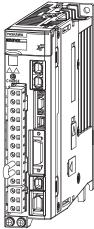
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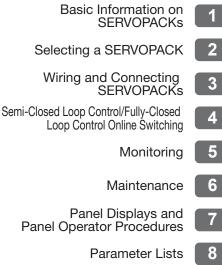
Σ -7-Series AC Servo Drive Σ -7S SERVOPACK with FT/EX Specification for Semi-/Fully-Closed Loop Control Online Switching for Conveyance Application Product Manual











Appendix

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About this Manual

This manual describes the semi-/fully-closed loop control online switching of the Σ -7-Series AC Servo Drive Σ -7S SERVOPACKs for conveyance applications.

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 product manual given in the following table.

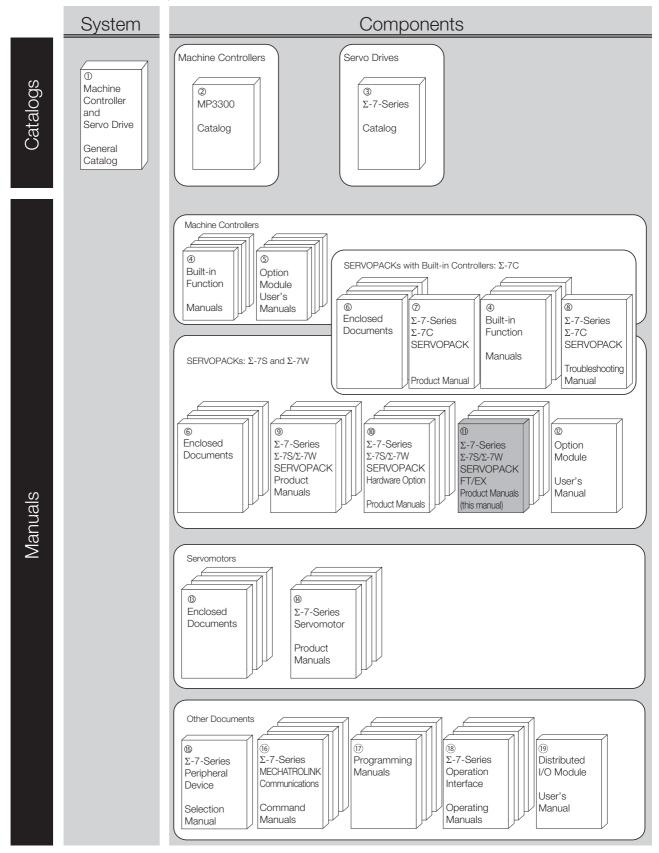
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Inter Part Basic Infor- Moc mation on Com SERVO- Func	rpreting the Nameplates t Names del Designations nbinations of SERVOPACKs and Servomotors ctions trictions	- - 1.2 1.3 1.4	1. 	.3
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SERVO-	ctions trictions	1.4		_
Eun/	trictions		-	
		1 5		-
		1.5	-	-
•	maWin+	1.6	_	
	nbining the SERVOPACKs with MP-Series chine Controllers and the MPE720 Engineering I	1.7	_	
Rati	ings	2.1	-	_
Ove	rload Protection Characteristics	2.2	_	
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Selecting a SERVOPACK Bloc	ck Diagrams	_	2.2	
Exte	ernal Dimensions	_	2.3	
	mples of Standard Connections between RVOPACKs and Peripheral Devices	_	2.	.4
SERVOPACK Installa	ation	-	Chap	oter 3
Wiri	ng Precautions	-	4.	.1
Basi	ic Wiring Diagrams	3.1	-	_
Wiri	ng the Fully-Closed Module	3.2	-	_
Wiring and Wirin	ng the Power Supply to the SERVOPACK	-	4.	.3
Connecting Wiri	ng Servomotors	-	4.	.4
SERVO- PACKs	Signal Connections	-	4.	.5
Con	necting Safety Function Signals	_	4.	.6
Con Cab	necting MECHATROLINK Communications ples	_	4.	.7
Con	nnecting the Other Connectors	-	4.	.8

			Continued f	rom previous page.	
Item			Σ-7S SERVOPACK with Analog Voltage/ Pulse Train References Product Manual (Manual No.: SIEP S800001 26)	Σ-7S SERVOPACK with MECHATROLINK- III Communications References Product Manual (Manual No.: SIEP S800001 28)	
Basic Functions That Require Setting before Operation		-	Chap	oter 5	
Application Fu	nctions	-	Chap	oter 6	
Trial Operation	and Actual Operation	-	Chap	oter 7	
Tuning		_	Chap	oter 8	
Fully-Closed L	oop Control	Chapter 4	-		
Semi-/Fully-Cl	osed Loop Control Online Switching	Chapter 4	_		
Monitoring		Chapter 5	Chap	oter 9	
Safety Functio	ns	-	Chap	ter 11	
	Inspections and Part Replacement	-	12	2.1	
	Alarm Displays	6.1.1, 6.2.1	-	_	
	List of Alarms	6.1.2, 6.2.2	-		
	Troubleshooting Alarms	6.1.3, 6.2.3	-		
	Resetting Alarms	-	12.2.3		
	Displaying Alarm History	_	12.2.4		
	Clearing the Alarm History	_	12.2.5		
Maintenance	Resetting Alarms Detected in Option Modules	-	12.2.6		
	Resetting Motor Type Alarms	-	12.	2.7	
	Warning Displays	6.1.4, 6.2.4	_		
	List of Warnings	6.1.5, 6.2.5	-	_	
	Troubleshooting Warnings	6.1.6, 6.2.6	_		
	Monitoring Communications Data during Alarms or Warnings	-	_	12.4	
	Troubleshooting Based on the Operation and Con- ditions of the Servomotor	6.1.7, 6.2.7	-	_	
Panel Displays and Panel Operator Procedures		Chapter 7	Chapter 13	-	
Parameter List	is	Chapter 8	-	-	
	Examples of Connections to Host Controllers	-	15.1	-	
Appendices	Interpreting Panel Displays	-	_	14.1	
, ,ppondiood	Corresponding SERVOPACK and SigmaWin+ Function Names	Chapter 9	15.2	14.2	

iv

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
① Machine Controller and Servo Drive General Catalog	Machine Controller and AC Servo Drive Solutions Catalog	KAEP S800001 22	Describes the features and application examples for combinations of MP3000-Series Machine Controllers and Σ -7-Series AC Servo Drives.
@ MP3300 Catalog	Machine Controller MP3300	KAEP C880725 03	Provides detailed information on MP3300 Machine Controllers, including features and specifica- tions.
③Σ-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 Built-in Function Manuals	Σ-7-Series AC Servo Drive Σ-7C SERVOPACK Motion Control User's Manual	SIEP S800002 03	Provides detailed information on the specifications, system configu- ration, and application methods of the Motion Control Function Mod- ules (SVD, SVC4, and SVR4) for Σ - 7-Series Σ -7C SERVOPACKs.
	Machine Controller MP3000 Series Communications User's Manual	SIEP C880725 12	Provides detailed information on the specifications, system configu- ration, and communications con- nection methods for the Ethernet communications that are used with MP3000-Series Machine Control- lers and Σ -7-Series Σ -7C SERVO- PACKs.
	Machine Controller MP2000 Series Communication Module User's Manual	SIEP C880700 04	
	Machine Controller MP2000 Series 262IF-01 FL-net Communication Module User's Manual	SIEP C880700 36	Provide detailed information on the specifications and communica- tions methods for the Communica- tions Modules that can be mounted to MP3000-Series Machine Con- trollers and Σ -7-Series Σ -7C
⑤ Option Module User's Manuals	Machine Controller MP2000 Series 263IF-01 EtherNet/IP Communication Module User's Manual	SIEP C880700 39	SERVOPACKs.
	Machine Controller MP2000 Series I/O Module User's Manual	SIEP C880700 34	
	Machine Controller MP2000 Series Analog Input/Analog Output Module AI-01/AO-01 User's Manual	SIEP C880700 26	Provide detailed information on the specifications and communica- tions methods for the I/O Modules that can be mounted to MP3000- Series Machine Controllers and Σ - 7-Series Σ -7C SERVOPACKs.
	Machine Controller MP2000 Series Counter Module CNTR-01 User's Manual	SIEP C880700 27	

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

			Continued from previous page.	
Classification	Document Name	Document No.	Description	
	Σ -7-Series AC Servo Drive Σ -7S SERVOPACK with MECHATROLINK-4 Communications References Product Manual	SIEP S800002 31		
	$\begin{array}{l} \Sigma\text{-}7\text{-}Series \text{ AC Servo Drive}\\ \Sigma\text{-}7S \text{ SERVOPACK with}\\ \text{MECHATROLINK-III}\\ \text{Communications References}\\ \text{Product Manual} \end{array}$	SIEP S800001 28		
	$\begin{array}{l} \Sigma\text{-}7\text{-}Series \text{ AC Servo Drive}\\ \Sigma\text{-}7S \text{ SERVOPACK with}\\ \text{MECHATROLINK-II}\\ \text{Communications References}\\ \text{Product Manual} \end{array}$	SIEP S800001 27	Provide detailed information on	
 ⑨ Σ-7-Series Σ-7S/Σ-7W SERVOPACK Product Manuals 	Σ -7-Series AC Servo Drive Σ -7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual	SIEP S800001 26	selecting Σ-7-Series SERVO- PACKs and information on install- ing, connecting, setting, performin trial operation for, tuning, monitor ing, and maintaining the Servo Drives.	
	$\begin{array}{l} \Sigma \text{-}7 \text{-} \text{Series AC Servo Drive} \\ \Sigma \text{-}7 \text{-} \text{S SERVOPACK} \\ \text{Command Option Attachable} \\ \text{Type with INDEXER Module} \\ \text{Product Manual} \end{array}$	SIEP S800001 64		
	$\begin{array}{l} \Sigma\text{-}7\text{-}Series \text{ AC Servo Drive}\\ \Sigma\text{-}7S \text{ SERVOPACK}\\ \text{Command Option Attachable}\\ \text{Type with DeviceNet Module}\\ \text{Product Manual} \end{array}$	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 Specifica- tions Dynamic Brake Product Manual	SIEP S800001 73	Provide detailed information on Hardware Options for Σ -7-Series	
	$\begin{array}{l} \Sigma \mbox{-}7\mbox{-}Series \mbox{ AC Servo Drive} \\ \Sigma \mbox{-}7\mbox{W}\mbox{-}7\mbox{C SERVOPACK with} \\ \mbox{Hardware Option Specifica-tions} \\ \mbox{HWBB Function} \\ \mbox{Product Manual} \end{array}$	SIEP S800001 72	SERVOPACKs.	

Classification	Document Name	Document No.	Continued from previous page. Description
Φ Σ-7-Series	Σ -7-Series AC Servo Drive Σ -7S SERVOPACK with FT/EX Specification for Index- ing Application Product Manual	SIEP S800001 84	
	$\begin{array}{l} \Sigma \text{-}7\text{-}Series \text{ AC Servo Drive} \\ \Sigma \text{-}7S \text{ SERVOPACK with} \\ \text{FT/EX Specification for Track-} \\ \text{ing Application} \\ \text{Product Manual} \end{array}$	SIEP S800001 89	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Application with Special Motor, SGM7D Motor Product Manual	SIEP S800001 91	
	Σ -7-Series AC Servo Drive Σ -7S SERVOPACK with FT/EX Specification for Press and Injection Molding Application Product Manual	SIEP S800001 94	
	Σ -7-Series AC Servo Drive Σ -7S SERVOPACK with FT/EX Specification for Transfer and Alignment Application Product Manual	SIEP S800001 95	Provide detailed information on the
Σ-7S/Σ-7W SERVOPACK FT/EX Product Manuals	Σ -7-Series AC Servo Drive Σ -7S SERVOPACK with FT/EX Specification for Torque/Force Assistance for Conveyance Application Product Manual	SIEP S800002 09	FT/EX Option for Σ-7-Series SERVOPACKs.
	Σ -7-Series AC Servo Drive Σ -7S SERVOPACK with FT/EX Specification for Cutting Application Feed Shaft Motor Product Manual	SIEP S800002 10	
	Σ -7-Series AC Servo Drive Σ -7S SERVOPACK with FT/EX Specification for Three-Point Latching for Conveyance Application Product Manual	SIEP S800002 17	
	Σ -7-Series AC Servo Drive Σ -7S SERVOPACK with FT/EX Specification for Semi-/Fully-Closed Loop Control Online Switching for Conveyance Application Product Manual	This manual (SIEP S800002 27)	
	Σ -7-Series AC Servo Drive Σ -7W SERVOPACK with FT/EX Specification for Gantry Applications Product Manual	SIEP S800002 29	
® Option Module User's Manual	AC Servo Drives 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 mainte- nance of a Safety Module.

			Continued from previous page.
Classification	Document Name	Document No.	Description
0	AC Servo Drive Rotary Servomotor Safety Precautions	TOBP C230260 00	Provides detailed information for the safe usage of Rotary Servomo- tors 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 Servomo- tors.
	Σ-7-Series AC Servo Drive Rotary Servomotor Product Manual	SIEP S800001 36	
[®] Σ-7-Series Servomotor Product Manuals	Σ-7-Series AC Servo Drive Linear Servomotor Product Manual	SIEP S800001 37	Provide detailed information on selecting, installing, and connecting the Σ -7-Series Servomotors.
	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	 Provides the following information in detail for Σ-7-Series Servo Sys- tems. Cables: Models, dimensions, wir- ing materials, connector models, and connection specifications Peripheral devices: Models, specifications, diagrams, and selection (calculation) methods
	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.
© Σ-7-Series MECHATROLINK Communications	Σ-7-Series AC Servo Drive MECHATROLINK-III Communications Standard Servo Profile Command Manual	SIEP S800001 31	Provides detailed information on the MECHATROLINK-III communi- cations standard servo profile com- mands that are used for a Σ -7- Series Servo System.
Command Manuals	Σ-7-Series AC Servo Drive MECHATROLINK-4 Communications Standard Servo Profile Command Manual	SIEP S800002 32	Provides detailed information on the MECHATROLINK-4 communi- cations standard servo profile com- mands that are used for a Σ -7- Series Servo System.
Ð	Machine Controller MP3000 Series Ladder Programming Manual	SIEP C880725 13	Provides detailed information on the ladder programming specifica- tions and instructions for MP3000- Series Machine Controllers and Σ -7-Series Σ -7C SERVOPACKs.
Programming Manuals	Machine Controller MP3000 Series Motion Programming Manual	SIEP C880725 14	Provides detailed information on the motion programming and sequence programming specifica- tions and instructions for MP3000- Series Machine Controllers and Σ -7-Series Σ -7C SERVOPACKs.
$^{(i)}$ Σ -7-Series Operation Interface Operating Manuals	System Integrated Engineering Tool MPE720 Version 7 USER'S MANUAL	SIEP C880761 03	Describes in detail how to operate MPE720 version 7.
	Σ-7-Series AC Servo Drive Digital Operator Operating Manual	SIEP S800001 33	Describes the operating proce- dures for a Digital Operator for a Σ -7-Series Servo System.
	AC Servo Drive Engineering Tool SigmaWin+ Operation Manual	SIET S800001 34	Provides detailed operating proce- dures for the SigmaWin+ Engineer- ing Tool for a Σ -7-Series Servo System.

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Classification	Document Name	Document No.	Description
[®] Distributed	MECHATROLINK-III Compatible I/O Module User's Manual	SIEP C880781 04	Describes the functions, specifica- tions, operating methods, and MECHATROLINK-III communica- tions for the Remote I/O Modules for MP2000/MP3000-Series Machine Controllers.
I/O Module User's Manual	MECHATROLINK-4 Compatible I/O Module User's Manual	SIEP C880782 01	Describes the functions, specifica- tions, operating methods, and MECHATROLINK-4 communica- tions for the Remote I/O Modules for MP3000-Series Machine Con- trollers.

Using This Manual

◆ Technical Terms Used in This Manual

The following terms are used in this manual.

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

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.

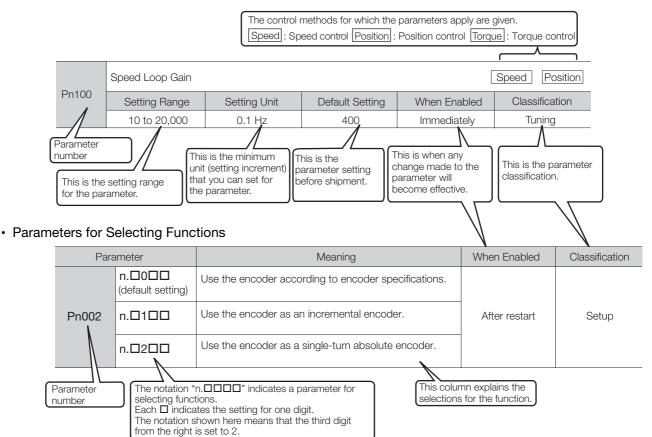
Notation Example

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
NOLALION	LVallibles	101	1 11002

		Digit Notation		Numeric Value Notation
n.0000	Notation	Meaning	Notation	Meaning
	Pn002 = n.□□□X	Indicates the first digit from the right in Pn002.	Pn002 = n.□□□1	Indicates that the first digit from the right in Pn002 is set to 1.
	Pn002 = n.□□X□	Indicates the second digit from the right in Pn002.	Pn002 = n.□□1□	Indicates that the second digit from the right in Pn002 is set to 1.
	Pn002 = n.□X□□	Indicates the third digit from the right in Pn002.	Pn002 = n.⊡1⊡⊡	Indicates that the third digit from the right in Pn002 is set to 1.
	Pn002 = n.X□□□	Indicates the fourth digit from the right in Pn002.	Pn002 = n.1□□□	Indicates that the fourth digit from the right in Pn002 is set to 1.

Engineering Tools Used in This Manual

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

♦ Trademarks

- QR code is a trademark of Denso Wave Inc.
- MECHATROLINK is a trademark of the MECHATROLINK Members Association.
- 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.

È mortant	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.

\Lambda DANGER

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

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

• 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

- 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.

- 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.

- 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

• 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

- 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

- 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.

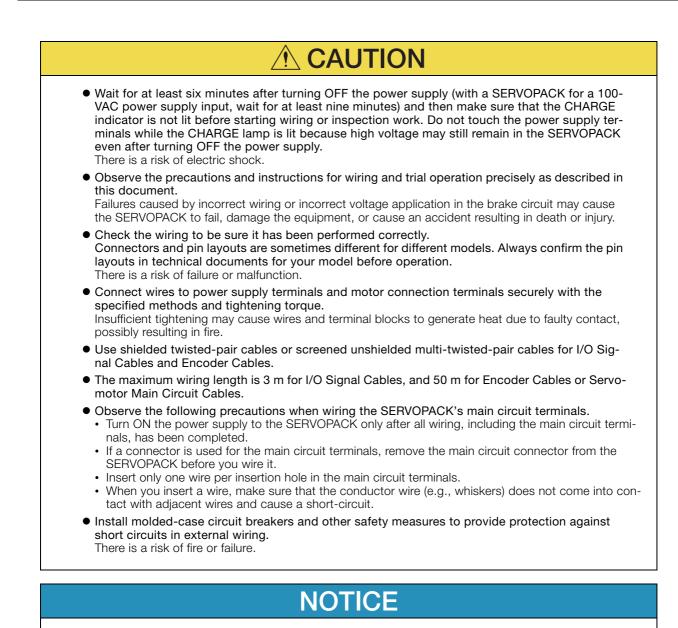
Wiring Precautions

A DANGER

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

- Wiring and inspections must be performed only by qualified engineers. There is a risk of electric shock or product failure.
- Check all wiring and power supplies carefully. Incorrect wiring or incorrect voltage application to the output circuits may cause short-circuit failures. If a short-circuit failure occurs as a result of any of these causes, the holding brake will not work. This could damage the machine or cause an accident that may result in death or injury.
- Connect the AC and DC power supplies to the specified SERVOPACK terminals.
 - Connect an AC power supply to the L1, L2, and L3 terminals and the L1C and L2C terminals on the SERVOPACK.
 - Connect a DC power supply to the B1/ \oplus and \ominus 2 terminals and the L1C and L2C terminals on the SERVOPACK.
 - There is a risk of failure or fire.
- If you use a SERVOPACK with the Dynamic Brake Hardware Option, connect an External Dynamic Brake Resistor that is suitable for the machine and equipment specifications to the specified terminals.

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



- Whenever possible, use the Cables specified by Yaskawa. If you use any other cables, confirm the rated current and application environment of your model and use the wiring materials specified by Yaskawa or equivalent materials.
- Securely tighten connector screws and lock mechanisms. Insufficient tightening may result in connectors falling off during operation.
- Do not bundle power lines (e.g., the Main Circuit Cable) and low-current lines (e.g., the I/O Signal Cables or Encoder Cables) together or run them through the same duct. If you do not place power lines and low-current lines in separate ducts, separate them by at least 30 cm. If the cables are too close to each other, malfunctions may occur due to noise affecting the low-current lines.
- Install a battery at either the host controller or on the Encoder Cable. If you install batteries both at the host controller and on the Encoder Cable at the same time, you will create a loop circuit between the batteries, resulting in a risk of damage or burning.
- When connecting a battery, connect the polarity correctly. There is a risk of battery rupture or encoder failure.

Operation Precautions

WARNING

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

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

- Do not radically change the settings of the parameters. There is a risk of unstable operation, machine damage, or injury.
- Install limit switches or stoppers at the ends of the moving parts of the machine to prevent unexpected accidents.

There is a risk of machine damage or injury.

- For trial operation, securely mount the Servomotor and disconnect it from the machine. There is a risk of injury.
- Forcing the motor to stop for overtravel is disabled when the Jog, Origin Search, or Easy FFT utility function is executed. Take necessary precautions. There is a risk of machine damage or injury.
- When an alarm occurs, the Servomotor will coast to a stop or stop with the dynamic brake according to the SERVOPACK Option and settings. The coasting distance will change with the moment of inertia of the load and the 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.

- Do not switch between semi-closed loop control and fully-closed loop control while a latch function (phase-C latch or external latch) is being executed. Unexpected machine operation, failure, or personal injury may occur.
- Design the system to ensure safety even when problems, such as broken signal lines, occur. For example, the P-OT and N-OT signals are set in the default settings to operate on the safe side if a signal line breaks. Do not change the polarity of this type of signal.
- When overtravel occurs, the power supply to the motor is turned OFF and the brake is released. If you use the Servomotor to drive a vertical load, set the Servomotor to enter a zero-clamped state after the Servomotor stops. Also, install safety devices (such as an external brake or counterweight) to prevent the moving parts of the machine from falling.
- Always turn OFF the servo before you turn OFF the power supply. If you turn OFF the main circuit power supply or control power supply during operation before you turn OFF the servo, the Servomotor will stop as follows:
 - If you turn OFF the main circuit power supply during operation without turning OFF the servo, the Servomotor will stop abruptly with the dynamic brake.
 - If you turn OFF the control power supply without turning OFF the servo, the stopping method that is used by the Servomotor depends on the model of the SERVOPACK. For details, refer to the manual for the SERVOPACK.
 - If you use a SERVOPACK with the Dynamic Brake Hardware Option, the Servomotor stopping methods will be different from the stopping methods used without the Option or with other Hardware Options. For details, refer to the following manual.
 - Ω Σ-7-Series Σ-7S/Σ-7W SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP S800001 73)
- Do not use the dynamic brake for any application other than an emergency stop. There is a risk of failure due to rapid deterioration of elements in the SERVOPACK and the risk of unexpected operation, machine damage, burning, or injury.

- When you adjust the gain during system commissioning, use a measuring instrument to monitor the torque waveform and speed waveform and confirm that there is no vibration. If a high gain causes vibration, the Servomotor will be damaged quickly.
- Do not frequently turn the power supply ON and OFF. After you have started actual operation, allow at least one hour between turning the power supply ON and OFF (as a guideline). Do not use the product in applications that require the power supply to be turned ON and OFF frequently.
 - The elements in the SERVOPACK will deteriorate quickly.
- An alarm or warning may occur if communications are performed with the host controller while the SigmaWin+ or Digital Operator is operating.
- If an alarm or warning occurs, it may interrupt the current process and stop the system.
- After you complete trial operation of the machine and facilities, use the SigmaWin+ to back up the settings of the SERVOPACK parameters. You can use them to reset the parameters after SERVOPACK replacement.

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

Maintenance and Inspection Precautions

🛕 DANGER

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

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

- Wait for at least six minutes after turning OFF the power supply (with a SERVOPACK for a 100-VAC power supply input, wait for at least nine minutes) and then make sure that the CHARGE indicator is not lit before starting wiring or inspection work. Do not touch the power supply terminals while the CHARGE lamp is lit because high voltage may still remain in the SERVOPACK even after turning OFF the power supply. There is a risk of electric shock.
- Before you replace a SERVOPACK, back up the settings of the SERVOPACK parameters. Copy the backed up parameter settings to the new SERVOPACK and confirm that they were copied

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

NOTICE

 Discharge all static electricity from your body before you operate any of the buttons or switches inside the front cover of the SERVOPACK. There is a risk of equipment damage.

Troubleshooting Precautions

• 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.

• 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.

- 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 con-

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

- If an alarm occurs, shut OFF the main circuit power supply. There is a risk of fire due to a regenerative resistor overheating as the result of regenerative transistor failure.
- Install a ground fault detector against overloads and short-circuiting or install a molded-case circuit breaker combined with a ground fault detector. There is a risk of SERVOPACK failure or fire if a ground fault occurs.
- The holding brake on a Servomotor will not ensure safety if there is the possibility that an external force (including gravity) may move the current position and create a hazardous situation when power is interrupted or an error occurs. If an external force may cause movement, install an external braking mechanism that ensures safety.

Disposal Precautions

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



General Precautions

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

Warranty

Details of Warranty

Warranty Period

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

Warranty Scope

Yaskawa shall replace or repair a defective product free of charge if a defect attributable to Yaskawa occurs during the above warranty period.

This warranty does not cover defects caused by the delivered product reaching the end of its service life and replacement of parts that require replacement or that have a limited service life.

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

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

Limitations of Liability

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

Suitability for Use

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

Specifications Change

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

Compliance with UL Standards, EU Directives, UK Regulations, and Other Safety Standards

Certification marks for the standards for which the product has been certified by certification bodies are shown on nameplate. Products that do not have the marks are not certified for the standards. Refer to the Servomotor manual for compliant standards of Servomotors.

North American Safety Standards (UL)



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

European Directives

CE			
Product	Model	EU Directive	Harmonized Standards
		Machinery Directive 2006/42/EC	EN ISO 13849-1: 2015 EN IEC 62061 EN 61800-5-2
SERVOPACK	SGD7S	EMC Directive 2014/30/EU	EN 55011 Group 1, Class A EN 61000-6-2 EN 61000-6-4 EN 61800-3 (Category C2, Second environment)
		Low Voltage Directive 2014/35/EU	EN 61800-5-1
		RoHS Directive 2011/65/EU (EU)2015/863	EN IEC 63000

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

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

UK Conformity Assessed (UKCA)

UK CA

Product	Model	UK Regulations	Designated Standards
		Supply of Machinery (Safety) Regulations S.I. 2008/1597	EN ISO 13849-1: 2015 EN IEC 62061 EN 61800-5-2
		Electromagnetic Compati- bility Regulations S.I. 2016/1091	EN 55011 Group 1, Class A EN 61000-6-2 EN 61000-6-4 EN 61800-3 (Category C2, Second environment)
SERVOPACK	SGD7S	Electrical Equipment (Safety) Regulations S.I. 2016/1101	EN 61800-5-1
		Restriction of the Use of Certain Hazardous Sub- stances in Electrical and Electronic Equipment Reg- ulations S.I. 2012/3032	EN IEC 63000

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

Safety Standards

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

Safety Parameters

Item	Standards	Performa	ance Level
Safety Integrity Level	EN 61508	SIL3	
Salety integrity Level	EN IEC 62061	maximum SIL 3	
Mission Time	EN 61508	10 years	20 years
Probability of Dangerous Failure per Hour	EN 61508 EN IEC 62061	$PFH = 4.04 \times 10^{-9}$ [1/h] (4.04% of SIL3)	PFH = 4.05 × 10 ⁻⁹ [1/h] (4.05% of SIL3)
Performance Level	EN ISO 13849-1	PLe (Category 3)	
Mean Time to Dangerous Failure of Each Channel	EN ISO 13849-1	MTTFd: High	
Average Diagnostic Coverage	EN ISO 13849-1	DCavg: Medium	
Stop Category	EN 60204-1	Stop category 0	
Safety Function	EN 61800-5-2	STO	
Hardware Fault Tolerance	EN 61508	HFT = 1	
Subsystem	EN 61508	В	

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Basic Information on SERVOPACKs

This chapter provides information required to select SERVOPACKs, such as SERVOPACK models and combinations with Servomotors.

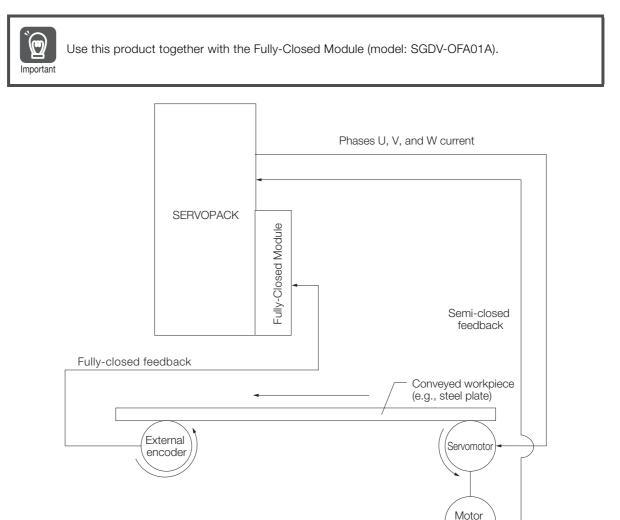
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1.1 Introduction to This Product

This product is capable of switching between semi-closed loop control and fully-closed loop control while online and without requiring the power supply of the SERVOPACK to be turned ON and OFF again. When this product is applied to leveler feeders, cutting machines, and other equipment, it can help achieve high-precision production and cutting that is little affected by slippage and warping.

The following figure shows an example of a system configuration using this product. The connected devices and cables depend on the type of external encoder that is used. Refer to the following manual for details.

Ω 2-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)



Motor Encoder

When using this product, the encoder included with the motor and an external encoder are required to switch between semi-closed loop control and fully-closed loop control. In this manual, the encoder that is included with the motor is referred to as the motor encoder.

encoder

Information With a fully-closed control, an externally installed encoder is used to detect the position of the controlled machine and the machine's position information is fed back to the SERVO-PACK. High-precision positioning is possible because the actual machine position is fed back directly. With a fully-closed control, looseness or twisting of mechanical parts may cause vibration or oscillation, resulting in unstable positioning.

1.2.1 Interpreting SERVOPACK Model Numbers

1.2 Model Designations

1.2.1 Interpreting SERVOPACK Model Numbers

Σ-7-Se Σ-7S	D7S eries DPACKs	- R70 1st+2nd+3rd digits	A 4th digit	00 A 5th+6th digits digit 8th	000 h+9th+10th digits	F63 11th+12th+13th digits	
1st+2nd	d+3rd dig	Maximum Applicable Motor Capacity	4th dig	it Voltage	8th+9	Oth+10th digits Specific	re Options ation
Voltage		Specification	Code	Specification	Code		Applicable
	R70*1	0.05 kW	A	200 VAC	000	Without options	Models All models
	R90*1	0.1 kW	F	100 VAC			SGD7S-R70A
	1R6 ^{*1}	0.2 kW	5th+6th digits Interface				to -330A
	2R8*1	0.4 kW			001	Rack-mounted	SGD7S-R70F
	3R8	0.5 kW			001		to -2R8F
	5R5*1	0.75 kW		Analog voltage/pulse train		Duct-ventilated	SGD7S-470A
Three-Pha se, 200 VAC	7R6	1.0 kW	00	reference			to -780A
	120 ^{*2}	1.5 kW		MECHATROLINK-III	002	Varnished	All models
	180	2.0 kW	20	communications reference	800	Single-phase, 200-VAC power supply input	SGD7S-120A
	200	3.0 kW	<u>.</u>	· · · · · · · · · · · · · · · · · · ·			SGD7S-R70A
	330	5.0 kW				to -2R8A	
	470	6.0 kW			020*	No dynamic brake	SGD7S-R70F
	550	7.5 kW	7th dig	7th digit Design Revision Order			to -2R8F
	590	11 kW	А			External dynamic brake resistor	SGD7S-3R8A
	780	15 kW				prake resistor	to -780A
	R70	0.05 kW					
Sin- gle-Phase 100 VAC	R90	0.1 kW					
	2R1	0.2 kW			1.1+b	-12th+13th digits) FT/E	
	2R8	0.4 kW					
					Code	Specification	
					500	Semi-/fully-closed	

*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-120A20A008).
- *3. Refer to the following manual for details.
 - Ω Σ-7-Series Σ-7S/Σ-7W SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP S800001 73)

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loop control online switching

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)

 \square Σ -7-Series Direct Drive Servomotor Product Manual (Manual No.: SIEP S800001 38)

1

1.3 Combinations of SERVOPACKs and Servomotors

Refer to the following manuals for information on combinations with Σ -7-Series Servomotors. $\square \Sigma$ -7-Series Rotary Servomotor Product Manual (Manual No.: SIEP S800001 36) $\square \Sigma$ -7-Series Direct Drive Servomotor Product Manual (Manual No.: SIEP S800001 38)

1.4 Functions

This section lists the functions provided by SERVOPACKs.

Functions given inside bold lines in the functions tables are restricted for the SERVOPACKs described in this manual. Refer to the following section for details on restrictions to these functions.

1.5.1 Function Application Restrictions on page 1-9

· Functions Related to the Machine

Function	Reference
Power Supply Type Settings for the Main Circuit and Control Circuit	
Automatic Detection of Connected Motor	
Motor Direction Setting	
Overtravel Function and Settings	
Holding Brake	Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP
Motor Stopping Methods for Servo OFF and Alarms	S800001 26) Σ -7-Series Σ-7S SERVOPACK with MECHATROLINK-III
Resetting the Absolute Encoder	Communications References Product Manual (Manual No.: SIEP S800001 28)
Setting the Origin of the Absolute Encoder	NO SILF 3800001 20)
Setting the Regenerative Resistor Capacity	
Operation for Momentary Power Interruptions	
SEMI F47 Function	
Setting the Motor Maximum Speed	
Software Limits and Settings*	🕼 1.5.1 Function Application Restrictions on page 1-9
Multiture Limit Cotting	Ω Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)
Multiturn Limit Setting	Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)
Adjustment of Motor Current Detection Signal Offset	1.5.1 Function Application Restrictions on page 1-9
Forcing the Motor to Stop	$\square \Sigma$ -7-Series Σ -7S SERVOPACK with Analog Voltage/Pulse
Overheat Protection	Train References Product Manual (Manual No.: SIEP S800001 26)
Current Control Mode Selection	Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)
Speed Ripple Compensation	1.5.1 Function Application Restrictions on page 1-9
Current Gain Level Setting	Ω 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)
Fully-Closed Loop Control	Chapter 4 Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching
Speed Detection Method Selection	Ω Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)
Safety Functions	Ω Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)
External Latches*	1.5.1 Function Application Restrictions on page 1-9

* These functions can be used with SERVOPACKs with MECHATROLINK-III Communications References.

• Functions Related to the Host Controller

Function		Reference						
Electronic Coor Settings		Σ -7-Series Σ -7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)						
Electronic Gear Settings		 Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No. SIEP S800001 28) 						
I/O Signal Allocations		4.5.1 I/O Signal Allocations: SERVOPACK with Analog Volt- age/Pulse Train References on page 4-20						
Σ-V Compatible Function								
ALM (Servo Alarm) Signal								
ALO1 to ALO3 (Alarm Code) Signals*	_							
/WARN (Warning) Signal								
/TGON (Rotation Detection) Signal								
/S-RDY (Servo Ready) Signal								
Speed Control*								
Basic Settings for Speed Control*								
Speed Reference Filter*								
Zero Clamping*	1							
/V-CMP (Speed Coincidence Detection) Signal		Σ -7-Series Σ -7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP						
Position Control*		S800001 26)						
Reference Pulse Form*		Σ -7-Series Σ -7S SERVOPACK with MECHATROLINK-III						
CLR (Position Deviation Clear) Signal Function and Settings*		Communications References Product Manual (Manual No.: SIEP S800001 28)						
Reference Pulse Input Multiplication Switching*								
/COIN (Positioning Completion) Signal								
/NEAR (Near) Signal								
Reference Pulse Inhibition and Settings*								
Torque Control*								
Basic Settings for Torque Control*								
Torque Reference Filter Settings*								
Speed Limit during Torque Control								
/VLT (Speed Limit Detection) Signal								
/FLC (Semi-closed/Fully-closed Loop Control Selection Input) Signal								
/SFECLR (Motor-Load Position Deviation Clear Input) Signal		4.5.1 I/O Signal Allocations: SERVOPACK with Analog Volt- age/Pulse Train References on page 4-20						
/FLCA (Semi-closed/Fully-closed Loop Control Status Output) Signal								
Encoder Divided Pulse Output								
Selecting Torque Limits		Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse						
Vibration Detection Level Initialization		Train References Product Manual (Manual No.: SIEP						
Alarm Reset		S800001 26) Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III						
Replacing the Battery		Communications References Product Manual (Manual No.:						
Setting the Position Deviation Overflow Alarm Level		SIEP S800001 28)						

* These functions can be used with SERVOPACKs with Analog Voltage/Pulse Train References.

• Functions to Achieve Optimum Motions

Function	Reference
Speed Control ^{*1}	
Soft Start Settings ^{*1}	—
Position Control ^{*1}	S800001 26) Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III
Smoothing Settings ^{*1}	Communications References Product Manual (Manual No.:
Torque Control ^{*1}	SIEP S800001 28)
Tuning-less Function	- 151 Function Application Protrictions on page 1.0
Autotuning without a Host Reference	■ 1.5.1 Function Application Restrictions on page 1-9
Autotuning with a Host Reference	
Custom Tuning	
Anti-Resonance Control Adjustment	$ \qquad \qquad$
Vibration Suppression	Train References Product Manual (Manual No.: SIEP S800001 26)
Gain Selection	\square Σ -7-Series Σ -7S SERVOPACK with MECHATROLINK-III
Friction Compensation	Communications References Product Manual (Manual No.: SIEP S800001 28)
Gravity Compensation	
Backlash Compensation ^{*2}	
Model Following Control	3 1.5.1 Function Application Restrictions on page 1-9
Compatible Adjustment Eurotione	Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)
Compatible Adjustment Functions	Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)
Mechanical Analysis	- 151 Supplier Application Destrictions on the 10
Easy FFT	■ 1.5.1 Function Application Restrictions on page 1-9

*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	Reference
Software Reset	Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)
Trial Operation of Servomotor without a Load	Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)
Jogging	
Program Jogging	• 151 Eurotian Application Proteintians on page 1.0
Origin Search	3 1.5.1 Function Application Restrictions on page 1-9
Test without a Motor	
Monitoring Machine Operation Status and	Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)
Signal Waveforms	Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)

• Functions for Inspection and Maintenance

Function	Reference
Write Prohibition Setting for Parameters	
Initializing Parameter Settings	\square Σ -7-Series Σ -7S SERVOPACK with Analog Voltage/Pulse
Automatic Detection of Connected Motor	Train References Product Manual (Manual No.: SIEP
Monitoring Product Information	- S800001 26) - Ω Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III
Monitoring Product Life	Communications References Product Manual (Manual No.:
Alarm History Display	SIEP S800001 28)
Alarm Tracing]

1.5 Restrictions

This section describes restrictions that apply when using the SERVOPACKs described in this manual.

1.5.1 Function Application Restrictions

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

Function	Restriction					
Control Method	Only position control can be used while Semi-/Fully-Closed Loop Control Online Switching is being used. Speed control and torque control cannot be used.					
Model Following Control						
Test without a Motor	These functions cannot be used.					
Software Limit ^{*1}						
Tuning-less Selection (Pn170 = n.□□□X)	Set Pn170 to $n.\square\square\square$ (Disable tuning-less function). If Pn170 is set to $n.\square\square\square$ (Enable tuning-less function), control may become unstable. Do not use this setting. Additional information: The default setting of Pn170 = $n.\square\square\squareX$ for the standard product is $n.\square\square\square$ (Enable tuning-less function). However, the default setting of this product is $n.\square\square\square$ (Disable tun- ing-less function).					
Fully-closed Control Speed Feedback Selection (Pn22A = $n.X\square\square\square$)	Set Pn22A to n.0 (Use motor encoder speed). If Pn22A is set to n.1 (Use external encoder speed), control may become unstable. Do not use this setting.					
Jog (Fn002)						
Origin Search (Fn003)						
Jog Program (Fn004)	If these functions are executed on the Panel Operator ^{*2} or Digital Operator during fully-closed loop control, [NO-OP]					
Autotune Motor Current Detection Signal Offset (Fn00E)	will be displayed on the Operator and the function will not be executed.					
Advanced Autotuning without Reference (Fn201)	Switch to semi-closed loop control before executing these functions.					
EasyFFT (Fn206)	If control is switched between semi-closed loop control and fully-closed loop control while these functions are being					
Mechanical Analysis ^{*3}	executed, an A.0b1 alarm (Semi-Closed Loop Control/Fully-					
Moment of Inertia Ratio Estimation*3	Closed Loop Control Switching Operation Error) will occur.					
Speed Ripple Compensation*3						
Latch Functions (Phase-C Latch and External Latch) ^{*1}	Do not switch between semi-closed loop control and fully- closed loop control while these functions are being exe- cuted. Example: Do not use this product in a manner such as latching a signal in semi-closed loop control and then mov- ing the machine to the latch position after switching to fully- closed loop control.					
Parameter Copy Function of the Digital Opera- tor	Use the parameter copy function of the Digital Operator between Σ -7-series FT63 SERVOPACKs. If the parameter copy function is used between the FT63 and a different model SERVOPACK, an alarm will occur (e.g., A.040 Parameter Setting Error) and the parameters will not be copied.					

*1. Function that can be used when using a SERVOPACK with MECHATROLINK-III communications references.

*2. Panel Operator is available only on a SERVOPACK with analog voltage/pulse train references.

*3. Function that can be used only on SigmaWin+.

1.5.2 Restrictions on Specifications

 Do not switch between semi-closed loop control and fully-closed loop control while a latch function (phase-C latch or external latch) is being executed.
 Unexpected machine operation, failure, or personal injury may occur.

1.5.2 Restrictions on Specifications

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

Item	Restriction
Linear Servomotor, Linear Encoder	These devices cannot be used. Use a Rotary Servomotor and rotary encoder.
Absolute Encoder	Do not use an absolute encoder when using Semi-/Fully-Closed Loop Control Online Switching. Use an incremental encoder or configure the setting (Pn002 = $n.\Box 1 \Box \Box$) to use the absolute encoder as an incremental encoder. Additional information: The default setting of Pn002 = $n.\Box X \Box \Box$ for the standard product is $n.\Box 0 \Box \Box$ (Use the encoder according to encoder specifications). However, the default setting of this product is $n.\Box 1 \Box \Box$ (Use the encoder as an incremental encoder).
Safety Module	This device cannot be used.
Vibration and	shock may occur when switching between semi-closed loop control and fully-



Vibration and shock may occur when switching between semi-closed loop control and fullyclosed loop control if an absolute encoder is used (an absolute encoder is connected and Pn002 is set to $n \square 0 \square \square$ or $n \square 2 \square \square$.). Use an incremental encoder or use the absolute encoder as an incremental encoder (Pn002 = $n \square 1 \square \square$).



Use this product together with the Fully-Closed Module (model: SGDV-OFA01A). If this product is used with the Safety Module instead of the Fully-Closed Module, the FT63 functions will not be available and the Safety Module will operate. The safety standards obtained by the Safety Module will also no longer be applicable.

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1.6 SigmaWin+

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

1.7 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+.

Selecting a SERVOPACK

This chapter provides information on specifications required to select SERVOPACKs.

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	2.3.1 2.3.2	SERVOPACK with Analog Voltage/Pulse Train References

2.1.1 Three-Phase, 200 VAC

2.1 Ratings

This section gives the ratings of SERVOPACKs.

2.1.1 Three-Phase, 200 VAC

Model SGD7S-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A	
Maximum Applicable Motor Capac- ity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0
Continuo	ous Output Cu	Irrent [Arms]	0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instanta Current	ineous Maxin [Arms]	num Output	2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
	Power Sup	ply				200 VA	AC to 2	40 VAC	, 50 Hz	/60 Hz			
Main Circuit	Permitted \ ation	/oltage Fluctu-					-15	% to +1	0%				
	Input Curre	nt [Arms]*	0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
	Power Sup	ply				200 VA	AC to 2	40 VAC	, 50 Hz	/60 Hz			
Con- trol				-15% to +10%									
	Input Current [Arms]*		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power S	Supply Capac	ity [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 [W]	Power Loss	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 Circ Loss [W]	cuit Power	12	12	12	12	14	14	14	15	16	16	19
L055 .	Built-in Reg Resistor Po	enerative wer Loss [W]	-	_	-	-	8	8	8	12	12	12	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
	Built-In	Resistance $[\Omega]$	-	-	-	-	40	40	40	20	12	12	8
Regen- erative Resis-	Regener- ative Resistor	Capacity [W]	-	-	_	-	40	40	40	60	60	60	180
tor	Minimum Allowable Exter- nal Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvolt	tage Categor	у											·

* This is the net value at the rated load.

2.1.2 Single-Phase, 200 VAC

	Model SGD7S-		470A	550A	590A	780A		
Maximum Applicable	e Motor Capacity [kW]		6.0	7.5	11	15		
Continuous Output (Current [Arms]	46.9	54.7	58.6	78.0			
Instantaneous Maxir	num Output Current [A	Arms]	110	130	140	170		
	Power Supply		200	0 VAC to 240 V	/AC, 50 Hz/60	Hz		
Main Circuit	Permitted Voltage Fl	uctuation		-15% to	o +10%			
	Input Current [Arms]	*1	29	37	54	73		
Power Supply			200	0 VAC to 240 V	/AC, 50 Hz/60	Hz		
Control	Permitted Voltage Fluctuation		-15% to +10%					
	Input Current [Arms]	*1	0.3 0.3 0.4		0.4	0.4		
Power Supply Capa	city [kVA] ^{*1}		10.7	14.6	21.7	29.6		
	Main Circuit Power L	Loss [W]	271.7	326.9	365.3	501.4		
	Control Circuit Powe	er Loss [W]	21	21	28	28		
Power Loss ^{*1}	External Regenerative Resistor Unit Power Loss [W]		180 ^{*2}	350 ^{*3}	350 ^{*3}	350 ^{*3}		
	Total Power Loss [W]	292.7	347.9	393.3	529.4		
	External Regenera-	Resistance $[\Omega]$	6.25 ^{*2}	3.13 ^{*3}	3.13 ^{*3}	3.13 ^{*3}		
External Regenera- tive Resistor Unit	tive Resistor Unit	Capacity [W]	880 ^{*2}	1760 ^{*3}	1760 ^{*3}	1760 ^{*3}		
	Minimum Allowable E	xternal Resistance $[\Omega]$	-15% to $+10%$ 0.3 0.3 0.4 0.4 10.7 14.6 21.7 29.6 271.7 326.9 365.3 501.4 21 21 28 28 180*2 350*3 350*3 350*3 292.7 347.9 393.3 529.4 6.25*2 3.13*3 3.13*3 3.13* 880*2 1760*3 1760*3 1760*3	2.9				
Overvoltage Catego	ry					•		

*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.

2.1.2 Single-Phase, 200 VAC

	Model SGD7S-		R70A	R90A	1R6A	2R8A	5R5A	120A	
Maximum Applic	able Motor Capacity [kW	/]	0.05	0.1	0.2	0.4	0.75	1.5	
Continuous Output Current [Arms]			0.66	0.91	1.6	2.8	5.5	11.6	
Instantaneous N	laximum Output Current	[Arms]	2.1	3.2	5.9	9.3	16.9	28	
	Power Supply			200 VA	C to 240 \	/AC, 50 H	z/60 Hz	<u> </u>	
Main Circuit	Permitted Voltage Flue	ctuation			-15% to	o +10%			
	Input Current [Arms]*		0.8	1.6	2.4	5.0	8.7	16	
Power Supply				200 VA	C to 240 \	/AC, 50 H	z/60 Hz	<u> </u>	
Control Permitted Voltage Fluctuation		-15% to +10%							
Input Current [Arms]*			0.2	0.2	0.2	0.2	0.2	0.25	
Power Supply C	apacity [kVA]*		0.2	0.3	0.6	1.2	1.9	4.0	
	Main Circuit Power Lo	ss [W]	5.0	7.1	12.1	23.7	39.2	71.8	
	Control Circuit Power	Loss [W]	12	12	12	12	14	16	
Power Loss*	Built-in Regenerative F [W]	Resistor Power Loss	-	-	-	-	8	12	
	Total Power Loss [W]		17.0	19.1	24.1	35.7	61.2	103.8	
	Built-In Regenera-	Resistance $[\Omega]$	-	-	-	-	40	12	
Regenerative Resistor	tive Resistor	Capacity [W]	-	-	-	_	40	60	
Minimum Allowable External Resistance [Ω]		40	40	40	40	40	12		
Overvoltage Cat	egory				I				

* This is the net value at the rated load.

2.1.3 270 VDC

2.1.3 270 VDC

				i							
	Model SGD7S-	R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A		
Maximum App	icable Motor Capacity [kW]	0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5		
Continuous Ou	Itput Current [Arms]	0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6		
Instantaneous	Maximum Output Current [Arms]	2.1	3.2	5.9	9.3	11.0	16.9	17.0	28.0		
Power Supply Main Circuit Permitted Voltage Fluctuation				27	0 VDC 1	o 324 V	DC				
					-15% t	o +10%					
	Input Current [Arms] ^{*1}	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11		
	Power Supply		270 VDC to 324 VDC								
Control	Permitted Voltage Fluctuation		-15% to +10%								
	Input Current [Arms] ^{*1}	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2*2		
Power Supply	Capacity [kVA] ^{*1}	0.2	0.3	0.6	1	1.4	1.6	2.3	3.2		
	Main Circuit Power Loss [W]	4.4	5.9	9.8	17.5	23.0	30.7	38.7	55.8		
Power Loss*1	Control Circuit Power Loss [W]	12	12	12	12	14	14	14	15		
	Total Power Loss [W]	16.4	17.9	21.8	29.5	37.0	44.7	52.7	70.8		
Overvoltage Ca	ategory		1			II	1		μ.		
*1. This is the net value at the rated load. *2. The value is 0.25 Arms for the SGD7S-120A00A008.											
	Model SGD7S-	180A	200A	330	A 47	0A 5	50A	590A	780A		
Maximum App	licable Motor Capacity [kW]	2.0	3.0	5.0) 6	.0	7.5	11.0	15.0		

	Model SGD/S-	180A	200A	330A	470A	550A	590A	780A	
Maximum Applicable Motor Capacity [kW]			3.0	5.0	6.0	7.5	11.0	15.0	
Continuous Ou	Itput Current [Arms]	18.5	19.6	32.9	46.9	54.7	58.6	78.0	
Instantaneous	stantaneous Maximum Output Current [Arms] 42.0 56.0 84.0 110 130 140				170				
	Power Supply	270 VDC to 324 VDC							
Main Circuit	Main Circuit Permitted Voltage Fluctuation -15% to +10%			0%					
	Input Current [Arms]*	14	20	34	36	48	68	92	
	Power Supply	270 VDC to 324 VDC							
Control	Permitted Voltage Fluctuation	-15% to +10%							
	Input Current [Arms]*	0.25	0.25	0.3	0.3	0.3	0.4	0.4	
Power Supply	Capacity [kVA]*	4.0 5.9 7.5 10.7 14.6 21.7 29.6				29.6			
	Main Circuit Power Loss [W]	82.7	83.5	146.2	211.6	255.3	243.6	343.4	
Power Loss*	Control Circuit Power Loss [W]	16	16	19	21	21	28	28	
	Total Power Loss [W]	98.7	99.5	165.2	232.6	276.3	271.6	371.4	
Overvoltage Ca							·		

* This is the net value at the rated load.

2.1.4 Single-Phase, 100 VAC

	Model SGD7S-	R70F	R90F	2R1F	2R8F		
Maximum App	licable Motor Capacity [kW]	0.05	0.1	0.2	0.4		
Continuous O	utput Current [Arms]	0.66	0.91	2.1	2.8		
Instantaneous	Maximum Output Current [Arms]	2.1	3.2	6.5	9.3		
	Power Supply	100	0 VAC to 120 V	AC, 50 Hz/60	Hz		
Main Circuit	Permitted Voltage Fluctuation		-15% to	o +10%			
	Input Current [Arms]*	1.5	2.5	5	10		
	Power Supply	100 VAC to 120 VAC, 50 Hz/60 Hz					
Control	Permitted Voltage Fluctuation	-15% to +10%					
	Input Current [Arms]*	0.38	0.38	0.38	0.38		
Power Supply	Capacity [kVA]*	0.2	0.3	0.6	1.4		
	Main Circuit Power Loss [W]	5.3	7.8	14.2	26.2		
Power Loss*	Control Circuit Power Loss [W]	12	12	12	12		
	Total Power Loss [W]	17.3	19.8	26.2	38.2		
$\begin{array}{c} \mbox{Regenera-} \\ \mbox{tive Resistor} \end{array} \mbox{Minimum Allowable Resistance } [\Omega] \end{array}$		40	40	40	40		
Overvoltage C	ategory			I	·		

* This is the net value at the rated load.

2.2 SERVOPACK Overload Protection Characteristics

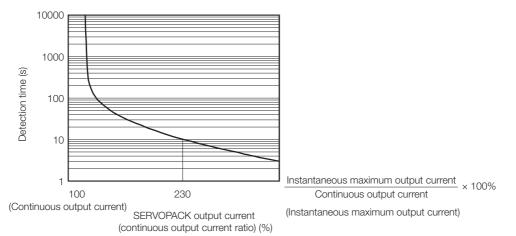
The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

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.

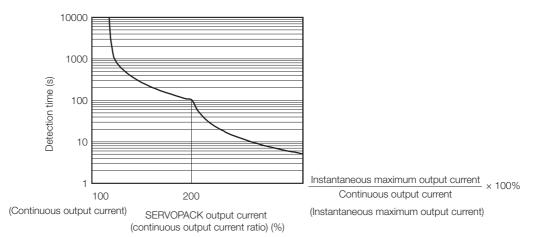




Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

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.

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



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

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

2.3 Specifications

This section gives the general specifications of the SERVOPACKs.

2.3.1 SERVOPACK with Analog Voltage/Pulse Train References

	Item			Specification		
Drive Metho	d	IGBT-bas	ed PWM control,	, sine wave current drive		
Feedback		Serial encoder: 17 bits (absolute encoder) 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)				
	Surrounding Air Tem- perature ^{*1}	Refer to t $\square \Sigma$ -7-8	ating, usage is po the following mar Series $Σ$ -7S SERVO	ossible between 55°C and 60°C. nual for derating specifications. DPACK with Analog Voltage/Pulse Train Refer- (Manual No.: SIEP S800001 26)		
	Storage Temperature	-20°C to	85°C			
	Surrounding Air Humidity	95% relat	tive humidity max	x. (with no freezing or condensation)		
	Storage Humidity	95% relat	tive humidity max	. (with no freezing or condensation)		
	Vibration Resistance	4.9 m/s ²				
	Shock Resistance	19.6 m/s ²	2			
		Degree		SERVOPACK Model: SGD7S-		
Environ- mental	Degree of Protection	IP20	B70A B90A 1B6A 2B8A 3B8A 5B5A 7B6A and 120			
Conditions		IP10 120A00A008, 180A, 200A, 330A, 470A, 550A, 590A, and 780A				
	Pollution Degree	 2 Must be no corrosive or flammable gases. Must be no exposure to water, oil, or chemicals. Must be no dust, salts, or iron dust. 				
	Altitude ^{*1}	 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 Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26) 				
	Others	Do not use the SERVOPACK in the following locations: Locations s ject to static electricity, noise, strong electromagnetic/magnetic fiel or radioactivity				
Compliant Standards		Refer to the following section for details. Compliance with UL Standards, EU Directives, UK Regulations, and Other Safety Standards on page xxvii				
			Mounting	SERVOPACK Model: SGD7S-		
			nounted	All Models		
Mounting		Rack-m	nounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F		
		Duct-ve	entilated	470A, 550A, 590A, 780A		

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	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 voltage fluctuation of $\pm 10\%$)
Perfor- mance	Fluctuation	*2	$\pm 0.1\%$ of rated speed max. (for a temperature fluctuation of 25°C ± 25 °C)
	Torque Con sion (Repea		±1%
	Soft Start T Setting	ïme	0 s to 10 s (Can be set separately for acceleration and deceleration.)
	Encoder Div Pulse Outp		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	Overheat P Input	rotection	Number of input points: 1 Input voltage range: 0 V to +5 V
		Fixed Input	Allowable voltage range: 5 VDC ±5% Number of input points: 1 SEN (Absolute Data Request) signal
I/O Signals	Sequence Input Signals	Input Signals That Can Be Allo- cated	 Allowable voltage range: 24 VDC ±20% Number of input points: 7 Input method: Sink inputs or source inputs Input Signals /S-ON (Servo ON) signal /P-CON (Proportional Control) signal P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals /ALM-RST (Alarm Reset) signal /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals /SPD-D (Motor Direction) signal /SPD-A and /SPD-B (Internal Set Speed Selection) signals /C-SEL (Control Selection) signal /ZCLAMP (Zero Clamping) signal /INHIBIT (Reference Pulse Inhibit) signal /G-SEL (Gain Selection) signal SEN (Absolute Data Request) signal /PSEL (Reference Pulse Input Multiplication Switch) signal /FSTP (Forced Stop Input) signal /FLC (Semi-closed/Fully-closed Loop Control Selection Input) signal /SFECLR (Motor - Load Position Deviation Clear Input) signal A signal can be allocated and the positive and negative logic can be changed.

Continued on next page.

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	Item		Continued from previous page. Specification
			Allowable voltage range: 5 VDC to 30 VDC
		Fixed Output	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 out- puts.)
I/O Signals	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 • /VLT (Speed Limit Detection) signal • /VLT (Speed Limit Detection) signal • /WARN (Warning) signal • /WARN (Warning) signal • /NEAR (Near) signal • /PSELA (Reference Pulse Input Multiplication Switching Output) sig- nal • ALO1, ALO2, and ALO3 (Alarm Code) signals • /FLCA (Semi-closed/Fully-closed Loop Control Status Output) signal A signal can be allocated and the positive and negative logic can be changed.
	RS-422A Communi- cations (CN3)	Inter- faces	Digital Operator (JUSP-OP05A-1-E) and personal computer (with Sig- maWin+)
		1:N Commu- nications	Up to N = 15 stations possible for RS-422A port
Communi- cations		Axis Address Setting	Set with parameters.
	USB	Interface	Personal computer (with SigmaWin+)
	Communi- cations (CN7)	Commu- nications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Inc	licators		CHARGE indicator and five-digit seven-segment display
Panel Opera	ator		Four push switches
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following catalog for details. \square AC Servo Drives Σ -7 Series (Manual No.: KAEP S800001 23)
Overtravel (0	OT) Preventio	n	Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective F	unctions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Funct	ions		Gain adjustment, alarm history, jogging, origin search, etc.

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		Iter	n		Specification			
		Input	S		/HWBB1 and /HWBB2: Base block signals for Power Modules			
Safe	ety	Outp	ut		EDM1: Monitors the status of built-in safety circuit (fixed output).			
Fun			Compliant Standards ^{*3}		ISO13849-1 PLe (Category 3), IEC61508 SIL3			
Арр	licable O	ption I	Module	es	Fully-closed Modules			
		Soft Start Time Set 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 kΩ			
	Speed Con- trol			Circuit Time Con- stant	30 μs			
		Internal Set Sper Control	Set Speed Selec-		With Proportional Control signal			
Controls			. 01	Speed Selec- tion	With Forward/Reverse External Torque Limit signals (speed 1 to 3 selection). Servomotor stops or another control method is used when both signals are OFF.			
Cor		Feedforward Compensation Output Signal Po tioning Complete Width Setting			0% to 100%			
				npleted	0 to 1,073,741,824 reference units			
					Refer- ence Pulse Form	One of the following is selected: Sign + pulse train, CW + CCW pulse trains, and two-phase pulse trains with 90° phase differential		
	Posi- tion		Ref-	Input Form	Line driver or open collector			
	Con- trol	Con- trol In-	er- ence pul- ses	Maxi- mum Input Fre- quency	 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 			
				Input Multiplica- tion Switching	1 to 100 times			
			Clear	Signal	Position deviation clear Line driver or open collector			

Continued on next page.

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	Item			Specification
sl	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.
Contro	O Torque Con- O trol Input Signal Input Input Input Input Input Input ance	Imped-	Approx. 14 kΩ	
			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 SERVO-PACKs 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.

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

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

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

2.3.2 SERVOPACK with MECHATROLINK-III Communications References

2.3.2 SERVOPACK with MECHATROLINK-III Communications References

	Item	Specification				
Drive Metho	d	IGBT-based PWM control, sine wave current drive				
Feedback		Serial encoder: 17 bits (absolute encoder) 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)				
	Surrounding Air Tem- perature ^{*1}	 -5°C to 55°C (With derating, usage is possible between 55°C and 60°C.) Refer to the following section for derating specifications. Ω 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)				
	Vibration Resistance	4.9 m/s ²				
	Shock Resistance	19.6 m/s ²				
Environ- mental	Degree of Protection	Degree SERVOPACK Model: SGD7S- IP20 R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A,				
Conditions		IP10 120A20A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A				
	Pollution Degree	 2 Must be no corrosive or flammable gases. Must be no exposure to water, oil, or chemicals. Must be no dust, salts, or iron dust. 				
	Altitude ^{*1}	 1,000 m max. (With derating, usage is possible between 1,000 m and 2,000 m.) Refer to the following section for derating specifications. Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28) 				
	Others	Do not use the SERVOPACK in the following locations: Locations su ject to static electricity, noise, strong electromagnetic/magnetic field or radioactivity				
Compliant S	tandards	Refer to the following section for details. Compliance with UL Standards, EU Directives, UK Regulations, and Other Safety Standards on page xxvii				
Mounting		Base-mounted				
	Speed Control Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)				
		±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)				
	Coefficient of Speed	0% of rated speed max. (for a voltage fluctuation of ±10%)				
Perfor- mance	Fluctuation ^{*2}	\pm 0.1% of rated speed max. (for a temperature fluctuation of 25°C \pm 25°C)				
	Torque Control Preci- sion (Repeatability)	±1%				
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)				

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2.3.2 SERVOPACK with MECHATROLINK-III Communications References

Continued from previous page.

