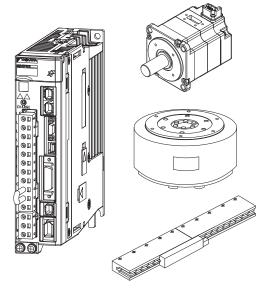
YASKAWA

 Σ -7-Series AC Servo Drive

Σ-7S SERVOPACK with FT/EX Specification for Tracking Application Product Manual

Model: SGD7S-□□□A00□□□□F19□, -□□□A20□□□□□F19□





Basic Information on SERVOPACKs

SERVOPACK Ratings and Specifications

Less-Deviation Control

Maintenance

Parameter Lists

4

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About this Manual

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

Read and understand this manual to ensure correct usage of the Σ -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.

Item				Σ -7-Series AC Servo Drive Σ -7S SERVOPACK Product Manual	
Product Introduction		Item		Voltage/Pulse Train References (Manual No.: SIED S200001, 26) MECHATROLINK-III Communications References	
Interpreting the Name-plates -		The Σ -V Series	_	1.1	
Plates		Product Introduction	1.1	-	
Nation and Servor National Part Names -	Rasio		-	1.2	
SERVO-PACKS		Part Names	_	1.3	
PACKS		Model Designations	-	1.4	
SigmaWin+		SERVOPACKs and	-	1.5	
Ratings 2.1		Functions	1.4	-	
SERVOPACK Over-		SigmaWin+	1.5	-	
Load Protection Characteristics Specifications Spec		Ratings	2.1	-	
Block Diagrams -		load Protection Char-	2.2	_	
PACK External Dimensions - 2.3 Examples of Standard Connections between SERVOPACKs and Peripheral Devices - 2.4 SERVOPACK Installation - Chapter 3 Wiring and Connecting SERVO-PACKs - Chapter 4 Basic Functions That Require Setting before Operation - Chapter 5 Application Functions - Chapter 6 Trial Operation and Actual Operation - Chapter 7	Selecting	Specifications	2.3	-	
External Dimensions – 2.3 Examples of Standard Connections between SERVOPACKs and Peripheral Devices SERVOPACK Installation – Chapter 3 Wiring and Connecting SERVO-PACKs – Chapter 4 Basic Functions That Require Setting before Operation – Chapter 5 Application Functions – Chapter 6 Trial Operation and Actual Operation – Chapter 7		Block Diagrams	_	2.2	
Connections between SERVOPACKs and Peripheral Devices SERVOPACK Installation - Chapter 3 Wiring and Connecting SERVO-PACKs - Chapter 4 Basic Functions That Require Setting before Operation - Chapter 5 Application Functions - Chapter 6 Trial Operation and Actual Operation - Chapter 7	PACK	External Dimensions	-	2.3	
Wiring and Connecting SERVO-PACKS Basic Functions That Require Setting before Operation Application Functions Trial Operation and Actual Operation Chapter 5 Chapter 6 Trial Operation and Actual Operation Chapter 7		Connections between SERVOPACKs and	-	2.4	
PACKs Basic Functions That Require Setting before Operation Application Functions - Chapter 5 Chapter 5 Trial Operation and Actual Operation - Chapter 7	SERVOPA	CK Installation	_	Chapter 3	
ting before Operation Application Functions Trial Operation and Actual Operation Chapter 6 Chapter 7			_	Chapter 4	
Trial Operation and Actual Operation Chapter 7			-	Chapter 5	
tion Chapter 7	Application Functions		_	Chapter 6	
Tuning – Chapter 8	·		_	Chapter 7	
	Tuning			Chapter 8	

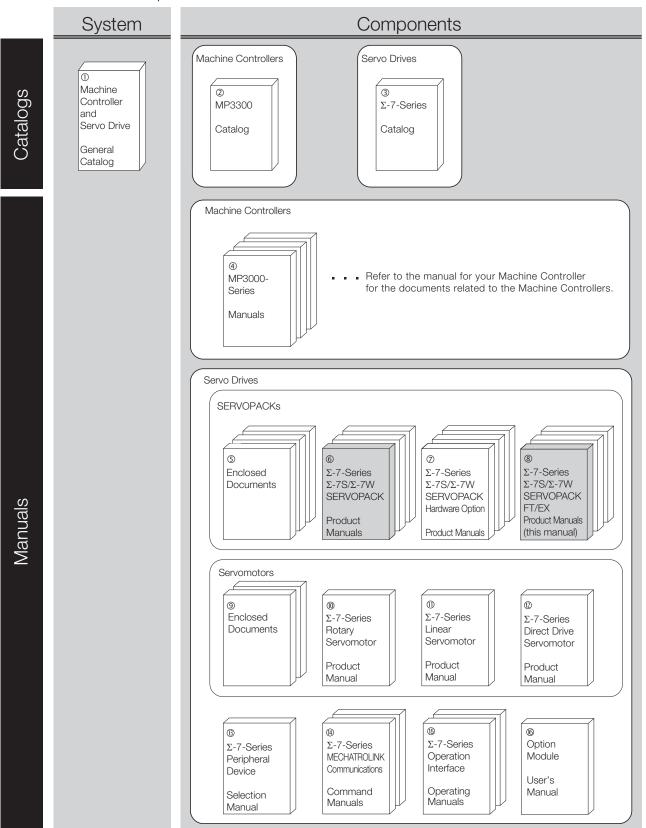
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Item This Manual SERVOPACKs with Analog Voltage/Pulse Train References (Manual No.: SIER Segment 26) Communications References				Σ -7-Series AC Servo Drive Σ -7	S SERVOPACK Product Manual
Information	Item		_	SERVOPACKs with Analog Voltage/Pulse Train References	SERVOPACKs with MECHATROLINK-III
Monitoring Machine Signal Waveforms Signal Waveforms			_	9	.1
Operation Status and Signal Waveforms 3.6			_	9	.2
Life	Monitoring	Operation Status and	3.6	-	-
Name			_	9	.4
Introduction 3.1	Fully-Close	d Loop Control	_	Chap	ter 10
Restrictions 3.2	Safety Fund	ctions	_	Chap	ter 11
Adjusting Less-Deviation Control 2 3.3		Introduction	3.1	-	-
Toubleshooting Displays Size Si		Restrictions	3.2	-	=
Control for Control 1 / Incorporation Control 1 / Reference Compensation Control 1 / Reference Compensation			3.3	-	-
Inspections and Part Replacement			3.4	-	-
Replacement			3.5	-	-
List of Alarms			_	12	2.1
Maintenance Alarms		Alarm Displays	4.1.1, 4.2.1	-	-
Maintenance		List of Alarms	4.1.2, 4.2.2	-	_
Name			4.1.3, 4.2.3	-	-
List of Warnings		Warning Displays	4.1.4, 4.2.4	-	_
ings	nance	List of Warnings	4.1.5, 4.2.5	-	-
on the Operation and Conditions of the Servomotor Panel Displays and Panel Operator Procedures Interpreting the Parameter Lists List of Parameters and List of Servo Parameters eter Lists List of MECHA-TROLINK-III Common Parameters Parameter Recording Table 4.1.7, 4.2.7 Chapter 13 - Chapter 13 -			4.1.6, 4.2.6	-	-
Interpreting the Parameter Lists 5.1.1, 5.2.1 -		on the Operation and Conditions of the Ser-	4.1.7, 4.2.7	-	-
Parameter Lists			_	Chapter 13	-
List of Servo Parameters 5.1.2, 5.2.2 -			5.1.1, 5.2.1	-	_
TROLINK-III Common Parameters 5.2.3 – Parameter Recording Table 5.1.3, 5.2.4 –		List of Servo Parame-	5.1.2, 5.2.2	-	-
Table 5.1.3, 5.2.4	ter Lists	TROLINK-III Common Parameters	5.2.3	-	-
Appendices – Chapter 15 Chapter 14			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.



Classification	Document Name	Document No.	Description
Machine Controller and Servo Drive General Catalog	o Drive Solutions Catalog		Describes the features and application examples for combinations of MP3000-Series Machine Controllers and Σ -7-Series AC Servo Drives.
© Machine Controller MP3300 Catalog 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 Σ -7-Series AC Servo Drives, including features and specifications.
④ MP3000-Series Manuals	Machine Controller MP3000 Series MP3300 Product Manual	SIEP C880725 21	Describes the functions, specifications, operating methods, maintenance, inspections, and troubleshooting of the MP3000-series MP3300 Machine Controllers.
	Σ-7-Series AC Servo Drive Σ-7S and Σ-7W SERVOPACK 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 a Command Option Module in a SERVOPACK.
⑤ 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.

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Classification	Document Name	Document No.	Description	
	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		
⑥ Σ-7-Series Σ-7S/Σ-7W	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual	SIEP S800001 26	Provide detailed information on selecting Σ-7-Series SERVO-PACKs and information on install-	
SERVOPACK Product Manuals	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK Command Option Attachable Type with Indexer Module Product Manual	SIEP S800001 64	ing, connecting, setting, performing trial operation for, tuning, and monitoring the Servo Drives.	
	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		
	Σ -7-Series AC Servo Drive Σ -7S/ Σ -7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual	SIEP S800001 73	Provides detailed information on Hardware Options for Σ-7-Series	
Hardware Option Specifications Product Manuals	Σ-7-Series AC Servo Drive Σ-7W SERVOPACK with Hardware Option Specifications HWBB Function Product Manual	SIEP S800001 72	SERVOPACKs.	
® Σ-7-Series Σ-7S/Σ-7W SERVOPACK FT/EX Specification Product Manuals	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Tracking Application Product Manual	This manual (SIEP S800001 89)	Provides detailed information on the FT/EX Option for Σ -7-Series SERVOPACKs.	
9	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.	

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Classification	Document Name	Document No.	Description
[®] Σ-7-Series Rotary Servomotor Product Manual	Σ-7-Series AC Servo Drive Rotary Servomotor Rotary Servomotor Product Manual		
© Σ-7-Series AC Servo Drive Linear Servomotor Product Manual		SIEP S800001 37	Provide detailed information on selecting, installing, and connecting the Σ -7-Series Servomotors.
© Σ-7-Series Direct Drive Servomotor Product Manual	Σ-7-Series AC Servo Drive Direct Drive Servomotor Product Manual	SIEP S800001 38	
[®] Σ-7-Series Peripheral Device Selection Manual	Σ-7-Series AC Servo Drive Peripheral Device Selection Manual	SIEP S800001 32	Describes the peripheral devices for a Σ -7-Series Servo System.
® Σ-7-Series MECHATROLINK	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 Σ-7-Series Servo System.
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 Σ -7-Series Servo System.
® Σ-7-Series	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.
Operation Interface Operating Manuals	AC Servo Drive Engineering Tool SigmaWin+ Operation Manual	SIEP S800001 34	Provides detailed operating procedures for the SigmaWin+ Engineering Tool for a Σ -7-Series Servo System.
© 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 details information required for the design and maintenance of a Safety Module.

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 Σ-7-Series Rotary Servomotor (SGM7A, SGM7J, or SGM7G) or a Direct Drive Servomotor (SGMCS or SGMCV). 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 Σ -7-Series Σ -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 horal 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 ⁻¹	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.

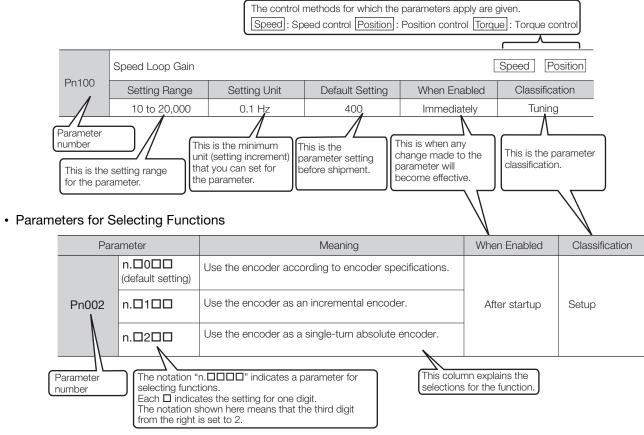
Notation Example

BK is written as /BK.

■ Notation for Parameters

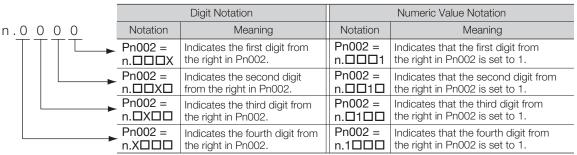
The notation depends on whether the parameter requires a numeric setting (parameter for numeric setting) or requires the selection of a function (parameter for selecting functions).

· 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.

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.

MARNING

- Use a power supply with specifications (number of phases, voltage, frequency, and AC/DC type) that are appropriate for the product.
 There is a risk of burning, electric shock, or fire.
- Connect the ground terminals on the SERVOPACK and Servomotor to ground poles according to local electrical codes (100 Ω or less for a SERVOPACK with a 100-VAC or 200-VAC power supply, and 10 Ω 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.

M 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

M 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

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.

⚠ WARNING

- Wiring and inspections must be performed only by qualified engineers.
 There is a risk of electric shock or product failure.
- Check all wiring and power supplies carefully.
 Incorrect wiring or incorrect voltage application to the output circuits may cause short-circuit failures. If a short-circuit failure occurs as a result of any of these causes, the holding brake will not work. This could damage the machine or cause an accident that may result in death or injury.
- 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/⊕ and ⊖2 terminals and the L1C and L2C terminals on the SERVOPACK.

There is a risk of failure or fire.

• If you use a SERVOPACK 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 six minutes after turning OFF the power supply 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 after turning OFF the power supply because high voltage may still remain in the SERVOPACK.

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.
- 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.
- 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 cable connector screws and lock mechanisms.
 Insufficient tightening may result in cable 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

WARNING

- Before starting operation with a machine connected, change the settings of the switches and parameters to match the machine.
 - Unexpected machine operation, failure, or personal injury may occur if operation is started before appropriate settings are made.
- Do not radically change the settings of the parameters.

 There is a risk of unstable operation, machine damage, or injury.
- Install limit switches or stoppers at the ends of the moving parts of the machine to prevent unexpected accidents.

There is a risk of machine damage or injury.

- For trial operation, securely mount the Servomotor and disconnect it from the machine. There is a risk of injury.
- Forcing the motor to stop for overtravel is disabled when the Jog (Fn002), Origin Search (Fn003), or Easy FFT (Fn206) 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 that supports a Dynamic Brake Option, the Servomotor stopping methods
 will be different from the stopping methods used without the Option or for other Hardware Option
 specifications. For details, refer to the Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with
 Hardware Option Specifications Dynamic Brake Product Manual.
- 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.

WARNING

Wiring and inspections must be performed only by qualified engineers.
 There is a risk of electric shock or product failure.

M CAUTION

- Wait for six minutes after turning OFF the power supply 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 after turning OFF the power supply because high voltage may still remain in the SERVOPACK.
 - 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

A DANGER

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

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

WARNING

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

CAUTION

- When an alarm occurs, remove the cause of the alarm and ensure safety. Then reset the alarm or turn the power 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

When disposing of the product, treat it as ordinary industrial waste. However, local ordinances
and national laws must be observed. Implement all labeling and warnings as a final product as
required.

■ 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, 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.

◆ North American Safety Standards (UL)





Product	Model	North American Safety Standards (UL File No.)
SERVOPACKs	SGD7S	UL 61800-5-1, CSA C22.2 No.274
Rotary Servomotors	• SGM7A • SGM7J • SGM7P • SGM7G	UL 1004-1 UL 1004-6
Direct Drive Servomotors*	SGMCV	
Linear Servomotors	• SGLGW • SGLFW • SGLFW2* • SGLTW	UL 1004 (E165827)

^{*} Certification is scheduled for September 2015.

◆ European Directives







Product	Model	European Directive	Harmonized Standards
	SGD7S	Machinery Directive 2006/42/EC	EN ISO13849-1: 2008/AC: 2009
SERVOPACKs		EMC Directive 2004/108/EC	EN 55011 group 1, class A EN 61000-6-2 EN 61000-6-4 EN 61800-3
		Low Voltage Directive 2006/95/EC	EN 50178 EN 61800-5-1
Rotary Servomotors	• SGM7J • SGM7A • SGM7P • SGM7G	EMC Directive 2004/108/EC	EN 55011 group 1, class A EN 61000-6-2 EN 61000-6-4 EN 61800-3
		Low Voltage Directive 2006/95/EC	EN 60034-1 EN 60034-5
Direct Drive Servomotors	SGM7D*1	EMC Directive 2004/108/EC	EN 55011 group 1, class A EN 61000-6-2 EN 61800-3
		Low Voltage Directive 2006/95/EC	EN 60034-1
	• SGMCV • SGMCS- □□B, □□C,	EMC Directive 2004/108/EC	EN 55011 group 1, class A EN 61000-6-2 EN 61800-3*2
	□□D, □□E (Small-Capacity, Coreless Servomotors)	Low Voltage Directive 2006/95/EC	EN 60034-1 EN 60034-5







Product	Model	European Directive	Harmonized Standards
Linear	• SCI E/V/2*1	EMC Directive 2004/108/EC	EN 55011 group 1, class A EN 61000-6-2 EN 61000-6-4
Servomotors	• SGLT • SGLC	Low Voltage Directive 2006/95/EC	EN 60034-1

^{*1.} Certification is scheduled for September 2015.

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

Safety Standards



Product	Model	Safety Standards	Standards
	SGD7S	Safety of Machinery	EN ISO13849-1: 2008/AC: 2009 IEC 60204-1
SERVOPACKs		Functional Safety	IEC 61508 series IEC 62061 IEC 61800-5-2
		EMC	IEC 61326-3-1

◆ Safety Parameters

Item	Standards	Performance Level
Sofaty Integrity Level	IEC 61508	SIL3
Safety Integrity Level	IEC 62061	SILCL3
Probability of Dangerous Failure per Hour	IEC 61508 IEC 62061	PFH = 4.04×10 ⁻⁹ [1/h] (4.04% 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	IEC 60204-1	Stop category 0
Safety Function	IEC 61800-5-2	STO
Mission Time	IEC 61508	10 years
Hardware Fault Tolerance	IEC 61508	HFT = 1
Subsystem	IEC 61508	В

^{*2.} Only the SGMCV is certified.

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Revision History

Basic Information on SERVOPACKs

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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 $\Sigma\mbox{-V-EX-Series}$ 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)

1.2 Model Designations

1.2.1 Interpreting SERVOPACK Model Numbers

SGD7S

 Σ -7-Series Σ -7S SERVOPACKs













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

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

4th digit Voltage

Code Specification

А		200 VAC	
5th-	+6t	th digits Interface*3	
Co	de	Specification	
00)	Analog voltage/pulse train reference	
20)	MECHATROLINK-III communications references	
		_	



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

Code	Specification	Applicable Models
000	Without options	All models
001	Rack-mounted	SGD7S-R70A to -330A
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200-VAC power supply input	SGD7S-120A

11th+12th+13th digits FT/EX Specification

Code	Specification
F19	Built-in less-deviation control

14th digit BTO Specification*4

Code	Specification
None	None
В	BTO specification

- *1. You can use these models with either a single-phase or three-phase input.
- *2. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model: SGD7S-120A□□A008).
- *3. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.
- *4. The BTO specification indicates if the SEVOPACK is customized by using the MechatroCloud BTO service. You need a BTO number to order SERVOPACKs with customized specifications.

 Refer to the following catalog for details on the BTO specification.

AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)

1.2.2 Interpreting Servomotor Model Numbers

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

- 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 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 Σ -7-Series Servomotors.

- 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 Σ -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
Speed Ripple Compensation
Current Control Mode Selection
Current Gain Level Setting
Speed Detection Method Selection
Fully-Closed Loop Control
Safety Functions
External Latches*

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

^{*} 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
Automatic Adjustment without a Host Reference
Automatic Adjustment with a Host Reference
Custom Adjustment
Anti-Resonance Control Adjustment
Vibration Suppression
Gain Selection
Friction 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 of Servomotor without a Load		
Program Jogging		
Origin Search		
Test without a Motor		
Monitoring Machine Operation Status and Signal Waveforms		

• Functions for Inspection and Maintenance

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.□□□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 7.10 or higher. 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	Rating	gs2-2
2.2	SERVO	PACK Overload Protection Characteristics 2-4
2.3	Speci	fications2-5
	2.3.1	SERVOPACKs with Analog Voltage/ Pulse Train References
	2.3.2	SERVOPACKs with MECHATROLINK-III Communications References

2.1

Ratings

This section gives the ratings of SERVOPACKs.

Three-Phase, 200 VAC

N	Model SGD7S-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
	um Applic ity [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
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9	
	taneous M t Current [/		2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
Main	Power Si	upply		•	200 VA	C to 24	O VAC,	-15% t	o +10%	, 50 Hz	z/60 Hz		
Circuit	Input Curr	rent [Arms]*	0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
Contro	l Power S	upply			200 VA	C to 24	0 VAC,	-15% t	0 +10%	, 50 Hz	z/60 Hz		
Power	Supply Cap	acity [kVA]*	0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
	Main Circuit Power Loss [W]		5.0	7.0	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
Power Loss*	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
LOSS	Built-in Reg Resistor Po	generative ower Loss [W]	-	_	-	_	8	8	8	10	16	16	36
	Total Powe	r 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 Regener-	Resistance $[\Omega]$	-	_	-	_	40	40	40	20	12	12	8
erative Resis-	ative Resistor	Capacity [W]	_	_	_	_	40	40	40	60	60	60	180
tor	Minimum A External Re	llowable esistance $[\Omega]$	40	40	40	40	40	40	40	20	12	12	8
Overvo	oltage Cate	egory						III					

^{*} This is the net value at the rated load.

	Model SGD7S-		470A	550A	590A	780A
Maximum Applic	cable Motor Capac	city [kW]	6.0	7.5	11	15
Continuous Out	put Current [Arms]		46.9	54.7	58.6	78.0
Instantaneous N	1aximum Output C	Current [Arms]	110	130	140	170
Main Circuit	Power Supply		200 VAC to	240 VAC, -15	% to +10%, 5	0 Hz/60 Hz
Main Circuit	Input Current [A	rms]*1	29	37	54	73
Control Power S	Supply		200 VAC to	240 VAC, -15	% to +10%, 5	0 Hz/60 Hz
Power Supply C	apacity [kVA]*1		10.7	14.6	21.7	29.6
	Main Circuit Pov	ver Loss [W]	271.7	326.9	365.3	501.4
D + *1	Control Circuit F	ower Loss [W]	21	21	28	28
Power Loss*1	External Regenerative	Resistor Power Loss [W]	180*2	350 ^{*3}	350 ^{*3}	350 ^{*3}
	Total Power Los	s [W]	292.7	347.9	393.3	529.4
	External Regen-	Resistance $[\Omega]$	6.25 ^{*2}	3.13* ³	3.13* ³	3.13* ³
Regenerative Resistor	erative Resistor	Capacity [W]	880*2	1760*3	1760*3	1760*3
	Minimum Allowable E	xternal Resistance [Ω]	5.8	2.9	2.9	2.9
Overvoltage Cat	egory			ļ.	I	

^{*1.} This is the net value at the rated load.

^{*2.} This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.

^{*3.} This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

Single-Phase, 200 VAC

	Model SGD7S-	R70A	R90A	1R6A	2R8A	5R5A	120A	
Maximum App	olicable Motor Capa	acity [kW]	0.05	0.1	0.2	0.4	0.75	1.5
Continuous O	utput Current [Arm:	tput Current [Arms]			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 V	AC to 240	VAC, -15	% to +10	%, 50 Hz	/60 Hz
Main Circuit	Input Current [Arn	Input Current [Arms]*			2.4	5.0	8.7	16
Control Power	r Supply		200 V	AC to 240	VAC, -15	% to +10	%, 50 Hz	/60 Hz
Power Supply Capacity [kVA]*				0.3	0.6	1.2	1.9	4.0
	Main Circuit Powe	5.0	7.1	12.1	23.7	39.2	71.8	
	Control Circuit Po	wer Loss [W]	12	12	12	12	14	16
Power Loss*	Built-in Regenerat Power Loss [W]	_	_	-	-	8	16	
	Total Power Loss	[W]	17.0	19.1	24.1	35.7	61.2	103.8
	Built-In Regener-	Resistance $[\Omega]$	_	_	_	-	40	12
Regenera- tive Resistor	ative Resistor	Capacity [W]	_	-	-	-	40	60
1.0010101	Minimum Allowable Ex	kternal Resistance $[\Omega]$	40	40	40	40	40	12
Overvoltage C	Category				ļ	II		

 $[\]boldsymbol{\ast}$ This is the net value at the rated load.

270 VDC

Model	R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A		
Maximum Applicable M	0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5		
Continuous Output Cu	0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6		
Instantaneous Maximum	n Output Current [Arms]	2.1	3.2	5.9	9.3	11.0	16.9	17.0	28.0	
Main Circuit	Power Supply		270) VDC to	324 VI	DC, -15	% to +1	0%	_	
Main Circuit	Input Current [Arms]*	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11	
Control Power Supply		270 VDC to 324 VDC, -15% to +10%								
Power Supply Capacity	y [kVA]*	0.2	0.3	0.6	1	1.4	1.6	2.3	3.2	
	Main Circuit Power Loss [W]	4.4	5.9	9.8	17.5	23.0	30.7	38.7	55.8	
Power Loss*	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										

 $[\]ensuremath{\ast}$ This is the net value at the rated load.

Model	180A	200A	330A	470A	550A	590A	780A			
Maximum Applicable N	Notor Capacity [kW]	2.0	3.0	5.0	6.0	7.5	11.0	15.0		
Continuous Output Cu	rrent [Arms]	18.5	19.6	32.9	46.9	54.7	58.6	78.0		
Instantaneous Maximum	n Output Current [Arms]	42.0	56.0	84.0	110	130	140	170		
Main Circuit	Power Supply		270 \	/DC to 32	24 VDC,	-15% to -	+10%			
Main Gircuit	Input Current [Arms]*	14	20	34	36	48	68	92		
Control Power Supply		270 VDC to 324 VDC, -15% to +10%								
Power Supply Capacity	y [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]			99.5	165.2	232.6	276.3	271.6	371.4		
Overvoltage Category					III					

^{*} This is the net value at the rated load.

2.2

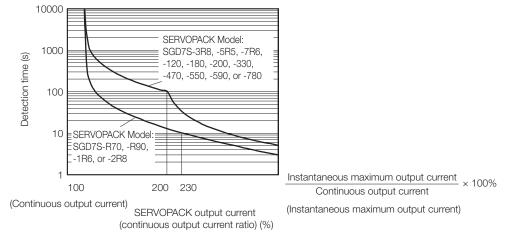
SERVOPACK Overload Protection Characteristics

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.



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 Meth	nod	IGBT-based PWM contro	I, sine wave current drive				
	With Rotary Servomotor	encoder)	r 24 bits (incremental encoder/absolute absolute encoder)				
Feedback	With Linear Servomotor	lute linear encoder.) • Incremental linear enco	 Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.) 				
	Surrounding Air Temperature*1	Refer to the following matrix Σ -7-Series Σ -7S SERV	cossible between 55°C and 60°C.) Inual 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% relative humidity ma	x. (with no freezing or condensation)				
	Storage Humidity	95% relative humidity ma	x. (with no freezing or condensation)				
	Vibration Resistance	4.9 m/s ²					
	Shock Resistance	19.6 m/s ²					
Environ- mental Conditions	Degree of Protection		SERVOPACK Model: SGD7S- 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A 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. 					
	Altitude*1	1,000 m max. (With derating, usage is possible between 1,00 2,000 m.) Refer to the following manual for derating specifications. \(\sum_{\text{c}} \sum_{\text{c}} \cdot -7 \subseteq \text{SERVOPACK} \) with Analog Voltage/Pulse Train ences Product Manual (Manual No.: SIEP S800001 26)					
	Others		ACK in the following locations: Locations sub- pise, strong electromagnetic/magnetic fields,				
Applicable S	Standards	Refer to the following se Compliance with UL S dards on page xxiv	ction for details. Itandards, EU Directives, and Other Safety Stan-				
		Mounting	SERVOPACK Model: SGD7S-				
		Base-mounted	All Models				
Mounting		Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A				
			7 1 107 1, 1207 1, 1007 1, 2007 1, 0007 1				

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 Time Set- ting		0 s to 10 s (Can be set separately for acceleration and deceleration.)				
	Encoder Divided Pulse Output Linear Servomotor Overheat Protection Signal Input		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.				
			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				
		nput Input	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				
I/O Signals	Sequence Input		 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 				
	That Be		Torque Limit) signals • /SPD-D (Motor Direction) signal • /SPD-A and /SPD-B (Internal Set Speed Selection) signals • /C-SEL (Control Selection) signal • /ZCLAMP (Zero Clamping) signal				
			 /INHIBIT (Reference Pulse Inhibit) signal /P-DET (Polarity Detection) signal /G-SEL (Gain Selection) signal /PSEL (Reference Pulse Input Multiplication Switch) Signal SEN (Absolute Data Request) signal A signal can be allocated and the positive and negative logic can be changed. 				

2.3.1 SERVOPACKs with Analog Voltage/ Pulse Train References

Continued from previous page.

	Item		Specification
		Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1
			Output signal: ALM (Servo Alarm) signal 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.)
I/O Signals	Sequence Output Signals	Output Signals That Can Be Allocated	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 · /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-	Interfaces 1:N Commu-	Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+) Up to N = 15 stations possible for RS-422A port
Communi- cations	cations (CN3)	nications Axis Address Setting	Set with parameters.
	USB Communi- cations (CN7)	Interface Communications Standard	Personal computer (with SigmaWin+) Conforms to USB2.0 standard (12 Mbps).
Displays/Ind	icators	O ton roron or	0.1.1.2021. 11
			CHARGE indicator and five-digit seven-seament display
Panel Operator Analog Monitor (CN5)			CHARGE indicator and five-digit seven-segment display Four push switches
			Four push switches 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
	itor (CN5)		Four push switches Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ)
Analog Moni	itor (CN5)		Four push switches 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) Activated when a servo alarm or overtravel (OT) occurs, or when the
Analog Moni Dynamic Bra Regenerative	itor (CN5) ake (DB)	n	Four push switches 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) Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF. Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following catalog for details.
Analog Moni Dynamic Bra Regenerative	ake (DB) Processing OT) Prevention	n	Four push switches 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) Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF. 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) 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 Pro-

2.3.1 SERVOPACKs with Analog Voltage/ Pulse Train References

Continued from previous page.

		Iter	n		Specification					
		Input	S		/HWBB1 and /HWBB2: Base block signals for Power Modules					
Safe		Outp			EDM1: Monitors the status of built-in safety circuit (fixed output).					
Fun	ctions	Appli dard:	icable s*3	Stan-	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 Start T ting		ïme Set-	0 s to 10 s (Can be set separately for acceleration and deceleration.)					
				Refer- ence Voltage	 Maximum input voltage: ±12 V (forward motor rotation for positive reference). 6 VDC at rated speed (default setting). Input gain setting can be changed. 					
		Input Signa		Input Imped- ance	Approx. 14 k Ω					
	Speed Con- trol			Circuit Time Con- stant	30 μs					
		Interr Set S Cont	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			forwar oensat		0% to 100%					
		tionin	Output Signal Posi- ioning Completed Width Setting		0 to 1,073,741,824 reference units					
			Wight Gottin	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-		Ref-	Input Form	Line driver or open collector					
	tion Con- trol	In- put Sig- nals	eren In- ce put puls Sig- es	Maxi- mum Input Fre- quency Input Multiplica-	 Line Driver Sign + pulse train or CW + CCW pulse trains: 4 Mpps Two-phase pulse trains with 90° phase differential: 1 Mpps Open Collector Sign + pulse train or CW + CCW pulse trains: 200 kpps Two-phase pulse trains with 90° phase differential: 200 kpps 					
				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	 Maximum input voltage: ±12 V (forward torque output for positive reference). 3 VDC at rated torque (default setting). Input gain setting can be changed.
Controls	Con- trol	Input Signal	Input Imped- ance	Approx. 14 k Ω
			Circuit Time Constant	16 μs

^{*1.} If you combine a Σ -7-Series SERVOPACK with a Σ -V-Series Option Module, the following Σ -V-Series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 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				
Drive Metho	d	IGBT-based PWM control, sine wave current drive				
	With Rotary Servomotor	Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)				
Feedback	With Linear Servomotor	 Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.) 				
	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- mental	Vibration Resistance	4.9 m/s ²				
Conditions	Shock Resistance	19.6 m/s ²				
	Degree of Protection	Degree SERVOPACK Model: SGD7S- IP20 R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A 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 on pert page.				

^{*2.} The coefficient of speed fluctuation for load fluctuation is defined as follows:

^{*3.} 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)			
Conditions	Others			CK in the following locations: Locations subse, strong electromagnetic/magnetic fields, or		
Applicable S	tandards		Refer to the following sect Car Compliance with UL Standards on page xxiv	tion for details. andards, EU Directives, and Other Safety Stan-		
			Mounting	SERVOPACK Model: SGD7S-		
			Base-mounted	All Models		
Mounting			Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A		
			Duct-ventilated	470A, 550A, 590A, 780A		
	Speed Con	trol Range	1:5000 (At the rated torque must not cause the Servor	e, the lower limit of the speed control range motor to stop.)		
			±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)			
	Coefficient of Speed Fluctuation*2		0% of rated speed max. (for a load fluctuation of ±10%)			
Perfor- mance			±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)			
	Torque Control Precision (Repeatability)		±1%			
	Soft Start T Setting	ime	0 s to 10 s (Can be set separately for acceleration and deceleration.)			
	Encoder Div Pulse Outpu		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.			
	Linear Servi Overheat Pi Signal Input	rotection	Number of input points: 1 Input voltage range: 0 V to +5 V			
			Allowable voltage range: 2 Number of input points: 7			
I/O Signals	Sequence Input Signals That Can Be Allocated		Input method: Sink inputs or source inputs Input Signals • /DEC (Origin Return Deceleration Switch) signal • /EXT1 to /EXT3 (External Latch Input 1 to 3) 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 • /P-DET (Polarity Detection) signal A signal can be allocated and the positive and negative logic can be changed.			

Continued from previous page

	D.		Continued from previous page.		
	Item		Specification		
		Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output signal: ALM (Servo Alarm) signal		
			Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (A photocoupler output (isolated) is used.)		
I/O Signals Out	Sequence Output Signals	Output Signals That Can Be Allo- cated	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 • /BK (Brake) signal • /WARN (Warning) signal • /NEAR (Near) signal A signal can be allocated and the positive and negative logic can be changed.		
		Inter- faces	Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)		
	RS-422A Communi- cations	1:N Commu- nications	Up to N = 15 stations possible for RS-422A port		
Communi- cations	(CN3)	Axis Address Setting	Set with parameters.		
	USB	Interface	Personal computer (with SigmaWin+)		
	Communications (CN7)	Commu- nications Standard	Conforms to USB2.0 standard (12 Mbps).		
Displays/Indi	cators		CHARGE, PWR, CN, L1, and L2 indicators, and one-digit seven-segment display		
	Communica tocol		MECHATROLINK-III		
MECHA- TROLINK-III	Station Add Settings	Iress	03 to EF hex (maximum number of slaves: 62) The rotary switches (S1 and S2) are used to set the station address.		
Communi-	Baud Rate		100 Mbps		
cations	Transmissio	n 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.		
Reference	Performanc	e	Position, speed, or torque control with MECHATROLINK-III communications		
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 Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V)		
Analog Moni	tor (CN5)		Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)		
Dynamic Bra	ıke (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. C 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	tions	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	Applicable 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.		

^{*}I. If you combine a Σ -7-Series SERVOPACK with a Σ -V-Series Option Module, the following Σ -V-Series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1,000 m max. Also, the applicable surrounding range cannot be increased by derating.

Coefficient of speed fluctuation = $\frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$

^{*2.} The coefficient of speed fluctuation for load fluctuation is defined as follows:

^{*3.} 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.

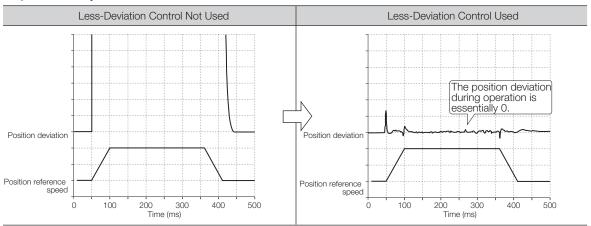
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3.1

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.



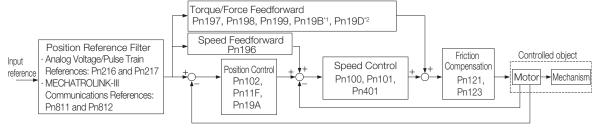
Less-deviation control is enabled or disabled with Pn190 = n.□□□X.

- 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.

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.

[3] 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.

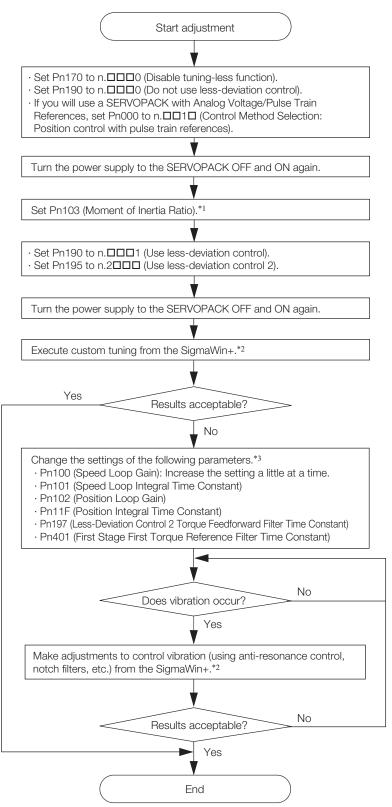
1.6 Combining the SERVOPACKs with MP-Series Machine Controllers and the MPE720 Engineering Tool on page 1-10

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

The following setting examples are for Pn100 = 40.0 Hz.

