	Turn OFF the power supply 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 supply to the servo system. Check the I/O signal cables to see if they satisfy specifications. Use shielded twisted-pair wire cables or screened twisted-pair cables with conductors of at least 0.12 mm <sup>2</sup> .	Use cables that satisfy the specifications.	-		
	Noise interference occurred because an I/O signal cable is too long.	Turn OFF the power supply 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 supply to the servo system.  Make sure that the rotary or Linear Encoder Cable satisfies the specifications. Use a shielded twisted-pair wire cable or a screened twisted-pair cable with a conductors of at least 0.12 mm <sup>2</sup> .	Use cables that satisfy the specifications.	-		

Continued from previous page.

Problem Possible Cause Confirmation Correction				
Problem	Possible Gause	Confirmation	• Rotary Servomotors:	Reference
	Noise interference occurred because the Encoder Cable is too long.	Turn OFF the power supply to the servo system. Check the length of the Encoder Cable.	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 supply 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 envi- ronment.	-
	The Encoder Cable was subjected to excessive noise interference.	Turn OFF the power supply to the servo system. Check to see if the Encoder Cable is bundled with a high-current line or installed near a high-current line.	Correct the cable lay- out so that no surge is applied by high-current lines.	-
	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 supply 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.	-
Abnormal Noise from Servomotor	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 supply 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 supply 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 supply to the servo system. Replace the Servomotor.	-
	A failure occurred in the Serial Converter Unit.	_	Turn OFF the power supply to the servo system. Replace the Serial Con- verter Unit.	-
	A failure occurred in the linear encoder.	_	Turn OFF the power supply to the servo system. Replace the linear encoder.  Continued or	-

4.2.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	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.	*
Servomotor	The setting of Pn100 (Speed Loop Gain) is too high.	Check the setting of Pn100. The default setting is Kv = 40.0 Hz.	Set Pn100 to an appropriate value.	-
Vibrates at Frequency of Approx. 200 to 400	The setting of Pn102 (Position Loop Gain) is too high.	Check the setting of Pn102. The default setting is Kp = 40.0/s.	Set Pn102 to an appropriate value.	-
Hz.	The setting of Pn101 (Speed Loop Integral Time Constant) is not appropriate.	Check the setting of Pn101. The default setting is Ti = 20.0 ms.	Set Pn101 to an appropriate value.	-
	The setting of Pn103 (Moment of Inertia Ratio or Mass Ratio) is not appropri- ate.	Check the setting of Pn103.	Set Pn103 to an appropriate value.	-
	The servo gains are not balanced.	Check to see if the servo gains have been correctly tuned.	Perform autotuning without a host reference.	*
	The setting of Pn100 (Speed Loop Gain) is too high.	Check the setting of Pn100. The default setting is Kv = 40.0 Hz.	Set Pn100 to an appropriate value.	-
Large Motor Speed	The setting of Pn102 (Position Loop Gain) is too high.	Check the setting of Pn102. The default setting is Kp = 40.0/s.	Set Pn102 to an appropriate value.	-
Overshoot on Starting and Stop- ping	The setting of Pn101 (Speed Loop Integral Time Constant) is not appropriate.	Check the setting of Pn101. The default setting is Ti = 20.0 ms.	Set Pn101 to an appropriate value.	-
ציייט	The setting of Pn103 (Moment of Inertia Ratio or Mass Ratio) is not appropri- ate.	Check the setting of Pn103.	Set Pn103 to an appropriate value.	-
	The torque reference is saturated.	Check the waveform of the torque reference.	Use the mode switch.	_
	The force limits (Pn483 and Pn484) are set to the default values.	The default values of the force limits and Pn483 = 30% and Pn484 = 30%.	Set Pn483 and Pn484 to appropriate values.	*

Continued from previous page.

Problem Possible Cause Confirmation Correction				
Problem	Possible Cause	Confirmation  Turn OFF the power quality	Correction	Reference
	Noise interference occurred because of incorrect Encoder Cable specifications.	Turn OFF the power supply 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 <sup>2</sup> .	Use cables that satisfy the specifications.	-
	Noise interference occurred because the Encoder Cable is too long.	Turn OFF the power supply 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.	-
Absolute Encoder Position Deviation Error (The	Noise interference occurred because the Encoder Cable is damaged.	Turn OFF the power supply 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 envi- ronment.	-
position that was saved in the host con- troller when the power	Replace the Encoder Cable and correct the cable installation environment.	Turn OFF the power supply to the servo system. Check to see if the Encoder Cable is bundled with a high-current line or installed near a high-current line.	Correct the cable lay- out so that no surge is applied by high-current lines.	-
was turned OFF is dif- ferent from the posi- tion when	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 supply 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.	-
the power was next turned ON.)	There is a SERVOPACK pulse counting error due to noise.	Turn OFF the power supply to the servo system. Check to see if there is noise interference on the I/O signal line from the encoder or Serial Converter Unit.	Implement counter- measures against noise for the encoder or Serial Converter Unit wiring.	-
	The encoder was subjected to excessive vibration or shock.	Turn OFF the power supply 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 supply to the servo system. Replace the Servomotor or linear encoder.	-

	Continued from previous page.					
Problem	Possible Cause	Confirmation	Correction	Reference		
Absolute Encoder Position Deviation Error (The	A failure occurred in the SER-VOPACK.	_	Turn OFF the power supply to the servo system. Replace the SERVO-PACK.	-		
position that was saved in the		Check the error detection section of the host controller.	Correct the error detection section of the host controller.	-		
host con- troller when the power was turned	Host Controller Multiturn Data or Absolute Encoder	Check to see if the host controller is executing data parity checks.	Perform parity checks for the multiturn data or absolute encoder posi- tion data.	-		
OFF is dif- ferent from the posi- tion when the power was next turned ON.)	Position Data Reading Error	Check for noise interference in the cable between the SERVO-PACK and the host controller.	Implement counter- measures against noise and then perform parity checks again for the multiturn data or abso- lute encoder position data.	-		
		Check the external power supply (+24 V) voltage for the input signals.	Correct the external power supply (+24 V) voltage for the input signals.	-		
	The P-OT/N-OT (Forward Drive Prohibit or Reverse Drive Prohibit) signal was input.	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.	*		
Overtravel Occurred		Check the settings of the overtravel input signal allocations (Pn50A/Pn50B).	Set the parameters to correct values.	*		
	The P-OT/N-OT (Forward Drive Prohibit or Reverse Drive Prohibit) 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 over-travel 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 or N-OT (Forward Drive Prohibit or	Check to see if the P-OT signal is allocated in Pn50A = n.X□□□.	If another signal is allocated in Pn50A =n.X□□□, allocate the P-OT signal instead.	*		
Overtravel Occurred	Reverse Drive Prohibit) signal in Pn50A = n.XDDD or Pn50B = n.DDDX.	Check to see if the N-OT signal is allocated in Pn50B = n.□□□X.	If another signal is allocated in Pn50B =n. \(\sigma\) \(\sigma\) X, allocate the N-OT signal instead.	*		
	The selection of the Servo-	Check the servo OFF stopping method set in Pn001 = n.□□□X or Pn001 = n.□□X□.	Select a Servomotor stopping method other than coasting to a stop.	*		
	motor stopping method is not correct.	Check the torque control stopping method set in Pn001 = n.□□□X or Pn001 = n.□□X□.	Select a Servomotor stopping method other than coasting to a stop.	*		

Continued from previous page.

Problem	Possible Cause	Confirmation	Correction	Reference
Improper Stop Posi- tion for	The limit switch position and dog length are not appropriate.	-	Install the limit switch at the appropriate position.	-
Overtravel (OT) Signal	The overtravel limit switch position is too close for the coasting distance.	_	Install the overtravel limit switch at the appropriate position.	_
Position Deviation (without Alarm)	Noise interference occurred because of incorrect Encoder Cable specifications.	Turn OFF the power supply 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 <sup>2</sup> .	Use cables that satisfy the specifications.	-
	Noise interference occurred because the Encoder Cable is too long.	Turn OFF the power supply 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 supply 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 envi- ronment.	-
	The Encoder Cable was subjected to excessive noise interference.	Turn OFF the power supply to the servo system. Check to see if the Encoder Cable is bundled with a high-current line or installed near a high-current line.	Correct the cable lay- out so that no surge is applied by high-current lines.	-
	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 supply 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 supply to the servo system. Check to see if there is noise interference on the I/O signal line from the encoder or Serial Converter Unit.	Implement counter- measures against noise for the encoder wiring or Serial Converter Unit wiring.	_

Continued from previous page.

Droblem	Continued from previous particular Problem Possible Cause Confirmation Correction Referen						
Problem	Possible Cause	Turn OFF the power supply	Correction	Reference			
	The encoder was subjected to excessive vibration or shock.	to the servo system. Check to see if vibration from the machine occurred. Check the Servomotor excessive vibration or installation (mounting sur-		-			
Position Deviation (without Alarm)	The coupling between the machine and Servomotor is not suitable.	Turn OFF the power supply 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 supply 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 <sup>2</sup> .	Use cables that satisfy the specifications.	-			
	Noise interference occurred because an I/O signal cable is too long.	Turn OFF the power supply 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.	-			
Position Deviation (without Alarm)	An encoder fault occurred. (The pulse count does not change.)	_	Turn OFF the power supply to the servo system. Replace the Servomotor or linear encoder. Turn OFF the power	-			
	A failure occurred in the SER-VOPACK.	_	supply to the servo system. Replace the SERVO- PACK.	-			
	The surrounding air temperature is too high.	Measure the surrounding air temperature around the Servomotor.	Reduce the surrounding air temperature to 40°C or less.	-			
Servomotor Overheated	The surface of the Servomotor is dirty.	Turn OFF the power supply 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.	_			

<sup>\*</sup> Refer to the following manual for details.

Ω Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)

This chapter provides information on the parameters.

5.1	SERVOF	PACKs with Analog Voltage/Pulse Train References5-2
	5.1.1 5.1.2 5.1.3	Interpreting the Parameter Lists
5.2	SERVOPA	CKs with MECHATROLINK-III Communications References5-44
	5.2.1 5.2.2 5.2.3	Interpreting the Parameter Lists 5-44 List of Servo Parameters 5-45 List of MECHATROLINK-III Common
	5.2.4	Parameters

5.1.1 Interpreting the Parameter Lists

## 5.1

# SERVOPACKs with Analog Voltage/Pulse Train References

### 5.1.1 Interpreting the Parameter Lists

The types of motors 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.

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 section for details.

◆ Differences in Terms for Rotary Servomotors and Linear Servomotors on page xii Indicates when a change to the parameter will be effective.

Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applica- ble Motors	When Enabled	Classi- fication	Refer- ence
	2	Basic Function Selections 0	0000h to 10B1h	-	0000h	All	After restart	Setup	_

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

There are the following two classifications.

- Setup
- Tuning

Refer to the following manual for details.

Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)

n.□□□X		Direction Selection nt Direction Selection	Reference
		Use CCW as the forward direction.	
	0	Use the direction in which the linear encoder counts up as the forward direction.	
		Use CW as the forward direction. (Reverse Rotation Mode)	_
	1	Use the direction in which the linear encoder counts down as the forward direction. (Reverse Movement Mode)	

	Control I	Method Selection	Reference
	0	Speed control with analog references	
	1	Position control with pulse train references	
	2	Torque control with analog references	
	3	Internal set speed control with contact commands	
	4	Switching between internal set speed control with contact references and speed control with analog references	
	5	Switching between internal set speed control with contact references and position control with pulse train references	
n.□□X□	6	Switching between internal set speed control with contact references and torque control with analog references	_
	7	Switching between position control with pulse train references and speed control with analog references	
	8	Switching between position control with pulse train references and torque control with analog references	
	9	Switching between torque control with analog references and speed control with analog references	
	А	Switching between speed control with analog references and speed control with zero clamping	
	В	Switching between position control with pulse train references and position control with reference pulse inhibition	

n.□X□□	Reserved parameter (Do not change.)							
	Rotary/Li	near Servomotor Startup Selection When Encoder Is Not Connected	Reference					
n.X□□□	0	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.	_					

Pn000

# Parameter Lists

#### List of Parameters 5.1.2

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

Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer ence		
	2	Basic Fund tions 0	ction Selec-	0000h to 10B1h	_	0000h	All	After restart	Setup	*1		
	_											
			Rotation Dir	ection Selectio	n							
				Direction Select	-							
				Use CCW as the forward direction.								
	1	n.□□□X	tic	Use the direction in which the linear encoder counts up as the forward direction.  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)								
			Control Met	hod Selection								
			H .	peed control wit								
				Position control with pulse train references  Torque control with analog references								
			9,	ernal set speed vitching betwee				ontact refer	nces and			
			4 sp	eed control with	n analog re	eferences						
Pn000				vitching betwee sition control w				ontact refere	ences and			
		n.□□X□		vitching betwee rque control with			control with c	ontact refere	ences and			
				Switching between position control with pulse train references and speed control with analog references								
		-		Switching between position control with pulse train references and torque control with analog references								
				vitching betwee th analog refere		ontrol with	analog refere	ences and sp	eed contr	rol		
			Δ	vitching betwee th zero clamping		ontrol with	analog refere	nces and sp	eed contr	ol		
				vitching betwee Introl with refere			h pulse train	references a	nd positio	n		
	I	n.□X□□	Reserved p	arameter (Do no	ot change.	)						
			Rotary/Line	ar Servomotor :	Startup Se	election W	hen Encoder	Is Not Con	nected			
	,	n.X□□□	1 ()	hen an encoder otor.	is not con	nected, st	art as SERVC	PACK for R	otary Serv	0-		
				hen an encoder otor.	is not cor	nected, st	art as SERVC	PACK for Li	near Servo	)-		

Continued from previous page.

Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Application Selections	n Function 1	0000h to 1142h	_	0000h	All	After restart	Setup	*1		
	,											
				ing Method for			-					
				Stop the motor by applying the dynamic brake.								
		n.□□□X		Stop the motor by the applying dynamic brake and then release the dynamic brake.								
			2 Co	ast the motor t	o a stop w	ithout the	dynamic brak	e.				
			Overtravel S	topping Metho	d							
			0 Ap	ply the dynamic	brake or	coast the	motor to a sto	p.				
				Decelerate the motor to a stop using the torque set in Pn406 as the maximum torque and then servo-lock the motor.								
		n.□□X□		celerate the mo			ne torque set i	n Pn406 as	the maxim	um		
Pn001				celerate the mo n servo-lock th		op using tl	ne deceleratio	n time set in	Pn30A aı	nd		
				celerate the motor		op using tl	ne deceleratio	n time set in	Pn30A aı	nd		
			Main Circuit	Power Supply	AC/DC In	put Select	ion					
				out AC power as			ver supply usi	ing the L1, L	2, and L3	ter-		
		n.□X□□	1 ter	Input DC power as the main circuit power supply using the B1/ $\oplus$ and $\ominus$ 2 terminals or the B1 and $\ominus$ 2 terminals (use an external converter or the shared converter).								
			Warning Cod	de Output Sele	ction							
			0 Ou	tput only alarm	codes on	the ALO1,	ALO2, and A	LO3 termina	als.			
		n.X□□□	1 ter	tput both warn minals. Howeve rm) output sigr	er, while ar	warning o	ode is being					
			1									

O 11 1	r		
Continued	trom	previous	page.

Parameter No.	Size	N	Name		Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Application Selections	Function 2	0000h to 4213h	_	0000h	-	After restart	Setup	*1
			Speed/Pos	Speed/Position Control Option (T-REF Input Allocation)						
		n.□□□X	0 [	o not use T-REF.						
			1 L	lse T-REF as an e	external to	rque limit i	nput.			
			2 L	lse T-REF as a to	rque feed	back input			All	
				Ise T-REF as an ∈ P-CL or /N-CL is		rque limit i	nput when			
			Torque Co	rque Control Option (V-REF Input Allocation)						
		n.□□X□	0 [	o not use V-REF		All				
			1 L	lse V-REF as an	external s	oeed limit i	nput.		All	
Pn002		n.0X00	Encoder Usage						Applicat Motors	
			0 (	Use the encoder according to encoder specifications.						
			1 L	Use the encoder as an incremental encoder.						
			2 L	2 Use the encoder as a single-turn absolute encoder.						,
			External E	ncoder Usage					Applicat Motors	
			0 [	o not use an ext	ernal enco	der.				
		n.X□□□		he external enco notor rotation.	der moves	s in the for	ward direction	for CCW		
			2 F	Reserved setting	(Do not us	e.)			Rotary	•
				he external enco notor rotation.	der moves	s in the rev	erse direction	for CCW		
			4 F	Reserved setting	(Do not us	e.)				

Continued from previous page.

Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
	2	Application Selections	Function 6	0000h to 105Fh	_	0002h	All	Immedi- ately	Setup	*1	
			A I M-		I I'			-			
			Analog Mo	nitor 1 Signal Se		. 1.					
			00	Motor speed (1							
				· · · · ·	-	· · ·					
			01	Speed reference (1 V/1,000 min <sup>-1</sup> ) Speed reference (1 V/1,000 mm/s)							
				Torque reference	•		rque)			<del></del>	
			02	Force reference	(1 V/1009	6 rated for	ce)				
			03	Position deviation	on (0.05 V	reference	unit)				
				Position amplifie	er deviation	n (after elec	ctronic gear) (	0.05 V/enco	der pulse	unit)	
			04	Position amplifice pulse unit)	er deviation	n (after elec	ctronic gear) (	0.05 V/linea	r encoder		
			05								
			05	Position reference speed (1 V/1,000 mm/s)							
			06	Reserved setting (Do not use.)							
			07	Load-motor pos	sition devia	ation (0.01	V/reference u	nit)			
Pn006		n.□□XX	08	Positioning completed: 0 V)	pletion (po	ositioning o	ompleted: 5	V, positionino	g not com-	-	
			09	Speed feedforward (1 V/1,000 min <sup>-1</sup> )							
				Speed feedforward (1 V/1,000 mm/s)							
			0A	Torque feedforward (1 V/100% rated torque)							
				Force feedforwa	•		•				
			0B	Active gain (1st							
			0C	Completion of p pleted: 0 V)	osition ref	erence dis	tribution (com	pleted: 5 V,	not com-		
			0D	External encode	er speed (1	V/1,000 r	nin <sup>-1</sup> : value at	the motor s	haft)		
			0E	Reserved setting	g (Do not i	use.)					
			0F	Reserved setting	g (Do not i	use.)					
			10	Main circuit DC							
			11 to 24	Reserved setting	•						
			25	Position deviation	· ·		ence filter (0.0	05 V/referen	ce unit)		
			26 to 5F	Reserved setting	gs (Do not	use.)					
		n.□X□□	.□X□□ Reserved parameter (Do not change.)								
		n.X□□□	Reserved p	parameter (Do no	ot change.	.)					

Applicable

Motors

#### 5.1.2 List of Parameters

Classi-

fication

Refer-

ence

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When

Enabled

					riarigo	0	00119				00		
	2	Application Selections	Function 7		0000h to 105Fh	-	0000h	All	Immedi- ately	Setup	*1		
								-			•		
	١.		Analog Ma	i+	or O Cianal Ca	laatian							
			Analog Mc		or 2 Signal Se		· -1\						
			00		Motor speed (1 V/1,000 min <sup>-1</sup> )  Motor speed (1 V/1,000 mm/s)								
					Motor speed (1 V/1,000 mm/s)								
			01	<u> </u>	Speed reference (1 V/1,000 min <sup>-1</sup> ) Speed reference (1 V/1,000 mm/s)								
						•		raua)					
			02		Torque reference (1 V/100% rated torque)								
			03		Force reference (1 V/100% rated force)  Position deviation (0.05 V/reference unit)								
					osition amplifie			,	0.05 V/enco	der pulse	unit)		
			04		osition amplifie								
					ulse unit)		(0	9, (					
			05	Р	osition reference	ce speed (	1 V/1,000	min <sup>-1</sup> )					
					Position reference speed (1 V/1,000 mm/s)								
			06		Reserved setting (Do not use.)  Load-motor position deviation (0.01 V/reference unit)								
Pn007	n.□□XX	07		· · · · · · · · · · · · · · · · · · ·		•							
		11.22/00	08		ositioning com eted: 0 V)	pletion (po	ositioning c	completed: 5	V, positioning	g not com-	-		
			09	Sp	peed feedforwa	ard (1 V/1,	,000 min <sup>-1</sup> )						
				Speed feedforward (1 V/1,000 mm/s)									
			0A	Torque feedforward (1 V/100% rated torque)									
				Force feedforward (1 V/100% rated force)									
			0B		ctive gain (1st			•					
			0C		ompletion of peted: 0 V)	osition ref	erence dist	tribution (com	pleted: 5 V,	not com-			
			0D	E	kternal encode	r speed (1	V/1,000 r	nin <sup>-1</sup> : value at	the motor s	haft)			
			0E	Re	eserved setting	g (Do not ι	use.)						
			0F	Re	eserved setting	g (Do not ι	use.)						
			10	М	ain circuit DC	voltage							
			11 to 24		eserved setting	, ,							
			25		osition deviation	· ·		ence filter (0.0	05 V/referen	ce unit)			
			26 to 5F	Re	eserved setting	gs (Do not	use.)						
		n.□X□□	Reserved parameter (Do not change.)										
		n.X□□□	Reserved	par	ameter (Do no	t change.	.)						

Setting

Range

Parameter

No.

Size

Name

Setting

Unit

Default

Setting

Continued from previous page.

Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Applicatio Selections	n Function 8	0000h to 7121h	_	0000h	Rotary	After restart	Setup	*1		
				Voltage Alarm								
		n.□□□X		tput alarm (A.8	,							
			1 Output warning (A.930) for low battery voltage.									
			Function Sel	ection for Und	ervoltage							
Pn008			0 Do									
F11000		n.□□X□	1 De	Detect undervoltage warning and limit torque at host controller.								
				Detect undervoltage warning and limit targue with Pn424 and Pn425 (i.e., only								
			Warning Det	ection Selection	n							
		n.□X□□	0 De									
		1 Do not detect warnings except for A.971.										
		n.XDDD	Reserved pa	rameter (Do no	ot change	)						
				,		,						
	2	Applicatio Selections	n Function 9	0000h to 0121h	-	0010h	All	After restart	Tuning	*1		
		n.□□□X	Reserved pa	rameter (Do no	t change.	)						
			Current Control Mode Selection									
			0 Use	e current contro	ol mode 1.							
				ERVOPACK Mo		,	-R90A, -1R6A	4, -2R8A, -5	R5A, and	_		
Pn009		n.□□X□	1 • s	R6A: Use curre ERVOPACK Mo	dels SGD	7S-120A,		., -330A, -47	OA, -550A	۸, -		
				90A, and -780A current contro			ii mode 2.					
				tion Method S								
		n.□X□□		e speed detecti e speed detecti								
			1 086	e speed detecti	UII Z.							
		n.X□□□	Reserved pa	rameter (Do no	t change.	)						

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Continued	trom	previous	page.

Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
	2	Application Selections		0000h to 1044h	-	0001h	All	After restart	Setup	*1	
			Motor Stops	oing Method fo	r Group 2	Alarms					
			O Ap	oply the dynami ethod set in Pno	c brake or	coast the	motor to a st	op (use the	stopping		
			1 De	ecelerate the mo	otor to a stetting of P	top using t n001 = n. <b>l</b>	he torque set □□□X for the	in Pn406 as e status afte	the maxir stopping	num	
		n.□□□X		recelerate the motor to a stop using the torque set in Pn406 as the maximum orque and then let the motor coast.							
			3 De	ecelerate the mose setting of PnC	otor to a s 001 = n. <b>□I</b>	top using t ⊐□X for th	he decelerations status after	on time set i stopping.	n Pn30A.	Use	
				ecelerate the motor		top using t	he deceleration	on time set i	n Pn30A a	and	
Pn00A			Stopping M	ethod for Force	ed Stops						
				pply the dynami ethod set in Pn			motor to a st	op (use the	stopping		
				ecelerate the more							
		n.□□X□		Decelerate the motor to a stop using the torque set in Pn406 as the maximum orque and then let the motor coast.  Decelerate the motor to a stop using the deceleration time set in Pn30A. Use							
			3 De	ecelerate the mode setting of PnC	otor to a s 101 = n. <b>□I</b>	top using t ⊐□X for th	he deceleration ne status after	on time set i stopping.	n Pn30A.	Use	
				ecelerate the motor		top using t	he deceleration	on time set i	n Pn30A a	and 	
		n.□X□□	Reserved pa	arameter (Do n	ot change	.)					
		n.X□□□	Reserved pa	arameter (Do n	ot change	.)					
	2	Application Selections		0000h to 1121h	-	0000h	All	After restart	Setup	*1	
			Operator Par	ameter Display	Selection	1					
		n.□□□X	0 Dis	olay only setup	paramete	rs.					
			1 Dis	olay all paramet	ters.						
			Motor Stoppi	ng Method for	Group 2	Alarms					
				p the motor by	-		ference to 0.				
Pn00B		n.□□X□		oly the dynamic thod set in Pn0			motor to a sto	p (use the s	topping		
			2 Set	the stopping n	nethod wit	h Pn00A =	: n.□□□X.				
			Power Input	Selection for T	hree-phas	e SERVOF	PACK				
		n.□X□□		a three-phase							
				a three-phase				nase power s	supply inp	ut.	
		n.X□□□	Reserved par	rameter (Do no	t change )						
					- ca.i.go.)						

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								itinuea tron	previou	s page.			
Parameter No.	Size		ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence			
	2	Application Selections	r Function C	0000h to 0131h	_	0000h	-	After restart	Setup	*1			
		n.□□□X		ection for Test					Applica Motor	ble ·s			
				able tests with					All				
				solution for Tes	ts without	a Motor			Applica Motor	ble			
Pn00C		n.□□X□	1 Us	e 13 bits. e 20 bits. e 22 bits.					Rotar	у			
				e 24 bits.									
		n.□X□□		e Selection for			tor		Applica Motor	ble 's			
				e an increment e an absolute e					All				
		n.X000		rameter (Do no		.)							
				, , , , , , , , , , , , , , , , , , , ,									
	2 Application Function 0000h to Selections D 0000h to 1001h - 0000h All Immediately Setup									*1			
		n.□□□X	Reserved pa	rameter (Do no	ot change.	.)							
Pn00D		n.□□X□	Reserved pa	rameter (Do no	ot change.	.)							
		n.□X□□	Reserved pa	rameter (Do no	ot change.	.)							
		п.Х□□□	0 Do	/arning Detecti not detect ove tect overtravel	ertravel wa								
	2	Application Selections		0000h to 2011h	-	0000h	All	After restart	Setup	*1			
Pn00F		n.□□□X	0 Dor	Maintenance on detect preventative	entative m	aintenance							
		n.□□X□	Reserved pa	rameter (Do no	ot change.	.)							
		n.□X□□	Reserved pa	rameter (Do no	ot change	.)							
		n.X□□□	Reserved pa	rameter (Do no	ot change.	.)							
Pn010	2		ess Selection JSB Commu-	0000h to 007Fh	_	0001h	All	After restart	Setup	_			
Pn021	2	Reserved p	parameter (Do e.)	_	_	0000h	All	-	-	_			
Pn022	2		parameter (Do	-	-	0000h	All	-	-	_			
				1	1	1	1	·					

Continued	from	nrevious	nage
Continued	110111	previous	page.

Parameter	Ф		N		Setting	Setting	Default	Applicable	When	Classi-	Refer-				
No.	Size		Name		Range	Unit	Setting	Motors	Enabled	fication	ence				
	2	Σ-V Com tion Swite	patible Fun ch	C-	0000h to 2111h	-	0000h	_	After restart	Setup	-				
	n.	пппх	Reserved	para	meter (Do not	change.)									
			Encoder F	Resol	ution Compati	bility Sele	ction			Applica Moto					
Pn040	n.	ппхп			he encoder res										
					a resolution of 2 7A, SGM7P, S					Rotar	У				
	n.		Reserved	para	meter (Do not	change.)									
	n.	XDDD	Reserved	para	meter (Do not	change.)									
	2	Application Selection	on Function s 80	1	0000h to 1111h	-	0000h	Linear	After restart	Setup	*1				
			Polarity S	Sens	or Selection										
	r	n.□□□X	0		polarity senso										
			1 Do not use polarity sensor.												
Pn080			+	Motor Phase Sequence Selection											
1 11000	r	1.00X0	1		a phase-A lead a phase-B lead										
			'	Set	а рпаѕе-в теас	as a pria	se sequen	ce or o, v, an	1 VV.						
	r	1.0X00	Reserved	d par	ameter (Do no	t change.)									
					lethod for Max										
	r	1.X000	1		culate the enco		·								
	-		'	Oak	diate the maxi	mum spec	ou lor a lixe	ed effectuel of	utput puise s	etting.					
	_	Application	on Function	1	0000h to		00006	All	After	Cotus	*1				
	2	Selection	s 81		1111h	_	0000h	All	restart	Setup	1				
	١.,		Dhana C	י חיים	aa Outaut Cale	ation									
		n.□□□X			se Output Sele tput phase-C p		in the for	vard direction	1.						
Pn081			1		tput phase-C p					ns.					
. 11001		n.□□X□	Reserve	d pa	rameter (Do no	ot change	.)								
		n.□X□□	Reserve	d pa	rameter (Do no	ot change	.)								
		n.X000	Reserve	d pa	rameter (Do no	ot change.	.)								
Pn100	2	Speed Lo	op Gain		10 to 20,000	0.1 Hz	400	All	Immedi- ately	Tuning	*1				
Pn101	2	Speed Lo Time Cor	oop Integral nstant	ı	15 to 51,200	0.01 ms	2000	All	Immedi- ately	Tuning	*1				
Pn102	2	Position I	_oop Gain		10 to 20,000	0.1/s	400	All	Immedi- ately	Tuning	*1				
Pn103	2	Moment	of Inertia Ra	atio	0 to 20,000	1%	100	All	Immedi- ately	Tuning	*1				
Pn104	2	Second S Gain	Speed Loop	)	10 to 20,000	0.1 Hz	400	All	Immedi- ately	Tuning	*1				
Pn105	2	Second S Integral T	Speed Loop ime Consta	ant	15 to 51,200	0.01 ms	2000	All	Immedi- ately	Tuning	*1				
Pn106	2	Second F Gain	Position Loc	op	10 to 20,000	0.1/s	400	All	Immedi- ately	Tuning	*1				
		_		•	-			-	<u> </u>						

Friction Compensation

Second Friction Com-

Friction Compensation Coefficient

Friction Compensation

Frequency Correction

Friction Compensation Gain Correction

Gain Switching Time 1

Gain Switching Time 2

Gain Switching Waiting

Gain Switching Waiting

pensation Gain

10 to 1,000

10 to 1,000

0 to 100

-10,000 to 10,000

1 to 1,000

0 to 65,535

0 to 65,535

0 to 65,535

0 to 65,535

1%

1%

1%

0.1 Hz

1%

1 ms

1 ms

1 ms

1 ms

100

100

0

0

100

0

0

0

0

ΑII

All

AII

ΑII

ΑII

All

ΑII

ΑII

All

Pn121

Pn122

Pn123

Pn124

Pn125

Pn131

Pn132

Pn135

Pn136

2

2

2

2

2

2

2

2

2

Time 2

#### 5.1.2 List of Parameters

Continued from previous page.

Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn109	2	Feedforwa	rd		0 to 100	1%	0	All	Immedi- ately	Tuning	*1
Pn10A	2	Feedforwar Constant	rd Filter Ti	me	0 to 6,400	0.01 ms	0	All	Immedi- ately	Tuning	*1
	2	Gain Applications	cation Sele	ec-	0000h to 5334h	_	0004h	All	_	Setup	*1
		n.□□□X	Mode Sv 0 1	Use Pn1 Use Use Pn1	e the internal to 100).  The the speed refer the speed refer the acceleration (100).  The the acceleration (100).	erence as erence as ion referen	the condit the condit ce as the	ion (level setti ion (level setti condition (leve	ing: Pn10D). ing: Pn181). el setting:	Whe Enabl	ed di-
Pn10B			3 4	Use	182). e the position on not use mode			lition (level set	iting: Pn10F)	Tuning Tuning Setup  Whe Enab  Imme atel  After	_
		n.□□X□	Speed Lo	•	Control Metho	od				Whe Enabl	
			1 2 to 3		control served settings	(Do not u	se.)			Afte resta	
	_	n. 🗆 X 🗆 🗆			rameter (Do no		,				
Pn10C	2	Mode Swit for Torque			0 to 800	1%	200	All	Immedi- ately	Tuning	*1
Pn10D	2	Mode Swit for Speed		el	0 to 10,000	1 min <sup>-1</sup>	0	Rotary	Immedi- ately	Tuning	*1
Pn10E	2	Mode Swit for Acceler		el	0 to 30,000	1 min <sup>-1</sup> /s	0	Rotary	Immedi- ately	Tuning	*1
Pn10F	2	Mode Swit for Position	ching Leven Deviation	el I	0 to 10,000	1 refer- ence unit	0	All	Immedi- ately	Tuning	*1
Pn11F	2	Position Int	tegral Time	Э	0 to 50,000	0.1 ms	0	All	Immedi- ately	Tuning	*1

Tuning ately Continued on next page.

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Tuning

Applicable

Motors

е	When	Classi-	Refer-
	Enabled	fication	ence

Continued from previous page.

	2	Automatic ing Selection		ch-	0000h to 0052h	-	0000h	All	Immedi- ately	Tuning	*1		
											•		
			Gain Sw	itchii	ng Selection								
			0		e manual gain s e gain is switch		lly with the	/G-SEL (Gai	n Selection) s	signal.			
		n.□□□X	1	Res	served setting (	Do not us	e.)						
			2	The sati	e automatic gai e gain settings isfied. The gain n A is not satisf	1 switch a settings 2	utomatical	ly to 2 when :	switching co o 1 when swi	ndition A i tching cor	s ndi-		
Pn139			Gain Sw	itchii	ng Condition A	<b>\</b>							
			0	/CC	OIN (Positioning	Completi	on Output	signal turns	ON.				
			1	/CC	COIN (Positioning Completion Output) signal turns OFF.								
		n.□□X□	2	/NE	NEAR (Near Output) signal turns ON.								
			3		/NEAR (Near Output) signal turns OFF.								
			4		sition reference	<u>'</u>		reference pu	ılse input is (	OFF.			
			5	Pos	sition reference	pulse inp	ut is ON.						
		n.□X□□	Reserve	eserved parameter (Do not change.)									
		n.XDDD	Reserve	Reserved parameter (Do not change.)									
			1.1000.10	u pu			,				<del></del> -		
Pn13D	2	Current Ga	ain Level		100 to 2,000	1%	2000	All	Immedi- ately	Tuning	*1		
Pn13F	2	Less-Devia 2 Second I gral Time (	Position Ir		0 to 50,000	0.1 ms	0	All	Immedi- ately	Tuning	-		
	2	Model Folk trol-Related	owing Cor d Selectio	า- ns	0000h to 1121h	ı	0100h	All	Immedi- ately	Tuning	*1		
			Model F	ollow	ving Control Se	election							
		n.□□□X	0	Do n	ot use model fo	ollowing co	ontrol.						
			1	Use ı	model following	control.							
			Vibration	n Sur	pression Sele	ction							
					ot perform vibr		oression.						
		n.□□X□	1	Perfo	orm vibration su	ıppressior	for a spec	cific frequency	y.				
Pn140			2	Perfo	orm vibration su	ıppressior	for two sp	pecific freque	ncies.				
111140			Vibration	n Sup	pression Adju	stment Se	election						
		n.□X□□	0	Do	not adjust vibra	ation supp	ression au						
			1	Adj with ing.	ust vibration su nout a host refe	ippression erence, au	automatic totuning w	cally during ex ith a host refe	recution of a erence, and r	utotuning custom tui	n-		
			Speed F	eedf	orward (VFF)/1	orque Fe	edforward	(TFF) Selecti	on				
		n.X□□□	0	Do	not use model	following	control and	d speed/torqu	ue feedforwa	rd togethe	er.		
				١									

Use model following control and speed/torque feedforward together.

500

1000

1000

Setting

Unit

Default

Setting

Setting

Range

Parameter

No.

Size

Name

Model Following Con-

Model Following Control Gain Correction

Model Following Control Bias in the Forward

trol Gain

Direction

10 to 20,000

500 to 2,000

0 to 10,000

0.1/s

0.1%

0.1%

Pn141

Pn142

Pn143

2

2

2

Continued on next page.

Tuning

Tuning

Tuning

\*1

\*1

\*1

Immediately

Immedi-

ately

Immedi-

All

AII

ΑII

Continued from previous page.

5 .				0 111	0	D ( 1)				
Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn144	2		owing Con- the Reverse	0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	*1
Pn145	2	Vibration S Frequency	uppression 1 A	10 to 2,500	0.1 Hz	500	All	Immedi- ately	Tuning	*1
Pn146	2	Vibration S Frequency	uppression 1 B	10 to 2,500	0.1 Hz	700	All	Immedi- ately	Tuning	*1
Pn147	2		owing Con- Feedforward tion	0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	*1
Pn148	2	Second Moing Contro	odel Follow- I Gain	10 to 20,000	0.1/s	500	All	Immedi- ately	Tuning	*1
Pn149	2		odel Follow- Gain Correc	- 500 to 2,000	0.1%	1000	All	Immedi- ately	Tuning	*1
Pn14A	2	Vibration S Frequency	uppression 2	10 to 2,000	0.1 Hz	800	All	Immedi- ately	Tuning	*1
Pn14B	2	Vibration S Correction	uppression 2	10 to 1,000	1%	100	All	Immedi- ately	Tuning	*1
	2	Control-Retions	lated Selec-	0000h to 0021h	_	0021h	All	After restart	Tuning	*1
			Model Follo	wing Control Ty	ne Select	rion				
		n.□□□X		se model followi	•					
		п.шшх								
	_		1 U	se model followi	ng control	type 2.				
Pn14F			Tuning-less	Type Selection						
			0 U	se tuning-less ty	pe 1.					
		n.□□X□	1 U	se tuning-less ty	pe 2.					<del></del>
			2 U	se tuning-less ty	pe 3.					
					•					
		n.□X□□	Reserved p	arameter (Do no	ot change	.)				
		n.X□□□	Reserved p	arameter (Do no	ot change	.)				
	2	Anti-Resor trol-Related	ance Con- d Selections	0000h to 0011h	_	0010h	All	Immedi- ately	Tuning	*1
			Anti-Reson	ance Control Se	election					
		n.□□□X		o not use anti-re		control.				
				se anti-resonanc						<del></del>
			Anti-Reson	ance Control Ac	ljustment	Selection				
Pn160				o not adjust anti	•		utomatically	durina execu	tion of aut	:O-
		n.□□X□	0 tu	ning without a h ning.						
				djust anti-resona thout a host refe						
		n.□X□□	Reserved p	arameter (Do no	ot change	.)				
		n.X000	Reserved n	arameter (Do no	ot change	1				
			rieserveu p	arameter (Bo ne	or charige	•,				
Pn161	2	Anti-Resor quency	ance Fre-	10 to 20,000	0.1 Hz	1000	All	Immedi- ately	Tuning	*1
Pn162	2	Anti-Resor Correction		1 to 1,000	1%	100	All	Immedi- ately	Tuning	*1
Pn163	2	Anti-Resor ing Gain	ance Damp-	0 to 300	1%	0	All	Immedi- ately	Tuning	*1
								Continuo	-I	.1

Applicable

Motors

ΑII

#### 5.1.2 List of Parameters

Classi-

fication

Tuning

Refer-

ence

\*1

Continued	from	nrovious	0000
Conunuea	IIOH	DIEVIOUS	Daue.

When

Enabled

Immedi-ately

Pn165	2	Anti-Resor Time Cons rection			-1,000 to 1,000	0.01 ms	0	All	Immedi- ately	Tuning	*1
Pn166	2	Anti-Resor ing Gain 2	nance Dam	p-	0 to 1,000	1%	0	All	Immedi- ately	Tuning	*1
	2	Tuning-less Related Se	s Function- elections		0000h to 2711h	_	1400h	All	_	Setup	*1
Pn170		n.000X n.00X0	Tuning-le 0 1 Speed Co 0 1 Rigidity L 0 to 7	Disa Ena ontro Use Use	able tuning-less able tuning-less bl Method a for speed cor a for speed cor	s function.  htrol.  htrol and u		ntroller for po	osition contro	Whe Enab  Afteresta  Whe Enab  Afteresta  Whe Enab  Immediatel	en led er art
		n.X□□□	Tuning-le		oad Level	for the tun	ing-less fui	nction.		Whe Enab Imme atel	led di-
Pn181	2	Mode Swit for Speed	ching Leve Reference	el	0 to 10,000	1 mm/s	0	Linear	Immedi- ately	Tuning	*1
Pn182	2	Mode Swit for Acceler		el	0 to 30,000	1 mm/s <sup>2</sup>	0	Linear	Immedi- ately	Tuning	*1
	2	Less-Devia Related Sv		ol-	0000h to 1101h	_	0100h	All	After restart	Setup	_
Pn190		n.□□□X	0 [	Do n Use	on Control Sel not use less-de less-deviation	eviation cor control.	ntrol.				
PITI90		11.0000	neserveu	рага	ameter (Do not	Criarige.)					
		n.□X□□	Reserved	para	ameter (Do not	change.)					
		n.X□□□	Speed Fe	edfo	orward/Torque	Feedforwa	rd Selection	n			
					s-deviation co						er.
			1	Les	s-deviation co	ntrol and s	peed/torqu	ie teedtorwa	rd are used t	ogether.	
Pn191	2		ss-Deviation Control							Tuning	_
Pn192	2		ation Contro Feedforwar		0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	_
Pn193	2	Less-Devia 1 Feedforw Time Cons	vard Filter	ol	0 to 65,535	0.01 ms	30	All	Immedi- ately	Tuning	_
		•							·		

Setting

Range

-1,000 to 1,000

Setting

Unit

0.01 ms

Default

Setting

0

Parameter

No.

Pn164

Size

2

Name

Anti-Resonance Filter Time Constant 1 Cor-

Continued from previous page.

Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Less-Deviation Function Selection Switches	0000h to 2113h	-	2102h	All	After restart	Setup	_		
		n DDDV Decembed	novementos (De no	at abanga \							
			parameter (Do no	,							
Pn195			parameter (Do not change.)								
111100			•								
		0 0	ation Mode Selection See Less-Deviation Control 1 Mode when less-deviation control is enabled.								
		(1	his mode is comeserved setting (	•		series EXUU2.	)				
			se Less-Deviatio		,	en less-devia	tion control	is enabled	<u> </u>		
Pn196	2	Less-Deviation Control 2 Speed Feedforward Gain	0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	-		
Pn197	2	Less-Deviation Control 2 Torque Feedforward Filter Time Constant	0 to 65,535	0.01 ms	50	All	Immedi- ately	Tuning	_		
Pn198	2	Less-Deviation Control 2 Forward Torque Feed forward Gain		0.1%	1000	All	Immedi- ately	Tuning	_		
Pn199	2	Less-Deviation Control 2 Reverse Torque Feed forward Gain		0.1%	1000	All	Immedi- ately	Tuning	_		
Pn19A	2	Less-Deviation Control 2 Incomplete Integra- tion Rate	0 to 10,000	0.01%	10000	All	Immedi- ately	Tuning	_		
Pn19B	2	Less-Deviation Control 2 Rotary Servomotor Viscous Friction Com- pensation Coefficient	0 to 8,000	0.01%/ 100 min <sup>-1</sup>	0	Rotary	Immedi- ately	Tuning	_		
Pn19C	2	Reserved parameter (D not change.)	0 _	-	0	All	Immedi- ately	Tuning	-		
Pn19D	2	Less-Deviation Control 2 Linear Servomotor Viscous Friction Com- pensation Coefficient	0 to 8,000	0.01%/ 100 mm/s	0	Linear	Immedi- ately	Tuning	-		
Pn19E	2	Reserved parameter (D not change.)	0 –	_	0	All	Immedi- ately	Tuning	-		
Pn19F	2	Less-Deviation Control 2 Torque Feedforward Moving Average Time	0 to 5,100	0.1 ms	0	All	Immedi- ately	Tuning	-		
Pn1A4	2	Reserved parameter (D not change.)	0 _	-	36	-	Immedi- ately	Tuning	_		
Pn1A5	2	Reserved parameter (D not change.)	0 _	-	0	-	Immedi- ately	Tuning	-		
Pn1AE	2	Reserved parameter (D not change.)	0 _	-	0	-	Immedi- ately	Tuning	-		
Pn1AF	2	Reserved parameter (D not change.)	0 _	_	0	-	Immedi- ately	Tuning	_		

<b>~</b>	•		
Continued	trom	previous	nage

Parameter   Section   Setting   Setting   Default   Applicable   When Calassi   Enabled   Classis   Enabled   Classis   Enabled   Classis   Enabled   Classis   Classis   Classis   Parameter   Conditions   Parameter   Par								Con	tinued from	i previou	s page.		
Reference Pulse Form		Size	N	ame	_	_					Refer- ence		
Pn200    Sign and pulse train, positive logic.		2			0000h to 2236h	-	0000h	All		Setup	*1		
Pn200    Sign and pulse train, positive logic.	Pn200												
Pn200    Sign and pulse train, positive logic.				Reference Pu	ılse Form								
Two-phase pulse trains, positive logic   2   Two-phase pulse trains with 90° phase differential (phase A and phase B) ×1, positive logic   3   Two-phase pulse trains with 90° phase differential (phase A and phase B) ×2, positive logic   4   Two-phase pulse trains with 90° phase differential (phase A and phase B) ×4, positive logic   5   Sign and pulse train, negative logic   5   Sign and pulse train, negative logic   6   Clear position deviation when the signal is at high level.   1   Clear position deviation on the rising edge of the signal.   2   Clear position deviation on the falling edge of the signal.   2   Clear position deviation on the falling edge of the signal.   2   Clear position deviation on the falling edge of the signal.   2   Clear position deviation on the falling edge of the signal.   2   Clear position deviation on the falling edge of the signal.   2   Clear position deviation on the falling edge of the signal.   2   Clear position deviation on the falling edge of the signal.   2   Clear position deviation when an alarm occurs.   1   Do not clear position deviation when an alarm occurs.   2   Clear position deviation when an alarm occurs.   1   Use the reference input filter for a line-driver signal. (1 Mpps max.)   1   Use the reference input filter for a line-driver signal. (200 kpps max.)   2   Use reference input filter for an open-collector signal. (200 kpps max.)   2   Use reference input filter for an ine-driver signal. (1 to 4 Mpps)   1   Use the reference input filter for an ine-driver signal. (1 to 4 Mpps)   1   Use the reference input filter for an ine-driver signal. (1 to 4 Mpps)   1   Use the reference input filter for an ine-driver signal. (1 to 4 Mpps)   1   Use the reference input filter for an ine-driver signal. (1 to 4 Mpps)   1   Use the reference input filter for an open-collector signal. (200 kpps max.)   2   Position Control Functions   2						in, positiv	e logic.						
Pn200    Pn200								gic					
Pn200    A						trains with	90° phase	e differential (p	hase A and	phase B) :	×1,		
Pn200  Pn200  Clear Signal Form  O Clear position deviation when the signal is at high level.  1 Clear position deviation when the signal is at high level.  1 Clear position deviation on the rising edge of the signal.  2 Clear position deviation on the rising edge of the signal.  Clear position deviation on the falling edge of the signal.  Clear Operation  O Clear position deviation on the falling edge of the signal.  Clear Operation  O Clear position deviation at a base block (at servo OFF or when alarm occurs).  1 Do not clear position error (cleared only with CLR (Clear Position Deviation) signal).  2 Clear position deviation when an alarm occurs.  Fitter Selection  O Use the reference input filter for an ine-driver signal. (1 Mpps max.)  1 Use the reference input filter for an open-collector signal. (200 kpps max.)  2 Use reference input filter 2 for a line-driver signal. (1 to 4 Mpps)  Pn205  Pn206  Pn207  Multiturn Limit  O to 65,535  1 rev  65,535  Rotary  After restart  Setup  1  Pn207  Reserved parameter (Do not change.)  n.DCD  Reserved parameter (Do not change.)  n.DCD  Reserved parameter (Do not change.)  COIN (Positioning Completion Output) Signal Output Timing  O Cutput when the absolute value of the position deviation is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference after the position reference ifilter is 0.  Cutput when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference after the position reference ifilter is 0.  Cutput when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.  Cutput when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.			n.□□□X			trains with	90° phase	e differential (p	hase A and	phase B) :	×2,		
Pn200    Clear Signal Form						trains with	90° phase	e differential (p	hase A and	phase B) :	×4,		
Pn200    Clear Signal Form				5 Sig	n and pulse tra	in, negativ	ve logic.						
Pn200    Clear position deviation when the signal is at high level.   Clear position deviation on the rising edge of the signal.   Clear position deviation when the signal is at low level.   Clear position deviation when the signal is at low level.   Clear position deviation when the signal is at low level.   Clear position deviation when the falling edge of the signal.				6 CW	/ and CCW pul	se trains, i	negative lo	gic					
Pn200    Clear position deviation when the signal is at high level.   Clear position deviation on the rising edge of the signal.   Clear position deviation when the signal is at low level.   Clear position deviation when the signal is at low level.   Clear position deviation when the signal is at low level.   Clear position deviation when the falling edge of the signal.				Clear Signal	Form								
1   Clear position deviation on the rising edge of the signal.	Pn200					iation whe	n the sign	al is at high le	vel.				
Clear Operation			n.□□X□										
Clear Operation				2 Cle	ar position dev	iation whe	n the sign	al is at low lev	rel.				
Do not clear position deviation at a base block (at servo OFF or when alarm occurs).   1				3 Cle	ar position dev	iation on t	he falling e	edge of the sig	gnal.				
Do not clear position deviation at a base block (at servo OFF or when alarm occurs).   1			n.□□□X    O   Sign and pulse train, positive logic.										
Pn207    Do not clear position error (cleared only with CLR (Clear Position Deviation) signal).													
Signal .   2   Clear position deviation when an alarm occurs.			n.□X□□	Do		,							
Filter Selection   0   Use the reference input filter for a line-driver signal. (1 Mpps max.)   1   Use the reference input filter for an open-collector signal. (200 kpps max.)   2   Use reference input filter 2 for a line-driver signal. (1 to 4 Mpps)   2   Use reference input filter 2 for a line-driver signal. (1 to 4 Mpps)   1   2   Position Control Function Selections   1 rev   65535   Rotary   After restart   Setup   *1   1   1   1   1   1   1   1   1						101101101	Sidarda orii	y with oth (c	noar r contor	Doviduoi	·/		
Description				2 Cle	ar position dev	iation whe	n an alarm	occurs.					
Description		Filter Selection											
Pn205 2 Multiturn Limit						input filter	for a line-	driver signal.	(1 Mpps max	<.)			
Pn205 2 Multiturn Limit 0 to 65,535 1 rev 65535 Rotary After restart Setup *1 2 Position Control Function Selections 2210h - 1000h All After restart Setup *1  n.□□□X Reserved parameter (Do not change.)  n.□□□X□ Reserved parameter (Do not change.)  n.□□□X□ Reserved parameter (Do not change.)  n.□□□□ Reserved parameter (Do not change.)    COIN (Positioning Completion Output) Signal Output Timing 0 Untput when the absolute value of the position deviation is the same or less than the setting of Pn522 (Positioning Completed Width).    Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference after the position reference filter is 0.    Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.    Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.    Pn20A   Vumber of External Encoder Scale Pitches   1 scale pitch/ revolu- restart   Setup   *1 scale Pitches   Pitches   Setup   *1 scale Pitches   Setup   *			n.X□□□										
Pn207  Pn207  Pn208  2 Position Control Function Selections  Double to 2210h  Double to 221				2 Use	e reference inpi	ut filter 2 f	or a line-dr	iver signal. (1	to 4 Mpps)				
Pn207  Pn207  Pn208  2 Position Control Function Selections  Double to 2210h  Double to 221													
Pn207   Reserved parameter (Do not change.)   n.□□X□   Reserved parameter (Do not change.)   n.□X□   Reserved parameter (Do not change.)   n.□X□   Reserved parameter (Do not change.)   n.□X□   Reserved parameter (Do not change.)   O	Pn205	2	Multiturn L	imit	0 to 65,535	1 rev	65535	Rotary		Setup	*1		
n.□□X   Reserved parameter (Do not change.)   n.□X□   Reserved parameter (Do not change.)   n.□X□   Reserved parameter (Do not change.)   n.□X□   Reserved parameter (Do not change.)   O   Output when the absolute value of the position deviation is the same or less than the setting of Pn522 (Positioning Completed Width).   Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference after the position reference filter is 0.   Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.   Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.   Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.   Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.   Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.   Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.   Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.		2			0000h to	_	1000h	All		Setup	*1		
Pn207    Reserved parameter (Do not change.)   n.□X□□   Reserved parameter (Do not change.)    COIN (Positioning Completion Output) Signal Output Timing   Output when the absolute value of the position deviation is the same or less than the setting of Pn522 (Positioning Completed Width).   Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference after the position reference filter is 0.   Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.   Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.   Pn20A			tion Select	ions	2210h				restart				
Pn207    Reserved parameter (Do not change.)   n.□X□□   Reserved parameter (Do not change.)    COIN (Positioning Completion Output) Signal Output Timing   Output when the absolute value of the position deviation is the same or less than the setting of Pn522 (Positioning Completed Width).   Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference after the position reference filter is 0.   Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.   Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.   Pn20A													
Pn207    Reserved parameter (Do not change.)    COIN (Positioning Completion Output) Signal Output Timing   O			n.□□□X	Reserved par	rameter (Do no	t change.	)						
Pn207    COIN (Positioning Completion Output) Signal Output Timing   O			n.□□X□	Reserved par	rameter (Do no	t change.	)						
n.XDDD  Output when the absolute value of the position deviation is the same or less than the setting of Pn522 (Positioning Completed Width).  Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference after the position reference filter is 0.  Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.  Pn20A  4 Number of External Encoder Scale Pitches  1 scale pitch/ revolu- 32768 Rotary  After restart  Setup *1		1	n.□X□□	Reserved par	rameter (Do no	t change.	)						
n.XDDD  than the setting of Pn522 (Positioning Completed Width).  Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference after the position reference filter is 0.  Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.  Pn20A  4 Number of External Encoder Scale Pitches  1 scale pitch/ revolu- 32768 Rotary After restart Setup *1	Pn207	1		/COIN (Positi	ioning Comple	tion Outp	ut) Signal	Output Timin	g				
n.XDDD 1 the setting of Pn522 (Positioning Completed Width) and the reference after the position reference filter is 0.  Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.  Pn20A 4 Number of External Encoder Scale Pitches 1,048,576 revolu-  1 scale pitch/ revolu-										ame or le	ss		
position reference filter is 0.  Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference input is 0.  Pn20A  4 Number of External Encoder Scale Pitches  1,048,576  1,048,576  1 scale pitch/ revolu- 32768  Rotary  After restart  Setup *1			n.X□□□										
Pn20A 4 Number of External Encoder Scale Pitches 1,048,576 Pn522 (Positioning Completed Width) and the reference input is 1 scale pitch/ revolu- 32768 Rotary After restart Setup *1				pos	sition reference	filter is 0.							
Pn20A 4 Number of External Encoder Scale Pitches 1,048,576 revolu- 32768 Rotary After restart Setup *1													
Pn20A 4 Number of External 4 to pitch/revolu- 32768 Rotary After restart Setup *1										. 51.156 II IPC			
Pn20A 4 Number of External 4 to pitch/revolu- 32768 Rotary After restart Setup *1													
Photo 4 Encoder Scale Pitches 1,048,576 revolu- 32/68 Rotary restart Setup			Nimater	Todame - I	4.1-				Λ.Ω				
	Pn20A	4					32768	Rotary		Setup	*1		

Electronic Gear Ratio (Numerator)

Pn20E

1 to 1,073,741,824

Setup Continued on next page.

After restart

ΑII

64

Continued from previous page.

Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn210	4	Electronic Gear Ratio (Denominator)	1 to 1,073,741,824	1	1	All	After restart	Setup	*1
Pn212	4	Number of Encoder Output Pulses	16 to 1,073,741,824	1 P/Rev	2048	Rotary	After restart	Setup	*1
Pn216	2	Position Reference Acceleration/Decelera- tion Time Constant	0 to 65,535	0.1 ms	0	All	Immedi- ately after the motor stops	Setup	*1
Pn217	2	Average Position Reference Movement Time	0 to 10,000	0.1 ms	0	All	Immedi- ately after the motor stops	Setup	*1
Pn218	2	Reference Pulse Input Multiplier	1 to 100	× 1	1	All	Immedi- ately	Setup	*1
	2	Fully-closed Control Selections	0000h to 1003h	_	0000h	Rotary	After restart	Setup	*1

Pn22A

n.□□□X	Reserve	d parameter (Do not change.)
n.□□X□	Reserve	d parameter (Do not change.)
11.00/0	11000170	a parameter (50 not onlyinge.)
n.□X□□	Reserve	d parameter (Do not change.)
	Fully-clo	sed Control Speed Feedback Selection
n.X□□□	0	Use motor encoder speed.
	1	Use external encoder speed.

Pn234	2	Second Position Reference Acceleration/ Deceleration Time Constant	0 to 65,535	0.1 ms	0	All	Immedi- ately	Setup	_
Pn281	2	Encoder Output Resolution	1 to 4,096	1 edge/ pitch	20	All	After restart	Setup	*1
Pn282	4	Linear Encoder Scale Pitch	0 to 6,553,600	0.01 μm	0	Linear	After restart	Setup	*1
Pn300	2	Speed Reference Input Gain	150 to 3,000	0.01 V/ Rated motor speed	600	All	Immedi- ately	Setup	*1
Pn301	2	Internal Set Speed 1	0 to 10,000	Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1 min <sup>-1</sup>	100	Rotary	Immedi- ately	Setup	*1
Pn302	2	Internal Set Speed 2	0 to 10,000	Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1 min <sup>-1</sup>	200	Rotary	Immedi- ately	Setup	*1
Pn303	2	Internal Set Speed 3	0 to 10,000	Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1 min <sup>-1</sup>	300	Rotary	Immedi- ately	Setup	*1
Pn304	2	Jogging Speed	0 to 10,000	Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1 min <sup>-1</sup>	500	Rotary	Immedi- ately	Setup	*1
Pn305	2	Soft Start Acceleration Time	0 to 10,000	1 ms	0	All	Immedi- ately	Setup	*1
Pn306	2	Soft Start Deceleration Time	0 to 10,000	1 ms	0	All	Immedi- ately	Setup	*1
				-	-		Continue	d on nov	t nago

Continued from previous page.

Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn307	2	Speed Reference Filter Time Constant	0 to 65,535	0.01 ms	40	All	Immedi- ately	Setup	*1
Pn308	2	Speed Feedback Filter Time Constant	0 to 65,535	0.01 ms	0	All	Immedi- ately	Setup	*1
Pn30A	2	Deceleration Time for Servo OFF and Forced Stops	0 to 10,000	1 ms	0	All	Immedi- ately	Setup	*1
Pn30C	2	Speed Feedforward Average Movement Time	0 to 5,100	0.1 ms	0	All	Immedi- ately	Setup	*1
	2	Vibration Detection Selections	0000h to 0002h	_	0000h	All	Immedi- ately	Setup	*1

Pn310

	Vibration	Detection Selection
п.ПППХ	0	Do not detect vibration.
11.000	1	Output a warning (A.911) if vibration is detected.
	2	Output an alarm (A.520) if vibration is detected.
n.□□X□	Reserve	d parameter (Do not change.)
n.□X□□	Reserve	d parameter (Do not change.)
n.X□□□	Reserve	d parameter (Do not change.)

Vibration Detection Sen-Immedi-2 Pn311 50 to 500 1% 100 ΑII Tuning \*1 sitivity ately Vibration Detection Immedi-Pn312 2 0 to 5,000 50 Rotary \*1 1 min<sup>-1</sup> Tuning Level ately After Pn316 2 \*1 0 to 65,535 10000 Maximum Motor Speed 1 min<sup>-1</sup> Rotary Setup restart Moment of Inertia Cal-Immedi-Pn324 2 300 0 to 20,000 1% ΑII Setup \*1 culation Starting Level ately Immedi-Setup Pn380 2 Internal Set Speed 1 0 to 10,000 1 mm/s 10 Linear \*1 ately Immedi-Pn381 2 0 to 10,000 \*1 Internal Set Speed 2 20 Setup 1 mm/s Linear ately Immedi-2 Pn382 0 to 10,000 30 \*1 Internal Set Speed 3 1 mm/s Linear Setup ately Immedi-Pn383 2 Jogging Speed 0 to 10,000 1 mm/s 50 Linear Setup \*1 ately Vibration Detection Immedi-Pn384 2 \*1 0 to 5,000 1 mm/s 10 Linear Tuning Level ately 100 After 2 \*1 Pn385 Maximum Motor Speed 1 to 100 50 Linear Setup mm/s restart 0.1 V/ Torque Reference Input Immedi-Pn400 2 10 to 100 30 ΑII Setup rated Gain ately torque First Stage First Torque Immedi-Pn401 2 0 to 65,535 0.01 ms 100 ΑII \*1 Reference Filter Time **Tuning** ately Constant Immedi- $1\%^{*2}$ 2 \*1 Pn402 Forward Torque Limit 0 to 800 800 Setup Rotary ately Immedi- $1\%^{*2}$ Pn403 2 0 to 800 800 \*1 Reverse Torque Limit Rotary Setup ately Forward External Torque Immedi-2 1%\*<sup>2</sup> Pn404 0 to 800 100 ΑII Setup \*1 Limit ately Reverse External Torque Immedi-1%\*2 Pn405 2 0 to 800 100 ΑII Setup \*1 Limit ately Immedi-Pn406 2 1%\*2 ΑII \*1 **Emergency Stop Torque** 0 to 800 800 Setup ately Speed Limit during Immedi-Pn407 2 0 to 10,000 10000 \*1 1 min<sup>-1</sup> Rotary Setup Torque Control ately

Continued from previous page.

Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Torque-Rel tion Selecti		0000h to 1111h	-	0000h	All	ı	Setup	*1
			Notch Filter	lotch Filter Selection 1						
		n.□□□X		sable first stage able first stage					Imme	
					TIOCOTT IIICE				Whe	an .
			Speed Limit	e the smaller of	f the maxir	num moto	r speed and t	he setting of	Enab	
			0 Pn	407 as the spe	ed limit.		·			
Pn408		n.□□X□	Pn	e the smaller of 480 as the spec	ed limit.				Afte	
		Use the smaller of the overspeed alarm detection speed and the setting of Pn407 as the speed limit.						XI C		
		Use the smaller of the overspeed alarm detection speed and the setting of Pn480 as the speed limit.					9			
		Notch Filter Selection 2						When Enabled		
		n.□X□□		sable second st					Imme	
			1 En	able second sta	age notch	filter.				
		n.X□□□		npensation Fun					Whe Enab	led
				Disable friction compensation.  Enable friction compensation.					Imme atel	
				1	I		T			1
Pn409	2	Frequency	Notch Filter	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn40A	2	Q Value	Notch Filter	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn40B	2	Depth	Notch Filter	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn40C	2	ter Frequer		50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn40D	2	ter Q Value		50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn40E	2	ter Depth	age Notch Fil-	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn40F	2		Second Stage Second Torque Reference Filter Frequency		1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn410	2	Second Sta Torque Ref Q Value	age Second erence Filter	50 to 100	0.01	50	All	Immedi- ately	Tuning	*1
Pn412	2	First Stage Torque Ref Time Cons	erence Filter	0 to 65,535	0.01 ms	100	All	Immedi- ately	Tuning	*1
Pn415	2	T-REF Filte stant	r Time Con-	0 to 65,535	0.01 ms	0	All	Immedi- ately	Setup	*1

Continued fro	m previous	nage

Parameter	a)			Setting	Setting	Default	Applicable	When	Classi-	Refer-
No.	Size	N	ame	Range	Unit	Setting	Motors	Enabled	fication	ence
	2	Torque-Rel tion Selecti	ated Func- ions 2	0000h to 1111h	-	0000h	All	Immedi- ately	Setup	*1
			Notch Filter							
		n.□□□X		able third stage						
				able third stage	notch ilite	er.				
Pn416			Notch Filter							
F11410		n.□□X□		able fourth stag						
					ic noton iii	itor.				
		- DVDD	Notch Filter							
		n.□X□□		able fifth stage						
		n.X□□□	Reserved pa	rameter (Do no	ot change.	.)				
Pn417	2	Frequency	e Notch Filter	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn418	2	Third Stage Q Value	e Notch Filter	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn419	2	Third Stage Depth	e Notch Filter	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn41A	2	ter Frequer	,	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn41B	2	Fourth Stag ter Q Value	ge Notch Fil-	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn41C	2	ter Depth	ge Notch Fil-	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn41D	2	Frequency	Notch Filter	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn41E	2	Q Value	Notch Filter	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn41F	2	Depth	Notch Filter	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
	2	Speed Ripp sation Sele	ple Compen- ections	0000h to 1111h	-	0000h	Rotary	-	Setup	*1
	•		Speed Ripple	e Compensatio	n Functio	n Selectio	n		Whe Enab	
		n.□□□X	0 Dis	able speed ripp	ole compe	nsation.			Imme	
			1 Ena	able speed ripp	le comper	nsation.			ate	ly
Pn423			Speed Ripple tion Selection	e Compensation	n Informa	ation Disag	greement Wai	rning Detec-	Whe	
111420		n.□□X□	0 Det	tect A.942 alarr	ns.				Afte	
			1 Do	not detect A.9	42 alarms				resta	art ——
			Speed Ripple	e Compensatio	n Enable	Condition	Selection		Whe Enab	
		n.□X□□	0 Spe	eed reference					Afte	er
			1 Mo	tor speed					resta	art
		n.X□□□	Reserved pa	rameter (Do no	ot change	.)				
	•									
Pn424	2	Torque Lim	nit at Main Cir- e Drop	0 to 100	1%*2	50	All	Immedi- ately	Setup	*1
								Continue	d on nov	+ 5566

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Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn425	2	Release Tir Limit at Ma Voltage Dro		0 to 1,000	1 ms	100	All	Immedi- ately	Setup	*1
Pn426	2	Torque Fee Average M Time		0 to 5,100	0.1 ms	0	All	Immedi- ately	Setup	*1
Pn427	2	Speed Ripp sation Enal	ole Compen- ole Speed	0 to 10,000	1 min <sup>-1</sup>	0	Rotary Ser- vomotor	Immedi- ately	Tuning	*1
Pn456	2	Sweep Tore ence Ampli		1 to 800	1%	15	All	Immedi- ately	Tuning	*1
	2	Notch Filte Selections	r Adjustment 1	0000h to 0101h	-	0101h	All	Immedi- ately	Tuning	*1
			Notch Filter A	Adjustment Se	lection 1					
		n.□□□X		not adjust the ing without a hing.						
				ust the first sta nout a host refe						
Pn460		n.□□X□	Reserved par	rameter (Do no	t change.	.)				
	Ī		Notch Filter A	Adjustment Se	lection 2					
		n.□X□□	0 fund	not adjust the socion is enabled otuning with a	d or during	execution	of autotuning	g without a h		
			1 tion	ust the second is enabled or otuning with a	during exe	ecution of a	autotuning wit	hout a host	ng-less fur reference,	nc-
		n.X000	Reserved par	rameter (Do no	ot change.	)				
	_									
	2	Gravity Cor Related Se	mpensation- lections	0000h to 0001h	_	0000h	All	After restart	Setup	*1
		n.□□□X	Gravity Comp	ensation Selec	tion					
				able gravity co		n.				
Pn475			1 Ena	able gravity cor	npensatio	n.				
		n.□□X□	Reserved para	ameter (Do not	change.)					
		n.□X□□	Reserved para	ameter (Do not	change.)					
		n.XDDD	Reserved para	ameter (Do not	change.)					
							T			
Pn476	2	Torqué	mpensation	-1,000 to 1,000	0.1%	0	All	Immedi- ately	Tuning	*1
Pn480	2	Speed Lim Force Cont	it during rol	0 to 10,000	1 mm/s	10000	Linear	Immedi- ately	Setup	*1
Pn481	2	Polarity De Speed Loo		10 to 20,000	0.1 Hz	400	Linear	Immedi- ately	Tuning	_
Pn482	2	Polarity De Speed Loo Time Cons	p Integral	15 to 51,200	0.01 ms	3000	Linear	Immedi- ately	Tuning	_
Pn483	2	Forward Fo	orce Limit	0 to 800	1%*2	30	Linear	Immedi- ately	Setup	*1
Pn484	2	Reverse Fo	orce Limit	0 to 800	1%*2	30	Linear	Immedi- ately	Setup	*1
Pn485	2	Polarity De ence Spee	tection Refer- d	0 to 100	1 mm/s	20	Linear	Immedi- ately	Tuning	_
Pn486	2	Polarity De ence Accel Deceleration		0 to 100	1 ms	25	Linear	Immedi- ately	Tuning	-

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Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn487	2	Polarity Detection Constant Speed Time	0 to 300	1 ms	0	Linear	Immedi- ately	Tuning	_
Pn488	2	Polarity Detection Reference Waiting Time	50 to 500	1 ms	100	Linear	Immedi- ately	Tuning	_
Pn48E	2	Polarity Detection Range	1 to 65,535	1 mm	10	Linear	Immedi- ately	Tuning	_
Pn490	2	Polarity Detection Load Level	0 to 20,000	1%	100	Linear	Immedi- ately	Tuning	-
Pn495	2	Polarity Detection Confirmation Force Reference	0 to 200	1%	100	Linear	Immedi- ately	Tuning	_
Pn498	2	Polarity Detection Allowable Error Range	0 to 30	1 deg	10	Linear	Immedi- ately	Tuning	_
Pn49F	2	Speed Ripple Compensation Enable Speed	0 to 10,000	1 mm/s	0	Linear	Immedi- ately	Tuning	*1
Pn501	2	Zero Clamping Level	0 to 10,000	1 min <sup>-1</sup>	10	Rotary	Immedi- ately	Setup	*1
Pn502	2	Rotation Detection Level	1 to 10,000	1 min <sup>-1</sup>	20	Rotary	Immedi- ately	Setup	*1
Pn503	2	Speed Coincidence Detection Signal Output Width	0 to 100	1 min <sup>-1</sup>	10	Rotary	Immedi- ately	Setup	*1
Pn506	2	Brake Reference-Servo OFF Delay Time	0 to 50	10 ms	0	All	Immedi- ately	Setup	*1
Pn507	2	Brake Reference Out- put Speed Level	0 to 10,000	1 min <sup>-1</sup>	100	Rotary	Immedi- ately	Setup	*1
Pn508	2	Servo OFF-Brake Com- mand Waiting Time	10 to 100	10 ms	50	All	Immedi- ately	Setup	*1
Pn509	2	Momentary Power Inter- ruption Hold Time	20 to 50,000	1 ms	20	All	Immedi- ately	Setup	*1

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				6	0	D		unuea iron					
Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence			
	2	Input Signal Selections 0000h to 2100h All After Setu								*1			
		1	FFF2h - 2100fl All restart Setup										
			Innut Cinnal Allegation Mode										
				Input Signal Allocation Mode  0 Use the sequence input signal terminals with the default allocations.									
		n.□□□X		·	·			fault allocation	ons.				
				hange the seque			cations.						
			2 R	eserved setting	(Do not us	e.)							
			/S-ON (Servo ON) Signal Allocation										
			0 A	ctive when CN1	-40 input s	ignal is ON	l (closed).						
			1 A	ctive when CN1	-41 input s	ignal is ON	l (closed).			<del></del>			
				ctive when CN1-									
			3 A	ctive when CN1	-43 input s	ignal is ON	l (closed).			<del></del>			
			4 A	ctive when CN1	-44 input s	ignal is ON	V (closed).						
			5 A	ctive when CN1	-45 input s	ignal is ON	l (closed).			<del></del>			
			6 A	ctive when CN1	-46 input s	ignal is ON	l (closed).			<del></del>			
		n.□□X□	7 T	ne signal is alwa	ys active.					<del></del>			
			8 T	ne signal is alwa	ys inactive	·.				<del></del>			
			9 A	ctive when CN1	-40 input s	ignal is OF	F (open).			<del></del>			
			A A	ctive when CN1	-41 input s	ignal is OF	F (open).			<del></del>			
			В А										
			C A	C Active when CN1-43 input signal is OFF (open).									
				ctive when CN1						<del></del>			
Pn50A				ctive when CN1-									
			F A	. 5 ,									
			/P-CON (Proportional Control) Signal Allocation										
		n.□X□□	0 to F The allocations are the same as the /S-ON (Servo ON) signal allocations.										
			P-OT (Forward Drive Prohibit) Signal Allocation										
			` `	nable forward dr	, 0			N (closed)					
				nable forward dr				, ,					
				nable forward dr						<del></del>			
				nable forward dr		-							
				nable forward dr		•							
				nable forward dr									
				nable forward dr				, ,					
		n.X□□□		et the signal to a				14 (010300).					
		11		et the signal to a									
				nable forward dr				IFF (open)					
				nable forward dr									
				nable forward dr				\ I /					
				nable forward dr		<u> </u>		V 1 /					
				nable forward dr									
						<u>'</u>		V 1 /					
				Enable forward drive when CN1-45 input signal is OFF (open).  Enable forward drive when CN1-46 input signal is OFF (open).									
			'	Table forward di	IAC AALICIL	2141 40 IIIk	rat signal is C	ii (obeii).		<del></del>			

Applicable	When	Classi-	Refer-
Motors	Enabled	fication	ence
ΛII	After	Satura	*1

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INO.	0)			nalige	Offic	Setting	MOLOIS	Lilableu	lication	ence		
	2	Input Signa 2	al Selections	0000h to FFFFh	-	6543h	All	After restart	Setup	*1		
	N-OT (Reverse Drive Prohibit) Signal Allocation											
			0 Enable reverse drive when CN1-40 input signal is ON (closed).									
		n.□□□X		Enable reverse drive when CN1-41 input signal is ON (closed).								
				Enable reverse drive when CN1-42 input signal is ON (closed).								
				Enable reverse drive when CN1-43 input signal is ON (closed).								
				Enable reverse drive when CN1-44 input signal is ON (closed).								
				Enable reverse dri								
				nable reverse dri				,				
			7 5	Set the signal to a	lways pro	hibit revers	e drive.	,				
				Set the signal to always enable reverse drive.								
				Enable reverse drive when CN1-40 input signal is OFF (open).								
			A E	Enable reverse drive when CN1-41 input signal is OFF (open).								
			ВЕ	Enable reverse drive when CN1-42 input signal is OFF (open).								
			C E	Enable reverse drive when CN1-43 input signal is OFF (open).								
			D E	Enable reverse drive when CN1-44 input signal is OFF (open).								
			E E	Enable reverse drive when CN1-45 input signal is OFF (open).								
			F E	. 5								
Pn50B	l	/ALM-RST (Alarm Reset) Signal Allocation										
		n.□□X□		Active on signal ed DN (closed).	dge when	CN1-40 in	put signal cha	anges from C	OFF (open)	) to		
			1 (	Active on signal edge when CN1-41 input signal changes from OFF (open) to ON (closed).								
			2 (	Active on signal edge when CN1-42 input signal changes from OFF (open) to ON (closed).								
			3 (	Active on signal edge when CN1-43 input signal changes from OFF (open) to ON (closed).								
			4 (	Active on signal edge when CN1-44 input signal changes from OFF (open) to ON (closed).								
			3 (	Active on signal edge when CN1-45 input signal changes from OFF (open) to ON (closed).								
			0	Active on signal edge when CN1-46 input signal changes from OFF (open) to ON (closed).								
				Reserved setting (Do not use.)								
				The signal is always inactive.  Active on signal edge when CN1-40 input signal changes from ON (closed) to								
			9 (	OFF (open).  Active on signal edge when CN1-40 input signal changes from ON (c								
			A	OFF (open).								
			В	Active on signal edge when CN1-42 input signal changes from ON (closed) OFF (open).								
				Active on signal edge when CN1-43 input signal changes from ON (closed) to OFF (open).								
			D	Active on signal edge when CN1-44 input signal changes from ON (closed) to OFF (open).								
			_ (	Active on signal edge when CN1-45 input signal changes from ON (closed) to OFF (open).  Active on signal edge when CN1-46 input signal changes from ON (closed) to								
				OFF (open).	age when	CINT-46 INF	out signal cha	anges from C	in (ciosea,			
		n.□X□□	/P-CL (Forward External Torque Limit Input) Signal Allocation									
			0 to F The allocations are the same as the /S-ON (Servo ON) signal allocations.									
			/N-CL (Rev	verse External To	rque Limi	t Input) Sig	gnal Allocatio	n				
		n.X□□□		The allocations are t	•	' '			S.			
	-		-									

Setting

Range

Setting

Unit

Default

Setting

Parameter

No.

Size

Name

Continued from previous page.

Parameter No.	Size	Name		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
Pn50C	2	Input Signa	al Selection	s 0000h to FFFFh	_	8888h	All	After restart	Setup	*1		
			/SPD-D (Motor Direction) Signal Allocation  O Active when CN1-40 input signal is ON (closed).									
		n.□□□X	+									
				Active when CN1-41 input signal is ON (closed).  Active when CN1-42 input signal is ON (closed).								
			+	Active when CN1-43 input signal is ON (closed).								
			+	Active when CN1-44 input signal is ON (closed).								
			6	Active when CN1	-46 input s	signal is ON	V (closed).					
			7	The signal is alwa	ys active.					<del></del> -		
			8	The signal is alwa	ys inactive	).						
			9	Active when CN1	-40 input s	signal is OF	F (open).					
			А	Active when CN1	-41 input s	signal is OF	F (open).					
				Active when CN1	<u> </u>		,					
			+	Active when CN1-43 input signal is OFF (open).								
				Active when CN1		-						
			+	Active when CN1								
			F	Active when CN1	-46 input s	signal is OF	F (open).					
		n.□□X□	/SPD-A (Internal Set Speed Selection Input) Signal Allocation									
			0 to F	The allocations ar tions.	e the same	e as the /S	PD-D (Motor	Direction) si	gnal alloca	l-		
		n. 🗆 X 🗆 🗆	/SPD-B (Internal Set Speed Selection Input) Signal Allocation									
			0 to F	The allocations ar tions.	e the same	e as the /S	PD-D (Motor	Direction) sig	gnal alloca	l- 		
		n.X□□□	/C-SEL (Control Selection Input) Signal Allocation									
			0 to E	The allocations ar	. , .			Direction) si	gnal alloca	1-		

Applicable

Motors

### 5.1.2 List of Parameters

Classi-

fication

Refer-

Continued from previous page.

When

Enabled

	2	Input Signa 4	al Selectio	ns	0000h to FFFFh	-	8888h	_	After restart	Setup	*1				
			(70)	- /-						Applicat	ole				
			/ZCLAM	/ZCLAMP (Zero Clamping Input) Signal Allocation											
			0	Acti	ve when CN1-	40 input s	signal is ON	(closed).							
			1	Acti	ve when CN1-	41 input s	signal is ON	(closed).							
			2		ve when CN1-										
			3	Acti	ve when CN1-										
			4		ve when CN1-										
			5		ve when CN1-										
		n 000V	6		ve when CN1-										
		n.□□□X	7		signal is alway					All					
			8	The signal is always inactive.						,					
			9	Acti	ve when CN1-										
			А	Acti	ve when CN1-										
Pn50D			В	Acti											
FIIOUD			С	Acti	ve when CN1-	43 input s	signal is OF	F (open).							
			D		Active when CN1-44 input signal is OFF (open).										
			E		ve when CN1-										
			F	Acti	ve when CN1-	46 input s	signal is OF	F (open).							
		n.□□X□	/INHIBIT	(Ref	erence Pulse I	nhibit Inp	out) Signal <i>i</i>	Allocation		Applical Motor					
		11.000	0 to F		allocations are ut) signal alloca		e as the /Z0	CLAMP (Zero	Clamping	All					
		n.□X□□	/G-SEL	(Gain	Selection Inpo	ut) Signal	Allocation			Applical Motor	ble s				
		11.07.00	0 to F	The Inpu	allocations are ut) signal alloca	the same tions.	e as the /Z0	CLAMP (Zero	Clamping	All					
		n.XDDD	/P-DET (	(Pola	rity Detection I	nput) Sig	nal Allocat	ion		Applicable Motors					
		11./	0 to F	The allocations are the same as the /ZCLAMP (Zero Clamping Input) signal allocations.											

Setting

Range

Parameter

No.

Size

Name

Setting

Unit

Default

Setting

### 5.1.2 List of Parameters

Continued from previous page.

Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence			
	2	Output Sig tions 1	ınal Selec-	0000h to 6666h	_	3211h	All	After restart	Setup	*1			
			/COIN (Positi	oning Comple	tion Outp	ut) Signal	Allocation						
			0 Disa	abled (the abov	ve signal c	utput is no	ot used).						
			1 Out	put the signal	from the C	N1-25 or	CN1-26 outpu	ut terminal.					
		n.□□□X	2 Out										
				put the signal			-						
Pn50E			6 Out	put the signal	irom the C	M1-39 OU	iput terminai.						
			/V-CMP (Spe	ed Coincidend	e Detecti	on Output	) Signal Alloc	ation					
		n.□□X□		The ellecations are the same as the /COIN /Positioning Completion) signal									
			/TGON (Rota	tion Detection	Output) S	Signal Allo	cation						
		n.□X□□		The allocations are the same as the /COIN (Positioning Completion) signal allocations.									
			/S-RDY (Servo Ready) Signal Allocation										
		n.X□□□	O to 6 The	The allocations are the same as the /COIN (Positioning Completion) signal allocations.									
	2	Output Sig tions 2	ınal Selec-	0000h to 6666h	_	0000h	All	After restart	Setup	*1			
			/CLT (Torque Limit Detection Output) Signal Allocation										
			0 Disa	abled (the abov	/e signal c	utput is no	ot used).						
			1 Out	put the signal	from the C	N1-25 or	CN1-26 outpu	ut terminal.					
		n.□□□X	2 Out	put the signal	from the C	N1-27 or	CN1-28 outp	ut terminal.					
		II. L L L X		put the signal				ut terminal.					
				put the signal			•						
				put the signal			•						
Pn50F			6 Out	put the signal	from the C	N1-39 ou	tput terminal.						
			/VLT (Speed	Limit Detection	n) Signal A	Allocation							
		n.□□X□		allocations are allocations.	e the same	e as the /C	LT (Torque Li	mit Detection	n Output) :	sig-			
			/BK (Brake O	utput) Signal /	Allocation								
		n.□X□□	/BK (Brake Output) Signal Allocation  1 to 6 The allocations are the same as the /CLT (Torque Limit Detectional allocations.										
			/WARN (War	ning Output) S	ignal Allo	cation							
		n.X□□□	O to 6 The	allocations are	-		LT (Torque Li	mit Detection	n Output) :	sig-			

Continued	from	nrevious	nage
Continueu	HOILI	previous	paye.

Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence			
	2	Output Sig	gnal Selec-	0000h to 0666h	_	0000h	All	After restart	Setup	*1			
				1	1	l .			1				
			/NEAR (Near	Output) Signa	ıl Allocatio	n							
			0 Dis	abled (the abo	ve signal c	output is no	ot used).						
			1 Out	tput the signal	from the C	N1-25 or	CN1-26 outpu	ut terminal.					
		n.□□□X	2 Out										
		11.000X	3 Out	tput the signal from the CN1-29 or CN1-30 output terminal.									
Pn510				5 Output the signal from the CN1-38 output terminal.									
			6 Out	tput the signal	put the signal from the CN1-39 output terminal.								
		n.□□X□ Reserved parameter (Do not change.)											
			/PSFLA (Refe	erence Pulse II	nout Multi	nlication S	Switching Out	nut) Signal	Allocation				
		n.□X□□	<u> </u>	allocations are	•	•		. , .					
		V===											
		n.X□□□	Reserved pa	rameter (Do no	ot change.	.)							
	2	Output Sig	gnal Inverse	0000h to	_	0000h	All	After	Setup	*1			
	_	Settings		1111h		000011	, ui	restart	Cotap				
			Output Signa	al Inversion for	CN1-25 a	and CN1-2	6 Terminals						
		n.□□□X	0 The	e signal is not in	nverted.								
			1 The	e signal is inver	ted.								
			Output Signa	eput Signal Inversion for CN1-27 and CN1-28 Terminals									
		n.□□X□		e signal is not in									
Pn512				e signal is inver						<del></del>			
			Output Signs	out Signal Inversion for CN1-29 and CN1-30 Terminals									
		n.□X□□		e signal is not in		and GNT-3	ou reminais						
				e signal is inver									
			Output Signal Inversion for CN1-37 Terminal										
		~ VDDD				Ierminai							
		n.X□□□		e signal is not in e signal is inver									
			1 1110	J SIGNAL IS INVOL	iou.								
	2	Output Sig Settings 2	gnal Inverse	0000h to 0011h	_	0000h	All	After restart	Setup	*1			
		Settings 2		001111				restart					
			Output Signa	al Inversion for	CN1-38	Terminal							
		n.□□□X	0 The	e signal is not in	nverted.								
			1 The	1 The signal is inverted.									
Pn513			Output Signa	al Inversion for	CN1-39	Terminal							
		n.□□X□		e signal is not in									
			1 The	e signal is inver	ted.								
		n. 🗆 X 🗆 🗆											
		n.X□□□	Reserved pa	rameter (Do no	ot change.	.)							