	Item		Specification
	Encoder Div Pulse Outp		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	Overheat Protection Input		Number of input points: 1 Input voltage range: 0 V to +5 V
			Allowable voltage range: 24 VDC ±20% Number of input points: 7
	Sequence Input Signals	Input Signals That Can Be Allo- cated	 Input method: Sink inputs or source inputs Input Signals P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals /DEC (Origin Return Deceleration Switch) signal /EXT1 to /EXT3 (External Latch Input 1 to 3) signals FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
I/O Signals		Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output signal: ALM (Servo Alarm) signal
	Sequence Output Signals		Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (A photocoupler output (isolated) is used.)
		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 • /VLT (Speed Limit Detection) signal • /WARN (Warning) 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 Sig- maWin+)
	RS-422A Communi- cations	1:N Commu- nications	Up to N = 15 stations possible for RS-422A port
Communi- cations	(CN3)	Axis Address Setting	03h to EFh (maximum number of slaves: 62) The rotary switches (S1 and S2) are used to set the station address.
	USB	Interface	Personal computer (with SigmaWin+)
	Communi- cations (CN7)	Commu- nications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, PWR, CN, L1, and L2 indicators, and one-digit seven-segment display
	Communica tocol	ations Pro-	MECHATROLINK-III
	Station Add Settings		03h to EFh (maximum number of slaves: 62) The rotary switches (S1 and S2) are used to set the station address.
OLINK-III Communi-	Transmissic	on Speed	100 Mbps
cations	Transmissic	on Cycle	125 μs, 250 μs, 500 μs, 750 μs, 1.0 ms to 4.0 ms (multiples of 0.5 ms)
	Number of Transmis- sion Bytes		32 or 48 bytes/station A DIP switch (S3) is used to select the number of transmission bytes.

Continued on next page.

2.3.2 SERVOPACK with MECHATROLINK-III Communications References

Continued from previous page.

	Item	Specification		
	Performance	Position, speed, or torque control with MECHATROLINK-III communi- cations		
Reference Method	Reference Input	MECHATROLINK-III commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)		
	Profile	MECHATROLINK-III standard servo profile		
MECHATRO	LINK-III Communica-	Rotary switch (S1 and S2) positions: 16		
tions Setting	g Switches	Number of DIP switch (S3) pins: 4		
Analog Mon	itor (CN5)	Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)		
Dynamic Bra	ake (DB)	Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.		
Regenerativ	e Processing	Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following catalog for details. Ω AC Servo Drives Σ-7 Series (Catalog No.: KAEP S800001 23)		
Overtravel (0	OT) Prevention	Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal		
Protective F	unctions	Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.		
Utility Funct	ions	Gain adjustment, alarm history, jogging, origin search, etc.		
	Inputs	/HWBB1 and /HWBB2: Base block signals for Power Modules		
Safety	Output	EDM1: Monitors the status of built-in safety circuit (fixed output).		
Functions	Compliant Standards ^{*3}	ISO13849-1 PLe (Category 3), IEC61508 SIL3		
Applicable (Option Modules	Fully-closed Modules		

*1. If you combine a Σ-7-Series SERVOPACK with a Σ-V-Series Option Module, the following Σ-V-Series SERVO-PACKs 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.

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

Coefficient of speed fluctuation = <u>No-load motor speed - Total-load motor speed</u> × 100% Rated motor speed

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

Wiring and Connecting SERVOPACKs

This chapter provides information on wiring and connecting SERVOPACKs to power supplies and peripheral devices.

3.1	Basic	Wiring Diagrams
	3.1.1	SERVOPACK with Analog Voltage/Pulse Train References
	3.1.2	SERVOPACK with MECHATROLINK-III
		Communications References
		-
3.2	Wiring	g the Fully-Closed Module
3.2	Wiring 3.2.1	g the Fully-Closed Module

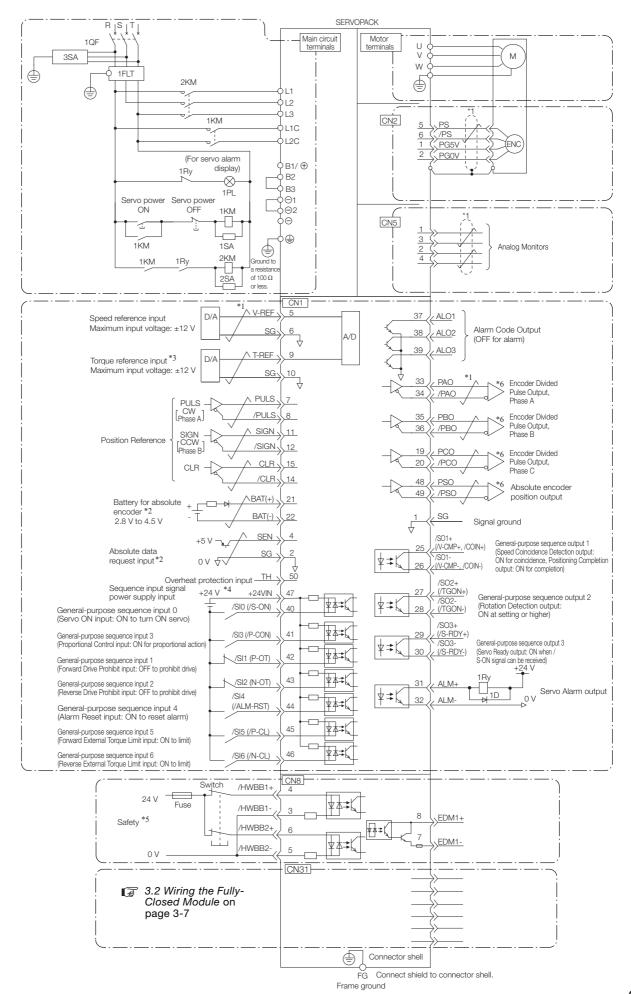
3.1 Basic Wiring Diagrams

This section provide the basic wiring diagrams.

3.1.1 SERVOPACK with Analog Voltage/Pulse Train References

Refer to the following manual for details on terminals and connectors in the diagram that do not have a reference page.

 $\prod_{i=1}^{n} \Sigma$ -7-Series Σ -7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)



- *1. represents twisted-pair wires.
 *2. Connect these when using an absolute encoder. If the Encoder Cable with a Battery Case is connected, do not connect a backup battery.
- *3. You can enable this function with a parameter setting.
- *4. The 24-VDC power supply is not provided by Yaskawa. Use a 24-VDC power supply with double insulation or reinforced insulation.
- *5. Refer to the following chapter if you use a safety function device.
 - \square Σ -7-Series Σ -7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)

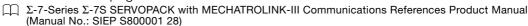
If you do not use the safety function, insert the Safety Jumper Connector (provided as an accessory) into CN8 when you use the SERVOPACK.

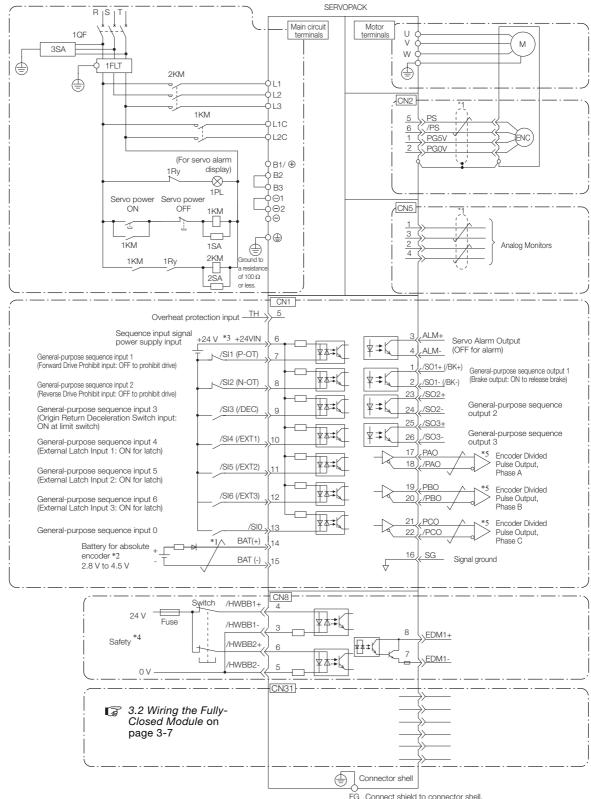
*6. Always use line receivers to receive the output signals.

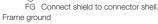
- Note: 1. If you use a 24-V brake, install a separate power supply for the 24-VDC power supply from other power supplies, such as the one for the I/O signals of the CN1 connector. If the power supply is shared, the I/O signals may malfunction.
 - 2. Default settings are given in parentheses.

3.1.2 SERVOPACK with MECHATROLINK-III Communications References

Refer to the following manual for details on terminals and connectors in the diagram that do not have a reference page.







3.1.2 SERVOPACK with MECHATROLINK-III Communications References

- *1. \checkmark represents twisted-pair wires.
- *2. Connect these when using an absolute encoder. If the Encoder Cable with a Battery Case is connected, do not connect a backup battery.
- *3. The 24-VDC power supply is not provided by Yaskawa. Use a 24-VDC power supply with double insulation or reinforced insulation.
- *4. Refer to the following chapter if you use a safety function device.
 - Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)

If you do not use the safety function, insert the Safety Jumper Connector (provided as an accessory) into CN8 when you use the SERVOPACK.

*5. Always use line receivers to receive the output signals.

- Note: 1. You can use parameters to change the functions allocated to the /DEC, P-OT, N-OT, /EXT1, /EXT2, and / EXT3 input signals and the /SO1, /SO2, and /SO3 output signals. Refer to the following section for details.
 - \square Σ -7-Series Σ -7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)
 - If you use a 24-V brake, install a separate power supply for the 24-VDC power supply from other power supplies, such as the one for the I/O signals of the CN1 connector. If the power supply is shared, the I/O signals may malfunction.
 - 3. Default settings are given in parentheses.

3.2.1 Wiring the Fully-Closed Module to the SERVOPACK

3.2 Wiring the Fully-Closed Module

3.2.1 Wiring the Fully-Closed Module to the SERVOPACK

The Fully-Closed Module is wired to the SERVOPACK by installing it in the SERVOPACK. Refer to the following manual for details about the installation procedure.

Σ-V-Series/Σ-V-Series for Large-Capacity Models/Σ-7-Series Installation Guide Fully-closed Module (Manual No.: TOBP C720829 03)

3.2.2 Wiring the Fully-Closed Module to the External Encoder

Connect CN31 on the Fully-Closed Module to the External Encoder with the External Encoder Cable.

Depending on the External Encoder that will be used, a device may be required in the connection between the Fully-Closed Module and External Encoder. Refer to the following manual for details about the necessary device and connection method.

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

3.2.2 Wiring the Fully-Closed Module to the External Encoder

Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching

4

This chapter provides detailed information about Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching.

4.1	Introd	luction
	4.1.1	Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching
	4.1.2	Semi-Closed Loop Control/Fully-Closed Loop Control Switching
	4.1.3	Motor-Load Position Deviation Clear 4-7
4.2	Contr	ol Block Diagrams4-9
	4.2.1 4.2.2	During Semi-Closed Loop Control 4-9 During Fully-Closed Loop Control 4-9
4.3	Checl	king Operations 4-10
	4.3.1 4.3.2	Semi-Closed Loop Control
4.4	Paran	neter Setting Details
	4.4.1	Electronic Gear Ratio for External Encoder Conversion Settings
	4.4.2	Encoder Divided Pulses during Fully-Closed
	4.4.3	Loop Control Setting

4.5 Signal and Command Setting Details4-19

4.5.1	I/O Signal Allocations: SERVOPACK with
	Analog Voltage/Pulse Train References4-20
4.5.2	Command Details: SERVOPACK with
	MECHATROLINK-III Communications
	References

4.1 Introduction

4.1.1 Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching

This section provides an introduction to Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching.

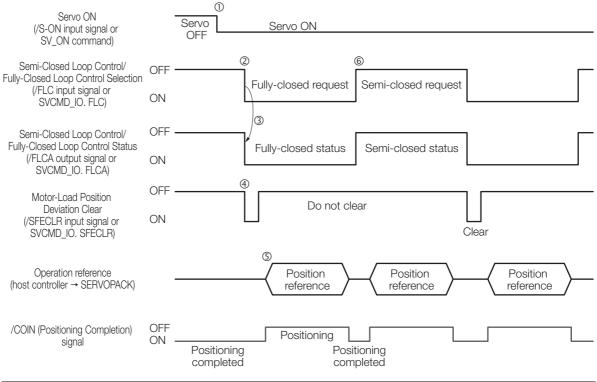
Information

Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching is the overall term for the function that combines the following two types of functions. The two types of functions and the reference pages are given in the following table.

Function Name	Reference
Semi-Closed Loop Control/ Fully-Closed Loop Control Switching	4.1.2 Semi-Closed Loop Control/Fully-Closed Loop Control Switching on page 4-5
Motor-Load Position Deviation Clear	4.1.3 Motor-Load Position Deviation Clear on page 4-7

Sequence

The following example shows the sequence for Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching.



No.	Description			
	Analog voltage/pulse train references	MECHATROLINK-III communications references		
1	The host controller inputs the /S-ON (Servo ON) signal, and when operation preparations have been completed, the host controller confirms that the /COIN (Positioning Completion) signal has turned ON (positioning completed).	The host controller issues the SV_ON (Servo ON) command, and when operation preparations have been completed, the host controller confirms that the /COIN (Positioning Completion) signal has turned ON (positioning completed).		
2	When positioning has been completed, the host controller inputs the /FLC (Semi-Closed Loop Control/Fully-Closed Loop Control Selection) signal.	When positioning has been completed, the host controller inputs Semi-Closed Loop Control/Fully-Closed Loop Control Selection (SVCMD_IO. FLC).		

Continued on next page.

4.1.1 Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching

Continued from previous page.

No.	Description			
	Analog voltage/pulse train references	MECHATROLINK-III communications references		
3	The SERVOPACK executes the processing to switch between semi-closed loop control and fully- closed loop control, and when that processing has completed, the SERVOPACK outputs the /FLCA (Semi-Closed Loop Control/Fully-Closed Loop Control Status) signal.	The SERVOPACK executes the processing to switch between semi-closed loop control and fully- closed loop control, and when that processing has completed, the SERVOPACK outputs Semi-Closed Loop Control/Fully-Closed Loop Control Status (SVCMD_IO. FLCA).		
4	The host controller confirms that the /FLCA output signal has turned ON (fully-closed loop control status), and then it turns ON the /SFECLR (Motor-Load Position Deviation Clear) signal.	The host controller confirms that SVCMD_IO. FLCA = ON (1: Fully-closed loop control status), and then it turns ON Motor-Load Position Devia- tion Clear (SVCMD_IO. SFECLR).		
\$	The host controller returns the /SFECLR input sig- nal to OFF, and then it outputs the position refer- ence to operate the motor. When the motor starts operation, the /COIN (Positioning Completion) sig- nal turns OFF.	The host controller returns SVCMD_IO. SFECLR to OFF, and then it outputs the position reference to operate the motor. When the motor starts operation, the /COIN (Positioning Completion) signal turns OFF.		
6	After motor operation has completed, the host controller confirms that the /COIN (Positioning Completion) signal has turned ON (positioning completed), and then it inputs the /FLC input signal.	After motor operation has completed, the host controller confirms that the /COIN (Positioning Completion) signal has turned ON (positioning completed), and then it inputs SVCMD_IO. FLC.		

Refer to the following section for details on how to use this function.

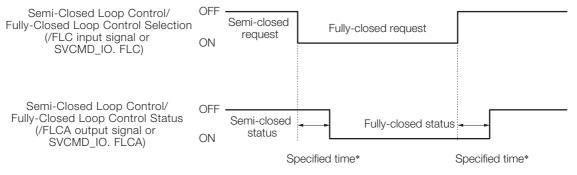
3 4.3 Checking Operations on page 4-10

4.1.2 Semi-Closed Loop Control/Fully-Closed Loop Control Switching

Semi-Closed Loop Control/Fully-Closed Loop Control Switching is the function that switches between semi-closed loop control and fully-closed loop control.

Sequence

When Semi-Closed Loop Control/Fully-Closed Loop Control Selection (/FLC input signal or SVCMD_IO. FLC) is changed, the control will change within the specified time*. When the control is changed, Semi-Closed Loop Control/Fully-Closed Loop Control Status (/FLCA output signal or SVCMD_IO. FLCA) will change.



* SERVOPACK with analog voltage/pulse train references: Within 2 ms SERVOPACK with MECHATROLINK-III communications references: Within 250 µs + transmission line delay time

Internal Status of SERVOPACK

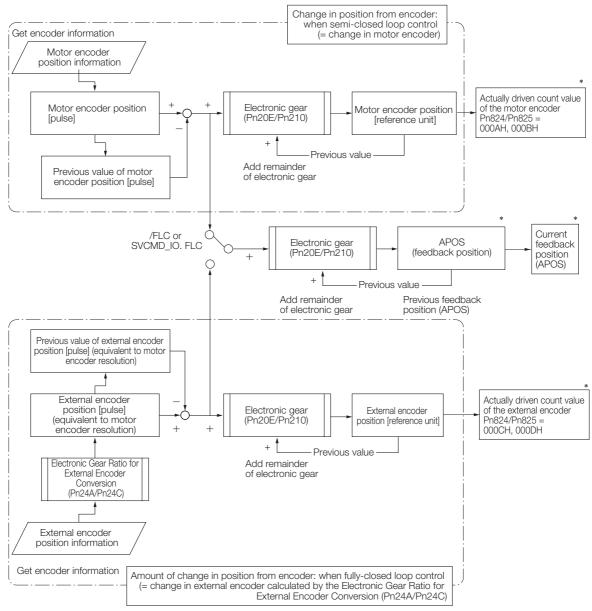
The following table gives the internal status of the SERVOPACK during semi-closed loop control and fully-closed loop control.

	Internal St		
Item	During Semi-Closed Loop Control	During Fully-Closed Loop Control	Reference
Motor-load position devi- ation	Always zero.	Will be updated.	4.1.3 Motor-Load Position Deviation
A.d10 (Motor-Load Posi- tion Deviation Overflow)	Will not be detected.	Will be detected.	Clear on page 4-7
Encoder divided output	The motor encoder position is divided by Pn212.	 If Pn02A = n.□□0□: The external encoder position is converted to motor encoder units by the Electronic Gear Ratio for External Encoder Conversion (Pn24A/Pn24C), and that posi- tion is divided by Pn212. If Pn02A = n.□□1□: The external encoder position is divided by Pn281. 	4.4.2 Encoder Divided Pulses during Fully-Closed Loop Control Set- ting on page 4-15
Feedback Position (APOS)	Current feedback posi- tion (APOS) = Previous feedback position (APOS) + Change in motor encoder	Current feedback position (APOS) = Previous feedback position (APOS) + Change in external encoder calculated with the Elec- tronic Gear Ratio for External Encoder Conversion (Pn24A/ Pn24C)	◆ Feedback Position (APOS) on page 4-6

4.1.2 Semi-Closed Loop Control/Fully-Closed Loop Control Switching

Feedback Position (APOS)

The current feedback position (APOS) is calculated by adding the value of the change in position from the encoder (current position - previous position) to the previous feedback position (APOS). The position information from the external encoder is first converted to the equivalent of the motor encoder resolution by the Electronic Gear Ratio for External Encoder Conversion (Pn24A/Pn24C), and then it is added to APOS. For this reason, the host controller does not need to convert the reference amount for semi-closed loop control and fully-closed loop control.



* Can be checked with a monitor only when using a SERVOPACK with MECHATROLINK-III communications references.

For a SERVOPACK with analog voltage/pulse train references, the concept of the feedback position is the same as that presented in the above diagram, but the values of APOS, Pn824, and Pn825 cannot be monitored.

4.1.3 Motor-Load Position Deviation Clear

■ Pn824 and Pn825: MECHATROLINK-III Communications References

Due to differences in the resolutions of the motor encoder and external encoder, even when the target position (TPOS) is the same during semi-closed loop control and fully-closed loop control, the position of the machine may not be the same. To check the position information of the motor encoder and external encoder, use Pn824 and Pn825 (Option Monitor 1 and 2 Selection).

Parameter		Monitor Information	Output Unit	Remarks
	000Ah	PG count (lower 32 bits)	Reference unit	Actually driven count value of the
Pn824	000Bh	PG count (upper 32 bits)	Reference unit	motor encoder
Pn825	000Ch	FPG count (lower 32 bits)	Reference unit	Actually driven count value of the
	000Dh FPG count (upper 32 bits		Reference unit	external encoder

Resetting the APOS Value: MECHATROLINK-III Communications References

Execute the CONFIG command to reset the value of APOS to 0.

4.1.3 Motor-Load Position Deviation Clear

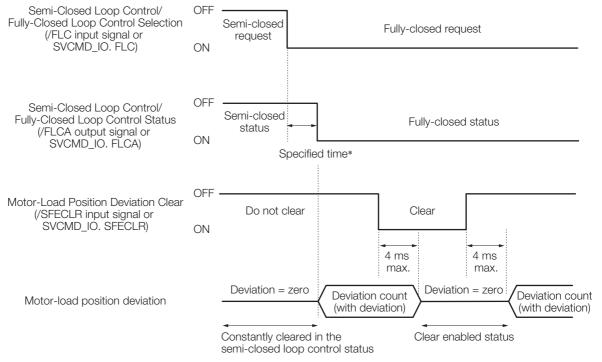
Motor-Load Position Deviation Clear is the function that clears the deviation between the motor and load position during fully-closed loop control. During semi-closed loop control, the motorload position deviation is always cleared and set to zero.

Sequence

During fully-closed loop control, the motor-load position deviation is always cleared and set to zero when the /SFECLR input signal is enabled or SVCMD_IO. SFECLR = 1 (clear).

During fully-closed loop control, the motor-load position deviation is calculated and accumulated when the /SFECLR input signal is disabled or SVCMD_IO. SFECLR = 0 (do not clear).

Note: Hold the level of the SFECLR signal from when the status of the SFECLR signal changes until the status of motor-load position deviation changes (4 ms or longer).



* SERVOPACK with analog voltage/pulse train references: Within 2 ms SERVOPACK with MECHATROLINK-III communications references: Within 250 µs + transmission line delay time 4.1.3 Motor-Load Position Deviation Clear

Analog Monitor Signal Settings

You can monitor motor-load position deviation with SigmaWin+ or an analog monitor.

- SigmaWin+ *Menu Trace*
- Analog Monitors

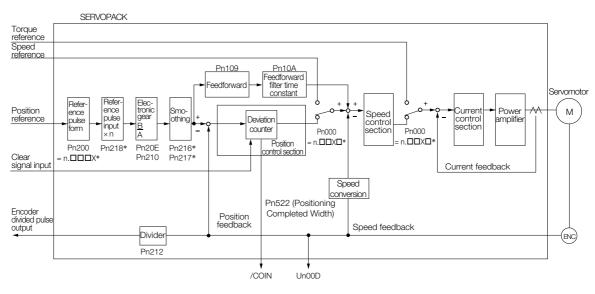
Parameter		Name	Description	When Enabled	Classifica- tion
Pn006	n.□□07	Analog Monitor 1 Signal Selection	Position deviation between motor and load (output unit: 0.01 V/reference unit).	Immedi-	Setup
Pn007	n.□□07	Analog Monitor 2 Signal Selection	Position deviation between motor and load (output unit: 0.01 V/reference unit).	ately	Serup

4.2.1 During Semi-Closed Loop Control

4.2 Control Block Diagrams

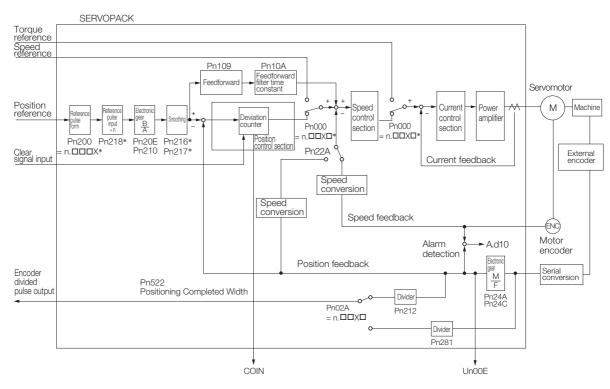
This section provides control block diagrams during semi-closed loop control and fully-closed loop control.

4.2.1 During Semi-Closed Loop Control



* Function that can be used when using a SERVOPACK with analog voltage/pulse train references.

4.2.2 During Fully-Closed Loop Control



* Function that can be used when using a SERVOPACK with analog voltage/pulse train references.

4.3.1 Semi-Closed Loop Control

4.3 Checking Operations

This section provides the commissioning procedures for a SERVOPACK for using Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching. First confirm that the SERVOPACK operates correctly with semi-closed loop control. Next, confirm that switching semi-closed loop control and fully-closed loop control operates correctly, and confirm that the SERVOPACK operates correctly with fully-closed loop control.

4.3.1 Semi-Closed Loop Control

The procedure to check operation of semi-closed loop control is given below.

- 1. Check the Servomotor with no load.
- 2. Set Pn002 = n.0□□□ (do not use an external encoder) to enable semi-closed loop control.
- **3.** Set Pn000 = n.□□1□ (position control with pulse train references) only when using a SERVOPACK with analog voltage/pulse train references.
- 4. Set the following parameters for your device.
 - $Pn000 = n.\Box\Box\BoxX$ (Rotation Direction Selection)
 - Pn001 = n. DDX (Motor Stopping Method for Servo OFF and Group 1 Alarms)
 - Pn001 = n. □□X□ (Overtravel Stopping Method)
 - Pn20E (Electronic Gear Ratio (Numerator))
 - Pn210 (Electronic Gear Ratio (Denominator))
 - Pn212 (Number of Encoder Output Pulses)
 - Pn50A (Input Signal Selections 1)
 - Pn50B (Input Signal Selections 2)
 - Pn511 (Input Signal Selections 5)
 - Pn515 (Input Signal Selections 6): SERVOPACK with analog voltage/pulse train references only
 - Pn516 (Input Signal Selections 7)
 - Pn50E (Output Signal Selections 1)
 - Pn50F (Output Signal Selections 2)
 - Pn510 (Output Signal Selections 3)
 - Pn514 (Output Signal Selections 4)

• Pn517 (Output Signal Selections 5): SERVOPACK with analog voltage/pulse train references only Refer to the following section for I/O signal settings on a SERVOPACK with analog voltage/pulse train references.

4.5.1 I/O Signal Allocations: SERVOPACK with Analog Voltage/Pulse Train References on page 4-20

Refer to the following manuals for information about settings other than those listed above.

- Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)
- $\label{eq:scalar} \underset{Manual}{\square} \Sigma \mbox{-7-Series AC Servo Drive Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)}$
- 5. To enable changes to the parameter settings, turn the power supply to the SERVOPACK OFF and ON again.
- 6. Operate the SERVOPACK and check the following items during operation. For a SERVOPACK with analog voltage/pulse train references, input the signals from the host controller. For a SERVOPACK with MECHATROLINK-III communications references, issue the Run command from the SERVOPACK or host controller.
 - Are there any errors in the SERVOPACK?
 - Does jogging function correctly when you operate the SERVOPACK without a load?
 - Do the I/O signals turn ON and OFF correctly?
 - SERVOPACK with analog voltage/pulse train references only: Is power supplied to the Servomotor when the /S-ON (Servo ON) signal is input?
 - SERVOPACK with MECHATROLINK-III communications references only: Is power supplied to the Servomotor when the SV_ON (Servo ON) command is sent from the host controller?
 - Does the Servomotor operate correctly when a position reference is input by the host controller?

4.3.2 Switching Semi-Closed Loop Control and Fully-Closed Loop Control, and Fully-Closed Loop Control

- 7. Connect the Servomotor to the machine.
- Set Pn103 (Moment of Inertia Ratio). If advanced autotuning can be applied, start advanced autotuning. This will automatically set Pn103 (Moment of Inertia Ratio). If advanced autotuning cannot be applied, directly set Pn103 (Moment of Inertia Ratio).
- **9.** Issue the Run command from the host controller and check that the machine's movement direction, travel distance, and movement speed agree with the references from the host controller.

This concludes checking operation of semi-closed loop control.

4.3.2 Switching Semi-Closed Loop Control and Fully-Closed Loop Control, and Fully-Closed Loop Control

The procedure to check operation of switching semi-closed loop control and fully-closed loop control, and fully-closed loop control is given below.

- **1.** Confirm that the following procedure has been completed.
- 2. Set the following parameters only when using a SERVOPACK with analog voltage/pulse train references.
 - Pn51A = n. DDX (/FLCA (Semi-Closed Loop Control/Fully-Closed Loop Control Status Output) Signal Allocation)
 - Pn58A = n. DDX (/FLC (Semi-Closed Loop Control/Fully-Closed Loop Control Selection Input) Signal Allocation)
 - Pn58A = n.□□X□ (/SFECLR (Motor-Load Position Deviation Clear) Signal Allocation)

Refer to the following section for more information about the settings.

- 4.5.1 I/O Signal Allocations: SERVOPACK with Analog Voltage/Pulse Train References on page 4-20
- **3.** Set the following parameters to enable Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching.

Required Parameter Settings	Description		
Pn002 = n.X□□□ (External Encoder Usage)	Set Pn002 to n.1 ("The external encoder moves in the for- ward direction for CCW motor rotation"). Or set Pn002 to n.3 ("The external encoder moves in the reverse direction for CCW motor rotation"). Either setting will enable fully-closed loop control. Set the appropriate value for the device that will be used.		
Pn02A = n.□□□X (Semi-Closed Loop Control/Fully-Closed Loop Control Switching Selection)	Set Pn02A = n.		

- **4.** To enable changes to the parameter settings, turn the power supply to the SERVOPACK OFF and ON again.
- 5. Set the servo OFF state.

4.3.2 Switching Semi-Closed Loop Control and Fully-Closed Loop Control, and Fully-Closed Loop Control

6. Confirm that the status of the inputs changes according to the signals and commands that are output.

Communications Reference	Confirmation Item
Analog voltage/pulse train refer- ences	Confirm that the /FLCA (Semi-Closed Loop Control/Fully-Closed Loop Control Status Output) signal changes according the ON and OFF status of the /FLC (Semi-Closed Loop Control/Fully- Closed Loop Control Selection Input) signal.
MECHATROLINK-III communica- tions references	Confirm that Semi-Closed Loop Control/Fully-Closed Loop Con- trol Status (SVCMD_IO. FLCA) changes according Semi-Closed Loop Control/Fully-Closed Loop Control Selection (SVCMD_IO. FLC). Refer to the following section for more information about the com- mands. # 4.5.2 Command Details: SERVOPACK with MECHATROLINK-III Communications References on page 4-25

Refer to the following section for details.

4.1.2 Semi-Closed Loop Control/Fully-Closed Loop Control Switching on page 4-5

7. Set the following parameters required for fully-closed loop control according to your device.

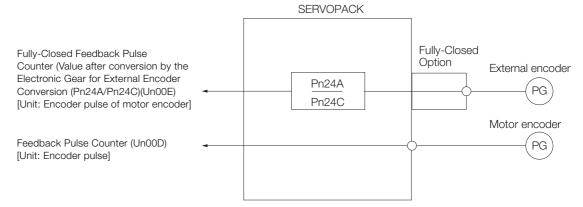
Required Parameter Settings	Description		
Pn20A (Number of External Encoder Scale Pitches)	 Set the appropriate value for the device that will be used. Refer to the following section for details. <i>4.4.3 Setting the Number of External Encoder Scale Pitches</i> on page 4-17 		
Pn24A (Electronic Gear Ratio for External Encoder Conversion (Numerator))	If required, set the appropriate value for the device that will be used. Refer to the following section for details.		
Pn24C (Electronic Gear Ratio for External Encoder Conversion (Denominator))	4.4.1 Electronic Gear Ratio for External Encoder Conversion Set- tings on page 4-14		
Pn02A = n.□□X□ (Encoder Divided Pulses Output Method Selection during Fully-Closed Loop Control)	Set the appropriate value for the device that will be used. Refer t the following section for details.		
Pn212 (Number of Encoder Output Pulses)	 4.4.2 Encoder Divided Pulses during Fully-Closed Loop Control Setting on page 4-15 		
Pn281 (Encoder Output Resolution)			
Pn51B (Motor-Load Position Devia- tion Overflow Detection Level)	Set the appropriate value for the device that will be used. For details, refer to the following manuals.		
Pn52A (Multiplier per Fully-closed Rotation)	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with Analog Voltage/ Pulse Train References Product Manual (Manual No.: SIEP S800001 26)		
Pn522 (Positioning Completed Width)	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)		
Pn22A = n.0□□□ (Use motor encoder speed.)	If Pn22A is set to n.1 [] (Use external encoder speed), control may become unstable. Do not use this setting.		

8. To enable changes to the parameter settings, turn the power supply to the SERVOPACK OFF and ON again.

4.3.2 Switching Semi-Closed Loop Control and Fully-Closed Loop Control, and Fully-Closed Loop Control

- **9.** Move the machine with your hand and check the following status with the Digital Operator or SigmaWin+.
 - Does Un00E (Fully-Closed Feedback Pulse Counter) count up when the Servomotor moves in the forward direction?
 - Is the travel distance of the machine visually about the same as the amount counted by Un00E (Fully-Closed Feedback Pulse Counter)?

Note: The unit for Un00E (Fully-Closed Feedback Pulse Counter) is the value converted with the parameters.



10. Set the servo ON state.

11. Input the position reference from the host controller and check the status of the following items. Start from a low speed and gradually increase the speed.

Communications Reference	Confirmation Item
Analog voltage/pulse train reference	 Does switching semi-closed loop control/fully-closed loop control operate correctly, including the host controller? Does the /SFECLR (Motor-Load Position Deviation Clear) signal operate correctly?
MECHATROLINK- III communications reference	 Does switching semi-closed loop control/fully-closed loop control operate correctly, including the host controller? Does Motor-Load Position Deviation Clear (SVCMD_IO. SFECLR) operate correctly?

Refer to the following section for the sequence for clearing motor-load position deviation. *4.1.3 Motor-Load Position Deviation Clear* on page 4-7 4.4.1 Electronic Gear Ratio for External Encoder Conversion Settings

4.4 Parameter Setting Details

4.4.1 Electronic Gear Ratio for External Encoder Conversion Settings

This product is equipped with the Electronic Gear for External Encoder Conversion. This function matches the resolution bits of the external encoder to the resolution bits of the motor encoder, and it is used for applications that switch between and use semi-closed loop control and fully-closed loop control. The following parameters set this gear.

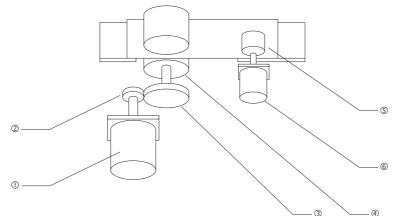
	Electronic Gear Ratio for External Encoder Conversion (Numerator) Speed Position Torque						
Pn24A	Setting Range	Setting Unit	Default Setting	When Enabled	Classification		
	1 to 1,073,741,824	_	1	After restart	Setup		
	Electronic Gear Ratio for External Encoder Conversion (Denominator) Speed Position Torque						
Pn24C	Setting Range	Setting Unit	Default Setting	When Enabled	Classification		
	1 to 1,073,741,824	_	1	After restart	Setup		

The effect of setting these parameters is as follows.

- During semi-closed loop control, control is performed with the resolution bits of the motor encoder. During fully-closed loop control, control is performed with the resolution bits of the external encoder. However, matching the resolution bits for the internal calculation of these two encoders eliminates the need to convert the number of pulses provided from the host controller, even when switching between semi-closed loop control and fully-closed loop control.
 - Note: The encoder resolution bits as viewed from the host controller is that of the motor encoder.
- Since the position deviation unit will be the same during semi-closed loop control and fullyclosed loop control, shock will be reduced even when control is switched from a state where position deviation has been accumulated.

Calculating the Settings Pn24A and Pn24C

This example gives the method of calculating Pn24A and Pn24C for a roll feeder.



No.	System Configuration	Example
1	Drive motor and motor encoder	Motor encoder resolution bits (Mr) = Resolution: 24 bits/rev
2	Drive gear on motor	Number of teeth (Nm) = 30
3	Drive gear on roll	Number of teeth (N1) = 80
4	Drive roll	Diameter of roll (Dr) = 200 mm
5	External encoder detection roll	Diameter of roll (Df) = 60 mm
6	External encoder	External encoder resolution bits (Fr) = Resolu- tion: 20 bits/rev

4.4.2 Encoder Divided Pulses during Fully-Closed Loop Control Setting

Calculating the Settings

 $\frac{Pn24A}{Pn24C} = \frac{Mr}{Fr} \times \frac{Df}{Dr} \times \frac{N1}{Nm} = \frac{16777216 \times 60 \times 80}{1048576 \times 200 \times 30} = \frac{80530636800}{6291456000} = \frac{64}{5}$

4.4.2 Encoder Divided Pulses during Fully-Closed Loop Control Setting

This product has two types of division methods during fully-closed loop control. The methods are set with $Pn02A = n.\Box\Box X\Box$ (Encoder Divided Pulses Output Method Selection during Fully-Closed Loop Control).

Parameter		Meaning	When Enabled	Classification
Pn02A	n.□□0□ (default set- ting)	During fully-closed loop control, output encoder divided pulses for position feedback from an external encoder according to the value after conversion using the Electronic Gear Ratio for External Encoder Conversion (Pn24A/Pn24C) and the setting value of Pn212.	After restart	Setup
	n.0010	During fully-closed loop control, output encoder divide pulses for position feedback from an external encoder according to the set- ting value of Pn281.		

Information Division Method during Semi-Closed Loop Control

During semi-closed loop control, position feedback from the motor encoder is output as divided pulses according to the setting of Pn212, regardless of whether Pn002A is set to $n.\square\square0\square$ or $n.\square\square1\square$.

Differences from the Standard Product

When Pn02A is set to n. \Box \Box 1, this product behaves in the same manner as the standard product during semi-closed loop control and fully-closed loop control. When Pn02A is set to n. \Box \Box \Box , this product behaves in the same manner as the standard product during semi-closed loop control, but it behaves in a different manner during fully-closed loop control. The standard product outputs position feedback as divided pulses according to the setting of Pn281 during fully-closed loop control, but this product outputs position feedback as divided pulses according to the setting of Pn281 during fully-closed loop control, but this product outputs position feedback as divided pulses according to the setting of Pn212 during fully-closed loop control. However, shock is reduced when changing control because the value of the Electronic Gear Ratio for External Encoder Conversion (Pn24A/Pn24C) is used.

Calculating the Setting of Pn212

This section describes how to calculate the setting of Pn212 (Number of Encoder Output Pulses).

Pn212	Number of Encode	r Output Pulses	Speed Position Torque		
	Setting Range	Setting Unit	Default Setting	When Enabled	Classification
	16 to 1,073,741,824	1 P/Rev	2048	After restart	Setup

The number of pulses from the encoder per rotation are processed inside the SERVOPACK, divided by the setting of Pn212, and then output.

Set the number of encoder divided output pulses according to the system specifications of the machine or host controller.

The setting of the number of encoder output pulses is limited by the resolution of the encoder.

4.4.2 Encoder Divided Pulses during Fully-Closed Loop Control Setting

Setting of the Number		Encoder Resolution Bits			Upper Limit of Servomotor
of Encoder Output Pulses [P/Rev]	Setting Increment	20 bits (1,048,576 pulses)	22 bits (4,194,304 pulses)	24 bits (16,777,216 pulses)	Speed for Set Number of Encoder Output Pulses [min ⁻¹]
16 to 16,384	1	0	0	0	6000
16,386 to 32,768	2	0	0	0	3000
32,772 to 65,536	4	0	0	0	1500
65,544 to 131,072	8	0	0	0	750
131,088 to 262,144	16	0	0	0	375
262,176 to 524,288	32	_	0	0	187
524,352 to 1,048,576	64	_	0	0	93
1,048,704 to 2,097,152	128	-	-	0*	46
2,097,408 to 4,194,304	256	_	_	0*	23

* Available only for incremental encoder

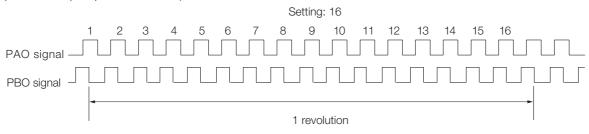
Note: 1. The setting range of the number of encoder output pulses (Pn212) depends on the resolution of the Servomotor encoder. An A.041 alarm (Encoder Output Pulse Setting Error) will occur if the above setting conditions are not met.

Correct setting example: Pn212 can be set to 25,000 [P/Rev].

Incorrect setting example: Pn212 cannot be set to 25,001 [P/Rev] because the setting increment in the above table is not used.

 The upper limit of the pulse frequency is approximately 1.6 Mpps. The Servomotor speed will be limited if the setting of the number of encoder output pulses is too high. An A.511 alarm (Encoder Output Pulse Overspeed) will occur if the upper limit of the motor speed is exceeded.

Output example: An output example is given below for the PAO (Encoder Pulse Output Phase A) signal and the PBO (Encoder Pulse Output Phase B) signal when Pn212 is set to 16 (16 pulses output per revolution).



Upper Limit of Pn212

When Pn02A is set to n. $\Box\Box\Box$, the upper limit of Pn212 (Number of Encoder Output Pulses) is either the resolution bits of the motor encoder or the resolution bits of the external encoder, whichever resolution bits is lower.

Example If the resolution bits of the motor encoder is 24 bits/rev and the resolution bits of the external encoder is 20 bits/rev, the resolution bits of the external encoder is lower, so the upper limit of Pn212 will be 1,048,576 (encoder resolution) ÷ 4 (multiplier) = 262,141 pulses/rev. Therefore, confirm that the setting of Pn212 is less than or equal to the upper limit value of 262,144.

Calculating the Setting of Pn281

This section describes how to calculate the setting of Pn281 (Encoder Output Resolution).

	Encoder Output Re	solution	Speed Position Torque		
Pn281	Setting Range	Setting Unit	Default Setting	When Enabled	Classification
	1 to 4096	1 edge/pitch	20	After restart	Setup

Note: 1. The maximum setting for the encoder output resolution is 4,096. Pulse output at an encoder resolution of 4,096 or higher is not possible.

2. If the setting of Pn281 exceeds the resolution of the external encoder, the A.041 alarm (Encoder Output Pulse Setting Error) will be output.

4.4.3 Setting the Number of External Encoder Scale Pitches

When Pn281 is set to the resolution (number of divisions) of the external encoder, divided pulses are output at the minimum resolution bits of the encoder. Calculate the appropriate setting for the machine that will be used based on the resolution (number of divisions) of the external encoder.

Refer to the following section for details on the resolution (number of divisions) of the external encoder.

Encoder Resolution Bits and Resolution (Number of Divisions) on page 4-18

Information When using external encoder RRU77-4096ADF

Resolution bits: 20 bits/rev

Resolution (number of divisions): 256

When Pn281 is set to 256, 1,048,576 pulses are output when the external encoder rotates once.

When Pn281 is set to 1, 4096 pulses are output when the external encoder rotates once.

4.4.3 Setting the Number of External Encoder Scale Pitches

Set the number of external encoder scale pitches in Pn20A. The setting of Pn20A will depend on the external encoder that you use.

	Number of Externa	al Encoder Scale Pitc	Pr	Position		
Pn20A	Setting Range	Setting Unit	Default Setting	When Enabled	Classification	
111207	4 to 1048576 1 scale pitch/revo- lution		32768	After restart	Setup	
	Pn20A must be set w Position loop gain c	vith the correct value calculation and other				

Position loop gain calculation and other calculations in the SERVOPACK during fully-closed loop control
 Phase C output of encoder divided pulses

Set the number of external encoder scale pitches per Servomotor rotation in Pn20A.

Note: 1. If there is a fraction, round off the digits below the decimal point.

2. If the number of external encoder scale pitches per Servomotor rotation is not an integer, there will be deviation in the position loop gain (Kp), feedforward, and position reference speed monitor. This is not relevant for the position loop and it therefore does not interfere with the position accuracy.

An example where the external encoder rotates once when the Servomotor rotates once.

Example

Servomotor (motor encoder)

External encoder

Resolution bits of the external encoder: 20 bits/rev

Resolution (number of divisions) of the external encoder: 256

 $2^{20} \div 256 = 1,048,576 \div 256 = 4096$. The setting is 4096.

4.4.3 Setting the Number of External Encoder Scale Pitches

Encoder Resolution Bits and Resolution (Number of Divisions)

The following table gives the resolution bits and resolution (number of divisions) of various encoders.

			Мо	del	Relay device			Maxi-
Output Signal	Manufacturer	Rotary Encoder Type	Scale	Sensor Head	between Fully-Closed Module and rotary encoder	Reso- lution	Reso- lution Bit	mum Spee d ^{*1} min ⁻¹
	Magnescale	Sealed	RU77-40	96ADF ^{*2}	_	256	20	2000
	Co., Ltd.	Туре	RU77-409	6AFFT01 ^{*2}	-	1024	22	2000
		E				4096	27	1600
	Dr. JOHANNES HEIDENHAIN	Exposed Type	ECA4412*2			4096	28	800
		.)po				4096	29	400
		Sealed Type	RCN2010*2			4096	26	3000
Encoder for Yaskawa's			RCN5	□ 10 ^{*2}	EIB3391Y	4096	28	800
Serial	GmbH		RCN8010*2			4096	29	400
Interface			ROC2	2310 ^{*2}		4096	26	3000
(Σ-LINK)			ROC7	′310 ^{*2}		4096	28	800
			RA2		_	4096	23	14600
						1000	20	11000
	Renishaw PLC	Exposed Type	RA2	26Y- □□□□ ^{*2}	_	4096	26	3250
			RAG	30Y-	-	4096	30	200

*1. The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a SERVOPACK. The actual speed will be restricted by either the maximum speed of the Rotary Servomotor or the maximum

speed of the rotary encoder (given above).

*2. This is a single-turn absolute encoder.

Note: 1. Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the rotary encoder before you use it.

2. Σ -LINK is a registered trademark of Yaskawa Electric Corporation.

4.5 Signal and Command Setting Details

This section provides details about the signals or commands that must be configured to use this product.

Information

The method to switch between semi-closed loop control and fully-closed loop control will depend on the SERVOPACK that is used.

- SERVOPACK with analog voltage/pulse train references: Switch with I/O signals. Refer to the following section for details.
 - 4.5.1 I/O Signal Allocations: SERVOPACK with Analog Voltage/Pulse Train References on page 4-20
- SERVOPACK with MECHATROLINK-III communications references: Switch with MECHATROLINK-III communications commands. Refer to the following section for details.
 - 4.5.2 Command Details: SERVOPACK with MECHATROLINK-III Communications References on page 4-25

4.5.1 I/O Signal Allocations: SERVOPACK with Analog Voltage/Pulse Train References

Functions are allocated to the pins on the I/O signal connector (CN1) in advance. You can change the allocations and the polarity for some of the connector pins. Function allocations and polarity settings are made with parameters.

This section describes the I/O signal allocations.

Input Signal Allocations

Although you can use the input signals with the default settings, you must allocate the input signals related to Semi-Closed Loop Control/Fully-Closed Loop Control Switching to pins 40 to 46 on the I/O signal connector (CN1) when using this product.

First set Pn50A to n. DDD1 (Change the individual sequence input signal allocations).

Parameter		Description	When Enabled	Classification				
Pn50A	n.□□□0 (default set- ting)	Use the sequence input signal terminals with the default allocations.	After restart	Setup				
1 1100/1	n.0001	Change the individual sequence input signal allocations.						
• If you change the default polarity settings for the /S-ON (Servo ON) P-OT (Forward Drive Pro-								

Ì	If you change the default polarity settings for the /S-ON (Servo ON), P-OT (Forward Drive Pro- hibit), or N-OT (Reverse Drive Prohibit) signal, the main circuit power supply will not be turned OFF and the overtravel function will not operate if there are signal line disconnections or other
Important	problems. If you must change the polarity of one of these signals, verify operation and make
	sure that no safety problems will exist.
•	If you allocate two or more signals to the same input circuit, a logical OR of the inputs will be used and all of the allocated signals will operate accordingly. This may result in unexpected operation.

The input signals that you can allocate to the pins on the I/O signal connector (CN1) and the related parameters are given in the following table. Signals in cells in bold lines are unique to this product.

Input Signal	Input Signal Name	Parameter
/S-ON	Servo ON	$Pn50A = n.\Box\Box X\Box$
/P-CON	Proportional Control	$Pn50A = n.\Box X \Box \Box$
P-OT	Forward Drive Prohibit	Pn50A = n.X□□□
N-OT	Reverse Drive Prohibit	$Pn50B = n.\Box\Box\BoxX$
/ARM-RST	Alarm Reset	Pn50B = n.□□X□
/P-CL	Forward External Torque Limit	Pn50B = n.□X□□
/N-CL	Reverse External Torque Limit	Pn50B = n.X□□□
/SPD-D	Motor Direction	$Pn50C = n.\Box\Box\BoxX$
/SPD-A	Internal Set Speed Selection	Pn50C = n.□□X□
/SPD-B	Internal Set Speed Selection	$Pn50C = n.\Box X \Box \Box$
/C-SEL	Control Selection	Pn50C = n.X□□□
/ZCLAMP	Zero Camping	$Pn50D = n.\Box\Box\BoxX$
/INHIBIT	Reference Pulse Inhibit	$Pn50D = n.\Box\Box X\Box$
/G-SEL	Gain Selection	$Pn50D = n.\Box X \Box \Box$
SEN	Absolute Data Request	Pn515 = n.□□□X
/PSEL	Reference Pulse Input Multiplication Switch	Pn515 = n.□□X□
FSTP	Forced Stop	Pn516 = n.□□□X
/FLC	Semi-Closed/Fully-Closed Loop Control Selection	Pn58A = n.□□□X
/SFECLR	Motor-Load Position Deviation Clear	$Pn58A = n.\Box\Box X\Box$

Relationship between Parameter Settings, Allocated Pins, and Polarities

The following table shows the relationship between the input signal parameter settings, the pins on the I/O signal connector (CN1), and polarities.

Parameter Setting	Pin No.	Description					
0	40						
1	41	+24 V					
2	42						
3	43	A reverse signal (a signal with "/" before the signal abbreviation, such as the /					
4	44	S-ON signal) is active when the contacts are ON (closed).					
5	45	A signal that does not have "/" before the signal abbreviation (such as the P- OT signal) is active when the contacts are OFF (open).					
6	46						
7	-	The input signal is not allocated to a connector pin and it is always active. If the signal is processed on a signal edge, then it is always inactive.					
8	-	The input signal is not allocated to a connector pin and it is always inactive. Set the parameter to 8 if the signal is not used.					
9	40						
A	41						
В	42						
С	43	A reverse signal (a signal with "/" before the signal abbreviation, such as the /					
D	44	S-ON signal) is active when the contacts are OFF (open).					
E	45	A signal that does not have "/" before the signal abbreviation (such as the P- OT signal) is active when the contacts are ON (closed).					
F	46						

Note: Refer to the following section for details on input signal parameter settings. 8.2.1 List of Servo Parameters on page 8-3

Example of Changing Input Signal Allocations

The following example shows reversing the P-OT (Forward Drive Prohibit) signal allocated to CN1-42 and the /P-CL (External Torque Limit) signal allocated to CN1-45.

Pn50A = n.2 □□ 0	Pn50B = n. □ 5 □□	Before change
\downarrow	\downarrow	
Pn50A = n.5 □□ 1	Pn50B = n. □ 2 □□	After change

Refer to the following manual for the parameter setting procedure.

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

Confirming Input Signals

You can confirm the status of input signals on the I/O signal monitor. Refer to the following manual for information on the I/O signal monitor.

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

Output Signal Allocations

You can allocate the desired output signals to pins 25 to 30 and 37 to 39 on the I/O signal connector (CN1). You set the allocations in the following parameters: Pn50E, Pn50F, Pn510, Pn512, Pn513, Pn514, Pn517, and Pn51A.

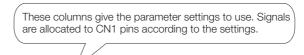
The signals that are not detected are considered to be OFF. For example, the /COIN (Position-ing Completion) signal is considered to be OFF during speed control.
Reversing the polarity of the /BK (Brake) signal, i.e., changing it to positive logic, will prevent the holding brake from operating if its signal line is disconnected. If you must change the polarity of this signal, verify operation and make sure that no safety problems will exist.

If you allocate more than one signal to the same output circuit, a logical OR of the signals will be output.

Output signals are allocated as shown in the following table. Signals in cells in bold lines are unique to this product.

Refer to *Interpreting the Output Signal Allocation Tables* and change the allocations accordingly.

Interpreting the Output Signal Allocation Tables



Output Signal Name	Output	(CN1 Pin No.						
and Parameter	Signal	25 and 26	27 and 28	29 and 30	37	38	39	(Not Used)	
Positioning Completion Pn50E = n.□□X□	/COIN	1	2	3	4	5	6	0	

				Distant				
Output Signal Name and Parameter	Output Signal	25 and 26	27 and 28	29 and 30	37	38	39	Disabled (Not Used)
Positioning Completion Pn50E = n.□□□X	/COIN	1 (default setting)	2	3	4	5	6	0
Speed Coincidence Detection Pn50E = n.□□X□	/V-CMP	1 (default setting)	2	3	4	5	6	0
Rotation Detection Pn50E = n.□X□□	/TGON	1	2 (default setting)	3	4	5	6	0
Servo Ready Pn50E = n.X□□□	/S-RDY	1	2	3 (default setting)	4	5	6	0
Torque Limit Detection Pn50F = n.□□□X	/CLT	1	2	3	4	5	6	0 (default setting)
Speed Limit Detection Pn50F = n.□□X□	/VLT	1	2	3	4	5	6	0 (default setting)
Brake Pn50F = n.□X□□	/BK	1	2	3	4	5	6	0 (default setting)
Warning Pn50F = n.X□□□	/WARN	1	2	3	4	5	6	0 (default setting)
Near Pn510 = n.□□□X	NEAR	1	2	3	4	5	6	0 (default setting)
Reference Pulse Input Multiplication Switch- ing Output Pn510 = n.□□X□	/PSELA	1	2	3	4	5	6	0 (default setting)
Preventative Mainte- nance Pn514 = n.□X□□	/PM	1	2	3	4	5	6	0 (default setting)
Alarm Code Pn517 = n.□□□X	ALO1	1	2	3	4 (default setting)	5	6	0
Alarm Code Pn517 = n.□□X□	ALO2	1	2	3	4	5 (default setting)	6	0
Alarm Code Pn517 = n.⊡X□□	ALO3	1	2	3	4	5	6 (default setting)	0
Semi-closed/Fully- closed Loop Control Status Pn51A = n.□□□X	/FLCA	1	2	3	4	5	6	0 (default setting)
Pn512 = n.□□□1	Reverse pol CN1-25 and	arity for CN1-26						
Pn512 = n.□□1□	Reverse polarity for CN CN1-28		1-27 and					
Pn512 = n.□1□□	Reverse polarity for CN1-29			CN1-30				0 (default setting) The polarity
Pn512 = n.1□□□	Reverse polarity for CN1-37							is not reversed in the default settings.
Pn513 = n.□□□1	Reverse polarity for CN1-38							
Pn513 = n.□□1□		F	leverse po	larity for C	N1-39			

Example of Changing Output Signal Allocations

The following example shows disabling the /COIN (Positioning Completion) signal allocated to CN1-25 and CN1-26 and allocating the /BK (Brake) signal.

Pn50E = $n.\Box\Box1\Box$ Pn50F = $n.\Box0\Box\Box$ Before change \downarrow \downarrow \downarrow Pn50E = $n.\Box\Box0\Box$ Pn50F = $n.\Box1\Box\Box$ After change

Refer to the following manual for the parameter setting procedure.

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

Checking Output Signal Status

You can confirm the status of output signals on the I/O signal monitor. Refer to the following manual for information on the I/O signal monitor.

 \square Σ -7-Series Σ -7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual

(Manual No.: SIEP S800001 26)

4.5.2 Command Details: SERVOPACK with MECHATROLINK-III Communications References

Commands for Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching

This product has the following MECHATROLINK-III communications commands for Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching.

- Semi-Closed Loop Control/Fully-Closed Loop Control Selection Signal (FLC)
- Motor-Load Position Deviation Clear Signal (SFECLR)
- Semi-Closed Loop Control/Fully-Closed Loop Control Status Signal (FLCA)

The following tables give the bit allocations and details of these signals.

• SVCMD_IO (output) region: 8th to 11th bytes of command field Command region from host controller to SERVOPACK.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
N_CL	P_CL	P_PPI	V_PPI	Reserved (0)					
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8		
DIL IO	DIL 14	DIL IS	DILIZ	DILII	DIL IU	DIL 9	DILO		
	Reserv	ved (0)		G-SEL					
Bit 23	Bit 22	Bit 21	Bit 20	Bit 19	Bit 18	Bit 17	Bit 16		
Reserved	SO3	SO2	SO1		BANK	K_SEL			
Bit 31	Bit 30	Bit 29	Bit 28	Bit 27	Bit 26	Bit 25	Bit 24		
Reserved (0)						SFECLR	FLC		

• Details of Output Signal Bits

Bit	Name	Description	Value	Setting	When Enabled				
	FLC	Semi-Closed Loop Control/ Fully-Closed Loop Control	0	Semi-closed loop control	Level				
24	TLO	Selection	1	Fully-closed loop control	Level				
	Switches the control between semi-closed loop control and fully-closed loop control when Semi-Closed Loop Control/Fully-Closed Loop Control Switching is enabled (Pn02A = $n.\Box\Box\Box$).								
	SFECLR	Motor-Load Position Devia-	0	Do not clear	Level				
	SILOLN	tion Clear	1	Clear	Levei				
25	Clears the motor-load position deviation when Semi-Closed Loop Control/Fully-Closed Loop Control Switching is enabled (Pn02A = n.								

4-25

4.5.2 Command Details: SERVOPACK with MECHATROLINK-III Communications References

SVCMD_IO (I/O signal status) region: 8th to 11th bytes of response field

Response region from the SERVOPACK to the host controller.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
ESTP	EXT3	EXT2	EXT1	N-OT	P-OT	DEC	Reserved (0)
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
ZPOINT	PSET	NEAR	DEN	N-SOT	P-SOT	BRK_ON	Reserved (0)
D 11 0 0			D 11 00				
Bit 23	Bit 22	Bit 21	Bit 20	Bit 19	Bit 18	Bit 17	Bit 16
	Reser	ved (0)		ZSPD	V_CMP	V_LIM	T_LIM
Bit 31	Bit 30	Bit 29	Bit 28	Bit 27	Bit 26	Bit 25	Bit 24
IO_STS8	IO_STS7	IO_STS6	IO_STS5	IO_STS4	IO_STS3	IO_STS2	FLCA

• Details of I/O Signal Status Bits

Bit	Name	Description	Value	Setting		
	FLCA Semi-Closed Loop Con- trol/Fully-Closed Loop Control Status	Semi-Closed Loop Con-	0	Semi-closed loop control status		
24		1	Fully-closed loop control status			
	Determines the control status (semi-closed loop control/fully-closed loop control).					



Bit 24 of SVCMD_IO can also be used as IO_STS1 in the same manner as the standard product. When an I/O signal monitor for CN1 is allocated to bit 24 with a setting, such as Pn860, the signal status changes with a logical OR of that signal and the FLCA signal.

Monitoring

This chapter provides information on monitoring SERVO-PACK status.

5.1	Moni	toring SERVOPACK Status5-2
	5.1.1	Monitoring Operation, Status, and I/O5-2
5.2	Monito	ring Machine Operation Status and Signal Waveforms5-5

5.1.1 Monitoring Operation, Status, and I/O

5.1 Monitoring SERVOPACK Status

5.1.1 Monitoring Operation, Status, and I/O

Items That You Can Monitor

The items that you can monitor on the Operation Pane, Status Pane, and I/O Pane are listed below.

· Operation Pane

Monitor Items					
 Motor Speed Speed Reference Internal Torque Reference Angle of Rotation 1 (number of encoder pulses from encoder phase C) Angle of Rotation 2 (electrical angle from polarity origin) Input Reference Pulse Speed Deviation Counter (Position Deviation) Cumulative Load Regenerative Load Power Consumption 	 Consumed Power Cumulative Power Consumption DB Resistor Consumption Power Absolute Encoder Multiturn Data Absolute Encoder Position within One Rotation Absolute Encoder (Lower) Absolute Encoder (Upper) Input Reference Pulse Counter Feedback Pulse Counter Fully Closed Feedback Pulse Counter Total Operating Time 				

Status Pane

Monitor Items				
Main Circuit	Position Reference (PULS)			
Encoder (PGRDY)Motor Power (Request)	 Position Reference Direction Clear Signal (CLR)* 			
Motor Power ON	Surge Current Limiting Resistor Short Relay			
 Dynamic Brake (DB) 	Regenerative Transistor			
 Rotation (Movement) Direction 	Regenerative Error Detection			
Mode Switch	AC Power ON			
Speed Reference (V-Ref)	Overcurrent			
 Torque Reference (T-Ref) 	Origin Not Passed			

* Can be monitored only when using a SERVOPACK with analog voltage/pulse train references.