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

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

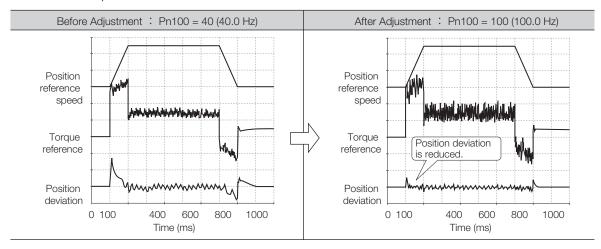
• Pn197 =
$$\frac{1000}{2 \times 4 \times 2\pi \times 40.0} \cong 0.50$$

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

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)

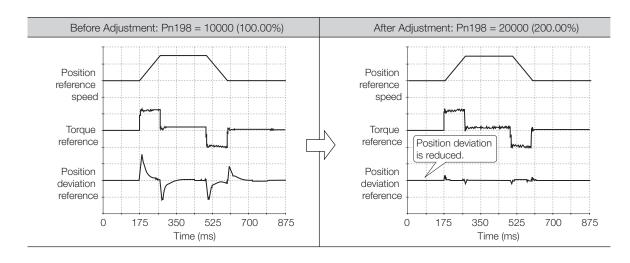
The effects of Pn198 (Less-Deviation Control 2 Forward Torque Feedforward Gain) and Pn199 (Less-Deviation Control 2 Reverse Torque Feedforward Gain) are shown below.

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 feedforward (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⁻¹.

The calculations for the setting of Pn19B are given below.

- 1. Operate the motor at a constant speed. In this procedure, 1,000 min⁻¹ 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⁻¹.
 - Formula: Torque at speed in step 1 (%) × 100 min⁻¹ ÷ Speed in step 1 (min⁻¹)

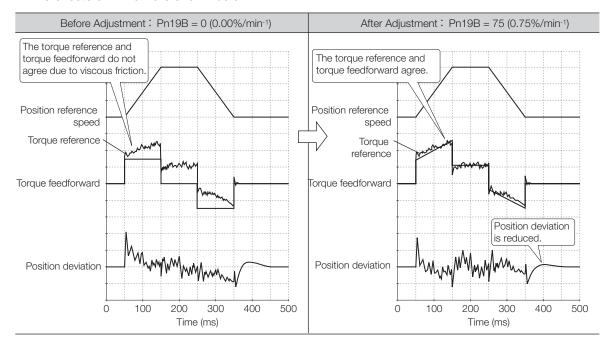
The calculation is as follows for this example:

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

Therefore, Pn19B is set to 0.75.

3.3.2 Adjustment Example

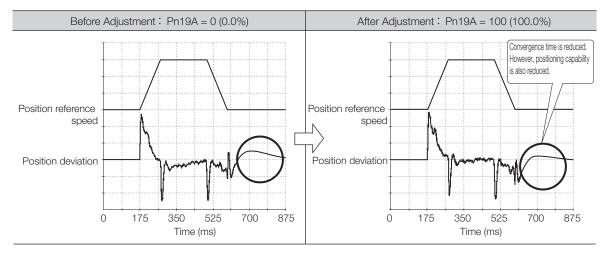
The effects of Pn19B are shown below.



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)

^{*} 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.□□□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	OFF	Changes the gains to gain settings 1.	
		$Pn50D = n.\square X \square \square.*$	ON	Changes the gains to gain settings 2.	

^{*} 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).

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

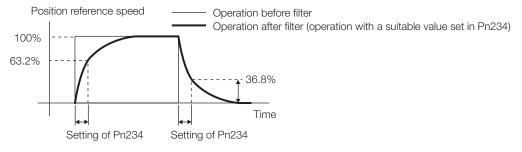
3.3.5 Settings for Low-speed Feeding

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

- 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.

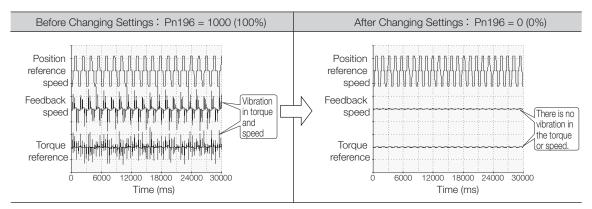
- Weakening reference tracking to reduce vibration
- Smoothing references to reduce vibration

Weakening Reference Tracking to Reduce Vibration

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

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

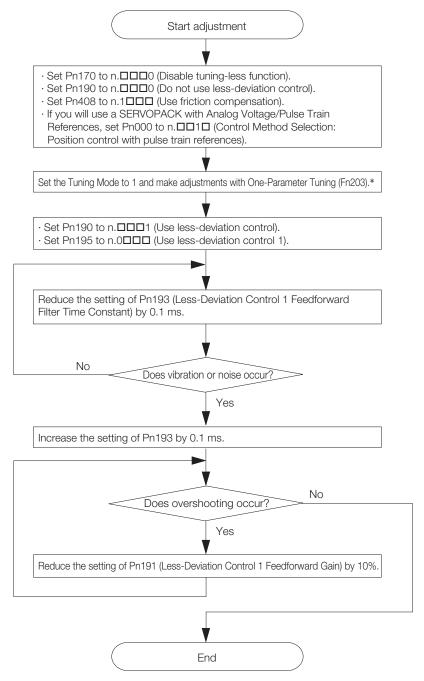
By increasing the settings of Pn811 and Pn812, the reference is smoothed to reduce vibration.

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.



^{*} 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)

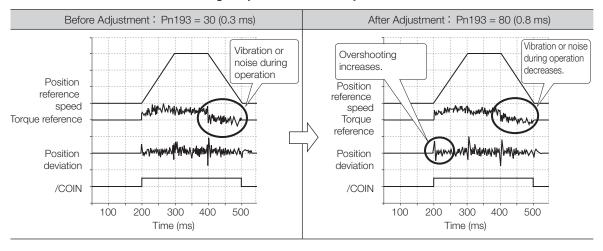
 $[\]Sigma$ -7-Series Σ -7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)

3.4.2 Adjustment Example

Pn193 Adjustment Example

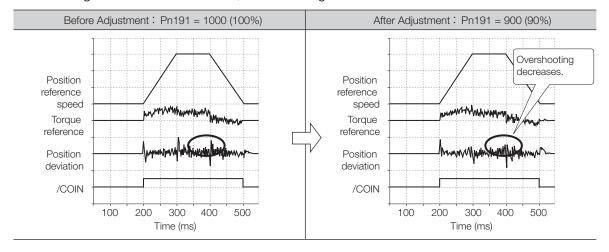
The effects of Pn193 (Less-Deviation Control 1 Feedforward Filter Time Constant) are shown below.

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-Deviation Control 1 Second Feedforward Gain (Pn192)

^{*} 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.□□□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	OFF	Changes the gains to gain settings 1.
		Pn50D = n.□X□□.*	ON	Changes the gains to gain settings 2.

^{*} 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).

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

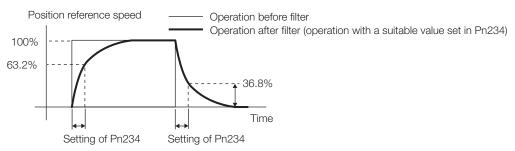
3.4.5 Settings for Low-speed Feeding

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.



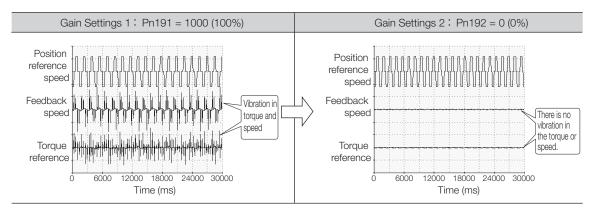
3.4.5 Settings for Low-speed Feeding



- 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.



5 Reference Compensation

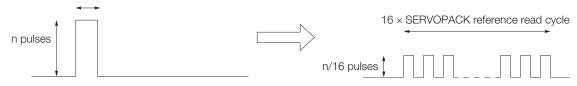
Reference compensation is used when pulse train references are input with SERVOPACKs with Analog Voltage/Pulse Train References.

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).

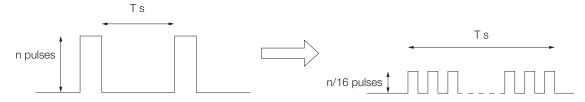
Also, the division method for the first reference input after the SERVOPACK's control power supply is turned ON is different from the second and later reference inputs, as described below.

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.



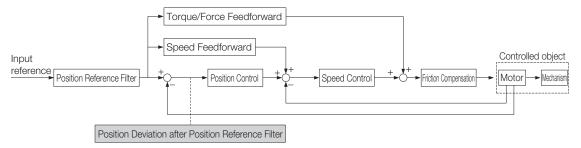
3.6

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.

- 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)

Maintenance

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

4.1	SERVO	PACKs with Analog Voltage/Pulse Train References 4-2
	4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 4.1.7	Alarm Displays
4.2	SERVOP	ACKs with MECHATROLINK-III Communications References 4-55
	4.2.1 4.2.2 4.2.3 4.2.4 4.2.5 4.2.6 4.2.7	Alarm Displays

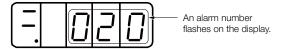
4.1.1 Alarm Displays

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.



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 Number	Alarm Name	Alarm Meaning	Servo- motor Stop- ping Method	Alarm Reset Possi- ble?	Alarm Code Output		
					ALO1	ALO2	ALO3
A.020	Parameter Checksum Error	There is an error in the parameter data in the SER-VOPACK.	Gr.1	No	Н	Ι	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	Η	Н
A.040	Parameter Setting Error	A parameter setting is outside of the setting range.	Gr.1	No	Н	Н	Н

Continued from previous page.

	Alarm Name	Alarm Meaning	Servo- motor Stop- ping Method	Alarm Reset Possi- ble?	Alarm Code Output		
Alarm Number					ALO1	ALO2	
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 transformer 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	The AC power supply input setting or DC power supply input setting is not correct. The power supply wiring is not correct.	Gr.1	Yes	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

Continued from previous page.

	Continued from previous page						
Alarm Number	Alarm Name	Alarm Meaning	Servo- motor Stop- ping Method	Alarm Reset Possi- ble?	Alarm Code Output		
					ALO1	ALO2	ALO3
A.511	Encoder Output Pulse Overspeed	 Rotary Servomotor: The pulse output speed for the setting of Pn212 (Number of Encoder Output Pulses) was exceeded. Linear Servomotor: The motor speed upper limit for the setting of Pn281 (Encoder Output Resolution) was exceeded. 	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 Temperature 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

Continued from previous page.

Alarm			Servo- motor	Alarm Reset	Alarm Code Output		
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.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	П	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
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

4.1.2 List of Alarms

Continued from previous page.

Alarm	Alarm Nama		Servo- motor	ntinued from Alarm Reset	Alarm Code Output		de
Number	Alarm Name	Alarm Meaning	Stop- ping Method	Possi- ble?	ALO1	ALO2	ALO3
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
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 while the servo was ON.	Gr.1	Yes	L	L	Н

Continued from previous page.

			Servo-	Alarm	Ala	ırm Cc	ode
Alarm Number	Alarm Name	Alarm Meaning	motor Stop- ping	Reset Possi- ble?		Output ALO2	ALO3
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.	Method 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
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
A.F50	Servomotor Main Circuit Cable Disconnection	The Servomotor did not operate or power was not supplied to the Servomotor even though the /S-ON (Servo ON) signal was input when the Servomotor was ready to receive it.	Gr.1	Yes	Н	L	Н
FL-1*				-			
FL-2* FL-3*	System Alarm	An internal program error occurred in the SERVO-	_	No	Ir	ndefine	2d
FL-3 FL-4*	Gystem Alami	PACK.	_	INU	UI	iu c ili le	u.
FL-5*							

4.1.2 List of Alarms

Continued from previous page.

Alarm Number	Alarm Name		Servo- motor	Alarm Reset		rm Co Output	
		Alarm Meaning	Stop- ping Method	Possi- ble?	ALO1	ALO2	ALO3
CPF00	Digital Operator Communications Error 1	Communications were not possible between the Digital			Undefined.		
CPF01	Digital Operator Commu- nications Error 2	Operator (model: JUSP- OP05A-1-E) and the SERVO- PACK (e.g., a CPU error occurred).	I	No			ed.

^{*} 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

4.1.3

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 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.	-

Continued from previous page.

Alarm Number: 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.030: Main Circuit Detector Error	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
	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-	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
ting Error (A parameter setting is outside of the setting	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.	_
range.)	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

Continued from previous page.

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 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.	Check the capacities to see if they satisfy the following condition: 1/4 ≤ Servomotor capacity ≤ 4 SERVOPACK capacity ≤ 4	Select a proper combination of the SERVOPACK and Servomotor capacities.	*1
(The capacities of the SERVOPACK and Servomotor do not match.)	A failure occurred in the encoder.	Replace the encoder and check to see if the alarm still occurs.	Replace the Servomotor or encoder.	-
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
A.051:	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
Unsupported 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.	-

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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

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Alarm Number:	Descible Cours	Confine the	Continued from pro	
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 trans-	The regenerative resistor is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	*1
former 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

Continued from previous page.

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.100: Overcurrent Detected (An overcurrent flowed through the power trans- former or the heat sink overheated.)	A heavy load was applied while the Ser- vomotor 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.	-
	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	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
exceeded the allowable cur- rent.)	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.	-

Continued from previous page.

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.	-
	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, or -330A.	Check it 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.300: Regeneration Error	The jumper between the regenerative resistor terminals (B2 and B3) was removed from one of the following SERVO-PACKs: SGD7S-3R8A, SGD7S-7R6A, SGD7S-120A, SGD7S-180A, or SGD7S-200A.	Check to see if the jumper is connected between power supply terminals B2 and B3.	Correctly connect a jumper.	*1
	The External Regenerative Resistor is not wired correctly, or was removed or disconnected.	Check the wiring of the External Regenerative Resistor.	Correct the wiring of the External Regenerative Resistor.	*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 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 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 it 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.330:	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
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 SERVO- PACKs: SGD7S- R70A, SGD7S- R90A,SGD7S-1R6A, or SGD7S-2R8A.	Check it 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.	-
	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.410: Undervoltage (Detected in the main circuit power supply section of the SERVOPACK.)	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
	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.	_
	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 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:	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.	_
	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:			Continued from pre	
Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The wiring is not correct or there is a faulty contact 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: Instantaneous Overload A.720:	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.	-
Continuous Overload	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.	_
	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 consump- tion 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 Numbar			Continued from pro	l lage.
Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.7A1: Internal Temperature Error 1 (Control Board Temperature Error)	The surrounding temperature is too high.	Check the surrounding temperature using a thermostat. 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.	-
	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 thermostat. Or, check the operating status with the SERVOPACK installation environment monitor.	Decrease the surrounding temperature by improving the SERVO-PACK installation conditions.	*1
A 7AO.	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 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 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.	-

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Alarm Number:	Doggible Cours	Confirmation	Continued from pre	, ,
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 allty. 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.	_

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Alarm Number: 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.	-
	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.	_
	Rotary Servomotor: The Servomotor speed was 200 min ⁻¹ 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 ⁻¹ , and turn ON the control power supply.	-
A.850: Encoder Over- speed	Linear Servomotor: The Servomotor exceeded the specified 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.	-
(Detected at the 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.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	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.	-
A.860:	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
Encoder Overheated (Detected at the encoder, but only when an absolute encoder is used.)	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.	-
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.	_

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
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.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.b11:	A malfunction occurred in the speed reference input section.	_	Reset the alarm and restart operation.	*1
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 Refer-	A malfunction occurred in the reading section for the torque reference input.	_	Reset the alarm and restart operation.	*1
ence 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.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.	-

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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.	-
	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
A.C10: 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 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.	-
A.C21: Polarity Sensor Error	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
	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: 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 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 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: District Continued from previous particles				, ,
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 specifications.	-
A.C90: Encoder Communications Error	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 environmental, and replace the cable. If the alarm still occurs, replace the SERVOPACK.	*1
	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.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	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 ² .	-
	The Encoder Cable is too long and noise entered on it.	_	Rotary Servomotors: The Encoder Cable wiring distance must be 50 m max. Linear Servomotors: The Encoder Cable wiring distance must be 20 m max.	-
A.Cb0: Encoder Echo- back Error	There is variation in the FG potential because of the influence of machines on the Servomotor side, such as a welder.	Check the condition of the Encoder Cable and connectors.	Properly ground the machine to separate it from the FG of the encoder.	-
	Excessive vibration or shock was applied to the encoder.	Check the operating conditions.	Reduce machine vibration. Correctly install the Servomotor or linear encoder.	-
	A failure occurred in the encoder.	-	Turn the power 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.	n nevt nage

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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-	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.	-
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 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.	*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.	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 Posi- tion 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.	_

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Alarm Number: Build Continued for the Continued				
Alarm Name	Possible Cause	Confirmation	Correction	Reference
	There is a faulty con- nection 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.	-
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 Safety Option Module	A failure occurred in the Safety Option Module.	_	Replace the 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.	_

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Alarm Number:	Possible Cause	Confirmation	Correction	Reference
Alarm Name	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	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.	-
Line Open Phase (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.	-
A.F50: Servomotor Main Circuit Cable Dis-	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
connection (The Servomotor did not operate or power was not supplied to the Servomotor even though the /S-ON (Servo ON) signal was input when the Servomotor was ready to receive it.)	The wiring is not correct or there is a faulty contact in the motor wiring.	Check the wiring.	Make sure that the Servo- motor is correctly wired.	*1
FL-1*5: System Alarm FL-2*5: System Alarm FL-3*5: System Alarm FL-4*5: System Alarm FL-5*5: 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 contact 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.	_

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
CPF01: Digital Operator Communications Error 2	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.	-
	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⁻¹] ×
$$\frac{\text{Encoder resolution}}{6 \times 10^5} \le \frac{\text{Pn20E}}{\text{Pn210}}$$

• Maximum motor speed [min⁻¹]
$$\times$$
 Encoder resolution
Approx. 3.66×10^{12} \geq Pn20E
Pn210

· Linear Servomotor

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

$$\frac{\text{Pn585 [mm/s]}}{\text{Linear encoder pitch [μm]}} \times \frac{\text{Resolution of Serial Converter Unit}}{10} \le \frac{\text{Pn20E}}{\text{Pn210}}$$

$$\frac{\text{Pn385 [100 mm/s]}}{\text{Linear encoder pitch [μm]}} \times \frac{\text{Resolution of Serial Converter Unit}}{\text{Approx. 6.10} \times 10^{5}} \ge \frac{\text{Pn20E}}{\text{Pn210}}$$

- *3. Detection Conditions
 - Rotary Servomotor

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

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

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

· Linear Servomotor

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

- *4. Refer to the following manual for details.
 - $\ \square$ Σ -7-Series Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)
- *5. These alarms are not stored in the alarm history. They are only displayed on the panel display.

4.1.4 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.

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	Warning arning Name Meaning Outp		rning C Output		
Number		_	ALO1	ALO2	ALO3	
A.900	Position Deviation Overflow	The position deviation exceeded the parameter settings (Pn520 × Pn51E/100).	Н	Н	Н	
A.901	Position Deviation Overflow Alarm at Servo ON	The position deviation exceeded the parameter settings (Pn526 \times Pn528/100) when the servo was turned ON.	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.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 (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)		

4.1.6 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
A.900: Position Deviation Overflow	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.	*
	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 exceeded the parameter settings (Pn526 × Pn528/100) when the servo was turned ON.	_	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
A.910: Overload (warning before an A.710 or A.720 alarm occurs)	The wiring is not correct or there is a faulty contact 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.	-
	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: Warning Name	Possible Cause	Confirmation	Correction	Reference
	The surrounding temperature is too high.	Check the surrounding temperature using a thermostat. 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 thermostat. 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

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	The battery connection is faulty or a battery is not connected.	Check the battery connection.	Correct the battery connection.	*
absolute encoder battery voltage was lower than the spec- ified level.) (Detected only when an abso- lute encoder is con- nected.)	The battery voltage is lower than the specified value (2.7 V).	Measure the battery voltage.	Replace the battery.	*
	A failure occurred in the SERVO-PACK.	_	The SERVOPACK may be faulty. Replace the SERVO-PACK.	_
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.	-

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Warning Number	Warning Number: Receible Course Confirmation Correction Reference			
Warning Name	Possible Cause	Confirmation	Correction	Reference
	The speed ripple	_	Reset the speed ripple compensation value on the SigmaWin+.	*
A.942: Speed Ripple Compensation Information Disagreement	compensation information stored in the encoder does not agree with the speed ripple compensa-	_	Set Pn423 to n.□□1□ (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. \(\sum \sup 0\) (Disable speed ripple compensation). However, changing the setting may increase the speed ripple.	*
	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.	-
	The power supply voltage dropped during operation.	Measure the power supply voltage.	Increase the power supply capacity.	-
A.971: Undervoltage	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.	-
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.	*

^{*} 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)

4.1.7 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.

Turn OFF the Servo System before troubleshooting the items shown in bold lines in the table.

Problem	Possible Cause	Confirmation	Correction	Reference
	The control power supply is not turned ON.	Measure the voltage between control power supply terminals.	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.	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.	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.	Wire the cable correctly.	-
	There is an overload on the Servomotor.	Operate the Servomotor with no load and check the load status.	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 $Pn002 = n.\square X \square \square$.	Set Pn002 = n. \(\Pi\)X\(\Pi\) according to the type of the encoder that is being used.	*
Servomotor Does Not	No speed or position reference is input.	Check the allocation status of the input signals.	Allocate an input signal so that the speed and position references are input correctly.	*
Start	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.□□X□ (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.	*
	The reference pulse mode selection is not correct.	Check the setting of Pn200 =n.□□□X (Reference Pulse Form) and the reference pulse form.	Set Pn200 =n. \(\begin{align*} \text{Image}Image	*
	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.	*

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 TODIETTI	1 ossible Gause	Check between the	Oorrection	Hererence
	Torque control: The torque reference input is not appropriate.	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.□□□X (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	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.	*
Does Not Start	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.	-	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.	If you are using an incremental linear encoder, turn ON the /S-ON or /P-DET signal. If you are using an absolute linear encoder, turn OFF the external /S-ON signal and execute polarity detection.	*

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
	There is a mistake in the Servomotor wiring.	Check the wiring.	Wire the Servomotor correctly.	-
	There is a mistake in the wiring of the encoder or Serial Converter Unit.	Check the wiring.	Wire the Serial Converter Unit correctly.	-
	There is a mistake in the linear encoder wiring.	Check the wiring.	Wire the cable correctly.	I
Servomotor Moves Instanta-	The setting of Pn282 (Linear Encoder Scale Pitch) is not correct.	Check the setting of Pn282.	Correct the setting of Pn282.	*
neously, 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. Check the wiring.	Tighten any loose terminals or connectors and correct the wiring.	-
	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.	*
Servomotor	The speed reference offset is not correct.	The SERVOPACK offset is adjusted incorrectly.	Adjust the SERVO- PACK offset.	*
Moves with- out a Refer- ence Input	Position control: The reference pulse input is not appropriate.	Check the setting of Pn200 =n.□□□X (Reference Pulse Form) and the sign and pulse signals.	Correctly set the control method and input method.	_
	A failure occurred in the SER-VOPACK.	-	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.	_

4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	Possible Cause	Confirmation	Correction	Reference
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.	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. Replace the SERVO-PACK.	-

4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

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Problem	Possible Cause	Confirmation	Correction	Reference
	The Servomotor vibrated considerably while performing the tuning-less function with the default settings.	Check the waveform of the motor speed.	Reduce the load so that the 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.	*
	The machine mounting is not secure.	Check to see if there are any loose mounting screws.	Tighten the mounting screws.	_
	The machine mounting is not secure.	Check to see if there is misalignment in the coupling.	Align the coupling.	_
		Check to see if the coupling is balanced.	Balance the coupling.	_
	The bearings are defective.	Check for noise and vibration around the bearings.	Replace the Servomotor.	_
	There is a vibration source at the driven machine.	Check for any foreign matter, damage, or deformation in the machine's moving parts.	Consult with the machine manufacturer.	-
Abnormal Noise from Servomotor	Noise interference occurred because of incorrect I/O signal cable specifications.	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 ² .	Use cables that satisfy the specifications.	-
	Noise interference occurred because an I/O signal cable is too long.	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.	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 ² .	Use cables that satisfy the specifications.	-
	Noise interference occurred because the Encoder Cable is too long.	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.	Check the Encoder Cable to see if it is pinched or the sheath is damaged.	Replace the Encoder Cable and correct the cable installation environment.	_

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 Encoder Cable was subjected to excessive noise interference.	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.	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.	Implement counter- measures against noise for the encoder wiring.	-
Abnormal Noise from Servomotor	The encoder was subjected to excessive vibration or shock.	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.	_	Replace the Servomotor.	_
	A failure occurred in the Serial Converter Unit.	_	Replace the Serial Converter Unit.	_
	A failure occurred in the linear encoder.	_	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. 200 Hz to 400 Hz.	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.	-
	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.	-

4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

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Droblem	Descible Cause	Confirmation	Continued from pre	
Problem	Possible Cause	Chock to soo if the sonyo	Correction Perform autotuning	Reference
	The servo gains are not balanced.	Check to see if the servo gains have been correctly tuned.	Perform autotuning without a host reference.	*
	The setting of Pn100 (Speed Loop Gain) is too high.	Check the setting of Pn100. 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.	*
	Noise interference occurred because of incorrect Encoder Cable specifications.	Check the Encoder Cable to see if it satisfies specifications. Use a shielded twisted-pair wire cable or a screened twisted-pair cable with conductors of at least 0.12 mm ² .	Use cables that satisfy the specifications.	-
Absolute Encoder Position Deviation Error (The position that was saved in the host con- troller when the power was turned OFF is dif-	Noise interference occurred because the Encoder Cable is too long.	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.	-
ferent from the posi- tion when the power	Noise interference occurred because the Encoder Cable is damaged.	Check the Encoder Cable to see if it is pinched or the sheath is damaged.	Replace the Encoder Cable and correct the cable installation environment.	_
was next turned ON.)	Replace the Encoder Cable and correct the cable installation environment.	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.	Check to see if the machines are correctly grounded.	Properly ground the machines to separate them from the FG of the encoder.	-

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 SERVOPACK pulse counting error due to noise.	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.	_
Absolute Encoder Position Deviation Error (The position that was saved in the	The encoder was subjected to excessive vibration or shock.	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.	-
host con- troller when	A failure occurred in the encoder.	_	Replace the Servomotor or linear encoder.	-
the power was turned	A failure occurred in the SER-VOPACK.	_	Replace the SERVO-PACK.	-
OFF is dif- ferent from the posi-	Host Controller Multiturn Data or Absolute Encoder Position Data Reading Error	Check the error detection section of the host controller.	Correct the error detection section of the host controller.	-
tion when the power was next turned ON.)		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.	-
		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.	-

4.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	Possible Cause	Confirmation	Correction	Reference
		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	Check the operating condition of the overtravel limit switches.	Make sure that the overtravel limit switches operate correctly.	-
	Drive Prohibit) signal was input. The P-OT/N-OT (Forward Drive Prohibit or Reverse Drive Prohibit) signal malfunctioned.	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		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.	-
Occurred	Drive Prohibit or Reverse Drive Prohibit) signal mal-	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 Reverse Drive Prohibit) signal in Pn50A = n.X□□□ or Pn50B = n.□□□X.	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.	*
		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 Occurred	The selection of the Servo- motor stopping method is not correct.	Check the servo OFF 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.	*
		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.	*
Improper Stop Posi-	The limit switch position and dog length are not appropriate.	_	Install the limit switch at the appropriate position.	_
tion for Overtravel (OT) Signal	The overtravel limit switch position is too close for the coasting distance.	_	Install the overtravel limit switch at the appropriate position.	_

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
	Noise interference occurred because of incorrect Encoder Cable specifications.	Check the Encoder Cable to see if it satisfies specifications. Use a shielded twisted-pair wire cable or a screened twisted-pair cable with conductors of at least 0.12 mm ² .	Use cables that satisfy the specifications.	-
Position Deviation	Noise interference occurred because the Encoder Cable is too long.	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.	_
(without Alarm)	Noise interference occurred because the Encoder Cable is damaged.	Check the Encoder Cable to see if it is pinched or the sheath is damaged.	Replace the Encoder Cable and correct the cable installation environment.	-
	The Encoder Cable was subjected to excessive noise interference.	Check to see if the Encoder Cable is bundled with a high-current line or installed near a high-cur- rent 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.	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 I/O signal line from the encoder or Serial Con- verter 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
110010111	i eccipio cade	Check to see if vibration	Contoolion	11010101100
	The encoder was subjected to excessive vibration or shock.	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.	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.	Check the I/O signal cables to see if they satisfy specifications. Use a shielded twisted-pair wire cable or a screened twisted-pair cable with conductors of at least 0.12 mm ² .	Use cables that satisfy the specifications.	-
	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.	Check the I/O signal cables to see if they satisfy specifications. Use a shielded twisted-pair wire cable or a screened twisted-pair cable with conductors of at least 0.12 mm ² .	Use cables that satisfy the specifications.	ı
	Noise interference occurred because an I/O signal cable is too long.	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.)	-	Replace the Servomotor or linear encoder.	-
	A failure occurred in the SER-VOPACK.	_	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.	_
	The surface of the Servomotor is dirty.	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 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.	_

^{*} Refer to the following manual for details.

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

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4.2

SERVOPACKs with MECHATROLINK-III Communications References

4.2.1 Alarm Displays

If an error occurs in the SERVOPACK, an alarm number will be displayed on the panel display.

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

Example: Alarm A.E60

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 Setting Error	The setting of Pn282 (Linear Encoder Scale Pitch) has not been changed from the default setting.	Gr.1	No
A.0b0	Invalid Servo ON 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 transformer 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	 The AC power supply input setting or DC power supply input setting is not correct. The power supply wiring is not correct. 	Gr.1	Yes
A.400	Overvoltage	The main circuit DC voltage is too high.	Gr.1	Yes
A.410	Undervoltage	The main circuit DC voltage is too low.	Gr.2	Yes
A.510	Overspeed	The motor exceeded the maximum speed.	Gr.1	Yes
A.511	Encoder Output Pulse Overspeed	 Rotary Servomotor: The pulse output speed for the setting of Pn212 (Number of Encoder Out- put Pulses) was exceeded. Linear Servomotor: The motor speed upper limit for the setting of Pn281 (Encoder Output Resolution) was exceeded. 	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 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

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.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
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

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.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 while the servo was ON.	Gr.1	Yes
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

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Alarm Number	Alarm Name	Alarm Meaning	Servo- motor Stop- ping Method	Alarm Reset Possi- ble?
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 MECHA-TROLINK communications with the SERVO-PACK.	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 Communications Data Size Setting 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 MECHA-TROLINK 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 Timeout	A timeout error occurred for a MECHATROLINK command.	Gr.2	Yes
A.F10	Power Supply Line Open Phase	The voltage was low for more than one second for phase R, S, or T when the main power supply was ON.	Gr.2	Yes
A.F50	Servomotor Main Circuit Cable Disconnection	The Servomotor did not operate or power was not supplied to the Servomotor even though the SV_ON (Servo ON) command was input when the Servomotor was ready to receive it.	Gr.1	Yes
FL-1*				
FL-2*		An internal program error occurred in the SER-		
FL-3*	System Alarm	VOPACK.	_	No
FL-4*				
FL-5*				

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?
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

^{*} 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 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.	_
A.022: System Check- sum Error (There is an error in the parameter data in the SER- VOPACK.)	The power supply voltage suddenly dropped.	Measure the power supply voltage.	The SERVOPACK may be faulty. Replace 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.	-

Continued from previous page.

Alarm Number: 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.030: Main Circuit Detector Error	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
	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-	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	-
ting Error (A parameter setting is outside of the setting	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.	-
range.)	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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A1			Continued from pre	evious page.
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.04A: Parameter Set-	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.	_
ting 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 capacities of	The SERVOPACK and Servomotor capacities do not match each other.	Check the capacities to see if they satisfy the following condition: 1/4 \leq \frac{\text{Servomotor capacity}}{\text{SERVOPACK capacity}} \leq 4	Select a proper combination of the SERVOPACK and Servomotor capacities.	*1
the SERVOPACK and Servomotor do not match.)	A failure occurred in the encoder.	Replace the encoder and check to see if the alarm still occurs.	Replace the Servomotor or encoder.	_
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the 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.	-

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

Maintenance

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Alarm Number:	Described O	0 1: 1:	Continued from pre	, ,
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 trans-	The regenerative resistor is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	*1
former 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:			Continued from pre	
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 trans- former or the heat	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.	-
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
	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.101: Motor Overcurrent Detected (The current to the motor exceeded the	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
allowable current.)	A heavy load was applied while the Ser- vomotor 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.	-

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	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, or -330A.	Check it 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.300: Regeneration Error	The jumper between the regenerative resistor terminals (B2 and B3) was removed from one of the following SERVO-PACKs: SGD7S-3R8A, SGD7S-5R5A, SGD7S-7R6A, SGD7S-120A, SGD7S-180A, or SGD7S-200A.	Check to see if the jumper is connected between power supply terminals B2 and B3.	Correctly connect a jumper.	*1
	The External Regenerative Resistor is not wired correctly, or was removed or disconnected.	Check the wiring of the External Regenerative Resistor.	Correct the wiring of the External Regenerative Resistor.	*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 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 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 it 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.330:	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
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 SERVO- PACKs: SGD7S- R70A, SGD7S- R90A,SGD7S-1R6A, or SGD7S-2R8A.	Check it 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:	Describle Occurs	Confinentia	Continued from pre	, ,
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.	_
	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.410: Undervoltage (Detected in the main circuit power supply section of the SERVOPACK.)	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
	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.	-
	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 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.	
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: Encoder Output	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
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.	-
	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 contact 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: Instantaneous Overload A.720:	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.	-
Continuous Overload	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.	-
	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 consump- tion 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 frequently turned ON and OFF.)	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.	-
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_

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Alarm Numbar			Continued from pro	l lage.
Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The surrounding temperature is too high.	Check the surrounding temperature using a thermostat. 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 thermostat. Or, check the operating status with the SERVOPACK installation environment monitor.	Decrease the surrounding temperature by improving the SERVO-PACK installation conditions.	*1
A 7AO.	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.	-

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Alarm Number: Describe Course Continued from previous page.				
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 allty. 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 than the speci- fied level.)	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.	_

Alarm Number: 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.	-
A 0.40-	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.	-
A.850: Encoder Over- speed (Detected at the encoder when the control power supply is turned ON.)	Rotary Servomotor: The Servomotor speed was 200 min ⁻¹ 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 ⁻¹ , and turn ON the control power supply.	-
	Linear Servomotor: The Servomotor exceeded the specified 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: Encoder Over- heated (Detected at the encoder, but only when an abso- lute encoder is used.)	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.	-
	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
	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.	-
A.861: Motor Over- heated	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 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.	-
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.	_

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
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.	-
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.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Continued from pro-	Reference
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.	-
	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. \$\square\$ (Motor Phase Sequence Selection).	Check the setting of Pn080 = n.□□X□.	Set Pn080 = n.□□X□ to an appropriate value.	*1
A.C10: 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.	-
A.C20: Phase Detection Error	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.	-
	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 countermeasures against noise for the polarity sensor wiring.	_

			Continued from pr	evious page.
Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The polarity sensor is protruding from the Magnetic Way of the motor.	Check the polarity sensor.	Correctly reinstall the Moving Coil or Magnetic Way of the motor.	-
A.C21: Polarity Sensor Error	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
	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

Continued from previous page.

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The parameter set- tings 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.	_

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 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	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.	-

Continued from previous page.

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 specifications.	-
A.C90: Encoder Commu- nications Error	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 environmental, and replace the cable. If the alarm still occurs, replace the SERVOPACK.	*1
	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.	-
	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
A.C91: Encoder Communications Position Data Acceleration Rate	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.	-
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 installation condition of the Encoder Cable.	Properly ground the machine to separate it from the FG of the encoder.	-

Continued from previous page.

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:	Possible Cause	Confirmation	Continued from pre	Reference
Alami 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 ² .	-
	The Encoder Cable is too long and noise entered on it.	_	Rotary Servomotors: The Encoder Cable wiring distance must be 50 m max. Linear Servomotors: The Encoder Cable wiring distance must be 20 m max.	-
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.	- novt 2003

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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-	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:	Possible Cause	Confirmation	Continued from pr	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 MECHA- TROLINK communica- tions 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:			Continued from pre	, ,
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
A.E50*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.	-
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 MECHA-TROLINK wiring.	Correct the MECHA-TROLINK Communications Cable wiring. Correctly connect the terminator.	-
A.E60*4: Reception Error in MECHATROLINK Communications	A MECHATROLINK data reception error occurred due to noise.	_	Implement countermeasures against noise. (Check the MECHA-TROLINK 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:			Continued from pre	
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 MECHA- TROLINK Communica- tions Cable wiring.	_
A.E63: MECHATROLINK Synchronization Frame Not Received	A MECHATROLINK data reception error occurred due to noise.	_	Implement countermea- sures against noise. (Check the MECHA- TROLINK Communica- tions Cable and FG wiring, and implement measures such as attach- ing a ferrite core to the MECHATROLINK Com- munications 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:	Danaible Cours	Carafirmanation	Correction	
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.	-
A.F50: Servomotor Main Circuit Cable Dis-	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SER-VOPACK.	_
connection (The Servomotor did not operate or power was not supplied to the Servomotor even though the SV_ON (Servo ON) command was input when the Servomotor was ready to receive it.)	The wiring is not correct or there is a faulty contact in the motor wiring.	Check the wiring.	Make sure that the Servo- motor is correctly wired.	*1
FL-1*3: System Alarm FL-2*3: System Alarm FL-3*3: System Alarm FL-4*3: System Alarm FL-5*3: 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 contact 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.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
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 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⁻¹] ×
$$\frac{\text{Encoder resolution}}{6 \times 10^5} \le \frac{\text{Pn20E}}{\text{Pn210}}$$

• Maximum motor speed [min⁻¹]
$$\times$$
 Encoder resolution
Approx. 3.66×10^{12} \geq Pn20E

· Linear Servomotor

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

$$\frac{\text{Pn585 [mm/s]}}{\text{Linear encoder pitch [μm]}} \times \frac{\text{Resolution of Serial Converter Unit}}{10} \leq \frac{\text{Pn20E}}{\text{Pn210}}$$

$$\frac{\text{Pn385 [100 mm/s]}}{\text{Linear encoder pitch [μm]}} \times \frac{\text{Resolution of Serial Converter Unit}}{\text{Approx. 6.10} \times 10^5} \geq \frac{\text{Pn20E}}{\text{Pn210}}$$

- *3. Detection Conditions
 - Rotary Servomotor

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

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

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

· Linear Servomotor

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

*4. Refer to the following manual for details.