### 5.1.2 List of Parameters

Continued from previous page.

Parameter No.	Size	N	Name		Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Output Sig tions 4	Output Signal Selections 4		-	0000h	All	After restart	Setup	*1		
	1	n.000X	Reserved pa	rameter (Do no	ot change.	)						
	-											
	1	n.□□X□	Reserved pa	parameter (Do not change.)								
			/PM (Preventative Maintenance Output) Signal Allocation									
		n.□X□□	0 Dis	Disabled (the above signal output is not used).								
Pn514			1 Ou	Output the signal from the CN1-25 or CN1-26 output terminal.								
			2 Ou	Output the signal from the CN1-27 or CN1-28 output terminal.								
	'	1.0.000	3 Ou	Output the signal from the CN1-29 or CN1-30 output terminal.								
			4 Ou	Output the signal from the CN1-37 output terminal.								
			5 Ou	tput the signal	from the C	N1-38 out	tput terminal.					
			6 Ou	Output the signal from the CN1-39 output terminal.								
	1	n.X□□□ Reserved parameter (Do not change.)										

### 5.1.2 List of Parameters

O 11 1	r		
Continued	trom	previous	page.

Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
140.	2	Input Signa	al Selections	0000h to	Offic	8888h	All	After	Setup	*1		
		6	0 Act 1 Act 2 Act	te Data Reque ive when CN1- ive when CN1- ive when CN1-	40 input s 41 input s 42 input s	Signal Alloosignal is ONsignal is ONsignal is ON	cation N (closed). N (closed). N (closed).	restart	Cottop			
				ive when CN1- ive when CN1-			, ,					
				ive when CN1- ive when CN1-								
		n.□□□X		e signal is alway able when 5 V i		CN1-4.						
				ive when CN1-			F (open).					
				ive when CN1-			,					
				ive when CN1-	<u>'</u>		· · · /					
				ive when CN1-								
				ive when CN1-			,					
				ive when CN1-		0	,					
				ive when CN1-								
Pn515		/PSEL (Reference Pulse Input Multiplication Switching Input) Signal Allocation  0 Active when CN1-40 input signal is ON (closed).										
							, ,					
				ive when CN1-								
			2 Act	ive when CN1-	42 input s	signal is ON	V (closed).					
			3 Act	ive when CN1-	43 input s	signal is ON	V (closed).					
			4 Act	ive when CN1-	44 input s	signal is ON	V (closed).					
			5 Act	ive when CN1-	45 input s	signal is ON	V (closed).					
			6 Act	ive when CN1-	46 input s	signal is ON	V (closed).					
		n.□□X□	7 The	e signal is alway	ys enabled	d.						
			8 The	e signal is alway	ys inactive							
			9 Act	ive when CN1-	40 input s	signal is OF	F (open).					
			A Act	ive when CN1-	41 input s	signal is OF	F (open).					
			B Act	ive when CN1-	42 input s	signal is OF	F (open).					
			C Act	ive when CN1-	43 input s	signal is OF	F (open).					
			D Act	ive when CN1-	44 input s	signal is OF	F (open).					
			E Act	ive when CN1-	45 input s	signal is OF	F (open).					
			F Act	ive when CN1-	46 input s	signal is OF	F (open).					
		n.□X□□	n.□X□□ Reserved parameter (Do not change.)									
		n.X□□□	Reserved pa	rameter (Do no	ot change.	.)						

### 5.1.2 List of Parameters

Continued from previous page.

Parameter No.	Size	1	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence				
	2	Input Sigr	nal Selections	0000h to FFFFh	-	8888h	All	After restart	Setup	*1				
					I.	1		I.		<u>L</u>				
	ı		FSTP (Forced	Stop Input) Si	gnal Alloc	ation								
				able drive wher	-		al is ON (close	ed).						
			1 En	able drive wher	n CN1-41	input signa	al is ON (close	ed).						
			2 En	able drive wher	n CN1-42	input signa	al is ON (close	ed).						
				able drive wher		·	*	•						
				able drive wher			•							
				able drive wher		·	,							
				Enable drive when CN1-46 input signal is ON (closed).  Set the signal to always prohibit drive (always force the motor to stop).										
		ı.□□□X		Set the signal to always prombit drive (always force the motor to stop).										
Pn516			Sic		0111 10		055 /	`						
				A Enable drive when CN1-41 input signal is OFF (open).  B Enable drive when CN1-42 input signal is OFF (open).										
				B Enable drive when CN1-42 input signal is OFF (open). C Enable drive when CN1-43 input signal is OFF (open).										
			E En											
			F En	F Enable drive when CN1-46 input signal is OFF (open).										
		n.□□X□	Reserved para	ameter (Do not	t change.)									
		n.□X□□	Reserved para	ameter (Do not	change.)									
	ı	n.X□□□	Reserved para	ameter (Do not	change.)									
	-	1 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1												
	2	Output Si tions 5	gnal Selec-	0000h to 0666h	-	0654h	All	After restart	Setup	*1				
			AI O1 (Alarm	Code Output)	Signal All	ocation								
			ALO1 (Alarm Code Output) Signal Allocation  O Disabled (the above signal output is not used).											
		n.□□□X	2 Out	put the signal	from the C	N1-27 or	CN1-28 outp	ut terminal.						
		II.LLLX		put the signal			·	ut terminal.						
				put the signal										
Pn517				put the signal to the signal t			•							
			0 Out	.put the signal	irom the C	7N 1-39 Ou	iput terriiriai.							
		- DDVD		Code Output)										
		n.□□X□	0 to 6 The	e allocations are is.	e the same	e as the AL	-O1 (Alarm Co	ode Output) :	signal allo	ca-				
			Al O3 (Alarm	Code Output)	Signal All	ocation								
		n.□X□□	` ` `	allocations are			_O1 (Alarm Co	ode Output)	signal allo	ca-				
			tion	is.										
	n.X□□□ Reserved parameter (Do not change.)													
				<u> </u>	ı		<u> </u>		1					
Pn518*3	-	Safety Mo Paramete	odule-Related ers	_	_	_	All	_	_	_				
Pn51B	4	Motor-Loa Deviation Detection		0 to 1,073,741,824	1 refer- ence unit	1000	Rotary	Immedi- ately	Setup	*1				
		•												

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Parameter	Size	Name	Setting	Setting	Default	Applicable	When	Classi-	Refer-
No.	တ		Range	Unit	Setting	Motors	Enabled	fication	ence
Pn51E	2	Position Deviation Over- flow Warning Level	10 to 100	1%	100	All	Immedi- ately	Setup	*1
Pn520	4	Position Deviation Over- flow Alarm Level	1 to 1,073,741,823	1 refer- ence unit	524288 0	All	Immedi- ately	Setup	*1
Pn522	4	Positioning Completed Width	0 to 1,073,741,824	1 refer- ence unit	7	All	Immedi- ately	Setup	*1
Pn524	4	Near Signal Width	1 to 1,073,741,824	1 refer- ence unit	107374 1824	All	Immedi- ately	Setup	*1
Pn526	4	Position Deviation Over- flow Alarm Level at Servo ON	1 to 1,073,741,823	1 refer- ence unit	524288 0	All	Immedi- ately	Setup	*1
Pn528	2	Position Deviation Over- flow Warning Level at Servo ON	10 to 100	1%	100	All	Immedi- ately	Setup	*1
Pn529	2	Speed Limit Level at Servo ON	0 to 10,000	1 min <sup>-1</sup>	10000	Rotary	Immedi- ately	Setup	*1
Pn52A	2	Multiplier per Fully- closed Rotation	0 to 100	1%	20	Rotary	Immedi- ately	Tuning	*1
Pn52B	2	Overload Warning Level	1 to 100	1%	20	All	Immedi- ately	Setup	*1
Pn52C	2	Base Current Derating at Motor Overload Detection	10 to 100	1%	100	All	After restart	Setup	*1
Pn52F	2	Monitor Display at Startup	0000h to 0FFFh	_	OFFFh	All	Immedi- ately	Setup	*1
	2	Program Jogging- Related Selections	0000h to 0005h	-	0000h	All	Immedi- ately	Setup	*1

	Program	Jogging Operation Pattern
n.□□□X	0	(Waiting time in Pn535 $\rightarrow$ Forward by travel distance in Pn531) $\times$ Number of movements in Pn536
	1	(Waiting time in Pn535 $\rightarrow$ Reverse by travel distance in Pn531) $\times$ Number of movements in Pn536
	2	(Waiting time in Pn535 → Forward by travel distance in Pn531) × Number of movements in Pn536 (Waiting time in Pn535 → Reverse by travel distance in Pn531) × Number of movements in Pn536
	3	(Waiting time in Pn535 → Reverse by travel distance in Pn531) × Number of movements in Pn536 (Waiting time in Pn535 → Forward by travel distance in Pn531) × Number of movements in Pn536
	4	(Waiting time in Pn535 $\rightarrow$ Forward by travel distance in Pn531 $\rightarrow$ Waiting time in Pn535 $\rightarrow$ Reverse by travel distance in Pn531) $\times$ Number of movements in Pn536
	5	(Waiting time in Pn535 $\rightarrow$ Reverse by travel distance in Pn531 $\rightarrow$ Waiting time in Pn535 $\rightarrow$ Forward by travel distance in Pn531) $\times$ Number of movements in Pn536
n.□□X□	Reserve	d parameter (Do not change.)

Pn530

n.□□X□	Reserved parameter (Do not change.)
n.□X□□	Reserved parameter (Do not change.)
n.X000	Reserved parameter (Do not change.)

Pn531	531 4 Program Jogging Travel Distance		1 to 1,073,741,824	1 refer- ence	32768	All	Immedi- ately	Setup	*1
Pn533	2	Program Jogging Move- ment Speed	1 to 10,000	unit Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1 min <sup>-1</sup>	500	Rotary	Immedi- ately	Setup	*1

### 5.1.2 List of Parameters

Continued from previous page.

Parameter	Size	Name	Setting	Setting	Default	Applicable	When	Classi-	Refer-
No.	Si		Range	Unit	Setting	Motors	Enabled	fication	ence
Pn534	2	Program Jogging Acceleration/Deceleration Time	2 to 10,000	1 ms	100	All	Immedi- ately	Setup	*1
Pn535	2	Program Jogging Wait- ing Time	0 to 10,000	1 ms	100	All	Immedi- ately	Setup	*1
Pn536	2	Program Jogging Number of Movements	0 to 1,000	Times	1	All	Immedi- ately	Setup	*1
Pn550	2	Analog Monitor 1 Offset Voltage	-10,000 to 10,000	0.1 V	0	All	Immedi- ately	Setup	*1
Pn551	2	Analog Monitor 2 Offset Voltage	-10,000 to 10,000	0.1 V	0	All	Immedi- ately	Setup	*1
Pn552	2	Analog Monitor 1 Mag- nification	-10,000 to 10,000	× 0.01	100	All	Immedi- ately	Setup	*1
Pn553	2	Analog Monitor 2 Mag- nification	-10,000 to 10,000	× 0.01	100	All	Immedi- ately	Setup	*1
Pn55A	2	Power Consumption Monitor Unit Time	1 to 1,440	1 min	1	All	Immedi- ately	Setup	_
Pn560	2	Residual Vibration Detection Width	1 to 3,000	0.1%	400	All	Immedi- ately	Setup	
Pn561	2	Overshoot Detection Level	0 to 100	1%	100	All	Immedi- ately	Setup	*1
Pn580	2	Zero Clamping Level	0 to 10,000	1 mm/s	10	Linear	Immedi- ately	Setup	*1
Pn581	2	Zero Speed Level	1 to 10,000	1 mm/s	20	Linear	Immedi- ately	Setup	*1
Pn582	2	Speed Coincidence Detection Signal Output Width	0 to 100	1 mm/s	10	Linear	Immedi- ately	Setup	*1
Pn583	2	Brake Reference Output Speed Level	0 to 10,000	1 mm/s	10	Linear	Immedi- ately	Setup	*1
Pn584	2	Speed Limit Level at Servo ON	0 to 10,000	1 mm/s	10000	Linear	Immedi- ately	Setup	*1
Pn585	2	Program Jogging Move- ment Speed	1 to 10,000	1 mm/s	50	Linear	Immedi- ately	Setup	*1
Pn586	2	Motor Running Cooling Ratio	0 to 100	1%/ Max. speed	0	Linear	Immedi- ately	Setup	_
Pn600	2	Regenerative Resistor Capacity*4	Depends on model.*5	10 W	0	All	Immedi- ately	Setup	*1
Pn601	2	Dynamic Brake Resistor Allowable Energy Consumption	0 to 65,535	10 J	0	All	After restart	Setup	*6
Pn603	2	Regenerative Resistance	0 to 65,535	10 mΩ	0	All	Immedi- ately	Setup	*1
Pn604	2	Dynamic Brake Resistance	0 to 65,535	10 mΩ	0	All	After restart	Setup	*6
	2	Overheat Protection Selections	0000h to 0003h	-	0000h	Linear	After restart	Setup	*1

Pn61	Δ	

n.□□□X	Overheat	t Protection Selection
	0	Disable overheat protection.
	1	Use overheat protection in the Yaskawa Linear Servomotor.*7
	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 parameter (Do not change.)					
n.□X□□	Reserved parameter (Do not change.)					
n.XDDD	Reserved parameter (Do not change.)					

Continued from previous page.

Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi-	Refer- ence
INO.	0)		nange	Offic	Setting	MOLOIS	Lilableu	lication	ence
Pn61B *8	1 2 1 ()Varhaat Alarm I aval		0 to 500	0.01 V	250	All	Immedi- ately	Setup	*1
Pn61C *8	1 2 1 ()Verheat Warning Leve		0 to 100	1%	100	All	Immedi- ately	Setup	*1
Pn61D *8	1) 0.0111000.7.11011		0 to 65,535	1 s	0	All	Immedi- ately	Setup	*1
Pn621 to Pn628*3	-	Safety Module-Related Parameters	-	-	-	All	-	_	_

- \*1. Refer to the following manual for details.
  - Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)
- \*2. Set a percentage of the motor rated torque.
- \*3. These parameters are for SERVOPACKs with a Safety Module. Refer to the following manual for details.
  - Σ-V-Series/Σ-V-Series for Large-Capacity Models/Σ-7-Series User's Manual Safety Module (Manual No.: SIEP C720829 06)
- \*4. Normally set this parameter to 0. If you use an External Regenerative Resistor, set the capacity (W) of the External Regenerative Resistor.
- \*5. The upper limit is the maximum output capacity (W) of the SERVOPACK.
- \*6. These parameters are for SERVOPACKs with the dynamic brake option. Refer to the following manual for details.
  - Ω Σ-7-Series Σ-7S/Σ-7W SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP S800001 73)
- \*7. The SGLFW2 is the only Yaskawa Linear Servomotor that supports this function.
- \*8. Enabled only when Pn61A is set to n.□□□2 or n.□□□3.

## 5.1.3 Parameter Recording Table

Use the following table to record the settings of the parameters.

Pn000         0000h         Basic Function Selections of After restart Application Function Selections 2         After restart After restart selections 2         After restart function Selections 2         After restart function Selections 3         After restart function Selections 6         Immediately function Selections 6         Immediately function Selections 8         After restart function Selections 8         Application Function Selections 8         After restart function Selections 8         Application Function Selections 9         After restart function Selections 9         Application Function Selections 9         After restart function Selections 9         After restart function Selections Application Function Selections 6         After restart function Selections 6         A	Parameter No.	Default Setting			Name	When Enabled
Pn002         0000h         tions 1         Atter restart           Pn006         0002h         Application Function Selections 2         After restart           Pn007         0000h         Application Function Selections 6         Immediately           Pn008         0000h         Application Function Selections 8         After restart           Pn009         0010h         Application Function Selections 9         After restart           Pn00A         0001h         Application Function Selections 9         After restart           Pn00B         0000h         Application Function Selections B         After restart           Pn00C         0000h         Application Function Selections B         After restart           Pn00D         0000h         Application Function Selections C         After restart           Pn00D         0000h         Application Function Selections C         After restart           Pn00D         0000h         Application Function Selections F         After restart           Pn01D         0000h         Application Function Selections F         After restart           Pn01D         0001h         Reserved parameter         —           Pn021         0000h         Reserved parameter         —           Pn022         0000h         R	Pn000	0000h			Basic Function Selections 0	After restart
Pn006         0002h         tions 2         Application Function Selections 6         Immediately Immediately Immediately Immediately Immediately 2000h         Application Function Selections 6         Immediately Immediately 2000h         After restart 2000h	Pn001	0000h				After restart
Pn007         0000h         tions 6         Immediately           Pn008         0000h         Application Function Selections 7         Immediately           Pn009         0010h         Application Function Selections 9         After restart           Pn000         0001h         Application Function Selections 9         After restart           Pn00B         0000h         Application Function Selections A         After restart           Pn00C         0000h         Application Function Selections D         After restart           Pn00D         0000h         Application Function Selections C         After restart           Pn00D         0000h         Application Function Selection for Unction Selections Punctions Selections Punction Selection for Unctions Selection for Selections Selection for Selections Selection for Selections Selection for Selection for Selection for Selections Selection for Selections Selection for Selections Selection for Selections Selection for Selection Selec	Pn002	0000h				After restart
Pn008         0000h         tions 7         Infinitediately           Pn009         0010h         Application Function Selections 8         After restart tons 8           Pn009         0010h         Application Function Selections 9         After restart tons 9           Pn00A         0001h         Application Function Selections After restart tons A papilication Function Selections B         After restart tons B           Pn00D         0000h         Application Function Selection Selections C         After restart tons C           Pn00D         0000h         Application Function Selection For Under Function Selection Selection For Under Function Selection Selectio	Pn006	0002h				Immediately
Pn009 0010h tions 8 Application Function Selections 9 Pn00A 0001h Application Function Selections A Application Function Selections A Application Function Selections B Application Function Selections B Application Function Selections B Application Function Selections C After restart tons C Application Function Selections C Application Function Selections C Pn00D 0000h Application Function Selections D Immediately Pn00F 0000h Application Function Selections F After restart tons D Axis Address Selection for UART7USB Communications F After restart tons Pn021 0000h Reserved parameter — Reserved parameter — Pn022 0000h Reserved parameter — Reserved parameter — Pn040 0000h Pn000 Pn0000h Pn0000 Pn0000 Pn0000 Pn00000 Pn000000 Pn0000000 Pn00000000	Pn007	0000h				Immediately
Pn00A 0001h tions 9 Application Function Selections A Application Function Selections B O000h Application Function Selections C After restart tions B Application Function Selections C After restart tions B Application Function Selections C After restart Application Function Selections C After restart Application Function Selections C After restart tions F Application Function Selections F Application Function Selections F Application Function Selections F Asia Address Selection for UART/USB Communications F Asia Address Selection for UART/USB Communications F After restart tions F Asia Address Selection for UART/USB Communications F After restart tions F Asia Address Selection for UART/USB Communications F After restart tions F Asia Address Selection for UART/USB Communication Selections F After restart Switch Application Function Selections 80 Application Function Selections 81 After restart Speed Loop Gain Immediately Pn00 After Selections 81 Immediately Constant Immediately Pn101 After Pn102 After Pn103 Indo Moment of Inertia Ratio Immediately Pn103 Indo Moment of Inertia Ratio Immediately Pn104 After Pn106 After Pn106 After Pn107 After Pn108 Immediately Pn108 Office After Pn108 Immediately Pn109 Office After Pn109 After Pn109 Office After Pn109	Pn008	0000h				After restart
Ph00B         0000h         Application Function Selections B         After restart           Pn00C         0000h         Application Function Selections C         After restart           Pn00D         0000h         Application Function Selections D         Immediately           Pn00F         0000h         Application Function Selections C         After restart           Pn010         0001h         Axis Address Selection for UART/USB Communications         After restart           Pn021         0000h         Reserved parameter         —           Pn022         0000h         Reserved parameter         —           Pn040         0000h         After restart           Pn080         0000h         Application Function Selection for UART/USB Communication Selections 80           Pn081         0000h         Application Function Selections 80           Pn082         After restart start switch           Pn083         0000h         Application Function Selections 80           Pn084         0000h         Application Function Selections 80           Pn100         400         Speed Loop Gain         Immediately           Pn101         2000         Speed Loop Integral Time Constant         Immediately           Pn102         400         Position Loop Gain         <	Pn009	0010h				After restart
Pn00C         0000h         tions B         After restart           Pn00D         0000h         Application Function Selections C         After restart           Pn00F         0000h         Application Function Selections D         Immediately           Pn010         0000h         Application Function Selections F         After restart           Pn010         0001h         After restart Selection for UART/USB Communications         After restart Selection for UART/USB Communications           Pn021         0000h         Reserved parameter         —           Pn022         0000h         Reserved parameter         —           Pn040         0000h         After restart Selections Sel	Pn00A	0001h				After restart
Pn00D         0000h         tions C Application Function Selections D Immediately         Immediately           Pn00F         0000h         Application Function Selections F Tions F         Immediately           Pn010         0001h         Axis Address Selection for UART/USB Communications         After restart           Pn021         0000h         Reserved parameter         —           Pn022         0000h         Reserved parameter         —           Pn040         0000h         S-V Compatible Function Switch         After restart           Pn080         0000h         Application Function Selections 80         After restart           Pn081         0000h         Application Function Selections 81         After restart           Pn100         400         Speed Loop Gain         Immediately           Pn101         2000         Speed Loop Integral Time Constant         Immediately           Pn102         400         Position Loop Gain         Immediately           Pn103         100         Moment of Inertia Ratio         Immediately           Pn104         400         Second Speed Loop Integral Time Constant         Immediately           Pn105         2000         Second Speed Loop Integral Time Constant         Immediately           Pn106         400 <td>Pn00B</td> <td>0000h</td> <td></td> <td></td> <td></td> <td>After restart</td>	Pn00B	0000h				After restart
Pn00F         0000h         tions D         Application Function Selections F         After restart           Pn010         0001h         Axis Address Selection for UART/USB Communications         After restart           Pn021         0000h         Reserved parameter         -           Pn022         0000h         Reserved parameter         -           Pn040         0000h         After restart           Pn080         0000h         Application Function Selections 80           Variation Selections 80         Application Function Selections 81           Pn081         0000h         Application Function Selections 81           Pn100         400         Speed Loop Gain         Immediately           Pn101         2000         Speed Loop Integral Time Constant         Immediately           Pn102         400         Position Loop Gain         Immediately           Pn103         100         Moment of Inertia Ratio         Immediately           Pn104         400         Second Speed Loop Integral Time Constant         Immediately           Pn105         2000         Second Speed Loop Integral Time Constant         Immediately           Pn106         400         Second Speed Loop Integral Time Constant         Immediately           Pn109         O	Pn00C	0000h			tions C	After restart
Pn010 0001h	Pn00D	0000h				Immediately
Pn010       0001h       UART/USB Communications       After restart         Pn021       0000h       Reserved parameter       —         Pn022       0000h       Reserved parameter       —         Pn040       0000h       \$\frac{2}{2}\text{V Compatible Function Selections Switch}}\$       After restart         Pn080       0000h       Application Function Selections 80       After restart         Pn081       0000h       Application Function Selections 81       After restart         Pn100       400       Speed Loop Gain       Immediately         Pn101       2000       Speed Loop Integral Time Constant       Immediately         Pn102       400       Position Loop Gain       Immediately         Pn103       100       Moment of Inertia Ratio       Immediately         Pn104       400       Second Speed Loop Integral Time Constant       Immediately         Pn105       2000       Second Speed Loop Integral Time Constant       Immediately         Pn106       400       Second Speed Loop Integral Time Constant       Immediately         Pn109       0       Feedforward       Immediately         Pn100       0       Feedforward       Immediately         Pn10B       0004h       Gain Application Selections	Pn00F	0000h				After restart
Pn0220000hReserved parameter-Pn0400000h\$\frac{\text{S-V Compatible Function}}{\text{Switch}}\$After restartPn0800000hApplication Function Selections 80After restartPn0810000hApplication Function Selections 81After restartPn100400Speed Loop GainImmediatelyPn1012000Speed Loop Integral Time ConstantImmediatelyPn102400Position Loop GainImmediatelyPn103100Moment of Inertia RatioImmediatelyPn104400Second Speed Loop GainImmediatelyPn1052000Second Speed Loop Integral Time ConstantImmediatelyPn106400Second Position Loop GainImmediatelyPn1090FeedforwardImmediatelyPn10A0Feedforward Filter Time ConstantImmediatelyPn10B0004hGain Application Selections*Pn10C200Mode Switching Level for Torque ReferenceImmediatelyPn10D0Mode Switching Level for Speed ReferenceImmediately	Pn010	0001h			UART/USB Communica-	After restart
Pn0400000h\$\text{S-V Compatible Function}\$ SwitchAfter restartPn0800000hApplication Function Selections 80After restartPn0810000hApplication Function Selections 81After restartPn100400Speed Loop GainImmediatelyPn1012000Speed Loop Integral Time ConstantImmediatelyPn102400Position Loop GainImmediatelyPn103100Moment of Inertia RatioImmediatelyPn104400Second Speed Loop GainImmediatelyPn1052000Second Speed Loop Integral Time ConstantImmediatelyPn106400Second Position Loop GainImmediatelyPn1090FeedforwardImmediatelyPn10A0Feedforward Filter Time ConstantImmediatelyPn10B0004hGain Application Selections*Pn10C200Mode Switching Level for Torque ReferenceImmediatelyPn10D0Mode Switching Level for Speed ReferenceImmediately	Pn021	0000h			Reserved parameter	-
Pn0800000hSwitchAtter restartPn0810000hApplication Function Selections 80After restartPn100400Application Function Selections 81After restartPn1012000Speed Loop GainImmediatelyPn102400Position Loop GainImmediatelyPn103100Moment of Inertia RatioImmediatelyPn104400Second Speed Loop GainImmediatelyPn1052000Second Speed Loop Integral Time ConstantImmediatelyPn106400Second Position Loop GainImmediatelyPn1090FeedforwardImmediatelyPn10A0Feedforward Filter Time ConstantImmediatelyPn10B0004hGain Application Selections*Pn10C200Mode Switching Level for Torque ReferenceImmediatelyPn10D0Mode Switching Level for Speed ReferenceImmediately	Pn022	0000h			<u> </u>	_
Pn081 0000h tions 80 After restart  Pn081 0000h Application Function Selections 81  Pn100 400 Speed Loop Gain Immediately  Pn101 2000 Speed Loop Integral Time Constant Immediately  Pn102 400 Position Loop Gain Immediately  Pn103 100 Moment of Inertia Ratio Immediately  Pn104 400 Second Speed Loop Gain Immediately  Pn105 2000 Second Speed Loop Integral Time Constant Immediately  Pn106 400 Second Position Loop Gain Immediately  Pn109 0 Feedforward Immediately  Pn109 0 Feedforward Immediately  Pn10A 0 Gain Application Selections  Pn10B 0004h Gain Application Selections  Mode Switching Level for Torque Reference Immediately  Pn10D 0 Mode Switching Level for Speed Reference Immediately	Pn040	0000h			Σ-V Compatible Function Switch	After restart
Pn100 400 Speed Loop Gain Immediately Pn101 2000 Position Loop Gain Immediately Pn102 400 Position Loop Gain Immediately Pn103 100 Moment of Inertia Ratio Immediately Pn104 400 Second Speed Loop Integral Time Immediately Pn105 2000 Second Speed Loop Gain Immediately Pn106 400 Second Position Loop Gain Immediately Pn109 0 Feedforward Immediately Pn109 0 Feedforward Filter Time Constant Immediately Pn100 Constant Second Position Selections * Pn100 Mode Switching Level for Torque Reference Immediately Pn100 Mode Switching Level for Speed Reference Immediately	Pn080	0000h			tions 80	After restart
Pn1012000Speed Loop Integral Time ConstantImmediatelyPn102400Position Loop GainImmediatelyPn103100Moment of Inertia RatioImmediatelyPn104400Second Speed Loop GainImmediatelyPn1052000Second Speed Loop Integral Time ConstantImmediatelyPn106400Second Position Loop GainImmediatelyPn1090FeedforwardImmediatelyPn10A0Feedforward Filter Time ConstantImmediatelyPn10B0004hGain Application Selections*Pn10C200Mode Switching Level for Torque ReferenceImmediatelyPn10D0Mode Switching Level for Speed ReferenceImmediately	Pn081	0000h				After restart
Pn102 400 Position Loop Gain Immediately Pn103 100 Moment of Inertia Ratio Immediately Pn104 400 Second Speed Loop Gain Immediately Pn105 2000 Second Speed Loop Integral Time Constant Immediately Pn106 400 Second Position Loop Gain Immediately Pn109 0 Feedforward Immediately Pn10A 0 Feedforward Filter Time Constant Immediately Pn10B 0004h Gain Application Selections Pn10C 200 Mode Switching Level for Torque Reference Immediately Pn10D 0 Mode Switching Level for Speed Reference Immediately	Pn100	400				Immediately
Pn103100Moment of Inertia RatioImmediatelyPn104400Second Speed Loop GainImmediatelyPn1052000Second Speed Loop Integral Time ConstantImmediatelyPn106400Second Position Loop GainImmediatelyPn1090FeedforwardImmediatelyPn10A0Feedforward Filter Time ConstantImmediatelyPn10B0004hGain Application Selections*Pn10C200Mode Switching Level for Torque ReferenceImmediatelyPn10D0Mode Switching Level for Speed ReferenceImmediately					Constant	
Pn104400Second Speed Loop GainImmediatelyPn1052000Second Speed Loop Integral Time ConstantImmediatelyPn106400Second Position Loop GainImmediatelyPn1090FeedforwardImmediatelyPn10A0Feedforward Filter Time ConstantImmediatelyPn10B0004hGain Application Selections*Pn10C200Mode Switching Level for Torque ReferenceImmediatelyPn10D0Mode Switching Level for Speed ReferenceImmediately					·	Immediately
Pn1052000Second Speed Loop Integral Time ConstantImmediatelyPn106400Second Position Loop Gain ImmediatelyPn1090Feedforward ImmediatelyPn10A0Feedforward Filter Time ConstantImmediatelyPn10B0004hGain Application Selections*Pn10C200Mode Switching Level for Torque ReferenceImmediatelyPn10D0Mode Switching Level for Speed ReferenceImmediately						
Pn106 400 Second Position Loop Gain Immediately Pn109 0 Feedforward Immediately Pn10A 0 Feedforward Filter Time Constant Pn10B 0004h Gain Application Selections * Pn10C 200 Mode Switching Level for Torque Reference Immediately Pn10D 0 Mode Switching Level for Speed Reference Immediately	Pn104	400				Immediately
Pn1090FeedforwardImmediatelyPn10A0Feedforward Filter Time ConstantImmediatelyPn10B0004hGain Application Selections*Pn10C200Mode Switching Level for Torque ReferenceImmediatelyPn10D0Mode Switching Level for Speed ReferenceImmediately	Pn105	2000			gral Time Constant	
Pn10A0Feedforward Filter Time ConstantImmediatelyPn10B0004hGain Application Selections*Pn10C200Mode Switching Level for Torque ReferenceImmediatelyPn10D0Mode Switching Level for Speed ReferenceImmediately					•	•
Pn10B 0004h Gain Application Selections *  Pn10C 200 Mode Switching Level for Torque Reference Immediately  Pn10D 0 Mode Switching Level for Speed Reference Immediately	Pn109	0				Immediately
Pn10C 200 Mode Switching Level for Torque Reference Immediately Pn10D 0 Mode Switching Level for Speed Reference Immediately					Constant	
Pn10D 0 Torque Reference Immediately  Mode Switching Level for Speed Reference Immediately	Pn10B	0004h				*
Speed Reference Immediately	Pn10C	200			Torque Reference	Immediately
	Pn10D	0			Speed Reference	

Parameter No.	Default Setting	Name	When Enabled
Pn10E	0	Mode Switching Level for Acceleration	Immediately
Pn10F	0	Mode Switching Level for Position Deviation	Immediately
Pn11F	0	Position Integral Time Constant	Immediately
Pn121	100	Friction Compensation Gain	Immediately
Pn122	100	Second Friction Compensation Gain	Immediately
Pn123	0	Friction Compensation Coefficient	Immediately
Pn124	0	Friction Compensation Frequency Correction	Immediately
Pn125	100	Friction Compensation Gain Correction	Immediately
Pn131	0	Gain Switching Time 1	Immediately
Pn132	0	Gain Switching Time 2	Immediately
Pn135	0	Gain Switching Waiting Time 1	Immediately
Pn136	0	Gain Switching Waiting Time 2	Immediately
Pn139	0000h	Automatic Gain Switching Selections 1	Immediately
Pn13D	2000	Current Gain Level	Immediately
Pn13F	0	Less-Deviation Control 2 Second Position Integral Time Constant	Immediately
Pn140	0100h	Model Following Control- Related Selections	Immediately
Pn141	500	Model Following Control Gain	Immediately
Pn142	1000	Model Following Control Gain Correction	Immediately
Pn143	1000	Model Following Control Bias in the Forward Direction	Immediately
Pn144	1000	Model Following Control Bias in the Reverse Direction	Immediately
Pn145	500	Vibration Suppression 1 Frequency A	Immediately
Pn146	700	Vibration Suppression 1 Frequency B	Immediately
Pn147	1000	Model Following Control Speed Feedforward Com- pensation	Immediately
Pn148	500	Second Model Following Control Gain	Immediately
Pn149	1000	Second Model Following Control Gain Correction	Immediately
Pn14A	800	Vibration Suppression 2 Frequency	Immediately
Pn14B	100	Vibration Suppression 2 Correction	Immediately
Pn14F	0021h	Control-Related Selections	After restart

### 5.1.3 Parameter Recording Table

Continued from previous page.

Continued from previous pa					
Parameter No.	Default Setting	Name	When Enabled		
Pn160	0010h	Anti-Resonance Control-Related Selections	Immediately		
Pn161	1000	Anti-Resonance Frequency	Immediately		
Pn162	100	Anti-Resonance Gain Correction	Immediately		
Pn163	0	Anti-Resonance Damping Gain	Immediately		
Pn164	0	Anti-Resonance Filter Time Constant 1 Correction	Immediately		
Pn165	0	Anti-Resonance Filter Time Constant 2 Correction	Immediately		
Pn166	0	Anti-Resonance Damping Gain 2	Immediately		
Pn170	1400h	Tuning-less Function- Related Selections	*		
Pn181	0	Mode Switching Level for Speed Reference	Immediately		
Pn182	0	Mode Switching Level for Acceleration	Immediately		
Pn190	0100h	Less-Deviation Control- Related Switches	After restart		
Pn191	1000	Less-Deviation Control 1 Feedforward Gain	Immediately		
Pn192	1000	Less-Deviation Control 1 Second Feedforward Gain	Immediately		
Pn193	30	Less-Deviation Control 1 Feedforward Filter Time Constant	Immediately		
Pn195	2102h	Less-Deviation Function Selection Switches	After restart		
Pn196	1000	Less-Deviation Control 2 Speed Feedforward Gain	Immediately		
Pn197	50	Less-Deviation Control 2 Torque Feedforward Filter Time Constant	Immediately		
Pn198	1000	Less-Deviation Control 2 Forward Torque Feedfor- ward Gain	Immediately		
Pn199	1000	Less-Deviation Control 2 Reverse Torque Feedforward Gain	Immediately		
Pn19A	10000	Less-Deviation Control 2 Incomplete Integration Rate	Immediately		
Pn19B	0	Less-Deviation Control 2 Rotary Servomotor Viscous Friction Compensation Coefficient	Immediately		
Pn19C	0	Reserved parameter	Immediately		
Pn19D	0	Less-Deviation Control 2 Linear Servomotor Viscous Friction Compensation Coefficient	Immediately		
Pn19E	0	Reserved parameter	Immediately		
Pn19F	0	Less-Deviation Control 2 Torque Feedforward Mov- ing Average Time	Immediately		
Pn1A4	36	Reserved parameter	Immediately		
	i		on next page		

5

Continued from previous page.

Parameter No.	Default Setting	Continued from p	When Enabled
Pn1A5	0	Reserved parameter	Immediately
Pn1AE	0	Reserved parameter	Immediately
Pn1AF	0	Reserved parameter	Immediately
Pn200	0000h	Position Control Reference Form Selections	After restart
Pn205	65535	Multiturn Limit	After restart
Pn207	1000h	Position Control Function Selections	After restart
Pn20A	32768	Number of External Scale Pitches	After restart
Pn20E	64	Electronic Gear Ratio (Numerator)	After restart
Pn210	1	Electronic Gear Ratio (Denominator)	After restart
Pn212	2048	Number of Encoder Output Pulses	After restart
Pn216	0	Position Reference Acceleration/Deceleration Time Constant	Immediately after the motor stops
Pn217	0	Average Position Reference Movement Time	Immediately after the motor stops
Pn218	1	Reference Pulse Input Multiplier	Immediately
Pn22A	0000h	Fully-closed Control Selections	After restart
Pn234	0	Second Position Reference Acceleration/Deceleration Time Constant	Immediately
Pn281	20	Encoder Output Resolution	After restart
Pn282	0	Linear Encoder Scale Pitch	After restart
Pn300	600	Speed Reference Input Gain	Immediately
Pn301	100	Internal Set Speed 1	Immediately
Pn302	200	Internal Set Speed 2	Immediately
Pn303	300	Internal Set Speed 3	Immediately
Pn304	500	Jogging Speed	Immediately
Pn305	0	Soft Start Acceleration Time	Immediately
Pn306	0	Soft Start Deceleration Time	Immediately
Pn307	40	Speed Reference Filter Time Constant	Immediately
Pn308	0	Speed Feedback Filter Time Constant	Immediately
Pn30A	0	Deceleration Time for Servo OFF and Forced Stops	Immediately
Pn30C	0	Speed Feedforward Average Movement Time	Immediately
Pn310	0000h	Vibration Detection Selections	Immediately
Pn311	100	Vibration Detection Sensitivity	Immediately
Pn312	50	Vibration Detection Level	Immediately
Pn316	10000	Maximum Motor Speed	After restart

## 5.1.3 Parameter Recording Table

Continued from previous page.

		Continued from p	
Parameter No.	Default Setting	Name	When Enabled
Pn324	300	Moment of Inertia Calculation Starting Level	Immediately
Pn380	10	Internal Set Speed 1	Immediately
Pn381	20	Internal Set Speed 2	Immediately
Pn382	30	Internal Set Speed 3	Immediately
Pn383	50	Jogging Speed	Immediately
Pn384	10	Vibration Detection Level	Immediately
Pn385	50	Maximum Motor Speed	After restart
Pn400	30	Torque Reference Input Gain	Immediately
Pn401	100	First Stage First Torque Reference Filter Time Con- stant	Immediately
Pn402	800	Forward Torque Limit	Immediately
Pn403	800	Reverse Torque Limit	Immediately
Pn404	100	Forward External Torque Limit	Immediately
Pn405	100	Reverse External Torque Limit	Immediately
Pn406	800	Emergency Stop Torque	Immediately
Pn407	10000	Speed Limit during Torque Control	Immediately
Pn408	0000h	Torque-Related Function Selections	*
Pn409	5000	First Stage Notch Filter Frequency	Immediately
Pn40A	70	First Stage Notch Filter Q Value	Immediately
Pn40B	0	First Stage Notch Filter Depth	Immediately
Pn40C	5000	Second Stage Notch Filter Frequency	Immediately
Pn40D	70	Second Stage Notch Filter Q Value	Immediately
Pn40E	0	Second Stage Notch Filter Depth	Immediately
Pn40F	5000	Second Stage Second Torque Reference Filter Frequency	Immediately
Pn410	50	Second Stage Second Torque Reference Filter Q Value	Immediately
Pn412	100	First Stage Second Torque Reference Filter Time Con- stant	Immediately
Pn415	0	T-REF Filter Time Constant	Immediately
Pn416	0000h	Torque-Related Function Selections 2	Immediately
Pn417	5000	Third Stage Notch Filter Frequency	Immediately
Pn418	70	Third Stage Notch Filter Q Value	Immediately
Pn419	0	Third Stage Notch Filter Depth	Immediately

Continued from previous pa					
Parameter No.	Default Setting	Name	When Enabled		
Pn41A	5000	Fourth Stage Notch Filter Frequency	Immediately		
Pn41B	70	Fourth Stage Notch Filter Q Value	Immediately		
Pn41C	0	Fourth Stage Notch Filter Depth	Immediately		
Pn41D	5000	Fifth Stage Notch Filter Frequency	Immediately		
Pn41E	70	Fifth Stage Notch Filter Q Value	Immediately		
Pn41F	0	Fifth Stage Notch Filter Depth	Immediately		
Pn423	0000h	Speed Ripple Compensation Selections	*		
Pn424	50	Torque Limit at Main Circuit Voltage Drop	Immediately		
Pn425	100	Release Time for Torque Limit at Main Circuit Voltage Drop	Immediately		
Pn426	0	Torque Feedforward Average Movement Time	Immediately		
Pn427	0	Speed Ripple Compensation Enable Speed	Immediately		
Pn456	15	Sweep Torque Reference Amplitude	Immediately		
Pn460	0101h	Notch Filter Adjustment Selections 1	Immediately		
Pn475	0000h	Gravity Compensation- Related Selections	After restart		
Pn476	0	Gravity Compensation Torque	Immediately		
Pn480	10000	Speed Limit during Force Control	Immediately		
Pn481	400	Polarity Detection Speed Loop Gain	Immediately		
Pn482	3000	Polarity Detection Speed Loop Integral Time Constant	Immediately		
Pn483	30	Forward Force Limit	Immediately		
Pn484	30	Reverse Force Limit	Immediately		
Pn485	20	Polarity Detection Reference Speed	Immediately		
Pn486	25	Polarity Detection Reference Acceleration/Deceleration Time	Immediately		
Pn487	0	Polarity Detection Constant Speed Time	Immediately		
Pn488	100	Polarity Detection Reference Waiting Time	Immediately		
Pn48E	10	Polarity Detection Range	Immediately		
Pn490	100	Polarity Detection Load Level	Immediately		
Pn495	100	Polarity Detection Confirmation Force Reference	Immediately		
Pn498	10	Polarity Detection Allowable Error Range	Immediately		

## 5.1.3 Parameter Recording Table

Continued from previous page.