5.1.1 Monitoring Operation, Status, and I/O

• I/O Pane: SERVOPACK with Analog Voltage/Pulse Train References

Monitor Items					
 /S-ON (Servo ON Input Signal) /P-CON (Proportional Control I P-OT (Forward Drive Prohibit In N-OT (Reverse Drive Prohibit In /P-CL (Forward External Torqu /N-CL (Reverse External Torqu /ALM-RST (Alarm Reset Input SEN (Absolute Data Request In /SPD-D (Motor Direction Signal) /SPD-D (Motor Direction Signal) /SPD-A (Internal Set Speed Senal) /C-SEL (Control Selection Input /INHIBIT (Reference Pulse Inhilit) /G-SEL (Gain Selection Input Signal) /P-DET (Polarity Detection Input Signal) FSTP (Forced Stop Input Signal) FSTP (Forced Stop Input Signal) /SFECLR (Motor-Load Position Input Signal) 	nput Signal) nput Signal) e Limit Signal) e Limit Signal) e Limit Signal) e Limit Signal) signal) nput Signal) election Input Sig- election Input Sig- it Signal) ti Signal) ti Signal) signal) ut Signal) Signal) mput Signal) Signal) Multiplication al) d Loop Control	Output Signal Status	 ALM (Servo Alarm Output Signal) /COIN (Positioning Completion Output Signal) /V-CMP (Speed Coincidence Detection Output Signal) /TGON (Rotation Detection Output Signal) /S-RDY (Servo Ready Output Signal) /CLT (Torque Limit Detection Output Signal) /VLT (Speed Limit Detection Output Signal) /VLT (Speed Limit Detection Output Signal) /WARN (Warning Output Signal) /WARN (Warning Output Signal) /NEAR (Near Output Signal) ALO1 (Alarm Code Output Signal) ALO2 (Alarm Code Output Signal) ALO3 (Alarm Code Output Signal) PAO (Encoder Divided Pulse Output Phase A Signal) PBO (Encoder Divided Pulse Output Phase B Signal) PCO (Encoder Divided Pulse Output Phase C Signal) /PSELA (Reference Pulse Input Multiplication Switching Output Signal) /PM (Preventative Maintenance Output Signal) /FLCA (Semi-closed/Fully-closed Loop Control Status Output Signal) 		

• I/O Pane: SERVOPACK with MECHATROLINK-III Communications References

Monitor Items

	Monitor Items					
Input Signal Status	 P-OT (Forward Drive Prohibit Input Signal) N-OT (Reverse Drive Prohibit Input Signal) /P-CL (Forward External Torque Limit Signal) /N-CL (Reverse External Torque Limit Signal) /G-SEL (Gain Selection Input Signal) /P-DET (Polarity Detection Input Signal) /DEC (Origin Return Deceleration Switch Input Signal) /EXT1 (External Latch Input 1 Signal) /EXT2 (External Latch Input 2 Signal) /EXT3 (External Latch Input 3 Signal) FSTP (Forced Stop Input Signal) /FLC (Semi-closed/Fully-closed Loop Control Selection Input Signal) /SFECLR (Motor-Load Position Deviation Clear Input Signal) 	Output Signal Status	 ALM (Servo Alarm Output Signal) /COIN (Positioning Completion Output Signal) /V-CMP (Speed Coincidence Detection Output Signal) /TGON (Rotation Detection Output Signal) /S-RDY (Servo Ready Output Signal) /CLT (Torque Limit Detection Output Signal) /VLT (Speed Limit Detection Output Signal) /VLT (Speed Limit Detection Output Signal) /WLT (Speed Limit Detection Output Signal) /WARN (Warning Output Signal) /NEAR (Near Output Signal) /NEAR (Near Output Signal) PAO (Encoder Divided Pulse Output Phase A Signal) PCO (Encoder Divided Pulse Output Phase B Signal) PCO (Encoder Divided Pulse Output Phase C Signal) /PM (Preventative Maintenance Output Signal) /FLCA (Semi-closed/Fully-closed Loop Control Status Output Signal) 			

5.1.1 Monitoring Operation, Status, and I/O

Operating Procedure

Use the following procedure to display the Operation Monitor, Status Monitor, and I/O Monitor for the SERVOPACK.

• Select Monitor in the SigmaWin+ Menu Dialog Box.

The Operation Pane, Status Pane, and I/O Pane will be displayed in the Monitor Window.

a			YA5K/	AWA SigmaWin	+ Ver.7	- 5 >	×
	Monitor Operation					۵ م م م	-1
0001-SV2		1/F 🗸	Item 🗸	Unit	0001-SV2- Axis A		
0001-SV2 -020L2 HBB P-0T HBB P-0T	POS SPO TRQ	Common	Mctor rotating speed	min-1	0		
POWER ESTP N-OT	SPD	Common	Speed reference	min-1	0		
	POS SPO TRO	Common	Input reference pulse speed	min-1	0		
	POS SPO TRO	Common	Position error amount	reference ur	0		
	POS SPO TRO	Common	Accumulated load ratio	%	0		
	POS SPO TRQ	Common	Regenerative load ratio	%	0		
	POS SPO TRQ		Power consumed by DB resi	%	0		
	POS SPO TRO	Common	Current Alarm State	-	Normal		
	Status 1/O						
	Status					- ļ	۱.
	Control	I/F 🖌	Item 🗸		0001-SV2-		11
	POS SPO TRO	Common	Dynamic Brake (DB)	ON(ALL)	Axis A ON		
	POS SPO TRO		Origin not Passed	ON(ALL)	OFF		
		Common	/COIN	-	OFF		
			/V-CMP	_	OFF	E CONTRACTOR OF CONTRACTOR	11
	POS SPO TRO		/S-RDY	-	OFF		
			/vlt	-	OFF		
	POS SPO TRO		Brake Interlock (/BK)	ON(ALL)	ON		
· · · · · · · · · · · · · · · · · · ·	POS SPO TRQ		/warn	-	OFF		
•	Filter 😑 Hid	ie 🕅 🛠 Standi	ard) 🛸 Clear				-

Information

You can flexibly change the contents that are displayed in the Monitor Window. Refer to the following manual for details.

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

5.2.1 Using the SigmaWin+

5.2 Monitoring Machine Operation Status and Signal Waveforms

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

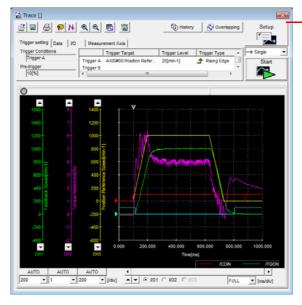
5.2.1 Using the SigmaWin+

This section describes how to trace data and I/O with the SigmaWin+.

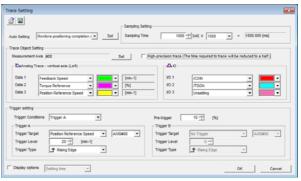
Refer to the following manual for detailed operating procedures for the SigmaWin+.

Operating Procedure

- 1. Click the <u>I</u> Servo Drive Button in the workspace of the Main Window of the SigmaWin+.
- 2. Select Trace in the Menu Dialog Box. The Trace Dialog Box will be displayed.



Click this button to display the Trace Setting Dialog Box shown below, and set the data to trace and the trace conditions.



Trace Objects

You can trace the following items.

Data Tracing

Trace Objects				
 Torque Reference Feedback Speed Reference Speed Position Reference Speed Position Error (Deviation) Position Amplifier Error (Deviation) 	 Motor - Load Position Deviation Speed Feedforward Torque Feedforward Effective (Active) Gain Main Circuit DC Voltage External Encoder Speed Control Mode 			

5.2.1 Using the SigmaWin+

• I/O Tracing: SERVOPACK with Analog Voltage/Pulse Train References

	Trace Objects						
Input Signals	 /S-ON (Servo ON Input Signal) /P-CON (Proportional Control Input Signal) P-OT (Forward Drive Prohibit Input Signal) N-OT (Reverse Drive Prohibit Input Signal) /ALM-RST (Alarm Reset Input Signal) /P-CL (Forward External Torque/Force Limit Input Signal) /N-CL (Reverse External Torque/Force Limit Input Signal) /N-CL (Reverse External Torque/Force Limit Input Signal) /SPD-D (Internal Set Speed Selection Input Signal) /SPD-A (Internal Set Speed Selection Input Signal) /SPD-B (Internal Set Speed Selection Input Signal) /C-SEL (Control Selection Input Signal) /ZCLAMP (Zero Clamping Input Signal) /INHIBIT (Reference Pulse Inhibit Input Signal) /G-SEL (Gain Selection Input Signal) /P-DET (Polarity Detection Input Signal) SEN (Absolute Data Request Input Signal) SIGN (Sign Reference Input Signal) CLR (Position Deviation Clear Input Signal) 	Output Signals	 ALM (Servo Alarm Output Signal) /COIN (Positioning Completion Output Signal) /V-CMP (Speed Coincidence Detection Output Signal) /TGON (Rotation Detection Output Sig- nal) /S-RDY (Servo Ready Output Signal) /CLT (Torque Limit Detection Output Sig- nal) /VLT (Speed Limit Detection Output Sig- nal) /VLT (Speed Limit Detection Output Sig- nal) /VLT (Speed Limit Detection Output Sig- nal) /WARN (Warning Output Signal) /MEAR (Near Output Signal) ALO1 (Alarm Code Output Signal) ALO2 (Alarm Code Output Signal) ALO2 (Alarm Code Output Signal) PAO (Encoder Divided Pulse Output Phase A Signal) PBO (Encoder Divided Pulse Output Phase B Signal) PCO (Encoder Divided Pulse Output Phase C Signal) /PSELA (Reference Pulse Input Multipli- cation Switching Output Signal) /FLCA (Semi-closed/Fully-closed Loop Control Status Output Signal) 				
	 /PŚEL (Reference Pulse Input Multiplication Input Signal) /HWBB1 (Hard Wire Base Block Input 1 Signal) /HWBB2 (Hard Wire Base Block Input 2 Signal) /FLC (Semi-closed/Fully-closed Loop Control Selection Input Signal) /SFECLR (Motor-Load Position Deviation Clear Input Signal) 	Internal Status	 ACON (Main Circuit ON Signal) PDETCMP (Polarity Detection Completed Signal) DEN (Position Reference Distribution Completed Signal) 				

	Trace Objects					
Input Signals	 P-OT (Forward Drive Prohibit Input Signal) N-OT (Reverse Drive Prohibit Input Signal) /P-CL (Forward External Torque/Force Limit Input Signal) /N-CL (Reverse External Torque/Force Limit Input Signal) /G-SEL (Gain Selection Input Signal) /P-DET (Polarity Detection Input Signal) /DEC (Origin Return Deceleration Switch Input Signal) /EXT1 (External Latch Input 1 Signal) /EXT2 (External Latch Input 2 Signal) /EXT3 (External Latch Input 3 Signal) FSTP (Forced Stop Input Signal) SEN (Absolute Data Request Input Signal) /HWBB1 (Hard Wire Base Block Input 1 Signal) /HWBB2 (Hard Wire Base Block Input 2 Signal) /FLC (Semi-closed/Fully-closed Loop Control Selection Input Signal) /SFECLR (Motor-Load Position Deviation Clear Input Signal) 	Output Signals	 ALM (Servo Alarm Output Signal) /COIN (Positioning Completion Output Signal) /V-CMP (Speed Coincidence Detection Output Signal) /TGON (Rotation Detection Output Signal) /TGON (Rotation Detection Output Signal) /CLT (Torque Limit Detection Output Signal) /CLT (Torque Limit Detection Output Signal) /VLT (Speed Limit Detection Output Signal) /VLT (Speed Limit Detection Output Signal) /WARN (Warning Output Signal) /WARN (Warning Output Signal) /NEAR (Near Output Signal) PAO (Encoder Divided Pulse Output Phase A Signal) PBO (Encoder Divided Pulse Output Phase B Signal) PCO (Encoder Divided Pulse Output Phase C Signal) /FLCA (Semi-closed/Fully-closed Loop Control Status Output Signal) 			
		Internal Status	 ACON (Main Circuit ON Signal) PDETCMP (Polarity Detection Completed Signal) DEN (Position Reference Distribution Completed Signal) PSET (Positioning Completion Output Signal) CMDRDY (Command Ready Signal) 			

• I/O Tracing: SERVOPACK with MECHATROLINK-III Communications References

5.2.2 Using the Analog Monitors

Connect a measuring instrument, such as a memory recorder, to the analog monitor connector (CN5) on the SERVOPACK to monitor analog signal waveforms. The measuring instrument is not provided by Yaskawa.

Refer to the following manuals for details on the connection.

- Ω 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)

Setting the Monitor Object

Use $Pn006 = n.\square\squareXX$ and $Pn007 = n.\square\squareXX$ (Analog Monitor 1 and 2 Signal Selections) to set the items to monitor.

Line Color	Signal	Parameter Setting
White	Analog monitor 1	Pn006 = n.□□XX
Red	Analog monitor 2	Pn007 = n.□□XX
Black (2 lines)	GND	_

Dev			Description	
Par	ameter	Monitor Signal	Output Unit	Remarks
	n.□□00 (default setting of Pn007)	Motor Speed	1 V/1,000 min ⁻¹	-
	n.□□01	Speed Reference	1 V/1,000 min ⁻¹	-
Pn006 or Pn007	n.□□02 (default setting of Pn006)	Torque Reference	1 V/100% rated torque	-
	n.□□03	Position Deviation	0.05 V/Reference unit	0 V for speed or torque control
	n.□□04	Position Amplifier Devi- ation	0.05 V/encoder pulse unit	Position deviation after electronic gear conversion
	n.□□05	Position Command Speed	1 V/1,000 min ⁻¹	For a SERVOPACK with Analog Volt- age/Pulse Train Ref- erences, the input reference pulses will be multiplied by n to output the position command speed.
	n.□□06	Reserved parameter (Do not change.)	-	-
	n.□□07	Motor - Load Position Deviation	0.01 V/Reference unit	-
	n.□□08	Positioning Completion	Positioning completed: 5 V Positioning not completed: 0 V	Completion is indi- cated by the output voltage.
	n.□□09	Speed Feedforward	1 V/1,000 min ⁻¹	-
	n.□□0A	Torque Feedforward	1 V/100% rated torque	-
	n.ロロ0B	Active Gain*	1st gain: 1 V 2nd gain: 2 V	The gain that is active is indicated by the output voltage.
	n.□□0C	Completion of Position Reference Distribution	Distribution completed: 5 V Distribution not completed: 0 V	Completion is indi- cated by the output voltage.
	n.□□0D	External Encoder Speed	1 V/1,000 min ⁻¹	Value calculated at the motor shaft
	n.□□10	Main Circuit DC Voltage	1 V/100 V (main circuit DC voltage)	-

* Refer to the following manuals for details. $\bigcap_{\mu} \Sigma$ -7-Series Σ -7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)

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

Changing the Monitor Factor and Offset

You can change the monitor factors and offsets for the output voltages for analog monitor 1 and analog monitor 2. The relationships to the output voltages are as follows:

Analog monitor 1	Analog Monitor 1 Signal	Analog Monitor 1	Analog Monitor 1
output voltage = (-1) × {	Selection (Pn006 = $n.\Box\BoxXX$) [×]	Magnification (Pn552) ⁺	Offset Voltage (Pn550)
Analog monitor 2 $= (-1) \times (-1) \times (-1)$	Analog Monitor 2 Signal ×	Analog Monitor 2 ₊	Analog Monitor 2
	Selection (Pn007 = n.□□XX)	Magnification (Pn553)	Offset Voltage (Pn551)

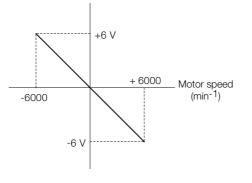
The following parameters are set.

	Analog Monitor 1 Of	fset Voltage		Speed	osition Torque	
Pn550	Setting Range	Setting Unit	Default Setting	When Enabled	Classification	
	-10,000 to 10,000	0.1 V	0	Immediately	Setup	
	Analog Monitor 2 Of	fset Voltage		Speed	osition Torque	
Pn551	Setting Range	Setting Unit	Default Setting	When Enabled	Classification	
	-10,000 to 10,000	0.1 V	0	Immediately	Setup	
	Analog Monitor 1 Ma	agnification		Speed	osition Torque	
Pn552	Setting Range	Setting Unit	Default Setting	When Enabled	Classification	
	-10,000 to 10,000	×0.01	100	Immediately	Setup	
	Analog Monitor 2 Ma	agnification		Speed	osition Torque	
Pn553	Setting Range	Setting Unit	Default Setting	When Enabled	Classification	
	-10,000 to 10,000	×0.01	100	Immediately	Setup	

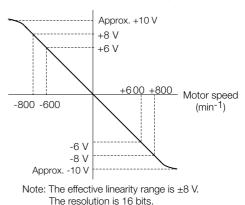
When Pn552 = 100 (Setting Unit: ×0.01)

When Pn552 = 1,000 (Setting Unit: ×0.01)

Analog monitor output voltage (V)



Analog monitor output voltage (V)



Adjusting the Analog Monitor Output

You can manually adjust the offset and gain for the analog monitor outputs for the torque reference monitor and motor speed monitor.

The offset is adjusted to compensate for offset in the zero point caused by output voltage drift or noise in the monitoring system.

The gain is adjusted to match the sensitivity of the measuring system.

The offset and gain are adjusted at the factory. You normally do not need to adjust them.

Adjustment Example

An example of adjusting the output of the motor speed monitor is provided below.

Offset Adju	stment	Gain Adju	stment		
Analog monitor output voltage		Analog monitor output	Voltage Gain adjustment 000 [min ⁻¹] Motor speed		
Item	Specification	Item	Specification		
Offset Adjustment Range	-2.4 V to 2.4 V	Gain Adjustment Range	100 ±50%		
Adjustment Unit	18.9 mV/LSB	Adjustment Unit	0.4%/LSB		
Adjustment office 0.476/200 The gain adjustment range is made using a 100% of put value (gain adjustment of 0) as the reference val with an adjustment range of 50% to 150%. A setting example is given below. • Setting the Adjustment Value to -125 100 + (-125 × 0.4) = 50 [%] Therefore, the monitor output voltage goes to 50% of the original value. • Setting the Adjustment Value to 125 100 + (125 × 0.4) = 150 [%] Therefore, the monitor output voltage goes to 50% of the original value.					

Information • The adjustment values do not use parameters, so they will not change even if the parameter settings are initialized.

- Adjust the offset with the measuring instrument connected so that the analog monitor output value goes to zero. The following setting example achieves a zero output.
 - While power is not supplied to the Servomotor, set the monitor signal to the torque reference.
 - In speed control, set the monitor signal to the position deviation.

Preparations

Always check the following before you adjust the analog monitor output.

• The parameters must not be write prohibited.

Applicable Tools

You can use the following tools to adjust analog monitor outputs.

• Offset Adjustment

Tool	Fn No./Function Name	Operating Procedure Reference
Panel Operator*	Fn00C	Ω Σ-7-Series Σ-7S SERVOPACK with Analog Volt- age/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)
Digital Operator	Fn00C	Ω Σ-7-Series Digital Operator Operating Manual (Manual No.: SIEP S800001 33)
SigmaWin+	Others - Analog Monitor Output Adjustment	

*Available for a SERVOPACK with Analog Voltage/Pulse Train References.

· Gain Adjustment

Tool	Fn No./Function Name	Operating Procedure Reference
Panel Operator*	Fn00D	Ω Σ-7-Series Σ-7S SERVOPACK with Analog Volt- age/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)
Digital Operator	Fn00D	Ω Σ-7-Series Digital Operator Operating Manual (Manual No.: SIEP S800001 33)
SigmaWin+	Others - Analog Monitor Output Adjustment	

*Available for a SERVOPACK with Analog Voltage/Pulse Train References.

Operating Procedure

Use the following procedure to adjust the analog monitor output.

- 1. Click the El Servo Drive Button in the workspace of the Main Window of the SigmaWin+.
- 2. Select Adjust the Analog Monitor Output in the Menu Dialog Box. The Adjust the Analog Monitor Output Dialog Box will be displayed.
- 3. Click the Zero Adjustment or Gain Adjustment Tab.

Search Adjust the Analog Monitor Output AXIS#00
Zero Adjustment Gain Adjustment
Analog Monitor Output Offset
Channel CH1
Offset +1 ᠿ♠
Monitor Signal Torque reference (1 V/100% rated to

4. While watching the analog monitor, use the +1 and -1 Buttons to adjust the offset. There are two channels: CH1 and CH2. If necessary, click the down arrow on the **Channel** Box and select the channel.

Search Adjust the Analog Monitor Output AXIS#00
Zero Adjustment Gain Adjustment
Analog Monitor Output Offset
Channel CH1
Offset
Monitor Signal Torque reference (1 V/100% rated to

This concludes adjusting the analog monitor output.

Maintenance

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

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	6.2.1 6.2.2 6.2.3 6.2.4 6.2.5 6.2.6 6.2.7	Alarm Displays6-54List of Alarms6-54Troubleshooting Alarms6-59Warning Displays6-87List of Warnings6-88Troubleshooting Warnings6-90Troubleshooting Based on the Operation and

6.1.1 Alarm Displays

6.1 SERVOPACK with Analog Voltage/Pulse Train References

6.1.1 Alarm Displays

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



Example: If an A.020 alarm occurs, "020" will flash on the display.

This section provides a list of the alarms that may occur and the causes of and corrections for those alarms.

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

Continued on next page.

6.1.2 List of Alarms

Continued from previous page.

Alarm	Alarm Name	Alarm Meaning	Servo- motor Stop-	Alarm Reset	-	arm Co Outpu	
Number	Alami Name	Alarm Meaning	ping Method	Possi- ble?	ALO1	ALO2	ALO3
A.041	Encoder Output Pulse Setting Error	The setting of Pn212 (Number of Encoder Output Pulses) or Pn281 (Encoder Output Reso- lution) 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 set- ting 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 SERVO- PACK 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 dif- ferent type of motor from the previously connected motor.	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 con- troller after a utility function that turns ON the Servomotor was executed.	Gr.1	Yes	н	Н	Н
A.0b1	Semi-closed/Fully-closed Loop Control Switching Operation Error	An error occurred when semi- closed/fully-closed loop con- trol is switched.	Gr.1	Yes	Н	Н	Н
A.100	Overcurrent Detected	An overcurrent flowed through the power transistor or the heat sink overheated.	Gr.1	No	L	Н	Н
A.101	Motor Overcurrent Detected	The current to the motor exceeded the allowable current.	Gr.1	No	L	Н	Н
A.300	Regeneration Error	There is an error related to regeneration.	Gr.1	Yes	L	L	н
A.320	Regenerative Overload	A regenerative overload occurred.	Gr.2	Yes	L	L	н
A.330	Main Circuit Power Supply Wiring Error	 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
A.511	Encoder Output Pulse Overspeed	The pulse output speed for the setting of Pn212 (Number of Encoder Output Pulses) or the setting of Pn281 (Encoder Output Resolution) was exceeded.	Gr.1	Yes	L	Н	L

Continued on next page.

6.1.2 List of Alarms

	Continued from previous page						
Alarm	Alarm Name	Alorm Mooning	Servo- motor	Alarm Reset		arm Co Outpu	
Number	Alami Name	Alarm Meaning	Stop- ping Method	Possi- ble?	ALO1	ALO2	ALO3
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.710	Instantaneous Overload	The Servomotor was operating for several seconds to several tens of seconds under a torque that largely exceeded the rating.	Gr.2	Yes	L	L	L
A.720	Continuous Overload	The Servomotor was operating continuously under a torque that exceeded the rating.	Gr.1	Yes	L	L	L
A.730 A.731	Dynamic Brake Overload	When the dynamic brake was applied, the rotational or linear kinetic energy exceeded the capacity of the dynamic brake resistor.	Gr.1	Yes	L	L	L
A.740	Inrush Current Limiting Resistor Overload	The main circuit power supply was frequently turned ON and OFF.	Gr.1	Yes	L	L	L
A.7A1	Internal Temperature Error 1 (Control Board Tempera- ture Error)	The surrounding temperature of the control PCB is abnormal.	Gr.2	Yes	L	L	L
A.7A2	Internal Temperature Error 2 (Power Board Tempera- ture Error)	The surrounding temperature of the power PCB is abnormal.	Gr.2	Yes	L	L	L
A.7A3	Internal Temperature Sen- sor Error	An error occurred in the tem- perature 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 check- sum results for encoder mem- ory.	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
A.840	Encoder Data Alarm	There is an internal data error in the encoder.	Gr.1	No	Н	Н	Н
A.850	Encoder Overspeed	The encoder was operating at high speed when the power was turned ON.	Gr.1	No	н	н	Н
A.860	Encoder Overheated	The internal temperature of the rotary encoder or linear encoder is too high.	Gr.1	No	Н	н	Н
A.861	Motor Overheated	The internal temperature of motor is too high.	Gr.1	No	Н	н	Н
A.862	Overheat Alarm	The input voltage (tempera- ture) for the overheat protec- tion input (TH) signal exceeded the setting of Pn61B (Overheat Alarm Level).	Gr.1	Yes	н	Н	Н

6.1.2 List of Alarms

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.8A0	External Encoder Error	An error occurred in the exter- nal 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 exter- nal encoder.	Gr.1	Yes	Н	н	Н
A.8A3	External Absolute Encoder Position Error	An error occurred in the posi- tion 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 cur- rent detection circuit.	Gr.1	No	Н	Н	Н
A.bF0	System Alarm 0	Internal program error 0 occurred in the SERVOPACK.	Gr.1	No	Н	н	н
A.bF1	System Alarm 1	Internal program error 1 occurred in the SERVOPACK.	Gr.1	No	Н	Н	Н
A.bF2	System Alarm 2	Internal program error 2 occurred in the SERVOPACK.	Gr.1	No	Н	Н	Н
A.bF3	System Alarm 3	Internal program error 3 occurred in the SERVOPACK.	Gr.1	No	Н	Н	н
A.bF4	System Alarm 4	Internal program error 4 occurred in the SERVOPACK.	Gr.1	No	Н	н	Н
A.bF5	System Alarm 5	Internal program error 5 occurred in the SERVOPACK.	Gr.1	No	Н	н	Н
A.bF6	System Alarm 6	Internal program error 6 occurred in the SERVOPACK.	Gr.1	No	Н	Н	Н
A.bF7	System Alarm 7	Internal program error 7 occurred in the SERVOPACK.	Gr.1	No	Н	Н	Н
A.bF8	System Alarm 8	Internal program error 8 occurred in the SERVOPACK.	Gr.1	No	Н	Н	Н
A.C10	Servomotor Out of Control	The Servomotor ran out of control.	Gr.1	Yes	L	н	L
A.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 SERVOPACK is not possible.	Gr.1	No	L	н	L
A.C91	Encoder Communications Position Data Acceleration Rate Error	An error occurred in calculat- ing the position data of the encoder.	Gr.1	No	L	н	L

Maintenance

6.1.2 List of Alarms

Continued from previous page						page.	
Alarm	Alarm Name	Alorm Mooning	Servo- motor	Alarm Reset	Alarm Co Output		
Number	Alami Name	Alarm Meaning	Stop- ping Method	Possi- ble?	ALO1	ALO2	ALO3
A.C92	Encoder Communications Timer Error	An error occurred in the com- munications timer between the encoder and SERVOPACK.	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 communica- tions 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 Feed- back Option Module failed.	Gr.1	No	L	Н	L
A.CF2	Timer Stopped Error in Feedback Option Module Communications	An error occurred in the timer for communications with the Feedback Option Module.	Gr.1	No	L	Н	L
A.d00	Position Deviation Over- flow	The setting of Pn520 (Position Deviation Overflow Alarm Level) was exceeded by the position deviation.	Gr.1	Yes	L	L	Н
A.d01	Position Deviation Over- flow Alarm at Servo ON	The servo was turned ON after the position deviation exceeded the setting of Pn526 (Position Deviation Overflow Alarm Level at Servo ON) while the servo was OFF.	Gr.1	Yes	L	L	Н
A.d02	Position Deviation Over- flow Alarm for Speed Limit at Servo ON	If position deviation remains in the deviation counter, the set- ting of Pn529 (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 Devi- ation 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 connected.	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

Continued from previous page.

6.1.2 List of Alarms

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Alarm			Servo- motor	Alarm	Alarm Code Output		
Number	Alarm Name	Alarm Meaning	Stop- ping Method	Possi- ble?	ALO1	ALO2	ALO3
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	ньн		Н
FL-1*		An internal program error	_	No	Undefined.		
FL-2*							
FL-3*	Ourstans Alama						
FL-4*	System Alarm	occurred in the SERVOPACK.					
FL-5*							
FL-6*							
CPF00	Digital Operator Commu- nications 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).	_	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)

6.1.3 Troubleshooting Alarms

The causes of and corrections for the alarms are given in the following table. Contact your Yaskawa representative if you cannot solve a problem with the correction given in the table.

Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The power supply voltage suddenly dropped.	Measure the power supply voltage.	Set the power supply volt- age within the specified range, and initialize the parameter settings.	*1
	The power supply was shut OFF while writing parameter set- tings.	Check the timing of shutting OFF the power supply.	Initialize the parameter settings and then set the parameters again.	
A.020: Parameter	The number of times that parameters were written exceeded the limit.	Check to see if the parameters were fre- quently changed from the host controller.	The SERVOPACK may be faulty. Replace the SERVOPACK. Reconsider the method for writing the parameters.	-
Checksum Error (There is an error in the parameter data in the SERVOPACK.)	A malfunction was caused by noise from the AC power supply, ground, static elec- tricity, or other source.	Turn the power supply to the SERVOPACK OFF and ON again. If the alarm still occurs, noise may be the cause.	Implement countermea- sures against noise.	*1
	Gas, water drops, or cutting oil entered the SERVOPACK and caused failure of the internal components.	Check the installation conditions.	The SERVOPACK may be faulty. Replace the SERVOPACK.	_
	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 SERVOPACK.	-
A.021: Parameter For- mat 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 soft- ware version of the parameters specified to write.	Read the product infor- mation to see if the soft- ware versions are the same. If they are differ- ent, 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
data format in the SERVOPACK.)	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The power supply voltage suddenly dropped.	Measure the power supply voltage.	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.022: System Check- sum Error (There is an error in the parameter data in the SERVOPACK.)	The power supply was shut OFF while setting a utility func- tion.	Check the timing of shutting OFF the power supply.	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
	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 SERVOPACK.	-

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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 SERVOPACK.	_		
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 SERVOPACK.	-		
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SERVOPACK.	-		
A.030: Main Circuit Detector Error	The jumper between the DC Reactor termi- nals (\ominus 1 and \ominus 2) was removed or there is faulty contact. The cable between		Correct the wiring between the DC Reactor	_		
	the DC Reactor and SERVOPACK is not wired correctly or there is a faulty con- tact.		terminals.			
	The SERVOPACK and Servomotor capaci- ties do not match each other.	Check the combination of the SERVOPACK and Servomotor capacities.	Select a proper combina- tion of SERVOPACK and Servomotor capacities.	*1		
A.040: Parameter Set-	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	_		
ting Error (A parameter set- ting is outside of the setting	A parameter setting is outside of the setting range.	Check the setting ranges of the parame- ters 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 fol- lowing 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 Out- put Resolution) is out- side of the setting range or does not sat- isfy the setting condi- tions.	Check the setting of Pn212 or Pn281.	Set Pn212 or Pn281 to an appropriate value.	*1		

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Alarm Number:					
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 Servo- motor 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 (Program Jogging Movement Speed) was changed.	Check to see if the detection conditions ^{*2} are satisfied.	Increase the setting of Pn533.	*1	
	The movement speed of advanced autotun- ing 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 011.	The setting of the Fully-Closed Module does not match the setting of Pn002 = n.X□□□ (External Encoder Usage).	Check the setting of Pn002 = $n.X\square\square\square$.	Make sure that the setting of the Fully-closed Module agrees with the setting of Pn002 = $n.X\square\square\square$.	*1	
A.044: Semi-Closed/ Fully-Closed Loop Control Parameter Setting Error	 The following parameters are not set correctly. Pn002 = n.X□□□ (External Encoder Usage) Pn02A = n.□□□X (Semi-closed/Fully-closed Loop Control Switching Selection) 	Check the setting of Pn002 = $n.X\square\square\square$ and Pn02A = $n.\square\square\squareX$.	When switching between semi-closed loop control and fully-closed loop con- trol, set the parameters as follows: • Pn002 = n.1000 or n.3000 • Pn02A = n.0001	_	
A.050: Combination Error (The capacities of the SERVOPACK and Servomotor do not match.)	The SERVOPACK and Servomotor capaci- ties do not match each other.	Confirm that the follow- ing condition is met: $1/4 \le$ (Servomotor capacity/SERVOPACK capacity) ≤ 4	Select a proper combina- tion of the SERVOPACK and Servomotor capaci- ties.	*1	
	A failure occurred in the encoder.	Replace the encoder and check to see if the alarm still occurs.	Replace the Servomotor or encoder.	_	
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SERVOPACK.	_	
A.051: Unsupported Device Alarm	An unsupported Serial Converter Unit or encoder (e.g., an external encoder) is connected to the SERVOPACK.	Check the product combination specifica-tions.	Change to a correct com- bination 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 SERVOPACK 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 SERVOPACK OFF and ON again.	*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 Ser- vomotor was exe- cuted.	_	Turn the power supply to the SERVOPACK OFF and ON again. Or, execute a software reset.	*1			
A.0b1: Semi-closed Loop Control/ Fully-closed Loop Control Switch- ing Operation Error	Semi-closed Loop Control/Fully-closed Loop Control Switch- ing was executed while one of the fol- lowing functions was running: • Jog • Origin Search • Jog Program • Adjust the Motor Current Detection Signal Offsets • Autotuning without Host Reference • Easy FFT • Mechanical Analysis • Moment of Inertia Estimation • Speed Ripple Com- pensation	Check the timing of switching between semi-closed loop con- trol and fully-closed loop control.	- Continued o	-			

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The Main Circuit Cable is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	
	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.	
A.100: Overcurrent Detected (An overcurrent flowed through the power tran-	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 Servo- motor.	*1
sistor or the heat sink overheated.)	There is a short-circuit or ground fault inside the SERVOPACK.	Check for short-circuits across the Servomotor connection terminals U, V, and W on the SERVOPACK, or between the ground and terminals U, V, or W.	The SERVOPACK may be faulty. Replace the SERVOPACK.	
	The regenerative resistor is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	*1

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference	
	The dynamic brake (DB, emergency stop executed from the SERVOPACK) was frequently activated, or a DB overload alarm occurred.	Check the power con- sumed by the DB resis- tor 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 meth- ods, or the mechanisms so that the dynamic brake does not need to be used so frequently.	_	
	The regenerative pro- cessing capacity was exceeded.	Check the regenerative load ratio in the Sig- maWin+ Motion Monitor Tab Page to see how frequently the regenera- tive resistor is being used.	Recheck the operating conditions and load.	*4	
A.100: Overcurrent Detected (An overcurrent flowed through the power tran- sistor or the heat	The SERVOPACK regenerative resis- tance is too small.	Check the regenerative load ratio in the Sig- maWin+ Motion Monitor Tab Page to see how frequently the regenera- tive resistor is being used.	Change the regenerative resistance to a value larger than the SERVO- PACK minimum allowable resistance.	7	
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 countermea- sures against noise, such as correct wiring of the FG. Use an FG wire size equivalent to the SERVO- PACK's main circuit wire size.	-	
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-	

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The Main Circuit Cable is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	
	There is a short-circuit or ground fault in a Main Circuit Cable.	Check for short-circuits across 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.	
	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 Servo- motor.	*1
A.101: Motor Overcur- rent Detected (The current to the motor exceeded the allowable current	There is a short-circuit or ground fault inside the SERVOPACK.	Check for short-circuits across the Servomotor connection terminals U, V, and W on the SERVOPACK, or between the ground and terminals U, V, or W.	The SERVOPACK may be faulty. Replace the SERVOPACK.	
allowable cur- rent.)	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 countermea- sures against noise, such as correct wiring of the FG. Use an FG wire size equivalent to the SERVO- PACK's main circuit wire size.	-
	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	Pn600 (Regenerative Resistor Capacity) is not set to 0 and an External Regenerative Resistor is not con- nected to one of the following SERVO- PACKs: SGD7S- R70A, -R90A,-1R6A, -2R8A, -R70F, -R90F, -2R1F, or -2R8F.	Check to see if an External Regenerative Resistor is connected and check the setting of Pn600.	Connect an External Regenerative Resistor, or set Pn600 (Regenerative Resistor Capacity) to 0 (setting unit: ×10 W) if no Regenerative Resistor is required.	*1
	An External Regener- ative 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 Regenera- tive Resistor Unit is con- nected 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.	
A.300: Regeneration Error	The jumper between the regenerative resis- tor terminals (B2 and B3) was removed from one of the fol- lowing SERVOPACKs: SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, or -330A.	Check to see if the jumper is connected between power supply terminals B2 and B3.	Correctly connect a jumper.	*1
	The External Regener- ative Resistor is not wired correctly, or was removed or discon- nected.	Check the wiring of the External Regenerative Resistor.	Correct the wiring of the External Regenerative Resistor.	
	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 SERVO- PACK may be faulty. Replace the SERVO- PACK.	-

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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 volt- age within the specified range.	_
	The external regener- ative resistance value or regenerative resis- tor capacity is too small, or there has been a continuous regeneration state.	Check the operating conditions or the capacity using the Sig- maJunmaSize+ Capac- ity Selection Software or other means.	Change the regenerative resistance value or capac- ity. Reconsider the operating conditions using the Sig- maJunmaSize+ Capacity Selection Software or other means.	*4
	There was a continu- ous regeneration state because a negative load was continu- ously 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 Resis- tor Capacity) is smaller than the capacity of the Exter- nal Regenerative Resistor.	Check to see if a Regenerative Resistor is connected and check the setting of Pn600.	Correct the setting of Pn600.	*1
	The setting of Pn603 (Regenerative Resis- tance) 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 regener- ative 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 SERVOPACK.	_

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The regenerative resistor was discon- nected when the SERVOPACK power supply voltage was high.	Measure the resistance of the regenerative resistor using a measur- ing instrument.	If you are using the regen- erative resistor built into the SERVOPACK, replace the SERVOPACK. If you are using an Exter- nal Regenerative Resis- tor, replace the External Regenerative Resistor.	-
4 000	DC power was sup- plied when an AC power supply input was specified in the settings.	Check the power sup- ply to see if it is a DC power supply.	Correct the power supply setting to match the actual power supply.	*1
A.330: Main Circuit Power Supply Wiring Error (Detected when the main circuit power supply is turned ON.)	AC power was sup- plied when a DC power supply input was specified in the settings.	Check the power sup- ply to see if it is an AC power supply.	Correct the power supply setting to match the actual power supply.	1
	Pn600 (Regenerative Resistor Capacity) is not set to 0 and an External Regenerative Resistor is not con- nected to one of the following SERVOPACKs: SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, or -2R8F.	Check to see if an External Regenerative Resistor is connected and check the setting of Pn600.	Connect an External Regenerative Resistor, or if an External Regenera- tive Resistor is not required, set Pn600 to 0.	*1
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the 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 AC/DC power supply voltage within the specified range.	_
	The power supply is not stable or was influenced by a light- ning surge.	Measure the power supply voltage.	Improve the power sup- ply 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 SER- VOPACK.	_
A.400: Overvoltage (Detected in the	The voltage for AC power supply was too high during accelera- tion or deceleration.	Check the power sup- ply voltage and the speed and torque during operation.	Set the AC power supply voltage within the speci- fied range.	-
main circuit power supply section of the SERVOPACK.)	The external regener- ative 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 oper- ating conditions and load.	*4
	The moment of inertia ratio exceeded the allowable value.	Check to see if the moment of inertia 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 SERVO- PACK may be faulty. Replace the SERVO- PACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The power supply voltage went below the specified range.	Measure the power supply voltage.	Set the power supply volt- age within the specified range.	-
	The power supply voltage dropped during operation.	Measure the power supply voltage.	Increase the power supply capacity.	-
	A momentary power interruption occurred.	Measure the power supply voltage.	If you have changed the setting of Pn509 (Momen- tary Power Interruption Hold Time), decrease the setting.	*1
A.410:	The SERVOPACK fuse is blown out.	Check the power sup- ply wiring.	Correct the power supply wiring and replace the SERVOPACK.	_
Undervoltage (Detected in the main circuit power supply section of the	The SERVOPACK fuse is blown out.	_	Replace the SERVO- PACK and connect a reactor to the DC reactor terminals (\ominus 1 and \ominus 2) on the SERVOPACK.	-
SERVOPACK.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SERVOPACK.	_
	The jumper between the DC Reactor termi- nals (\ominus 1 and \ominus 2) was removed or there is faulty contact.		Correct the wiring	
	The cable between the DC Reactor and SERVOPACK is not wired correctly or there is a faulty con- tact.	_	between the DC Reactor terminals.	_
	The order of phases U, V, and W in the motor wiring is not correct.	Check the wiring of the Servomotor.	Make sure that the Servo- motor is correctly wired.	-
A.510: Overspeed	A reference value that exceeded the over- speed detection level was input.	Check the input refer- ence.	Reduce the reference value. Or, adjust the gain.	
(The motor exceeded the maximum speed.)	The motor exceeded the maximum speed.	Check the waveform of the motor speed.	Reduce the speed refer- ence 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 SERVOPACK.	_
A.511:	The encoder output pulse frequency exceeded the limit.	Check the encoder out- put 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 out- put pulse setting and the motor speed.	Reduce the motor speed.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	Abnormal oscillation was detected in the motor speed.	Check for abnormal motor noise, and check the speed and torque waveforms during oper- ation.	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.	Set Pn103 (Moment of Inertia Ratio) to an appro- priate value.	*1
	The vibration detec- tion level (Pn312) is not suitable.	Check that the vibra- tion detection level (Pn312) is suitable.	Set a suitable vibration detection level (Pn312).	*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 cus- tom tuning or Easy FFT.	Check the waveform of the motor speed.	Check the operating pro- cedure of corresponding function and implement corrections.	*1
	The wiring is not cor- rect 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: Continuous Overload	An excessive load was applied during operation because the Servomotor was not driven due to mechanical problems.	Check the operation reference and motor speed.	Correct the mechanical problem.	-
	Operation was per- formed with a load applied to the shaft of the servomotor that exceeded the allow- able value.	Check the condition of the machine to deter- mine if a load was applied to the shaft of the servomotor that exceeded the allowable value.	Correct the condition of the machine so that the load on the shaft during servomotor operation does not exceed the allowable value.	-
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
4 720 and 4 721.	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 Servomo- tor was stopped with the dynamic brake, the rotational or linear kinetic energy exceeded the capac- ity of the dynamic brake resistor.	Check the power con- sumed by the DB resis- tor to see how frequently the DB is being used.	 Reconsider the following: Reduce the Servomotor command speed. Decrease the moment of inertia ratio. Reduce the frequency of stopping with the dynamic brake. 	_
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SERVOPACK.	_
A.740: Inrush Current Limiting Resistor Overload (The main circuit power supply	The allowable fre- quency of the inrush current limiting resis- tor 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 SERVOPACK.	-
	The surrounding tem- perature is too high.	Check the surrounding temperature using a thermostat. Or, check the operating status with the SERVOPACK installation environment monitor.	Decrease the surround- ing temperature by improving the SERVO- PACK installation condi- tions.	*1
A.7A1:	An overload alarm was reset by turning OFF the power sup- ply 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 exces- sive load or operation was performed that exceeded the regen- erative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenera- tive load ratio to check the regenerative pro- cessing capacity.	Reconsider the load and operating conditions.	-
	The SERVOPACK installation orientation is not correct or there is insufficient space around the SERVO- PACK.	Check the SERVOPACK installation conditions.	Install the SERVOPACK according to specifica- tions.	*1
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
Alarm Name	The surrounding tem- perature is too high.	Check the surrounding temperature using a thermostat. Or, check the operating status with the SERVOPACK installation environment monitor.	Decrease the surround- ing temperature by improving the SERVO- PACK installation condi- tions.	*1
	An overload alarm was reset by turning OFF the power sup- ply 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 exces- sive load or operation was performed that exceeded the regen- erative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenera- tive load ratio to check the regenerative pro- cessing capacity.	Reconsider the load and operating conditions.	-
	The SERVOPACK installation orientation is not correct or there is insufficient space around the SERVO- PACK.	Check the SERVOPACK installation conditions.	Install the SERVOPACK according to specifica- tions.	*1
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	_
A.7A3: Internal Tempera- ture Sensor Error (An error occurred in the temperature sen- sor circuit.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SERVOPACK.	_
A.7Ab: SERVOPACK Built-in Fan Stopped	The fan inside the SERVOPACK stopped.	Check for foreign matter inside the SERVOPACK.	Remove foreign matter from the SERVOPACK. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The power to the absolute encoder was turned ON for the first time.	Check to see if the power supply was turned ON for the first time.	Set up the encoder.	
A.810: Encoder Backup Alarm (Detected at the encoder, but only when an abso- lute encoder is used.)	The Encoder Cable was disconnected and then connected again.	Check to see if the power supply was turned ON for the first time.	Check the encoder con- nection and set up the encoder.	*1
	Power is not being supplied both from the control power supply (+5 V) from the SERVOPACK and from the battery power supply.	Check the encoder connector battery and the connector status.	Replace the battery or implement similar mea- sures to supply power to the encoder, and set up the encoder.	
	A failure occurred in the absolute encoder.	-	If the alarm still occurs after setting up the encoder again, replace the Servomotor.	_
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Device Continued from previous page.				
Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.820: Encoder Check- sum Alarm (Detected at the encoder.)	A failure occurred in the encoder.	_	 When Using an Absolute Encoder Set up the encoder again. If the alarm still occurs, the Servomotor may be faulty. Replace the Servomotor. When Using a Singleturn Absolute Encoder or Incremental Encoder The Servomotor may be faulty. Replace the Servomotor. 	*1
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.830: Encoder Battery	The battery connec- tion is faulty or a bat- tery is not connected.	Check the battery con- nection.	Correct the battery con- nection.	*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 SERVOPACK.	-
A.840: Encoder Data	The encoder malfunc- tioned.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor may be faulty. Replace the Servomotor.	_
Alarm (Detected at the encoder.)	The encoder malfunc- tioned 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.	-
A.850: Encoder Over- speed (Detected at the encoder when the control power supply is turned	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 failure occurred in the encoder.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor may be faulty. Replace the Servomotor.	-
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.	-

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

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The surrounding tem- perature is too high.	Check the surrounding temperature using a thermostat.	Lower the surrounding temperature by improving the installation conditions of the machine.	_
	The overheat protec- tion input signal line is disconnected or short-circuited.	Check the input voltage with the overheat pro- tection input information on the Motion Monitor Tab Page on the Sig- maWin+.	Repair the line for the overheat protection input signal.	_
A.862: Overheat Alarm	An overload alarm was reset by turning OFF the power sup- ply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	-
	Operation was per- formed under an excessive load.	Use the accumulated load ratio to check the load during operation.	Reconsider the load and operating conditions.	_
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The temperature detection circuit in the sensor attached to the machine is faulty.	-	The temperature detec- tion circuit in the sensor attached to the machine may be faulty. Repair the sensor attached to the machine.	_
A.8A0: External Encoder Error	A failure occurred in the external encoder.	_	Replace the external encoder.	-
A.8A1:	A failure occurred in the external encoder.	-	Replace the external encoder.	_
External Encoder Module Error	A failure occurred in the Serial Converter Unit.	_	Replace the Serial Con- verter Unit.	-
A.8A2: External Incre- mental Encoder Sensor Error	A failure occurred in the external encoder.	_	Replace the external encoder.	_
A.8A3: External Abso- lute Encoder Position Error	A failure occurred in the external absolute encoder.	_	The external absolute encoder may be faulty. Refer to the encoder manufacturer's instruc- tion manual for correc- tions.	-
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 maxi- mum 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 sec- tion.	-	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.	_

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Maintenance

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.b11:	A malfunction occurred in the speed reference input sec- tion.	_	Reset the alarm and restart operation.	*1
A.DTT: 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- ence A/D Error	A malfunction occurred in the read- ing section for the torque reference input.	-	Reset the alarm and restart operation.	*1
(Detected when the servo is turned ON.)	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	_
A.b33: Current Detec- tion Error 3	A failure occurred in the current detection circuit.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF0: System Alarm 0	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF1: System Alarm 1	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	_
A.bF2: System Alarm 2	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	_
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.	_

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Alarm Number:			Continued from pre	
Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.bF5: System Alarm 5	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	_
A.bF6: System Alarm 6	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF7: System Alarm 7	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	_
A.bF8: System Alarm 8	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The order of phases U, V, and W in the motor wiring is not correct.	Check the Servomotor wiring.	Make sure that the Servo- motor is correctly wired.	_
A.C10: Servomotor Out of Control (Detected when the servo is turnod ON)	A failure occurred in the encoder.	_	If the motor wiring is cor- rect and an alarm still occurs after turning the power supply OFF and ON again, the Servomotor may be faulty. Replace the Servomotor.	_
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.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 may be faulty. Replace the Servomotor.	_
	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 o	-

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Alarm Number:			Continued from pro	
Alarm Name	Possible Cause	Confirmation	Correction	Reference
	There is a faulty con- tact 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 dis- connection or short- circuit in the encoder. Or, the cable imped- ance is outside the specified values.	Check the condition of the Encoder Cable.	Use the Encoder Cable within the specified specifications.	-
A.C90: Encoder Commu-	One of the following has occurred: corro- sion caused by improper tempera- ture, humidity, or gas, a short-circuit caused by entry of water drops or cutting oil, or faulty contact in con- nector caused by vibration.	Check the operating environment.	Improve the operating environmental, and replace the cable. If the alarm still occurs, replace the SERVOPACK.	*1
nications Error	A malfunction was caused by noise.	_	Correct the wiring around the encoder by separating the Encoder Cable from the Servomotor Main Cir- cuit Cable or by ground- ing the encoder.	*1
	A failure occurred in the SERVOPACK.	_	Connect the Servomotor to another SERVOPACK, and turn ON the control power supply. If no alarm occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	A failure occurred in the encoder.	_	Connect the Servomotor to another SERVOPACK, and turn ON the control power supply. If the alarm occurs, the Servomotor may be faulty. Replace the Servomotor.	-
	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 Commu- nications Posi- tion 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.	-

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

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	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.	-	The Encoder Cable wiring distance must be 50 m max.	_
A.Cb0: Encoder Echo-	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.	_
back Error	Excessive vibration or shock was applied to the encoder.	Check the operating conditions.	Reduce machine vibra- tion. Correctly install the Ser- vomotor.	_
	A failure occurred in the encoder.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor may be faulty. Replace the Servomotor.	_
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	_
	When using a Direct Drive Servomotor, the setting of Pn205 (Mul- titurn Limit) does not agree with the encoder.	Check the setting of Pn205.	Correct the setting of Pn205 (0 to 65,535).	*1
A.CC0: Multiturn Limit Disagreement	The multiturn limit of the encoder is differ- ent from that of the SERVOPACK. Or, the multiturn limit of the SERVOPACK has been changed.	Check the setting of Pn205 in the SERVO- PACK.	Change the setting if the alarm occurs.	*1
	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.CF1: Reception Failed Error in Feed-	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 Con- verter Unit and SERVO- PACK.	*1
	A specified cable is not being used between Serial Con- verter Unit and SER- VOPACK.	Check the wiring speci- fications 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 Con- verter Unit and SERVO- PACK must be 20 m or less.	_
	The sheath on cable between the Serial Converter Unit and SERVOPACK is bro- ken.	Check the cable that connects the Serial Converter Unit.	Replace the cable between the Serial Con- verter 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 Con- verter 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 Cir- cuit Cables.	Make sure that there are no faulty contacts in the wiring for the Servomotor and encoder.	-
A.d00:	The frequency of the position reference pulse is too high.	Reduce the reference pulse frequency and try operating the SERVO- PACK.	Reduce the position refer- ence pulse frequency or the reference accelera- tion rate, or reconsider the electronic gear ratio.	*1
Position Devia- tion Overflow (The setting of Pn520 (Position Deviation Over- flow Alarm Level) was exceeded by the position devi- ation.)	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 Con- stant).	*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 Devia- tion 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).	
A.d02: Position Devia- tion Overflow Alarm for Speed Limit at Servo ON	If position deviation remains in the devia- tion counter, the set- ting of Pn529 (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 (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 direc- tion and the external encoder installation ori- entation.	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 refer- ence pulse counter.	Reconsider the operating specifications.	-
	There is a faulty con- nection 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 Configura- tion 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: 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	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 sig- nals 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 cir- cuits may be faulty. Alternatively, the input sig- nal cables may be discon- nected. Check to see if any of these items are faulty or have been dis- connected.	_
	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:			Continued from pro	
Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.F10: Power Supply	The three-phase power supply wiring is not correct.	Check the power sup- ply wiring.	Make sure that the power supply is correctly wired.	*1
	The three-phase power supply is unbalanced.	Measure the voltage for each phase of the three-phase power sup- ply.	Balance the power sup- ply 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 with- out specifying a sin- gle-phase AC power supply input (Pn00B = $n.\Box 1\Box \Box$).	Check the power sup- ply and the parameter setting.	Match the parameter set- ting to the power supply.	*1
was ON.)	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	_
FL-1 ^{*5} :				
System Alarm FL-2 ^{*5} :			Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	
System Alarm				
FL-3 ^{*5} :				
System Alarm FL-4 ^{*5} :	A failure occurred in			-
FL-4 ⁻ : System Alarm	THE SERVOFACK.			
FL-5 ^{*5} :	-			
System Alarm				
FL-6 ^{*5} : System Alarm				
CPF00: Digital Operator Communications	There is a faulty con- tact between the Digi- tal Operator and the SERVOPACK.	Check the connector contact.	Disconnect the connec- tor and insert it again. Or, replace the cable.	_
Error 1	A malfunction was caused by noise.	-	Keep the Digital Operator or the cable away from sources of noise.	-
CPF01: Digital Operator Communications	A failure occurred in the Digital Operator.	_	Disconnect the Digital Operator and then con- nect it again. If an alarm still occurs, the Digital Operator may be faulty. Replace the Digital Oper- ator.	-
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. $\prod_{i=1}^{\infty} \Sigma$ -7-Series Σ -7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)

*2. Detection Conditions If either of the following conditions is detected, an alarm will occur.

• Pn533 [min⁻¹] ×
$$\frac{\text{Encoder resolution}}{6 \times 10^5} \leq \frac{\text{Pn20E}}{\text{Pn210}}$$

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

6.1.4 Warning Displays

- *3. Detection Conditions
 - 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 $[\min^{-1}] \times \frac{\text{Encoder resolution}}{\text{Approx. } 3.66 \times 10^{12}} \ge \frac{\text{Pn20E}}{\text{Pn210}}$
- *4. Refer to the following manual for details.

Ω 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.

6.1.4 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.

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

6.1.5 List of Warnings

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

Warning Number	Warning Name	Meaning		rning C Output	out	
Number			ALO1	ALO2	ALO3	
A.900	Position Deviation Overflow	The position deviation exceeded the percentage set with the following formula: (Pn520 × Pn51E/100)	Н	Н	Н	
A.901	Position Deviation Overflow Alarm at Servo ON	The position deviation when the servo was turned ON exceeded the percentage set with the following formula: ($Pn526 \times Pn528/100$)	Н	Н	Н	
A.910	Overload	This warning occurs before an overload alarm (A.710 or A.720) occurs. If the warning is ignored and operation is continued, an alarm may occur.	L	Н	Н	
A.911	Vibration	Abnormal vibration was detected during motor operation. The detection level is the same as A.520. Set whether to output an alarm or a warn- ing by setting Pn310 (Vibration Detection Selec- tion).	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	

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6.1.5 List of Warnings

Continued from previous page. Warning Code Warning Output Warning Name Meaning Number ALO2 ALO3 ALO1 This warning occurs when the voltage of absolute Absolute Encoder Bat-A.930 L L Н encoder's battery is low. tery Error The input voltage (temperature) for the overheat protection input (TH) signal exceeded the setting A.93B **Overheat Warning** L L Н of Pn61C (Overheat Warning Level). Change of Parameters Parameters have been changed that require the A.941 L Н Н power supply to be turned OFF and ON again. **Requires Restart** The speed ripple compensation information stored Speed Ripple Comin the encoder does not agree with the speed rip-A.942 pensation Information Н Н L ple compensation information stored in the SER-Disagreement VOPACK. This warning occurs before an A.410 alarm A.971 (Undervoltage) occurs. If the warning is ignored Undervoltage L L L and operation is continued, an alarm may occur. A.9A0 Overtravel Overtravel was detected while the servo was ON. Н L L Preventative Mainte-One of the consumable parts has reached the end A.9b0 Н L Н nance Warning of its service life.

Note: 1. A warning code is not output unless you set Pn001 to n.1 [] (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	$Pn310 = n.\Box\Box\BoxX$ (Vibration Detection Selection)
A.923	$^{-}$ (Not affected by the setting of Pn008 = n.□X□□.)
A.930	Pn008 = n.
A.942	Pn423 = n. DXD (Speed Ripple Compensation Information Disagreement Warning Detection Selection)
A.971	$Pn008 = n.\Box\Box X\Box$ (Function Selection for Undervoltage) (Not affected by the setting of $Pn008 = n.\Box X\Box\Box$.)
A.9A0	Pn00D = $n.X\square\square\square$ (Overtravel Warning Detection Selection) (Not affected by the setting of Pn008 = $n.\squareX\square\square$.)
A.9b0	Pn00F = n. DDX (Preventative Maintenance Warning Selection)

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)

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 Cir- cuit 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 refer- ence pulse frequency or the reference acceleration rate, or reconsider the electronic gear ratio.	*
A.900: Position Deviation Overflow	The acceleration of the position ref- erence is too high.	Reduce the reference acceleration and try operating the SERVO- PACK.	Apply smoothing, i.e., by using Pn216 (Position Ref- erence Acceleration/ Decel- eration Time Constant).	*
	The excessive position deviation alarm level (Pn520 × Pn51E/100) is too low for the operating condi- tions.	Check excessive posi- tion 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 devi- ation when the servo was turned ON exceeded the percentage set with the following formula: (Pn526 × Pn528/ 100)	_	Set the position deviation to be cleared while the servo is OFF. Optimize the setting of Pn528 (Position Deviation Overflow Warning Level at Servo ON).	*

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Warning Number:	Dessible Original	Confirmentia	Continued from pre	
Warning 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 cor- rectly wired.	-
	Operation was performed that exceeded the overload protec- tion characteris- tics.	Check the motor over- load characteristics and Run command.	Reconsider the load and operating conditions. Or, increase the motor capacity.	-
A.910: Overload (warning before an A.710 or A.720 alarm occurs)	An excessive load was applied during operation because the Ser- vomotor was not driven because of mechanical prob- lems.	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 vibra- tion was detected during motor operation.	Check for abnormal motor noise, and check the speed and torque waveforms during oper- ation.	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.	Set Pn103 (Moment of Iner- tia Ratio) to an appropriate value.	*
	The vibration detection level (Pn312) is not suitable.	Check that the vibration detection level (Pn312) is suitable.	Set a suitable vibration detection level (Pn312).	*

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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 environ- ment monitor.	Decrease the surrounding temperature by improving the SERVOPACK installa- tion conditions.	*
	An overload alarm was reset by turn- ing 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 pro- cessing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenera- tive load ratio to check the regenerative pro- cessing capacity.	Reconsider the load and operating conditions.	-
	The SERVOPACK installation orien- tation is not cor- rect or there is insufficient space around the SER- VOPACK.	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 environ- ment monitor.	Decrease the surrounding temperature by improving the SERVOPACK installa- tion conditions.	*
	An overload alarm was reset by turn- ing 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 pro- cessing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenera- tive load ratio to check the regenerative pro- cessing capacity.	Reconsider the load and operating conditions.	-
	The SERVOPACK installation orien- tation is not cor- rect 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:	Possible Cause	Confirmation	Continued from pre	Reference
Warning Name		Commutation		
A.920: Regenerative Over- load (warning before an A.320 alarm occurs)	The power supply voltage exceeded the specified range.	Measure the power supply voltage.	Set the power supply volt- age within the specified range.	-
	There is insuffi- cient external regenerative resis- tance, regenera- tive resistor capacity, or SERVOPACK capacity, or there has been a con- tinuous regenera- tion state.	Check the operating conditions or the capacity using the Sig- maJunmaSize+ Capac- ity Selection Software or another means.	Change the regenerative resistance value, regenera- tive resistance capacity, or SERVOPACK capacity. Reconsider the operating conditions using the Sigma- JunmaSize+ Capacity Selection Software or other means.	-
	There was a con- tinuous regenera- tion state because a negative load was continuously applied.	Check the load applied to the Servomotor during operation.	Reconsider the system including the servo, machine, and operating conditions.	-
A.921: Dynamic Brake Overload (warning before an A.731 alarm occurs)	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 exter- nal force.	-
	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 con- sumed by the DB resis- tor to see how frequently the DB is being used.	 Reconsider the following: Reduce the Servomotor command speed. Decrease the moment of inertia. 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 mat- ter inside the SERVO- PACK.	Remove foreign matter from the SERVOPACK. If an alarm still occurs, the SERVOPACK 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 con- nection.	Correct the battery connec- tion.	*
	The battery volt- age 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.	-

6.1.6 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.	Lower the surrounding tem- perature by improving the installation conditions of machine.	_
	Operation was performed under an excessive load.	Use the accumulated load ratio to check the load during operation.	Reconsider the load and operating conditions.	-
A.93B: Overheat Warning	A failure occurred in the SERVO- PACK.	_	The SERVOPACK may be faulty. Replace the SERVO- PACK.	-
	The temperature detection circuit in the sensor attached to the machine is faulty.	_	The temperature detection circuit in the sensor attached to the machine may be faulty. Repair the sensor attached to the machine.	-
A.941: Change of Parame- ters Requires Restart	Parameters have been changed that require the power supply to be turned OFF and ON again.	-	Turn the power supply to the SERVOPACK OFF and ON again.	_
	The speed ripple	-	Reset the speed ripple compensation value on the SigmaWin+.	*
A.942: Speed Ripple Com- pensation Informa-	compensation information stored in the encoder does not agree with the speed ripple compensa-	_	Set Pn423 to n. D11 (Do not detect A.942 alarms). However, changing the set- ting may increase the speed ripple.	*
tion Disagreement	tion information stored in the SERVOPACK.	_	Set Pn423 to n. DDD (Disable speed ripple com- pensation). However, changing the setting may increase the speed ripple.	*
	For a 200-V SERVOPACK, the AC power supply voltage dropped below 140 V.	Measure the power supply voltage.	Set the power supply volt- age within the specified range.	-
	For a 100-V SERVOPACK, the AC power supply voltage dropped below 60 V.	Measure the power supply voltage.	Set the power supply volt- age within the specified range.	-
A.971: Undervoltage	The power supply voltage dropped during operation.	Measure the power supply voltage.	Increase the power supply capacity.	-
	A momentary power interrup- tion occurred.	Measure the power supply voltage.	If you have changed the setting of Pn509 (Momen- tary 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.	-

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6.1.6 Troubleshooting Warnings

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Warning Number:	Possible Cause	Confirmation	Correction	Reference
Warning Name				
A.9A0: Overtravel (Over- travel status was detected.)	Overtravel was detected while the servo was ON.	Check the status of the overtravel signals on the input signal monitor.	 Even if an overtravel signal is not shown by the input signal monitor, momentary overtravel may have been detected. Take the following precautions. Do not specify move- ments that would cause overtravel from the host controller. Check the wiring of the overtravel signals. Implement countermea- sures against noise. 	*
A.9b0: Preventative Mainte- nance Warning	One of the con- sumable parts has reached the end of its service life.	_	Replace the part. Contact your Yaskawa representa- tive for replacement.	*

* Refer to the following manual for details.