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

*5. 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.

4.2.5 List of Warnings

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 parameter settings (Pn520 \times Pn51E/100).	Required.
A.901	Position Deviation Overflow Alarm at Servo ON	The position deviation exceeded the parameter settings (Pn526 × Pn528/100) when the servo was turned ON.	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 Battery Error	This warning occurs when the voltage of absolute encoder's battery is low.	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 Com- mand Conditions)	A command was sent when the conditions for sending a command were not satisfied.	Automatically reset.*
A.95b	Command Warning 2 (Unsupported Command)	An unsupported command was sent.	Automatically reset.*

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Warning Number	Warning Name	Meaning	Resetting
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 MECHA-TROLINK 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.

^{*} If using the commands for the MECHATROLINK-III standard servo profile, the warning will automatically be cleared after the correct command is received. If you use MECHATROLINK-II-compatible profile commands, send an ALM_CLR (Clear Warning or Alarm) command to clear the warning.

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.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 exceeded the parameter settings (Pn526 × Pn528/100) when the servo was turned ON.	_	Optimize the setting of Pn528 (Position Deviation Overflow Warning Level at Servo ON).	-

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Warning Number: Warning Name	Possible Cause	Confirmation	Correction	Reference
A.910: Overload (warning before an A.710 or A.720 alarm occurs)	The wiring is not correct or there is a faulty contact 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.	-
	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).	*

4.2.6 Troubleshooting Warnings

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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 thermostat. 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 thermostat. 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.	_

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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- lute encoder is con- nected.)	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.	*
	A failure occurred in the SERVO-PACK.	_	The SERVOPACK may be faulty. Replace the SERVO-PACK.	_

4.2.6 Troubleshooting Warnings

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Warning Number: Warning Name	Possible Cause	Confirmation	Correction	Reference
	The speed ripple	_	Reset the speed ripple compensation value on the SigmaWin+.	*
A.942: Speed Ripple Compensation Information Disagreement	compensation information stored in the encoder does not agree with the speed ripple compensa-	_	Set Pn423 to n. □□1□ (Do not detect A.942 alarms). However, changing the setting may increase the speed ripple.	*
tion bisagreement	tion information stored in the SER- VOPACK.	_	Set Pn423 to n. \(\sum \subseteq \subseteq 0\) (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 Warn- ing 2 (Out of Range)	The set com- mand data was clamped to the minimum or maxi- mum 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 Warn- ing 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. (The applies when using the MECHATROLINK-II-compatible profile.)	*
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.	*
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 latch-related 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.	*

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Warning Number: Warning Name	Possible Cause	Confirmation	Correction	Reference
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 MECHA- TROLINK Com- munications Cable is not wired cor- rectly.	Check the wiring conditions.	Correct the MECHA- TROLINK communications cable wiring.	*
A.960: MECHATROLINK Communications Warning	A MECHA- TROLINK data reception error occurred due to noise.	Confirm the installation conditions.	Implement the following countermeasures against noise. • Check the MECHA-TROLINK 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.	-
	The power supply voltage dropped during operation.	Measure the power supply voltage.	Increase the power supply capacity.	-
A.971: Undervoltage	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.	_
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 com- mand data was clamped to the minimum or maxi- mum value of the setting range.	_	Set the command data within the setting ranges.	-

4.2.6 Troubleshooting Warnings

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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.	*

^{*} 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

This section provides troubleshooting based on the operation and conditions of the Servomotor, including causes and corrections.

Turn OFF the Servo System before troubleshooting the items shown in bold lines in the table.

Problem	Possible Cause	Confirmation	Correction	Reference
	The control power supply is not turned ON.	Measure the voltage between control power supply terminals.	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.	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.	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.	Wire the cable correctly.	-
	There is an overload on the Servomotor.	Operate the Servomotor with no load and check the load status.	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 $Pn002 = n.\square X \square \square$.	Set Pn002 = n.\(\pi\)X\(\pi\) according to the type of the encoder that is being used.	*
Servomotor	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).	*
Does Not Start	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.	*
	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.	*

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Problem	Possible Cause	Confirmation	Continued from pre	Reference
	A failure occurred in the SER-VOPACK.	-	Replace the SERVO-PACK.	-
		Check the setting of Pn080 =n.□□□X (Polarity Sensor Selection).	Correct the parameter setting.	*
Servomotor Does Not Start	The polarity detection was not executed.	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.	Check the wiring.	Wire the Servomotor correctly.	_
	There is a mistake in the wiring of the encoder or Serial Converter Unit.	Check the wiring.	Wire the Serial Converter Unit correctly.	_
	There is a mistake in the linear encoder wiring.	Check the wiring.	Wire the cable correctly.	_
Servomotor Moves Instanta-	The setting of Pn282 (Linear Encoder Scale Pitch) is not correct.	Check the setting of Pn282.	Correct the setting of Pn282.	*
neously, 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. Check the wiring.	Tighten any loose terminals or connectors and correct the wiring.	-
	A failure occurred in the SER-VOPACK.	_	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.	_

Problem	Possible Cause	Confirmation	Correction	Reference
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.	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. Replace the SERVO-PACK.	_
	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.	*
	The machine mounting is not secure.	Check to see if there are any loose mounting screws.	Tighten the mounting screws.	_
	The machine mounting is not secure.	Check to see if there is misalignment in the coupling.	Align the coupling.	_
	secure.	Check to see if the coupling is balanced.	Balance the coupling.	_
	The bearings are defective.	Check for noise and vibration around the bearings.	Replace the Servomotor.	-
Abnormal Noise from Servomotor	There is a vibration source at the driven machine.	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.	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 ² .	Use cables that satisfy the specifications.	-
	Noise interference occurred because an I/O signal cable is too long.	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.	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 ² .	Use cables that satisfy the specifications.	_

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Problem	Possible Cause	Confirmation	Continued from pre	Reference
	Noise interference occurred because the Encoder Cable is too long.	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.	Check the Encoder Cable to see if it is pinched or the sheath is damaged.	Replace the Encoder Cable and correct the cable installation environment.	-
Abnormal Noise from Servomotor	The Encoder Cable was subjected to excessive noise interference.	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.	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.	Implement counter- measures against noise for the encoder wiring.	_
	The encoder was subjected to excessive vibration or shock.	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.	_	Replace the Servomotor.	_
	A failure occurred in the Serial Converter Unit.	_	Replace the Serial Converter Unit.	_
	A failure occurred in the linear encoder.	_	Replace the linear encoder.	_

4.2.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	Possible Cause	Confirmation	Continued from pre	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.	-
p9	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.	*

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Problem	Possible Cause	Confirmation	Correction	Reference
Absolute Encoder Position Deviation Error (The position that was saved in the host con- troller when the power was turned OFF is dif- ferent from	Noise interference occurred because of incorrect Encoder Cable specifications.	Check the Encoder Cable to see if it satisfies specifications. Use a shielded twisted-pair wire cable or a screened twisted-pair cable with conductors of at least 0.12 mm ² .	Use cables that satisfy the specifications.	-
	Noise interference occurred because the Encoder Cable is too long.	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.	Check the Encoder Cable to see if it is pinched or the sheath is damaged.	Replace the Encoder Cable and correct the cable installation environment.	-
the posi- tion when the power was next turned ON.)	Replace the Encoder Cable and correct the cable installation environment.	Check to see if the Encoder Cable is bundled with a high-current line or installed near a high-cur- rent 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.	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 I/O signal line from the encoder or Serial Converter Unit.	Implement counter- measures against noise for the encoder or Serial Converter Unit wiring.	-

4.2.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	Possible Cause	Confirmation	Correction	Reference
Absolute Encoder Position Deviation Error (The position	The encoder was subjected to excessive vibration or shock.	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.	ı
that was saved in the	A failure occurred in the encoder.	_	Replace the Servomotor or linear encoder.	-
host con- troller when	A failure occurred in the SER-VOPACK.	_	Replace the SERVO-PACK.	_
the power was turned OFF is dif-		Check the error detection section of the host controller.	Correct the error detection section of the host controller.	-
ferent from the posi- tion when the power	Host Controller Multiturn Data or Absolute Encoder Position Data Reading Error	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.	-
was next turned ON.)		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.	*
Overtravel Occurred		Check the settings of the overtravel input signal allocations (Pn50A/Pn50B).	Set the parameters to correct values.	*
		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.	_
	The P-OT/N-OT (Forward Drive Prohibit or Reverse Drive Prohibit) signal mal-	Check to see if the operation of the overtravel limit switches is unstable.	Stabilize the operating condition of the overtravel limit switches.	-
	functioned.	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.	-

Continued from previous page.

Desklare	Continued from previous page			
Problem	Possible Cause	Confirmation	Correction	Reference
	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	Reverse Drive Prohibit) signal in Pn50A = n.X□□□ or Pn50B = n.□□□X.	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.	*
Occurred	The selection of the Servo- motor stopping method is	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.	*
	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.	*
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	Noise interference occurred because of incorrect Encoder Cable specifications.	Check the Encoder Cable to see if it satisfies specifications. Use a shielded twisted-pair wire cable or a screened twisted-pair cable with conductors of at least 0.12 mm ² .	Use cables that satisfy the specifications.	-
	Noise interference occurred because the Encoder Cable is too long.	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.	-
(without Alarm)	Noise interference occurred because the Encoder Cable is damaged.	Check the Encoder Cable to see if it is pinched or the sheath is damaged.	Replace the Encoder Cable and correct the cable installation environment.	-
	The Encoder Cable was subjected to excessive noise interference.	Check to see if the Encoder Cable is bundled with a high-current line or installed near a high-cur- rent 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.	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 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.	-

4.2.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Continued from previous page.

Problem	Possible Cause	Confirmation	Correction	Reference
Position	The encoder was subjected to excessive vibration or shock.	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.	-
Deviation (without Alarm)	The coupling between the machine and Servomotor is not suitable.	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.	Check the I/O signal cables to see if they satisfy specifications. Use a shielded twisted-pair wire cable or a screened twisted-pair cable with conductors of at least 0.12 mm ² .	Use cables that satisfy the specifications.	-
Position	Noise interference occurred because an I/O signal cable is too long.	Check the lengths of the I/O signal cables.	The I/O signal cables must be no longer than 3 m.	_
Deviation (without Alarm)	An encoder fault occurred. (The pulse count does not change.)	_	Replace the Servomotor or linear encoder.	_
	A failure occurred in the SER-VOPACK.	_	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.	-
	The surface of the Servomotor is dirty.	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 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.	_

^{*} 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)

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 References5-43
	5.2.1 5.2.2 5.2.3	Interpreting the Parameter Lists
	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 ix Indicates when a change to the parameter will be effective.

Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applica- ble Motors	-	Classi- fication	Refer- ence
	2	Basic Function Selections 0	0000 to 10B1	-	0000	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)

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

	Control	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.X000	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

Applicable

Classi-

Refer-

When

List of Parameters 5.1.2

Parameter

The following table lists the parameters.

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

• Reserved parameters

Size

Name

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

Setting

Default

Setting

No.	S			Range	Unit	Setting	Motors	Enabled	fication	ence	
	2	Basic Functions 0	tion Selec-	0000 to 10B1	_	0000	All	After restart	Setup	*1	
			Rotation Direction Selection								
		n.□□□X	Movemen	t Direction Selec		1					
			0	Use CCW as the forward direction.							
				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 direction. (Revers			coder counts	down as th	e forward		
	Ī										
			0	Speed control wit	h analog r	eferences					
				Position control w	ith pulse t	rain referer	ices				
		n.00X0	2	Torque control wit	th analog r	eferences					
				Internal set speed control with contact commands							
				Switching between internal set speed control with contact references and speed control with analog references							
Pn000				Switching between internal set speed control with contact references and position control with pulse train references							
11000				Switching between internal set speed control with contact references and torque control with analog references							
				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							
				Switching between torque control with analog references and speed c with analog references						ol	
				Switching between speed control with analog references and speed control with zero clamping							
				Switching betwee			h pulse train	references a	nd positio	n	
		n.□X□□	Reserved parameter (Do not change.)								
	l		Rotary/Lii	near Servomotor	Startup Se	election WI	nen Encoder	Is Not Conr	nected		
		п.Х□□□		When an encoder is not connected, start as SERVOPACK for Rotary Servomotor.							
				When an encoder motor.	is not cor	nected, sta	art as SERVC	PACK for Li	near Servo)-	

5.1.2 List of Parameters

Continued from previous page.

Б.				0	0	D (!!		11111464 11011				
Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Application Selections		0000 to 1142	_	0000	All	After restart	Setup	*1		
				·								
			Motor Sto	pping Method fo	r Servo Of	F and Gro	oup 1 Alarms					
			0	Stop the motor by	applying	the dynam	ic brake.					
		n.□□□X	1	Stop the motor by brake.	the apply	ing dynam	ic brake and	then release	the dynan	nic		
			2	Coast the motor t	o a stop w	ithout the	thout the dynamic brake.					
			Overtrave	l Stopping Metho	od							
			0	Apply the dynamion method set in Pn0			motor to a sto	op (use the s	topping			
			1	Decelerate the motor to a stop using the torque set in Pn406 as the maximum torque and then servo-lock the motor.								
		n.□□X□	2	Decelerate the motorque and then le			e torque set i	n Pn406 as	the maxim	um		
Pn001			3	Decelerate the mo then servo-lock th		op using tl	ne deceleratio	on time set in	Pn30A aı	nd		
			4	Decelerate the motor		op using tl	ne deceleratio	on time set in	Pn30A a	nd		
	Ī		Main Circ	uit Power Supply	AC/DC In	put Select	ion					
		- UVUU	0	Input AC power a minals (do not use			ver supply us	ing the L1, L	2, and L3	ter-		
		n.□X□□	1	Input DC power as the main circuit power supply using the B1/⊕ terminals or the B1 and ⊖ 2 terminals (use an external converter c shared converter).						2		
			Warning	Code Output Sele	ction							
			0	Output only alarm	codes on	the ALO1,	ALO2, and A	LO3 termina	ıls.			
		n.X□□□	1	Output both warning codes and alarm codes on the ALO1, ALO2, and ALO3 terminals. However, while an warning code is being output, the ALM (Servo Alarm) output signal will remain ON (normal state).								

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Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Application Selections	Function 2	0000 to 4213	-	0000	-	After restart	Setup	*1
			Speed/Pos	sition Control Op	tion (T-RE	F Input Al	location)		Applicat Motors	
			0 [Do not use T-REF.						
		n.□□□X	1 l	Jse T-REF as an e						
			2 l	Jse T-REF as a to	rque feed	oack input			All	
			3 l	Jse T-REF as an e P-CL or /N-CL is	external to ON.	rque limit i	nput when			
			Torque Co	ntrol Option (V-R		Applicable Motors				
		n.□□X□	0 [Oo not use V-REF					All	
			1 l	Jse V-REF as an	external sp	oeed limit i	nput.		All	
Pn002			Encoder Usage							ole s
		n.□X□□	0 (Use the encoder according to encoder specifications.						
			1 l	Jse the encoder a	as an incre	mental en	coder.		All	
			2 l	Jse the encoder a	as a single	-turn abso	lute encoder.		Rotary	<u>' </u>
			External E	ncoder Usage					Applicat Motors	
			0 [Do not use an ext	ernal enco	der.				
		n.X□□□		he external enco	der moves	s in the for	ward directior	for CCW		
			2 F	Reserved setting (Do not us	e.)			Rotary	′
				The external encoder moves in the reverse direction for CCW motor rotation.						
			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	n Function 6	0000 to 105F	-	0002	All	Immedi- ately	Setup	*1		
			Analog Mo	Analog Monitor 1 Signal Selection								
			Analog Mc			1\						
			00	Motor speed (1 Motor speed (1								
				Speed reference	e (1 V/1,00	00 min ⁻¹)						
			01	Speed reference (1 V/1,000 mm/s)								
				Torque reference	e (1 V/100	% rated to	rque)					
			02	Force reference (1 V/100% rated force)								
			03	Position deviation	n (0.05 V/	reference	unit)					
				Position amplifie	er deviation	n (after elec	ctronic gear) (0.05 V/enco	der pulse	unit)		
	Position amplifier deviation (after electronic gear) (0.05 V/linear en pulse unit)											
			05	Position reference speed (1 V/1,000 min ⁻¹)								
			05	Position reference speed (1 V/1,000 mm/s)								
			06	Reserved setting (Do not use.)								
			07	Load-motor pos	ition devia	ation (0.01	V/reference u	nit)				
Pn006		n.□□XX	08	Positioning completed: 0 V)	pletion (po	ositioning o	completed: 5	V, positionin	g not com-	-		
			09	Speed feedforw	ard (1 V/1	,000 min ⁻¹))					
			09	Speed feedforw	ard (1 V/1	,000 mm/s	s)					
			0A	Torque feedforw	ard (1 V/1	00% rated	torque)					
			UA	Force feedforwa	ırd (1 V/10	0% rated t	force)					
			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	min ⁻¹ : value at	the motor s	shaft)			
			0E	Reserved setting	g (Do not ı	use.)						
			0F	Reserved setting	g (Do not ı	use.)						
			10	Main circuit DC	voltage							
			11 to 24	Reserved setting	gs (Do not	use.)						
			25	Position deviation	n after po	sition refer	ence filter (0.	05 V/referen	ce unit)			
			26 to 5F Reserved settings (Do not use.)									
		n.□X□□	Reserved	parameter (Do no	ot change.	.)						
		n.X000	Reserved	oarameter (Do no	ot change.	.)						

Applicable

Motors

5.1.2 List of Parameters

Classi-

fication

Refer-

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When

Enabled

	2	Application Selections	Function 7		0000 to 105F	_	0000	All	Immedi- ately	Setup	*1	
			Analog Mo	nito	or 2 Signal Se	lection						
			00	М	otor speed (1	V/1,000 m	nin ⁻¹)					
			00	М	otor speed (1	V/1,000 m	ım/s)					
			01	Sp	peed reference	e (1 V/1,00	0 min ⁻¹)					
				Sp	peed reference	e (1 V/1,00	0 mm/s)					
			02		rque reference							
					rce reference	•						
			03		Position deviation (0.05 V/reference unit) Position amplifier deviation (after electronic gear) (0.05 V/encoder pulse unit)							
			04	Po	osition amplifiensition amplifiensition amplifiensition		•				unit)	
			0.5	•	osition reference	ce speed (1 V/1,000	min ⁻¹)				
			05	Position reference speed (1 V/1,000 mm/s)								
			06	Reserved setting (Do not use.)								
			07	Lo	ad-motor pos	ition devia	tion (0.01	V/reference u	nit)			
Pn007		n.□□XX	08		ositioning com eted: 0 V)	pletion (po	sitioning c	ompleted: 5	V, positioning	g not com-	-	
			09	Sp	peed feedforwa	ard (1 V/1,	000 min ⁻¹)					
			03	Sp	eed feedforw	ard (1 V/1,	000 mm/s	s)				
			0A	То	rque feedforw	ard (1 V/1	00% rated	torque)				
			0,1	Fc	rce feedforwa	rd (1 V/10	0% rated f	force)				
			0B		ctive gain (1st	-		-				
			0C		ompletion of peted: 0 V)	osition refe	erence dist	tribution (com	pleted: 5 V,	not com-		
			0D	Ex	ternal encode	r speed (1	V/1,000 n	nin ⁻¹ : value at	the motor s	haft)		
			0E	Re	eserved setting	g (Do not ι	ıse.)					
			0F	Re	eserved setting	g (Do not ι	ıse.)					
			10	Ma	ain circuit DC	voltage						
			11 to 24		eserved setting	, ,						
			25		sition deviation			ence filter (0.0	05 V/referen	ce unit)		
]]		26 to 5F	Re	eserved setting	gs (Do not	use.)					
		n.□X□□	Reserved	oara	ameter (Do no	t change.)					
		n.X□□□	Reserved	Reserved parameter (Do not change.)								

Setting

Range

Setting

Default

Parameter

No.

Size

Name

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 8	0000 to 7121	_	0000	Rotary	After restart	Setup	*1
		n.□□□X	0 Ou	Voltage Alarm, tput alarm (A.8 tput warning (A	30) for low	battery vo				
				ection for Und						
			1	not detect und						
Pn008		n.□□X□		ect undervolta			torque at hos	t controller.		
			2 De	ect undervolta SERVOPACK).					425 (i.e., c	only
			Warning Det	ection Selection	n					
		n.□X□□	0 De	ect warnings.						
			1 Do	not detect war	nings exce	ept for A.9	71.			
		n.X□□□	Reserved pa	rameter (Do no	ot change)				
		,	riocci voa pa	ramotor (Bo ne	or orialigo.)				
	2	Application Selections	Function 9	0000 to 0121	-	0010	All	After restart	Tuning	*1
				15						
		n.□□□X	Reserved pa	rameter (Do no	t change.)				
			Current Cont	rol Mode Sele	ction					
			0 Use	current contro	ol mode 1.					
Pn009		n.□□X□	1 71 • S	ERVOPACK Mo R6A: Use curre ERVOPACK Mo 90A, and -780A	nt control odels SGD	mode 1. 7S-120A,	-180A, -200A			
			2 Use	current contro	l mode 2.					
			Sneed Detec	tion Method S	election					
		n.□X□□	<u> </u>	speed detecti						
				speed detecti						
		n.XDDD	Reserved pa	rameter (Do no	t change.)				
			, rou pa							

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Parameter No.	Size	Na	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
	2	Application Selections		0000 to 0044	-	0001	All	After restart	Setup	*1	
				'	.ll	1		I.	II.		
			Motor Stop	ping Method fo	r Group 2	Alarms					
			0 AI	oply the dynami ethod set in Pn	c brake or	coast the	motor to a st	op (use the :	stopping		
				ecelerate the mo							
		n.□□□X		ecelerate the more rque and then le			he torque set	in Pn406 as	the maxin	num	
			3 Do	ecelerate the meesecelerate the meesecelerate	otor to a s 101 = n. □I	or to a stop using the deceleration time set in Pn30A = n.□□□X for the status after stopping.					
				ecelerate the metor		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		
				ecelerate the more rque. Use the s							
		n.□□X□		ecelerate the more rque and then le			he torque set	in Pn406 as	the maxin	num	
				ecelerate the mees setting of Pn0					n Pn30A.	Use	
				ecelerate the metor		top using t	the decelerati	on time set i	n Pn30A a	ind	
		n.□X□□	Reserved parameter (Do not change.)								
		n.X□□□	Reserved p	arameter (Do n	ot change	.)					
				·							
	2	Application Selections		0000 to 1121	_	0000	All	After restart	Setup	*1	
			Operator Pai	ameter Display	Selection	1					
		n.□□□X	0 Dis	play only setup	paramete	rs.					
			1 Dis	play all parame	ters.						
			Motor Stopp	ing Method for	Group 2	Alarms					
D 00D		-	0 Sto	op the motor by	setting th	e speed re	ference to 0.				
Pn00B		n.□□X□		ply the dynamic			motor to a sto	p (use the s	topping		
				t the stopping r		,	= n.□□□X.				
			Power Input	Selection for T	hree-phas	e SERVO	PACK				
		n.□X□□	0 Us	e a three-phase	power su	pply input.					
			1 Use	e a three-phase	power su	pply input	as a single-pl	nase power s	supply inp	ut.	
	n.X□□□ Reserved parameter (Do not change.)										
	_										

Continued from previous page.

Parameter	(I)			Setting	Setting	Default	Applicable	When	Classi-	Refer-
No.	Size	N	ame	Range	Unit	Setting	Motors	Enabled	fication	ence
	2	Application Selections		0000 to 0131	-	0000	-	After restart	Setup	*1
			Function Sel	ection for Test	without a	Motor			Applical Motor	ole
		n.□□□X	0 Dis	able tests with	out a moto	or.				
			1 Ena	able tests withou	out a moto	r.			All	
			Encoder Res	olution for Tes	ts without	a Motor			Applical Motor	
Pn00C		n.□□X□		e 13 bits.						
		11.00/0		e 20 bits.					Rotar	/
				e 22 bits. e 24 bits.						
			3 03	5 24 DII.S.						
		n.□X□□	-	e Selection for			tor		Applical Motor	ole s
				e an incrementa					All	
			1 Us	e an absolute e	ricoder.					
	n.X□□□ Reserved parameter (Do not change.)									
	2	Application Selections	Function D	0000 to 1001	-	0000	All	After restart	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.	.)				
			Overtravel W	arning Detecti	on Selecti	ion				
		n.X□□□	0 Do	not detect ove	rtravel wa	rnings.				
			1 De	ect overtravel	warnings.					
	2	Application Selections		0000 to				A 51		
			F	2011	-	0000	All	After restart	Setup	*1
			F	2011	_	0000	All		Setup	*1
					- Warning S		All		Setup	*1
		n.□□□X	Preventative	2011 Maintenance Vot detect prevenue.		election			Setup	*1
Pn00F			Preventative 0 Do n	Maintenance \	entative ma	election aintenance	warnings.		Setup	*1
Pn00F			Preventative 0 Do n 1 Dete	Maintenance Vot detect prevenue.	entative ma maintena	election aintenance nce warnir	warnings.		Setup	*1
Pn00F		п.ППХ	Preventative 0 Do n 1 Dete	Maintenance of detect preventative	entative maintena	delection aintenance nce warnir	warnings.		Setup	*1
Pn00F		n.000X	Preventative 0 Do n 1 Dete Reserved pa	Maintenance of the detect preventative transfer (Do no	maintena ot change.	selection aintenance nce warnir	warnings.		Setup	*1
Pn00F		n.000X n.00X0 n.0X0	Preventative 0 Do n 1 Dete Reserved pa	Maintenance of the detect preventative rameter (Do no rameter (Do	maintena ot change.	selection aintenance nce warnir	warnings.		Setup	*1
Pn00F	2	n.□□X□ n.□X□□ n.□X□□ n.X□□□ Axis Addre for UART/U	Preventative 0 Do n 1 Dete Reserved pa	Maintenance of the detect preventative rameter (Do no rameter (Do	maintena ot change.	selection aintenance nce warnir	warnings.		Setup	*1
	2 2	n.□□X□ n.□X□□ n.X□□□ Axis Addrefor UART/Unications	Preventative 0 Do n 1 Dete Reserved pa Reserved pa Reserved pa Ss Selection JSB Commu- parameter (Do	Maintenance of the detect preventative of preventative rameter (Do no rameter (Do	maintena ot change.	selection aintenance nce warnir .)	warnings.	restart		*1

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OUTILITIALLA	11 0111	pievious	page.

Parameter State									Cor	tinued fron	n previou	s page.
Pn040 Pn040 Reserved parameter (Do not change.) Encoder Resolution Compatibility Selection O Use the encoder resolution of the connected motor. 1 Use a resolution of 20 bits when connected to an SGM7J, SGM7A, SGM7A, SGM7A por SGM7S Servomotor. Potary Reserved parameter (Do not change.) Reserved parameter (Do not change.) Reserved parameter (Do not change.) Polarity Sensor Selection D Use polarity sensor. 1 Do not use polarity sensor. 1 Do not use polarity sensor. 1 Do not use polarity sensor. D Use a phase-B lead as a phase sequence of U, V, and W. Reserved parameter (Do not change.) Reserved parameter (Do not change.) Reserved parameter (Do not change.) D Use polarity sensor. D Use polarity senso		Size		Name		_	_					
Pn080 Pn080 Pn080 Polarity Sensor Selection Description Descri		2			nc-		-	0000	-		Setup	-
Pn080 Pn080 Pn080 Polarity Sensor Selection Description Descri				D			-1					
Pn080 Pn		n.				·					Applica	ıhle
Phosphase Property	Pn040	n	ппхп			·	•		cted motor			
Pn080 Reserved parameter (Do not change.)					Use a	a resolution of 2	20 bits wh	en connec	ted to an SG	M7J,	Rotar	У
Pn080 Polarity Sensor Selection		n.	OXOO	Reserved	d para	meter (Do not	change.)					
Pn080 Polarity Sensor Selection O Use polarity sensor.		n.	XDDD	Reserved	d para	meter (Do not	change.)					
Pn080 Pn0800 Pn0800 Pn0800 Pn0800 Pn0800 Pn0800 Pn0800 Pn0800		2			n		_	0000	Linear		Setup	*1
Pn080 N.□□□X□ D Use polarity sensor.			Selection	S 60		1111				restart		
Note				Polarity	Sens	or Selection						
Pn080		r	n.□□□X									
Pn081 Pn100 2 Speed Loop Gain 10 to 20,000 0.1 Hz 400 All Immediately Tuning *1 Pn102 2 Position Loop Gain 10 to 20,000 1.7 S 400 All Immediately Tuning *1 Pn102 2 Second Speed Loop Gain 10 to 20,000 0.1 Hz 400 All Immediately Tuning *1 Pn103 2 Moment of Inertia Ratio 0 to 20,000 1.0 to 20,000 0.1 Hz 400 All Immediately Pn105 2 Second Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn105 2 Second Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn106 2 Second Speed Loop Gate 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn106 2 Second Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn106 2 Second Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn106 2 Second Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn107 2 Second Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn107 2 Second Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn107 2 Second Speed Loop Integral Time Constant Integral Tuning *1 Immediately Tuning *1 Immediately Imm				Motor F	hase	Sequence Sele	ection					
Pn081 Pn081 Reserved parameter (Do not change.) Calculation Method for Maximum Speed or Encoder Output Pulses 0 Calculate the encoder output pulse setting for a fixed maximum speed. 1 Calculate the maximum speed for a fixed encoder output pulse setting. 2 Application Function 1 Calculate the maximum speed for a fixed encoder output pulse setting. 2 Application Function 2 Selections 81 Phase-C Pulse Output Selection 1 Output phase-C pulses only in the forward direction. 1 Output phase-C pulses in both the forward and reverse directions. Reserved parameter (Do not change.) n.□□X□ Reserved parameter (Do not change.) n.□□\ Reserved parameter (Do not change.) n.□□\ Reserved parameter (Do not change.) 1 Speed Loop Integral 15 to 51,200 0.01 ms 2000 All Immediately 1 Tuning *1 Pn102 2 Position Loop Gain 10 to 20,000 0.1/s 400 All Immediately 1 Tuning *1 Pn103 2 Moment of Inertia Ratio 0 to 20,000 0.1 Hz 400 All Immediately 1 Tuning *1 Pn104 2 Second Speed Loop 10 to 20,000 0.1 Hz 400 All Immediately 1 Tuning *1 Pn105 2 Second Speed Loop 10 to 20,000 0.1 Hz 400 All Immediately 1 Tuning *1 Pn106 2 Second Speed Loop 10 to 20,000 0.1 Hz 400 All Immediately 1 Tuning *1 Pn106 2 Second Speed Loop 10 to 20,000 0.1 Hz 400 All Immediately 1 Tuning *1 Pn106 2 Second Speed Loop 10 to 20,000 0.1 Hz 400 All Immediately 1 Tuning *1 Pn106 2 Second Speed Loop 10 to 20,000 0.1 Hz 400 All Immediately 1 Tuning *1	Pn080	r										
Pn081 Pn081 Calculate the encoder output pulse setting for a fixed maximum speed. 1 Calculate the maximum speed for a fixed encoder output pulse setting.		r	n.□X□□			·	•			<u> </u>		
Pn081 Pn081 Pn081 Pn081 Pn081 Pn081 Pn081 Pn081 Pn081 Pn100 Pn				Calcula	tion M	lethod for Max	imum Spe	eed or End	oder Output	Pulses		
Phase-C Pulse Output Selection		r	n.X000					·			•	
Phase-C Pulse Output Selection		_									-	
Pn081 Pn081 Description Pn100 Postion Loop Gain 10 to 20,000 Pn100 Pn1000 Pn1000 Pn1000 Pn1000 Pn1000 Pn1000 Pn1000 Pn1000 Pn1000 Pn		2			n		-	0000	All		Setup	*1
Pn081 Pn081 Description Pn100 Postion Loop Gain 10 to 20,000 Pn100 Pn1000 Pn1000 Pn1000 Pn1000 Pn1000 Pn1000 Pn1000 Pn1000 Pn1000 Pn				Phase-	C Pul:	se Output Sele	ection					
Pn081			n.□□□X	-	-1	•		in the forv	ward direction	1.		
n.□X□□ Reserved parameter (Do not change.) n.X□□□ Reserved parameter (Do not change.) Pn100 2 Speed Loop Gain 10 to 20,000 0.1 Hz 400 All Immediately Tuning *1 Pn101 2 Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn102 2 Position Loop Gain 10 to 20,000 0.1/s 400 All Immediately Tuning *1 Pn103 2 Moment of Inertia Ratio 0 to 20,000 1% 100 All Immediately Tuning *1 Pn104 2 Second Speed Loop Gain 10 to 20,000 0.1 Hz 400 All Immediately Tuning *1 Pn105 2 Second Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn106 2 Second Position Loop 10 to 20,000 0.1/s 400 All Immediately Tuning *1	Pn081			1	Out	tput phase-C p	ulses in b	oth the for	ward and reve	erse direction	ns.	
N.XIIII Reserved parameter (Do not change.)			n.□□X□	Reserv	ed pa	rameter (Do no	ot change.	.)				
Pn100 2 Speed Loop Gain 10 to 20,000 0.1 Hz 400 All Immediately Immediately Tuning *1 Pn101 2 Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn102 2 Position Loop Gain 10 to 20,000 0.1/s 400 All Immediately Tuning *1 Pn103 2 Moment of Inertia Ratio 0 to 20,000 1% 100 All Immediately Tuning *1 Pn104 2 Second Speed Loop Gain 10 to 20,000 0.1 Hz 400 All Immediately Tuning *1 Pn105 2 Second Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn106 2 Second Position Loop 10 to 20,000 0.1/s 400 All Immediately Tuning *1			n.□X□□	Reserv	ed pa	rameter (Do no	ot change.	.)				
Pn100 2 Speed Loop Gain 10 to 20,000 0.1 Hz 400 All ately ately ately Tuning *1 Pn101 2 Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Immediately Tuning *1 Pn102 2 Position Loop Gain 10 to 20,000 0.1/s 400 All Immediately Tuning *1 Pn103 2 Moment of Inertia Ratio 0 to 20,000 1% 100 All Immediately Tuning *1 Pn104 2 Second Speed Loop Gain 10 to 20,000 0.1 Hz 400 All Immediately Tuning *1 Pn105 2 Second Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn106 2 Second Position Loop 10 to 20,000 0.1/s 400 All Immediately Tuning *1			n.X□□□	Reserv	ed pa	rameter (Do no	ot change.	.)				
Pn101 2 Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Immediately Tuning *1 Pn102 2 Position Loop Gain 10 to 20,000 0.1/s 400 All Immediately Tuning *1 Pn103 2 Moment of Inertia Ratio 0 to 20,000 1% 100 All Immediately Tuning *1 Pn104 2 Second Speed Loop Gain 10 to 20,000 0.1 Hz 400 All Immediately Tuning *1 Pn105 2 Second Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn106 2 Second Position Loop 10 to 20,000 0.1/s 400 All Immediately Tuning *1	Pn100	2	Speed Lo	oop Gain		10 to 20.000	0.1 Hz	400	All		Tunina	*1
Pn102 2 Position Loop Gain 10 to 20,000 0.1/s 400 All Immediately ately Tuning *1 Pn103 2 Moment of Inertia Ratio 0 to 20,000 1% 100 All Immediately ately Tuning *1 Pn104 2 Second Speed Loop Gain 10 to 20,000 0.1 Hz 400 All Immediately Tuning *1 Pn105 2 Second Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn106 2 Second Position Loop 10 to 20,000 0.1/s 400 All Immediately Tuning *1			·		al	-				Immedi-		
Pn103 2 Moment of Inertia Ratio 0 to 20,000 1% 100 All Immediately Tuning *1 Pn104 2 Second Speed Loop Gain 10 to 20,000 0.1 Hz 400 All Immediately Tuning *1 Pn105 2 Second Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn106 2 Second Position Loop 10 to 20,000 0.1/s 400 All Immediately Tuning *1	Pn102	2				10 to 20,000	0.1/s	400	All	Immedi-	Tuning	*1
Pn104 2 Second Speed Loop Gain 10 to 20,000 0.1 Hz 400 All Immediately Immediately Tuning *1 Pn105 2 Second Speed Loop Integral Time Constant 15 to 51,200 0.01 ms 2000 All Immediately Tuning *1 Pn106 2 Second Position Loop 10 to 20,000 0.1/s 400 All Immediately Tuning *1	Pn103	2	Moment	of Inertia F	Ratio	0 to 20,000	1%	100	All	Immedi-	Tuning	*1
Pn105 2 Second Speed Loop Integral Time Constant 2 Second Position Loop 10 to 20 000 0.1/s 400 All Immediately Tuning *1	Pn104	2		Speed Loc	p	10 to 20,000	0.1 Hz	400	All	Immedi-	Tuning	*1
	Pn105	2	Second S	Speed Loc ime Cons	p tant	15 to 51,200	0.01 ms	2000	All	Immedi-	Tuning	*1
	Pn106	2		Position Lo	ор	10 to 20,000	0.1/s	400	All		Tuning	*1

Continued from previous page.

Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
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	0000 to 5334	_	0004	All	-	Setup	*1

Pn10B

	Mode Switching Selection								
	0	Use the internal torque reference as the condition (level setting: Pn10C).							
	1	Use the speed reference as the condition (level setting: Pn10D).							
п.ПППХ	ļ	Use the speed reference as the condition (level setting: Pn181).							
11.000	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).							
	4	Do not use mode switching.							