Parameter No.   Peralt Setting   Name   Enabled   Pn49F   D   Speed Rippie Compensation Enable Speed   Immediately   Immediately   Pn501   10   Zero Clamping Level   Immediately   Pn502   20   Rotation Detection Level   Immediately   Pn503   10   Speed Coincidence Date-loss of Signal Output Width   Immediately   Pn504   Time   Pn506   D   Brake Reference Servo   Display Time   Immediately   Immediately   Pn506   D   Brake Reference Output   Immediately   Pn508   So   Servo OFF-Brake Command Walting Time   Immediately   Immediately   Pn509   20   Momentary Power Interruption Hold Time   Immediately   Immediately   Pn508   So   Servo OFF-Brake Command Walting Time   Immediately   Pn508   So   Servo OFF-Brake Command Walting Time   Immediately   Pn509   20   Momentary Power Interruption Hold Time   Imput Signal Selections 1   After restart   Pn509   After restart   Input Signal Selections 2   After restart   Pn509   Seaseh   Input Signal Selections 3   After restart   Pn500   Seaseh   Input Signal Selections 3   After restart   Pn500   Seaseh   Input Signal Selections 4   After restart   Output Signal Selections 4   After restart   Output Signal Selections 5   After restart   After restart   Input Signal Selections 5   After restart   Input Signal Selections 6   After restart   Input Signal Selections 6   After restart   Input Signal Selections 5   After restart   Input Signal Selections 5   After restart   Input Signal Selections 6   After restart   Input Signal Selections 7   After restart   Input Signal Selections 6   After restart   Input Signal Selections 7   After restart   Input Signal Selections 6   After restart   Input Signal Selections 7   After restart   Input Signal Selections 7   After restart   Input Signal Selections 7   After restart			Continued from p	·
Pn501		Default Setting		
Ph502         20         Rotation Detection Level         Immediately technological concidence Detection Signal Output Width         Immediately technological Considence Detection Signal Output Width         Immediately technological Considence Detection Signal Output Width         Immediately technological Considence Detection Signal Output Width         Immediately technological Immediately           Pn507         100         Brake Reference Output Speed Level         Immediately           Pn508         50         Servo OFF-Brake Command Waiting Time         Immediately           Pn509         20         Momentary Power Interruption Hold Time         Immediately           Pn50A         2100h         Input Signal Selections 1         After restart           Pn50B         6543h         Input Signal Selections 2         After restart           Pn50C         8888h         Input Signal Selections 3         After restart           Pn50D         8888h         Input Signal Selections 3         After restart           Pn50F         0000h         Output Signal Selections 3         After restart           Pn510         0000h         Output Signal Selections 3         After restart           Pn513         0000h         Output Signal Inverse Settings         After restart           Pn514         0000h         Output Signal Selections 4         After restart	Pn49F	0		Immediately
Pn503   10   Speed Coincidence Detection Signal Output Width   Immediately   Pn506   0   Brake Reference Serve OFF Delay Time   Immediately   Immediately   Pn507   100   Brake Reference Output   Immediately   Immediately   Pn508   50   Servo OFF-Brake Command Waiting Time   Immediately   Pn509   20   Momentary Power Interruption Hold Time   Immediately   Pn508   6543h   Input Signal Selections 1   After restart   Pn508   6543h   Input Signal Selections 2   After restart   Pn50B   6543h   Input Signal Selections 3   After restart   Pn50D   8388h   Input Signal Selections 4   After restart   Pn50E   3211h   Output Signal Selections 3   After restart   Pn50E   3211h   Output Signal Selections 3   After restart   After restart   Pn50F   O000h   Output Signal Selections 3   After restart   After restart   After restart   Input Signal Selections 3   After restart   After restart   Input Signal Selections 3   After restart   Input Signal Selections 4   After restart   Input Signal Selections 5   After restart   Input Signal Selections 5   After restart   Input Signal Selections 6   After restart   Input Signal Selections 7   After restart   Input Signal Selections 7   After restart   Input Signal Selections 6   After restart   Input Signal Selections 7   After restart   Input Signal Selections 6   After restart   Input Signal Selections 7   After restart   Input Signal	Pn501	10	Zero Clamping Level	Immediately
PR506   0	Pn502	20	Rotation Detection Level	Immediately
PR507   100   Brake Reference Output   Immediately   PR508   50   Servo OFF-Brake Command Wating Time   Immediately   PR509   20   Momentary Power Interruption Hold Time   Immediately   Immediately   PR500   2100h   Input Signal Selections 1   After restart   PR500   B888h   Input Signal Selections 2   After restart   PR500   B888h   Input Signal Selections 3   After restart   PR500   After restart   After restart   PR510   After restart   PR510   After restart   After restart   PR510   After restart   After restart   PR511   After   After restart	Pn503	10		Immediately
Pn508   50   Speed Level   Servo OFF-Brake Command Wating Time   Immediately   Immed	Pn506	0		Immediately
Pn509	Pn507	100		Immediately
Pin509	Pn508	50		Immediately
Pn50B         6543h         Input Signal Selections 2         After restart           Pn50C         8888h         Input Signal Selections 3         After restart           Pn50D         8888h         Input Signal Selections 4         After restart           Pn50E         3211h         Output Signal Selections 1         After restart           Pn50F         0000h         Output Signal Selections 2         After restart           Pn510         0000h         Output Signal Inverse Settings         After restart           Pn512         0000h         Output Signal Inverse Settings         After restart           Pn513         0000h         Output Signal Selections 4         After restart           Pn514         0000h         Output Signal Selections 4         After restart           Pn515         8888h         Input Signal Selections 4         After restart           Pn516         8888h         Input Signal Selections 7         After restart           Pn517         0654h         Output Signal Selections 7         After restart           Pn518         1000         Motor-Load Position Deviation Deviation Overflow Detection         Immediately           Pn518         100         Position Deviation Overflow Detection Level         Immediately           Pn520	Pn509	20	tion Hold Time	Immediately
Pn50C         8888h         Input Signal Selections 3         After restart           Pn50D         8888h         Input Signal Selections 4         After restart           Pn50E         3211h         Output Signal Selections 1         After restart           Pn50F         0000h         Output Signal Selections 2         After restart           Pn510         0000h         Output Signal Selections 3         After restart           Pn512         0000h         Output Signal Inverse Settings 2         After restart           Pn513         0000h         Output Signal Inverse Settings 2         After restart           Pn514         0000h         Output Signal Selections 4         After restart           Pn515         8888h         Input Signal Selections 4         After restart           Pn516         8888h         Input Signal Selections 7         After restart           Pn517         0654h         Output Signal Selections 5         After restart           Pn518         1000         Motor-Load Position Deviation Deviation Deviation Overflow Detection Level         Immediately           Pn518         100         Position Deviation Overflow Alarm Level         Immediately           Pn520         5242880         Position Deviation Overflow Alarm Level         Immediately	Pn50A	2100h		After restart
Pn50D         8888h         Input Signal Selections 4         After restart           Pn50E         3211h         Output Signal Selections 1         After restart           Pn50F         0000h         Output Signal Selections 2         After restart           Pn510         0000h         Output Signal Selections 3         After restart           Pn512         0000h         Output Signal Inverse Settings         After restart           Pn513         0000h         Output Signal Inverse Settings 2         After restart           Pn514         0000h         Output Signal Inverse Settings 2         After restart           Pn515         8888h         Input Signal Selections 4         After restart           Pn516         8888h         Input Signal Selections 6         After restart           Pn517         0654h         Output Signal Selections 5         After restart           Pn518         1000         Motor-Load Position Deviation Deviation Over-Inflow Varing Level         Immediately           Pn518         100         Position Deviation Over-Inflow Warning Level         Immediately           Pn520         5242880         Position Deviation Over-Inflow Alarm Level         Immediately           Pn524         1073741824         Near Signal Width         Immediately	Pn50B	6543h		After restart
Pn50E         3211h         Output Signal Selections 1         After restart           Pn50F         0000h         Output Signal Selections 2         After restart           Pn510         0000h         Output Signal Selections 3         After restart           Pn512         0000h         Output Signal Inverse Settings         After restart           Pn513         0000h         Output Signal Inverse Settings 2         After restart           Pn514         0000h         Output Signal Selections 4         After restart           Pn515         8888h         Input Signal Selections 6         After restart           Pn516         8888h         Input Signal Selections 7         After restart           Pn517         0654h         Output Signal Selections 5         After restart           Pn518         1000         Motor-Load Position Deviation Over-Inflow Deviation Over-Inflow Varning Level         Immediately           Pn518         100         Position Deviation Over-Inflow Warning Level         Immediately           Pn520         5242880         Position Deviation Over-Inflow Alarm Level         Immediately           Pn522         7         Position Deviation Over-Inflow Alarm Level at Servo ON         Immediately           Pn524         1073741824         Near Signal Width         Immediate	Pn50C	8888h	Input Signal Selections 3	After restart
Pn50F         0000h         Output Signal Selections 2         After restart           Pn510         0000h         Output Signal Selections 3         After restart           Pn512         0000h         Output Signal Inverse Settings         After restart           Pn513         0000h         Output Signal Inverse Settings 2         After restart           Pn514         0000h         Output Signal Selections 4         After restart           Pn515         8888h         Input Signal Selections 4         After restart           Pn516         8888h         Input Signal Selections 7         After restart           Pn517         0654h         Output Signal Selections 5         After restart           Pn518         1000         Motor-Load Position Deviation Over-flow Detection Level         Immediately           Pn518         100         Position Deviation Over-flow Detection Deviation Over-flow Alarm Level         Immediately           Pn520         5242880         Position Deviation Over-flow Alarm Level         Immediately           Pn522         7         Position Deviation Over-flow Alarm Level at Servo ON         Immediately           Pn524         1073741824         Near Signal Width         Immediately           Pn525         5242880         Position Deviation Over-flow Alarm Level at Servo ON<	Pn50D	8888h	Input Signal Selections 4	After restart
Pn510         0000h         Output Signal Selections 3         After restart           Pn512         0000h         Output Signal Inverse Settings         After restart           Pn513         0000h         Output Signal Inverse Settings 2         After restart           Pn514         0000h         Output Signal Selections 4         After restart           Pn515         8888h         Input Signal Selections 6         After restart           Pn516         8888h         Input Signal Selections 7         After restart           Pn517         0654h         Output Signal Selections 5         After restart           Pn518         1000         Motor-Load Position Deviation Deviation Deviation Overflow Detection Level         Immediately           Pn518         100         Position Deviation Overflow Alarm Level         Immediately           Pn520         5242880         Position Deviation Overflow Alarm Level         Immediately           Pn522         7         Position Deviation Overflow Alarm Level at Servo ON         Immediately           Pn524         1073741824         Near Signal Width         Immediately           Pn526         5242880         Position Deviation Overflow Verflow Warning Level at Servo ON         Immediately           Pn528         100         Position Deviation Deviation Overflo	Pn50E	3211h	Output Signal Selections 1	After restart
Pn512 0000h Output Signal Inverse Settings Pn513 0000h Output Signal Inverse Settings 2 Pn514 0000h Output Signal Selections 4 After restart Pn515 8888h Input Signal Selections 6 After restart Pn515 8888h Input Signal Selections 6 After restart Pn516 8888h Input Signal Selections 7 After restart Pn517 0654h Output Signal Selections 7 After restart Pn517 0654h Output Signal Selections 5 After restart Pn518 1000 Pn518 1000 Position Deviation Deviation Overflow Detection Level Immediately Pn518 100 Position Deviation Overflow Warning Level Immediately Pn520 5242880 Position Deviation Overflow Alarm Level Immediately Pn524 1073741824 Pn524 Near Signal Width Immediately Pn526 5242880 Position Deviation Overflow Alarm Level at Servo On Position Deviation Overflow Alarm Level at Servo On Position Deviation Overflow Alarm Level at Servo On Pn529 10000 Pn529 10000 Pn520 Immediately Pn524 20 Multiplier per Fully-closed Rotation Immediately Pn528 20 Overload Warning Level Immediately Pn528 After restart	Pn50F	0000h	Output Signal Selections 2	After restart
Pn513 0000h tings After restart Output Signal Inverse Settings 2 Pn514 0000h Output Signal Selections 4 After restart Pn515 8888h Input Signal Selections 6 After restart Pn516 8888h Input Signal Selections 7 After restart Pn517 0654h Output Signal Selections 7 After restart Pn517 0654h Output Signal Selections 5 After restart Pn518 1000 Motor-Load Position Deviation Overflow Detection Level Immediately Level Position Deviation Overflow Warning Level Immediately Pn520 5242880 Position Deviation Overflow Marm Level Immediately Pn524 1073741824 Near Signal Width Immediately Pn526 5242880 Position Deviation Overflow Marm Level at Servo On Position Deviation Overflow Warning Level Immediately Pn528 100 Position Deviation Overflow Warning Level at Servo On Immediately Pn529 10000 Speed Limit Level at Servo On Immediately Pn529 10000 Speed Limit Level at Servo On Immediately Pn528 20 Multiplier per Fully-closed Rotation Immediately Pn528 20 Overload Warning Level Immediately Pn528 20 Overload Warning Level Immediately Pn528 20 Overload Warning Level Immediately Pn528 Agreement Servo Overload Detection After restart	Pn510	0000h	Output Signal Selections 3	After restart
Pn514 0000h 1 0utput Signal Selections 4 After restart Pn515 8888h 1 Input Signal Selections 6 After restart Pn516 8888h 1 Input Signal Selections 7 After restart Pn517 0654h 1 0utput Signal Selections 5 After restart Motor-Load Position Deviation Overflow Detection Level 1 Immediately Pn518 1000 Position Deviation Overflow Warning Level 1 Immediately Pn520 5242880 Position Deviation Overflow After restart Pn522 7 Position Deviation Overflow After Position Deviation Overflow After Position Deviation Overflow After Deviation Overflow After Position Deviation Overflow After Deviation Overflow After Deviation Overflow After Pn528 1000 Pn528 1000 Speed Limit Level at Servo On Immediately On Immediately Pn529 10000 Pn529 Immediately Pn529 10000 After Deviation Overflow After restart Pn528 20 Overload Warning Level Immediately Pn52B 20 Overload Warning Level Immediately Pn52B 20 Overload Detection After restart	Pn512	0000h		After restart
Pn5158888hInput Signal Selections 6After restartPn5168888hInput Signal Selections 7After restartPn5170654hOutput Signal Selections 5After restartPn5181000Motor-Load Position Deviation Overflow Detection LevelImmediatelyPn51E100Position Deviation Overflow Warning LevelImmediatelyPn5205242880Position Deviation Overflow Alarm LevelImmediatelyPn5227Position Deviation Completed WidthImmediatelyPn5241073741824Near Signal WidthImmediatelyPn5265242880Position Deviation Overflow Alarm Level at Servo ONImmediatelyPn528100Position Deviation Overflow Warning Level at Servo ONImmediatelyPn52910000Speed Limit Level at Servo ONImmediatelyPn52A20Multiplier per Fully-closed RotationImmediatelyPn52B20Overload Warning LevelImmediatelyPn52C100Base Current Derating at Motor Overload DetectionAfter restart	Pn513	0000h		After restart
Pn5168888hInput Signal Selections 7After restartPn5170654hOutput Signal Selections 5After restartPn51B1000Motor-Load Position Deviation Overflow Detection LevelImmediatelyPn51E100Position Deviation Deviation Overflow Warning LevelImmediatelyPn5205242880Position Deviation Overflow Alarm LevelImmediatelyPn5227Positioning Completed WidthImmediatelyPn5241073741824Near Signal WidthImmediatelyPn5265242880Position Deviation Overflow Alarm Level at Servo ONImmediatelyPn528100Position Deviation Overflow Warning Level at Servo ONImmediatelyPn52910000Speed Limit Level at Servo ONImmediatelyPn52A20Multiplier per Fully-closed RotationImmediatelyPn52B20Overload Warning LevelImmediatelyPn52C100Base Current Derating at Motor Overload DetectionAfter restart	Pn514	0000h	Output Signal Selections 4	After restart
Pn5170654hOutput Signal Selections 5After restartPn51B1000Motor-Load Position Deviation Overflow Detection LevelImmediatelyPn51E100Position Deviation Overflow Warning LevelImmediatelyPn5205242880Position Deviation Overflow Alarm LevelImmediatelyPn5227Positioning Completed WidthImmediatelyPn5241073741824Near Signal WidthImmediatelyPn5265242880Position Deviation Overflow Alarm Level at Servo ONImmediatelyPn528100Position Deviation Overflow Warning Level at Servo ONImmediatelyPn52910000Speed Limit Level at Servo ONImmediatelyPn52A20Multiplier per Fully-closed RotationImmediatelyPn52B20Overload Warning LevelImmediatelyPn52C100Base Current Derating at Motor Overload DetectionAfter restart	Pn515	8888h	Input Signal Selections 6	After restart
Pn51B1000Motor-Load Position Deviation Overflow Detection LevelImmediatelyPn51E100Position Deviation Overflow Warning LevelImmediatelyPn5205242880Position Deviation Overflow Alarm LevelImmediatelyPn5227Positioning Completed WidthImmediatelyPn5241073741824Near Signal WidthImmediatelyPn5265242880Position Deviation Overflow Alarm Level at Servo ONImmediatelyPn528100Position Deviation Overflow Warning Level at Servo ONImmediatelyPn52910000Speed Limit Level at Servo ONImmediatelyPn52A20Multiplier per Fully-closed RotationImmediatelyPn52B20Overload Warning LevelImmediatelyPn52C100Base Current Derating at Motor Overload DetectionAfter restart	Pn516	8888h	Input Signal Selections 7	After restart
Pn51B1000tion Overflow Detection LevelImmediatelyPn51E100Position Deviation Overflow Warning LevelImmediatelyPn5205242880Position Deviation Overflow Alarm LevelImmediatelyPn5227Position Deviation Completed WidthImmediatelyPn5241073741824Near Signal WidthImmediatelyPn5265242880Position Deviation Overflow Alarm Level at Servo ONImmediatelyPn528100Position Deviation Overflow Warning Level at Servo ONImmediatelyPn52910000Speed Limit Level at Servo ONImmediatelyPn52A20Multiplier per Fully-closed RotationImmediatelyPn52B20Overload Warning LevelImmediatelyPn52C100Base Current Derating at Motor Overload DetectionAfter restart	Pn517	0654h	Output Signal Selections 5	After restart
Pn520 5242880 Position Deviation Over- flow Alarm Level Immediately Pn522 7 Positioning Completed Width Immediately Pn524 1073741824 Near Signal Width Immediately Pn526 5242880 Position Deviation Over- flow Alarm Level at Servo ON Immediately Pn528 100 Position Deviation Over- flow Warning Level at Servo ON Immediately Pn529 10000 Speed Limit Level at Servo ON Immediately Pn52A 20 Multiplier per Fully-closed Rotation Multiplier per Fully-closed Rotation Immediately Pn52B 20 Overload Warning Level Immediately Pn52C 100 Base Current Derating at Motor Overload Detection After restart	Pn51B	1000	tion Overflow Detection	Immediately
Pn520 5242880   flow Alarm Level   Immediately   Pn522 7   Positioning Completed   Immediately   Pn524 1073741824   Near Signal Width   Immediately   Pn526 5242880   Position Deviation Overflow Alarm Level at Servo   Immediately   Pn528 100   Position Deviation Overflow Warning Level at Servo   Immediately   Pn529 10000   Speed Limit Level at Servo   Immediately   Pn520   Multiplier per Fully-closed   Immediately   Pn521   Pn522   Pn522   Overload Warning Level   Immediately   Pn523   Rotation   Immediately   Pn524   Rotation   Rotation   Immediately   Pn525   Rotation   Rotation   Immediately   Pn526   Rotation   Rotation   After restart   Pn527   Rotation   Rotation   After restart   Pn528   Rotation   Rotation   After restart   Pn529   Rotation   Rotation   Rotation   After restart   Pn529   Rotation   Rotation	Pn51E	100		Immediately
Pn524 1073741824 Near Signal Width Immediately Pn526 5242880 Pn528 100 Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Immediately Pn529 10000 Speed Limit Level at Servo ON Immediately Pn52A 20 Multiplier per Fully-closed Rotation Pn52B 20 Overload Warning Level Immediately Pn52C 100 Base Current Derating at Motor Overload Detection After restart	Pn520	5242880		Immediately
Pn526 5242880 Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Immediately Pn529 10000 Speed Limit Level at Servo ON Immediately Pn52A 20 Multiplier per Fully-closed Rotation Pn52B 20 Overload Warning Level Immediately Pn52C 100 Base Current Derating at Motor Overload Detection After restart	Pn522	7		Immediately
Pn526 5242880 flow Alarm Level at Servo ON Immediately Position Deviation Overflow Warning Level at Servo ON Immediately Pn528 1000 Speed Limit Level at Servo ON Immediately Pn52A 20 Multiplier per Fully-closed Rotation Immediately Pn52B 20 Overload Warning Level Immediately Pn52C 100 Base Current Derating at Motor Overload Detection After restart	Pn524	1073741824	Near Signal Width	Immediately
Pn528100flow Warning Level at Servo ONImmediatelyPn52910000Speed Limit Level at Servo ONImmediatelyPn52A20Multiplier per Fully-closed RotationImmediatelyPn52B20Overload Warning LevelImmediatelyPn52C100Base Current Derating at Motor Overload DetectionAfter restart	Pn526	5242880	flow Alarm Level at Servo	Immediately
Pn52A 20 Multiplier per Fully-closed Rotation Immediately Pn52B 20 Overload Warning Level Immediately Pn52C 100 Base Current Derating at Motor Overload Detection After restart	Pn528	100	flow Warning Level at Servo	Immediately
Pn52B 20 Rotation Immediately  Pn52B 20 Overload Warning Level Immediately  Pn52C 100 Base Current Derating at Motor Overload Detection After restart	Pn529	10000		Immediately
Pn52C 100 Base Current Derating at Motor Overload Detection After restart	Pn52A	20		Immediately
Motor Overload Detection After restart	Pn52B	20	Overload Warning Level	Immediately
Pn52F OFFFh Monitor Display at Startup Immediately	Pn52C	100		After restart
	Pn52F	0FFFh	Monitor Display at Startup	Immediately

Continued from previous page.

Parameter No.         Default Setting         Name         When Enabled Enabled           Pn530         00000h         Program Jogging-Related Selections         Immediately Immediately Program Jogging Travel Distance         Immediately Immediately Program Jogging Movement Speed         Immediately Immediately Immediately Immediately Immediately Program Jogging Movement Speed         Immediately Immediately Immediately Immediately Immediately Immediately Trips         Immediately Immediately Immediately Immediately Immediately Immediately Trips         Immediately Immediately Immediately Immediately Immediately Voltage         Immediately Immediately Immediately Voltage         Immediately Immediately Immediately Voltage         Immediately Immediately Immediately Immediately Immediately Voltage         Immediately Immediately Immediately Immediately Immediately Voltage         Immediately Immedi				nunued from previous page.
Pn531 32768 Program Jogging Travel Immediately Pn533 500 Program Jogging Movement Speed Immediately Pn534 100 Program Jogging Movement Speed Immediately Pn534 100 Program Jogging Acceleration Time Immediately Pn535 100 Program Jogging Acceleration Time Immediately Pn536 1 Program Jogging Number Immediately Pn536 1 Program Jogging Number Immediately Pn536 0 Program Jogging Number Immediately Pn536 0 Program Jogging Number Immediately Pn537 Nanalog Monitor 1 Offset Voltage Immediately Voltage Immediately Voltage Immediately Voltage Immediately Voltage Analog Monitor 2 Offset Voltage Immediately Voltage Analog Monitor 2 Magnification Analog Monitor 2 Magnification Pn538 100 Analog Monitor 2 Magnification Immediately Voltage Analog Monitor 2 Magnification Pn538 100 Program Jogging Number Immediately Voltage Immediately Voltage Immediately Voltage Immediately Voltage Immediately Voltage Voltage Voltage Immediately Voltage Vol		Default Setting		ne Enabled
Pn533 500 Program Jogging Movement Speed Immediately Pn534 100 Program Jogging Movement Speed Immediately Program Jogging Acceleration/Deceleration Time Immediately Pn535 100 Program Jogging Number of Movements Immediately Immediately Pn536 1 Program Jogging Number of Movements Immediately Pn536 1 Program Jogging Number of Movements Immediately Pn536 0 Analog Monitor 1 Offset Voltage Immediately Voltage Immediately Voltage Immediately Voltage Analog Monitor 2 Offset Voltage Immediately Voltage Analog Monitor 2 Magnification Analog Monitor 2 Magnification Immediately Cation Pn553 100 Analog Monitor 2 Magnification Pn554 1 Program Jogging Monitor 2 Magnification Pn556 1 Program Jogging Monitor 2 Magnification Pn556 1 Program Jogging Movemediately Pn558 1 Program Jogging Movement Speed Level Immediately Pn558 2 Program Jogging Movement Speed Level Immediately Pn558 2 Program Jogging Movement Speed Level Immediately Pn558 3 Program Jogging Movement Speed Level Immediately Immediately Pn558 3 Program Jogging Movement Speed Immediately Immediately Pn558 4 Program Jogging Movement Speed Immediately Immediately Pn558 4 Program Jogging Movement Speed Immediately Immediately Pn569 4 Program Jogging Movement Speed Immediately Immediately Pn560 4 Program Jogg	Pn530	0000h		ing-Related Immediately
Pn534 100 Program Jogging Acceleration/Deceleration Time Immediately Immediate	Pn531	32768		ing Travel Immediately
Pn535 100 Program Jogging Waiting Immediately Time Program Jogging Waiting Time Immediately Pn536 1 Program Jogging Number of Movements of Movements Pn550 0 Analog Monitor 1 Offset Voltage Immediately Pn551 100 Analog Monitor 2 Offset Voltage Immediately Cation Analog Monitor 2 Magnification Immediately Cation Immediately Cation Immediately Pn553 100 Program Jogging Movements Pn560 400 Residual Vibration Detection Level Immediately Pn560 400 Residual Vibration Detection Width Immediately Pn561 100 Overshoot Detection Level Immediately Pn580 10 Zero Clamping Level Immediately Pn581 20 Zero Speed Level Immediately Pn582 10 Speed Coincidence Detection Signal Output Width Immediately Pn583 10 Brake Reference Output Speed Level Immediately Pn584 10000 Speed Limit Level at Servo On Program Jogging Movement Speed Pn585 50 Program Jogging Movement Speed Immediately Pn586 0 Program Jogging Movement Speed Immediately Pn600 Program Jogging Movement Speed Immediately Pn600 Program Jogging Movement Speed Immediately Pn600 O Regenerative Resistor Capacity Immediately Pn600 O Regenerative Resistor Capacity Immediately Pn600 O Program Jogging Movement Speed On After restart Sumption Pn600 O Regenerative Resistance Immediately Pn600 O Program Program Program Program Jogging Movement Speed Overheat Protection Selections Sumption Pn600 O Program Protection Selections Sumption Pn600 O Program Protection Selections Sumption Pn600 O Program Protection Selections Selections Selections Selections Selections Overheat Protection Selections Selections Selections Overheat Protection Selections Selections Overheat Protection Selections Unions Overheat Protection Selections Selections Overheat Protection Selections Immediately	Pn533	500		ing Move- Immediately
Pn536 1 Program Jogging Number of Movements Immediately Program Jogging Number of Movements Immediately Oltage Immediately Voltage Immediately Pn552 100 Analog Monitor 1 Magnification Immediately Pn553 100 Analog Monitor 2 Magnification Immediately Immediately Pn554 1 Power Consumption Monitor Unit Time Immediately Immediately Pn560 400 Residual Vibration Detection Width Immediately Pn561 100 Overshoot Detection Level Immediately Pn580 10 Zero Clamping Level Immediately Pn581 20 Zero Speed Level Immediately Pn582 10 Speed Coincidence Detection Signal Output Width Immediately Pn583 10 Brake Reference Output Speed Level Immediately Pn584 10000 Speed Limit Level at Servo On Program Jogging Movement Speed Program Jogging Movement Speed Immediately Pn586 0 Regenerative Resistor Capacity Pn600 0 Regenerative Resistor Immediately Dynamic Brake Resistor Allowable Energy Consumption After restart Survey Overheat Protection Selections Overheat Protection Selections Pn604 0 Dynamic Brake Resistance Immediately Pn604 0 Overheat Protection Selections Selections Selections Overheat Protection Selections Immediately Pn616 0 Overheat Protection Selections Overheat Protection Selections Overheat Warning Level Immediately	Pn534	100		
Pn550 0 0 Analog Monitor 1 Offset Voltage Immediately Analog Monitor 2 Offset Voltage Immediately Analog Monitor 1 Magnification Immediately Cation Immediately Pn553 100 Analog Monitor 2 Magnification Immediately Pn554 1 Power Consumption Monitor Unit Time Immediately Voltage Pn560 400 Residual Vibration Detection Width Immediately Pn561 100 Overshoot Detection Level Immediately Pn581 20 Zero Clamping Level Immediately Pn581 20 Zero Speed Level Immediately Speed Coincidence Detection Signal Output Width Immediately Pn583 10 Speed Level Immediately Speed Level Immediately Speed Level Pn584 10000 Speed Limit Level at Servo On Pn584 10000 Speed Limit Level at Servo On Pn585 50 Program Jogging Movement Speed Pn586 0 Regenerative Resistor Capacity Immediately Pn586 0 Regenerative Resistor Capacity Immediately Pn600 0 Regenerative Resistor Allowable Energy Consumption On Pn601 0 Regenerative Resistor Capacity Immediately Pn603 0 Regenerative Resistor Allowable Energy Consumption Overheat Pn604 0 Dynamic Brake Resistance Immediately Pn604 0 Dynamic Brake Resistance After restart Pn604 0 Dynamic Brake Resistance Immediately Pn606 Overheat Protection Selections	Pn535	100		ing Waiting Immediately
Pn551 0 Analog Monitor 2 Offset Voltage Immediately Voltage Immediately Voltage Immediately Voltage Analog Monitor 1 Magnification Immediately Cation Analog Monitor 2 Magnification Immediately Cation Immediately Cation Immediately Cation Immediately Cation Immediately Cation Immediately Cation Power Consumption Monitor Unit Time Immediately Pn560 400 Residual Vibration Detection Width Immediately Pn561 100 Overshoot Detection Level Immediately Pn580 10 Zero Clamping Level Immediately Pn581 20 Zero Speed Level Immediately Pn582 10 Speed Coincidence Detection Signal Output Width Immediately Pn583 10 Brake Reference Output Speed Level Immediately Speed Level Immediately Pn584 10000 Speed Limit Level at Servo ON Immediately Pn585 50 Program Jogging Movement Speed Immediately Pn586 0 Regenerative Resistor Capacity Immediately Pn600 0 Regenerative Resistor Capacity Immediately Pn601 0 Regenerative Resistor After restart Sumption Pn603 0 Regenerative Resistance Immediately Pn604 0 Dynamic Brake Resistance Immediately Pn604 0 Dynamic Brake Resistance After restart Pn604 0 Overheat Protection Selections After restart Pn61A 0000h Overheat Alarm Level Immediately Immediately Pn61B 250 Overheat Alarm Level Immediately Imme	Pn536	1		
Pn552 100 Analog Monitor 1 Magnification Immediately Analog Monitor 2 Magnification Immediately Cation Analog Monitor 2 Magnification Pn553 100 Pn553 100 Pn554 Immediately Cation Power Consumption Monitor Unit Time Immediately tor Unit Time Residual Vibration Detection Width Immediately Dn560 Pn560 Pn560 Immediately Dn560 Immediately Dn560 Immediately Pn560 Immediately Pn660 Immediately	Pn550	0		or 1 Offset Immediately
Pn553 100   Cation   Immediately   Pn554 1   Pn556   Power Consumption Monitor Unit Time   Immediately   Pn560 400   Residual Vibration Detection Width   Immediately   Pn561 100   Overshoot Detection Level   Immediately   Pn580 10   Zero Clamping Level   Immediately   Pn581 20   Zero Speed Level   Immediately   Pn582 10   Speed Coincidence Detection Signal Output Width   Pn583 10   Brake Reference Output   Speed Level   Pn584 10000   Speed Limit Level at Servo ON   Pn585 50   Program Jogging Movement Speed   Immediately   Pn586 0   Motor Running Cooling   Immediately   Pn600 0   Regenerative Resistor   Capacity   Immediately   Pn601 0   Regenerative Resistor   After restart   Pn603 0   Regenerative Resistance   Immediately   Pn604 0   Overheat Protection Selections   Pn615 250   Overheat Alarm Level   Immediately   Pn616   Immediately   Pn617   Immediately   Pn618 250   Overheat Marning Level   Immediately   Pn618 250   Overheat Marning Level   Immediately   Pn616   Immediately   Pn617   Immediately   Pn618   Dynamic Brake Resistance   Immediately   Pn619   Immediately   Pn610   Immediately   Pn6110   Immediately   Pn6120   Immediately   Pn6130   Immediately   Pn6140   Immediately   Pn6150   Immediately   Pn6160   Immediately   Pn6170   Immediately   Pn6180   Immedia	Pn551	0		or 2 Offset Immediately
Pn55A 1 Power Consumption Monitor Unit Time Immediately Pn560 400 Residual Vibration Detection Width 100 Overshoot Detection Level Immediately Pn561 100 Overshoot Detection Level Immediately Pn580 10 Zero Clamping Level Immediately Immediately Pn581 20 Zero Speed Level Immediately Pn582 10 Speed Coincidence Detection Signal Output Width Immediately Pn583 10 Brake Reference Output Speed Level Immediately Pn584 10000 Speed Limit Level at Servo ON Immediately Pn585 50 Program Jogging Movement Speed Motor Running Cooling Ratio Regenerative Resistor Capacity Pn600 0 Regenerative Resistor Capacity Pn601 0 Regenerative Resistor Allowable Energy Consumption Pn603 0 Regenerative Resistance Immediately Pn604 0 Dynamic Brake Resistance After restart Pn61A 0000h Overheat Protection Selections Overheat Protection Selections Overheat Protection Selections Overheat Alarm Level Immediately Pn61C 100 Overheat Warning Level Immediately Immediately Immediately Immediately Pn61C 100 Overheat Warning Level Immediately I	Pn552	100		or 1 Magnifi- Immediately
Pn560 400 Residual Vibration Detection Width  Pn561 100 Overshoot Detection Level Immediately  Pn580 10 Zero Clamping Level Immediately  Pn581 20 Zero Speed Level Immediately  Pn582 10 Speed Coincidence Detection Signal Output Width  Pn583 10 Speed Level Immediately  Pn584 10000 Speed Level Immediately  Pn585 50 Program Jogging Movement Speed  Pn586 0 Motor Running Cooling Ratio  Pn600 0 Regenerative Resistor Capacity  Pn601 0 Dynamic Brake Resistor After restart sumption  Pn603 0 Regenerative Resistance Immediately  Pn604 0 Dynamic Brake Resistance Immediately  Pn61A 0000h Overheat Alarm Level Immediately  Pn61B 250 Overheat Alarm Level Immediately  Pn61C 100 Overheat Warning Level Immediately	Pn553	100		or 2 Magnifi- Immediately
Pn561   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   10	Pn55A	1		mption Moni- Immediately
Pn58010Zero Clamping LevelImmediatelyPn58120Zero Speed LevelImmediatelyPn58210Speed Coincidence Detection Signal Output WidthImmediatelyPn58310Brake Reference Output Speed LevelImmediatelyPn58410000Speed Limit Level at Servo ONImmediatelyPn58550Program Jogging Movement SpeedImmediatelyPn5860Motor Running Cooling RatioImmediatelyPn6000Regenerative Resistor CapacityImmediatelyPn6010Dynamic Brake Resistor Allowable Energy ConsumptionAfter restart sumptionPn6030Regenerative Resistance ImmediatelyPn6040Dynamic Brake Resistance After restartPn6040Overheat Protection SelectionsPn61A0000hOverheat Protection SelectionsPn61B250Overheat Alarm LevelImmediatelyPn61C100Overheat Warning LevelImmediately	Pn560	400		tion Detec- Immediately
Pn58120Zero Speed LevelImmediatelyPn58210Speed Coincidence Detection Signal Output WidthImmediatelyPn58310Brake Reference Output Speed LevelImmediatelyPn58410000Speed Limit Level at Servo ONImmediatelyPn58550Program Jogging Movement SpeedImmediatelyPn5860Motor Running Cooling RatioImmediatelyPn6000Regenerative Resistor CapacityImmediatelyPn6010After restart SumptionAfter restart SumptionPn6030Regenerative Resistance ImmediatelyPn6040Dynamic Brake Resistance After restartPn6040Dynamic Brake Resistance After restartPn61A0000hOverheat Protection SelectionsPn61B250Overheat Alarm Level ImmediatelyPn61C100Overheat Warning Level Immediately	Pn561	100	Overshoot De	tection Level Immediately
Pn582 10 Speed Coincidence Detection Signal Output Width Pn583 10 Brake Reference Output Speed Level Immediately Pn584 10000 Speed Limit Level at Servo ON Immediately Pn585 50 Program Jogging Movement Speed Immediately Pn586 0 Motor Running Cooling Ratio Immediately Pn600 0 Regenerative Resistor Capacity Pn601 0 Speed Limit Level Asservo Immediately Pn603 0 Regenerative Resistor After restart sumption Pn604 0 Dynamic Brake Resistance Immediately Pn61A 0000h Overheat Protection Selections Pn61B 250 Overheat Alarm Level Immediately Pn61C 100 Overheat Warning Level Immediately	Pn580	10	Zero Clampino	Level Immediately
Pn583 10 tion Signal Output Width Brake Reference Output Speed Level Immediately Pn584 10000 Speed Limit Level at Servo ON Immediately Pn585 50 Program Jogging Movement Speed Immediately Pn586 0 Motor Running Cooling Ratio Immediately Pn600 0 Regenerative Resistor Capacity Pn601 0 Dynamic Brake Resistor After restart sumption Pn603 0 Regenerative Resistance Immediately Pn604 0 Dynamic Brake Resistance Immediately Pn616 Overheat Protection Selections Pn618 250 Overheat Alarm Level Immediately Pn61C 100 Overheat Warning Level Immediately	Pn581	20	Zero Speed Le	evel Immediately
Pn584 10000 Speed Level Immediately Pn584 10000 Speed Limit Level at Servo ON Immediately Pn585 50 Program Jogging Movement Speed Immediately Pn586 0 Motor Running Cooling Ratio Immediately Pn600 0 Regenerative Resistor Capacity Pn601 0 Dynamic Brake Resistor Allowable Energy Consumption After restart sumption Pn603 0 Regenerative Resistance Immediately Pn604 0 Dynamic Brake Resistance After restart Pn61A 0000h Overheat Protection Selections Pn61B 250 Overheat Warning Level Immediately Pn61C 100 Overheat Warning Level Immediately	Pn582	10		
Pn585 50 Program Jogging Movement Speed Immediately Pn586 0 Motor Running Cooling Ratio Immediately Pn600 0 Regenerative Resistor Capacity Immediately Pn601 0 Dynamic Brake Resistor After restart sumption Pn603 0 Regenerative Resistance Immediately Pn604 0 Dynamic Brake Resistance After restart Pn61A 0000h OVerheat Protection Selections Pn61B 250 Overheat Warning Level Immediately Pn61C 100 Overheat Warning Level Immediately	Pn583	10		ce Output Immediately
Pn586 0 Motor Running Cooling Ratio Immediately Pn600 0 Regenerative Resistor Capacity Dynamic Brake Resistor After restart sumption Pn603 0 Regenerative Resistance Immediately Pn604 0 Dynamic Brake Resistance After restart Pn61A 0000h Overheat Protection Selections Pn61B 250 Overheat Warning Level Immediately Pn61C 100 Overheat Warning Level Immediately	Pn584	10000		evel at Servo Immediately
Pn600 0 Regenerative Resistor Capacity Immediately  Pn601 0 Pn601 0 Pn601 Dynamic Brake Resistor Allowable Energy Consumption After restart sumption  Pn603 0 Regenerative Resistance Immediately  Pn604 0 Dynamic Brake Resistance After restart  Pn61A 0000h Overheat Protection Selections  Pn61B 250 Overheat Alarm Level Immediately  Pn61C 100 Overheat Warning Level Immediately	Pn585	50		ing Move- Immediately
Pn601 0 Dynamic Brake Resistor Allowable Energy Consumption After restart  Pn603 0 Regenerative Resistance Immediately Pn604 0 Dynamic Brake Resistance After restart  Pn61A 0000h Overheat Protection Selections Pn61B 250 Overheat Alarm Level Immediately Pn61C 100 Overheat Warning Level Immediately	Pn586	0		g Cooling Immediately
Pn6010Allowable Energy ConsumptionAfter restartPn6030Regenerative ResistanceImmediatelyPn6040Dynamic Brake ResistanceAfter restartPn61A0000hOverheat Protection SelectionsAfter restartPn61B250Overheat Alarm LevelImmediatelyPn61C100Overheat Warning LevelImmediately	Pn600	0		Resistor
Pn6040Dynamic Brake ResistanceAfter restartPn61A0000hOverheat Protection SelectionsAfter restartPn61B250Overheat Alarm LevelImmediatelyPn61C100Overheat Warning LevelImmediately	Pn601	0	Allowable Ene	
Pn61A0000hOverheat Protection SelectionsAfter restartPn61B250Overheat Alarm LevelImmediatelyPn61C100Overheat Warning LevelImmediately	Pn603	0	Regenerative	Resistance Immediately
Pn61AO00001tionsAfter restartPn61B250Overheat Alarm LevelImmediatelyPn61C100Overheat Warning LevelImmediately	Pn604	0	Dynamic Brak	e Resistance After restart
Pn61C 100 Overheat Warning Level Immediately	Pn61A	0000h		ection Selec- After restart
	Pn61B	250	Overheat Aları	n Level Immediately
Pn61D 0 Overheat Alarm Filter Time Immediately	Pn61C	100	Overheat War	ning Level Immediately
	Pn61D	0	Overheat Aları	m Filter Time   Immediately

5.2.1 Interpreting the Parameter Lists

## 5.2

# SERVOPACKs with MECHATROLINK-III Communications References

## 5.2.1 Interpreting the Parameter Lists

### **List of Servo Parameters**

The types of motors 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.

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 section for details.

◆ Differences in Terms for Rotary Servomotors and Linear Servomotors on page xii "After restart" indicates parameters that will be effective after one of the following is executed.

- The power supply is turned OFF and ON again.
- The CONFIG command is sent.
- · A software reset is executed.

Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applica- ble Motors	When Enabled	Classi- fication	Refer-	
	2	Basic Funct	ion Selections 0	0000h to 10B1h	-	0000h	All	After restart	Setup	-	
		Servo provi • To	There are the following two classifice. Setup  Servomotor and Linear Servomotors, information is provided for both.  • Top row: For Rotary Servomotors  • Bottom row: For Linear Servomotors  Rotation Direction Selection  Movement Direction Selection  There are the following two classifice.  • Setup  • Tuning  Refer to the following manual for de  □ Σ-7-Series Σ-7S SERVOPACK with  MECHATROLINK-III Communication  Product Manual (Manual No.: SIEF								
Pn000		n.□□□X	Use 0 Use	Use CCW as the forward direction.  Use the direction in which the linear encoder counts up as the forward direction.							
			1 Use	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)							
	1	n.□□X□	Reserved para	ameter (Do no	t change.)						
	n.□X□□ Reserved parameter (Do not change.)										
	I		Rotary/Linear	Servomotor Sta	artup Selec	tion When	Encoder Is N	ot Connected	Refere	nce	
		n.X000		When an encoder is not connected, start as SERVOPACK for Rotary Servomotor.							
				en an encoder Servomotor.	is not conr	ected, sta	rt as SERVO	PACK for Lin-			
	oa. ss. isinotsii										

### List of MECHATROLINK-III Common Parameters

The types of motors 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.

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 section for details.

◆ Differences in Terms for Rotary Servomotors and Linear Servomotors on page xii

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 supply is turned OFF and ON again.
- The CONFIG command is sent.
- A software reset is executed.

Parameter No.	Size	Name	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classi- fication
61 PnAC2	4	Speed Loop Gain	1,000h to 2,000,000h	0.001 Hz [0.1 Hz]	40000h	All	Immedi- ately	Tuning

You can set the parameter in increments of the setting unit.

Default

Setting

However, if a unit is given in square brackets, the setting is automatically converted to the resolution given in the square brackets.

**Applicable** 

Motors

When

Enabled

Classi-

fication

Refer-

#### **List of Servo Parameters** 5.2.2

The following table lists the parameters.

Note: Do not change the following parameters from their default settings.

Reserved parameter

Size

Parameter

No.

· Parameters not given in this manual

Name

· Parameters that are not valid for the Servomotor that you are using, as given in the parameter table

Setting

Unit

Setting

Range

	2	Basic Fund tions 0	tion Selec-	0000h to 10B1h	-	0000h	All	After restart	Setup	*1			
	_												
			Rotation [	Direction Select	on								
			Movement Direction Selection										
				Use CCW as the	forward di	rection.							
		n.□□□X		Use the direction in which the linear encoder counts up as the forward direction.									
				Use CW as the forward direction. (Reverse Rotation Mode)									
Pn000				Use the direction direction. (Reven			ncoder counts	down as the	e forward				
	n.□□X□ Reserved parameter (Do not change.)												
		n.□X□□ Reserved parameter (Do not change.)											
	I		Rotary/Lir	near Servomoto	Startup S	election W	hen Encoder	Is Not Conr	ected				
		n.X□□□	1 () 1	When an encod motor.	er is not cor	nnected, st	art as SERVC	PACK for Ro	otary Serve	<b>D-</b>			
				When an encoder is not connected, start as SERVOPACK for Linear Setor.						mo-			
	_	toi.											

Continued from previous page.

Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Application Selections	n Function 1	0000h to 1142h	_	0000h	All	After restart	Setup	*1
	_									
			Motor Stopp	ing Method for	r Servo Of	FF and Gro	oup 1 Alarms			
				p the motor by						
		n.□□□X		pp the motor by lke.	the apply	ing dynam	ic brake and	then release	the dynan	nic
			2 Co	ast the motor to	o a stop w	ithout the	dynamic brak	æ.		
	I		Overtravel S	topping Metho	d					
			0 Ар	ply the dynamic	brake or	coast the	motor to a sto	op.		
			Decelerate the motor to a stop using the torque set in Pn406 as the maximum torque and then servo-lock the motor.							
Pn001		n.□□X□		celerate the mo			ne torque set i	in Pn406 as t	he maxim	um
				celerate the mo n servo-lock th		op using t	he deceleration	on time set in	Pn30A aı	nd
				celerate the mo n let the motor		op using t	he deceleration	on time set in	Pn30A a	nd
	l		Main Circuit	Power Supply	AC/DC In	put Select	ion			
		- DVDD	_ Inp	out AC power as	s the main	circuit pov		ing the L1, L	2, and L3	ter-
		n.□X□□	1 ter	out DC power a minals or the B ared converter).	1 and $\ominus$ 2			•		2
	n.XDDD Reserved parameter (Do not change.)									

### 5.2.2 List of Servo Parameters

Continued from previous page.

Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Application Selections	n Function 2	0000h to 4213h	-	0011h	_	After restart	Setup	-
			MEQUATES		15		10 1	A 1: 1.1		_
			Option	LINK Comman	a Position	and Spee	ea Control	Applicable Motors	Refere	ence
		n.□□□X		served setting						
		11.000	1 Us	e TLIM as the t	orque limit	t.		All	*2	
			2 R	served setting	(Do not us	e.)		7 111		
			3 R	served setting	Do not us	e.)				
			Torque Con	rol Option				Applicable Motors	Refere	ence
	n.□□X□ 0 Reserved setting (Do not use.)									
			1 Us	All	*2					
Pn002			Encoder Us	age				Applicable Motors	Refere	ence
Pn002		n. 🗆 X 🗆 🗆	O Us	age se the encoder ans.	according	to encode	r specifica-		Refere	ence
Pn002		n. 🗆 X 🗆 🗆	0 Us	se the encoder a				Motors	Refere	
Pn002		n.ロXロロ	0 Us	se the encoder ans.	as an incre	emental en	coder.	Motors	Refere	
Pn002		n.□X□□	0 Us tic 1 Us 2 Us er	se the encoder ans. se the encoder as	as an incre	emental en	coder.	Motors	*1	
Pn002		n.□X□□	0 Us tic 1 Us 2 Us er	se the encoder ans. se the encoder accoder.	as an incre as a single	emental en -turn abso	coder.	Motors  All  Rotary  Applicable	*I	
Pn002	<u>.</u>	n.0X00	0 Us tic 1 Us 2 Us er  External En 0 Do	the encoder and the encoder and the encoder accoder.	as an increas a single	emental en -turn abso oder. s in the for	coder. Ilute	Motors  All  Rotary  Applicable	*I	
Pn002	<u>.</u>		0 Us tic 1 Us 2 Us er External Encorporation 1 Tr tic	the encoder and the encoder and the encoder accoder.  coder Usage on not use an extender and the external encoder.	ernal enco	emental en -turn abso oder. s in the for	coder. Ilute	Motors  All  Rotary  Applicable	*I	
Pn002	<u>.</u>		0 Us tic 1 Us 2 Us er  External En 0 Do 1 Tr tic 2 Re 2 Tr	the encoder and the encoder.  Coder Usage  In not use an extended encoder and the external encoder and the external encoder and the encoder an	ernal encoder moves or rotation (Do not us der moves der	emental en -turn abso oder. s in the for e.)	coder. llute	Motors  All  Rotary  Applicable Motors	*1	
Pn002	_		0 Us tick 1 Us 2 Us er  External Enr 0 Do 1 Tr tick 2 Re 3 Tr	the encoder and the encoder.  The encoder and	ernal encoder moves or rotation (Do not us der moves or rotation rotation or rotation)	emental en- turn abso oder. s in the for e.)	coder. llute	Motors  All  Rotary  Applicable Motors	*1	

Continued from previous page.

Setting Setting Default Applicable When Classi- Refer-

Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
	2	Application Selections	Function 6	0000h to 105Fh	_	0002h	All	Immedi- ately	Setup	*1	
			Analog Mc	mitor 1 Signal Se Motor speed (1 Motor speed (1	V/1,000 m V/1,000 m	nm/s)					
			01	Speed reference (1 V/1,000 min <sup>-1</sup> ) Speed reference (1 V/1,000 mm/s) Torque reference (1 V/100% rated torque)							
			03	Force reference Position deviation	•		•				
				Position amplifie	•		•	0.05 V/enco	der nulse	unit)	
			04	Position amplified pulse unit)						urity_	
			0.5	Position referen	ce speed (	1 V/1,000	min <sup>-1</sup> )				
			Position reference speed (1 V/1,000 mm/s)								
			06	Reserved setting	g (Do not i	use.)	· · · · · · · · · · · · · · · · · · ·				
			07 Load-motor position deviation (0.01 V/reference unit)								
Pn006		n.□□XX	08	Positioning completion (positioning completed: 5 V, positioning not completed: 0 V)						-	
			09	Speed feedforw	ard (1 V/1	,000 min <sup>-1</sup>	)				
				Speed feedforward (1 V/1,000 mm/s)							
			0A	Torque feedforward (1 V/100% rated torque)							
			UA .	Force feedforwa	ard (1 V/10	00% rated	force)				
			0B	Active gain (1st	gain: 1 V,	2nd gain: 1	2 V)				
			0C	Completion of p pleted: 0 V)							
			0D	External encode	er speed (1	V/1,000 r	min <sup>-1</sup> : value at	the motor s	haft)		
			0E	Reserved setting	<u> </u>						
			0F	Reserved setting		use.)					
			10	Main circuit DC							
			11 to 24	Reserved setting							
			25	Position deviation			ence filter (0.0	05 V/referen	ce unit)		
			26 to 5F	Reserved setting	gs (Do not	use.)					
		n.□X□□	Reserved	parameter (Do no	ot change.	.)					
		n.X□□□	Reserved	parameter (Do no	ot change.	.)					

Applicable

Motors

### 5.2.2 List of Servo Parameters

Classi-

fication

Refer-

When

Enabled

110.	٠,				riarigo	Oint	oottiiig	11101010	Lilabioa	Hoution	01100	
	2	Application Selections	Function 7		0000h to 105Fh	_	0000h	All	Immedi- ately	Setup	*1	
			Analog Mo	nit	or 2 Signal Se	lection						
			Analog Mc	1	otor speed (1		nin-1)					
			00		otor speed (1 ot	•						
					peed reference	-						
			01		peed reference	•						
				-	orque reference	•		raue)				
			02		Force reference (1 V/100% rated force)							
			03	-	osition deviation							
				Р	osition amplifie	r deviation	n (after elec	ctronic gear) (	0.05 V/enco	der pulse	unit)	
			04		osition amplifie ulse unit)	r deviatior	n (after eled	ctronic gear) (	0.05 V/linea	r encoder		
			05	Р	osition referenc	ce speed (	1 V/1,000	min <sup>-1</sup> )				
				Р	osition reference	ce speed (	1 V/1,000	mm/s)				
			06	R	Reserved setting (Do not use.)							
	n.□□XX	07	Lo	oad-motor pos	ition devia	ation (0.01	V/reference u	nit)				
Pn007		08		ositioning com eted: 0 V)	pletion (po	ositioning o	ompleted: 5	V, positioning	g not com			
			09	S	peed feedforwa	ard (1 V/1,	,000 min <sup>-1</sup> )					
			00	Speed feedforward (1 V/1,000 mm/s)								
			0A	To	orque feedforw	ard (1 V/1	00% rated	torque)				
					orce feedforwa			•				
			0B	_	ctive gain (1st							
			0C		ompletion of peted: 0 V)	osition ref	erence dist	tribution (com	pleted: 5 V,	not com-		
			0D	E	kternal encode	r speed (1	V/1,000 r	nin <sup>-1</sup> : value at	the motor s	haft)		
			0E	R	eserved setting	g (Do not ι	use.)					
			0F	R	eserved setting	g (Do not ι	use.)					
			10	М	ain circuit DC	voltage						
			11 to 24	R	eserved setting	gs (Do not	use.)					
			25	Р	osition deviatio	n after po	sition refer	ence filter (0.0	05 V/referen	ce unit)		
			26 to 5F	R	eserved setting	gs (Do not	use.)					
		n.□X□□	Reserved	par	ameter (Do no	t change.	.)					
		n.X□□□	Reserved	par	ameter (Do no	t change.	.)					

Setting

Range

Setting

Default

Setting

Parameter

Size

Name

Continued from previous page.

Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence			
	2	Applicatio Selections	n Function 8	0000h to 7121h	-	4000h	Rotary	After restart	Setup	*1			
			L. B.U.	Mallana Alama	0.01	2 - 1 1'							
		~ DDDV		Voltage Alarm			altaga						
		n.□□□X		utput alarm (A.8 utput warning (A									
			Function Se	election for Und	ervoltage								
Pn008				o not detect und									
		n.□□X□		Detect undervoltage warning and limit torque at host controller.									
			1 2	etect undervolta SERVOPACK).	ge warning	g and limit	torque with Pr	n424 and Pn	425 (i.e., c	nly 			
			Warning De	tection Selection	n								
		n.□X□□		etect warnings.									
			1 D										
		~ VDDD	Decembed in	avamatav (Da na	at abanas	\							
n.X□□□ Reserved parameter (Do not change.)													
	2	Applicatio Selections	n Function 9	0000h to 0121h	-	0010h	All	After restart	Tuning	*1			
		n.□□□X	Reserved parameter (Do not change.)										
			Current Co.	ntrol Mode Sele	ction								
				se current contro									
Pn009		n.□□X□	1	SERVOPACK Mo -7R6A: Use curr SERVOPACK Mo -590A, and -780	odels SGD ent contro odels SGD	l mode 1. 7S-120A,	-180A, -200A			λ,			
			2 U	se current contro	ol mode 2.								
			Speed Dete	ction Method S	election								
		n.□X□□	0 U	se speed detect	ion 1.								
			1 U	se speed detect	ion 2.								
		n.X□□□	Reserved p	arameter (Do no	ot change.	)							

O			
Continued	trom	previous	page.

Parameter No.	Size	N	Name		Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Application Selections		0000h to 1044h	-	0001h	All	After restart	Setup	*1		
			Motor Stopping Method for Group 2 Alarms									
			U m	oply the dynami ethod set in Pno	001 = n. <b>□</b>	□□X).		. ,				
			l to	rque. Use the s	celerate the motor to a stop using the torque set in Pn406 as the que. Use the setting of Pn001 = n. \(\sigma\supers\) \(\sigma\) for the status after stop in the status a							
		n.□□□X	<sup>2</sup> to	ecelerate the motor to a stop using the torque set in Pn406 as the maximum rque and then let the motor coast.								
			3 De	ecelerate the mode setting of PnC	otor to a s 001 = n. <b>□I</b>	top using t ⊐□X for th	he deceleration ne status after	on time set in stopping.	n Pn30A. I	Jse 		
				ecelerate the motor		top using t	the decelerati	on time set i	n Pn30A a	ınd		
Pn00A			Stopping M	ethod for Force	ed Stops							
				oply the dynami ethod set in Pn			motor to a st	op (use the	stopping	_		
			1 De	ecelerate the mo	otor to a st etting of P	op using t n001 = n. <b>!</b>	he torque set □□□X for the	in Pn406 as e status afte	the maxing stopping	num		
		n.□□X□		ecelerate the mo			he torque set	in Pn406 as	the maxin	num		
				ecelerate the mo					n Pn30A.	Use		
				ecelerate the motor		top using t	the decelerati	on time set i	n Pn30A a	ınd		
		n.□X□□	Reserved p	arameter (Do n	ot change	.)						
		n.XDDD	Reserved p	arameter (Do n	ot change	.)						
	2	Application Selections		0000h to 1121h	-	0000h	All	After restart	Setup	*1		
			Operator Par	ameter Display	Selection	1						
		n.□□□X	0 Dis	play only setup	paramete	s.						
			1 Dis	play all paramet	ters.							
	Ī		Motor Stopp	ing Method for	Group 2	Alarms						
D - 00D			0 Sto	p the motor by	setting th	e speed re	eference to 0.					
Pn00B		n.□□X□		ply the dynamic thod set in Pn0			motor to a sto	p (use the s	topping			
			2 Se	t the stopping n	nethod wit	h Pn00A =	= n.□□□X.					
	ı		Power Input	Selection for T	hree-phas	e SERVOF	PACK					
		n.□X□□	0 Use	e a three-phase	power su	oply input.				_		
				e a three-phase		' ' '		nase power :	supply inp	ut.		
		n.X000	Reserved pa	rameter (Do no	t change.)							
			pa		2							

Continued from previous page.

Parameter	a)			Setting	Setting	Default	Applicable	When	Classi-	Refer-	
No.	Size	N	ame	Range	Unit	Setting	Motors	Enabled	fication	ence	
	2	Application Selections		0000h to 0131h	-	0000h	_	After restart	Setup	*1	
			Function Sele	ection for Test	without a	Motor			Applicable Motors		
		n.□□□X	0 Dis	able tests with	out a moto	or.				S	
			1 Ena	able tests witho	out a moto	r.			All		
			Encoder Res	olution for Tes	ts without	a Motor			Applicable Motors		
Pn00C		~ UUVU	0 Use	e 13 bits.							
		n.□□X□									
				e 22 bits.					Rotar	,	
			3 US6	3 Use 24 bits.							
			Encoder Type	e Selection for	Tests wit	hout a Mo	tor		Applica Motor	ble s	
		n.□X□□		e an incrementa	al encoder				All		
			1 Use	e an absolute e	ncoder.						
		n.X□□□	Reserved pa	rameter (Do no	ot change.	.)					
	2	Application Selections	Function D	0000h to 1001h	_	0000h	All	Immedi- ately	Setup	*1	
		n.□□□X	Reserved pa	rameter (Do no	ot change.	.)					
Pn00D		n.□□X□	Reserved pa	Reserved parameter (Do not change.)							
FIIOOD		$n.\Box X\Box\Box$	Reserved pa	leserved parameter (Do not change.)							
			Overtravel Warning Detection Selection								
		n.X□□□	Do not detect overtravel warnings.								
			Detect overtravel warnings.								
	2	Application Selections		0000h to 2011h	_	0000h	All	After restart	Setup	*1	
			Preventative	Maintenance \	Warning S	election					
		n.□□□X		ot detect preve			warnings.				
Pn00F			1 Dete	ct preventative	maintena	nce warnir	gs.				
		n.□□X□	Reserved pa	rameter (Do no	ot change.	.)					
		n. 🗆 X 🗆 🗆	Reserved na	rameter (Do no	ot change	)					
				•							
		n.X□□□	neserved pa	rameter (Do no	or change.	)					
Pn021	2	Reserved p	parameter (Do	_	-	0000h	All	-	_	-	
Pn022	2	Reserved p	parameter (Do e.)	-	-	0000h	All	-	-	-	
				•				0 11			

Continued fro	m previous	nage

Parameter No.	Size		Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence				
	2	Σ-V Com tion Swite	patible Func- ch	0000h to 2111h	_	0000h	-	After restart	Setup	_				
			Communicat	ons Interface C	face Compatibility Selection Applicable Motors					able ors				
	n.			form Σ-7 commu	All									
Pn040			1 Per	form Σ-V commu	unications.									
111040			Encoder Res	olution Compati	bility Sele	ction			Applica Motor					
	n.		Hee		ne encoder resolution of the Servomotor. resolution of 20 bits when connected to an SGM7J,									
				M7A, SGM7P, S					Rotar					
	n.		Reserved par	ameter (Do not	change.)									
	n.	XDDD	Reserved par	ameter (Do not	change.)									
	2	Application Selection	on Function is 80	0000h to 1111h	-	0000h	Linear	After restart	Setup	*1				
Pn080														
				sor Selection	<u>.</u>									
	ſ	1.□□□X		e polarity senso not use polarity										
	Ī		Motor Phas	e Sequence Sel	ection									
	r	n.□□X□		t a phase-A lead										
	_			t a phase-B lead			ce of U, V, an	a vv.						
	r	1.0X00		arameter (Do no	,									
	n.X□□□ Calculation Method for Maximum Speed or Encoder Output Pulses  O Calculate the encoder output pulse setting for a fixed maximum speed.													
			Calculate the maximum speed for a fixed encoder output pulse setting.											
	2	Application Selection	on Function	0000h to 1111h	_	0000h	All	After restart	Setup	*1				
	- Coloculor C1													
		n.□□□X		ulse Output Sele utput phase-C p		in the for	ward direction							
Pn081				utput phase-C p					ns.					
111001		n.□□X□	Reserved p	arameter (Do no	ot change	)								
	]	n.□X□□	Reserved p	arameter (Do no	ot change.	.)								
		n.X□□□	Reserved p	arameter (Do no	ot change.	)								
Pn100	2	Speed Lo	oop Gain	10 to 20,000	0.1 Hz	400	All	Immedi- ately	Tuning	*1				
Pn101	2	Speed Lo	oop Integral nstant	15 to 51,200	0.01 ms	2000	All	Immedi- ately	Tuning	*1				
Pn102	2		Loop Gain	10 to 20,000	0.1/s	400	All	Immedi- ately	Tuning	*1				
Pn103	2	Moment	of Inertia Ratio	0 to 20,000	1%	100	All	Immedi- ately	Tuning	*1				
Pn104	2	Second S Gain	Speed Loop	10 to 20,000	0.1 Hz	400	All	Immedi- ately	Tuning	*1				

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Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn105	2	Second Speed Loop Integral Time Constant	15 to 51,200	0.01 ms	2000	All	Immedi- ately	Tuning	*1
Pn106	2	Second Position Loop Gain	10 to 20,000	0.1/s	400	All	Immedi- ately	Tuning	*1
Pn109	2	Feedforward	0 to 100	1%	0	All	Immedi- ately	Tuning	*1
Pn10A	2	Feedforward Filter Time Constant	0 to 6,400	0.01 ms	0	All	Immedi- ately	Tuning	*1
	2	Gain Application Selections	0000h to 5334h	_	0004h	All	-	Setup	*1
				•				•	

Pn10B

	Mode Sv	witching Selection	When Enabled
n.□□□X	0	Use the internal torque reference as the condition (level setting: Pn10C).	
	4	Use the speed reference as the condition (level setting: Pn10D).	
	'	Use the speed reference as the condition (level setting: Pn181).	
	2	Use the acceleration reference as the condition (level setting: Pn10E).	Immedi- ately
	2	Use the acceleration reference as the condition (level setting: Pn182).	
	3	Use the position deviation as the condition (level setting: Pn10F).	İ
	4	Do not use mode switching.	

	Speed L	Speed Loop Control Method						
n.□□X□	0	PI control	A 61					
	1	I-P control	After restart					
	2 to 3	Reserved settings (Do not use.)						

n.□X□□	Reserved parameter (Do not change.)
<u> </u>	
n.X□□□	Reserved parameter (Do not change.)

Pn10C	2	Mode Switching Level for Torque Reference	0 to 800	1%	200	All	Immedi- ately	Tuning	*1
Pn10D	2	Mode Switching Level for Speed Reference	0 to 10,000	1 min <sup>-1</sup>	0	Rotary	Immedi- ately	Tuning	*1
Pn10E	2	Mode Switching Level for Acceleration	0 to 30,000	1 min <sup>-1</sup> /s	0	Rotary	Immedi- ately	Tuning	*1
Pn10F	2	Mode Switching Level for Position Deviation	0 to 10,000	1 refer- ence unit	0	All	Immedi- ately	Tuning	*1
Pn11F	2	Position Integral Time Constant	0 to 50,000	0.1 ms	0	All	Immedi- ately	Tuning	*1
Pn121	2	Friction Compensation Gain	10 to 1,000	1%	100	All	Immedi- ately	Tuning	*1
Pn122	2	Second Friction Compensation Gain	10 to 1,000	1%	100	All	Immedi- ately	Tuning	*1
Pn123	2	Friction Compensation Coefficient	0 to 100	1%	0	All	Immedi- ately	Tuning	*1
Pn124	2	Friction Compensation Frequency Correction	-10,000 to 10,000	0.1 Hz	0	All	Immedi- ately	Tuning	*1
Pn125	2	Friction Compensation Gain Correction	1 to 1,000	1%	100	All	Immedi- ately	Tuning	*1
Pn131	2	Gain Switching Time 1	0 to 65,535	1 ms	0	All	Immedi- ately	Tuning	*1
Pn132	2	Gain Switching Time 2	0 to 65,535	1 ms	0	All	Immedi- ately	Tuning	*1
Pn135	2	Gain Switching Waiting Time 1	0 to 65,535	1 ms	0	All	Immedi- ately	Tuning	*1
Pn136	2	Gain Switching Waiting Time 2	0 to 65,535	1 ms	0	All	Immedi- ately	Tuning	*1

Applicable	When	Classi- Refer			
Motors	Enabled	fication	ence		

Continued from previous page.

No.	Sizo	N	ame	Range	Unit	Setting	Motors	Enabled	fication	ence			
	2	Automatic ing Selection	Gain Switch- ons 1	0000h to 0052h	-	0000h	All	Immedi- ately	Tuning	*1			
	-												
			Gain Switching Selection										
		n.□□□X	0 Tr	se manual gain switching. ne gain is switched manually with G-SEL in the servo command output sig- als (SVCMD_IO).									
			1 Re	eserved setting (	Do not us	e.)							
			2 Th	se automatic gain the gain is switch vitching condition cond gain to the	ed automa n A is sati	atically fror sfied. The	n the first gair gain is switch	ed automati	cally from	hen the			
Pn139			Gain Switching Condition A										
			0 /C	0 /COIN (Positioning Completion Output) signal turns ON.									
			1 /C	OIN (Positioning	g Completi	ion Output	) signal turns	OFF.					
		n.□□X□	2 /N	EAR (Near Outp	out) signal	turns ON.							
			3 /N	/NEAR (Near Output) signal turns OFF.									
				Position reference filter output is 0 and position reference input is OFF.									
			5 Pc	Position reference input is ON.									
		n.□X□□	Reserved pa	arameter (Do no	ot change.	.)							
	I	n.XDDD	Reserved pa	arameter (Do no	ot change.	.)							
	-		ı										
Pn13D	2	Current Ga	ain Level	100 to 2,000	1%	2000	All	Immedi- ately	Tuning	*1			
Pn13F	2		ation Control Position Inte- Constant	0 to 50,000	0.1 ms	0	All	Immedi- ately	Tuning	-			
	2		owing Con- d Selections	0000h to 1121h	-	0100h	All	Immedi- ately	Tuning	*1			
	3.07												

Setting

Default

Setting

Name

Parameter

		Model	Following Control Selection				
	n.□□□X	0	Do not use model following control.				
		1	Use model following control.				
		Vibratio	on Suppression Selection				
		0	Do not perform vibration suppression.				
	n.□□X□	1	Perform vibration suppression for a specific frequency.				
n140		2	Perform vibration suppression for two specific frequencies.				
1140		Vibratio	on Suppression Adjustment Selection				
		VIDIATION OUPPICSSION AGUSTINENT OURSTIN					
	n. 🗆 X 🗆 🗆	0	Do not adjust vibration suppression automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning.				
		1	Adjust vibration suppression automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning.				
		Speed	Feedforward (VFF)/Torque Feedforward (TFF) Selection				
	n.X□□□	0	Do not use model following control and speed/torque feedforward together.				
		1	Use model following control and speed/torque feedforward together.				

Model Following Control Gain Immedi-ately Pn141 2 10 to 20,000 0.1/s\*1 500 ΑII Tuning Model Following Control Gain Correction Immedi-2 Tuning Pn142 500 to 2,000 0.1% 1000 All ately

Continued from previous page.

Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
Pn143	2		owing Con- the Forward	0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	*1		
Pn144	2	Model Follo trol Bias in Direction	owing Con- the Reverse	0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	*1		
Pn145	2	Vibration S Frequency	Suppression 1 A	10 to 2,500	0.1 Hz	500	All	Immedi- ately	Tuning	*1		
Pn146	2	Vibration S Frequency	Suppression 1 B	10 to 2,500	0.1 Hz	700	All	Immedi- ately	Tuning	*1		
Pn147	2	trol Speed	Model Following Con- trol Speed Feedforward Compensation		0.1%	1000	All	Immedi- ately	Tuning	*1		
Pn148	2	Second Moing Contro	odel Follow- I Gain	10 to 20,000	0.1/s	500	All	Immedi- ately	Tuning	*1		
Pn149	2		odel Follow- I Gain Correc-	500 to 2,000	0.1%	1000	All	Immedi- ately	Tuning	*1		
Pn14A	2	Vibration S Frequency	Suppression 2	10 to 2,000	0.1 Hz	800	All	Immedi- ately	Tuning	*1		
Pn14B	2	Vibration S Correction	Suppression 2	10 to 1,000	1%	100	All	Immedi- ately	Tuning	*1		
	2	Control-Retions	elated Selec-	0000h to 0021h	_	0021h	All	After restart	Tuning	*1		
Pn14F		n.0X00 n.0X00	0 Use 1 Use 2 Use Reserved pa	Type Selection e tuning-less type tuning-less type tuning-less type tuning-less type tuning-less type trameter (Do no	pe 2. pe 3. pt change.	,						
	2		nance Con- d Selections	0000h to 0011h	_	0010h	All	Immedi- ately	Tuning	*1		
		n.□□□X	Anti-Resonance Control Selection  O Do not use anti-resonance control.  1 Use anti-resonance control.									
Pn160		n.□□X□	Anti-Resonance Control Adjustment Selection  Do not adjust anti-resonance control automa tuning without a host reference, autotuning without a host reference, autotuning without a host reference, autotuning with a hing.					execution of	, and cust autotuning	om 		
		n.□X□□	Reserved pa	rameter (Do no	t change.	)						
		n.X□□□	Reserved pa	rameter (Do no	t change.	)						
Pn161	2	Anti-Resor quency	nance Fre-	10 to 20,000	0.1 Hz	1000	All	Immedi- ately	Tuning	*1		
Pn162	2	Anti-Resor Correction		1 to 1,000	1%	100	All	Immedi- ately	Tuning	*1		

Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn163	2	Anti-Resonance Damping Gain	0 to 300	1%	0	All	Immedi- ately	Tuning	*1
Pn164	2	Anti-Resonance Filter Time Constant 1 Cor- rection	-1,000 to 1,000	0.01 ms	0	All	Immedi- ately	Tuning	*1
Pn165	2	Anti-Resonance Filter Time Constant 2 Cor- rection	-1,000 to 1,000	0.01 ms	0	All	Immedi- ately	Tuning	*1
Pn166	2	Anti-Resonance Damping Gain 2	0 to 1,000	1%	0	All	Immedi- ately	Tuning	*1
	2	Tuning-less Function- Related Selections	0000h to 2711h	_	1400h	All	_	Setup	*1
				•				•	

			Tuning-less Selection								en led
		n.□□□X	0	Disa	able tuning-les	s function.				Afte	<del></del> er
			1 Enable tuning-less function.							resta	art
			Speed Control Method								en led
D : 470		n.□□X□	0	Use	for speed cor	itrol.				Afte	<del></del> er
Pn170			1	Use	for speed cor	itrol and u	se host co	ntroller for po	sition control	. resta	art
		n.□X□□	Rigidity Level							Whe Enab	
		11.0700	0 to 7	O to 7 Set the rigidity level.							edi- y
		n.X□□□	Tuning-le	Tuning-less Load Level							en led
		11	0 to 2 Set the load level for the tuning-less function.								edi- y
Pn181	2	Mode Swite for Speed F			0 to 10,000	1 mm/s	0	Linear	Immedi- ately	Tuning	*1
Pn182	2	Mode Swite for Acceler	ching Leve ation	əl	0 to 30,000	1 mm/s <sup>2</sup>	0	Linear	Immedi- ately	Tuning	*1
	2	Less-Devia Related Sw		ol-	0000h to 1101h	-	0100h	All	After restart	Setup	_

n.□□□X	Less-De	s-Deviation Control Selection						
	0	Do not use less-deviation control.						
	1	Use less-deviation control.						

Pn190 n.□□X□ Reserved parameter (Do not change.)

n.□X□□	Reserved parameter (Do not change.)
--------	-------------------------------------

n.XDDD	Speed F	eedforward/Torque Feedforward Selection
	0	Less-deviation control and speed/torque feedforward are not used together.
	1	Less-deviation control and speed/torque feedforward are used together.

Pn191	2	Less-Deviation Control 1 Feedforward Gain	0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	-
Pn192	2	Less-Deviation Control 1 Second Feedforward Gain	0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	-
Pn193	2	Less-Deviation Control 1 Feedforward Filter Time Constant	0 to 65,535	0.01 ms	30	All	Immedi- ately	Tuning	_

Continued from previous page.

Parameter No.	Size	Na	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
110.	2	Less-Deviat			0000h to 2113h	-	2102h	All	After restart	Setup	-		
		tion colocit	orr Owner	100	27.00				1001011				
		n.□□□X	□X Reserved parameter (Do not change.)										
		n.□□X□	Reserve	Reserved parameter (Do not change.)									
Pn195		n.□X□□	Reserve	d pai	rameter (Do no	t change.)							
		n.X□□□	Less-De		on Mode Selec		Maala		tian anntur!		/Th:-		
			0		Less-Deviatior le is compatibl				tion control i	s enabled	. (THIS		
			1		erved setting (I								
			2	Use	Less-Deviation	n Control 2	2 Mode wh	en less-devia	tion control i	s enabled	<u>.                                    </u>		
Pn196	2	Less-Deviat 2 Speed Fe Gain			0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	_		
Pn197	2	Less-Deviat 2 Torque Fe Filter Time (	edforwa	rd	0 to 65,535	0.01 ms	50	All	Immedi- ately	Tuning	_		
Pn198	2	Less-Deviat 2 Forward 7 forward Gai	Torque Fe		0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	_		
Pn199	2	2 Reverse 7	Less-Deviation Control 2 Reverse Torque Feed- forward Gain		0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	_		
Pn19A	2	Less-Deviat 2 Incomplet tion Rate			0 to 10,000	0.01%	10000	All	Immedi- ately	Tuning	_		
Pn19B	2	Less-Deviat 2 Rotary Se Viscous Frid pensation C	ervomoto ction Cor	r n-	0 to 8,000	0.01%/ 100 min <sup>-1</sup>	0	Rotary	Immedi- ately	Tuning	_		
Pn19C	2	Reserved pa		(Do	_	-	0	All	Immedi- ately	Tuning	_		
Pn19D	2	Less-Deviat 2 Linear Se Viscous Frid pensation C	rvomotor ction Cor	n-	0 to 8,000	0.01%/ 100 mm/s	0	Linear	Immedi- ately	Tuning	-		
Pn19E	2	Reserved pa	<b>\</b>	(Do	-	-	0	All	Immedi- ately	Tuning	-		
Pn19F	2	Less-Deviat 2 Torque Fe Moving Ave	edforwa	rd	0 to 5,100	0.1 ms	0	All	Immedi- ately	Tuning	-		
Pn1A4	2	Reserved pa not change		(Do	-	-	36	-	Immedi- ately	Tuning	-		
Pn1A5	2	Reserved pa not change		(Do	_	_	0	-	Immedi- ately	Tuning	-		
Pn1AE	2	Reserved pa not change		(Do	_	-	0	-	Immedi- ately	Tuning	-		
Pn1AF	2	Reserved pa not change		(Do	_	-	0	-	Immedi- ately	Tuning	-		
Pn205	2	Multiturn Lii	mit		0 to 65,535	1 rev	65535	Rotary	After restart	Setup	*1		

							Con	itinued from	n previou	s page.		
Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Position Co	ontrol Func- ions	0000h to 2210h	-	1000h	All	After restart	Setup	*1		
		1										
		n.□□□X	Reserved parameter (Do not change.)									
		n.□□X□	Reserved parameter (Do not change.)									
		n.□X□□	Reserved parameter (Do not change.)									
Pn207	Ī		<b>`</b>	oning Comple	•	, 0	<u> </u>	<u> </u>				
			Output when the absolute value of the position deviation is the same or less than the setting of Pn522 (Positioning Completed Width).									
		n.X□□□	1 the	Output when the absolute value of the position error is the same or less than the setting of Pn522 (Positioning Completed Width) and the reference after the position reference filter is 0.								
				put when the a setting of Pn5								
					1							
Pn20A	4	Number of Encoder S	External cale Pitches	4 to 1,048,576	1 scale pitch/ revolu- tion	32768	Rotary	After restart	Setup	*1		
Pn20E	4	Electronic (Numerato		1 to 1,073,741,824	1	16	All	After restart	Setup	*1		
Pn210	4	Electronic (Denomina		1 to 1,073,741,824	1	1	All	After restart	Setup	*1		
Pn212	4	Number of Output Pul		16 to 1,073,741,824	1 P/Rev	2048	Rotary	After restart	Setup	*1		
	2	Fully-close Selections	d Control	0000h to 1003h	-	0000h	Rotary	After restart	Setup	*1		
		1			I	1		I.	II.	1		
	Ī	n.□□□X	Reserved par	rameter (Do no	ot change.	.)						
D . 00 A	Ī	n.□□X□	Reserved par	rameter (Do no	ot change.	)						
Pn22A	Ī	n.□X□□	Reserved par	rameter (Do no	ot change.	)						
	Ī		Fully-closed	Control Speed	l Feedbac	k Selectio	n					
		n.X□□□		e motor encode e external enco								
			1 000	o external erice	<u> </u>	·•						
	2	Position Co	ontrol Expan- ion Selections	0000h to 0001h	-	0000h	All	After restart	Setup	*1		
						<u> </u>			I			
	Ī		Backlash Cor	mpensation Di	rection							
		n.□□□X		mpensate forw								
Pn230	_			mpensate reve						_		
		n. 🗆 🗆 X 🗆		rameter (Do no		,						
		n. 🗆 X 🗆 🗆		rameter (Do no		,						
		n.X□□□	Reserved par	rameter (Do no	ot change.	)						
Pn231	4	Backlash (	Compensation	-500,000 to 500,000	0.1 reference	0	All	Immedi- ately	Setup	*1		
Pn233	2	Backlash (		0 to 65,535	0.01 ms	0	All	Immedi- ately	Setup	*1		

Continued from previous page.

Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn234	2	Second Position Refe ence Acceleration/ Deceleration Time Co stant	0 to 65 535	0.1 ms	0	All	Immedi- ately	Setup	-
Pn281	2	Encoder Output Reso	lu- 1 to 4,096	1 edge/ pitch	20	All	After restart	Setup	*1
Pn282	4	Linear Encoder Scale Pitch	0 to 6,553,600	0.01 μm	0	Linear	After restart	Setup	*1
Pn304	2	Jogging Speed	0 to 10,000	Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1 min <sup>-1</sup>	500	Rotary	Immedi- ately	Setup	*1
Pn305	2	Soft Start Acceleration Time	0 to 10,000	1 ms	0	All	Immedi- ately	Setup	*2
Pn306	2	Soft Start Deceleration Time	n 0 to 10,000	1 ms	0	All	Immedi- ately	Setup	*2
Pn308	2	Speed Feedback Filte Time Constant	o to 65,535	0.01 ms	0	All	Immedi- ately	Setup	*1
Pn30A	2	Deceleration Time for Servo OFF and Force Stops		1 ms	0	All	Immedi- ately	Setup	*1
Pn30C	2	Speed Feedforward Average Movement Time	0 to 5,100	0.1 ms	0	All	Immedi- ately	Setup	*1
	2	Vibration Detection Selections	0000h to 0002h	_	0000h	All	Immedi- ately	Setup	*1
Pn310	<u> </u>	1 2  n.□□X□ Reserved  n.□X□ Reserved	Do not detect vibility Output a warning Output an alarm (aparameter (Do not parameter (Do not paramete	(A.911) if vi A.520) if vi ot change.	bration is ( )				
Pn311	2	Vibration Detection Se sitivity	50 to 500	1%	100	All	Immedi- ately	Tuning	*1
Pn312	2	Vibration Detection Level	0 to 5,000	1 min <sup>-1</sup>	50	Rotary	Immedi- ately	Tuning	*1
Pn316	2	Maximum Motor Spee	ed 0 to 65,535	1 min <sup>-1</sup>	10000	Rotary	After restart	Setup	*1
Pn324	2	Moment of Inertia Cal culation Starting Leve		1%	300	All	Immedi- ately	Setup	*1
Pn383	2	Jogging Speed	0 to 10,000	1 mm/s	50	Linear	Immedi- ately	Setup	*1
Pn384	2	Vibration Detection Level	0 to 5,000	1 mm/s	10	Linear	Immedi- ately	Tuning	*1
Pn385	2	Maximum Motor Spee	ed 1 to 100	100 mm/s	50	Linear	After restart	Setup	*1
Pn401	2	First Stage First Torqu Reference Filter Time Constant	0 to 65,535	0.01 ms	100	All	Immedi- ately	Tuning	*1
Pn402	2	Forward Torque Limit	0 to 800	1%*3	800	Rotary	Immedi- ately	Setup	*1
Pn403	2	Reverse Torque Limit	0 to 800	1%*3	800	Rotary	Immedi- ately	Setup	*1
	1	Forward External Torq	1	1		l .	Immedi-	1	

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Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn405	2	Reverse External Torque Limit	0 to 800	1%*3	100	All	Immedi- ately	Setup	*1
Pn406	2	Emergency Stop Torque	0 to 800	1%*3	800	All	Immedi- ately	Setup	*1
Pn407	2	Speed Limit during Torque Control	0 to 10,000	1 min <sup>-1</sup>	10000	Rotary	Immedi- ately	Setup	*1
	2	Torque-Related Function Selections	0000h to 1111h	-	0000h	All	-	Setup	*1

		Notch F	When Enabled				
	n.□□□X	0	Disable first stage notch filter.	Immedi-			
		1	Enable first stage notch filter.	ately			
		Speed L	When Enabled				
		0	Use the smaller of the maximum motor speed and the setting of Pn407 as the speed limit.	After			
Pn408	n.□□X□		Use the smaller of the maximum motor speed and the setting of Pn480 as the speed limit.				
		1	Use the smaller of the overspeed alarm detection speed and the setting of Pn407 as the speed limit.				
			Use the smaller of the overspeed alarm detection speed and the setting of Pn480 as the speed limit.				
		Notch F	When Enabled				
	n.□X□□	0	0 Disable second stage notch filter.				
		1	Enable second stage notch filter.	ately			
		Friction	Compensation Function Selection	When Enabled			
	n.X□□□	0 Disable friction compensation.					
		1	1 Enable friction compensation.				