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6.1.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

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

Problem	Possible Cause	Confirmation	Correction	Reference
	The control power supply is not turned ON.	Measure the voltage between control power supply terminals.	Turn OFF the power supply to the servo system. Correct the wiring so that the control power supply is turned ON.	-
	The main circuit power supply is not turned ON.	Measure the voltage between the main circuit power input terminals.	Turn OFF the power supply to the servo system. Correct the wiring so that the main circuit power supply is turned ON.	-
	The I/O signal connector (CN1) pins are not wired cor- rectly or are disconnected.	Turn OFF the power sup- ply to the servo system. Check the wiring condi- tion of the I/O signal con- nector (CN1) pins.	Correct the wiring of the I/O signal connec- tor (CN1) pins.	*
	The wiring for the Servomo- tor Main Circuit Cables or Encoder Cable is discon- nected.	Check the wiring condi- tions.	Turn OFF the power supply to the servo system. Wire the cable cor- rectly.	-
Servomotor Does Not Start	There is an overload on the Servomotor.	Operate the Servomotor with no load and check the load status.	Turn OFF the power supply to the servo system. Reduce the load or replace the Servomo- tor with a Servomotor with a larger capacity.	-
	The type of encoder that is being used does not agree with the setting of $Pn002 = n.\Box X \Box \Box$ (Encoder Usage).	Check the type of the encoder that is being used and the setting of Pn002 = $n.\Box X \Box \Box$.	Set Pn002 = $n.\Box X \Box \Box$ according to the type of the encoder that is being used.	*
	No speed or position refer- ence is input.	Turn OFF the power sup- ply to the servo system. Check the allocation sta- tus of the input signals.	Allocate an input signal so that the speed and position references are input correctly.	*
	There is a mistake in the input signal allocations (Pn50A to Pn50D, Pn515, and Pn516).	Check the input signal allocations (Pn50A to Pn50D, Pn515, and Pn516).	Correctly allocate the input signals (Pn50A to Pn50D, Pn515, and Pn516).	*
	The /S-ON (Servo ON) signal is OFF.	Check the settings of Pn50A = n. 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 Con- trol) signal is not correct.	Check the setting of Pn000 = $n.\Box\Box X\Box$ (Con- trol 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.	*

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Problem	Possible Cause	Confirmation	Correction	Reference
	The reference pulse mode selection is not correct.	Check the setting of Pn200 =n.	Set Pn200 =n.□□□X so that is agrees with the reference pulse form.	*
	Speed control: The speed reference input is not appropriate.	Check between the speed reference input (V- REF) and signal ground (SG) to see if the control method and the input agree.	Correctly set the con- trol method and input method.	*
	Torque control: The torque reference input is not appro- priate.	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 con- trol method and input method.	*
	Position control: The refer- ence pulse input is not appropriate.	Check the setting of Pn200 =n. DDX (Refer- ence Pulse Form) and the sign and pulse signals.	Correctly set the con- trol 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 sig- nal.	*
Servomotor Does Not Start	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 sig- nals. If you are not using the safety function, con- nect the Safety Jumper Connector (provided as an accessory) to CN8.	*
	The FSTP (Forced Stop Input) signal is still OFF.	Check the FSTP signal.	 Turn ON the FSTP signal. If you will not use the function to force the motor to stop, set Pn516 = n.□□□X (FSTP (Forced Stop Input) Signal Allocation) to disable the signal. 	*
	A failure occurred in the SERVOPACK.	_	Turn OFF the power supply to the servo system. Replace the SERVO- PACK.	-
Servomotor Moves Instanta-	There is a mistake in the Ser- vomotor wiring.	Turn OFF the power sup- ply to the servo system. Check the wiring.	Wire the Servomotor correctly.	-
neously, and Then Stops	There is a mistake in the wir- ing of the encoder or Serial Converter Unit.	Turn OFF the power sup- ply to the servo system. Check the wiring.	Wire the Serial Con- verter Unit correctly.	-

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Problem	Possible Cause	Confirmation	Continued from pre	Reference
Problem	Possible Cause		Correction	Reference
Servomotor Speed Is Unstable	There is a faulty connection in the Servomotor wiring.	The connector connec- tions for the power line (U, V, and W phases) and the encoder or Serial Converter Unit may be unstable. Turn OFF the power sup- ply to the servo system. Check the wiring.	Tighten any loose ter- minals or connectors and correct the wiring.	-
	Speed control: The speed reference input is not appro- priate.	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 con- trol method and input method.	*
Servomotor Moves with-	Torque control: The torque reference input is not appro- priate.	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 con- trol method and input method.	*
out a Refer- ence Input	The speed reference offset is not correct.	The SERVOPACK offset is adjusted incorrectly.	Adjust the SERVO- PACK offset.	*
	Position control: The refer- ence pulse input is not appropriate.	Check the setting of Pn200 =n. DDX (Refer- ence Pulse Form) and the sign and pulse signals.	Correctly set the con- trol method and input method.	-
	A failure occurred in the SERVOPACK.	_	Turn OFF the power supply to the servo system. Replace the SERVO- PACK.	-
	The setting of Pn001 = n.□□□X (Motor Stopping Method for Servo OFF and Group 1 Alarms) is not suit- able.	Check the setting of Pn001 = $n.\Box\Box\BoxX$.	Set Pn001 = n.□□□X correctly.	-
Dynamic Brake Does Not Operate	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 resis- tance may be discon- nected.	Turn OFF the power supply to the servo system. Replace the SERVO- PACK. To prevent dis- connection, reduce the load.	-
	There was a failure in the dynamic brake drive circuit.	_	There is a defective component in the dynamic brake circuit. Turn OFF the power supply to the servo system. Replace the SERVO- PACK. Continued or	- -

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Problem	Possible Cause	Confirmation	Correction	Reference
Abnormal Noise from Servomotor	The Servomotor vibrated considerably while perform- ing 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 is within the allowable value, or increase the load level or reduce the rigidity level in the tuning-less level settings. If the situation is not improved, disable the tuning-less function (i.e., set Pn170 to n.□□□0) and execute autotuning either with or without a host refer- ence.	*
	The machine mounting is not secure.	Turn OFF the power sup- ply to the servo system. Check to see if there are any loose mounting screws.	Tighten the mounting screws.	-
	The machine mounting is not	Turn OFF the power sup- ply to the servo system. Check to see if there is misalignment in the cou- pling.	Align the coupling.	-
	secure.	Turn OFF the power sup- ply to the servo system. Check to see if the cou- pling is balanced.	Balance the coupling.	-
	The bearings are defective.	Turn OFF the power sup- ply to the servo system. Check for noise and vibration around the bear- ings.	Replace the Servomo- tor.	-

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Problem	Possible Cause	Confirmation	Correction	Reference
	There is a vibration source at the driven machine.	Turn OFF the power sup- ply to the servo system. Check for any foreign matter, damage, or defor- mation in the machine's moving parts.	Consult with the machine manufacturer.	-
	Noise interference occurred because of incorrect I/O sig- nal cable specifications.	Turn OFF the power sup- ply to the servo system. Check the I/O signal cables to see if they sat- isfy specifications. Use shielded twisted-pair cables or screened twisted-pair cables with conductors of at least 0.12 mm ² (stranded wire).	Use cables that satisfy the specifications.	-
	Noise interference occurred because an I/O signal cable is too long.	Turn OFF the power sup- ply to the servo system. Check the lengths of the I/O signal cables.	The I/O signal cables must be no longer than 3 m.	-
Abnormal Noise from Servomotor	Noise interference occurred because of incorrect Encoder Cable specifications.	Turn OFF the power sup- ply to the servo system. Check the Encoder Cable to see if it satisfies speci- fications. Use shielded twisted-pair cables or screened twisted-pair cables with conductors of at least 0.12 mm ² (stranded wire).	Use cables that satisfy the specifications.	-
	Noise interference occurred because the Encoder Cable is too long.	Turn OFF the power sup- ply to the servo system. Check the length of the Encoder Cable.	The Encoder Cable length must be 50 m max.	-
	Noise interference occurred because the Encoder Cable is damaged.	Turn OFF the power sup- ply to the servo system. Check the Encoder Cable to see if it is pinched or the sheath is damaged.	Replace the Encoder Cable and correct the cable installation envi- ronment.	-
	The Encoder Cable was sub- jected to excessive noise interference.	Turn OFF the power sup- ply to the servo system. 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.	Turn OFF the power sup- ply to the servo system. Check to see if the machines are correctly grounded.	Properly ground the machines to separate them from the FG of the encoder.	-

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Problem	Possible Cause	Confirmation	Correction	Reference
Abnormal Noise from Servomotor	There is a SERVOPACK pulse counting error due to noise.	Check to see if there is noise interference on the signal line from the encoder.	Turn OFF the power supply to the servo system. Implement counter- measures against noise for the encoder wiring.	-
	The encoder was subjected to excessive vibration or shock.	Turn OFF the power sup- ply to the servo system. Check to see if vibration from the machine occurred. Check the Ser- vomotor installation (mounting surface preci- sion, securing state, and alignment).	Reduce machine vibra- tion. Improve the mounting state of the Servomotor.	-
	A failure occurred in the encoder.	_	Turn OFF the power supply to the servo system. Replace the Servomo- tor.	-
	A failure occurred in the Serial Converter Unit.	-	Turn OFF the power supply to the servo system. Replace the Serial Con- verter Unit.	-
	The servo gains are not bal- anced.	Check to see if the servo gains have been cor- rectly tuned.	Perform autotuning without a host refer- ence.	*
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 appro- priate value.	-
Vibrates at Frequency of Approx. 200 to 400 Hz.	The setting of Pn102 (Posi- tion Loop Gain) is too high.	Check the setting of Pn102. The default setting is Kp = 40.0/s.	Set Pn102 to an appro- priate value.	-
	The setting of Pn101 (Speed Loop Integral Time Con- stant) is not appropriate.	Check the setting of Pn101. The default setting is Ti = 20.0 ms.	Set Pn101 to an appro- priate value.	-
	The setting of Pn103 (Moment of Inertia Ratio) is not appropriate.	Check the setting of Pn103.	Set Pn103 to an appro- priate value.	-

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Problem	Possible Cause	Confirmation	Correction	Reference
	The servo gains are not bal- anced.	Check to see if the servo gains have been cor- rectly 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 Overshoot on Starting	The setting of Pn102 (Posi- tion Loop Gain) is too high.	Check the setting of Pn102. The default setting is Kp = 40.0/s.	Set Pn102 to an appropriate value.	-
and Stop- ping	The setting of Pn101 (Speed Loop Integral Time Con- stant) is not appropriate.	Check the setting of Pn101. The default setting is Ti = 20.0 ms.	Set Pn101 to an appro- priate value.	-
	The setting of Pn103 (Moment of Inertia Ratio) is not appropriate.	Check the setting of Pn103.	Set Pn103 to an appro- priate value.	-
	The torque reference is saturated.	Check the waveform of the torque reference.	Use the mode switch.	-
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 the posi- tion when the power was next turned ON.)	Noise interference occurred because of incorrect Encoder Cable specifications.	Turn OFF the power sup- ply to the servo system. Check the Encoder Cable to see if it satisfies speci- fications. Use shielded twisted-pair 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 the Encoder Cable is too long.	(stranded wire). Turn OFF the power sup- ply to the servo system. Check the length of the Encoder Cable.	The Encoder Cable length must be 50 m max.	_
	Noise interference occurred because the Encoder Cable is damaged.	Turn OFF the power sup- ply to the servo system. Check the Encoder Cable to see if it is pinched or the sheath is damaged.	Replace the Encoder Cable and correct the cable installation envi- ronment.	-
	The Encoder Cable was subject to excessive noise inter- ference.	Turn OFF the power sup- ply to the servo system. 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.	-

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Problem	Possible Cause	Confirmation	Correction	Reference
	There is variation in the FG potential because of the influence of machines on the Servomotor side, such as a welder.	Turn OFF the power sup- ply to the servo system. Check to see if the machines are correctly grounded.	Properly ground the machines to separate them from the FG of the encoder.	-
	There is a SERVOPACK pulse counting error due to noise.	Turn OFF the power sup- ply to the servo system. 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 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.	Turn OFF the power sup- ply to the servo system. Check to see if vibration from the machine occurred. Check the Servomotor installation (mounting sur- face precision, securing state, and alignment).	Reduce machine vibra- tion. Improve the mounting state of the Servomotor.	-
host con- troller when the power was turned OFF is dif-	A failure occurred in the encoder.	_	Turn OFF the power supply to the servo system. Replace the Servomo- tor.	-
ferent from the posi- tion when the power was next	A failure occurred in the SERVOPACK.	-	Turn OFF the power supply to the servo system. Replace the SERVO- PACK.	-
turned ON.)		Check the error detec- tion section of the host controller.	Correct the error detec- tion section of the host controller.	-
	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.	-
		Check for noise interfer- ence in the cable between the SERVO- PACK and the host con- troller.	Implement counter- measures against noise and then perform parity checks again for the multiturn data or abso- lute encoder position data.	-

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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 con- dition of the overtravel limit switches.	Make sure that the overtravel limit switches operate correctly.	-
	Drive Prohibit) signal was input.	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.	*
		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.	-
Overtravel	The P-OT/N-OT (Forward Drive Prohibit or Reverse Drive Prohibit) signal mal- functioned.	Check to see if the opera- tion of the overtravel limit switches is unstable.	Stabilize the operating condition of the over- travel limit switches.	-
Occurred		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 allo- cation of the P-OT or N-OT (Forward Drive Prohibit or Reverse Drive Prohibit) sig- nal in Pn50A = $n.X\square\square\square$ or Pn50B = $n.\square\square\squareX$.	Check to see if the P-OT signal is allocated in Pn50A = $n.X\square\square\square$.	If another signal is allo- cated in Pn50A =n.X□□□, allocate the P-OT signal instead.	*
		Check to see if the N-OT signal is allocated in Pn50B = $n.\square\square\squareX$.	If another signal is allo- cated in Pn50B =n.□□□X, allocate the N-OT signal instead.	
	The selection of the Servo- motor stopping method is not correct.	Check the servo OFF stopping method set in Pn001 = $n.\Box\Box\BoxX$ or Pn001 = $n.\Box\BoxX\Box$.	Select a Servomotor stopping method other than coasting to a stop.	. *
		Check the torque control stopping method set in Pn001 = $n.\Box\BoxX$ or Pn001 = $n.\Box\BoxX\Box$.	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.	-

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n	Correction	Reference	
r Cable			

Problem	Possible Cause	Confirmation	Correction	Reference
	Noise interference occurred because of incorrect Encoder Cable specifications.	Check the Encoder Cable to see if it satisfies speci- fications. Use shielded twisted-pair cables or screened twisted-pair cables with conductors of at least 0.12 mm ² (stranded wire).	Use cables that satisfy the specifications.	_
	Noise interference occurred because the Encoder Cable is too long.	Turn OFF the power sup- ply to the servo system. Check the length of the Encoder Cable.	The Encoder Cable length must be 50 m max.	-
	Noise interference occurred because the Encoder Cable is damaged.	Turn OFF the power sup- ply to the servo system. Check the Encoder Cable to see if it is pinched or the sheath is damaged.	Replace the Encoder Cable and correct the cable installation envi- ronment.	-
Position	The Encoder Cable was sub- jected to excessive noise interference.	Turn OFF the power sup- ply to the servo system. 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.	_
Deviation without Marm)	There is variation in the FG potential because of the influence of machines on the Servomotor side, such as a welder.	Turn OFF the power sup- ply to the servo system. Check to see if the machines are correctly grounded.	Properly ground the machines to separate them from the FG of the encoder.	-
	There is a SERVOPACK pulse counting error due to noise.	Turn OFF the power sup- ply to the servo system. 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.	-
	The encoder was subjected to excessive vibration or shock.	Turn OFF the power sup- ply to the servo system. Check to see if vibration from the machine occurred. Check the Servomotor installation (mounting sur- face precision, securing state, and alignment).	Reduce machine vibra- tion. Improve the mounting state of the Servomotor.	_
	The coupling between the machine and Servomotor is not suitable.	Turn OFF the power sup- ply to the servo system. Check to see if position offset occurs at the cou- pling between machine and Servomotor.	Correctly secure the coupling between the machine and Servomotor.	-

Continued from previous page.

Problem	Possible Cause	Confirmation	Correction	Reference
	Noise interference occurred because of incorrect I/O signal cable specifications.	Turn OFF the power sup- ply to the servo system. Check the I/O signal cables to see if they sat- isfy specifications. Use shielded twisted-pair cables or screened twisted-pair cables with conductors of at least 0.12 mm ² (stranded wire).	Use cables that satisfy the specifications.	-
Position Deviation (without	If reference pulse input multi- plication switching is being used, noise may be causing the I/O signals used for this function (/PSEL and /PSELA) to be falsely detected.	Turn OFF the power sup- ply to the servo system. Check the I/O signal cables to see if they sat- isfy specifications. Use shielded twisted-pair cables or screened twisted-pair cables with conductors of at least 0.12 mm ² (stranded wire).	Use cables that satisfy the specifications.	-
Alarm)	Pulses are being lost because the filter for the ref- erence pulse input is not appropriate.	Check the setting of Pn200=n.XDDD(Filter Selection).	Set the parameters to correct values.	*
	Noise interference occurred because an I/O signal cable is too long.	Turn OFF the power sup- ply to the servo system. Check the lengths of the I/O signal cables.	The I/O signal cables must be no longer than 3 m.	-
	An encoder fault occurred. (The pulse count does not change.)	_	Turn OFF the power supply to the servo system. Replace the Servomo- tor.	-
	A failure occurred in the SERVOPACK.	_	Turn OFF the power supply to the servo system. Replace the SERVO- PACK.	-
Servomotor Overheated	The surrounding air tempera- ture is too high.	Measure the surrounding air temperature around the Servomotor.	Reduce the surround- ing air temperature to 40°C or less.	-
	The surface of the Servomo- tor is dirty.	Turn OFF the power sup- ply to the servo system. Visually check the surface for dirt.	Clean dirt, dust, and oil from the surface.	-
	There is an overload on the Servomotor.	Check the load status with a monitor.	If the Servomotor is overloaded, reduce the load or replace the Servo Drive with a SERVOPACK and Ser- vomotor with larger capacities.	-

* 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)

6.2.1 Alarm Displays

6.2 SERVOPACK with MECHATROLINK-III Communications References

6.2.1 Alarm Displays

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

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

Example: Alarm A.E60

 $\overset{\text{Status}}{\longrightarrow} \text{Not lit.} \longrightarrow \textbf{R}, \longrightarrow \text{Not lit.} \longrightarrow \textbf{E} \longrightarrow \text{Not lit.} \longrightarrow \textbf{E} \longrightarrow \text{Not lit.} \longrightarrow \textbf{D} \longrightarrow \text{Not lit.} \longrightarrow \textbf{C}$

This section provides a list of the alarms that may occur and the causes of and corrections for those alarms.

6.2.2 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. \square 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 SERVOPACK.	Gr.1	No
A.025	System Alarm	An internal program error occurred in the SERVOPACK.	Gr.1	No
A.030	Main Circuit Detector Error	There is an error in the detection data for the main circuit.	Gr.1	Yes
A.040	Parameter Setting Error	A parameter setting is outside of the setting range.	Gr.1	No

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		Oontinded	from previo	lus paye.
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 Servomo- tor 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.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.0b1	Semi-closed/Fully-closed Loop Control Switching Operation Error	An error occurred when semi-closed/fully-closed loop control is switched.	Gr.1	Yes
A.100	Overcurrent Detected	An overcurrent flowed through the power transis- tor 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	The pulse output speed for the setting of Pn212 (Number of Encoder Output Pulses) 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.710	Instantaneous Overload	The Servomotor was operating for several sec- onds 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 rota- tional or linear kinetic energy exceeded the capacity of the dynamic brake resistor.	Gr.1	Yes
A.740	Inrush Current Limiting Resistor Overload	The main circuit power supply was frequently turned ON and OFF.	Gr.1	Yes

Maintenance

Servo-Alarm motor Alarm Reset Alarm Name Alarm Meaning Stop-Number Possiping ble? Method Internal Temperature Error The surrounding temperature of the control PCB 1 (Control Board Tempera-A.7A1 Gr.2 Yes is abnormal. ture Error) Internal Temperature Error The surrounding temperature of the power PCB A.7A2 2 (Power Board Tempera-Gr.2 Yes is abnormal. ture Error) Internal Temperature Sen-An error occurred in the temperature sensor cir-A.7A3 Gr.2 No sor Error cuit. SERVOPACK Built-in Fan A.7Ab The fan inside the SERVOPACK stopped. Gr.1 Yes Stopped The power supplies to the encoder all failed and A.810 Encoder Backup Alarm Gr 1 No the position data was lost. There is an error in the checksum results for A.820 Encoder Checksum Alarm Gr.1 No encoder memory. The battery voltage was lower than the specified A.830 **Encoder Battery Alarm** level after the control power supply was turned Gr.1 Yes ON. A.840 Encoder Data Alarm There is an internal data error in the encoder. Gr.1 No The encoder was operating at high speed when A.850 **Encoder Overspeed** Gr.1 No the power was turned ON. 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 The input voltage (temperature) for the overheat A.862 **Overheat Alarm** protection input (TH) signal exceeded the setting Gr.1 Yes of Pn61B (Overheat Alarm Level). A.8A0 External Encoder Error An error occurred in the external encoder. Gr.1 Yes External Encoder Module A.8A1 An error occurred in the Serial Converter Unit. Gr.1 Yes Frror External Incremental A.8A2 Gr.1 Yes An error occurred in the external encoder. Encoder Sensor Error External Absolute Encoder An error occurred in the position data of the A.8A3 Gr.1 Yes **Position Error** external encoder. External Encoder Over-An overspeed error occurred in the external A.8A5 Gr.1 Yes speed encoder. External Encoder Over-An overheating error occurred in the external A.8A6 Gr.1 Yes heated encoder. A.b33 **Current Detection Error 3** An error occurred in the current detection circuit. Gr.1 No MECHATROLINK Commu-ASIC error 1 occurred in MECHATROLINK com-A.b6A Gr 1 No nications ASIC Error 1 munications. MECHATROLINK Commu-ASIC error 2 occurred in MECHATROLINK com-A.b6b Gr.2 No nications ASIC Error 2 munications. Internal program error 0 occurred in the SERVO-A.bF0 Gr.1 System Alarm 0 No PACK. Internal program error 1 occurred in the SERVO-A.bF1 System Alarm 1 Gr.1 No PACK. Internal program error 2 occurred in the SERVO-A.bF2 System Alarm 2 Gr.1 No PACK. Internal program error 3 occurred in the SERVO-A.bF3 System Alarm 3 Gr.1 No PACK. Internal program error 4 occurred in the SERVO-A.bF4 System Alarm 4 Gr.1 No PACK.

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Alarm Number	Alarm Name	Alarm Meaning	Servo- motor Stop- ping Method	Alarm Reset Possi- ble?
A.bF5	System Alarm 5	Internal program error 5 occurred in the SERVO- PACK.	Gr.1	No
A.bF6	System Alarm 6	Internal program error 6 occurred in the SERVO- PACK.	Gr.1	No
A.bF7	System Alarm 7	Internal program error 7 occurred in the SERVO- PACK.	Gr.1	No
A.bF8	System Alarm 8	Internal program error 8 occurred in the SERVO- PACK.	Gr.1	No
A.C10	Servomotor Out of Control	The Servomotor ran out of control.	Gr.1	Yes
A.C80	Encoder Clear Error or Multiturn Limit Setting Error	The multiturn data for the absolute encoder was not correctly cleared or set.	Gr.1	No
A.C90	Encoder Communications Error	Communications between the encoder and SERVOPACK is not possible.	Gr.1	No
A.C91	Encoder Communications Position Data Acceleration Rate Error	An error occurred in calculating the position data of the encoder.	Gr.1	No
A.C92	Encoder Communications Timer Error	An error occurred in the communications timer between the encoder and SERVOPACK.	Gr.1	No
A.CA0	Encoder Parameter Error	The parameters in the encoder are corrupted.	Gr.1	No
A.Cb0	Encoder Echoback Error	The contents of communications with the encoder are incorrect.	Gr.1	No
A.CC0	Multiturn Limit 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 Mod- ule failed.	Gr.1	No
A.CF2	Timer Stopped Error in Feedback Option Module Communications	An error occurred in the timer for communica- tions with the Feedback Option Module.	Gr.1	No
A.d00	Position Deviation Over- flow	The setting of Pn520 (Position Deviation Overflow Alarm Level) was exceeded by the position deviation.	Gr.1	Yes
A.d01	Position Deviation Over- flow Alarm at Servo ON	The servo was turned ON after the position devi- ation 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 (Speed Limit Level at Servo ON) limits the speed when the servo is turned ON. This alarm occurs if a position refer- ence is input and the setting of Pn520 (Position Deviation Overflow Alarm Level) is exceeded before the limit is cleared.		Yes
A.d10	Motor-Load Position Devi- ation Overflow	There was too much position deviation between the motor and load during fully-closed loop con- trol.	Gr.2	Yes
A.d30	Position Data Overflow	The position feedback data exceeded ±1,879,048,192.	Gr.1	No
A.E02	MECHATROLINK Internal Synchronization Error 1	A synchronization error occurred during MECHATROLINK communications with the SER- VOPACK.	Gr.1	Yes

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Alarm Number	Alarm Name	Alarm Meaning	Servo- motor Stop- ping Method	Alarm Reset Possi- ble?
A.E40	MECHATROLINK Trans- mission Cycle Setting Error	The setting of the MECHATROLINK communica- tions transmission cycle is not correct.	Gr.2	Yes
A.E41	MECHATROLINK Commu- nications Data Size Set- ting Error	The setting of the MECHATROLINK communica- tions data size is not correct.	Gr.2	Yes
A.E42	MECHATROLINK Station Address Setting Error	The setting of the MECHATROLINK station address is not correct.	Gr.2	No
A.E50*	MECHATROLINK Syn- chronization Error	A synchronization error occurred during MECHATROLINK communications.	Gr.2	Yes
A.E51	MECHATROLINK Syn- chronization Failed	Synchronization failed during MECHATROLINK communications.	Gr.2	Yes
A.E60*	Reception Error in MECHATROLINK Commu- nications	Communications errors occurred continuously during MECHATROLINK communications.	Gr.2	Yes
A.E61	Synchronization Interval Error in MECHATROLINK Transmission Cycle	An error occurred in the transmission cycle during MECHATROLINK communications.	Gr.2	Yes
A.E63	MECHATROLINK Syn- chronization Frame Not Received	Synchronization frames were continuously not received during MECHATROLINK communica- tions.	Gr.2	Yes
A.E71	Safety Option Module Detection Failure	Detection of the Safety Option Module failed.	Gr.1	No
A.E72	Feedback Option Module Detection Failure	Detection of the Feedback Option Module failed.	Gr.1	No
A.E74	Unsupported Safety Option Module	An unsupported Safety Option Module was connected.	Gr.1	No
A.Eb1	Safety Function Signal Input Timing Error	An error occurred in the input timing of the safety function signal.	Gr.1	No
A.EC8	Gate Drive Error 1	An error occurred in the gate drive circuit.	Gr.1	No
A.EC9	Gate Drive Error 2	An error occurred in the gate drive circuit.	Gr.1	No
A.Ed1	Command Execution Tim- eout	A timeout error occurred for a MECHATROLINK command.	Gr.2	Yes
A.F10	Power Supply Line Open Phase	The voltage was low for more than one second for phase R, S, or T when the main power supply was ON.	Gr.2	Yes
FL-1*				
FL-2*				
FL-3*	System Alarm	An internal program error occurred in the	_	No
FL-4*	- ,	SERVOPACK.		
FL-5*				
FL-6*				
CPF00	Digital Operator Commu- nications Error 1	Communications were not possible between the Digital Operator (model: JUSP-OP05A-1-E) and	_	No
CPF01	Digital Operator Commu- nications Error 2	the SERVOPACK (e.g., a CPU error occurred).		-

* 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.

 μ
 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)

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 volt- age within the specified range, and initialize the parameter settings.	*1
	The power supply was shut OFF while writing parameter set- tings.	Check the timing of shutting OFF the power supply.	Initialize the parameter settings and then set the parameters again.	
A.020: Parameter	The number of times that parameters were written exceeded the limit.	Check to see if the parameters were fre- quently changed from the host controller.	The SERVOPACK may be faulty. Replace the SERVOPACK. Reconsider the method for writing the parame- ters.	_
Checksum Error (There is an error in the parameter data in the SERVOPACK.)	A malfunction was caused by noise from the AC power supply, ground, static elec- tricity, or other source.	Turn the power supply to the SERVOPACK OFF and ON again. If the alarm still occurs, noise may be the cause.	Implement countermea- sures against noise.	*1
	Gas, water drops, or cutting oil entered the SERVOPACK and caused failure of the internal components.	Check the installation conditions.	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
	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 SERVOPACK.	-
A.021: Parameter For- mat Error (There is an error in the parameter dota format in the	The software version of the SERVOPACK that caused the alarm is older than the soft- ware version of the parameters specified to write.	Read the product infor- mation to see if the soft- ware versions are the same. If they are differ- ent, 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
data format in the SERVOPACK.)	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The power supply voltage suddenly dropped.	Measure the power supply voltage.	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.022: System Check- sum Error (There is an error in the parameter data in the SERVOPACK.)	The power supply was shut OFF while setting a utility func- tion.	Check the timing of shutting OFF the power supply.	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
	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 SERVOPACK.	-

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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 SERVOPACK.	-
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 SERVOPACK.	-
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.030: Main Circuit Detector Error	The jumper between the DC Reactor termi- nals (\ominus 1 and \ominus 2) was removed or there is faulty contact. The cable between the DC Reactor and SERVOPACK is not wired correctly or there is a faulty con- tact.	_	Correct the wiring between the DC Reactor terminals.	_
	The SERVOPACK and Servomotor capaci- ties do not match each other.	Check the combination of the SERVOPACK and Servomotor capacities.	Select a proper combina- tion of SERVOPACK and Servomotor capacities.	*1
A.040: Parameter Set-	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
ting Error (A parameter set- ting is outside of the setting	A parameter setting is outside of the setting range.	Check the setting ranges of the parame- ters 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 fol- lowing 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 Out- put Resolution) is out- side of the setting range or does not sat- isfy the setting condi- tions.	Check the setting of Pn212 or Pn281.	Set Pn212 or Pn281 to an appropriate value.	*1

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The speed of program jogging went below the setting range when the electronic gear ratio (Pn20E/ Pn210) or the Servo- motor 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 (Program Jogging Movement Speed) was changed.	Check to see if the detection conditions ^{*2} are satisfied.	Increase the setting of Pn533.	*1
	The movement speed of advanced autotun- ing 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 = $n.X\Box\Box\Box$.	Make sure that the setting of the Fully-closed Mod- ule agrees with the setting of Pn002 = n.X□□□.	*1
	 The following parameters are not set correctly. Pn002 = n.X□□□ (External Encoder Usage) Pn02A = n.□□□X (Semi-closed/Fully- closed Loop Control Switching Selection) 	Check the setting of Pn002 = $n.X\square\square\square$ and Pn02A = $n.\square\square\squareX$.	When switching between semi-closed loop control and fully-closed loop con- trol, set the parameters as follows: • Pn002 = n.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	The SERVOPACK and Servomotor capaci- ties do not match each other.	Confirm that the follow- ing condition is met: 1/4 ≤ (Servomotor capacity/SERVOPACK capacity) ≤ 4	Select a proper combina- tion of the SERVOPACK and Servomotor capaci- ties.	*1
	A failure occurred in the encoder.	Replace the encoder and check to see if the alarm still occurs.	Replace the Servomotor or encoder.	_
do not match.)	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	_

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.051: Unsupported Device Alarm	An unsupported Serial Converter Unit or encoder (e.g., an external encoder) is connected to the SERVOPACK.	Check the product combination specifica-tions.	Change to a correct com- bination of models.	_
A.070: Motor Type Change Detected (The connected motor is a differ-	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 SERVOPACK OFF and ON again.	*1
front type of motor from the previ- ously connected motor.)	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 SERVOPACK OFF and ON again.	*1
A.0b0: Invalid Servo ON Command Alarm	The SV_ON (Servo ON) command was sent from the host controller after a util- ity 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
A.0b1: Semi-closed Loop Control/ Fully-closed Loop Control Switch- ing Operation Error	Semi-closed Loop Control/Fully-closed Loop Control Switch- ing was executed while one of the fol- lowing functions was running: • Jog • Origin Search • Jog Program • Adjust the Motor Current Detection Signal Offsets • Autotuning without Host Reference • Easy FFT • Mechanical Analysis • Moment of Inertia Estimation • Speed Ripple Com- pensation	Check the timing of switching between semi-closed loop con- trol and fully-closed loop control.	_	_

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The Main Circuit Cable is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	
	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.	
A.100: Overcurrent Detected (An overcurrent flowed through the power tran- sistor or the heat sink overheated.)	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 Servo- motor.	*1
	There is a short-circuit or ground fault inside the SERVOPACK.	Check for short-circuits across the Servomotor connection terminals U, V, and W on the SERVOPACK, or between the ground and terminals U, V, or W.	The SERVOPACK may be faulty. Replace the SERVOPACK.	
	The regenerative resistor is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	*1

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The dynamic brake (DB, emergency stop executed from the SERVOPACK) was frequently activated, or a DB overload alarm occurred.	Check the power con- sumed by the DB resis- tor 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 meth- ods, or the mechanisms so that the dynamic brake does not need to be used so frequently.	-
	The regenerative pro- cessing capacity was exceeded.	Check the regenerative load ratio in the Sig- maWin+ Motion Monitor Tab Page to see how frequently the regenera- tive resistor is being used.	Recheck the operating conditions and load.	*4
A.100: Overcurrent Detected (An overcurrent flowed through the power tran-	The SERVOPACK regenerative resis- tance is too small.	Check the regenerative load ratio in the Sig- maWin+ Motion Monitor Tab Page to see how frequently the regenera- tive resistor is being used.	Change the regenerative resistance to a value larger than the SERVO- PACK minimum allowable resistance.	
sistor 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 countermea- sures 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. Continued o	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The Main Circuit Cable is not wired correctly or there is faulty contact.	Check the wiring.	Correct the wiring.	
	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.	
	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 Servo- motor.	*1
A.101: Motor Overcur- rent 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 SERVOPACK, or between the ground and terminals U, V, or W.	The SERVOPACK may be faulty. Replace the SERVOPACK.	
allowable cur- rent.)	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 countermea- sures against noise, such as correct wiring of the FG. Use an FG wire size equivalent to the SERVO- PACK's main circuit wire size.	-
	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	Pn600 (Regenerative Resistor Capacity) is not set to 0 and an External Regenerative Resistor is not con- nected to one of the following SERVO- PACKs: SGD7S- R70A, -R90A,-1R6A, -2R8A, -R70F, -R90F, -2R1F, or -2R8F.	Check to see if an External Regenerative Resistor is connected and check the setting of Pn600.	Connect an External Regenerative Resistor, or set Pn600 (Regenerative Resistor Capacity) to 0 (setting unit: ×10 W) if no Regenerative Resistor is required.	*1
	An External Regener- ative 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 Regenera- tive Resistor Unit is con- nected 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.	
A.300: Regeneration Error	The jumper between the regenerative resis- tor terminals (B2 and B3) was removed from one of the fol- lowing SERVOPACKs: SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, or -330A.	Check to see if the jumper is connected between power supply terminals B2 and B3.	Correctly connect a jumper.	*1
	The External Regener- ative Resistor is not wired correctly, or was removed or discon- nected.	Check the wiring of the External Regenerative Resistor.	Correct the wiring of the External Regenerative Resistor.	
	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 SERVO- PACK may be faulty. Replace the SERVO- PACK.	-

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Alarm Number:	Possible Cause	Confirmation	Continued from pre	Reference
Alarm Name				
	The power supply voltage exceeded the specified range.	Measure the power supply voltage.	Set the power supply volt- age within the specified range.	-
	The external regener- ative resistance value or regenerative resis- tor capacity is too small, or there has been a continuous regeneration state.	Check the operating conditions or the capacity using the Sig- maJunmaSize+ Capac- ity Selection Software or other means.	Change the regenerative resistance value or capac- ity. Reconsider the operating conditions using the Sig- maJunmaSize+ Capacity Selection Software or other means.	*4
	There was a continu- ous regeneration state because a negative load was continu- ously 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 Resis- tor Capacity) is smaller than the capacity of the Exter- nal Regenerative Resistor.	Check to see if a Regenerative Resistor is connected and check the setting of Pn600.	Correct the setting of Pn600.	*1
	The setting of Pn603 (Regenerative Resis- tance) 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 regener- ative 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 SERVOPACK.	_

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The regenerative resistor was discon- nected when the SERVOPACK power supply voltage was high.	Measure the resistance of the regenerative resistor using a measur- ing instrument.	If you are using the regen- erative resistor built into the SERVOPACK, replace the SERVOPACK. If you are using an Exter- nal Regenerative Resis- tor, replace the External Regenerative Resistor.	_
4.000	DC power was sup- plied when an AC power supply input was specified in the settings.	Check the power sup- ply to see if it is a DC power supply.	Correct the power supply setting to match the actual power supply.	*1
A.330: Main Circuit Power Supply Wiring Error (Detected when the main circuit power supply is turned ON.) Ref for SI SC -1 -F	AC power was sup- plied when a DC power supply input was specified in the settings.	Check the power sup- ply to see if it is an AC power supply.	Correct the power supply setting to match the actual power supply.	*1
	Pn600 (Regenerative Resistor Capacity) is not set to 0 and an External Regenerative Resistor is not con- nected to one of the following SERVOPACKs: SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, or -2R8F.	Check to see if an External Regenerative Resistor is connected and check the setting of Pn600.	Connect an External Regenerative Resistor, or if an External Regenera- tive Resistor is not required, set Pn600 to 0.	*1
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number:	Possible Cause	Confirmation	Correction	Reference
Alarm Name		Commutation	Concetion	
	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 light- ning surge.	Measure the power supply voltage.	Improve the power sup- ply 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 SER- VOPACK.	-
A.400: Overvoltage (Detected in the	The voltage for AC power supply was too high during accelera- tion or deceleration.	Check the power sup- ply voltage and the speed and torque during operation.	Set the AC power supply voltage within the speci- fied range.	-
main circuit power supply section of the SERVOPACK.)	The external regener- ative 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 oper- ating conditions and load.	*4
	The moment of inertia ratio exceeded the allowable value.	Check to see if the moment of inertia 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 SERVO- PACK may be faulty. Replace the SERVO- PACK.	-

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Alarm Number:	_			
Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The power supply voltage went below the specified range.	Measure the power supply voltage.	Set the power supply volt- age within the specified range.	-
	The power supply voltage dropped during operation.	Measure the power supply voltage.	Increase the power supply capacity.	-
	A momentary power interruption occurred.	Measure the power supply voltage.	If you have changed the setting of Pn509 (Momen- tary Power Interruption Hold Time), decrease the setting.	*1
A.410: Undervoltage (Detected in the main circuit power supply	The SERVOPACK fuse is blown out.	-	Replace the SERVO- PACK and connect a reactor to the DC reactor terminals (\ominus 1 and \ominus 2) on the SERVOPACK.	-
section of the SERVOPACK.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The jumper between the DC Reactor termi- nals (\ominus 1 and \ominus 2) was removed or there is faulty contact.		Correct the wiring	
	The cable between the DC Reactor and SERVOPACK is not wired correctly or there is a faulty con- tact.	-	between the DC Reactor terminals.	-
	The order of phases U, V, and W in the motor wiring is not correct.	Check the wiring of the Servomotor.	Make sure that the Servo- motor is correctly wired.	-
A.510: Overspeed	A reference value that exceeded the over- speed detection level was input.	Check the input refer- ence.	Reduce the reference value. Or, adjust the gain.	
(The motor exceeded the maximum speed.)	The motor exceeded the maximum speed.	Check the waveform of the motor speed.	Reduce the speed refer- ence input gain and adjust the servo gain. Or, reconsider the operating conditions.	_
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.511:	The encoder output pulse frequency exceeded the limit.	Check the encoder out- put 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 out- put pulse setting and the motor speed.	Reduce the motor speed.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	Abnormal oscillation was detected in the motor speed.	Check for abnormal motor noise, and check the speed and torque waveforms during oper- ation.	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 appro- priate value.	*1
	The vibration detec- tion level (Pn312) is not suitable.	Check that the vibra- tion detection level (Pn312) is suitable.	Set a suitable vibration detection level (Pn312).	*1
A.521: Autotuning Alarm (Vibration was detected while executing the output tuning	The Servomotor vibrated considerably while performing the tuning-less function.	Check the waveform of the motor speed.	Reduce the load so that the moment of inertia ratio is within the allowable value. Or increase the load level or reduce the rigidity level in the tuning- less level settings.	*1
custom tuning, Easy FFT, or the tuning-less func- tion.)	The Servomotor vibrated considerably while performing cus- tom tuning or Easy FFT.	Check the waveform of the motor speed.	Check the operating pro- cedure of corresponding function and implement corrections.	*1
	The wiring is not cor- rect 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
A.710: Instantaneous Overload	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.720: Continuous Overload	An excessive load was applied during operation because the Servomotor was not driven due to mechanical problems.	Check the operation reference and motor speed.	Correct the mechanical problem.	-
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
A 700 1 1 701	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 Servomo- tor was stopped with the dynamic brake, the rotational or linear kinetic energy exceeded the capac- ity of the dynamic brake resistor.	Check the power con- sumed by the DB resis- tor to see how frequently the DB is being used.	 Reconsider the following: Reduce the Servomotor command speed. Decrease the moment of inertia ratio. Reduce the frequency of stopping with the dynamic brake. 	-
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.740: Inrush Current Limiting Resistor Overload (The main circuit power supply	The allowable fre- quency of the inrush current limiting resis- tor 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 SERVOPACK.	-
	The surrounding tem- perature is too high.	Check the surrounding temperature using a thermostat. Or, check the operating status with the SERVOPACK installation environment monitor.	Decrease the surround- ing temperature by improving the SERVO- PACK installation condi- tions.	*1
	An overload alarm was reset by turning OFF the power sup- ply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	-
A.7A1: Internal Tempera- ture Error 1 (Control Board Temperature Error)	There was an exces- sive load or operation was performed that exceeded the regen- erative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenera- tive load ratio to check the regenerative pro- cessing capacity.	Reconsider the load and operating conditions.	_
	The SERVOPACK installation orientation is not correct or there is insufficient space around the SERVO- PACK.	Check the SERVOPACK installation conditions.	Install the SERVOPACK according to specifica- tions.	*1
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference	
	The surrounding tem- perature is too high.	Check the surrounding temperature using a thermostat. Or, check the operating status with the SERVOPACK installation environment monitor.	Decrease the surround- ing temperature by improving the SERVO- PACK installation condi- tions.	*1	
4 740	An overload alarm was reset by turning OFF the power sup- ply 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 exces- sive load or operation was performed that exceeded the regen- erative processing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenera- tive load ratio to check the regenerative pro- cessing capacity.	Reconsider the load and operating conditions.	-	
	The SERVOPACK installation orientation is not correct or there is insufficient space around the SERVO- PACK.	Check the SERVOPACK installation conditions.	Install the SERVOPACK according to specifica- tions.	*1	
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	-	
A.7A3: Internal Tempera- ture Sensor Error (An error occurred in the temperature sen- sor circuit.)	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SERVOPACK.	-	
A.7Ab: SERVOPACK Built-in Fan Stopped	The fan inside the SERVOPACK stopped.	Check for foreign matter inside the SERVOPACK.	Remove foreign matter from the SERVOPACK. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-	
	The power to the absolute encoder was turned ON for the first time.	Check to see if the power supply was turned ON for the first time.	Set up the encoder.		
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 con- nection 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 mea- sures to supply power to the encoder, and set up the encoder.		
	A failure occurred in the absolute encoder.	_	If the alarm still occurs after setting up the encoder again, replace the Servomotor.	-	
	A failure occurred in the SERVOPACK.	-	The SERVOPACK may be faulty. Replace the SERVOPACK.	-	

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Maintenance

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.820: Encoder Check- sum Alarm (Detected at the encoder.)	A failure occurred in the encoder.		 When Using an Absolute Encoder Set up the encoder again. If the alarm still occurs, the Servomotor may be faulty. Replace the Servomotor. When Using a Singleturn Absolute Encoder or Incremental Encoder The Servomotor may be faulty. Replace the Servomotor. 	*1
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.830: Encoder Battery	The battery connec- tion is faulty or a bat- tery is not connected.	Check the battery con- nection.	Correct the battery con- nection.	*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 SERVOPACK.	-
A.840: Encoder Data	The encoder malfunc- tioned.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor may be faulty. Replace the Servomotor.	_
Alarm (Detected at the encoder.)	The encoder malfunc- tioned 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.	_
A.850:	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.	-
Encoder Over- speed (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 may be faulty. Replace the Servomotor.	-
	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-	The surrounding air temperature around the Servomotor is too high.	Measure the surround- ing air temperature around the Servomotor.	Reduce the surrounding air temperature of the Servomotor to 40°C or less.	-
heated (Detected when a Rotary Servomo- tor, or Direct Drive	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 speci- fied range.	*1
Servomotor is connected. How- ever, this alarm is not detected for SGMCS Servomotors with	A failure occurred in the encoder.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor may be faulty. Replace the Servomotor.	-
Incremental Encoders.) (Detected at the 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 tem- perature around the Servomotor is too high.	Measure the surround- ing temperature around the Servomotor.	Reduce the surrounding air temperature of the Servomotor to 40°C 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 speci- fied range.	*1
A.861: Motor Over- heated	A failure occurred in the Serial Converter Unit.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Serial Con- verter Unit may be faulty. Replace the Serial Con- verter Unit.	_
	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	The surrounding tem- perature is too high.	Check the surrounding temperature using a thermostat.	Lower the surrounding temperature by improving the installation conditions of the machine.	-
	The overheat protec- tion input signal line is disconnected or short-circuited.	Check the input voltage with the overheat pro- tection input information on the Motion Monitor Tab Page on the Sig- maWin+.	Repair the line for the overheat protection input signal.	-
A.862: Overheat Alarm	An overload alarm was reset by turning OFF the power sup- ply too many times.	Check the alarm display to see if there is an overload alarm.	Change the method for resetting the alarm.	-
	Operation was per- formed under an excessive load.	Use the accumulated load ratio to check the load during operation.	Reconsider the load and operating conditions.	-
	A failure occurred in the SERVOPACK.	_	The SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The temperature detection circuit in the sensor attached to the machine is faulty.	_	The temperature detec- tion circuit in the sensor attached to the machine may be faulty. Repair the sensor attached to the machine.	-
A.8A0: External Encoder Error	Setting the origin of the absolute linear encoder failed because the motor moved.	Before you set the ori- gin, use the fully-closed feedback pulse counter to confirm that the motor is not moving.	The motor must be stopped while setting the origin position.	*1
	A failure occurred in the external encoder.	-	Replace the external encoder.	-
A.8A1:	A failure occurred in the external encoder.	-	Replace the external encoder.	-
External Encoder Module Error	A failure occurred in the Serial Converter Unit.	_	Replace the Serial Con- verter Unit.	-
A.8A2: External Incre- mental Encoder Sensor Error	A failure occurred in the external encoder.	_	Replace the external encoder.	-
A.8A3: External Abso- lute Encoder Position Error	A failure occurred in the external absolute encoder.	_	The external absolute encoder may be faulty. Refer to the encoder manufacturer's instruc- tion manual for correc- tions.	-
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 maxi- mum speed.	-
A.8A6: External Encoder Overheated	An overheating error was detected in the external encoder.	_	Replace the external encoder.	-
A.b33: Current Detec- tion 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.b6A: MECHATROLINK Communications ASIC Error 1	There is a fault in the SERVOPACK MECHATROLINK communications sec- tion.	-	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 sec- tion 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 sec- tion.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF0: System Alarm 0	A failure occurred in the SERVOPACK.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF1: System Alarm 1	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF2: System Alarm 2	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF3: System Alarm 3	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF4: System Alarm 4	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF5: System Alarm 5	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.bF6: System Alarm 6	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF7: System Alarm 7	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.bF8: System Alarm 8	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
	The order of phases U, V, and W in the motor wiring is not correct.	Check the Servomotor wiring.	Make sure that the Servo- motor is correctly wired.	-
A.C10: Servomotor Out of Control (Detected when the servo is turnod ON)	A failure occurred in the encoder.	_	If the motor wiring is cor- rect and an alarm still occurs after turning the power supply OFF and ON again, the Servomotor may be faulty. Replace the Servomotor.	-
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.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 may be faulty. Replace the Servomotor.	-
	A failure occurred in the SERVOPACK.	-	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	There is a faulty con- tact 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 dis- connection or short- circuit in the encoder. Or, the cable imped- ance is outside the specified values.	Check the condition of the Encoder Cable.	Use the Encoder Cable within the specified specifications.	-
A.C90: Encoder Commu-	One of the following has occurred: corro- sion caused by improper tempera- ture, humidity, or gas, a short-circuit caused by entry of water drops or cutting oil, or faulty contact in con- nector caused by vibration.	Check the operating environment.	Improve the operating environmental, and replace the cable. If the alarm still occurs, replace the SERVOPACK.	*1
nications Error	A malfunction was caused by noise.	_	Correct the wiring around the encoder by separating the Encoder Cable from the Servomotor Main Cir- cuit Cable or by ground- ing the encoder.	*1
	A failure occurred in the SERVOPACK.	_	Connect the Servomotor to another SERVOPACK, and turn ON the control power supply. If no alarm occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	_
	A failure occurred in the encoder.	_	Connect the Servomotor to another SERVOPACK, and turn ON the control power supply. If the alarm occurs, the Servomotor may be faulty. Replace the Servomotor.	-
	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 Commu- nications Posi- tion 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.	-

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

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
	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.	-	The Encoder Cable wiring distance must be 50 m max.	-
A.Cb0: Encoder Echo-	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.	-
back Error	Excessive vibration or shock was applied to the encoder.	Check the operating conditions.	Reduce machine vibra- tion. Correctly install the Ser- vomotor.	-
	A failure occurred in the encoder.	_	Turn the power supply to the SERVOPACK OFF and ON again. If an alarm still occurs, the Servomotor may be faulty. Replace the Servomotor.	-
	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. Continued o	-

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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 Con- verter 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 speci- fications 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 Con- verter Unit and SERVO- PACK must be 20 m or less.	_
	The sheath on cable between the Serial Converter Unit and SERVOPACK is bro- ken.	Check the cable that connects the Serial Converter Unit.	Replace the cable between the Serial Con- verter 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 Con- verter 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 Cir- cuit Cables.	Make sure that there are no faulty contacts in the wiring for the Servomotor and encoder.	_
	The position com- mand speed is too fast.	Reduce the position command speed and try operating the SERVOPACK.	Reduce the position refer- ence speed or the refer- ence acceleration rate, or reconsider the electronic gear ratio.	*1
A.d00: Position Devia- tion Overflow (The setting of Pn520 (Position Deviation Over- flow Alarm Level) was exceeded by the position devi-	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 accel- eration by selecting the position reference filter (ACCFIL) using a MECHATROLINK com- mand.	_
ation.)	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 Devia- tion 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).	
A.d02: Position Devia- tion Overflow Alarm for Speed Limit at Servo ON	If position deviation remains in the devia- tion counter, the set- ting of Pn529 (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 (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 direc- tion and the external encoder installation ori- entation.	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 refer- ence pulse counter.	Reconsider the operating specifications.	_
A.E02:	The MECHATROLINK transmission cycle fluctuated.	-	Remove the cause of transmission cycle fluctu- ation at the host control- ler.	_
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 speci- fied range.	Check the setting of the MECHATROLINK trans- mission cycle.	Set the MECHATROLINK transmission cycle to an appropriate value.	-
A.E41: MECHATROLINK Communications Data Size Setting Error	The number of trans- mission bytes set on DIP switch S3 is not correct.	Check the MECHATROLINK com- munications 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:	D	0		
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 communica- tions network have the same address.	Check to see if two or more stations on the communications net- work 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 ^{*5} :	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 syn- chronous communi- cations, so synchronous commu- nications 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 wir- ing is not correct.	Check the MECHATROLINK wir- ing.	Correct the MECHATROLINK Com- munications Cable wiring.	-
A.E60 ^{*5} : Reception Error in MECHATROLINK Communications	A MECHATROLINK data reception error occurred due to noise.	_	Implement countermea- sures against noise. (Check the MECHATROLINK Com- munications 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.	-

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Alarm Number: Describe Operation Operation Defenses				
Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
A.E61: Synchronization	The MECHATROLINK transmission cycle fluctuated.	Check the setting of the MECHATROLINK trans- mission cycle.	Remove the cause of transmission cycle fluctu- ation at the host control- ler.	-
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 wir- ing is not correct.	Check the Servomotor wiring.	Correct the MECHATROLINK Com- munications 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 MECHATROLINK Com- munications 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 con- nection 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 Configura- tion 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 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.	-
	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	Continued from pro	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 sig- nals 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 cir- cuits may be faulty. Alternatively, the input sig- nal cables may be discon- nected. Check to see if any of these items are faulty or have been dis- connected.	-
	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.	-
A.Ed1:	A timeout error occurred for a	Check the motor status when the command is executed.	Execute the SV_ON or SENS_ON command only when the motor is not operating.	-
Command Exe- cution Timeout	MECHATROLINK command.	Check the status of the external encoder when the command is exe- cuted.	Execute the SENS_ON command only when an external encoder is connected.	-
	The three-phase power supply wiring is not correct.	Check the power sup- ply wiring.	Make sure that the power supply is correctly wired.	*1
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	The three-phase power supply is unbalanced.	Measure the voltage for each phase of the three-phase power sup- ply.	Balance the power sup- ply by changing phases.	-
	A single-phase power supply was input with- out specifying a sin- gle-phase AC power supply input (Pn00B = $n.\Box 1\Box \Box$).	Check the power sup- ply and the parameter setting.	Match the parameter set- ting 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.	-

6.2.4 Warning Displays

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Alarm Number: Alarm Name	Possible Cause	Confirmation	Correction	Reference
FL-1 ^{*5} : System Alarm FL-2 ^{*5} : System Alarm FL-3 ^{*5} : System Alarm FL-5 ^{*5} : System Alarm FL-6 ^{*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 con- tact between the Digi- tal Operator and the SERVOPACK.	Check the connector contact.	Disconnect the connec- tor and insert it again. Or, replace the cable.	_
Communications Error 1	A malfunction was caused by noise.	-	Keep the Digital Operator or the cable away from sources of noise.	-
CPF01: Digital Operator	A failure occurred in the Digital Operator.	_	Disconnect the Digital Operator and then con- nect it again. If an alarm still occurs, the Digital Operator may be faulty. Replace the Digital Oper- ator.	-
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.	_

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

*2. Detection Conditions

*3.

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] × $\frac{\text{Encoder resolution}}{\text{Approx. } 3.66 \times 10^{12}} \ge \frac{\text{Pn20E}}{\text{Pn210}}$
Detection Conditions

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 $[\min^{-1}] \times \frac{\text{Encoder resolution}}{\text{Approx. } 3.66 \times 10^{12}} \ge \frac{\text{Pn20E}}{\text{Pn210}}$

*4. Refer to the following manual for details.

Ω 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.

Warning Displays 6.2.4

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

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

6.2.5 List of Warnings

6.2.5 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 percentage set with the following formula: $(Pn520 \times Pn51E/100)$	Required.
A.901	Position Deviation Overflow Alarm at Servo ON	The position deviation when the servo was turned ON exceeded the percentage set with the following formula: $(Pn526 \times Pn528/100)$	Required.
A.910	Overload	This warning occurs before an overload alarm (A.710 or A.720) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.911	Vibration	Abnormal vibration was detected during motor opera- tion. The detection level is the same as A.520. Set whether to output an alarm or a warning by setting Pn310 (Vibration Detection Selection).	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 (Regenera- tive Overload) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.921	Dynamic Brake Over- load	This warning occurs before an A.731 alarm (Dynamic Brake Overload) occurs. If the warning is ignored and operation is continued, an alarm may occur.	Required.
A.923	SERVOPACK Built-in Fan Stopped	The fan inside the SERVOPACK stopped.	Required.
A.930	Absolute Encoder Bat- tery Error	This warning occurs when the voltage of absolute encoder's battery is low.	Required.
A.93B	Overheat Warning	The input voltage (temperature) for the overheat protec- tion input (TH) signal exceeded the setting of Pn61C (Overheat Warning Level).	Required.
A.942	Speed Ripple Com- pensation Information Disagreement	The speed ripple compensation information stored in the encoder does not agree with the speed ripple com- pensation 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.*

6.2.5 List of Warnings

Continued from previous page.

Warning Number	Warning Name	Meaning	Resetting
A.95b	Command Warning 2 (Unsupported Com- mand)	An unsupported command was sent.	Automatically reset.*
A.95d	Command Warning 4 (Command Interfer- ence)	There was command interference, particularly latch command interference.	Automatically reset.*
A.95E	Command Warning 5 (Subcommand Not Possible)	The subcommand and main command interfere with each other.	Automatically reset.*
A.95F	Command Warning 6 (Undefined Command)	An undefined command was sent.	Automatically reset.*
A.960	MECHATROLINK Communications Warning	A communications error occurred during MECHATROLINK communications.	Required.
A.971	Undervoltage	This warning occurs before an A.410 alarm (Undervolt- age) 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.

* The warning will automatically be cleared after the correct command is received.

Note: 1. A warning code is not output unless you set Pn001 to n.1 [] (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	$Pn310 = n.\Box\Box\BoxX$ (Vibration Detection Selection)
A.923	− (Not affected by the setting of Pn008 = $n.\Box X \Box \Box$.)
A.930	Pn008 = n.
A.942	Pn423 = n.
A.94A to A.960 and A.97A to A.97b	Pn800=n.□□X□ (Warning Check Masks)
A.971	Pn008 = $n.\Box\Box X\Box$ (Function Selection for Undervoltage) (Not affected by the setting of Pn008 = $n.\Box X\Box\Box$.)
A.9A0	Pn00D = $n.X\square\square\square$ (Overtravel Warning Detection Selection) (Not affected by the setting of Pn008 = $n.\squareX\square\square$.)
A.9b0	Pn00F = $n.\square\square\squareX$ (Preventative Maintenance Warning Selection)

Refer to the following manual for details.