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

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

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 ⁻¹	0	Rotary	Immedi- ately	Tuning	*1
Pn10E	2	Mode Switching Level for Acceleration	0 to 30,000	1 min ⁻¹ /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

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Parameter No.	Size		Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2		atic Gain Switch ections 1	0000 to 0052	-	0000	All	Immedi- ately	Tuning	*1
			Gain Switc	ning Selection						
				se manual gain s ne gain is switch		lly with the	/G-SEL (Gair	n Selection) :	signal.	
		n. 🗆 🗆 🗆 🗙	1 R	eserved setting	Do not us	e.)				
			2 T	se automatic ga ne gain is switch witching conditic econd gain to the	ed automa n A is sati	atically fron sfied. The	n the first gair gain is switch	ed automati	cally from	
Pn139			Gain Switc	ning Condition A	4					
			0 /0	COIN (Positioning Completion Output) signal turns ON.						
			1 /0	COIN (Positioning Completion Output) signal turns OFF.						
		n.□□X□	2 /1	NEAR (Near Outp	out) signal	turns ON.				
				NEAR (Near Outp	, ,					
				osition reference			I reference pu	llse input is (OFF.	
			5 P	osition reference	pulse inp	ut is ON.				
		n.□X□□	Reserved p	arameter (Do no	ot change.	.)				
		n.X□□□	Reserved p	arameter (Do no	ot change.	.)				
						,				
					ı		I		ı	
Pn13D	2		Gain Level	100 to 2,000	1%	2000	All	Immedi- ately	Tuning	*1
Pn13F	2	2 Seco	eviation Control nd Position Inte- ne Constant	0 to 50,000	0.1 ms	0	All	Immedi- ately	Tuning	-
	2		ollowing Con- ated Selections	0000 to 1121	-	0100	All	Immedi- ately	Tuning	*1
			Model Follo	Model Following Control Selection						
		n. 🗆 🗆 🗆 🔾		not use model f		ontrol.				
				e model following						
			\.m 0							
				uppression Sele						
		n.□□X□		not perform vibr	- ' '		aifia fraguesa			
				form vibration su form vibration su	• • • • • • • • • • • • • • • • • • • •					
Pn140			2 Fe	IOITI VIDIALIOIT SI	appression	1 101 100 5	Jecilic Trequei	icies.		
1 11140				uppression Adju						
		n.□X□□	0 tu	o not adjust vibr ıning without a h ıning.						
			1 A	djust vibration su ithout a host refe	uppressior erence, au	automationation	cally during ex rith a host refe	recution of a erence, and	utotuning custom tu	n-
			ir	g.						
			Speed Fee	dforward (VFF)/	Torque Fee	edforward	(TFF) Selecti	on		
		n.X□□□	0 D	o not use model	following	control and	d speed/torqu	ue feedforwa	rd togethe	er.
			1 U	se model followi	ng control	and speed	d/torque feed	forward toge	ther.	
								·		
D.444	0 Model Following Con- 10 to 20 000 0 1/2 500 All Immedi- Tuning *1									
Pn141	2	trol Ga		10 to 20,000	0.1/s	500	All	ately	Tuning	*1

500 to 2,000

0.1%

1000

ΑII

Pn142

2

Model Following Control Gain Correction

Tuning Continued on next page.

Immedi-ately

*1

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 Follotrol 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		owing Con- Feedforward ation	0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	*1	
Pn148	2	Second Ming 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-	0000 to 0021	-	0021	All	After restart	Tuning	*1	
Pn14F		1 Use model following control type 2. Tuning-less Type Selection 0 Use tuning-less type 1. 1 Use tuning-less type 2. 2 Use tuning-less type 3. n.□X□□ Reserved parameter (Do not change.) Reserved parameter (Do not change.)									
	2		nance Con- d Selections	0000 to 0011	-	0010	All	Immedi- ately	Tuning	*1	
		n.□□□X Anti-Resonance Control Selection Do not use anti-resonance control. Use anti-resonance control.									
Pn160		n.□□X□	0 Do tun tun	nce Control Ad not adjust anti- ing without a he ing. just anti-resona	resonancost referer	e control a ace, autotu ol automat	ining with a ho	execution of	and cust	com 	
		n.□X□□		hout a host refe rameter (Do no			iui a nost rele	rence, and c	นธเบกา เน้า	iii ig.	
	-	n.X000		rameter (Do no		,					
Pn161	2 Anti-Resonance Frequency 10 to 20,000 0.1 Hz 1000 All Immediately Tuning *1								*1		
Pn162	2		nance Gain	1 to 1,000	1%	100	All	Immedi- ately	Tuning	*1	

Applicable

Motors

5.1.2 List of Parameters

Classi-

fication

Refer-

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When

Enabled

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Pn163	2	Anti-Reson ing Gain	ance Damp	0 to 300	1%	0	All	Immedi- ately	Tuning	*1	
Pn164	2	Anti-Reson Time Cons rection		-1,000 to 1,000	0.01 ms	0	All	Immedi- ately	Tuning	*1	
Pn165	2	Anti-Reson Time Cons rection		-1,000 to 1,000	0.01 ms	0	All	Immedi- ately	Tuning	*1	
Pn166	2	Anti-Reson ing Gain 2	ance Damp	0 to 1,000	1%	0	All	Immedi- ately	Tuning	*1	
	2	Tuning-less Related Se	Function- lections	0000 to 2711	-	1400	All	_	Setup	*1	
		n.□□□X	0 1	ss Selection Disable tuning-les Enable tuning-les					Enab Afte	When Enabled After restart	
	li		Speed Co	ntrol Method					Whe Enab		
Pn170		n. 🗆 🗆 X 🗆		Use for speed co Use for speed co		se host co	ntroller for po	osition contro	Afte		
		n. 🗆 X 🗆 🗆	Rigidity Le	evel					Whe Enab		
			0 to 7	Set the rigidity lev				Immedi- ately			
		n.X000	Tuning-less Load Level WEnd								
		11.7000	0 to 2 Set the load level for the tuning-less function.						Immedi- ately		
Pn181	2	Mode Swite for Speed F	ching Level Reference	0 to 10,000	1 mm/s	0	Linear	Immedi- ately	Tuning	*1	
Pn182	2	Mode Swite for Acceler	ching Level ation	0 to 30,000	1 mm/s ²	0	Linear	Immedi- ately	Tuning	*1	
	2	Less-Devia Related Sw	tion Contro vitches	ol- 0000 to 1101	-	0100	All	After restart	Setup	_	
		n.□□□X	Less-Devi	ation Control Sel	ection						
			0 0	o not use less-de	eviation co	ntrol.					
			1 U	lse less-deviation	control.						
Pn190		n.□□X□	Reserved	parameter (Do not	t change.)						
		n.□X□□ Reserved parameter (Do not change.)									

Setting

Range

Parameter

No.

Size

Name

Setting

Unit

Default

Setting

n.X□□□	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	ı

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	0000 to 2113	-	2102	All	After restart	Setup	-	
			parameter (Do not change.)							
			arameter (Do no	,						
Pn195		n.□X□□ Reserved p	arameter (Do no	t change.)						
		Llo	tion Mode Selecter e Less-Deviatio		I Modo wh	on loss dovis	tion control	is anablad		
			nis mode is com					is eriableu	·	
			served setting (·		ting protection			
		2 09	e Less-Deviatio	n Control 2	2 IVIOGE WI	ien iess-devia	ition control	s enabled	·	
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 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	-	
Pn199	2	Less-Deviation Control 2 Reverse Torque Feed- forward Gain	0 to 10,000	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 ⁻¹	0	Rotary	Immedi- ately	Tuning	_	
Pn19C	2	Reserved parameter (Do not change.)	_	-	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 (Do not change.)	-	_	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 (Do not change.)	_	-	36	-	Immedi- ately	Tuning	-	
Pn1A5	2	Reserved parameter (Do not change.)	_	-	0	-	Immedi- ately	Tuning	_	
Pn1AE	2	Reserved parameter (Do not change.)	_	_	0	_	Immedi- ately	Tuning	_	
Pn1AF	2	Reserved parameter (Do not change.)	_	_	0	-	Immedi- ately	Tuning	-	

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Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence			
	2	Position Co	ontrol Refer- Selections	_	_	0000	All	After restart	Setup	*1			
		1											
			Reference	Pulse Form									
			0 8	Sign and pulse tra	ain, positiv	e logic.							
				CW and CCW pul									
				wo-phase pulse bositive logic	trains with	90° phase	e differential (p	hase A and	phase B) :	×1,			
		n.□□□X		wo-phase pulse positive logic	trains with	90° phase	e differential (p	hase A and	phase B) :	×2,			
				wo-phase pulse positive logic	trains with	90° phase	e differential (p	hase A and	phase B) :	×4,			
				Sign and pulse tra									
			6 (CW and CCW pul	se trains,	negative Ic	gic						
			Clear Sign	al Form									
Pn200			0 (Clear position dev	riation whe	n the sign	al is at high le	vel.					
		n.□□X□		Clear position dev									
				Clear position dev									
			3 (Clear position dev	riation on t	he falling e	edge of the sig	gnal.					
			Clear Ope	ration									
			 Clear position deviation at a base block (at servo OFF or when alarm occurs). Do not clear position error (cleared only with CLR (Clear Position Deviation) 										
		n.□X□□		Do not clear posit signal).	ion error (d	cleared on	y with CLR (C	lear Position	n Deviation	1)			
			2 (Clear position dev	riation whe	en an alarn	occurs.						
			Filter Sele	ction									
			0 (Jse the reference	input filter	for a line-	driver signal.	(1 Mpps ma:	x.)	_			
		n.X□□□	1 (Jse the reference	input filter	for an op	en-collector s	ignal. (200 k	pps max.)				
			2 (Jse reference inp	ut filter 2 f	or a line-dı	river signal. (1	to 4 Mpps)					
Pn205	2	Multiturn L	imit	0 to 65,535	1 rev	65535	Rotary	After restart	Setup	*1			
	2	Position Cotion Select	ontrol Func- ions	0000 to 2210	_	1000	All	After restart	Setup	*1			
		n.□□□X	Reserved	parameter (Do no	ot change.)							
			· ·	,		,							
		n. 🗆 X		parameter (Do no		,							
		n.□X□□	Reserved	oarameter (Do no	ot change.	.)							
Pn207			/COIN (Po	sitioning Comple	tion Outp	ut) Signal	Output Timin	g					
				Output when the a han the setting of					same or les	38			
		n.X□□□	1 t	Output when the a	22 (Positio								
			-	oosition reference Output when the a		alue of the	position error	r is the same	or less th	 nan			
			2 t	he setting of Pn5).									
					-				-				
		Number of	External	4 to	1 scale pitch/		_	After	_				
Pn20A	4		cale Pitches		revolu- tion	32768	Rotary	restart	Setup	*1			
Pn20E	4	Electronic (Numerato	Gear Ratio	1 to 1,073,741,824	1	64	All	After restart	Setup	*1			
		(1 tarriorato	• /	1,010,141,024	1	<u> </u>			d on nev	t page			

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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	0000 to 1003	_	0000	Rotary	After restart	Setup	*1

Pn22A

n.□□□X	Reserved	d parameter (Do not change.)							
n.□□X□	□□X□ Reserved parameter (Do not change.)								
	neserved parameter (Do not change.)								
n.□X□□	Reserved	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 ⁻¹ Direct Drive: 0.1 min ⁻¹	100	Rotary	Immedi- ately	Setup	*1
Pn302	2	Internal Set Speed 2	0 to 10,000	Rotary: 1 min ⁻¹ Direct Drive: 0.1 min ⁻¹	200	Rotary	Immedi- ately	Setup	*1
Pn303	2	Internal Set Speed 3	0 to 10,000	Rotary: 1 min ⁻¹ Direct Drive: 0.1 min ⁻¹	300	Rotary	Immedi- ately	Setup	*1
Pn304	2	Jogging Speed	0 to 10,000	Rotary: 1 min ⁻¹ Direct Drive: 0.1 min ⁻¹	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
							Continuo	رم مر مرما	

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Immedi-

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	0000 to 0002	_	0000	All	Immedi- ately	Setup	*1

Pn310

Pn406

Pn407

2

2

Emergency Stop Torque

Speed Limit during

Torque Control

Vibration Detection Sen-

	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.)			
$n.\Box X\Box\Box$	Reserve	d parameter (Do not change.)			
n.X□□□	Reserve	d parameter (Do not change.)			

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⁻¹ **Tuning** Level ately After Pn316 2 Maximum Motor Speed 0 to 65,535 10000 *1 1 min⁻¹ Rotary Setup restart Moment of Inertia Cal-Immedi-Pn324 2 300 0 to 20,000 1% AllSetup *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 20 *1 Internal Set Speed 2 1 mm/s Setup Linear ately Immedi-*1 Pn382 2 0 to 10,000 30 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 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 *1 rated Gain ately torque First Stage First Torque Immedi-Pn401 2 Reference Filter Time 0 to 65,535 0.01 ms 100 ΑII *1 **Tuning** ately Constant Immedi-1%*2 2 *1 Pn402 Forward Torque Limit 0 to 800 800 Rotary Setup ately Immedi-1%*2 Pn403 2 0 to 800 800 *1 Reverse Torque Limit Rotary Setup ately Forward External Torque Immedi-Pn404 2 1%*2 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

1%*2

1 min⁻¹

800

10000

0 to 800

0 to 10,000

Continued on next page.

Setup

Setup

Immedi-

Immedi-

ately

ΑII

Rotary

*1

*1

Continued from previous page.

Parameter No.	Size	Na	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Torque-Rel tion Selecti	ated Func ons	-	0000 to 1111	_	0000	All	_	Setup	*1
								1	L		
			Notch Fil	ter S	Selection 1					Whe Enab	
		n.□□□X	0		able first stage able first stage					Imme atel	
						TIOTOTI IIITO				Whe	
			Speed Li	Use the smaller of the maximum motor speed and the setting of							
			0	Pn4	107 as the spe	ed limit.					
Pn408		n.□□X□		Pn4	e the smaller of 180 as the spe	ed limit.		· 		Afte	
111400			1	sett	e the smaller of ting of Pn407 a	as the spee	ed limit.				11 L
					e the smaller of ting of Pn480 a			n detection sp	peed and the)	
			Notch Fil	ter S	Selection 2	Whe Enab					
		n.□X□□	0								
			1	Ena	able second sta	age notch	filter.			atel	
		n.XDDD			pensation Fun					Whe Enab	
		11.7.0.0.0	0		able friction co able friction cor					Imme atel	
					1			1	1	1	
Pn409	2	First Stage Frequency			50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn40A	2	First Stage Q Value	Notch Filt	er	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn40B	2	First Stage Depth	Notch Filt	er	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn40C	2	Second State ter Frequer	age Notch ncy	Fil-	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn40D	2	Second Stater Q Value		Fil-	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn40E	2	Second Stater Depth	age Notch	Fil-	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn40F	2	Second Sta Torque Ref Frequency	age Secor erence Filt	id er	100 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn410	2	Second Sta Notch Filte	age Secor r Q Value	nd	50 to 100	0.01	50	All	Immedi- ately	Tuning	*1
Pn412	2	First Stage Torque Ref Time Cons	erence Filt	er	0 to 65,535	0.01 ms	100	All	Immedi- ately	Tuning	*1
Pn415	2	T-REF Filter	r Time Co	n-	0 to 65,535	0.01 ms	0	All	Immedi- ately	Setup	*1

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Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Torque-Rel	ated Func- ions 2	0000 to	-	0000	All	Immedi- ately	Setup	*1		
										<u>I</u>		
			Notch Filte	er Selection 3								
		n.□□□X		Disable third stage	e notch filt	er.						
			1 E	Enable third stage	notch filte	er.						
			Notch Filte	ilter Selection 4								
Pn416		n.□□X□	0 [Disable fourth stag	ge notch f	ilter.						
			1 E	Enable fourth stag	je notch fi	lter.						
			Notch Filte	er Selection 5								
		n.□X□□	0 [Disable fifth stage	notch filte	er.						
			1 E	nable fifth stage	notch filte	r.						
		n.X□□□	Reserved p	parameter (Do no	ot change	.)						
Pn417	2	Third Stage Frequency	e Notch Filte	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1		
Pn418	2	Third Stage Q Value	e Notch Filte	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1		
Pn419	2	Third Stage Depth	e Notch Filte	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 State ter Q Value	ge Notch Fil-	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1		
Pn41C	2	Fourth Stater Depth	ge Notch Fil-	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1		
Pn41D	2	Fifth Stage Frequency	Notch Filter	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1		
Pn41E	2	Q Value	Notch Filter	50 10 1,000	0.01	70	All	Immedi- ately	Tuning	*1		
Pn41F	2	Fifth Stage Depth	Notch Filter	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1		
	2	Speed Rip sation Sele	ple Compenections	- 0000 to	_	0000	Rotary	_	Setup	*1		
			Speed Rip	ple Compensation	on Functio	n Selectio	n		Whe Enab			
		n.□□□X	0 [Disable speed ripp	ole compe	nsation.			Imme			
				nable speed ripp	•				ate			
			Speed Rip	ple Compensatio	on Informa	ation Disag	greement Wa	rning Detec-	Whe Enab			
Pn423		n.□□X□		Detect A.942 aları	ms.				Afte			
			1 C	o not detect A.9	42 alarms				resta			
			Speed Rip	ple Compensation	on Enable	Condition	Selection		Whe			
		n.□X□□	0 S	Speed reference					Afte			
				Notor speed					resta			
		n.XDDD	Reserved r	parameter (Do no	nt change)						
			riosorved p	Jaramotor (DO III	onange	•/						
Pn424	2	Torque Lim	nit at Main Ci e Drop	ir- 0 to 100	1%*2	50	All	Immedi- ately	Setup	*1		
		-		•								

Continued from previous page.

Parameter No.	Size	Na	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn425	2	Release Tir Limit at Ma Voltage Dro	in Circuit [']		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	ple Comper ble Speed	n- 0 t	to 10,000	1 min ⁻¹	0	Rotary Ser- vomotor	Immedi- ately	Tuning	*1
Pn456	2	Sweep Tordence Ampli	que Refer- itude	1	1 to 800	1%	15	All	Immedi- ately	Tuning	*1
	2	Notch Filte Selections		nt (0000 to 0101	_	0101	All	Immedi- ately	Tuning	*1
				,		1	l			l	
			Notch Filt	er Adju	stment Se	lection 1					
		n.□□□X	0					r automatically Ining with a ho			
								natically during ith a host refe			
Pn460		n.□□X□	Reserved	parame	eter (Do no	ot change.	.)				
			Notch Filt	er Adju	ıstment Se	lection 2					
		n.□X□□	0	autotun				filter automat utotuning with			
			1	Adjust t ing with tuning.	the second nout a host	stage not reference	ch filter au , autotunir	itomatically dung with a host	uring executi reference, a	on of auto	tun-
		n.XDDD	Reserved	parame	eter (Do no	ot change.)				
							,				_
Pn480	2	Speed Limi Force Cont	it during trol	0 t	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	C	0 to 800	1%*2	30	Linear	Immedi- ately	Setup	*1
Pn484	2	Reverse Fo	orce Limit	C) to 800	1%*2	30	Linear	Immedi- ately	Setup	*1
Pn485	2	Polarity De		er- C) to 100	1 mm/s	20	Linear	Immedi- ately	Tuning	-
Pn486	2	Polarity De ence Accel Deceleration	leration/) to 100	1 ms	25	Linear	Immedi- ately	Tuning	_
Pn487	2	Polarity Des	tection Cor d Time	n- C	0 to 300	1 ms	0	Linear	Immedi- ately	Tuning	-
Pn488	2	Polarity De ence Waitir		er- 5	0 to 500	1 ms	100	Linear	Immedi- ately	Tuning	-
Pn48E	2	Polarity De Range	tection	1 t	to 65,535	1 mm	10	Linear	Immedi- ately	Tuning	-
Pn490	2	Polarity De Level	tection Loa	o t	to 20,000	1%	100	Linear	Immedi- ately	Tuning	-
Pn495	2	Polarity De firmation For ence) to 200	1%	100	Linear	Immedi- ately	Tuning	-
Pn498	2	Polarity De able Error F		W-	0 to 30	1 deg	10	Linear	Immedi- ately	Tuning	-
Pn49F	2	Speed Ripp sation Enab	ple Comper ble Speed	n- 0 t	to 10,000	1 mm/s	0	Linear	Immedi- ately	Tuning	*1

Continued from previous page.

Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn501	2	Zero Clamping Level	0 to 10,000	1 min ⁻¹	10	Rotary	Immedi- ately	Setup	*1
Pn502	2	Rotation Detection Level	1 to 10,000	1 min ⁻¹	20	Rotary	Immedi- ately	Setup	*1
Pn503	2	Speed Coincidence Detection Signal Output Width	0 to 100	1 min ⁻¹	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 ⁻¹	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

Name

ize

5.1.2 List of Parameters

Parameter

Continued from previous page.

When

Classi- Refer-

No.	Siz	IN	ame		Range	Unit	Setting	Motors	Enabled	fication	ence	
	2	Input Signa	al Selection	IS	0000 to FFF2	ı	2100	All	After restart	Setup	*1	
			Input Sign	nal A	Allocation Mod	le						
	r	n.□□□X	0	Use	the sequence	input sigr	nal termina	ls with the de	fault allocation	ons.		
	•	1.000	1	Cha	ange the seque	nce input	signal allo	cations.				
			2	Res	erved setting (Do not us	e.)					
			L		ON) Signal Al							
					ve when CN1-							
					ive when CN1-							
			-		ive when CN1-			, ,				
					ive when CN1-	•		. ,				
				Active when CN1-44 input signal is ON (closed).								
	5 Active when CN1-45 input signal is ON (closed). 6 Active when CN1-46 input signal is ON (closed). 7 The signal is always active.											
	r	п.ШХШ	7									
			9		signal is alway			E (opon)				
								, , ,				
	A Active when CN1-41 input signal is OFF (open). B Active when CN1-42 input signal is OFF (open). C Active when CN1-43 input signal is OFF (open). D Active when CN1-44 input signal is OFF (open).											
Pn50A												
				Active when CN1-44 input signal is OFF (open). Active when CN1-45 input signal is OFF (open).								
			-		ive when CN1-			, , ,				
	/P-CON (Proportional Control) Signal Allocation											
	r	n.□X□□	0 to F									
	Ī		P-OT (Fo	rwar	d Drive Prohib	oit) Signal	Allocation					
			0	Ena	ble forward dri	ve when (CN1-40 inp	out signal is C	N (closed).			
			1	Ena	ble forward dri	ve when (CN1-41 inp	out signal is C	N (closed).			
			2	Ena	ble forward dri	ve when (CN1-42 inp	out signal is C	N (closed).			
			3	Ena	ble forward dri	ve when (CN1-43 inp	out signal is C	N (closed).			
			4	Ena	ble forward dr	ve when (CN1-44 inp	out signal is C	N (closed).			
			5		ble forward dri							
			6	Ena	ble forward dri	ve when (CN1-46 inp	out signal is C	N (closed).			
	r	n.X000	7	Set	the signal to a	lways prol	hibit forwai	rd drive.				
			8		the signal to a							
			9	Ena	ble forward dri	ve when (CN1-40 inp	out signal is C	FF (open).			
			Α		ble forward dri							
			-		ble forward dri				,			
			С		ble forward dri				,			
			D		ble forward dri							
					ble forward dri			_				
			F	Ena	ble forward dri	ve when (N1-46 inp.	out signal is O	rr (open).			
									Continue	d on nov	t nacc	

Setting

Setting

Default

Applicable

No. 1	Darameta	•			Cotting	Sotting	Default		Itinued from	· .	Refer-			
N-OT (Reverse Drive Prohibit) Signal Allocation Charles reverse drive when CN1-40 input signal is ON (closed).		Size	N	ame		_					ence			
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Pn50B Pn50B 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). 5 Active on signal edge when CN1-45 input signal changes from OFF (open) to ON (closed). 6 Active on signal edge when CN1-46 input signal changes from OFF (open) to ON (closed). 7 Reserved setting (Do not use.) 8 The signal is always inactive. 9 Active on signal edge when CN1-40 input signal changes from ON (closed) to OFF (open). A Active on signal edge when CN1-41 input signal changes from ON (closed) to OFF (open). B Active on signal edge when CN1-42 input signal changes from ON (closed) to OFF (open). C 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). E Active on signal edge when CN1-45 input signal changes from ON (closed) to OFF (open). F Active on signal edge when CN1-45 input signal changes from ON (closed) to OFF (open). 7 Active on signal edge when CN1-46 input signal changes from ON (closed) to OFF (open). 8 Active on signal edge when CN1-46 input signal changes from ON (closed) to OFF (open). 9 Active on signal edge when CN1-46 input signal changes from ON (closed) to OFF (open). 10 Active on signal edge when CN1-46 input signal changes from ON (closed) to OFF (open). 11 Active on signal edge when CN1-46 input signal changes from ON (closed) to OFF (open). 12 Active on signal edge when CN1-46 input signal changes from ON (closed) to OFF (open).						dge when	CN1-40 in	put signal cha	anges from (OFF (open)) to			
Pn50B 2 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). 5 Active on signal edge when CN1-45 input signal changes from OFF (open) to ON (closed). 6 Active on signal edge when CN1-46 input signal changes from OFF (open) to ON (closed). 7 Reserved setting (Do not use.) 8 The signal is always inactive. 9 Active on signal edge when CN1-40 input signal changes from ON (closed) to OFF (open). A Active on signal edge when CN1-41 input signal changes from ON (closed) to OFF (open). B Active on signal edge when CN1-42 input signal changes from ON (closed) to OFF (open). C 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). E Active on signal edge when CN1-45 input signal changes from ON (closed) to OFF (open). E Active on signal edge when CN1-46 input signal changes from ON (closed) to OFF (open). F Active on signal edge when CN1-46 input signal changes from ON (closed) to OFF (open). N-CL (Forward External Torque Limit Input) Signal Allocation 7 N-CL (Reverse External Torque Limit Input) Signal Allocation	Pn50B					dge when	CN1-41 in	put signal cha	anges from (OFF (open)) to			
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n.□□X□ Active on signal edge when CN1-46 input signal changes from OFF (open) to ON (closed). Reserved setting (Do not use.) Active on signal is always inactive. Active on signal edge when CN1-40 input signal changes from ON (closed) to OFF (open). Active on signal edge when CN1-41 input signal changes from ON (closed) to OFF (open). Active on signal edge when CN1-42 input signal changes from ON (closed) to OFF (open). C 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). E 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). Active on signal edge when CN1-46 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). Active on signal edge when CN1-46 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). Active on signal edge when CN1-46 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). Active on signal edge when CN1-46 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). Active on signal edge when CN1-46 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 CN1-45 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 CN1-45 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).														
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9 Active on signal edge when CN1-40 input signal changes from ON (closed) to OFF (open). A Active on signal edge when CN1-41 input signal changes from ON (closed) to OFF (open). B Active on signal edge when CN1-42 input signal changes from ON (closed) to OFF (open). C 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). E Active on signal edge when CN1-45 input signal changes from ON (closed) to OFF (open). F Active on signal edge when CN1-46 input signal changes from ON (closed) to OFF (open). NCURD //-CL (Forward External Torque Limit Input) Signal Allocation O to F The allocations are the same as the /S-ON (Servo ON) signal allocations.			n.□□X□											
OFF (open). A Active on signal edge when CN1-41 input signal changes from ON (closed) to OFF (open). B Active on signal edge when CN1-42 input signal changes from ON (closed) to OFF (open). C 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). E Active on signal edge when CN1-45 input signal changes from ON (closed) to OFF (open). F Active on signal edge when CN1-46 input signal changes from ON (closed) to OFF (open). NUDDO //P-CL (Forward External Torque Limit Input) Signal Allocation O to F The allocations are the same as the /S-ON (Servo ON) signal allocations.						·								
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C 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). E Active on signal edge when CN1-45 input signal changes from ON (closed) to OFF (open). F Active on signal edge when CN1-46 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). Active on signal edge when CN1-46 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). Active on signal edge when CN1-45 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 CN1-45 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 CN1-45 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 CN1-45 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).				А	OFF (open).									
D Active on signal edge when CN1-44 input signal changes from ON (closed) to OFF (open). E Active on signal edge when CN1-45 input signal changes from ON (closed) to OFF (open). F Active on signal edge when CN1-46 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). Active on signal edge when CN1-46 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 CN1-45 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 CN1-45 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 CN1-45 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 CN1-45 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).				В	OFF (open).									
D OFF (open). E Active on signal edge when CN1-45 input signal changes from ON (closed) to OFF (open). F Active on signal edge when CN1-46 input signal changes from ON (closed) to OFF (open). N-CL (Forward External Torque Limit Input) Signal Allocation				C	OFF (open).									
F Active on signal edge when CN1-46 input signal changes from ON (closed) to OFF (open). P-CL (Forward External Torque Limit Input) Signal Allocation				D	OFF (open).									
n.□X□□				E										
0 to F The allocations are the same as the /S-ON (Servo ON) signal allocations. N-CL (Reverse External Torque Limit Input) Signal Allocation				F		dge when	CN1-46 in	out signal cha	anges from C	N (closed)) to			
0 to F The allocations are the same as the /S-ON (Servo ON) signal allocations. N-CL (Reverse External Torque Limit Input) Signal Allocation														
$n.X\square\square\square$			n.UXUI	0 to F The allocations are the same as the /S-ON (Servo ON) signal allocations.										
$n.X\square\square\square$			V===	/N-CL (Re	everse External To	rque Limi	t Input) Sig	gnal Allocatio	on					
0 to F The allocations are the same as the /S-ON (Servo ON) signal allocations.			n.XUUU	· ` ·		•				ıs.				

Continued from previous page.

Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Input Signa	al Selection	os 0000 to FFFF	-	8888	All	After restart	Setup	*1		
			/SPD-D (Motor Direction) &			V (closed).					
			1	Active when CN1	-41 input s	signal is ON	V (closed).					
			2	Active when CN1								
			3	Active when CN1								
			4	Active when CN1	-44 input s	signal is ON	(closed).					
			5	Active when CN1	-45 input s	ignal is ON	l (closed).					
			6	Active when CN1	-46 input s	ignal is ON	V (closed).					
		n.□□□X	7	The signal is always active.								
			8	The signal is always inactive.								
			9	Active when CN1	-40 input s	signal is OF	F (open).					
5			Α	Active when CN1	-41 input s	ignal is OF	F (open).					
Pn50C			В	Active when CN1	<u> </u>		,					
			С	Active when CN1-43 input signal is OFF (open).								
			D	Active when CN1-44 input signal is OFF (open).								
			Е	Active when CN1-45 input signal is OFF (open).								
			F	Active when CN1	-46 input s	signal is OF	F (open).					
			/SPD-A (I	nternal Set Spee	d Selection	n Input) Si	gnal Allocatio	n				
		n.□□X□	0 to F	The allocations at tions.	e the same	e as the /S	PD-D (Motor	Direction) si	gnal alloca	l-		
			/SPD-B (nternal Set Spee	d Selection	n Input) Si	gnal Allocatio	on				
		n.□X□□	0 to F	The allocations at tions.	e the same	e as the /S	PD-D (Motor	Direction) sig	gnal alloca	l- 		
			/C-SEL (Control Selection	Input) Siar	nal Allocat	ion					
		n.X□□□	0 to F	The allocations at tions.	1 / 0			Direction) si	gnal alloca	l-		
									d on nov			

Refer-

									tinaca non	. p. o o a.	-			
Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer ence			
	2	Input Signa	al Selectio	ns	0000 to FFFF	-	8888	-	After restart	Setup	*1			
			/ZCLAM	P (Ze	ero Clamping I	nput) Sigr	nal Allocat	ion		Applicable Motors				
			0	Act	ive when CN1-	40 input s	signal is ON	V (closed).						
			1	Act	ive when CN1-	41 input s	signal is ON	V (closed).						
			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	Active when CN1-46 input signal is ON (closed).										
		n.□□□X	7	The signal is always active.										
			8	The	signal is alway	ys inactive	٠.			All				
			9	Act										
			Α	Act	ive when CN1-	41 input s	signal is OF	F (open).						
D 50D			В	Act	ive when CN1-	42 input s	signal is OF	F (open).						
Pn50D			С	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).						
	•	~ DDVD	/INHIBIT	(Ref	erence Pulse	Inhibit Inp	ut) Signal	Allocation		Applical Motor				
	_	n.□□X□	0 to F		allocations are ut) signal alloca		e as the /Z	CLAMP (Zero	Clamping	All				
		n.□X□□	/G-SEL (Gain	Selection Inp	ut) Signal	Allocation	1		Applical Motor				
		11.0700	0 to F		allocations are ut) signal alloca		e as the /Z	CLAMP (Zero	Clamping	All				
		n.XDDD	/P-DET (Pola	rity Detection	Input) Sig	nal Alloca	tion		Applicat Motors				
		11.7000	0 to F	The allocations are the same as the /ZCLAMP (Zero Clamping Input) signal allocations.						Linear				

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Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
	2	Output Sig tions 1	nal Selec-	0000 to 6666	_	3211	All	After restart	Setup	*1	
			1							_	
			— `	ioning Comple	•	, ,					
				sabled (the abo			•				
			-	tput the signal			<u>.</u>				
		n.□□□X		tput the signal							
				tput the signal			•	ut terminal.			
				tput the signal							
				tput the signal			•				
Pn50E			6 Ou	tput the signal	from the C	IN 1-39 OU	tput terminai.				
			/V-CMP (Spe	eed Coincidend	ce Detecti	on Output) Signal Alloc	ation			
		n.□□X□		e allocations are	e the same	e as the /C	OIN (Position	ing Complet	ion) signal		
			/TGON (Rotation Detection Output) Signal Allocation								
		n.□X□□		e allocations are	e the same	e as the /C	OIN (Position	ing Complet	ion) signal		
			/S-RDY (Ser	vo Ready) Sigr	nal Allocat	ion					
		n.X□□□	0 to 6	e allocations are			OIN (Position	ing Complet	ion) signal		
	2	Output Sig tions 2	inal Selec-	0000 to 6666	-	0000	All	After restart	Setup	*1	
			/CLT (Torque	Limit Detection	n Outnut)	Signal All	ocation				
			/CLT (Torque Limit Detection Output) Signal Allocation 0 Disabled (the above signal output is not used).								
				tput the signal		•		ut terminal			
				tput the signal							
		n.□□□X		tput the signal							
			4 Ou	tput the signal	from the C	N1-37 out	tput terminal.			 -	
			5 Ou	tput the signal	from the C	N1-38 out	tput terminal.				
Pn50F			6 Ou	tput the signal	from the C	N1-39 out	tput terminal.				
			/VLT (Speed	Limit Detectio	n) Signal A	Allocation					
		n.□□X□		e allocations are allocations.	e the same	e as the /C	LT (Torque Li	mit Detection	n Output) :	sig-	
			/BK (Brake 0	Output) Signal /	Allocation						
		n.□X□□	0 to 6	e allocations and allocations.		e as the /C	LT (Torque Li	mit Detection	n Output) :	sig-	
			/WARN (War	ning Output) S	ignal Allo	cation					
		n.X□□□	O to 6 Th	The ellecations are the same as the /CLT /Torque Limit Detection Output) sig						sig-	
			1							,	

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							Cor	ntinued fron	n previou:	s page.		
Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Output Sig tions 3	gnal Selec-	0000 to 0666	_	0000	All	After restart	Setup	*1		
			/NEAR (Near	Output) Signa	ıl Allocatio	n						
			0 Dis	abled (the abo	ve signal c	utput is no	ot used).					
			1 Ou	tput the signal	from the C	N1-25 or	CN1-26 outp	ut terminal.				
		n.□□□X		tput the signal								
				tput the signal				ut terminal.				
D 540				tput the signal			·					
Pn510				tput the signal			·					
			6 Ou	tput trie signal	mom the C	7N1-39 0u	ıput terminai.					
		n.□□X□		rameter (Do no		,						
		n.□X□□		erence Pulse I						I		
			0 to 6 The	e allocations ar	e the same	e as the /N	IEAR (Near) s	ignal allocati	ons.			
		n.X□□□	Reserved pa	rameter (Do no	ot change	.)						
									_			
	2	Output Sig Settings	gnal Inverse	0000 to 1111	-	0000	All	After restart	Setup	*1		
		J Gottin igo						1001011				
			Output Signa	al Inversion for	CN1-25	and CN1-2	% Terminals					
Pn512		n.□□□X		e signal is not in			.0 1011111110					
				e signal is inver								
			Output Signal Inversion for CN1-27 and CN1-28 Terminals									
		n.□□X□		0 The signal is not inverted.								
Pn512				e signal is inver								
			1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2									
		n.□X□□	Output Signal Inversion for CN1-29 and CN1-30 Terminals 0 The signal is not inverted.									
		11.0700		e signal is inver								
		- VOOO		al Inversion for		Terminal						
		n.X□□□		e signal is not in signal is inver								
			1 1116	s signal is inver	tea.							
	2	Output Sig Settings 2	gnal Inverse	0000 to 0011	_	0000	All	After restart	Setup	*1		
		Octaingo 2		0011				rootart				
				al Inversion for		Terminal						
		n.□□□X		signal is not in						<u>.</u>		
			1 The	e signal is inver	ted.							
Pn513			Output Signa	al Inversion for	CN1-39	Terminal						
		n.□□X□		The signal is not inverted.								
			1 The	e signal is inver	ted.							
		n.□X□□	Reserved pa	Reserved parameter (Do not change.)								
	n.X□□□ Reserved parameter (Do not change.)											