Pn409	2	First Stage Notch Filter Frequency	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn40A	2	First Stage Notch Filter Q Value	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn40B	2	First Stage Notch Filter Depth	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn40C	2	Second Stage Notch Filter Frequency	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn40D	2	Second Stage Notch Filter Q Value	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn40E	2	Second Stage Notch Filter Depth	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn40F	2	Second Stage Second Torque Reference Filter Frequency	100 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn410	2	Second Stage Second Torque Reference Filter Q Value	50 to 100	0.01	50	All	Immedi- ately	Tuning	*1
Pn412	2	First Stage Second Torque Reference Filter Time Constant	0 to 65,535	0.01 ms	100	All	Immedi- ately	Tuning	*1

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		Continued from previous page									
Parameter No.	Size		ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
	2	Torque-Rel tion Select	ated Func- ions 2	0000h to 1111h	_	0000h	All	Immedi- ately	Setup	*1	
	Notch Filter Selection 3										
	n.□□□X		Disable third stage notch filter.								
			1 Ena	able third stage	notch filte	er.					
	i		Notch Filter Selection 4								
Pn416	n.□□X□		0 Disable fourth stage notch filter.								
			1 Ena	able fourth stag	je notch fil	lter.					
	li		Notch Filter	Selection 5							
		n.□X□□		able fifth stage	notch filte	er.					
			1 Ena	able fifth stage	notch filte	r.					
	İ	n.X□□□	Reserved pa	rameter (Do no	ot change	.)					
	n.X□□□ Reserved parameter (Do not change.)										
Pn417	2	Third Stage	e Notch Filter	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1	
Pn418	2	1 ,	e Notch Filter	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1	
Pn419	2	Third Stage Depth	e Notch Filter	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1	
Pn41A	2	Fourth Stater Frequen	ge Notch Fil- ncy	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1	
Pn41B	2	Fourth Stage Notch Filter Q Value		50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1	
Pn41C	2	ter Depth	ge Notch Fil-	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1	
Pn41D	2	Fifth Stage Notch Filter Frequency		50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1	
Pn41E	2	Fifth Stage Notch Filter Q Value		50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1	
Pn41F	2	Depth	Notch Filter	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1	
	2	sation Sele	ple Compen- ections	0000h to 1111h	_	0000h	Rotary	_	Setup	*1	
	-	n.□□□X	Speed Ripple Compensation Function Selection  0 Disable speed ripple compensation.							When Enabled	
			Enable speed ripple compensation.  1 Enable speed ripple compensation.							ately	
	Speed Ripple Compensation Information Disagreement Warning Detection Selection								When Enabled		
Pn423	n.□□X□		0 Detect A.942 alarms.							After	
			1 Do not detect A.942 alarms.							restart	
			Speed Ripple Compensation Enable Condition Selection							When Enabled	
	n.□X□□		0 Speed reference							After	
			1 Motor speed							restart	
	n.X□□□ Reserved parameter (Do not change.)										
Pn424	2	Torque Lim	nit at Main Cir- e Drop	0 to 100	1%*2	50	All	Immedi- ately	Setup	*1	
	1		•	1	1	l .	1	Continue	d on nov	t naga	

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Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
Pn425	2	Release Tir Limit at Ma Voltage Dro		0 to 1,000	1 ms	100	All	Immedi- ately	Setup	*1		
Pn426	2	Torque Fee Average M Time	dforward ovement	0 to 5,100	0.1 ms	0	All	Immedi- ately	Setup	*1		
Pn427	2	Speed Ripp sation Enal	ole Compen- ole Speed	0 to 10,000	1 min <sup>-1</sup>	0	Rotary Ser- vomotor	Immedi- ately	Tuning	*1		
Pn456	2	Sweep Tore ence Ampli		1 to 800	1%	15	All	Immedi- ately	Tuning	*1		
	2	Notch Filte Selections	r Adjustment 1	0000h to 0101h	_	0101h	All	Immedi- ately	Tuning	*1		
							L	<u>I</u>				
	1		Notch Filter	Adjustment Se	lection 1							
			<b></b>			notch filter	automaticall	v durina exec	cution of a	uto-		
		n.□□□X	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.									
				ust the first sta nout a host refe								
Pn460		n.□□X□ Reserved parameter (Do not change.)										
			Notch Filter	Adjustment Se	lection 2							
		n.□X□□	0 fun	Do not adjust the second stage notch filter automatically when the tuning-less								
			Adj 1 tior	ust the second is enabled or otuning with a	stage not	ch filter au ecution of a	itomatically water	hen the tunir thout a host				
			aut	oturiing with a	nost refere	ence, and i	custom tuning	J.				
		n.X□□□	Reserved pa	rameter (Do no	t change.	)						
	2	Gravity Cor Related Se	mpensation- lections	0000h to 0001h	-	0000h	All	After restart	Setup	*1		
	-	n.□□□X	Gravity Comp	ensation Selec	tion							
			, .	Disable gravity compensation.								
Pn475			Enable gravity compensation.      Enable gravity compensation.									
P11475		n.□□X□		ameter (Do not	•							
		n.□X□□	Reserved par	ameter (Do not	change.)							
			'	•	<b>0</b> /							
		n.X□□□	neserved par	ameter (Do not	cnange.)							
Pn476	2	Gravity Cor Torque	mpensation	-1,000 to 1,000	0.1%	0	All	Immedi- ately	Tuning	*1		
Pn480	2	Speed Lim Force Cont		0 to 10,000	1 mm/s	10000	Linear	Immedi- ately	Setup	*1		
Pn481	2	Polarity De Speed Loo	tection	10 to 20,000	0.1 Hz	400	Linear	Immedi- ately	Tuning	-		
Pn482	2	Polarity De Speed Loo Time Cons	p Integral	15 to 51,200	0.01 ms	3000	Linear	Immedi- ately	Tuning	-		
Pn483	2	Forward Fo	orce Limit	0 to 800	1%*3	30	Linear	Immedi- ately	Setup	*1		
Pn484	2	Reverse Fo	orce Limit	0 to 800	1%*3	30	Linear	Immedi- ately	Setup	*1		
Pn485	2	ence Špee		0 to 100	1 mm/s	20	Linear	Immedi- ately	Tuning	-		
Pn486	2	Polarity De ence Accel Deceleration		0 to 100	1 ms	25	Linear	Immedi- ately	Tuning	-		
		1		1	1	1		Continue	-l	1		

Continued from previous page.

Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn487	2	Polarity Detection Constant Speed Time	0 to 300	1 ms	0	Linear	Immedi- ately	Tuning	_
Pn488	2	Polarity Detection Reference Waiting Time	50 to 500	1 ms	100	Linear	Immedi- ately	Tuning	-
Pn48E	2	Polarity Detection Range	1 to 65,535	1 mm	10	Linear	Immedi- ately	Tuning	-
Pn490	2	Polarity Detection Load Level	0 to 20,000	1%	100	Linear	Immedi- ately	Tuning	-
Pn495	2	Polarity Detection Confirmation Force Reference	0 to 200	1%	100	Linear	Immedi- ately	Tuning	_
Pn498	2	Polarity Detection Allowable Error Range	0 to 30	1 deg	10	Linear	Immedi- ately	Tuning	-
Pn49F	2	Speed Ripple Compensation Enable Speed	0 to 10,000	1 mm/s	0	Linear	Immedi- ately	Tuning	*1
Pn502	2	Rotation Detection Level	1 to 10,000	1 min <sup>-1</sup>	20	Rotary	Immedi- ately	Setup	*1
Pn503	2	Speed Coincidence Detection Signal Output Width	0 to 100	1 min <sup>-1</sup>	10	Rotary	Immedi- ately	Setup	*1
Pn506	2	Brake Reference-Servo OFF Delay Time	0 to 50	10 ms	0	All	Immedi- ately	Setup	*1
Pn507	2	Brake Reference Output Speed Level	0 to 10,000	1 min <sup>-1</sup>	100	Rotary	Immedi- ately	Setup	*1
Pn508	2	Servo OFF-Brake Command Waiting Time	10 to 100	10 ms	50	All	Immedi- ately	Setup	*1
Pn509	2	Momentary Power Inter- ruption Hold Time	20 to 50,000	1 ms	20	All	Immedi- ately	Setup	*1
	2	Input Signal Selections	0000h to FFF2h	_	1881h	All	After restart	Setup	*1

	n.□□□X	Rese	rved parameter (Do not change.)							
	n.□□X□	Rese	Reserved parameter (Do not change.)							
	n.□X□□	Rese	rved parameter (Do not change.)							
		P-OT	(Forward Drive Prohibit) Signal Allocation							
		0	Enable forward drive when CN1-13 input signal is ON (closed).							
		1	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).							
Pn50A		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).							
	n.X□□□	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).							
		Α	Enable forward drive when CN1-7 input signal is OFF (open).							
		В	Enable forward drive when CN1-8 input signal is OFF (open).							
		С	Enable forward drive when CN1-9 input signal is OFF (open).							
		D	Enable forward drive when CN1-10 input signal is OFF (open).							
		Е	Enable forward drive when CN1-11 input signal is OFF (open).							
		F	Enable forward drive when CN1-12 input signal is OFF (open).							

Applicable

Motors

Classi-

fication

Refer-

#### Continued from previous page.

When

Enabled

2	Input 2	Signal Selection	ns	0000h to FFFFh	_	8882h	All	After restart	Setup		
		N-OT (F	ever	se Drive Prohib	oit) Signal	Allocation					
		0	Ena	able reverse dri	ve when (	N1-13 inp	ut signal is O	N (closed).			
		1	Ena	able reverse dri	ve when (	CN1-7 inpu	t signal is ON	l (closed).			
		2	Ena	able reverse dri	ve when (	CN1-8 inpu	t signal is ON	l (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	Ena	able reverse dri	ve when (	N1-11 inp	ut signal is O	N (closed).			
		6	Ena	able reverse dri	ve when (	N1-12 inp	ut signal is O	N (closed).			
	n. 🗆 🗆 🗆	1X 7	Set the signal to always prohibit reverse drive.								
		8	Set the signal to always enable reverse drive.								
		9	Ena	able reverse dri	ve when (	N1-13 inp	ut signal is O	FF (open).			
		А	Ena	able reverse dri	ve when (	CN1-7 inpu	t signal is OF	F (open).			
		В	Ena	able reverse dri	ve when (	CN1-8 inpu	t signal is OF	F (open).			
		С	Ena	able reverse dri	ve when (	CN1-9 inpu	t signal is OF	F (open).			
		D	Ena	able reverse dri	ve when (	N1-10 inp	ut signal is O	FF (open).			
		Е	Ena	able reverse dri	ve when (	N1-11 inp	ut signal is O	FF (open).			

Setting

Unit

Default

Setting

Setting

Range

Pn50B

Parameter

No.

Size

Name

F

Α

В

D

Reserved parameter (Do not change.)

n.□□X□

	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).
.DXDD	7	The signal is always active.
	8	The signal is always inactive.
	9	Active when CN1-13 input signal is OFF (open).

/P-CL (Forward External Torque Limit Input) Signal Allocation

Enable reverse drive when CN1-12 input signal is OFF (open).

	Е	Active when CN1-11 input signal is OFF (open).							
	F	ive when CN1-12 input signal is OFF (open).							
	/N-CL (Reverse External Torque Limit Input) Signal Allocation								
n.X□□□	0 to F	The allocations are the same as the /P-CL (Forward External Torque Limit Input) signal allocations.							

Active when CN1-7 input signal is OFF (open).

Active when CN1-8 input signal is OFF (open).

Active when CN1-9 input signal is OFF (open).

Active when CN1-10 input signal is OFF (open).

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Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Output Sig tions 1	gnal Selec-	0000h to 6666h	-	0000h	All	After restart	Setup	*1		
			/COIN (Positioning Completion Output) Signal Allocation									
				sabled (the above								
		n.□□□X										
				3 Output the signal from the CN1-25 or CN1-26 output terminal.								
			4 to 6 Re	served setting (	Do not us	e.)						
Pn50E			/V-CMP (Sp	eed Coincidend	e Detecti	on Output	) Signal Alloc	ation				
		n.□□X□										
			/TGON (Rot	ation Detection	Output) S	Signal Allo	cation					
		n.□X□□	0 to 6 The allocations are the same as the /COIN (Positioning Completion) signal allocations.									
			/S-RDY (Servo Ready) Signal Allocation									
		n.X□□□		0 to 6 The allocations are the same as the /COIN (Positioning Completion) signal allocations.								
	2	Output Sig	gnal Selec-	0000h to 6666h	_	0100h	All	After restart	Setup	*1		
			/CLT (Torque Limit Detection Output) Signal Allocation									
			0 Dis	sabled (the abov	ve signal c	utput is no	ot used).					
		n.□□□X	1 Ou	tput the signal	from the C	N1-1 or C	N1-2 output	terminal.				
		11.000X		tput the signal								
				tput the signal			CN1-26 outpu	ut terminal.				
			4 to 6 Re	served setting (	Do not us	e.)						
Pn50F			/VLT (Speed	Limit Detection	n) Signal A	Allocation						
		n.□□X□		e allocations are l allocations.	e the same	e as the /C	LT (Torque Li	mit Detectior	Output) s	sig-		
			/BK (Brake (	Output) Signal A	Allocation							
		n.□X□□	O to 6 Th	e allocations are l allocations.		e as the /C	LT (Torque Li	mit Detection	Output) s	sig-		
			/WARN (Wai	ning Output) S	ignal Allo	cation						
		n.X□□□		e allocations are l allocations.	e the same	e as the /C	LT (Torque Li	mit Detectior	Output) s	sig-		
			,									

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Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer			
	2	Output Sig	ınal Selec-	0000h to	_	0000h	All	After	Setup	*1			
		tions 3		0666h		000011	7411	restart	Остар				
			/NEAR (Nea	ar Output) Signa	al Allocatio	on							
			0 D	isabled (the abo	ve signal c	output is no	ot used).						
			1 0	utput the signal	from the C	 CN1-1 or C	N1-2 output	terminal.					
		n.□□□X	2 0	utput the signal	from the C	N1-23 or	CN1-24 outp	ut terminal.					
Pn510			3 O	utput the signal	from the C	N1-25 or	CN1-26 outp	ut terminal.					
			4 to 6 R	eserved setting	(Do not us	e.)							
		n.□□X□	Reserved parameter (Do not change.)										
		n.□X□□	Reserved parameter (Do not change.)										
		n.X□□□	Reserved n	arameter (Do n	ot change	)							
		п.хььь	Reserved parameter (Do not change.)										
		Input Sign	al Selections	0000h to	1	1		After		1			
	2	5	ai Selections	FFFFh	_	6543h	All	restart	Setup	*1			
			/DEC (Origi	n Return Decel	eration Sw	vitch Input	) Signal Alloc	ation					
			0 A	ctive when CN1	-13 input s	signal is Of	V (closed).						
			1 A	1 0 ,									
			2 Active when CN1-8 input signal is ON (closed).										
			3 A										
			4 A	ctive when CN1	-10 input s	signal is Of	V (closed).						
			5 A										
			6 A										
		n.□□□X	7 The signal is always active.										
			8 The signal is always inactive.										
			9 Active when CN1-13 input signal is OFF (open).										
			A Active when CN1-7 input signal is OFF (open).										
				B Active when CN1-8 input signal is OFF (open).									
				ctive when CN1									
				ctive when CN1		0	· · ·						
Pn511				ctive when CN1			,						
			F A	ctive when CN1	-12 input s	signal is Of	-F (open).						
			/EXT1 (Exte	rnal Latch Inpu	it 1) Signa	Allocation	า						
				ne signal is alwa	<u>.                                      </u>								
				ctive when CN1			. ,						
				ctive when CN1			. ,						
		n.□□X□		ctive when CN1									
				ctive when CN1		-							
				ctive when CN1		_							
			F A	ctive when CN1	-12 input s	signal is Of	F (open).						
			7 to C Th	ne signal is alwa	ys inactive	).							
			/EXT2 (Exte	rnal Latch Inpu	ıt 2) Signa	l Allocatio	n						
		n.□X□□		ne allocations ar ations.	e the same	e as the /E	XT1 (External	Latch Input	1) signal a	allo-			
			/EXT3 (Exte	rnal Latch Inpu	it 3) Signa	l Allocatio	n						
		n.X□□□		ne allocations ar ations.	e the same	e as the /E	XT1 (External	Latch Input	1) signal a	allo-			
			,										

Continued from previous page.

Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence			
	2	Output Sig Settings	gnal Inverse	0000h to 1111h	_	0000h	All	After restart	Setup	*1			
			Output Signal Inversion for CN1-1 and CN1-2 Terminals										
		n.□□□X	0 The signal is not inverted.										
			1 The signal is inverted.										
			Output Sign	al Inversion for	CN1-23 a	and CN1-2	4 Terminals						
Pn512		n.□□X□		e signal is not i									
			1 Th	e signal is inver	ted.								
			Output Sign	al Inversion for	CN1-25 a	and CN1-2	6 Terminals						
		n.□X□□	0 Th										
			1 Th	e signal is inver	ted.								
		n.X□□□	Reserved pa	arameter (Do no	ot change.	.)							
	2	Output Sig	gnal Selec-	0000h to 0666h	_	0000h	All	After restart	Setup	*1			
		n.□□□X Reserved parameter (Do not change.)											
		n.□□X□	Reserved pa	arameter (Do no	ot change	)							
			/PM (Preven	tative Mainten	ance Outp	ut) Signal	Allocation						
Pn514			0 Dis	sabled (the abo	ve signal c	utput is no	ot used).						
		n.□X□□		itput the signal			•						
				itput the signal									
				itput the signal			CN1-26 outp	ut terminal.					
			4 to 6 Re	served setting	Do not us	e.)							
		n.X□□□	Reserved pa	arameter (Do no	ot change	.)							

Applicable

Motors

#### 5.2.2 List of Servo Parameters

Classi-

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Refer-

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Continued	from	previous	nage
OULILIIIUGU	11 0111	previous	page.

When

Enabled

		1 1.0:			0001-1-				Λ.(1 -				
	2	Input Signal Selection 7			000h to FFFFh	_	8888h	All	After restart	Setup	*1		
			FSTP (Forc	ed Sto	p Input) S	ignal Alloc	ation						
			0	Enable drive when CN1-13 input signal is ON (closed).									
			1	Enable	drive whe	n CN1-7 ir	nput signal	is ON (closed	d).				
			2	Enable	nable drive when CN1-8 input signal is ON (closed).								
			3	Enable drive when CN1-9 input signal is ON (closed).									
			4	Enable	drive whe	n CN1-10	input signa	al is ON (close	ed).				
			5	Enable drive when CN1-11 input signal is ON (closed).									
			6	Enable drive when CN1-12 input signal is ON (closed).									
	n	X	7	Set the	signal to	always pro	hibit drive	(always force	the motor to	stop).			
Pn516		11.000		Set the stop).	signal to	always ena	able drive (	always disabl	e forcing the	motor to			
			9	Enable	drive whe	n CN1-13	input signa	al is OFF (ope	n).				
			А	Enable	drive whe	n CN1-7 ir	nput signal	is OFF (open	).				
			В	Enable	drive whe	n CN1-8 ir	nput signal	is OFF (open	).				

Setting

Unit

Default

Setting

Setting

Range

Parameter

No.

Size

Name

n.□□X□	Reserved parameter (Do not change.)
n.□X□□	Reserved parameter (Do not change.)

Enable drive when CN1-9 input signal is OFF (open).

Enable drive when CN1-10 input signal is OFF (open).

Enable drive when CN1-11 input signal is OFF (open).

Enable drive when CN1-12 input signal is OFF (open).

n.XDDD	Reserved parameter	(Do not change)
11.7000	neserved parameter	(DO HOL CHAINGE.)

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Ε

F

Pn518*4	_	Safety Module-Related Parameters	_	-	-	All	_	-	_
Pn51B	4	Motor-Load Position Deviation Overflow Detection Level	0 to 1,073,741,824	1 refer- ence unit	1000	Rotary	Immedi- ately	Setup	*1
Pn51E	2	Position Deviation Over- flow Warning Level	10 to 100	1%	100	All	Immedi- ately	Setup	*1
Pn520	4	Position Deviation Over- flow Alarm Level	1 to 1,073,741,823	1 refer- ence unit	524288 0	All	Immedi- ately	Setup	*1
Pn522	4	Positioning Completed Width	0 to 1,073,741,824	1 refer- ence unit	7	All	Immedi- ately	Setup	*1
Pn524	4	Near Signal Width	1 to 1,073,741,824	1 refer- ence unit	107374 1824	All	Immedi- ately	Setup	*1
Pn526	4	Position Deviation Over- flow Alarm Level at Servo ON	1 to 1,073,741,823	1 refer- ence unit	524288 0	All	Immedi- ately	Setup	*1
Pn528	2	Position Deviation Over- flow Warning Level at Servo ON	10 to 100	1%	100	All	Immedi- ately	Setup	*1
Pn529	2	Speed Limit Level at Servo ON	0 to 10,000	1 min <sup>-1</sup>	10000	Rotary	Immedi- ately	Setup	*1
Pn52A	2	Multiplier per Fully- closed Rotation	0 to 100	1%	20	Rotary	Immedi- ately	Tuning	*1
Pn52B	2	Overload Warning Level	1 to 100	1%	20	All	Immedi- ately	Setup	*1

Name

#### 5.2.2 List of Servo Parameters

Parameter

No.

Size

Continued from previous page.

Classi-

fication

Refer-

When

Enabled

Applicable

Motors

Pn52C	2	Base Current Derating at Motor Overload Detection		10 to 100	1%	100	All	After restart	Setup	*1		
	2	Program Je Related Se		0000h to 0005h	-	0000h	All	Immedi- ately	Setup	*1		
	li		Program Jogging Operation Pattern									
				aiting time in Provements in Pna		orward by t	travel distanc	e in Pn531) >	Number	of		
				aiting time in Provements in Pna		everse by t	ravel distanc	e in Pn531) ×	Number	of		
			2 mc (W	aiting time in Provements in Properties in Properties in Provements in Professional Professiona	536 n535 → R	•		•				
Pn530		n.□□□X	3 mc (W	aiting time in Provements in Properties in Properties in Provements in Provements in Professional Professional Indian Professional Indian Professional Indian Professional Indian Professional Indian	536 n535 → Fo	•		,				
			4 in I	aiting time in Pr Pn535 → Rever 536								
			5 in I	aiting time in Pr Pn535 → Forwa 536								
		n.□□X□	Reserved pa	rameter (Do no	ot change	.)						
		n.□X□□	Reserved pa	rameter (Do no	ot change	.)						
	l .											
		n.X□□□	Reserved pa	rameter (Do no	ot change	.)						
		n.X□□□	Reserved pa	rameter (Do no	ot change	.)						
Pn531	4		Reserved pa	1 to 1,073,741,824	1 reference	32768	All	Immedi- ately	Setup	*1		
Pn531 Pn533		Program Jo Distance	ogging Travel	1 to	1 reference	,	All		Setup	*1		
	4	Program Jo Distance Program Jo ment Spee	ogging Travel ogging Move-	1 to 1,073,741,824	1 reference unit Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1	32768		ately Immedi-				
Pn533	4 2	Program John Speed Program John Program John Program John Time	ogging Travel ogging Move-	1 to 1,073,741,824 1 to 10,000	1 reference unit Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1 min <sup>-1</sup>	32768	Rotary	Immediately	Setup	*1		
Pn533	2	Program John Speed Program John Speed Program John Time Program John Time Program John Time	ogging Travel ogging Move- ogging Accel- celeration ogging Wait- ogging Num-	1 to 1,073,741,824 1 to 10,000 2 to 10,000	1 reference unit Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1 min <sup>-1</sup> 1 ms	32768 500	Rotary	Immediately  Immediately  Immediately	Setup	*1		
Pn533 Pn534 Pn535	2 2	Program John Speed Program John Speed Program John Time Program John Time Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Sp	ogging Travel ogging Move- ogging Accel- celeration ogging Wait- ogging Num-	1 to 1,073,741,824 1 to 10,000 2 to 10,000 0 to 10,000	1 reference unit Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1 min <sup>-1</sup> 1 ms	32768 500 100	Rotary All	Immediately  Immediately  Immediately  Immediately  Immediately	Setup Setup Setup	*1 *1 *1		
Pn533 Pn534 Pn535 Pn536	2 2 2 2	Program John Speed Program John Speed Program John Time Program John Time Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Speed Program John Sp	ogging Travel ogging Move- ogging Accel- celeration ogging Wait- ogging Num- ements	1 to 1,073,741,824 1 to 10,000 2 to 10,000 0 to 10,000 -10,000 to 10,000 -10,000 to 10,000	1 reference unit Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1 min <sup>-1</sup> 1 ms  1 ms Times	32768 500 100 100	Rotary  All  All	Immediately Immediately Immediately Immediately Immediately Immediately Immediately	Setup Setup Setup Setup	*1 *1 *1		
Pn533 Pn534 Pn535 Pn536 Pn550	2 2 2 2 2	Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Jone Program Jone Jone Program Jone Jone Program Jone Jone Program Jone Jone Program Jone Jone Jone Jone Jone Jone Jone Jone	ogging Travel ogging Move- ogging Accel- celeration ogging Wait- ogging Num- ements initor 1 Offset initor 2 Offset initor 1 Mag-	1 to 1,073,741,824 1 to 10,000 2 to 10,000 0 to 10,000 -10,000 to 10,000 -10,000 to 10,000 -10,000 to 10,000	1 reference unit Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1 min <sup>-1</sup> 1 ms 1 ms Times 0.1 V	32768 500 100 100 1	Rotary  All  All  All  All	Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately	Setup Setup Setup Setup Setup	*1 *1 *1 *1		
Pn533 Pn534 Pn535 Pn536 Pn550 Pn551	2 2 2 2 2 2	Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Jone Program Jone Jone Program Jone Jone Program Jone Jone Program Jone Jone Jone Jone Jone Jone Jone Jone	ogging Travel ogging Move- ogging Accel- celeration ogging Wait- ogging Num- ements nitor 1 Offset initor 2 Offset initor 1 Mag- initor 2 Mag-	1 to 1,073,741,824  1 to 10,000  2 to 10,000  0 to 10,000  -10,000 to 10,000  -10,000 to 10,000  -10,000 to 10,000  -10,000 to 10,000	1 reference unit Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1 min <sup>-1</sup> 1 ms 1 ms Times 0.1 V	32768 500 100 100 1 0	All All All All	Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately	Setup Setup Setup Setup Setup Setup	*1  *1  *1  *1  *1  *1  *1		
Pn533 Pn534 Pn535 Pn536 Pn550 Pn551 Pn552	2 2 2 2 2 2 2	Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Program Jone Progr	ogging Travel ogging Move- ogging Accel- celeration ogging Wait- ogging Num- ements nitor 1 Offset initor 2 Offset initor 1 Mag- initor 2 Mag- nsumption nit Time	1 to 1,073,741,824 1 to 10,000 2 to 10,000 0 to 10,000 -10,000 to 10,000 -10,000 to 10,000 -10,000 to 10,000 -10,000 to	1 reference unit Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1 min <sup>-1</sup> 1 ms 1 ms Times 0.1 V × 0.01	32768 500 100 100 1 0 100	All All All All All All	Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately	Setup Setup Setup Setup Setup Setup Setup	*1  *1  *1  *1  *1  *1  *1		
Pn533 Pn534 Pn535 Pn536 Pn550 Pn551 Pn552 Pn553	2 2 2 2 2 2 2 2	Program Jone Program Jone Program Jone Program Jone Time Program J	ogging Travel ogging Move- ogging Accel- celeration ogging Wait- ogging Num- ements initor 1 Offset initor 2 Offset initor 1 Mag- initor 2 Mag- insumption init Time ibration	1 to 1,073,741,824  1 to 10,000  2 to 10,000  0 to 10,000  -10,000 to 10,000	1 reference unit Rotary: 1 min <sup>-1</sup> Direct Drive: 0.1 min <sup>-1</sup> 1 ms 1 ms Times 0.1 V × 0.01 × 0.01	32768 500 100 100 0 100 100	All All All All All All All All	Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately	Setup Setup Setup Setup Setup Setup Setup Setup	*1  *1  *1  *1  *1  *1  *1  *1  *1  *1		

0 to 100

1 to 10,000

1%

1 mm/s

100

20

All

Linear

Overshoot Detection

Zero Speed Level

2

2

Level

Pn561

Pn581

Setting

Range

Setting

Unit

Default

Setting

Setup Continued on next page.

Setup

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Continued from previous page.

Parameter	Size	Name	Setting	Setting	Default	Applicable	When	Classi-	Refer-
No.	Si	Name	Range	Unit	Setting	Motors	Enabled	fication	ence
Pn582	2	Speed Coincidence Detection Signal Output Width	0 to 100	1 mm/s	10	Linear	Immedi- ately	Setup	*1
Pn583	2	Brake Reference Output Speed Level	0 to 10,000	1 mm/s	10	Linear	Immedi- ately	Setup	*1
Pn584	2	Speed Limit Level at Servo ON	0 to 10,000	1 mm/s	10000	Linear	Immedi- ately	Setup	*1
Pn585	2	Program Jogging Move- ment Speed	1 to 10,000	1 mm/s	50	Linear	Immedi- ately	Setup	*1
Pn586	2	Motor Running Cooling Ratio	0 to 100	1%/ Max. speed	0	Linear	Immedi- ately	Setup	_
	2	Polarity Detection Execution Selection for Absolute Linear Encoder	0000h to 0001h	-	0000h	Linear	Immedi- ately	Setup	*1
Pn587		n.□□□X	ection Selection not detect polar ect polarity.	ity.		r Encoder			
Pn587		n.□□□X         0         Do n           1         Dete           n.□□X□         Reserved pa           n.□X□□         Reserved pa	not detect polar	ity. ot change. ot change.	.)	r Encoder			
Pn587		n.□□□X 0 Do n 1 Dete  n.□□X□ Reserved pa  n.□X□□ Reserved pa  n.X□□□ Reserved pa  Reserved pa	rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do not rameter (Do no	ity. ot change. ot change.	.)	All	Immedi-	Setup	*1
		n.□□□X 0 Do n 1 Dete  n.□□X□ Reserved pa  n.□X□□ Reserved pa  n.X□□□ Reserved pa	not detect polar ect polarity. grameter (Do no grameter (Do no	ot change.	.)		Immedi- ately After restart	Setup	*1
Pn600	2	n.□□□X 0 Do n 1 Dete  n.□□X□ Reserved pa  n.□X□□ Reserved pa  n.X□□□ Reserved pa  Regenerative Resistor Capacity*5  Dynamic Brake Resistor Allowable Energy	pot detect polarity.  Irameter (Do not arameter (Do not arameter (Do not arameter)  Depends on model.*6	ot change.	0	All	ately After		
Pn600 Pn601	2	n.□□□X 0 Do n 1 Dete  n.□□X□ Reserved pa  n.□X□□ Reserved pa  n.X□□□ Reserved pa  Regenerative Resistor Capacity*5  Dynamic Brake Resistor Allowable Energy Consumption  Regenerative Resistor	pot detect polarity.  parameter (Do not present polarity).  parameter (Do not present polarity).  Depends on model.*6	ot change.  ot change.  ot change.  10 W	0	All All	After restart	Setup	*7

	0	Disable overheat protection.					
	1	Use overheat protection in the Yaskawa Linear Servomotor.*8					
	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 parameter (Do not change.)						

n.⊔⊔X⊔	Reserved parameter (Do not change.)
n.□X□□	Reserved parameter (Do not change.)
n.X□□□	Reserved parameter (Do not change.)

Pn61B	2	Overheat Alarm Level	0 to 500	0.01 V	250	All	Immedi- ately	Setup	*1
Pn61C	2	Overheat Warning Level	0 to 100	1%	100	All	Immedi- ately	Setup	*1
Pn61D	2	Overheat Alarm Filter Time	0 to 65,535	1 s	0	All	Immedi- ately	Setup	*1

n. 

Overheat Protection Selection

Continued from previous page.

Parameter No.	Size	N	lame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence				
		0.5.1.14													
Pn621 to Pn628*4	-	Safety Mod Parameter		ed	-	_	_	All	_	_	_				
	2	Communic trols	cations Co	n-	0000h to 1FF3h	-	1040h	All	Immedi- ately	Setup	-				
	MEQUATROLINIC O THE STATE OF TH										-				
				TROLINK Communications Check Mask for Debugging  Do not mask.						l .					
					e MECHATROI	INIK com	munication	o orroro /A EG	:0)		=				
		n.□□□X			e WDT errors (		Tiuriication	5 611015 (A.LC	10).		_				
				-	e both MECHA		communic	eations arrors	(A E60) and	WDT	_				
					s (A.E50).	MINOLINK	Communic	ations enois	(A.LOO) and	VVD1	_				
			Warning	Che	ck Masks						Ī				
			0 [	Do no	ot mask.						_				
			1 I	gnor	e data setting	warnings (	A.94 <b>□</b> ).				=				
			2 I	gnor	e command wa	arnings (A.	.95□).				=				
			3 I	gnor	e both A.94□	and A.95 <b>C</b>	☐ warnings	S.			<b>=</b> .				
				gnor	e communicati	ons warni	ngs (A.96 <b>C</b>	□).			_				
Pn800			5 I	gnor	e both A.94□	and A.96 <b>E</b>	<b>1</b> warnings	).			_				
1 11000					e both A.95□						_				
		n.□□X□			e A.94 <b>□</b> , A.95						_				
				8 Ignore data setting warnings (A.97A and A.97b).							=				
					e A.94 <b>□</b> , A.97										
					e A.95 <b>□</b> , A.97						_				
					e A.94 <b>□</b> , A.95										
					e A.96□, A.97										
					e A.94□, A.96						=				
				Ignore A.95 , A.96 , A.97A, and A.97b warnings.  Ignore A.94 , A.95 , A.96 , A.97A, and A.97b warnings.							=				
			FI	gnor	e A.94 <b>⊔</b> , A.95	⊔, A.96⊔	, A.97A, aı	nd A.97b war	nings.		=				
	n.□X□□ Reserved parameter (Do not change.)									l					
			Automat	ic Wa	arning Clear S	election fo	or Debugg	ing			Ī				
		n.X□□□	0 F	Retai	n warnings for	debuggin	g.				_				
			1 A	Autor	matically clear	warnings (	MECHATE	OLINK-III spe	ecification).		=				
	2	Application Selections Limits)			0000h to 0103h	-	0003h	All	Immedi- ately	Setup	*1				
			Software	Lim	it Selection						Ī				
			0 E	Enab	le both forward	d and reve	rse softwa	re limits.			-				
		n.□□□X	1 [	Disab	le forward soft	ware limit					=				
			2 [	Disab	le reverse soft	ware limit.					=				
Pn801			3 [	Disab	le both forwar	d and reve	erse softwa	are limits.			_				
		n.□□X□	Reserved	d par	ameter (Do no	ot change.	.)				- 				
					•		,				-				
		» DVDD			it Check for R			rofores							
		n.□X□□			ot perform soft						=				
			<u> </u>	-e110	rm software lin	III CHECKS	ioi reierer	ices.			_				
		n.X□□□	Reserved	d par	ameter (Do no	t change.	.)								

Continued from previous page.

						Con	tinued fron	previou	s page.
Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn803	2	Origin Range	0 to 250	1 refer- ence unit	10	All	Immedi- ately	Setup	*2
Pn804	4	Forward Software Limit	-1,073,741,823 to 1,073,741,823	1 refer- ence unit	107374 1823	All	Immedi- ately	Setup	*1
Pn806	4	Reverse Software Limit	-1,073,741,823 to 1,073,741,823	1 refer- ence unit	-10737 41823	All	Immedi- ately	Setup	*1
Pn808	4	Absolute Encoder Origin Offset	-1,073,741,823 to 1,073,741,823	1 refer- ence unit	0	All	Immedi- ately *10	Setup	*1
Pn80A	2	First Stage Linear Acceleration Constant	1 to 65,535	10,000 refer- ence units/s <sup>2</sup>	100	All	Immedi- ately *11	Setup	*2
Pn80B	2	Second Stage Linear Acceleration Constant	1 to 65,535	10,000 refer- ence units/s <sup>2</sup>	100	All	Immedi- ately *11	Setup	*2
Pn80C	2	Acceleration Constant Switching Speed	0 to 65,535	100 ref- erence units/s	0	All	Immedi- ately *11	Setup	*2
Pn80D	2	First Stage Linear Deceleration Constant	1 to 65,535	10,000 refer- ence units/s <sup>2</sup>	100	All	Immedi- ately *11	Setup	*2
Pn80E	2	Second Stage Linear Deceleration Constant	1 to 65,535	10,000 refer- ence units/s <sup>2</sup>	100	All	Immedi- ately *11	Setup	*2
Pn80F	2	Deceleration Constant Switching Speed	0 to 65,535	100 ref- erence units/s	0	All	Immedi- ately *11	Setup	*2
Pn810	2	Exponential Accelera- tion/Deceleration Bias	0 to 65,535	100 ref- erence units/s	0	All	Immedi- ately *12	Setup	*2
Pn811	2	Exponential Acceleration/Deceleration Time Constant	0 to 5,100	0.1 ms	0	All	Immedi- ately *12	Setup	*2
Pn812	2	Movement Average Time	0 to 5,100	0.1 ms	0	All	Immedi- ately *12	Setup	*2
Pn814	4	External Positioning Final Travel Distance	-1,073,741,823 to 1,073,741,823	1 refer- ence unit	100	All	Immedi- ately	Setup	*2
Pn816	2	Reserved parameters (Do not change.)	_	_	0000h	All	-	_	_
Pn817 *13	2	Origin Approach Speed	0 to 65,535	100 reference units/s	50	All	Immedi- ately *11	Setup	*2
Pn818 *14	2	Origin Approach Speed 2	0 to 65,535	100 ref- erence units/s	5	All	Immedi- ately *11	Setup	*2
Pn819	4	Final Travel Distance for Origin Return	-1,073,741,823 to 1,073,741,823	1 refer- ence unit	100	All	Immedi- ately	Setup	*2
Pn81E	2	Reserved parameters (Do not change.)	-	_	0000h	All	-	-	_
Pn81F	2	Reserved parameters (Do not change.)	-	_	0010h	All	-	_	_
Pn820	4	Forward Latching Area	-2,147,483,648 to 2,147,483,647	1 refer- ence unit	0	All	Immedi- ately	Setup	*2
Pn822	4	Reverse Latching Area	-2,147,483,648 to 2,147,483,647	1 refer- ence unit	0	All	Immedi- ately	Setup	*2

Continued from previous page.

Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Option Monitor 1 Selection	0000h to FFFFh	_	0000h	_	Immedi- ately	Setup	*2

	Setting	Monitor	Applicable Moto										
		d Monitor Region											
	0000h	Motor speed [overspeed detection speed/1000000h]	All										
	0001h	Speed reference [overspeed detection speed/1000000h]	All										
	0002h	Torque [maximum torque/1000000h]	All										
	0003h	Position deviation (lower 32 bits) [reference units]	All										
	0004h	Position deviation (upper 32 bits) [reference units]	All										
	000Ah	Encoder count (lower 32 bits) [reference units]	All										
	000Bh	Encoder count (upper 32 bits) [reference units]	All										
	000Ch	FPG count (lower 32 bits) [reference units]	All										
	000Dh	FPG count (upper 32 bits) [reference units]	All										
	Low-Speed	Low-Speed Monitor Region											
	0010h	Un000: Motor speed [min <sup>-1</sup> ]	All										
	0011h	Un001: Speed Reference [min <sup>-1</sup> ]	All										
	0012h	Un002: Torque Reference [%]	All										
_	0013h	Un003: Rotational Angle 1 [encoder pulses] Number of encoder pulses from encoder phase C displayed in decimal	All										
		Un003: Rotational Angle 1 [linear encoder pulses] Linear encoder pulses from the polarity origin displayed in decimal	- ' '''										
	0014h	Un004: Rotational Angle 2 [deg] Electrical angle from polarity origin	All										
4		Un004: Electrical Angle 2 [deg] Electrical angle from polarity origin	All										
	0015h	Un005: Input Signal Monitor	All										
	0016h	Un006: Output Signal Monitor	All										
	0017h	Un007: Input Reference Speed [min <sup>-1</sup> ]	All										
	0018h	Un008: Position Deviation [reference units]	All										
	0019h	Un009: Accumulated Load Ratio [%]	All										
	001Ah	Un00A: Regenerative Load Ratio [%]	All										
	001Bh	Un00B: Dynamic Brake Resistor Power Consumption [%]	All										
	001Ch	Un00C: Input Reference Pulse Counter [reference units]	All										
	001Dh	Un00D: Feedback Pulse Counter [encoder pulses]	All										
	001Eh	Un00E: Fully-closed Loop Feedback Pulse Counter [external encoder resolution]	Rotary										
	0023h	Initial multiturn data [Rev]	Rotary										
	0024h	Initial incremental data [pulses]	Rotary										
	0025h	Initial absolute position data (lower 32 bits) [pulses]	Linear										
	0026h	Initial absolute position data (upper 32 bits) [pulses]	Linear										
	0040h	Un025: SERVOPACK Installation Environment Monitor	All										
	0041h	Un026: Servomotor Installation Environment Monitor	All										
	0042h	Un027: Built-in Fan Remaining Life Ratio	All										
	0043h	Un028: Capacitor Remaining Life Ratio	All										
	0044h	Un029: Surge Prevention Circuit Remaining Life Ratio	All										
	0045h	Un02A: Dynamic Brake Circuit Remaining Life Ratio	All										
	0046h	Un032: Instantaneous Power	All										
-	0047h	Un033: Power Consumption	All										
	0048h	Un034: Cumulative Power Consumption	All										

#### Continued from previous page.

Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
		Setting			Monitor			Appl	icable Mot	ors	
			ations Module	Only							
		0080h	Previous value units]	e of latched fee	dback po	sition (LPO	S1) [reference	e	All		
Pn824		0081h	Previous value units]	e of latched fee	dback po	sition (LPO	S2) [reference	e	All		
		0084h	Continuous La	atch Status (EX	(STATUS)				All		
	-	Other	Reserved sett	ings (Do not us	se.)				All		
	2	Option Mo	onitor 2 Selec-	0000h to FFFFh	_	0000h	All	Immedi- ately	Setup	*2	
Pn825	-	0000h to 0084h	The settings	are the same	as those fo	or the Opti	on Monitor 1	Selection.		_	
Pn827	2	Linear Dec	celeration 1 for Stopping	1 to 65,535	10,000 refer- ence units/s <sup>2</sup>	100	All	Immedi- ately *11	Setup	*2	
Pn829	2	SVOFF Wa SVOFF at to Stop)	aiting Time (for Deceleration	0 to 65,535	10 ms	0	All	Immedi- ately *11	Setup	*2	
Pn82A	2	Reserved (Do not ch	parameters lange.)	-	_	1813h	All	-	-	_	
Pn82B	2	Reserved (Do not ch	parameters ange.)	_	_	1D1Ch	All	-	-	-	
Pn82C	2	Reserved (Do not ch	parameters lange.)	_	_	1F1Eh	All	-	_	_	
Pn82D	2	Reserved (Do not ch	parameters lange.)	_	-	0000h	All	-	-	_	
Pn82E	2	Reserved (Do not ch	parameters lange.)	-	-	0000h	All	-	-	_	
	2	Motion Se	ttings	0000h to 0001h	_	0000h	All	After restart	Setup	*2	
Pn833		n.□□□X	0 Use fignor	Pn834 to Pn84	F and Pn8	327. (The s	ettings of Pn8			] -	
		n.□□X□	Reserved par	rameter (Do no	t change.	)					
		n.□X□□	Reserved par	rameter (Do no	t change.	)					
	1	n.X□□□	Reserved par	rameter (Do no	t change.	)					
Pn834	4	First Stage eration Co	E Linear Accel- Instant 2	1 to 20,971,520	10,000 refer- ence units/s <sup>2</sup>	100	All	Immedi- ately *11	Setup	*2	
Pn836	4		tage Linear on Constant 2	1 to 20,971,520	10,000 refer- ence units/s <sup>2</sup>	100	All	Immedi- ately *11	Setup	*2	
Pn838	4	Acceleration Switching	on Constant Speed 2	0 to 2,097,152,000	1 refer- ence unit/s	0	All	Immedi- ately *11	Setup	*2	

 $n.X\square\square\square$ 

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#### 5.2.2 List of Servo Parameters

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Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn83A	4	First Stage Deceleration	Linear on Constant 2	1 to 20,971,520	10,000 refer- ence units/s <sup>2</sup>	100	All	Immedi- ately *11	Setup	*2
Pn83C	4	Second Sta Deceleration	age Linear on Constant 2	1 to 20,971,520	10,000 refer- ence units/s <sup>2</sup>	100	All	Immedi- ately *11	Setup	*2
Pn83E	4	Deceleration Switching S	on Constant Speed 2	0 to 2,097,152,000	1 refer- ence unit/s	0	All	Immedi- ately *11	Setup	*2
Pn840	4	Linear Dec Constant 2	eleration ? for Stopping	1 to 20,971,520	10,000 refer- ence units/s <sup>2</sup>	100	All	Immedi- ately *11	Setup	*2
Pn842 *13	4	Second Or Approach	igin Speed 1	0 to 20,971,520	100 reference units/s	0	All	Immedi- ately *11	Setup	*2
Pn844 *14	4	Second Or Approach		0 to 20,971,520	100 reference units/s	0	All	Immedi- ately *11	Setup	*2
Pn846	2	POSING C Scurve Acc Deceleration	celeration/	0 to 50	1%	0	All	Immedi- ately *11	Setup	_
Pn850	2	Number of Sequences		0 to 8	-	0	All	Immedi- ately	Setup	*2
Pn851	2	Continuous Sequence		0 to 255	-	0	All	Immedi- ately	Setup	*2
	2	Latch Sequence Settings	uence 1 to 4	0000h to 3333h	-	0000h	All	Immedi- ately	Setup	*2
		n.000X	0 Phas 1 EXT1 2 EXT2	1 EXT1 signal 2 EXT2 signal						
Pn852		n.□□X□		nce 2 Signal S settings are the		those for t	he Latch Seq	uence 1 Sigr	nal Selec-	_
		n.□X□□	Latch Sequence 3 Signal Selection  0 to 3 The settings are the same as those for the Latch Sequence 1 Signal Selection.							
		Latch Sequence 4 Signal Selection								I

The settings are the same as those for the Latch Sequence 1 Signal Selection.