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

6.2.6 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 Cir- cuit 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 ref- erence 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 \times Pn51E/100) is too low for the operating condi- tions.	Check excessive posi- tion 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 devi- ation when the servo was turned ON exceeded the percentage set with the following formula: (Pn526 × Pn528/ 100)	_	Optimize the setting of Pn528 (Position Deviation Overflow Warning Level at Servo ON).	-

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Warning Number: Warning 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 cor- rectly wired.	-
	Operation was performed that exceeded the overload protec- tion characteris- tics.	Check the motor over- load characteristics and Run command.	Reconsider the load and operating conditions. Or, increase the motor capacity.	-
A.910: Overload (warning before an A.710 or A.720 alarm occurs)	An excessive load was applied during operation because the Ser- vomotor was not driven because of mechanical prob- lems.	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 vibra- tion was detected during motor operation.	Check for abnormal motor noise, and check the speed and torque waveforms during oper- ation.	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.	Set Pn103 (Moment of Iner- tia Ratio) to an appropriate value.	*
	The vibration detection level (Pn312) is not suitable.	Check that the vibration detection level (Pn312) is suitable.	Set a suitable vibration detection level (Pn312).	*

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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 environ- ment monitor.	Decrease the surrounding temperature by improving the SERVOPACK installa- tion conditions.	*
	An overload alarm was reset by turn- ing 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 pro- cessing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenera- tive load ratio to check the regenerative pro- cessing capacity.	Reconsider the load and operating conditions.	-
	The SERVOPACK installation orien- tation is not cor- rect or there is insufficient space around the SER- VOPACK.	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 environ- ment monitor.	Decrease the surrounding temperature by improving the SERVOPACK installa- tion conditions.	*
	An overload alarm was reset by turn- ing 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 pro- cessing capacity.	Use the accumulated load ratio to check the load during operation, and use the regenera- tive load ratio to check the regenerative pro- cessing capacity.	Reconsider the load and operating conditions.	-
	The SERVOPACK installation orien- tation is not cor- rect 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 volt- age within the specified range.	-
A.920: Regenerative Over- load (warning before an A.320 alarm occurs)	There is insuffi- cient external regenerative resis- tance, regenera- tive resistor capacity, or SERVOPACK capacity, or there has been a con- tinuous regenera- tion state.	Check the operating conditions or the capacity using the Sig- maJunmaSize+ Capac- ity Selection Software or another means.	Change the regenerative resistance value, regenera- tive resistance capacity, or SERVOPACK capacity. Reconsider the operating conditions using the Sigma- JunmaSize+ Capacity Selection Software or other means.	_
	There was a con- tinuous regenera- tion 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 exter- nal 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 con- sumed by the DB resis- tor to see how frequently the DB is being used.	 Reconsider the following: Reduce the Servomotor command speed. Decrease the moment of inertia. 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 mat- ter inside the SERVO- PACK.	Remove foreign matter from the SERVOPACK. If an alarm still occurs, the SERVOPACK may be faulty. Replace the SERVOPACK.	-
A.930: Absolute Encoder Battery Error (The absolute encoder battery voltage was lower than the spec- ified level.) (Detected only when an abso-	The battery con- nection is faulty or a battery is not connected.	Check the battery con- nection.	Correct the battery connec- tion.	*
	The battery volt- age is lower than the specified value (2.7 V).	Measure the battery voltage.	Replace the battery.	*
lute encoder is con- nected.)	A failure occurred in the SERVO- PACK.	-	The SERVOPACK may be faulty. Replace the SERVO- PACK.	-

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Warning Number: Warning Name	Possible Cause	Confirmation	Correction	Reference
	The surrounding temperature is too high.	Check the surrounding temperature using a thermostat.	Lower the surrounding tem- perature by improving the installation conditions of the machine.	_
	Operation was performed under an excessive load.	Use the accumulated load ratio to check the load during operation.	Reconsider the load and operating conditions.	-
A.93B: Overheat Warning	A failure occurred in the SERVO- PACK.	-	The SERVOPACK may be faulty. Replace the SERVO- PACK.	-
	The temperature detection circuit in the sensor attached to the machine is faulty.	_	The temperature detection circuit in the sensor attached to the machine may be faulty. Repair the sensor attached to the machine.	-
	The speed ripple	-	Reset the speed ripple compensation value on the SigmaWin+.	*
A.942: Speed Ripple Com- pensation Informa- tion Disagreement	compensation information stored in the encoder does not agree with the speed ripple compensa-	_	Set Pn423 to n. D 1 (Do not detect A.942 alarms). However, changing the set- ting may increase the speed ripple.	*
tion Disagreement	tion information stored in the SERVOPACK.	-	Set Pn423 to n. DDD (Disable speed ripple com- pensation). However, changing the setting may increase the speed ripple.	*
A.94A: Data Setting Warn- ing 1 (Parameter Number Error)	An invalid param- eter number was used.	Check the command that caused the warn- ing.	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 warn-ing.	Set the parameter within the setting range.	*
A.94C: Data Setting Warn- ing 3 (Calculation Error)	The calculation result of the set- ting is not correct.	Check the command that caused the warn-ing.	Set the parameter within the setting range.	*
A.94d: Data Setting Warn- ing 4 (Parameter Size)	The parameter size set in the command is not correct.	Check the command that caused the warn-ing.	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 warn-ing.	Change the setting of Pn850 or the LT_MOD data for the LTMOD_ON com- mand sent by the host con- troller to an appropriate value.	*
A.95A: Command Warning 1 (Unsatisfied Com- mand Conditions)	The command conditions are not satisfied.	Check the command that caused the warn-ing.	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 warn-ing.	Do not send unsupported commands.	*

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Warning Number: Describle Cause Confirmation Defense				
Warning Number. Warning Name	Possible Cause	Confirmation	Correction	Reference
A.95d: Command Warning 4 (Command Inter- ference)	The command sending condi- tions for latch- related com- mands was not satisfied.	Check the command that caused the warn-ing.	Send the command after the command conditions are satisfied.	*
A.95E: Command Warning 5 (Subcommand Not Possible)	The command sending condi- tions for subcom- mands was not satisfied.	Check the command that caused the warn-ing.	Send the command after the conditions are satisfied.	*
A.95F: Command Warning 6 (Undefined Com- mand)	An undefined command was sent.	Check the command that caused the warn-ing.	Do not send undefined commands.	*
	The MECHATROLINK Communications Cable is not wired correctly.	Check the wiring condi- tions.	Correct the MECHATROLINK communi- cations cable wiring.	*
A.960: MECHATROLINK Communications Warning	A MECHATROLINK data reception error occurred due to noise.	Confirm the installation conditions.	 Implement the following countermeasures against noise. Check the MECHATROLINK Communications Cable and FG wiring and implement countermeasures to prevent noise from entering. Attach a ferrite core to the MECHATROLINK Communications Cable. 	-
	A failure occurred in the SERVO- PACK.	_	The SERVOPACK may be faulty. Replace the SERVO- PACK.	-
	For a 200-V SERVOPACK, the AC power supply voltage dropped below 140 V.	Measure the power supply voltage.	Set the power supply volt- age within the specified range.	-
	For a 100-V SERVOPACK, the AC power supply voltage dropped below 60 V.	Measure the power supply voltage.	Set the power supply volt- age within the specified range.	-
A.971: Undervoltage	The power supply voltage dropped during operation.	Measure the power supply voltage.	Increase the power supply capacity.	-
	A momentary power interrup- tion occurred.	Measure the power supply voltage.	If you have changed the setting of Pn509 (Momen- tary 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.	-

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Warning Number: Warning Name	Possible Cause	Confirmation	Correction	Reference
A.97A: Command Warning 7 (Phase Error)	A command that cannot be exe- cuted in the cur- rent 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.	-
A.9A0: Overtravel (Over- travel status was detected.)	Overtravel was detected while the servo was ON.	Check the status of the overtravel signals on the input signal monitor.	 Even if an overtravel signal is not shown by the input signal monitor, momentary overtravel may have been detected. Take the following precautions. Do not specify move- ments that would cause overtravel from the host controller. Check the wiring of the overtravel signals. Implement countermea- sures against noise. 	*
A.9b0: Preventative Mainte- nance Warning	One of the con- sumable parts has reached the end of its service life.	_	Replace the part. Contact your Yaskawa representa- tive 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)

6.2.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

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

Problem	Possible Cause	Confirmation	Correction	Reference
	The control power supply is not turned ON.	Measure the voltage between control power supply terminals.	Turn OFF the power supply to the servo system. Correct the wiring so that the control power supply is turned ON.	-
	The main circuit power supply is not turned ON.	Measure the voltage across the main circuit power input terminals.	Turn OFF the power supply to the servo system. Correct the wiring so that the main circuit power supply is turned ON.	-
	The I/O signal connector (CN1) pins are not wired cor- rectly or are disconnected.	Turn OFF the power sup- ply to the servo system. Check the wiring condi- tion of the I/O signal con- nector (CN1) pins.	Correct the wiring of the I/O signal connec- tor (CN1) pins.	*
	The wiring for the Servomo- tor Main Circuit Cables or Encoder Cable is discon- nected.	Check the wiring condi- tions.	Turn OFF the power supply to the servo system. Wire the cable cor- rectly.	-
Servomotor Does Not Start	There is an overload on the Servomotor.	Operate the Servomotor with no load and check the load status.	Turn OFF the power supply to the servo system. Reduce the load or replace the Servomo- tor with a Servomotor with a larger capacity.	-
	The type of encoder that is being used does not agree with the setting of $Pn002 = n.\Box X \Box \Box$ (Encoder Usage).	Check the type of the encoder that is being used and the setting of Pn002 = $n.\Box X \Box \Box$.	Set Pn002 = $n.\Box X \Box \Box$ according to the type of the encoder that is being used.	*
	There is a mistake in the input signal allocations (Pn50A, Pn50B, Pn511, and Pn516).	Check the input signal allocations (Pn50A, Pn50B, Pn511, and Pn516).	Correctly allocate the input signals (Pn50A, Pn50B, Pn511, and Pn516).	*
	The SV_ON command was not sent.	Check the commands sent from the host con- troller.	Send the SV_ON com- mand from the host controller.	_
	The SENS_ON (Turn ON Sensor) command was not sent.	Check the commands sent from the host con- troller.	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 sig- nals. If you are not using the safety func- tion, connect the Safety Jumper Connector (provided as an acces- sory) to CN8.	*

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Problem	Possible Cause	Confirmation	Correction	Reference
Servomotor 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. DDX (FSTP (Forced Stop Input) Signal Allocation) to disable the signal. 	*
	A failure occurred in the SERVOPACK.	-	Turn OFF the power supply to the servo system. Replace the SERVO- PACK.	-
Servomotor Moves Instanta-	There is a mistake in the Ser- vomotor wiring.	Turn OFF the power sup- ply to the servo system. Check the wiring.	Wire the Servomotor correctly.	-
neously, and Then Stops	There is a mistake in the wir- ing of the encoder or Serial Converter Unit.	Turn OFF the power sup- ply to the servo system. Check the wiring.	Wire the Serial Con- verter Unit correctly.	-
Servomotor Speed Is Unstable	There is a faulty connection in the Servomotor wiring.	The connector connec- tions for the power line (U, V, and W phases) and the encoder or Serial Converter Unit may be unstable. Turn OFF the power sup- ply to the servo system. Check the wiring.	Tighten any loose ter- minals or connectors and correct the wiring.	_
Servomotor Moves with- out a Refer- ence Input	A failure occurred in the SERVOPACK.	_	Turn OFF the power supply to the servo system. Replace the SERVO- PACK.	-
	The setting of Pn001 = n.□□□X (Motor Stopping Method for Servo OFF and Group 1 Alarms) is not suit- able.	Check the setting of Pn001 = $n.\Box\Box\BoxX$.	Set Pn001 = n.□□□X correctly.	-
Dynamic Brake Does Not Operate	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 resis- tance may be discon- nected.	Turn OFF the power supply to the servo system. Replace the SERVO- PACK. To prevent dis- connection, reduce the load.	_
	There was a failure in the dynamic brake drive circuit.	-	There is a defective component in the dynamic brake circuit. Turn OFF the power supply to the servo system. Replace the SERVO- PACK.	-

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Problem	Possible Cause	Confirmation	Correction	Reference
	The Servomotor vibrated considerably while perform- ing 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 is within the allowable value, or increase the load level or reduce the rigidity level in the tuning-less level settings. If the situation is not improved, disable the tuning-less function (i.e., set Pn170 to $n.\square\square\square0$) and execute autotuning either with or without a host refer- ence.	*
		Turn OFF the power sup- ply to the servo system. Check to see if there are any loose mounting screws.	Tighten the mounting screws.	-
	The machine mounting is not secure.	Turn OFF the power sup- ply to the servo system. Check to see if there is misalignment in the cou- pling.	Align the coupling.	-
Abnormal Noise from Servomotor		Turn OFF the power sup- ply to the servo system. Check to see if the cou- pling is balanced.	Balance the coupling.	-
	The bearings are defective.	Turn OFF the power sup- ply to the servo system. Check for noise and vibration around the bear- ings.	Replace the Servomo- tor.	-
	There is a vibration source at the driven machine.	Turn OFF the power sup- ply to the servo system. Check for any foreign matter, damage, or defor- mation in the machine's moving parts.	Consult with the machine manufacturer.	_
	Noise interference occurred because of incorrect I/O signal cable specifications.	Turn OFF the power sup- ply to the servo system. Check the I/O signal cables to see if they sat- isfy specifications. Use shielded twisted-pair cables or screened twisted-pair cables with conductors of at least 0.12 mm ² (stranded wire).	Use cables that satisfy the specifications.	-
	Noise interference occurred because an I/O signal cable is too long.	Turn OFF the power sup- ply to the servo system. Check the lengths of the I/O signal cables.	The I/O signal cables must be no longer than 3 m.	_

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Problem	Possible Cause	Confirmation	Correction	Reference
	Noise interference occurred because of incorrect Encoder Cable specifications.	Turn OFF the power sup- ply to the servo system. Check the Encoder Cable to see if it satisfies speci- fications. Use shielded twisted-pair cables or screened twisted-pair cables with conductors of at least 0.12 mm ² (stranded wire).	Use cables that satisfy the specifications.	_
	Noise interference occurred because the Encoder Cable is too long.	Turn OFF the power sup- ply to the servo system. Check the length of the Encoder Cable.	The Encoder Cable length must be 50 m max.	-
	Noise interference occurred because the Encoder Cable is damaged.	Turn OFF the power sup- ply to the servo system. Check the Encoder Cable to see if it is pinched or the sheath is damaged.	Replace the Encoder Cable and correct the cable installation envi- ronment.	-
	The Encoder Cable was sub- jected to excessive noise interference.	Turn OFF the power sup- ply to the servo system. 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.	-
Abnormal Noise from Servomotor	There is variation in the FG potential because of the influence of machines on the Servomotor side, such as a welder.	Turn OFF the power sup- ply to the servo system. Check to see if the machines are correctly grounded.	Properly ground the machines to separate them from the FG of the encoder.	-
	There is a SERVOPACK pulse counting error due to noise.	Check to see if there is noise interference on the signal line from the encoder.	Turn OFF the power supply to the servo system. Implement counter- measures against noise for the encoder wiring.	-
	The encoder was subjected to excessive vibration or shock.	Turn OFF the power sup- ply to the servo system. Check to see if vibration from the machine occurred. Check the Ser- vomotor installation (mounting surface preci- sion, securing state, and alignment).	Reduce machine vibra- tion. Improve the mounting state of the Servomotor.	-
	A failure occurred in the encoder.	-	Turn OFF the power supply to the servo system. Replace the Servomo- tor.	-
	A failure occurred in the Serial Converter Unit.	-	Turn OFF the power supply to the servo system. Replace the Serial Con- verter Unit. Continued or	-

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Problem	Possible Cause	Confirmation	Correction	Reference
Servomotor Vibrates at Frequency of Approx. 200 to 400 Hz.	The servo gains are not bal- anced.	Check to see if the servo gains have been cor- rectly tuned.	Perform autotuning without a host refer- ence.	*
	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.	-
	The setting of Pn102 (Posi- tion 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 Con- stant) is not appropriate.	Check the setting of Pn101. The default setting is Ti = 20.0 ms.	Set Pn101 to an appro- priate value.	-
	The setting of Pn103 (Moment of Inertia Ratio) is not appropriate.	Check the setting of Pn103.	Set Pn103 to an appro- priate value.	-
Large Motor Speed Overshoot on Starting and Stop- ping	The servo gains are not bal- anced.	Check to see if the servo gains have been cor- rectly 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 appro- priate value.	-
	The setting of Pn102 (Posi- tion 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 Con- stant) is not appropriate.	Check the setting of Pn101. The default setting is Ti = 20.0 ms.	Set Pn101 to an appro- priate value.	-
	The setting of Pn103 (Moment of Inertia Ratio) is not appropriate.	Check the setting of Pn103.	Set Pn103 to an appro- priate value.	-
	The torque reference is saturated.	Check the waveform of the torque reference.	Use the mode switch.	-

			Continued from pre	vious page.
Problem	Possible Cause	Confirmation	Correction	Reference
	Noise interference occurred because of incorrect Encoder Cable specifications.	Turn OFF the power sup- ply to the servo system. Check the Encoder Cable to see if it satisfies speci- fications. Use shielded twisted-pair cables or screened twisted-pair cables with conductors of at least 0.12 mm ² (stranded wire).	Use cables that satisfy the specifications.	-
Absoluto	Noise interference occurred because the Encoder Cable is too long.	Turn OFF the power sup- ply to the servo system. Check the length of the Encoder Cable.	The Encoder Cable length must be 50 m max.	-
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 the posi- tion when the power was next turned ON.)	Noise interference occurred because the Encoder Cable is damaged.	Check the Encoder Cable	Replace the Encoder Cable and correct the cable installation envi- ronment.	-
	The Encoder Cable was subject to excessive noise inter- ference.	Turn OFF the power sup- ply to the servo system. 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.	Turn OFF the power sup- ply to the servo system. Check to see if the machines are correctly grounded.	Properly ground the machines to separate them from the FG of the encoder.	-
	There is a SERVOPACK pulse counting error due to noise.	Turn OFF the power sup- ply to the servo system. 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 or Serial Converter Unit wiring.	-
	The encoder was subjected to excessive vibration or shock.	Turn OFF the power sup- ply to the servo system. Check to see if vibration from the machine occurred. Check the Servomotor installation (mounting sur- face precision, securing state, and alignment).	Reduce machine vibra- tion. Improve the mounting state of the Servomotor.	-

Continued from previous page.

Problem	Possible Cause	Confirmation	Continued from pre	Reference
Absolute Encoder Position Deviation Error (The position that was saved in the	A failure occurred in the encoder.	_	Turn OFF the power supply to the servo system. Replace the Servomo- tor.	-
	A failure occurred in the SERVOPACK.	-	Turn OFF the power supply to the servo system. Replace the SERVO- PACK.	_
host con- troller when		Check the error detec- tion section of the host controller.	Correct the error detec- tion section of the host controller.	-
the power was turned OFF is dif- ferent from the posi-	Host Controller Multiturn Data or Absolute Encoder	Check to see if the host controller is executing data parity checks.	Perform parity checks for the multiturn data or absolute encoder posi- tion data.	-
tion when the power was next turned ON.)	Position Data Reading Error	Check for noise interfer- ence in the cable between the SERVO- PACK and the host con- troller.	Implement counter- measures against noise and then perform parity checks again for the multiturn data or abso- lute encoder position data.	_
		Check the external power supply (+24 V) voltage for the input signals.	Correct the external power supply (+24 V) voltage for the input signals.	-
	The P-OT/N-OT (Forward Drive Prohibit or Reverse Drive Prohibit) signal was input.	Check the operating con- dition 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 opera- tion of the overtravel limit switches is unstable.	Stabilize the operating condition of the over- travel 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.	-
	There is a mistake in the allo- cation of the P-OT or N-OT (Forward Drive Prohibit or	Check to see if the P-OT signal is allocated in Pn50A = $n.X\square\square\square$.	If another signal is allo- cated in Pn50A =n.XDDD, allocate the P-OT signal instead.	*
	Reverse Drive Prohibit) sig- nal in Pn50A = n.X□□□ or Pn50B = n.□□□X.	Check to see if the N-OT signal is allocated in Pn50B = $n.\Box\Box\BoxX$.	If another signal is allo- cated in Pn50B =n.□□□X, allocate the N-OT signal instead.	- *

Continued on next page.

Problem	Possible Cause	Confirmation	Correction	Reference	
Overtravel Occurred	The selection of the Servo- motor stopping method is			*	
Occurred	not correct.	Check the torque control stopping method set in Pn001 = $n.\Box\BoxX$ or Pn001 = $n.\Box\BoxX\Box$.	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.	_	
	Noise interference occurred because of incorrect Encoder Cable specifications.	Check the Encoder Cable to see if it satisfies speci- fications. Use shielded twisted-pair cables or screened twisted-pair cables with conductors of at least 0.12 mm ² (stranded wire).	Use cables that satisfy the specifications.	-	
Position	Noise interference occurred because the Encoder Cable is too long.	Turn OFF the power sup- ply to the servo system. Check the length of the Encoder Cable.	The Encoder Cable length must be 50 m max.	-	
	Noise interference occurred because the Encoder Cable is damaged.	Turn OFF the power sup- ply to the servo system. Check the Encoder Cable to see if it is pinched or the sheath is damaged.	Replace the Encoder Cable and correct the cable installation envi- ronment.	-	
Deviation (without Alarm)	The Encoder Cable was sub- jected to excessive noise interference.	Turn OFF the power sup- ply to the servo system. 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.	Turn OFF the power sup- ply to the servo system. Check to see if the machines are correctly grounded.	Properly ground the machines to separate them from the FG of the encoder.	-	
	There is a SERVOPACK pulse counting error due to noise.	Turn OFF the power sup- ply to the servo system. 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.	-	

Continued from previous page.

Problem	Possible Cause	Confirmation	Correction	Reference
Position Deviation (without Alarm)	The encoder was subjected to excessive vibration or shock.	Turn OFF the power sup- ply to the servo system. Check to see if vibration from the machine occurred. Check the Servomotor installation (mounting sur- face precision, securing state, and alignment).	Reduce machine vibra- tion. Improve the mounting state of the Servomotor.	-
	The coupling between the machine and Servomotor is not suitable.	Turn OFF the power sup- ply to the servo system. Check to see if position offset occurs at the cou- pling between machine and Servomotor.	Correctly secure the coupling between the machine and Servomotor.	-
	Noise interference occurred because of incorrect I/O signal cable specifications.	Turn OFF the power sup- ply to the servo system. Check the I/O signal cables to see if they sat- isfy specifications. Use shielded twisted-pair cables or screened twisted-pair cables with conductors of at least 0.12 mm ² (stranded wire).	Use cables that satisfy the specifications.	-
	Noise interference occurred because an I/O signal cable is too long.	Turn OFF the power sup- ply to the servo system. Check the lengths of the I/O signal cables.	The I/O signal cables must be no longer than 3 m.	-
	An encoder fault occurred. (The pulse count does not change.)	_	Turn OFF the power supply to the servo system. Replace the Servomo- tor.	-
	A failure occurred in the SERVOPACK.	_	Turn OFF the power supply to the servo system. Replace the SERVO- PACK.	-
Servomotor	The surrounding air tempera- ture is too high.	Measure the surrounding air temperature around the Servomotor.	Reduce the surround- ing air temperature to 40°C or less.	_
	The surface of the Servomo- tor is dirty.	Turn OFF the power sup- ply to the servo system. Visually check the surface for dirt.	Clean dirt, dust, and oil from the surface.	-
Overheated	There is an overload on the Chec	Check the load status with a monitor.	If the Servomotor is overloaded, reduce the load or replace the Servo Drive with a SERVOPACK and Ser- vomotor with larger capacities.	-

* 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)

6.2 SERVOPACK with MECHATROLINK-III Communications References

6.2.7 Troubleshooting Based on the Operation and Conditions of the Servomotor

Panel Displays and Panel Operator Procedures

7

This chapter describes how to interpret panel displays.

7.1	Monitor	r Display (Un□□□) Operations on the Panel Operator7-2
	7.1.1	Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching-Related Monitor (Un08B)

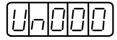
7.1.1 Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching-Related Monitor (Un08B)

7.1 Monitor Display (Un D D) Operations on the Panel Operator

You can monitor the status of the reference values and I/O signals that are set in the SERVO-PACK and the internal status of the SERVOPACK with monitor displays. This function is available only on SERVOPACKs with analog voltage/pulse train references.

The Panel Operator displays numbers beginning with "Un."

Display Example for Motor Speed



This section describes monitor numbers that are not available on the standard product.

Refer to the following manual for monitor numbers that are not listed here. $\bigcap_{(Manual No.: SIEP S800001 26)} \Sigma$ -7-Series Σ -7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual Manual No.: SIEP S800001 26)

7.1.1 Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching-Related Monitor (Un08B)

You can use Un08B to display the status of signals related to Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching on the LED segments of the Panel Operator.

Information You can also use Un005 (Input Signal Monitor) and Un006 (Output Signal Monitor) to monitor the signals related to Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching. However, Un08B allows you to monitor the status of the three signals at one time.

Interpreting the Display

LED Segments

87654321 - Display digit number

Display Digit Number	Description
1	Top: Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching enabled Bottom: Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching disabled
2	Top: Fully-closed loop control status Bottom: Semi-closed loop control status
3	Top: Motor-Load Position Deviation Clear enabled Bottom: Motor-Load Position Deviation Clear disabled
4 to 8	Reserved (The display is fixed as shown below.)

Display Examples

Display examples are shown below.

• When Semi-Closed Loop Control/Fully-Closed Loop Control Online Switching is enabled

• Semi-closed loop control status

Parameter Lists

8.1 8.1.1 8.1.2 List of MECHATROLINK-III Common 8.2 SERVOPACK with Analog Voltage/Pulse Train References ...8-3 List of Servo Parameters 8-3 8.2.1 8.3 SERVOPACK with MECHATROLINK-III Communications References . . 8-33 List of Servo Parameters 8-33 8.3.1 8.3.2 List of MECHATROLINK-III Common

This chapter provides information on the parameters.

8.1.1 List of Servo Parameters

8.1 Interpreting Parameter Lists

8.1.1 List of Servo Parameters

All of the parameters given in this manual can be used with any type of Servomotor. There is no need for the user to be concerned with the "All" and "Rotary" specifications given in this column. These are used for maintenance by Yaskawa.

"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.

Indicates when a change to the parameter will be effective.

Name Name											
2 Basic Function Selections 0 10B1h - 0000n All After restart Setup There are the following two classifications. • Tuning • Setup Refer to the following manuals for details. Product Manual (Manual No.: SIEP S800001 26) £ -7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26) £ -7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28) 1 Use CW as the forward direction. (Reverse Rotation Mode) n.□□X□ Reserved parameter (Do not change.)		Size	1	Name	U	•					Refer ence
Pn000 • Tuning • Setup Refer to the following manuals for details. □ Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26) □ Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28) 1 Use CW as the forward direction. (Reverse Rotation Mode) n.□□X Reserved parameter (Do not change.) n.□X□□ Reserved parameter (Do not change.) n.□ 0 When an encoder is not connected, start as SERVOPACK for Rotary Servomotor. 1 When an encoder is not connected, start as SERVOPACK for Lin-		2	Basic Func	tion Selections (-	0000h	All	After restart	Setup	-
n.X□□□ 0 Rotary Servomotor. 1 When an encoder is not connected, start as SERVOPACK for Lin-	Pn000	r	1.00X0	Tun Setu Refer 1 Use Reserved pa	ng ip to the following r Σ-7-Series Σ-7S Product Manual Σ-7-Series Σ-7S Product Manual CCW as the for rameter (Do no rameter (Do no	manuals for SERVOPAC (Manual No. SERVOPAC (Manual No. ward direc t change.)	details. CK with Anale : SIEP S800 CK with MEC : SIEP S800 tion. (Rever	001 26) HATROLINK- 001 28) se Rotation	III Communica Mode)	tions Refer	
		n	n.X000				nected, star	t as SERVOI	PACK for		
						is not conr	nected, star	t as SERVOI	PACK for Lin-		

8.1.2 List of MECHATROLINK-III Common Parameters

All of the parameters given in this manual can be used with any type of Servomotor. There is no need for the user to be concerned with the

"All" and "Rotary" specifications given in this column. These are used

for maintenance by Yaskawa

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.

7,

Param- eter No.	Size	Name	Setting Range	Setting Unit [Resolu- tion]	Default Setting	Appli- cable Motors	When Enabled	Clas- sifica- tion
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 in the Servomotor to the resolution given in the square brackets.

8.2.1 List of Servo Parameters

SERVOPACK with Analog Voltage/Pulse Train References 8.2

List of Servo Parameters 8.2.1

The following table lists the parameters.

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

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

Parameter No.	Size	Name		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer ence		
Pn000	2	Basic Function Selec- tions 0		0000h to 10B1h	-	0000h	All	After restart	Setup	-		
		n.000X	0 1 Control M 0	Direction Selection Use CCW as the forward direction. Use CW as the forward direction. (Reverse Rotation Mode) Method Selection Speed control with analog references Position control with pulse train references								
			3	Torque control wit nternal set speed Switching betwee ences and speed	control w n internal s	ith contact set speed	control with c	ontact refer-				
		n.🗆🗆 X 🗆	5	Switching between internal set speed control with contact refer- ences and position control with pulse train references Switching between internal set speed control with contact refer- ences 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								
			0	Switching betwee	een torque control with analog references and vith analog references					-		
			A :	Switching between speed control with analog references and speed control with zero clamping Switching between position control with pulse train references and								
			В	Switching betwee position control w	n position ith referen	control wit ce pulse ir	h pulse train re hibition	eferences and	Ľ			
		n.¤X¤¤	Reserved parameter (Do not change.)									
			Rotary/Linear Servomotor Startup Selection When Encoder Is Not Con- nected							ence		
		n.X000	0	When an encoder is not connected, start as SERVOPACK for Rotary Servomotor.								
				When an encoder ear Servomotor.	is not cor	inected, st	art as SERVO	PACK for Lin	*1			

Continued on next page.

8.2.1 List of Servo Parameters

Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence				
Pn001	2	Application Selections		0000h to 1142h	-	0000h	All	After restart	Setup	_				
		n.000X	Motor Stopping Method for Servo OFF and Group 1 Alarms							ence				
			0 St	op the motor by	applying	the dynam	ic brake.							
				Stop the motor by the applying dynamic brake and then release the dynamic brake. $\space{*}_1$										
	_		2 Co	ast the motor t	o a stop w	ithout the	dynamic brak	æ.						
			Overtravel Stopping Method							Reference				
		n.□□X□	0 Ap	ply the dynamic	brake or	coast the	motor to a sto	op.						
				celerate the mo maximum torc										
				celerate the mo maximum torc				in Pn406 as	*1	*1				
				celerate the mo 30A and then s			he deceleratio	on time set in						
				celerate the mo 30A and then le			he deceleratio	on time set in						
		n.0X00	Main Circuit Power Supply AC/DC Input Selection							Reference				
				out AC power as d L3 terminals (ng the L1, L2)					
			1 an	but DC power as $O \ominus 2$ terminals nverter or the s	s or the B ⁻	$i and \ominus 2$		U -						
	1	n.X000	Warning Code Output Selection						Refere	Reference				
				0 Output only alarm codes on the ALO1, ALO2, and ALO3 termi- nals.										
			1 an ou	tput both warni d ALO3 termina tput, the ALM (al state).	ls. Howev	er, while a	n warning coo	de is being						
			- I											

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Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refe enc
	2	Application Selections	Function		0000h to 4213h	-	0111h	_	After restart	Setup	_
			Speed/P	ositi	on Control Op	tion (T-RE	F Input Al	ocation)	Applicable Motors	Refere	ence
			0	Do	not use T-REF.					-	
		n.🗆🗆 🗆 X	1		T-REF as an e			1	• •	*1	
			2		T-REF as a to				All	*1	
			3		T-REF as an e		rque limit i	nput when		*1	
			Torque C	Torque Control Option (V-REF Input Allocation)						Refere	ence
		n.🗆 🗆 X 🗆	0	Do	not use V-REF.	•			All	*1	
			1	Use	V-REF as an e	nput.	All	1			
Pn002			Encoder	Usa	ge				Applicable Motors	Refere	ence
		n.0X00	0	Use tion	the encoder a s.	according	to encode	specifica-	All		
			1	Use	the encoder a	as an incre	emental en	coder.		*1	
			2		the encoder a oder.	lute	Rotary				
			External	Enco	oder Usage				Applicable Motors	Refere	ence
			0	Do	not use an ext	ernal encc	oder.				
		n.X000	1		external enco for CCW mote			ward direc-			
			2	Res	erved setting ((Do not us	e.)		Rotary	*1	
	3 The external encoder moves in the reverse direc- tion for CCW motor rotation.					erse direc-					
			4	Dee	erved setting (-				

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		T					Con	itinued from	n previou	s page.
Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Application Selections	n Function 6	0000h to 105Fh	-	0002h	All	Immedi- ately	Setup	*1
Pn006		n.⊡⊡XX	6	105Fh nitor 1 Signal Se Motor speed (1 Speed reference Torque reference Position deviatio Position amplifie Position reference Reserved setting Load-motor pos Positioning com pleted: 0 V) Speed feedforw Torque feedforw Active gain (1st Completion of p pleted: 0 V) External encode Reserved setting Reserved setting Main circuit DC Reserved setting	V/1,000 m (1 V/1,00 (1 V/100 (1 V/100 (1 V/100 (1 V/100 (1 V/100 (2 speed (1 (2 speed (1 (2 speed (1 V/1) (3 ard (1	hin ⁻¹) 0 min ⁻¹) % rated to (reference (after elec 1 V/1,000 use.) tion (0.01 positioning c 00% rated 2nd gain: 2 erence dis V/1,000 r use.) use.) use.)	rque) unit) ctronic gear) (min ⁻¹) V/reference u completed: 5 ^v torque) 2 V) tribution (com	0.05 V/enco nit) V, positioning pleted: 5 V,	der pulse g not com-	unit)
		n.OXOO		parameter (Do no	.	,				
						,				
		n.XDDD	Reserved p	parameter (Do no	ot change.)				

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								Con	tinued from	n previou	s page				
Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer ence				
	2	Application	Function		0000h to	_	0000h	All	Immedi-	Setup	*1				
		Selections	1		105Fh				ately	[-					
			1												
			Analog M	onitor	2 Signal Se	lection									
			00	Mote	or speed (1	V/1,000 m	nin⁻¹)								
			01	Spe	ed reference	e (1 V/1,00	00 min⁻¹)								
			02		ue reference										
			03		tion deviatio										
			04					ctronic gear) (0.05 V/enco	der pulse	unit)				
			05		tion reference			min⁻¹)							
			06		erved setting		,								
			07				•	V/reference u	,						
Pn007		n.🗆🗆XX	08		itioning com ed: 0 V)	pletion (po	ositioning c	completed: 5	V, positioning	g not com	-				
111007			09	Spe	ed feedforw	ard (1 V/1	,000 min ⁻¹)								
			0A	Torq	ue feedforw	ard (1 V/1	00% rated	torque)							
			0B	-	ve gain (1st	-	-								
			0C		npletion of p ed: 0 V)	osition ref	erence dis	tribution (com	pleted: 5 V,	not com-					
			0D	External encoder speed (1 V/1,000 min ⁻¹ : value at the motor shaft)											
			0E	Rese	Reserved setting (Do not use.)										
			0F	Rese	Reserved setting (Do not use.)										
			10	Mair	Main circuit DC voltage										
			11 to 5F	11 to 5F Reserved settings (Do not use.)											
		n.¤X¤¤	Reserved	paran	neter (Do no	ot change.)								
		n.XDDD	Reserved	paran	neter (Do no	ot change.)								
			1												
	2	Application Selections			0000h to 7121h	-	0000h	Rotary	After restart	Setup	-				
			Low Batte	ery Vol	tage Alarm	/Warnina \$	Selection			Refere	ence				
		n.🗆 🗆 🛛 X		-	t alarm (A.8	-		oltage.							
			1	Outpu	t warning (A	930) for l	ow battery	voltage.		*1					
			Eurotion	Soloot	ion for Und	onvoltago		-		Refere	2000				
					t detect unc	•				T E E E E					
Pn008		n.🗆 🗆 🗆				0		torque at hos	t controller	-					
						0 1	,	torque with P		*1					
					6 (i.e., only ir										
			Warning [Detect	ion Selectic	n				Refere	ence				
				Varning Detection Selection Reference 0 Detect warnings.											
		n.¤X¤¤	0	Detect	t warnings.					* 1					
		n.¤X¤¤	-		t detect war	nings exc	ept for A.9	71.		*1					
		n.0X00	1	Do no	Ũ	0		71.		*1					

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							Con	itinued 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	Application Selections		0000h to 0121h	_	0010h	All	After restart	Tuning	-
		n.000X	Reserved p	parameter (Do no	ot change.)				
			Current Co	ntrol Mode Sele	oction	,			Refere	nce
				lse current contre						
Pn009		n.OOXO	1	SERVOPACK M 3R8A, -5R5A, au SERVOPACK M 470A, -550A, -5	nd -7R6A: odels SGD	Use currei 7S-120A,	nt control mod -180A, -200A	de 1. ., -330A, -	*1	
			2 L	lse current contro	ol mode 2.					
			- ·	ection Method S					Refere	ence
		n.¤X¤¤		lse speed detect lse speed detect					*1	
		n.XOOO	Reserved p	parameter (Do no	ot change.	.)				
	2	Application Selections		0000h to 1044h	_	0001h	All	After restart	Setup	-
			Motor Sto	pping Method fo	or Group 2	Alarms			Refer	ence
			0 ;	Apply the dynam stopping method Decelerate the m	set in Pn0	001 = n. □ [⊐□X).	• •	3	
		n.000X	1 1	he maximum tor status after stopp	que. Use t bing.	he setting	of Pn001 = n.l	DDDX for th	ne	
		11.000X	2	Decelerate the m the maximum tor	que and th	nen let the	motor coast.	in Ph406 as	*	l
			3 1	Decelerate the m Pn30A. Use the s stopping.						
				Decelerate the m Pn30A and then			the deceleration	on time set i	n	
Pn00A			Stopping	Method for Forc	ed Stops				Refer	ence
			0 ;	Apply the dynam stopping method	set in Pn0	001 = n. □ [$\Box \Box X).$			
			1 1	Decelerate the m the maximum tor status after stopp	que. Use t					
		n.🗆 🗆 X 🗆		Decelerate the m he maximum tor				t in Pn406 as	8 *1	l
			3 1	Decelerate the m Pn30A. Use the s stopping.						
				Decelerate the m Pn30A and then			the deceleration	on time set i	n	
		n.¤X¤¤	Reserved	parameter (Do n	iot change	e.)				
		n.XDDD	Reserved	parameter (Do n	ot change	e.)				

Continued from previous page.

							Con	tinued from	n previou	s page.
Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Application Selections	n Function B	0000h to 1121h	-	0000h	All	After restart	Setup	-
		n.000X	0 Dis	r <mark>ameter Display</mark> play only setup play all parame	paramete				Referen	nce
Pn00B	-	n.00X0	0 Sto 1 Ap	ing Method for op the motor by ply the dynamic opping method s t the stopping n	setting th brake or set in Pn00	e speed re coast the i 01 = n.□□	motor to a sto I□X).	op (use the	*1	nce
		n.OXOO	0 Use	Selection for T e a three-phase e a three-phase oply input.	power su	pply input.		nase power	Referen	nce
		n.X000	Reserved pa	rameter (Do no	t change.)	1				
	2	Application Selections		0000h to 0130h	-	0000h	_	After restart	Setup	*1
		n.DDDX		lection for Test					Applical Motor All	
Pn00C		n.00X0	0 Us 1 Us 2 Us	solution for Tes a 13 bits. a 20 bits. a 22 bits. a 24 bits.	ts without	t a Motor			Applical Motor Rotary	8
		n.¤X¤¤	0 Us	be Selection for	al encoder		tor		Applical Motor	
		n.XDDD	ļ	se an absolute e arameter (Do no		.)				
	2	Application Selections	n Function D	0000h to 1001h	-	0000h	All	Immedi- ately	Setup	*1
		n.□□□X	Reserved pa	arameter (Do no	ot change.	.)				
Pn00D		n.🗆 🗆 X 🗆		arameter (Do no	-	,				
		n.¤X¤¤		arameter (Do no	-					
		n.XDDD	0 Do	Varning Detecti o not detect ove etect overtravel	ertravel wa					

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Parameter Lists

								Con	tinued from	n previou	s page.			
Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence			
	2	Application Selections	Function F		0000h to 2011h	-	0000h	All	After restart	Setup	_			
			Preventa	tive	Maintenance \	Warning S	election			Reference	e			
		n.🗆🗆 🗆 X	0 [Do no	ot detect preve	entative ma	aintenance	warnings.		*1				
Pn00F			1 [Deteo	ct preventative	maintena	nce warnin	gs.		1				
		n.DDXD	Reserved	l par	ameter (Do no	ot change.)							
		n.¤X¤¤	Reserved	l par	ameter (Do no	ot change.)							
		n.XDDD	Reserved	l par	ameter (Do no	ot change.)							
Pn010	2	Axis Addre for UART/L nications			0000h to 007Fh	-	0001h	All	After restart	Setup	-			
Pn021	2	Reserved p not change		Do	-	_	0000h	All	-	-	_			
Pn022	2	Reserved p not change		(Do	_	_	0000h	All	-	-	_			
	2	Semi-close closed Loc Switching- Selection	p Control		0000h to 0011h	-	0000h	All	After restart	Setup	_			
			Semi-clo	sod/	Fully-closed L	oon Cont	rol Switch	ing Selection						
		n.000X	0		sable Semi-clo			•						
		/	1											
					ed Pulses Out			-		Refere	ence			
Pn02A		n.00X0	Control 0	pos of E	ing fully-closec ition feedback lectronic Gear 24C) after conv	from an ex Ratio for	kternal enc External Er	oder accordir ncoder Conve	ng to the valuersion (Pn24/	ie	4-15			
			1	pos	ing fully-closed ition feedback value of Pn28	from an e				or				
		n.¤X¤¤	Reserved	d par	ameter (Do no	ot change.)							
		n.X000	Reserved	l par	ameter (Do no	ot change.)							
Pn040	2	Reserved p (Do not ch	parameter		-	-	0000h	-	_	-	_			
	2	Application Selections	Function		0000h to 1111h	_	0000h	All	After restart	Setup	*1			
		1				<u> </u>		I		I	<u> </u>			
	1		Phase-C	Puls	e Output Sele	ction								
		n.000X	0		put phase-C p		in the forv	vard direction						
Pn081			1		put phase-C p	,				าร.				
Phuo I		n.🗆 🗆 🗆	Reserved	d par	ameter (Do no	ot change.)							
		n.0X00	Reserved	l par	ameter (Do no	ot change.)							
		n.X000	Reserved parameter (Do not change.)											
Pn100	2	Speed Loc	p Gain		10 to 20,000	0.1 Hz	400	All	Immedi- ately	Tuning	*1			
Pn101	2	Speed Loc Time Cons	p Integral tant		15 to 51,200	0.01 ms	2000	All	Immedi- ately	Tuning	*1			
		10 0013				I			Continue					

						Con	tinued from	n previou:	s page.
Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn102	2	Position Loop Gain	10 to 20,000	0.1/s	400	All	Immedi- ately	Tuning	*1
Pn103	2	Moment of Inertia Ratio	0 to 20,000	1%	100	All	Immedi- ately	Tuning	*1
Pn104	2	Second Speed Loop Gain	10 to 20,000	0.1 Hz	400	All	Immedi- ately	Tuning	*1
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 Selec- tions	0000h to 5334h	_	0000h	All	_	Setup	_

Continued from previous page

	Mode Sv	vitching Selection	When Enabled	Reference	
	0	Use the internal torque reference as the condition (level setting: Pn10C).			
n.□□□X	1	Use the speed reference as the condition (level set- ting: Pn10D).			
	2	Use the acceleration reference as the condition (level setting: Pn10E).	Immedi- ately	*1	
	3	Use the position deviation as the condition (level set- ting: Pn10F).			
	4	Do not use mode switching.			
	Speed L	oop Control Method	When Enabled	Reference	
n.DDXD	0	PI control			
		I-P control	After	*1	
			restart		

n.XDDD Reserved parameter (Do not change.)

Pn

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 Com- pensation 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

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Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn132	2	Gain Switc	hing Time 2	0 to 65,535	1 ms	0	All	Immedi- ately	Tuning	*1
Pn135	2	Gain Switc Time 1	hing Waiting	0 to 65,535	1 ms	0	All	Immedi- ately	Tuning	*1
Pn136	2	Gain Switc Time 2	hing Waiting	0 to 65,535	1 ms	0	All	Immedi- ately	Tuning	*1
	2	Automatic ing Selection	Gain Switch- ons 1	0000h to 0052h	-	0000h	All	Immedi- ately	Tuning	*1
			Osia Quitab							_
				ing Selection e manual gain s	switchina.					
			U Th	e gain is switch	ed manua	,	/G-SEL (Gair	n Selection) :	signal.	
		n.🗆🗆 🛛 X		served setting		,				;
			2 Th sa	e automatic ga e gain settings tisfied. The gair n A is not satisf	1 switch a settings 2	utomatical	ly to 2 when a			
Pn139			Gain Switch	ing Condition A	ł					
			0 /C	OIN (Positioning	g Complet	ion Output) signal turns	ON.		
			1 /C	OIN (Positioning	g Complet	ion Output) signal turns	OFF.		
		n.🗆 🗆 X 🗆		EAR (Near Outp	, 0					
				EAR (Near Outp						;
				sition reference			l reference pu	ilse input is (JFF.	
			5 PC	sition reference	puise inp	ut is ON.				
		n.¤X¤¤	Reserved pa	arameter (Do no	ot change	.)				
		n.XDDD	Reserved pa	arameter (Do no	ot change	.)				
Pn13D	2	Current Ga	ain Level	100 to 2,000	1%	2000	All	Immedi-	Tuning	*1
	2	Model Foll	owing Con-	0000h to	_	0100h	All	ately Immedi-	Tuning	
	_	trol-Relate	d Selections	1120h		010011	7	ately	. ar in 19	
			Model Follo	wing Control S	election				Referer	
		n.DDDX		not use model f		ontrol.			*1	
				ppression Sele					Referer	ce
		n.DDXD	-	not perform vibr			nific froquency		*1	
			-	orm vibration si				,		
Pn140			Vibration Su	ppression Adju	istment Se	election			Referer	ce
11140		n.¤X¤¤	0 tio	not adjust vibr n of autotuning st reference, ar	without a	host refere			*1	
			Adjust vibration suppression automatically during execution of autotuning without a host reference, autotuning with a host reference, and custom tuning.							
			Speed Feedforward (VFF)/Torque Feedforward (TFF) Selection							ce
		n.X000	0 Do not use model following control and speed/torque feedforward together.						*1	
	_			e model followi gether.	ng control	and speed	d/torque feed	forward	- *1	
Pn141	2	Model Folle trol Gain	owing Con-	10 to 20,000	0.1/s	500	All	Immedi- ately	Tuning	*1
Pn142	2		owing Con-	500 to 2,000	0.1%	1000	All	Immedi- ately	Tuning	*1
		u or Gairi O	011001011	1	1			areiy	1	[

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Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer ence			
Pn143	2		owing Con- the Forward	d 0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	*1			
Pn144	2	Model Foll trol Bias in Direction	owing Con- the Reverse	e 0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	*1			
Pn145	2	Vibration S Frequency	Suppression A	¹ 10 to 2,500	0.1 Hz	500	All	Immedi- ately	Tuning	*1			
Pn146	2	Vibration S Frequency	Suppression B	¹ 10 to 2,500	0.1 Hz	700	All	Immedi- ately	Tuning	*1			
Pn147	2		owing Con- Feedforwar ation	d 0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	*1			
Pn148	2	Second M ing Contro	odel Follow- I Gain	10 to 20,000	0.1/s	500	All	Immedi- ately	Tuning	*1			
Pn149	2		odel Follow- I Gain Corre		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-Re tions	elated Selec-	- 0000h to 0021h	-	0021h	All	After restart	Tuning	-			
				owing Control Ty		Refere	ence						
		n.🗆🗆 🛛 X		0 Use model following control type 1. 1 Use model following control type 2.									
			1 l	Jse model followi	ng control	type 2.							
Pn14F			Tuning-les	Tuning-less Type Selection 0 Use tuning-less type 1.									
-11146			0 l										
		n.□□X□	1 Use tuning-less type 2.										
			2 l	2 Use tuning-less type 3.									
		n.¤X¤¤	Posorvod	parameter (Do no	ot change)							
			nescrived		or change	.)							
		n.XDDD	Reserved	parameter (Do no	ot change	.)							
	2	Anti-Resor trol-Relate	nance Con- d Selections	0000h to 0011h	_	0010h	All	Immedi- ately	Tuning	_			
			Anti-Reso	nance Control Se	ection				Refere	nce			
		n.DDDX	-	Do not use anti-re		control			Hereite				
				Jse anti-resonand					*1				
				nance Control Ac					Refere	ence			
Pn160		n.🗆 🗆 X 🗆	0 t	Do not adjust anti-resonance control automatically during execu 0 tion of autotuning without a host reference, autotuning with a host reference, and custom tuning.									
			Adjust anti-resonance control automatically during execution of autotuning without a host reference, autotuning with a host refe ence, and custom tuning.										
		n.¤X¤¤	Reserved parameter (Do not change.)										
		n.XDDD	Reserved	parameter (Do no	ot change	.)							
Pn161	2	Anti-Resor	nance Fre-	10 to 20,000	0.1 Hz	1000	All	Immedi- ately	Tuning	*1			
Pn162	2	quency Anti-Resor Correction	nance Gain	1 to 1,000	1%	100	All	Immedi- ately	Tuning	*1			
		CONFECTION						aleiy		<u> </u>			

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Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn163	2	Anti-Resor ing Gain	nance Dan	np-	0 to 300	1%	0	All	Immedi- ately	Tuning	*1
Pn164	2	Anti-Resor Time Cons rection			-1,000 to 1,000	0.01 ms	0	All	Immedi- ately	Tuning	*1
Pn165	2	Anti-Resor Time Cons rection			-1,000 to 1,000	0.01 ms	0	All	Immedi- ately	Tuning	*1
Pn166	2	Anti-Resor ing Gain 2	nance Dan	np-	0 to 1,000	1%	0	All	Immedi- ately	Tuning	*1
	2	Tuning-less Related Se	s Function lections	-	0000h to 2711h	-	1400h	All	-	Setup	*1
		n.000X	Tuning-le	Disa	Selection able tuning-les able tuning-les					Whe Enab Afte resta	led er
			-		0						
		n.00X0	Speed C		ontrol Method						en led
Pn170			1		e for speed con e for speed con		se host cc	ntroller for po	sition contro	Afte ol. resta	
		n.OXOO	Rigidity	Leve	I					Whe Enab	
			0 to 7	Set	the rigidity lev	vel.				Imme ate	
			Tuning-le	ess L	oad Level					Whe Enab	
	n.X□□□ 0 to 2 Set the load level for the tuning-less function.								Imme ate		

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Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refe ence
	2		ontrol Refer- Selections	0000h to 2236h	-	0000h	All	After restart	Setup	-
			Reference F	Pulse Form					Refere	nce
			0 Si	gn and pulse tra	ain, positiv	e logic.				
			1 C'	N and CCW pul	se trains,	positive log	gic			
			∠ pł	vo-phase pulse nase B) ×1, posi	tive logic	-				
		n.□□□X	3 pł	vo-phase pulse nase B) ×2, posi	tive logic	-			*1	
			4 pł	vo-phase pulse nase B) ×4, posi	tive logic	-	e differential (p	phase A and		
				gn and pulse tra	. 0	Ũ				
			6 C'	N and CCW pul	se trains,	negative lo	gic			
			Clear Signa	l Form					Refere	nce
Pn200			0 C	ear position dev	viation whe	en the sign	al is at high le	vel.		
		n.🗆🗆 X 🗆		ear position dev		Ũ	0	·	*1	
				ear position dev						
			3 C	ear position dev	viation on t	he falling e	edge of the sig	gnal.		
			Clear Opera	ition					Refere	nce
		n.¤X¤¤	0 al	ear position dev arm occurs).			`			
		/	¹ De	o not clear posit eviation) signal).				Clear Position	*1	
			2 C	ear position dev	viation whe	en an alarm	occurs.			
			Filter Select	ion					Refere	nce
			0 U:	se the reference	input filter	r for a line-	driver signal.	(1 Mpps max	(.)	
		n.XDDD		se the reference	input filte	r for an ope	en-collector s	ignal. (200	*1	
				se reference inp	ut filter 2 f	or a line-dr	iver signal (1	to 4 Mpps)		
							iror orginali (1	to 1 (1000)		
n205	2	Multiturn L	imit	0 to 65,535	1 rev	65535	Rotary	After restart	Setup	*1
	2	Position Control tion Select	ontrol Func- ions	0000h to 2210h	_	0000h	All	After restart	Setup	-
		n.DDDX	Reserved p	arameter (Do no	ot change	.)				
			Position Co	ntrol Option					Refere	nce
		n.□□X□		not use V-REF						
				se V-REF as a s		back input			*1	
				arameter (Do no	•					
		n.🗆X🗆 🗆	neserveu p		-					
00207		n.¤X¤¤	neserveu p	`					Defe	
Pn207		n.□X□□	/COIN (Pos	tioning Comple		, 0	•	•	Refe	
Pn207			/COIN (Pos	tioning Comple utput when the ime or less than idth).	absolute v	alue of the	position devi	ation is the		
Pn207		n.2X00	/COIN (Pos 0 Sa W 0 O 1 Or	utput when the a	absolute v the settin absolute v etting of P	alue of the g of Pn522 alue of the n522 (Posi	position devi 2 (Positioning position erro tioning Comp	ation is the Completed r is the same leted Width)	enc	

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Parameter Lists

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Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn20A	4	Number of Encoder S	f 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	64	All	After restart	Setup	*1
Pn210	4	Electronic (Denomina	Gear Ratio itor)	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
Pn216	2	Position Re Acceleration tion Time C	on/Decelera-	0 to 65,535	0.1 ms	0	All	Immedi- ately after the motor stops	Setup	*1
Pn217	2		osition Refer- ement Time	0 to 10,000	0.1 ms	0	All	Immedi- ately after the motor stops	Setup	*1
Pn218	2	Reference Multiplier	Pulse Input	1 to 100	× 1	1	All	Immedi- ately	Setup	*1
	2	Fully-close Selections		0000h to 1003h	-	0000h	Rotary	After restart	Setup	*1
Pn22A		n.000X n.00X0 n.0X00	Reserved par Reserved par Fully-closed	rameter (Do no rameter (Do no rameter (Do no Control Speec e motor encode	ot change. ot change. I Feedbac)	n			
Pn24A	4		Gear Ratio for ncoder Con-	e external enco 1 to 1073741824	der speed	1	All	After restart	Setup	page 4-14
Pn24C	4	External Er	Gear Ratio for ncoder Con- enominator)	1 to 1073741824	_	1	All	After restart	Setup	page 4-14
Pn281	2	Encoder O tion	utput Resolu-	1 to 4,096	1 edge/ pitch	20	All	After restart	Setup	*1
Pn300	2	Speed Ref Gain	erence Input	150 to 3,000	0.01 V/ Rated motor speed	600	All	Immedi- ately	Setup	*1
Pn301	2	Internal Se	et 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 Se	et 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 Se	ot 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 S		0 to 10,000	Rotary: 1 min ⁻¹ Direct Drive: 0.1 min ⁻¹	500	Rotary	Immedi- ately	Setup	*1
Pn305	2	Soft Start / Time	Acceleration	0 to 10,000	1 ms	0	All	Immedi- ately Continue	Setup	*1

Parameter No.0 ioNamePn3062Soft Start Deceleration TimePn3072Speed Reference Filte Time ConstantPn3082Speed Feedback Filter Time ConstantPn30A2Speed Feedback Filter Time ConstantPn30A2Speed Feedback Filter Time ConstantPn30A2Speed Feedback Filter Time ConstantPn30A2Speed Feedback Filter Time ConstantPn30C2Speed Feedforward Average Movement Time	0 to 65,535 0 to 65,535	Setting Unit 1 ms 0.01 ms 0.01 ms 1 ms	Default Setting 0 40 0	Applicable Motors All All All All	When Enabled Immedi- ately Immedi- ately	Classi- fication Setup Setup Setup	Refer- ence *1 *1 *1
Pn306 2 Time Pn307 2 Speed Reference Filte Time Constant Pn308 2 Speed Feedback Filter Time Constant Pn30A 2 Speed Feedback Filter Time Constant Pn30A 2 Speed Feedback Filter Time Constant Pn30A 2 Servo OFF and Forced Stops Pn30C 2 Speed Feedforward Average Movement	0 to 10,000 0 to 65,535 0 to 65,535 0 to 10,000	0.01 ms 0.01 ms 1 ms	40	All	ately Immedi- ately Immedi-	Setup	*1
Pn307 2 Time Constant Pn308 2 Speed Feedback Filter Time Constant Pn30A 2 Deceleration Time for Servo OFF and Forced Stops Pn30C 2 Speed Feedforward Average Movement	0 to 65,535 0 to 65,535 0 to 10,000	0.01 ms 1 ms	0	All	ately Immedi-		
Pn308 2 Time Constant Pn30A 2 Deceleration Time for Servo OFF and Forced Stops Pn30C 2 Speed Feedforward Average Movement	0 to 10,000	1 ms	-			Setup	*1
Pn30A 2 Servo OFF and Forced Stops Pn30C 2 Speed Feedforward Average Movement			0	All		1	
Pn30C 2 Average Movement	0 to 5,100	0.1		7.00	Immedi- ately	Setup	*1
Time		0.1 ms	0	All	Immedi- ately	Setup	*1
2 Vibration Detection Selections	0000h to 0002h	-	0000h	All	Immedi- ately	Setup	*1
Vibration	Detection Selecti	on					
	Do not detect vibr						
	Dutput a warning		/ibration is	detected			
	Dutput an alarm (J						
n.□□X□ Reserved	parameter (Do no	ot change.)				
n.□X□□ Reserved	parameter (Do no	ot change.)				
n.XDDD Reserved	parameter (Do no	ot change.)				
			/				
Vibratian Datastics Or	2				Immodi		
Pn311 2 Vibration Detection Se sitivity	n- 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 Spee	d 0 to 65,535	1 min ⁻¹	10000	Rotary	After restart	Setup	*1
Pn324 2 Moment of Inertia Calculation Starting Level		1%	300	All	Immedi- ately	Setup	*1
Pn400 2 Torque Reference Inpu Gain	t 10 to 100	0.1 V/ rated torque	30	All	Immedi- ately	Setup	*1
Pn401 First Stage First Torque 2 Reference Filter Time Constant Constant	0 to 65,535	0.01 ms	100	All	Immedi- ately	Tuning	*1
Pn402 2 Forward Torque Limit	0 to 800	1%*2	800	Rotary	Immedi- ately	Setup	*1
Pn403 2 Reverse Torque Limit	0 to 800	1%*2	800	Rotary	Immedi- ately	Setup	*1
Pn404 2 Forward External Torqu Limit	0 to 800	1%*2	100	All	Immedi- ately	Setup	*1
Pn405 2 Reverse External Torqu Limit	0 to 800	1%*2	100	All	Immedi- ately	Setup	*1
Pn406 2 Emergency Stop Torqu	ue 0 to 800	1%*2	800	All	Immedi- ately	Setup	*1
Pn407 2 Speed Limit during Torque Control	0 to 10,000	1 min ⁻¹	10000	Rotary	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 tion Select	lated Func- ions	0000h to 1111h	_	0000h	All	_	Setup	_
		1				I	1			
			Notch Filt	er Selection 1				When Enabled	d Refere	nce
		n.□□□X		Disable first stage Enable first stage				Immedi ately	- *1	
				nit Selection				When	Refere	nce
		n.DDXD		Use the smaller of setting of Pn407 a			speed and th		*1	
Pn408				Jse the smaller o speed and the se				restart	1	
			Notch Filt	er Selection 2				When Enabled	Refere	nce
		n.¤X¤¤		Disable second st Enable second st	0			Immedi ately	- *1	
			Friction C	ompensation Fur	nction Sele	ection		When Enabled	Refere	nce
		n.XDDD		Disable friction co	•			Immedi	- *1	
			1	Enable friction co	mpensatio	n.		ately		
Pn409	2	First Stage Frequency	Notch Filte	r 50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn40A	2	First Stage Q Value	Notch Filte	r 50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn40B	2	First Stage Depth	Notch Filte	r 0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn40C	2	Second Stater Frequer	age Notch F ncy	^{-il-} 50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn40D	2	Second State ter Q Value	age Notch F e	^{-il-} 50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn40E	2	Second Stater Depth	age Notch F	il- 0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn40F	2		age Secono ference Filte		1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn410	2	Second St	age Secono ference Filte	r 50 to 100	0.01	50	All	Immedi- ately	Tuning	*1
Pn412	2	First Stage Torque Ref Time Cons	ference Filte	r 0 to 65,535	0.01 ms	100	All	Immedi- ately	Tuning	*1
Pn415	2		r Time Con	0 to 65,535	0.01 ms	0	All	Immedi- ately	Setup	*1

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Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	itinued fron When Enabled	Classi- fication	Refer- ence
	2	Torque-Re tion Select	lated Func- ions 2	0000h to 1111h	-	0000h	All	Immedi- ately	Setup	*1
		n.000X		Selection 3 able third stage able third stage						
Pn416		n.00X0	Notch Filter S		ge notch f	ilter.				
		n.¤X¤¤		Selection 5 able fifth stage able fifth stage						
		n.XDDD	Reserved pa	rameter (Do no	ot change	.)				
Pn417	2	Third Stag Frequency	e Notch Filter	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn418	2	Third Stag Q Value	e Notch Filter	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn419	2	Third Stag Depth	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		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	e Notch Filter	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn41E	2	Fifth Stage Q Value	e Notch Filter	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn41F	2	Fifth Stage Depth	e Notch Filter	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
	2		ple Compen- ections	0000h to 1111h	-	0000h	Rotary	-	Setup	*1
		n.000X	0 Dis	e Compensation able speed ripp able speed ripp	ole compe	nsation.	'n		Whe Enab	edi-
Pn423		n.00X0	tion Selection	e Compensation n ect A.942 alan not detect A.9	ms.		greement Wa	rning Detec-	Whe Enab Afte resta	e led
		n.¤X¤¤	0 Spe	e Compensation eed reference tor speed	on Enable	Condition	Selection		Whe Enabl Afte resta	led er
		n.XDDD	Reserved pa	rameter (Do no	ot change	.)				
										_
Pn424	2	cuit Voltag		0 to 100	1%*2	50	All	Immedi- ately	Setup	*1
Pn425	2	Release Ti Limit at Ma Voltage Dr		0 to 1,000	1 ms	100	All	Immedi- ately	Setup	*1

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Parameter No.	Size	Name	Э	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn426	2	Torque Feedfo Average Move Time		0 to 5,100	0.1 ms	0	All	Immedi- ately	Setup	*1
Pn427	2	Speed Ripple sation Enable S	Compen- Speed	0 to 10,000	1 min ⁻¹	0	Rotary	Immedi- ately	Tuning	*1
Pn456	2	Sweep Torque ence Amplitud	e Refer- le	1 to 800	1%	15	All	Immedi- ately	Tuning	*1
	2	Notch Filter Ac Selections 1	djustment	0000h to 0101h	_	0101h	All	Immedi- ately	Tuning	*1
	1	No	otch Filter A	djustment Se	lection 1					
		n.000X		not adjust the f ng without a he						
				ust the first sta nout a host refe						
Pn460		n.□□X□ Re	eserved par	ameter (Do no	t change.)				
		No	otch Filter A	Adjustment Sel	lection 2					
		n.0X00	0 auto	not adjust the sotuning without tom tuning.						
				ust the second without a host ng.						
		n.XDDD Re	eserved par	ameter (Do no	t change.)				
	2	Gravity Compe Related Select	ensation- tions	0000h to 0001h	_	0000h	All	After restart	Setup	*1
Pn475		n.□□□X Gra	0 Disa	ensation Selec able gravity cor ble gravity con	npensatio					
		n.DDXD Re	eserved para	ameter (Do not	change.)					
		n.¤X¤¤ Re	eserved para	ameter (Do not	change.)					
		n.XDDD Re	eserved para	ameter (Do not	change.)					
Pn476	2	Gravity Compe Torque	ensation	-1,000 to 1,000	0.1%	0	All	Immedi- ately	Tuning	*1
Pn501	2	Zero Clamping	g Level	0 to 10,000	1 min ⁻¹	10	Rotary	Immedi- ately	Setup	*1
Pn502	2	Rotation Detec	ction Level	1 to 10,000	1 min ⁻¹	20	Rotary	Immedi- ately	Setup	*1
Pn503	2	Speed Coincid Detection Sign Width		0 to 100	1 min ⁻¹	10	Rotary	Immedi- ately	Setup	*1
Pn506	2	Brake Reference OFF Delay Tim		0 to 50	10 ms	0	All	Immedi- ately	Setup	*1
Pn507	2	Brake Reference put Speed Lev		0 to 10,000	1 min ⁻¹	100	Rotary	Immedi- ately	Setup	*1
Pn508	2	Servo OFF-Bra mand Waiting	ake Com- Time	10 to 100	10 ms	50	All	Immedi- ately	Setup	*1
Pn509	2	Momentary Po ruption Hold T	ower Inter- ime	20 to 50,000	1 ms	20	All	Immedi- ately	Setup	*1