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 4	ınal Selec-	0000 to 0666	-	0000	All	After restart	Setup	*1		
	n.□□□X Reserved parameter (Do not change.)											
	1	n.□□X□	Reserved pa	d parameter (Do not change.)								
			/PM (Preventative Maintenance Output) Signal Allocation									
			0 Dis	abled (the abov	ve signal c	utput is no	ot used).					
Pn514			1 Ou	Output the signal from the CN1-25 or CN1-26 output terminal.								
		n. 🗆 X 🗆 🗆	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	tput the signal	from the C	N1-37 out	tput terminal.					
			5 Ou	tput the signal	from the C	N1-38 out	tput terminal.					
			6 Ou	tput the signal	from the C	N1-39 out	tput terminal.					
	n.X□□□ Reserved parameter (Do not change.)											

5.1.2 List of Parameters

Continued	from	provious	0000
Continued	IIOIII	hi evious	page.

Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Input Signa 6	al Selections	0000 to FFFF	_	8888	All	After restart	Setup	*1		
			SEN (Absolu	te Data Reque	st Input) S	Signal Allo	cation					
			0 Ac	tive when CN1-	-40 input s	signal is ON	l (closed).					
			1 Ac	tive when CN1-	-41 input s	signal is ON	(closed).					
			2 Ac	tive when CN1-	-42 input s	signal is ON	V (closed).			 -		
			3 Ac	tive when CN1-	-43 input s	signal is ON	V (closed).					
			4 Ac	tive when CN1-	-44 input s	signal is ON	V (closed).					
			5 Ac	Range Unit Setting Motors Enabled fication ence 0000 to FFFF - 8888 All After restart Setup *1 se Data Request Input) Signal Allocation we when CN1-40 input signal is ON (closed). we when CN1-41 input signal is ON (closed). we when CN1-42 input signal is ON (closed). we when CN1-43 input signal is ON (closed). we when CN1-44 input signal is ON (closed). we when CN1-45 input signal is ON (closed). we when CN1-46 input signal is ON (closed). we when CN1-46 input signal is ON (closed). we when CN1-47 input signal is ON (closed). we when CN1-40 input signal is OFF (open). we when CN1-41 input signal is OFF (open). we when CN1-43 input signal is OFF (open). we when CN1-45 input signal is OFF (open). we when CN1-46 input signal is OFF (open). we when CN1-47 input signal is ON (closed). we when CN1-48 input signal is ON (closed). we when CN1-49 input signal is ON (closed). we when CN1-40 input signal is ON (closed). we when CN1-41 input signal is ON (closed). we when CN1-42 input signal is ON (closed). we when CN1-46 input signal is ON (closed). we when CN1-47 input signal is ON (closed). we when CN1-48 input signal is ON (closed). we when CN1-49 input signal is ON (closed). we when CN1-40 input signal is ON (closed).								
			6 Ac	tive when CN1-	to Fe							
		n.□□□X	7 Th	e signal is alwa	ys active.							
			8 En	Active when CN1-43 input signal is ON (closed). Active when CN1-44 input signal is ON (closed). Active when CN1-45 input signal is ON (closed). Active when CN1-46 input signal is ON (closed). The signal is always active. Enable when 5 V is input to CN1-4. Active when CN1-40 input signal is OFF (open). Active when CN1-41 input signal is OFF (open). Active when CN1-42 input signal is OFF (open). Active when CN1-43 input signal is OFF (open). Active when CN1-44 input signal is OFF (open). Active when CN1-45 input signal is OFF (open). Active when CN1-45 input signal is OFF (open). Active when CN1-46 input signal is OFF (open).								
			9 Ac	tive when CN1-	-40 input s	signal is OF	F (open).					
			A Ac	tive when CN1-	-41 input s	signal is OF	F (open).					
			. 5									
			C Ac	tive when CN1-	-43 input s	Setting Motors Enabled fication ence 8888 All After restart Setup *1 Signal Allocation signal is ON (closed). signal is OF (copen). signal is OFF (open). signal is ON (closed). signal is OFF (open). signal is OFF (open).						
			SEN (Absolute Data Request Input) Signal Allocation O Active when CN1-40 input signal is ON (closed). 1 Active when CN1-41 input signal is ON (closed). 2 Active when CN1-42 input signal is ON (closed). 3 Active when CN1-43 input signal is ON (closed). 4 Active when CN1-44 input signal is ON (closed). 5 Active when CN1-45 input signal is ON (closed). 6 Active when CN1-46 input signal is ON (closed). 7 The signal is always active. 8 Enable when 5 V is input to CN1-4. 9 Active when CN1-41 input signal is OFF (open). A Active when CN1-41 input signal is OFF (open). B Active when CN1-43 input signal is OFF (open). C Active when CN1-43 input signal is OFF (open). E Active when CN1-44 input signal is OFF (open). E Active when CN1-45 input signal is OFF (open). F Active when CN1-46 input signal is OFF (open). Active when CN1-46 input signal is OFF (open). Active when CN1-45 input signal is OFF (open). Active when CN1-46 input signal is OFF (open). Active when CN1-46 input signal is ON (closed). 4 Active when CN1-42 input signal is ON (closed). Active when CN1-43 input signal is ON (closed). Active when CN1-43 input signal is ON (closed). Active when CN1-44 input signal is ON (closed). Active when CN1-45 input signal is ON (closed).									
			E Ac	tive when CN1-	45 input s	signal is OF	F (open).					
			F Ac	tive when CN1-	-46 input s	signal is OF	F (open).					
Pn515			/PSEL (Refe	rence Pulse Inp	out Multip	lication Sv	vitching Input	t) Signal Allo	cation			
				tive when CN1-	-40 input s	signal is ON	(closed).					
					· ·							
							, ,					
			5 Ac	tive when CN1-	-45 input s	signal is Of	\ (closed).					
					•		V (closed).					
		n.□□X□										
					•							
							,					
							,					
			F Ac	tive when CN1-	-46 input s	signal is Of	-F (open).					
		n.□X□□	Reserved pa	rameter (Do no	ot change	.)						
		n.X□□□	Reserved pa	rameter (Do no	ot change	.)						

Continued from previous page.

Parameter No.	Size	1	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
	Post of the signal selections Name Range	0000 to	-	8888	All	After restart	Setup	*1			
				1	I				l		
	Ī		FSTP (Forced	Stop Input) Si	gnal Alloc	ation					
					-		al is ON (close	ed).			
			1 En	able drive wher	n CN1-41	input signa	al is ON (close	ed).			
Parameter No. Name Setting Range Onto Setting Setting Setting Setting Setting Setting Setting Setting Setting Setting Setting Setting Setting Setting Name Setting Name Setting Setting Setting Setting Setting Alter restart			2 En	able drive wher	n CN1-42	input signa	al is ON (close	ed).			
	· · · · · · · · · · · · · · · · · · ·										
	Name										
Parameter No. Name Setting Range Unit Setting Motors Entity Setting Setting Setting Setting Setting Setting Setting Setting Motors Entity Setting No. Setting Se		o ctop)									
	Se				`						
Parameter No. S Name Range Setting Default Applicable When Class											
	Name Setting Setting Setting Setting Setting Applicable When Classi Re Range Classi Reserved parameter (Do not change.)										
		Name Setting Range Unit Setting Se									
	Part Security Part Par										
Pn516	-					·					
			-					,			
	The second secon										
	-										
		n.X□□□ Reserved parameter (Do not change.)									
	2		gnal Selec-		_	0654	All		Setup	*1	
		10110 0		0000				rootart			
			Al O1 (Alarm	Code Output)	Signal All	ocation					
							ot used).				
				•		•	,	ut terminal.			
		n 000V	2 Ou	tput the signal	from the C	N1-27 or	CN1-28 outpu	ut terminal.			
		11.000	3 Ou	tput the signal	from the C	N1-29 or	CN1-30 outpu	ut terminal.			
				1 0			•				
Pn517				·			•				
1 11017			6 Ou	tput the signal	from the C	N1-39 out	put terminal.				
			ALO2 (Alarm	Code Output)	Signal All	ocation					
		n.□□X□			e the same	e as the AL	.O1 (Alarm Co	ode Output)	signal allo	ca-	
			A1 00 (A1	0 1 0 1 1	0:	15					
		n.□X□□	<u> </u>	. ,			O1 (Alarm Co	ada Output)	cianal allo	00	
		/			e trie Sarrie	e as the AL	OT (Alamii GC	ode Odipui)	signal allo	ua-	
		п.ХППП	Reserved pa	rameter (Do no	ot change.)					
					<u> </u>	,					
								_	-		
		raramete	15								
				0 to	1 refer-			Immodi			
Pn51B	4					1000	Rotary		Setup	*1	
		2 313311011	_0.0.	1	Ji iit				1		

Continued from previous page.

Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
2	Position Deviation Over- flow Warning Level	10 to 100	1%	100	All	Immedi- ately	Setup	*1
4	Position Deviation Over- flow Alarm Level	1 to 1,073,741,823	1 refer- ence unit	524288 0	All	Immedi- ately	Setup	*1
4	Positioning Completed Width	0 to 1,073,741,824	1 refer- ence unit	7	All	Immedi- ately	Setup	*1
4	Near Signal Width	1 to 1,073,741,824	1 refer- ence unit	107374 1824	All	Immedi- ately	Setup	*1
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
2	Position Deviation Over- flow Warning Level at Servo ON	10 to 100	1%	100	All	Immedi- ately	Setup	*1
2	Speed Limit Level at Servo ON	0 to 10,000	1 min ⁻¹	10000	Rotary	Immedi- ately	Setup	*1
2	Multiplier per Fully- closed Rotation	0 to 100	1%	20	Rotary	Immedi- ately	Tuning	*1
2	Overload Warning Level	1 to 100	1%	20	All	Immedi- ately	Setup	*1
2	Base Current Derating at Motor Overload Detection	10 to 100	1%	100	All	After restart	Setup	*1
2	Reserved parameter (Do not change.)	_	_	50	All	-	_	_
2	Monitor Display at Startup	0000 to 0FFF	-	OFFF	All	Immedi- ately	Setup	*1
2	Program Jogging- Related Selections	0000 to 0005	_	0000	All	Immedi- ately	Setup	*1
	2 4 4 4 2 2 2 2 2 2 2 2	2 Position Deviation Over- flow Warning Level 4 Position Deviation Over- flow Alarm Level 4 Positioning Completed Width 4 Near Signal Width 4 Position Deviation Over- flow Alarm Level at Servo ON 2 Position Deviation Over- flow Warning Level at Servo ON 2 Speed Limit Level at Servo ON 2 Multiplier per Fully- closed Rotation 2 Overload Warning Level 2 Base Current Derating at Motor Overload Detection 2 Reserved parameter (Do not change.) 2 Monitor Display at Startup 2 Program Jogging-	Position Deviation Over- flow Warning Level Position Deviation Over- flow Alarm Level Positioning Completed Width Position Deviation Over- flow Alarm Level Near Signal Width Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Speed Limit Level at Servo ON Multiplier per Fully- closed Rotation Multiplier per Fully- closed Rotation Verload Warning Level Range 10 to 100 1 to 1,073,741,823 1 to 1,073,741,824 1 to 1,073,741,823 10 to 100 10 to 100 Deviation Over- flow Warning Level at Servo ON Nultiplier per Fully- closed Rotation Position Deviation Over- flow Warning Level To to 100 To 100 Reserved Parameter (Do not change.) Monitor Display at Startup Program Jogging- O000 to	Position Deviation Over- flow Warning Level Position Deviation Over- flow Alarm Level Positioning Completed Width Position Deviation Over- flow Alarm Level Near Signal Width Position Deviation Over- flow Alarm Level Position Deviation Over- flow Alarm Level at Servo ON Servo ON Position Deviation Over- flow Warning Level at Servo ON Multiplier per Fully- closed Rotation Multiplier per Fully- closed Rotation Passe Current Derating at Motor Overload Detection Range Unit 1 to 10 to 100 1 refer- ence unit 1 refer- ence unit 1 refer- ence unit 1 refer- ence unit 1 to 1,073,741,824 1 refer- ence unit 1 r	Position Deviation Over-flow Warning Level	Position Deviation Over- flow Warning Level Position Deviation Over- flow Warning Level Position Deviation Over- flow Alarm Level Positioning Completed Width Near Signal Width Position Deviation Over- flow Alarm Level Position Deviation Over- flow Alarm Level Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Oto 100 Position Deviation Over- flow Warning Level at Oto 100 Position Deviation Over- flow Warning Level at Oto 100 All Program Jogging- OU000 to OFFF All Program Jogging- OU000 to OFFF All	Position Deviation Over- flow Alarm Level Position Deviation Over- flow Alarm Level Position Deviation Over- flow Alarm Level Positioning Completed Width Near Signal Width Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Warning Level at Oto 10,000 Position Deviation Over- flow Warning Level at Oto 10,000 Position Deviation Over- flow Warning Level at Oto 10,000 Position Deviation Over- flow Warning Level at Oto 10,000 Position Deviation Over- flow Warning Level at Oto 10,000 Position Deviation Over- flow All Immediately Program Jogging- Out to 100 All Immediately Immediately Immediately	Position Deviation Over- flow Alarm Level Position Deviation Over- flow Alarm Level Positioning Completed Width Position Deviation Over- flow Alarm Level Positioning Completed Width Position Deviation Over- flow Alarm Level Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Warning Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level at Servo ON Position Deviation Over- flow Alarm Level Alar Immediately Position Deviation Deviation Over- flow Alarm Level Alar Immediately Position Deviation Over- flow Alarm Level Alar Immediately Position Deviation Deviation Over- flow Alarm Level Alar Immediately Position Deviat

			Program J	ogging Operation	n Pattern					
				Waiting time in Pr		orward by t	travel distanc	e in Pn531) >	< Number	of
				Waiting time in Pr		everse by t	ravel distance	e in Pn531) >	Number	of
			2	Waiting time in Pr novements in Pnง Waiting time in Pr novements in Pnง	536 n535 → Re	,		,		
Pn530		n.□□□X	3	Waiting time in Proposements i	536 n535 → Fo	,		,		
			4 i	Waiting time in Pr n Pn535 → Reser Pn536						
			5 i	Waiting time in Pr n Pn535 → Forwa Pn536						
		n.□□X□	Reserved	parameter (Do no	ot change.	.)				
		n.□X□□	Reserved parameter (Do not change.)							
		n.X000	Reserved parameter (Do not change.)							
Pn531	4	Program J Distance	ogging Trav	1 to 1,073,741,824	1 refer- ence unit	32768	All	Immedi- ately	Setup	*1

Continued from previous page.

Parameter	e i	Name	Setting	Setting	Default	Applicable	When	Classi-	Refer-
No.	Size	Name	Range	Unit	Setting	Motors	Enabled	fication	ence
Pn533	2	Program Jogging Move- ment Speed	1 to 10,000	Rotary: 1 min ⁻¹ Direct Drive: 0.1 min ⁻¹	500	Rotary	Immedi- ately	Setup	*1
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	*1
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 Movement 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
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.

Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual (Manual No.: SIEP S800001 73)

Parameter Recording Table

5.1.3

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

Parameter No.	Default Setting		Name	When Enabled
Pn000	0000		Basic Function Selections 0	After restart
Pn001	0000		Application Function Selections 1	After restart
Pn002	0000		Application Function Selections 2	After restart
Pn006	0002		Application Function Selections 6	Immediately
Pn007	0000		Application Function Selections 7	Immediately
Pn008	0000		Application Function Selections 8	After restart
Pn009	0010		Application Function Selections 9	After restart
Pn00A	0001		Application Function Selections A	After restart
Pn00B	0000		Application Function Selections B	After restart
Pn00C	0000		Application Function Selections C	After restart
Pn00D	0000		Application Function Selections D	After restart
Pn00F	0000		Application Function Selections F	After restart
Pn010	0001		Axis Address Selection for UART/USB Communications	After restart
Pn040	0000		Σ-V Compatible Function Switch	After restart
Pn021	0000		Reserved parameter	_
Pn080	0000		Application Function Selections 80	After restart
Pn081	0000		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	0004		Gain Application Selections	*
Pn10C	200		Mode Switching Level for Torque Reference	Immediately
Pn10D	0		Mode Switching Level for Speed Reference	Immediately
Pn10E	0		Mode Switching Level for Acceleration	Immediately

5.1.3 Parameter Recording Table

Continued from previous page.

		Continued from p	
Parameter No.	Default Setting	Name	When Enabled
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	0000	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	0100	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	0021	Control-Related Selections	After restart
Pn160	0010	Anti-Resonance Control- Related Selections	Immediately
Pn161	1000	Anti-Resonance Frequency	Immediately

Continued from previous page	
	_

		Continued from p	
Parameter No.	Default Setting	Name	When Enabled
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	1400	Tuning-less Function- Related Selections	*
Pn181	0	Mode Switching Level for Speed Reference	Immediately
Pn182	0	Mode Switching Level for Acceleration	Immediately
Pn190	0100	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	2102	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 Vis- cous Friction Compensa- tion 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
Pn1A5	0	Reserved parameter	Immediately
Pn1AE	0	Reserved parameter	Immediately
Pn1AF	0	Reserved parameter	Immediately

5.1.3 Parameter Recording Table

Continued from previous page.

		Continued from p	, , ,
Parameter No.	Default Setting	Name	When Enabled
Pn200	0000	Position Control Reference For Selections	After restart
Pn205	65535	Multiturn Limit	After restart
Pn207	1000	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 Acceler- ation/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	0000	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	0000	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
Pn380	10	Internal Set Speed 1	Immediately on next page.

5.1.3 Parameter Recording Table

Continued from previous page.

Parameter No.	Default Setting	Name	When Enabled
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 Constant	Immediately
Pn402	800	Forward Torque Limit	Immediately
Pn403	800	Reverse Torque Limit	Immediately
Pn404	100	Forward External Torque Limit	Immediately
Pn405	100	Reverse External Torque Limit	Immediately
Pn406	800	Emergency Stop Torque	Immediately
Pn407	10000	Speed Limit during Torque Control	Immediately
Pn408	0000	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 Notch Filter Q Value	Immediately
Pn412	100	First Stage Second Torque Reference Filter Time Constant	Immediately
Pn415	0	T-REF Filter Time Constant	Immediately
Pn416	0000	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

5.1.3 Parameter Recording Table

Continued from previous page.

Parameter		Continued from p	When
No.	Default Setting	Name	Enabled
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	0000	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	0101	Notch Filter Adjustment Selections 1	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
Pn501	10	Zero Clamping Level	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

		Continued from p	
Parameter	Default Setting	Name	When
No.	g		Enabled
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	2100	Input Signal Selections 1	After restart
Pn50B	6543	Input Signal Selections 2	After restart
Pn50C	8888	Input Signal Selections 3	After restart
Pn50D	8888	Input Signal Selections 4	After restart
Pn50E	3211	Output Signal Selections 1	After restart
Pn50F	0000	Output Signal Selections 2	After restart
Pn510	0000	Output Signal Selections 3	After restart
Pn512	0000	Output Signal Inverse Settings	After restart
Pn513	0000	Output Signal Inverse Settings 2	After restart
Pn514	0000	Output Signal Selections 4	After restart
Pn515	8888	Input Signal Selections 6	After restart
Pn516	8888	Input Signal Selections 7	After restart
Pn517	0654	Output Signal Selections 5	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
Pn52D	50	Reserved parameter	-
Pn52F	0FFF	Monitor Display at Startup	Immediately
Pn530	0000	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

5.1.3 Parameter Recording Table

Continued from previous page.

Parameter No.	Default Setting	Name	When Enabled
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 Magnification	Immediately
Pn553	100	Analog Monitor 2 Magnification	Immediately
Pn55A	1	Power Consumption Monitor Unit Time	Immediately
Pn560	400	Residual Vibration Detection Width	Immediately
Pn561	100	Overshoot Detection Level	Immediately
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	Immediately
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 Allowable Energy Con- sumption	After restart
Pn603	0	Regenerative Resistance	Immediately
Pn604	0	Dynamic Brake Resistance	After restart

^{*} The enable timing depends on the digit that is changed. Refer to the following section for details. 5.1.2 List of Parameters on page 5-3

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 ix

"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.

		/	
Applica-	When	Classi-	Refer-
	′.	c	

Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applica- ble Motors	When Enabled	Classi- fication	Refer- ence
2	2	Basic Funct	ion Selections 0	0000 to 10B1	_	0000	All	After restart	Setup	_
Pn000 M3		Serva provi • Ta	0 Use ward Use 1 Use	r Servomotor, in y Servomotors near Servomotors tion Selection	ors orward direct ward direct which the	e linear enc	Setup Tuning er to the follov Σ-7-Series Σ TROLINK-III (uct Manual (N oder counts rse Rotation oder counts	Mode)	details. K with MEC Reference \$800001	es Prod- 28)
• <u>M2</u>	Paran	neters that are va	a parameter is va lid only for a MECHA ⁻ lid only for a MECHA ⁻	FROLINK-II-compat	ible profile.					
			Rotary/Linear S	Servomotor Sta	artup Selec	tion When I	Encoder Is N	ot Connected	Refere	nce
	1	n.X000		n an encoder Iry Servomotol		nected, star	t as SERVO	PACK for		
				n an encoder	is not conr	nected, star	t as SERVO	PACK for Lin-		

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 ix

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.

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

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

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

Setting Setting Default Applicable When Classi- Refer-

5.2.2 List of Servo Parameters

The following table lists the parameters.

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

Reserved parameter

Parameter 9

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

No.	Siz	N	ame	me Range Unit Setting Motors Enabled						ence		
	2	Basic Fund tions 0	ction Selec-	0000 to 10B1	-	0000	All	After restart	Setup	*1		
			Rotation [Rotation Direction Selection								
n		Movemen	t Direction Sele	ction								
			Use CCW as the	e forward di	rection.							
	1	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 in which the linear encoder counts down as the forward direction. (Reverse Movement Mode)								
		n.□□X□	Reserved parameter (Do not change.)									
		n.□X□□	Reserved parameter (Do not change.)									
			Rotary/Lir	near Servomoto	r Startup S	election W	hen Encoder	Is Not Conr	ected			
	r	n.X□□□		When an encod motor.	er is not cor	nnected, st	art as SERVC	PACK for Ro	otary Serve	0-		
			1 1 1	When an encoder is not connected, start as SERVOPACK for Linear Servomotor.								
							·			_		

Setting Default Applicable

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 1	0000 to 1142	-	0000	All	After restart	Setup	*1
			Motor Stopping Method for Servo OFF and Group 1 Alarms							
			0 St	op the motor by	applying	the dynam	ic brake.			
	n.E	n.□□□X		op the motor by ake.	the apply	ing dynam	ic brake and	then release	the dynar	nic
			2 Cc	ast the motor to	o a stop w	ithout the	dynamic brak	æ.		
			Overtravel S	topping Metho	d					
				ply the dynamic ethod set in Pn0			motor to a sto	op (use the s	topping	
				celerate the mo que and then s			ne torque set i	in Pn406 as	the maxim	ium
Pn001		n.□□X□		celerate the mo			ne torque set i	in Pn406 as	the maxim	ium
				Decelerate the motor to a stop using the deceleration time set in then servo-lock the motor.						nd
				celerate the moen let the motor		op using t	he deceleration	on time set ir	Pn30A a	nd
			Main Circuit	Power Supply	AC/DC In	put Select	ion			
		~ UVUU	O Inp	out AC power as nals (do not use	s the main	circuit pov		ing the L1, L	2, and L3	ter-
		n.□X□□	1 ter	Input DC power as the main circuit power supply using the B1/⊕ and terminals or the B1 and ⊕ 2 terminals (use an external converter or the shared converter).						2
		n.X□□□	Reserved pa	rameter (Do no	ot change.)				
	'									
	l									

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		0000 to 4213 - 0011 -				After restart	Setup	-
			MECHATF Option	OLINK Comma	Applicable Motors	Refere	ence			
		n.□□□X	0 1	Reserved setting	g (Do not us					
		11.000	1 1	Jse TLIM as the	torque limi	t.		All	*2	
				Reserved setting	<u> </u>			,	_	
			3 1	Reserved setting	(Do not us	se.)				
	Ī		Torque Co	ntrol Option				Applicable Motors	Refere	ence
		n.□□X□	0 1	Reserved setting	(Do not us	se.)				
				Jse the speed li speed limit.	mit for torqu	All *2				
Pn002										
Pn002			Encoder U	sage				Applicable Motors	Refere	ence
Pn002		n.□X□□	0	sage Jse the encode ions.	according	to encode	r specifica-		Refere	ence
Pn002		n.ロXロロ	0	Jse the encode			· 	Motors	Refere	
Pn002		n.ロXロロ	0 1	Jse the encode ions.	as an incre	emental en	coder.	Motors	Refere	
Pn002	_	n.0X00	0 1 2	Jse the encode ions. Jse the encode Jse the encode	as an incre	emental en	coder.	Motors	*1	
Pn002	<u>-</u>	n.0X00	0 1 2 External E	Jse the encode ions. Jse the encode Jse the encode encoder.	as an incre	emental en e-turn absc	coder.	Motors All Rotary Applicable	*1	
Pn002	-	n.0X00	0 1 2 C	Jse the encode ions. Jse the encode Jse the encode encoder.	r as an incre r as a single external enco	emental en e-turn abso oder. s in the for	coder. lute	Motors All Rotary Applicable	*1	
Pn002	-		0 1 2 External E	Jse the encode ions. Jse the encode Jse the encode encoder. ncoder Usage Do not use an e	r as an incre r as a single external enco	emental en e-turn abso oder. s in the for	coder. lute	Motors All Rotary Applicable	*1	ence
Pn002	-		0 1 2 0 1 1 1 1 1 1 1 1 1	Jse the encode ions. Jse the encode Jse the encode encoder. ncoder Usage Do not use an encoder ion for CCW moder ions.	r as an incre r as a single external enco- coder move- otor rotation g (Do not us	emental en e-turn abso oder. s in the for he.) s in the rev	coder. lute	Motors All Rotary Applicable Motors	*1	ence
Pn002	-		0 1 2 6 6 6 6 6 6 6 6 6	Jse the encode ions. Jse the encode Jse the encode encoder. ncoder Usage Do not use an encoder of CCW moder ion for CCW moder.	r as an incre r as a single external enco- coder move- otor rotation g (Do not us	emental en e-turn abso	coder. lute	Motors All Rotary Applicable Motors	*1	ence

Applicable

Motors

5.2.2 List of Servo Parameters

Classi- Refer-

fication

Continued from previous page.

When

Enabled

	2	Application Selections	Function 6		0000 to 105F	1	0002	All	Immedi- ately	Setup	*1	
	Ī		Analog Mo	nito	or 1 Signal Se	lection						
			00	Мо	otor speed (1	V/1,000 m	nin ⁻¹)					
			00	М	otor speed (1	V/1,000 m	ım/s)					
			01	Sp	eed reference	(1 V/1,00	0 min ⁻¹)					
				<u> </u>	eed reference	•						
			02	Torque reference (1 V/100% rated torque)								
			03		Force reference (1 V/100% rated force)							
					Position deviation (0.05 V/reference unit) Position amplifier deviation (after electronic gear) (0.05 V/encoder pulse unit)							
			04	Po	sition amplifie		•				unit)	
			05	pulse unit) Position reference speed (1 V/1,000 min ⁻¹)								
				_	sition reference							
			06		served setting	• •	-	,				
Pn006		07	Lo	ad-motor pos	or position deviation (0.01 V/reference unit)							
		n.□□XX	08	Positioning completion (positioning completed: 5 V, positioning not completed: 0 V)						g not com-	-	
			09	Sp	Speed feedforward (1 V/1,000 min ⁻¹)							
			09	Speed feedforward (1 V/1,000 mm/s)								
			0A	Torque feedforward (1 V/100% rated torque)								
			UA	Fo	rce feedforwa	rd (1 V/10	0% rated f	force)				
			0B	Ac	tive gain (1st	gain: 1 V, :	2nd gain: 2	2 V)				
			0C		eted: 0 V)	osition refe	erence dist	tribution (com	pleted: 5 V,	not com-		
			0D	Ex	ternal encode	r speed (1	V/1,000 n	nin ⁻¹ : value at	the motor s	haft)		
			0E	Re	served setting	g (Do not ι	ıse.)					
			0F	Re	served setting	g (Do not ι	ıse.)					
			10	Ma	ain circuit DC	voltage						
			11 to 24	Re	served setting	gs (Do not	use.)					
			25	Po	sition deviation	n after po	sition refer	ence filter (0.	05 V/reference	ce unit)		
			26 to 5F	Re	served setting	gs (Do not	use.)					
		n.□X□□	Reserved	para	ameter (Do no	t change.)					
		n.X□□□	Reserved	para	ameter (Do no	t change.)					
						-				-		

Setting

Default

Setting

Setting

Range

Parameter

No.

Size

Name

Parameter 0

Continued from previous page.

Classi- Refer-

Setting Default Applicable When

No.	Siz	N	ame	Range	Unit	Setting	Motors	Enabled	fication	ence		
	2	Application Selections		0000 to 105F	-	0000	All	Immedi- ately	Setup	*1		
			Angleg Meniter 2 Signal Selection									
			Analog Mol	onitor 2 Signal Selection								
			00	Motor speed (1 V/1,000 min ⁻¹) Motor speed (1 V/1,000 mm/s)								
						•						
			01	Speed reference								
				Speed reference			`					
			02	Torque reference	•		• /					
			00	Force reference	`		,					
			03	Position deviation	•		•	0 05 Wanaa	طمد میامم	:+\		
			04	Position amplifie						unit)		
			04	Position amplifie pulse unit)	r deviation	i (arter elec	ctronic gear) (u.us v/iineai	encoder			
			05	Position reference	ce speed (1 V/1,000	min ⁻¹)					
				Position reference	ce speed (1 V/1,000	mm/s)					
			06	Reserved setting (Do not use.)								
	Pn007 n.□□XX	07	Load-motor pos	ition devia	tion (0.01	V/reference u	nit)					
Pn007		08	Positioning completion (positioning completed: 5 V, positioning not completed: 0 V)									
			09	Speed feedforward (1 V/1,000 min ⁻¹)								
			03	Speed feedforwa	ard (1 V/1	,000 mm/s)					
			0A	Torque feedforw	ard (1 V/1	00% rated	torque)					
			0,1	Force feedforwa	rd (1 V/10	0% rated f	orce)					
			0B	Active gain (1st								
			0C	Completion of populated: 0 V)	osition ref	erence dist	tribution (com	pleted: 5 V,	not com-			
			0D	External encode	r speed (1	V/1,000 n	nin ⁻¹ : value at	the motor s	haft)			
			0E	Reserved setting	g (Do not ι	use.)						
			0F	Reserved setting	g (Do not ι	use.)						
			10	Main circuit DC	voltage							
			11 to 24	Reserved setting	gs (Do not	use.)						
			25	Position deviation	n after po	sition refer	ence filter (0.0	05 V/referen	ce unit)			
			26 to 5F	Reserved setting	gs (Do not	use.)						
		n.□X□□	Reserved p	arameter (Do no	t change.)						
		n.X□□□	Reserved p	arameter (Do no	t change.)						
	-			,								

Setting

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Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
	2	Application Selections	Function 8	0000 to 7121	_	4000	Rotary	After restart	Setup	*1	
					·						
			Low Batte	ry Voltage Ala	rm/Warning	Selection					
		n.□□□X	-	Output alarm (A							
			1	Output warning	g (A.930) for I	ow battery	voltage.				
			Function S	Selection for U	Indervoltage						
Pn008				Do not detect undervoltage.							
FIIOOO		n.□□X□	1	Detect undervoltage warning and limit torque at host controller.							
				Detect undervoltage warning and limit torque with Pn424 and Pn425 (i.e., only n SERVOPACK).							
			Warning D	etection Selec	ction						
		n.□X□□		Detect warnings.							
		1 Do not detect warnings except for A.971.									
		n.XDDD	Reserved	parameter (Do	not change	.)					
	2	Application Selections	Function 9	0000 to 0121	-	0010	All	After restart	Tuning	*1	
	Ī	n.□□□X	Reserved	parameter (Do	not change.)					
				·		,					
				ontrol Mode Se							
				Jse current coi			D004 1D6	1 0D01 E	DEA and		
Pn009		n.□□X□	1	SERVOPACK -7R6A: Use c SERVOPACK -590A, and -7	urrent contro Models SGD	l mode 1. 7S-120A,	-180A, -200A			۸,	
			2	Jse current co	ntrol mode 2.						
			Speed De	tection Method	d Selection						
		n.□X□□	0 (Jse speed dete	ection 1.						
			1 (Jse speed dete	ection 2.				· <u> </u>	· <u></u>	
	n.X□□□ Reserved parameter (Do not change.)										
				, , , , , , , , , , , , , , , , , , , ,		,					

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Parameter No.	Size	Na	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Application Selections	Function A	0000 to 0044	_	0001	All	After restart	Setup	*1
					1			1	ii.	1
			Motor Stopp	ing Method fo	r Group 2	Alarms				
				ply the dynamiethod set in Pno			motor to a st	op (use the s	stopping	
				celerate the mo que. Use the s						
		n.□□□X	² tor	celerate the mo que and then le	et the mot	or coast.				
			the	celerate the most setting of PnC	01 = n. □ I	□□X for th	ne status after	r stopping.		
				celerate the motor		top using t	the decelerati	on time set i	n Pn30A a	ınd
Pn00A			Stopping Me	ethod for Force	ed Stops					
				ply the dynamiethod set in Pno			motor to a st	op (use the	stopping	
			1 De	celerate the mo	otor to a st etting of P	op using t n001 = n. l	he torque set □□□X for the	in Pn406 as e status after	the maxin	num
		n.□□X□		celerate the mo			he torque set	in Pn406 as	the maxin	num
				celerate the most setting of PnC					n Pn30A.	Use
		л ПХПП		celerate the moen let the motor		top using t	the decelerati	on time set i	n Pn30A a	and
		n.□X□□	Reserved pa	rameter (Do n	ot change	.)				
		n.XDDD Reserved parameter (Do not change.)								
										1
	2	Application Selections		0000 to 1121	_	0000	All	After restart	Setup	*1
		-		ameter Display	Selection	1				
		n.□□□X		olay only setup olay all paramet		S.				
			Motor Stoppi	ng Method for	Group 2 A	Alarms				
		_	0 Sto	p the motor by	setting th	e speed re	ference to 0.			
Pn00B		n.□□X□	1 Apr	oly the dynamic hod set in Pn0	brake or 01 = n.□[coast the r	motor to a sto	p (use the s	topping	
			2 Set	the stopping n	nethod wit	h Pn00A =	= n.□□□X.			
			Power Input S	Selection for TI	nree-phas	e SERVOF	PACK			
		n.□X□□	0 Use	a three-phase	power su	oply input.				
			1 Use	a three-phase	power su	oply input	as a single-pl	nase power s	supply inp	ut.
		n.X□□□	Reserved par	ameter (Do no	t change.)					