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Continued	trom	previous	page.

Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Latch Sequent Settings	uence 5	to 8	0000h to 3333h	-	0000h	All	Immedi- ately	Setup	*2
											_
			Latch S	Sequer	nce 5 Signal S	Selection					
			0	Phase							_
		n.□□□X	1		signal						=
			3		signal signal						=
			3	EXIO	signal						_
Pn853			Latch S	Sequer	nce 6 Signal S	Selection					
		n.□□X□	0 to 3	The stion.	ettings are the	e same as	those for t	he Latch Seq	uence 5 Sigr	nal Selec-	_
			Latch S	atch Sequence 7 Signal Selection							
	_	n.□X□□	0 to 3	The s tion.	ettings are the	e same as	those for t	he Latch Seq	uence 5 Sigr	nal Selec-	=
	1		Latch Sequence 8 Signal Selection								
		n.X□□□	0 to 3	The settings are the same as those for the Latch Sequence 5 Signal Selec-							
	2	SVCMD_IC Monitor All	O Input S locations	Signal 1	0000h to 1717h	-	0000h	All	Immedi- ately	Setup	*2
	2	SVCMD_IC Monitor All	locations	3 1	1717h	- ation for C				Setup	*2
	2	SVCMD_IC Monitor All	locations	ignal N			N1-13 (SV	CMD_IO)	ately	Setup	*2
	2	SVCMD_IC Monitor All	Input S	Signal I	1717h Monitor Alloca	STS1) to C	N1-13 (SV N1-13 inp	CMD_IO) ut signal mon	ately itor.	Setup	*2
	2	SVCMD_IC Monitor All	Input S	Signal I Alloca	1717h  Monitor Alloca ate bit 24 (IO_S	STS1) to C STS2) to C	N1-13 (SV N1-13 inp N1-13 inp	CMD_IO) ut signal mon ut signal mon	ately itor.	Setup	*2
	2	SVCMD_IC Monitor All	Input S	Signal I Alloca Alloca	1717h  Monitor Alloca ate bit 24 (IO_sate bit 25 (IO_s	STS1) to C STS2) to C STS3) to C	N1-13 (SV N1-13 inp N1-13 inp N1-13 inp	CMD_IO) ut signal mon ut signal mon ut signal mon	ately itor. itor. itor.	Setup	*2
	2	Monitor All	Input S 0 1 2 3 4	Signal I Alloca Alloca Alloca Alloca Alloca	Monitor Alloca ate bit 24 (IO_S ate bit 25 (IO_S ate bit 26 (IO_S ate bit 27 (IO_S ate bit 28 (IO_S	STS1) to C STS2) to C STS3) to C STS4) to C STS5) to C	N1-13 (SV N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp	CMD_IO) ut signal mon ut signal mon ut signal mon ut signal mon ut signal mon ut signal mon	itor. itor. itor. itor. itor. itor.	Setup	*2
	2	Monitor All	Input S 0 1 2 3 4 5	Signal I Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca	Monitor Alloca ate bit 24 (IO_S ate bit 25 (IO_S ate bit 26 (IO_S ate bit 27 (IO_S ate bit 28 (IO_S ate bit 28 (IO_S	STS1) to C STS2) to C STS3) to C STS4) to C STS5) to C STS6) to C	N1-13 (SV N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp	CMD_IO) ut signal mon ut signal mon ut signal mon ut signal mon ut signal mon ut signal mon ut signal mon	ately  itor. itor. itor. itor. itor. itor. itor.	Setup	*2
	2	Monitor All	Input S	Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca	Monitor Alloca ate bit 24 (IO_S) ate bit 25 (IO_S) ate bit 26 (IO_S) ate bit 27 (IO_S) ate bit 28 (IO_S) ate bit 29 (IO_S) ate bit 30 (IO_S)	STS1) to C STS2) to C STS3) to C STS4) to C STS5) to C STS6) to C STS7) to C	N1-13 (SV N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp	CMD_IO) ut signal mon ut signal mon ut signal mon ut signal mon ut signal mon ut signal mon ut signal mon	ately itor. itor. itor. itor. itor. itor. itor. itor.	Setup	*2
Pn860	2	Monitor All	Input S 0 1 2 3 4 5	Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca	Monitor Alloca ate bit 24 (IO_S ate bit 25 (IO_S ate bit 26 (IO_S ate bit 27 (IO_S ate bit 28 (IO_S ate bit 28 (IO_S	STS1) to C STS2) to C STS3) to C STS4) to C STS5) to C STS6) to C STS7) to C	N1-13 (SV N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp	CMD_IO) ut signal mon ut signal mon ut signal mon ut signal mon ut signal mon ut signal mon ut signal mon	ately itor. itor. itor. itor. itor. itor. itor. itor.	Setup	*2
Pn860	2	Monitor All	Input S	Signal I Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca	Monitor Alloca ate bit 24 (IO_S) ate bit 25 (IO_S) ate bit 26 (IO_S) ate bit 27 (IO_S) ate bit 28 (IO_S) ate bit 29 (IO_S) ate bit 30 (IO_S)	STS1) to C STS2) to C STS3) to C STS4) to C STS5) to C STS6) to C STS7) to C STS8) to C	N1-13 (SV N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp	CMD_IO)  ut signal mon	ately itor. itor. itor. itor. itor. itor. itor. itor.	Setup	*2
Pn860	2	Monitor All	Input S	Signal I Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca	Monitor Alloca ate bit 24 (IO_s ate bit 25 (IO_s ate bit 26 (IO_s ate bit 27 (IO_s ate bit 28 (IO_s ate bit 29 (IO_s ate bit 30 (IO_s ate bit 31 (IO_s	STS1) to C STS2) to C STS3) to C STS4) to C STS5) to C STS6) to C STS7) to C STS8) to C	N1-13 (SV N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp	CMD_IO)  ut signal mon	ately itor. itor. itor. itor. itor. itor. itor. itor.	Setup	*2
Pn860	2	Monitor All	Input S	Signal I Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca	Monitor Alloca ate bit 24 (IO_S ate bit 25 (IO_S ate bit 26 (IO_S ate bit 27 (IO_S ate bit 28 (IO_S ate bit 29 (IO_S ate bit 30 (IO_S ate bit 31 (IO_S	STS1) to C STS2) to C STS3) to C STS4) to C STS5) to C STS6) to C STS7) to C STS8) to C STS8) to C	N1-13 (SV N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp VN1-13 inp	CMD_IO)  ut signal mon	ately itor. itor. itor. itor. itor. itor. itor. itor.	Setup	*2
Pn860	2	n.□□X□	Input S	Signal I Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Enable	Monitor Alloca ate bit 24 (IO_S ate bit 25 (IO_S ate bit 26 (IO_S ate bit 27 (IO_S ate bit 28 (IO_S ate bit 29 (IO_S ate bit 30 (IO_S ate bit 31 (IO_S ate bit 31 (IO_S	STS1) to C STS2) to C STS3) to C STS4) to C STS5) to C STS6) to C STS7) to C STS8) to C or Enable, or CN1-13	N1-13 (SV N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp input signa	CMD_IO)  ut signal mon  al monitor.  al monitor.	ately itor. itor. itor. itor. itor. itor. itor. itor.	Setup	*2
Pn860	2	Monitor All	Input S	Signal I Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Enab	Monitor Alloca ate bit 24 (IO_S ate bit 25 (IO_S ate bit 26 (IO_S ate bit 27 (IO_S ate bit 28 (IO_S ate bit 29 (IO_S ate bit 30 (IO_S ate bit 31 (IO_S ate bit 31 (IO_S ate allocation for	STS1) to C STS2) to C STS3) to C STS4) to C STS5) to C STS6) to C STS7) to C STS8) to C or Enable, or CN1-13	N1-13 (SV N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp Input signa input signa	CMD_IO)  ut signal mon  celection  al monitor.	ately itor. itor. itor. itor. itor. itor. itor. itor.	Setup	*2
Pn860	2	n.□□X□	Input S	Signal I Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Enab  The s	Monitor Alloca ate bit 24 (IO_S ate bit 25 (IO_S ate bit 26 (IO_S ate bit 27 (IO_S ate bit 29 (IO_S ate bit 30 (IO_S ate bit 31 (IO_S ate bit 31 (IO_S ate bit 31 (IO_S	STS1) to C STS2) to C STS3) to C STS4) to C STS5) to C STS6) to C STS7) to C STS8) to C Or Enable, or CN1-13 or CN1-13	N1-13 (SV N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp Input signal input signal N1-7 (SVC	CMD_IO)  ut signal mon  clection  al monitor.  al monitor.  CMD_IO)  3 allocations.	ately itor. itor. itor. itor. itor. itor. itor. itor.	Setup	*2
Pn860	2	n.□□X□	Input S	Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Alloca Toisab Enab The s	Monitor Alloca ate bit 24 (IO_S ate bit 25 (IO_S ate bit 26 (IO_S ate bit 27 (IO_S ate bit 29 (IO_S ate bit 30 (IO_S ate bit 31 (IO_S ate bit 31 (IO_S ate allocation for the allocation for Monitor Alloca ettings are the	STS1) to C STS2) to C STS3) to C STS4) to C STS5) to C STS6) to C STS7) to C STS8) to C Or Enable, or CN1-13 r CN1-13 ation for C e same as	N1-13 (SV N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp Toisable Se input signa N1-7 (SVC	CMD_IO)  ut signal mon  signal mon  al monitor.  al monitor.  SMD_IO)  3 allocations.	ately itor. itor. itor. itor. itor. itor. itor. itor.	Setup	*2

Continued from previous page.

Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	SVCMD_IC Monitor All	O Input Signal locations 2	0000h to 1717h	_	0000h	All	Immedi- ately	Setup	*2		
		n.□□□X	Input Signal	Monitor Alloca	tion for C	N1-8 (SVC	MD_IO)					
		^	0 to 7 The s	settings are the	same as	the CN1-1	3 allocations.			_		
			CN1-8 Input	Signal Monito	r Enable/D	isable Sel	ection					
		n.□□X□	0 Disab	1 3								
Pn861			1 Enable allocation for CN1-8 input signal monitor.						_			
		, UVUU	Input Signal	Monitor Alloca	tion for C	N1-9 (SVC	MD_IO)			Ī		
		n.□X□□	0 to 7 The s	settings are the	same as	the CN1-1	3 allocations.			_		
			CN1-9 Input	Signal Monitor	r Enable/D	isable Sel	ection			ī		
		n.X□□□	0 Disak	ole allocation fo	or CN1-9 in	nput signal	monitor.			-		
			1 Enab	le allocation fo	r CN1-9 in	put signal	monitor.			<del>-</del> -		
		- Ender disease. 10. 0.1. 0 input orginal monitor.										
	2	SVCMD_IC Monitor All	O Input Signal locations 3	0000h to 1717h	_	0000h	All	Immedi- ately	Setup	*2		
		n.□□□X		Monitor Alloca			-					
			0 to 7 The s	settings are the	same as	the CN1-1	3 allocations.			_		
			CN1-10 Input Signal Monitor Enable/Disable Selection									
		n.□□X□	0 Disab	ole allocation fo	or CN1-10	input signa	al monitor.			_		
Pn862			Enable allocation for CN1-10 input signal monitor.							_		
		n. 🗆 X 🗆 🗆	Input Signal Monitor Allocation for CN1-11 (SVCMD_IO)									
		0 to 7 The settings are the same as the CN1-13 allocations.								_		
			CN1-11 Inpu	t Signal Monit	or Enable/	Disable S	election					
		n.X□□□	0 Disab	ole allocation fo	or CN1-11	input signa	al monitor.			_		
			1 Enab	le allocation fo	r CN1-11	input signa	al monitor.			_		
	2		O Input Signal locations 4	0000h to 1717h	_	0000h	All	Immedi- ately	Setup	*2		
		1		1 1111						L		
			Input Signal	Monitor Alloca	tion for C	N1-12 (SV	CMD IO)			ī		
		n.□□□X		settings are the		-				-		
			CNI 12 Inpu	t Signal Monit	or Enables	Disable S	oloction			_		
Pn863		n.□□X□		ole allocation fo								
				le allocation fo						<u> </u>		
		n.□X□□	Reserved parameter (Do not change.)							- 		
		n.XDDD	Reserved pa	rameter (Do no	ot change	)				- I		
			riosciveu pai	rameter (DO NO	or onange.	,						

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Continued	1110111	previous	page.

Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	SVCMD_IC nal Monitor	Output S r Allocation	Sig- ns	0000h to 1717h	-	0000h	All	Immedi- ately	Setup	*2
Pn868		n. D D X D	Output S  0	1 Allocate bit 25 (IO_STS2) to CN1-1/CN1-2 output signal monitor. 2 Allocate bit 26 (IO_STS3) to CN1-1/CN1-2 output signal monitor. 3 Allocate bit 27 (IO_STS4) to CN1-1/CN1-2 output signal monitor. 4 Allocate bit 28 (IO_STS5) to CN1-1/CN1-2 output signal monitor. 5 Allocate bit 29 (IO_STS6) to CN1-1/CN1-2 output signal monitor. 6 Allocate bit 30 (IO_STS7) to CN1-1/CN1-2 output signal monitor. 7 Allocate bit 31 (IO_STS8) to CN1-1/CN1-2 output signal monitor. CN1-1/CN1-2 Output Signal Monitor Enable/Disable Selection 0 Disable allocation for CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-1/CN1-2 output signal monitor. Output Signal Monitor Allocation for CN1-23 and CN1-24 (SVCMD_IO)							*2
		n.XDDD	O Disable allocation for CN1-23/CN1-24 output signal monitor.  1 Enable allocation for CN1-23/CN1-24 output signal monitor.								
	2	SVCMD_IC nal Monitor 2	Output S r Allocation	Sig- ns	0000h to 1717h	_	0000h	All	Immedi- ately	Setup	*2
D=000		n.□□□X	0 to 7	The se	Monitor Allocatings are the	same as	the CN1-1	/CN1-2 alloca	ations.		]
Pn869		n.□□X□	0 [	Disabl	26 Output Sign e allocation for allocation for	r CN1-25	/CN1-26 o	utput signal n	nonitor.		_
		n.□X□□			ameter (Do no		,				
		n.X□□□	Reserved	d para	ameter (Do no	t change.	)				
Pn880	2	Station Ad- tor (for mai read only)			03h to EFh	_	_	All	_	Setup	-
Pn881	2	Set Transm Count Mor (for mainte only)	nitor [bytes	s]	17, 32, 48	-	-	All	-	Setup	-
Pn882	2	Transmission ting Monitor (for mainte only)	or [× Ó.25 <b>μ</b>	μs]	Oh to FFFFh	_	-	All	-	Setup	-
Pn883	2	Communications Cycle		S-	0 to 32	-	-	All	Continue	Setup	-

Continued from previous page.

Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
	2	Communications Controls 2	0000h to 0001h	_	0000h	All	Immedi- ately	Setup	*2	
Pn884	n.	0 Mainta MECH. 1 Apply t  DDXD Reserved para	MECHAI ROLINK communications error occurs.							
Pn88A	2	MECHATROLINK Receive Error Counter Monitor (for maintenance, read only)	0 to 65,535	_	0	All	_	Setup	-	
Pn890 to Pn8A6	4	Command Data Monitor during Alarm/Warning (for maintenance, read only)	Oh to FFFFFFFh	-	Oh	All	_	Setup	*2	
Pn8A8 to Pn8BE	4	Response Data Monitor during Alarm/Warning (for maintenance, read only)	Oh to FFFFFFFh	-	Oh	All	-	Setup	*2	
Pn900	2	Number of Parameter Banks	0 to 16	-	0	All	After restart	Setup	*2	
Pn901	2	Number of Parameter Bank Members	0 to 15	_	0	All	After restart	Setup	*2	
Pn902 to Pn910	2	Parameter Bank Member Definition	0000h to 08FFh	_	0000h	All	After restart	Setup	*2	
Pn920 to Pn95F	2	Parameter Bank Data (Not saved in nonvolatile memory.)	0000h to FFFFh	_	0000h	All	Immedi- ately	Setup	*2	

- \*1. Refer to the following manual for details.
  - Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)
- \*2. Refer to the following manual for details.
  - Σ-7-Series MECHATROLINK-III Communications Standard Servo Profile Command Manual (Manual No.: SIEP S800001 31)
- \*3. Set a percentage of the motor rated torque.
- \*4. These parameters are for SERVOPACKs with a Safety Module. Refer to the following manual for details.
  - Σ-V-Series/Σ-V-Series for Large-Capacity Models/Σ-7-Series User's Manual Safety Module (Manual No.: SIEP C720829 06)
- \*5. Normally set this parameter to 0. If you use an External Regenerative Resistor, set the capacity (W) of the External Regenerative Resistor.
- \*6. The upper limit is the maximum output capacity (W) of the SERVOPACK.
- \*7. These parameters are for SERVOPACKs with the dynamic brake option. Refer to the following manual for details.
  - Σ-7-Series Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual (Manual No.: SIEP S800001 73)
- st 8. The SGLFW2 is the only Yaskawa Linear Servomotor that supports this function.
- \*9. Enabled only when Pn61A is set to n.□□□2 or n.□□□3.
- $st 10. The parameter setting is enabled after SENS_ON command execution is completed.$
- \*11. Change the setting when the reference is stopped (i.e., while DEN is set to 1). If you change the setting during operation, the reference output will be affected.
- \*12. The settings are updated only if the reference is stopped (i.e., only if DEN is set to 1).
- \*13.The setting of Pn842 is valid while Pn817 is set to 0.
- \*14. The setting of Pn844 is valid while Pn818 is set to 0.

# Parameter List

## List of MECHATROLINK-III Common Parameters

5.2.3

The following table lists the common MECHATROLINK-III parameters. These common parameters are used to make settings from the host controller via MECHATROLINK communications. Do not change the settings with the Digital Operator or any other device.

Parameter No.	Size	Nar	ne	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classi- fication	
	4	Encoder Ty tion (read c		0h, 1h	_	-	All	-		
04										
01 PnA02		0000h	Absolute	encoder						
		0001h	Increment	tal encoder						
	4	Motor Type (read only)	Selection	0h, 1h	-	_	All	_		
02									_	
PnA04		0000h	Rotary Se	ervomotor					ation	
		0001h	Linear Se	rvomotor					)rm	
									infe	
	4	Semi-close closed Sele (read only)		0h, 1h	-	_	All	_	Device information	
03	(**************************************									
PnA06		0000h Semi-closed								
		0001h Fully-closed								
04 PnA08	4	Rated Moto (read only)	or Speed	Oh to FFFFFFFh	x10^PnA0C min <sup>-1</sup>	_	All	_		
05 PnA0A	4	Maximum ( Speed (rea		Oh to FFFFFFFh	x10^PnA0C min <sup>-1</sup>	-	All	_		
06 PnA0C	4	Speed Muli (read only)	tiplier	-1,073,741,823 to 1,073,741,823	-	_	All	_		
07 PnA0E	4	Rated Torq (read only)	ue	Oh to FFFFFFFh	x10^PnA12 N·m	-	All	_		
08 PnA10	4	Maximum ( Torque (rea	Output d only)	Oh to FFFFFFFh	x10^PnA12 N·m	-	All	-	nation	
09 PnA12	4	Torque Mul (read only)	tiplier	-1,073,741,823 to 1,073,741,823	_	_	All	_	Device information	
0A PnA14	4	Resolution (read only)		Oh to FFFFFFFh	1 pulse/rev	-	Rotary	_	Devi	
0B PnA16	4	Scale Pitch	1	0 to 65,536,000	1 nm [0.01 μm]	0	Linear	After restart*1		
0C PnA18	4	Pulses per Pitch (read		Oh to FFFFFFFh	1 pulse/ pitch	_	Linear	_		

#### 5.2.3 List of MECHATROLINK-III Common Parameters

Continued from previous page.

Parameter No.	Size	Name		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	
21 PnA42	4	Electronic Gea (Numerator)	ar Ratio	1 to 1,073,741,824	-	16	All	After restart	neation	
22 PnA44	4	Electronic Gea (Denominator)		1 to 1,073,741,824	-	1	All	After restart		
23 PnA46	4	Absolute Enco	oder	-1,073,741,823 to 1,073,741,823	1 reference unit	0	All	Immedi- ately*1		
24 PnA48	4	Multiturn Limit Setting	·	0 to 65,535	1 Rev	65535	Rotary	After restart	-	
	4	Limit Setting		0h to 33h	-	0000h	All	After restart		
25 PnA4A		Bit 0 Bit 1 Bit 2 Bit 3 Bit 4 Bit 5 Bits 6 to 31	N-O1 Rese Rese P-SC N-SC	P-OT (0: Enabled, 1: Disabled) N-OT (0: Enabled, 1: Disabled) Reserved. Reserved. P-SOT (0: Disabled, 1: Enabled) N-SOT (0: Disabled, 1: Enabled) Reserved.						
26 PnA4C	4	Forward Softv Limit	vare	-1,073,741,823 to 1,073,741,823	1 reference unit	10737418 23	All	Immedi- ately		
27 PnA4E	4	Reserved para (Do not chang	ameter e.)	_	_	0	All	Immedi- ately		
28 PnA50	4	Reverse Softw Limit	/are	-1,073,741,823 to 1,073,741,823	1 reference unit	-1073741 823	All	Immedi- ately		
29 PnA52	4	Reserved para (Do not chang		-	-	0	All	Immedi- ately		
	4	Speed Unit Selection*2		0h to 4h	-	0h	All	After restart		
41 PnA82		0001h P 0002h P 0003h m	deference dercentae nin <sup>-1</sup> *4	rence units/s rence units/min entage (%) of rated speed*3,*4  1 *4  mum motor speed/40000000h*5						
42 PnA84	4	Speed Base Unit Selection*3, *4, *5 (Set the value of n from the following formula: Speed unit selection (41 PnA82) × 10 <sup>n</sup> )		-3 to 3	-	0	All	After restart	Unit settings	
40	4	Position Unit Selection		0h	-	0h	All	After restart		
43 PnA86		0000h R	eference	e units			Contin			

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					0 111 11		ontinued tr	'		
Parameter No.	Size	Nar	ne	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classi- fication	
44 PnA88	4	Position Ba Selection (Set the val from the fo formula: Po selection (4 × 10 <sup>n</sup> )	lue of n llowing osition un		-	0	All	After restart		
	4	Acceleratio Selection	n Unit	Oh	-	0h	All	After restart		
45 PnA8A		0000h	Referen	ce units/s <sup>2</sup>						
46 PnA8C	4	Acceleration Unit Select (Set the valid from the formula: Accurate Selection PnA8A) x 1	ion lue of n llowing celeration on (45	4 to 6	-	4	All	After restart		
	4	Torque Unit Selection	t	1h, 2h	-	1h	All	After restart	-	
47		0001h	Parcon	tage (%) of rated tord	7110*6					
PnA8E		0001h		um torque/40000000						
		MAXIMUM TOTAL TOTA								
48 PnA90	4	Torque Bas Selection*6. (Set the val from the fo formula: To selection (4 × 10 <sup>n</sup> )	, *7 lue of n llowing orque uni	-5 to 0	-	0	All	After restart	Unit settings	
	4	Supported tems (read		-	_	0601011F h	All	-	- D	
					1		1			
		Speed Unit								
		Bit 0		Reference units/s (1: Enabled)						
		Bit 1 Bit 2		Reference units/min Percentage (%) of rat	•	nabled)				
		Bit 3		min <sup>-1</sup> (rpm) (1: Enable						
		Bit 4		Maximum motor spe		1: Enabled)				
		Bits 5 to 7		Reserved (0: Disable		/				
		Position Ur	nits							
49 PnA92		Bit 8		Reference units (1: E						
TIMBL		Bits 9 to 18		Reserved (0: Disable	d).					
		Acceleration		Deference1-2 /4	. English					
		Bit 16 Bit 17		Reference units/s <sup>2</sup> (1		ach rated ar	and) (O: Dica	hlad)		
		Bits 18 to 2		ms (acceleration time Reserved (0: Disable		acii ialeu st	beeu) (U: DISa	DI <del>C</del> U)		
		Torque Uni			~,·					
		Bit 24		N·m (0: Disabled)						
		Bit 25		Percentage (%) of rated torque (1: Enabled)						
		Bit 26		Maximum torque/400	000000h (1: En	abled)				
		Bits 27 to 3	31	Reserved (0: Disable	d).					

#### 5.2.3 List of MECHATROLINK-III Common Parameters

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Parameter No.	Size	Nan	ne	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classi
61 PnAC2	4	Speed Loop	o Gain	1,000 to 2,000,000	0.001 Hz [0.1 Hz]	40000	All	Immedi- ately	
62 PnAC4	4	Speed Loop Time Const		150 to 512,000	1 μs [0.01 ms]	20000	All	Immedi- ately	
63 PnAC6	4	Position Lo	op Gain	1,000 to 2,000,000	0.001/s [0.1/s]	40000	All	Immedi- ately	
64 PnAC8	4	Feedforwar pensation	d Com-	0 to 100	1%	0	All	Immedi- ately	
65 PnACA	4	Position Logral Time C		0 to 5,000,000	1 μs [0.1 ms]	0	All	Immedi- ately	
66 PnACC	4	Positioning pleted Widt	Com- h	0 to 1,073,741,824	1 reference unit	7	All	Immedi- ately	
67 PnACE	4	Near Signal	Width	1 to 1,073,741,824	1 reference unit	10737418 24	All	Immedi- ately	
81 PnB02	4	Exponential ation/Decel Time Const	eration	0 to 510,000	1 μs [0.1 ms]	0	All	Immedi- ately*8	
82 PnB04	4	Movement . Time	Average	0 to 510,000	1 μs [0.1 ms]	0	All	Immedi- ately*8	
83 PnB06	4	External Po Final Travel		-1,073,741,823 to 1,073,741,823	1 reference unit	100	All	Immedi- ately	
84 PnB08	4	Origin Appr Speed	oach	Oh to 3FFFFFFh	10 <sup>-3</sup> min <sup>-1</sup>	× 5,000h reference units/s con- verted to 10 <sup>-3</sup> min <sup>-1</sup>	All	Immedi- ately	
85 PnB0A	4	Origin Retu Speed	rn Creep	Oh to 3FFFFFFh	10 <sup>-3</sup> min <sup>-1</sup>	× 500h reference units/s con- verted to 10 <sup>-3</sup> min <sup>-1</sup>	All	Immedi- ately	Tuning
86 PnB0C	4	Final Travel for Origin R		-1,073,741,823 to 1,073,741,823	1 reference unit	100	All	Immedi- ately	
	4	Fixed Monit tion 1	or Selec-	Oh to Fh	-	1h	All	Immedi- ately	
87 PnB0E		0000h 0001h 0002h 0003h 0004h 0005h 0006h 0007h 0008h 0009h 000Ah 000Bh 000Ch 000Dh 000Eh 000Fh	Reserved CMN1 (co CMN2 (co OMN1 (o	(undefined value). (undefined value). ommon monitor 1) ommon monitor 2) ptional monitor 2)					

# Continued from previous page.

Parameter No.	Size	Nan	пе	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Clas	
	4	Fixed Monit tion 2	or Selec-	0h to Fh	-	0h	All	Immedi- ately		
88 PnB10		0000h to 000Fh The settings are the same as those for Fixed Monitor Selection 1.								
	4	SEL_MON Monitor Sel	(CMN1) ection 1	0h to 9h	_	0h	All	Immedi- ately		
		0000h	TPOS (target position in reference coordinate system)							
		0001h	IPOS (reference position in reference coordinate system)							
		0002h	POS_OFFSET (offset set in POS_SET (Set Coordinate System) command)							
		0002h	TSPD (target speed)							
		0000h	,	(speed limit)						
		0004H		I (torque limit)						
		000311	SV_STAT Monitor I Byte 1: C 00h: Ph 01h: Ph 02h: Ph 03h: Ph	(servo actual of Opescription Current communase 0 ase 1 ase 2	ications phase					
			00h: Position control mode 01h: Speed control mode 02h: Torque control mode Byte 3: Reserved Byte 4: Expansion signal monitor						neters	
		0006h	Bit	Name	Description	Value			Iran	
			Bit 0	LT_RDY1	Processing statulatch detection full LT_REQ1 in SV0	or	Latch dete not yet pro cessed.  Processing detection in	latch	Command-related parameters	
89					-	'	progress.		la C	
PnB12			Bit 1	LT_RDY1	Processing status f latch detection for LT_REQ2 in SVCM D_CTRL region	or	Latch dete not yet pro cessed.		Comm	
						CM- 1	Processing detection in progress.			
						0	Phase C	<del></del>		
						1	External in	out		
			Bits 2 and 3	LT_SEL1R	Latch signal	2	signal 1  External in signal 2	out		
						3	External in	out		
						0	Phase C			
			D'1 4			1	External in signal 1	out		
			Bits 4 and 5	LT_SEL2R	Latch signal	2	External in signal 2	out		
				_		3	External in signal 3	out		
		0007h	Bit 6	Reserved (0)	).					
		0007h 0008h	Reserved	POS (Low)			coder positio			
			_		Upper 32 bits	s of initial er	reference dat coder positio	n con-		
		0009h	INH_PGF	POS (High)			reference dat			

Parameter Lists

#### 5.2.3 List of MECHATROLINK-III Common Parameters

Continued from previous page.

Parameter	Size	Name	Setting Range	Setting Unit	Default	Applicable	When	Classi-
No.	Size			[Resolution]	Setting	Motors	Enabled	fication
	4	SEL_MON (CMN2) Monitor Selection 2	Oh to 9h	_	0h	All	Immedi- ately	
		WOTHER GOICETON 2	-				atory	
8A		00001-1-						
PnB14		0000h to 0009h The set	tings are the same as	those for SEL	_MON Monit	tor Selection	1.	
8B	4	Origin Detection	0 to 250	1 reference	10	All	Immedi-	
PnB16	7	Width	0 10 200	unit	10	7311	ately	
8C PnB18	4	Forward Torque Lir	nit 0 to 800	1%	100	All	Immedi- ately	
8D							Immedi-	
PnB1A	4	Reverse Torque Lir	nit 0 to 800	1%	100	All	ately	
8E	4	Zero Speed Detec-		10 <sup>-3</sup> min <sup>-1</sup>	20000	All	Immedi-	1
PnB1C	7	tion Range	10,000,000	10 111111	20000	7311	ately	ω
8F PnB1E	4	Speed Coincidence Signal Detection	0 to 100,000	10 <sup>-3</sup> min <sup>-1</sup>	10000	All	Immedi- ately	neter
FIIDIE		Width					atery	aran
	4	Servo Command Control Field Enabl Disable Selections (read only)	le/	_	0FFF3F3F h	All	_	Command-related parameters
		(road orny)						d-re
		Bit 0	CMD PAUSE (1: Ena	ahled)				nan
		Bit 1	CMD_CANCEL (1: E	,				omr
		Bits 2 and 3	STOP_MODE (1: En					Ŏ
		Bits 4 and 5	ACCFIL (1: Enabled)					
		Bits 6 and 7	Reserved (0: Disable	ed).				
90		Bit 8	LT_REQ1 (1: Enabled	d)				
PnB20		Bit 9	LT_REQ2 (1: Enabled	d)				
		Bits 10 and 11	LT_SEL1 (1: Enabled	d)				
		Bits 12 and 13	LT_SEL2 (1: Enabled) Reserved (0: Disabled).					
		Bits 14 and 15						
		Bits 16 to 19	SEL_MON1 (1: Enab					
		Bits 20 to 23	SEL_MON2 (1: Enab					
		Bits 24 to 27	SEL_MON3 (1: Enab					
		Bits 28 to 31	Reserved (0: Disable	ed).				
								1

Continued from previous page.

Parameter No.	Size	Name	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classi- fication		
	4	Servo Status Field Enable/Disable Selections (read only)	-	-	-	All	_			
		Bit 0	CMD_PAUSE_CMP	(1: Enabled)						
		Bit 1	CMD_CANCEL_CM	P (1: Enabled)						
		Bit 2 and 3	Reserved (0: Disable	ed).						
		Bits 4 and 5	ACCFIL (1: Enabled)	)						
		Bits 6 and 7	Reserved (0: Disable	ed).						
		Bit 8	L_CMP1 (1: Enabled	d)						
91		Bit 9	L_CMP2 (1: Enabled	d)						
PnB22		Bit 10	POS_RDY (1: Enable	ed)						
		Bit 11	PON (1: Enabled)							
		Bit 12	M_RDY (1: Enabled)	1						
		Bit 13	SV_ON (1: Enabled)							
		Bits 14 and 15 Reserved (0: Disabled).								
		Bits 16 to 19	SEL_MON1 (1: Enak	oled)				nete		
		Bits 20 to 23	SEL_MON2 (1: Enak	oled)				aran		
		Bits 24 to 27	SEL_MON3 (1: Enak	oled)				bg p		
		Bits 28 to 31	Reserved (0: Disable	ed).				atec		
				I		I		Command-related parameters		
	4	Output Bit Enable/ Disable Selections (read only)	-	_	007F01F0 h	All	_	Comn		
		Bits 0 to 3	Reserved (0: Disable	ed).						
		Bit 4	V_PPI (1: Enabled)							
		Bit 5	P_PPI (1: Enabled)							
		Bit 6	P_CL (1: Enabled)							
92		Bit 7	N_CL (1: Enabled)							
PnB24		Bit 8	G_SEL (1: Enabled)							
		Bits 9 to 11	G_SEL (0: Disabled)	)						
		Bits 12 to 15	Reserved (0: Disable	ed).						
		Bits 16 to 19	BANK_SEL (1: Enab	oled)						
		Bits 20 to 22	SO1 to SO3 (1: Ena	bled)						
		Bit 23	Reserved (0: Disable	ed).						
		Bits 24 to 31	Reserved (0: Disable	ed).						

#### 5.2.3 List of MECHATROLINK-III Common Parameters

Continued from previous page.

Parameter No.	Size	Name	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classi- fication
	4	Input Bit Enable/Dis able Selections (rea only)		_	FF0FFEFE h	All	_	
93 PnB26		Bit 0 Bit 1 Bit 2 Bit 3 Bit 4 Bit 5 Bit 6 Bit 7 Bit 8 Bit 9 Bit 10 Bit 11 Bit 12 Bit 13 Bit 14 Bit 15 Bit 18 Bit 14 Bit 15 Bit 16 Bit 17 Bit 18 Bit 19 Bits 20 to 23 Bits 24 to 31	Reserved (0: Disabl DEC (1: Enabled) P-OT (1: Enabled) N-OT (1: Enabled) EXT1 (1: Enabled) EXT2 (1: Enabled) EXT3 (1: Enabled) EXT3 (1: Enabled) ESTP (1: Enabled) Reserved (0: Disabl BRK_ON (1: Enabled) N-SOT (1: Enabled) N-SOT (1: Enabled) DEN (1: Enabled) DEN (1: Enabled) PSET (1: Enabled) Y_CII (1: Enabled) V_LIM (1: Enabled) V_LIM (1: Enabled) V_CMP (1: Enabled) Reserved (0: Disabl IO_STS1 to IO_STS	ed). sd)				Command-related parameters

- \*1. The parameter setting is enabled after SENS\_ON command execution is completed.
- \*2. When using fully-closed loop control, set the reference units/s.
- \*3. If you set the Speed Unit Selection (parameter 41: PnA82) to 0002h adjust the Speed Base Unit Selection (parameter 42: PnA84) to satisfy the following formula.

  Rotary Servomotor: 1.28 × Rated speed [min<sup>-1</sup>] × 10<sup>PnA84</sup> < Maximum speed [min<sup>-1</sup>] Linear Servomotor: 1.28 × Rated speed [mm/s] × 10<sup>PnA84</sup> < Maximum speed [mm/s]
- \*4. If you set the Speed Unit Selection (parameter 41: PnA82) to either 0002h or 0003h, set the Speed Base Unit Selection (parameter 42: PnA84) to a number between -3 and 0.
- \*5. If you set the Speed Unit Selection (parameter 41: PnA82) to 0004h, set the Speed Base Unit Selection (parameter 42: PnA84) to 0.
- \*6. If you set the Torque Unit Selection (parameter 47: PnA8E) to 0001h, adjust the Torque Base Unit Selection (parameter 48: PnA90) to satisfy the following formula. 128 × 10<sup>PnA90</sup> < Maximum torque [%]</p>
- \*7. If you set the Torque Unit Selection (parameter 47: PnA8E) to 0002h, set the Torque Base Unit Selection (parameter 48: PnA90) to 0.
- \*8. Change the setting when the reference is stopped (i.e., while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

# Parameter Recording Table

5.2.4

Use the following table to record the settings of the parameters.

Parameter No.	Default Setting	Name	When Enabled
Pn000	0000h	Basic Function Selections 0	After restart
Pn001	0000h	Application Function Selections 1	After restart
Pn002	0011h	Application Function Selections 2	After restart
Pn006	0002h	Application Function Selections 6	Immediately
Pn007	0000h	Application Function Selections 7	Immediately
Pn008	4000h	Application Function Selections 8	After restart
Pn009	0010h	Application Function Selections 9	After restart
Pn00A	0001h	Application Function Selections A	After restart
Pn00B	0000h	Application Function Selections B	After restart
Pn00C	0000h	Application Function Selections C	After restart
Pn00D	0000h	Application Function Selections D	Immediately
Pn00F	0000h	Application Function Selections F	After restart
Pn021	0000h	Reserved parameter	_
Pn022	0000h	Reserved parameter	_
Pn040	0000h	Σ-V Compatible Function Switch	After restart
Pn080	0000h	Application Function Selections 80	After restart
Pn081	0000h	Application Function Selections 81	After restart
Pn100	400	Speed Loop Gain	Immediately
Pn101	2000	Speed Loop Integral Time Constant	Immediately
Pn102	400	Position Loop Gain	Immediately
Pn103	100	Moment of Inertia Ratio	Immediately
Pn104	400	Second Speed Loop Gain	Immediately
Pn105	2000	Second Speed Loop Integral Time Constant	Immediately
Pn106	400	Second Position Loop Gain	Immediately
Pn109	0	Feedforward	Immediately
Pn10A	0	Feedforward Filter Time Constant	Immediately
Pn10B	0004h	Gain Application Selections	*1
Pn10C	200	Mode Switching Level for Torque Reference	Immediately
Pn10D	0	Mode Switching Level for Speed Reference	Immediately
Pn10E	0	Mode Switching Level for Acceleration	Immediately
Pn10F	0	Mode Switching Level for Position Deviation	Immediately

#### 5.2.4 Parameter Recording Table

Continued from previous page.