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Parameter No.	Size	N	lame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refe enc
	2	Input Sign	al Selection	าร	0000h to FFF2h	_	2100h	All	After restart	Setup	_
			Input Sig	inal (Allocation Mod					Refere	ance
					the sequence		nal termina	ls with the de	fault alloca-	TICICIC	
		n.🗆🗆 X	0	tion		input oigi			adit allood		
			1	Cha	inge the seque	ence input	signal allo	cations.		*1	
			2	Res	erved setting (Do not us	e.)				
			/S-ON (S	ervo	ON) Signal A	llocation				Refere	ence
			0		ve when CN1.		signal is ON	V (closed).			
			1		ve when CN1-		0	, ,			
			2		ve when CN1.		0	, ,			
			3		ve when CN1		-				
			4	Acti	ve when CN1	44 input s	signal is ON	l (closed).			
			5	Acti	ve when CN1	45 input s	signal is ON	V (closed).			
			6	Acti	ve when CN1.	46 input s	signal is ON	l (closed).			
		n.🗆🗆 X 🗆	7	The	signal is alwa	ys active.	-				
			8	The	signal is alway	ys inactive				*1	
			9	Acti	ve when CN1-	40 input s	signal is OF	F (open).			
			А	Acti	ve when CN1-	41 input s	signal is OF	F (open).			
			В	Acti	ve when CN1-	42 input s	signal is OF	F (open).			
			С	Acti	ve when CN1-	43 input s	signal is OF	F (open).			
			D	Acti	ve when CN1-	44 input s	signal is OF	F (open).			
n50A			E	Acti	ve when CN1-	45 input s	signal is OF	F (open).			
			F	Acti	ve when CN1-	46 input s	signal is OF	FF (open).			
			/P-CON	(Pror	ortional Cont	rol) Signa	Allocatio	า		Refere	ence
		n.¤X¤¤	0 to F	The	allocations ar				N) signal allo		
			P-OT (Fo	orwar	d Drive Prohil	oit) Signal	Allocation	1		Refere	ence
			0		ble forward dr				N (closed).		
			1		ble forward dr						
			2		ble forward dr			-			
			3		ble forward dr		-	÷		_	
			4		ble forward dr			-			
			5	Ena	ble forward dr	ive when (CN1-45 inp	out signal is C	N (closed).		
			6	Ena	ble forward dr	ive when (CN1-46 inp	out signal is C	N (closed).		
		n.XDDD	7	Set	the signal to a	lways pro	hibit forwa	rd drive.		*1	
			8	Set	the signal to a	lways ena	ble forwar	d drive.		*1	
			9	Ena	ble forward dr	ive when (CN1-40 inp	out signal is C	FF (open).		
			А	Ena	ble forward dr	ive when (CN1-41 inp	out signal is C	FF (open).		
			В	Ena	ble forward dr	ive when (CN1-42 inp	out signal is C	FF (open).		
			С	Ena	ble forward dr	ive when (CN1-43 inp	out signal is C	FF (open).		
			_			-	-			-	
			D	Ena	ble forward dr	ive when (CN1-44 inp	out signal is C	PFF (open).		
					ble forward dr ble forward dr			-			

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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 2	al Selectior	ns 0000h to FFFFh	-	6543h	All	After restart	Setup	-
	Ī		N-OT (Re	verse Drive Prohi	bit) Signal	Allocation	1		Refere	ence
			0	Enable reverse dr	ive when (CN1-40 inp	out signal is O	N (closed).		
			1	Enable reverse dr	ive when (CN1-41 inp	out signal is O	N (closed).		
			2	Enable reverse dr	ive when (CN1-42 inp	out signal is O	N (closed).		
			3	Enable reverse dr	ive when (CN1-43 inp	out signal is O	N (closed).		
			4	Enable reverse dr	ive when (CN1-44 inp	out signal is O	N (closed).		
			5	Enable reverse dr	ive when (CN1-45 inp	out signal is O	N (closed).		
			6	Enable reverse dr	ive when (CN1-46 inp	out signal is O	N (closed).		
		n.🗆🗆 🗆 X	7	Set the signal to a	always pro	hibit revers	e drive.		*1	
			8	Set the signal to a	,					
			9	Enable reverse dr	ive when (CN1-40 inp	out signal is O	FF (open).		
			A	Enable reverse dr			0	(1)		
			В	Enable reverse dr			0	,	_	
			С	Enable reverse dr			0	,	_	
			D	Enable reverse dr			0	(1)	_	
			E	Enable reverse dr			5	,	_	
			F	Enable reverse dr	ive when (CN1-46 inp	out signal is O	FF (open).		
			/ALM-RS	T (Alarm Reset) S	ignal Alloo	cation			Refere	ence
			0	Active on signal e OFF (open) to ON		CN1-40 in	put signal ch	anges from		
			1	Active on signal e OFF (open) to ON		CN1-41 in	put signal ch	anges from		
			2	Active on signal e OFF (open) to ON		CN1-42 in	put signal ch	anges from		
n50B			3	Active on signal e OFF (open) to ON		CN1-43 in	put signal ch	anges from		
			4	Active on signal e OFF (open) to ON		CN1-44 in	put signal ch	anges from		
			5	Active on signal e OFF (open) to ON		CN1-45 in	put signal ch	anges from		
			6	Active on signal e OFF (open) to ON	(closed).		put signal ch	anges from		
		n.🗆 🗆 X 🗆	7	Reserved setting					*1	
			8	The signal is alwa	,		and also also t		_	
			9	Active on signal er (closed) to OFF (c	pen).			-		
			A	Active on signal e (closed) to OFF (c	pen).		0	0		
			В	Active on signal e (closed) to OFF (c	pen).		-	-		
			С	Active on signal e (closed) to OFF (c	pen).		0	0		
			D	Active on signal e (closed) to OFF (c	pen).		0	0	_	
			E	Active on signal e (closed) to OFF (c	pen).		0	0		
			F	Active on signal e (closed) to OFF (c		UN1-46 inj	out signal cha	nges from ON		
			/P-CL (Fo	orward External To	orque Limi	t Input) Sig	gnal Allocatio	n	Refere	ence
		n.¤X¤¤	0 to F	The allocations are	the same a	s the /S-ON	I (Servo ON) sig	gnal allocations	. *1	
				everse External To	orque Limi	t Input) Si	nal Allocatio	n	Refere	nce
		n.XDDD	0 to F	The allocations are			-			

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Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refe enc
	2	Input Signa 3	al Selection	าร	0000h to FFFFh	-	8888h	All	After restart	Setup	-
	Ī		/SPD-D (Moto	r Direction) S	ignal Allo	cation			Refere	ence
			0	Activ	ve when CN1-	-40 input s	ignal is ON	l (closed).			
			1	Activ	ve when CN1-	-41 input s	ignal is ON	l (closed).			
			2	Activ	ve when CN1-	-42 input s	ignal is ON	l (closed).			
			3	Activ	ve when CN1-	-43 input s	ignal is ON	l (closed).			
			4	Activ	ve when CN1-	-44 input s	ignal is ON	l (closed).			
			5	Activ	ve when CN1-	-45 input s	ignal is ON	l (closed).			
			6	Activ	ve when CN1-	-46 input s	ignal is ON	l (closed).			
		n.🗆🗆🗆 X	7	The	signal is alway	ys active.				*1	
			8	The	signal is alway	ys inactive	•			1	
			9	Activ	ve when CN1-	40 input s	ignal is OF	F (open).			
			А	Activ	ve when CN1-	41 input s	ignal is OF	F (open).			
n50C			В	Activ	ve when CN1-	42 input s	ignal is OF	F (open).			
			С	Activ	ve when CN1-	43 input s	ignal is OF	F (open).			
			D	Activ	ve when CN1-	44 input s	ignal is OF	F (open).			
			E	Activ	ve when CN1-	45 input s	ignal is OF	F (open).			
			F	Activ	ve when CN1-	-46 input s	ignal is OF	F (open).			
			/SPD-A (Interr	nal Set Speed	Selection	n Input) Sig	gnal Allocatic	on	Refere	ence
		n.DDXD	0 to F		allocations are allocations.	e the same	e as the /S	PD-D (Motor	Direction) sig	*1	
			/SPD-B (Interr	nal Set Speed	d Selection	n Input) Si	gnal Allocatio	on	Refere	ence
		n.¤X¤¤	0 to F		allocations are allocations.	e the same	e as the /S	PD-D (Motor	Direction) sig	*1	
			/C-SEL (Contr	ol Selection I	nput) Sigr	nal Allocat	ion		Refere	ence
		n.XDDD	0 to F		allocations are	e the same	e as the /S	PD-D (Motor	Direction) sig	- *1	

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	put Signa	0 1 2 3 4 5 6	Range As 0000h to FFFFh Cero Clamping I Active when CN1- Active when CN1-	40 input s 41 input s	ignal is ON		Enabled After restart Applicable Motors	fication Setup Refere	ence –
		/ZCLAMP 0 1 2 3 4 5 6	P (Zero Clamping I Active when CN1- Active when CN1- Active when CN1- Active when CN1-	nput) Sigr 40 input s 41 input s	al Allocat i ignal is ON		restart Applicable		
n.¤I		0 1 2 3 4 5 6	Active when CN1- Active when CN1- Active when CN1- Active when CN1-	40 input s 41 input s	ignal is ON			Refere	
n.¤I		1 2 3 4 5 6	Active when CN1- Active when CN1- Active when CN1-	41 input s	0	(closed)		- I CICIC	ence
n.¤I		2 3 4 5 6	Active when CN1- Active when CN1-						
n.□I		3 4 5 6	Active when CN1-	42 input s	ignal is ON	l (closed).			
n.¤I	00X	4 5 6			0	,			
n.□I	DOX	5 6	Active when (:NI1 -		0	, ,			
n.🗆 (6			0	, ,			
n.🗆 [DDX		Active when CN1- Active when CN1-		•				
			The signal is alway		Ignal is ON	r (cioseu).			
		8	The signal is alway	, 			All	*1	
			Active when CN1-			F (open).			
		A	Active when CN1-	41 input s	ignal is OF	F (open).			
		В	Active when CN1-	42 input s	ignal is OF	F (open).			
		С	Active when CN1-	43 input s	ignal is OF	F (open).			
		D	Active when CN1-	44 input s	ignal is OF	F (open).			
			Active when CN1-		•	,			
		F	Active when CN1-	46 input s	ignal is OF	F (open).			
n DI		/INHIBIT	(Reference Pulse	Inhibit Inp	ut) Signal .	Allocation	Applicable Motors	Refere	ence
		0 to F	The allocations are (Zero Clamping In				All	*1	
n.□)	XDD	/G-SEL (C	Gain Selection Inp	ut) Signal	Allocation		Applicable Motors	Refere	ence
		0 to F	The allocations are (Zero Clamping In				All	*1	
n.XE		Reserved	parameter (Do no	ot change.)				
	utput Sig ons 1	nal Selec-	0000h to 6666h	-	3211h	All	After restart	Setup	-
		/COIN (Pe	ositioning Comple	tion Outp	ut) Signal <i>i</i>	Allocation		Refere	ence
		0	Disabled (the above	ve signal c	utput is no	ot used).			
		1	Output the signal						
		2	Output the signal					_	
n.🗆		3	Output the signal				ut terminal.	*1	
n.🗆		4	Output the signal Output the signal			•		_	
n.🗆		6	Output the signal					_	
n.⊡I		0			11-09 Out	put terminai.			
n.□I		/V-CMP (Speed Coincidend		• •	•		Refere	ence
		0 to 6			e as the /C	OIN (Position	ing Comple-	*1	
			Rotation Detection	Output) S	ignal Allo	cation		Refere	ence
		/TGON (F			e as the /C	OIN (Position	ing Comple-	*1	
n.□I		/TGON (F 0 to 6	tion) signal allocat	ions.				Pofor	ncc
n.□I		0 to 6	, ,		ion			neiere	HCe
			0 to 6 /TGON (F	0 to 6 tion) signal allocations and tion) signal allocation /TGON (Rotation Detection	. UXUD //TGON (Rotation Detection Output) S	0 to 6 The allocations are the same as the /o /TGON (Rotation Detection Output) Signal Alloc .DXDD The allocations are the same as the /O	. □X□□ /TGON (Rotation Detection Output) Signal Allocation . □X□□ 0 to 6	. □X□□ /TGON (Rotation Detection Output) Signal Allocation . □X□□ 0 to 6	0 to 6 The allocations are the same as the /OOIN (Fositioning Completer in the allocation). *1 .□X□□ /TGON (Rotation Detection Output) Signal Allocation Reference in the allocation is are the same as the /COIN (Positioning Completer in the allocation). 0 to 6 The allocations are the same as the /COIN (Positioning Completer in the allocation).

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Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refe enc	
	2	Output Sig tions 2	nal Selec-	0000h to 6666h	-	0000h	All	After restart	Setup	_	
			· · ·	ue Limit Detectio	. ,	•			Refere	ence	
				Disabled (the abo Output the signal	Ū		,	uttorminal			
				Output the signal							
		n.🗆🗆🗆 X		Output the signal			•		*1		
				Output the signal					_		
				Output the signal			•				
				Output the signal			•				
n50F		n.□□X□ /VLT (Speed Limit Detection) Signal Allocation 0 to 6 The allocations are the same as the /CLT (Torque Limit Detection									
				The allocations ar Output) signal allo		e as the /C	LI (Iorque Li	mit Detection	*1		
			/BK (Brak	e Output) Signal	Allocation				Refere	ence	
		n.¤X¤¤		The allocations ar Output) signal allo		e as the /C	ELT (Torque Li	mit Detectior	*1		
			/WARN (W	/arning Output) S	Signal Allo	cation			Refere	ence	
		n.XDDD		The allocations ar Output) signal allo		e as the /C	CLT (Torque Li	mit Detectior	*1		
			·								
	2	Output Sig tions 3	nal Selec-	0000h to 0666h	_	0000h	All	After restart	Setup	_	
	-									I	
			/NEAR (N	ear Output) Signa	al Allocatio	n			Refere	ence	
			,	Disabled (the abo			ot used).				
				Output the signal	Ū		,	ut terminal.			
			2	Output the signal	from the C	CN1-27 or	CN1-28 outp	ut terminal.			
		n.🗆🗆 X	3	Output the signal	from the C	CN1-29 or	CN1-30 outp	ut terminal.	*1		
			4	Output the signal	from the C	CN1-37 ou	tput terminal.				
n510			5	Output the signal	from the C	CN1-38 ou	tput terminal.				
			6	Output the signal	from the C	CN1-39 ou	tput terminal.				
		n.DDXD	Reserved	parameter (Do n	ot change	.)					
		/PSELA (Reference Pulse Input Multiplication Switching Output) Signal Allocation								ence	
			Allocation								
		n.¤X¤¤	0 to 6	The allocations ar tions.	e the same	e as the /N	IEAR (Near) s	ignal alloca-	*1		

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_								tinued fron		
Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refei ence
	2	Output Sig Settings	inal Inverse	0000h to 1111h	-	0000h	All	After restart	Setup	*1
				1	1					
			Output Signa	al Inversion for	CN1-25 a	and CN1-2	6 Terminals			
		n.🗆🗆 🛛 X		e signal is not ir						
			1 Th	e signal is inver	ted.					
			Output Signa	al Inversion for	CN1-27 a	and CN1-2	8 Terminals			
		n.🗆🗆 X 🗆		e signal is not ir						
Pn512			1 Th	e signal is inver	ted.					
			Output Sign	al Inversion for	CN1-29 a	and CN1-3	0 Terminals			
		n.🗆X🗆 🗆	0 Th	e signal is not ir	nverted.					
			1 The	e signal is inver	ted.					
			Output Sign	al Inversion for	CN1-37	erminal				
		n.XDDD	0 Th	e signal is not ir	nverted.					
			1 Th	e signal is inver	ted.					
					1			A (1	1	
	2	Output Sig Settings 2	inal Inverse	0000h to 0011h	-	0000h	All	After restart	Setup	*1
					1					
			Output Signa	al Inversion for	CN1-38	erminal				
		n.🗆🗆 🗆 X	0 Th	e signal is not ir	nverted.					
			1 Th	e signal is inver	ted.					
Pn513			Output Signa	al Inversion for	CN1-39	erminal				
		n.🗆🗆 X 🗆	0 Th	e signal is not ir	nverted.					
			1 Th	e signal is inver	ted.					
	I	n.¤X¤¤	Reserved pa	rameter (Do no	ot change)				
		n.X000	Reserved pa	rameter (Do no	ot change)				
	2	Output Sig tions 4	inal Selec-	0000h to 0666h	_	0000h	All	After restart	Setup	_
		10115 4		000011				Testart		
	Ī	n.DDDX	Reserved pa	rameter (Do no	ot change)				
			•	`	0	,				
		n.□□X□	Reserved pa	rameter (Do no	ot change.)				
				tative Maintena		, 0			Refere	ence
Pn514				abled (the abov	-					
Pn514				tput the signal						
		n.🗆X🗆	-	tput the signal tput the signal			•		*1	
				tput the signal				at torrindu.	-	
				tput the signal						
				tput the signal						
		n.XDDD	Reserved pa	rameter (Do no	ot change)				

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arameter No.	Size		Name		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refe enc
110.	2	Input Sigi	nal Select	ions	0000h to	Onic			After		
	2	6			FFFFh	-	8888h	All	restart	Setup	_
			SEN (AF	solute	Data Reques	et Innut) Si		ation		Refere	nce
				1	e when CN1-					Tielele	nce
			1		e when CN1-		0	,		_	
			2		e when CN1-		-			_	
			3		e when CN1-					_	
			4		e when CN1-		0	,		_	
			5		e when CN1-		0	,		_	
			6		e when CN1-		0	. ,		_	
	n.		7		signal is alway		5	(
			8		ble when 5 V is		CN1-4.			*1	
			9		e when CN1-			(open).		-	
			A		e when CN1-		0	()		_	
			В		e when CN1-		0	()		_	
			C		e when CN1-		-			_	
			D		e when CN1-	1 1	0	(1)			
			E		e when CN1-		-			_	
			F	-	e when CN1-						
515			/PSEL (I cation	Refere	nce Pulse Inp	ut Multipli	cation Swi	tching Input)	Signal Allo-	Refere	nce
			0	Activ	e when CN1-	40 input sig	gnal is ON	(closed).			
			1	Activ	e when CN1-	41 input si	gnal is ON	(closed).			
			2	Activ	e when CN1-	42 input sig	gnal is ON	(closed).			
			3	Activ	e when CN1-	43 input si	gnal is ON	(closed).			
			4	Activ	e when CN1-	44 input si	gnal is ON	(closed).			
			5	Activ	e when CN1-	45 input sig	gnal is ON	(closed).			
			6	Activ	e when CN1-	46 input sig	gnal is ON	(closed).			
	n.		7	The	signal is alway	s enabled.				*1	
			8	The s	signal is alway	s inactive.				1	
			9	Activ	e when CN1-	40 input sig	gnal is OFF	(open).			
			A	Activ	e when CN1-	41 input sig	gnal is OFF	(open).			
			В	Activ	e when CN1-	42 input si	gnal is OFF	(open).			
			С		e when CN1-		-				
			D		e when CN1-						
			E		e when CN1-		-				
				Activ	e when CN1-	16 innut si	anal is OFF	(open).			
			F	/ 1011		to input sig		(-1)			
	n.			1	imeter (Do no		-	(-1)			

Continued on next page.

No. Øi Name Range Unit Setting Motors Enabled freation freation ence 2 Input Signal Selections ODDh to PFFFh - 888h All Metors Setup - 3 Enable drive when CN1-40 input signal is ON (closed). I Enable drive when CN1-42 input signal is ON (closed). Enable drive when CN1-42 input signal is ON (closed). I Enable drive when CN1-42 input signal is ON (closed). I Enable drive when CN1-44 input signal is ON (closed). I Enable drive when CN1-44 input signal is ON (closed). I Enable drive when CN1-44 input signal is ON (closed). I Enable drive when CN1-44 input signal is ON (closed). I Enable drive when CN1-44 input signal is ON (closed). I I Enable drive when CN1-44 input signal is ON (closed). I I Enable drive when CN1-44 input signal is OFF (open). I <th></th> <th></th> <th></th> <th></th> <th>-</th> <th></th> <th></th> <th>Con</th> <th>itinued from</th> <th>n previou</th> <th>s page.</th>					-			Con	itinued from	n previou	s page.	
Pn516 Prime Description All restart General Pn516 Image: Start Star		Size		Name		0					Refer- ence	
0 Enable drive when CN1-40 input signal is ON (closed). 1 Enable drive when CN1-41 input signal is ON (closed). 2 Enable drive when CN1-42 input signal is ON (closed). 3 Enable drive when CN1-43 input signal is ON (closed). 4 Enable drive when CN1-43 input signal is ON (closed). 5 Enable drive when CN1-46 input signal is ON (closed). 6 Enable drive when CN1-46 input signal is ON (closed). 7 Set the signal to always enable drive (always disable forcing the motor to stop). 8 Set the signal to always enable drive (always disable forcing the motor to stop). 9 Enable drive when CN1-42 input signal is OFF (open). A Enable drive when CN1-42 input signal is OFF (open). C Enable drive when CN1-42 input signal is OFF (open). 0 Enable drive when CN1-42 input signal is OFF (open). 1 Enable drive when CN1-42 input signal is OFF (open). 1 Enable drive when CN1-42 input signal is OFF (open). 1 Enable drive when CN1-42 input signal is OFF (open). 1 Enable drive when CN1-42 input signal is OFF (open). 1 Enable drive when CN1-42 input signal is OFF (open). 1		2	Input Sigr 7	nal Selections		-	8888h	All		Setup	-	
Pn516 1 Enable drive when CN1-41 input signal is ON (closed). 2 Enable drive when CN1-42 input signal is ON (closed). 3 3 Enable drive when CN1-44 input signal is ON (closed). 5 6 Enable drive when CN1-44 input signal is ON (closed). 5 7 Set the signal to always prohibit drive (always force the motor to stop). 7 8 Set the signal to always prohibit drive (always disable forcing the motor to stop). 7 9 Enable drive when CN1-44 input signal is OFF (open). A A Enable drive when CN1-44 input signal is OFF (open). A A Enable drive when CN1-44 input signal is OFF (open). C A Enable drive when CN1-44 input signal is OFF (open). C A Enable drive when CN1-44 input signal is OFF (open). F 0 Enable drive when CN1-44 input signal is OFF (open). F 1 Enable drive when CN1-44 input signal is OFF (open). F 1 Beserved parameter (Do not change.) I I 1 Reserved parameter (Do not change.) I I 1 Dutput the signal from the CN1-27 o		-		FSTP (Forced	d Stop Input) Si	ignal Alloc	ation			Refere	ence	
2 Enable drive when CN1-42 input signal is ON (closed). 3 Enable drive when CN1-43 input signal is ON (closed). 4 Enable drive when CN1-45 input signal is ON (closed). 5 Enable drive when CN1-45 input signal is ON (closed). 6 Enable drive when CN1-45 input signal is ON (closed). 7 Set the signal to always prohibit drive (always force the motor to stop). 9 Enable drive when CN1-40 input signal is OF (open). A Enable drive when CN1-41 input signal is OF (open). B Enable drive when CN1-43 input signal is OF (open). C Enable drive when CN1-43 input signal is OF (open). C Enable drive when CN1-44 input signal is OF (open). E Enable drive when CN1-43 input signal is OF (open). F Enable drive when CN1-44 input signal is OF (open). E Enable drive when CN1-45 input signal is OF (open). N.CICX Reserved parameter (Do not change.) N.XICIC Reserved parameter (Do not change.) N.XICIC Reserved output Signal from the CN1-25 or CN1-26 output terminal. 2 Output the signal from the CN1-27 or CN1-26 output terminal. 3 Output the signal from the CN1-38 outp				0 Er	hable drive whe	n CN1-40	input signa	al is ON (close	ed).			
Image: state in the second state in the sec				1 Er	nable drive whe	n CN1-41	input signa	al is ON (close	ed).			
Pn516 4				2 Er	hable drive whe	n CN1-42	input signa	al is ON (close	ed).			
Pn516 S Enable drive when CN1-45 input signal is ON (closed). Image: Close c				3 Er	hable drive whe	n CN1-43	input signa	al is ON (close	ed).			
Pn516 6 Enable drive when CN1-46 input signal is ON (closed). ** 8 Set the signal to always prohibit drive (always force the motor to solve). 9 Enable drive when CN1-40 input signal is OFF (open). ** 9 Enable drive when CN1-41 input signal is OFF (open). A Enable drive when CN1-41 input signal is OFF (open). ** 0 Enable drive when CN1-43 input signal is OFF (open). B Enable drive when CN1-43 input signal is OFF (open). ** 0 Enable drive when CN1-44 input signal is OFF (open). E Enable drive when CN1-46 input signal is OFF (open). ** 1 C Enable drive when CN1-46 input signal is OFF (open). ** ** 1 D Enable drive when CN1-46 input signal is OFF (open). ** ** 1 D Enable drive when CN1-46 input signal is OFF (open). ** ** 1 Reserved parameter (Do not change.) ** ** ** 1 N				4 Er	nable drive whe	n CN1-44	input signa	al is ON (close	ed).			
Pn516 7 Set the signal to always prohibit drive (always force the motor to stop). ************************************				5 Er	nable drive whe	n CN1-45	input signa	al is ON (close	ed).			
n.□□□X 1 stop). ************************************				6 Er	nable drive whe	n CN1-46	input signa	al is ON (close	ed).			
Pn516 8 Set the signal to always enable drive (always disable forcing the more to stop). 9 Enable drive when CN1-40 input signal is OFF (open). A Enable drive when CN1-42 input signal is OFF (open). B Enable drive when CN1-42 input signal is OFF (open). D Enable drive when CN1-42 input signal is OFF (open). D Enable drive when CN1-43 input signal is OFF (open). F Enable drive when CN1-45 input signal is OFF (open). F Enable drive when CN1-45 input signal is OFF (open). F Enable drive when CN1-46 input signal is OFF (open). F Enable drive when CN1-46 input signal is OFF (open). N.IIIII Reserved parameter (Do not change.) N.IIIIII Reserved parameter (Do not change.) N.IIIIIII Reserved parameter (Do not change.) N.IIIIIIII Reserved parameter (Do not change.) N.IIIIIIIII Reserved parameter (Do not change.) N.IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		r	n.000X			always pro	hibit drive	(always force	the motor to			
A Enable drive when CN1-41 input signal is OFF (open). B Enable drive when CN1-42 input signal is OFF (open). C Enable drive when CN1-43 input signal is OFF (open). D Enable drive when CN1-44 input signal is OFF (open). E Enable drive when CN1-46 input signal is OFF (open). F Enable drive when CN1-46 input signal is OFF (open). F Enable drive when CN1-46 input signal is OFF (open). F Enable drive when CN1-46 input signal is OFF (open). F Enable drive when CN1-46 input signal is OFF (open). N.IDXD Reserved parameter (Do not change.) n.IDXD Reserved parameter (Do not change.) n.XDDD Output Signal Allocation 0 Disabled (the above signal output is not used). 1 Output the signal from the CN1-25 or CN1-28 output terminal. 2 Output the signal from the CN1-27 or CN1-28 output terminal. 3 Output the signal from the CN1-37 output terminal. 4 Outp	Pn516		N.LULIX Stop). 8 Set the signal to always enable drive (always disable forcing th motor to stop). 9 Enable drive when CN1-40 input signal is OFF (open). A Enable drive when CN1-41 input signal is OFF (open). B Enable drive when CN1-42 input signal is OFF (open).									
B Enable drive when CN1-42 input signal is OFF (open). C Enable drive when CN1-43 input signal is OFF (open). D Enable drive when CN1-44 input signal is OFF (open). E Enable drive when CN1-46 input signal is OFF (open). F Enable drive when CN1-46 input signal is OFF (open). F Enable drive when CN1-46 input signal is OFF (open). F Enable drive when CN1-46 input signal is OFF (open). n.DIXD Reserved parameter (Do not change.) n.XDDD Reserved parameter (Do not change.) n.DDDX ALO1 (Alarm Code Output) Signal Allocation 0 Disabled (the above signal output is not used). 1 Output the signal from the CN1-27 or CN1-28 output terminal. 2 Output the signal from the CN1-27 or CN1-28 output terminal. 4 Output the signal from the CN1-38 output terminal. 5 Output Sig				9 Er	nable drive whe	n CN1-40	input signa	al is OFF (ope	n).			
Pn517 C Enable drive when CN1-43 input signal is OFF (open). D Enable drive when CN1-45 input signal is OFF (open). E Enable drive when CN1-46 input signal is OFF (open). F Enable drive when CN1-46 input signal is OFF (open). Reserved parameter (Do not change.) n.□IX□ Reserved parameter (Do not change.) n.□X□□ Reserved parameter (Do not change.) n.□X□□ Reserved parameter (Do not change.) n.□X□□ Reserved parameter (Do not change.) n.□ n.□□□□ Reserved parameter (Do not change.) n.□□□□ ALO1 (Alarm Code Output) Signal Allocation 0 Disabled (the above signal output is not used). 1 Output the signal from the CN1-29 or CN1-30 output terminal. 2 Output the signal from the CN1-30 output terminal. 3 Output the signal from the CN1-30 output terminal. 4 Output Signal Allocation n.□□□□□ ALO2 (Alarm Code Output) Signal Allocation				A Er	nable drive whe	n CN1-41	input signa	al is OFF (ope	n).			
D Enable drive when CN1-44 input signal is OFF (open). E Enable drive when CN1-45 input signal is OFF (open). F Enable drive when CN1-46 input signal is OFF (open). n.DZDD Reserved parameter (Do not change.) n.DZDD Reserved parameter (Do not change.) n.XDDD Reserved parameter (Do not change.) n.DDDX ALO1 (Alarm Code Output) Signal Allocation 0 Disabled (the above signal output is not used). 1 Output the signal from the CN1-25 or CN1-26 output terminal. 2 Output the signal from the CN1-29 or CN1-30 output terminal. 4 Output the signal from the CN1-30 output terminal. 5 Output the contract on the CN1-30 output terminal. 6 Output the signal from the CN1-30 output termina				B Er	nable drive whe	n CN1-42	input signa	al is OFF (ope	n).			
E Enable drive when CN1-45 input signal is OFF (open). F Enable drive when CN1-46 input signal is OFF (open). n.□□X□ Reserved parameter (Do not change.) n.N□□X□ Reserved parameter (Do not change.) n.X□□ Reserved parameter (Do not change.) n.□□□X ALO1 (Alarm Code Output) Signal Allocation 0 Disabled (the above signal output is not used). 1 Output the signal from the CN1-25 or CN1-26 output terminal. 2 Output the signal from the CN1-29 or CN1-30 output terminal. 3 Output the signal from the CN1-37 output terminal. 4 Output the signal from the CN1-39 output terminal. 5 Output the signal Allocation n.□□X□ ALO2 (Alarm Code Output) Signal Allocation n.□□X□ ALO3 (Alarm Code Output) Signal Allocation n.□X□□ Reserved parameter (Do not change.)				C Er	nable drive whe	n CN1-43	input signa	al is OFF (ope	n).			
F Enable drive when CN1-46 input signal is OFF (open). n.□X□ Reserved parameter (Do not change.) n.□X□□ Reserved parameter (Do not change.) n.□X□□ Reserved parameter (Do not change.) n.X□□□ Reserved parameter (Do not change.) n.□□□ Reserved parameter (Do not change.) n.□□□ Reserved parameter (Do not change.) n.□□□ ALO1 (Alarm Code Output) Signal Allocation 0 Utput the signal from the CN1-25 or CN1-26 output terminal. 2 Output the signal from the CN1-27 or CN1-28 output terminal. 3 Output the signal from the CN1-38 output terminal. 4 Output the signal from the CN1-38 output terminal. 5 Output the signal from the CN1-38 output terminal. 6 Output Signal Allocation n.□□□X□ ALO2 (Alarm Code Output) Signal Allocation 0 to 6 The allocations are the same as th				D Er	hable drive whe	n CN1-44	input signa	al is OFF (ope	n).			
n.□□X□ Reserved parameter (Do not change.) n.□X□□ Reserved parameter (Do not change.) n.□X□□ Reserved parameter (Do not change.) n.X□□□ Reserved parameter (Do not change.) n.X□□□ Reserved parameter (Do not change.) n.X□□□ Reserved parameter (Do not change.) 1 Output Signal Selec- 0000h to 0666h - 0654h All After restart Setup *1 1 Output to signal from the CN1-25 or CN1-26 output terminal. 1 Output the signal from the CN1-27 or CN1-26 output terminal. 2 Output the signal from the CN1-27 or CN1-28 output terminal. 1 Output the signal from the CN1-27 or CN1-28 output terminal. 2 Output the signal from the CN1-27 or CN1-30 output terminal. 1 0utput the signal from the CN1-37 output terminal. 1 0utput the signal from the CN1-39 output terminal. 1 0utput the signal from the CN1-39 output terminal. 1 0 1 0utput terminal. 1 0 1 0utput terminal. 1 0 1 0 1 0 1 0 1 1 1 0 1 0 1 0 1 0 1 0 1				E Er								
ALO1 Reserved parameter (Do not change.) n.□X□□ Reserved parameter (Do not change.) n.X□□□ Reserved parameter (Do not change.) 2 Output Signal Selec- tions 5 0000h to 0666h - 0654h All After restart Setup *1 ALO1 (Alarm Code Output) Signal Allocation 0 Disabled (the above signal output is not used). 1 Output the signal from the CN1-25 or CN1-26 output terminal. 2 Output the signal from the CN1-27 or CN1-28 output terminal. 3 Output the signal from the CN1-37 output terminal. 3 Output the signal from the CN1-37 output terminal. 6 Output the signal from the CN1-39 output terminal. 6 Output the signal from the CN1-39 output terminal. 6 Output the signal Allocation n.□□X□ ALO2 (Alarm Code Output) Signal Allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocation n.□X□□ ALO3 (Alarm Code Output) Signal Allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.X□□□ Reserved parameter (Do not change.) All All				F Er	F Enable drive when CN1-46 input signal is OFF (open).							
ALDI Reserved parameter (Do not change.) 2 Output Signal Selec: 0000h to 0666h – 0654h All After restart Setup *1 ALO1 (Alarm Code Output) Signal Allocation 0 Disabled (the above signal output is not used). 1 Output the signal from the CN1-25 or CN1-26 output terminal. 2 Output the signal from the CN1-25 or CN1-26 output terminal. 2 Output the signal from the CN1-27 or CN1-28 output terminal. 3 Output the signal from the CN1-29 or CN1-30 output terminal. 3 Output the signal from the CN1-37 output terminal. 4 Output the signal from the CN1-37 output terminal. 5 Output the signal from the CN1-38 output terminal. 5 Output the signal from the CN1-39 output terminal. 6 Output the signal from the CN1-39 output terminal. 6 Output the signal from the CN1-39 output terminal. 6 Output the signal from the CN1-39 output terminal. 10 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocation 1 10 0 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocation 10 0 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations.		r	n.00X0	Reserved par	rameter (Do no	t change.)						
2 Output Signal Selec- tions 5 0000h to 0666h - 0654h All After restart Setup *1 n 0 Disabled (the above signal output is not used). 1 Output the signal from the CN1-25 or CN1-26 output terminal. 2 Output the signal from the CN1-25 or CN1-26 output terminal. 2 Output the signal from the CN1-25 or CN1-26 output terminal. 2 Output the signal from the CN1-27 or CN1-28 output terminal. 3 Output the signal from the CN1-27 or CN1-30 output terminal. 3 Output the signal from the CN1-37 output terminal. 4 Output the signal from the CN1-37 output terminal. 5 Output the signal from the CN1-39 output terminal. 5 Output the signal from the CN1-39 output terminal. 6 Output terminal. 6 Output the signal Allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n ALO3 (Alarm Code Output) Signal Allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.X Reserved parameter (Do not change.) All All All		r	n.OXOO	Reserved par	rameter (Do no	t change.)						
Pn517 ALO1 (Alarm Code Output) Signal Allocation 0 Disabled (the above signal output is not used). 1 Output the signal from the CN1-25 or CN1-26 output terminal. 2 Output the signal from the CN1-27 or CN1-28 output terminal. 3 Output the signal from the CN1-29 or CN1-30 output terminal. 4 Output the signal from the CN1-37 output terminal. 5 Output the signal from the CN1-39 output terminal. 6 Output the signal from the CN1-39 output terminal. 6 Output the signal from the CN1-39 output terminal. 6 Output the signal Allocation n.□□X□ ALO2 (Alarm Code Output) Signal Allocation 0 0 0 The allocations are the same as the ALO1 (Alarm Code Output) signal allocation. 0 0 0 0 0 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.□X□□ Reserved parameter (Do not change.)		r	n.X000	Reserved par	rameter (Do no	t change.)						
Pn518*3 0 Disabled (the above signal output is not used). 1 Output the signal from the CN1-25 or CN1-26 output terminal. 2 Output the signal from the CN1-27 or CN1-28 output terminal. 3 Output the signal from the CN1-29 or CN1-30 output terminal. 4 Output the signal from the CN1-37 output terminal. 5 Output the signal from the CN1-30 output terminal. 6 Output the signal from the CN1-30 output terminal. 6 Output the signal from the CN1-30 output terminal. 6 Output the signal from the CN1-30 output terminal. 6 Output the signal from the CN1-30 output terminal. 6 Output the signal from the CN1-30 output terminal. 10 0 to 6 11 ALO2 (Alarm Code Output) Signal Allocation 11 0 to 6 11 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. 11 0 to 6 11 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. 11 0 to 6 11 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. 11 0 to 6 11 The allocations are the same as the		2		gnal Selec-		_	0654h	All		Setup	*1	
Pn518*3 1 Output the signal from the CN1-25 or CN1-26 output terminal. 2 Output the signal from the CN1-27 or CN1-28 output terminal. 3 Output the signal from the CN1-29 or CN1-30 output terminal. 4 Output the signal from the CN1-37 output terminal. 5 Output the signal from the CN1-38 output terminal. 6 Output the signal from the CN1-39 output terminal. 6 Output the signal from the CN1-39 output terminal. 6 Output the signal from the CN1-39 output terminal. 1 0 to 6 7 The allocations are the same as the ALO1 (Alarm Code Output) signal allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. 1 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. 1 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. 1 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. 1 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations.		1		ALO1 (Alarn	n Code Output)	Signal Al	location					
Pn517 2 Output the signal from the CN1-27 or CN1-28 output terminal. 3 Output the signal from the CN1-29 or CN1-30 output terminal. 4 Output the signal from the CN1-37 output terminal. 5 Output the signal from the CN1-38 output terminal. 6 Output the signal from the CN1-39 output terminal. 0 0 to 6 0 The allocation 0 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocation 0 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocation 0 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocation 0 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocation 0 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocation 0 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.XDDD Reserved parameter (Do not change.)				0 Di	sabled (the abo	ve signal c	output is no	ot used).				
Pn517 3 Output the signal from the CN1-29 or CN1-30 output terminal. 4 Output the signal from the CN1-37 output terminal. 5 Output the signal from the CN1-38 output terminal. 6 Output the signal from the CN1-39 output terminal. 1 0 Output the signal from the CN1-39 output terminal. 1 0 0 <t< td=""><td></td><td></td><td></td><td>1 Ou</td><td>Itput the signal</td><td>from the C</td><td>N1-25 or</td><td>CN1-26 outp</td><td>ut terminal.</td><td></td><td></td></t<>				1 Ou	Itput the signal	from the C	N1-25 or	CN1-26 outp	ut terminal.			
Pn517 3 Output the signal from the CN1-29 or CN1-30 output terminal. 4 Output the signal from the CN1-37 output terminal. 5 Output the signal from the CN1-38 output terminal. 6 Output the signal from the CN1-39 output terminal. 1 6 Output the signal from the CN1-39 output terminal. 1 6 Output the signal from the CN1-39 output terminal. 1 1 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. 1 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. 1 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. 1 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. 1 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. 1 N.C. Reserved parameter (Do not change.)				2 Oi	tput the signal	from the C	N1-27 or	CN1-28 outp	ut terminal.			
Pn517 5 Output the signal from the CN1-38 output terminal. 6 Output the signal from the CN1-39 output terminal. n.□□X□ ALO2 (Alarm Code Output) Signal Allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.□□X□ ALO3 (Alarm Code Output) Signal Allocation 0.0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.□□X□ 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.□X□□ Reserved parameter (Do not change.) Pn518*3 Safety Module-Related				3 Ou	Itput the signal	from the C	N1-29 or	CN1-30 outp	ut terminal.			
Pn517 6 Output the signal from the CN1-39 output terminal. n.□□X□ ALO2 (Alarm Code Output) Signal Allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.□X□ ALO3 (Alarm Code Output) Signal Allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocation 0 to 6 n.□X□ ALO3 (Alarm Code Output) Signal Allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.X□□ Reserved parameter (Do not change.) Allocation = 0				4 Output the signal from the CN1-37 output terminal.								
6 Output the signal from the CN1-39 output terminal. n.□□X□ ALO2 (Alarm Code Output) Signal Allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.□X□ ALO3 (Alarm Code Output) Signal Allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.□X□□ Reserved parameter (Do not change.)	D. 547			5 Output the signal from the CN1-38 output terminal.								
n.□□X□ 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.□X□□ ALO3 (Alarm Code Output) Signal Allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.□X□□ The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.□X□□ Reserved parameter (Do not change.) Pn518*3 Safety Module-Related	Phot/			6 Output the signal from the CN1-39 output terminal.								
n.□□X□ 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.□X□□ ALO3 (Alarm Code Output) Signal Allocation 0 to 6 The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.□X□□ The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.□X□□ Reserved parameter (Do not change.) Pn518*3 Safety Module-Related				ALO2 (Alarm		Signal Al	ocation					
0 to 6 Introduction of the data the full of			n.🗆🗆 X 🗆	The allocations are the same as the ALO1 (Alarm Code Output) signal alloca								
n.□X□□ The allocations are the same as the ALO1 (Alarm Code Output) signal allocations. n.X□□□ Reserved parameter (Do not change.)												
Image: Safety Module-Related Safety Module-Related				ALO3 (Alarm	n Code Output)	Signal Al	ocation					
Pn518*3 _ Safety Module-Related			n.¤X¤¤			e the same	e as the AL	-01 (Alarm Co	ode Output) :	signal allo	ca-	
			n.XDDD	Reserved pa	arameter (Do no	ot change	.)					
			1			1	I			I		
	Pn518 ^{*3}	-			-	_	_	All	_	_	-	

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					·		Cor	tinued from	n previou	s page.
Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Output Sig	nal Selec-	0000h to	_	0000h	All	After	Setup	page 4-22
		tions 8		0006h				restart	[-	4-22
			(<u></u>				<u> </u>			
				i-closed/Fully-o			-	ut) Signal A	location	
				sabled (the abov	0		,	1.1.2.2.2.2.2.2.1		
				Itput the signal						
		n.🗆🗆🗆 X		Itput the signal			•			
Pn51A				Itput the signal				ut terminal.		
TINTA				Itput the signal						
				Itput the signal						
			0 01	itput the signal		JN1-39 UU	put terminal.			
		n.🗆🗆 X 🗆	Reserved pa	arameter (Do no	ot change	.)				
		n.¤X¤¤	Reserved pa	arameter (Do no	ot change	.)				
		n.XDDD	Reserved pa	arameter (Do no	ot change	.)				
			ricocived pr		onunge	•)				
		Motor-Loa	d Position		1 refer-					
Pn51B	4	Deviation (Overflow	0 to 1,073,741,824	ence	1000	Rotary	Immedi- ately	Setup	*1
		Detection I		.,,	unit			-		
Pn51E	2	flow Warni	eviation Over- ng Level	10 to 100	1%	100	All	Immedi- ately	Setup	*1
			eviation Over-	1 to	1 refer-			Immedi-		
Pn520	4	flow Alarm		1,073,741,823	ence unit	5242880	All	ately	Setup	*1
		D	<u> </u>		1 refer-					
Pn522	4	Width	Completed	0 to 1,073,741,824	ence	7	All	Immedi- ately	Setup	*1
				.,,	unit					
Pn524	4	Near Signa	al Width	1 to 1,073,741,824	1 refer- ence	107374 1824	All	Immedi-	Setup	*1
				1,073,741,024	unit	1024		ately		ļ
Pn526	4	Position De flow Alarm	eviation Over-	1 to	1 refer- ence	5242880	All	Immedi-	Setup	*1
11020		Servo ON		1,073,741,823	unit	5272000	7 411	ately	Colup	
D. 500			eviation Over-		4.07	100	A.!!	Immedi-	0.1	**
Pn528	2	flow Warnii Servo ON	ng Level at	10 to 100	1%	100	All	ately	Setup	*1
Dn520	2	Speed Lim	it Level at	0 to 10 000	1	10000	Potoni	Immedi-	Sotup	*1
Pn529	2	Servo ON		0 to 10,000	1 min ⁻¹	10000	Rotary	ately	Setup	1
Pn52A	2	Multiplier p closed Rot		0 to 100	1%	20	Rotary	Immedi- ately	Tuning	*1
D 50D				4 1 400	10/			Immedi-	0.1	
Pn52B	2	Overload V	Varning Level	1 to 100	1%	20	All	ately	Setup	*1
Draf 20	0		ent Derating	10 to 100	10/	100	Δ	After	S at in	*1
Pn52C	2	at Motor O Detection	verioad	10 to 100	1%	100	All	restart	Setup	~1
Pn52F	2	Monitor Dis	splay at	0000h to	_	0FFFh	All	Immedi-	Setup	*1
111521	2	Startup		0FFFh	_			ately	Jeruh	1

Continued on next page.

								tinued fron	n previou	s page.
Parameter No.	Size	Na	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Program Jo Related Sel		0000h to 0005h	-	0000h	All	Immedi- ately	Setup	*1
			Program Jo	gging Operation	n Pattern					
				Vaiting time in Pr ovements in Pn		prward by t	travel distance	e in Pn531)>	< Number	of
				Vaiting time in Pr ovements in Pn		everse by t	ravel distance	e in Pn531) >	< Number	of
			2 m (V	Vaiting time in Pr ovements in Pn Vaiting time in Pr ovements in Pn	536 1535 → Re			,		
Pn530		n.□□□X	3 (V	Vaiting time in Pr lovements in Pr Vaiting time in Pr lovements in Pr	536 1535 → Fo			,		
			4 in	Vaiting time in Pr Pn535 → Revei n536	n535 → Fo rse by trav	orward by t el distance	ravel distance e in Pn531) ×	e in Pn531 – Number of n	 Waiting t novements 	ime s in
			5 İn	Vaiting time in Pr Pn535 → Forwa n536						
		n.DDXD	Reserved p	arameter (Do no	ot change.	.)				
		n.🗆X🗆 🗆	Reserved p	arameter (Do no	ot change.	.)				
		n.XOOO	Reserved p	arameter (Do no	ot change.)				
Pn531	4	Program Jo Distance	ogging Trave	1 to 1,073,741,824	1 refer- ence unit	32768	All	Immedi- ately	Setup	*1
Pn533	2	Program Jo ment Speed	ogging Move d	- 1 to 10,000	Rotary: 1 min ⁻¹ Direct Drive: 0.1 min ⁻¹	500	Rotary	Immedi- ately	Setup	*1
Pn534	2	Program Jo eration/Dec Time	ogging Accel eleration	- 2 to 10,000	1 ms	100	All	Immedi- ately	Setup	*1
Pn535	2	Program Jo ing Time	ogging Wait-	0 to 10,000	1 ms	100	All	Immedi- ately	Setup	*1
Pn536	2	Program Jo ber of Move	ogging Num- ements	0 to 1,000	1 time	1	All	Immedi- ately	Setup	*1
Pn550	2	Analog Mor Voltage	nitor 1 Offset	t -10,000 to 10,000	0.1 V	0	All	Immedi- ately	Setup	*1
Pn551	2	Analog Mor Voltage	nitor 2 Offset	-10,000 to 10,000	0.1 V	0	All	Immedi- ately	Setup	*1
Pn552	2	Analog Mor nification	nitor 1 Mag-	-10,000 to 10,000	× 0.01	100	All	Immedi- ately	Setup	*1
Pn553	2	Analog Mor nification	nitor 2 Mag-	-10,000 to 10,000	× 0.01	100	All	Immedi- ately	Setup	*1
Pn55A	2	Power Con Monitor Uni		1 to 1,440	1 min	1	All	Immedi- ately	Setup	_
Pn560	2	Residual Vil Detection V		1 to 3,000	0.1%	400	All	Immedi- ately	Setup	*1
Pn561	2	Overshoot I Level	Detection	0 to 100	1%	100	All	Immedi- ately	Setup	*1

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							Con	itinued from	i previou	s page
Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Input Signa 9	al Selection:	s 0000h to 00FFh	-	0088h	All	After restart	Setup	page 4-20
				· · · · · ·		0 1 1				_
			· · ·	ii-closed/Fully-cl			•	, ,		
				-ully-closed loop						
				Fully-closed loop					,	
				Fully-closed loop			. 0	•	,	
				-ully-closed loop						
				ully-closed loop			1 0	`	,	
				Fully-closed loop						
				Fully-closed loop						
		n.DDDX		The signal is alway	,	. ,			,	
				The signal is alway						
				-ully-closed loop						
				Fully-closed loop					,	
				Fully-closed loop					,	
				Fully-closed loop			. 0		,	
				Fully-closed loop				· ·	,	
				Fully-closed loop			1 0	× 1	,	
			F	-ully-closed loop	control wh	en CINT-46	o input signai	IS OFF (oper	1).	
Pn58A			/SFECLR	Motor-Load Posi	ition Devia	ation Clear	⁻ Input) Signa	I Allocation		
			0	Clear deviation wh	nen CN1-4	0 input sig	nal is ON (clo	osed).		
			1	Clear deviation wh	nen CN1-4	1 input sig	nal is ON (clo	osed).		
			2	Clear deviation wh	nen CN1-4	2 input sig	nal is ON (clo	osed).		
			3	Clear deviation wh	nen CN1-4	3 input sig	nal is ON (clo	osed).		
			4	Clear deviation wh	nen CN1-4	4 input sig	nal is ON (clo	osed).		
			5	Clear deviation wh	nen CN1-4	5 input sig	nal is ON (clo	osed).		
			6	Clear deviation wh	nen CN1-4	6 input sig	nal is ON (clo	osed).		
		n.🗆🗆 X 🗆	7	The signal is alway	ys active.	(Deviation	s always clea	ired.)		
			8	The signal is alway	ys inactive	. (Deviation	n is always no	ot cleared.)		
			9	Clear deviation wh	nen CN1-4	0 input sig	nal is OFF (op	cen).		
			A	Clear deviation wh	nen CN1-4	1 input sig	nal is OFF (or	cen).		
			В	Clear deviation wh	nen CN1-4	2 input sig	nal is OFF (op	cen).		
				Clear deviation wh				·		
				Clear deviation wh						
				Clear deviation wh						
			F	Clear deviation wh	nen CN1-4	6 input sig	nal is OFF (or	cen).		
		n.¤X¤¤	Reserved	parameter (Do no	ot change.)				
		n.XDDD	Reserved	parameter (Do no	ot change.)				
Pn600	2	Regenerati Capacity ^{*4}	ve Resistor	Depends on model.*5	10 W	0	All	Immedi- ately	Setup	*1
Pn601	2				10 J	0	All	After restart	Setup	*6
Pn603	2	Regenerati		0 to 65,535	10 mΩ	0	All	Immedi- ately	Setup	*1
					1	1			1	

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							Con	tinued from	n previou	s page.		
Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Overheat F Selections		0000h to 0003h	-	0000h	All	After restart	Setup	*1		
			Overheat P	rotection Selection	n							
			0 [isable overheat p	protection.							
			1 F	Reserved setting (Do not us	e.)						
Pn61A		n.000X	2Monitor a negative voltage input from a sensor attached to the machine and use overheat protection.3Monitor a positive voltage input from a sensor attached to the machine and use overheat protection.									
				3 Monitor a positive voltage input from a sensor attached to the machine and use overheat protection.								
	I	n.00X0	Reserved p	eserved parameter (Do not change.)								
	1	n.0X00	Reserved p	arameter (Do not	change.)							
	1	n.X000	Reserved p	arameter (Do not	change.)							
Pn61B *7	2	Overheat A	Alarm Level	0 to 500	0.01 V	250	All	Immedi- ately	Setup	*1		
Pn61C *7	2	Overheat \	Warning Leve	el 0 to 100	1%	100	All	Immedi- ately	Setup	*1		
Pn61D *7	2	Overheat A Time	Overheat Alarm Filter 0 to 65,535 1 s 0 All Immediately Setup *1									
Pn621 to Pn628 ^{*3}	_	Safety Mo Parameter	dule-Related s	_	_	_	All	_	_	-		
	1	1		1	1	1	1		1			

1. Refer to the following manual for details.

 $\label{eq:scalar} \underset{\Sigma-7-Series}{\square} \Sigma\text{-7-Series} \Sigma\text{-7-S$ (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. \square Σ -7-Series AC Servo Drive Σ -7S/ Σ -7W SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP S800001 73)

*7. Enabled only when Pn61A is set to n. DDD2 or n. DDD3.

SERVOPACK with MECHATROLINK-III Communications References 8.3

List of Servo Parameters 8.3.1

The following table lists the parameters.

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

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

Parameter No.	Size	N	lame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refe enc
	2	Basic Fund tions 0	ction Selec)-	0000h to 10B1h	-	0000h	All	After restart	Setup	-
			Rotation	Dire	ction Selectio	n				Refere	ence
		n.🗆🗆 🗆 X	0	-	CCW as the f		rection.				
			1	Use	e CW as the for	rward dire	ction. (Rev	erse Rotation	Mode)	*1	
		n.🗆 🗆 X 🗆	Reserved	d par	ameter (Do no	ot change	.)				
² n000		n.🗆X🗆 🗆	Reserved	d par	ameter (Do no	ot change	.)				
			Rotary/L nected	ineai	r Servomotor S	Startup Se	election W	hen Encoder	Is Not Con-	Refere	ence
		n.XDDD	0		en an encoder ary Servomoto		nected, st	art as SERVC	PACK for		
			1		en an encoder Servomotor.	is not cor	nected, st	art as SERVC	PACK for Lir)- *1	
	2	Application Selections			0000h to 1142h	-	0000h	All	After restart	Setup	_
			Motor St	oppi	ng Method for	· Servo Ol	FF and Gro	oup 1 Alarms		Refere	ence
			0	Sto	p the motor by	applying	the dynam	ic brake.			
		n.000X	1		p the motor by dynamic brake		ing dynam	ic brake and	then release	*1	
			2	Coa	ast the motor to	o a stop w	vithout the	dynamic brak	æ.		
			Overtrav	el St	opping Metho	d				Refere	ence
			0	Арр	ly the dynamic	brake or	coast the	motor to a sto	op.		
			1		elerate the mo maximum torg						
Pn001		n.DDXD	2	Dec the	elerate the mo maximum torg	otor to a st ue and the	op using t en let the r	he torque set notor coast.	in Pn406 as	*1	
			3		elerate the mc 0A and then s			ne deceleratio	on time set in		
			4		elerate the mo 0A and then le			ne deceleratio	on time set in		
			Main Circ	cuit F	Power Supply	AC/DC In	put Select	ion		Refere	ence
			0	Inpu	ut AC power as L3 terminals (the main	circuit pov	ver supply usi	ng the L1, L2		
		n.¤X¤¤	1	Inp. and	ut DC power as \ominus 2 terminals	s the main s or the B ⁻	circuit poul and \ominus 2	ver supply us			
			Input DC power as the main circuit power supply using the B and \bigcirc 2 terminals or the B1 and \bigcirc 2 terminals (use an ext converter or the shared converter).								

Parameter Lists

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								Con	tinued from	previou	s page
Parameter No.	Size	N	lame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Application Selections	n Function 2		0000h to 4213h	-	0111h	-	After restart	Setup	-
		n.000X	Option 0	Rese	NK Comman	Do not us	e.)	ed Control	Applicable Motors	Refere	ence
		11.000X	1 2 3	Rese	TLIM as the to erved setting (erved setting (Do not us	e.)		All	*2	
			Torque C	ontro	l Option				Applicable Motors	Refere	ence
	n.□□X□	0	Use	erved setting (the speed lim ed limit.	VLIM) as the	All	*2				
Pn002				Usag	e		Applicable Motors	Refere	ence		
		n.¤X¤¤	0	tions					All		
			1 2		the encoder a the encoder a oder.				Rotary	*1	
	n.X000	External	Enco	der Usage				Applicable Motors	Refere	ence	
		0	Do r	iot use an ext	ernal encc	der.					
		n.X000	1		external enco for CCW mote			ward direc-			
			2	Rese	erved setting (Do not us	e.)		Rotary	*1	
		3		external enco for CCW mote			erse direc-				

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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	n Function 6	0000h to 105Fh	_	0002h	All	Immedi- ately	Setup	*1
			Analog Mo	nitor 1 Signal Se Motor speed (1		2010 ⁻¹)				
			01	Speed reference	,	,				
			02	Torque reference		,	iraue)			
			03	Position deviation			• •			
			04	Position amplifie	N N		,	0.05 V/enco	der pulse	unit)
			05	Position reference	ce speed (1 V/1,000	min ⁻¹)			
			06	Reserved setting	g (Do not i	use.)				
			07	Load-motor pos	ition devia	ation (0.01	V/reference u	nit)		
D - 000		n.ロロXX	08	Positioning com pleted: 0 V)	pletion (po	ositioning c	completed: 5 י	V, positioninę	g not com	-
Pn006			09	Speed feedforw	ard (1 V/1	,000 min ⁻¹))			
			0A	Torque feedforw	ard (1 V/1	00% rated	l torque)			
			0B	Active gain (1st	.	5	,			
			0C	Completion of p pleted: 0 V)	osition ref	erence dis	tribution (com	pleted: 5 V,	not com-	
			0D	External encode	r speed (1	V/1,000 r	min ⁻¹ : value at	the motor s	haft)	
			0E	Reserved setting	g (Do not i	use.)				
			0F	Reserved setting	g (Do not i	use.)				
			10	Main circuit DC	0					
			11 to 5F	Reserved setting	gs (Do not	use.)				
		n.¤X¤¤	Reserved p	parameter (Do no	ot change	.)				
		n.X000	Reserved p	arameter (Do no	ot change	.)				

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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		0000h to 105Fh	_	0000h	All	Immedi- ately	Setup	*1	
		Gelections	1	103111				atery			
			Analog Ma	miter O Cianal C	alaatian						
			-	onitor 2 Signal S		· -1					
			00	Motor speed (1	,	,					
			01	Speed reference							
			02	Torque reference Position deviati			1 7				
			03	Position amplifi			,	0 05 V/encc	dar nulsa	unit)	
			05	Position referer			0 / (0.00 0/0100			
			06	Reserved settir							
			07	Load-motor po	0.	,	V/reference u	nit)			
		n.🗆 🗆 XX	08	Positioning con pleted: 0 V)					g not com	-	
Pn007			09	Speed feedforv	/ard (1 V/1	000 min ⁻¹					
			0A	Torque feedforv							
			OB	Active gain (1st			. ,				
			0C	Completion of pleted: 0 V)				pleted: 5 V,	not com-		
			0D								
			OE	0E Reserved setting (Do not use.)							
			OF	Reserved settir	0 (,					
			10	0 Main circuit DC voltage							
			11 to 5F	Reserved settir	gs (Do not	use.)					
		n.¤X¤¤	Reserved	parameter (Do n	ot change	.)					
		n.XDDD	Reserved parameter (Do not change.)								
	-		neserved parameter (D0 not change.)								
	2	Application Selections		0000h to 7121h	-	4000h	Rotary	After restart	Setup	_	
						<u> </u>				ļ	
	Ī		Low Batte	ry Voltage Alarm	/Warning	Selection			Refere	ence	
		n.🗆 🗆 🗆 X	+	Output alarm (A.8	•		oltage.				
	_			Dutput warning (A					*1		
			Function S	Selection for Und	lervoltage				Refere	ence	
			0 [Do not detect un	dervoltage						
Pn008		n.🗆🗆 X 🗆	1 [Detect undervolta	age warnin	g and limit	torque at hos	st controller.	*1		
		2 Detect undervoltage warning and limit torque with Pn424 and Pn425 (i.e., only in SERVOPACK).									
	[Warning D	etection Selecti	on				Refere	ence	
		n.¤X¤¤		Detect warnings.					*1		
			1 [Do not detect wa	rnings exc	ept for A.9	71.		*1		
		n.XDDD	Reserved	parameter (Do n	ot change)					
	1					,					

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Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refe ence			
Pn009	2	Application Selections		0000h to 0121h	-	0010h	All	After restart	Tuning	I			
		n.□□□X Reserved parameter (Do not change.)											
	1		Current Co	ntrol Mode Sele	ction				Refere	nce			
		n.00X0	0Use current control mode 1.1• SERVOPACK Models SGD7S-R70A, -R90A, -1R6A, -2R8A, - 3R8A, -5R5A, and -7R6A: Use current control mode 1. • SERVOPACK Models SGD7S-120A, -180A, -200A, -330A, - 470A, -550A, -590A, and -780A: Use current control mode 2.										
				se current contro						_			
			<u> </u>	ection Method S					Refere	nce			
		n.¤X¤¤		se speed detect					*1				
				•									
		n.XDDD	Reserved p	parameter (Do no	ot change.)							
	2	Application Selections	n Function	0000h to 1044h	_	0001h	All	After restart	Setup	_			
		00100110110		TOTIN				rootart					
		n.OOOX	Motor Stopping Method for Group 2 Alarms										
			$0 \qquad Apply the dynamic brake or coast the motor to a stop (use the stopping method set in Pn001 = n.\Box\Box\BoxX).$										
			Decelerate the motor to a stop using the torque set in Pn406 as the maximum torque. Use the setting of Pn001 = $n.\square\square\squareX$ for the status after stopping.										
				2 Decelerate the motor to a stop using the torque set in Pn406 as the maximum torque and then let the motor coast.									
			Decelerate the motor to a stop using the deceleration time set in Pn30A. Use the setting of Pn001 = $n.\Box\Box\BoxX$ for the status after stopping.										
			4 [F	١									
Pn00A			Stopping I	Method for Force	ed Stops				Refer	ence			
			$0 \qquad Apply the dynamic brake or coast the motor to a stop (use the stopping method set in Pn001 = n.\square\square\squareX).$										
			1 t	Decelerate the motor to a stop using the torque set in Pn406 as the maximum torque. Use the setting of Pn001 = $n.\Box\Box\BoxX$ for the status after stopping.									
		n.□□X□		Decelerate the m he maximum tor				in Pn406 as					
			3 F	Decelerate the m Pn30A. Use the s stopping.									
				Decelerate the m Pn30A and then I			he decelerati	on time set ir	1				
		n.¤X¤¤	Reserved	parameter (Do n	ot change	e.)							
		n.XDDD	Reserved parameter (Do not change.)										