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									itinuea iron		
Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Application Selections	Function C		0000 to 0131	-	0000	-	After restart	Setup	*1
						•				•	
			Function 9	Sele	ection for Test	without a	Motor			Applica Motor	
		n.□□□X	0	Disa	able tests with	out a moto	or.			A.II.	
			1	Ena	ble tests witho	out a moto	r.			All	
			Encoder F	Resc	olution for Tes	ts without	a Motor			Applicable Motors	
Pn00C			0	Use	13 bits.						
111000		n.□□X□	1								/
					22 bits.					Rotar	,
			3 Use 24 bits.								
			Encoder T	Encoder Type Selection for Tests without a Motor Applicable Motors							
		n.□X□□	0	Use	an incrementa	al encoder				All	
			1	Use	an absolute e	encoder.				All	
		n.XDDD	Reserved	par	ameter (Do no	ot change)				
						<u> </u>	,				
_	2	Application Selections	Function D		0000 to 1001	_	0000	All	After restart	Setup	*1
		n.□□□X	Reserved	par	ameter (Do no	ot change)				
Pn00D		n.□□X□	Reserved	par	ameter (Do no	ot change)				
FIIOOD		n.□X□□	Reserved	Reserved parameter (Do not change.)							
			Overtravel Warning Detection Selection								
		n.X□□□	0	Ş.							
			1	Det	ect overtravel	warnings.					
	2	Application	Function		0000 to	_	0000	All	After	Setup	*1
		Selections	<u> </u>		2011				restart		
			Preventati	ive I	Maintenance \	Warning S	election				
		n.□□□X	0 D	o no	ot detect preve	entative m	aintenance	warnings.			
Pn00F			1 D	etec	ct preventative	maintena	nce warnin	ngs.			
		n.□□X□	Reserved	par	ameter (Do no	ot change)				
		n.□X□□	Reserved	par	ameter (Do no	ot change)				
		n.X□□□	Reserved	par	ameter (Do no	ot change)				
				-		1			Г	1	
Pn021	2	Reserved p	oarameter ([e.)	Do .	-	_	0000	All	-	_	_

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Parameter	Ф		N		Setting	Setting	Default	Applicable	When	Classi-	Refer-
No.	Size		Name		Range	Unit	Setting	Motors	Enabled	fication	ence
	2 t	Σ -V Compliant Σ -V Complia	patible Fund ch	0-	0000 to 2111	-	0000		After restart	Setup	-
										A 11	
			Communic	cation	ns Interface C	ompatibili	ty Selection	on		Applica Moto	
	n.□				rm Σ-7 commu					All	
Pn040			1 F	Pertoi	rm Σ-V commu	unications.					
1 110-40			Encoder R	lesolu	ution Compati	bility Sele	ction			Applica Motor	
	n. 🗆		0 l	Jse tl	ne encoder res	solution of	the conne	cted motor.			
	1 Use a resolution of 20 bits when connected to an SGM7J, SGM7A, SGM7P, or SGM7G Servomotor.								У		
	n []	XDD	¥-		neter (Do not						
					•	<u> </u>					
	n.XL		Reserved	parar	meter (Do not	change.)					
		Application Selection	on Function s 80		0000 to 1111	-	0000	Linear	After restart	Setup	*1
		30.000.01							rootart		
			Dolority S	`onor	or Coloction						
	n.E	пппх	0		polarity senso	r.					
			1		ot use polarity						
			Motor Ph	ase S	Sequence Sel	ection					
Pn080	n.E		0		a phase-A lead	<u> </u>	<u> </u>				
			1	Set a	a phase-B lead	d as a pha	se sequen	ce of U, V, ar	nd W.		
	n.E	Reserved parameter (Do not change.)									
			Calculation		ethod for Max	•		•			
	n.X		1		ulate the enco ulate the maxi		•			•	
			' '	Caic	ulate the maxi	mum spec	tu ioi a iixt	ed efficadel o	atput puise s	ettirig.	
			on Function		0000 to	_	0000	All	After	Setup	*1
		Selection	8 81		1111				restart	'	
			Phase-C	Puls	se Output Sele	ection					
	n.l	□□□Х	0	Out	put phase-C p	ulses only	in the for	ward direction	٦.		
Pn081			1	Out	put phase-C p	ulses in b	oth the for	ward and rev	erse direction	ns.	
	n.l		Reserved	d par	ameter (Do no	ot change.)				
	n.l		Reserved	d par	ameter (Do no	ot change.)				
	n.2	XDDD	Reserved	d par	ameter (Do no	ot change.)				
Pn100	2 5	Speed Lo	op Gain		10 to 20,000	0.1 Hz	400	All	Immedi- ately	Tuning	*1
Pn101	2	Speed Lo	op Integral		15 to 51,200	0.01 ms	2000	All	Immedi-	Tuning	*1
		Time Cor							ately Immedi-		
Pn102	2 F	osition l	_oop Gain		10 to 20,000	0.1/s	400	All	ately	Tuning	*1
Pn103	2 1	Moment o	of Inertia Ra	atio	0 to 20,000	1%	100	All	Immedi- ately	Tuning	*1
Pn104		Second S Gain	Speed Loop	,	10 to 20,000	0.1 Hz	400	All	Immedi- ately	Tuning	*1
		Guii I							Continue	-1	

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	0000 to 5334	_	0004	All	-	Setup	*1
		•				•			

Mode Switching Selection

			Enabled		
	0	Use the internal torque reference as the condition (level setting: Pn10C).			
	1	Use the speed reference as the condition (level setting: Pn10D).			
n.□□□X	ļ.	Use the speed reference as the condition (level setting: Pn181).			
11.000	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).			
	4	Do not use mode switching			

Pn10B

	Speed L	oop Control Method	When Enabled	
n.□□X□	0	PI control		
	1	I-P control	After restart	
	2 to 3	Reserved settings (Do not use.)	rootart	

n.□X□□	Reserved parameter (Do not change.)
n ХППП	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 ⁻¹	0	Rotary	Immedi- ately	Tuning	*1
Pn10E	2	Mode Switching Level for Acceleration	0 to 30,000	1 min ⁻¹ /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

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Parameter Sa								COI	itinuea tron	i previou	s page.		
Pn130 2 Current Gain Level 100 to 2,000 1% 2000 All ately tuning *1		Size	N	ame		_							
Pn139 Use manual gain switching. The gain is switched manually with G-SEL in the servo command output signals (SVCMD_IO). Reserved setting (Do not use.) Use automatic gain switching pattern 1.		2				-	0000	All		Tuning	*1		
Pn139 Use manual gain switching. The gain is switched manually with G-SEL in the servo command output signals (SVCMD_IO). Reserved setting (Do not use.) Use automatic gain switching pattern 1.													
Pn139 Use manual gain switching. The gain is switched manually with G-SEL in the servo command output signals (SVCMD_IO). Reserved setting (Do not use.) Use automatic gain switching pattern 1.				I									
Pn139													
Pn139 Pn139 Cain Switching Condition A setsidisfed. The gain is switched automatically from the first gain to the second gain when switching condition is establisfed. The gain is switched automatically from the second gain to the first gain when switching condition A is not satisfied. Cain Switching Condition A				0 The	e gain is switch		lly with G-	SEL in the se	rvo comman	d output s	sig-		
Pn139 Cain Switching condition A Seatisfied, The gain is switched automatically from the second gain when second gain to the first gain which gain is detected automatically from the second gain to the first gain which gain is switched automatically from the second gain to the first gain when switching condition A is not satisfied. Gain Switching Condition A 0 //COIN (Positioning Completion Output) signal turns ON. 1 //COIN (Positioning Completion Output) signal turns OFF. 2 //COIN (Positioning Completion Output) signal turns OFF. 4 Position reference filter output is 0 and position reference input is OFF. 5 Position reference input is ON.			n.□□□X				,						
Pn13D 2 Current Gain Level 100 to 2,000 1% 2000 All Immediately Tuning 1 Use model following control. Model Following Control Selection 1 Use model following control. 1 Use model following control and speed/forque feedforward together. 2 Perform vibration suppression automatically during execution of autotuning with a host reference, and custom tuning. 2 Performance (VFF) Torque Feedforward (VFF) Selection 0 Do not use model following control and speed/forque feedforward together. 2 Performance (VFF) Torque Feedforward together. 3 Post to 2 Perforward together. 4 Post to 3 Post to 4 Po				2 The	e gain is switch itching conditio	ed automa n A is sati	atically fror sfied. The	n the first gair gain is switch	ned automation	cally from			
Pn140 O	Pn139			Gain Switchi	na Condition A								
Pn13D 2 Current Gain Level 100 to 2,000 1% 2000 All Immediately Tuning 1 1 10 10 10 10 10 10													
Pn13D 2 Current Gain Level 100 to 2,000 1% 2000 All Immediately Tuning *1 Less-Deviation Integrand Control Selection n.□DXD Model Following Control Selection n.□DXD Model Following Control Selection n.□DXD Do not use model following control suppression automatically during execution of autoturing without a host reference, and custom tuning. Pn13D Vibration Suppression Adjustment Selection n.□DXD Do not use model following control and speed/forque feedforward together. Pn140 Seed Feedforward (VFF)/Torque Feedforward together. Pn141 2 Model Following Control Selection Do not use model following control and speed/forque feedforward together. Pn141 2 Model Following Control Selection Do not select													
Pn13D 2 Current Gain Level 100 to 2,000 1% 2000 All Immediately Tuning *1			n.□□X□			· · ·		,					
Pn13D 2 Current Gain Level 100 to 2,000 1% 2000 All Immediately Tuning *1 Less-Deviation Control 2 2 Second Position Integral Time Constant 1 Use model following control. 1 Use model following Control 3 Do not use model following with a host reference, and custom tuning without a host reference, autotuning with a host reference, and custom tuning without a host reference, autotuning with a host reference, and custom tuning whole Pn14D 2 Model Following Control suse model following control and speed/torque feedforward together. Pn141 2 Model Following Control Solution on 10 Do not use model following control and speed/torque feedforward together. Pn141 2 Model Following Control Solution on 10 Do not use model following control and speed/torque feedforward together. Pn141 2 Model Following Control Solution on 10 Do not use model following control and speed/torque feedforward together. Pn142 2 Model Following Control Solution Solution on 10 Do not use model following control and speed/torque feedforward together. 1 Use model following control and speed/torque feedforward together. 1 Use model following control and speed/torque feedforward together. 2 Model Following Control Solution S					, ,	, 0							
Pn13D 2 Current Gain Level 100 to 2,000 1% 2000 All Immediately Tuning *1						, ,			rence input i	s OFF.	<u></u>		
Pn13D 2 Current Gain Level 100 to 2,000 1% 2000 All Immediately Tuning *I								. pod		0 0			
Pn13D 2 Current Gain Level 100 to 2,000 1% 2000 All Immediately Tuning *1			5 Position reference input is ON.										
Pn13D 2 Current Gain Level 100 to 2,000 1% 2000 All Immediately Tuning *1 Pn13F 2 Second Position Integral Time Constant 2 Model Following Control Selection Do not use model following control. 1 Use model following control. Vibration Suppression Selection Do not perform vibration suppression for a specific frequency. Perform vibration suppression for two specific frequencies. Vibration Suppression Adjustment Selection Do not 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 Do not use model following control. Vibration Suppression Adjustment Selection Do not 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 Do not use model following control and speed/torque feedforward together. 1 Use model following control and speed/torque feedforward together. Pn141 2 Model Following Control Solo to 2,000 0.1% 500 All Immediately Tuning *1			n.□X□□ Reserved parameter (Do not change.)										
Pn13F 2 Current Gain Level 100 to 2,000 1% 2000 All ately 10 lining *1 Pn13F 2 Second Position Control 2 Second Position Integral Time Constant 0 to 50,000 0.1 ms 0 All Immediately Tuning - 2 Model Following Constant 121 - 0100 All Immediately Tuning *1 Nodel Following Control Selection			n.X□□□ Reserved parameter (Do not change.)										
Pn13F 2 Current Gain Level 100 to 2,000 1% 2000 All ately 10 lining *1 Pn13F 2 Second Position Control 2 Second Position Integral Time Constant 0 to 50,000 0.1 ms 0 All Immediately Tuning - 2 Model Following Constant 121 - 0100 All Immediately Tuning *1 Nodel Following Control Selection													
Pn140 2 2 Second Position Integral Time Constant 2 Model Following Control Selection 2 Model Following Control Selection 3 Do not use model following control. Vibration Suppression Selection 1 Perform vibration suppression for a specific frequency. 2 Perform vibration suppression for two specific frequencies. Vibration Suppression Adjustment Selection 0 Do not adjust vibration suppression automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning. 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 1 Use model following control and speed/torque feedforward together. Speed Feedforward (VFF)/Torque Feedforward (TFF) Selection 1 Use model following control and speed/torque feedforward together. Pn141 2 Model Following Control Sol to 2,000 0.1/s 500 All Immediately Tuning *1 I	Pn13D	2	Current Ga	ain Level	100 to 2,000	1%	2000	All		Tuning	*1		
Pn140 Pn140	Pn13F	2	2 Second	Position Inte-	0 to 50,000	0.1 ms	0	All		Tuning	_		
Pn140 N_D_D_D Do not use model following control. 1 Use model following control. 1 Use model following control. 1 Perform vibration suppression. 1 Perform vibration suppression for a specific frequency. 2 Perform vibration suppression for two specific frequencies.		2				-	0100	All		Tuning	*1		
Pn140 Do not use model following control. Use model following control.									,				
Pn140 Pn140 Tuse model following control.				Model Follov	ving Control Se	election							
Pn140 Pn140 Vibration Suppression Selection 0 Do not perform vibration suppression. 1 Perform vibration suppression for a specific frequency. 2 Perform vibration suppression for two specific frequencies.			n.□□□X	0 Do n	ot use model for	ollowing c	ontrol.						
Pn140 Pn140 Do not perform vibration suppression.				1 Use	Use model following control.								
Pn140 Pn140 Do not perform vibration suppression.				Vibration Su	opression Sele	ction							
Pn140 1 Perform vibration suppression for a specific frequency. 2 Perform vibration suppression for two specific frequencies. Vibration Suppression Adjustment Selection Do not adjust vibration suppression automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning. 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 0 Do not use model following control and speed/torque feedforward together. 1 Use model following control and speed/torque feedforward together. Pn141 2 Model Following Control and speed/torque feedforward together. Pn142 2 Model Following Control and Speed/torque feedforward together. 1 Use model following Control and Speed/torque feedforward together. 1 Use model following Control and Speed/torque feedforward together. Pn142 2 Model Following Control Soo to 2,000 0.1/s 500 All Immediately Tuning *1							oression.						
Pn140 2 Perform vibration suppression for two specific frequencies. Vibration Suppression Adjustment Selection			n.□□X□					cific freauenc	V.				
Pn140 Vibration Suppression Adjustment Selection Do not adjust vibration suppression automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning. 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 0 Do not use model following control and speed/torque feedforward together. 1 Use model following control and speed/torque feedforward together. Pn141 2 Model Following Control and speed/torque feedforward together. 1 Use model following control and speed/torque feedforward together. Pn142 2 Model Following Control and speed/torque feedforward together. 1 Use model following Control and speed/torque feedforward together. 1 Use model following Control and speed/torque feedforward together. 2 Model Following Control and speed/torque feedforward together. 1 Immediately Tuning *1 Pn142 2 Model Following Control and speed/torque feedforward together. 2 Model Following Control and speed/torque feedforward together. 1 Immediately Tuning *1 Pn142 2 Model Following Control and speed/torque feedforward Tuning *1 Pn143 Pn144 2 Model Following Control and speed/torque feedforward Tuning *1 Pn145 Pn146 Pn147 Pn148				+		• •	· ·	<u> </u>	•				
Do not adjust vibration suppression automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning. 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 0 Do not use model following control and speed/torque feedforward together. 1 Use model following control and speed/torque feedforward together. Pn141 2 Model Following Control and speed/torque feedforward together. Pn142 2 Model Following Control and Speed/torque feedforward together. Note: Tuning *1 Note: Tuning *1 Note: Tuning *1	Pn140					•							
n.□X□□ 0 tuning without a host reference, autotuning with a host reference, and custom tuning. Adjust vibration suppression automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning. NX□□□ Speed Feedforward (VFF)/Torque Feedforward (TFF) Selection 0 Do not use model following control and speed/torque feedforward together. 1 Use model following control and speed/torque feedforward together. 1 Use model following control and speed/torque feedforward together. Pn141 2 Model Following Control Gain 10 to 20,000 0.1/s 500 All Immediately Tuning *1 Pn142 2 Model Following Control Gain Correction 500 to 2,000 0.1% 1000 All Immediately Tuning *1 Pn142 10 Pn144 10 Pn145 10 Pn146 10 Pn146 10 Pn146 10 Pn147 10 Pn147 10 Pn148 Pn148 10 Pn148 Pn148 10 Pn148 Pn148 10 Pn148 10 Pn148 10 Pn148 10 Pn148 10					•			tomatically d	urina evecuti	on of auto)-		
1 without a host reference, autotuning with a host reference, and custom tuning. Speed Feedforward (VFF)/Torque Feedforward (TFF) Selection 0 Do not use model following control and speed/torque feedforward together. 1 Use model following control and speed/torque feedforward together.			n.□X□□	0 tun	ing without a h	ost referer	nce, autotu	ning with a ho	ost reference	, and cust			
n.X□□□ 0 Do not use model following control and speed/torque feedforward together. 1 Use model following control and speed/torque feedforward together. Pn141 2 Model Following Control and speed/torque feedforward together. Pn142 2 Model Following Control and speed/torque feedforward together. **1 **1 **1 **1 **1 **1 **1 *				1 wit	hout a host refe						n-		
n.X□□□ 0 Do not use model following control and speed/torque feedforward together. 1 Use model following control and speed/torque feedforward together. Pn141 2 Model Following Control and speed/torque feedforward together. Pn142 2 Model Following Control and speed/torque feedforward together. **1 **1 **1 **1 **1 **1				Spood Foods	ionword (VEE)/T	Torquo Fo	adforward	(TEE) Colooti	on				
Pn141 2 Model Following Control and speed/torque feedforward together. Pn142 2 Model Following Control and speed/torque feedforward together. 10 to 20,000 0.1/s 500 All Immediately Tuning *1 Pn142 2 Model Following Control Gain Correction 500 to 2,000 0.1% 1000 All Immediately Tuning *1								,		rd togothe			
Pn141 2 Model Following Control Gain 10 to 20,000 0.1/s 500 All Immediately Tuning *1 Pn142 2 Model Following Control Gain Correction 500 to 2,000 0.1% 1000 All Immediately Tuning *1			11\								اا .		
Pn142 2 trol Gain 10 to 20,000 0.1/s 500 All ately 10 lining 11 Pn142 2 Model Following Control Gain Correction 500 to 2,000 0.1% 1000 All Immediately 11 lining *1		Ose model following control and speed/torque leedlorward together.											
Pn142 2 trol Gain 10 to 20,000 0.1/s 500 All ately 10 liming 11 Pn142 2 Model Following Control Gain Correction 500 to 2,000 0.1% 1000 All Immediately 11 liming 11										1			
trol Gain Correction 500 to 2,000 0.1% 1000 All ately fulling 41	Pn141	2	trol Gain		10 to 20,000	0.1/s	500	All	ately	Tuning	*1		
	Pn142	2			500 to 2,000	0.1%	1000	All	ately	J			

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Continued	trom	previous	page.

Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn143	2	Model Following Control Bias in the Forward Direction	0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	*1
Pn144	2	Model Following Control Bias in the Reverse Direction	0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	*1
Pn145	2	Vibration Suppression 1 Frequency A	10 to 2,500	0.1 Hz	500	All	Immedi- ately	Tuning	*1
Pn146	2	Vibration Suppression 1 Frequency B	10 to 2,500	0.1 Hz	700	All	Immedi- ately	Tuning	*1
Pn147	2	Model Following Control Speed Feedforward Compensation	0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	*1
Pn148	2	Second Model Follow- ing Control Gain	10 to 20,000	0.1/s	500	All	Immedi- ately	Tuning	*1
Pn149	2	Second Model Follow- ing Control Gain Correc- tion	500 to 2,000	0.1%	1000	All	Immedi- ately	Tuning	*1
Pn14A	2	Vibration Suppression 2 Frequency	10 to 2,000	0.1 Hz	800	All	Immedi- ately	Tuning	*1
Pn14B	2	Vibration Suppression 2 Correction	10 to 1,000	1%	100	All	Immedi- ately	Tuning	*1
	2	Control-Related Selections	0000 to 0021	_	0021	All	After restart	Tuning	*1

	N	Model Fo	ollowing Control Type Selection
n. 🗆 🗆 🗆	□X	0	Use model following control type 1.
		1	Use model following control type 2.

Pn14F

	Tuning-le	ess Type Selection
n.□□X□	0	Use tuning-less type 1.
	1	Use tuning-less type 2.
	2	Use tuning-less type 3.

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

11.7000	rieserved parameter (bo not change.)

2 Anti-Resonance Control-Related Selections 0000 to 0011 - 0010 All Immediately Tuning	*1
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	Anti-Res	onance Control Selection
n.□□□X	0	Do not use anti-resonance control.
	1	Use anti-resonance control.
	Anti-Res	onance Control Adjustment Selection

Pn160

	,	
n.□□X□	0	Do not adjust anti-resonance control automatically during execution of auto- tuning without a host reference, autotuning with a host reference, and custom tuning.
	1	Adjust anti-resonance control automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning.

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

Pn161	2	Anti-Resonance Frequency	10 to 20,000	0.1 Hz	1000	All	Immedi- ately	Tuning	*1
Pn162	2	Anti-Resonance Gain Correction	1 to 1,000	1%	100	All	Immedi- ately	Tuning	*1

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Setting Setting Default Applicable When Classi- Refer-

								tinued from	previou	s paye.	
Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
Pn163	2	Anti-Resor	nance Damp	- 0 to 300	1%	0	All	Immedi- ately	Tuning	*1	
Pn164	2	Anti-Resor Time Cons rection	nance Filter tant 1 Cor-	-1,000 to 1,000	0.01 ms	0	All	Immedi- ately	Tuning	*1	
Pn165	2	Anti-Resor Time Cons rection	nance Filter tant 2 Cor-	-1,000 to 1,000	0.01 ms	0	All	Immedi- ately	Tuning	*1	
Pn166	2	Anti-Resoring Gain 2	nance Damp	- 0 to 1,000	1%	0	All	Immedi- ately	Tuning	*1	
	2	Tuning-less Related Se	s Function- elections	0000 to 2711	_	1400	All	_	Setup	*1	
			Tuning-less	s Selection					Whe Enab		
		n.□□□X	0 [Disable tuning-les	s function				Afte	er	
			1 E	Enable tuning-less	s function.				resta		
			' '						\A/I=		
		n.□□X□		ntrol Method					Whe Enab		
Pn170		II.LLXL		Jse for speed cor Jse for speed cor		se host co	ontroller for po	sition contro	Afte II. resta		
				·			·		\A/I=		
		n.□X□□	Rigidity Level							When Enabled	
			0 to 7	7 Set the rigidity level.						Immedi- ately	
			Tuning-less	ng-less Load Level						When Enabled	
		n.X□□□	0 to 2 Set the load level for the tuning-less function.							Immedi-	
									ate	<u>y</u>	
		Mode Swit	ching Level					Immedi-			
Pn181	2	for Speed		0 to 10,000	1 mm/s	0	Linear	ately Immedi-	Tuning	*1	
Pn182	2	for Acceler	ation	0 to 30,000	1 mm/s ²	0	Linear	ately	Tuning	*1	
	2	Related Sv	tion Control vitches	- 0000 to 1101	-	0100	All	After restart	Setup	-	
		- DDDV		:-+:							
		n.□□□X	0	viation Control Se		control					
				Use less-deviation							
Pn190		n.□□X□	Reserved	d parameter (Do r	ot change	.)					
	n.□X□□ Reserved parameter (Do not change.)										
		n.XDDD Speed Feedforward/Torque Feedforward Selection									
			Less-deviation control and speed/torque feedforward are not used together. Less-deviation control and speed/torque feedforward are used together.							ther.	
Pn191	2	Less-Devia	ation Control	0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning		
Pn192	2	Less-Devia	ation Control Feedforward		0.1%	1000	All	Immedi- ately	Tuning	-	
Pn193	2			0 to 65,535	0.01 ms	30	All	Immedi- ately	Tuning	_	
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Parameter No.	Size		ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
	2	Less-Deviation Function Selection Switches		0000 to 2113	_	2102	All	After restart	Setup	-		
	,	n.□□□X Reserved parameter (Do not change.)										
		n.□□□X				<u> </u>						
		n.□□X□	Reserve	ed pai	rameter (Do not change.)							
Pn195		n.□X□□	Reserve	ved parameter (Do not change.)								
		n.X□□□	Less-De	eviatio	on Mode Selec	tion						
			0		Less-Deviation de is compatibl				tion control	is enabled	. (This	
			1	Res	erved setting (I	Do not use	e.)					
			2	Use	Less-Deviation	n Control 2	2 Mode wh	nen less-devia	tion control	is enabled		
		Less-Deviat	tion Cont									
Pn196	2	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 F		0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	_	
Pn199	2		Less-Deviation Control 2 Reverse Torque Feed-		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 m-	0 to 8,000	0.01%/ 100 min ⁻¹	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	rvomoto ction Cor	r m-	0 to 8,000	0.01%/ 100 mm/s	0	Linear	Immedi- ately	Tuning	_	
Pn19E	2	Reserved pa		· (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		· (Do	-	_	36	-	Immedi- ately	Tuning	-	
Pn1A5	2	Reserved pa		· (Do	-	_	0	-	Immedi- ately	Tuning	-	
Pn1AE	2	Reserved pa		(Do	_	_	0	-	Immedi- ately	Tuning	-	
Pn1AF	2	Reserved pa not change		· (Do	-	-	0	-	Immedi- ately	Tuning	-	
Pn205	2	Multiturn Lin	mit		0 to 65,535	1 rev	65535	Rotary	After restart	Setup	*1	

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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	0000 to 2210	-	1000	All	After restart	Setup	*1		
		n.□□□X	Reserved pa	rameter (Do no	ot change.)						
		n.□□X□	Reserved pa	rameter (Do no	ot change.)						
		n.□X□□	Reserved pa	erved parameter (Do not change.)								
Pn207			` `	Positioning Completion Output) Signal Output Timing								
			0 Ou	than the setting of Ph522 (Positioning Completed Width).								
		n.X000	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.								
				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								
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	Gear Ratio r)	1 to 1,073,741,824	1	16	All	After restart	Setup	*1		
Pn210	4	Electronic (Denomina	Gear Ratio tor)	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	0000 to 1003	_	0000	Rotary	After restart	Setup	*1		
		100tare										
		n.□□□X	Reserved pa	rameter (Do no	ot change.)						
Pn22A		n.□□X□	Reserved pa	rameter (Do no	ot change.)						
FIIZZA		n.□X□□	Reserved pa	rameter (Do no	ot change.)						
			Fully-closed	Control Speed	l Feedbac	k Selectio	n					
		n.X□□□	-	e motor encode	<u>'</u>							
			1 Us	e external enco	der speed							
	2	Position Co	ontrol Expan- ion Selections	0000 to 0001	_	0000	All	After restart	Setup	*1		
				mpensation Di								
Pn230		n.□□□X	-	mpensate forw mpensate reve								
		n.□□X□	Reserved pa	ırameter (Do no	ot change.)						
		n.□X□□	Reserved pa	ırameter (Do no	ot change.)						
		n.X□□□	Reserved pa	ırameter (Do no	ot change.)						
Pn231	4	Backlash (Compensation	-500,000 to 500,000	0.1 ref- erence units	0	All	Immedi- ately	Setup	*1		
Pn233	2	Backlash (tion Time (Compensa- Constant	0 to 65,535	0.01 ms	0	All	Immedi- ately	Setup	*1		
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Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
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
Pn304	2	Jogging Speed	0 to 10,000	Rotary: 1 min ⁻¹ Direct Drive: 0.1 min ⁻¹	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	0 to 10,000	1 ms	0	All	Immedi- ately	Setup	*2
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	0000 to 0002	_	0000	All	Immedi- ately	Setup	*1

Pn310

	Vibration	Detection Selection						
n.□□□X	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□□	Reserved parameter (Do not change.)							
n.X□□□	Reserved parameter (Do not change.)							

Pn311	2	Vibration Detection Sensitivity	50 to 500	1%	100	All	Immedi- ately	Tuning	*1
Pn312	2	Vibration Detection Level	0 to 5,000	1 min ⁻¹	50	Rotary	Immedi- ately	Tuning	*1
Pn316	2	Maximum Motor Speed	0 to 65,535	1 min ⁻¹	10000	Rotary	After restart	Setup	*1
Pn324	2	Moment of Inertia Cal- culation Starting Level	0 to 20,000	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 Speed	1 to 100	100 mm/s	50	Linear	After restart	Setup	*1
Pn401	2	First Stage First Torque 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
Pn404	2	Forward External Torque Limit	0 to 800	1%*3	100	All	Immedi- ately	Setup	*1

Name

5.2.2 List of Servo Parameters

Parameter

No.

Size

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Classi-

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Refer-

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When

Enabled

NO.	0)				nange	Ullit	Setting	MOLOIS	Enabled	lication	ence
Pn405	2	Reverse Ex Limit	cternal Tord	que	0 to 800	1%*3	100	All	Immedi- ately	Setup	*1
Pn406	2	Emergency	y Stop Tor	que	0 to 800	1%*3	800	All	Immedi- ately	Setup	*1
Pn407	2	Speed Lim Torque Co	it during ntrol		0 to 10,000	1 min ⁻¹	10000	Rotary	Immedi- ately	Setup	*1
	2	Torque-Re tion Select		;-	0000 to 1111	_	0000	All	_	Setup	*1
Pn408	n.□□□X		Notch Fi 0 1 Speed Li 0 Notch Fi 0 1	Disamit ! Use Pn4 Use Sett Use Sett Use Sett Disamit Iter !	Selection 1 able first stage able first stage belief first stage the smaller of 107 as the spece the smaller of 180 as the specee the smaller of 180 as the specee the smaller of 180 as the speceee the smaller of 180 as the speceee the smaller of 180 as the speceee the smaller of 180 as the 180 as	the maximed limit. If the maximed limit. If the maximed limit. If the overs as the special the overs as the special the overs as the special the overs. If the overs are the overs as the special the overs as the special the overs are the special the overs.	num motor num motor peed alarm ed limit. peed alarm ed limit. filter. filter.	speed and to	the setting of	Afte resta	ed di- y n ed r rt di- n ed di- di- di- di- di- di- di- di- di- di
		1									
Pn409	2	First Stage Frequency			50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn40A	2	First Stage Q Value			50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn40B	2	First Stage Depth	Notch Fil	ter	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn40C	2	Second St ter Freque		Fil-	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn40D	2	Second St ter Q Value		Fil-	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn40E	2	Second St ter Depth	age Notch	Fil-	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn40F	2	Second St Torque Ref Frequency	ference Fil		100 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn410	2	Second St Notch Filte		nd	50 to 100	0.01	50	All	Immedi- ately	Tuning	*1
Pn412	2	First Stage Torque Ret Time Cons	ference Fil	ter	0 to 65,535	0.01 ms	100	All	Immedi- ately	Tuning	*1

Setting

Range

Setting

Unit

Default

Applicable

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Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Torque-Retion Select	lated Func- ions 2	0000 to 1111	_	0000	All	Immedi- ately	Setup	*1
				l	1	I			1	
	Ī		Notch Filter S	Selection 3						
		n.□□□X		able third stage						
			Notch Filter	able third stage notch filter.						
Pn416		n.□□X□		able fourth stag						
	_		1 Ena	able fourth stag	ge notch fi	lter.				
		- DVDD	Notch Filter		a a t a la Citt					
		n.□X□□		able fifth stage able fifth stage						
	Ī	n.X□□□	Reserved pa	rameter (Do no	ot change	.)				
	-		•							
Pn417	2	Third Stage 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 Stag	e Notch Filter	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn41A	2	Fourth Sta ter Freque	ge Notch Fil- ncy	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn41B	2	Fourth Sta ter Q Value	ge Notch Fil-	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn41C	2	Fourth Sta ter Depth	ge Notch Fil-	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn41D	2	Fifth Stage Frequency	Notch Filter	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn41E	2	Fifth Stage Q Value	Notch Filter	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn41F	2	Fifth Stage Depth	Notch Filter	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
	2	Speed Rip sation Sele	ple Compen- ections	0000 to 1111	_	0000	Rotary	_	Setup	*1
			Speed Ripple	e Compensatio	on Functio	n Selectio	n		Whe Enab	
		n.□□□X		able speed ripp	<u> </u>				Imme	
				able speed ripp	•				ate	_
Pn423			Speed Ripple tion Selection	e Compensation	on Informa	ation Disaç	greement Wa	rning Detec-	Whe	
23		n.□□X□		tect A.942 aları not detect A.9					Afte	
									Whe	
		n. 🗆 X 🗆 🗆		e Compensation Enable Condition Selection						led
			<u> </u>	eed reference tor speed					Afte	
		n.X□□□		parameter (Do not change.)						
			,							
Pn424	2	Torque Lim cuit Voltag	nit at Main Cir- e Drop	0 to 100	1%*2	50	All	Immedi- ately	Setup	*1

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Parameter No.	Size	Na	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn425	2	Release Tir Limit at Ma Voltage Dro	in Circuit	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 Enab	ole Comper ole Speed	0 to 10,000	1 min ⁻¹	0	Rotary Ser- vomotor	Immedi- ately	Tuning	*1
Pn456	2		Sweep Torque Refer- ence Amplitude		1%	15	All	Immedi- ately	Tuning	*1
	2	Notch Filte Selections		0000 to 0101	_	0101	All	Immedi- ately	Tuning	*1
	-	n.□□□X	0 tuning tuning		first stage nost referer	nce, autotu	r automatically uning with a ho	ost reference	e, and cus	tom
							rith a host refe	rence, and c	custom tur	ning.
Pn460		n.□□X□	'			.)				
		n.□X□□	0 8	er Adjustment Second adjust the autotuning withou custom tuning.	second st ut a host re	eference, a	utotuning with	n a host refe	rence, and	i
			Adju 1 ing v tunir		d stage not t reference	tch filter au , autotunir	itomatically dung with a host	uring executi reference, a	on of auto nd custon	ntun-
		n.X□□□	Reserved	parameter (Do n	ot change	.)				
Pn480	2	Speed Limi 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%*3	30	Linear	Immedi- ately	Setup	*1
Pn484	2	Reverse Fo	rce Limit	0 to 800	1%*3	30	Linear	Immedi- ately	Setup	*1
Pn485	2	Polarity De ence Spee		o to 100	1 mm/s	20	Linear	Immedi- ately	Tuning	-
Pn486	2	Polarity De ence Accel Deceleration	eration/	0 to 100	1 ms	25	Linear	Immedi- ately	Tuning	_
Pn487	2	Polarity Des	tection Con d Time	0 to 300	1 ms	0	Linear	Immedi- ately	Tuning	-
Pn488	2	Polarity De ence Waitir	tection Refe ng Time	er- 50 to 500	1 ms	100	Linear	Immedi- ately	Tuning	-
Pn48E	2	Polarity De Range	tection	1 to 65,535	1 mm	10	Linear	Immedi- ately	Tuning	-
Pn490	2	Polarity De	tection Loa	0 to 20,000	1%	100	Linear	Immedi- ately	Tuning	_
Pn495	2	Polarity De firmation For ence		0 to 200	1%	100	Linear	Immedi- ately	Tuning	_
Pn498	2	Polarity Deable Error F		0 to 30	1 deg	10	Linear	Immedi- ately	Tuning	-
Pn49F	2	Speed Ripp sation Enal	ole Comper ole Speed	0 to 10,000	1 mm/s	0	Linear	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
Pn502	2	Rotation Detection Level	1 to 10,000	1 min ⁻¹	20	Rotary	Immedi- ately	Setup	*1
Pn503	2	Speed Coincidence Detection Signal Output Width	0 to 100	1 min ⁻¹	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 ⁻¹	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
	2	Input Signal Selections	0000 to FFF2	_	1881	All	After restart	Setup	*1

			, (D, 1, 1, 1, 1)								
	n.□□□X	Rese	rved parameter (Do not change.)								
	n.□□X□	Rese	Reserved parameter (Do not change.)								
	- DVDD	D	Decomposition / Demost shapped								
	n.□X□□	Reserved parameter (Do not change.)									
		P-OT	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).								
		E	Enable forward drive when CN1-11 input signal is OFF (open).								
		F	Enable forward drive when CN1-12 input signal is OFF (open).								

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Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence			
	2	Input Signa	al Selection	าร	0000 to FFFF	-	8882	All	After restart	Setup	*1			
								<u>I</u>	<u> </u>					
			N OT (De		a Duiva Drahik	sit\ Cianal	Allogation							
			0 (Re		se Drive Prohib ble reverse dri				N (closed)					
			1		ble reverse dri		-							
			2		ble reverse dri		•		, ,					
			3		ble reverse dri			-	, ,					
			4		ble reverse dri									
			5	Ena	ble reverse dri	ve when C	N1-11 inp	ut signal is O	N (closed).					
			6	Ena	nable reverse drive when CN1-12 input signal is ON (closed).									
		n.□□□X	7	Set the signal to always prohibit reverse drive.										
			8	Set	Set the signal to always enable reverse drive.									
			9	Ena	ble reverse dri	ve when C	N1-13 inp	ut signal is O	FF (open).					
			Α	Ena	ble reverse dri	ve when C	N1-7 inpu	t signal is OF	F (open).					
			В		ble reverse dri				,					
			С		ble reverse dri									
			D	Enable reverse drive when CN1-10 input signal is OFF (open).										
			E		ble reverse dri				(1 /					
			F Enable reverse drive when CN1-12 input signal is OFF (open).											
Pn50B		n.□□X□	Reserved	par	ameter (Do no	ot change.	.)							
1 113013			/P-CL (Forward External Torque Limit Input) Signal Allocation											
			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	Acti	ive when CN1-	9 input siç	gnal is ON	(closed).						
			4	Acti	ive when CN1-	10 input s	ignal is ON	V (closed).						
			5	Acti	ive when CN1-	·11 input s	signal is ON	l (closed).						
			6	Acti	ive when CN1-	12 input s	signal is ON	l (closed).						
		n.□X□□	7		signal is alway									
			8		signal is alway									
			9		ive when CN1-									
			Α		ive when CN1-									
			В		ive when CN1-									
			С		ive when CN1-	• •		,						
			D		ve when CN1-	•		(1)						
			E		ive when CN1-			,						
			F	Acti	ive when CN1-	12 input s	signal is OF	r (open).						
		- VDED	/N-CL (Reverse External Torque Limit Input) Signal Allocation											
		n.X□□□	0 to F		allocations are ut) signal alloca		e as the /P	-CL (Forward	External Tor	rque Limit				

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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	ınal Selec-	0000 to 6666	-	0000	All	After restart	Setup	*1			
			<u> </u>	itioning Comple	·	, 0							
				isabled (the abo									
		n.□□□X		utput the signal									
				utput the signal									
				utput the signal			CN1-26 outpi	ut terminal.					
			4 to 6 R	eserved setting (Do not us	e.)							
Pn50E			/V-CMP (Sp	eed Coincidend	e Detecti	on Output) Signal Alloc	ation					
		n.□□X□		o 6 The allocations are the same as the /COIN (Positioning Completion) signal allocations.									
			/TGON (Rotation Detection Output) Signal Allocation										
		n.□X□□		The ellegations are the same as the (COIN (Desitioning Completion) signal									
			/S-RDY (Se	/S-RDY (Servo Ready) Signal Allocation									
		n.X□□□	O to 6	ne allocations are locations.			OIN (Position	ing Complet	ion) signal				
	2	Output Sig	ınal Selec-	0000 to 6666	_	0100	All	After restart	Setup	*1			
			/CLT (Torqu	e Limit Detection	n Output)	Signal All	ocation						
			0 D	isabled (the abo	ve signal c	utput is no	ot used).						
		- DDDV	1 0	utput the signal	from the C	N1-1 or C	N1-2 output	terminal.					
		n.□□□X	2 0	utput the signal	from the C	N1-23 or	CN1-24 outpi	ut terminal.					
			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.)							
Pn50F			/VLT (Spee	d Limit Detectio	n) Signal /	Allocation							
		n.□□X□	O to 6	ne allocations are al allocations.	, 0		CLT (Torque Li	mit Detection	n Output) s	sig-			
			/BK (Brake	Output) Signal	Allocation								
		n.□X□□	O to 6	ne allocations and allocations.		e as the /C	CLT (Torque Lir	mit Detection	n Output) s	sig-			
			/WARN (Wa	rning Output) S	ignal Allo	cation							
		n.X□□□	n to 6 The anecations are the same as the 7021 (longue Emili Detection Outp							sig-			
	nal allocations.												