D	Continued from previous page						
Parameter No.	Default Setting	Name	When Enabled				
Pn11F	0	Position Integral Time Constant	Immediately				
Pn121	100	Friction Compensation Gain	Immediately				
Pn122	100	Second Friction Compensation Gain	Immediately				
Pn123	0	Friction Compensation Coefficient	Immediately				
Pn124	0	Friction Compensation Frequency Correction	Immediately				
Pn125	100	Friction Compensation Gain Correction	Immediately				
Pn131	0	Gain Switching Time 1	Immediately				
Pn132	0	Gain Switching Time 2	Immediately				
Pn135	0	Gain Switching Waiting Time 1	Immediately				
Pn136	0	Gain Switching Waiting Time 2	Immediately				
Pn139	0000h	Automatic Gain Switching Selections 1	Immediately				
Pn13D	2000	Current Gain Level	Immediately				
Pn13F	0	Less-Deviation Control 2 Second Position Integral Time Constant	Immediately				
Pn140	0100h	Model Following Control- Related Selections	Immediately				
Pn141	500	Model Following Control Gain	Immediately				
Pn142	1000	Model Following Control Gain Correction	Immediately				
Pn143	1000	Model Following Control Bias in the Forward Direction	Immediately				
Pn144	1000	Model Following Control Bias in the Reverse Direction	Immediately				
Pn145	500	Vibration Suppression 1 Frequency A	Immediately				
Pn146	700	Vibration Suppression 1 Frequency B	Immediately				
Pn147	1000	Model Following Control Speed Feedforward Compensation	Immediately				
Pn148	500	Second Model Following Control Gain	Immediately				
Pn149	1000	Second Model Following Control Gain Correction	Immediately				
Pn14A	800	Vibration Suppression 2 Frequency	Immediately				
Pn14B	100	Vibration Suppression 2 Correction	Immediately				
Pn14F	0021h	Control-Related Selections	After restart				
Pn160	0010h	Anti-Resonance Control- Related Selections	Immediately				
Pn161	1000	Anti-Resonance Frequency	Immediately				
Pn162	100	Anti-Resonance Gain Correction	Immediately				

			Continued from previous page
Parameter No.	Default Setting		Name When Enabled
Pn163	0		Anti-Resonance Damping Gain Immediately
Pn164	0		Anti-Resonance Filter Time Constant 1 Correction Immediately
Pn165	0		Anti-Resonance Filter Time Constant 2 Correction Immediately
Pn166	0		Anti-Resonance Damping Gain 2 Immediately
Pn170	1400h		Tuning-less Function- Related Selections *1
Pn181	0		Mode Switching Level for Speed Reference Immediately
Pn182	0		Mode Switching Level for Acceleration Immediately
Pn190	0100h		Less-Deviation Control- Related Switches After restart
Pn191	1000		Less-Deviation Control 1 Feedforward Gain Immediately
Pn192	1000		Less-Deviation Control 1 Second Feedforward Gain Immediately
Pn193	30		Less-Deviation Control 1 Feedforward Filter Time Constant Immediately
Pn195	2102h		Less-Deviation Function Selection Switches After restart
Pn196	1000		Less-Deviation Control 2 Speed Feedforward Gain Immediately
Pn197	50		Less-Deviation Control 2 Torque Feedforward Filter Time Constant  Immediately
Pn198	1000		Less-Deviation Control 2 Forward Torque Feedforward Gain
Pn199	1000		Less-Deviation Control 2 Reverse Torque Feedforward Gain
Pn19A	10000		Less-Deviation Control 2 Incomplete Integration Rate
Pn19B	0		Less-Deviation Control 2 Rotary Servomotor Viscous Friction Compensation Coefficient
Pn19C	0		Reserved parameter Immediately Less-Deviation Control 2
Pn19D	0		Linear Servomotor Viscous Friction Compensation Coefficient
Pn19E	0		Reserved parameter Immediately
Pn19F	0		Less-Deviation Control 2 Torque Feedforward Moving Average Time
Pn1A4	36		Reserved parameter Immediately
Pn1A5	0		Reserved parameter Immediately
Pn1AE	0		Reserved parameter Immediately
Pn1AF	0		Reserved parameter Immediately

Pn205

65535

Continued on next page.

After restart

Multiturn Limit

#### 5.2.4 Parameter Recording Table

Continued from previous page.

Parameter No.         Default Setting         Name         When Enabled Enabled           Pn207         1000h         Position Control Function Selections         After restart Selections           Pn208         32768         Number of External Scale Pitches         After restart Selections           Pn209         16         Electronic Gear Ratio (Numeration)         After restart Electronic Gear Ratio (Denominator)         After restart Selections           Pn210         1         Electronic Gear Ratio (Denominator)         After restart Selections           Pn221         2048         Number of Encoder Output After restart Unions         After restart Selections           Pn222         0000h         Position Control Expansion Function Selections         After restart Function Selections           Pn231         0         Backlash Compensation Immediately Immediately Immediately Time Constant         Immediately Immedia			Continued from p	1 0
Page		Default Setting		
Pn20E         16         Pitches         After restart           Pn210         1         Electronic Gear Ratio (Numerator)         After restart           Pn210         1         Electronic Gear Ratio (Denominator)         After restart           Pn212         2048         Number of Encoder Output After restart           Pn22A         0000h         Fully-closed Control Selections         After restart           Pn230         0000h         Position Control Expansion Function Selections         After restart           Pn231         0         Backlash Compensation Immediately           Pn233         0         Backlash Compensation Immediately           Pn234         0         Second Position Reference Acceleration Plant Resolution After restart         Immediately           Pn234         0         Encoder Output Resolution After restart         Immediately           Pn284         20         Encoder Output Resolution After restart         Immediately           Pn282         0         Linear Encoder Scale Pitch After restart         After restart           Pn304         500         Jogging Speed Immediately         Immediately           Pn305         0         Soft Start Decoleration Immediately         Immediately           Pn306         0         Speed Feedback Filter Time	Pn207	1000h		After restart
Pn210 1 Electronic Gear Ratio (Denominator) After restart Electronic Gear Ratio (Denominator) After restart Number of Encoder Output Pulses After restart Pulses (Pn22A) 0000h Position Control Selections After restart Pulses (Pn2A) 0000h Position Control Expansion After restart Function Selections (Pn2A) 0000h Position Control Expansion After restart Function Selections (Pn2A) 0000h Position Control Expansion After restart Function Selections (Pn2A) 0000h Position Control Expansion Function Selections (Pn2A) 0000h Position Position Control Expansion Immediately (Pn2A) 0000h Passition Control Expansion Immediately (Pn2A) 0000h Passition Position Reference Acceleration/Deceleration Immediately (Pn2A) 0000h Position Reference Acceleration/Deceleration Immediately (Pn2A) 0000h Pn3A 0000	Pn20A	32768		After restart
Pn212 2048   Number of Encoder Output Pulses   Pn22A	Pn20E	16		After restart
Pn22A 0000h Fully-closed Control Selections After restart fully-closed Control Selections Pn230 0000h Position Control Expansion Function Selections After restart function Selections Immediately Pn231 0 Backlash Compensation Immediately Backlash Compensation Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Dn304 500 Encoder Output Resolution After restart Dn304 500 Jugging Speed Immediately Immediately Immediately Speed Feedback Filter Time Constant Immediately Time Constant Immediately Dn306 O Speed Feedback Filter Time Constant Immediately Dn308 O Deceleration Time Immediately Dn308 O Deceleration Time Immediately Dn308 O Deceleration Time For Servo OFF and Forced Stops Immediately Dn300 O Deceleration Time for Servo OFF and Forced Stops Immediately Dn310 O000h Vibration Detection Selections Detection Selections Detection Selections Detection Selections Detection Selections Detection Level Immediately Dn310 Deceleration Detection Level Immediately Dn310 Deceleration Detection Level Immediately Dn310 Detection Level Immediately Dn310 Detection Level Immediately Dn310 Detection Level Immediately Dn310 Detection Level Immediately Dn310 Detection Level Immediately Dn311 Dn	Pn210	1		After restart
Pn230 0000h Position Control Expansion Function Selections Pn231 0 Backlash Compensation Immediately Backlash Compensation Immediately Backlash Compensation Immediately Backlash Compensation Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Deceleration Immediately Deceleration Immediately Deceleration Immediately Immediately Immediately Immediately Immediately Immediately Immediately Deceleration Immediately Immediately Deceleration Immediately Immediately Deceleration Immediately Immediately Immediately Deceleration Immediately Immediately Deceleration Immediately Immediately Deceleration Immediately Immediately Deceleration Immediately Immediately Deceleration Detection Selections Immediately Deceleration Detection Selections Immediately Deceleration Detection Dete	Pn212	2048		After restart
Pn231 0 Backlash Compensation Immediately Pn233 0 Backlash Compensation Immediately Immediately Pn233 0 Backlash Compensation Immediately Immediately Pn234 0 Backlash Compensation Immediately Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant Immediately Time Constant After restart Pn204 500 Encoder Output Resolution After restart Jogging Speed Immediately Pn305 0 Soft Start Acceleration Immediately Soft Start Acceleration Immediately Soft Start Deceleration Immediately Pn306 0 Soft Start Deceleration Immediately Immediately Pn308 0 Soft Start Deceleration Immediately Deceleration Time Immediately Deceleration Time Immediately Deceleration Time Sorvo OFF and Forced Stops Speed Feedback Filter Time Constant Immediately OFF and Forced Stops Speed Feedback Filter Immediately Deceleration Time Immediately Deceleration Time Immediately Deceleration Time Immediately Speed Feedback Filter Immediately Speed Feedback Filter Immediately Deceleration Time Immediately Deceleration Time Immediately Deceleration Time Immediately Deceleration Time Immediately Immediately Deceleration Detection Selections Selections Detection Selection Selection Selection Selection Detection Detection Selection Selection Selection Detection Detection Selection Selection Selection Selection Detection Selection	Pn22A	0000h		After restart
Pn233         0         Backlash Compensation Time Constant         Immediately           Pn234         0         Second Position Reference Acceleration/Deceleration Time Constant         Immediately Time Constant           Pn281         20         Encoder Output Resolution         After restart           Pn304         500         Linear Encoder Scale Pitch         After restart           Pn304         500         Jogging Speed         Immediately           Pn305         0         Soft Start Acceleration Time         Immediately           Pn306         0         Soft Start Deceleration Time for Serool Time Constant         Immediately           Pn308         0         Speed Feedback Filter Time Constant         Immediately           Pn30A         0         Deceleration Time for Serool OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and Forced Stops OFF and	Pn230	0000h		After restart
Pn234 0 Second Position Reference Acceleration/Deceleration Prime Constant Immediately Fn281 20 Encoder Output Resolution After restart Linear Encoder Scale Pitch After restart Pn304 500 Jogging Speed Immediately Soft Start Acceleration Immediately Pn305 0 Soft Start Acceleration Immediately Soft Start Deceleration Immediately Soft Start Deceleration Immediately Time Pn306 0 Soft Start Deceleration Immediately Time Pn308 0 Soft Start Deceleration Immediately Time Constant Immediately Pn308 0 Soft Start Deceleration Time for Servo OFF and Forced Stops Immediately Pn30C 0 Soft Start Deceleration Time for Servo OFF and Forced Stops Immediately Pn30C 0 Soft Start Deceleration Time for Servo OFF and Forced Stops Immediately Vibration Detection Selections Vibration Detection Selections Vibration Detection Sensitivity Vibration Detection Sensitivity Pn312 50 Vibration Detection Level Immediately Pn316 10000 Maximum Motor Speed After restart Moment of Inertia Calculation Starting Level Immediately Vibration Detection Level Immediately Pn383 50 Jogging Speed Immediately Pn384 10 Vibration Detection Level Immediately Pn385 50 Maximum Motor Speed After restart First Stage First Torque Reference Filter Time Constant First Stage First Torque Reference Filter Time Constant Immediately Pn403 800 Reverse Torque Limit Immediately Immediately Limit Immediately Immediate	Pn231	0	Backlash Compensation	Immediately
Pn281         0         Acceleration/Deceleration Time Constant         Immediately Time Constant           Pn282         0         Encoder Output Resolution         After restart           Pn304         500         Linear Encoder Scale Pitch         After restart           Pn305         0         Soft Start Acceleration Time Immediately           Pn306         0         Soft Start Deceleration Time Immediately           Pn308         0         Speed Feedback Filter Time Constant         Immediately           Pn30A         0         Deceleration Time for Servo OFF and Forced Stops         Immediately           Pn30C         0         Speed Feedforward Average Movement Time         Immediately           Pn310         0000h         Vibration Detection Selections         Immediately           Pn311         100         Vibration Detection Sensitivity         Immediately           Pn312         50         Vibration Detection Level         Immediately           Pn316         10000         Maximum Motor Speed         After restart           Pn324         300         Moment of Inertia Calculation Starting Level         Immediately           Pn383         50         Jogging Speed         Immediately           Pn384         10         Vibration Detection Level	Pn233	0		Immediately
Pn282         0         Linear Encoder Scale Pitch         After restart           Pn304         500         Jogging Speed         Immediately           Pn305         0         Soft Start Acceleration Time         Immediately           Pn306         0         Soft Start Deceleration Time         Immediately           Pn308         0         Speed Feedback Filter Time Constant         Immediately           Pn30A         0         Deceleration Time for Servo OFF and Forced Stops         Immediately           Pn30C         0         Speed Feedforward Average Movement Time         Immediately           Pn310         0000h         Vibration Detection Selections         Immediately           Pn311         100         Vibration Detection Sensitivity         Immediately           Pn312         50         Vibration Detection Level         Immediately           Pn316         10000         Maximum Motor Speed         After restart           Pn324         300         Moment of Inertia Calculation Starting Level         Immediately           Pn383         50         Jogging Speed         Immediately           Pn384         10         Vibration Detection Level         Immediately           Pn385         50         Maximum Motor Speed         After	Pn234	0	Acceleration/Deceleration	Immediately
Pn304         500         Jogging Speed         Immediately           Pn305         0         Soft Start Acceleration Time         Immediately           Pn306         0         Soft Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Time for Start Deceleration Detection Detection Starting Level Deceleration Starting Level Deceleration Starting Level Deceleration Detection Level Deceleration Starting Level Deceleration Deceleratio	Pn281	20	Encoder Output Resolution	After restart
Pn305         0         Soft Start Acceleration Time         Immediately           Pn306         0         Soft Start Deceleration Time         Immediately           Pn308         0         Speed Feedback Filter Time Constant         Immediately           Pn30A         0         Deceleration Time for Servo OFF and Forced Stops         Immediately           Pn30C         0         Speed Feedforward Average Movement Time         Immediately           Pn310         0000h         Vibration Detection Selections         Immediately           Pn311         100         Vibration Detection Sensitivity         Immediately           Pn312         50         Vibration Detection Level         Immediately           Pn316         10000         Maximum Motor Speed         After restart           Pn324         300         Moment of Inertia Calculation Starting Level         Immediately           Pn383         50         Jogging Speed         Immediately           Pn384         10         Vibration Detection Level         Immediately           Pn385         50         Maximum Motor Speed         After restart           Pn401         100         Forward Torque Limit         Immediately           Pn402         800         Forward Torque Limit         Imm	Pn282	0	Linear Encoder Scale Pitch	After restart
Pn306 0 Time Immediately Pn306 0 Soft Start Deceleration Immediately Pn308 0 Deceleration Time Constant Immediately Pn30A 0 Deceleration Time for Servo OFF and Forced Stops Pn30C 0 Speed Feedforward Average Movement Time Pn310 0000h Vibration Detection Selections Vibration Detection Selections Vibration Detection Sensitivity Pn312 50 Vibration Detection Level Immediately Pn316 10000 Maximum Motor Speed After restart Pn324 300 Moment of Inertia Calculation Starting Level Pn383 50 Jogging Speed Immediately Pn384 10 Vibration Detection Level Immediately Pn385 50 Maximum Motor Speed After restart Pn401 100 Reference Filter Time Constant Pn402 800 Forward Torque Limit Immediately Pn403 800 Reverse Torque Limit Immediately Pn404 100 Reverse External Torque Immediately Pn405 100 Reverse External Torque Immediately Immediately Immediately Immediately Immediately Immediately	Pn304	500	Jogging Speed	Immediately
Pn308 0 Time Immediately Pn308 0 Speed Feedback Filter Time Constant Immediately Pn30A 0 Deceleration Time for Servo OFF and Forced Stops Pn30C 0 Speed Feedforward Average Movement Time Immediately Pn310 0000h Vibration Detection Selections Pn311 100 Vibration Detection Sensitivity Immediately Pn312 50 Vibration Detection Level Immediately Pn316 10000 Maximum Motor Speed After restart Pn324 300 Moment of Inertia Calculation Starting Level Immediately Pn383 50 Jogging Speed Immediately Pn384 10 Vibration Detection Level Immediately Pn385 50 Maximum Motor Speed After restart Pn30B First Stage First Torque Reference Filter Time Constant Pn401 100 Forward Torque Limit Immediately Pn403 800 Forward Torque Limit Immediately Pn404 100 Reverse External Torque Limit Immediately Pn405 100 Reverse External Torque Immediately Immediately Immediately	Pn305	0		Immediately
Pn30A 0 Time Constant Immediately Pn30A 0 Deceleration Time for Servo OFF and Forced Stops Immediately Pn30C 0 Speed Feedforward Average Movement Time Pn310 0000h Vibration Detection Selections Immediately Pn311 100 Vibration Detection Sensitivity Immediately Pn312 50 Vibration Detection Level Immediately Pn316 10000 Maximum Motor Speed After restart Pn324 300 Moment of Inertia Calculation Starting Level Immediately Pn383 50 Jogging Speed Immediately Pn384 10 Vibration Detection Level Immediately Pn385 50 Maximum Motor Speed After restart Pn401 100 Reference Filter Time Constant Pn402 800 Forward Torque Limit Immediately Pn403 800 Reverse Torque Limit Immediately Pn404 100 Reverse External Torque Immediately Pn405 100 Reverse External Torque Immediately Pn405 Immediately	Pn306	0		Immediately
Pn30C 0 Speed Feedforward Average Movement Time Immediately Pn310 0000h Vibration Detection Selections Pn311 100 Vibration Detection Sensitivity Pn312 50 Vibration Detection Level Immediately Pn316 10000 Maximum Motor Speed After restart Pn324 300 Moment of Inertia Calculation Starting Level Immediately Pn383 50 Jogging Speed Immediately Pn384 10 Vibration Detection Level Immediately Pn385 50 Maximum Motor Speed After restart Pn401 100 First Stage First Torque Reference Filter Time Constant Pn402 800 Forward Torque Limit Immediately Pn403 800 Reverse Torque Limit Immediately Pn404 100 Reverse External Torque Immediately Pn405 100 Reverse External Torque Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately	Pn308	0		Immediately
Pn310 0000h Vibration Detection Selections Immediately Pn311 100 Vibration Detection Sensitivity Pn312 50 Vibration Detection Level Immediately Pn316 10000 Maximum Motor Speed After restart Pn324 300 Moment of Inertia Calculation Starting Level Immediately Pn383 50 Jogging Speed Immediately Pn384 10 Vibration Detection Level Immediately Pn385 50 Maximum Motor Speed After restart Pn401 100 Pn401 100 Forward Torque Filter Time Constant Pn402 800 Forward Torque Limit Immediately Pn403 800 Reverse Torque Limit Immediately Pn404 100 Reverse External Torque Limit Immediately Pn405 100 Reverse External Torque Immediately Immediately Immediately Immediately Immediately Pn405 100 Reverse External Torque Immediately Immediately Immediately Immediately Immediately	Pn30A	0		Immediately
Pn311 100 Vibration Detection Sensitivity Pn312 50 Vibration Detection Level Immediately Pn316 10000 Maximum Motor Speed After restart Pn324 300 Moment of Inertia Calculation Starting Level Immediately Pn383 50 Jogging Speed Immediately Pn384 10 Vibration Detection Level Immediately Pn385 50 Maximum Motor Speed After restart Pn401 100 First Stage First Torque Reference Filter Time Constant Forward Torque Limit Immediately Pn403 800 Reverse Torque Limit Immediately Pn404 100 Reverse External Torque Immediately Reverse External Torque Immediately Reverse External Torque Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately Immediately	Pn30C	0	Speed Feedforward Average Movement Time	Immediately
Pn312 50 Vibration Detection Level Immediately Pn316 10000 Maximum Motor Speed After restart Pn324 300 Moment of Inertia Calculation Starting Level Immediately Pn383 50 Jogging Speed Immediately Pn384 10 Vibration Detection Level Immediately Pn385 50 Maximum Motor Speed After restart Pn401 100 First Stage First Torque Reference Filter Time Constant Pn402 800 Forward Torque Limit Immediately Pn403 800 Reverse Torque Limit Immediately Pn404 100 Reverse External Torque Immediately Pn405 100 Reverse External Torque Immediately Pn405 Inmediately	Pn310	0000h		Immediately
Pn31610000Maximum Motor SpeedAfter restartPn324300Moment of Inertia Calculation Starting LevelImmediatelyPn38350Jogging SpeedImmediatelyPn38410Vibration Detection LevelImmediatelyPn38550Maximum Motor SpeedAfter restartPn401100First Stage First Torque Reference Filter Time ConstantImmediatelyPn402800Forward Torque LimitImmediatelyPn403800Reverse Torque LimitImmediatelyPn404100Forward External Torque LimitImmediatelyPn405100Reverse External Torque LimitImmediately	Pn311		tivity	,
Pn324300Moment of Inertia Calculation Starting LevelImmediatelyPn38350Jogging SpeedImmediatelyPn38410Vibration Detection LevelImmediatelyPn38550Maximum Motor SpeedAfter restartPn401100First Stage First Torque Reference Filter Time ConstantImmediatelyPn402800Forward Torque LimitImmediatelyPn403800Reverse Torque LimitImmediatelyPn404100Forward External Torque LimitImmediatelyPn405100Reverse External Torque LimitImmediately				-
Pn383 50 Jogging Speed Immediately Pn384 10 Vibration Detection Level Immediately Pn385 50 Maximum Motor Speed After restart Pn401 100 First Stage First Torque Reference Filter Time Constant Pn402 800 Forward Torque Limit Immediately Pn403 800 Reverse Torque Limit Immediately Pn404 100 Forward External Torque Limit Reverse External Torque Limit Immediately Pn405 100 Reverse External Torque Limit Immediately	Pn316	10000	·	After restart
Pn38410Vibration Detection LevelImmediatelyPn38550Maximum Motor SpeedAfter restartPn401100First Stage First Torque Reference Filter Time ConstantImmediatelyPn402800Forward Torque LimitImmediatelyPn403800Reverse Torque LimitImmediatelyPn404100Forward External Torque LimitImmediatelyPn405100Reverse External Torque LimitImmediately			tion Starting Level	
Pn38550Maximum Motor SpeedAfter restartPn401100First Stage First Torque Reference Filter Time Con- stantImmediatelyPn402800Forward Torque LimitImmediatelyPn403800Reverse Torque LimitImmediatelyPn404100Forward External Torque LimitImmediatelyPn405100Reverse External Torque LimitImmediately			35 5 .	
Pn401100First Stage First Torque Reference Filter Time Con- stantImmediatelyPn402800Forward Torque LimitImmediatelyPn403800Reverse Torque LimitImmediatelyPn404100Forward External Torque LimitImmediatelyPn405100Reverse External Torque LimitImmediately				
Pn401100Reference Filter Time ConstantImmediatelyPn402800Forward Torque LimitImmediatelyPn403800Reverse Torque LimitImmediatelyPn404100Forward External Torque LimitImmediatelyPn405100Reverse External Torque LimitImmediately	Pn385	50	·	After restart
Pn403     800     Reverse Torque Limit     Immediately       Pn404     100     Forward External Torque Limit     Immediately       Pn405     100     Reverse External Torque Limit     Immediately	Pn401	100	Reference Filter Time Con-	Immediately
Pn404 100 Forward External Torque Limit Immediately Pn405 100 Reverse External Torque Limit Immediately	Pn402	800	Forward Torque Limit	Immediately
Pn405 100 Limit Reverse External Torque Limit Immediately	Pn403	800	Reverse Torque Limit	Immediately
Limit Limit	Pn404	100		Immediately
Pn406 800 Emergency Stop Torque Immediately			Limit	
	Pn406	800	Emergency Stop Torque	Immediately

Parameter No.	Default Setting	Continued from p	When Enabled
Pn407	10000	Speed Limit during Torque Control	Immediately
Pn408	0000h	Torque-Related Function Selections	*1
Pn409	5000	First Stage Notch Filter Frequency	Immediately
Pn40A	70	First Stage Notch Filter Q Value	Immediately
Pn40B	0	First Stage Notch Filter Depth	Immediately
Pn40C	5000	Second Stage Notch Filter Frequency	Immediately
Pn40D	70	Second Stage Notch Filter Q Value	Immediately
Pn40E	0	Second Stage Notch Filter Depth	Immediately
Pn40F	5000	Second Stage Second Torque Reference Filter Fre- quency	Immediately
Pn410	50	Second Stage Second Torque Reference Filter Q Value	Immediately
Pn412	100	First Stage Second Torque Reference Filter Time Con- stant	Immediately
Pn416	0000h	Torque-Related Function Selections 2	Immediately
Pn417	5000	Third Stage Notch Filter Frequency	Immediately
Pn418	70	Third Stage Notch Filter Q Value	Immediately
Pn419	0	Third Stage Notch Filter Depth	Immediately
Pn41A	5000	Fourth Stage Notch Filter Frequency	Immediately
Pn41B	70	Fourth Stage Notch Filter Q Value	Immediately
Pn41C	0	Fourth Stage Notch Filter Depth	Immediately
Pn41D	5000	Fifth Stage Notch Filter Frequency	Immediately
Pn41E	70	Fifth Stage Notch Filter Q Value	Immediately
Pn41F	0	Fifth Stage Notch Filter Depth	Immediately
Pn423	0000h	Speed Ripple Compensation Selections	*1
Pn424	50	Torque Limit at Main Circuit Voltage Drop	Immediately
Pn425	100	Release Time for Torque Limit at Main Circuit Voltage Drop	Immediately
Pn426	0	Torque Feedforward Average Movement Time	Immediately
Pn427	0	Speed Ripple Compensa- tion Enable Speed	Immediately

#### 5.2.4 Parameter Recording Table

Continued from previous page.

D !		Continued from p	1 0
Parameter No.	Default Setting	Name	When Enabled
Pn456	15	Sweep Torque Reference Amplitude	Immediately
Pn460	0101h	Notch Filter Adjustment Selections 1	Immediately
Pn475	0000h	Gravity Compensation- Related Selections	After restart
Pn476	0	Gravity Compensation Torque	Immediately
Pn480	10000	Speed Limit during Force Control	Immediately
Pn481	400	Polarity Detection Speed Loop Gain	Immediately
Pn482	3000	Polarity Detection Speed Loop Integral Time Constant	Immediately
Pn483	30	Forward Force Limit	Immediately
Pn484	30	Reverse Force Limit	Immediately
Pn485	20	Polarity Detection Reference Speed	Immediately
Pn486	25	Polarity Detection Reference Acceleration/Deceleration Time	Immediately
Pn487	0	Polarity Detection Constant Speed Time	Immediately
Pn488	100	Polarity Detection Reference Waiting Time	Immediately
Pn48E	10	Polarity Detection Range	Immediately
Pn490	100	Polarity Detection Load Level	Immediately
Pn495	100	Polarity Detection Confirmation Force Reference	Immediately
Pn498	10	Polarity Detection Allowable Error Range	Immediately
Pn49F	0	Speed Ripple Compensation Enable Speed	Immediately
Pn502	20	Rotation Detection Level	Immediately
Pn503	10	Speed Coincidence Detection Signal Output Width	Immediately
Pn506	0	Brake Reference-Servo OFF Delay Time	Immediately
Pn507	100	Brake Reference Output Speed Level	Immediately
Pn508	50	Servo OFF-Brake Com- mand Waiting Time	Immediately
Pn509	20	Momentary Power Interruption Hold Time	Immediately
Pn50A	1881h	Input Signal Selections 1	After restart
Pn50B	8882h	Input Signal Selections 2	After restart
Pn50E	0000h	Output Signal Selections 1	After restart
Pn50F	0100h	Output Signal Selections 2	After restart
Pn510	0000h	Output Signal Selections 3	After restart
Pn511	6543h	Input Signal Selections 5	After restart
Pn512	0000h	Output Signal Inverse Settings	After restart
Pn514	0000h	Output Signal Selections 4	After restart

Parameter No.	Default Setting	Name	When Enabled
Pn516	8888h	Input Signal Selections 7	After restart
Pn51B	1000	Motor-Load Position Deviation Overflow Detection Level	Immediately
Pn51E	100	Position Deviation Over- flow Warning Level	Immediately
Pn520	5242880	Position Deviation Over- flow Alarm Level	Immediately
Pn522	7	Positioning Completed Width	Immediately
Pn524	1073741824	Near Signal Width	Immediately
Pn526	5242880	Position Deviation Over- flow Alarm Level at Servo ON	Immediately
Pn528	100	Position Deviation Over- flow Warning Level at Servo ON	Immediately
Pn529	10000	Speed Limit Level at Servo ON	Immediately
Pn52A	20	Multiplier per Fully-closed Rotation	Immediately
Pn52B	20	Overload Warning Level	Immediately
Pn52C	100	Base Current Derating at Motor Overload Detection	After restart
Pn530	0000h	Program Jogging-Related Selections	Immediately
Pn531	32768	Program Jogging Travel Distance	Immediately
Pn533	500	Program Jogging Movement Speed	Immediately
Pn534	100	Program Jogging Acceleration/Deceleration Time	Immediately
Pn535	100	Program Jogging Waiting Time	Immediately
Pn536	1	Program Jogging Number of Movements	Immediately
Pn550	0	Analog Monitor 1 Offset Voltage	Immediately
Pn551	0	Analog Monitor 2 Offset Voltage	Immediately
Pn552	100	Analog Monitor 1 Magnifi- cation	Immediately
Pn553	100	Analog Monitor 2 Magnification	Immediately
Pn55A	1	Power Consumption Monitor Unit Time	Immediately
Pn560	400	Residual Vibration Detection Width	Immediately
Pn561	100	Overshoot Detection Level	Immediately
Pn581	20	Zero Speed Level	Immediately
Pn582	10	Speed Coincidence Detection Signal Output Width	Immediately
Pn583	10	Brake Reference Output Speed Level	Immediately
Pn584	10000	Speed Limit Level at Servo ON	Immediately

#### 5.2.4 Parameter Recording Table

Continued from previous page.

		Continued from p	revious page.
Parameter No.	Default Setting	Name	When Enabled
Pn585	50	Program Jogging Move- ment Speed	Immediately
Pn586	0	Motor Running Cooling Ratio	Immediately
Pn587	0000h	Polarity Detection Execu- tion Selection for Absolute Linear Encoder	Immediately
Pn600	0	Regenerative Resistor Capacity	Immediately
Pn601	0	Dynamic Brake Resistor Allowable Energy Consumption	After restart
Pn603	0	Regenerative Resistance	Immediately
Pn604	0	Dynamic Brake Resistance	After restart
Pn61A	0000h	Overheat Protection Selections	After restart
Pn61B	250	Overheat Alarm Level	Immediately
Pn61C	100	Overheat Warning Level	Immediately
Pn61D	0	Overheat Alarm Filter Time	Immediately
Pn800	1040h	Communications Controls	Immediately
Pn801	0003h	Application Function Selections 6 (Software Limits)	Immediately
Pn803	10	Origin Range	Immediately
Pn804	1073741823	Forward Software Limit	Immediately
Pn806	-1073741823	Reverse Software Limit	Immediately
Pn808 0		Absolute Encoder Origin Offset	Immedi- ately*2
Pn80A 100		First Stage Linear Acceleration Constant	Immedi- ately*3
Pn80B	100	Second Stage Linear Acceleration Constant	Immedi- ately*3
Pn80C	0	Acceleration Constant Switching Speed	Immedi- ately*3
<b>Pn80D</b> 100		First Stage Linear Deceleration Constant	Immedi- ately*3
Pn80E	100	Second Stage Linear Deceleration Constant	Immedi- ately*3
Pn80F	0	Deceleration Constant Switching Speed	Immedi- ately*3
Pn810	0	Exponential Acceleration/ Deceleration Bias	Immedi- ately*3
Pn811	0	Exponential Acceleration/ Deceleration Time Constant	Immedi- ately*3
Pn812	12 0 Movement Average Time		Immedi- ately*3
Pn814	100	External Positioning Final Travel Distance	Immedi- ately*3
Pn816	0000h	Reserved parameter	_
Pn817	50	Origin Approach Speed 1	Immedi- ately*3
Pn818	5	Origin Approach Speed 2	Immedi- ately*3

Continued from previous page.

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Parameter No.	Default Setting	Name	When Enabled
Pn819	100	Final Travel Distance for Origin Return	Immedi- ately*3
Pn81E	0000h	Reserved parameter	_
Pn81F	0010h	Reserved parameter	_
Pn820	0	Forward Latching Area	Immediately
Pn822	0	Reverse Latching Area	Immediately
Pn824	0000h	Option Monitor 1 Selection	Immediately
Pn825	0000h	Option Monitor 2 Selection	Immediately
Pn827	100	Linear Deceleration Constant 1 for Stopping	Immedi- ately*3
Pn829	0	SVOFF Waiting Time (for SVOFF at Deceleration to Stop)	Immediately
Pn82A	1813h	Reserved parameter	_
Pn82B	1D1Ch	Reserved parameter	_
Pn82C	1F1Eh	Reserved parameter	_
Pn82D	0000h	Reserved parameter	_
Pn82E	0000h	Reserved parameter	_
Pn833	0000h	Motion Settings	After restart
Pn834	100	First Stage Linear Acceleration Constant 2	Immedi- ately*3
Pn836 100		Second Stage Linear Acceleration Constant 2	Immedi- ately <sup>*3</sup>
Pn838	0	Acceleration Constant Switching Speed 2	Immedi- ately <sup>*3</sup>
Pn83A	100	First Stage Linear Deceleration Constant 2	Immedi- ately <sup>*3</sup>
Pn83C 100		Second Stage Linear Deceleration Constant 2	Immedi- ately <sup>*3</sup>
Pn83E	0	Deceleration Constant Switching Speed 2	Immedi- ately <sup>*3</sup>
Pn840	100	Linear Deceleration Constant 2 for Stopping	Immedi- ately <sup>*3</sup>
Pn842	0	Second Origin Approach Speed 1	Immedi- ately <sup>*3</sup>
Pn844	0	Second Origin Approach Speed 2	Immedi- ately*3
<b>Pn846</b> 0		POSING Command Scurve Acceleration/Deceleration Rate	Immedi- ately*3
Pn850	0	Number of Latch Sequences	Immediately
Pn851	0	Continuous Latch Sequence Count	Immediately
Pn852	0000h	Latch Sequence 1 to 4 Settings	Immediately
Pn853	0000h Latch Sequence 5 to 8 tings		Immediately
Pn860	0000h	SVCMD_IO Input Signal Monitor Allocations 1	Immediately
Pn861	0000h	SVCMD_IO Input Signal Monitor Allocations 2	Immediately

#### 5.2.4 Parameter Recording Table

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Parameter No.	Default Setting	Name	When Enabled
Pn862	0000h	SVCMD_IO Input Signal Monitor Allocations 3	Immediately
Pn863	0000h	SVCMD_IO Input Signal Monitor Allocations 4	Immediately
Pn868	0000h	SVCMD_IO Output Signal Monitor Allocations 1	Immediately
Pn869	0000h	SVCMD_IO Output Signal Monitor Allocations 2	Immediately
Pn880	-	Station Address Monitor (for maintenance, read only)	Immediately
Pn881	_	Set Transmission Byte Count Monitor [bytes] (for maintenance, read only)	Immediately
Pn882	_	Transmission Cycle Setting Monitor [x 0.25 μs] (for maintenance, read only)	Immediately
Pn883	1	Communications Cycle Setting Monitor [transmission cycles] (for maintenance, read only)	Immediately
Pn884	0000h	Communications Controls 2	Immediately
Pn88A	0	MECHATROLINK Receive Error Counter Monitor (for maintenance, read only)	Immediately
Pn890 to Pn8A6	0h	Command Data Monitor during Alarm/Warning (for maintenance, read only)	Immediately
Pn8A8 to Pn8BE Oh		Response Data Monitor during Alarm/Warning (for maintenance, read only)	Immediately
<b>Pn900</b> 0		Number of Parameter Banks	After restart
Pn901 0		Number of Parameter Bank Members	After restart
Pn902 to 0000h Pn910		Parameter Bank Member Definition	After restart
Pn920 to Pn95F 0000h		Parameter Bank Data (Not saved in nonvolatile memory.)	Immediately
01 _ PnA02		Encoder Type Selection (read only)	_
02 PnA04	_	Motor Type Selection (read only)	_
03 PnA06		Semi-closed/Fully-closed Selection (read only)	_
04 PnA08	-	Rated Motor Speed (read only)	-
05 PnA0A	-	Maximum Output Speed (read only)	-
06 PnA0C	-	Speed Multiplier (read only)	_
07 PnA0E		Rated Torque (read only)	_

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Parameter No.	Default Setting			Name	When Enabled	
08 PnA10	-			Maximum Output Torque (read only)	-	
09 PnA12	-			Torque Multiplier (read only)	_	
0A PnA14	-			Resolution (read only)	_	
0B PnA16	0			Scale Pitch	After restart	
0C PnA18	-			Pulses per Scale Pitch (read only)	_	
21 PnA42	16			Electronic Gear Ratio (Numerator)	After restart	
22 PnA44	1			Electronic Gear Ratio (Denominator)	After restart	
23 PnA46	0			Absolute Encoder Origin Offset	Immedi- ately*2	
24 PnA48	65535			Multiturn Limit Setting	After restart	
25 PnA4A	0000h			Limit Setting	After restart	
26 PnA4C	1073741823	1073741823		Forward Software Limit	Immediately	
27 PnA4E 0				Reserved parameter (Do not change.)	Immediately	
28 PnA50	1 -1073771893			Reverse Software Limit	Immediately	
29 PnA52	0			Reserved parameter (Do not change.)	er (Do Immediately	
41 PnA82	0h			Speed Unit Selection	After restart	
42 PnA84	0			Speed Base Unit Selection	After restart	
43 PnA86	PnA86 Oh F		Position Unit Selection	After restart		
44 PnA88				Position Base Unit Selection	After restart	
45 PnA8A	5 Ob		Acceleration Unit Selection	After restart		
46 PnA8C	4			Acceleration Base Unit Selection	After restart	
47 PnA8E	1h			Torque Unit Selection	After restart	
48 PnA90	48			Torque Base Unit Selection	After restart	
49 PnA92	0601011Fh			Supported Unit Systems (read only)	_	
61 PnAC2	40000			Speed Loop Gain	Immediately	
62 PnAC4	20000			Speed Loop Integral Time Constant	Immediately	
63 PnAC6	Position Loop Ga			Position Loop Gain	Immediately	
64 PnAC8	0			Feedforward Compensation	Immediately	

#### 5.2.4 Parameter Recording Table

Continued from previous page.

Parameter No.	Default Setting	Name	When Enabled
65 PnACA	0	Position Loop Integral Constant	Time Immediately
66 PnACC	7	Positioning Completed Width	Immediately
67 PnACE	1073741824	Near Signal Width	Immediately
81 PnB02	0	Exponential Accelerati Deceleration Time Cor	
82 PnB04	0	Movement Average Tir	me Immedi- ately*3
83 PnB06	100	External Positioning Fi Travel Distance	nal Immediately
84 PnB08	× 5,000h reference units/s converted to 10 <sup>-3</sup> min <sup>-1</sup>	Origin Approach Spee	d Immediately
85 PnB0A	× 500h reference units/s converted to 10 <sup>-3</sup> min <sup>-1</sup>	Origin Return Creep S	peed Immediately
86 PnB0C	100	Final Travel Distance for Origin Return	Immediately
87 PnB0E 1h		Fixed Monitor Selection	n 1 Immediately
88 PnB10	Oh	Fixed Monitor Selection	n 2 Immediately
89 PnB12	Oh	SEL_MON (CMN1) Mo Selection 1	Immediately
8A PnB14	0h	SEL_MON (CMN2) Mo Selection 2	Immediately
8B PnB16	10	Origin Detection Width	Immediately
8C PnB18	100	Forward Torque Limit	Immediately
8D PnB1A	100	Reverse Torque Limit	Immediately
8E PnB1C	20000	Zero Speed Detection Range	Immediately
8F PnB1E	10000	Speed Coincidence Si Detection Width	gnal Immediately
90 PnB20 OFFF3F3Fh		Servo Command Cont Field Enable/Disable S tions (read only)	
91 PnB22 0FFF3F33h		Servo Status Field Ena Disable Selections (rea only)	
92 PnB24	007F01F0h	Output Bit Enable/Disa Selections (read only)	able
93 PnB26	FF0FFEFEh	Input Bit Enable/Disab Selections (read only)	le _

<sup>\*1.</sup> The enable timing depends on the digit that is changed. Refer to the following section for details.

<sup>5.2.2</sup> List of Servo Parameters on page 5-45

<sup>5.2.3</sup> List of MECHATROLINK-III Common Parameters on page 5-81

<sup>\*2.</sup> The parameter setting is enabled after SENS\_ON command execution is completed.

<sup>\*3.</sup> Change the setting when the reference is stopped (i.e., while DEN is set to 1). If you change the setting during operation, the reference output will be affected.

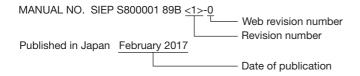
# $\langle | \mathsf{Index} \rangle$

Α
adjustment procedure
adjustment procedures 3-4
advanced autotuning with reference 1-8
advanced autotuning without reference 1-8
alarm code output 4-2
automatic gain switching 1-8
_
В
base block (BB) xii
С
coefficient of speed fluctuation 2-11, 2-14
F
feedforward 1-8
L
less-deviation control 3-2
Linear Servomotor Xii
list of alarms 4-2, 4-59
list of parameters 5-2, 5-44
list of warnings 4-40, 4-97
ist of warnings
M
Main Circuit Cable xii
manual gain switching 3-10, 3-15
model following control 1-8
0
one-parameter tuning 1-8
Р
parameter settings recording table 5-36, 5-89
parameters
notation (numeric settings) Xiii
notation (selecting functions) Xiii
D
Rotary Servomotor xii
notary dervolnotor
S
Servo Drive xii
servo lock xii
servo OFF xii
servo ON xii
Servo System xii
Servomotor xii
SERVOPACK xii
model designations 1-3
specifications 2-7

SigmaWin+xii
storage humidity 2-7, 2-11
storage temperature 2-7, 2-11
surrounding air humidity 2-7, 2-11
surrounding air temperature2-7, 2-11
<u>_</u>
Т
troubleshooting alarms
troubleshooting warnings 4-41, 4-99
tuning-less function 1-8
tuning-less level setting 1-8
.,
V
vibration suppression 1-8
W
warning code output4-40
warning code output

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The revision dates and numbers of the revised manuals are given on the bottom of the back cover.



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#### $\Sigma$ -7-Series AC Servo Drive

# $\Sigma$ -7S SERVOPACK with FT/EX Specification for Tracking Application

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