Continued on next page.

No. Name Range Unit Setting Motors Enabled fication ence 2 Application Function 0000h to 1121h - 0000h All After restart Setup - n.□□□X 0 Display only setup parameters. - *1 - *1 Pn00B 0 Stop the motor by setting the speed reference to 0. *1 *1 *1 Pn00B 0 Stop the motor by setting the speed reference to 0. *1 Apply the dynamic brake or coast the motor to a stop (use the stopping method set in Pn001 = n.□□□X). *1 2 Set the stopping method set in Pn001 = n.□□□X). 2 Set the stopping method set in Pn001 = n.□□□X). 2 Set the stopping method set in Pn001 = n.□□UX). 2 Set the stopping the speed reference to 0. n.□X□□ Power Input Selection for Three-phase SERVOPACK Reference n.□X□□ Ques a three-phase power supply input. *1 n.□Z□□ Reserved parameter (Do not change.) *1 NC□□ Reserved parameter (Do not change.) *1 NC□□ Reserved						1		Cor	tinued fror	n previou:	s page.	
2 Selections B 1121h - 0000h Ail restart SetUp - n		Size		Name		U U					Refer- ence	
ProDB 0 Display only setup parameters. *1 Motor Stopping Method for Group 2 Alarms Reference 0 Stop the motor by setting the speed reference to 0. 1 Apply the dynamic brake or coast the motor to a stop (use the stopping method set in Pn001 = n.DIDX). Reference 0 Stop the motor by setting the speed reference to 0. •1 1 Apply the dynamic brake or coast the motor to a stop (use the stopping method with Pn00A = n.DIDX). Reference 0 Use a three-phase power supply input. •1 Use a three-phase power supply input. •1 n.DDD Reserved parameter (Do not change.) •1 Netor's setting the speed reference in the stopping method with Pn00A = n.DIDX. Reference n.DDD Reserved parameter (Do not change.) •1 1 Use a three-phase power supply input. •1 n.DDD Reserved parameter (Do not change.) •1 1330h - 0000h - Alter Motors n.DDD Function Selection for Tests without a Motor Applicable Motors Applicable Applicable n.DDD 0 Use 13 bits. - - Alter Motors Applicable n.DDD 0 Use		2	Application	on Function s B		-	0000h	All		Setup	-	
ProDB 0 Display only setup parameters. *1 Motor Stopping Method for Group 2 Alarms Reference 0 Stop the motor by setting the speed reference to 0. 1 Apply the dynamic brake or coast the motor to a stop (use the stopping method set in Pn001 = n.DIDX). Reference 0 Stop the motor by setting the speed reference to 0. •1 1 Apply the dynamic brake or coast the motor to a stop (use the stopping method with Pn00A = n.DIDX). Reference 0 Use a three-phase power supply input. •1 Use a three-phase power supply input. •1 n.DDD Reserved parameter (Do not change.) •1 Netor's setting the speed reference in the stopping method with Pn00A = n.DIDX. Reference n.DDD Reserved parameter (Do not change.) •1 1 Use a three-phase power supply input. •1 n.DDD Reserved parameter (Do not change.) •1 1330h - 0000h - Alter Motors n.DDD Function Selection for Tests without a Motor Applicable Motors Applicable Applicable n.DDD 0 Use 13 bits. - - Alter Motors Applicable n.DDD 0 Use												
Pn00B Image: Image										Reference		
Pn00B Motor Stopping Method for Group 2 Alarms Reference 0 Stop the motor by setting the speed reference to 0. 1 Apply the dynamic brake or coast the motor to a stop (use the stopping method set in Pn001 = n.DIDX). 1 Apply the dynamic brake or coast the motor to a stop (use the stopping method set in Pn001 = n.DIDX). 1 Stop the motor by setting the speed reference to 0. 1 1 Apply the dynamic brake or coast the motor to a stop (use the stopping method set in Pn001 = n.DIDX). 2 Set the stopping method set in Pn001 = n.DIDX). Reference 0 Use a three-phase power supply input. 1 Use a three-phase power supply input. 1 Use a three-phase power supply input. 1 Imply the dynamic brake or coast the motor to a stop (use the Motors Complexity) input. 1 Imply the dynamic brake or coast the motor to a single-phase power 1 1 Imply the dynamic brake or coast the motor to a single-phase power 1 1 Use a single-phase power supply input. 1 Imply the dynamic brake or coast the motor to a single-phase power 1 1 Imply the dynamic brake or coast the motor to a single-phase power supply input. 1 Imply the dynamic brake or coast the motor to a single-phase power supply input. 1 Imply the dynamic brake or coast the motor to a single-phase power supply input. 1			n.DDDX									
Pnoos Image: state in the image: state in the state in t				1 Dis	1 Display all parameters.							
Pn00B n.□IIX□ Apply the dynamic brake or coast the motor to a stop (use the stopping method set in Pn001 = n.□IIIX). -,				Motor Stopp	Motor Stopping Method for Group 2 Alarms							
Image: Stopping method set in Ph001 = n. DIDX. Image: Stopping method set in Ph001 = n. DIDX. Image: Stopping method set in Ph001 = n. DIDX. Image: Stopping method with Ph00A = n. DIDX. Image: Stopping method set in Ph001 = n. DIDX. Image: Stopping method with Ph00A = n. DIDX. Image: Stopping method set in Ph001 = n. DIDX. Image: Stopping method with Ph00A = n. DIDX. Image: Stopping method set in Ph001 = n. DIDX. Image: Stopping method with Ph00A = n. DIDX. Image: Stopping method set in Ph001 = n. DIDX. Image: Stopping method set in Ph001 = n. DIDX. Image: Stopping method with Ph00A = n. DIDX. Image: Stopping method set in Ph001 = n. DIDX. Image: Stopping method with Ph00A = n. DIDX. Image: Stopping method set in Ph00A = n. DIDX. Image: Stopping method with Ph00A = n. DIDX. Image: Stopping method set in Ph00A = n. DIDX. Image: Stopping method with Ph00A = n. DIDX. Image: Stopping method set in Ph00A = n. DIDX. Image: Stopping method set in Ph00A = n. DIDX. Reference Image: Stopping method set in Ph00A = n. DIDX. Image: Stopping method set in Ph00A = n. DIDX. Image: Stopping method set in Ph00A = n. DIDX. Reference Image: Stopping method set in Ph00A = n. DIDX. Reference Image: Stopping method set in Ph00A = n. DIDX. Image: Stopping nethod set in Ph00A = n. DIDX. <												
Image: Properting the stopping method with Pn00A = n.□□□X. Power Input Selection for Three-phase SERVOPACK Reference 0 Use a three-phase power supply input. 1 1 Use a three-phase power supply input as a single-phase power 1 n.XDID Reserved parameter (Do not change.) 1 n.XDID Reserved parameter (Do not change.) 1 n.DDID Reserved parameter (Do not change.) 1 n.DDIDX Function Selection for Test without a Motor Applicable Motors 0 Disable tests without a motor. All n.DDIXD 0 Use 13 bits. 1 1 Use 20 bits. 2 Applicable 1 Use 20 bits. Rotary Applicable n.DDIXD Reserved parameter (Do not change.) All n.DIXDID Reserved parameter (Do not change.) Rotary 1 Use 20 bits. Rotary 2 Applicable Motors 1 Use 20 bits. Rotary 2 Use 21 bits. Rotary 1 Use 20 bits. Rotary 1 Use 20 bits.	Pn00B				op (use the	*1						
Image: Note of the second s								,				
Image: Note of the second s				Power Input	Selection for T	hree-nhas	e SERVOI	PACK		Refere	nce	
1 Use a three-phase power supply input as a single-phase power *1 n.XIIII Reserved parameter (Do not change.) 1 Use at hree-phase power supply input as a single-phase power 1 Use at hree-phase power supply input as a single-phase power 1 Image: the second				· · · · ·								
Image: supply input. Image: supply input. Image: supple supply input. Image: supple suppl					•	1			hase power	*1		
Pn00C 2 Application Function Selections C 0000h to 0130h - 0000h - After restart Setup *1 n.□□DX Function Selection for Test without a Motor Applicable Motors Applicable Motors Applicable Motors n.□□DX Function Selection for Test without a Motor Applicable Motors All n.□□DX 0 Use 13 bits. Applicable Motors 1 Use 20 bits. Rotary 2 Use 22 bits. Rotary 3 Use 24 bits. Rotary 0 Use an incremental encoder. All n.□DDD Reserved parameter (Do not change.) All n.□DDD Reserved parameter (Do not change.) *1 n.□DDD Nortravel Warning Detection Selection 0 N.DDD 0 Do not det				' su	pply input.							
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2 Selections C 0130h - 0000h - restart Selup 1 n.□□□X Function Selection for Test without a Motor Applicable Applicable Motors 0 Disable tests without a motor. All n.□□□X Encoder Resolution for Tests without a Motor Applicable 0 Use 13 bits. Applicable 1 Use 20 bits. Rotary 2 Use 22 bits. Applicable 3 Use 24 bits. Applicable 0 Use an incremental encoder. All n.□X□□ Reserved parameter (Do not change.) All n.□DUX Reserved parameter (Do not change.) *1 n.□DUX Reserved parameter (Do not change.) *1 </td <td></td>												
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Pn00C Image: Constraint of the set without a Motor Motors 0 Use 13 bits. Image: Constraint of the set without a Motor Rotary 1 Use 20 bits. Image: Constraint of the set without a Motor Rotary 1 Use 20 bits. Image: Constraint of the set without a Motor Applicable Motors 1 Use 24 bits. Image: Constraint of the set without a Motor Applicable Motors 0 Use an incremental encoder. All 1 Use an absolute encoder. Image: Setup *1 1 Image: Setup *1				0 D	isable tests with	out a moto	or.			All		
Pn00C 1 Use 20 bits. Rotary 2 Use 22 bits. 3 Use 24 bits. Applicable Motors 0 Use an incremental encoder. All All 1 Use an absolute encoder. 1001h 1 Use an absolute encoder. 1000h 1 Use an absolute encoder. 1001h 1 Use an absolute encoder. 1000h 1 Use an absolute encoder. 1000h 1 Use an absolute encoder. 1000h 1 Reserved parameter (Do not change.) *1 n. Reserved parameter (Do not change.) *1 n. Reserved parameter (Do not change.) Vertravel Warning Detection Selection n. 0 Do not detect overtravel warnings. Vertravel warnings.			n.ooxo	Encoder Resolution for Tests without a Motor								
Image: Second				0 U	se 13 bits.							
2 Use 22 bits. Applicable 3 Use 24 bits. Applicable n.DXDD Encoder Type Selection for Tests without a Motor Applicable 0 Use an incremental encoder. All 1 Use an absolute encoder. All n.XDDD Reserved parameter (Do not change.) All n.DDDX Reserved parameter (Do not change.) *1 n.DDXD Reserved parameter (Do not change.) *1 n.DDXD Reserved parameter (Do not change.) *1 n.DDXD Reserved parameter (Do not change.) *1 n.DXDD 0 Do not detect overtravel warnings. *1	Pn00C									Botar	/	
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Image: Column Science of the second				Encoder Ty	pe Selection for	r Tests wit	hout a Mo	tor				
1 Use an absolute encoder. n.X□□□ Reserved parameter (Do not change.) 2 Application Function Selections D 0000h to 1001h - 0000h All Immedi- ately *1 n.□□□X Reserved parameter (Do not change.) - 0000h All Immedi- ately *1 n.□□□X Reserved parameter (Do not change.) - - 0 - - n.□□X□ Reserved parameter (Do not change.) - - - - - n.□□X□ Reserved parameter (Do not change.) - - - - - n.□X□□ Reserved parameter (Do not change.) - - - - - n.□X□□ Reserved parameter (Do not change.) - - - - - 0 Do not detect overtravel warnings. 0 Do not detect overtravel warnings. - - -					se an increment	al encoder				All		
Image: Application Function Selections D 0000h to 1001h - 0000h All Immediately Setup *1 n.□□□X Reserved parameter (Do not change.) n.□□X□ Reserved parameter (Do not change.) immediately immediately setup *1 n.□□X□ Reserved parameter (Do not change.) immediately setup *1 n.□□X□ Reserved parameter (Do not change.) immediately setup *1 n.□□X□ Reserved parameter (Do not change.) immediately setup *1 immediately Reserved parameter (Do not change.) immediately setup *1 immediately Reserved parameter (Do not change.) immediately setup setup *1 immediately Reserved parameter (Do not change.) immediately setup				1 U								
n.□□□X Reserved parameter (Do not change.) n.□□X□ Reserved parameter (Do not change.) n.□X□ Reserved parameter (Do not change.) 0 Do not detect overtravel warnings.			n.XDDD	Reserved p	arameter (Do no	ot change	.)					
n.□□□X Reserved parameter (Do not change.) n.□□X□ Reserved parameter (Do not change.) n.□X□ Reserved parameter (Do not change.) 0 Do not detect overtravel warnings.										1		
N.IIIXII Reserved parameter (Do not change.) n.IIXIII Reserved parameter (Do not change.) N.IIXIII Overtravel Warning Detection Selection n.XIIIII 0 Do not detect overtravel warnings.		2	Application Selection	on Function s D	0000h to 1001h	-	0000h	All		Setup	*1	
N.IIIXII Reserved parameter (Do not change.) n.IIXIII Reserved parameter (Do not change.) N.IIXIII Overtravel Warning Detection Selection n.XIIIII 0 Do not detect overtravel warnings.												
Overtravel Warning Detection n.XDD 0 Do not detect overtravel warnings.												
N.IXIII Reserved parameter (Do not change.) Overtravel Warning Detection Selection 0 Do not detect overtravel warnings.	Pn00D			XL Heserved parameter (Do not change.)								
n.XDDD 0 Do not detect overtravel warnings.			n.¤X¤¤	Reserved p	arameter (Do no	ot change	.)					
n.XDDD 0 Do not detect overtravel warnings.				Overtravel	Narning Detect	ion Select	ion					
1 Detect overtravel warnings.			n.XDDD		-							
				1 D	etect overtravel	warnings.						

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Parameter No.	Size		Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence		
	2	Application Selection	on Function Is F	0000h to 2011h	-	0000h	All	After restart	Setup	-		
Pn00F		n.000X	0 Do r 1 Dete Reserved pa Reserved pa	Maintenance N not detect preventative rameter (Do no rameter (Do no	entative ma maintena ot change. ot change.	aintenance nce warnir))	0	Reference				
		n.XDDD	neserveu pa	rameter (Do no	or change.)						
Pn021	2	Reserved not chan	l parameter (Do ge.)	-	-	0000h	All	_	-	-		
Pn022	2	Reserved not chan	l parameter (Do ge.)	-	-	0000h	All	_	-	-		
	2			0000h to 0011h	-	0000h	All	After restart	Setup	-		
	n	.000X	Semi-closed/Fully-closed Loop Control Switching Selection 0 Disable Semi-closed/Fully-closed Loop Control Switching. 1 Enable Semi-closed/Fully-closed Loop Control Switching. Encoder Divided Pulses Output Method Selection during Fully-closed									
Pn02A	Loop		Loop Control Durir positi of Ele Pn2 ² 1 Durir positi	ng fully-closed le ion feedback fre ectronic Gear F IC) after conver ng fully-closed le ion feedback fre value of Pn281.	Page 4-15							
	n. DXDD Reserved parameter (Do not change.)											
	n.XDDD Reserved parameter (Do not change.)											
Pn040	2	(Do not c	on Function	- 0000h to 1111h	-	0000h 0000h	– All	– After restart	– Setup	- *1		
Pn081	Phase-C Pulse Output Selection 0 Output phase-C pulses only in the forward direction. 1 Output phase-C pulses in both the forward and reverse directions. n.□□X□ Reserved parameter (Do not change.) n.□X□□ Reserved parameter (Do not change.)								ns.			
		n.XDDD	· ·	rameter (Do no		,		Immedi-				
Pn100	2	Speed Lo	op Integral	10 to 20,000	0.1 Hz	400	All	ately Immedi-	Tuning	*1		
Pn101	2	Time Cor	nstant	15 to 51,200		2000	All	ately Immedi-	Tuning	*1		
Pn102	2	Position I	Loop Gain	10 to 20,000	0.1/s	400	All	ately	Tuning	*1		

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Parameter No.	Size	N	Name			Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence	
Pn103	2	Moment of	Inertia Ra	tio	0 to 20,000	1%	100	All	Immedi- ately	Tuning	*1	
Pn104	2	Second Sp Gain	cond Speed Loop in		10 to 20,000	0.1 Hz	400	All	Immedi- ately	Tuning	*1	
Pn105	2	Second Sp Integral Tin			15 to 51,200	0.01 ms	2000	All	Immedi- ately	Tuning	*1	
Pn106	2	Second Po Gain	sition Loo	р	10 to 20,000	0.1/s	400	All	Immedi- ately	Tuning	*1	
Pn109	2	Feedforwa	rd		0 to 100	1%	0	All	Immedi- ately	Tuning	*1	
Pn10A	2	Feedforwar Constant	Feedforward Filter Time Constant			0.01 ms	0	All	Immedi- ately	Tuning	*1	
	2	Gain Applic tions	cation Sele	C-	0000h to 5334h	_	0000h	All	_	Setup	Ι	
			1					· · · · ·				
			Mode Sw	vitch	ing Selection				When Enabled	Refere	nce	
			0		e the internal to el setting: Pn10		ence as th	e condition				
		n.□□□X	1		e the speed refe : Pn10D).	erence as	the condit	ion (level set-				
			2		e the accelerati ting: Pn10E).	on referen	ce as the o	condition (leve	el Immedi ately	*1	*1	
Pn10B			3		e the position d g: Pn10F).	leviation a	s the cond	ndition (level set-				
			4	Do	not use mode		Reference					
			Speed Loop Control Method							Refere	Reference	
		n.DDXD	0	control	After	*1						
			2 and 3 Reserved settings (Do not use.)									
		n.□X□□ Reserved parameter (Do not change.)										
	n.XDDD Reserved parameter (Do not change.)											
Pp10C	2	Mode Swit	ching Leve	el	0 to 800	1%	200	All	Immedi-	Tuning	*1	
Pn10C Pn10D	2	for Torque Mode Swit	ching Leve	el	0 to 10,000	1 min ⁻¹	0	All Rotary	ately Immedi-	Tuning	*1	
		for Speed Mode Swit					-		ately Immedi-		*1	
Pn10E	2	for Acceler	ation		0 to 30,000	1 min ⁻¹ /s 1 refer-	0	Rotary	ately	Tuning	.1	
Pn10F	2	Mode Swit for Positior			0 to 10,000	ence unit	0	All	Immedi- ately	Tuning	*1	
Pn11F	2	Position Int Constant	tegral Time	9	0 to 50,000	0.1 ms	0	All	Immedi- ately	Tuning	*1	
Pn121	2	Friction Co Gain	mpensatic	n	10 to 1,000	1%	100	All	Immedi- ately	Tuning	*1	
Pn122	2	Second Fri		-	10 to 1,000	1%	100	All	Immedi- ately	Tuning	*1	
Pn123	2	Friction Co Coefficient		'n	0 to 100	1%	0	All	Immedi- ately	Tuning	*1	
Pn124	2	Friction Co Frequency			-10,000 to 10,000	0.1 Hz	0	All	Immedi- ately	Tuning	*1	
Pn125	2	Friction Co Gain Corre		n	1 to 1,000	1%	100	All	Immedi- ately	Tuning	*1	
Pn131	2	Gain Switc	hing Time	1	0 to 65,535	1 ms	0	All	Immedi- ately	Tuning	*1	
Pn132	2	Gain Switc	hing Time	2	0 to 65,535	1 ms	0	All	Immedi- ately	Tuning	*1	
		1			1	1		1	Continue		+	

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							Cor	ntinued fron	n previou:	s page			
Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence			
Pn135	2	Gain Swito Time 1	ching Waiting	0 to 65,535	1 ms	0	All	Immedi- ately	Tuning	*1			
Pn136	2	Gain Swito Time 2	ching Waiting	0 to 65,535	1 ms	0	All	Immedi- ately	Tuning	*1			
	2	Automatic ing Selecti	Gain Switch- ons 1	0000h to 0052h	_	0000h	All	Immedi- ately	Tuning	*1			
			Gain Switch	ing Selection									
			0 Th	se manual gain s ne gain is switch als (SVCMD_IO).		lly with G-	SEL in the sei	rvo comman	d output s	ig-			
		n.🗆🗆 🗆 X	1 Re	eserved setting (Do not us	e.)							
			2 Th	se automatic ga ne gain settings tisfied. The gair on A is not satisf	1 switch a settings 2	utomatical	ly to 2 when a						
Pn139			Gain Switch	ing Condition A	4								
				OIN (Positioning		ion Output) signal turns	ON.					
			1 /C	OIN (Positioning	g Complet	ion Output) signal turns	OFF.					
		n.🗆🗆 X 🗆	2 /N	IEAR (Near Outp	out) signal	turns ON.							
			3 /N	3 /NEAR (Near Output) signal turns OFF.									
				osition reference			l position refe	rence input i	s OFF.				
			5 Po	osition reference	input is C	N.							
		n.¤X¤¤	Reserved p	arameter (Do no	ot change	.)							
		n.XDDD	Reserved p	arameter (Do no	ot change)							
			riccorrou p		en ange	/							
Pn13D	2	Current Ga	ain Level	100 to 2,000	1%	2000	All	Immedi-	Tuning	*1			
		Model Foll	owing Con-	0000h to				ately Immedi-					
	2		d Selections	1120h	-	0100h	All	ately	Tuning	-			
			Model Follo	wing Control S	election				Referen	се			
		n.DDDX		o not use model		control.			*1				
					0								
			-	ppression Sele					Referen	ce			
		n.🗆🗆 X 🗆		o not perform vil			acific fragman		*1				
				erform vibration		•		-					
			2 10		300000000								
Pn140			Vibration Su	appression Adju	istment S	election			Referen	се			
		n.¤X¤¤	0 tic	o not adjust vibr on of autotuning ost reference, ar	without a	host refere	tomatically du ence, autotun	uring execu- ing with a	- *1				
			1 au	djust vibration su Itotuning withou ence, and custo	t a host re				1				
			Speed Feed	lforward (VFF)/1	Forque Fe	adforward	(TEE) Selecti	ion	Referen				
				o not use model			、 ,		neieleli	Ce			
		n.XDDD		ard together.					*1				
				se model followi gether.	ng control	and speed	d/torque feed	forward	1				
		-1		-1	1	1	1	1					
Pn141	2	trol Gain	owing Con-	10 to 20,000	0.1/s	500	All	Immedi- ately	Tuning	*1			
Pn142	2	Model Foll trol Gain C	owing Con- Correction	500 to 2,000	0.1%	1000	All	Immedi- ately	Tuning	*1			
									d on nov				

Parameter Lists

Parameter	(I)			Setting	Setting	Default	Cor Applicable	tinued fron When	n previou: Classi-	s page Refer
No.	Size	N	ame	Range	Unit	Setting	Motors	Enabled	fication	ence
Pn143	2		owing Con- the Forward	I 0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	*1
Pn144	2	Model Folle trol Bias in Direction	owing Con- the Reverse	e 0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	*1
Pn145	2	Vibration S Frequency	Suppression A	¹ 10 to 2,500	0.1 Hz	500	All	Immedi- ately	Tuning	*1
Pn146	2	Vibration S Frequency	uppression B	1 10 to 2,500	0.1 Hz	700	All	Immedi- ately	Tuning	*1
Pn147	2		owing Con- Feedforward Ition	d 0 to 10,000	0.1%	1000	All	Immedi- ately	Tuning	*1
Pn148	2	ing Contro		10 to 20,000	0.1/s	500	All	Immedi- ately	Tuning	*1
Pn149	2		odel Follow- I Gain Corre	c- 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	Correction		10 to 1,000	1%	100	All	Immedi- ately	Tuning	*1
	2	Control-Re tions	lated Selec-	0000h to 0021h	-	0021h	All	After restart	Tuning	-
	_									
			Model Foll	owing Control Ty	vpe Select	ion			Refere	ence
		n.DDDX		Jse model followi	Ũ				*1	
			1 เ	Jse model followi	ng control	type 2.				
Pn14F			Tuning-les	s Type Selection					Refere	ence
11146		n.00X0	0 L	Jse tuning-less ty	pe 1.					
			1 l	Jse tuning-less ty	rpe 2.				*1	
			2 l	Jse tuning-less ty	rpe 3.					
		n.¤X¤¤	Reserved	parameter (Do no	ot change	.)				
		n.XDDD	Reserved	parameter (Do no	ot change	.)				
	2		nance Con- d Selections	0000h to 0011h	_	0010h	All	Immedi- ately	Tuning	-
	-				1				Defee	
		n.DDDX		ance Control Se		Control			Refere	ence
			-	Jse anti-resonance					*1	
				ance Control Ac				-1 - 2 -	Refere	ence
Pn160		n.□□X□	0 t	Do not adjust anti ion of autotuning eference, and cu	without a	host refere				
			1 a	djust anti-resona utotuning withou nce, and custom	t a host re					
		n.¤X¤¤	Reserved	parameter (Do no	ot change	.)				
		n.X000	Reserved	parameter (Do no	ot change	.)				
		Anti-Resor	ance Fre-					Immedi-		
Pn161	2	quency Anti-Resor		10 to 20,000	0.1 Hz	1000	All	ately Immedi-	Tuning	*1
Pn162	2	Correction		1 to 1,000	1%	100	All	ately	Tuning	*1

			Continued							s page.
Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn163	2	Anti-Resor ing Gain	ance Damp-	0 to 300	1%	0	All	Immedi- ately	Tuning	*1
Pn164	2		ance 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	ance Filter tant 2 Cor-	-1,000 to 1,000	0.01 ms	0	All	Immedi- ately	Tuning	*1
Pn166	2	Anti-Resor ing Gain 2	ance Damp-	0 to 1,000	1%	0	All	Immedi- ately	Tuning	*1
	2	Tuning-less Related Se	s Function- lections	0000h to 2711h	-	1400h	All	-	Setup	*1
										_
			Tuning-less	Selection					Whe Enab	
		n.🗆🗆 🛛 X	0 Di	sable tuning-les	s function.				Afte	er
			1 Er	able tuning-les	s function.				resta	art
			Speed Cont	rol Method					Whe	
		n.🗆🗆 X 🗆	0 Us							
Pn170			1 Us	se for speed cor	ntrol and u	se host co	ntroller for po	sition contro	Afte I. resta	
			Rigidity Lev	el					Whe	
		n.¤X¤¤			Enab Imme					
			0 to 7 Se	et the rigidity lev	el.				ate	
			Tuning-less	Load Level					Whe Enab	
		n.XDDD	0 to 2 Se	et the load level	for the tun	ing-less fu	nction.		Imme	
			II							<u> </u>
Pn205	2	Multiturn L	imit	0 to 65,535	1 rev	65535	Rotary	After restart	Setup	*1
	2	Position Co tion Select	ontrol Func- ions	0000h to 2210h	_	0010h	All	After restart	Setup	_
		n.DDDX	-	arameter (Do no	-					
		n.□□X□		arameter (Do no		,				
		n.¤X¤¤	Reserved pa	arameter (Do no	ot change.	.)				
Pn207			/COIN (Posi	tioning Comple	tion Outp	ut) Signal	Output Timin	g	Refe	
			0 sa	utput when the me or less than idth).						
		n.XDDD	1 or	utput when the a less than the se	etting of Pr	n522 (Posi	tioning Comp	leted Width)		
			Oi 2 or	utput when the second	absolute v etting of Pr	alue of the 1522 (Posi	position erro	r is the same		
			ar	d the reference	input is 0.					
Pn20A	4	Number of Encoder S	External cale Pitches	4 to 1,048,576	1 scale pitch/ revolu- tion	32768	Rotary	After restart	Setup	*1
Pn20E	4	Electronic (Numerato		1 to 1,073,741,824	1	16	All	After restart	Setup	*1
Pn210	4	Electronic	Gear Ratio	1 to 1,073,741,824	1	1	All	After restart	Setup	*1
		(Donornina		1,010,141,024	1			rostart		I

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Parameter Lists

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Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn212	4	Number of Encoder Output Pulses	16 to 1,073,741,824	1 P/Rev	2048	Rotary	After restart	Setup	*1
	2	Fully-closed Control Selections	0000h to 1003h	-	0000h	Rotary	After restart	Setup	*1
		n.DDDX Reserved	parameter (Do n	ot change.)				
Pn22A		n.DDXD Reserved	parameter (Do n	ot change.)				
		n.□X□□ Reserved	parameter (Do n	ot change.)				
		n.XDDD 0 1	ed Control Speed Use motor encod Use external enco	er speed.		n			
	2	Position Control Expa sion Function Selection		_	0000h	All	After restart	Setup	*1
Pn230		n.DDDX 0 1	Compensation D Compensate forw Compensate reve	vard referer					
		n.□□X□ Reserved	parameter (Do n	ot change.)				
		n.□X□□ Reserved	parameter (Do n	ot change.)				
		n.XDDD Reserved	parameter (Do n	ot change.)				
Pn231	4	Backlash Compensat	on -500,000 to 500,000	0.1 ref- erence units	0	All	Immedi- ately	Setup	*1
Pn233	2	Backlash Compensa- tion Time Constant	0 to 65,535	0.01 ms	0	All	Immedi- ately	Setup	*1
Pn24A	4	Electronic Gear Ratio External Encoder Cor version (Numerator)		-	1	All	After restart	Setup	page 4-14
Pn24C	4	Electronic Gear Ratio External Encoder Corversion (Denominator)	- I TO - 1073741824	-	1	All	After restart	Setup	page 4-14
Pn281	2	Encoder Output Resc tion	^{lu-} 1 to 4,096	1 edge/ pitch	20	All	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 Acceleratio Time	¹ 0 to 10,000	1 ms	0	All	Immedi- ately	Setup	*2
Pn306	2	Soft Start Deceleratio Time	0 to 10,000	1 ms	0	All	Immedi- ately	Setup	*2
Pn308	2	Speed Feedback Filte Time Constant	r 0 to 65,535	0.01 ms	0	All	Immedi- ately	Setup	*1
Pn30A	2	Deceleration Time for Servo OFF and Force Stops	d 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	_

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Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refe
	2	Vibration D Selections	etection	0000h to 0002h	-	0000h	All	Immedi- ately	Setup	*1
Pn310		n.000X n.00X0 n.0X00 n.X000	0 Do 1 Out 2 Out Reserved par	ection Selection not detect vibr tput a warning tput an alarm (rameter (Do no rameter (Do no rameter (Do no	ration. (A.911) if v A.520) if vi ot change.	bration is ())				
Pn311	2	Vibration D sitivity	etection Sen-	50 to 500	1%	100	All	Immedi- ately	Tuning	*1
Pn312	2	Vibration D Level	etection	0 to 5,000	1 min ⁻¹	50	Rotary	Immedi- ately	Tuning	*1
Pn316	2	Maximum I	Notor Speed	0 to 65,535	1 min ⁻¹	10000	Rotary	After restart	Setup	*1
Pn324	2		Inertia Cal- arting Level	0 to 20,000	1%	300	All	Immedi- ately	Setup	*1
Pn401	2	First Stage Reference Constant	First Torque Filter Time	0 to 65,535	0.01 ms	100	All	Immedi- ately	Tuning	*1
Pn402	2	Forward To	orque Limit	0 to 800	1%*3	800	Rotary	Immedi- ately	Setup	*1
Pn403	2	Reverse To	orque Limit	0 to 800	1% ^{*3}	800	Rotary	Immedi- ately	Setup	*1
Pn404	2	Forward Ex Limit	Forward External Torque ∟imit		1%*3	100	All	Immedi- ately	Setup	*1
Pn405	2	Reverse Ex Limit	ternal Torque	0 to 800	1%*3	100	All	Immedi- ately	Setup	*1
Pn406	2	Emergency	/ Stop Torque	0 to 800	1% ^{*3}	800	All	Immedi- ately	Setup	*1
Pn407	2	Speed Lim Torque Cor		0 to 10,000	1 min ⁻¹	10000	Rotary	Immedi- ately	Setup	*1
	2	Torque-Rel tion Select	ated Func- ions	0000h to 1111h	-	0000h	All	-	Setup	-
		n.000X		Selection 1 able first stage able first stage				When Enabled Immedi- ately	-	nce
			Speed Limit	Selection				When Enabled	Refere	nce
² n408		n.00X0	u seti	e the smaller of ting of Pn407 a e the smaller of	as the spec f the overs	ed limit. peed alarn	n detection	e After restart	*1	
			Notch Filter S	eed and the set	tting of Ph	407 as the	speed limit.	When Enabled	Refere	nce
		n.¤X¤¤		able second st able second sta	0			Immedi- ately	*1	
			Friction Com	pensation Fun	ction Sele	ction		When Enabled	Refere	nce
		n.XDDD	0 Dis	able friction co	mpensatic	n.		Immedi-	*1	

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Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn409	2	First Stage Frequency	Notch Filt	er	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 Sta ter Frequer		Fil-	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn40D	2	Second Sta ter Q Value		Fil-	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn40E	2	Second Sta ter Depth	age Notch	Fil-	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn40F	2	Second Sta Torque Ref Frequency			100 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn410	2	Second Sta Torque Ref Q Value			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
	2	Torque-Rel tion Select		-	0000h to 1111h	_	0000h	All	Immedi- ately	Setup	*1
Pn416		n.000X	0 1 Notch Fil 0	Disa Ena ter S Disa	Selection 3 able third stage able third stage Selection 4 able fourth stag	notch filte ge notch fi	er. Iter.				
		n.0X00	1 Notch Fil 0 1	ter S Disa	able fourth stag Selection 5 able fifth stage able fifth stage	notch filte	r.				
		n.XOOO	Reserved	l pai	rameter (Do no	ot change.)				
Pn417	2	Third Stage Frequency	e Notch Fil	ter	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn418	2	Third Stage Q Value	e Notch Fil	ter	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn419	2	Third Stage Depth	e Notch Fil	ter	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn41A	2	Fourth Stag		-il-	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn41B	2	Fourth Star ter Q Value		Fil-	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn41C	2	Fourth Stag ter Depth	ge Notch F	-il-	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*1
Pn41D	2	Fifth Stage Frequency	Notch Filt	er	50 to 5,000	1 Hz	5000	All	Immedi- ately	Tuning	*1
Pn41E	2	Fifth Stage Q Value	Notch Filt	er	50 to 1,000	0.01	70	All	Immedi- ately	Tuning	*1
Pn41F	2	Fifth Stage Depth	Notch Filt	er	0 to 1,000	0.001	0	All	Immedi- ately	Tuning	*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	Speed Ripp sation Sele	ple Compen- ections	0000h to 1111h	-	0000h	Rotary	-	Setup	*1
			Speed Ripple	e Compensatio	on Functio	n Selectio	'n		Whe Enab	
		n.DDDX		able speed ripp able speed ripp					Imme atel	
				e Compensatio	•		greement Wa	rning Detec-	Whe Enab	
Pn423		n.🗆🗆 X 🗆		ect A.942 alar	ms.				Afte	
			1 Do	not detect A.9	42 alarms				resta	
			Speed Ripple	e Compensatio	on Enable	Condition	Selection		Whe Enabl	
		n.¤X¤¤	0 Spe	eed reference					Afte	r
			1 Mo	tor speed					resta	ırt
		n.XDDD	Reserved pa	rameter (Do no	ot change.	.)				
						,				
Pn424	2	Torque Lim cuit Voltage	iit at Main Cir- e Drop	0 to 100	1%*3	50	All	Immedi- ately	Setup	*1
Pn425	2	Release Tir Limit at Ma Voltage Dro		0 to 1,000	1 ms	100	All	Immedi- ately	Setup	*1
Pn426	2	Torque Fee Average M Time		0 to 5,100	0.1 ms	0	All	Immedi- ately	Setup	-
Pn427	2	Speed Rip sation Enal	ple Compen- ble Speed	0 to 10,000	1 min ⁻¹	0	Rotary	Immedi- ately	Tuning	*1
Pn456	2	Sweep Tor ence Ampl		1 to 800	1%	15	All	Immedi- ately	Tuning	*1
	2	Notch Filte Selections	r Adjustment 1	0000h to 0101h	-	0101h	All	Immedi- ately	Tuning	*1
				Adjustment Se						
		n.DDDX	0 tun	not adjust the ing without a h ing.						
				ust the first standard						
Pn460		n.DDXD	Reserved pa	rameter (Do no	ot change.	.)				
1 11400			Notch Filter	Adjustment Se	lection 2					
				not adjust the		age notch	filter automat	ically during	execution	of
		n.¤X¤¤	0 aut	otuning withou tom tuning.						
			1 ing	ust the second without a host ing.						
		n.XDDD	Reserved pa	rameter (Do no	ot change.)				

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Parameter No.	Size	١	Jame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer ence
	2	Gravity Co Related S	ompensation- elections	0000h to 0001h	_	0000h	All	After restart	Setup	*1
	-	1		1	I	I	1			
			Gravity Com	pensation Sele	ection					
		n.DDDX	0 Dis	able gravity co	mpensatic	on.				
Pn475			1 Ena	able gravity cor	npensatio	n.				
		n.DDXD	Reserved pa	rameter (Do no	ot change.	.)				
		n.¤X¤¤	Reserved pa	rameter (Do no	ot change.	.)				
		n.XDDD	Reserved pa	rameter (Do no	ot change.	.)				
				1.000.1						1
Pn476	2	Gravity Co Torque	ompensation	-1,000 to 1,000	0.1%	0	All	Immedi- ately	Tuning	*1
Pn502	2	Rotation D	Detection Level	1 to 10,000	1 min ⁻¹	20	Rotary	Immedi- ately	Setup	*1
Pn503	2	Speed Co Detection Width	incidence Signal Output	0 to 100	1 min ⁻¹	10	Rotary	Immedi- ately	Setup	*1
Pn506	2	Brake Ref OFF Delay	erence-Servo / Time	0 to 50	10 ms	0	All	Immedi- ately	Setup	*1
Pn507	2	Brake Ref put Speed	erence Out- I Level	0 to 10,000	1 min ⁻¹	100	Rotary	Immedi- ately	Setup	*1
Pn508	2	Servo OFF mand Wai	-Brake Com- ting Time	10 to 100	10 ms	50	All	Immedi- ately	Setup	*1
Pn509	2	Momentar ruption Ho	y Power Inter- old Time	20 to 50,000	1 ms	20	All	Immedi- ately	Setup	*1
	2	Input Sign 1	al Selections	0000h to FFF2h	-	1881h	All	After restart	Setup	-
		L			1	I	1		l	1
		n.000X	Reserved pa	rameter (Do no	ot change.	.)				
		n.DDXD	Reserved pa	rameter (Do no	ot change.	.)				
		n.¤X¤¤	Reserved pa	rameter (Do no	ot change.	.)				
			P-OT (Forwa	rd Drive Prohit	oit) Signal	Allocation	1		Refere	ence
			0 Enable	e forward drive	when CN1	-13 input	signal is ON (closed).		
				e forward drive			5	,		
				e forward drive						
Pn50A				e forward drive			· ·			
IJUA				e forward drive			0	,		
				e forward drive			-			
				e forward drive			÷ .	closed).		
		n.XDDD		e signal to alwa	, ,				*1	
				e signal to alwa	-			(opop)		
				e forward drive			-			
				forward drive		•	0	. ,		
				e forward drive			•		_	
				forward drive			•			
				e forward drive			-			
						i i input	orginal to OFT	, opony.		
			F Enable	e forward drive	when CNH	-12 innut	signal is OFF	(onen)		

Continued from previous page.

Parameter	Size	N	ame	Setting	Setting	Default	Applicable	When	Classi-	Refe
No.	S	Innut Cign	ol Coloction	Range	Unit	Setting	Motors	Enabled	fication	enc
	2	2	al Selection	s 0000h to FFFFh	-	8882h	All	After restart	Setup	-
	Ι.									
				/erse Drive Prohi					Refere	ence
				Enable reverse dr			•	· · ·		
				Enable reverse dr			-			
				Enable reverse dr			-			
				Enable reverse dr			0	()		
				Enable reverse dr			8	, ,		
				Enable reverse dr			8	, ,		
		~ 000V		Enable reverse dr			-	in (closed).		
		n.🗆 🗆 🗆 X		Set the signal to a					*1	
				Set the signal to a Enable reverse dr	-			EE (opop)		
				Enable reverse dr						
				Enable reverse dr			0	(1)		
				Enable reverse dr						
			-	Enable reverse dr			0	,		
				Enable reverse dr						
						21 1 1 1 1 1 1 1 1 1 1 1	at olgi lui 10 O	ri (opon).		
			F	Enable reverse dr	ive when (N1-12 inc	ut signal is O	FE (open)		
				Enable reverse dr			ut signal is O	FF (open).		
n50B		n.DDXD		Enable reverse dr parameter (Do n			ut signal is O	FF (open).		
n50B		n.□□X□	Reserved		ot change	.)			Refere	ence
n50B		n.□□X□	Reserved /P-CL (Fo 0	parameter (Do n rward External To Active when CN1	ot change orque Limi -13 input s	.) t Input) Signal is ON	gnal Allocatic I (closed).		Refere	ence
n50B		n.□□X□	Reserved /P-CL (Fo 0 1	parameter (Do n rward External To	ot change orque Limi -13 input s	.) t Input) Signal is ON	gnal Allocatic I (closed).		Refere	ence
n50B		n.□□X□	Reserved /P-CL (Fo 0 1 2	parameter (Do n rward External To Active when CN1 Active when CN1 Active when CN1	ot change orque Limi -13 input si -7 input si -8 input si	t Input) Sig signal is ON gnal is ON	gnal Allocatic I (closed). (closed). (closed).		Refere	ence
n50B		n.□□X□	Reserved /P-CL (Fo 0 1 2 3	parameter (Do n rward External To Active when CN1 Active when CN1 Active when CN1 Active when CN1	ot change orque Limi -13 input s -7 input sig -8 input sig -9 input sig	t Input) Sig signal is ON gnal is ON gnal is ON gnal is ON	gnal Allocatic J (closed). (closed). (closed). (closed).		Refere	ence
n50B		n.□□X□	Reserved /P-CL (Fo 0 1 2 3 4	parameter (Do n rward External To Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1	ot change orque Limi -13 input s -7 input sig -8 input sig -9 input sig -10 input s) signal is ON gnal is ON gnal is ON gnal is ON gnal is ON	gnal Allocatic J (closed). (closed). (closed). (closed). J (closed).		Refere	ence
n50B		n.□□X□	Reserved /P-CL (Fo 0 1 2 3 4 5	parameter (Do n rward External To Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1	ot change prque Limi -13 input si -7 input si -8 input si -9 input si -10 input s -11 input s) t Input) Sig signal is ON gnal is ON gnal is ON signal is ON signal is ON	gnal Allocatic V (closed). (closed). (closed). (closed). V (closed).		Refere	ence
n50B			Reserved /P-CL (Fo 0 1 2 3 4 5 6	parameter (Do n rward External To Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1	ot change -13 input sig -7 input sig -8 input sig -9 input sig -10 input s -11 input s -12 input s) t Input) Sig signal is ON gnal is ON gnal is ON signal is ON signal is ON	gnal Allocatic V (closed). (closed). (closed). (closed). V (closed).		Refere	ence
n50B		n.□X□	Reserved /P-CL (Fo 0 1 2 3 4 5 6 7	parameter (Do n rward External To Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1 The signal is alwa	ot change -13 input sig- -7 input sig- -8 input sig- -9 input sig- -10 input sig- -11 input sig- -12 input sig- ys active.) signal is ON gnal is ON gnal is ON gnal is ON signal is ON signal is ON signal is ON	gnal Allocatic V (closed). (closed). (closed). (closed). V (closed).		Refere	ence
n50B			Peserved /P-CL (Fo 0 1 2 3 4 5 6 7 8	parameter (Do n rward External To Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1 The signal is alwa The signal is alwa	ot change orque Limi -13 input sig -7 input sig -8 input sig -9 input sig -10 input sig -11 input sig -12 input sig ys active.	t Input) Sig signal is ON gnal is ON gnal is ON gnal is ON signal is ON signal is ON	gnal Allocatic J (closed). (closed). (closed). J (closed). J (closed). J (closed). J (closed).			ence
n50B			Reserved /P-CL (Fo 0 1 2 3 4 5 6 7 8 9	parameter (Do n rward External To Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1 The signal is alwa Active when CN1	ot change -13 input sig- -7 input sig- -8 input sig- -9 input sig- -10 input sig- -11 input sig- -12 input sig- ys active. ys inactive- -13 input sig-	t Input) Sig signal is ON gnal is ON gnal is ON signal is ON signal is ON signal is ON signal is ON	gnal Allocatic J (closed). (closed). (closed). J (closed). J (closed). J (closed). J (closed). F (open).			ence
n50B			Reserved /P-CL (Fo 0 1 2 3 4 5 6 7 8 9 A	parameter (Do n rward External To Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1 The signal is alwa The signal is alwa Active when CN1 Active when CN1	ot change orque Limi -13 input si -7 input si -8 input si -9 input si -10 input si -11 input s -12 input si ys active. -13 input si -7 input si	t Input) Sig signal is ON gnal is ON gnal is ON gnal is ON signal is ON signal is ON signal is ON signal is OF signal is OFF	gnal Allocatic (closed). (closed). (closed). (closed). (closed). (closed). (closed). (closed). (closed). (closed).			ence
n50B			Reserved /P-CL (Fo 0 1 2 3 4 5 6 7 8 9 A B	parameter (Do n rward External To Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1 Active when CN1 The signal is alwa Active when CN1 Active when CN1 Active when CN1 Active when CN1	ot change orque Limi -13 input sig -7 input sig -8 input sig -9 input sig -10 input sig -11 input sig -12 input sig ys active -13 input sig -8 input sig	t Input) Sig signal is ON gnal is ON gnal is ON signal is ON signal is ON signal is ON signal is ON signal is OFF gnal is OFF	gnal Allocatic (closed). (close			ence
n50B			Reserved /P-CL (Fo 0 1 2 3 4 5 6 7 8 9 A B C	parameter (Do n rward External To Active when CN1 Active when CN1	ot change orque Limi -13 input sig -7 input sig -9 input sig -9 input sig -10 input sig -11 input sig -12 input sig -13 input sig -8 input sig -9 input sig	t Input) Sig signal is ON gnal is ON gnal is ON signal is ON signal is ON signal is ON signal is OF gnal is OFF gnal is OFF	gnal Allocatic (closed). (close			ence
n50B			Reserved /P-CL (Fo 0 1 2 3 4 5 6 7 8 9 A B C D	parameter (Do n rward External To Active when CN1 Active when CN1	ot change orque Limi -13 input sig -7 input sig -9 input sig -9 input sig -10 input sig -12 input sig -12 input sig -13 input sig -8 input sig -9 input sig -10 input sig	t Input) Sig signal is ON gnal is ON gnal is ON signal is ON signal is ON signal is ON signal is OF gnal is OFF gnal is OFF gnal is OFF	gnal Allocatic J (closed). (closed). (closed). J (closed). J (clos			ence
n50B			Reserved /P-CL (Fo 0 1 2 3 4 5 6 7 8 9 A B C D E	parameter (Do n rward External To Active when CN1 Active when CN1	ot change prque Limi -13 input si -7 input si -8 input si -9 input si -10 input si -11 input si -12 input si ys active. ys inactive -13 input si -7 input si -8 input si -9 input si -10 input si	t Input) Sig signal is ON gnal is ON gnal is ON gnal is ON signal is ON signal is ON signal is OF gnal is OFF gnal is OFF gnal is OFF gnal is OFF gnal is OFF	gnal Allocation (closed). (clos			ence
n50B			Reserved /P-CL (Fo 0 1 2 3 4 5 6 7 8 9 A B C D E	parameter (Do n rward External To Active when CN1 Active when CN1	ot change prque Limi -13 input si -7 input si -8 input si -9 input si -10 input si -11 input si -12 input si ys active. ys inactive -13 input si -7 input si -8 input si -9 input si -10 input si	t Input) Sig signal is ON gnal is ON gnal is ON gnal is ON signal is ON signal is ON signal is OF gnal is OFF gnal is OFF gnal is OFF gnal is OFF gnal is OFF	gnal Allocation (closed). (clos			ence
n50B			Reserved /P-CL (Fo 0 1 2 3 4 5 6 7 8 9 A B C D E F /N-CL (Ret	parameter (Do n rward External To Active when CN1 Active when CN1	ot change prque Limi -13 input si -7 input si -8 input si -9 input si -10 input si -11 input si -12 input si -13 input si -8 input si -9 input si -9 input si -10 input si	t Input) Sig signal is ON gnal is ON gnal is ON gnal is ON signal is ON signal is ON signal is OF gnal is OFF gnal is OFF	gnal Allocation (closed). (clos	pn		

Continued on next page.

	0 Di 1 0 2 0 3 0 4 to 6 Re	Setting Range 0000h to 6666h itioning Comple isabled (the abov utput the signal utput the signal utput the signal eserved settings	ve signal o from the C from the C	output is no N1-1 or C	ot used).	Enabled After restart	Classi- fication Setup Refere	Refer- ence _				
.DDDX	/COIN (Pos 0 Di 1 O 2 O 3 O 4 to 6 Ri	itioning Comple isabled (the above utput the signal utput the signal utput the signal	ve signal o from the C from the C	ut) Signal / output is nc CN1-1 or C	Allocation ot used).	restart		nce				
	0 Di 1 0 2 0 3 0 4 to 6 Re	isabled (the above utput the signal utput the signal utput the signal	ve signal o from the C from the C	output is no N1-1 or C	ot used).	torminal	Refere	nce				
	0 Di 1 0 2 0 3 0 4 to 6 Re	isabled (the above utput the signal utput the signal utput the signal	ve signal o from the C from the C	output is no N1-1 or C	ot used).	terminal	Refere	nce				
	1 0 2 0 3 0 4 to 6 R	utput the signal utput the signal utput the signal	from the C from the C	N1-1 or C	,	terminal						
	2 0 3 0 4 to 6 R	utput the signal utput the signal	from the C		NT-2 output							
.00X0	3 O 4 to 6 R	utput the signal		111-20 01 0			*1					
	4 to 6 R			N1-25 or (_ `					
.00X0	/V-CMP (Sc		(Do not us				_					
		beed Coincidend	ce Detectio	on Output)) Signal Alloc	ation	Refere	ence				
		ne allocations are on) signal allocat		e as the /C	OIN (Position	ing Comple-	*1					
	/TGON (Rot	tation Detection	Output) S	Signal Allo	cation		Refere	ence				
n.□X□□ /TGON (Rotation Detection Output) Signal Allocation 0 to 6 The allocations are the same as the /COIN (Positioning Completion) signal allocations.							*1					
							Refere	ence				
N.XDDD /S-RDY (Servo Ready) Signal Allocation 0 to 6 The allocations are the same as the /COIN (Positioning Completion) signal allocations.												
Output Sig tions 2	gnal Selec-	0000h to 6666h	-	0100h	All	After restart	Setup	-				
	· · ·	e Limit Detectio	. ,	•			Refere	nce				
		isabled (the abov	0	•	,		_					
		utput the signal					*1					
		utput the signal										
 3 Output the signal from the CN1-25 or CN1-26 output terminal. 4 to 6 Reserved settings (Do not use.) 							_					
				,			Refere	ence				
	n.□□X□ 0 to 6 The allocations are the same as the /CLT (Torque Limit Detection Output) signal allocations.						*1					
x	O to 6		0410115.		/BK (Brake Output) Signal Allocation							
x	0 to 6 O	utput) signal allo					Reference 1 *1					
	0 to 6 Th 0 BK (Brake	utput) signal allo	Allocation e the same	e as the /C	LT (Torque Li	mit Detection	*1					
	0 to 6 Th O /BK (Brake 0 0 to 6 Th O	utput) signal allo Output) Signal A	Allocation e the same cations.		LT (Torque Li	mit Detection	*1 Refere	nce				
. 🗆 🛙	םאם		Output signaraio				/BK (Brake Output) Signal Allocation					

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								Cor	ntinued from	n previou	s pag		
Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refe enc		
	2	Output Sig tions 3	nal Selec-		0000h to 0666h	-	0000h	All	After restart	Setup	_		
	Ι.			Noar (Jutout) Signa					Refere	nco		
				1	Dutput) Signa			at used)		neiere	ince		
			1		bied (the above but the signal	Ũ		,	terminal				
		n.🗆 🗆 🗆 X	2	•	but the signal					*1			
Pn510			3	-	out the signal								
			4 to 6		erved settings			0111 20 0atp					
		n.DDXD			ameter (Do no		,						
		n.¤X¤¤			ameter (Do no	-	,						
		n.X000			ameter (Do no	-							
		T	•					I	I				
	2	Input Signa 5	al Selection	ns	0000h to FFFFh	-	6543h	All	After restart	Setup	*1		
		-1				1	I		1				
			/DEC (Or	rigin F	Return Decele	eration Sw	vitch Input)) Signal Alloc	ation				
			0		ve when CN1-		0	()					
			1		ve when CN1-		-						
			2		ve when CN1-		-						
				3 Active when CN1-9 input signal is ON (closed).									
			4		ve when CN1-		-						
			5		ve when CN1-		0	, ,					
		n.000X	6		e when CN1-		signal is Of	N (Closed).					
			7		signal is alway								
			8		signal is alway /e when CN1-			E (opop)					
			A		ve when CN1-		-						
			B		ve when CN1-		-						
			C		ve when CN1-								
			D		ve when CN1-		,	()					
Pn511			E		ve when CN1-		0						
11511			F		ve when CN1-		-						
			/EXT1 (E	xtern	al Latch Input	t 1) Signal	Allocation	า					
			0 to 3	The	signal is alway	ys inactive							
			4		ve when CN1-		÷						
			5		ve when CN1-		5	()					
		n.🗆 🗆 X 🗆	6		ve when CN1-		-						
			D		ve when CN1-		-						
			E		ve when CN1-		-						
			F		e when CN1-		-	-⊢ (open).					
			7 to C		signal is alway								
			/EXT2 (E		al Latch Input								
		n.¤X¤¤	0 to F	The catio	allocations are	e the same	e as the /E	XT1 (External	Latch Input	1) signal a	allo-		
		n.X000	/EXT3 (E		al Latch Input	t 3) Signal	Allocation	ı					

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							Con	tinued 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 Settings	jnal Inverse	0000h to 1111h	-	0000h	All	After restart	Setup	*1
			Output Sig	nal Inversion for	CN1-1 ar	nd CN1-2	Terminals			
		n.🗆🗆 🗆 X	0 T	he signal is not ir	nverted.					
			1 T	he signal is inver	ted.					
			Output Sig	nal Inversion for	CN1-23 a	and CN1-2	4 Terminals			
Pn512		n.🗆🗆 X 🗆		he signal is not ir						
			1 T	he signal is inver	ted.					
			Output Sig	nal Inversion for	CN1-25 a	and CN1-2	6 Terminals			
		n.¤X¤¤	0 T	he signal is not ir	nverted.					
			1 T	he signal is inver	ted.					
		n.XDDD	Reserved p	arameter (Do no	ot change)				
	2	Output Sig tions 4	inal Selec-	0000h to 0666h	-	0000h	All	After restart	Setup	-
		n.🗆 🗆 🛛 X	Reserved p	arameter (Do no	ot change)				
		n.DDXD	Reserved p	arameter (Do no	ot change)				
			/PM (Preve	ntative Maintena	ance Outp	ut) Signal	Allocation		Refere	ence
Pn514			0 0	isabled (the abo	ve signal c	output is no	ot used).			
		n.¤X¤¤	1 C	utput the signal	from the C	N1-1 or C	N1-2 output	terminal.		
			2 C	utput the signal	from the C	N1-23 or	CN1-24 outpu	ut terminal.	*1	
			3 C	utput the signal	from the C	N1-25 or	CN1-26 outpu	ut terminal.		
			4 to 6 R	eserved settings	(Do not u	se.)				
		n.XDDD	Reserved p	arameter (Do no	ot change)				

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Parameter					-		Cor			
No.	Size	1	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer ence
	2	Input Sigr 7	nal Selections	0000h to FFFFh	-	8888h	All	After restart	Setup	_
		1		- I	1	1	I	I.		1
			FSTP (Force	d Stop Input) Si	gnal Alloc	ation			Refere	ence
			0 Ei	nable drive wher	n CN1-13	input signa	al is ON (close	ed).		
			1 Ei	nable drive wher	n CN1-7 ir	nput signal	is ON (closed	d).		
			2 Ei	nable drive wher	n CN1-8 ir	nput signal	is ON (closed	d).		
			3 Ei	nable drive wher	n CN1-9 ir	nput signal	is ON (closed	d).		
				nable drive wher	n CN1-10	input signa	al is ON (close	ed).		
				hable drive wher		1 0		,		
				hable drive wher						
	n	.000X	/ st	et the signal to a op).					*1	
Pn516				et the signal to a otor to stop).	always ena	able drive (a	always disabl	e forcing the		
			9 Ei	nable drive wher	n CN1-13	input signa	al is OFF (ope	n).		
				hable drive wher				,	_	
				hable drive wher		1 0	× 1	,		
				hable drive wher				,		
				hable drive wher					_	
				hable drive wher				-	_	
	-		F Ei	hable drive wher	1 GN1-12	input signa	ai is UFF (ope	rı).		
	n.□□X□ n.□X□□		Reserved pa	rameter (Do not	t change.)					
	n	.0X00	Reserved pa	rameter (Do not	t change.)					
	n	.X000	Reserved pa	rameter (Do not	t change.)					
Pn518 ^{*4}	-	Safety Mo Paramete	odule-Related ers	-	-	-	All	-	-	-
Pn51B	4	Motor-Loa Deviation Detection		0 to 1,073,741,824	1 refer- ence unit	1000	Rotary	Immedi- ately	Setup	*1
Pn51E	2		Deviation Over-	10 to 100	1%	100	All	Immedi-	Setup	*1
			-		1 refer-			ately		
Pn520	4	Position [flow Alarr	Deviation Over- n Level	1 to 1,073,741,823	ence unit	524288 0	All	Immedi- ately	Setup	*1
Pn522	4	Positionin Width	ng Completed	0 to 1,073,741,824	1 refer- ence unit	7	All	Immedi- ately	Setup	*1
Pn524	4	Near Sigr	nal Width	1 to 1,073,741,824	1 refer- ence unit	107374 1824	All	Immedi- ately	Setup	*1
Pn526	4		Deviation Over- n Level at I	1 to 1,073,741,823	1 refer- ence unit	524288 0	All	Immedi- ately	Setup	*1
Pn528	2		Deviation Over- ning Level at I	10 to 100	1%	100	All	Immedi- ately	Setup	*1
Pn529	2	Speed Lir Servo ON	mit Level at I	0 to 10,000	1 min ⁻¹	10000	Rotary	Immedi- ately	Setup	*1
Pn52A	2	Multiplier closed Ro	per Fully- otation	0 to 100	1%	20	Rotary	Immedi- ately	Tuning	*1
		Overload	Warning Level	1 to 100	1%	20	All	Immedi- ately	Setup	*1
Pn52B	2									

Parameter Lists

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								tinued fron	1	
Parameter No.	Size	N	ame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Program Je Related Se		0000h to 0005h	-	0000h	All	Immedi- ately	Setup	*1
				1			I			
			<u> </u>	ging Operation						
				aiting time in Pr vements in Pn		prward by t	travel distance	e in Pn531)>	< Number	of
				aiting time in Pr vements in Pn		everse by t	ravel distance	e in Pn531) >	< Number	of
			2 mo (Wa	aiting time in Pr vements in Pn aiting time in Pr vements in Pn	536 1535 → Re			,		
Pn530		n.□□□X	3 mo (Wa	aiting time in Pr vements in Pn{ aiting time in Pr vements in Pn{	536 1535 → Fo	-		,		
			4 in F	aiting time in Pr Pn535 → Rever 536	n535 → Fo rse by trav	orward by t el distance	ravel distance e in Pn531) ×	e in Pn531 – Number of n	 Waiting t novements 	ime s in
			5 İn F	aiting time in Pr Pn535 → Forwa 536						
		n.DDXD	Reserved pa	rameter (Do no	ot change.	.)				
		n.¤X¤¤	Reserved pa	rameter (Do no	ot change.	.)				
		n.X000	Reserved pa	rameter (Do no	ot change.	.)				
Pn531	4	Program Je Distance	ogging Travel	1 to 1,073,741,824	1 refer- ence unit	32768	All	Immedi- ately	Setup	*1
Pn533	2	Program Jo ment Spee	ogging Move- d	1 to 10,000	Rotary: 1 min ⁻¹ Direct Drive: 0.1 min ⁻¹	500	Rotary	Immedi- ately	Setup	*1
Pn534	2	Program Je eration/De Time	ogging Accel- celeration	2 to 10,000	1 ms	100	All	Immedi- ately	Setup	*1
Pn535	2	Program Jo ing Time	ogging Wait-	0 to 10,000	1 ms	100	All	Immedi- ately	Setup	*1
Pn536	2	Program Je ber of Mov	ogging Num- ements	0 to 1,000	1 time	1	All	Immedi- ately	Setup	*1
Pn550	2	Analog Mo Voltage	nitor 1 Offset	-10,000 to 10,000	0.1 V	0	All	Immedi- ately	Setup	*1
Pn551	2	Analog Mo Voltage	nitor 2 Offset	-10,000 to 10,000	0.1 V	0	All	Immedi- ately	Setup	*1
Pn552	2	Analog Mo nification	nitor 1 Mag-	-10,000 to 10,000	× 0.01	100	All	Immedi- ately	Setup	*1
Pn553	2	Analog Mo nification	nitor 2 Mag-	-10,000 to 10,000	× 0.01	100	All	Immedi- ately	Setup	*1
Pn55A	2	Power Cor Monitor Ur	isumption it Time	1 to 1,440	1 min	1	All	Immedi- ately	Setup	-
Pn560	2	Residual V Detection V		1 to 3,000	0.1%	400	All	Immedi- ately	Setup	*1
Pn561	2	Overshoot Level	Detection	0 to 100	1%	100	All	Immedi- ately	Setup	*1