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Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
	2	Output Sig tions 3	nal Selec-		0000 to 0666	_	0000	All	After restart	Setup	*1	
			/NEAR (N	Near	Output) Signa	ıl Allocatio	on					
			0	Disa	abled (the abo	ve signal c	output is no	ot used).				
			1	Out	put the signal	from the C	N1-1 or C	N1-2 output	terminal.			
		n.□□□X	2	Out	put the signal	from the C	N1-23 or	CN1-24 outp	ut terminal.			
Pn510			3	Out	put the signal	from the C	N1-25 or	CN1-26 outp	ut terminal.			
			4 to 6	Res	erved setting	(Do not us	e.)					
		n.□□X□	Reserve	d par	ameter (Do no	ot change	.)					
		n.□X□□	Reserved	d par	ameter (Do no	ot change	.)					
		n.X□□□	Reserved	d par	ameter (Do no	ot change	.)					
	2	Input Signa	al Selectio	ns	0000 to	_	6543	All	After restart	Setup	*1	
			/DFC (O	rigin	Return Decele	eration Sw	vitch Input	Signal Alloc	ation			
			0		ve when CN1-		•					
			1	Acti	Active when CN1-7 input signal is ON (closed).							
			2	Acti	ve when CN1-	-8 input siç	gnal is ON	(closed).				
			3	Acti	ve when CN1-	-9 input siç	gnal is ON	(closed).				
			4	Acti	ve when CN1-	-10 input s	signal is ON	V (closed).				
			5		ve when CN1-	•	<u> </u>	,				
			6	Acti	ve when CN1-	-12 input s	signal is ON	V (closed).				
		n.□□□X	7	The signal is always active.								
			8	The signal is always inactive.								
			9	1 0 (1)								
				A Active when CN1-7 input signal is OFF (open).								
			С	Active when CN1-8 input signal is OFF (open). Active when CN1-9 input signal is OFF (open).								
			D		ve when CN1-							
D 544			E		ve when CN1-	<u> </u>						
Pn511			F		ve when CN1-							
			/EXT1 (E		nal Latch Inpu	· .						
			0 to 3	The	signal is alwa	ys inactive	٠.					
			4	Acti	ve when CN1-	-10 input s	ignal is ON	V (closed).				
			5	Acti	ve when CN1-	-11 input s	signal is ON	V (closed).				
		n.□□X□	6	Acti	ve when CN1-	-12 input s	signal is ON	V (closed).				
			D	Acti	ve when CN1-	-10 input s	signal is OF	F (open).				
			E		ve when CN1-							
			F		ve when CN1-			F (open).				
			7 to C	The	signal is alwa	ys inactive).					
			/EXT2 (E	xterr	nal Latch Inpu	t 2) Signal	Allocation	1				
		n.□X□□	0 to F		allocations arons.	e the same	e as the /E	XT1 (External	Latch Input	1) signal a	allo-	
	/EXT3 (External Latch Input 3) Signal Allocation											
		n.X□□□	0 to F The allocations are the same as the /EXT1 (External Latch Input 1) signal allocations.						allo-			
												

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Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Output Sig Settings	nal Inverse	0000 to 1111	_	0000	All	After restart	Setup	*1		
				al Inversion for		nd CN1-2	Terminals					
		n.□□□X		ne signal is not i								
			1 Ti	ne signal is inver	ted.							
			Output Sign	gnal Inversion for CN1-23 and CN1-24 Terminals								
Pn512		n.□□X□	0 TI	ne signal is not i	nverted.							
			1 Ti	ne signal is inver	ted.							
			Output Sign	al Inversion for	CN1-25 a	and CN1-2	6 Terminals					
		n.□X□□	0 TI	ne signal is not i	nverted.							
			1 Ti	ne signal is inver	ted.							
		n.XDDD	Reserved p	arameter (Do no	ot change	.)						
					<u>-</u>	-7						
	2	Output Sig	ınal Selec-	0000 to 0666	_	0000	All	After restart	Setup	*1		
		n.□□□X	Reserved parameter (Do not change.)									
				`								
		n.□□X□	Reserved p	arameter (Do no	ot change.	.)						
			/PM (Preve	ntative Mainten	ance Outp	ut) Signal	Allocation					
Pn514				sabled (the abo								
		n.□X□□		utput the signal								
				utput the signal								
				utput the signal			CN1-26 outpu	ut terminal.				
			4 to 6 Reserved setting (Do not use.)									
		n.X□□□	Reserved p	arameter (Do no	ot change	.)						

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Parameter No.	Size	1	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence			
	2	Input Sigr	nal Selections	0000 to FFFF	_	8888	All	After restart	Setup	*1			
				1			1	1					
			FSTP (Forced	l Stop Input) Si	anal Alloc	ation							
			· ` ·	able drive wher			al is ON (close	ed).					
			1 Er	nable drive wher	n CN1-7 ir	put signal	is ON (closed	d).					
			2 Er	nable drive wher	n CN1-8 ir	put signal	is ON (closed	d).					
			3 Er	nable drive wher	n CN1-9 ir	nput signal	is ON (closed	d).					
			4 Er	nable drive wher	n CN1-10	input signa	al is ON (close	ed).					
			-	nable drive wher		· ·	•						
				nable drive wher		· ·	•						
	n	.000X	-	et the signal to a			`						
Pn516				Set the signal to always enable drive (always disable forcing the motor to stop).									
				Enable drive when CN1-13 input signal is OFF (open).									
		A Enable drive when CN1-7 input signal is OFF (open). B Enable drive when CN1-8 input signal is OFF (open).											
		C Enable drive when CN1-9 input signal is OFF (open). D Enable drive when CN1-10 input signal is OFF (open).											
		E Enable drive when CN1-10 input signal is OFF (open). E Enable drive when CN1-11 input signal is OFF (open).											
				nable drive wher									
				iable unve when	10111-12	input signa	ans on tope	11).					
	n	.00X0	Reserved par	ameter (Do not	change.)								
	n	.0X00	Reserved par	ameter (Do not	change.)								
	n	.X000	Reserved par	ameter (Do not	change.)								
			The second second		· · · · · · · · · · · · · · · · · · ·								
Pn518*3	_		odule-Related	_	_	_	All	_	_	_			
		Paramete	rs										
		Motor-Loa	ad Position	0.1	1 refer-								
Pn51B	4	Deviation	Overflow	0 to 1,073,741,824	ence	1000	Rotary	Immedi- ately	Setup	*1			
		Detection	Deviation Over-		unit			Immedi-					
Pn51E	2	flow Warn	ning Level	10 to 100	1%	100	All	ately	Setup	*1			
Pn520	4		Deviation Over-	1 to	1 refer- ence	524288	All	Immedi-	Setup	*1			
		flow Alarn	n Level	1,073,741,823	unit	0		ately	,				
Pn522	4		g Completed	0 to	1 refer- ence	7	All	Immedi-	Setup	*1			
		Width		1,073,741,824	unit			ately					
Pn524	4	Near Sign	nal Width	1 to	1 refer- ence	107374	All	Immedi-	Setup	*1			
				1,073,741,824	unit	1824		ately					
Pn526	4	Position D	Deviation Over-	1 to	1 refer- ence	524288	All	Immedi-	Setup	*1			
111020	7	Servo ON		1,073,741,823	unit	0	All	ately	Octup	1			
Pn528	2	Position Deviation Over-		10 to 100	1%	100	All	Immedi-	Setup	*1			
		Servo ON						ately					
Pn529	2	Speed Lin Servo ON	nit Level at	0 to 10,000	1 min ⁻¹	10000	Rotary	Immedi- ately	Setup	*1			
Pn52A	2	Multiplier closed Ro	per Fully-	0 to 100	1%	20	Rotary	Immedi- ately	Tuning	*1			
Pn52B	2			1 to 100	1%	20	All	Immedi-	Setup	*1			
THOLD		Overload Warning Level		1 10 100	1 /0	20	All	Continue					

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Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn52C	2	Base Current Derating at Motor Overload Detection	10 to 100	1%	100	All	After restart	Setup	*1
Pn52D	2	Reserved parameter (Do not change.)	_	-	50	All	-	-	_
	2	Program Jogging- Related Selections	0000 to 0005	_	0000	All	Immedi- ately	Setup	*1

	Program	Jogging Operation Pattern						
	0	(Waiting time in Pn535 \rightarrow Forward by travel distance in Pn531) \times Number of movements in Pn536						
	1	(Waiting time in Pn535 → Reverse by travel distance in Pn531) × Number of movements in Pn536						
	2	(Waiting time in Pn535 → Forward by travel distance in Pn531) × Number of movements in Pn536 (Waiting time in Pn535 → Reverse by travel distance in Pn531) × Number of movements in Pn536						
n.□□□X	(Waiting time in Pn535 → Reverse by travel distance in Pn531) × Nun movements in Pn536 (Waiting time in Pn535 → Forward by travel distance in Pn531) × Nun movements in Pn536							
	4	(Waiting time in Pn535 \rightarrow Forward by travel distance in Pn531 \rightarrow Waiting time in Pn535 \rightarrow Reserve 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.)						
11.4444	I ICSCI VE	a parameter (Do not change.)						
n. 🗆 X 🗆 🗆	Reserve	d parameter (Do not change.)						

Pn530

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

Pn531	4	Program Jogging Travel Distance	1 to 1,073,741,824	1 refer- ence unit	32768	All	Immedi- ately	Setup	*1
Pn533	2	Program Jogging Move- ment Speed	1 to 10,000	Rotary: 1 min ⁻¹ Direct Drive: 0.1 min ⁻¹	500	Rotary	Immedi- ately	Setup	*1
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	*1
Pn561	2	Overshoot Detection Level	0 to 100	1%	100	All	Immedi- ately	Setup	*1

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| Setting | Setting | Default | Applicable | When | Classi- | Refer-

Parameter	Φ		Setting	Setting	Default	Applicable	When	Classi-	Refer-
No.	Size	Name	Range	Unit	Setting	Motors	Enabled	fication	ence
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	-
	2	Polarity Detection Execution Selection for Absolute Linear Encoder	0000 to 0001	-	0000	Linear	Immedi- ately	Setup	*1
Pn587	Polarity Detection Selection for Absolute Linear Encoder 0								
Pn600	2	Regenerative Resistor Capacity*5	Depends on model.*6	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	*7
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	*7
Pn621 to Pn628*4	_	Safety Module-Related Parameters	_	_	_	All	-	_	_
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Parameter No.	Size	N	Name			Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence							
	2	Communic	ations C	Con-	0000 to 1FF3	-	1040	All	Immedi- ately	Setup	_							
					1			1		l .	l .							
	MECHATROLINK Communications Check Mask for Debugging																	
			0	1	Do not mask.													
			1		Ignore MECHATROLINK communications errors (A.E60).													
		n.□□□X	2	Ŭ	e WDT errors (Huriication	3 611013 (A.LC			=							
			3	Ignor	Ignore both MECHATROLINK communications errors (A.E60) and WDT errors (A.E50).													
			Warnin	g Che	ck Masks						_ 							
			0	Do no	ot mask.						_							
			1	Ignor	e data setting v	warnings (A.94 □).				_							
			2	Ignor	gnore command warnings (A.95□).													
			3	Ignor	e both A.94□	and A.95 C	warnings	i.			_							
Pn800			4	Ignor	e communicati	ons warni	ngs (A.96 C]).			_							
			5	Ignor	e both A.94□	and A.96 C] warnings	.			_							
		n.□□X□	6	Ignor	e both A.95□	and A.96 C	warnings	i.			_							
			7	Ignor	e A.94 □ , A.95	□, and A.	96 □ warni	ngs.			_							
			8	Ignor	e data setting v	warnings (A.97A and	A.97b).			_							
			9	Ignor	e A.94 □ , A.97	A, and A.9	7b warnin	gs.			_							
			Α	Ignor	e A.95 □ , A.97	A, and A.9	7b warnin	gs.			_							
			В	Ignor	e A.94 □ , A.95	□, A.97A,	and A.97k	o warnings.			_							
			С	Ignor	e A.96 □ , A.97	A, and A.9	7b warnin	gs.			_							
			D	Ignor	e A.94 □ , A.96	□, A.97A,	and A.97b	o warnings.			_							
			Е	Ignor	e A.95 □ , A.96	□, A.97A,	and A.97k	o warnings.			_							
			F	F Ignore A.94□, A.95□, A.96□, A.97A, and A.97b warnings.														
		n.□X□□	Reserv	ed par	rameter (Do no	ot change.)											
		- VODO	Automatic Warning Clear Selection for Debugging*7								Ī							
		n.X□□□ M3 *7	0	1	Retain warnings for debugging.													
		IVIO	1	Autor	matically clear	warnings (MECHATR	OLINK-III spe	cification).		_							
	2	Selections	Application Function Selections 6 (Software			_	0003	All	Immedi- ately	Setup	*1							
		Limits)			0103				atory									
			Software Limit Selection															
			0		le both forward			re limits.			_							
		n.□□□X	1		le forward soft						_							
D=001			2		ole reverse soft						=							
Pn801			3	Disab	le both forwar	d and reve	erse softwa	ire limits.			_							
		n.□□X□	Reserv	ed par	rameter (Do no	ot change.)											
			Softwa	re Lim	it Check for R	eferences												
		n.□X□□	0	Do no	ot perform soft	ware limit	checks for	references.			_							
			1	Perfo	rm software lin	nit checks	for referen	ices.			_							
		~ VCCC	Des		ramata: /D	+ al	\				_							
		n.X□□□	Heserv	ed par	rameter (Do no	or change.)											
Pn803	2	Origin Ran	ge		0 to 250	1 refer- ence unit	10	All	Immedi- ately	Setup	*2							

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Parameter No.	Size	Na	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
Pn804	4	Forward So	oftware L	.imit	-1,073,741,823 to 1,073,741,823	1 refer- ence unit	107374 1823	All	Immedi- ately	Setup	*1	
Pn806	4	Reverse Sc	oftware L	imit	-1,073,741,823 to 1,073,741,823	1 refer- ence unit	-10737 41823	All	Immedi- ately	Setup	*1	
Pn808	4	Absolute Er Offset	ncoder C	rigin	-1,073,741,823 to 1,073,741,823	1 refer- ence unit	0	All	Immedi- ately *9	Setup	*1	
Pn80A	2	First Stage eration Cor		.ccel-	1 to 65,535	10,000 refer- ence units/s ²	100	All	Immedi- ately *10	Setup	*2	
Pn80B	2	Second Sta Acceleratio			1 to 65,535	10,000 refer- ence units/s ²	100	All	Immedi- ately *10	Setup	*2	
Pn80C	2	Acceleration Switching S		ant	0 to 65,535	100 reference units/s	0	All	Immedi- ately *10	Setup	*2	
Pn80D	2	First Stage Deceleration		ant	1 to 65,535	10,000 refer- ence units/s ²	100	All	Immedi- ately *10	Setup	*2	
Pn80E	2	Second Stage Linear Deceleration Constant			1 to 65,535	10,000 refer- ence units/s ²	100	All	Immedi- ately *10	Setup	*2	
Pn80F	2	Deceleration Constant Switching Speed			0 to 65,535	100 ref- erence units/s	0	All	Immedi- ately *10	Setup	*2	
Pn810	2	Exponentia tion/Decele			0 to 65,535	100 reference units/s	0	All	Immedi- ately *11	Setup	*2	
Pn811	2	Exponential Accelera- tion/Deceleration Time Constant			0 to 5,100	0.1 ms	0	All	Immedi- ately *11	Setup	*2	
Pn812	2	Movement Average Time			0 to 5,100	0.1 ms	0	All	Immedi- ately *11	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	
	2	Origin Retu tings	ırn Mode	Set-	0000 to 0001	_	0000	All	Immedi- ately	Setup	*12	
			Origin F	Return	Direction							
Pn816		n.□□□X			n in forward di	rection.					=	
M2 *13			1	Retur	turn in reverse direction.							
IVIZ		n.□□X□	Reserve	ed par	rameter (Do no	ot change)					
		n.□X□□	Reserve	ed par	parameter (Do not change.)							
		n.X□□□	Reserve	ed par	rameter (Do no	ot change.)					
Pn817 *14	2	Origin Appi	roach Sp	eed	0 to 65,535	100 reference units/s	50	All	Immedi- ately *10	Setup	*2	
Pn818 *15	2	Origin Appi	roach Sp	eed	0 to 65,535	100 reference units/s	5	All	Immedi- ately *10	Setup	*2	
Pn819	4	Final Travel Origin Retu		e for	-1,073,741,823 to 1,073,741,823	1 refer- ence unit	100	All	Immedi- ately	Setup	*2	

Continued from previous page.

Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence						
	2	Input Signa Selections	al Monitor	0000 to 7777	-	0000	All	Immedi- ately	Setup	*12						
			IO12 Signal I	Mapping												
			0 Do no	ot map.						=						
			1 Moni	onitor CN1-13 input terminal.												
			2 Moni	Monitor CN1-7 input terminal.												
		n.□□□X	3 Moni	Monitor CN1-8 input terminal.												
			4 Moni	Monitor CN1-9 input terminal.												
Pn81E			5 Moni	tor CN1-10 inp	ut termina	ıl.				_						
M2 *13			6 Moni	tor CN1-11 inp	ut termina	ıl.				_						
IVIZ 13			7 Moni	tor CN1-12 inp	ut termina	l.				=						
			IO13 Signal I	Mapping						Ī						
		n.□□X□	0 to 7 The mappings are the same as the IO12 signal mappings.													
			IO14 Signal Mapping													
		n.□X□□	I		ne same a	s the IO12	signal manni	nas		_						
			The desired states and the desired states are													
		n.X□□□	IO15 Signal Mapping													
	0 to 7 The mappings are the same as the IO12 signal mappings.									_						
	2	Command tions	Data Alloca-	0000 to 1111	_	0010	All	After restart	Setup	*12						
									•							
			Option Field Allocation													
		n.□□□X														
Pn81F			1 Enab	le option field a	allocation.					_						
			Position Control Command TFF/TLIM Allocation													
M2 *13		n.□□X□	Disable allocation.													
			1 Enable allocation.													
			1 Enable allocation.													
		n.□X□□	Reserved pa	rameter (Do no	t change.)										
		n.X□□□	Reserved pa	rameter (Do no	ot change.)										
			. 1000. Tou pu			,				-						
				-2,147,483,648	1 refer-			Immedi-								
Pn820	4	Forward La	atching Area	to 2,147,483,647	ence unit	0	All	ately	Setup	*2						
Pn822	4	Reverse La	atching Area	-2,147,483,648 to 2,147,483,647	1 refer- ence unit	0	All	Immedi- ately	Setup	*2						
				2,171,700,041	uriit			Continuo	-1							

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		Range	Unit	Setting	Motors	Enabled	fication	ence
2	Option Monitor 1 Selection	0000 to FFFF	_	0000	_	Immedi- ately	Setup	*2

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

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								Con	unu	ea iron	n previous	s page	
Parameter	Size		lame		Setting	Setting	Default	Applicable		/hen	Classi-	Refer-	
No.	S				Range	Unit	Setting	Motors	En	abled	fication	ence	
										l		_	
		Setting Monitor									Applicable Motors		
Pn824 M3 *8		Communications Module Only Previous value of latched feedback position (LPOS1) [encoder											
		0080 hex	Previous pulses]	value	e of latched fee	edback po	sition (LPC	081) [encoder			All		
			Previous value of latched feedback position (LPOS2) (encoder										
		0081 hex	pulses]	value	or lateried rec	σουσοκ ρο	onton (Er C	702) [01100d01			All		
		0084 hex	Continuo	ous La	atch Status (EX	(STATUS)	TUS)				All		
		All Areas											
		Other Reserved settings (Do not use.)									ΑII		
		values Tieserved settings (Bornot use.)											
	2	Option Mo	onitor 2 Se	elec-	0000 to	_	0000	All		medi-	Setup	*2	
		tion			FFFF				i	itely	·		
5													
Pn825		0000 hex to)									_	
		0084 hex	The se	ttings	s are the same as those for the Option Monitor 1					Selection.			
												_	
						10,000							
Pn827	2	Linear Dec			1 to 65,535	refer-	100	All		medi-	Setup	*2	
		Constant	1 for Stop	ping) 10000,000	ence units/s ²	100	7 111	ate	ely *10	Cotap	2	
		SVOEEWA	aiting Time (for			ui iito/ o			-				
Pn829	2	SVOFF at	Decelerat	ion	0 to 65,535	10 ms	0	All	Immedi- ately *10		Setup	*2	
		to Stop)							ale	∃ıy			
	2	Option Fie	eld Allocati	ions	0000 to 1E1E	-	1813	All		After start	Setup	*12	
		'			TETE					Jotal t			
			ACCFIL	Alloc	ation (Option)							Ī	
			0	Alloca	ate bits 0 and	1 to ACCF	IL.					=	
			1	Alloca	ate bits 1 and 2	2 to ACCF	IL.					=	
			2	Allocate bits 2 and 3 to ACCFIL.									
			3	Allocate bits 3 and 4 to ACCFIL.								_	
			4	Allocate bits 4 and 5 to ACCFIL.								_	
			5	Allocate bits 5 and 6 to ACCFIL.								_	
		, DDDV	6	Alloca	ate bits 6 and	7 to ACCF	IL.					=	
		n.□□□X	7	Allocate bits 7 and 8 to ACCFIL.									
			8									=	
			9									_	
Pn82A			Α	A Allocate bits 10 and 11 to ACCFIL.								_	
111027			В	B Allocate bits 11 and 12 to ACCFIL.									
M2 *13			С	Alloca	ate bits 12 and	I 13 to AC	CFIL.					_	
			D	Alloca	ate bits 13 and	I 14 to AC	CFIL.						
			E	Alloca	ate bits 14 and	I 15 to AC	CFIL.					=	
			ACCEIL	Alloc	ation Enable/I	Diaabla S	alaction					_	
		n.□□X□	0		le ACCFIL allo		election						
		11.111111										_	
			1	⊏⊓ab	le ACCFIL allo	Janon.						_	
			G SEI	۸۱۱۸۸	ation (Option)								
		n.□X□□			ettings are the	samo oo	for the AC	CEIL allocatio	ne				
			U IU E	1116 8	ettings are the	same as	IOI IIIE AU	OI IL AIIOCALIO	115.			_	
			G SEL	Alloca	ation Enable/D	isable Se	lection						
		n. X🗆 🗆 🗆			le G_SEL alloc		icotion -						
		11. 人口口口			le G_SEL alloc							_	
			'	LIIdD	ie g_sel alioc	auul.						_	

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Pn82B M2*13 PnB2B PnB2B M2*13 PnB2B PnB2
Pn82B Pn
Pn82B Pn
Pn82B M2 *13
Pn82B Pn82B M2*13 Allocate bit 2 to V_PPI. 3 Allocate bit 3 to V_PPI. 4 Allocate bit 4 to V_PPI. 5 Allocate bit 5 to V_PPI. 6 Allocate bit 6 to V_PPI. 7 Allocate bit 7 to V_PPI. 8 Allocate bit 8 to V_PPI. 9 Allocate bit 9 to V_PPI. A Allocate bit 10 to V_PPI. A Allocate bit 10 to V_PPI. C Allocate bit 10 to V_PPI. D Allocate bit 13 to V_PPI. E Allocate bit 14 to V_PPI. F Allocate bit 15 to V_PPI. V_PPI Allocation Enable/Disable Selection 0 Disable V_PPI allocation. P_PI_CLR Allocation (Option) 0 to F The settings are the same as for the V_PPI allocations.
Pn82B Pn82B M2*13 Allocate bit 3 to V_PPI. 4 Allocate bit 4 to V_PPI. 5 Allocate bit 5 to V_PPI. 6 Allocate bit 6 to V_PPI. 7 Allocate bit 7 to V_PPI. 8 Allocate bit 8 to V_PPI. 9 Allocate bit 9 to V_PPI. A Allocate bit 10 to V_PPI. B Allocate bit 11 to V_PPI. C Allocate bit 11 to V_PPI. D Allocate bit 12 to V_PPI. E Allocate bit 13 to V_PPI. E Allocate bit 14 to V_PPI. F Allocate bit 15 to V_PPI. F Allocate bit 15 to V_PPI. N.DDD N.DDD N.DDD P_PI_CLR Allocation (Option) O to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection P_PI_CLR Allocation Enable/Disable Selection
Pn82B Pn82B M2*13 Allocate bit 4 to V_PPI. 5 Allocate bit 5 to V_PPI. 6 Allocate bit 6 to V_PPI. 7 Allocate bit 7 to V_PPI. 8 Allocate bit 8 to V_PPI. 9 Allocate bit 9 to V_PPI. A Allocate bit 10 to V_PPI. B Allocate bit 11 to V_PPI. C Allocate bit 12 to V_PPI. D Allocate bit 13 to V_PPI. E Allocate bit 13 to V_PPI. E Allocate bit 14 to V_PPI. F Allocate bit 15 to V_PPI. O Disable V_PPI allocation 1 Enable V_PPI allocation. 1 Enable V_PPI allocation. P_PI_CLR Allocation (Option) O to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection
Pn82B M2*13 Pn82B M2*13 Allocate bit 5 to V_PPI. 6 Allocate bit 6 to V_PPI. 7 Allocate bit 7 to V_PPI. 8 Allocate bit 8 to V_PPI. 9 Allocate bit 9 to V_PPI. A Allocate bit 10 to V_PPI. B Allocate bit 11 to V_PPI. C Allocate bit 12 to V_PPI. D Allocate bit 13 to V_PPI. E Allocate bit 14 to V_PPI. F Allocate bit 15 to V_PPI. V_PPI Allocation Enable/Disable Selection 1 Enable V_PPI allocation. P_PI_CLR Allocation (Option) 0 to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection
Pn82B M2 *13 A A A A A A A A A
Pn82B M2*13 Pn82B M2*13 Allocate bit 7 to V_PPI. 8 Allocate bit 9 to V_PPI. 9 Allocate bit 10 to V_PPI. B Allocate bit 11 to V_PPI. C Allocate bit 12 to V_PPI. D Allocate bit 13 to V_PPI. E Allocate bit 14 to V_PPI. F Allocate bit 15 to V_PPI. F Allocate bit 15 to V_PPI. V_PPI Allocation Enable/Disable Selection 0 Disable V_PPI allocation. 1 Enable V_PPI allocation. P_PI_CLR Allocation (Option) 0 to F The settings are the same as for the V_PPI allocations.
Pn82B Allocate bit 8 to V_PPI. 9
Pn82B A Allocate bit 9 to V_PPI. A Allocate bit 10 to V_PPI. B Allocate bit 11 to V_PPI. C Allocate bit 12 to V_PPI. D Allocate bit 13 to V_PPI. E Allocate bit 14 to V_PPI. F Allocate bit 15 to V_PPI. F Allocate bit 15 to V_PPI. V_PPI Allocation Enable/Disable Selection 0 Disable V_PPI allocation. 1 Enable V_PPI allocation. P_PI_CLR Allocation (Option) 0 to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection
A Allocate bit 10 to V_PPI. B Allocate bit 11 to V_PPI. C Allocate bit 12 to V_PPI. D Allocate bit 13 to V_PPI. E Allocate bit 14 to V_PPI. F Allocate bit 15 to V_PPI. V_PPI Allocation Enable/Disable Selection 1 Enable V_PPI allocation. P_PI_CLR Allocation (Option) 0 to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection
B Allocate bit 11 to V_PPI. C Allocate bit 12 to V_PPI. D Allocate bit 13 to V_PPI. E Allocate bit 14 to V_PPI. F Allocate bit 15 to V_PPI. V_PPI Allocation Enable/Disable Selection 0 Disable V_PPI allocation. 1 Enable V_PPI allocation. n.□X□□ P_PI_CLR Allocation (Option) 0 to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection
C Allocate bit 12 to V_PPI. D Allocate bit 13 to V_PPI. E Allocate bit 14 to V_PPI. F Allocate bit 15 to V_PPI. V_PPI Allocation Enable/Disable Selection D Disable V_PPI allocation. 1 Enable V_PPI allocation. P_PI_CLR Allocation (Option) O to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection
D Allocate bit 13 to V_PPI. E Allocate bit 14 to V_PPI. F Allocate bit 15 to V_PPI. V_PPI Allocation Enable/Disable Selection 0 Disable V_PPI allocation. 1 Enable V_PPI allocation. P_PI_CLR Allocation (Option) 0 to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection
E Allocate bit 14 to V_PPI. F Allocate bit 15 to V_PPI. V_PPI Allocation Enable/Disable Selection 0 Disable V_PPI allocation. 1 Enable V_PPI allocation. P_PI_CLR Allocation (Option) 0 to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection
F Allocate bit 15 to V_PPI. V_PPI Allocation Enable/Disable Selection 0 Disable V_PPI allocation. 1 Enable V_PPI allocation. P_PI_CLR Allocation (Option) 0 to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection
N.□□X□ V_PPI Allocation Enable/Disable Selection 0
n.□□X□ 0 Disable V_PPI allocation. 1 Enable V_PPI allocation. n.□X□□ P_PI_CLR Allocation (Option) 0 to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection
1 Enable V_PPI allocation. P_PI_CLR Allocation (Option) 0 to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection
n.□X□□
0 to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection
0 to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection
O to F The settings are the same as for the V_PPI allocations. P_PI_CLR Allocation Enable/Disable Selection
II.ALILI U DISADIE F_FI_OLIN AIIOCATIOTI.
1 Enable P_PI_CLR allocation.
I Litable I _I I_OLI (allocation.
2 Option Field Allocations 0000 to 1F1F - 1F1E All After restart Setup *12
P_CL Allocation (Option)
0 to F The settings are the same as for the V_PPI allocations.
P_CL Allocation Enable/Disable Selection
Pn82C n.□□X□ 0 Disable P_CL allocation.
1 Enable P_CL allocation.
M2 *13
N_CL Allocation (Option)
0 to F The settings are the same as for the V_PPI allocations.
N_CL Allocation Enable/Disable Selection
n.XDDD 0 Disable N_CL allocation.
1 Enable N_CL allocation.

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Parameter No.	Size	N	Name			Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Option Fiel 4	ld Allocation	ons	0000 to 1F1C	-	0000	All	After restart	Setup	*12
			BANK_S	EL1	Allocation (Op	tion)					
			0 /	Alloca	ate bits 0 to 3 t	to BANK_	SEL1.				
			1 /	Alloca	ate bits 1 to 4 to	to BANK_S	SEL1.				
			2 /	Alloca	ate bits 2 to 5	to BANK_	SEL1.				_
			3 /	Alloca	ate bits 3 to 6	to BANK_	SEL1.				_
					ate bits 4 to 7						_
		n.□□□X			ate bits 5 to 8 to						_
					ate bits 6 to 9 to						_
					ate bits 7 to 10						_
					ate bits 8 to 11						_
Pn82D					ate bits 9 to 12						_
*12					ate bits 10 to 1						_
M2 *13					ate bits 11 to 1						_
			C /	Alloca	ate bits 12 to 1	5 to BAN	K_SEL1.				_
	İ		BANK_S	EL1	Allocation Ena	ıble/Disab	le Selection	on			
		n.□□X□	0 [Disab	le BANK_SEL	1 allocatio	n.				_
			1 [Enabl	e BANK_SEL1	allocation	١.				_
											_
		n.□X□□	LT_DISA	BLE.	Allocation (Op	tion)					
		П.ЦХЦЦ	0 to F	The s	ettings are the	same as	for the V_F	PPI allocations	S		_
			LT_DISA	BLE	Allocation Ena	able/Disab	ole Selection	on			ī
		n.X□□□	0 [Disab	le LT_DISABLE	allocatio	n.				_
			1 E	Enabl	e LT_DISABLE	allocation	١.				
	•										_
									0 "		

Continued from previous page.

Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Option Fie	ld Allocations	0000 to 1D1F	-	0000	All	After restart	Setup	*12		
				1					I	<u> </u>		
		n.□□□X	Reserved pa	rameter (Do no	ot change.)						
		n.□□X□	Reserved pa	rameter (Do no	ot change.)						
	Ī		OUT_SIGNA	L Allocation (O	ption)							
			0 Alloc	ate bits 0 to 2	to OUT_SI	GNAL.				_		
			1 Alloc	ate bits 1 to 3 t	to OUT_SI	GNAL.				<u> </u>		
				ate bits 2 to 4 to								
				ate bits 3 to 5 to						_		
Pn82E				ate bits 4 to 6 to ate bits 5 to 7 to						<u> </u>		
M2 *13		n.□X□□		ate bits 6 to 8 to						_		
M2 *13				ate bits 7 to 9 to						_		
				ate bits 8 to 10						_		
			9 Alloc	ate bits 9 to 11	to OUT_9	SIGNAL.				<u> </u>		
			A Alloc	ate bits 10 to 1	2 to OUT_	_SIGNAL.				_		
				ate bits 11 to 1						_		
				ate bits 12 to 1						_		
			D Alloc	ate bits 13 to 1	5 to OUI_	_SIGNAL.				_		
			OUT_SIGNAL	L Allocation Er	nable/Disa	ble Select	ion					
		n.X□□□		ole OUT_SIGNA						_		
			1 Enab	le OUT_SIGNA	L allocatio	n.				_		
		T		1			T	Ī	1			
	2	Motion Se	ttings	0000 to 0001	_	0000	All	After restart	Setup	*2		
		_							l			
	_									_		
				eration/Decele								
		n.□□□X	0 Use ignor	Pn80A to Pn80 red.)	F and Pn8	327. (The s	ettings of Pna	334 to Pn840	0 are			
Pn833			1 Use	Pn834 to Pn84	0. (The se	ttings of P	n80A to Pn80	F and Pn82	7 are	_		
			' ignor	red.)						=		
		n.□□X□	Reserved pa	rameter (Do no	t change.)						
		n.□X□□	Reserved pa	rameter (Do no	ot change.)						
		n.X□□□	Reserved pa	rameter (Do no	ot change.)						
					10,000							
Pn834	4	First Stage eration Co	Linear Accel- nstant 2	1 to 20,971,520	refer- ence	100	All	Immedi- ately *10	Setup	*2		
				.,. ,.	units/s ²			ato.y				
		Second St	age Linear	1 to	10,000 refer-			Immedi-	_			
Pn836	4	Acceleration	on Constant 2	20,971,520	ence	100	All	ately *10	Setup	*2		
					units/s ²							
Pn838	4	Acceleration Switching	on Constant Speed 2	0 to 2,097,152,000	1 refer- ence	0	All	Immedi- ately *10	Setup	*2		
		219	-1	, , , , , , , , , , , , , , , , , , , ,	unit/s 10,000			atory				
Pn83A	4	First Stage		1 to	refer-	100	All	Immedi-	Setup	*2		
	г	Decelerati	on Constant 2	20,971,520	ence units/s ²		7	ately *10	Joidp	_		
				1			I .	Continue	d on nov	t page		

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Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn83C	4	Second Stage Linear Deceleration Constant 2	1 to 20,971,520	10,000 refer- ence units/s ²	100	All	Immedi- ately *10	Setup	*2
Pn83E	4	Deceleration Constant Switching Speed 2	0 to 2,097,152,000	1 refer- ence unit/s	0	All	Immedi- ately *10	Setup	*2
Pn840	4	Linear Deceleration Constant 2 for Stopping	1 to 20,971,520	10,000 refer- ence units/s ²	100	All	Immedi- ately *10	Setup	*2
Pn842 *14	4	Second Origin Approach Speed 1	0 to 20,971,520	100 ref- erence units/s	0	All	Immedi- ately *10	Setup	*2
Pn844 *15	4	Second Origin Approach Speed 2	0 to 20,971,520	100 ref- erence units/s	0	All	Immedi- ately *10	Setup	*2
Pn846	2	POSING Command Scurve Acceleration/ Deceleration Rate	0 to 50	1%	0	All	Immedi- ately *10	Setup	_
Pn850	2	Number of Latch Sequences	0 to 8	_	0	All	Immedi- ately	Setup	*2
Pn851	2	Continuous Latch Sequence Count	0 to 255	-	0	All	Immedi- ately	Setup	*2
	2	Latch Sequence 1 to 4 Settings	0000 to 3333	_	0000	All	Immedi- ately	Setup	*2

		Latch S	Sequence 1 Signal Selection							
		0	Phase C							
	n.□□□X	1	EXT1 signal							
		2	EXT2 signal							
		3	EXT3 signal							
Pn852		Latch S	atch Sequence 2 Signal Selection							
	n.□□X□	0 to 3	The settings are the same as those for the Latch Sequence 1 Signal Selection.							
		Latch S	Sequence 3 Signal Selection							
	n.□X□□	0 to 3	The settings are the same as those for the Latch Sequence 1 Signal Selection.							
		Latch S	Sequence 4 Signal Selection							
	n.X□□□	0 to 3	The settings are the same as those for the Latch Sequence 1 Signal Selection.							