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Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refe
	2	Output Sig Method Se	gnal Referen elections 1	•	-	0000h	All	After restart	Setup	*1
		1				I	I	I	1	
			· ·	ut Signal Referer						
		n.🗆 🗆 🗆 X		Output parameter	Ŭ	Ű				
			1	Output OR of para	ameter-ass	signed SO ⁻	1 signal and s	ignal set by	SVCMD_I	Э.
			SO2 Outp	ut Signal Referer	ice Metho	d Selectio	n			
Pn56A		n.🗆🗆 X 🗆		Output parameter	0	0				
			1	Output OR of para	ameter-ass	signed SO2	2 signal and s	ignal set by	SVCMD_I	Э. <u> </u>
			SO3 Outp	ut Signal Referer	ice Metho	d Selectio	n			
		n.🗆X🗆 🗆	0	Output parameter	-assigned	SO3 signa	ıl.			
			1	Output OR of para	ameter-ass	signed SO	3 signal and s	ignal set by	SVCMD_I	Э.
		n.XDDD	Reserved	parameter (Do no	ot change.	.)				
Pn56B	2	Reserved	parameters	_	_	0000h	All	_	_	_
			tive Resistor					Immedi-	<u> </u>	
Pn600	2	Capacity*5	5	model.*6	10 W	0	All	ately	Setup	*1
² n601	2	Dynamic E tor Allowal Consumpt	Brake Resis- ble Energy tion	0 to 65,535	10 J	0	All	After restart	Setup	*7
Pn603	2	Regenerat tance	tive Resis-	0 to 65,535	10 m Ω	0	All	Immedi- ately	Setup	*1
Pn604	2	Dynamic E tance	Brake Resis-	0 to 65,535	10 m Ω	0	All	After restart	Setup	*7
	2	Overheat I Selections		0000h to 0003h	-	0000h	All	After restart	Setup	*1
			Overheat	Protection Select	ion					
			0	Disable overheat	protection.					
		n.000X		Reserved setting	•	,				
				Monitor a negative use overheat prot		nput from a	a sensor attac	ched to the r	nachine ai	nd
Pn61A			3	Monitor a positive use overheat prot	voltage in		sensor attac	hed to the m	nachine an	d
		n.🗆🗆 X 🗆	Reserved	parameter (Do no	ot change)				
		n.¤X¤¤	Reserved	parameter (Do no	ot change)				
		n.XDDD	Reserved	parameter (Do no	ot change)				
Pn61B	2	Overheat /	Alarm Level	0 to 500	0.01 V	250	All	Immedi- atelv	Setup	*1
Pn61C	2	Overheat	Warning Lev	vel 0 to 100	1%	100	All	Immedi- ately	Setup	*1
Pn61D *8	2	Overheat / Time	Alarm Filter	0 to 65,535	1 s	0	All	Immedi- ately	Setup	*1
Pn621 to Pn628 ^{*4}	-	Safety Mo Parameter	dule-Related rs	d _	-	_	All	_	-	_

_					•			tinued from	· ·	· · ·
Parameter No.	Size	N	lame	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Communie	cations Con-	0000h to 1FF3h	_	1040h	All	Immedi- ately	Setup	_
								utoty		
	1		MECHATROL	INK Commun	ications C	heck Mas	k for Debugg	ing		ī i
				ot mask.				-		-
		n.DDDX	1 Ignor	e MECHATROI	LINK com	nunication	s errors (A.E6	60).		_
				e WDT errors (,					_
				e both MECHA s (A.E50).	ATROLINK	communic	ations errors	(A.E60) and	WDT	
			Warning Che	ck Masks						-
			0 Do no	ot mask.						-
			1 Ignor	e data setting	warnings (A.94 □).				_
			2 Ignor	e command wa	arnings (A	95 □).				_
				e both A.94		Ū				_
				e communicati						_
Pn800				e both A.94		-				_
			0	e both A.95		0				-
		n.□□X□		e A.94□, A.95			8			-
			Ű	e data setting e A.94□, A.97	0					-
				e A.94□, A.97 e A.95□, A.97			8			-
				e A.94□, A.95			8			-
				e A.96□, A.97			Ũ			-
				e A.94 □ , A.96			•			-
				e A.95 □ , A.96						-
			F Ignor	e A.94 □ , A.95	□, A.96□	, A.97A, ar	nd A.97b war	nings.		-
		n.¤X¤¤	Reserved par	rameter (Do no	ot change)				Ī
			Automatic W	arning Clear S	election f	or Debugg	ing			Î
		n.XDDD	0 Retai	n warnings for	debuggin	 g.				-
			1 Autor	matically clear	warnings (MECHATR	OLINK-III spe	ecification).		_
	2	Applicatio Selections Limits)	n Function 6 (Software	0000h to 0103h	-	0003h	All	Immedi- ately	Setup	*1
		1		I				I		
			Software Lim	it Selection						Ī.
			0 Enab	le both forward	d and reve	rse softwa	re limits.			_
		n.🗆🗆 🛛 X	1 Disat	ole forward soft	tware limit					_
				ole reverse soft						_
Pn801			3 Disab	ble both forwar	d and reve	erse softwa	re limits.			_
		n.🗆🗆 X	Reserved parameter (Do not change.)							I
	1		Software Lim	it Check for R	eferences					I.
		n.🗆X🗆	0 Do no	ot perform soft	ware limit	checks for	references.			-
			1 Perfo	rm software lin	nit checks	for referen	ices.			-
		n.XDDD	Reserved par	rameter (Do no	ot change)				ī i
										-
Pn803	2	Origin Rar	nge	0 to 250	1 refer- ence unit	10	All	Immedi- ately	Setup	*2
Pn804	4	Forward S	Software Limit	-1,073,741,823 to 1,073,741,823	1 refer- ence unit	107374 1823	All	Immedi- ately	Setup	*1
				1,073,741,823	unit			Continue	I	<u> </u>

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Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn806	4	Reverse Software Limit	-1,073,741,823 to 1,073,741,823	1 refer- ence unit	-10737 41823	All	Immedi- ately	Setup	*1
Pn808	4	Absolute Encoder Origin Offset	-1,073,741,823 to 1,073,741,823	1 refer- ence unit	0	All	Immedi- ately *9	Setup	*1
Pn80A	2	First Stage Linear Accel- eration Constant	1 to 65,535	10,000 refer- ence units/s ²	100	All	Immedi- ately ^{*10}	Setup	*2
Pn80B	2	Second Stage Linear Acceleration Constant	1 to 65,535	10,000 refer- ence units/s ²	100	All	Immedi- ately ^{*10}	Setup	*2
Pn80C	2	Acceleration Constant Switching Speed	0 to 65,535	100 ref- erence units/s	0	All	Immedi- ately ^{*10}	Setup	*2
Pn80D	2	First Stage Linear Deceleration Constant	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	Exponential Accelera- tion/Deceleration Bias	0 to 65,535	100 ref- erence 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
Pn816	2	Reserved parameters (Do not change.)	-	-	0000h	All	-	-	-
Pn817 *12	2	Origin Approach Speed	0 to 65,535	100 ref- erence units/s	50	All	Immedi- ately ^{*10}	Setup	*2
Pn818 *13	2	Origin Approach Speed 2	0 to 65,535	100 ref- erence units/s	5	All	Immedi- ately ^{*10}	Setup	*2
Pn819	4	Final Travel Distance for Origin Return	-1,073,741,823 to 1,073,741,823	1 refer- ence unit	100	All	Immedi- ately	Setup	*2
Pn81E	2	Reserved parameters (Do not change.)	-	-	0000h	All	_	-	-
Pn81F	2	Reserved parameters (Do not change.)	-	-	0010h	All	-	-	-
Pn820	4	Forward Latching Area	-2,147,483,648 to 2,147,483,647	1 refer- ence unit	0	All	Immedi- ately	Setup	*2
Pn822	4	Reverse Latching Area	-2,147,483,648 to 2,147,483,647	1 refer- ence unit	0	All	Immedi- ately	Setup	*2

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Parameter No.	Size		Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	Wh Enal		Classi- fication	Refer- ence
	2	Option N tion	Ionitor 1 Selec-	0000h to FFFFh	-	0000h	-	Imm ate		Setup	*2
		Setting			Monitor				App	licable Mo	otors
	Н	ligh-Speed	d Monitor Regio	้า					1		
	C	000h	Motor speed [c	verspeed dete	ction spee	ed ^{*14} /1000	000h]			All	
	C	001h	Speed reference	e loverspeed (detection s	speed ^{*14} /1	200000h1			All	
	C	002h	Torque [maximi							All	
	С	003h	Position deviati	on (lower 32 b	its) [refere	nce units]				All	
	С	004h	Position deviati	on (upper 32 k	oits) [refere	nce units]				All	
	C	00Ah	Encoder count	(lower 32 bits)	[reference	e units]				All	
	C	00Bh	Encoder count	(upper 32 bits) [referenc	e units]				All	
	С	00Ch	FPG count (low	er 32 bits) [ref	erence uni	ts]				All	
	С	000Dh	FPG count (upp	per 32 bits) [re	ference un	its]				All	
	L	ow-Speed	Monitor Region	l					-T		
	С	010h	Un000: Motor s	speed [min ⁻¹]						All	
	С	011h	Un001: Speed	Reference [mir	ו ⁻¹]					All	
	С	012h	Un002: Torque	Reference [%]						All	
	C	013h	Un003: Rotatio Number of enc mal				displayed in	deci-		All	
	С	014h	Un004: Rotatio Electrical angle							All	
Pn824	С	015h	Un005: Input S	ignal Monitor						All	
	С	016h	Un006: Output	Signal Monito	r					All	
	С	017h	Un007: Input R	eference Spee	ed [min ⁻¹]					All	
	C	018h	Un008: Position	n Deviation [ret	ference un	its]				All	
	С	019h	Un009: Accum	ulated Load R	atio [%]					All	
	С	01Ah	Un00A: Regene	erative Load R	atio [%]					All	
	С	01Bh	Un00B: Dynam	ic Brake Resis	tor Power	Consump	tion [%]			All	
	С	01Ch	Un00C: Input F	Reference Puls	e Counter	[reference	units]			All	
	С	01Dh	Un00D: Feedba							All	
	С	01Eh	Un00E: Fully-cl tronic gear con version) [encod	version (Pn24/	A and Pn2	4C) for ext				Rotary	
	С	023h	Initial multiturn	data [Rev]						Rotary	
	С	024h	Initial increment	tal data [pulses	5]					Rotary	
	C	040h	Un025: SERVC	PACK Installat	ion Enviro	nment Moi	nitor			All	
	С	041h	Un026: Servorr	notor Installatio	n Environi	ment Moni [.]	tor			All	
	С	042h	Un027: Built-in	Fan Remainin	g Life Rati	0				All	
	С	043h	Un028: Capaci	tor Remaining	Life Ratio					All	
	С	044h	Un029: Surge F	Prevention Circ	uit Remai	ning Life R	atio			All	
	С	045h	Un02A: Dynam	ic Brake Circu	it Remainii	ng Life Rat	io			All	
	С	046h	Un032: Instanta	aneous Power						All	
	С	047h	Un033: Power	Consumption						All	
	С	048h	Un034: Cumula	ative Power Co	nsumption	1				All	

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Parameter	0			Setting	Setting	Default	Applicable	When	Classi-	Refer
No.	Size	Na	ame	Range	Unit	Setting	Motors	Enabled	fication	ence
	Ι.									
		Setting		(0)	Monitor			Appli	cable Moto	ors
		Low-Speed	•	on (Communica			01) [usfauera	-		
	_	0080h	units]	e of latched fee	еораск роз	Sition (LPC	S I) [referenc	e	All	
Pn824		0081h	Previous value units]	e of latched fee	dback po	sition (LPC	S2) [reference	e	All	
		0084h	Continuous La	atch Status (EX	(STATUS)				All	
		All Areas								
		Other values	Reserved sett	ings (Do not us	se.)				All	
	2	Option Mor tion	nitor 2 Selec-	0000h to FFFFh	_	0000h	All	Immedi- ately	Setup	*2
Pn825	-	0000h to 0084h	The settings	are the same	as those fo	or the Opti	on Monitor 1	Selection.		
Pn827	2	Linear Dec Constant 1	eleration for Stopping	1 to 65,535	10,000 refer- ence units/s ²	100	All	Immedi- ately ^{*10}	Setup	*2
Pn829	2		iting Time (for Deceleration	0 to 65,535	10 ms	0	All	Immedi- ately ^{*10}	Setup	*2
Pn82A	2	Reserved p (Do not cha		-	-	1813h	All	-	-	_
Pn82B	2	Reserved p (Do not cha		-	-	1D1Ch	All	-	_	_
Pn82C	2	Reserved p (Do not cha		-	-	1F1Eh	All	-	_	_
Pn82D	2	Reserved p (Do not cha		-	-	0000h	All	-	_	-
Pn82E	2	Reserved p (Do not cha		_	-	0000h	All	-	-	_
	2	Motion Set	tings	0000h to 0001h	-	0000h	All	After restart	Setup	*2
				l	1		1	1	1	
			Linear Accele	eration/Decele	ration Cor	nstant Sele	ection			
		n.000X	0 Use I ignor	Pn80A to Pn80	F and Pn8	327. (The s	ettings of Pn	834 to Pn84	0 are	_
Pn833			9	- Pn834 to Pn84	0. (The se	ttings of P	n80A to Pn80)F and Pn82	7 are	-
		n.00X0	<u></u>	rameter (Do no	ot change.)				-
	1	n.¤X¤¤	Reserved par	rameter (Do no	ot change.)				
	1	n.X000	Deserved	rameter (Do no	t obongo	\ \				
	-		neserved par		ot change.)				
Pn834	4	First Stage eration Cor	Linear Accel- nstant 2	1 to 20,971,520	10,000 refer- ence units/s ²	100	All	Immedi- ately *10	Setup	*2
	4	Second Sta Acceleratio	age Linear In Constant 2	1 to 20,971,520	10,000 refer- ence	100	All	Immedi- ately ^{*10}	Setup	*2
Pn836					units/s ²					

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Parameter Lists

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Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
Pn83A	4	First Stage Deceleratio		ant 2	1 to 20,971,520	10,000 refer- ence units/s ²	100	All	Immedi- ately ^{*10}	Setup	*2
Pn83C	4	Second Sta Deceleratio			1 to 20,971,520	10,000 refer- ence units/s ²	100	All	Immedi- ately ^{*10}	Setup	*2
Pn83E	4	Deceleration Switching S		ant	0 to 2,097,152,000	1 refer- ence unit/s	0	All	Immedi- ately ^{*10}	Setup	*2
Pn840	4	Linear Dec Constant 2			1 to 20,971,520	10,000 refer- ence units/s ²	100	All	Immedi- ately ^{*10}	Setup	*2
Pn842 *12	4	Second Or Approach			0 to 20,971,520	100 ref- erence units/s	0	All	Immedi- ately ^{*10}	Setup	*2
Pn844 *13	4		Gecond Origin Approach Speed 2 COSING Command		0 to 20,971,520	100 ref- erence units/s	0	All	Immedi- ately ^{*10}	Setup	*2
Pn846	2	POSING C Scurve Acc Deceleration	celeration		0 to 50	1%	0	All	Immedi- ately ^{*10}	Setup	_
Pn850	2	Number of Sequences			0 to 8	_	0	All	Immedi- ately	Setup	*2
Pn851	2	Continuous Sequence			0 to 255	-	0	All	Immedi- ately	Setup	*2
	2	Latch Sequence Settings	uence 1	to 4	0000h to 3333h	-	0000h	All	Immedi- ately	Setup	*2
Pn852		n.000X	0 1 2 3 Latch S 0 to 3 Latch S 0 to 3	Phase EXT1 EXT2 EXT3 Gequen The s tion. Gequen The s tion.	nce 1 Signal S e C signal signal signal nce 2 Signal S settings are the nce 3 Signal S settings are the nce 4 Signal S settings are the	election same as election same as election	those for t	he Latch Seq	uence 1 Sigr	nal Selec-	
										d on nov	

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Parameter No.	Size	N	ame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refe ence
	2	Latch Seq Settings	uence 5	to 8	0000h to 3333h	-	0000h	All	Immedi- ately	Setup	*2
									,		
			Latch S	Sequer	nce 5 Signal S	election					T
			0	Phase	эC						
		n.🗆🗆 🛛 X	1	EXT1	signal						_
			2	EXT2	signal						_
			3	EXT3	signal						-
Dm050			Latch S	Sequer	nce 6 Signal S	election					
Pn853		n.DDXD	0 to 3	The s tion.	ettings are the	same as	those for t	he Latch Seq	uence 5 Sigr	nal Selec-	_
			Latch S	Sequer	nce 7 Signal S	election					
		n.¤X¤¤	0 to 3	The s tion.	ettings are the	same as	those for t	he Latch Seq	uence 5 Sigr	nal Selec-	_
			Latch S	Sequer	nce 8 Signal S	election					
		n.XDDD	0 to 3	The s tion.	ettings are the	same as	those for t	he Latch Seq	uence 5 Sigr	nal Selec-	_
	2	SVCMD_I			0000h to		0000h	All	Immedi-	Setup	*2
	<u> </u>	Monitor Al	locations	51	1717h		000011		ately	Setup	-
	ļ ,										
			- ·	Ŭ	Monitor Alloca			_ ,	itor		
			0		ate bit 24 (IO_8 ate bit 25 (IO_8		•	0			-
											_
			2	Alloca	ate bit 26 (IO S	153100					_
		n.000X	2		ate bit 26 (IO_9 ate bit 27 (IO_9						
		n.000X	2 3 4	Alloca	ate bit 26 (IO_9 ate bit 27 (IO_9 ate bit 28 (IO_9	STS4) to C	N1-13 inp	ut signal mor	iitor.		_
		n.000X	3	Alloca Alloca	ate bit 27 (IO_S	STS4) to C STS5) to C	N1-13 inp N1-13 inp	ut signal mor ut signal mor	nitor. nitor.		-
		n.000X	3 4	Alloca Alloca Alloca	ate bit 27 (IO_8 ate bit 28 (IO_8	STS4) to C STS5) to C STS6) to C	N1-13 inp N1-13 inp N1-13 inp	ut signal mor ut signal mor ut signal mor	iitor. iitor. iitor.		-
Pn860		n.□□□X	3 4 5	Alloca Alloca Alloca Alloca	ate bit 27 (IO_S ate bit 28 (IO_S ate bit 29 (IO_S	STS4) to C STS5) to C STS6) to C STS7) to C	N1-13 inp N1-13 inp N1-13 inp N1-13 inp	ut signal mor ut signal mor ut signal mor ut signal mor	itor. itor. itor. itor.		-
Pn860	-	n.□□□X	3 4 5 6 7	Alloca Alloca Alloca Alloca Alloca	ate bit 27 (IO_S ate bit 28 (IO_S ate bit 29 (IO_S ate bit 30 (IO_S	STS4) to C STS5) to C STS6) to C STS7) to C STS8) to C	N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp	ut signal mor ut signal mor ut signal mor ut signal mor ut signal mor	itor. itor. itor. itor.		-
Pn860	-	n.000X	3 4 5 6 7	Alloca Alloca Alloca Alloca Alloca 3 Input	ate bit 27 (IO_S ate bit 28 (IO_S ate bit 29 (IO_S ate bit 30 (IO_S ate bit 31 (IO_S	GTS4) to C GTS5) to C GTS6) to C GTS7) to C GTS8) to C GTS8) to C or Enable,	N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp /Disable S	ut signal mor ut signal mor ut signal mor ut signal mor ut signal mor election	itor. itor. itor. itor.		- - -
Pn860			3 4 5 6 7 CN1-13	Alloca Alloca Alloca Alloca Alloca 3 Input	ate bit 27 (IO_S ate bit 28 (IO_S ate bit 29 (IO_S ate bit 30 (IO_S ate bit 31 (IO_S Signal Monit	GTS4) to C GTS5) to C GTS6) to C GTS7) to C GTS7) to C GTS8) to C Or Enable, or CN1-13	N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp /Disable S input sign	ut signal mor ut signal mor ut signal mor ut signal mor ut signal mor election al monitor.	itor. itor. itor. itor.		-
Pn860		n.00X0	3 4 5 6 7 CN1-13 0 1	Alloca Alloca Alloca Alloca Alloca 3 Input Disab	ate bit 27 (IO_S ate bit 28 (IO_S ate bit 29 (IO_S ate bit 30 (IO_S ate bit 31 (IO_S signal Monit le allocation fo e allocation fo	GTS4) to C GTS5) to C GTS6) to C GTS7) to C GTS8) to C GTS8) to C Or Enable/ or CN1-13 r CN1-13	N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp /Disable S input sign	ut signal mor ut signal mor ut signal mor ut signal mor election al monitor. al monitor.	itor. itor. itor. itor.		-
Pn860			3 4 5 6 7 CN1-13 0 1	Alloca Alloca Alloca Alloca Alloca 3 Input Disab Enabl	ate bit 27 (IO_S ate bit 28 (IO_S ate bit 29 (IO_S ate bit 30 (IO_S ate bit 31 (IO_S signal Monite le allocation for	GTS4) to C GTS5) to C GTS6) to C GTS7) to C GTS7) to C GTS8) to C or Enable, or CN1-13 r CN1-13 tion for C	N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp Disable S input sign input signa	ut signal mor ut signal mor ut signal mor ut signal mor ut signal mor election al monitor. al monitor.	itor. iitor. iitor. iitor. iitor.		-
Pn860		n.00X0	3 4 5 6 7 CN1-1 0 1 Input S 0 to 7	Alloca Alloca Alloca Alloca 3 Input 5 Input The s	ate bit 27 (IO_S ate bit 28 (IO_S ate bit 29 (IO_S ate bit 30 (IO_S ate bit 31 (IO_S Signal Monito Monitor Alloca ettings are the Signal Monito	GTS4) to C GTS5) to C GTS6) to C GTS7) to C GTS7) to C GTS8) to C or Enable/ or CN1-13 tion for C same as r Enable/[N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp Disable S input sign input sign N1-7 (SVC the CN1-1	ut signal mor ut signal mor ut signal mor ut signal mor ut signal mor election al monitor. al monitor. SMD_IO) 3 allocations.	itor. iitor. iitor. iitor. iitor.		
Pn860		n.00X0	3 4 5 6 7 CN1-1 0 1 Input S 0 to 7	Alloca Alloca Alloca Alloca 3 Input Disab Enabl ignal N The s Input	ate bit 27 (IO_S ate bit 28 (IO_S ate bit 29 (IO_S ate bit 30 (IO_S ate bit 31 (IO_S is Signal Monitate le allocation for e allocation for Monitor Alloca ettings are the	STS4) to C STS5) to C STS6) to C STS7) to C STS7) to C STS8) to C STS9 to C STS	N1-13 inp N1-13 inp N1-13 inp N1-13 inp N1-13 inp Disable S input sign N1-7 (SVC the CN1-1 Disable Se nput signal	ut signal mor ut signal mor ut signal mor ut signal mor ut signal mor election al monitor. al monitor. 3 allocations. lection I monitor.	itor. iitor. iitor. iitor. iitor.		

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							Con	itinued 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		O Input Signal locations 2	0000h to 1717h	-	0000h	All	Immedi- ately	Setup	*2
		n.DDDX		Monitor Alloca						
			0 to 7 The s	ettings are the	same as	the CN1-1	3 allocations.			_
				Signal Monito						<u> </u>
Pn861		n.□□X□		le allocation fo						-
			Input Signal I	Monitor Alloca	tion for C	N1-9 (SVC				-
		n.¤X¤¤		ettings are the						
			CN1-9 Input	Signal Monito	r Enable/D	isable Se	lection			ī
		n.XDDD		le allocation fo		1 0				_
			1 Enab	le allocation fo	r CN1-9 in	put signal	monitor.			_
	2		O Input Signal locations 3	0000h to 1717h	_	0000h	All	Immedi- ately	Setup	*2
										_
		n.DDDX		Monitor Alloca			,			
				0						-
		n.DDXD		t Signal Monit						
Pn862				le allocation fo						-
		n.¤X¤¤	Input Signal I	Monitor Alloca	tion for C	N1-11 (SV	CMD_IO)			[
		11.0700	0 to 7 The s	ettings are the	same as	the CN1-1	3 allocations.			_
			· · · ·	t Signal Monit						[
		n.X□□□		le allocation fo		1 0				-
			I Endo			input orgine				_
	2		O Input Signal locations 4	0000h to 1717h	-	0000h	All	Immedi- ately	Setup	*2
			Input Signal	Appitor Allogo	tion for C					
		n.🗆 🗆 X		Monitor Alloca ettings are the						_
Pn863				t Signal Monit						I
		n.□□X□		le allocation fo						-
		n.¤X¤¤		rameter (Do no						-
										l
		n.XOOO	Reserved par	ameter (Do no	ot change.)				L
								Continue		

Continued from previous page.

Parameter No.	Size	N	lame		Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refe enc
	2	SVCMD_IC nal Monito 1	O Output or Allocati	Sig- ons	0000h to 1717h	-	0000h	All	Immedi- ately	Setup	*2
		-									
			· · ·	•					_ ,		
					. –	,					_
		Name Range Unit Setting Motors Enabled fication er SVCMD_IO_OUtput Signal Monitor Allocations 0000h to 1717h - 0000h All Immedi- ately Setup 0 Allocate bit 24 (IO_STS1) to CN1-1/CN1-2 output signal monitor. 1 Allocate bit 26 (IO_STS2) to CN1-1/CN1-2 output signal monitor. 1 Allocate bit 26 (IO_STS3) to CN1-1/CN1-2 output signal monitor. 3 Allocate bit 26 (IO_STS3) to CN1-1/CN1-2 output signal monitor. 2 Allocate bit 26 (IO_STS3) to CN1-1/CN1-2 output signal monitor. 5 Allocate bit 20 (IO_STS7) to CN1-1/CN1-2 output signal monitor. 6 Allocate bit 20 (IO_STS3) to CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-1/CN1-2 output signal monitor. n.DDXD 0 Disable allocation for CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-23/CN1-24 output signal monitor. n.DDXD 0 Disable allocation for CN1-23/CN1-24 output signal monitor. 1 Enable allocation for CN1-23/CN1-24 output signal monitor. n.DDXD 0 Disable allocation for CN1-23/CN1-24 output signal monitor. 1 Enable allocation for CN1-23/CN1-24 output signal monitor. n.MODD			_						
		Name Setting Range Default Unit Applicable Setting When Motors Classi- Enabled Re factor SVCMD_IO Output Sig- nal Monitor Allocations 0000h to 1717h - 0000h All Immedi- ately Setup Setup 0 Output Signal Monitor Allocation for CN1-1 and CN1-2 (SVCMD_IO) 0 Allocate bit 24 (IO_STS2) to CN1-1/CN1-2 output signal monitor. 1 Allocate bit 25 (IO_STS3) to CN1-1/CN1-2 output signal monitor. 1 Allocate bit 29 (IO_STS5) to CN1-1/CN1-2 output signal monitor. 3 Allocate bit 29 (IO_STS5) to CN1-1/CN1-2 output signal monitor. 1 Allocate bit 30 (IO_STS6) to CN1-1/CN1-2 output signal monitor. 5 Allocate bit 30 (IO_STS6) to CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-2/CN1-24 output signal monitor. 1 Enable allocation for CN1-2/CN1-24 output signal monitor. 1 Enable allocation for CN1-23/CN1-24 output signal monitor. 1 Enable allocation for CN1-23/CN1-24			_						
		n.🗆🗆 🗆 X			(=	1		1 0			-
		Name Setting Rage Default Unit Applicable Setting When Motors Classi- Enabled Re- fication SVCMD_IO_OUputSig- nal Monitor Allocations 0000h to 1717h - 0000h All Immedi- ately Setup Name Output Signal Monitor Allocation for CN1-1 and CN1-2 (SVCMD_IO) 0 Allocate bit 26 (IO_STS3) to CN1-1/CN1-2 output signal monitor. 1 Allocate bit 27 (IO_STS3) to CN1-1/CN1-2 output signal monitor. 3 Allocate bit 28 (IO_STS5) to CN1-1/CN1-2 output signal monitor. 3 Allocate bit 28 (IO_STS5) to CN1-1/CN1-2 output signal monitor. 4 Allocate bit 29 (IO_STS6) to CN1-1/CN1-2 output signal monitor. 6 Allocate bit 30 (IO_STS6) to CN1-1/CN1-2 output signal monitor. 7 Allocate bit 30 (IO_STS6) to CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-2/3/CN1-24 output signal monitor. 1 Enable allocation for CN1-23/CN1-24 output signal monitor. 1 Enable allocation for CN1-23/CN1-24 output signa			-						
					· –	,					_
² n868					. –	,					_
			7	Alloca	ate bit 31 (IO_S	STS8) to C	N1-1/CN1	-2 output sig	nal monitor.		_
	· ·		CN1-1/	CN1-2	2 Output Signa	al Monitor	Enable/Di	sable Select	ion		
		Bit Name Setting Range Setting Unit Default Setting Applicable Motors When Enabled Motors Classi- fication 2 SVCMD_IO Output Sig- nal Monitor Allocations 0000h to 1717h - 0000h All Immedi- ately Setup 2 Monitor Allocations 0000h to 1717h - 0000h All Immedi- ately Setup 0 Allocate bit 24 (IO_STS1) to CN1-1/CN1-2 output signal monitor. 1 Allocate bit 25 (IO_STS2) to CN1-1/CN1-2 output signal monitor. 2 Allocate bit 26 (IO_STS3) to CN1-1/CN1-2 output signal monitor. 4 Allocate bit 30 (IO_STS5) to CN1-1/CN1-2 output signal monitor. 5 Allocate bit 30 (IO_STS5) to CN1-1/CN1-2 output signal monitor. 7 Allocate bit 30 (IO_STS5) to CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-1/CN1-2 output signal monitor. 1 Enable allocation for CN1-20 uput signal monitor. 1 Enable allocation for CN1-20 uput signal monitor. 1 Enable allocation for CN1-20 uput signal monitor. 1 Enable allocation for CN1-23/CN1-24 output signal monitor. 1 Enable allocation for CN1-23/CN1-24 output signal monitor. 1 Enable allocat			-						
			1	Enab	le allocation fo	r CN1-1/C	atuo 2-1N	ut signal mor	nitor.		-
							•				-
		n.¤X¤¤	Output	Signa	I Monitor Alloo	cation for	CN1-23 a	nd CN1-24 (S	SVCMD_IO)		
			0 to 7	The s	ettings are the	same as	the CN1-1	/CN1-2 alloca	ations.		_
	·		CN1-23	3/CN1	-24 Output Sid	onal Moni	tor Enable	/Disable Sele	ection		
						5					-
											-
	·			LIIUD			0111 24 00	atput signai n			_
	2	nal Monito	O Output or Allocati	Sig- ons		-	0000h	All		Setup	*2
		n.DDDX		-							
Pn869			CN1-25	5/CN1	-26 Output Sid	nal Moni	tor Enable	/Disable Sele	ection		
111000		n.ППХП				,					
											_
											_
		n.¤X¤¤	Reserv	ed par	rameter (Do no	ot change	.)				
		n.XDDD	Reserve	ed par	rameter (Do no	ot change	.)				
							1		1		*1
Pn880	2	tor (for ma			03h to EFh	-	-	All	-	Setup	1
Pn880 Pn881	2	tor (for ma read only) Set Transr Count Mo (for mainter	nission B	e, yte es]		-	_		-		*1
		tor (for ma read only) Set Transr Count Mo (for mainte only) Transmiss ting Monit	nission B nitor (byte enance, re ion Cycle or (× 0.25	e, yte es] ead Set- δ μs]	17, 32, 48	-	-	All	-	Setup	

						Con	itinued from	n previous	s page.
Parameter No.	Size	Name	Setting Range	Setting Unit	Default Setting	Applicable Motors	When Enabled	Classi- fication	Refer- ence
	2	Communications Con- trols 2	0000h to 0001h	-	0000h	All	Immedi- ately	Setup	*2
Pn884	n. n.	MECH	in the status se ATROLINK con the holding bra ameter (Do not ameter (Do not	et by the E nmunication ke when a change.) change.)	BRK_ON of the second se	r BRK_OFF co occurs.	ommand wh		ırs.
Pn88A	2	MECHATROLINK Receive Error Counter Monitor (for maintenance, read only)	0 to 65,535	_	0	All	_	Setup	_
Pn890 to Pn8A6	4	Command Data Moni- tor during Alarm/Warn- ing (for maintenance, read only)	Oh to FFFFFFFFh	_	Oh	All	_	Setup	*1
Pn8A8 to Pn8BE	4	Response Data Monitor during Alarm/Warning (for maintenance, read only)	Oh to FFFFFFFFh	-	Oh	All	-	Setup	*1
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 Mem- ber Definition	0000h to 08FFh	-	0000h	All	After restart	Setup	*2
Pn920 to Pn95F	2	Parameter Bank Data (Not saved in nonvolatile memory.)	0000h to FFFFh	_	0000h	All	Immedi- ately	Setup	*2

Continued from provide to p

*1. Refer to the following manual for details.

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

*2. Refer to the following manual for details.

Ω Σ-7-Series AC Servo Drive 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 AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP S800001 73)
- *8. Enabled only when Pn61A is set to n.DDD2 or n.DDD3.
- *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.The setting of Pn842 is valid while Pn817 is set to 0.
- *13.The setting of Pn844 is valid while Pn818 is set to 0.
- *14.You can check overspeed detection speed with MECHATROLINK-III Common Parameter 05 PnA0A (Maximum Output Speed).

8.3.2 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	me	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classi- fication
	4	Encoder Ty tion (read o	/pe Selec- only)	0h or 1h	-	-	All	-	
01									
PnA02		0000h	Absolute	encoder					
		0001h	Increment	tal encoder					
	4	Motor Type (read only)	Selection	0h or 1h	-	-	All	_	_
02 PnA04		0000h	Rotary Se	ervomotor					tion
1 10 10 1		0001h	Linear Se	ervomotor					orma
									einfe
	4	Semi-close closed Typ tion (read o	e Selec-	0h or 1h	-	-	All	_	Device information
03 PnA06									
T HAOO		0000h	Semi-clos Fully-clos						
		000111	T ully-clos	eu					
04 PnA08	4	Rated Spe only)	ed (read	Oh to FFFFFFFFh	x10^PnA0C min ⁻¹	-	All	-	_
05 PnA0A	4	Maximum (Speed (rea	Output Id only)	Oh to FFFFFFFFh	x10^PnA0C min ⁻¹	-	All	-	
06 PnA0C	4	Speed Mul (read only)	ltiplier	-1,073,741,823 to 1,073,741,823	-	-	All	_	
07 PnA0E	4	Rated Toro (read only)	lue	Oh to FFFFFFFFh	x10^PnA12 N•m	-	All	-	nation
08 PnA10	4	Maximum (Torque (rea	Output ad only)	Oh to FFFFFFFFh	x10^PnA12 N∙m	-	All	_	Device information
09 PnA12	4	Torque Mu (read only)		-1,073,741,823 to 1,073,741,823	-	-	All	-	Device
0A PnA14	4	Resolution (read only)		Oh to FFFFFFFh	1 pulse/rev	-	Rotary	_	

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						(Continued fr	rom previo	us page.
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 Enco 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	t	0 to 65,535	1 Rev	65535	Rotary	After restart	
	4	Limit Setting		0h to 33h	-	0000h	All	After restart	
25		Bit 0 P-OT (0: Enabled, 1: Disabled) Bit 1 N-OT (0: Enabled, 1: Disabled) Bit 2 Reserved.						Machine specifications	
PnA4A		Bit 3	Rese	rved.					ds i
		Bit 4	P-SC	T (0: Disabled, 1:	Enabled)				line
		Bit 5	N-SC	DT (0: Disabled, 1:	Enabled)				lach
		Bits 6 to 31	Rese	rved.	,				≥
		ı		1	I	1		1	
26 PnA4C	4	Forward Softw Limit	vare	-1,073,741,823 to 1,073,741,823	1 reference unit	10737418 23	All	Immedi- ately	
27 PnA4E	4	Reserved para (Do not chang	ameter je.)	-	-	0	All	Immedi- ately	
28 PnA50	4	Reverse Softv Limit	vare	-1,073,741,823 to 1,073,741,823	1 reference unit	-1073741 823	All	Immedi- ately	
29 PnA52	4	Reserved para (Do not chang		-	-	0	All	Immedi- ately	
	4	Speed Unit Se	election	Oh to 4h	-	Oh	All	After restart	
		0000h F	Reference	e units/s					
41		0001h F	Reference	e units/min					
PnA82		0002h F	Percenta	ge (%) of rated spe	ed*3,*4				
		0003h n	nin ^{-1 *4}						
		0004h N	/laximum	n motor speed/400)00000h*5				
									sbu
42 PnA84	4	Speed Base U Selection ^{*3, *4} (Set the value from the follow formula: Spee selection (41 PnA82) ×	n, *5 of n wing ed unit	-3 to 3	_	0	All	After restart	Unit settings
	4	Position Unit stion	Selec-	Oh	-	0h	All	After restart	1
43 PnA86			leference	e units	1	I			

							Continued fr		
Parameter No.	Size	Name	Э	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classi- fication
44 PnA88	4	Position Base Selection (Set the value from the follo formula: Posi selection (43 PnA86) ×	e of n owing ition unit	0	_	0	All	After restart	
	4	Acceleration Selection	Acceleration Unit Ob – Ob All After						
45 PnA8A		0000h R	leference	units/s ²	·	·		·	
46 PnA8C	4	Acceleration Unit Selection (Set the value from the follo formula: Acce unit selection (45 PnA8A) >	n e of n owing eleration 1	4 to 6	_	4	All	After restart	
	4	Torque Unit S tion	Selec-	1h or 2h	-	1h	All	After restart	
47 PnA8E				ge (%) of rated toro					
48 PnA90	4	Torque Base Selection ^{*6, *7} (Set the value from the follo formula: Toro selection (47 PnA8E) ×	7 e of n owing que unit	-5 to 0	_	0	All	After restart	Unit settings
	4	Supported U only)	nit (read	_	-	0601011F h	All	-	
49 PnA92	7	only) Speed Units Bit 0 Bit 1 Bit 2 Bit 3 Bit 4 Bits 5 to 7 Position Unit Bit 8 Bits 9 to 15 Acceleration Bit 16 Bit 17 Bits 18 to 23 Torque Units Bit 24 Bit 25 Bit 26 Bits 27 to 31	Re Pe min Ma Re Re Re Units Re Re Re Re Re Re Re Re Re Ma	ference units/s (1: ference units/min (rcentage (%) of rat n ⁻¹ (rpm) (1: Enable aximum motor spect served (0: Disable ference units (1: E served (0: Disable ference units/s ² (1 a (acceleration time served (0: Disable m (0: Disabled) rcentage (%) of rat aximum torque/400 served (0: Disabled	(1: Enabled) ed speed (1: E ed) ed/4000000h (d). nabled) d). : Enabled) e required to re d). ered torque (1: E 000000h	Enabled) (1: Enabled) ach rated sp			

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Deverate					Catting at Line's		Continued fr		
Parameter No.	Size	Nan	ne	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classi- fication
61 PnAC2	4	Speed Loo	p Gain	1,000 to 2,000,000	0.001 Hz [0.1 Hz]	40000	All	Immedi- ately	
62 PnAC4	4	Speed Loo Time Const		150 to 512,000	1 μs [0.01 ms]	20000	All	Immedi- ately	
63 PnAC6	4	Position Lo	op Gain	1,000 to 2,000,000	0.001/s [0.1/s]	40000	All	Immedi- ately	
64 PnAC8	4	Feed Forward pensation	ard Com-	0 to 100	1%	0	All	Immedi- ately	
65 PnACA	4	Position Lo gral Time C		0 to 5,000,000	1 μs [0.1 ms]	0	All	Immedi- ately	
66 PnACC	4	In-position	Range	0 to 1,073,741,824	1 reference unit	7	All	Immedi- ately	
67 PnACE	4	Near-positi	on Range	1 to 1,073,741,824	1 reference unit	10737418 24	All	Immedi- ately	
81 PnB02	4	Exponentia tion Accele Deceleratio Constant	ration/	0 to 510,000	1 μs [0.1 ms]	0	All	Immedi- ately ^{*8}	
82 PnB04	4	Movement Time	Average	0 to 510,000	1 μs [0.1 ms]	0	All	Immedi- ately ^{*8}	
83 PnB06	4	Final Travel nal Input Po		-1,073,741,823 to 1,073,741,823	1 reference unit	100	All	Immedi- ately	
84 PnB08	4	Zero Point Approach S		Oh to 3FFFFFFFh	10 ⁻³ min ⁻¹	× 5,000h reference units/s con- verted to 10 ⁻³ min ⁻¹	All	Immedi- ately	
85 PnB0A	4	Zero Point Creep Spee		Oh to 3FFFFFFFh	10 ⁻³ min ⁻¹	× 500h reference units/s con- verted to 10 ⁻³ min ⁻¹	All	Immedi- ately	Tuning
86 PnB0C	4	Final Travel Point Retur		-1,073,741,823 to 1,073,741,823	1 reference unit	100	All	Immedi- ately	
	4	Monitor Se	ect 1	0h to Fh	-	1h	All	Immedi- ately	
87 PnB0E		0000h 0001h 0002h 0003h 0004h 0005h 0006h 0007h 0008h 0009h 000Ah 0008h 0000Ah 0000Ah 0000Ah 000Ch 000Dh 000Eh 000Fh	Reserved CMN1 (cd CMN2 (cd OMN1 (o	(undefined value). (undefined value). (undefined value). ommon monitor 1) ommon monitor 2) ptional monitor 1) ptional monitor 2)					

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							Continued fr	
Parameter No.	Size	Na	me	Setting Range	e Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled
	4	Monitor Se	elect 2	0h to Fh	_	0h	All	Immedi- ately
88 PnB10		0000 to 000Fh	The settin	gs are the same	e as those for Fixed	I Monitor S	election 1.	
	4	Monitor Se SEL_MON		0h to 9h	_	Oh	All	Immedi- ately
			1					atory
		0000h	TPOS (ta	raet position in	reference coordina	to evetom)		
		0000h			in reference coordi		m)	
		0002h			in POS_SET (Set 0		,	mand)
		0003h		rget speed)			-)	
		0004h		l (speed limit)				
		0005h	TRQ_LIM	I (torque limit)				
			00h: Ph 01h: Ph 02h: Ph 03h: Ph Byte 2: C 00h: Pc 01h: Sp 02h: To Byte 3: F	ase 1 ase 2 ase 3 Current control m sition control mo eed control mo rque control mo	node ode de de			
			Bit	Name	Description	Value	Setting	g
					Processing status latch detection for		Latch dete not yet pro cessed.	
39		0006h Bit 1		LT_RDY1	LT_REQ1 in SVCM D_CTRL region	VI- 1	Processing detection in progress.	
PnB12			Bit 1	LT_RDY1	Processing status latch detection for	r	Latch detendet not yet pro cessed.	
			BILI		LT_REQ2 in SVCN		Processing	latch
					D_CTRL region	1	detection in progress.	
					D_CTRL region	1	detection i progress. Phase C	n
			Bits 2		D_CTRL region	1	detection in progress. Phase C External in signal 1	put
			Bits 2 and 3	LT_SEL1R	Latch signal	0	detection ii progress. Phase C External in	put
				LT_SEL1R	D_CTRL region	1 0 1	detection in progress. Phase C External in signal 1 External in	out
				LT_SEL1R	D_CTRL region	1 0 1 2	detection in progress. Phase C External in signal 1 External in signal 2 External in	out
			and 3	LT_SEL1R	D_CTRL region	1 0 1 2 3	detection in progress. Phase C External in signal 1 External in signal 2 External in signal 3	out out out
				LT_SEL1R LT_SEL2R	D_CTRL region	1 0 1 2 3 0	detection in 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	out
			and 3 Bits 4		D_CTRL region	1 0 1 2 3 0 1	detection in progress. Phase C External in signal 1 External in signal 2 External in signal 3 Phase C External in signal 1 External in signal 2 External in signal 2	out out out out out out
			and 3 Bits 4		D_CTRL region Latch signal Latch signal	1 0 1 2 3 0 1 2	detection is progress.Phase CExternal in signal 1External in signal 2External in signal 3Phase CExternal in signal 1External in signal 1External in signal 2	out out out out out out
		0007h	and 3 Bits 4 and 5	LT_SEL2R Reserved (0)	D_CTRL region Latch signal Latch signal	1 0 1 2 3 0 1 2	detection in progress. Phase C External in signal 1 External in signal 3 Phase C External in signal 1 External in signal 1 External in signal 2 External in signal 2	out out out out out out
		0007h 0008h	and 3 Bits 4 and 5 Bit 6 Reserved	LT_SEL2R Reserved (0)	D_CTRL region Latch signal Latch signal	1 0 1 2 3 0 1 2 3 3 0 1 2 3	detection ii progress. Phase C External in signal 1 External in signal 2 External in signal 3 Phase C External in signal 1 External in signal 2 External in signal 2 External in signal 3	n

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Parameter No.	Size	Name	Setting Range	Setting Unit [Resolution]	Default Setting	Applicable Motors	When Enabled	Classi- fication
	4	Monitor Select for SEL_MON2	0h to 9h	-	0h	All	Immedi- ately	
8A PnB14		0000 to 0009h The set	ttings are the same as	those for SEL	_MON Monit	or Selection	1.	
8B	4	Zero Point Detecti	on 0 to 250	1 reference	10	All	Immedi-	_
PnB16 8C	4	Range Forward Torque Li		unit 1%	100	All	ately Immedi-	_
PnB18 8D PnB1A	4	Reverse Torque Li	mit 0 to 800	1%	100	All	ately Immedi- ately	-
8E PnB1C	4	Zero Speed Detection Range	- 1,000 to 10,000,000	10 ⁻³ min ⁻¹	20000	All	Immedi- ately	হ
8F PnB1E	4	Speed Match Sigr Detection Range	nal 0 to 100,000	10 ⁻³ min ⁻¹	10000	All	Immedi- ately	amete
	4	SVCMD_CTRL bit Enabled/Disabled (read only)	-	-	0FFF3F3F h	All	_	Command-related parameters
								nd-rel
		Bit 0	CMD_PAUSE (1: En	7				mar
		Bit 1 Bits 2 and 3	CMD_CANCEL (1: E STOP MODE (1: En	,				Com
		Bits 2 and 5	ACCFIL (1: Enabled)	,				0
		Bits 6 and 7	Reserved (0: Disable					
90		Bit 8	LT_REQ1 (1: Enable	,				
PnB20		Bit 9	LT_REQ2 (1: Enable					
		Bits 10 and 11	LT_SEL1 (1: Enabled	,				
		Bits 12 and 13	LT_SEL2 (1: Enabled					
		Bits 14 and 15	Reserved (0: Disable	ed).				
		Bits 16 to 19	SEL_MON1 (1: Enal	oled)				
	Bits 20 to 23 SEL_MON2 (1: Enabled)							
		Bits 24 to 27	SEL_MON3 (1: Enab	oled)				
		Bits 28 to 31	Reserved (0: Disable	ed).				

Continued from previous page.

Parameter	Size	Name	Setting Range	Setting Unit	Default	Applicable	When	us page Classi-
No.			gg-	[Resolution]	Setting	Motors	Enabled	fication
	4	SVCMD_STAT bit Enabled/Disabled (read only)	-	-	0FFF3F33 h	All	-	
		Bit 0	CMD_PAUSE_CMP	(1: Enabled)				
		Bit 1	CMD_CANCEL_CM	P (1: Enabled)				
		Bit 2 and 3	Reserved (0: Disable	ed).				
		Bits 4 and 5	ACCFIL (1: Enabled)					
		Bits 6 and 7	Reserved (0: Disable	ed).				
		Bit 8	CMP1 (1: Enabled	(k				
91		Bit 9	CMP2 (1: Enabled	(k				
PnB22		Bit 10	POS_RDY (1: Enable	ed)				
		Bit 11	PON (1: Enabled)					
		Bit 12	M_RDY (1: Enabled)					
		Bit 13	SV_ON (1: Enabled)					
		Bits 14 and 15	Reserved (0: Disable	ed).				
		Bits 16 to 19	SEL_MON1 (1: Enat	oled)				ters
		Bits 20 to 23	SEL_MON2 (1: Enat	oled)				me
		Bits 24 to 27	SEL_MON3 (1: Enat	oled)				ara
		Bits 28 to 31	Reserved (0: Disable	ed).				d þ
								elate
	4	I/O Bit Enabled/Dis- abled (Output) (read only)	-	-	037F01F0 h	All	_	Command-related parameters
				1		1	I	
		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)					
		Bit 7	N_CL (1: Enabled)					
92		Bit 8	G_SEL (1: Enabled)					
PnB24		Bits 9 to 11	G_SEL (0: Disabled)					
		Bits 12 to 15	Reserved (0: Disable	ed).				
		Bits 16 to 19	BANK_SEL (1: Enab	oled)				
		Bits 20 to 22	SO1 to SO3 (1: Ena	bled)				
		Bit 23	Reserved (0: Disable	ed).				
		Bit 24	FLC (1: Enabled)					
		Bit 25	SFECLR (1: Enabled	ł)				
	1	Bits 26 to 31	Reserved (0: Disable	n				

Continued from previous page.

Continued on next page.

Class ficatio	When Enabled	Applicable Motors	Default Setting	Setting Unit [Resolution]	Setting Range	Name	Size	Parameter No.
	-	All	FF0FFEFE h	-	-) Bit Enabled/Dis- led (Input) (read ly)	4	
				ed).	eserved (0: Disable			
					EC (1: Enabled)			
					OT (1: Enabled)			
					-OT (1: Enabled)			
					KT1 (1: Enabled)			
ers					KT2 (1: Enabled)			
net					KT3 (1: Enabled)			
araı				ad)	STP (1: Enabled) eserved (0: Disable	-		
d p				,	RK ON (1: Enable			93
late				J)	-SOT (1: Enabled)	-		PnB26
d-re					-SOT (1: Enabled)			
Jan					EN (1: Enabled)			
Command-related parameters					EAR (1: Enabled)			
ŏ					SET (1: Enabled)	-		
)	POINT (1: Enabled)			
				/	LIM (1: Enabled)			
					LIM (1: Enabled)			
	V CMP (1: Enabled)							
		Sit 19 ZSPD (1: Enabled)						
	Bits 20 to 23 Reserved (0: Disabled).							
	Bits 24 to 31 I0_STS1 to I0_STS8 (1: Enabled)							

*1. The parameter setting is enabled after SENS_ON command execution is completed.

*2. When using fully-closed loop control, set the reference units/s.

- *3. If you set the Speed Unit Selection (parameter 41: PnA82) to 0002h adjust the Speed Base Unit Selection (parameter 42: PnA84) to satisfy the following formula.
 Rotary Servomotor: 1.28 × Rated speed [min⁻¹] × 10^{PnA84} < Maximum speed [min⁻¹] Linear Servomotor: 1.28 × Rated speed [mm/s] × 10^{PnA84} < Maximum speed [mm/s]

*4. If you set the Speed Unit Selection (parameter 41: PnA82) to either 0002h or 0003h, set the Speed Base Unit Selection (parameter 42: PnA84) to a number between -3 and 0.

*5. If you set the Speed Unit Selection (parameter 41: PnA82) to 0004h, set the Speed Base Unit Selection (parameter 42: PnA84) to 0.

*6. If you set the Torque Unit Selection (parameter 47: PnA8E) to 0001h, adjust the Torque Base Unit Selection (parameter 48: PnA90) to satisfy the following formula. 128×10^{PnA90} < Maximum torque [%]

*7. If you set the Torque Unit Selection (parameter 47: PnA8E) to 0002h, set the Torque Base Unit Selection (parameter 48: PnA90) to 0.

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

Appendix

The appendix provides information on tables of corresponding SERVOPACK and SigmaWin+ function names.

9.1	Corresp	onding SERVOPACK and SigmaWin+ Function Names9-2
	9.1.1	Corresponding SERVOPACK Monitor Display Function Names

9.1.1 Corresponding SERVOPACK Monitor Display Function Names

9.1 Corresponding SERVOPACK and SigmaWin+ Function Names

This section gives the names and numbers of the monitor display functions used by the SERVOPACKs and the names used by the SigmaWin+.

9.1.1 Corresponding SERVOPACK Monitor Display Function Names

	SigmaWin+		SERVOPACK
Button in Menu Dialog Box	Name [Unit]	Un No.	Name [Unit]
	Motor Speed [min ⁻¹]	Un000	Motor Speed [min ⁻¹]
	Speed Reference [min ⁻¹]	Un001	Speed Reference [min ⁻¹]
	Torque Reference [%]	Un002	Torque Reference [%] (percentage of rated torque)
	Rotational Angle 1 [encoder pulses] (number of encoder pulses from encoder phase C)	Un003	Rotational Angle 1 [encoder pulses] (number of encoder pulses from encoder phase C displayed in decimal)
	Rotational Angle 2 [deg] (electrical angle from polarity origin)	Un004	Rotational Angle 2 [deg] (electrical angle from polarity origin)
	Input Reference Pulse Speed [min ⁻¹]	Un007	Input Reference Pulse Speed [min ⁻¹] (displayed only during position control)
Motion	Position Deviation [reference units]	Un008	Position Error Amount [reference units] (displayed only during position control)
Monitor	Accumulated Load Ratio [%]	Un009	Accumulated Load Ratio [%] (percentage of rated torque: effective torque in cycles of 10 seconds)
	Regenerative Load Ratio [%]	Un00A	Regenerative Load Ratio [%] (percentage of processable regenerative power: regenerative power consumption in cycles of 10 seconds)
	Dynamic Brake Resistor Power Con- sumption [%]	Un00B	Power Consumed by DB Resistance [%] (percentage of processable power at DB acti- vation: displayed in cycles of 10 seconds)
	Input Reference Pulse Counter [ref- erence units]	Un00C	Input Reference Pulse Counter [reference units]
	Feedback Pulse Counter [encoder pulses]	Un00D	Feedback Pulse Counter [encoder pulses]
Motion Monitor:	Fully-closed Loop Feedback Pulse Counter (value after electronic gear conversion (Pn24A and Pn24C) for external encoder conversion) [encoder pulses of motor-end encoder]	Un00E	Fully-closed Loop Feedback Pulse Counter (value after electronic gear conversion (Pn24A and Pn24C) for external encoder conversion) [encoder pulses of motor-end encoder]
SERVO-	Total Operation Time [100 ms]	Un012	Total Operation Time [100 ms]
PACK with Analog Voltage/	Feedback Pulse Counter [reference units]	Un013	Feedback Pulse Counter [reference units]
Pulse Train	Overheat Protection Input [0.01 V]	Un02F	Overheat Protection Input [0.01 V]
Refer-	Power Consumption [W]	Un032	Power Consumption [W]
ences	Consumed Power [0.001 Wh]	Un033	Consumed Power [0.001 Wh]
	Cumulative Power Consumption [Wh]	Un034	Cumulative Power Consumption [Wh]
	Absolute Encoder Multiturn Data	Un040	Absolute Encoder Multiturn Data

9.1.1 Corresponding SERVOPACK Monitor Display Function Names

Continued from previous page.

	SigmaWin+		SERVOPACK
Button in Menu Dialog Box	Name [Unit]	Un No.	Name [Unit]
Motion Monitor:	Position within One Rotation of Absolute Encoder [encoder pulses]	Un041	Position within One Rotation of Absolute Encoder [encoder pulses]
SERVO- PACK with Analog	Lower Bits of Absolute Encoder Position [encoder pulses]	Un042	Lower Bits of Absolute Encoder Position [encoder pulses]
Voltage/ Pulse Train Refer- ences	Upper Bits of Absolute Encoder Position [encoder pulses]	Un043	Upper Bits of Absolute Encoder Position [encoder pulses]
	Fully-closed Loop Feedback Pulse Counter [encoder pulses of motor- end encoder]	Un00E	Fully-closed Loop Feedback Pulse Counter [encoder pulses of motor-end encoder]
	Total Operation Time [100 ms]	Un012	Total Operation Time [100 ms]
	Feedback Pulse Counter [reference units]	Un013	Feedback Pulse Counter [reference units]
Mation	Overheat Protection Input [0.01 V]	Un02F	Overheat Protection Input [0.01 V]
Motion Moni- tor:SER-	Current Backlash Compensation Value [0.1 reference units]	Un030	Current Backlash Compensation Value [0.1 reference units]
VOPACK with	Backlash Compensation Value Set- ting Limit [0.1 reference units]	Un031	Backlash Compensation Value Setting Limit [0.1 reference units]
MECHATR OLINK-III	Power Consumption [W]	Un032	Power Consumption [W]
Communi-	Consumed Power [0.001 Wh]	Un033	Consumed Power [0.001 Wh]
cations Reference	Cumulative Power Consumption [Wh]	Un034	Cumulative Power Consumption [Wh]
	Absolute Encoder Multiturn Data	Un040	Absolute Encoder Multiturn Data
	Position within One Rotation of Absolute Encoder [encoder pulses]	Un041	Position within One Rotation of Absolute Encoder [encoder pulses]
	Lower Bits of Absolute Encoder Position [encoder pulses]	Un042	Lower Bits of Absolute Encoder Position [encoder pulses]
	Upper Bits of Absolute Encoder Position [encoder pulses]	Un043	Upper Bits of Absolute Encoder Position [encoder pulses]
Status	Active Gain Monitor	Un014	Effective Gain Monitor (gain settings 1 = 1, gain settings 2 = 2)
Status Monitor	Safety I/O Signal Monitor	Un015	Safety I/O Signal Monitor
	Semi-closed/Fully-closed Loop Con- trol Online Switching Monitor	Un08B	Semi-closed/Fully-closed Loop Control Online Switching Monitor
Input Sig- nal Moni- tor	Input Signal Monitor	Un005	Input Signal Monitor
Output Signal Monitor	Output Signal Monitor	Un006	Output Signal Monitor
	Installation Environment Monitor – SERVOPACK	Un025	SERVOPACK Installation Environment Monitor [%]
	Installation Environment Monitor – Servomotor*	Un026	Servomotor Installation Environment Monitor [%]
Service Life Moni-	Service Life Prediction Monitor – Built-in Fan	Un027	Built-in Fan Remaining Life Ratio [%]
tor	Service Life Prediction Monitor – Capacitor	Un028	Capacitor Remaining Life Ratio [%]
	Service Life Prediction Monitor – Surge Prevention Circuit	Un029	Surge Prevention Circuit Remaining Life Ratio [%]
	Service Life Prediction Monitor – Dynamic Brake Circuit	Un02A	Dynamic Brake Circuit Remaining Life Ratio [%]

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9.1 Corresponding SERVOPACK and SigmaWin+ Function Names

9.1.1 Corresponding SERVOPACK Monitor Display Function Names

Continued from previous page.

	SigmaWin+	SERVOPACK	
Button in Menu Dialog Box	Name [Unit]	Un No.	Name [Unit]
Product Informa- tion	Motor – Resolution	-	-
_	-	Un020	Rated Motor Speed [min ⁻¹]
	-	Un021	Maximum Motor Speed [min-1]

* This applies to the following motors. The display will show 0 for all other models. SGM7J, SGM7A, SGM7P, SGM7G, SGMMV, SGM7E, SGM7F, and SGMCV

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IRUMA BUSINESS CENTER (SOLUTION CENTER)

480, Kamifujisawa, Iruma, Saitama, 358-8555, Japan Phone: +81-4-2962-5151 Fax: +81-4-2962-6138 www.yaskawa.co.jp

YASKAWA AMERICA, INC.

2121, Norman Drive South, Waukegan, IL 60085, U.S.A. Phone: +1-800-YASKAWA (927-5292) or +1-847-887-7000 Fax: +1-847-887-7310 www.yaskawa.com

YASKAWA ELÉTRICO DO BRASIL LTDA. 777, Avenida Piraporinha, Diadema, São Paulo, 09950-000, Brasil Phone: +55-11-3585-1100 Fax: +55-11-3585-1187 www.vaskawa.com.br

YASKAWA EUROPE GmbH

Philipp-Reis-Str. 6, 65795 Hattersheim am Main, Germany Phone: +49-6196-569-300 Fax: +49-6196-569-398 www.yaskawa.eu.com E-mail: info@yaskawa.eu.com

YASKAWA ELECTRIC KOREA CORPORATION

6F, 112, LS-ro, Dongan-gu, Anyang-si, Gyeonggi-do, Korea Phone: +82-31-8015-4224 Fax: +82-31-8015-5034 www.yaskawa.co.kr

YASKAWA ASIA PACIFIC PTE. LTD. 30A, Kallang Place, #06-01, 339213, Singapore

Phone: +65-6282-3003 Fax: +65-6289-3003 www.yaskawa.com.sg

YASKAWA ELECTRIC (THAILAND) CO., LTD. 59, 1F-5F, Flourish Building, Soi Ratchadapisek 18, Ratchadapisek Road, Huaykwang, Bangkok, 10310, Thailand Phone: +66-2-017-0099 Fax: +66-2-017-0799 www.vaskawa.co.th

YASKAWA ELECTRIC (CHINA) CO., LTD.

22F, Link Square 1, No.222, Hubin Road, Shanghai, 200021, China Phone: +86-21-5385-2200 Fax: +86-21-5385-3299 www.yaskawa.com.cn

YASKAWA ELECTRIC (CHINA) CO., LTD. BEIJING OFFICE Room 1011, Tower W3 Oriental Plaza, No.1, East Chang An Avenue,

Dong Cheng District, Beijing, 100738, China Phone: +86-10-8518-4086 Fax: +86-10-8518-4082

YASKAWA ELECTRIC TAIWAN CORPORATION

12F, No. 207, Section 3, Beishin Road, Shindian District, New Taipei City 23143, Taiwan Phone: +886-2-8913-1333 Fax: +886-2-8913-1513 or +886-2-8913-1519 www.yaskawa.com.tw



VASKAWA ELECTRIC CORPORATION

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