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Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
	2	Latch Seq Settings	uence 5 to 8	0000 to 3333	_	0000	All	Immedi- ately	Setup	*2	
			Latch Sequ	ence 5 Signal S	Selection						
			0 Pha	se C						_	
		n.□□□X	1 EXT	1 signal						_	
			2 EXT	2 signal						_	
			3 EXT	3 signal						_	
D 050			Latch Sequ	ence 6 Signal S	Selection					1	
Pn853		n.□□X□	0 to 3 The	settings are the	e same as	those for t	he Latch Seq	uence 5 Sigr	nal Selec-	_	
			Latch Sequ	ence 7 Signal S	Selection					Ī	
		n.□X□□	0 to 3 The tion	settings are the	e same as	those for t	he Latch Seq	uence 5 Sigr	nal Selec-	_	
			Latch Sequ	ence 8 Signal S	Selection						
		n.X□□□		settings are the		those for t	he Latch Seq	uence 5 Sigr	nal Selec-	_	
	_	SVCMD IO	O Input Signal	0000 to				Immedi-			
	2	Monitor Al	locations 1	1717	_	0000	All	ately	Setup	*2	
			Input Signal Monitor Allocation for CN1-13 (SVCMD_IO)								
			O Allocate bit 24 (IO_STS1) to CN1-13 input signal monitor. O Allocate bit 24 (IO_STS1) to CN1-13 input signal monitor.								
			Allocate bit 24 (IO_STS1) to CN1-13 input signal monitor. Allocate bit 25 (IO_STS2) to CN1-13 input signal monitor.								
		n.□□□X	3 Allo	cate bit 27 (IO_	STS4) to C	N1-13 inp	ut signal mon	itor.		=	
			4 Allo	cate bit 28 (IO_	STS5) to C	N1-13 inp	ut signal mon	itor.		=	
			5 Allo	cate bit 29 (IO_	STS6) to C	N1-13 inp	ut signal mon	itor.		_	
Pn860			6 Allo	cate bit 30 (IO_	STS7) to C	N1-13 inp	ut signal mon	itor.		_	
*8			7 Allo	cate bit 31 (IO_	STS8) to C	N1-13 inp	ut signal mon	itor.		=	
M3 *8			CN1-13 Inp	ut Signal Monit	or Enable	Disable S	election			I	
		n.□□X□	0 Disa	ble allocation for	or CN1-13	input sign	al monitor.			-	
			1 Ena	ble allocation fo	r CN1-13	input signa	al monitor.			- -	
			Input Signa	Monitor Alloca	ation for C	N1-7 (SVC	CMD IO)				
		n.□X□□	<u> </u>	settings are the			-			_	
			CN1-7 Inpu	t Signal Monito	r Enable/[Disable Se	lection			I	
		n.X□□□	0 Disa	ble allocation fo	or CN1-7 i	nput signal	I monitor.			_	
			1 Ena	ble allocation fo	r CN1-7 ir	ıput signal	monitor.			_	

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Parameter No.	Size	٨	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
	2	SVCMD_IOMONITOR AI	O Input Signal locations 2	0000 to 1717	-	0000	All	Immedi- ately	Setup	*2	
		n.□□□X	Input Signal I	Monitor Alloca		•	_ ,	,			
				ettings are the						-	
Pn861		~ DDVD	<u> </u>	Signal Monito ble allocation for						l	
F11001		n.□□X□		le allocation fo		·				_	
M3 *8		n.□X□□	<u> </u>	Monitor Alloca		•	,				
										-	
		n.X□□□	<u> </u>	Signal Monito ble allocation for							
				le allocation fo						_	
	2	SVCMD_IOMONITOR AI	O Input Signal locations 3	0000 to 1717	_	0000	All	Immedi- ately	Setup	*2	
			1	M 21 All	1 (0	N4 40 (0)	(OMP 10)				
		n.□□□X		Monitor Alloca settings are the			•				
										- 	
Pn862		n.□□X□		t Signal Monit						1	
*6				le allocation fo						_	
M3 *6	n.□X□□ Input Signal Monitor Allocation for CN1-11 (SVCMD_IO)										
		n.□X□□		ettings are the			-			_	
			CN1-11 Inpu	t Signal Monit	or Enable/	Disable S	election			I	
		n.X□□□		le allocation fo						_	
			1 Enab	le allocation fo	r CN1-11	input signa	al monitor.			=	
	2		O Input Signal locations 4	0000 to 1717	_	0000	All	Immedi- ately	Setup	*2	
		n.□□□X		Monitor Alloca							
Pn863			0 to 7 The s	ettings are the	same as	the CN1-1	3 allocations.			=	
P11003				t Signal Monit							
M3 *8		n.□□X□		le allocation fo						=	
			1 Enab	le allocation fo	r GN 1-12	input signa	ai monitor.			=	
		n.□X□□	Reserved par	rameter (Do no	ot change.)					
		n.X□□□	Reserved par	rameter (Do no	ot change.)					

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Parameter No.	Size	Name			Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	SVCMD_IC nal Monito 1	Output r Allocatio	Sig- ons	0000 to 1717	_	0000	All	Immedi- ately	Setup	*2
			Output	Signa	l Monitor Allo	cation for	CN1-1 and	d CN1-2 (SV	CMD_IO)		I
			<u> </u>		ate bit 24 (IO_S			•			_
			1	Alloca	ate bit 25 (IO_9	STS2) to C	N1-1/CN1	-2 output sig	nal monitor.		_
			2	Alloca	ate bit 26 (IO_S	STS3) to C	N1-1/CN1	-2 output sig	nal monitor.		,
		n.□□□X			ate bit 27 (IO_S						_
					ate bit 28 (IO_9	,		1 0			_
Pn868					ate bit 29 (IO_S						<u> </u>
1 11000					ate bit 30 (IO_S						_
M3 *8			7	Alloca	ate bit 31 (IO_S	S1S8) to C	N1-1/CN1	-2 output sig	nal monitor.		_
			CN1-1/0	N1-1/CN1-2 Output Signal Monitor Enable/Disable Selection							
		n.□□X□	Disable allocation for CN1-1/CN1-2 output signal monitor.								
			1	Enabl	le allocation fo	r CN1-1/C	N1-2 outp	ut signal mor	nitor.		—" =:
			Output	Signa	l Monitor Allo	cation for	CN1-23 aı	nd CN1-24 (S	SVCMD IO)		ī
		n.□X□□			ettings are the			•			-
	-										-
		·	 		-24 Output Sig						l
		n.X□□□			le allocation fo						_
			1	Enabi	le allocation fo	r CN 1-23/	CN 1-24 O	utput signai m	ionitor.		=
	2	SVCMD_IC nal Monito 2	Output r Allocatio	Sig- ons	0000 to 1717	-	0000	All	Immedi- ately	Setup	*2
				<u> </u>							
											_
		n.□□□X			l Monitor Allo			-	-		
Pn869			0 to 7	The s	ettings are the	same as	the CN1-1	/CN1-2 alloca	ations.		_
			CN1-25	/CN1	-26 Output Sig	gnal Moni	tor Enable	/Disable Sele	ection		
M3 *8		n.□□X□	0	Disab	le allocation fo	or CN1-25	/CN1-26 o	utput signal n	nonitor.		_
			1	Enabl	le allocation fo	r CN1-25/	CN1-26 oı	utput signal m	onitor.		_
		n.□X□□	Reserve	d nar	ameter (Do no	nt change	1				
			11000170	a pai	amotor (Bo m	or orialigo					_
		n.X□□□	Reserve	ed par	ameter (Do no	ot change.	.)				
Pn880	2	Station Ad tor (for ma read only)			03 to EF	-	0	All	Immedi- ately	Setup	-
Pn881	2	Set Transn Count Mor (for mainte only)	nitor (byté	s]	17, 32, 48	_	0	All	Immedi- ately	Setup	-
Pn882	2	Transmissi ting Monito (for mainte only)	or [× Ó.25	μs]	0 to FFFF	_	0	All	Immedi- ately	Setup	_
Pn883	2	Communic Setting Mo mission cy maintenan	nitor [trar cles] (for	าร-	0 to 32	-	0	All	Immedi- ately	Setup	-

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						0011	tillada ildii	provious	s pago.
Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Communications Controls 2	0000 to 0001	-	0000	All	Immedi- ately	Setup	*2

		MECH	ATROLINK Communications Error Holding Brake Signal Setting								
Pn884	n.□□□X	0	Maintain the status set by the BRK_ON or BRK_OFF command when a MECHA TROLINK communications error occurs. Apply the holding brake when a MECHATROLINK communications error occurs. Served parameter (Do not change.)								
M3 *8	1 Apply the holding brake when a MECHATROLINK communications error occu										
	n.□□X□	Reserv	ed parameter (Do not change.)								
	n.□X□□	Reserv	ed parameter (Do not change.)								
	n.X□□□	□□□ Reserved parameter (Do not change.)									

Pn88A	2	MECHATROLINK Receive Error Counter Monitor (for maintenance, read only)	0 to 65,535	-	0	All	Immedi- ately	Setup	_
Pn890 to Pn8A6	4	Command Data Monitor during Alarm/Warning (for maintenance, read only)	0 to FFFFFFF	-	0	All	Immedi- ately	Setup	*2
Pn8A8 to Pn8BE	4	Response Data Monitor during Alarm/Warning (for maintenance, read only)	0 to FFFFFFF	-	0	All	Immedi- ately	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	0000 to 08FF	_	0	All	After restart	Setup	*2
Pn920 to Pn95F	2	Parameter Bank Data (Not saved in nonvolatile memory.)	0000 to FFFF	-	0	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)
- *8. This parameter is valid only when the MECHATROLINK-III standard servo profile is used.
- ${
 m *9.}$ The parameter setting is enabled after SENS_ON command execution is completed.
- *10.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.
- *11. The settings are updated only if the reference is stopped (i.e., only if DEN is set to 1).
- *12.Refer to the following manual for details.
 - Ω Σ-7-Series MECHATROLINK-II Communications Command Manual (Manual No.: SIEP S800001 30)
- *13. This parameter is valid only when the MECHATROLINK-II-compatible profile is used.
- *14. The setting of Pn842 is valid while Pn817 is set to 0.
- *15. The setting of Pn844 is valid while Pn818 is set to 0.

5.2.3 List of MECHATROLINK-III Common Parameters

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 o	rpe Selec- only)	0 to 1	_	_	All	_	
01									
PnA02		0000 hex	Absolute	encoder				,	
		0001 hex	Increment	tal encoder					
	4	Motor Type (read only)	Selection	0 to 1	-	-	All	-	
02									_
PnA04		0000 hex	Rotary Se	Rotary Servomotor					atior
		0001 hex	Linear Se	rvomotor					Jr. W
									info
	4	Semi-close closed Sele (read only)		0 to 1	-	_	All	_	Device information
03					<u> </u>				
PnA06		0000 hex	Semi-clos	sed					
		0001 hex	Fully-clos	ed					
04 PnA08	4	Rated Moto (read only)	or Speed	0 to FFFFFFF	1 min ⁻¹	_	All	-	
05 PnA0A	4	Maximum (Speed (rea		0 to FFFFFFF	1 min ⁻¹	-	All	-	
06 PnA0C	4	Speed Muli	tiplier	-1,073,741,823 to	_	_	All	-	
07		Rated Torg	I I A	1,073,741,823					-
PnA0E	4	(read only)	u c	0 to FFFFFFF	1 N·m	_	All	_	
08 PnA10	4	Maximum (Torque (rea	Output Id only)	0 to FFFFFFF	1 N·m	_	All	_	nation
09 PnA12	4	Torque Mul (read only)	Itiplier	-1,073,741,823 to 1,073,741,823	-	-	All	_	Device information
0A PnA14	4	Resolution (read only)		0 to FFFFFFF	1 pulse/rev	_	Rotary	_	Devic
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		0 to FFFFFFF	1 pulse/ pitch	_	Linear	-	

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Parameter No.	Size	Name		Setting Range	Setting Unit [Resolution]	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	
22 PnA44	4	Electronic Gea (Denominator		1 to 1,073,741,824	_	1	All	After restart	
23 PnA46	4	Absolute Enc Origin Offset	oder	-1,073,741,823 to 1,073,741,823	1 reference unit	0	All	Immedi- ately*1	
24 PnA48	4	Multiturn Limi Setting	it	0 to 65,535	1 Rev	65535	Rotary	After restart	-
	4	Limit Setting		0 to 33 hex	_	0000 hex	All	After restart	= -
				(0: Enabled, 1: Di	· · · · · · · · · · · · · · · · · · ·				Machine specifications
0.5				,	oabica)				iji.
25 PnA4A		Bit 2	Rese)ec
111/4/		Bit 3	Rese						e SS
		Bit 4		T (0: Disabled, 1:					rid:
		Bit 5		T (0: Disabled, 1:	Enabled)				Лас
		Bits 6 to 31	Rese	rved.					2
26 PnA4C	4	Forward Software Limit		-1,073,741,823 to 1,073,741,823	1 reference unit	10737418 23	All	Immedi- ately	
27 PnA4E	4	Reserved parameter (Do not change.)		-	_	0	All	Immedi- ately	
28 PnA50	4	Reverse Softv Limit	ware	-1,073,741,823 to 1,073,741,823	1 reference unit	-1073741 823	All	Immedi- ately	
29 PnA52	4	Reserved par (Do not chang		-	_	0	All	Immedi- ately	
	4	Speed Unit Selection*2		0 to 4	-	0	All	After restart	
		0000 hex F	Reference	e units/s					
41		0001 hex F	Reference	e units/min					
PnA82		0002 hex F	Percenta	ge (%) of rated spe	eed*3				
			min ^{-1*3}	, , , , , , , , , , , , , , , , , , , ,					
		-		motor speed/400	00000 bov*4				
		JOOH HEX	viaxiiiiuli	imotor speed/400	OOOOO HEX .				ings
42 PnA84	4	Speed Base U Selection*3,*4 (Set the value from the folloo formula: Spee selection (41 × 10 ⁿ)	e of n wing ed unit	-3 to 3	_	0	All	After restart	Unit settings
	4	Position Unit Selection		0	-	0	All	After restart	
43 PnA86		0000 hex F	Reference	e units		-			

5.2.3 List of MECHATROLINK-III Common Parameters

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Parameter No.	Size	Name	Setting Rang	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classi- fication
44 PnA88	4	Position Base Un Selection (Set the value of a from the following formula: Position selection (43 PnA × 10 ⁿ)	n g O unit	-	0	All	After restart	
	4	Acceleration Unit Selection	0	_	0	All	After restart	
45 PnA8A			ence units/s ²				- Footal C	
46 PnA8C	4	Acceleration Bass Unit Selection (Set the value of I from the following formula: Accelera unit selection (45 PnA8A) × 10 ⁿ)	n 4 to 6	-	4	All	After restart	
	4	Torque Unit Selection	1 to 2	-	1	All	After restart	
47 PnA8E		0001 hex Perce	entage (%) of rated	torque				
FIIAOL	0002 hex Maximum torque/40000000 hex*5							
48 PnA90	4	Torque Base Unit Selection*5 (Set the value of from the following formula: Torque u selection (47 PnA × 10")	n g -5 to 0	-	0	All	After restart	Unit settings
	4	Supported Unit S tems (read only)	ys	_	0601011F hex	All	_	
		Speed Units						
		Bit 0	Reference units/s	· · · · · · · · · · · · · · · · · · ·				
		Bit 1	Reference units/m					
		Bit 2	Percentage (%) of		Enabled)			
		Bit 3	min ⁻¹ (rpm) (1: En	abled)				
		Bit 4	Maximum motor s	•	ex (1: Enable	ed)		
		Bits 5 to 7	Reserved (0: Disa	bled).				
		Position Units						
49 PnA92		Bit 8	Reference units (1					
1 11/13/2		Bits 9 to 15	Reserved (0: Disa	bled).				
		Acceleration Unit	1					
		Bit 16	Reference units/s					
		Bit 17	ms (acceleration t	•	each rated sp	peed) (0: Disa	bled)	
		Bits 18 to 23	Reserved (0: Disa	bled).				
		Torque Units						
		Bit 24	N·m (0: Disabled)					
		Bit 25	Percentage (%) of		Enabled)			
		Bit 26	Maximum torque/					
		Bits 27 to 31	Reserved (0: Disa	bled).				

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						Continued fr	on previou	as page
Parameter No.	Size	Name	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classi- fication
61 PnAC2	4	Speed Loop Gain	1,000 to 2,000,000	0.001 Hz [0.1 Hz]	40000	All	Immedi- ately	
62 PnAC4	4	Speed Loop Integral Time Constant	150 to 512,000	1 μs [0.01 ms]	20000	All	Immedi- ately	
63 PnAC6	4	Position Loop Gain	1,000 to 2,000,000	0.001/s [0.1/s]	40000	All	Immedi- ately	
64 PnAC8	4	Feedforward Compensation	0 to 100	1%	0	All	Immedi- ately	
65 PnACA	4	Position Loop Integral Time Constant	0 to 5,000,000	1 μs [0.1 ms]	0	All	Immedi- ately	
66 PnACC	4	Positioning Completed Width	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 Acceleration/Deceleration Time Constant	0 to 510,000	1 μs [0.1 ms]	0	All	Immedi- ately*6	
82 PnB04	4	Movement Average Time	0 to 510,000	1 μs [0.1 ms]	0	All	Immedi- ately*6	
83 PnB06	4	External Positioning Final Travel Distance	-1,073,741,823 to 1,073,741,823	1 reference unit	100	All	Immedi- ately	
84 PnB08	4	Origin Approach Speed	0 to 3FFFFFF hex	10 ⁻³ min ⁻¹	× 5,000 reference units/s con- verted to 10 ⁻³ min ⁻¹	All	Immedi- ately	
85 PnB0A	4	Origin Return Creep Speed	0 to 3FFFFFFF hex	10 ⁻³ min ⁻¹	× 500 ref- erence units/s con- verted to 10 ⁻³ min ⁻¹	All	Immedi- ately	Tuning
86 PnB0C	4	Final Travel Distance for Origin Return	-1,073,741,823 to 1,073,741,823	1 reference unit	100	All	Immedi- ately	
	4	Fixed Monitor Selection 1	0 to F	_	1	All	Immedi- ately	- -
87 PnB0E		000B hex Reserved 000C hex CMN1 (cr 000D hex CMN2 (cr 000E hex OMN1 (or	(undefined value). (undefined value). common monitor 1) common monitor 2) ptional monitor 2)					

5.2.3 List of MECHATROLINK-III Common Parameters

Continued from previous page.

Parameter										
No.	Size	Nan	ne	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled		
	4	Fixed Monitation 2	tor Selec-	0 to F	_	0	All	Immedi- ately		
3 nB10		0000 to 000F hex								
	4	SEL_MON Monitor Se		0 to 9	-	0	All	Immedi- ately		
			1							
		0000 hex	1		reference coordina		`			
		0001 hex 0002 hex	,	IPOS (reference position in reference coordinate system) POS_OFFSET (offset set in POS_SET (Set Coordinate System) command)						
		0002 flex 0003 hex		get speed)	III POS_SET (Set (Joordinate	System) con	imanu)		
		0003 flex 0004 hex		(speed limit)						
		0005 hex		(torque limit)						
			Monitor D Byte 1: C 00 hex: 01 hex: 02 hex: 03 hex: Byte 2: C 00 hex: 01 hex: 02 hex: Byte 3: R	Phase 1 Phase 2 Phase 3 urrent control m Position control Speed control r Torque control	node mode mode mode mode					
			Bit	Name	Description	Value	Settin	g		
					Processing status		Latch dete not yet pro cessed.			
89 PnB12		0006 hex	Bit 0	LT_RDY1	LT_REQ1 in SVCN D_CTRL region		Processing detection i progress.			
			Bit 1		Processing status	for 0	Latch dete			
		0006 hex	Rit 1	IT RDV1	latch detection for	r	cessed.			
		0006 hex	Bit 1	LT_RDY1		r	cessed. Processing detection i progress.	g latch		
B12		0006 hex	Bit 1	LT_RDY1	latch detection for LT_REQ2 in SVCN	r M-	Processing detection i progress. Phase C	glatch n		
		0006 hex			latch detection for LT_REQ2 in SVCN D_CTRL region	r M-	Processing detection i progress.	glatch n		
		0006 hex	Bit 1 Bits 2 and 3	LT_RDY1	latch detection for LT_REQ2 in SVCN	M- 1	Processing detection i progress. Phase C External in	glatch n put		
		0006 hex	Bits 2		latch detection for LT_REQ2 in SVCN D_CTRL region	1 0 1	Processing detection i progress. Phase C External in signal 1 External in	platch n put		
B12		0006 hex	Bits 2		latch detection for LT_REQ2 in SVCN D_CTRL region	1 0 1 2	Processing detection i progress. Phase C External in signal 1 External in signal 2 External in	platch n put		
B12		0006 hex	Bits 2 and 3		latch detection for LT_REQ2 in SVCN D_CTRL region	1 0 1 2 3	Processing detection i progress. Phase C External in signal 1 External in signal 2 External in signal 3	put put		
		0006 hex	Bits 2		latch detection for LT_REQ2 in SVCN D_CTRL region	1 0 1 2 3 0	Processing detection i progress. Phase C External in signal 1 External in signal 2 External in signal 3 Phase C External in signal 3	put put put		
		0006 hex	Bits 2 and 3	LT_SEL1R	latch detection for LT_REQ2 in SVCN D_CTRL region	1 0 1 2 3 0 1	Processing detection i progress. Phase C External in signal 1 External in signal 2 External in signal 3 Phase C External in signal 1 External in signal 1	put put put put		
		0006 hex	Bits 2 and 3	LT_SEL1R	latch detection for LT_REQ2 in SVCN D_CTRL region Latch signal Latch signal	1 0 1 2 3 0 1 2 2	Processing detection i progress. Phase C External in signal 1 External in signal 2 External in signal 3 Phase C External in signal 1 External in signal 1 External in signal 2	put put put put		
B12		0006 hex	Bits 2 and 3 Bits 4 and 5	LT_SEL1R LT_SEL2R Reserved (0)	latch detection for LT_REQ2 in SVCN D_CTRL region Latch signal Latch signal	1 0 1 2 3 0 1 2 2	Processing detection i progress. Phase C External in signal 1 External in signal 2 External in signal 3 Phase C External in signal 1 External in signal 1 External in signal 2	put put put put		
			Bits 2 and 3 Bits 4 and 5 Bit 6 Reserved	LT_SEL1R LT_SEL2R Reserved (0)	latch detection for LT_REQ2 in SVCN D_CTRL region Latch signal Latch signal	1 0 1 2 3 0 1 2 3 of initial en	Processing detection i progress. Phase C External in signal 1 External in signal 2 External in signal 3 Phase C External in signal 1 External in signal 1 External in signal 2 External in signal 2 External in signal 2	put put put put put put put on con-		

Continued from previous page.

Parameter	0:	N.	0	Setting Unit	Default	Applicable	When	С
No.	Size	Name	Setting Range	[Resolution]	Setting	Motors	Enabled	f
	4	SEL_MON (CMN2) Monitor Selection 2	0 to 9	_	0	All	Immedi- ately	
8A PnB14		0000 to 0009 The sett	ings are the same as	those for SEL	_MON Monit	or Selection	1.	
8B PnB16	4	Origin Detection Width	0 to 250	1 reference unit	10	All	Immedi- ately	
8C PnB18	4	Forward Torque Lin	nit 0 to 800	1%	100	All	Immedi- ately	
8D PnB1A	4	Reverse Torque Lin	nit 0 to 800	1%	100	All	Immedi- ately	
8E PnB1C	4	Zero Speed Detection Range	1,000 to 10,000,000	10 ⁻³ min ⁻¹	20000	All	Immedi- ately	
8F PnB1E	4	Speed Coincidence Signal Detection Width	0 to 100,000	10 ⁻³ min ⁻¹	10000	All	Immedi- ately	
	4	Servo Command Control Field Enabl Disable Selections (read only)	e/ _	_	0FFF3F3F hex	All	_	
								7
		Bit 0	CMD_PAUSE (1: Ena	abled)				
		Bit 1	CMD_CANCEL (1: E	nabled)				
		Bits 2 and 3	STOP_MODE (1: En	abled)				
		Bits 4 and 5	ACCFIL (1: Enabled)					
		Bits 6 and 7	Reserved (0: Disable	ed).				
90		Bit 8	LT_REQ1 (1: Enabled)					
PnB20		Bit 9	LT_REQ2 (1: Enable	d)				
		Bits 10 and 11	LT_SEL1 (1: Enabled	(k				
		Bits 12 and 13	LT_SEL2 (1: Enabled	(k				
		Bits 14 and 15	Reserved (0: Disable	ed).				
		Bits 16 to 19	SEL_MON1 (1: Enab	oled)				
		Bits 20 to 23	SEL_MON2 (1: Enab	oled)				
		Bits 24 to 27	SEL_MON3 (1: Enab	oled)				
	I	Bits 28 to 31	Reserved (0: Disabled).					

5.2.3 List of MECHATROLINK-III Common Parameters

Continued from previous page.

						Jontinued fr		
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)	-	-	0FFF3F33 hex	All	_	
		•	·	•	•	•	•	
		Bit 0	CMD_PAUSE_CMP	(1: Enabled)				
		Bit 1	CMD_CANCEL_CMI	, ,				
		Bit 2 and 3	Reserved (0: Disable	ed).				
		Bits 4 and 5	ACCFIL (1: Enabled)					
		Bits 6 and 7	Reserved (0: Disabled).					
		Bit 8	L_CMP1 (1: Enabled)					
91		Bit 9	L_CMP2 (1: Enabled)					
PnB22		Bit 10						
		Bit 11	PON (1: Enabled)					
		Bit 12 M_RDY (1: Enabled)						
	Bit 13 SV_ON (1: Enabled)							
		Bits 14 and 15	Reserved (0: Disabled).					
	Bits 16 to 19 SEL_MON1 (1: Enabled)							mete
		Bits 20 to 23	SEL_MON2 (1: Enab	oled)				arar
		Bits 24 to 27	SEL_MON3 (1: Enab	oled)				ğ p
		Bits 28 to 31	Reserved (0: Disable	ed).				late
				T	Т		T	Command-related parameters
	4	Output Bit Enable/ Disable Selections (read only)	_	_	007F01F0 hex	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	∍d).				
		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)	d –	_	FF0FFEFE hex	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 16 Bit 17 Bit 18 Bit 19 Bit 10 Bit 11 Bit 12 Bit 13 Bit 14 Bit 15 Bit 16 Bit 17 Bit 18 Bit 19 Bits 20 to 23 Bits 24 to 31	Reserved (0: Disable 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: Disable BRK_ON (1: Enabled) N-SOT (1: Enabled) N-SOT (1: Enabled) DEN (1: Enabled) DEN (1: Enabled) PSET (1: Enabled) ZPOINT (1: Enabled) ZPOINT (1: Enabled) V_LIM (1: Enabled) V_LIM (1: Enabled) ZSPD (1: Enabled) Reserved (0: Disable DESTS) In Enabled) Reserved (0: Disable DESTS)	ed).				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) to either 0002 hex or 0003 hex, set the Speed Base Unit Selection (parameter 42) to a number between -3 and 0.
- *4. If you set the Speed Unit Selection (parameter 41) to 0004 hex, set the Speed Base Unit Selection (parameter 42) to 0.
- *5. If you set the Torque Unit Selection (parameter 47) to 0002 hex, set the Torque Base Unit Selection (parameter 48) to 0.
- *6. 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.

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

Parameter No.	Default Setting	Name	When Enabled
Pn000	0000	Basic Function Selections 0	After restart
Pn001	0000	Application Function Selections 1	After restart
Pn002	0011	Application Function Selections 2	After restart
Pn006	0002	Application Function Selections 6	Immediately
Pn007	0000	Application Function Selections 7	Immediately
Pn008	4000	Application Function Selections 8	After restart
Pn009	0010	Application Function Selections 9	After restart
Pn00A	0001	Application Function Selections A	After restart
Pn00B	0000	Application Function Selections B	After restart
Pn00C	0000	Application Function Selections C	After restart
Pn00D	0000	Application Function Selections D	After restart
Pn00F	0000	Application Function Selections F	After restart
Pn021	0000	Reserved parameter	_
Pn040	0000	Σ -V Compatible Function Switch	After restart
Pn080	0000	Application Function Selections 80	After restart
Pn081	0000	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	0004	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

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		Continued from p	
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	0000	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	0100	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	0021	Control-Related Selections	After restart
Pn160	0010	Anti-Resonance Control- Related Selections	Immediately
D-101	1000	Anti Danaran 5	

Pn161

Pn162

1000

100

Continued on next page.

Immediately

Immediately

Anti-Resonance Frequency

Anti-Resonance Gain Cor-

rection

Continued from previous page.

		Continued from p	
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	1400	Tuning-less Function- Related Selections	*1
Pn181	0	Mode Switching Level for Speed Reference	Immediately
Pn182	0	Mode Switching Level for Acceleration	Immediately
Pn190	0100	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	2102	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 Vis- cous Friction Compensa- tion 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
Pn1A5	0	Reserved parameter	Immediately
Pn1AE	0	Reserved parameter	Immediately
Pn1AF	0	Reserved parameter	Immediately
Pn205	65535	Multiturn Limit	After restart

	Continued from previous page.						
Parameter No.	Default Setting	Name	When Enabled				
Pn207	1000	Position Control Function Selections	After restart				
Pn20A	32768	Number of External Scale Pitches	After restart				
Pn20E	16	Electronic Gear Ratio (Numerator)	After restart				
Pn210	1	Electronic Gear Ratio (Denominator)	After restart				
Pn212	2048	Number of Encoder Output Pulses	After restart				
Pn22A	0000	Fully-closed Control Selections	After restart				
Pn230	0000	Position Control Expansion Function Selections	After restart				
Pn231	0	Backlash Compensation	Immediately				
Pn233	0	Backlash Compensation Time Constant	Immediately				
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				
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	0000	Vibration Detection Selections	Immediately				
Pn311	100	Vibration Detection Sensitivity	Immediately				
Pn312	50	Vibration Detection Level	Immediately				
Pn316	10000	Maximum Motor Speed	After restart				
Pn324	300	Moment of Inertia Calculation Starting Level	Immediately				
Pn383	50	Jogging Speed	Immediately				
Pn384	10	Vibration Detection Level	Immediately				
Pn385	50	Maximum Motor Speed	After restart				
Pn401	100	First Stage First Torque Reference Filter Time 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				

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Parameter No.	Default Setting	Name	When Enabled
Pn407	10000	Speed Limit during Torque Control	Immediately
Pn408	0000	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 Frequency	Immediately
Pn410	50	Second Stage Second Notch Filter Q Value	Immediately
Pn412	100	First Stage Second Torque Reference Filter Time Con- stant	Immediately
Pn416	0000	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	0000	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 Compensation Enable Speed	Immediately
Pn456	15	Sweep Torque Reference Amplitude	Immediately
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Parameter No.	Default Setting	Name	When Enabled
Pn460	0101	Notch Filter Adjustment Selections 1	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	1881	Input Signal Selections 1	After restart
Pn50B	8882	Input Signal Selections 2	After restart
Pn50E	0000	Output Signal Selections 1	After restart
Pn50F	0100	Output Signal Selections 2	After restart
Pn510	0000	Output Signal Selections 3	After restart
Pn511	6543	Input Signal Selections 5	After restart
Pn512	0000	Output Signal Inverse Settings	After restart
Pn514	0000	Output Signal Selections 4	After restart
Pn516	8888	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

Continued from previous page.

Parameter	Defeate O III		When
No.	Default Setting	Name	Enabled
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
Pn52D	50	Reserved parameter	-
Pn530	0000	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
Pn585	50	Program Jogging Movement Speed	Immediately
Pn586	0	Motor Running Cooling Ratio	Immediately on next page.

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No.	Default Setting	Name	When Enabled
Pn587	0000	Polarity Detection Execution Selection for Absolute Linear Encoder	Immediately
Pn600	0	Regenerative Resistor Capacity	Immediately
Pn601	0	Dynamic Brake Resistor Allowable Energy Con- sumption	After restar
Pn603	0	Regenerative Resistance	Immediately
Pn604	0	Dynamic Brake Resistance	After restar
Pn800	1040	Communications Controls	Immediatel
Pn801	0003	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 Accelera- tion Constant	Immedi- ately*3
Pn80B	100	Second Stage Linear Acceleration Constant	Immedi- ately*3
Pn80C	0	Acceleration Constant Switching Speed	Immedi- ately*3
Pn80D	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	0	Movement Average Time	Immedi- ately*3
Pn814	100	External Positioning Final Travel Distance	Immedi- ately*3
Pn816	0000	Origin Return Mode Set- tings	Immedi- ately*3
Pn817	50	Origin Approach Speed 1	Immedi- ately*3
Pn818	5	Origin Approach Speed 2	Immedi- ately*3
Pn819	100	Final Travel Distance for Origin Return	Immedi- ately*3
Pn81E	0000	Input Signal Monitor Selections	Immediatel
Pn81F	0010	Command Data Allocations	After restar
Pn820	0	Forward Latching Area	Immediatel
Pn822	0	Reverse Latching Area	Immediatel
Pn824	0000	Option Monitor 1 Selection	Immediatel

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Parameter No.	Default Setting	Name	When Enabled
Pn827	100	Linear Deceleration Constant 1 for Stopping	Immedi- ately*3
Pn829	0	SVOFF Waiting Time (for SVOFF at Deceleration to Stop)	Immediately
Pn82A	1813	Option Field Allocations 1	After restart
Pn82B	1D1C	Option Field Allocations 2	After restart
Pn82C	1F1E	Option Field Allocations 3	After restart
Pn82D	0000	Option Field Allocations 4	After restart
Pn82E	0000	Option Field Allocations 5	After restart
Pn833	0000	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*3
Pn838	0	Acceleration Constant Switching Speed 2	Immedi- ately*3
Pn83A	100	First Stage Linear Deceleration Constant 2	Immedi- ately*3
Pn83C	100	Second Stage Linear Deceleration Constant 2	Immedi- ately*3
Pn83E	0	Deceleration Constant Switching Speed 2	Immedi- ately*3
Pn840	100	Linear Deceleration Constant 2 for Stopping	Immedi- ately*³
Pn842	0	Second Origin Approach Speed 1	Immedi- ately*3
Pn844	0	Second Origin Approach Speed 2	Immedi- ately*3
Pn846	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	0000	Latch Sequence 1 to 4 Settings	Immediately
Pn853	0000	Latch Sequence 5 to 8 Settings	Immediately
Pn860	0000	SVCMD_IO Input Signal Monitor Allocations 1	Immediately
Pn861	0000	SVCMD_IO Input Signal Monitor Allocations 2	Immediately
Pn862	0000	SVCMD_IO Input Signal Monitor Allocations 3	Immediately
Pn863	0000	SVCMD_IO Input Signal Monitor Allocations 4	Immediately
Pn868	0000	SVCMD_IO Output Signal Monitor Allocations 1	Immediately
Pn869	0000	SVCMD_IO Output Signal Monitor Allocations 2	Immediately
Pn880	0	Station Address Monitor (for maintenance, read only)	Immediately

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Parameter No.	Default Setting	Name Whe Enab	
Pn881	0	Set Transmission Byte Count Monitor [bytes] (for maintenance, read only)	iately
Pn882	0	Transmission Cycle Setting Monitor [× 0.25 µs] (for maintenance, read only)	iately
Pn883	0	Communications Cycle Setting Monitor [transmission cycles] (for maintenance, read only)	iately
Pn884	0000	Communications Controls 2 Immedi	iately
Pn88A	0	MECHATROLINK Receive Error Counter Monitor (for maintenance, read only)	iately
Pn890 to Pn8A6	0	Command Data Monitor during Alarm/Warning (for maintenance, read only)	iately
Pn8A8 to Pn8BE	0	Response Data Monitor during Alarm/Warning (for maintenance, read only)	iately
Pn900	0	Number of Parameter Banks After re	estart
Pn901	0	Number of Parameter Bank Members After re	estart
Pn902 to Pn910	0	Parameter Bank Member Definition After re	estart
Pn920 to Pn95F	0	Parameter Bank Data (Not saved in nonvolatile memory.)	iately
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) -	
08 PnA10	-	Maximum Output Torque (read only)	
09 PnA12		Torque Multiplier (read only) -	
0A PnA14	-	Resolution (read only) -	
0B PnA16	0	Scale Pitch After re	estart
0C PnA18	-	Pulses per Scale Pitch (read only)	
21 PnA42	16	Electronic Gear Ratio (Numerator) After re	estart

Continued from previous page.

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Parameter No.	Default Setting	Name	When Enabled
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	0000 hex	Limit Setting	After restart
26 PnA4C	1073741823	Forward Software Limit	Immediately
27 PnA4E	0	Reserved parameter (Do not change.)	Immediately
28 PnA50	-1073741823	Reverse Software Limit	Immediately
29 PnA52	0	Reserved parameter (Do not change.)	Immediately
41 PnA82	0	Speed Unit Selection	After restart
42 PnA84	0	Speed Base Unit Selection	After restart
43 PnA86	0	Position Unit Selection	After restart
44 PnA88	0	Position Base Unit Selection	After restart
45 PnA8A	0	Acceleration Unit Selection	After restart
46 PnA8C	4	Acceleration Base Unit Selection	After restart
47 PnA8E	1	Torque Unit Selection	After restart
48 PnA90	0	Torque Base Unit Selection	After restart
49 PnA92	0601011F hex	Supported Unit Systems (read only)	_
61 PnAC2	40000	Speed Loop Gain	Immediately
62 PnAC4	20000	Speed Loop Integral Time Constant	Immediately
63 PnAC6	40000	Position Loop Gain	Immediately
64 PnAC8	0	Feedforward Compensation	Immediately
65 PnACA	0	Position Loop Integral Time Constant	Immediately
66 PnACC	7	Positioning Completed Width	Immediately
67 PnACE	1073741824	Near Signal Width	Immediately
81 PnB02	0	Exponential Acceleration/ Deceleration Time Constant	Immedi- ately*3
82 PnB04	0	Movement Average Time	Immedi- ately*3
83 PnB06	100	External Positioning Final Travel Distance	Immediately

Continued from previous page.

Parameter No.	Default Setting	Name	When Enabled
84 PnB08	× 5,000 reference units/s converted to 10 ⁻³ min ⁻¹	Origin Approach Speed	Immediately
85 PnB0A	× 500 reference units/s converted to 10 ⁻³ min ⁻¹	Origin Return Creep Speed	Immediately
86 PnB0C	100	Final Travel Distance for Origin Return	Immediately
87 PnB0E	1	Fixed Monitor Selection 1	Immediately
88 PnB10	0	Fixed Monitor Selection 2	Immediately
89 PnB12	0	SEL_MON (CMN1) Monitor Selection 1	Immediately
8A PnB14	0	SEL_MON (CMN2) Monitor 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 Signal Detection Width	Immediately
90 PnB20	0FFF3F3F hex	Servo Command Control Field Enable/Disable Selec- tions (read only)	_
91 PnB22	0FFF3F33 hex	Servo Status Field Enable/ Disable Selections (read only)	_
92 PnB24	007F01F0 hex	Output Bit Enable/Disable Selections (read only)	_
93 PnB26	FF0FFEFE hex	Input Bit Enable/Disable Selections (read only)	_

^{*1.} The enable timing depends on the digit that is changed. Refer to the following section for details.

5.2.2 List of Servo Parameters on page 5-44

^{5.2.3} List of MECHATROLINK-III Common Parameters on page 5-84

^{*2.} The parameter setting is enabled after SENS_ON command execution is completed.

^{*3.} 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.

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Σ -7-Series AC Servo Drive

Σ -7S SERVOPACK with FT/EX Specification for Tracking Application

Product Manual

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